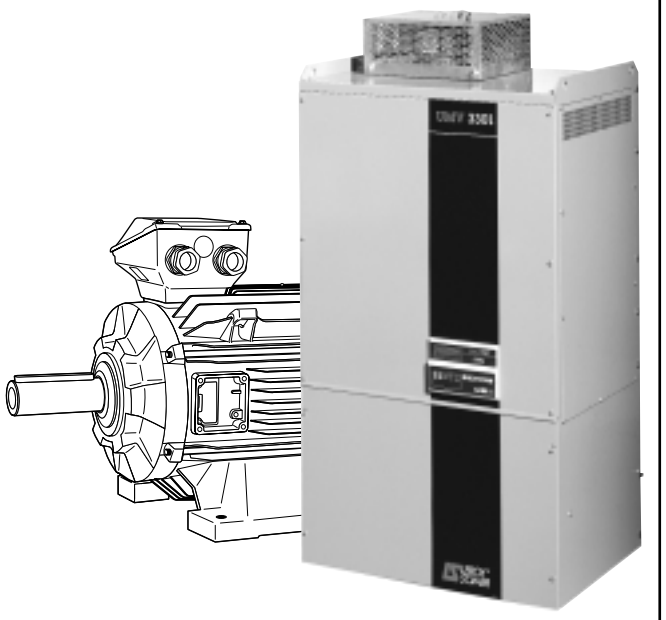
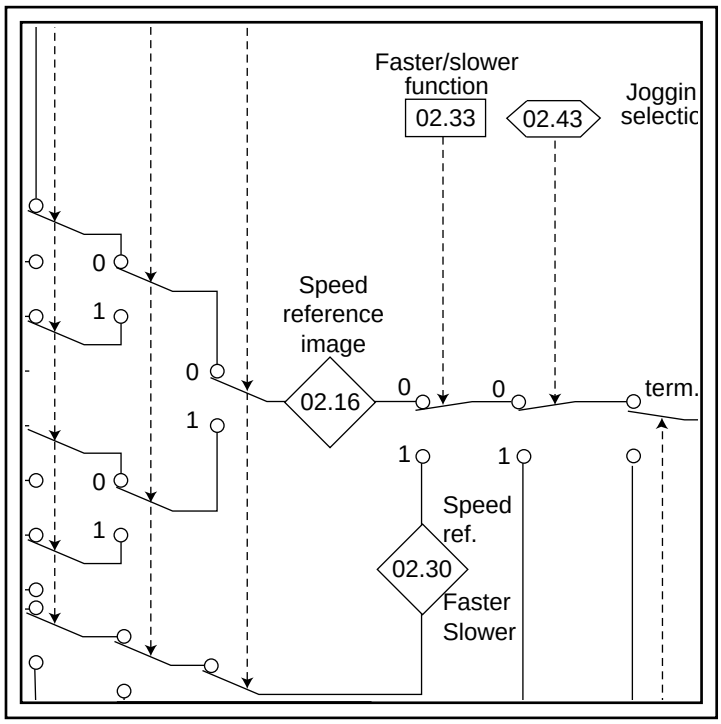
LEROY SOMER

Réf. 2416 GB - 4.33 / d - 01.01



This manual must be given to the end user



UMV 3301

Open or closed loop flux vector controller

Installation and maintenance

UMV 3301
MODBUS

ADDENDUM
to manual for UMV 3301 réf. 2416c

1 - General information

RTU transmission mode

Message frames sent in RTU transmission mode do not include header nor frame-end character. Frame synchronization can be done by simulating a synchronous message : the receiving device monitors the elapsed time between receipt of two consecutive characters. If three and one-half character times elapse without a new character or completion of the frame, then the receiving device assumes that the next byte received will be the first of a new frame. The partly-received frame is said physically mistaken. It does not get any response and it is flushed by the next received frame. In RTU mode transmission, each byte is coded in hexadecimal system (00 to FF).

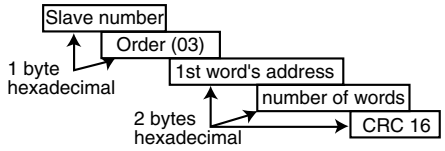
A control key is included in the frames. It is made of two bytes, issued from the evaluation of a CRC16 (Cyclic Redundancy Check 16 bits) using the polynom

x^16 + x^15 + x^2 + 1 and applied on all the frame except the control field. The 2 bytes are sent low byte first.

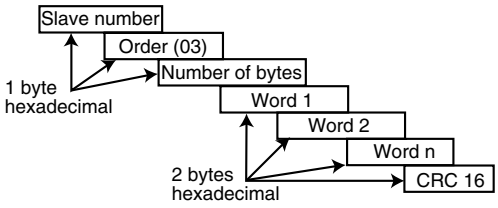
The RTU coding system is mainly used for MODBUS network applications, especially because of the high-transmission-error recovery due to CRC16.

2 - Protocol frames

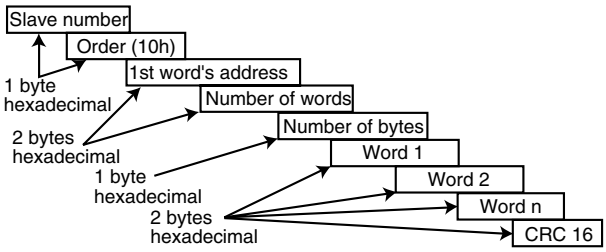
a) Slave reading frame requested by the master



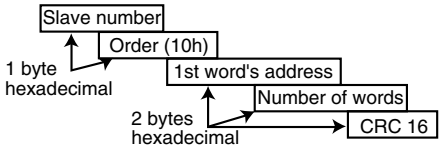
b) Slave reading frame responded by the slave



c) Slave writing frame requested the master



d) Slave writing frame responded by the slave



3 - Commands (from UMV 3301 Software version V625 and above)

- run forward command : parameter N2102 set to 2,
- run reverse command : parameter N2102 set to 3,
- stop-reset command : parameter N2102 set to 1.

4 - Parameters

- All parameters in publication N° 2416-4.33.
- Errors status : N1801.

Display	N1801	Display	N1801
BUS OVERVOLTAGE	0	BUS Underv.	16
OVERCURRENT	1	MOTOR Th.	17
I IMBALANCE *	2	MOTOR PTC PROBE	18
CONTROLLER Th.	3	RS 485 LINK	19
RESISTOR Th.	4	CDC-UMV	20
Int. POWER supp.	5	4/20mA LOSS	21
PROCESSOR	6	ALARM 1 ACTIVE	22
ENCODER	7	ALARM 2 ACTIVE	23
ENCODER LOSS	8	ALARM 3 ACTIVE	24
PROCESSOR opt 1	9	ALARM 4 ACTIVE	25
PROCESSOR opt 2	10	OVERSPEED	26
EXTERNAL	11	I LIMIT TIME	27
MAINS FAILURE	12	IGBT	29
PHASE MISSING	13	DIRECTION / ROT	30
MAINS Underv.	14	MOTOR PHASE	31
MAINS Overv.	15	No Assigment	32

* from rating 180T and above

CAUTION : Do not forget to set parameter N0601 as command origin and parameter N1001 as reset origin.

5 - Address calcultation

Words are addressed corresponding to parameters address : address = MM x 256 + PP (where MM stands for Menu and PP for parameter).

e.g. : address = 01 x 256 + 23 for parameter 01.23.

UMV 3301
open or closed loop
flux vector controller

NOTE

LEROY-SOMER reserves the right to modify its product characteristics at any time to incorporate the latest technological developments. The information contained in this document may therefore be changed without prior warning.

LEROY-SOMER gives no contractual guarantee whatsoever concerning the information published in this document and cannot be held responsible for any errors it may contain, nor for any damage arising from its use.

CAUTION

For the user's own safety, this variable speed drive must be connected to an approved earth (⏚ terminal).

If accidentally starting the installation is likely to cause a risk to personnel or the machines being driven, it is essential to supply the device via a circuit-breaking device (power contactor) which can be controlled via an external safety system (emergency stop, detection of errors on the installation).

The variable speed drive is fitted with safety devices which, in the event of a fault, control stopping and thus stop the motor. The motor itself can become jammed for mechanical reasons. Voltage fluctuations, and in particular power cuts, may also cause the motor to stop.
The removal of the causes of the shutdown can lead to restarting, which may be dangerous for certain machines or installations. In such cases, it is essential that the user takes appropriate precautions against the motor restarting after an unscheduled stop.

The variable speed drive is designed to be able to supply a motor and the driven machine above its rated speed.
If the motor or the machine are not mechanically designed to withstand such speeds, the user may be exposed to serious danger resulting from their mechanical deterioration.
It is important that the user checks that the installation can withstand it before programming a high speed.

The variable speed drive which is the subject of this manual is designed to be integrated in an installation or an electrical machine, and can under no circumstances be considered to be a safety device. It is therefore the responsibility of the machine manufacturer, the designer of the installation or the user to take all necessary precautions to ensure that the system complies with current standards, and to provide any devices required to ensure the safety of equipment and personnel.

Using the speed controller for lifting : if this application is selected, special instructions, available on request, must be observed. The user is responsible for obtaining this instruction manual from his usual LEROY-SOMER contact.

LEROY-SOMER declines all responsibility in the event of the above recommendations not being observed.

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Manual corresponding to software version **9.02**

Update of manual **2416 - 4.33/c - 06.00**

For more recent software versions, consult the attached guide or LEROY-SOMER

UMV 3301
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flux vector controller

SAFETY AND OPERATING INSTRUCTIONS FOR THE SPEED CONTROLLER (Conforming to the low voltage directive 73/23/EEC, modified by 93/68/EEC)

⚠ Throughout the manual, this symbol warns against consequences which may arise from inappropriate use of the speed controller, since electrical risks may lead to material and physical damage as well as constituting a fire hazard.

1 - General

According to their degree of protection, speed controllers can comprise live bare parts, either moving or turning, as well as hot surfaces during operation.
Unjustified removal of protections, incorrect use, faulty installation or inappropriate operation could represent a serious risk to personnel and machinery.
For additional information, consult the manual.
Work relating to transportation, installation, commissioning and maintenance must be carried out by experienced qualified personnel (see IEC 364 or CENELEC HD 384, or DIN VDE 0100 and national specifications for installation and accident prevention).
In these basic safety instructions, qualified personnel denotes persons competent in installation, mounting, commissioning and operation of a product and possessing the relevant qualifications.

2 - Use

Speed controllers are components designed for integration in installations or electrical machines.
When integrated in a machine, commissioning must not take place until the machine's conformity with the 89/392/EEC Directive (Machinery Directive) has been verified. The EN 60024 standard, stipulating notably that electrical actuators (which include speed controllers) cannot be regarded as circuit-breaking devices and certainly not as operating devices, must be respected.
Commissioning can only take place if the requirements of the Directive on electromagnetic compatibility (89/336/EEC, modified by 92/31/EEC) are adhered to.
Speed controllers fulfil the requirements of the 73/23/EEC Low Voltage Directive, modified by 93/68/EEC. The harmonized standards of the VDE 0160 DIN series in connection with standard VDE 0660, part 500 and EN 60146/VDE 0558 are also applicable.
The technical characteristics and instructions concerning connection conditions specified on the nameplate and in the documentation supplied must be observed without fail.

3 - Transportation, storage

All instructions concerning transportation, storage and handling must be respected.
The climatic conditions specified in the technical manual must be adhered to.

4 - Installation

The installation and cooling of equipment must comply with the specifications stated in the manual supplied with the product.
Speed controllers must be protected against any excessive stress. In particular, avoid any damage to parts and/or modification of component isolating distances during transportation and handling. Avoid touching the electronic components and contact parts.
Speed controllers comprise parts which are sensitive to electrostatic stress and can be easily damaged if handled incorrectly. Electrical components must not be exposed to mechanical damage or destruction (risks to health !).

5 - Electrical connection

When work is carried out on the powered-up speed controller, national accident prevention specifications must be respected.
Electrical installation must conform with the appropriate specifications (for example conductor cross-sections, protection via circuit-breaker fuses, connection of protective conductor). Refer to the documentation for more detailed information.
Instructions for an installation complying with electromagnetic compatibility requirements such as screening, earthing, presence of filters and correct insertion of cables and conductors) are outlined in the documentation supplied with the speed controller. These indications must be respected in all cases, even if the speed controller has the CE mark. Adherence to the limits imposed by EMC legislation relieves the installation or machine manufacturer of responsibility.

6 - Operation

Installations incorporating speed controllers must be equipped with additional protection and monitoring devices as set down in the relevant current safety regulations : law on technical equipment, accident prevention specifications, etc. Modifications to speed controllers using control software are permitted.
After the speed controller is powered down, active parts of the equipment and live connections must not be touched immediately, as the capacitors may still be charged. In view of this, heed the warnings fixed to the speed controllers.
During operation, all doors and protective devices must remain closed.

7 - Care and maintenance

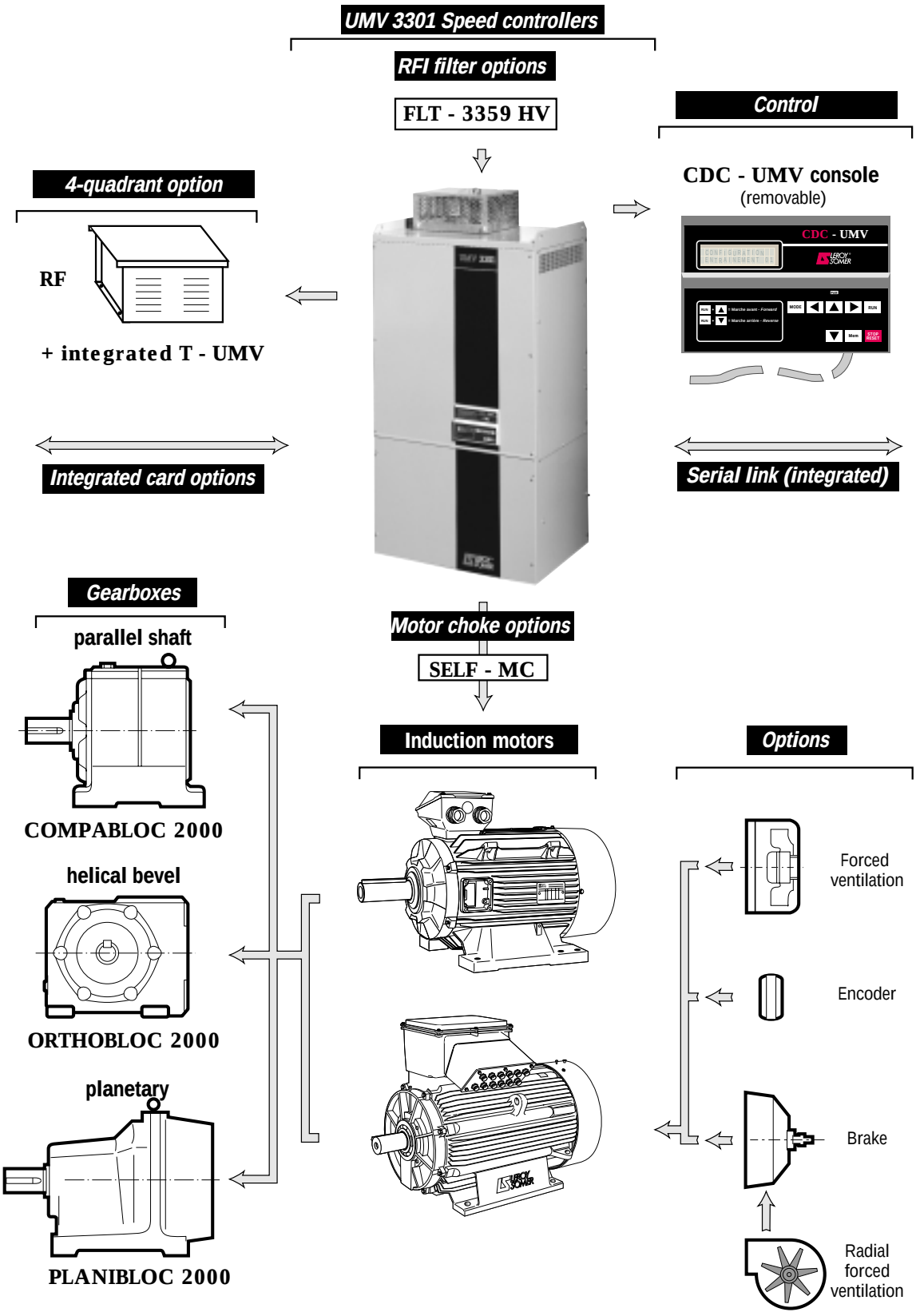
Refer to the manufacturer's documentation.

This document must be supplied to the end user.

UMV 3301
open or closed loop
flux vector controller

PREFACE

This manual describes how to commission **UMV 3301** flux vector control electronic speed drives with digital technology. It details all procedures to be carried out on the speed controller.



UMV 3301
open or closed loop
flux vector controller

CONTENTS

UMV 3301
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1 - GENERAL INFORMATION

1.1 - General operating principle

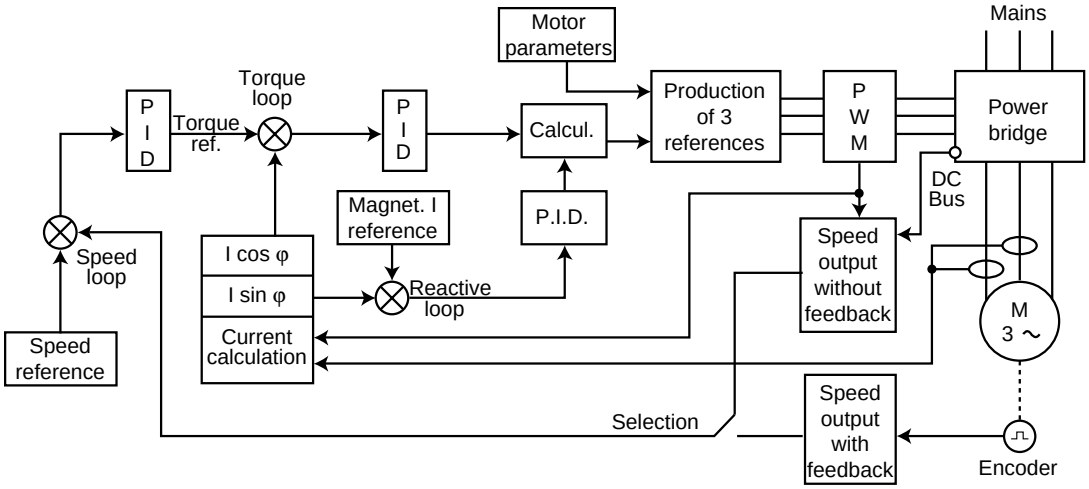
The **UMV 3301** is an A.C. open or closed loop flux vector controller.
The use of vector control with an induction motor enables the magnetizing current and active current to be handled separately. The torque and speed of the induction motor are controlled impeccably.
The **UMV 3301** flux vector controller uses an inverter bridge with IGBT transistors.
This precision technology considerably diminishes the noise and temperature rise of variable speed induction motors.
The performance of the **UMV 3301** is ideally suited to use in all 4 quadrants of the torque - speed relationship.

During periods of operation in generator mode, the energy restored by the motor is dissipated by resistors.

In certain applications where the energy restoration is continuous, the energy can be reinjected into another motor speed drive assembly.

Main characteristics :
- power range : 55 kW to 600 kW,
- speed range from 0 to 8000 min^{-1} (4 P motor),
- operation at nominal torque from 0 to 1500 min^{-1} (4 P motor),
- with speed feedback, nominal torque at zero speed maintained permanently,
- IP 55 motor,
- master slave operation,
- speed or torque pilot control.

Diagram



1.2 - Product designation

UMV 3301 : open or closed loop flux vector controller.
120 = Rating in kVA.
T = 3-phase supply 400V, TH = 3-phase supply 690V
This designation appears on the name plates located on the front panel and right side of the speed controller.

LEROY SOMER	**ENTREE - INPUT**				
	Ph	V (V)	Hz (Hz)	I (A)	KVA
	3	400/460	50/60	207/197	143/157
MOTEURS LEROY-SOMER 16015 ANGOULEME FRANCE	Alim - électronique 280VA				
	230/400/460V 50/60Hz				
CE	**TYPE : UMV 3301**			**120T**	
	S/N :				

1.3 - Characteristics

1.3.1 - Main electrical characteristics

Power supply	3-phase supply 380V to 460V, ± 10 %, 50 Hz or 60 Hz, ± 2 % (75T to 600T) 3-phase supply 525V to 690V, ± 10 %, 50Hz or 60Hz, ± 2 % (75TH to 700TH)	
Electronic system supply	Single phase supply	230V, 400V or 460V, ± 10 %, 50/60Hz (75T to 600T) 230V, 500V, 600V or 690V, ± 15 %, 50/60Hz (75TH to 700TH) 300VA (75T to 265T and 75TH to 340TH) 800VA (270T to 600T and 400TH to 700TH)
Output voltage	From 0V of the power supply	
Maximum number of power-ups per hour	20	

1.3.2 - Electrical output characteristics

UMV 3301	Overtorque ✶ (01.04)	Maximum motor power (kW)		Output continuous maximum current (A)		Overload at 400V in % (60s)
		400Vac	460Vac	1.7 to 2.5kHz	3.4 to 5kHz	
75T	High	55	55	112	100	155
	Low	75	75	145	125	125
100T	High	75	75	145	130	150
	Low	90	90	180	155	120
120T	High	90	90	180	150	142
	Low	110	110	220	170	116
150T	High	110	110	220	180	132
	Low	132	132	260	190	112
180T	High	132	132	260	195	138
	Low	160	160	315	250	114
220T	High	160	160	315	235	139
	Low	200	200	380	300	115
265T	High	200	200	370	310	149
	Low	250	250	480	360	118
270T	High	200	200	380	Consult LEROY-SOMER	149
	Low	250	250	490		118
340T	High	250	250	480		140
	Low	310	310	580		115
400T	High	310	310	580		134
	Low	355	355	680		114
470T	High	355	355	680		135
	Low	450	450	820		117
600T	High	450	450	860		128
	Low	500	500	970		115

UMV 3301 (UL)	Overtorque ✶ (01.04)	Maximum motor power (kW)			Output continuous maximum current (A)		Overload in % (60s)
		690Vac	600Vac	525Vac	2.5 kHz	1.7 kHz	
75TH	High	55	45	37	63		150
	Low	75	55	45	85		112
100TH	High	75	55	45	86		150
	Low	90	75	55	115		112
120TH	High	90	75	55	101		150
	Low	110	90	75	135		112
150TH	High	110	90	75	116		150
	Low	132	110	90	155		112
180TH	High	132	110	90	142		150
	Low	160	132	110	190		112
220TH	High	160	132	110	165		150
	Low	200	160	132	225		112
265TH	High	200	160	132	205		150
	Low	250	200	160	280		110
340TH	High	250	200	160	255		146
	Low	300	250	200	340 (UL)		109
400TH	High	300	250	200	Consult LEROY-SOMER	300	147
	Low	355	300	250		400	110
470TH	High	355	300	250		350	140
	Low	450	355	300		450	109
600TH	High	450	355	300		450	142
	Low	500	450	355		580	110
700TH	High	500	450	355		500	146
	Low	600	500	450		670	109

✶ High overtorque : for machines with strong resistive torque, for example : presses, grinders, extruding machines, conveyors, sieves, lifting or applications requiring rapid acceleration of high inertia.
Low overtorque : for machines with centrifugal torque or constant torque with reduced overload, for example : pumps, fans, compressors.

(UL): The 75TH to 340TH ratings comply with UL requirements provided the following limitations are observed :
- the power supply voltage is limited to 600 Vac,
- the maximum continuous output current of the 340TH rating is limited to 304A.

1.3.3 - Characteristics of smoothing choke

UMV 3301 rating	75T	100T	120T	150T	180T	220T	265T	270T	340T	400T	470T	600T
I nominal (A)	146	193	214	257	350	480	535	535	680	750	860	1000
Inductance (mH)	0.4	0.3	0.25	0.2	0.22	0.18	0.14	0.16	0.11	0.09	0.08	0.05

UMV 3301 rating	75TH	100TH	120TH	150TH	180TH	220TH	265TH	340TH	400TH	470TH	600TH	700TH
I nominal (A)	92	106	130	160	200	240	310	375	460	520	660	760
Inductance (mH)	1.3	1.1	0.9	0.8	0.6	0.6	0.45	0.35	0,225	0,225	0,16	0,14

1.3.4 - Characteristics and functions

Note : The UMV 3301 has been configured to suit the majority of requirements. The most commonly used parameters have been listed in a user menu which allows rapid access to the functions indicated in gray. The other functions are distributed throughout the 19 specific menus and are arranged by topic.

Characteristics	UMV 3301
Regulation mode	• **Vectorial, open loop** • **Vectorial, closed loop** • **Voltage/Frequency ratio**
Regulation	• **Speed reference** • **Torque reference** (regulation of the motor current) • P.I.D.
Constant torque, constant power	**Adjusted by basic frequency**
Switching frequency	1.7 - **2.5** - 3.4 - 5 kHz
Overload capacity	60s adjustable level • **High** • **Low** (see table para 1.3.2)
Braking	• **Hypersynchronous** **controller only** or with R - UMV and T - UMV options • By D.C. injection • Mechanical brake handling
Speed loop	• **By incremental encoder** (max frequency 102 kHz) • **Adjustment of number of points per revolution**
Programming	• Via menus • **Programmable user menu**
Control	• Integrated P.I.D. loop • Brake handling
Control logic	Positive or negative
Operating flexibility	• Assignment of analogue I/O • Assignment of logic I/O

Pilot control	UMV 3301
Speed reference	• **Analogue** : choice of 3 references assigned by programming - differential voltage ±10V - voltage 0/± 10V - **voltage 0/10V** or current **0/20mA** or **4/20mA**, signal selection and inversion (10/0V - 20/0mA - 20/4mA) by programming • **Digital** - **3** or 7 fixed programmable speeds, switchable via three assignable logic inputs - **from the console keypad by incrementation** - by serial link
Additional reference	Selection by programmable logic input • **Analogue** by assigning an analogue input - voltage 0/± 10V - **current** 0/20mA or **4/20mA** • Digital - fixed by programming

1.3.4 - Characteristics and functions (continued)

Pilot control	UMV 3301
Additive reference	Reference without " ramp " • Analogue by programmable assignment of an analogue input - voltage 0/± 10V - current 0/20mA or 4/20mA • Digital - fixed by programming
Speed offset	• Fixed by programming on the 3 analogue references • Enabled by programming
Jogging speed reference	Selection by programmable logic input • Fixed by programming
Speed control via faster/ slower button	• Enabled by programming - assignment of two logic inputs • Function can be " superimposed " on programmable fixed speeds • Programmable memory function (on stop) • Programmable sensitivity
Local/Remote	Choice by logic input, of two references For example : - Local (by programming) ref. 1 by potentiometer 0 to ± 10V - Remote (by programming) ref. 2 in current
Speed skips	**Elimination** by programming, of **1** to 3 operating **zones** - **Programmable** skip band - zones can overlap
Programmable speeds	**By** combination of **2** or 3 assignable **logic inputs**, **selection of 3** to 7 **programmable speeds**
Speed control modes	• **Selection** by programming - **terminal block** control - **console keypad** control - control by serial link
Speed loop	• Open loop • Feedback by incremental encoder (8 to 4096 points per revolution). Max. frequency : 102 kHz
Speed reference	Adjustment by programming the " proportional " and " integral " speed loop coefficients
P.I.D. loop	• P.I.D. reference 3 references switchable by two programmable logic inputs - analogue : voltage (0/10V or 0/± 10V), current (0/20mA or 4/20mA) - digital : fixed by programming Ramp adjustable by programming • P.I.D. feedback - inversion of feedback signal by programming • Low and high limits, P.I.D. coefficient, scaling of the output signal, adjustable by programming • Integral action can be locked by programming
Speed regulation Torque regulation	Change from one regulation mode to the other by logic input
Torque reference	• Analogue : choice of three programmable inputs - differential voltage ± 10V - voltage 0/± 10V - voltage 0/10V or current 0/20mA or 4/20mA with signal inversion by assignable logic input • Digital - from the console keypad by incrementation - by serial link
Zero torque selection	By logic input
Torque offset	• Fixed by programming • Enabled by programming
Torque limits	Adjustable by programming • limit 1 • time in limit 1 • **limit 2** • limit in generator mode • symmetry of limiting

1.3.4 - Characteristics and functions (continued)

Pilot control	UMV 3301
Starting modes	By programming • **automatic or controlled** • timed • start prohibited if a reference is present • locking of the reference in " jogging " mode • by **automatic or controlled fault clearing** • on reappearance of supply with motor **flying restart**
Stopping modes	• By selection of logic states and weighting of faults causing stops - freewheel - on ramp - fast (in current limiting mode with braking resistor or DC bus voltage regulation) - with change to low speed (programmable time and level) - with D.C. injection (programmable speed threshold, level and duration of injection) - indexed with logic input DI 5 • Directly by the external fault input (EXT-FLT) instantaneous locking of the speed controller output (freewheel stop)
Electromechanical brake	Control via an assignable relay whose state depends on two assignable parameters • current threshold • speed threshold
Forward/Reverse control	• By inversion of the reference polarity • **By logic input**
Logic inputs	• **1 unlocking input** • **1 dedicated Forward/Stop input** • **1 dedicated Reverse/Stop input** (or assignable logic input) • **5 inputs assignable by programming** or • 1 unlocking input • 1 dedicated Forward/Stop input • 1 dedicated input Reverse/Stop (or assignable logic input) • 4 inputs assignable by programming
Control logic	Positive or **negative** • Selection by jumper
Analogue inputs	• **1 differential reference input** ± **10V** assignable • 1 reference input 0/± 10V assignable • 1 reference input 0/10V or 0/20mA or 4/20mA assignable • **1 dedicated P.T.C. input** (disabled by programming)
Console	• Clear display of menus and parameters with language selection in 2 rows of 16 LCD characters • Isolated RS 485 link - 9-pin SUB-D connector - access to reading of all parameters and the writing of accessible parameters
Serial link	Isolated RS 485 • connection (SUB-D 9-pin female) • MODBUS protocol

Operation	UMV 3301
Controller/motor adaptation	By programming : • **motor characteristics** - nominal power - basic frequency - nominal speed - nominal motor frequency - nominal voltage - cosine φ - C max/C nominal - cooling • **controller characteristics** - pilot control - switching frequency - overtorque request

1.3.4 - Characteristics and functions (continued)

Operation	UMV 3301
Ramps	• Main ramps assigned to general references 4 selection modes by programming - 1 single setting for ACC and DEC - FWD or REV - **1 setting for ACC FWD and REV, 1 for DEC FWD and REV** - 4 settings ACC/FWD - DEC/FWD - ACC/REV - DEC/REV - 2 ACC settings with change by programmable speed threshold 2 DEC settings with change by programmable speed threshold • Ramps assigned to programmable speeds - association or not with programmable speeds by programming - ACC and DEC associated or separated by programming - automatic selection corresponding to switching of programmable speeds • ACC and DEC ramps assigned to jogging • Selection of " S " or " U "ramp by programming • Adjustment of " S " or " U " ramp curves by programming • Short-circuit ramp via logic input • Lock ramp via logic input
Minimum speed limit	• With **reference 0/10V** or 0/20mA or 4/20mA, adjustment of **minimum speed stops FWD and REV** by programming • Automatic suppression of stops with faster/slower jogging reference
Maximum speed limit	• Adjustment of maximum speed stops by programming - maximum forward speed/maximum reverse speed separately - **max. forward/reverse speed** symmetrically • Stops maintained in torque regulation
Torque limiting	Selection by programming the limiting choice • **Symmetrical limiting of the motor and generator** • Separate limiting of the motor or generator - 2 programmable limits in motor mode - programmable time - 1 programmable limit in generator mode
Min. speed detection	• Open loop : accuracy greater than the speed in min^{-1} corresponding to 1Hz of stator frequency. • Closed loop : accuracy greater than 1 min^{-1} with encoder 1024 points per revolution.
Switching via assignable logic inputs	5 assignable logic inputs enabling selections : • Local/Remote control • additional speed reference • 1, **3** or 7 fixed **programmable speeds** • run or jog • faster/slower control • ramp short-circuiting • ramp locking • speed regulation/torque regulation • zero torque • direction of rotation • stopping modes • **fault clearing** • pilot control by external logic information - starting - change in speed - reverse direction - stop
Special functions	• Electromechanical brake handled by integration of engagement and release times • Weighting of safety actions (minor fault/major fault)
Programmable thresholds	2 circuits with analogue source and programmable logic output • level of tripping threshold adjustable by programming • hysteresis adjustable by programming • inversion of logic information by programming
Settings protected	• By security code • Settings memorised after each modification

1.3.4 - Characteristics and functions (continued)

Signalling	UMV 3301
Display	On the console • Controller states • Parameter description and values • Faults
Display	• 2 rows of 16 LCD characters • 1 LED indicating parameter-setting mode
Analogue outputs	**2 outputs** with programmable source • Scaling the source by programming • Conversion of output signal by programming • Selection of output signal by programming - 0/20mA or 20/0mA, **4/20mA** or 20/4mA, 0/10V or 10/0V, ± 10V
Digital information	• Motor frequency • Motor voltage • Active current and motor current • Output torque on the motor shaft • Active power consumed by the motor • Overload level
Logic outputs	• 2 outputs with single or double programmable logic sources - combination of both sources (AND function) by programming - inversion of logic sources and the AND output by programming - time delay adjustable by programming • 2 relay outputs with single or double programmable logic sources - combination of both sources (AND function) by programming - inversion of logic sources and the AND output by programming - time delay adjustable by programming • 1 output assignable by programming - programmable logic source with inversion of the logic source by programming - motor speed pulsed output
Logic information	• Logic input state • Selection state (speed - ramps - starting and (or) stopping modes - jogging - P.I.D.) • State of programmed thresholds (speed or current)

Protection	UMV 3301
Thresholds and alarms	• 4 detection circuits - tripping threshold level adjustable by programming - hysteresis adjustable by programming - inversion of the logic information by programming - tripping time delay - selection of the effect on operation • 1 detection of time in current limit - threshold level adjustable by programming - selection of the effect on operation • 2 assignable time-based alarms - periods adjustable by programming - display of the duration before alarm • 1 break of reference 4-20mA alarm • 1 ramp monitoring alarm • 1 rotation direction supervisor • 1 serial link and console supervisor • Motor earthing supervisor (for ratings ≥ 180T)
I x t overload	Electronic **thermal relay function**
Overcurrent	Monitoring and instantaneous break of current in IGBT transistors
Controller overheating	Thermal protection of power bridge
Motor overheating	• **Management of PTC probes** (assigned analogue input) • Management of PTO probes directly or by assignable logic input
Motor protection	• Motor phase loss monitoring
Supply voltage	• Mains fault with programmable time delay • Mains undervoltage with programmable threshold
D.C. bus voltage	• Undervoltage fault

1.3.4 - Characteristics and functions (end)

Option	UMV 3301
Resistance braking (4 quadrants)	Braking resistors • RF 27500, RF 37500, RF 55000, RF 75000, RF 110000 for 75T to 600T (consult LEROY-SOMER for 75TH to 700TH) T - UMV modules • 100 : for UMV 3301 75T and100T • 210 : for UMV 3301 120T to 150T • 220 : for UMV 3301 180T to 265T • 300 for UMV 270T and 340T TH - UMV modules • 85 : for UMV 3301 75TH to 150TH • 175 : for UMV 3301 180TH to 340TH • Varies according to the application for UMV 3301 400T to 600T and 400TH to 700TH

1.4 - Environmental characteristics

1.4.1 - General

Characteristics	Level
Ingress protection	• IP21 : 75T to 265T and 75TH to 340TH • IP20 : 270T to 600T and 400TH to 700TH
Storage temperature	- 25°C to + 55°C, 12 months maximum with 5 to 95 % humidity ✶
Surronding air temperature	- 10°C to + 40°C with 5 to 85 % humidity
Transportation temperature	-25°C to +55°C with 95 % maximum humidity
Altitude	• ≤ 1000 m without derating. • Derating : 1 % of I_N per 100 m above 1000m up to 4000 maximum.
Humidity	Without condensation.
Vibration	Conforms to IEC 62-2-36 (maximum acceleration : 1g for 10 to 50Hz)
Shocks	Conforms to IEC 68-2-27 (peak acceleration 15g - 11ms)
Immunity and emissions	See para 3.3
Max. imbalance of supply voltage without chokes	2 %

✶ If stored for a period of 12 months or more, the speed controller must be powered up (electronics and power supply) for 24 hours once this limit is reached : repeat every six months afterwards.

If the supply voltage imbalance is equal or above 2 %, insert a chocke connected in series with the mains supply.

Chockes	UMV 3301			
	75T/100T	120T/150T	180T/220T	265T
Type	140µH	85µH	55µH	55µH
Code	SEL176NT000	SEL292NT000	SEL460NT000	SEL160NT000
Chockes	**75TH/100TH**	**120TH/150TH**	**180TH/220TH**	**265TH/340TH**
Type	280µH	190µH	140µH	85µH
Code	SEL090NT000	SEL130NT000	SEL176NT000	SEL292NT000

1.4.2 - Losses and dissipation (kW)

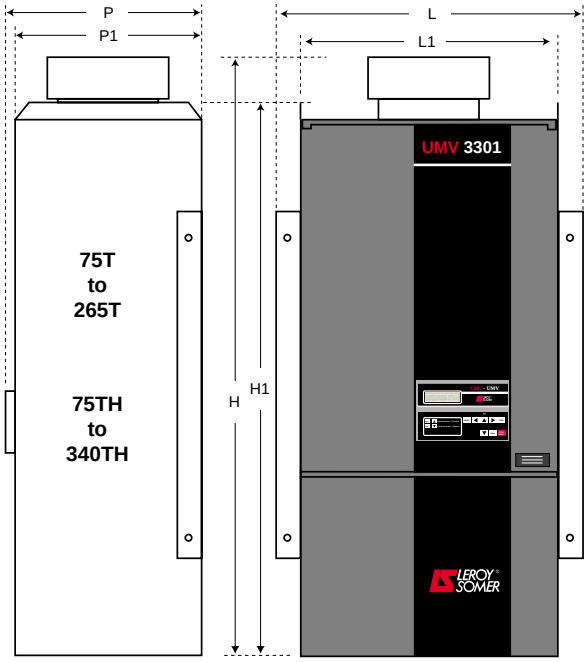
Installing the inverter in a cubicle requires special precautions with regard to the size of the surrounding area. Check that the heat dissipation is adequate.

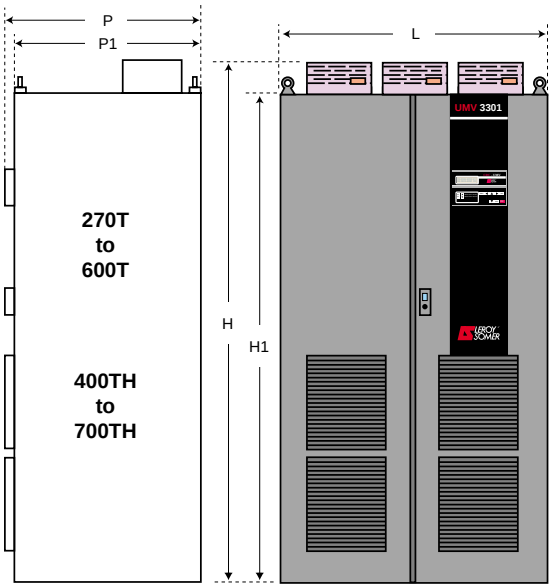
Switching Frequency	UMV 3301											
	75T	100T	120T	150T	180T	220T	265T	270T	340T	400T	470T	600T
2.5 kHz	1.5 kW	1.9 kW	2.3 kW	2.6 kW	3.6 kW	4.1 kW	4.6 kW	8 kW	9.4 kW	10.3 kW	11.2 kW	13.7 kW
	75TH	**100TH**	**120TH**	**150TH**	**180TH**	**220TH**	**265TH**	**340TH**				
	1.7 kW	2.2 kW	2.5 kW	3.1 kW	3.5 kW	4.4 kW	5.2 kW	5.6 kW				
2 kHz	**400TH**	**470TH**	**600TH**	**700TH**								
	7.1 kW	8.4 kW	10.1 kW	12.2 kW								

1.4.3 - Table for forced ventilation flow ($m^3\ h^{-1}$)

Forced ventilation	UMV 3301							
	75T(H)	100T(H)	120T(H)	150T(H)	180T(H)	220T(H)		
Flow ($m^3\ h^{-1}$)	300	300	500	500	500	500		
	265T(H)	**270T**	**340T**	**340TH**	**400T(H)**	**470T(H)**	**600T(H)**	**700TH**
	500	1200	1200	500	1200	1200	1200	1200

1.5 - Weight and dimensions





Rating	Dimensions (mm)						Weight
UMV 3301	H	H1	L	L1	P	P1	(kg)
75T(H)	928	850	526	459	420	405	100
100T(H)	928	850	526	459	420	405	102
120T(H)	958	850	526	459	420	405	104
150T(H)	958	850	526	459	420	405	106
180T(H)	1345	1238	666	596	506	491	170
220T(H)	1345	1238	666	596	506	491	190
265T(H)	1345	1238	666	596	506	491	215
270T	2150	2000	1200	-	620	600	400
340T	2150	2000	1200	-	620	600	400
340TH	1345	1238	666	596	506	491	215
400T	2185	2000	1200	-	620	600	440
400TH	2150	2000	1200	-	620	600	400
470T(H)	2185	2000	1200	-	620	600	440
600T	2385	2200	1200	-	620	620	500
600TH	2185	2000	1200	-	620	600	440
700TH	2385	2200	1200	-	620	620	500

2 - INSTALLATION

• The owner or user is responsible for ensuring that the installation, use, and care of the inverter and its options comply with legislation relating to the safety of machinery and personnel and the current regulations of the country in which it is used.

• The controller must not be installed in hazardous zones unless it is stored in a specially adapted enclosure. In this case, the installation must be certified.

• In atmospheres subject to condensation, a space heater must be installed. This operates when the controller is not in use and is powered up when the controller is in use. Ideally, the space heater should be controlled automatically.

2.1 - Checks on receipt

Before installing the controller, ensure that :
- the controller has not been damaged during transport,
- the name plate corresponds to the power supply and motor characteristics.

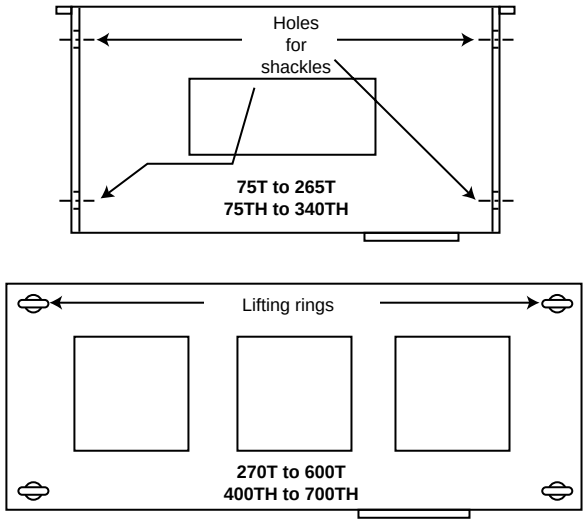
2.2 - Handling

• Ensure that lifting method is suitable for the weight being handled.

• UMV 3301 controllers are equipped with lifting rings or holes (for shackles) on the top.

The angle formed by the slings must not be greater than 30°. Use a lifting bar if necessary.

Lifting points



Rating UMV 3301	Spacing (mm)	Lifting Ø (mm)	Weight (kg)
75T(H)	455 x 285	4 x 20	100
100T(H)	455 x 285	4 x 20	102
120T(H)	455 x 285	4 x 20	104
150T(H)	455 x 285	4 x 20	106
180T(H)	592 x 373	4 x 20	170
220T	592 x 373	4 x 20	190
220TH	592 x 373	4 x 20	170
265T	592 x 373	4 x 20	215
265TH	592 x 373	4 x 20	190
270T	1114 x 530	4 x 26	400
340T	1114 x 530	2 x 26	400
340TH	592 x 373	4 x 20	215
400T	1114 x 530	2 x 26	440
400TH	1114 x 530	2 x 26	400
470T	1114 x 530	4 x 26	440
470TH	1114 x 530	2 x 26	440
600T	1114 x 530	4 x 26	500
600TH	1114 x 530	4 x 26	440
700TH	1114 x 530	4 x 26	500

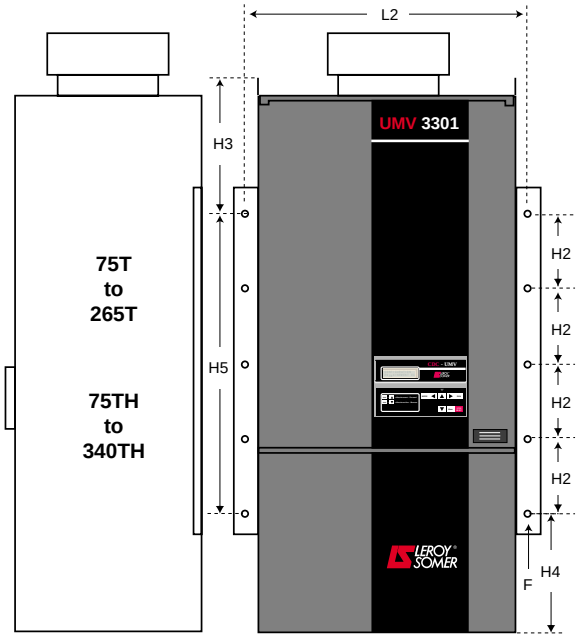
2.3 - Installation precautions

• UMV 3301 75T to 265T and 75TH to 340TH controllers have an IP21 protection index.

• They are designed to be installed in an enclosure or cubicle to protect them from conductive dust and condensation. This also prohibits access by non-qualified personnel.

UMV 3301 controllers must also be installed in a clean environment, sheltered from conductive dust, corrosive gas and dripping water.
If this is not the case, installation in an enclosure or cubicle is recommended.
Mount the controller vertically allowing a space of 100 mm all round.
Never obstruct the controller ventilation grilles.
When several controllers are installed in the same enclosure, pay attention to the size of the openings and thermal exchanges between the controllers.

2.4 - Installing the speed controller



Rating	Dimensions (mm)					
UMV 3301	H2	H5 ✶	H3	H4	L2	F Screw
75T(H)	-	500	190	160	500	M8
100T(H)	-	500	190	160	500	M8
120T(H)	-	500	190	160	500	M8
150T(H)	-	500	190	160	500	M8
180T(H)	170	-	207	351	640	M8
220T(H)	170	-	207	351	640	M8
265T(H)	170	-	207	351	640	M8
340TH	170	-	207	351	640	M8

The UMV 3301 270T to 600T are supplied in a cubicle and only require the baseplate to be fixed to the ground.

✶ Only 2 fixing screws per bracket for ratings 75T(H) to 150T(H).

2.5 - Remote installation of the CDC - UMV console

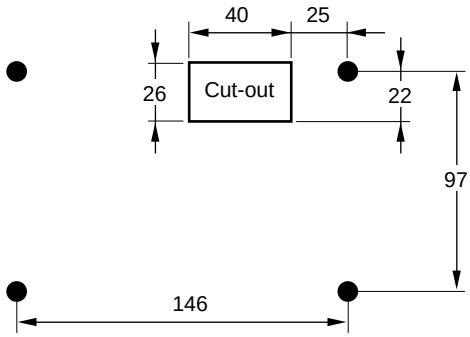
This is mounted :
- either directly on the front panel of the controller,
- or remotely on the front panel of the cubicle. The distance will then be less than 10 metres.

Connection is via a 9-pin SUB-D connector situated at the back of the console. The link cable must be screened.

Mounting on the front panel of the cubicle

Fixing by 4 Ø 4.0 mm holes.

Plan of the cut-out and drill holes :



3 - CONNECTIONS

• The voltages present on the power terminal blocks and in the cables connected to them may cause fatal electric shocks. The controller stop function does not protect against these high voltages.

• The controller contains capacitors which remain charged at a fatal voltage even after the power supply has been cut.

• After the controller is powered down, wait 10 mins (so that the internal circuits can discharge the capacitors) before removing the protective devices. If in doubt, measure the voltage between power terminals RF1 and LC1, if the measurement does not fall below 60 V, connect a 30W, 500Ω resistor between the terminals to discharge the capacitors.

• The controller power supply must be protected against overloads and short-circuits.

• Do not ignore the rating of any protective devices.

3.1 - Motor connection

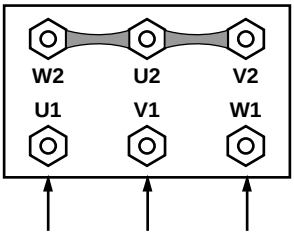
3.1.1 - Terminal block

WARNING : The UMV 3301 output voltage is equivalent to the input voltage. The motors should therefore be connected in order to withstand a voltage equal to the power supply voltage.
Ensure that the motor connection corresponds to the information on the name-plate.

3.1.2 - Auxiliary terminal blocks

3.1.2.1 - Optional forced ventilation

• LS MV motors of frame size 160 and above, can be equipped with a 3-phase 400V, 50Hz forced ventilation, connected as shown below.



400V ~ : Y connection

Refer to the LS - MV motor catalogue for more information.

3.1.2.2 - Optional encoder

LS - MV motors can be equipped with optional incremental encoders.
All installed encoders have the same electrical characteristics, unless otherwise specified. Connection is via a fast-on 12-pin connector attached to the motor terminal box.

Common characteristics :
- supply : 5V,
- consumption : 150 mA,
- number of pulses/revolution : 1024,
- number of channels : 2 channels with their complement and 0 marker.
- maximum speed : 6000 min^{-1},
- housing : injected Zamac,
- external finish : epoxy,
- protection : IP 65.

Connection

Connector pin	Function
1	- power supply
2	+ power supply
3	A
4	B
5	O
6	$\overline{A}$
7	$\overline{B}$
8	$\overline{O}$
9	Free terminal
10	⏚
11	⏚
12	⏚

The encoder is connected to the **UMV 3301** inverter by a cable with shielded pairs, maximum length 150m.

Note : Depending on the manufacturer, the O marker may be labelled 0, C or Z.

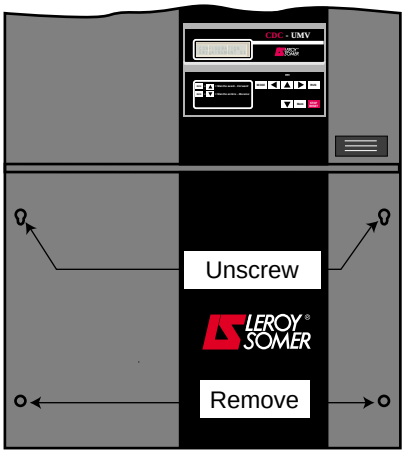
Precautions :
- connect or disconnect the controller encoder when powered down,
- keep the encoder shielded cable separate from the power cables and avoid parallel routing.

3.2 - Connecting the controller

3.2.1 - Access to terminal blocks

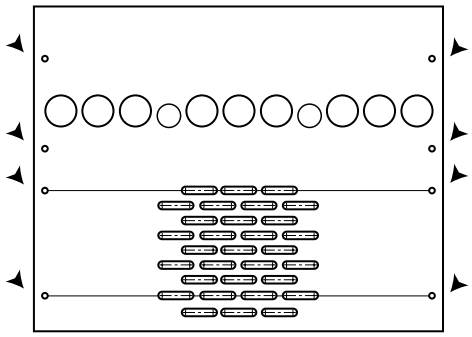
3.2.1.1 - UMV 3301 75T to 265T and 75TH to 340TH

To access the terminal blocks, remove the cover located under the CDC - UMV console. Only the bottom 2 screws need to be removed, the other two should just be loosened.



- Loosen the screws marked ➤ .
- Remove the protective elements, retaining the cable entries.
- Wire the terminals situated at the bottom of the controller first.

WARNING :
It is essential :
- not to remove the air guidance plate,
- to replace all protective plates,
- to use cable entries when wiring in order to protect the cables.



UMV 3301 75T to 265T and 75TH to 340TH

- The power terminal block is composed of 1 group of 11 terminals.
- The power supply for the electronics is to be provided on a spring type terminal block.
- The control terminal block is composed of 5 removable screw connectors and a 9-pin female SUB-D connector.

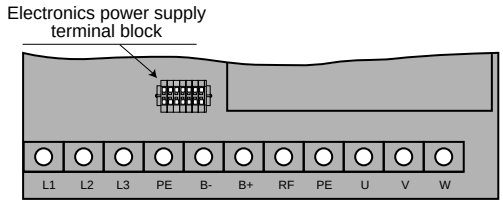
3.2.1.2 - UMV 3301 270T to 600T and 400TH to 700TH

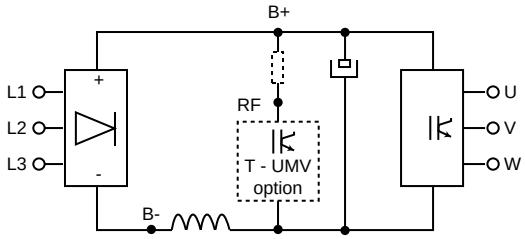
Open the cubicle doors to access the terminals.

3.2.2 - The power terminal block

WARNING :
- **Never connect a circuit such as a capacitor bank between the controller output and the motor.**
- **Never connect the A.C. supply to the U.V.W. terminals.**

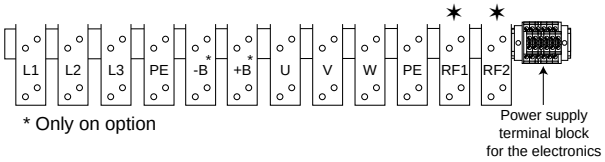
3.2.2.1 - UMV 75T to 265T and 75TH to 340TH

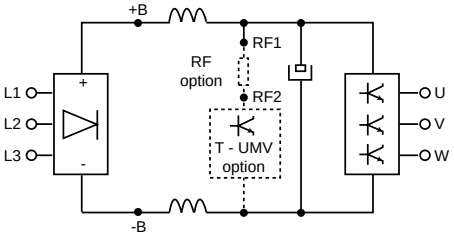




Labels	Functions	Terminal connectors							
		75T(H) to 150T(H)				180T(H) to 340T(H)			
		Max. terminal screw torque (Nm)	Bolt Ø	Width (mm)	Length (mm)	Max. terminal screw torque (Nm)	Bolt Ø	Width (mm)	Length (mm)
L1, L2, L3	3-phase controller supply	10	M10	26	33	15,5	M12	36	24
B+, RF	Connecting the RF optional braking resistor via a thermal relay								
B+, B-	Supplying the controllers via the D.C. bus : • 510V to 620V ± 10% for 270T to 600T • 740V to 980V ± 10% for 400TH to 700TH **(see § 3.2.5.3 for warnings)**								
U, V, W	Connecting the motor								
PE	Earthing the controller and motor	6	M8	20	20	10	M10	26	33

3.2.2.2 - UMV 270T to 600T and 400TH to 700TH



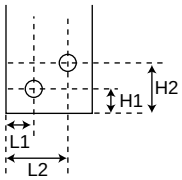


Label	Function
L1 - L2 - L3	3-phase controller supply
⏚	Earthing the controller and motor
+B, -B	Supplying the controller via the D.C. bus •510V to 620V ±10% for 270T to 600T •740V to 980V ±10% for 400TH to 700TH (see § 3.2.5.3 for warnings)
U - V - W	Connecting the motor
RF1 - RF2 ✶	Connecting the RF braking resistors via a thermal relay

✶ These terminals are mounted optionally

UMV 3301		Connecting the bars	
Rating	Terminals	Ø Screw - nut	Section (mm)
270T	All	2 x M10	40 x 5
340T 400T	PE	2 x M10	40 x 5
	L1, L2, L3, -B, +B, U, V, W, RF1, RF2	2 x M10	50 x 5
470T	PE	2 x M10	40 x 5
	L1, L2, L3, -B, +B, U, V, W, RF1, RF2	2 x M10	40 x 10
600T	PE	2 x M10	40 x 10
	L1, L2, L3, -B, +B, U, V, W, RF1, RF2	2 x M10	50 x 10
400TH	PE	2 x M10	40 x 5
	L1, L2, L3, -B, +B, U, V, W, RF1, RF2	2 x M10	40 x 5
470TH	PE	2 x M10	40 x 5
	L1, L2, L3, -B, +B, U, V, W, RF1, RF2	2 x M10	40 x 5
600TH 700TH	PE	2 x M10	40 x 5
	L1, L2, L3, -B, +B, U, V, W, RF1, RF2	2 x M10	40 x 10

Drilling the bars



Width of bar (mm)	Dimensions (mm)				
	L1	L2	H1	H2	Ø
40	10	30	10	30	11
50	12,5	25	12,5	35	11

3.2.3 - The electronics supply terminal block

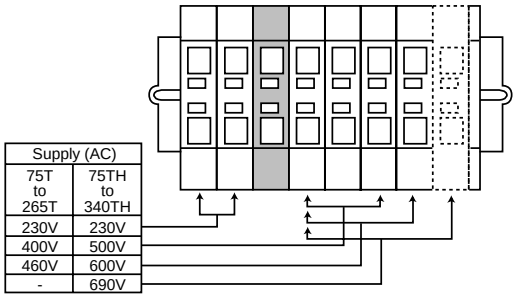
⚠ • It is imperative to ensure that the voltage between the neutral of the power supply and the neutral of the electronics supply is lower than the value of the voltage on each power supply phase.

• For UMV 3301 75T to 265T and 75TH to 340TH, both power supply cables must be protected by a 2A semi time delayed fuses or a 2A D curve circuit-breaker.

• For 230Vac control terminals, if external power is provided, then additional transient voltage surge suppressors with clamping voltage of 2kVA max must be provided.

3.2.3.1 - UMV 75T to 265T and 75TH to 340TH

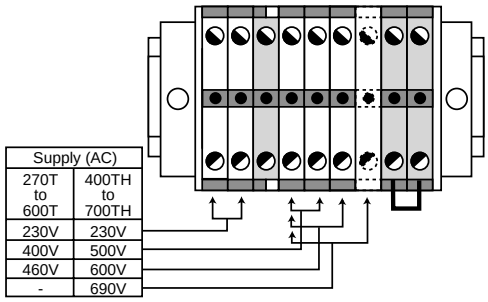
Power supply for electronics is to be provided on terminal block located on the left hand side of the control board.



Supply (AC)	
75T to 265T	75TH to 340TH
230V	230V
400V	500V
460V	600V
-	690V

3.2.3.2 - UMV 270T to 600T and 400 TH to 700 TH

Power supply for electronics is to be provided on terminal block located on the right hand side of the power bars.



Supply (AC)	
270T to 600T	400TH to 700TH
230V	230V
400V	500V
460V	600V
-	690V

When the motor is stopped, it is possible to power down the forced ventilation while keeping the electonic powered. Replace connection between the two terminals located on the right with the fan Start/Stop dry contact commands.

Warning :

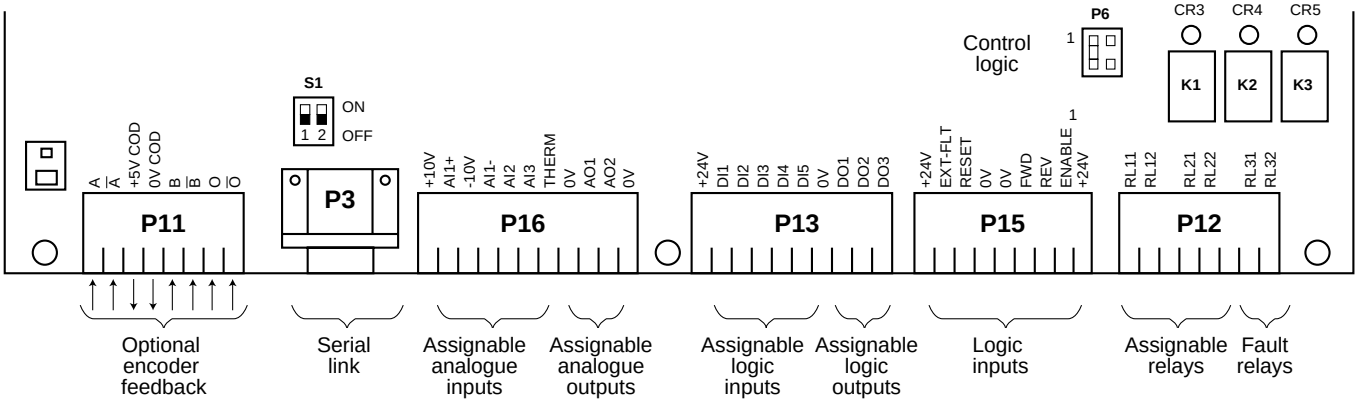
• In this configuration, power up 10 seconds before a run command, and power down 15 minuts after a stop command.

• The contact must allow to switch a 5A inductive load under 230V.

3.2.4 - Control terminal block

3.2.4.1 - General

The control terminal block comprises 5 removable screw connectors and a 9-pin female SUB-D 9 connector.



3.2.4.2 - Description

Terminal	Label	Designation	Function	Factory setting	Electrical characteristics
P11	P11/1 P11/2	A $\overline{A}$	Isolated encoder feedback Complementary channel A	-	5V 20mA
	P11/3 P11/4	+5V - COD 0V - COD	Encoder power supply	-	5V ±5% 100mA max.
	P11/5 P11/6	B $\overline{B}$	Isolated encoder feedback Complementary channel B	-	5V 20mA
	P11/7 P11/8	O $\overline{O}$	Isolated encoder feedback Complementary 0 marker	-	5V 20mA
P3	1	-	0V	-	Isolated from P16/8, P16/11, P13/7, P15/4 and P15/5
	2	-	$\overline{TX}$ transmission	-	Isolated by optocoupler
	3	-	$\overline{RX}$ reception	-	Isolated by optocoupler
	4	-	Not connected	-	-
	5	-	Not connected	-	-
	6	-	TX transmission	-	Isolated by optocoupler
	7	-	RX reception	-	Isolated by optocoupler
	8	-	Not connected	-	-
	9	-	Not connected	-	-
P16	P16/1	+10V	Internal source	-	+10V ±2 % 10mA max.
	P16/2	AI1+	Differential analogue input 1 (+)	02.11 Speed N° 1 (0-10V)	-10V to +10V impedance 10kΩ
	P16/3	-10V	Internal source	-	-10V ±2 % 10mA max.
	P16/4	AI1-	Differential analogue input 1 (+)	02.11 Speed N° 1	-10V to +10V Impedance 10kΩ
	P16/5	AI2	Analogue input 2	04.36 Torque limiting (0-10V)	±10V Impedance 15kΩ
	P16/6	AI3	Analogue input 3	02.12 Speed N° 2 (4-20mA)	0 to +10V (8 kΩ) 4 to 20mA or 0 to 20mA (100Ω)
	P16/7	THERM	Analogue input	-	0 to 5V Impedance 40kΩ fault > 3.3kΩ, reset < 1.8kΩ
	P16/8	0V	0V common		Equipotential to other 0V
	P16/9	AO1	Analogue output 1	Current image (4-20 mA)	0-20mA, 4-20 mA or ±10V 10mA max.
	P16/10	AO2	Analogue output 2	Speed image (4-20 mA)	
	P16/11	0V	0V common	-	Equipotential to other 0V

3.2.4.2 - Description (continued)

Terminal	Label	Designation	Function	Factory setting	Electrical characteristics
P13	P13/1	+24V	Common internal source	-	+24V ±5%, 100mA max. (total with P15/1 and P15/8)
	P13/2	DI1	Logic input 1	02.17 1PS selected	0 to +24V 1mA max.
	P13/3	DI2	Logic input 2	02.18 3PS selected	0 to +24V 1mA max.
	P13/4	DI3	Logic input 3	Stop 1	0 to +24V 1mA max.
	P13/5	DI4	Logic input 4	02.14 N1/N2 selected	0 to +24V 1mA max.
	P13/6	DI5	Logic input 5 or reference	03.07 Ramp locking	0 to +24V 1mA max.
	P13/7	0V	0V common	-	Equipotential to other 0V
	P13/8	DO1	Logic output 1	10.40 I limit reached	Transistor output 100mA max.
	P13/9	DO2	Logic output 2	10.32 UMV fault	
	P13/10	DO3	Logic output 3 or frequency image	10.42 Max. speed reached	24V max.
P15	P15/1	+24V	Common internal source	-	+24V ±5%, 100mA max. (total with P13/1 and P15/8)
	P15/2	EXT-FLT	External fault	-	0 to +24V 1mA max.
	P15/3	RESET	Clear fault	-	0 to +24V 1mA max.
	P15/4	0V	0V common	-	Equipotential to other 0V
	P15/5	0V	0V common	-	Equipotential to other 0V
	P15/6	FWD	Forward	-	0 to +24V 1mA max.
	P15/7	REV	Reverse of programmable logic input	Reverse	0 to +24V 1mA max.
	P15/8	ENABLE	Unlocking logic input	-	0 to +24V 1mA max.
	P15/9	+24V	Common internal source	-	+24V ±5 % 100mA max. (total with P13/1 and P15/1)
P12	P12/1 P12/2	RL1/1 RL1/2	Programmable relay 1	10.41 Min. speed reached	250V max. 5A resistive load
	P12/3	-	Not to be connected	-	-
	P12/4 P12/5	RL2/1 RL2/2	Programmable relay 2	10.33 UMV output active	250V max. 5A resistive load
	P12/6	-	Not to be connected	-	-
	P12/7 P12/8	RL3/1 RL3/2	Fault relay	-	250V max. 5A resistive load

• The control logic is selected by P6 : position 1 negative logic (0V) position 2 positive logic (+24V).

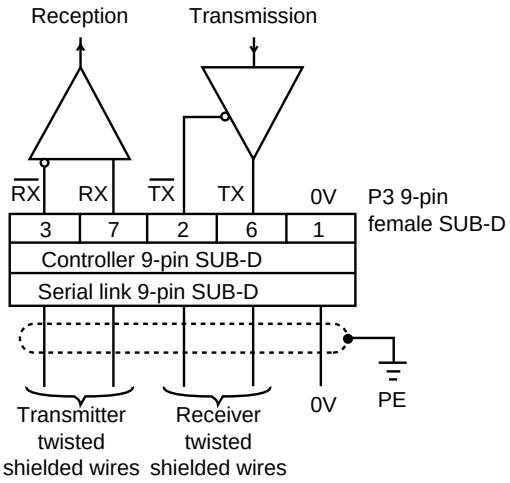
: Limited to 50Vac for UL requirements.

3.2.5 - Special connections

3.2.5.1 - Connecting the serial link

This serial link is created in accordance with standard RS 485/RS 422 which allows differential transmission and reception of data via 4 wires. The maximum length of cables must be 1200m.

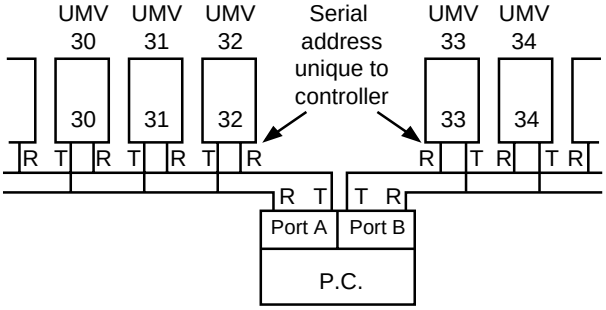
RS 485/RS 422 standard :



The S1 selector switch located on the control circuit allows impedance matching resistors to be used.

Note : With the RS 485 standard, it is possible to communicate with up to 32 controllers connected on the same line from a single P.C.
Each controller has a unique serial address.

RS 485 serial link with 32 controllers per port



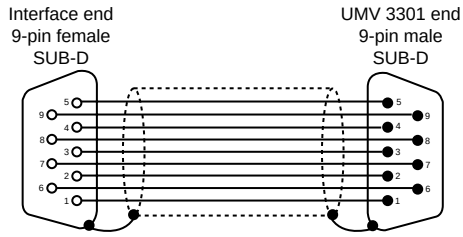
R : receiver input
T : transmitter output

Protocol : MODBUS.

3.2.5.2 - Connecting the parameter-setting option via PEGASE software

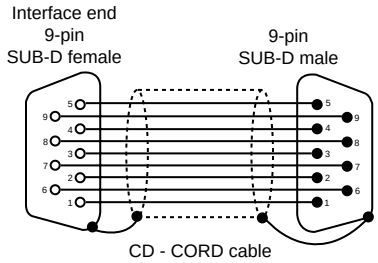
This can be connected either on a single line via the console SUB-D, or on a network via the terminal block SUB-D.

• On a single line, remove the CDC-UMV console and connect a CD-CORD cable to the RS 232/RS 485 unit, at the RS 485 end.
The unit does not need to be powered externally.



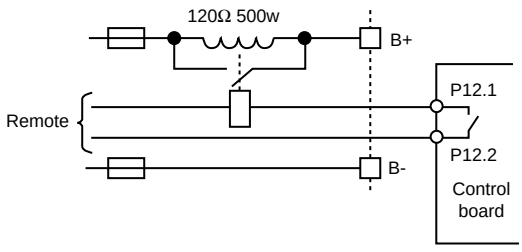
WARNING :
The maximum length of the shielded cable must not exceed 5 metres.

• With a network, on the control circuit SUB-D P3, connect a CD-CORD cable to the RS 485 end of the RS 232/RS 485 unit. Use a male/female converter for connection.
The terminal box needs to be powered externally.



3.2.5.3 - Supply via the D.C. bus

It is possible to supply several UMV 3301 controllers from one 510V to 620V ± 10 % D.C. bus for " T " ratings and 668V to 1000V for " TH " ratings.
Connection is between terminals B+ and B-.
The protective fuses used for each controller are indicated in section 3.4; two fuses are necessary per controller.



Drive settings :
09.11 = 10.49
09.12 = No
09.15 = No
09.16 = 0

3.3 - Electrical and electromagnetic phenomena

3.3.1 - General

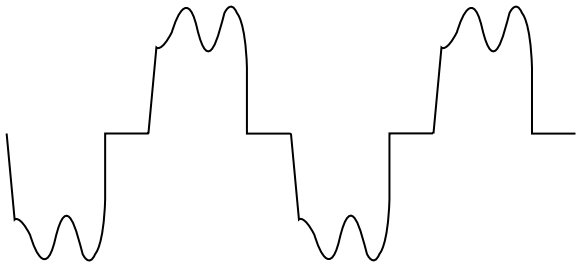
The power structure of frequency inverters leads to the occurrence of two types of phenomena :
- low frequency harmonic feedback on the mains power supply,
- emission of radio frequency signals (RFI).

These are separate phenomena, which have different consequences on the electrical environment.

3.3.2 - Low frequency harmonics

3.3.2.1 - General

The rectifier, at the head of the frequency inverter, generates a non-sinusoidal A.C. line current.



Mains line current consumed by a 3-phase rectifier.

This current carries harmonics $6n \pm 1$.

Their amplitudes depend on the impedance of the mains upstream of the rectifier bridge, and the structure of the D.C. bus downstream of the rectifier bridge.

The more inductive the mains supply and the D.C. bus, the more these harmonics are reduced.

They only have a significant effect on loads on frequency inverters of several hundred kVA and where these loads are more than a quarter of the total on-site load.

They have virtually no effect on the level of electrical energy consumption. Temperature rises associated with these harmonics in transformers and motors connected directly to the mains supply are negligible.

These low frequency harmonics only rarely cause interference on sensitive equipment.

3.3.2.2 - Standards

There is no standard for current harmonics.

Current harmonics introduce voltage harmonics on the mains supply. **The amplitude of these harmonics depends on the impedence of the mains supply.**

The energy distributor, who is affected by these phenomena in the case of **high power installations,** will have his own **recommendations** on the level of voltage harmnics :
- 0.6 % on even harmonic numbers,
- 1 % on odd harmonic numbers,
- 1.6 % on whole harmonic distortion.

This applies to the power distributor side connction point and not to the harmonic generator.

3.3.2.3 - Reduction of harmonics fed back to the mains supply

The weak power ratio between the inverter and the network on which it is installed produces an acceptable level of voltage harmonics.

However, for rare cases where the network characteristics and the total installed inverter power make it impossible to adhere to the harmonic levels which the energy distributor may have had to impose, LEROY-SOMER will offer any assistance to the installer in determining the elements required for an additional network choke.

3.3.3 - Radio frequency interference : Immunity

3.3.3.1 - General

The level of immunity of a device is defined by its capacity to operate in an environment polluted by external elements or by its electrical connections.

3.3.3.2 - Standards

Each piece of equipment must undergo a series of standardised tests (European standards) and meet a minimum level in order to be declared in conformity with the generic industrial (EN 50082-2) and domestic (EN 50082-1) standards.

3.3.3.3 - Recommendations

An installation composed exclusively of equipment conforming to the standards concerning immunity runs very little risk of interference.

3.3.4 - Radio frequency interference : Emission

3.3.4.1 - General

Frequency inverters use high-speed switches (transistors, semi-conductors) for switching high voltages (around 550V) and high frequency currents (several kHz). This provides a high level of efficiency and a low level of motor noise.
They also therefore generate radio frequency signals which may disturb the operation of other equipment or distort sensor measurements :
- due to high frequency leakage currents which escape to earth via the inverter/motor cable leakage capacitance and the leakage capacitance of the motor across the metal structures which support the motor.
- by conduction or feedback of radio frequency signals on the supply cable : **conducted emissions,**
- by direct radiation close to the power supply cable or the inverter/motor cable : **radiated emissions,**

These phenomena are of direct interest to the user.
The frequency range concerned (radio-frequency) does not affect the energy distributor.

3.3.4.2 - Standards

The maximum level of emissions is fixed by the generic industrial (EN 50081-2) and domestic (EN 50081-1) standards.

3.3.4.3 - Recommendations

• Experience shows that the level fixed by standards EN 50081-1 and 50081-2 does not necessarily need to be respected in order to be free of interference phenomena.
• following the elementary precautions in the following paragraph generally results in correct operation of the installation.

3.3.5 - Elementary precautions

These are to be taken into account during the design stage and also when wiring the cubicle and the external elements. In each paragraph, they are classed in decreasing order of influence on correct operation of the installation.

3.3.5.1 - Design

1) Choice of material
Give priority to components whose level of immunity conforms to the generic immunity standards EN 50082-1 and EN 50082-2, and mount them in a steel cubicle.
2) Locating the inverter
Install the inverter as near to the motor as possible in order to reduce the length of the cable.

3.3.5.2 - Installing the inverter and its relevant components in the cubicle

1) Fix the inverter and components onto a metal grille or base plate which is unpainted or paint-free around its fixing points.
2) Fix the plate at several paint-free points on the bottom of the cubicle.

3.3.5.3 - Wiring inside cubicles

1) Do not place control cables and power cables in the same cable trough (distance 0.5m minimum).
2) For control cables, use twisted shielded cables.
3) Relays and contactors which are electrically linked to the inverter should be equipped with an RC filter.

3.3.5.4 - Wiring outside the cubicle

1) Isolate the power cables from the control cables.
2) Link the motor earth terminal directly to that of the inverter.
3) Place the motor supply cables, as well as the accompanying cable which links the motor earth to the inverter earth, in a metal trough. Mecanically link this trough to the cubicle and to the metal structure supporting the motor. Fix the conductors on a plate at the bottom of the trough.
4) Isolate sensitive elements (probes, sensors etc.) from metal structures which could have the same common as the motor support.

3.3.5.5 - Ground wiring

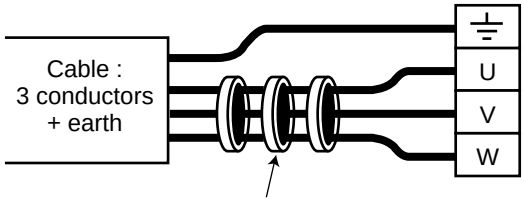
The immunity and level of radio frequency emissions are directly linked to the quality of the ground connections. The metallic grounds must be mechanically connected to each other with the largest possible electrical contact surface. In no case should the ground connections, designed to ensure the protection of personnel by linking metallic grounds to earth via a cable, be replaced by earth connections.

3.3.6 - Additional precautions

Respecting the elementary precautions of the previous paragraph generally ensures correct operation of the installation. However, its immunity can be increased by following the additional precautions below. These are listed in order of importance.

3.3.6.1 - Installation and wiring of an MC choke

The majority of interference phenomena are caused by high frequency leakage currents which escape to the earth via the inverter/motor cable and via the metal structures supporting the motor.
MC chokes are used to reduce the leakage currents. The greater the length of the inverter/motor cable, the more important is their role.



MC chokes installed as near to the inverter as possible

UMV rating	MC choke reference	Quantity
75T	FAP038FE001	3
100T	FAP038FE001	3
120T	FAP038FE001	3
150T	FAP038FE001	3
180T	FAP055FE001	3
220T	FAP055FE001	3
265T	FAP055FE001	3
270T	Consult LEROY-SOMER	
340T		
400T		
470T		
600T		

3.3.6.2 - Using RFI filters

Using RFI filters reduces the level of radio frequency signal emissions. They enable UMV 3301 components to conform to the EN 50081-1 and EN 50081-2 directives on conducted and radiated radio frequency emissions.
Depending on the controller used, install the recommended RFI filter as described in the table below, between the mains and the controller input.

UMV rating	Filter reference	
	High overtorque	Low overtorque
75T & 100T	FLT 3359 HV - 180	FLT 3359 HV - 180
120T	FLT 3359 HV - 180	FLT 3359 HV - 250
150T	FLT 3359 HV - 250	FLT 3359 HV - 320
180T	FLT 3359 HV - 320	FLT 3359 HV - 320
220T	FLT 3359 HV - 320	FLT 3359 HV - 400
265T & 270T	FLT 3359 HV - 400	FLT 3359 HV - 600
340T	FLT 3359 HV - 600	FLT 3359 HV - 600
400T	FLT 3359 HV - 600	FLT 3359 HV - 1000
470T & 600T	FLT 3359 HV - 1000	FLT 3359 HV - 1000

UMV rating	Filter reference	
	High overtorque	Low overtorque
75TH & 100 TH	FLT 3359 HV - 180	FLT 3359 HV - 180
120TH to 265TH	FLT 3359 HV - 250	FLT 3359 HV - 250
340TH	FLT 3359 HV - 320	FLT 3359 HV - 320
400TH	FLT 3359 HV - 400	FLT 3359 HV - 400
470TH	FLT 3359 HV - 600	FLT 3359 HV - 600
600TH	FLT 3359 HV - 400	FLT 3359 HV - 600
700TH	FLT 3359 HV - 1000	FLT 3359 HV - 1000

Rules to follow when using filters
- Install the UMV 3301 in a metal cubicle in accordance with the wiring recommendations described in the previous paragraphs.
- Install the filter as near to the cubicle incoming mains as possible. Fix the filter on the same base grille as the controller.

WARNING :
Using a RFI filter on a IT power supply is not recommended. Indeed, the capacitance leakage of the filter may disturb the operation of the permanent insulation controller used to detect earth fault. With this type of installation, it is recommended to use ferrite rings on the motor cables at the drive output (see paragraph 3.3.6.1).

3.3.7 - Conformity to standards

Tests carried out in the conditions imposed by the standards show that the UMV 3301, if installed and connected according to the instructions in sections 3.3.5 and 3.3.6, conforms to EMC directive 89/336/EEC, modified by 92/31/EEC.

3.3.7.1 - Immunity

UMV 3301s conform to international immunity standards.

Standard	Type of immunity	Application	Level
EN 61000-4-2	Electrostatic discharge	Product enclosure	Level 3 (industrial)
EN 61000-4-3	Radiated radio frequency	Product enclosure	Level 3 (industrial)
ENV 50140*	Radiated radio frequency	Product enclosure	Level 3 (industrial)
ENV 50141*	Conducted radio frequency	Control and power cables	Level 3 (industrial)
EN 61000-4-4*	Rapid transients in succession	Control cables	Level 4 (reinf. industrial)
		Power cables	Level 3 (industrial)
CEI 1000-4-11	Voltage dips, momentary cuts and voltage variations	Supply cables	Level 4
EN 50082-1	Generic immunity standard Part 1 : residential, commercial and light industry	-	Conforming
EN 50082-2	Generic immunity standard Part 2 : industrial environment Concerns the basic standards marked*	-	Conforming

3.3.7.2 - Conducted and radiated emissions

Rules to be respected for bringing UMV 3301 components into conformity with directives EN 50081-1 and EN 50081-2 on conducted and radiated radio frequency emissions :

- adhere to the wiring rules in section 3.3.5,
- use RFI filters as described in section 3.3.6.2,
- use a switching frequency equal to 2.5 kHz,
- length of motor cables limited to 20m for the EN 50081-1 directive and 80m for the EN 50081-2 directive.

NOTES

3.4 - Protection

• Use the specified size of protective fuse.

• The cable definition can vary depending on the current legislation of the country, which always takes precedence over the tables below.

• In no case should these tables replace the current standards.

• Refer to § 3.2.2.1 for the maximum terminal screw torque.

Table of fuses and cable cross-sections recommended for the cubicles for copper wires

WARNING :

- **Cable cross-sections do not take line drops into account.**
- **To conform to UL requirements, equipment suitable for use on a circuit capable of delivering not more than 10000 rms symmetrical Amps for 75TH to 150TH, or 18000 rms symmetrical Amps for 180TH to 340TH, 600V maximum.**
- **UL listed closed-loop connectors sized according to the field wiring, shall be used for power connections.**

UMV 3301		Output current ✶ (A)	Mains current ✶ (A)		D.C. bus current ✶ (A)		Mains gl fuses (A)	Mains UL fuses (A)	Motor cables (mm^2)	Mains cables (mm^2)	D.C. bus cables (mm^2)
			400V	460V	400V	460V					
75T	High	112	110	110	108	108	125	200	50	50	50
	Low	145	136	136	146	146	160		50	50	50
100T	High	145	142	142	146	146	160	250	70	70	70
	Low	180	169	169	175	175	200		70	70	70
120T	High	180	176	176	175	165	200	300	95	95	95
	Low	220	207	197	214	204	250		95	95	95
150T	High	220	216	216	214	204	250	300	120	120	120
	Low	260	244	226	257	242	250		120	120	120
180T	High	260	255	255	257	242	315	400	150	150	150
	Low	315	296	282	350	328	315		150	150	150
220T	High	315	309	309	350	328	315	500	185	185	2 x 95
	Low	380	357	338	480	460	400		185	185	2 x 95
265T	High	380	372	372	425	370	400	600	185	185	2 x 120
	Low	480	451	423	535	465	500		2 x 95	2 x 95	2 x 120
270T	High	380	372	372	425	370	400	-	For cables outside the cubicle consult your cable supplier		
	Low	490	462	423	540	465	500				
340T	High	480	470	470	580	500	500	-			
	Low	580	545	508	680	590	630				
400T	High	580	568	568	630	550	630	-			
	Low	680	639	602	750	650	800				
470T	High	680	666	666	730	635	800	-			
	Low	820	773	667	873	750	800				
600T	High	860	843	843	890	770	1000	-			
	Low	970	907	799	1042	870	1000				

: Use 600V class J fuses e.g. Ferraz Shawmut A4J series.

UMV 3301		Output current ✶ (A)	Mains current ✶ (A) (525 to 690Vac)	D.C. bus current ✶ (A)	Mains gl fuses (A)	Mains UL fuses (A)	Motor cables (mm^2)	Mains cables (mm^2)	D.C. bus cables (mm^2)
75TH	High	63	59	73	100	125	25	25	25
	Low	85	83	102	100		25	25	25
100TH	High	86	81	99	125	150	35	35	35
	Low	115	113	138	125		35	35	35
120TH	High	101	95	116	160	200	50	50	50
	Low	135	132	162	160		50	50	50
150TH	High	116	109	134	160	250	70	70	70
	Low	155	152	186	200		70	70	70
180TH	High	142	133	164	200	300	95	95	95
	Low	190	186	228	200		95	95	95
220TH	High	165	155	190	250	300	120	120	120
	Low	225	221	270	250		120	120	120
265TH	High	205	193	236	315	400	150	150	150
	Low	280	274	336	315		150	150	150
340TH	High	255	240	294	400	500	185	185	185
	Low	340	333	408	400		185	185	185
400TH	High	300	282	345	400	-	For cables outside the cubicle consult your cable supplier		
	Low	400	392	480	500				
470TH	High	350	329	403	500	-			
	Low	450	441	540	500				
600TH	High	450	423	518	630	-			
	Low	580	568	696	630				
700TH	High	500	470	576	630	-			
	Low	670	657	804	800				

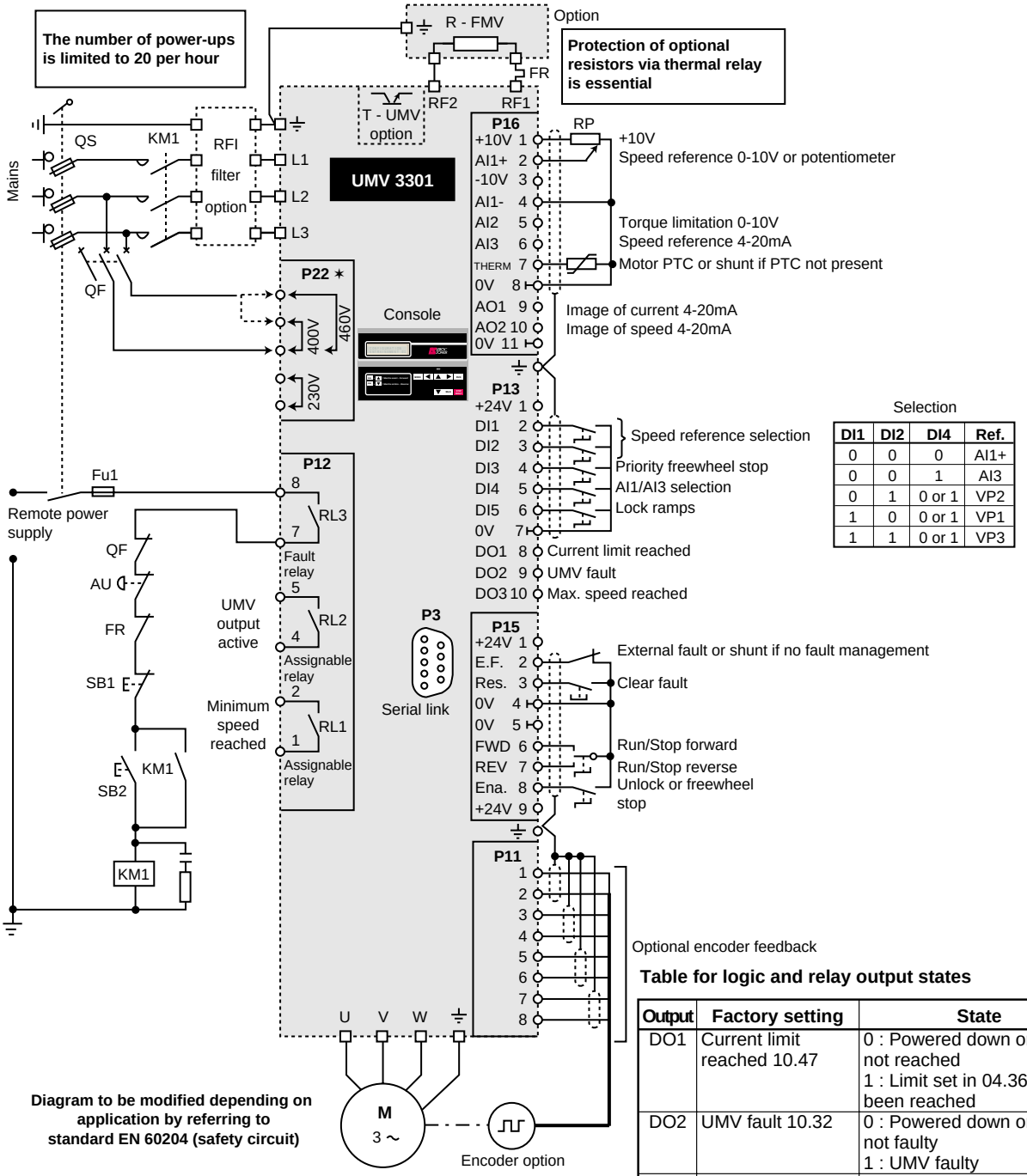
✶ Switching frequency : 2.5 kHz for 75T to 600T and 75TH to 340TH ; 1.7kHz for 400TH to 700TH.
✶✶ Only when the UMV 3301 is supplied via the D.C. bus.

Note :
Use a 2A curve D circuit breaker or semi-timed 2A (5A for ratings ≥ 400TH) fused isolator as a circuit-breaking and protection device for the 2 electronics supply wires for ratings 75T to 265T.

UL : Use 600V class J fuses e.g. Ferraz Shawmut A4J series.

3.5 - Wiring diagram

Factory configuration - Simplified setup using the user menu



QS : Fused isolator.
QF : 2A circuit-breaker or 2A fused isolator.
SB1 : Off button.
SB2 : On button.
KM1 : Line contactor.
FR : Thermal relay.
AU : Customer safety devices.
RP : 10 kΩ potentiometer.
✶ : see § 3.2.3 for details.

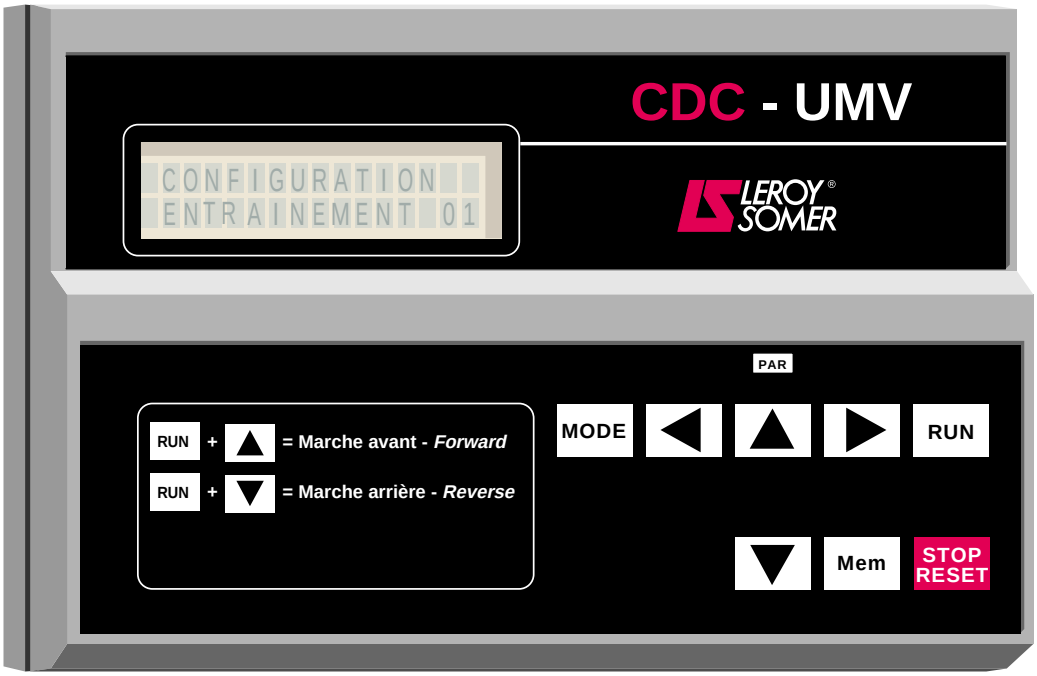
Table for logic and relay output states

Output	Factory setting	State
DO1	Current limit reached 10.47	0 : Powered down or limit not reached 1 : Limit set in 04.36 has been reached
DO2	UMV fault 10.32	0 : Powered down or UMV not faulty 1 : UMV faulty
DO3	Max. speed reached 10.42	0 : Powered down or speed reached 1 : Speed not reached (threshold 05.22)
RL1	Min. speed reached 10.41	Open: Powered down or min. speed not reached Closed : Minimum speed reached (threshold 05.12)
RL2	UMV output active 10.33	Open : Powered down or UMV stopped Closed : UMV operating
RL3	UMV fault (fixed)	Open: Powered down or UMV faulty Closed : UMV not faulty (10.32)

4 - COMMISSIONING

4.1 - Using the CDC - UMV console

4.1.1 - Presentation



Key	**MODE**	Used to change from READ mode to PARAMETER-SETTING mode and vice versa
	◁ △ ▽ ▷	Cursor for moving around the various menus (◁ , ▷) and modifying the content of the parameters (△ , ▽)
	MEM	For memorising the settings. These settings are memorised in EEPROM type memories which do not require any protected power supply.
	RUN	Used when the device is configured for control via the console for giving the run command, together with the cursor keys RUN + △ for forward operation RUN + ▽ for reverse operation
	STOP RESET	Used when the device is configured for control via the console for giving the stop command, and can also be used as a fault reset button
LED	**PAR**	On : reminds the user that the UMV 3301 is in parameter-setting mode Flashing : a setting has been modified but not memorised
Display		Clearly displays menus and parameters, with selection of the language, with 2 rows of 16 LCD characters

4.1.2 - Read mode

On power-up, the display indicates the motor speed on the top line and the controller status or measurements and data on the bottom line.
The various statuses displayed are :

S	P	E	E	D	:	+	X	X	X	X	X	m	i	n	$^{-1}$
				D	I	S	A	B	L	E	D				

← Indication of the motor status on the bottom line
M for motor
G for generator

Display															Comments
				E	N	A	B	L	E					X	The controller is ready to supply energy to the motor
		S	T	O	P		O	N		R	A	M	P	X	The motor is decelerating following a ramp
T	I	M	E	D		L	S	P		S	T	O	P	X	The motor is decelerating until low speed is reached and then freewheels to a stop
	I	N	D	E	X	E	D		S	T	O	P		X	The motor stops at a selected position
	D	C		I	N	J	E	C	T	I	O	N		X	Direct current is injected between 2 motor phases in order to brake it
C	U	R	R	E	N	T		L	I	M	I	T		X	The current supplied by the controller is at the limit value
B	U	S		V		L	I	M	I	T				X	The maximum value of the DC bus has been reached
	F	L	Y	I	N	G		R	E	S	T	A	R	T	X	The controller synchronises itself with the speed of the motor in order to restart it smoothly
	S	T	A	R	T	I	N	G		D	E	L	A	Y		A run command has been given but the motor does not start because a time delay is running
D	E	L	A	Y		B	e	f	.	R	e	s	t	.		The flying restart has been enabled but it is subject to a time delay
		E	x	t	.	D	I	S	A	B	L	E				Terminal P15/2 (External fault) has not been enabled
M	A	I	N	S		V			<		M	i	n	.	V	The motor does not start because the power supply voltage is insufficient
A	U	T	O	C	A	L	I	B	R	A	T	I	O	N		The drive carries out the autotune of the motor map

The measurements and data which can be accessed on the bottom line using the △ and ▽ keys are :

Press	Display																Comment
▽	M	A	I	N	S		U	:					X	X	X	V	UMV 3301 power supply voltage
▽	D	C		B	U	S		:					X	X	X	V	UMV 3301 DC bus voltage
▽	R	e	f	.	N	:	+	X	X	X	X	X	m	i	n	$^{-1}$	Value of the selected speed reference
▽	M	O	T	O	R		I	:		X	X	X	X	.	X	A	Value of the current supplied to the motor
▽	T	O	R	Q	U	E	:	+	X	X	X	.	X	%	M	n	Torque supplied to motor as a % of nominal motor torque
▽	F		M	O	T	O	R	:		X	X	X	.	X	H	z	Frequency supplied to the motor
▽	T	I	M	E		:	X	X	.	X	X	X	y	r	.	d	Total operating time in years, days
▽	T	I	M	E		:		X	X	.	X	X	h	.	m	n	Total operating time in hours and minutes
▽	U	M	V		3	3	0	1			X	X	X		T		Controller rating
▽	N	O	M	I	N	A	L		I	:			X	X	X	A	Nominal current
▽	M	A	X	.		I	:						X	X	X	%	Permissible current overload for 60s
▽	S	f	t	U	M	V	3	3	0	1	:	V	X	X	X	C	PID control card software version
▽	S	f	t	C	D	C	-	U	M	V	:	V	X	X	X	A	Console software version
▽	O	P	T	I	O	N	1	:	X	X	X	X	X	X	X	X	Indication of the type of intelligent options installed
▽	O	P	T	I	O	N	2	:	X	X	X	X	X	X	X	X	on the UMV 3301

4.1.3 - Parameter-setting mode

Pressing the MODE key gives access to the parameter-setting mode. The drive is configured for a given application using the parameters which are organised into menus, with each menu corresponding to a group of parameters linked by a function.

Numerical or binary parameters can be accessed :

- either in " READ WRITE " : R-W, for example : basic frequency, etc.
- or in " READ " : R, for example : motor speed image, etc.
- or in " READ ASSIGN " : R-A, for example : selection of 1 programmable acceleration, etc.

Note :

- When modifying assignments, it is necessary to exit the menu so that the display is updated and indicates the selected assignment.
- The settings can be protected by an access code.

The parameters are then only accessible in read-only mode.

4.1.4 - UMV 3301 menus

Menus which provide access to simplified setup

Display		Function
SELECT.		For selecting the language in which the parameters will be displayed.
ACCESS CODE		For entering a code to protect access to parameter-setting.
DRIVE SYSTEM CONFIGURATION	01	Adaptation of the controller to the motor and to the application.
PROGRAMMABLE USER MENU		For grouping together the most commonly used parameters.

Special menus which provide access to specific applications

Display		Function
SPEED REFERENCE	02	Generation and selection of analogue or preset references.
ACCEL/DECEL RAMP	03	Selection of the ramps according to the operating modes.
SPEED CURRENT TORQUE CONTROL	04	Selection of the regulation mode and adjustment of its limits.
THRESHOLDS ALARMS/TIMERS	05	Programming speed, torque, voltage thresholds, which can be assigned to relays or logic outputs.
MACHINE CONTROL	06	Selection of start and stop modes, brake control and braking resistances.
ANALOGUE INPUTS/OUTPUTS	07	Scaling and assignment of analogue inputs and outputs.
DIGITAL INPUTS	08	Assignment, inversion and processing of logic inputs.
DIGITAL OUTPUTS/RELAYS	09	Selection of sources, processing, inversion of logic outputs and relays.
DRIVE SYSTEM STATUS	10	Reading operating states and management of faults.
END-USER MENU CONFIGURATION	11	Assignment in the user menu of the parameters most frequently used in the application.
PROGRAMMABLE THRESHOLDS	12	Selection of sources, processing and assignment of programmable threshold functions.
SERIAL LINK	13	Serial link, hour counter and energy counter.
P.I.D. CONTROLLER	14	Adjustment, assignment and processing of the P.I.D. loop.
HOISTING SPECIAL SET-UP	15	Functions specific to a lifting application.
REGENERATION MODE	16	These menus are related with specific applications and are discribed in the associated instructions.
INTERNAL USE	19	Contact LEROY-SOMER for more informations.

4.1.5 - Parameter-setting principles

Comment	Press	Display
Power-up of the electronics The display is in Read mode	-	SPEED:+0000 0min-1 DISABLED
Change to parameter-setting mode ①	MODE	SELECT. LANGUAGE:ENGLISH
Go to the required menu Eg. : Menu 1	▽	ACCESS CODE 0000
	▽	DRIVE SYSTEM CONFIGURATION 01
Enter the selected menu ②	▷	0101 CTRL MODE OPEN LOOP
Go to the parameter to be modified Eg. : Overtorque request ③	3 x ▽	0104 REQUEST OVERTORQ.: HIGH
Modify the parameter by moving the cursor to the value to be modified	▷	0104 REQUEST OVERTORQ.: HIGH
Make the selection Press several times to display all the choices	▽	0104 REQUEST OVERTORQ.: LOW
Memorise once the choice has been made The cursor returns to the parameter	MEM	0104 REQUEST OVERTORQ.: LOW
Go to another parameter	▽	0121 Nom.Motor POWER: 75,0kW
To modify a numerical parameter place the cursor on the first number	▷	0121 Nom.Motor POWER: 75,0kW
Use the △ key to increment or the ▽ key to decrement	2 x △	0121 Nom.Motor POWER: 95,0kW
Move the cursor to the number to be modified	▷	0121 Nom.Motor POWER: 95,0kW
Use the ▽ key to decrement or the △ key to increment	5 x ▽	0121 Nom.Motor POWER: 90,0kW
Memorise setting	MEM	0121 Nom.Motor POWER: 90,0kW
Exit menu 1	◁	DRIVE SYSTEM CONFIGURATION 01
Access all the menus which require modification of parameters	▽	PROGRAMMABLE USER MENU
When parameter-setting is complete, return to read mode	MODE	SPEED:+0000 0min-1 DISABLED

Note : In parameter-setting mode, if no key on the keypad has been pressed for 3 min, the display automatically returns to read mode.

① : The cursor is memorised by flashing of the zone in which it is positioned (shown in grey in the display column).

② : The number to the left represents the number of the menu followed by the number of the parameter.

③ : The △ key is used to go back if you have gone too far.

4.1.6 - Changing the display language

Comment	Press	Display
Power up the electronics The display is in Read mode	-	Vit. :+0000 0min -1 VERROUILLE
Go to parameter-setting mode	MODE	SELECT. LANGUE:FRANCAISE
Move the cursor	▷	SELECT. LANGUE:FRANCAISE
Select English	▽	SELECT. LANGUAGE:ENGLISH
Memorise the language	MEM	SELECT. LANGUAGE:ENGLISH

All displays from now on will be in English

4.1.7 Setting up a security code

Comment	Press	Display
Power up the electronics The display is in Read mode	-	SPEED:+0000 0min -1 DISABLED
Go to parameter-setting mode	MODE	SELECT. LANGUAGE:ENGLISH
Select the access code menu	▽	ACCESS CODE 0000
Enter the menu and access the first number of the code	▷	ACCESS CODE 0000
Modify the first number	△	ACCESS CODE X000
Access the second number Modify it and go to the next one, and so on	▷	ACCESS CODE X000
Memorise the chosen code	MEM	DRIVE SYSTEM CONFIGURATION 01
To validate the code, switch off then switch on	-	SPEED:+0000 0min -1 DISABLED

Note : Only the Select and access code menus can be accessed. In order to access any other menu, enter the code and memorise it.

4.1.8 - Return to factory settings

Comment	Press	Display
With the controller off, press all 4 keys simultaneously then power up	△, ▽, ▷ and ◁	BACK TO FACTORY Setts YES>>MEM
Validate the return	MEM	BACK TO FACTORY Setts >WAIT...
All parameters, except those in menu 1, have returned to their original value	-	SPEED:+XXXXX min -1 DISABLED

Note : The return to factory settings also cancels the current security code.

4.2 - Simplified setup

4.2.1 - Programming

• Power up the electronics supply by closing QF.

• Select menu 1 : (described in section 4.3) and set the controller, motor and application parameters.

• Select the user menu : (described in section 4.4)
Set the parameters of the user menu according to the operation (references, run commands, limits, etc).

4.2.2 - Dynamic tests

• Starting :
- activate the power contactor,
- select forward or reverse,
- apply a reference equal to 10 % of the maximum reference,
- check the direction of rotation and speed of the motor,
- give a stop command.

• Optimising the settings :
- Adjust the acceleration (03.10) and deceleration (03.30) ramps and make abrupt changes to the reference (close to maximum speed),
- observe the increase in motor speed,
- increase the stability only if the driven inertia is very high.

4.3 - Menu 01 : Drive system configuration

4.3.1 - List of menu 01 parameters

Parameter	Label	Type	Variation range	Factory setting
• Controller				
01.01	Pilot control	R - W	Open loop - Closed loop - U/f ratio	Open loop
01.02	Base frequency	R - W	25 to 500Hz	50Hz
01.03	Switching frequency	R - W	1.7 - 2.5 - 3.4 - 5kHz	2.5kHz
01.04	Overtorque request	R - W	High or Low	High
• Motor				
01.21	Nominal motor power	R - W	0 to 999.9 kW	See table
01.23	Nominal motor frequency	R - W	25 to 500Hz	50Hz
01.24	Nominal motor speed	R - W	375 to 8000 min^{-1}	See table
01.25	Nominal motor voltage	R - W	60 to 500V	T : 400V ; TH : 690V
01.26	Nominal motor current	R - W	0 to 1500.0A	See table
01.27	Motor cosine φ	R - W	0.50 to 0.95	See table
01.28	Motor C max/C nominal	R - W	2.0 to 5.0	See table
01.29	Motor cooling	R - W	Not cooled - Self-cooled - Motor-cooled	Self-cooled
01.30	Motor protection by thermistor	R - W	Yes or No	No
01.31	Points per encoder revolution	R - W	8 to 4096	1024

Note : The menu 1 parameters are not affected by the return to factory settings.

Table of factory settings according to rating

UMV rating	Factory setting				
	01.21	01.24	01.26	01.27	01.28
75T	55	1480	99	0.85	3
100T	75	1480	135	0.85	2.8
120T	90	1480	162	0.85	3.0
150T	110	1490	193	0.86	3.1
180T	132	1485	234	0.85	3.1
220T	160	1485	276	0.87	2.9
265T	200	1480	350	0.87	3.2
270T	200	1480	350	0.87	3.2
340T	250	1480	425	0.89	3.5
400T	300	1485	505	0.89	3.0
470T	355	1490	610	0.87	3.0
600T	400	1490	687	0.87	3.0

UMV rating	Factory setting				
	01.21	01.24	01.26	01.27	01.28
75TH	55	1480	57	0.85	3
100TH	75	1480	78	0.85	2.8
120TH	90	1480	94	0.85	3.0
150TH	110	1490	111	0.86	3.1
180TH	132	1485	135	0.85	3.1
220TH	160	1485	159	0.87	2.9
265TH	200	1480	202	0.87	3.2
340TH	250	1480	245	0.87	3.2
400TH	300	1480	291	0.89	3.5
470TH	355	1485	352	0.89	3.0
600TH	400	1490	397	0.87	3.0
700TH	500	1490	490	0.87	3.0

4.3.2 - Menu 01 parameters

01.01 : Pilot control

Range : Open loop, Closed loop, U/F ratio
Factory setting : Open loop
Selection of controller operating mode according to the application and the options used.

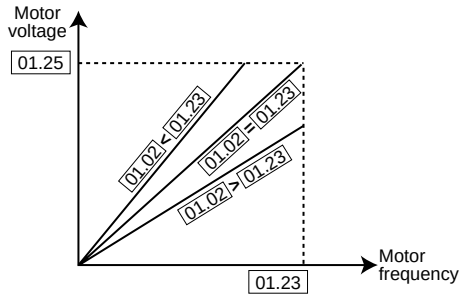
• Open loop : operation as a flux vector controller without feedback, used for the majority of applications.

• Closed loop : operation as a flux vector controller with feedback. If the motor has an optional encoder, state this in 01.31. If the motor has an optional resolver, the controller must be fitted with a resolver option card (not currently available).

• U/F ratio: operation as a frequency inverter, the regulated measurement being the output frequency of the controller.
Used when open loop vector control is not suitable, for example, when supplying several motors of different powers which are not mechanically linked, or supplying a medium voltage motor via a transformer.

01.02 : Base frequency

Range : 25 to 500 Hz
Factory setting : 50 Hz
This is the frequency for which the output voltage of the controller reaches the nominal motor value declared in 01.25.
V/F motor characteristics in open lopp



For a non-specific application, set the frequency indicated on the motor nameplate.

01.03 : Switching frequency

Range : 1.7 - 2.5 - 3.4 or 5 kHz
Factory setting : 2.5 kHz
Frequency for generating PWM pulses. A high frequency reduces the noise in the motor but increases the temperature rise of the controller power modules and the level of interference.

01.04 : Overtorque request

Range : High or Low
Factory setting : High
According to the application and the required torque, adjustment of overload characteristics.

• High : maximum overload with continuous nominal current indicated on nameplate. Applications : grinder, press, extruder, high inertias, etc.

• Low : reduced overload with increased continuous nominal current. Applications : pomp, cooling, etc.

UMV 3301 rating	01.04 = LOW	
	I max (A)	Overload (% In)
75T	145	125
100T	180	120
120T	220	116
150T	260	112
180T	315	114
220T	380	115
265T	480	118
270T	490	118
340T	580	115
400T	680	114
470T	820	117
600T	970	115

UMV 3301 rating	01.04 = LOW	
	I max (A)	Overload (% In)
75TH	85	112
100TH	115	112
120TH	135	112
150TH	155	112
180TH	190	112
220TH	225	112
265TH	280	110
340TH	340	109
400TH	400	110
470TH	450	109
600TH	580	110
700TH	670	109

UMV 3301 rating	01.04 = HIGH	
	I max (A)	Overload (% In)
75T	112	155
100T	145	150
120T	180	142
150T	220	132
180T	260	138
220T	315	139
265T	380	149
270T	380	149
340T	480	140
400T	580	134
470T	680	135
600T	860	128

UMV 3301 rating	01.04 = HIGH	
	I max (A)	Overload (% In)
75TH	63	150
100TH	86	150
120TH	101	150
150TH	116	150
180TH	142	150
220TH	165	150
265TH	205	150
340TH	255	146
400TH	300	147
470TH	350	140
600TH	450	142
700TH	500	146

01.21 : Nominal motor power
Range : 0 to 999.9 kW
Factory setting : See table ratings/power in § 1.3.2.

UMV rating	75T	100T	120T	150T	180T	220T
Setting (kW)	55	75	90	110	132	160
UMV rating	265T	270T	340T	400T	470T	600T
Setting (kW)	200	200	250	310	355	400

Note : With the factory setting, the value is that corresponding to 01.04 = High.
Enter here the value indicated on the motor nameplate.

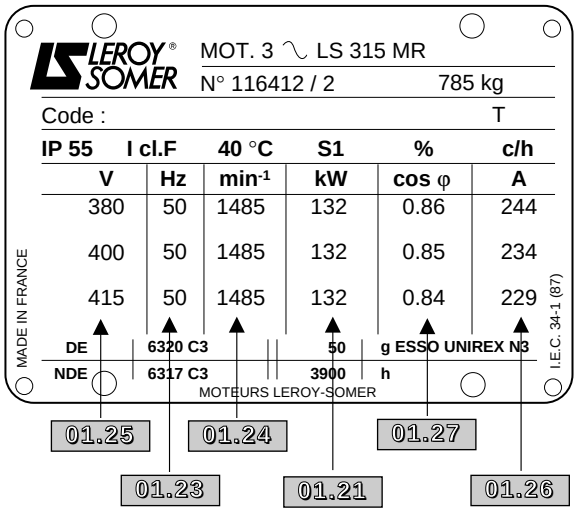
01.23 : Nominal motor frequency
Range : 25 to 500 Hz
Factory setting : 50 Hz
Enter here the value indicated on the motor nameplate.

01.24 : Nominal motor speed
Range : 375 to 8000 min^{-1}
Factory setting : 1480 to 1490 min^{-1}. See table in section 4.3.1
Enter here the value indicated on the motor nameplate.
WARNING :
Enter the actual value, do not round it up or down.

01.25 : Nominal motor voltage
Range : 60 to 500 V
Factory setting : 400 V
Enter here the value indicated on the motor nameplate according to the coupling.

01.26 : Nominal motor current
Range : 0 to 999.9 A
Factory setting : See table in section 4.3.1
Enter here the value indicated on the motor nameplate according to the coupling.

01.27 : Motor cosine φ
Range : 0.50 to 0.95
Factory setting : See table in section 4.3.1
Enter here the value indicated on the motor nameplate.



01.28 : Motor C max/C nominal
Range : 2 to 5
Factory setting : See table in section 4.3.1
Enter here the motor catalogue value.

Examples of LEROY-SOMER 4-pole motors

Motor type	Power (kW)	Cmax/Cnom.
LS 250 MP	55	3
LS MV 250 MP	55	3,2
LS 280 SP	75	2,8
LS MV 280 SP	75	3,3
LS 280 MP	90	3
LS MV 280 MP	90	3,5
LS 315 SP	110	3,1
LS MV 315 SP	110	3,4
LS 315 MR	132	3,1
LS 315 MR	160	2,9
LS 315 MR	200	3,2

01.29 : Motor cooling
Range : Not cooled, Self-cooled, Motor-cooled
Factory setting : Self-cooled.
Depending on the motor used, declare its cooling type here.

01.30 : Motor protection by thermistor
Range : Yes or No
Factory setting : No
• **Yes :** the motor has a PTC or PTO probe which is connected between terminals P7/7 and P7/8. See menu 7 AI4.
• **No : there is no motor probe management.**

01.31 : Points per encoder revolution
Range : 8 to 4096
Factory setting : 1024
Enter here the number of points per encoder revolution used for speed feedback.

NOTES

4.4 - User menu

4.4.1 - List of user menu parameters

Parameter	Label	Type	Variation range	Factory setting
02.50	CDC - UMV speed reference	R - W	± 8000min^{-1}	0
02.02	Speed reference source	R - W	Terminal block, CDC - UMV	Terminal block
06.01	Control source	R - W	Terminal block, CDC - UMV, RS 485	Terminal block
06.03	Starting	R - W	Controlled or Automatic	Controlled
10.02	Reset	R - W	Controlled or Automatic	Controlled
06.05	Flying restart	R - W	Yes or No	No
10.06	Mains undervoltage threshold	R - W	240V to 320V	300V
10.07	Mains time delay	R - W	0 to 20.00s	0.50s
07.17	AI1 100 % calibration	R - W	0 to 8000	1500
07.36	AI3 reference selection	R - W	0/10V, 0/20mA, 4/20mA	4/20mA
07.33	AI3 0 % calibration	R - W	0 to 8000	0
07.34	AI3 100 % calibration	R - W	0 to 8000	1500
02.21	Speed reference PS1	R - W	± 8000min^{-1}	1500 min^{-1}
02.22	Speed reference PS2	R - W	± 8000min^{-1}	1000 min^{-1}
02.23	Speed reference PS3	R - W	± 8000min^{-1}	750 min^{-1}
02.81	Minimum limit (clockwise)	R - W	0 to 8000min^{-1}	0
02.83	Maximum limit (clockwise)	R - W	0 to 8000min^{-1}	1500 min^{-1}
02.91	Skip speed 1	R - W	± 8000min^{-1}	0
02.94	Skip band 1	R - W	0 to 255min^{-1}	0
02.70	Forward/Reverse	R - W	Disabled or Enabled	Enabled
03.10	Main acceleration ramp 1	R - W	0.1 to 3200s	20s
03.30	Main deceleration ramp 3	R - W	0.1 to 3200s	20s
07.29	AI2 destination	R - W	None - 04.36 (1)	None
07.27	AI2 100 % calibration	R - W	0 to 8000	100
04.36	Motor torque limit 2	R - W	0 to 300% Mn	110 % Mn
05.12	Alarm 1 threshold	R - W	0 to 9999	0
05.22	Alarm 2 threshold	R - W	0 to 9999	1500
07.52	AO1 type selection	R - W	0/10V, 0/20mA, 4/20mA	4/20mA
07.57	AO1 100 % calibration	R - W	0 to 8000	150
07.62	AO2 type selection	R - W	0/10V, 0/20mA, 4/20mA	4/20mA
07.67	AO2 100 % calibration	R - W	0 to 8000	1800
04.04	Stability	R - W	0.1 to 40	4.0

(1) There are other possible assignments for 07.29 but only the assignment of 04.36 (torque limiting) is operational when using the user menu.

Note : Depending on the application, the parameters in this menu may be replaced by parameters more suited to the application. Simply assign them in menu 11.

4.4.2 - The user menu parameters

02.50 : CDC-UMV speed reference
Range : ± 8000 min^{-1}
Factory setting : 0
This is the digital reference set from the CDC-UMV console. It is selected via 02.02.

02.02 : Speed reference source
Range : Terminal block - CDC - UMV
Factory setting : Terminal block
• Terminal block : the source of the speed reference is an analogue reference at the terminal block or a digital reference selected via the logic inputs.
• CDC - UMV : the source of the speed reference is 02.50 adjusted on the console.

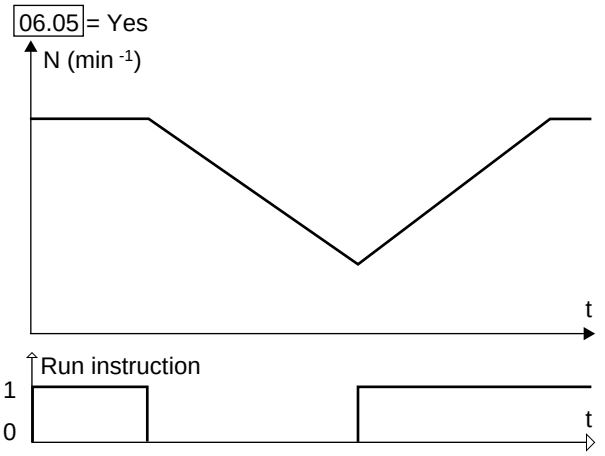
06.01 : Control source
Range : Terminal block - CDC-UMV - RS 485
Factory setting : Terminal block
• Terminal block : the run commands and other commands come from the terminal block.
• CDC - UMV : the run commands and the fault reset come from the console (RUN + △ or ▽).
• RS 485 : the controller is piloted via the serial link connected at P3 (MODBUS protocol).

06.03 : Starting
Range : Controlled or Automatic
Factory setting : Controlled
Automatic : on power-up, after a fault reset or unlocking, if a run command has already been selected, the motor starts in order to reach the reference.
Controlled : external control via the terminal block : if a run command has already been selected, the motor does not start even if a reference appears. A stop must first be made, followed by a run command.

10.02 : Reset mode
Range : Controlled or Automatic
Factory setting : Controlled
Automatic : if a run command is present, the motor restarts without any external intervention. If the fault persists, the controller will perform the number of resets selected in 10.03 before locking.
Controlled : the reset must be performed manually at the location selected in 10.01.

Note : It is useful to set 10.02 = automatic, to avoid having to switch the run command.

06.05 : Flying restart
Range : Yes or No
Factory setting : No
Y**es :** enables a rotating motor to be powered up, for example starting a motorised fan which is backdriving in a chimney.
No : function inhibited.



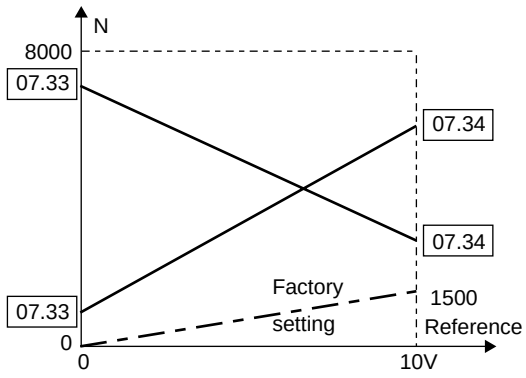
10.06 : Mains undervoltage threshold
Range : 240 to 320 V
Factory setting : 300 V
Adjusts the mains voltage level for which the controller will detect a mains loss fault.

10.07 : Time delay before mains fault
Range : 0 to 20.00s
Factory setting : 0.50s
Delays the action of a « mains loss fault ».

07.17 : AI1 100 % calibration
Range : 0 to 8000
Factory setting : 07.17 : 1500
Adjustment of the value corresponding to 10V on analogue input 1.

07.36 : AI3 reference selection
Range : 0-10V, 0-20mA, 4-20mA
Factory setting : 4-20mA
Selection according to the type of signal at input AI3.

07.33 : AI3 0 % calibration
Range : 0 to 8000
Factory setting : 0
Enables any value from 0 to 8000 to be given to the 0 %. The value set depends on the assignment of 07.39.



07.34 : AI3 100 % calibration
Range : 0 to 8000
Factory setting : 1500
Enables any value from 0 to 8000 to be given to the 10V. The value set depends on the assignment of 07.39.

02.21 to **02.23** **Speed references PS1 to PS3**
Range : ± 8000 min^{-1}
Factory settings : 02.21 = 1500 min^{-1}
02.22 = 1000 min^{-1}
02.23 = 750 min^{-1}
Preset speeds 1 to 3 (02.21 to 02.23) can be accessed via combinations of logic inputs DI1 and DI2.
Selection

DI1	DI2	DI4	Reference
0	0	0	AI1+
0	0	1	AI3
0	1	0 or 1	PS2
1	0	0 or 1	PS1
1	1	0 or 1	PS3

02.81 : Min limit
Range : 0 to + 8000 min^{-1}
Factory setting : 0
This is the lowest reference for clockwise or anti-clockwise operation. 02.01 cannot have a value below 02.81.

02.83 : Max limit
Range : 0 to + 8000 min^{-1}
Factory setting : 1500 min^{-1}
This parameter sets the highest reference for clockwise or anti-clockwise operation. 02.01 cannot have a value above 02.83.

02.91 : Speed : skips 1
Range : ± 8000 min^{-1}
Factory setting : 0
This parameter enables the system to skip 1 speed which causes operational problems (noise, vibrations, resonance). Skip point 1 is set via 02.91. It affects the speed increase and decrease.

02.94 : Skip band 1
Range : 0 to 255 min^{-1}
Factory setting : 0
Point 02.91 has an associated total skip band set via 02.94. One speed zone can therefore be avoided during operation.
Note : the skip speed is at a central point in the skip band.

02.70 : Forward/Reverse
Range : Disabled or Enabled
Factory setting : Enabled
Disabled : reversal of the direction of rotation of the motor is prohibited, even if the reference polarities are inverted, and whatever the control mode (external via the terminal block, serial link, console).
Enabled : the motor can turn in both directions.

03.10 and **03.30** **: Main ramps 1 and 3**
Range : 0.1 to 3200s
Factory setting : 20s
This is the acceleration 03.10 or deceleration 03.30 time for 1000 min^{-1}.

07.29 : AI2 destination
Range : None - Torque limiting
Factory setting : None
Selects the destination of analogue input AI2.

07.27 : AI2 100 % calibration
Range : 0 to 8000
Factory setting : 100
Adjustment of the value corresponding to 10V on the analogue input.

04.36 : Motor torque limit 2
Range : 0 to 300 % In
Factory setting : 110 % Mn
This is the continuous max torque supplied in motor mode.
If 04.38 = yes, 04.37 = 04.36.

05.12 : Alarm 1 threshold
Range : 0 to 9999
Factory setting : 0
Sets the underspeed threshold, assigned to relay RL1.

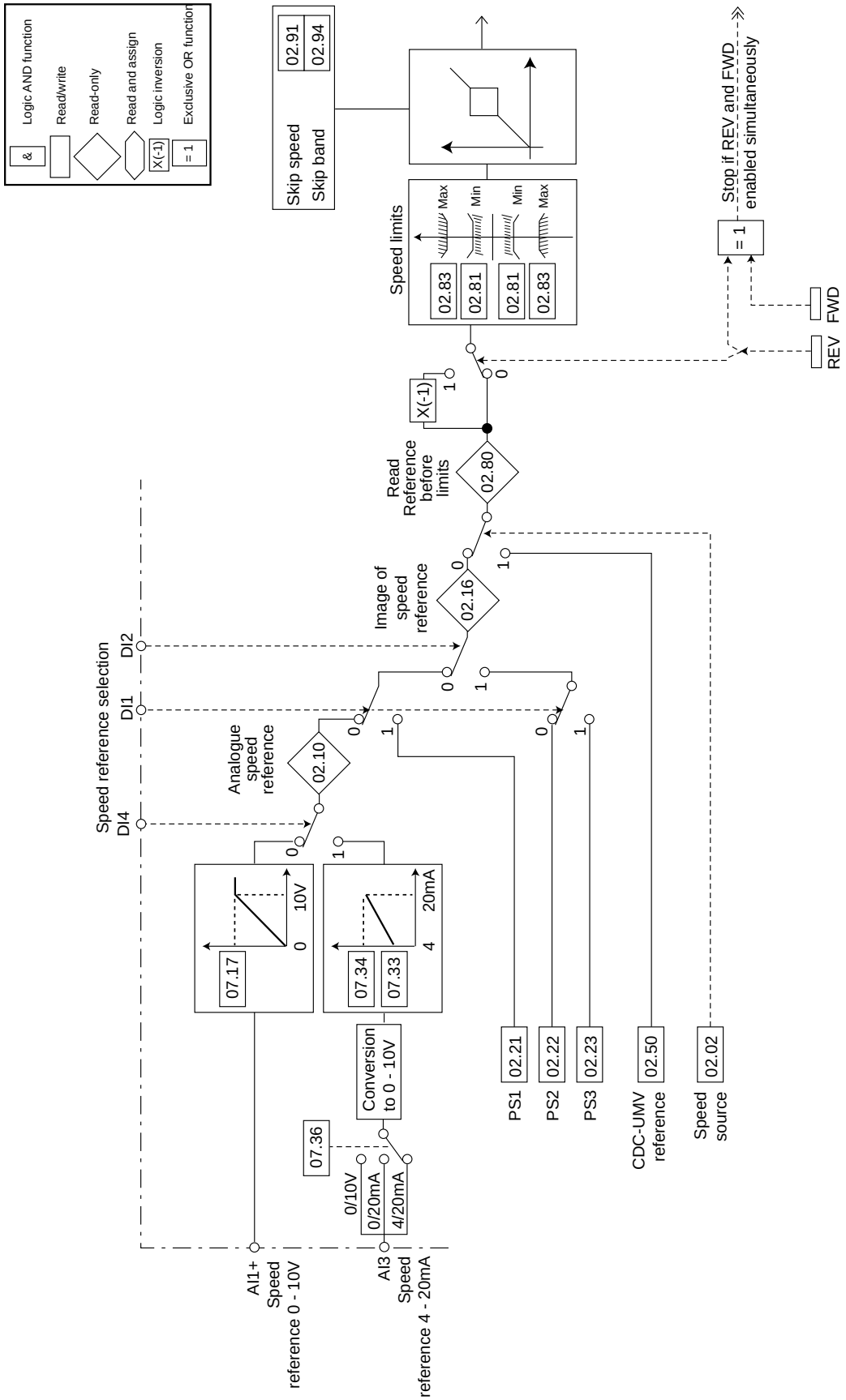
05.22 : Alarm 2 threshold
Range : 0 to 9999
Factory setting : 1500
Sets the overspeed threshold, assigned to output DO3.

07.52 and **07.62** **: AO1 - AO2 type selection**
Range : 0 - 10V, 4 - 20mA, 0- 20mA
Factory setting : 4 - 20mA
Selection of the signal supplied by the analogue output.
Note : The 4-20mA and 0-20mA signals can be inverted via 07.51 and 07.61.

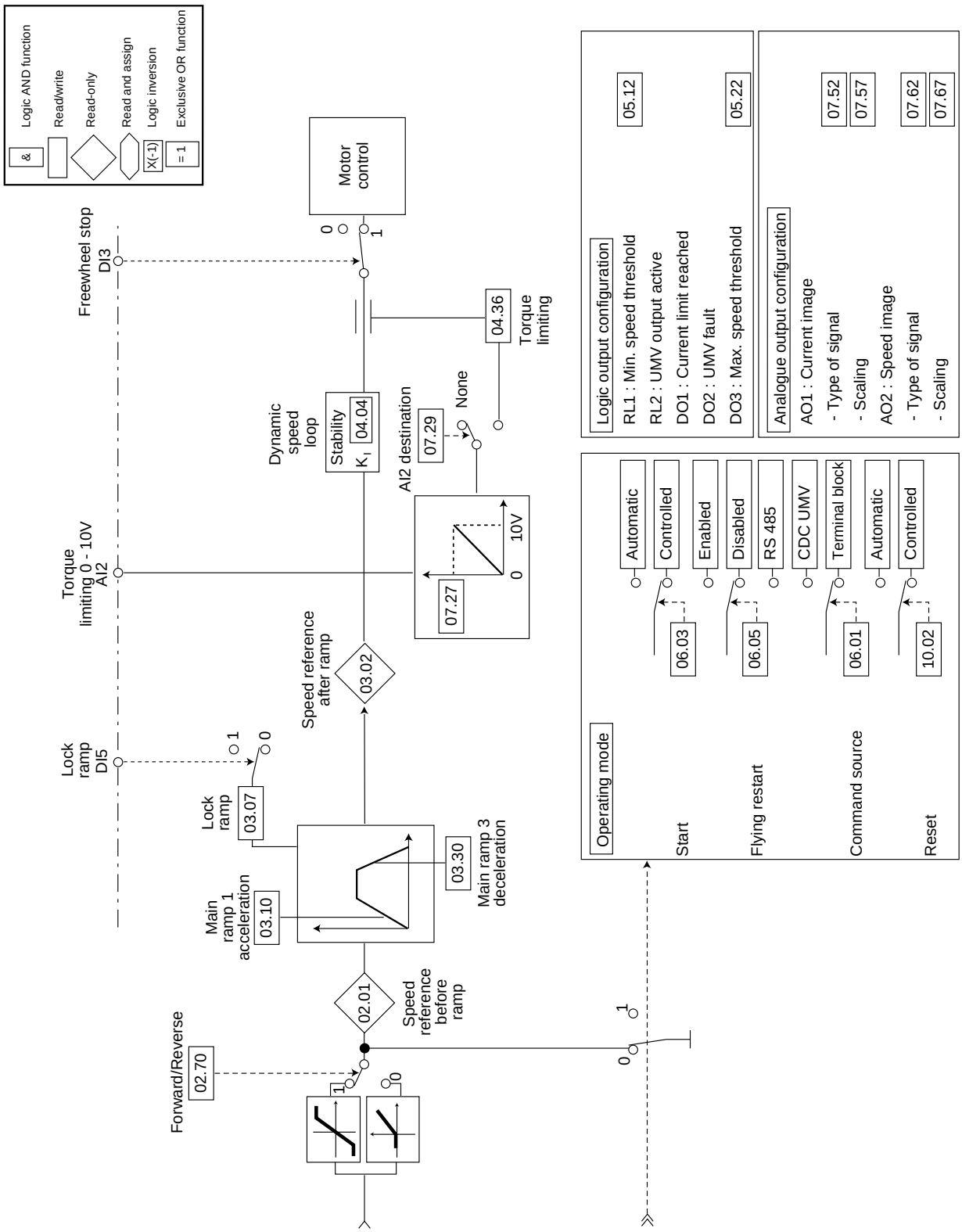
07.57 and **07.67** **: AO1 - AO2 100 % calibration**
Range : 0 to 8000
Factory setting : AO1 = 150, AO2 = 1800
Scaling of the signal selected via the source 07.59 or 07.69. With the factory setting, output AO1 is assigned to the current image, and output AO2 is assigned to the speed image.

04.04 : Stability
Range : 0.1 to 40.0
Factory setting : 4
This parameter is used to set the speed stability.
The factory setting is suitable for most applications.
It can be increased for high inertias.

4.4.3 - User menu block diagram (1)



4.4.3 - User menu block diagram (2)



NOTES

4.5 - Other menus

4.5.1 - Menu 02 : Speed setpoint

4.5.1.1 - List of menu 02 parameters

Parameter	Label	Type	Variation range	Factory setting
• Reference				
02.01	Speed reference before ramp	R	± 8000 min-1	-
02.02	**Speed reference source**	**R - W**	**Terminal block - CDC - UMV**	**Terminal block**
02.03	RS 485 reference enabled	R - W	Yes or No	No
02.10	Analogue speed reference	R	± 8000 min^{-1}	-
02.11	Speed reference No. 1	R - A	± 8000 min^{-1}	-
02.12	Speed reference No. 2	R - A	± 8000 min^{-1}	-
02.13	Additional speed reference	R - W	± 8000 min^{-1}	0
02.14	No. 1 - No. 2 selection	R - W	Speed ref. no. 1 - Speed ref. no. 2	Speed ref. no. 1
02.15	Summing selection	R - W	No - Yes	No
02.16	Speed reference image	R	± 8000 min^{-1}	-
02.17	1 PS selected	R - A	0 or 1	-
02.18	3 PS selected	R - A	0 or 1	-
02.19	7 PS selected	R - A	0 or 1	-
02.21	**PS1 reference**	**R - W**	**± 8000 min^{-1}**	**1500 min^{-1}**
02.22	**PS2 reference**	**R - W**	**± 8000 min^{-1}**	**1000 min^{-1}**
02.23	**PS3 reference**	**R - W**	**± 8000 min^{-1}**	**750 min^{-1}**
02.24	PS4 reference	R - W	± 8000 min^{-1}	3000 min^{-1}
02.25	PS5 reference	R - W	± 8000 min^{-1}	900 min^{-1}
02.26	PS6 reference	R - W	± 8000 min^{-1}	1200 min^{-1}
02.27	PS7 reference	R - W	± 8000 min^{-1}	1800 min^{-1}
• Special functions				
02.30	Motorized potentiometer reference value	R	± 8000 min^{-1}	-
02.31	Increase speed command	R - A	Disabled or Enabled	-
02.32	Decrease speed command	R - A	Disabled or Enabled	-
02.33	Motorized potentiometer function	R - W	Disabled or Enabled	Disabled
02.34	Motorized potentiometer sensitivity	R - W	1 to 999 s^{-1}	100 s^{-1}
02.35	Motorized potentiometer memorisation	R - W	Yes or No	No
02.40	Jogging reference	R - W	0 to 512 min^{-1}	150 min^{-1}
02.43	Jogging	R - A	Disabled or Enabled	-
02.44	Locking of jogging zero reference	R - W	Yes or No	No
02.50	**CDC-UMV speed reference**	**R - W**	**± 8000 min^{-1}**	**0**
02.60	RS 485 speed reference	R	± 8000 min^{-1}	-
02.70	**Forward/Reverse**	**R - W**	**Disabled or Enabled**	**Enabled**
02.80	Reference before limiting	R	± 8000 min^{-1}	-
• Limiting and skips				
02.81	**Minimum limit clockwise**	**R - W**	**0 to 8000 min^{-1}**	**0**
02.82	Minimum limit anti-clockwise	R - W	0 to 8000 min^{-1}	0
02.83	**Maximum limit clockwise**	**R - W**	**0 to 8000 min^{-1}**	**1500 min^{-1}**
02.84	Maximum limit anti-clockwise	R - W	0 to 8000 min^{-1}	1500 min^{-1}
02.85	Symmetry selection	R - W	Yes or No	Yes
02.90	Speed skip present	R	Yes or No	-
02.91	**Skip speed 1**	**R - W**	**± 8000 min^{-1}**	**0**
02.92	Skip speed 2	R - W	± 8000 min^{-1}	0
02.93	Skip speed 3	R - W	± 8000 min^{-1}	0
02.94	**Skip band 1**	**R - W**	**0 to 255 min^{-1}**	**0**
02.95	Skip band 2	R - W	0 to 255 min^{-1}	0
02.96	Skip band 3	R - W	0 to 255 min^{-1}	0

4.5.1.2 - The menu 02 parameters

02.01 : Speed reference before ramp

Range : ± 8000 min^{-1}
Reads the final speed reference before the ramp.

02.02 : Speed reference source
Range : Terminal block - CDC - UMV
Factory setting : Terminal block
• Terminal block : the source of the speed reference is an analogue reference on the terminal block or a digital reference selected via the logic inputs.
• CDC - UMV : the source of the speed reference is 02.50 adjusted on the console.

02.03 : RS 485 reference enabled
Range : Yes or No
Factory setting : No
Yes : the serial link produces the reference (02.60).
No : the reference is selected on the terminal block or the CDC-UMV.

02.10 : Analogue speed reference

Range : ± 8000 $min^{-1.}$
Reading of the main reference after selection of reference N1/reference N2 optionally increased by the additional reference.
Note : If 02.70 = disabled, a negative reference is inhibited.

02.11 : Speed reference No. 1
Range : ± 8000 min^{-1}
Reading of main reference 1.

02.12 : Speed reference No. 2
Range : ± 8000 min^{-1}
Reading of main reference 2.

02.13 : Additional speed reference
Range : ± 8000 min^{-1}
Factory setting : 0
This is a reference which may be added to main reference N1 or N2. It can be set directly via the console keypad or externally by assignment to an analogue input.

02.14 : No. 1 - No. 2 selection
Range : Speed ref. No. 1 - Speed ref No. 2
Factory setting : Speed ref No. 1
Choice between reference N1 and reference N2.

02.15 : Summing selection
Range : Yes or No
Factory setting : No
Yes : references N1 or N2 are increased by the value of additional reference 02.13.
No : the additional reference 02.13 is inhibited.

02.16 : Speed reference image

Range : ± 8000 min^{-1}
Reads the main reference or the programmable references in min^{-1} according to the selections made.

02.17 : 1 PS selected
Range : 0 or 1
Reads the 1 PS selection.
0 : 1 PS not controlled.
1 : 1 PS controlled.
See the binary combinations in 02.19.

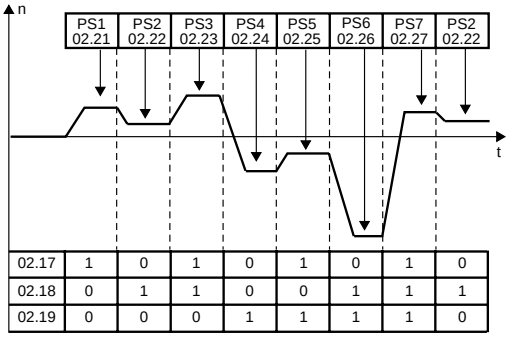
02.18 : 3 PS selected
Range : 0 or 1
Reads the 3 PS selection.
0 : 3 PS not controlled.
1 : 3 PS controlled.
See the binary combinations in 02.19.
The change of state controlled externally by assignment and combinations of logic inputs.

02.19 : 7 PS selected
Range : 0 or 1
Reads the 7 PS selection.
0 : 7 PS not controlled.
1 : 7 PS controlled.

Binary combinations
The change of state is controlled externally by assignment and combinations of logic inputs.

02.17	02.18	02.19	PS
0	0	0	—
1	0	0	1 (02.21)
1	1	0	3 (02.23)
0	1	0	2 (02.22)
0	0	1	4 (02.24)
0	1	1	6 (02.26)
1	0	1	5 (02.25)
1	1	1	7 (02.27)

02.21 to 02.27 Speed references PS1 to PS7
Range : ± 8000 min^{-1}
Factory settings : 1500 min^{-1}, 1000 min^{-1}, 750 min^{-1}, 3000 min^{-1}, 900 min^{-1}, 1200 min^{-1}, 1800 min^{-1} respectively
Preset speeds 1 to 7 (02.21 to 02.27) can be accessed via combinations of logic inputs assigned as shown in 02.19.
Selection of preset speeds



02.30 : Motorized potentiometer reference value

Range : ± 8000 min^{-1}
Reads the reference from a command via motorized potentiometer.

02.31 and **02.32** **: Motorized potentiometer command**

Range : Disabled or Enabled
02.31 : increase speed command.
02.32 : decrease speed command.

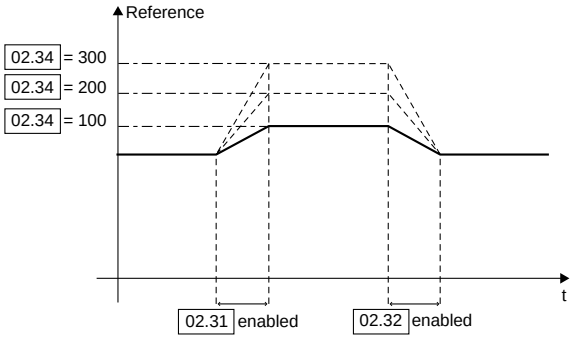
02.33 : Motorized potentiometer function

Range : Disabled or Enabled
Factory setting : Disabled
Enabled : the speed reference (**02.30**) is increased (**02.31**) or decreased (**02.32**). The sensitivity of the increase/decrease commands is controlled by applying a ramp rate (**02.34**) to the reference.
Disabled : the speed reference is issued from the preset speeds or from 02.10.

WARNING :
The increase speed command increases the speed :
- with the sign of the selected speed for preset speeds,
- with a positive value only for an analogue reference.
the decrease speed command decreases the absolute speed value.

02.34 : Motorized potentiometer sensitivity

Range : 1 to 999 s^{-1}
Factory setting : 100 s^{-1}
Adjusts the ramp rate when pressing the increase/decrease control buttons.



02.35 : Motorized potentiometer memorisation

Range : Yes or No
Factory setting : No
Yes : enables the reference to be retained during a stop, and to return to it at a restart.
No : at a stop command the reference will restart from 0.

02.40 : Jogging reference

Range : 0 to 512 min^{-1}
Factory setting : 150 min^{-1}
The jogging reference is adjusted via **02.40** and is always positive. Reversal is made by the REV input which inverts the reference.

02.43 : Jogging

Range : Disabled or Enabled
Enabled : the speed reference is **02.40**.
Disabled : the speed reference is the result of faster/slower, preset speeds or **02.10**.

02.44 : Locking of jogging zero reference

Range : Yes or No
Factory setting : No
Yes : it is not possible to give a jogging reference if **02.30** or **02.16** are other than 0.
No : a jogging reference can be given at any time.

02.50 : CDC-UMV speed reference

Rang : ± 8000 min^{-1}
Factory setting : 0
This is the digital reference adjusted from the CDC-UMV console. It is selected via **02.02**.

02.60 : RS 485 speed reference

Range : ± 8000 min^{-1}
This is the digital reference from the serial link. It is selected when **02.03** = yes.

02.70 : Forward/reverse

Range : Disabled or Enabled
Factory setting : Enabled
Disabled : reversal of the motor direction of rotation is prohibited even if the reference polarities are inverted, and whatever the control mode (external via the terminal block, serial link, console).
Enabled : the motor can turn in both directions.

02.80 : Reference before limiting

Range : ± 8000 min^{-1}
Reads the reference, wherever it is from, before it is limited.

02.81 : Minimum limit clockwise

Range : 0 to + 8000 min^{-1}
Factory setting : 0
This is the lowest reference for clockwise operation. 02.01 cannot have a value below **02.81**.

02.82 : Minimum limit anti-clockwise

Range : 0 to + 8000 min^{-1}
Factory setting : 0
This is the lowest reference for anti-clockwise operation. **02.01** cannot have a value below **02.82** for anti-clockwise operation.

02.83 : Maximum limit clockwise

Range : 0 to + 8000 min^{-1}
Factory setting : 1500 min^{-1}
This parameter sets the highest reference for clockwise operation. **02.01** cannot have a value above **02.83**.
WARNING :
It is requested that an additional maximum speed detection be realised outside the drive as the internal maximum speed thresholds are not considered as full safety features.

02.84 **: Maximum limit anti-clockwise**
Range : 0 to + 8000 min^{-1}
Factory setting : 1500 min^{-1}
This parameter sets the highest reference for anti-clockwise operation. 02.01 cannot have a value above 08.84 for anti-clockwise operation.

02.85 **: Symmetry selection**
Range : Yes or No
Factory setting : Yes
Yes : is used to limit the maximum clockwise and anti-clockwise reference to the same value.
The anti-clockwise limit will not be the value of 02.84 but that of 02.83.
No : limits 02.81 to 02.84 are independent.

02.90 **: Speed skip present**
Range : Yes or No
Reads whether or not there are speed skips present.
Yes : a speed skip is in the process of being performed.
No : no speed skip is being performed.

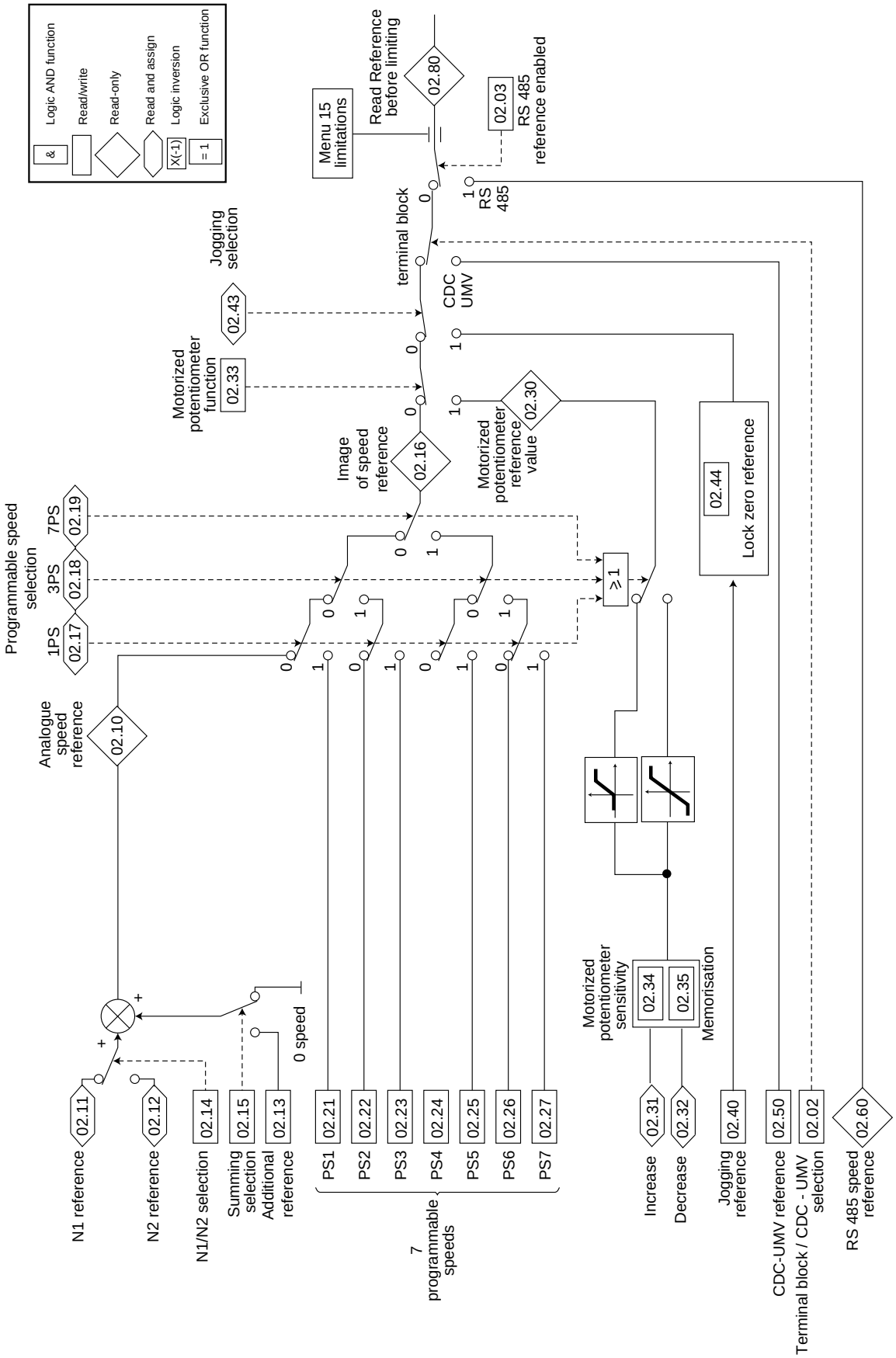
02.91 to 02.93 **: Speed : skips 1, 2 and 3**
Range : ± 8000 min^{-1}
Factory setting : 0
These parameters enable the system to skip 3 speeds which cause operational problems (noise, vibration, resonance). The skip points (1 to 3) are adjusted via 02.91 to 02.93 respectively. They affect the reference increase and decrease.

02.94 to 02.96 **: Skip bands 1, 2 and 3**
Range : 0 to 255 min^{-1}
Factory setting : 0
Each point 02.91 to 02.93 has an associated total skip band which is set by 02.94 to 02.96 respectively. Three speed zones can therefore be avoided during operation. The three zones can overlap.

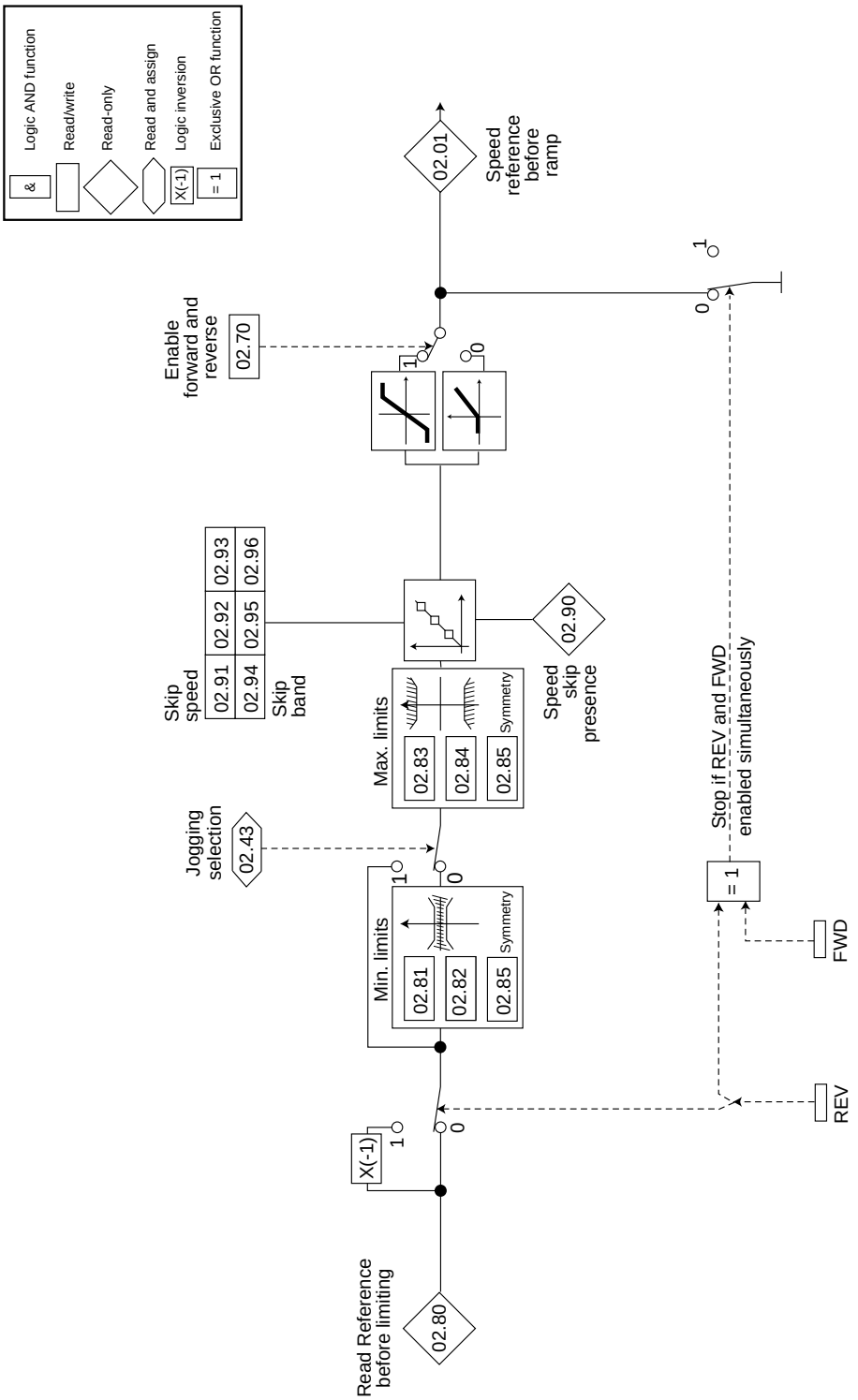
Note : The skip speed is at a central point in the skip band.

NOTES

4.5.1.3 - Menu 02 block diagram
Speed reference



4.5.1.3 - Menu 02 block diagram (continued)
Limiting and skips



NOTES

4.5.2 - Menu 03 : Generation of ramps

4.5.2.1 - List of menu 03 parameters

Parameter	Label	Type	Variation range	Factory setting
03.01	Final speed reference	R	± 8000 min^{-1}	-
03.02	Speed reference after ramp	R	± 8000 min^{-1}	-
03.03	Additional reference without ramp	R - W	± 8000 min^{-1}	0
03.04	Starting speed	R - W	0 to 255 min^{-1}	0
03.05	Special ramp selection	R - W	Yes or No	No
03.06	Special ramp rounding	R - W	2 to 10	10
03.07	Ramp	R - W	Locked or Unlocked	Unlocked
03.08	Ramp by-pass	R - W	Yes or No	No
03.09	Main ramp mode	R - W	1 to 4	1
03.10	**Main ramp 1**	**R - W**	**0.1 to 3200.0s**	**20.0s**
03.11	Main ramp 2	R - W	0.1 to 3200.0s	20.0s
03.12	Speed threshold on acceleration	R - W	0 to 8000 min^{-1}	8000 min^{-1}
03.15	Acceleration/deceleration associated programming	R - W	Yes or No	Yes
03.16	Associated programmable speeds and ramps	R - W	Yes or No	Yes
03.17	1 ACCP ramp selection	R - A	0 or 1	-
03.18	3 ACCP ramp selection	R - A	0 or 1	-
03.21	Acceleration ramp 1/5	R - W	0.1 to 3200.0s	20.0s
03.22	Acceleration ramp 2/6	R - W	0.1 to 3200.0s	20.0s
03.23	Acceleration ramp 3/7	R - W	0.1 to 3200.0s	20.0s
03.28	Jogging acceleration ramp	R - W	0.1 to 25.5s	10.0s
03.30	**Main ramp no. 3**	**R - W**	**0.1 to 3200.0s**	**20.0s**
03.31	Main ramp no. 4	R - W	0.1 to 3200.0s	20.0s
03.32	Speed threshold on deceleration	R - W	0 to 8000 min^{-1}	0
03.37	1 DECP ramp selection	R - A	0 or 1	-
03.38	3 DECP ramp selection	R - A	0 or 1	-
03.41	Deceleration ramps 1/5	R - W	0.1 to 3200.0s	20.0s
03.42	Deceleration ramps 2/6	R - W	0.1 to 3200.0s	20.0s
03.43	Deceleration ramps 3/7	R - W	0.1 to 3200.0s	20.0s
03.48	Jogging deceleration ramp	R - W	0.1 to 25.5 s	10.0s
03.50	Special ramp type	R - W	S type or U type	S type

4.5.2.2 - The menu 03 parameters

03.01 : Final speed reference

Range : ± 8000 min^{-1}

Reads the value of the final speed reference after setting the ramps and the optional addition of an additional speed without ramp (03.03).

03.02 : Speed reference after ramp

Range : ± 8000 min^{-1}

Reads the value of the speed reference after setting the ramps and before the optional addition of an additional speed.

03.03 : Additional reference without ramp

Range : ± 8000 min^{-1}

Factory setting : 0

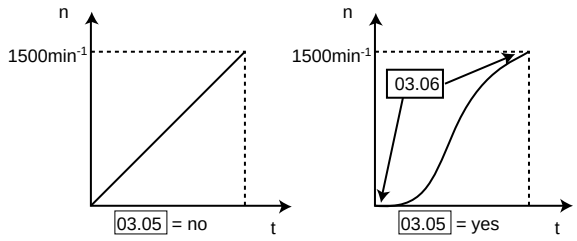
Enables an additional speed which is not subject to the ramp effect of the main reference. This parameter can be assigned to a programmable analogue input.

Note : When only one direction of operation is authorised (02.70 = disabled), 03.03 can only have a positive value.

03.04 : Starting speed
Range : 0 to 255 min^{-1}
Factory setting : 0
This parameter provides starting assistance for certain applications (eg. : priming a pump). It is a fixed reference which is not subject to the ramp effect. The ramp time which is set is automatically decreased during this type of start. (Eg. : a 10s ramp is set in order to reach a speed of 1500min^{-1}. Parameter 03.04 is set to 150min^{-1}, the motor will accelerate from 150 to 1500min^{-1} in 9s).

Note : this function is not available if flying restart is enabled.

03.05 : Special ramp selection
Range : Yes or No
Factory setting : No
Yes : selects delinearisation of the ramp curve. The times at the start and finish of ramp operation are extended without changing the total time. This is generally used for movement of fragile or unstable items.
Example : S ramp



No : linear ramps are used.
Warning : This function can only be used if 01.01 = closed loop or U/F.

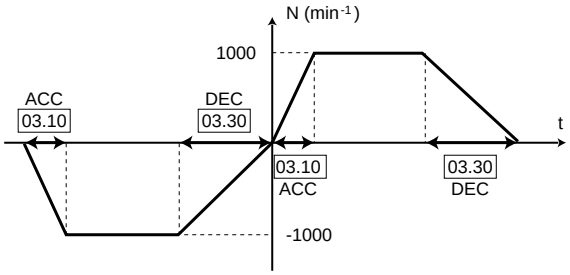
03.06 : Special ramp rounding
Range : 2 to 10
Factory setting : 10
This parameter is used to modify the curve in the same way at the start and finish of the ramp. 4 represents a rounding time of 25 % of 03.10, and 10 a time of 10 % of 03.10.

03.07 : Ramp
Range : Locked or Unlocked
Factory setting : Unlocked
Locked : the value of the speed reference is fixed.
Unlocked : the ramp develops normally.

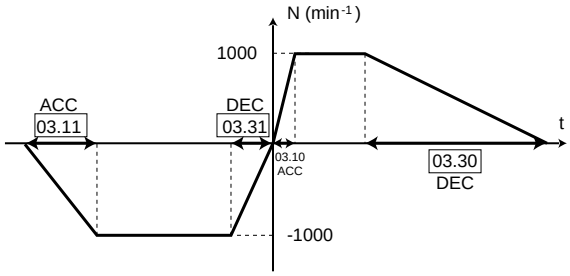
03.08 : Ramp by-pass
Range : Yes or No
Factory setting : No
Yes : is used to eliminate the ramp times without deleting them. The final reference develops in the same way as the reference at the input.
No : the ramps are operational.

03.09 : Main ramp mode
Range : 1 to 4
Factory setting : 1
This parameter provides four possibilities for associating ramps and operating quadrants.

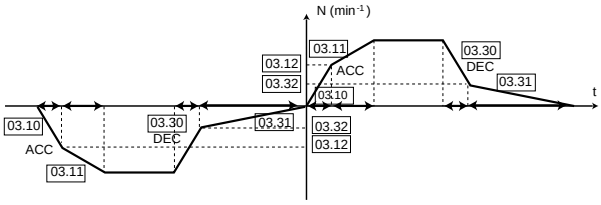
• **Mode 1 :** A clockwise and anti-clockwise acceleration ramp : 03.10
A clockwise and anti-clockwise deceleration ramp : 03.30



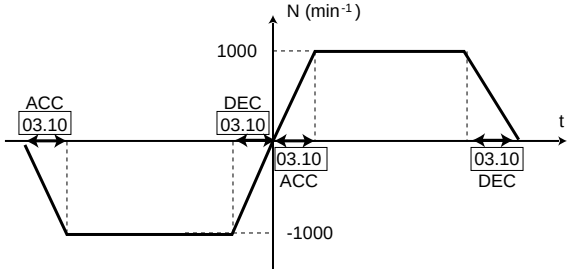
• **Mode 2 :** Possibility of ramp-setting by operating quadrant
03.10 = Clockwise acceleration
03.11 = Anti-clockwise acceleration
03.30 = Clockwise deceleration
03.31 = Anti-clockwise deceleration



• **Mode 3** : Two ramps are associated, and can be set to change from one to the other (03.12 and 03.32).
03.10 and 03.11 = Acceleration.
03.30 and 03.31 = Deceleration.



• **Mode 4** : A single ramp defined by 03.10
Acceleration, deceleration, clockwise or anti-clockwise (03.10 = 03.11 = 03.30 = 03.31)



03.10 and **03.11** **: Main ramps 1 and 2**

03.30 and **03.31** **: Main ramps 3 and 4**

Range : 0.1 to 3200.0
Factory setting : 20.0
This is the acceleration (03.10 and 03.11) or deceleration (03.30 and 03.31) time for 1000 min^{-1}.
See the timing diagrams for parameter 03.09.

03.12 and **03.32** **: Speed thresholds**

Range : 0 to 8000 min^{-1}
Factory setting : 03.12 = 8000 min^{-1}, 03.32 = 0
This is the speed threshold at which the ramp change takes place.
03.12 : change from 03.10 to 03.11.
03.32 : change from 03.30 to 03.31.
See timing diagram of 03.09, Mode 3.

03.15 and **03.16** **: Selection of acceleration and deceleration ramps, association with preset speeds**

Range : Yes or No
Factory setting : Yes

03.15	03.16	Comments on programmable ramps and speeds
Yes	Yes	03.17 = 02.17 and 03.37 = 02.17 03.18 = 02.18 and 03.38 = 02.18 The acceleration and deceleration ramps are controlled by the logic inputs which define the programmable speeds.
Yes	No	03.17 = 03.37 and 03.18 = 03.38 The acceleration and deceleration ramps are controlled by the same logic inputs. These inputs are independent of those which may control the programmable speeds.
No	Yes	03.17 = 02.17 and 03.37 = 02.17 03.18 = 02.18 and 03.38 = 02.18 The acceleration and deceleration ramps are controlled by the logic inputs which define the programmable speeds. When 03.16 = Yes, programming 03.15 modifies nothing.
No	No	The acceleration ramps are controlled independently of the deceleration ramps (different logic inputs). They are also independent of the inputs which may control the programmable speeds.

03.17 **and** **03.18** **: Acceleration ramp selection**

03.37 **and** **03.38** **: Deceleration ramp selection**

Range : 0 or 1
Ramps are selected using these 4 parameters. The change of state is performed by assignment to logic inputs.
Depending on the state of 03.15, the logic inputs which control the acceleration and deceleration ramps are the same or independent.

In the same way, depending on the state of 03.16, the programmable ramps can be defined by the logic inputs which control the programmable speeds.

03.17	03.18	Acceleration ramp
0	0	Main ramp following 03.09
1	0	03.21
0	1	03.22
1	1	03.23

03.37	03.38	Deceleration ramp
0	0	Main ramp following 03.09
1	0	03.41
0	1	03.42
1	1	03.43

03.21 to **03.23** **: Acceleration ramp ACC1/5, ACC2/6, ACC3/7**

Range : 0.1 to 3200.0 s
Factory setting : 20.0 s.
Preset speeds can have acceleration ramps associated in pairs.
03.21 : sets the acceleration of PS1 and PS5,
03.22 : sets the acceleration of PS2 and PS6,
03.23 : sets the acceleration of PS3 and PS7.

Note : the acceleration of PS4 is 03.10 or 03.11 depending on 03.09.

03.28 **: Jogging acceleration ramp**

Range : 0.1 to 25.0 s
Factory setting : 10. 0 s
The jogging function has a special acceleration ramp : 03.28. Setting for 1000 min^{-1}.

03.41 to **03.43** **: Deceleration ramp DEC1/5, DEC2/6, DEC3/7**

Range : 0.1 to 3200.0 s
Factory setting : 20.0 s
Preset speeds can have deceleration ramps associated in pairs.
03.41 : sets the deceleration of PS1 and PS5,
03.42 : sets the deceleration of PS2 and PS6,
03.43 : sets the deceleration of PS3 and PS7.

Note : the deceleration of PS4 is 03.10, 03.30 or 03.31 depending on 03.09.

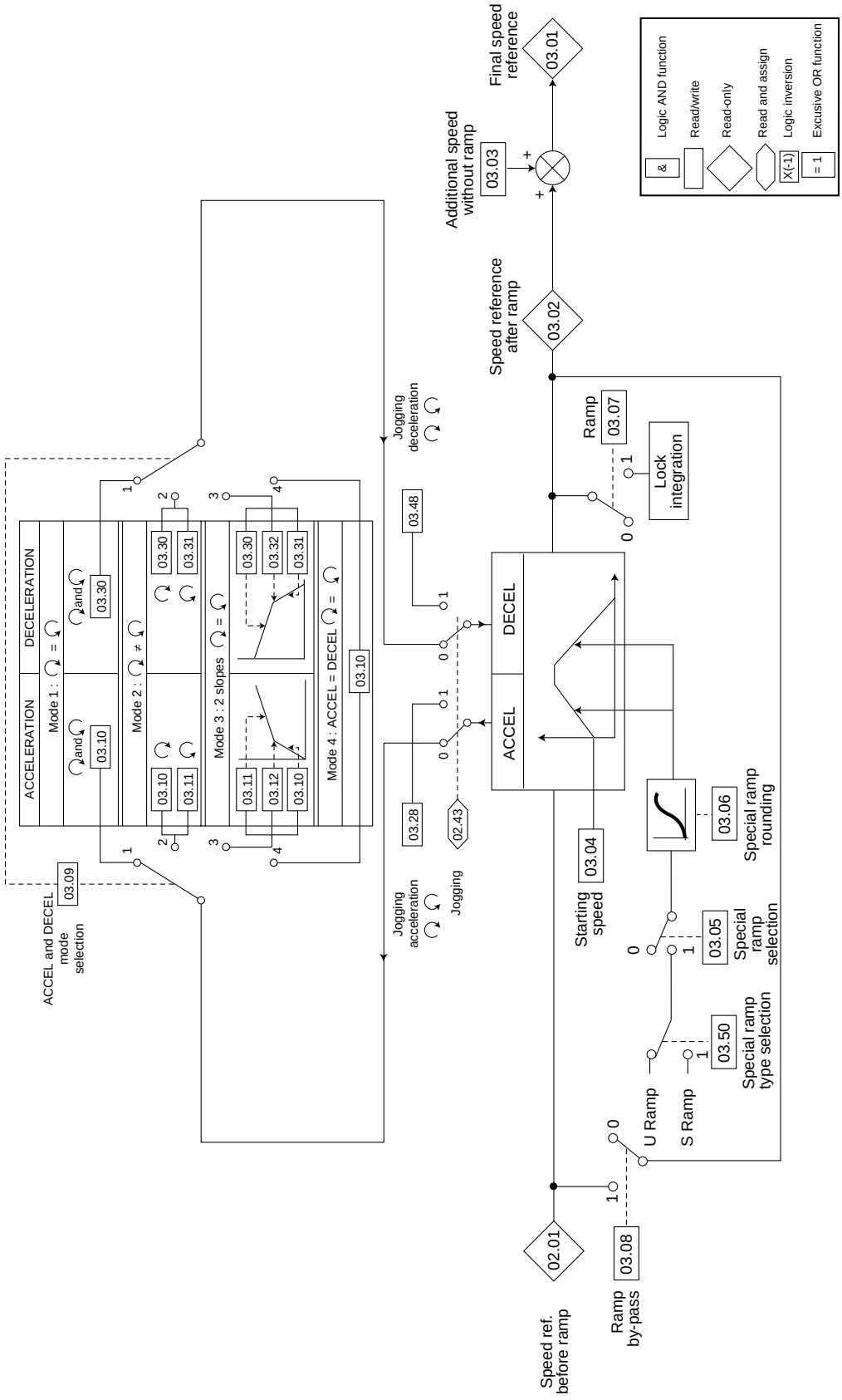
03.48 **: Jogging deceleration ramp**

Range : 0.1 to 25.0s
Factory setting : 10.0s
The jogging function has a special deceleration ramp : 03.48.

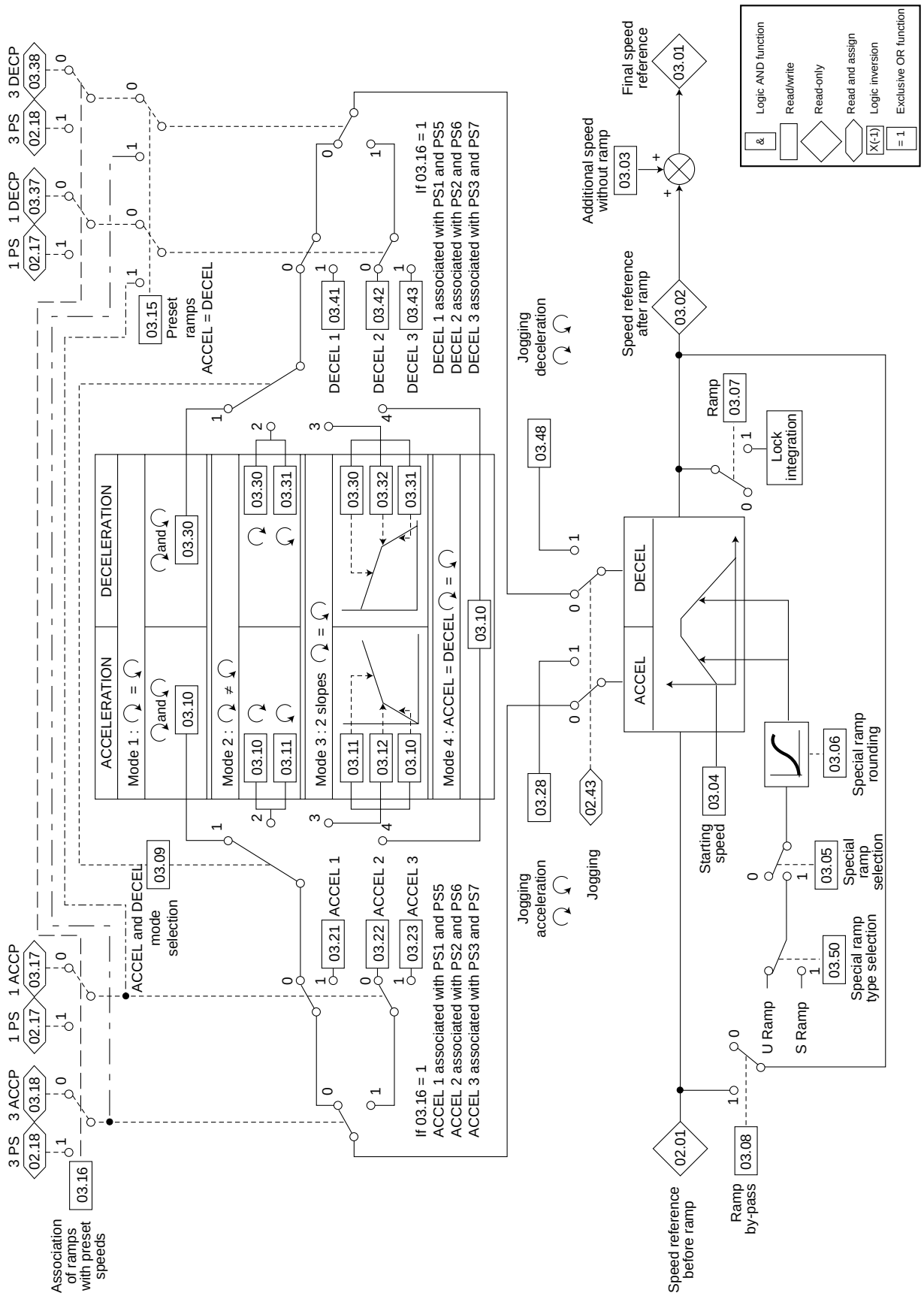
03.50 **: Special ramp type**

Range : U type or S type
Factory setting : S type
Selection of the form of the non-linear ramp enabled via 03.05.

4.5.2.3 - Menu 03 simplified block diagram



4.5.2.4 - Menu 03 detailed block diagram



NOTES

4.5.3 - Menu 04 : speed loop, torque control, power calculation

4.5.3.1 - List of menu 04 parameters

Parameter	Label	Type	Variation range	Factory setting
• Speed loop				
04.01	Speed measurement	R	± 8000 min^{-1}	-
04.02	Speed error	R	± 8000 min^{-1}	-
04.03	Dynamic performance	R - W	0 to 10.0	1.0
04.04	**Stability**	**R - W**	**0 to 99.9**	**4.0**
04.05	Torque d/dt	R - W	00.01 to 99.99 %/ms	10.00 %/ms
04.06	Speed reached error	R	± 8000 min^{-1}	-
• Torque control				
04.10	Torque reference	R - W	± 300 % Mn	0
04.11	Control type	R - W	Speed or Torque	Speed
04.12	Zero torque selection	R - W	Yes or No	No
04.13	Torque offset	R - W	± 150 % mN	0
04.14	Torque offset selection	R - W	0 or 1	0
04.20	Final torque reference	R	± 300 % Mn	-
04.30	Active current limit	R	± 300 % In	-
04.32	Total current limit	R	± 300 % In	-
04.33	Limit 1 or limit 2 enable	R - W	Limit 1 or Limit 2	Limit 2
04.34	Torque limit 1 in motor mode	R - W	0 to 300 % Mn	150 % Mn
04.35	Time delay limit 1 --> 2	R - W	0 to 255s	60 s
04.36	**Torque limit 2 in motor mode**	**R - W**	**0 to 300 % Mn**	**110 % Mn**
04.37	Torque limit in generator mode	R - W	0 to 300 % Mn	120 % Mn
04.38	I gen = I motor limiting selection	R - W	Yes or No	Yes
04.39	Limit 1 --> limit 2 select	R - W	04.33 or 04.35	04.35
04.40	Active current reference	R	± 300 % Mn	-
04.41	Current stability	R - W	1 to 8	4
04.42	Total current measurement	R	0 to 1500.0 A	-
04.43	Magnetising current measurement	R	± 1500.0 A	-
04.44	Active current measurement	R	± 1500.0 A	-
04.45	Duration of limiting operation	R	0 to 100 s	-
04.46	Energy saver	R - W	Yes or No	No
04.50	Motor torque	R	± 300 % Mn	-
• Power calculation				
04.60	Motor frequency	R	0 to 500.0 Hz	-
04.69	Motor speed adaptation threshold	R - W	300 to 999V	360V
04.70	Motor voltage	R	0 to 999 V	-
04.71	DC bus maximum voltage	R - W	600 to 700	650
04.80	Active motor power	R	0 to 999.9 kW	-
04.81	Energy 1 (MW.h)	R	0 to 32767	-
04.82	Energy 2 (kW.h)	R	0 to 999	-
04.90	Encoder frequency	R	± 327,00 kHz	-
04.92	Remanent frequency	R	± 500 Hz	-

4.5.3.2 - The menu 04 parameters

04.01 : Speed measurement

Range : ± 8000 min^{-1}
In open loop operation, 04.01 is an estimation of the motor speed. In closed loop operation, 04.01 indicates the actual motor speed.

04.02 : Speed error

Range : ± 8000 min^{-1}
This is the measurement of the difference between the final reference after ramp 03.01 and the motor speed (estimated in open loop operation or actual in closed loop operation).

04.03 : Dynamic performance

Range : 0 to 10.0
Factory setting : 1
This parameter is used to adjust the dynamic (transient) on the speed loop.

04.04 : Stability

Range : 0 to 99.9
Factory setting : 4.0
This parameter is used to set the speed stability.
The factory setting is suitable for most applications.
It can be increased for high inertias.

04.05 : Torque d/dt

Range : 00.01 to 99.99 %/ms
Factory setting : 10.00 %/ms
When using torque regulation, this parameter allows to apply a ramp to the torque reference. This prevents from getting spurious trips when the reference is subject to important transients.

04.06 : Speed reached error

Range : ± 8000 min^{-1}
This is the measurement of the difference between the reference before ramp 02.01 and the motor speed (estimated in open loop operation or actual in closed loop operation).

04.10 : Torque reference

Range : ± 300 % Mn
Factory setting : 0
If : 04.11 = torque, this parameter adjusts the motor torque with respect to the resistive torque at the shaft. The choice of a positive or negative value enables forward and reverse rotation. **This mode can only be used with closed loop operation.**
02.83 and 02.84 are the overspeed limits.

04.11 : Control type

Range : Speed or Torque
Factory setting : Speed
Is used to select the type of operation.
Speed : speed regulation.
Torque : torque regulation, overspeed protection via 02.83 and 02.84. **This mode can only be used with closed loop operation.**

04.12 : Zero torque selection

Range : Yes or No
Factory setting : No
No : the motor torque is defined according to the resistive torque and the reference.
Yes : the motor torque is cancelled. If the torque at the motor shaft is resistive, the motor stops ; if the torque is driving, the motor is driven without restriction.

04.13 : Torque offset

Range : ± 150 % Mn
Factory setting : 0
When enabled, this value is added (if positive) or substracted (if negative) to the main torque reference.
For hoist applications with fixed torque selected (06.44) this parameter is used to set the torque level at brake opening.
Warning :
This value must be high enough to prevent from having a load backlash at brake opening.

04.14 : Torque offset selection

Range : 0 or 1
Factory setting : 0
0 : torque offset 04.13 is inactive.
1 : torque offset 04.13 is added to the torque request.

04.20 : Final torque reference

Range : ± 300 % Mn
Reads the final torque reference whatever the type of operation (speed or torque regulation).

04.30 : Active current limit

Range : ± 300 % In
Reads the authorised « end stop » of the active current with respect to the motor nominal current.

04.32 : Total current limit

Range : ± 300 % In
Reads the authorised « end stop » with respect to the motor nominal current.

04.33 : Limit 1 or limit 2 enable

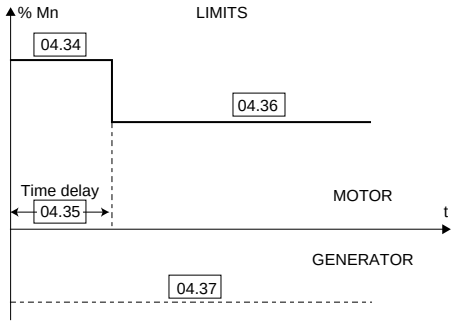
Range : Limit 1 or Limit 2
Factory setting : Limit 2
Limit 1 : the torque limit set in 4.34 is enabled.
Limit 2 : the torque limit set in 4.36 is enabled.
This parameter can be switched either using a timer (if 4.39 is set to 4.35) or a digital input (if 4.39 is set to 4.33 and if 4.33 is programmed to a digital input).

04.34 : Motor torque 1 limit
Range : 0 to 300 % Mn
Factory setting : 150 % Mn
This is the maximum overload torque supplied to the motor for a maximum period set in 04.35.

04.35 : Time delay limit 1 --> 2
Range : 0 to 255s
Factory setting : 60s
Time authorised in overload (04.34) before limiting via 04.36.

04.36 : Motor torque 2 limit
Range : 0 to 300 % Mn
Factory setting : 110 % Mn
This is the maximum continuous torque supplied in motor mode.
If 04.38 = Yes, 04.37 = 04.36.

04.37 : Torque limit in generator mode
Range : 0 to 300 % Mn
Factory setting : 120 % Mn
This is the maximum continuous torque drawn in generator mode. If 04.38 = 1, 04.37 = 04.36.



04.38 : I gen = I motor limiting selection
Range : Yes - no.
Factory setting : Yes.
Yes : limiting is the same in motor and in generator mode. 04.37 takes the value of 04.36.
No : limiting in motor and generator modes are set separately.

04.39 : Limit 1 --> limit 2 select
Range : 04.33 or 04.35
Factory setting : 04.35
04.33 : torque limit is switched from limit 1 (04.34) to limit 2 (04.36) using a digital input.
In this configuration, 04.33 must be programmed to a digital input using menu 8.
04.35 : **torque limit is switched from limit 1 (04.34) to limit 2 (04.36) using a timer set in 04.35.**

04.40 : Active current reference
Range : ± 300 % In
Current reference value after limiting.

04.41 : Current stability
Range : 1 to 8
Factory setting : 4
Sets the stability of the current loop. Used in particular in torque control.

04.42 : Total current measurement
Range : 0 to 1500.0A
Measurement of the current in the motor.

04.43 : Magnetising current measurement
Range : ± 1500.0A
Value of the motor magnetising current.

04.44 : Active current measurement
Range : ± 1500.0 A
Value of the motor active current.

04.45 : Duration of limiting operation
Range : 0 to 100s
A counter starts to increment as soon as the torque limit (04.36) is reached. Downcounting is performed twice as fast as upcounting.

04.46 : Energy saver
Range : Yes or No
Factory setting : No
Yes : the controller adapts its output voltage in such a way as to reduce the consumption on the mains.
No : function not used.

04.50 : Motor torque
Range : ± 300 % Mn
The motor torque measurement is established with respect to the motor characteristics (see 01.21, 01.26, 01.28).

04.60 : Motor frequency
Range : 0 to 500.0 Hz
Calculation of the motor frequency.

04.69 : Motor speed adaptation threshold
Range : 300 to 999V
Factory setting : 360V
On low voltage, this feature prevents the drive from tripping by adjusting the motor speed to the mains voltage.
When the mains voltage is above this threshold, the drive matches the speed reference.
If the mains voltage drops below the treshold, the drive decreases the speed, in order to withstand the voltage drop.

04.70 : Motor voltage

Range : 0 to 999 V
Calculation of the voltage at the motor terminals.

04.71 : DC bus maximum voltage

Range : 600 to 700V
Factory setting : 750V
Is used to set the limit value of the DC bus in the absence of a braking resistor (06.57 = No).

04.80 : Active motor power

Range : 0 to 999.9 kW
Calculation of the active power consumed by the motor.

04.81 : Energy 1

Range : 0 to 32767 MW.h
Counts the energy supplied to the motor by the controller in MW/h. See also 05.50 to 05.57.

04.82 : Energy 2

Range : 0 to 999 kW.h
Counts the energy supplied to the motor by the controller in kW/h. The total energy is obtained by adding together 04.41 and 04.42.

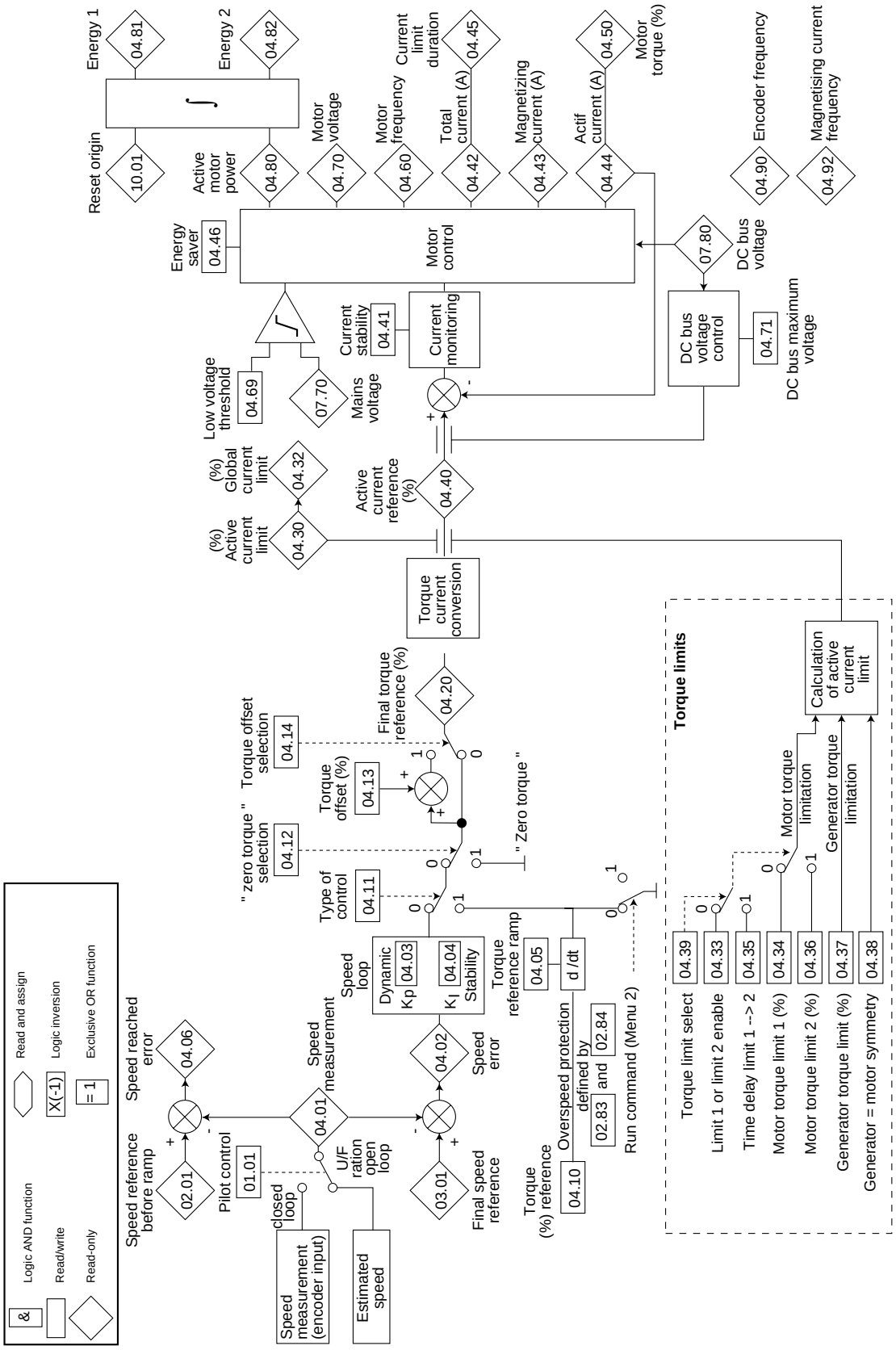
04.90 : Encoder frequency

Range : ± 300.00 kHz
Read only of the frequency of an encoder signal connected to input P11 of the drive.
Allows to check the direction of the motor when commissionning. When running at low speed, the sign of 4.01 and 4.90 must be the same.

04.92 : Remanent frequency

Range : ± 600 Hz
When drive disabled, this allows to read the frequency of the motor magnetizing current. On high inertia loads, this information provides the speed of the motor during coast stop. This parameter is set back to 1 when drive is enabled.

4.5.3.3 - Menu 04 block diagram



NOTES

4.5.4 - Menu 05 : Thresholds and alarm
4.5.4.1 - List of menu 05 parameters

Parameter	Label	Type	Variation range	Factory setting
• Current limit times				
05.02	Current limit time threshold	R - W	0 to 100s	60s
• Alarm 1				
05.10	Alarm 1 source	R - W	See table	04.01
05.11	Alarm 1 level	R	± 9999	-
05.12	**Alarm 1 threshold**	R - W	0 to 9999	0
05.13	Alarm 1 hysteresis	R - W	2 to 200	20
05.14	Alarm 1 type	R - W	Overlevel or Underlevel	Underlevel
05.15	Alarm 1 masking	R - W	0 to 255s	60s
05.16	Alarm 1 time delay	R - W	0 to 60s	0
• Alarm 2				
05.20	Alarm 2 source	R - W	See table	04.01
05.21	Alarm 2 level	R	± 9999	-
05.22	**Alarm 2 threshold**	R - W	0 to 9999	1500
05.23	Alarm 2 hysteresis	R - W	2 to 200	20
05.24	Alarm 2 type	R - W	Overlevel or Underlevel	Overlevel
05.25	Alarm 2 masking	R - W	0 to 255s	60s
05.26	Alarm 2 time delay	R - W	0 to 60s	0
• Alarm 3				
05.30	Alarm 3 source	R - W	See table	No assignment
05.31	Alarm 3 level	R	± 9999	-
05.32	Alarm 3 threshold	R - W	0 to 9999	0
05.33	Alarm 3 hysteresis	R - W	2 to 200	10
05.34	Alarm 3 type	R - W	Overlevel or Underlevel	Overlevel
05.35	Alarm 3 masking	R - W	0 to 255s	60s
05.36	Alarm 3 time delay	R - W	0 to 60s	10s
• Alarm 4				
05.40	Alarm 4 source	R - W	See table	No assignment
05.41	Alarm 4 level	R	± 9999	-
05.42	Alarm 4 threshold	R - W	0 to 9999	0
05.43	Alarm 4 hysteresis	R - W	2 to 200	10
05.44	Alarm 4 type	R - W	Overlevel or Underlevel	Overlevel
05.45	Alarm 4 masking	R - W	0 to 255s	60s
05.46	Alarm 4 time delay	R - W	0 to 60s	10s
• Alarms and Counter				
05.50	Counter 1 (yr/day)	R	0 to 31.364	-
05.51	Counter 2 (hr/min)	R	00.00 to 23.59	-
05.52	Alarm 5 period	R - W	0 to 9999 h	9999 h
05.53	Duration before alarm 5	R	0 to 9999 h	-
05.54	Alarm 5 tripped	R - W	Yes or No	-
05.55	Alarm 6 period	R - W	0 to 9999 h	9999 h
05.56	Duration before alarm 6	R	0 to 9999 h	-
05.57	Alarm 6 tripped	R - W	Yes or No	-

Source of alarms 1 to 4 (05.10, 05.20, 05.30, 05.40)

Parameter	Label	Parameter	Label
-	No assignment	07.10	AI1 reading (%)
02.01	Speed reference before ramp	07.18	AI1 final value
02.80	Reference before limiting	07.20	AI2 reading (%)
03.01	Final speed reference	07.28	AI2 final value
04.01	Speed measurement	07.30	AI3 reading (%)
04.02	Speed error	07.38	AI3 final value
04.06	Speed reached error	07.40	AI4 reading (%)
04.20	Torque final reference	07.70	Mains voltage
04.40	Active current reference	07.80	DC bus voltage
04.42	Total motor current	10.70	Motor use
04.44	Active motor current	10.75	Controller use
04.50	Motor torque	10.80	Braking resistor use
04.60	Motor frequency	14.01	PID output
04.70	Motor voltage	14.20	PID final reference
04.80	Motor power	14.30	PID feedback
04.81	Energy 1 MWh	14.40	PID error
04.82	Energy 2 KWh	15.10	Customer torque
04.90	Encoder frequency	16.06	Voltage error
04.92	Magnetising current frequency		

4.5.4.2 - Menu 05 parameters

05.02 : Current limit time threshold

Range : 0 to 100s
Factory setting : 60s
This is used to set the time during which an overload is permitted. This setting has no effect on the controller protection limits which still take priority.

05.10 , 05.20 : Alarm 1 to 4 source

05.30 & 05.40

Range : see table in section 4.5.4.1
Factory setting : 05.10 and 05.20 : 04.01,
05.30 and 05.40 : no assignment
These are used to select the parameter whose value is to be compared to the threshold.

05.11 , 05.21 : Alarm 1 to 4 level

05.31 & 05.41

Range : ± 9999
These follow the development of the source with respect to the threshold.

05.12 , 05.22 : Alarm 1 to 4 threshold

05.32 & 05.42

Range : 0 to 9999
Factory setting : 05.12 : 0,
05.22 : 1500,
05.32 and 05.42 : 0
For setting the detection level of Alarms 1 to 4.

05.13 , 05.23 : Alarms 1 to 4 hysteresis

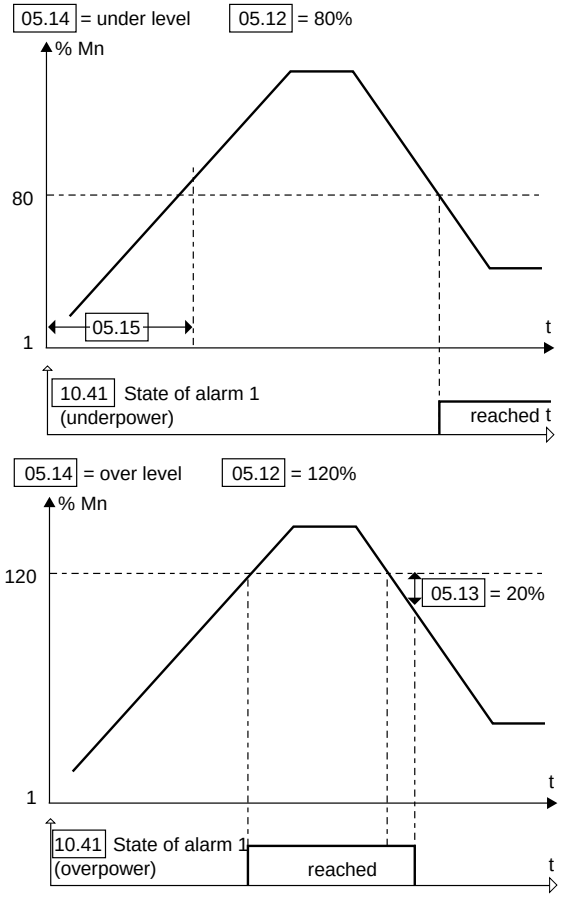
05.33 & 05.43

Range : 2 to 200
Factory setting : 05.13 and 05.23 : 20,
05.33 and 05.43 : 10
Prevents triggering around the detection threshold.

05.14 , 05.24 : Alarm 1 to 4 threshold

05.34 & 05.44

Range : Overlevel or Underlevel
Factory setting : 05.14 : Underlevel
05.24, 05.34 and 05.44 : Overlevel
Selects whether monitoring is to be performed above or below the alarm threshold.
Example 05.10 = 04.50



05.15 , 05.25 : Alarm 1 to 4 masking

05.35 & 05.45

Range : 0 to 255s
Factory setting : 60s
When the threshold type = underload, enables detection to be time-delayed with respect to controller unlocking, in order to avoid detection when starting.

05.16 , 05.26 : Alarm 1 to 4 time delay

05.36 & 05.46

Range : 0 to 60s
Factory setting : 05.16 and 05.26 : 0
05.36 and 05.46 : 10s
Avoids tripping on a transient level.

05.50 : Counter 1 duration

Range : 0 to 31.364 yr.day
Reads the actual duration of operation (controller unlocked) in years (00 to 31) and days (0 to 364). See also 05.51.

05.51 : Counter 2 duration

Range : 00.00 to 23.59 h min
Reads the actual duration of operation (controller unlocked) in hours (00 to 99) and minutes (0 to 59).

05.52 : Alarm 5 period

Range : 0 to 9999 h
Factory setting : 9999 h
For setting the actual operating time which will trigger a change of state of 05.54.

05.53 : Duration before alarm 5

Range : 0 to 9999 h
Indication of the duration before the tripping of alarm 1 (05.54) as a function of the setting of 05.52.
The counter is reinitialised by forcing 05.54 to no.

05.54 : Alarm 5 tripped

Range : Yes or No
Factory setting : No
05.54 changes to yes state when the period in 05.52 has elapsed (ie. 05.53 = 0).
05.54 can be assigned to a logic output or a relay for remote transmission.

05.55 : Alarm 6 period

Range : 0 to 9999 h
Factory setting : 9999 h
For setting the actual operating time which will trigger a change of state of 05.57.

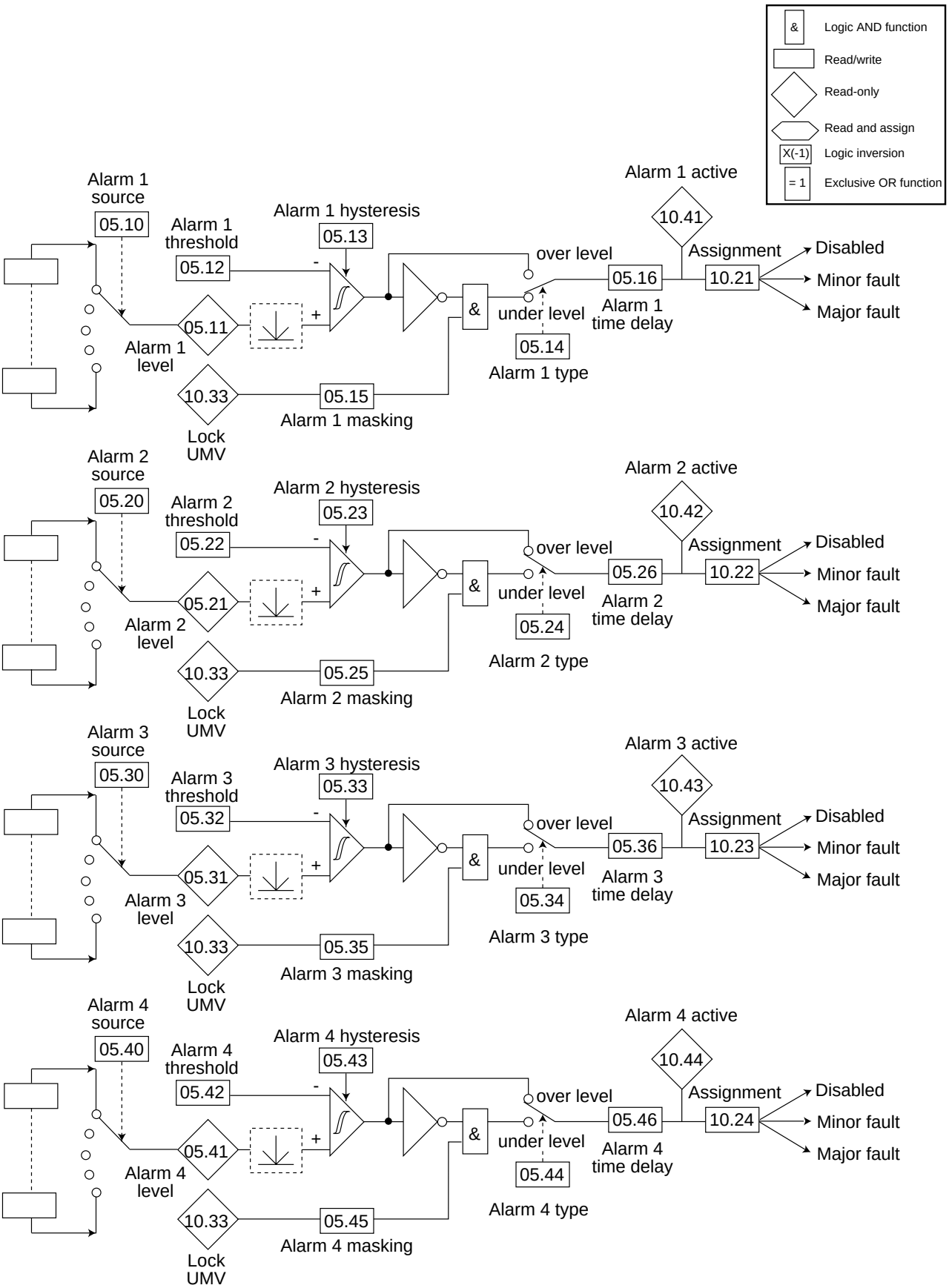
05.56 : Duration before alarm 6

Range : 0 to 9999 h
Indication of the duration before the tripping of alarm 2 (05.57) as a function of the setting of 05.55.
The counter is reinitialised by forcing 05.57 to no.

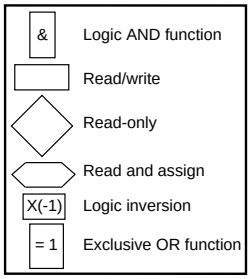
05.57 : Alarm 6 tripped

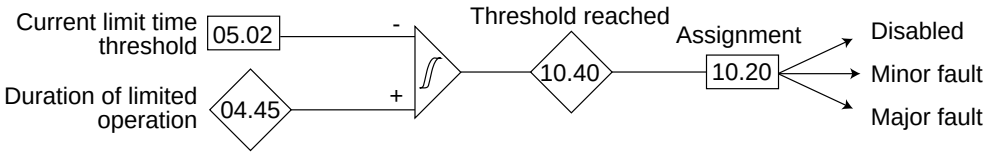
Range : Yes or No
Factory setting : No
05.57 changes to yes state when the period in 13.41 has elapsed (ie. 05.56 = 0).
05.57 can be assigned to a logic output or a relay for remote transmission.

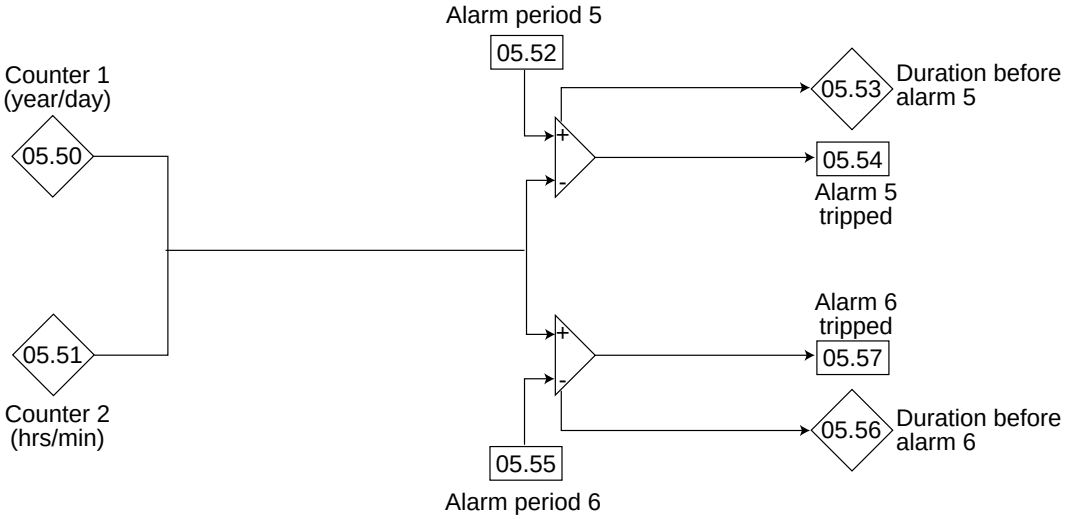
4.5.4.3 - Menu 05 block diagram (1)



4.5.4.3 - Menu 05 block diagram (2)







NOTES

4.5.5 - Menu 06 : Operating modes

4.5.5.1 - List of menu 06 parameters

Parameter	Label	Type	Variation range	Factory setting
• Run - stop command				
06.01	**Command source**	**R - W**	**Term. block / CDC - UMV / RS 485**	**Terminal block**
• Starting modes				
06.02	Starting time delay	R - W	0 to 25.5s	0
06.03	**Starting**	**R - W**	**Controlled or Automatic**	**Controlled**
06.04	Flying restart time delay	R - W	0.5 to 20s	2s
06.05	**Flying restart**	**R - W**	**Yes or No**	**No**
06.06	Zero reference locked	R - W	Yes or No	No
06.07	Semi manual starting	R - W	Yes or No	No
• U/f ratio adaptation				
06.10	Boost type	R - W	Fixed or Dynamic	Fixed
06.11	Boost level	R - W	0 to 10.0 %	0
06.12	Type of ratio	R - W	Fixed or Dynamic	Fixed
• Brake control				
06.40	Starting overtorque	R - W	0 to 100 % Mn	0
06.41	Flux time delay	R - W	100 to 999 ms	250 ms
06.42	Flux at stop	R - W	Yes or No	No
06.43	Flux stop time delay	R - W	0 to 30s	10s
06.44	Locked rotor function	R - W	Fix torque - Variable torque	Fix torque
06.50	Brake present	R - W	No - On motor - On installation	No
06.51	Minimum current on brake engagement	R - W	0 to 150 % In	0
06.52	Brake release speed	R - W	0 to 255 min^{-1}	0
06.53	Brake engagement time	R - W	0.01 to 0.99s	0.1s
06.54	Brake release time	R - W	0.01 to 0.99s	0.1s
• Resistance braking				
06.57	Braking resistor present	R - W	Yes or No	No
06.58	Braking power (S1)	R - W	0 to 999.9 kW	0
06.59	Resistance time constant	R - W	20 to 800s	180s
• Stopping mode				
06.60	Stop command	R	Enabled or Disabled	-
06.61	Stop command 1 (priority)	R - A	Enabled or Disabled	-
06.62	Stopping mode	R - W	Freewheel - On ramp DC injection - Timed low speed Fast stop - Indexing	On ramp
06.63	Stopping mode 1 (priority)	R - W	Freewheel - On ramp DC injection - Timed low speed Fast stop - Indexing	Freewheel
06.64	Stopping mode for minor faults	R - W	Freewheel - On ramp DC injection - Timed low speed Fast stop - Indexing	On ramp
06.71	Timed low speed setting	R - W	0 to 510 min^{-1}	150 min^{-1}
06.72	Low speed operation duration	R - W	0 to 25.5 s	5.0 s
06.73	Speed for start of DC injection	R - W	0 to 510 min^{-1}	150 min^{-1}
06.74	Injection level	R - W	0 to 150 % In	100 % In
06.75	Duration of injection	R - W	0 to 60 s	5 s

4.5.5.2 - Menu 06 parameters

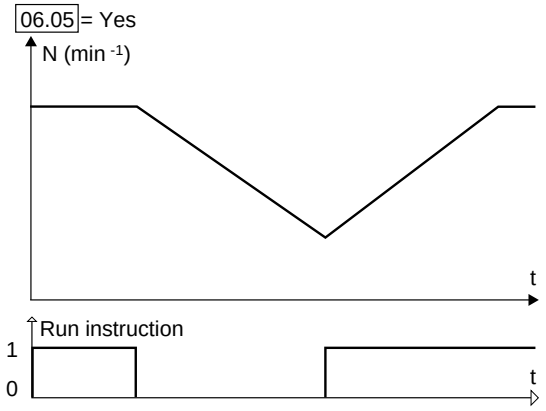
06.01 : Command source
Range : Terminal block - CDC-UMV - RS 485
Factory setting : Terminal block
• **Terminal block : the run commands and other commands come from the terminal block.**
• **CDC - UMV :** the run commands and fault reset come from the console (RUN + △ or ▽).
• **RS 485 :** the controller is piloted via the serial link connected at P3 (MODBUS protocol).

06.02 : Starting time delay
Range : 0 to 20.0s
Factory setting : 0s
This function is used to delay the start of rotation of the motor with respect to the run command.

06.03 : Starting
Range : Controlled or Automatic
Factory setting : Controlled
Controlled : external command via the terminal block.
Automatic : if a run command is already selected, the motor will start at power up. A stop must first be made, followed by a run command.
WARNING :
A time delay of longer than 0.5s must be set in 06.02.

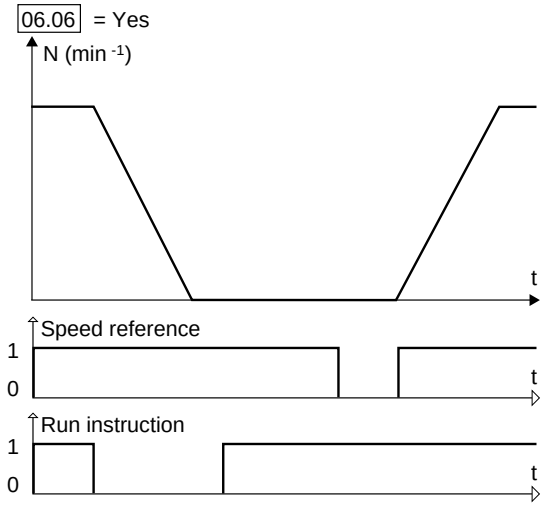
06.04 : Flying restart time delay
Range : 0.5 to 20.0s
Factory setting : 2.0s
Enables the start of the flying restart function to be delayed.

06.05 : Flying restart
Range : Yes or No
Factory setting : No
Yes : enables a rotating motor to be powered up, for example starting a motorised fan which is backdriving in a chimney.



No : function inhibited.

06.06 : Zero reference locked
Range : Yes or No
Factory setting : No
Yes : starting is prohibited if a reference other than zero is present even if a run command is transmitted. The reference must be reset to 0 before starting.



No : function disabled.

06.07 : Semi manual starting
Range : Yes or No
Factory setting : No
Yes : if 06.03 is set to " Controlled ", the drive will not start automatically, if the start command is given before a power up or before a reset following a trip. In this case, the start command will have to be set to 0 and to 1 again.
No : drive starting will operate as set in 06.03.

06.10 : Boost
Range : Fixed or Dynamic
Factory setting : Fixed
Fixed : in U/f ratio, on starting, the supply voltage is increased by a fixed value which is set via 06.11.
Dynamic : in U/f ratio, on starting, the supply voltage is increased by a value which is in proportion with the load in order to reach 06.11 at full load.

06.11 : Boost level
Range : 0 to 10.0 %
Factory setting : 0
For setting the starting voltage applied to the motor in manual boost.

06.12 : Type of ratio
Range : Fixed or Dynamic
Factory setting : Fixed
Fixed : the output voltage/frequency curve is a straight line. This is used for constant torque applications.
Dynamic : the output voltage/frequency curve is $y = x^2$ type. This is used for pumps, fans, etc.

06.40 : Starting overtorque
Range : 0 to 100 % Mn
Factory setting : 0
In closed loop, this parameter allows to increase the value of the magnetising current at very low speed thus providing more torque.
e.g. : if 06.40 is set at 50 % Mn, the magnetizing current at very low speed will be 150 %.

06.41 : Flux time delay
Range : 100 to 999ms
Factory setting : 250 ms
Depending on motor characteristics, this parameter is used to decrease the flux start time before motor rotation.
On hoist, this allows to set the torque quicker before the brake release.

06.42 : Flux at stop
Range : Yes or No
Factory setting : No
Yes : once the motor is stopped, the drive continues to deliver the magnetizing current during a programmable time (06.43). For hoist applications, it saves the flux start time before brake release when starting frequently.
No : the drive is disabled once the motor is stopped.

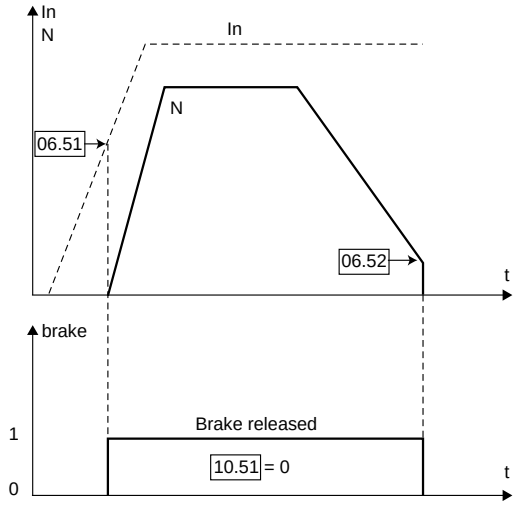
06.43 : Flux stop time delay
Range : 0 to 30s
Factory setting : 10s
If flux at standstill is selected, this parameter is used to set the time between the end of the stopping sequence and the drive disable.

06.44 : Locked rotor function
Range : Fix torque or variable torque
Factory setting : Fix torque
For hoist applications, this parameter is used to select the brake release condition.
Fix torque : on start command, the torque reference set in 04.13 is applied. When the torque level set in 06.51 is reached, the brake is released.
Variable torque : on start command, a low speed reference is given. As the brake is closed, the torque will raise up to a limit set in 04.34. When the torque level set in 06.51 is reached, the brake is released.

06.50 : Brake present
Range : No - On motor - On installation
Factory setting : No
Declare the presence of a brake and its location.

06.51 : Minimum current on brake engagement
Range : 0 to 150 % In
Factory setting : 0
Is used to set the motor current threshold level above which the electromechanical brake (optional) on the motor is released. Backdriving is thus avoided by only freeing the motor shaft when the torque is established. See graph 06.52.

06.52 : Brake release speed
Range : 0 to 255 min^{-1}
Factory setting : 0
Is used to set the speed threshold level above which the electromechanical brake (optional) on the motor is engaged. Braking can thus be performed before the motor comes to a complete stop, and can be inhibited until the motor speed has reached this threshold.



06.53 : Brake : engagement time
Range : 0.01 to 99.9s
Factory setting : 0.1s
Enter here the characteristic of the brake used.

06.54 : Brake : release time
Range : 0.01 to 99.9s
Factory setting : 0.1s
Enter here the characteristic of the brake used.

06.57 : Braking resistor present
Range : Yes or No
Factory setting : No
Yes : the optional braking transistor is controlled when the DC bus voltage exceeds 725V. A braking resistor must be wired between terminals RF1 and RF2 across a thermal relay.
The DC bus voltage is automatically limited to the value of 04.71.
Note : The braking capacity of the controller is very poor.
No : no braking resistor present.

06.58 : Braking power (S1)
Range : 0 to 999.9 kW
Factory setting : 0
Enter here the thermal power of the braking resistor.

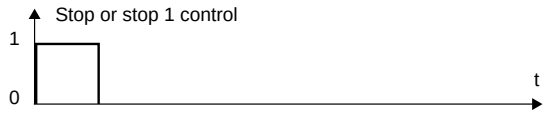
06.59 : Thermal time constant
Range : 20 to 800s
Factory setting : 180s
Enter the time constant according to the resistor used.

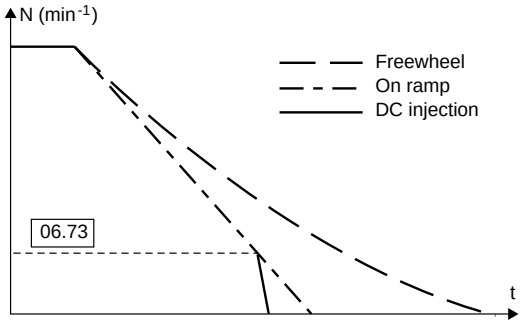
R - UMV resistor	Constant (s)
27500	59
55000	59
75000	60
90000	Consult LEROY-SOMER
110000	
132000	

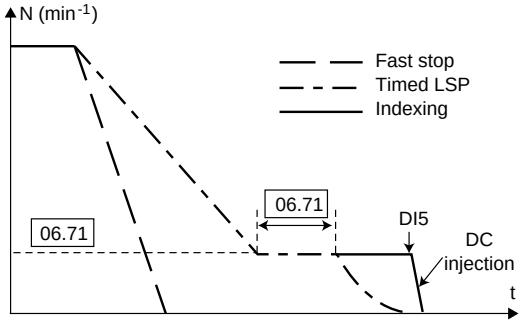
06.60 : Stop command
Range : Enabled or Disabled
Displays the stop command coming from the FWD and REV inputs.

06.61 : Stop command 1
Range : Enabled or Disabled
Displays stop command 1 coming from a programmable logic input. This stop command takes priority.

06.62 and **06.63 : Stopping mode - Stopping mode 1**
Range : Freewheel - On ramp - DC injection - Timed low speed - Fast stop - Indexing
Factory setting : 06.62 = On ramp
06.63 = Freewheel
At a stop command (06.60 or 06.61 enabled) 06.62 and 06.63 are used to select the stopping conditions according to the application.
Note : stopping mode 1 takes priority over all other stopping modes.
Freewheel stop : the motor is no longer supplied and stops on its own inertia.
On ramp : the motor decelerates following the ramp defined in menu 3.
DC injection : the motor decelerates following the ramp up to 06.73 then DC current is injected (level 06.74) in the motor during 06.75 in order to brake the motor.
Timed low speed : the motor decelerates following the ramp up to the step defined by 06.71 during 06.72 then the motor decelerates in freewheel on its own inertia.
Fast stop : the motor decelerates as fast as possible up to the DC bus overvoltage limit and the generator torque limit 04.37.
Indexing : the motor decelerates following the ramp up to the step defined by 06.71 for a period at least equal to 06.72, then when input IP5 is activated, DC current is injected (according to 06.74 and 06.75) in the motor. Logic input DI5 must not be assigned to any other use (08.51 = none).
See timing diagrams.



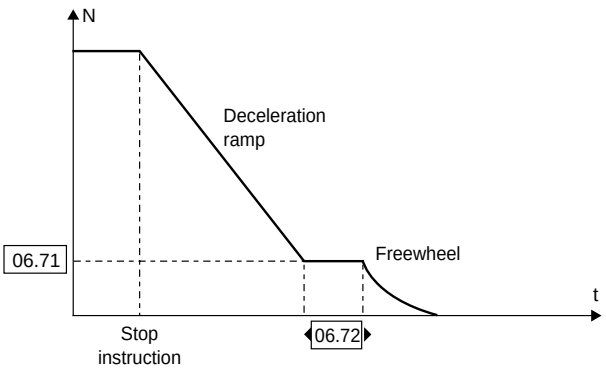




06.64 : Minor faults mode
Range : Freewheel - On ramp - DC injection - Timed low speed - Fast stop - Indexing
Factory setting : On ramp
When a minor fault is detected (10.04 = minor fault), 06.64 is used to select the stop conditions. See 06.62 and 06.63.

06.71 : Timed low speed setting
Range : 0 to 510 min^{-1}
Factory setting : 150 min^{-1}
Speed to be reached following the ramp when stop with low speed is selected in 06.62, 06.63 or 06.64, then stop following the ramp after the period set in 06.72.

06.72 : Low speed operation duration
Range : 0 to 25.5s
Factory setting : 5s
Duration of operation at low speed (06.71) before freewheel stop.



06.73 : Speed for start of DC injection

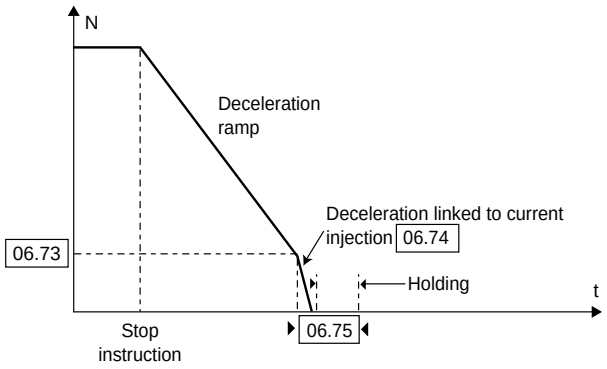
Range : 0 to 510 min^{-1}
Factory setting : 150 min^{-1}
Speed from which DC current is injected in the motor.

06.74 : DC injection level

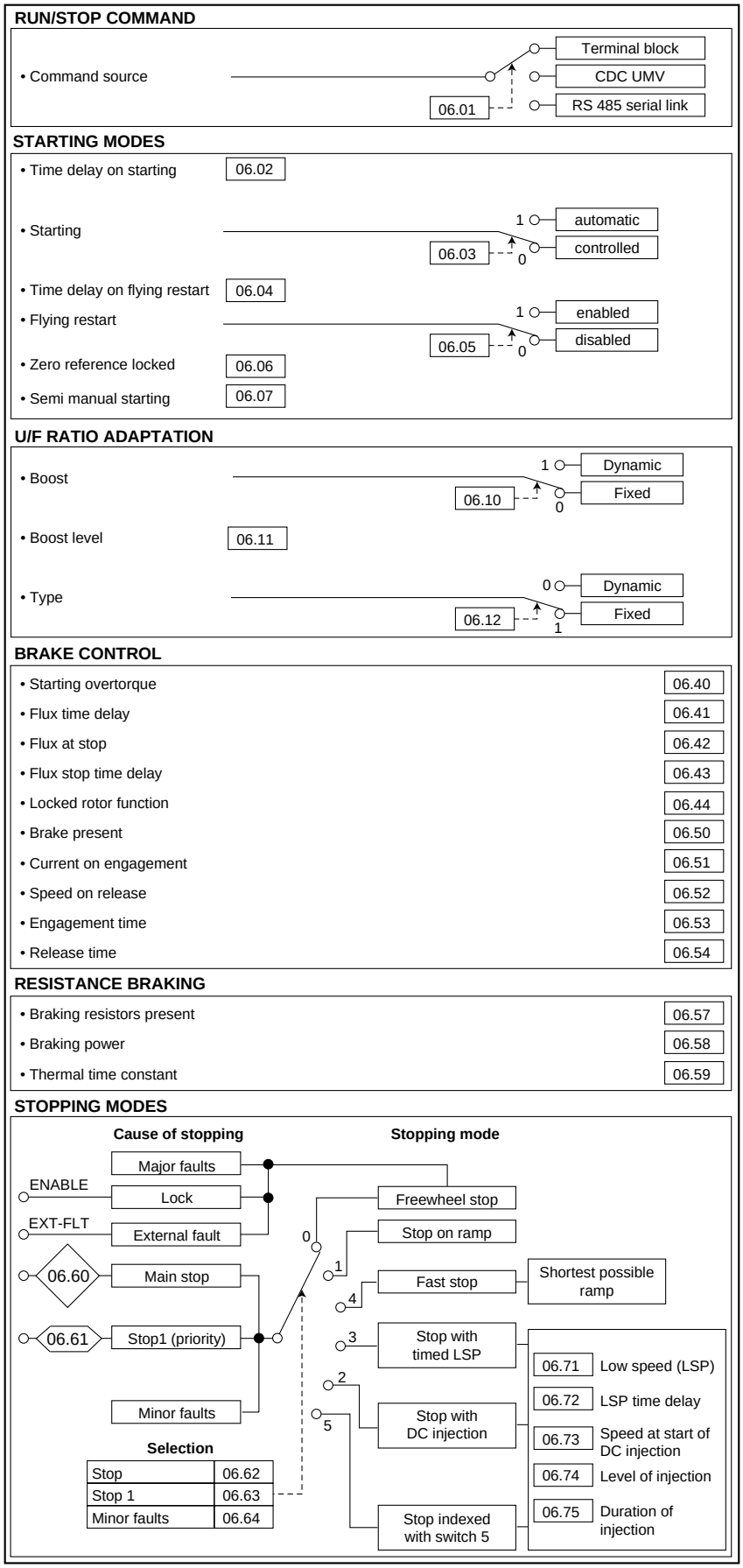
Range : 0 to 150 % In
Factory setting : 100 % In
Sets the level of DC current injected in the motor in order to stop it.

06.75 : Duration of DC injection

Range : 0 to 60s
Factory setting : 5s
Period during which the current defined in 06.74 is applied to the motor.



4.5.5.3 - Menu 06 block diagram



4.5.6 - Menu 07 : Analogue I/O

4.5.6.1 - List of menu 07 parameters

Parameter	Label	Type	Variation range	Factory setting
• Analogue inputs				
07.10	AI1 reading	R	± 100.00 %	-
07.11	AI1 offset	R - W	± 100.00 %	0
07.12	AI1 offset selection	R - W	Yes or No	No
07.13	AI1 minimum calibration	R - W	0 to 100.00 %	0
07.14	AI1 maximum calibration	R - W	0 to 100.00 %	100.00 %
07.15	AI1 input polarity	R - W	Single pole - 2-pole	2-pole
07.17	**AI1 100 % calibration**	**R - W**	**0 to 32000**	**1500**
07.18	AI1 final value	R	± 8192	-
07.19	AI1 destination	R - W	See table on next page	Speed no.1
07.20	AI2 reading	R	± 100 %	-
07.21	AI2 offset	R - W	± 100.0 %	0
07.22	AI2 offset selection	R - W	Yes or No	No
07.23	AI2 minimum calibration	R - W	0 to 100.0 %	0
07.24	AI2 maximum calibration	R - W	0 to 100.0 %	100.0 %
07.25	AI2 input polarity	R - W	Single pole - 2-pole	2-pole
07.27	**AI2 100 % calibration**	R - W	0 to 32000	100
07.28	AI2 final value	R	± 8192	-
07.29	**AI2 destination**	**R - W**	**See table on next page**	**None**
07.30	AI3 reading	R	0 to +100.0 %	-
07.33	**AI3 0 % calibration**	**R - W**	**0 to 32000**	**0**
07.34	**AI3 100 % calibration**	R - W	0 to 32000	1500
07.35	AI3 input inversion	R - W	Yes or No	No
07.36	**AI3 reference selection**	**R - W**	**0/10V - 0/20mA - 4/20mA**	**4/20 mA**
07.37	AI3 scaling	R	0 to 999.9	-
07.38	AI3 final value	R	± 8192	-
07.39	AI3 destination	R - W	See table on next page	Speed no. 2
07.40	AI4 reading (THERM)	R	0 to 100.0 %	-
07.41	Thermistor state	R	0 or 1	-
• Analogue outputs				
07.50	AO1 reading	R	± 100.0 %	-
07.51	AO1 signal conversion	R - W	Yes or No	No
07.52	**AO1 type selection**	**R - W**	**0 - 10V, 0 - 20mA, 4 - 20mA**	**4 - 20 mA**
07.53	**AO1 output filter**	**R - W**	**0 to 15**	**2**
07.57	**AO1 100 % calibration**	**R - W**	**0 to 32000**	**150**
07.59	AO1 signal source	R - W	See table on next page	Total motor current
07.60	AO2 reading	R	± 100.0 %	-
07.61	AO2 signal conversion	R - W	Yes or No	No
07.62	**AO2 type selection**	**R - W**	**0 - 10V, 0 - 20mA, 4 - 20mA**	**4 - 20 mA**
07.63	**AO2 output filter**	**R - W**	**0 to 15**	**2**
07.67	**AO2 100 % calibration**	**R - W**	**0 to 32000**	**1800**
07.69	AO2 signal source	R - W	See table on next page	Motor speed
07.70	Mains voltage	R	0 to 999V	-
07.80	DC bus voltage	R	0 to 1300V	-

Analog input destinations list (07.19, 07.29, 07.39)

Parameter	Label	Parameter	Label
-	None	05.02	Current limit time threshold
02.11	Speed reference 1	05.12	Alarm 1 threshold
02.12	Speed reference 2	05.22	Alarm 2 threshold
02.13	Additional speed reference	05.32	Alarm 3 threshold
02.40	Jogging reference	05.42	Alarm 4 threshold
02.83	Speed limiting	07.17	AI1 scaling
03.03	Additional reference without ramp	07.27	AI2 scaling
03.10	Main ramp 1	10.06	Mains undervoltage threshold
03.30	Main ramp n°3	12.12	Variable threshold 1
04.10	Torque reference	12.22	Variable threshold 2
04.13	Torque offset	14.10	PID reference
04.34	Torque limit 1 in motor mode	14.30	PID feedback
04.36	Torque 2 limiting	14.45	PID limit
04.37	Torque limit 1 in generator mode	14.49	PID additionnal reference
04.69	Motor speed adaptation threshold	16.02	DC bus reference

Analog output sources list (07.59 and 07.69)

Parameter	Label	Parameter	Label
-	None	07.10	AI1 reading (%)
02.01	Speed reference before ramp	07.18	AI1 final value
02.80	Reference before limiting	07.20	AI2 reading (%)
03.01	Final speed reference	07.28	AI2 final value
04.01	Motor speed	07.30	AI3 reading (%)
04.02	Speed error	07.38	AI3 final value
04.06	Speed reached error	07.40	AI4 reading (%)
04.20	Final torque reference	07.70	Mains voltage
04.40	Active current reference	07.80	DC bus voltage
04.42	Total motor current	10.70	Motor use
04.44	Active motor current	10.75	Controller use
04.50	Motor torque	10.80	Braking resistor use
04.60	Motor frequency	14.01	PID output reading
04.70	Motor voltage	14.20	PID final reference
04.80	Motor active power	14.30	PID feedback
04.81	Energy 1 (MW.h)	14.40	PID error
04.82	Energy 2 (KW.h)	15.10	Customer torque
04.90	Encoder frequency	16.06	Voltage error
04.92	Remanent frequency		

4.5.6.2 - Menu 07 parameters

07.10 and **07.20** **: AI1 - AI2 reading**

Range : 07.10 : ± 100.00 %
07.20 : ± 100.0 %
Used to read the corresponding analogue input.

07.11 and **07.21** **: AI1 - AI2 offset**

Range : 07.11 : ± 100.00 %
07.21 : ± 100.0 %
Factory setting : 0
Modifies the reference value when the offset is selected (07.12 or 07.22 = Yes).

07.12 and **07.22** **: AI1 - AI2 offset selection**

Range : Yes or No
Factory setting : No
Yes : the offset (07.11 or 07.21) is added to the value of the analogue input (07.10 or 07.20).
No : the reference is not modified before calibration.

07.13 and **07.23** **: AI1 - AI2 minimum calibration**

Range : 07.13 : 0 to 100.00 %
07.23 : 0 to 100.0 %
Factory setting : 0
Limits the minimum value of the analogue input (AI1 or AI2) associated with its offset.
Minimum calibration is inhibited when 07.15 or 07.25 = 2-pole.

07.14 and **07.24** **: AI1 - AI2 maximum calibration**

Range : 07.14 : 0 to 100.00 %
07.24 : 0 to 100.0 %
Factory setting : 07.14 : 100.00 %
07.24 : 100.0 %
Limits the maximum value of analogue input AI1 or AI2 associated with its offset.

07.15 and **07.25** **: AI1 - AI2 input polarity**

Range : Single pole - 2-pole
Factory setting : 2-pole
Single pole : only a positive reference is taken into account. A negative reference is treated as a zero reference.
2-pole : the reference can be positive or negative. In this case, a minimum calibration cannot be applied to the reference.

⚠ **• If inputs AI1 and AI2 are selected in 2-pole mode, the minimum speeds 02.81 and 02.82 must be left at 0.**

07.17 and **07.27** **: AI1 and AI2 100 % calibration**

Range : 0 to 32000
Factory setting : 07.17 : 1500
07.27 : 100
For setting the value corresponding to 100 % on the analogue input.

07.18 and **07.28** **: AI1 - AI2 final value**

Range : ± 8192
This is the reading of the value of the AI1 or AI2 signal after processing (offset, calibration, scaling) which will be assigned via 07.19 or 07.29.

07.19 and **07.29** **: AI1 - AI2 destination**

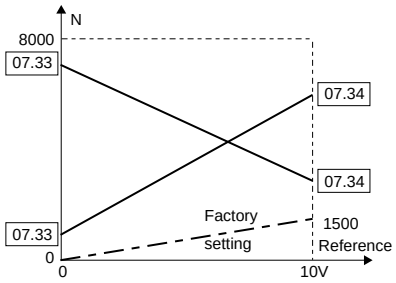
Range : See table in section 4.5.6.1
Factory setting : 07.19 = speed reference 1
07.29 = none
Selects the destination of analogue input AI1 or AI2.

07.30 **: AI3 reading**

Range : 0 to 100.0 %
Is used to read input AI3.

07.33 **: AI3 0 % calibration**

Range : 0 to 32000
Factory setting : 0
Is used to give 0 % any value from 0 to 8000. The value set depends on the assignment of 07.39.



07.34 **: AI3 100 % calibration**

Range : 0 to 32000
Factory setting : 1500
Is used to give 100 % any value from 0 to 8000. The value set depends on the assignment of 07.39.

07.35 **: AI3 input inversion**

Range : Yes or No
Factory setting : No
Yes : multiplies the value of input AI3 by -1.
No : the polarity of the reference is unchanged.

07.36 **: AI3 reference selection**

Range : 0-10V, 0-20mA, 4-20mA
Factory setting : 4-20mA
Selection according to the type of signal at input AI3.

07.37 **: AI3 scaling**

Range : 0 to 999.9
Scaling coefficient on input AI3 as a function of the calibration of 07.33 and 07.34.

07.38 **: AI3 final value**

Range : ± 8192
This is the reading of the value of the AI3 signal after processing (calibration, inversion).

07.39 **: AI3 destination**
Range : See assignment table in section 4.5.6.1
Factory setting : Speed reference no. 2.
Selects the destination of input AI3.

07.40 **: AI4 reading (THERM)**

Range : 0 to 100.0 %.
Is used to read input AI4 (motr probe).
See 01.30 and 10.10.

07.41 **: Thermistor state**

Range : 0 or 1
0 : the motor temperature is correct.
1 : the motor temperature is too high, the controller becomes faulty depending on the setting of 10.10.
Note : Up to 3 PTC probes can be managed.

07.50 and 07.60 **: AO1 - AO2 reading**

Range : ± 100.0 %
Is used to read analogue output AO1 or AO2.

07.51 and 07.61 **: AO1 and AO2 signal conversion**
Range : Yes or No
Factory setting : No
Yes : the 0 - 20 mA and 4 - 20 mA signals are inverted. 0 % as an input gives 20mA as an output, and 100 % as an input gives 0 or 4 mA as an output.
No : the 0 - 20 mA and 4 - 20 mA signals are not inverted.

07.52 and 07.62 **: AO1 - AO2 type selection**
Range : 0 - 10V, 0- 20mA, 4 - 20mA
Factory setting : 4 - 20mA
Selection of the signal supplied by the analogue output.
Note : The 4-20mA and 0-20mA signals can be inverted via 07.51 and 07.61.

07.53 and 07.63 **: AO1 - AO2 output filter**
Range : 0 to 15
Factory setting : 2
Applies a filter to the analog outputs in order to reduce the noise.

07.57 and 07.67 **: AO1 - AO2 100 % calibration**
Range : 0 to 32000
Factory setting : AO1 : 150, AO2 : 1800
Scaling of the signal selected via the source 07.59 or 07.69.

07.59 and 07.69 **: AO1 - AO2 source**
Range : see assignment table in section 4.5.6.1
Factory setting : 07.59 = motor current
07.69 = motor speed
Selects the source of the signal destined for analogue signal AO1 or AO2.

07.70 **: Mains voltage**

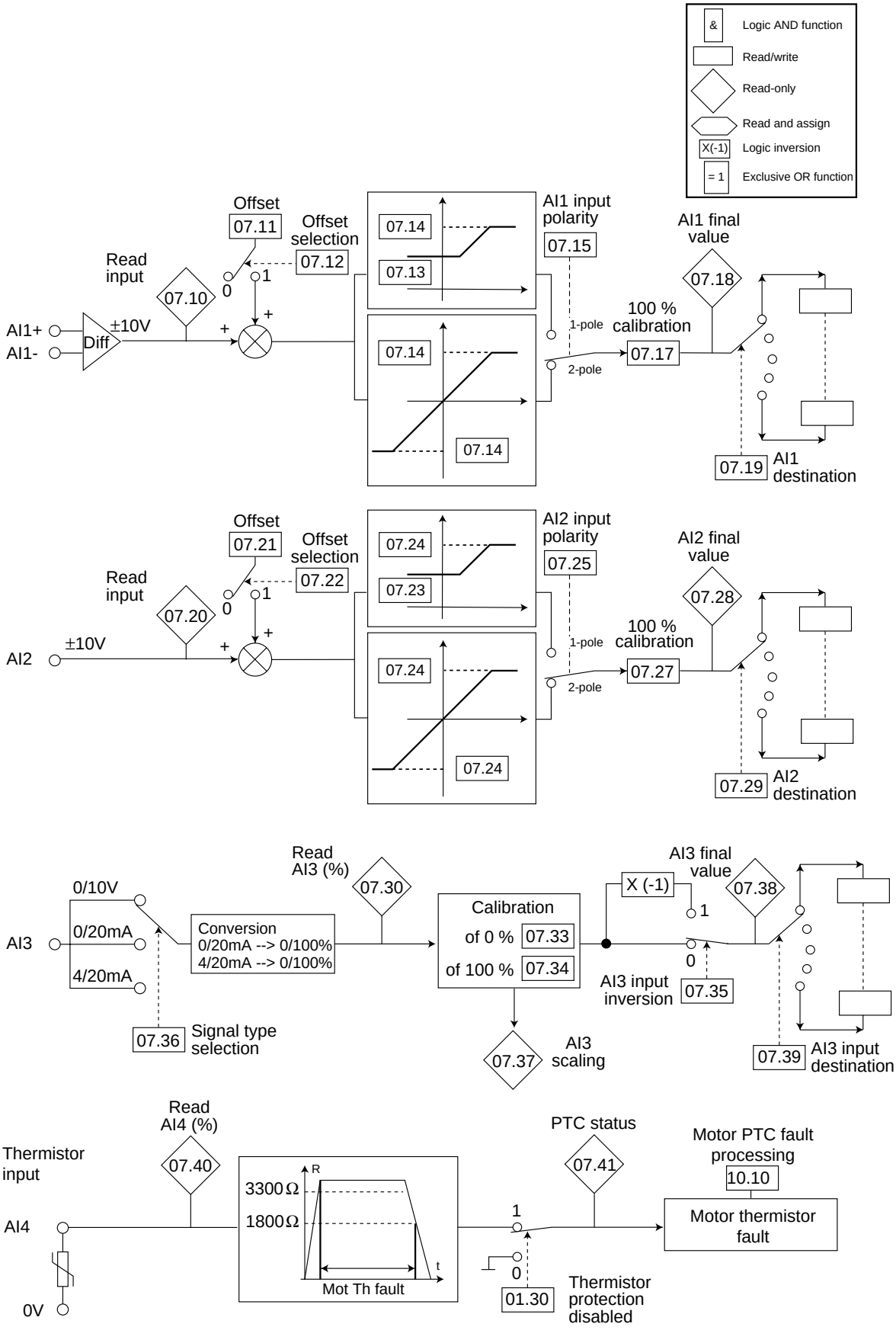
Range : 0 to 999V
Measurement of the voltage at the controller input.

07.80 **: DC bus voltage**

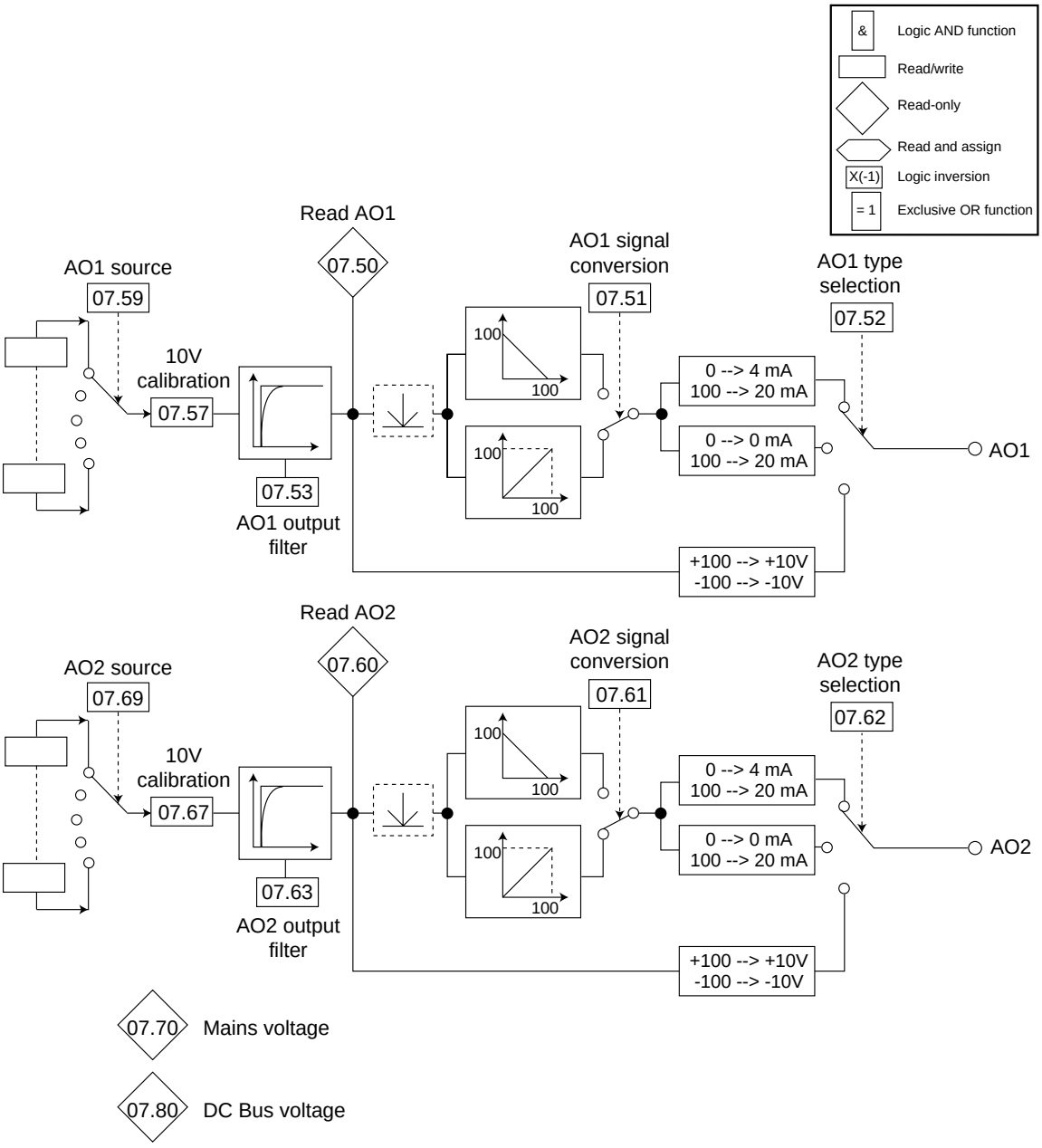
Range : 0 to 1300V
Measurement of the voltage on the DC bus between the rectifier and the inverter.

NOTES

4.5.6.3 - Menu 07 block diagram (1)



4.5.6.3 - Menu 07 block diagram (2)



NOTES

4.5.7 - Menu 08 : Logic inputs

4.5.7.1 - List of menu 08 parameters

Parameter	Label	Type	Variation range	Factory setting
08.10	DI1 logic input state	R	0 or 1	-
08.11	DI1 destination	R - W	See table	Select 1PS
08.12	DI1 input inversion	R - W	Yes or No	No
08.20	DI2 logic input state	R	0 or 1	-
08.21	DI2 destination	R - W	See table	Select 3PS
08.22	DI2 input inversion	R - W	Yes or No	No
08.30	DI3 logic input state	R	0 or 1	-
08.31	DI3 destination	R - W	See table	Stop 1
08.32	DI3 input inversion	R - W	Yes or No	No
08.40	DI4 logic input state	R	0 or 1	-
08.41	DI4 destination	R - W	See table	Select ref. N1-N2
08.42	DI4 input inversion	R - W	Yes or No	No
08.50	DI5 logic input state	R	0 or 1	-
08.51	DI5 logic destination	R - W	See table	Ramp locking
08.52	DI5 input inversion	R - W	Yes or No	No
08.60	REV logic input state	R	0 or 1	-
08.61	REV input destination	R - W	See table	Reverse/Stop
08.62	REV input inversion	R - W	Yes or No	No
08.70	FWD logic input state	R	0 or 1	-
08.75	ENABLE input state	R	0 or 1	-
08.80	RESET input state	R	0 or 1	-
08.90	External fault (EXT-FLT) input state	R	0 or 1	-
08.95	Type of logic	R	0 or 1	-

Destination of logic inputs (08.11, 08.21, 08.31, 08.41, 08.51 et 08.61)

Parameter	Label	Parameter	Label
-	None	04.11	Speed / Torque control
02.02	Speed reference source	04.12	Zero torque selection
02.03	RS 485 enabled	04.14	Torque offset selection
02.14	Ref. No.1 - ref. No. 2 selection	04.33	Limit 1 or limit 2 enable
02.15	Summing selection	04.46	Energy saver
02.17	1PS selection state	06.42	Flux at stop
02.18	3PS selection state	06.61	Stop command 1
02.19	7PS selection state	07.12	AI1 offset selection
02.31	Faster function	07.22	AI2 offset selection
02.32	Slower function	07.35	AI3 input inversion
02.33	Faster/slower enabled	13.11	Inhibit MODBUS control
02.43	Jogging	14.17	1 RP PID selection
02.70	Forward/Reverse	14.18	3 RP PID selection
03.05	S ramp selection	14.46	PID integral locking
03.07	Ramp locking	14.48	PID output summing
03.08	Ramp reset	14.50	PID enabled
03.17	1 ACCP selection	15.11	HSP authorisation
03.18	3 ACCP selection	15.16	Overspeed authorisation
03.37	1 DECP selection	15.22	LSP request
03.38	3 DECP selection	16.20	Preload contactor OK
03.50	Special ramp type	-	Reverse / Stop✶

✶ Only for 08.61.

4.5.7.2 -Menu 08 parameters

08.10 : DI1 logic input state

Range : 0 or 1
Reading of the state of logic input DI1.

08.11 : DI1 destination
Range : See table in section 4.5.7.1
Factory setting : 1 PS selected (02.17)
Selects the destination of logic input DI1.

08.12 : DI1 input inversion
Range : Yes or No
Factory setting : Yes
No : the input is enabled by a logic 1.
Yes : the input is enabled by a logic 0.

08.20 , **08.21** and **08.22** **: DI2 logic input**

Operation identical to DI1. Assigned to 3PS selection (02.18).

08.30 , **08.31** and **08.32** **: DI3 logic input**

Operation identical to DI1. Assigned to Stop 1 (06.61).

08.40 , **08.41** and **08.42** **: DI4 logic input**

Operation identical to DI1. Assigned to Reference N1 - N2 selection (02.14).

08.50 : DI5 logic input state

Range : 0 or 1
Reading of the state of logic input DI5.

08.51 : DI5 logic destination
Range : See table in section 4.5.7.1
Factory setting : Locking of ramps (03.07)
When DI5 is a logic input (08.58 = logic input), 08.51 selects the function of this input.

08.52 : DI5 input inversion
Range : Yes or No
Factory setting : No
No : logic input DI5 is enabled by a logic 1.
Yes : logic input DI5 is enabled by a logic 0.

08.60 : REV logic input state

Range : 0 or 1
1 : the REV input is activated .

08.61 : REV input destination
Range : See table in section 4.5.7.1
Factory setting : Reverse / Stop
Selections the function of the REV input.

08.62 : REV input inversion
Range : Yes or No
Factory setting : No
Yes : the logic state of the REV input is inverted.
No : the logic state of the REV input is unchanged.

08.70 : FWD logic input state

Range : 0 or 1
1 : the FWD input is activated.

08.75 : ENABLE input state

Range : 0 or 1
1 : the ENABLE input is enabled.

08.80 : RESET logic input state

Range : 0 or 1
1 : the RESET input is activated.

08.90 : External fault (EXT-FLT) input state

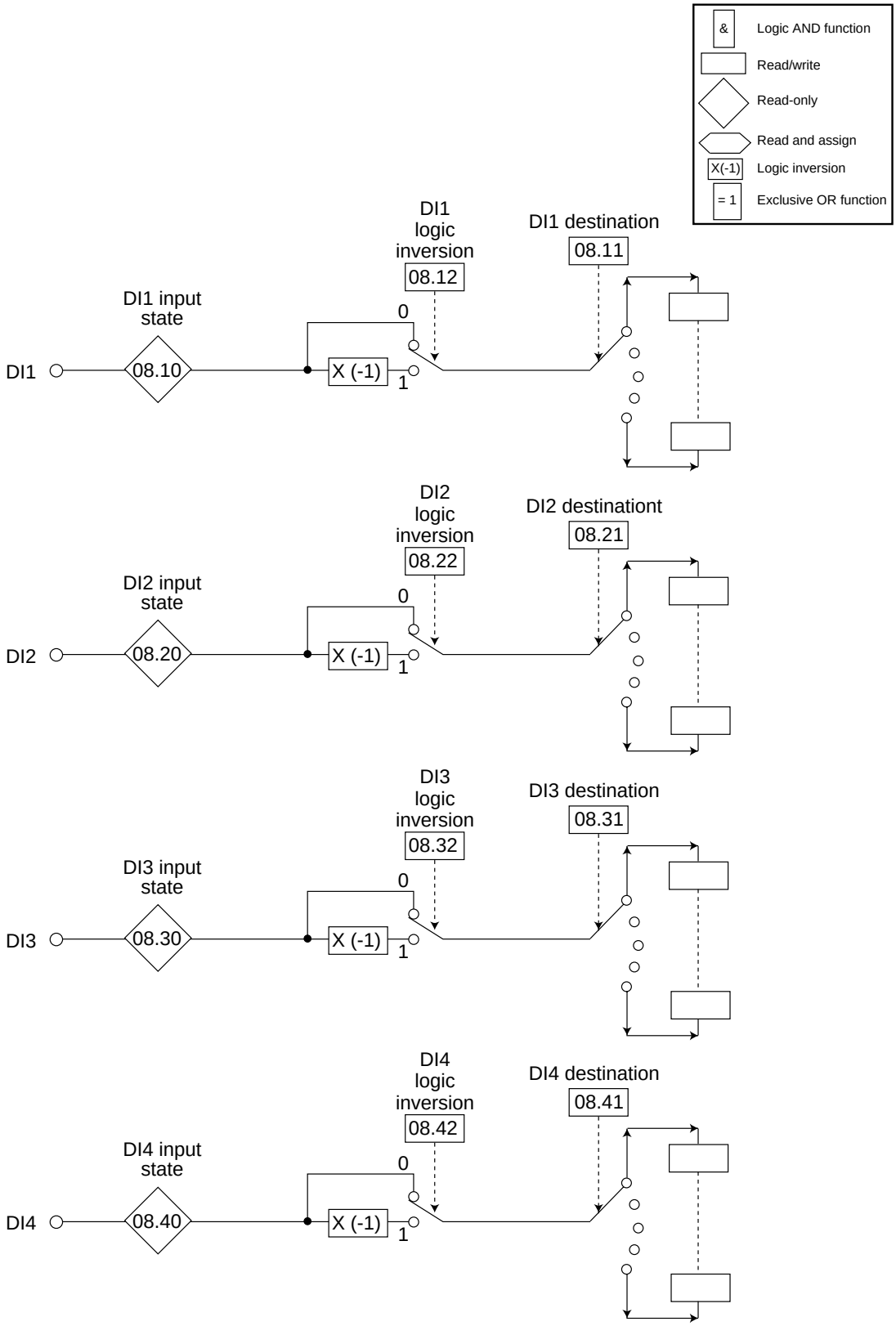
Range : 0 or 1
1 : the EXT-FLT input is activated.

08.95 : Type of logic

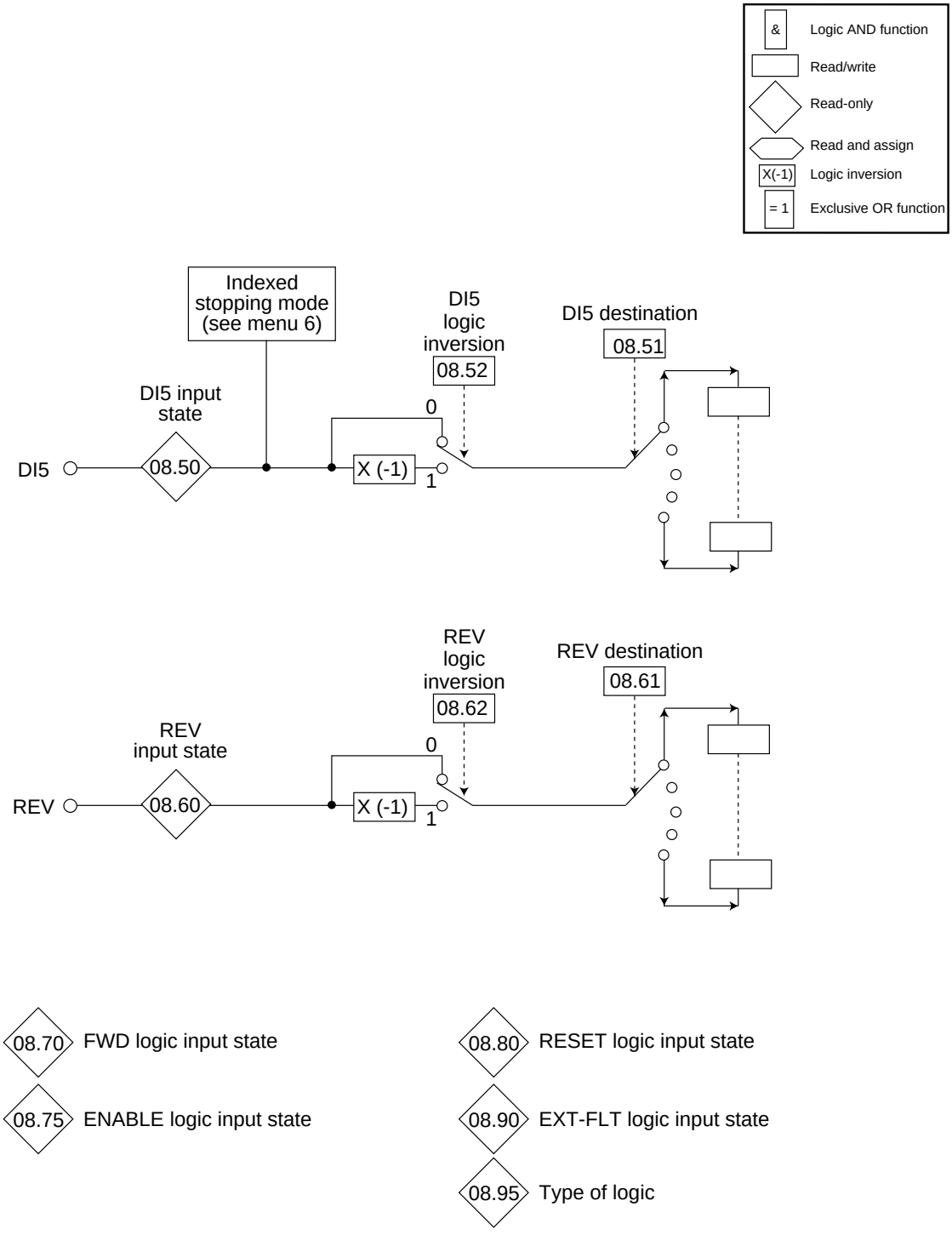
Range : 0 or 1
0 : negative logic control (P6 position 1).
1 : positive logic control (P6 position 2).
P6 is a jumper located on the PID control card.

NOTES

4.5.7.3 - Menu 08 block diagram (1)



4.5.7.3 - Menu 08 block diagram (2)



NOTES

4.5.8 - Menu 09 : Relays and programmable logic outputs

4.5.8.1 - List of menu 09 parameters

Parameter	Label	Type	Variation range	Factory setting
• Relay				
09.10	RL1 relay status	R	Open or Closed	-
09.11	RL1 source 1	R - W	See table	Alarm 1 state
09.12	RL1 source 1 inverted	R - W	Yes or No	No
09.13	RL1 source 2	R - W	See table	No assignment
09.14	RL1 source 2 inverted	R - W	Yes or No	No
09.15	RL1 relay inverted	R - W	Yes or No	Yes
09.16	RL1 relay time delay	R - W	0 to 25.5s	2 s
09.17	RL1 relay selection	R - W	Single source or Combination	Single source
09.20	RL2 relay status	R	Open or Closed	-
09.21	RL2 source 1	R - W	See table	UMV 3301 output
09.22	RL2 source 1 inverted	R - W	Yes or No	No
09.23	RL2 source 2	R - W	See table	No assignment
09.24	RL2 source 2 inverted	R - W	Yes or No	No
09.25	RL2 relay inverted	R - W	Yes or No	No
09.26	RL2 relay time delay	R - W	0 to 25.5s	2.0 s
09.27	RL2 relay selection	R - W	Single source or Combination	Single source
• Logic outputs				
09.30	DO1 logic output state	R	0 or 1	-
09.31	DO1 source	R - W	See table	I limit reached
09.32	DO1 source inverted	R - W	Yes or No	No
09.36	DO1 output time delay	R - W	0 to 25.5s	2.0 s
09.40	DO2 logic output state	R	0 or 1	-
09.41	DO2 source	R - W	See table	UMV fault
09.42	DO2 source inverted	R - W	Yes or No	Yes
09.46	DO2 output time delay	R - W	0 to 25.5s	2.0 s
09.50	DO3 logic output state	R	0 or 1	-
09.51	DO3 logic information source	R - W	See table	Alarm 2 state
09.52	DO3 source inversion	R - W	Yes or No	No
09.56	DO3 output time delay	R - W	0 to 25.5s	2.0 s

Sources and assignment of relays and logic outputs (09.11, 09.13, 09.21, 09.23, 09.31, 09.41,09.51)

Parameter	Label	Parameter	Label
-	No assignment	10.43	Alarm 3 active
02.90	Speed skip present	10.44	Alarm 4 active
05.54	Alarm 5 active	10.45	Clockwise direction
05.57	Alarm 6 active	10.46	Anti-clockwise direction
07.41	Thermistor state	10.47	I limit reached
08.90	External fault	10.48	DC bus limit reached
10.32	UMV fault	10.49	In-rush contactor control
10.33	UMV output	10.51	Brake control
10.34	Minor fault	10.61	Timed low speed
10.35	Major fault	10.62	End of indexing
10.38	Motor operation	10.63	Zero speed
10.39	Generator operation	12.01	Exceeds threshold 1
10.40	Time in I limit	12.02	Exceeds threshold 2
10.41	Alarm 1 active	14.53	PID status
10.42	Alarm 2 active	15.12	Weighing alarm
		16.12	Network synchronisation OK

Parameter	Label	Parameter	Label
-	Bus overvoltage	-	Mains over V
-	Overcurrent	-	Bus under V
-	I Imbalance	-	Motor TH
-	Controller Th.	-	Motor PTC probe
-	Resistor Th.	-	Direction/Rot
-	Int. power supp	-	Motor phase
-	Processor	-	RS 485 link
-	Encoder	-	CDC - UMV
-	Encoder loss	-	4/20mA loss
-	Processor opt 1	-	Alarm 1 active
-	Processor opt 2	-	Alarm 2 active
-	External	-	Alarm 3 active
-	Mains failure	-	Alarm 4 active
-	Phase missing	-	IGBT
-	Mains under V	-	I limit time
		-	Overspeed

4.5.8.2 - Menu 09 parameters

❖ Function planned for a future software upgrade.

◇09.10◇ and ◇09.20◇ **: RL1 and RL2 relays status**

Range : Open or Closed
Reads the status of relay RL1 and RL2.

09.11 and 09.21 **: RL1 and RL2 source 1**

Range : See table in section 4.5.8.1
Factory setting : Alarm 1 active (10.41)
Selects logic source 1 for RL1 and RL2.

09.12 and 09.22 **: RL1 and RL2 source 1 inverted**

Range : Yes or No
Factory setting : No
Yes : the logic state of the parameter selected in 09.11 is inverted.
No : rhe logic state of the parameter selected in 09.11 is not inverted.

09.13 and 09.23 **: RL1 and RL2 source 2**

Range : See table in section 4.5.8.1
Factory setting : No assignment
Selects the various logic sources of input 2 for RL1. This source will only be used for combination (AND function) with source 1. If there is no logic combination, source 1 will be used on its own.

09.14 and 09.24 **: RL1 and RL2 source 2 inverted**

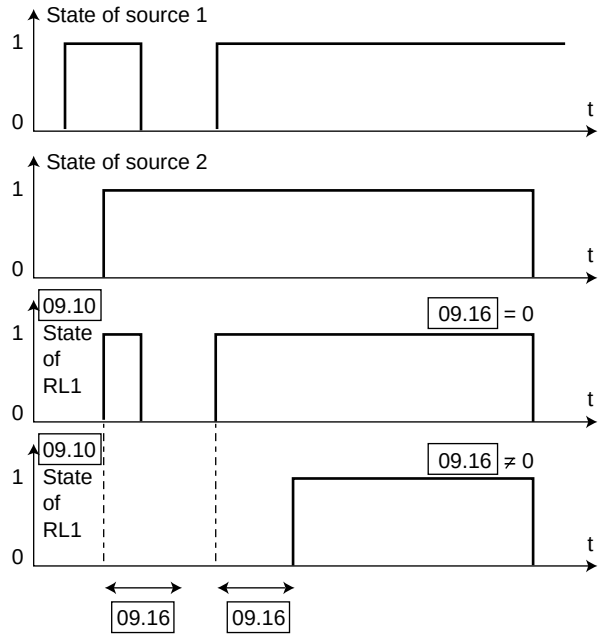
Range : Yes or No
Factory setting : No
Yes : the logic state of the parameter selected in 09.13 is inverted.
No : the logic state of the parameter selected in 09.13 is not inverted.

09.15 and 09.25 **: RL1 and RL2 relays inverted**

Range : Yes or No
Factory setting : Yes
Yes : the logic state after the time delay is inverted to give 09.10.
No : the logic state after the time delay is not inverted.

09.16 and 09.26 **: RL1 and RL2 relays time delay**

Range : 0 to 25.5s
Factory setting : 2.0s
On energisation, this is used to delay the action of source 1 or the combination of sources 1 and 2 on output RL1.



09.17 and 09.27 **: RL1 and RL2 relays selection**

Range : Single source or Combination
Factory setting : Single source
Single source : only logic data item 1 (09.11) is taken into account.
Combination : logic data items 1 (09.11) and 2 (09.13) are taken into account via a logic AND gate.

◇09.30◇ , ◇09.40◇ and ◇09.50◇ **: DO1 to DO3 logic outputs state**

Range : 0 or 1
Reads the state of logic output DO1 to DO3.

09.31 , 09.41 and 09.51 **: DO1 to DO3 sources**

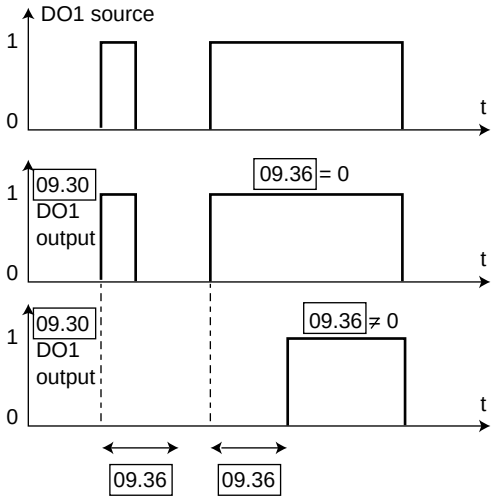
Range : See table 4.5.8.1
Factory setting : I limit reached
Selects the logic source of DO1 to DO3.

09.32 , 09.42 and 09.52 **: DO1 to DO3 sources inverted**

Range : Yes or No
Factory setting : No
Yes : the logic state of the parameter selected in 09.31 is inverted.
No : the logic state of the parameter selected in 09.31 is not inverted.

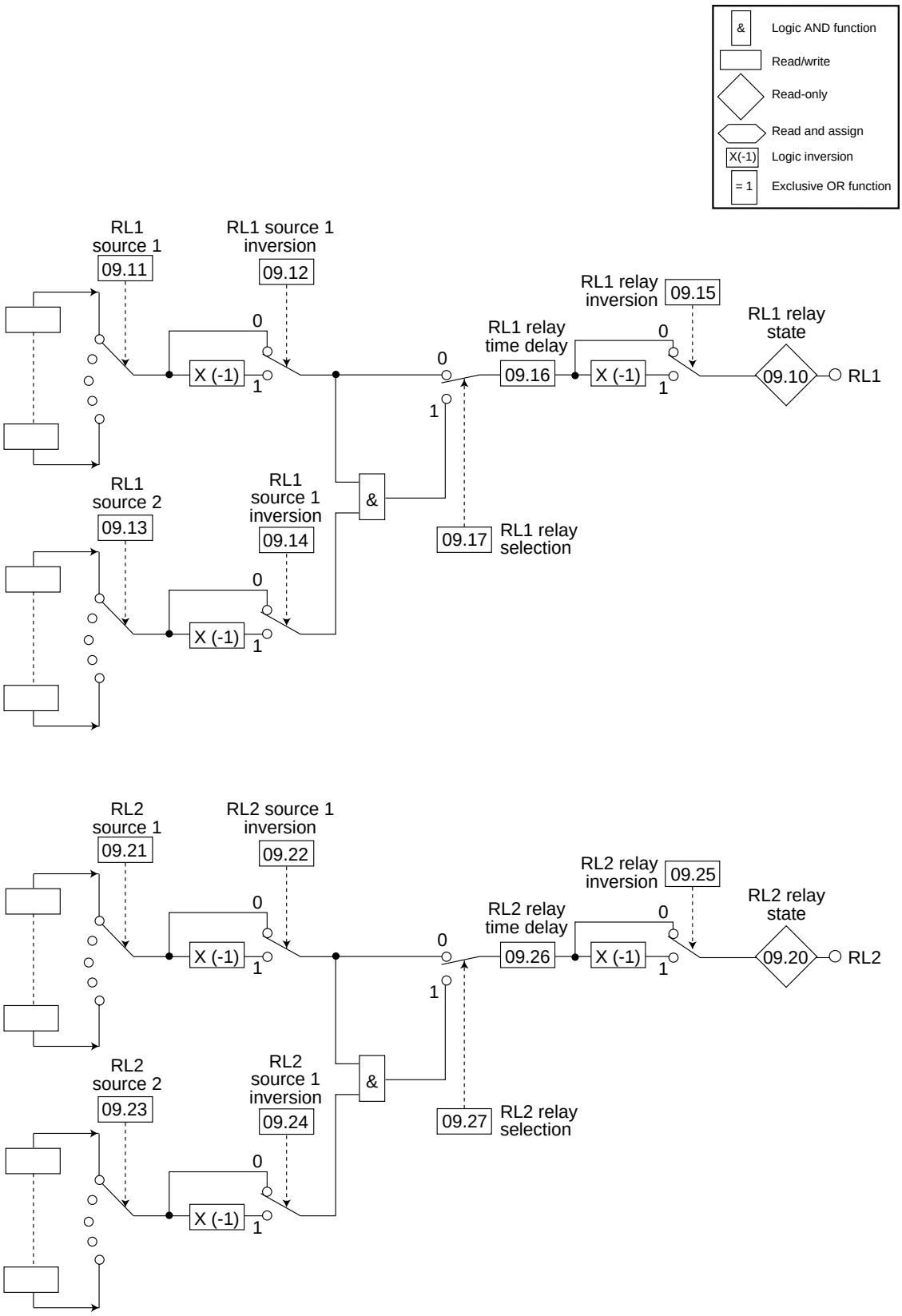
09.36 , **09.46** and **09.56** : **DO1 to DO3 output time delay**

Range : 0 to 25.5s
Factory setting : 2.0s
This is used to delay the action of the logic source of DO1 to DO3.

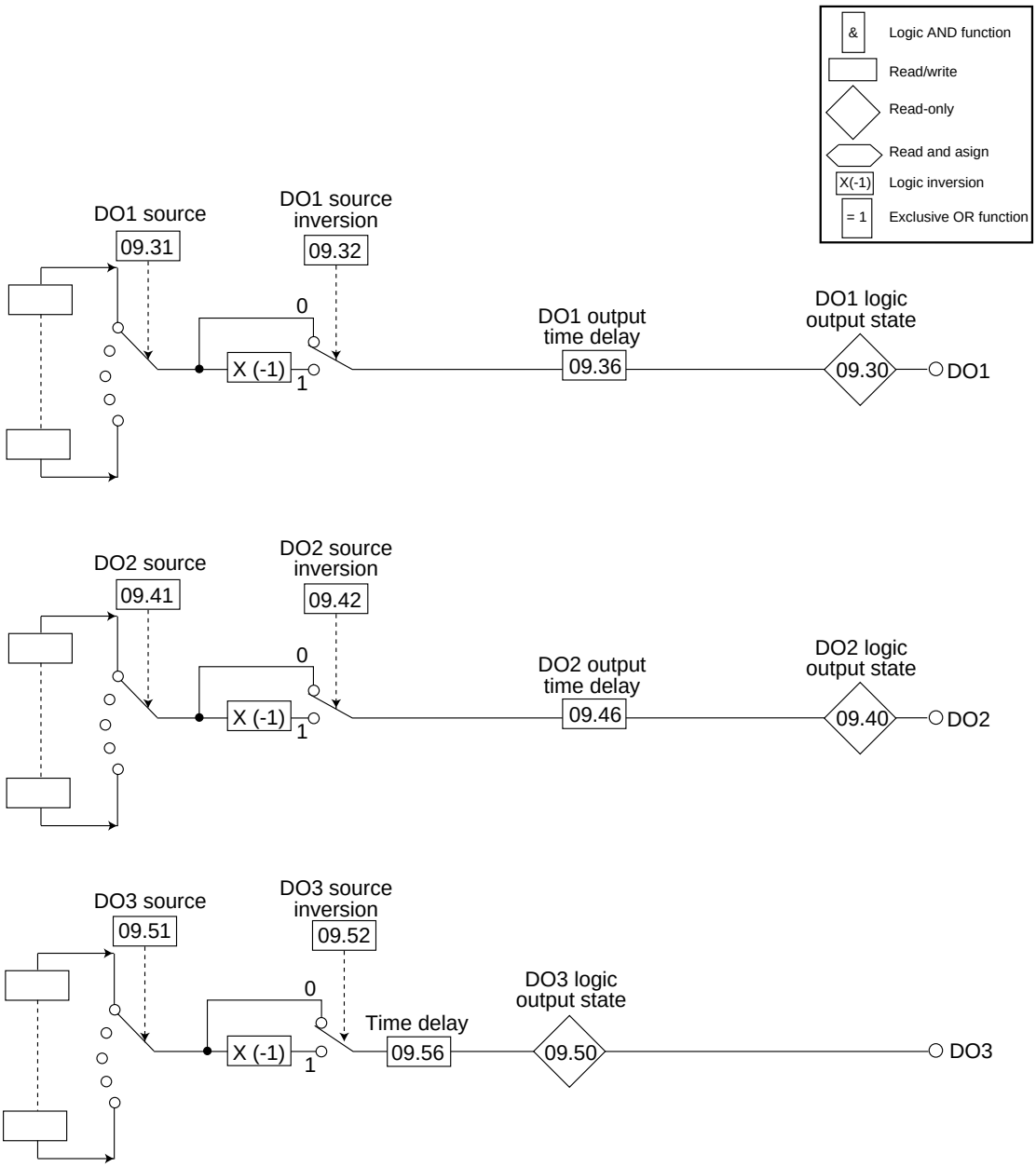


NOTES

4.5.8.3 - Menu 09 block diagram (1)



4.5.8.3 - Menu 09 block diagram (2)



NOTES

4.5.9 - Menu 10 : Drive system states

4.5.9.1 - List of menu 10 parameters

Parameter	Label	Type	Variation range	Factory setting
• Fault reset				
10.01	Reset origin	R - W	Terminal block, CDC - UMV, RS 485, Terminal block + CDC - UMV + RS 485	Terminal block + CDC-UMV + RS 485
10.02	**Reset mode**	**R - W**	**Controlled or Automatic**	**Controlled**
10.03	Number of authorised resets	R - W	0 to 3	3
10.04	Automatic reset time delay	R - W	0 to 25.5 s	10.0 s
• Fault management				
10.05	Mains fault	R - W	Disabled - Minor fault - Major fault	Major fault
10.06	**Mains undervoltage threshold**	**R - W**	**240V to 320V**	**300V**
10.07	**Mains fault time delay**	**R - W**	**0 to 20.00s**	**0.50 s**
10.09	Motor thermal fault	R - W	Disabled - Minor fault - Major fault	Minor fault
10.10	Motor PTC fault	R - W	Minor fault or Major fault	Minor fault
10.11	RS 485 serial link fault	R - W	Disabled - Minor fault - Major fault	Minor fault
10.12	CDC - UMV fault	R - W	Disabled or Minor fault	Disabled
10.13	4 - 20mA break processing	R - W	Disabled - Minor fault - Major fault	Disabled
10.15	Monitoring direction of rotation	R - W	Disabled - Minor fault - Major fault	Disabled
10.16	Motor phase break	R - W	Disabled - Minor fault - Major fault	Disabled
10.20	Current limit time	R - W	Disabled - Minor fault - Major fault	Disabled
10.21	Alarm 1 destination	R - W	Disabled - Minor fault - Major fault	Disabled
10.22	Alarm 2 destination	R - W	Disabled - Minor fault - Major fault	Disabled
10.23	Alarm 3 destination	R - W	Disabled - Minor fault - Major fault	Disabled
10.24	Alarm 4 destination	R - W	Disabled - Minor fault - Major fault	Disabled
• Application status				
10.31	Operating status	R	See list in section 4.1.2	-
10.32	General fault	R	No fault or Faulty	-
10.33	UMV 3301 output	R	Inhibited or Active	-
10.34	Minor fault	R	No fault or Faulty	-
10.35	Major fault	R	No fault or Faulty	-
10.38	Motor mode	R	Yes or No	-
10.39	Generator mode	R	Yes or No	-
10.40	Current limit time reached	R	Yes or No	-
10.41	Alarm 1 active	R	Yes or No	-
10.42	Alarm 2 active	R	Yes or No	-
10.43	Alarm 3 active	R	Yes or No	-
10.44	Alarm 4 active	R	Yes or No	-
10.45	Clockwise direction	R	Yes or No	-
10.46	Anti-clockwise direction	R	Yes or No	-
10.47	Current limit reached	R	Yes or No	-
10.48	Bus voltage limit reached	R	Yes or No	-
10.49	In-rush contactor control	R	Yes or No	-

4.5.9.1 - List of menu 10 parameters (continued)

Parameter	Label	Type	Variation range	Factory setting
• Braking				
10.51	Brake control	R	Yes or No	-
10.61	Timed low speed	R	Not reached or Reached	-
10.62	Indexing completed	R	Yes or No	-
10.63	Zero speed	R	Yes or No	-
• Level of use				
10.70	Motor use	R	0 to 150 %	-
10.75	Controller use	R	0 to 150 %	-
10.80	Braking resistor use	R	0 to 150 %	-
• 10 last faults stored				
10.90	Fault - 9	R	See list	-
10.91	Fault - 8	R	See list	-
10.92	Fault - 7	R	See list	-
10.93	Fault - 6	R	See list	-
10.94	Fault - 5	R	See list	-
10.95	Fault - 4	R	See list	-
10.96	Fault - 3	R	See list	-
10.97	Fault - 2	R	See list	-
10.98	Fault - 1	R	See list	-
10.99	Fault - 0	R	See list	-

List of faults read from 10.90 to 10.99

Label	Label
Bus overvoltage	Bus undervoltage
Overcurrent	Motor thermal
Current imbalance *	Motor PTC probe
Controller thermal	RS 485 link
Resistor thermal	CDC - UMV
Internal power supply	4 - 20mA break
Processor	Alarm 1 active
Encoder	Alarm 2 active
Encoder break	Alarm 3 active
Processor option 1	Alarm 4 active
Processor option 2	Overspeed
External	Current limit time
Mains failure	Ramp following
Phase missing	IGBT
Mains undervoltage	Direction of rotation error
Mains overvoltage	Motor phase break
	None

* From 180T rating upwards.

4.5.9.2 - Menu 10 parameters

10.01 : Reset origin
Range : Terminal block - CDC-UMV, RS 485
Terminal block or CDC-UMV or RS 485
Factory setting : Terminal block or CDC-UMV or RS 485
This is used to locate the position at which the manual fault reset is to be performed.

10.02 : Reset mode
Range : Controlled or Automatic
Factory setting : Controlled
Automatic : if a run command is present, the motor restarts without external intervention. If the fault persists, the controller will perform the number of resets selected in 10.03 before locking.
Controlled : the reset must be performed manually at the location selected in 10.01.

Note : It is helpful to set 10.02 = Automatic, so that the run command does not have to be switched.

10.03 : Number of authorised resets
Range : 0 to 3
Factory setting : 3
Limits the number of fault reset attempts (see 10.02). If, after a period of 5 min, no fault occurs, the number of attempts is incremented by 1 within the limit of 10.03.

10.04 : Time delay before reset
Range : 0 to 25.5s
Factory setting : 10.0s
Is used to set the period between triggering of the fault and the automatic reset request.

10.05 : Mains fault
Range : Disabled - Minor fault - Major fault
Factory setting : Major fault
This is used to select the importance or the impact of a mains fault according to the application. See 10.06 Detection threshold.
Disabled : the fault is detected, but has no consequences.
Minor fault : the fault causes a stop according to the selection made in 06.64.
Major fault : the fault causes a freewheel stop.
See parameter 10.07.

10.06 : Mains undervoltage threshold
Range : 240 to 320V
Factory setting : 300V
Sets the mains voltage level for which the controller will detect an undervoltage fault.

10.07 : Time delay before mains fault
Range : 0 to 20.00s
Factory setting : 0.50s
Is used to delay the action of a « mains fault ».
See parameter 10.05.

10.09 : Motor thermal fault
Range : Disabled - Minor fault - Major fault
Factory setting : Minor fault
This is used to select the importance or the impact of a motor thermal fault. See 10.05.

10.10 : Motor PTC fault
Range : Minor fault or Major fault
Factory setting : Minor fault
This is used to select the importance or the impact of a PTC fault (up to 3 PTCs in series). See 10.05.

10.11 : Serial link fault
Range : Disabled - Minor fault - Major fault
Factory setting : Minor fault
This is used to select the importance or the impact of a serial link fault. See 10.05.

10.12 : CDC - UMV fault
Range : Disabled or Minor fault
Factory setting : Disabled
Communication fault between the controller and the console. See 10.05.

10.13 : 4-20mA fault
Range : Disabled - Minor fault - Major fault
Factory setting : Disabled
This is used to select the importance or the impact of a 4/20mA analogue reference break fault. See 10.05.

10.15 : Monitoring the direction of rotation
Range : Disabled - Minor fault - Major fault
Factory setting : Disabled
Is used to cause a fault when the motor is not turning in the required direction. See the processing in 10.05.

10.16 : Motor phase break
Range : Disabled - Minor fault - Major fault
Factory setting : Disabled
Is used to monitor the connections between the motor and the controller. See the processing in 10.05.

10.20 : Current limit time processing
Range : Disabled - Minor fault - Major fault
Factory setting : Disabled
Processing of the fault detected by 10.40. See 10.05.

10.21 to 10.24 : Destination of alarms 1 to 4
Range : Disabled - Minor fault - Major fault
Factory setting : Disabled
The state of the 4 alarms in menu 5 may cause a fault whose impact is set here. See 10.05.

10.31 : Operating status
This is used to read the status of the controller when it is stopped or running. See list in section 4.1.2.

10.32 : General fault

Range : No fault or Faulty
Whatever the origin or type of a fault, 10.32 indicates whether or not a fault is present.

10.33 : UMV 3301 output

Range : Inhibited or Active
Inhibited : the controller does not supply any energy, because it has not received a command or is faulty.
Active : the controller supplies energy to the motor.

10.34 : Minor fault

Range : No fault or Faulty
Faulty : one of the faults (10.05 to 10.24) has been declared minor and has tripped.
No fault : no fault declared as minor has tripped.

10.35 : Major fault

Range : No fault or Faulty
Faulty : one of the faults (10.05 to 10.24) has been declared major and has tripped.
No fault : no fault declared as major has tripped.

10.38 : Motor mode

Range : Yes or No
Yes : the motor is driving the load. Operation is taking place in quadrant 1 or 3. In read mode, M is displayed.
No : the motor is stopped or in generator mode.

10.39 : Generator mode

Range : Yes or No
Yes : the motor is driving the load (braking inertia, etc). Operation is taking place in quadrant 2 or 4. In read mode, G is displayed.
No : the motor is stopped or in motor mode.

10.40 : Current limit time reached

Range : Yes or No
Yes : the current has been limited for longer than the time in 05.02, causing a fault according to 10.20.
No : the time set in 05.02 has not been reached.

10.41 to 10.44 : Alarm 1 to 4 active

Range : Yes or No
Yes : the corresponding alarm threshold has been reached (menu 5 level) and triggers a fault according to 10.21 to 10.24.
No : no alarm has been detected in menu 5.

10.45 : Clockwise direction

Range : Yes or No
Yes : the direction of rotation of the motor viewed from the shaft end is clockwise. In read mode, ↻ is displayed.
No : the motor is rotating anti-clockwise.

10.46 : Anti-clockwise direction

Range : Yes or No
Yes : the direction of rotation of the motor viewed from the shaft end is anti-clockwise. In read mode ↺ is displayed.
No : the motor is rotating clockwise.

10.47 : Current limit reached

Range : Yes or No
Yes : the current request is higher than current limit 04.30 when there is an overload or a transient. The controller is no longer in speed regulation and the overload integration is beginning to take effect.
No : limit 04.30 has not been reached.

10.48 : Bus voltage limit reached

Range : Yes or No
Yes : the DC bus voltage limit 04.71 has been reached because the load is driving the motor too fast (backdriving) or the deceleration is too fast.
No : the DC bus voltage remains below the value of 04.71.

10.49 : In-rush contactor control

Range : Yes or No
Yes : the DC bus in-rush contactor is energised.
No : the DC bus in-rush contactor is not energised.

10.51 : Brake control

Range : Yes or No
Yes : the electromechanical brake mounted on the motor or the application is controlled. See 06.50 to 06.54.
No : the brake is not controlled.

10.61 : Timed low speed

Range : Not reached or Reached
Reached : at a stop command, the motor speed has decreased to settle at the low speed set via 06.71 for the period set via 06.72.
Not reached : at a stop command, the motor is in the deceleration phase.

10.62 **: Indexing completed**

Range : Yes or No
Yes : at an indexed stop (in closed loop operation only) DI5 has issued the indexing completed data bit.
No : DI5 has not issued the indexing completed data bit.

10.63 **: Zero speed**

Range : Yes or No
Yes : the motor speed is close to zero (loop open) or at zero (loop closed).
No : the motor speed is other than zero.

10.70 **: Motor use**

Range : 0 to 150 %
Indicates the output power level supplied via the motor.

10.75 **: Controller use**

Range : 0 to 150 %
Indicates the level of stress on the controller.

10.80 **: Braking resistor use**

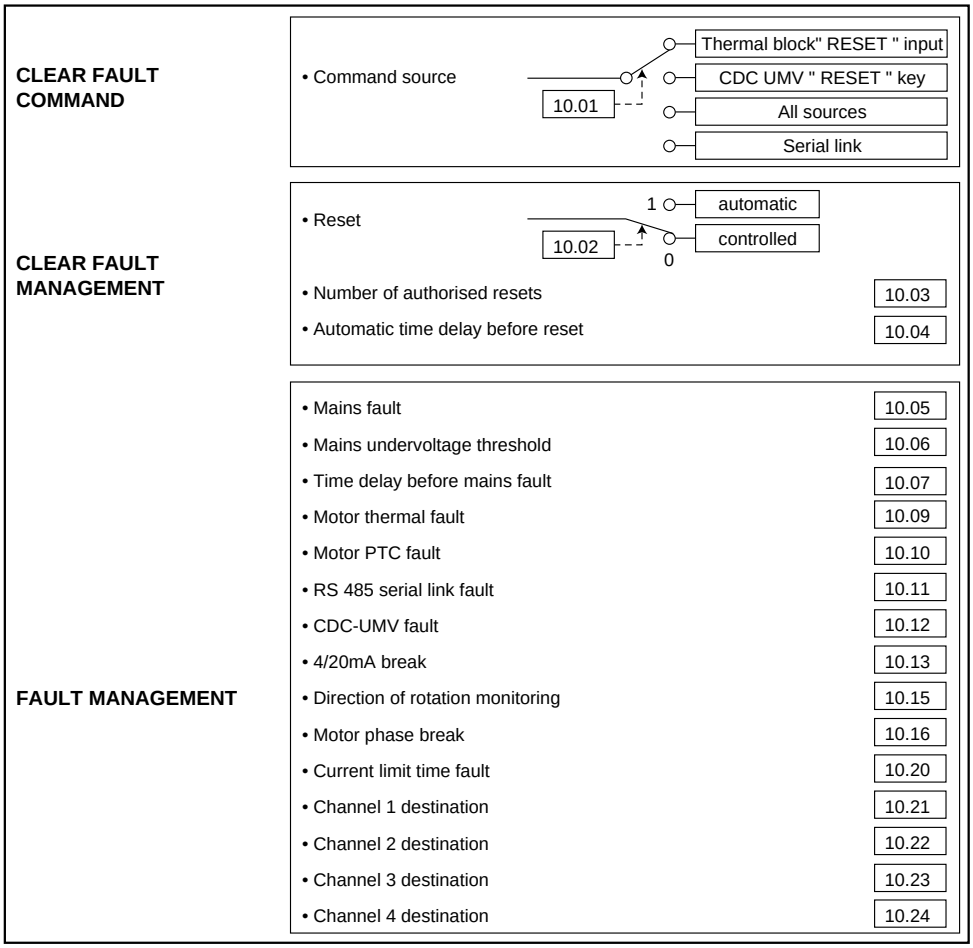
Range : 0 to 150 %
Indicates the level of stress on the optional braking resistor as a function of 06.58 and 06.59.

10.90 to 10.99 **: Reading the last 10 stored faults**

The faults are displayed as they appear from 10.90 to 10.99. The display is stored as long as there are no more than 10 faults. Then, as new faults appear, the oldest ones are deleted. The chronological order is always observed (eg. : 10.90 always displays the oldest fault, and 10.99 the most recent one stored).
See list of faults in section 4.5.9.1 and their meanings in section 5.2.

4.5.9.3 - Menu 10 block diagram (1)

FAULT PROCESSING



4.5.9.3 - Menu 10 block diagram (2)

SIGNALLING

APPLICATION STATUS

- Operating status 10.31
- General fault 10.32
- UMV 3301 output inhibited/active 10.33
- Minor fault 10.34
- Major fault 10.35
- Motor operating 10.38
- Generator operating 10.39
- Current limit time reached 10.40
- Channel 1 output state 10.41
- Channel 2 output state 10.42
- Channel 3 output state 10.43
- Channel 4 output state 10.44
- Clockwise operation 10.45
- Anti-clockwise operation 10.46
- Current limiting 10.47
- DC bus voltage limiting 10.48
- Control of preloading contractor 10.49

BRAKING

- Brake control 10.51
- Timed low speed 10.61
- Indexing completed 10.62
- Zero speed (<10 min $^{-1}$) 10.63

OPERATING RATE

- Motor(%) 10.70
- Speed controller (%) 10.75
- Braking resistor (%) 10.80

LAST 10 FAULTS MEMORIZED

- Last fault : 0 10.99
- Fault - 1 10.98
- Fault - 2 10.97
- Fault - 3 10.96
- Fault - 4 10.95
- Fault - 5 10.94
- Fault - 6 10.93
- Fault - 7 10.92
- Fault - 8 10.91
- Fault - 9 10.90

NOTES

4.5.10 - Menu 11 : User menu parameters

11.01 to 11.32

Range : 01.01 to 17.99.
Factory setting : see below.
The menu 11 parameters are used for programming parameters from any menu in the user menu.
With the factory setting, the most commonly used parameters are assigned in the user menu. For special applications, useful parameters can be assigned to the user menu via menu 11.
Eg. : If 11.04 = 14.41, the PID proportional gain (14.41) can be set in the user menu.

Factory setting of the menu 11 parameters

Parameter	Factory setting	
11.01	02.50	CDC - UMV speed reference
11.02	02.02	Speed reference source
11.03	06.01	Control source
11.04	06.03	Starting
11.05	10.02	Reset mode
11.06	06.05	Flying restart
11.07	10.06	Mains undervoltage threshold
11.08	10.07	Time delay before mains fault
11.09	07.17	AI1 100 % calibration
11.10	07.36	Selection of setpoint type on AI3
11.11	07.33	AI3 0 % calibration
11.12	07.34	Ana input 3 Remote scaling
11.13	02.21	PS1
11.14	02.22	PS2
11.15	02.23	PS3
11.16	02.81	Minimum limit
11.17	02.83	Maximum limit
11.18	02.91	Skip speed 1
11.19	02.94	Skip band 1
11.20	02.70	Forward/Reverse enabled
11.21	03.10	Acceleration ramp
11.22	03.30	Deceleration ramp
11.23	07.29	AI2 input destination
11.24	07.27	Ana input 2 Local scaling
11.25	04.36	Current limit
11.26	05.12	RL1 output minimum speed threshold
11.27	05.22	DO3 output maximum speed threshold
11.28	07.52	Type of AO1 output signal
11.29	07.57	Maximum current value on AO1
11.30	07.62	AO2 output signal type
11.31	07.67	AO2 output maximum speed value
11.32	04.04	Stability

NOTES

4.5.11 - Menu 12 : Programmable thresholds

4.5.11.1 - List of menu 12 parameters

Parameter	Label	Type	Variation range	Factory setting
12.01	Threshold No. 1 overshoot	R	Yes or No	-
12.02	Threshold No. 2 overshoot	R	Yes or No	-
12.11	Threshold No. 1 source	R - W	See table	04.01
12.12	Threshold No. 1 level	R - W	± 9999	9999
12.13	Threshold No. 1 hysteresis	R - W	2 to 255	2
12.14	Threshold No. 1 inversion	R - W	Yes or No	No
12.15	Threshold No. 1 destination	R - W	See table	None
12.21	Threshold No. 2 source	R - W	See table	04.01
12.22	Threshold No. 2 level	R - W	± 9999	9999
12.23	Threshold No. 2 hysteresis	R - W	2 to 255	2
12.24	Threshold No. 2 inversion	R - W	Yes or No	No
12.25	Threshold No. 2 destination	R - W	See table	None

Source of programmable thresholds (12.11, 12.21)

Parameter	Label	Parameter	Label
-	No assignment	07.10	AI1 reading (%)
02.01	Speed reference before ramp	07.18	AI1 final value
02.80	Reference before limiting	07.20	AI2 reading (%)
03.01	Final speed reference	07.28	AI2 final value
04.01	Speed measurement	07.30	AI3 reading (%)
04.02	Speed error	07.38	AI3 final value
04.06	Speed reachel error	07.40	AI4 reading (%)
04.20	Final torque reference	07.70	Motor voltage
04.40	Active current reference	07.80	Motor power
04.42	Total motor current	10.70	Motor use
04.44	Active motor current	10.75	Controller use
04.50	Motor torque	10.80	Braking resistor use
04.60	Motor frequency	14.01	PID output
04.70	Motor voltage	14.20	PID final reference
04.80	Motor power	14.30	PID feedback
04.81	Energy 1 (MW.h)	14.40	PID error
04.82	Energy 2 (KW.h)	15.10	Customer torque
04.90	Encoder frequency	16.06	Voltage error
04.92	Remanent frequency		

Assigment of programmable thresholds (12.15 and 12.25)

Parameter	Label	Parameter	Label
-	No assignment	03.50	Special ramp type
01.42	Operational setting	04.11	Control type
02.02	Speed reference source	04.12	Zero torque selection
02.03	RS 485 reference enabled	04.14	Torque offset selection
02.14	Ref. No. 1 / No. 2 selection	04.33	Limit 1 or limit 2 enable
02.15	Summing	04.46	Energy saver
02.17	1 PS selected	06.42	Flux at stop
02.18	3 PS selected	06.61	Stop command 1
02.19	7 PS selected	07.12	AI1 offset selection
02.31	Faster function	07.22	AI2 offset selection
02.32	Slower function	07.35	AI3 input inversion
02.33	Faster/slower function	13.11	Inhibit MODBUS control
02.43	Jogging	14.17	1 PID RP selection
02.70	Forward/Reverse	14.18	3 PID RP selection
03.05	S ramp selection	14.46	Integral locked
03.07	Ramp locking	14.48	PID output summing
03.08	Ramp by-pass	14.50	PID enabled
03.17	1 ACCP selection	15.11	HSP enabled
03.18	3 ACCP selection	15.16	No-lead overspeed
03.37	1 DECP selection	15.22	Low speed request
03.38	3 DECP selection	16.20	Preload contactor OK

4.5.11.2 - Menu 12 parameters

12.01 : Threshold No. 1 overshoot

Range : Yes or No
Yes : the threshold set in 12.11 has been exceeded.
No : the threshold set in 12.11 has not been reached.

12.02 : Threshold No. 2 overshoot

Range : Yes or No
Yes : the threshold set in 12.21 has been exceeded.
No : the threshold set in 12.21 has not been reached.

12.11 : Threshold No. 1 source
Range : See table in section 4.5.11.1
Factory setting : Speed measurement (04.01)
This is used to select the source of the variable to be compared with the threshold set in 12.12.

12.12 : Threshold No. 1 level
Range : ± 9999
Factory setting : 9999
For setting the required threshold as a function of 12.11.

12.13 : Threshold No. 1 hysteresis
Range : 2 to 255
Factory setting : 2
Prevents « triggering » around the setting threshold.

12.14 : Threshold No. 1 inversion
Range : Yes or No
Factory setting : No
Yes : the logic state of 12.01 is inverted before its assignment by 12.15.
No : the logic state of 12.01 is not inverted.

12.15 : Threshold No. 1 destination
Range : See table in section 4.5.11.1
Factory setting : None
Is used to select the address which will receive the threshold No. 1 exceeded information.

12.21 : Threshold No. 2 source
Range : See table in section 4.5.11.1
Factory setting : Speed measurement (04.01)
This is used to select the source of the variable to be compared with the threshold set in 12.22.

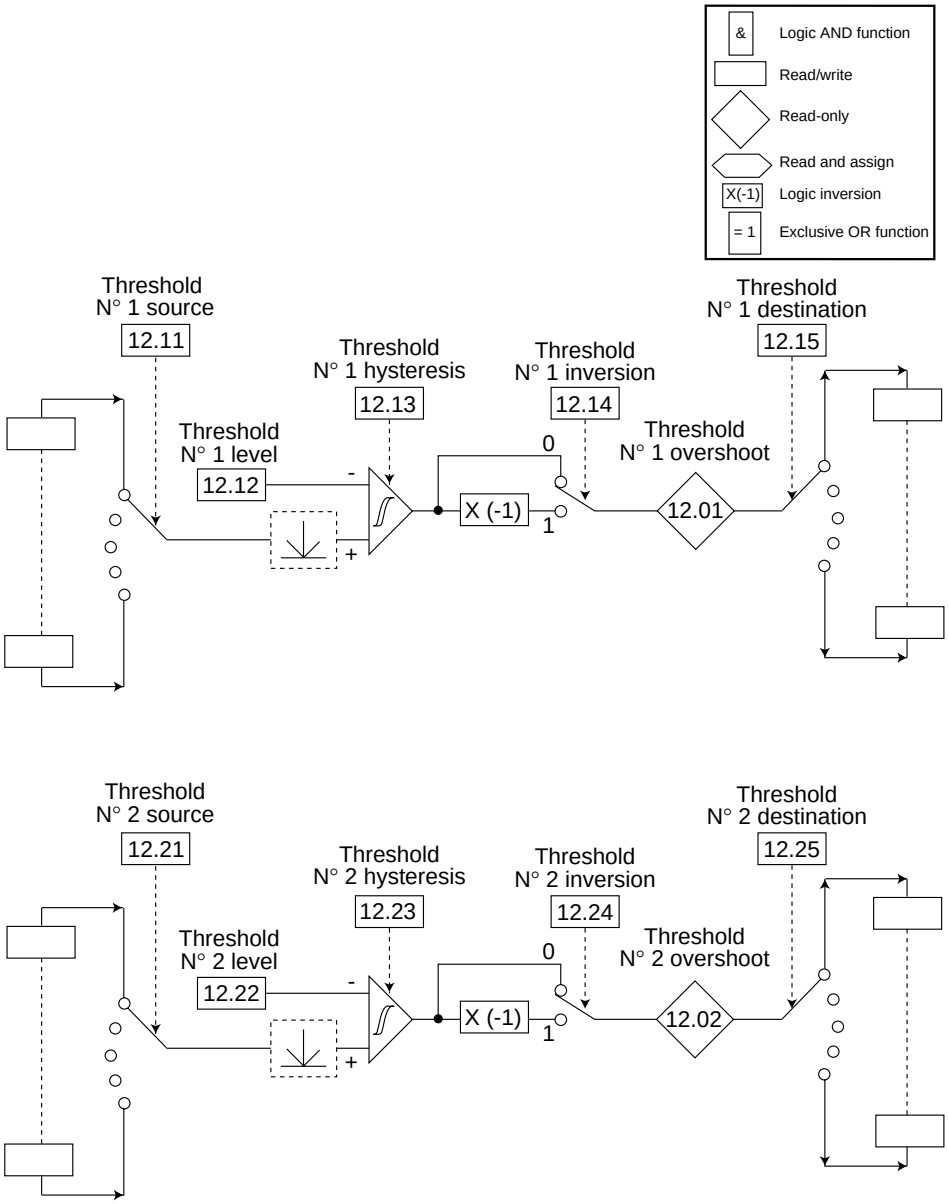
12.22 : Threshold No. 2 level
Range : ± 9999
Factory setting : 9999
For setting the required threshold as a function of 12.21.

12.23 : Threshold No. 2 hysteresis
Range : 2 to 255
Factory setting : 2
Prevents « triggering » around the setting threshold.

12.24 : Threshold No. 2 inversion
Range : Yes or No
Factory setting : No
Yes : the logic state of 12.02 is inverted before its assignment by 12.25.
No : the logic state of 12.02 is not inverted.

12.25 : Threshold No. 2 destination
Range : See table in section 4.5.11.1
Factory setting : None
Is used to select the address which will receive the threshold No. 2 exceeded information.

4.5.11.3 - Menu 12 block diagram



4.5.12 - Menu 13 : Serial link

4.5.12.1 - List of menu 13 parameters

Parameter	Label	Type	Variation range	Factory setting
13.01	Serial link address	R - W	1 to 32	11
13.02	Speed	R - W	2400 - 4800 - 9600 - 19200 bauds	9600 bauds
13.03	Parity	R - W	No parity - Even - Odd	Odd
13.04	Serial link monitoring	R - W	Yes or No	No
13.05	Monitoring period	R - W	0 to 999	10
13.06	Serial link self-test	R - W	Yes or No	No
13.07	Self-test result	R	None - OK - Error	-
13.08	Parameter-setting mode	R - W	Locked, MODBUS, CDC-UMV MODBUS or CDC-UMV	CDC-UMV
13.10	MODBUS control	R - W	MODBUS, MODBUS or Term. blk MODBUS or CDC-UMV	MODBUS
13.11	Inhibit MODBUS control	R - W	Yes or No	No

4.5.12.2 - Menu 13 parameters

13.01 : Serial link address
Range : 1 to 32
Factory setting : 11
Address of the controller when it is communicating with a PC or PLC.

13.02 : Speed
Range : 2400 - 4800, 9600, 19200 bauds
Factory setting : 9600 bauds
Speed of data transmission via the serial link.

13.03 : Parity
Range : No parity - Even - Odd
Factory setting : Odd
Selection of the structure of the serial link messages for either PC or PLC.

13.04 : Serial link monitoring
Range : Yes or No
Factory setting : No
Yes : enables monitoring of serial link operation by the microprocessor.
No : no monitoring of the serial link.

13.05 : Monitoring period
Range : 0 to 999
Factory setting : 10
For setting the monitoring periodicity when 13.04 = yes.

13.06 : Serial link self-test
Range : Yes or No
Factory setting : No
Yes : enables a serial link self-test each time the controller is powered up.
No : no automatic self-test on each power-up.

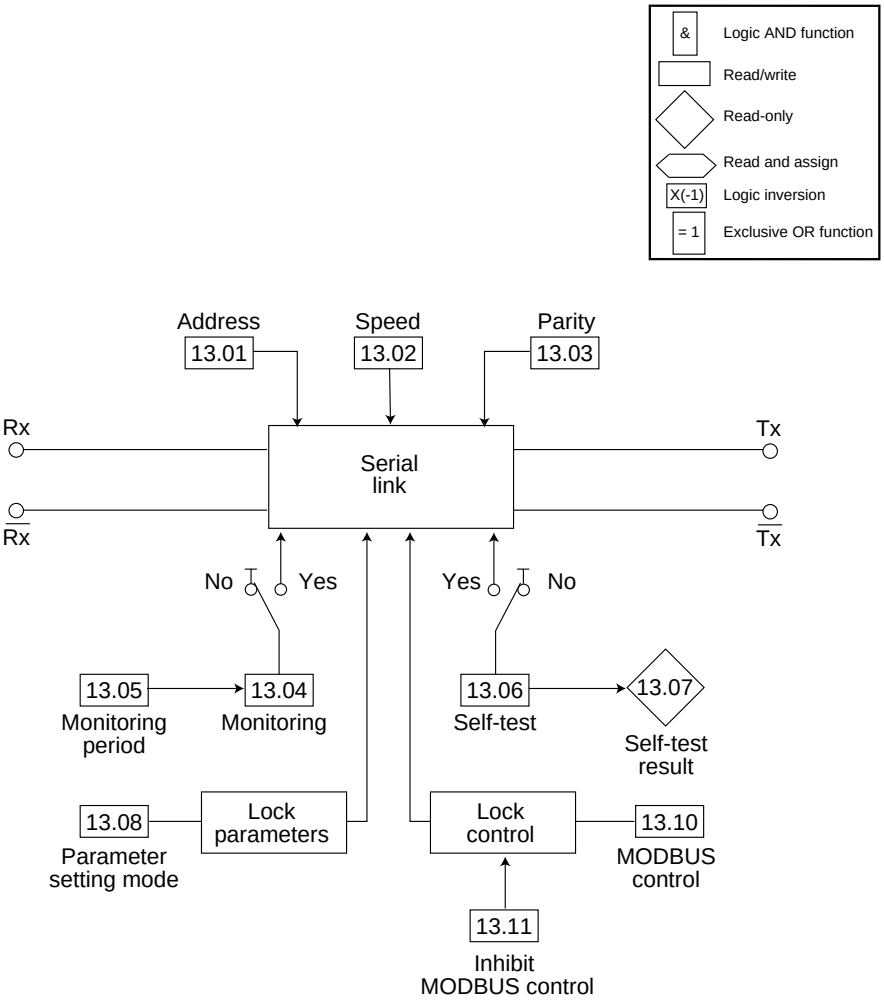
13.07 : Self-test result
Range : None - OK - Error
Report on the serial link self-test if 13.06 = yes.

13.08 : Parameter-setting mode
Range : Locked, MODBUS, CDC-UMV, MODBUS or CDC-UMV
Factory setting : CDC-UMV
Locked : no parameter can be modified.
MODBUS : the parameters can only be modified via the serial link.
CDC-UMV : the parameters can only be modified via the console.
MODBUS or CDC-UMV : the parameters can be modified via the serial link or the console.

13.10 : MODBUS control
Range : MODBUS only, MODBUS or Terminal block, MODBUS or CDC-UMV
Factory setting : MODBUS only
MODBUS only : when 06.01 = MODBUS, commands can only be given via the serial link.
MODBUS or CDC-UMV : when 06.01 = MODBUS, commands are given via the serial link or the keypad.
MODBUS or terminal block : when 06.01 = MODBUS, commands are given via the serial link or the terminal block.
WARNING :
This parameter is available only when 06.01 is set to RS485.

13.11 : Inhibit MODBUS control
Range : Yes or No
Factory setting : No
No : commands via MODBUS are active.
Yes : commands via MODBUS are not taken into account.
Note : 13.11 can be assigned to a logic input.

4.5.12.3 - Menu 13 block diagram



4.5.13 - Menu 14 : PID controller

4.5.13.1 - List of menu 14 parameters

Parameter	Label	Type	Variation range	Factory setting
14.01	PID output	R	±32000	-
14.10	Analogue PID reference	R	± 8192	
14.17	1 PID reference selection	R - A	0 or 1	-
14.18	3 PID reference selection	R - A	0 or 1	-
14.20	PID final reference	R	±32000	-
14.21	Programmable PID reference 1	R - W	±32000	0
14.22	Programmable PID reference 2	R - W	±32000	0
14.23	Programmable PID reference 3	R - W	±32000	0
14.25	PID ramp	R - W	0 to 3200.0s^{-1}	600.0
14.30	PID feedback	R	±32000	-
14.31	PID feedback inversion	R - W	Yes or No	No
14.32	PID feedback source	R - W	See table	-
14.40	PID error	R	±32000	-
14.41	PID proportional gain	R - W	0 to 999	10
14.42	PID integral gain	R - W	0 to 999	10
14.43	PID derivative gain	R - W	0 to 10	0
14.44	PID low limit	R - W	±32000	0
14.45	PID high limit	R - W	±32000	+8000
14.46	PID integral locked	R - W	Yes or No	No
14.47	Scaling of PID output	R - W	0.01 to 10.00	1.00
14.48	PID output summing	R - W	Yes or No	No
14.49	PID additionnal reference	R - W	± 32000	0
14.50	PID enabled	R - W	Yes or No	No
14.51	Programmable condition	R - W	See table	Always enabled
14.52	Programmable condition inversion	R - W	Yes or No	No
14.53	PID status	RO	Locked or Unlocked	-
14.60	PID destination	R - W	See table	None

PID feedback source list (14.32)

Parameter	Label	Parameter	Label
-	None	04.80	Active motor power
04.01	Speed measurement	04.90	Encoder frequency
04.20	Final torque reference	07.18	AI1 final value
04.40	Active current reference	07.28	AI2 final value
04.42	Total current measurement	07.38	AI3 final value
04.44	Active current measurement	07.80	DC bus voltage
04.50	Motor torque	10.70	Motor use
04.60	Motor frequency	10.75	Controller use
04.70	Motor voltage	10.80	Braking resistor use

Source of PID controller (14.51)

Parameter	Label
-	Always enabled
10.41	Alarm 1 active
10.42	Alarm 2 active
10.43	Alarm 3 active
10.44	Alarm 4 active
12.01	Threshold No. 1 overshoot
12.02	Threshold No. 2 overshoot

PID feedback assigment list (14.60)

Parameter	Label
-	None
02.11	Speed reference No. 1
02.12	Speed reference No. 2
02.13	Additional speed reference
02.83	Maximum limit clockwise
03.03	Additional reference without ramp
04.10	Torque reference
04.13	Torque offset
04.34	Motor torque 1 limit
04.36	Motor torque 2 limit
04.37	Torque limit in generator mode
04.69	Motor speed adaptation threshold
16.02	DC bus reference

4.5.13.2 - Menu 14 parameters

14.01 : PID output

Range : ± 32000
Reads the PID output after scaling.

14.10 : Analogue PID reference
Range : ± 8192
Analogue PID reference from a programmable analogue input.

14.17 : 1 PID reference selection
Range : 0 or 1
Reads the selection state. The state is changed by assigning 14.17 to a programmable logic input.

14.18 : 3 PID reference selection
Range : 0 or 1
Reads the selection state. The state is changed by assigning 14.18 to to a programmable logic input.

14.20 : Final PID reference

Range : ± 32000
Reads, after selection, the PID reference and the ramp.

14.21 : Programmable PID reference 1
Range : ± 32000
Factory setting : 0
For setting the numeric value of the PID 1 reference.

14.22 : Programmable PID reference 2
Range : ± 32000
Factory setting : 0
For setting the numeric value of the PID 2 reference.

14.23 : Programmable PID reference 3
Range : ± 32000
Factory setting : 0
For setting the numeric value of the PID 3 reference.

14.25 : PID ramp
Range : 0 to 3200s^{-1}
Factory setting : 600s^{-1}
All the PID references can be subject to a special ramp set via 14.25.

14.30 : PID feedback

Range : ± 32000
Reads the PID feedback signal from a programmable analogue input.

14.31 : PID feedback inversion
Range : Yes or No
Factory setting : No
Yes : the polarity of the PID feedback signal is inverted.
No : the PID feedback is unchanged.

14.32 : PID feedback source
Range : See table § 4.5.13.1
Factory setting : None
Define the parameter which will be used as the PID feedback.

14.40 : PID error

Range : ± 32000
Reads the PID error after summing the PID reference and the PID feedback.

14.41 : PID proportional gain

Range : 0 to 999
Factory setting : 10
For setting the proportional gain of the PID loop.

14.42 : PID integral gain

Range : 0 to 999
Factory setting : 10
For setting the integral gain of the PID loop. 14.12 can be locked by 14.46.

14.43 : PID derivative gain

Range : 0 to 10
Factory setting : 0
For setting the derivative gain of the PID loop.

14.44 : PID low limit

Range : ± 32000
Factory setting : 0
For setting the minimum PID output value before scaling. The low limit can be assigned to a threshold (see menu 12) which can be used externally by programming a logic output (see menu 09).

14.45 : PID high limit

Range : ± 32000
Factory setting : + 8000
For setting the maximum PID output value before scaling.
The high limit can be assigned to a threshold (see menu 12) which can be used externally by programming a logic output (see menu 09).

14.46 : PID integral locked

Range : Yes or No
Factory setting : No
Yes : the value of 14.42 is not taken into account. This locking can be assigned externally if it is assigned to a programmable logic input.
No : the value of 14.42 is taken into account.

14.47 : PID output scaling

Range : 0.01 to 10.00
Factory setting : 1.00
This adjustable coefficient is used to adapt the final PID signal with respect to its use depending on how it has been assigned.

14.48 : PID output summing

Range : Yes or No
Factory setting : No
Yes : a reference set in 14.49 is added to the PID output.
No : there is no additionnal reference to the PID output.

14.49 : PID additionnal reference

Range : ± 32000
Factory setting : 0
Used to set the reference which is added to the PID output when 14.48 is enabled.

14.50 : PID enabled

Range : Yes or No
Factory setting : No
Yes : the PID function is active.
No : the PID function is inactive.

14.51 : Programmable condition

Range : See table § 4.5.13.1
Factory setting : Always enabled
Used to select a PID function enable source.

14.52 : Programmable condition inversion

Range : Yes or No
Factory setting : No
Used to invert the signal from the source selected via 14.51.
Yes : the logic state resulting from the selection in 14.51 is inverted.
No : the logic state resulting from the selection in 14.51 is not inverted.

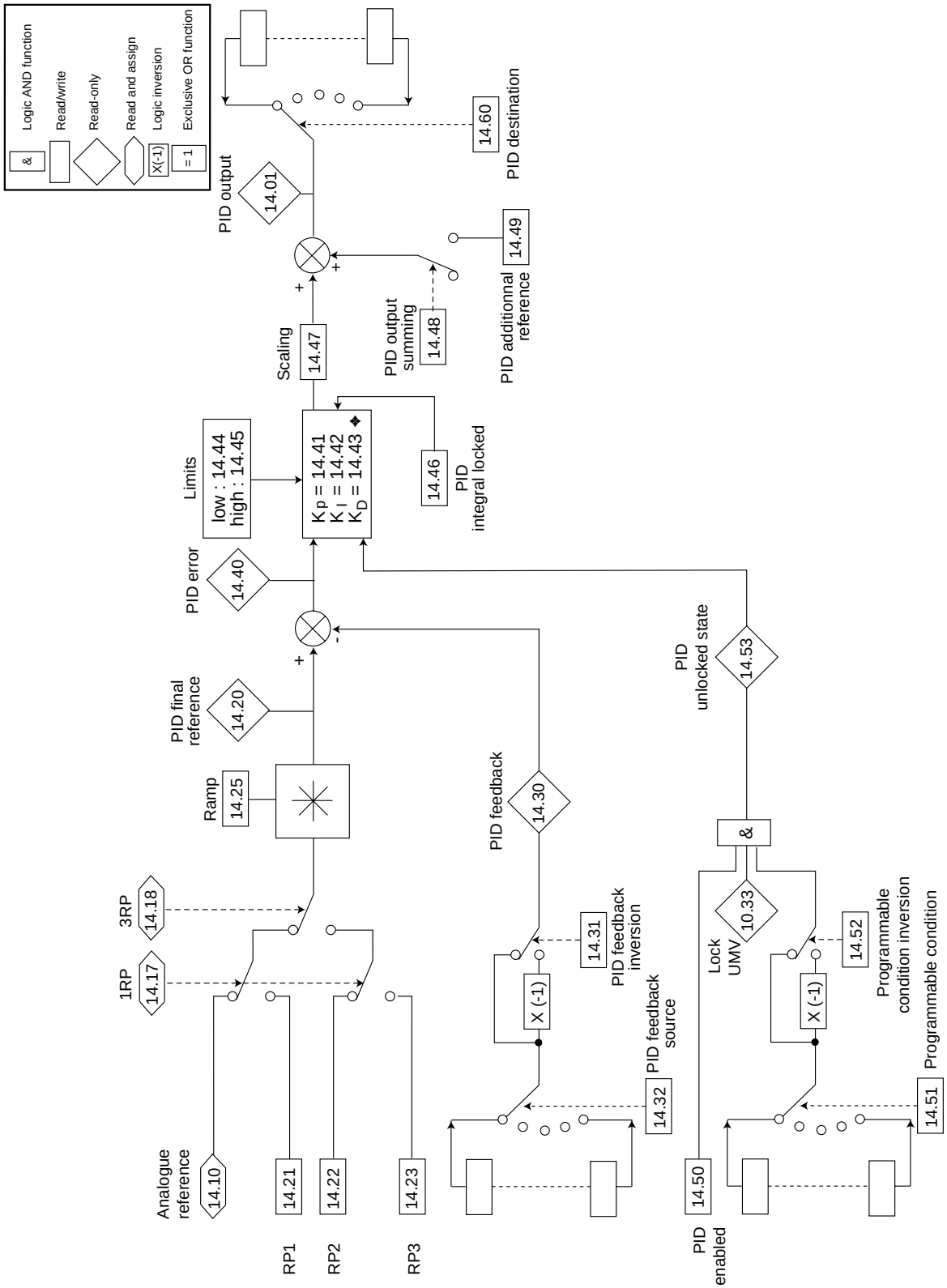
14.53 : PID status

Range : Locked or Unlocked
Reads the action condition of the PID function subject to 14.50 and to 14.51.
Locked : the PID function is inactive as either the UMV is locked (10.33), or 14.50 = no, or programmable condition 14.51 has not been given.
Unlocked : the PID function is active.

14.60 : PID destination

Range : See table § 4.5.13.1
Factory setting : No assignment
Used to optionally select the assignment of the PID function to a reference.
WARNING :
PID is disabled when 14.60 is not programmed.

4.5.13.3 - Menu 14 block diagram



4.5.14 - Menu 15 : Hoisting (closed loop only)
4.5.14.1 - List of hoisting menu parameters

Parameter	Label	Type	Variation range	Factory setting
15.01	Weighing enabled	R - W	Yes or No	No
15.02	Weighing speed	R - W	0 to 8000 min^{-1}	1500 min^{-1}
15.03	Weighing time delay	R - W	0.2 to 0.99s	0.4s
15.04	Weighing ramp	R - W	0.1 to 3200.0s	20s
15.05	B up	R - W	± 25 % Mn	0
15.06	A up	R - W	50 to 200	100
15.07	B down	R - W	± 25 % Mn	0
15.08	A down	R - W	50 to 200	100
15.10	Customer torque	R	0 to 300 % Mn	-
15.11	HSP enabled	R - A	Yes or No	-
15.12	Weighing alarm	R	Yes or No	-
15.13	External load measurement	R - W	Yes or No	No
15.14	Weighing threshold	R - W	0 to 200 % Mn	50 % Mn
15.15	Speed limit	R - W	0 to 8000 min^{-1}	3000 min^{-1}
15.16	No-load overspeed	R - A	Yes or No	-
15.17	Stepper limitation threshold	R - W	0 to 100 % Mn	33 % Mn
15.20	Limiting selection	R - W	No step or With step	With step
15.21	Low speed limit	R - W	0 to 8000 min^{-1}	50 min^{-1}
15.22	Low speed request	R - A	Yes or No	-

4.5.14.2 - Menu 15 parameters

15.01 : Weighing enabled
Range : Yes or No
Factory setting : No
No : the speed of the motor is limited by 02.83.
Yes : the speed limit depends on the weight which is calculated by the drive. The maximum speed never exceeds the value set in 02.83 or 02.84.
This feature must be enabled when the maximum speed of the motor exceeds the nominal speed shown on the nameplate.
WARNING :
It is important that FWD be enabled when going up and REV be enabled when going down. Otherwise, motor rotation must be changed by crossing phase U and W as well as encoder signals.

15.02 : Weighing speed
Range : 0 to 8000 min^{-1}
Factory setting : 1500 min^{-1}
Speed at which the weight calculation is made.
Each time the brake is released, the motor will accelerate up to this speed using the ramp set in 15.04. When this step is reached, the ramp is held for a time set in 15.03. During this period, the drive will perform the weight measurement.

15.03 : Weighing time delay
Range : 0.2 to 0.99s
Factory setting : 0.4s
Time delay during which sampling is performed in order to determine the motor torque.

15.04 : Weighing ramp
Range : 0.1 to 3200.0s
Factory setting : 20s
Acceleration ramp before sampling.

15.05 : B up
Range : ± 25 % Mn
Factory setting : 0
This parameter represents the mechanical losses when the hoist is going up. To determine this parameter, give a up command at maximum speed with the hook empty. Read the torque in 04.50 and set this value in 15.05.

15.06 : A up
Range : 50 to 200
Factory setting : 100
This parameter represents the torque required to lift 100 % of the load. To determine this parameter, give a up command at nominal speed with 100 % of the load. Read the torque in 04.50. Then 15.06 = 100/04.50.
WARNING :
During this test, 15.01 must be disabled.

15.07 **: B down**
Range : ± 25 % Mn
Factory setting : 0
This parameter represents the mechanical losses when the hoist is going down. To determine this parameter, give a down command at maximum speed with the hook empty. Read the torque in 04.50 and set this value in 15.07.

15.08 **: A down**
Range : 50 to 200
Factory setting : 100
This parameter represents the torque required to hold 100 % of the load when going down. To determine this parameter, give a down command at nominal speed with 100 % of the load. Read the torque in 04.50. Then 15.08 = 100/04.50.
WARNING :
During this test, 15.01 must be disabled.

15.10 **: Customer torque**
Range : 0 to 300 % Mn
This parameter gives the weight of the load as a percentage of the nominal torque. It is the result of the torque provided (04.50) minus the losses when going up and plus the losses when going down.

15.11 **: HSP enabled**
Range : Yes or No
When this input is enabled using a contact provided by an external weighing device, it allows speed to reach level set in 15.15. See parameters 15.13 and 15.14.

15.12 **: Weighing alarm**
Range : Yes or No
Yes : high speed authorisation 15.11 is not consistent with the torque estimation.
When the alarm is enabled, the speed is limited to 50 % of 15.15.
No : weighing is connected.

15.13 **: External load measurement**
Range : Yes or No
Factory setting : No
Yes : the load measurement is external to the drive and the calculation is only a confirmation which enables high speed.
No : the load is calculated to limit the speed.

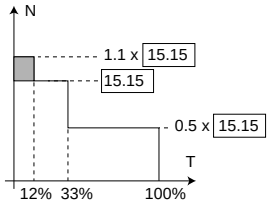
15.14 **: Weighing threshold**
Range : 0 to 200 % Mn
Factory setting : 50 % Mn
If the calculated weight (15.10) exceeds this threshold and if the high speed input (15.11) is enabled, then the weighing alarm is enabled (15.12) and the speed is limited at 50 % of 15.15.

15.15 **: Speed limit**
Range : 0 to 8000 min^{-1}
Factory setting : 3000 min^{-1}
Maximum motor speed when overspeed is not enabled via 15.16.

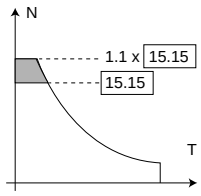
15.16 **: No-load overspeed**
Range : Yes or No
Factory setting : No
Yes : when this parameter is enabled using an external contact and if the calculated weight does not exceed 12 % Mn, then high speed (15.15) is increased by 10 %.
No : high speed does not exceed 15.15.

15.17 **: Stepper limitation threshold**
Range : 0 to 100 % Mn
Factory setting : 33 % Mn
When 15.20 is set to " with step " this parameter sets the weighing threshold from which the speed is step limited.

15.20 **: Limiting selection**
Range : No step or With step
Factory setting : With step
With step : the authorised speed depends on the torque according to the following steps.



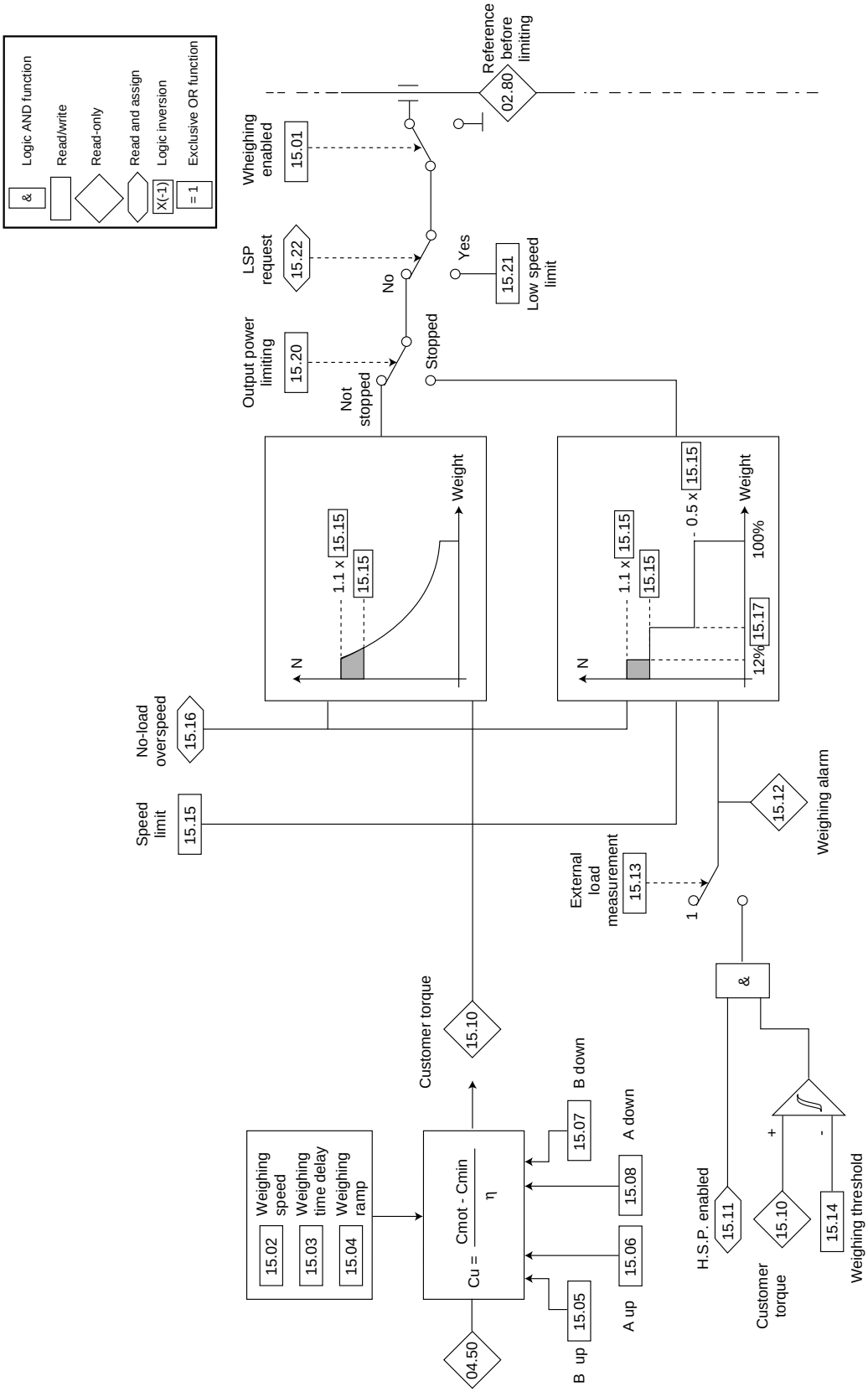
No step : the authorised speed depends on the torque according to a U-shaped curve.



15.21 **: Low speed limit**
Range : 0 to 8000 min^{-1}
Factory setting : 50 min^{-1}
When 15.22 is enabled, the maximum speed is limited to this parameter. It will never exceed 02.83 nor 02.84.

15.22 **: Low speed request**
Range : Yes or No
Yes : this parameter allows to select a second maximum speed (15.21).
WARNING :
In this case, the maximum speed based on the weight calculation is no longer enabled.
No : the speed reference depends on the load.

4.5.14.3 - Menu 15 block diagram



NOTES

4.5.15 - Menu 16 : Regen mode
This menu is related to a specific application, and is discribed in the associated instruction. Contact LEROY-SOMER for more information.

CAUTION :
Do not modify the setting.

4.5.16 - Menu 17 : Option card 2
Under development.

4.5.17 - Menu 19 : Special menu
This menu is related to a specific application, and is discribed in the associated instruction. Contact LEROY-SOMER for more information.

CAUTION :
Do not modify the setting.

5 - FAULTS - DIAGNOSTICS

5.1 - General

• Information about the controller status is provided by the display unit.
• Faults are indicated by a flashing display.

The last ten faults are stored in the memory (even after a mains power break) in parameters 10.20 to 10.24.
• Information about the controller status is also provided by the display unit.
• Some controller states can be easily signalled by assigning them to relays or logic outputs.

5.2 - Fault indication

DISPLAY	ASSOCIATED PARAMETER	CHECK POINTS	SOLUTION
Bus overvoltage	10.48	- Inertia returned to motor - Optional braking resistor	• Adapt the deceleration • Check the dimensions • Set 06.57, 06.58, 06.59 parameters
Overcurrent	-	- Associated motor - Parameter settings	• Check the wiring • Motor stalled • Check the limiting in menu 04
I imbalance	-	- Associated motor	• Check the wiring • Check the motor isolation
Controller th.	-	- Cooling - Overload	• Check the ambient temperature • Check the operation of the controller fans • Clean the ventillation grilles • Check the operating cycle • Check the limitations of menu 04
Resistor th.	-	- Resistor adapted to braking cycle - Cooling	• Increase the deceleration time • Check the setting of 01.58 and 01.59 • Check the ambient temperature • Check the resistor ventilation
Int. power supp	-	- Control terminal block	• Check the wiring • Disconnect all the connections and check the +10V, -10V, +24V supplies
Processor	-	- Wiring - Environment	• Adhere to the wiring precautions for the control terminal block • Keep the controller away from sources of interference
Encoder	-	- Wiring - Environment - Motor - Programming	• Check the connection of channels and the encoder supply • Check the wiring continuity • Check that the encoder cable is free from interference • Check the mechanical coupling • Check 01.31
Encoder Loss	-	- Wiring	• Check the continuity • Check that all channels are present
Processor opt 1	-	- Installation - Adaptation	• Check that the option is correctly installed • Check the programming of menu 16
Processor opt 2	-	- Installation - Adaptation	• Check that the option is correctly installed • Check the programming of menu 17
External	08.90	- Wiring - Programming	• Check the voltage on the external fault logic input • Check the control logic
Mains failure	10.05	- Mains supply + protection - Programming	• Check the mains supply voltage • Check the tightness of power connections • Check the mains supply power • Check 10.06, 10.07 • Check the fuses of EMC cards, Interface and transformer-trip device

* From rating 180T and above.

DISPLAY	ASSOCIATED PARAMETER	CHECK POINTS	SOLUTION
Phase missing	-	- Mains supply + protection	• Check the 3 phases, the protective fuses and protective devices are present • Check the tightness of power connections • Check the EMC card fuses
Mains under v	-	- Mains supply	• Check the mains supply voltage • Check the mains supply power
Mains over v	-	- Mains supply - Line choke	• Check the mains supply voltage
Bus under v	-	- Mains supply	• Check the mains supply voltage • Check the connections and the value
Motor th.	10.09	- Programming	• Check the settings for 01.21 to 01.29 and 01.40
Motor PTC probe	10.10	- Wiring - Environment	• Check the continuity • Check the temperature of the motor and the ambient temperature • Check the motor ventilation
Direction / Rot	10.15	- Wiring	• Check the order of the 3 motor phases
Motor phase	10.16	- Wiring	• Check the motor connections • Check the motor coils
RS 485 link	10.11	- Wiring - Programming	• Check the continuity and the conformity • Check 13.01, 13.02 and 13.03
CDC - UMV	-	- SUB-D console	• Check the connection • Check the CD-CORD cable (option)
4/20mA loss	10.13	- Wiring - Programming	• Check the continuity • Check the minimum signal value • Check that the setting of 07.36 corresponds to the signal in AI3
Alarm 1 active	10.41	- Environment - Programming	• Check the monitored value • Check 05.12, 05.14 and 05.16
Alarm 2 active	10.42	- Environment - Programming	• Check the monitored value • Check 05.22, 05.24 and 05.26
Alarm 3 active	10.43	- Environment - Programming	• Check the monitored value • Check 05.32, 05.34 and 05.36
Alarm 4 active	10.44	- Environment - Programming	• Check the monitored value • Check 05.42, 05.44 and 05.46
IGBT	-	- Power bridge	• Check the temperature • Test the bridge
I limit time	10.40	- Load - Programming	• Check the load and inertia • Check the acceleration ramp • Check 05.02 • Check the limiting in menu 04
Overspeed	02.83 - 02.84	- Motor speed - Speed feedback	• Check the limiting • Driving load • Check the speed feedback • Check the fuses (6) see section 6.4.

Note : Certain faults only appear if « Minor fault » or « Major fault » has been selected during processing.
A reset can only be carried out once the cause of the fault has disappeared.

6 - MAINTENANCE

6.1 - Introduction and advice

• The power circuit is connected directly to the mains.

• Do not perform any operations on the controller without first manually opening the supply circuit of the power stages (fused isolator or circuit-breaker) **or opening the KM input contactor and manually locking the remote control of KM. Also open the QF circuit-breaker which protects the power supply to the electronics.**

• Wait 10 mins before connecting the protective covers.

• After performing any operation, replace the protective covers.

UMV 3301 controllers require a minimum of maintenance and repair operations on behalf of the user. Detailed below are normal maintenance operations and simple methods for checking that the controller is operating correctly.

6.2 - Care

Any controller may be subject to problems after being exposed to excessive heat, humidity, oil, dust, or if any external matter is allowed to penetrate.

Printed circuits and their components do not normally require any maintenance. Contact your retailer or nearest approved service centre if any problems occur.

DO NOT REMOVE PRINTED CIRCUIT BOARDS DURING THE GUARANTEE PERIOD, AS THIS WILL IMMEDIATELY RENDER IT NULL AND VOID.

Do not touch integrated circuits or the microprocessor with your fingers or with any charged or live material. Earth yourself, as well as the bench or soldering iron before any intervention on the circuits.

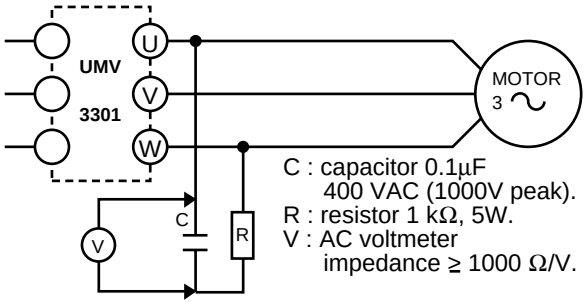
Do not handle the socket-mounted integrated circuits located on the printed control circuit (risk of damage).

Periodically check the tightness of the power connections.

6.3 - Measuring voltage, current and power

6.3.1 - Mesuring the voltage at the controller output

The harmonics from the controller mean that it is not possible to measure the voltage at the motor input correctly with an ordinary voltmeter. However, you can obtain an approximate value of the rms voltage of the fundamental wave (which has a bearing on the torque) by using a standard voltmeter and the arrangement described in the diagram below.



6.3.2 - Measuring the motor current

The current drawn by the motor and the controller input current can be measured approximately using a standard ammeter.

6.3.3 - Measuring the controller input and output power

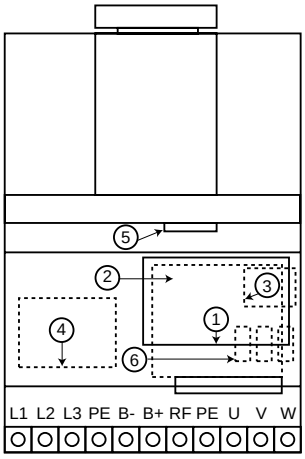
The controller input and output power can be measured using an electro-dynamic instrument.

NOTES

6.4 - Spare parts list

6.4.1 - UMV 3301 75T to 265T and 75TH to 340TH

UMV 3301 75T to 265T and 75TH to 340TH



		75T to 265T Fuse item code	75TH to 340TH Fuse item code
①	Control card	-	-
②	Interface card	PEL002FA003	None
③	Transfo trigger F1 Fuse F2 Fuse	 PEL002FA003 PEL001FU005	 PEL002FA003 PEL001FU005
④	EMC card	PEL010FU002	PEL010FU002
⑤	Bus fuse card	PEL002FU004	PEL002FU004
⑥	Output voltage measurement fuse card	PEL002FA003	None

The dotted line cards are located behind the control card ①

UMV 3301 75T to 265T

Description	Item code	UMV 3301 rating						
		75T	100T	120T	150T	180T	220T	265T
Control card ①	PEF240NS000	1	1	1	1	1	1	1
Interface card ②	PEF240NP000-2	1						
	PEF240NP000-3		1					
	PEF240NP000-4			1				
	PEF240NP000-5				1			
	PEF240NB001-1					1		
	PEF240NB001-2						1	
	PEF240NB001-3							1
Transformer trigger device card ③	PEF240NW000	1	1	1	1	1	1	1
EMC card ④	PEF240NJ000	1	1	1	1	1	1	1
Bus fuse card ⑤	PEF240NU000	1	1	1	1	1	1	1
Voltage measurement fuse card ⑥	PEF240NK000					3	3	3
Rectifier module ✦	ESC106MM001	3	3					
	ESC160MM001			3	3			
	ESC250MM001					3	3	
	ESC430MD001							3
	ESC330MT001							3
Rectifier + inverter module ✦	ESC075EI002	1						
	ESC100EI002		1					
	ESC120EI002			1				
	ESC150EI002				1			
	ESC180EI002					1		
	ESC220EI002						1	
	ESC265EI002							1
Inrush resistor	RES047DH001	3	3	3	3			
	RES047PH005					1	1	1
Power supply transformer	TRF300CF001	1	1	1	1	1	1	1
Varistors	PEL550EC000	1	1	1	1	1	1	1
Current sensor	MES200CA001	2	2					
	MES300CA001			2	2			
Fan	VEN230VN005	1	1					
	VEN230VN003			1	1	1	1	1
FA 2A 6,3 x 32 - 660V fuse Ⓢ	PEL002FU004	2	2	2	2	2	2	2
SA 2A 6,3 x 32 - 500V fuse Ⓢ	PEL002FA003	1	1	1	1	1	1	1
FA 1,25A 6,3 x 32 - 660V fuse Ⓢ	PEL001FU005	1	1	1	1	1	1	1
FA 10A 6,3 x 32 - 600V fuse Ⓢ	PEL010FU002	3	3	3	3	3	3	3

✦ Mounting by an approved LEROY-SOMER facility.

Ⓤ : PEL002FA003 : e.g. Ferraz/Shawmut P098131 type
PEL010FU002 : e.g. Ferraz/Shawmut B222549 type
PEL002FU004 : e.g. Ferraz/Shawmut F093293P type
PEL001FU005 : e.g. Ferraz/Shawmut B093289 type or Shurter 70220860 type.

Options

Description	Item code	TUMV 100	TUMV 210	TUMV 220
Braking transistor	ESC145QI000	1		
	ESC300QI000		1	1
Braking card	PEF240NC001	1		
	PEF240NC002		1	1

UMV 3301 75TH to 340TH

Description	Item code	UMV 3301 rating							
		75TH	100TH	120TH	150TH	180TH	220TH	265TH	340TH
Control card ①	PEF240NS100	1	1	1	1	1	1	1	1
Interface card ②	PEF240NB101-1	1							
	PEF240NB101-2		1						
	PEF240NB101-3			1					
	PEF240NB101-4				1				
	PEF240NB101-5					1			
	PEF240NB101-6						1		
	PEF240NB101-C							1	
	PEF240NB101-7								1
Transformer trigger device card ③	PEF240NW100	1	1	1	1	1	1	1	1
EMC card ④	PEF240NJ100	1	1	1	1	1	1	1	1
Bus fuse card ⑤	PEF240NU100	1	1	1	1	1	1	1	1
Voltage measurement fuse card ⑥	PEF240NK100	3	3	3	3	3	3	3	3
Rectifier module ✦	SKKH57/22E	3							
	SKKH72/22E		3						
	SKKH132/22			3	3				
	SKKH131/22					3	3		
	SKKH210/22							3	3
Rectifier + inverter module ✦	ESC075EI100	1							
	ESC100EI100		1						
	ESC120EI100			1					
	ESC150EI100				1				
	ESC180EI100					1	1		
	ESC265EI100							1	
	ESC340EI100								1
Inrush resistor	RES180PH002	1	1	1	1				
	RES047DH005					1	1	1	1
Power supply transformer	TRF300CF001	1	1	1	1	1	1	1	1
Varistors	PEL750EC001	1	1	1	1	1	1	1	1
Current sensor	MES200CA001	2	2						
	MES300CA001			2	2				
Fan	VEN230VN003	1	1	1	1	1	1	1	1
FA 2A 6,3 x 32 - 660V fuse	PEL002FU004	2	2	2	2	2	2	2	2
SA 2A 6,3 x 32 - 500V fuse	PEL002FA003	1	1	1	1	1	1	1	1
FA 1,25A 6,3 x 32 - 660V fuse	PEL001FU005	1	1	1	1	1	1	1	1
FA 10A 6,3 x 32 - 600V fuse	PEL010FU002	3	3	3	3	3	3	3	3

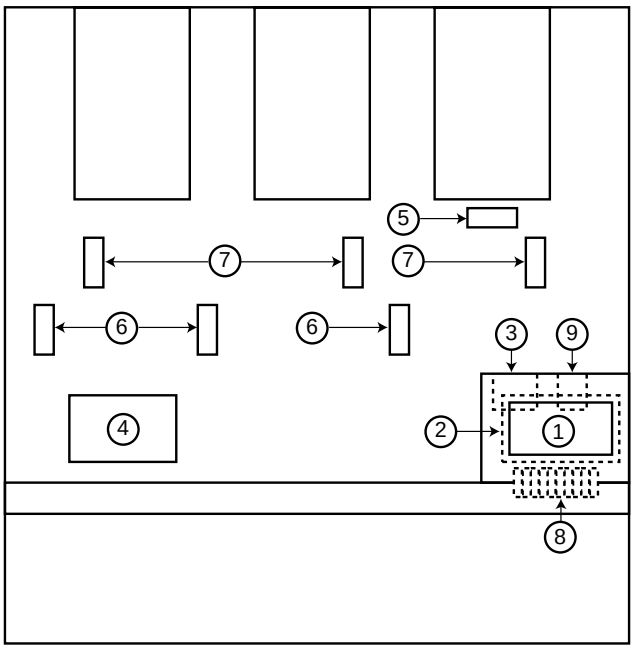
✦ Mounting by an approved LEROY-SOMER facility.

: PEL002FA003 : e.g. Ferraz/Shawmut P098131 type
PEL010FU002 : e.g. Ferraz/Shawmut B222549 type
PEL002FU004 : e.g. Ferraz/Shawmut F093293P type
PEL001FU005 : e.g. Ferraz/Shawmut B093289 type or Shurter 70220860 type.

Options

Description	Item code	TUMV TH 85	TUMV TH 175
Braking transistor	ESC200QI000	1	
	ESC380QI000		1
Braking card	PEF240NC101	1	
	PEF240NC102		1

6.4.2 - UMV 3301 270T to 600T and 400TH to 700TH



1. Control card
2. Interface card
3. Transfo trigger device card (fuses : PEL002FA003)
4. EMC card
5. Bus fuse card (fuses : PEL002FU004)
6. Output voltage measurement fuse card (fuses : PEL002FA003)
7. Input voltage measurement fuse card (fuses : PEL008FA004)
8. Transformer protection (fuses : PEL004FG000)
9. OCP2 power supply card (UMV ≥ 400T)

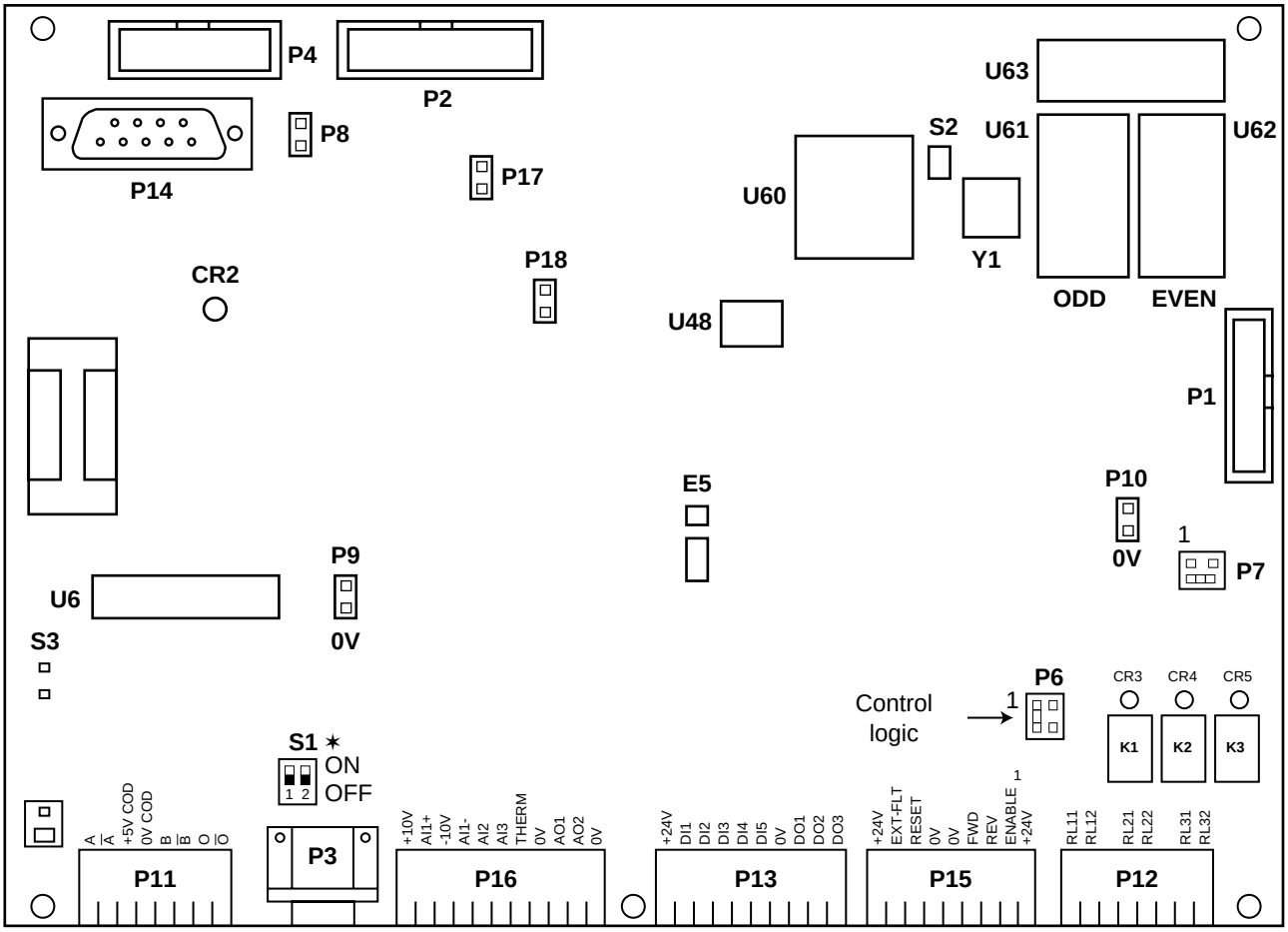
UMV 3301 270T to 600T

Description	Item code	UMV 3301 rating				
		270T	340T	400T	470T	600T
Control card ①	PEF240NS000	1	1	1	1	1
Interface card ②	PEF240NB001	1	1	1	1	1
Transformer trigger device card ③	PEF240NW000	1	1	1	1	1
EMC card ④	PEF240NL000	1	1	1	1	1
Bus fuse card ⑤	PEF240NK000	2	2	4	4	4
Output voltage measurement fuse card ⑥	PEF240NK000	3	3	3	3	3
Input voltage measurement fuse card ⑦	PEF240NK000	3	3	3	3	3
OCP2 power supply card ⑨	PEF249NA000	-	-	1	1	1
FV inverter rectifier module	ESC270EI002	3				
	ESC340EI002		3			
	ESC400EI002			3		
	ESC470EI002				3	
	ESC600EI002					3
Forced ventilation	VEN230VM006	3				
	VEN230VM007		3	3	3	3
Inrush resistance	RES018PH001					
FU 6.3 x 32 2A SA fuse on ③ and ⑥	PEL002FA003	5	5	5	5	5
FU 6.3 x 32 2A fuse on ⑤	PEL002FU004	2	2	4	4	4
FA 6.3 x 32 8A fuse on ⑦	PEL008FA004	3	3	3	3	3
10 x 38 AM 4A fuse ⑧	PEL004FG000	10	10	10	10	10

UMV 3301 400TH to 700TH

Description	Item code	UMV 3301 rating			
		400TH	470TH	600TH	700TH
Control card ①	PEF240NS100	1	1	1	1
Interface card ②	PEF240NB101	1	1	1	1
Transformer trigger device card ③	PEF240NW100	1	1	1	1
EMC card ④	PEF240NL100	1	1	1	1
Bus fuse card ⑤		2	4	4	4
Output voltage measurement fuse card ⑥		3	3	3	3
Input voltage measurement fuse card ⑦		3	3	3	3
OCP2 power supply card ⑨	PEF249NA000	-	1	1	1
FV inverter rectifier module	ESC400EI				
	ESC470EI		3		
	ESC600EI			3	
	ESC700EI				3
Forced ventilation	VEN230VM007	3	3	3	3
Inrush resistance		1	1	1	1
Fuse		3	3	3	3
Fuse		2	4	4	4
Fuse		3	3	3	3
Fuse ⑧		4	4	4	4

6.4.3 - Control card
Main component installation



✶ **S1** ON / OFF (1 2) : the terminating resistor is rated for 4 wire connection

S1 ON / OFF (1 2) : the terminating resistor is rated for 2 wire connection

7 - OPERATING EXTENSIONS

7.1 - Braking modules

These are factory-installed inside the UMV 3301 controller. They comprise an IGBT transistor and a control circuit.

Characteristics

UMV 3301 rating	Braking module	Peak current (A)	Continuous current (A)	Minimum value of the associated resistor (Ω)
75T and 100T	T - UMV 100	100	60	7,2
120T and 150T	T - UMV 210	210	100	3,5
180T to 265T	T - UMV 220	210	100	3,5
270T and 340T	T - UMV 300	305	245	2,35
400T to 600T	Contact LEROY-SOMER			
75TH to 150TH	TH - UMV 85	85	60	13
180TH to 340TH	TH - UMV 175	175	100	6,5

To choose the braking resistors for ratings 75TH to 340TH, contact LEROY-SOMER.

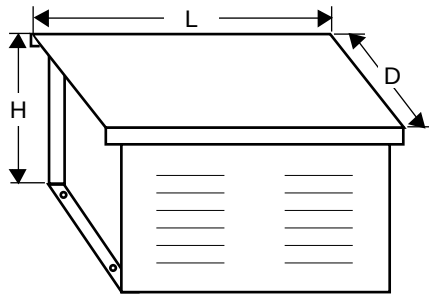
7.2 - Braking resistors (RF)

7.2.1 - Electrical characteristics

RF	Ohmic value (Ω)	Thermal power (kW)	Peak power (kW)	rms current (A)*	Thermal constant (s) **
27500T	10	27,5	51,8	52	180
37500T	5	37,5	103	87	180
55000T	5	55	103	105	180
75000T	3,5	75	148	146	180
110000T	2,35	110	220	216	180

* Thermal relay calibrated in series in the resistor.
** 06.59 parameter settings.

7.2.2 - Mechanical characteristics



RF	L	D	H	Weight (kg)
27500T	860	480	690	66
37500T	960	380	1150	77
55000T	960	540	1150	105
75000T	1080	680	1150	145
110000T	960	740	1520	200

7.3 - RFI filters

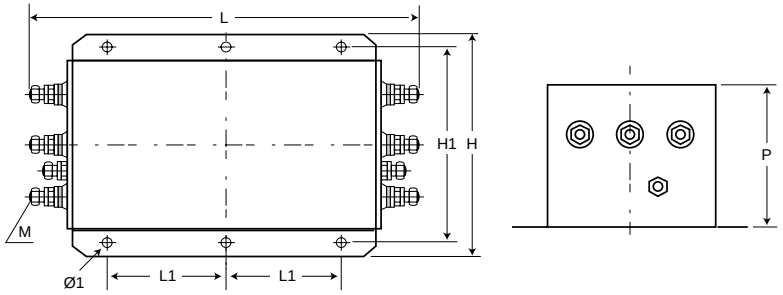
7.3.1 - Electrical characteristics

Type	Nominal current (A)	Leakage current (mA) *	Losses (W)
FLT 3359 HV - 180	180	< 6	38
FLT 3359 HV - 250	250	< 6	57
FLT 3359 HV - 320	320	< 6	40
FLT 3359 HV - 400	400	< 6	50
FLT 3359 HV - 600	600	< 6	65
FLT 3359 HV - 1000	1000	< 6	91
FLT 3359 HV - 1600	1600	< 6	180

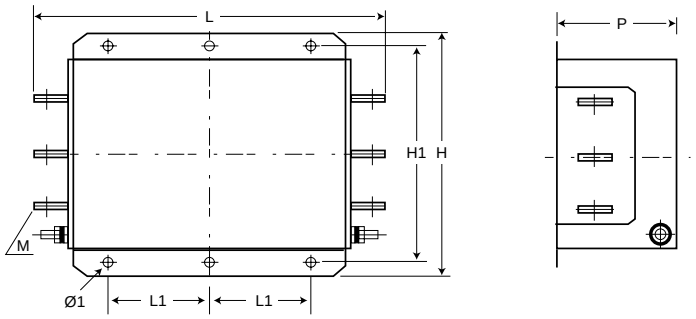
* 500Vac - 50Hz mains supply

7.3.2 - Characteristics

• FLT 3359 HV - 180 and FLT 3359 HV - 250



• FLT 3359 HV - 320 to FLT 3359 HV - 1600



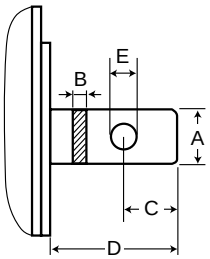
Type	Dimensions (mm)						Weight (kg)
	L	L1	H	H1	P	Ø1	
FLT 3359 HV - 180	-	120	210	185	120	12	6.5
FLT 3359 HV - 250	-	120	230	205	125	12	7
FLT 3359 HV - 320	386	120	260	235	115	12	10.5
FLT 3359 HV - 400	386	120	260	235	115	12	10.5
FLT 3359 HV - 600	386	120	260	235	135	12	11
FLT 3359 HV - 1000	456	145	280	255	170	12	18
FLT 3359 HV - 1600	586	170	300	275	160	12	27

Connection
Earth connection is by means of an M12 screw ; input and output connections are on the terminals (dimensions according to rating - see table below).

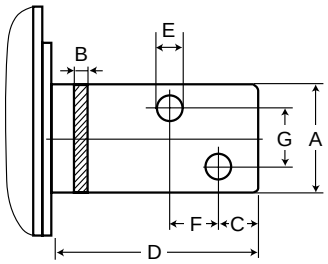
Dimensions	Type of FLT 3359 HV				Tol.
	320 & 400	600	1000	1600	mm
A	25	25	40	60	±0.1
B	6	8	8	10	±0.1
C	15	15	20	17	±0.5
D	40	40	50	90	±1.5
E	10,5	10,5	14	14	±0.2
F	-	-	-	26	±0.2
G	-	-	-	26	±0.2

All dimensions in mm.

FLT 3359 HV - 320
to
FLT 3359 HV - 1000



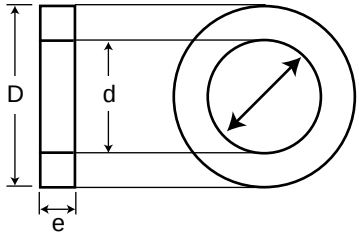
FLT 3359 HV - 1600



7.4 - Self-MC chokes
These are wired directly to the controller output (U, V, W terminals) and help reduce leakage currents and interference.

• Wiring
Self-MC chokes must be wired as close as possible to the inverter.

• Dimensions



	Dimensions (mm)		
	D	d	e
FAP038FE001	63	38	25
FAP055FE001	100	55	20

7.5 - Forced ventilation kit
The UMV 3301 180T and 220T can accommodate a kit which enables fresh air from outside the cubicle to be circulated inside.

7.6 - Connection option
The UMV 3301 270T to 600T can accommodate an option comprising an isolator, a power contactor and the RFI filter option for supplying the UMV.
This takes the form of a cubicle section of 600 mm which fixes against the UMV 3301 cubicle.

7.7 - PEGASE parameter-setting software
This software enables the serial link and an RS 232/RS 485 interface to access all UMV 3301 inverter parameters via a PC.
The software is particularly suitable for repetitive controller programming.

NOTES

8 - SUMMARY OF SETTINGS

UMV Type	Rating	Software	Serial no.	Motor type	Motor no.	Commissioning

Parameter	Label	Factory setting	Setting date :	Setting date :
01.01	Pilot control	Open loop		
01.02	Base frequency	50Hz		
01.03	Switching frequency	2.5kHz		
01.04	Overtorque request	High		
01.21	Nominal motor power	See table		
01.23	Nominal motor frequency	50Hz		
01.24	Nominal motor speed	See table		
01.25	Nominal motor voltage	400V		
01.26	Nominal motor current	See table		
01.27	Motor cosine φ	See table		
01.28	Motor C max/C nominal	See table		
01.29	Motor cooling	Self-cooled		
01.30	Motor protection by thermistor	No		
01.31	Points per encoder revolution	1024		
	USER MENU			
02.50	CDC - UMV speed reference	0		
02.02	Speed reference source	Terminal block		
06.01	Control source	Terminal block		
06.03	Starting	Controlled		
10.02	Reset	Controlled		
06.05	Flying restart	No		
10.06	Mains undervoltage threshold	300V		
10.07	Mains time delay	0.50s		
07.17	AI1 100 % calibration	1500		
07.36	AI3 reference selection	4/20mA		
07.33	AI3 0 % calibration	0		
07.34	AI3 100 % calibration	1500		
02.21	Speed reference PS1	1500 min^{-1}		
02.22	Speed reference PS2	1000 min^{-1}		
02.23	Speed reference PS3	750 min^{-1}		
02.81	Minimum limit (clockwise)	0		
02.83	Maximum limit (clockwise)	1500 min^{-1}		
02.91	Skip speed 1	0		
02.94	Skip band 1	0		
02.70	Forward/Reverse	Enabled		
03.10	Main acceleration ramp 1	20s		
03.30	Main deceleration ramp 3	20s		

Parameter	Label	Factory setting	Setting date :	Setting date :
07.29	AI2 destination	None		
07.27	AI2 100 % calibration	100		
04.36	Motor torque limit 2	110 % Mn		
05.12	Alarm 1 threshold	0		
05.22	Alarm 2 threshold	1500		
07.52	AO1 type selection	4/20mA		
07.57	AO1 100 % calibration	150		
07.62	AO2 type selection	4/20mA		
07.67	AO2 100 % calibration	1800		
04.04	Stability	4.0		

02.02	**Speed reference source**	**Terminal block**		
02.03	RS 485 reference enabled	No		
02.13	Additional speed reference	0		
02.14	No. 1 - No. 2 selection	Speed ref. no. 1		
02.15	Summing selection	No		
02.21	**PS1 reference**	**1500 min^{-1}**		
02.22	**PS2 reference**	**1000 min^{-1}**		
02.23	**PS3 reference**	**750 min^{-1}**		
02.24	PS4 reference	3000 min^{-1}		
02.25	PS5 reference	900 min^{-1}		
02.26	PS6 reference	1200 min^{-1}		
02.27	PS7 reference	1800 min^{-1}		
02.33	Motorized potentiometer function	Disabled		
02.34	Motorized potentiometer sensitivity	100 s^{-1}		
02.35	Motorized potentiometer memorisation	No		
02.40	Jogging reference	150 min^{-1}		
02.44	Locking of jogging zero reference	No		
02.50	**CDC-UMV speed reference**	**0**		
02.70	**Forward/Reverse**	**Enabled**		
02.81	**Minimum limit clockwise**	**0**		
02.82	Minimum limit anti-clockwise	0		
02.83	**Maximum limit clockwise**	**1500 min^{-1}**		
02.84	Maximum limit anti-clockwise	1500 min^{-1}		
02.85	Symmetry selection	Yes		
02.91	**Skip speed 1**	**0**		
02.92	Skip speed 2	0		
02.93	Skip speed 3	0		
02.94	**Skip band 1**	**0**		
02.95	Skip band 2	0		
02.96	Skip band 3	0		

Parameter	Label	Factory setting	Setting date :	Setting date :
03.03	Additional reference without ramp	0		
03.04	Starting speed	0		
03.05	Special ramp selection	No		
03.06	Special ramp rounding	10		
03.07	Ramp	Unlocked		
03.08	Ramp by-pass	No		
03.09	Main ramp mode	1		
03.10	**Main ramp 1**	**20.0s**		
03.11	Main ramp 2	20.0s		
03.12	Speed threshold on acceleration	8000 min^{-1}		
03.15	Acceleration/deceleration associated programming	Yes		
03.16	Associated programmable speeds and ramps	Yes		
03.21	Acceleration ramp 1/5	20.0s		
03.22	Acceleration ramp 2/6	20.0s		
03.23	Acceleration ramp 3/7	20.0s		
03.28	Jogging acceleration ramp	10.0s		
03.30	**Main ramp no. 3**	**20.0s**		
03.31	Main ramp no. 4	20.0s		
03.32	Speed threshold on deceleration	0		
03.41	Deceleration ramps 1/5	20.0s		
03.42	Deceleration ramps 2/6	20.0s		
03.43	Deceleration ramps 3/7	20.0s		
03.48	Jogging deceleration ramp	10.0s		
03.50	Special ramp type	S type		

04.03	Dynamic performance	1.0		
04.04	**Stability**	**4.0**		
04.05	Torque d/dt	10.00 %/ms		
04.10	Torque reference	0		
04.11	Control type	Speed		
04.12	Zero torque selection	No		
04.13	Torque offset	0		
04.14	Torque offset selection	0		
04.33	Limit 1 or limit 2 enable	Limit 2		
04.34	Torque limit 1 in motor mode	150 % Mn		
04.35	Time delay limit 1 --> 2	60 s		
04.36	**Torque limit 2 in motor mode**	**110 % Mn**		
04.37	Torque limit in generator mode	120 % Mn		

Parameter	Label	Factory setting	Setting date :	Setting date :
04.38	I gen = I motor limiting selection	Yes		
04.39	Limit 1 --> limit 2 select	04.35		
04.41	Current stability	4		
04.46	Energy saver	No		
04.69	Motor speed adaptation threshold	360V		
04.71	DC bus maximum voltage	650		
05.02	Current limit time threshold	60s		
05.10	Alarm 1 source	04.01		
05.12	Alarm 1 threshold	0		
05.13	Alarm 1 hysteresis	20		
05.14	Alarm 1 type	Underlevel		
05.15	Alarm 1 masking	60s		
05.16	Alarm 1 time delay	0		
05.20	Alarm 2 source	04.01		
05.22	Alarm 2 threshold	1500		
05.23	Alarm 2 hysteresis	20		
05.24	Alarm 2 type	Overlevel		
05.25	Alarm 2 masking	60s		
05.26	Alarm 2 time delay	0		
05.30	Alarm 3 source	No assignment		
05.32	Alarm 3 threshold	0		
05.33	Alarm 3 hysteresis	10		
05.34	Alarm 3 type	Overlevel		
05.35	Alarm 3 masking	60s		
05.36	Alarm 3 time delay	10s		
05.40	Alarm 4 source	No assignment		
05.42	Alarm 4 threshold	0		
05.43	Alarm 4 hysteresis	10		
05.44	Alarm 4 type	Overlevel		
05.45	Alarm 4 masking	60s		
05.46	Alarm 4 time delay	10s		
05.52	Alarm 5 period	9999 h		
05.54	Alarm 5 tripped	-		
05.55	Alarm 6 period	9999 h		
05.57	Alarm 6 tripped	-		
06.01	**Command source**	**Terminal block**		
06.02	Starting time delay	0		
06.03	**Starting**	**Controlled**		
06.04	Flying restart time delay	2s		

Parameter	Label	Factory setting	Setting date :	Setting date :
06.05	**Flying restart**	**No**		
06.06	Zero reference locked	No		
06.07	Semi manual starting	No		
06.10	Boost type	Fixed		
06.11	Boost level	0		
06.12	Type of ratio	Fixed		
06.40	Starting overtorque	0		
06.41	Flux time delay	250 ms		
06.42	Flux at stop	No		
06.43	Flux stop time delay	10s		
06.44	Locked rotor function	Fix torque		
06.50	Brake present	No		
06.51	Minimum current on brake engagement	0		
06.52	Brake release speed	0		
06.53	Brake engagement time	0.1s		
06.54	Brake release time	0.1s		
06.57	Braking resistor present	No		
06.58	Braking power (S1)	0		
06.59	Resistance time constant	180s		
06.62	Stopping mode	On ramp		
06.63	Stopping mode 1 (priority)	Freewheel		
06.64	Stopping mode for minor faults	On ramp		
06.71	Timed low speed setting	150 min^{-1}		
06.72	Low speed operation duration	5.0 s		
06.73	Speed for start of DC injection	150 min^{-1}		
06.74	Injection level	100 % In		
06.75	Duration of injection	5 s		

07.11	AI1 offset	0		
07.12	AI1 offset selection	No		
07.13	AI1 minimum calibration	0		
07.14	AI1 maximum calibration	100.00 %		
07.15	AI1 input polarity	2-pole		
07.17	**AI1 100 % calibration**	**1500**		
07.19	AI1 destination	Speed no.1		
07.21	AI2 offset	0		
07.22	AI2 offset selection	No		
07.23	AI2 minimum calibration	0		
07.24	AI2 maximum calibration	100.0 %		
07.25	AI2 input polarity	2-pole		

Parameter	Label	Factory setting	Setting date :	Setting date :
07.27	**AI2 100 % calibration**	100		
07.29	**AI2 destination**	**None**		
07.33	**AI3 0 % calibration**	**0**		
07.34	**AI3 100 % calibration**	1500		
07.35	AI3 input inversion	No		
07.36	**AI3 reference selection**	**4/20 mA**		
07.39	AI3 destination	Speed no. 2		
07.51	AO1 signal conversion	No		
07.52	**AO1 type selection**	**4 - 20 mA**		
07.53	**AO1 output filter**	**2**		
07.57	**AO1 100 % calibration**	**150**		
07.59	AO1 signal source	Total motor current		
07.61	AO2 signal conversion	No		
07.62	**AO2 type selection**	**4 - 20 mA**		
07.63	**AO2 output filter**	**2**		
07.67	**AO2 100 % calibration**	**1800**		
07.69	AO2 signal source	Motor speed		

08.11	DI1 destination	Select 1PS		
08.12	DI1 input inversion	No		
08.21	DI2 destination	Select 3PS		
08.22	DI2 input inversion	No		
08.31	DI3 destination	Stop 1		
08.32	DI3 input inversion	No		
08.41	DI4 destination	Select ref. N1-N2		
08.42	DI4 input inversion	No		
08.51	DI5 logic destination	Ramp locking		
08.52	DI5 input inversion	No		
08.61	REV input destination	Reverse/Stop		
08.62	REV input inversion	No		

09.11	RL1 source 1	Alarm 1 state		
09.12	RL1 source 1 inverted	No		
09.13	RL1 source 2	No assignment		
09.14	RL1 source 2 inverted	No		
09.15	RL1 relay inverted	Yes		
09.16	RL1 relay time delay	2 s		
09.17	RL1 relay selection	Single source		
09.21	RL2 source 1	UMV 3301 output		
09.22	RL2 source 1 inverted	No		

Parameter	Label	Factory setting	Setting date :	Setting date :
09.23	RL2 source 2	No assignment		
09.24	RL2 source 2 inverted	No		
09.25	RL2 relay inverted	No		
09.26	RL2 relay time delay	2.0 s		
09.27	RL2 relay selection	Single source		
09.31	DO1 source	I limit reached		
09.32	DO1 source inverted	No		
09.36	DO1 output time delay	2.0 s		
09.41	DO2 source	UMV fault		
09.42	DO2 source inverted	Yes		
09.46	DO2 output time delay	2.0 s		
09.51	DO3 logic information source	Alarm 2 state		
09.52	DO3 source inversion	No		
09.54	DO3 scaling ✦	0.033		
09.56	DO3 output time delay	2.0 s		
09.57	DO3 output mode ✦	Logic output		

10.01	Reset origin	Terminal block + CDC-UM + RS 485		
10.02	**Reset mode**	**Controlled**		
10.03	Number of authorised resets	3		
10.04	Automatic reset time delay	10.0 s		
10.05	Mains fault	Major fault		
10.06	Mains undervoltage threshold	300V		
10.07	Mains fault time delay	0.50 s		
10.09	Motor thermal fault	Minor fault		
10.10	Motor PTC fault	Minor fault		
10.11	RS 485 serial link fault	Minor fault		
10.12	CDC - UMV fault	Disabled		
10.13	4 - 20mA break processing	Disabled		
10.15	Monitoring direction of rotation	Disabled		
10.16	Motor phase break	Disabled		
10.20	Current limit time	Disabled		
10.21	Alarm 1 destination	Disabled		
10.22	Alarm 2 destination	Disabled		
10.23	Alarm 3 destination	Disabled		
10.24	Alarm 4 destination	Disabled		

Parameter	Label	Factory setting	Setting date :	Setting date :
12.11	Threshold No. 1 source	04.01		
12.12	Threshold No. 1 level	9999		
12.13	Threshold No. 1 hysteresis	2		
12.14	Threshold No. 1 inversion	No		
12.15	Threshold No. 1 destination	None		
12.21	Threshold No. 2 source	04.01		
12.22	Threshold No. 2 level	9999		
12.23	Threshold No. 2 hysteresis	2		
12.24	Threshold No. 2 inversion	No		
12.25	Threshold No. 2 destination	None		
13.01	Serial link address	11		
13.02	Speed	9600 bauds		
13.03	Parity	Odd		
13.04	Serial link monitoring	No		
13.05	Monitoring period	10		
13.06	Serial link self-test	No		
13.08	Parameter-setting mode	CDC-UMV		
13.10	MODBUS control	MODBUS		
13.11	Inhibit MODBUS control	No		
14.21	Programmable PID reference 1	0		
14.22	Programmable PID reference 2	0		
14.23	Programmable PID reference 3	0		
14.25	PID ramp	600.0		
14.31	PID feedback inversion	No		
14.32	PID feedback source	-		
14.41	PID proportional gain	10		
14.42	PID integral gain	10		
14.43	PID derivative gain ✦	0		
14.44	PID low limit	0		
14.45	PID high limit	+8000		
14.46	PID integral locked	No		
14.47	Scaling of PID output	1.00		
14.48	PID output summing	No		
14.49	PID additionnal reference	0		
14.50	PID enabled	No		
14.51	Programmable condition	Always enabled		
14.52	Programmable condition inversion	No		
14.60	PID destination	None		

Parameter	Label	Factory setting	Setting date :	Setting date :
15.01	Weighing enabled	No		
15.02	Weighing speed	1500 min^{-1}		
15.03	Weighing time delay	0.4s		
15.04	Weighing ramp	20s		
15.05	B up	0		
15.06	A up	100		
15.07	B down	0		
15.08	A down	100		
15.13	External load measurement	No		
15.14	Weighing threshold	50 % Mn		
15.15	Speed limit	3000 min^{-1}		
15.17	Stepper limitation threshold	33 % Mn		
15.20	Limiting selection	With step		
15.21	Low speed limiting	50 min^{-1}		

NOTES

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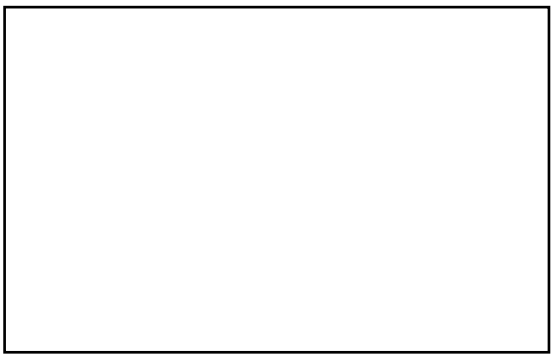

MOTEURS LEROY-SOMER 16015 ANGOULÊME CEDEX - FRANCE

RCS ANGOULÊME N° B 671 820 223
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Version	Nature de l'évolution	Paragraphes concernés
b - 6.98	Notice de base	
c - 6.00	• Modification of software version	Page 2
	• Modification of filter references	Preface
	• Modification of drive power and speed range	1.1
	• Addition of " TH " ratings	1.2
	• Addition of electrical characteristics for UMV 265T and all " TH " ratings	1.3.1 & 1.3.2
	• Modification of the characteristic table for " T " ratings	1.3.1 & 1.3.2
	• Addition of smoothing choke characteristics for ratings " TH "	1.3.3
	• Addition of fast stopping mode details and suppression of jogging in indexed stopping mode	1.3.4
	• Suppression of one dedicated input	1.3.4
	• Addition of TH-UMV and T-UMV 220 modules	1.3
	• Modification of vibration standard ans shock peak acceleration	1.4.1
	• Addition of ingress protection for UMV 3301 265T and " TH " ratings	1.4.1
	• Addition of losses and forced ventilation flow for UMV 265T and " TH " ratings	1.4.2
	• Modification of losses for 180T and 220T, modification of forced ventilation flow for 120T and 150T	1.4.2
	• Addition of weight and dimensions for 265T and all " TH " ratings	1.5.1
	• Modification of dimensions for 180T and 220T	1.5.1
	• Suppression of smoothing choke details	1.5.2, 2.1 & 2.5
	• Modification on the table for the drive handling (modification of 180T, 220T and addition of 265T and all " TH " ratings)	2.2
	• Modification of dimensions for fixing 180T & 220T	2.4
	• Addition of dimensions for fixing 265T and all " TH " ratings	2.4
	• Modification of the access to the terminal blocks	3.2.1.1
	• Modification of the power terminal blocks	3.2.2
	• Modification of the control terminal blocks	3.2.3
	• Modification of the factory setting for DO3	3.2.4.2
	• Addition of a drawing and modification of the voltage range for supplying drives by DC bus	3.2.5.3
	• Modification of the RFI filters and addition of the " TH " ratings	3.3.6.2
	• Addition of a warning about the use of RFI filters on a IT power supply	3.3.6.2

Version	Nature de l'évolution	Paragraphes concernés
c - 6.00 (suite)	• Addition of a table for " TH " rating fuses and cables and modification of the table for " T " ratings	3.4
	• Addition of the recommended fuses and cables for 265T	3.4
	• Suppression of the smoothing choke and the " MC " self on the diagram	3.5
	• Modification of the supply on P22	3.5
	• Translation of the display in English	4.1.2 to 4.1.8
	• Modification of the factory setting for 01.25 and 01.30	4.3.1 & 4.3.2
	• Suppression of 01.40 to 01.42, 08.55 to 08.59, 09.54, 09.55, 09.57, 10.18, 10.14 & 10.60	4.3.1, 4.3.2, 4.5.7, 4.5.8 & 4.5.9
	• Addition of a diagram for 01.02	4.3.2
	• Addition of the permitted overload depending of 01.04	4.3.2
	• Suppression of the factory setting table for 01.21	4.3.2
	• Modification of the name for 02.30 to 02.34	4.5.1
	• Modification of the description for 02.31 to 02.33	4.5.1
	• 02.35, 02.44, 03.05, 03.06, 03.50, 04.81, 04.82, 05.50 to 05.57, 10.15, 10.16, 10.62, 13.08, 13.10, 13.11, 15.01 to 15.08, 15.10 to 15.16 and 15.20 to 15.22 become available	4.5.1, 4.5.2, 4.5.3, 4.5.4, 4.5.9, 4.5.12 & 4.5.14
	• Addition of menu 15 limitation on the diagram	4.5.1.3
	• The lock integration of the ramps has been moved	4.5.2.3 & 4.5.2.4
	• Addition of 04.05, 04.33, 04.39, 04.69, 04.90 and 04.92	4.5.3
	• Modification of the range for 04.04	4.5.3.1
	• Modification of all the diagram for menu 04	4.5.3.3
	• Modification of the range of 05.51	4.5.4
	• Modification of the source list	4.5.4.1 & 4.5.8.1
	• Addition of 06.07 and 06.40 to 06.44	4.5.5
	• Modification of the range for 07.17, 07.27, 07.28, 07.33, 07.34, 07.38, 07.57, 07.67 and 07.80	4.5.6
	• Addition of 07.53 and 07.63	4.5.6
	• Modification assignment and source lists	4.5.6.1
	• Modification of the source lists	4.5.7.1
	• Addition of indexed stopping mode block on DI5	4.5.7.3
	• Modification of the range and the factory setting of 09.54	4.5.8

Version	Nature de l'évolution	Paragraphes concernés
c - 6.00 (fin)	• Suppression of the note about 10.31(*) and the list of display	4.5.9.1
	• Modification of the source and assignment list	4.5.11.1
	• Addition of a warning for 13.10	4.5.12.2
	• Modification of the range for 14.01, 14.10, 14.20, 14.21 to 14.23, 14.30, 14.40, 14.44, 14.45	4.5.13
	• Addition of 14.32, 14.48 and 14.49	4.5.13
	• Addition of the source list for 14.32	4.5.13.1
	• Modification of the assignment list for 14.60	4.5.13.1
	• Modification of the diagram	4.5.13.3
	• Addition of 15.17	4.5.14
	• Modification of some parameters of menu 15	4.5.14.2
	• Addition of 02.80 in the diagram	4.5.14.3
	• Addition of comments on menu 16, 17 and 19	4.5.15, 4.5.16 & 4.5.17
	• Translation of the trips in English	5.2
	• Modification of all the spare part list according to the changes for 265T and " TH " ratings	6.4
	• Modification of the link on switch P7	6.4.3
	• Addition of an explanation about the use of switch S1	6.4.3
	• Addition of the braking modules T-UMV 220, the selection for 265T and all " TH " ratings	7.1
	• Addition of R-UMV 37500T and suppression of 90000T	7.2
	• Modification of filter types (electrical and mechanical characteristics)	7.3
	• Addition of one type of Self-MC choke	7.4
d - 01.01	• Software version updated	Page 2
	• Chokes for a supply voltage imbalance of 2 % or more added	1.4.1
	• Addition of the UL requirements	1.3.1 - 1.3.2 3.2.4.2 - 3.4 - 6.4.1
	• Addition of the maximum terminal screw torque	3.2.2.1
	• Modification of a warning when external power is provided	3.2.3
	• Modification of the filter reference tables	3.3.6.2
	• Addition of a warning on terminal screw torque	3.4
	• Addition of a warning on an additional maximum speed detection	4.5.1.2