Field oriented vector AC Drive for syncronous motors

Industrial application

ADV200

... Functions description and parameters list

GEFRAN

Information about this manual

This manual explains the functions and the description of the parameters.

The informations about mechanical installation, electrical connection and fast start-up can be found on the ADV200 Quick start guide.

The whole set of manuals (included the expansions and field bus manuals) can be found on the CD provided with the dirve.

Software version

This manual is updated according the software version V 7.X.11.

The identification number of the software version is indicated on the identification plate of the drive or can be checked with the Firmware ver.rel - PAR 490 parameter, menu 2.5.

General information

Note ! In industry, the terms “Inverter”, “Regulator” and “Drive” are sometimes interchanged. In this document, the term “Drive” will be used.

Before using the product, read the safety instruction section carefully. Keep the manual in a safe place and available to engineering and installation personnel during the product functioning period.

Gefran S.p.A has the right to modify products, data and dimensions without notice. The data can only be used for the product description and they can not be understood as legally stated properties.

Thank you for choosing this Gefran product.

We will be glad to receive any possible information which could help us improving this manual. The e-mail address is the following: techdoc@gefran.com.

All rights reserved

Symbols used in the manual

Warning

Indicates a procedure, condition, or statement that, if not strictly observed, could result in personal injury or death.

Indique le mode d’utilisation, la procédure et la condition d’exploitation. Si ces consignes ne sont passtrictement respectées, il y a des risques de blessures corporelles ou de mort.

Caution

Indicates a procedure, condition, or statement that, if not strictly observed, could result in damage to or destruction of equipment.

Indique et le mode d’utilisation, la procédure et la condition d’exploitation. Si ces consignes ne sont pas strictement respectées, il y a des risques de détérioration ou de destruction des appareils.

Indicates that the presence of electrostatic discharge could damage the appliance. When handling the boards, always wear a grounded bracelet.

Indique que la présence de décharges électrostatiques est susceptible d’endommager l’appareil. Toujours porter un bracelet de mise à la terre lors de la manipulation des cartes.

Important

Indicates a procedure, condition, or statement that should be strictly followed in order to optimize these applications.

Indique le mode d’utilisation, la procédure et la condition d’exploitation. Ces consignes doivent êtrerigoureusement respectées pour optimiser ces applications.

Note ! Indicates an essential or important procedure, condition, or statement.

Indique un mode d’utilisation, de procédure et de condition d’exploitation essentiels ou importants

Table of Contents

Information about this manual....2
Software version....2
General information....2
Symbols used in the manual....2
A – Programming....5
A.1 Menu display modes....5
A.2 Programming of “function block” analog and digital input signals....5
A.3 Variable interconnections mode....5
A.4 Multiple destination....7
B – Parameters and functions description (Expert list)....8
Legend....8
1 – MONITOR....9
2 – DRIVE INFO....14
3 – STARTUP WIZARD....18
4 – DRIVE CONFIG....19
5 – REFERENCES....24
6 – RAMPS....29
7 – MULTI REFERENCE....33
8 – MOTORPOTENTIOMETER....36
9 – JOG FUNCTION....42
10 – MONITOR FUNCTION....43
11 – COMMANDS....47
12 – DIGITAL INPUTS....57
13 – DIGITAL OUTPUTS....60
14 – ANALOG INPUTS....62
15 – ANALOG OUTPUTS....72
16 – MOTOR DATA....78
17 – ENCODER....81
17.1 - ENCODER/ENCODER CONFIG....82
17.2 - ENCODER/ENCODER 1....84
17.3 - ENCODER/ENCODER 2....88
17.4 - ENCODER/ENCODER 3....92
17.5 - ENCODER/RESOLVER....93
18 – SPEED REG GAINS....95
19 – REGULATOR PARAM....98
20 – TORQUE CONFIG....100
21 - SENSORLESS....104
22 – FUNCTIONS....107
22.1 – FUNCTIONS/SPEED RATIO....107
22.2 – FUNCTIONS/DROOP....108
22.3 – FUNCTIONS/INERTIA COMP....110
22.4 – FUNCTIONS/MOTOR OVERLOAD....111
22.5 – FUNCTIONS/BRES OVERLOAD....114
22.6 – FUNCTIONS/DOUBLE PAR SET....115
22.7 – FUNCTIONS/SPEED CAPTURE....116
22.8 – FUNCTIONS/POWER LOSS....117
22.9– FUNCTIONS/COMPARE....125
22.10 – FUNCTIONS/PADS....127
22.11 - FUNCTIONS/VDC CONTROL....128
22.12 - FUNCTIONS/BRAKE CONTROL....129
22.13 - FUNCTIONS/DIMENSION FACT....134
22.14 - FUNCTIONS/CONTROL MODE....136
22.15 - FUNCTIONS/TEMP CONTROL....138
22.16 - FUNCTIONS/LC CONTROL....139
22.17 - FUNCTIONS/TIMERS....143
22.18 - FUNCTIONS/TORQUE LIMADAPT....144
23 – COMMUNICATION....145
23.1 – COMMUNICATION/RS485....145
23.2 – COMMUNICATION/FIELDBUS CONFIG....146
23.3 – COMMUNICATION/FIELDBUS M->S....147
23.4 – COMMUNICATION/FIELDBUS S->M....152
23.5 – COMMUNICATION/WORD COMP....155
23.6 – COMMUNICATION/WORD DECOMP....156
23.7 - COMMUNICATION/EXTERNAL IO....156
23.8 - COMMUNICATION/FAST LINK....157
24 – ALARM CONFIG....161
25 – ALARM LOG....174
26 – APPLICATION....175
28 - RECIPE CONFIG....176

29 - RECIPE 176
PARAMETERS ON SELECTION LISTS, BUT NOT DISPLAYED ON KEYPAD 177
C – TROUBLESHOOTING - Alarms 186
C.1 Speed fbk loss alarm according to the type of feedback....191
C-2 “ExtIO fault” Alarm 197
C-3 “Fastlink” Alarm 198
D – MESSAGES 199
E - Block Diagrams 204
System Diagrams Index....204
Drive overview 204
References 205
Ramps 206
Multireference 207
Motorpotentiometer....208
Jog function 208
Monitor function 209
Commands 211
Digital inputs 213
Digital outputs 214
Analog inputs 215
Analog outputs 217
Encoder config 219
Speed reg gains....220
Torque config 221
Functions 222
F - Parameters List (Expert) 230
G – SELECTION LISTS....274
L_ANOUT 274
L_CMP....274
L_CTRLMODE 275
L_DIGSEL1 275
L_DIGSEL2 275
L_DIGSEL3 276
L_FBS2M....276
L_FLWORD 277
L_LIM....278
L_MLTREF 278
L_NLIM 278
L_PLIM 279
L_REF 279
L_RESFREEZE 279
L_SCOPE 279
L_TCREF....279
L_TEMPCTRL 280
L_VREF 280
L_WDECOMP 280
APPENDIX 1....282
APP. 1.1 - Use of analog and digital I/Os from the MDPLC programming environment....282
APP. 1.2 - CANopen protocol support 286
APP. 1.3 - SDO Configuration Table 287
APP. 1.4 - System variables for MDPLC....290

A.1 Menu display modes

The programming menu can be displayed in two modes, which can be selected using the **Access mode** parameter (04 - DRIVE CONFIG menu):

- **Easy** (default) only the main parameters are displayed.
- **Expert** all the parameters are displayed

A.2 Programming of “function block” analog and digital input signals

The signals, variables and parameters of each single “function block” of the drive are interconnected in order to achieve the configurations and controls inside the control system.

These can be managed and modified using the keypad, PC configurator or fieldbus programming.

The programming mode is based on the following logic:

Src (source; i.e.: **Ramp ref 1 src**, PAR: 610)

This term defines **the source of the function block input,** i.e. the signal to be processed in the function block.

The different configurations are defined in the relative ***selection lists***.

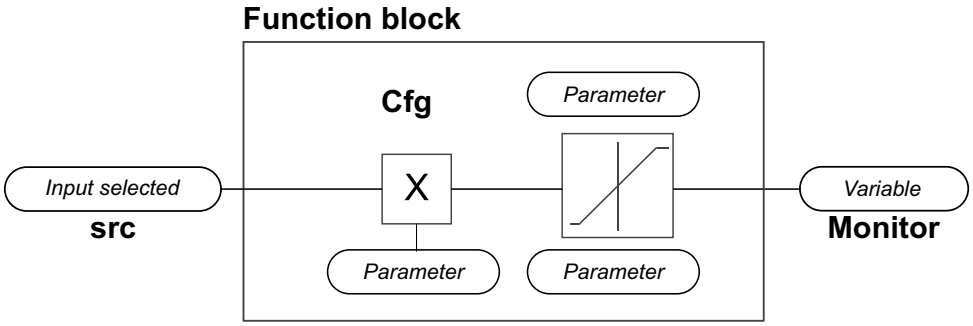
cfg (configuration; i.e.: **Mpot init cfg**, PAR: 880)

This term refers to ***the parameter setting and its effect on the function block.***

For example: Ramp times, internal reference adjustment, etc...

mon (display; i.e.: **Ramp ref 1 mon**, PAR: 620)

This term refers to the ***variable output from the function block, which is the result of the calculations performed on the actual block***.



A.3 Variable interconnections mode

The **source (src)** allows the desired control signal to be assigned to the function block input.

This operation is performed by using specific selection lists.

Possible control signal sources:

1 – Physical terminal

The analog and digital signals come from the terminal strip of the regulation card and/or from those of the expansion cards.

2 – Drive internal variables

Internal drive control system variables, from “function block” calculations, sent via keypad, PC configurator or fieldbus.

Practical example

The following examples illustrate the philosophies and methods with which more or less complex operations are performed in the single “function blocks”, the results of which represent the output of the block.

• Example: Changing the Speed Reference source

The main drive reference (in the default configuration) **Ramp ref 1 mon** (PAR: 620) is generated by the output of the function block “**Ramp setpoint Block**”.

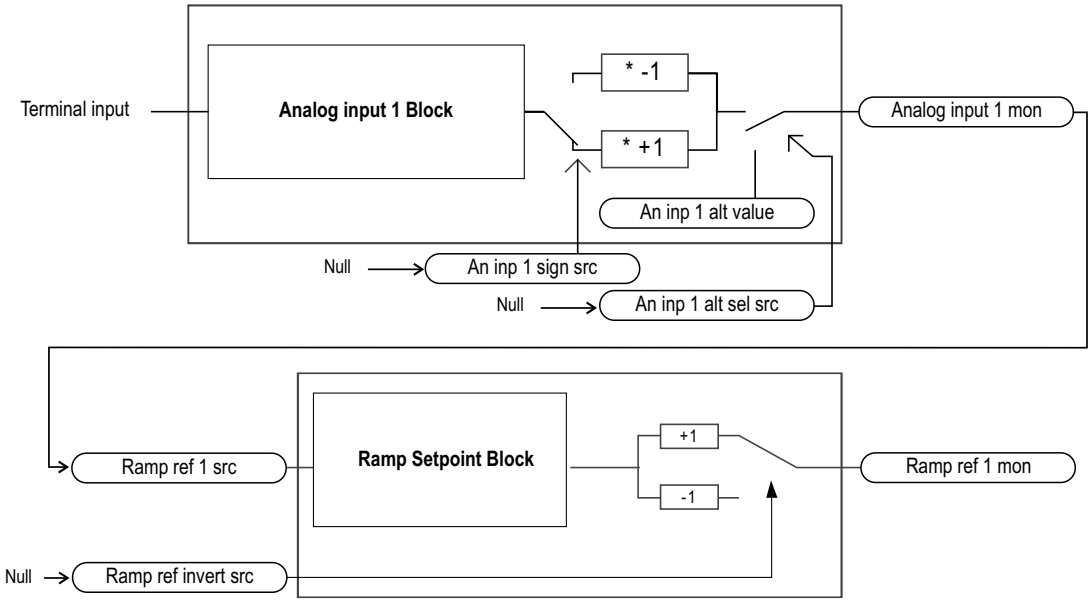
Its default source is the **Analog input 1 mon** signal (PAR: 1500), from the output of the function block “**Analog input 1 Block**”, which in this case refers to analog input 1 of the signal terminal strip.

To change the reference source from the analog input to a digital reference inside the drive, the input signal must be changed to “**Ramp setpoint Block**”.

Enter the **Ramp ref 1 src** parameter (PAR: 610) and set a new reference, selecting it from among those listed in the L_MLTREF selection list, for example **Dig ramp ref 1** (PAR: 600).

• Example: Inverting the analog reference signal

To invert the “**Analog input 1 Block**” output signal, the value of the **An inp 1 sign src** parameter (PAR: 1526), which has a default setting of **Null** (no operation), must be changed by selecting the source of the command signal from among those listed in the L_DIGSEL 2 selection list, for example **Digital input X mon**, **One** (function always enabled), etc.



The diagrams above illustrate the internal processing philosophy of the single “function blocks” and the result of these changes on the other interconnected “function blocks”.

Note ! This section contains a brief description of the functions of the other parameters in the function blocks not included for the changes in the example

The **An inp 1 alt sel src** parameter (PAR: 1528) can be used to select an alternative reference for the **Analog input 1 mon** (PAR: 1500) output.

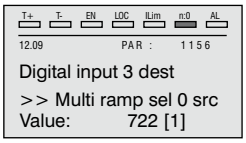
The **An inp 1 alt value** parameter (PAR: 1524) determines the alternative reference value for the **Analog input 1 mon** (PAR: 1500) output.

The **Ramp ref invert src** parameter (PAR: 616) can be used to select the source for the command to reverse the “**Ramp setpoint**” function block output.

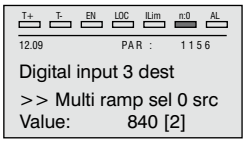
The output signal from the “**Ramp setpoint**” block is displayed in the **Ramp ref 1 mon** parameter (PAR: 620).

A.4 Multiple destination

Several functions can be assigned together to each input: to display which and how many functions have been assigned to each input, check the relative "**dest**" parameter to see whether there is a number shown in square brackets to the right of the number of the selected parameter (as shown in the figure below).



If there is a number, press the key to display the next source applied to the selected input.



B – Parameters and functions description (Expert list)

Legend

⓿ Menu	❶ PAR	❷ Description	❸ UM	❹ Type	❹ FB BIT	❺ Def	❻	❼ Min	❽ Max	❾ Acc	❿ Mod
1 - MONITOR						*(Level 1 menu)*					
1.1	**250**	**Output current**	A	FLOAT	16/32	0.0		0.0	0.0	R	FVS
1.2	**252**	**Output voltage**	V	FLOAT	16/32	0.0		0.0	0.0	R	FVS
22.1 - FUNCTIONS/SPEED RATIO						*(Level 2 menu)*					
22.1.1	**3000**	**Dig speed ratio**	perc	INT16	16/32	100		CALCI	CALCI	ERW	FVS
22.1.2	3002	Speed ratio src			LINK	16/32	3000	0	16384	ERW	FVS
					L_VREF	*(Selection List) [*]*					

⓿	Indexing of the menu and parameter
❶	Parameter identifier (IPA)
❷	Parameter description
❸	UM: unit of measure
❹	Type of parameter BIT Boolean, from modbus seen as 16 bits ENUM Selection list, from modbus seen as 16 bits FLOAT Real, from modbus seen as 32 bits FBM2SIPA 16-bit unsigned integer. Only PAR of existing parameters accepted. FBS2MIPA 16-bit unsigned integer. Only PAR of existing parameters accepted. INT16 Integer with sign 16 bits, from modbus seen as 16 bits INT32 Integer with sign 32 bits, from modbus seen as 32 bits ILINK Selection list, from modbus seen as 16 bits LINK Selection list, from modbus seen as 16 bits UINT16 Integer without sign 16 bits, from modbus seen as 16 bits UINT32 Integer without sign 32 bits, from modbus seen as 32 bits SINT Integer 8 bits
❺	Format of data exchanged on Fieldbus (16BIT, 32BIT)

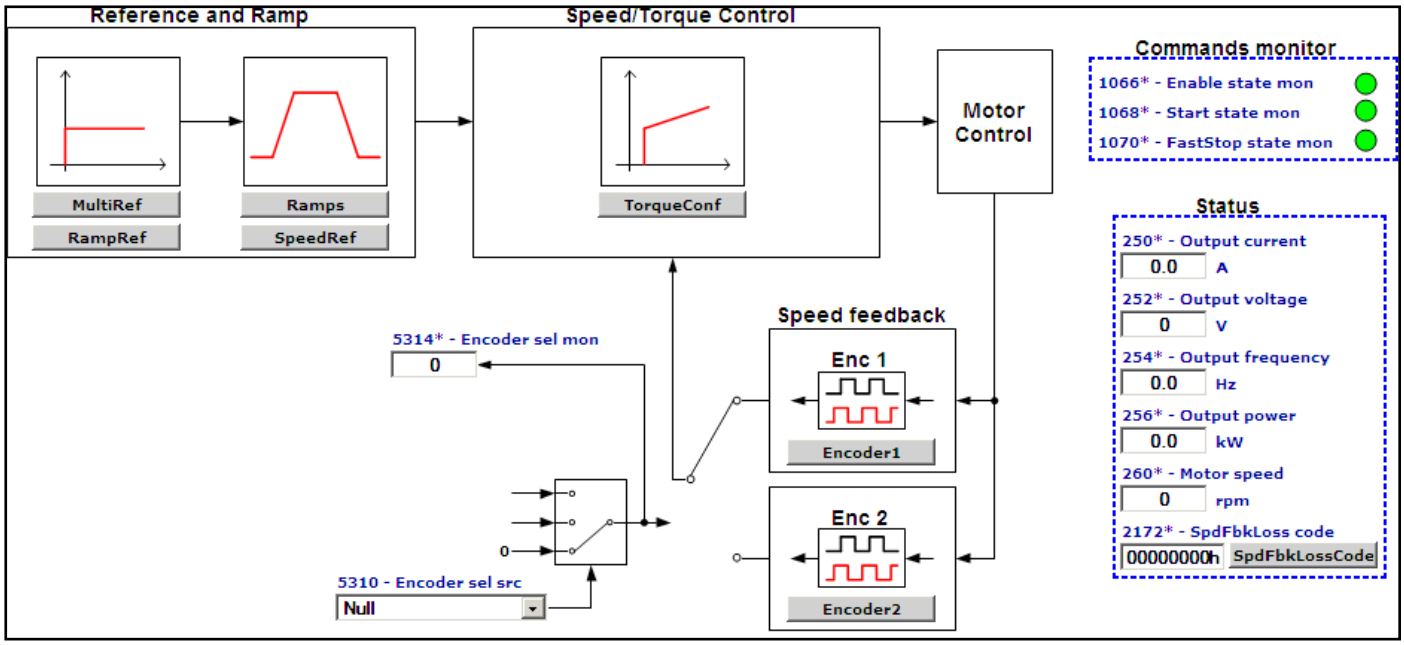
❻	Default value	CALCF Value calculated as a number with floating point CALCI Value calculated as a whole number (Max = 32768) SIZE Value depending on the size of the drive
❼	Minimum value	
❽	Maximum value	
❾	Accessibility : E Expert R Read S Size (set value depending on the size of the device) W Write Z parameters that can be modified ONLY with the drive disabled	
❿	Available in regulation mode: V = V/f Control S = Vect Flux OL F = Vect Flux CL	
[*]	**Selection lists:** The "... src" format parameters are linked to a selection list. The source of the signal that will control the parameter can be selected from the list indicated. The lists are indicated in paragraph C of this manual.	

Note ! The drive is factory-set to control Asynchronous motors. To switch to Synchronous mode, send the **Load synch control** command (In menu 4 DRIVE CONFIG, first set PAR 554 **Access mode** = Expert, then again in menu 4 - DRIVE CONFIG, run parameter 6100 **Load synch control**). The drive is re-started (in this mode, reference should be made to the "ADV 200 – Field-oriented vector inverter for synchronous motors – Description of functions and list of parameters" guide on the CD supplied with the inverter or downloadable from the www.gefran.com website).

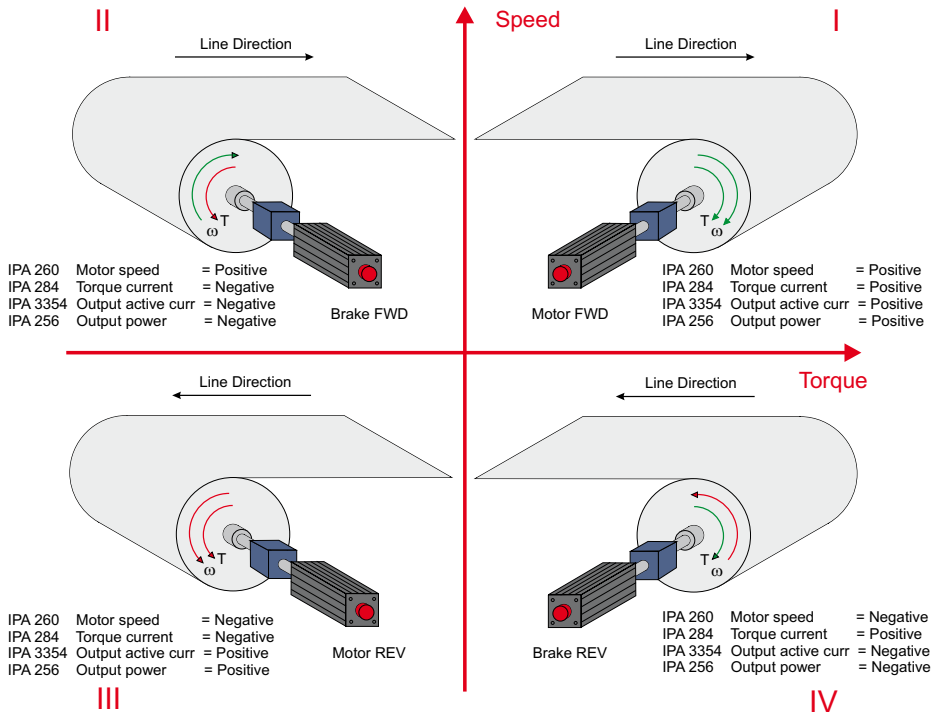
To return to Asynchronous motor control mode, send the **Load asynch control** command (PAR 6100). The drive is re-started to operate in the new mode.

1 – MONITOR

The monitor menu displays the measured values of the sizes and of the drive operating parameters.



Relationship between Speed-Torque-Power monitor parameters



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.1	**250**	**Output current**	A	FLOAT	16/32	0.0	0.0	0.0	R	FVS

The drive output current is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.2	**252**	**Output voltage**	V	FLOAT	16/32	0.0	0.0	0.0	R	FVS

The drive line voltage output is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.3	**254**	**Output frequency**	Hz	FLOAT	16/32	0	0	0	R	FVS

The drive output frequency is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.4	**256**	**Output power**	kW	FLOAT	16/32	0.0	0.0	0.0	R	FVS

Displays the drive output power.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.5	**628**	**Ramp setpoint**	FF	INT16	16/32	0	0	0	R	FVS

The ramp reference is displayed. This is the speed value the drive must reach at the end of the ramp.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.6	**664**	**Speed setpoint**	FF	INT16	16/32	0	0	0	R	FVS

The speed reference is displayed. This is the value measured at the output of the speed reference circuit.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.7	**260**	**Motor speed**	FF	INT16	16/32	0	0	0	R	FVS

The actual output speed of the motor is displayed (in FOC = speed measured by the encoder, in SLS/VF = speed estimated by the drive).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.8	**270**	**DC link voltage**	V	FLOAT	16/32	0.0	0.0	0.0	ER	FVS

The direct voltage of the intermediate circuit capacitors is displayed (DC-Bus).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.9	**272**	**Heatsink temperature**	degC	INT16	16	0	0	0	ER	FVS

The temperature measured is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.10	**290**	**Motor temperature**	degC	FLOAT	16BIT	0.0	0.0	0.0	ER	FVS

Displays motor temperature in °C based on type of sensor selected to manage the alarm.
Equals 0 when direct conversion from count/ohm to °C is not possible, for example with **PTC** sensors.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.11	**292**	**Sensor inp X mon**	**degC**	**FLOAT**	**16BIT**	**0.0**	**0.0**	**0.0**	**ER**	FVS

Display of temperature in degrees centigrade measured by KTY84 sensor connected to dedicated input of EXP-IO-SENS-100-ADV and EXP-IO-SENS-1000-ADV expansion cards.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.12	**1544**	**An inp 1 temp mon**	**degC**	**FLOAT**	**16BIT**	**0.0**	**0.0**	**0.0**	**ER**	FVS
1.13	**1594**	**An inp 2 temp mon**	**degC**	**FLOAT**	**16BIT**	**0.0**	**0.0**	**0.0**	**ER**	FVS

Display of temperature in degrees centigrade measured by KTY84 sensor connected to analog input 1 or 2 of control board.

These parameters are on the L_TEMPCTRL selection list and can be assigned as selection to source parameter 6040 **Liquid temp src**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.14	**1610**	**An inp 1X temp mon**	degC	FLOAT	16BIT	0.0	0.0	0.0	ER	FVS
1.15	**1660**	**An inp 2X temp mon**	degC	FLOAT	16BIT	0.0	0.0	0.0	ER	FVS

Displays temperature in °C with **PT100/PT1000/NI1000** from input 1 (PAR 1610) or input 2 (PAR 1660) of EXP-IO-SENS-100-ADV or EXP-IO-SENS-1000-ADV card, regardless of how the motor overtemperature alarm is managed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.16	**2342**	**Working load**	perc	FLOAT		0.0	0.0	0.0	ER	F_S

Normal motor torque scaled according to setting of parameter **Torque scale factor** IPA 2340. This value is expressed in %.

This parameter is obtained with the following formula:

Scaled torque % = **Torque %** (IPA 2394) * 100 / **Torque scale factor.**

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.17	**280**	**Torque current ref**	A	FLOAT	16/32	0.0	0.0	0.0	ER	F_S

The current reference used for torque control is displayed (in the sensorless vector and field-oriented vector modes).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.18	**282**	**Magnet current ref**	A	FLOAT	16/32	0.0	0.0	0.0	ER	F_S

The magnetizing current reference is displayed (in the sensorless vector and field-oriented vector modes).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.19	**284**	**Torque current**	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS

The actual torque current value is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.20	**286**	**Magnet current**	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS

The actual magnetizing current value is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.21	**3212**	**Motor overload accum**	perc	UINT16	16/32	0	0	100	ER	FVS

The motor overload level is displayed (100% = alarm threshold).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.22	**368**	**Drive overload accum**	perc	UINT16	16/32	0	0	100	ER	FVS

The drive overload level is displayed. An instantaneous overload of 200% of the drive rated current is allowed for 3 s. The thermal image I^2t adjusts the drive output current thresholds. During normal operation, the instantaneous output current value can reach 200% of the drive rated current. After 3 s at 200%, the output current threshold is reduced to 160%. When the overload level **par. 368 Drive overload accum** reaches 100%, the output current threshold is reduced to 100% of the rated current, and stays at that value until the I^2t integrator cycle is complete. At this point the 200% instantaneous overload is re-enabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.23	**3260**	**Bres overload accum**	perc	UINT16	16/32	0	0	100	ER	FVS

The braking resistor overload limit is displayed (100% = alarm threshold).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.24	**1066**	**Enable state mon**		BIT	16	0	0	1	R	FVS

The drive Enable command status is displayed. Voltage must be present on terminal 7. The FR Forwardstart command is needed to start the inverter.

0 Disabled drive disabled

1 Enabled drive enabled

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.25	**1068**	**Start state mon**		BIT	16	0	0	1	R	FVS

The drive **Start** command status is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.26	**1070**	**FastStop state mon**		BIT	16	0	0	1	R	FVS

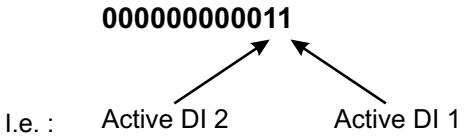
The drive **FastStop** command status is displayed.

Menu	PAR	Descripttion	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.27	**1100**	**Digital input mon**		UINT16	16	0	0	0	R	FVS

The status of the digital inputs on the drive is displayed. It can also be read via a serial line or fieldbus. The data are contained in a word, where each bit is 1 if voltage is supplied to the corresponding input terminal.

1 Input enabled.

0 Input disabled.

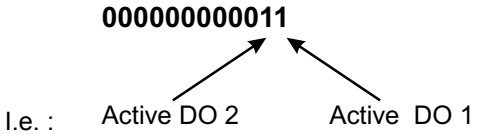


Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.28	**1300**	**Digital output mon**		UINT16		0	0	0	R	FVS

The status of the digital outputs on the drive is displayed. It can also be read via a serial line or fieldbus. The data are contained in a word, where each bit is 1 if voltage is supplied to the corresponding input terminal.

1 Output enabled.

0 Output disabled.

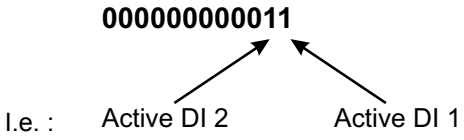


Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.29	**1200**	**Digital input X mon**		UINT16	16	0	0	0	R	FVS

The status of the digital inputs of the expansion card is displayed. It can also be read via a serial line or fieldbus. The data are contained in a word, where each bit is 1 if voltage is supplied to the corresponding input terminal. This parameter displays the state of the 16 external inputs. The 14 less significant bits are displayed from the keypad.

1 Input enabled.

0 Input disabled.

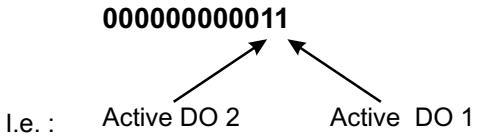


Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.30	**1400**	**Digital output X mon**		UINT16		0	0	0	R	FVS

The status of the digital outputs of the expansion card is displayed. It can also be read via a serial line or fieldbus. The data are contained in a word, where each bit is 1 if voltage is supplied to the corresponding input terminal.

1 Output enabled.

0 Output disabled.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.31	**5400**	**Dig inp 0Ext mon**		UINT16	32	0	0	4294967295	ER	FVS

This parameter displays the state of external inputs from 0 to 31 through the use of EXP-FL-XCAN-ADV optional card.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.32	**5402**	**Dig inp 1Ext mon**		UINT16		0	0	4294967295	ER	FVS

This parameter displays the state of external inputs from 32 to 63 through the use of EXP-FL-XCAN-ADV optional card.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.33	**5450**	**Digital out 0Ext mon**		UINT16		0	0	0	R	FVS

This parameter is used to read the state of external outputs from 0 to 31 through the use of EXP-FL-XCAN-ADV optional card.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.34	**5452**	**Digital out 1Ext mon**		UINT16		0	0	0	R	FVS

This parameter is used to read the state of external outputs from 32 to 63 through the use of EXP-FL-XCAN-ADV optional card.

2 – DRIVE INFO

This menu displays the information for identifying and configuring the drive.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.1	**480**	**Control type**		ENUM		Synchronous	0	0	R	FVS

The type of motor control mode is displayed.

1 Synchronous

2 Asynchronous

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.2	**482**	**Drive size**		UINT16		No Power	0	0	R	FVS

The drive size identification code is displayed.

Size code	Size text	Family code	Family text
1	0.75/1.5 kW	1	380V..480V
2	1.5/2.2 kW	1	380V..480V
3	2.2/3.0 kW	1	380V..480V
4	3.0/4.0 kW	1	380V..480V
5	4.0/5.5 kW	1	380V..480V
6	5.5/7.5 kW	1	380V..480V
7	7.5/11.0 kW	1	380V..480V
8	11.0/15.0 kW	1	380V..480V
9	15.0/18.5 kW	1	380V..480V
10	18.5/22.0 kW	1	380V..480V
11	22.0/30.0 kW	1	380V..480V
12	30.0/37.0 kW	1	380V..480V
12	30.0/37.0 kW	1	380V..480V
13	37.0/45.0 kW	1	380V..480V
13	37.0/45.0 kW	1	380V..480V
14	45.0/55.0 kW	1	380V..480V
14	45.0/55.0 kW	1	380V..480V
15	55.0/75.0 kW	1	380V..480V
15	55.0/75.0 kW	1	380V..480V
16	75.0/90.0 kW	1	380V..480V
16	75.0/90.0 kW	1	380V..480V
17	90.0/110.0 kW	1	380V..480V
17	90.0/110.0 kW	1	380V..480V
18	110.0/132.0 kW	1	380V..480V
18	110.0/132.0 kW	1	380V..480V
19	132.0/160.0 kW	1	380V..480V
19	132.0/160.0 kW	1	380V..480V
20	160.0/200.0 kW	1	380V..480V
20	160.0/200.0 kW	1	380V..480V
21	200.0/250.0 kW	1	380V..480V
21	200.0/250.0 kW	1	380V..480V
22	250.0/315.0 kW	1	380V..480V
22	250.0/315.0 kW	1	380V..480V
23	315.0/355.0 kW	1	380V..480V
23	315.0/355.0 kW	1	380V..480V
24	355.0/400.0 kW	1	380V..480V
25	400.0/500.0 kW	1	380V..480V
26	500.0/630.0 kW	1	380V..480V
27	630.0/710.0 kW	1	380V..480V
28	710.0/800.0 kW	1	380V..480V
29	0.9/1.0 MW	1	380V..480V
30	1.0/1.2 MW	1	380V..480V
1	75.0/90.0 kW	3	690V

2	90.0/110.0 kW	3	690V
3	110.0/132.0 kW	3	690V
4	132.0/160.0 kW	3	690V
5	160.0 kW	3	690V
6	200.0 kW	3	690V
7	250.0 kW	3	690V
8	315.0 kW	3	690V
9	355.0 kW	3	690V
10	400.0 kW	3	690V
11	500.0 kW	3	690V
12	630.0 kW	3	690V
13	710.0 kW	3	690V
14	800.0 kW	3	690V
15	1000.0 kW	3	690V
16	1200.0 kW	3	690V
17	160.0/200.0 kW	3	690V
18	200.0/250.0 kW	3	690V
19	250.0/315.0 kW	3	690V
20	315.0/355.0 kW	3	690V
21	355.0/400.0 kW	3	690V
22	400.0/500.0 kW	3	690V
23	500.0/630.0 kW	3	690V
24	630.0/710.0 kW	3	690V
25	710.0/800.0 kW	3	690V
26	0.9/1.0 MW	3	690V
27	1.0/1.2 MW	3	690V
28	1.35/1.5 MW	3	690V
29	1.65/1.8 MW	3	690V

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.3	**484**	**Drive family**		ENUM		No Power	0	0	RS	FVS

The available mains voltage is displayed (e.g. 380V...480V for mains 400V). The undervoltage alarm refers to this voltage value.

The condition **No power** occurs when the regulation board does not recognize the power board because not set up properly. The configuration adjustment of a new regulation board is achieved by linking it to a power board and running a **Save parameters**.

0 No Power
1 380V…480V
2 500V…575V
3 690V
4 230V
5 380V..480V LC (ADV200-LC)

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.4	**486**	**Drive region**		ENUM		EU	0	1	R	FVS

The geographical area (Europe or USA) is displayed. The factory settings for the power supply voltage and frequency used by the drive are defined accordingly.

	ADV200-4	ADV200-6
0	EU (400V / 50Hz)	EU (690V / 50Hz)
1	USA (460V / 60Hz)	USA (690V or 575V / 60Hz)

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.5	**488**	**Drive cont current**	A	FLOAT		CALCF	0.0	0.0	RZS	FVS

The current that the drive can deliver continuously according to size, supply voltage and programmed switching frequency is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.6	**490**	**Firmware ver.rel**		UINT16		0	0	0	R	FVS

The version and release number of the firmware used in the drive are displayed. On the keypad they are displayed in the format version.release. When the parameter is read via serial line or fieldbus the version is returned in the high byte and the release in the low byte.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.7	**496**	**Firmware type**		UINT16		0	0	0	R	FVS

The type of firmware installed in the drive is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.8	**504**	**Application ver.rel**		UINT16		0	0	0	ER	FVS

The version and release number of the MDPlc application used in the drive are displayed. On the keypad these are displayed in version.release format. When the parameter is read via serial line or fieldbus the version is returned in the high byte and the release in the low byte.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.9	**506**	**Application type**		UINT16		0	0	0	ER	FVS

The type of application currently used by the drive is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.10	**508**	**Application subver**		UINT16		0	0	0	ER	

The Revision Index of the application currently used by the drive is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.11	**510**	**Time drive power on**	h.min	UINT32		0	0.0	0.0	ER	FVS

The total time for which the drive has been powered is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.12	**512**	**Time drive enable**	h.min	UINT32		0	0.0	0.0	ER	FVS

The time for which the enable hardware contact on the drive has been connected is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.13	**514**	**Number power up**		UINT16		0	0	0	ER	FVS

The number of times the drive has been powered on is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.14	**516**	**Time fan on**	h.min	UINT32		0	0	0	ER	FVS

The total operating time of the drive fan is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.15	**526**	**Power file ver.rel**		UINT16		0	0	0	ER	FVS

The version number and release number of the drive power card are displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.16	**530**	**Slot 1 card type**		ENUM		None	0	0	R	FVS
2.16	**532**	**Slot 2 card type**		ENUM		None	0	0	R	FVS
2.18	**534**	**Slot 3 card type**		ENUM		None	0	0	R	FVS

The type of expansion card installed in the relative slot of the drive is displayed.

0 None

1	I/O 0	
769	I/O 1	(EXP-IO-D6A4R1-ADV)
1793	I/O 2	
2305	I/O 3	
3329	I/O 4	
1544	Enc 1	(EXP-DE-I1R1F2-ADV)
1800	Enc 2	(EXP-SE-I1R1F2-ADV)
520	Enc 3	(EXP-SESC-I1R1F2-ADV)
776	Enc 4	(EXP-EN/SSI-I1R1F2-ADV)
1032	Enc 5	(EXP-HIP-I1R1F2-ADV)
2056	Enc 7	(EXP-DE-I2R1F2-ADV)
4	Can/Dnet	(EXP-CAN-ADV)
260	Profibus	(EXP-PDP-ADV)
516	RTE	(EXP-ETH-...)
576	FastLink	
320	I/O Ext	
832	I/O FastLink	(EXP-FL-XCAN-ADV)
255	Unknown	
2312	Enc 8	(EXP-ASC-I1-ADV)
1288	Enc 6	(EXP-RES-I1R1-ADV)
5633	I/O 6	(EXP-IO-SENS-1000-ADV)
6401	I/O 7	(EXP-IO-D5R8-ADV)
7681	I/O 8	(EXP-IO-SENS-100-ADV)

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.19	**546**	**Fw enc sl2 ver.rel**		UINT16		0	0	0	R	FVS

The version and release number of the firmware installed on the encoder (mounted in slot 2) used in the drive are displayed. When the parameter is read via serial line or fieldbus the version is returned in the high byte and the release in the low byte.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.20	**548**	**Fw enc sl2 type**		UINT16		0	0	0	R	FVS

The version of firmware on the encoder card mounted in slot 2 is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.21	**5300**	**Fw enc sl1-3 ver.rel**		UINT16		0	0	0	R	FVS

The version and release number of the firmware on the encoder card (mounted in slot 1 or 3) used in the drive are displayed. When the parameter is read via serial line or fieldbus the version is returned in the high byte and the release in the low byte.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.22	**5302**	**Fw enc sl1-3 type**		UINT16		0	0	0	R	FVS

The version of firmware on the encoder card mounted in slot 1 or 3 is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.23	**5724**	**Fw FastLink ver.rel**		UINT16		0	0	0	ER	FVS

The version and release number of the FastLink card firmware installed in the driveare displayed.

When the parameter is read via serial line or fieldbus the version is returned in the high byte and the release in the low byte.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.24	**5726**	**Fw FastLink type**		UINT16		0	0	0	ER	FVS

The type of FastLink card firmware installed in the drive is displayed.

3 – STARTUP WIZARD

The startup wizard menu suggests a procedure for commissioning the drive quickly with a reduced number of settings. Advanced customization requires the use of the single parameters relating to the specific performance levels. See the procedure described in the chapter 7.1 **Startup wizard** on ADV200 QS manual

4 – DRIVE CONFIG

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.1	**550**	**Save parameters**		BIT		0	0	1	RW	FVS

Any changes to parameter values immediately affect drive operations, but are not automatically saved in the permanent memory.

The “Save Parameters” command is used to save current parameter values in the permanent memory.

Any changes that are not saved will be lost when the drive is switched off.

To save parameters follow the procedure described in **STEP 6** of the **Startup wizard**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.2	**552**	**Regulation mode**		ENUM		Flux vector CL	1	3	RWZ	FVS

The ADV200 is capable of operating with different control modes:

1 Flux vector OL
2 Flux vector CL
3 Autotune

With the **sensorless vector control (Flux vector OL)** mode, fine precision can be achieved at low motor rpm. The drive has a algorithm that uses a self-tuning procedure to obtain all the electric measurements of the motor. This allows the speed and position of the motor shaft to be estimated, enabling operation similar to that of a drive with feedback, both in terms of the response in torque to load variations, and of the regularity of rotation even at low rmp.

In the **field oriented vector mode (Flux vector CL)** an encoder is required for closed loop feedback. With this mode it is possible to achieve extremely high dynamic responses thanks to the regulation bandwidth, maximum torque even with the rotor blocked, speed and torque control. Numerous regulation parameters can be used to adjust the drive to each specific application, for instance adaptive gains, system inertia compensation, etc..

Autotune mode enables self-tuning of motor parameters when the **STARTUP WIZARD** is not used. This command can only be executed after enabling the drive by opening the hardware contact between terminals 7 and S3. Then set the **Regulation mode** parameter to **Autotune**. Next, if the drive is not already in Local mode, press the **Local** key (the LOC LED will light up) and re-close the hardware enabling contact (terminals 7 and S3). Self-tuning can now be enabled (see parameters 2022 or 2224). When self-tuning is complete, open the hardware contact between terminals 7 and S3 and restore any parameters that have been changed.

This procedure must be used for both self-tuning with the engine standing still and with the motor turning with **Flux vector CL** mode**.** Motor parameter self-tuning is possible with **Flux vector OL** mode.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.3	**554**	**Access mode**		ENUM		Easy	0	1	RW	FVS

With this parameter you can restrict access to advanced configuration.

0 Easy
1 Expert

The **Easy** mode gives access to a list of parameters that can be used for rapid drive commissioning. This type of configuration is suitable for the majority of applications.

Setting the parameter to **Expert** gives access to all the parameters in the firmware. This mode allows an extremely high level of customization to be achieved in order to exploit the potential of the ADV200 to the full.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.4	**558**	**Application select**		ENUM		None	0	2	ERWZ	FVS

Selection of which IEC 61131-3-compliant MDPlc application.

0 None
1 Application 1
2 Application 2

The drive is supplied already incorporating a number of applications developed in the IEC 61331-3 environment. To use these, set the desired application, run save parameter, switch the drive off and then on again.

NOTE! The **Load Default** command (par. 580) does not modify this parameter

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.5	**560**	**Mains voltage**		ENUM		400 V	SIZE	SIZE	ERWZS	FVS

Setting of the available mains voltage value in Volts. Detection of the undervoltage alarm refers to this value.
For Drive Size 7 and parallel units, “S1” Switch mounted on R-PSM board define the **Undervoltage** threshold level. It must be set as the configuration in PAR 560.

0 None
1 230 V
2 380 V
3 400 V
4 415 V
5 440 V
6 460 V
7 480 V
8 500 V
9 575 V
10 690 V

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.6	**586**	**DC supply**		ENUM		None	0	3	ERWZS	FVS

Selection of the voltage applied to the DC link if the drive is powered by an AC/DC power supply unit, whether standard or regenerative (e.g. AFE200). If a value of other than “**None**” is selected, all parameters that depend on **Mains voltage** (PAR 560) are calculated on the basis of the voltage shown in the table below, while the value of PAR 560 **Mains voltage** is set automatically.

If “None” is selected, these parameters are calculated according to the value of parameter 560 **Mains voltage**.

	DC power supply	**Drive family 380V..480V Mains voltage**	**Drive family 690V Mains voltage**
0	None	Use P560	Use P560
1	540 V (380-480V)	400 V	N/A
2	650 V (380-480V)	460 V	N/A
3	750 V (380-480V)	460 V	N/A
10	675 V (690V)	N/A	500 V (if compatible with the size, otherwise N/A)
11	810 V (690V)	N/A	575 V (if compatible with the size, otherwise N/A)
12	935 V (690V)	N/A	690 V
13	1120 V (690V)	N/A	690 V

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.7	**450**	**Undervoltage**	V	FLOAT		CALCF	CALCF	CALCF	ERWZS	FVS

Setting of the drive minimum operating voltage. The maximum and minimum default values are calculated automatically by the drive according to the value set in parameter 560 **Mains voltage**, as shown in the table below.

Table of undervoltage limits

	Mains voltage	**Def**	**Min**	**Max**
0	None	(Vdc)	(Vdc)	(Vdc)
1	230 V	225	200	282
2	380 V	372	330	466
3	400 V	392	330	490
4	415 V	407	360	509
5	440 V	431	382	539
6	460 V	451	400	564
7	480 V	470	417	588
8	500 V	490	434	613
9	575 V	563	500	705
10	690 V	676	600	846

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.8	**562**	**Switching frequency**		ENUM		SIZE	SIZE	SIZE	ERWS	FVS

Setting of the switching frequency value in kHz. The maximum value that can be set depends on the size of the drive.

0 1 kHz
1 2 kHz
2 4 kHz
3 6 kHz
4 8 kHz
5 10 kHz
6 12 kHz
7 16 kHz

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.9	**564**	**Ambient temperature**		ENUM		40 degC	0	1	ERWZ	FVS

Setting of the ambient temperature value. This parameter is used to set the output current derating factor (1% for every °C above 40°C).

0 40 degC The inverter is capable of delivering direct current continuously with ambient temperatures of up to 40°C.
1 50 degC The inverter is capable of delivering direct current continuously with ambient temperatures of up to 50°C.

If the value is set to 1 the drive output current will be 10% less than the rated current at 40°C.

Installation altitude above sea level	**Output Current derating factor at Ambient Temperature of:**						
	20°C	25°C	30°C	35°C	40°C	45°C	50°C
0 … 1000 m	100%					85%	90%

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.10	**566**	**Drive overload mode**		ENUM		Heavy duty	1	2	ERWZ	FVS

Setting of the current overload that can be supplied by the drive, depending on the application.

1 Heavy duty
2 Light duty

Set **Heavy duty** when a large overload is requested:

- (synchronous motor control) the drive can supply 200% of the rated current for 3 seconds and 160% for 1 minute every 5 minutes,
- (asynchronous motor control) the drive can supply 180% of the rated current for 0,5 seconds and 150% for 1 minute every 5 minutes.

Select **Light duty** to enable the drive to deliver a current of 110% of the rated current for 1 minute every 5 minutes.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.11	**568**	**Switching freq mode**		ENUM		(*)	0	1	ERWZS	FVS

(PAR 480 **Control type** = [2] Synchronous): (*): ADV200-4 = [0] Variable, ADV200-6 = [1] Costant.

Setting of the switching frequency operating mode.

The factory switching frequency setting is 4 kHz for motors between 2.2 kW and 37 kW (the factory switching frequency setting for smaller drives is 8kHz); this value may result in increased noise. Setting a higher switching frequency will increase drive losses and thus increase the heatsink temperature, but it will also reduce noise. To combine the advantages of both settings, with the ADV drive the heatsink temperature can be controlled by reducing the switching frequency if it increases.

0 Costant
1 Variable

If set to **Constant**, the switching frequency is fixed and set with the **Switching freq mode** parameter according to the size of the drive. If the selected switching frequency is higher than the default value, the drive output current is derated.

If set to **Variable**, the switching frequency is set to 8 kHz (for sizes between 2.2 kW and 37 kW / lower values

are defined for more powerful drives) and the drive heat sink temperature and output frequency values are also controlled. If the heat sink temperature exceeds a given threshold (which depends on the size of the drive) or the output frequency falls to less than 5 Hz, the switching frequency is automatically reduced to 4 kHz (again considering sizes of between 2.2 kW and 37 kW), to avoid any derating of the output current value. (When the output frequency exceeds 7 Hz the switching frequency is brought back to 8 kHz). The switching frequency is reduced in a single step. **With this setting the switching frequency value selected in the Switching frequency parameter is ineffective**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.12	**454**	**Chopper ON**	V	FLOAT		CALCF	CALCF	CALCF	ERWZS	FVS

Corresponding to the threshold of activation of the braking resistor. It is so possible to increase this value just below the **Overvoltage** threshold level (ADV200 -4: 820 Vdc, ADV200 -6: 1192 Vdc).

Parameter's range are defined thru IPA 560 **Mains voltage** setting

Note! If **Mains voltage** is set at the maximum possible value, the activation threshold of the braking resistor can only assume the max value and can not be changed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.13	**570**	**Password**		UINT32		0	0	99999	ERW	FVS

You can enter a **password** to protect the parameters from unauthorized tampering: the password can consist of a combination of a maximum of any 5 figures that can be selected by the user. All parameters are locked, except this one and **Save parameters**.

After entering the password, press the E key once to enter it into the memory and again to enable it (= Enabled is displayed to indicate that the password is enabled).

So that the password remains valid even after switching the unit off and then switching it back on, save it using the **Save parameters** command.

When the password is enabled any attempts to modify a parameter are blocked and the **Password enabled** message is displayed.

To disable the password, enter the **Password** parameter (**572**) in the **DRIVE CONFIG menu**.

Check that the password is enabled (**Enabled**), press **E** and enter the combination of figures that make up the password.

Press E again. A message is displayed telling you the password is no longer enabled (**Disabled**).

To make sure the password continues to be disabled even after switching the unit off and then switching it back on, save this configuration using the **Save parameters** command.

When an incorrect password is entered, the Password wrong message is displayed

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.14	**572**	**Application key**		UINT32	0	0	4294967295	ERW	FVS	

This parameter can be used to enter the key for enabling the MDPlc application.

You may need to enter a key to definitively enable some applications. Please contact Gefran for details about which applications require the key.

If executing an application that envisages a key verification and the key is incorrect, enabling is forced for 200 hours (time drive enabled).

In this phase a message is displayed informing you that the period of forced enabling time is about to expire.

At the first power-on after the 200 hours an alarm is generated and the application does not start.

Please contact Gefran for the numerical value of the key.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.15	**574**	**Startup display**		INT16		-1	-1	20000	ERW	FVS

This is used to set the parameter that will be displayed automatically at drive power-on.

-1 Entering the value -1 (default), the function is disabled and the main menu is displayed at power-on.

0 Displays "DISP" menu parameters (monitor of inverter output variables: voltage, current, frequency, speed, etc.). This menu can also be displayed by pressing the DISP key on the keypad.

1 Displays RECIPE menu parameters.

X Any existing PAR (IPA).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.16	**576**	**Display backlight**		BIT		0	0	1	ERW	FVS

Enabling of the backlight on the drive display.

If set to **0** the display backlight will go off when the drive has been on for three minutes.

If set to **1** the backlight will stay on for as long as the drive is powered.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.17	**578**	**Language select**		ENUM		English	0	9	RWZ	FVS

Setting of the drive programming language.

0 English
1 Italian
2 French
3 German
4 Spanish
5 Polish
6 Romanian
7 Russian
8 Turkish
9 Portuguese

Note ! The **Load Default** command (par. 580) does not modify this parameter.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.18	**580**	**Load default**		BIT		0	0	1	RWZ	FVS

Transfers the standard factory settings to the drive memory (“Def” column in the parameters table).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.19	**590**	**Save par to keypad**		BIT		0	0	1	RW	FVS

Transfers the parameters currently stored in the drive and saves them in the keypad memory (See ADV200 Quick Start manual, chapter 6.8).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.20	**592**	**Load par from keypad**		BIT		0	0	1	RWZ	FVS

Transfers the parameters from the keypad memory to the drive (See ADV200 Quick Start manual, chapter 6.9).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.21	**594**	**Keypad memory select**		UINT16		1	1	5	ERW	FVS

Selection of the area of the keypad memory to which to transfer and save the parameters stored in the drive.

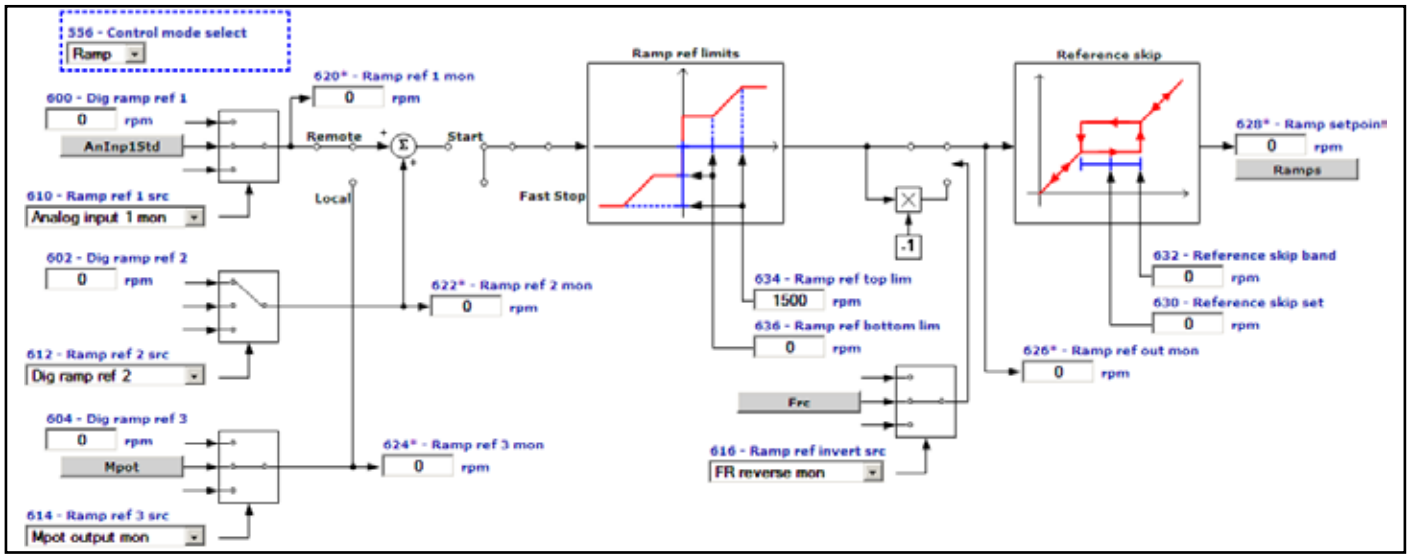
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.22	**6100**	**Load asynch control**		BIT		0	0	1	ERW	F_S

This command is sent to switch to Asynchronous motor control mode. A message prompting you to confirm the command is displayed on the keypad, as the drive must be re-started to enable the new mode.

5 – REFERENCES

ADV drives are provided with a speed regulation circuit, which can be adapted to suit the various applications. In the standard version, the regulator has PI behaviour and the regulator parameters are the same for the entire field of regulation.

Different sources can be used for the speed and torque references, depending on how the **554 Control mode select** parameter is set.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.1	**600**	**Dig ramp ref 1**	FF	INT16	16/32	0	CALCI	CALCI	RW	FVS

Setting of the digital ramp reference. The speed that the drive must reach after completing the acceleration phase is set with the ramp reference. Variations in the ramp reference are made with the selected ramp times. The size of the ramp reference determines the motor speed value. The sign determines the direction of rotation. The **Ramp ref** parameter also refers to a minimum speed, if set. When the "**Motor potentiometer**" or "**Multispeed**" functions are selected the relative references are used. This reference can only be used in the **Remote** mode.

The overall ramp reference is the result of the sum of the values with the **Ramp ref 1** and **Ramp ref 2** sign.

Example 1: **Ramp ref 1** = + 500 rpm **Ramp ref 2** = + 300 rpm
Ramp ref = 500 rpm + 300 rpm = 800 rpm

Example 2: **Ramp ref 1** = + 400 rpm **Ramp ref 2** = - 600 rpm
Ramp ref = 400 rpm – 600 rpm = - 200 rpm

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.2	**602**	**Dig ramp ref 2**	FF	INT16	16/32	0	CALCI	CALCI	ERW	FVS

Setting of the digital ramp reference. The speed that the drive must reach after completing the acceleration phase is set with the ramp reference. Variations in the ramp reference are made with the selected ramp times. The size of the ramp reference determines the motor speed value. The sign determines the direction of rotation. The **Ramp ref** parameter also refers to a minimum speed, if set. When the "**Motor potentiometer**" or "**Multispeed**" functions are selected the relative references are used.

In **Remote** mode the overall ramp reference is the result of the sum of the values with the Ramp ref 1 and Ramp ref 2 sign.

Example 1: **Ramp ref 1** = + 500 rpm **Ramp ref 2** = + 300 rpm
Ramp ref = 500 rpm + 300 rpm = 800 rpm

Example 2: **Ramp ref 1** = + 400 rpm **Ramp ref 2** = - 600 rpm
Ramp ref = 400 rpm – 600 rpm = - 200 rpm

In **Local** mode the overall ramp reference is the result of the sum of the values with the **Ramp ref 3** and **Ramp ref 2** sign.

Example 1: **Ramp ref 3** = + 500 rpm **Ramp ref 2** = + 300 rpm
Ramp ref = 500 rpm + 300 rpm = 800 rpm

Example 2: **Ramp ref 3** = + 400 rpm **Ramp ref 2** = - 600 rpm
Ramp ref = 400 rpm – 600 rpm = - 200 rpm

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.3	**604**	**Dig ramp ref 3**	FF	INT16	16/32	0	CALCI	CALCI	ERW	FVS

Setting of the digital ramp reference. The speed that the drive must reach after completing the acceleration phase is set with the ramp reference. Variations in the ramp reference are made with the selected ramp times. The size of the ramp reference determines the motor speed value. The sign determines the direction of rotation. The **Ramp ref** parameter also refers to a minimum speed, if set. When the "**Motor potentiometer**" or "**Multispeed**" functions are selected the relative references are used. This reference can only be used in the **Local** mode.

The overall ramp reference is the result of the sum of the values with the **Ramp ref 3** and **Ramp ref 2** sign.

Example 1: **Ramp ref 3** = + 500 rpm **Ramp ref 2** = + 300 rpm
Ramp ref = 500 rpm + 300 rpm = 800 rpm

Example 2: **Ramp ref 3** = + 400 rpm **Ramp ref 2** = - 600 rpm
Ramp ref = 400 rpm – 600 rpm = - 200 rpm

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.4	**610**	**Ramp ref 1 src**		LINK	16/32	1500	0	16384	RW	FVS
5.5	**612**	**Ramp ref 2 src**		LINK	16/32	602	0	16384	ERW	FVS
5.6	**614**	**Ramp ref 3 src**		LINK	16/32	894	0	16384	ERW	FVS

Selection of the origin (source) of the reference signals on the input of the ramp function block, that defines the main drive speed. The ramp reference values can be selected from among those listed in the "**L_MLTREF**" selection list.

When assigning the reference via terminals, signals with ±10V, 0 ...10V, 0... 20 mA and 4 ... 20 mA can be used.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.7	**616**	**Ramp ref invert src**		LINK	16	1050	0	16384	ERW	FVS

Selection of the origin (source) of the signal that inverts the ramp reference output from the "Ramp ref" block. The signal that can be used for this function can be selected from among those listed in the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.8	**620**	**Ramp ref 1 mon**	FF	INT16		0	0	0	R	FVS
5.9	**622**	**Ramp ref 2 mon**	FF	INT16		0	0	0	ER	FVS
5.10	**624**	**Ramp ref 3 mon**	FF	INT16		0	0	0	ER	FVS

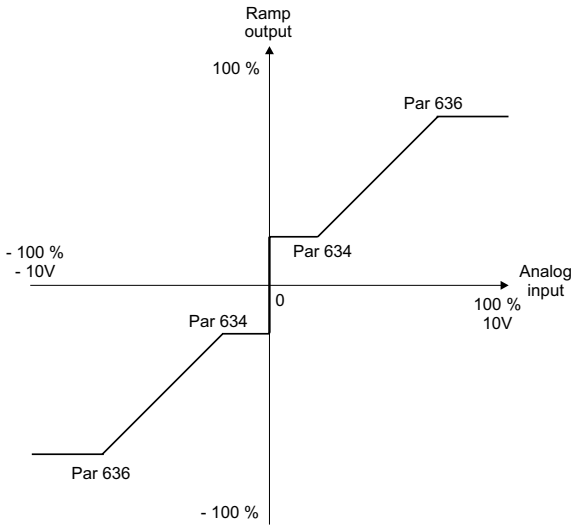
The value of the relative ramp reference on the output of the relative function block is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.11	**634**	**Ramp ref top lim**	FF	INT32		0	0	CALCI	ERWZ	FVS

It defines the maximum value of the output of the ramp reference block, regardless of the signal that is present. The ramp reference follows the reference signal from the value set in parameter PAR 636 **Ramp ref bottom lim** up to the value set with this parameter, after which the motor speed remains constant. The limit is valid for both directions of rotation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.12	**636**	**Ramp ref bottom lim**	FF	INT32		0	0	CALCI	ERWZ	FVS

It defines the minimum value of the output of the ramp reference block, regardless of the signal that is present. The ramp block output remains at the value set with this parameter until the analog signal exceeds this threshold: the ramp output value then starts to follow the reference up to the value set in parameter PAR 634 **Ramp ref top lim**. The limit is valid for both directions of rotation.

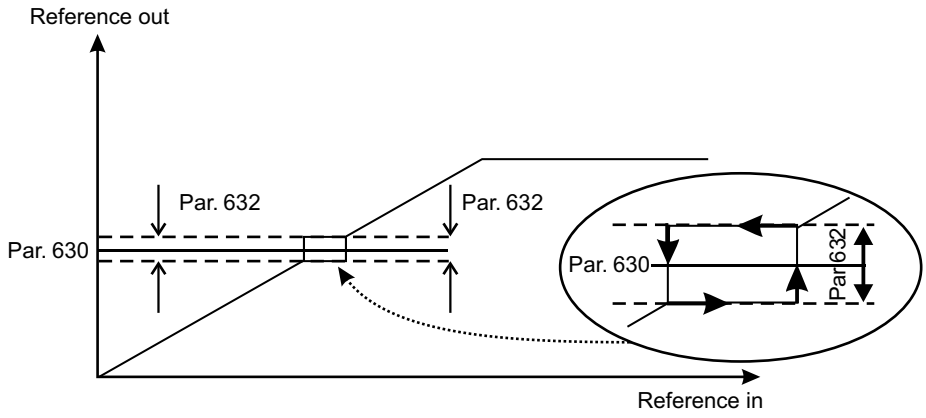


Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.13	**630**	**Reference skip set**	rpm	INT16		0	0	CALCI	ERW	FVS

Setting of the prohibited speed threshold at which the drive cannot operate.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.14	**632**	**Reference skip band**	rpm	INT16		0	0	CALCI	ERW	FVS

Setting of the prohibited bandwidth.



Example:

A) Increase in the reference by values of less than ***Par. 630***

Par. 630 = 300 rpm (prohibited speed threshold)

Par. 632 = 10 rpm (thus prohibited band: 290rpm.310rpm)

Set speed reference = 295 rpmHz

Output speed = 290 rpm

Set speed reference = 305 rpm

Output speed = 290 rpm

B) Decrease in the reference by values above ***Par. 630***

Par.630 = 300 rpm (prohibited speed threshold)

Par.632 = 10 rpm (thus tolerance band: 290 rpm…310 rpm)

Set speed reference = 305 rpm

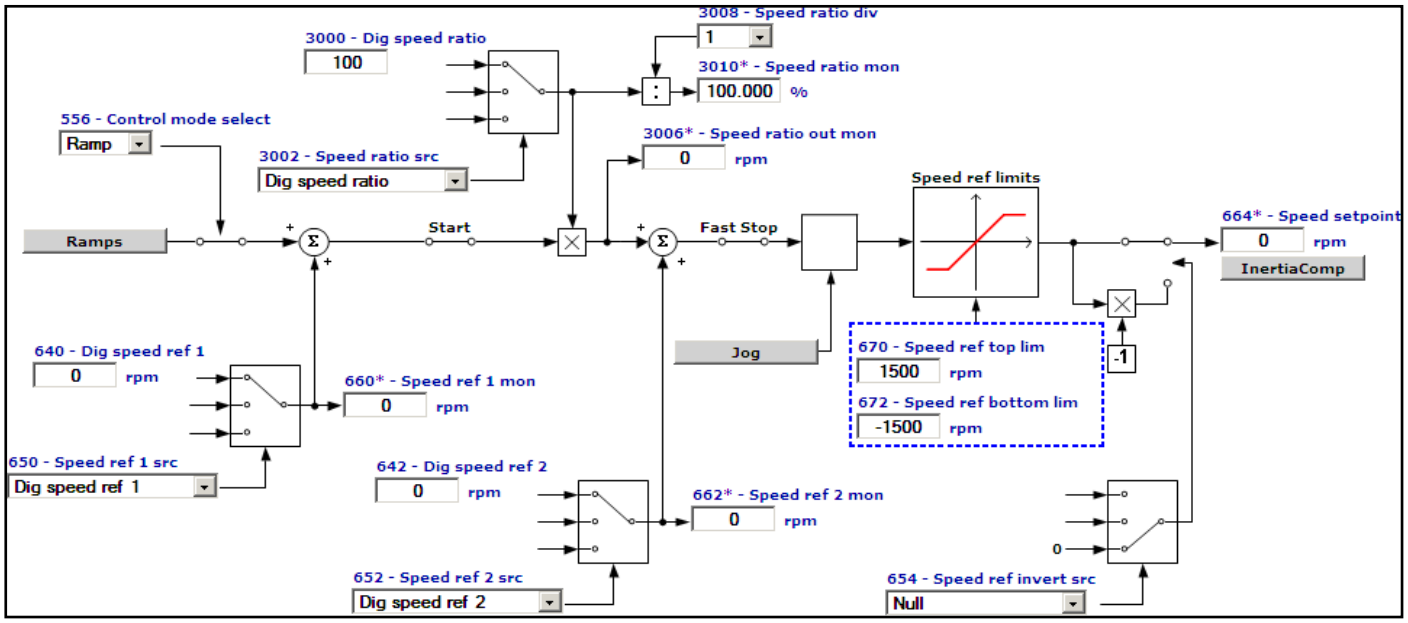
Output frequency = 310 rpm

Set speed reference = 295 rpm

Output frequency = 310 rpm

The user can thus set any reference value, but if the set value is within the prohibited range, the drive automatically maintains the speed outside the limits defined by the tolerance band.

During ramp phases the prohibited speed is passed freely and there are no points of discontinuity in the generation of the output frequency.



The speed reference supplies the desired speed to the drive, which directly follows the reference pattern. This only happens when the available torque is sufficient. In this case the drive functions at its current limit, until reaching the set speed. The speed reference value determines the motor speed value. The sign determines the direction of rotation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.15	**640**	**Dig speed ref 1**	FF	INT16	16/32	0	CALCI	CALCI	ERW	FVS
5.16	**642**	**Dig speed ref 2**	FF	INT16	16/32	0	CALCI	CALCI	ERW	FVS

Setting of the digital speed references. The overall speed reference is the result of the sum of the values with the respective signs, of **Dig speed ref 1** and **Dig speed ref 2**. The digital speed references are linked to the ramp circuit output.

The overall speed reference is the result of the sum of the values, with sign, of **Speed ref 1** and **Speed ref 2**.

Example 1: **Speed ref 1** = + 500 rpm **Speed ref 2** = + 300 rpm
Speed ref = 500 rpm + 300 rpm = 800 rpm

Example 2: **Speed ref 1** = + 400 rpm **Speed ref 2** = - 600 rpm
Speed ref = 400 rpm – 600 rpm = - 200 rpm

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.17	**650**	**Speed ref 1 src**		LINK	16/32	640	0	16384	ERW	FVS
5.18	**652**	**Speed ref 2 src**		LINK	16/32	642	0	16384	ERW	FVS

Selection of the origin (source) of the drive speed reference signals. The values that can be used as speed references can be selected from those listed in the "**L_MLTREF**" selection list.

When assigning the reference via terminals, signals with ±10V, 0 ...10V, 0... 20 mA and 4 ... 20 mA can be used.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.19	**654**	**Speed ref invert src**		LINK	16	6000	0	16384	ERWZ	FVS

Selection of the origin (source) of the signal that inverts the speed reference output from the regulator. The terminal that can be used for this function can be selected from among those listed in the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.20	**660**	**Speed ref 1 mon**	FF	INT16		0	0	0	ER	FVS
5.21	**662**	**Speed ref 2 mon**	FF	INT16		0	0	0	ER	FVS

The value of the relative speed reference is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.22	**670**	**Speed ref top lim**	FF	INT32		CALCI	0	CALCI	ERWZ	FVS

Setting of the upper speed reference limit. If the speed reference exceeds the limits, the motor speed remains at the set limit value in any case. Speed limits cannot be more than 200% of the value set in the **Full scale speed** parameter (REFENCES menu par. 680).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.23	**672**	**Speed ref bottom lim**	FF	INT32		CALCI	CALCI	0	ERWZ	FVS

Setting of the lower speed reference limit. If the speed reference exceeds the limits, the motor speed remains at the set limit value in any case. Speed limits cannot be more than 200% of the value set in the **Full scale speed** parameter (REFERENCES menu par. 680).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.24	**666**	**Speed ref filter**	ms	UINT16		0	0	1000	ERW	FVS

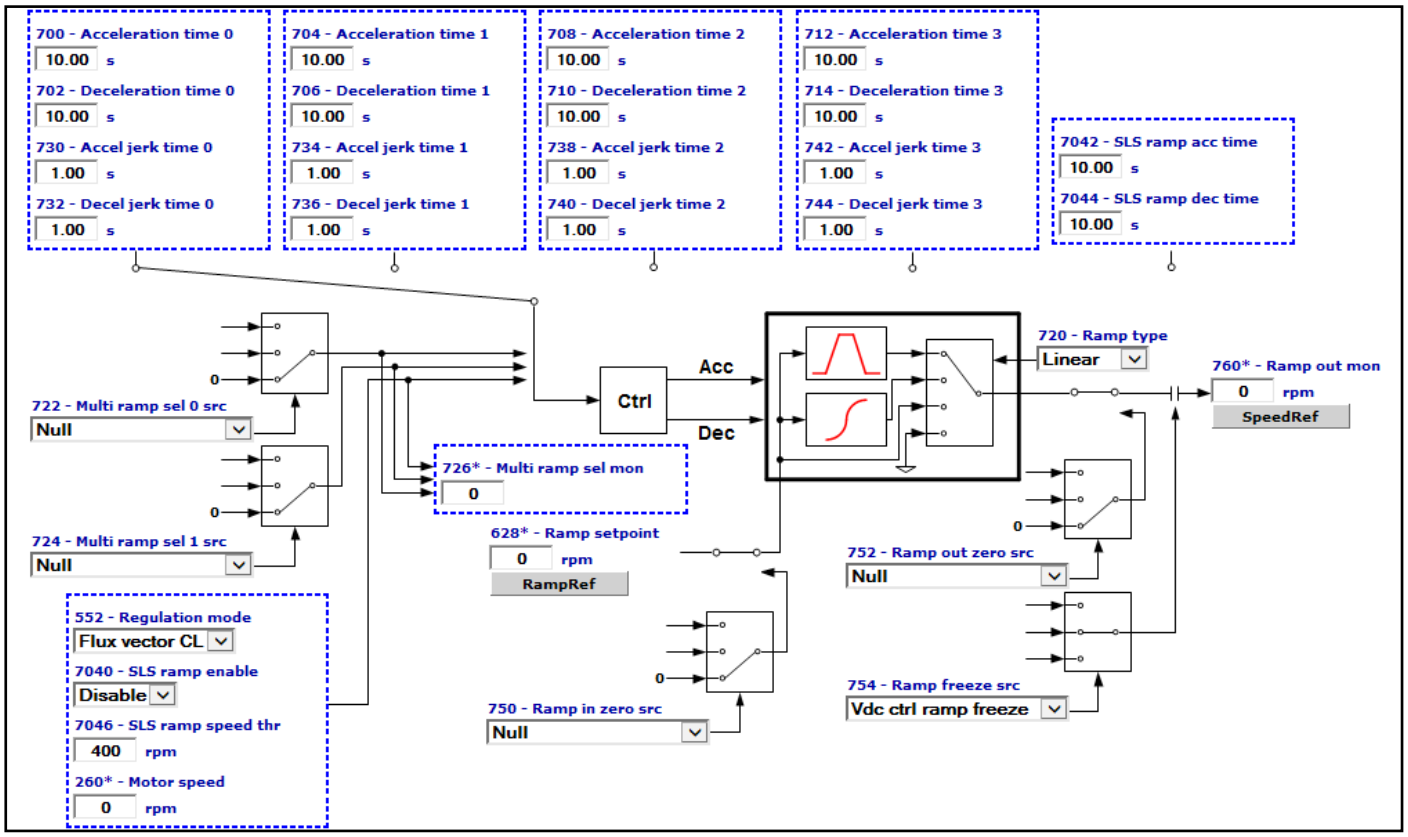
Settting of the filter to the speed reference value. If IPA 666 **Speed ref filter** is set to 0, filter is disabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.25	**680**	**Full scale speed**	rpm	INT16		CALCI	50	32000	RWZ	FVS

Setting of the reference value for all speed percentage data (References, Speed adaptives ...) corresponding to 100 % of the actual speed. This parameter can only be changed with the inverter blocked (Enable drive = Disabled). The recommended setting for the value of this parameter is the motor rated speed. If altered, the self-tuning procedure should be repeated.

Full scale speed does not define the maximum possible speed. In any case, the maximum speed percentage value is ± 200 % of the **Full scale speed** value.

6 – RAMPS



The ramp (reference integrator) determines the acceleration and deceleration times of the drive. Times can be set independently.

The ramp times of Fast stop command are set on **Acceleration time 3** and **Deceleration time 3**. The command can be enabled from the terminal strip..

The ramp can be linear or S-shaped, as preferred.

The references can be set in different ways:
- with the Ramp ref 1 and / or Ramp ref 2 references
- with the Multi speed function
- with the Motor potentiometer function
- with the Jog function

The ramp generator can be used in the “stand alone” mode. When disabled (**Ramp type = Off**), the “Enable drive, Start/Stop and Fast stop” commands do not affect the ramp generator. In this condition the ramp generator can be used separately.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
6.1	**700**	**Acceleration time 0**	s	FLOAT		10.00	0.01	1000.00	RW	FVS
6.2	**702**	**Deceleration time 0**	s	FLOAT		10.00	0.01	1000.00	RW	FVS
6.3	**704**	**Acceleration time 1**	s	FLOAT		10.00	0.01	1000.00	ERW	FVS
6.4	**706**	**Deceleration time 1**	s	FLOAT		10.00	0.01	1000.00	ERW	FVS
6.5	**708**	**Acceleration time 2**	s	FLOAT		10.00	0.01	1000.00	ERW	FVS
6.6	**710**	**Deceleration time 2**	s	FLOAT		10.00	0.01	1000.00	ERW	FVS
6.7	**712**	**Acceleration time 3**	s	FLOAT		10.00	0.01	1000.00	ERW	FVS

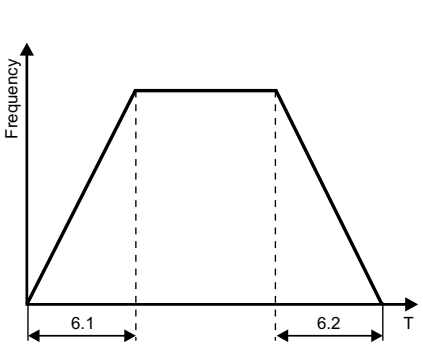
6.8	**714**	**Deceleration time 3**	s	FLOAT		10.00	0.01	1000.00	ERW	FVS

The acceleration and deceleration ramp times are used to avoid sudden changes in the drive output frequency, which could cause mechanical shocks, excessive current on the motor and excessive DC-bus voltage values. The acceleration times (**6.1, 6.3, 6.5, 6.7**) are expressed as the time necessary to bring the frequency from zero to the maximum value set in the **Full scale speed (5.22)**. On the other hand, the deceleration times (**6.2, 6.4, 6.6, 6.8**) are expressed as the time necessary to bring the frequency from the maximum value set in the **Full scale speed (5.22)** parameter to zero. Each of the 4 available ramp selections can be selected using one or two digital inputs programmed as **Multi ramp sel**.

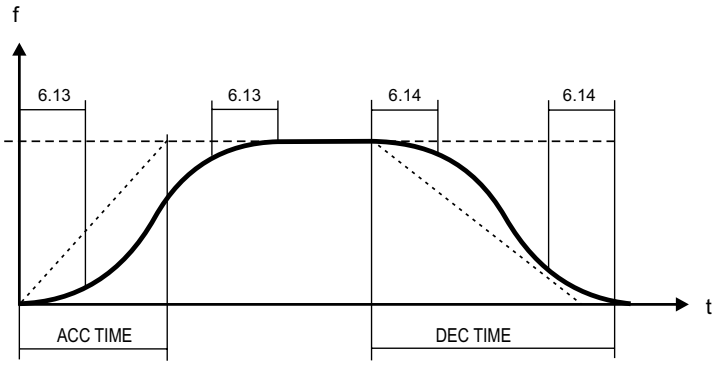
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
6.9	**720**	**Ramp type**		ENUM		Linear	0	3	ERWZ	FVS

This parameter defines the ramp shape (linear/S-shape). It can only be modified with the drive disabled.

0 Linear
1 S-Shape
2 Bypass
3 Off



0 = Linear



1 = S-Shape

When linear ramps are set (**Linear**) the motor speed varies in a way that is directly in proportion to the frequency.

When S-shape ramps are set (**S-Shape**) it is possible to avoid sudden mechanical variations in the system at the beginning and end of the acceleration and deceleration phase.

The ramp time, meaning the time necessary to accelerate from zero to the maximum frequency value set, is given by the sum of the linear ramp time and that of the associated **Jerks** (see par. 6.13 – 6.20).

The **Bypass** excludes the ramp circuit and the reference is brought directly to the speed regulator input.

With **Off** the ramp reference is set to zero.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
6.10	**722**	**Multi ramp sel 0 src**		LINK		6000	0	16384	ERWZ	FVS
6.11	**724**	**Multi ramp sel 1 src**		LINK		6000	0	16384	ERWZ	FVS

1 or 2 digital inputs can be used to select one of the 4 available sets of ramps.

The origin (source) of the command to enable the ramp selection function can be selected from the "**L_DIG-SEL2**" selection list.

The following table describes the ramp selection procedure:

Enabled ramp time	Multi ramp sel 0	Multi ramp sel 1
Acceleration time 0 Deceleration time 0	0	0
Acceleration time 1 Deceleration time 1	1	0

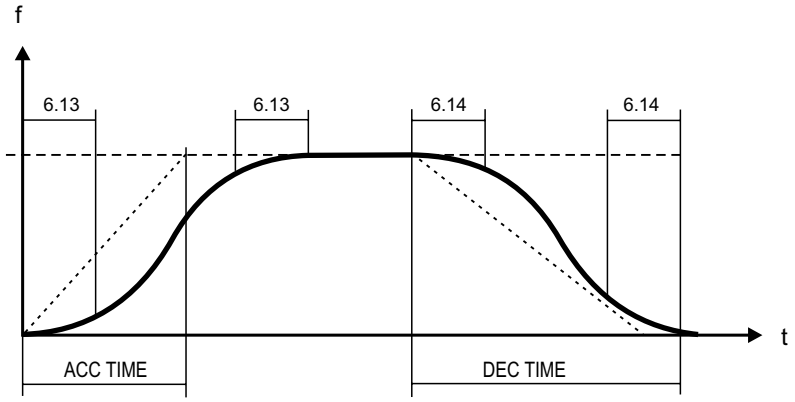
Enabled ramp time	Multi ramp sel 0	Multi ramp sel 1
Acceleration time 2 Deceleration time 2	0	1
Acceleration time 3 Deceleration time 3	1	1

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
6.12	**726**	**Multi ramp sel mon**		UINT16		0	0	3	ER	FVS

The set of acceleration/deceleration ramps selected using the digital inputs is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
6.13	**730**	**Accel jerk time 0**	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.14	**732**	**Decel jerk time 0**	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.15	**734**	**Accel jerk time 1**	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.16	**736**	**Decel jerk time 1**	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.17	**738**	**Accel jerk time 2**	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.18	**740**	**Decel jerk time 2**	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.19	**742**	**Accel jerk time 3**	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.20	**744**	**Decel jerk time 3**	s	FLOAT		1.0	0.02	10.0	ERW	FVS

Jerks are variations of acceleration in time. They are used when there is a need to dampen the beginning and end of the ramp. The Jerk value is added, regardless of the variation in speed, to the linear ramp time.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
6.21	**750**	**Ramp in zero src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) of the signal that blocks the ramp input and moves the reference to zero. If the ramp input is enabled, the **Ramp ref** parameter corresponds to the set reference. If the ramp input is blocked, the drive slows down with the set deceleration time until reaching zero speed. The terminal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

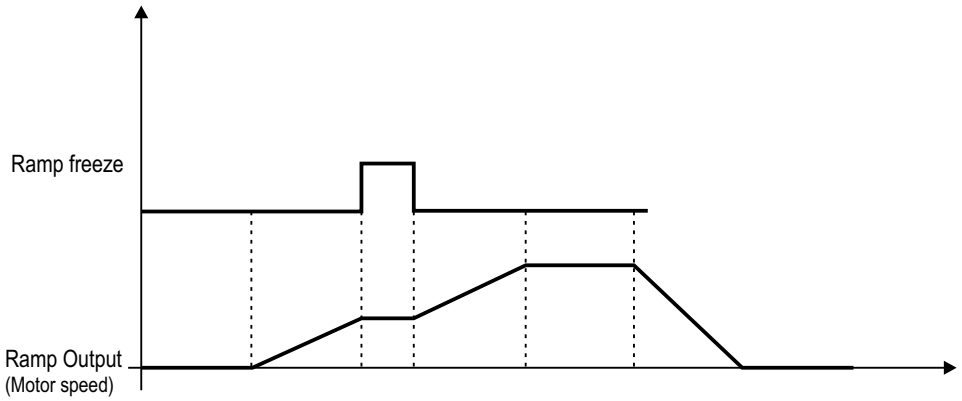
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
6.22	**752**	**Ramp out zero src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) of the signal that brings the ramp to 0 (**Ramp ref 1/Ramp ref 2 = 0**). When the ramp output is set to zero using **Ramp out zero**, the drive brakes with the maximum available torque; in this case the ramp is disabled. The terminal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

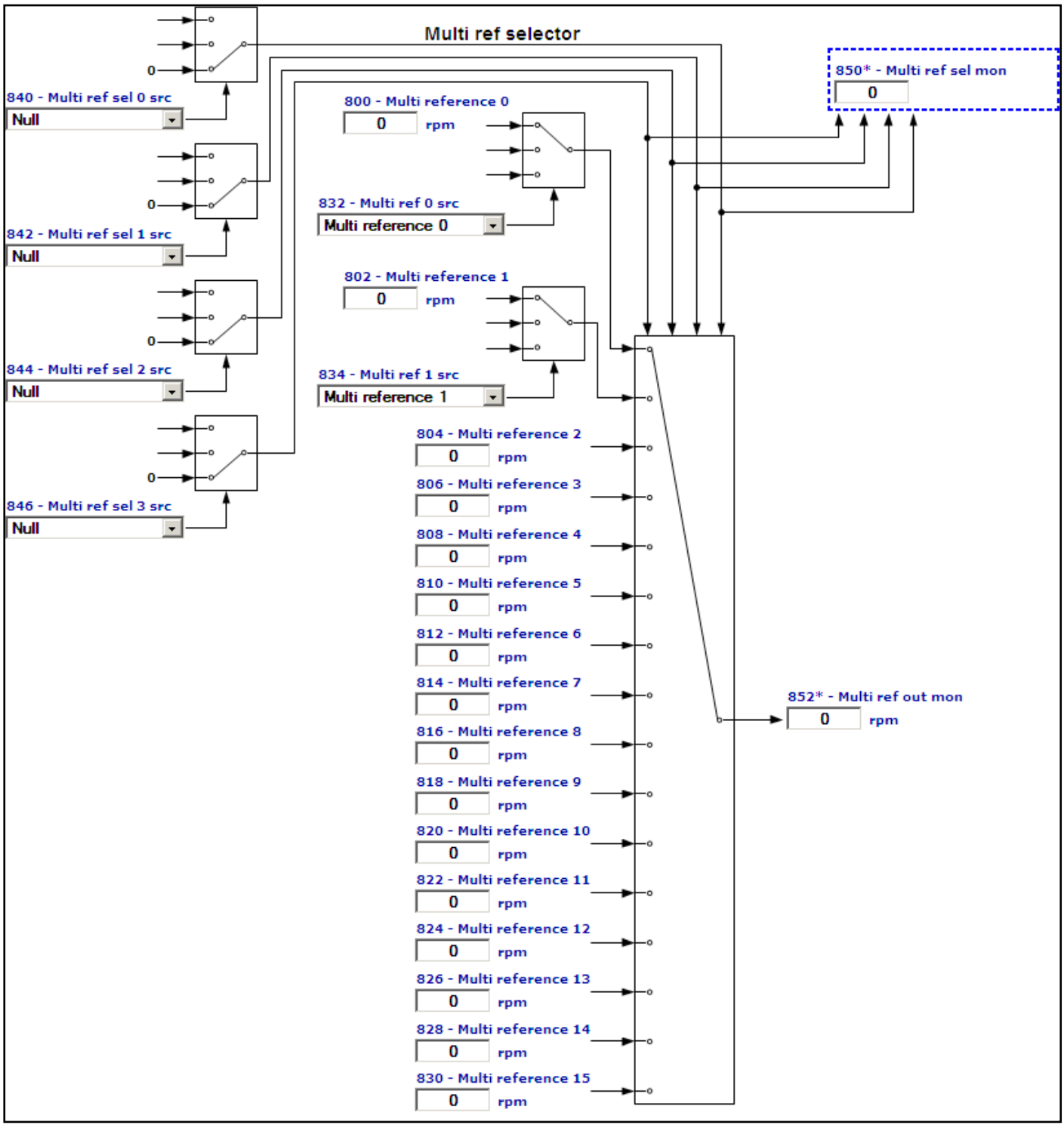
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
6.23	**754**	**Ramp freeze src**		LINK	16	3480	0	16384	ERW	FVS

Selection of the origin (source) of the signal that temporarily freezes the ramp output value, regardless of any changes in the input reference. The terminal to be associated with this function can be selected from the "**L_**

DIGSEL2" selection list.



7 – MULTI REFERENCE



With the “Multispeed” function (**Multi references**) it is possible to recall up to sixteen internally saved speed references to be recalled using a digital signal or via digital inputs on the terminal strip.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
7.1	**800**	**Multi reference 0**	FF	INT16	16/32	0	CALCI	CALCI	RW	FVS
7.2	**802**	**Multi reference 1**	FF	INT16	16/32	0	CALCI	CALCI	RW	FVS
7.3	**804**	**Multi reference 2**	FF	INT16		0	CALCI	CALCI	RW	FVS
7.4	**806**	**Multi reference 3**	FF	INT16		0	CALCI	CALCI	RW	FVS
7.5	**808**	**Multi reference 4**	FF	INT16		0	CALCI	CALCI	RW	FVS
7.6	**810**	**Multi reference 5**	FF	INT16		0	CALCI	CALCI	RW	FVS

7.7	**812**	**Multi reference 6**	FF	INT16	0	CALCI	CALCI	RW	FVS
7.8	**814**	**Multi reference 7**	FF	INT16	0	CALCI	CALCI	RW	FVS
7.9	**816**	**Multi reference 8**	FF	INT16	0	CALCI	CALCI	ERW	FVS
7.10	**818**	**Multi reference 9**	FF	INT16	0	CALCI	CALCI	ERW	FVS
7.11	**820**	**Multi reference 10**	FF	INT16	0	CALCI	CALCI	ERW	FVS
7.12	**822**	**Multi reference 11**	FF	INT16	0	CALCI	CALCI	ERW	FVS
7.13	**824**	**Multi reference 12**	FF	INT16	0	CALCI	CALCI	ERW	FVS
7.14	**826**	**Multi reference 13**	FF	INT16	0	CALCI	CALCI	ERW	FVS
7.15	**828**	**Multi reference 14**	FF	INT16	0	CALCI	CALCI	ERW	FVS
7.16	**830**	**Multi reference 15**	FF	INT16	0	CALCI	CALCI	ERW	FVS

It is possible to select up to 16 operating frequencies, which can be set in these parameters.

The frequencies are selected using the binary code of the digital inputs programmed using the **Multi ref sel 0 src**, **Multi ref sel 1 src**, **Multi ref sel 2 src** and **Multi ref sel 3 src** parameters.

References can be set via the keypad, serial line, digital inputs and Fieldbus.

A sign can be given to the references, so that when they are defined so too is the desired direction of rotation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
7.17	**832**	**Multi ref 0 src**		LINK	16/32	800	0	16384	RW	FVS
7.18	**834**	**Multi ref 1 src**		LINK	16/32	802	0	16384	RW	FVS

Selection of the origin (source) of the drive speed reference signals. The speed reference values can be selected from those listed in the "**L_MLTREF**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
7.19	**840**	**Multi ref sel 0 src**		LINK	16	6000	0	16384	RW	FVS
7.20	**842**	**Multi ref sel 1 src**		LINK	16	6000	0	16384	RW	FVS
7.21	**844**	**Multi ref sel 2 src**		LINK	16	6000	0	16384	RW	FVS
7.22	**846**	**Multi ref sel 3 src**		LINK	16	6000	0	16384	ERW	FVS

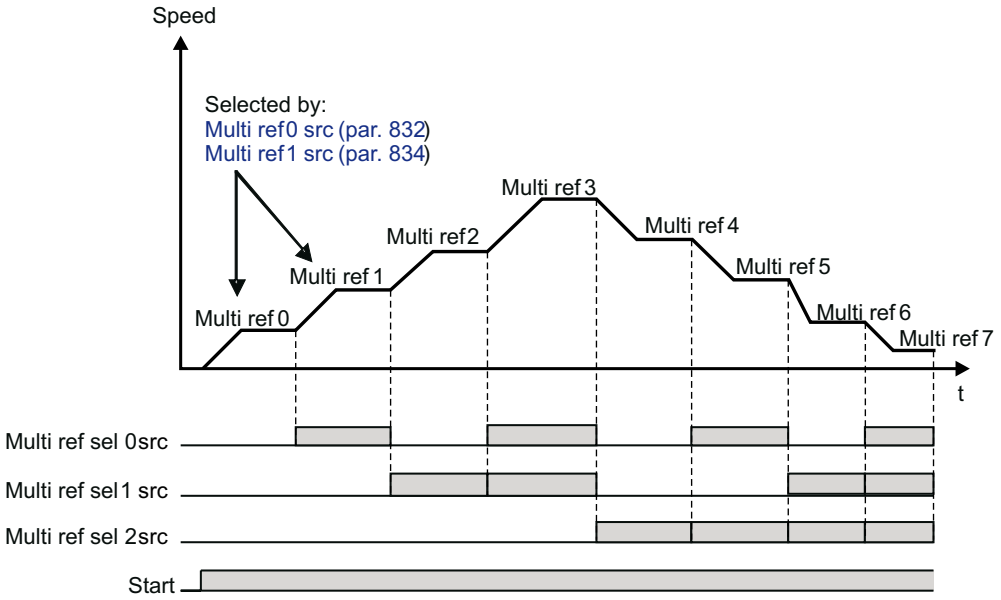
Selection of the origin (source) of the signals used to select one of the preset speeds. These parameters can only be used together in combinations. The terminals that can be used for this function can be selected from among those listed in the "**L_DIGSEL2**" selection list.

The following table describes the selection of the Multispeed function:

Active speed ref	Multi ref sel 0 src	Multi ref sel 1 src	Multi ref sel 2 src	Multi ref sel 3 src
Multi reference 0	0	0	0	0
Multi reference 1	1	0	0	0
Multi reference 2	0	1	0	0
Multi reference 3	1	1	0	0
Multi reference 4	0	0	1	0
Multi reference 5	1	0	1	0
Multi reference 6	0	1	1	0
Multi reference 7	1	1	1	0
Multi reference 8	0	0	0	1
Multi reference 9	1	0	0	1
Multi reference 10	0	1	0	1
Multi reference 11	1	1	0	1
Multi reference 12	0	0	1	1
Multi reference 13	1	0	1	1

Active speed ref	Multi ref sel 0 src	Multi ref sel 1 src	Multi ref sel 2 src	Multi ref sel 3 src
Multi reference 14	0	1	1	1
Multi reference 15	1	1	1	1

The following figure describes the selection of a control for 8 Multispeeds.



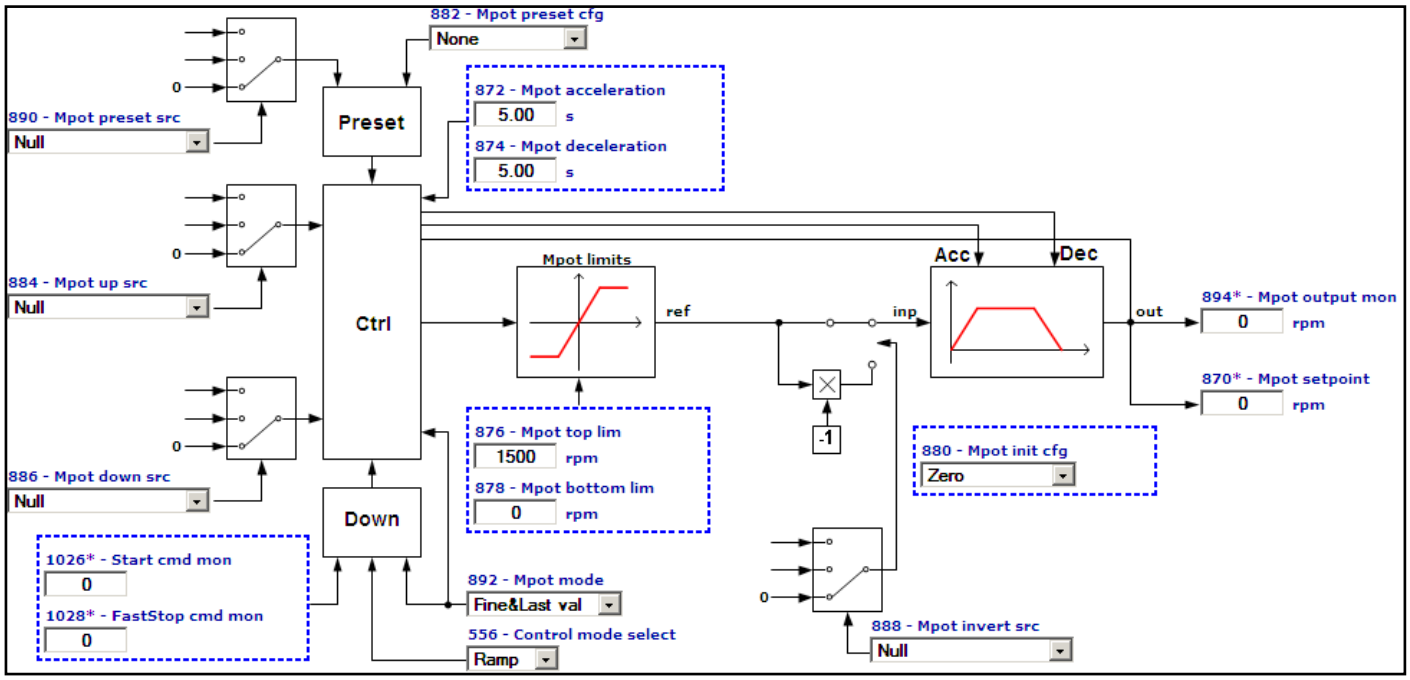
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
7.23	**850**	**Multi ref sel mon**		UINT16		0	0	15	R	FVS

The multispeed that has been selected using the digital commands or by the digital inputs selected in the terminal strip.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
7.24	**852**	**Multi ref out mon**	FF	INT16	16/32	0	0	0	R	FVS

The selected speed reference on the Multispeed block output is displayed.

8 – MOTORPOTENTIOMETER



The Motor potentiometer function allows the speed reference of the drive to be changed by pressing buttons with which the UP and DOWN commands are associated.

The UP and DOWN commands can be sent from the keypad, by digital inputs, the serial line or fieldbus.

To send the UP and DOWN commands from the keypad, enter the **MPot setpoint** parameter modify mode and press the UP and DOWN keys.

The UP and DOWN commands increase or decrease the speed of the motor for as long as they are present. The simultaneous presence of both commands will not produce any change (see time chart).

The speed changes according to the set ramp times and within the set lower and upper limits.

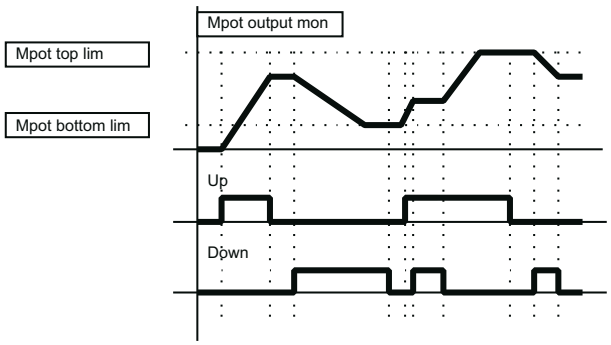
The value of the Motor potentiometer function output at drive power-on can be configured.

The preset command can be used to force a preset value for the input and output of the Motor potentiometer function.

The invert command can be used to force an inversion of the reference sign of the Motor potentiometer function.

In the default condition, the speed reference produced by the Motor potentiometer function is connected in input to the Ramp function. For direct control of the motor speed, the Acceleration time and Deceleration time parameters in the RAMP menu should be set = 0.

Note ! The Motor potentiometer function produces a speed reference. Therefore a RUN command must always be sent to start motor rotation.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.1	**870**	**Mpot setpoint**	FF	INT16	16/32	0	CALCI	CALCI	R	FVS

The speed reference value of the Motor potentiometer function is displayed. Default setting is “rpm”. It can be modified thru the DIMENSION FACT function.

Enter this parameter to send the UP and DOWN commands from the keypad.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.2	**872**	**Mpot acceleration**	s	FLOAT		5.0	0.01	1000.00	RW	FVS
8.3	**874**	**Mpot deceleration**	s	FLOAT		5.0	0.01	1000.00	RW	FVS

Setting of the acceleration/deceleration ramp times (in seconds) used with the Motor potentiometer function.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.4	**876**	**Mpot top lim**	FF	INT16		CALCI	CALCI	CALCI	ERW	FVS

Setting of the top limit for the speed reference output from the motor potentiometer.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.5	**878**	**Mpot bottom limit**	FF	INT16		0	CALCI	CALCI	ERW	FVS

Setting of the bottom limit for the speed reference output from the motor potentiometer.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.6	**880**	**Mpot init cfg**		ENUM		Zero	0	3	ERW	FVS

Use this parameter to configure the output value of the Motor potentiometer at drive start-up.

0 Last power off
1 Zero
2 Lower Limit
3 Upper Limit

When set to **Last power off**, the motor potentiometer output starts from the last frequency that was set before the drive was switched off.

When set to **Zero** the motor potentiometer output starts from a value of 0.

When set to **Lower limit** the output of the motor potentiometer starts from the value of the lower limit set in the **Mpot bottom limit** parameter.

When set to **Upper limit** the output of the motor potentiometer starts from the value of the upper limit set in the **Mpot top limit** parameter.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.7	**882**	**Mpot preset cfg**		ENUM		None	0	11	ERW	FVS

This parameter can be used to configure the preset of the Motor potentiometer function, i.e. to configure the value at which the Motor potentiometer input and output are set when the Preset command is enabled.

The Preset command has priority over the Up command and the Down command.

Mpot mode (PAR 892) = [1] **Ramp&Follow** has priority over the Preset command, i.e. actions programmed with **Mpot preset cfg** (PAR 882) are not executed.

The Up and Down commands are enabled again when the Preset command is disabled.

0 None
1 Input = 0
2 Input = low lim
3 Input & ref = 0
4 Input & ref = low lim
5 Output = 0

6 Output = low lim

7 Output & ref = 0

8 Output & ref = low lim

9 Input = upp lim

10 Input & ref = upp lim

11 Freeze input

When set to **None**, no setting is executed.

Input = 0 sets input = 0 i.e. a temporary reference setting is performed and the previous reference value is maintained. The output of the Motor potentiometer function varies with the set ramp times. The previous reference value is restored when the preset command is removed.

Input = low lim sets Inp = low lim i.e. a temporary reference setting is performed and the previous reference value is maintained. The output of the Motor potentiometer function varies with the set ramp times. The previous reference value is restored when the preset command is removed.

Input & ref = 0 sets Inp = 0 and Ref = 0 i.e. a definitive reference setting is performed. The output of the Motor potentiometer function varies with the set ramp times.

Input & ref = low lim sets Inp = low lim and Ref = low lim i.e. a definitive reference setting is performed. The output of the Motor potentiometer function varies with the set ramp times.

Output = 0 sets Out = 0 i.e. a temporary output setting for the Motor potentiometer function is performed. The previous reference value is maintained. If the preset command is enabled, the output of the Motor potentiometer function continues to be = 0, if the preset command is not enabled the output of the Motor potentiometer function varies with the set ramp times.

Output = low lim sets Out = low lim i.e. a temporary setting for the output of the Motor potentiometer function is performed. The previous reference value is maintained. If the preset command is enabled, the output of the Motor potentiometer function continues to be = low lim, if the preset command is not enabled the output of the Motor potentiometer function varies with the set ramp times.

Output & ref = 0 sets Out = 0 i.e. a definitive setting for the output of the Motor potentiometer function is performed.

Output & ref = low lim sets Out = low lim i.e. a definitive setting for the output of the Motor potentiometer function is performed.

Input = upp lim sets Inp = upp lim i.e. a temporary setting for the reference is performed and the previous reference value is maintained. The output of the Motor potentiometer function varies with the set ramp times. The previous reference value is restored when the preset command is removed.

Input & ref = upp lim sets Inp = upp lim and Ref = upp lim i.e. a definitive reference setting is performed. The output of the Motor potentiometer function varies with the set ramp times.

When **Freeze input** is set, the Up and Down commands are temporarily disabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.8	**884**	**Mpot up src**		LINK	16	6000	0	16384	RW	FVS

Selection of the origin (source) of the signal that increases the speed reference of the motor potentiometer with the set ramp. The terminal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.9	**886**	**Mpot down src**		LINK	16	6000	0	16384	RW	FVS

Selection of the origin (source) of the signal that decreases the speed reference of the motor potentiometer with the set ramp. The terminal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.10	**888**	**Mpot invert src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) of the signal that inverts the speed reference of the motor potentiometer. The

terminal to be associated with this function can be selected from the “**L_DIGSEL2**” selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.11	**890**	**Mpot preset src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) of the signal to preset the motor potentiometer function. The signal to be associated with this function can be selected from the “**L_DIGSEL2**” selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.12	**892**	**Mpot mode**		ENUM		Fine&Last val	0	3	ERW	FVS

Setting of the configuration of two possible options of the Motor potentiometer function. There are two operating modes for each of the two options.

0 Ramp&Last val

1 Ramp&Follow

2 Fine&Last val

3 Fine&Follow

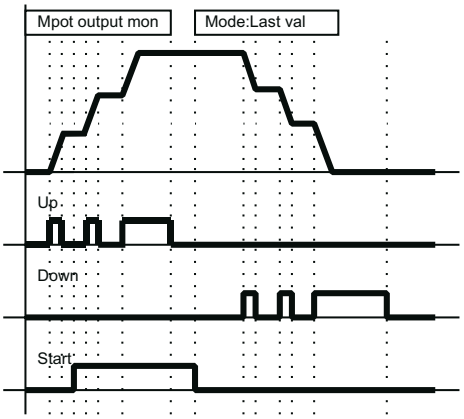
Option 1: Behaviour of the Motor potentiometer function with the Stop or FastStop command present with the PAR 556 **Control mode = Ramp** parameter.

The two operating modes are: **Last val** or **Follow**.

With the Control mode not equal to Ramp setting, this option is not completely applicable and it always behaves in Last val mode.

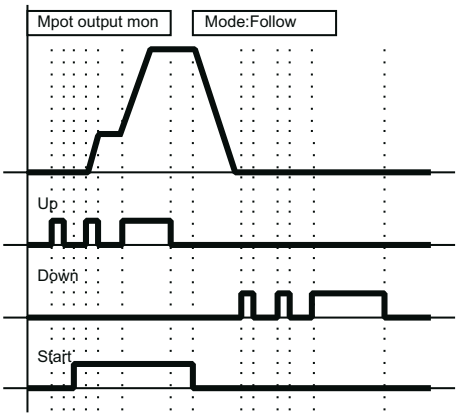
In **Last val** mode with the Stop or FastStop command present, the speed reference of the Motor potentiometer function is not altered.

The motor speed moves to 0 according to the selected control mode (**Control mode = Ramp** or **Control mode = Speed**). When the Run command is sent, the motor speed moves to the speed reference set by the motor potentiometer function according to the selected control mode.



In **Follow** mode with the Stop or FastStop command present, the Down command is simulated, i.e. the output of the Motor potentiometer function moves to 0 with the set ramp time.

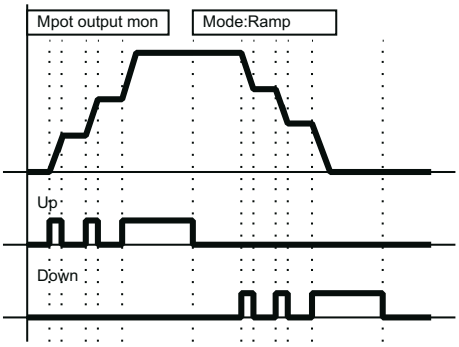
If the Run command is sent when the 0 speed has been reached, it is maintained until the Up command is sent. If the Run command is sent before the motor reaches the 0 speed, the speed at that moment is taken as the new reference.



Option 2: Ramp behaviour

The two operating modes are: **Ramp** or **Fine**

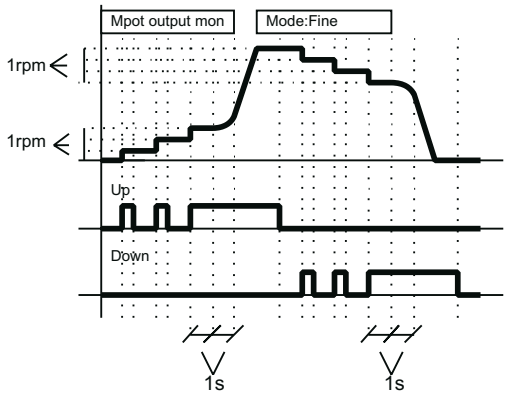
In **Ramp** mode, each time the Up or Down commands are enabled, the output of the Motor potentiometer function increases or decreases with the set ramp. When the Up or Down command is removed, the last value that was reached is maintained.



In **Fine** mode, each time the Up or Down commands are enabled, the output of the Motor potentiometer function increases or decreases by 1 rpm.

If the command persists for less than 1 second, no other changes are made on the output.

If the command persists for more than 1 second, the output increases or decreases with the set ramp. The variation with the set ramp is performed gradually (1 second). When the Up or Down command is removed the last value that was reached is maintained.



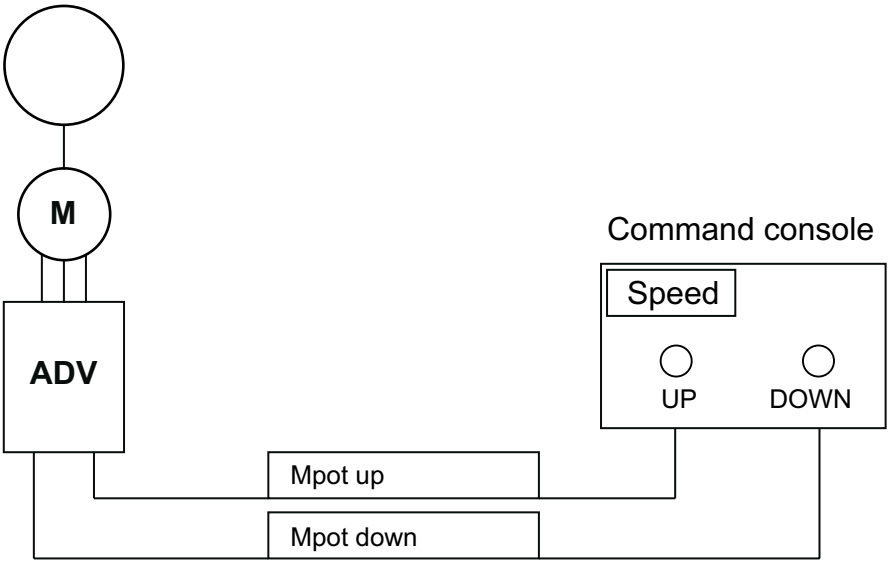
Mpot mode	**Ramp behaviour**	Behaviour of the Motor potentiometer function with the Stop or FastStop command present with the **Control mode = Ramp** parameter.
0	Ramp	Last val
1	Ramp	Follow
2	Fine	Last val
3	Fine	Follow

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
8.13	**894**	**Mpot output mon**	rpm	INT16	16/32	0	0	0	ER	FVS

The value of the output of the motor potentiometer function is displayed.

Two examples of application of the motor potentiometer function are shown below.

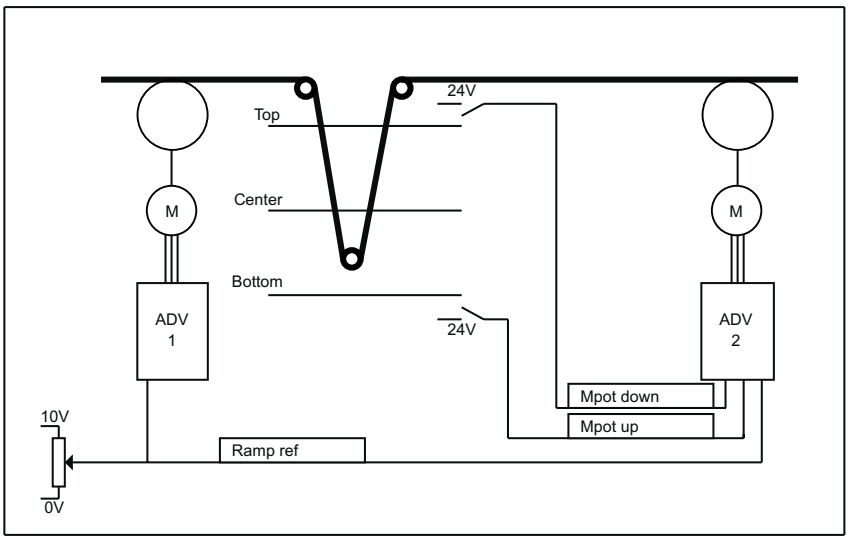
Manual speed control with command sent from external control desk.



The Up and Down keys are used to adjust the speed of a motor.

For fine-tuning of the speed reference value the recommended settings are **Mpot Mode = Fine&Follow** or **Fine&Last Val**. Each time they are pressed for 1 second, the speed increases by 1 rpm. For an immediate effect on motor speed, the Acceleration time and Deceleration time parameters should be set to short times.

Automatic speed control for rudimentary dancer control.

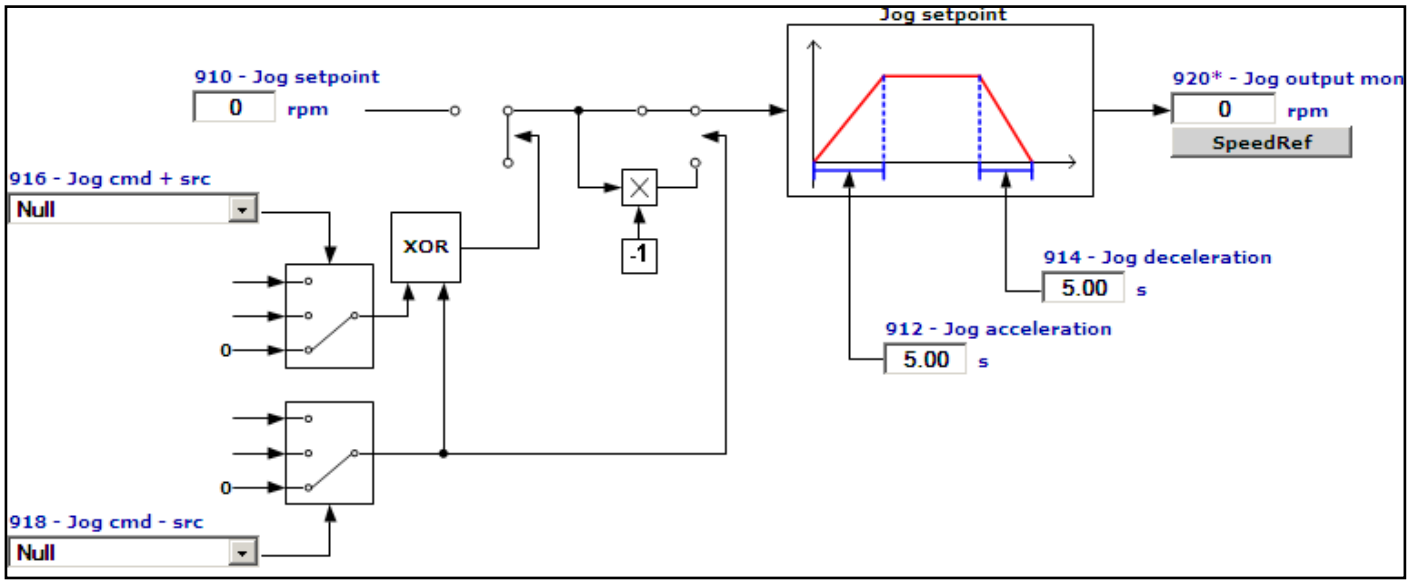


The limit switches at the ends of dancer travel ranges are connected to the Up and Down commands in the motor potentiometer function. If the dancer presses the bottom limit switch, this means motor 2 is running slowly and the Up command must be sent. If the dancer presses the top limit switch, this means motor 2 is running quickly and the Down command must be sent.

Connect the line reference to **Ramp ref 1 src** on both drives, connect the motor potentiometer function output to **Speed ref 1 src** on drive 2.

To change the motor speed immediately, the recommended settings are **Mpot Mode = Ramp&Follow** or **Rampa&Last Val**.

9 – JOG FUNCTION



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
9.1	**910**	**Jog setpoint**	rpm	INT16		0	CALCI	CALCI	RW	FVS

The reference for Jog mode operation. This reference can also be set via an analog input. The **Jog** reference is enabled when the signal used for the **Jog +** or **Jog –** command is enabled, the Run command is not present and the drive output frequency is zero.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
9.2	**912**	**Jog acceleration**	s	FLOAT		5.0	0.01	1000.00	RW	FVS
9.3	**914**	**Jog deceleration**	s	FLOAT		5.0	0.01	1000.00	RW	FVS

Setting of the acceleration/deceleration ramp time (in seconds) used during **Jog** operation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
9.4	**916**	**Jog cmd + src**		LINK	16	6000	0	16384	RW	FVS

Selection of the origin (source) of the **Jog +** function enabling signal. When this command is enabled it generates a Jog Mode reference with a sign matching the value entered for the **Jog setpoint value** parameter. The signal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

Note ! The **Run** command has priority over the **Jog +** command.

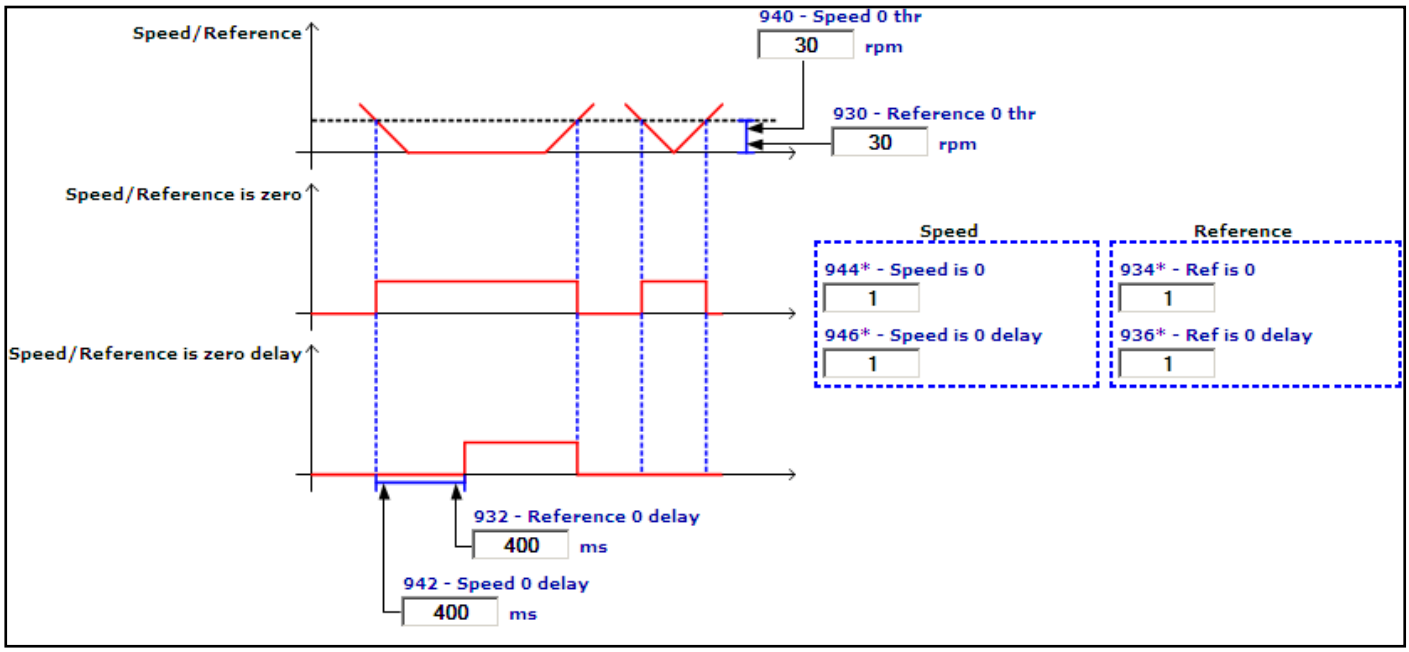
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
9.5	**918**	**Jog cmd - src**		LINK	16	6000	0	16384	RW	FVS

Selection of the origin (source) of the **Jog -** function enabling signal. When this command is enabled the Jog Mode reference sign is inverted with respect to the value entered in the **Jog setpoint value** parameter. The signal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

Note ! The **Run** command has priority over the **Jog -** command.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
9.6	**920**	**Jog output mon**	rpm	INT16	16/32	0	0	0	ER	FVS

The speed reference used by the **Jog** command is displayed.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.1	930	**Reference 0 thr**	rpm	INT16		30	0	CALCI	RW	FVS

Setting of the threshold for recognition of the speed = 0 reference. The value is valid for both directions of rotation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.2	932	**Reference 0 delay**	ms	UINT16		400	0	10000	RW	FVS

Setting of the delay in milliseconds after which the reference = 0 reached signal is enabled.

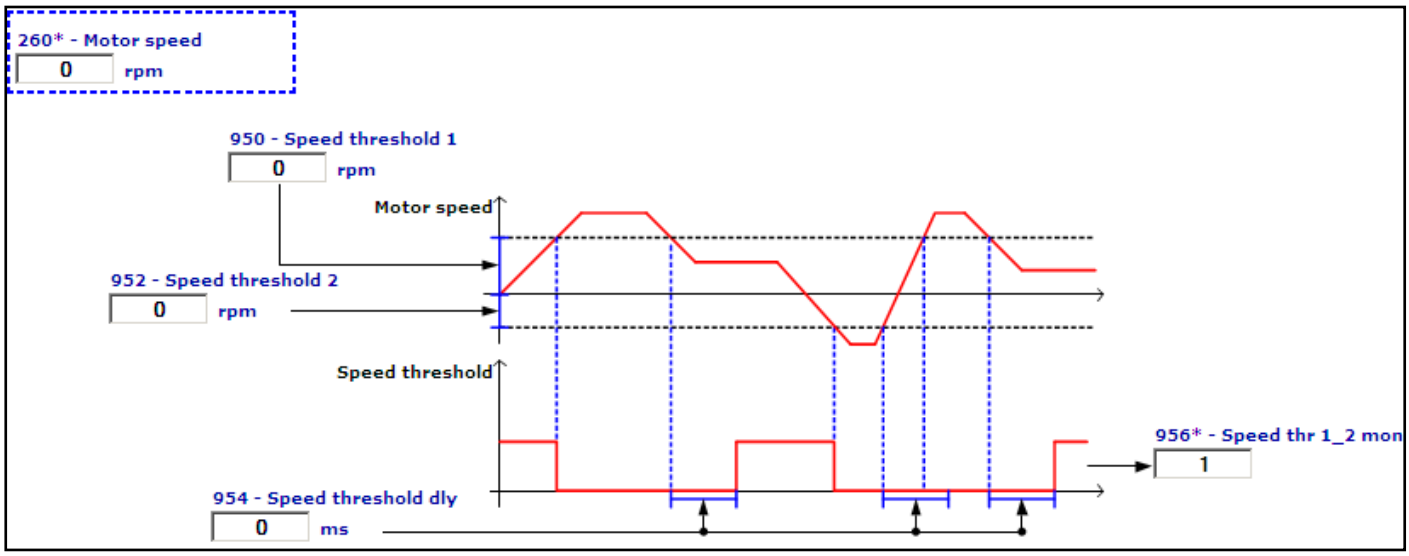
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.3	940	**Speed 0 thr**	rpm	INT16		30	0	CALCI	RW	FVS

Setting of the threshold for recognizing speed value = 0. The value is valid for both directions of rotation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.4	942	**Speed 0 delay**	ms	UINT16		400	0	10000	RW	FVS

Setting of the delay in milliseconds after which the speed = 0 reached signal is enabled.

When the motor reaches a speed that is below the zero speed threshold, it stops and the n=0 LED lights up.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.5	**950**	**Speed threshold 1**	rpm	INT32		0	CALCI	CALCI	RW	FVS

Setting of speed threshold 1 (upper). When the threshold is exceeded the **Speed threshold** signal is disabled, with a delay that can be set in **Speed threshold dly**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.6	**952**	**Speed threshold 2**	rpm	INT32		0	CALCI	CALCI	RW	FVS

Setting of speed threshold 2 (lower). When the threshold is exceeded the **Speed threshold** signal is disabled, with a delay that can be set in **Speed threshold dly**.

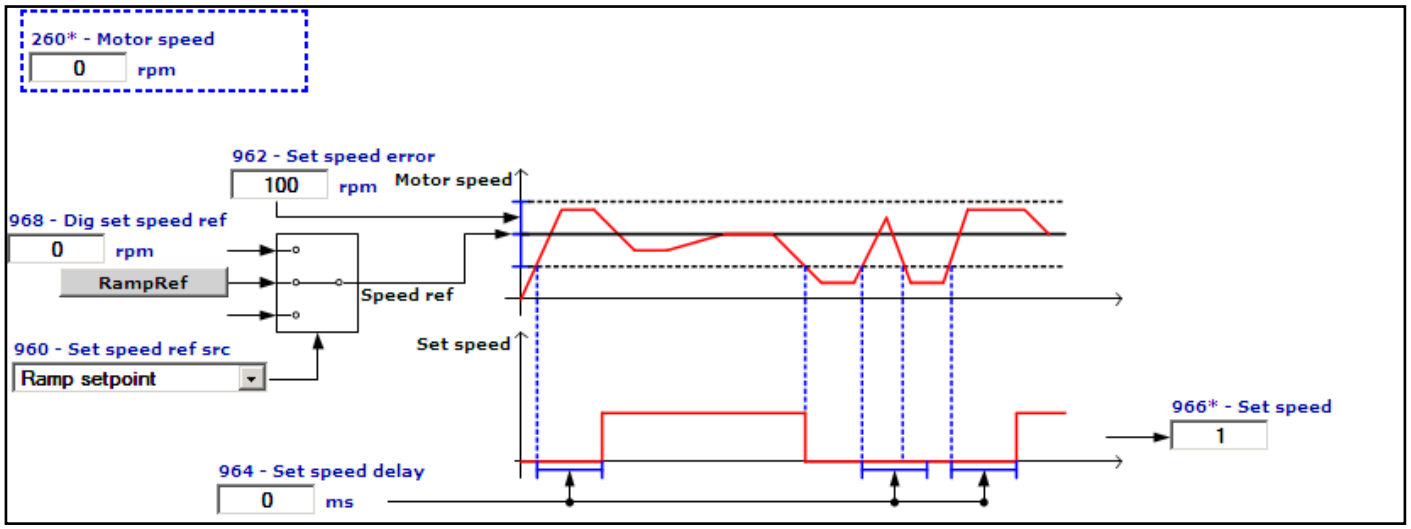
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.7	**954**	**Speed threshold dly**	ms	UINT16		0	0	50000	RW	FVS

Setting of the delay after which the transition from 0 ⇨1 is activated. The transition from 0 ⇨1 occurs when the speed is within the set limits. **The Speed threshold signal transition from 1 ⇨ 0 is always immediate**.

If the motor speed is between **Speed threshold 1** and **Speed threshold 2**, the **Speed threshold** signal is active. If **Speed threshold 1** < **Speed threshold 2** the **Speed threshold** signal is not significant.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.8	**960**	**Set speed ref src**		LINK	16/32	628	0	16384	ERW	FVS

Selection of the origin (source) of the signal used as speed reference and on which the speed reached control is performed (for control with ramp, use **Ramp setpoint**, for control without ramp, use **Speed setpoint**). The signal that can be used as the speed reference can be selected from among those listed in the "**L_CMP**" selection list.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.9	**962**	**Set speed error**	rpm	INT16		100	0	CALCI	RW	FVS

Setting of the bandwidth of the tolerance within which, even if the speed is not equal to the reference, the two values are considered to coincide and the **Set speed** signal is enabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.10	**964**	**Set speed delay**	ms	UINT16		0	0	50000	RW	FVS

Setting of a delay in ms before the signal (**Set speed** programmed on a digital output), if the speed is within a tolerance band defined by the **Set speed error** parameter, after which the transition from 0 ⇨1 is enabled.

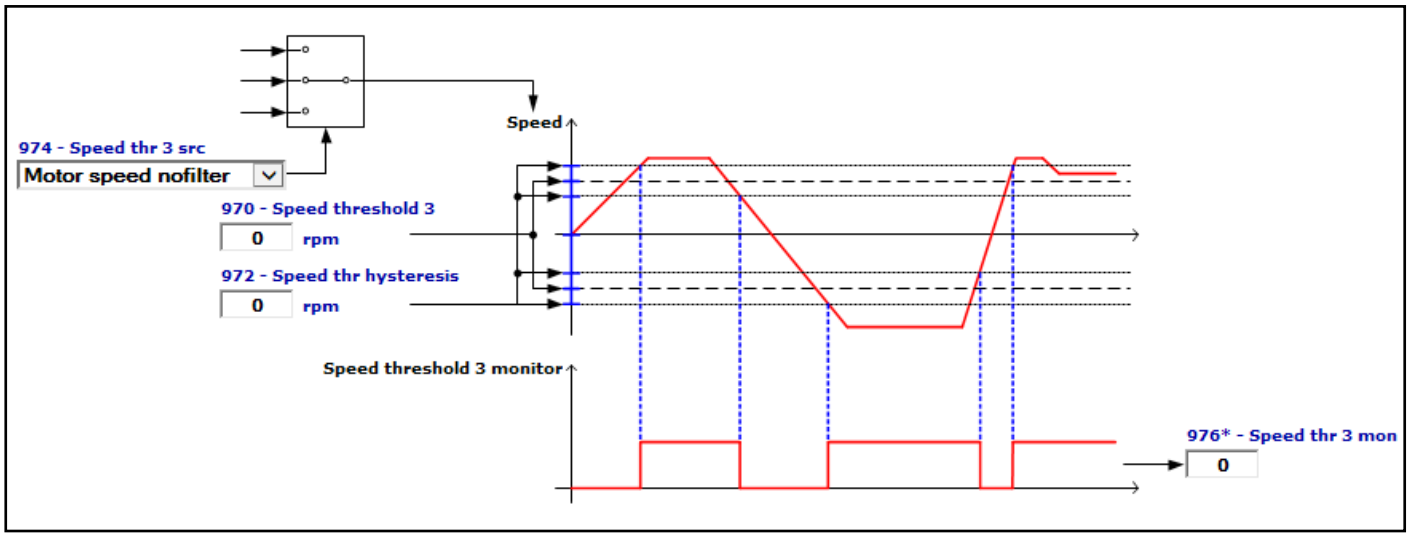
The transition of the Set Speed signal from 0 ⇨1 is always immediate.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.11	**968**	**Dig set speed ref**	rpm	UINT16	16/32BIT	0	CALCI	CALCI	RW	FVS

Setting of the threshold used as the speed reference: this parameter is used to set a fixed threshold regardless of the speed reference.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.12	**970**	**Speed threshold 3**	rpm	INT32		0	0	CALCI	ERW	FVS

Setting of the speed 3 threshold. When this threshold + the tolerance band set in parameter **972 Speed thr hysteresis** are exceeded, parameter **976 Speed thr 3 mon** is enabled. The signal is disabled when the motor speed falls below the threshold - the tolerance band. If the threshold value is lower than the value set in **972 Speed thr hysteresis**, the result produced is always 0. The value set in this parameter is active in both directions of rotation.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.13	**972**	**Speed thr hysteresis**	rpm	UINT16		0	0	CALCI	RW	FVS

Setting of the tolerance band around **Speed threshold 3**. The tolerance band is the same for both directions of rotation of the motor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.14	**974**	**Sorg vel soglia 3**		LINK	16/32	262	0	16384	ERW	FVS

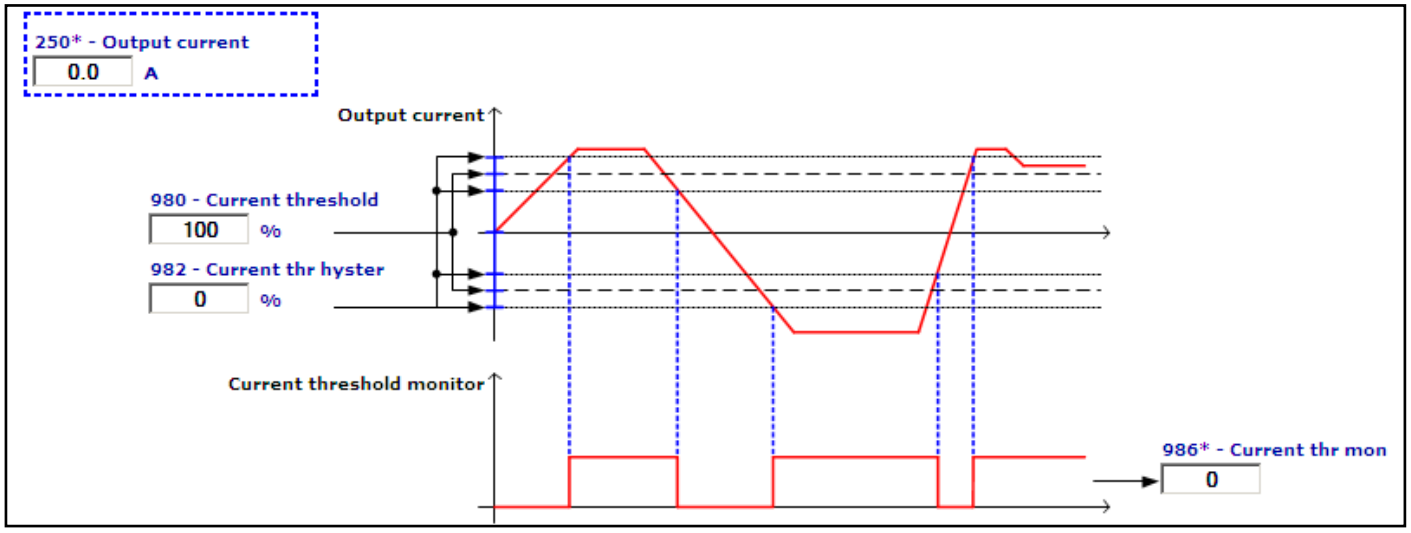
Lets you select the source of the “Speed threshold 3” function block to compare **Speed threshold 3** (IPA 970) with the real or estimated motor speed or speed reference.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.15	**980**	**Current threshold**	perc	UINT16		100	0	200	RW	FVS

Setting of the current threshold. A value of 100% corresponds to the value of the drive heavy duty continuous current, displayed in parameter **488 Drive cont current**, when parameter **566 Drive overload mode** is set to **Heavy duty**, and no derating of the drive continuous current has been activated due to any modification of Mains voltage, Switching frequency and Ambient temperature.

The drive heavy duty continuous current value to be used is the factory setting read in PAR 488 **Drive cont current**.

When this threshold + the tolerance band set in parameter **982 Current thr hyster** are exceeded, parameter **986 Current thr mon** is enabled. The signal is disabled when the motor speed falls below the threshold - the tolerance band. If the threshold value is lower than the value set in **982 Current thr hyster**, the result produced is always 0. The value set in this parameter is active in both directions of rotation.



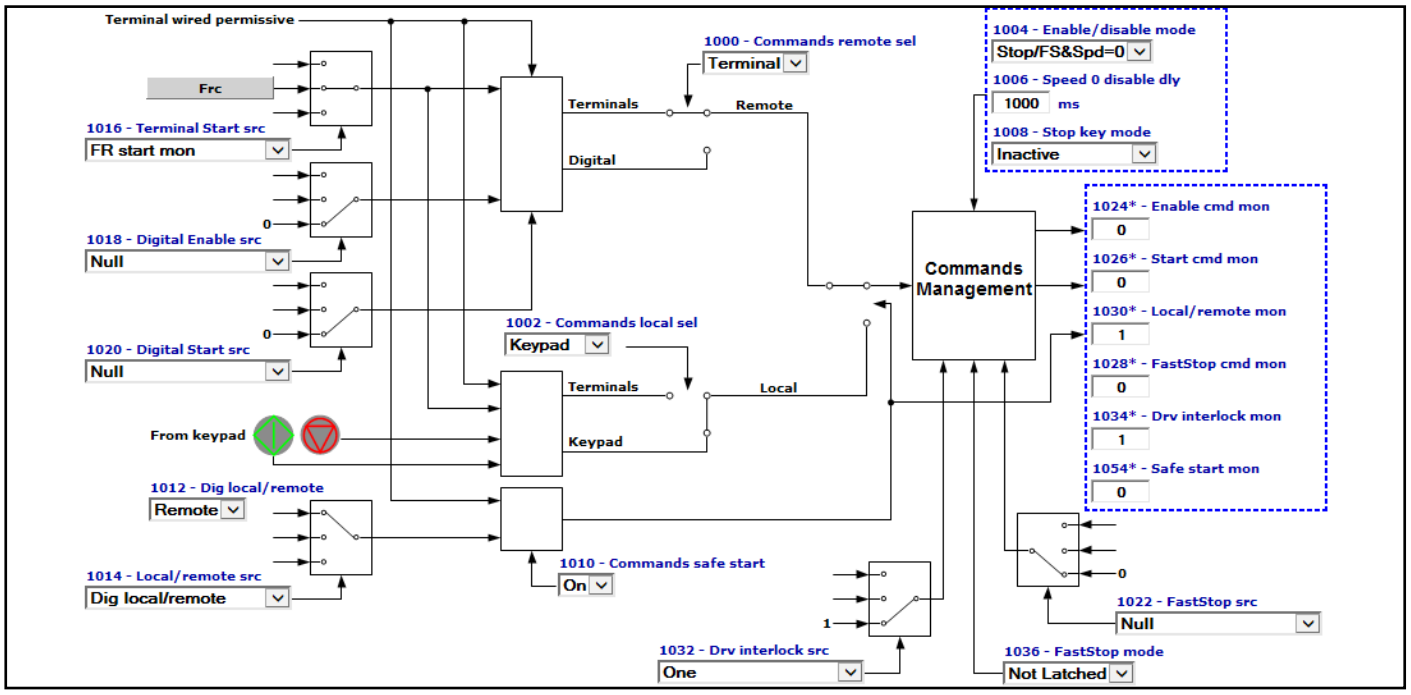
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.16	**982**	**Current thr hyster**	perc	UINT16		0	0	100	RW	FVS

Setting of the tolerance band around the current threshold. A value of 100% corresponds to the value of the drive heavy duty continuous current, displayed in parameter **488 Drive cont current**, when parameter **566 Drive overload mode** is set to **Heavy duty**, and no derating of the drive continuous current has been activated due to any modification of Mains voltage, Switching frequency and Ambient temperature.

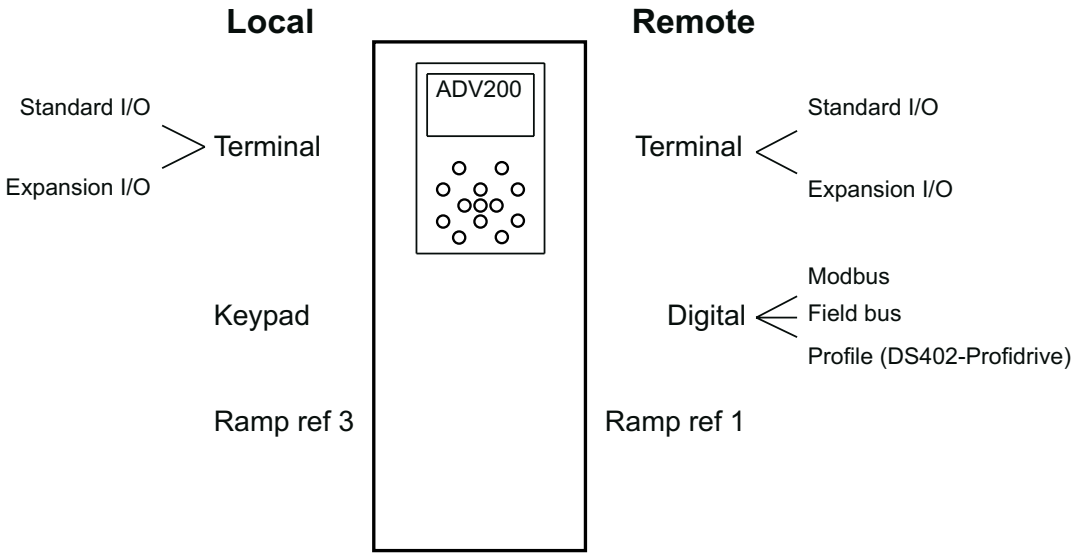
The drive heavy duty continuous current value to be used is the factory setting read in PAR 488 **Drive cont current**.

The tolerance band is the same for both directions of rotation of the motor.

11 – COMMANDS



It is possible to work in **Local** or **Remote** mode.



When switching between **Remote** and **Local** modes the origin of the Enable and Start commands is switched and in the **Ramp Ref** block, switching occurs between Ramp ref 1 and Ramp ref 3.

In **Remote** mode the "**Commands remote sel**" parameter is used to configure the source of the Enable and Start commands which can be **Terminal** (standard digital input, expansion digital input) or **Digital** (Modbus, Fieldbus, Profile DS402, Profile profidrive).

In **Local** mode the "**Commands local sel**" parameter is used to configure the source of the Enable and Start commands, which can be **Terminal** (standard digital input, expansion digital input) or **Keypad** (Start key, Stop key).

In **Remote** ⇨ **Digital** mode the **Digital Enable src** and **Digital Start src** parameters must be used to configure the source.

Normally the sources are the Pad parameters. Modbus or Fieldbus must therefore write the desired value on the Pad parameters. Alternatively, the value of 6000 can be written directly on the **Digital Enable src** and **Digital Start src**

parameters for a source of Null (0) or the value of 6002 for a source of One (1).
Another alternative is to configure the **Digital Enable src** and **Digital Start src** sources on the **BitX decomp mon** parameters, so that the Modbus or Fieldbus can then write the desired value on the **Dig word decomp** parameter.

Local ⇔ Remote switching is performed with the variable value configured as **Loc/Remote src**, i.e. it can be a standard digital input, expansion digital input, Modbus, Fieldbus, **Dig Local/Remote**.
In the default condition, the associated variable is **Dig Local/Remote**, which is written by the **LOC** key from the keypad: switching is thus performed by pressing the **LOC** key.
For safety reasons, **Local ⇔ Remote** switching is only performed with **Terminal Enable = 0**.

Example 1

With the machine in automatic operating mode, the drive works in Remote -> Digital -> Fieldbus mode.
With the machine in manual operating mode, the drive works in Local -> Terminal -> Standard digital input mode.
If switching from automatic to manual machine operation, the drive must switch between Remote and Local mode. The switch command must be sent via standard digital input or fieldbus.

Example 2

With the machine controlled from console A, the drive operates in Local -> Terminal -> Standard digital input mode.
With the machine controlled from console B, the drive operates in Remote ->Digital -> Expansion digital input mode.
When switching the control console, the drive must switch between Remote and Local mode. The switch command must be sent via Standard digital input or Expansion digital input.
This configuration is allowed because the Terminal variables are available in the digital command selection lists.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.1	**1000**	**Commands remote sel**		ENUM		Terminals	0	1	RWZ	FVS

This parameter defines the source of the command signals when the drive is used in the Remote mode.

The Enable command can only be set via hardware, connecting a positive voltage (+24VDC) to terminal 7.

0 Terminals
1 Digital

When the parameter is set to **Terminals** the source of the **Enable cmd mon** command is the **Enable** terminal (7) and the origin of the **Start cmd mon** command is configured using the **Terminal Start src** parameter.

When the parameter is set to **Digital** the origin of the **Enable cmd mon** command is configured using the **Digital Enable src** parameter and the origin of the **Start cmd mon** command is configured using the **Digital Start src** parameter.
If **Digital** is set to generate the **Enable cmd mon** command, as well as the variable associated with **Digital Enable src**, the enable hardware command must also be sent to the **Enable** terminal.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.2	**1002**	**Commands local sel**		ENUM		Keypad	0	2	ERWZ	FVS

This parameter defines the source of the command signals when the drive is used in the **Local** mode.

0 Terminals
2 Keypad

When the parameter is set to **Terminals** the source of the **Enable cmd mon** command is the **Enable** terminal (7) and the origin of the **Start cmd mon** command is configured using the **Terminal Start src** parameter.

When the parameter is set to **Keypad** the origin of the **Enable cmd mon** and **Start cmd mon** commands is the Start key. When **Keypad** is set to generate the **Enable cmd mon** command, as well as the Start key the enable hardware command must also be sent to the **Enable** terminal (7).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.3	**1004**	**Enable/disable mode**		ENUM		Stop/FS&Spd=0	0	3	ERWZ	FVS

This parameter is used to define the generation of **Enable cmd mon**, i.e. to configure the type of control used for enabling and disabling the drive.

0 Off
1 Stop/FS&Spd = 0
2 Stop&Spd = 0
3 FS&Spd = 0

If set to **0 Off**:

In **Terminal** mode the drive is enabled and disabled via the **Enable** terminal.
In **Digital** mode the drive is enabled and disabled when the signal on the **Enable** terminal and the **Digital Enable** command are present simultaneously.
In **Keypad** mode the drive is enabled if the hardware is enabled on the **Enable** terminal and the **Start** key is pressed.
In **Keypad** mode it is disabled if the hardware is not enabled on the **Enable** terminal or if the **Stop** key is pressed twice.

If **1 Stop/FS&Spd = 0** is set:

In **Terminal** mode the drive is enabled when the hardware is enabled on the **Enable** terminal, on the terminal programmed as **Terminal Start** and the **FastStop** terminal must not be enabled.
In **Terminal** mode the drive is instantly disabled if there is no signal on the **Enable** terminal, or when speed=0 is reached if the **Start command** is disabled or the terminal programmed as **FastStop** is enabled.
In **Digital** mode the drive is enabled when the hardware is enabled on the **Enable** terminal, the **Digital Enable**, In **Digital** mode the drive is instantly disabled if there is no signal on the **Enable** terminal, or when speed=0 is reached if the **Digital Start** command is disabled or the terminal programmed as **FastStop** is enabled.
In **Keypad** mode the drive is enabled if the hardware is enabled on the **Enable** terminal and the **Start** key is pressed, with the command disabled on the **FastStop** terminal.
In **Keypad** mode the drive is disabled instantly if the signal is not present on the **Enable** terminal or the **Stop** key is pressed twice.

If **2 Stop&Spd = 0** is set:

In **Terminal** mode the drive is enabled if the hardware is enabled on the **Enable** terminal and the signal is enabled on the terminal programmed as **Terminal Start**.
In **Terminal** mode the drive is instantly disabled if there is no signal on the **Enable** terminal, or if, upon reaching the speed=0, the **Terminal Start** command is disabled.
In **Digital** mode the drive is enabled when the hardware is enabled on the **Enable** terminal and the **Digital Enable** and **DigitalStart** signals are present.
In **Digital** mode the drive is instantly disabled if the signal is not present on the **Enable** terminal, or the **Digital Enable** command is not present, or upon reaching the speed=0 if the **Digital Start** command is set to 0.
In **Keypad** mode the drive is enabled when the hardware is enabled on the **Enable** terminal and the **Start** key is pressed.
In **Keypad** mode the drive is instantly disabled if the signal is not present on the **Enable** terminal or the **Stop** key is pressed twice, or when the speed=0 is reached if the **Stop** key is pressed.

If **3 FS&Spd = 0** is set:

In **Terminal** mode the drive is enabled when the hardware is enabled on the **Enable** terminal and the **FastStop**

terminal is not enabled.

In **Terminal** mode the drive is instantly disabled if there is no signal on the **Enable** terminal, or when the speed=0 is reached if the terminal programmed as **FastStop** is enabled.

In **Digital** mode the drive is enabled if the hardware is enabled on the **Enable** terminal and the **Digital Enable** signal is present, with the command on the **FastStop** terminal disabled.

In **Digital** mode the drive is instantly disabled if there is no signal on the **Enable** terminal, or no **Digital Enable** command, or when the speed=0 is reached if the **Digital Start** command is set to 0.

In **Keypad** mode the drive is enabled if the hardware is enabled on the **Enable** terminal and the **Start** key is pressed, with the **FastStop** command disabled.

In **Keypad** mode the drive is instantly disabled if there is no signal on the **Enable** terminal or the **Stop** key is pressed twice, or if, when the speed=0 is reached, the terminal programmed as **FastStop** is enabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.4	**1006**	**Speed 0 disable dly**	ms	UINT16		1000	0	10000	ERW	FVS

Setting of a delay in milliseconds between reaching the zero speed and disabling the drive when **Enable/Disable mode** is set to a value other than **Off**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.5	**1008**	**Stop key mode**		ENUM		Inactive	0	1	ERW	FVS

Setting of the stop key functioning on the keypad. In Local with command from Keypad , this configuration is ineffective.

Active in remote control mode (PAR 1012=1) both by using “Terminals” command or “Digital” commands and, in local control mode (PAR 1012=0) by using “Terminals” command

0 Inactive

1 EmgStop&Alarm

If the command is set to **Inactive**, pressing the Stop key on the keypad is ineffective.

If the command is set to **EmgStop&Alarm**, when the Stop key is pressed the motor stops in FastStop mode and the **Emg stop alarm** is generated. When the motor reaches the speed=0, the drive is automatically disabled and waits for the **Fault reset** command. The **Fault reset** command must be sent twice to reset the drive.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.6	**1010**	**Commands safe start**		BIT		1	0	1	ERW	FVS

This parameter is used to define whether the safe start command is disabled or enabled at drive power-on.

0 Off

1 On

If set to **Off**, the safe start command is disabled. If the drive is powered-on with the hardware enabled on the **Enable** terminal, the motor could start rotating.

When set to **On**, the safe start command is enabled. If the drive is powered-on with the hardware enabled on the **Enable** terminal, the motor will not rotate. To set the drive to accept subsequent commands, open the hardware enabling contact on the **Enable** terminal and then close it again.

If the drive is restarted (and the Enable command is present), message [23] **Safe start active** is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.7	**1012**	**Dig local/remote**		ENUM	16	Remote	0	1	ERW	FVS

Setting **Local** or **Remote** operating mode.

0 Local

1 Remote

Writing this parameter is only effective if it is associated with **Local/Remote src** and if performed without the hardware enabled on the **Enable** terminal. Press LOC to modify the value of this parameter 0<->1.

To disable the LOC key, set **Local/Remote src** to a value other than **Dig local/remote**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.8	**1014**	**Local/remote src**		LINK	16	1012	0	16384	ERW	FVS

Selection of the origin (source) of the signal that switches between **Remote** and **Local**. Switching can only be performed if the hardware is not enabled on the **Enable** terminal.

The signal to be associated with this function can be selected from the "**L_DIGSEL3**" selection list.

0 Local

1 Remote

In **Remote** mode the "**Commands remote sel**" parameter is used to configure the source of the Enable and Start commands, which can be **Terminal** (standard digital input, expansion digital input) or **Digital** (Modbus, Fieldbus, Profile DS402, Profile profidrive).

In **Local** mode the "**Commands local sel**" parameter is used to configure the source of the Enable and Start commands, which can be **Terminal** (standard digital input, expansion digital input) or **Keypad** (Start key, Stop key).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.9	**1016**	**Terminal Start src**		LINK	16	1048	0	16384	ERW	FVS

Selection of the origin (source) of the **Terminal Start** signal. Switching can only be performed if the hardware is not enabled on the **Enable** terminal.

The signal to be associated with this function can be selected from the "**L_DIGSEL3**" selection list.

In the default condition, the origin of the Terminal Start signal is the **Start** output of the ForwardReverseControl (FRC) block.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.10	**1018**	**Digital Enable src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) of the signal that defines the enabling of the drive when the commands are sent via serial line or fieldbus. The command to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.11	**1020**	**Digital Start src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) of the Digital Start signal. The signal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.12	**1022**	**FastStop src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) for the fast stop signal (FastStop). The terminal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list. During the execution of the FastStop command the ramps used are **Acceleration time 3** and **Deceleration time 3**.

The **FastStop mode** (PAR 1036) parameter can be used to define the specific operating modes for automatic motor restart.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.13	**1024**	**Enable cmd mon**		BIT	16	0	0	1	R	FVS

The status of the enable command is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.14	**1026**	**Start cmd mon**		BIT	16	0	0	1	R	FVS

The status of the Start command is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.15	**1028**	**FastStop cmd mon**		BIT	16	0	0	1	R	FVS

This parameter is used to display the value of the FastStop command state.

0 FastStop not active

1 FastStop active

If the “FastStop mode” parameter is set to 0 = “Not Latched”, the value of the FastStop command monitor changes to 1 when the FastStop input is activated and remains high (1) until the Enable or FastStop inputs are deactivated (0 state).

If the “FastStop mode” parameter is set to 1 = “Latched”, the value of the FastStop command monitor changes to 1 when the FastStop input is activated and remains high (1) until the Enable, Start, FastStop inputs are deactivated (0 state).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.16	**1054**	**Safe start mon**		BIT	16BIT	0	0	1	ER	FVS

Display of state of “check safe start” function:

0 Disable

1 Enable

The function is enabled with PAR 1010 **Commands safe start.**

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.17	**1040**	**FR mode**		ENUM		Normal	0	2	ERWZ	FVS

Setting of the operating mode of the Forward Reverse Control (FRC) block.

0 Normal

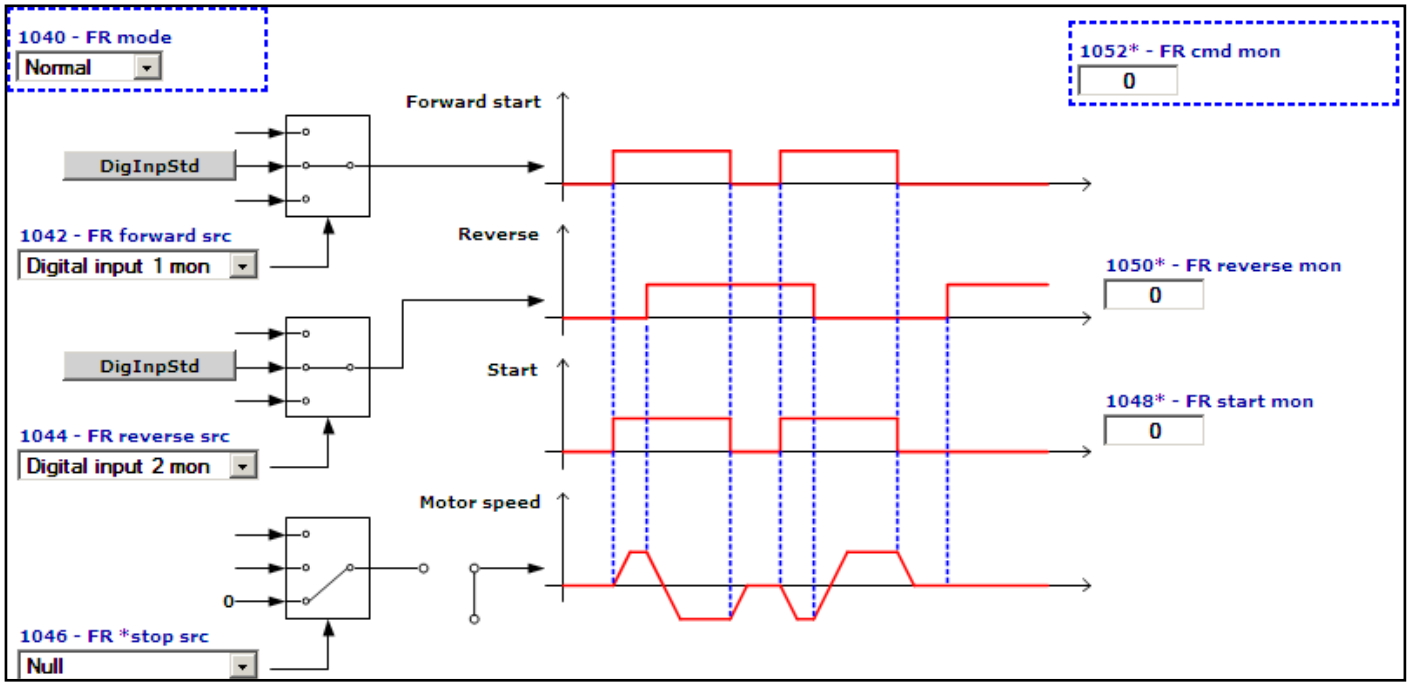
1 Two wire Two wire control

2 Three wire Three wire control

The default use of the FRC block is shown below.

The Start command is linked to the Start terminal and the Reverse command is linked to Ramp ref invert.

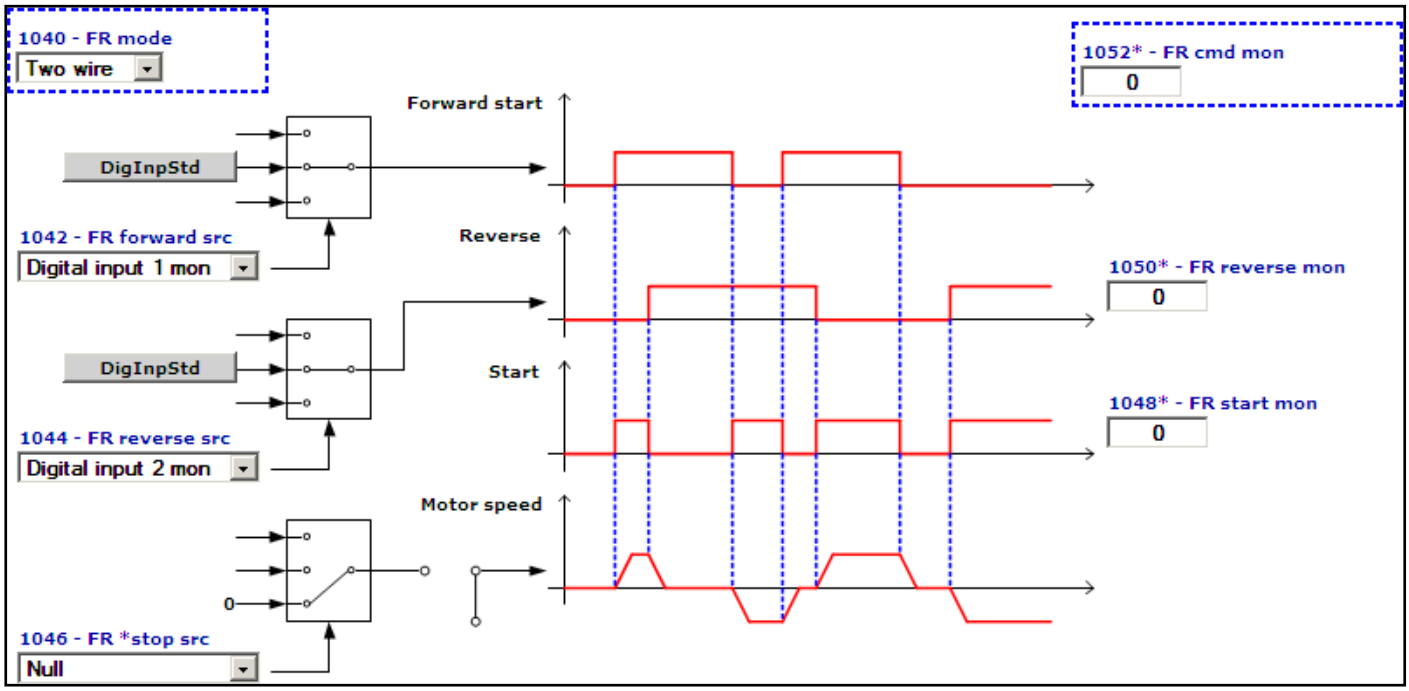
The function diagrams of the 3 modes are shown below.



When **0 - Normal** control is set the motor only starts rotating when the **FR Forward** command is sent. If the **FR Reverse** command is present the motor rotates in the reverse direction,

The **FR start mon** output repeats the status of the **FR Forward** command, while the **FR reverse mon** output

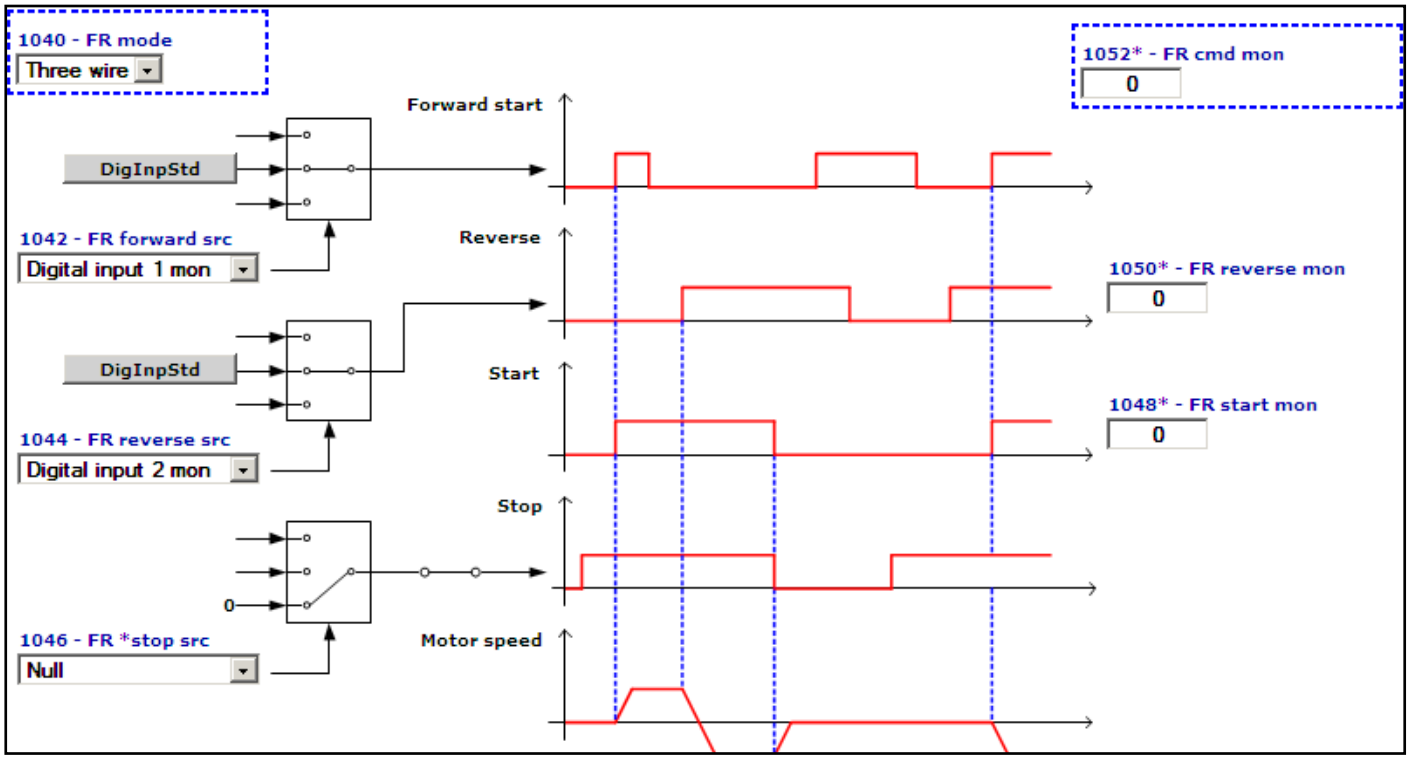
repeats the status of the **FR Reverse** command.



When set to **1 - Two wire** control, the motor only rotates if the **FR Forward** command or **FR Reverse** command is present. The simultaneous presence of the **FR Forward** and **FR Reverse** commands causes the motor to stop.

The **FR start mon** output is enabled if the **FR Forward** and **FR Reverse** commands are not present simultaneously.

The **FR reverse mon** output repeats the status of the **FR Reverse** command.



For **2 - Three wire** control the **FR *stop** command must be present on a digital input programmed via the **FR *stop src** parameter (not present in the default condition). When set to **Three wire** control, the motor starts upon receiving an impulse of not less than 50 msec on the **FR Forward** terminal. Once the motor has started the command is no longer necessary on the **FR Forward** terminal. To reverse the direction of rotation enable the FR Reverse command: the motor will be brought to the zero speed with the set ramp and will restart in the opposite direction of rotation. The motor rotates in the Reverse direction for as long as the FR Reverse signal is enabled. If the **FR Reverse** signal is disabled the motor rotates in the **Forward** direction. To stop the motor open the FR *stop contact.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.18	**1042**	**FR forward src**		LINK	16	1112	0	16384	ERW	FVS

Selection of the origin (source) for the FR forwardstart signal. With this command the motor starts to rotate (with the **Enable** command enabled). The terminal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.19	**1044**	**FR reverse src**		LINK	16	1114	0	16384	ERW	FVS

Selection of the origin (source) for the FR reverse signal. With this command the motor reverses the direction of rotation (with the **Enable** command enabled). The terminal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.20	**1046**	**FR *stop src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) for the FR stop signal. The terminal to be associated with this function can be selected from the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.21	**1048**	**FR start mon**		BIT	16	0	0	1	ER	FVS

The status of the Start output of the **Forward Reverse Control (FRC)** block is displayed.

0 Stop
1 Start

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.22	**1050**	**FR reverse mon**		BIT	16	0	0	1	ER	FVS

The status of the Reverse output of the **Forward Reverse Control (FRC)** block is displayed.

0 No Reverse
1 Reverse

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.23	**1052**	**FR cdm mon**		UINT16		0	0	0	ER	FVS

The status of the commands of the **Forward Reverse Control (FRC)** block are displayed.

FR *stop src	FR reverse src	FR forward src	FR cdm mon
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3
1	0	0	4
1	0	1	5
1	1	0	6
1	1	1	7

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.24	**1032**	**Drv Interlock src**		LINK	16	6002	0	16384	ERW	FVS

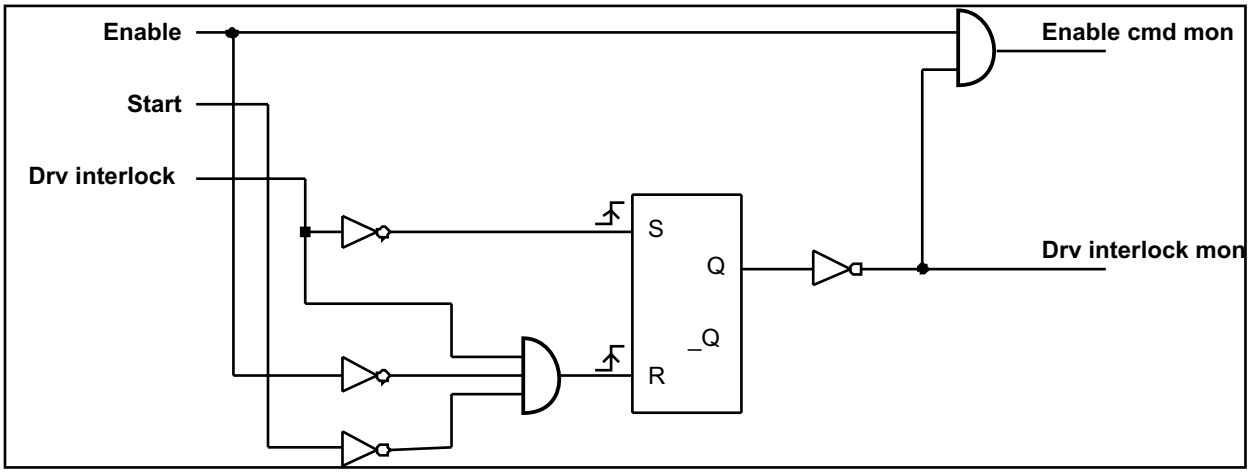
This parameter is used to select the origin (source) of the Drv Interlock signal.
The signal to be associated with this function can be selected from the "L_DIGSEL2" selection list.

0 Drive interlock active (Drive disabled)
1 Drive interlock not active (Drive can be enabled)

If the Drive Interlock command is active, the drive cannot be enabled (Drive Enable command).

If the Drive Interlock command is not active, the drive can be enabled by applying the Drive enable command.

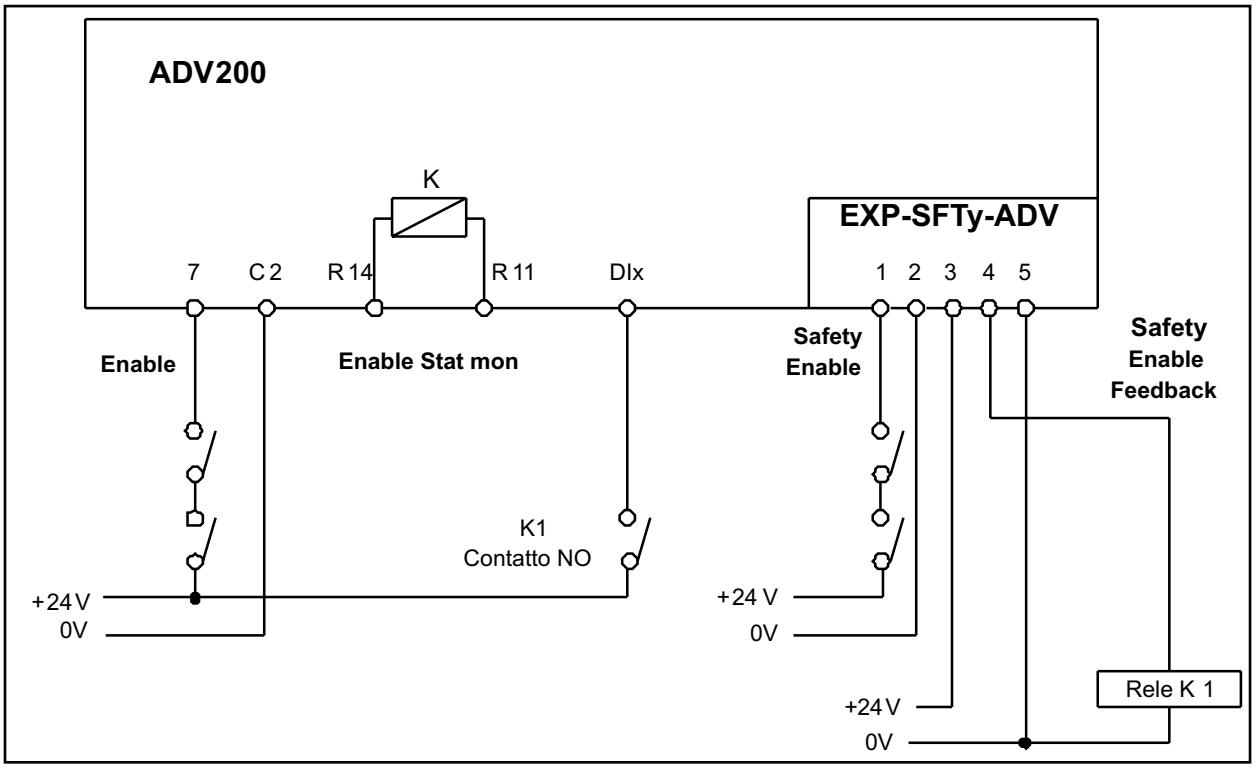
In default conditions the "**Drv Interlock src**" signal is connected to "One". In this configuration the Drive interlock function is not active and the drive can only be enabled with the "Enable" command.



The **Drv Interlock** signal, with the "**EXP-SFTy-ADV**" (ADV200.....-SI series) safety card, is used to disable the drive under certain conditions and to prevent any dangerous situations from arising.

The drive reads the state of the Safety card via the **Drv Interlock src** input

The EXP-SFTy-ADV card can be connected to the drive as shown in the figure below.



If the "Drv Interlock" command is active (low state = 0) the drive is disabled immediately. To enable the drive again, set the "Drv Interlock" command to the high state (1) (Drive interlock not active) and the "Enable" and "Start" commands to the 0 state (Disabled and Stop) and then to the high state (1).

The "Drv Interlock" command must be sent before the "Enable" command.

The EXP-SFTy-ADV card supplies the Safety Enable Feedback digital output as shown in the following table.

Safety Enable	Safety Enable Feedback	Description
Open	0V	Safety function active The drive does not supply current
+24V	+24V	Safety function not active The drive can supply current

A relay (K1) can be used to repeat the safety card feedback signal. A normally

open (NO) contact of the relay can be connected to a drive input set to "**Drv Interlock src**".

If the **Safety card is active** (the drive does not supply current) the Safety Enable Feedback digital output is set to low (0), the relay is not excited and the NO contact is open.

When the "Drv interlock" signal receives a low command (0) (Drive interlock active) the drive is disabled.

The "**Drv Interlock src**" can be used to know the instantaneous state of the Safety Enable Feedback function.

The "**Drv interlock mon**" parameter can be used to know the state of the Safety Enable Feedback function taking into account the interlocking logic with the drive Enable command.

0 Drive interlock active (the Safety card is active)

1 Drive interlock not active (the Safety card is not active)

In "**Drv interlock mon**" the Drive interlock state remains active until the Safety card is deactivated and the "Enable" and "Start" commands are set to low (0).

The drive remains disabled until the "Drv Interlock" commandis set to the high state (1) (Drive interlock not active) and the "Enable" and "Start" commands to the low state (0) (Disabled and Stop) and then to the high state (1).

If the **Safety card is not active** (the drive can supply current) the Safety Enable Feedback digital output is set to high (1), the relay is excited and the NO contact is closed.

The "Drv interlock" signal receives a high (1) signal (Drive interlock not active), the drive can be enabled by applying the drive enable command.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.25	**1034**	**Drv interlock mon**		BIT	16	0	0	1	ER	FVS

In "**Drv interlock mon**" the Drive interlock state remains active until the Safety card is deactivated and the "Enable" and "Start" commands are set to low (0).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.26	**1036**	**FastStop mode**		ENUM		Not Latched	0	1	ERW	FVS

This parameter is used to select the operating mode of the FastStop command.

0 Not Latched

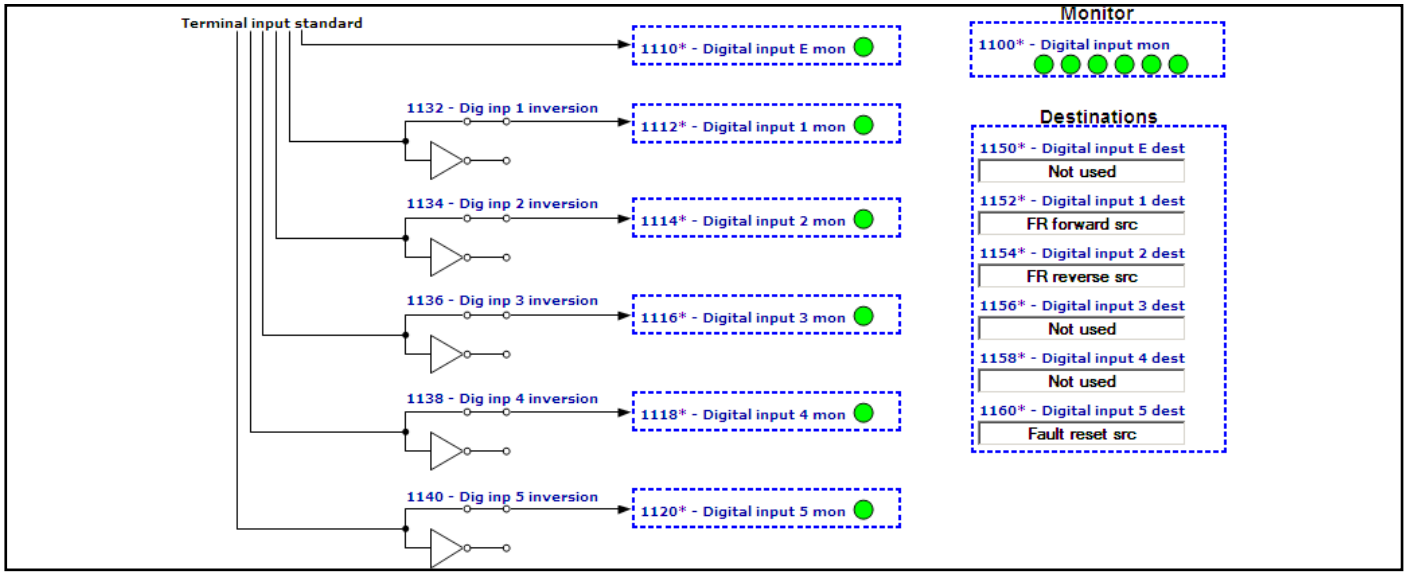
1 Latched

If set to 0 (Not Latched), the FastStop command is not stored. Therefore, if the FastStop command is removed the drive automatically restarts.

If set to 1 (Latched) the FastStop command is stored. If the FastStop command is removed, the drive will not restart automatically. It can only restart after removing the FastStop command and sending a new Enable and Start command.

12 – DIGITAL INPUTS

Note: The numbering and description of the following parameters may change if an MDPLc application is active.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
12.1	**1132**	**Dig inp 1 inversion**		BIT		0	0	1	RW	FVS
12.2	**1134**	**Dig inp 2 inversion**		BIT		0	0	1	RW	FVS
12.3	**1136**	**Dig inp 3 inversion**		BIT		0	0	1	RW	FVS
12.4	**1138**	**Dig inp 4 inversion**		BIT		0	0	1	RW	FVS
12.5	**1140**	**Dig inp 5 inversion**		BIT		0	0	1	RW	FVS

Reversal of the logic status of the function associated with the digital input (e.g. from enabled with +24V signal to enabled with low signal).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
12.6	**1150**	**Digital input E dest**		ILINK		0	0	0	ER	FVS
12.7	**1152**	**Digital input 1 dest**		ILINK		0	0	0	ER	FVS
12.8	**1154**	**Digital input 2 dest**		ILINK		0	0	0	ER	FVS
12.9	**1156**	**Digital input 3 dest**		ILINK		0	0	0	ER	FVS
12.10	**1158**	**Digital input 4 dest**		ILINK		0	0	0	ER	FVS
12.11	**1160**	**Digital input 5 dest**		ILINK		0	0	0	ER	FVS

The function to which the associated digital input refers is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
12.12	**1240**	**Dig inp 1X inversion**		BIT		0	0	1	RW	FVS
12.13	**1242**	**Dig inp 2X inversion**		BIT		0	0	1	RW	FVS
12.14	**1244**	**Dig inp 3X inversion**		BIT		0	0	1	RW	FVS
12.15	**1246**	**Dig inp 4X inversion**		BIT		0	0	1	RW	FVS
12.16	**1248**	**Dig inp 5X inversion**		BIT		0	0	1	RW	FVS
12.17	**1250**	**Dig inp 6X inversion**		BIT		0	0	1	RW	FVS
12.18	**1252**	**Dig inp 7X inversion**		BIT		0	0	1	RW	FVS
12.19	**1254**	**Dig inp 8X inversion**		BIT		0	0	1	RW	FVS
12.20	**5540**	**Dig inp 9X inversion**		BIT		0	0	1	RW	FVS
12.21	**5542**	**Dig inp 10X inversion**		BIT		0	0	1	RW	FVS
12.22	**5544**	**Dig inp 11X inversion**		BIT		0	0	1	RW	FVS
12.23	**5546**	**Dig inp 12X inversion**		BIT		0	0	1	RW	FVS
12.24	**5548**	**Dig inp 13X inversion**		BIT		0	0	1	RW	FVS
12.25	**5550**	**Dig inp 14X inversion**		BIT		0	0	1	RW	FVS
12.26	**5552**	**Dig inp 15X inversion**		BIT		0	0	1	RW	FVS
12.27	**5554**	**Dig inp 16X inversion**		BIT		0	0	1	RW	FVS

These parameters invert the state of the corresponding digital input of the expansion card.

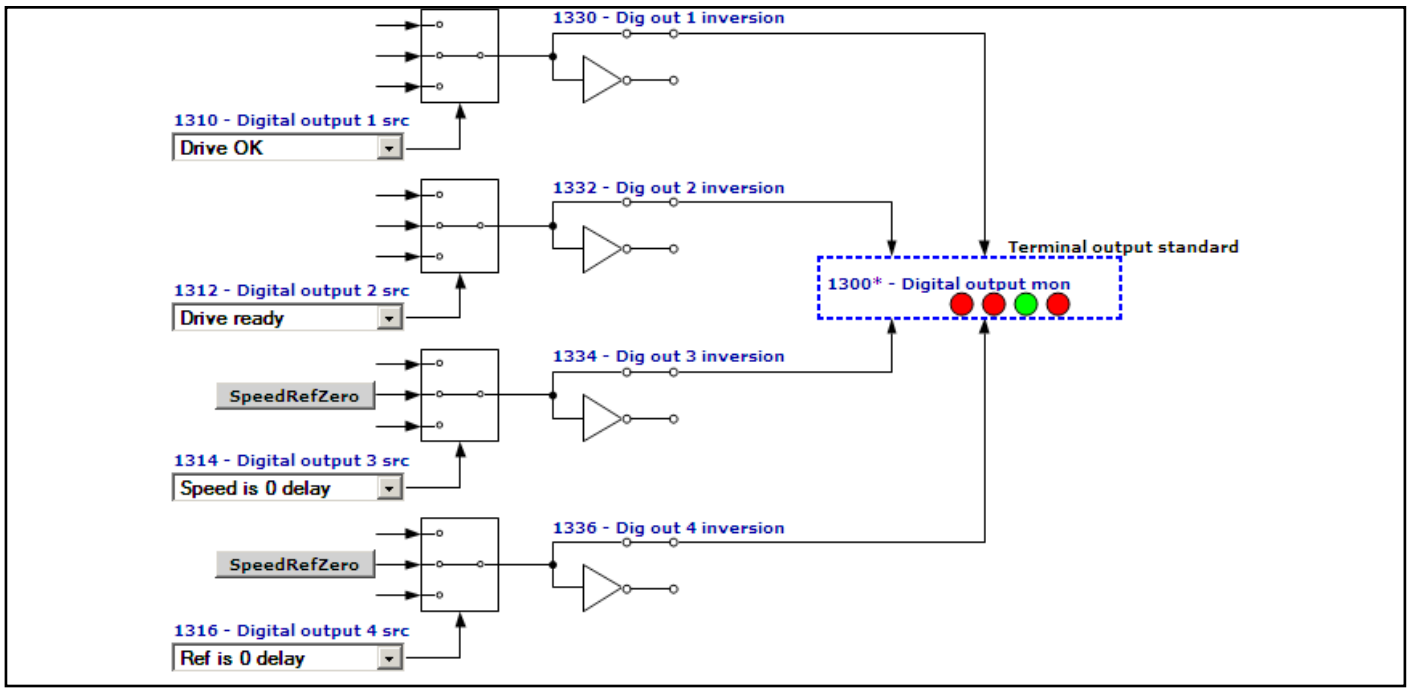
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
12.28	**1270**	**Dig input 1X dest**		ILINK		0	0	0	ER	FVS
12.29	**1272**	**Dig input 2X dest**		ILINK		0	0	0	ER	FVS
12.30	**1274**	**Dig input 3X dest**		ILINK		0	0	0	ER	FVS
12.31	**1276**	**Dig input 4X dest**		ILINK		0	0	0	ER	FVS
12.32	**1278**	**Dig input 5X dest**		ILINK		0	0	0	ER	FVS
12.33	**1280**	**Dig input 6X dest**		ILINK		0	0	0	ER	FVS
12.34	**1282**	**Dig input 7X dest**		ILINK		0	0	0	ER	FVS
12.35	**1284**	**Dig input 8X dest**		ILINK		0	0	0	ER	FVS

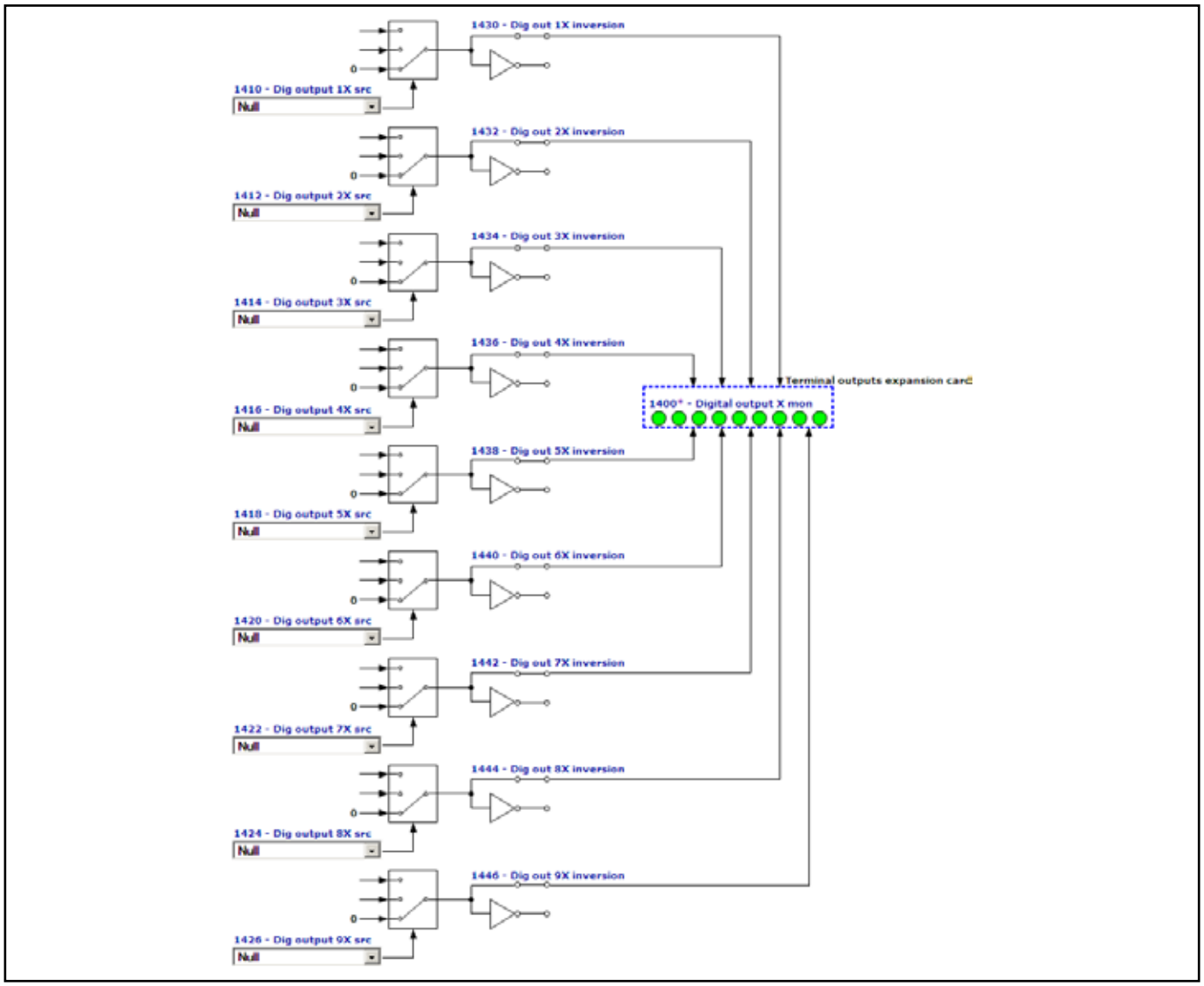
12.36	**5570 Dig input 9X dest**	ILINK	0	0	0	ER	FVS
12.37	**5572 Dig input 10X dest**	ILINK	0	0	0	ER	FVS
12.38	**5574 Dig input 11X dest**	ILINK	0	0	0	ER	FVS
12.39	**5576 Dig input 12X dest**	ILINK	0	0	0	ER	FVS
12.40	**5578 Dig input 13X dest**	ILINK	0	0	0	ER	FVS
12.41	**5580 Dig input 14X dest**	ILINK	0	0	0	ER	FVS
12.42	**5582 Dig input 15X dest**	ILINK	0	0	0	ER	FVS
12.43	**5584 Dig input 16X dest**	ILINK	0	0	0	ER	FVS

These parameters show which “src” parameter is using the corresponding digital input of the expansion card.

13 – DIGITAL OUTPUTS

Note: The numbering and description of the following parameters may change if an MDPLc application is active.





Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
13.1	**1310**	**Digital output 1 src**		LINK	16	1062	0	16384	RW	FVS
13.2	**1312**	**Digital output 2 src**		LINK	16	1064	0	16384	RW	FVS
13.3	**1314**	**Digital output 3 src**		LINK	16	946	0	16384	RW	FVS
13.4	**1316**	**Digital output 4 src**		LINK	16	936	0	16384	RW	FVS

Selection of the origin (source) of the signal to be assigned to the relative digital output. The functions that can be associated with the digital outputs are listed in the "**L_DIGSEL1**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
13.5	**1330**	**Dig out 1 inversion**		BIT		0	0	1	RW	FVS
13.6	**1332**	**Dig out 2 inversion**		BIT		0	0	1	RW	FVS
13.7	**1334**	**Dig out 3 inversion**		BIT		0	0	1	RW	FVS
13.8	**1336**	**Dig out 4 inversion**		BIT		0	0	1	RW	FVS

Reversal of the logic status of the function associated with the digital output.

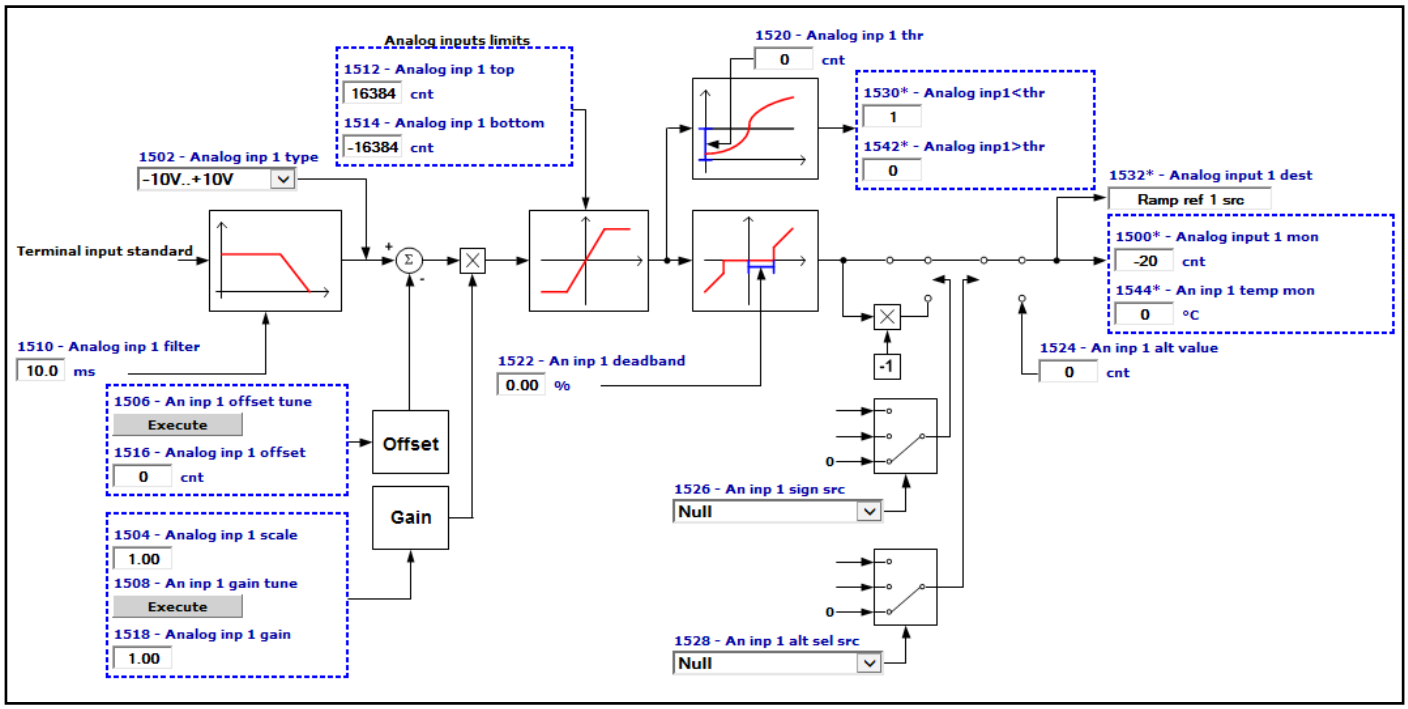
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
13.9	**1410**	**Dig output 1X src**		LINK	16	6000	0	16384	RW	FVS
13.10	**1412**	**Dig output 2X src**		LINK	16	6000	0	16384	RW	FVS
13.11	**1414**	**Dig output 3X src**		LINK	16	6000	0	16384	RW	FVS
13.12	**1416**	**Dig output 4X src**		LINK	16	6000	0	16384	RW	FVS
13.13	**1418**	**Dig output 5X src**		LINK	16	6000	0	16384	RW	FVS
13.14	**1420**	**Dig output 6X src**		LINK	16	6000	0	16384	RW	FVS
13.15	**1422**	**Dig output 7X src**		LINK	16	6000	0	16384	RW	FVS
13.16	**1424**	**Dig output 8X src**		LINK	16	6000	0	16384	RW	FVS
13.17	**1426**	**Dig output 9X src**		LINK	16	6000	0	16384	RW	FVS

Selection of the origin (source) of the signal to be assigned to the relative digital output of the expansion card. The functions that can be associated with the digital outputs are listed in the "**L_DIGSEL1**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
13.18	**1430**	**Dig out 1X inversion**		BIT		0	0	1	RW	FVS
13.19	**1432**	**Dig out 2X inversion**		BIT		0	0	1	RW	FVS
13.20	**1434**	**Dig out 3X inversion**		BIT		0	0	1	RW	FVS
13.21	**1436**	**Dig out 4X inversion**		BIT		0	0	1	RW	FVS
13.22	**1438**	**Dig out 5X inversion**		BIT		0	0	1	RW	FVS
13.23	**1440**	**Dig out 6X inversion**		BIT		0	0	1	RW	FVS
13.24	**1442**	**Dig out 7X inversion**		BIT		0	0	1	RW	FVS
13.25	**1444**	**Dig out 8X inversion**		BIT		0	0	1	RW	FVS
13.26	**1444**	**Dig out 9X inversion**		BIT		0	0	1	RW	FVS

Reversal of the logic status of the function associated with the digital output of the expansion card.

14 – ANALOG INPUTS



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.1	**1500**	**Analog input 1 mon**	cnt	INT16	16/32	0	0	0	R	FVS
14.17	**1550**	**Analog input 2 mon**	cnt	INT16	16/32	0	0	0	R	FVS

The value of the voltage on the output of the function block of the relative analog input is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.2	**1502**	**Analog inp 1 type**		ENUM		-10V..+10V	0	2	RW	FVS
14.18	**1552**	**Analog inp 2 type**		ENUM		-10V..+10V	0	2	RW	FVS

Selection of the type of input (voltage or current). Depending on the input signal, move the switches on the regulation card. The factory parameter is inputs set for differential voltage signals (± 10V).

0 -10V…+10V
1 0,20mA … 10V
2 4..20mA
3 0.1V..10.1V
4 KTY84

Select option **0** in order to connect a maximum voltage of ±12.5V (typically ±10V/5mA) to the analog input concerned. If the signal is used as a reference, reverse the direction of rotation by inverting the voltage polarity.

With this selection, the analog input can acquire the temperature of motor with KTY84 / PTC sensor. (An analog output need to be used as power supply signal).

Additional info are available through the Quick startup manual.

Select option **1** to connect a max voltage of 12.5V (typically 10V/5mA) or a signal in current from 0 ... 20 mA to the analog input concerned. The signal must be positive.

Select option **2** to connect a current signal of 4...20 mA to the analog input concerned. The signal must be positive.

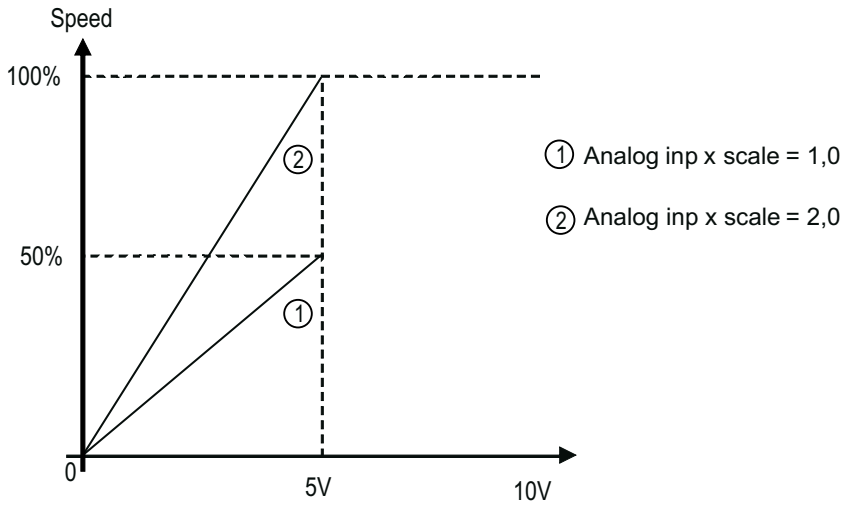
Select option **3** to connect 0.1V...10.1V to the analog input in use. You can also detect signal loss (due to disconnection or short circuit) with alarm [62] **AnalogInpLoss**.

Select option **4** to connect a KTY84 temperature sensor to the analog input in use (you have to use an analog output as power supply signal). You can also detect signal loss (due to disconnection or short circuit) with alarm [62] **AnalogInpLoss**.

NOTE! See chapter 7.2 of Quick startup manual for setting as reaading of a temperature sensor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.3	**1504**	**Analog inp 1 scale**		FLOAT		1.0	-10.0	10.0	RW	FVS
14.19	**1554**	**Analog inp 2 scale**		FLOAT		1.0	-10.0	10.0	RW	FVS

Setting of a multiplier factor to apply to the relative analog input.



Example:

The speed reference of a drive is assigned with a max external voltage of 5V. With this value the drive must reach the maximum speed allowed (set using **Full scale speed**).

As the **Analog inp x scale** parameter a scale factor of 2 is entered (10V : 5V)

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.4	**1506**	**An inp 1 offset tune**		BIT		0	0	1	RW	FVS
14.20	**1556**	**An inp 2 offset tune**		BIT		0	0	1	RW	FVS

Self-tuning command for the relative analog input offset. Automatic fine tuning of the input. To perform self-tuning, set the input signal to its minimum value and execute the command. The conditions containing an offset can be compensated. When this command is sent, **An inp x offset tune** is automatically selected so that the available input signal corresponds to the zero value of the variable. Offset tuning can also be performed with the drive enabled.

Automatic tuning can only be performed if the following condition is present:

- Input voltage less than 1V or input current less than 2 mA

Note ! The value that is obtained automatically can be changed manually if necessary, using **Analog inp x offset.**

If the voltage setting on the analog input is higher than 1V, the Value too low alarm is generated.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.5	**1508**	**An inp 1 gain tune**		BIT		0	0	1	RW	FVS
14.21	**1558**	**An inp 2 gain tune**		BIT		0	0	1	RW	FVS

Self-tuning command for the relative analog input gain. Automatic fine tuning of the input. When this command is sent, **Analog inp 1 gain x** is automatically selected so that the available input signal corresponds to the maximum value of the variable. Offset tuning can also be performed with the drive enabled.

Two conditions are necessary in order to perform automatic tuning:

- Input voltage greater than 1V or input current greater than 2 mA
- Positive polarity. The value that is found is automatically accepted for the other direction of rotation.

Note ! If necessary, the value obtained automatically can be changed manually via **Analog inp x gain**.

To perform self-tuning, set the input signal to its maximum value and execute the command. A multiplier factor

is calculated to apply to the input signal value (not considering the **Analog inp scale** parameter) to reach the full scale value.

If the voltage setting on the analog input is less than 1V, the Value too low alarm is generated.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.6	**1510**	**Analog inp 1 filter**	ms	FLOAT		10.0	1.0	1000.0	ERW	FVS
14.22	**1560**	**Analog inp 2 filter**	ms	FLOAT		10.0	1.0	1000.0	ERW	FVS

Filter on the measurement of the corresponding analog input. This parameter can be used to control the response of the analog input and reduce any possible noise and interference.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.7	**1512**	**Analog inp 1 top**	cnt	INT16		16384	-32768	+32767	ERW	FVS
14.23	**1562**	**Analog inp 2 top**	cnt	INT16		16384	-32768	+ 32767	ERW	FVS

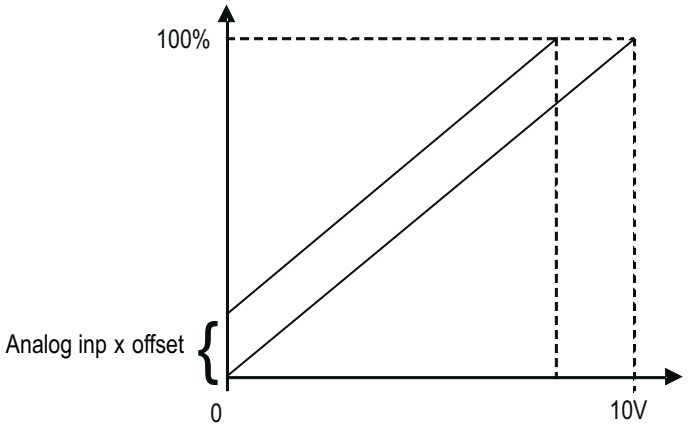
Setting of the upper speed reference limit as a function of the voltage (or current) of the relative analog reference.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.8	**1514**	**Analog inp 1 bottom**	cnt	INT16		-16384	-32768	+ 32767	ERW	FVS
14.24	**1564**	**Analog inp 2 bottom**	cnt	INT16		-16384	-32768	+ 32767	ERW	FVS

Setting of the lower speed reference limit as a function of the voltage (or current) of the relative analog reference.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.9	**1516**	**Analog inp 1 offset**	cnt	INT16		0	-32768	+ 32767	ERW	FVS
14.25	**1566**	**Analog inp 2 offset**	cnt	INT16		0	-32768	+ 32767	ERW	FVS

Setting of a value to compensate the condition in which the analog signal contains an offset, or when the variable assigned to the input already has a value even though no signal is connected.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.10	**1518**	**Analog inp 1 gain**		FLOAT		1.0	-10.0	10.0	ERW	FVS
14.26	**1568**	**Analog inp 2 gain**		FLOAT		1.0	-10.0	10.0	ERW	FVS

This parameter contains the value of the multiplier factor to apply to the analog reference calculated using the **Analog inp gain tune** function.

Example:

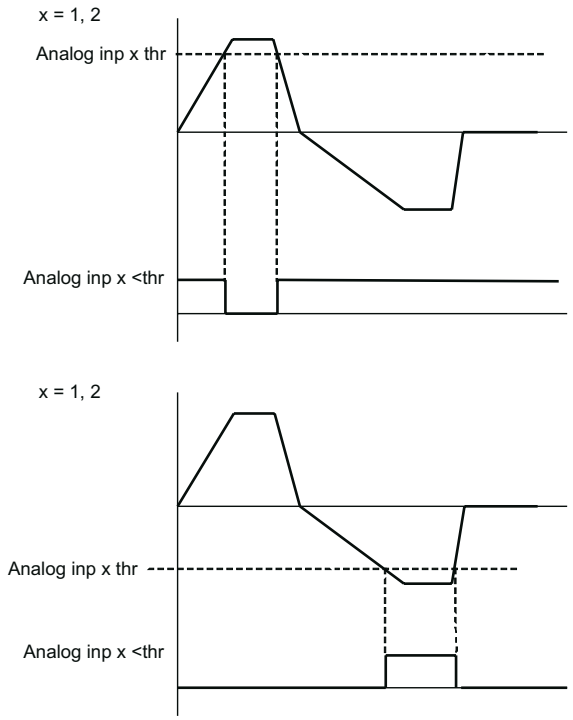
An external analog reference only reaches a maximum of 9.8V instead of 10V. 1.020 (10V : 9.8V) is entered as the **Analog inp x gain** parameter.

The same result can be achieved using the **An inp x gain tune** function. This parameter can be selected from the keypad menu. The maximum analog value available (in this case 9.8V) must be present on the terminal,

with positive polarity. Press the Enter key on the keypad to start analog reference self-tuning.

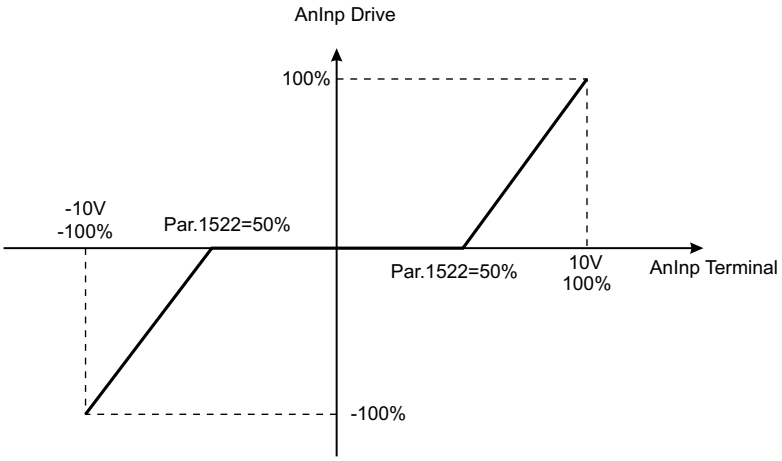
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.11	**1520**	**Analog inp 1 thr**		INT16		0	-16384	+ 16383	ERW	FVS
14.27	**1570**	**Analog inp 2 thr**		INT16		0	-16384	+ 16383	ERW	FVS

Setting of the analog input threshold for the **speed not exceeded** signal, which allows enabling of the digital outputs **Analog inp1** (par. 1530) and **Analog inp2** (par.1580).



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.12	**1522**	**An inp 1 deadband**	perc	FLOAT		0	0	100.0	ERW	FVS
14.28	**1572**	**An inp 2 deadband**	perc	FLOAT		0	0	100.0	ERW	FVS

Deadband referring to the analog input signal. When the value on the input terminal is below the threshold defined by the parameter, the output signal of the analog input block is forced to zero. Outside the deadband, the block output varies linearly from zero to 100%.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.13	**1524**	**An inp 1 alt value**	cnt	INT16	16/32	0	-16384	16384	ERW	FVS
14.29	**1574**	**An inp 2 alt value**	cnt	INT16	16/32	0	-16384	16384	ERW	FVS

Setting of a fixed alternative value for the relative analog input, which can be selected via a command enabled

by a digital input programmed with the **An inp alt sel src** parameter.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.14	**1526**	**An inp 1 sign src**		LINK	16	6000	0	16384	ERW	FVS
14.30	**1576**	**An inp 2 sign src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) of the signal to be assigned to the relative digital input for selecting the direction of rotation of the motor. The functions that can be associated with the digital outputs are listed in the "**L_DIG-SEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.15	**1528**	**An inp 1 alt sel src**		LINK	16	6000	0	16384	ERW	FVS
14.31	**1578**	**An inp 2 alt sel src**		LINK	16	6000	0	16384	ERW	FVS

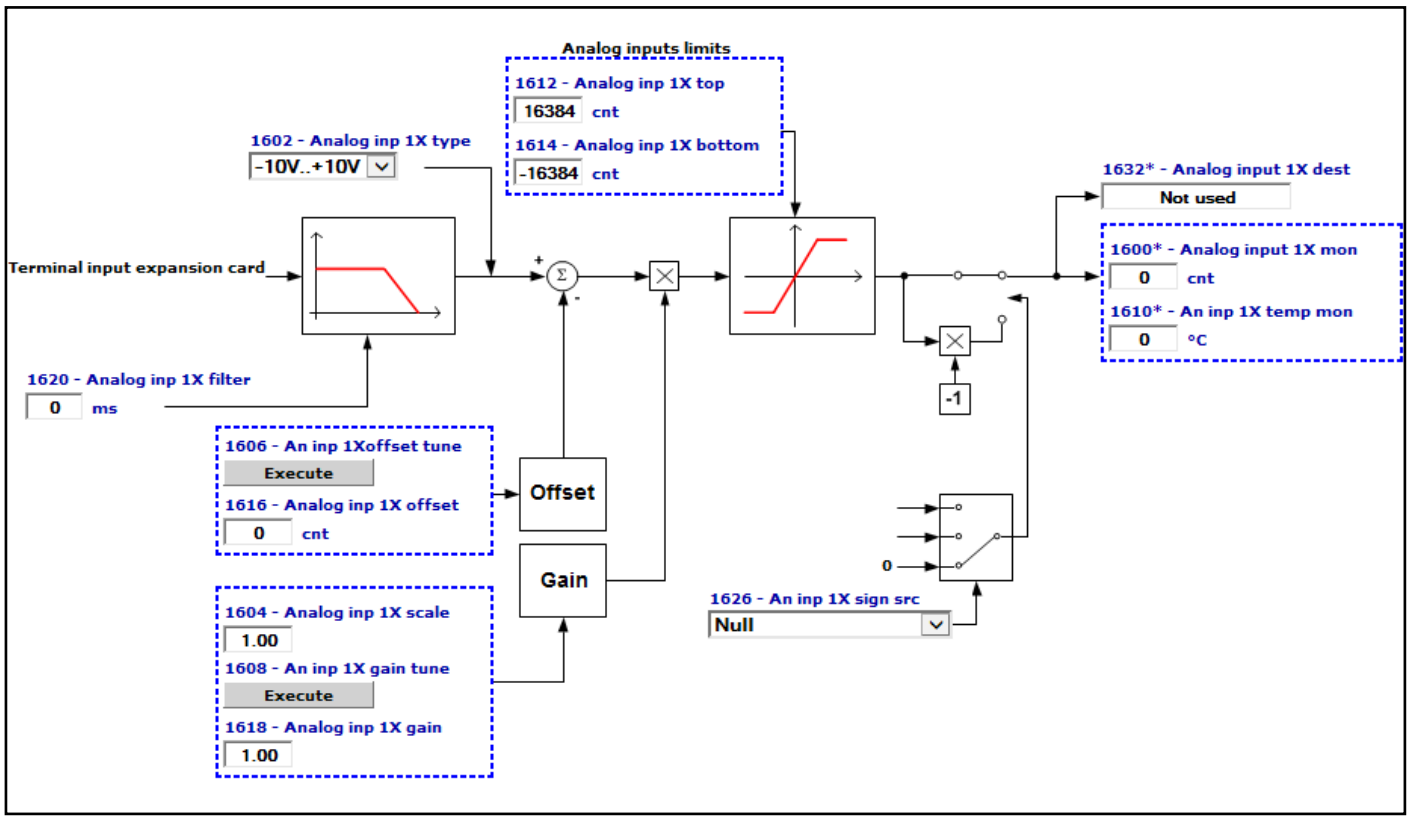
Selection of the origin (source) of the signal to be assigned to the relative digital input for selecting the alternative analog reference. The functions that can be associated with the digital outputs are listed in the "**L_DIG-SEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.16	**1532**	**Analog inp 1 dest**		ILINK		0	0	0	ER	FVS
14.32	**1582**	**Analog inp 2 dest**		ILINK		0	0	0	ER	FVS

The function for which the relative analog input has been programmed and on which it acts is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.33	**1600**	**Analog input 1X mon**	cnt	INT16	16/32	0	-16384	16384	R	FVS
14.45	**1650**	**Analog input 2X mon**	cnt	INT16	16/32	0	-16384	16384	R	FVS

The value of the voltage output of the function block of the relative analog input is displayed.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.34	**1602**	**Analog inp 1X type**		ENUM		-10V..+10V	0	6	RW	FVS
14.46	**1652**	**Analog inp 2X type**		ENUM		-10V..+10V	0	6	RW	FVS

Selection of the type of expansion card input (voltage or current input). Depending on the input signal, move the switches on the expansion card. Standard inputs are coded for voltage signals.

0 -10V…+10V
1 0..10V
2 4..20mA
3 0..20mA
4 PT1000
5 NI1000
6 PT100
7 0.1V..10.1V
8 KTY84

Select option **0** in order to connect a maximum voltage of ±12.5V (typically ±10V/5mA) to the analog input concerned. If the signal is used as a reference, reverse the direction of rotation of the drive by inverting the voltage polarity.

Select option **1** to connect a max voltage of 12.5V (typically 10V/5mA).

Select option **2** to connect a current signal of 4...20 mA to the analog input concerned. The signal must be positive.

Select option 3 to connect a current signal of 0...20 mA to the analog input concerned. The signal must be positive.

Select option **4** to connect a signal from a PT1000 probe to the analog input concerned.

Select option **5** to connect a signal from an NI1000 probe to the analog input concerned.

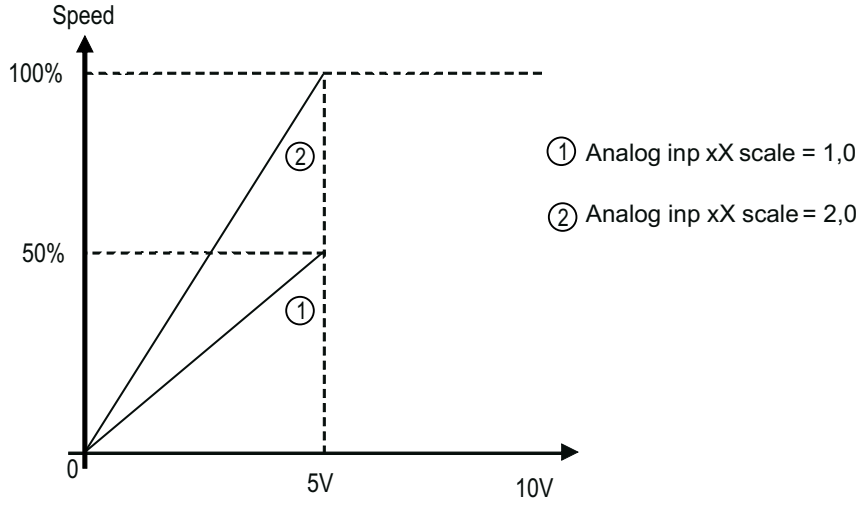
Select option **6** to connect a signal from a PT1000 probe to the analog input concerned.

Select option **3** to connect 0.1V...10.1V to the analog input in use. You can also detect signal loss (due to disconnection or short circuit) with alarm [62] **AnalogInpLoss**.

Select option **4** to connect a KTY84 temperature sensor to the analog input in use (you have to use an analog output as power supply signal). You can also detect signal loss (due to disconnection or short circuit) with alarm [62] **AnalogInpLoss**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.35	**1604**	**Analog inp 1X scale**		FLOAT		1.0	-20.0	20.0	RW	FVS
14.47	**1654**	**Analog inp 2X scale**		FLOAT		1.0	-20.0	20.0	RW	FVS

Setting of a multiplier factor to apply to the relative analog input of the expansion card.



Example:

The speed reference of a drive is assigned with a max external voltage of 5V. With this value the drive must reach the maximum speed allowed (set using **Full scale speed**).

As the **Analog inp X scale** parameter the scale factor of 2 is entered (10V : 5V)

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.36	**1606**	**An inp 1Xoffset tune**		BIT		0	0	1	RWZ	FVS
14.48	**1656**	**An inp 2Xoffset tune**		BIT		0	0	1	RWZ	FVS

Self-tuning command for the offset of the relative analog input of the expansion card. Automatic fine tuning of the input. To perform self-tuning, set the input signal to its minimum value and execute the command. The conditions containing an offset can be compensated. When this command is sent, **An inp xX offset tune** is automatically selected so that the available input signal corresponds to the zero value of the variable.

Automatic tuning can only be performed if the following condition is present:

- Input voltage less than 1V or input current less than 2 mA

Note ! The value that is obtained automatically can be changed manually, if necessary, using **An inp offset xX**.

If the voltage setting on the analog input is higher than 1V, the Value too low alarm is generated.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.37	**1608**	**An inp 1X gain tune**		BIT		0	0	1	RWZ	FVS
14.49	**1658**	**An inp 2X gain tune**		BIT		0	0	1	RWZ	FVS

Self-tuning command for the relative analog input gain. Automatic fine tuning of the input. When this command is sent, **Analog inp 1 gain x** is automatically selected so that the available input signal corresponds to the maximum value of the variable.

Two conditions are necessary in order to perform automatic tuning:

- Input voltage greater than 1V or input current greater than 2 mA
- Positive polarity. The value that is found is automatically accepted for the other direction of rotation.

Note ! If necessary, the value obtained automatically can be changed manually via **Analog inp Xx gain**.

To perform self-tuning, set the input signal to its maximum value and execute the command. A multiplier factor is calculated to apply to the input signal value (not considering the **Analog inp scale** parameter) to reach the full scale value.

If the voltage setting on the analog input is less than 1V, the Value too low alarm is generated.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.38	**1620**	**Analog inp 1X filter**	ms	UINT16		0	0	1000	ERW	FVS
14.50	**1670**	**Analog inp 2X filter**	ms	UINT16		0	0	1000	ERW	FVS

Parameters used to filter input signals to the I/O expansion card, especially if the card is used to measure motor temperature with KTY84.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.39	**1612**	**Analog inp 1X top**	cnt	INT16		16384	-32768	+ 32767	ERW	FVS
14.51	**1662**	**Analog inp 2X top**	cnt	INT16		16384	-32768	+ 32767	ERW	FVS

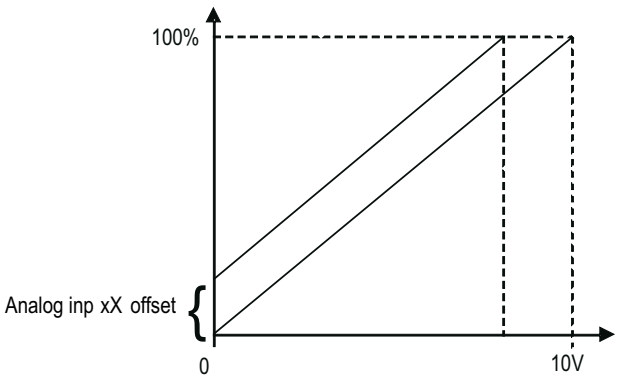
Setting of the upper speed reference limit as a function of the voltage (or current) of the relative analog reference of the expansion card.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.40	**1614**	**Analog inp 1X bottom**	cnt	INT16		-16384	-32768	+ 32767	ERW	FVS
14.52	**1664**	**Analog inp 2X bottom**	cnt	INT16		-16384	-32768	+ 32767	ERW	FVS

Setting of the lower speed reference limit as a function of the voltage (or current) of the relative analog reference of the expansion card.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.41	**1616**	**Analog inp 1X offset**	cnt	INT16		0	-32768	+ 32767	ERW	FVS
14.53	**1666**	**Analog inp 2X offset**	cnt	INT16		0	-32768	+ 32767	ERW	FVS

Setting of an offset value to algebrically add to the relative analog input of the expansion card.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.42	**1618**	**Analog inp 1X gain**		FLOAT		1.0	-20.0	20.0	ERW	FVS
14.54	**1668**	**Analog inp 2X gain**		FLOAT		1.0	-20.0	20.0	ERW	FVS

This parameter contains the value of the multiplier factor to apply to the analog reference of the expansion card calculated using the **Analog inp gain tune** function.

Example:

An external analog reference only reaches a maximum of 9.8V instead of 10V. 1.020 (10V : 9.8V) is entered as the **Analog inp x gain** parameter.

The same result can be achieved using the **Analog inp x gain tune** function. This parameter can be selected from the keypad menu. The maximum analog value available (in this case 9.8V) must be present on the terminal, with positive polarity. Press the Enter key on the keypad to start analog reference self-tuning.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.43	**1626**	**An inp 1X sign src**		LINK	16	6000	0	16384	ERW	FVS
14.55	**1676**	**An inp 2X sign src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) of the signal to be assigned to the relative digital input of the expansion card for selecting the direction of rotation of the motor. The functions that can be associated with the digital outputs are listed in the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.44	**1632**	**Analog inp 1X dest**		ILINK		0	0	0	ER	FVS
14.56	**1682**	**Analog inp 2X dest**		ILINK		0	0	0	ER	FVS

The function for which the relative analog input of the expansion card has been programmed and on which it acts is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.57	**5410**	**Analog inp 0Ext mon**		INT16	16	0	-32768	32767	ER	FVS
14.58	**5412**	**Analog inp 1Ext mon**		INT16	16	0	-32768	32767	ER	FVS
14.59	**5414**	**Analog inp 2Ext mon**		INT16	16	0	-32768	32767	ER	FVS
14.60	**5416**	**Analog inp 3Ext mon**		INT16	16	0	-32768	32767	ER	FVS
14.61	**5418**	**Analog inp 4Ext mon**		INT16	16	0	-32768	32767	ER	FVS
14.62	**5420**	**Analog inp 5Ext mon**		INT16	16	0	-32768	32767	ER	FVS
14.63	**5422**	**Analog inp 6Ext mon**		INT16	16	0	-32768	32767	ER	FVS
14.64	**5424**	**Analog inp 7Ext mon**		INT16	16	0	-32768	32767	ER	FVS

These parameters show the value of the analog input of the I/O remotable module (EXP-FL-XCAN-ADV expansion board is needed).

Analog input modules can have a resolution of 12 to 16 bits and scaling may vary from manufacturer to manufacturer.

E.g.:

12-bit module

Signal connected Module configuration	Variant 1	Variant 2	Variant 3	Variant 4
-10V..+10V	-2048..+2047	-32768..+32767	-16384..+16383	
0V..+10V	0..+4095	0..+2047	0..+32767	**0..+65535**
4..20mA	0..+32767	+6553..+32767	+3276..+16383	

16-bit module

Signal connected Module configuration	Variant 1	Variant 2	Variant 3	
-10V..+10V	-32768..+32767			
0V..+10V	**0..+65535**	0..+32767		
4.0.20mA				

There is no single Unit suitable for all models of analog input module. Check the scaling provided by the model being used and use the system variables accordingly.

Analog input 0 and analog input 1 can also be managed by the drive parameters. To ensure correction operation, the scaling provided by the external module must be compatible with the scaling requested by the drive.

The drive needs I/O modules that supply datum scaled as follows

Analog inp X type	Range
-10V..+10V	-32768..+32767
0V..+10V	0..+65535
4..20mA	+13107..+65535

When the **An inp X gain tune** (PAR 1508, PAR1558) command is sent with analog input set to the maximum value, the gain needed to adjust the full scale value is calculated.

For modules with scaling other than that requested by the drive, the **An inp X gain tune** command attempts to adjust the scaling. For that reason the maximum value is increased for **An inp X gain tune** parameters.

The tables below show the output of the analog input block according to the signal connected and the configuration of the **Analog inp X type** parameter (PAR 1502, PAR1552).

Signal connected: -10V..+10V

An input type	-10V	0V	+10V
-10V..+10V	Bottom	Obtained from straight line	Top
0V..+10V	Less than 0V saturation at Bottom	Bottom	Top
4..20mA	Less than 2V saturation at Bottom	Bottom	Top

Signal connected: 0V..+10V

An input type		0V	+10V
-10V..+10V		Obtained from straight line	Top
0V..+10V		Bottom	Top
4..20 mA		Less than 2V saturation at Bottom	Top

Signal connected: 4..20 mA

An input type		4mA	20mA
-10V..+10V			Top
0V..+10V		Less than 4 mA saturation at Bottom	Top

4..20 mA		Bottom	Top

The Analog inputs voltage or current inputs must be configured on the external module using a dedicated switch or tool. For analog input 0 and analog input 1 the An input type parameter must be set according to the type of external device.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.65	**1586**	**Sensor inp X type**		**ENUM**		**None**	**0**	**3**	**ERW**	**FVS**

0 None

1 Klixon

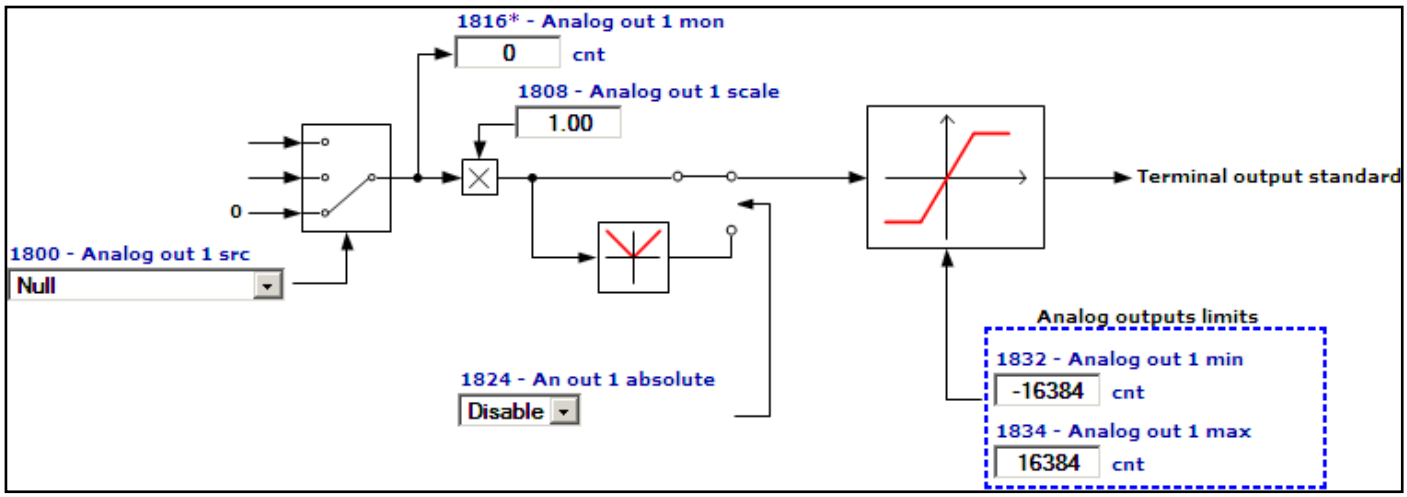
2 KTY84

3 PTC

Setting of sensor type connected to dedicated input of temperature expansion cards EXP-IO-SENS-100-ADV or EXP-IO-SENS-1000-ADV.

When these cards are used, alarm [62] **An inpLoss** signals the disconnection or short circuit of the KTY84 or PTC sensor.

15 – ANALOG OUTPUTS



On the AVD regulation card there are two programmable analog outputs.

Analog output 1 supplies a two-pole +/-10VDC voltage signal, while analog output 2 can be programmed to obtain a 0-20mA or 4-20mA output signal in current or a signal in two-pole +/-10VDC voltage, depending on the parameter assigned.

Table: value of the signal of the analog outputs according to the measurement used

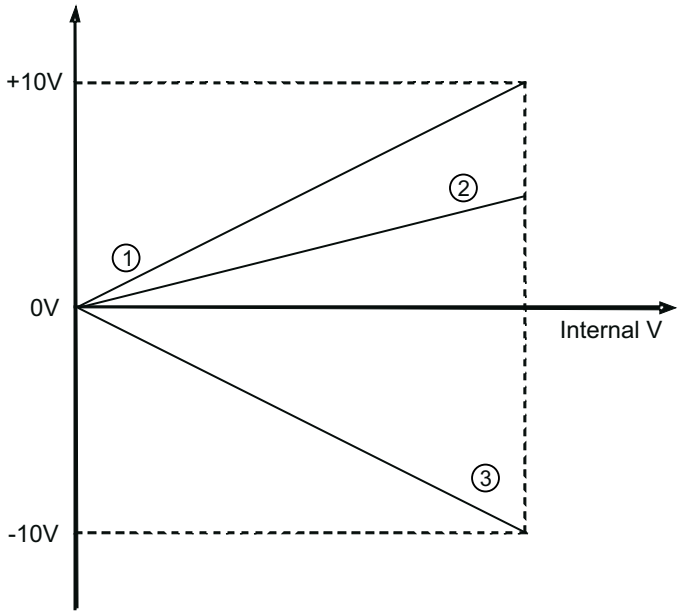
PAR	Description	Full scale output
626	Ramp ref out mon	10V = Full scale speed (Par 680)
628	Ramp setpoint	
760	Ramp out mon	
664	Speed setpoint	
260	Motor speed	
262	Motor speed nofilter	
2150	Encoder 1 speed	
852	Multi ref out mon	
870	Mpot setpoint	
894	Mpot output mon	
920	Jog output mon	
250	Output current	10V = 200% CT drive rated current (available on Quick startup manual, this value is defined @400Vac, default switching frequency and 40°C)
280	Torque current ref	
282	Magnet current ref	
284	Torque current	
286	Magnet current	
2360	Torque lim Pos Inuse	
2362	Torque lim Neg Inuse	
2386	Torque ref	10V = 200% Nominal motor torque
2388	Torque ref nofilter	
3070	Droop out mon	
3104	Inertia comp mon	
252	Output voltage	10V = 200% Mains voltage (Par 560)
254	Output frequency	10V = 1000Hz
270	DC link voltage	10V = 7000V
3006	Speed ratio out mon	10V = 100%
1500	Analog input 1 mon	10V = 10V Analog input
1550	Analog input 2 mon	
1600	Analog input 1X mon	
1650	Analog input 2X mon	
368	Drive overload accum	5V = 100% Accumulator
3212	Motor overload accum	
3260	Bres overload accum	
2232	Spd reg P gain Inuse	10V = 400%
2234	Spd reg I gain Inuse	
3446	Powerloss nextratio	10V = 50%
4024 … 4174	Fieldbus M->SX mon	10V = 16384 * 2 ^ 16
3700 … 3730	Pad X	

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.1	**1800**	**Analog out 1 src**		LINK	16/32	6000	0	16384	RW	FVS
15.2	**1802**	**Analog out 2 src**		LINK	16/32	6000	0	16384	RW	FVS

Selection of the origin (source) of the signals that can be placed as variables on the analog outputs. The functions that can be assigned to the analog outputs are listed in the "**L_ANOUT**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.3	**1808**	**Analog out 1 scale**		FLOAT		1.0	-10.0	10.0	RW	FVS
15.4	**1810**	**Analog out 2 scale**		FLOAT		1.0	-10.0	10.0	RW	FVS

Parameter for setting a multiplier factor of the signal of the relative analog output. It can be used to amplify or reduce the input value of the relative analog output block.



① Par. 1808 (1810) = 1

② Par. 1808 (1810) = 0,5

③ Par. 1808 (1810) = -1

$$Vout = 10 \times \left(\frac{\text{Stp Var x par. 1808 (1810)}}{\text{FS Var}} \right)$$

where:

Vout output voltage on the card terminals.
Stp Var actual value of the variable (variable unit)
SF Var full scale of the variable (variable unit)

Example of calculation of scale factor **Analog out x scale**

To display the drive speed, use an analog instrument with field of measurement from 0...2V. This means that, to display the speed of the drive, a voltage of 2V on the analog output of the drive must correspond to the maximum speed. With a scale factor equal to 1 a voltage of 10V would correspond to the maximum speed.
With a scale factor equal to 0.2 = 2V/10V a voltage of 2V would correspond to the maximum speed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.5	**1816**	**Analog out 1 mon**	cnt	INT16		0	0	0	ER	FVS

The value of the actual voltage present on analog output 1 is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.6	**1818**	**Analog out 2 mon**	cnt	INT16		0	0	0	ER	FVS

The value of the actual voltage or current present on analog output 2 is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.7	**1824**	**An out 1 absolute**		ENUM		Disable	0	1	ERW	FVS
15.8	**1826**	**An out 2 absolute**		ENUM		Disable	0	1	ERW	FVS

Enables the relative analog output as an absolute value. If this parameter is set to 1 the voltage on the analog output assumes the value of 0 - 10V regardless of the sign of the command signal.

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.9	**1832**	**Analog out 1 min**	cnt	INT16		-16384	-32768	+32767	ERW	FVS
15.10	**1834**	**Analog out 1 max**	cnt	INT16		16384	-32768	+32767	ERW	FVS

Setting of the minimum and maximum values for the analog output for the voltage present on analog output 1

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.11	**1840**	**Analog out 2 min**	cnt	INT16		-16384	-32768	+32767	ERW	FVS
15.12	**1842**	**Analog out 2 max**	cnt	INT16		16384	-32768	+32767	ERW	FVS

Setting of the minimum and maximum values for the analog output for the voltage present on analog output 2

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.13	**1848**	**Analog out 2 type**		ENUM		-10V..+10V	0	2	ERW	FVS

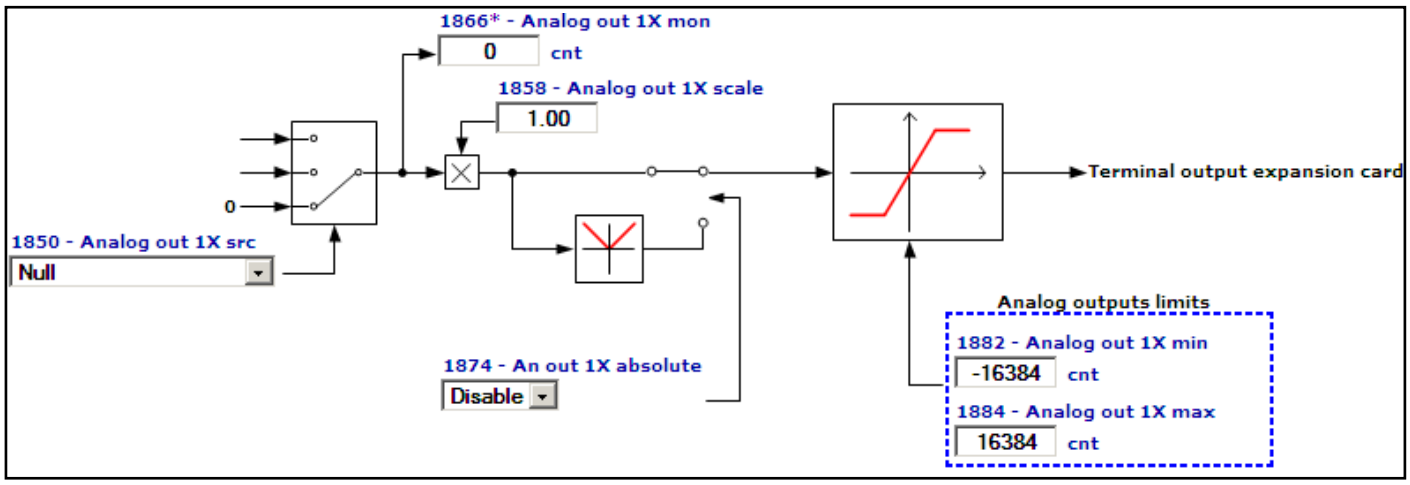
Selection of the type of output (in voltage or current). Depending on the output signal, move the S3 switch on the regulation card. The standard output is coded for the signal in voltage.

0 0...20mA
1 4..20mA
2 -10V..+10V

If set to **0** the analog output sends 0...20mA
If set to **1** the analog output sends 4...20mA
If set to **2** the analog output sends -10..+10V

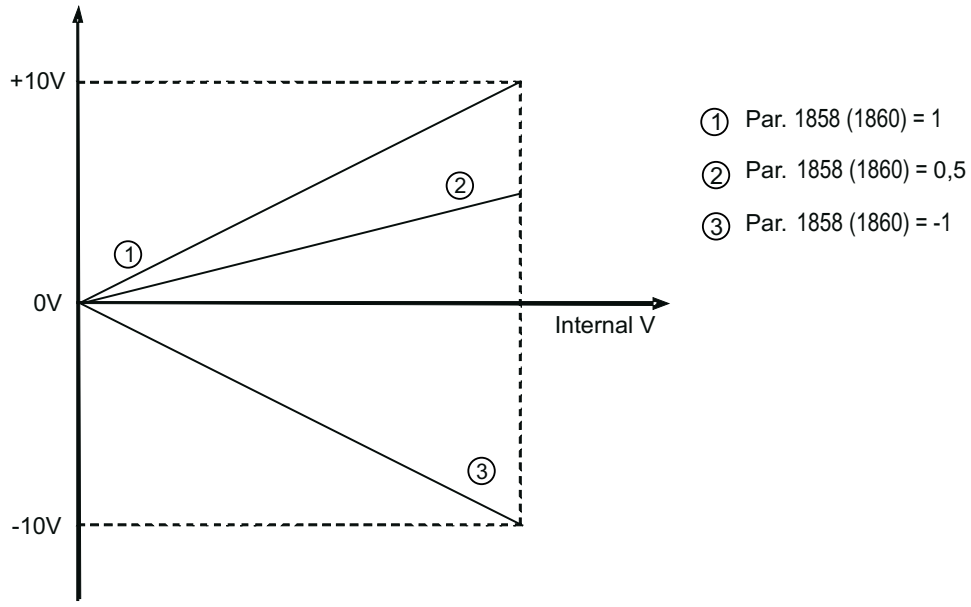
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.14	**1850**	**Analog out 1X src**		LINK	16/32	6000	0	16384	RW	FVS
15.15	**1852**	**Analog out 2X src**		LINK	16/32	6000	0	16384	RW	FVS

Selection of the origin (source) of the signals that can be placed as variables on the analog outputs of the expansion card. The functions that can be assigned to the analog outputs are listed in the "**L_ANOUT**" selection list.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.16	**1858**	**Analog out 1X scale**		FLOAT		1.0	-20.0	20.0	RW	FVS
15.17	**1860**	**Analog out 2X scale**		FLOAT		1.0	-20.0	20.0	RW	FVS

Parameter for setting a multiplier factor of the signal of the relative analog output of the expansion card. It can be used to amplify or reduce the input value of the relative analog output block.



$$Vout = 10 \times \left(\frac{\text{Stp Var x par. 1858 (1860)}}{\text{FS Var}} \right)$$

where:

Vout output voltage on the card terminals.
Stp Var actual value of the variable (variable unit)
SF Var full scale of the variable (variable unit)

Example of calculation of the **Analog out Xx scale factor**

To display the drive speed, use an analog instrument with field of measurement from 0 ... 2V. This means that, to display the speed of the drive, a voltage of 2V on the analog output of the drive must correspond to the maximum speed. With a scale factor of 1 this would be 10V (Scale factor = 2V / 10 V = 0.200).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.18	**1866**	**Analog out 1X mon**	cnt	INT16		0	0	0	ER	FVS

The actual value of the voltage present on analog output 1 of the expansion card is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.19	**1868**	**Analog out 2X mon**	cnt	INT16		0	0	0	ER	FVS

The actual value of the voltage or current present on analog output 2 of the expansion card is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.20	**1874**	**An out 1X absolute**		ENUM		Disable	0	1	ERW	FVS
15.21	**1876**	**An out 2X absolute**		ENUM		Disable	0	1	ERW	FVS

Enables the relative analog output as an absolute value. If this parameter is set to 1 the voltage on the analog

output assumes the value of 0 - 10V regardless of the sign of the command signal.

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.22	**1882**	**Analog out 1X min**	cnt	INT16		-16384	-32768	+32767	ERW	FVS
15.23	**1884**	**Analog out 1X max**	cnt	INT16		16384	-32768	+32767	ERW	FVS

Setting of the minimum and maximum values for the analog output for the voltage present on analog output 1 of the expansion card.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.24	**1886**	**Analog out 1X type**		ENUM		-	0	3	ERW	FVS

Selection of the programmed signal on analog output 1 of the expansion card. Depending on the output signal, move the dedicated switch on the expansion card. The standard output is coded for the signal in voltage.

0 0...20mA
1 4..20mA
2 -10V..+10V
3 0..10V

If set to **0** the analog output sends 0...20mA
If set to **1** the analog output sends 4...20mA
If set to **2** the analog output sends -10..+10V
If set to **3** the analog output sends 0..+10V.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.25	**1890**	**Analog out 2X min**	cnt	INT16		-16384	-32768	+32767	ERW	FVS
15.26	**1892**	**Analog out 2X max**	cnt	INT16		16384	-32768	+32767	ERW	FVS

Setting of the minimum and maximum values for the analog output in current or voltage present on analog output 2 of the expansion card.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.27	**1898**	**Analog out 2X type**		ENUM		-10V..+10V	0	3	ERW	FVS

Selection of the programmed signal on analog output 2 of the expansion card. Depending on the output signal, move the dedicated switch on the expansion card. The standard output is coded for the signal in voltage.

0 0...20mA
1 4..20mA
2 -10V..+10V
3 0..10V

If set to **0** the analog output sends 0...20mA
If set to **1** the analog output sends 4...20mA
If set to **2** the analog output sends -10..+10V
If set to **3** the analog output sends 0..+10V.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.28	**5460**	**Dig Analog out 0 ext**		INT16	16	0	-32768	32767	ERW	FVS
15.29	**5462**	**Dig Analog out 1 ext**		INT16	16	0	-32768	32767	ERW	FVS
15.30	**5464**	**Dig Analog out 2 ext**		INT16	16	0	-32768	32767	ERW	FVS
15.31	**5466**	**Dig Analog out 3 ext**		INT16	16	0	-32768	32767	ERW	FVS
15.32	**5468**	**Dig Analog out 4 ext**		INT16	16	0	-32768	32767	ERW	FVS
15.33	**5470**	**Dig Analog out 5 ext**		INT16	16	0	-32768	32767	ERW	FVS

15.34	**5472 Dig Analog out 6 ext**	INT16	16	0	-32768	32767	ERW	FVS
15.35	**5474 Dig Analog out 7 ext**	INT16	16	0	-32768	32767	ERW	FVS

These parameters are used with I/O remotable module (EXP-FL-XCAN-ADV expansion board is needed).

Analog output modules can have a resolution of 12 to 16 bits and scaling may vary from manufacturer to manufacturer.

E.g.:

12-bit module

Signal connected Module configuration	Variant 1	Variant 2	Variant 3	Variant 4
-10V..+10V	-2048..+2047	-32768..+32767	-16384..+16383	
0V..+10V	0..+4095	0..+2047	0..+16383	0..+32767
4..20mA	0..+32767	+6553..+32767	+3276..+16383	

16-bit module

Signal connected Module configuration	Variant 1	Variant 2	Variant 3
-10V..+10V	-32768..+32767		
0V..+10V	0..+65535	0..+32767	
4..20mA			

There is no single unit that is suitable for all models of analog output module.

Check the scaling provided by the model being used and use the system variables accordingly.

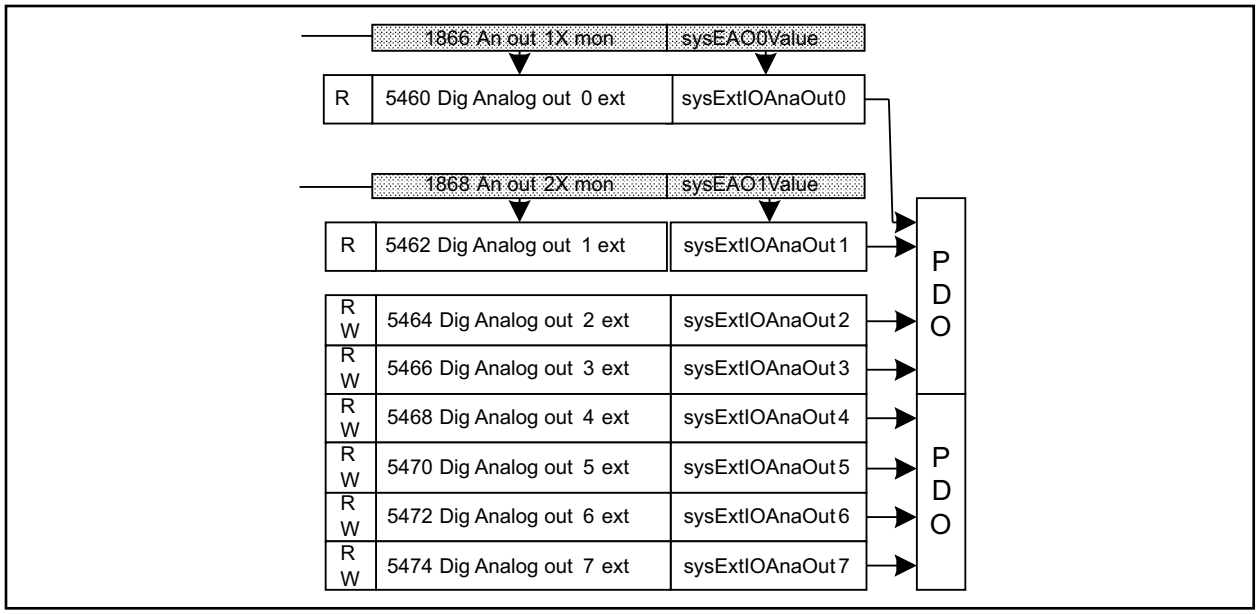
Analog output 0 and analog output 1 can also be managed by the drive parameters.

To ensure correction operation, the scaling provided by the external module must be compatible with the scaling provided by the drive.

The drive supplies a datum for the I/O modules scaled as follows

Analog input type	Range
-10V..+10V	-32768..+32767
0V..+10V	0..+65535
4..20mA	+13107..+65535

Analog outputs 0..1 are managed via drive parameters and the value produced by the drive overwrites that written by the MDPLC or serial communication or fieldbus.



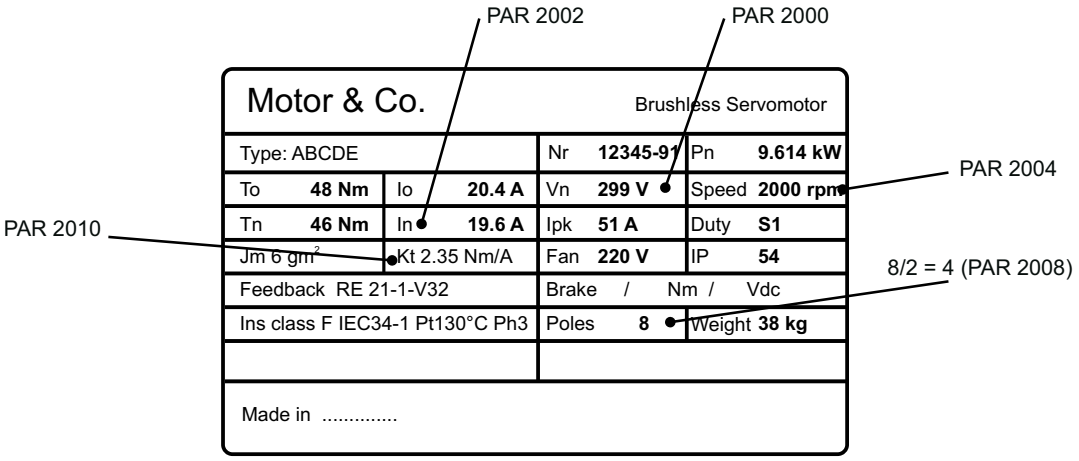
16 – MOTOR DATA

From this menu you can enter the motor plate data and “basic” values for the voltage/frequency characteristics. It is important to enter the correct data in order to optimize drive operation and that of the application as a whole. These data are required in order to obtain:

a) Computation of the normalization factors necessary for regulation

b) Computation of the estimated values for the motor parameters necessary for regulation

Rated voltage, Rated speed, Rated current must be entered. After entering these parameters, send a Take motor par command to calculate (a) and (b) above. The motor cannot be enabled until the Take motor par command has been set. If some results are inconsistent, or if the motor is much smaller than the inverter, an error message is displayed indicating a numerical capacity overflow and the previous set of parameters is restored in the “Mot plate data” sub-menu.



Motor data plates

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.1	**2000**	**Rated voltage**	V	FLOAT		SIZE	50.0	690.0	RWZS	FVS

Set the motor rated voltage as indicated on the data plate. This is the voltage the drive must supply at the motor rated frequency.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.2	**2002**	**Rated current**	A	FLOAT		SIZE	1.0	2200.0	RWZS	FVS

The motor rated current at its rated power (kW / Hp) and voltage (indicated on the motor data plate).

If using a single drive to control several motors connected in parallel (only possible in the V/f mode), enter a value that corresponds to the sum of the rated currents of all the motors; in this case do not perform any self-tuning operations.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.3	**2004**	**Rated speed**	rpm	FLOAT		SIZE	10.0	32000.0	RWZS	FVS

Rated speed of the motor with full load in rpm.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.4	**2008**	**Pole pairs**		UINT16		SIZE	1	(*)	RWZS	FVS

Setting of the number of motor pole pairs.

(*) Open loop (Sensorless) = 34pp; Closed Loop = 50pp.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.5	**2010**	**Torque constant**	Nm/A	FLOAT		SIZE	0.1	100.0	RWZS	FVS

Setting of the ratio between the torque generated and the rated current of the motor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.6	**2012**	**EMF constant**	Wb	FLOAT		SIZE	0.0	100.0	RWZS	FVS

Setting of the electromotive force constant, which represents the ratio between motor voltage and motor rated speed (can be calculated by dividing the torque constant by √3 with appropriate scaling).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.7	**2020**	**Take parameters**		BIT		0	0	1	RWZ	FVS

Saves the set motor data in the drive. This command must be supplied last after entering the appropriate values of all the parameters listed above. This means calculating the normalization factors (a) and estimated values for the motor parameters (b). The drive cannot be started until the **Take parameters** command has been set.

Note ! This is not saved permanently. Use the "**Save Parameters**" command in the **DRIVE CONFIG** menu to save in the permanent memory.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.8	**2022**	**Autotune rotation**		BIT		0	0	1	RWZ	FVS

Performs self-tuning in rotation: the motor must be uncoupled from the load or the transmission must not represent more than 5% of the load. This procedure allows the greatest degree of accuracy in measuring the motor parameters. To execute the command you must first open the hardware enabling contact between terminals 7 and S3. Next set the **Regulation mode** parameter to **Autotune**. If you are not already in Local mode, press the Local key (the LOC LED will light up) and close the hardware enabling contact again (terminals 7 and S3). Selt-tuning can now be performed. At the end of the self-tuning procedure, open the contact between terminals 7 and S3 again and reset the parameters that were modified.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.9	**2024**	**Autotune still**		BIT		0	0	1	RWZ	FVS

Performs self-tuning with the motor coupled to the transmission. The self-tuning procedure may cause limited rotation of the motor shaft. To perform self-tuning, follow the procedure described for the previous parameter.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.10	**2026**	**Autotune mode**		ENUM		Reduced	0	1	ERWZ	FVS

Selection of the motor parameter self-tuning mode.

0 Reduced

1 Extended

If set to **0** all the motor parameters are measured except those relating to the non-linear saturation curve. Use this mode to obtain a faster self-tuning procedure.

If set to **1** all the motor parameters are measured. Use this mode to obtain maximum efficiency: this procedure may take a few minutes.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.11	**2028**	**Take par status**		ENUM		Required	0	0	R	FVS

Indication of the status of parameter saving.

0 Required

1 Done

The parameter displays the Required message when the motor parameters that have been entered need to be saved. When they have been saved the parameter indicates Done.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.12	**2030**	**Autotune status**		ENUM		Required	0	0	R	FVS

Indication of the status of execution of motor parameter self-tuning.

0 Required

1 Done

The parameter displays the **Required** message when motor parameter self-tuning is required. When self-tuning is complete the parameter indicates **Done**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.13	**2050**	**Measured Rs**	ohm	FLOAT		CALCF	0.0005	200	ERWS	FVS

Measured stator resistance value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.14	**2052**	**Measured DTL**	V	FLOAT		0.0	0.0	100.0	ERWS	FVS

Measured value of dead time compensation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.15	**2054**	**Measured DTS**	V/A	FLOAT		0.0	0.0	100.0	ERWS	FVS

Measured compensation gradient value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.16	**2056**	**Measured Lsig**	mH	FLOAT		CALCF	0.001	200.0	ERWS	FVS

Measured leakage inductance value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.17	**2074**	**Measured Lsig min**	mH	FLOAT		CALCF	0.001	200.0	ERWS	FVS

Value of minimum inductance leakage measured during autotuning.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.18	**2078**	**Take tune parameters**		BIT		0	0	1	ERWZ	FVS

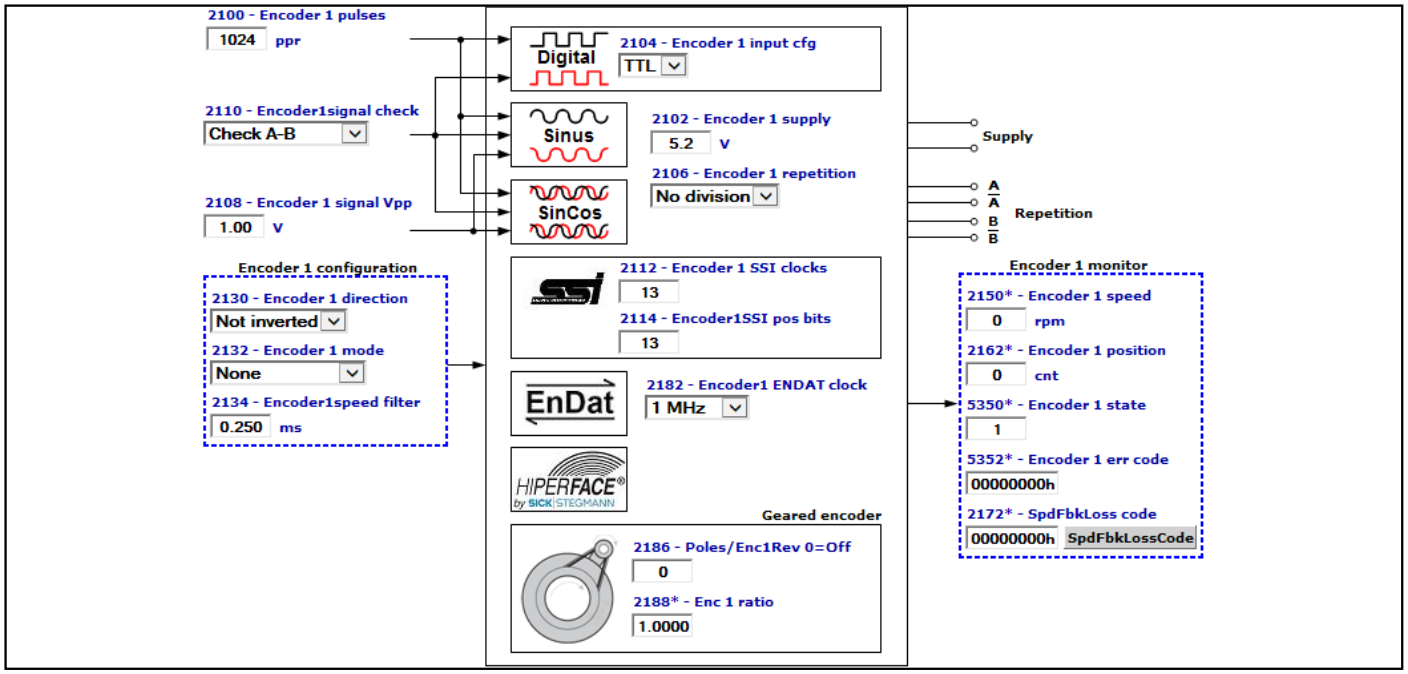
Saves the motor data calculated by the self-tuning procedure in the drive.

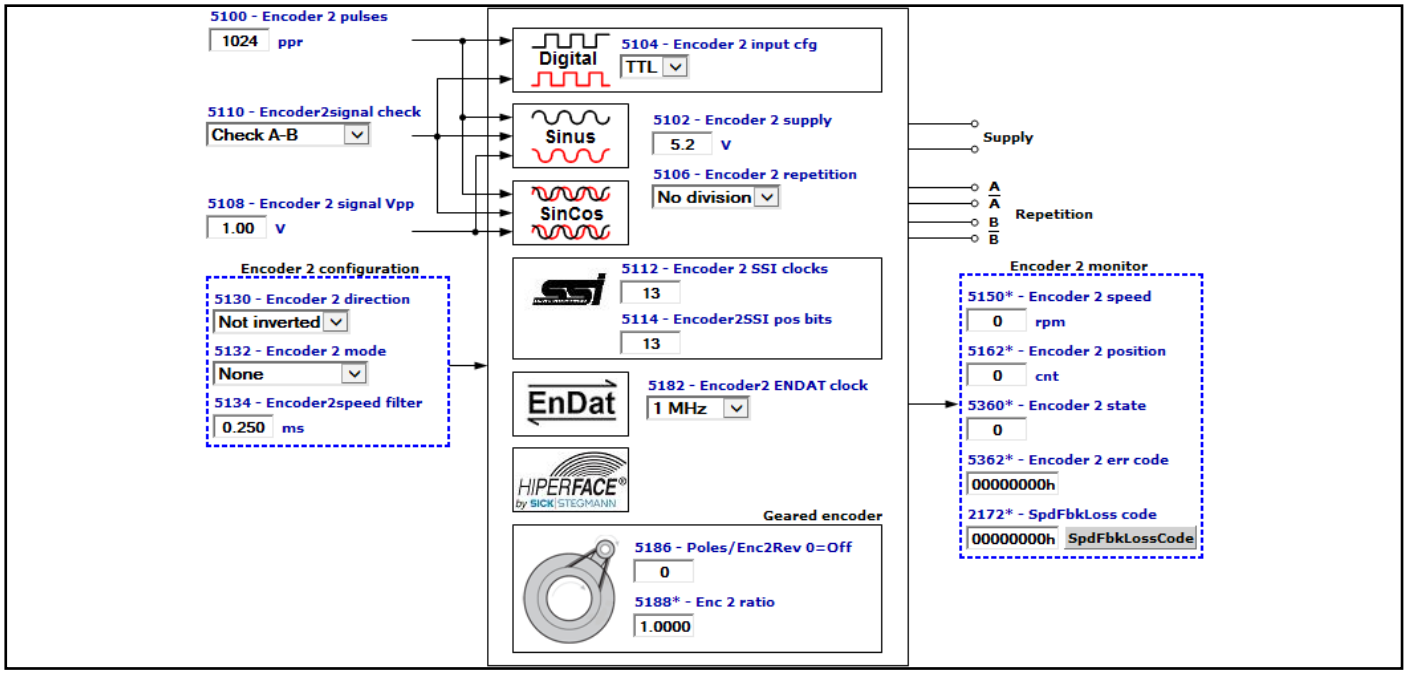
Note ! Data are not saved permanently. Use the "**Save Parameters**" command in the **DRIVE CONFIG** menu to save in the permanent memory.

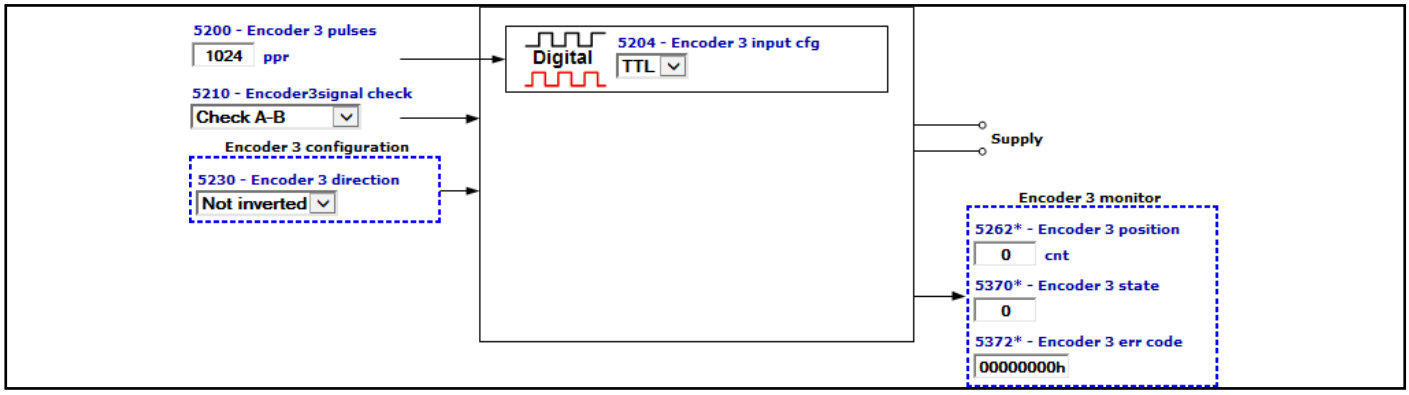
17 – ENCODER

The closed-loop control mode requires a speed reading by a digital encoder on the motor shaft. Optional cards have been developed to acquire different types of encoder signals. These enable the drive to use both incremental and absolute signals as its feedback. In the field oriented vector mode, closed-loop encoder feedback is essential for correct drive operation.

For further information, see section A2.2 Encoder of the Appendix to the ADV200 QS guide.







17.1 - ENCODER/ENCODER CONFIG

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.1.1	**5310**	**Encoder sel src**		LINK	16BIT	6000	0	16384	ERW	FVS

Selection of the origin (source) of the input to be used to select the speed feedback encoder. The digital inputs that can be used can be selected from the **"L_DIGSEL2"** selection list.

When the value of the signal is 0, it is associated with encoder 1.

When the value of the signal is 1, it is associated with encoder 2.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.1.2	**5314**	**Encoder sel mon**		UINT16		0	0	1	ER	FVS

The encoder selected as the feedback device is displayed.

0 Encoder 1

1 Encoder 2

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.1.3	**2172**	**SpdFbkLoss code**		UINT32		0	0	0	ER	FVS

The **Speed fbk loss** alarm generated by an encoder fault is displayed. As each type of encoder generates the alarm differently (incremental signal error, absolute signal error, serial error), this parameter displays information about the alarm that has occurred. If there are several, simultaneous causes, these are shown in this parameter.

Bit	Value	Name
0	0x01	CHA
1	0x02	CHB
2	0x04	CHZ
3	0x08	MOD_INCR
4	0x10	MOD_ABS
5	0x20	CRC_CKS_P
6	0x40	ACK_TMO
7	0x80	DT1_ERR
8	0x100	Error Setup
10..15		Free
16..31		Depending on the type of feedback.

For further details please refer to the description of the **Speed fbk loss** alarm and the "9.2.1 Speed fbk loss alarm according to the type of feedback" chapter of ADV200 QS manual.

Note ! To interpret the causes of the alarm correctly, you will need to convert the hexadecimal code written in parameter 17.29 **SpdFbkLoss code**, PAR 2172, into the corresponding binary code and then use the table of the encoder being used to check the various active bits and relative description.

Example with Endat encoder:

PAR 2172 = A0H (hexadecimal value)

A0 is not present in the value column of the " **Speed fbk loss** [22] with absolute EnDat encoder" table.

A0 must be seen as a bitword meaning A0 -> 10100000 -> bit 5 and bit 7. This indicates the simultaneous intervention of the following causes:

Bit 5 = 20H Cause: disturbed SSI signals cause a **CKS** error or **Parity**

Bit 7 = 80H Cause: Encoder has detected malfunction and signals this to the drive via Error bit. Bits 16..31 contain the type of malfunction detected by the encoder.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.1.4	**2190**	**Autophase rotation**		BIT		0	0	1	RWZ	F__

This parameter can be set to perform encoder phasing with the motor turning: the motor must be free to turn and with no load applied (the brake must be released). This procedure allows the greatest degree of accuracy.

To execute the command:

- open the Enable command.
- set this parameter to 1 (for serial control)
- press Enter to confirm (for keypad control)
- when prompted to close the enable command, apply the command to terminal 9 (Enable)
- when the procedure is complete you will be asked to confirm by re-opening the Enable command.

Note ! See section A2.2 of the Appendix to the Quick start guide for further information.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.1.5	**2192**	**Autophase still**		BIT		0	0	1	RWZ	F__

This parameter can be set to perform encoder phasing without the motor turning: the brake must be closed.

To execute the command:

- open the Enable command.
- set this parameter to 1
- press Enter to confirm
- when prompted to close the enable command, apply the command to terminal 9 (Enable)
- when the procedure is complete you will be asked to confirm by re-opening the Enable command.

Note ! See section A2.2 of the Appendix to the Quick start guide for further information.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.1.6	**2194**	**Autophase still mode**		ENUM		Mode 1	0	1	ERWZ	FV_

You can select two different static phasing methods based on the different characteristics of synchronous motors on the market. We recommend using **Mode 1** as the first option. If **Mode 1** does not run correctly, the motor (due to its constructive characteristics) requires a different mode (i.e., **Mode 2**).

0 Mode 1
1 Mode 2

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.1.7	**2196**	**Autophase run mode**		ENUM		First enable	1	2	ERWZ	FV_

Selection of execution of motor phasing with an incremental encoder (for synchronous motors).

0	Par/startup	Only thru the dedicated command autophase rotation or thru the wizard procedure.
1	First enable	At first enabling. The phasing is executed also at next enabling, in the event of restart after an alarm condition.
2	Each enable	At each enabling.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.1.8	**2198**	**Autophase run type**		ENUM		Still	0	1	ERWZ	FV_

0 Still
1 Rotation

This parameter allows the user to select the phasing type procedure (for synchronous motor) to run at the start: “Still” (0) as static method or “Rotation” (1) with the motor shaft moving.

If an error occurs during phasing procedure (Still or Rotation), ”Encoder error” will be shown and the drive is immediately disabled.

17.2 - ENCODER/ENCODER 1

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.1	**2100**	**Encoder 1 pulses**	ppr	UINT16		CALCI	CALCI	CALCI	RWZ	FVS

Setting of the number of feedback encoder impulses.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.2	**2102**	**Encoder 1 supply**	V	FLOAT		5.2	5.2	CALCF	ERWZ	FVS

Setting of the encoder supply voltage supplied by the relative optional card. Min and max values are modified according to the type of encoder card applied.

Encoder option type		Def	Min	Max
Enc1	EXP-DE-I1R1F2-ADV	5.2V	5.2V	20.0V
Enc2	EXP-SE-I1R1F2-ADV	5.2V	5.2V	6.0V
Enc3	EXP-SESC-I1R1F2-ADV	5.2V	5.2V	6.0V
Enc4	EXP-EN/SSI-I1R1F2-ADV	5.2V	5.2V	10.0V
Enc5	EXP-HIP-I1R1F2-ADV	8.0V	7.0V	12.0V
Enc6	EXP-RES-I1R1-ADV	-	-	-
Enc7	EXP-DE-I2R1F2-ADV	5.2V	5.2V	20.0V
Enc8	EXP-ASC-I1-ADV	5.2V	5.2V	6.0V

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.3	**2104**	**Encoder 1 input cfg**		ENUM		TTL	0	1	ERWZ	FVS

Setting of the input configuration of the incremental digital encoder, TTL or HTL.

0 HTL
1 TTL

The value of this parameter is automatically set in HTL when the value entered in the **Encoder 1 supply** parameter is more than 6.0V.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.4	**2106**	**Encoder 1 repetition**		ENUM		No division	0	3	ERWZ	FVS

Setting of the divider to apply to the encoder repetition output frequency.

0 No division
1 Divide 2
2 Divide 4
3 Divide 8

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.5	**2108**	**Encoder 1 signal Vpp**	V	FLOAT		1.0	0.8	1.2	ERWZ	FVS

Setting of the encoder signal peak-to-peak voltage value. Incremental sinusoidal encoders and absolute SinCos encoders normally produce signals with a peak-to-peak voltage of 1 Vpp. Due to voltage drops along the cable, the signal may have a lower peak-to-peak voltage when it reaches the feedback card, triggering the **Speed fbk loss** alarm.

This parameter is used to configure the value of the peak-to-peak voltage of the incremental sinusoidal encoders and absolute SinCos encoders on the input terminals of the feedback card.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.6	**2110**	**Encoder1signal check**		ENUM		Check A-B	0	1	ERWZ	FVS

Configuration of which channels of the incremental digital encoder must be controlled for processing the **Speed fbk loss [22]**.

0 Check disabled

1 Check A-B

2 Check A-B-Z

4 Check A-B-Z-P

If set to 1, the application checks for the presence of the signals of channels A-B

If set to 2, the application checks for the presence of the signals of channels A-B-Z

If set to 4, the application controls loss of feedback for SE (single ended) encoders.

If the application detects the absence of feedback the **Speed fbk loss [22]** is generated.

As loss of feedback cannot be detected at speeds of around zero, the control is only performed if the speed reference is higher than the value set in parameter **4564 SpdFbkLoss threshold**. It is also important to consider the fact that when working with a speed reference slightly above the limit set in parameter **4564 SpdFbkLoss threshold**, the speed error could exceed the set threshold, given the load or current limit, and generate false alarms.

In that case increase the value of parameter **4550 SpdRefLoss threshold** or of parameter **4554 SpdRefLoss holdoff**.

enu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.7	**2112**	**Encoder 1 SSI clocks**		UINT16		13	11	25	ERWZ	F_S

Setting of the length of the serial package of the SSI encoder used. The value is shown on the encoder datasheet and defined in clock cycles (usually from 13 to 25 bits).

Example of single-turn encoder

13 position bits: set par 2114 = 13.

13 clock bits: set par 2112 = 13.

Example of multi-turn encoder

13 position bits: set par 2114 = 13.

25 clock bits: set par 2112 = 25.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.8	**2114**	**Encoder1SSI pos bits**		UINT16		13	11	25	ERWZ	F_S

Setting of the number of bits used by the SSI encoder to define the position.

See examples of PAR 2112.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.9	**2182**	**Encoder1 ENDAT clock**		ENUM		1 MHz	0	1	ERWZ	FVS

Selection of clock value for Encoder ENDAT type.

0 1 MHz

1 500 kHz

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.10	**2130**	**Encoder 1 direction**		ENUM		Not inverted	0	1	RWZ	FVS

Selection of the encoder direction

0 Not inverted

1 Inverted

By setting **0** the encoder feedback signals are not inverted.

By setting **1** the encoder feedback signals are inverted.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.11	**2132**	**Encoder 1 mode**		ENUM		None	CALCI	CALCI	ERWZ	FVS

Setting of the method for measuring the speed of the encoder connected to the optional card. The drive automatically recognises the encoder card that is inserted and only shows the methods that are compatible.

0 None

1 Digital FP
2 Digital F
3 Sinus
4 Sinus SINCOS
5 Sinus ENDAT
6 Sinus SSI
7 Sinus HIPER
8 Resolver
9 Abs SINCOS
10 ENDAT
11 SSI

The speed measurement procedure depends on the type of encoder card; minimum and maximum default values are set according to the type of feedback card that is applied.

Encoder option type	Def	Min	Max
Enc 1	Digital F	Digital FP	Digital F
Enc 2	Sinus	Sinus	Sinus
Enc 3	Sinus SINCOS	Sinus SINCOS	Sinus SINCOS
Enc 4	Sinus SSI	Sinus ENDAT	SSI
Enc 5	Sinus HIPER	Sinus HIPER	Sinus HIPER
Enc 6	Resolver	Resolver	Resolver
Enc 7	Digital F	Digital FP	Digital F
Enc 8	SINCOS / No inc dig	SINCOS / No inc dig	SINCOS / No inc dig

In the presence of the **Enc 1** encoder option:

- setting **1** (Digital FP) selects the method for measuring frequency and period. This type of measurement lets you achieve high precision and dynamics at medium and high speed.
- setting **2** (Digital F) selects the method for measuring frequency. This selection is preferable for applications that rotate at very low speeds.

In the presence of the **Enc 4** encoder option:

- selection **10** (ENDAT), as opposed to selection **5** (Sinusoidal ENDAT), indicates that the encoder has no incremental channels. Switching between the two selections is automatic by means of a recognition procedure.
- selection **11** (SSI), as opposed to selection **6** (Sinusoidal SSI), indicates that the encoder has no incremental channels. Switching between the two selections has to be performed manually during commissioning.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.12	**2134**	**Encoder1speed filter**	ms	FLOAT		0.250	0.125	20.000	ERW	FVS

Setting of the time constant of the filter applied to the feedback encoder pulse reading. The parameter affects both the accuracy of the speed measurement and the dynamics obtainable in closed loop control. Long updating times allow greater stability (more filtering) of the speed measurement, as a higher number of encoder pulses are counted at a given speed of rotation. On the other hand, the use of a speed measurement filter introduces delays that do not permit high control loop dynamics. Low settings extend the regulation bandwidth but may accentuate any disturbance.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.13	**2150**	**Encoder 1 speed**	rpm	INT16	16/32	0	0	0	ER	FVS

The motor speed measured by the encoder is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.14	**2162**	**Encoder 1 position**	cnt	UINT16	16	0	0	0	ER	FVS

The encoder position is displayed. The scale is Number of encoder impulses *4.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.15	**2176**	**Encoder 1 sync mode**		UINT16		1	0	3	ERWZ	F__

Setting of the frequency of synchronisation of incremental tracks with absolute tracks (encoder 1).

If set to 0 synchronisation is performed once at power-on.

If set to 1 synchronisation is set each time the start command is sent.

If set to 2 synchronisation is performed every 128 ms.

If set to 3 synchronisation is always performed, using the absolute part.

This function is only available with absolute encoders and the minimum and maximum default values are modified according to the type of encoder.

Encoder option type	Def	Min	Max
Enc 1	1	0	3
Enc 2	1	0	3
Enc 3	1	0	3
Enc 4	1	0	3
Enc 5	1	0	1
Enc 6	Not appllicable		
Enc 7	1	0	3
Enc 8	Not appllicable		

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.16	**2186**	**Poles/Enc1Rev 0=Off**		UINT16		0	0	65535	ERWZ	FVS

Enabling of management of peripheral encoder used with “Torque” synchronous motors.

0 = function disabled. Gear ratio set to 1

To enable the motor/encoder gear ratio, set in this parameter the number of motor pole pairs corresponding to one encoder revolution.

Example:

With a synchronous motor with 10 Pole Pairs and an encoder ratio “K” of 6:3, you get:

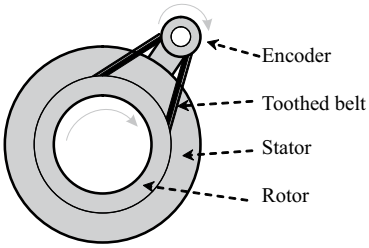
PP / K = 10 / (6/3) = 5

Note ! Not all “K” ratios are permitted: only those that give “finite” numbers.

The maximum programmable value is equal to the number of pole pairs set in the drive.

If when programming the pole pairs you enter a number lower than the value in PAR 2186, PAR 2196 is automatically set to 0 and the function is disabled.

Use of a Geared Encoder



Most of the Torque motors on the market includes feedback position device mounted via toothed belt or other multiplier (see figure). This involves a non-unitary kinematic relationship that must be considered for the proper control of the motor. (Contact Gefran if you require application help).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.17	**2188**	**Enc 1 ratio**		FLOAT		0	0	0	ER	FVS

This read-only parameter displays the motor/encoder 1 gear ratio calculated by the drive.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.18	**5350**	**Encoder 1 state**		**UINT16**		**0**	**0**	**0**	**ER**	**FVS**

Indicates the state of Encoder 1 (1= error, 0 = no error) regardless of whether this Encoder is used/not used as feedback for motor control.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.19	**5352**	**Encoder 1 err code**		**UINT32**		**0**	**0**	**0**	**ER**	**FVS**

This parameter contains a hexadecimal code that supplies information on the type of error that occurred.

Error values are the same (and have the same significance) as the ones indicated in parameter IPA 2172 **Spd-FbkLoss code**.

17.3 - ENCODER/ENCODER 2

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.1	**5100**	**Encoder 2 pulses**	ppr	UINT16		CALCI	CALCI	CALCI	ERWZ	FVS

Setting of the number of impulses/rev of the incremental encoder mounted in slot 1 or 3.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.2	**5102**	**Encoder 2 supply**	V	FLOAT		5.2	5.2	CALCF	ERWZ	FVS

Setting of the encoder supply voltage supplied by the relative optional card. Min and max values refer to the incremental digital encoder cards with one or two encoders.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.3	**5104**	**Encoder 2 input cfg**		ENUM		TTL	0	1	ERWZ	FVS

Setting of the input configuration of the incremental digital encoder, TTL or HTL.

0 HTL
1 TTL

The value of this parameter is automatically set in HTL when the value entered in the **Encoder 2 supply** parameter is more than 6.0V.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.4	**5106**	**Encoder 2 repetition**		ENUM		No division	0	3	ERWZ	FVS

Setting of the divider to apply to the encoder repetition output frequency.

0 No division
1 Divide 2
2 Divide 4
3 Divide 8

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.5	**5108**	**Encoder 2 signal Vpp**	V	FLOAT		1.0	0.8	1.2	ERWZ	FVS

Setting of the encoder signal peak-to-peak voltage value. Incremental sinusoidal encoders 2 and absolute SinCos encoders normally produce signals with a peak-to-peak voltage of 1 Vpp. Due to voltage drops along the cable, the signal may have a lower peak-to-peak voltage when it reaches the feedback card, triggering the **Speed fbk loss** alarm.

This parameter is used to configure the value of the peak-to-peak voltage of the incremental sinusoidal encoders and absolute SinCos encoders on the input terminals of the feedback card.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.6	**5110**	**Encoder2signal check**		ENUM		Contr A-B	0	3	ERWZ	FVS

Configuration of which channels of the incremental digital encoder must be controlled for processing the **Speed fbk loss [22]**.

0 Check disabled
1 Check A-B
2 Check A-B-Z
4 Check A-B-Z-P

If set to 1, the application checks for the presence of the signals of channels A-B

If set to 2, the application checks for the presence of the signals of channels A-B-Z

If set to 4, the application controls loss of feedback for SE (single ended) encoders.

If the application detects the absence of feedback the **Speed fbk loss [22]** is generated.

As loss of feedback cannot be detected at speeds of around zero, the control is only performed if the speed reference is higher than the value set in parameter **4564 SpdFbkLoss threshold**. It is also important to consider the fact that when working with a speed reference slightly above the limit set in parameter **4564 SpdFbkLoss threshold**, the speed error could exceed the set threshold, given the load or current limit, and generate false alarms.

In that case increase the value of parameter **4550 SpdRefLoss threshold** or of parameter **4554 SpdRefLoss holdoff**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.7	**5112**	**Encoder 2 SSI clocks**		UINT16		13	11	25	ERWZ	FVS

Setting of the length of the serial package of the SSI encoder 2 used. The value is shown on the encoder datasheet and defined in clock cycles (usually from 13 to 25 bits).

Example of single-turn encoder

13 position bits: set par 5114 = 13.

13 clock bits: set par 5112 = 13.

Example of multi-turn encoder

13 position bits: set par 5114 = 13.

25 clock bits: set par 5112 = 25.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.8	**5114**	**Encoder2SSI pos bits**		UINT16		13	11	25	ERWZ	FVS

Setting of the number of bits used by the SSI encoder 2 to define the position.

See examples of PAR 5112.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.9	**5182**	**Encoder2 ENDAT clock**		ENUM		1 MHz	0	1	ERWZ	FVS

Selection of clock value for Encoder 2 ENDAT type.

0 1 MHz

1 500 kHz

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.10	**5130**	**Encoder 2 direction**		ENUM		Not inverted	0	1	ERWZ	FVS

Selection of the encoder 2 direction.

0 Not inverted

1 Inverted

If set to 0 the encoder feedback signals are not inverted.

If set to 1 the encoder feedback signals are inverted.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.11	**5132**	**Encoder 2 mode**		ENUM		None	CALCI	CALCI	ERWZ	FVS

Setting of the method for measuring the speed of the digital encoder connected to the optional card.

0 Nessuna
1 Digital FP
2 Digital F
3 Sinus
4 Sinus SINCOS
5 Sinus ENDAT

6 Sinus SSI
7 Sinus HIPER
8 Resolver
9 Abs SINCOS
10 ENDAT
11 SSI

In the presence of the **Enc 1** encoder option:

- setting **1** (Digital FP) selects the method for measuring frequency and period. This selection is preferable for applications that rotate at very low speeds.
- setting **2** (Digital F) selects the method for measuring frequency. This type of measurement lets you achieve high precision and dynamics at medium and high speed.

In the presence of the **Enc 4** encoder option:

- selection **10** (ENDAT), as opposed to selection **5** (Sinusoidal ENDAT), indicates that the encoder has no incremental channels. Switching between the two selections is automatic by means of a recognition procedure.
- selection **11** (SSI), as opposed to selection **6** (Sinusoidal SSI), indicates that the encoder has no incremental channels. Switching between the two selections has to be performed manually during commissioning.

The other settings are relative to the type of encoder used.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.12	**5134**	**Encoder2speed filter**	ms	FLOAT		0.250	0.125	20.000	ERW	FVS

Setting of the time constant of the filter applied to the reading of the feedback encoder impulses. The parameter affects both the precision of the speed measurement and the dynamics obtainable in the closed-loop control mode. Long update times provide greater stability (increased filtering) of speed measurement, as more encoder impulses are counted at a given speed of rotation. On the other hand, the speed measurement filter adds delays that prevent high control loop dynamics. Low settings increase the regulation bandwidth but could accentuate disturbance.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.13	**5150**	**Encoder 2 speed**	rpm	INT16	16/32BIT	0	0	0	ER	FVS

The speed measured for encoder 2 is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.14	**5162**	**Encoder 2 position**	cnt	UINT16	16BIT	0	0	0	ER	FVS

The encoder position is displayed. The scaling factor is Number encoder impulses *4.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.15	**5176**	**Encoder 2 sync mode**		UINT16		1	0	3	ERWZ	FVS

Setting of the frequency of synchronisation of incremental tracks with absolute tracks (encoder 1).

If set to 0 synchronisation is performed once at power-on.

If set to 1 synchronisation is set each time the start command is sent.

If set to 2 synchronisation is performed every 128 ms.

If set to 3 synchronisation is always performed, using the absolute part.

This function is only available with absolute encoders and the minimum and maximum default values are modified according to the type of encoder.

Encoder option type	Def	Min	Max
Enc 1	1	0	3
Enc 2	1	0	3
Enc 3	1	0	3
Enc 4	1	0	3
Enc 5	1	0	1
Enc 6	Not appllicable		
Enc 7	1	0	3
Enc 8	Not appllicable		

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.16	**5186**	**Poles/Enc2Rev 0=Off**		UINT16		0	0	65535	ER	FVS

Enabling of management of peripheral encoder used with “Torque” synchronous motors.

0 = function disabled. Gear ratio set to 1

To enable the motor/encoder gear ratio, set in this parameter the number of motor pole pairs corresponding to one encoder revolution.

Example:

With a synchronous motor with 10 Pole Pairs and an encoder ratio “K” of 6:3, you get:

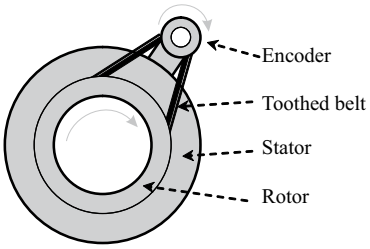
PP / K = 10 / (6/3) = 5

Note ! Not all “K” ratios are permitted: only those that give “finite” numbers.

The maximum programmable value is equal to the number of pole pairs set in the drive.

If when programming the pole pairs you enter a number lower than the value in PAR 2186, PAR 2196 is automatically set to 0 and the function is disabled.

Use of a Geared Encoder



Most of the Torque motors on the market includes feedback position device mounted via toothed belt or other multiplier (see figure). This involves a non-unitary kinematic relationship that must be considered for the proper control of the motor. (Contact Gefran if you require application help).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.17	**5188**	**Enc 2 ratio**		UINT16		0	0	0	ER	FVS

This read-only parameter displays the motor/encoder 2 gear ratio calculated by the drive.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.18	**5360**	**Encoder 2 state**		UINT16		0	0	0	ER	FVS

Indicates the state of Encoder 2 (1= error, 0 = no error) regardless of whether this Encoder is used/not used as feedback for motor control.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3.19	**5362**	**Encoder 2 err code**		UINT32		0	0	0	ER	FVS

This parameter contains a hexadecimal code that supplies information on the type of error that occurred.

Error values are the same (and have the same significance) as the ones indicated in parameter IPA 2172 **Spd-FbkLoss code**.

17.4 - ENCODER/ENCODER 3

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.4.1	**5200**	**Encoder 3 pulses**	ppr	UINT16		1024	128	32768	ERWZ	FVS

Setting of the number of impulses/rev of the incremental encoder mounted in slot 1 or 3.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.4.2	**5204**	**Encoder 3 input cfg**		ENUM		TTL	0	1	ERWZ	FVS

Setting of the input configuration of incremental digital encoder 3, TTL or HTL. If the encoder has an internal power supply the level of the encoder's supply voltage is equal to that set for encoder 2.

0 HTL

1 TTL

The value of this parameter is automatically set in HTL when the value entered in the **Encoder 2 supply** parameter is more than 6.0V.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.4.3	**5210**	**Encoder3signal check**		ENUM		Check A-B	0	3	ERWZ	FVS

Configuration of which channels of the incremental digital encoder 3 must be controlled for processing the **Speed fbk loss [22]**.

0 Check disabled

1 Check A-B

2 Check A-B-Z

4 Check A-B-Z-P

If set to 1, the application checks for the presence of the signals of channels A-B

If set to 2, the application checks for the presence of the signals of channels A-B-Z

If set to 4, the application controls loss of feedback for SE (single ended) encoders.

If the application detects the absence of feedback the **Speed fbk loss [22]** is generated.

As loss of feedback cannot be detected at speeds of around zero, the control is only performed if the speed reference is higher than the value set in parameter **4564 SpdFbkLoss threshold**. It is also important to consider the fact that when working with a speed reference slightly above the limit set in parameter **4564 SpdFbkLoss threshold**, the speed error could exceed the set threshold, given the load or current limit, and generate false alarms.

In that case increase the value of parameter **4550 SpdRefLoss threshold** or of parameter **4554 SpdRefLoss holdoff**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.4.4	**5230**	**Encoder 3 direction**		ENUM		Not inverted	0	1	ERWZ	FVS

Selection of the encoder direction

0 Not inverted

1 Inverted

If set to 0 the encoder feedback signals are not inverted.

If set to 1 the encoder feedback signals are inverted.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.4.5	**5262**	**Encoder 3 position**	cnt	UINT16	16BIT	0	0	0	ER	FVS

The encoder position is displayed. The scaling factor is Number encoder impulses *4.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.4.6	**5370**	**Encoder 3 state**		**UINT16**		**0**	**0**	**0**	**ER**	FVS

Indicates the state of Encoder 3 (1= error, 0 = no error) regardless of whether this Encoder is used/not used as

feedback for motor control.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.4.7	**5372**	**Encoder 3 err code**		**UINT32**		**0**	**0**	**0**	**ER**	FVS

This parameter contains a hexadecimal code that supplies information on the type of error that occurred.

Error values are the same (and have the same significance) as the ones indicated in parameter IPA 2172 **Spd-FbkLoss code**.

17.5 - ENCODER/RESOLVER

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.5.1	**2116**	**Resolver pole pairs**		UINT16		1	1	8	ERWZ	FVS

Setting of pairs of poles of resolver used (see resolver plate data).

1 1 pair of poles

2 2 pairs of poles

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.5.2	**2118**	**Resolver frequency**	Hz	UINT16		8000	2000.0	10000.0	ERWZ	FVS

Value of the resolver frequency (see Resover name plate data). Step 250Hz.

Nota! In order to manage the **EXP-RES-I1R1-ADV** card, three parameters need to be set: PAR 2118, 2120 and 2116.

Parameters PAR 2124 and 2128 could be modify if it is require a fine tuning of the card and resolver output voltage are outside the limits.

Plese refer to **EXP-RES-I1R1-ADV** Resolver option card instruction book (code 1S5F33) for more detailed informations

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.5.3	**2120**	**Resolver T ratio K**		FLOAT		0.5	0.2	1.0	ERWZ	FVS

Value of the resolver Trasformer ratio of used resolver (see Resolver name plate data).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.5.4	**2122**	**Resolver repetition**		ENUM		16384 ppr	0	3	ERWZ	FVS

Simulated selection of the resolver repetition.

0 256 ppr

1 1024 ppr

2 4096 ppr

3 16384 ppr

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.5.5	**2124**	**Resolver LOS thr**	V	FLOAT		2.200	0.000	4.820	ERWZ	FVS

Loss Of Signal threshold: Setting of the lower threshold value of the Resolver signal. Values below this setting will generate a **Speed fbk loss [22]** alarm.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.5.6	**2128**	**Resolver MIS thr**	V	FLOAT		0.380	0.000	4.820	ERWZ	FVS

A threshold value between SIN and COS signal amplitudes can be set.

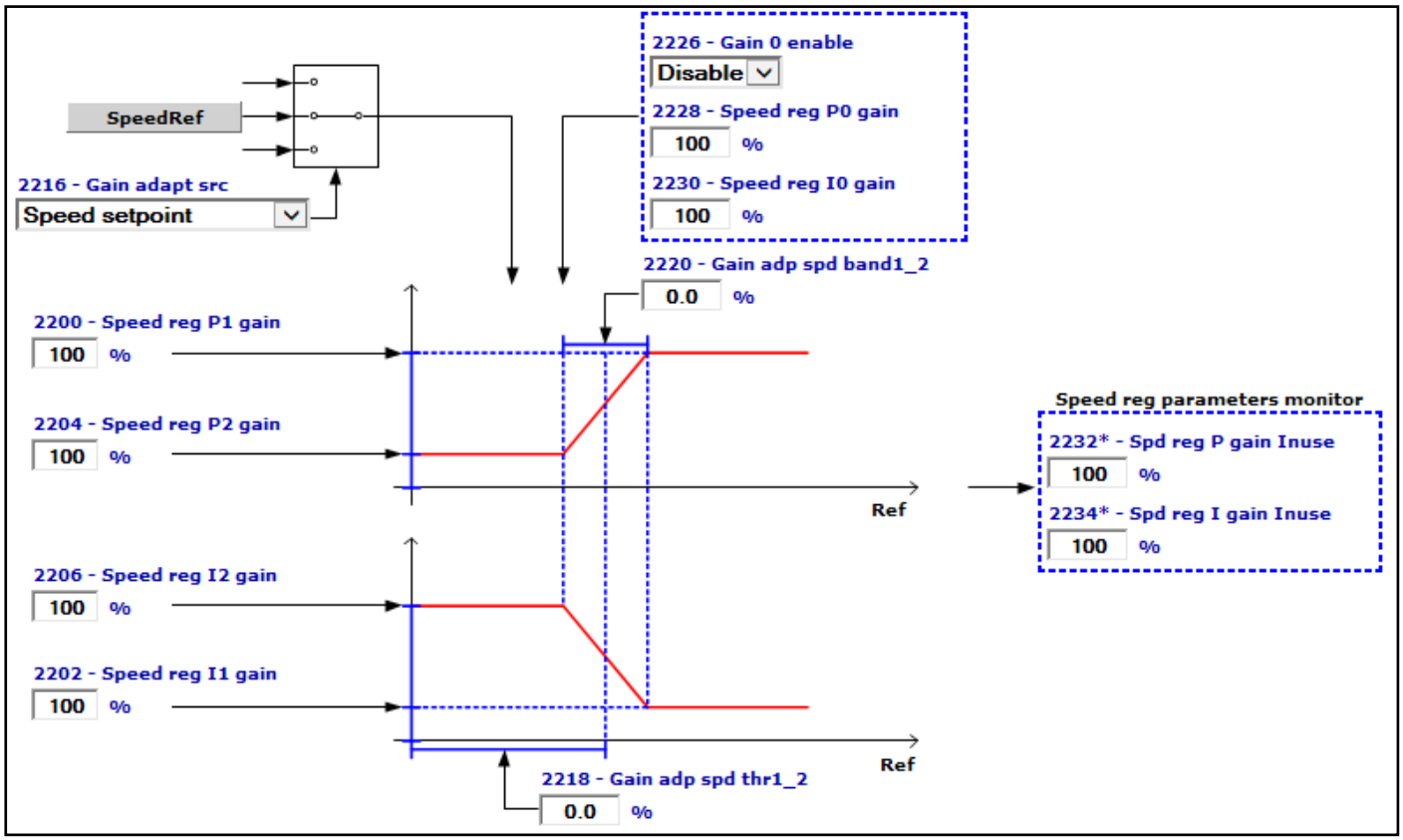
An alarm is shown If it is detected an amplitude value differences higher than the value set in MIS threshold. This value can be increased: If the alarm does not disappear, the resolver used could be defective or the wiring drive-resolver are not correct.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.5.7	**2094**	**Resolver freeze0 src**		LINK	16	6000	0	16384	ERWZ	FVS
17.5.8	**2096**	**Resolver freeze1 src**		LINK	16	6000	0	16384	ERWZ	FVS

It indicates which digital input can be used as **Freeze input 0** or **Freeze input 1** when resolver feedback is used and managed thru MDPLC application. Digital input is updated every 125 µsec.

Input can be selected from those available on **"L_RESFREEZE"** selection list.

18 – SPEED REG GAINS



The speed adaptive allows different speed regulator gains to be obtained according to the speed or another value. The behaviour of the speed regulator can thus be configured in the best way for the specific application requirements.

Note ! Current, flux and voltage regulators can be set using the self-tuning procedure. If this is not successful, current and flux regulators can be tuned manually (this does not apply to voltage regulators, whch must not be modified by the user). The speed regulator must be tuned manually. Gains are usually adjusted according to the drive speed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.1	**2200**	**Speed reg P1 gain**	perc	INT16		100	0	1000	RW	F_S
18.2	**2202**	**Speed reg I1 time**	perc	INT16		100	0	1000	RW	F_S

Setting of the proportional and integral gain of the speed regulator, set 1.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.3	**2204**	**Speed reg P2 gain**	perc	INT16		100	0	1000	ERW	F_S
18.4	**2206**	**Speed reg I2 time**	perc	INT16		100	0	1000	ERW	F_S

Setting of the proportional and integral gain of the speed regulator, set 2.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.5	**2216**	**Gain adapt src**		LINK	16/32	664	0	16384	ERW	F_S

Selection of the origin (source) of the signal to be used for the adaptive speed gain. The values that can be associated with the function are listed in the "**L_REF**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.6	**2218**	**Gain adapt spd thr 1_2**	perc	FLOAT		0.0	0.0	100.0	ERW	F_S

Setting of the speed threshold for changing gains from set 1 to set 2.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.7	**2220**	**Gain adapt spd band 1_2**	perc	FLOAT		0.0	0.0	100.0	ERW	F_S

Setting of the band within which gains vary between set 1 and set 2. The use of this parameter ensures a smooth transition between the two parameter sets.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.8	**2226**	**Gain 0 enable**		ENUM		Disable	0	1	ERW	F_S

Enabling of the gain at zero speed.

0 Disable

1 Enable

When this parameter is set to 0 the control of gains at zero speed is disabled.

When this parameter is set to 1 the control of gains at zero speed is enabled. This function is used to improve the response of the motor below the zero speed threshold (Speed zero threshold)..

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.9	**2228**	**Speed reg P0 gain**	perc	INT16		100	0	1000	ERW	F_S

Setting of the proportional gain of the speed regulator at zero speed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.10	**2230**	**Speed reg I0 gain**	perc	INT16		100	0	1000	ERW	F_S

Setting of the integral gain of the speed regulator at zero speed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.11	**2232**	**Spd reg P gain Inuse**	perc	INT16	16/32	100	0	1000	ER	F_S

The current proportional coefficient of the speed regulator is displayed as a percentage.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.12	**2234**	**Spd reg I gain Inuse**	perc	INT16	16/32	100	0	1000	ER	F_S

The current integral coefficient of the speed regulator is displayed as a percentage.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.13	**2236**	**Speed reg P gain**	N/rpm	FLOAT		CALCF	0.0	500.0	ERWS	F_S

Setting of the proportional coefficient of the speed regulator.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.14	**2238**	**Speed reg I time**	ms	FLOAT		CALCF	1.0	5000.0	ERWS	F_S

Setting of the integral coefficient of the speed regulator. Reducing the integral time value increases the integral action of the regulator.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.15	**2244**	**Speed reg I dis src**		LINK	16/32	6000	0	16384	ERW	F_S

Selection of the origin (source) of the signal for Enabling/disabling of the Integral part of the Speed regulator (Null= enabled). The signal to be associated with this function can be selected from the “L_DIGSEL2” selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.16	**2246**	**Speed reg P factor**	perc	FLOAT	16/32	0	0	0	ER	F_S

Monitor of the proportional component value of the Speed regulator output. It is also available thru analog output.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.17	**2248**	**Speed reg I factor**	perc	FLOAT	16/32	0	0	0	ER	F_S

Monitor of the integral component value of the Speed regulator output. It is also available thru analog output.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.18	**2240**	**Inertia**	kgm^2	FLOAT		SIZE	0.0001	100.0	RWZS	F_S

Setting of total inertia of the application with reference to the motor shaft.

Inertia is the tendency of a body at rest to remain at rest or of a body in straight line motion to stay in motion in astraight line unless acted on by an outside force;

Setting the total system inertia value (motor + mechanical transmission), the drive will set automatically the PAR 2236 **Speed reg P gain** proportional gain of the speed regulator in order to react immediatelly to the speed variations.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
18.19	**2242**	**Bandwidth**	rad/s	FLOAT		SIZE	1.0	700.0	RWZS	F_S

Setting of the bandwidth.

The bandwidth defines the dynamic performance in terms of capacity of follow the speed references or torque which the are time variable .

Increasing the value, the drive responce time will increase (automatically will increase PAR 2236 **Speed reg P gain** and decrease PAR 2238 **Speed reg I time**).

Higher value can be used in the case of “rigid” connections between the motor and the machine. Otherwise you may encounter instability of the system.

Note! In the case of controlling Synchronous motor (PAR480 = 1) the real value is IPA2242*10.

19 – REGULATOR PARAM

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.1	**2250**	**Current reg P gain**	V/A	FLOAT		CALCF	0.0	0.0	ERWS	F_S

Setting of the proportional coefficient of the current regulator.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.2	**2252**	**Current reg I time**	ms	FLOAT		CALCF	0.01	10000.0	ERWS	F_S

Setting of the integral coefficient of the current regulator.

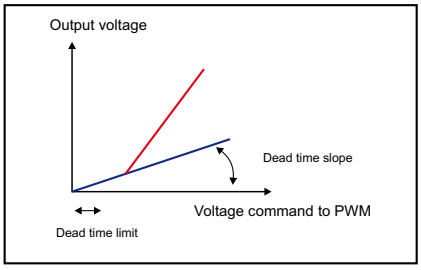
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.3	**2270**	**Voltage reg P gain**	Wb/V	FLOAT		CALCF	0.0	0.0	ERWS	F_S

Setting of the proportional coefficient of the voltage regulator.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.4	**2272**	**Voltage reg I time**	s	FLOAT		CALCF	0.01	100.0	ERWS	F_

Setting of the integral coefficient of the voltage regulator.

Dead time compensation



The dead time compensation function (**Dead time compensation**), compensates the distortion of output voltage caused by the voltage drop on the IGBT devices and their switching characteristics.

Distortion of output voltage could cause irregular motor rotation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.5	**2280**	**Dead time limit**	V	FLOAT		SIZE	0.0	50.0	ERWS	FVS

Setting of the dead time voltage compensation value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.6	**2282**	**Dead time slope**	V/A	FLOAT		SIZE	0.0	200.0	ERWS	FVS

Setting of the dead time compensation slope value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.7	**2290**	**Voltage base**	V	FLOAT		CALCF	50.0	690.0	ERWS	F_S

Setting of the basic voltage of the motor. This parameter is calculated automatically by the self-tuning procedure.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.8	**2292**	**Voltage margin**	perc	FLOAT		5.0	0.0	10.0	ERWS	F_S

Setting of the voltage regulation margin according to the available voltage. In case of a **Voltage base** setting close to or equal to the actual mains value, **Voltage margin** represents the margin allowable by the voltage regulation to perform rapid current variations when load steps are suddenly applied.

A value of 5% allows a very fast response to load steps but with a loss of output voltage and thus power output (reduced power output).

The minimum value (1%) allows a maximum output voltage (around 98%) of the mains voltage to be achieved but with loss of quality of the dynamic response.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.9	**132**	**Magnet current lim**	A	FLOAT		CALCF	0.0	CALCF	ERWZS	F__

Setting of the magnetisation current with operation at above the motor rated speed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.10	**144**	**Volt feedfwd enable**		BIT		1	0	1	ERWZ	F_S

With this parameter (only for synchronous motors) is possible to enable/disable the internal function of voltage feedforward of the current regulator to allow to uncouple the torque current and magnetizing current component. The disabling of this parameter is mainly useful when torque motors are used.

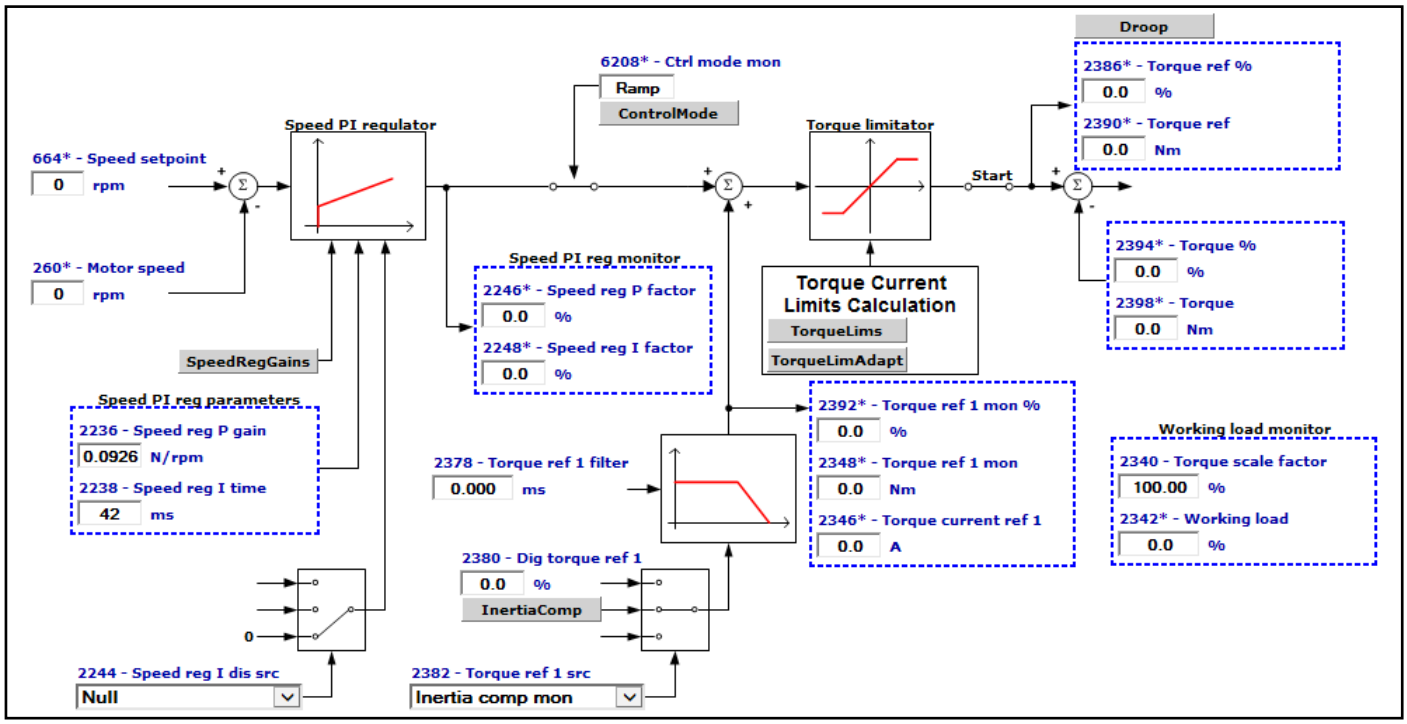
0 Off

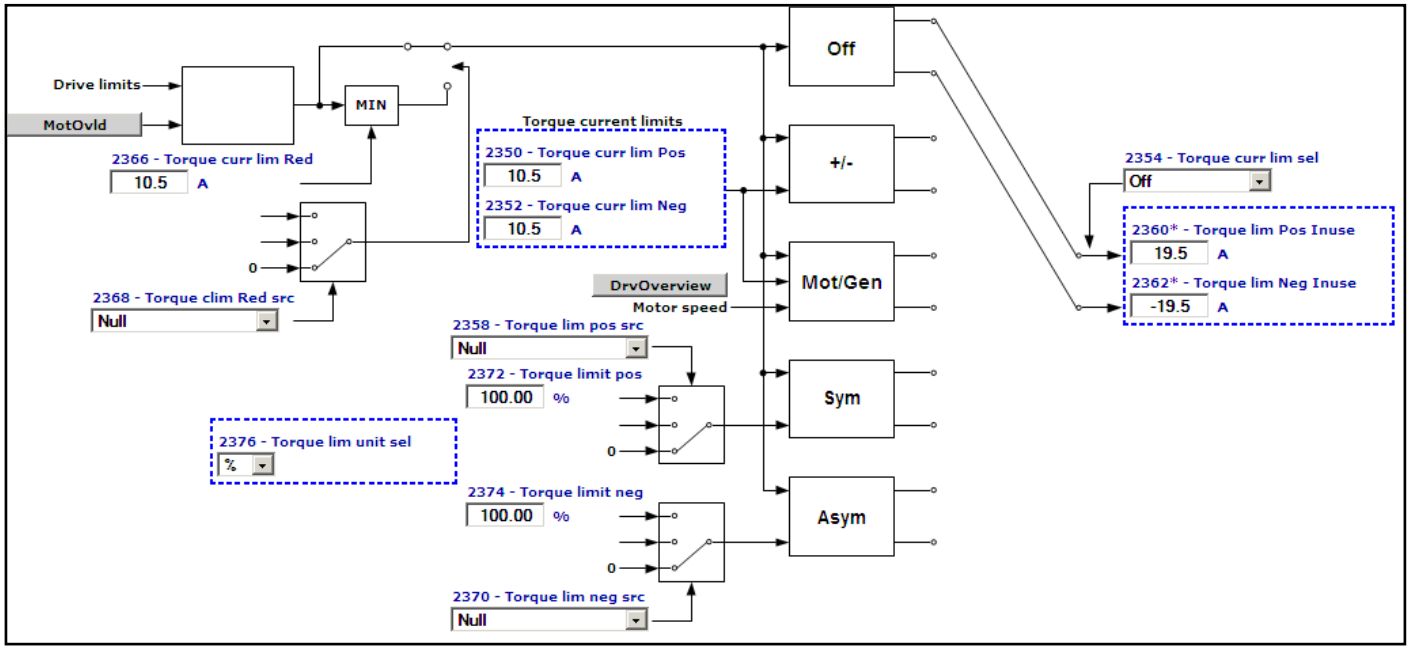
1 On

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.11	**152**	**Rotor compensation**		BIT		1	0	1	ERWZ	FVS

Enables rotor misalignment compensation in presence of motors with high polar torque number.

20 – TORQUE CONFIG





Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.1	**2350**	**Torque curr lim Pos**	A	FLOAT	16/32	CALCF	0.0	CALCF	ERWS	FVS

Setting of the active torque limit of the drive for the positive current direction (clockwise rotation and anti-clockwise braking).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.2	**2352**	**Torque curr lim Neg**	A	FLOAT	16/32	CALCF	0.0	CALCF	ERWS	FVS

Setting of the active torque limit of the drive for the negative current direction (anti-clockwise rotation and clockwise braking).

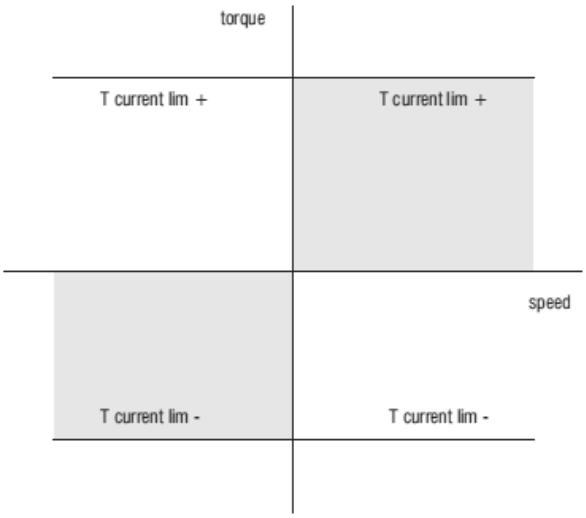
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.3	**2354**	**Torque curr lim sel**		ENUM		Off	0	4	ERWZ	FVS

Setting of the type of behaviour of the drive in the current limit condition.

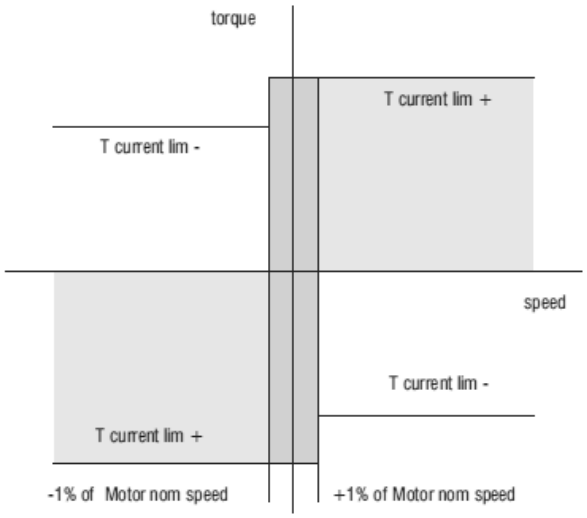
0 Off
1 T clim +/-
2 T clim mot/gen
3 T lim sym
4 T lim pos/neg

If set to **0** no specific type of current limitation is set.

If set to **1** the active positive torque limit is **Torque curr lim Pos** and the active negative torque limit is **Torque curr lim Neg**; the limit is provided on the torque current.



Torque limits with **Torque curr lim Sel** = 1



Torque limits with **Torque curr lim sel** = 2

If set to **2** three conditions are possible:

1 - If the motor speed is > +1% of **Rated speed** the active positive torque limit is **Torque curr lim Pos** and the active negative torque limit is **Torque curr lim Neg**.

2 - If the motor speed is < -1% of **Rated speed** the active positive torque limit is **Torque curr lim Neg** and the active negative torque limit is **Torque curr lim Pos**.

3 - If -1% of Motor non speed < motor speed < + 1% of **Rated speed** the active positive torque limit is **Torque curr lim Pos** and the active negative torque limit is **Torque curr lim Neg**

If set to **3** the torque limits are symmetrical. The torque reference is the value of parameter **2358 Torque lim pos src**. This mode is not managed in the V/f control mode. The limit is provided on the torque current.

If set to 4 the torque limits are assigned independently, setting the value of parameter **2358 Torque lim pos src** as the positive torque reference and the value of parameter **2370 Torque lim neg src** as the negative torque reference. The torque reference is the value of parameter **2370 Torque lim neg src**. This mode is not managed in the V/f control mode. The limit is provided on the torque current.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.4	**2358**	**Torque lim pos src**		LINK	16/32	6000	0	16384	ERWZ	F_S

Selection of the origin (source) to be used to set the torque limit:

If parameter **2354 Torque curr lim sel** is set to 3 the torque limit is symmetrical
If parameter **2354 Torque curr lim sel** is set to 4 the torque limit is positive

The signals that can be associated with the function can be selected from the **"L_PLIM"** selection list.

Parameter IPA 2338 **Torque lim adapt** can be selected (from the "L_PLIM" selection list) if parameter IPA 2354 **Torque curr lim sel** is set to [3] **T lim sym** to manage symmetrical torque limits.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.5	**2370**	**Torque lim neg src**		LINK	16/32BIT	6000	0	16384	ERWZ	FVS

Selection of the origin (source) to be used for the negative torque limit. The signals that can be associated with the function can be selected from the **"L_LIM"** selection list

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.6	**2372**	**Torque limit pos**	perc	FLOAT	16/32	CALCF	0.0	CALCF	ERW	F_S

Setting of the positive limit for torque limitation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.7	**2374**	**Torque limit neg**	perc	FLOAT	16/32	CALCF	0.0	CALCF	ERW	F_S

Setting of the negative limit for torque limitation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.8	**2376**	**Torque lim unit sel**		ENUM		%	0	1	ERW	F_S

Setting of the unit of measure for torque limits.

0 %

1 Nm

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.9	**2360**	**Torque lim Pos Inuse**	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS

The positive torque limit value currently being used is displayed. When parameter 2354 is set to [3] T lim sym or [4] T lim pos/neg, the unit of measure of parameter 2360 is Nm.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.10	**2362**	**Torque lim Neg Inuse**	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS

The negative torque limit value currently being used is displayed. When parameter 2354 is set to [3] T lim sym or [4] T lim pos/neg, the unit of measure of parameter 2362 is Nm.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.11	**2378**	**Torque ref 1 filter**	ms	FLOAT		0.0	0.0	1000.0	ERW	F_S

Setting of filter on Torque Feed forward filter monitoring. If IPA2378=0, disabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.12	**2380**	**Dig torque ref 1**	perc	FLOAT	16/32	0.0	-300.0	300.0	ERW	F_S

Setting of a digital torque reference. The current reference value is proportional to the active motor current and determines the torque value. The sign determines the torque direction.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.13	**2382**	**Torque ref 1 src**		LINK	16/32	3104	0.0	16384	ERWZ	F_S

Selection of the origin (source) of the signal to be used for the torque reference. The signals that can be associated with the function can be selected from the "**L_VREF**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.14	**2392**	**Torque ref 1 mon %**	perc	FLOAT	16/32	0.0	0.0	0.0	ER	F_S

Torque ref 1 monitor in %

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.15	**2346**	**Torque current ref 1**	A	FLOAT	16/32	0.0	0.0	0.0	ER	F_S

Monitoring of the torque current reference 1 in Amps. Monitoring is always active both when the drive is enabled or disabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.16	**2348**	**Torque ref 1 mon**	Nm	FLOAT		0.0	0.0	0.0	ER	FVS

Torque ref 1 monitor in Nm.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.17	**2384**	**Torque ref filter**	ms	FLOAT		0.125	0.125	10.000	ERW	F_S

Setting of a filter on the torque reference monitoring.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.18	**2386**	**Torque ref %**	perc	FLOAT	16/32	0.0	0.0	0.0	ER	F_S

Monitoring of the torque reference value in %.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.19	**2390**	**Torque ref**	**Nm**	**FLOAT**	**16/32**	**0.0**	**0.0**	**0.0**	**ER**	**F_S**

Monitoring of the torque reference value in Nm.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.20	**2394**	**Torque %**	perc	FLOAT	16/32	0.0	0.0	0.0	ER	F_S

Monitoring of the % value of the motor nominal Torque.

Values are available thru analog outputs.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.21	**2398**	**Torque**	Nm	FLOAT		0.0	0.0	0.0	ER	F_S

Monitoring of the Nm value of the motor nominal Torque.

Values are available thru analog outputs.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.22	**2366**	**Torque curr lim Red**	A	FLOAT	16/32BIT	CALCF	0.0	CALCF	ERWS	F_S

Setting of the torque current limit when the **2368 Torque clim Red src** command is enabled. The default value and maximum value are automatically calculated by the drive whenever any changes are made to the motor plate data and after autotuning.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.23	**2368**	**Torque clim Red src**		LINK	16BIT	6000	0	16384	ERW	F_S

Selection of the origin (source) to be used to reduce the torque current limit. When this command is enabled the torque limit passes to the level set in parameter **2366 Torque curr lim Red**. The signals that can be associated with the function can be selected from the **"L_DIGSEL2"** selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.24	**2340**	**Fattore scala coppia**	perc	FLOAT		100.00	1.00	200.00	ERW	F_S

Scale factor of nominal motor torque in % (**Torque %**, IPA 2394) to let the user display motor torque in the required scale.

Scaled torque % = **Torque %** (IPA 2394) * 100 / **Torque scale factor** (IPA 2340).

21 - SENSORLESS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.1	**7008**	**SLS status**		ENUM		Disabled	0	2	R	FVS

This indicates the operating status of the internal sensorless algorithm.

0 Disabled not operational

1 Enabled the sensorless algorithm is enabled

2 Run the sensorless algorithm is active and operational.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.2	**7010**	**SLS min speed CL**	rpm	FLOAT		CALCF	0.0	CALCF	RWZ	FVS

This indicates the minimum operating speed of the sensorless algorithm in closed loop estimation speed (CL). This parameter is automatically calculated through Seltune procedure. Correct value is ≤ 80% of PAR 7012 SLS max speed OL.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.3	**7012**	**SLS max speed OL**	rpm	FLOAT		CALCF	CALCF	CALCF	RWZ	FVS

This indicates the maximum operating speed of the sensorless algorithm in open loop estimation speed (OL). This parameter is automatically calculated through Seltune procedure.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.4	**7014**	**SLS id current corr**	A	FLOAT		CALCF	0	CALCF	RW	FVS

This indicates the 'Id' flux current that is injected into the motor at low speed.

It is expressed as a percentage of the rated current of the motor.

Increasing this value, motor starting with load applied and speed stability performance are improved.

Increasing this value could cause reduction of motor efficiency

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.5	**7016**	**SLS id desat time**	ms	FLOAT		250	20	1000	ERW	FVS

This indicates the time within which the Id current correction must be cancelled once the maximum speed limit set in PAR 7018 **SLS id speed thr** is exceeded. This parameter is automatically calculated through Seltune procedure .

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.6	**7018**	**SLS id speed thr**	rpm	FLOAT		CALCF	0	CALCF	ERW	FVS

This indicates the speed up to which the Id current correction must be maintained.

Above this limit the reactive current is reset with the time set in PAR 7016 **SLS tempo desat id**. If this parameter is set to 0, the Id current is reset automatically when PAR 7012 **SLS max speed OL** is exceeded.

This parameter is automatically calculated through Seltune procedure .

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.7	**7020**	**SLS id sel ctrl**		ENUM		Normal	0	1	ERW	FVS

This setting can be used to select the Id current control mode.

0 Normal Standard

1 Advanced Adaptive

If Adaptive mode is selected, the estimated speed control correction is optimized,

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.8	**7022**	**SLS obs speed gain**		FLOAT		1	0.001	50	RW	FVS

This sets the gain for the speed and position estimator (PLL). Increasing this value speeds up the speed estimation reading to allow to follow more accurately the speed profile, but reduces disturbance rejection.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.9	**7024**	**SLS K1 speed obs**		FLOAT		CALCF	0.0	35000	ERW	FVS
21.10	**7026**	**SLS K2 speed obs**		FLOAT		CALCF	0.0	2000	ERW	FVS

Speed/position estimator coefficients (PLL).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.11	**7028**	**SLS Rs corr factor**	perc	INT16		0	-100	100	ERW	FVS

Correction as a percentage of the stator resistance measured during selftune procedure.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.12	**7030**	**SLS Lsig corr factor**	perc	INT16		0	-100	200	ERW	FVS

Correction as a percentage of the leakage inductance measured during selftune procedure.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.13	**7032**	**SLS K1 motor obs**		FLOAT		CALCF	0.0	800000	ERWZ	FVS

This is used to modify the behaviour of the estimator of the motor parameters.

This parameter is automatically calculated through Seltune procedure .

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.14	**7034**	**SLS K2 motor obs**		FLOAT		CALCF	-3050000	-10	ERWZ	FVS

This is used to modify the behaviour of the estimator of the motor parameters.

This parameter is automatically calculated through Seltune procedure .

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.15	**7040**	**SLS ramp enable**		ENUM		Disable	0	1	RWZ	FVS

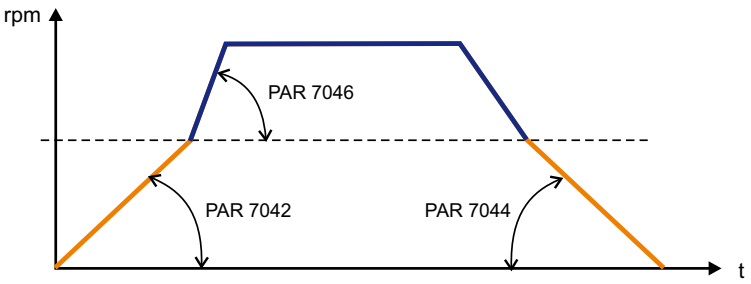
This enables/disables the possibility of setting a double ramp profile during the acceleration/deceleration phase in SLS mode.

It allows to speed up the internal estimator catching to the speed profile. The use of this function is recommended in applications in which high inertia loads are applied. When the double ramp procedure is enabled it replaces the standard ramp profiles up to the speed set in PAR 7046.

Above that speed the acceleration/deceleration profiles set in menu 6 – RAMPE are used. Use of the linear ramp is recommended (PAR 720 = 0).

0 Disable

1 Enable



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.16	**7042**	**SLS ramp acc time**	s	FLOAT		10.0	0.01	1000.0	RW	FVS

Acceleration time of the double ramp profile.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.17	**7044**	**SLS ramp dec time**	s	FLOAT		10.0	0.01	1000.0	RW	FVS

Deceleration time of the double ramp profile.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.18	**7046**	**SLS ramp speed thr**	rpm	UINT32		CALCI	0	CALCI	RW	FVS

Maximum speed limit below which the ramp profile set in parameters PAR 7042 and PAR 7044 is managed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.19	**7048**	**SLS rotor alignment**		ENUM		Disable	0	1	ERWZ	FVS

This enables/disables the possibility of aligning the rotor at a standstill.

0 Disable

1 Enable

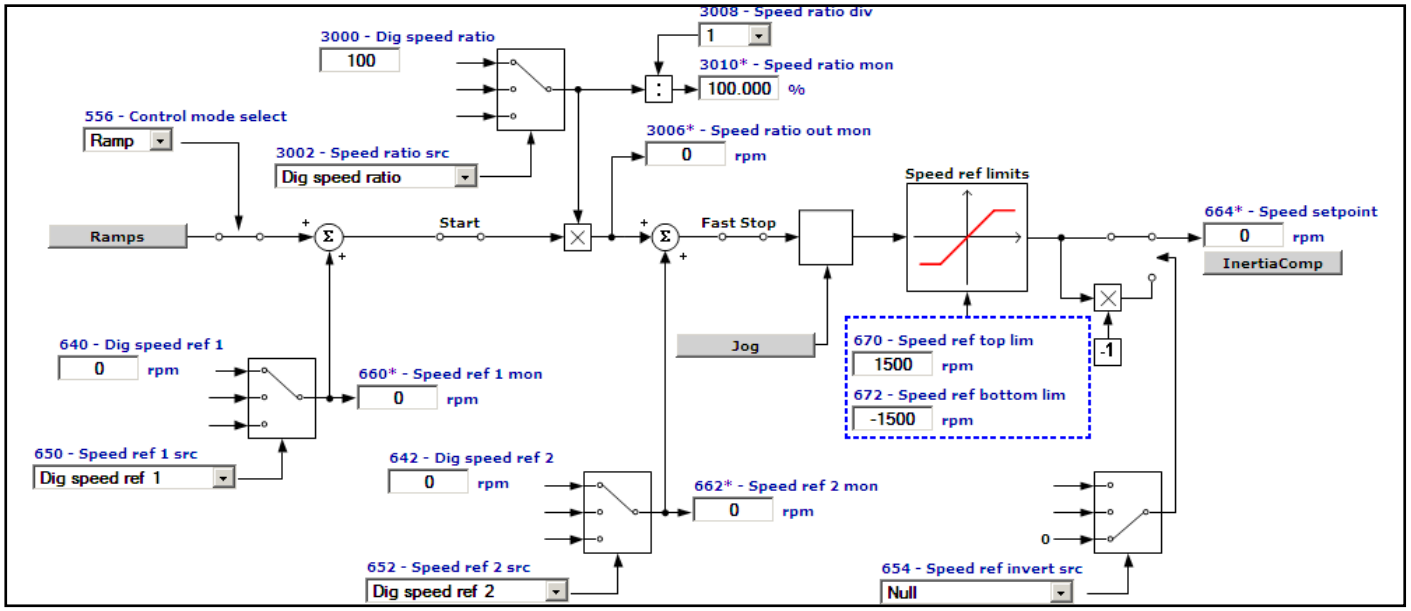
It can be used (set to Enable) in the case of application when more than 50% of the load is applied.

Below procedure need to be followed:

- Enable the drive at ref=0;
- Wait for the time indicated in P7050 is finished;
- Increase speed value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.20	**7050**	**SLS rotor align time**	s	FLOAT		1.0	0.1	10.0	ERW	FVS

This sets the time for aligning the rotor when PAR 7048 is enabled.



22.1 – FUNCTIONS/SPEED RATIO

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.1.1	**3000**	**Dig speed ratio**	perc	INT16	16/32	100	CALCI	CALCI	ERW	FVS

This function allows a configurable speed ratio (Speed ratio) to be applied to the main reference and determines the speed ratio percentage. This setting can be performed in digital form, via fieldbus, or through an analog input. This function is useful in “multi drive” systems where a slip value is required between the various motors being used. The resulting speed value can be read through the Speed ratio mon parameter on a programmable analog output.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.1.2	**3002**	**Speed ratio src**		LINK	16/32	3000	0	16384	ERW	FVS

Selection of the origin (source) of the signal that determines the speed ratio percentage value. The terminal to be associated with this function can be selected from the “L_VREF” selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.1.3	**3008**	**Speed ratio div**		ENUM		1	0	3	ERW	FVS

This parameter defines the number of decimal positions for setting PAR 3000 **Dig speed ratio**. Possible values are shown in the table below:

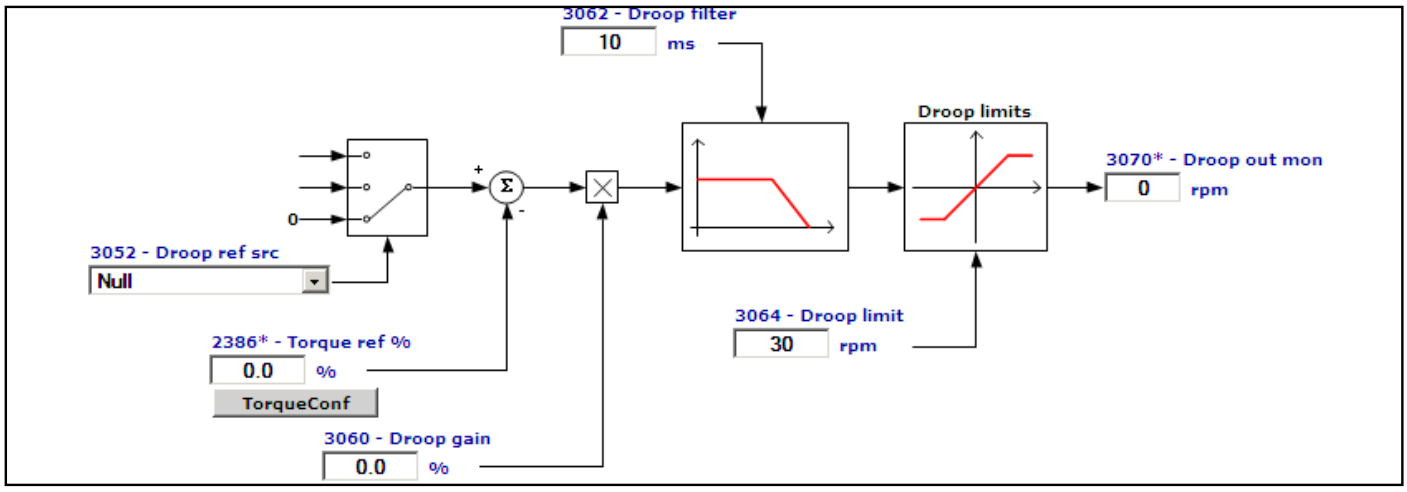
Speed ratio divider	Values that can be set in PAR 3000 Dig speed ratio	Corresponding % value
1	0-200	0-200
10	0-2000	0-200.0
100	0-20000	0-200.00
1000	0-32000	0-32.000

1 1
10 10
100 100
1000 1000

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.1.4	**3010**	**Speed ratio mon**	FLOAT	INT16		0	0	0	ER	FVS

The speed ratio value to apply to the selected speed reference signal value is displayed.

22.2 – FUNCTIONS/DROOP



The Droop function is only active in **Regulation mode** = **Flux vector OL** or **Flux vector CL**.

The block consists of:

- a node of comparison between **Droop ref src** connected to the **Analog inp** of the master drive torque reference (set Torque ref nofilter on the master analog output) and slave drive torque reference (**Torque ref nofilter** produced by the speed regulator).
- a proportional regulator the output of which is added to or subtracted from the reference of the slave drive speed regulator. Set **Speed ref 1 src** equal to **Droop out mon**.

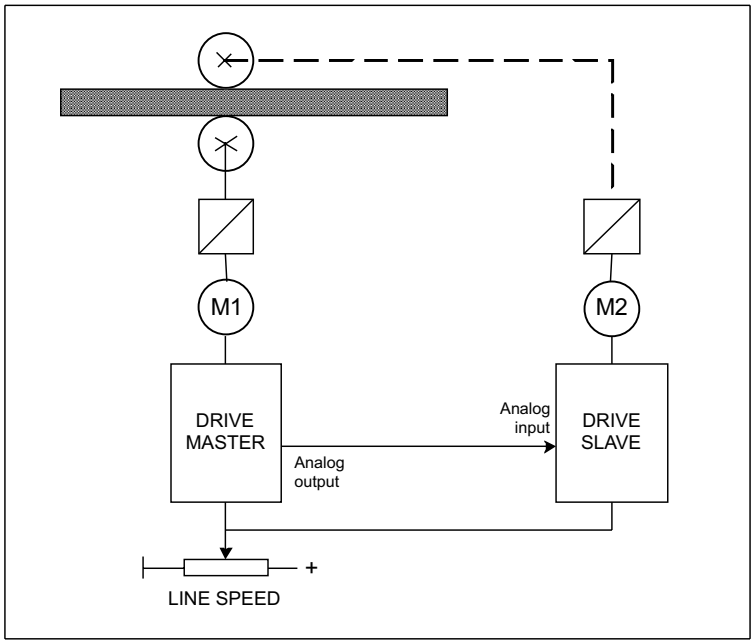
Before it is applied to the reference of the slave drive speed regulator, the adjustment passes through a low-pass filter and a limit.

The Droop function is used to control two coupled motors.

The advantage of using the Droop block is that the speed regulator can remain enabled on both drives. If using the Droop function, it can be adjusted to avoid speed regulator saturation on one of the two drives. Should there be a loss of load by one of the two drives, the adjustment provided by the Droop block is limited by the dedicated parameter.

This function is used to scale the current. This block is typically used when two motors are coupled mechanically to one another (for example if they are connected to the same shaft). They must turn at the same speed. If one of the two motors tends to turn faster, the result is a difference in the load conditions which leads to an Overload condition. The second motor acts as a brake. This causes a current unbalance, which can be eliminated by using the Droop function. An adjustment is added to or subtracted from the reference of the slave drive speed regulator (proportional to the load difference) to re-balance the two currents.

Example of machine on which the droop function can be used.



Parameter configuration:

Master drive:

Analog out x src connected to **Torque ref nofilter**

Slave drive:

Droop ref src connected to **Analog inp**.

Speed ref 1 src connected to **Droop out mon**.

Set "**Droop gain**", **Droop limit**, **Droop filter**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.1	**3052**	**Droop ref src**		LINK	16/32	6000	0	16384	ERW	F_S

This parameter can be used to select the origin (source) of the **Droop ref src** signal. The signal to be associated with this function can be selected from the "**L_LIM**" selection list. Select an analog input to which an analog signal from the master drive with information about the torque reference level will be connected.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.2	**3060**	**Droop gain**	perc	FLOAT		0.0	0.0	100.0	ERW	F_S

Use the **Droop gain** parameter to tune the proportional regulator gain. Setting this parameter to 0.0 forces the output of the Droop block to 0.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.3	**3062**	**Droop filter**	ms	UINT16		10	1	100	ERW	F_S

The **Droop filter** parameter can be used to tune the filter time constant.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.4	**3064**	**Droop limit**	rpm	INT16	16/32	30	0	CALCI	ERWZ	F_S

The **Droop limit** parameter can be used to tune the absolute value of the maximum adjustment applied by the Droop block to the speed reference.

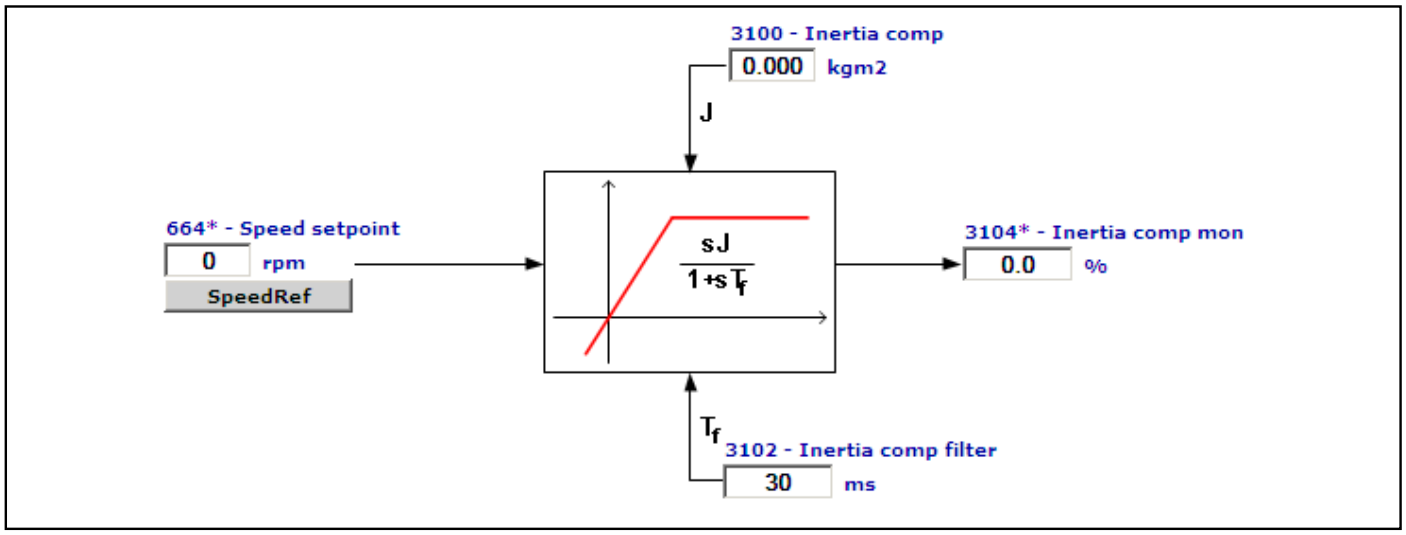
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.5	**3070**	**Droop out mon**	rpm	INT16	16/32	0	0	0	ER	F_S

The **Droop out mon** parameter can be used to read the size of the adjustment applied by the Droop block.

This variable is typically connected to **Speed ref 1 src** to add or substrat the adjustment by the Droop function to or from the speed reference.

This parameter is available in the speed reference, analog output, slave->master and compare selection lists.

22.3 – FUNCTIONS/INERTIA COMP



An increase in the dynamic response of the speed regulator with a variation in the reference, can be modified by varying the current value during the acceleration/ deceleration phase, to counter the applied inertia of the machine.
These parameters can be set manually by the user.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.3.1	**3100**	**Inertia comp**	kgm^2	FLOAT		0.0	0.0	100.0	ERWS	F_S

Inertia compensation value at motor shaft. Increasing this value can speed up the speed setpoint search. However, if the system inertia value set in PAR 2240 is incorrect, it could cause instability of speed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.3.2	**3102**	**Inertia comp filter**	ms	UINT16		30	1	100	ERW	F_S

Setting of a filter on the torque compensation. The filter reduces noise due to speed differentiation in the inertia block.

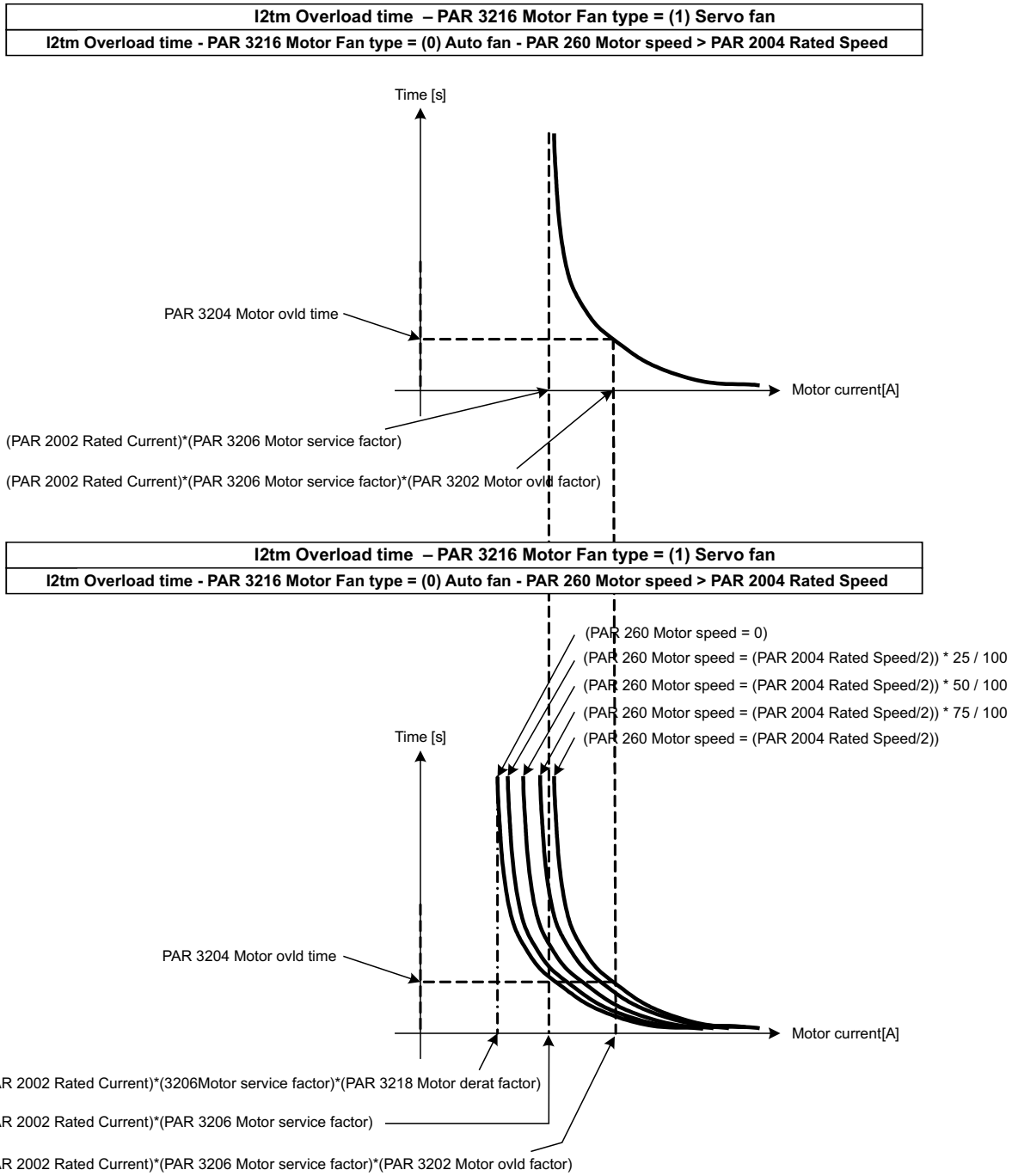
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.3.3	**3104**	**Inertia comp mon**	perc	FLOAT	16/32	0.0	0.0	0.0	ER	F_S

The value of inertia compensation on the function block output is displayed.

22.4 – FUNCTIONS/MOTOR OVERLOAD

The overload control function provides integrator logic to protect the motor against thermal overload. This protection presents the characteristic I²t behaviour and is an emulation of the thermal relay of the motor controlled by the ADV drive.

When the function is enabled, the value reached by the integrator is stored each time the drive is switched off. The saved value is restored each time the drive is switched on.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.4.1	**3200**	**Motor ovld enable**		BIT		0	0	1	ERW	FVS

Enabling of the motor overload control.

0 Disable
1 Enable

If set to 0 the MOTOR OVERLOAD function is disabled.
If set to 1 the MOTOR OVERLOAD function is enabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.4.2	**3202**	**Motor ovld factor**	perc	FLOAT		150.0	100.0	300.0	ERWS	FVS

Setting of the motor overload value. The value is expressed as a percentage of **Rated current** (PAR 2002) * **Motor service factor** (PAR 3206).

The current obtained from **Rated current** (PAR 2002) * **Motor service factor** (PAR 3206) * **Motor ovld factor** (PAR 3202) is the maximum current that can circulate in the motor.

If the MOTOR OVERLOAD function is enabled the drive automatically sets the torque current limit so that Iout max. does not exceed this value. The MOTOR OVERLOAD function can be used to deliver current to the motor at the overload value for a time set in **Motor ovld time** (PAR 3204). After the set time, the MOTOR OVERLOAD function automatically sets the torque current limit so that Iout max. does not exceed **Rated current** (PAR 2002) * **Motor service factor** (PAR 3206).

If the value of parameter 3202 **Motor ovld factor** is 100 % the overload current of the Motor Overload function is equal to the continuous current of the Motor Overload function. In this case the drive behaves as if the overload cycle has been executed and so sets the torque current limit so that Iout max is not more than the continuous current, i.e. **Rated current** (PAR 2002) * **Motor service factor** (PAR 3206).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.4.3	**3204**	**Motor ovld time**	s	FLOAT		30.0	10.0	300.0	ERWS	FVS

Setting of the motor overload duration in seconds.

With the MOTOR OVERLOAD function a current equal to the level of **Rated current** (PAR 2002) * **Motor service factor** (PAR 3206) * **Motor ovld factor** (PAR 3202) is supplied to the motor for the time set in **Motor ovld time** (PAR 3204).

The MOTOR OVERLOAD protection intervention time depends on the level of current circulating in the motor, a current equal to the overload level is allowed for the time set in **Motor ovld time**, a current at below the overload level is allowed for longer.

This alarm can be assigned to a programmable digital output (**Motor overload trip**).

The trip time depends on the motor current value, see figure on previous page.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.4.4	**3206**	**Motor service factor**	perc	FLOAT		100.0	25.0	200.0	ERWS	FVS

Setting of the motor service factor. The value is expressed as a percentage of **Rated current** (PAR 2002).

The current obtained from **Rated current** (PAR 2002) * **Motor service factor** (PAR 3206) * **Motor ovld factor** (PAR 3202) is the maximum current that can circulate in the motor.

If the MOTOR OVERLOAD function is enabled the drive automatically sets the torque current limit so that Iout max. does not exceed this value. The MOTOR OVERLOAD function can be used to deliver current to the motor at the overload value for a time set in **Motor ovld time** (PAR 3204). After the set time, the MOTOR OVERLOAD function automatically sets the torque current limit so that Iout max. does not exceed **Rated current** (PAR 2002) * **Motor service factor** (PAR 3206).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.4.5	**3216**	**Motor fan type**		ENUM		Servo fan	0	1	ERW	F_S

This parameter is used to set the type of motor cooling system.

0 Auto fan

1 Servo fan

Auto fan indicates the presence of a fan unit mounted on the motor shaft that therefore turns at a speed proportional to the motor speed. Cooling is not very effective at low motor speeds.

Servo fan indicates the presence of an independent fan unit that therefore always runs at the rated speed. It ensures optimum cooling efficiency at all motor speeds.

When the current motor speed is below (PAR 2004 **Rated speed** / 2) and PAR 3216 **Motor fan type** = Auto fan; , the MOTOR OVERLOAD protection intervention time must be reduced as cooling is insufficient.

At below (PAR 2004 **Rated speed** / 2) the protection intervention time is reduced by reducing the direct current of the MOTOR OVERLOAD function.

When the motor speed is equal to (PAR 2004 **Rated speed** / 2) the direct current of the MOTOR OVERLOAD func-

tion is equal to PAR 2002 **Rated current** * PAR 3206 **Motor service factor**, , whereas below that limit it is modified following a linear pattern until PAR 2002 **Rated current** * 3206 **Motor service factor** * PAR 3218 **Motor derat factor** when the motor speed reaches zero.

The overload current of the MOTOR OVERLOAD function is obtained by PAR 2002 **Rated current** * 3206 **Motor service factor** * PAR 3202 **Motor ovld factor** and is the maximum current that can circulate in the motor. If the MOTOR OVERLOAD function is enabled the drive automatically sets the torque current limit so that Iout max. does not exceed this value.

With the MOTOR OVERLOAD function a current equal to the Overload level is supplied to the motor for the maximum time set in PAR 3204 **Motor ovld time**, The slower the motor speed, the shorter the time allowed (see figure at beginning of chapter).

After the set time, the MOTOR OVERLOAD function automatically sets the torque current limit so that Iout max. does not exceed the direct current of the MOTOR OVERLOAD function.

When the motor current speed exceeds (PAR 2004 **Rated speed** / 2) and PAR 3216 **Motor fan type** = Auto fan, the direct current is not reduced as cooling is sufficient.

When PAR 3216 **Motor fan type** = Servo fan, the direct current is not reduced as cooling is sufficient.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.4.6	**3218**	**Motor derat factor**	perc	FLOAT		50.0	0.0	100.0	ERWS	F_S

This parameter is used to set the derating factor. The value is expressed as a percentage of PAR 2002 **Rated current** * PAR 3206 **Motor service factor**.

When the current motor speed is below (PAR 2004 **Rated speed** / 2) and PAR 3216 **Motor fan type** = Auto fan, the protection intervention time must be reduced as cooling is insufficient.

At below (PAR 2004 **Rated speed** / 2) sthe protection intervention time is reduced by reducing the direct current of the MOTOR OVERLOAD function.

When the motor speed is equal to (PAR 2004 **Rated speed** / 2)) the direct current of the MOTOR OVERLOAD function is equal to PAR 2002 **Rated current** * PAR 3206 **Motor service factor**, whereas below that limit it is modified following a linear pattern until PAR 2002 **Rated current** * PAR 3206 **Motor service factor** * PAR 3218 **Motor derat factor** when the motor speed reaches zero.

The overload current of the MOTOR OVERLOAD function is obtained by PAR 2002 **Rated current** * PAR 3206 **Motor service factor** * PAR 3202 **Motor ovld factor** and is the maximum current that can circulate in the motor. If the MOTOR OVERLOAD function is enabled the drive automatically sets the torque current limit so that Iout max. does not exceed this value.

With the MOTOR OVERLOAD function a current equal to the Overload level is supplied to the motor for the maximum time set in PAR 3204 **Motor ovld time**, The slower the motor speed, the shorter the time allowed (see graphs).

After the set time, the MOTOR OVERLOAD function automatically sets the torque current limit so that Iout max. does not exceed the direct current of the MOTOR OVERLOAD function.

When the motor current speed exceeds (PAR 2004 **Rated speed** / 2) and PAR 3216 **Motor fan type** = Auto fan, the direct current is not reduced as cooling is sufficient.

When PAR 3216 **Motor fan type** = Servo fan, the direct current is not reduced as cooling is sufficient.

If the value of parameter 3202 **Motor ovld factor** is 100 % the overload current of the Motor Overload function is equal to the continuous current of the Motor Overload function. In this case the drive behaves as if the overload cycle has been executed and so sets the torque current limit so that Iout max is not more than the continuous current, i.e. **Rated current** (PAR 2002) * **Motor service factor** (PAR 3206) * **Motor derat factor** (PAR 3218).

We recommend setting parameter 3218 **Motor derat factor** to a value so that **Rated current** (PAR 2002) * **Motor service factor** (PAR 3206) * **Motor derat factor** (PAR 3218) produces a result that is more than the motor magnetisation current.

22.5 – FUNCTIONS/BRES OVERLOAD

Warning

Braking resistors may be subject to sudden overloads following failures.
Always protect resistors by using thermal protection devices.
These devices do not have to interrupt the circuit where the resistor is installed, but their auxiliary contact must interrupt the power supply of the drive power section. If the resistor requires the presence of a protection contact, this must be used together with the one belonging to the thermal protection device.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.1	**3250**	**Bres control**		BIT		0	0	1	ERWZS	FVS

Enabling of the overload control of the external braking resistor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.2	**3252**	**Bres value**	ohm	FLOAT		SIZE	5.0	1000.0	ERWS	FVS

Setting of the ohm value of the external braking resistor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.3	**3254**	**Bres cont power**	kW	FLOAT		SIZE	0.1	100.0	ERWS	FVS

Setting of the power that can be continuously dissipated by the external braking resistor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.4	**3256**	**Bres overload factor**		FLOAT		SIZE	1.5	10.0	ERWS	FVS

Setting of the external resistor overload factor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.5	**3258**	**Bres overload time**	s	FLOAT		SIZE	0.5	50.0	ERWS	FVS

Setting of the intervention time of the external braking resistor overload.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.6	**3272**	**Bres enable src**		**LINK**	**16BIT**	**6002**	**0**	**16384**	**ERW**	FVS

Parameters IPA 3272 **Bres enable src** and IPA 3274 **Bres enable inv** manage enabling/disabling (by digital input) of the internal BU connected to a braking resistance with or without protective klickson.

The internal BU must be enabled with parameter IPA 3250 **Bres control**.

It can be used two ways:

1) If you use a resistance with klickson, the protection contact can be linked to a digital input by appropriately configuring IPA 3272 from selection list L_DIGSEL1. The digital input will enable the braking when the temperature of the resistance is below the protection threshold or disable it when the temperature exceeds the threshold.
2) If you use a resistance without klickson, you can use the state of an alarm such as (for example) **[15] Bres overload** to enable the braking unit when the alarm is inactive:

- configure IPA 3272 **Bres enable src** = IPA 4708 **Alm dig out mon 1** (from selection list L_DIGSEL1),
- set IPA 4700 **Alarm dig sel 1** = [15] **Bres overload**,
- set IPA 3274 **Bres enable inv** = 1 to invert the logic state.

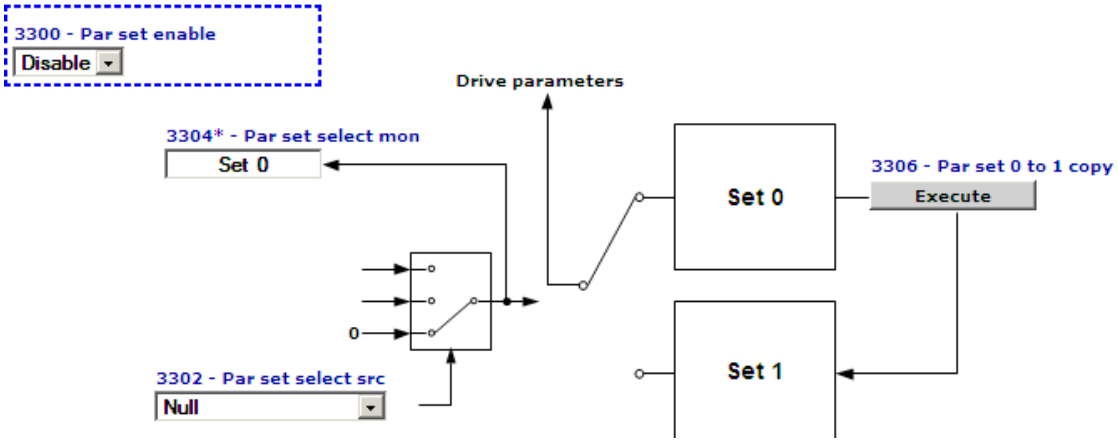
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.7	**3274**	**Bres enable inv**		**BIT**		**0**	**0**	**1**	**ERW**	FVS

Inverts the logic state of the BU enable command from IPA 3272 **Bres enable src**.

0 Off: inversion disabled

1 On: inversion enabled

22.6 – FUNCTIONS/DOUBLE PAR SET



Two independent sets of parameters can be stored in the ADV200 drive. These can be selected via the keypad or by using an external command.

This makes it possible to change all the drive parameters quickly and automatically according to the various operating requirements. For example, two motors with different characteristics can be controlled alternately.

MDPLC application parameters are not included in the two sets of parameters. This makes it possible to switch between all drive parameters in two separate groups, while having a single set of parameters for the application.

With the GF_eXpress configurator this function can be managed using the commands in the program toolbar.

R0|1 -> "read set 0/1"

This command is used to read set 0 (and store set 1 in a .gfe file) or vice versa, depending on which set is currently active

W0|1 -> " write set 0/1"

This command is used to load both sets of parameters to the drive

The toolbar commands "**Copy set 0**" and "**Copy set 1**" are used, after opening a .gfe file where the two sets have been stored, to load set 0 and set 1, respectively, to the parameter grid, without interacting with the drive. The previous contents of the parameter grid (which will not necessarily have coincided with either set 0 or set 1) are lost. Use this command to find out which values will actually be sent to the drive.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.6.1	**3300**	**Par set enable**		ENUM		Disable	0	1	ERW	FVS

Enabling of management of two parameter sets

0 Disable
1 Enable

When set to **0** only one parameter set is managed (the one used as the default set).

If set to **1** two separate parameter sets can be configured. These can be selected using a command signal on a digital input of the terminal strip.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.6.2	**3302**	**Par set select src**		LINK	16	6000	0	16384	ERWZ	FVS

Selection of the origin (source) of the signal to be used to select the parameter set. The terminal or digital command that can be associated with this function can be selected from among those available in the "**L_DIG-SEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.6.3	**3304**	**Par set select mon**		ENUM	16	Set 0	0	0	ER	FVS

The parameter set currently in use is displayed.

0 Set 0
1 Set 1

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.6.4	**3306**	**Par set 0 to 1 copy**		BIT		0	0	1	ERW	FVS

Procedures for setting up and managing the double parameter set

Creating the second set:

This function copies parameter set 0 onto set 1. Before enabling management of the double parameter set, the first set should be programmed with the correct values.

When the first set is ready, the second can be activated as follows:

1 Activate management of the double parameter set by enabling parameter **3300 Par set enable**.
2 Copy set 0 onto set 1 using command **3306 Par set 0 to 1 copy**.
This creates an initial parameter base in set 1 to which changes can be made.
Save the parameters.
3 Activate set 1 using parameter **3302 Par set select src**.
To select set 1 manually, set this parameter to "**One**".
Otherwise select the desired source.
4 Modify the parameters in set 1 as necessary.
5 Save the parameters.

You can change the set being used by changing the source selected in parameter **3302 Par set select src**. This can only be changed with the drive disabled.

When the double parameter set is active, the number of the set being used is shown next to the number of each parameter on the keypad.

Modifying and saving parameters:

When the double parameter set is active, any parameters that need to be the same in the two sets must be modified in each set separately.

Parameters are only saved in the set that is active at the time. To save both sets, you must first save one and then select and save the other.

Note ! Any changes to the parameters regarding the "parameter sets", performed when enabled, will be lost at the next switching unless a **Par set 0 to 1 copy** command is sent. To save data permanently (even when the drive is switched off), send the **Save parameters** command (DRIVE CONFIG menu).

22.7 – FUNCTIONS/SPEED CAPTURE

This function allows the drive to capture a motor running due to inertia or driven by the load. The function is also enabled in case of an automatic restart after an alarm condition.

Main fields of application:

- Capturing a motor set in motion by the load (for example pump motors driven by the fluid)
- Capturing a motor connected directly to the power mains
- Capturing a motor running due to temporary disabling of the drive
- Capturing a motor that is running in the case of an automatic restart after an alarm

Note ! If the drive is enabled with the motor running and this function disabled, the drive could be blocked due to the intervention of the Overcurrent or Undercurrent protections

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.7.1	**3350**	**Speed capture**		ENUM		Disable	0	2	ERW	FV_

This parameter is used to enable the function to capture a motor that is running.

0 Disable
1 Alarm restart
2 Enable&restart

If set to **0** the capture running motor function is disabled. The output frequency starts from 0 and passes to the set reference value using the ramp. If the drive is enabled with the motor running and this function disabled, the drive could be disabled due to the intervention of the Overcurrent or Undercurrent protections.

If set to **1** the capture running motor function is executed at restart each time an alarm is automatically reset.

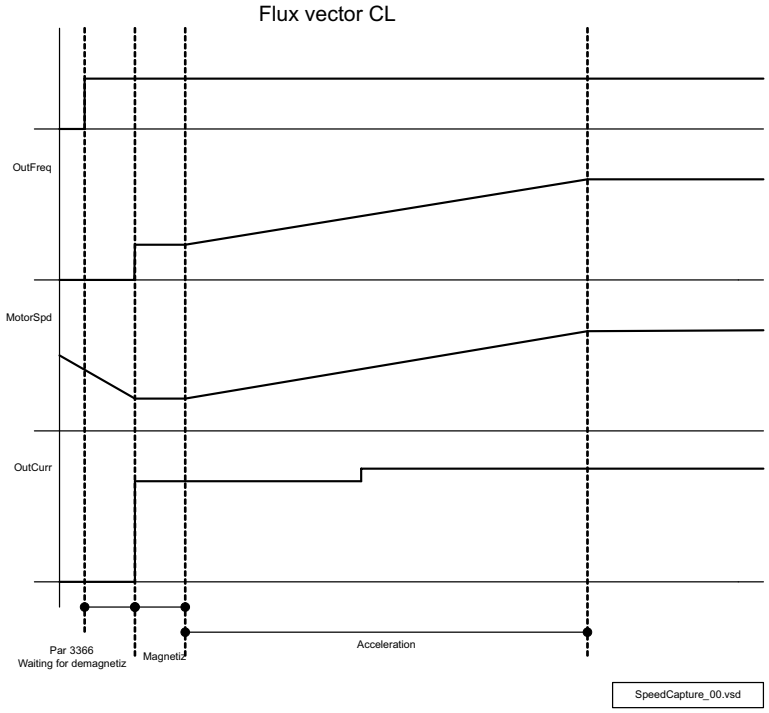
If set to **2** the capture running motor function is executed each time the drive is enabled and each time an alarm is

automatically reset.

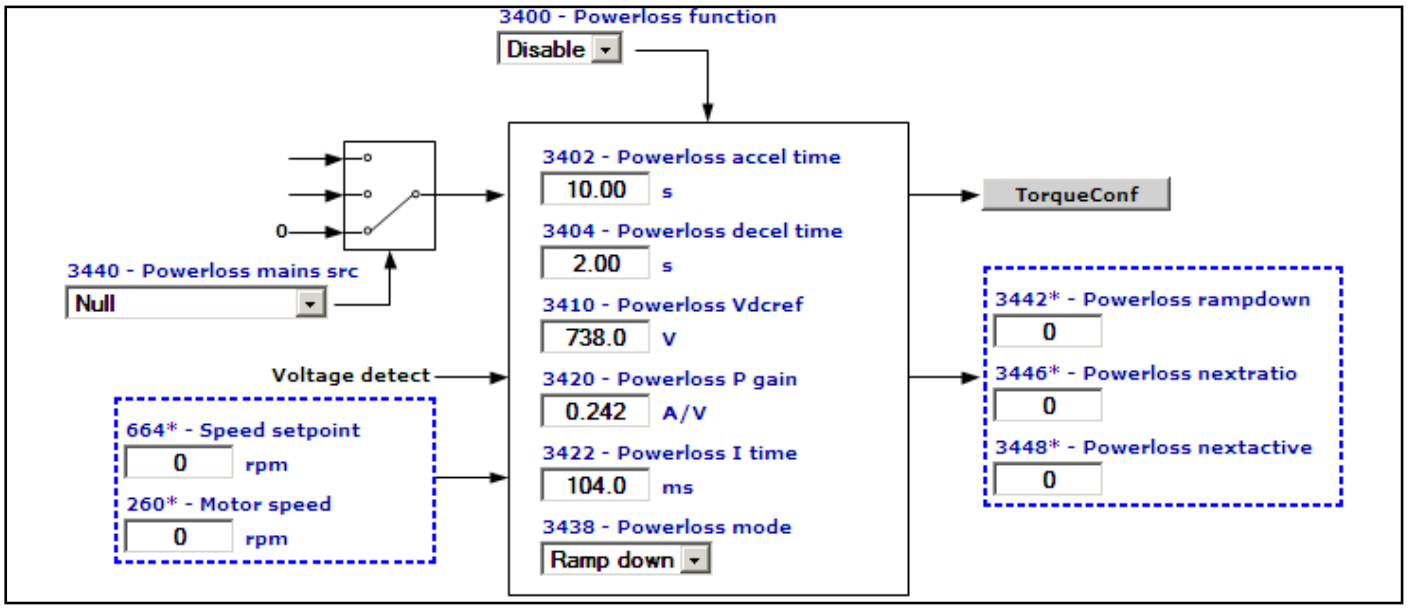
This function is available with **Regulation mode = Flux vector CL** (asynchronous and synchronous motors) or **V/f control** (asynchronous motors).

This function is not available with **Regulation mode = Flux vector OL**.

With **Regulation mode = Flux vector CL** the capture procedure consists of forcing the output frequency to the value measured by the encoder, and then bringing the motor speed to the reference value using the ramp



22.8 – FUNCTIONS/POWER LOSS



This function controls a loss of power or temporary mains failure.

When the function is enabled the system stops with the controlled ramp; the power regenerated by the load sustains the DC link power supply so that the motor speed can be controlled. The speed of the motor is controlled for as long as power can be recovered (motor speed almost zero but not zero), after which the **Undervoltage** alarm is generated and the motor performs an uncontrolled stop due to inertia.

The function is only effective with loads that accumulate sufficient energy (typically loads with a high moment of inertia and which the moment the power loss occurs have a speed of rotation not close to zero). The function cannot be used for passive loads.

The function can only be used with **Regulation mode = Flux vector CL** (asynchronous and synchronous motors) and **Regulation mode = V/f control** (asynchronous motors).

The Powerloss function is enabled when the DC link voltage falls below a threshold configured internally as a function of the mains voltage at a value that is higher than the **Undervoltage** threshold. When the function is enabled the drive controls a stop with a user-definable deceleration ramp. In this phase the current limit is controlled by a regulator on the DC link voltage and the setpoint is a threshold configured internally as a function of the mains voltage at a value below the **Overvoltage** threshold.

The regulator envisages two setting parameters (proportional and integral) calculated in advance by the drive as a function of the size of the motor and plate data. If the regulator acts on the current limit the motor speed does not follow the set deceleration ramp. The function continues for as long as power can be recovered, after which the **Undervoltage** alarm is generated. If the mains supply is restored during the deceleration ramp phase, the user can configure how the drive should behave. The following options are available: continue in any case until reaching zero speed or stop the deceleration ramp and pass to the set reference.

The drive does not automatically recognise the fact that the mains supply has been restored. This information must be supplied from the outside via the **Powerloss mains src** digital input.

The presence of the braking unit prevents the intervention of the **Overvoltage** alarm and the function has the advantage of being able to stop the motor while guaranteeing the set time.

As the setpoint of the Powerloss function regulator is higher than the brake activation threshold, it is not enabled and the current limit is not altered to allow compliance with the set deceleration ramp time. The intervention of the braking unit dissipates the energy of the motor in the resistor, reducing the amount of power available to sustain the DC link and the time available to control stopping of the motor. The presence of the braking unit could mean that the speed of the motor from which no power can be recovered is higher than that with no braking unit.

The function can be used on machines with a single drive as well as on machines with several drives, the speeds of which must always be synchronised.

For machines with a single drive, enabling the Powerloss function is sufficient.

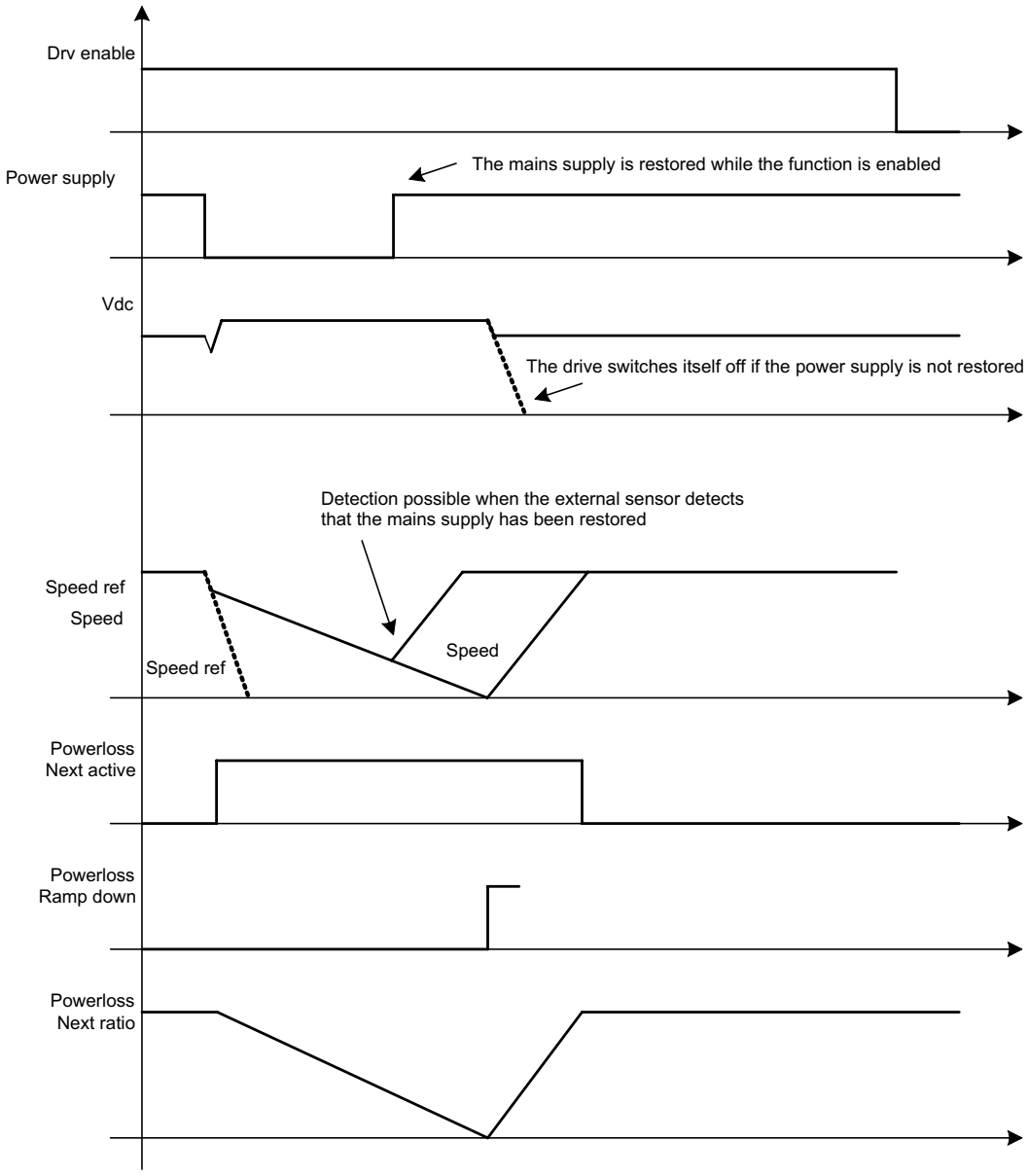
For machines with several drives, the DC links must be connected: the Powerloss function must only be enabled on the drive identified as the master and not on the slaves. The master drive is normally the one that controls the load with the highest inertia. The master drive sends the **Powerloss nextratio** signal with the ratio between the motor speed and the speed reference. Line synchronisation can be achieved by connecting the **Powerloss nextratio** output of the master to the **Speed ratio src** input (selection list L_VREF) of the slave drives. The master => slave connection can be achieved via analog signals or fieldbus.

To ensure correct operation of the Powerloss function, the following alarms must be configured as described below:

Since the speed reference and current limit are controlled internally by the Powerloss function, a difference could occur between the speed reference and motor speed with subsequent activation of the **Perd Riferim** alarm: to avoid this, set Par **4552 SpdRefLoss activity = Ignore**

During the power failure, the power supply phase loss detection system might not work properly with subsequent activation of the **Phaseloss** alarm: to avoid this, set Par **4660 PhLoss activity=Ignore**.

Powerloss



PowerLoss_01.vsd

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.8.1	**3400**	**Powerloss function**		ENUM		Disable	0	1	ERWZ	F__

This parameter is used to enable the Powerloss function.

0 Disable

1 Enable

If set to **0** the Powerloss function is disabled. The Undervoltage alarm is generated in the event of a power failure.

If set to **1** the Powerloss function is enabled. In case of a power failure the function is enabled to try to control the motor speed and prevent the intervention of the **Undervoltage** alarm.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.8.2	**3402**	**Powerloss accel time**	s	FLOAT		10.0	0.01	100.0	ERW	F__

Setting of the acceleration time used in the Powerloss operating mode. The acceleration ramp time is used when **Powerloss mode = Restart** has been selected and must be adjusted to suit machine requirements.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.8.3	**3404**	**Powerloss decel time**	s	FLOAT		2.0	0.01	100.0	ERW	F__

Setting of the deceleration time used during Powerloss operating mode.

The deceleration ramp time must be short enough (in case of low speeds) to allow the drive to enter regeneration mode quickly, otherwise the **Undervoltage** alarm is generated. If the deceleration ramp time setting is too short, when the drive enters regeneration mode it might not be able to control the DC link voltage and the **Overvoltage** alarm would be generated.

Longer deceleration times are necessary at high motor speeds to prevent the **Overvoltage** alarm from being generated.

This parameter must be adjusted so as to reach a compromise between low speed and high speed motor operation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.8.4	**3410**	**Powerloss Vdcref**	V	FLOAT		CALCF	0.0	CALCF	ERWZS	FV_

Setting of the voltage control limit on the DC-link during a controlled stop with loss of supply voltage The maximum value that can be set is the drive overvoltage limit.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.8.5	**3420**	**Powerloss P gain**	A/V	FLOAT		CALCF	0	100.000	ERWS	F__

Setting of the proportional gain during the Powerloss function.

Increase in case of **Overvoltage** error; the **Undervoltage** alarm can also be prevented by increasing the deceleration time.

Increase if the DC link voltage is set to a value other than the setpoint.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.8.6	**3422**	**Powerloss I gain**	ms	FLOAT		CALCF	1.0	1000.0	ERWS	F__

Setting of the integral gain during the Powerloss function.

Reduce if the DC link voltage is set to a value other than the setpoint.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.8.7	**3438**	**Powerloss mode**		ENUM		Ramp down	0	1	ERWZ	F__

This parameter is used to configure the behaviour of the Powerloss function when the mains supply is restored.

It is possible to set whether the drive should continue at zero speed or return to the setpoint when the mains supply is restored. The drive does not automatically recognise the fact that the mains supply has been restored. This information must be supplied from the outside via the **Powerloss mains src** digital input.

0 Ramp down

1 Restart

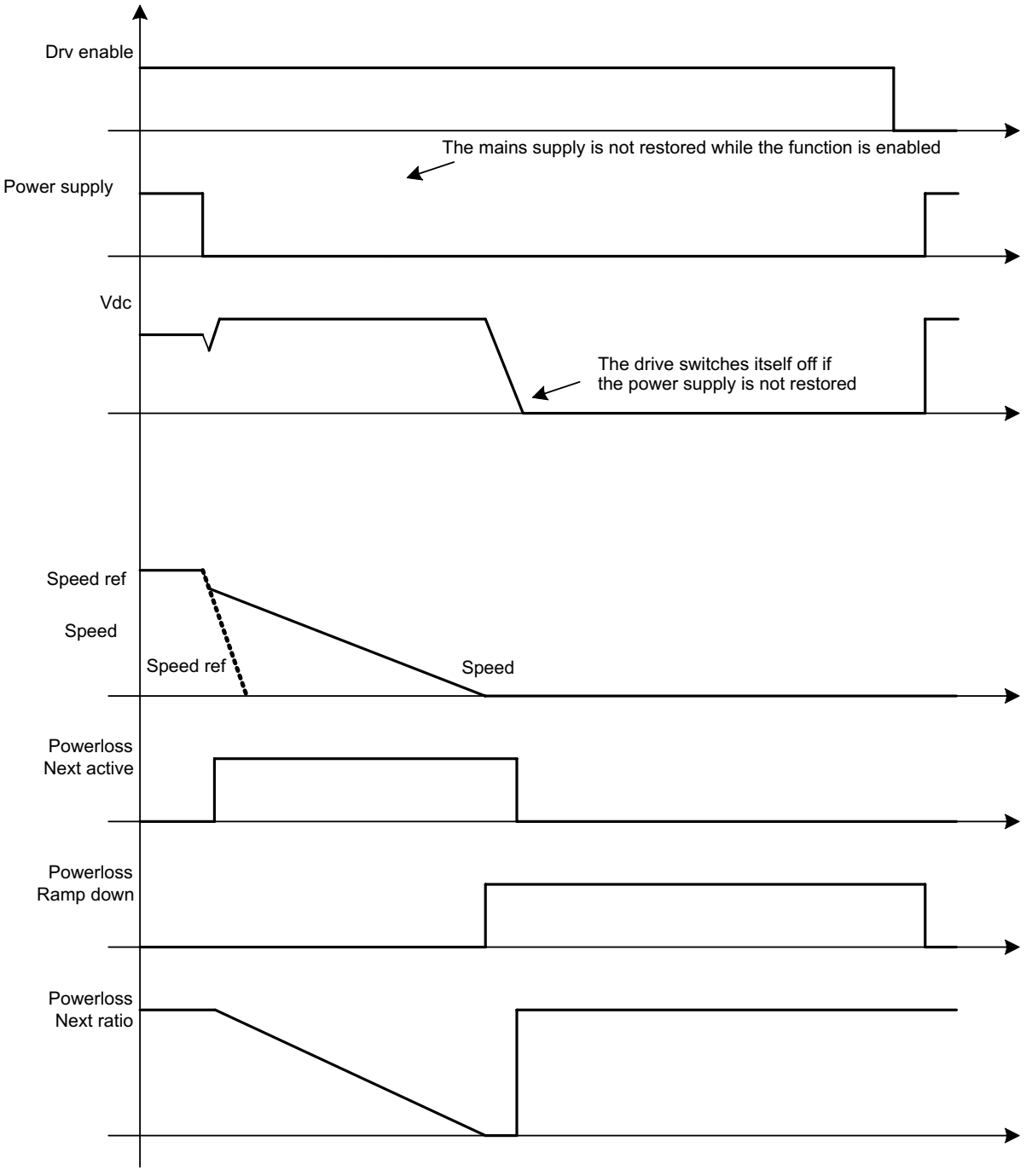
Example 1) End of ramp and mains supply not restored

The drive controls a deceleration with the ramp set in **Powerloss decel time**.

The drive automatically controls the DC link voltage and prevents the **Overvoltage** alarm.

If the mains supply is not restored close to a speed of zero, when there is insufficient regenerated power, the **Undervoltage** alarm is generated and the drive may switch itself off.

Ramp down and mains supply not restored



PowerLoss_02.vsd

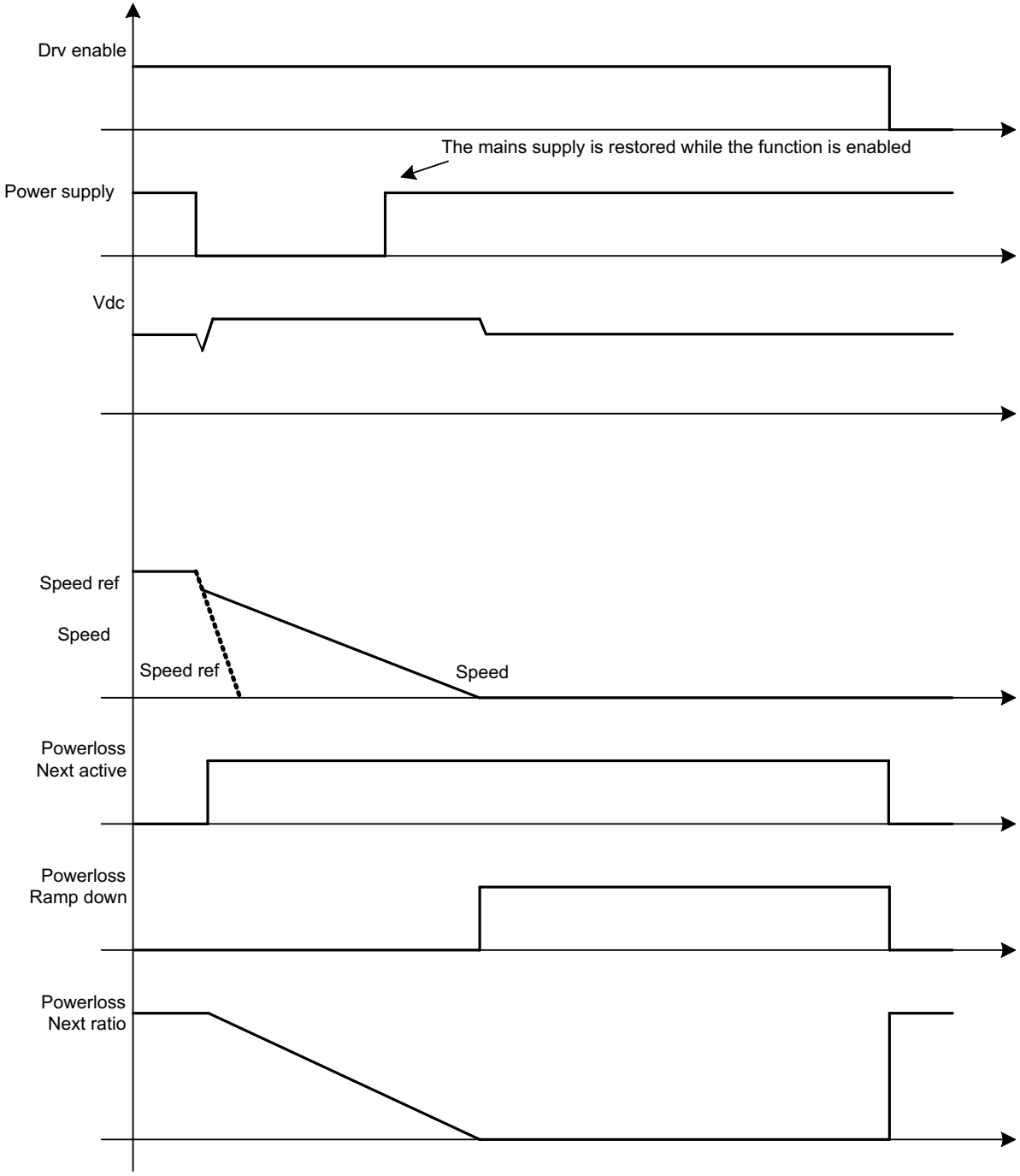
Example 2) End of ramp and mains supply restored

The drive controls a deceleration with the ramp set in **Powerloss decel time**.

The drive automatically controls the DC link voltage and prevents the **Overvoltage** alarm.

If the mains supply is restored and the **Mains voltage OK** signal is applied, the drive passes to zero speed and remains enabled at zero speed. To restart disable and enable the drive.

Ramp down and mains supply restored



PowerLoss_03.vsd

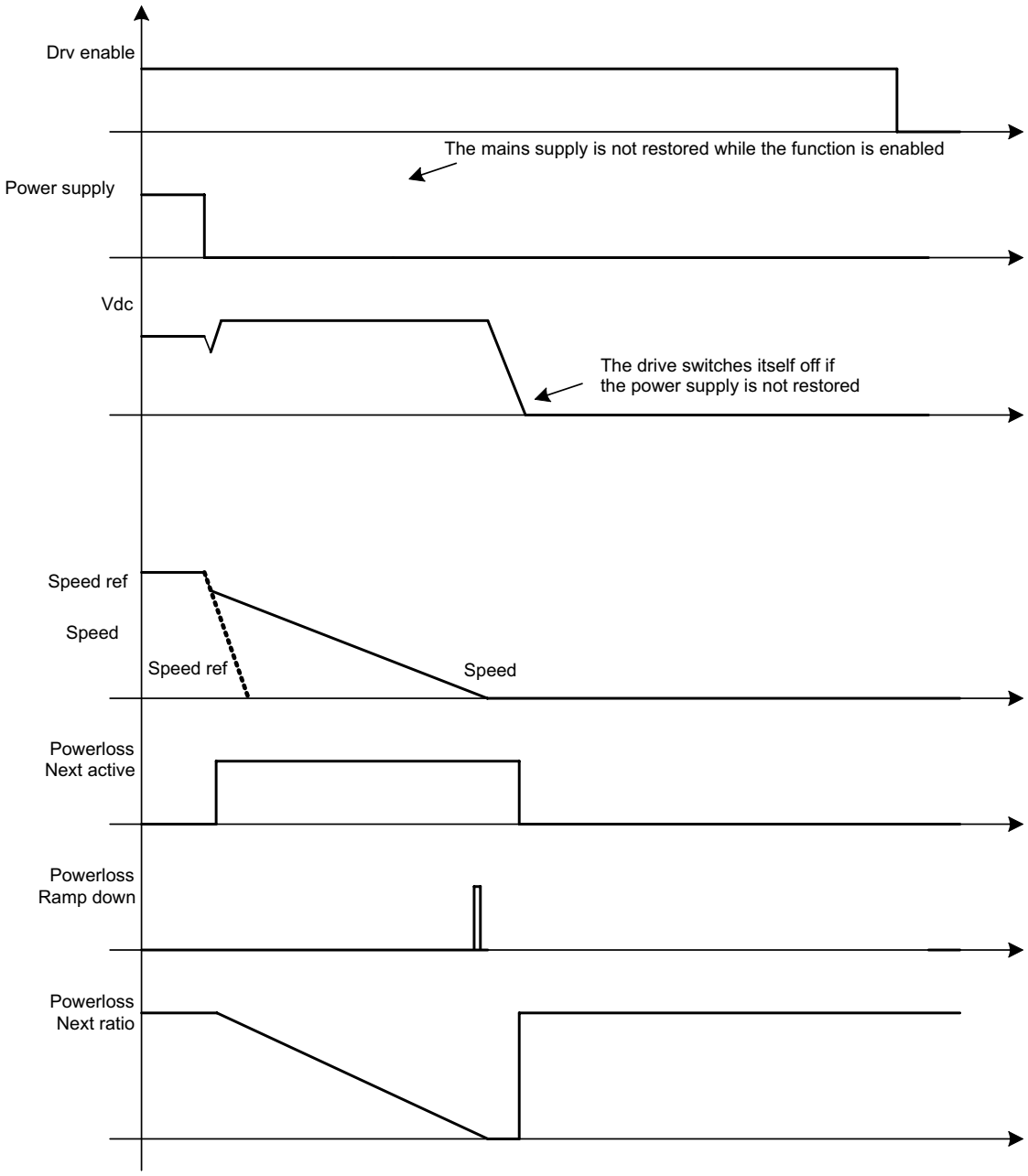
Example 3) Restart and mains supply not restored

The drive controls a deceleration with the ramp set in **Powerloss decel time**.

The drive automatically controls the DC link voltage and prevents the **Overvoltage** alarm.

If the mains supply is not restored close to a speed of zero, when there is insufficient regenerated power, the **Undervoltage** alarm is generated and the drive may switch itself off.

Restart and mains supply not restored



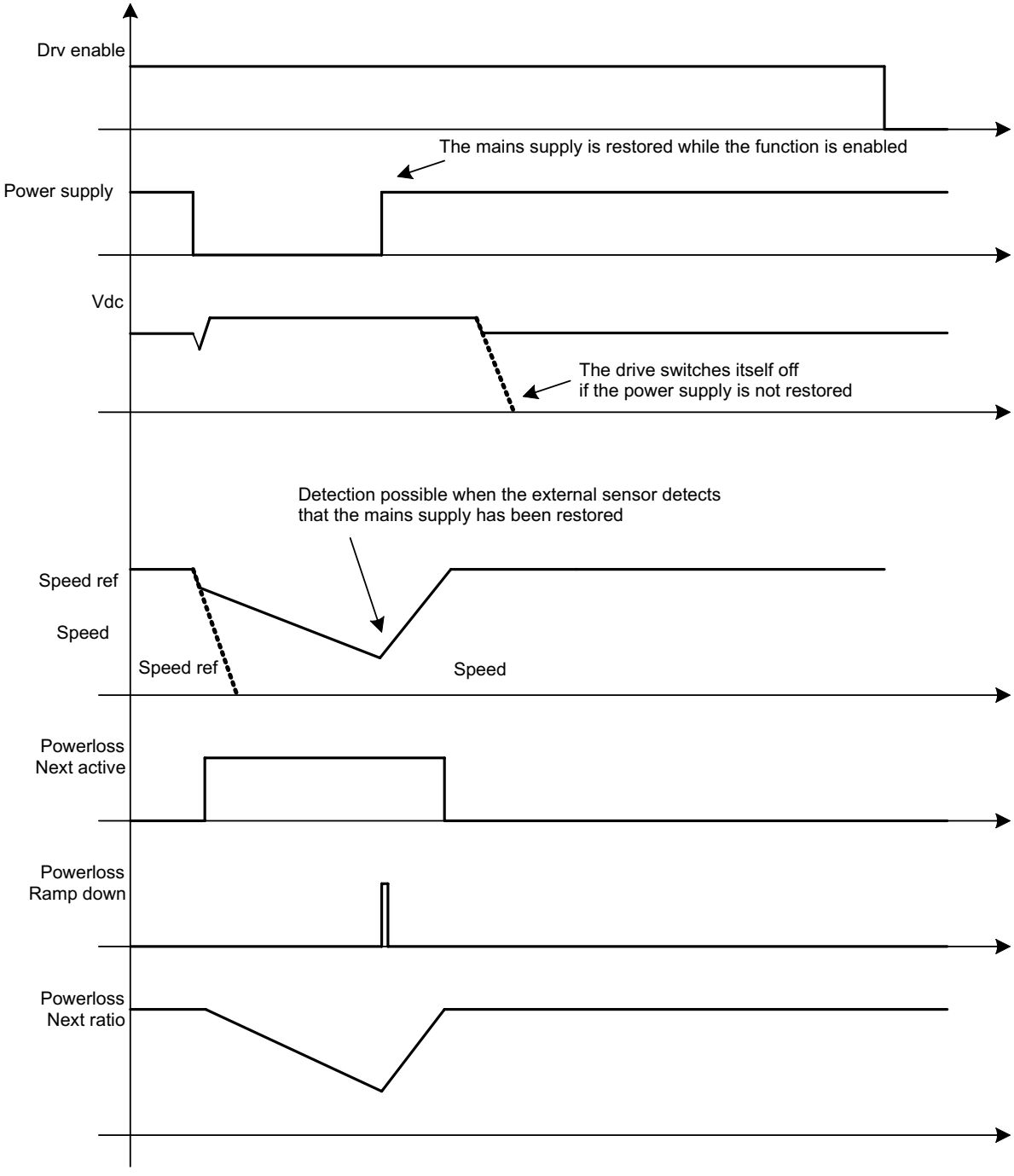
Example 4) Restart and mains supply restored

The drive controls a deceleration with the ramp set in **Powerloss decel time**.

The drive automatically controls the DC link voltage and prevents the **Overvoltage** alarm.

If the mains supply is restored and the **Mains voltage OK** signal is applied, the drive immediately stops the deceleration ramp and executes the acceleration ramp set in **Powerloss accel time** to pass to the set reference.

Restart and mains supply restored



PowerLoss_05.vsd

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.8.8	**3440**	**Powerloss mains src**		LINK	16	6000	0	16384	ERWZ	F__

This parameter is used to select the origin (source) o Fine rampa f the **Mains voltage OK** signal. The signal to be associated with this function can be selected from the “L_DIGSEL2” selection list.

If the signal is not enabled it means the power supply is not present (**Mains voltage not OK**), whereas if the signal is enabled it means the power supply is present (**Mains voltage OK**).

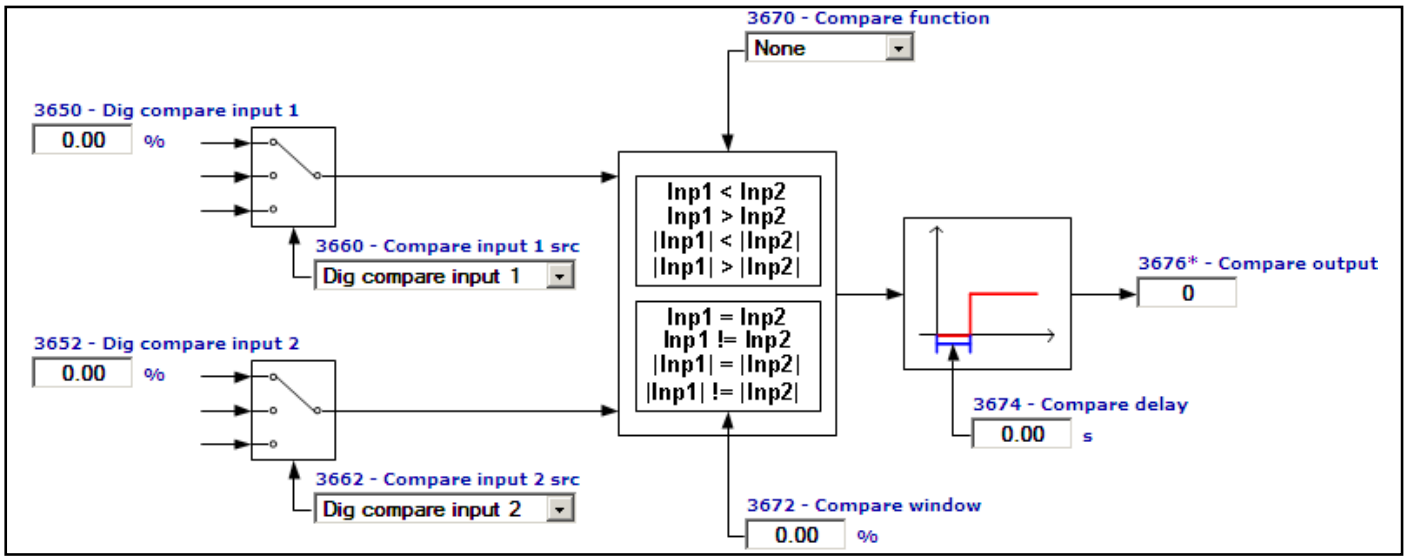
In the default condition the origin of the **Powerloss mains src** signal is **Zero**.

The user must connect an external sensor to inform the drive of the mains supply status.

If the function is configured as **Powerloss mode = Restart**, when the **Mains voltage OK** signal is enabled the drive stops the deceleration ramp and passes to the set reference.

For machines with several drives the external sensor signal must only be connected to the master drive.

22.9– FUNCTIONS/COMPARE



This function allows the comparison among two signals or values.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.9.1	**3650**	**Dig compare input 1**	perc	FLOAT	32	0.0	-100.0	100.0	ERW	FVS

Setting of the digital value of the first element of comparison.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.9.2	**3652**	**Dig compare input 2**	perc	FLOAT	32	0.0	-100.0	100.0	ERW	FVS

Setting of the digital value of the second element of comparison.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.9.3	**3660**	**Compare input 1 src**		LINK	32	3650	0	16384	ERW	FVS

Selection of the origin (source) of the signal to be used as the first term of comparison. The values that can be selected in the compare function are listed in the "**L_CMP**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.9.4	**3662**	**Compare input 2 src**		LINK	32	3652	0	16384	ERW	FVS

Selection of the origin (source) of the signal to be used as the second term of comparison. The values that can be selected in the compare function are listed in the "**L_CMP**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.9.5	**3670**	**Compare function**		ENUM		None	0	8	ERW	FVS

Setting of the compare function between **Compare input 2** and **Compare input 1** to enable **Compare output** PAR 3676.

0 None

1 Inp1=Inp2
2 Inp1!=Inp2
3 Inp1<Inp2
4 Inp1>Inp2
5 |Inp1|=|Inp2|
6 |Inp1|!=|Inp2|
7 |Inp1|<|Inp2|
8 |Inp1|>|Inp2|

If set to **0** the comparator is not enabled

If set to **1** the comparator output is enabled when the value of **Compare digital inp** 1 is inside the window resulting from the value of **Compare digital inp** 2 ± the tolerance set via the **Comparator Window**.

If set to **2** the comparator output is enabled when the value of **Compare digital inp** 1 is not inside the window resulting from the value of **Compare digital inp** 2 ± the tolerance set via the **Comparator Window**.

If set to **3** the comparator output is enabled when **Compare input 1** is less than **Compare input 2**.

If set to **4** the comparator output is enabled when **Compare input 1** is greater than **Compare input 2**.

If set to **5** the comparator output is enabled when the value of **Compare digital inp** 1 is inside the window resulting from the absolute value of **Compare digital inp** 2 ± the tolerance set via the **Comparator Window**.

If set to **6** the comparator output is enabled when the absolute value of **Compare digital inp 1** is not inside the window resulting from the absolute value of **Compare digital inp 2** ± the tolerance set via the **Comparator Window**.

If set to **7** the comparator output is enabled when the absolute value of **Compare digital inp 1** is less than the absolute value of **Compare digital inp 2**.

If set to **8** the comparator output is enabled when the absolute value of **Digital compar inp1** is more than the absolute value of **Digital compar in2**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.9.6	**3672**	**Compare window**	perc	FLOAT		0.0	0.0	100.0	ERW	FVS

Setting of the tolerance window for comparing the **Compare input 1** and **Compare input 2** signals.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.9.7	**3674**	**Compare delay**	s	FLOAT		0.0	0.0	30.0	ERW	FVS

Setting of the delay for signalling the result of the comparison.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.9.8	**3676**	**Compare output**		BIT	16	0	0	1	ER	FVS

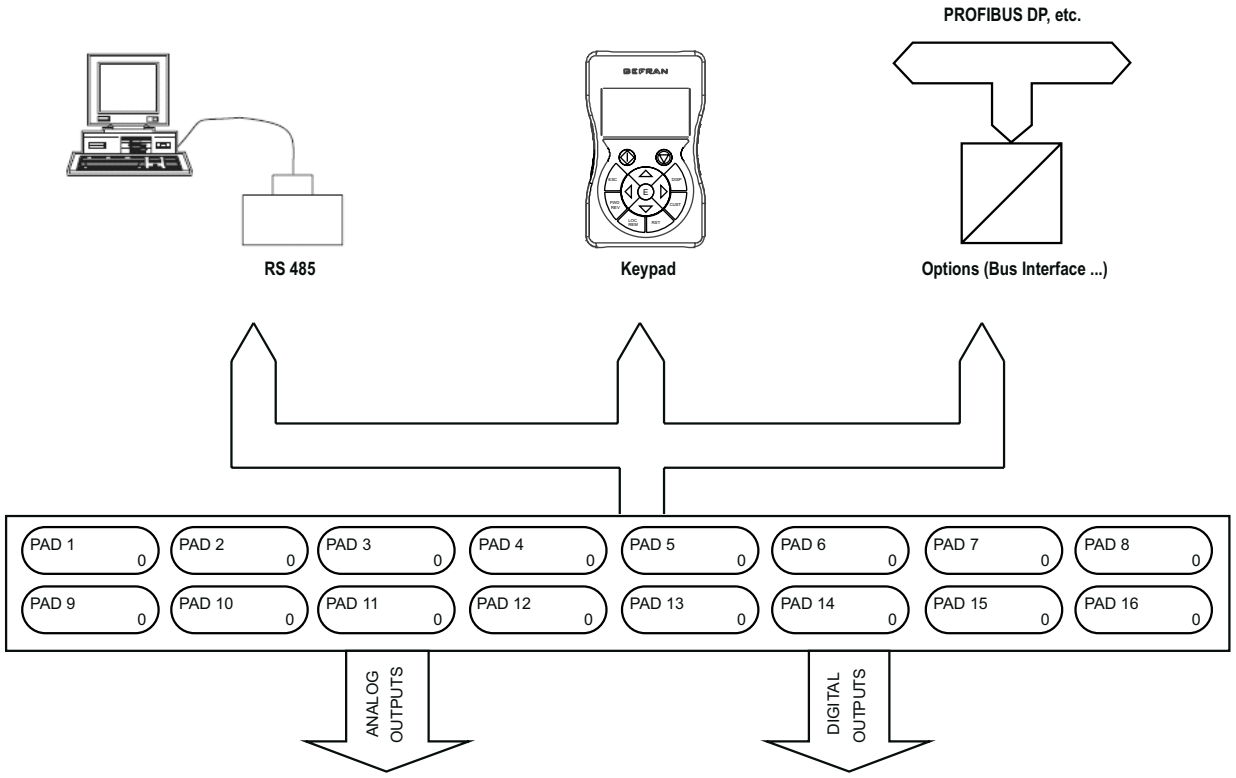
The status of the comparator output is displayed:

0 The result of the set comparison is negative
1 The result of the set comparison is positive

22.10 – FUNCTIONS/PADS

The general variables are used to exchange data between the various components of a Bus system. They are similar to the variables of a PLC. The basic structure of the system is illustrated below. Pads can be used, for example, to send information from a fieldbus to an optional card. All Pads can be read and written.

The Pads can also be used to exchange data with an MDPlc application installed in the drive. See the MDPlc manual for more details.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.10.1	**3700**	**Pad 1**		INT32	32	0	0	0	ERW	FVS
22.10.2	**3702**	**Pad 2**		INT32	32	0	0	0	ERW	FVS
22.10.3	**3704**	**Pad 3**		INT32	32	0	0	0	ERW	FVS
22.10.4	**3706**	**Pad 4**		INT32	32	0	0	0	ERW	FVS
22.10.5	**3708**	**Pad 5**		INT32	32	0	0	0	ERW	FVS
22.10.6	**3710**	**Pad 6**		INT32	32	0	0	0	ERW	FVS
22.10.7	**3712**	**Pad 7**		INT32	32	0	0	0	ERW	FVS
22.10.8	**3714**	**Pad 8**		INT32	32	0	0	0	ERW	FVS
22.10.9	**3716**	**Pad 9**		INT32	32	0	0	0	ERW	FVS
22.10.10	**3718**	**Pad 10**		INT32	32	0	0	0	ERW	FVS
22.10.11	**3720**	**Pad 11**		INT32	32	0	0	0	ERW	FVS
22.10.12	**3722**	**Pad 12**		INT32	32	0	0	0	ERW	FVS
22.10.13	**3724**	**Pad 13**		INT32	32	0	0	0	ERW	FVS
22.10.14	**3726**	**Pad 14**		INT32	32	0	0	0	ERW	FVS
22.10.15	**3728**	**Pad 15**		INT32	32	0	0	0	ERW	FVS
22.10.16	**3730**	**Pad 16**		INT32	32	0	0	0	ERW	FVS

Setting of general, 32 Bit variables. PAD parameters can be used as supporting parameters to send values written by the fieldbus, serial line, etc. to analog or digital outputs.

22.11 - FUNCTIONS/VDC CONTROL

This function is used to control the voltage and power recovered in the DC link during regeneration (e.g. during braking ramp). When this function is enabled, if the power regenerated by the load during braking increases the DC link voltage, the drive prevents triggering of the **Overvoltage** alarm by limiting the regenerated current.

The **Vdc control function** is enabled automatically (if parameter **3450 Vdc control function** is set to 1) when the DC link voltage exceeds a preset threshold, depending on the mains voltage and lower than the **Overvoltage** threshold.

This threshold is also used for the regulator that controls the regenerated current limit.

If the **Vdc control function** is enabled, the motor speed need not follow the set ramp.

If the regulator is unable to limit the regenerated power during the deceleration ramp and prevent the **Overvoltage** alarm from being generated, the ramp can be temporarily blocked by setting parameter **754 Ramp freeze src** using the information in **Vdc ctrl ramp freeze**.

The function remains enabled until the power regenerated by the load is cancelled and the DC link voltage falls below the disable threshold (below the enable threshold).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.11.1	**3450**	**Vdc control function**		ENUM		Disable	0	1	ERWZ	FVS

This parameter is used to enable the **Vdc control function**.

0 Disable

1 Enable

If set to **0** the function is disabled: in case of power recovery the Sovratensione alarm is generated.

If set to **1** the function is enabled: in case of power recovery the function is enabled and attempts to control the current regenerated by the motor and prevent the **Overvoltage** alarm from being generated.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.11.21	**3470**	**Vdc control P gain**	A/V	FLOAT		CALCF	0.0	100.000	ERWS	FVS

Setting of the proportional gain used during the **Vdc control function**. The set value must be increased if the **Overvoltage** alarm is generated. The Sovratensione alarm can also be prevented by lengthening the deceleration ramp. The value of this parameter must also be increased if the DC link voltage is set to a value other than the setpoint

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.11.3	**3472**	**Vdc control I time**	ms	FLOAT		CALCF	1.0	1000.0	ERWS	FVS

Setting of the integral time used during the **Vdc control function**. The set value must be reduced if the DC link voltage is set to a value other than the setpoint.

22.12 - FUNCTIONS/BRAKE CONTROL

This function is used to control the motor parking brake.

Do not use the **Brake control** and the **Speed Capture** functions together, as the latter, if enabled before the Start command, attempts to execute synchronisation with the motor speed and with the brake closed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.1	**3170**	**Brake control funct**		ENUM		Disable	0	3	ERWZ	FVS

This parameter is used to enable the **Brake control funct**.

0 Disable
1 Standard
2 Hoist mode 1
3 Hoist mode 2

If set to **0** the function is disabled:

If set to **1** the function is enabled.

Set to **2** to enable the Hoist mode 1 function for hoisting applications using the standard drive.

Set to **3** to enable the Hoist mode 2 function for hoisting applications using the drive with the special "Positioner" application.

In "**Hoist mode 1**" all the parameters between PAR 3170 and PAR 3186 are used, whereas in "**Hoist mode 2**" PAR 3188 and 3190 are also used, but parameter 3182 is ineffective (since it is the "torque" value that is considered, not the "current").

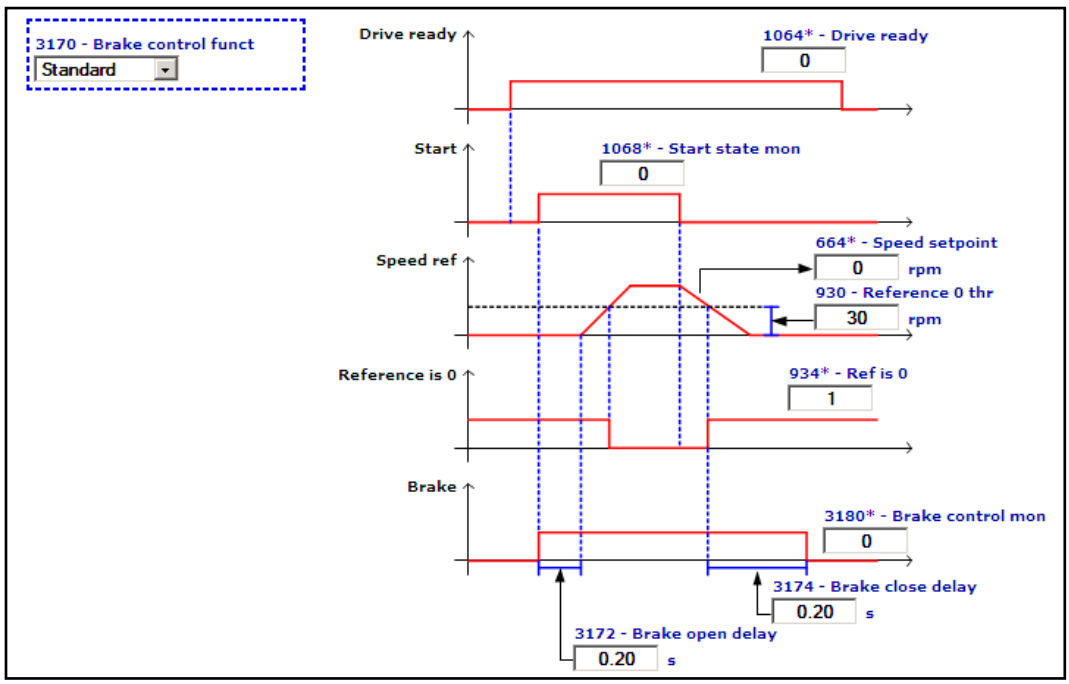
If the drive is in "V/f" control mode, the only possible selection is "**Standard**" and "**Hoist mode 1**".

If "**Hoist mode 2**" is enabled and the drive is thus in "**Flux vector CL**" or "**Flux vector OL**" mode, when switching to "**V/f control**" the brake control mode (PAR 3170) is automatically set to "**Disable**".

The following can be selected, depending on the control mode used:

1) **V/f control** -> "Standard" ; "Hoist mode 1" (for asynchronous motors)
2) **Flux vector CL** -> "Standard" ; "Hoist mode 1" ; "Hoist mode 2"
3) **Flux vector OL** -> "Standard" ; "Hoist mode 1" ; "Hoist mode 1"

Standard



Opening phase:

When the drive receives the **Start** command it releases the brake immediately. To make sure that the brake has actually been released, the references are disabled for a time that can be set in parameter 3172 **Brake open delay**.

Closing phase:

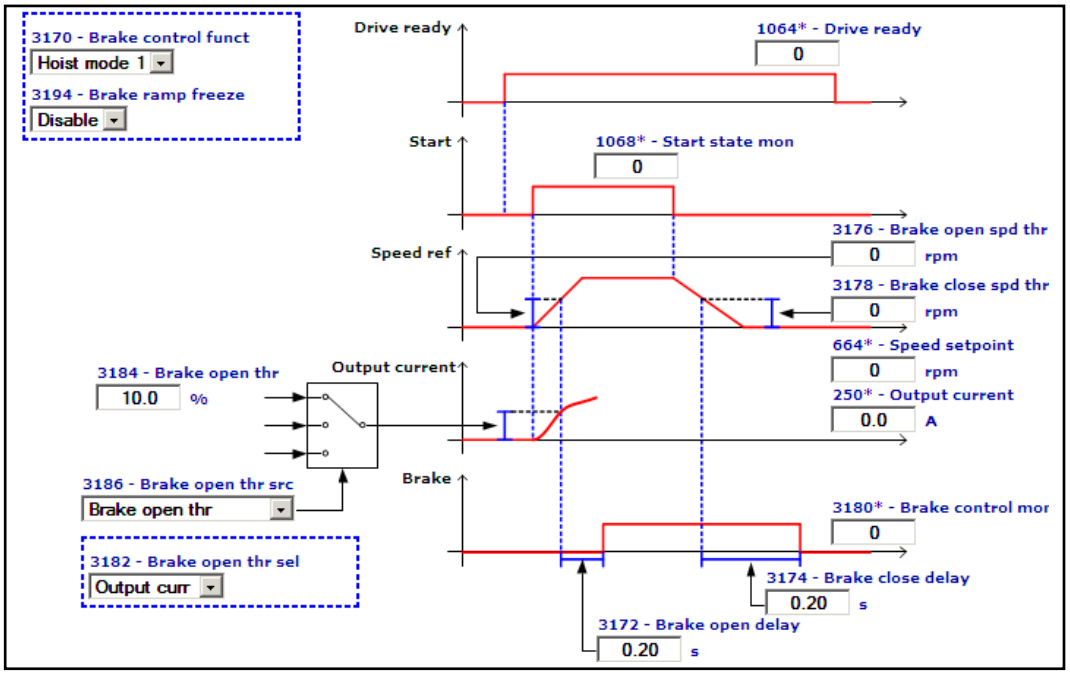
When the drive receives a stop command and the **Ref is 0** signal, it applies the parking brake after a time that can be set in parameter **3174 Brake close delay**. Set parameter **3174 Brake close delay** to a high enough value to be sure the motor has actually stopped before enabling the brake.

If this function is enabled, the brake is applied immediately if one or more alarms occur or if the drive is disabled.

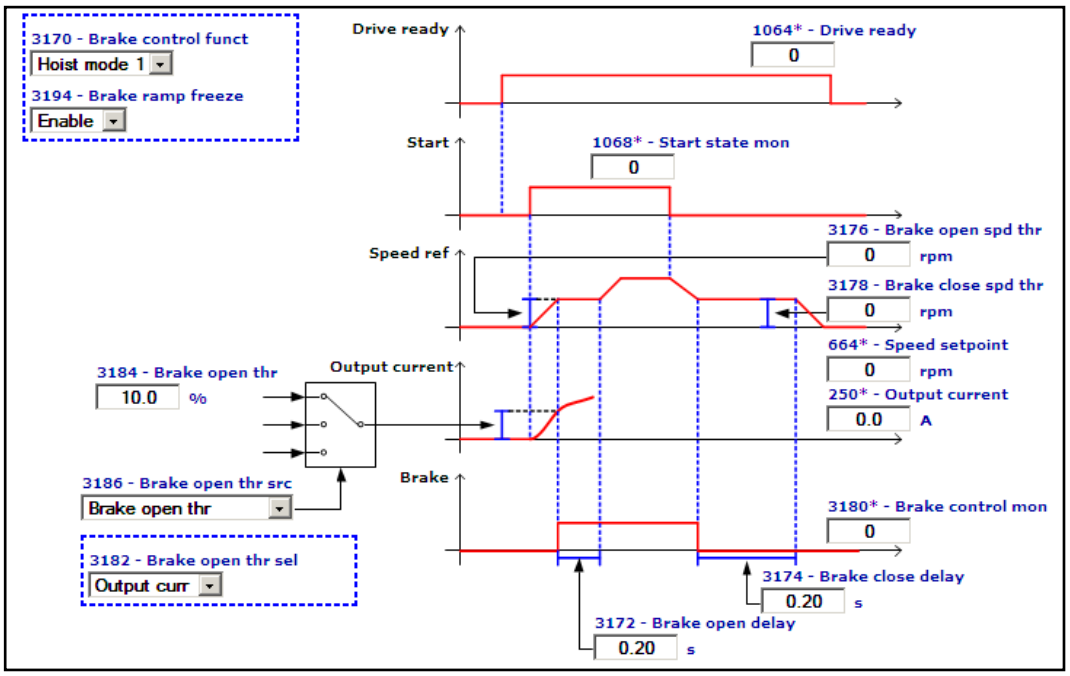
"Hoist mode 1"

With parameter PAR 3194 **Brake ramp freeze** you can freeze the velocity reference during the brake opening and closing phases.

If PAR 3194 = "**Disable**," "**Hoist mode 1**" does not use velocity reference freezing.



If PAR 3194 = "**Enable**," "**Hoist mode 1**" uses velocity reference freezing (diagram shown below).



Opening phase:

Setting of parameters 3172, 3176, 3182, 3184, 3186.

When the drive is in the "**Drive ready**" and "**Start**" conditions (following the enable and start commands) the brake is opened (i.e. the signal corresponding to PAR 3180 **Brake control mon**, which must in turn be assigned to a digital output, is raised) provided a further condition, defined by setting parameters 3182, 3184, 3186, is met once the **Speed setpoint** (PAR 664, considered as an absolute value) has reached the value set in PAR 3176 **Brake open spd thr**.

Parameter 3182 **Brake open thr sel** is used to establish whether the comparison is to be made with the drive output current (value 1, **Output curr**) or with the torque supplied (value 0, "**Torque ref%**").

Parameters 3184 **Brake open thr** and 3186 **Brake open thr src** are used to define the value of the threshold at which the comparison is made (this can also be set via analog input, fieldbus, Pad, FastLink…).

If the value of parameter 3182 **Brake open thr sel** is equal to **Output curr**, the brake is opened provided one of the following 3 conditions is met:

- The threshold defined by parameters 3184/3186 is positive, and the value of parameter 250 **Output current** is higher than the threshold.
- The threshold defined by parameters 3184/3186 is negative, and the value of parameter 250 **Output current** is less than the threshold.
- The threshold is zero, therefore the brake is always opened.

If the value of parameter 3182 **Brake open thr sel** is equal to "**Torque ref%**", the brake is opened provided one of the following 3 conditions is met:

- The threshold defined by parameters 3184/3186 is positive, and the value of parameter 2386 **Torque ref %** is higher than the threshold.
- The threshold defined by parameters 3184/3186 is negative, and the value of parameter 2386 **Torque ref %** is less than the threshold.
- The threshold is zero, therefore the brake is always opened.

Threshold values are expressed as a percentage and refer to the rated current or torque values of the drive.

Parameter 3172 **Brake open delay** can be set to define the delay between the moment the double opening condition occurs (speed reference + current or torque) and the time the open command is actually sent by the drive.

If the speed reference condition is met but not the current or torque condition, the drive enters a **Brake fault** alarm condition, which can be managed via parameter 4684 **Brake fault activity**, (set by default to Disable).

Closing phase:

If the drive is disabled (also due to any alarms that are capable of disabling it) the close brake command is sent immediately, regardless of the operating condition.

For normal closing, set parameters 3174, 3178.

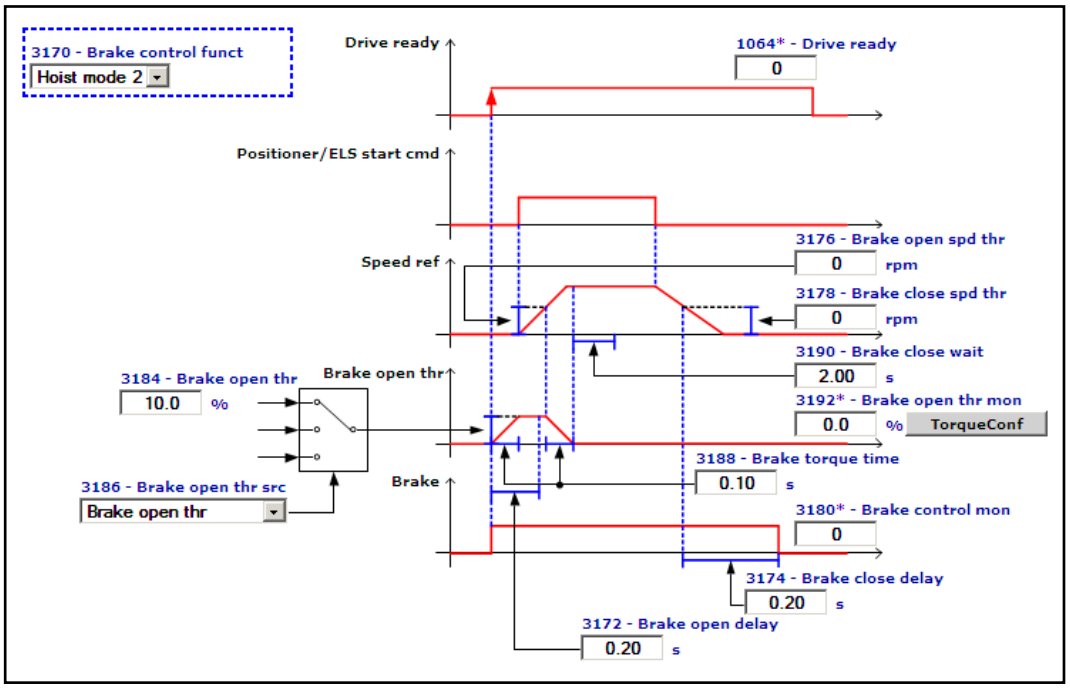
When the brake has been opened, it waits for the "**Stop**" command, then sends the close command when the speed reference is less than the value set in parameter 3178 **Brake close spd thr.** Parameter 3174 **Brake close delay** can be used to enter a delay between the moment the closing condition occurs and that in which the close command is actually sent by the drive. After the closing condition, it is also possible to restart the drive within the time set in **Brake close delay,** by sending the normal "**Start**" command. In that case the timer is reset and the drive waits for the closing condition again, which starts when a new "**Stop**" command is sen

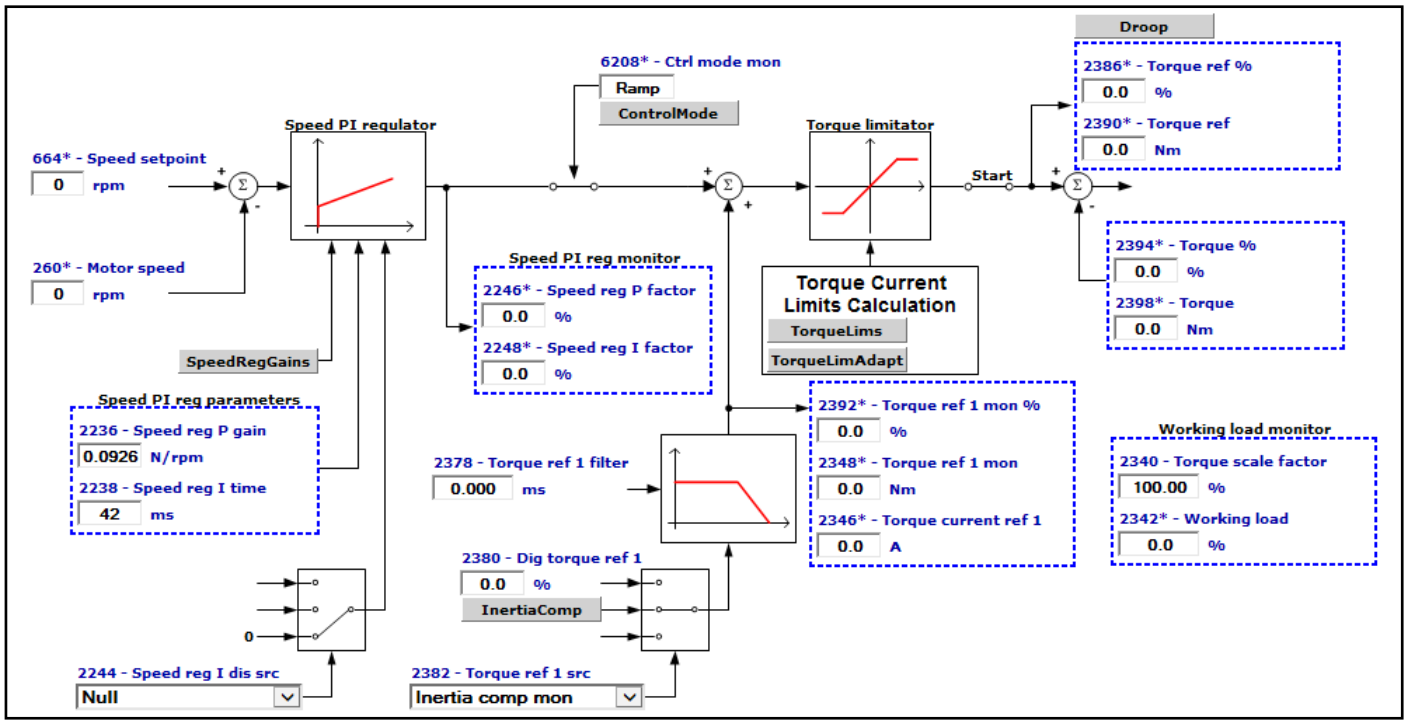
Avvertenza

In V/f control mode, since there is no precise control of the actual speed and torque, the 'Speed ref loss' alarm is not managed, which means that external controls must be used to detect any possible loss of a suspended load.

“Hoist mode 2”:

This mode can only be used when the “Positioner” application is installed in the drive.





Opening phase:

Setting of parameters 3172, 3176, 3184, 3186, 3188 and 2382.

Parameter 2382 **Torque ref 1 src** (menu 20 - TORQUE CONFIG) must be set to PAR 3192 **Brake open thr mon**.

Parameter 3182 **Brake open thr sel** is not considered, in that regardless of its value, the values considered are always to be taken as “torque” and not “current” (since the positioner can only be used in **Flux vector CL** mode).

When the “**Drive ready**” (enable drive) signal switches from 0->1 the open brake command is sent immediately. At the same time, parameter 3192 **Brake open thr mon**, added to the **TORQUE CONFIG** block, starts to increase in value from 0 up to the threshold value defined on the output of the selector associated with the pair of parameters 3184/3186. This value increases over a ramping up time settable in parameter 3188 **Brake torque time**. Parameter 3188 must be set to a value close to the brake open delay (i.e. the time it takes for the brake to be opened after the open command is sent). This ramp can be monitored via parameter 2392 **Torque**

ref 1 mon, visible in the diagrams of GF_eXpress.

When the **Start** positioner command (in the list of commands of the “Positioner” application) is sent, the value of parameter 664 **Speed setpoint** is increased. When this speed reference reaches the threshold defined by parameter 3176 **Brake open spd thr** (and in any case not before a time equal to PAR 3172 **Brake open delay**, which is always measured from the moment the brake opens) the pre-torque value injected (**Brake open thr mon**) after opening is reset to 0 with a ramping down time that is always equal to the value of 3188 **Brake torque time**.

In the transient opening phase the “positioner” could generate a speed reference value that is higher than the “**Brake open spd thr**” threshold. This, in turn, could result in the removal of the pre-torque due to the incorrect assumption that a positioner has started. To prevent this, parameter 3172 **Brake open delay** can be set so that the comparison with the speed reference is only performed after a certain delay.

In this mode the “**Brake fault**” alarm can never be triggered as it is not envisaged in “**Hoist mode 2**”.

Closing phase:

When the drive is disabled (also due to any alarms that are capable of disabling it) a close brake command is sent immediately, regardless of the operating condition.

For normal closing, set parameters 3174, 3178 and 3190.

When the brake opening phase is complete and after a delay equal to at least the value of 3190 **Brake close wait** (measured from the moment pre-torque removal ends) it waits for the speed reference to fall below the value set in 3178 **Brake close spd thr**.

Parameter 3174 **Brake close delay** can be used to enter a delay between the moment the closing condition occurs and that in which the close command is actually sent by the drive.

After the brake closing condition has occurred (within the time set in Brake close delay) it is also possible to restart the drive by sending a new positioning command. In that case the timer is reset and the drive waits for the closing condition again, which occurs when the speed reference falls to below the value of **Brake close spd thr** and after the delay set in **Brake close wait**.

Parameter 3190 **Brake close wait** can thus reasonably be set to a value that is slightly less than the positioning time. It ensures that within the set time the speed reference can also fall below the **Brake close spd thr** value without the close command being sent.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.2	**3172**	**Brake open delay**	s	FLOAT		0.20	0.0	60.0	ERW	FVS

Setting of the delay for opening an external mechanical brake.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.3	**3174**	**Brake close delay**	s	FLOAT		0.20	0.0	60.0	ERW	FVS

Setting of the delay to reach the motor zero speed before closing the brake.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.4	**3176**	**Brake open spd thr**	rpm	INT16		0	0	CALCI	ERW	FVS

Setting of the brake opening speed threshold value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.5	**3178**	**Brake close spd thr**	rpm	INT16		0	0	CALCI	ERW	FVS

Setting of the brake closing speed threshold value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.6	**3194**	**Brake ramp freeze**		ENUM		Disable	0	1	ERWZ	FVS

With this parameter you can freeze the velocity reference during brake opening and closing in “**Hoist Mode 1**”.

0 Disable

1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.7	**3182**	**Brake open thr sel**		ENUM		Output curr	0	1	ERWZ	FVS

Selecting of the type of comparison between the threshold value of open brake torque and the torque value or output current of the drive.

0 Torque ref%

1 Output curr

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.8	**3184**	**Brake open thr**	perc	FLOAT		10	-200.0	200.0	ERWZS	FVS

Threshold value at which the comparison is made.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.9	**3186**	**Brake open thr src**		LINK	16/32BIT	3184	0	16384	ERWZ	FVS

Selection of the origin (source) of the signal to be used.
The values that can be selected in the compare function are listed in the " **L_TCREF**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.10	**3188**	**Brake torque time**	s	FLOAT		0.10	0.01	60.0	ERWZ	FVS

Ramp time of parameter 3192 **Brake open thr mon** to move from the value up to the threshold value defined by PAR 3184 / 3186 (only if **Hoist mode 2** is selected).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.12.11	**3190**	**Brake close wait**	s	FLOAT		2	0.0	60.0	ERW	FVS

Delay before measuring the speed reference (equal to the time from opening the brake + the time up until removal of the pre-torque). Only if **Hoist mode 2** has been selected.

22.13 - FUNCTIONS/DIMENSION FACT

The function factor allows the drive speed to be expressed in a unit of measure other than rpm, generally referred to as user units. A conversion factor is used to convert the value from rpm to user units. This can be set as a fraction using two parameters:

PAR 3900 **Dim factor num** and PAR 3902 **Dim factor den**.

The conversion formula is rpm = **Dim factor num / Dim factor den * user unit**

The unit of measure displayed for parameters expressed in user units is user definable, but requires the use of the keypad or GF-eXpress configurator. The text of the unit of measure is set in PAR 3904 **Dim factor text**. Since this is a UINT32 it can contain a maximum of 4 characters.

The default values of the parameters that define the function factor are:

PAR **3900 Dim factor num** = 1; PAR **3902 Dim factor den** = 1; PAR **3904 Dim factor text** = "rpm"

The following parameters expressed by default in rpm can be displayed in user units:

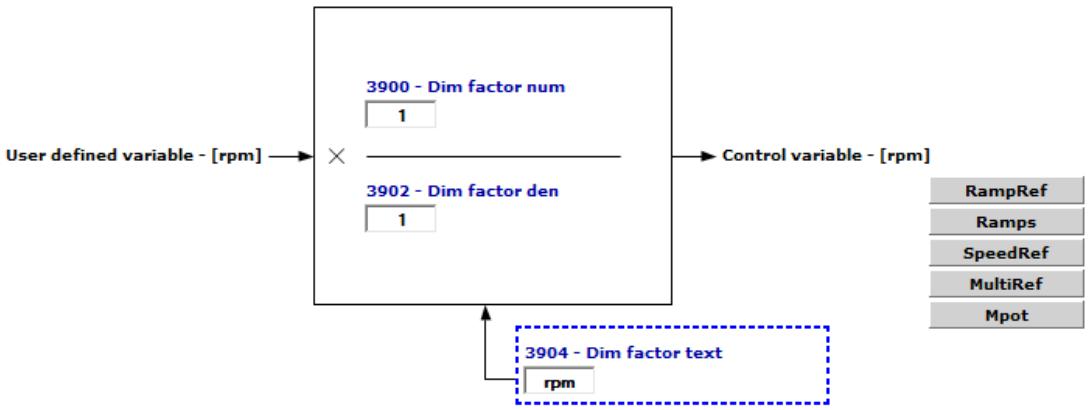
PAR	Description	UM	UU
628	Ramp setpoint	rpm	X
664	Speed setpoint	rpm	X
260	Motor speed	rpm	X
600	Dig ramp ref 1	rpm	X
602	Dig ramp ref 2	rpm	X
604	Dig ramp ref 3	rpm	X
620	Ramp ref 1 mon	rpm	X
622	Ramp ref 2 mon	rpm	X
624	Ramp ref 3 mon	rpm	X
626	Ramp ref out mon	rpm	X
634	Ramp ref top lim	rpm	X
636	Ramp ref bottom lim	rpm	X

PAR	Description	UM	UU
810	Multi reference 5	rpm	X
812	Multi reference 6	rpm	X
814	Multi reference 7	rpm	X
816	Multi reference 8	rpm	X
818	Multi reference 9	rpm	X
820	Multi reference 10	rpm	X
822	Multi reference 11	rpm	X
824	Multi reference 12	rpm	X
826	Multi reference 13	rpm	X
828	Multi reference 14	rpm	X
830	Multi reference 15	rpm	X
852	Multi ref out mon	rpm	X

630	Reference skip set	rpm	
632	Reference skip band	rpm	
640	Dig speed ref 1	rpm	X
642	Dig speed ref 2	rpm	X
660	Speed ref 1 mon	rpm	X
662	Speed ref 2 mon	rpm	X
670	Speed ref top lim	rpm	X
672	Speed ref bottom lim	rpm	X
680	Full scale speed	rpm	
760	Ramp outmon	rpm	X
800	Multi reference 0	rpm	X
802	Multi reference 1	rpm	X
804	Multi reference 2	rpm	X
806	Multi reference 3	rpm	X
808	Multi reference 4	rpm	X

870	Mpot setpoint	rpm	X
876	Mpot top lim	rpm	X
878	Mpot bottom lim	rpm	X
894	Mpot output mon	rpm	
910	Jog setpoint	rpm	
920	Jog output mon	rpm	
930	Reference 0 thr	rpm	
940	Speed 0 thr	rpm	
950	Speed threshold 1	rpm	
952	Speed threshold 2	rpm	
962	Set speed error	rpm	
968	Dig set speed ref	rpm	
970	Speed threshold 3	rpm	
972	Speed thr hysteresis	rpm	

If a function factor is set, all the parameters in the above table are converted into user units.



Calculation of the minimum and maximum values of parameters "Dim factor num" and "Dim factor den"

Calculation of the minimum and maximum values of parameters "**Dim factor num**" and "**Dim factor den**".

Limits must be included when setting the values of PAR 3900 **Dim factor num** and PAR 3902 **Dim factor den** to prevent the internal variables of the drive moving out of range.

Fixed limits for each of the two parameters cannot be defined since it is the ratio between the two that must be limited and because this limit also depends on parameter 680 **Full scale speed**.

There is the possibility of an overflow depending on the order in which the two

parameters PAR 3900 **Dim factor num** and PAR 3902 **Dim factor den** are set and their initial value.

The conditions in which an overflow could occur are described in the table below.

Initial value	Values to be set	Order	Overflow
Den = 1 Num = 1	Den 30 – Num 10	Num – Den	No
Den = 1 Num = 1	Den 30 – Num 10	Den – Num	Si
Den = 30 Num = 10	Den 1 – Num 1	Num – Den	Si
Den = 30 Num = 10	Den 1 – Num 1	Den – Num	No

If an overflow occurs when setting one of the two parameters, the other parameter is automatically set to the same value so that the conversion value is equal to 1.

Sent via the configurator

If the parameters are sent by the GF-eXpress configurator, they are written in a set order and an intermediate overflow could occur while setting valid values.

If the value of the first parameter sent by the configurator generates an overflow, the second parameter is set to the same value as the first (this temporarily forces the dimension factor to 1); when the second parameter is written the dimension factor returns to the correct value.

Changing the end of scale speed

When modifying PAR 680 **Full scale speed**, parameters PAR 3900 **Dim factor num** and PAR 3902 **Dim factor den** are forced to 1.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.13.1	**3900**	**Dim factor num**		UINT16		1	1	65535	ERW	FVS

Numerator dimension factor

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.13.2	**3902**	**Dim factor den**		UINT16		1	1	65535	ERW	FVS

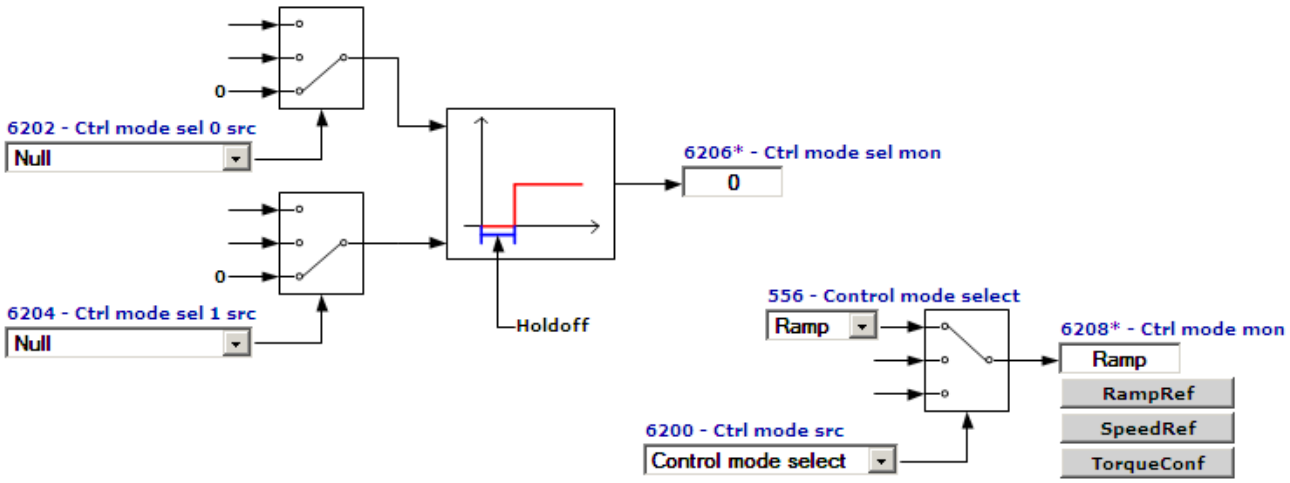
Denominator dimension factor

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.13.3	**3904**	**Dim factor text**		UINT32		7172210	0	0	ERW	FVS

The unit of measure displayed for parameters expressed in user units is user definable but requires the use of the configurator. The text of the unit of measure can contain up to a maximum of 4 characters.

22.14 - FUNCTIONS/CONTROL MODE

Note! Function available only when PAR 552 **Control mode select** is set [1] **Flux Vector CL** or [2] **Flux Vector OL**.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.14.1	**556**	**Control mode select**		ENUM		Ramp	0	2	ERWZ	F_S

Selection of the drive control mode.

Flux vector CL mode

0 Torque

1 Speed

2 Ramp

In **torque control (0 - Torque)** the reference and load of the motor determine its speed and direction of rotation. Symmetrical torque limits can be set, for each direction of rotation and for motor/generator operation. This type of control is only available in the **Flux vector CL** control mode. In this mode the **Ramp** function is not used to generate the drive speed reference so it can be used in stand-alone mode.

In **speed control (1 - Speed)** the reference arrives straight after the ramp circuit, enabling an extremely rapid response to signal variations. This is ideal for applications that require a highly dynamic response. This type of control is available in the **Flux vector CL** and **Flux vector OL** control modes. In this mode the **Ramp** function is not used to generate the drive speed reference so it can be used in stand-alone mode.

In **control with ramp (2 - Ramp)** the speed reference is applied to the input of the "**Ramp**" block and is produced by the "**Ramp ref**" block. This allows setting of both the acceleration/deceleration times and the ramp time (linear or S-shaped with customizable jerks). This type of control is available in all control.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.14.2	**6200**	**Ctrl mode src**		LINK	16BIT	556	0	16384	ERWZ	F_S

Selection of source of **Control Mode** function. The parameter to be assigned to this function is selected from the "**L_CTRLMODE**" selection list.

If IPA 6200 = **Control mode select**, IPA6208 value is set thru IPA556.

If IPA 6200 = **Ctrl mode sel mon,** IPA6208 value is set thru IPA6206.

If IPA 6200 is a **PAD X**, the PAD value will be considered.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.14.3	**6202**	**Ctrl mode sel 0 src**		LINK	16BIT	6000	0	16384	ERWZ	F_S
22.14.4	**6204**	**Ctrl mode sel 1 src**		LINK	16BIT	6000	0	16384	ERWZ	F_S

Selection of the drive control mode thru digital inputs

Ctrl mode sel 0 src	Ctrl mode sel 1 src		Flux vector OL	Flux vector CL
0	0	0	Torque	Ramp
0	1	1	Speed	Speed
1	0	2	Ramp	Ramp

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.14.5	**6206**	**Ctrl mode sel mon**		UINT32		0	0	3	ER	F_S

Monitoring of the selection done thru the IPA6202 **Ctrl mode sel 0 src** and IPA6204 **Ctrl mode sel 1 src.**

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.14.6	**6208**	**Ctrl mode mon**		ENUM		Torque	0	0	ER	F_S

Torque-Speed-Ramp selection done thru the IPA6200 "Ctrl mode src, IPA6202 **Ctrl mode sel 0 src** and IPA6204 **Ctrl mode sel 1 src.**

0 Torque

1 Speed

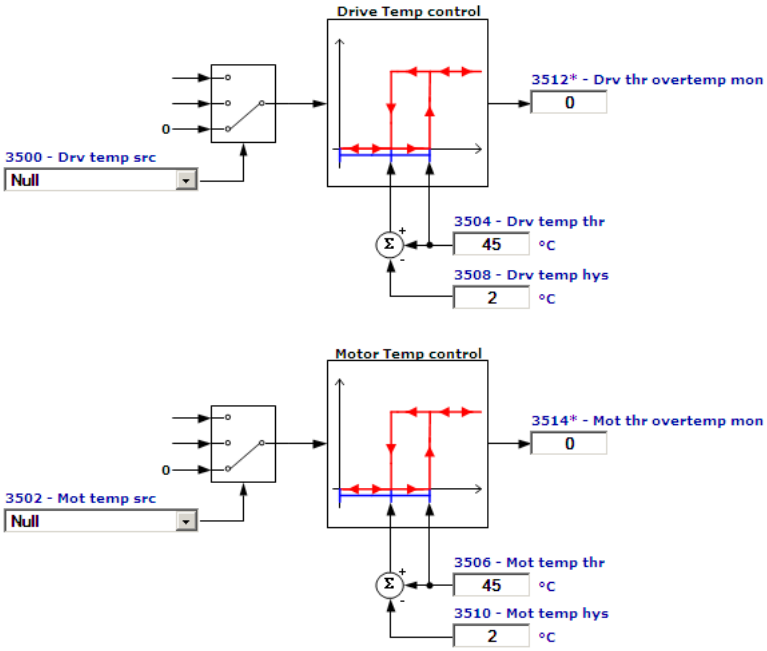
2 Ramp

22.15 - FUNCTIONS/TEMP CONTROL

This function basically includes two comparators with hysteresis.

By managing temperature sensors such as the PTC, PT100 or KTY84, you can command (via the drive's digital outputs) external solenoids to activate drive and/or motor cooling systems.

The TEMP CONTROL function works only on the basis of the temperature measured by its sensor and consequently commands the digital output. It does not run any check of the system's safety conditions (formation of condensation, over-humidity). The user has to employ systems outside the inverter to check that working conditions are safe.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.15.1	**3500**	**Drv temp src**		LINK	32BIT	6000	0	16384	ERW	FVS

Selection of signal origin (source) for management of a temperature signal. The parameter to be assigned to this function is selected from the "**L_TEMPCTRL**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.15.2	**3504**	**Drv temp thr**	degC	INT32		45	1	100	ERW	FVS

Setting the hysteresis comparator setpoint.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.15.3	**3508**	**Drv temp hys**	degC	INT32		2	0	CALCI	ERW	FVS

Setting of a tolerance band for the trip threshold set in PAR 3504.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.15.4	**3502**	**Mot temp src**		LINK	32BIT	6000	0	16384	ERW	FVS

Selection of signal origin (source) for management of a temperature signal. The parameter to be assigned to this function is selected from the "**L_TEMPCTRL**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.15.5	**3506**	**Mot temp thr**	degC	INT32		45	1	100	ERW	FVS

Setting the hysteresis comparator setpoint.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.15.6	**3510**	**Mot temp hys**	degC	INT32		2	0	CALCI	ERW	FVS

Setting of a tolerance band for the trip threshold set in PAR 3506.

22.16 - FUNCTIONS/LC CONTROL

The LC function runs the Condensation check on a water-cooled drive (ADV200-LC).

It lets you check if working conditions are safe, command the cooling circuit solenoid and, if necessary, specify what the allowed cooling liquid temperature should be.

Based on the humidity and ambient temperature measured by the built-in sensors, the dew point is calculated and compared to the cooling liquid temperature measured by the sensor on the drive plate near the input manifold or by an external sensor.

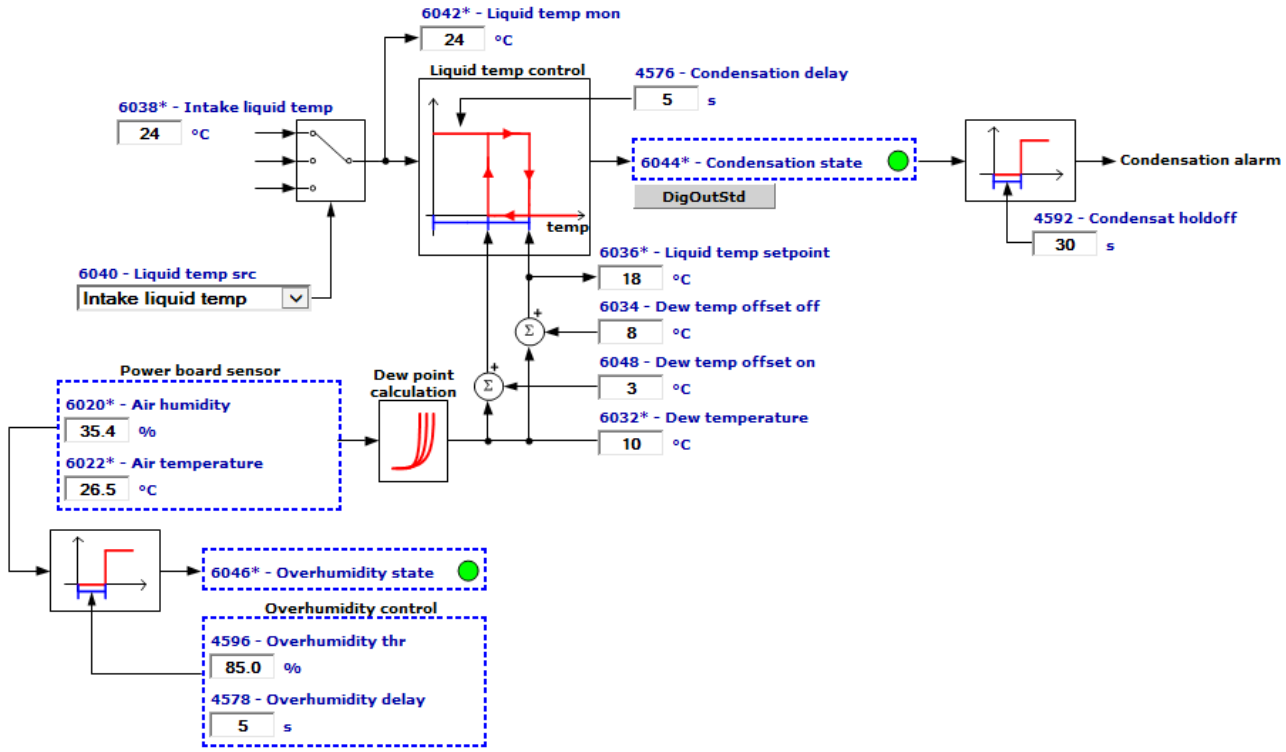
If the cooling liquid temperature is below the dew point, the flag on the Condensation monitor is activated.

By means of a digital output on the drive, the monitor flag is generally used to command the cooling circuit solenoid.

An alarm trips if the Condensation conditions persists for a (settable) time.

Safety conditions are shown on the “Safe operating area” graph below.

The LC function also detects Over-humidity condition and manages the relative alarm.



Condensation Control

- By measuring **Air Temperature** IPA 6022 and **Air humidity** IPA 6020, the dew point is calculated and shown as monitor parameter IPA 6032 **Dew temperature.**
- The selector assigned to parameter IPA 6040 **Liquid temp src** lets you set the sensor used to measure cooling liquid temperature:
- If IPA 6040 **Liquid temp src** = **Intake liquid temp** (IPA 6038, default setting),, the measurement is made by a sensor on the drive plate near the input manifold.
- If IPA 6040 **Liquid temp src** = **An inp 1X temp mon** or **2X**, the measurement is made by an external sensor (PT100, PTC or KTY84) connected to the optional EXP-IO-SENS-100-ADV board (see the manual for this option).
- Cooling liquid temperature is displayed on monitor parameter IPA 6042 **Liquid temp mon**. If the temperature is below dew point IPA 6032 added to the offset IPA 6048 **Dew temp offset On** for a time exceeding IPA 4576 **Condensation delay** (default = 5s), monitor flag IPA 6044 **Condensation state** is activated. The flag can be copied to a digital output to control the external valve used to manage cooling liquid circulation.

  Flag off = **digital output level = L = valve open**

  Flag on = **digital output level = H = valve closed**

  The digital output can be set on the DIGITAL OUTPUTS menu. For example: IPA 1314 **Digital output 3 src** = **Condensation** (the output will be at terminal 13 of the control board).

  The operating state of the digital output may be reversed: IPA 1434 **Dig out 3X inversion** = On.

Note: the draw of the circulation valve coil should always be assessed based on the loadability of the digital output. If draw exceeds loadability, you have to use an external relay. (we recommend a solid-state relay).

- The value obtained by adding IPA 6032 **Dew temperature** and IPA 6048 **Dew temp offset On** is shown in parameter IPA 6036 **Liquid temp setpoint** and represents the minimum temperature allowed for the cooling liquid. This value may be used as a reference for an external controller/regulator.
- If Condensation state persists for a time exceeding the delay set on the ALARMS CONFIG menu, parameter IPA 4592 **Condensat holdoff** (default = 30s), the [32] **Condensation** alarm condition with the programmed activity is signalled.
- If the system has a cooling liquid temperature controller, the time set in IPA 4592 **Condensat holdoff** must match the minimum time needed to bring the temperature to the value of PAR 6036 **Liquid temp setpoint**.

  The activities normally provided for the condensation alarm are:

  1) IPA 4590 **Condensat activity=** Disabled (default programming)

     In this case the condition is put on the alarms list and historical file, the Drive OK relay is opened, and the inverter is disabled. The motor stops based on the inertia, friction, and resistive torque applied to the axis.

     You are advised to use relay OK status to open the line contactor of the inverter.

     To restart the drive, reset the alarm (from keypad, digital input, or fieldbus) and restore safe working conditions.

  2) IPA 4590 **Condensat activity=** Warning

     In this case the condition is put on the alarms list and historical file but commands to the inverter are not changed. The motor continues to be controlled according to the assigned references.

     The user is responsible for taking all steps to prevent all breakdowns of the drive: disable the inverter, open the line contactor.

     If the temperature of the liquid returns above or equal to PAR 6036 **Liquid temp setpoint**, the alarm is automatically reset.
- The alarm condensation condition can be copied to a digital output of the inverter:

  ALARMS CONFIG menu – IPA 4702 **Alarm dig sel 1 = Condensation**

  DIGITAL OUTPUTS menu– IPA 1316 **Digital output 4 src=** 4708 **Alm dig out mon 1** (the output will be at terminal 14 of the control board).

Condensation occurs when the temperature of the liquid entering the inverter is significantly lower than ambient temperature (in the electrical panel).

The allowed temperature difference depends on the % of ambient humidity.

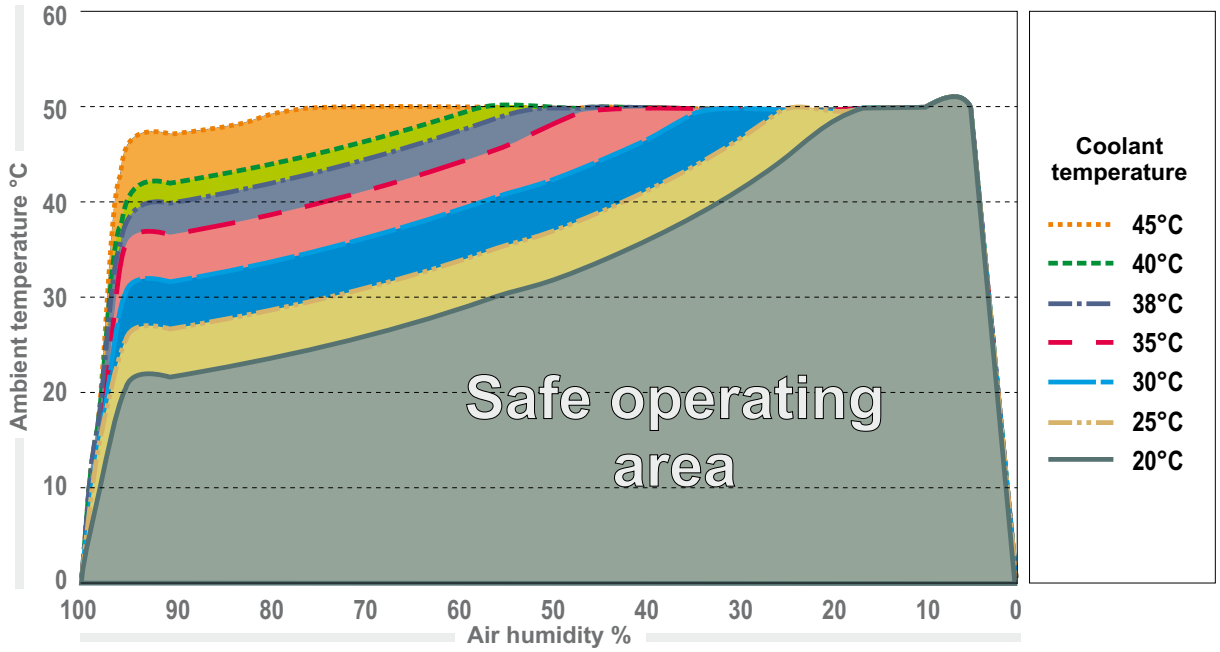
The temperature at which air becomes saturated with water vapor and “precipitates” is called the dew point.

The following graph can be used to check if working conditions (combination of ambient temperature, humidity, and cooling liquid temperature) sare safe and, if necessary, to select the allowed cooling liquid temperature.

Safe conditions are obtained when the work point is below the respective “Safe condition area” curve. Otherwise, take adequate precautions by raising the cooling liquid temperature (or by adjusting ambient temperature and humidity).

The curves shown are valid at sea level (1013 mbar).

Note: Raising the cooling liquid temperature may cause a reduction in the nominal current and overload of the inverter (1.5% for each degree over 35°C).



Condensation, Safe condition area"

If the temperature in the electrical closet is 30°C, relative humidity 40%, and cooling liquid temperature is 20°C (the lowest curve in the figure shown above), the drive's working conditions are safe.

If the ambient temperature rises to 35°C and relative humidity to 60%, the drive's working conditions are no longer safe. In this case, to restore safe working conditions, the cooling liquid temperature must be brought to at least 25°C.

The following table (dew point table) presents the data shown in the above graph in numerical form (input temperature of cooling liquid [°C] based on ambient temperature and humidity in air).

		Humidity in air [%]									
		10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Ambient temperature[°C]	**-25**	-45	-40	-36	-34	-32	-30	-29	-27	-26	-25
	-20	-42	-36	-32	-29	-27	-25	-24	-22	-21	-20
	-15	-37	-31	-27	-24	-22	-20	-18	-16	-15	-15
	-10	-34	-26	-22	-19	-17	-15	-13	-11	-11	-10
	-5	-29	-22	-18	-15	-13	-11	-8	-7	-6	-5
	0	-26	-19	-14	-11	-8	-6	-4	-3	-2	0
	5	-23	-15	-11	-7	-5	-2	0	2	3	5
	10	-19	-11	-7	-3	0	1	4	6	8	9
	15	-18	-7	-3	1	4	7	9	11	13	15
	20	-12	-4	1	5	9	12	14	16	18	20
	25	-8	0	5	10	13	16	19	21	23	25
	30	-6	3	10	14	18	21	24	26	28	30
	35	-2	8	14	18	22	25	28	31	33	35
	40	1	11	18	22	27	31	33	36	38	40
	45	4	15	22	27	32	36	38	41	43	45
	50	8	19	28	32	36	40	43	45	48	50

The dew point also depends on absolute pressure, i.e., on the altitude at which the electrical panel is installed.

At altitudes above sea level (0 m), atmospheric pressure (and therefore the dew point) decreases. For this reason, you should always check the cooling liquid temperature by considering the curves and tables calculated for an altitude of 0 m.

In continuous operating conditions, a liquid-cooled inverter works at lower temperatures than an air-cooled inverter. This extends the life of power components such electrolytic capacitors and IGBT modules.

The inverters have been sized based on continuous use of the cooling liquid at the nominal flow rates specified in the manual. Discontinuous use of the cooling liquid (for example, to lower the possibility of condensation), or continuous use but at lower flow rates than specified, may reduce the drive's performance and may also shorten the life of some components.

Overhumidity control

The drive's built-in humidity sensor lets you signal an unsafe condition and can also generate an alarm.

Overhumidity parameter IPA 6046 becomes active when the value of parameter IPA 6020 **Air humidity** exceeds the threshold set in parameter IPA 4596 **Overhumidity thr** (default = 85%) for a time exceeding IPA 4578 **Overhumidity delay**.

Internal alarm [52] **HumTempSensErr** detects a possible communication error between the humidity sensor and the drive's control board.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.16.1	**6020**	**Air humidity**	perc	FLOAT		0.0	0.0	0.0	ER	FVS

Monitor value of the Air Humidity detected from the internal sensor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.16.2	**6022**	**Air temperature**	degC	FLOAT		0.0	0.0	0.0	ER	FVS

Monitor value of the Air Temperature detected from the internal sensor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.16.3	**6032**	**Dew temperature**	degC	INT16		0	0	0	ER	FVS

Monitor value of the Dew point depending on parameters PAR 6020 and PAR 6022.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.16.4	**6034**	**Dew temp offset Off**	degC	INT16		8	3	50	ERW	FVS

Setting of a programmable Offset that can be added to the dew point value so that the **Condensation state** output (IPA 6044) is deactivated (Digital output level = L = circulation valve open) when liquid temperature (IPA 6042) is higher than **Dew temperature** (IPA 6032) + **Dew temp offset off** (IPA 6034).

IPA 6034 **Dew temp offset off** cannot be set to a value below IPA 6048 **Dew temp offset on**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.16.5	**6048**	**Dew temp offset on**	degC	INT16		3	2	50	ERW	FVS

Setting of a programmable Offset that can be added to the dew point value so that the **Condensation state** output (IPA 6044) is activated (Digital output level = H = circulation valve closed) when liquid temperature (IPA 6042) is below **Dew temperature** (IPA 6032) + **Dew temp offset on** (IPA 6048).

IPA 6048 **Dew temp offset on** cannot be higher than IPA 6034 **Dew temp offset off.**

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.16.6	**6036**	**Liquid temp setpoint**	degC	INT16		0	0	0	ER	FVS

Setpoint monitor value of the Liquid temperature. It is the sum of the parameters PAR 6032 and PAR 6034.

It is the value to which the temperature of the liquid cooling must be in order to be below the internal security curves to avoid condensation. The user must act externally on the values of temperature to avoid alarm situations.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.16.7	**6038**	**Intake liquid temp**	degC	INT16		0	0	0	ER	FVS

Monitor of temperature of cooling liquid flowing into the heatsink plate.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.16.8	**6040**	**Liquid temp src**		LINK	32BIT	6038	0	16384	ERW	FVS

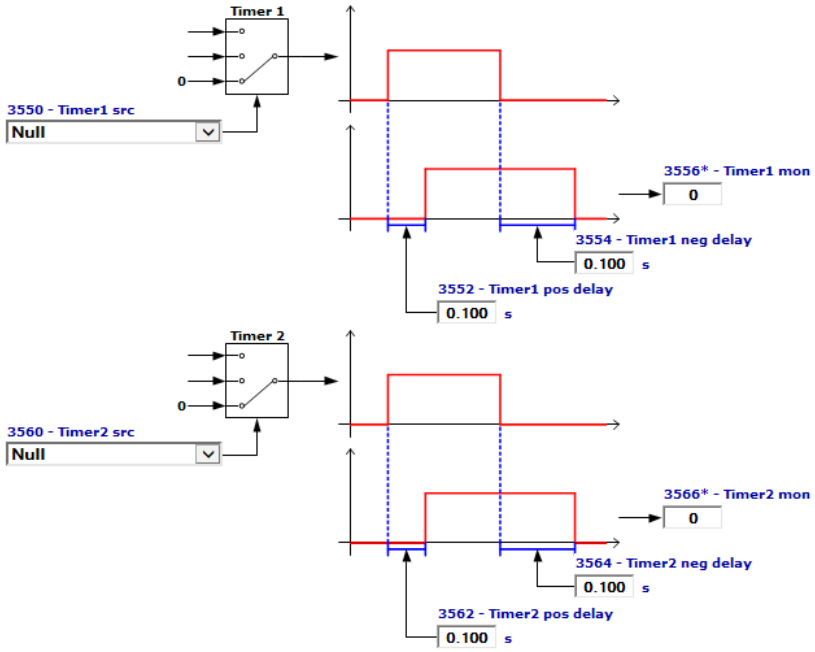
Selection of the origin (source) of the liquid temperature value to be assigned to the relative input. The functions that can be associated are listed in the "L_TEMPCTRL" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.16.9	**6042**	**Liquid temp mon**	degC	INT16		0	0	0	ER	FVS

Monitor of the liquid temperature value.

22.17 - FUNCTIONS/TIMERS

Menu for managing two programmable and independent Timer modules in order to delay the effect of the digital inputs and of all of the parameters on the L_DIGSEL1 selection list.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.17.1	**3550**	**Timer1 src**		LINK	32BIT	6000	0	16384	ERW	FVS
22.17.4	**3560**	**Timer2 src**		LINK	32BIT	6000	0	16384	ERW	FVS

Lets you assign the control signal to be delayed at Timer X function block input. The signals that can be used for this function can be set from the ones on the L_DIGSEL1 selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.17.2	**3552**	**Timer1 pos delay**	s	FLOAT		0.10	0.0	30.0	ERW	FVS
22.17.5	**3562**	**Timer2 pos delay**	s	FLOAT		0.10	0.0	30.0	ERW	FVS

Setting of positive delay edge.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.17.3	**3554**	**Timer1 neg delay**	s	FLOAT		0.10	0.0	30.0	ERW	FVS
22.17.6	**3564**	**Timer2 neg delay**	s	FLOAT		0.10	0.0	30.0	ERW	FVS

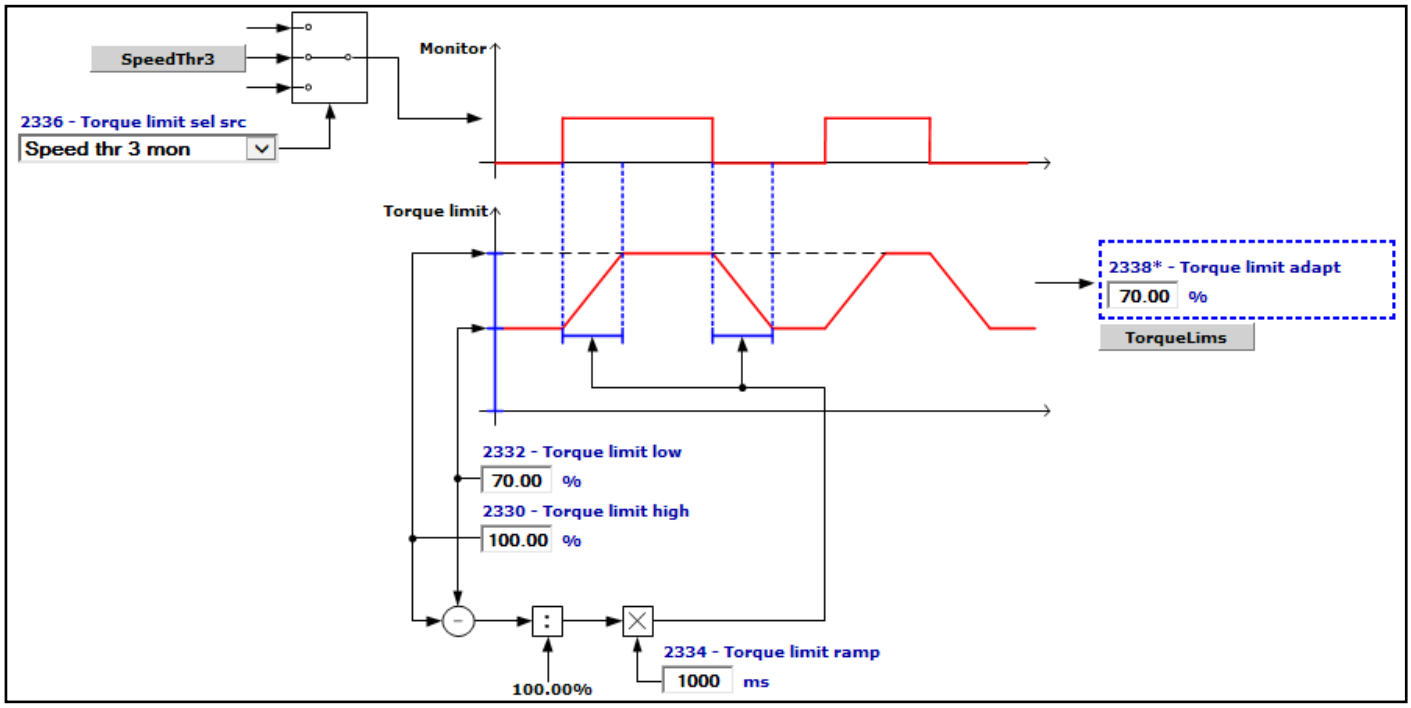
Setting of negative delay edge.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.17.4	**3556**	**Timer1 mon**		**INT32**		**0**	**0**	**0**	**ER**	**FVS**
22.17.8	**3566**	**Timer2 mon**		**INT32**		**0**	**0**	**0**	**ER**	**FVS**

Display of Timer output state.

22.18 - FUNCTIONS/TORQUE LIMADAPT

These menu parameters let you manage the drive torque limits dynamically based on On/Off conditions, for example, motor speed (above or below a threshold).



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.18.1	**2330**	**Torque limit high**	perc	FLOAT		100.0	0.0	CALCF	ERW	F_S

Setting of high torque limit.

If this parameter is set to a value lower than IPA 2332 **Torque limit low**, IPA 2332 is automatically changed to such value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.18.2	**2332**	**Torque limit low**	perc	FLOAT		70.0	0.0	CALCF	ERW	F_S

Setting of low torque limit.

Cannot be higher than the value set in parameter IPA 2330 **Torque limit high**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.18.3	**2334**	**Torque limit ramp**	ms	UINT16		1000	0	60000	ERW	F_S

Setting of time to go linearly from 0 to 100% of nominal torque.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.18.4	**2336**	**Torque limit sel src**		LINK	16/32	976	0	16384	ERW	F_S

Selection of source to be used to manage the adaptive torque limit:

The list of signals assignable to the function can be selected from the “L_DIGSEL1” selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.18.5	**2338**	**Torque limit adapt**	perc	FLOAT		0.0	0.0	0.0	ER	F_S

Adaptive torque limit in percentage, calculated internally by the drive based on the monitor parameter selected in parameter IPA 2336 **Torque limit sel src.**

If the monitor parameter equals 0, IPA 2338 goes to the value of **Torque limit low**

If the monitor parameter equals 1, IPA 2338 goes to the value of IPA 2330 **Torque limit high**.

23 – COMMUNICATION

23.1 – COMMUNICATION/RS485

The ADV200 drive is provided with a standard port (9 pole sub-D connector: XS) for connecting the RS485 serial line used for drive-PC point-to-point communication (via the GF-eXpress configuration software) or for the multidrop connection where it is needed the use of OPT-RS485-ADV optional board. (Max 20 drives can be connected on the serial line).

The RS485 serial line format is: 8 data bits, no parity and one stop bit.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.1.1	**3800**	**Drive address**		UINT16		1	1	255	ERW	FVS

Setting of the address to which the drive responds when connected to the RS485 serial line.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.1.2	**3802**	**Serial baudrate**		ENUM		38400	0	2	ERW	FVS

Setting of the RS485 serial communication speed (Baud Rate).

0 9600
1 19200
2 38400

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.1.3	**3810**	**Serial parameter**		ENUM		None,8,1	0	3	ERW	FVS

Setting of the format of the RS485 serial communication data.

0 None,8,1
1 None,8,2
2 Even,8,1
3 Odd,8,1

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.1.4	**3804**	**Serial protocol**		ENUM		Modbus	0	1	ERW	FVS

Setting of the serial communication protocol:

0 Modbus
1 Jbus

Setting to **0** selects the Modbus RTU (Remote Terminal Unit) serial communication protocol.

Setting to **1** selects the Jbus serial communication protocol. The Jbus protocol is functionally identical to the Modbus, except for the different numbering of addresses: in the Modbus these start from zero (0000 = 1st address) while in the JBUS they start from one (0001 = 1st address) and maintain this difference throughout numbering.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.1.5	**3806**	**Serial delay**	ms	UINT16		0	0	1000	ERW	FVS

Setting of the minimum delay between the drive receiving the last byte and starting its response. This delay avoids conflicts on the serial line when the RS485 interface that is used has not been pre-set for automatic Tx/Rx switching. The parameter only concerns the use of the standard RS485 serial line.

Example: if the delay in Tx/Rx switching on the master is a maximum of 20ms, the Ser answer delay parameter must be set to at least 20ms: 22ms

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.1.6	**3808**	**Serial swap data**		BIT		0	0	1	ERW	FVS

This parameter enables the exchange of the reading of the High and Low parts of the words for FLOAT, UINT32, INT32 type parameters when using the Modbus protocol.

23.2 – COMMUNICATION/FIELDBUS CONFIG

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.2.1	**4000**	**Fieldbus type**		ENUM		Off	0	5	RW	FVS

Setting of the type of fieldbus to be used.

0 Off
1 CanOpen
2 DeviceNet
3 Profibus
10 DS402
30 Profidrive
40 Rte

If set to **0** no fieldbus is selected.
If set to **1** the CanOpen fieldbus profile is selected.
If set to **2** the ProfiBus-DP fieldbus profile is selected.
If set to **3** the DeviceNet fieldbus profile is selected.
If set to **10** the DS402 fieldbus is selected.
If set to **30** the Profidrive fieldbus is selected.
If set to **40** the Real Time Ethernet fieldbus is selected.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.2.2	**4004**	**Fieldbus baudrate**		ENUM		500k	0	12	RW	FVS

Setting of the communication network speed (Baud Rate).

0 Auto
1 125k
2 250k
3 500k
4 1M
5 9600
6 19200
7 93750
8 187.5k
9 1.5M
10 3M
11 6M
12 12M

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.2.3	**4006**	**Fieldbus address**		INT16		3	0	255	RW	FVS

Setting of the node address of the drive when connected to the network.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.2.4	**4010**	**Fieldbus M->S enable**		ENUM		Enable	0	1	ERWZ	FVS

Setting of fieldbus data updating.

0 Disable
1 Enable

If set to **0**, the possibility of sending commands and references from the drive PLC via the fieldbus is disabled.

If set to **1** the possibility of sending commands and references from the drive PLC via the fieldbus is enabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.2.5	**4012**	**Fieldbus alarm mode**		INT32		0	0	1	ERWZ	FVS

Setting of the **Opt Bus Fault** alarm generation mode.

0 Off
1 On

If set to **0** the alarm is only generated if the drive is enabled.

If set to **1** the alarm is generated even with the drive disabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.2.6	**4014**	**Fieldbus state**		ENUM		Stop	0	9	R	FVS

The logic status of the fieldbus connection is displayed. The value depends on the type of bus that is used.
The following logic states are displayed if the CANopen or Rte fieldbus is selected:
0 Stop
1 PreOperational
2 Operational
The following logic states are displayed if the Profibus fieldbus is selected:
3 Error
4 WaitPRM
5 WaitCFG
6 DataExchange
7 DPError

The following logic states are displayed if the Rte fieldbus is selected:
8 SafeOp
9 Init

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.2.7	**4398**	**RTE protocol**		ENUM		None	0	0	ER	FVS

The Real Time Ethernet protocol implemented on the expansion card is displayed.
0 None
1 Ethercat
2 EthernetIP
3 GdNet
4 Profinet
5 ModbusTCP (Not available)
6 Powerlink (Not available)
107 Profidrive

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.2.8	**5608**	**IP address**		UINT32		0	0	4294967295	ER	FVS

Display of DCP address set via configuration of Profinet node.

23.3 – COMMUNICATION/FIELDBUS M->S

Configuration of input data

There are 16 groups of parameters, with the same structure, for configuring data to be exchanged cyclically with the fieldbus. Each group permits the exchange of a single datum, which corresponds to a single drive parameter.

The data written by the Master (a PLC, PC or control panel) to the Slave (the drive) can be configured in the COMMUNICATION/FIELDBUS M2S menu, hence the name of the M->S menu:

Parameter for setting input data:

It must contain a valid IPA corresponding to the parameter to be written, or 0 if sys (PAR 4022...4172 **Fieldbus M->Sn sys**) is **Fill** or **Mdplc**.

For *src* (Source) parameters, if you select PAR 4024 **Fieldbus M->S1 mon** in the corresponding enum, the value of parameter 4020 is automatically set to the IPA of the *src*.

E.g.: if PAR 4020 **Fieldbus M->S1 ipa** = 610 then PAR 610 **Ramp ref 1 src** = PAR 4020 **Fieldbus M->S1 ipa**.

For *src* parameters with a FB type other than 0, the datum coming to the fieldbus is not written in the enum selection but directly in the mon associated with the *src*.

E.g.: PAR 4020 **Fieldbus M->S1 ipa** = 610, the reference from the bus is sent to PAR 620 **Ramp ref 1 mon**, it does not modify the selection of PAR 610 **Ramp ref 1 src** which continues to be set to PAR 4020 **Fieldbus M->S1 ipa**.

If it contains a valid IPA and is forced to 0 the corresponding sys parameter assumes the value of Fill (16 or 32 depending on the previous setting), to guarantee that the structure of the exchanged data area is not changed.

PAR 4022 **Fieldbus M->S1 sys** Format of the datum to exchange

This parameter is automatically adjusted to the recommended value when the corresponding PAR 4020...4170 **Fieldbus M->Sn mon** is modified. Although the automatic value is user-definable, acceptable values depend on the datum IPA parameter: some combinations are not allowed and generate a configuration alarm at restart.

Values:

- **Not assigned**: if set to "**Not assigned**" this and all subsequent groups (regardless of their sys) are not part of the data exchanged, regardless of the IPA.
- **Fill16/32**: the datum is exchanged on the fieldbus but not written in any parameter.
- **Eu**: the datum is exchanged in 16-bit signed integer format with the parameter unit configured in the corresponding IPA or, in the case of src with the corresponding mon (e.g.: if PAR 4020 **Fieldbus M->S1 ipa** = PAR 610 **Ramp ref 1 src** and PAR 4022 **Fieldbus M->S1 sys** = Eu the datum is in rpm), multiplied by div. This setting is only possible for some parameters. See the table of FBUS types in the list of parameters. For these parameters the datum is exchanged every ms.
- **Eu_float** : Eu_float: same as Eu, but the datum is in floating point 32-bit IEEE754 single precision format.
- **Count16/32**: the datum is exchanged in internal units (see scaling table) every ms (e.g.: if PAR 4020 Fieldbus M->S1 IPA = 610, PAR 610 **Ramp ref 1 src** and PAR 4022 **Fieldbus M->S1 sys** = Count16 the datum is scaled so that a value of 0x4000 produces a reference equal to PAR 680 **Full scale speed**).

  This setting is only possible for some parameters. See the table of FBUS types in the list of parameters: if the field is empty Count cannot be set in the parameter. Some parameters permit the use of Count16 (usually values in which there is no need to exchange the least significant 16 bits) and Count32, according to the following rule: if FBUS = 32bit only Count32 can be set, if 16hi or 16lo Count32 and Count16 can both be set, indicating which word of the parameter is actually used. If Count32 is used and the internal type of the parameter is FLOAT the datum must be exchanged in floating point IEEE754 single precision format, otherwise as an integer (signed or unsigned, again according to the internal type).
- **MdPlc16/32**: this indicates that the datum is for use by the MdPlc application, which will use the value of PAR 4024...4174 **Fieldbus M->Sn mon** accordingly. If set to MdPlc16 the 16 bits of the low part of the mon are exchanged, if set to MdPlc32 all 32 bits are exchanged. All this applies if PAR 4020...4170 **Fieldbus M->Sn mon** = 0 or = at "corresponding **Fieldbus M->Sn mon**" (for example P.4020 = 4024), otherwise it behaves in the same way as Count.
- **Par16/32**: this is the default setting for all parameters with FB type empty so that data cannot be exchanged at 1 ms and the datum is updated in background. The datum format depends on the format of the parameter and the setting: with Par16 the datum is a 16-bit integer (signed or unsigned, according to the external type of the parameter) with the same unit of measure as the selected parameter (multiplied by div); Par16 is only available if the parameter is not actually a 32-bit one (e.g. it is not possible for iPad and Compare). With Par32 the format is float if the external type of the parameter is float, otherwise it is integer, always with the unit of the parameter. Parameters with FB type not empty can also be exchanged as PAR, according to the same rules listed above.

If using the CANopen fieldbus, the sys is also used to structure the data area in 8-byte PDOs. The PDOs are created starting from the first group and it is necessary to guarantee that the data are contained in the PDO. Therefore, for example, a setting with PAR 4022 Fieldbus M->S1 sys = Count32, PAR 4032 Fieldbus M->S2 sys = Count16, PAR 4042 Sys M->S3 Fieldbus = Count32 is not valid, as the datum in group 3 would straddle the first two 2 PDOs. In these

cases, shorter PDOs can be generated by using the Count setting with IPA 0 (in the example PAR 4040 **IPA M->S3 Fieldbus** = 0, PAR 4042 **Fieldbus M->S3 sys** = Count16, PAR 4050 **Fieldbus M->S4 ipa** = IPA of the parameter that was previously in 3 and PAR 4052 **Fieldbus M->S4 sys** = Count32, thus using a first PDO with 6 bytes), or by creating unused areas in the PDO using Fill (the PDO has a size of 8 bytes but the last word is not used).

If the data cannot be mapped in the PDOs, a specific alarm is generated at startup, indicating the group with the problem. Note that this only applies to CANopen and DS402. For the other fieldbuses the exchange area is contiguous with a max size of 16 words (14 for DeviceNet).

PAR 4024 **Fieldbus M->S1 mon** Monitor of datum coming from the master

This is the value, already scaled in internal counts, of the datum arriving from the master. If, for example, a value equal to PAR 680 **Full scale speed** is sent to PAR 610 **Ramp ref 1 src** in rpm, the internal value is 0x40000000 = 1073741824. The scaling also includes the division of the div parameter.

PAR 4026 **Fieldbus M->S1 div** Divider to apply to the parameter

This can only be used for sys = Eu or Par. It divides the incoming datum by the value entered: this makes it possible to increase the resolution of the datum. For example, if IPA = PAR 610 **Ramp ref 1 src**, sys is automatically set to Eu. When div = 10 is entered, the Master must send the datum in rpm multiplied by 10, for example to send a reference equal to 100.5 rpm the datum exchanged on the bus is 1005: the resolution is therefore in tenths of a degree. Before entering a value, it is important to consider the maximum value of the datum exchanged, to make sure it can be contained in a 16-bit integer (in the example, the maximum possible speed is 3276.7 rpm).

Use

This group of parameters is repeated 16 times, making it possible to configure up to 16 input data, but also bearing in mind the maximum limit of 16 words in all (14 for DeviceNet). The total number of configurable data thus also depends on the format, whether 16 or 32-bit, according to the above rules for *sys*.

The drive only implements the parameters in the COMMUNICATION/FIELDBUS M2S menu at startup. Once set, they must therefore be saved and the drive restarted (this procedure is not necessary for values set via dynamic mapping by the master, currently only supported by CANopen and Ethercat). The data are processed in order from 1 to the first with sys = **Not assigned**: depending on the configuration, an area for exchanging data with the fieldbus is created, the size and composition of which are clearly-defined.

If the data entered are not consistent (for example if sys is set as Eu or Count for a parameter that does not support these, or set to 16-bit for a parameter that can only be 32, or if the IPA does not exist, or if the PDO is not the right size, etc.) alarm "[17] **Opt Bus fault**" is generated with a subcode indicating the type of problem and group in which it occurred (code meanings are described in the Interface page in Menu/FIELDBUS WORDS MAP/M->S in Gf_eXpress).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.3.1	**4020**	**Fieldbus M->S1 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.5	**4030**	**Fieldbus M->S2 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.9	**4040**	**Fieldbus M->S3 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.13	**4050**	**Fieldbus M->S4 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.17	**4060**	**Fieldbus M->S5 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.21	**4070**	**Fieldbus M->S6 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.25	**4080**	**Fieldbus M->S7 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.29	**4090**	**Fieldbus M->S8 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.33	**4100**	**Fieldbus M->S9 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.37	**4110**	**Fieldbus M->S10 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.41	**4120**	**Fieldbus M->S11 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.45	**4130**	**Fieldbus M->S12 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.49	**4140**	**Fieldbus M->S13 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.53	**4150**	**Fieldbus M->S14 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.57	**4160**	**Fieldbus M->S15 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.3.61	**4170**	**Fieldbus M->S16 ipa**		FBM2SIPA		0	0	20000	RW	FVS

Setting of the parameter to associate with the bus channel. The default setting is 0, which means channel not active.

If the parameter to be connected is a **sorg** (source), the channel and parameter can also be associated by modifying the **sorg** parameter in its menu.

When setting a parameter, the format is also automatically set in the sys parameter.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.3.2	**4022**	**Fieldbus M->S1 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.6	**4032**	**Fieldbus M->S2 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.10	**4042**	**Fieldbus M->S3 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.14	**4052**	**Fieldbus M->S4 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.18	**4062**	**Fieldbus M->S5 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.22	**4072**	**Fieldbus M->S6 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.26	**4082**	**Fieldbus M->S7 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.30	**4092**	**Fieldbus M->S8 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.34	**4102**	**Fieldbus M->S9 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.38	**4112**	**Fieldbus M->S10 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.42	**4122**	**Fieldbus M->S11 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.46	**4132**	**Fieldbus M->S12 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.50	**4142**	**Fieldbus M->S13 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.54	**4152**	**Fieldbus M->S14 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.58	**4162**	**Fieldbus M->S15 sys**		ENUM		Not assigned	0	10	RW	FVS
23.3.62	**4172**	**Fieldbus M->S16 sys**		ENUM		Not assigned	0	10	RW	FVS

Setting of the format of the datum received on the channel. When the src parameter is programmed, the format is automatically programmed on the relative sys. If the src parameter is reset to null, the format does not change. The value of the format can be selected from the following list, according to the parameter selected as the source:

0 Not assigned
1 Count 16
2 Count 32
3 Fill 16
4 Fill 32
5 Mdplc 16
6 Mdplc 32
7 Eu
8 Eu float
9 Par 16
10 Par 32

If set to **0** the channel is not assigned.

If set to **1** the datum is assigned a 16-bit count.

If set to **2** the datum is assigned a 32-bit count.

If set to **3** 16 bits on the channel are reserved for the datum, not used.

If set to **4** 32 bits on the channel are reserved for the datum, not used.

If set to **5** the datum is assigned a 16-bit count used by MDPLC.

If set to **6** the datum is assigned a 32-bit count used by MDPLC.

If set to **7** the datum is assigned engineering units on a 16-bit integer.

If set to **8** the datum is assigned engineering units on a 32-bit integer.

If set to **9**, the datum is assigned a 16-bit integer engineering unit format not in real time (5-10ms)

If set to **10** the datum is assigned a 32-bit integer engineering unit format or float format if the associated pa-

rameter is a float-type parameter not in real time (5-10ms)

Note! If the sys parameter is **not assigned**, none of the subsequent fieldbus channels are read, even if programmed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.3.3	**4024**	**Fieldbus M->S1 mon**		INT32	16	0	0	0	ERW	FVS
23.3.7	**4034**	**Fieldbus M->S2 mon**		INT32	16	0	0	0	ERW	FVS
23.3.11	**4044**	**Fieldbus M->S3 mon**		INT32	16	0	0	0	ERW	FVS
23.3.15	**4054**	**Fieldbus M->S4 mon**		INT32	16	0	0	0	ERW	FVS
23.3.19	**4064**	**Fieldbus M->S5 mon**		INT32	16	0	0	0	ERW	FVS
23.3.23	**4074**	**Fieldbus M->S6 mon**		INT32	16	0	0	0	ERW	FVS
23.3.27	**4084**	**Fieldbus M->S7 mon**		INT32	16	0	0	0	ERW	FVS
23.3.31	**4094**	**Fieldbus M->S8 mon**		INT32	16	0	0	0	ERW	FVS
23.3.35	**4104**	**Fieldbus M->S9 mon**		INT32	16	0	0	0	ERW	FVS
23.3.39	**4114**	**Fieldbus M->S10 mon**		INT32	16	0	0	0	ERW	FVS
23.3.43	**4124**	**Fieldbus M->S11 mon**		INT32	16	0	0	0	ERW	FVS
23.3.47	**4134**	**Fieldbus M->S12 mon**		INT32	16	0	0	0	ERW	FVS
23.3.51	**4144**	**Fieldbus M->S13 mon**		INT32	16	0	0	0	ERW	FVS
23.3.55	**4154**	**Fieldbus M->S14 mon**		INT32	16	0	0	0	ERW	FVS
23.3.59	**4164**	**Fieldbus M->S15 mon**		INT32	16	0	0	0	ERW	FVS
23.3.63	**4174**	**Fieldbus M->S16 mon**		INT32	16	0	0	0	ERW	FVS

The value received from the bus is displayed. This parameter must be associated with the src parameter to enable the **M->S** channel.

The user may modify the **M->S** and by **S->M** sys parameters. The consistency of the sys with the parameter assigned to the channel is checked.

A Fieldbus M->S X Mon parameter can only be assigned to a single "src". If assigned to more than one src, an error signal is generated during fieldbus initialization.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.3.4	**4026**	**Fieldbus M->S1 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.8	**4036**	**Fieldbus M->S2 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.12	**4046**	**Fieldbus M->S3 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.16	**4056**	**Fieldbus M->S4 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.20	**4066**	**Fieldbus M->S5 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.24	**4076**	**Fieldbus M->S6 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.28	**4086**	**Fieldbus M->S7 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.32	**4096**	**Fieldbus M->S8 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.36	**4106**	**Fieldbus M->S9 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.40	**4116**	**Fieldbus M->S10 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.44	**4126**	**Fieldbus M->S11 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.48	**4136**	**Fieldbus M->S12 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.52	**4146**	**Fieldbus M->S13 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.56	**4154**	**Fieldbus M->S14 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.60	**4166**	**Fieldbus M->S15 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.64	**4176**	**Fieldbus M->S16 div**		FLOAT		1.0	1.0	1000.0	ERW	FVS

The **Div M->Sx fieldbus** parameters can be used to increase the resolution of the datum sent on the bus to the drive in the corresponding channel in EU and EU_float exchange mode. The parameter value is used by the drive as the divider of the incoming datum, so that a number with decimal digits can be transferred.

N.B.: You must check the size in bits of the datum that is sent to make sure that the maximum value in bits fits in a 16-bit integer. For example, if specifying the divider as “Fieldbus M->Sn div” = 1000, the maximum value that can be used for the exchanged datum is 32.768 (32768/1000).

.

Example: **Div M->Sx fieldbus** = 10, **M->S1 fieldbus par** = **Ramp ref src 1**, **Sys M->S1 fieldbus** = **Eu**. If the PLC sends the decimal value 1000 on the first word the value of **ramp ref 1** on the drive is 1000/10 = 100.

23.4 – COMMUNICATION/FIELDBUS S->M

Configuration of output data

The data read by the Master (a PLC, PC or control panel) sent by the slave (the drive) can be configured in the COMMUNICATION/FIELDBUS S2M menu.

Since the functions of the 16 groups are similar to those of the COMMUNICATION/FIELDBUS S2M menu, only the differences are listed here:

PAR 4180 **Fieldbus S->M1 ipa**: unlike with M->S, the src are not managed. The IPA therefore always refers to the parameter that is entered (e.g. to monitor ramp 1 input I must select PAR 620 **Ramp ref 1 mon** whereas if I select PAR 610 **Ramp ref 1 src** I would read the selection of the enum of that src).

Moreover, with sys = MdPlc16/32, you cannot enter IPA 0 but must enter the IPA of the corresponding dig, for the first group PAR 4184 **Dig Fieldbus S->M1**, etc..), the MdPlc application then writes a value in this parameter, which is sent to the bus in 16 or 32-bit format according to the sys.

If you enter 0 when the IPA was set to a value other than zero, the sys is automatically set to Fill16 or 32, to guarantee the structure of the data exchange area.

PAR 4182 **Fieldbus S->M1 sys** : the only difference regards the MdPlc16/32 setting, as explained above, to send all 32 bits or just the low word of the corresponding dig.

PAR 4186 **Fieldbus S->M1 mul**: this works symmetrically with respect to M>S. In this case a multiplier is applied to increase the resolution of the output datum (for Eu and Par only). For example, if PAR 4180 **Fieldbus S->M1 ipa** = PAR 260 **Motor speed,** PAR 4182 **Fieldbus S->M1 sys** = Eu, PAR 4186 **Fieldbus S->M1 mul** = 10 the datum sent to the bus is in rpm multiplied by 10: if the drive turns at 100.5 rpm the master receives a value equal to 1005.

PAR 4184 **Dig Fieldbus S->M1**: there are no monitors for output data, the digs send a fixed datum to the bus (with the sys set to Count32) or for the MdPlc application, which writes a value in these parameters (with sys set to MdPlc16/32).

The groups are processed in order at startup as for M>S. If there are any configuration errors, alarm “[17] **Opt Bus fault**” is generated with a subcode indicating the type of problem and the group in which it occurred (see the S->M page in Gf_eXpress for the meaning of the code).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.4.1	**4180**	**Fieldbus S->M1 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.4.5	**4190**	**Fieldbus S->M2 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.4.9	**4200**	**Fieldbus S->M3 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.4.13	**4210**	**Fieldbus S->M4 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.4.17	**4220**	**Fieldbus S->M5 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.4.21	**4230**	**Fieldbus S->M6 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.4.25	**4240**	**Fieldbus S->M7 ipa**		FBM2SIPA		0	0	20000	RW	FVS
23.4.29	**4250**	**Fieldbus S->M8 ipa**		FBM2SIPA		0	0	20000	RW	FVS

23.4.33	**4260 Fieldbus S->M9 ipa**	FBM2SIPA	0	0	20000	RW	FVS
23.4.37	**4270 Fieldbus S->M10 ipa**	FBM2SIPA	0	0	20000	RW	FVS
23.4.41	**4280 Fieldbus S->M11 ipa**	FBM2SIPA	0	0	20000	RW	FVS
23.4.45	**4290 Fieldbus S->M12 ipa**	FBM2SIPA	0	0	20000	RW	FVS
23.4.49	**4300 Fieldbus S->M13 ipa**	FBM2SIPA	0	0	20000	RW	FVS
23.4.53	**4310 Fieldbus S->M14 ipa**	FBM2SIPA	0	0	20000	RW	FVS
23.4.57	**4320 Fieldbus S->M15 ipa**	FBM2SIPA	0	0	20000	RW	FVS
23.4.61	**4330 Fieldbus S->M16 ipa**	FBM2SIPA	0	0	20000	RW	FVS

Setting of the parameter to associate with the bus channel. The default setting is 0, which means channel not active.
When setting a parameter, the format is also automatically set in the sys parameter

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.4.2	**4182**	**Fieldbus S->M1 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.6	**4192**	**Fieldbus S->M2 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.10	**4202**	**Fieldbus S->M3 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.14	**4212**	**Fieldbus S->M4 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.18	**4222**	**Fieldbus S->M5 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.22	**4232**	**Fieldbus S->M6 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.26	**4242**	**Fieldbus S->M7 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.30	**4252**	**Fieldbus S->M8 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.34	**4262**	**Fieldbus S->M9 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.38	**4272**	**Fieldbus S->M10 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.42	**4282**	**Fieldbus S->M11 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.46	**4292**	**Fieldbus S->M12 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.50	**4302**	**Fieldbus S->M13 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.54	**4312**	**Fieldbus S->M14 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.58	**4322**	**Fieldbus S->M15 sys**		ENUM		Not assigned	0	10	RW	FVS
23.4.62	**4332**	**Fieldbus S->M16 sys**		ENUM		Not assigned	0	10	RW	FVS

When setting the sorg parameter the format is automatically set on the relative **sys**. If **sorg** is set to **null**, the data format does not change. The value of the format can be selected from the following list, according to the parameter selected as the source:

0 Not assigned
1 Count 16
2 Count 32
3 Fill 16
4 Fill 32
5 Mdplc 16
6 Mdplc 32
7 Eu
8 Eu float
9 Par 16
10 Par 32

If set to **0** the channel is not assigned.
If set to **1** the datum is assigned a 16-bit count.
If set to **2** the datum is assigned a 32-bit count.
If set to **3** 16 bits on the channel are reserved for the datum, not used.
If set to **4** 32 bits on the channel are reserved for the datum, not used.
If set to **5** the datum is assigned a 16-bit count used by MDPLC.

If set to **6** the datum is assigned a 32-bit count used by MDPLC.

If set to **7** the datum is assigned engineering units on a 16-bit integer.

If set to **8** the datum is assigned engineering units on a 32-bit integer.

If set to **9**, the datum is assigned a 16-bit integer engineering unit format not in real time (5-10ms)

If set to **10** the datum is assigned a 32-bit integer engineering unit format or float format if the associated parameter is a float-type parameter not in real time (5-10ms)

Note ! If the sys parameter is **not assigned**, none of the subsequent channels are transferred to the fieldbus, even if programmed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.4.3	**4184**	**Dig Fieldbus S->M1**		INT32	16	0	0	0	ERW	FVS
23.4.7	**4194**	**Dig Fieldbus S->M2**		INT32	16	0	0	0	ERW	FVS
23.4.11	**4204**	**Dig Fieldbus S->M3**		INT32	16	0	0	0	ERW	FVS
23.4.15	**4214**	**Dig Fieldbus S->M4**		INT32	16	0	0	0	ERW	FVS
23.4.19	**4224**	**Dig Fieldbus S->M5**		INT32	16	0	0	0	ERW	FVS
23.4.23	**4234**	**Dig Fieldbus S->M6**		INT32	16	0	0	0	ERW	FVS
23.4.27	**4244**	**Dig Fieldbus S->M7**		INT32	16	0	0	0	ERW	FVS
23.4.31	**4254**	**Dig Fieldbus S->M8**		INT32	16	0	0	0	ERW	FVS
23.4.35	**4264**	**Dig Fieldbus S->M9**		INT32	16	0	0	0	ERW	FVS
23.4.39	**4274**	**Dig Fieldbus S->M10**		INT32	16	0	0	0	ERW	FVS
23.4.43	**4284**	**Dig Fieldbus S->M11**		INT32	16	0	0	0	ERW	FVS
23.4.47	**4294**	**Dig Fieldbus S->M12**		INT32	16	0	0	0	ERW	FVS
23.4.51	**4304**	**Dig Fieldbus S->M13**		INT32	16	0	0	0	ERW	FVS
23.4.55	**4314**	**Dig Fieldbus S->M14**		INT32	16	0	0	0	ERW	FVS
23.4.59	**4324**	**Dig Fieldbus S->M15**		INT32	16	0	0	0	ERW	FVS
23.4.63	**4334**	**Dig Fieldbus S->M16**		INT32	16	0	0	0	ERW	FVS

If associated with the relative src, the value of this parameter is sent to the bus.

The user may modify the M->S and by S->M sys parameters. The consistency of the sys with the parameter assigned to the channel is checked.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.4.4	**4186**	**Fieldbus S->M1 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.8	**4196**	**Fieldbus S->M2 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.12	**4206**	**Fieldbus S->M3 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.16	**4216**	**Fieldbus S->M4 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.20	**4226**	**Fieldbus S->M5 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.24	**4236**	**Fieldbus S->M6 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.28	**4246**	**Fieldbus S->M7 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.32	**4256**	**Fieldbus S->M8 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.36	**4266**	**Fieldbus S->M9 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.40	**4276**	**Fieldbus S->M10 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.44	**4286**	**Fieldbus S->M11 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.48	**4296**	**Fieldbus S->M12 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.52	**4306**	**Fieldbus S->M13 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.56	**4316**	**Fieldbus S->M14 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.60	**4326**	**Fieldbus S->M15 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.64	**4336**	**Fieldbus S->M16 mul**		FLOAT		1.0	1.0	1000.0	ERW	FVS

The “**Fieldbus S->Mx mul**” parameters are multipliers that the drive applies to the datum before sending it to the bus. It is therefore possible to increase the resolution of some values read in EU and EU_float mode, also using decimal digits.

N.B.: The drive does not check that the multiplied parameter expressed in bits fits in a 16-bit integer. You must make sure that the multiplier is compatible with the maximum value of the exchanged parameter and that it does not exceed the maximum size of 32768.

Example: **Fieldbus S->Mx mul** = 10, **S->M1 fieldbus par** = **Motor speed**, **Sys S->M1 fieldbus** = **Eu**.

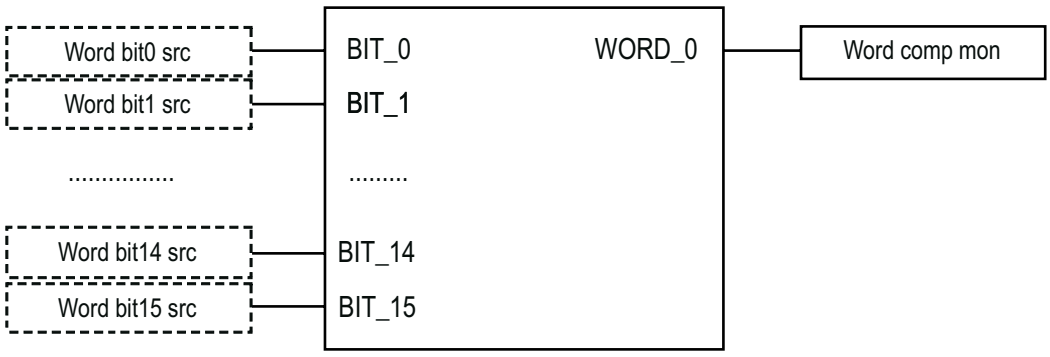
If the motor is running at 100 rpm, the PLC reads the value 100 * 10 = 1000 on the first word that is exchanged.

23.5 – COMMUNICATION/WORD COMP

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.5.1	**4400**	**Word bit0 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.2	**4402**	**Word bit1 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.3	**4404**	**Word bit2 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.4	**4406**	**Word bit3 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.5	**4408**	**Word bit4 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.6	**4410**	**Word bit5 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.7	**4412**	**Word bit6 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.8	**4414**	**Word bit7 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.9	**4416**	**Word bit8 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.10	**4418**	**Word bit9 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.11	**4420**	**Word bit10 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.12	**4422**	**Word bit11 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.13	**4424**	**Word bit12 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.14	**4426**	**Word bit13 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.15	**4428**	**Word bit14 src**		LINK	16	6000	0	16384	ERW	FVS
23.5.16	**4430**	**Word bit15 src**		LINK	16	6000	0	16384	ERW	FVS

Selection of the origin (source) of the signal to be used for coding in **Word comp**. This function allows the user to compose a single word composed of 16 signals, each of which can be selected from among those listed in the “**L_DIGSEL1**” selection list.

The values of the sectioned sizes are converted into a single word.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.5.17	**4432**	**Word comp mon**		UINT32	16	0	0	0	ER	FVS

The hexadecimal value of the Word comp output is displayed.

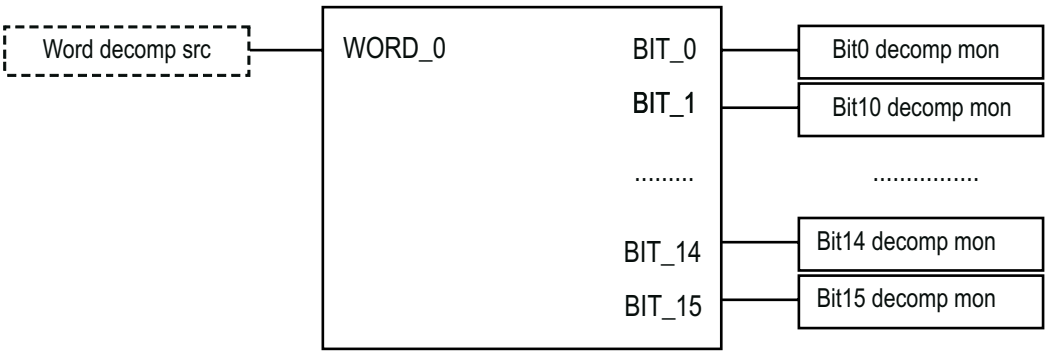
23.6 – COMMUNICATION/WORD DECOMP

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.6.1	**4450**	**Dig word decomp**		UINT32	16	0	0	0	ERW	FVS

Setting of the digital input decoded by the "**Word decomp**" block.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.6.2	**4452**	**Word decomp src**		LINK	16	4450	0	16384	ERW	FVS

Selection of the origin (source) of the word to be decoded by the "**Word decomp**" block. Each bit that is part of the word to be decoded is associated with the output channel of the "**Word decomp**" block. The variables that can be used for this function can be selected from among those listed in the "**L_WDECOMP**" selection list.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.6.3	**4454**	**Bit0 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.4	**4456**	**Bit1 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.5	**4458**	**Bit2 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.6	**4460**	**Bit3 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.7	**4462**	**Bit4 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.8	**4464**	**Bit5 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.9	**4466**	**Bit6 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.10	**4468**	**Bit7 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.11	**4470**	**Bit8 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.12	**4472**	**Bit9 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.13	**4474**	**Bit10 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.14	**4476**	**Bit11 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.15	**4478**	**Bit12 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.16	**4480**	**Bit13 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.17	**4482**	**Bit14 decomp mon**		BIT	16	0	0	1	ER	FVS
23.6.18	**4484**	**Bit15 decomp mon**		BIT	16	0	0	1	ER	FVS

The single bits that make up the selected word are displayed.

23.7 - COMMUNICATION/EXTERNAL IO

The optional EXP-FL-XCAN-ADV card (generally inserted in slot 1) allows the number of I/Os managed by the drive to be increased, using an external device. Communication with the external device is performed via CAN using the "DS401 Device profile for generic IO modules".

For more details see manual 1S5F32_EXP-FL-XCAN-ADV.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.7.1	**5480**	**External IO enable**		ENUM		Disable	0	1	ERW	FVS

This parameter is used to enable or disable communication between the EXP-FL-XCAN-ADV card and the external device.

0 Disable

1 Enable

Communication is disabled in the default configuration. Communication can be enabled by setting **Enable** and saving the parameters. When the drive is re-started the EXP-FL-XCAN-ADV card, if installed, is recognised. The communication is started and the external I/Os are managed. With the "**External IO enable**" set to **Disable** the EXP-D6A4R1-ADV can be managed, if installed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.7.2	**5482**	**External IO info**		UINT32		0	0	4294967295	ER	FVS

This parameter displays the number of I/O resources read by the module.

It is a 32-bit parameter made up as follows:

Uint32			
Uint16 High		Uint16 Low	
Uint8 High	Uint8 Low	Uint8 High	Uint8 Low
N. of AO	N. of AI	N. of DO	N. of DI

The parameter is displayed in HEX format.

E.g.:

PAR 5482	N. of AO	N. of AI	N. of DO	N. of DI
0x02041020 33820704	0x02 2	0x04 4	0x10 16	0x20 32
0x00000810 2064	0x00 0	0x00 0	0x08 8	0x10 16

If the configuration that is read has changed (compared to the last configuration saved or read) the drive displays and message requires the intervention of the operator in order to proceed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.7.3	**5484**	**External IO state**		BIT	16	0	0	1	ER	FVS

This parameter displays the communication state

0 Off

1 On

This parameter is set to 1 (on) if the communication state is operational.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.7.4	**5486**	**External IO failcode**		UINT32		0	0	4294967295	ER	FVS

If an "Ext I/O fault" occurs due to the **Emergency slave subcode 255..65535** alarm message, this parameter displays 4 of the 5 InfoBytes of the "Emergency" message.

See the slave manual for information about the meaning of the InfoBytes in the Emergency message (CAN slave communication module).

See Chapter C - "ExtIO fault alarm".

23.8 - COMMUNICATION/FAST LINK

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.1	**5702**	**FL address**		UINT16		0	0	16	ERWZ	FVS

This parameter is used to enable the FastLink function and select whether the drive is to be the master or

slave. If used as a slave device, the address can be selected.

0 = Disabled

1 = Master

2 = Slave 1

X = Slave X-1

16 = Slave 16

For the Pwm synchronisation to function properly, the address of the slave drive must be configured in the same order as the physical connection.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.2	**5818**	**FL bidirectional**		ENUM		Enable	0	1	ERWZ	FVS

Enables/disables bi-directional Fast Link mode.

0 Disable

1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.3	**5820**	**FL N of slave**		UINT16		0	0	32767	ERWZ	FVS

It is a parameter related only to the master drive and it indicates which slave drives need to be interrogated.

The encoding data used is an integer having set to 1 the bit corresponding to the slaves that need to be interrogated:

- bit 0 (least significant bit)) is related to slave with address 2

- bit 1 is related to the slave with address 3

- …

- …until to the slave with address 16.

For example, if need to be interrogated slaves with address 2 and address 5, the value will be 9 (1001 binary). If one or more slaves are not connected to the drops giving no answer, it will produce a fast link alarm on the master drive. Fast link alarm on the master will produce communication error to all the slaves connected.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.4	**5710**	**FL sync slave type**		ENUM		Pwm&Ctrl	0	2	ERWZ	FVS

This parameter is ineffective on the master drive.

On the slave drive this parameter is used to enable the function for generating Pwm signals that are synchronised with the Pwm signals of the master. It is also possible to enable the function for executing control tasks synchronised with execution of control tasks of the master.

0 Off — Fastlink transfers information between the drives.

1 Pwm — The Fastlink transfers information between the drives and the function for synchronising the generation of Pwm signals with the Pwm signals of the master is enabled. The variables in the 11) Updating times for the various functions table are synchronised at 125 us

2 Pwm&Ctrl — The Fastlink transfers information between the drives, the function for synchronising the generetion of Pwm signals with the Pwm signals of the master is enabled and the function for synchronsing control tasks with the control tasks of the master is enabled. The variables in table “Updating times for the various functions” (on manual 1S5F32_EXP-FL-XCAN-ADV) and the MDPLC tasks are also synchronised to 1 ms and 8 ms.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.5	**5712**	**FL N Fwd slave chg**		UINT16		0	0	4	ERWZ	FVS

There are two possible operation modes.

In the first, the master sends the data frame to the first slave. The first slave takes all the data in the frame and sends the same frame to the next slave without making any changes. The same sequence is repeated by all the slave drives.

In the second, the master sends the data frame to the first slave. The first slave takes all the data in the frame, replaces part of the data and then sends the frame to the next slave drive. The same sequence is repeated by all the slave drives.

This parameter is ineffective on the master drive.

On the slave drive this parameter is used to configure the amount of data to be replaced in the data frame.

FL N Fw slave change	Information replaced
0	None
1	FL Fw 1
2	FL Fw 1, FL Fw 2
3	FL Fw 1, FL Fw 2, FL Fw 3
4	FL Fw 1, FL Fw 2, FL Fw 3, FL Fw 4

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.6	**5714**	**FL fault enable src**		LINK	16	6002	0	16384	ERW	FVS

This parameter is used to select the origin (source) of the **FL fault enable** signal.

The signal to be associated with this function can be selected from the "**L_DIGSEL1**" selection list.

0 **FL fault enable** not active (No FastLink alarm signal)

1 **FL fault enable** active (FastLink alarm signal)

When the drive detects a FastLink fault, it prepares to trigger a "FastLink fault" alarm.

This command is used to select whether an alarm is generated when a fault is detected.

Alarm generation is enabled in the default configuration.

The configuration of the "**FL fault enable src**" parameter can be changed to control the phases in which alarm generation is enabled.

For example, by connecting the "**FL fault enable src**" parameter to "**Enable state mon**" you can enable generation of the "FastLink fault" alarm in the phase when the drive is enabled.

In systems where drive the drives are not powered-off simultaneously, some drives detect a FastLink fault and generate a FastLink alarm.

This parameter is used to disable the alarm at power-off by connecting the "**FL fault enable src**" parameter to "**Enable state mon**".

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.7	**5730**	**FL Fwd 1 src**		LINK	16/32BIT	6000	0	16384	ERW	FVS
23.8.8	**5732**	**FL Fwd 2 src**		LINK	16/32BIT	6000	0	16384	ERW	FVS
23.8.9	**5734**	**FL Fwd 3 src**		LINK	16/32BIT	6000	0	16384	ERW	FVS
23.8.10	**5736**	**FL Fwd 4 src**		LINK	16/32BIT	6000	0	16384	ERW	FVS

This parameter is used to select the origin (source) of the **FL Fw 1 src** signal.

The signal to be associated with this function can be selected from the "**L_FBS2M**" selection list.

On the drive configured as the master, these parameters are used to select the data to be sent to the first slave.

On drives configured as slaves, these paramters are used to select the data that the slave must include in the data frame to replace the data received from the previous drive.

Replacement is disabled in the default configuration. It can be enabled with the PAR 5712 "**FL N Fwd slave chg**" parameter.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.11	**5830**	**FL Rev 1 src**		LINK	16/32BIT	6000	0	16384	ERW	FVS
23.8.12	**5832**	**FL Rev 2 src**		LINK	16/32BIT	6000	0	16384	ERW	FVS

Parameter significant only for Slave drive, indicates what data to insert in first word to be sent to Master drive when Slave is interrogated. Selectable values are shown on the L_FLWORD list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.13	**5750**	**FL Fwd 1 mon**		INT32	32BIT	0	0	0	ER	FVS
23.8.14	**5752**	**FL Fwd 2 mon**		INT32	32BIT	0	0	0	ER	FVS
23.8.15	**5754**	**FL Fwd 3 mon**		INT32	32BIT	0	0	0	ER	FVS

23.8.16	**5756**	**FL Fwd 4 mon**	INT32	32BIT	0	0	0	ER	FVS
23.8.17	**5758**	**FL Fwd 5 mon**	INT32	32BIT	0	0	0	ER	FVS
23.8.18	**5760**	**FL Fwd 6 mon**	INT32	32BIT	0	0	0	ER	FVS
23.8.19	**5762**	**FL Fwd 7 mon**	INT32	32BIT	0	0	0	ER	FVS
23.8.20	**5764**	**FL Fwd 8 mon**	INT32	32BIT	0	0	0	ER	FVS

These parameters are not used on the master drive.

On the slave drive these parameters show the value received from the previous drive. The “Inv” parameters enable the value received to be used with the opposite sign, without changing any of the data sent to subsequent slaves.

These parameters are available in the src analog parameter selection lists.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.21	**5850**	**FL Rev 1 mon**		INT32	32BIT	0	0	0	ER	FVS
23.8.22	**5852**	**FL Rev 2 mon**		INT32	32BIT	0	0	0	ER	FVS
23.8.23	**5854**	**FL Rev 3 mon**		INT32	32BIT	0	0	0	ER	FVS
23.8.24	**5856**	**FL Rev 4 mon**		INT32	32BIT	0	0	0	ER	FVS

Display of data selected via parameters **FL Rev X Slave sel** corresponding (PAR 5822 ... 5828).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.25	**5822**	**FL Rev 1 slave sel**		UINT16		0	0	31	ERWZ	FVS
23.8.26	**5824**	**FL Rev 2 slave sel**		UINT16		0	0	31	ERWZ	FVS
23.8.27	**5826**	**FL Rev 3 slave sel**		UINT16		0	0	31	ERWZ	FVS
23.8.28	**5828**	**FL Rev 4 slave sel**		UINT16		0	0	31	ERWZ	FVS

Parameter significant only for Master drive, indicates what data of which Slave drive to display in parameter **FL Rev X mon** (you can choose to display word 1 or 2 of a Slave with address from 2 to 16). The code used assigns the significance of the first word of the Slave at address 2 to value 0, value 1 for the first word of the Slave at address 3 …. 14 first word of the Slave at address 16, 15 has no significance, 16 second word of Slave at address 2 … 30 second word of Slave at address 16.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.29	**5720**	**Sync slave mon**		BIT	16	0	0	1	ER	FVS

This parameter is not significant on the master drive.

On the slave drives this parameter indicates the state of the function that enables Pwm signals to be synchronised with the Pwm signals of the master and execution of control tasks to be synchronised with execution of control tasks of the master.

0 Slave not synchronised

1 Slave synchronised

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.8.30	**5722**	**FL fault code**		UINT32		0	0	0	ER	FVS

This parameter is used to display the cause of the FastLink fault alarm.

See chapter C - FastLink Fault.

24 – ALARM CONFIG

In the **ALARM CONFIG** menu the type of effect any alarm signals have on the drive is determined:

- The alarm status is saved
- How must the drive react to the alarm signal?
- Auto restart
- Alarm reset

For some alarms, behaviour can be configured separately for each signal, while for the others the **Disable drive** is executed. Individual signals can also be sent to a programmable digital output.

Activity	**Ignore**	The alarm is not included in the list of alarms, it is not included in the alarm log, it is not signalled on the digital outputs, no drive commands are modified.
	Warning	The alarm is included in the list of alarms, it is included in the alarm log, it is signalled on the digital outputs, the First alarm information is updated, the Alarm enabled information is updated, no drive commands are modified.
	Disable drive	The alarm is included in the list of alarms, it is included in the alarm log, it is signalled on the digital outputs, the First alarm information is updated, the Alarm enabled information is updated, a command is sent to stop and disable the motor, which stops due to inertia.
	Stop	The alarm is included in the list of alarms, it is included in the alarm log, it is signalled on the digital outputs, the First alarm information is updated, the Alarm enabled information is updated, a Stop command is sent. When the zero speed is reached the drive is disabled. If **Ramp** control mode is enabled, the drive moves to the zero speed with the set ramp time; when the **Speed delay 0** signal is activated the drive is disabled. If **Speed** control mode is enabled, the drive moves to the zero speed with the maximum current possible; when the **Speed delay 0** signal is activated the drive is disabled. If **Torque** control mode is enabled, the drive moves to the zero speed with the time set by the load; when the **Speed delay 0** signal is activated the drive is disabled.
	Fast stop	The alarm is included in the list of alarms, it is included in the alarm log, it is signalled on the digital outputs, the First alarm information is updated, the Alarm enabled information is updated, a Fast Stop command is sent. When the zero speed is reached the drive is disabled. If **Ramp** control mode is enabled, the drive moves to the zero speed with the set fast stop ramp time (deceleration time 3); when the **Speed delay 0** signal is activated the drive is disabled. If **Speed** control mode is enabled, the drive moves to the zero speed with the maximum current possible; when the **Speed delay 0** signal is activated the drive is disabled. If **Torque** control mode is enabled, the drive moves to the zero speed with the set load time; when the **Speed delay 0** signal is activated the drive is disabled.

n alarms with Activity = Ignore or Warning can be enabled at the same time.

If an alarm with Activity = Stop or Fast Stop is enabled and another alarm with an Activity other than Ignore or Warning is enabled, the drive stops and is disabled.

Not all alarms allow the controlled stopping of the drive. The following table shows the possibility of setting the Activities for the individual alarm signals.

Alarm	Ignore	Warning	Disable drive	Stop	Fast stop
ExtFlt	✓	✓	✓	✓	✓
Motor OT	✓	✓	✓	✓	✓
Overspeed	✓	✓	✓	✓	✓
SpdRefLoss	✓	✓	✓	✓	✓
SpdFbkLoss	✓	✓	✓	✓	✓
Drive ovld	✓	✓	✓	✓	✓
Motor ovld	✓	✓	✓	✓	✓
Bres ovld	✓	✓	✓	✓	✓
HTsens	-	-	✓	✓	✓
InAir	✓	✓	✓	✓	✓
Desat	-	-	✓	-	-
IOverC	-	-	✓	-	-
OverV	-	-	✓	-	-
UnderV	-	-	✓	-	-
PhLoss	✓	✓	✓	✓	✓
Bus option	✓	✓	✓	✓	✓
GroundFault thr	-	-	✓	-	-
Brake fault	✓	✓	✓	✓	✓
EXT IO	✓	✓	✓	✓	✓
FL faukt	✓	✓	✓	✓	✓
Missing Motor phase	✓	✓	✓	✓	✓
Condensation (for ADV200-LC series only)	✓	✓	✓	✓	✓
An inpLoss	✓	✓	✓	✓	✓

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.1	**4500**	**Fault reset src**		LINK	16	1120	0	16384	RW	FVS

Selection of the origin (source) of the signal to be used for the command to reset the drive after an alarm. The terminal that can be used for this function can be selected from among those listed in the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.2	**4502**	**ExtFlt src**		LINK	16	6000	0	16384	RW	FVS

Selection of the origin (source) of the signal to be used as the input for the drive external fault alarm **ExtFlt**. The terminal that can be used for this function can be selected from among those listed in the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.3	**4504**	**ExtFlt activity**		ENUM		Disable	0	4	RW	FVS

Setting of the behaviour of the drive in the event of an external fault alarm **ExtFlt**. This alarm indicates the intervention of a drive external protection.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.4	**4506**	**ExtFlt restart**		ENUM		Disable	0	1	RW	FVS

Enabling of automatic restart after the external fault alarm **ExtFlt**

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.5	**4508**	**ExtFlt restart time**	ms	UINT16		1000	120	30000	RW	FVS

Setting of the time within which the **External Fault** alarm must be reset in order to perform automatic restart.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.6	**4510**	**ExtFlt holdoff**	ms	UINT16		0	0	10000	RW	FVS

Setting of the delay between the signalling of the external fault alarm **ExtFlt** and enabling of the alarm. If an alarm condition occurs, the drive will wait for the set time before blocking is enabled. If the alarm is removed within the set time, the drive will not indicate any alarm condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.7	**4516**	**MotorOT pre activity**		ENUM		Ignore	0	4	ERW	FVS

Manages activity from motor overtemperature prealarm.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.8	**4518**	**MotorOT pre thr**	perc	UINT16		60	0	100	ERW	FVS

Represents the threshold, in % of the value set in IPA 4532 **MotorOT thr**, at which the motor overtemperature prealarm trips.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.9	**4520**	**MotorOT src**		LINK	16	6000	0	16384	RW	FVS

Selection of the origin (source) of the signal to be used for the motor overtemperature alarm **MotorOT**. The terminal that can be used for this function can be selected from among those listed in the "**L_DIGSEL2**" selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.10	**4522**	**MotorOT activity**		ENUM		Warning	0	4	RW	FVS

Setting of the behaviour of the drive in case of a motor overtemperature alarm **MotorOT**. This alarm indicates that the motor temperature is too high.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.11	**4524**	**MotorOT restart**		ENUM		Disable	0	1	RW	FVS

Enabling of automatic restart after the motor overtemperature alarm **MotorOT**.

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.12	**4526**	**MotorOT restart time**	ms	UINT16		1000	120	30000	RW	FVS

Setting of the time within which the **Motor Overtemperature** alarm must be reset in order to perform automatic restart.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.13	**4528**	**MotorOT holdoff**	ms	UINT16		1000	0	30000	RW	FVS

Setting of the delay between the signalling of the motor overtemperature alarm **MotorOT** and enabling of the alarm. If an alarm condition occurs, the drive will wait for the set time before enabling the alarm. If the alarm is removed within the set time, the drive will not indicate any alarm condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.14	**4530**	**MotorOT probe**		ENUM		SRC	0	8	ERW	FVS

Selection of type of sensor for measuring external temperature. The following can be selected:

0	SRC	alarm managed via IPA 4520 **MotorOT src**
1	Sens An1X	alarm managed via **PT100/PT1000/NI1000** read by input 1 expansion card (*)
2	Sens An2X	alarm managed via **PT100/PT1000/NI1000** read by input 2 expansion card (*)
3	KTY84 AnX	alarm managed via **KTY84** read by dedicated input for cards (*)
4	PTC AnX	alarm managed via **PTC** read by dedicated input for cards (*)
5	KTY84 An1	alarm managed via **KTY84** read by analog input 1 of control card
6	KTY84 An2	alarm managed via **KTY84** read by analog input 2 of control card
7	PTC An1	alarm managed via **PTC** read by analog input 1 of control card
8	PTC An2	alarm managed via **PTC** read by analog input 2 of control card
9	Klixon AnX	alarm managed via KLIXON read by dedicated input for cards (*)
10	KTY84 An1X	alarm managed via KTY84 read by analog input 1 expansion card (*)
11	KTY84 An2X	alarm managed via KTY84 read by analog input 2 expansion card (*)
12	PTC An1X	alarm managed via PTC read by analog input 1 expansion card (*)
13	PTC An2X	alarm managed via PTC read by analog input 2 expansion card (*)

(*) = **EXP-IO-SENS-100-ADV**, **EXP-IO-SENS-1000-ADV.**

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.15	**4514**	**MotorOT KTY84 unit**		ENUM		ohm	0	1	ERW	FVS

It allows to select the activation "**MotorOT**" alarm threshold in ohm or degrees Celsius (°C):

0	ohm	(IPA 4532 **MotorOT thr** and IPA 4536 **MotorOT mon** will be shown in ohm).
1	°C	(IPA 4532 **MotorOT thr** and IPA 4536 **MotorOT mon** will be shown in °C).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.16	**4532**	**MotorOT thr**	(*)	UINT16		0	0	32767	ERW	FVS

Represents the resistance threshold at which the "**Motor OT**" alarm must trip.

To the IPA 4536 has been associated the "SysMotorOTmon" system variable and It is available for MDPLC application. This system variable is scaled for 2^16 and it has been defined in Ohm or °C depending on the selection thru IPA 4514.

(*) The parameter is expressed in counts, ohms or °C depending on the type of sensor selected.

The parameter is expressed in Ohm when selecting PTC An1, PTC An2.

The parameter is expressed in Ohm or °C when selecting KTY84 An1, KTY84 An2.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.17	**4536**	**MotorOT mon**	(*)	INT16		0	0	32767	ER	FVS

Represents the measurement monitor of the sensor.

(*) The parameter is expressed in counts, ohms or °C depending on the type of sensor selected.

The parameter is expressed in Ohm when selecting PTC An1, PTC An2.

The parameter is expressed in Ohm or °C when selecting KTY84 An1, KTY84 An2.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.18	**4540**	**Overspeed threshold**	rpm	INT32		CALCI	0	CALCI	RW	FVS

Setting of the threshold above which the overspeed alarm **Overspeed** is enabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.19	**4542**	**Overspeed activity**		ENUM		Disable	0	4	RW	FVS

Setting of the behaviour of the drive in case of a motor overspeed alarm **Overspeed**. This alarm indicates that the motor speed has exceeded the threshold set in the **Speed ref top lim** and **Speed ref bottom lim** parameters in the COMMANDS menu.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.20	**4544**	**Overspeed holdoff**	ms	UINT16		0	0	5000	RW	FVS

Setting of the delay between the signalling of the motor overspeed alarm **Overspeed** and enabling of the alarm. If an alarm condition occurs, the drive will wait for the set time before enabling the alarm. If the alarm is removed within the set time, the drive will not indicate any alarm condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.21	**4550**	**SpdRefLoss threshold**	rpm	INT16		100	0	CALCI	RW	FVS

Setting of the threshold below which the speed reference loss alarm **SpdRefLoss** occurs.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.22	**4552**	**SpdRefLoss activity**		ENUM		Ignore	0	4	RW	FVS

Setting of the behaviour of the drive in case of a speed reference loss alarm **SpdRefLoss**. This alarm indicates that the difference between the speed regulator reference and the actual motor speed is more than 100 rpm.

This alarm must be disabled (= 0 Ignore) when parameter 556 **Control mode select** is set to Torque (0) or when parameter 2354 is set to a value other than zero.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.23	**4554**	**SpdRefLoss holdoff**	ms	UINT16		1000	0	10000	RW	FVS

Setting of the delay between the signalling of the speed reference loss alarm condition SpdRefLoss and enabling of the alarm. If an alarm condition occurs, the drive will wait for the set time before enabling the alarm. If the alarm is removed within the set time, the drive will not indicate any alarm condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.24	**4556**	**SpdRefLoss max spdOL**	rpm	INT16		CALCI	0	CALCI	RW	FVS

This parameter (active with **Flux vector CL**) can be used to activate an alarm if the drive does not start or the rotor is blocked. The setting refers to a speed threshold value before checking whether the rotor is blocked or the motor is not running.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.25	**4558**	**SpdRefLoss minThr en**		BIT		0	0	1	ERW	FVS

Mode to enable the speed reference loss alarm over the entire motor speed range or based on **Speed threshold 3** (IPA 970).

If **SpdRefLoss minThr en** (IPA 4558) is set to “Off,” the speed reference loss alarm enables because the difference between the speed regulate reference and current motor speed is higher than **SpdRefLoss threshold** (IPA 4550).

If **SpdRefLoss minThr en** (IPA 4558) is set to “On,” the following occurs:

- If **Speed thr 3 mon** (IPA 976) is 0 (current speed below threshold), the drive checks the conditions of the

speed reference loss alarm.

- If **Speed thr 3 mon** (IPA 976) is 1 (current speed above threshold), the drive DOES NOT check the conditions of the speed reference loss alarm (alarm disabled).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.26	**4560**	**SpdFbkLoss activity**		ENUM		Disable	0	4	RW	FV_

Setting of the behaviour of the drive in case of a speed feedback loss alarm **SpdFbkLoss**. This alarm indicates the loss of the encoder feedback signals.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.27	**4562**	**SpdFbkLoss holdoff**	ms	UINT16		200	0	10000	RW	FVS

Setting of the delay between the signalling of the speed feedback loss alarm condition **SpdFbkLoss** and the enabling of the alarm. If an alarm condition occurs, the drive will wait for the set time before enabling the alarm. If the alarm is removed within the set time, the drive will not indicate any alarm condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.28	**4564**	**SpdFbkLoss threshold**	rpm	INT16		100	5	CALCI	RW	FVS

For SE (single ended) encoders and with parameters 2110 or 5110 = (3) Control A-B-SE.

The **Speed fbk loss [22]** alarm control is enabled when the speed reference is higher than the value set in this parameter

If using incremental digital encoders in single-ended mode, this parameter sets the limit above which the drive executes the action set with parameter 4560 **SpdFbkLoss activity**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.29	**4570**	**Drive ovld activity**		ENUM		Ignore	0	4	ERW	FVS

Setting of the behaviour of the drive in case of a drive overload alarm **Drive ovld [13]**. This alarm indicates that the drive overload threshold has been reached.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.30	**4572**	**Motor ovld activity**		ENUM		Warning	0	4	ERW	FVS

Setting of the behaviour of the drive in case of a motor overload alarm **Motor ovld [14]**. This alarm indicates that the motor overload threshold has been reached.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.31	**4574**	**Bres ovld activity**		ENUM		Disable	0	4	ERW	FVS

Setting of the behaviour of the drive in case of a braking resistor overload alarm **Bres ovld**. This alarm indicates that the braking resistor overload threshold has been reached.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.32	**4582**	**HTsens restart**		ENUM		Disable	0	1	ERW	FVS

Enabling of automatic restart after the drive heatsink overtemperature alarm **HeatsinkS OTUT [10]**.

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.33	**4584**	**HTsens restart time**	ms	UINT16		20000	120	60000	ERW	FVS

Setting of the time within which the **HeatsinkS OTUT [10]** alarm must be reset in order to perform automatic restart.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.34	**4600**	**InAir activity**		ENUM		Stop	0	4	ERW	FVS

Setting of the behaviour of the drive in case of an intake air overtemperature alarm **Intakeair OT [11].**This alarm indicates that the temperature of the intake cooling air is too high.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.35	**4602**	**InAir restart**		ENUM		Disable	0	1	ERW	FVS

Enabling of automatic restart after the intake air overtemperature alarm **Intakeair OT [11]**.

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.36	**4604**	**InAir restart time**	ms	UINT16		1000	120	30000	ERW	FVS

Setting of the time within which the **Intakeair OT [11]** alarm must be reset in order to perform automatic restart.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.37	**4606**	**InAir holdoff**	ms	UINT16		10000	1000	30000	ERW	FVS

Setting of the delay between the signalling of the intake air overtemperature alarm **Intakeair OT [11]** and enabling of the alarm. If an alarm condition occurs, the drive will wait for the set time before enabling the alarm. If the alarm is removed within the set time, the drive will not indicate any alarm condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.38	**4610**	**Desat restart**		ENUM		Disable	0	1	ERW	FVS

Enabling of automatic restart after the desaturation alarm **Desat**. This alarm indicates a short circuit between the motor phases or on the power bridge.

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.39	**4612**	**Desat restart time**	ms	UINT16		2000	1000	10000	ERW	FVS

Setting of the time within which the **Desaturation** alarm must be reset in order to perform automatic restart. (Time with alarm signal active + 1000 msec).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.40	**4620**	**IOverC restart**		ENUM		Disable	0	1	ERW	FVS

Enabling of automatic restart after the drive overcurrent alarm. This alarm indicates an overcurrent (or short circuit between phases or towards the ground).

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.41	**4622**	**IOverC restart time**	ms	UINT16		2000	1000	10000	ERW	FVS

Setting of the time within which the **Overcurrent** alarm must be reset in order to perform automatic restart. (Time with alarm signal active + 1000 msec).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.42	**4630**	**OverV restart**		ENUM		Disable	0	1	ERW	FVS

Enabling of automatic restart after the overvoltage alarm. This alarm indicates an overvoltage on the intermediate circuit (DC link).

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.43	**4632**	**OverV restart time**	ms	UINT16		2000	1000	10000	ERW	FVS

Setting of the time within which the **Overvoltage** alarm must be reset in order to perform automatic restart. (Time with alarm signal active + 1000 msec).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.44	**4640**	**UnderV restart**		ENUM		Enable	0	1	ERW	FVS

Enabling of automatic restart after the **Undervoltage** [2] alarm. This alarm indicates an undervoltage on the intermediate circuit (DC link).

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.45	**4642**	**UnderV restart time**	ms	UINT16		1000	120	10000	ERW	FVS

Setting of the time within which the **Undervoltage** [2] alarm must be reset in order to perform automatic restart. (Time with alarm signal active + 100 msec).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.46	**4650**	**UVRep attempts**		UINT16		5	0	1000	ERW	FVS

Setting of the maximum number of attempts at automatic restart after the **Undervoltage** [2] alarm before a **Mult Undervoltage** [6] alarm is generated. If this parameter is set to 1000 an infinite number of attempts are available.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.47	**4652**	**UVRep delay**	s	UINT16		240	0	300	ERW	FVS

Setting of the time within which, if no automatic restarts are executed after the **Undervoltage** [2] alarm, the attempts counter is reset. In this way the number of attempts set in **UVRep attempt** are still available.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.48	**4660**	**PhLoss activity**		ENUM		Disable	0	4	ERW	FVS

Setting of the behaviour of the drive in case of a no phase alarm. This alarm indicates the absence of a drive power supply phase.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.49	**4662**	**PhLoss restart**		ENUM		Disable	0	1	ERW	FVS

Enabling of automatic restart after the no phase alarm.

0 Disable
1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.50	**4664**	**PhLoss restart time**	ms	UINT16		1000	120	10000	ERW	FVS

Setting of the time within which the **Phase loss** alarm must be reset in order to perform automatic restart. (Time with alarm signal active + 100 msec).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.51	**4670**	**Optionbus activity**		ENUM		Disable	0	4	ERW	FVS

Setting of the behaviour of the drive in case of an **Opt Bus Fault** alarm.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.52	**4672**	**Optbus fault en src**		LINK	16	6002	0	16384	ERW	FVS

Selection of the origin (source) of the signal to be used as "**Opt bus fault" [17]** alarm. The terminal that can be used for this function can be selected from among those listed in the "**L_DIGSEL1**" selection list.

The default is PAR 6002 **One**. If it is selected the PAR 1030 **Local / remote mon**, it can inhibit the alarm only when you switch from "**Remote**" to "**Local**".

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.53	**4680**	**Ground Fault thr**	perc	FLOAT		10.0	0	150.0	ERWS	FVS

Setting of the threshold for the ground short circuit alarm **Ground Fault.**

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.54	**4684**	**Brake fault activity**		ENUM		Disable	0	4	ERW	FVS

This parameter can be used to configure the behaviour of the drive in the event of a mechanical brake fault. The following activities are programmable:

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.55	**4690**	**ExtIO activity**		ENUM		Disable	0	4	ERW	FVS

This parameter is used to configure the behaviour of the drive if the "**Ext I/O fault"** [27] alarm occurs when the EXP-FL-XCAN-ADV card is installed.

See Chapter C - "**Ext I/O fault"** [27] alarm.

When the alarm is activated due to a communication error, the last value that was received is maintained.

The following activities are programmable:

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

You can check whether a card that supports XCAN External IO functions is installed from the DRIVE INFO menu for parameters 530, 532, 534 **SlotX card type**:

Value	Description	Expansion	
832	IO FastLink	EXP-FL-XCAN-ADV	XCAN External IO supported

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.56	**4940**	**FL fault activity**		ENUM		Disable	0	4	ERW	FVS

This parameter is used to configure the behaviour of the drive when the "**FastLink fault**" [28] alarm occurs.

If the EXP-FL-XCAN-ADV card is installed in the drive, all the FastLink communication fault signals are enabled and managed via generation of a "**FastLink fault**" [28] alarm, with different subcodes to indicate the cause of the error.

See Chapter C - "**FastLink Fault**" [28] alarm.

The following activities are programmable:

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.57	**4654**	**Mot PhLoss activity**		ENUM		Ignore	0	4	ERW	FV_

The "**Motor phase loss**" alarm signals the loss of a motor phase. This parameter manages the alarm activity.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.58	**4656**	**Mot PhLoss holdoff**	ms	UINT16		800	800	10000	ERW	FV_

Represents the time the alarm condition has to persist before the alarm is actually generated.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.59	**4658**	**Mot PhLoss threshold**	A	FLOAT		0.20	0	CALCF	ERW	FVS

Represents the output current threshold for generating the alarm.

The value has to be lower than the torque current value set in the drive.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.60	**4674**	**Mot PhLoss speed thr**	rpm	INT16		30	10	32000	ERW	FVS

In case of failure of the connection between a phase of the motor and the drive, the alarm signal is active when it is exceeded the speed threshold set in this parameter.

It can be used to mask the alarm at very low speed during the start and stop transients when external noise could cause false alarm tripping.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.61	**4678**	**Mot PhLoss code**		UINT32		0	0	0	ER	FVS

The hexadecimal value contains information about the type of problem detected and the motor phase where there is the anomaly.

0x0001	Error detected on phase U with motor running
0x0002	Error detected on phase V with motor running
0x0004	Error detected on phase W with motor running
0x0008	Error detected on phase U with motor running and speed ref loss
0x0010	Error detected on phase V with motor running and speed ref loss
0x0020	Error detected on phase W with motor running and speed ref loss
0x0040	Error detected on phase U during magnetizing stage (Asynchronous motor only)
0x0080	Error detected on phase V during magnetizing stage (Asynchronous motor only)
0x0100	Error detected on phase W during magnetizing stage (Asynchronous motor only)
0x0200	Error detected on phase U with motor disabled (Asynchronous motor only)
0x0400	Error detected on phase V with motor disabled (Asynchronous motor only)
0x0800	Error detected on phase W with motor disabled (Asynchronous motor only)

In some cases it is possible that more bit are showed at the same time.Depending on the type of fault, in fact, if the interruption of one phase makes that even in the other two there is no more current circulation, the displayed code indicates the absence of all three phases, while being just one connection failed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.62	**4590**	**Condensat activity**		ENUM		Disable	0	4	ERW	FVS

Setting of the behaviour of the drive in the event of the “Condensation” alarm. This alarm Indicates the intervention of the dangerous situation of condensation inside the ADV200-LC drive series.

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.63	**4592**	**Condensat holdoff**	s	UINT16		300	0	500	ERW	FVS

Setting of the delay between the signalling of the Condensation alarm and enabling of the alarm. If an alarm condition occurs, the drive will wait for the set time before disabling the drive regulation. If the alarm is removed within the set time, the drive will not indicate any alarm condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.64	**4576**	**Condensation delay**	s	UINT16		5	0	50	ERW	FVS

Setting of delay time (in seconds) for activation of the **Condensation state** (IPA 6044) condition used to switch from 0 to 1 after the **Liquid temp mon** (IPA 6042) parameter has dropped below **Dew temperature** (IPA 6032) + **Dew temp offset off** (IPA 6034)

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.65	**4596**	**Overhumidity thr**	perc	FLOAT		85.0	0.0	100	ERW	FVS

Represents the threshold value, in % , at which the Overhumidity state output trips.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.66	**4578**	**Overhumidity delay**	s	UINT16		5	0	50	ERW	FVS

Setting of delay time (in seconds) for activation of the **Overhumidity state** (IPA 6046) condition used to switch from 0 to 1 after the **Air humidity** (IPA 6020) parameter has become higher than **Overhumidity thr** (IPA 4596).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.67	**4598**	**HumTSensErr code**		UINT32		0	0	0	ER	FVS

Error code of alarm [52] **HumTempSensErr**, which can be:

0x0: no error

0x1: communication error on humidity / temperature sensor

0x2: error on NTC temperature sensor for temperature of liquid flowing into heatsink

0x3: the sum of both

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.68	**4546**	**An inpLoss activity**		ENUM		Warning	0	4	ERW	FVS

0 Ignore
1 Warning
2 Disable
3 Stop
4 Fast stop

Setting of drive behavior if alarm [62] **An inpLos** trips.

This alarm indicates disconnection of the 0.1V..10.1V or KTY84 o 4..20mA signal for parameters IPA 1502 **Analog inp 1 type,** IPA 1552 **Analog inp 2 type**, IPA 1602 **Analog inp 1X type** and IPA 1652 **Analog inp 2X type**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.69	**4548**	**An inpLoss holdoff**	**ms**	**UINT16**		**1000**	**0**	**30000**	**ERW**	**FVS**

Represents the time the alarm condition has to persist before the **An inpLoss** alarm is actually generated.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.70	**4568**	**An inpLoss code**		UINT16		0	0	0	ER	FVS

Lets you specify which analog input has gone into error.

0x01	error on analog input 1 standard control board
0x02	error on analog input 2 standard control board
0x04	error on analog input 1 I/O expansion board
0x08	error on analog input 2 I/O expansion board
0x10	error on dedicated KTY84 input on EXP-SENS expansion boards

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.71	**4700**	**Alarm dig sel 1**		ENUM		No alarm	0	62	ERW	FVS
24.72	**4702**	**Alarm dig sel 2**		ENUM		No alarm	0	62	ERW	FVS
24.73	**4704**	**Alarm dig sel 3**		ENUM		No alarm	0	62	ERW	FVS
24.74	**4706**	**Alarm dig sel 4**		ENUM		No alarm	0	62	ERW	FVS

Setting of the alarm signal to enable on a digital output. The digital output is selected using parameters **Alm dig out mon 1÷4**, which can be enabled in the **L_DIGSEL1** selection list.

0 No alarm
1 Overvoltage
2 Undervoltage
3 Ground fault
4 Overcurrent
5 Desaturation
6 MultiUndervolt
7 MultiOvercurr
8 MultiDesat
9 Heatsink OT
10 HeatsinkS OTUT
11 Intakeair OT
12 Motor OT
13 Drive overload
14 Motor overload
15 Bres overload
16 Phaseloss
17 Opt Bus fault

18 Opt 1 IO fault
19 Opt 2 IO fault
20 Opt Enc fault
21 External fault
22 Speed fbk loss
23 Overspeed
24 Speed ref loss
25 Emg stop alarm
26 Power down
27 ExtIO fault
28 FastLink fault
29 Brake fault
30 Motor pre OT
31 Mot phase loss
32 Condensation
33 Plc1 fault
34 Plc2 fault
35 Plc3 fault
36 Plc4 fault
37 Plc5 fault
38 Plc6 fault
39 Plc7 fault
40 Plc8 fault
41 Watchdog
42 Trap error
43 System error
44 User error
45 Param error
46 Load def par
47 Plc cfg error
48 Load def plc
49 Key failed
50 Encoder error
51 Opt cfg change
52 HumTempSensErr
53 Plc9 fault
54 Plc10 fault
55 Plc11 fault
56 Plc12 fault
57 Plc13 fault
58 Plc14 fault
59 Plc15 fault
60 Plc16 fault
61 Not used1
62 An inpLoss

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.75	**4720**	**Alm autoreset time**	s	FLOAT		0.0	0.0	60.0	ERW	FVS

Setting of the time interval that must pass before executing an automatic reset.

If no alarms are enabled the drive is set to restart.

If some alarms are still enabled the drive is set to execute a new attempt at automatic reset.

At each attempted reset a counter increases. If the limit set in the Alm autoreset number parameter is reached the drive is set to make no more attempts at reset and waits for a user reset.

The counter is set to zero when an automatic reset or user reset is performed and no alarms are enabled.

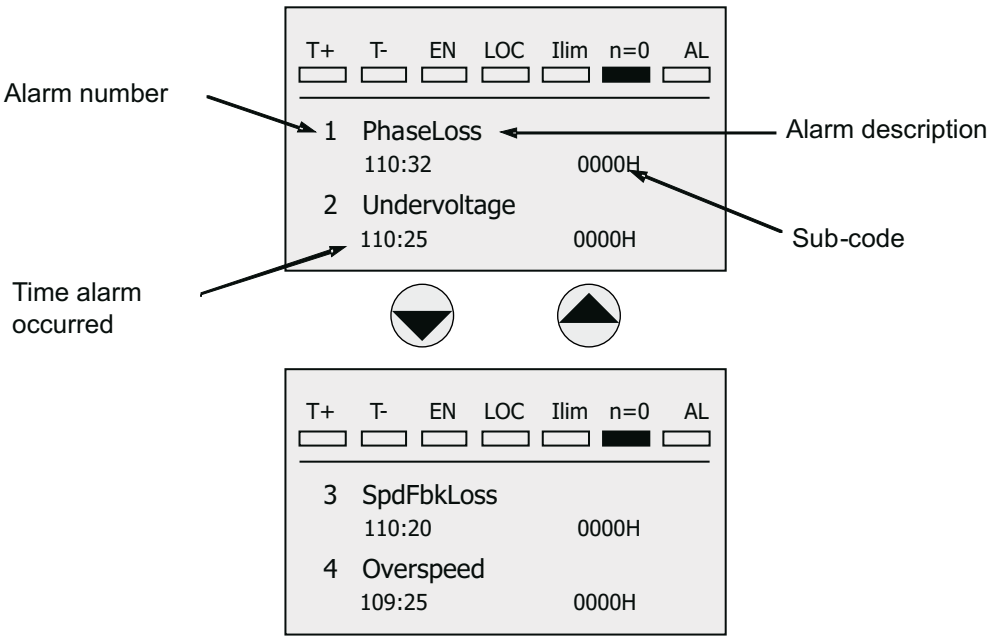
If the parameter is 0 the function is disabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.76	**4722**	**Alm autoreset number**		UINT16		20	0	100	ERW	FVS

Setting of the maximum number of attempted automatic resets.

25 – ALARM LOG

This is the menu in which the log of previous alarms is saved, with the time the alarm occurred (in relation to the **Time drive power** on parameter). The alarms are displayed starting from the most recent (No. 1) up to the furthest back in time (No. 30). Up to 30 alarm signals can be displayed. The sub-code is used by service technicians to identify the specific type of alarm. Press the ▲ and ▼ keys to scroll the screen pages of the alarm log. The alarm log cannot be deleted.



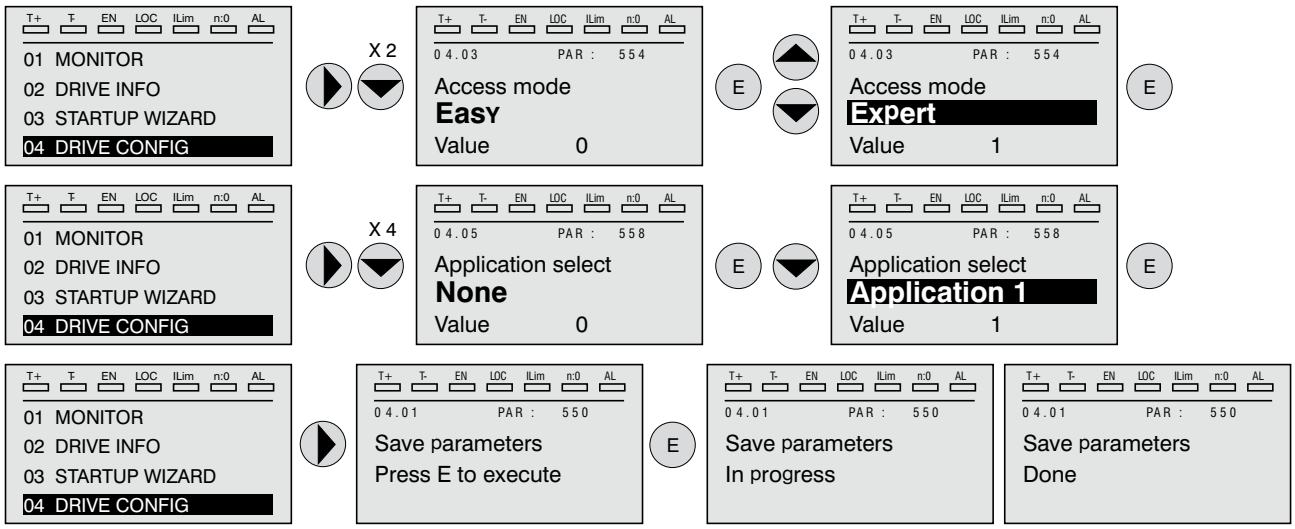
26 – APPLICATION

This menu is designed to host two applications using the MDPlc program.

The PID application is installed by default in the APPLICATION / APPLICATION 1 menu. Follow below procedure to activate PID application.

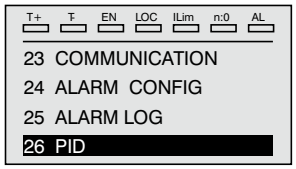
The APPLICATION / APPLICATION 2 menu is available for custom applications.

It will not be possible to use both applications simultaneously. The **558 Application select** parameter in the DRIVE CONFIG menu must be used to select between the two possible applications.



Switch the drive off and then switch it on again.

The PID menu will be available via keypad.



28 - RECIPE CONFIG

Lets you create a custom menu from the keypad (or from GF_eXpress), composed of a maximum of 20 parameters (menu 29 - RECIPE).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
28.1	**6300**	**Recipe config 1**		UINT16		0	0	0	RW	FVS
28.2	**6302**	**Recipe config 2**		UINT16		0	0	0	RW	FVS
28.3	**6304**	**Recipe config 3**		UINT16		0	0	0	RW	FVS
28.4	**6306**	**Recipe config 4**		UINT16		0	0	0	RW	FVS
28.5	**6308**	**Recipe config 5**		UINT16		0	0	0	RW	FVS
28.6	**6310**	**Recipe config 6**		UINT16		0	0	0	RW	FVS
28.7	**6312**	**Recipe config 7**		UINT16		0	0	0	RW	FVS
28.8	**6314**	**Recipe config 8**		UINT16		0	0	0	RW	FVS
28.9	**6316**	**Recipe config 9**		UINT16		0	0	0	RW	FVS
28.10	**6318**	**Recipe config 10**		UINT16		0	0	0	RW	FVS
28.11	**6320**	**Recipe config 11**		UINT16		0	0	0	RW	FVS
28.12	**6322**	**Recipe config 12**		UINT16		0	0	0	RW	FVS
28.13	**6324**	**Recipe config 13**		UINT16		0	0	0	RW	FVS
28.14	**6326**	**Recipe config 14**		UINT16		0	0	0	RW	FVS
28.15	**6328**	**Recipe config 15**		UINT16		0	0	0	RW	FVS
28.16	**6330**	**Recipe config 16**		UINT16		0	0	0	RW	FVS
28.17	**6332**	**Recipe config 17**		UINT16		0	0	0	RW	FVS
28.18	**6334**	**Recipe config 18**		UINT16		0	0	0	RW	FVS
28.19	**6336**	**Recipe config 19**		UINT16		0	0	0	RW	FVS
28.20	**6338**	**Recipe config 20**		UINT16		0	0	0	RW	FVS

Configuration parameters for creating custom menu.

Select a **Recipe config X** parameter, press **Enter** and insert the IPA of the parameter to be added to the custom list (will be available on menu 29 - RECIPE).

To remove an IPA from the list of custom menus, set the related parameter **Recipe config X** = 0.

When settings are done, use the "**Save parameters**" command on the DRIVE CONFIG menu to save in permanent memory.

29 - RECIPE

The parameters configured on menu 28 - RECIPE CONFIG. are written on the RECIPE menu (initially empty).

PARAMETERS ON SELECTION LISTS, BUT NOT DISPLAYED ON KEYPAD

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	262	**Motor speed nofilter**	FF	INT16	16	0	0	0	ER	

This parameter indicates the unfiltered motor speed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	362	**Drive overload trip**		BIT	16	0	0	1	ER	

This signal indicates that the drive is in the overload condition. In the default condition the alarm is not triggered as the relative action is set to **Ignore**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	366	**Drive overload 80**		BIT	16	0	0	1	ER	

This signal indicates that the drive has reached 80% of the thermal image accumulator (drive overload).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	626	**Ramp ref out mon**	FF	INT16	16	0	0	0	ER	

This parameter displays the reference value output of the ramp remference function block.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	760	**Ramp out mon**	FF	INT16	16	0	0	0	ER	

This parameter displays the reference value output of the ramp function block.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	764	**Ramp acc state**		BIT	16	0	0	1	ER	

This signal indicates whether the acceleration ramp is active.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	766	**SRamp dec state**		BIT	16	0	0	1	ER	

This signal indicates whether the deceleration ramp is active.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	934	**Ref is 0**		BIT	16	0	0	1	ER	

This signal is active when the reference is below the limit set in parameter **930 Reference 0 threshold**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	936	**Ref is 0 delay**		BIT	16	0	0	1	ER	

This parameter is active when the reference is below the threshold set in parameter **930 Reference 0 threshold**. The signal is enabled after the delay set with parameter **932 Reference delay 0**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	944	**Speed is 0**		BIT	16	0	0	1	ER	

This parameter is active when the speed is below the threshold set in parameter **940 Speed 0 threshold**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	946	**Speed is 0 delay**		BIT	16	0	0	1	ER	

This signal is active when the reference is below the threshold set in parameter **940 Speed 0 threshold**. The signal is activated after the delay set in parameter **942 Speed 0 delay**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	956	**Speed thr 1_2 mon**		BIT	16	0	0	1	ER	

To display the speed threshold status: if the motor speed is higher than the value set in parameter **950 Speed threshold 1** or lower than the value set in parameter **952 Speed threshold 2** this parameter assumes the value of 0.

If the motor speed is between the value of **950 Speed threshold 1** and that of **952 Speed threshold 2**, this parameter assumes the value of 1.

Use parameter **954 Speed threshold dly** to set a delay time for the transition from 0 to 1 of parameter **956 Speed thr 1_2 mon**; the transition from 1 to 0 is always immediate.

When **950 Speed threshold 1** is set to a value higher than **952 Speed threshold 2**, if the motor speed is between the thresholds this parameter assumes the value of 1. If **950 Speed threshold 1** is set to a value lower than **952 Speed threshold 2**, the threshold status is not significant

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	966	**Set speed**		BIT	16	0	0	1	ER	

This signal is active when the error between the speed reference and actual motor speed is greater than the tolerance set in parameter **962 Set speed error**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	976	**Speed thr 3 mon**		BIT	16	0	0	1	ER	

The status of the block that detects exceeding of the speed 3 threshold is displayed.

0 Actual speed below threshold
1 Actual speed above threshold

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	986	**Current thr mon**		BIT	16	0	0	1	ER	

The status of the block that detects exceeding of the current threshold is displayed.

0 Actual output current below threshold
1 Actual output current above threshold.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	1030	**Local/remote mon**		BIT	16	0	0	1	ER	

This signal is active when the drive is in the **Remote** operating mode.

0 Local
1 Remote

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	1060	**Sequencer status**		UINT16	16	0	0	0	ER	

This signal indicates the state of the “machine states” that controls drive operation.

STS_INIT	0
STS_MAGN	1
STS_STOP	2
STS_START	3
STS_FS_STOP	4
STS_FS_START	5
STS_QSTOP	6
STS_FS_MAGN	7
STS_W_QSTOP	8
STS_READY	9
STS_MAGN_START	10
STS_ALM_DISABLED	11
STS_ALM_END_ACTION	12

STS_ALM_STOP	13
STS_ALM_FSTOP	14
STS_ALM_R_TO_NORMAL	15
STS_READY_START	16
STS_READY_FSTOP	17
STS_ALM_NO_RESTART	18
STS_FS_MAGN_START	19

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	1062	**Drive OK**		BIT	16	0	0	1	ER	

This signal is active when the drive is in the “OK” condition and no alarms are present.
Connected to the relay output, the normally open relay contact closes when:
- the drive is powered
- no alarm conditions are active.

Note: in the case of parameter 4640 **UnderV restart** is set to “Enable”, signal remains at the high level if undervoltage condition disappears within the specified time in P4642.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	1064	**Drive ready**		BIT	16	0	0	1	ER	

This signal is active when the drive reference is in the “Ready” to run condition.
Connected to the relay output, the normally open relay contact closes when:
- the drive is powered
- preloading is complete
- no alarm conditions are active
- the drive is enabled
- motor magnetisation is complete.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	1110	**Digital input E mon**		BIT	16	0	0	1	ER	
	1112	**Digital input 1 mon**		BIT	16	0	0	1	ER	
	1114	**Digital input 2 mon**		BIT	16	0	0	1	ER	
	1116	**Digital input 3 mon**		BIT	16	0	0	1	ER	
	1118	**Digital input 4 mon**		BIT	16	0	0	1	ER	
	1120	**Digital input 5 mon**		BIT	16	0	0	1	ER	

These signals represent the state of the corresponding digital input.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	1210	**Digital input 1X mon**		BIT	16	0	0	1	ER	
	1212	**Digital input 2X mon**		BIT	16	0	0	1	ER	
	1214	**Digital input 3X mon**		BIT	16	0	0	1	ER	
	1216	**Digital input 4X mon**		BIT	16	0	0	1	ER	
	1218	**Digital input 5X mon**		BIT	16	0	0	1	ER	
	1220	**Digital input 6X mon**		BIT	16	0	0	1	ER	
	1222	**Digital input 7X mon**		BIT	16	0	0	1	ER	
	1224	**Digital input 8X mon**		BIT	16	0	0	1	ER	
	5510	**Digital input 9X mon**		BIT	16	0	0	1	ER	
	5512	**Digital input 10X mon**		BIT	16	0	0	1	ER	
	5514	**Digital input 11X mon**		BIT	16	0	0	1	ER	
	5516	**Digital input 12X mon**		BIT	16	0	0	1	ER	

5518	**Digital input 13X mon**	BIT	16	0	0	1	ER	
5520	**Digital input 14X mon**	BIT	16	0	0	1	ER	
5522	**Digital input 15X mon**	BIT	16	0	0	1	ER	
5524	**Digital input 16X mon**	BIT	16	0	0	1	ER	

These signals represent the state of the corresponding digital input on the expansion card..

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	1530	**Analog inp1**		BIT	16	0	0	1	ER	

This signal is active when the value of the analog input is below the threshold set in parameter **1520 Analog inp 1 thr**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
-	**1540**	**An inp 1 err mon**		BIT	16BIT	0	0	0	ER	

This parameter contains the signal of possible disconnection of the related input.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
-	**1542**	**Analog inp1>thr**		BIT	16BIT	0	0	1	ER	

This signal activates when the value of the analog input exceeds the threshold set with parameter 1520 **Analog inp 1 thr**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	1580	**Analog inp2**		BIT	16	0	0	1	ER	

This signal is active when the value of the analog input is below the threshold set in parameter **1570 Analog inp 2 thr.**

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
-	**1590**	**An inp 2 err mon**		BIT	16BIT	0	0	0	ER	

This parameter contains the signal of possible disconnection of the related input.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
-	**1592**	**Analog inp2>thr**		BIT	16BIT	0	0	1	ER	

This signal activates when the value of the analog input exceeds the threshold set with parameter 1570 **Analog inp 2 thr**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
-	**1640**	**An inp 1X err mon**		BIT	16BIT	0	0	0	ER	
-	**1690**	**An inp 2X err mon**		BIT	16BIT	0	0	0	ER	

This parameter contains the signal of possible disconnection of the related input from the optional board.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	2038	**Autophase status**		UINT32		0	0	2	ERW	

It indicates phasing procedure ended (with or without any error).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	2040	**Autophase OK**		UINT32		0	0	0	ER	

It indicates phasing procedure ended without errors.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	2388	**Torque ref nofilter**	perc	FLOAT	16	0.0	0.0	0.0	ER	

The torque control reference current without filter is displayed (in sensorless vector and field-oriented vector mode).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	2396	**Torque nofilter**	perc	FLOAT	16	0.0	0.0	0.0	ER	

Monitoring of the actual torque reference without filters.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3006	**Speed ratio out mon**	rpm	INT16	16	0	0	0	ER	

This parameter displays the value of the speed ratio used by the “Speed draw” function (speed ratio).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	2392	**Torque ref 1 mon**	perc	FLOAT	16/32	0.0	-300.0	300.0	ERW	

The total value of torque reference 1 is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3180	**Brake control mon**	rpm	INT16	16	0	0	1	ER	

This parameter displays the status of the brake command.

0 Brake closed
1 Brake open

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3192	**Brake open thr mon**	perc	FLOAT		0	0.0	0	ERS	

Brake opening threshold value. Only if **Hoist mode 2** has been selected.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3214	**Motor overload trip**		BIT	16	0	0	1	ER	

This signal is active when the drive is in the motor overload alarm condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3262	**Bres overload trip**		BIT	16	0	0	1	ER	

This signal is active when the drive is in the braking resistor overload alarm condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3442	**Powerloss rampdown**		BIT	16	0	0	1	ER	

This parameter indicates the status of the Powerloss function deceleration ramp

0 Powerloss function deceleration ramp not ended
1 Powerloss function deceleration ramp ended

The signal is enabled at the end of the Powerloss function deceleration ramp.
The signal is disabled at different times depending on the **Powerloss mode** setting.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3446	**Powerloss nextratio**		INT32	32	0	0	0	ER	

This parameter gives the ratio between the motor speed and the speed reference.
For machines with several drives, line synchronisation can be achieved by connecting the **Powerloss mode** output of the master to the **Speed ratio src** input of the slave drives. The master => slave connection can be achieved via analog signals or fieldbus.
The value 2^30 corresponds to a ratio of 1.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3448	**Powerloss nextactive**		BIT	16	0	0	1	ER	

This parameter indicates the status of the Powerloss function

0 Powerloss not enabled

1 Powerloss enabled

The function is enabled when there is a power failure.

The function is disabled at different times depending on the **Powerloss mode** setting.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3480	**Vdc ctrl ramp freeze**		BIT	16	0	0	1	ER	

This parameter displays when the deceleration ramp block is requested during the **Vdc control function**.

0 VdcCtrl function not enabled

1 VdcCtrl function enabled

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3512	**Drv thr overtemp mon**		UINT32		0	0	0	ER	

Signals that the threshold set in PAR 3504 **Drv temp thr** has been exceeded.

0 Threshold not exceeded

1 Threshold exceeded

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	3514	**Mot thr overtemp mon**		UINT32		0	0	0	ER	

Signals that the threshold set in PAR 3506 **Mot temp thr** has been exceeded.

0 Threshold not exceeded

1 Threshold exceeded

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4372	**DS402 status word**		UINT16	16	0	0	65535	ER	

This parameter displays the status word according to the DS402 profile. For more information reference should be made to the fieldbus manual.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4394	**PFdrv status word 1**		UINT16	16	0	0	65535	ER	

This parameter displays the status word 1 according to the Profidrives profile. For more information reference should be made to the fieldbus manual.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4396	**PFdrv status word 2**		UINT16	16	0	0	65535	ER	

This parameter displays the status word 2 according to the Profidrives profile. For more information reference should be made to the fieldbus manual.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4538	**KTY84/PTC current**	mA	UINT32		2	1	10	ERWS	

Value of current flowing in connected temperature sensor KTY84.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4708	**Alm dig out mon 1**		BIT	16	0	0	1	ER	

This signal is activated when the alarm configured in parameter **4700 alarm dig sel 1** is active.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4710	**Alm dig out mon 2**		BIT	16	0	0	1	ER	

This signal is activated when the alarm configured in parameter **4702 alarm dig sel 2** is active.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4712	**Alm dig out mon 3**		BIT	16	0	0	1	ER	

This signal is activated when the alarm configured in parameter **4704 alarm dig sel 3** is active.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4714	**Alm dig out mon 4**		BIT	16	0	0	1	ER	

This signal is activated when the alarm configured in parameter **4706 alarm dig sel 4** is active.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4770	**First alarm**		UINT32	16	0	0	0	ERW	

This parameter displays the first alarm to be activated.

0 No alarm
1 Overvoltage
2 Undervoltage
3 Ground fault
4 Overcurrent
5 Desaturation
6 MultiUndervolt
7 MultiOvercurr
8 MultiDesat
9 Heatsink OT
10 HeatsinkS OTUT
11 Intakeair OT
12 Motor OT
13 Drive overload
14 Motor overload
15 Bres overload
16 Phaseloss
17 Opt Bus fault
18 Opt 1 IO fault
19 Opt 2 IO fault
20 Opt Enc fault
21 External fault
22 Speed fbk loss
23 Overspeed
24 Speed ref loss
25 Emg stop alarm
26 Power down
27 ExtIO fault
28 FastLink fault
29 Brake fault
30 Motor pre OT
31 Mot phase loss
32 Condensation
33 Plc1 fault
34 Plc2 fault
35 Plc3 fault
36 Plc4 fault
37 Plc5 fault
38 Plc6 fault
39 Plc7 fault
40 Plc8 fault
41 Watchdog
42 Trap error
43 System error
44 User error
45 Param error
46 Load def par
47 Plc cfg error
48 Load def plc
49 Key failed
50 Encoder error
51 Opt cfg change
52 HumTempSensErr
53 Plc9 fault
54 Plc10 fault
55 Plc11 fault
56 Plc12 fault
57 Plc13 fault

58 Plc14 fault
59 Plc15 fault
60 Plc16 fault
61 Not used1
62 An inpLoss

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4780	**Alarm PLC**		UINT16		0	0	0	ER	

This parameter displays the state of the alarms generated by the application written with the internal MDPlc.

Bit	Description
0	1 = PLC 1 fault active
1	1 = PLC 2 fault active
2	1 = PLC 3 fault active
3	1 = PLC 4 fault active
4	1 = PLC 5 fault active
5	1 = PLC 6 fault active
6	1 = PLC 7 fault active
7	1 = PLC 8 fault active

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4840	**Alarm Io state**		UINT32	32	0	0	0	ER	

This parameter displays the state of alarms 1..32 of the drive.

Bit	Description
0	1 = Overvoltage active
1	1 = Undervoltage active
2	1 = Ground fault active
3	1 = Overcurrent active
4	1 = Desaturation active
5	1 – MultiUndervolt active
6	1 = MultiOvercurr active
7	1 – MultiDesat active
8	1 = Heatsink OT active
9	1 = Heatsink Iin OT active
10	1 = Air OT active
11	1 = Motor OT active
12	1 = Drive overload active
13	1 = Motor overload active
14	1 = Bres overload active
15	1 = Phase loss active
16	1 = Opt bus fault active
17	1 = Opt 1 I/O fault active
18	1 = Opt 2 I/O fault active
19	1 = Opt enc fault active
20	1 = External fault active
21	1 = Fbk loss active
22	1 = Overspeed active
23	1 = Ref loss active
24	1 = Emg stop alarm active
25	1 = Power down active
26	1 = not used
27	1 = not used
28	1 = not used
29	1 = not used
30	1 = not used
31	1 = not used

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	4842	**Alarm hi state**		UINT32	32	0	0	0	ER	

This parameter displays the state of alarms 33...64 of the drive.

Bit	Description
0	1 = PLC 1 fault active
1	1 = PLC 2 fault active
2	1 = PLC 3 fault active
3	1 = PLC 4 fault active
4	1 = PLC 5 fault active
5	1 = PLC 6 fault active
6	1 = PLC 7 fault active
7	1 = PLC 8 fault active

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	5800	**FL Fwd 1 inv mon**		INT32	32BIT	0	0	0	ER	
	5802	**FL Fwd 2 inv mon**		INT32	32BIT	0	0	0	ER	
	5804	**FL Fwd 3 inv mon**		INT32	32BIT	0	0	0	ER	
	5806	**FL Fwd 4 inv mon**		INT32	32BIT	0	0	0	ER	
	5808	**FL Fwd 5 inv mon**		INT32	32BIT	0	0	0	ER	
	5810	**FL Fwd 6 inv mon**		INT32	32BIT	0	0	0	ER	
	5812	**FL Fwd 7 inv mon**		INT32	32BIT	0	0	0	ER	
	5814	**FL Fwd 8 inv mon**		INT32	32BIT	0	0	0	ER	

These parameters are not used on the master drive.

On the slave drive these parameters show the value received from the previous drive. The " Inv" parameters enable the value received to be used with the opposite sign, without changing any of the data sent to subsequent slaves.

These parameters are available in the "src" analog parameter selection lists.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	6000	**Null**		UINT32	32	0	0	0	ER	

This signal forces the variable to the zero level (always disabled).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	6002	**One**		UINT32	32	1	1	1	ER	

This signal forces the variable to level one (always active).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	6004	**Speed limit state**		BIT	16	0	0	1	ER	

This signal is activated when the drive is in the speed limit condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	6006	**Current limit state**		BIT	16	0	0	1	ER	

This signal is activated when the drive is in the current limit condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
-	**6044**	**Condensation state**		UINT32		0	0	0	ER	

This signal is activated when the drive is in the condensation alarm condition. (ADV200-LC series).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
-	**6046**	**Overhumidity state**		UINT32		0	0	0	ER	

This signal is activated when the drive is in the overhumidity alarm condition. (ADV200-LC series).

C – TROUBLESHOOTING - Alarms

Note ! To reset alarms, see Quick start guide, **paragraph 6.6.1**.
In the following table, the Code is visible only from serial line.

Code	Error message shown on the display	Sub-code	Description
0	**No alarm**		**Condition:** No alarm present
1	**Overvoltage**		**Condition: DC link overvoltage alarm due to energy recovered from the motor.** The voltage arriving at the drive power section is too high compared to the maximum threshold relating to the PAR 560 **Mains voltage** parameter setting.
			Solution: - Extend the deceleration ramp. - Use a braking resistor between terminals BR1 and BR2 to dissipate the recovered energy - Use the VDC Control function
2	**Undervoltage**		**Condition:** DC link undervoltage alarm. The voltage arriving at the drive power section is too low compared to the minimum threshold relating to the PAR 560 **Mains voltage** parameter setting due to: - the mains voltage being too low or overextended voltage drops. - poor cable connections (e.g. loose contactor terminals, inductance, filter, etc.).
			Solution: Check the related connections of the drive power supply and its correct range.
3	**Ground fault**		**Condition:** Ground short circuit alarm
			Solution: - Check drive and motor wiring. - Check that the motor is not grounded.
4	**Overcurrent**		**Condition: Instantaneous overcurrent protection intervention alarm.** This may be due to the incorrect setting of current regulator parameters or a short circuit between phases or ground fault on the drive output.
			Solution: - Check the current regulator parameters - Check wiring towards the motor
5	**Desaturation**		**Condition: Instantaneous overcurrent in the IGBT bridge alarm.**
			Solution: Switch the drive off and then switch it on again. If the alarm persists, contact the technical service centre.
6	**MultiUndervolt**		**Condition:** The number of attempted automatic restarts after the **Undervoltage** alarm has exceeded the set PAR 4650 **UVRep attempts** value in the PAR 4652 **UVRep delay** time.
			Solution: Too many Undervoltage alarms. Adopt the proposed solutions for the Undervoltage alarm.
7	**MultiOvercurr**		**Condition:** 2 attempted automatic restarts after the Overcurrent alarm within 30 seconds. If more than 30 seconds pass after the Overcurrent alarm was generated, the attempt counter is reset.
			Solution: Too many Overcurrent alarms. Adopt the proposed solutions for the Overcurrent alarm.
8	**MultiDesat**		**Condition:** 2 attempted at automatic restarts after the Desaturation alarm within 30 seconds. If more than 30 seconds pass after the Desaturation alarm was generated, the attempt counter is reset.
			Solution: Too many **Desaturation** alarms. Adopt the proposed solutions for the **Desaturation** alarm.
9	**Heatsink OT**		**Condition:** Heatsink temperature too high alarm
			Solution: - Verify the correct operation of the cooling fan. - Check that the heatsinks are not clogged - Check that the openings for the cabinet cooling air are not blocked.
10	**HeatsinkS OTUT**		**Condition:** IGBT modules temperature too high or too low alarm
			Solution: - Verify the correct operation of the cooling fan. - Check that the heatsinks are not clogged - Check that the openings for the cabinet cooling air are not blocked.
11	**Intakeair OT**		**Condition:** Intake drive air temperature too high alarm.

Code	Error message shown on the display	Sub-code	Description
		Solution: **-** Check correct fan operation - Check that the heatsinks are not clogged - Check temperature in electrical panel.	
12	**Motor OT**	**Condition:** Motor overtemperature alarm. Possible causes: - Load cycle too heavy - The motor is installed in a place where the ambient temperature is too high - If the motor is provided with a blower: the fan is not working - If the motor is not provided with a blower: the load is too high at slow speeds. Cooling the fan on the motor shaft is not sufficient for this load cycle. - The motor is used at less than the rated frequency, causing additional magnetic losses.	
		Solution: - Change the processing cycle. - Use a cooling fan to cool the motor.	
13	**Drive overload**	**Condition:** Drive overload alarm. The overload threshold of the accumulator of the I^2t drive thermal image has been exceeded.	
		Solution: Check that the size of the drive is suitable for the application.	
14	**Motor overload**	**Condition:** Motor overload alarm. The current absorbed during operation is greater than that specified on the motor data plate. The overload threshold of the accumulator of the I^2t motor thermal image has been exceeded.	
		Solution: - Reduce the motor load. - Increase the size of the motor.	
15	**Bres overload**	**Condition:** Braking resistor overload alarm. The current absorbed by the resistor is greater than the rated current. The overload threshold of the accumulator of the I^2t braking resistor thermal image has been exceeded.	
		Solution: Increase the Watt value of the braking resistor	
16	**Phaseloss**	**Condition:** Power phase loss alarm.	
		Solution: Check the mains voltage and whether any protections upstream of the drive have been tripped.	
17	**Opt Bus fault**	**Condition:** Error in the configuration stage or communication error.	
		XXX0H-X	If the first digit to the left of "H" in the alarm sub-code is 0, the error regards a communication problem.
		XXXXH-X	If the first digit to the left of "H" in the alarm sub-code is other than 0, the error regards a configuration problem.
		Solution: For configuration errors, check the configuration of the bus communication, type of bus, baudrate, address, parameter setting. For communication errors verify wiring, resistance of terminations, interference immunity, timeout settings. For further details, please refer to the user guide for the specific bus.	
18	**Opt 1 IO fault**	**Condition:** Error in the communication between Regulation and I/O expansion card in slot 1	
		Solution: Check that it has been inserted correctly, see chapter 10.5 ADV200 QS manual.	
19	**Opt 2 IO fault**	**Condition:** Error in the communication between Regulation and I/O expansion card in slot 2 or 3	
		Solution: Check that it has been inserted correctly, see chapter 10.5 ADV200 QS manual.	
20	**Opt Enc fault**	**Condition:** Error in the communication between Regulation and Encoder feedback card.	
		Solution: Check that it has been inserted correctly, see chapter 10.5 ADV200 QS manual.	
21	**External fault**	**Condition:** External alarm present. A digital input has been programmed as an external alarm, but the +24V voltage is not available on the terminal.	
		Solution: Check that the terminal screws are tight	
22	**Speed fbk loss**	**Condition:** Speed feedback loss alarm. The encoder is not connected, not connected properly or not powered: verify encoder operation by selecting the **Motor speed** parameter in the MONITOR menu.	

Code	Error message shown on the display	Sub-code	Description
		Solution: - Check encoder wiring for integrity. - Check that the encoder is connected to the power supply. - With the drive disabled, turn the motor clockwise (seen from the motor shaft side). A positive value must be displayed. - If the value does not change or values are indicated randomly, check the encoder power supply and cables. - If the value displayed is negative, invert the encoder connections. Change channel A+ and A- or B+ and B-. - Check that the encoder electronics are consistent with those of the relative expansion card. - Generated in case of an encoder fault. Each type of encoder generates a "Loss of feedback" alarm differently. See parameter 2172 **SpdFbkLoss code** for information about the cause of the alarm and chapter C.1 Speed fbk loss alarm.	
23	**Overspeed**	**Condition:** Motor overspeed alarm. The motor speed exceeds the limits set in the PAR 4540 **Overspeed threshold** parameter.	
		Solution: - Limit the speed reference. - Check that the motor is not driven in overspeed during rotation.	
24	**Speed ref loss**	**Condition: Speed reference loss alarm;** occurs if the difference between the speed regulator reference and the actual motor speed is more than 100 rpm. This condition occurs because the drive is in the current limit condition. It is only available in the Flux Vect OL and Flux Vect OC mode.	
		Solution: - Check the drive load conditions - Check the number of encoder impulses	
25	**Emg stop alarm**	**Condition:** Emergency stop alarm. The Stop key on the keypad was pressed with the PAR 1008 **Stop key mode** parameter set to **EmgStop&Alarm.** Active in remote control mode (PAR 1012=1) both by using "Terminals" command or "Digital" commands and, in local control mode (PAR 1012=0) by using "Terminals" command.	
		Solution: Eliminate the reason for which the Stop key on the keypad was pressed and reset the drive.	
26	**Power down**	**Condition:** The drive was enabled with no supply voltage at the power section.	
		Solution: Check the drive power supply	
27	**ExtIO fault**	**Condition: Communication fault with the external module.**	
		Solution: See paragraph "C-2 "ExtIO fault" Alarm" on page 209	
28	**FastLink fault**	**Condition: FastLink communication fault**	
		Solution: See paragraph "C-3 "Fastlink" Alarm" on page 210	
29	**Brake fault**	**Condition: Incorrect setting of brake control function parameters.**	
		Solution: See menu 22.12 - FUNCTIONS/BRAKE CONTROL	
30	**Motor pre OT**	**Condition:** Motor overtemperature prealarm. % value of threshold compared to PAR 4532 **MotorOT thr,**	
		Solution: **- Value set too low for duty cycle** **- Heavy duty cycle**	
31	**Mot phase loss**	**Condition: Output phase loss.**	
		Solution: Check Drive/motor connection.	
32	**Condensation**	**Condition:** Condition:There may be problem of condensation inside the ADV200-LC drive series. Working condition (combination of ambient temperature, Humidity level and temperature of the cooling liquid) is not safe,	
		Solution: Safe conditions are obtained when the work point is under the respective curve indicated in the drawing of chapter 22.18 FUNCTION/LC CONTROL. Otherwise, you have to take adequate precautions to lower the ambient temperature and/or the relative humidity or to raise the cooling liquid temperature.	
33 ... 40	**Plc1 fault** **...** **Plc8 fault**	**Condition:** Enabled application developed in the IEC 61131-3 environment has found the conditions for generating this specific alarm to be true. The meaning of the alarm depends on the type of application. For more information, refer to the documentation concerning the specific application..	
		XXXXH-X	The XXXXH-X code indicates the reason for the error: make a note of this to discuss it with the service centre.
		Solution: Refer to the documentation concerning the enabled application.	

Code	Error message shown on the display	Sub-code	Description
41	**Watchdog**	**Condition:** may occur during functioning when the watchdog protection of the micro is activated; the alarm is inserted in the alarm list and alarm log. After this alarm: - the drive automatically runs a reset - motor control is not available.	
		XXXXH-X	The XXXXH-X code indicates the reason for the error: take note for examination with the service centre.
		Solution: If the alarm was a consequence of a variation to the drive configuration (parameter setting, installation of an option, downloading of a PLC application), remove it. Switch the drive off and then switch it on again.	
42	**Trap error**	**Condition:** this condition can occur during operation when the trap micro protection is enabled; the alarm is included in the list of alarms and alarm log. After this alarm: - the drive automatically runs a reset - motor control is not available.	
		XXXXH-X	The XXXXH-X code (SubHandler-Class) indicates the reason for the error: take note for examination with the service centre.
		Solution: If the alarm was a consequence of a variation to the drive configuration (parameter setting, installation of an option, downloading of a PLC application), remove it. Switch the drive off and then switch it on again.	
43	**System error**	**Condition:** this condition can occur during operation when the operating system protection is enabled; the alarm is included in the list of alarms and alarm log. After this alarm: - the drive automatically runs a reset - motor control is not available.	
		XXXXH-X	The XXXXH-X code (Error-Pid) indicates the reason for the error: take note for examination with the service centre.
		Solution: If the alarm was a consequence of a variation to the drive configuration (parameter setting, installation of an option, downloading of a PLC application), remove it. Switch the drive off and then switch it on again.	
44	**User error**	**Condition:** this condition can occur during operation when the software protection is enabled; the alarm is included in the list of alarms and alarm log. After this alarm: - the drive automatically runs a reset - motor control is not available.	
		XXXXH-X	The XXXXH-X (Error-Pid) code indicates the reason for the error: make a note of this to discuss it with the service centre.
		Solution: If the alarm was a consequence of a variation to the drive configuration (parameter setting, installation of an option, downloading of a PLC application), remove it. Switch the drive off and then switch it on again.	
45	**Param error**	**Condition:** if an error occurs during the enabling of the parameter database saved in the Flash memory; the alarm is included in the list of alarms and alarm log.	
		XXXH-X	The code XXXXH-X indicates the IPA of the parameter that has been set outside the range allowed when the database is enabled.
		Solution: Set the parameter causing the error to a value within the range and run **Save parameter**. Switch the drive off and then switch it back on again. If the IPA of the parameter is not shown in the manual, contact the service centre.	
46	**Load default**	**Condition:** this can occur during loading of the parameter database saved in the Flash memory it is normal if it appears in the following conditions: the first time the drive is switched on, when a new version of the firmware is downloaded, when the regulation is installed on a new size, when a new region is entered. If this message appears when the drive is already in use it means there has been a problem in the parameter database saved in the Flash memory. If this message is displayed the drive restores the default database, i.e. the one downloaded.	
		0001H-1	The database saved is not valid
		0002H-2	The database saved is not compatible
		0003H-3	The saved database refers to a different size and not to the current size
		0004H-4	The saved database refers to a different region and not to the current region
		Solution: Set the parameters to the desired value and run Save parameter	
47	**Plc cfg error**	**Condition:** this can occur during loading of the MDPLC application The Mdplc application present on the drive is not run.	
		0004H-4	The application that has been downloaded has a different Crc on the DataBlock and Function table.

Code	Error message shown on the display	Sub-code	Description
		0065H-101	The application that has been downloaded has an invalid identification code (Info).
		0066H-102	The applciation that has been downloaded uses an incorrect task number (Info).
		0067H-103	The application that has been downloaded has an incorrect software configuration.
		0068H-104	The application that has been downloaded has a different Crc on the DataBlock and Function table.
		0069H-105	A Trap error or System error has occurred. The drive has automatically executed a Power-up operation. Application not executed. See the Alarm List for more information about an error that has occurred.
		006AH-106	The application that has been downloaded has an invalid identification code (Task).
		006BH-107	The application that has been downloaded uses an incorrect task number (Task).
		006CH-108	The application that has been downloaded has an incorrect Crc (Tables + Code)
		Solution: Remove the MDPLC application or download a correct MDPLC application.	
48	**Load def plc**	**Condition:** this can occur during loading of the parameter database saved in the Flash memory of the MDPLC application it is normal if it appears the first time the drive is switched on, after downloading a new application. If this message appears when the drive is already in use it means there has been a problem in the parameter database saved in the Flash memory. If this message appears the drive automatically runs the Load default command.	
		0001H-1	The database saved is not valid
		Solution: Set the parameters to the desired value and run Save parameter.	
49	**Key failed**	**Condition:** Shis may occur at drive power-on if the incorrect enabling key was inserted for a given firmware function.	
		0001H-1	Incorrect PLC key. PLC application not available.
		Solution: Ask Gefran for the correct key to enable the desired firmware function.	
50	**Encoder error**	**Condition:** this condition may occur when the drive is powered during encoder setup each time parameter 552 **Regulation mode** is set.	
		100H-256	An error occurred during setup; the information received from the encoder is not reliable. If the encoder is used for feedback the **Speed fbk loss** [22] alarm is also generated.
		Solution: Take the recommended action for the **Speed fbk loss** [22] alarm.	
		200H-512	Cause: The firmware on the optional encoder card is incompatible with that on the regulation card. The information received from the encoder is not reliable
		Solution: Contact Gefran in order to update the firmware on the optional encoder card.	
51	**Opt cfg change**	**Condition**: this may occur when powering the drive if an expansion card has been removed or replaced or the incorrect enable key is inserted for a given firmware function.	
		0064H-100	Card removed from slot 1.
		0014H-20	Card removed from slot 2
		0003H-3	Card removed from slot 3
		0078H-120	Card removed from slot 1 and from slot 2
		0067H-103	Card removed from slot 1 and from slot 3.
		0017H-23	Card removed from slot 2 and from slot 3.
		007BH-123	Card removed from slot 1, from slot 2 and from slot 3
		Solution: Check the hardware configuration, then press ESC. Save the parameters (**Save parameters**, menu 04.01 par 550) to save the new hardware configuration.	
52	**HumTempSensErr**	**Condition**: Disconnection or short circuit of the humidity sensor built into the ADV200-LC drive.	
		0x0	No error.
		0x1	Communication error on humidity / temperature sensor
		0x2	Error on NTC temperature sensor for temperature of liquid flowing into heatsink
		0x3	Communication error and NTC temperature sensor
		Solution: Reset the drive. If the problem persists, contact Gefran Customer Service.	

Code	Error message shown on the display	Sub-code	Description
53 ... 60	Plc9 fault ... Plc16 fault	**Condition:** Enabled application developed in the IEC 61131-3 environment has found the conditions for generating this specific alarm to be true. The meaning of the alarm depends on the type of application. For more information, refer to the documentation concerning the specific application..	
		XXXXH-X	The XXXXH-X code indicates the reason for the error: make a note of this to discuss it with the service centre.
		Solution: Refer to the documentation concerning the enabled application.	
61	Not Used1		
62	An inpLoss	**Condition:** Occurs when: • the input signal is below 0.1V or 4-20mA • the KTY84 sensor short-circuits or disconnect	
		Solution: Check the wiring.	

C.1 Speed fbk loss alarm according to the type of feedback

Note ! To interpret the causes of the alarm correctly, read the parameter 17.30 **SpdFbkLoss code**, PAR 2172, as described below.

Take the digits of the number in hexadecimal format and enter them in the table below:

	D7..D4	D3	D2	D1	D0
Value					

For each D0, D1, D2, D3 value other than 0x0 (0x0 = no alarm active)search for the sub-values it can be divided into in the table below.

D0 D1 D2 D3				
0x0	0x0	0x0	0x0	0x0
0x1	0x0	0x0	0x0	0x1
0x2	0x0	0x0	0x2	0x0
0x3	0x0	0x0	0x2	0x1
0x4	0x0	0x4	0x0	0x0
0x5	0x0	0x4	0x0	0x1
0x6	0x0	0x4	0x2	0x0
0x7	0x0	0x4	0x2	0x1
0x8	0x8	0x0	0x0	0x0
0x9	0x8	0x0	0x0	0x1
0xA	0x8	0x0	0x2	0x0
0xB	0x8	0x0	0x2	0x1
0xC	0x8	0x4	0x0	0x0
0xD	0x8	0x4	0x0	0x1
0xE	0x8	0x4	0x2	0x0
0xF	0x8	0x4	0x2	0x1

In the table regarding the type of encoder in use, search for the sub-values obtained from each D0, D1, D2, D3 digit in the corresponding columns Value.D0, Value.D1, Value.D2, Value.D3.

Example with Endat encoder:

PAR 2172 = A0H

Take the digits of the number in hexadecimal format and enter them in the table below:

	D7..D4	D3	D2	D1	D0
Value				0xA	0x0

For each D0, D1, D2, D3 value other than 0x0 search for the sub-values it can be divided into in table 1.

D0 D1 D2 D3				
0x0	0x0	0x0	0x0	0x0
0x1	0x0	0x0	0x0	0x1
0x2	0x0	0x0	0x2	0x0
0x3	0x0	0x0	0x2	0x1
0x4	0x0	0x4	0x0	0x0
0x5	0x0	0x4	0x0	0x1
0x6	0x0	0x4	0x2	0x0
0x7	0x0	0x4	0x2	0x1
0x8	0x8	0x0	0x0	0x0
0x9	0x8	0x0	0x0	0x1
0xA	0x8	0x0	0x2	0x0
0xB	0x8	0x0	0x2	0x1
0xC	0x8	0x4	0x0	0x0
0xD	0x8	0x4	0x0	0x1
0xE	0x8	0x4	0x2	0x0
0xF	0x8	0x4	0x2	0x1

For each D0, D1, D2, D3 value other than 0x0 search for the sub-values it can be divided into in table 1.

In the table regarding the type of encoder in use, search for the sub-values obtained from each D0, D1, D2, D3 digit in the corresponding columns Value.D0, Value.D1, Value.D2, Value.D3

Value.D1 = 2H

Cause: (CRC_CKS_P)disturbed SSI signals cause a CKS error or Parity.

Valore.D1 = 8H

Cause: (DT1_ERR) Encoder has detected a malfunction and signals this to the drive via Error bit. Bits 16..31 contain the type of malfunction detected by the encoder.

- **Speed fbk loss [22] alarm with digital incremental encoder**

Bit	Value					Name	Description
	D7.. D4	D3	D2	D1	D0		
0					**0x1**	**CHA**	**Cause:** no impulses or disturbance on incremental channel A.
							Solution: Check the connection of the encoder-drive channel A, check the connection of the screen, check the encoder supply voltage. Check parameters 2102 **Encoder 1 supply** and 2104 **Encoder 1 input cfg** (if encoder 1 is used). Check parameters 5102 **Encoder 2 supply** and 5104 **Encoder 2 input cfg** (if encoder 2 is used).
1					**0x2**	**CHB**	**Cause:** no impulses or disturbance on incremental channel B.
							Solution: Check the connection of the encoder-drive channel B, check the connection of the screen, check the Encoder 1 supply voltage. Check parameters 2102 **Encoder 1 supply** and 2104 **Encoder 1 input cfg** (if encoder 1 is used). Check parameters 5102 **Encoder 2 supply** and 5104 **Encoder 2 input cfg** (if encoder 2 is used).
2					**0x4**	**CHZ**	**Cause:** no impulses or disturbance on incremental channel Z.
							Solution: Check the connection of the encoder-drive channel Z, check the connection of the screen, check the Encoder 1 supply voltage. Check parameters 2102 **Encoder 1 supply** and 2104 **Encoder 1 input cfg** (if encoder 1 is used). Check parameters 5102 **Encoder 2 supply** and 5104 **Encoder 2 input cfg** (if encoder 2 is used).

- **Speed fbk loss [22] alarm with sinusoidal incremental encoder**

Bit	Value					Name	Description
	D7.. D4	D3	D2	D1	D0		
3					0x8	MOD_ INCR	**Cause:** voltage level not correct or disturbance on signals of incremental channels A-B.
							Solution: Check the connection of the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**, check parameter 2108 **Encoder 1 signal Vpp.**

- **Speed fbk loss [22] alarm with SinCos encoder**

Bit	Value					Name	Description
	D7.. D4	D3	D2	D1	D0		
3					0x8	MOD_ INCR	**Cause:** voltage level not correct or disturbance on signals of incremental channels A-B.
							Solution: Check the connection of the the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**, check parameter 2108 **Encoder 1 signal Vpp**.
4				0x1	0x0	MOD_ABS	**Cause:** voltage level not correct or disturbance on signals of absolute SinCos channels.
							Solution: Check the connection of the the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**, check parameter 2108 **Encoder 1 signal Vpp**.

- **Speed fbk loss [22] alarm with SSI absolute encoder**

Bit	Value					Name	Description
	D7.. D4	D3	D2	D1	D0		
3					0x8	MOD_ INCR	**Cause:** voltage level not correct or disturbance on signals of incremental channels A-B.
							Solution: Check the connection of the the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**, check parameter 2108 **Encoder 1 signal Vpp**.
5				0x2	0x0	CRC_ CKS_P	**Cause:** SSI signals not present or disturbed.
							Solution: Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**, check parameter 2112 **Encoder 1 SSI bits**.
8			0x1	0x0	0x0	Setup error	**Cause:** An error occurred during setup.
							Solution: Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**, check parameter 2112 **Encoder 1 SSI bits**.

- **Speed fbk loss [22] alarm with EnDat absolute encoder**

Bit	Value					Name	Description
	D7.. D4	D3	D2	D1	D0		
3					0x8	MOD_ INCR	**Cause: v**oltage level not correct or disturbance on signals of incremental channels A-B.

Bit	Value					Name	Description
	D7.. D4	D3	D2	D1	D0		
							Solution: Check the connection of the the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**, check parameter 2108 **Encoder 1 signal Vpp**.
5				**0x2**	**0x0**	**CRC_ CKS_P**	**Cause:** SSI signals not present or disturbed cause an error on CRC
							Solution: Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**.
8			**0x1**	**0x0**	**0x0**	**Setup error**	**Cause:** An error occurred during setup.
							Solution: Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**.

The following conditions occur while resetting the encoder following **Speed fbk loss** [22] activation

Bit	Value					Name	Description			
	D7.. D4	D3	D2	D1	D0					
6				**0x4**	**0x0**	**ACK_TMO**	**Cause:** SSI signals not present or disturbed cause an error on CRC			
							Solution: Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**.			
7				**0x8**	**0x0**	**DT1_ERR**	**Cause:** Encoder has detected malfunction and signals this to the drive via bit DT1. Bits 16..31 contain the type of malfunction detected by the encoder.			
							Solution: See the encoder manufacturer's technical guide.			
16.31	**xxxx**						**Bit**		**=0**	**=1**
							0	Light source	OK	Failure (1)
							1	Signal amplitude	OK	Erroneous (1)
							2	Position value	OK	Erroneous (1)
							3	Over voltage	NO	Yes (1)
							4	Under voltage	NO	Under voltage supply (1)
							5	Over current	NO	Yes (1)
							6	Battery	OK	Change the battery (2)
							7..15			
							(1) Can also be set after the power supply is switched off or on. (2) Only for battery-buffered encoders			

- **Speed fbk loss [22] alarm with Hiperface absolute encoder**

Bit	Value					Name	Description
	D7.. D4	D3	D2	D1	D0		
3					**0x8**		**Cause:** voltage level not correct or disturbance on signals of incremental channels A-B.
							Solution: Check the connection of the the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**, check parameter 2108 **Encoder 1 signal Vpp**.
5				**0x2**	**0x0**		**Cause:** disturbed SSI signals cause a CKS error or Parity
							Solution: Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**.
6				**0x4**	**0x0**		**Cause:** Encoder does not recognise the command that has been sent to it and replies with ACK. The SSI signals not present cause a TMO error.

Bit	Value					Name	Description
	D7.. D4	D3	D2	D1	D0		
							Solution: Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply.**
8			**0x1**	**0x0**	**0x0**		**Cause:** An error occurred during setup.
							Solution: Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder 1 supply**.

The following conditions occur while resetting the encoder following **Speed fbk loss** [22] activation.

Bit	Value					Name	Description		
	D7.. D4	D3	D2	D1	D0				
7				**0x8**	**0x0**	**DT1_ERR**	**Cause:** Encoder has detected malfunction and signals this to the drive via Error bit. Bits 16..31 contain the type of malfunction detected by the encoder.		
							Solution: See the encoder manufacturer's technical guide.		
16.31	**xxxx**						**Type**	**Code**	**Description**
							Transmis-sion	09h	Transmitted parity bit is incorrect
								0AH	Checksum of transmitted data is wrong
								0BH	Incorrect command code
								0CH	Wrong number of transmitted data
								0DH	Illegal transmitted command argument
								0FH	Wrong access authorization specified
								0EH	Selected field has READ ONLY status
								10H	Data field (re) definition not executable due to field size
								11H	Specified address is not available in selected field
								12H	Selected field does not yet exist
								00H	No encoder error, no error message
								03H	Data field operations disabled
								04H	Analog monitoring inoperative
								08H	Counting register overflow
								01H	Encoder analog signals are unreliable
								02H	Wrong synchronisation or offset
								05H-07H	Encoder-internal hardware fault, no operation possible
								1CH-1DH	Error in sampling, no operation possible
								1EH	Permissible operation temperature is exceeded

- **Speed fbk loss [22] alarm with Resolver**

Code	Name	Error description	Possible solution
0x00000001	D0 FAULT REGISTER	Configuration parity error	Reset Resolver card
0x00000002	D1 FAULT REGISTER	Phase error exceeds phase lock range	
0x00000004	D2 FAULT REGISTER	Velocity exceeds maximum tracking rate	
0x00000008	D3 FAULT REGISTER	Tracking error exceeds LOT (Loss of Signal) threshold	
0x00000010	D4 FAULT REGISTER	SIN/COS inputs exceed DOS (Degradation of signal) mismatch threshold	Check the connection of the Resolver input pins (SIN-,SIN+,COS-,COS+), check PAR 2128
0x00000020	D5 FAULT REGISTER	SIN/COS inputs exceed DOS (Degradation of signal) over range threshold	Check the connection of the Resolver input pins (SIN-,SIN+,COS-,COS+), check PAR 2126
0x00000040	D6 FAULT REGISTER	SIN/COS inputs below LOS (Loss of Signal) threshold	Check the connection of the Resolver input pins (SIN-,SIN+,COS-,COS+), check PAR 2124
0x00000080	D7 FAULT REGISTER	SIN/COS inputs clipped	Check if any of the Resolver input pins (SIN-,SIN+,COS-,COS+) are shorted with power input or ground of the resolver board

C.1.1 Reset Speed fbk loss alarm

The reasons for activating the **Speed fbk loss** alarm and the information acquired by the encoder are shown in parameter 2172 **SpdFbkLoss code.**

If no card has been installed the **Speed fbk loss** [22] alarm is generated and no cause is displayed in parameter 2172 **SpdFbkLoss code**. Several causes may be present at the same time.

If no card is recognised, the system runs a routine that always returns **Speed fbk loss** [22] active without specifying a cause.

C.1.2 Encoder error alarm

Setup is performed each time the drive is turned on, regardless of the regulation mode that has been selected. If an error is detected during setup the **Encoder error** alarm is generated with the following codes:

Bit	Value					Name	Description
	D7.. D4	D3	D2	D1	D0		
8			**0x1**	**0x0**	**0x0**	**Setup error**	**Cause:** An error occurred during setup. When this has been signalled the information obtained from the encoder is not reliable.
							Solution: Take the action recommended for **Speed fbk loss** [22] alarm according to the type of encoder.
9			**0x2**	**0x0**	**0x0**	**Compatibility error**	**Cause:** Firmware on option card incompatible with firmware on regulation card. When this has been signalled the information obtained from the encoder is not reliable.
							Solution: Contact Gefran in order to update the firmware on the optional card.

C-2 “ExtIO fault” Alarm

The drive may generate an “ExtIO fault” alarm for a series of reasons. At drive startup there may be problems with configuration, associated with the EXP-FL-XCAN-ADV card or parameter settings. During the Config phase the alarm might depend on an SDO communication error. During the Control phase the HeartBeat or NodeGuarding protocol might fail due to an interruption in the communication with the slave. An Emergency message sent by the slave could generate the “ExtIO fault” alarm.

Each reason for the alarm can be identified by to the associated subcode.

The table below shows information about the subcodes and how to associate these with the cause of the alarm, to enable troubleshooting and proper use of the system.

Subcode		Description	Remarks
0	0	BusLoss	Loss of communication in the Operational state
1..51	1h..35h	SDO error	Error sending the SDO. See the SDO Configuration Table on appendix to identify the object with the problem
200	0xC8	CAN error	Internal hardware fault; if the problem cannot be solved, replace the regulation card
202	0xCA	Config error	The number or I/Os in the slave module has changed. Check parameter 5482 **External IO info**. Save the parameters to store the current configuraiton.
203	0xCB	Lost Messages	TPDOs coming from the slave too frequently. Check that the slave meets CAN-open specifications for TPDO sending times
204	0xCC	Opt IO installed	An optional internal I/O expansion card has been installed. The EXP-XCAN-ADV card functions are not available.
255..65535	0xFF..0xFFFF	Slave Emergency	Emergency message sent by the slave.

If the alarm is due to an Emergency message sent by the slave, the subcode contains the error code (Error code low and Error code Hi) of the message, while 4 of the 5 additional bytes in the message are shown by parameter 5486 **External IO Failcode**.

Emergency message content:

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Error code Low	Error code Hi	Error register	Info 0	Info 1	Info 2	Info3	Info4
Subcode	PAR 5486 **External IO Failcode**						

See the slave manual for information about the meaning of the Emergency message.

C-3 “Fastlink” Alarm

Reasons why the FastLink alarm is generated:

Bit					Name	Description
	D3	D2	D1	D0		
0				0x1	Cks	**Cause:** The drive has detected a checksum error
						Solution: Take all the necessary precautions to increase the resistance of the drive to disturbance
1				0x2	Not used	**Cause:**
						Solution:
2				0x4	Not used	**Cause:**
						Solution:
3				0x8	Not used	**Cause:**
						Solution:
4			0x1		Not used	**Cause:**
						Solution:
5			0x2		RX Timeout	**Cause:** The slave drive has not received a new data frame for 2 consecutive cycles.
						Solution: Take all the necessary precautions to increase the resistance of the drive to disturbance
6			0x4		Pwm sync slave	**Cause:** On the slave drives there is a problem with the function that enables the generation of Pwm signals to be synchronised with the Pwm signals of the master and with the function that enables the execution of control tasks to be synchronised with execution of control tasks by the master. An error exceeding the maximum error allowed has been detected for 4 consecutive cycles.
						Solution: Take all the necessary precautions to increase the resistance of the drive to disturbance
7			0x8		Cable open	**Cause:** No optical fibre.
						Solution: Check connection with optical fibre.
8		0x1			Setup error	**Cause:** An error occurred during setup; the information received from the FastLink is not reliable.
						Solution: Check setting of FastLink parameters.
9		0x2			Compatibility error	**Cause:** The firmware on the optional FastLink card is incompatible with that on the regulation card.
						Solution: Contact Gefran in order to update the firmware on the optional fastlink card.
10		0X4			Slave answer NOK	**Cause:** situation in which an interrogated Slave does not reply
						Solution: check FastLink connection

D – MESSAGES

Note ! For more information see Quick start guide, **chapter 6.7**.

Index	Error message shown on the display	Sub-code	Description
1	**Load default param**	**Condition:** may occur during loading of the parameter database saved in flash normally appears in the following conditions: at initial power-on when a new firmware version is downloaded, when the regulation is installed on a new size, when the region is changed. If this message is displayed when the drive is already operating, this means that a problem has occurred in the parameter database saved in Flash. If this message is displayed the drive restores the default database, i.e. the one downloaded.	
		0001H-1	The database saved is not valid
		0002H-2	The database saved is not compatible
		0003H-3	The database saved refers to a different size from the current size
		0004H-4	The database saved refers to a different region from the current region
		Solution: Set the parameters to the value required and perform **Save parameter**	
2 3 4	**Option detect slot 1** **Option detect slot 2** **Option detect slot 3**	**Condition:** at power-on, the drive recognizes the presence of an optional card in one of the three expansion slots. One of the three messages is shown on the display	
		0H-0	None
		0004H-4	Can/DeviceNet
		00FFH-255	Unknown
		0104H-260	Profibus
		0204H-516	Rte
		0208H-520	Enc 3 EXP-SESC- I1R1F2-ADV
		0301H-769	I_O_1
		0308H-776	Enc 4 EXP-EN/SSI- I1R1F2-ADV
		0408H-1032	Enc 5 EXP-HIP- I1R1F2-ADV
		0608H-1544	Enc 1 EXP-DE-I1R1F2-ADV
		0701H-1793	I_O_2
		0108H-1800	Enc 2 EXP-SE-I1R1F2-ADV
		0808H-2056	Enc 7 EXP-DE-I2R1F2-ADV
		0901H-2305	I_O_3
		0D01H-3329	I_O_4
		0508H-1288	Enc 6 EXP-RES-I1R1-ADV
		908H-2312	Enc 8 EXP-ASC-I1-ADV
		Solution:	
5	**Autotune**	**Condition:** this may occur during the **Autotune** procedure	
		0	No error
		1	The commands are not configured in Local mode.
			Solution: Execute the requested configuration
		2	The Commands local sel parameter has not been configured from the keypad
			Solution: Execute the requested configuration
		3	The motor plate data parameters have changed but the **Take parameters** command, PAR 2020, has not been executed
			Solution: Execute the **Take parameters** command.
		4	Error in motor connection.
			Solution:Check the motor connection, set the value of the direct current of the motor to 1/3 and perform the motor autotune procedure. Then increase the direct current until autotuning is executed. The penultimate value is the nominal current value at which the drive performs autotuning.
		5	While running self-tuning the ESC key was pressed or the enable contact was opened or an alarm occurred. The **Autotune** command was sent with the drive in the alarm condition
			Solution: Eliminate the reason for the alarm, remove the reason for the opening of the enable contact, reset alarms.
		6	A setting performed by the **Autotune** function produced a parameter value outside the min or max range.
			Solution: Check the motor plate data or drive and motor sizes have been combined incorrectly.
		7	The **Autotune** command was sent without being enabled.
			Solution: Close the enable contact before sending the **Autotune** command

Index	Error message shown on the display	Sub-code	Description
		8	Internal calculation error concerning IGBT control
			Solution: Perform autotuning once more, if the problem persists, contact the Gefran technical support centre.
		9	The drive has measured a stator resistance value exceeding the set limit.
			Solution: contact the Gefran technical support centre.
		10	The drive has measured a stator resistance value below the set limit.
			Solution: contact the Gefran technical support centre.
		11-12	Measurement of DTL internal compensation voltage outside accepted range.
			Solution: check connection between drive and motor. If correct, the drive is faulty, contact the Gefran technical support centre.
		13-14	Measurement of DTS internal voltage outside accepted range.
			Solution: check connection between drive and motor. If correct, the drive is faulty, contact the Gefran technical support centre.
		15 - 16 -17	LS leakage inductance value outside accepted range.
			Solution: Perform autotuning once more, if the problem persists, contact the Gefran technical support centre.
		18-19	Measurement of Im magnetising current outside accepted range.
			Solution: Perform autotuning once more, if the problem persists, contact the Gefran technical support centre.
		20-21	Measurement of Rr rotor resistor outside accepted range.
			Solution: Perform autotuning once more, if the problem persists, contact the Gefran technical support centre.
		Solution: If the message appears with a value other than 0, follow the instructions supplied for each particular case and repeat **Autotune**. This should be performed using the wizard function available from the keypad (STARTUP WIZARD) and the Tool software on the PC. Pay attention to all motor plate data parmaeters, especially: - **Rated speed**, **Motor rated speed** in rpm. - **Rated frequency**, **Motor rated frequency** in Hz - **Pole pairs**, **Motor pole pairs** Take care not to set the **Rated speed** parameter to the synchronous speed. The value of the **Rated speed** parameter must be less than: [(**Rated frequency** * 60) / **Pole pairs**]. If the problem persists even after following the instructions supplied, confirm the values of the motor plate data parameters, execute the **Take parameters** command but not **Autotune**.	
6	**Power config**	**Condition:** may occur during recognition of power cards. If this message is displayed, it is not possible to drive the motor.	
		0020H-32	The power card is configured for a drive that is incompatible with the regulation card
		0021H-33	The configuration of the power card is not compatible with the regulation card
		0017H-23	The configuration required is not available on the power card
		Solution: Download the correct configuration on the power card	
7	**Save par failed**	**Condition:** during transfer of the parameters from the drive to the memory of the keypad	
		0H-0	Communication error
		0025H-37	The data saved on the keypad are not valid
		0026H-38	Incompatible drive series
		0027H-39	Incompatible software version
		0028H-40	Incompatible drive size
		0029H-41	Error during saving of parameters on the drive
		Solution:	
8 **9**	**Load par failed** **Load par incomplete**	**Condition:** during transfer of the parameters from the memory of the keypad to the drive	
		0H-0	Communication error
		0025H-37	The data saved on the keypad are not valid. No parameter is transferred from the keypad to the drive
		0026H-38	Incompatible control type. No parameter is transferred from the keypad to the drive
		0027H-39	Incompatible software version. All the parameters present in the memory of the keypad have been transferred to the drive. The set of parameters transferred refers to a drive with a different firmware version; therefore, certain parameters may not be updated.
		0028H-40	Incompatible control type. All the parameters present in the memory of the keypad (excluding those that depend on the size of the drive), have been transferred to the drive. The parameters that depend on size maintain their original value.

Index	Error message shown on the display	Sub-code	Description
		0029H-41	Error during saving of parameters on the drive. All the parameters present in the memory of the keypad have been transferred to the drive. The transfer of one or more parameters has caused an "out of range" error, or one or more parameters does not exist. At the end of transfer, one or more parameters may not have been updated.
		002AH-42	PLC application release and version not compatible. All parameters in the keypad memory have been transferred to the drive. The transferred set of parameters relates to a drive with a PLC application in which the version and release of the application are different. As a result some of the PLC application parameters may not be updated.
		002BH-43	PLC application not compatible. All the parameters in the keypad memory except those relating to the PLC applciation have been transferred to the drive. The transferred set of parameters relates to a drive with a different PLC application. As a result none of the PLC application parameters are updated.
		Solution: Recover a set of parameters from a compatible drive (model and size)	
10	**Options config error**	**Condition:** may occur at drive start-up, during recognition of the optional cards installed	
		0001H-1	Non-permissible optional card in slot 1
		0002H-2	Non-permissible optional card in slot 2
		0004H-4	Non-permissible optional card in slot 3
		0010H-16	Conflict slot 1 with slot 2
		0020H-32	Conflict slot 1 with slot 3
		0040H-64	Conflict slot 2 with slot 3
		Solution: Remove the optional cards from the incorrect slots and insert them in the correct slots	
11	**Load def plc**	**Condition:** may occur during loading of the parameter database saved in the Flash of the Mdplc application Normally appears at initial power-on after downloading a new application. If this message is displayed when the drive is already operating, this means that a problem has occurred in the parameter database saved in Flash. If this message appears the drive restores the default database, i.e. the one that was downloaded.	
		0001H-1	The database saved is not valid
		Solution: Set the parameters to the value required and perform **Save parameter**	
12	**Plc cfg error**	**Condition:** may occur during loading of the Mdplc application The Mdplc application present on the drive is not run.	
		0004H-4	The application downloaded has a different Crc on DataBlock and Function table
		0065H-101	The application downloaded has an invalid identifier (Info)
		0066H-102	The application downloaded has an incorrect task number (Info)
		0067H-103	The application downloaded has an incorrect software configuration
		0068H-104	The application downloaded has a different Crc on DataBlock and Function table
		0069H-105	A Trap error or System error has occurred. The drive automatically performs a Power-up operation. The application is not run. See in Alarm List for further information regarding the error occurred
		006AH-106	The application downloaded has an incorrect identifier (Task)
		006BH-107	The application downloaded has an incorrect task number (Task)
		006CH-108	The application downloaded has an incorrect Crc (Tables + Code)
		Solution: Remove the Mdplc application or download a correct Mdplc application	
13 **14** **15** **16**	**Plc 1** **Plc 2** **Plc 3** **Plc 4**	Reserved messages and dedicated to the PLC application. See the application manual.	
17	**Option bus fault**	**Condition:** this may occur when the drive is turned on, during fieldbus card setup. Error during configuration or communication error.	
		XXX0H-X	If the first digit to the left of "H" in the alarm sub-code is 0, the error regards a communication problem.
		XXX0H-X	If the first digit to the left of "H" in the alarm sub-code is other than 0, the error regards a configuration problem.
		Solution: For configuration errors, check the configuration of the bus communication, type of bus, baudrate, address, parameter setting. For communication errors, check wiring, termination resistors, disturbance immunity, timeout settings. For further details, please refer to the user guide for the specific bus.	
18	**Key failed**	**Condition**: this may occur when powering the drive, if the incorrect enable key is inserted for a given firmware function.	

Index	Error message shown on the display	Sub-code	Description
		0001H-1	Incorrect PLC key. PLC application not available.
		Solution: Ask Gefran to supply the correct key to enable the desired firmware function.	
19	**Key expiring**	**Condition:** this may occur at drive power-on if the incorrect enabling key was inserted for a given firmware function. At this stage the firmware function can still be used freely, but this time limit is about to expire.	
		xxxxH-x	Number of hours for which the function can still be used freely.
		Solution: Ask Gefran for the correct key to enable the desired firmware function.	
20	**Param error**	**Condition**: if an error occurs during activation of the parameter database saved in flash; the alarm is inserted in the alarm list and alarm log.	
		XXX0H-X	The code XXXXH-X indicates the IPA of the parameter that has been set outside the range allowed when the database is enabled.
		Solution: Set the parameter causing the error to a value within the range and run **Save parameters**. Switch the drive off and then switch it back on again. If the IPA of the parameter is not shown in the manual, contact the service centre.	
21	**Encoder error**	**Condition:** this condition may occur when the drive is powered during encoder setup each time parameter **552 Regulation mode** is set.	
		100H-2564	**Cause**: An error occurred during setup; the information received from the encoder is not reliable. If the encoder is used for feedback the **Speed fbk loss** [22] alarm is also generated.
		Solution: Take the recommended action for the **Speed fbk loss**[22] alarm.	
		200H-512	**Cause**: The firmware on the optional encoder card is incompatible with that on the regulation card. The information received from the encoder is not reliable
		Solution: Contact Gefran in order to update the firmware on the optional encoder card.	
22	**Options cfg changed**	**Condition**: this may occur when powering the drive if an expansion card has been removed or replaced or the incorrect enable key is inserted for a given firmware function.	
		0064H-100	Card removed from slot 1
		0014H-20	Card removed from slot 2
		0003H-3	Card removed from slot 3
		0078H-120	Card removed from slot 1 and from slot 2
		0067H-103	Card removed from slot 1 and from slot 3
		0017H-23	Card removed from slot 2 and from slot 3
		007BH-123	Card removed from slot 1, from slot 2 and from slot 3
		Solution: Check the hardware configuration, then press ESC. Save the parameters (**Save parameters**, menu 04.01 par 550) to save the new hardware configuration.	
23	**Autotune** (phasing)	**0**	No error
		40	The encoder card in use cannot manage automatic phasing.
			Solution: Use the appropriate encoder card
		41	Incorrect Incremental encoder impulse count
			Solution: Check the electric signals of the incremental encoder. Check the value of the encoder impulse parameter
		42	Incorrect absolute encoder impulse count
			Solution: Check the electric signals of the absolute encoder. Check the configuration of the absolute encoder
		43	Incorrect incremental encoder impulse count or incorrect absolute encoder impulse count probably caused by an incorrect value of the pole pairs parameter or a load applied to the motor.
			Solution: Check the value of the pole pairs parameter, check whether a load is applied
		44	Incorrect incremental encoder impulse count probably caused by the incorrect value of the encoder impulse parameter.
			Solution: Check the electric signals of the incremental encoder. Check the value of the encoder impulse parameter.
		45	Incorrect absolute encoder impulse count
			Solution: Check the electric signals of the absolute encoder. Check the configuration of the absolute encoder.
		46	Incremental encoder impulse count sign inverted with respect to the absolute encoder impulse count.
			Solution: Invert the A+ and A- signal of the incremental encoder.
		47	Incremental encoder impulse count sign inverted with respect to the absolute encoder impulse count.
			Solution: Invert the A+ and A- signal of the absolute encoder.
		48	Incorrect phase sequence. (Message not signalled)
			Solution: The automatic procedure has modified the setting of the Encoder direction parameter. No other action is required

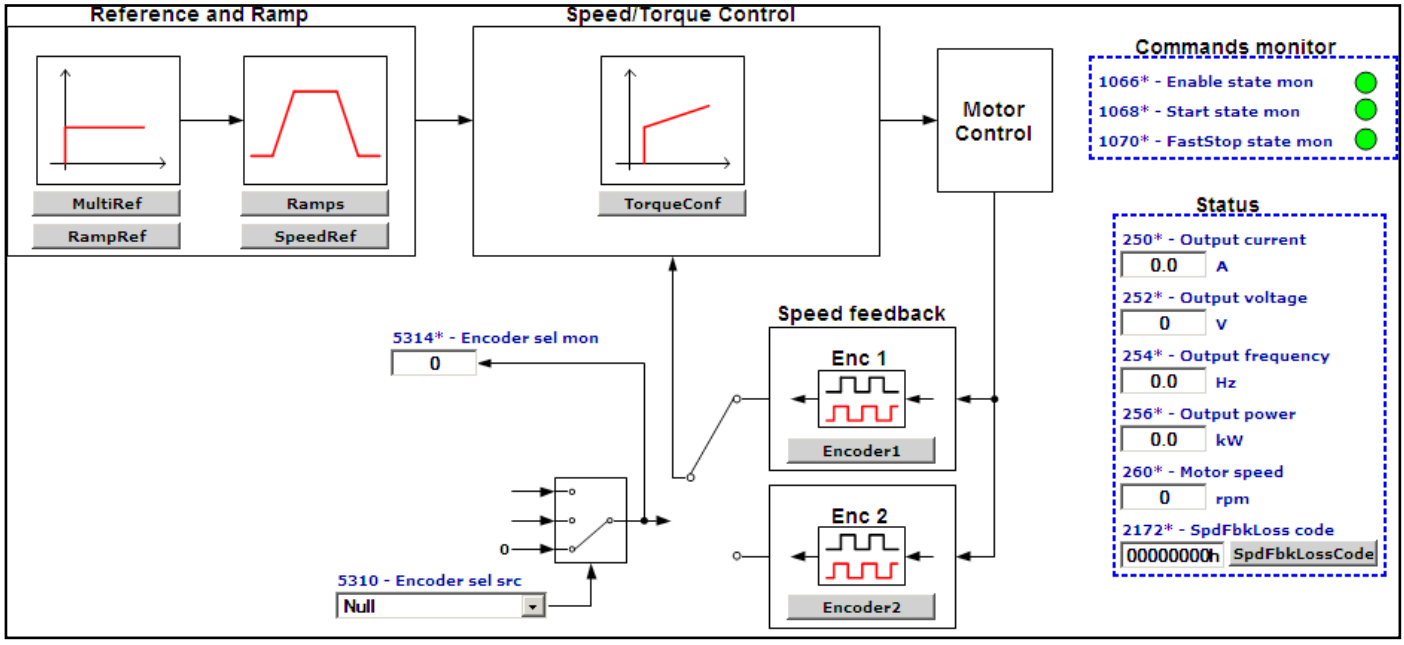
Index	Error message shown on the display	Sub-code	Description
		49	During automatic phasing a communication channel is activated between the drive and encoder. An error has occurred on this communication channel.
			Solution: Repeat the procedure.
		Solution: If the message has a value other than 0 follow the instructions provided for each case and repeat automatic phasing.	
24	Safe start active	**Condition:** The drive was restarted when PAR 1010 **Safe Start Command** = ON and in presence of Enable command.	
		Solution: Press the ESC key to cancel the message You have to disable the Enable command to restart the drive.	

Note! For any messages that are displayed but not included in this list reference should be made to the manual for the MDPLc application used by the drive.

System Diagrams Index

DRIVE OVERVIEW	DrvOverview	DigOuts	DIGITAL OUTPUTS
REFERENCES	References	AnalInps	ANALOG INPUTS
RAMPS	Ramps	AnalOuts	ANALOG OUTPUTS
MULTI REFERENCE	MultiRef	EncoderConf	ENCODER CONFIG
MOTORPOTENTIOMETER	Mpot	SpeedRegGains	SPEED REG GAINS
JOG FUNCTION	Jog	TorqueConf	TORQUE CONFIG
MONITOR FUNCTION	MonitorFunc	Functions	FUNCTIONS
COMMANDS	Commands	AppIndex	APPLICATIONS DIAGRAMS INDEX
DIGITAL INPUTS	DigInps		

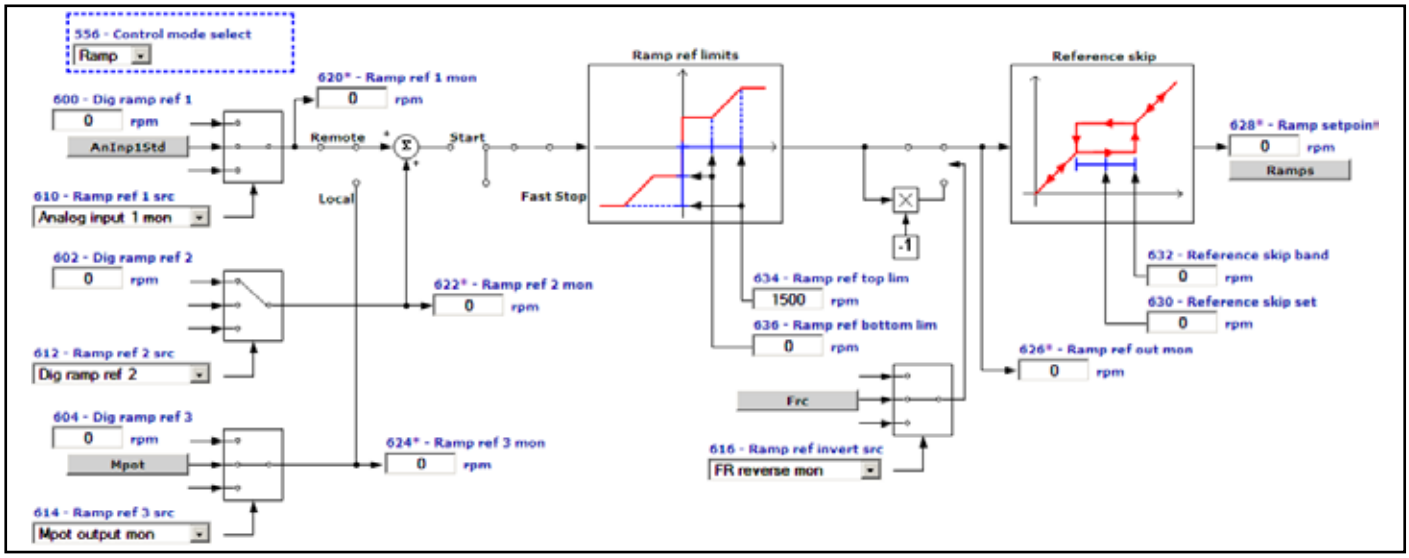
Drive overview

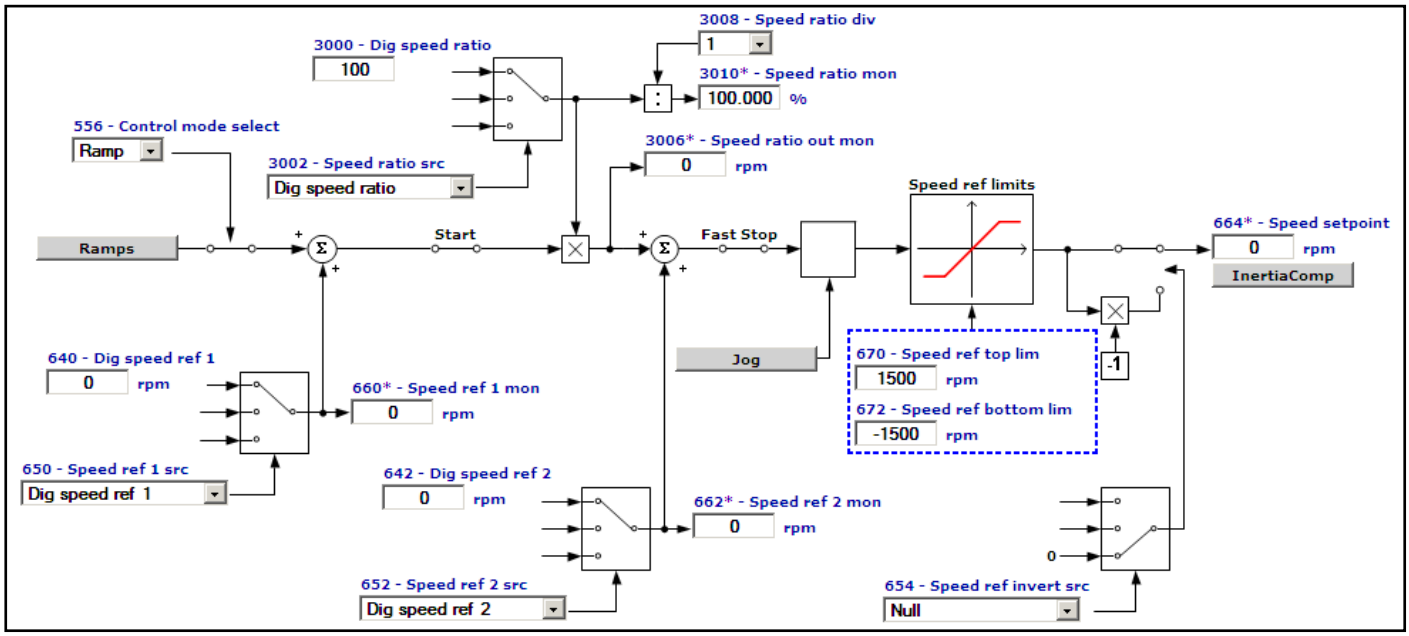


References

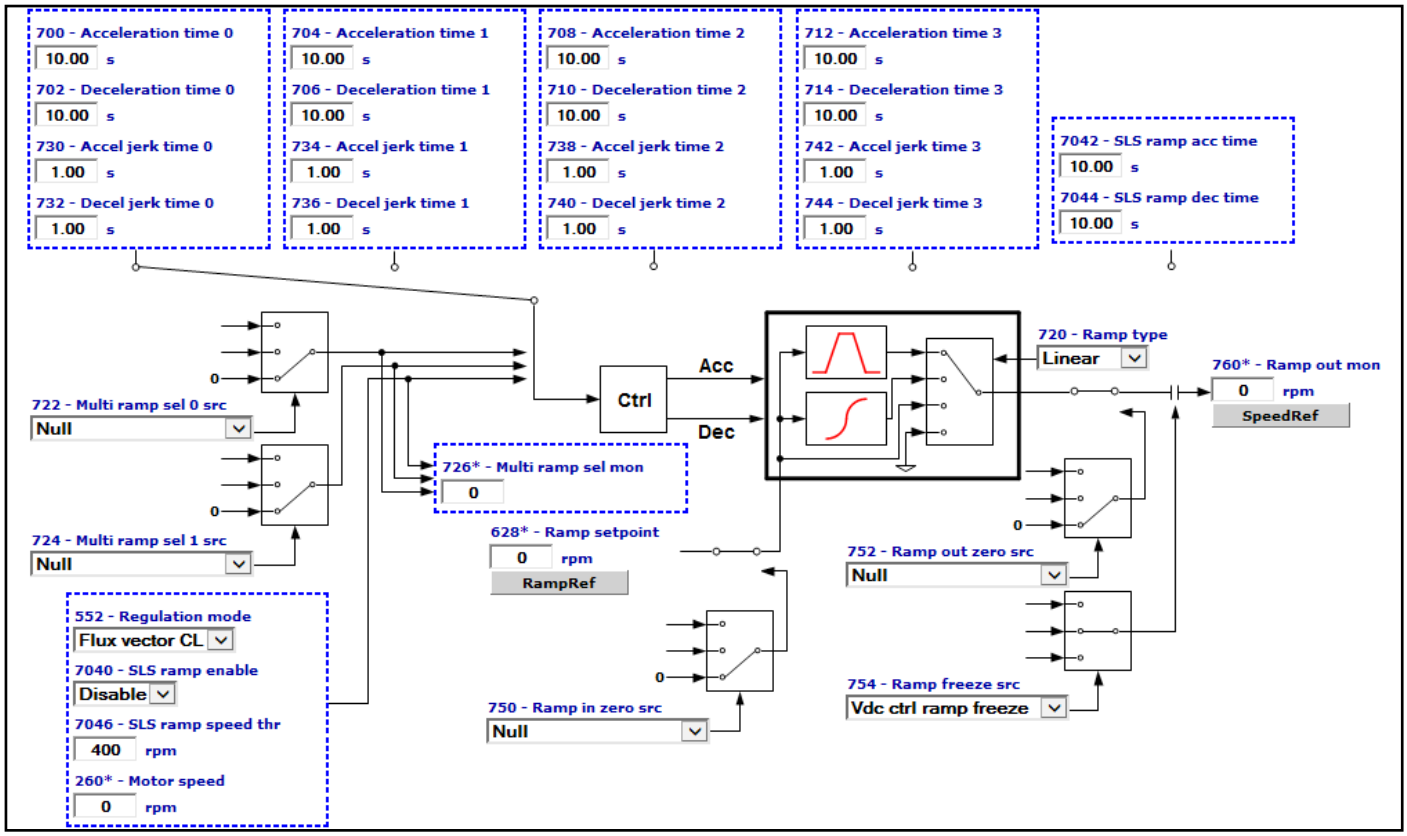
RAMP REFERENCE RampRef

SPEED REFERENCE SpeedRef

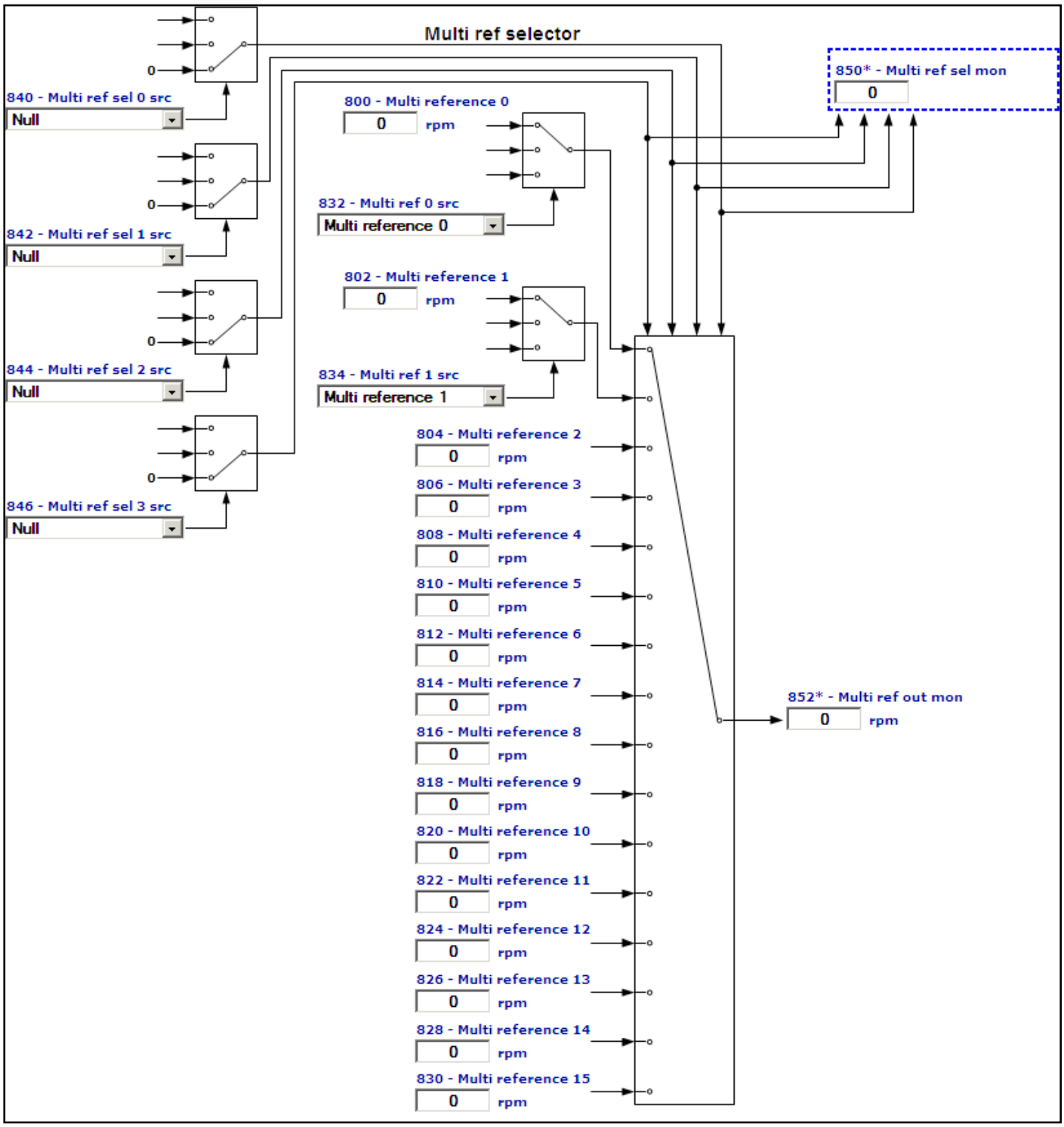




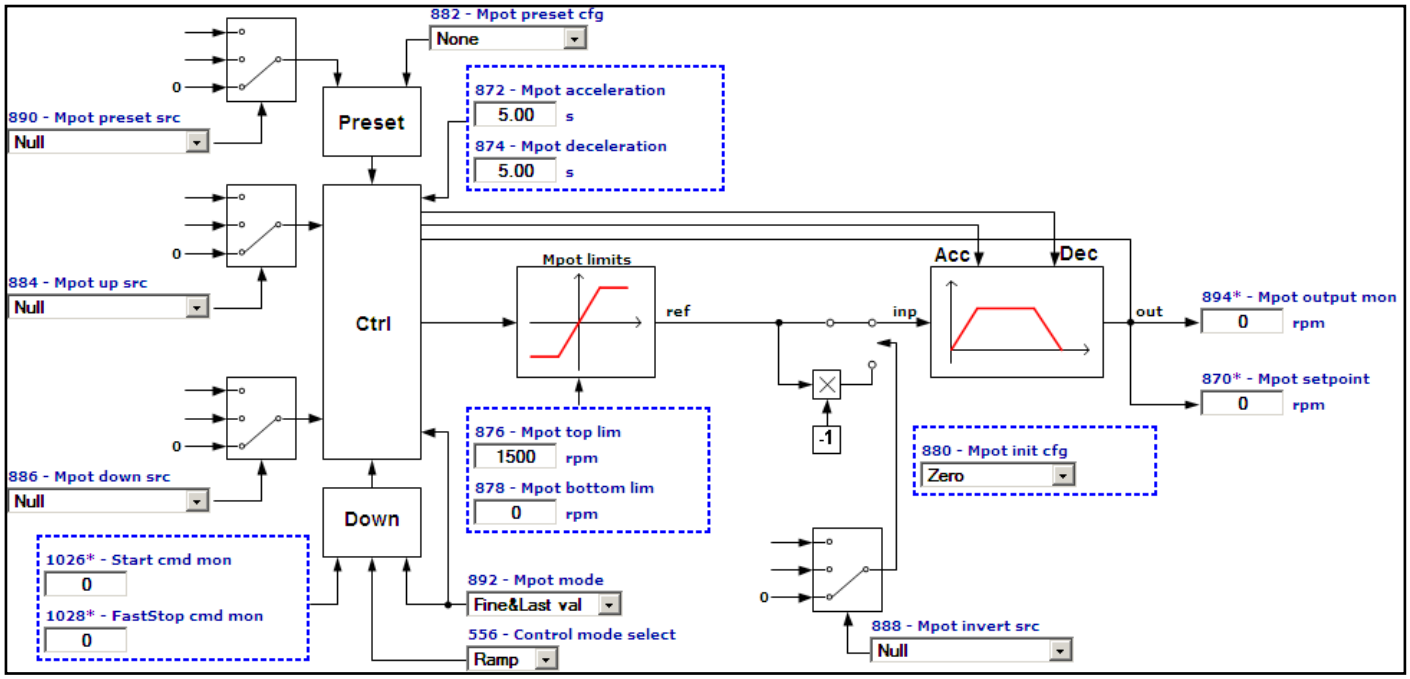
Ramps


700 - Acceleration time 0
10.00 s
702 - Deceleration time 0
10.00 s
730 - Accel jerk time 0
1.00 s
732 - Decel jerk time 0
1.00 s
704 - Acceleration time 1
10.00 s
706 - Deceleration time 1
10.00 s
734 - Accel jerk time 1
1.00 s
736 - Decel jerk time 1
1.00 s
708 - Acceleration time 2
10.00 s
710 - Deceleration time 2
10.00 s
738 - Accel jerk time 2
1.00 s
740 - Decel jerk time 2
1.00 s
712 - Acceleration time 3
10.00 s
714 - Deceleration time 3
10.00 s
742 - Accel jerk time 3
1.00 s
744 - Decel jerk time 3
1.00 s
7042 - SLS ramp acc time
10.00 s
7044 - SLS ramp dec time
10.00 s
722 - Multi ramp sel 0 src
Null
724 - Multi ramp sel 1 src
Null
726* - Multi ramp sel mon
0
628* - Ramp setpoint
0 rpm
RampRef
Ctrl
Acc
Dec
720 - Ramp type
Linear
760* - Ramp out mon
0 rpm
SpeedRef
752 - Ramp out zero src
Null
754 - Ramp freeze src
Vdc ctrl ramp freeze
750 - Ramp in zero src
Null
552 - Regulation mode
Flux vector CL
7040 - SLS ramp enable
Disable
7046 - SLS ramp speed thr
400 rpm
260* - Motor speed
0 rpm

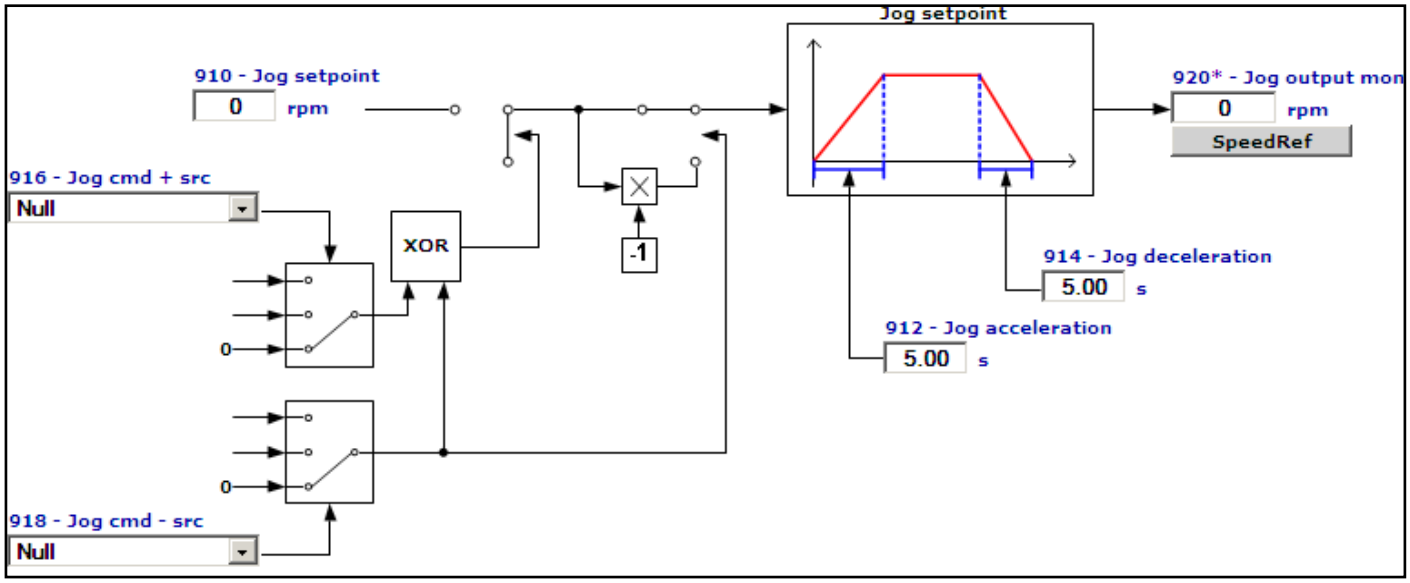
Multireference



Motorpotentiometer

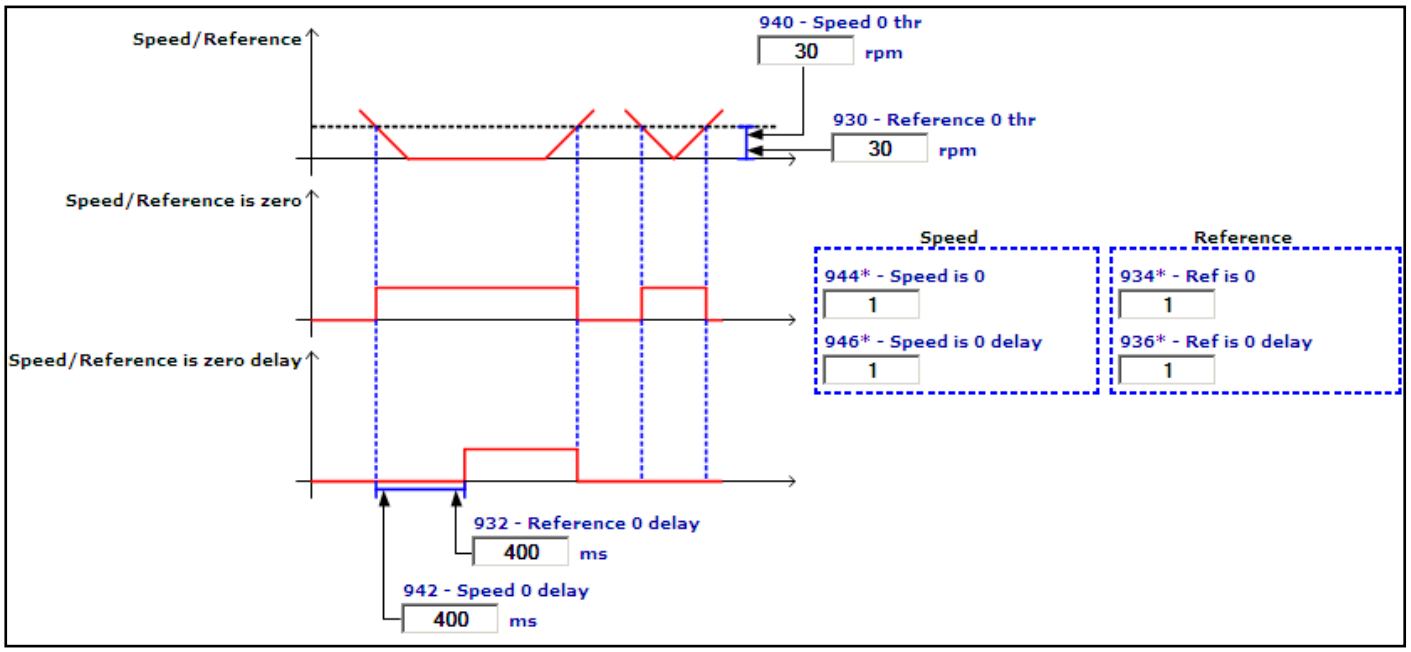


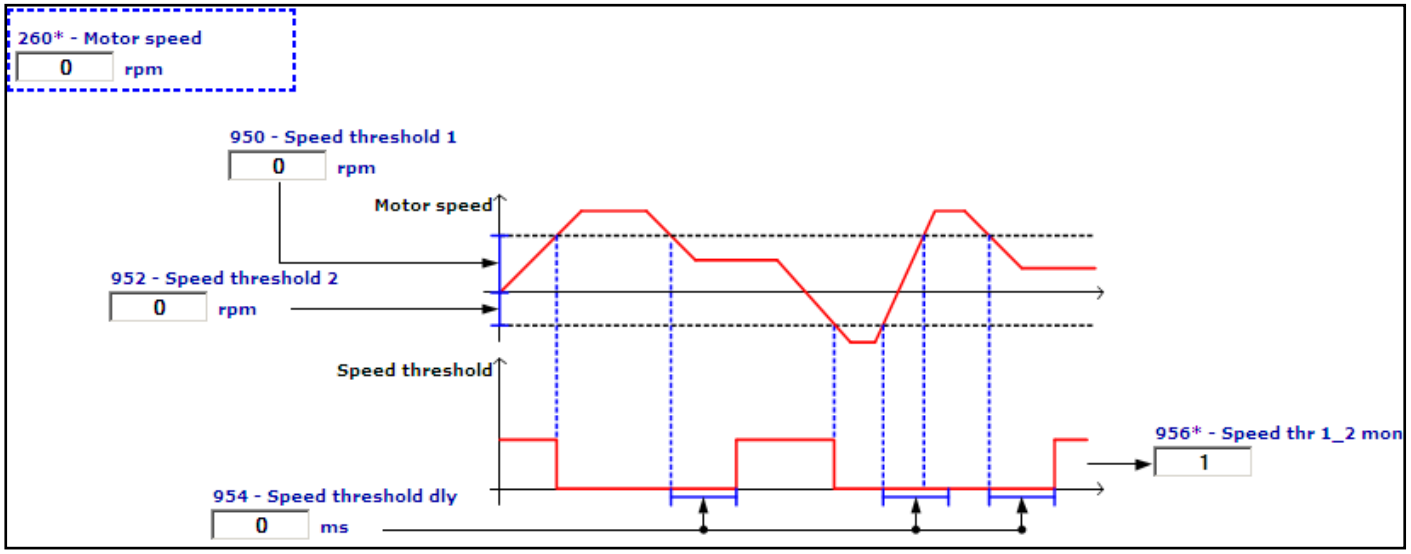
Jog function

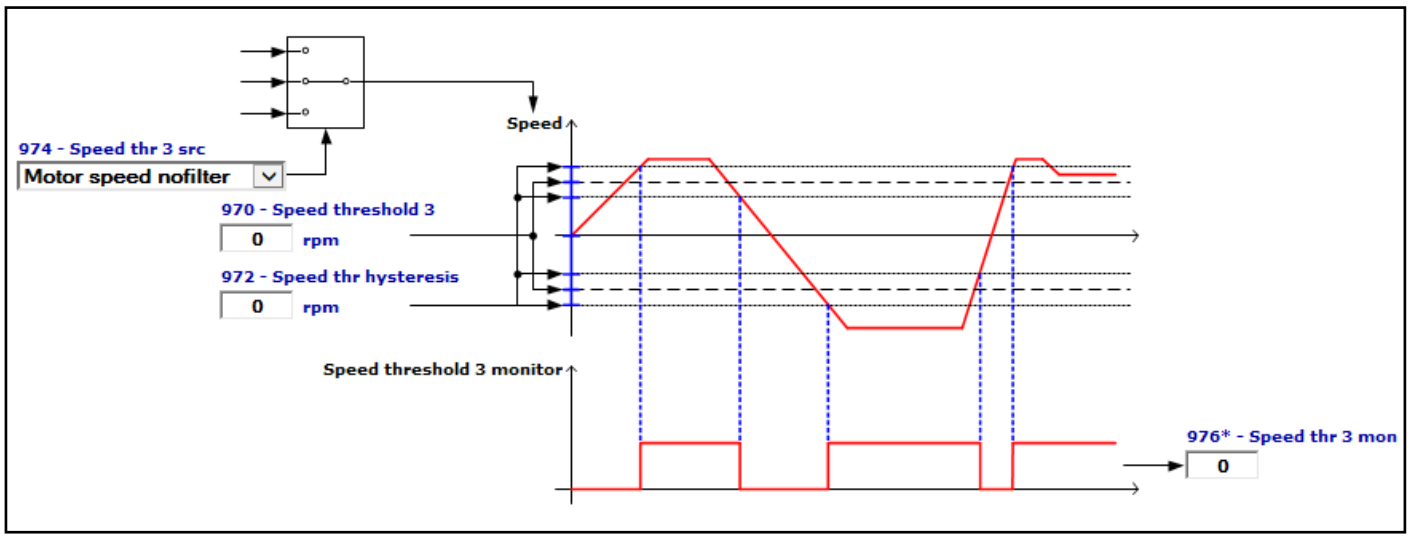


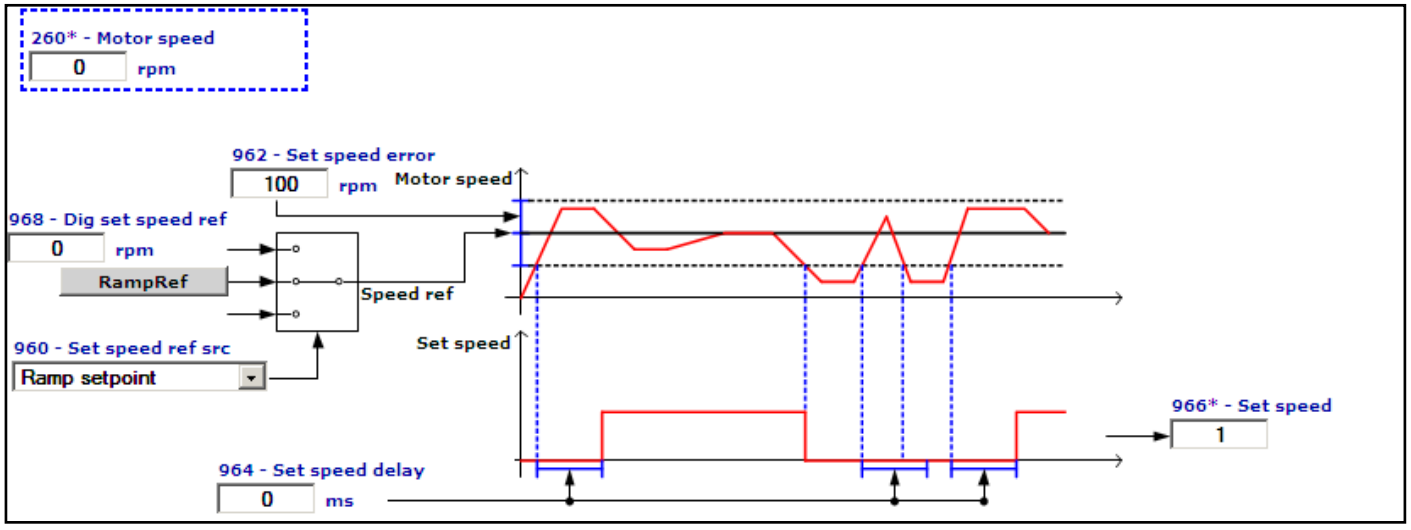
Monitor function

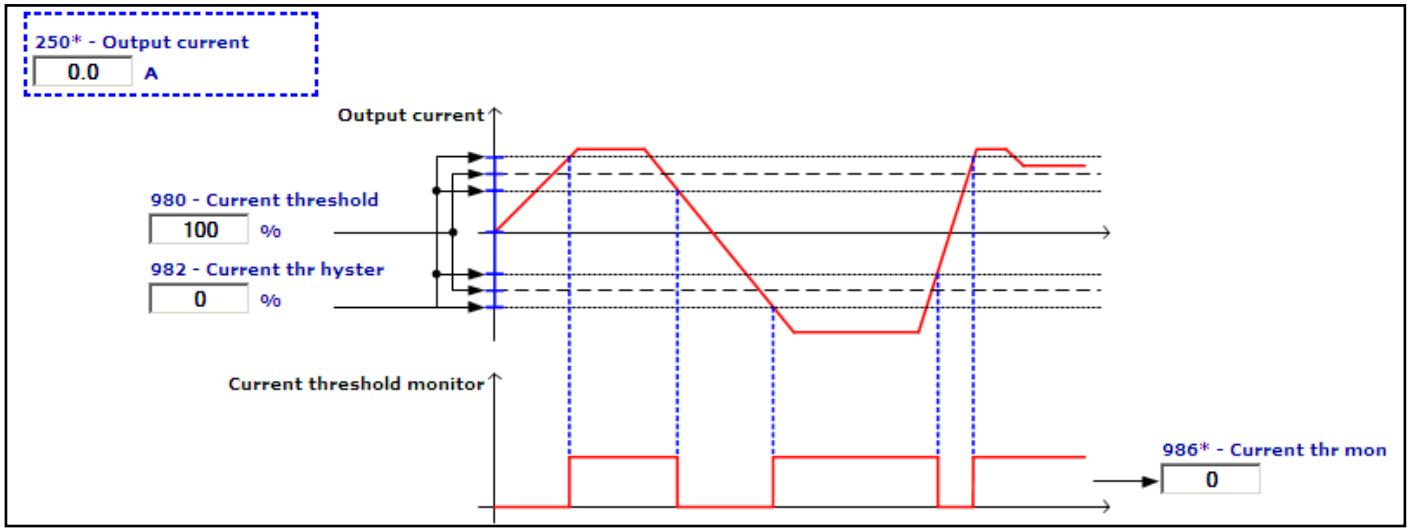
SPEED/REFERENCE ZERO	SpeedRefZero
SPEED THRESHOLD 1-2	SpeedThr1_2
SPEED THRESHOLD 3	SpeedThr3
SET SPEED	SetSpeed
CURRENT THRESHOLD	CurrThr






974 - Speed thr 3 src
Motor speed nofilter
970 - Speed threshold 3
0 rpm
972 - Speed thr hysteresis
0 rpm
Speed
Speed threshold 3 monitor
976* - Speed thr 3 mon
0

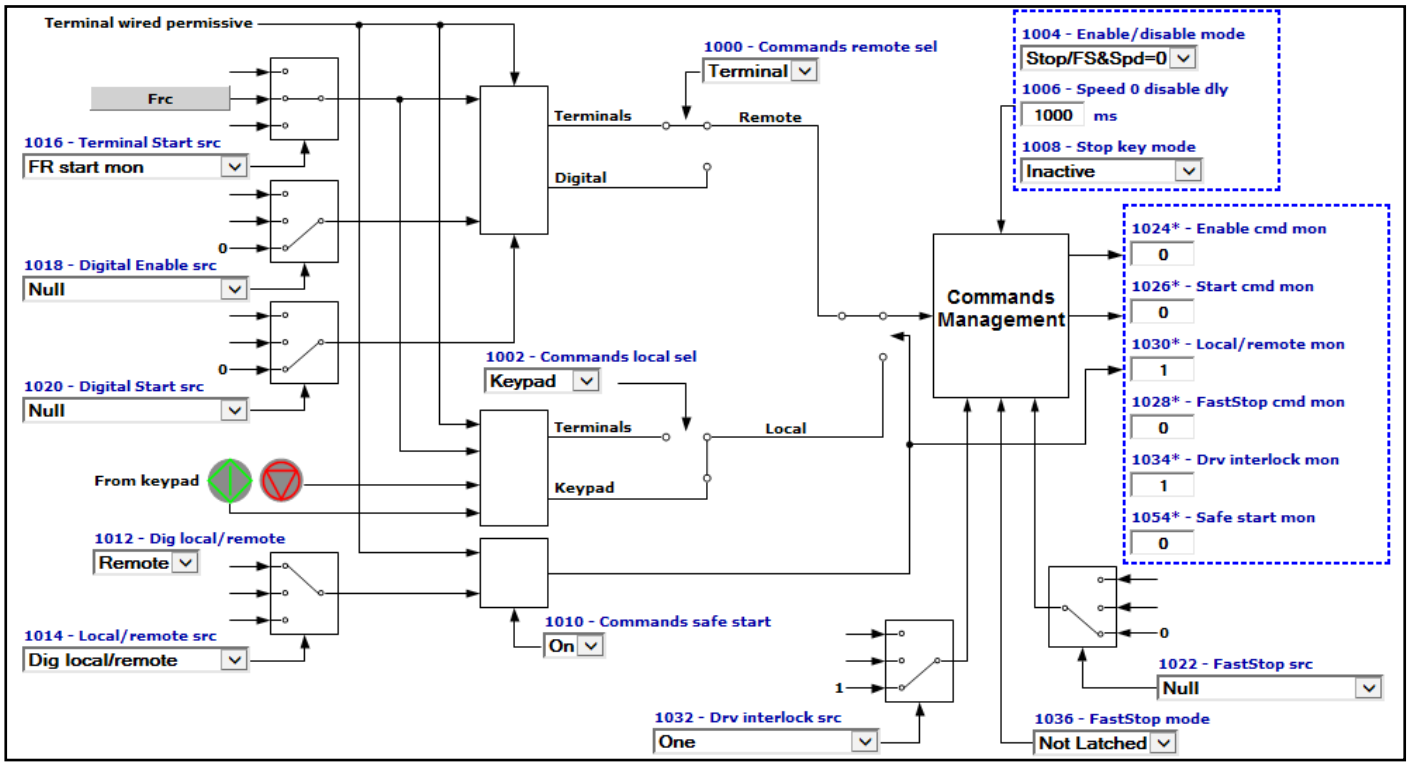

260* - Motor speed
0 rpm
962 - Set speed error
100 rpm
968 - Dig set speed ref
0 rpm
RampRef
960 - Set speed ref src
Ramp setpoint
Motor speed
Speed ref
Set speed
964 - Set speed delay
0 ms
966* - Set speed
1

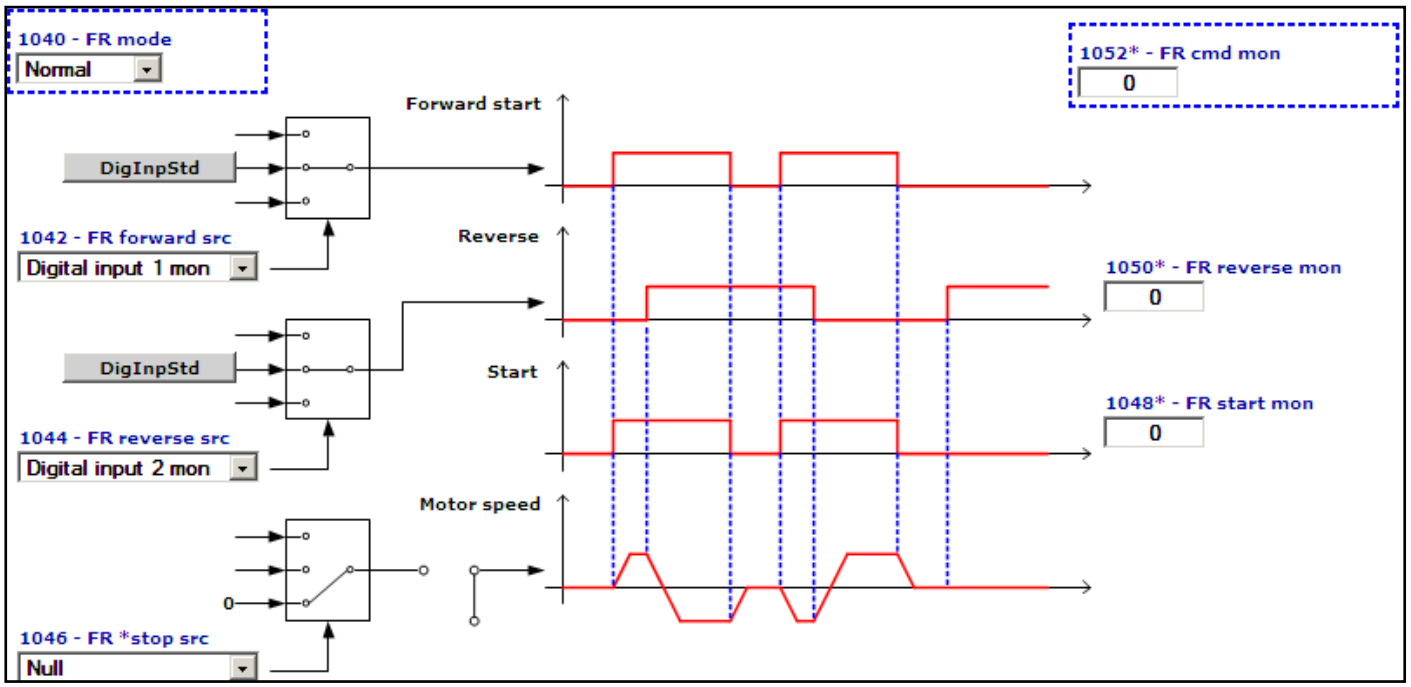

250* - Output current
0.0 A
Output current
980 - Current threshold
100 %
982 - Current thr hyster
0 %
Current threshold monitor
986* - Current thr mon
0

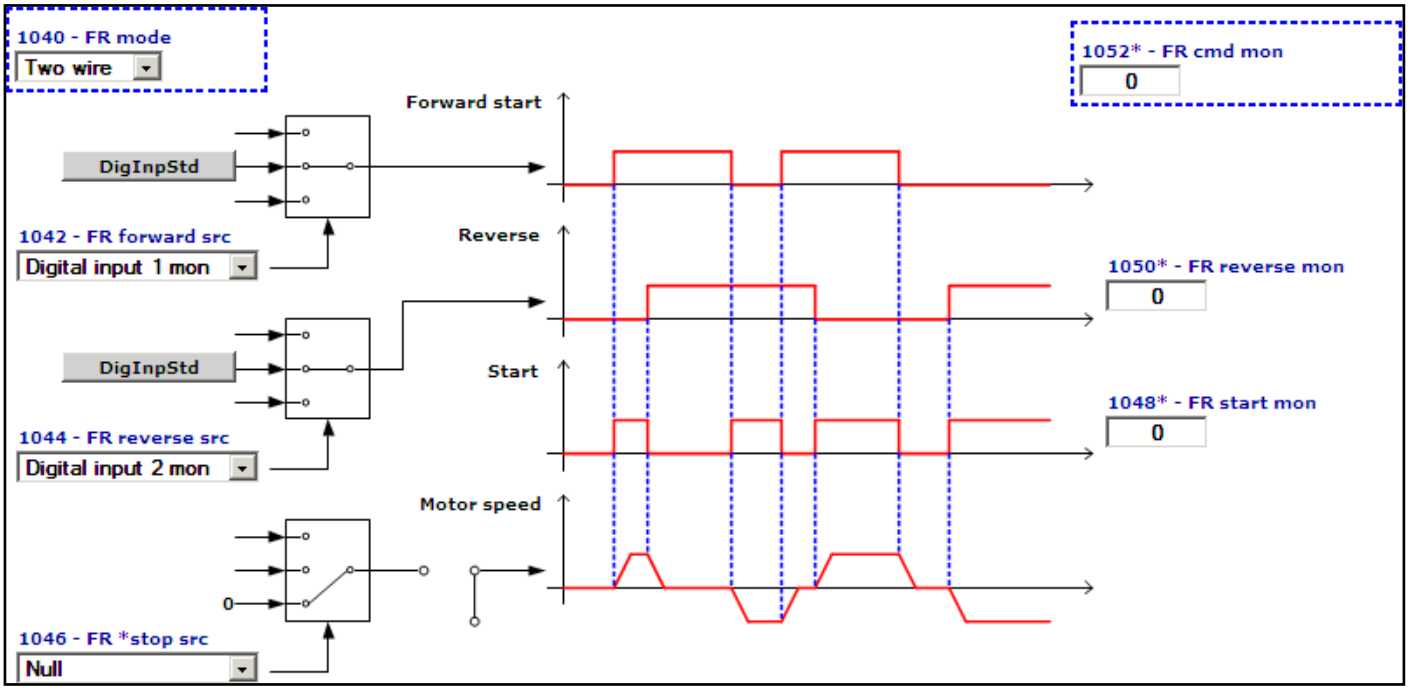
Commands

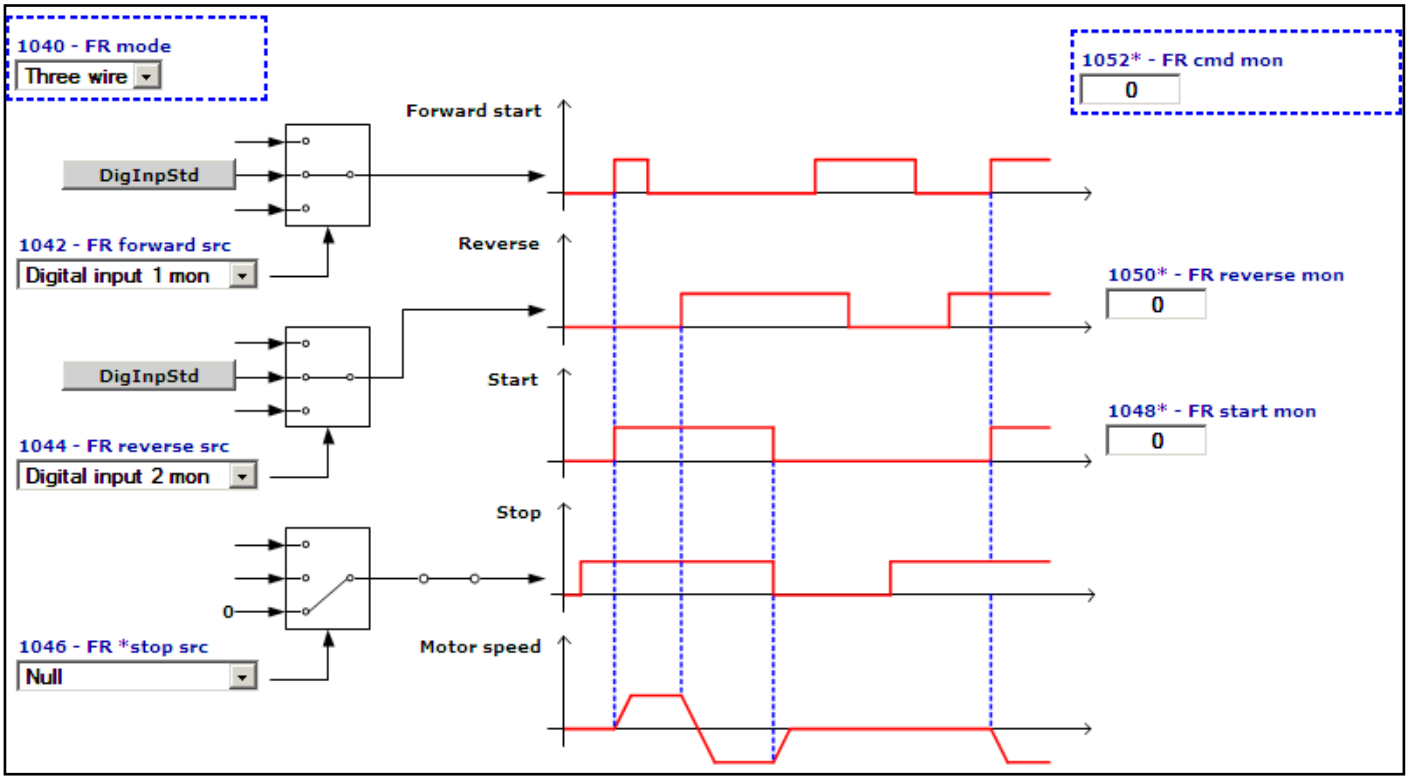
COMMANDS MANAGEMENT CommManage

FORWARD REVERSE CONTROL Frc





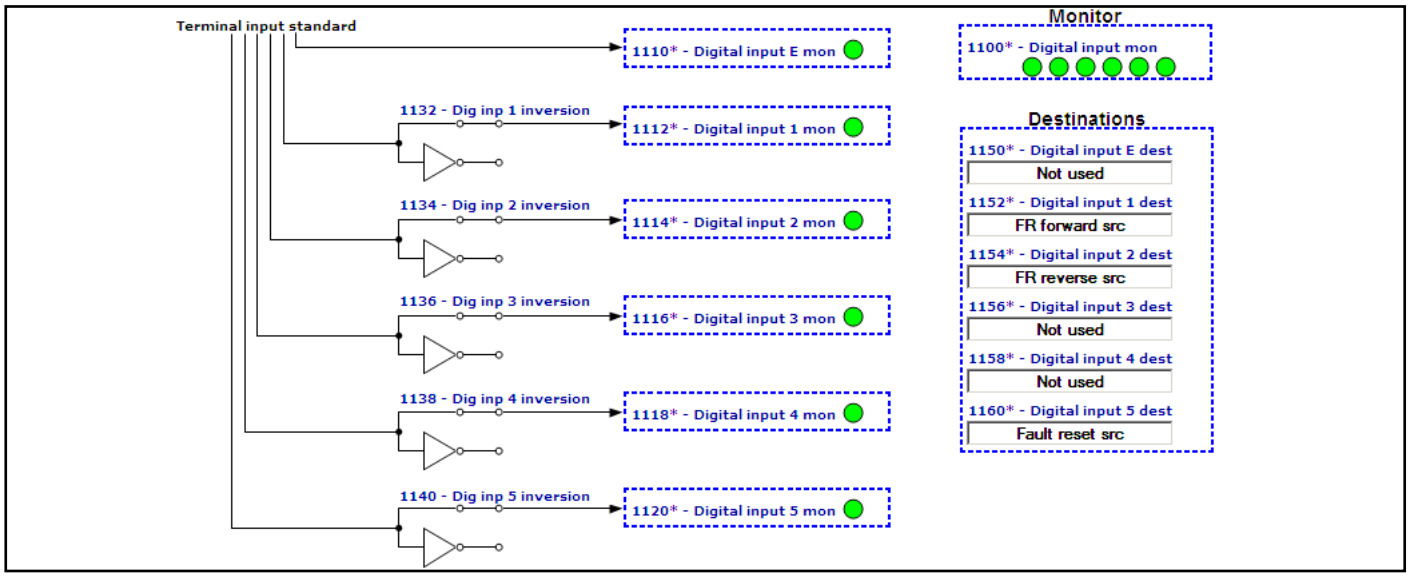

1040 - FR mode
Two wire
1052* - FR cmd mon
0
Forward start
DigInpStd
1042 - FR forward src
Digital input 1 mon
Reverse
1050* - FR reverse mon
0
DigInpStd
Start
1048* - FR start mon
0
1044 - FR reverse src
Digital input 2 mon
Motor speed
0
1046 - FR *stop src
Null

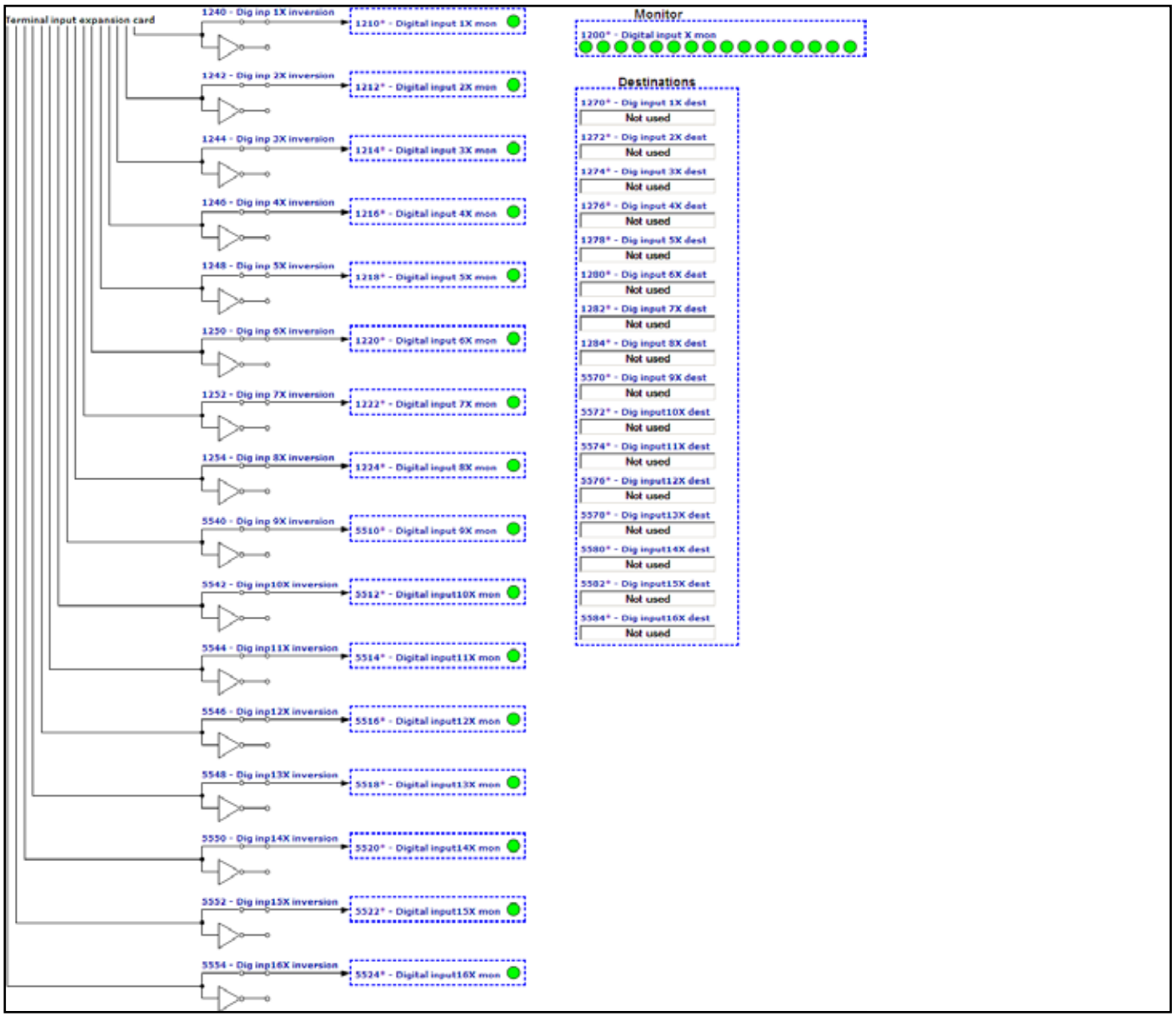

1040 - FR mode
Three wire
1052* - FR cmd mon
0
Forward start
DigInpStd
1042 - FR forward src
Digital input 1 mon
Reverse
1050* - FR reverse mon
0
DigInpStd
Start
1048* - FR start mon
0
1044 - FR reverse src
Digital input 2 mon
Stop
0
1046 - FR *stop src
Null
Motor speed

Digital inputs

DIGITAL INPUTS STANDARD DigInpStd

DIGITAL INPUTS EXPANSION CARD DigInpExp

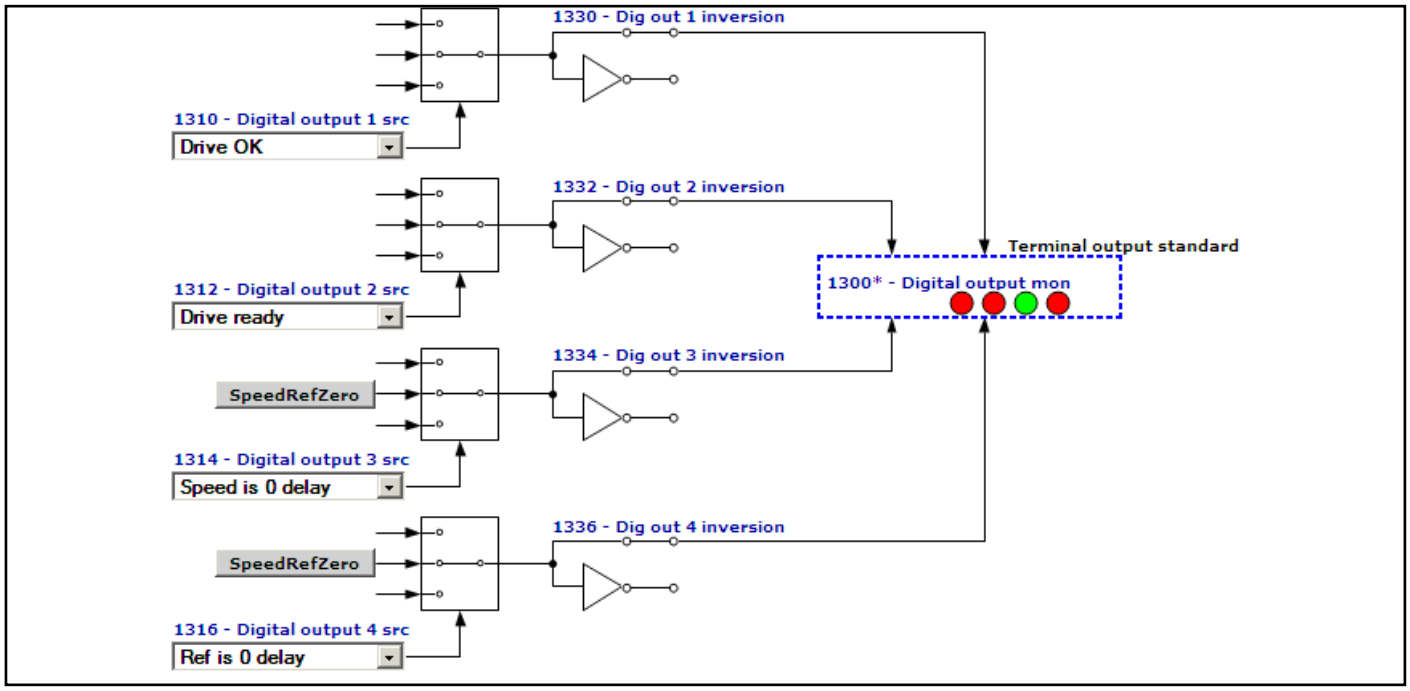


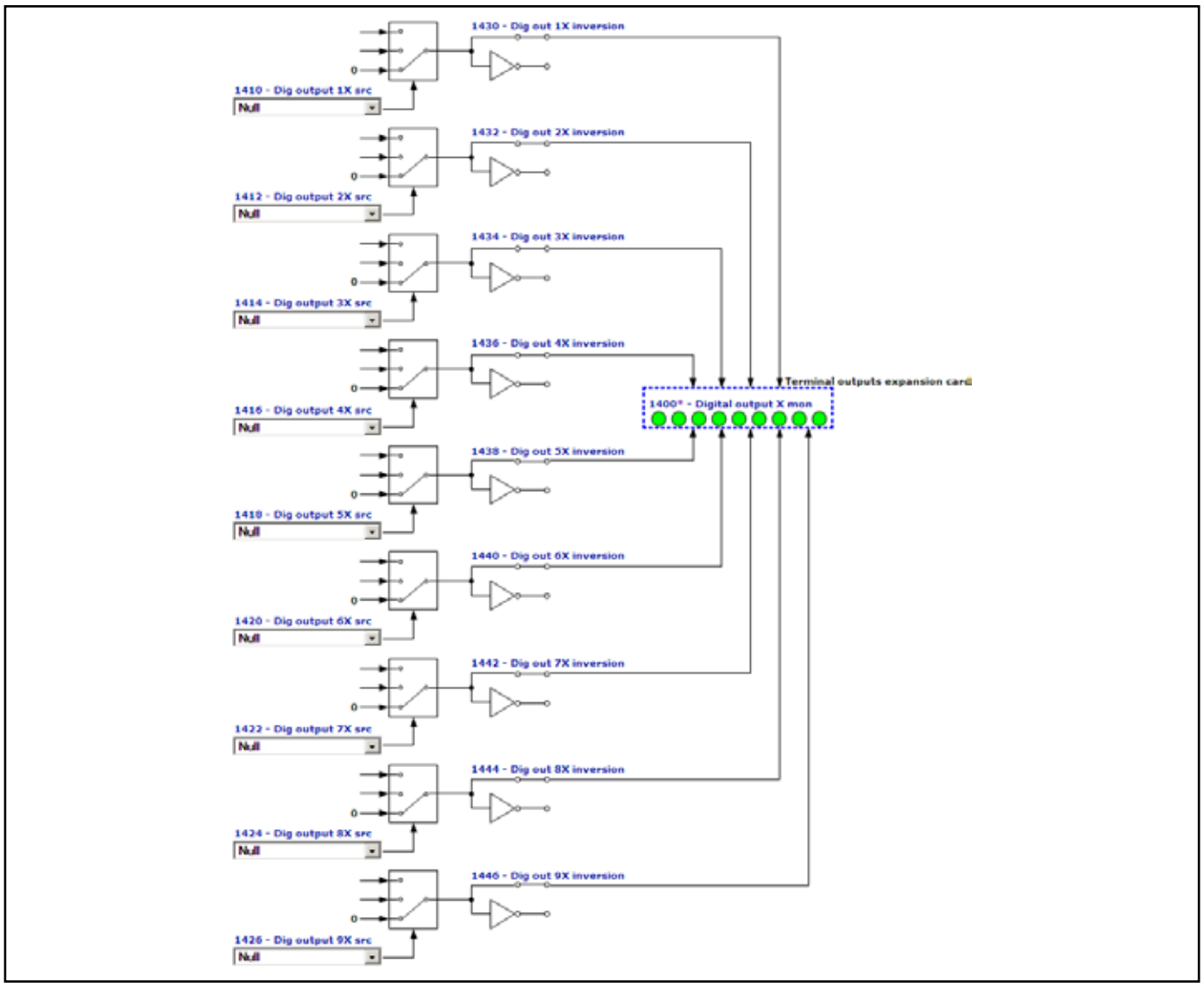


Digital outputs

DIGITAL OUTPUTS STANDARD DigOutStd

DIGITAL OUTPUTS EXPANSION CARD DigOutExp





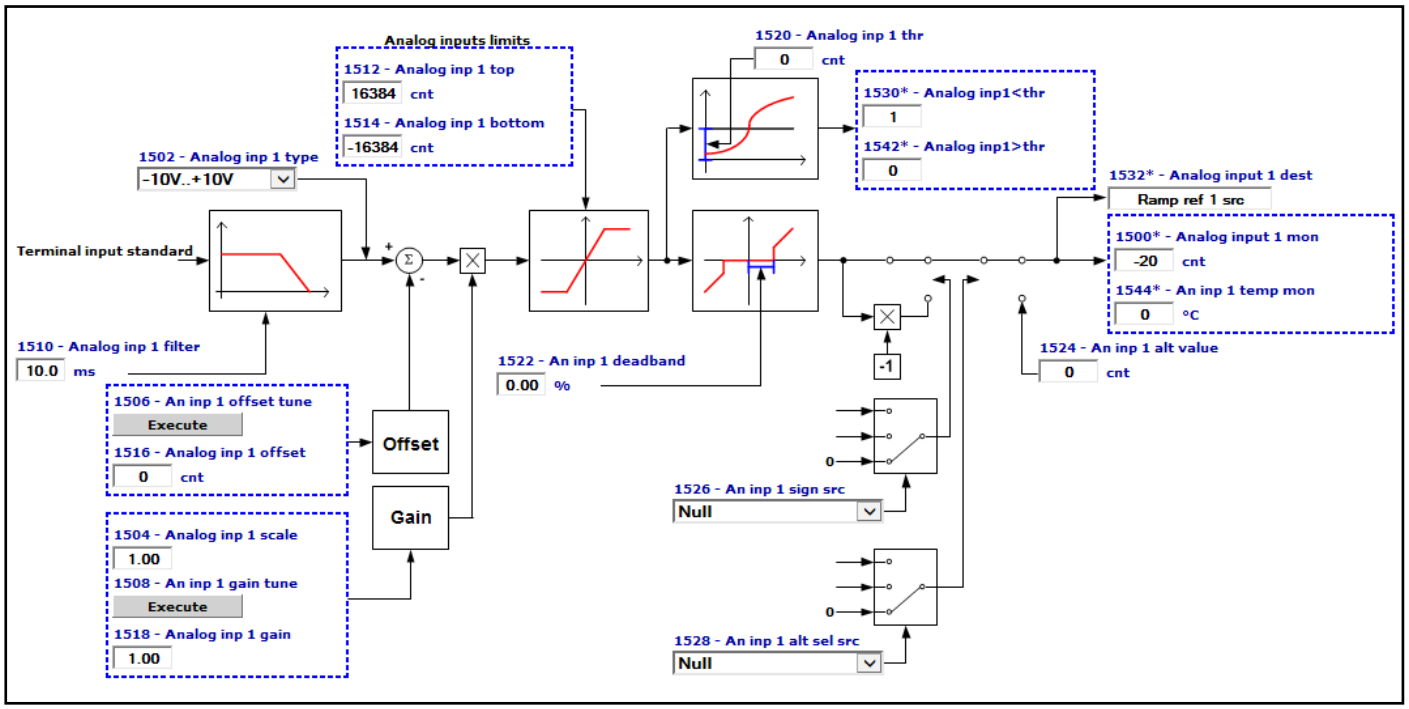
Analog inputs

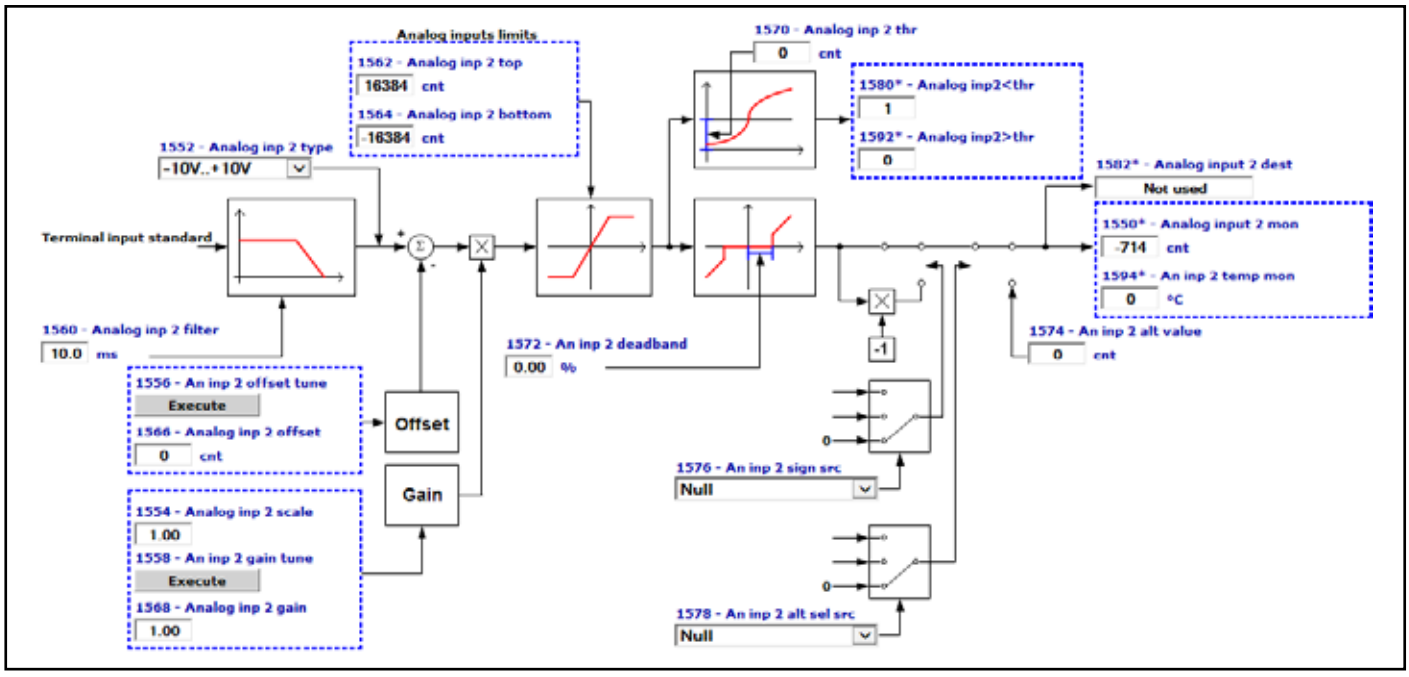
ANALOG INPUT 1 STANDARD **AnInp1Std**

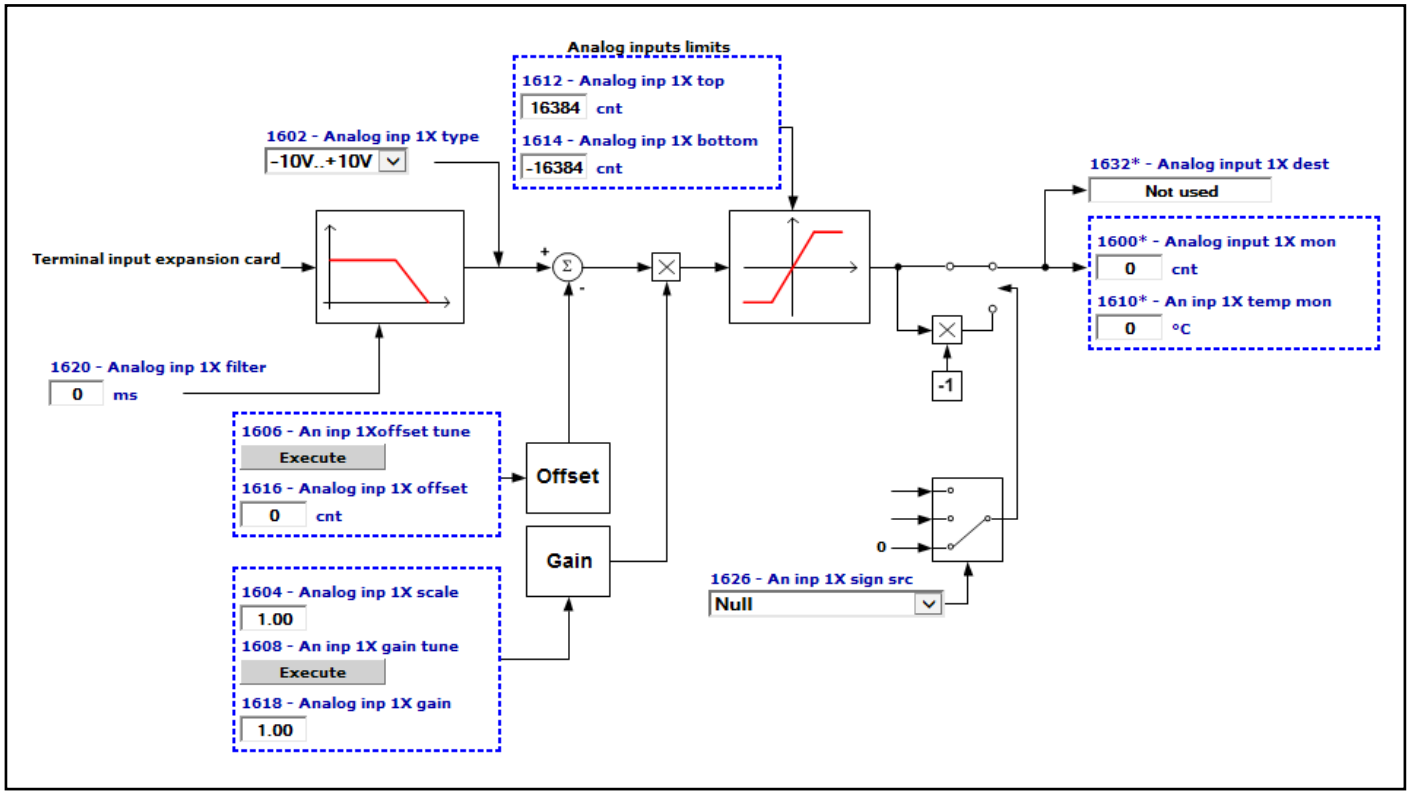
ANALOG INPUT 2 STANDARD **AnInp2Std**

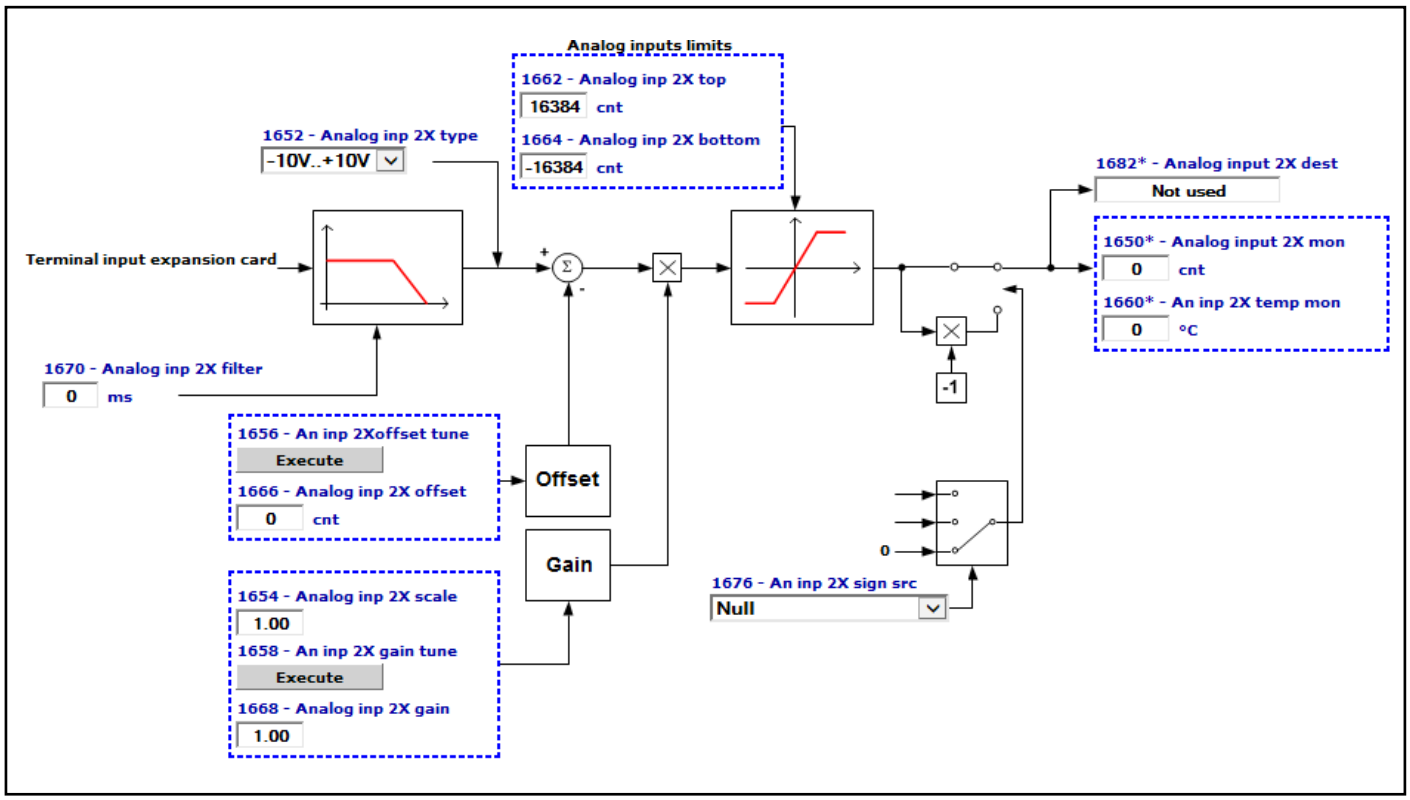
ANALOG INPUT 1 EXPANSION CARD **AnInp1Exp**

ANALOG INPUT 2 EXPANSION CARD **AnInp2Exp**






Analog inputs limits
1612 - Analog inp 1X top
16384 cnt
1614 - Analog inp 1X bottom
-16384 cnt
1602 - Analog inp 1X type
-10V..+10V
Terminal input expansion card
1632* - Analog input 1X dest
Not used
1600* - Analog input 1X mon
0 cnt
1610* - An inp 1X temp mon
0 °C
1620 - Analog inp 1X filter
0 ms
1606 - An inp 1Xoffset tune
Execute
1616 - Analog inp 1X offset
0 cnt
Offset
Gain
1604 - Analog inp 1X scale
1.00
1608 - An inp 1X gain tune
Execute
1618 - Analog inp 1X gain
1.00
-1
0
1626 - An inp 1X sign src
Null


Analog inputs limits
1662 - Analog inp 2X top
16384 cnt
1664 - Analog inp 2X bottom
-16384 cnt
1652 - Analog inp 2X type
-10V..+10V
Terminal input expansion card
1682* - Analog input 2X dest
Not used
1650* - Analog input 2X mon
0 cnt
1660* - An inp 2X temp mon
0 °C
1670 - Analog inp 2X filter
0 ms
1656 - An inp 2Xoffset tune
Execute
1666 - Analog inp 2X offset
0 cnt
Offset
Gain
1654 - Analog inp 2X scale
1.00
1658 - An inp 2X gain tune
Execute
1668 - Analog inp 2X gain
1.00
-1
0
1676 - An inp 2X sign src
Null

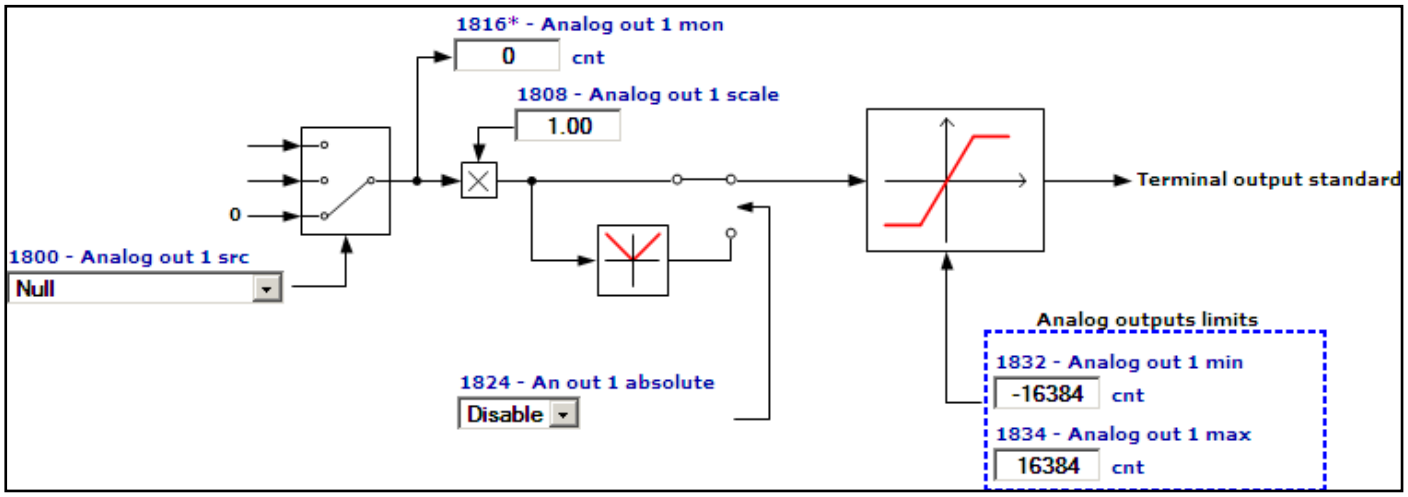
Analog outputs

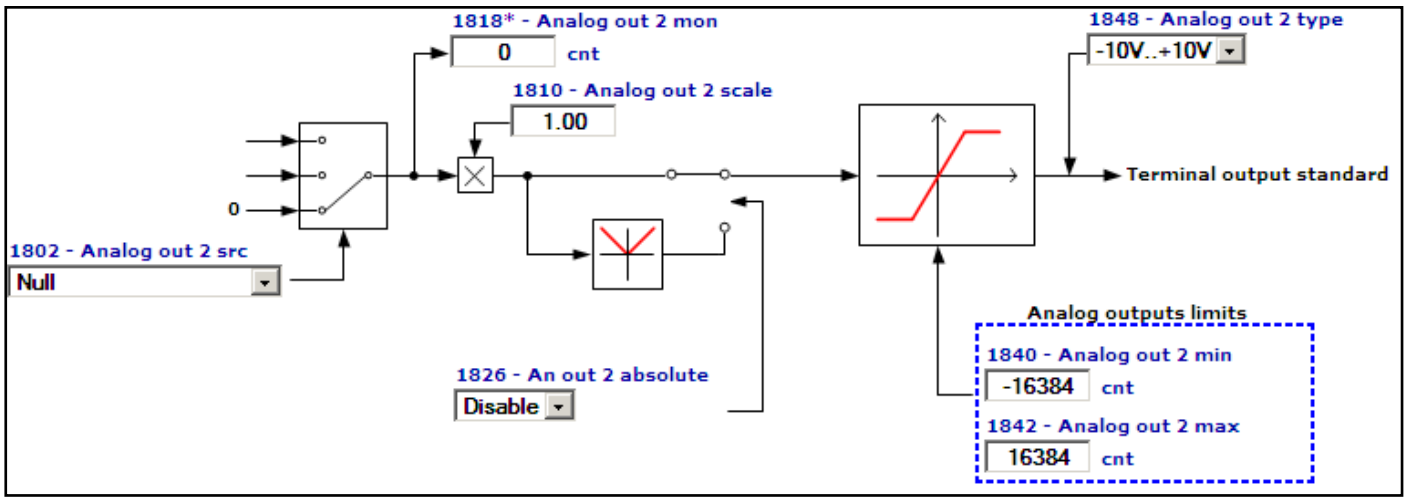
ANALOG OUTPUT 1 STANDARD AnOut1Std

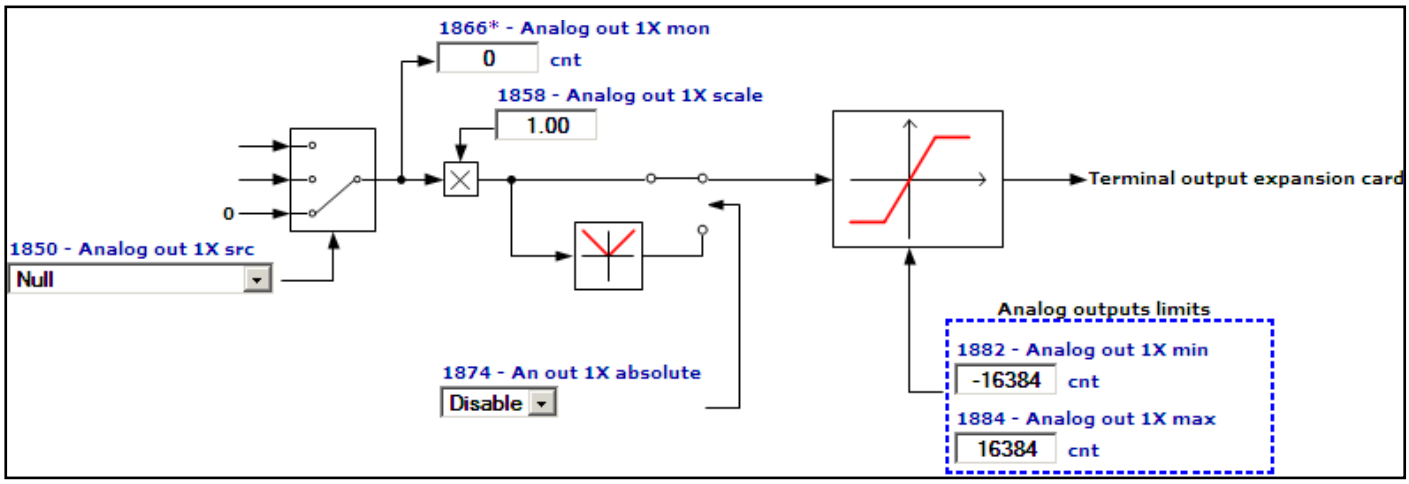
ANALOG OUTPUT 2 STANDARD AnOut2Std

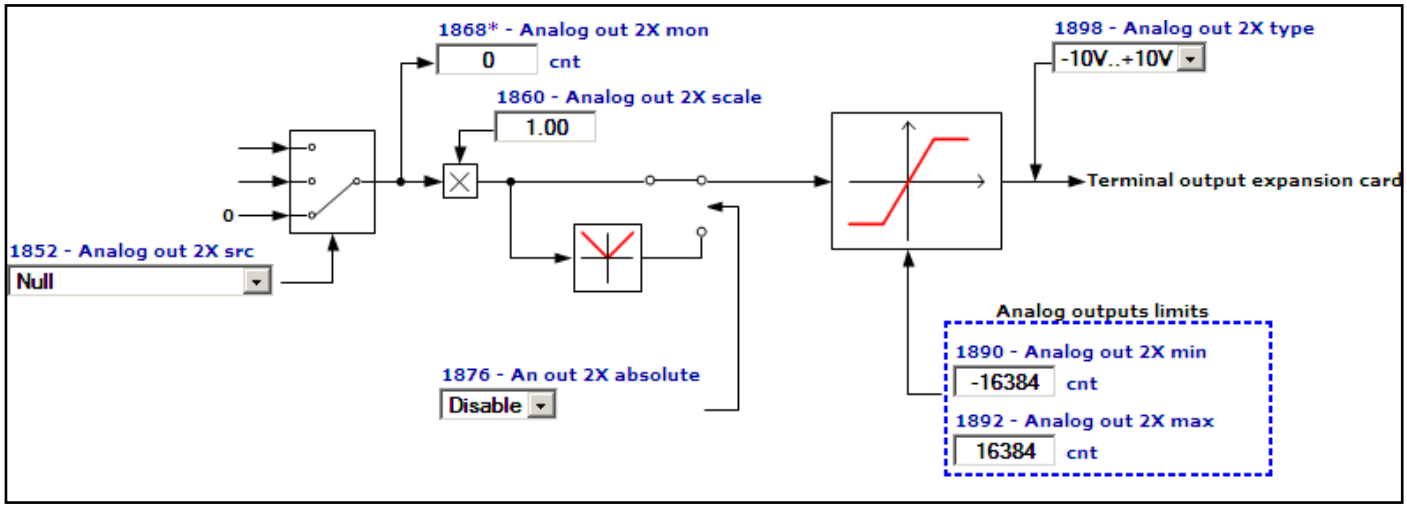
ANALOG OUTPUT 1 EXPANSION CARD AnOut1Exp

ANALOG OUTPUT 2 EXPANSION CARD AnOut2Exp







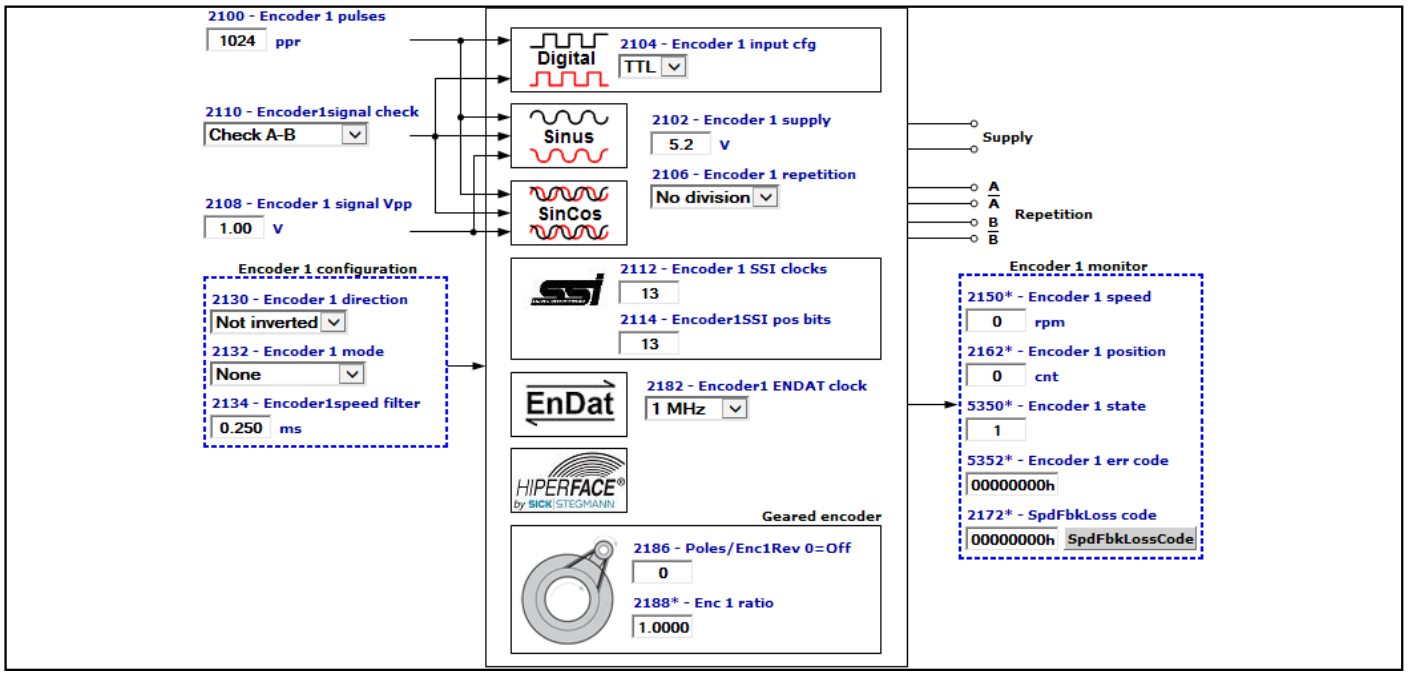

1868* - Analog out 2X mon
0
cnt
1860 - Analog out 2X scale
1.00
1898 - Analog out 2X type
-10V..+10V
Terminal output expansion card
0
1852 - Analog out 2X src
Null
Analog outputs limits
1890 - Analog out 2X min
-16384
cnt
1892 - Analog out 2X max
16384
cnt
1876 - An out 2X absolute
Disable

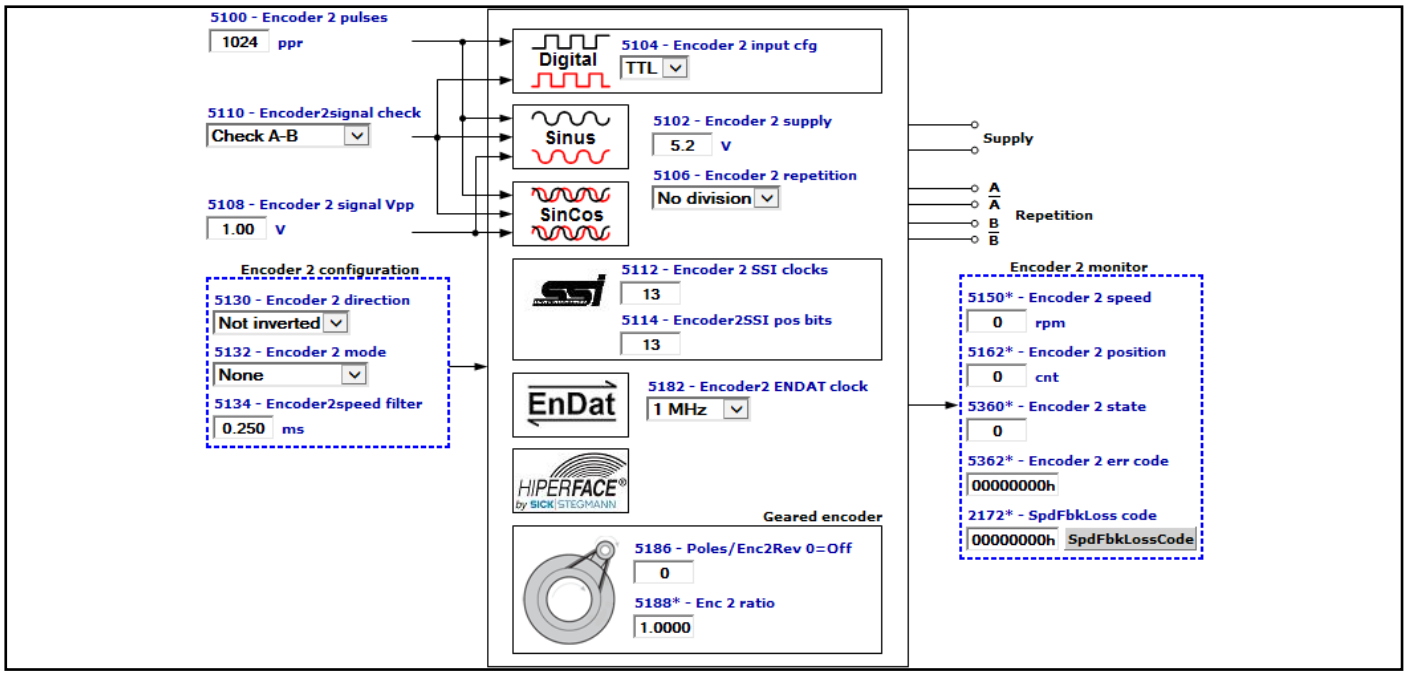
Encoder config

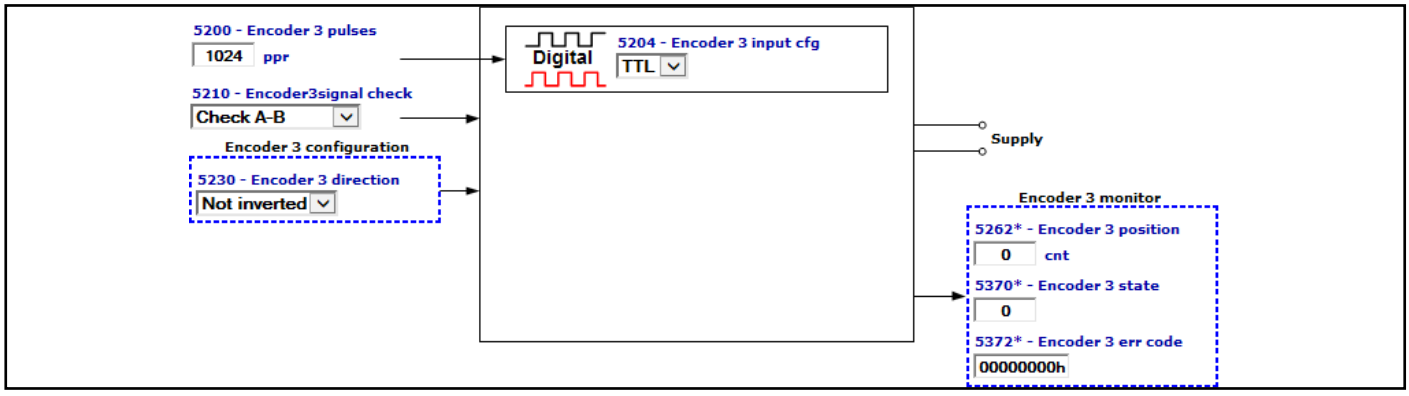
ENCODER 1 CONFIGURATION [Encoder1]

ENCODER 2 CONFIGURATION [Encoder2]

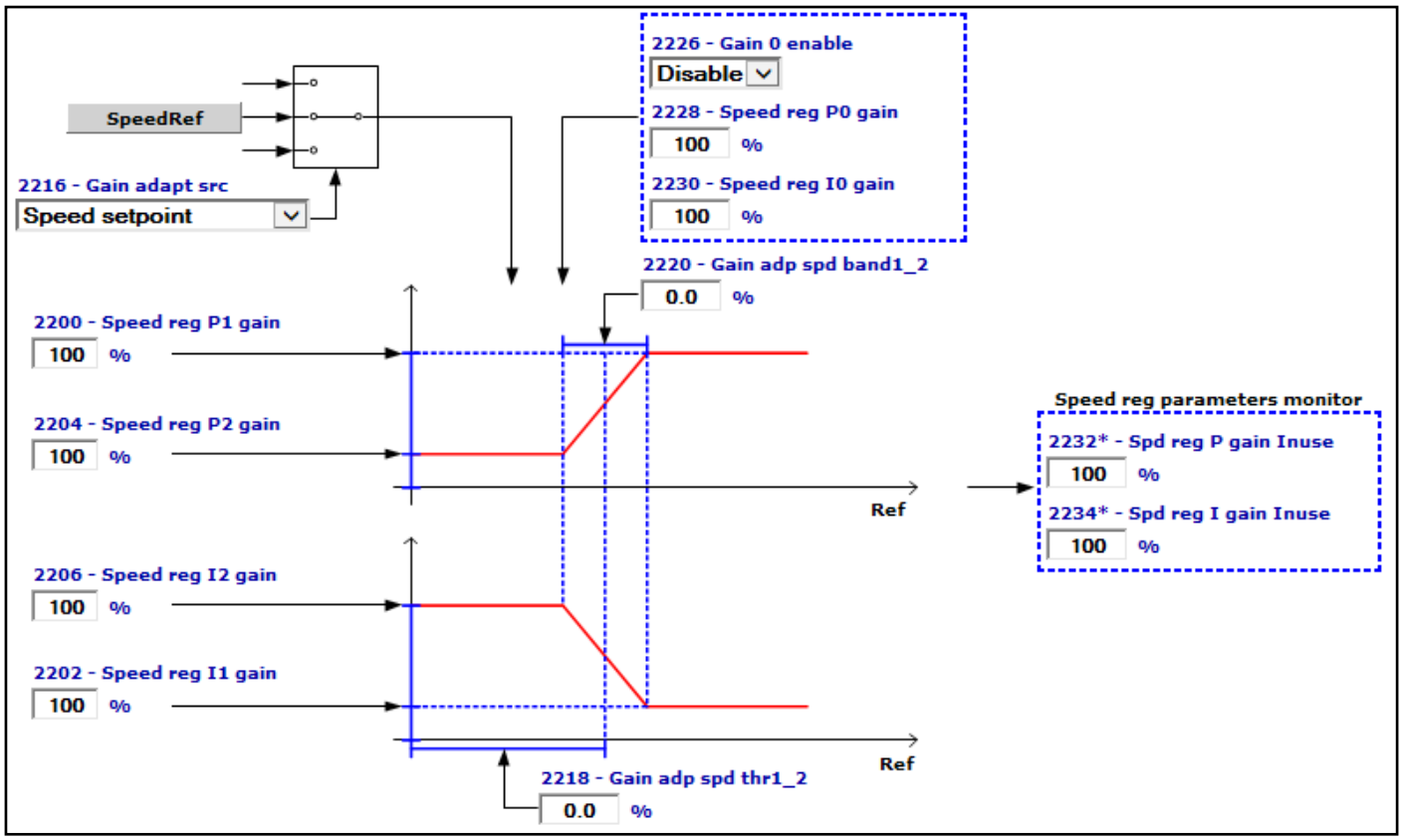
ENCODER 3 CONFIGURATION [Encoder3]



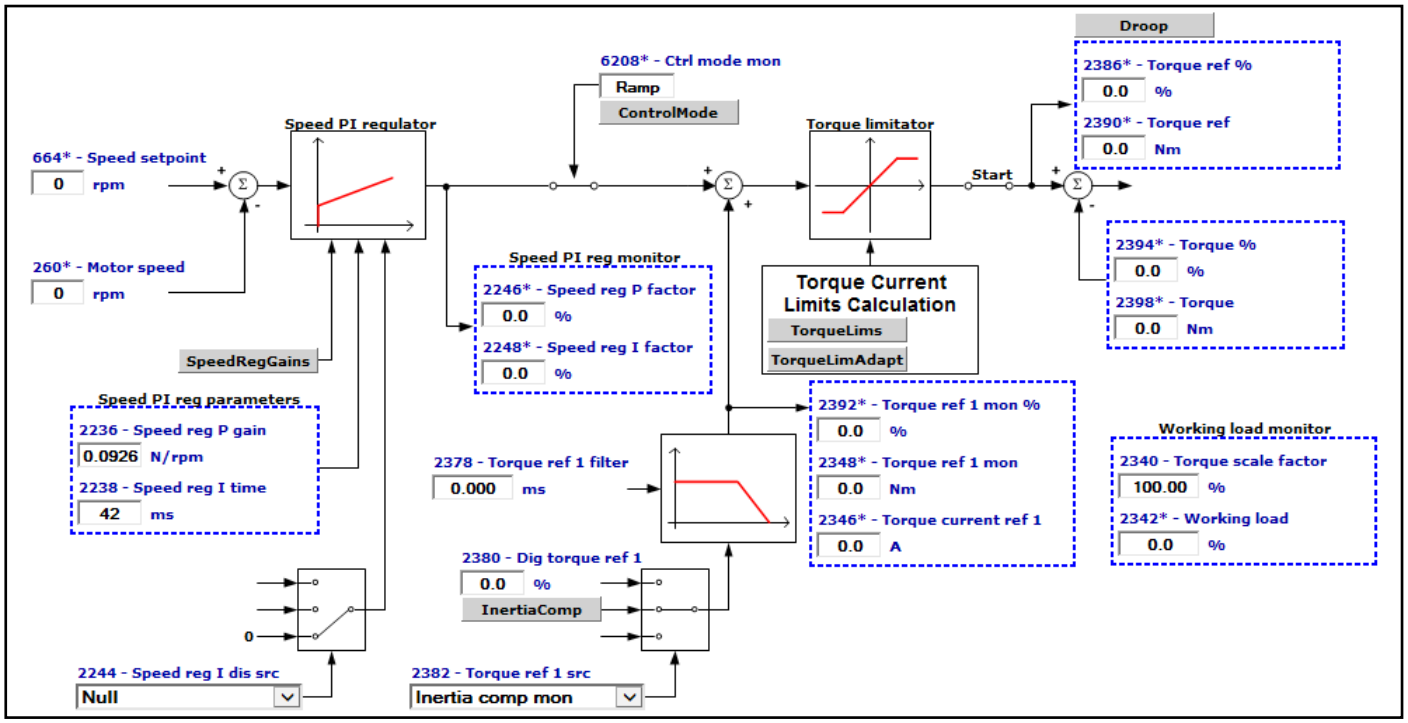


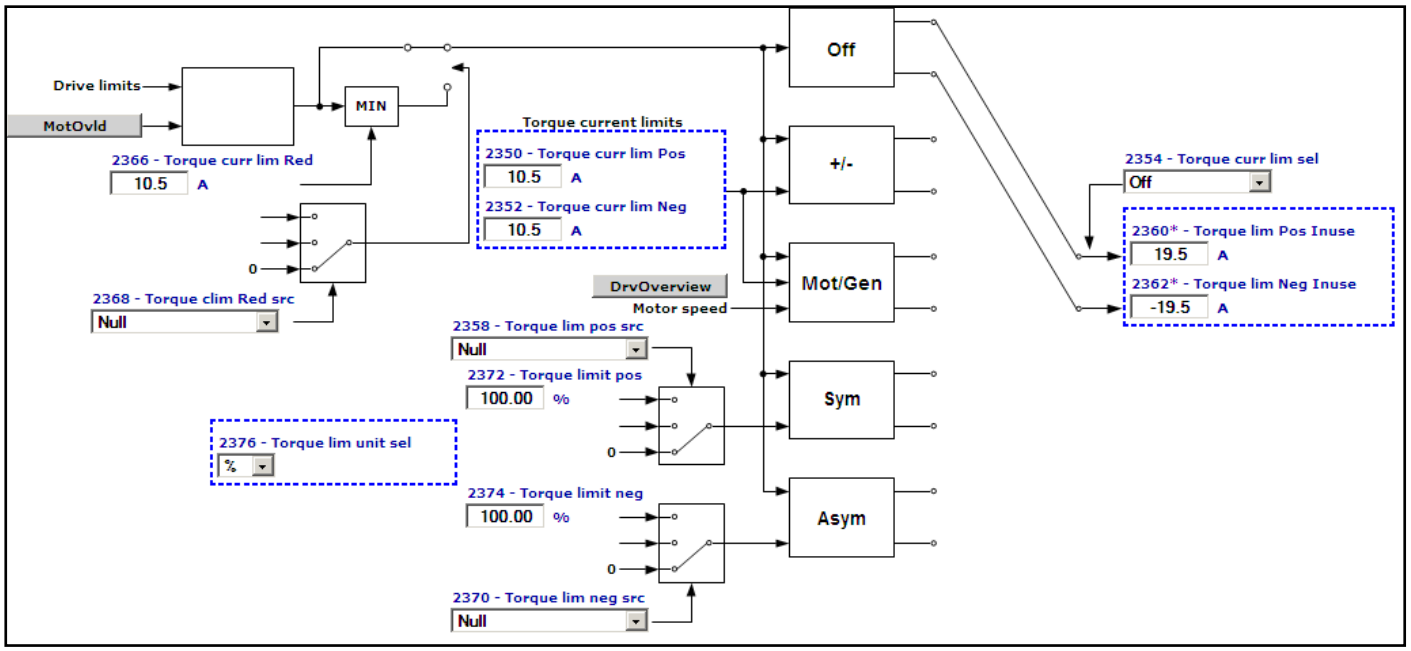


Speed reg gains

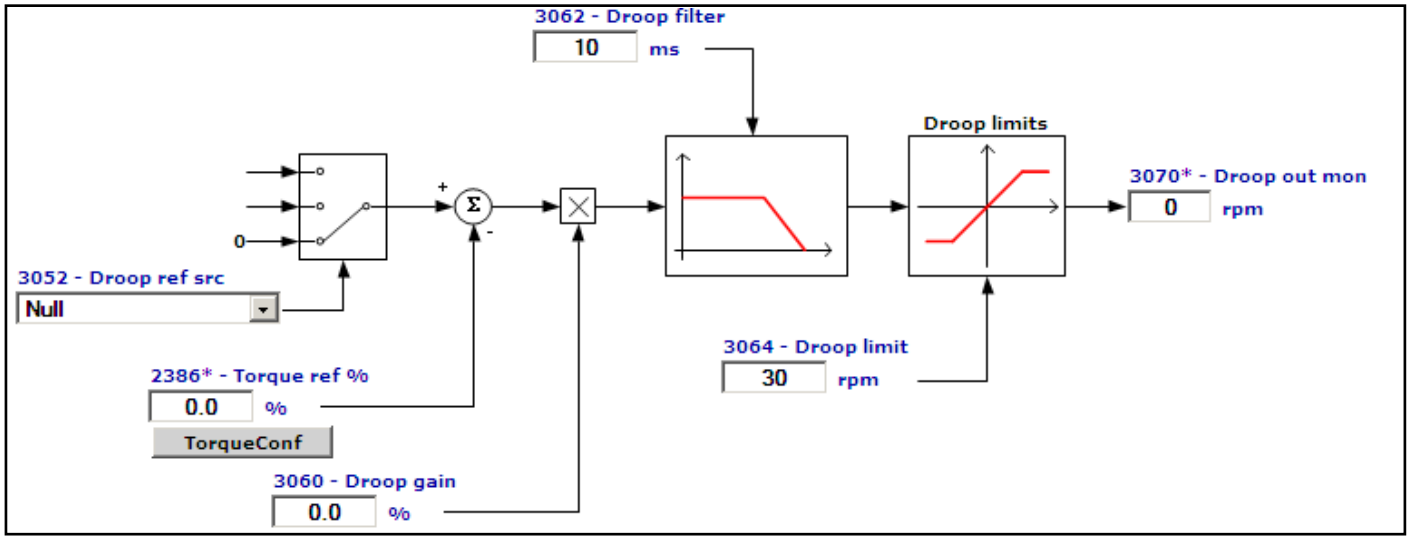


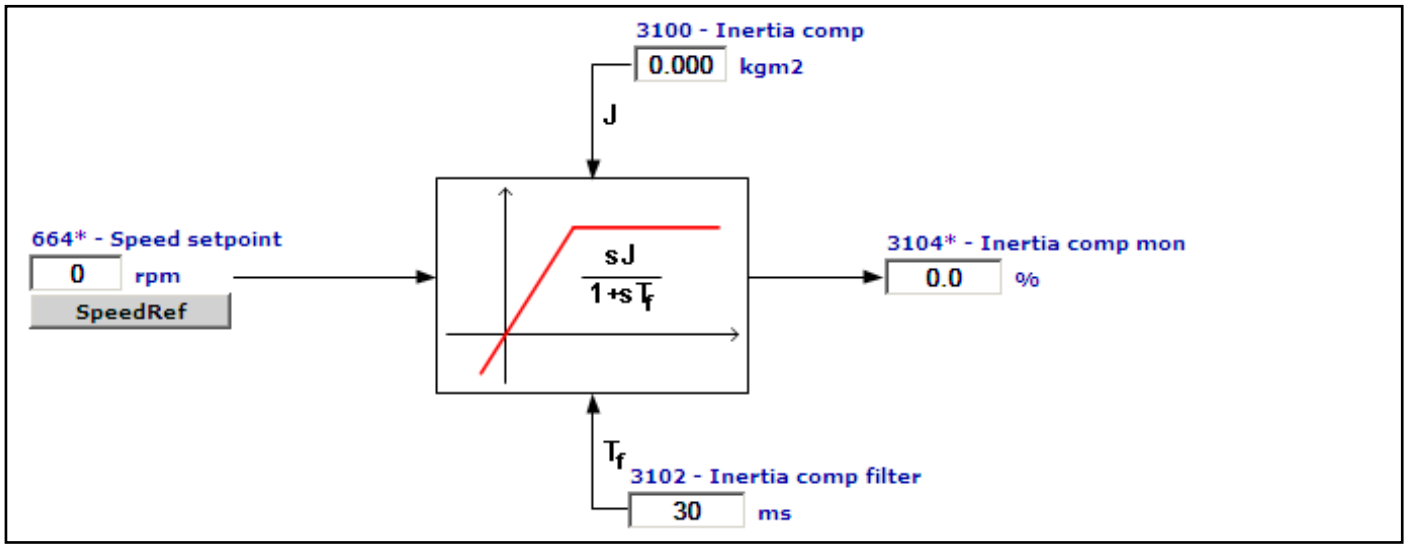
Torque config

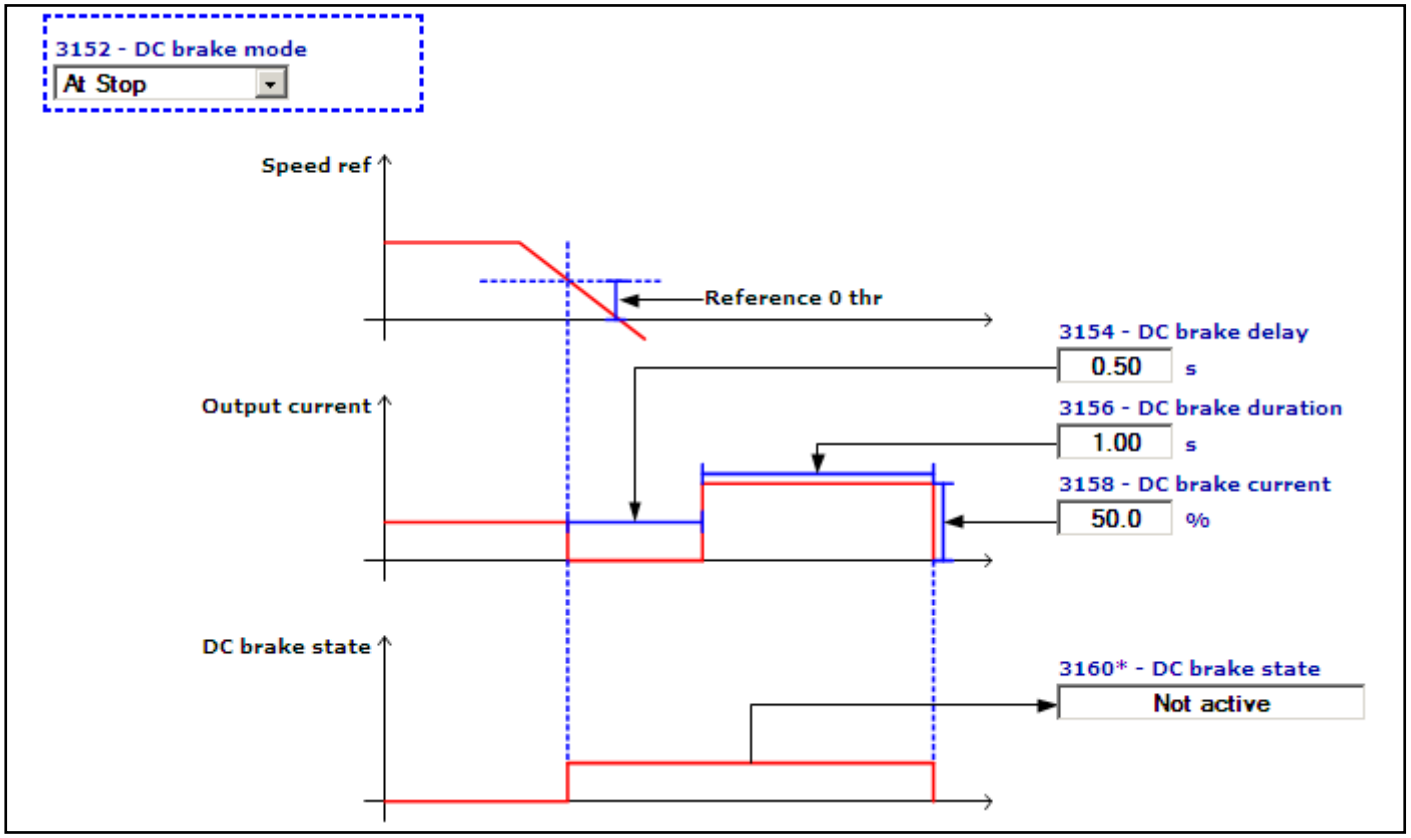


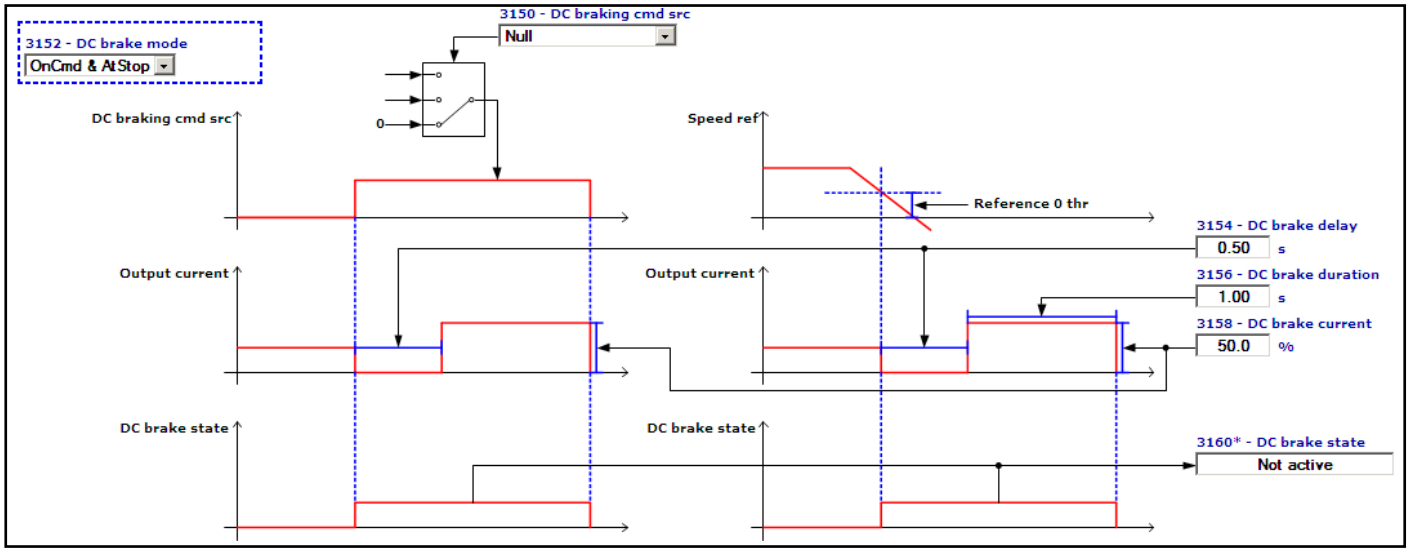


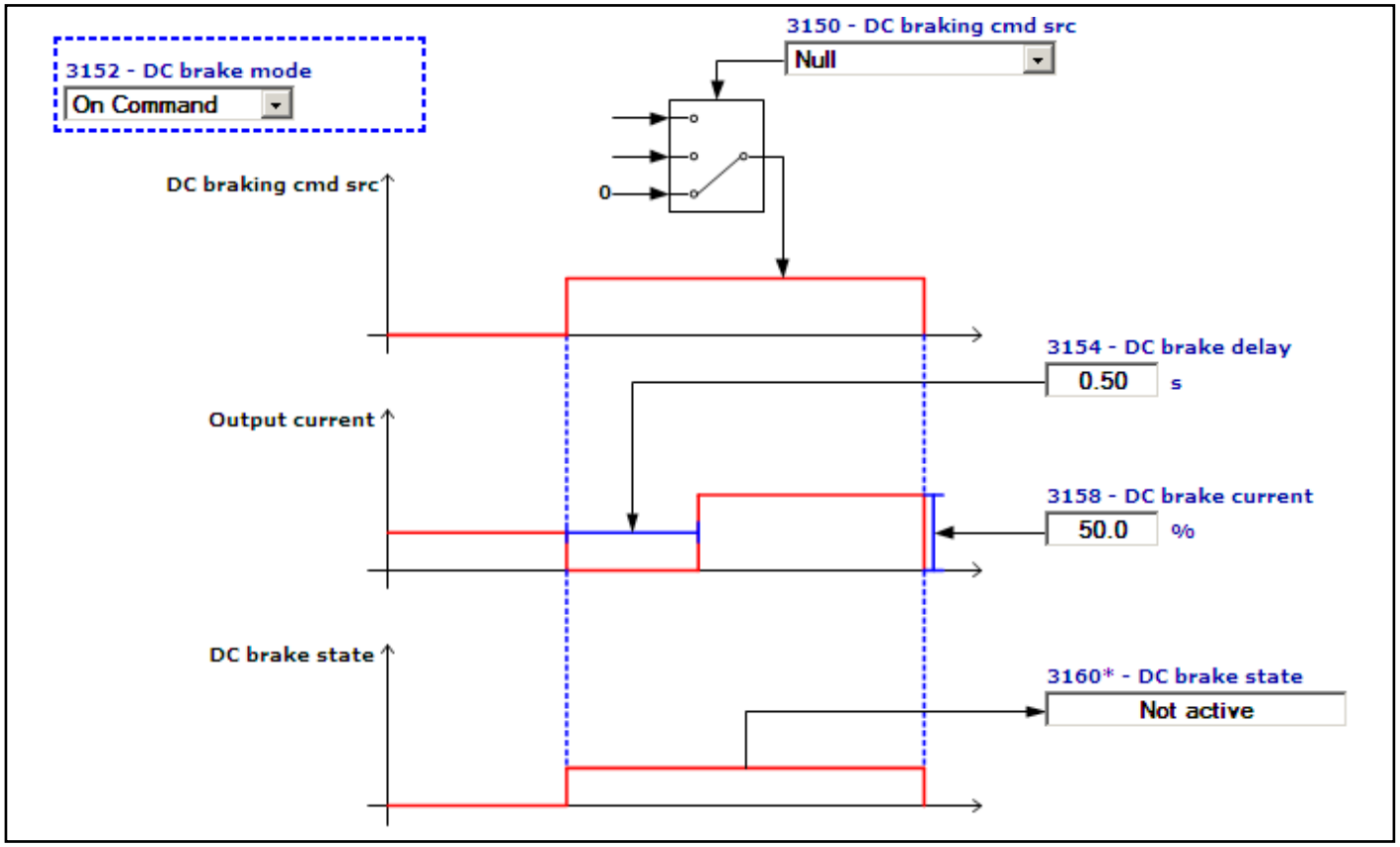
DROOP	Droop
INERTIA COMP	InertiaComp
MOTOR OVERLOAD	MotOvld
BRES OVERLOAD	BresOvld
DOUBLE PAR SET	DoubleParSet
POWER LOSS	PowerLoss
COMPARE	Compare
BRAKE CONTROL	BrakeCtrl
DIMENSION FACT	DimFactor
CONTROL MODE	ControlMode
TEMP CONTROL	TempControl
LC CONTROL	LCControl
TIMERS	Timers
TORQUE LIMADAPT	TorqueLimAdapt

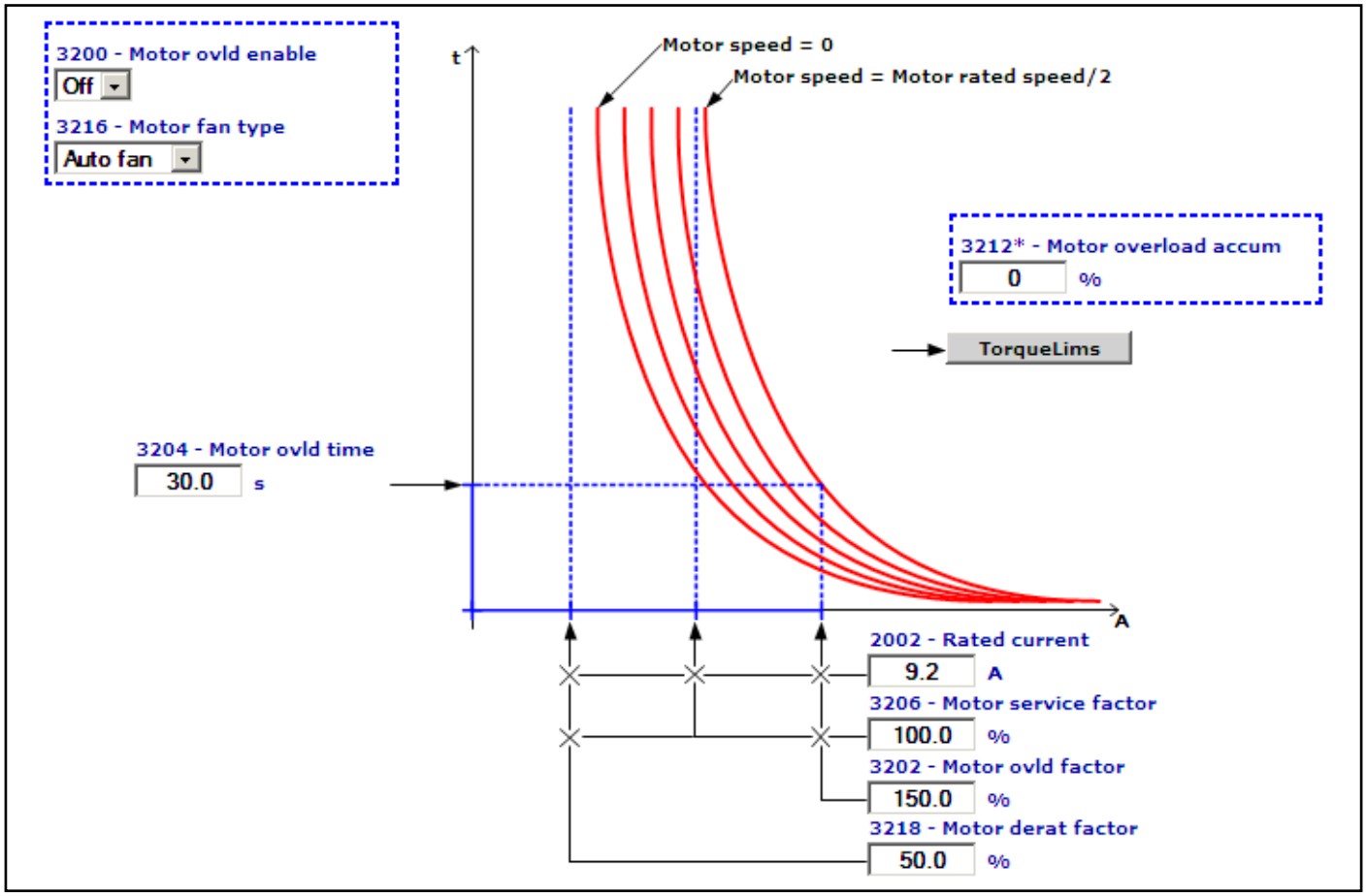


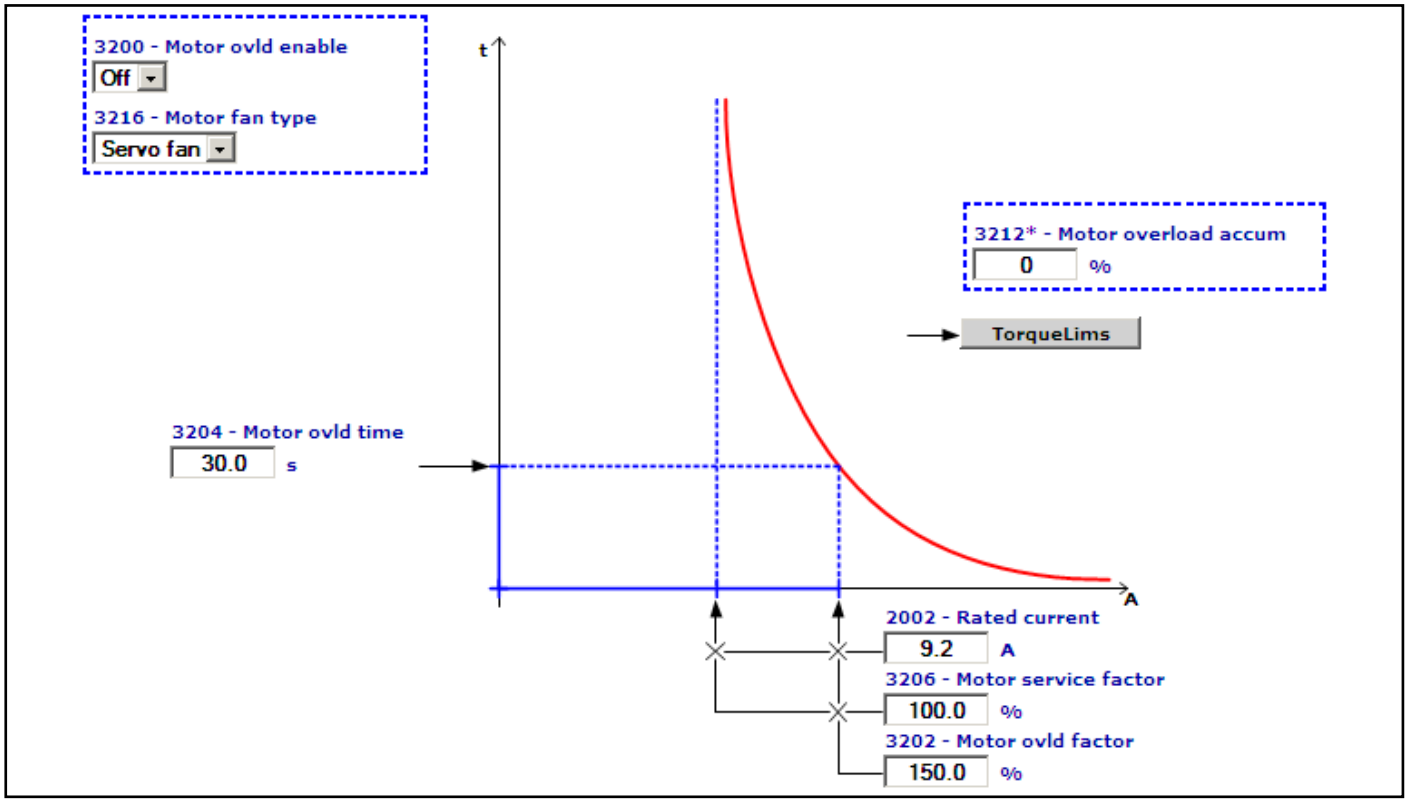


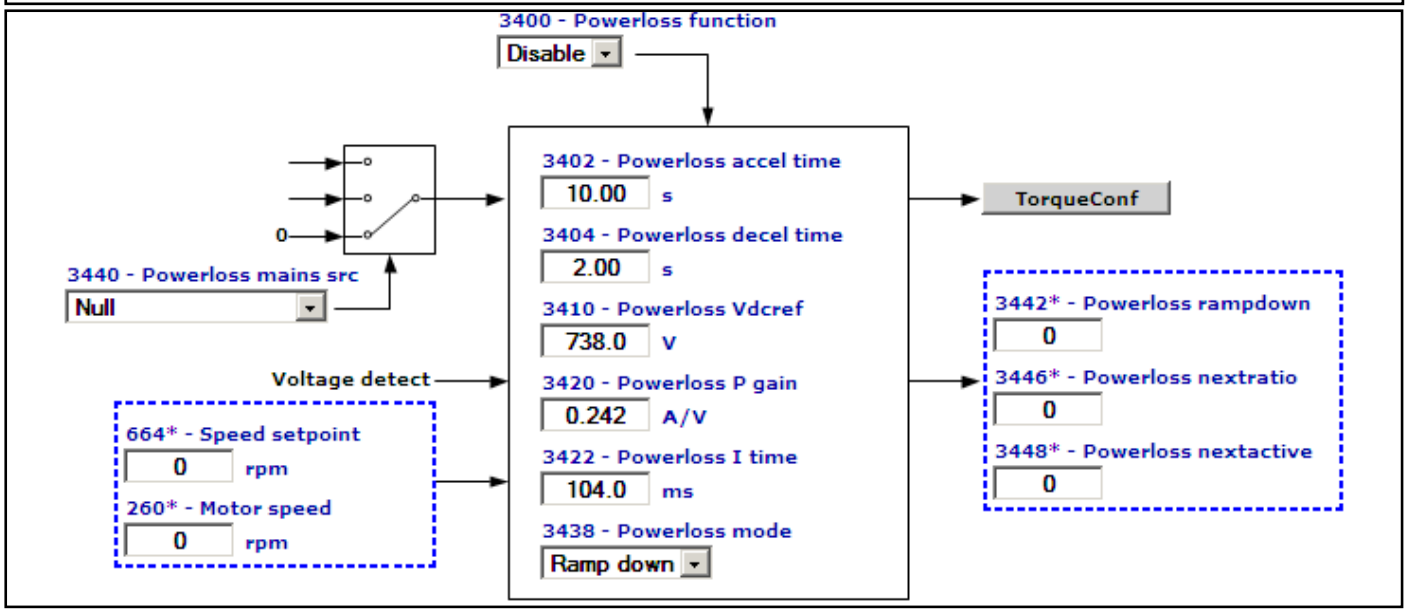

3152 - DC brake mode
At Stop
Speed ref
Reference 0 thr
3154 - DC brake delay
0.50
s
Output current
3156 - DC brake duration
1.00
s
3158 - DC brake current
50.0
%
DC brake state
3160* - DC brake state
Not active

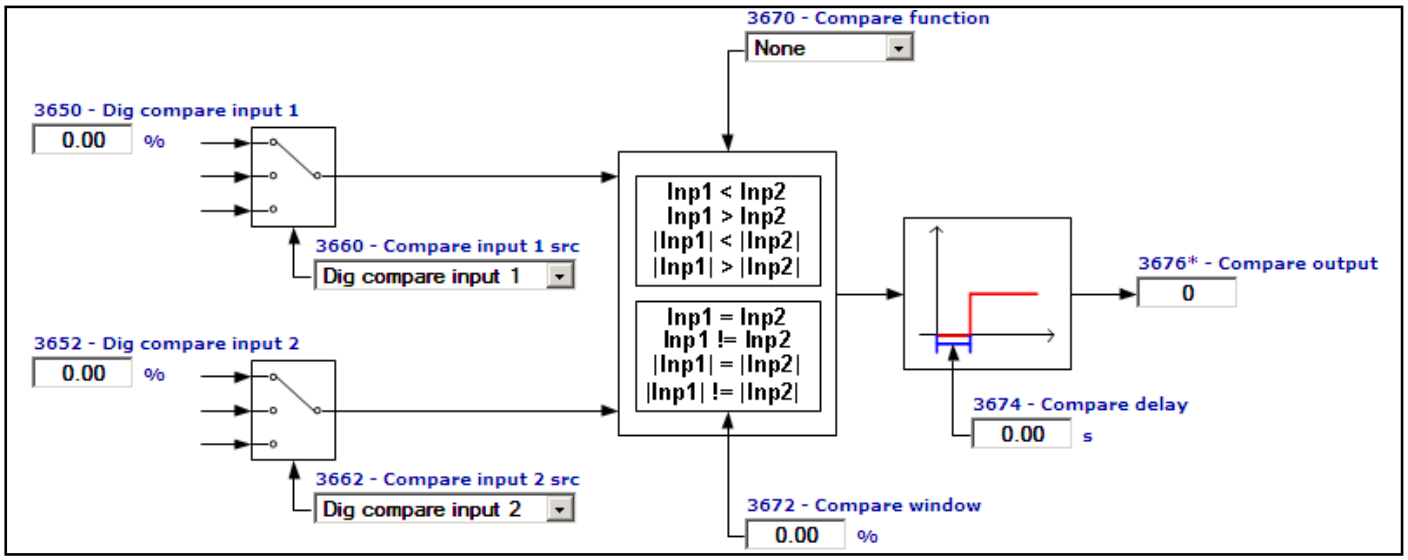

3152 - DC brake mode
OnCmd & AtStop
3150 - DC braking cmd src
Null
0
DC braking cmd src
Speed ref
Reference 0 thr
3154 - DC brake delay
0.50
s
Output current
Output current
3156 - DC brake duration
1.00
s
3158 - DC brake current
50.0
%
DC brake state
DC brake state
3160* - DC brake state
Not active

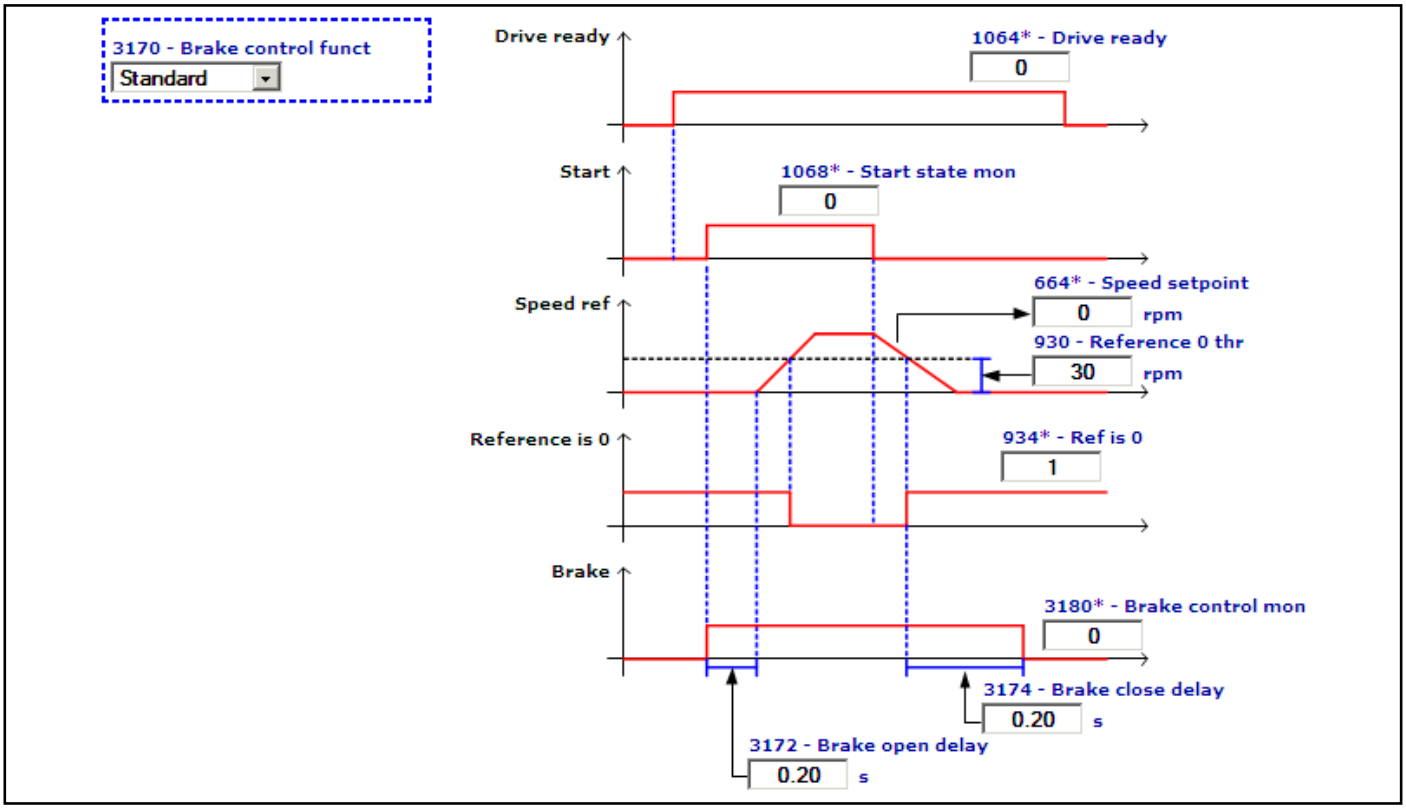

3152 - DC brake mode
On Command
3150 - DC braking cmd src
Null
0
DC braking cmd src
3154 - DC brake delay
0.50
s
Output current
3158 - DC brake current
50.0
%
DC brake state
3160* - DC brake state
Not active

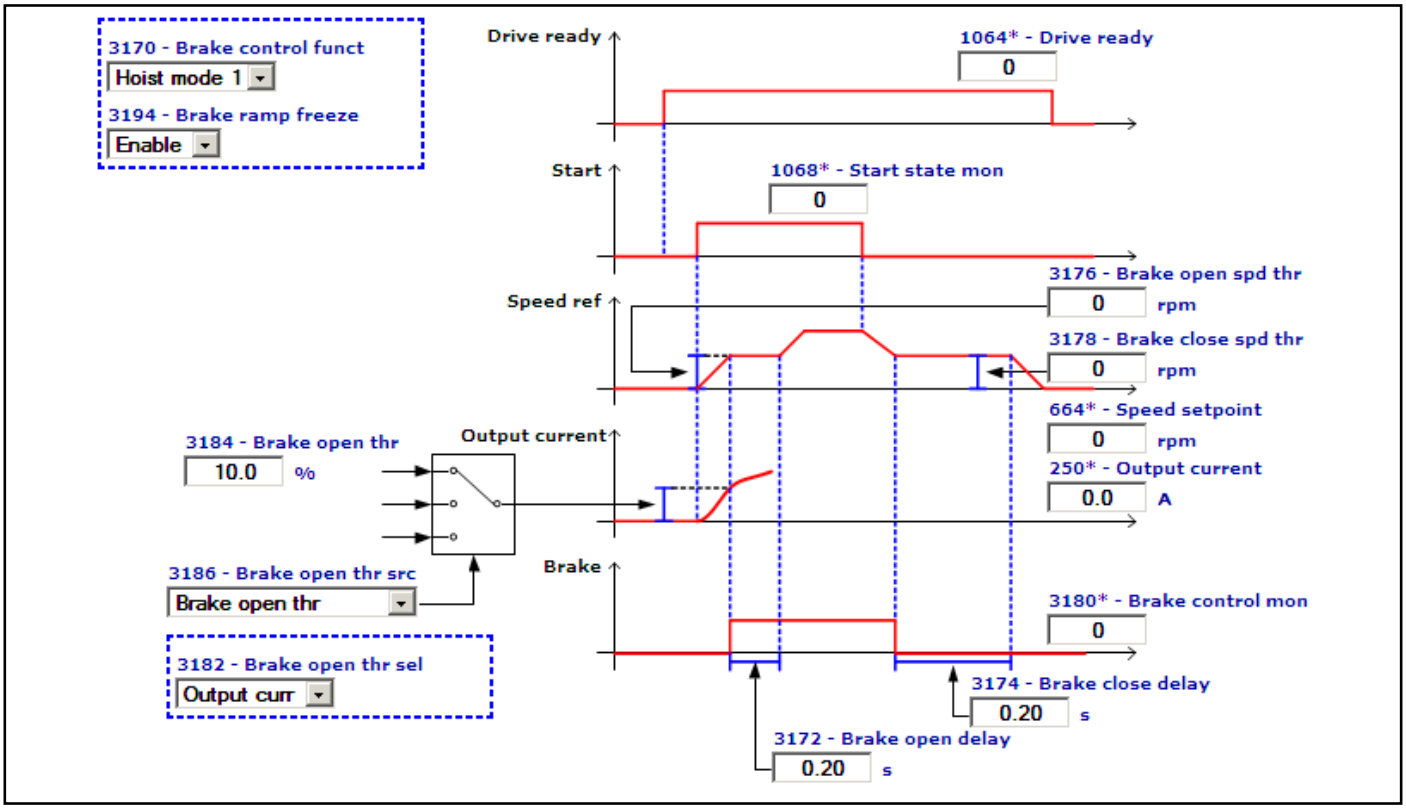

3200 - Motor ovld enable
Off
3216 - Motor fan type
Auto fan
t
Motor speed = 0
Motor speed = Motor rated speed/2
3212* - Motor overload accum
0
%
TorqueLims
3204 - Motor ovld time
30.0
s
A
2002 - Rated current
9.2
A
3206 - Motor service factor
100.0
%
3202 - Motor ovld factor
150.0
%
3218 - Motor derat factor
50.0
%

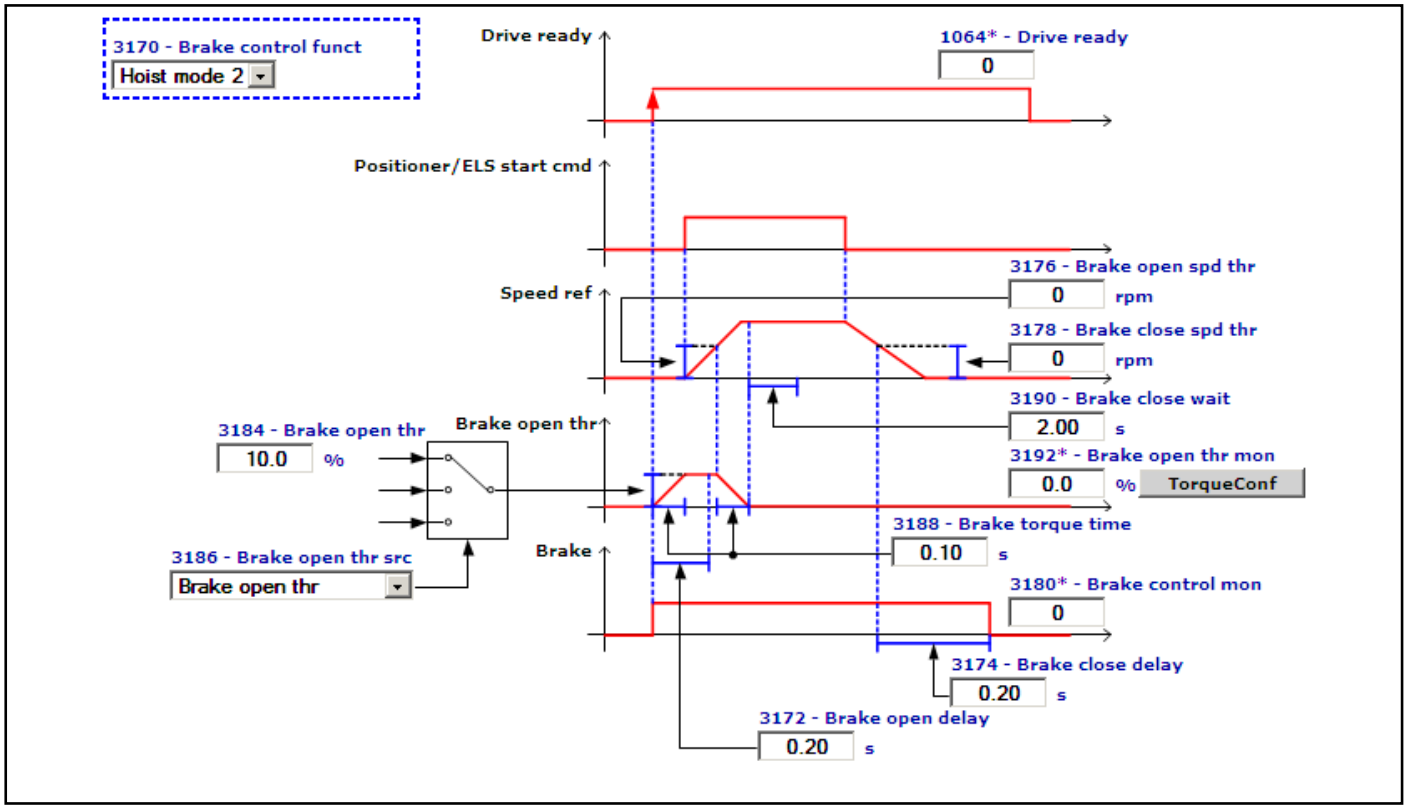

3200 - Motor ovld enable
Off
3216 - Motor fan type
Servo fan
t
3212* - Motor overload accum
0 %
TorqueLims
3204 - Motor ovld time
30.0 s
A
2002 - Rated current
9.2 A
3206 - Motor service factor
100.0 %
3202 - Motor ovld factor
150.0 %

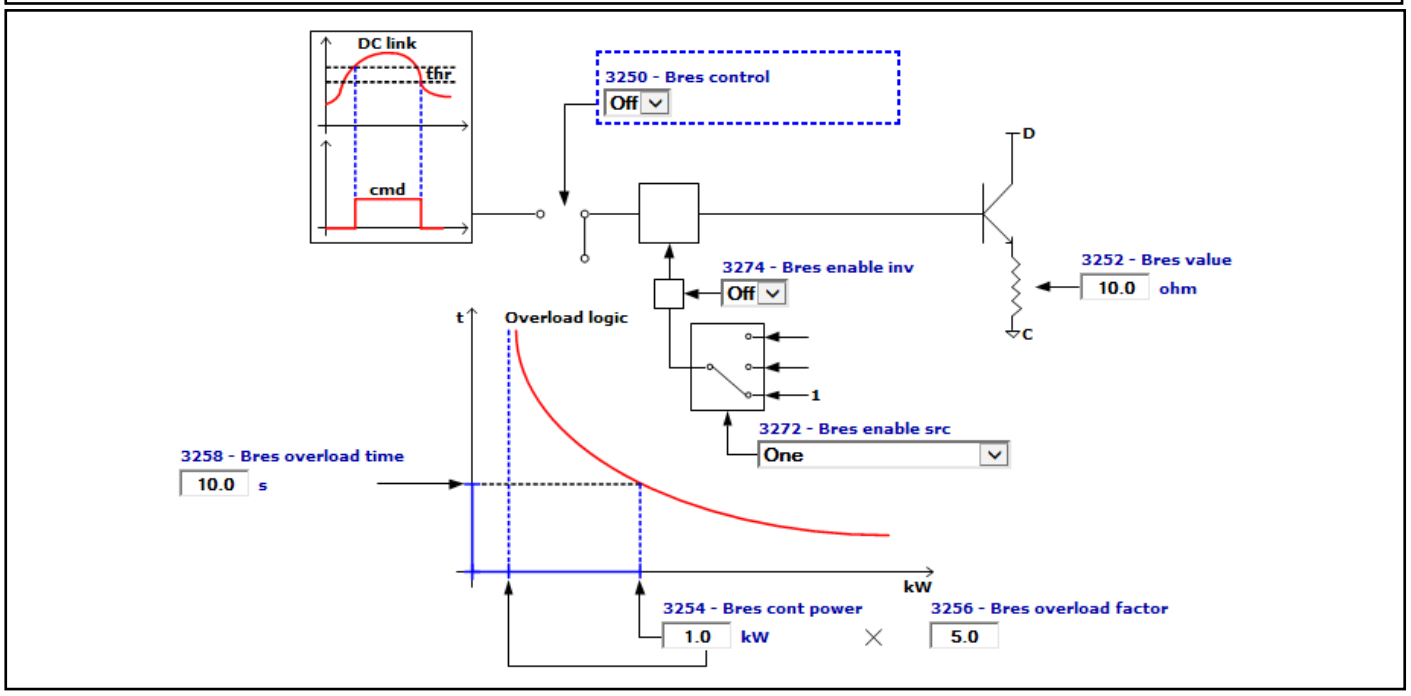

3400 - Powerloss function
Disable
0
3440 - Powerloss mains src
Null
Voltage detect
664* - Speed setpoint
0 rpm
260* - Motor speed
0 rpm
3402 - Powerloss accel time
10.00 s
3404 - Powerloss decel time
2.00 s
3410 - Powerloss Vdcref
738.0 V
3420 - Powerloss P gain
0.242 A/V
3422 - Powerloss I time
104.0 ms
3438 - Powerloss mode
Ramp down
TorqueConf
3442* - Powerloss rampdown
0
3446* - Powerloss nextratio
0
3448* - Powerloss nextactive
0

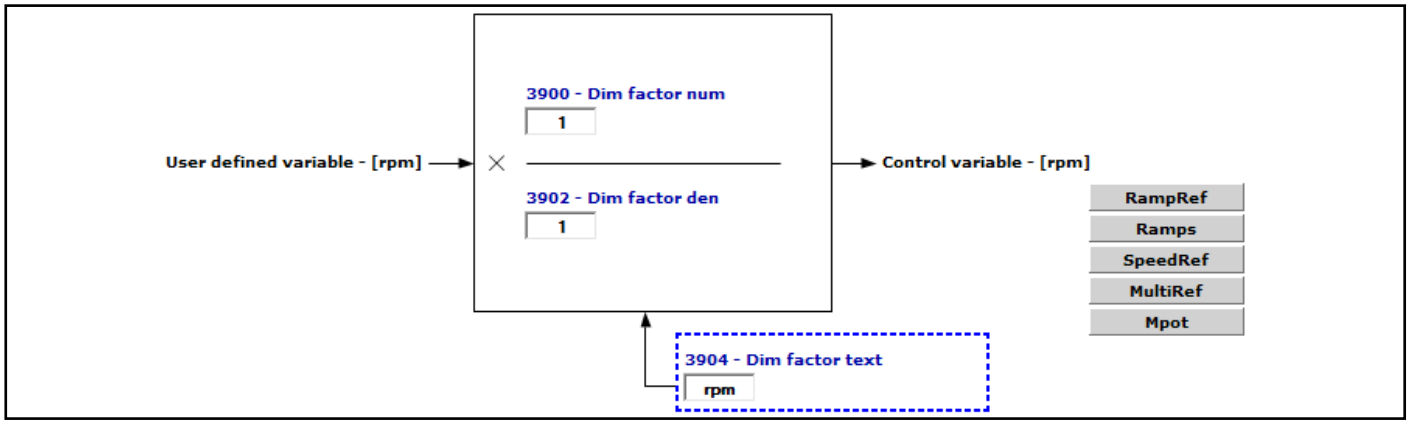

3670 - Compare function
None
3650 - Dig compare input 1
0.00 %
3660 - Compare input 1 src
Dig compare input 1
3652 - Dig compare input 2
0.00 %
3662 - Compare input 2 src
Dig compare input 2
Inp1 < Inp2
Inp1 > Inp2
|Inp1| < |Inp2|
|Inp1| > |Inp2|
Inp1 = Inp2
Inp1 != Inp2
|Inp1| = |Inp2|
|Inp1| != |Inp2|
3676* - Compare output
0
3674 - Compare delay
0.00 s
3672 - Compare window
0.00 %

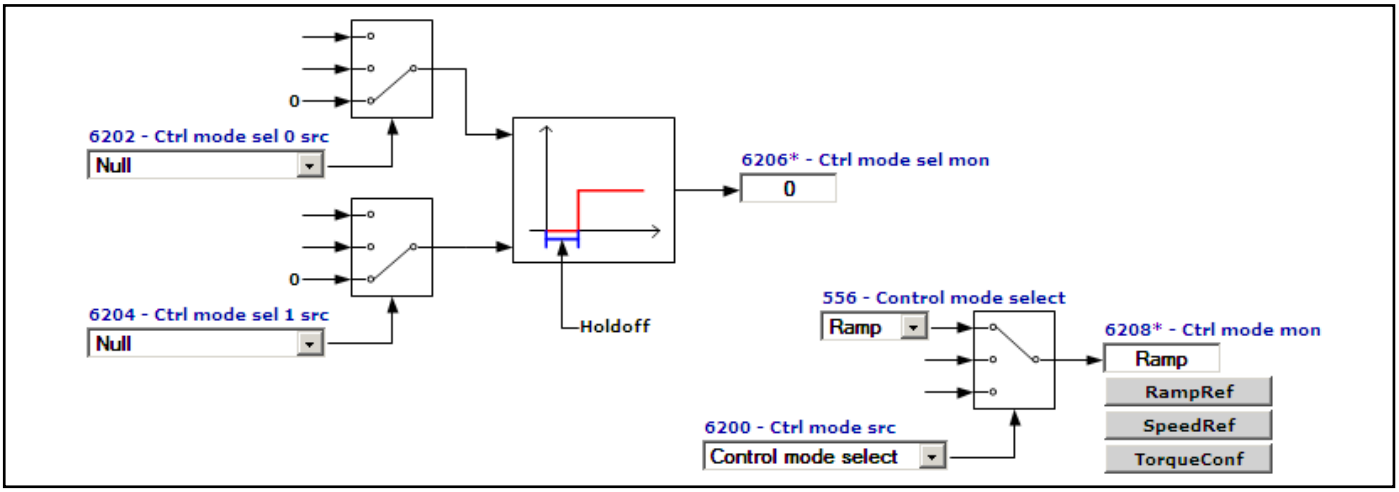

3170 - Brake control funct
Standard
Drive ready
1064* - Drive ready
0
Start
1068* - Start state mon
0
Speed ref
664* - Speed setpoint
0
rpm
930 - Reference 0 thr
30
rpm
Reference is 0
934* - Ref is 0
1
Brake
3180* - Brake control mon
0
3174 - Brake close delay
0.20
s
3172 - Brake open delay
0.20
s

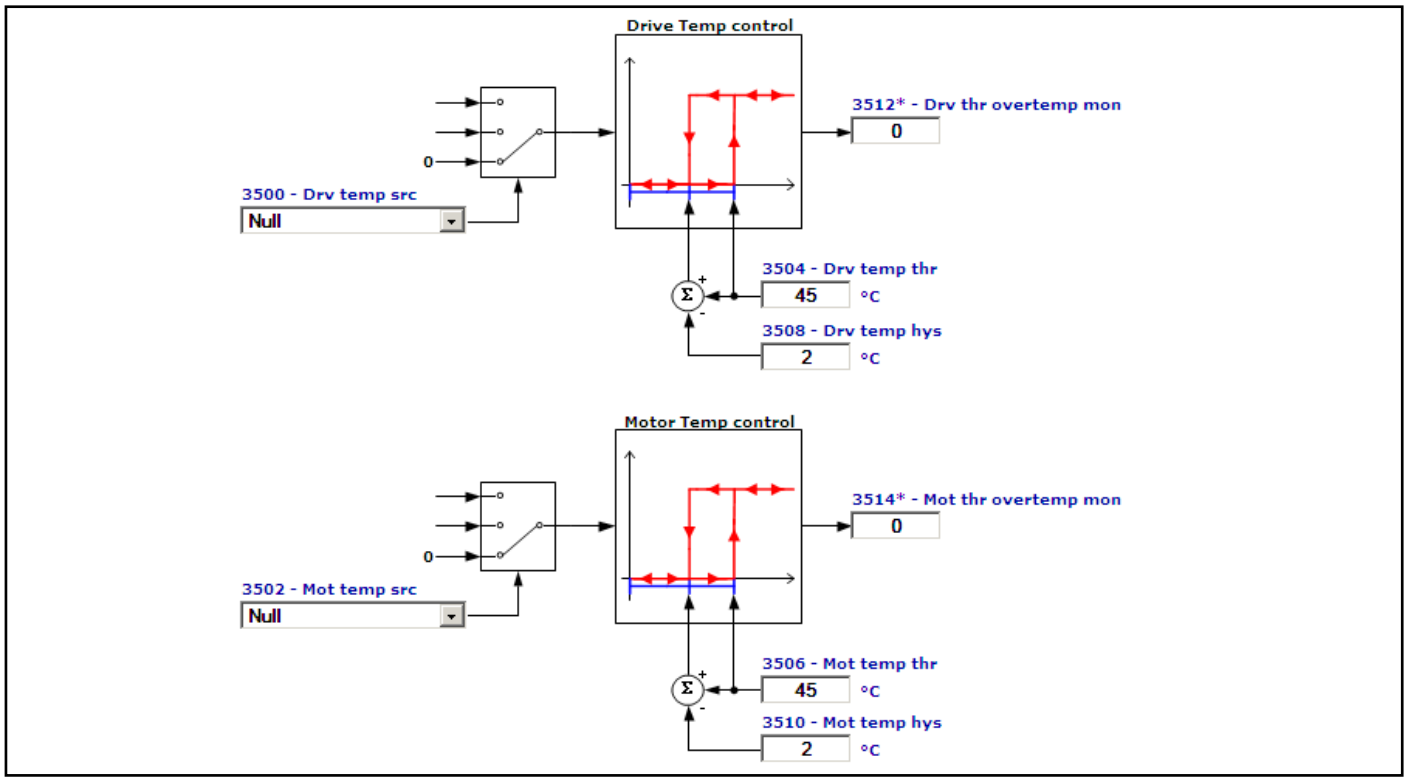

3170 - Brake control funct
Hoist mode 1
3194 - Brake ramp freeze
Enable
Drive ready
1064* - Drive ready
0
Start
1068* - Start state mon
0
Speed ref
3176 - Brake open spd thr
0
rpm
3178 - Brake close spd thr
0
rpm
664* - Speed setpoint
0
rpm
3184 - Brake open thr
10.0
%
Output current
250* - Output current
0.0
A
3186 - Brake open thr src
Brake open thr
Brake
3180* - Brake control mon
0
3182 - Brake open thr sel
Output curr
3174 - Brake close delay
0.20
s
3172 - Brake open delay
0.20
s

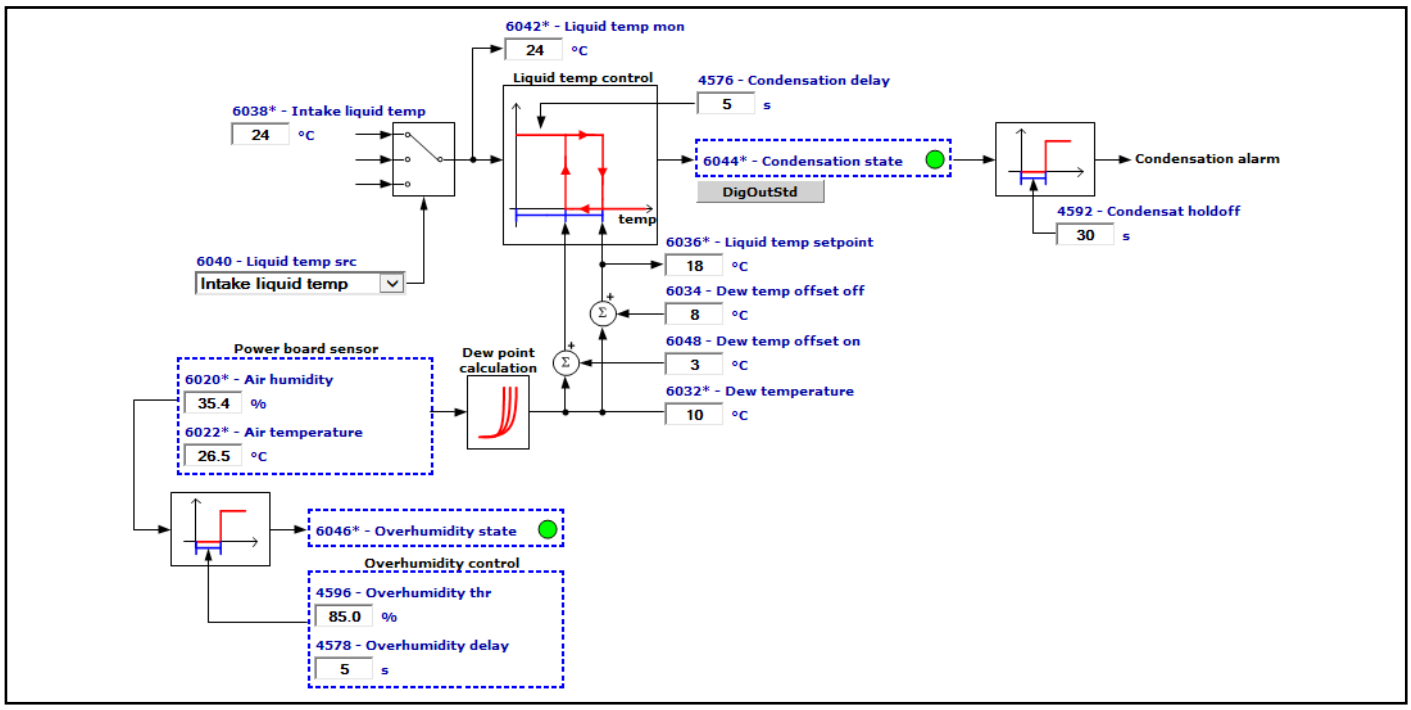

3170 - Brake control funct
Hoist mode 2
Drive ready
1064* - Drive ready
0
Positioner/ELS start cmd
Speed ref
3176 - Brake open spd thr
0
rpm
3178 - Brake close spd thr
0
rpm
3190 - Brake close wait
2.00
s
3184 - Brake open thr
10.0
%
Brake open thr
3192* - Brake open thr mon
0.0
%
TorqueConf
3188 - Brake torque time
0.10
s
3186 - Brake open thr src
Brake open thr
Brake
3180* - Brake control mon
0
3174 - Brake close delay
0.20
s
3172 - Brake open delay
0.20
s

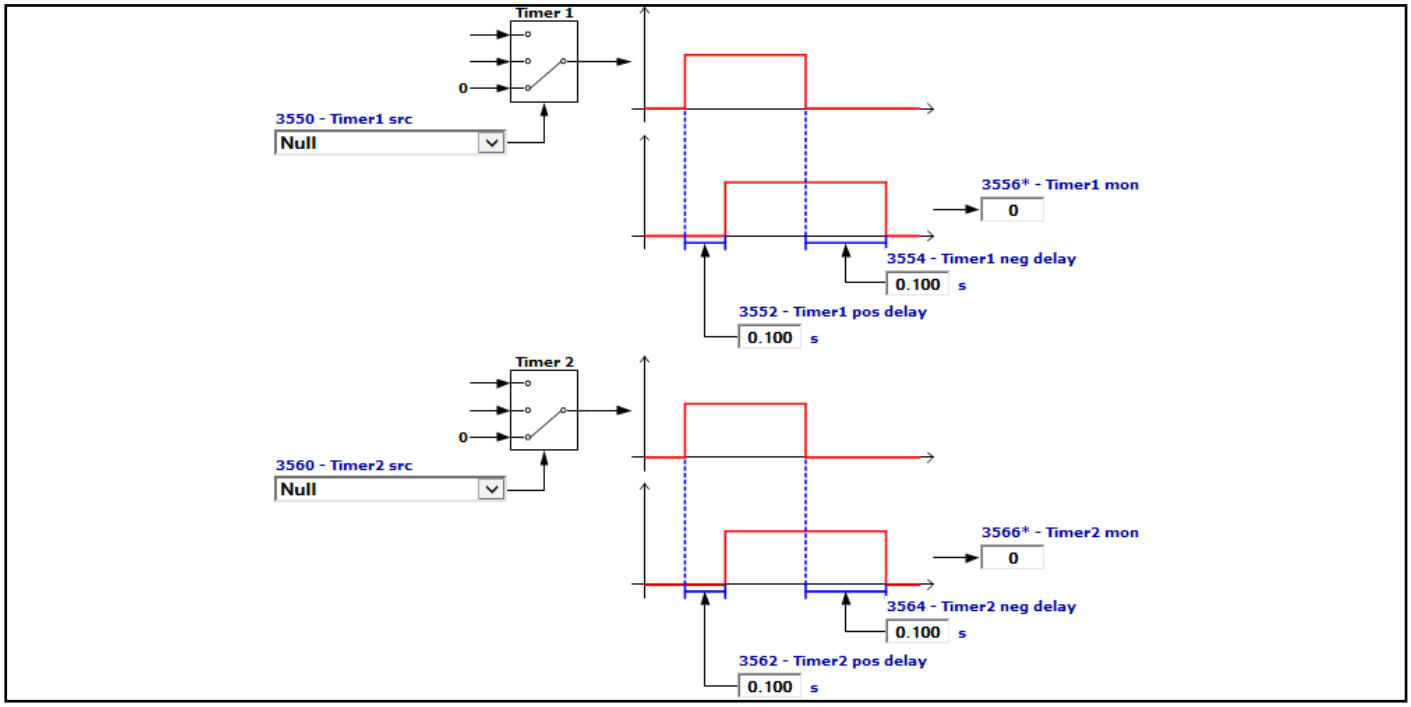

DC link
fthr
cmd
3250 - Bres control
Off
D
C
3252 - Bres value
10.0
ohm
3274 - Bres enable inv
Off
1
3272 - Bres enable src
One
t
Overload logic
3258 - Bres overload time
10.0
s
kW
3254 - Bres cont power
1.0
kW
3256 - Bres overload factor
5.0

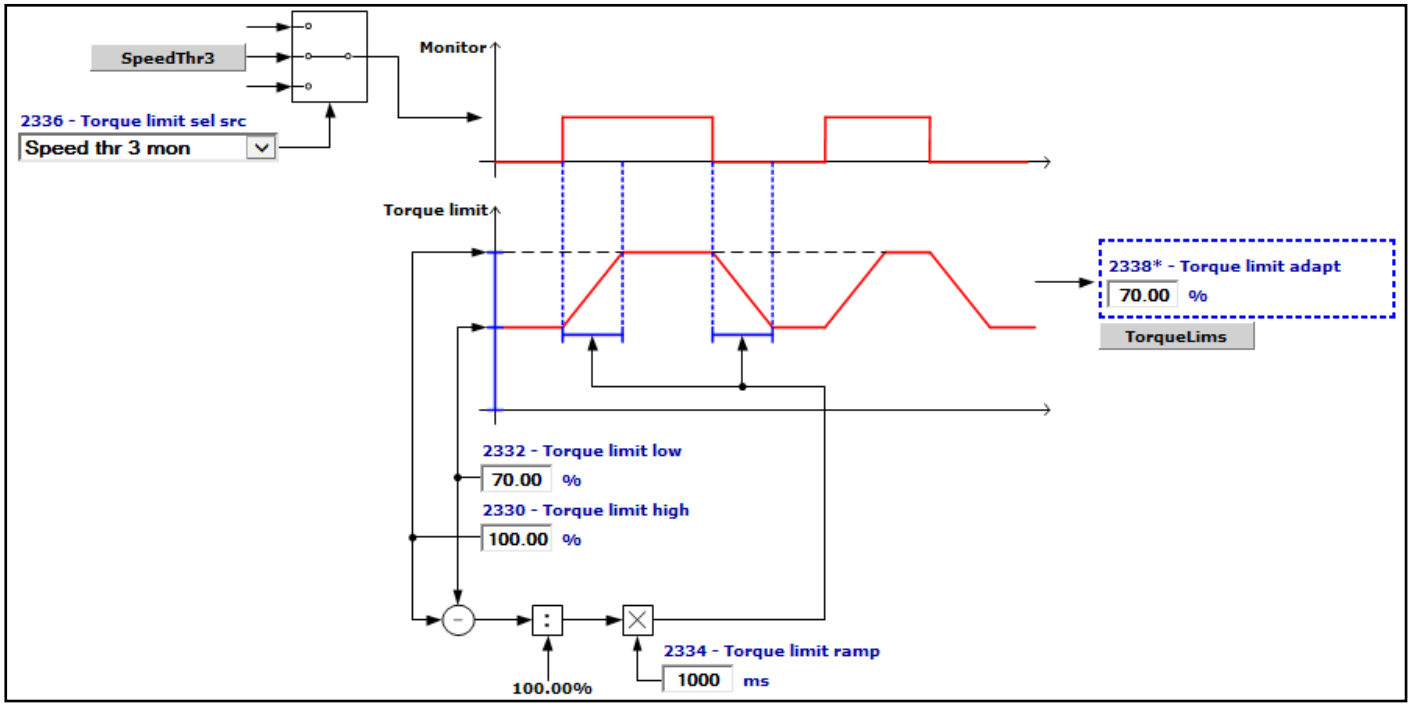

3900 - Dim factor num
1
User defined variable - [rpm]
Control variable - [rpm]
3902 - Dim factor den
1
RampRef
Ramps
SpeedRef
MultiRef
Mpot
3904 - Dim factor text
rpm


0
6202 - Ctrl mode sel 0 src
Null
0
6204 - Ctrl mode sel 1 src
Null
Holdoff
6206* - Ctrl mode sel mon
0
556 - Control mode select
Ramp
6208* - Ctrl mode mon
Ramp
RampRef
SpeedRef
TorqueConf
6200 - Ctrl mode src
Control mode select


Drive Temp control
0
3500 - Drv temp src
Null
3512* - Drv thr overtemp mon
0
3504 - Drv temp thr
45 °C
3508 - Drv temp hys
2 °C
Motor Temp control
0
3502 - Mot temp src
Null
3514* - Mot thr overtemp mon
0
3506 - Mot temp thr
45 °C
3510 - Mot temp hys
2 °C


6042* - Liquid temp mon
24 °C
Liquid temp control
4576 - Condensation delay
5 s
6038* - Intake liquid temp
24 °C
6044* - Condensation state
DigOutStd
Condensation alarm
4592 - Condensat holdoff
30 s
temp
6040 - Liquid temp src
Intake liquid temp
6036* - Liquid temp setpoint
18 °C
6034 - Dew temp offset off
8 °C
6048 - Dew temp offset on
3 °C
Power board sensor
6020* - Air humidity
35.4 %
6022* - Air temperature
26.5 °C
Dew point calculation
6032* - Dew temperature
10 °C
6046* - Overhumidity state
Overhumidity control
4596 - Overhumidity thr
85.0 %
4578 - Overhumidity delay
5 s


Timer 1
0
3550 - Timer1 src
Null
3556* - Timer1 mon
0
3554 - Timer1 neg delay
0.100 s
3552 - Timer1 pos delay
0.100 s
Timer 2
0
3560 - Timer2 src
Null
3566* - Timer2 mon
0
3564 - Timer2 neg delay
0.100 s
3562 - Timer2 pos delay
0.100 s


SpeedThr3
2336 - Torque limit sel src
Speed thr 3 mon
Monitor
Torque limit
2338* - Torque limit adapt
70.00 %
TorqueLims
2332 - Torque limit low
70.00 %
2330 - Torque limit high
100.00 %
100.00%
2334 - Torque limit ramp
1000 ms

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1 - MONITOR										
1.1	250	Output current	A	FLOAT	16/32	0.0	0.0	0.0	R	FVS
1.2	252	Output voltage	V	FLOAT	16/32	0.0	0.0	0.0	R	FVS
1.3	254	Output frequency	Hz	FLOAT	16/32	0.0	0.0	0.0	R	FVS
1.4	256	Output power	kW	FLOAT	16/32	0.0	0.0	0.0	R	FVS
1.5	628	Ramp setpoint	FF	INT16	16/32	0	0	0	R	FVS
1.6	664	Speed setpoint	FF	INT16	16/32	0	0	0	R	FVS
1.7	260	Motor speed	FF	INT16	16/32	0	0	0	R	FVS
1.8	270	DC link voltage	V	FLOAT	16/32	0.0	0.0	0.0	ER	FVS
1.9	272	Heatsink temperature	degC	INT16	16	0	0	0	ER	FVS
1.10	290	Motor temperature	degC	FLOAT	16	0.0	0.0	0.0	ER	FVS
1.11	292	Sensor inp X mon	degC	FLOAT	16	0.0	0.0	0.0	ER	FVS
1.12	1544	An inp 1 temp mon	degC	FLOAT	16	0.0	0.0	0.0	ER	FVS
1.13	1594	An inp 2 temp mon	degC	FLOAT	16	0.0	0.0	0.0	ER	FVS
1.14	1610	An inp 1X temp mon	degC	FLOAT	16	0.0	0.0	0.0	ER	FVS
1.15	1660	An inp 2X temp mon	degC	FLOAT	16	0.0	0.0	0.0	ER	FVS1
1.16	2342	Working load	perc	FLOAT		0.0	0.0	0.0	ER	FVS
1.17	280	Torque current ref	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS
1.18	282	Magnet current ref	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS
1.19	284	Torque current	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS
1.20	286	Magnet current	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS
1.21	3212	Motor overload accum	perc	UINT16	16/32	0	0	100	ER	FVS
1.22	368	Drive overload accum	perc	UINT16	16/32	0	0	100	ER	FVS
1.23	3260	Bres overload accum	perc	UINT16	16/32	0	0	100	ER	FVS
1.24	1066	Enable state mon		BIT	16	0	0	1	R	FVS
1.25	1068	Start state mon		BIT	16	0	0	1	R	FVS
1.26	1070	FastStop state mon		BIT	16	0	0	1	R	FVS
1.27	1100	Digital input mon		UINT16	16	0	0	0	R	FVS
1.28	1300	Digital output mon		UINT16		0	0	0	R	FVS
1.29	1200	Digital input X mon		UINT16	16	0	0	0	R	FVS
1.30	1400	Digital output X mon		UINT16		0	0	0	R	FVS
1.31	5400	Dig inp 0Ext mon		UINT32	32	0	0	4294967295	ER	FVS
1.32	5402	Dig inp 1Ext mon		UINT32	32	0	0	4294967295	ER	FVS
1.33	5450	Digital out 0Ext mon		UINT32	32	0	0	0	ER	FVS
1.34	5452	Digital out 1Ext mon		UINT32	32	0	0	0	ER	FVS
2 - DRIVE INFO										
2.1	480	Control type		ENUM		Syn	0	0	R	FVS
				1	Asynchronous					
				2	Synchronous					
2.2	482	Drive size		UINT16		0	0	0	RS	FVS
2.3	484	Drive family		ENUM		No power	0	0	RS	FVS
				0	No power					
				1	380V..480V					
				2	500V..575V					
				3	690V					
				4	230V					
				5	380V..480V LC					
2.4	486	Drive region		ENUM		EU	0	1	R	FVS
				0	EU					
				1	USA					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.5	488	Drive cont current	A	FLOAT		CALCF	0.0	0.0	RZS	FVS
2.6	490	Firmware ver.rel		UINT16		0	0	0	R	FVS
2.7	496	Firmware type		UINT16		0	0	0	R	FVS
2.8	504	Application ver.rel		UINT16		0	0	0	ER	FVS
2.9	506	Application type		UINT16		0	0	0	ER	FVS
2.10	508	Application subver		UINT16		0	0	0	ER	FVS
2.11	510	Time drive power on	h.min	UINT32		0	0	0	ER	FVS
2.12	512	Time drive enable	h.min	UINT32		0	0	0	ER	FVS
2.13	514	Number power up		UINT16		0	0	0	ER	FVS
2.14	516	Time fan on	h.min	UINT32		0	0	0	ER	FVS
2.15	526	Power file ver.rel		UINT16		0	0	0	ER	FVS
2.16	530	Slot1 card type		ENUM		None	0	0	R	FVS
2.17	532	Slot2 card type		ENUM		None	0	0	R	FVS
2.18	534	Slot3 card type		ENUM		None	0	0	R	FVS
				0	None					
				769	I/O 1					
				1793	I/O 2					
				2305	I/O 3					
				3329	I/O 4					
				1544	Enc 1					
				1800	Enc 2					
				520	Enc 3					
				776	Enc 4					
				1032	Enc 5					
				2056	Enc 7					
				4	Can/Dnet					
				260	Profibus					
				516	RTE					
				576	FastLink					
				320	I/O Ext					
				832	I/O FastLink					
				255	Unknown					
				2312	Enc 8					
				1288	Enc 6					
				5633	I/O 6					
				6401	I/O 7					
				7681	I/O 8					
2.19	546	Fw enc sl2 ver.rel		UINT16		0	0	0	R	FVS
2.20	548	Fw enc sl2 type		UINT16		0	0	0	R	FVS
2.21	5300	Fw enc sl1-3 ver.rel		UINT16		0	0	0	R	FVS
2.22	5302	Fw enc sl1-3 type		UINT16		0	0	0	R	FVS
2.23	5724	Fw FastLink ver.rel		UINT16		0	0	0	ER	FVS
2.24	5726	Fw FastLink type		UINT16		0	0	0	ER	FVS

3 - STARTUP WIZARD

4 - DRIVE CONFIG

4.1	550	Save parameters		BIT		0	0	1	RW	FVS
4.2	552	Regulation mode		ENUM		Flux vector CL	1	3	RWZ	FVS
				1	Flux vector OL					
				2	Flux vector CL					
				3	Autotune					
4.3	554	Access mode		ENUM		Easy	0	1	RW	FVS
				0	Easy					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				1	Expert					
4.4	558	Application select		ENUM		None	0	2	ERWZ	FVS
				0	None					
				1	Application 1					
				2	Application 2					
4.5	560	Mains voltage		ENUM		400 V	SIZE	SIZE	ERWZS	FVS
				0	None					
				1	230 V					
				2	380 V					
				3	400 V					
				4	415 V					
				5	440 V					
				6	460 V					
				7	480 V					
				8	500 V					
				9	575 V					
				10	690 V					
4.6	586	DC supply		ENUM		None	0	7	ERWZS	FVS
				0	None					
				1	540V(380-480V)					
				2	650V(380-480V)					
				3	750V(380-480V)					
				10	675V(690V)					
				11	810V(690V)					
				12	935V(690V)					
				13	1120V(690V)					
4.7	450	Undervoltage	V	FLOAT		CALCF	CALCF	CALCF	ERWZS	FVS
4.8	562	Switching frequency		ENUM		SIZE	SIZE	SIZE	ERWS	FVS
				0	1 kHz					
				1	2 kHz					
				2	4 kHz					
				3	6 kHz					
				4	8 kHz					
				5	10 kHz					
				6	12 kHz					
				7	16 kHz					
4.9	564	Ambient temperature		ENUM		40 degC	0	1	ERWZ	FVS
				0	40 degC					
				1	50 degC					
4.10	566	Drive overload mode		ENUM		Heavy duty	1	2	ERWZ	FVS
				1	Heavy duty					
				2	Light duty					
4.11	568	Switching freq mode		ENUM		Constant	0	1	ERWZS	FVS
				0	Constant					
				1	Variable					
4.12	454	Chopper ON	V	FLOAT		CALCF	CALCF	CALCF	ERWZS	FVS
4.13	570	Password		UINT32		0	0	99999	ERW	FVS
4.14	572	Application key		UINT32		0	0	4294967295	ERW	FVS
4.15	574	Startup display		INT16		-1	-1	20000	ERW	FVS
4.16	576	Display backlight		BIT		0	0	1	ERW	FVS
4.17	578	Language select		ENUM		1	0	9	RWZ	FVS
				0	English					
				1	Italian					
				2	French					
				3	German					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				4	Spanish					
				5	Polish					
				6	Romanian					
				7	Russian					
				8	Turkish					
				9	Portuguese					
4.18	580	Load default		BIT		0	0	1	RWZ	FVS
4.19	590	Save par to keypad		BIT		0	0	1	RW	FVS
4.20	592	Load par from keypad		BIT		0	0	1	RWZ	FVS
4.21	594	Keypad memory select		UINT16		1	1	5	ERW	FVS
4.22	6100	Load asynch control		BIT		0	0	1	ERW	FVS

5 - REFERENCES

5.1	600	Dig ramp ref 1	FF	INT16	16/32	0	CALCI	CALCI	RW	FVS
5.2	602	Dig ramp ref 2	FF	INT16	16/32	0	CALCI	CALCI	ERW	FVS
5.3	604	Dig ramp ref 3	FF	INT16	16/32	0	CALCI	CALCI	ERW	FVS
5.4	610	Ramp ref 1 src		LINK L_MLTREF	16/32	1500	0	16384	RW	FVS
5.5	612	Ramp ref 2 src		LINK L_MLTREF	16/32	602	0	16384	ERW	FVS
5.6	614	Ramp ref 3 src		LINK L_MLTREF	16/32	894	0	16384	ERW	FVS
5.7	616	Ramp ref invert src		LINK L_DIGSEL2	16	1050	0	16384	ERW	FVS
5.8	620	Ramp ref 1 mon	FF	INT16		0	0	0	R	FVS
5.9	622	Ramp ref 2 mon	FF	INT16		0	0	0	ER	FVS
5.10	624	Ramp ref 3 mon	FF	INT16		0	0	0	ER	FVS
5.11	634	Ramp ref top lim	FF	INT32		0	0	CALCI	ERWZ	FVS
5.12	636	Ramp ref bottom lim	FF	INT32		0	0	CALCI	ERWZ	FVS
5.13	630	Reference skip set	rpm	INT16		0	0	CALCI	ERW	FVS
5.14	632	Reference skip band	rpm	INT16		0	0	CALCI	ERW	FVS
5.15	640	Dig speed ref 1	FF	INT16	16/32	0	CALCI	CALCI	ERW	FVS
5.16	642	Dig speed ref 2	FF	INT16	16/32	0	CALCI	CALCI	ERW	FVS
5.17	650	Speed ref 1 src		LINK L_MLTREF	16/32	640	0	16384	ERW	FVS
5.18	652	Speed ref 2 src		LINK L_MLTREF	16/32	642	0	16384	ERW	FVS
5.19	654	Speed ref invert src		LINK L_DIGSEL2	16	6000	0	16384	ERWZ	FVS
5.20	660	Speed ref 1 mon	FF	INT16		0	0	0	ER	FVS
5.21	662	Speed ref 2 mon	FF	INT16		0	0	0	ER	FVS
5.22	670	Speed ref top lim	FF	INT32		CALCI	0	CALCI	ERWZ	FVS
5.23	672	Speed ref bottom lim	FF	INT32		CALCI	CALCI	0	ERWZ	FVS
5.24	666	Speed ref filter	ms	UINT16		0	0	1000	ERW	FVS
5.25	680	Full scale speed	rpm	INT16		CALCI	50	32000	RWZ	FVS

6 - RAMPS

6.1	700	Acceleration time 0	s	FLOAT		10.0	0.01	1000.0	RW	FVS
6.2	702	Deceleration time 0	s	FLOAT		10.0	0.01	1000.0	RW	FVS
6.3	704	Acceleration time 1	s	FLOAT		10.0	0.01	1000.0	ERW	FVS
6.4	706	Deceleration time 1	s	FLOAT		10.0	0.01	1000.0	ERW	FVS
6.5	708	Acceleration time 2	s	FLOAT		10.0	0.01	1000.0	ERW	FVS
6.6	710	Deceleration time 2	s	FLOAT		10.0	0.01	1000.0	ERW	FVS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
6.7	712	Acceleration time 3	s	FLOAT		10.0	0.01	1000.0	ERW	FVS
6.8	714	Deceleration time 3	s	FLOAT		10.0	0.01	1000.0	ERW	FVS
6.9	720	Ramp type		ENUM		Linear	0	3	ERWZ	FVS
				0	Linear					
				1	S-Shape					
				2	Bypass					
				3	Off					
6.10	722	Multi ramp sel 0 src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
6.11	724	Multi ramp sel 1 src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
6.12	726	Multi ramp sel mon		UINT16		0	0	3	ER	FVS
6.13	730	Accel jerk time 0	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.14	732	Decel jerk time 0	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.15	734	Accel jerk time 1	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.16	736	Decel jerk time 1	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.17	738	Accel jerk time 2	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.18	740	Decel jerk time 2	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.19	742	Accel jerk time 3	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.20	744	Decel jerk time 3	s	FLOAT		1.0	0.02	10.0	ERW	FVS
6.21	750	Ramp in zero src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
6.22	752	Ramp out zero src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
6.23	754	Ramp freeze src		LINK	16	3480	0	16384	ERW	FVS
				L_DIGSEL2						

7 - MULTI REFERENCE

7.1	800	Multi reference 0	FF	INT16	16/32	0	CALCI	CALCI	RW	FVS
7.2	802	Multi reference 1	FF	INT16	16/32	0	CALCI	CALCI	RW	FVS
7.3	804	Multi reference 2	FF	INT16		0	CALCI	CALCI	RW	FVS
7.4	806	Multi reference 3	FF	INT16		0	CALCI	CALCI	RW	FVS
7.5	808	Multi reference 4	FF	INT16		0	CALCI	CALCI	RW	FVS
7.6	810	Multi reference 5	FF	INT16		0	CALCI	CALCI	RW	FVS
7.7	812	Multi reference 6	FF	INT16		0	CALCI	CALCI	RW	FVS
7.8	814	Multi reference 7	FF	INT16		0	CALCI	CALCI	RW	FVS
7.9	816	Multi reference 8	FF	INT16		0	CALCI	CALCI	ERW	FVS
7.10	818	Multi reference 9	FF	INT16		0	CALCI	CALCI	ERW	FVS
7.11	820	Multi reference 10	FF	INT16		0	CALCI	CALCI	ERW	FVS
7.12	822	Multi reference 11	FF	INT16		0	CALCI	CALCI	ERW	FVS
7.13	824	Multi reference 12	FF	INT16		0	CALCI	CALCI	ERW	FVS
7.14	826	Multi reference 13	FF	INT16		0	CALCI	CALCI	ERW	FVS
7.15	828	Multi reference 14	FF	INT16		0	CALCI	CALCI	ERW	FVS
7.16	830	Multi reference 15	FF	INT16		0	CALCI	CALCI	ERW	FVS
7.17	832	Multi ref 0 src		LINK	16/32	800	0	16384	RW	FVS
				L_MLTREF						
7.18	834	Multi ref 1 src		LINK	16/32	802	0	16384	RW	FVS
				L_MLTREF						
7.19	840	Multi ref sel 0 src		LINK	16	6000	0	16384	RW	FVS
				L_DIGSEL2						
7.20	842	Multi ref sel 1 src		LINK	16	6000	0	16384	RW	FVS
				L_DIGSEL2						
7.21	844	Multi ref sel 2 src		LINK	16	6000	0	16384	RW	FVS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				L_DIGSEL2						
7.22	846	Multi ref sel 3 src		LINK L_DIGSEL2	16	6000	0	16384	ERW	FVS
7.23	850	Multi ref sel mon		UINT16		0	0	15	R	FVS
7.24	852	Multi ref out mon	FF	INT16	16/32	0	0	0	R	FVS

8 - MOTORPOTENTIOMETER

8.1	870	Mpot setpoint	FF	INT16	16/32	0	CALCI	CALCI	R	FVS
8.2	872	Mpot acceleration	s	FLOAT		5.0	0.01	1000.0	RW	FVS
8.3	874	Mpot deceleration	s	FLOAT		5.0	0.01	1000.0	RW	FVS
8.4	876	Mpot top lim	FF	INT16		CALCI	CALCI	CALCI	ERW	FVS
8.5	878	Mpot bottom lim	FF	INT16		0	CALCI	CALCI	ERW	FVS
8.6	880	Mpot init cfg		ENUM		Zero	0	3	ERW	FVS
				0	Last Power Off					
				1	Zero					
				2	Lower Limit					
				3	Upper Limit					
8.7	882	Mpot preset cfg		ENUM		None	0	11	ERW	FVS
				0	None					
				1	Input=0					
				2	Input=low lim					
				3	Input&ref=0					
				4	Input&ref=low					
				5	Output=0					
				6	Output=low lim					
				7	Output&ref=0					
				8	Output&ref=low					
				9	Input=upp lim					
				10	Input&ref=upp					
				11	Freeze input					
8.8	884	Mpot up src		LINK L_DIGSEL2	16	6000	0	16384	RW	FVS
8.9	886	Mpot down src		LINK L_DIGSEL2	16	6000	0	16384	RW	FVS
8.10	888	Mpot invert src		LINK L_DIGSEL2	16	6000	0	16384	ERW	FVS
8.11	890	Mpot preset src		LINK L_DIGSEL2	16	6000	0	16384	ERW	FVS
8.12	892	Mpot mode		ENUM		Fine&Last val	0	3	ERW	FVS
				0	Ramp&Last val					
				1	Ramp&Follow					
				2	Fine&Last val					
				3	Fine&Follow					
8.13	894	Mpot output mon	rpm	INT16	16/32	0	0	0	ER	FVS

9 - JOG FUNCTION

9.1	910	Jog setpoint	rpm	INT16		0	CALCI	CALCI	RW	FVS
9.2	912	Jog acceleration	s	FLOAT		5.0	0.01	1000.0	RW	FVS
9.3	914	Jog deceleration	s	FLOAT		5.0	0.01	1000.0	RW	FVS
9.4	916	Jog cmd + src		LINK L_DIGSEL2	16	6000	0	16384	RW	FVS
9.5	918	Jog cmd - src		LINK L_DIGSEL2	16	6000	0	16384	RW	FVS
9.6	920	Jog output mon	rpm	INT16	16/32	0	0	0	ER	FVS

Menu	PAR	Description	UM	Type	FB	BIT	Def	Min	Max	Acc	Mod
10 - MONITOR FUNCTION											
10.1	930	Reference 0 thr	rpm	INT16			30	0	CALCI	RW	FVS
10.2	932	Reference 0 delay	ms	UINT16			400	0	10000	RW	FVS
10.3	940	Speed 0 thr	rpm	INT16			30	0	CALCI	RW	FVS
10.4	942	Speed 0 delay	ms	UINT16			400	0	10000	RW	FVS
10.5	950	Speed threshold 1	rpm	INT32			0	CALCI	CALCI	RW	FVS
10.6	952	Speed threshold 2	rpm	INT32			0	CALCI	CALCI	RW	FVS
10.7	954	Speed threshold dly	ms	UINT16			0	0	50000	RW	FVS
10.8	960	Set speed ref src		LINK L_CMP	16/32		628	0	16384	ERW	FVS
10.9	962	Set speed error	rpm	INT16			100	0	CALCI	RW	FVS
10.10	964	Set speed delay	ms	UINT16			0	0	50000	RW	FVS
10.11	968	Dig set speed ref	rpm	INT16	16/32		0	CALCI	CALCI	ERW	FVS
10.12	970	Speed threshold 3	rpm	INT32			0	0	CALCI	RW	FVS
10.13	972	Speed thr hysteresis	rpm	INT16			0	0	CALCI	RW	FVS
10.14	974	Speed thr 3 src		LINK L_REF	16/32		262	0	16384	ERW	FVS
10.15	980	Current threshold	perc	INT16			100	0	200	RW	FVS
10.16	982	Current thr hyster	perc	INT16			0	0	100	RW	FVS
11 - COMMANDS											
11.1	1000	Commands remote sel		ENUM			Terminal	0	1	RWZ	FVS
				0	Terminal						
				1	Digital						
11.2	1002	Commands local sel		ENUM			Keypad	0	1	ERWZ	FVS
				0	Terminal						
				2	Keypad						
11.3	1004	Enable/disable mode		ENUM			Stop/FS&Spd=0	0	3	ERWZ	FVS
				0	Off						
				1	Stop/FS&Spd=0						
				2	Stop&Spd=0						
				3	FS&Spd=0						
11.4	1006	Speed 0 disable dly	ms	UINT16			1000	0	10000	ERW	FVS
11.5	1008	Stop key mode		ENUM			Inactive	0	1	ERW	FVS
				0	Inactive						
				1	EmgStop&Alarm						
11.6	1010	Commands safe start		BIT			1	0	1	ERW	FVS
11.7	1012	Dig local/remote		ENUM		16	Remote	0	1	ERW	FVS
				0	Local						
				1	Remote						
11.8	1014	Local/remote src		LINK L_DIGSEL3		16	1012	0	16384	ERW	FVS
11.9	1016	Terminal Start src		LINK L_DIGSEL2		16	1048	0	16384	ERW	FVS
11.10	1018	Digital Enable src		LINK L_DIGSEL2		16	6000	0	16384	ERW	FVS
11.11	1020	Digital Start src		LINK L_DIGSEL2		16	6000	0	16384	ERW	FVS
11.12	1022	FastStop src		LINK L_DIGSEL2		16	6000	0	16384	ERW	FVS
11.13	1024	Enable cmd mon		BIT		16	0	0	1	R	FVS
11.14	1026	Start cmd mon		BIT		16	0	0	1	R	FVS

Menu	PAR	Description	UM	Type	FB	BIT	Def	Min	Max	Acc	Mod
11.15	1028	FastStop cmd mon		BIT	16		0	0	1	R	FVS
11.16	1054	Safe start mon		BIT	16		0	0	1	ER	FVS
11.17	1040	FR mode		ENUM			Two wire	0	2	ERWZ	FVS
				0	Normal						
				1	Two wire						
				2	Three wire						
11.18	1042	FR forward src		LINK	16		1112	0	16384	ERW	FVS
				L_DIGSEL2							
11.19	1044	FR reverse src		LINK	16		1114	0	16384	ERW	FVS
				L_DIGSEL2							
11.20	1046	FR *stop src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL2							
11.21	1048	FR start mon		BIT	16		0	0	1	ER	FVS
11.22	1050	FR reverse mon		BIT	16		0	0	1	ER	FVS
11.23	1052	FR cmd mon		UINT16			0	0	0	ER	FVS
11.24	1032	Drv interlock src		LINK	16		6002	0	16384	ERW	FVS
				L_DIGSEL2							
11.25	1034	Drv interlock mon		BIT	16		0	0	1	ER	FVS
11.26	1036	FastStop mode		ENUM			Not Latched	0	1	ERW	FVS
				0	Not Latched						
				1	Latched						

12 - DIGITAL INPUTS

12.1	1132	Dig inp 1 inversion	BIT		0	0	1	RW	FVS
12.2	1134	Dig inp 2 inversion	BIT		0	0	1	RW	FVS
12.3	1136	Dig inp 3 inversion	BIT		0	0	1	RW	FVS
12.4	1138	Dig inp 4 inversion	BIT		0	0	1	RW	FVS
12.5	1140	Dig inp 5 inversion	BIT		0	0	1	RW	FVS
12.6	1150	Digital input E dest	ILINK		0	0	0	ER	FVS
12.7	1152	Digital input 1 dest	ILINK		0	0	0	ER	FVS
12.8	1154	Digital input 2 dest	ILINK		0	0	0	ER	FVS
12.9	1156	Digital input 3 dest	ILINK		0	0	0	ER	FVS
12.10	1158	Digital input 4 dest	ILINK		0	0	0	ER	FVS
12.11	1160	Digital input 5 dest	ILINK		0	0	0	ER	FVS
12.12	1240	Dig inp 1X inversion	BIT		0	0	1	RW	FVS
12.13	1242	Dig inp 2X inversion	BIT		0	0	1	RW	FVS
12.14	1244	Dig inp 3X inversion	BIT		0	0	1	RW	FVS
12.15	1246	Dig inp 4X inversion	BIT		0	0	1	RW	FVS
12.16	1248	Dig inp 5X inversion	BIT		0	0	1	RW	FVS
12.17	1250	Dig inp 6X inversion	BIT		0	0	1	RW	FVS
12.18	1252	Dig inp 7X inversion	BIT		0	0	1	RW	FVS
12.19	1254	Dig inp 8X inversion	BIT		0	0	1	RW	FVS
12.20	5540	Dig inp 9X inversion	BIT		0	0	1	ERW	FVS
12.21	5542	Dig inp10X inversion	BIT		0	0	1	ERW	FVS
12.22	5544	Dig inp11X inversion	BIT		0	0	1	ERW	FVS
12.23	5546	Dig inp12X inversion	BIT		0	0	1	ERW	FVS
12.24	5548	Dig inp13X inversion	BIT		0	0	1	ERW	FVS
12.25	5550	Dig inp14X inversion	BIT		0	0	1	ERW	FVS
12.26	5552	Dig inp15X inversion	BIT		0	0	1	ERW	FVS
12.27	5554	Dig inp16X inversion	BIT		0	0	1	ERW	FVS
12.28	1270	Dig input 1X dest	ILINK		0	0	0	ER	FVS
12.29	1272	Dig input 2X dest	ILINK		0	0	0	ER	FVS
12.30	1274	Dig input 3X dest	ILINK		0	0	0	ER	FVS

Menu	PAR	Description	UM	Type	FB	BIT	Def	Min	Max	Acc	Mod
12.31	1276	Dig input 4X dest		ILINK			0	0	0	ER	FVS
12.32	1278	Dig input 5X dest		ILINK			0	0	0	ER	FVS
12.33	1280	Dig input 6X dest		ILINK			0	0	0	ER	FVS
12.34	1282	Dig input 7X dest		ILINK			0	0	0	ER	FVS
12.35	1284	Dig input 8X dest		ILINK			0	0	0	ER	FVS
12.36	5570	Dig input 9X dest		ILINK			0	0	0	ER	FVS
12.37	5572	Dig input10X dest		ILINK			0	0	0	ER	FVS
12.38	5574	Dig input11X dest		ILINK			0	0	0	ER	FVS
12.39	5576	Dig input12X dest		ILINK			0	0	0	ER	FVS
12.40	5578	Dig input13X dest		ILINK			0	0	0	ER	FVS
12.41	5580	Dig input14X dest		ILINK			0	0	0	ER	FVS
12.42	5582	Dig input15X dest		ILINK			0	0	0	ER	FVS
12.43	5584	Dig input16X dest		ILINK			0	0	0	ER	FVS

13 - DIGITAL OUTPUTS

13.1	1310	Digital output 1 src		LINK L_DIGSEL1	16		1062	0	16384	RW	FVS
13.2	1312	Digital output 2 src		LINK L_DIGSEL1	16		1064	0	16384	RW	FVS
13.3	1314	Digital output 3 src		LINK L_DIGSEL1	16		946	0	16384	RW	FVS
13.4	1316	Digital output 4 src		LINK L_DIGSEL1	16		936	0	16384	RW	FVS
13.5	1330	Dig out 1 inversion		BIT			0	0	1	RW	FVS
13.6	1332	Dig out 2 inversion		BIT			0	0	1	RW	FVS
13.7	1334	Dig out 3 inversion		BIT			0	0	1	RW	FVS
13.8	1336	Dig out 4 inversion		BIT			0	0	1	RW	FVS
13.9	1410	Dig output 1X src		LINK L_DIGSEL1	16		6000	0	16384	RW	FVS
13.10	1412	Dig output 2X src		LINK L_DIGSEL1	16		6000	0	16384	RW	FVS
13.11	1414	Dig output 3X src		LINK L_DIGSEL1	16		6000	0	16384	RW	FVS
13.12	1416	Dig output 4X src		LINK L_DIGSEL1	16		6000	0	16384	RW	FVS
13.13	1418	Dig output 5X src		LINK L_DIGSEL1	16		6000	0	16384	RW	FVS
13.14	1420	Dig output 6X src		LINK L_DIGSEL1	16		6000	0	16384	RW	FVS
13.15	1422	Dig output 7X src		LINK L_DIGSEL1	16		6000	0	16384	RW	FVS
13.16	1424	Dig output 8X src		LINK L_DIGSEL1	16		6000	0	16384	RW	FVS
13.17	1426	Dig output 9X src		LINK L_DIGSEL1	16		6000	0	16384	RW	FVS
13.18	1430	Dig out 1X inversion		BIT			0	0	1	RW	FVS
13.19	1432	Dig out 2X inversion		BIT			0	0	1	RW	FVS
13.20	1434	Dig out 3X inversion		BIT			0	0	1	RW	FVS
13.21	1436	Dig out 4X inversion		BIT			0	0	1	RW	FVS
13.22	1438	Dig out 5X inversion		BIT			0	0	1	RW	FVS
13.23	1440	Dig out 6X inversion		BIT			0	0	1	RW	FVS
13.24	1442	Dig out 7X inversion		BIT			0	0	1	RW	FVS
13.25	1444	Dig out 8X inversion		BIT			0	0	1	RW	FVS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
13.26	1446	Dig out 9X inversion		BIT		0	0	1	RW	FVS

14 - ANALOG INPUTS

14.1	1500	Analog input 1 mon	cnt	INT16	16/32	0	-16384	16384	R	FVS
14.2	1502	Analog inp 1 type		ENUM		-10V..+10V	0	4	RW	FVS
				0	-10V..+10V					
				1	0.20mA , 0.10V					
				2	4..20mA					
				3	0.1V..10.1V					
				4	KTY84					
14.3	1504	Analog inp 1 scale		FLOAT		1.0	-10.0	10.0	RW	FVS
14.4	1506	An inp 1 offset tune		BIT		0	0	1	RW	FVS
14.5	1508	An inp 1 gain tune		BIT		0	0	1	RW	FVS
14.6	1510	Analog inp 1 filter	ms	FLOAT		10.0	1.0	1000.0	ERW	FVS
14.7	1512	Analog inp 1 top	cnt	INT16		16384	-32768	+32767	ERW	FVS
14.8	1514	Analog inp 1 bottom	cnt	INT16		-16384	-32768	+32767	ERW	FVS
14.9	1516	Analog inp 1 offset	cnt	INT16		0	-32768	+32767	ERW	FVS
14.10	1518	Analog inp 1 gain		FLOAT		1.0	-10.0	10.0	ERW	FVS
14.11	1520	Analog inp 1 thr	cnt	INT16		0	-16384	+16384	ERW	FVS
14.12	1522	An inp 1 deadband	perc	FLOAT		0.0	0.0	100.0	ERW	FVS
14.13	1524	An inp 1 alt value	cnt	INT16	16/32	0	-16384	16384	ERW	FVS
14.14	1526	An inp 1 sign src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
14.15	1528	An inp 1 alt sel src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
14.16	1532	Analog input 1 dest		ILINK		0	0	0	ER	FVS
14.17	1550	Analog input 2 mon	cnt	INT16	16/32	0	-16384	16384	R	FVS
14.18	1552	Analog inp 2 type		ENUM		-10V..+10V	0	4	RW	FVS
				0	-10V..+10V					
				1	0.20mA , 0.10V					
				2	4..20mA					
				3	0.1V..10.1V					
				4	KTY84					
14.19	1554	Analog inp 2 scale		FLOAT		1.0	-10.0	10.0	RW	FVS
14.20	1556	An inp 2 offset tune		BIT		0	0	1	RW	FVS
14.21	1558	An inp 2 gain tune		BIT		0	0	1	RW	FVS
14.22	1560	Analog inp 2 filter	ms	FLOAT		10.0	1.0	1000.0	ERW	FVS
14.23	1562	Analog inp 2 top	cnt	INT16		16384	-32768	+32767	ERW	FVS
14.24	1564	Analog inp 2 bottom	cnt	INT16		-16384	-32768	+32767	ERW	FVS
14.25	1566	Analog inp 2 offset	cnt	INT16		0	-32768	+32767	ERW	FVS
14.26	1568	Analog inp 2 gain		FLOAT		1.0	-10.0	10.0	ERW	FVS
14.27	1570	Analog inp 2 thr	cnt	INT16		0	-16384	+16384	ERW	FVS
14.28	1572	An inp 2 deadband	perc	FLOAT		0.0	0.0	100.0	ERW	FVS
14.29	1574	An inp 2 alt value	cnt	INT16	16/32	0	-16384	16384	ERW	FVS
14.30	1576	An inp 2 sign src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
14.31	1578	An inp 2 alt sel src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
14.32	1582	Analog input 2 dest		ILINK		0	0	0	ER	FVS
14.33	1600	Analog input 1X mon	cnt	INT16	16/32	0	-16384	16384	R	FVS
14.34	1602	Analog inp 1X type		ENUM		-10V..+10V	0	8	RW	FVS
				0	-10V..+10V					
				1	0..10V					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				2	4..20mA					
				3	0..20mA					
				4	PT1000					
				5	NI1000					
				6	PT100					
				7	0.1V..10.1V					
				8	KTY84					
14.35	1604	Analog inp 1X scale		FLOAT		1.0	-20.0	20.0	RW	FVS
14.36	1606	An inp 1Xoffset tune		BIT		0	0	1	RW	FVS
14.37	1608	An inp 1X gain tune		BIT		0	0	1	RW	FVS
14.38	1620	Analog inp 1X filter	ms	UINT16		0	0	1000	ERW	FVS
14.39	1612	Analog inp 1X top	cnt	INT16		16384	-32768	+32767	ERW	FVS
14.40	1614	Analog inp 1X bottom	cnt	INT16		-16384	-32768	+32767	ERW	FVS
14.41	1616	Analog inp 1X offset	cnt	INT16		0	-32768	+32767	ERW	FVS
14.42	1618	Analog inp 1X gain		FLOAT		1.0	-20.0	20.0	ERW	FVS
14.43	1626	An inp 1X sign src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
14.44	1632	Analog input 1X dest		ILINK		0	0	0	ER	FVS
14.45	1650	Analog input 2X mon	cnt	INT16	16/32	0	-16384	16384	R	FVS
14.46	1652	Analog inp 2X type		ENUM		-10V..+10V	0	8	RW	FVS
				0	-10V..+10V					
				1	0..10V					
				2	4..20mA					
				3	0..20mA					
				4	PT1000					
				5	NI1000					
				6	PT100					
				7	0.1V..10.1V					
				8	KTY84					
14.47	1654	Analog inp 2X scale		FLOAT		1.0	-20.0	20.0	RW	FVS
14.48	1656	An inp 2Xoffset tune		BIT		0	0	1	RW	FVS
14.49	1658	An inp 2X gain tune		BIT		0	0	1	RW	FVS
14.50	1670	Analog inp 2X filter	ms	UINT16		0	0	1000	ERW	FVS
14.51	1662	Analog inp 2X top	cnt	INT16		16384	-32768	+32767	ERW	FVS
14.52	1664	Analog inp 2X bottom	cnt	INT16		-16384	-32768	+32767	ERW	FVS
14.53	1666	Analog inp 2X offset	cnt	INT16		0	-32768	+32767	ERW	FVS
14.54	1668	Analog inp 2X gain		FLOAT		1.0	-20.0	20.0	ERW	FVS
14.55	1676	An inp 2X sign src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
14.56	1682	Analog input 2X dest		ILINK		0	0	0	ER	FVS
14.57	5410	Analog inp 0Ext mon		INT16	16	0	-32768	32767	ER	FVS
14.58	5412	Analog inp 1Ext mon		INT16	16	0	-32768	32767	ER	FVS
14.59	5414	Analog inp 2Ext mon		INT16	16	0	-32768	32767	ER	FVS
14.60	5416	Analog inp 3Ext mon		INT16	16	0	-32768	32767	ER	FVS
14.61	5418	Analog inp 4Ext mon		INT16	16	0	-32768	32767	ER	FVS
14.62	5420	Analog inp 5Ext mon		INT16	16	0	-32768	32767	ER	FVS
14.63	5422	Analog inp 6Ext mon		INT16	16	0	-32768	32767	ER	FVS
14.64	5424	Analog inp 7Ext mon		INT16	16	0	-32768	32767	ER	FVS
14.65	1586	Sensor inp X type		ENUM		None	0	3	ERW	FVS
				0	None					
				1	Klixon					
				2	KTY84					
				3	PTC					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15 - ANALOG OUTPUTS										
15.1	1800	Analog out 1 src		LINK L_ANOUT	16/32	6000	0	16384	RW	FVS
15.2	1802	Analog out 2 src		LINK L_ANOUT	16/32	6000	0	16384	RW	FVS
15.3	1808	Analog out 1 scale		FLOAT		1.0	-10.0	10.0	RW	FVS
15.4	1810	Analog out 2 scale		FLOAT		1.0	-10.0	10.0	RW	FVS
15.5	1816	Analog out 1 mon	cnt	INT16		0	0	0	ER	FVS
15.6	1818	Analog out 2 mon	cnt	INT16		0	0	0	ER	FVS
15.7	1824	An out 1 absolute		ENUM		Disable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
15.8	1826	An out 2 absolute		ENUM		Disable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
15.9	1832	Analog out 1 min	cnt	INT16		-16384	-32768	+32767	ERW	FVS
15.10	1834	Analog out 1 max	cnt	INT16		16384	-32768	+32767	ERW	FVS
15.11	1840	Analog out 2 min	cnt	INT16		-16384	-32768	+32767	ERW	FVS
15.12	1842	Analog out 2 max	cnt	INT16		16384	-32768	+32767	ERW	FVS
15.13	1848	Analog out 2 type		ENUM		-10V..+10V	0	2	ERW	FVS
				0	0..20mA					
				1	4..20mA					
				2	-10V..+10V					
15.14	1850	Analog out 1X src		LINK L_ANOUT	16/32	6000	0	16384	RW	FVS
15.15	1852	Analog out 2X src		LINK L_ANOUT	16/32	6000	0	16384	RW	FVS
15.16	1858	Analog out 1X scale		FLOAT		1.0	-20.0	20.0	RW	FVS
15.17	1860	Analog out 2X scale		FLOAT		1.0	-20.0	20.0	RW	FVS
15.18	1866	Analog out 1X mon	cnt	INT16		0	0	0	ER	FVS
15.19	1868	Analog out 2X mon	cnt	INT16		0	0	0	ER	FVS
15.20	1874	An out 1X absolute		ENUM		Disable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
15.21	1876	An out 2X absolute		ENUM		Disable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
15.22	1882	Analog out 1X min	cnt	INT16		-16384	-32768	+32767	ERW	FVS
15.23	1884	Analog out 1X max	cnt	INT16		16384	-32768	+32767	ERW	FVS
15.24	1886	Analog out 1X type		ENUM		-10V..+10V	0	3	ERW	FVS
				0	0..20mA					
				1	4..20mA					
				2	-10V..+10V					
				3	0..10V					
15.25	1890	Analog out 2X min	cnt	INT16		-16384	-32768	+32767	ERW	FVS
15.26	1892	Analog out 2X max	cnt	INT16		16384	-32768	+32767	ERW	FVS
15.27	1898	Analog out 2X type		ENUM		-10V..+10V	0	3	ERW	FVS
				0	0..20mA					
				1	4..20mA					
				2	-10V..+10V					
				3	0..10V					
15.28	5460	Dig Analog out 0 ext		INT16	16	0	-32768	32767	ERW	FVS
15.29	5462	Dig Analog out 1 ext		INT16	16	0	-32768	32767	ERW	FVS
15.30	5464	Dig Analog out 2 ext		INT16	16	0	-32768	32767	ERW	FVS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.31	5466	Dig Analog out 3 ext		INT16	16	0	-32768	32767	ERW	FVS
15.32	5468	Dig Analog out 4 ext		INT16	16	0	-32768	32767	ERW	FVS
15.33	5470	Dig Analog out 5 ext		INT16	16	0	-32768	32767	ERW	FVS
15.34	5472	Dig Analog out 6 ext		INT16	16	0	-32768	32767	ERW	FVS
15.35	5474	Dig Analog out 7 ext		INT16	16	0	-32768	32767	ERW	FVS

16 - MOTOR DATA

16.1	2000	Rated voltage	V	FLOAT		SIZE	50.0	690.0	RWZS	
16.2	2002	Rated current	A	FLOAT		SIZE	0.3	2200.0	RWZS	
16.3	2004	Rated speed	rpm	FLOAT		SIZE	10.0	32000.0	RWZS	
16.4	2008	Pole pairs		UINT16		SIZE	1	CALCI	RWZS	
16.5	2010	Torque constant	Nm/A	FLOAT		SIZE	0.1	100.0	RWZS	
16.6	2012	EMF constant	Wb	FLOAT		SIZE	0.0	100.0	RWZS	
16.7	2020	Take parameters		BIT		0	0	1	RWZ	FVS
16.8	2022	Autotune rotation		BIT		0	0	1	RWZ	FVS
16.9	2024	Autotune still		BIT		0	0	1	RWZ	FVS
16.10	2026	Autotune mode		ENUM		Reduced	0	1	ERWZ	FVS
				0	Reduced					
				1	Extended					
16.11	2028	Take par status		ENUM		Required	0	0	R	FVS
				0	Required					
				1	Done					
16.12	2030	Autotune status		ENUM		Required	0	0	R	FVS
				0	Required					
				1	Done					
16.13	2050	Measured RS	ohm	FLOAT		CALCF	0.0005	200.0	ERWS	FVS
16.14	2052	Measured DTL	V	FLOAT		0.0	0.0	100.0	ERWS	FVS
16.15	2054	Measured DTS	V/A	FLOAT		0.0	0.0	100.0	ERWS	FVS
16.16	2056	Measured Lsig	mH	FLOAT		CALCF	0.001	200.0	ERWS	FVS
16.17	2074	Measured Lsig min	mH	FLOAT		CALCF	0.001	200.0	ERWS	FVS
16.18	2078	Take tune parameters		BIT		0	0	1	ERWZ	FVS

17 - ENCODER

17.1 - ENCODER/ENCODER CONFIG

17.1.1	5310	Encoder sel src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
17.1.2	5314	Encoder sel mon		UINT16		0	0	1	ER	FVS
17.1.3	2172	SpdFbkLoss code		UINT32		0	0	0	ER	FVS
17.1.4	2190	Autophase rotation		BIT		0	0	1	ERWZ	FVS
17.1.5	2192	Autophase still		BIT		0	0	1	ERWZ	FVS
17.1.6	2194	Autophase still mode		ENUM		Mode 1	0	1	ERWZ	FVS
				0	Mode 1					
				1	Mode 2					
17.1.7	2196	Autophase run mode		ENUM		First enable	0	2	ERWZ	FVS
				0	Par/startup					
				1	First enable					
				2	Each enable					
17.1.8	2198	Autophase run type		ENUM		Still	0	1	ERWZ	FVS
				0	Still					
				1	Rotation					

17.2 - ENCODER/ENCODER 1

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2.1	2100	Encoder 1 pulses	ppr	UINT16		CALCI	CALCI	CALCI	RWZ	FVS
17.2.2	2102	Encoder 1 supply	V	FLOAT		5.2	5.2	CALCF	ERWZ	FVS
17.2.3	2104	Encoder 1 input cfg		ENUM		TTL	0	1	ERWZ	FVS
				0	HTL					
				1	TTL					
17.2.4	2106	Encoder 1 repetition		ENUM		No division	0	3	ERWZ	FVS
				0	No division					
				1	Divide 2					
				2	Divide 4					
				3	Divide 8					
17.2.5	2108	Encoder 1 signal Vpp	V	FLOAT		1.0	0.8	1.2	ERWZ	FVS
17.2.6	2110	Encoder1signal check		ENUM		Check A-B	0	3	ERWZ	FVS
				0	Check disabled					
				1	Check A-B					
				2	Check A-B-Z					
				4	Check A-B-Z-P					
17.2.7	2112	Encoder 1 SSI clocks		UINT16		13	11	25	ERWZ	FVS
17.2.8	2114	Encoder1SSI pos bits		UINT16		13	11	25	ERWZ	FVS
17.2.9	2182	Encoder1 ENDAT clock		ENUM		1 MHz	0	1	ERWZ	FVS
				0	1 MHz					
				1	500 kHz					
17.2.10	2130	Encoder 1 direction		ENUM		Not inverted	0	1	RWZ	FVS
				0	Not inverted					
				1	Inverted					
17.2.11	2132	Encoder 1 mode		ENUM		None	CALCI	CALCI	ERWZ	FVS
				0	None					
				1	Digital FP					
				2	Digital F					
				3	Sinus					
				4	Sinus SINCOS					
				5	Sinus ENDAT					
				6	Sinus SSI					
				7	Sinus HIPER					
				8	Resolver					
				9	Abs SINCOS					
				10	ENDAT					
				11	SSI					
17.2.12	2134	Encoder1speed filter	ms	FLOAT		0.250	0.125	20.0	ERW	FVS
17.2.13	2150	Encoder 1 speed	rpm	INT16	16/32	0	0	0	ER	FVS
17.2.14	2162	Encoder 1 position	cnt	UINT16	16	0	0	0	ER	FVS
17.2.15	2176	Encoder 1 sync mode		UINT16		1	0	3	ERWZ	FVS
17.2.16	2186	Poles/Enc1Rev 0=Off		UINT16		0	0	65535	ERWZ	FVS
17.2.17	2188	Enc 1 ratio		FLOAT		0	0	0	ER	FVS
17.2.18	5350	Encoder 1 state		UINT16		0	0	0	ER	FVS
17.2.19	5352	Encoder 1 err code		UINT32		0	0	0	ER	FVS

17.3 - ENCODER/ENCODER 2

17.3.1	5100	Encoder 2 pulses	ppr	UINT16		CALCI	CALCI	CALCI	ERWZ	FVS
17.3.2	5102	Encoder 2 supply	V	FLOAT		5.2	5.2	CALCF	ERWZ	FVS
17.3.3	5104	Encoder 2 input cfg		ENUM		TTL	0	1	ERWZ	FVS
				0	HTL					
				1	TTL					
17.3.4	5106	Encoder 2 repetition		ENUM		No division	0	3	ERWZ	FVS
				0	No division					

Menu	PAR	Description	UM	Type	FB	BIT	Def	Min	Max	Acc	Mod
				1	Divide 2						
				2	Divide 4						
				3	Divide 8						
17.3.5	5108	Encoder 2 signal Vpp	V	FLOAT			1.0	0.8	1.2	ERWZ	FVS
17.3.6	5110	Encoder2signal check		ENUM			Check A-B	0	3	ERWZ	FVS
				0	Check disabled						
				1	Check A-B						
				2	Check A-B-Z						
				4	Check A-B-Z-P						
17.3.7	5112	Encoder 2 SSI clocks		UINT16			13	11	25	ERWZ	FVS
17.3.8	5114	Encoder2SSI pos bits		UINT16			13	11	25	ERWZ	FVS
17.3.9	5182	Encoder2 ENDAT clock		ENUM			1 MHz	0	1	ERWZ	FVS
				0	1 MHz						
				1	500 kHz						
17.3.10	5130	Encoder 2 direction		ENUM			Not inverted	0	1	ERWZ	FVS
				0	Not inverted						
				1	Inverted						
17.3.11	5132	Encoder 2 mode		ENUM			None	CALCI	CALCI	ERWZ	FVS
				0	None						
				1	Digital FP						
				2	Digital F						
				3	Sinus						
				4	Sinus SINCOS						
				5	Sinus ENDAT						
				6	Sinus SSI						
				7	Sinus HIPER						
				8	Resolver						
				9	Abs SINCOS						
				10	ENDAT						
				11	SSI						
17.3.12	5134	Encoder2speed filter	ms	FLOAT			0.250	0.125	20.0	ERW	FVS
17.3.13	5150	Encoder 2 speed	rpm	INT16	16/32		0	0	0	ER	FVS
17.3.14	5162	Encoder 2 position	cnt	UINT16	16		0	0	0	ER	FVS
17.3.15	5176	Encoder 2 sync mode		UINT16			1	0	3	ERWZ	FVS
17.3.16	5186	Poles/Enc2Rev 0=Off		UINT16			0	0	65535	ERWZ	FVS
17.3.17	5188	Enc 2 ratio		FLOAT			0	0	0	ER	FVS
17.3.18	5360	Encoder 2 state		UINT16			0	0	0	ER	FVS
17.3.19	5362	Encoder 2 err code		UINT32			0	0	0	ER	FVS

17.4 - ENCODER/ENCODER 3

17.4.1	5200	Encoder 3 pulses	ppr	UINT16			1024	128	32768	ERWZ	FVS
17.4.2	5204	Encoder 3 input cfg		ENUM			TTL	0	1	ERWZ	FVS
				0	HTL						
				1	TTL						
17.4.3	5210	Encoder3signal check		ENUM			Check A-B	0	3	ERWZ	FVS
				0	Check disabled						
				1	Check A-B						
				2	Check A-B-Z						
				4	Check A-B-Z-P						
17.4.4	5230	Encoder 3 direction		ENUM			Not inverted	0	1	ERWZ	FVS
				0	Not inverted						
				1	Inverted						
17.4.5	5262	Encoder 3 position	cnt	UINT16	16		0	0	0	ER	FVS
17.4.6	5370	Encoder 3 state		UINT16			0	0	0	ER	FVS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.4.7	5372	Encoder 3 err code		UINT32		0	0	0	ER	FVS

17.5 - ENCODER/RESOLVER

17.5.1	2116	Resolver pole pairs		UINT16		1	1	8	ERWZ	FVS
17.5.2	2118	Resolver frequency	Hz	UINT16		8000	2000.0	10000.0	ERWZ	FVS
17.5.3	2120	Resolver T ratio K		FLOAT		0.5	0.2	1.0	ERWZ	FVS
17.5.4	2122	Resolver repetition		ENUM		16384 ppr	0	3	ERWZ	FVS
				0	256 ppr					
				1	1024 ppr					
				2	4096 ppr					
				3	16384 ppr					
17.5.5	2124	Resolver LOS thr	V	FLOAT		2.200	0.000	4.820	ERWZ	FVS
17.5.6	2128	Resolver MIS thr	V	FLOAT		0.380	0.000	4.820	ERWZ	FVS
17.5.7	2094	Resolver freeze0 src		LINK	16	6000	0	16384	ERWZ	FVS
				L_RESFREEZE						
17.5.8	2096	Resolver freeze1 src		LINK	16	6000	0	16384	ERWZ	FVS
				L_RESFREEZE						

18 - SPEED REG GAINS

18.1	2200	Speed reg P1 gain	perc	INT16		100	0	1000	RW	F_S
18.2	2202	Speed reg I1 gain	perc	INT16		100	0	1000	RW	F_S
18.3	2204	Speed reg P2 gain	perc	INT16		100	0	1000	ERW	F_S
18.4	2206	Speed reg I2 gain	perc	INT16		100	0	1000	ERW	F_S
18.5	2216	Gain adapt src		LINK	16/32	664	0	16384	ERW	F_S
				L_REF						
18.6	2218	Gain adp spd thr1_2	perc	FLOAT		0.0	0.0	100.0	ERW	F_S
18.7	2220	Gain adp spd band1_2	perc	FLOAT		0.0	0.0	100.0	ERW	F_S
18.8	2226	Gain 0 enable		ENUM		Disable	0	1	ERW	F_S
				0	Disable					
				1	Enable					
18.9	2228	Speed reg P0 gain	perc	INT16		100	0	1000	ERW	F_S
18.10	2230	Speed reg I0 gain	perc	INT16		100	0	1000	ERW	F_S
18.11	2232	Spd reg P gain Inuse	perc	INT16	16/32	100	0	1000	ER	F_S
18.12	2234	Spd reg I gain Inuse	perc	INT16	16/32	100	0	1000	ER	F_S
18.13	2236	Speed reg P gain	N/rpm	FLOAT		CALCF	0.0	500.0	ERWS	F_S
18.14	2238	Speed reg I time	ms	FLOAT		CALCF	1.0	5000.0	ERWS	F_S
18.15	2244	Speed reg I dis src		LINK	16/32	6000	0	16384	ERW	F_S
				L_DIGSEL2						
18.16	2246	Speed reg P factor	perc	FLOAT	16/32	0	0	0	ER	F_S
18.17	2248	Speed reg I factor	perc	FLOAT	16/32	0	0	0	ER	F_S
18.18	2240	Inertia	kgm2	FLOAT		SIZE	0.0001	100.0	RWZS	F_S
18.19	2242	Bandwidth	rad/s	FLOAT		SIZE	1.0	700.0	RWZS	F_S

19 - REGULATOR PARAM

19.1	2250	Current reg P gain	V/A	FLOAT		CALCF	0.0	0.0	ERWS	F_S
19.2	2252	Current reg I time	ms	FLOAT		CALCF	0.01	10000.0	ERWS	F_S
19.3	2270	Voltage reg P gain	Wb/V	FLOAT		CALCF	0.0	0.0	ERWS	F_S
19.4	2272	Voltage reg I time	s	FLOAT		CALCF	0.01	100.0	ERWS	F_S
19.5	2280	Dead time limit	V	FLOAT		SIZE	0.0	50.0	ERWS	FVS
19.6	2282	Dead time slope	V/A	FLOAT		SIZE	0.0	200.0	ERWS	FVS
19.7	2290	Voltage base	V	FLOAT		CALCF	50.0	690.0	ERWS	F_S
19.8	2292	Voltage margin	perc	FLOAT		5.0	0.0	10.0	ERWS	F_S

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.9	132	Magnet current lim	A	FLOAT		CALCF	0.0	CALCF	ERWZS	FVS
19.10	144	Volt feedfwd enable		BIT		1	0	1	ERWZ	F_S
19.11	152	Rotor compensation		BIT		1	0	1	ERWZ	FVS

20 - TORQUE CONFIG

20.1	2350	Torque curr lim Pos	A	FLOAT	16/32	CALCF	0.0	CALCF	ERWS	FVS
20.2	2352	Torque curr lim Neg	A	FLOAT	16/32	CALCF	0.0	CALCF	ERWS	FVS
20.3	2354	Torque curr lim sel		ENUM		Off	0	4	ERWZ	FVS
				0	Off					
				1	T clim +/-					
				2	T clim mot/gen					
				3	T lim sym					
				4	T lim pos/neg					
20.4	2358	Torque lim pos src		LINK	16/32	6000	0	16384	ERWZ	F_S
				L_PLIM						
20.5	2370	Torque lim neg src		LINK	16/32	6000	0	16384	ERWZ	F_S
				L_NLIM						
20.6	2372	Torque limit pos	perc	FLOAT	16/32	CALCF	0.0	CALCF	ERW	F_S
20.7	2374	Torque limit neg	perc	FLOAT	16/32	CALCF	0.0	CALCF	ERW	F_S
20.8	2376	Torque lim unit sel		ENUM		Perc	0	1	ERW	F_S
				0	%					
				1	Nm					
20.9	2360	Torque lim Pos Inuse	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS
20.10	2362	Torque lim Neg Inuse	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS
20.11	2378	Torque ref 1 filter	ms	FLOAT		0.0	0.0	1000.0	ERW	F_S
20.12	2380	Dig torque ref 1	perc	FLOAT	16/32	0.0	-300.0	300.0	ERW	F_S
20.13	2382	Torque ref 1 src		LINK	16/32	3104	0	16384	ERWZ	F_S
				L_VREF						
20.14	2392	Torque ref 1 mon %	perc	FLOAT	16/32	0.0	0.0	0.0	ER	F_S
20.15	2346	Torque current ref 1	A	FLOAT	16/32	0.0	0.0	0.0	ER	F_S
20.16	2348	Torque ref 1 mon	Nm	FLOAT		0.0	0.0	0.0	ER	F_S
20.17	2384	Torque ref filter	ms	FLOAT		0.125	0.125	10.0	ERW	F_S
20.18	2386	Torque ref %	perc	FLOAT	16/32	0.0	0.0	0.0	ER	F_S
20.19	2390	Torque ref	Nm	FLOAT	16/32	0.0	0.0	0.0	ER	F_S
20.20	2394	Torque %	perc	FLOAT	16/32	0.0	0.0	0.0	ER	F_S
20.21	2398	Torque	Nm	FLOAT		0.0	0.0	0.0	ER	F_S
20.22	2366	Torque curr lim Red	A	FLOAT	16/32	CALCF	0.0	CALCF	ERWS	FVS
20.23	2368	Torque clim Red src		LINK	16	6000	0	16384	ERW	FVS
				L_DIGSEL2						
20.24	2340	Torque scale factor	perc	FLOAT		100.00	1.00	200.00	ERW	F_S

21 - SENSORLESS

21.1	7008	SLS status		ENUM		Disabled	0	2	R	FVS
				0	Disabled					
				1	Enabled					
				2	Run					
21.2	7010	SLS min speed CL	rpm	FLOAT		CALCF	0.0	CALCF	RWZ	FVS
21.3	7012	SLS max speed OL	rpm	FLOAT		CALCF	CALCF	CALCF	RWZ	FVS
21.4	7014	SLS id current corr	A	FLOAT		CALCF	0	CALCF	RW	FVS
21.5	7016	SLS id desat time	ms	FLOAT		250	20	1000	ERW	FVS
21.6	7018	SLS id speed thr	rpm	FLOAT		CALCF	0	CALCF	ERW	FVS
21.7	7020	SLS id sel ctrl		ENUM		Normal	0	1	ERW	FVS
				0	Normal					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				1	Advanced					
21.8	7022	SLS obs speed gain		FLOAT		1	0.001	50	RW	FVS
21.9	7024	SLS K1 speed obs		FLOAT		CALCF	0.0	35000	ERW	FVS
21.10	7026	SLS K2 speed obs		FLOAT		CALCF	0.0	2000	ERW	FVS
21.11	7028	SLS RS	FVS corr factor		perc	INT16		0	-100	100
ERW	FVS									
21.12	7030	SLS Lsig corr factor	perc	INT16		0	-100	200	ERW	FVS
21.13	7032	SLS K1 motor obs		FLOAT		CALCF	0.0	800000	ERWZ	FVS
21.14	7034	SLS K2 motor obs		FLOAT		CALCF	-3050000	-10	ERWZ	FVS
21.15	7040	SLS ramp enable		ENUM		Disable	0	1	RWZ	FVS
				0	Disable					
				1	Enable					
21.16	7042	SLS ramp acc time	s	FLOAT		10.0	0.01	1000.0	RW	FVS
21.17	7044	SLS ramp dec time	s	FLOAT		10.0	0.01	1000.0	RW	FVS
21.18	7046	SLS ramp speed thr	rpm	UINT32		CALCI	0	CALCI	RW	FVS
21.19	7048	SLS rotor alignment		ENUM		Disable	0	1	ERWZ	FVS
				0	Disable					
				1	Enable					
21.20	7050	SLS rotor align time	s	FLOAT		1.0	0.1	10.0	ERW	FVS

22 - FUNCTIONS

22.1 - FUNCTIONS/SPEED RATIO

22.1.1	3000	Dig speed ratio		INT16	16/32	100	CALCI	CALCI	ERW	FVS
22.1.2	3002	Speed ratio src		LINK	16/32	3000	0	16384	ERW	FVS
				L_VREF						
22.1.3	3008	Speed ratio div		ENUM		Div 1	0	3	ERW	FVS
				1	1					
				10	10					
				100	100					
				1000	1000					
22.1.4	3010	Speed ratio mon	perc	FLOAT		0	0	0	ER	FVS

22.2 - FUNCTIONS/DROOP

22.2.1	3052	Droop ref src		LINK	16/32	6000	0	16384	ERW	F_S
				L_LIM						
22.2.2	3060	Droop gain	perc	FLOAT		0.0	0.0	100.0	ERW	F_S
22.2.3	3062	Droop filter	ms	UINT16		10	1	100	ERW	F_S
22.2.4	3064	Droop limit	rpm	INT16	16/32	30	0	CALCI	ERWZ	F_S
22.2.5	3070	Droop out mon	rpm	INT16	16/32	0	0	0	ER	F_S

22.3 - FUNCTIONS/INERTIA COMP

22.3.1	3100	Inertia comp	kgm2	FLOAT		0.0	0.0	100.0	ERWS	F_S
22.3.2	3102	Inertia comp filter	ms	UINT16		30	1	100	ERW	F_S
22.3.3	3104	Inertia comp mon	perc	FLOAT	16/32	0.0	0.0	0.0	ER	F_S

22.4 - FUNCTIONS/MOTOR OVERLOAD

22.4.1	3200	Motor ovld enable		BIT		0	0	1	ERW	FVS
22.4.2	3202	Motor ovld factor	perc	FLOAT		150.0	100.0	300.0	ERWS	FVS
22.4.3	3204	Motor ovld time	s	FLOAT		30.0	10.0	300.0	ERWS	FVS
22.4.4	3206	Motor service factor	perc	FLOAT		100.0	25.0	200.0	ERWS	FVS
22.4.5	3216	Motor fan type		ENUM		Servo fan	0	1	ERW	FVS
				0	Auto fan					

Menu	PAR	Description	UM	Type	FB	BIT	Def	Min	Max	Acc	Mod
				1	Servo fan						
22.4.6	3218	Motor derat factor	perc	FLOAT			50.0	0.0	100.0	ERWS	FVS

22.5 - FUNCTIONS/BRES OVERLOAD

22.5.1	3250	Bres control		BIT			0	0	1	ERWZS	FVS
22.5.2	3252	Bres value	ohm	FLOAT			SIZE	3.0	1000.0	ERWS	FVS
22.5.3	3254	Bres cont power	kW	FLOAT			SIZE	0.1	100.0	ERWS	FVS
22.5.4	3256	Bres overload factor		FLOAT			SIZE	1.5	10.0	ERWS	FVS
22.5.5	3258	Bres overload time	s	FLOAT			SIZE	0.5	50.0	ERWS	FVS
22.5.6	3272	Bres enable src		LINK	16		6002	0	16384	ERW	FVS
				L_DIGSEL1							
22.5.7	3274	Bres enable inv		BIT			0	0	1	ERW	FVS

22.6 - FUNCTIONS/DOUBLE PAR SET

22.6.1	3300	Par set enable		ENUM			Disable	0	1	ERW	FVS
				0	Disable						
				1	Enable						
22.6.2	3302	Par set select src		LINK	16		6000	0	16384	ERWZ	FVS
				L_DIGSEL2							
22.6.3	3304	Par set select mon		ENUM	16		Set 0	0	0	ER	FVS
				0	Set 0						
				1	Set 1						
22.6.4	3306	Par set 0 to 1 copy		BIT			0	0	1	ERW	FVS

22.7 - FUNCTIONS/SPEED CAPTURE

22.7.1	3350	Speed capture		ENUM			Disable	0	2	ERW	FV_
				0	Disable						
				1	Alarm restart						
				2	Enable&restart						

22.8 - FUNCTIONS/POWER LOSS

22.8.1	3400	Powerloss function		ENUM			Disable	0	1	ERWZ	FV_
				0	Disable						
				1	Enable						
22.8.2	3402	Powerloss accel time	s	FLOAT			10.0	0.01	100.0	ERW	FV_
22.8.3	3404	Powerloss decel time	s	FLOAT			2.0	0.01	100.0	ERW	FV_
22.8.4	3410	Powerloss Vdcref	V	FLOAT			CALCF	0.0	CALCF	ERWZS	FV_
22.8.5	3420	Powerloss P gain	A/V	FLOAT			CALCF	0.0	100.000	ERWS	FV_
22.8.6	3422	Powerloss I time	ms	FLOAT			CALCF	1.0	1000.0	ERWS	FV_
22.8.7	3438	Powerloss mode		ENUM			Ramp down	0	1	ERWZ	FV_
				0	Ramp down						
				1	Restart						
22.8.8	3440	Powerloss mains src		LINK	16		6000	0	16384	ERWZ	FV_
				L_DIGSEL2							

22.9 - FUNCTIONS/COMPARE

22.9.1	3650	Dig compare input 1	perc	FLOAT	32		0.0	-100.0	100.0	ERW	FVS
22.9.2	3652	Dig compare input 2	perc	FLOAT	32		0.0	-100.0	100.0	ERW	FVS
22.9.3	3660	Compare input 1 src		LINK	32		3650	0	16384	ERW	FVS
				L_CMP							
22.9.4	3662	Compare input 2 src		LINK	32		3652	0	16384	ERW	FVS
				L_CMP							
22.9.5	3670	Compare function		ENUM			None	0	8	ERW	FVS

Menu	PAR	Description	UM	Type	FB	BIT	Def	Min	Max	Acc	Mod
				0	None						
				1	Inp1=Inp2						
				2	Inp1!=Inp2						
				3	Inp1<Inp2						
				4	Inp1>Inp2						
				5	|Inp1|=|Inp2|						
				6	|Inp1|!=|Inp2|						
				7	|Inp1|<|Inp2|						
				8	|Inp1|>|Inp2|						
22.9.6	3672	Compare window	perc	FLOAT			0.0	0.0	100.0	ERW	FVS
22.9.7	3674	Compare delay	s	FLOAT			0.0	0.0	30.0	ERW	FVS
22.9.8	3676	Compare output		BIT	16		0	0	1	ER	FVS

22.10 - FUNCTIONS/PADS

22.10.1	3700	Pad 1		INT32	32		0	0	0	ERW	FVS
22.10.2	3702	Pad 2		INT32	32		0	0	0	ERW	FVS
22.10.3	3704	Pad 3		INT32	32		0	0	0	ERW	FVS
22.10.4	3706	Pad 4		INT32	32		0	0	0	ERW	FVS
22.10.5	3708	Pad 5		INT32	32		0	0	0	ERW	FVS
22.10.6	3710	Pad 6		INT32	32		0	0	0	ERW	FVS
22.10.7	3712	Pad 7		INT32	32		0	0	0	ERW	FVS
22.10.8	3714	Pad 8		INT32	32		0	0	0	ERW	FVS
22.10.9	3716	Pad 9		INT32	32		0	0	0	ERW	FVS
22.10.10	3718	Pad 10		INT32	32		0	0	0	ERW	FVS
22.10.11	3720	Pad 11		INT32	32		0	0	0	ERW	FVS
22.10.12	3722	Pad 12		INT32	32		0	0	0	ERW	FVS
22.10.13	3724	Pad 13		INT32	32		0	0	0	ERW	FVS
22.10.14	3726	Pad 14		INT32	32		0	0	0	ERW	FVS
22.10.15	3728	Pad 15		INT32	32		0	0	0	ERW	FVS
22.10.16	3730	Pad 16		INT32	32		0	0	0	ERW	FVS

22.11 - FUNCTIONS/VDC CONTROL

22.11.1	3450	Vdc control function		ENUM			Disable	0	1	ERWZ	FVS
				0	Disable						
				1	Enable						
22.11.2	3470	Vdc control P gain	A/V	FLOAT			CALCF	0.0	100.000	ERWS	FVS
22.11.3	3472	Vdc control I time	ms	FLOAT			CALCF	1.0	1000.0	ERWS	FVS

22.12 - FUNCTIONS/BRAKE CONTROL

22.12.1	3170	Brake control funct		ENUM			Disable	0	3	ERWZ	FVS
				0	Disable						
				1	Standard						
				2	Hoist mode 1						
				3	Hoist mode 2						
22.12.2	3172	Brake open delay	s	FLOAT			0.20	0.0	60.0	ERW	FVS
22.12.3	3174	Brake close delay	s	FLOAT			0.20	0.0	60.0	ERW	FVS
22.12.4	3176	Brake open spd thr	rpm	INT16			0	0	CALCI	ERW	FVS
22.12.5	3178	Brake close spd thr	rpm	INT16			0	0	CALCI	ERW	FVS
22.12.6	3194	Brake ramp freeze		ENUM			Disable	0	1	ERWZ	FVS
				0	Disable						
				1	Enable						
22.12.7	3182	Brake open thr sel		ENUM			Output curr	0	1	ERWZ	FVS
				0	Torque ref%						

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				1	Output curr					
22.12.8	3184	Brake open thr	perc	FLOAT		10	-200.0	200.0	ERWZS	FVS
22.12.9	3186	Brake open thr src		LINK	16/32	3184	0	16384	ERWZ	FVS
				L_TCREF						
22.12.10	3188	Brake torque time	s	FLOAT		0.10	0.01	60.0	ERWZ	F_S
22.12.11	3190	Brake close wait	s	FLOAT		2	0.0	60.0	ERW	F_S

22.13 - FUNCTIONS/DIMENSION FACT

22.13.1	3900	Dim factor num		UINT16		1	1	65535	ERW	FVS
22.13.2	3902	Dim factor den		UINT16		1	1	65535	ERW	FVS
22.13.3	3904	Dim factor text		UINT32		7172210	0	0	ERW	FVS

22.14 - FUNCTIONS/CONTROL MODE

22.14.1	556	Control mode select		ENUM		Ramp	0	2	ERWZ	F_S
				0	Torque					
				1	Speed					
				2	Ramp					
22.14.2	6200	Ctrl mode src		LINK	16	556	0	16384	ERWZ	F_S
				L_CTRLMODE						
22.14.3	6202	Ctrl mode sel 0 src		LINK	16	6000	0	16384	ERWZ	F_S
				L_DIGSEL2						
22.14.4	6204	Ctrl mode sel 1 src		LINK	16	6000	0	16384	ERWZ	F_S
				L_DIGSEL2						
22.14.5	6206	Ctrl mode sel mon		UINT32		0	0	3	ER	F_S
22.14.6	6208	Ctrl mode mon		ENUM		Torque	0	0	ER	F_S
				0	Torque					
				1	Speed					
				2	Ramp					

22.15 - FUNCTIONS/TEMP CONTROL

22.15.1	3500	Drv temp src		LINK	32	6000	0	16384	ERW	FVS
				L_TEMPCTRL						
22.15.2	3504	Drv temp thr	degC	INT32		45	1	100	ERW	FVS
22.15.3	3508	Drv temp hys	degC	INT32		2	0	CALCI	ERW	FVS
22.15.4	3502	Mot temp src		LINK	32	6000	0	16384	ERW	FVS
				L_TEMPCTRL						
22.15.5	3506	Mot temp thr	degC	INT32		45	1	100	ERW	FVS
22.15.6	3510	Mot temp hys	degC	INT32		2	0	CALCI	ERW	FVS

22.16 - FUNCTIONS/LC CONTROL

22.16.1	6020	Air humidity	perc	FLOAT		0.0	0.0	0.0	ER	FVS
22.16.2	6022	Air temperature	degC	FLOAT		0.0	0.0	0.0	ER	FVS
22.16.3	6032	Dew temperature	degC	INT16		0	0	0	ER	FVS
22.16.4	6034	Dew temp offset off	degC	INT16		8	2	50	ERW	FVS
22.16.5	6048	Dew temp offset on	degC	INT16		3	2	50	ERW	FVS
22.16.6	6036	Liquid temp setpoint	degC	INT16		0	0	0	ER	FVS
22.16.7	6038	Intake liquid temp	degC	INT16		0	0	0	ER	FVS
22.16.8	6040	Liquid temp src		LINK	32	6038	0	16384	ERW	FVS
				L_TEMPCTRL						
22.16.9	6042	Liquid temp mon	degC	INT16		0	0	0	ER	FVS

22.17 - FUNCTIONS/TIMERS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.17.1	3550	Timer1 src		LINK L_DIGSEL1	32	6000	0	16384	ERW	FVS
22.17.2	3552	Timer1 pos delay	s	FLOAT		0.10	0.0	30.0	ERW	FVS
22.17.3	3554	Timer1 neg delay	s	FLOAT		0.10	0.0	30.0	ERW	FVS
22.17.4	3556	Timer1 mon		INT32		0	0	0	ER	FVS
22.17.5	3560	Timer2 src		LINK L_DIGSEL1	32	6000	0	16384	ERW	FVS
22.17.6	3562	Timer2 pos delay	s	FLOAT		0.10	0.0	30.0	ERW	FVS
22.17.7	3564	Timer2 neg delay	s	FLOAT		0.10	0.0	30.0	ERW	FVS
22.17.8	3566	Timer2 mon		INT32		0	0	0	ER	FVS

22.18 - FUNCTIONS/TORQUE LIMADAPT

22.18.1	2330	Torque limit high	perc	FLOAT		100.0	0.0	CALCF	ERW	F_S
22.18.2	2332	Torque limit low	perc	FLOAT		70.0	0.0	CALCF	ERW	F_S
22.18.3	2334	Torque limit ramp	ms	UINT16		1000	0	60000	ERW	F_S
22.18.4	2336	Torque limit sel src		LINK	16/32	976	0	16384	ERW	F_S
22.18.5	2338	Torque limit adapt	perc	FLOAT		0.0	0.0	0.0	ER	F_S

23 - COMMUNICATION

23.1 - COMMUNICATION/RS485

23.1.1	3800	Drive address		UINT16		1	1	255	ERW	FVS
23.1.2	3802	Serial baudrate		ENUM		38400	0	2	ERW	FVS
				0	9600					
				1	19200					
				2	38400					
23.1.3	3810	Serial parameter		ENUM		N_8_1	0	3	ERW	FVS
				0	None,8,1					
				1	None,8,2					
				2	Even,8,1					
				3	Odd,8,1					
23.1.4	3804	Serial protocol		ENUM		Modbus	0	1	ERW	FVS
				0	Modbus					
				1	Jbus					
23.1.5	3806	Serial delay	ms	UINT16		0	0	1000	ERW	FVS
23.1.6	3808	Serial swap data		BIT		0	0	1	ERW	FVS

23.2 - COMMUNICATION/FIELDBUS CONFIG

23.2.1	4000	Fieldbus type		ENUM		Off	0	6	RW	FVS
				0	Off					
				1	CanOpen					
				2	DeviceNet					
				3	Profibus					
				10	DS402					
				30	Profidrive					
				40	Rte					
23.2.2	4004	Fieldbus baudrate		ENUM		500k	0	12	RW	FVS
				0	Auto					
				1	125k					
				2	250k					
				3	500k					
				4	1M					
				5	9600					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				6	19200					
				7	93750					
				8	187,5k					
				9	1,5M					
				10	3M					
				11	6M					
				12	12M					
23.2.3	4006	Fieldbus address		INT16		3	0	255	RW	FVS
23.2.4	4010	Fieldbus M->S enable		ENUM		Enable	0	1	ERWZ	FVS
				0	Disable					
				1	Enable					
23.2.5	4012	Fieldbus alarm mode		INT32		0	0	1	ERWZ	FVS
23.2.6	4014	Fieldbus state		ENUM		Stop	0	9	R	FVS
				0	Stop					
				1	PreOperational					
				2	Operational					
				3	Error					
				4	WaitPRM					
				5	WaitCFG					
				6	DataExchange					
				7	DPError					
				8	SafeOp					
				9	Init					
23.2.7	4398	RTE protocol		ENUM		None	0	0	ER	FVS
				0	None					
				1	Ethercat					
				2	EthernetIP					
				3	GdNet					
				4	Profinet					
				5	ModbusTCP					
				6	Powerlink					
				107	Profidrive					
23.2.8	5608	IP address		UINT32		0	0	4294967295	ER	FVS

23.3 - COMMUNICATION/FIELDBUS M->S

23.3.1	4020	Fieldbus M->S1 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.2	4022	Fieldbus M->S1 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.3	4024	Fieldbus M->S1 mon		INT32	16	0	0	0	ERW	FVS
23.3.4	4026	Fieldbus M->S1 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.5	4030	Fieldbus M->S2 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.6	4032	Fieldbus M->S2 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.7	4034	Fieldbus M->S2 mon		INT32	16	0	0	0	ERW	FVS
23.3.8	4036	Fieldbus M->S2 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.9	4040	Fieldbus M->S3 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.10	4042	Fieldbus M->S3 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.11	4044	Fieldbus M->S3 mon		INT32	16	0	0	0	ERW	FVS
23.3.12	4046	Fieldbus M->S3 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.13	4050	Fieldbus M->S4 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.14	4052	Fieldbus M->S4 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.15	4054	Fieldbus M->S4 mon		INT32	16	0	0	0	ERW	FVS
23.3.16	4056	Fieldbus M->S4 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.17	4060	Fieldbus M->S5 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.18	4062	Fieldbus M->S5 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.19	4064	Fieldbus M->S5 mon		INT32	16	0	0	0	ERW	FVS
23.3.20	4066	Fieldbus M->S5 div		FLOAT		1.0	1.0	1000.0	ERW	FVS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.3.21	4070	Fieldbus M->S6 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.22	4072	Fieldbus M->S6 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.23	4074	Fieldbus M->S6 mon		INT32	16	0	0	0	ERW	FVS
23.3.24	4076	Fieldbus M->S6 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.25	4080	Fieldbus M->S7 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.26	4082	Fieldbus M->S7 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.27	4084	Fieldbus M->S7 mon		INT32	16	0	0	0	ERW	FVS
23.3.28	4086	Fieldbus M->S7 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.29	4090	Fieldbus M->S8 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.30	4092	Fieldbus M->S8 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.31	4094	Fieldbus M->S8 mon		INT32	16	0	0	0	ERW	FVS
23.3.32	4096	Fieldbus M->S8 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.33	4100	Fieldbus M->S9 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.34	4102	Fieldbus M->S9 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.35	4104	Fieldbus M->S9 mon		INT32	16	0	0	0	ERW	FVS
23.3.36	4106	Fieldbus M->S9 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.37	4110	Fieldbus M->S10 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.38	4112	Fieldbus M->S10 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.39	4114	Fieldbus M->S10 mon		INT32	16	0	0	0	ERW	FVS
23.3.40	4116	Fieldbus M->S10 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.41	4120	Fieldbus M->S11 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.42	4122	Fieldbus M->S11 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.43	4124	Fieldbus M->S11 mon		INT32	16	0	0	0	ERW	FVS
23.3.44	4126	Fieldbus M->S11 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.45	4130	Fieldbus M->S12 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.46	4132	Fieldbus M->S12 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.3.47	4134	Fieldbus M->S12 mon		INT32	16	0	0	0	ERW	FVS
23.3.48	4136	Fieldbus M->S12 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.49	4140	Fieldbus M->S13 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.50	4142	Fieldbus M->S13 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				3 Fill 16						
				4 Fill 32						
				5 Mdplc 16						
				6 Mdplc 32						
				7 Eu						
				8 Eu float						
				9 Par 16						
				10 Par 32						
23.3.51	4144	Fieldbus M->S13 mon		INT32	16	0	0	0	ERW	FVS
23.3.52	4146	Fieldbus M->S13 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.53	4150	Fieldbus M->S14 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.54	4152	Fieldbus M->S14 sys		ENUM		Not assigned	0	10	RW	FVS
				0 Not assigned						
				1 Count 16						
				2 Count 32						
				3 Fill 16						
				4 Fill 32						
				5 Mdplc 16						
				6 Mdplc 32						
				7 Eu						
				8 Eu float						
				9 Par 16						
				10 Par 32						
23.3.55	4154	Fieldbus M->S14 mon		INT32	16	0	0	0	ERW	FVS
23.3.56	4156	Fieldbus M->S14 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.57	4160	Fieldbus M->S15 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.58	4162	Fieldbus M->S15 sys		ENUM		Not assigned	0	10	RW	FVS
				0 Not assigned						
				1 Count 16						
				2 Count 32						
				3 Fill 16						
				4 Fill 32						
				5 Mdplc 16						
				6 Mdplc 32						
				7 Eu						
				8 Eu float						
				9 Par 16						
				10 Par 32						
23.3.59	4164	Fieldbus M->S15 mon		INT32	16	0	0	0	ERW	FVS
23.3.60	4166	Fieldbus M->S15 div		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.3.61	4170	Fieldbus M->S16 ipa		FBM2SIPA		0	0	20000	RW	FVS
23.3.62	4172	Fieldbus M->S16 sys		ENUM		Not assigned	0	10	RW	FVS
				0 Not assigned						
				1 Count 16						
				2 Count 32						
				3 Fill 16						
				4 Fill 32						
				5 Mdplc 16						
				6 Mdplc 32						
				7 Eu						
				8 Eu float						
				9 Par 16						
				10 Par 32						
23.3.63	4174	Fieldbus M->S16 mon		INT32	16	0	0	0	ERW	FVS
23.3.64	4176	Fieldbus M->S16 div		FLOAT		1.0	1.0	1000.0	ERW	FVS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.4 - COMMUNICATION/FIELDBUS S->M										
23.4.1	4180	Fieldbus S->M1 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.2	4182	Fieldbus S->M1 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.3	4184	Dig Fieldbus S->M1		INT32	16	0	0	0	ERW	FVS
23.4.4	4186	Fieldbus S->M1 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.5	4190	Fieldbus S->M2 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.6	4192	Fieldbus S->M2 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.7	4194	Dig Fieldbus S->M2		INT32	16	0	0	0	ERW	FVS
23.4.8	4196	Fieldbus S->M2 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.9	4200	Fieldbus S->M3 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.10	4202	Fieldbus S->M3 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.11	4204	Dig Fieldbus S->M3		INT32	16	0	0	0	ERW	FVS
23.4.12	4206	Fieldbus S->M3 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.13	4210	Fieldbus S->M4 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.14	4212	Fieldbus S->M4 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.15	4214	Dig Fieldbus S->M4		INT32	16	0	0	0	ERW	FVS
23.4.16	4216	Fieldbus S->M4 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.17	4220	Fieldbus S->M5 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.18	4222	Fieldbus S->M5 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.19	4224	Dig Fieldbus S->M5		INT32	16	0	0	0	ERW	FVS
23.4.20	4226	Fieldbus S->M5 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.21	4230	Fieldbus S->M6 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.22	4232	Fieldbus S->M6 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.23	4234	Dig Fieldbus S->M6		INT32	16	0	0	0	ERW	FVS
23.4.24	4236	Fieldbus S->M6 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.25	4240	Fieldbus S->M7 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.26	4242	Fieldbus S->M7 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.27	4244	Dig Fieldbus S->M7		INT32	16	0	0	0	ERW	FVS
23.4.28	4246	Fieldbus S->M7 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.29	4250	Fieldbus S->M8 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.30	4252	Fieldbus S->M8 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.31	4254	Dig Fieldbus S->M8		INT32	16	0	0	0	ERW	FVS
23.4.32	4256	Fieldbus S->M8 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.33	4260	Fieldbus S->M9 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.34	4262	Fieldbus S->M9 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.35	4264	Dig Fieldbus S->M9		INT32	16	0	0	0	ERW	FVS
23.4.36	4266	Fieldbus S->M9 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.37	4270	Fieldbus S->M10 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.38	4272	Fieldbus S->M10 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.39	4274	Dig Fieldbus S->M10		INT32	16	0	0	0	ERW	FVS
23.4.40	4276	Fieldbus S->M10 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.41	4280	Fieldbus S->M11 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.42	4282	Fieldbus S->M11 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.4.43	4284	Dig Fieldbus S->M11		INT32	16	0	0	0	ERW	FVS
23.4.44	4286	Fieldbus S->M11 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.45	4290	Fieldbus S->M12 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.46	4292	Fieldbus S->M12 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.47	4294	Dig Fieldbus S->M12		INT32	16	0	0	0	ERW	FVS
23.4.48	4296	Fieldbus S->M12 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.49	4300	Fieldbus S->M13 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.50	4302	Fieldbus S->M13 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.51	4304	Dig Fieldbus S->M13		INT32	16	0	0	0	ERW	FVS
23.4.52	4306	Fieldbus S->M13 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.53	4310	Fieldbus S->M14 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.54	4312	Fieldbus S->M14 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					
				6	Mdplc 32					
				7	Eu					
				8	Eu float					
				9	Par 16					
				10	Par 32					
23.4.55	4314	Dig Fieldbus S->M14		INT32	16	0	0	0	ERW	FVS
23.4.56	4316	Fieldbus S->M14 mul		FLOAT		1.0	1.0	1000.0	ERW	FVS
23.4.57	4320	Fieldbus S->M15 ipa		FBS2MIPA		0	0	20000	RW	FVS
23.4.58	4322	Fieldbus S->M15 sys		ENUM		Not assigned	0	10	RW	FVS
				0	Not assigned					
				1	Count 16					
				2	Count 32					
				3	Fill 16					
				4	Fill 32					
				5	Mdplc 16					

Menu	PAR	Description	UM	Type	FB	BIT	Def	Min	Max	Acc	Mod
				6	Mdplc 32						
				7	Eu						
				8	Eu float						
				9	Par 16						
				10	Par 32						
23.4.59	4324	Dig Fieldbus S->M15		INT32	16		0	0	0	ERW	FVS
23.4.60	4326	Fieldbus S->M15 mul		FLOAT			1.0	1.0	1000.0	ERW	FVS
23.4.61	4330	Fieldbus S->M16 ipa		FBS2MIPA			0	0	20000	RW	FVS
23.4.62	4332	Fieldbus S->M16 sys		ENUM			Not assigned	0	10	RW	FVS
				0	Not assigned						
				1	Count 16						
				2	Count 32						
				3	Fill 16						
				4	Fill 32						
				5	Mdplc 16						
				6	Mdplc 32						
				7	Eu						
				8	Eu float						
				9	Par 16						
				10	Par 32						
23.4.63	4334	Dig Fieldbus S->M16		INT32	16		0	0	0	ERW	FVS
23.4.64	4336	Fieldbus S->M16 mul		FLOAT			1.0	1.0	1000.0	ERW	FVS

23.5 - COMMUNICATION/WORD COMP

23.5.1	4400	Word bit0 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.2	4402	Word bit1 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.3	4404	Word bit2 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.4	4406	Word bit3 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.5	4408	Word bit4 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.6	4410	Word bit5 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.7	4412	Word bit6 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.8	4414	Word bit7 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.9	4416	Word bit8 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.10	4418	Word bit9 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.11	4420	Word bit10 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.12	4422	Word bit11 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.13	4424	Word bit12 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.14	4426	Word bit13 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							
23.5.15	4428	Word bit14 src		LINK	16		6000	0	16384	ERW	FVS
				L_DIGSEL1							

Menu	PAR	Description	UM	Type	FB	BIT	Def	Min	Max	Acc	Mod
23.5.16	4430	Word bit15 src		LINK L_DIGSEL1	16		6000	0	16384	ERW	FVS
23.5.17	4432	Word comp mon		UINT32	16		0	0	0	ER	FVS

23.6 - COMMUNICATION/WORD DECOMP

23.6.1	4450	Dig word decomp		UINT32	16		0	0	0	ERW	FVS
23.6.2	4452	Word decomp src		LINK L_WDECOMP	16		4450	0	16384	ERW	FVS
23.6.3	4454	Bit0 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.4	4456	Bit1 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.5	4458	Bit2 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.6	4460	Bit3 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.7	4462	Bit4 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.8	4464	Bit5 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.9	4466	Bit6 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.10	4468	Bit7 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.11	4470	Bit8 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.12	4472	Bit9 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.13	4474	Bit10 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.14	4476	Bit11 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.15	4478	Bit12 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.16	4480	Bit13 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.17	4482	Bit14 decomp mon		BIT	16		0	0	1	ER	FVS
23.6.18	4484	Bit15 decomp mon		BIT	16		0	0	1	ER	FVS

23.7 - COMMUNICATION/EXTERNAL IO

23.7.1	5480	External IO enable		ENUM 0 Disable 1 Enable			Disable	0	1	ERW	FVS
23.7.2	5482	External IO info		UINT32			0	0	4294967295	ER	FVS
23.7.3	5484	External IO state		BIT	16		0	0	1	ER	FVS
23.7.4	5486	External IO failcode		UINT32			0	0	4294967295	ER	FVS

23.8 - COMMUNICATION/FAST LINK

23.8.1	5702	FL address		UINT16			0	0	16	ERWZ	FVS
23.8.2	5818	FL bidirectional		ENUM 0 Disable 1 Enable			Enable	0	1	ERWZ	FVS
23.8.3	5820	FL N of slave		UINT16			0	0	32767	ERWZ	FVS
23.8.4	5710	FL sync slave type		ENUM 0 Off 1 Pwm 2 Pwm&Ctrl			Pwm&Ctrl	0	2	ERWZ	FVS
23.8.5	5712	FL N Fwd slave chg		UINT16			0	0	4	ERWZ	FVS
23.8.6	5714	FL fault enable src		LINK L_DIGSEL1	16		6002	0	16384	ERW	FVS
23.8.7	5730	FL Fwd 1 src		LINK L_FLWORD	16/32		6000	0	16384	ERW	FVS
23.8.8	5732	FL Fwd 2 src		LINK L_FLWORD	16/32		6000	0	16384	ERW	FVS
23.8.9	5734	FL Fwd 3 src		LINK L_FLWORD	16/32		6000	0	16384	ERW	FVS
23.8.10	5736	FL Fwd 4 src		LINK	16/32		6000	0	16384	ERW	FVS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				L_FLWORD						
23.8.11	5830	FL Rev 1 src		LINK L_FLWORD	16/32	6000	0	16384	ERW	FVS
23.8.12	5832	FL Rev 2 src		LINK L_FLWORD	16/32	6000	0	16384	ERW	FVS
23.8.13	5750	FL Fwd 1 mon		INT32	32	0	0	0	ER	FVS
23.8.14	5752	FL Fwd 2 mon		INT32	32	0	0	0	ER	FVS
23.8.15	5754	FL Fwd 3 mon		INT32	32	0	0	0	ER	FVS
23.8.16	5756	FL Fwd 4 mon		INT32	32	0	0	0	ER	FVS
23.8.17	5758	FL Fwd 5 mon		INT32	32	0	0	0	ER	FVS
23.8.18	5760	FL Fwd 6 mon		INT32	32	0	0	0	ER	FVS
23.8.19	5762	FL Fwd 7 mon		INT32	32	0	0	0	ER	FVS
23.8.20	5764	FL Fwd 8 mon		INT32	32	0	0	0	ER	FVS
23.8.21	5850	FL Rev 1 mon		INT32	32	0	0	0	ER	FVS
23.8.22	5852	FL Rev 2 mon		INT32	32	0	0	0	ER	FVS
23.8.23	5854	FL Rev 3 mon		INT32	32	0	0	0	ER	FVS
23.8.24	5856	FL Rev 4 mon		INT32	32	0	0	0	ER	FVS
23.8.25	5822	FL Rev 1 slave sel		UINT16		0	0	31	ERWZ	FVS
23.8.26	5824	FL Rev 2 slave sel		UINT16		0	0	31	ERWZ	FVS
23.8.27	5826	FL Rev 3 slave sel		UINT16		0	0	31	ERWZ	FVS
23.8.28	5828	FL Rev 4 slave sel		UINT16		0	0	31	ERWZ	FVS
23.8.29	5720	Sync slave mon		BIT	16	0	0	1	ER	FVS
23.8.30	5722	FL fault code		UINT32		0	0	0	ER	FVS

24 - ALARM CONFIG

24.1	4500	Fault reset src		LINK L_DIGSEL2	16	1120	0	16384	RW	FVS
24.2	4502	ExtFlt src		LINK L_DIGSEL2	16	6000	0	16384	RW	FVS
24.3	4504	ExtFlt activity		ENUM		Disable	0	4	RW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.4	4506	ExtFlt restart		ENUM		Disable	0	1	RW	FVS
				0	Disable					
				1	Enable					
24.5	4508	ExtFlt restart time	ms	UINT16		1000	120	30000	RW	FVS
24.6	4510	ExtFlt holdoff	ms	UINT16		0	0	10000	RW	FVS
24.7	4516	MotorOT pre activity		ENUM		Ignore	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.8	4518	MotorOT pre thr	perc	UINT16		60	0	100	ERW	FVS
24.9	4520	MotorOT src		LINK L_DIGSEL2	16	6000	0	16384	RW	FVS
24.10	4522	MotorOT activity		ENUM		Warning	0	4	RW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				3	Stop					
				4	Fast stop					
24.11	4524	MotorOT restart		ENUM		Disable	0	1	RW	FVS
				0	Disable					
				1	Enable					
24.12	4526	MotorOT restart time	ms	UINT16		1000	120	30000	RW	FVS
24.13	4528	MotorOT holdoff	ms	UINT16		1000	0	30000	RW	FVS
24.14	4530	MotorOT probe		ENUM		SRC	0	13	ERW	FVS
				0	SRC					
				1	Sens An1X					
				2	Sens An2X					
				3	KTY84 AnX					
				4	PTC AnX					
				5	KTY84 An1					
				6	KTY84 An2					
				7	PTC An1					
				8	PTC An2					
				9	Klixon AnX					
				10	KTY84 An1X					
				11	KTY84 An2X					
				12	PTC An1X					
				13	PTC An2X					
24.15	4514	MotorOT KTY84 unit		ENUM		ohm	0	1	ERW	FVS
				0	ohm					
				1	°C					
24.16	4532	MotorOT thr	cnt	UINT16		0	0	32767	ERW	FVS
24.17	4536	MotorOT mon	cnt	INT16	16/32	0	0	32767	ER	FVS
24.18	4540	Overspeed threshold	rpm	INT32		CALCI	0	CALCI	RW	FVS
24.19	4542	Overspeed activity		ENUM		Disable	0	4	RW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.20	4544	Overspeed holdoff	ms	UINT16		0	0	5000	RW	FVS
24.21	4550	SpdRefLoss threshold	rpm	INT16		100	0	CALCI	RW	FVS
24.22	4552	SpdRefLoss activity		ENUM		Ignore	0	4	RW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.23	4554	SpdRefLoss holdoff	ms	UINT16		1000	0	10000	RW	FVS
24.24	4556	SpdRefLoss max spdOL	rpm	INT16		CALCI	0	CALCI	RW	FVS
24.25	4558	SpdRefLoss minThr en		BIT		0	0	1	ERW	FVS
24.26	4560	SpdFbkLoss activity		ENUM		Disable	0	4	RW	FV_
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.27	4562	SpdFbkLoss holdoff	ms	UINT16		200	0	10000	RW	FV_
24.28	4564	SpdFbkLoss threshold	rpm	INT16		100	5	CALCI	RW	FV_
24.29	4570	Drive ovld activity		ENUM		Ignore	0	4	ERW	FVS
				0	Ignore					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.30	4572	Motor ovld activity		ENUM		Warning	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.31	4574	Bres ovld activity		ENUM		Disable	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.32	4582	HTsens restart		ENUM		Disable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
24.33	4584	HTsens restart time	ms	UINT16		20000	120	60000	ERW	FVS
24.34	4600	InAir activity		ENUM		Stop	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.35	4602	InAir restart		ENUM		Disable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
24.36	4604	InAir restart time	ms	UINT16		1000	120	30000	ERW	FVS
24.37	4606	InAir holdoff	ms	UINT16		10000	1000	30000	ERW	FVS
24.38	4610	Desat restart		ENUM		Disable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
24.39	4612	Desat restart time	ms	UINT16		2000	1000	10000	ERW	FVS
24.40	4620	IOverC restart		ENUM		Disable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
24.41	4622	IOverC restart time	ms	UINT16		2000	1000	10000	ERW	FVS
24.42	4630	OverV restart		ENUM		Disable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
24.43	4632	OverV restart time	ms	UINT16		2000	1000	10000	ERW	FVS
24.44	4640	UnderV restart		ENUM		Enable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
24.45	4642	UnderV restart time	ms	UINT16		1000	120	10000	ERW	FVS
24.46	4650	UVRep attempts		UINT16		5	0	1000	ERW	FVS
24.47	4652	UVRep delay	s	UINT16		240	0	300	ERW	FVS
24.48	4660	PhLoss activity		ENUM		Disable	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				4	Fast stop					
24.49	4662	PhLoss restart		ENUM		Disable	0	1	ERW	FVS
				0	Disable					
				1	Enable					
24.50	4664	PhLoss restart time	ms	UINT16		1000	120	10000	ERW	FVS
24.51	4670	Optionbus activity		ENUM		Disable	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.52	4672	Optbus fault en src		LINK	16	6002	0	16384	ERW	FVS
				L_DIGSEL1						
24.53	4680	GroundFault thr	perc	FLOAT		10.0	0.0	150.0	ERWS	FVS
24.54	4684	Brake fault activity		ENUM		Disable	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.55	4690	ExtIO activity		ENUM		Disable	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.56	4940	FL fault activity		ENUM		Disable	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.57	4654	Mot PhLoss activity		ENUM		Ignore	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.58	4656	Mot PhLoss holdoff	ms	UINT16		800	400	10000	ERW	FVS
24.59	4658	Mot PhLoss threshold	A	FLOAT		0.20	0	CALCF	ERW	FVS
24.60	4674	Mot PhLoss speed thr	rpm	INT16		10	5	32000	ERW	FVS
24.61	4678	Mot PhLoss code		UINT32		0	0	0	ER	FVS
24.62	4590	Condensat activity		ENUM		Disable	0	4	ERW	FVS
				0	Ignore					
				1	Warning					
				2	Disable					
				3	Stop					
				4	Fast stop					
24.63	4592	Condensat holdoff	s	UINT16		30	0	500	ERW	FVS
24.64	4576	Condensation delay	s	UINT16		5	0	50	ERW	FVS
24.65	4596	Overhumidity thr	perc	FLOAT		85.0	0.0	100	ERW	FVS
24.66	4578	Overhumidity delay	s	UINT16		5	0	50	ERW	FVS
24.67	4598	HumTSensErr code		UINT32		0	0	0	ER	FVS
24.68	4546	An inpLoss activity		ENUM		Warning	0	4	ERW	FVS

Menu	PAR	Description	UM	Type	FB BIT Def	Min	Max	Acc	Mod
				0	Ignore				
				1	Warning				
				2	Disable				
				3	Stop				
				4	Fast stop				
24.69	4548	An inpLoss holdoff	ms	UINT16	1000	0	30000	ERW	FVS
24.70	4568	An inpLoss code		UINT32	0	0	0	ER	FVS
24.71	4700	Alarm dig sel 1		ENUM	No alarm	0	62	ERW	FVS
24.72	4702	Alarm dig sel 2		ENUM	No alarm	0	62	ERW	FVS
24.73	4704	Alarm dig sel 3		ENUM	No alarm	0	62	ERW	FVS
24.74	4706	Alarm dig sel 4		ENUM	No alarm	0	62	ERW	FVS
				0	No alarm				
				1	Overvoltage				
				2	Undervoltage				
				3	Ground fault				
				4	Overcurrent				
				5	Desaturation				
				6	MultiUndervolt				
				7	MultiOvercurr				
				8	MultiDesat				
				9	Heatsink OT				
				10	HeatsinkS OTUT				
				11	Intakeair OT				
				12	Motor OT				
				13	Drive overload				
				14	Motor overload				
				15	Bres overload				
				16	Phaseloss				
				17	Opt Bus fault				
				18	Opt 1 IO fault				
				19	Opt 2 IO fault				
				20	Opt Enc fault				
				21	External fault				
				22	Speed fbk loss				
				23	Overspeed				
				24	Speed ref loss				
				25	Emg stop alarm				
				26	Power down				
				27	ExtIO fault				
				28	FastLink fault				
				29	Brake fault				
				30	Motor pre OT				
				31	Mot phase loss				
				32	Condensation				
				33	Plc1 fault				
				34	Plc2 fault				
				35	Plc3 fault				
				36	Plc4 fault				
				37	Plc5 fault				
				38	Plc6 fault				
				39	Plc7 fault				
				40	Plc8 fault				
				41	Watchdog				
				42	Trap error				
				43	System error				
				44	User error				

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
				45	Param error					
				46	Load def par					
				47	Plc cfg error					
				48	Load def plc					
				49	Key failed					
				50	Encoder error					
				51	Opt cfg change					
				52	HumTempSensErr					
				53	Plc9 fault					
				54	Plc10 fault					
				55	Plc11 fault					
				56	Plc12 fault					
				57	Plc13 fault					
				58	Plc14 fault					
				59	Plc15 fault					
				60	Plc16 fault					
				61	Not used1					
				62	An inpLoss					
24.75	4720	Alm autoreset time	s	FLOAT		0.0	0.0	60.0	ERW	FVS
24.76	4722	Alm autoreset number		UINT16		20	0	100	ERW	FVS

25 - ALARM LOG

26 - APPLICATION

27 - SERVICE

27.1 - SERVICE/TEST GENERATOR

27.1.1	5000	Test gen dest		ENUM		Off	0	4	ERWZ	FVS
				0	Off					
				1	Ramp ref 1					
				2	Speed ref 1					
				3	Torque ref 1					
				4	Current ref					
27.1.2	5002	Test gen level high	perc	INT16		0	-200	200	ERW	FVS
27.1.3	5004	Test gen level low	perc	INT16		0	-200	200	ERW	FVS
27.1.4	5006	Test gen period	s	FLOAT		1.0	0.01	10.0	ERW	FVS
27.1.5	5008	Test gen out	perc	INT16	16/32	0	0	0	ER	FVS

27.2 - SERVICE/POSITION

27.2.1	2152	E1 Virtual pulses		UINT32		CALCI	0	0	ERW	FVS
27.2.2	2154	E1 Virtual position	cnt	UINT32	32	0	0	0	ER	FVS
27.2.3	2156	E1 Revolutions		INT32	32	0	0	0	ER	FVS
27.2.4	2168	E1 Abs pulses		UINT32		CALCI	0	0	ER	FVS
27.2.5	2164	E1 Abs position	cnt	UINT32	32	0	0	0	ER	FVS
27.2.6	2166	E1 Abs revolutions		UINT32	32	0	0	0	ER	FVS
27.2.7	2174	E1 Abs offset	cnt	UINT32	32	775480206	0	0	ERW	FVS
27.2.8	2178	E1 Abs offset memory		ENUM		Drive memory	0	1	ERWZ	FVS
				0	Drive memory					
				1	Encoder memory					
27.2.9	2180	E1 Abs offset deg	deg	FLOAT	32	65	0.0	0.0	ERW	FVS
27.2.10	5152	E2 Virtual pulses		UINT32		CALCI	0	0	ERW	FVS
27.2.11	5154	E2 Virtual position	cnt	UINT32	32	0	0	0	ER	FVS
27.2.12	5156	E2 Revolutions		INT32	32	0	0	0	ER	FVS

Menu	PAR	Description	UM	Type	FB	BIT	Def	Min	Max	Acc	Mod
27.2.13	5168	E2 Abs pulses		UINT32			CALCI	0	0	ER	FVS
27.2.14	5164	E2 Abs position	cnt	UINT32	32		0	0	0	ER	FVS
27.2.15	5166	E2 Abs revolutions		UINT32	32		0	0	0	ER	FVS
27.2.16	5174	E2 Abs offset	cnt	UINT32	32		775480206	0	0	ERW	FVS
27.2.17	5178	E2 Abs offset memory		ENUM			Drive memory	0	1	ERWZ	FVS
				0	Drive memory						
				1	Encoder memory						
27.2.18	5180	E2 Abs offset deg	deg	FLOAT	32		65	0.0	0.0	ERW	FVS
27.2.19	5252	E3 Virtual pulses		UINT32			CALCI	0	0	ERW	FVS
27.2.20	5254	E3 Virtual position	cnt	UINT32	32		0	0	0	ER	FVS
27.2.21	5256	E3 Revolutions		INT32	32		0	0	0	ER	FVS
27.2.22	2126	Resolver OVR thr	V	FLOAT			4.820	0.000	4.820	ERWZ	FVS
27.2.23	2136	Resolver MIS maxThr	V	FLOAT			2.280	0.000	4.820	ERWZ	FVS
27.2.24	2138	Resolver MIS minThr	V	FLOAT			3.990	0.000	4.820	ERWZ	FVS
27.2.25	2140	Resolver LOT thr	deg	FLOAT			4	0	9	ERWZ	FVS
27.2.26	2142	Resolver LOT hys	deg	FLOAT			0.5	0	9	ERWZ	FVS
27.2.27	2144	Resolver get reg		UINT16			0	0	0	ERWZ	FVS
27.2.28	2146	Resolver reg mon		UINT16			0	0	0	ERZ	FVS
27.2.29	2086	Resolver resolution		ENUM			16	2	3	ERWZ	FVS
				2	14 bit						
				3	16 bit						
27.2.30	5312	Encoder fbk mon		ENUM			E1 Abs	0	0	ER	FVS
				0	E1 Abs						
				1	E1 Inc						
				2	E2 Abs						
				3	E2 Inc						
				4	E1 None						
				5	E2 None						

27.3 - SERVICE/FIELDBUS SERV

27.3.1	4016	Fieldbus float order		BIT			0	0	1	ERW	FVS
27.3.2	4018	Profibus byte order		BIT			0	0	1	ERW	FVS
27.3.3	5604	InputSize		UINT16			0	0	65535	ER	FVS
27.3.4	5614	PN diagnostic		UINT32			0	0	4294967295	ERW	FVS
27.3.5	5616	MdPlc direct map		INT32			0	0	1	ERWZ	FVS

27.4 - SERVICE/EXT IO SERV

27.4.1	5488	External IO period		UINT16			8	8	64	ERW	FVS
27.4.2	5492	External IO baudrate		ENUM			500k	0	12	ERW	FVS
				0	Auto						
				1	125k						
				2	250k						
				3	500k						
				4	1M						
				5	9600						
				6	19200						
				7	93750						
				8	187,5k						
				9	1,5M						
				10	3M						
				11	6M						
				12	12M						
27.4.3	5490	External IO address		INT16			1	1	255	ERW	FVS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
27.4.4	5494	External IO lifetime		UINT16		3	1	100	ERW	FVS
27.4.5	5496	External IO err cnt		UINT16		0	0	65535	ERW	FVS
27.4.6	4980	ExtIO holdoff	ms	UINT16		1	1	10000	ERW	FVS
27.4.7	4982	External IO pdo time		UINT16		4	1	10000	ERW	FVS
27.4.8	4984	External IO HB time	ms	UINT16		100	8	10000	ERW	FVS

27.5 - SERVICE/FAST LINK SERV

27.5.1	4946	FL fault holdoff	us	UINT16		250	125	10000	ERW	FVS
27.5.2	5790	FLRxTimeoutHoldOff		UINT16		4	0	4000	ERW	FVS
27.5.3	5792	FLRxTimeoutCnt		UINT16		0	0	0	ER	FVS
27.5.4	5794	FLSyncSlaveEHoldOff		UINT16		4	0	4000	ERW	FVS
27.5.5	5796	FLSyncSlaveErrCnt		UINT16		0	0	0	ER	FVS

27.6 - SERVICE/SERIAL NUMBERS

27.6.1	520	Product S/N		UINT32		0	0	0	R	FVS
27.6.2	522	Regulation S/N		UINT32		0	0	0	R	FVS
27.6.3	524	Power S/N		UINT32		0	0	0	R	FVS
27.6.4	536	Slot1 card S/N		UINT32		0	0	0	R	FVS
27.6.5	538	Slot2 card S/N		UINT32		0	0	0	R	FVS
27.6.6	540	Slot3 card S/N		UINT32		0	0	0	R	FVS

27.7 - SERVICE/SENSORLESS SERV

27.7.1	7000	SLS Actual ctrl mode		UINT16		8208	0	65535	ERW	FVS
27.7.2	7036	SLS RS corr	ohm	FLOAT		CALCF	CALCF	CALCF	ERWZS	FVS
27.7.3	7038	SLS Lsig corr	mH	FLOAT		CALCF	CALCF	CALCF	ERWZS	FVS
27.7.4	7002	SLS lower thr absErr	rpm	FLOAT		4.0	0.0	20.0	ERW	FVS
27.7.5	7004	SLS upper thr absErr	rpm	FLOAT		20.0	0.0	100.0	ERW	FVS
27.7.6	7006	SLS max thr absErr	rpm	FLOAT		50.0	0.0	200.0	ERW	FVS

27.8 - SERVICE/CURRENTS

27.8.1	80	Phase current U	A	FLOAT		0.0	0.0	0.0	ER	FVS
27.8.2	82	Phase current V	A	FLOAT		0.0	0.0	0.0	ER	FVS
27.8.3	84	Phase current W	A	FLOAT		0.0	0.0	0.0	ER	FVS
27.8.4	90	Phase current RMS U	A	FLOAT		0.0	0.0	0.0	ER	FVS
27.8.5	92	Phase current RMS V	A	FLOAT		0.0	0.0	0.0	ER	FVS
27.8.6	94	Phase current RMS W	A	FLOAT		0.0	0.0	0.0	ER	FVS
27.8.7	78	Phase current filter	ms	UINT16		0	0	20	ERW	FVS

27.9 - SERVICE/MOTOR PHLOSS

27.9.1	4686	Mot PhLoss scale		FLOAT		0.5	0	0.8	ERW	FVS
27.9.2	4694	Mot PhLoss SRL delay	ms	UINT16		300	0	1000	ERW	FVS

27.10 - SERVICE/LC SERV

27.10.1	200	Thermal_resistance1	degC/W	FLOAT		0.02	0	1	ERWS	FVS
27.10.2	202	Thermal_resistance2	degC/W	FLOAT		0	0	1	ERWS	FVS
27.10.3	204	Inverter bridge type		UINT16		CALCF	0	3	ERWS	FVS
27.10.4	206	Powerloss factor1		FLOAT		0.005	0	1	ERWS	FVS
27.10.5	210	Liquid temp filter	ms	UINT16		1000	0	10000	ERW	FVS
27.10.6	212	Powerloss factor2		FLOAT		0	0	1	ERWS	FVS
27.10.7	4594	HumTSensErr activity		ENUM		Disable	0	4	ERW	FVS
				0	Ignore					

Menu	PAR	Description	UM	Type	FB BIT Def	Min	Max	Acc	Mod
				1	Warning				
				2	Disable				
				3	Stop				
				4	Fast stop				
27.10.8	4580	HumTSensErr holdoff	s	UINT16	3	1	50	ERW	FVS
27.10.9	6052	LC sens err enable		UINT16	2	0	0	ERWS	FVS

27.11 - SERVICE/FILTERS

27.11.1	30	Display spd filter	ms	UINT16	200	10	1000	ERW	FVS
27.11.2	32	Display trq filter	ms	UINT16	200	10	1000	ERW	FVS

27.12 - SERVICE/TEST VAR

27.12.1	5060	Var 1 addr		UINT32	3759169536	0	0	ERW	FVS
27.12.2	5062	Var 2 addr		UINT32	3759169536	0	0	ERW	FVS
27.12.3	5070	Var 1 type		ENUM	Not assigned	0	2	ERW	FVS
				0	Not assigned				
				1	Count 16				
				2	Count 32				
27.12.4	5072	Var 2 type		ENUM	Not assigned	0	2	ERW	FVS
				0	Not assigned				
				1	Count 16				
				2	Count 32				
27.12.5	5080	Var 1 mon		INT32	0	0	0	ER	FVS
27.12.6	5082	Var 2 mon		INT32	0	0	0	ER	FVS

27.13 - SERVICE/SD CARD

27.13.1	598	Load from SD card		BIT	0	0	1	ERWZ	FVS

28 - RECIPE CONFIG

28.1	6300	Recipe config 1	UINT16	0	0	0	RW	FVS
28.2	6302	Recipe config 2	UINT16	0	0	0	RW	FVS
28.3	6304	Recipe config 3	UINT16	0	0	0	RW	FVS
28.4	6306	Recipe config 4	UINT16	0	0	0	RW	FVS
28.5	6308	Recipe config 5	UINT16	0	0	0	RW	FVS
28.6	6310	Recipe config 6	UINT16	0	0	0	RW	FVS
28.7	6312	Recipe config 7	UINT16	0	0	0	RW	FVS
28.8	6314	Recipe config 8	UINT16	0	0	0	RW	FVS
28.9	6316	Recipe config 9	UINT16	0	0	0	RW	FVS
28.10	6318	Recipe config 10	UINT16	0	0	0	RW	FVS
28.11	6320	Recipe config 11	UINT16	0	0	0	RW	FVS
28.12	6322	Recipe config 12	UINT16	0	0	0	RW	FVS
28.13	6324	Recipe config 13	UINT16	0	0	0	RW	FVS
28.14	6326	Recipe config 14	UINT16	0	0	0	RW	FVS
28.15	6328	Recipe config 15	UINT16	0	0	0	RW	FVS
28.16	6330	Recipe config 16	UINT16	0	0	0	RW	FVS
28.17	6332	Recipe config 17	UINT16	0	0	0	RW	FVS
28.18	6334	Recipe config 18	UINT16	0	0	0	RW	FVS
28.19	6336	Recipe config 19	UINT16	0	0	0	RW	FVS
28.20	6338	Recipe config 20	UINT16	0	0	0	RW	FVS

29 - RECIPE

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
PARAMETERS NOT PRESENT ON MENU										
-	262	Motor speed nofilter	FF	INT16	16	0	0	0	ER	
-	362	Drive overload trip		BIT	16	0	0	1	ER	
-	366	Drive overload 80%		BIT	16	0	0	1	ER	
-	626	Ramp ref out mon	FF	INT16	16	0	0	0	ER	
-	760	Ramp out mon	FF	INT16	16	0	0	0	ER	
-	764	Ramp acc state		BIT	16	0	0	1	ER	
-	766	Ramp dec state		BIT	16	0	0	1	ER	
-	934	Ref is 0		BIT	16	0	0	1	ER	
-	936	Ref is 0 delay		BIT	16	0	0	1	ER	
-	944	Speed is 0		BIT	16	0	0	1	ER	
-	946	Speed is 0 delay		BIT	16	0	0	1	ER	
-	956	Speed thr 1_2 mon		BIT	16	0	0	1	ER	
-	966	Set speed		BIT	16	0	0	1	ER	
-	976	Speed thr 3 mon		BIT	16	0	0	1	ER	
-	986	Current thr mon		BIT	16	0	0	1	ER	
-	1030	Local/remote mon		BIT	16	0	0	1	ER	
-	1060	Sequencer status		UINT16	16	0	0	0	ER	
-	1062	Drive OK		BIT	16	0	0	1	ER	
-	1064	Drive ready		BIT	16	0	0	1	ER	
-	1110	Digital input E mon		BIT	16	0	0	1	ER	
-	1112	Digital input 1 mon		BIT	16	0	0	1	ER	
-	1114	Digital input 2 mon		BIT	16	0	0	1	ER	
-	1116	Digital input 3 mon		BIT	16	0	0	1	ER	
-	1118	Digital input 4 mon		BIT	16	0	0	1	ER	
-	1120	Digital input 5 mon		BIT	16	0	0	1	ER	
-	1210	Digital input 1X mon		BIT	16	0	0	1	ER	
-	1212	Digital input 2X mon		BIT	16	0	0	1	ER	
-	1214	Digital input 3X mon		BIT	16	0	0	1	ER	
-	1216	Digital input 4X mon		BIT	16	0	0	1	ER	
-	1218	Digital input 5X mon		BIT	16	0	0	1	ER	
-	1220	Digital input 6X mon		BIT	16	0	0	1	ER	
-	1222	Digital input 7X mon		BIT	16	0	0	1	ER	
-	1224	Digital input 8X mon		BIT	16	0	0	1	ER	
-	1530	Analog inp1		BIT	16	0	0	1	ER	
-	1540	An inp 1 err mon		BIT	16	0	0	0	ER	
-	1542	Analog inp1>thr		BIT	16	0	0	1	ER	
-	1580	Analog inp2		BIT	16	0	0	1	ER	
-	1590	An inp 2 err mon		BIT	16	0	0	0	ER	
-	1592	Analog inp2>thr		BIT	16	0	0	1	ER	
-	1640	An inp 1X err mon		BIT	16	0	0	0	ER	
-	1690	An inp 2X err mon		BIT	16	0	0	0	ER	
-	2038	Autophase status		UINT32		0	0	2	ERW	
-	2040	Autophase OK		UINT32		0	0	0	ER	
-	2388	Torque ref nofilter	perc	FLOAT	16	0.0	0.0	0.0	ER	
-	2396	Torque nofilter	perc	FLOAT	16	0.0	0.0	0.0	ER	
-	3006	Speed ratio out mon	rpm	INT16	16	0	0	0	ER	
-	3180	Brake control mon		BIT	16	0	0	1	ER	
-	3192	Brake open thr mon	perc	FLOAT		0	0.0	0	ERS	
-	3214	Motor overload trip		BIT	16	0	0	1	ER	
-	3262	Bres overload trip		BIT	16	0	0	1	ER	
-	3442	Powerloss rampdown		BIT	16	0	0	1	ER	

Menu	PAR	Description	UM	Type	FB	BIT	Def	Min	Max	Acc	Mod
-	3446	Powerloss nextratio		INT32	32		0	0	0	ER	
-	3448	Powerloss nextactive		BIT	16		0	0	1	ER	
-	3480	Vdc ctrl ramp freeze		BIT	16		0	0	1	ER	
-	3512	Drv thr overtemp mon		UINT32			0	0	0	ER	
-	3514	Mot thr overtemp mon		UINT32			0	0	0	ER	
-	4372	DS402 status word		UINT16	16		0	0	65535	ER	
-	4394	PFdrv status word 1		UINT16	16		0	0	65535	ER	
-	4396	PFdrv status word 2		UINT16	16		0	0	65535	ER	
-	4538	KTY84/PTC current	mA	UINT32			2	1	10	ERWS	
-	4708	Alm dig out mon 1		BIT	16		0	0	1	ER	
-	4710	Alm dig out mon 2		BIT	16		0	0	1	ER	
-	4712	Alm dig out mon 3		BIT	16		0	0	1	ER	
-	4714	Alm dig out mon 4		BIT	16		0	0	1	ER	
-	4770	First alarm		UINT32	16		0	0	0	ERW	
-	4780	Alarm PLC		UINT16			0	0	0	ER	
-	4840	Alarm lo state		UINT32	32		0	0	0	ER	
-	4842	Alarm hi state		UINT32	32		0	0	0	ER	
-	5510	Digital input 9X mon		BIT	16		0	0	1	ER	
-	5512	Digital input10X mon		BIT	16		0	0	1	ER	
-	5514	Digital input11X mon		BIT	16		0	0	1	ER	
-	5516	Digital input12X mon		BIT	16		0	0	1	ER	
-	5518	Digital input13X mon		BIT	16		0	0	1	ER	
-	5520	Digital input14X mon		BIT	16		0	0	1	ER	
-	5522	Digital input15X mon		BIT	16		0	0	1	ER	
-	5524	Digital input16X mon		BIT	16		0	0	1	ER	
-	5800	FL Fwd 1 inv mon		INT32	32		0	0	0	ER	
-	5802	FL Fwd 2 inv mon		INT32	32		0	0	0	ER	
-	5804	FL Fwd 3 inv mon		INT32	32		0	0	0	ER	
-	5806	FL Fwd 4 inv mon		INT32	32		0	0	0	ER	
-	5808	FL Fwd 5 inv mon		INT32	32		0	0	0	ER	
-	5810	FL Fwd 6 inv mon		INT32	32		0	0	0	ER	
-	5812	FL Fwd 7 inv mon		INT32	32		0	0	0	ER	
-	5814	FL Fwd 8 inv mon		INT32	32		0	0	0	ER	
-	6000	Null		UINT32	32		0	0	0	ER	
-	6002	One		UINT32	32		1	1	1	ER	
-	6004	Speed limit state		BIT	16		0	0	1	ER	
-	6006	Current limit state		BIT	16		0	0	1	ER	
-	6044	Condensation state		UINT32			0	0	0	ER	
-	6046	Overhumidity state		UINT32			0	0	0	ER	

L_ANOUT

PAR	Description	Menu
6000	Null	(*)
626	Ramp ref out mon	(*)
628	Ramp setpoint	1.5
760	Ramp out mon	(*)
664	Speed setpoint	1.6
260	Motor speed	1.7
262	Motor speed nofilter	(*)
2150	Encoder 1 speed	17.2.13
5150	Encoder 2 speed	17.3.13
250	Output current	1.1
252	Output voltage	1.2
254	Output frequency	1.3
256	Output power	1.4
280	Torque current ref	1.17
282	Magnet current ref	1.18
284	Torque current	1.19
286	Magnet current	1.20
2360	Torque lim Pos Inuse	20.9
2362	Torque lim Neg Inuse	20.10
2386	Torque ref %	20.18
2388	Torque ref nofilter	(*)
2394	Torque %	20.20
2396	Torque nofilter	(*)
270	DC link voltage	1.8
3006	Speed ratio out mon	(*)
3070	Droop out mon	22.2.5
852	Multi ref out mon	7.24
870	Mpot setpoint	8.1
894	Mpot output mon	8.13
920	Jog output mon	9.6
3104	Inertia comp mon	22.3.3
1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
368	Drive overload accum	1.22
3212	Motor overload accum	1.21
3260	Bres overload accum	1.23
2232	Spd reg P gain Inuse	18.11
2234	Spd reg I gain Inuse	18.12
2246	Speed reg P factor	18.16
2248	Speed reg I factor	18.17
3446	Powerloss nextratio	(*)
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
5008	Test gen out	27.1.5
5750	FL Fwd 1 mon	23.8.13
5752	FL Fwd 2 mon	23.8.14
5754	FL Fwd 3 mon	23.8.15
5756	FL Fwd 4 mon	23.8.16
5758	FL Fwd 5 mon	23.8.17
5760	FL Fwd 6 mon	23.8.18
5762	FL Fwd 7 mon	23.8.19
5764	FL Fwd 8 mon	23.8.20
5800	FL Fwd 1 inv mon	(*)
5802	FL Fwd 2 inv mon	(*)
5804	FL Fwd 3 inv mon	(*)
5806	FL Fwd 4 inv mon	(*)
5808	FL Fwd 5 inv mon	(*)
5810	FL Fwd 6 inv mon	(*)
5812	FL Fwd 7 inv mon	(*)
5814	FL Fwd 8 inv mon	(*)
4538	KTY84/PTC current	(*)
2346	Torque current ref 1	20.15
2342	Working load	1.16

L_CMP

PAR	Description	Menu
XXXX	*(1)*	
626	Ramp ref out mon	(*)
628	Ramp setpoint	1.5
760	Ramp out mon	(*)
664	Speed setpoint	1.6
260	Motor speed	1.7
262	Motor speed nofilter	(*)
2150	Encoder 1 speed	17.2.13
5150	Encoder 2 speed	17.3.13
250	Output current	1.1
252	Output voltage	1.2
254	Output frequency	1.3
256	Output power	1.4
280	Torque current ref	1.17
282	Magnet current ref	1.18
284	Torque current	1.19
286	Magnet current	1.20
2386	Torque ref %	20.18
2388	Torque ref nofilter	(*)
2394	Torque %	20.20
2396	Torque nofilter	(*)
270	DC link voltage	1.8
3006	Speed ratio out mon	(*)
3070	Droop out mon	22.2.5
852	Multi ref out mon	7.24
870	Mpot setpoint	8.1
894	Mpot output mon	8.13
920	Jog output mon	9.6
1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
368	Drive overload accum	1.22
3212	Motor overload accum	1.21
3260	Bres overload accum	1.23
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
5750	FL Fwd 1 mon	23.8.13
5752	FL Fwd 2 mon	23.8.14
5754	FL Fwd 3 mon	23.8.15
5756	FL Fwd 4 mon	23.8.16
5758	FL Fwd 5 mon	23.8.17
5760	FL Fwd 6 mon	23.8.18
5762	FL Fwd 7 mon	23.8.19
5764	FL Fwd 8 mon	23.8.20
5800	FL Fwd 1 inv mon	(*)
5802	FL Fwd 2 inv mon	(*)
5804	FL Fwd 3 inv mon	(*)
5806	FL Fwd 4 inv mon	(*)
5808	FL Fwd 5 inv mon	(*)
5810	FL Fwd 6 inv mon	(*)
5812	FL Fwd 7 inv mon	(*)
5814	FL Fwd 8 inv mon	(*)
2346	Torque current ref 1	20.15

(1) the XXXX parameter changes according to the src parameter used:

960 Set speed ref src

PAR	Description	Menu
(1) = 968 Dig set speed ref		*10.11*
3660 Compare input 1 src		
(1) = 3650 Dig compare input 1		*22.9.1*
3662 Compare input 2 src		
(1) = 3652 Dig compare input 2		*22.9.2*

L_CTRLMODE

XXXX (2)		
6206	Ctrl mode sel mon	22.14.5
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16

(2) the XXXX parameter changes according to the src parameter used:

6200	*Ctrl mode src*	
(2) = 556 Control mode select		*22.14.1*

L_DIGSEL1

6000	Null	(*)
6002	One	(*)
1110	Digital input E mon	(*)
1112	Digital input 1 mon	(*)
1114	Digital input 2 mon	(*)
1116	Digital input 3 mon	(*)
1118	Digital input 4 mon	(*)
1120	Digital input 5 mon	(*)
1210	Digital input 1X mon	(*)
1212	Digital input 2X mon	(*)
1214	Digital input 3X mon	(*)
1216	Digital input 4X mon	(*)
1218	Digital input 5X mon	(*)
1220	Digital input 6X mon	(*)
1222	Digital input 7X mon	(*)
1224	Digital input 8X mon	(*)
5510	Digital input 9X mon	(*)
5512	Digital input10X mon	(*)
5514	Digital input11X mon	(*)
5516	Digital input12X mon	(*)
5518	Digital input13X mon	(*)
5520	Digital input14X mon	(*)
5522	Digital input15X mon	(*)
5524	Digital input16X mon	(*)
1062	Drive OK	(*)
1064	Drive ready	(*)
934	Ref is 0	(*)
936	Ref is 0 delay	(*)
944	Speed is 0	(*)
946	Speed is 0 delay	(*)
956	Speed thr 1_2 mon	(*)
966	Set speed	(*)
976	Speed thr 3 mon	(*)
986	Current thr mon	(*)
1066	Enable state mon	1.24
1068	Start state mon	1.25
1070	FastStop state mon	1.26
1024	Enable cmd mon	11.13
1026	Start cmd mon	11.14
1028	FastStop cmd mon	11.15
1054	Safe start mon	11.16
1034	Drv interlock mon	11.25
4708	Alm dig out mon 1	(*)
4710	Alm dig out mon 2	(*)
4712	Alm dig out mon 3	(*)
4714	Alm dig out mon 4	(*)
1530	Analog inp1<thr	(*)
1542	Analog inp1>thr	(*)
1580	Analog inp2<thr	(*)
1592	Analog inp2>thr	(*)
362	Drive overload trip	(*)
3214	Motor overload trip	(*)
3262	Bres overload trip	(*)
366	Drive overload 80%	(*)
1048	FR start mon	11.21
1050	FR reverse mon	11.22
4454	Bit0 decomp mon	23.6.3
4456	Bit1 decomp mon	23.6.4
4458	Bit2 decomp mon	23.6.5
4460	Bit3 decomp mon	23.6.6
4462	Bit4 decomp mon	23.6.7
4464	Bit5 decomp mon	23.6.8
4466	Bit6 decomp mon	23.6.9
4468	Bit7 decomp mon	23.6.10
4470	Bit8 decomp mon	23.6.11
4472	Bit9 decomp mon	23.6.12
4474	Bit10 decomp mon	23.6.13
4476	Bit11 decomp mon	23.6.14
4478	Bit12 decomp mon	23.6.15
4480	Bit13 decomp mon	23.6.16
4482	Bit14 decomp mon	23.6.17
4484	Bit15 decomp mon	23.6.18
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
6004	Speed limit state	(*)
6006	Current limit state	(*)
764	Ramp acc state	(*)
766	Ramp dec state	(*)
1030	Local/remote mon	(*)
4780	Alarm PLC	(*)
3676	Compare output	22.9.8
3442	Powerloss rampdown	(*)
3448	Powerloss nextactive	(*)
3180	Brake control mon	(*)
3304	Par set select mon	22.6.3
5720	Sync slave mon	23.8.29
3512	Drv thr overtemp mon	(*)
3514	Mot thr overtemp mon	(*)
6044	Condensation state	(*)
6046	Overhumidity state	(*)
2040	Autophase OK	(*)
2038	Autophase status	(*)
3556	Timer1 mon	22.17.4
3566	Timer2 mon	22.17.8
1540	An inp 1 err mon	(*)
1590	An inp 2 err mon	(*)
1640	An inp 1X err mon	(*)
1690	An inp 2X err mon	(*)
5350	Encoder 1 state	17.2.18
5360	Encoder 2 state	17.3.18
5370	Encoder 3 state	17.4.6

L_DIGSEL2

6000	Null	(*)
6002	One	(*)
1110	Digital input E mon	(*)
1112	Digital input 1 mon	(*)
1114	Digital input 2 mon	(*)
1116	Digital input 3 mon	(*)
1118	Digital input 4 mon	(*)
1120	Digital input 5 mon	(*)
1210	Digital input 1X mon	(*)
1212	Digital input 2X mon	(*)
1214	Digital input 3X mon	(*)
1216	Digital input 4X mon	(*)
1218	Digital input 5X mon	(*)
1220	Digital input 6X mon	(*)
1222	Digital input 7X mon	(*)
1224	Digital input 8X mon	(*)
5510	Digital input 9X mon	(*)

PAR	Description	Menu
5512	Digital input10X mon	(*)
5514	Digital input11X mon	(*)
5516	Digital input12X mon	(*)
5518	Digital input13X mon	(*)
5520	Digital input14X mon	(*)
5522	Digital input15X mon	(*)
5524	Digital input16X mon	(*)
4454	Bit0 decomp mon	23.6.3
4456	Bit1 decomp mon	23.6.4
4458	Bit2 decomp mon	23.6.5
4460	Bit3 decomp mon	23.6.6
4462	Bit4 decomp mon	23.6.7
4464	Bit5 decomp mon	23.6.8
4466	Bit6 decomp mon	23.6.9
4468	Bit7 decomp mon	23.6.10
4470	Bit8 decomp mon	23.6.11
4472	Bit9 decomp mon	23.6.12
4474	Bit10 decomp mon	23.6.13
4476	Bit11 decomp mon	23.6.14
4478	Bit12 decomp mon	23.6.15
4480	Bit13 decomp mon	23.6.16
4482	Bit14 decomp mon	23.6.17
4484	Bit15 decomp mon	23.6.18
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
1530	Analog inp1<thr	(*)
1542	Analog inp1>thr	(*)
1580	Analog inp2<thr	(*)
1592	Analog inp2>thr	(*)
1048	FR start mon	11.21
1050	FR reverse mon	11.22
3676	Compare output	22.9.8
3480	Vdc ctrl ramp freeze	(*)
3556	Timer1 mon	22.17.4
3566	Timer2 mon	22.17.8

L_DIGSEL3

XXXX	*(3)*	
6000	Null	(*)
6002	One	(*)
1110	Digital input E mon	(*)
1112	Digital input 1 mon	(*)
1114	Digital input 2 mon	(*)
1116	Digital input 3 mon	(*)
1118	Digital input 4 mon	(*)
1120	Digital input 5 mon	(*)
1210	Digital input 1X mon	(*)
1212	Digital input 2X mon	(*)
1214	Digital input 3X mon	(*)
1216	Digital input 4X mon	(*)
1218	Digital input 5X mon	(*)
1220	Digital input 6X mon	(*)
1222	Digital input 7X mon	(*)
1224	Digital input 8X mon	(*)
5510	Digital input 9X mon	(*)
5512	Digital input10X mon	(*)
5514	Digital input11X mon	(*)
5516	Digital input12X mon	(*)
5518	Digital input13X mon	(*)
5520	Digital input14X mon	(*)
5522	Digital input15X mon	(*)
5524	Digital input16X mon	(*)
1062	Drive OK	(*)
1064	Drive ready	(*)
934	Ref is 0	(*)
936	Ref is 0 delay	(*)
944	Speed is 0	(*)
946	Speed is 0 delay	(*)
956	Speed thr 1_2 mon	(*)
966	Set speed	(*)
976	Speed thr 3 mon	(*)
986	Current thr mon	(*)
1066	Enable state mon	1.24
1068	Start state mon	1.25
1070	FastStop state mon	1.26
1024	Enable cmd mon	11.13
1026	Start cmd mon	11.14
1028	FastStop cmd mon	11.15
1054	Safe start mon	11.16
1034	Drv interlock mon	11.25
4708	Alm dig out mon 1	(*)
4710	Alm dig out mon 2	(*)
4712	Alm dig out mon 3	(*)
4714	Alm dig out mon 4	(*)
1530	Analog inp1<thr	(*)
1542	Analog inp1>thr	(*)
1580	Analog inp2<thr	(*)
1592	Analog inp2>thr	(*)
362	Drive overload trip	(*)
3214	Motor overload trip	(*)
3262	Bres overload trip	(*)
366	Drive overload 80%	(*)
1048	FR start mon	11.21
1050	FR reverse mon	11.22
4454	Bit0 decomp mon	23.6.3
4456	Bit1 decomp mon	23.6.4
4458	Bit2 decomp mon	23.6.5
4460	Bit3 decomp mon	23.6.6
4462	Bit4 decomp mon	23.6.7
4464	Bit5 decomp mon	23.6.8
4466	Bit6 decomp mon	23.6.9
4468	Bit7 decomp mon	23.6.10
4470	Bit8 decomp mon	23.6.11
4472	Bit9 decomp mon	23.6.12
4474	Bit10 decomp mon	23.6.13
4476	Bit11 decomp mon	23.6.14
4478	Bit12 decomp mon	23.6.15
4480	Bit13 decomp mon	23.6.16
4482	Bit14 decomp mon	23.6.17
4484	Bit15 decomp mon	23.6.18
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
6004	Speed limit state	(*)
6006	Current limit state	(*)
764	Ramp acc state	(*)
766	Ramp dec state	(*)
4780	Alarm PLC	(*)
3676	Compare output	22.9.8
5720	Sync slave mon	23.8.29
3556	Timer1 mon	22.17.4
3566	Timer2 mon	22.17.8

(3) the XXXX parameter changes according to the src parameter used:

1014 Local/remote src
(3) = 1012 Dig local/remote 11.7

L_FBS2M

XXXX	*(4)*	
6000	Null	(*)
6002	One	(*)
626	Ramp ref out mon	(*)
628	Ramp setpoint	1.5
760	Ramp out mon	(*)
664	Speed setpoint	1.6
260	Motor speed	1.7
262	Motor speed nofilter	(*)
2150	Encoder 1 speed	17.2.13
5150	Encoder 2 speed	17.3.13
250	Output current	1.1
252	Output voltage	1.2
254	Output frequency	1.3
280	Torque current ref	1.17
282	Magnet current ref	1.18
284	Torque current	1.19
286	Magnet current	1.20
2360	Torque lim Pos Inuse	20.9
2362	Torque lim Neg Inuse	20.10
2386	Torque ref %	20.18
2388	Torque ref nofilter	(*)
2394	Torque %	20.20
2396	Torque nofilter	(*)
270	DC link voltage	1.8
2162	Encoder 1 position	17.2.14
2154	E1 Virtual position	27.2.2
2156	E1 Revolutions	27.2.3
3006	Speed ratio out mon	(*)

PAR	Description	Menu
3070	Droop out mon	22.2.5
852	Multi ref out mon	7.24
870	Mpot setpoint	8.1
894	Mpot output mon	8.13
920	Jog output mon	9.6
3104	Inertia comp mon	22.3.3
1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
368	Drive overload accum	1.22
3212	Motor overload accum	1.21
3260	Bres overload accum	1.23
272	Heatsink temperature	1.9
1060	Sequencer status	(*)
4432	Word comp mon	23.5.17
3446	Powerloss nextratio	(*)
4372	DS402 status word	(*)
4394	PFdrv status word 1	(*)
4396	PFdrv status word 2	(*)
2246	Speed reg P factor	18.16
2248	Speed reg I factor	18.17
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
4770	First alarm	(*)
4840	Alarm lo state	(*)
4842	Alarm hi state	(*)
1100	Digital input mon	1.27
1200	Digital input X mon	1.29
5008	Test gen out	27.1.5
5750	FL Fwd 1 mon	23.8.13
5752	FL Fwd 2 mon	23.8.14
5754	FL Fwd 3 mon	23.8.15
5756	FL Fwd 4 mon	23.8.16
5758	FL Fwd 5 mon	23.8.17
5760	FL Fwd 6 mon	23.8.18
5762	FL Fwd 7 mon	23.8.19
5764	FL Fwd 8 mon	23.8.20
5800	FL Fwd 1 inv mon	(*)
5802	FL Fwd 2 inv mon	(*)
5804	FL Fwd 3 inv mon	(*)
5806	FL Fwd 4 inv mon	(*)
5808	FL Fwd 5 inv mon	(*)
5810	FL Fwd 6 inv mon	(*)
5812	FL Fwd 7 inv mon	(*)
5814	FL Fwd 8 inv mon	(*)
5850	FL Rev 1 mon	23.8.21
5852	FL Rev 2 mon	23.8.22
5854	FL Rev 3 mon	23.8.23
5856	FL Rev 4 mon	23.8.24

(4) the XXXX parameter changes according to the src parameter used:

4340 DS402 cw src
(4) = 4024 Fieldbus M->S1 mon 23.3.3

4346 PFdrv cw 1 src
(4) = 4024 Fieldbus M->S1 mon 23.3.3

4348 PFdrv cw 2 src
(4) = 4034 Fieldbus M->S2 mon 23.3.7

L_FLWORD

6000	Null	(*)
6002	One	(*)
626	Ramp ref out mon	(*)
628	Ramp setpoint	1.5
760	Ramp out mon	(*)
664	Speed setpoint	1.6
260	Motor speed	1.7
262	Motor speed nofilter	(*)
2150	Encoder 1 speed	17.2.13
5150	Encoder 2 speed	17.3.13
250	Output current	1.1
252	Output voltage	1.2
254	Output frequency	1.3
280	Torque current ref	1.17
282	Magnet current ref	1.18
284	Torque current	1.19
286	Magnet current	1.20
2360	Torque lim Pos Inuse	20.9
2362	Torque lim Neg Inuse	20.10
2386	Torque ref %	20.18
2388	Torque ref nofilter	(*)
2394	Torque %	20.20
2396	Torque nofilter	(*)
270	DC link voltage	1.8
2162	Encoder 1 position	17.2.14
2154	E1 Virtual position	27.2.2
2156	E1 Revolutions	27.2.3
5162	Encoder 2 position	17.3.14
5154	E2 Virtual position	27.2.11
5156	E2 Revolutions	27.2.12

PAR	Description	Menu
3006	Speed ratio out mon	(*)
3070	Droop out mon	22.2.5
852	Multi ref out mon	7.24
870	Mpot setpoint	8.1
894	Mpot output mon	8.13
920	Jog output mon	9.6
3104	Inertia comp mon	22.3.3
1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
368	Drive overload accum	1.22
3212	Motor overload accum	1.21
3260	Bres overload accum	1.23
272	Heatsink temperature	1.9
1060	Sequencer status	(*)
4432	Word comp mon	23.5.17
3446	Powerloss nextratio	(*)
4372	DS402 status word	(*)
4394	PFdrv status word 1	(*)
4396	PFdrv status word 2	(*)
2246	Speed reg P factor	18.16
2248	Speed reg I factor	18.17
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
4770	First alarm	(*)
4840	Alarm lo state	(*)
4842	Alarm hi state	(*)
1100	Digital input mon	1.27
1200	Digital input X mon	1.29
5008	Test gen out	27.1.5
5750	FL Fwd 1 mon	23.8.13
5752	FL Fwd 2 mon	23.8.14

PAR	Description	Menu
5754	FL Fwd 3 mon	23.8.15
5756	FL Fwd 4 mon	23.8.16
5758	FL Fwd 5 mon	23.8.17
5760	FL Fwd 6 mon	23.8.18
5762	FL Fwd 7 mon	23.8.19
5764	FL Fwd 8 mon	23.8.20
5800	FL Fwd 1 inv mon	(*)
5802	FL Fwd 2 inv mon	(*)
5804	FL Fwd 3 inv mon	(*)
5806	FL Fwd 4 inv mon	(*)
5808	FL Fwd 5 inv mon	(*)
5810	FL Fwd 6 inv mon	(*)
5812	FL Fwd 7 inv mon	(*)
5814	FL Fwd 8 inv mon	(*)
5850	FL Rev 1 mon	23.8.21
5852	FL Rev 2 mon	23.8.22
5854	FL Rev 3 mon	23.8.23
5856	FL Rev 4 mon	23.8.24

L_LIM

6000	Null	(*)
1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
2380	Dig torque ref 1	20.12
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
5008	Test gen out	27.1.5
5750	FL Fwd 1 mon	23.8.13
5752	FL Fwd 2 mon	23.8.14

PAR	Description	Menu
5754	FL Fwd 3 mon	23.8.15
5756	FL Fwd 4 mon	23.8.16
5758	FL Fwd 5 mon	23.8.17
5760	FL Fwd 6 mon	23.8.18
5762	FL Fwd 7 mon	23.8.19
5764	FL Fwd 8 mon	23.8.20
5800	FL Fwd 1 inv mon	(*)
5802	FL Fwd 2 inv mon	(*)
5804	FL Fwd 3 inv mon	(*)
5806	FL Fwd 4 inv mon	(*)
5808	FL Fwd 5 inv mon	(*)
5810	FL Fwd 6 inv mon	(*)
5812	FL Fwd 7 inv mon	(*)
5814	FL Fwd 8 inv mon	(*)

L_MLTREF

XXXX	*(5)*	
1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
852	Multi ref out mon	7.24
894	Mpot output mon	8.13
2150	Encoder 1 speed	17.2.13
5150	Encoder 2 speed	17.3.13
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
3070	Droop out mon	22.2.5
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
5008	Test gen out	27.1.5
5750	FL Fwd 1 mon	23.8.13
5752	FL Fwd 2 mon	23.8.14

PAR	Description	Menu
5754	FL Fwd 3 mon	23.8.15
5756	FL Fwd 4 mon	23.8.16
5758	FL Fwd 5 mon	23.8.17
5760	FL Fwd 6 mon	23.8.18
5762	FL Fwd 7 mon	23.8.19
5764	FL Fwd 8 mon	23.8.20
5800	FL Fwd 1 inv mon	(*)
5802	FL Fwd 2 inv mon	(*)
5804	FL Fwd 3 inv mon	(*)
5806	FL Fwd 4 inv mon	(*)
5808	FL Fwd 5 inv mon	(*)
5810	FL Fwd 6 inv mon	(*)
5812	FL Fwd 7 inv mon	(*)
5814	FL Fwd 8 inv mon	(*)

(5) the XXXX parameter changes according to the src parameter used:

610 Ramp ref 1 src	
(5) = 600 Dig ramp ref 1	*5.1*
612 Ramp ref 2 src	
(5) = 602 Dig ramp ref 2	*5.2*
614 Ramp ref 3 src	
(5) = 604 Dig ramp ref 3	*5.3*
650 Speed ref 1 src	
(5) = 640 Dig speed ref 1	*5.15*
652 Speed ref 2 src	
(5) = 642 Dig speed ref 2	*5.16*
832 Multi ref 0 src	
(5) = 800 Multi reference 0	*7.1*
834 Multi ref 1 src	
(5) = 802 Multi reference 1	*7.2*

L_NLIM

6000	Null	(*)
1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
2380	Dig torque ref 1	20.12
2374	Torque limit neg	20.7
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55

PAR	Description	Menu
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
5008	Test gen out	27.1.5
5750	FL Fwd 1 mon	23.8.13
5752	FL Fwd 2 mon	23.8.14
5754	FL Fwd 3 mon	23.8.15
5756	FL Fwd 4 mon	23.8.16
5758	FL Fwd 5 mon	23.8.17
5760	FL Fwd 6 mon	23.8.18
5762	FL Fwd 7 mon	23.8.19
5764	FL Fwd 8 mon	23.8.20
5800	FL Fwd 1 inv mon	(*)
5802	FL Fwd 2 inv mon	(*)
5804	FL Fwd 3 inv mon	(*)
5806	FL Fwd 4 inv mon	(*)
5808	FL Fwd 5 inv mon	(*)
5810	FL Fwd 6 inv mon	(*)
5812	FL Fwd 7 inv mon	(*)
5814	FL Fwd 8 inv mon	(*)

L_PLIM

6000	Null	(*)
1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
2380	Dig torque ref 1	20.12
2372	Torque limit pos	20.6
2338	Torque limit adapt	22.18.5
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63

L_REF

1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
626	Ramp ref out mon	(*)
664	Speed setpoint	1.6
262	Motor speed nofilter	(*)
2150	Encoder 1 speed	17.2.13
5150	Encoder 2 speed	17.3.13
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
5008	Test gen out	27.1.5
5750	FL Fwd 1 mon	23.8.13
5752	FL Fwd 2 mon	23.8.14
5754	FL Fwd 3 mon	23.8.15
5756	FL Fwd 4 mon	23.8.16
5758	FL Fwd 5 mon	23.8.17
5760	FL Fwd 6 mon	23.8.18
5762	FL Fwd 7 mon	23.8.19
5764	FL Fwd 8 mon	23.8.20
5800	FL Fwd 1 inv mon	(*)
5802	FL Fwd 2 inv mon	(*)
5804	FL Fwd 3 inv mon	(*)
5806	FL Fwd 4 inv mon	(*)
5808	FL Fwd 5 inv mon	(*)
5810	FL Fwd 6 inv mon	(*)
5812	FL Fwd 7 inv mon	(*)
5814	FL Fwd 8 inv mon	(*)

L_RESFREEZE

6000	Null	(*)
1110	Digital input E mon	(*)
1112	Digital input 1 mon	(*)
1114	Digital input 2 mon	(*)
1116	Digital input 3 mon	(*)
1118	Digital input 4 mon	(*)
1120	Digital input 5 mon	(*)

L_SCOPE

6000	Null	(*)

L_TCREF

XXXX (6)

1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23

PAR	Description	Menu
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
6000	Null	(*)
5008	Test gen out	27.1.5
5750	FL Fwd 1 mon	23.8.13
5752	FL Fwd 2 mon	23.8.14
5754	FL Fwd 3 mon	23.8.15
5756	FL Fwd 4 mon	23.8.16
5758	FL Fwd 5 mon	23.8.17
5760	FL Fwd 6 mon	23.8.18
5762	FL Fwd 7 mon	23.8.19
5764	FL Fwd 8 mon	23.8.20
5800	FL Fwd 1 inv mon	(*)
5802	FL Fwd 2 inv mon	(*)
5804	FL Fwd 3 inv mon	(*)
5806	FL Fwd 4 inv mon	(*)
5808	FL Fwd 5 inv mon	(*)
5810	FL Fwd 6 inv mon	(*)
5812	FL Fwd 7 inv mon	(*)
5814	FL Fwd 8 inv mon	(*)

(6) the XXXX parameter changes according to the src parameter used:

3186 Brake open thr src
(6) 3184 Brake open thr 22.12.8

L_TEMPCTRL

6000	Null	(*)
272	Heatsink temperature	1.9
6038	Intake liquid temp	22.16.7
292	Sensor inp X mon	1.11
1544	An inp 1 temp mon	1.12
1594	An inp 2 temp mon	1.13
1610	An inp 1X temp mon	1.14
1660	An inp 2X temp mon	1.15
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16

L_VREF

XXXX	*(7)*	
3104	Inertia comp mon	22.3.3
1500	Analog input 1 mon	14.1
1550	Analog input 2 mon	14.17
1600	Analog input 1X mon	14.33
1650	Analog input 2X mon	14.45
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
6000	Null	(*)
5008	Test gen out	27.1.5
5750	FL Fwd 1 mon	23.8.13
5752	FL Fwd 2 mon	23.8.14
5754	FL Fwd 3 mon	23.8.15
5756	FL Fwd 4 mon	23.8.16
5758	FL Fwd 5 mon	23.8.17
5760	FL Fwd 6 mon	23.8.18
5762	FL Fwd 7 mon	23.8.19
5764	FL Fwd 8 mon	23.8.20
5800	FL Fwd 1 inv mon	(*)
5802	FL Fwd 2 inv mon	(*)
5804	FL Fwd 3 inv mon	(*)
5806	FL Fwd 4 inv mon	(*)
5808	FL Fwd 5 inv mon	(*)
5810	FL Fwd 6 inv mon	(*)
5812	FL Fwd 7 inv mon	(*)
5814	FL Fwd 8 inv mon	(*)
3192	Brake open thr mon	(*)

(7) the XXXX parameter changes according to the src parameter used:

2382 Torque ref 1 src
(7) = 2380 Dig torque ref 1 20.12

3002 Speed ratio src
(7) = 3000 Dig speed ratio 22.1.1

L_WDECOMP

XXXX	*(8)*	
6000	Null	(*)
6002	One	(*)
4432	Word comp mon	23.5.17
4024	Fieldbus M->S1 mon	23.3.3
4034	Fieldbus M->S2 mon	23.3.7
4044	Fieldbus M->S3 mon	23.3.11
4054	Fieldbus M->S4 mon	23.3.15
4064	Fieldbus M->S5 mon	23.3.19
4074	Fieldbus M->S6 mon	23.3.23
4084	Fieldbus M->S7 mon	23.3.27
4094	Fieldbus M->S8 mon	23.3.31
4104	Fieldbus M->S9 mon	23.3.35
4114	Fieldbus M->S10 mon	23.3.39
4124	Fieldbus M->S11 mon	23.3.43
4134	Fieldbus M->S12 mon	23.3.47
4144	Fieldbus M->S13 mon	23.3.51
4154	Fieldbus M->S14 mon	23.3.55
4164	Fieldbus M->S15 mon	23.3.59
4174	Fieldbus M->S16 mon	23.3.63
3700	Pad 1	22.10.1
3702	Pad 2	22.10.2
3704	Pad 3	22.10.3
3706	Pad 4	22.10.4
3708	Pad 5	22.10.5
3710	Pad 6	22.10.6
3712	Pad 7	22.10.7
3714	Pad 8	22.10.8
3716	Pad 9	22.10.9
3718	Pad 10	22.10.10
3720	Pad 11	22.10.11
3722	Pad 12	22.10.12
3724	Pad 13	22.10.13
3726	Pad 14	22.10.14
3728	Pad 15	22.10.15
3730	Pad 16	22.10.16
5750	FL Fwd 1 mon	23.8.13

PAR	Description	Menu	PAR	Description	Menu	PAR	Description	Menu
5752	FL Fwd 2 mon	23.8.14						
5754	FL Fwd 3 mon	23.8.15						
5756	FL Fwd 4 mon	23.8.16						
5758	FL Fwd 5 mon	23.8.17						
5760	FL Fwd 6 mon	23.8.18						
5762	FL Fwd 7 mon	23.8.19						
5764	FL Fwd 8 mon	23.8.20						
5800	FL Fwd 1 inv mon	(*)						
5802	FL Fwd 2 inv mon	(*)						
5804	FL Fwd 3 inv mon	(*)						
5806	FL Fwd 4 inv mon	(*)						
5808	FL Fwd 5 inv mon	(*)						
5810	FL Fwd 6 inv mon	(*)						
5812	FL Fwd 7 inv mon	(*)						
5814	FL Fwd 8 inv mon	(*)						

(8) the XXXX parameter changes according to the src parameter used:

4452 Word decomp src
(8) = 4450 Dig word decomp 23.6.1

(*) Parameter not shown on the keypad. For information see the “PARAMETERS INCLUDED IN SELECTION LISTS BUT NOT SHOWN ON THE KEYPAD” section.

APPENDIX 1.

APP. 1.1 - Use of analog and digital I/Os from the MDPLC programming environment

- The following table shows the internal and variable system parameters for External digital input exp.

DIGITAL INPUT EXP

Name	Type	Description	Unit		R/W
sysEDIBitWord	DWORD	Exp Digital input word Scheme: "Digital Inputs"	Null	1200	R
sysEDIBitWordBit0	BOOL	Exp Digital input 0 (0..1) Scheme: "Digital Inputs"	Null	1210	R
sysEDIBitWordBit1	BOOL	Exp Digital input 1 (0..1) Scheme: "Digital Inputs"	Null	1212	R
sysEDIBitWordBit2	BOOL	Exp Digital input 2 (0..1) Scheme: "Digital Inputs"	Null	1214	R
sysEDIBitWordBit3	BOOL	Exp Digital input 3 (0..1) Scheme: "Digital Inputs"	Null	1216	R
sysEDIBitWordBit4	BOOL	Exp Digital input 4 (0..1) Scheme: "Digital Inputs"	Null	1218	R
sysEDIBitWordBit5	BOOL	Exp Digital input 5 (0..1) Scheme: "Digital Inputs"	Null	1220	R
sysEDIBitWordBit6	BOOL	Exp Digital input 6 (0..1) Scheme: "Digital Inputs"	Null	1222	R
sysEDIBitWordBit7	BOOL	Exp Digital input 7 (0..1) Scheme: "Digital Inputs"	Null	1224	R
SysEDIBitWordBit8	BOOL	Exp Digital input 8 (0..1) Scheme: "Digital Inputs"	Null	5510	R
SysEDIBitWordBit9	BOOL	Exp Digital input 9 (0..1) Scheme: "Digital Inputs"	Null	5512	R
SysEDIBitWordBit10	BOOL	Exp Digital input 10 (0..1) Scheme: "Digital Inputs"	Null	5514	R
SysEDIBitWordBit11	BOOL	Exp Digital input 11 (0..1) Scheme: "Digital Inputs"	Null	5516	R
SysEDIBitWordBit12	BOOL	Exp Digital input 12 (0..1) Scheme: "Digital Inputs"	Null	5518	R
SysEDIBitWordBit13	BOOL	Exp Digital input 13 (0..1) Scheme: "Digital Inputs"	Null	5520	R
SysEDIBitWordBit14	BOOL	Exp Digital input 14 (0..1) Scheme: "Digital Inputs"	Null	5522	R
SysEDIBitWordBit15	BOOL	Exp Digital input 15 (0..1) Scheme: "Digital Inputs"	Null	5524	R
sysExtIODigIn0	DWORD	External expansion digital input 0 This parameter displays the state of external inputs from 0 to 31	Null	5400	R
sysExtIODigIn1	DWORD	External expansion digital input 1 This parameter displays the state of external inputs from 32 to 63	Null	5402	R

- The following table shows the internal and variable system parameters for External analog input exp.

Analog input modules can have a resolution of 12 to 16 bits and scaling may vary from manufacturer to manufacturer.

E.g.:

12-bit module

Signal connected Module configuration	Variant 1	Variant 2	Variant 3	Variant 4
-10V..+10V	-2048..+2047	**-32768..+32767**	-16384..+16383	
0V..+10V	0..+4095	0..+2047	0..+32767	**0..+65535**
4..20mA	0..+32767	+6553..+32767	+3276..+16383	

16-bit module

Signal connected Module configuration	Variant 1	Variant 2	Variant 3
-10V..+10V	**-32768..+32767**		
0V..+10V	**0..+65535**	0..+32767	
4..20mA			

- There is no single Unit suitable for all models of analog input module.

Check the scaling provided by the model being used and use the system variables accordingly.

ANALOG INPUT EXP

Name	Type	Description	Unit		R/W
sysEAI0	DINT	Exp Analog input 0 Scheme: "Analog Inputs Expansion Card"	4000H * 2 ^ 16 = 10V	1600	R
sysEAI1	DINT	Exp Analog input 1 Scheme: "Analog Inputs Expansion Card"	4000H * 2 ^ 16 = 10V	1650	R
sysExtIOAnaIn0	INT	External expansion analog input 0.	Defined by module builder	5410	R
sysExtIOAnaIn1	INT	External expansion analog input 1	Defined by module builder	5412	R
sysExtIOAnaIn2	INT	External expansion analog input 2	Defined by module builder	5414	R
sysExtIOAnaIn3	INT	External expansion analog input 3	Defined by module builder	5416	R
sysExtIOAnaIn4	INT	External expansion analog input 4	Defined by module builder	5418	R
sysExtIOAnaIn5	INT	External expansion analog input 5	Defined by module builder	5420	R
sysExtIOAnaIn6	INT	External expansion analog input 6	Defined by module builder	5422	R
sysExtIOAnaIn7	INT	External expansion analog input 7	Defined by module builder	5424	R

- The following table shows the internal and variable system parameters for External digital output exp.

DIGITAL OUTPUT EXP

Name	Type	Description	Unit		R/W
sysEDOBitWord	DWORD	Read only exp digital output word Scheme: "Digital Outputs"	Null	1400	R
sysExtIODigOut0	DWORD	External expansion digital output 0 *This parameter displays the state of the external outputs from 0 to 31. The state of digital outputs 0...7 from the MDPLC is not actually available, as it is overwritten by the drive according to the setting of the analog output.*	Null	5454	RW
sysExtIODigOut1	DWORD	External expansion digital output 1 *This parameter displays the state of the external outputs from 32 to 63.*	Null	5456	RW

- The following table shows the internal and variable system parameters for External analog output exp.

Analog output modules can have a resolution of 12 to 16 bits and scaling may vary from manufacturer to manufacturer.

E.g.:

12-bit module

Signal connected Module configuration	Variant 1	Variant 2	Variant 3	Variant 4
-10V..+10V	-2048..+2047	-32768..+32767	-16384..+16383	
0V..+10V	0..+4095	0..+2047	0..+16383	0..+32767
4..20mA	0..+32767	+6553..+32767	+3276..+16383	

16-bit module

Signal connected Module configuration	Variant 1	Variant 2	Variant 3
-10V..+10V	-32768..+32767		
0V..+10V	0..+65535	0..+32767	
4..20mA			

- There is no single unit that is suitable for all models of analog output module.

Check the scaling provided by the model being used and use the system variables accordingly.

ANALOG OUTPUT EXP

Name	Type	Description	Unit		R/W
sysEA00Value	DINT	Exp Analog Output 0 Value Scheme: "Analog Outputs"	4000H * 2 ^ 16 = 10V	1866	R
sysEA01Value	DINT	Exp Analog Output 1 Value Scheme: "Analog Outputs"	4000H * 2 ^ 16 = 10V	1868	R
sysExtI0AnaOut0	INT	External expansion analog output 0. *This variable is not actually available from the MDPLC.* *The value written by the MDPLC is overwritten by the drive according to the setting of the analog output.*	Defined by module builder	5460	RW
sysExtI0AnaOut1	INT	External expansion analog output 1 *This variable is not actually available from the MDPLC.* *The value written by the MDPLC is overwritten by the drive according to the setting of the analog output.*	Defined by module builder	5462	RW
sysExtI0AnaOut2	INT	External expansion analog output 2	Defined by module builder	5464	RW
sysExtI0AnaOut3	INT	External expansion analog output 3	Defined by module builder	5466	RW
sysExtI0AnaOut4	INT	External expansion analog output 4	Defined by module builder	5468	RW
sysExtI0AnaOut5	INT	External expansion analog output 5	Defined by module builder	5470	RW
sysExtI0AnaOut6	INT	External expansion analog output 6	Defined by module builder	5472	RW
sysExtI0AnaOut7	INT	External expansion analog output 7	Defined by module builder	5474	RW

- The state of the communication with the external module can be read directly by the application using the following variable:

DIGITAL OUTPUT EXP

Name	Type	Description	Unit		R/W
sysExtI0state	BOOL	External expansion state	Null	5484	R

The value is identical to that of parameter 5484 **ExtIO State**, however, the variable is updated immediately in the task.

TRUE when the communication with the module is active. This indicates that the state is Operational and all slave TPDO data have been received correctly at least once.

If not all TPDO data are received in a communication cycle the variable moves to FALSE and alarm “**Opt ExtIO**” [27] is generated.

APP. 1.2 - CANopen protocol support

The drive controls an external I/O module via CANopen, with some master functions, limited to the possibility of managing a single device.

The single slave that is connected must be equipped with CANopen DS301 according to “DS401 Device profile for generic I/O modules Version 3.0.0 3 June 2008” and must be set separately from the drive to operate with a baudrate of 500 kbps, with address 1.

The drive has access to the following objects in the Object Directory of the salve:

. Index	Sub.	Name
0x1000	0	Device type
0x100c	0	Guard time (as an alternative to 0x1016 and 0x1017)
0x100d	0	Lifetime factor
0x1016	0	Consumer HB Object
	1	Cons.HB n+T
0x1017	0	Producer HB time
0x1018	0	Identity Object
	1	Vendor Id
	2	Product Code
0x1400/1/2/3	0	RPDOs Communication Parameters
	1	COB-ID
	2	Transmission type = 1
0x1600/1/2/3	0	RPDOs Mapping
	1-n	Object mapped
0x1800/1/2/3	0	RPDOs Communication Parameters
	1	COB-ID
	2	Transmission type = 1
	3	Inhibit time
0x1A00/1/2/3	0	TPDOs Mapping
	1-n	Object mapped

The slave must preferably support the Heartbeat protocol, or at least NodeGuarding.

If objects 1016 and 1017 are writeable, HeartBeat is used and the 100C and 100D objects are reset, otherwise they are set to 200 and 3, respectively, and the NodeGuarding protocol is active.

The drive interprets the Emergency command as a possible error and so generates an alarm, which is managed in all 3 phases.

The slave must support the NMT protocol for transition to Pre-Operational and Operational.

APP. 1.3 - SDO Configuration Table

The objects requested via SDO in the Config phase are listed in the table below. An error or lack of response generates an alarm with the subcode shown.

SubCode	Index	SubIndex	Notes
1	0x1000	0	Device Type . Must be 401
2	0x1018	0	
3	0x1018	1	Vendor ID
4	0x1018	2	Product Code
5	0x1400	1	RPDO1
6	0x1401	1	RPDO2
7	0x1402	1	RPDO3
8	0x1403	1	RPDO4
9	0x1800	1	TPDO1
10	0x1801	1	TPDO2
11	0x1802	1	TPDO3
12	0x1803	1	TPDO4
13	0x1600	0..8 Mapping	RPDO1 mapping info
14	0x1601	0..8 Mapping	RPDO2 mapping info
15	0x1602	0..8 Mapping	RPDO3 mapping info
16	0x1603	0..8 Mapping	RPDO4 mapping info
17	0x1A00	0..8 Mapping	TPDO1mapping info
18	0x1A01	0..8 Mapping	TPDO1mapping info
19	0x1A02	0..8 Mapping	TPDO1mapping info
20	0x1A03	0..8 Mapping	TPDO1mapping info

These objects are written via SDO in the Config phase

SubCode	Index	SubIndex	Notes
21	0x1016	1	HeartBeat consumer rate and Id
22	0x1017	0	HeartBeat producer rate
23	0x100C	0	GuardTime (100 ms or 0 if HeartBeat is supported)
24	0x100D	0	LifeTime period (3 or 0 if HeartBeat is supported)
25	0x1400	1	RPDO1 default
26	0x1401	1	RPDO2 default
27	0x1402	1	RPDO3 default
28	0x1403	1	RPDO4default
29	0x1800	1	TPDO1 default
30	0x1801	1	TPDO3 default
31	0x1802	1	TPDO3 default
32	0x1803	1	TPDO4 default
33	0x1400	2	RPDO1 transmission type
34	0x1400	1	RPDO1 enable
35	0x1401	2	RPDO3 transmission type
36	0x1401	1	RPDO2 enable
37	0x1402	2	RPDO3 transmission type
38	0x1402	1	RPDO3 enable
39	0x1403	2	RPDO3 transmission type
40	0x1403	1	RPDO4 enable
41	0x1800	2	TPDO1 transmission type
42	0x1800	3	TPDO1 inhibit time
43	0x1800	1	TPDO1 enable
44	0x1801	2	TPDO2 transmission type
45	0x1801	3	TPDO2 inhibit time
46	0x1801	1	TPDO2 enable
47	0x1802	2	TPDO3 transmission type
48	0x1802	3	TPDO3 inhibit time
49	0x1802	1	TPDO3 enable
50	0x1803	2	TPDO4 transmission type
51	0x1803	3	TPDO4 inhibit time

SubCode	Index	SubIndex	Notes
52	0x1803	1	TPDO4 enable

During the control phase, the system sends a HeartBeat message to the slave every 100 ms and checks the Op state via HeartBeat producer message sent by the device, which must arrive within the time set in object 1017. If an error occurs it returns to Init .

If HeartBeat is not available and NodeGuarding is active instead, the timeout values set in objects 100C and 100D are used.

Among the objects requested during the configuration phase are those which contain the mapping, the meaning of the data in the PDOs. The objects the slave may have mapped in the PDOs are a subset of those defined by the DS401 profile. In particular, the list indicates objects recognised by the drive:

- 6000h Read Input 8 bit
- 6100h ReadInput 16 bit
- 6120h ReadInput 32 bit
- 6200h Write Output 8 bit
- 6300h WriteOutput 16 bit
- 6320h WriteOutput 32 bit
- 6400h ReadAnalog 8 bit
- 6401h ReadAnalog 16 bit
- 6411h WriteAnalog 16 bit

The configuration does not fail if other objects are detected, however the object in the PDO is not managed when received and is written as 0 for transmission.

The objects are associated with the analog and digital input and output parameters in the order they are detected.

For example, if the slave is configured as follows

1600	
1	6200h
2	6200h
1601	
1	6300h
2	6300h

The data sent via RPDO will be associated in this order

Byte 0	Byte1	Byte2	Byte3	Digital out 0Ext mon
V	V			
Byte 0	Byte1	Byte2	Byte3	PDO1
6200h	6200h	--	--	

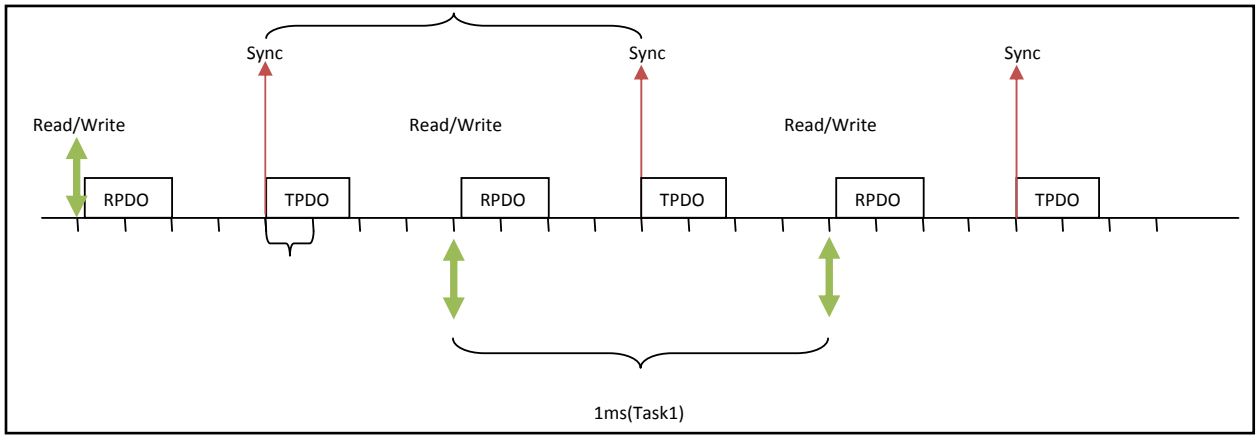
Byte 0	Byte1	Digital out 0Ext mon		
V	V	Byte 0	Byte1	Digital out 1Ext mon
		V	V	
Byte 0	Byte1	Byte2	Byte3	PDO1
6200h	6200h	--	--	

Following the transition to Op, the drive software reads and writes the PDOs (RPDO) and moves the data to the I/O control blocks and periodically sends the Sync message.

Since there are only 2 devices in the network and data exchange is predefined, synchronous PDOs are always used to have repeatability in communication.

Data are exchanged in communciation cycles, the duration of which is predefined with parameter 5488 “External IO period” (available in the service menu and via the .sco configuration file). The default communication cycle value is 8 ms.

Each communication cycle the block accesses the CAN peripheral device to check the PDOs sent by the slave (TPDOs) and copy these, and then writes the RPDOs to be sent.



Each communication cycle sends a Sync message, to which the slave must immediately reply with its PDOs. If the slave does not send the PDOs this is interpreted as a loss of communication owing to the generation of an “ExtIO fault” alarm and switching of parameter 5484 “External IO state” from Off to On. The loss of communication is detected after a maximum time equal to twice the communication cycle from the last time value data were received.

APP. 1.4 - System variables for MDPLC

System variables in the MDPLC environment for FastLink.

FASTLINK

Name	Type	Description	Unit	PAR	R/W
sysFL_Fw1_mon	DWORD	FastLink Forward 1 monitor Scheme: "Control_FastLink_04"	Null	5750	R
sysFL_Fw2_mon	DWORD	FastLink Forward 2 monitor Scheme: "Control_FastLink_04"	Null	5752	R
sysFL_Fw3_mon	DWORD	FastLink Forward 3 monitor Scheme: "Control_FastLink_04"	Null	5754	R
sysFL_Fw4_mon	DWORD	FastLink Forward 4 monitor Scheme: "Control_FastLink_04	Null	5756	R
sysFL_Fw5_mon	DWORD	FastLink Forward 5 monitor Scheme: "Control_FastLink_04"	Null	5758	R
sysFL_Fw6_mon	DWORD	FastLink Forward 6 monitor Scheme: "Control_FastLink_04"	Null	5760	R
sysFL_Fw7_mon	DWORD	FastLink Forward 7 monitor Scheme: "Control_FastLink_04"	Null	5762	R
sysFL_Fw8_mon	DWORD	FastLink Forward 8 monitor Scheme: "Control_FastLink_04"	Null	5764	R
sysFL_Fw1_inv_mon	DWORD	FastLink Forward 1 monitor inverted Scheme: "Control_FastLink_04"	Null	5800	R
sysFL_Fw2_ inv_mon	DWORD	FastLink Forward 2 monitor inverted Scheme: "Control_FastLink_04"	Null	5802	R
sysFL_Fw3_ inv_mon	DWORD	FastLink Forward 3 monitor inverted Scheme: "Control_FastLink_04"	Null	5804	R
sysFL_Fw4_ inv_mon	DWORD	FastLink Forward 4 monitor inverted Scheme: "Control_FastLink_04"	Null	5806	R
sysFL_Fw5_ inv_mon	DWORD	FastLink Forward 5 monitor inverted Scheme: "Control_FastLink_04"	Null	5808	R
sysFL_Fw6_ inv_mon	DWORD	FastLink Forward 6 monitor inverted Scheme: "Control_FastLink_04"	Null	5810	R
sysFL_Fw7_ inv_mon	DWORD	FastLink Forward 7 monitor inverted Scheme: "Control_FastLink_04"	Null	5812	R
sysFL_Fw8_ inv_mon	DWORD	FastLink Forward 8 monitor inverted Scheme: "Control_FastLink_04"	Null	5814	R
sysFL_Fw5		FastLink Forward 5 Scheme: "Control_FastLink_04"	Null	5578	RW
sysFL_Fw6		FastLink Forward 6 Scheme: "Control_FastLink_04"	Null	5580	RW
sysFL_Fw7		FastLink Forward 7 Scheme: "Control_FastLink_04"	Null	5582	RW
sysFL_Fw8		FastLink Forward 8 Scheme: "Control_FastLink_04"	Null	5584	RW

SYSTEM

Name	Type	Description	Unit		R/W
sysSyncSlaveStatus	DWORD	State of Pwm synchronisation Scheme: "Control_FastLink_04"	Null	5720	R

Name	Type	Description	Unit		R/W
sysSLSidCurrentCorr	DWORD	Possible modification of the Id current (IPA7014) in sensorless mode while the drive is running	Null	7014	RW

Gefran worldwide

GEFRAN DEUTSCHLAND GmbH
Philipp-Reis-Straße 9a
D-63500 Seligenstadt
Ph. +49 (0) 61828090
Fax +49 (0) 6182809222
vertrieb@gefran.de

SIEI AREG - GERMANY
Gottlieb-Daimler Strasse 17/3
D-74385 - Pleidelsheim
Ph. +49 (0) 7144 897360
Fax +49 (0) 7144 8973697
info@sieiareg.de

SENSORMATE AG
Steigweg 8,
CH-8355 Aadorf, Switzerland
Ph. +41(0)52-2421818
Fax +41(0)52-3661884
http://www.sensormate.ch

GEFRAN FRANCE sa
PARC TECHNOLAND
Bâtiment K - ZI Champ Dolin
3 Allée des Abruzzes
69800 Saint-Priest
Ph. +33 (0) 478770300
Fax +33 (0) 478770320
commercial@gefran.fr

GEFRAN BENELUX NV
ENA 23 Zone 3, nr. 3910
Lammerdries-Zuid 14A
B-2250 OLEN
Ph. +32 (0) 14248181
Fax +32 (0) 14248180
info@gefran.be

GEFRAN UK Ltd
Unit 7, Brook Business Centre
54a Cowley Mill Road, Uxbridge,
UB8 2FX
Ph. +44 (0) 8452 604555
Fax +44 (0) 8452 604556
sales@gefran.co.uk

GEFRAN MIDDLE EAST ELEKTRIK VE ELEKTRONIK San. ve Tic. Ltd. Sti
Yesilkoy Mah. Ataturk
Cad. No: 12/1 B1 Blok K:12
D: 389 Bakirkoy /Istanbul
TURKIYE
Ph. +90212 465 91 21
Fax +90212 465 91 22

GEFRAN SIEI
Drives Technology Co., Ltd
No. 1285, Beihe Road, Jiading
District, Shanghai, China 201807
Ph. +86 21 69169898
Fax +86 21 69169333
info@gefran.com.cn

GEFRAN SIEI - ASIA
31 Ubi Road 1
#02-07, Aztech Building,
Singapore 408694
Ph. +65 6 8418300
Fax +65 6 7428300
info@gefran.com.sg

GEFRAN INDIA
Survey No. 191/A/1,
Chinchwad Station Road,
Chinchwad,
Pune-411033, Maharashtra
Ph. +91 20 6614 6500
Fax +91 20 6614 6501
gefran.india@gefran.in

GEFRAN Inc.
8 Lowell Avenue
WINCHESTER - MA 01890
Toll Free 1-888-888-4474
Fax +1 (781) 7291468
info.us@gefran.com

GEFRAN BRASIL
ELETROELETRôNICA
Avenida Dr. Altino Arantes,
377 Vila Clementino
04042-032 SÂO PAULO - SP
Ph. +55 (0) 1155851133
Fax +55 (0) 1132974012
comercial@gefran.com.br

GEFRAN

GEFRAN S.p.A.
Via Sebina 74
25050 Provaglio d'Iseo (BS) ITALY
Ph. +39 030 98881
Fax +39 030 9839063
info@gefran.com
www.gefran.com

Drive & Motion Control Unit
Via Carducci 24
21040 Gerenzano (VA) ITALY
Ph. +39 02 967601
Fax +39 02 9682653
infomotion@gefran.com

Technical Assistance :
technohelp@gefran.com

Customer Service :
motioncustomer@gefran.com
Ph. +39 02 96760500
Fax +39 02 96760278

Manuale ADV200 FP-SYN-EN
Rev. 3.4 - 1-6-2017
1S9H66