

# Field oriented vector AC Drive

# SIEDrive



# ADV100

■ ■ ■ ■ ... Functions description  
and parameters list

# GEFRAN

## Information about this manual

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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 ADV100 Quick start guide.

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

### Software version

This manual is updated according the software version V 1.X.0.

Variation of the number replacing "X" have no influence on the functionality of the device.

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](mailto:techdoc@gefran.com).

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## Table of Contents

<b>Information about this manual</b> .....	<b>2</b>
Symbols used in the manual.....	4
<b>A – Programming</b> .....	<b>5</b>
A.1 Menu display modes .....	5
A.2 Programming of “function block” analog and digital input signals .....	5
A.3 Variable interconnections mode .....	5
<b>B – Parameters and functions description (Expert list)</b> .....	<b>7</b>
Legend.....	7
1 – MONITOR.....	8
2 – DRIVE INFO .....	11
3 – STARTUP WIZARD .....	14
4 – DRIVE CONFIG.....	15
5 – REFERENCES .....	20
6 – RAMPS .....	25
7 – MULTI REFERENCE .....	29
8 – MOTORPOTENTIOMETER .....	32
9 – JOG FUNCTION.....	38
10 – MONITOR FUNCTION .....	39
11 – COMMANDS.....	43
12 – DIGITAL INPUTS .....	51
13 – DIGITAL OUTPUTS .....	52
14 – ANALOG INPUTS.....	53
15 – ANALOG OUTPUTS .....	58
16 – MOTOR DATA.....	60
17 – ENCODER CONFIG.....	64
18 – SPEED REG GAINS.....	68
19 – REGULATOR PARAM .....	71
20 – TORQUE CONFIG .....	74
21 – FV PARAMETERS.....	77
22 – FUNCTIONS.....	82
22.1 – FUNCTIONS/INERTIA COMP .....	82
22.2 – FUNCTIONS/DC BRAKING .....	83
22.3 – FUNCTIONS/MOTOR OVERLOAD .....	86
22.4 – FUNCTIONS/BRES OVERLOAD .....	87
22.5 – FUNCTIONS/SPEED CAPTURE .....	88
22.6 – FUNCTIONS/POWER LOSS .....	91
22.7 – FUNCTIONS/PADS .....	98
22.8- FUNCTIONS/VDC CONTROL .....	99
22.9 - FUNCTIONS/BRAKE CONTROL.....	100
22.10 - FUNCTIONS/VF ENERGY SAVE .....	101
23 – COMMUNICATION .....	103
23.1 - COMMUNICATION/RS232 .....	103
23.2 – COMMUNICATION/FIELDBUS CONFIG .....	104
23.3 – COMMUNICATION/FIELDBUS M2S .....	105
23.4 – COMMUNICATION/FIELDBUS S2M.....	108
23.5 – COMMUNICATION/WORD COMP.....	110
23.6 – COMMUNICATION/WORD DECOMP.....	111
24 – ALARM CONFIG.....	113
25 – ALARM LOG .....	122
26 – APPLICATION .....	123
ADV100 PID HVAC application .....	123
REFERENCES .....	123
GAINS .....	127
LEVELS.....	128
ALARMS.....	131
PARAMETERS ON SELECTION LISTS, BUT NOT DISPLAYED ON KEYPAD .....	133
<b>C – SELECTION LISTS</b> .....	<b>140</b>
L_ANOUT .....	140
L_CMP .....	140
L_DIGSEL1 .....	140
L_DIGSEL2 .....	141
L_DIGSEL3 .....	141
L_FBS2M .....	141
L_LIM .....	142
L_MLTREF .....	142
L_REF .....	143
L_WDECOMP .....	143
<b>D – TROUBLESHOOTING - Alarms</b> .....	<b>144</b>

D.1 Speed fbk loss alarm according to the type of feedback.....	148
<b>E – MESSAGES .....</b>	<b>149</b>
<b>F - Block Diagrams.....</b>	<b>152</b>
System Diagrams Index.....	152
Drive overview .....	152
References .....	153
Ramps .....	154
Braking.....	154
Multireference .....	155
Motorpotentiometer.....	156
Jog function .....	156
Monitor function .....	157
Commands .....	159
Digital inputs .....	161
Digital outputs.....	161
Analog inputs.....	162
Analog outputs.....	163
Encoder config.....	163
Speed reg gains.....	164
Torque config .....	165
VF parameters .....	166
Functions .....	167
PID application.....	170

## Symbols used in the manual



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 pas strictement respectées, il y a des risques de blessures corporelles ou de mort.*



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.*



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 être rigoureusement 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*

## A – Programming

### 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

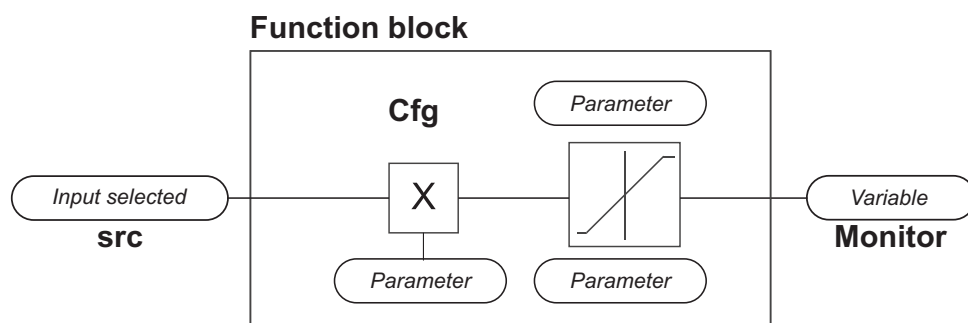
### A.2 Programming of “function block” analog and digital input signals

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**”.

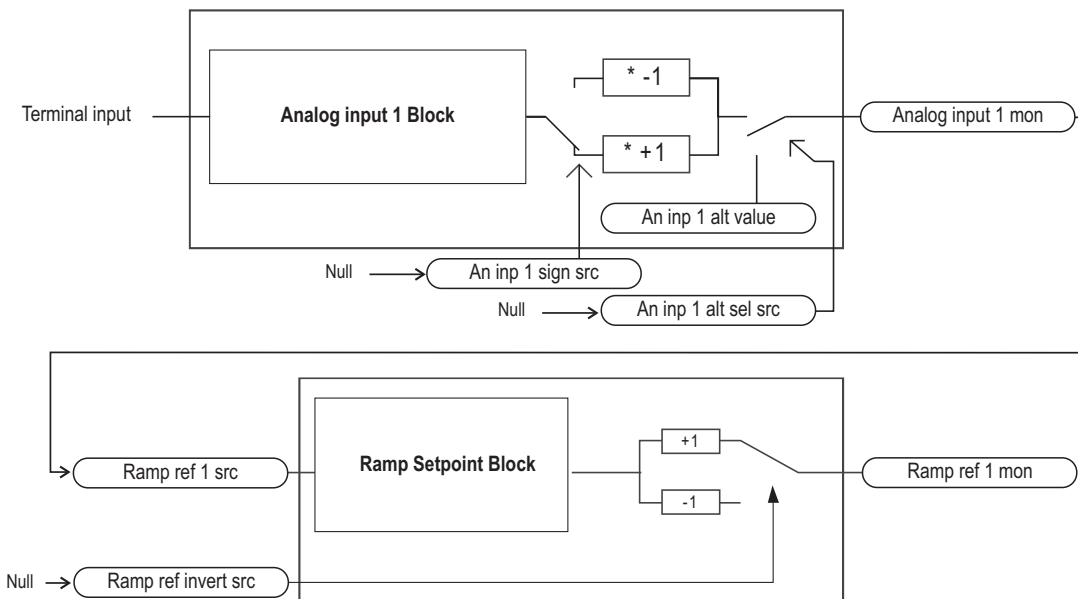
Its default source is the **Analog input 1X mon** signal (PAR: 1600), from the output of the function block “**Analog input 1 Block**”, which in this case refers to analog input 1 of the signal terminal strip.

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 1X alt sel src** parameter (PAR: 1628) can be used to select an alternative reference for the **Analog input 1X mon** (PAR: 1600) output.

The **An inp 1X alt value** parameter (PAR: 1624) determines the alternative reference value for the **Analog input 1X mon** (PAR: 1600) 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).

## B – Parameters and functions description (Expert list)

### Legend

0	1	2	3	4	5	6	7	8	9	10
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>1 - MONITOR</b>						<i>( Level 1 menu )</i>				
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
6.23	754	Ramp freeze src		LINK	16	3480	0	16384	ERW	FVS
				L_DIGSEL2 <i>(Selection List) [*]</i>						
<b>22.1 - FUNCTIONS/SPEED RATIO</b>						<i>( Level 2 menu )</i>				
22.1.1	3100	Inertia comp	kgm2	FLOAT		0.0 (*)	0.0 (*)	100.0 (*)	ERWS	F_S

0	Indexing of the menu and parameter
1	Parameter identifier
2	Parameter description
3	UM: unit of measure
4	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
5	Format of data exchanged on Fieldbus (16BIT, 32BIT)

6	Default value	CALCF Value calculated as a number with floating point
7	Minimum value	CALCI Value calculated as a whole number
8	Maximum value	SIZE Value depending on the size of the drive
9	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	
10	Available in regulation mode: V = V/f Control S = Vect Flux OL F = Vect Flux CL	
[*]	<b>Selection lists:</b> 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.	

# 1 – MONITOR

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.1	250	<b>Output current</b>	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	<b>Output voltage</b>	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	<b>Output frequency</b>	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	628	<b>Ramp setpoint</b>	rpm	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
1.5	664	<b>Speed setpoint</b>	rpm	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
1.6	260	<b>Motor speed</b>	rpm	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
1.7	270	<b>DC link voltage</b>	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
1.8	272	<b>Heatsink temperature</b>	degC	INT16	16	0	0	0	ER	FVS

The temperature measured on the drive heatsink is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.9	280	<b>Torque current ref</b>	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
1.10	282	<b>Magnet current ref</b>	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
1.11	284	<b>Torque current</b>	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
1.12	286	<b>Magnet current</b>	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
1.13	3212	<b>Motor overload accum</b>	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
1.14	368	<b>Drive overload accum</b>	perc	UINT16	16/32	0	0	100	ER	FVS

The drive overload level is displayed. An overload of 150% of the drive rated current is allowed for 60s. The thermal image I<sup>2t</sup> adjusts the drive output current thresholds. During normal operation, the instantaneous output current value can reach 180% (for 0.5 s) of the drive rated current. 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<sup>2t</sup> integrator cycle is complete. At this point the overload of 150% will be re-activated.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.15	3260	<b>Bres overload accum</b>	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
1.16	1066	<b>Enable state mon</b>		BIT	16	0	0	1	R	FVS

The drive Enable command status is displayed. Voltage must be present on terminal 9. The FR Forward start 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
1.17	1068	<b>Start state mon</b>		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
1.18	1070	<b>FastStop state mon</b>		BIT	16	0	0	1	R	FVS

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

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.19	1100	<b>Digital input X mon</b>		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.

I.e. :

0 0 0 0 0 0 0 0 0 0 1 1

Enable  
DI 1

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
1.20	1300	<b>Digital output X mon</b>		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.

i.e. :

0 0 0 0 0 0 0 0 0 0 1 1



DO 1  
DO 2

## 2 – DRIVE INFO

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

Menu	PAR	Descrizione	EU	Tipo	FB BIT	Def	Min	Max	Acc	Mod
2.1	480	<b>Drive series</b>		UINT16		7	0	0	R	FVS

The drive series identification code is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.2	482	<b>Drive size</b>		UINT16		0	0	0	R	

The drive size identification code is displayed.

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

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

The condition No power occurs when the regulation board has just left from production and has never been configured for any power. The configuration adjustment for a given power is achieved by linking it to a power board and running a **Save parameters**.

- 0 No Power
- 1 380V...480V
- 2 -
- 3 -
- 4 230V

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

Setting of the geographical area in which the drive is to be used (Europe or USA). This setting determines the factory voltage and power supply frequency values.

- 0 EU (400V / 50Hz)
- 1 USA (460 / 60 Hz)

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.5	488	<b>Drive cont current</b>	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	<b>Firmware ver.rel</b>		UINT16		0	0	0	R	FVS

The version number and release number of the drive firmware are displayed. On the keypad these are displayed in the version.release format. The parameter reading from the serial communication device or fieldbus returns the version 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	<b>Firmware type</b>		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	<b>Application ver.rel</b>		UINT16		0	0	0	ER	FVS

The version and release number of the 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
<b>2.9</b>	<b>506</b>	<b>Application type</b>		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
<b>2.10</b>	<b>510</b>	<b>Time drive power on</b>	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
<b>2.11</b>	<b>512</b>	<b>Time drive enable</b>	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
<b>2.12</b>	<b>514</b>	<b>Number power up</b>		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
<b>2.13</b>	<b>516</b>	<b>Time fan on</b>	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
<b>2.14</b>	<b>520</b>	<b>Product S/N</b>		UINT32		0	0	0	R	FVS
The drive serial number is displayed.										
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>2.15</b>	<b>522</b>	<b>Regulation S/N</b>		UINT32		0	0	0	R	FVS
The drive regulation card serial number is displayed.										
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>2.16</b>	<b>524</b>	<b>Power S/N</b>		UINT32		0	0	0	R	FVS
The drive power card serial number is displayed.										
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>2.17</b>	<b>526</b>	<b>Power file ver.rel</b>		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
<b>2.18</b>	<b>530</b>	<b>Slot 1 card type</b>		ENUM		None	0	0	R	FVS
<b>2.19</b>	<b>532</b>	<b>Slot 2 card type</b>		ENUM		None	0	0	R	FVS
<b>2.20</b>	<b>534</b>	<b>Slot 3 card type</b>		ENUM		None	0	0	R	FVS
The type of expansion card installed in the relative slot of the drive is displayed.										
<b>0</b>	None									
<b>1</b>	I/O 0									
<b>769</b>	I/O 1									
<b>1793</b>	I/O 2									
<b>2305</b>	I/O 3									
<b>3329</b>	I/O 4									
<b>4865</b>	I/O 5									
<b>5377</b>	I/O 6									

- 8 Enc 1
- 264 Enc 2
- 520 Enc 3
- 776 Enc 4
- 4 Can/Dnet
- 255 Unknown

**Note!**

.....  
 SLOT 3 indicates the presence of the CAN on the regulation card in versions ADV100-...-C  
 .....

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.21	536	Slot 1 card S/N		UINT32		0	0	0	R	FVS
2.22	538	Slot 2 card S/N		UINT32		0	0	0	R	FVS
2.23	540	Slot 3 card S/N		UINT32		0	0	0	R	FVS

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

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
2.24	546	Fw enc sl2 ver.rel		UINT16		0	0	0	R	FVS

The version and release number of the encoder firmware 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
2.25	548	Fw enc sl2 type		UINT16		0	0	0	R	FVS

The type of firmware installed in the encoder 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 previous **Startup wizard** chapter.

## 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		V/f control	0	3	RWZ	FVS

The ADV100 is capable of operating with different control modes:

- 0 V/f control
- 1 Flux vector OL
- 2 Flux vector CL
- 3 Autotune

The open loop **V/f (V/f control)** mode is the simplest type of asynchronous motor control, as the only parameters required are the rated voltage, current and frequency of the motor.

The open loop V/F control mode is factory-set and does not require any speed feedback. The natural variation in speed generated by machine load induction (slippage) can be compensated using **Slip comp** and **Slip comp filter**.

In V/f mode a single drive can be used to control several asynchronous motors, even of different sizes, connected in parallel, provided the sum of the currents of the single motors is less than the drive rated current. If using several motors connected in parallel, be sure to provide adequate thermal protection for each single motor.

Closed loop control is also possible in the V/f mode. It requires a speed reading by a digital encoder on the motor shaft; to enable encoder feedback, you must set parameter **2444 Slip comp mode =1**. The EXP-DE-I1-ADL card (standard on ADV120-... models) is necessary in order to acquire the encoder signals. The speed feedback supplied by the encoder is used to compensate motor slippage in the different load conditions, to achieve accurate control and greater precision of the actual motor speed.

With the **sensorless vector control (Flux vector OL)** mode, high speed and torque precision can be achieved at low motor rpm. The drive has a powerful 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 very low rpm.

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..

If the **Startup wizard** procedure is not used, self-tuning of the motor parameters is possible in the **self-tuning mode (Autotune)**. To execute the command the hardware enabling contact between terminals 9 and 12 must be opened. Then set the **Regulation Mode** parameter to **Autotune**. If not already in Local mode, press the Local key (the **LOC** LED lights up) and close the hardware enabling contact (terminals 9 and 12). Self-tuning can now be enabled (refer to parameters **2022** or **2224**). At the end of the self-tuning procedure, open the contact between terminals 9 and 12 again and restore the parameters that were changed.

This procedure must be used for both self-tuning with the engine standing still and with the motor turning.

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 ADV100 to the full.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.4	556	<b>Control mode select</b>		ENUM		Ramp	0	2	ERWZ	F_S

Selection of the drive control 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 OL** and **Flux vector CL** 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
4.5	558	<b>Application select</b>		ENUM		None	0	2	ERWZ	FVS

Selection of which IEC 61131-3-compliant application to make operational.

- 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, configure 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
4.6	560	<b>Mains voltage</b>		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.

- 0 None
- 1 230 V
- 2 380 V
- 3 400 V
- 4 415 V
- 5 440 V



- 6 460 V
- 7 480 V
- 8 575 V
- 9 690 V

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.7	562	<b>Switching frequency</b>		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
4.8	564	<b>Ambient temperature</b>		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.										

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.9	568	<b>Switching freq mode</b>		ENUM		Costant	0	1	ERWZS	FVS
Setting of the switching frequency operating mode when drive overload is set in Heavy duty. 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 **Costant** the switching frequency is fixed and is set using the **Switching frequency** parameter, according to the size of the drive. If the selected switching frequency value is higher than the default value, the output current of the drive is derated.

If set to **Variable** the switching frequency is set to 8kHz and controlled by the temperature of the drive heatsink and by the output frequency. If the heatsink temperature exceeds a set threshold (which depends on the size of the drive) or falls to below 5Hz ± 1Hz, the switching frequency is automatically reduced to 4kHz, to prevent derating of the output current. 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
4.10	570	<b>Password</b>		UINT32		0	0	99999	ERW	FVS
You can enter a <b>password</b> 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
4.11	572	<b>Application key</b>		UINT32	0	0	4294967295	ERW	FVS	

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

You may need to enter a key to definitively enable some PLC applications. Please contact Gefran for details about which PLC 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
4.12	574	<b>Startup display</b>		INT16		-1	-1	20000	ERW	FVS

This is used to set the parameter that will be displayed automatically at drive power-on. Entering the value -1 (default), the function is disabled and the main menu is displayed at power-on.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
4.13	576	<b>Display backlight</b>		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
4.14	578	<b>Language select</b>		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
<b>4.15</b>	<b>580</b>	<b>Load default</b>		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
<b>4.16</b>	<b>590</b>	<b>Save par to keypad</b>		BIT		0	0	1	RW	FVS
Transfers the parameters currently stored in the drive and saves them in the keypad memory (See ADV100 Quick Start manual, chapter 6.8).										

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>4.17</b>	<b>592</b>	<b>Load par from keypad</b>		BIT		0	0	1	RWZ	FVS
Transfers the parameters from the keypad memory to the drive (See ADV100 Quick Start manual, chapter 6.9).										

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>4.18</b>	<b>594</b>	<b>Keypad memory select</b>		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.										

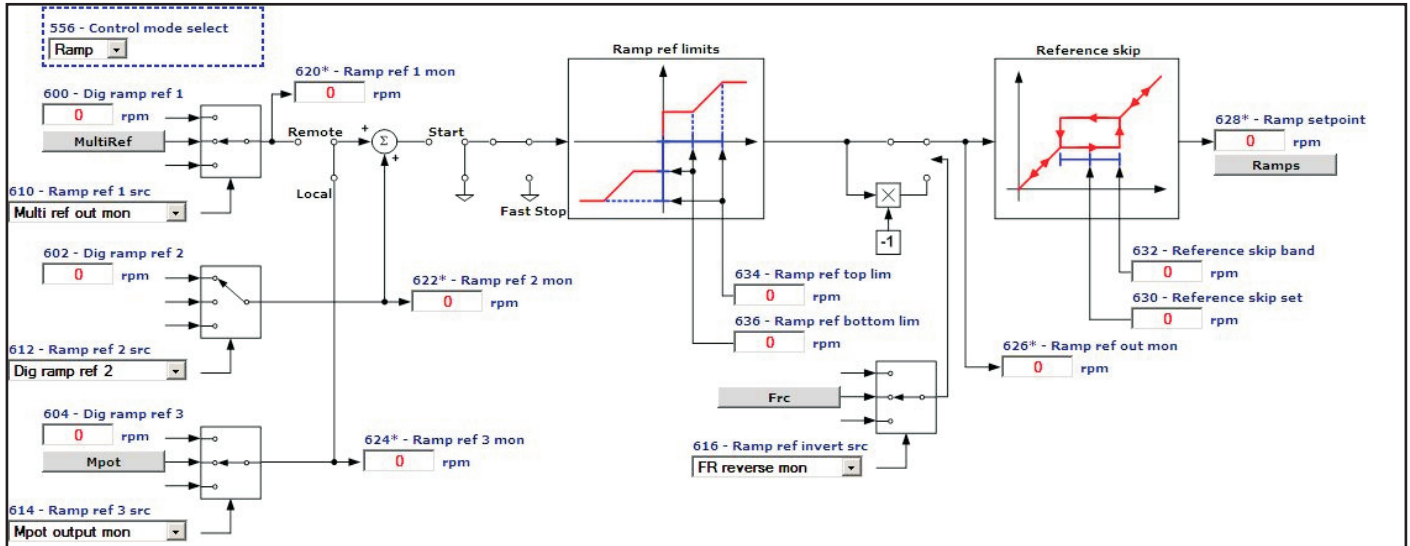
Menu	PAR	Descrizione	EU	Tipo	FB BIT	Def	Min	Max	Acc	Mod
<b>4.19</b>	<b>596</b>	<b>Salva par-&gt;card SD</b>		BIT		0	0	1	RW	FVS
Transfers the drive parameters to the SD memory card (See chapter 8.9 of the Quick start-up guide).										

Menu	PAR	Descrizione	EU	Tipo	FB BIT	Def	Min	Max	Acc	Mod
<b>4.20</b>	<b>598</b>	<b>Carica par&lt;-card SD</b>		BIT		0	0	1	RWZ	FVS
Transfers the parameters from the SD memory card to the drive (See chapter 8.9 of the Quick start-up guide).										

## 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 **552 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	rpm	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	rpm	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
<b>5.3</b>	<b>604</b>	<b>Dig ramp ref 3</b>	rpm	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
<b>5.4</b>	<b>610</b>	<b>Ramp ref 1 src</b>		LINK	16/32	852	0	16384	RW	FVS
<b>5.5</b>	<b>612</b>	<b>Ramp ref 2 src</b>		LINK	16/32	602	0	16384	ERW	FVS
<b>5.6</b>	<b>614</b>	<b>Ramp ref 3 src</b>		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
<b>5.7</b>	<b>616</b>	<b>Ramp ref invert src</b>		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
<b>5.8</b>	<b>620</b>	<b>Ramp ref 1 mon</b>	rpm	INT16		0	0	0	R	FVS
<b>5.9</b>	<b>622</b>	<b>Ramp ref 2 mon</b>	rpm	INT16		0	0	0	ER	FVS
<b>5.10</b>	<b>624</b>	<b>Ramp ref 3 mon</b>	rpm	INT16		0	0	0	ER	FVS

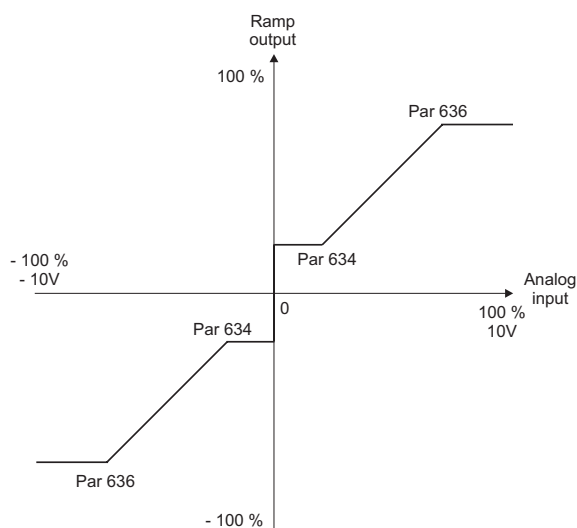
The value of the relative ramp reference on the output of the relative function block is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>5.11</b>	<b>634</b>	<b>Ramp ref top lim</b>	rpm	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	rpm	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.



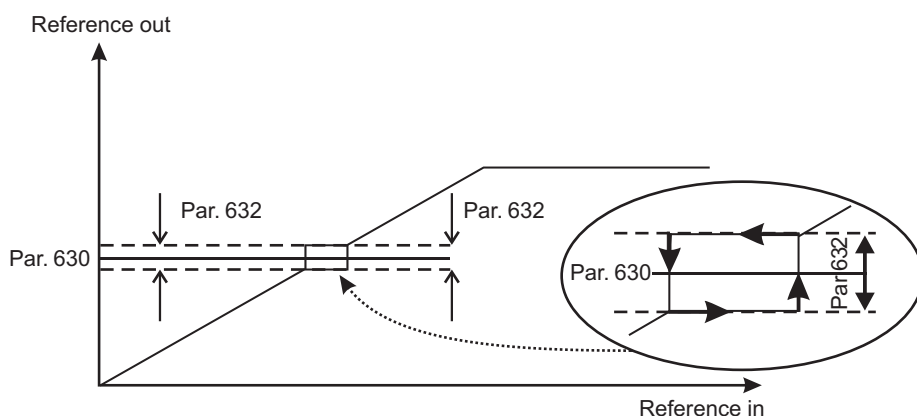
In a system comprising a drive and motor, vibrations may be generated at certain frequencies, due to mechanical resonance. This phenomenon can be limited by entering a prohibited speed at which the drive cannot operate

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

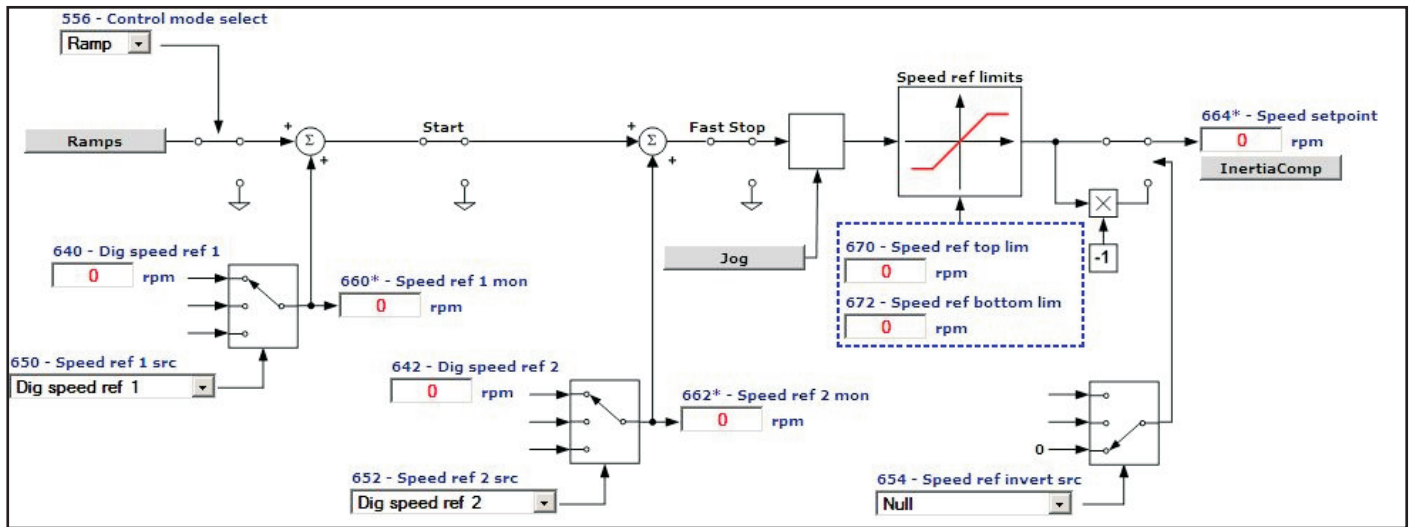
Output frequency = 310 rpm

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	rpm	INT16	16/32	0	CALCI	CALCI	ERW	FVS
5.16	642	Dig speed ref 2	rpm	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  $\pm 10V$ , 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	<b>Speed ref invert src</b>		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	<b>Speed ref 1 mon</b>	rpm	INT16		0	0	0	ER	FVS
5.21	662	<b>Speed ref 2 mon</b>	rpm	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	<b>Speed ref top lim</b>	rpm	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 (REFERENCES menu par. 680).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.23	672	<b>Speed ref bottom lim</b>	rpm	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).

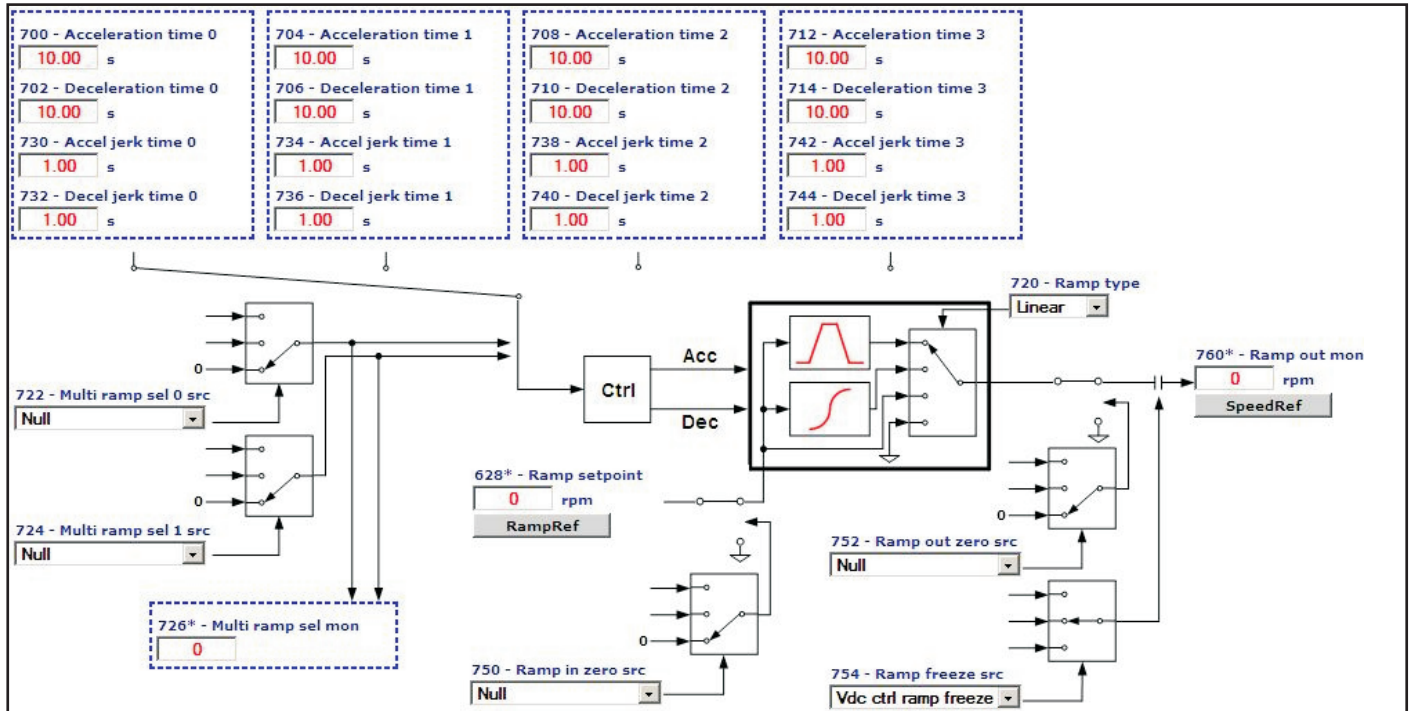
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
5.24	680	<b>Full scale speed</b>	rpm	INT16		CALCI	50	32000	RWZ	FVS

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  $\pm 200$  % 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

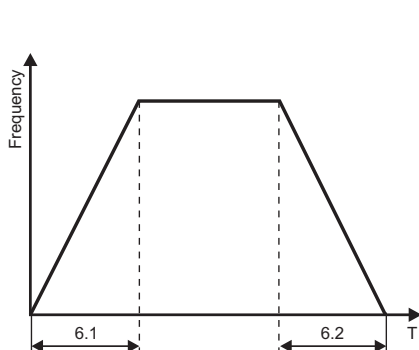
The acceleration and deceleration ramp times are used to avoid sudden changes in the drive output frequency, which could cause mechanical shocks, excessive current on the motor and excessive DC-bus voltage values. The acceleration times (**6.1, 6.3, 6.5, 6.7**) are expressed as the time necessary to 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**.

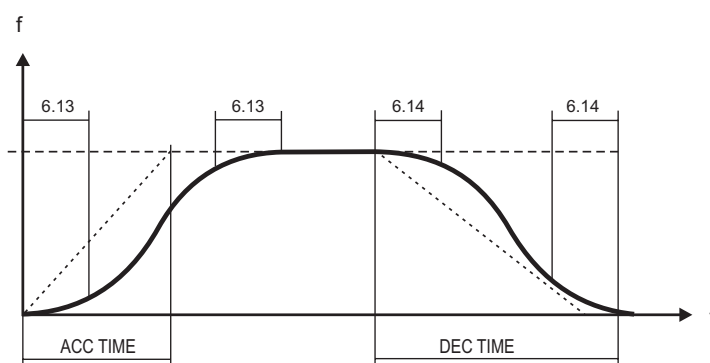
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
6.9	720	<b>Ramp type</b>		ENUM		Linear	0	3	ERWZ	FVS

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	<b>Multi ramp sel 0 src</b>		LINK		6000	0	16384	ERWZ	FVS
6.11	724	<b>Multi ramp sel 1 src</b>		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\_DIGSEL2**" selection list.

The following table describes the ramp selection procedure:

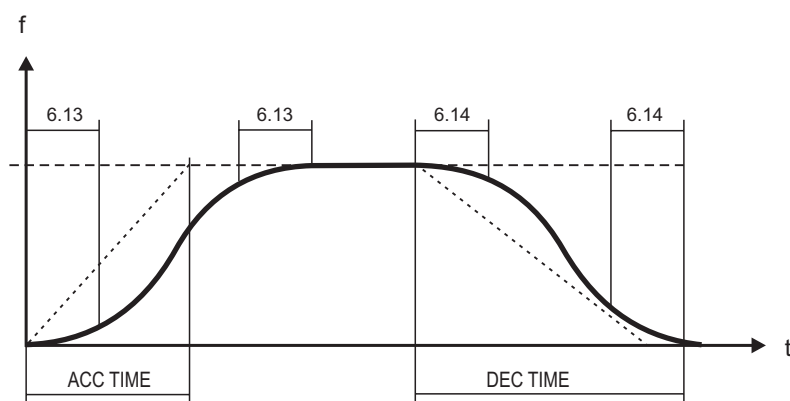
Enabled ramp time	Multi ramp sel 0	Multi ramp sel 1
Acceleration time 0 Deceleration time 0	0	0
Acceleration time 1 Deceleration time 1	1	0
Acceleration time 2 Deceleration time 2	0	1
Acceleration time 3 Deceleration time 3	1	1

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

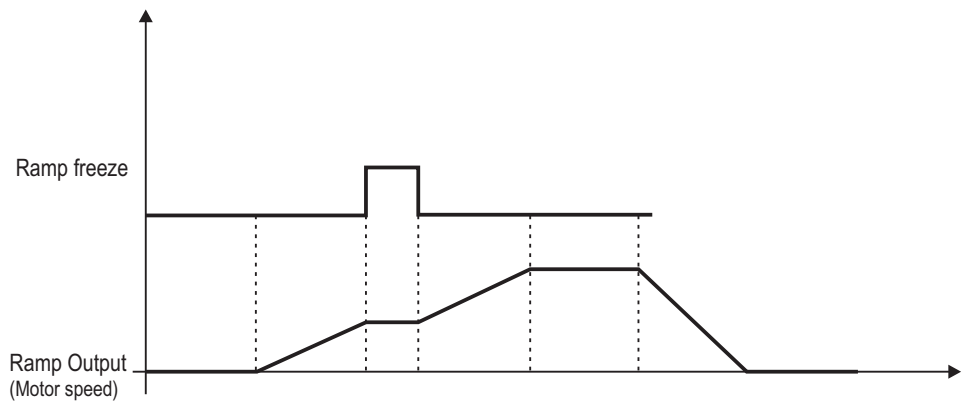
Selection of the origin (source) of the signal that blocks the ramp input and moves the reference to zero. If the ramp input is enabled, the **Ramp ref** parameter corresponds to the set reference. If the ramp input is blocked, the drive slows down with the set deceleration time until reaching zero speed. 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

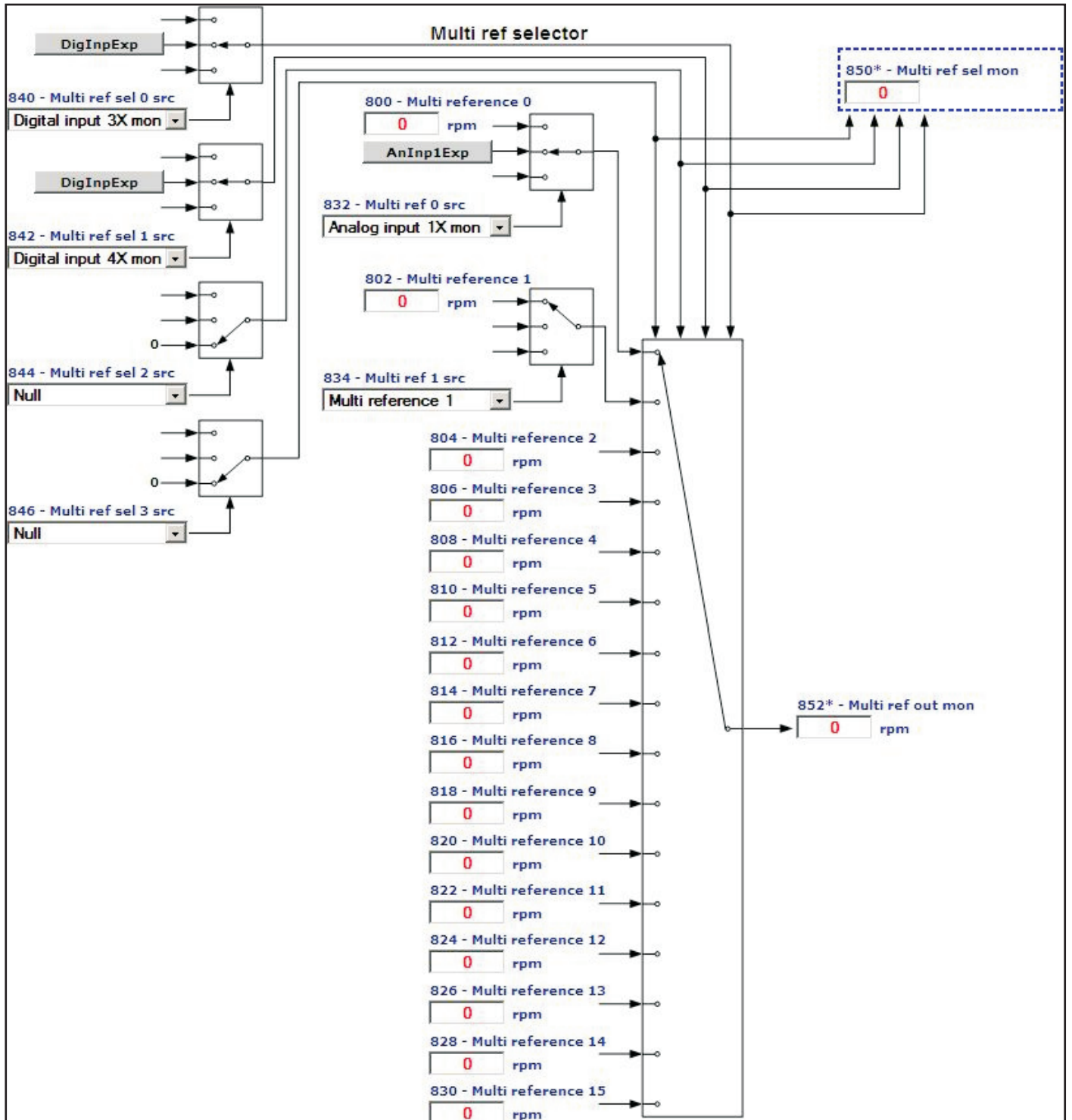
Selection of the origin (source) of the signal that brings the ramp to 0 (**Ramp ref 1/Ramp ref 2 = 0**). When the ramp output is set to zero using **Ramp out zero**, the drive brakes with the maximum available torque; in this case the ramp is disabled. The terminal to be associated with this function 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	rpm	INT16	16/32	0	CALCI	CALCI	RW	FVS
7.2	802	Multi reference 1	rpm	INT16	16/32	0	CALCI	CALCI	RW	FVS
7.3	804	Multi reference 2	rpm	INT16		0	CALCI	CALCI	RW	FVS
7.4	806	Multi reference 3	rpm	INT16		0	CALCI	CALCI	RW	FVS
7.5	808	Multi reference 4	rpm	INT16		0	CALCI	CALCI	RW	FVS
7.6	810	Multi reference 5	rpm	INT16		0	CALCI	CALCI	RW	FVS

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

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	1600	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	1214	0	16384	RW	FVS
7.20	842	Multi ref sel 1 src		LINK	16	1216	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

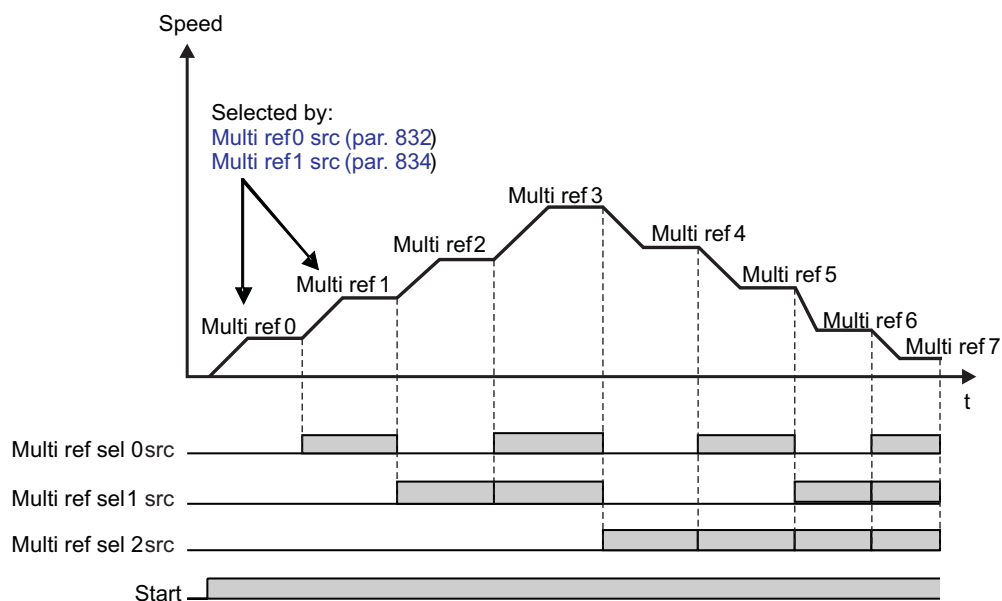
Selection of the origin (source) of the signals used to select one of the preset speeds. These parameters can only be used together in combinations. The terminals that can be used for this function can be selected from among those listed in the “**L\_DIGSEL2**” selection list.

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.



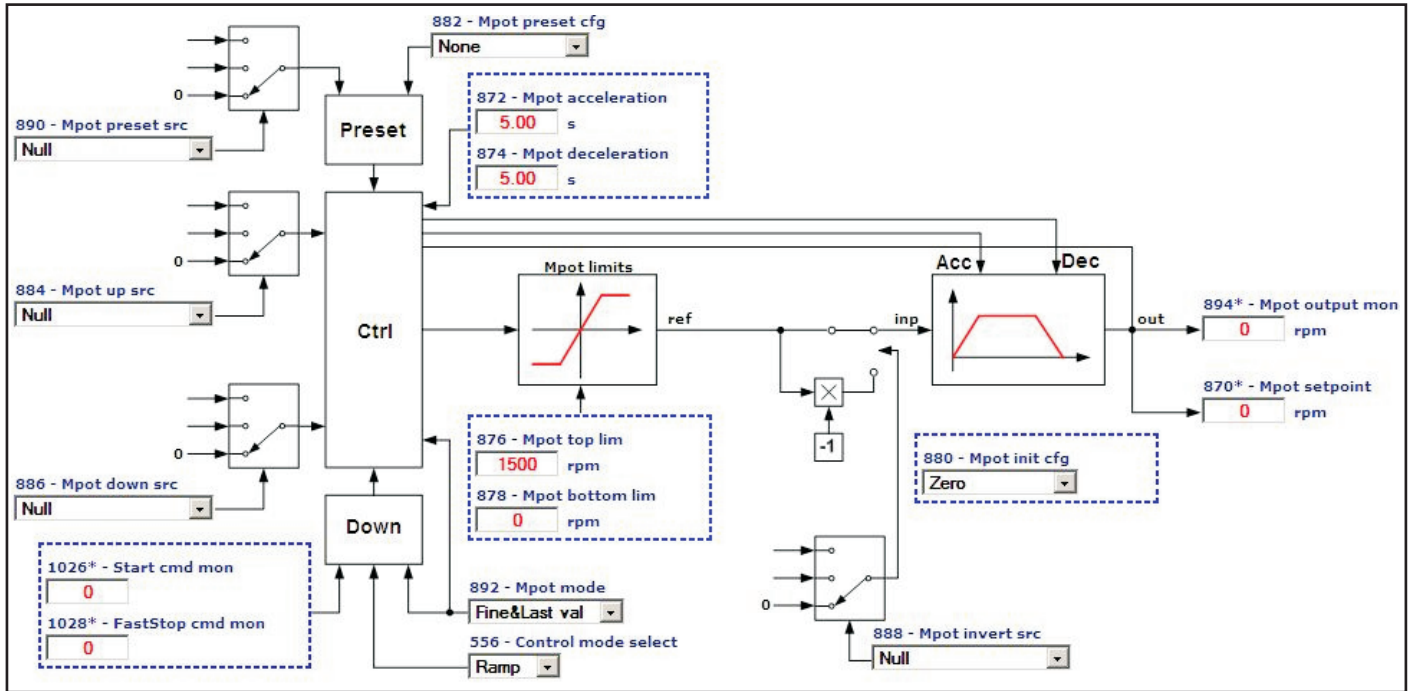
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>7.23</b>	<b>850</b>	<b>Multi ref sel mon</b>		UINT16		0	0	15	R	FVS

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
<b>7.24</b>	<b>852</b>	<b>Multi ref out mon</b>	rpm	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.

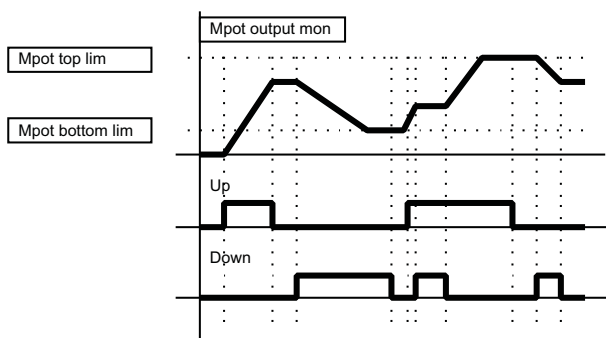
The preset command can be used to force a preset value for the input and output of the Motor potentiometer function.

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	<b>Mpot setpoint</b>	rpm	INT16	16/32	0	CALCI	CALCI	R	FVS

The speed reference value of the Motor potentiometer function is displayed.  
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	<b>Mpot acceleration</b>	s	FLOAT		5.0	0.01	1000.00	RW	FVS
8.3	874	<b>Mpot deceleration</b>	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	<b>Mpot top lim</b>	rpm	INT16		1500	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	<b>Mpot bottom limit</b>	rpm	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	<b>Mpot init cfg</b>		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	<b>Mpot preset cfg</b>		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. Il precedente valore di riferimento viene mantenuto. 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	<b>Mpot mode</b>		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

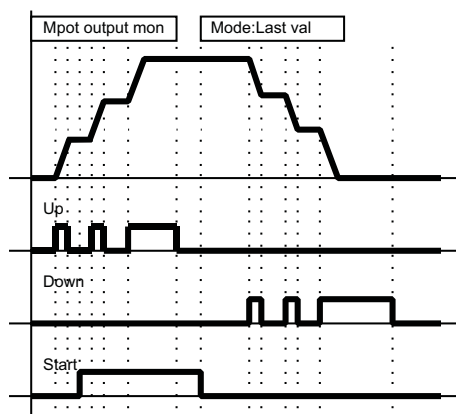
Option 1: Behaviour of the Motor potentiometer function with the Stop or FastStop command present with the **Control mode = Ramp** parameter.

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.

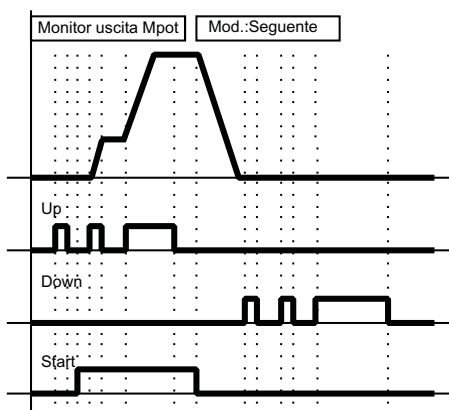
In **Last val** mode with the Stop or FastStop command present, the speed reference of the Motor potentiometer function is not altered.

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.

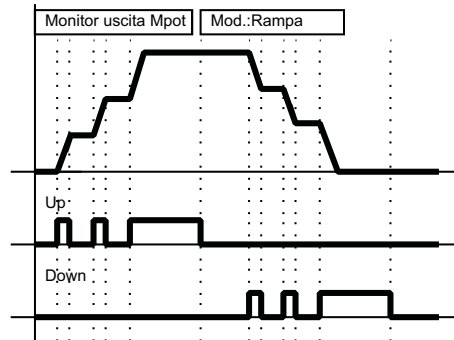
If the Run command is sent when the 0 speed has been reached, it is maintained until the Up command is sent. If the Run command is sent before the motor reaches the 0 speed, the speed at that moment is taken as the new reference.



## Option 2: Ramp behaviour

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

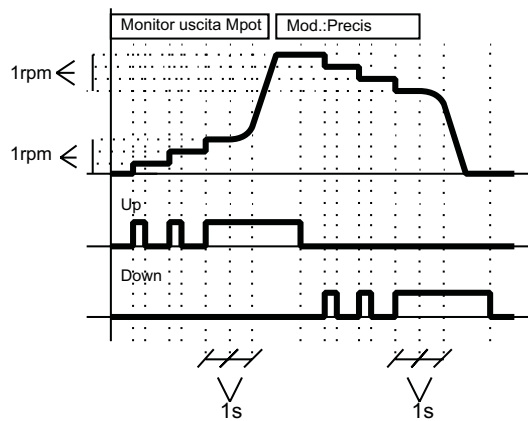
In **Ramp** mode, each time the Up or Down commands are enabled, the output of the Motor potentiometer function increases or decreases with the set ramp. When the Up or Down command is removed, the last value that was reached is maintained.



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.



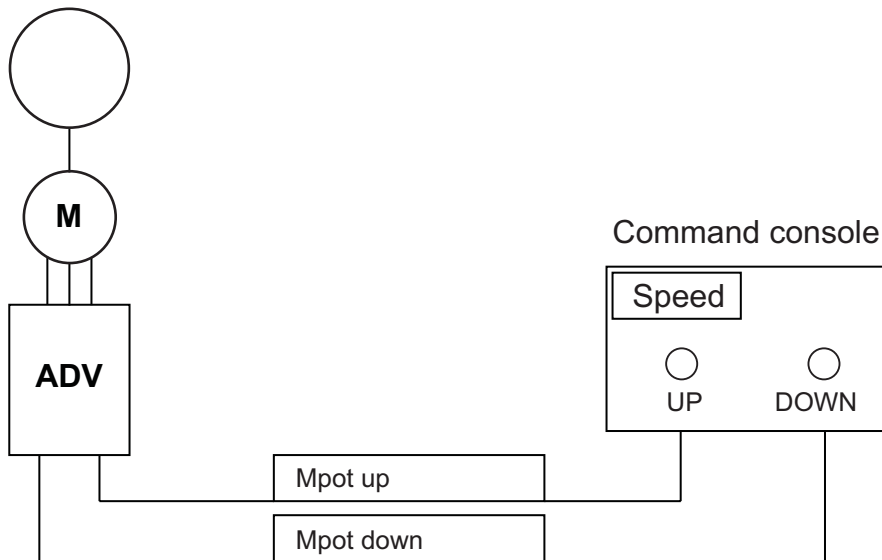
Mpot mode	Ramp behaviour	Behaviour of the Motor potentiometer function with the Stop or FastStop command present with the <b>Control mode = Ramp</b> parameter.
0	Ramp	Last val
1	Ramp	Follow
2	Fine	Last val
3	Fine	Follow

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.

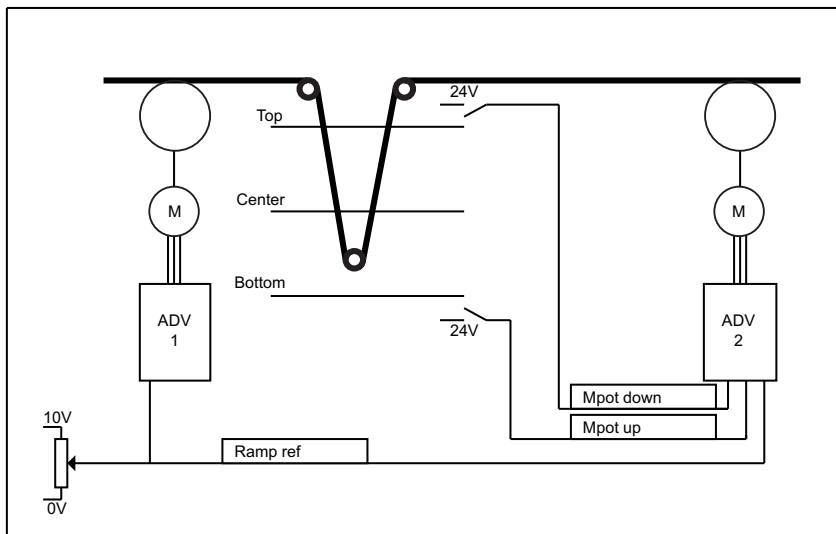
### Manual speed control with command sent from control desk.



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.

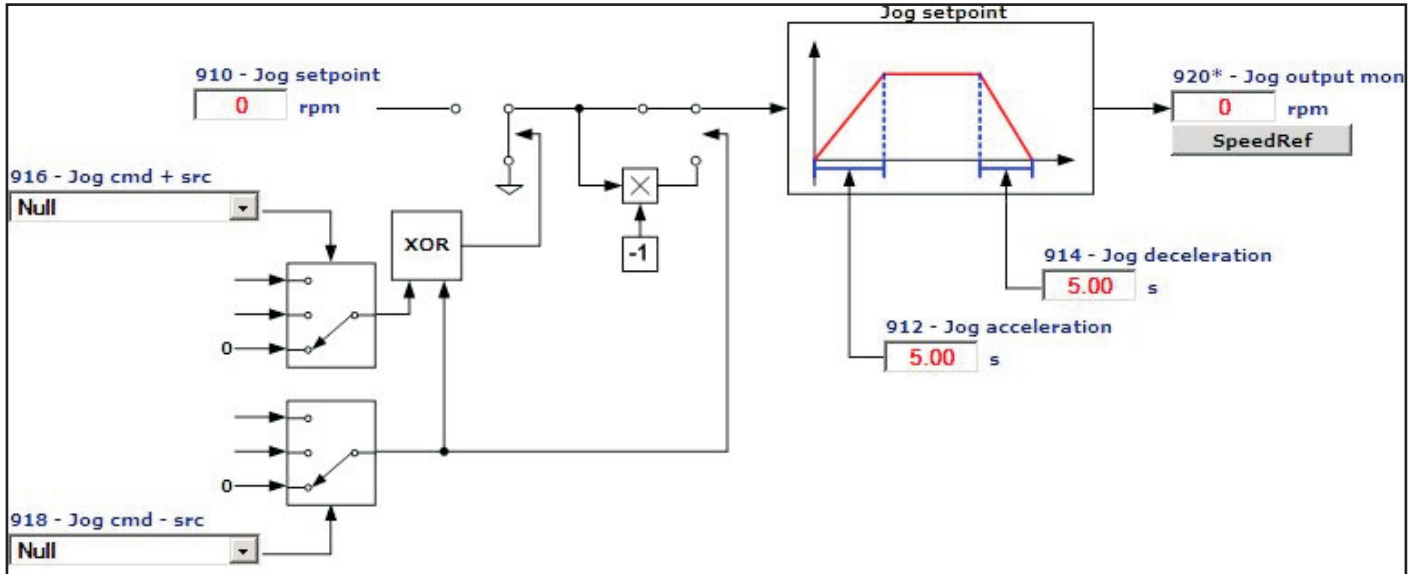


The limit switches at the ends of dancer travel ranges are connected to the Up and Down commands in the motor potentiometer function. If the dancer presses the bottom limit switch, this means motor 2 is running slowly and the Up command must be sent. If the dancer presses the top limit switch, this means 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	<b>Jog setpoint</b>	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	<b>Jog acceleration</b>	s	FLOAT		5.0	0.01	1000.00	RW	FVS
9.3	914	<b>Jog deceleration</b>	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	<b>Jog cmd + src</b>		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	<b>Jog cmd - src</b>		LINK	16	6000	0	16384	RW	FVS

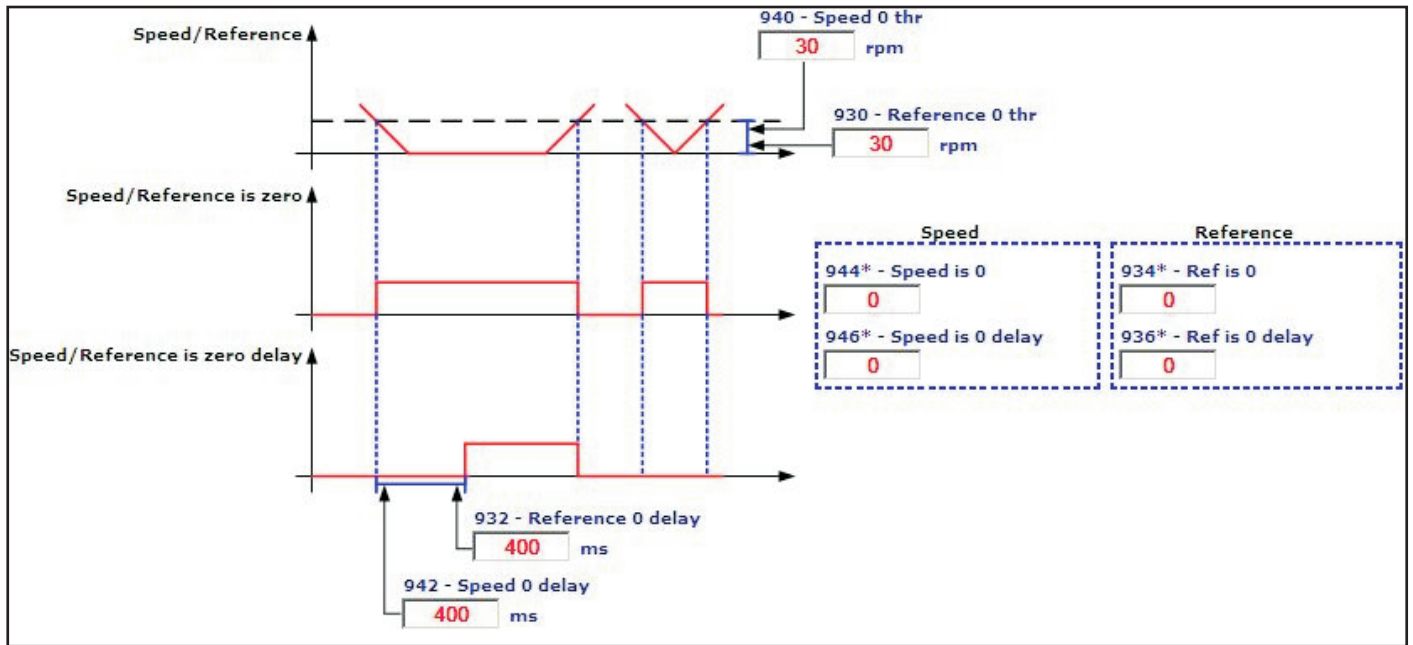
Selection of the origin (source) of the **Jog -** function enabling signal. When this command is enabled the Jog Mode reference sign is inverted with respect to the value entered in the **Jog setpoint value** parameter. The signal to be associated with this function can be selected from the "L\_DIGSEL2" 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	<b>Jog output mon</b>	rpm	INT16	16/32	0	0	0	ER	FVS

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

# 10 – MONITOR FUNCTION



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

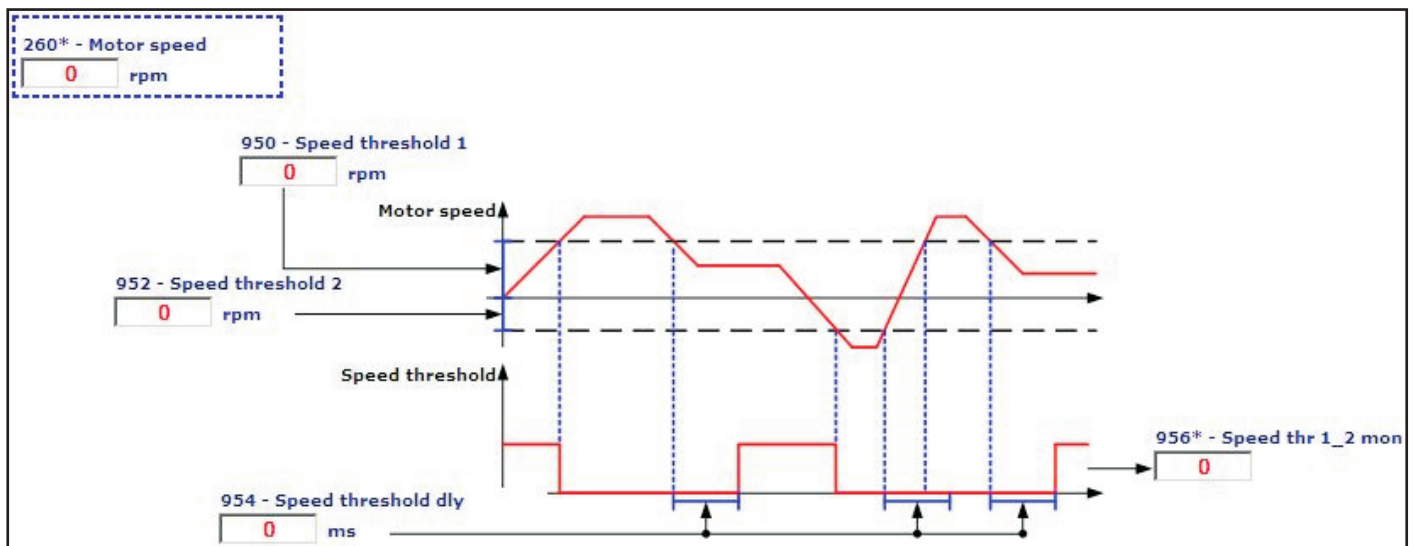
Setting of the delay in milliseconds after which the reference = 0 reached signal is enabled.

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	<b>Speed threshold 1</b>	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**.

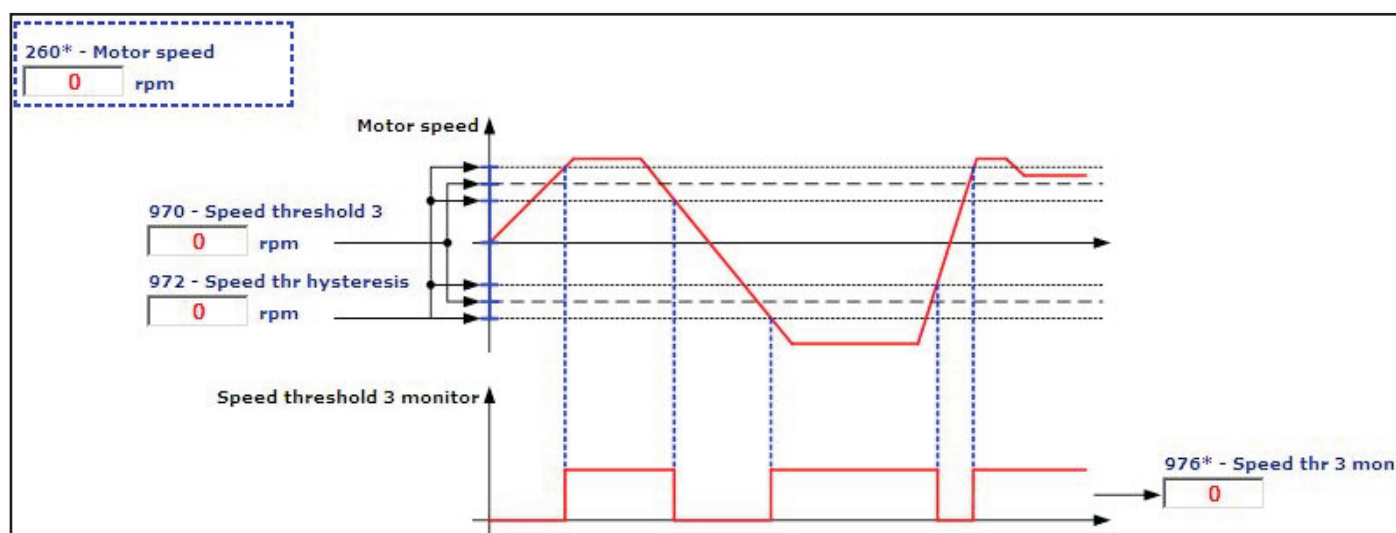
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.6	952	<b>Speed threshold 2</b>	rpm	INT32		0	CALCI	CALCI	RW	FVS

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	<b>Speed threshold dly</b>	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	<b>Set speed ref src</b>		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	<b>Set speed error</b>	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	<b>Set speed delay</b>	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.**

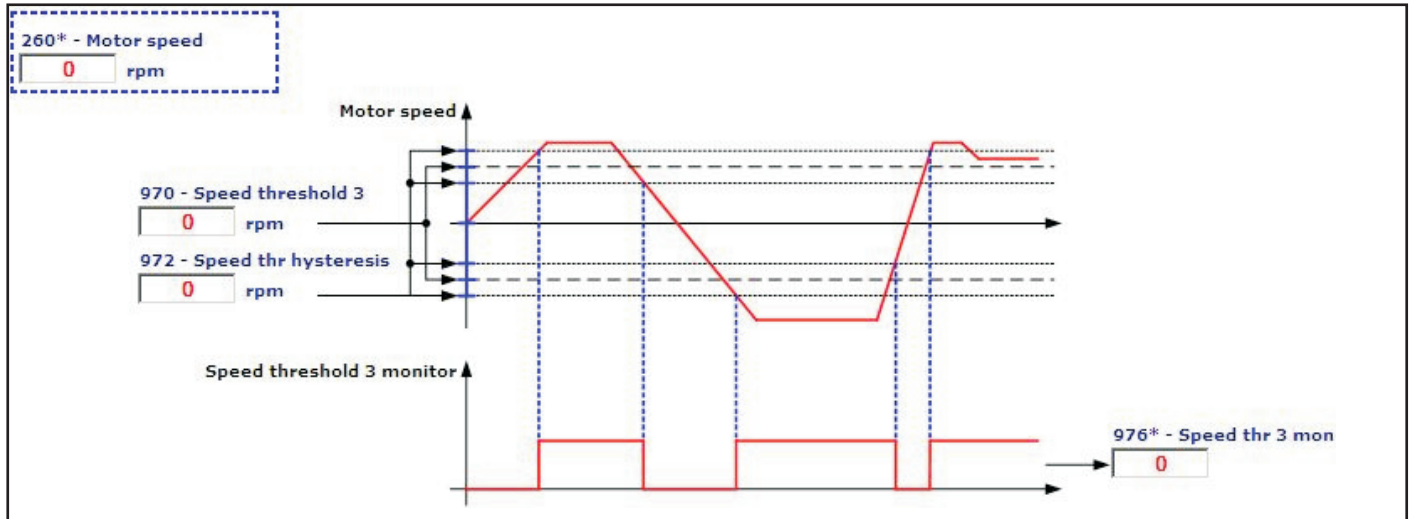


Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.11	968	<b>Dig set speed ref</b>	rpm	UINT16	16/32BIT	0	CALCI	CALCI	RW	FVS

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

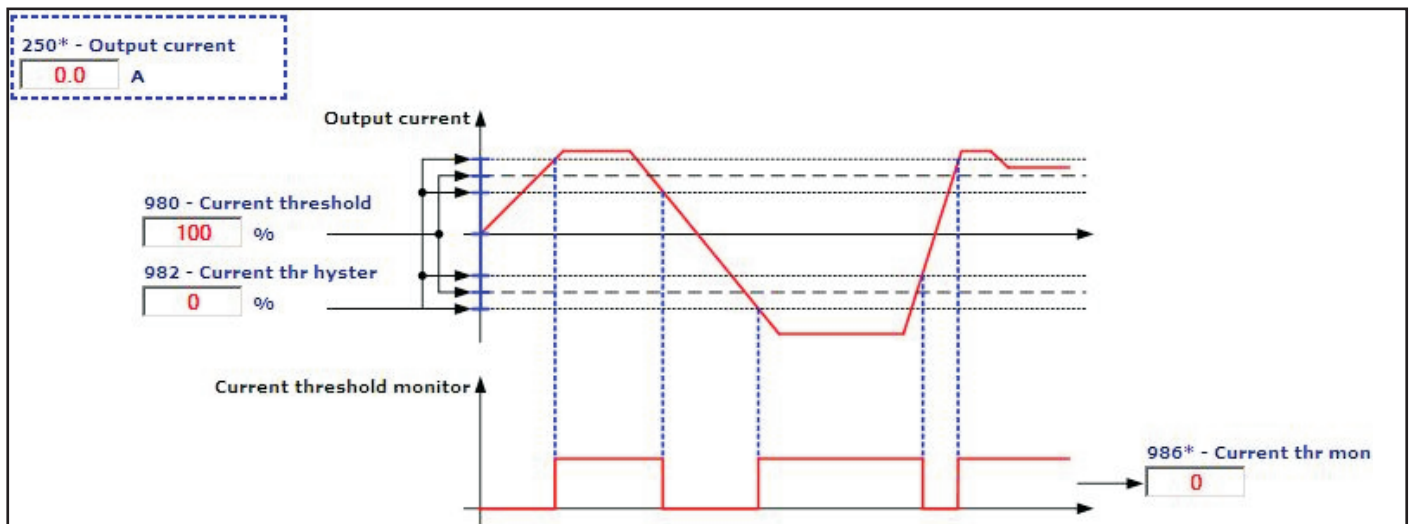
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.12	970	<b>Speed threshold 3</b>	rpm	INT32		0	0	CALCI	ERW	FVS

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	<b>Speed thr hysteresis</b>	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.



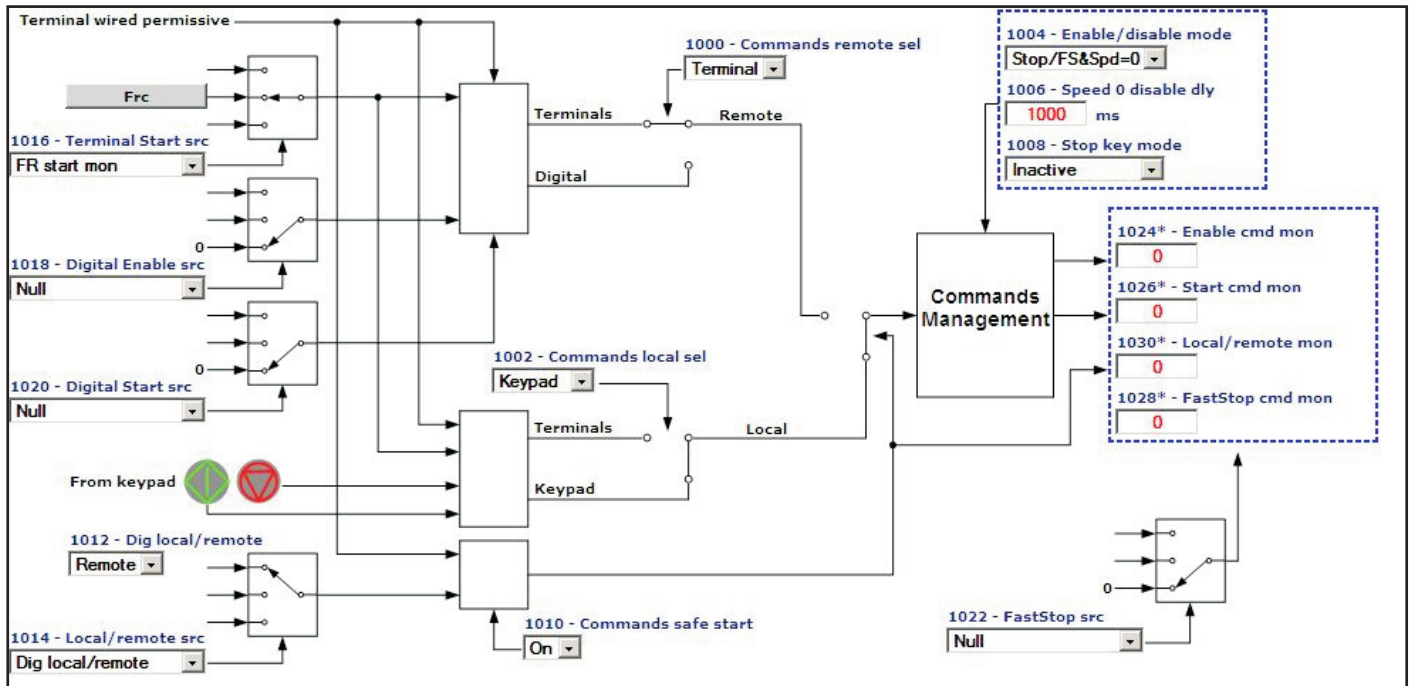
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.14	980	<b>Current threshold</b>	perc	UINT16		100	0	200	RW	FVS

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 this threshold + the tolerance band set in parameter **982 Current thr hysteresis** 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 hysteresis**, the result produced is always 0. The value set in this parameter is active in both directions of rotation.

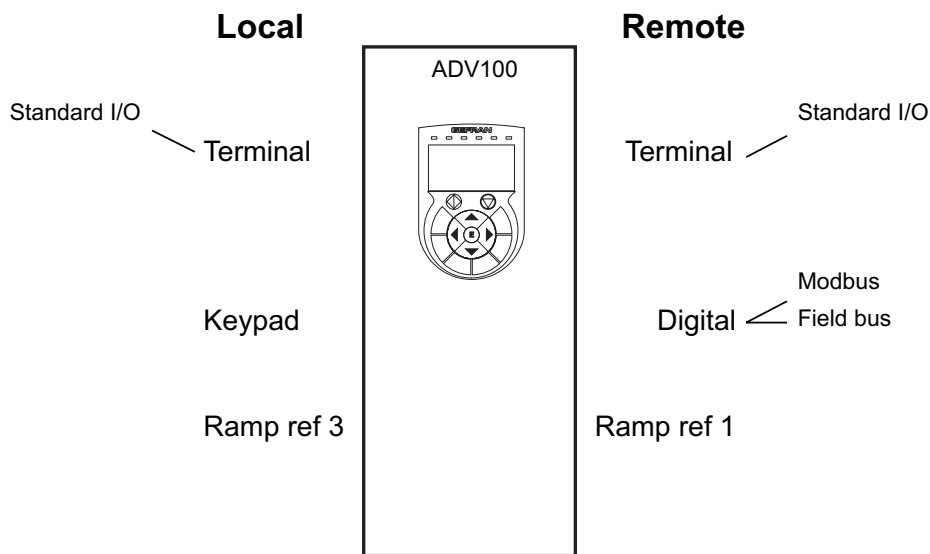
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
10.15	982	<b>Current thr hyster</b>	perc	UINT16		0	0	100	RW	FVS

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**. 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 profdrive).

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 (9) 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 (9) 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 (9).

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	ERW	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	<b>Speed 0 disable dly</b>	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	<b>Stop key mode</b>		ENUM		Inactive	0	1	ERW	FVS

Setting of the stop key functioning on the keypad in case of Remote->Terminal or Remote->Digital or Local->Terminal mode. In Local -> Keypad mode this configuration is ineffective.

- 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	<b>Commands safe start</b>		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.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.7	1012	<b>Dig local/remote</b>		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	<b>Local/remote src</b>		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	<b>Terminal Start src</b>		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	<b>Digital Enable src</b>		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	<b>Digital Start src</b>		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	<b>FastStop src</b>		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**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.13	1024	<b>Enable cmd mon</b>		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	<b>Start cmd mon</b>		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	<b>FastStop cmd mon</b>		BIT	16	0	0	1	R	FVS

The status of the FastStop command is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.16	1040	<b>FR mode</b>		ENUM		Normal	0	2	ERWZ	FVS

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

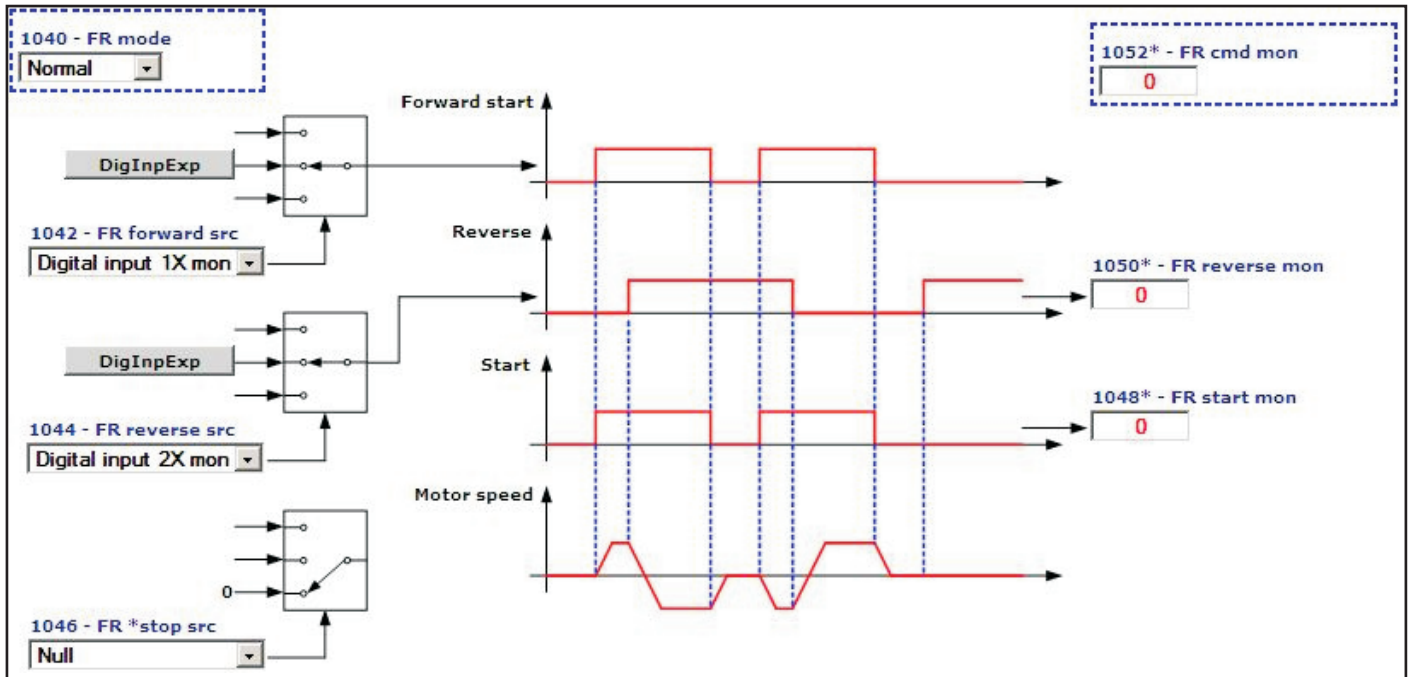
- 0 Normal
- 1 Two wire      Two wire control

## 2 Three wire Three wire control

The default use of the FRC block is shown below.

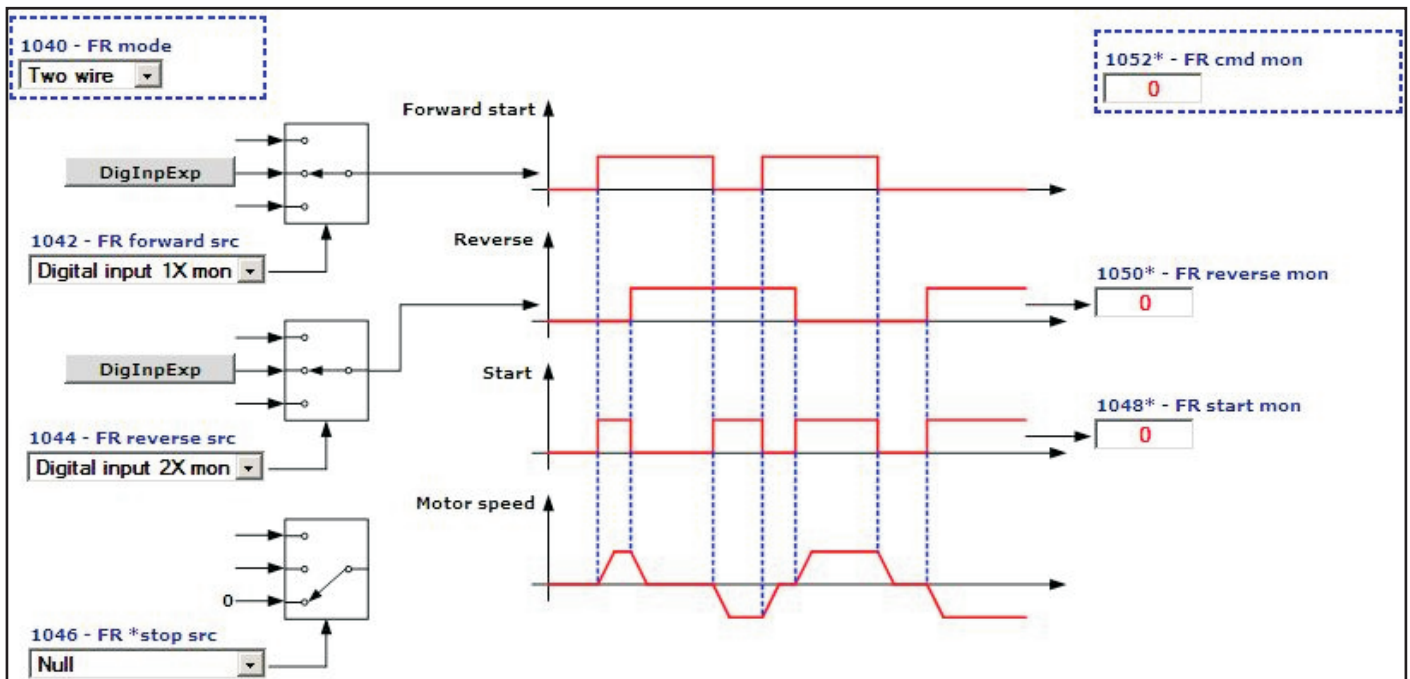
The Start command is linked to the Start terminal and the Reverse command is linked to Ramp ref invert.

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.

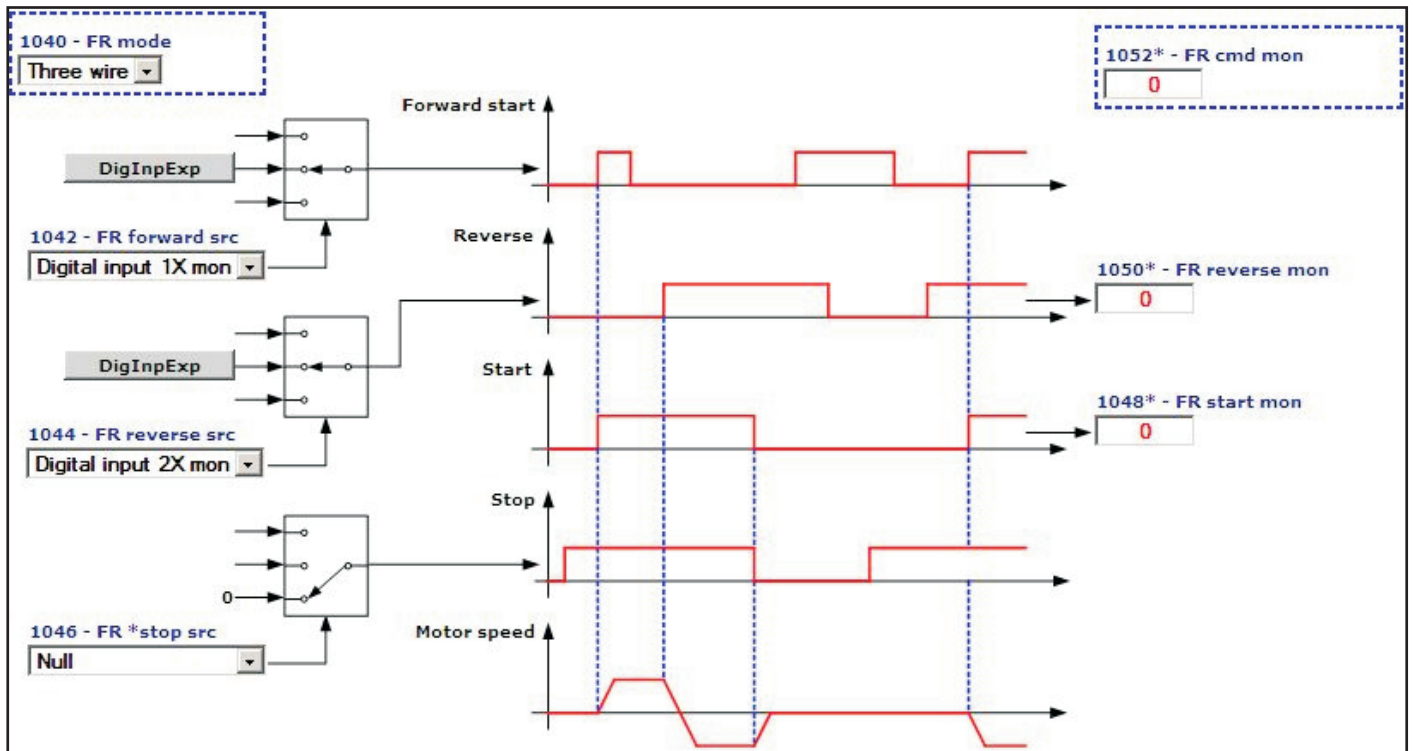


When set to **1 - Two wire** control, the motor only rotates if the **FR Forward** command or **FR Reverse** command is present. The simultaneous presence of the **FR Forward** and **FR Reverse** commands causes the motor to stop.

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
11.17	1042	FR forward src		LINK	16	1210	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
11.18	1044	FR reverse src		LINK	16	1212	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
11.19	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
11.20	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
11.21	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

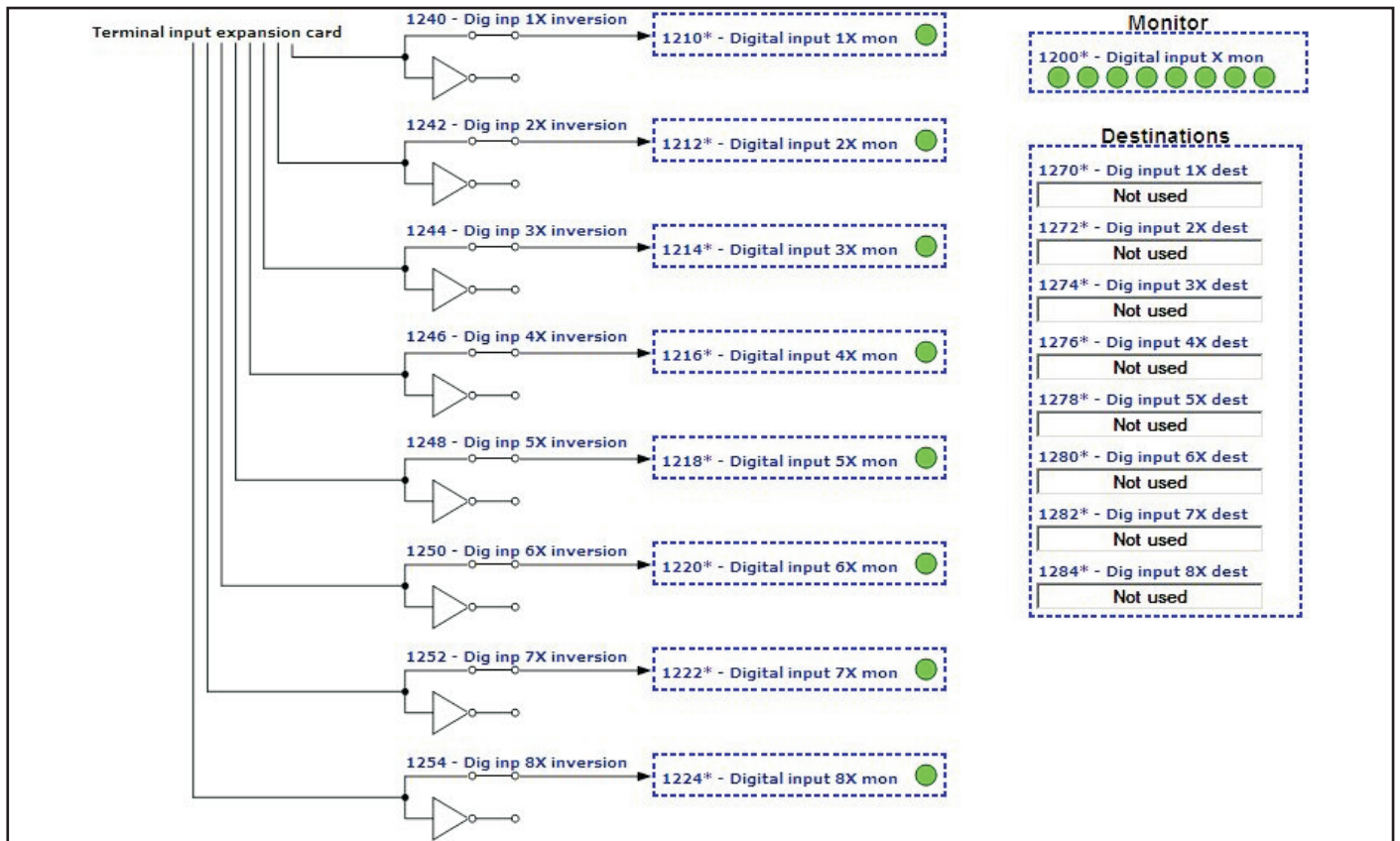
1 Reverse

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
11.22	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

## 12 – DIGITAL INPUTS



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
12.1	1240	Dig inp 1X inversion		BIT		0	0	1	RW	FVS
12.2	1242	Dig inp 2X inversion		BIT		0	0	1	RW	FVS
12.3	1244	Dig inp 3X inversion		BIT		0	0	1	RW	FVS
12.4	1246	Dig inp 4X inversion		BIT		0	0	1	RW	FVS
12.5	1248	Dig inp 5X inversion		BIT		0	0	1	RW	FVS
12.6	1250	Dig inp 6X inversion		BIT		0	0	1	RW	FVS
12.7	1252	Dig inp 7X inversion		BIT		0	0	1	RW	FVS
12.8	1254	Dig inp 8X inversion		BIT		0	0	1	RW	FVS

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

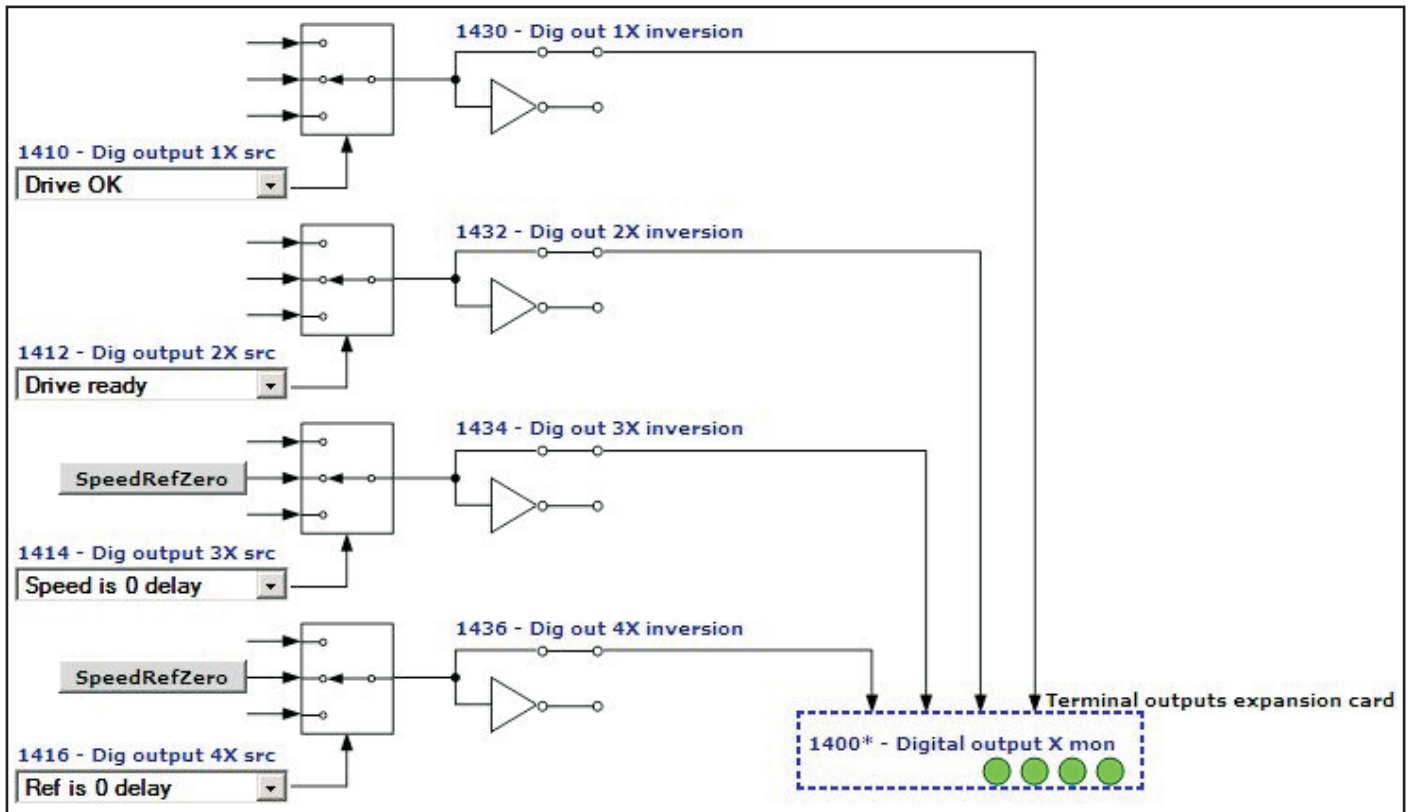
- 0 On
- 1 Off

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
12.09	1150	Dest ing digitale E		ILINK		0	0	0	ER	FVS
12.10	1270	Dig input 1X dest		ILINK		0	0	0	ER	FVS
12.11	1272	Dig input 2X dest		ILINK		0	0	0	ER	FVS
12.12	1274	Dig input 3X dest		ILINK		0	0	0	ER	FVS
12.13	1276	Dig input 4X dest		ILINK		0	0	0	ER	FVS
12.14	1278	Dig input 5X dest		ILINK		0	0	0	ER	FVS
12.15	1280	Dig input 6X dest		ILINK		0	0	0	ER	FVS
12.16	1282	Dig input 7X dest		ILINK		0	0	0	ER	FVS
12.17	1284	Dig input 8X dest		ILINK		0	0	0	ER	FVS

Selection of the destination of the associated 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	1410	Dig output 1X src		LINK	16	1062	0	16384	RW	FVS
13.2	1412	Dig output 2X src		LINK	16	1064	0	16384	RW	FVS
13.3	1414	Dig output 3X src		LINK	16	946	0	16384	RW	FVS
13.4	1416	Dig output 4X src		LINK	16	936	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.

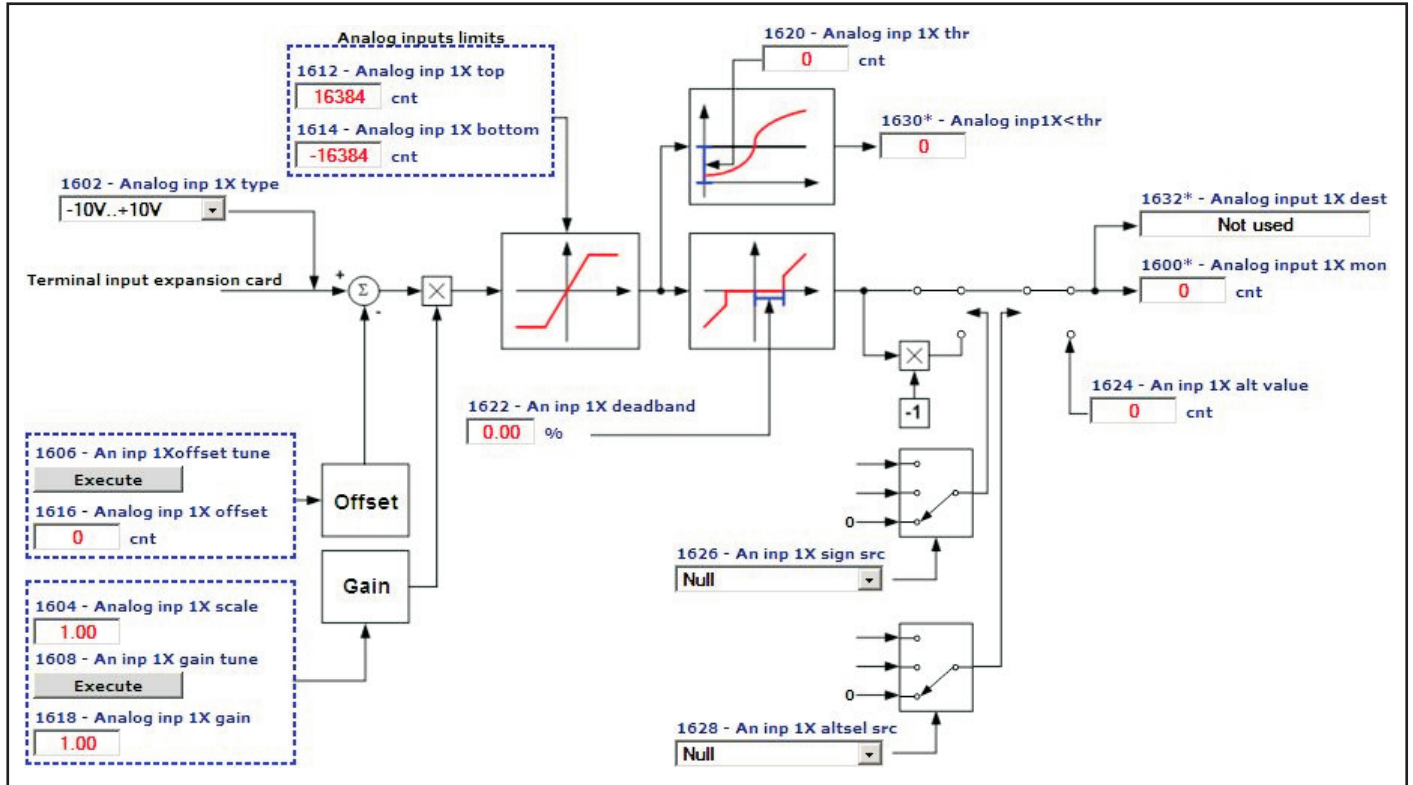
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
13.5	1430	Dig out 1X inversion		BIT		0	0	1	RW	FVS
13.6	1432	Dig out 2X inversion		BIT		0	0	1	RW	FVS
13.7	1434	Dig out 3X inversion		BIT		0	0	1	RW	FVS
13.8	1436	Dig out 4X inversion		BIT		0	0	1	RW	FVS

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	1600	Analog input 1X mon	cnt	INT16	16/32	0	0	0	R	FVS
14.16	1650	Analog input 2X mon	cnt	INT16	16/32	0	0	0	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
14.2	1602	Analog inp 1X type		ENUM		-10V..+10V	0	2	RW	FVS
14.17	1652	Analog inp 2X type		ENUM		-10V..+10V	0	2	RW	FVS

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

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

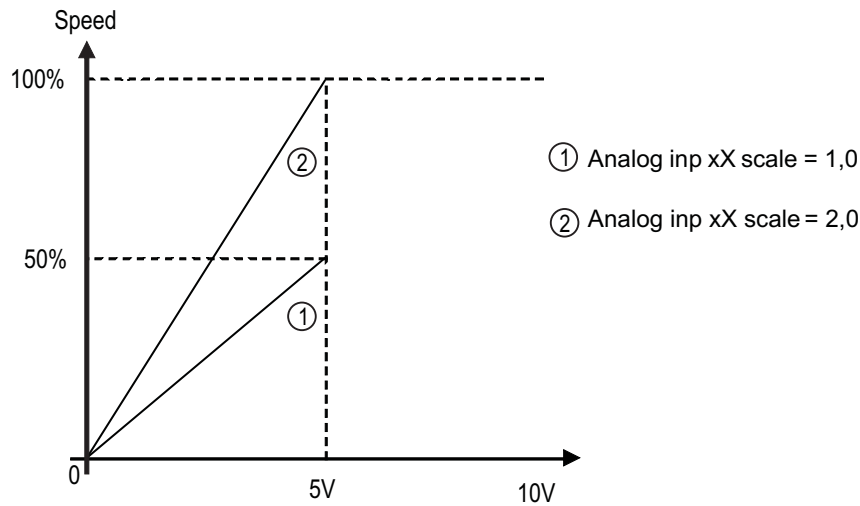
Select option **0** in order to connect a maximum voltage of  $\pm 12.5V$  (typically  $\pm 10V/5mA$ ) to the analog input concerned. If the signal is used as a reference, reverse the direction of rotation of the drive by inverting the voltage polarity.

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

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.3	1604	Analog inp 1X scale		FLOAT		1.0	-10.0	10.0	RW	FVS
14.18	1654	Analog inp 2X scale		FLOAT		1.0	-10.0	10.0	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
14.4	1606	An inp 1Xoffset tune		BIT		0	0	1	RWZ	FVS
14.19	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
14.5	1608	An inp 1X gain tune		BIT		0	0	1	RWZ	FVS
14.20	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
14.6	1612	<b>Analog inp 1X top</b>	cnt	INT16		16384	-32768	+ 32767	ERW	FVS
14.21	1662	<b>Analog inp 2X top</b>	cnt	INT16		16384	-32768	+ 32767	ERW	FVS

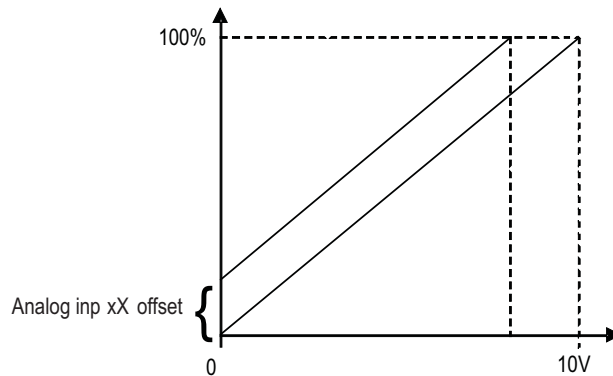
Setting of the upper speed reference limit as a function of the voltage (or current) of the relative analog reference of the expansion card.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.7	1614	<b>Analog inp 1X bottom</b>	cnt	INT16		-16384	-32768	+ 32767	ERW	FVS
14.22	1664	<b>Analog inp 2X bottom</b>	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
14.8	1616	<b>Analog inp 1X offset</b>	cnt	INT16		0	-32768	+ 32767	ERW	FVS
14.23	1666	<b>Analog inp 2X offset</b>	cnt	INT16		0	-32768	+ 32767	ERW	FVS

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



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.9	1618	<b>Analog inp 1X gain</b>		FLOAT		1.0	-10.0	10.0	ERW	FVS
14.24	1668	<b>Analog inp 2X gain</b>		FLOAT		1.0	-10.0	10.0	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.

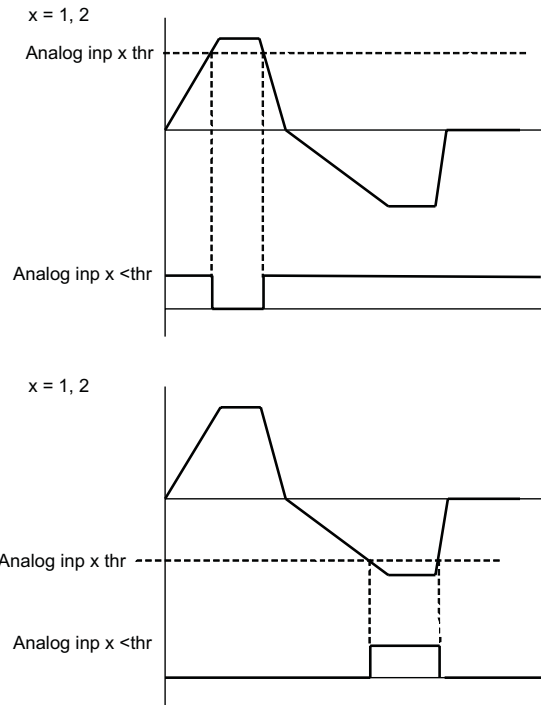
Example:

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.

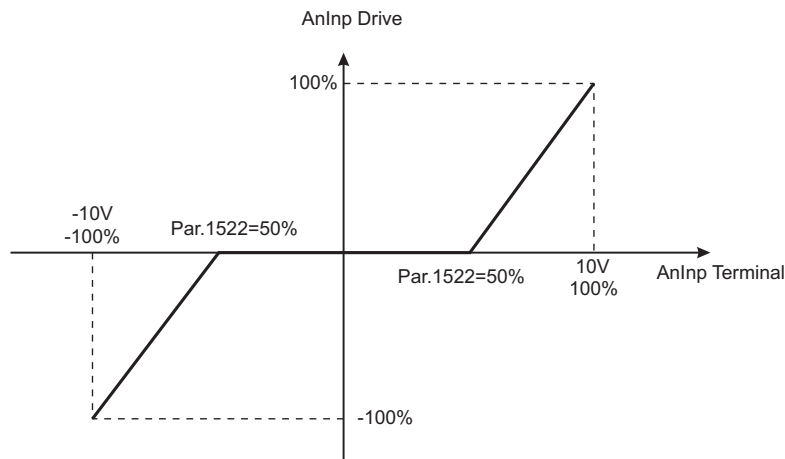
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.10	1620	<b>Analog inp 1X thr</b>	cnt	INT16		0	-16384	+16384	ERW	FVS
14.25	1670	<b>Analog inp 2X thr</b>	cnt	INT16		0	-16384	+16384	ERW	FVS

Setting of the analog input threshold for the speed not exceeded signal, which allows enabling of the digital outputs **Analog inp1X** (par. 1630) and **Analog inp2X** (par.1680).



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.11	1622	An inp 1X deadband	perc	FLOAT		0.0	0.0	100.0	ERW	FVS
14.26	1672	An inp 2X deadband	perc	FLOAT		0.0	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
14.12	1624	An inp 1X alt value	cnt	INT16	16/32BIT	0	-16384	16384	ERW	FVS
14.27	1674	An inp 2X alt value	cnt	INT16	16/32BIT	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 xX alt sel src** parameter.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
14.13	1626	An inp 1X sign src		LINK	16	6000	0	16384	ERW	FVS
14.28	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
<b>14.14</b>	<b>1628</b>	<b>An inp 1X altsel src</b>		LINK	16	6000	0	16384	ERW	FVS
<b>14.29</b>	<b>1678</b>	<b>An inp 2X altsel src</b>		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\_DIGSEL2” selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>14.15</b>	<b>1632</b>	<b>Analog inp 1X dest</b>		ILINK		0	0	0	ER	FVS
<b>14.30</b>	<b>1682</b>	<b>Analog inp 2X dest</b>		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.

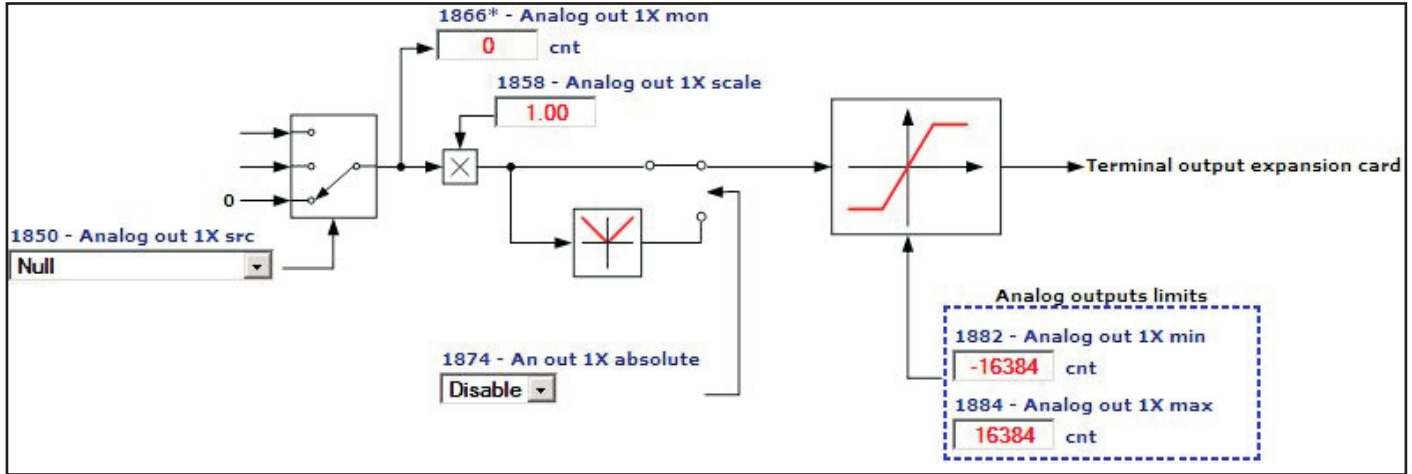
# 15 – ANALOG OUTPUTS

There can be two programmable analog outputs, depending on the configuration.

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.

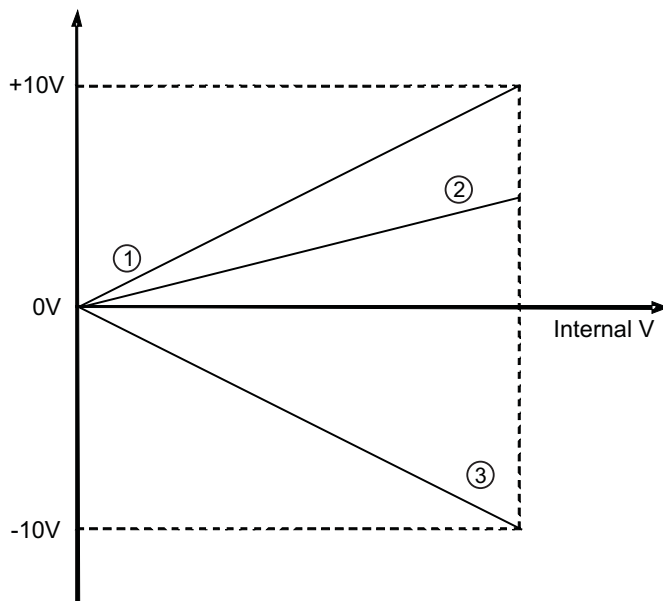
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
15.1	1850	Analog out 1X src		LINK	16/32	6000	0	16384	RW	FVS
15.2	1852	Analog out 2X src		LINK	16/32	6000	0	16384	RW	FVS

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
15.3	1858	Analog out 1X scale		FLOAT		1.0	-10.0	10.0	RW	FVS
15.4	1860	Analog out 2X scale		FLOAT		1.0	-10.0	10.0	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.



- ① Par. 1858 (1860) = 1
- ② Par. 1858 (1860) = 0,5
- ③ Par. 1858 (1860) = -1

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

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
15.5	1866	<b>Analog out 1X mon</b>	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
15.6	1868	<b>Analog out 2X mon</b>	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
15.7	1874	<b>An out 1X absolute</b>		ENUM		Disable	0	1	ERW	FVS
15.8	1876	<b>An out 2X absolute</b>		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	1882	<b>Analog out 1X min</b>	cnt	INT16		-16384	-32768	+32767	ERW	FVS
15.10	1884	<b>Analog out 1X max</b>	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
15.11	1890	<b>Analog out 2X min</b>	cnt	INT16		-16384	-32768	+32767	ERW	FVS
15.12	1892	<b>Analog out 2X max</b>	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
15.13	1898	<b>Analog out 2X type</b>		ENUM		-10V..+10V	0	2	ERW	FVS

Selection of the programmed signal on analog output 2 of the expansion card. Depending on the output signal, move the switch on the regulation card. The standard output is coded for the signal in voltage.

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

Select option **0** in order to apply a maximum voltage of  $\pm 12.5V$  (typically  $\pm 10V/5mA$ ) to analog output 2.

Select option **1** in order to apply a maximum voltage of +10V or a signal in current of 0 ... 20 mA to analog output 2. The signal must be positive.

Select option **2** to apply a signal in current of 4...20 mA to analog output 2.

## 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:

- Computation of the normalization factors necessary for regulation
- Computation of the estimated values for the motor parameters necessary for regulation

Rated voltage, Rated speed, Rated frequency, Rated current, Cos phi, Basic voltage and Basic frequency must be entered (the Cos phi default value can be used if this value is not present on the plate). 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 & Co.			
Type: ABCDE	IEC 34-1 / VDE 0530		
Motor: 3 phase	50 Hz	Nr	12345-91
Rated voltage	400 V	I nom	6.7 A
Rated power	3 kW	Power factor	0.8
Rated speed (n <sub>n</sub> )	1420 rpm		
IP54	Iso Kl F	S1	
Made in .....			

P.2012

Motor & Co.			
Type: ABCDE	IEC 34-1 / VDE 0530		
Motor: 3 phase	60 Hz	Nr	12345-91
Rated voltage	575 V	I nom	2 A
Rated power	2 Hp	Power factor	0.83
Rated speed (n <sub>n</sub> )	1750 rpm	Efficiency	86.5
IP54	Iso Kl F	S1	
Made in .....			

P.2012

### kW and HP 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 (rpm = m-1). In some motors the synchronous speed (e.g. 1500 rpm for a 4-pole motor) and slippage, i.e. the loss of revolutions between the motor idling condition and the rated load condition (e.g. 80 rpm), is indicated. Enter the following: synchronous speed - slippage.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.4	2006	Rated frequency	Hz	FLOAT		SIZE	10.0	1000.0	RWZS	FVS

Rated frequency of the motor expressed in Hz, at which the flux weakening range starts.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.5	2008	Pole pairs		UINT16		SIZE	1	20	RWZS	FVS

Motor pole pairs. The number of motor pole pairs is calculated using the motor plate data and applying the following formula:

$$P = \frac{60 [s] \times f [Hz]}{nN [rpm]}$$

Where:

p = motor pole pairs

f = motor rated frequency (P. 2006)

nN = motor rated speed (P. 2004)

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.6	2010	Rated power	kW	FLOAT		SIZE	0.1	1500.0	RWZS	FVS

Rated power of the motor at the rated voltage and frequency. This value represents the mechanical power produced on the motor shaft.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.7	2012	Rated power factor		FLOAT		SIZE	0.6	0.95	RWZS	FVS

Motor power factor, as indicated on the data plate (Cos φ). This parameter is not always present on the motor data plate: in that case use the default value present in the drive.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.8	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
16.9	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 9 and 12. 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 9 and 12). Self-tuning can now be performed. At the end of the self-tuning procedure, open the contact between terminals 9 and 12 again and reset the parameters that were modified.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.10	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
16.11	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
16.12	2028	<b>Take status</b>		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
16.13	2030	<b>Autotune status</b>		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
16.14	2050	<b>Measured Rs</b>	ohm	FLOAT		CALCF	0.0005	200.0	ERWS	FVS

Measured stator resistance value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.15	2052	<b>Measured DTL</b>	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
16.16	2054	<b>Measured DTS</b>	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
16.17	2056	<b>Measured Lsig</b>	mH	FLOAT		CALCF	0.1	200.0	ERWS	FVS

Measured leakage inductance value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.18	2058	<b>Measured ImN</b>	A	FLOAT		CALCF	0.1	1500	.0	

ERWS FVS

Measured rated magnetizing current value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.19	2060	<b>Measured ImX</b>	A	FLOAT		CALCF	0.0	0.0	ERWS	FVS

Measured magnetizing current saturation value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.20	2062	<b>Measured FlxN</b>	Wb	FLOAT		CALCF	0.05	10.0	ERWS	FVS

Measured rated flux value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.21	2064	<b>Measured FlxX</b>	Wb	FLOAT		CALCF	0.0	0.0	ERWS	FVS
Measured flux saturation value.										

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.22	2066	<b>Measured P1</b>		FLOAT		0.5	0.0	1.0	ERWS	FVS
Measured value of the first parameter to define the motor magnetization curve.										

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.23	2068	<b>Measured P2</b>		FLOAT		9.0	3.0	18.0	ERWS	FVS
Measured value of the second parameter to define the motor magnetization curve.										

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.24	2070	<b>Measured P3</b>		FLOAT		0.87	0.0	1.0	ERWS	FVS
Measured value of the third parameter to define the motor magnetization curve.										

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.25	2072	<b>Measured Rr</b>	ohm	FLOAT		CALCF	0.0005	200.0	ERWS	FVS
Measured rotor resistance value.										

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
16.26	2078	<b>Take tune parameters</b>		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 CONFIG

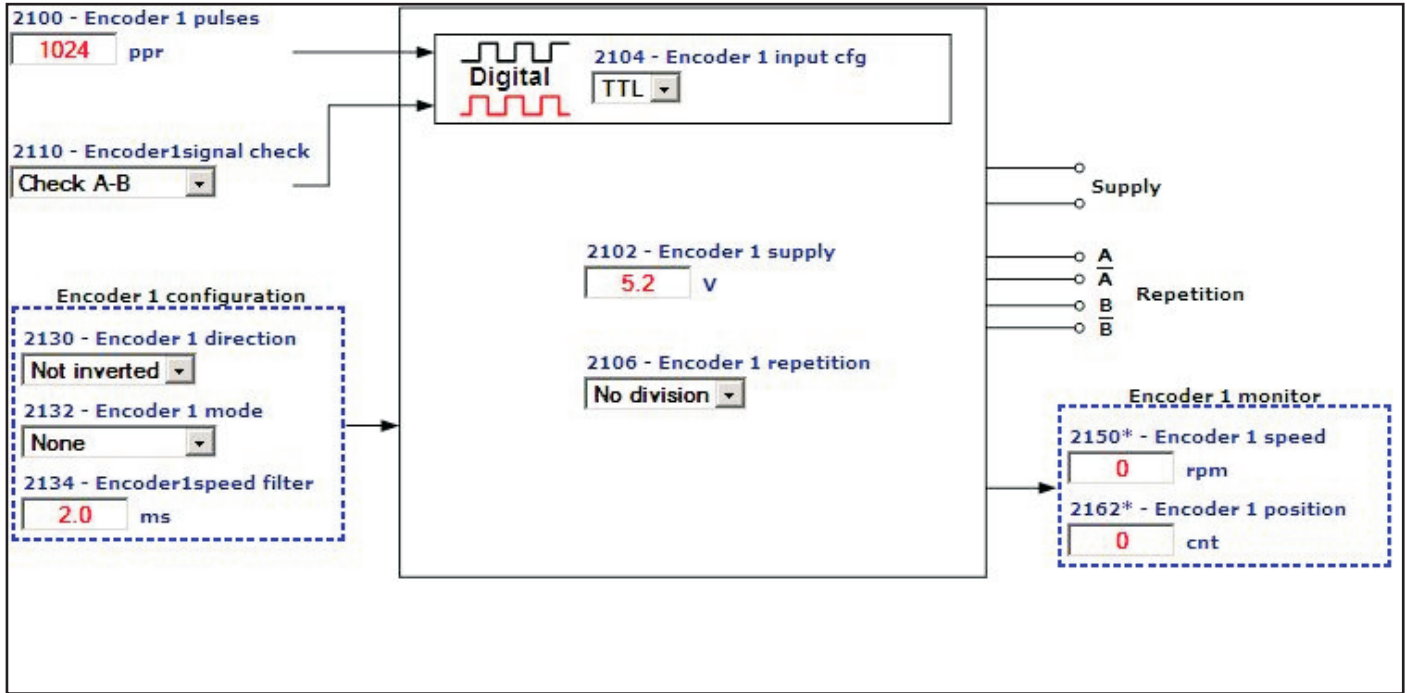
The closed-loop control mode requires a speed reading by a digital encoder on the motor shaft.

The EXP-DE-I1-ADL card (standard on ADV120-... models) is necessary in order to acquire the encoder signals.

The natural variation in speed generated by machine load induction, known as slippage, can be compensated by the speed feedback supplied by the encoder in SSC mode.

In the field oriented vector mode, closed-loop encoder feedback is essential for correct drive operation.

**Note !** This menu is only displayed if a feedback card is installed



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.1	2100	Encoder 1 pulses	ppr	UINT16		1024	128	16384	RWZ	FVS

Setting of the number of feedback encoder impulses.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.2	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 type		Def	Min	Max
Enc1	EXP-DE-I1-ADL	5.2V	5.2V	20.0V

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.3	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
17.4	2106	<b>Encoder 1 repetition</b>		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
17.5	2108	<b>Encoder 1 signal Vpp</b>	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
17.6	2110	<b>Encoder1 signal check</b>		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-SE

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 hold-off**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.7	2112	<b>Encoder 1 SSI bits</b>		ENUM		25	13	25	ERWZ	FVS

Setting of the length of the SSI package, defined as the number of clock cycles, as the absolute SSI encoders on the market have package lengths varying from 13 to 25 bits.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.8	2130	<b>Encoder 1 direction</b>		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.

In accordance with international standards, a positive reference corresponds to clockwise motor rotation, seen from the command side (shaft). For correct operation, the control algorithms ensure that a positive speed reference corresponds to a positive speed measurement.

If the motor pulley is mounted on the side opposite the command side, it will turn in an anticlockwise direction when the speed is positive: to make the pulley turn in a clockwise direction, the motor phase sequence is modified, which inverts the speed measurement sign. To restore the correct speed measurement sign, invert the incremental encoder A+ and A- signal.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.9	2132	<b>Encoder 1 mode</b>		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 Reserved
- 4 Reserved
- 5 Reserved
- 6 Reserved
- 7 Reserved
- 8 Reserved

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 type	Def	Min	Max
Enc 1	Digital F	Digital FP	Digital F

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
17.10	2134	<b>Encoder1speed filter</b>	ms	FLOAT		2.0	0.1	20.0	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
17.11	2150	<b>Encoder 1 speed</b>	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
17.12	2162	<b>Encoder 1 position</b>	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
17.13	2172	<b>SpdFbkLoss code</b>		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

Bit	Value	Name
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 ADV100 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)

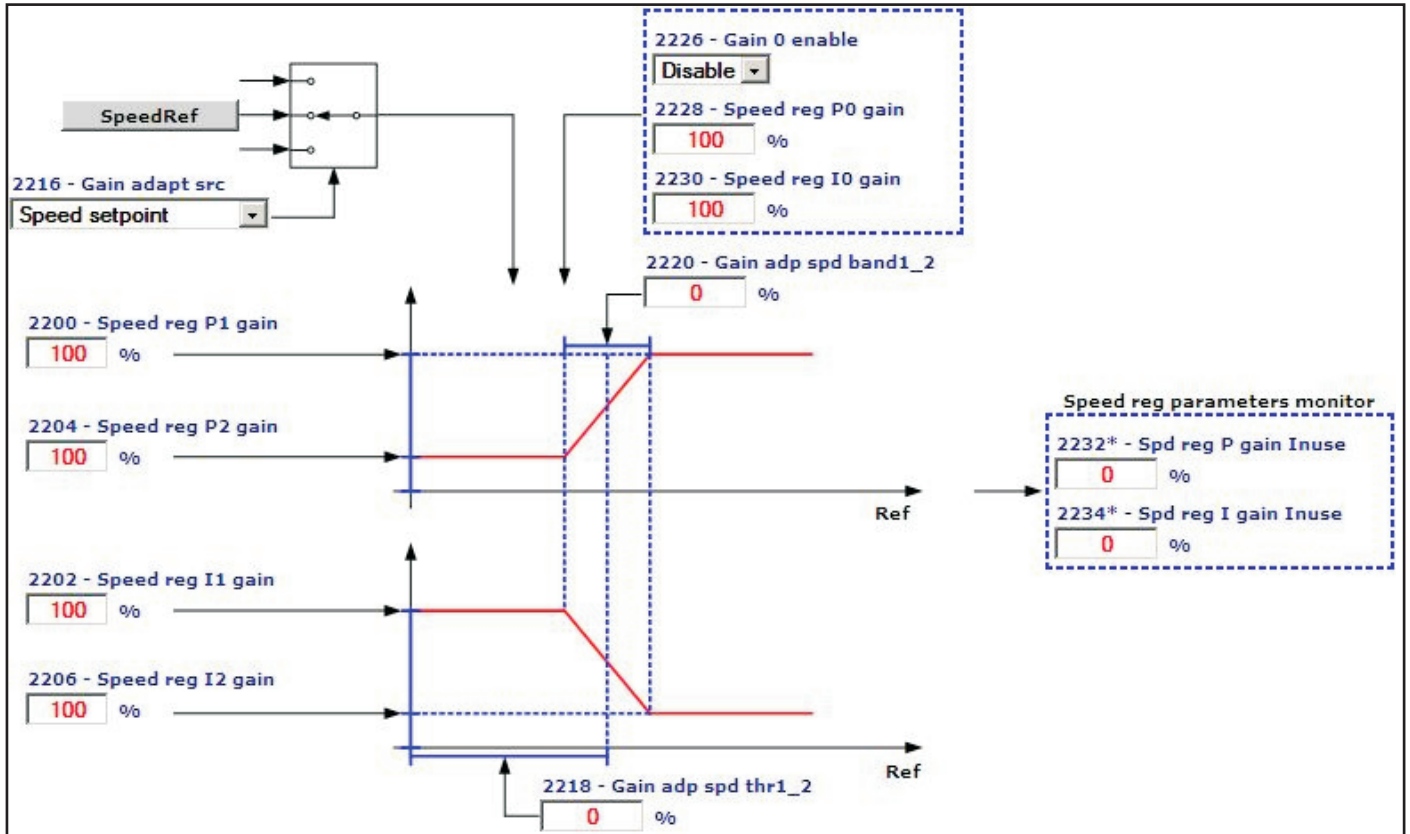
A0 is not present in the value column of the “ **Speed fbk loss** [22] with absolute EnDat encoder” table.

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.

## 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, which 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

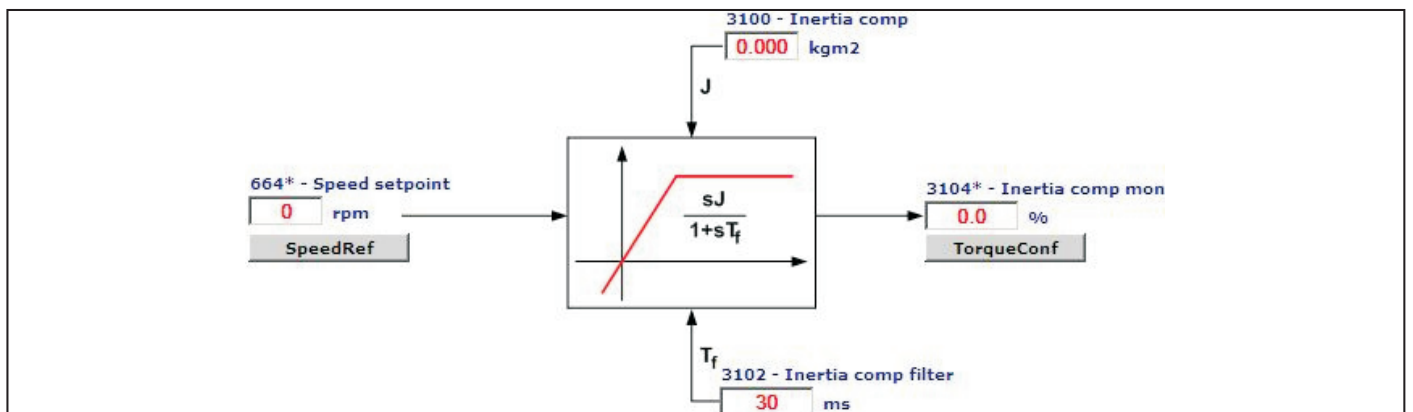
The current integral coefficient of the speed regulator is displayed as a percentage.

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.



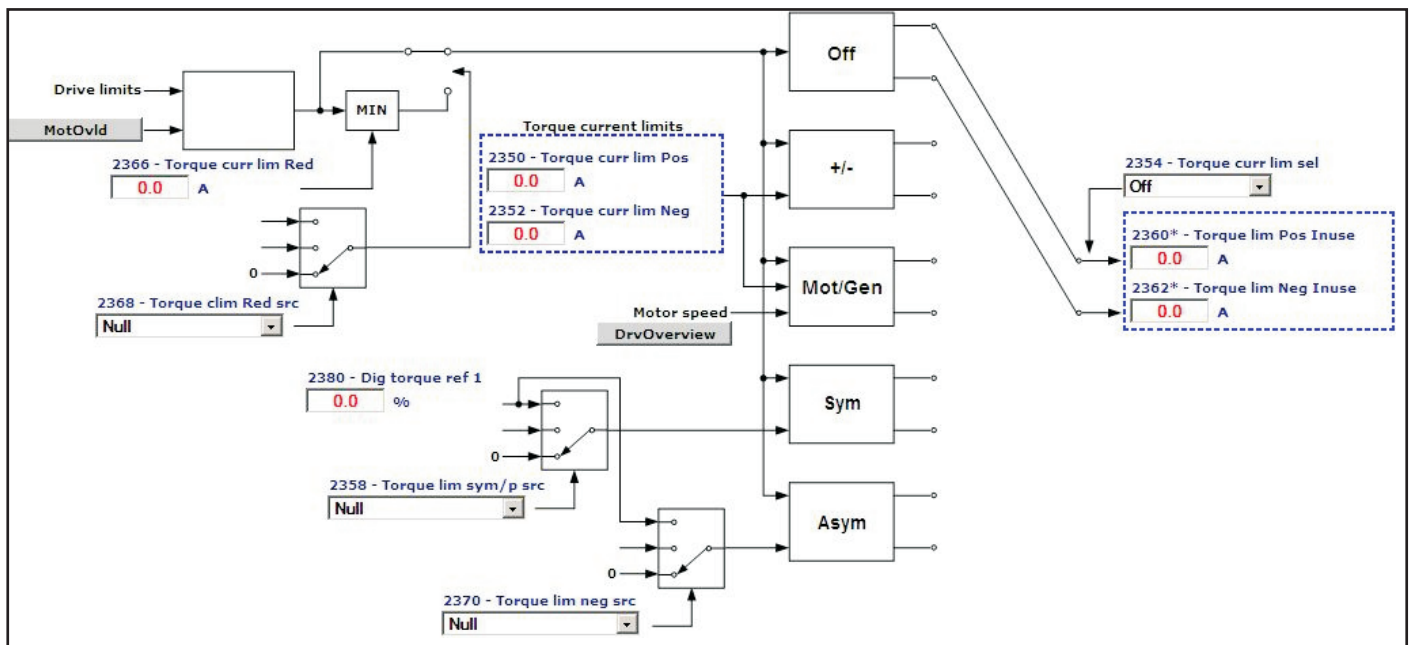
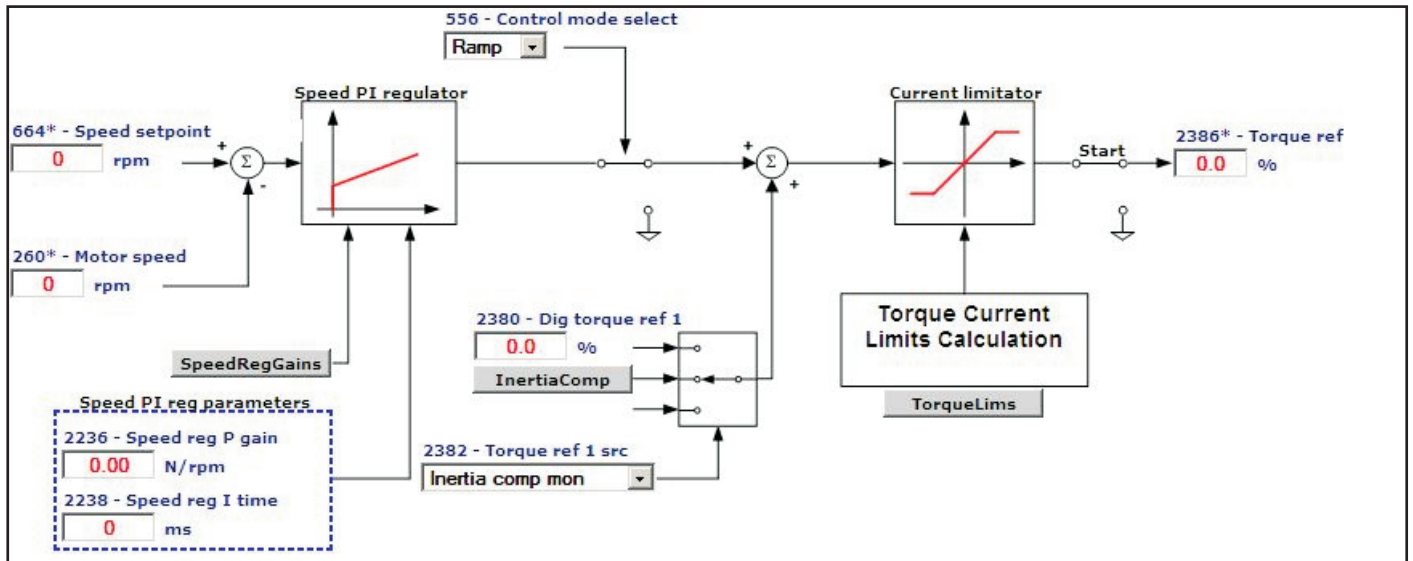
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>18.15</b>	<b>2240</b>	<b>Inertia</b>	kgm <sup>2</sup>	FLOAT		SIZE	0.001	100.0	RWZS	F_S

Setting of the inertia compensation coefficient. An increase in the dynamic response of the speed regulator to a variation in the reference, can be modified by changing the current value during the acceleration/deceleration phase, to counter the applied machine inertia.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>18.16</b>	<b>2242</b>	<b>Bandwidth</b>	rad/s	FLOAT		SIZE	1.0	500.0	RWZS	F_S

Setting of the bandwidth. Increasing the setting of this parameter increases the dynamic response and makes the system more rigid.

# 19 – REGULATOR PARAM



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.1	2250	<b>Current reg P gain</b>	V/A	FLOAT		CALCF	0.0	0.0	ERWS	F_S
Setting of the proportional coefficient of the current regulator.										
19.2	2252	<b>Current reg I time</b>	ms	FLOAT		CALCF	0.01	10000.0	ERWS	F_S
Setting of the integral coefficient of the current regulator.										
19.3	2260	<b>Flux reg P gain</b>	A/Wb	FLOAT		CALCF	0.0	0.0	ERWS	F__
Setting of the proportional coefficient of the flux regulator.										
19.4	2262	<b>Flux reg I time</b>	ms	FLOAT		CALCF	0.01	10000.0	ERWS	F__
Setting of the integral coefficient of the flux regulator.										

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.5	2264	Flux reg P gain OL	A/Wb	FLOAT		CALCF	0.0	0.0	ERWS	_S

Setting of the flux regulator proportional gain when the drive is used in open loop sensorless vector control mode. This parameter is set automatically by the self-tuning procedure.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.6	2266	Flux reg I time OL	ms	FLOAT		CALCF	0.01	10000.0	ERWS	_S

Setting of the flux regulator integral time when the drive is used in open loop sensorless vector control mode. This parameter is set automatically by the self-tuning procedure.

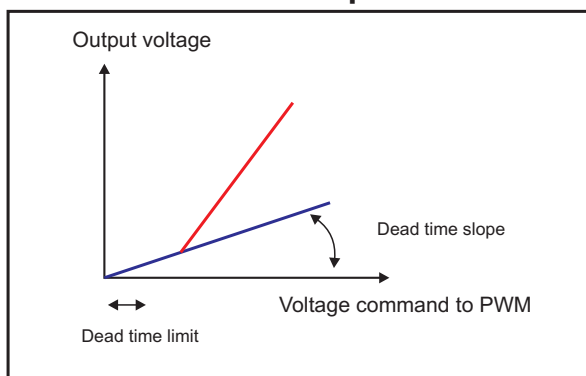
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.7	2270	Voltage reg P gain	Wb/V	FLOAT		CALCF	0.0	0.0	ERWS	F_S

Setting of the proportional coefficient of the voltage regulator.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.8	2272	Voltage reg I time	s	FLOAT		CALCF	0.1	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
19.9	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
19.10	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
19.11	2290	Voltage base	V	FLOAT		CALCF	50.0	690.0	ERWS	F_S

Setting of the voltage value that determines the threshold at which flux weakening starts (maximum drive output voltage). If this parameter is set to a value equal to the nominal speed of the motor, operation is at nominal flux in the constant torque region and weakened flux at higher frequencies. The default value is set to the voltage supply value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.12	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
19.13	2300	<b>Minimum speed OL</b>	rpm	INT16		30	0	CALCI	ERW	__S

Setting of the minimum speed threshold in the sensorless vector control mode. Below this limit the sensorless regulator is disabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.14	2302	<b>Min speed delay OL</b>	ms	UINT16		200	0	5000	ERW	__S

Setting of the delay for disabling the sensorless regulator.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.15	2304	<b>Speed filter OL</b>	ms	FLOAT		5.0	0.1	20.0	ERWZ	__S

Setting of the time constant for the estimated speed in sensorless vector mode. By increasing this parameter it is possible to reduce the level of disturbance of the estimated speed, but the speed control dynamics are also lowered.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.16	2306	<b>Flux observe gain OL</b>		FLOAT		250.0	10.0	5000.0	ERW	__S

Flux observer gain in open-loop flux vector control mode.

In case of instability, try changing the value and setting half or twice the default value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.17	2310	<b>Flux weakening OL</b>		ENUM		Enable	0	1	ERWZ	__S

Enables or disables flux reduction in the open-loop flux vector control mode.

If set to Disable, the flux is not reduced when the speed of the motor exceeds the nominal speed. This results in loss of control and instability.

To prevent this problem, set the parameter to Enable.

In the open-loop mode a flux value of less than the nominal speed of the motor is advantageous in terms of stability.

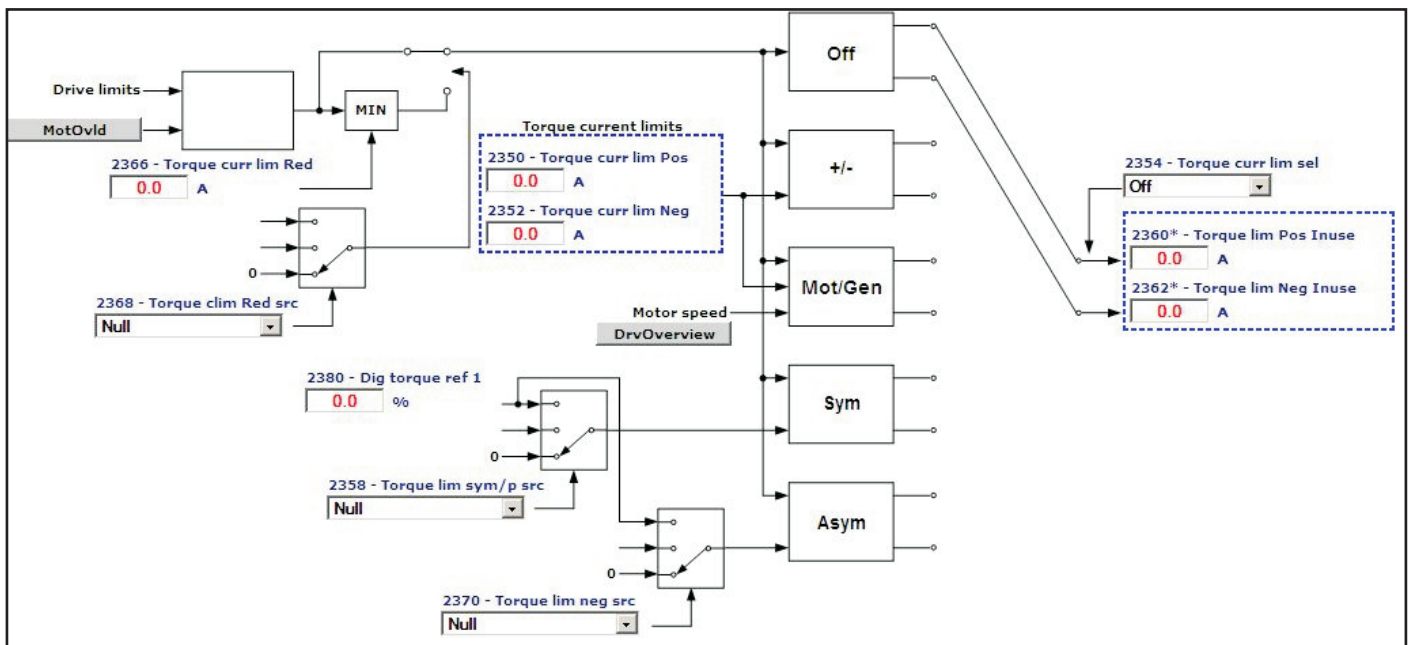
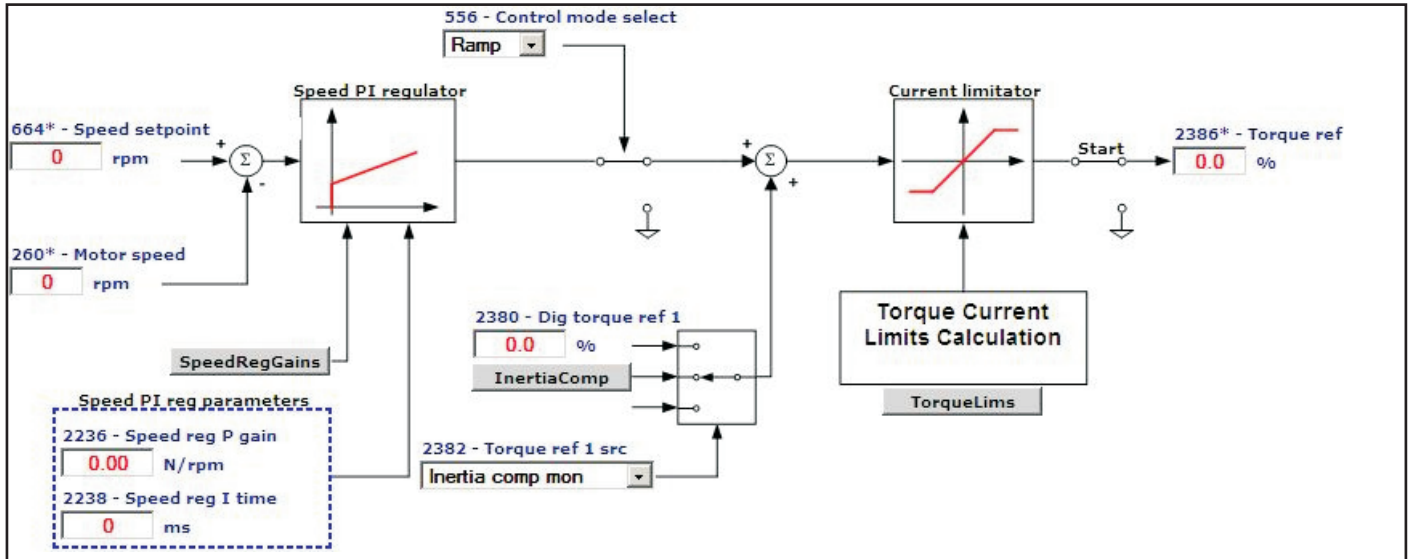
0 Disable

1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
19.18	2320	<b>Magnetization time</b>	ms	UINT16		256	128	4096	ERWZ	__S

This parameter is used to slow down the magnetisation transient and prevent the motor shaft from rotating due to the alignment of the stator and rotor.

## 20 – TORQUE CONFIG



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.1	2350	<b>Torque curr lim Pos</b>	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	<b>Torque curr lim Neg</b>	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	<b>Torque curr lim sel</b>		ENUM		Off	0	4	ERWZ	FVS

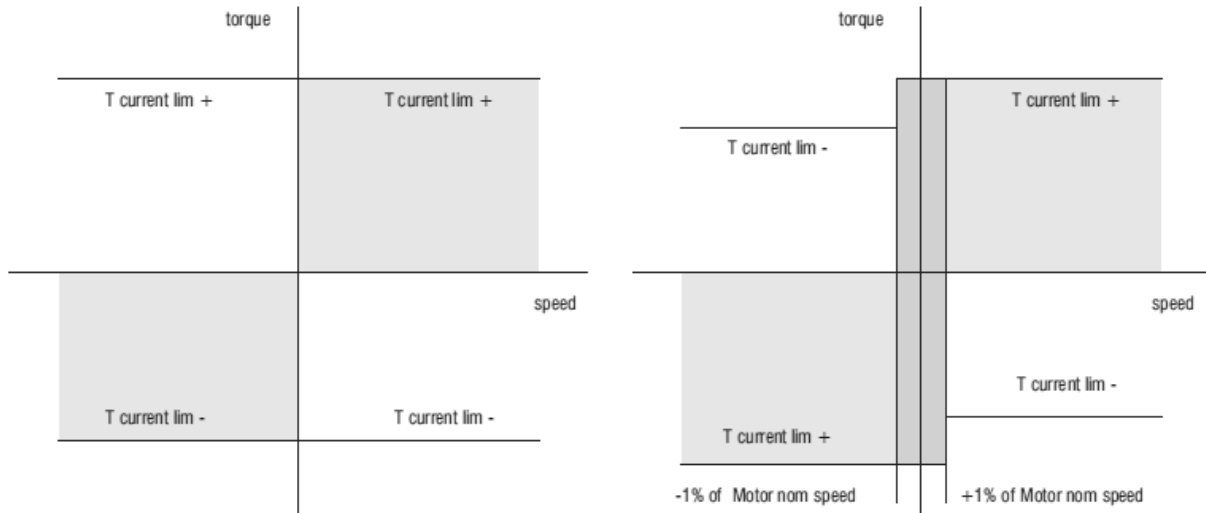
Setting of the type of behaviour of the drive in the current limit condition.

- 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 sym/p 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 sym/p 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	<b>Torque lim sym/p src</b>		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\_LIM**” selection list.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.5	2370	<b>Torque lim neg src</b>		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	2360	<b>Torque lim Pos Inuse</b>	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS

The positive torque limit value currently being used is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.7	2362	<b>Torque lim Neg Inuse</b>	A	FLOAT	16/32	0.0	0.0	0.0	ER	FVS

The negative torque limit value currently being used is displayed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.8	2380	<b>Dig torque ref 1</b>	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
20.9	2382	<b>Torque ref 1 src</b>		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 values that can be sociabili alla funzione sono nella lista di selezione “**L\_VREF**”.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.10	2384	<b>Torque ref filter</b>	ms	FLOAT		1.0	0.1	10.0	ERW	F_S

Setting of a filter on the torque reference.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.11	2386	<b>Torque ref</b>	perc	FLOAT	16/32	0.0	0.0	0.0	ER	F_S

The value of the torque reference is displayed.

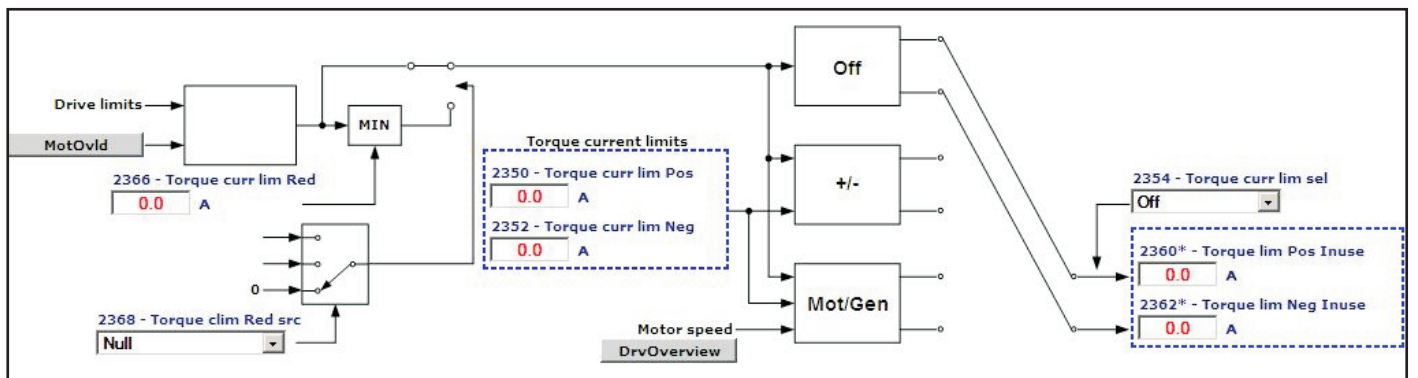
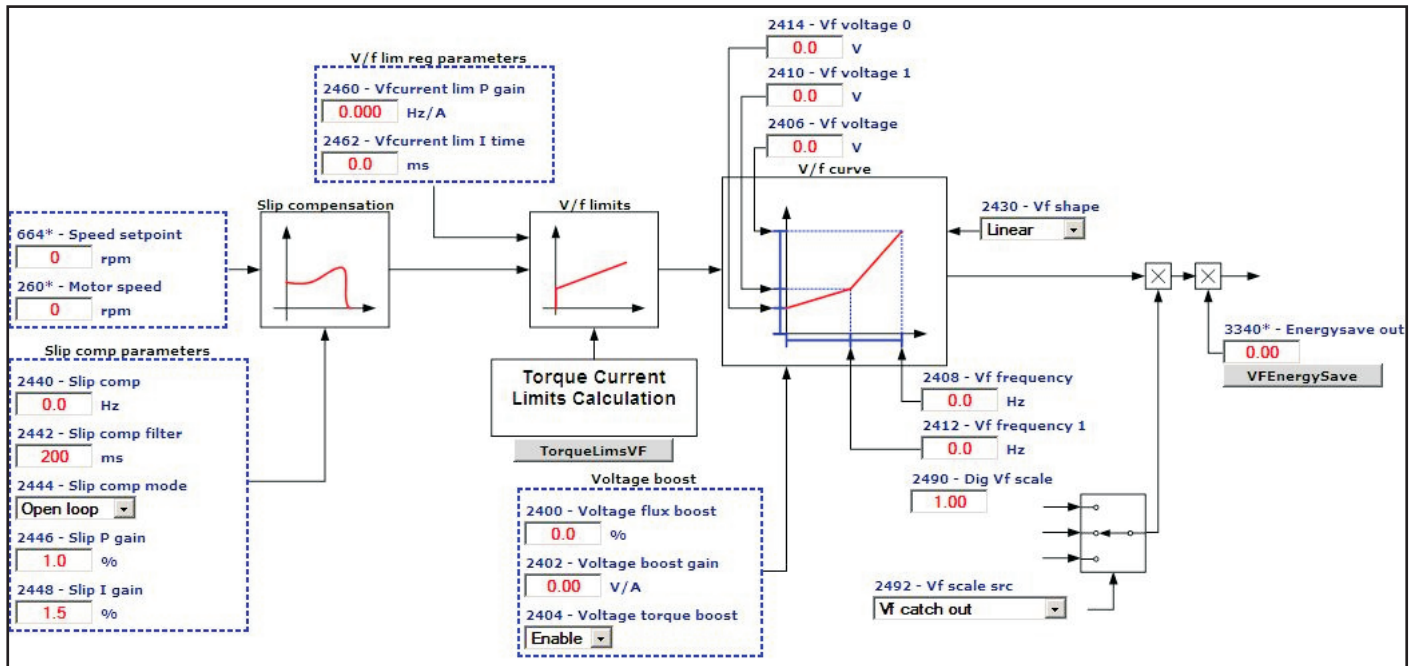
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
20.12	2366	<b>Torque curr lim Red</b>	A	FLOAT	16/32BIT	CALCF	0.0	CALCF	ERWS	F_S

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
20.13	2368	<b>Torque clim Red src</b>		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.

# 21 – FV PARAMETERS



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.1	2400	<b>Voltage flux boost</b>	perc	FLOAT		2.0	0.0	15.0	RWS	V

Setting of the boost voltage. The resistive impedance of the stator windings causes a voltage drop within the motor, which results in a reduction in torque in the lower speed range. This effect can be compensated by boosting the output voltage. If self-tuning is performed, the boost value is calculated automatically.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.2	2402	<b>Voltage boost gain</b>	V/A	FLOAT		CALCF	0.0	0.0	ERWS	V

Manual setting of the voltage boost gain to apply to the motor terminals for the set V/f characteristic curve.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.3	2404	<b>Voltage torque boost</b>		ENUM		Enable	0	1	ERWZ	V

Enables vector torque compensation. For pure V/f control, disable this parameter.

- 0 Disable
- 1 Enable

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.4	2406	<b>Vf voltage</b>	V	FLOAT		CALCF	10.0	690.0	ERWZS	V

Setting of the maximum voltage value to be applied at the motor terminals (usually set according to the motor data plate).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.5	2408	Vf frequency	Hz	FLOAT		CALCF	10.0	2000.0	ERWZS	V

Setting of the motor rated frequency (indicated on the motor data plate)

This is the frequency at which the drive output voltage reaches the maximum output voltage (**Vf voltage**) on the motor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.6	2410	Vf voltage 1	V	FLOAT		CALCF	CALCF	CALCF	ERWZS	V

Setting of an intermediate voltage value for the custom V/f characteristic curve.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.7	2412	Vf frequency 1	Hz	FLOAT		CALCF	0.0	CALCF	ERWZS	V

Setting of an intermediate frequency value for the custom V/f characteristic curve.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.8	2414	Vf voltage 0	V	FLOAT		0.0	0.0	CALCF	ERWZS	V

Compensation of IR voltage drop at 0 Hz. This parameter must be increased in case of pure V/f control. The increase depends on the size of the motor. Values that are too high could cause an overcurrent and motor saturation.

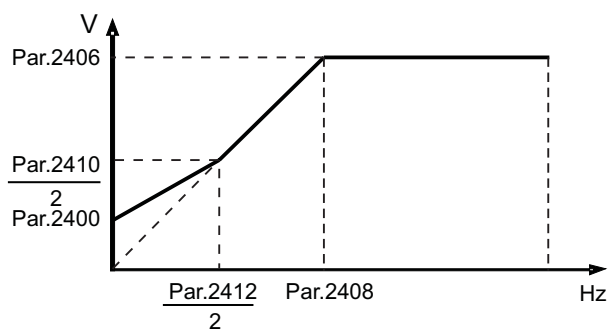
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.9	2430	Vf shape		ENUM		Linear	0	2	ERWS	V

Selection of the type of V/f characteristic curve

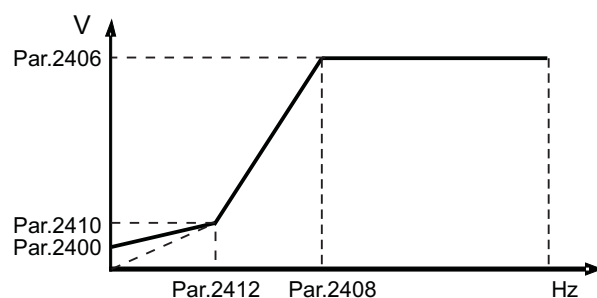
- 0 Linear
- 1 Custom
- 2 Quadratic

Set **0 (Linear)** to obtain a linear V/f characteristic curve, on which the intermediate points are reset to a value that is equal to half those of parameters **2406** and **2408**.

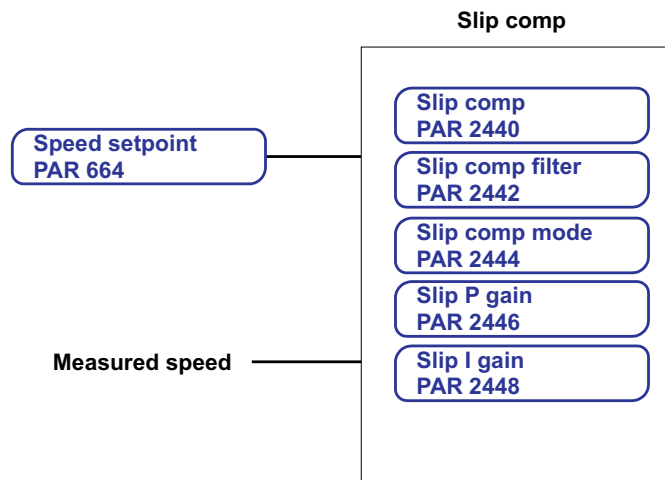
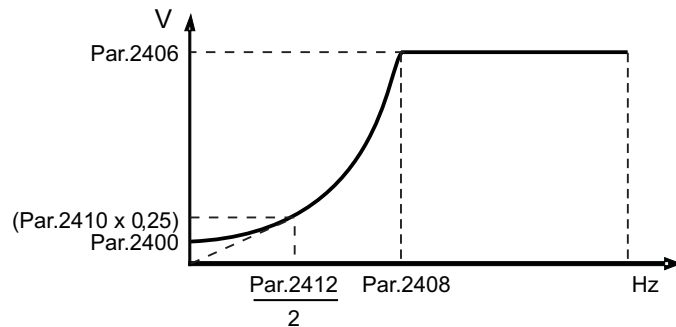
The Boost joins the curve automatically.



Set **1 (Custom)** to obtain a customized V/f characteristic curve, in which the intermediate voltage and frequency values are defined by parameters **2410** and **2412**, as is the point at which the Boost joins the characteristic curve.



Set **2 (Quadratic)** to obtain a quadratic V/f characteristic curve, useful for controlling pumps and fans, where torque is proportional to the square of the speed. When this type of curve is selected, the median voltage point is fixed at 0.25% of the maximum output voltage (par.**2406**), and the median frequency point at 50% of the basic frequency (par.**2408**).



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.10	2440	<b>Slip comp</b>	Hz	FLOAT		CALCF	0.0	10.0	RWS	V

Setting of the slip compensation. When the asynchronous motor is loaded, the mechanical speed of the motor shaft varies according to the electric slippage, which affects torque generation. The slip compensation function can be used to maintain a constant motor shaft speed. Compensation is performed by varying the drive output frequency as a function of its output current and the motor parameters. Thus, to obtain the best effect, the motor plate data must be set appropriately, and the correct stator resistance value (Par.**2050**) must be set or measured using the self-tuning function, The slip compensation value is calculated automatically during the self-tuning procedure or set manually in this parameter.

During slip compensation tuning the drive must not be in the current limit condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.11	2442	<b>Slip comp filter</b>	ms	UINT16		200	50	5000	ERW	V

Setting of the slip compensation filter. The value set in this parameter determines the slip compensation function reaction time. The lower this parameter is set, the greater the slip compensation reaction. If this parameter is too low, it could cause undesirable oscillations in speed after sudden variations to the applied load.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.12	2444	<b>Slip comp mode</b>		ENUM		Open loop	0	1	ERW	V

Setting of the slip compensation mode.

- 0 Open loop
- 1 Closed loop

When set to **0 (Open loop)** the slip compensation value is that set manually in parameter 5210 or calculated by the self-tuning procedure.

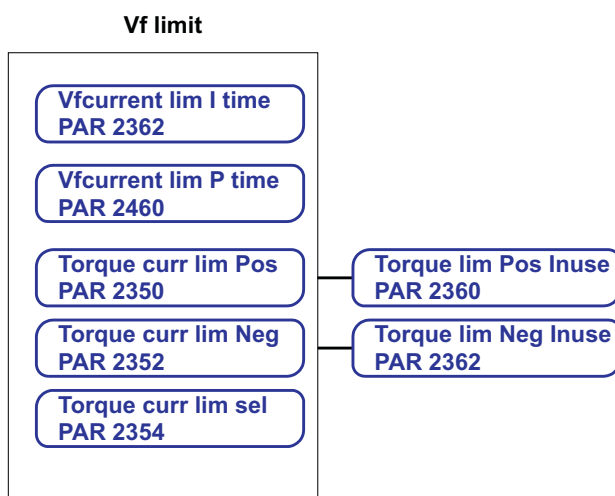
If set to **1 (Closed loop)** the slip compensation value is measured by the reading of the signals by a digital encoder keyed to the motor shaft. The EXP-DE-I1R1F1-ADV expansion card must be installed in the drive in order to acquire encoder signals.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.13	2446	<b>Slip P gain</b>	perc	FLOAT		1.0	0.0	100.0	ERWS	V

Setting of the slip compensation proportional gain.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.14	2448	<b>Slip I gain</b>	perc	FLOAT		1.5	0.0	100.0	ERWS	V

Setting of the slip compensation integral gain.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.15	2460	<b>Vfcurrent lim P gain</b>	Hz/A	FLOAT		CALCF	0.0	1000.0	ERWS	V

Setting of the proportional gain limit in V/f mode. This is calculated automatically if the self-tuning procedure is performed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.16	2462	<b>Vfcurrent lim I time</b>	ms	FLOAT		CALCF	1.0	50.0	ERWS	V

Setting of the proportional gain limit in V/f mode. This is calculated automatically if the self-tuning procedure is performed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.17	2470	<b>Damping gain</b>	perc	UINT16		0	0	100	ERW	V

Setting of the damping gain. The parameter is used to eliminate any oscillations or faults in the drive output current, deriving from configurations capable of generating oscillations in the drive/cable/motor system. If oscillations occur, gradually increase the value of this parameter, until they disappear.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.18	2472	<b>Damping threshold 1</b>	Hz	INT16		20	5	100	ERW	V

Setting of the first damping gain regulation threshold. These settings are usually effective for intermediate frequencies and make it possible to limit motor oscillations.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.19	2474	<b>Damping threshold 2</b>	Hz	INT16		30	5	100	ERW	V

Setting of the second damping gain regulation threshold. These settings are usually effective for intermediate frequencies and make it possible to limit motor oscillations.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.20	2480	<b>Vf min frequency</b>	Hz	FLOAT		1.0	0.2	5.0	ERW	V

Setting of the minimum frequency in the V/f control mode. This represents the minimum output frequency, below which frequency regulations are ineffective. It is not possible to go below this value, regardless of the reference that has been set.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.21	2482	<b>Vf min freq delay</b>	ms	UINT16		800	0	5000	ERW	V

Setting of the delay for the minimum frequency signal in the V/f control mode.

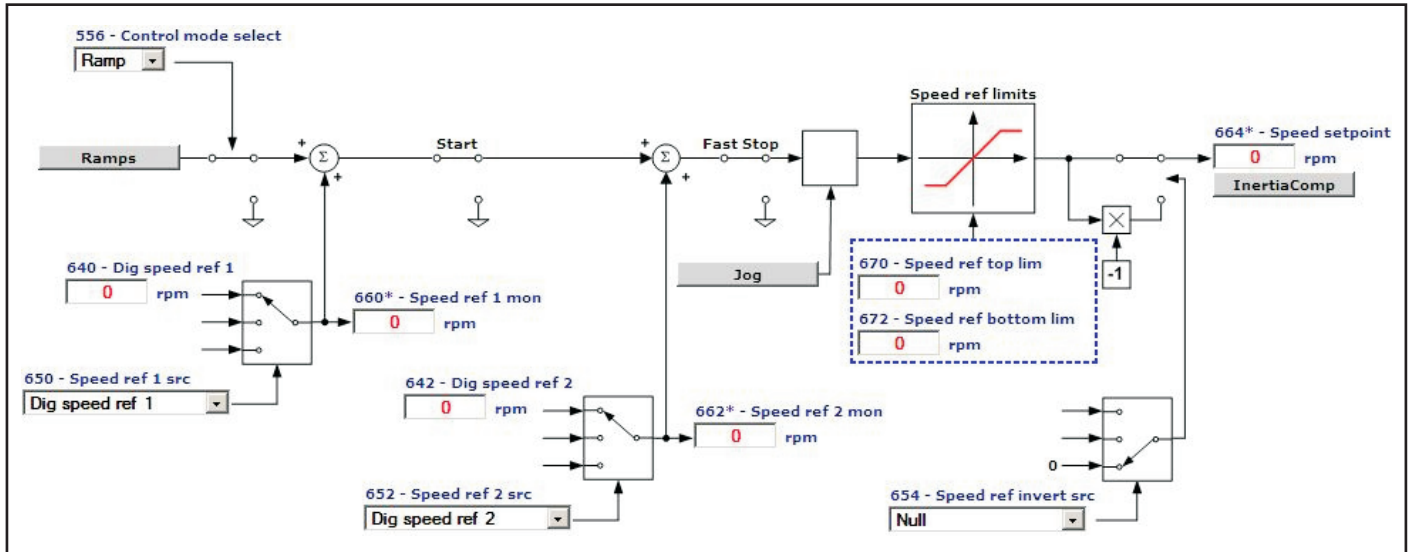
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.22	2490	<b>Dig Vf scale</b>		FLOAT	16/32	1.0	0.0	1.0	ERWZ	V

Setting of a digital multiplier factor for the drive output voltage in the V/f mode.

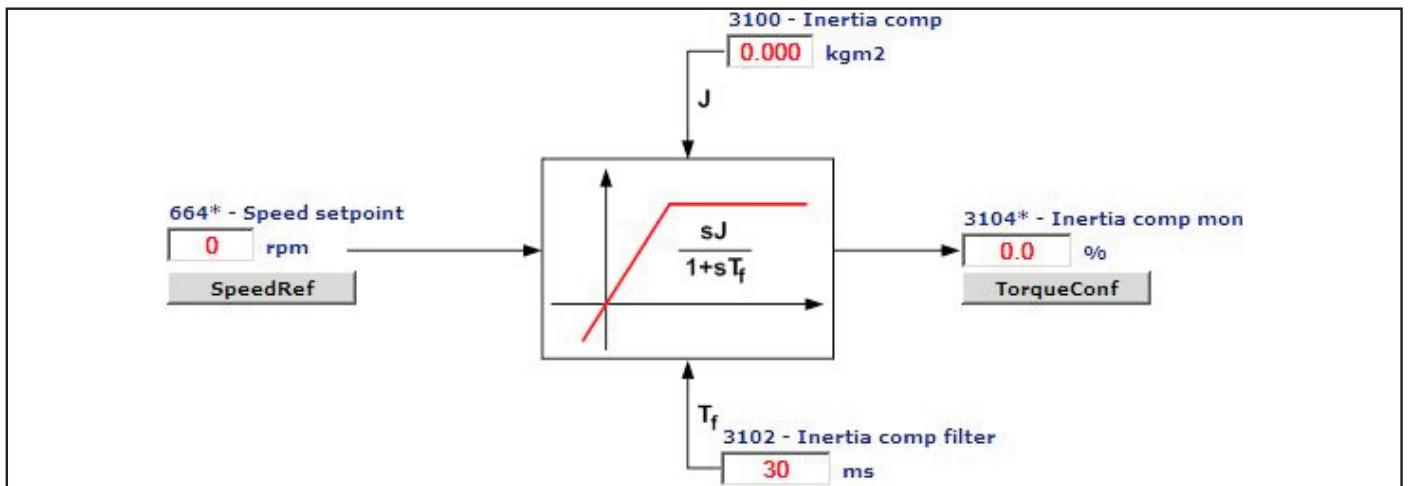
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
21.23	2492	<b>Vf scale src</b>		LINK	16/32	3374	0	16384	ERW	V

Selection of the origin (source) of the signal to be used to set a multiplier factor for the drive output voltage. The as-sociable functions are listed in the “**L\_REF**” selection list.

## 22 – FUNCTIONS



### 22.1 – 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 are calculated by the speed loop self-tuning procedure but can also be set manually by the user.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.1.1	3100	<b>Inertia comp</b>	kgm <sup>2</sup>	FLOAT		0.0	0.0	100.0	ERWS	F_S

Total value of the inertia on the motor shaft in Kgm<sup>2</sup> identified during the self-tuning procedure. If known, this value can also be set manually by the user.

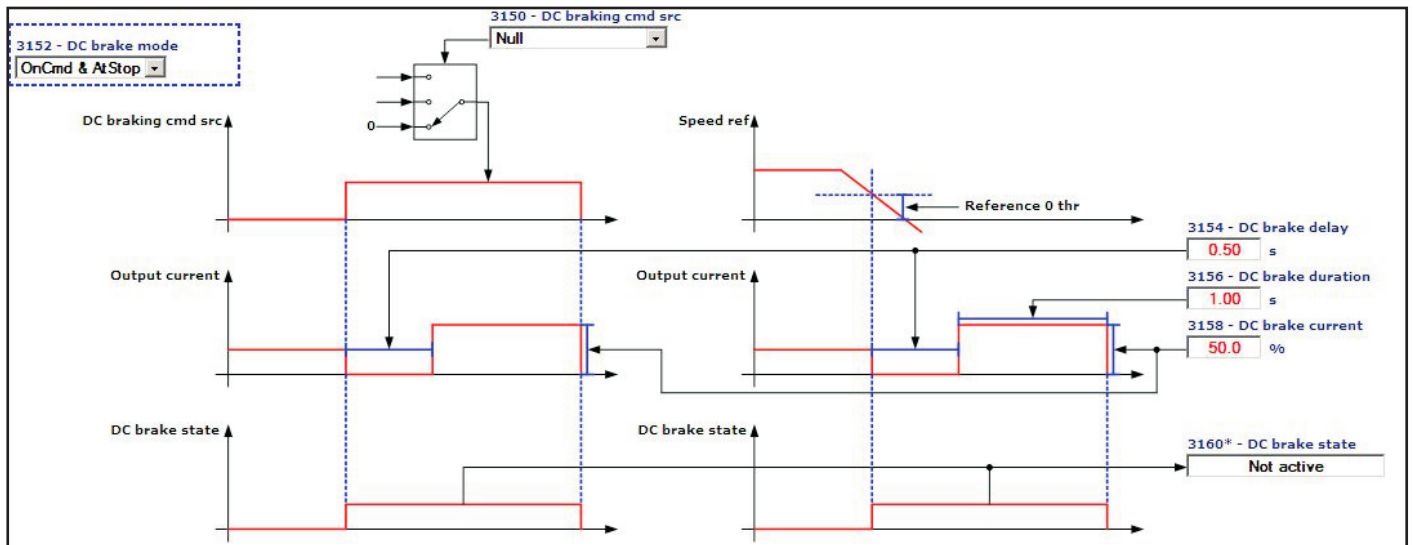
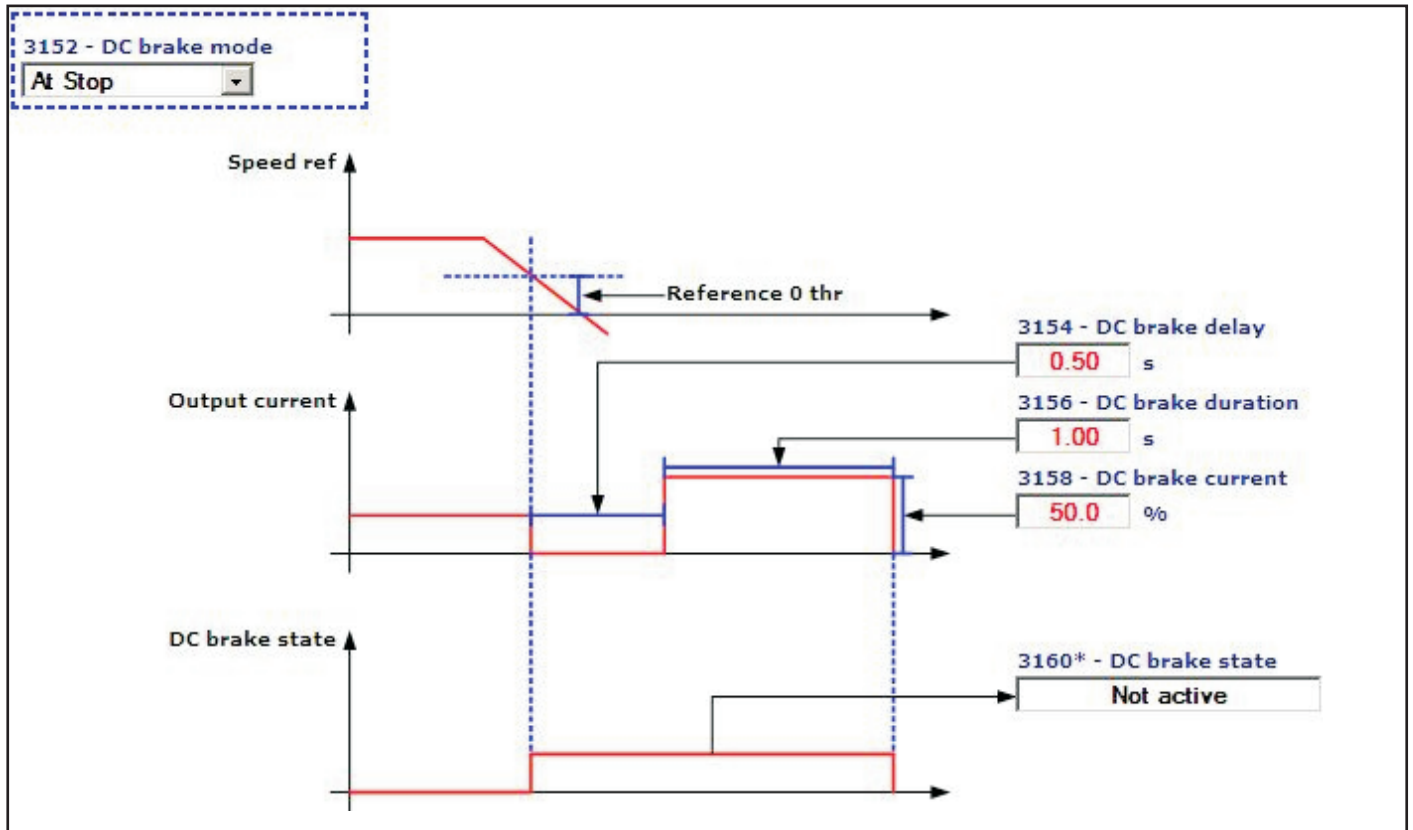
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.1.2	3102	<b>Inertia comp filter</b>	ms	UINT16		30	1	100	ERW	F_S

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
22.1.3	3104	<b>Inertia comp mon</b>	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.

## 22.2 – FUNCTIONS/DC BRAKING



The drive is capable of managing a direct current injection phase. During this phase a braking torque is generated that can be used to stop the motor or block the rotor.

The following characteristics can be configured:

- signal used to activate the direct current injection phase
- direct current injection phase activation mode
- delay between activation of request for DC braking and start of direct current injection
- duration of direct current injection phase
- intensity of injected direct current

This function is useful for:

- slowing the motor running at any speed to zero speed
- slowing a motor driven by the load before applying the start command
- keeping the rotor blocked at the end of a deceleration ramp following a stop command.

This function cannot be used for intermediate braking as the motor speed must be brought to zero.

During the direct current injection phase the kinetic energy of the motor is dissipated as heat in the motor. The following parameters allow complete control of the function.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.1	3150	DC braking cmd src		LINK	16	6000	0	16384	ERW	FVS

This parameter is used to select the origin (source) of the **DC braking cmd** signal. The signal to be associated with this function can be selected from the “L\_DIGSEL2” selection list.

If the command is activated (=1) DC braking is enabled.  
In the default condition the origin of the **DC braking cmd** signal is 6000 (disabled).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.2	3152	DC brake mode		ENUM		Off	0	1	ERW	FVS

Setting of the direct current braking mode.

- 0 Off
- 1 At Stop
- 2 On Command
- 3 OnCmd & AtStop

If set to **0** the direct current injection phase is never executed.

If set to **1** the direct current injection phase is executed when the stop command is sent and the speed reference threshold = zero has been reached.

Example:

With the motor running at any speed, when the stop command is enabled the ramp output decreases according to the selected ramp time. When the speed reference threshold = zero is reached PAR **934 Riferimento = 0** the direct current injection phase is enabled and direct current injection starts after a delay set in PAR **3154 DC brake delay**. PAR **3156 DC brake duration** is used to configure the duration of the injection phase and PAR **3158 DC brake current** is used to configure the intensity of the injection phase current.

In “**On Command**” mode the direct current injection phase is executed when the **DC braking cmd** configured using parameter PAR **3150 DC braking cmd src** is sent.

Example:

Motor running driven by load. When the drive is enabled and the **DC braking cmd** is sent the direct current injection phase is activated. When the command is enabled and after the delay configured in PAR **3154 DC brake delay** direct current injection starts. PAR **3156 DC brake duration** is used to configure the duration of the injection phase and PAR **3158 DC brake current** is used to configure the intensity of the injection phase current.

If the command is an impulse shorter than the time set with PAR **3156 Durata frenatura DC**, the direct current injection phase continues at least for the time set in parameter **3156 DC brake duration**.

If the command is an impulse longer than the time set with **3156 DC brake duration**, the direct current injection phase continues for as long as the command is present.

In “**OnCmd & AtStop**” modes the direct current injection phase is executed when one of the two conditions described in the “**At Stop**” or “**On Command**” modes is present.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.3	3154	DC brake delay	s	FLOAT		0.5	0.01	30.0	ERW	FVS

This parameter is used to configure the delay in seconds between the moment DC braking is requested and the moment direct current injection starts. This delay enables the motor to demagnetise, and thus avoid an overcurrent due to the electromotive force of the motor (e.f.m.).

The value of this parameter, added to parameter 3156 **DC brake duration**, must be lower than the value of parameter 1006 **Speed 0 disable dly**, otherwise direct current injection will stop when the drive is disabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.4	3156	<b>DC brake duration</b>	s	FLOAT		1.0	0.01	30.0	ERW	FVS

This parameter is used to configure the duration of direct current injection in the stator windings.

The value of this parameter, added to parameter 3154 **DC brake delay**, must be lower than the value of parameter 1006 **Speed 0 disable dly**, otherwise direct current injection will stop when the drive is disabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.5	3158	<b>DC brake current</b>	perc	FLOAT		50.0	0.0	150.0	ERW	FVS

This parameter is used to configure the value of the injected direct current.

It is expressed as a percentage of the drive continuous current (PAR 488 **Drive cont current**).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.2.6	3160	<b>DC brake state</b>		ENUM	16	Non active	0	1	ER	FVS

The status of direct current braking is displayed.

0 Non active

1 Active

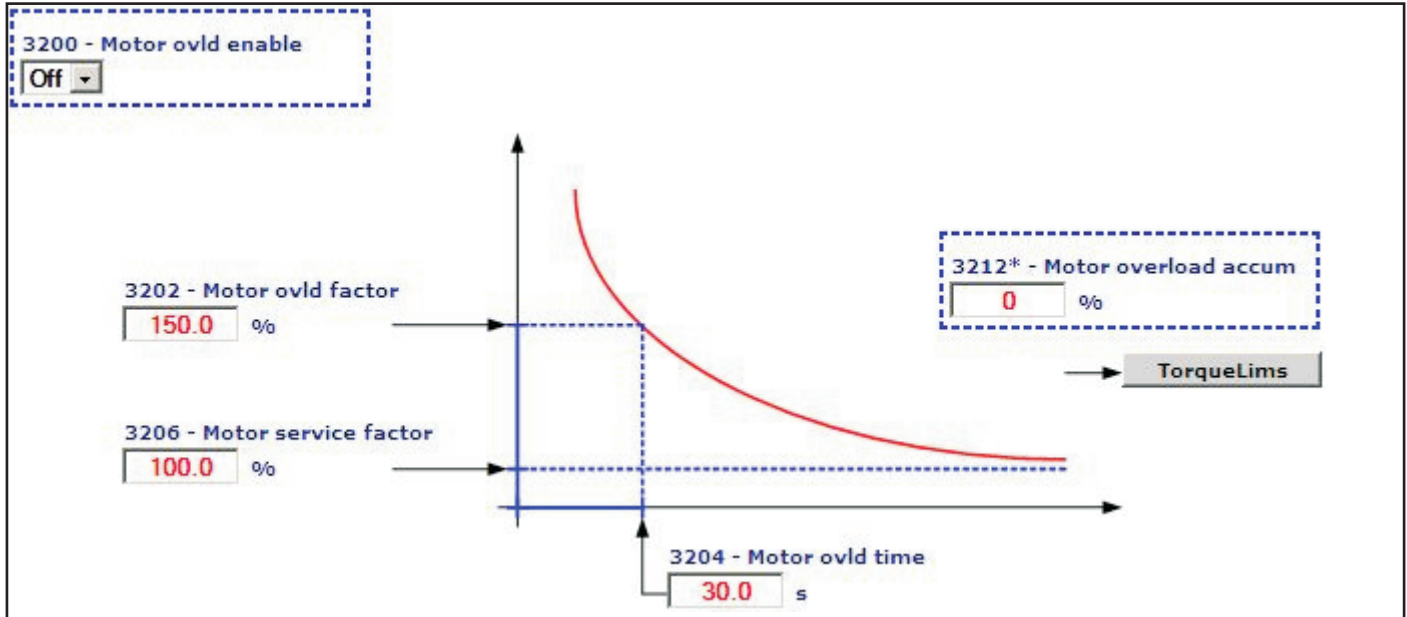
**Note !**

During the direct current injection phase the **Enable** command should not be enabled. If the **Enable** command is sent to the drive, the ramp output starts following the set reference; direct current output is produced in any case. The moment the **DC braking cmd** is removed there is immediately a speed step without performing a change in the ramp.

During the direct current injection phase, for the **Jog** command follow the instructions provided for the **Enable** command.

## 22.3 – FUNCTIONS/MOTOR OVERLOAD

The overload control function provides integrator logic to protect the motor against thermal overload. This protection presents the characteristic  $I^2t$  behaviour and is an emulation of the thermal relay of the motor controlled by the ADV drive.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.3.1	3200	<b>Motor ovld enable</b>		BIT		0	0	1	ERW	FVS

Enabling of the motor overload control.

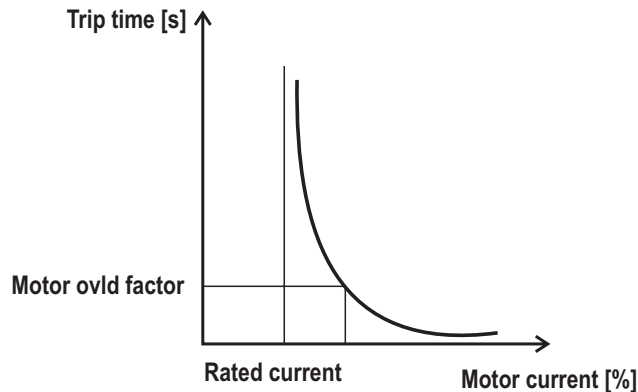
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.3.2	3202	<b>Motor ovld factor</b>	perc	FLOAT		150.0	100.0	300.0	ERWS	FVS

Setting of the motor overload value. Percentage value of the motor rated current (par. **2002 Rated current**).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.3.3	3204	<b>Motor ovld time</b>	s	FLOAT		30.0	10.0	300.0	ERWS	FVS

Setting of the motor overload duration in seconds. It represents the moment in which the protection ("Motor Overload") is enabled, if the motor current value is above the overload set in the **Motor ovld factor** parameter. This alarm can be assigned to a programmable digital output (**Motor overload trip**).

The trip time depends on the motor current value and is as follows:



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.3.4	3206	<b>Motor service factor</b>	perc	FLOAT		100.0	25.0	200.0	ERWS	FVS

Setting of the motor service factor. This is the difference between the peak current and rated current. It is used to calculate the thermal image of the motor.

## 22.4 – 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
22.4.1	3250	<b>Bres control</b>		BIT		0	0	1	ERWZ	FVS

Enabling of the overload control of the external braking resistor.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.4.2	3252	<b>Bres value</b>	ohm	FLOAT		SIZE	7.0	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
22.4.3	3254	<b>Bres cont power</b>	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
22.4.4	3256	<b>Bres overload factor</b>		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
22.4.5	3258	<b>Bres overload time</b>	s	FLOAT		SIZE	0.5	50.0	ERWS	FVS

Setting of the intervention time of the external braking resistor overload.

## 22.5 – 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
22.5.1	3350	Speed capture		ENUM		Disable	0	1	ERW	FV_

This parameter is used to enable the function to capture a motor that is running.

- 0 Disable
- 1 Enable

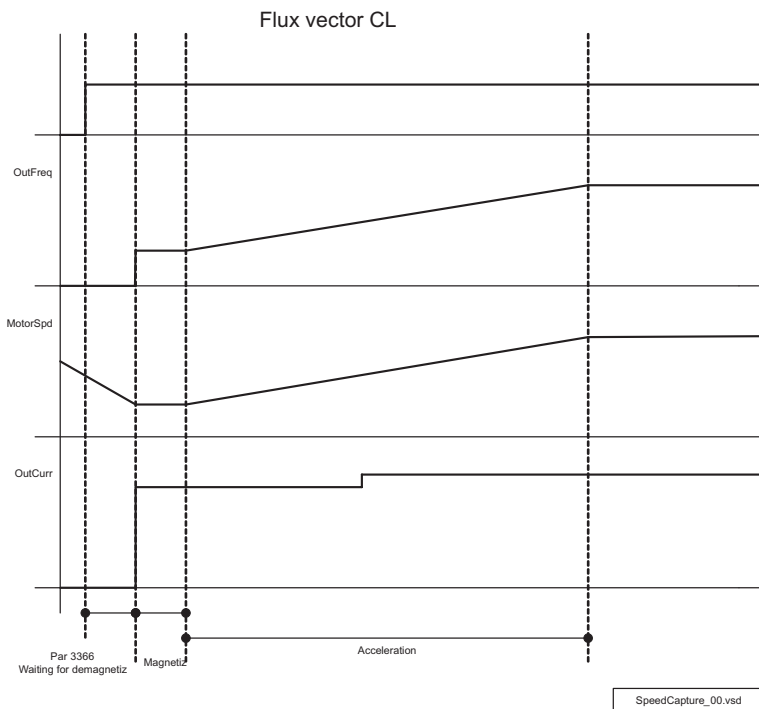
If set to 0 the capture running motor function is disabled. The output frequency starts from 0 and passes to the set reference value using the ramp.

If set to 1 the capture running motor function is enabled.

This function is available with **Regulation mode = Flux vector CL** or **V/f control**.

This function is not available with **Regulation mode = Flux vector OL**.

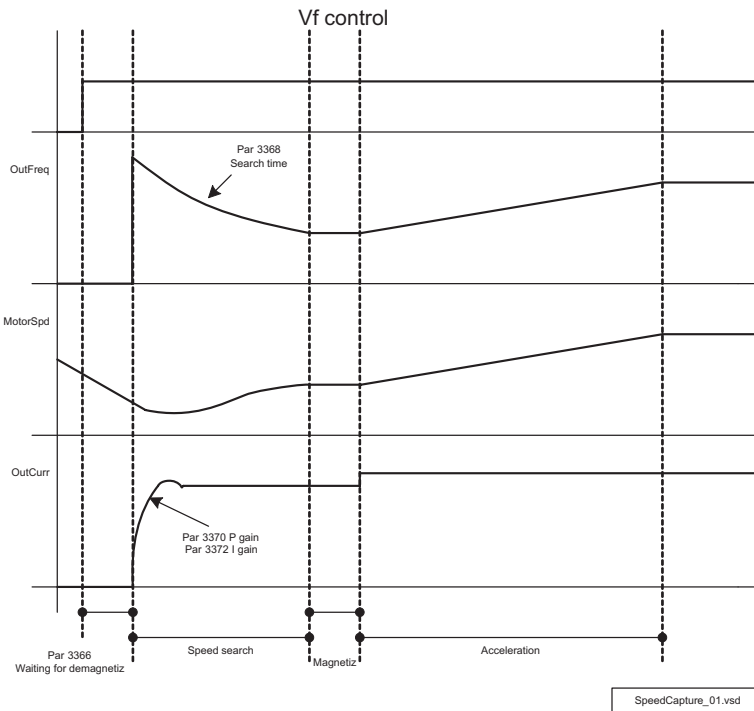
With **Regulation mode = Flux vector CL** the capture procedure consists of forcing the output frequency to the value measured by the encoder, and then bringing the motor speed to the reference value using the ramp.



With **Regulation mode = V/f control** the capture procedure consists of altering the inverter output frequency until the actual motor speed is detected, then increasing the motor speed to the reference value using the ramp. The procedure can take several seconds, depending on the type of load and parameter settings. If this function is enabled on a motor at speed = 0 and drive speed reference = 0, the motor might start running until the moment the drive detects the actual motor speed, after which the motor speed passes to the speed reference setting, i.e. 0. The initial value of the output frequency depends on the condition that generated the capture procedure. Various conditions are possible:



Condition	Frequency value
First enabling of the drive after power-on	Par 3364 Vf catch start freq
Drive enabled and demagnetising for a time > Par 3376 Vf catch lastref dly	Par 3364 Vf catch start freq
Drive enabled and demagnetising for a time < Par 3376 Vf catch lastref dly	Last frequency before disabling the drive
Automatic restart after an alarm	Last frequency before the alarm occurred



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.2	3364	Vf catch start freq	Hz	FLOAT		50.0	-500.0	500.0	ERWZ	V

This parameter is used to configure the frequency at which the procedure to capture a motor that is running starts. This parameter is used if:

Condition	Frequency value
First enabling of the drive after power-on	Par 3364 Vf catch start freq
Drive enabled and demagnetising for a time > Par 3376 Vf catch lastref dly	Par 3364 Vf catch start freq

This parameter must be set to a frequency that is higher than the frequency at which the motor is running at the beginning of the capture procedure. If the conditions are not always identical the maximum frequency or a few Hz below this must be set. The reference sign setting must be the same as the sign of the frequency at which the motor is running.

If a frequency value close to the actual frequency is set, the capture time is short. If there is a big difference between the frequency value setting and the actual frequency, the capture time is longer.

The recommended setting for this parameter is 0 if the function is enabled for use to capture a motor running due to a temporary disabling of the drive or to capture a motor running in the case of an automatic restart after an alarm; or in case of enabling after power-on or after prolonged periods of disabling, the motor speed is certainly 0.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.3	3366	Vf catch enable dly	ms	UINT16		1000	10	10000	ERWZ	V

This parameter is used to configure the time to wait for demagnetisation of the motor before executing the procedure to capture the motor that is running. The waiting time for demagnetisation is measured starting from the moment the drive detects that the conditions are OK to execute the capture procedure. This parameter is useful for automatic restarts after an alarm.

If the motor flux is not zero when the enable command is sent the drive might generate the **Overcurrent** alarm.

The value to set depends on the size of the motor. Large motors have a high rotor time constant and therefore require a long demagnetisation time. Setting a higher value than necessary is not a problem.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.4	3368	<b>Vf catch search time</b>	s	FLOAT		2.0	1.0	10.0	ERW	V

This parameter is used to configure the speed at which the output frequency changes for synchronisation with the motor running. It represents the time in which the frequency would change from 50 Hz to zero if the output current were equal to the drive continuous current.

The default setting is correct for most applications.

Low values require high current levels but guarantee fast synchronisation.

High values require low current levels but synchronisation takes longer.

During the synchronisation procedure the motor may change its speed of rotation. The longer the synchronisation phase the more evident the change in the speed of rotation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.5	3370	<b>Vf catch P gain</b>	perc	FLOAT		10.0	0.0	100.0	ERW	V

This parameter is used to set the proportional gain of the current regulator used by the procedure to capture a motor that is running. Values that are too low could trigger the Overcurrent protection. Changing this value is not recommended.

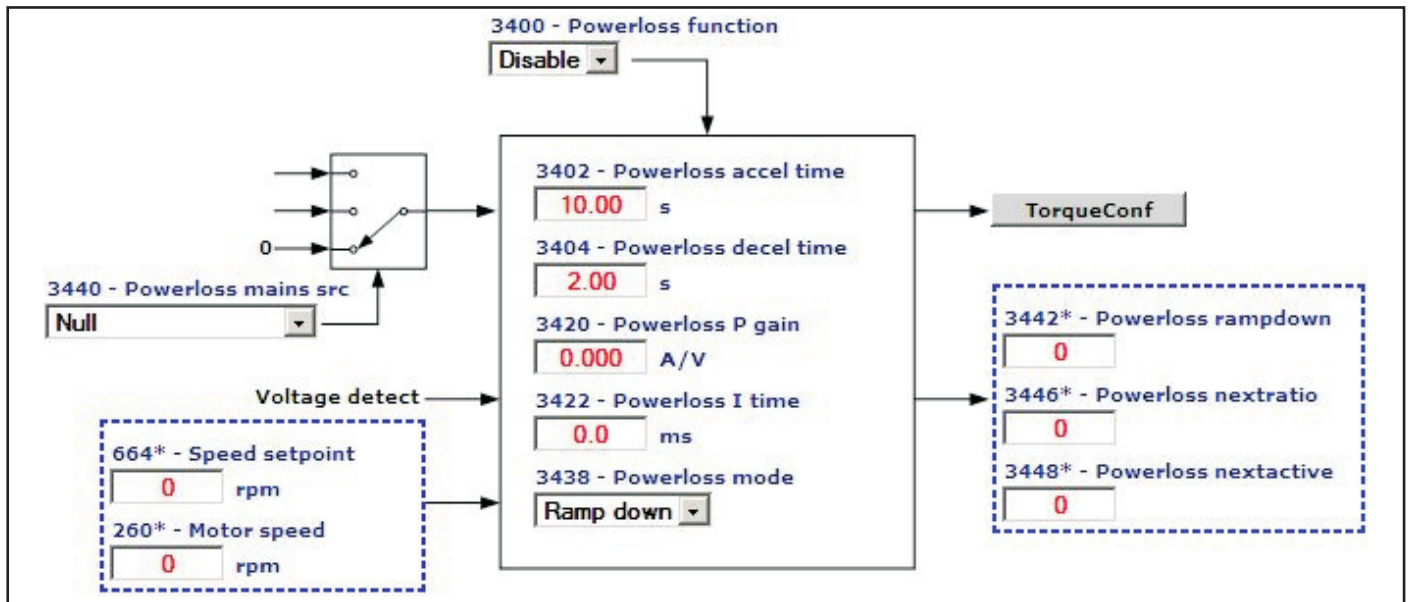
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.6	3372	<b>Vf catch I time</b>	ms	UINT16		200	200	1000	ERW	V

This parameter is used to set the integral time of the current regulator used by the procedure to capture a motor that is running. Changing this value is not recommended.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.5.7	3376	<b>Vf catch lastref dly</b>	ms	UINT16		0	0	30000	ERWZ	V

This parameter is used to set the time within which the drive must be enabled in order to start the capture procedure at the output frequency present before disabling the drive. If the time that elapses from the moment the drive is disabled exceeds the time set in this parameter, the capture procedure starts from the frequency set in parameter **3364 Vf catch start freq.**

## 22.6 – 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 **Sottotensione** 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** and **Regulation mode = V/f control**.

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.

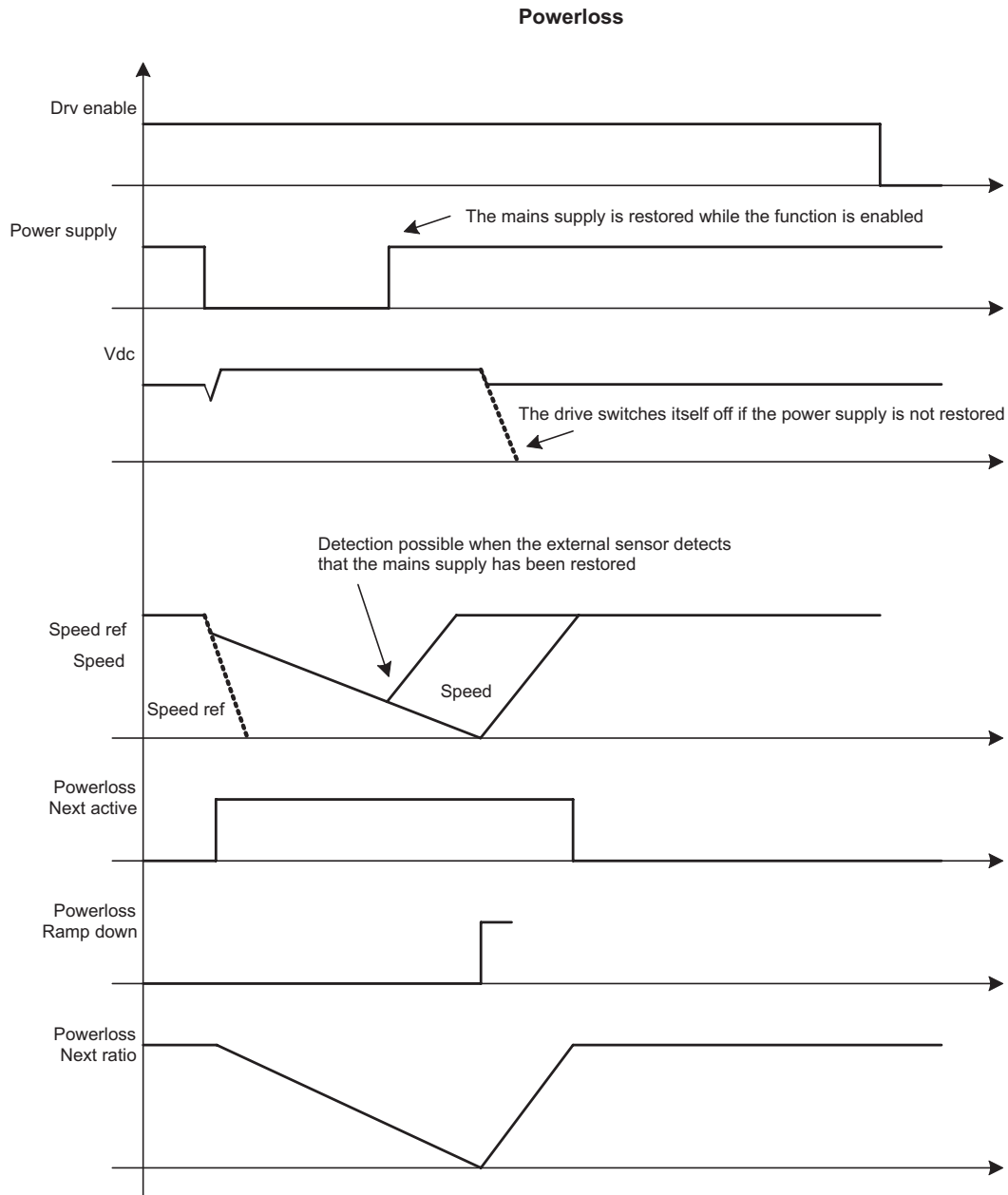
For machines with several drives, the DC links must be connected: the Powerloss function must only be enabled on the drive identified as the master and not on the slaves. The master drive is normally the one that controls the load with the highest inertia. The master drive sends the **Powerloss nexratio** signal with the ratio between the motor speed and the speed reference. Line synchronisation can be achieved by connecting the **Powerloss nexratio**

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\_01.vsd

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.6.1	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 Sottotensione 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
22.6.2	3402	<b>Powerloss accel time</b>	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
22.6.3	3404	<b>Powerloss decel time</b>	s	FLOAT		0.5	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
22.6.4	3420	<b>Powerloss P gain</b>	A/V	FLOAT		CALCF	0	100000	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
22.6.5	3422	<b>Powerloss I gain</b>	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
22.6.6	3438	<b>Powerloss mode</b>		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.

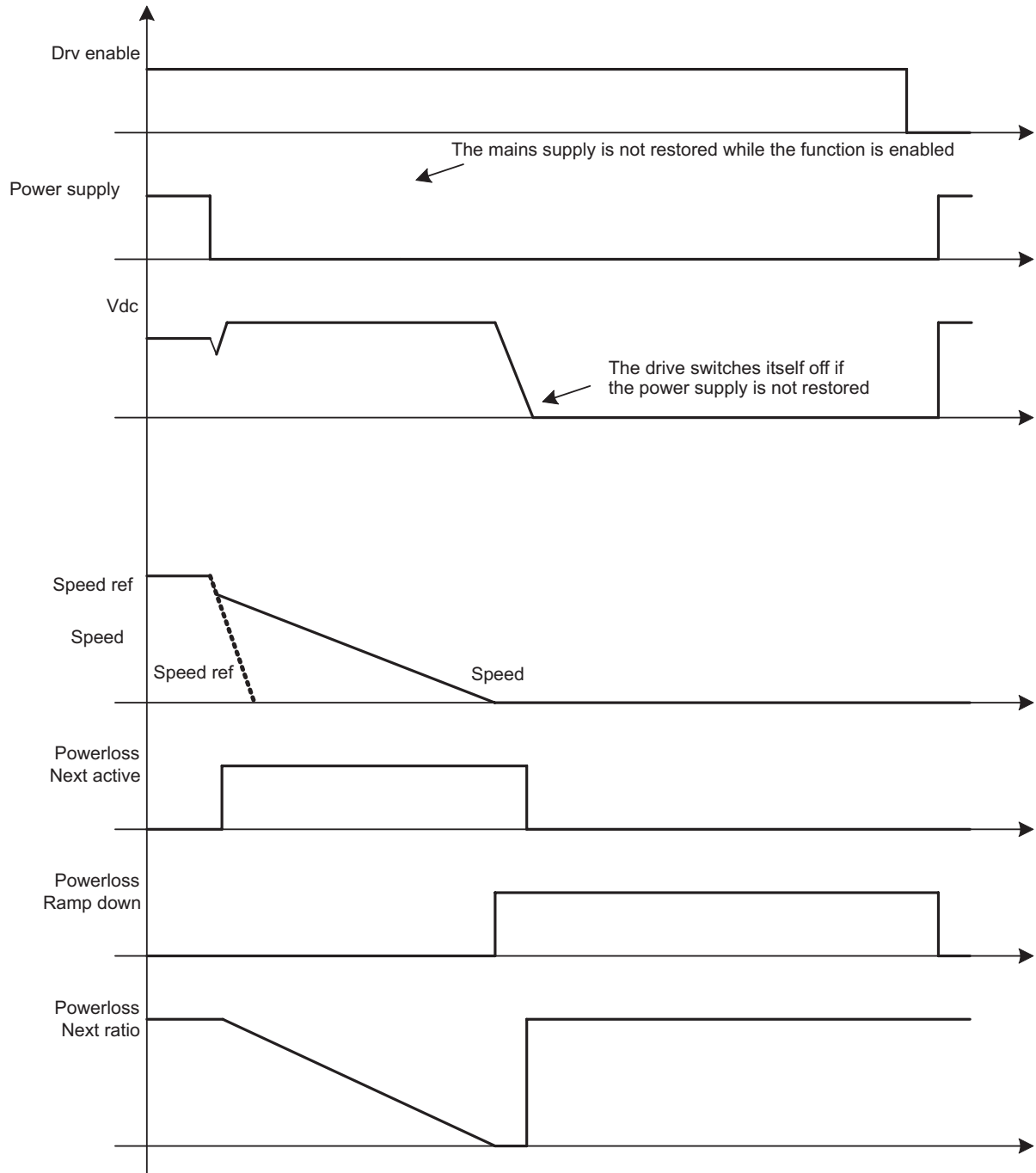
It is possible to set whether the drive should continue at zero speed or return to the setpoint when the mains supply is restored. The drive does not automatically recognise the fact that the mains supply has been restored. This information must be supplied from the outside via the **Powerloss mains 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 **Under-voltage** alarm is generated and the drive may switch itself off.

### Ramp down and mains supply not restored



PowerLoss\_02.vsd

Example 2)

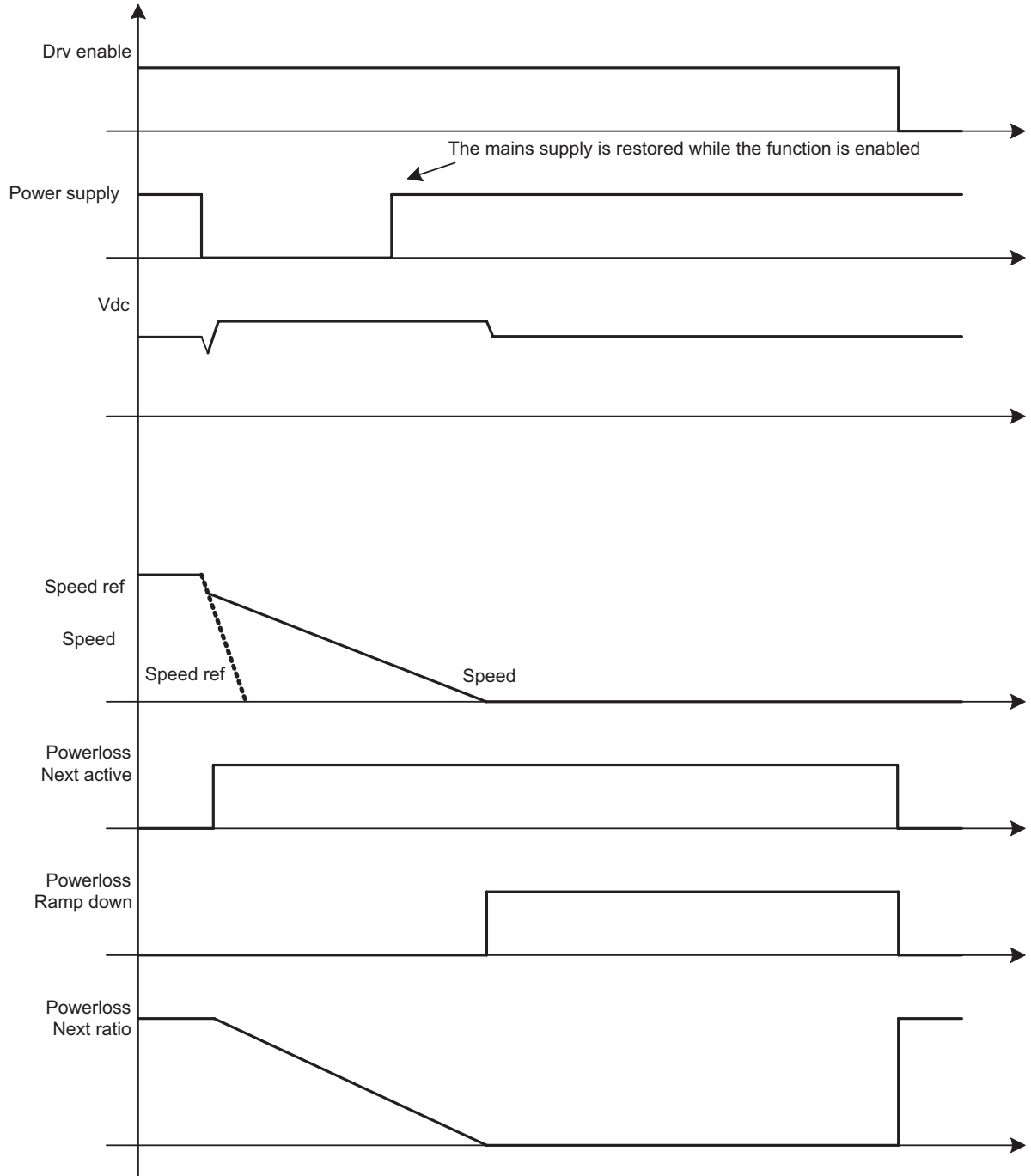
End of ramp and mains supply restored

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

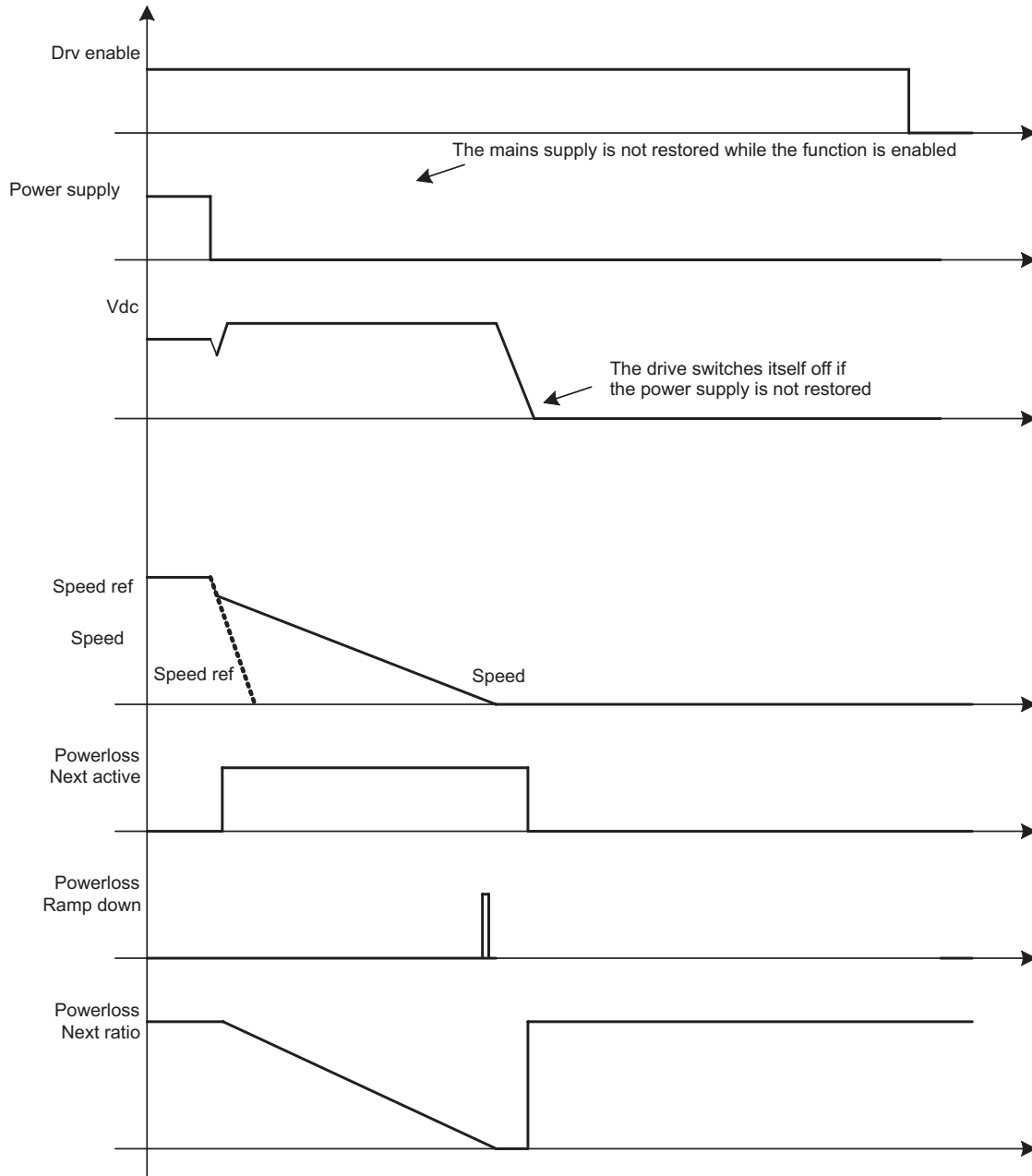
Example 3) Restart and mains supply not restored

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 **Under-voltage** alarm is generated and the drive may switch itself off.

Restart and mains supply not restored



PowerLoss\_04.vsd

Example 4) Restart and mains supply restored

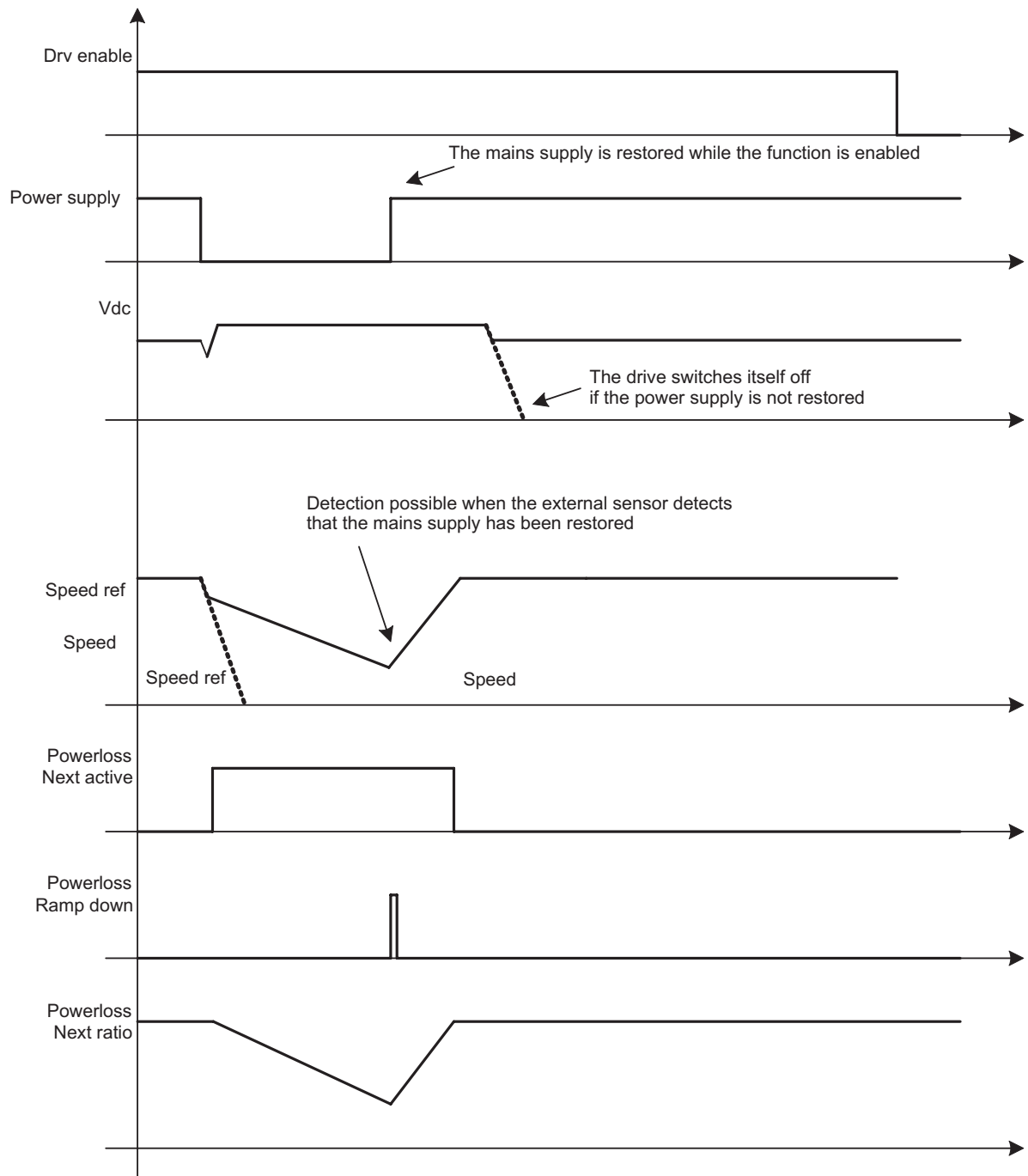
The drive controls a deceleration with the ramp set in **Powerloss decel time**.

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
22.6.7	3440	Powerloss mains src		LINK	16	6000	0	16384	ERWZ	F__

This parameter is used to select the origin (source) of 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.

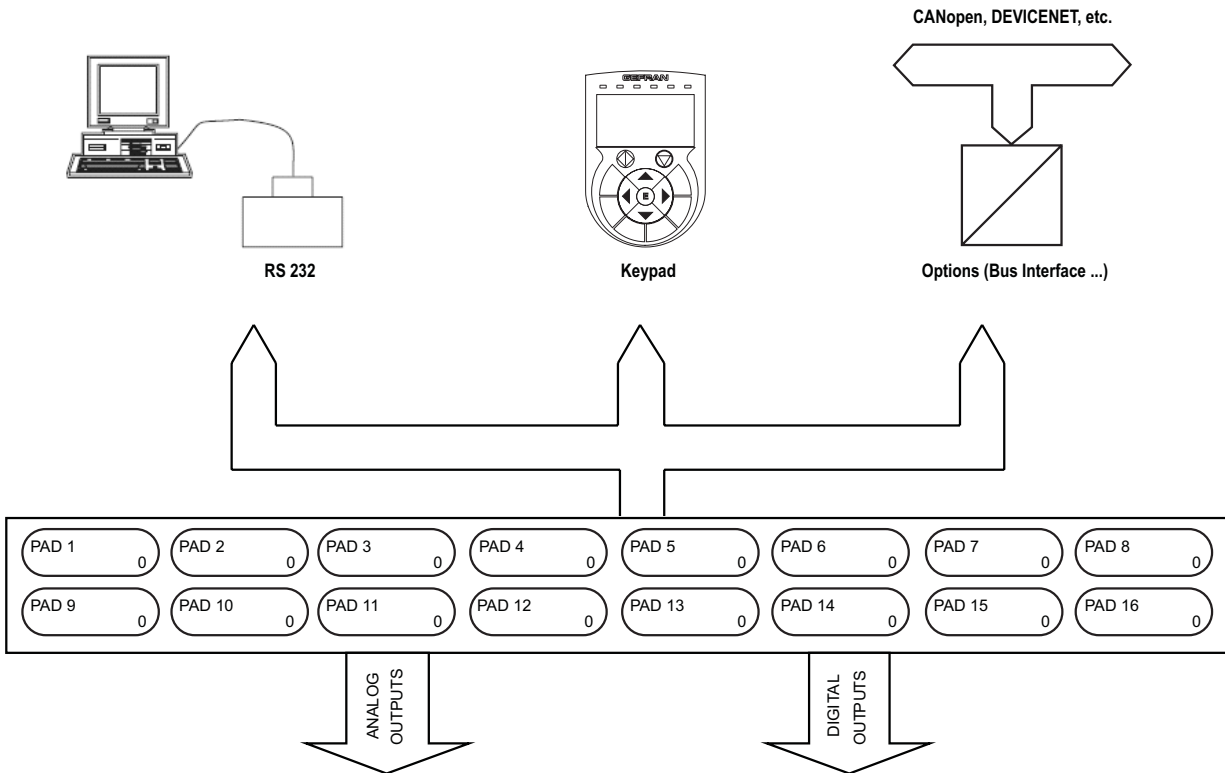
If the function is configured as **Powerloss mode = Restart**, when the **Mains voltage OK** signal is enabled the drive stops the deceleration ramp and passes to the set reference.

For machines with several drives the external sensor signal must only be connected to the master drive.

## 22.7 – 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 MDPic application installed in the drive. See the MDPic manual for more details.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.7.1	3700	Pad 1		INT32	32	0	0	0	ERW	FVS
22.7.2	3702	Pad 2		INT32	32	0	0	0	ERW	FVS
22.7.3	3704	Pad 3		INT32	32	0	0	0	ERW	FVS
22.7.4	3706	Pad 4		INT32	32	0	0	0	ERW	FVS
22.7.5	3708	Pad 5		INT32	32	0	0	0	ERW	FVS
22.7.6	3710	Pad 6		INT32	32	0	0	0	ERW	FVS
22.7.7	3712	Pad 7		INT32	32	0	0	0	ERW	FVS
22.7.8	3714	Pad 8		INT32	32	0	0	0	ERW	FVS
22.7.9	3716	Pad 9		INT32	32	0	0	0	ERW	FVS
22.7.10	3718	Pad 10		INT32	32	0	0	0	ERW	FVS
22.7.11	3720	Pad 11		INT32	32	0	0	0	ERW	FVS
22.7.12	3722	Pad 12		INT32	32	0	0	0	ERW	FVS
22.7.13	3724	Pad 13		INT32	32	0	0	0	ERW	FVS
22.7.14	3726	Pad 14		INT32	32	0	0	0	ERW	FVS
22.7.15	3728	Pad 15		INT32	32	0	0	0	ERW	FVS
22.7.16	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.

## 22.8- FUNCTIONS/VDC CONTROL

This function is used to control the voltage and power recovered in the DC link during regeneration (e.g. 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
22.8.1	3450	<b>Vdc control function</b>		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
22.8.2	3470	<b>Vdc control P gain</b>	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
22.8.3	3472	<b>Vdc control I time</b>	ms	FLOAT		CALCF	1.0	1000.0	ERWS	FVS

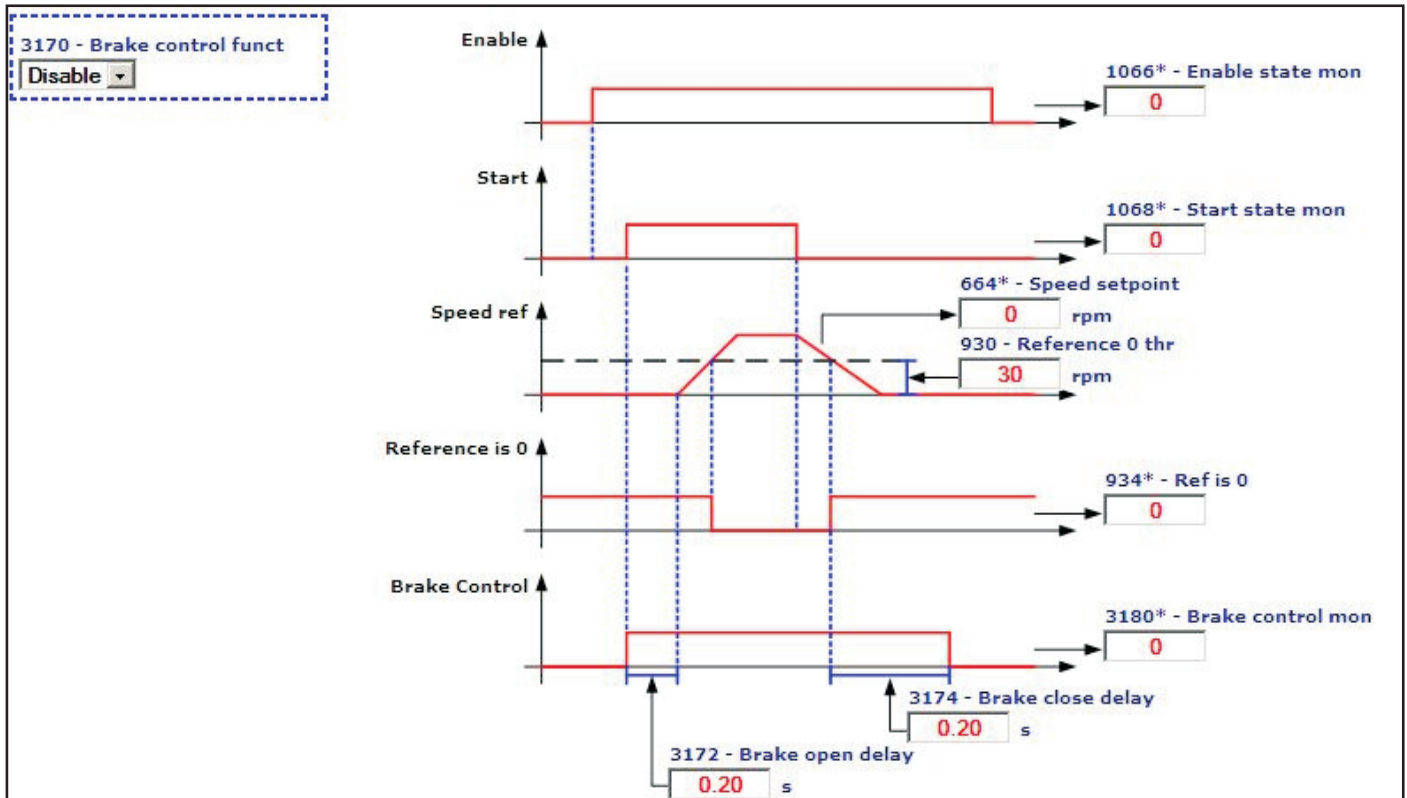
Setting of the integral time used during the **Vdc control function**. The set value must be reduced if the DC link voltage is set to a value other than the setpoint.

## 22.9 - FUNCTIONS/BRAKE CONTROL

This function is used to control the motor parking brake. 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**.

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. 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
22.9.1	3170	<b>Brake control funct</b>		ENUM		Disable	0	1	ERWZ	FVS

This parameter is used to enable the **Brake control funct**.

- 0 Disable
- 1 Enable

If set to **0** the function is disabled:

If set to **1** the function is enabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.9.2	3172	<b>Brake open delay</b>	s	FLOAT		0.20	0.0	60.0	ERW	FVS

Setting of the delay for mechanical opening of the brake

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.9.3	3174	<b>Brake close delay</b>	s	FLOAT		0.20	0.0	60.0	ERW	FVS

Setting of the delay to reach the motor zero speed before closing the brake.

## 22.10 - FUNCTIONS/VF ENERGY SAVE

With V/f control, the Energy saving function automatically reduces the output voltage requested by the configured V/f curve, making it possible to save energy without changing the speed of the motor.

The output voltage can be reduced for as long as it is possible to reduce the flux current without increasing the torque current. If the output voltage is reduced too much the drive will be unable to maintain a constant motor speed.

If the Energy saving function is enabled, the output voltage is only reduced if the drive is in the drive ready condition and the speed reference is within the following range:

25% of **Vf frequency** (par. 2408) < speed reference < **Vf frequency** (par. 2408)

When the speed ramp output is constant for a time that can be set in parameter 3324 **Energysave delay** the Energy saving function automatically reduces the output voltage. The output voltage reduction phase stops and is maintained when the torque current moves out of the range configured in parameter 3326 **Energysave trqband 1**.

In the low output voltage condition, if there is a change in the ramp input reference or in the load conditions bringing the torque current outside the range set in parameter 3328 **Energysave trqband 2**, the Energy saving function automatically restores the output voltage.

The energy saving function attempts to reduce the output voltage to a fixed minimum limit that is 70% of the voltage defined by the V/f curve.

**Nota:**

For increased energy saving, disable the function set in parameter 2404 **Voltage torque boost** or reduce the boost set in parameter 2402 **Voltage boost gain** as these functions tend to maintain the flux current at a constant level rendering the Energy saving function ineffective.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.10.1	3320	<b>Energysave enable</b>		BIT		0	0	1	ERWZ	_V_

This parameter enables the energy saving function

- 0 Enabled
- 1 Disabled

If set to **0** the energy saving function is disabled

If set to **1** the energy saving function is enabled

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.10.2	3322	<b>Energysave spd band</b>	rpm	INT16		2	0	100	ERW	_V_

This parameter is used to set a speed used to calculate a range around the ramp output. When the ramp reference is inside this range it is constant and the ramp output has reached the steady state. The Energy saving function uses this information to decide whether or not to apply the output voltage reduction.

This parameter can be changed if there are small, continuous changes in the speed of the speed reference to avoid continuously entering/leaving the output voltage reduction condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.10.3	3324	<b>Energysave delay</b>	s	FLOAT		3.0	0.1	120.0	ERW	_V_

This parameter is used to set the delay, once the speed set point has been reached, before starting to reduce the output voltage.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
22.10.4	3326	<b>Energysave trqband 1</b>	perc	FLOAT		10.0	0.0	100.0	ERWS	_V_

This parameter is used to set a percentage used to calculate a range around the torque current the moment the output voltage starts to be reduced.

The torque current value is saved the moment the voltage starts to be reduced. if the torque current is not within the calculated range during the output voltage reduction phase, output voltage reduction is aborted.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>22.10.5</b>	<b>3328</b>	<b>Energysave trqband 2</b>	perc	FLOAT		10.0	0.0	100.0	ERWS	_V_

This parameter is used to set a percentage used to calculate a range around the torque current the moment output voltage reduction is aborted. The torque current is saved at the end of the voltage reduction phase. if the torque current is not within the calculated range, due to a change in the load while functioning at low voltage, the output voltage requested by the V/f curve must be restored.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>22.10.6</b>	<b>3340</b>	<b>Energysave out</b>		FLOAT	16/32BIT	0.0	0.0	1.0	ER	_V_

This parameter is used to read the request to reduce the output voltage.

## 23 – COMMUNICATION

### 23.1 - COMMUNICATION/RS232

The ADV100 drive is provided with a standard port (9 pole sub-D connector: XS) for connecting the RS232 serial line used for drive-PC point-to-point communication (via the GF-eXpress configuration software).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.1.1	3800	<b>Drive address</b>		UINT16		1	1	255	ERW	FVS

Setting of the address to which the drive responds when connected to the RS232 serial line.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.1.2	3802	<b>Serial baudrate</b>		ENUM		38400	0	2	ERW	FVS

Setting of the RS232 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	<b>Serial parameter</b>		ENUM		None,8,1	0	3	ERW	FVS

Setting of the format of the RS232 serial line.

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	<b>Serial protocol</b>		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	<b>Serial delay</b>	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 RS232 interface that is used has not been pre-set for automatic Tx/Rx switching. The parameter only concerns the use of the standard RS232 serial line.

Example: if the delay in Tx/Rx switching on the master is a maximum of 20ms, the **Serial 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	<b>Serial swap data</b>		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 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	<b>Fieldbus type</b>		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 profile

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.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.2.2	4004	<b>Fieldbus baudrate</b>		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	<b>Fieldbus address</b>		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	<b>Fieldbus M-&gt;S enable</b>		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	<b>Fieldbus alarm mode</b>		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
<b>23.2.6</b>	<b>4014</b>	<b>Fieldbus state</b>		ENUM		Stop	0	7	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 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

## 23.3 – COMMUNICATION/FIELDBUS M2S

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
<b>23.3.1</b>	<b>4020</b>	<b>Fieldbus M-&gt;S1 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.5</b>	<b>4030</b>	<b>Fieldbus M-&gt;S2 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.9</b>	<b>4040</b>	<b>Fieldbus M-&gt;S3 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.13</b>	<b>4050</b>	<b>Fieldbus M-&gt;S4 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.17</b>	<b>4060</b>	<b>Fieldbus M-&gt;S5 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.21</b>	<b>4070</b>	<b>Fieldbus M-&gt;S6 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.25</b>	<b>4080</b>	<b>Fieldbus M-&gt;S7 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.29</b>	<b>4090</b>	<b>Fieldbus M-&gt;S8 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.33</b>	<b>4100</b>	<b>Fieldbus M-&gt;S9 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.37</b>	<b>4110</b>	<b>Fieldbus M-&gt;S10 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.41</b>	<b>4120</b>	<b>Fieldbus M-&gt;S11 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.45</b>	<b>4130</b>	<b>Fieldbus M-&gt;S12 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.49</b>	<b>4140</b>	<b>Fieldbus M-&gt;S13 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.53</b>	<b>4150</b>	<b>Fieldbus M-&gt;S14 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.57</b>	<b>4160</b>	<b>Fieldbus M-&gt;S15 ipa</b>		FBM2SIPA		0	0	20000	RW	FVS
<b>23.3.61</b>	<b>4170</b>	<b>Fieldbus M-&gt;S16 ipa</b>		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
<b>23.3.2</b>	<b>4022</b>	<b>Fieldbus M-&gt;S1 sys</b>		ENUM		Not assigned	0	10	RW	FVS
<b>23.3.6</b>	<b>4032</b>	<b>Fieldbus M-&gt;S2 sys</b>		ENUM		Not assigned	0	10	RW	FVS
<b>23.3.10</b>	<b>4042</b>	<b>Fieldbus M-&gt;S3 sys</b>		ENUM		Not assigned	0	10	RW	FVS
<b>23.3.14</b>	<b>4052</b>	<b>Fieldbus M-&gt;S4 sys</b>		ENUM		Not assigned	0	10	RW	FVS
<b>23.3.18</b>	<b>4062</b>	<b>Fieldbus M-&gt;S5 sys</b>		ENUM		Not assigned	0	10	RW	FVS
<b>23.3.22</b>	<b>4072</b>	<b>Fieldbus M-&gt;S6 sys</b>		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 parameter 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	32	0	0	0	ER	FVS
23.3.7	4034	Fieldbus M->S2 mon		INT32	32	0	0	0	ER	FVS
23.3.11	4044	Fieldbus M->S3 mon		INT32	32	0	0	0	ER	FVS
23.3.15	4054	Fieldbus M->S4 mon		INT32	32	0	0	0	ER	FVS
23.3.19	4064	Fieldbus M->S5 mon		INT32	32	0	0	0	ER	FVS
23.3.23	4074	Fieldbus M->S6 mon		INT32	32	0	0	0	ER	FVS
23.3.27	4084	Fieldbus M->S7 mon		INT32	32	0	0	0	ER	FVS

23.3.31	4094	Fieldbus M->S8 mon	INT32	32	0	0	0	ER	FVS
23.3.35	4104	Fieldbus M->S9 mon	INT32	32	0	0	0	ER	FVS
23.3.39	4114	Fieldbus M->S10 mon	INT32	32	0	0	0	ER	FVS
23.3.43	4124	Fieldbus M->S11 mon	INT32	32	0	0	0	ER	FVS
23.3.47	4134	Fieldbus M->S12 mon	INT32	32	0	0	0	ER	FVS
23.3.51	4144	Fieldbus M->S13 mon	INT32	32	0	0	0	ER	FVS
23.3.55	4154	Fieldbus M->S14 mon	INT32	32	0	0	0	ER	FVS
23.3.59	4164	Fieldbus M->S15 mon	INT32	32	0	0	0	ER	FVS
23.3.63	4174	Fieldbus M->S16 mon	INT32	32	0	0	0	ER	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 S2M

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	32	0	0	0	ERW	FVS
23.4.7	4194	Dig Fieldbus S->M2		INT32	32	0	0	0	ERW	FVS
23.4.11	4204	Dig Fieldbus S->M3		INT32	32	0	0	0	ERW	FVS
23.4.15	4214	Dig Fieldbus S->M4		INT32	32	0	0	0	ERW	FVS
23.4.19	4224	Dig Fieldbus S->M5		INT32	32	0	0	0	ERW	FVS
23.4.23	4234	Dig Fieldbus S->M6		INT32	32	0	0	0	ERW	FVS
23.4.27	4244	Dig Fieldbus S->M7		INT32	32	0	0	0	ERW	FVS
23.4.31	4254	Dig Fieldbus S->M8		INT32	32	0	0	0	ERW	FVS
23.4.35	4264	Dig Fieldbus S->M9		INT32	32	0	0	0	ERW	FVS
23.4.39	4274	Dig Fieldbus S->M10		INT32	32	0	0	0	ERW	FVS
23.4.43	4284	Dig Fieldbus S->M11		INT32	32	0	0	0	ERW	FVS
23.4.47	4294	Dig Fieldbus S->M12		INT32	32	0	0	0	ERW	FVS
23.4.51	4304	Dig Fieldbus S->M13		INT32	32	0	0	0	ERW	FVS
23.4.55	4314	Dig Fieldbus S->M14		INT32	32	0	0	0	ERW	FVS
23.4.59	4324	Dig Fieldbus S->M15		INT32	32	0	0	0	ERW	FVS
23.4.63	4334	Dig Fieldbus S->M16		INT32	32	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.**

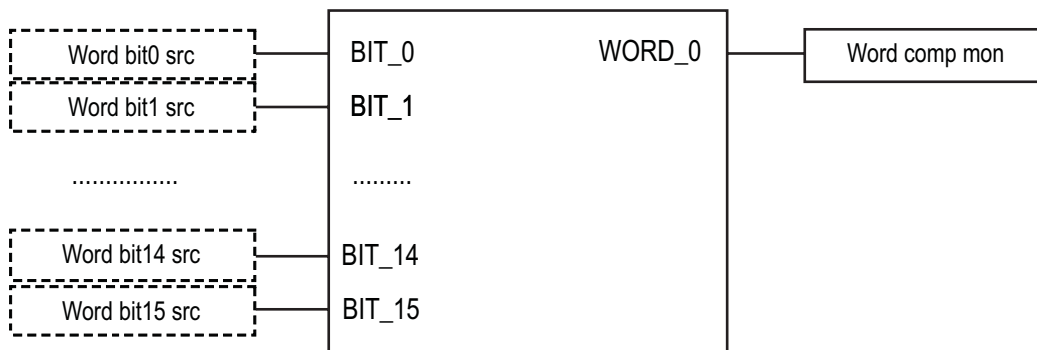
If the motor is running at 100 rpm, the PLC reads the value  $100 * 10 = 1000$  on the first word that is exchanged.

## 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	<b>Word comp mon</b>		UINT32	16	0	0	0	ER	FVS

The hexadecimal value of the Word comp output is displayed.

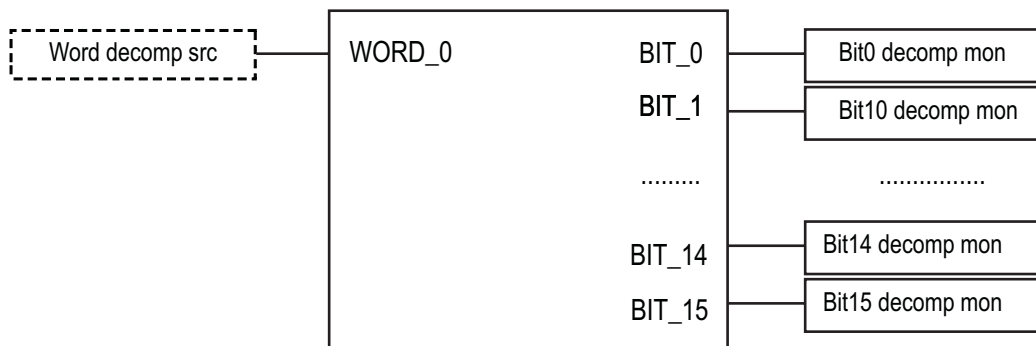
## 23.6 – COMMUNICATION/WORD DECOMP

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
23.6.1	4450	<b>Dig word decomp</b>		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	<b>Word decomp src</b>		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	<b>Bit0 decomp mon</b>		BIT	16	0	0	1	ER	FVS
23.6.4	4456	<b>Bit1 decomp mon</b>		BIT	16	0	0	1	ER	FVS
23.6.5	4458	<b>Bit2 decomp mon</b>		BIT	16	0	0	1	ER	FVS
23.6.6	4460	<b>Bit3 decomp mon</b>		BIT	16	0	0	1	ER	FVS
23.6.7	4462	<b>Bit4 decomp mon</b>		BIT	16	0	0	1	ER	FVS
23.6.8	4464	<b>Bit5 decomp mon</b>		BIT	16	0	0	1	ER	FVS
23.6.9	4466	<b>Bit6 decomp mon</b>		BIT	16	0	0	1	ER	FVS
23.6.10	4468	<b>Bit7 decomp mon</b>		BIT	16	0	0	1	ER	FVS
23.6.11	4470	<b>Bit8 decomp mon</b>		BIT	16	0	0	1	ER	FVS
23.6.12	4472	<b>Bit9 decomp mon</b>		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.



## 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.

<b>Activity</b> <b>Ignore</b>	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.
<b>Warning</b>	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.
<b>Disable drive</b>	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.
<b>Stop</b>	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 <b>Ramp</b> control mode is enabled, the drive moves to the zero speed with the set ramp time; when the <b>Speed delay 0</b> signal is activated the drive is disabled. If <b>Speed</b> control mode is enabled, the drive moves to the zero speed with the maximum current possible; when the <b>Speed delay 0</b> signal is activated the drive is disabled. If <b>Torque</b> control mode is enabled, the drive moves to the zero speed with the time set by the load; when the <b>Speed delay 0</b> signal is activated the drive is disabled.
<b>Fast stop</b>	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 <b>Ramp</b> control mode is enabled, the drive moves to the zero speed with the set fast stop ramp time (deceleration time 3); when the <b>Speed delay 0</b> signal is activated the drive is disabled. If <b>Speed</b> control mode is enabled, the drive moves to the zero speed with the maximum current possible; when the <b>Speed delay 0</b> signal is activated the drive is disabled. If <b>Torque</b> control mode is enabled, the drive moves to the zero speed with the set load time; when the <b>Speed delay 0</b> 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	✓	✓	✓	✓	✓
GroundFault thr	-	-	✓	-	-

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.1	4500	<b>Fault reset src</b>		LINK	16	1218	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	<b>ExtFlt src</b>		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	<b>ExtFlt activity</b>		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	<b>ExtFlt restart</b>		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	<b>ExtFlt restart time</b>	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	<b>ExtFlt holdoff</b>	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	4520	<b>MotorOT src</b>		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
24.8	4522	<b>MotorOT activity</b>		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
24.9	4524	<b>MotorOT restart</b>		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
24.10	4526	<b>TMotorOT restart time</b>	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
24.11	4528	<b>MotorOT holdoff</b>	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
24.12	4540	<b>Overspeed threshold</b>	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
24.13	4542	<b>Overspeed activity</b>		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
24.14	4544	<b>Overspeed holdoff</b>	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
24.15	4550	<b>SpdRefLoss threshold</b>	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
24.16	4552	<b>SpdRefLoss activity</b>		ENUM		Warning	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** 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
24.17	4554	<b>SpdRefLoss holdoff</b>	ms	UINT16		1000	0	10000	RW	FV_

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
24.18	4560	<b>SpdFbkLoss activity</b>		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
24.19	4562	<b>SpdFbkLoss holdoff</b>	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
24.20	4564	<b>SpdFbkLoss threshold</b>	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
24.21	4570	<b>Drive ovlid activity</b>		ENUM		Ignore	0	4	ERW	FVS

Setting of the behaviour of the drive in case of a drive overload alarm **Drive ovlid**. 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
24.22	4572	<b>Motor ovlid activity</b>		ENUM		Warning	0	4	ERW	FVS

Setting of the behaviour of the drive in case of a motor overload alarm **Motor ovlid [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
24.23	4574	<b>Bres ovlid activity</b>		ENUM		Disable	0	4	ERW	FVS

Setting of the behaviour of the drive in case of a braking resistor overload alarm **Bres ovlid**. 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
24.24	4582	<b>HTsens restart</b>		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
24.25	4584	<b>HTsens restart time</b>	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
24.26	4600	<b>InAir activity</b>		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
24.27	4602	<b>InAir restart</b>		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
24.28	4604	<b>InAir restart time</b>	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
24.29	4606	<b>InAir holdoff</b>	ms	UINT16		10000	0	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
24.30	4610	<b>Desat restart</b>		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
24.31	4612	<b>Desat restart time</b>	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
24.32	4620	<b>IOverC restart</b>		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
24.33	4622	<b>IOverC restart time</b>	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
24.34	4630	<b>OverV restart</b>		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
24.35	4632	<b>OverV restart time</b>	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
24.36	4640	<b>UnderV restart</b>		ENUM		Enable	0	1	ERW	FVS

Enabling of automatic restart after the undervoltage 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
24.37	4642	<b>UnderV restart time</b>	ms	UINT16		1000	120	10000	ERW	FVS

Setting of the time within which the **Undervoltage** 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
24.38	4650	<b>UVRep attempts</b>		UINT16		5	0	1000	ERW	FVS

Setting of the maximum number of attempts at automatic restart after the **Undervoltage** alarm before a **Mult Undervoltage** 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
24.39	4652	<b>UVRep delay</b>	s	UINT16		240	0	300	ERW	FVS

Setting of the time within which, if no automatic restarts are executed after the **Undervoltage** 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
24.40	4660	<b>PhLoss activity</b>		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
24.41	4662	<b>PhLoss restart</b>		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
24.42	4664	<b>PhLoss restart time</b>	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
24.43	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
24.44	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
24.45	4700	Alarm dig sel 1		ENUM		No alarm	0	40	ERW	FVS
24.46	4702	Alarm dig sel 2		ENUM		No alarm	0	40	ERW	FVS
24.47	4704	Alarm dig sel 3		ENUM		No alarm	0	40	ERW	FVS
24.48	4706	Alarm dig sel 4		ENUM		No alarm	0	40	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 Phase loss
- 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 Not Used1
- 28 Not Used2
- 29 Not Used3
- 30 Not Used4
- 31 Not Used5
- 32 Not Used6
- 33 Plc1 fault



- 34 Plc2 fault
- 35 Plc3 fault
- 36 Plc4 fault
- 37 Plc5 fault
- 38 Plc6 fault
- 39 Plc7 fault
- 40 Plc8 fault

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.49	4720	<b>Alm autoreset time</b>	s	FLOAT		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.

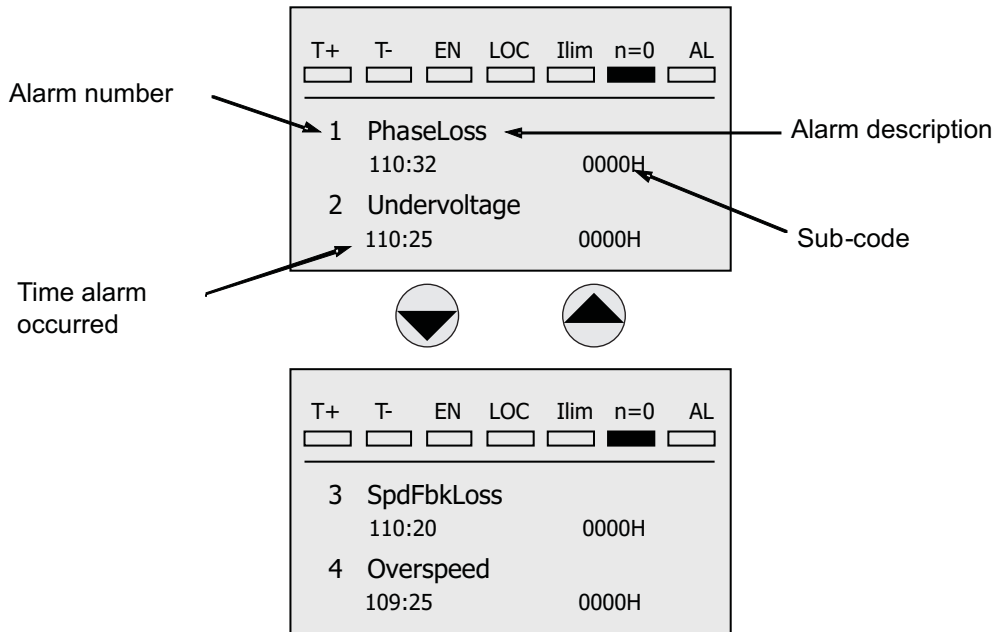
If the parameter is 0 the function is disabled.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
24.50	4722	<b>Alm autoreset number</b>		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 MDPIc program.

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.

### ADV100 PID HVAC application

#### REFERENCES

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11000</b>	<b>Set point sel</b>		ENUM		Disable PID	-1	4174	RWZ	FVS

Parameter for selecting the PID input reference. If you select PID disable [-1] the ramp reference and thus the drive speed depend on the standard selections in the REFERENCES menu. For the other selections the parameters in the REFERENCES menu are modified so that the ramp reference corresponds to the value of the **PID output** [3700] variable.

If you select **Digital Param** [0] the PID reference corresponds to the value of parameter 11002 **Set point sel**. One of the following values can be set:

-1	Disable PID
0	Digital Param
1600	Analog inp 1X
1650	Analog inp 2X
3700	PID output
3710	Pad 6
3712	Pad 7
3714	Pad 8
3716	Pad 9
3718	Pad 10
3720	Pad 11
3722	Pad 12
3724	Pad 13
3726	Pad 14
3728	Pad 15
3730	Pad 16
4024	FieldbusM->S1
4034	FieldbusM->S2
4044	FieldbusM->S3
4054	FieldbusM->S4
4064	FieldbusM->S5
4074	FieldbusM->S6
4084	FieldbusM->S7
4094	FieldbusM->S8
4104	FieldbusM->S9
4114	FieldbusM->S10
4124	FieldbusM->S11
4134	FieldbusM->S12
4144	FieldbusM->S13
4154	FieldbusM->S14
4164	FieldbusM->S15
4174	FieldbusM->S16

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11002</b>	<b>Set point val</b>		FLOAT		0	0	0	RW	FVS

If parameter 11000 **Set point val** is set to **Digital Param** [0] the PID input reference value can be written in this parameter. For the other selections of parameter 11000 **Set point val** this parameter displays the value of the current reference, scaled according to parameters 11012 **Signals full scale** and 11014 **Signals offset** and to the unit of

measure selected in parameter 11010 **Refences unit**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11004</b>	<b>Feedback sel</b>		ENUM		Analog inp 1X	0	4174	RWZ	FVS

Parameter for selecting the PID feedback reference.

When you select Param digitale the feedback corresponds to the value of parameter 11006 **Feedback val**.

- 0 Digital Param
- 1600 Analog inp 1X
- 1650 Analog inp 2X
- 3700 PID output
- 3710 Pad 6
- 3712 Pad 7
- 3714 Pad 8
- 3716 Pad 9
- 3718 Pad 10
- 3720 Pad 11
- 3722 Pad 12
- 3724 Pad 13
- 3726 Pad 14
- 3728 Pad 15
- 3730 Pad 16
- 4024 FieldbusM->S1
- 4034 FieldbusM->S2
- 4044 FieldbusM->S3
- 4054 FieldbusM->S4
- 4064 FieldbusM->S5
- 4074 FieldbusM->S6
- 4084 FieldbusM->S7
- 4094 FieldbusM->S8
- 4104 FieldbusM->S9
- 4114 FieldbusM->S10
- 4124 FieldbusM->S11
- 4134 FieldbusM->S12
- 4144 FieldbusM->S13
- 4154 FieldbusM->S14
- 4164 FieldbusM->S15
- 4174 FieldbusM->S16

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11006</b>	<b>Feedback val</b>		FLOAT		0	0	1	RW	FVS

If parameter 11004 **Feedback sel** is set to **Digital Param** [0] the PID feedback value can be written in this parameter. For the other selections of parameter 11004 **Feedback sel** it displays the value of the current feedback, scaled according to parameters 11012 **Signals full scale** and 11014 **Signals offset** and to the unit of measure selected in parameter 11010 **Refences unit**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11008</b>	<b>Feedback sign</b>		ENUM		Negative	0	1	RW	FVS

Selection of the feedback sign.

Negative feedbacks are used for pump pressure control and the error (Pid error) is calculated as: Set point – Feedback.

Therefore a reduction in feedback corresponds to an increase in output and thus in drive speed.

Positive feedbacks are used for fan temperature control and the error (Pid error) is calculated as: -Set point + Feedback.

Therefore a reduction in feedback corresponds to a reduction in output and thus in drive speed.

- 0 Negative
- 1 Positive

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11010</b>	<b>Refences unit</b>		ENUM		%	0	3	RWZ	FVS
		Parameter for selecting the unit of measure of the value to be controlled. It changes the unit of measure in parameters 11002 <b>Set point val</b> , 11006 <b>Feedback val</b> , 11012 <b>Signals full scale</b> and 11014 <b>Signals offset</b> .								
		0		%						
		1		m3/h						
		2		°C						
		3		bar						

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11012</b>	<b>Signals full scale</b>		FLOAT		100			RWZ	FVS
		Parameter for scaling the input reference and feedback. It must correspond to the maximum limit for the value to be controlled.								
		For correct tuning, for example when a transducer is used to measure the feedback that supplies a 0-10V signal. The recommended setting for this parameter is the physical value to which the 10V of the signal correspond. (e.g. 5 bar = 10V)								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11014</b>	<b>Signals offset</b>		FLOAT		0			RWZ	FVS
		Parameter for scaling the input reference and feedback. This must correspond to the minimum limit for the value to be controlled.								
		For correct tuning, for example when a transducer is used to measure the feedback that supplies a 0-10V signal. The recommended setting for this parameter is the physical value to which the 0V of the signal correspond.								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11016</b>	<b>Start PID sel</b>		ENUM		Mon ing an 1X	0	4484	RW	FVS
		Parameter for selecting the source of the command to enable the PID controller. If this command is not active when the PID is enabled, the PID will be in the STOP condition, the PID controller will not function and the drive will be disabled.								
		When <b>Digital Param</b> [0] is selected the source of the Start PID command corresponds to the value set in parameter 11018 <b>Start PID</b> .								
		0		Digital Param						
		1110		Dig Inp E Mon						
		1210		Dig Input 1X						
		1212		Dig Input 2X						
		1214		Dig Input 3X						
		1216		Dig Input 4X						
		1218		Dig Input 5X						
		1220		Dig Input 6X						
		1222		Dig Input 7X						
		1224		Dig Input 8x						
		3702		PID Start mon						
		3704		FB level alarm						
		3706		Wait state mon						
		3708		Const pres mon						
		3710		Pad 6						
		3712		Pad 7						
		3714		Pad 8						
		3716		Pad 9						
		3718		Pad 10						
		3720		Pad 11						
		3722		Pad 12						
		3724		Pad 13						
		3726		Pad 14						
		3728		Pad 15						
		3730		Pad 16						
		4024		FieldbusM->S1						
		4034		FieldbusM->S2						

4044 FieldbusM->S3  
 4054 FieldbusM->S4  
 4064 FieldbusM->S5  
 4074 FieldbusM->S6  
 4084 FieldbusM->S7  
 4094 FieldbusM->S8  
 4104 FieldbusM->S9  
 4114 FieldbusM->S10  
 4124 FieldbusM->S11  
 4134 FieldbusM->S12  
 4144 FieldbusM->S13  
 4154 FieldbusM->S14  
 4164 FieldbusM->S15  
 4174 FieldbusM->S16  
 4454 Bit0 decompMon  
 4456 Bit1 decompMon  
 4458 Bit2 decompMon  
 4460 Bit3 decompMon  
 4462 Bit4 decompMon  
 4464 Bit5 decompMon  
 4466 Bit6 decompMon  
 4468 Bit7 decompMon  
 4470 Bit8 decompMon  
 4472 Bit9 decompMon  
 4474 Bit10decompMon  
 4476 Bit11decompMon  
 4478 Bit12decompMon  
 4480 Bit13decompMon  
 4482 Bit14decompMon  
 4484 Bit15decompMon

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11018</b>	<b>Start PID</b>		ENUM		Not Active	0	1	RW	FVS

Parameter for selecting the source of the command to enable the PID controller. If this command is not active when the PID is enabled, the PID will be in the STOP condition, the PID controller will not function and the drive will be disabled.

When Digital Param is selected the source of the Start PID command corresponds to the value set in PAR 11018 **Start PID**.

0 Not Active  
 1 Active

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>12000</b>	<b>Pid Output</b>	rpm	INT32		0	0	16384	R	FVS

This variable displays the PID output: it can assume values of 0 to 16384 and if used as the drive speed reference the value of 16384 corresponds to the value set in PAR 680 **Full scale speed**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>12004</b>	<b>Pid State</b>		ENUM		Disable	0	5	R	FVS

This variable displays the current state of the PID controller.

0 Disable  
 1 PID  
 2 Stop  
 3 Alarm  
 4 Wait  
 5 Pressure const

If **0 (Disable)** is displayed, parameter 11000 **Set point sel** has been set to PID disabled.

If **1 (PID)** is displayed, the controller is functioning and the drive speed reference is therefore linked to the PID out-

put.

If **2 (Stop)** is displayed the Start PID command has not been enabled.

If **3 (Alarm)** is displayed a drive alarm condition has occurred

If **4 (Wait)** is displayed the drive has been disabled because the output speed has fallen below the threshold set in parameter 11040 **Wait speed**. For further details reference should be made to parameter 11044 **Restart speed**.

If **5 (Pressure const)** is displayed the drive has been disabled because the feedback is not as far from the set point as the value set in parameter 11070 **Const pressure thr**. For further details reference should be made to parameters 11070 **Const pressure thr**, 11074 **Const press offset** and 11076 **Fluid loss thr**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>12008</b>	<b>Word comp PID</b>		UINT16		0			R	FVS

This variable displays the word composed of the PID output commands.

Bits	Meaning	
0	PID Start mon	(3702)
1	FB level alarm	(3704)
2	Wait state mon	(3706)
3	Const pres mon	(3708)
4	free	
5	free	
6	free	
7	free	

## GAINS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11020</b>	<b>Proportional gain</b>	%	FLOAT		1.00	0.00	10.00	RW	FVS

This parameter specifies the gain associated with proportional control (P).

If the other two gains (I and D) are set to zero, only proportional control is effective. With a PID error equal to 10% of the full scale value and 11020 **Proportional gain** = 1, the speed reference linked to the PID output is equal to 10% of **Full scale speed**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11022</b>	<b>Integral gain</b>	sec	FLOAT		1.00	0.00	100.00	RW	FVS

This parameter specifies the gain associated with integral control (I). If proportional gain is set to 1 and the PID error is constant, the output of the integral block is equal to the input (PID error) after reaching the set integral time (parameter 11022 **Integral gain**).

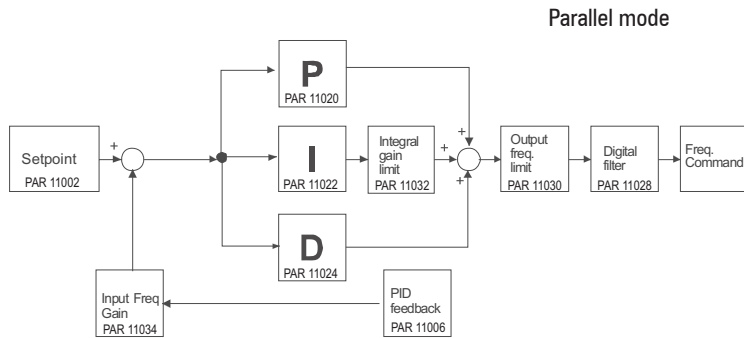
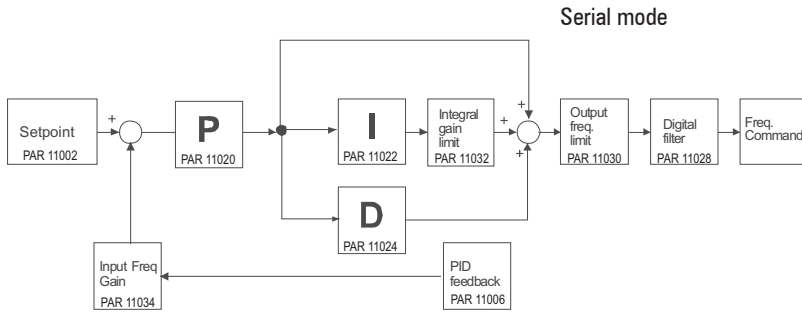
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11024</b>	<b>Derivative gain</b>	sec	INT16		0.000	0.000	1.000	RW	FVS

This parameter specifies the gain associated with derivative control (D). With proportional gain set to 1, when the PID error has a constant variation, the output of the proportional block is equal to the value of the variation after reaching the set derivative time (parameter 11024 **Derivative gain**). The derivative part has the effect of increasing the response speed, but it may lead to over-compensation.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11026</b>	<b>Calc PID mode</b>		ENUM		Series	0	1	RW	FVS

PID controller calculation mode.

0	Series
1	Parallel



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11028</b>	<b>Output filter time</b>	sec	FLOAT		0.000	0.000	2.500	RW	FVS

This parameter defines the time constant of the digital filter inserted before the PID output. The filter is inserted to prevent any amplification of measurement noise in the controller output and helps to mitigate any oscillations.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11030</b>	<b>Limit gain</b>	%	FLOAT		100.0	0.0	110.0	RW	FVS

This parameter defines the percentage of the output speed limit during PID control. The formula is: output speed limit = Full scale speed multiplied by parameter 11030 **Limit gain** (%). This parameter may limit the maximum output speed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11032</b>	<b>Limit integral gain</b>	%	FLOAT		100.0	0.0	100.0	RW	FVS

This parameter defines the upper limit for integral gain (I) and thus limits the output speed.

The formula is: upper integral limit = **Full scale speed** multiplied by parameter 11032 **Lim Integral gain** (%).

This parameter may limit the maximum output speed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11034</b>	<b>Gain feedback</b>		FLOAT		1.0	0.0	10.0	RW	FVS

This parameter defines the gain on the feedback detection value.

The feedback value is that of the source selected in parameter 11004 **Feedback sel** multiplied by parameter 11034 **Gain feedback**.

## LEVELS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11038</b>	<b>Minimum speed</b>	rpm	INT32		0	0	CALCI	RW	FVS

This parameter defines the minimum PID output speed.

The offset derived from the minimum PID speed is set before calculating the maximum speed limit so that the output cannot exceed the maximum speed limit even in case of a high minimum speed.

To avoid any inconsistency between the minimum speed set in this parameter and that set in parameter 636 **Ramp ref bottom lim** these parameters are always the same.



Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11040</b>	<b>Wait speed</b>	rpm	FLOAT		0.00	0.00	CALCI	RW	FVS

This parameter defines the output speed threshold below which the PID enters the waiting condition (PID state = Wait).

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11042</b>	<b>Check wait time</b>	sec	FLOAT		0.00	0.00	100000	RW	FVS

This parameter defines the time for detecting the waiting and restart condition.

The PID moves to the waiting condition if the output speed remains below the threshold set in parameter 11040 **Wait speed** for longer than the time set in this parameter.

The drive moves back to the PID condition if the PID output exceeds the threshold set in parameter 11044 **Restart speed** for longer than the time set in parameter 11042 **Check wait time**.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11044</b>	<b>Restart speed</b>	rpm	FLOAT		0.00	0.00	CALCI	RW	FVS

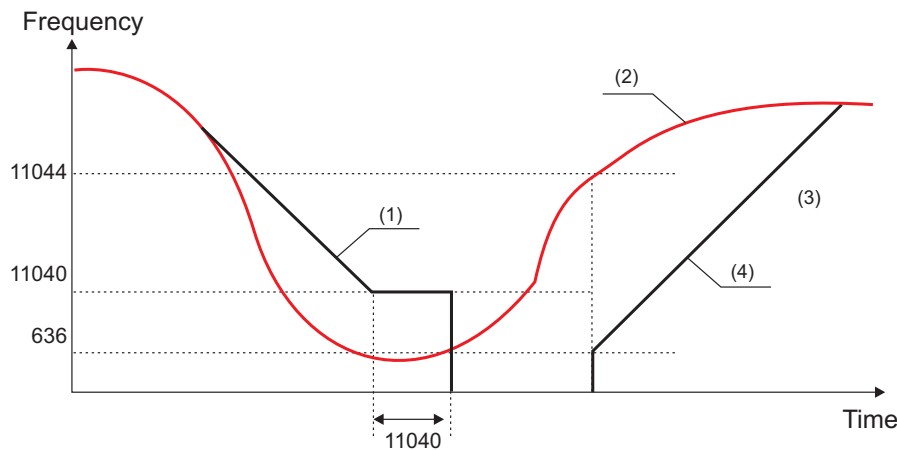
This parameter defines the speed threshold above which the PID moves out of the waiting condition.

When the actual output speed is lower than or equal to that set in parameter 11040 **Wait speed** for longer than the time set in 11042 **Check wait time**, the drive moves to the waiting condition.

When the speed command is higher than the value set in **Restart speed** for longer than the time set in **Check wait time**, the drive restarts.

When the drive is in the waiting condition, the speed command is still calculated by the PID. When the calculated speed reaches the restart speed, the drive accelerates from the minimum speed following the set ramps.

The restart speed must be higher than the waiting speed.



- (1) Deceleration time limit
- (2) Frequency calculated by the PID
- (3) Output frequency
- (4) Acceleration time limit

**Note:**

.....  
 If the waiting speed is equal to zero the function is disabled.  
 When the output speed is lower than or equal to the waiting speed and the time is longer than the detection time, the waiting condition is enabled and the output speed is equal to 0.  
 When the output speed is lower than or equal to the waiting speed for less than the detection time, the speed command = waiting speed.  
 If the minimum speed is lower than the waiting speed, the waiting condition cannot be enabled.  
 .....

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11070</b>	<b>Const pressure thr</b>	%	INT32		0	0	100	RW	FVS

This parameter defines the error threshold (expressed as a percentage with respect to the set point) for moving to the constant pressure condition.

When the error is below the set threshold, the PID moves to the “Constant pressure” condition and the drive stops.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11072</b>	<b>Const press thr time</b>	sec	FLOAT		0.00	0.00	100000	RW	FVS

This parameter defines the time for detecting that the constant pressure threshold has been exceeded. When the error is below “**Const pressure thr**” for longer than “**Const press thr time**” the drive decelerates until it stops and then moves to the “**Const pressure**” condition.

Example: suppose parameter 11002 **Set point val** of a pump pressure control is 10 bar, parameter 11070 **Const pressure thr** is set to 5% and parameter 11072 **Const press thr time** is set to 15 seconds.

This means that the error threshold is 0.5 bar (10 bar X 5% = 0.5 bar), so that when the feedback value is more than 9.5 bar for more than 15 seconds, the drive decelerates until it stops. When the feedback value is less than 9.5 bar, the drive restarts.

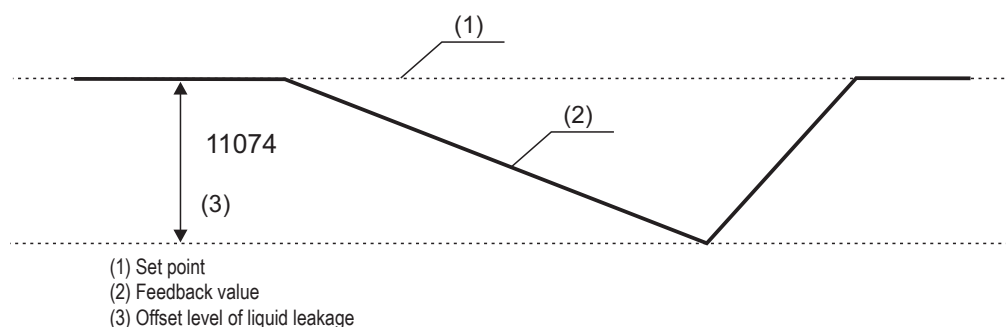
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11074</b>	<b>Const press offset</b>	%	INT32		0	0	50	RW	FVS

This parameter defines the offset (expressed as a percentage with respect to the set point) for moving from the constant pressure condition and restarting the drive.

If the PID is in the constant pressure condition, to restart the drive the error must be higher than the value set in parameter 11070 **Const pressure thr** + parameter 11074 **Const press offset**.

Example: suppose the value of a pump pressure control set point (PAR 11002) is 10 bar, 11070 **Const pressure thr** is set to 5%, PAR 11074 **Const press offset** is set to 4%.

This means that to move to the constant pressure condition the feedback must be more than 9.5 bar. To restart the drive the feedback must be less than 9.1 bar (10 – (10bar X 5% + 10bar X 4%)).



This parameter is used to avoid frequent start/stop operations due to leakages.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11076</b>	<b>Fluid loss thr</b>	%	FLOAT		0.0	0.0	100.0	RW	FVS

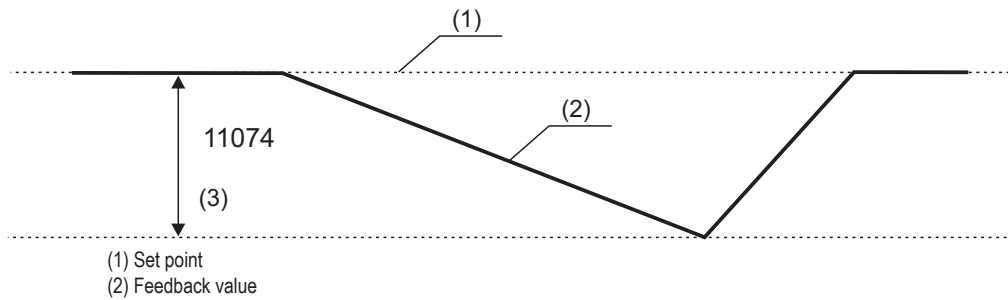
This parameter defines the threshold (expressed as a percentage with respect to the set point) for a change in the error in the time set in PAR 11078 Fluid loss thr time to detect a leakage and move from the constant pressure condition and restart the drive.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11078</b>	<b>Fluid loss thr time</b>	%	FLOAT		0.10	0.01	10.00	RW	FVS

This parameter defines the time for calculating the change in PIDerror to detect the leakage.

**Note:**

.....  
If parameter 11076 **Fluid loss thr** = 0 the function is not enabled.  
To move from the constant pressure condition, the function is enabled if the PID error is higher than the value set in PAR 11070 **Const pressure thr** otherwise each restart operation would correspond to an immediate stop with the return to the constant pressure condition.  
.....



*Example:* suppose parameter 11002 **Set point val** of a pump pressure control is 10 bar, 11070 **Const pressure thr** is set to 5%, 11074 **Const press offset** is set to 4% and 11076 **Fluid loss thr** = 1% with 11078 **Fluid loss thr time** = 0.6 seconds

This means that to move to the constant pressure condition the feedback must be more than 9.5 bar.

We can consider 2 cases for restarting:

Case 1: the liquid leakage causes the pressure to fall by 0.1 bar per second

In this case the change is lower than the set threshold and to restart the drive the feedback must be less than 9.1 bar due to the settings in parameter 11074 **Const press offset**.

Case 2: the liquid leakage causes the pressure to fall by 0.2 bar per second

In this case the change exceeds that set in PAR 11076 **Fluid loss thr** (0.1 bar every 0.6 seconds). After 0.6 seconds (from when the constant pressure threshold is exceeded) the pressure feedback is 9.38 bar, a leakage is detected and the drive is restarted.

## ALARMS

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11050</b>	<b>Feedback loss time</b>	sec	FLOAT		0.00	0	10000	RW	FVS

This parameter defines the time for recognising the loss of the feedback signal.

The alarm is only recognised if parameter 11004 **Feedback sel** is set to PAR 1600 **Analog input 1X mon** and PAR 1650 **Analog input 2X mon**.

The drive recognises the alarm if the feedback signal is equal to zero (no signal) for longer than the time set in PAR 11050 **Feedback loss time**. If this parameter is set to zero, the alarm is not recognised.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11052</b>	<b>Feedback loss act</b>		ENUM		Stop	0	4	RW	FVS

This parameter defines drive activity following the recognition of a **Perdita retroaz PID** alarm.

- 0 Ignore
- 1 Warning
- 2 Disable
- 3 Stop
- 4 Faststop

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11054</b>	<b>Feedback level</b>	%	FLOAT		20.000	1.000	50.000	RW	FVS

This parameter defines the error level (expressed as a percentage with respect to the set point) for generating the **PID FB loss** alarm.

The alarm is generated when the PID error is higher than the set threshold.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11056</b>	<b>Feedback level time</b>	sec	FLOAT		5.00	0.10	3600	RW	FVS

This parameter defines the time for recognising the **PID FB loss** alarm.

The alarm is generated when the PID error exceeds the level set in parameter 11054 **Feedback level** for longer than the set time.

*Example:* suppose parameter 11002 **Set point val** of a pump pressure controller is 10 bar, 11054 **Feedback level** = 20% and 11056 **Feedback level time** = 5 seconds

If the feedback remains below the 8 bar level (10 bar – (10 bar X 20%)) for more than 5 seconds, a **PID FB loss** alarm is generated.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11058</b>	<b>Feedback level act</b>		ENUM		Ignora	0	5	RW	FVS

This parameter defines drive activity following recognition of a **PID FB loss** alarm.

- 0 Ignore
- 1 Warning
- 2 Disable
- 3 Stop
- 4 Faststop
- 5 Stop & restart

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>11060</b>	<b>Restart time</b>	sec	FLOAT		5.00	0.10	3600	RW	FVS

This parameter defines the delay before restarting after a **PID FB loss** alarm.

Automatic restart only occurs if parameter 11058 **Feedback level act** is set to **Stop & restart**.

## 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** rpm 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
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**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
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**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
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**626 Ramp ref out mon** rpm 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
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**760 Ramp out mon** rpm 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
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**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
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**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
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**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
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**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
	<b>956</b>	<b>Speed thr 1_2 mon</b>		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
	<b>966</b>	<b>Set speed</b>		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
	<b>976</b>	<b>Speed thr 3 mon</b>		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
	<b>986</b>	<b>Current thr mon</b>		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
	<b>1030</b>	<b>Local/remote mon</b>		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
	<b>1060</b>	<b>Sequencer status</b>		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
	<b>1062</b>	<b>Drive OK</b>		BIT	16	0	0	1	ER	

This signal is active when the drive is in the “OK” condition and no alarms are present.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>1064</b>	<b>Drive ready</b>		BIT	16	0	0	1	ER	

This signal is active when the drive reference is in the “Ready” to run condition.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>1110</b>	<b>Digital input E mon</b>		BIT	16	0	0	1	ER	
	<b>1210</b>	<b>Digital input 1X mon</b>		BIT	16	0	0	1	ER	
	<b>1212</b>	<b>Digital input 2X mon</b>		BIT	16	0	0	1	ER	
	<b>1214</b>	<b>Digital input 3X mon</b>		BIT	16	0	0	1	ER	
	<b>1216</b>	<b>Digital input 4X mon</b>		BIT	16	0	0	1	ER	
	<b>1218</b>	<b>Digital input 5X mon</b>		BIT	16	0	0	1	ER	
	<b>1220</b>	<b>Digital input 6X mon</b>		BIT	16	0	0	1	ER	
	<b>1222</b>	<b>Digital input 7X mon</b>		BIT	16	0	0	1	ER	
	<b>1224</b>	<b>Digital input 8X mon</b>		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
	<b>1630</b>	<b>Analog inp1X</b>		BIT	16	0	0	1	ER	

This signal is active when the value of the analog input is below the threshold set in parameter **1620 Analog inp 1X thr.**

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>1680</b>	<b>Analog inp2X</b>		BIT	16	0	0	1	ER	

This signal is active when the value of the analog input is below the threshold set in parameter **1670 Analog inp 2X thr.**

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>2388</b>	<b>Torque ref nofilter</b>	perc	FLOAT	16	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
	<b>3180</b>	<b>Brake control mon</b>	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
	<b>3214</b>	<b>Motor overload trip</b>		BIT	16	0	0	1	ER	
		This signal is active when the drive is in the motor overload alarm condition.								
	<b>3262</b>	<b>Bres overload trip</b>		BIT	16	0	0	1	ER	
		This signal is active when the drive is in the braking resistor overload alarm condition.								
	<b>3342</b>	<b>Energysave out run</b>		BIT	16BIT	0	0	1	ER	
		This parameter is used to read whether an increase in output voltage or reduction in output voltage is being executed. This parameter may be linked to parameter 754 <b>Ramp freeze src</b> to freeze the speed ramp during changes in output voltage.								
	<b>3374</b>	<b>Vf catch out</b>		INT32	16	0	0	0	ER	
		The voltage applied during capture on-the-fly of the motor in Vf mode is displayed.								
	<b>3442</b>	<b>Powerloss rampdown</b>		BIT	16	0	0	1	ER	
		This parameter indicates the status of the Powerloss function deceleration ramp								
		<ul style="list-style-type: none"> <li>0 Powerloss function deceleration ramp not ended</li> <li>1 Powerloss function deceleration ramp ended</li> </ul>								
		The signal is enabled at the end of the Powerloss function deceleration ramp.								
		The signal is disabled at different times depending on the <b>Powerloss mode</b> setting.								
	<b>3446</b>	<b>Powerloss nextratio</b>		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 <b>Powerloss mode</b> output of the master to the <b>Speed ratio src</b> input of the slave drives. The master => slave connection can be achieved via analog signals or fieldbus.								
		The value 2 <sup>30</sup> corresponds to a ratio of 1.								
	<b>3448</b>	<b>Powerloss nextactive</b>		BIT	16	0	0	1	ER	
		This parameter indicates the status of the Powerloss function								
		<ul style="list-style-type: none"> <li>0 Powerloss not enabled</li> <li>1 Powerloss enabled</li> </ul>								
		The function is enabled when there is a power failure.								
		The function is disabled at different times depending on the <b>Powerloss mode</b> setting.								
	<b>3480</b>	<b>Vdc ctrl ramp freeze</b>		BIT	16	0	0	1	ER	
		This parameter displays when the deceleration ramp block is requested during the <b>Vdc control function</b> .								
		<ul style="list-style-type: none"> <li>0 VdcCtrl function not enabled</li> </ul>								



## 1 VdcCtrl function enabled

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>4372</b>	<b>DS402 status word</b>		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
	<b>4708</b>	<b>Alm dig out mon 1</b>		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
	<b>4710</b>	<b>Alm dig out mon 2</b>		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
	<b>4712</b>	<b>Alm dig out mon 3</b>		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
	<b>4714</b>	<b>Alm dig out mon 4</b>		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
	<b>4770</b>	<b>First alarm</b>		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 Not Used1
- 28 Not Used2
- 29 Not Used3

- 30 Not Used4
- 31 Not Used5
- 32 Not Used6
- 33 Plc1 fault
- 34 Plc2 fault
- 35 Plc3 fault
- 36 Plc4 fault
- 37 Plc5 fault
- 38 Plc6 fault
- 39 Plc7 fault
- 40 Plc8 fault

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Mod
	<b>4780</b>	<b>Alarm PLC</b>		UINT16		0	0	0	ER	

This parameter displays the state of the alarms generated by the application written with the internal PLC

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
	<b>4840</b>	<b>Alarm Io state</b>		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 lin 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
	<b>4842</b>	<b>Alarm hi state</b>		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
	<b>6000</b>	<b>Null</b>		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
	<b>6002</b>	<b>One</b>		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
	<b>6004</b>	<b>Speed limit state</b>		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
	<b>6006</b>	<b>Current limit state</b>		BIT	16	0	0	1	ER	

This signal is activated when the drive is in the current limit condition.

## C – SELECTION LISTS

PAR	Description	Menu	PAR	Description	Menu	PAR	Description	Menu
<b>L_ANOUT</b>			3720	Pad 11	22.7.11	3718	Pad 10	22.7.10
6000	Null	0.0 (*)	3722	Pad 12	22.7.12	3720	Pad 11	22.7.11
626	Ramp ref out mon	0.0 (*)	3724	Pad 13	22.7.13	3722	Pad 12	22.7.12
628	Ramp setpoint	1.4	3726	Pad 14	22.7.14	3724	Pad 13	22.7.13
760	Ramp out mon	0.0 (*)	3728	Pad 15	22.7.15	3726	Pad 14	22.7.14
664	Speed setpoint	1.5	3730	Pad 16	22.7.16	3728	Pad 15	22.7.15
260	Motor speed	1.6	5008	Test gen out	27.1.5	3730	Pad 16	22.7.16
262	Motor speed nofilter	0.0 (*)	<b>L_CMP</b>			<i>(1) the XXXX parameter changes according to the src parameter used:</i>		
2150	Encoder 1 speed	17.11	XXXX (1)			960	Set speed ref src	
250	Output current	1.1	626	Ramp ref out mon	0.0 (*)	(1) = 968 Dig set speed ref		10.11
252	Output voltage	1.2	628	Ramp setpoint	1.4	3660	Compare input 1 src	
254	Output frequency	1.3	760	Ramp out mon	0.0 (*)	(1) = 3650 Dig compare input 1		0.0 (*)
280	Torque current ref	1.9	664	Speed setpoint	1.5	3662	Compare input 2 src	
282	Magnet current ref	1.10	260	Motor speed	1.6	(1) = 3652 Dig compare input 2		0.0 (*)
284	Torque current	1.11	262	Motor speed nofilter	0.0 (*)	<b>L_DIGSEL1</b>		
286	Magnet current	1.12	2150	Encoder 1 speed	17.11	6000	Null	0.0
2360	Torque lim Pos Inuse	20.6	250	Output current	1.1	6002	One	0.0 (*)
2362	Torque lim Neg Inuse	20.7	252	Output voltage	1.2	1110	Digital input E mon	0.0 (*)
2386	Torque ref	20.11	254	Output frequency	1.3	1210	Digital input 1X mon	0.0 (*)
2388	Torque ref nofilter	0.0 (*)	280	Torque current ref	1.9	1212	Digital input 2X mon	0.0 (*)
270	DC link voltage	1.7	282	Magnet current ref	1.10	1214	Digital input 3X mon	0.0 (*)
852	Multi ref out mon	7.24	284	Torque current	1.11	1216	Digital input 4X mon	0.0 (*)
870	Mpot setpoint	8.1	286	Magnet current	1.12	1218	Digital input 5X mon	0.0 (*)
894	Mpot output mon	8.13	2386	Torque ref	20.11	1220	Digital input 6X mon	0.0 (*)
920	Jog output mon	9.6	2388	Torque ref nofilter	0.0 (*)	1222	Digital input 7X mon	0.0 (*)
3104	Inertia comp mon	22.1.3	270	DC link voltage	1.7	1224	Digital input 8X mon	0.0 (*)
1600	Analog input 1X mon	14.1	852	Multi ref out mon	7.24	1062	Drive OK	0.0 (*)
1650	Analog input 2X mon	14.16	870	Mpot setpoint	8.1	1064	Drive ready	0.0 (*)
368	Drive overload accum	1.14	894	Mpot output mon	8.13	934	Ref is 0	0.0 (*)
3212	Motor overload accum	1.13	920	Jog output mon	9.6	936	Ref is 0 delay	0.0 (*)
3260	Bres overload accum	1.15	1600	Analog input 1X mon	14.1	944	Speed is 0	0.0 (*)
2232	Spd reg P gain Inuse	18.11	1650	Analog input 2X mon	14.16	946	Speed is 0 delay	0.0 (*)
2234	Spd reg I gain Inuse	18.12	368	Drive overload accum	1.14	956	Speed thr 1_2 mon	0.0 (*)
3446	Powerloss nexratio	0.0 (*)	3212	Motor overload accum	1.13	966	Set speed	0.0 (*)
3340	Energysave out	22.10.6	4024	Fieldbus M->S1 mon	23.3.3	976	Speed thr 3 mon	0.0 (*)
4024	Fieldbus M->S1 mon	23.3.3	4024	Fieldbus M->S1 mon	23.3.3	986	Current thr mon	0.0 (*)
4034	Fieldbus M->S2 mon	23.3.7	4034	Fieldbus M->S2 mon	23.3.7	1066	Enable state mon	1.16
4044	Fieldbus M->S3 mon	23.3.11	4044	Fieldbus M->S3 mon	23.3.11	1068	Start state mon	1.17
4054	Fieldbus M->S4 mon	23.3.15	4054	Fieldbus M->S4 mon	23.3.15	1070	FastStop state mon	1.18
4064	Fieldbus M->S5 mon	23.3.19	4064	Fieldbus M->S5 mon	23.3.19	1024	Enable cmd mon	11.13
4074	Fieldbus M->S6 mon	23.3.23	4074	Fieldbus M->S6 mon	23.3.23	1026	Start cmd mon	11.14
4084	Fieldbus M->S7 mon	23.3.27	4084	Fieldbus M->S7 mon	23.3.27	1028	FastStop cmd mon	11.15
4094	Fieldbus M->S8 mon	23.3.31	4094	Fieldbus M->S8 mon	23.3.31	4708	Alm dig out mon 1	0.0 (*)
4104	Fieldbus M->S9 mon	23.3.35	4104	Fieldbus M->S9 mon	23.3.35	4710	Alm dig out mon 2	0.0 (*)
4114	Fieldbus M->S10 mon	23.3.39	4114	Fieldbus M->S10 mon	23.3.39	4712	Alm dig out mon 3	0.0 (*)
4124	Fieldbus M->S11 mon	23.3.43	4124	Fieldbus M->S11 mon	23.3.43	4714	Alm dig out mon 4	0.0 (*)
4134	Fieldbus M->S12 mon	23.3.47	4134	Fieldbus M->S12 mon	23.3.47	1630	Analog inp1X<thr	0.0 (*)
4144	Fieldbus M->S13 mon	23.3.51	4144	Fieldbus M->S13 mon	23.3.51	1680	Analog inp2X<thr	0.0 (*)
4154	Fieldbus M->S14 mon	23.3.55	4154	Fieldbus M->S14 mon	23.3.55	362	Drive overload trip	0.0 (*)
4164	Fieldbus M->S15 mon	23.3.59	4164	Fieldbus M->S15 mon	23.3.59	3214	Motor overload trip	0.0 (*)
4174	Fieldbus M->S16 mon	23.3.63	4174	Fieldbus M->S16 mon	23.3.63	3262	Bres overload trip	0.0 (*)
3700	Pad 1	22.7.1	3700	Pad 1	22.7.1	366	Drive overload 80%	0.0 (*)
3702	Pad 2	22.7.2	3702	Pad 2	22.7.2	1048	FR start mon	11.20
3704	Pad 3	22.7.3	3704	Pad 3	22.7.3	1050	FR reverse mon	11.21
3706	Pad 4	22.7.4	3706	Pad 4	22.7.4			
3708	Pad 5	22.7.5	3708	Pad 5	22.7.5			
3710	Pad 6	22.7.6	3710	Pad 6	22.7.6			
3712	Pad 7	22.7.7	3712	Pad 7	22.7.7			
3714	Pad 8	22.7.8	3714	Pad 8	22.7.8			
3716	Pad 9	22.7.9	3716	Pad 9	22.7.9			
3718	Pad 10	22.7.10						

PAR	Description	Menu	PAR	Description	Menu	PAR	Description	Menu
4454	Bit0 decomp mon	23.6.3	4468	Bit7 decomp mon	23.6.10	4708	Alm dig out mon 1	0.0 (*)
4456	Bit1 decomp mon	23.6.4	4470	Bit8 decomp mon	23.6.11	4710	Alm dig out mon 2	0.0 (*)
4458	Bit2 decomp mon	23.6.5	4472	Bit9 decomp mon	23.6.12	4712	Alm dig out mon 3	0.0 (*)
4460	Bit3 decomp mon	23.6.6	4474	Bit10 decomp mon	23.6.13	4714	Alm dig out mon 4	0.0 (*)
4462	Bit4 decomp mon	23.6.7	4476	Bit11 decomp mon	23.6.14	1630	Analog inp1X<thr	0.0 (*)
4464	Bit5 decomp mon	23.6.8	4478	Bit12 decomp mon	23.6.15	1680	Analog inp2X<thr	0.0 (*)
4466	Bit6 decomp mon	23.6.9	4480	Bit13 decomp mon	23.6.16	362	Drive overload trip	0.0 (*)
4468	Bit7 decomp mon	23.6.10	4482	Bit14 decomp mon	23.6.17	3214	Motor overload trip	0.0 (*)
4470	Bit8 decomp mon	23.6.11	4484	Bit15 decomp mon	23.6.18	3262	Bres overload trip	0.0 (*)
4472	Bit9 decomp mon	23.6.12	3700	Pad 1	22.7.1	366	Drive overload 80%	0.0 (*)
4474	Bit10 decomp mon	23.6.13	3702	Pad 2	22.7.2	1048	FR start mon	11.20
4476	Bit11 decomp mon	23.6.14	3704	Pad 3	22.7.3	1050	FR reverse mon	11.21
4478	Bit12 decomp mon	23.6.15	3706	Pad 4	22.7.4	4454	Bit0 decomp mon	23.6.3
4480	Bit13 decomp mon	23.6.16	3708	Pad 5	22.7.5	4456	Bit1 decomp mon	23.6.4
4482	Bit14 decomp mon	23.6.17	3710	Pad 6	22.7.6	4458	Bit2 decomp mon	23.6.5
4484	Bit15 decomp mon	23.6.18	3712	Pad 7	22.7.7	4460	Bit3 decomp mon	23.6.6
3700	Pad 1	22.7.1	3714	Pad 8	22.7.8	4462	Bit4 decomp mon	23.6.7
3702	Pad 2	22.7.2	3716	Pad 9	22.7.9	4464	Bit5 decomp mon	23.6.8
3704	Pad 3	22.7.3	3718	Pad 10	22.7.10	4466	Bit6 decomp mon	23.6.9
3706	Pad 4	22.7.4	3720	Pad 11	22.7.11	4468	Bit7 decomp mon	23.6.10
3708	Pad 5	22.7.5	3722	Pad 12	22.7.12	4470	Bit8 decomp mon	23.6.11
3710	Pad 6	22.7.6	3724	Pad 13	22.7.13	4472	Bit9 decomp mon	23.6.12
3712	Pad 7	22.7.7	3726	Pad 14	22.7.14	4474	Bit10 decomp mon	23.6.13
3714	Pad 8	22.7.8	3728	Pad 15	22.7.15	4476	Bit11 decomp mon	23.6.14
3716	Pad 9	22.7.9	3730	Pad 16	22.7.16	4478	Bit12 decomp mon	23.6.15
3718	Pad 10	22.7.10	1630	Analog inp1X<thr	0.0 (*)	4480	Bit13 decomp mon	23.6.16
3720	Pad 11	22.7.11	1680	Analog inp2X<thr	0.0 (*)	4482	Bit14 decomp mon	23.6.17
3722	Pad 12	22.7.12	1048	FR start mon	11.20	4484	Bit15 decomp mon	23.6.18
3724	Pad 13	22.7.13	1050	FR reverse mon	11.21	3700	Pad 1	22.7.1
3726	Pad 14	22.7.14	3480	Vdc ctrl ramp freeze	0.0 (*)	3702	Pad 2	22.7.2
3728	Pad 15	22.7.15	3342	Energysave out run	0.0 (*)	3704	Pad 3	22.7.3
3730	Pad 16	22.7.16				3706	Pad 4	22.7.4
6004	Speed limit state	0.0 (*)				3708	Pad 5	22.7.5
6006	Current limit state	0.0 (*)				3710	Pad 6	22.7.6
764	Ramp acc state	0.0 (*)				3712	Pad 7	22.7.7
766	Ramp dec state	0.0 (*)				3714	Pad 8	22.7.8
1030	Local/remote mon	0.0 (*)				3716	Pad 9	22.7.9
4780	Alarm PLC	0.0 (*)				3718	Pad 10	22.7.10
3442	Powerloss rampdown	0.0 (*)				3720	Pad 11	22.7.11
3448	Powerloss nextactive	0.0 (*)				3722	Pad 12	22.7.12
3180	Brake control mon	0.0 (*)				3724	Pad 13	22.7.13
						3726	Pad 14	22.7.14
						3728	Pad 15	22.7.15
						3730	Pad 16	22.7.16
						6004	Speed limit state	0.0 (*)
						6006	Current limit state	0.0 (*)
						764	Ramp acc state	0.0 (*)
						766	Ramp dec state	0.0 (*)
						4780	Alarm PLC	0.0 (*)

**L\_DIGSEL2**

6000	Null	0.0 (*)
6002	One	0.0 (*)
1110	Digital input E mon	0.0 (*)
1210	Digital input 1X mon	0.0 (*)
1212	Digital input 2X mon	0.0 (*)
1214	Digital input 3X mon	0.0 (*)
1216	Digital input 4X mon	0.0 (*)
1218	Digital input 5X mon	0.0 (*)
1220	Digital input 6X mon	0.0 (*)
1222	Digital input 7X mon	0.0 (*)
1224	Digital input 8X mon	0.0 (*)
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

**L\_DIGSEL3**

XXXX (2)		
6000	Null	0.0 (*)
6002	One	0.0 (*)
1110	Digital input E mon	0.0 (*)
1210	Digital input 1X mon	0.0 (*)
1212	Digital input 2X mon	0.0 (*)
1214	Digital input 3X mon	0.0 (*)
1216	Digital input 4X mon	0.0 (*)
1218	Digital input 5X mon	0.0 (*)
1220	Digital input 6X mon	0.0 (*)
1222	Digital input 7X mon	0.0 (*)
1224	Digital input 8X mon	0.0 (*)
1062	Drive OK	0.0 (*)
1064	Drive ready	0.0 (*)
934	Ref is 0	0.0 (*)
936	Ref is 0 delay	0.0 (*)
944	Speed is 0	0.0 (*)
946	Speed is 0 delay	0.0 (*)
956	Speed thr 1_2 mon	0.0 (*)
966	Set speed	0.0 (*)
976	Speed thr 3 mon	0.0 (*)
986	Current thr mon	0.0 (*)
1066	Enable state mon	1.16
1068	Start state mon	1.17
1070	FastStop state mon	1.18
1024	Enable cmd mon	11.13
1026	Start cmd mon	11.14
1028	FastStop cmd mon	11.15

**L\_FBS2M**

XXXX (3)		
6000	Null	0.0 (*)
6002	One	0.0 (*)

(2) the XXXX parameter changes according to the src parameter used:

1014 Local/remote src  
(2) = Dig local/remote 11.7

PAR	Description	Menu	PAR	Description	Menu	PAR	Description	Menu
626	Ramp ref out mon	0.0 (*)	3720	Pad 11	22.7.11	<b>L_MLTREF</b>		
628	Ramp setpoint	1.4	3722	Pad 12	22.7.12			
760	Ramp out mon	0.0 (*)	3724	Pad 13	22.7.13	XXXX (4)		
664	Speed setpoint	1.5	3726	Pad 14	22.7.14	852	Multi ref out mon	7.24
260	Motor speed	1.6	3728	Pad 15	22.7.15	894	Mpot output mon	8.13
262	Motor speed nofilter	0.0 (*)	3730	Pad 16	22.7.16	2150	Encoder 1 speed	17.11
2150	Encoder 1 speed	17.11	4770	First alarm	0.0 (*)	1600	Analog input 1X mon	14.1
250	Output current	1.1	4840	Alarm lo state	0.0 (*)	1650	Analog input 2X mon	14.16
252	Output voltage	1.2	4842	Alarm hi state	0.0 (*)	4024	Fieldbus M->S1 mon	23.3.3
254	Output frequency	1.3	1200	Digital input X mon	1.19	4034	Fieldbus M->S2 mon	23.3.7
280	Torque current ref	1.9	5008	Test gen out	27.1.5	4044	Fieldbus M->S3 mon	23.3.11
282	Magnet current ref	1.10				4054	Fieldbus M->S4 mon	23.3.15
284	Torque current	1.11				4064	Fieldbus M->S5 mon	23.3.19
286	Magnet current	1.12				4074	Fieldbus M->S6 mon	23.3.23
2360	Torque lim Pos Inuse	20.6	(3) the XXXX parameter changes according to the src parameter used:			4084	Fieldbus M->S7 mon	23.3.27
2362	Torque lim Neg Inuse	20.7				4094	Fieldbus M->S8 mon	23.3.31
2386	Torque ref	20.11	4340	DS402 cw src		4104	Fieldbus M->S9 mon	23.3.35
2388	Torque ref nofilter	0.0 (*)	(3) = 4024 Fieldbus M->S1 mon	23.3.3		4114	Fieldbus M->S10 mon	23.3.39
270	DC link voltage	1.7	<b>L_LIM</b>			4124	Fieldbus M->S11 mon	23.3.43
2162	Encoder 1 position	17.12	6000	Null	0.0 (*)	4134	Fieldbus M->S12 mon	23.3.47
2154	E1 Virtual position	27.3.2	2380	Dig torque ref 1	20.8	4144	Fieldbus M->S13 mon	23.3.51
2156	E1 Revolutions	27.3.3	1600	Analog input 1X mon	14.1	4154	Fieldbus M->S14 mon	23.3.55
852	Multi ref out mon	7.24	1650	Analog input 2X mon	14.16	4164	Fieldbus M->S15 mon	23.3.59
870	Mpot setpoint	8.1	4024	Fieldbus M->S1 mon	23.3.3	4174	Fieldbus M->S16 mon	23.3.63
894	Mpot output mon	8.13	4034	Fieldbus M->S2 mon	23.3.7	3700	Pad 1	22.7.1
920	Jog output mon	9.6	4044	Fieldbus M->S3 mon	23.3.11	3702	Pad 2	22.7.2
3104	Inertia comp mon	22.1.3	4054	Fieldbus M->S4 mon	23.3.15	3704	Pad 3	22.7.3
1600	Analog input 1X mon	14.1	4064	Fieldbus M->S5 mon	23.3.19	3706	Pad 4	22.7.4
1650	Analog input 2X mon	14.16	4074	Fieldbus M->S6 mon	23.3.23	3708	Pad 5	22.7.5
368	Drive overload accum	1.14	4084	Fieldbus M->S7 mon	23.3.27	3710	Pad 6	22.7.6
3212	Motor overload accum	1.13	4094	Fieldbus M->S8 mon	23.3.31	3712	Pad 7	22.7.7
3260	Bres overload accum	1.15	4104	Fieldbus M->S9 mon	23.3.35	3714	Pad 8	22.7.8
272	Heatsink temperature	1.8	4114	Fieldbus M->S10 mon	23.3.39	3716	Pad 9	22.7.9
1060	Sequencer status	0.0 (*)	4124	Fieldbus M->S11 mon	23.3.43	3718	Pad 10	22.7.10
4432	Word comp mon	23.5.17	4134	Fieldbus M->S12 mon	23.3.47	3720	Pad 11	22.7.11
3446	Powerloss nexratio	0.0 (*)	4144	Fieldbus M->S13 mon	23.3.51	3722	Pad 12	22.7.12
4372	DS402 status word	0.0 (*)	4154	Fieldbus M->S14 mon	23.3.55	3724	Pad 13	22.7.13
4024	Fieldbus M->S1 mon	23.3.3	4164	Fieldbus M->S15 mon	23.3.59	3726	Pad 14	22.7.14
4034	Fieldbus M->S2 mon	23.3.7	4174	Fieldbus M->S16 mon	23.3.63	3728	Pad 15	22.7.15
4044	Fieldbus M->S3 mon	23.3.11	3700	Pad 1	22.7.1	3730	Pad 16	22.7.16
4054	Fieldbus M->S4 mon	23.3.15	3702	Pad 2	22.7.2	5008	Test gen out	27.1.5
4064	Fieldbus M->S5 mon	23.3.19	3704	Pad 3	22.7.3	(4) the XXXX parameter changes according to the src parameter used:		
4074	Fieldbus M->S6 mon	23.3.23	3706	Pad 4	22.7.4	610	Ramp ref 1 src	
4084	Fieldbus M->S7 mon	23.3.27	3708	Pad 5	22.7.5	(4) = 600 Dig ramp ref 1	5.1	
4094	Fieldbus M->S8 mon	23.3.31	3710	Pad 6	22.7.6	612	Ramp ref 2 src	
4104	Fieldbus M->S9 mon	23.3.35	3712	Pad 7	22.7.7	(4) = 602 Dig ramp ref 2	5.2	
4114	Fieldbus M->S10 mon	23.3.39	3714	Pad 8	22.7.8	614	Ramp ref 3 src	
4124	Fieldbus M->S11 mon	23.3.43	3716	Pad 9	22.7.9	(4) = 604 Dig ramp ref 3	5.3	
4134	Fieldbus M->S12 mon	23.3.47	3718	Pad 10	22.7.10	650	Speed ref 1 src	
4144	Fieldbus M->S13 mon	23.3.51	3720	Pad 11	22.7.11	(4) = 640 Dig speed ref 1	5.15	
4154	Fieldbus M->S14 mon	23.3.55	3722	Pad 12	22.7.12	652	Speed ref 2 src	
4164	Fieldbus M->S15 mon	23.3.59	3724	Pad 13	22.7.13	(4) = 642 Dig speed ref 2	5.16	
4174	Fieldbus M->S16 mon	23.3.63	3726	Pad 14	22.7.14	832	Multi ref 0 src	
3700	Pad 1	22.7.1	3728	Pad 15	22.7.15	(4) = 800 Multi reference 0	7.1	
3702	Pad 2	22.7.2	3730	Pad 16	22.7.16			
3704	Pad 3	22.7.3	5008	Test gen out	27.1.5			
3706	Pad 4	22.7.4						
3708	Pad 5	22.7.5						
3710	Pad 6	22.7.6						
3712	Pad 7	22.7.7						
3714	Pad 8	22.7.8						
3716	Pad 9	22.7.9						
3718	Pad 10	22.7.10						

PAR	Description	Menu
834	Multi ref 1 src (4) = 802 Multi reference 1	7.2

## L\_REF

XXXX	(5)	
3104	Inertia comp mon	22.1.3
3374	Vf catch out	0.0 (*)
1600	Analog input 1X mon	14.1
1650	Analog input 2X mon	14.16
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	22.7.1
3702	Pad 2	22.7.2
3704	Pad 3	22.7.3
3706	Pad 4	22.7.4
3708	Pad 5	22.7.5
3710	Pad 6	22.7.6
3712	Pad 7	22.7.7
3714	Pad 8	22.7.8
3716	Pad 9	22.7.9
3718	Pad 10	22.7.10
3720	Pad 11	22.7.11
3722	Pad 12	22.7.12
3724	Pad 13	22.7.13
3726	Pad 14	22.7.14
3728	Pad 15	22.7.15
3730	Pad 16	22.7.16
6000	Null	0.0 (*)
5008	Test gen out	27.1.5

(5) the XXXX parameter changes according to the src parameter used:

2382	Torque ref 1 src (5) = 2380 Dig torque ref 1	20.8
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2492	Vf scale src (5) = 2490 Dig Vf scale	21.22
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3002	Speed ratio src (5) = 3000 Dig speed ratio	0.0 (*)
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## L\_WDECOMP

XXXX	(6)	
6000	Null	0.0 (*)
6002	One	0.0 (*)
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	22.7.1
3702	Pad 2	22.7.2
3704	Pad 3	22.7.3
3706	Pad 4	22.7.4
3708	Pad 5	22.7.5
3710	Pad 6	22.7.6
3712	Pad 7	22.7.7
3714	Pad 8	22.7.8
3716	Pad 9	22.7.9
3718	Pad 10	22.7.10
3720	Pad 11	22.7.11
3722	Pad 12	22.7.12
3724	Pad 13	22.7.13
3726	Pad 14	22.7.14
3728	Pad 15	22.7.15
3730	Pad 16	22.7.16

(6) the XXXX parameter changes according to the src parameter used:

4452	Word decomp src (6) = 4450 Dig word decomp	23.6.1
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## D – TROUBLESHOOTING - Alarms

**Note 1**

To reset alarms, see Quick start guide, **paragraph 8.6.1**.

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		<b>Condition:</b> No alarm present
1	Overvoltage		<b>Condition: DC link overvoltage alarm due to energy recovered from the motor.</b> 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.
			<b>Solution:</b> - Extend the deceleration ramp. - Use a braking resistor between terminals BR and C to dissipate the recovered energy
2	Undervoltage		<b>Condition:</b> DC link undervoltage alarm. The voltage arriving at the drive power section is too low compared to the minimum threshold relating to the 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. ).
			<b>Solution:</b> Check the connections.
3	Ground fault		<b>Condition:</b> Ground short circuit alarm
			<b>Solution:</b> - Check drive and motor wiring. - Check that the motor is not grounded.
4	Overcurrent		<b>Condition: Instantaneous overcurrent protection intervention alarm.</b> 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.
			<b>Solution:</b> - Check the current regulator parameters - Check wiring towards the motor
5	Desaturation		<b>Condition: Instantaneous overcurrent in the IGBT bridge alarm.</b>
			<b>Solution:</b> Switch the drive off and then switch it on again. If the alarm persists, contact the technical service centre.
6	MultiUndervolt		<b>Condition:</b> The number of attempted automatic restarts after the <b>Undervoltage</b> alarm has exceeded the set <b>PAR 4650 UVRep attempts</b> value in the <b>PAR 4652 UVRep delay</b> time.
			<b>Solution:</b> Too many Undervoltage alarms. Adopt the proposed solutions for the Undervoltage alarm.
7	MultiOvercurr		<b>Condition:</b> 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.
			<b>Solution:</b> Too many Overcurrent alarms. Adopt the proposed solutions for the Overcurrent alarm.
8	MultiDesat		<b>Condition:</b> 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.
			<b>Solution:</b> Too many <b>Desaturation</b> alarms. Adopt the proposed solutions for the <b>Desaturation</b> alarm.
9	Heatsink OT		<b>Condition:</b> Heatsink temperature too high alarm
			<b>Solution:</b> - Verify the correct operation of the cooling fan. - Check that the heatsinks are not clogged
10	HeatsinkS OTUT		<b>Condition:</b> Heatsink temperature too high or too low alarm The temperature has exceeded the upper or lower limit set for the linear temperature transducer. <b>Solution:</b>
			<b>Solution:</b> - 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		<b>Condition:</b> Intake air temperature too high alarm.
			<b>Solution:</b> Check correct fan operation
12	Motor OT		<b>Condition:</b> 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.
			<b>Solution:</b> - Change the processing cycle. - Use a cooling fan to cool the motor.



Code	Error message shown on the display	Sub-code	Description
13	Drive overload	<b>Condition:</b> Drive overload alarm. The overload threshold of the accumulator of the I <sup>2</sup> t drive thermal image has been exceeded.	
		<b>Solution:</b> Check that the size of the drive is suitable for the application.	
14	Motor overload	<b>Condition:</b> 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 <sup>2</sup> t motor thermal image has been exceeded.	
		<b>Solution:</b> - Reduce the motor load. - Increase the size of the motor.	
15	Bres overload	<b>Condition:</b> 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 <sup>2</sup> t braking resistor thermal image has been exceeded.	
		<b>Solution:</b> Increase the Watt value of the braking resistor	
16	Phase loss	<b>Condition:</b> Power phase loss alarm.	
		<b>Solution:</b> Check the mains voltage and whether any protections upstream of the drive have been tripped.	
17	Opt Bus fault	<b>Condition:</b> 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 equal to 0, the error relates to 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 relates to a configuration problem.
		<b>Solution:</b> For configuration errors, check the configuration of the Bus communication, Bus type, Baudrate, address, parameter setting For communication errors verify wiring, resistance of terminations, interference immunity, timeout settings. For more details reference should be made to the datasheet of the bus being used.	
18	Opt 1 IO fault	<b>Condition:</b> Error in the communication between Regulation and I/O expansion card in slot 1	
		<b>Solution:</b> Check that it has been inserted correctly.	
19	Opt 2 IO fault	<b>Condition:</b>	
		<b>Solution:</b>	
20	Opt Enc fault	<b>Condition:</b> Error in the communication between Regulation and Encoder feedback card.	
		<b>Solution:</b> Check that it has been inserted correctly.	
21	External fault	<b>Condition:</b> External alarm present. A digital input has been programmed as an external alarm, but the +24V voltage is not available on the terminal.	
		<b>Solution:</b> Check that the terminal screws are tight	
22	Speed fbk loss	<b>Condition:</b> Speed feedback loss alarm. The encoder is not connected, not connected properly or not powered: verify encoder operation by selecting the <b>PAR 260 Motor speed</b> parameter in the MONITOR menu.	
		<b>Solution:</b> See parameter 2172 <b>SpdFbkLoss code</b> for information about the cause of the alarm and chapter 10.2 <b>Speed fbk loss [22]</b> alarm	
23	Overspeed	<b>Condition:</b> Motor overspeed alarm. The motor speed exceeds the limits set in the <b>PAR 670 Speed ref top lim</b> and <b>PAR 672 Speed ref bottom lim</b> parameters.	
		<b>Solution:</b> - Limit the speed reference. - Check that the motor is not driven in overspeed during rotation.	
24	Speed ref loss	<b>Condition:</b> <b>Speed reference loss alarm;</b> 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.	
		<b>Solution:</b> Check the drive load conditions.	
25	Emg stop alarm	<b>Condition:</b> Emergency stop alarm. The Stop key on the keypad was pressed with the <b>Stop key mode</b> parameter set to <b>EmgStop&amp;Alarm</b> in case of Remote-> Terminal Strip or Remote-> Digital or Local-> Terminal Strip mode.	
		<b>Solution:</b> Eliminate the reason for which the Stop key on the keypad was pressed and reset the drive.	
26	Power down	<b>Condition:</b> The drive was enabled with no supply voltage at the power section.	
		<b>Solution:</b> Emergency stop alarm. The Stop key on the keypad was pressed with the <b>Stop key mode</b> parameter set to <b>EmgStop&amp;Alarm</b> in case of Remote-> Terminal Strip or Remote-> Digital or Local-> Terminal Strip mode.	
27 ... 32	Not Used 1... 6		
33 ... 40	Plc1 fault ... Plc8 fault	<b>Condition:</b> 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.
		<b>Solution:</b> Refer to the documentation concerning the enabled application.	
41	Watchdog	<b>Condition:</b> this condition can occur during operation when the watchdog 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.	

Code	Error message shown on the display	Sub-code	Description
		<b>XXXXH-X</b>	The XXXXH-X code indicates the reason for the error: make a note of this to discuss it with the service centre.  <b>Solution:</b> If the alarm is the consequence of a change in the drive configuration (parameter setting, option installation, PLC application download) remove it. Turn the drive off and then on again.
42	Trap error		<b>Condition:</b> 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.
		<b>XXXXH-X</b>	The XXXXH-X (SubHandler-Class) code indicates the reason for the error: make a note of this to discuss it with the service centre.  <b>Solution:</b> If the alarm was a consequence of a variation to the drive configuration (parameter setting, installation of an option, down-loading of a PLC application), remove it. Switch the drive off and then switch it on again.
43	System error		<b>Condition:</b> 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.
		<b>XXXXH-X</b>	The XXXXH-X (Error-Pid) code indicates the reason for the error: make a note of this to discuss it with the service centre.  <b>Solution:</b> If the alarm was a consequence of a variation to the drive configuration (parameter setting, installation of an option, down-loading of a PLC application), remove it. Switch the drive off and then switch it on again.
44	User error		<b>Condition:</b> 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.
		<b>XXXXH-X</b>	The XXXXH-X (Error-Pid) code indicates the reason for the error: make a note of this to discuss it with the service centre.  <b>Solution:</b> If the alarm was a consequence of a variation to the drive configuration (parameter setting, installation of an option, down-loading of a PLC application), remove it. Switch the drive off and then switch it on again.
45	Param error		<b>Condition:</b> 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.
		<b>XXXH-X</b>	Code XXXXH-X indicates the number of the parameter (Hex-Dec) that has caused the error: make a note of this to discuss it with the service centre.  <b>Solution:</b> Set the parameter causing the error to the correct value and run <b>Save parameter</b> . Switch the drive off and then switch it back on again.
46	Load default		<b>Condition:</b> 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 during production.
		<b>0001H-1</b>	The database saved is not valid
		<b>0002H-2</b>	The database saved is not compatible
		<b>0003H-3</b>	The saved database refers to a different size and not to the current size
		<b>0004H-4</b>	The saved database refers to a different region and not to the current region
			<b>Solution:</b> Set the parameters to the desired value and execute <b>Save parameters</b>
47	Plc cfg error		<b>Condition:</b> this can occur during loading of the MDPLC application The Mdplc application present on the drive is not run.
		<b>0004H-4</b>	The application that has been downloaded has a different Crc on the DataBlock and Function table.
		<b>0065H-101</b>	The application that has been downloaded has an invalid identification code (Info).
		<b>0066H-102</b>	The application that has been downloaded uses an incorrect task number (Info).
		<b>0067H-103</b>	The application that has been downloaded has an incorrect software configuration.
		<b>0068H-104</b>	The application that has been downloaded has a different Crc on the DataBlock and Function table.
		<b>0069H-105</b>	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.
		<b>006AH-106</b>	The application that has been downloaded has an invalid identification code (Task).
		<b>006BH-107</b>	The application that has been downloaded uses an incorrect task number (Task).
		<b>006CH-108</b>	The application that has been downloaded has an incorrect Crc (Tables + Code)
			<b>Solution:</b> Remove the MDPLC application or download a correct MDPLC application.
48	Load par def plc		<b>Condition:</b> 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.

Code	Error message shown on the display	Sub-code	Description
		<b>0001H-1</b>	The database saved is not valid <b>Solution:</b> Set the parameters to the desired value and run Save parameter.
49	Key failed	<b>Condition:</b> this can occur at drive power-on if the wrong enabling key is entered for a given firmware function	
		<b>0001H-1</b>	Incorrect PLC key. PLC application not available. <b>Solution:</b> Contact Gefran to request the key to enable the desired firmware function.
50	Encoder error	<b>Condition:</b> this condition may occur when the drive is powered during encoder setup each time parameter 552 <b>Regulation mode</b> is set.	
		<b>100H-256</b>	<b>Cause:</b> An error occurred during setup; the information received from the encoder is not reliable. If the encoder is used for feedback the <b>Speed fbk loss</b> alarm is also generated. <b>Solution:</b> Take the recommended action for the <b>Speed fbk loss</b> alarm.
			<b>200H-512</b>
51	No opt card	<b>Condition:</b> an optional card has been removed with respect to the configuration present when the last <b>Save parameters</b> command was executed or there is a fault on the optional card or on the regulation card.	
		<b>Solution:</b> If the user has removed the card on purpose, execute <b>Save parameters</b> . If the user has not removed the card, identify and replace the faulty card.	

## D.1 Speed fbk loss alarm according to the type of feedback

### Note !

For the correct interpretation of the cause of the alarm trigger, it is necessary to transform the hex code indicated in parameter 17.29 **SpdFbkLoss code**, PAR 2172 , in the corresponding binary and verify in the encoder table that the active bits and related description are used.

Example with encoder Endat:

PAR 2172 = A0H (hex value)

In the table "Speed fbk loss [22] alarm with absolute encoder EnDat" A0 is not indicated in the value column.

A0 should be contemplated as a bitword with meaning A0 -> 10100000 -> bit 5 and bit 7 . The following causes simultaneously intervene:

- Bit 5 = 20H Cause: the SSI signal interferences cause an error in the CKS or parity.
- Bit 7 = 20H Cause: The encoder has detected an incorrect operation and communicates it to the converter through the Error bit. Bits 16..31 present the type of incorrect encoder operation detected.

- **Speed fbk loss [22] alarm with digital incremental encoder**

Bit	Value	Name	Description
0	0x01	CHA	<b>Cause:</b> no impulses or disturbance on incremental channel A.
			<b>Solution:</b> Check the connection of the encoder-drive channel A, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder 1 supply</b> , check parameter 2104 <b>Encoder input config</b> .
1	0x02	CHB	<b>Cause:</b> no impulses or disturbance on incremental channel B.
			<b>Solution:</b> Check the connection of the encoder-drive channel B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder 1 supply</b> , check parameter 2104 <b>Encoder input config</b> .
2	0x04	CHZ	<b>Cause:</b> no impulses or disturbance on incremental channel Z.
			<b>Solution:</b> Check the connection of the encoder-drive channel Z, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder 1 supply</b> , check parameter 2104 <b>Encoder input config</b> , check parameter 2110 <b>Encoder1signal check</b>

### D.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.

### D.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
8	0x100	Setup error	<b>Cause:</b> An error occurred during setup. When this has been signalled the information obtained from the encoder is not reliable.
			<b>Solution:</b> Take the action recommended for <b>Speed fbk loss [22]</b> alarm according to the type of encoder.
9	0x200	Compatibility error	<b>Cause:</b> Firmware on option card incompatible with firmware on regulation card. When this has been signalled the information obtained from the encoder is not reliable.
			<b>Solution:</b> Contact Gefran in order to update the firmware on the optional card.

## E – MESSAGES

**Note**

For more information see Quick start guide, **chapter 8.7**.

Index	Error message shown on the display	Sub-code	Description
1	Load default param		<p><b>Condition:</b> 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.</p>
		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
			<b>Solution:</b> Set the parameters to the value required and perform <b>Save parameter</b>
2 3 4	Option detect slot 1 Option detect slot 2 Option detect slot 3		<p><b>Condition:</b> 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</p>
		0H-0	None
		0004H-4	Can/DeviceNet
		00FFH-255	Unknown
		0608H-1544	Enc 1 EXP-DE-I1R1F2-ADL / EXP-DE-I1-ADL
			<b>Solution:</b>
5	Autotune		<b>Condition:</b> this may occur during the <b>Autotune</b> procedure
		0	No error
		1	The commands are not configured in Local mode.
			<b>Solution:</b> Execute the requested configuration
		2	The Commands local sel parameter has not been configured from the keypad
			<b>Solution:</b> Execute the requested configuration
		3	The motor plate data parameters have changed but the <b>Take parameters</b> command, PAR 2020, has not been executed
			<b>Solution:</b> Execute the <b>Take parameters</b> command.
		4	The motor is not connected
			<b>Solution:</b> Connect the motor
		5	While running self-tuning the ESC key was pressed or the enable contact was opened or an alarm occurred. The <b>Autotune</b> command was sent with the drive in the alarm condition
			<b>Solution:</b> Eliminate the reason for the alarm, remove the reason for the opening of the enable contact, reset alarms.
		6	A setting performed by the <b>Autotune</b> function produced a parameter value outside the min or max range.
<b>Solution:</b> Check the motor plate data or drive and motor sizes have been combined incorrectly.			
7	The <b>Autotune</b> command was sent without being enabled.		
	<b>Solution:</b> Close the enable contact before sending the <b>Autotune</b> command		
8 ... 21	A setting performed by <b>Autotune</b> has reached a measurement method limit		
	<b>Solution:</b> Check the motor plate data or the drive and motor sizes have been combined incorrectly.		
			<p><b>Solution:</b> If the message appears with a value other than 0, follow the instructions supplied for each particular case and repeat <b>Autotune</b>. 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 parameters, especially: - <b>Rated speed, Motor rated speed</b> in rpm. - <b>Rated frequency, Motor rated frequency</b> in Hz - <b>Pole pairs, Motor pole pairs</b> Take care not to set the <b>Rated speed</b> parameter to the synchronous speed. The value of the <b>Rated speed</b> parameter must be less than: <math>[(\text{Rated frequency} * 60) / \text{Pole pairs}]</math>. If the problem persists even after following the instructions supplied, confirm the values of the motor plate data parameters, execute the <b>Take parameters</b> command but not <b>Autotune</b>.</p>
6	Power config		<b>Condition:</b> 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
			<b>Solution:</b> Download the correct configuration on the power card
7	Save par failed		<b>Condition:</b> during transfer of the parameters from the drive to the memory of the keypad
		0H-0	Communication error

Index	Error message shown on the display	Sub-code	Description
		<b>0025H-37</b>	The data saved on the keypad are not valid
		<b>0026H-38</b>	Incompatible drive series
		<b>0027H-39</b>	Incompatible software version
		<b>0028H-40</b>	Incompatible drive size
		<b>0029H-41</b>	Error during saving of parameters on the drive
		<b>Solution:</b>	
<b>8</b>	<b>Load par failed</b>	<b>Condition:</b> during transfer of the parameters from the memory of the keypad to the drive	
<b>9</b>	<b>Load par incomplete</b>	<b>0H-0</b>	Communication error
		<b>0025H-37</b>	The data saved on the keypad are not valid. No parameter is transferred from the keypad to the drive
		<b>0026H-38</b>	Incompatible drive series. No parameter is transferred from the keypad to the drive
		<b>0027H-39</b>	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.
		<b>0028H-40</b>	Incompatible drive size. 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.
		<b>0029H-41</b>	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.
		<b>002AH-42</b>	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.
		<b>002BH-43</b>	PLC application not compatible. All the parameters in the keypad memory except those relating to the PLC application 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.
		<b>Solution:</b> Recover a set of parameters from a compatible drive (model and size)	
<b>10</b>	<b>Options config error</b>	<b>Condition:</b> may occur at drive start-up, during recognition of the optional cards installed	
		<b>0001H-1</b>	Non-permissible optional card in slot 1
		<b>0002H-2</b>	Non-permissible optional card in slot 2
		<b>0004H-4</b>	
		<b>0010H-16</b>	Conflict slot 1 with slot 2
		<b>0020H-32</b>	
		<b>0040H-64</b>	
		<b>Solution:</b> Remove the optional cards from the incorrect slots and insert them in the correct slots	
<b>11</b>	<b>Load def plc</b>	<b>Condition:</b> 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.	
		<b>0001H-1</b>	The database saved is not valid
		<b>Solution:</b> Set the parameters to the value required and perform <b>Save parameter</b>	
<b>12</b>	<b>Plc cfg error</b>	<b>Condition:</b> may occur during loading of the Mdplc application The Mdplc application present on the drive is not run.	
		<b>0004H-4</b>	The application downloaded has a different Crc on DataBlock and Function table
		<b>0065H-101</b>	The application downloaded has an invalid identifier (Info)
		<b>0066H-102</b>	The application downloaded has an incorrect task number (Info)
		<b>0067H-103</b>	The application downloaded has an incorrect software configuration
		<b>0068H-104</b>	The application downloaded has a different Crc on DataBlock and Function table
		<b>0069H-105</b>	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
		<b>006AH-106</b>	The application downloaded has an incorrect identifier (Task)
		<b>006BH-107</b>	The application downloaded has an incorrect task number (Task)
		<b>006CH-108</b>	The application downloaded has an incorrect Crc (Tables + Code)
		<b>Solution:</b> Remove the Mdplc application or download a correct Mdplc application	

Index	Error message shown on the display	Sub-code	Description
13	Plc 1		Reserved messages and dedicated to the PLC application. See the application manual.
14	Plc 2		
15	Plc 3		
16	Plc 4		
17	Option bus fault	<b>Condition:</b> this may occur when the drive is turned on, during fieldbus card setup. Error during configuration or communication error.	
		<b>XXX0H-X</b>	If the first digit to the left of "H" in the alarm sub-code is 0, the error regards a communication problem.
		<b>XXX0H-X</b>	If the first digit to the left of "H" in the alarm sub-code is other than 0, the error regards a configuration problem.
		<b>Solution:</b> 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	<b>Condition:</b> this may occur when powering the drive, if the incorrect enable key is inserted for a given firmware function.	
		<b>0001H-1</b>	Incorrect PLC key. PLC application not available.
		<b>Solution:</b> Ask Gefran to supply the correct key to enable the desired firmware function.	
19	Key expiring	<b>Condition:</b> 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.	
		<b>xxxxH-x</b>	Number of hours for which the function can still be used freely.
		<b>Solution:</b> Ask Gefran for the correct key to enable the desired firmware function.	
20	Param error	<b>Condition:</b> if an error occurs during activation of the parameter database saved in flash; the alarm is inserted in the alarm list and alarm log.	
		<b>XXX0H-X</b>	The code XXXXH-X indicates the IPA of the parameter that has been set outside the range allowed when the database is enabled.
		<b>Solution:</b> Set the parameter causing the error to a value within the range and run <b>Save parameters</b> . 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	<b>Condition:</b> this condition may occur when the drive is powered during encoder setup each time parameter <b>552 Regulation mode</b> is set.	
		<b>100H-2564</b>	<b>Cause:</b> An error occurred during setup; the information received from the encoder is not reliable. If the encoder is used for feedback the <b>Speed fbk loss [22]</b> alarm is also generated.
		<b>Solution:</b> Take the recommended action for the <b>Speed fbk loss[22]</b> alarm.	
		<b>200H-512</b>	<b>Cause:</b> The firmware on the optional encoder card is incompatible with that on the regulation card. The information received from the encoder is not reliable
		<b>Solution:</b> Contact Gefran in order to update the firmware on the optional encoder card.	
22	Options cfg changed	<b>Condition:</b> 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.	
		<b>0064H-100</b>	Card removed from slot 1
		<b>0014H-20</b>	Card removed from slot 2
		<b>0003H-3</b>	
		<b>0078H-120</b>	Card removed from slot 1 and from slot 2
		<b>0067H-103</b>	
		<b>0017H-23</b>	
		<b>007BH-123</b>	
		<b>Solution:</b> Check the hardware configuration, then press ESC. Save the parameters ( <b>Save parameters</b> , menu 04.01 par 550) to save the new hardware configuration.	

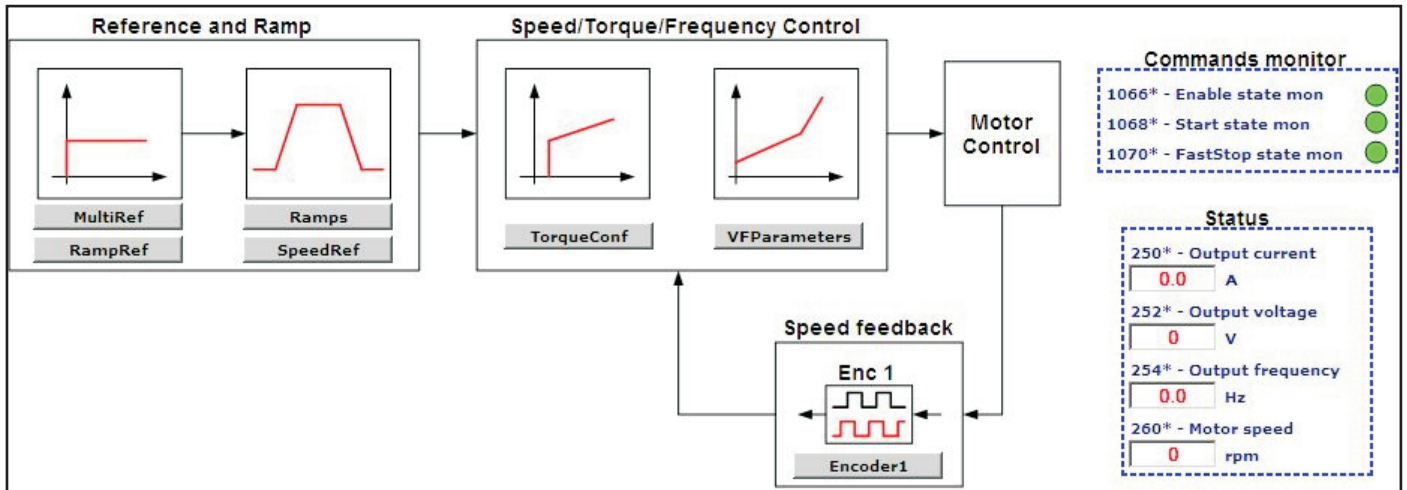
**Note!**

For any messages that are displayed but not included in this list reference should be made to the manual for the application used by the drive.

### System Diagrams Index

<b>DRIVE OVERVIEW</b>	DrvOverview	DigOuts	<b>DIGITAL OUTPUTS</b>
<b>REFERENCES</b>	References	AnalInps	<b>ANALOG INPUTS</b>
<b>RAMPS</b>	Ramps	AnalOuts	<b>ANALOG OUTPUTS</b>
<b>MULTI REFERENCE</b>	MultiRef	EncoderConf	<b>ENCODER CONFIG</b>
<b>MOTORPOTENTIOMETER</b>	Mpot	SpeedRegGains	<b>SPEED REG GAINS</b>
<b>JOG FUNCTION</b>	Jog	TorqueConf	<b>TORQUE CONFIG</b>
<b>MONITOR FUNCTION</b>	MonitorFunc	VFParameters	<b>VF PARAMETERS</b>
<b>COMMANDS</b>	Commands	Functions	<b>FUNCTIONS</b>
<b>DIGITAL INPUTS</b>	DigInps		

### Drive overview

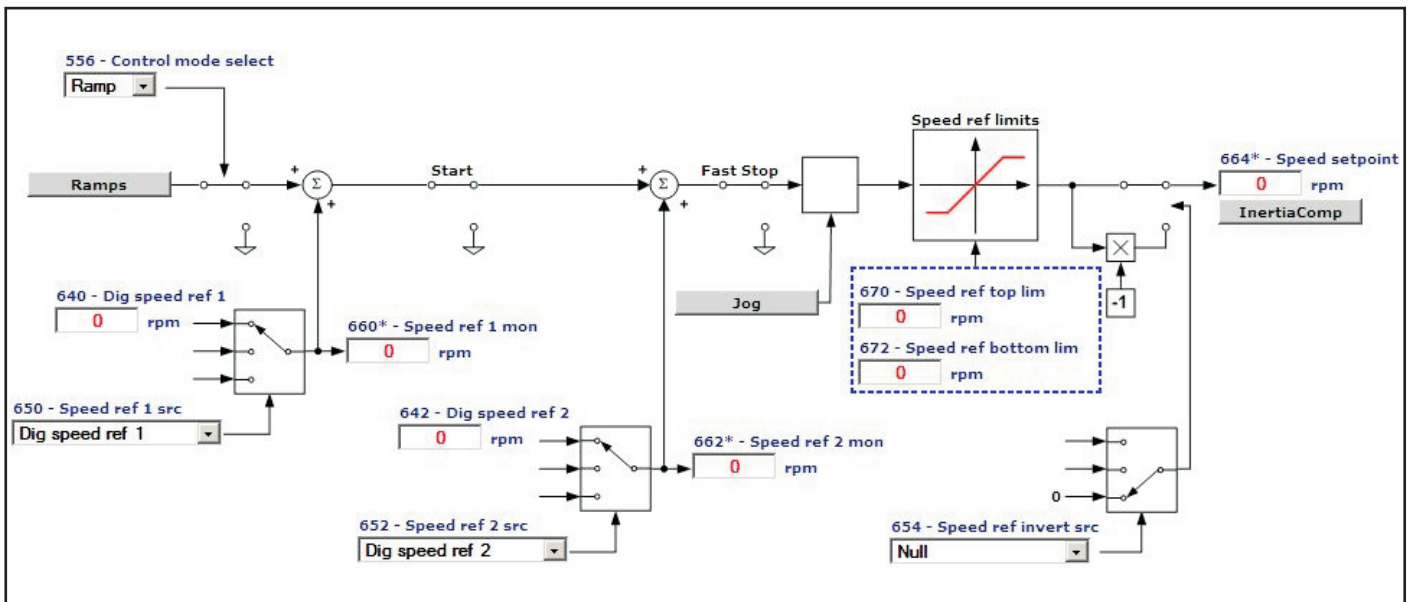
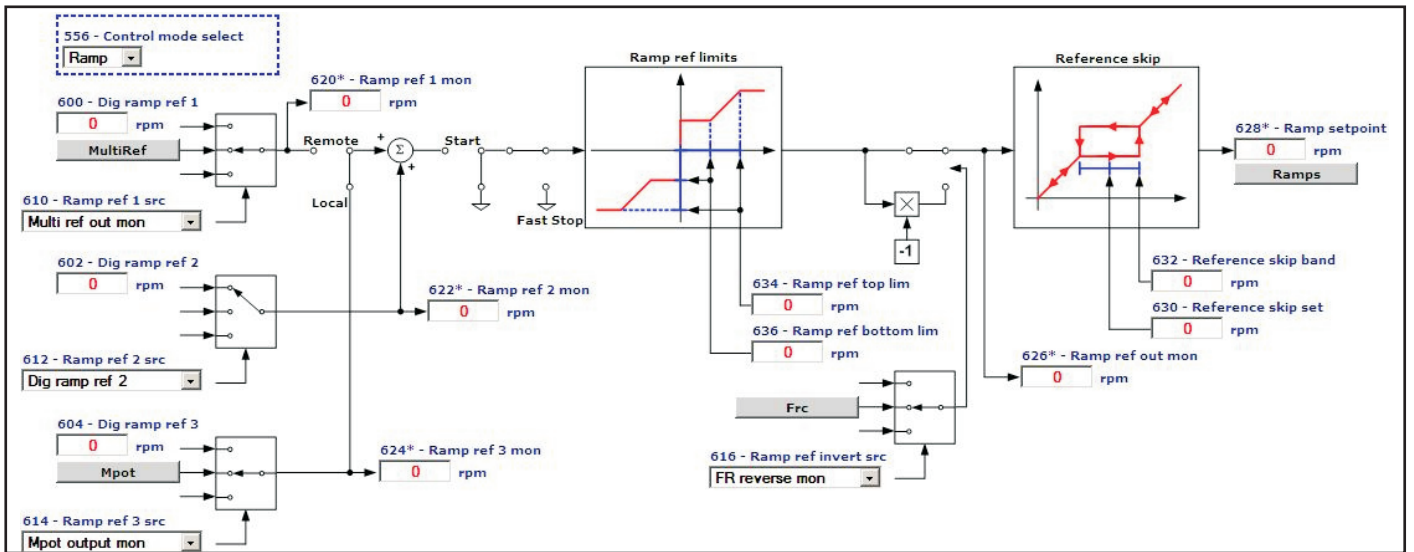




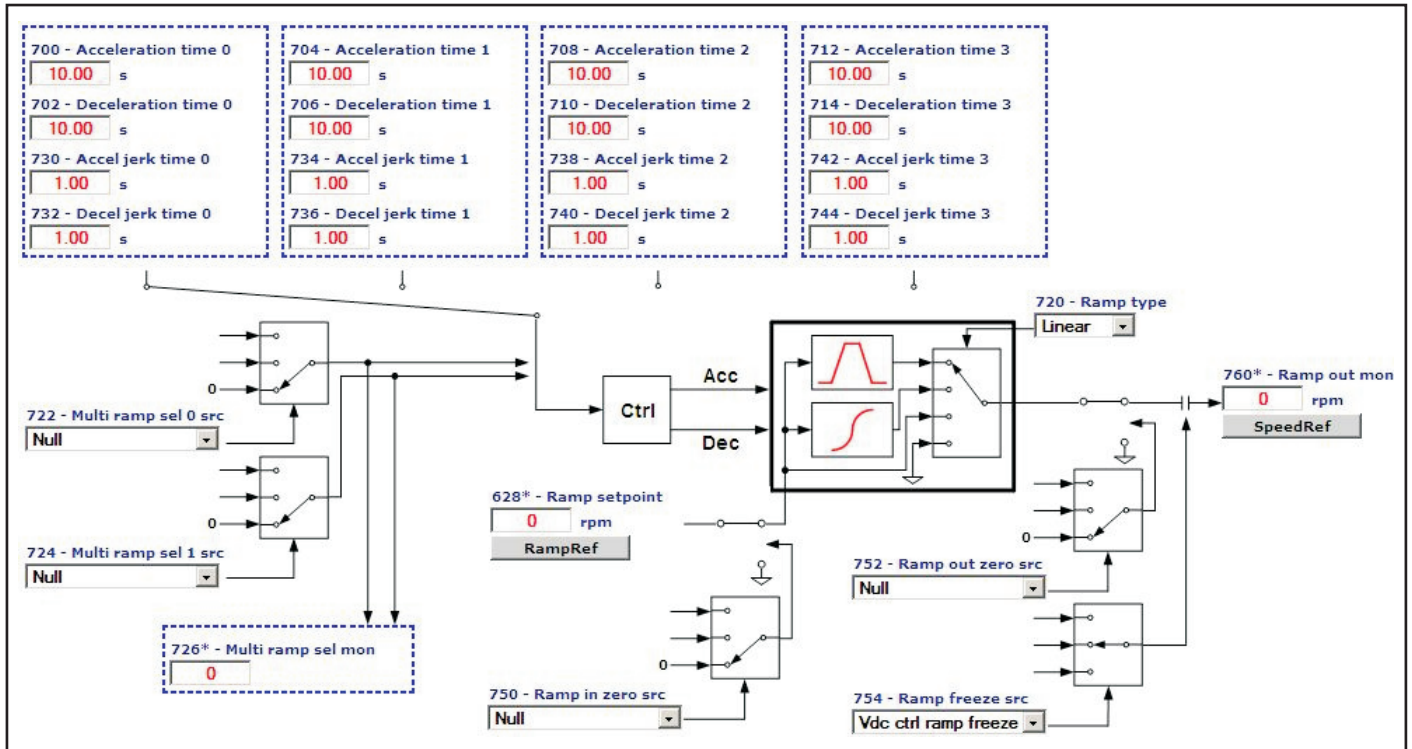
# References

RAMP REFERENCE RampRef

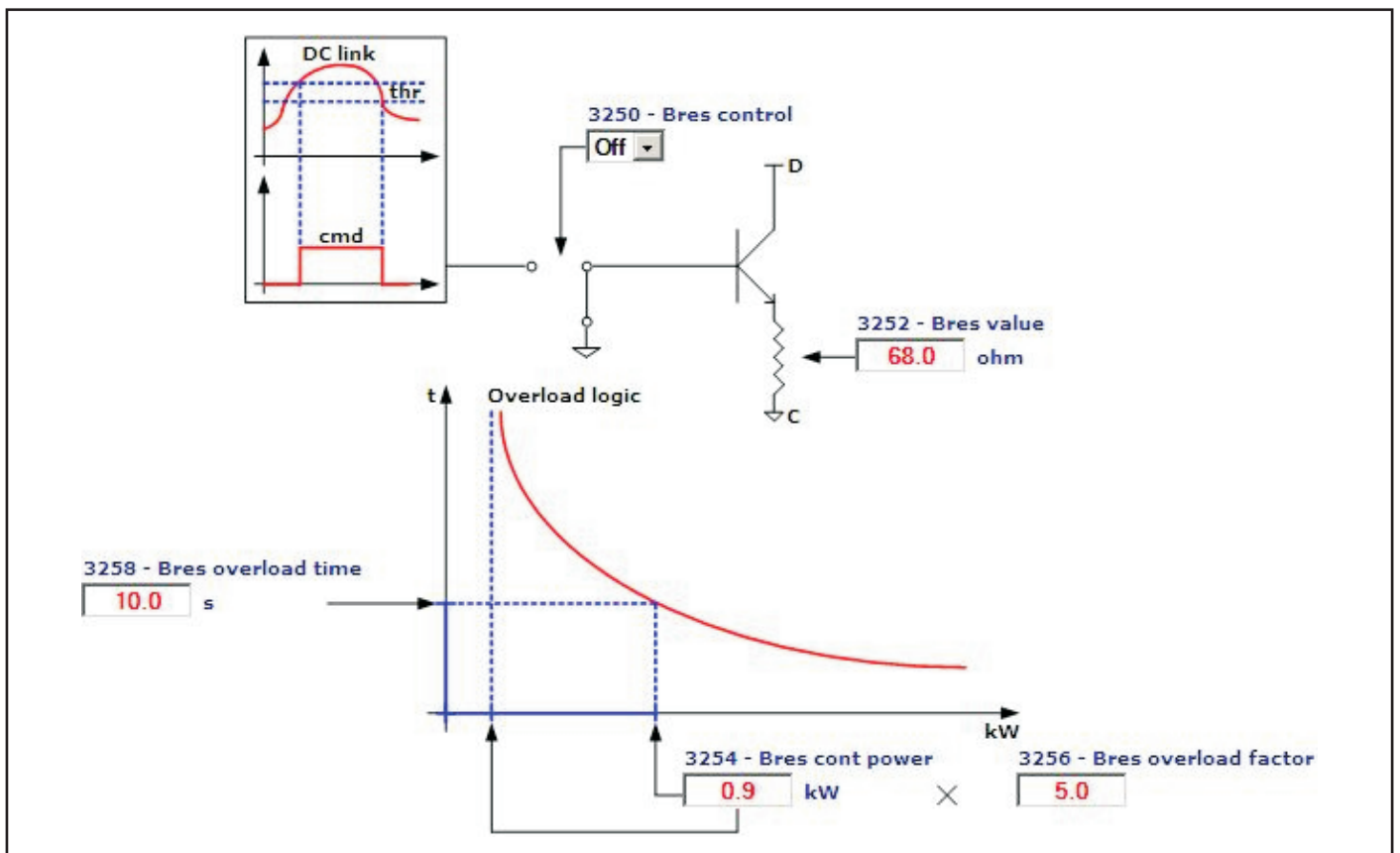
SPEED REFERENCE SpeedRef



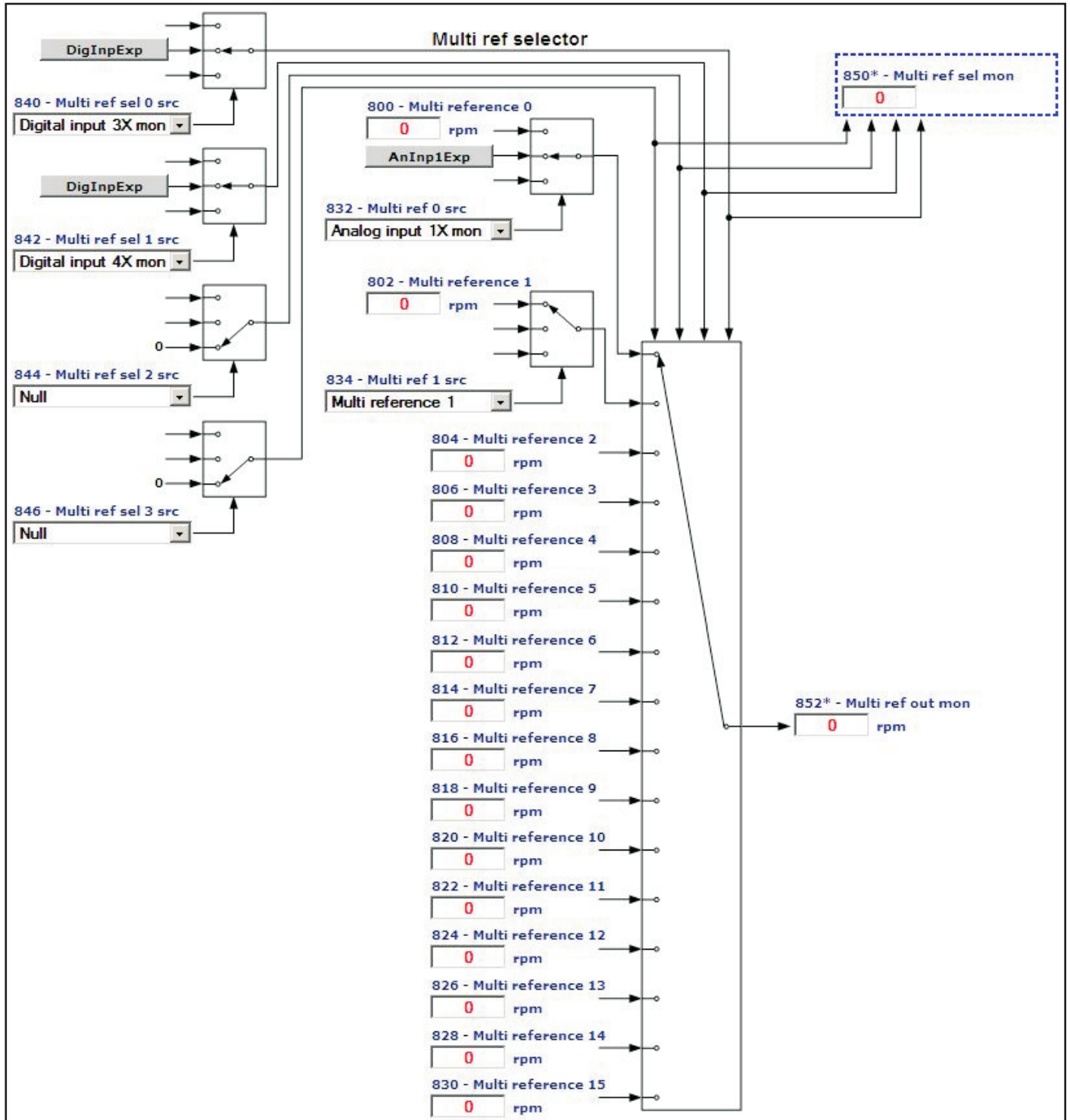
## Ramps



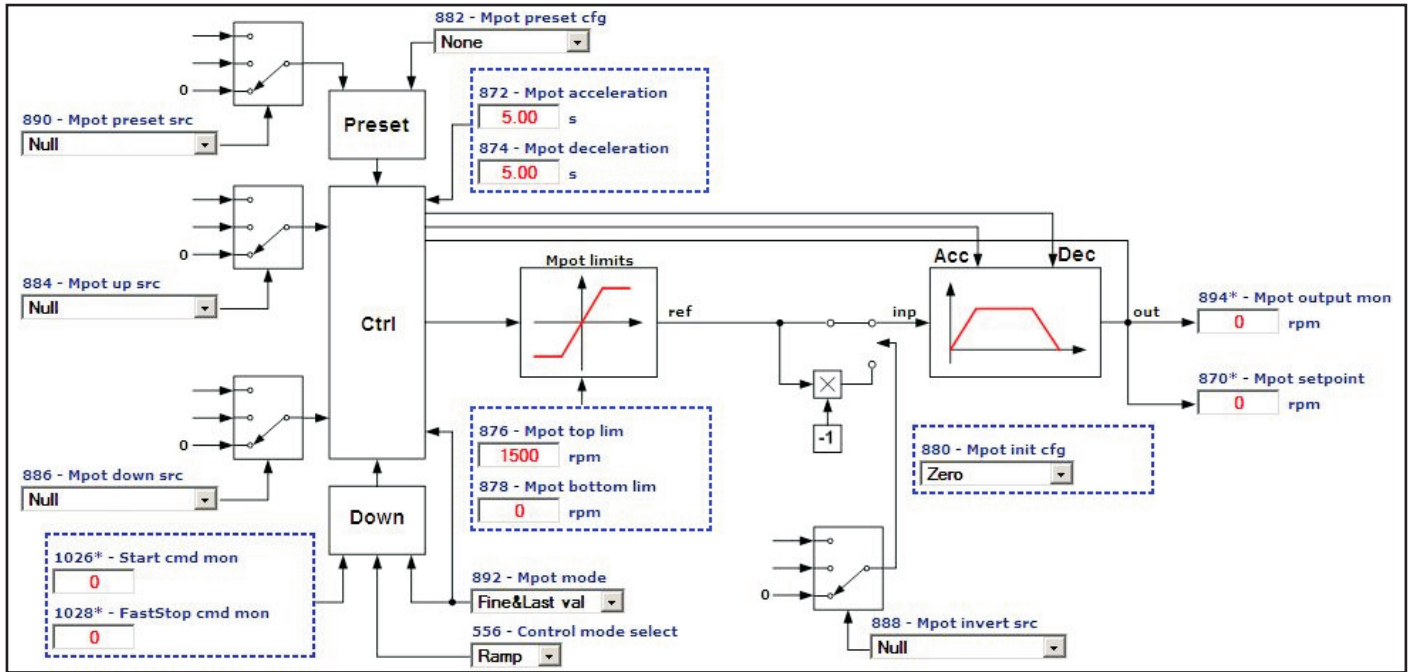
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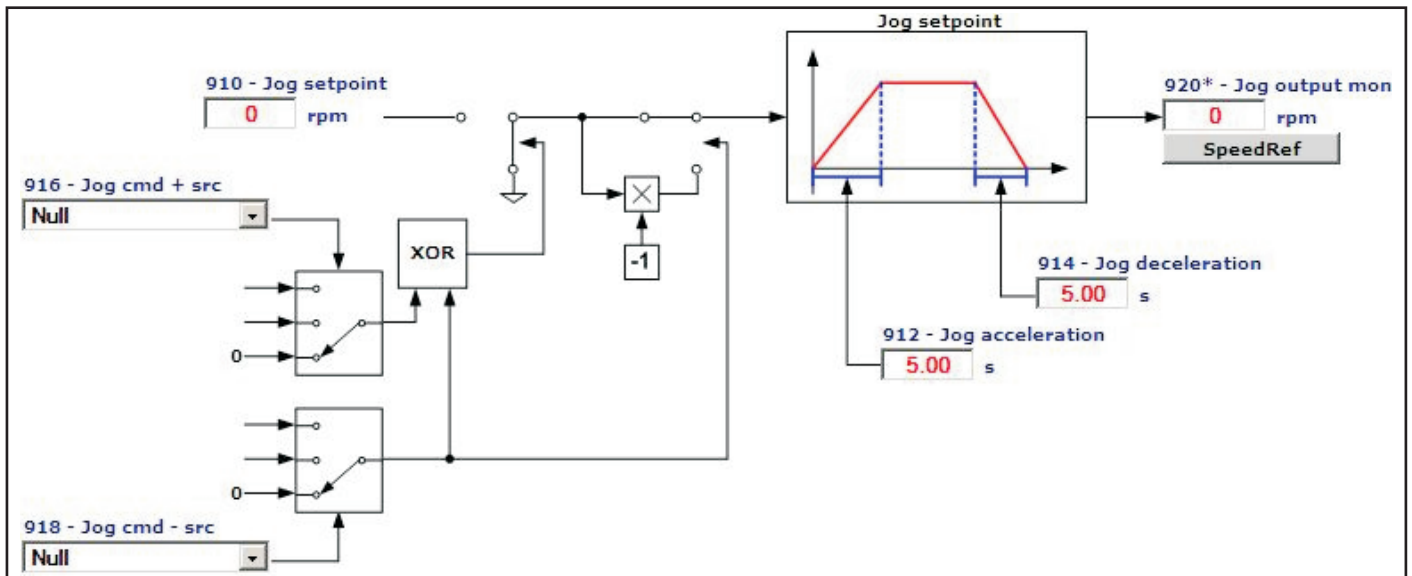
# Multireference



## Motorpotentiometer

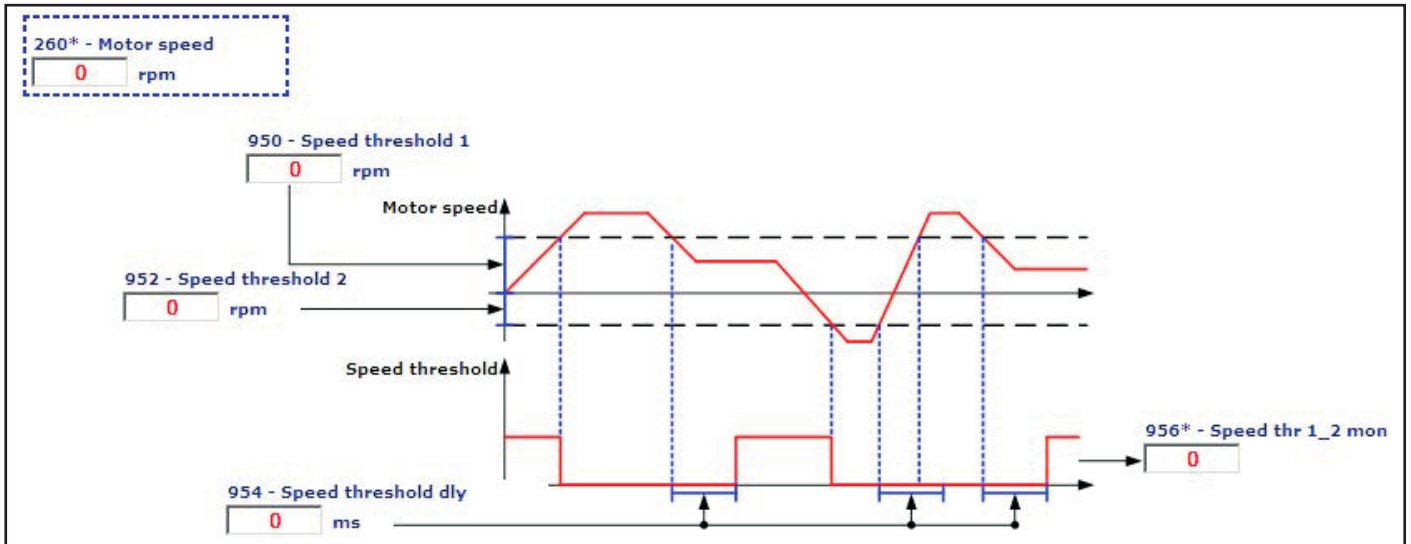
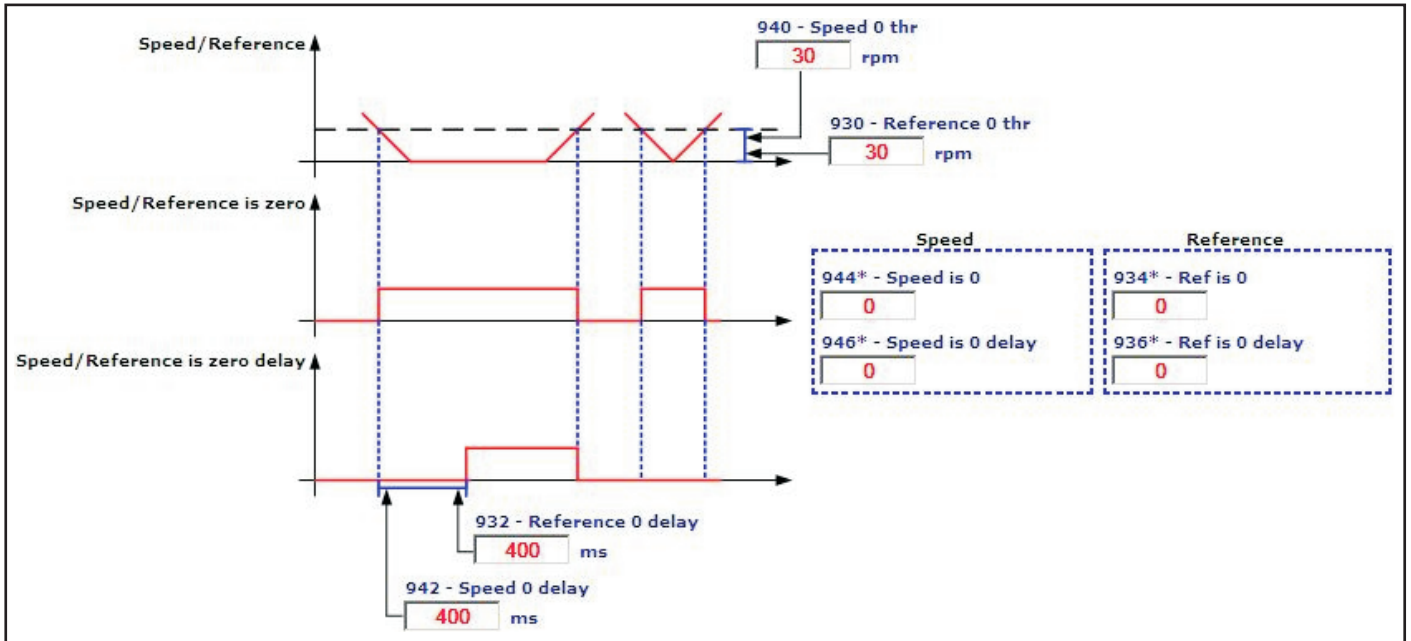


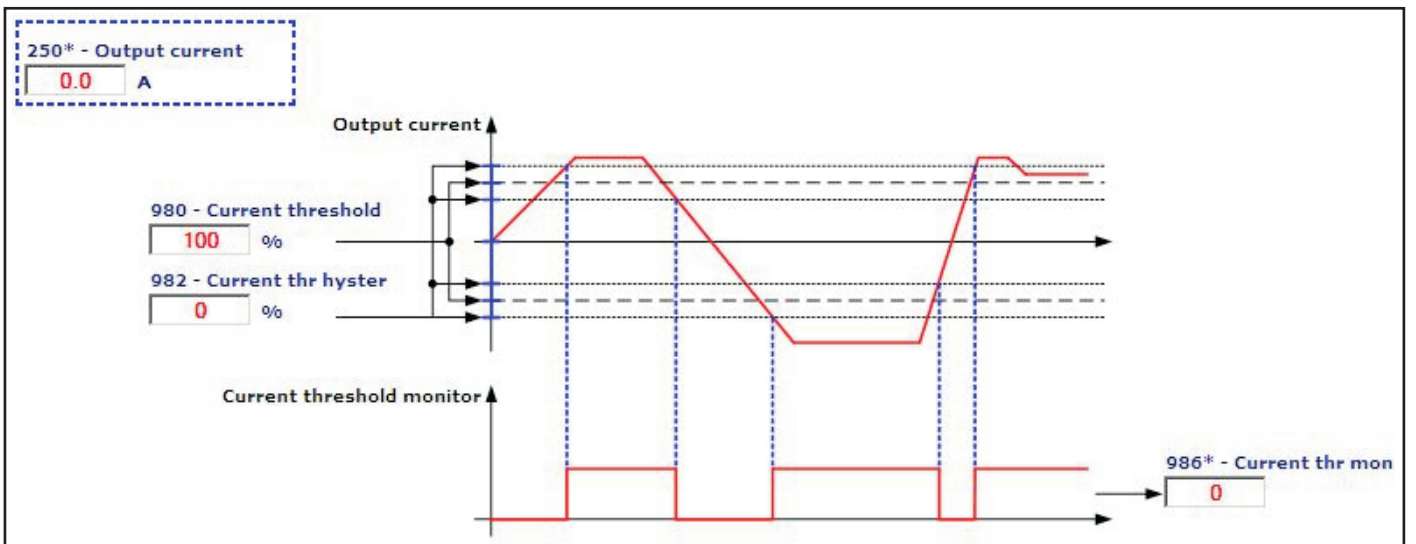
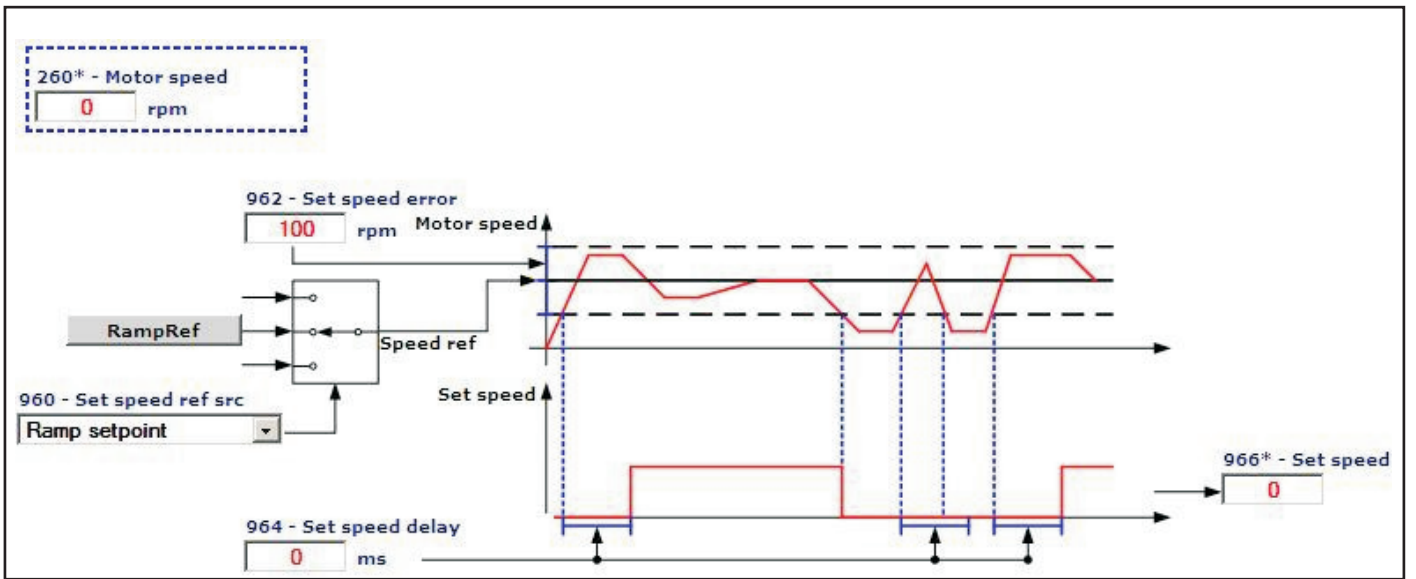
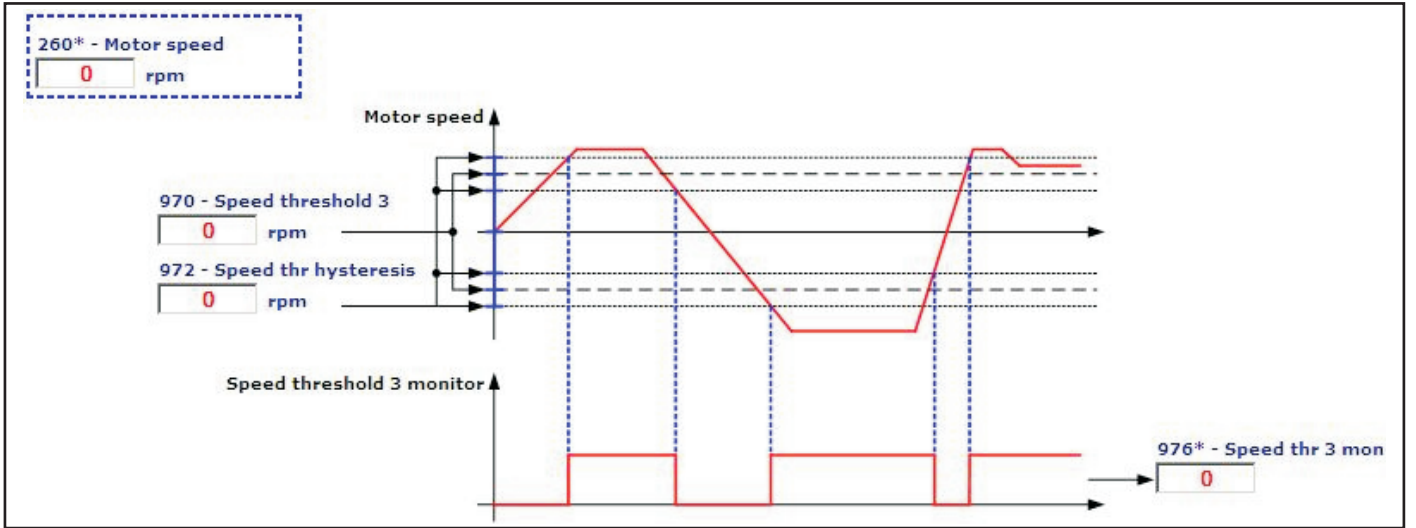
## Jog function



# Monitor function

SPEED/REFERENCE ZERO	SpeedRefZero
SPEED THRESHOLD 1-2	SpeedThr1_2
SPEED THRESHOLD 3	SpeedThr3
SET SPEED	SetSpeed
CURRENT THRESHOLD	CurrThr

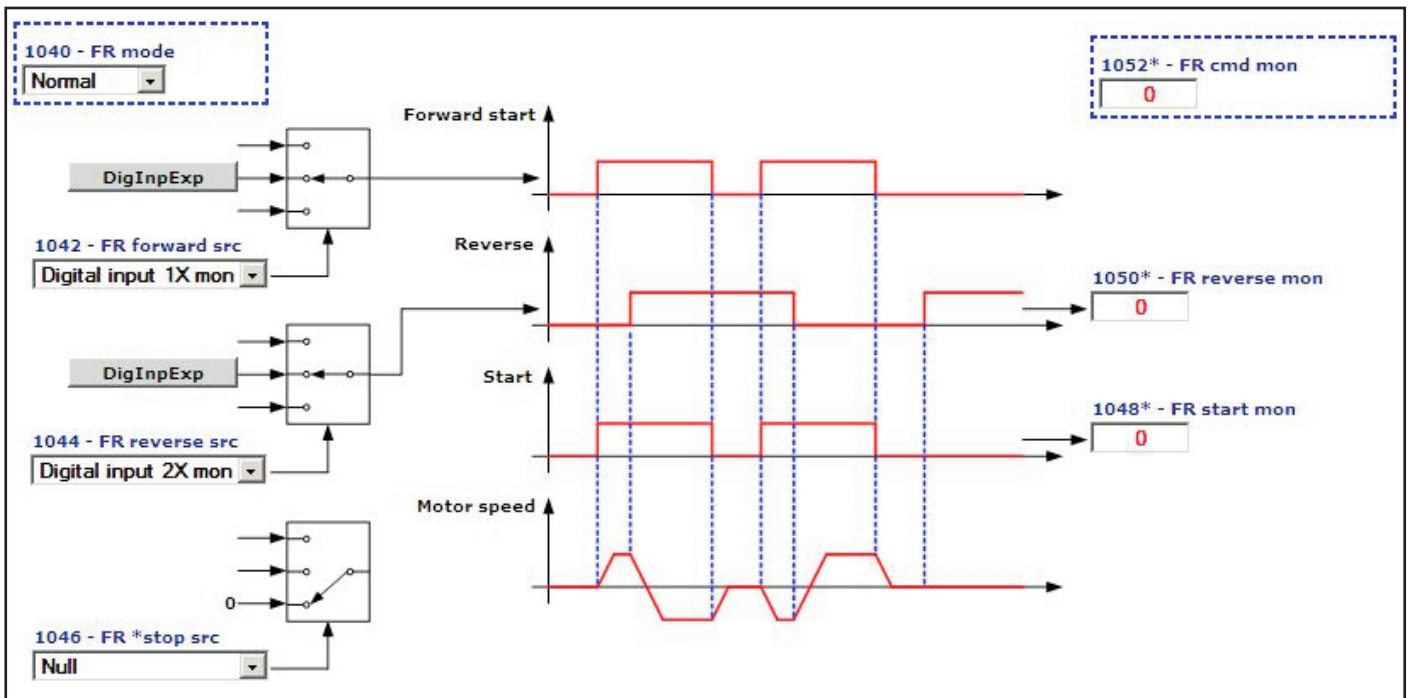
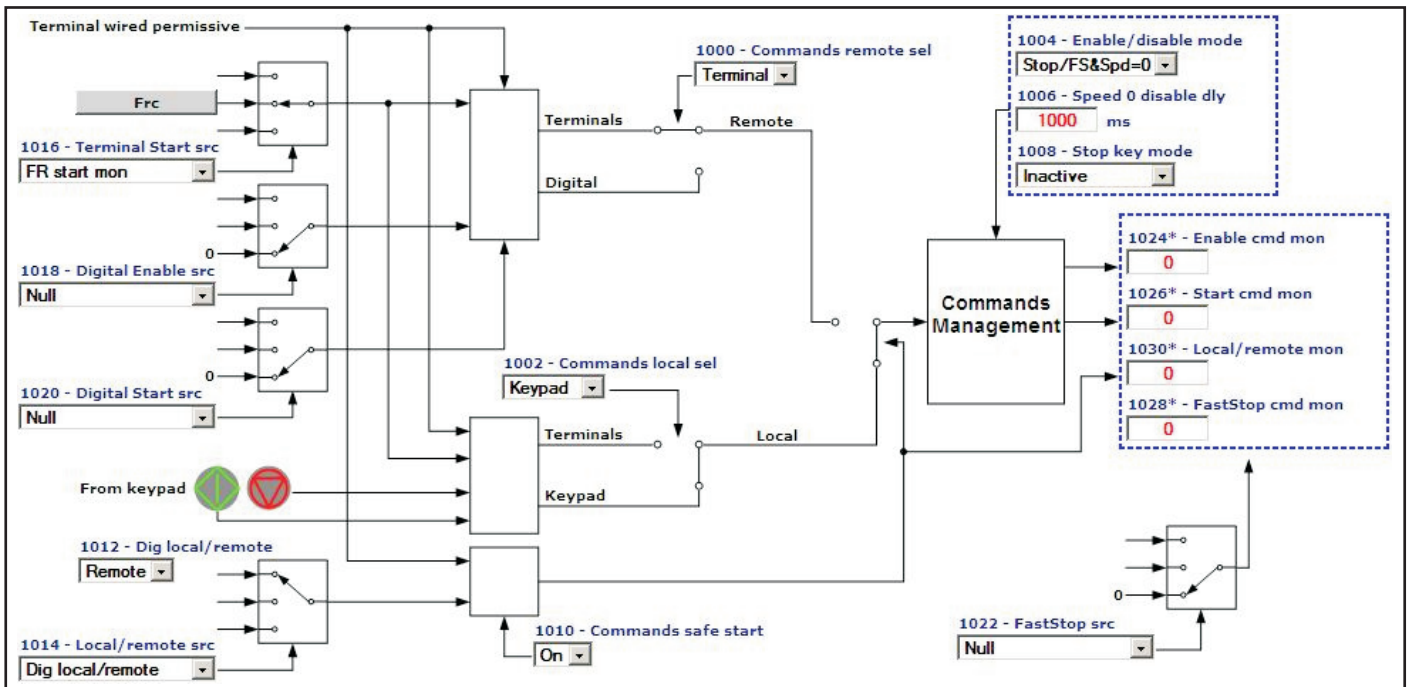


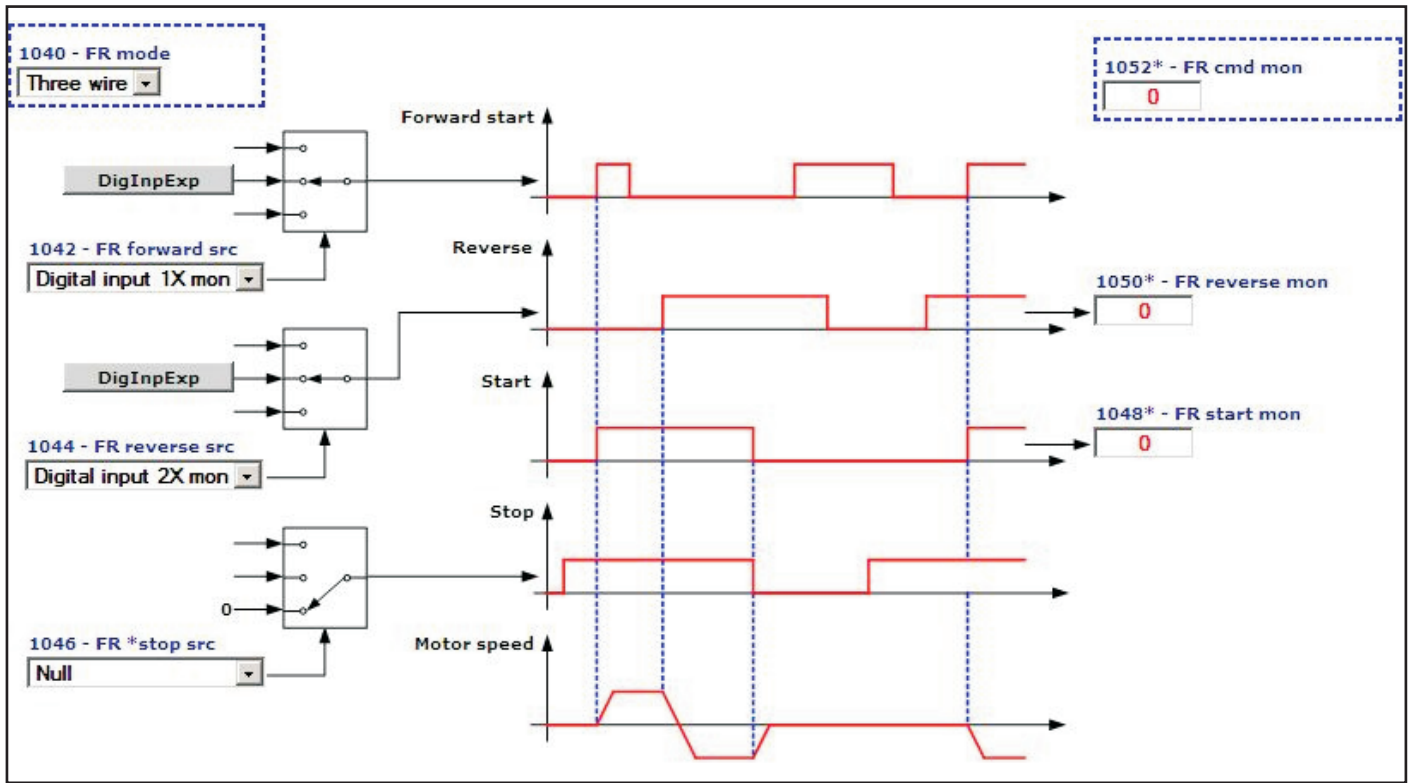
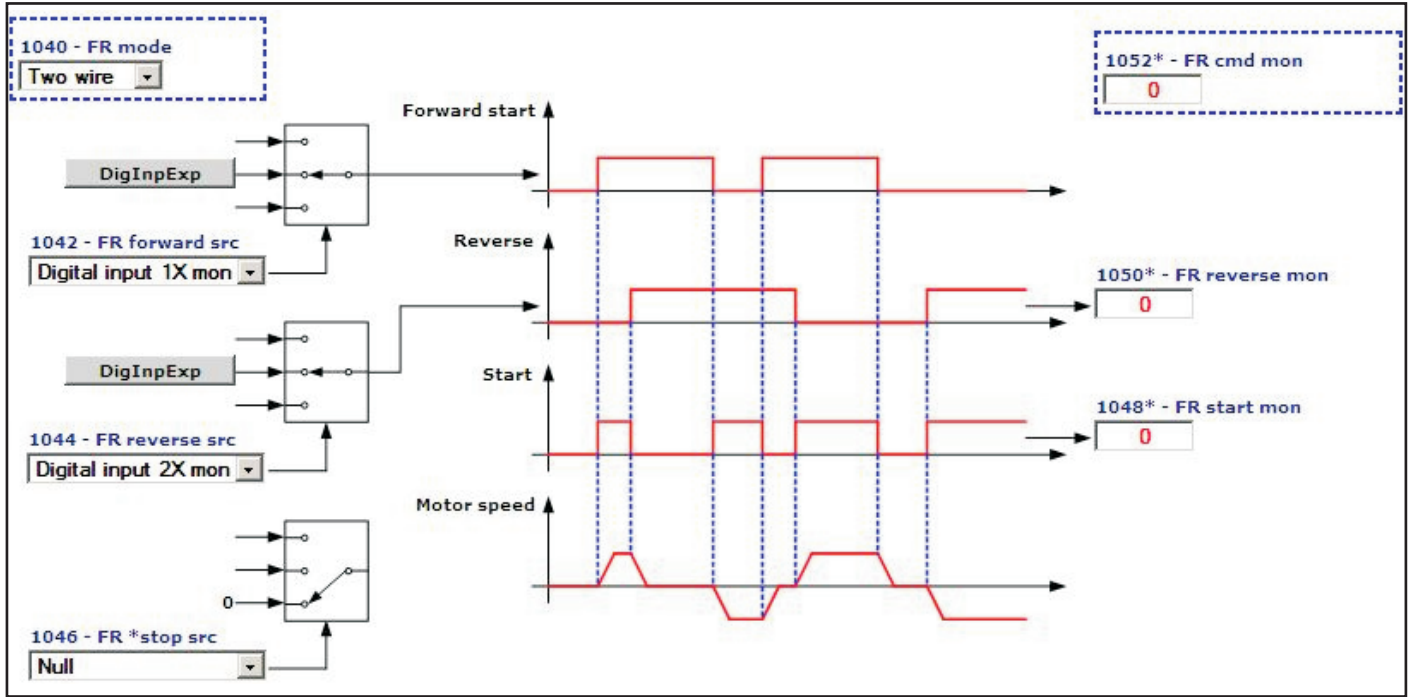


# Commands

COMMANDS MANAGEMENT **CommManage**

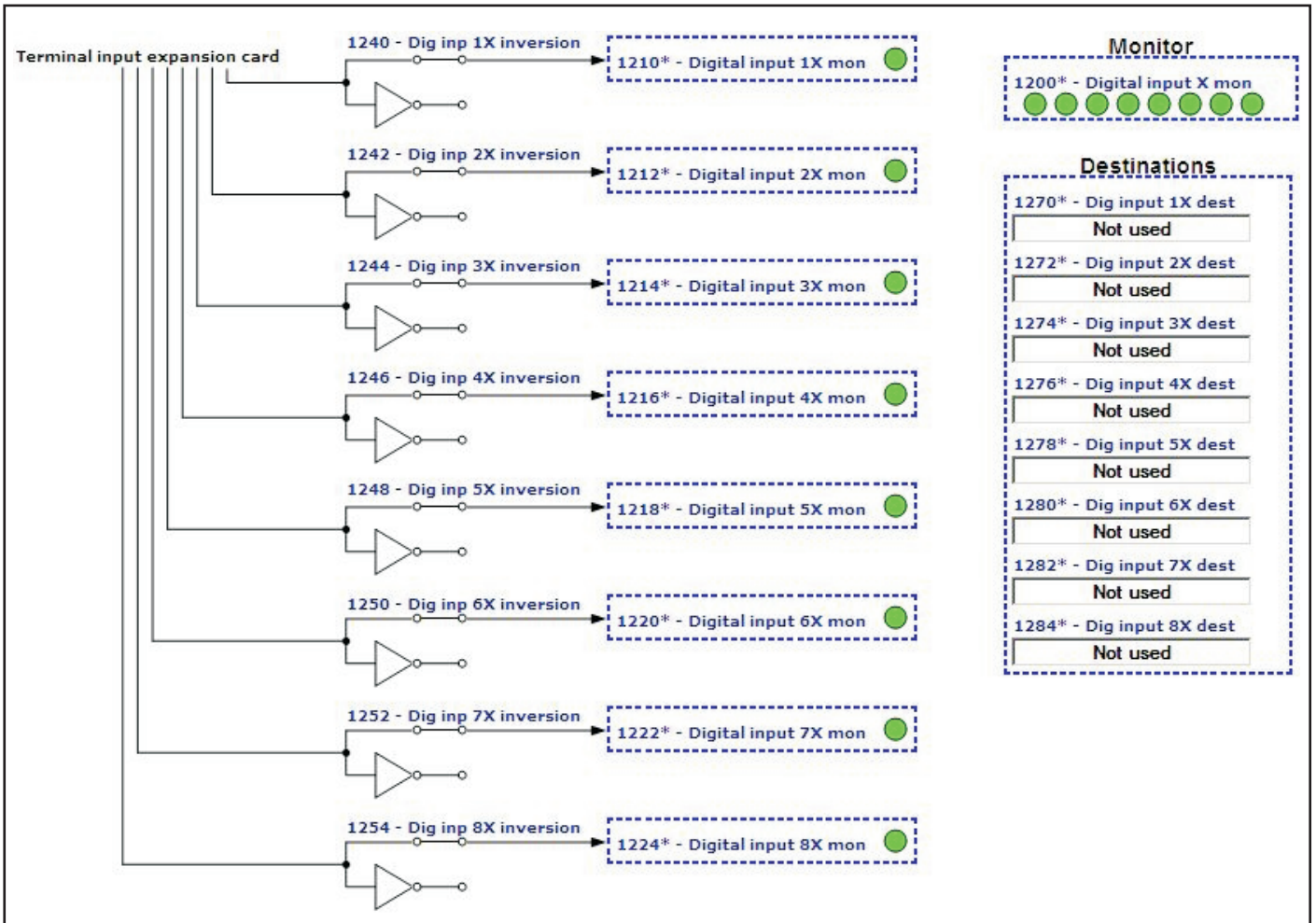
FORWARD REVERSE CONTROL **Frc**



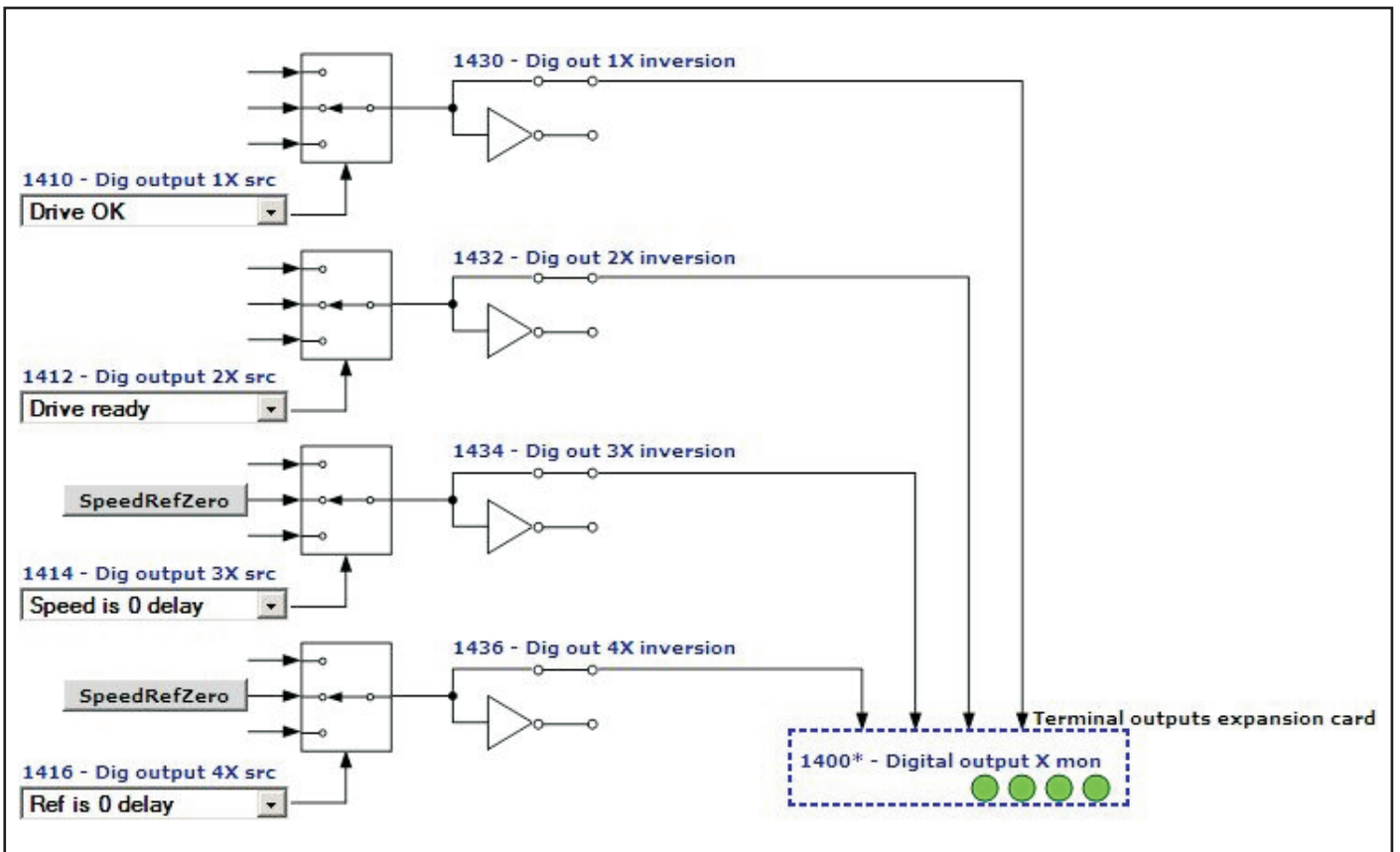




## Digital inputs



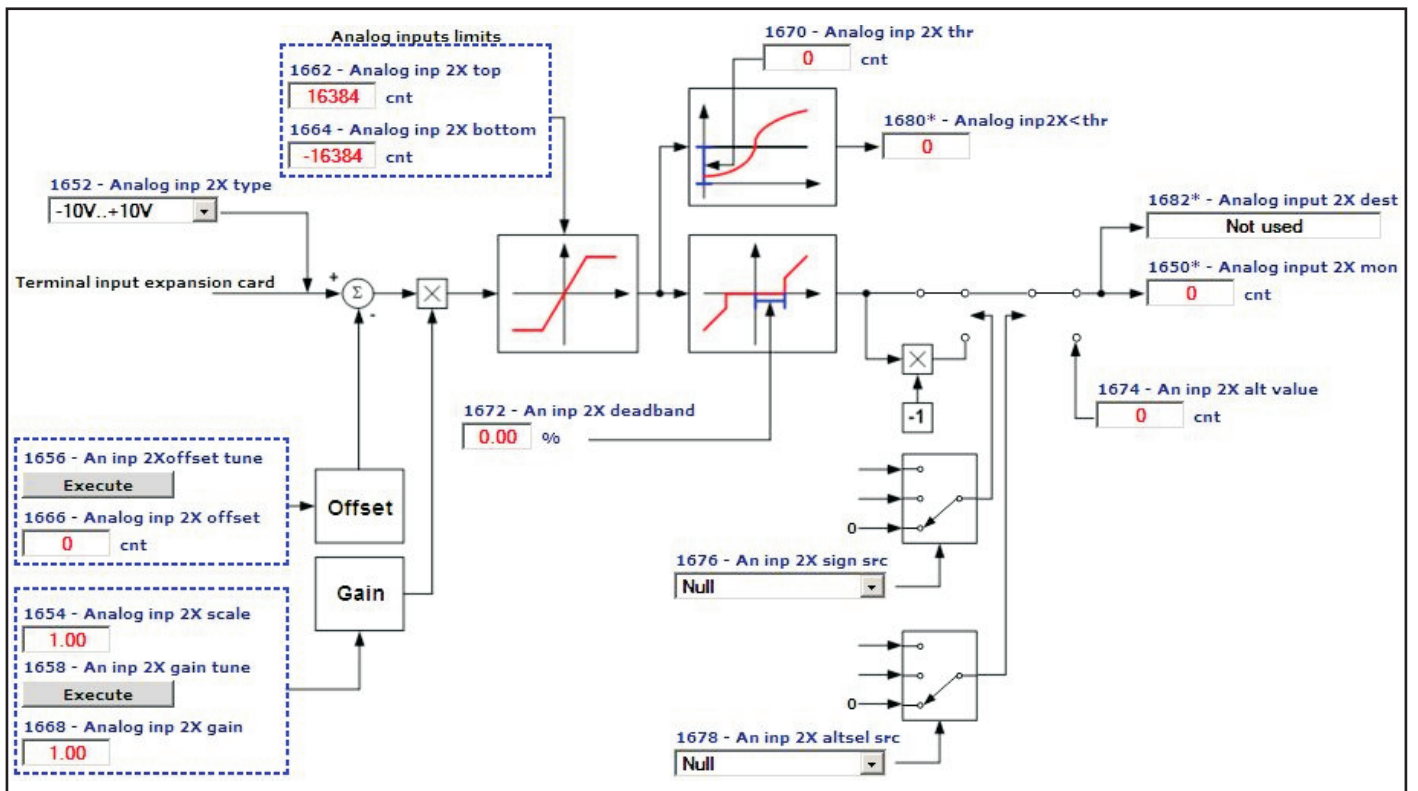
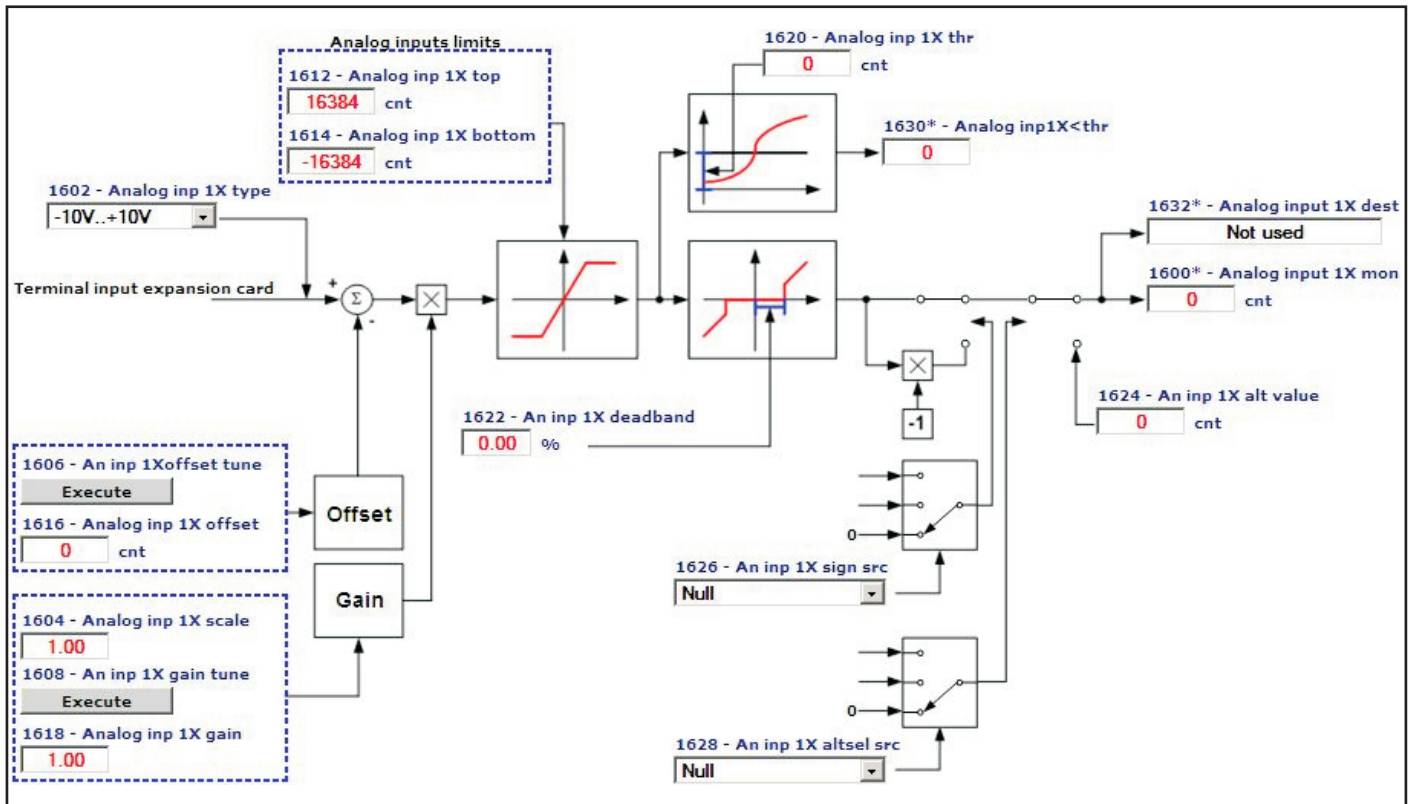
## Digital outputs



# Analog inputs

ANALOG INPUT 1 EXPANSION CARD **AnInp1Exp**

ANALOG INPUT 2 EXPANSION CARD **AnInp2Exp**



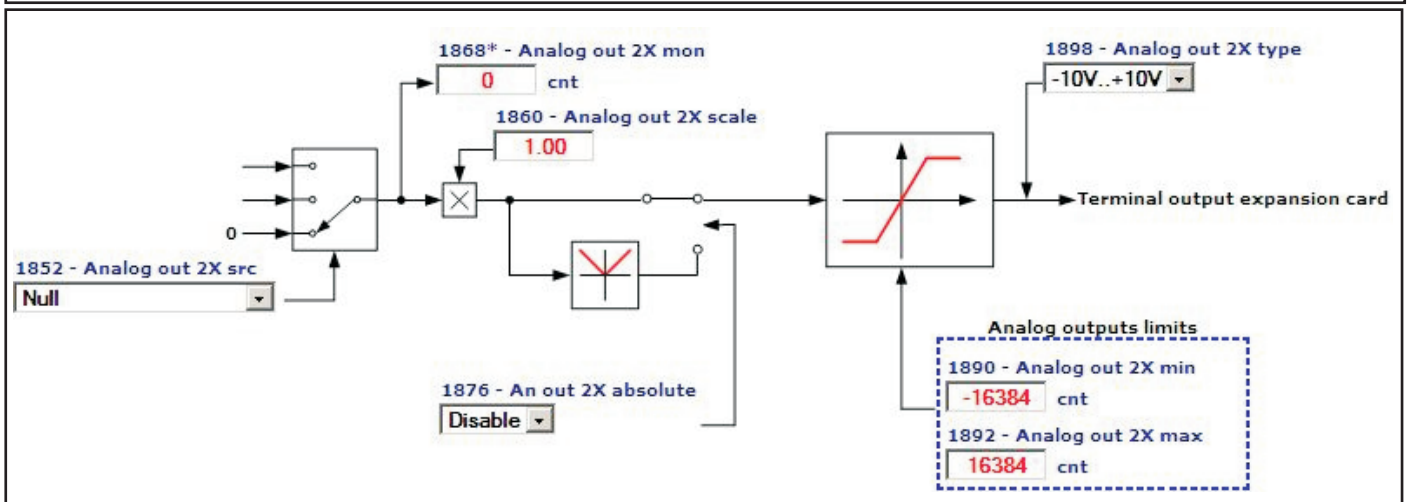
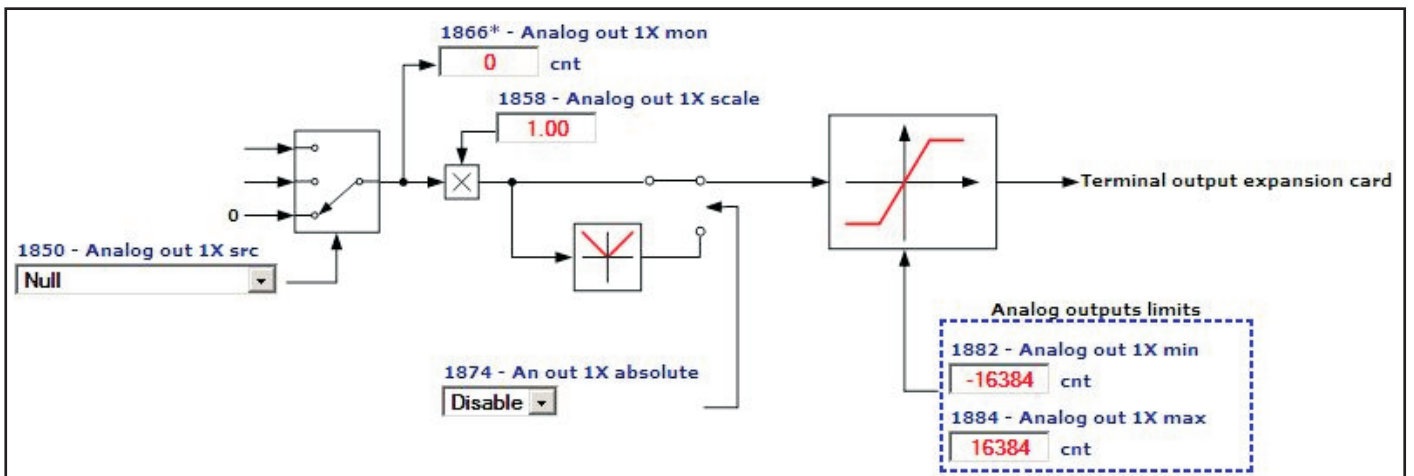
## Analog outputs

ANALOG OUTPUT 1 EXPANSION CARD

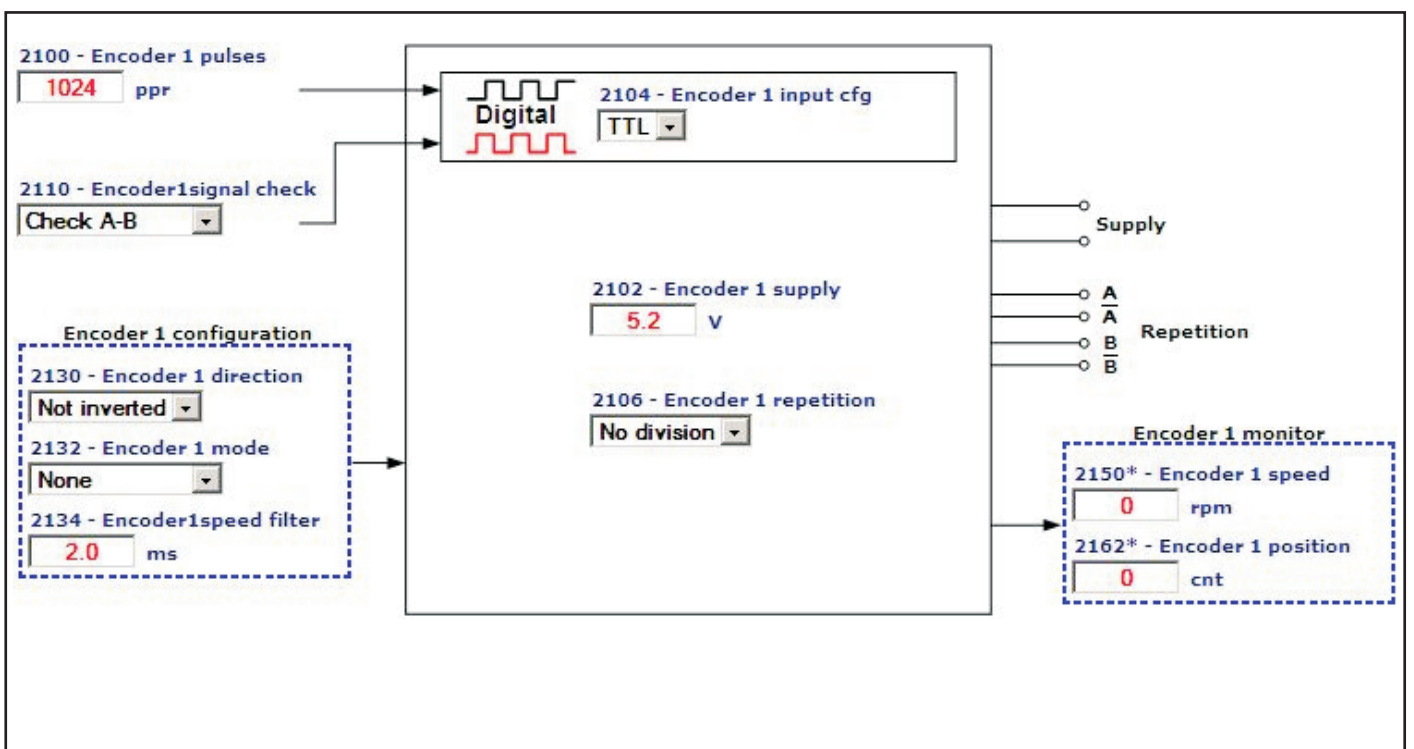
AnOut1Exp

ANALOG OUTPUT 2 EXPANSION CARD

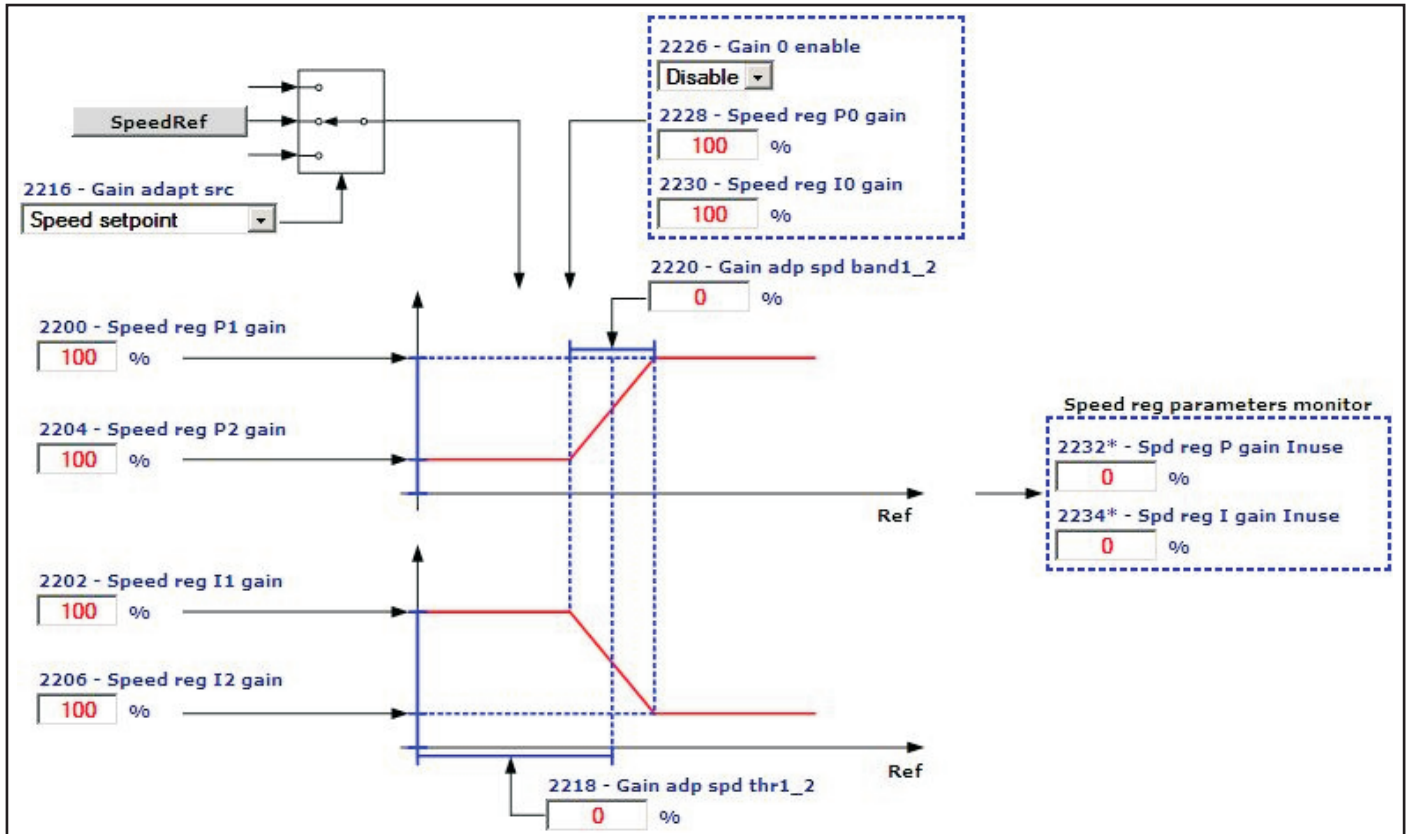
AnOut2Exp



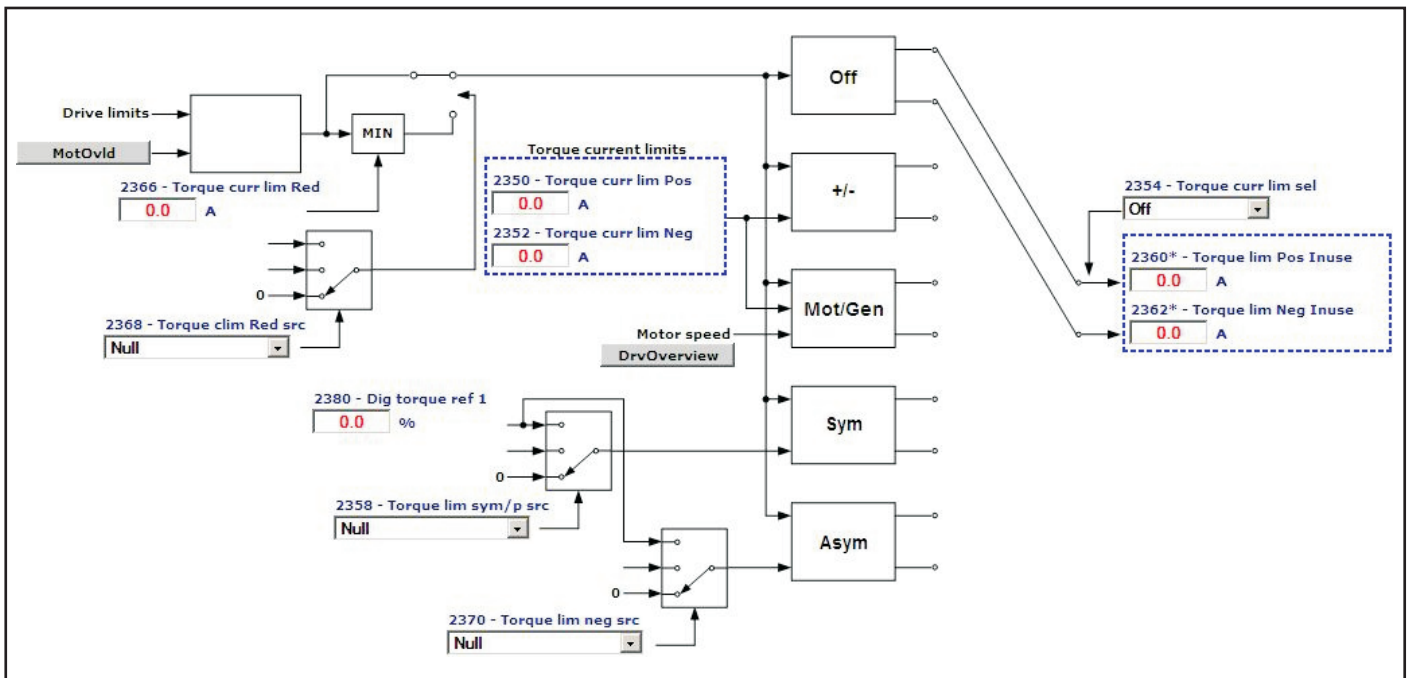
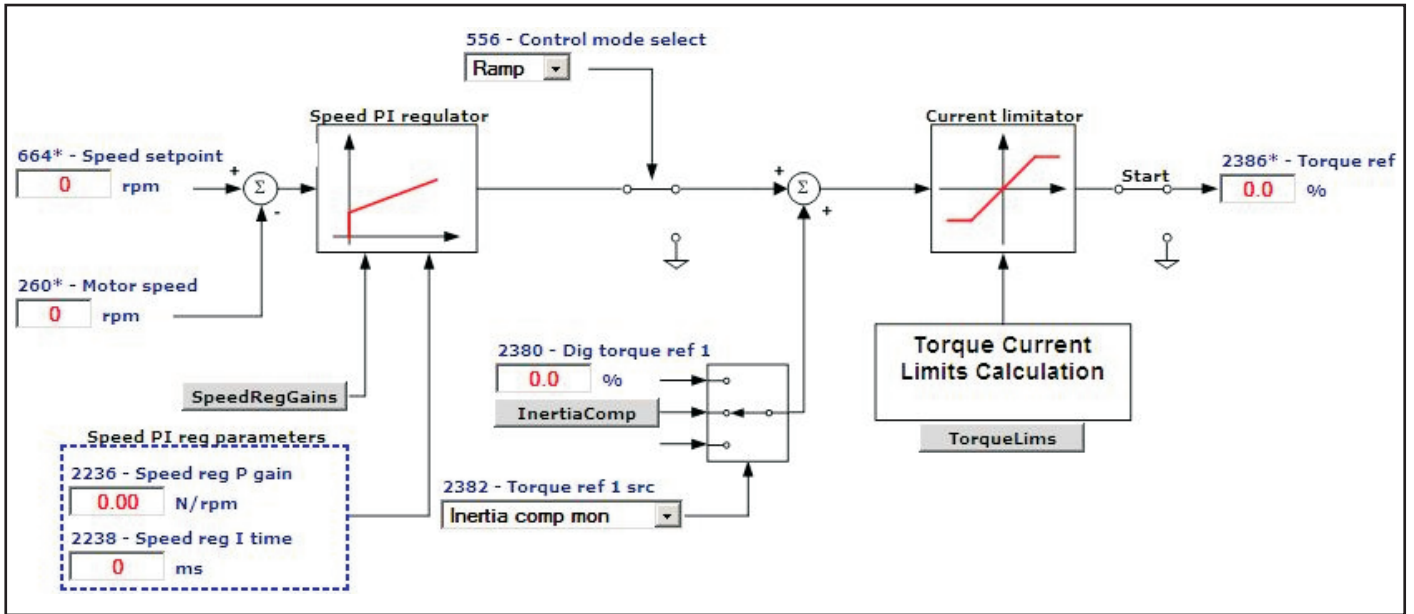
## Encoder config



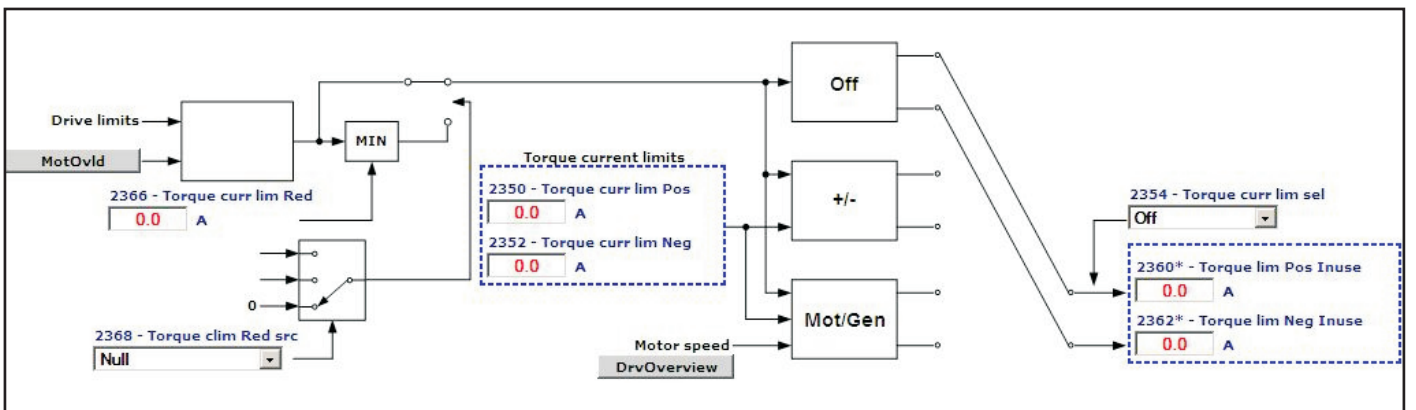
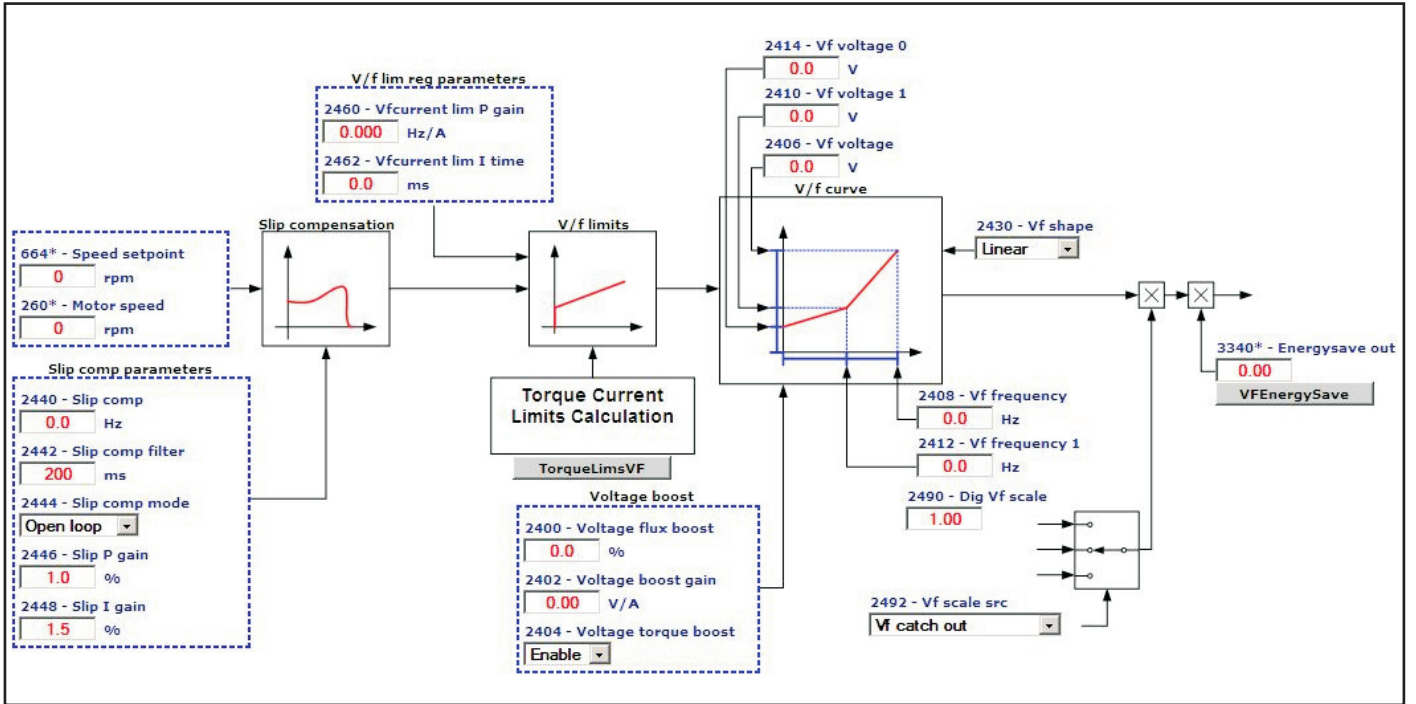
## Speed reg gains



# Torque config

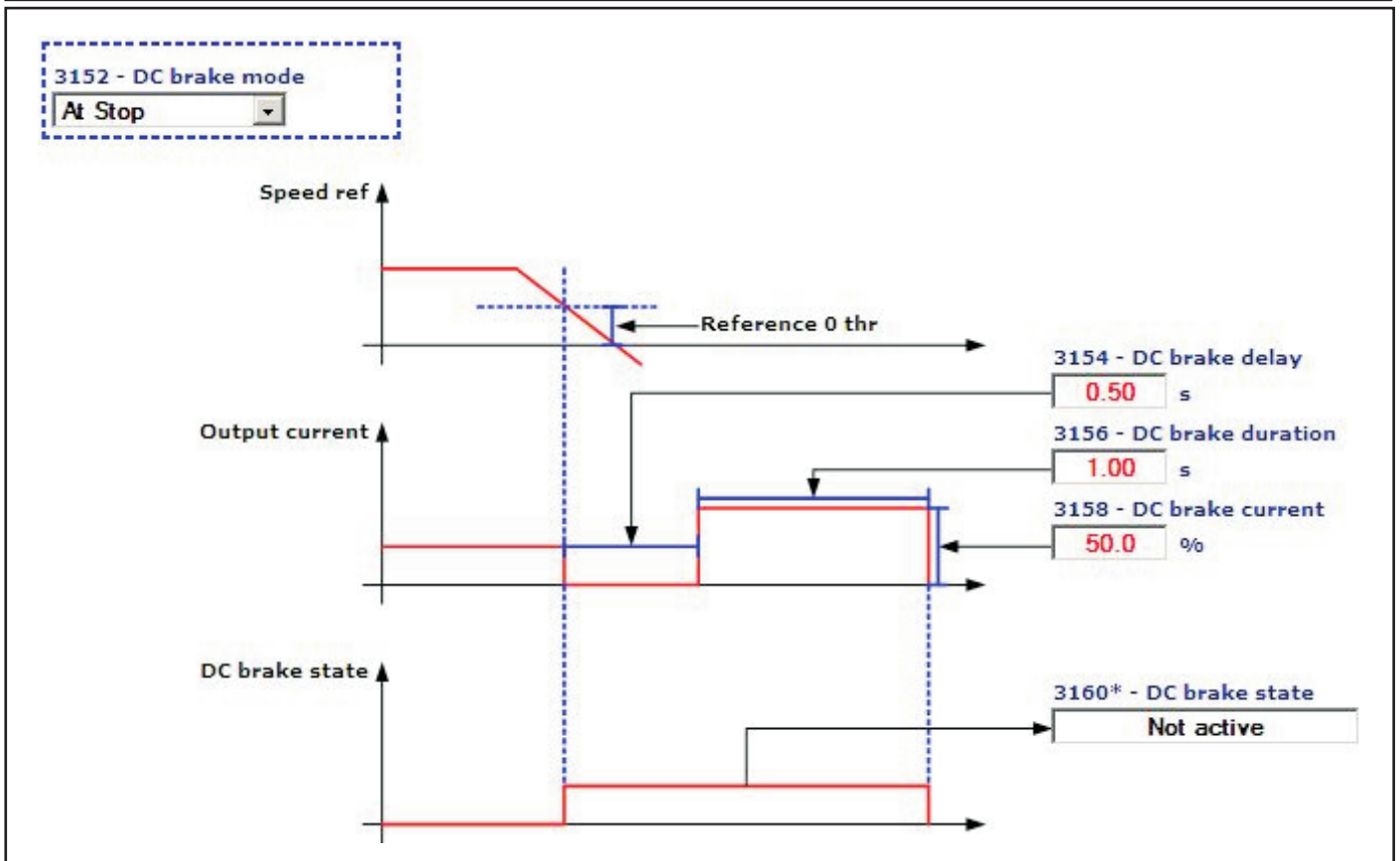
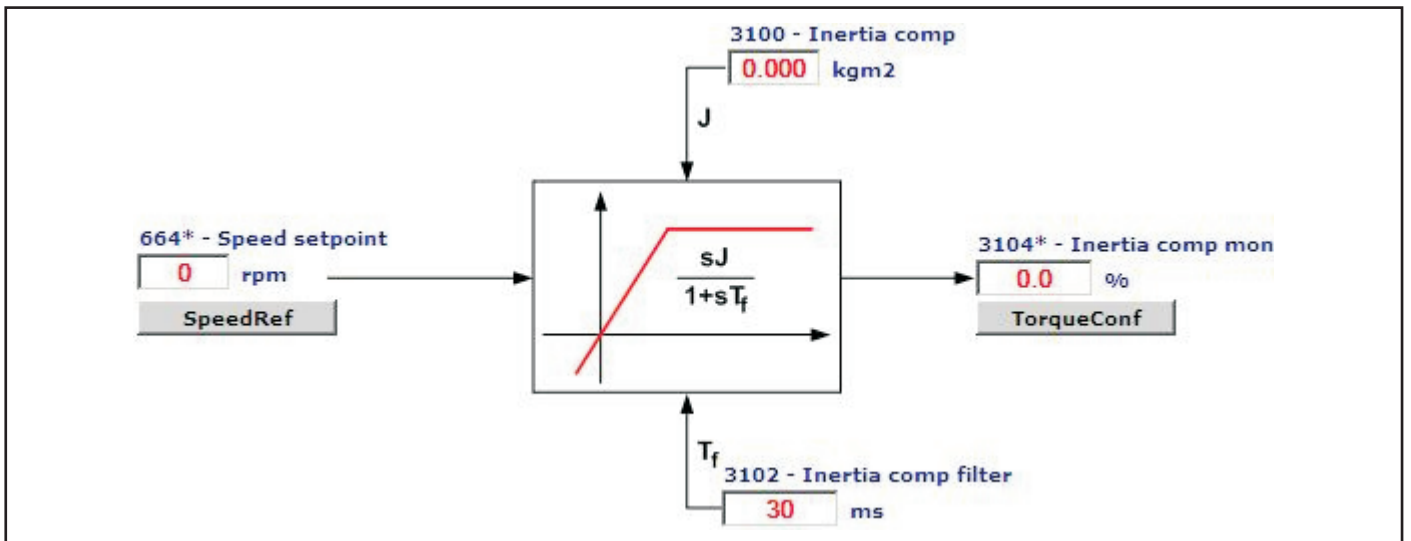


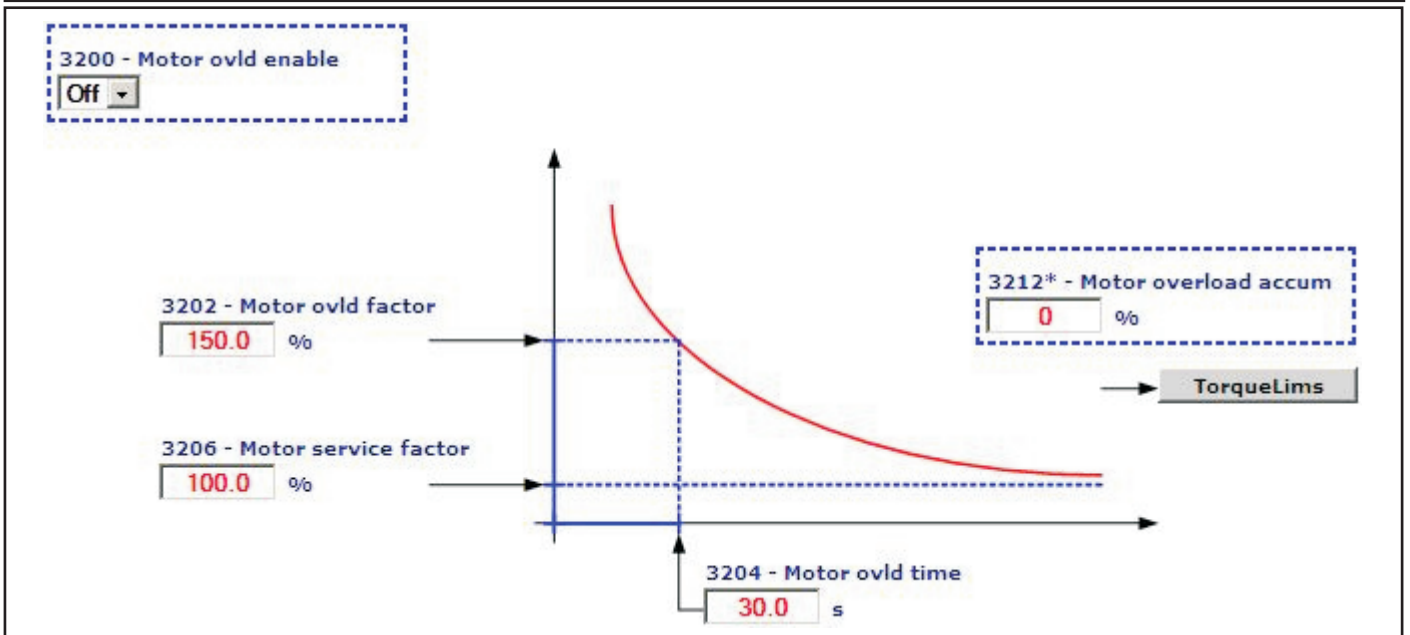
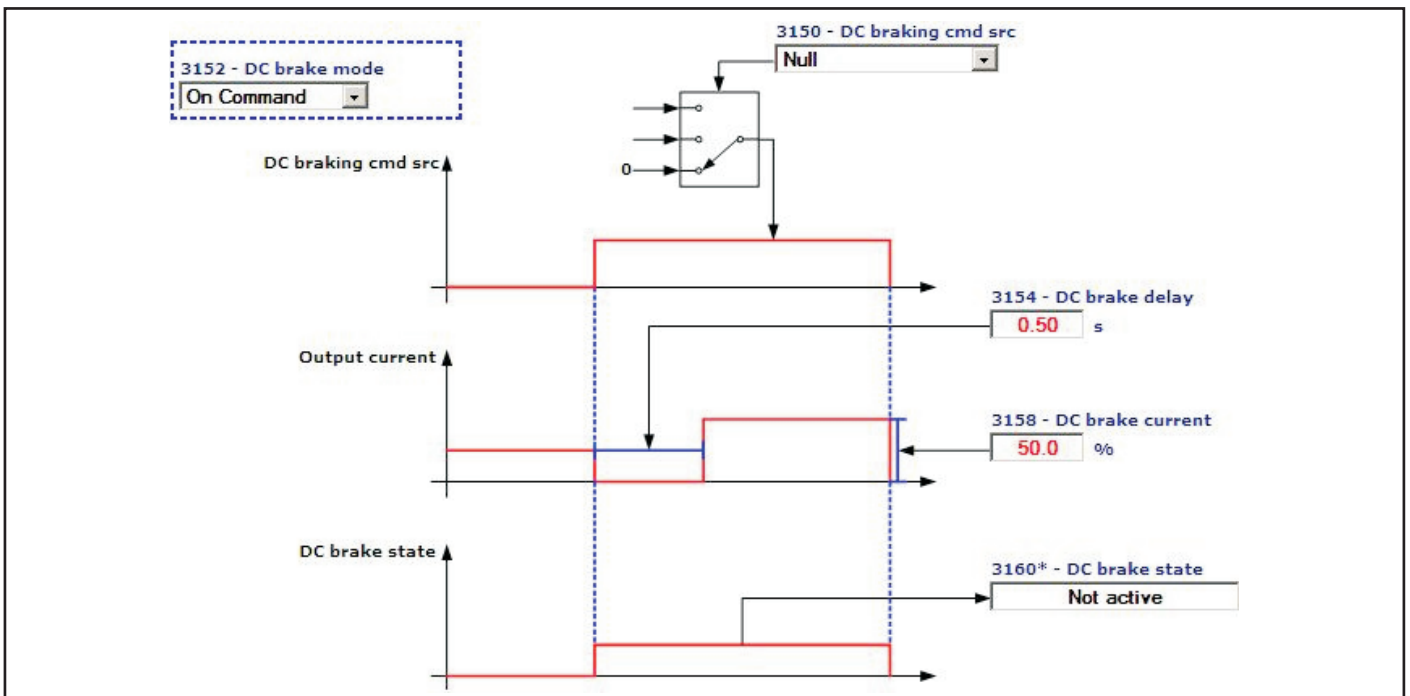
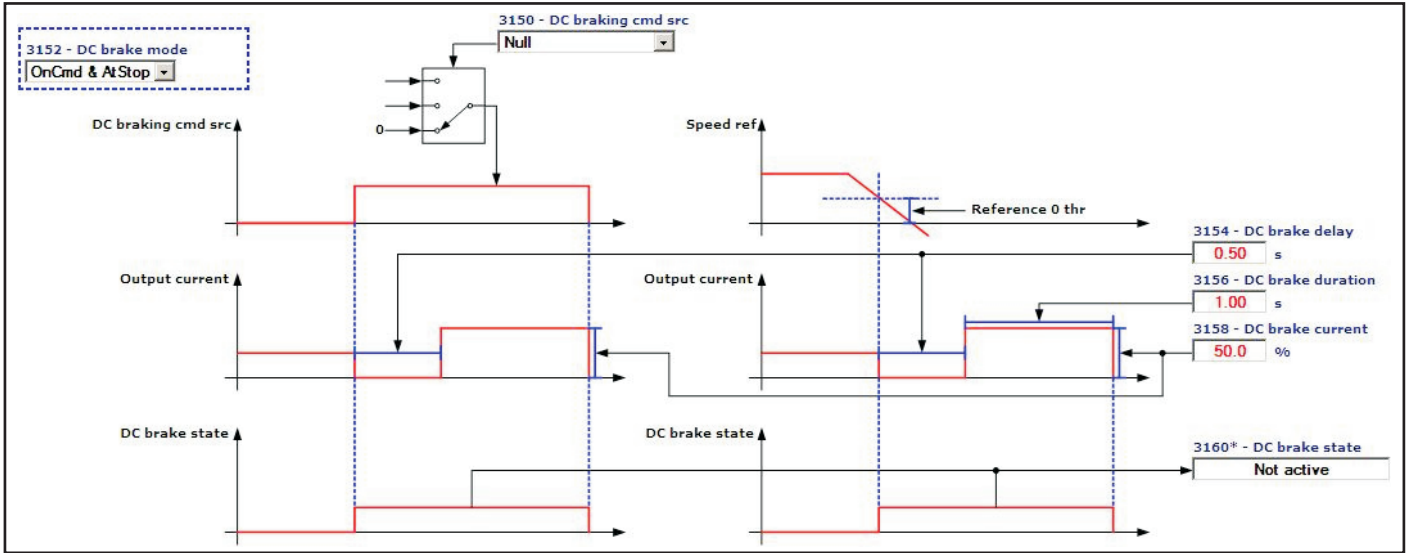
# VF parameters



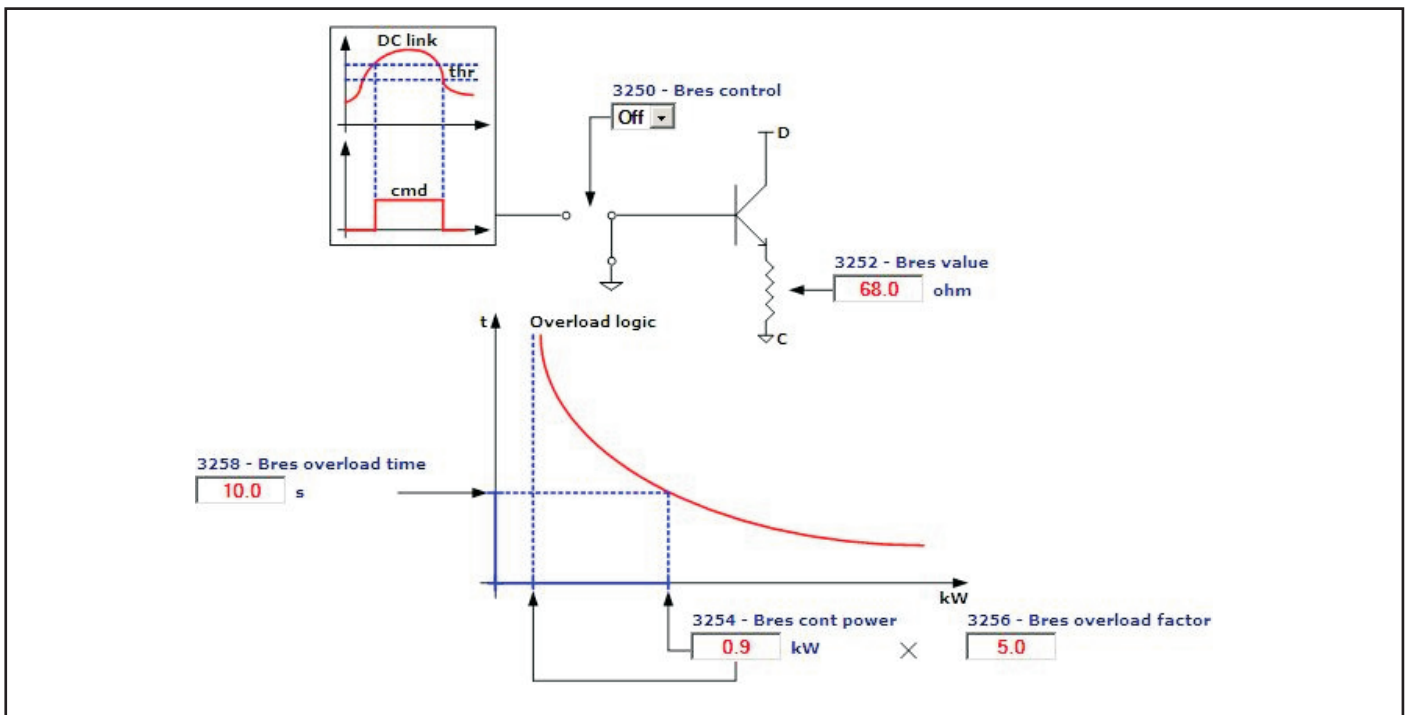
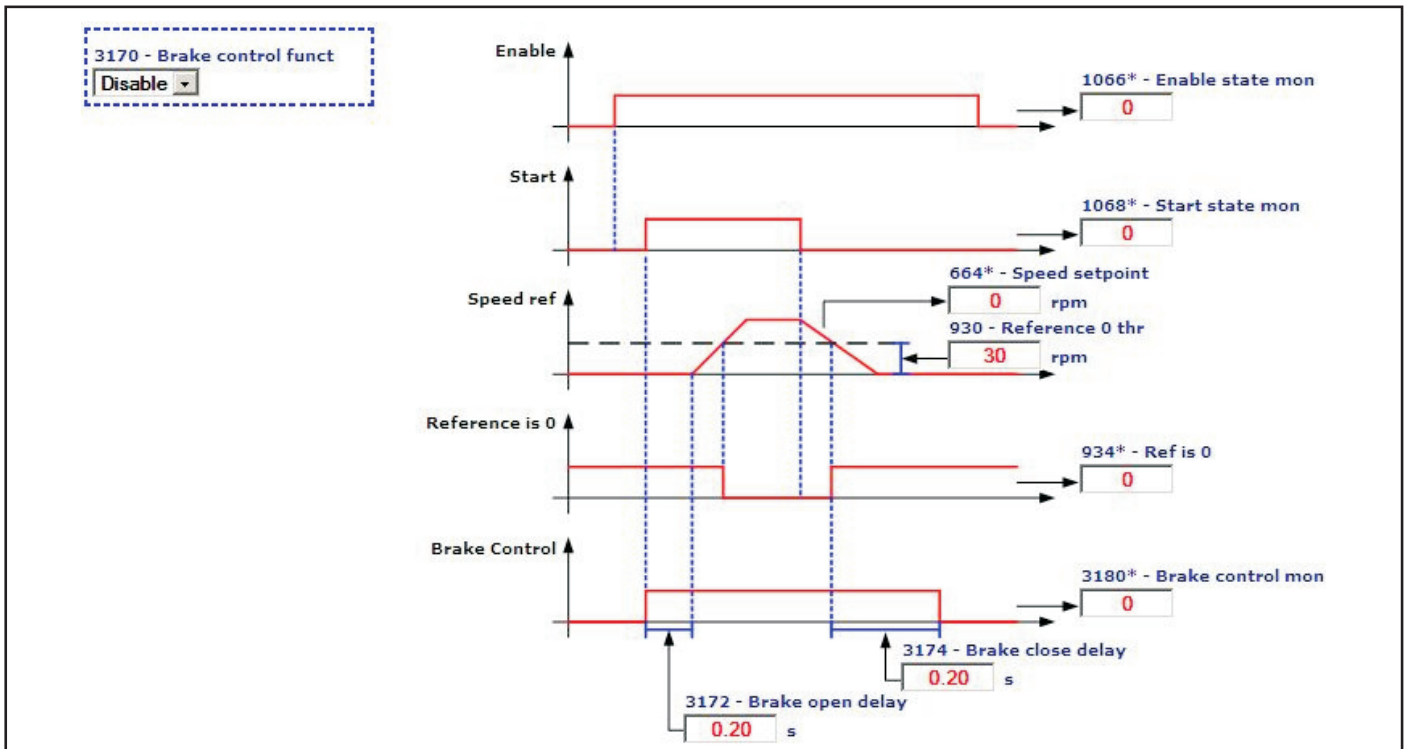
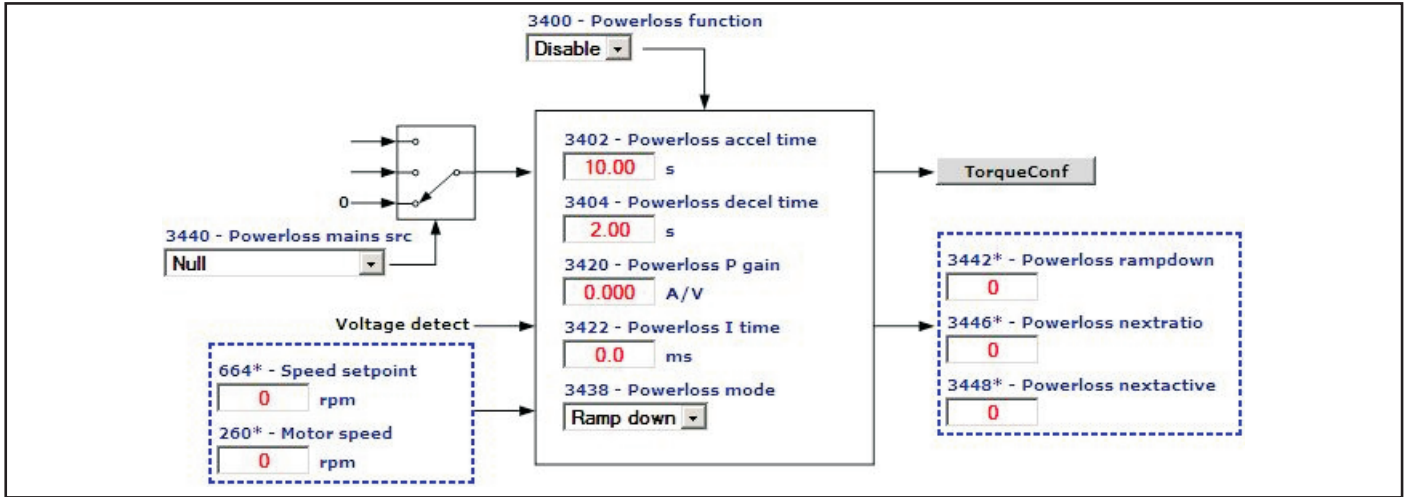
# Functions

INERTIA COMP	InertiaComp
DC BRAKING	DCBraking
MOTOR OVERLOAD	MotOvld
BRES OVERLOAD	BresOvld
POWER LOSS	PowerLoss
BRAKE CONTROL	BrakeCtrl
VF ENERGY SAVE	VFEnergySave





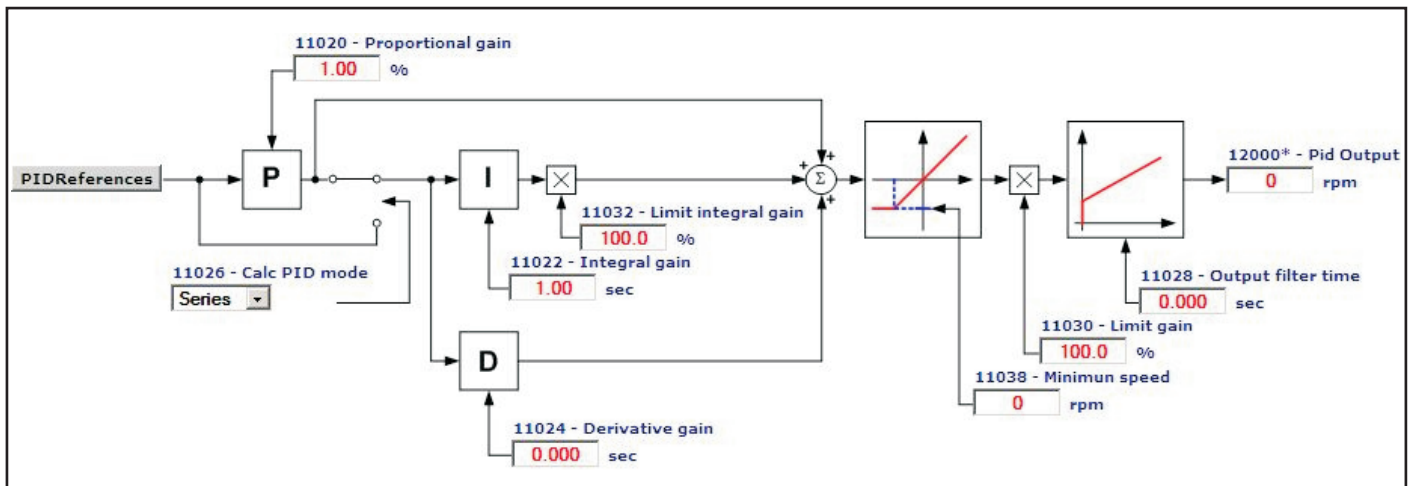
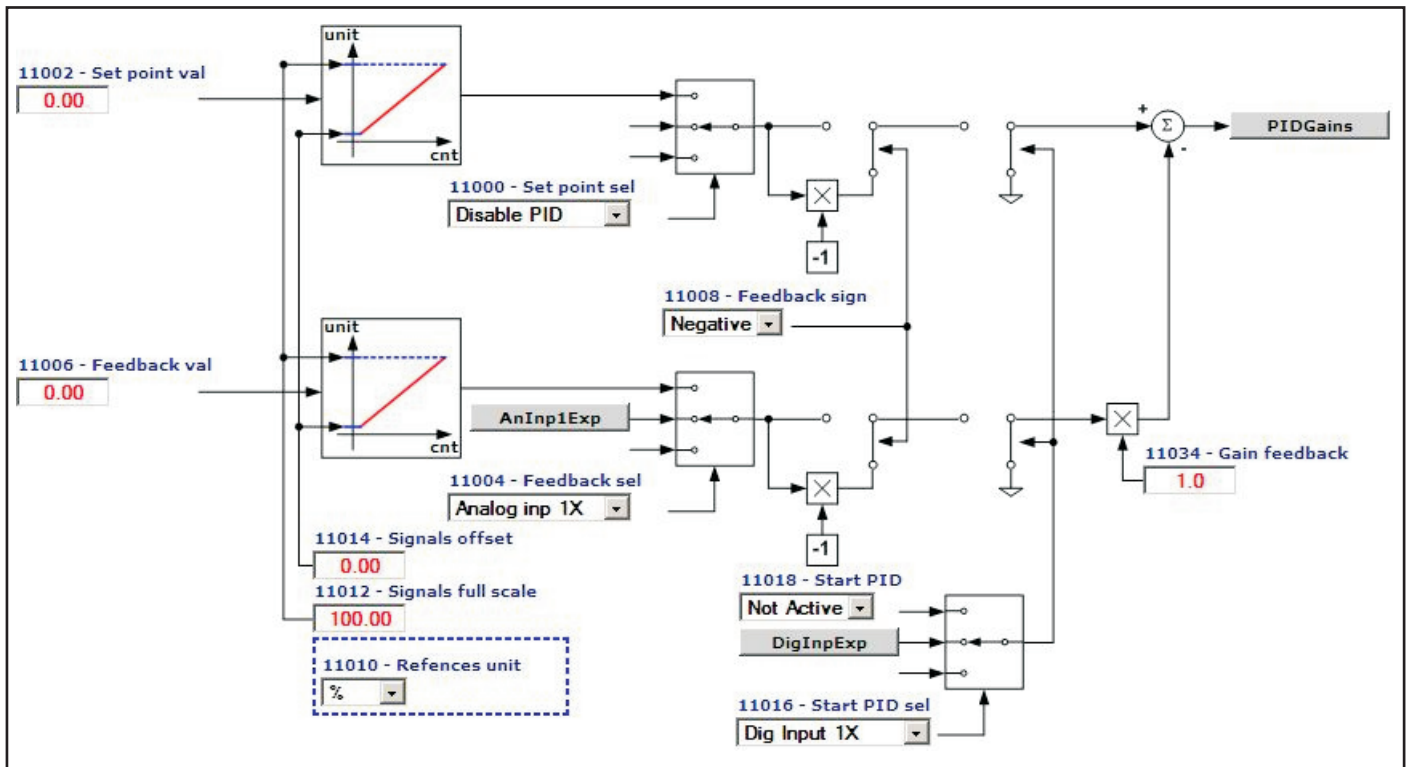




# PID application

PID REFERENCES

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Rev. 0.0 - 22-11-2010



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