

Altivar 12

Variable speed drives
for asynchronous motors

User manual

05/2013



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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

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Failure to observe this information can result in injury or equipment damage.

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Energy savings

Speed control process regulating enables significant energy savings, particularly with pump and fan applications.

Furthermore some ATV12 functions enable to enhance these savings: **[Motor control type]** (**C E E**) page [57](#), **[Sleep/wake]** (**E L 5**) page [74](#) and **[PID feedback assignment]** (**P 1 F**) page [72](#).

Important information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result** in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury or equipment damage.

CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

NOTICE

NOTICE, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result** in equipment damage.

PLEASE NOTE

The word "drive" as used in this manual refers to the controller portion of the adjustable speed drive as defined by NEC.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this product.

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Before you begin

Read and understand these instructions before performing any procedure with this drive.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.
- Many components of the product, including the printed circuit boards, operate with mains voltage. Do not touch. Use only electrically insulated tools.
- Do not touch unshielded components or terminals with voltage present.
- Motors can generate voltage when the shaft is rotated. Before performing any type of work on the drive system, block the motor shaft to prevent rotation.
- AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors of the motor cable.
- Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.
- Before performing work on the drive system:
 - Disconnect all power, including external control power that may be present.
 - Place a "Do Not Turn On" label on all power switches.
 - Lock all power switches in the open position.
 - Wait 15 minutes to allow the DC bus capacitors to discharge. The DC bus LED is not an indicator of the absence of DC bus voltage that can exceed 800Vdc.
 - Measure the voltage on the DC bus between the DC bus terminals using a properly rated voltmeter to verify that the voltage is < 42Vdc.
 - If the DC bus capacitors do not discharge properly, contact your local Schneider Electric representative.
- Install and close all covers before applying voltage.

Failure to follow these instructions will result in death or serious injury.

DANGER

UNINTENDED EQUIPMENT OPERATION

- Read and understand this manual before installing or operating the Altivar 12 drive.
- Any changes made to the parameter settings must be performed by qualified personnel.

Failure to follow these instructions will result in death or serious injury.

WARNING

DAMAGED DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Before you begin

WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage, and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.^a
- Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

a. For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable Speed Drive Systems."

CAUTION

INCOMPATIBLE LINE VOLTAGE

Before turning on and configuring the drive, ensure that the line voltage is compatible with the supply voltage range shown on the drive nameplate. The drive may be damaged if the line voltage is not compatible.

Failure to follow these instructions can result in injury or equipment damage.

Using motors in parallel

Set [Motor control type](#) **C E E** page [57](#) to **S E d**.

NOTICE

RISK OF DAMAGE TO THE MOTOR

Motor thermal protection is no longer provided by the drive. Provide an alternative means of thermal protection on every motor

Failure to follow these instructions can result in equipment damage

Documentation structure

The following Altivar 12 technical documents are available on the Schneider Electric website (www.schneider-electric.com).

ATV12 Quick Start Guide (S1A56146)

The Quick Start describes how to wire and configure the drive to start motor quickly and simply for simple applications. This document is delivered with the drive with an Annex (S1A58684) for Short Circuit Current Ratings (SCCR) and branch circuit protection.

ATV12 User manual (BBV28581)

This manual describes how to install, program and operate the drive.

ATV12 Modbus Communication manual (BBV28590)

This manual describes the assembly, connection to the bus or network, signaling, diagnostics, and configuration of the communication-specific parameters via the 7 segment LED display.

It also describes the communication services of the Modbus protocol.

This manual includes all Modbus addresses. It explains the operating mode specific to communication (state chart).

ATV12P Installation manual (BBV28587)

This manual describes how to install the drive ATV12 baseplate following the conditions of acceptability.

ATV12 Parameters description file

All the parameters are grouped together in an Excel file with the following data:

- Code
- Name
- Modbus Addresses
- Category
- Read/write access
- Type: signed numerical, unsigned numerical, etc.
- Unit
- Factory setting
- Minimum value
- Maximum value
- Display on the 7-segment integrated display terminal
- Relevant menu

This file offers the option of sorting and arranging the data according to any criterion chosen by the user.

Software enhancements

Since it was first marketed, the Altivar ATV 12 has been equipped with additional functions. Software version V1.2 has now been updated to V1.4. This documentation relates to version V1.4.

The software version appears on the rating plate attached to the side of the drive.

Enhancements made to version V1.2 in comparison to V1.1

- New parameters:
 - Sleep threshold Offset **S L E**. See page [75](#).
 - PI feedback supervision threshold **L P I**. See page [76](#).
 - PI feedback supervision function time delay **t P I**. See page [76](#).
 - Maximum frequency detection hysteresis **h P D**. See page [76](#).
 - PI feedback supervision **h P I**. See page [76](#).
 - Fallback speed **L F F**. See page [76](#).
 - Time delay before automatic start for the overload fault **F t O**. See page [77](#).
 - Time delay before automatic start for the underload fault **F t U**. See page [78](#).
 - Selecting the operating mode **h d E**. See page [78](#).
 - Starting frequency of the auxiliary pump **F D n**. See page [78](#).
 - Time delay before starting the auxiliary pump **t D n**. See page [78](#).
 - Ramp for reaching the auxiliary pump nominal speed **r D n**. See page [78](#).
 - Auxiliary pump stopping frequency **F D F**. See page [78](#).
 - Time delay before the auxiliary pump stop command **t D F**. See page [79](#).
 - Ramp for auxiliary pump stopping **r D F**. See page [79](#).
 - Zero flow detection period **n F d**. See page [79](#).
 - Zero flow detection activation threshold **F F d**. See page [79](#).
 - Zero flow detection offset **L F d**. See page [79](#).
- New menu Pump sub-menu **P h P -**. See page [77](#). For pumping applications.
- New quick REMOTE/LOCAL configuration switching using the embedded buttons. See page [34](#).
- New wiring labels, LO+ and LO- instead of LO and CLO, see pages [18](#) and [19](#).

Enhancements made to version V1.4 in comparison to V1.2

- New menu:
 - External fault **E t F -**. See page [97](#). For External fault management by logic input.
- New parameters:
 - External fault assignment **E t F**. See page [97](#).
 - Stop type - external fault **E P L**. See page [97](#).
- New detected fault:
 - External detected fault by logic input **E P F I**. See page [111](#).

These parameters are added to the standard ATV12 product offer.

Steps for setting up (also refer to Quick Start)

1. Receive and inspect the drive

- Check that the part number printed on the label is the same as that on the purchase order.
- Remove the Altivar from its packaging and check that it has not been damaged in transit.

2. Check the line voltage

- Check that the line voltage is compatible with the voltage range of the drive (page [11](#)).

3. Mount the drive

- Mount the drive in accordance with the instructions in this document (page [13](#)).
- Install any options required.

Steps 2 to 4 must be performed with the **power off**.



4. Wire the drive (page [20](#))

- Connect the motor, ensuring that its connections correspond to the voltage.
- Connect the line supply, after making sure that the power is off.
- Connect the control part.

5. Configure the drive (page [32](#))

- Apply input power to the drive but do not give a run command.
- Set the motor parameters (in Conf mode) only if the factory configuration of the drive is not suitable.
- Perform auto-tuning.

6. Start

Setup - Preliminary recommendations

Before switching-on the drive

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Ensure that all logic inputs are inactive to help prevent an accidental startup.

Failure to follow these instructions will result in death or serious injury.

Before configuring the drive

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Read and understand this manual before installing or operating the Altivar 12 drive.
- Any changes made to the parameter settings must be performed by qualified personnel.
- Ensure that all logic inputs are inactive to help prevent an accidental startup when modifying parameters.

Failure to follow these instructions will result in death or serious injury.

Using the drive with motor having a different size

The motor could have different rating than drive. In case of smaller motor, there is no specific calculation. The motor current has to be set on [Motor thermal current I_{LH}](#) parameter page [94](#). In case of higher size of motor, possible up to 2 sizes (example is using a 4 kW (5.5 HP) on a 2.2 kW (3 HP) drive) it is necessary to ensure motor current and actual motor power will not pass over nominal power of drive.

Line contactor

NOTICE

RISK OF DAMAGE TO THE DRIVE

- Avoid operating the contactor frequently to avoid premature aging of the filter capacitors.
- Power cycling must be MORE than 60 seconds.

Failure to follow these instructions can result in equipment damage.

Use with a smaller rated motor or without a motor

- In factory settings mode, [Output Phase loss OPL](#) page [94](#) is active ([OPL](#) set to [YES](#)). To check the drive in a test or maintenance environment without having to switch to a motor with the same rating as the drive (useful in the case of high power drives), deactivate [Output Phase loss OPL](#) ([OPL](#) set to [nD](#)).
- Set [Motor control type CLE](#) page [57](#) to [Std](#) in Motor control menu [drc](#).

NOTICE

RISK OF DAMAGE TO THE MOTOR

Motor thermal protection will not be provided by the drive if the motor rating current is less than 20% of the rated drive current. Provide an alternative means of thermal protection.

Failure to follow these instructions can result in equipment damage.

Drive ratings

1-phase supply voltage: 100...120 V 50/60 Hz

For 3-phase Output 200/240 V motors

Motor		Line supply (input)				Drive (output)			Reference (2)	Size (3)
		Maximum line current		Apparent power	Power dissipated at nominal current (1)	Nominal current In	Max. transient current for			
Power indicated on plate (1)		at 100 V	at 120 V						60 s	2 s
kW	HP	A	A	kVA	W	A	A	A		
0.18	0.25	6	5	1	18	1.4	2.1	2.3	ATV12H018F1	1C1
0.37	0.5	11.4	9.3	1.9	29	2.4	3.6	4	ATV12H037F1	1C1
0.75	1	18.9	15.7	3.3	48	4.2	6.3	6.9	ATV12H075F1	2C1

1-phase supply voltage: 200...240 V 50/60 Hz

For 3-phase Output 200/240 V motors

Motor		Line supply (input)				Drive (output)			Reference (2)	Size (3)
		Maximum line current		Apparent power	Power dissipated at nominal current (1)	Nominal current In	Max. transient current for			
Power indicated on plate (1)		at 200 V	at 240 V						60 s	2 s
kW	HP	A	A	kVA	W	A	A	A		
0.18	0.25	3.4	2.8	1.2	18	1.4	2.1	2.3	ATV12H018M2	1C2
0.37	0.5	5.9	4.9	2	27	2.4	3.6	4	ATV12H037M2	1C2
0.55	0.75	8	6.7	2.8	34	3.5	5.3	5.8	ATV12H055M2	1C2
0.75	1	10.2	8.5	3.5	44	4.2	6.3	6.9	ATV12H075M2	1C2
1.5	2	17.8	14.9	6.2	72	7.5	11.2	12.4	ATV12HU15M2	2C2
2.2	3	24	20.2	8.4	93	10	15	16.5	ATV12HU22M2	2C2

3-phase supply voltage: 200...240 V 50/60 Hz

For 3-phase Output 200/240 V motors

Motor		Line supply (input)				Drive (output)			Reference (2)	Size (3)
		Maximum line current		Apparent power	Power dissipated at nominal current (1)	Nominal current In	Max. transient current for			
Power indicated on plate (1)		at 200 V	at 240 V						60 s	2 s
kW	HP	A	A	kVA	W	A	A	A		
0.18	0.25	2	1.7	0.7	16	1.4	2.1	2.3	ATV12H018M3	1C3
0.37	0.5	3.6	3	1.2	24	2.4	3.6	4	ATV12H037M3	1C3
0.75	1	6.3	5.3	2.2	41	4.2	6.3	6.9	ATV12H075M3	1C3
1.5	2	11.1	9.3	3.9	73	7.5	11.2	12.4	ATV12HU15M3	2F3
2.2	3	14.9	12.5	5.2	85	10	15	16.5	ATV12HU22M3	2F3
3	4	19	15.9	6.6	94	12.2	18.3	20.1	ATV12HU30M3	3F3
4	5.5	23.8	19.9	8.3	128	16.7	25	27.6	ATV12HU40M3	3F3

(1) These power ratings are for a switching frequency of 4 kHz, in continuous operation. The switching frequency is adjustable from 2 to 16 kHz.

Above 4 kHz, the drive will reduce the switching frequency if an excessive temperature rise occurs. The temperature rise is detected by a probe in the power module. Nonetheless, derating should be applied to the nominal drive current if continuous operation above 4 kHz is required:

- 10% derating for 8 kHz
- 20% derating for 12 kHz
- 30% derating for 16 kHz

(2) **Reference description**, example: ATV12HU15M3

ATV12: Altivar 12;

H: product on heatsink;

U15: drive power rating,

see **nCU** parameter page 41;

M3: drive voltage rating,

see **UCAL** parameter page 41.

(3) Size description

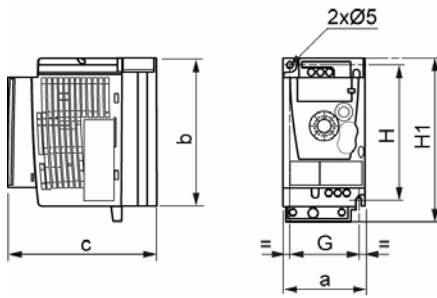
[2]
possible values 1 physical size 1
2 physical size 2
3 physical size 3

[F]
possible values F Flat
C Compact

[3]
possible values 1 100 V 1-phase
2 200 V 1-phase
3 200 V 3-phase

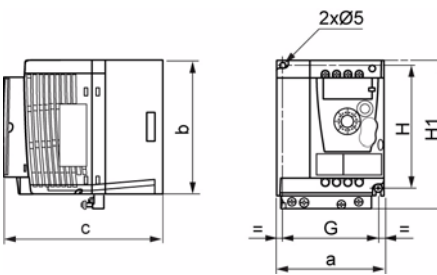
Dimensions and weights

ATV12H018F1, 018M2, 037F1, 037M2, 037M3, 018M2, 018M3, 055M2, 075M2



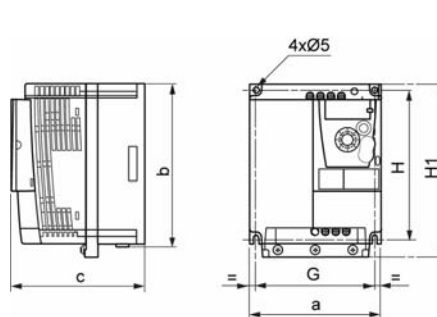
ATV12H	a mm (in.)	b mm (in.)	c mm (in.)	G mm (in.)	H mm (in.)	H1 mm (in.)	Ø mm (in.)	For screws	Weight kg (lb)
018F1 018M2 018M3	72 (2.83)	142 (5.59)	102.2 (4.02)	60 (2.36)	131 (5.16)	143 (5.63)	2 x 5 (2 x 0.20)	M4	0.7 (1.5)
037F1 037M2 037M3	72 (2.83)	130 (5.12)	121.2 (4.77)	60 (2.36)	120 (4.72)	143 (5.63)	2 x 5 (2 x 0.20)	M4	0.8 (1.8)
055M2 075M2 075M3	72 (2.83)	130 (5.12)	131.2 (5.17)	60 (2.36)	120 (4.72)	143 (5.63)	2 x 5 (2 x 0.20)	M4	0.8 (1.8)

ATV12H075F1, U15M2, U22M2, U15M3, U22M3



ATV12H	a mm (in.)	b mm (in.)	c mm (in.)	G mm (in.)	H mm (in.)	H1 mm (in.)	Ø mm (in.)	For screws	Weight kg (lb)
075F1	105 (4.13)	130 (5.12)	156.2 (6.15)	93 (3.66)	120 (4.72)	142 (5.59)	2 x 5 (2 x 0.20)	M4	1.3 (2.9)
U15M2 U22M2	105 (4.13)	130 (5.12)	156.2 (6.15)	93 (3.66)	120 (4.72)	142 (5.59)	2 x 5 (2 x 0.20)	M4	1.4 (3.1)
U15M3 U22M3	105 (4.13)	130 (5.12)	131.2 (5.17)	93 (3.66)	120 (4.72)	143 (5.63)	2 x 5 (2 x 0.20)	M4	1.2 (2.6)

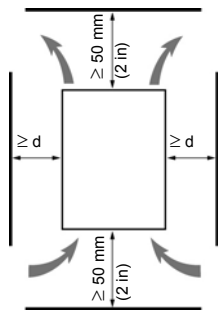
ATV12HU30M3, U40M3



ATV12H	a mm (in.)	b mm (in.)	c mm (in.)	G mm (in.)	H mm (in.)	H1 mm (in.)	Ø mm (in.)	For screws	Weight kg (lb)
U30M3 U40M3	140 (5.51)	170 (6.69)	141.2 (5.56)	126 (4.96)	159 (6.26)	184 (7.24)	4 x 5 (2 x 0.20)	M4	2.0 (4.4)

Mounting

Mounting and temperature conditions



Install the unit vertically, at $\pm 10^\circ$.

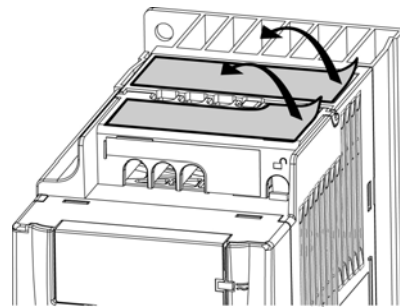
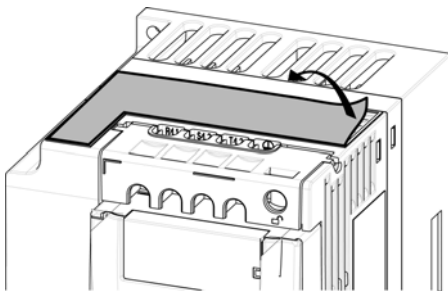
Do not place it close to heating elements.

Leave sufficient free space to ensure that the air required for cooling purposes can circulate from the bottom to the top of the unit.

Free space in front of unit: 10 mm (0.4 in.) minimum.

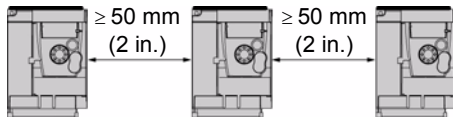
It is recommended that the drive is installed on a dissipative surface.

Removing the vent cover(s)



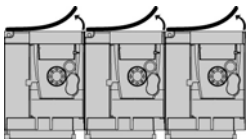
Mounting types

Type A mounting



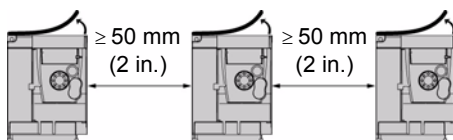
Free space ≥ 50 mm (2 in.) on each side, with vent cover fitted. Mounting type A is suitable for drive operation at surrounding air temperature less than or equal to 50°C (122°F) and 40°C (104°F) for UL.

Type B mounting



Drives mounted side-by-side, vent cover should be removed.

Type C mounting



Free space ≥ 50 mm (2 in.) on each side. Vent cover should be removed for operation at surrounding air temperature above 50°C (122°F).

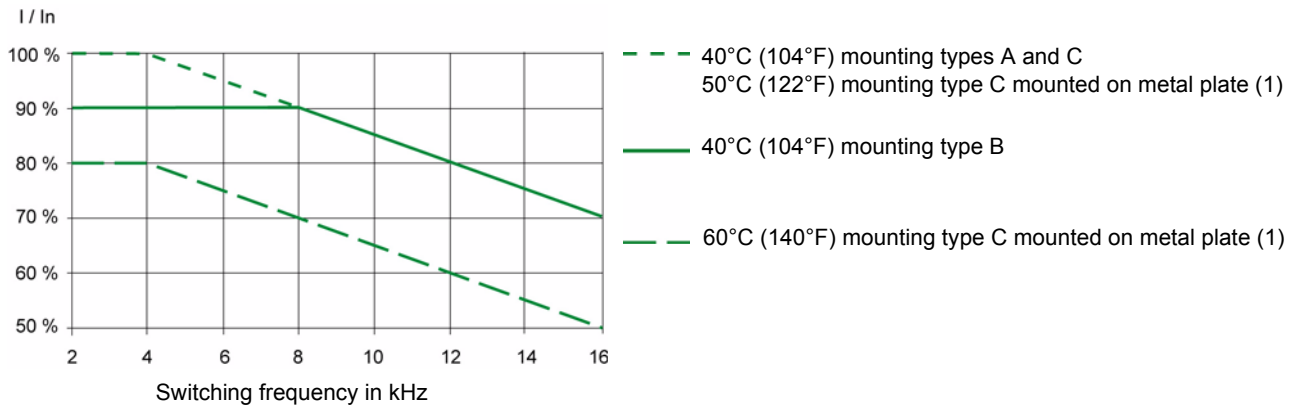
With these types of mounting, the drive can be used up to an ambient temperature of 50°C (122°F), with a switching frequency of 4 kHz. Fanless drives need derating.

Mounting

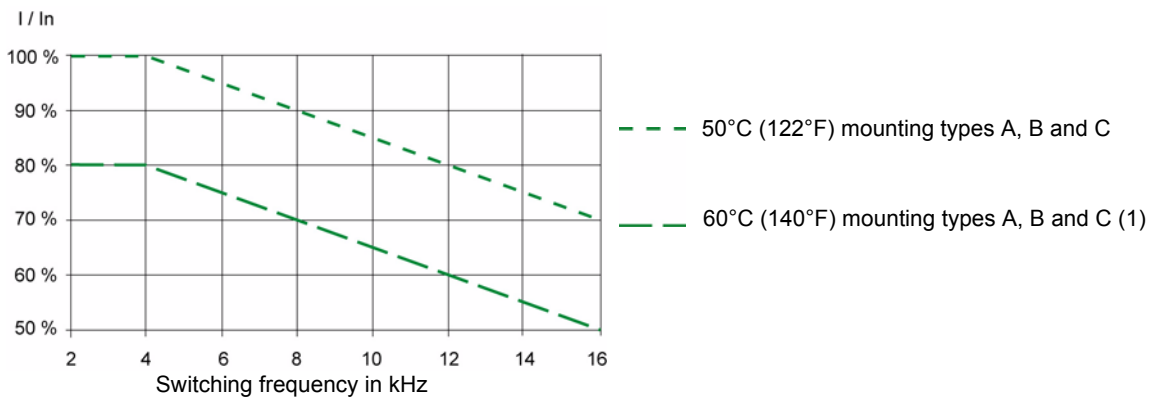
Derating curves

Derating curves for the nominal drive current (I_n) as a function of temperature, switching frequency and mounting type.

ATV12H0●●M2, ATV12H0●●M3, ATV12H018F1 to ATV12H037F1



ATV12HU●●M2, ATV12H075F1, ATV12HU15M3 to ATV12HU40M3



For intermediate temperatures (for example 55°C (131°F)), interpolate between 2 curves.
(1) Not UL recognized.

Bus voltage measurement procedure

⚡ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in "Before you begin" on page 5 before performing this procedure.

Failure to follow these instructions will result in death or serious injury.

Mounting

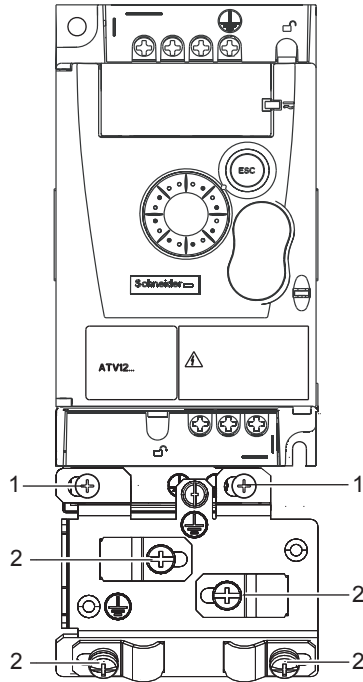
Installing the EMC plates

EMC mounting plate: size 1 VW3A9523, size 2 VW3A9524 or size 3 VW3A9525 to be ordered separately

Mount the EMC mounting plate to the holes in the ATV12 using the 2 screws supplied, as shown in the drawings below.

Size 1, plate reference VW3A9523:

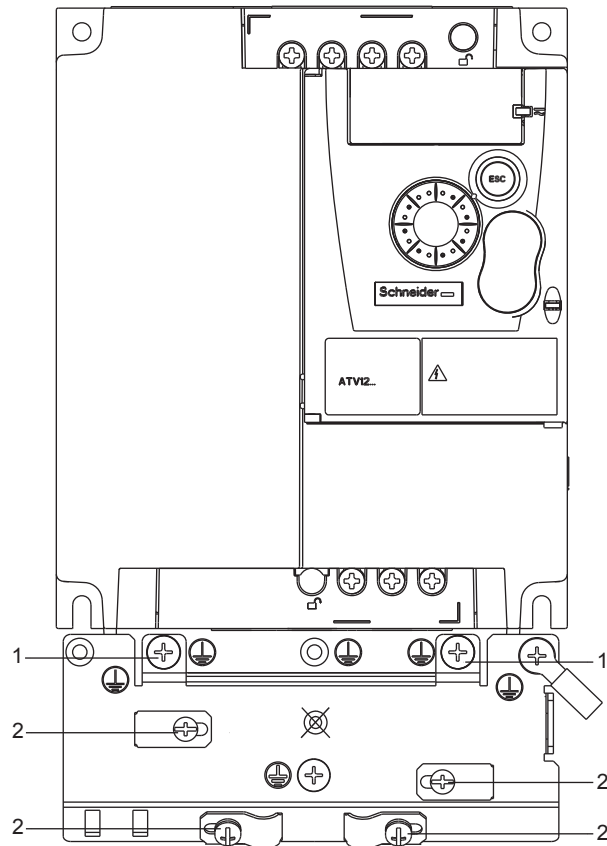
**ATV12H018F1, ATV12H037F1, ATV12P037F1,
ATV12H018M2, ATV12●0●●M2, ATV12●0●●M3**



1. 2 mounting screws
2. 4 x M4 screws for attaching EMC clamps

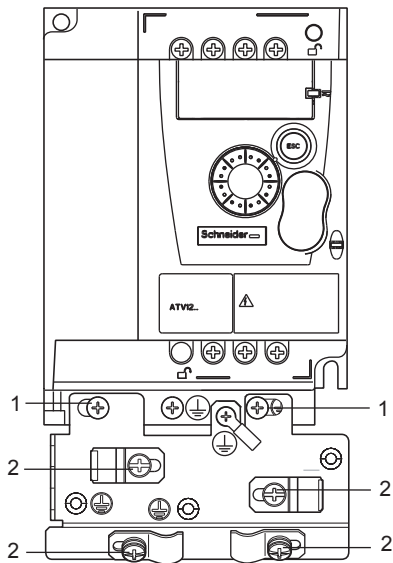
Size 3, plate reference VW3A9525:

ATV12●U30M3 and ATV12●U40M3



Size 2, plate reference VW3A9524:

**ATV12H075F1, ATV12HU●●M2, ATV12●U15M3,
ATV12●U22M3**



Wiring

Recommendations

Keep the power cables separate from control circuits with low-level signals (detectors, PLCs, measuring apparatus, video, telephone). Always cross control and power cables at 90° if possible.

Power and circuit protection

Follow wire size recommendations according to local codes and standards.

Before wiring power terminals, connect the ground terminal to the grounding screws located below the output terminals (see Access to the motor terminals if you use ring terminals, page 21).

The drive must be grounded in accordance with the applicable safety standards. ATV12●●●●M2 drives have an internal EMC filter, and as such the leakage current is over 3.5 mA.

When upstream protection by means of a "residual current device" is required by the installation standards, a type A circuit breaker should be used for 1-phase drives and type B for 3-phase drives. Choose a suitable model incorporating:

- HF current filtering
- A time delay which prevents tripping caused by the load from stray capacitance on power-up. The time delay is not possible for 30 mA devices. In this case, choose devices with immunity against accidental tripping, for example RCDs with **SI** type leakage current protection.

If the installation includes several drives, provide one "residual current device" per drive.

Control

For control and speed reference circuits, it is recommended to use shielded twisted cables with a pitch of between 25 and 50 mm (1 and 2 in.), connecting the shield to ground as outlined on page 26.

Length of motor cables

For motor cable lengths longer than 50 m (164 ft) for shielded cables and longer than 100 m (328 ft) for unshielded cables, please use motor chokes.

For accessory part numbers, refer to the catalog.

Equipment grounding

Ground the drive according to local and national code requirements. A minimum wire size of 10 mm² (6 AWG) may be required to meet standards limiting leakage current.

⚡ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The drive panel must be properly grounded before power is applied.
- Use the provided ground connecting point as shown in the figure below.

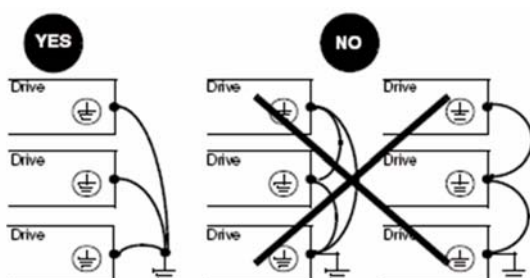
Failure to follow these instructions will result in death or serious injury.

⚡ ⚠ DANGER

ATV12H075F1, ATV12H075M2 AND ATV12H075M3 - GROUND CONTINUITY HAZARD

An anodized heatsink can create an insulation barrier to the mounting surface. Ensure that you follow the recommended grounding connections.

Failure to follow these instructions will result in death or serious injury.



- Ensure that the resistance of the ground is one ohm or less.
- When grounding several drives, you must connect each one directly, as shown in the figure to the left.
- Do not loop the ground cables or connect them in series.

WARNING

RISK OF DRIVE DESTRUCTION

- The drive will be damaged if input line voltage is applied to the output terminals (U/T1,V/T2,W/T3).
- Check the power connections before energizing the drive.
- If replacing another drive, verify that all wiring connections to the drive comply with wiring instructions in this manual.

Failure to follow these instructions can result in death, serious injury or equipment damage.

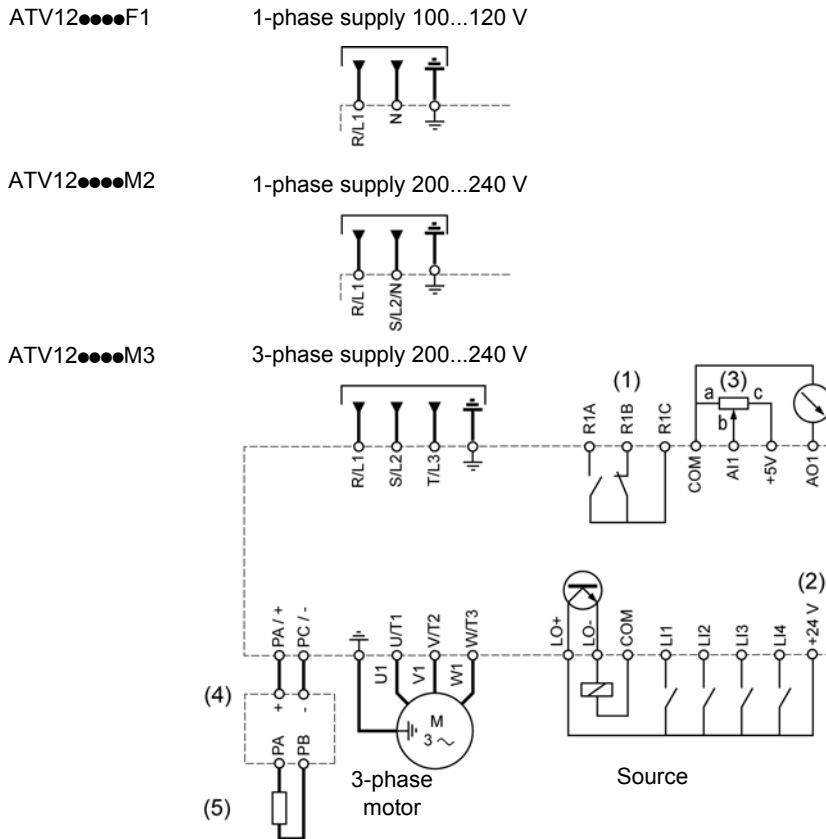
WARNING

INADEQUATE OVERCURRENT PROTECTION

- Overcurrent protective devices must be properly coordinated.
- The Canadian Electrical Code and the National Electrical Code require branch circuit protection. Use the fuses recommended in the Quick Start Annex (S1A58684) delivered with the drive.
- Do not connect the drive to a power feeder whose short-circuit capacity exceeds the drive short-circuit current rating listed in the Quick Start Annex (S1A58684) delivered with the drive.

Failure to follow these instructions can result in death, serious injury or equipment damage.

General wiring diagram



(1) R1 relay contacts, for remote indication of the drive status, see page 52

If intermittent **DSF** code appear, set Relay R1 to **FLE** and it can be connected to upstream protection to avoid overvoltage in the drive. In this case **LDI** can be used for others drive status see page 53

(2) Internal + 24 V \equiv . If an external source is used (+ 30 V \equiv maximum), connect the 0 V of the source to the COM terminal, and do not use the + 24 V \equiv terminal on the drive.

(3) Reference potentiometer SZ1RV1202 (2.2 k Ω) or similar (10 k Ω maximum).

(4) Optional braking module VW3A7005

(5) Optional braking resistor VW3A7●●● or other acceptable resistor. See the possible resistor values in the catalog.

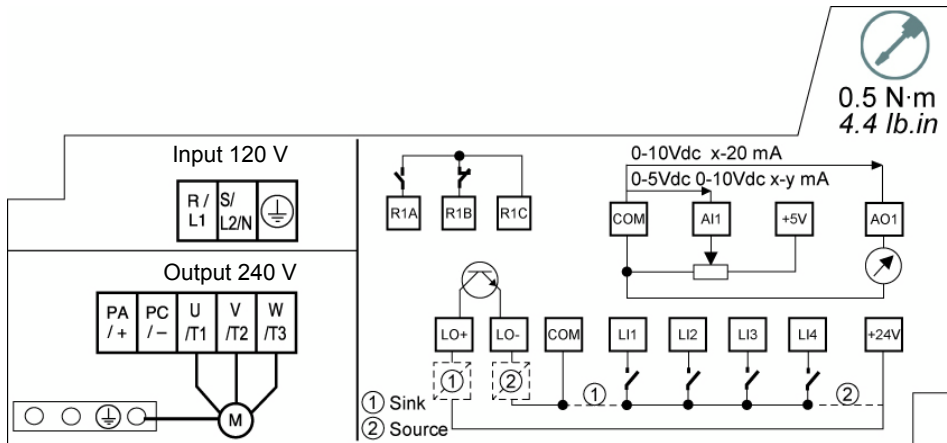
Note:

- Use transient voltage surge suppressors for all inductive circuits near the drive or coupled to the same circuit (relays, contactors, solenoid valves, etc.).
- The ground terminal (green screw) is located on the opposite side in comparison with its position on the ATV11 (see wiring trap label).

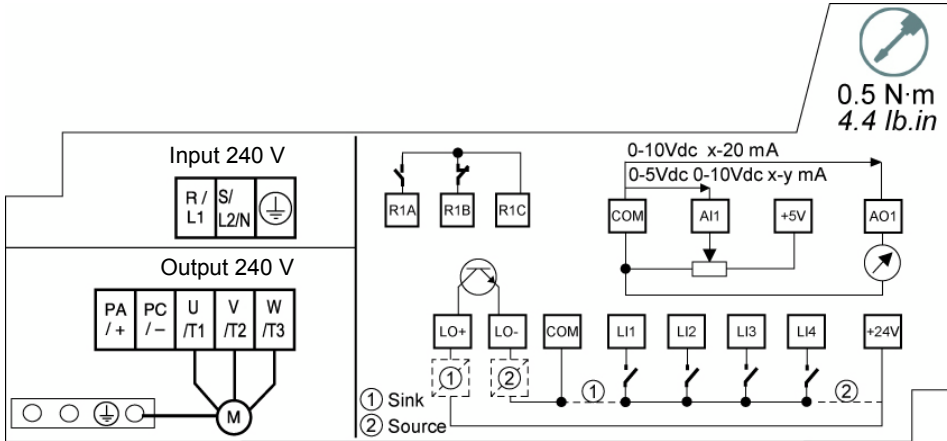
Wiring

Wiring labels

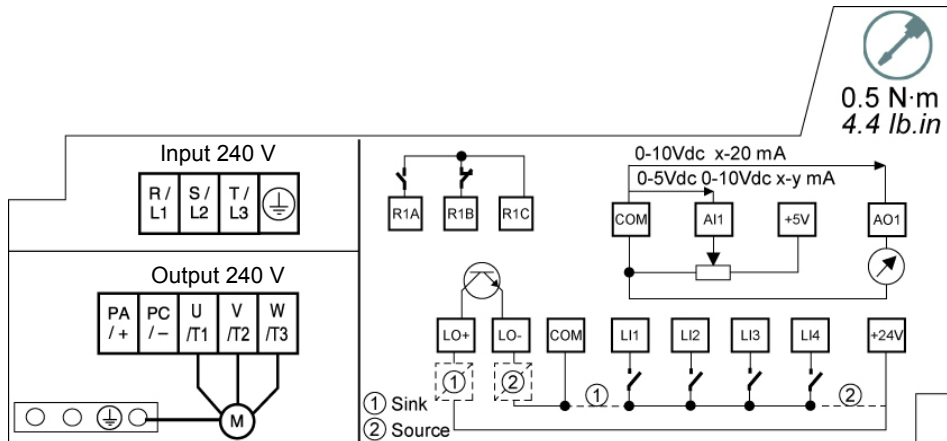
ATV12H...F1



ATV12H...M2



ATV12H...M3

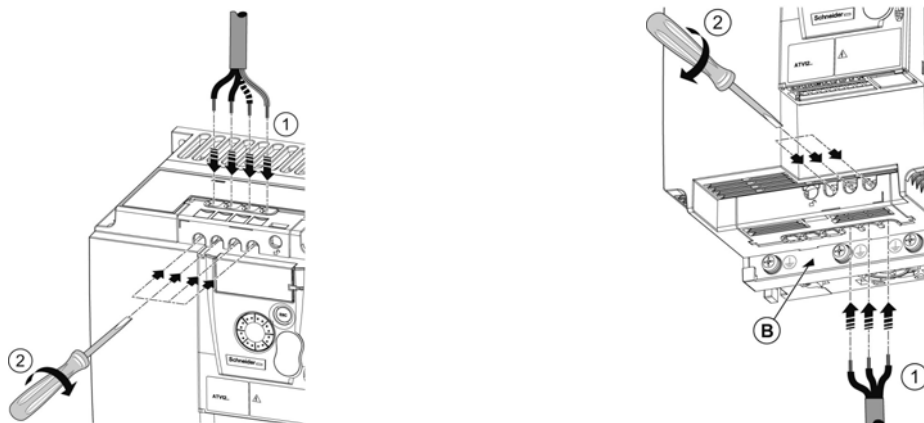


Power terminals

Line supply is at the top of the drive, the motor power supply is at the bottom of the drive. The power terminals can be accessed without opening the wiring trap if you use stripped wire cables.

Access to the power terminals

Access to the terminals if you use stripped wire cables



⚡ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Replace the wiring trap before applying power.

Failure to follow these instructions will result in death or serious injury.

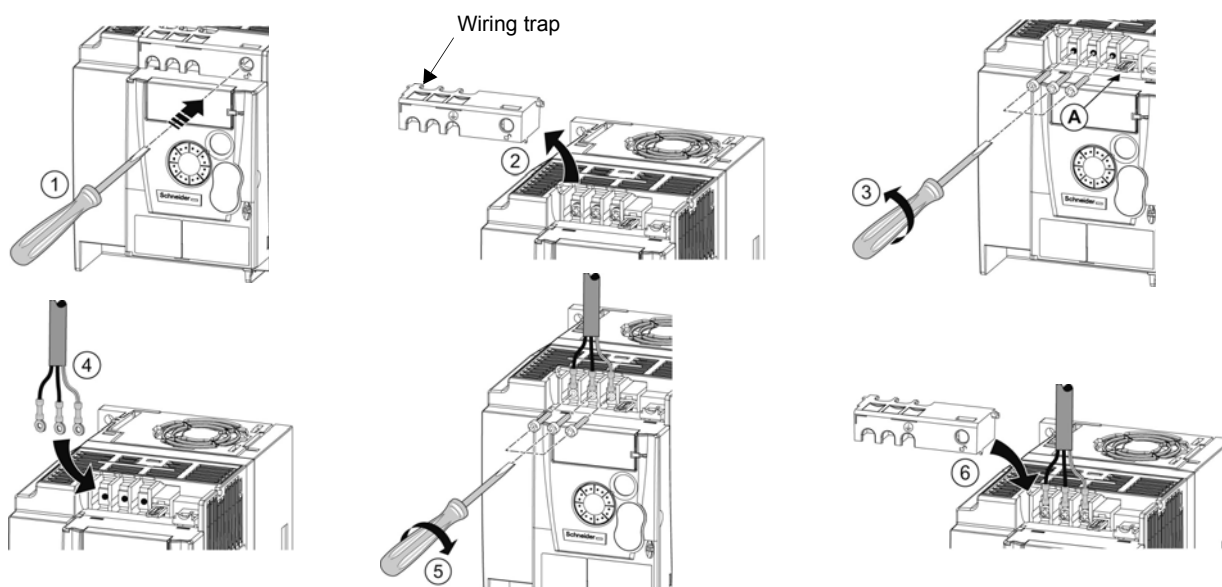
⚠ CAUTION

RISK OF BODY INJURY

Use pliers to remove snap-off of the wiring trap.

Failure to follow these instructions can result in injury or equipment damage.

Access to the line supply terminals to connect ring terminals

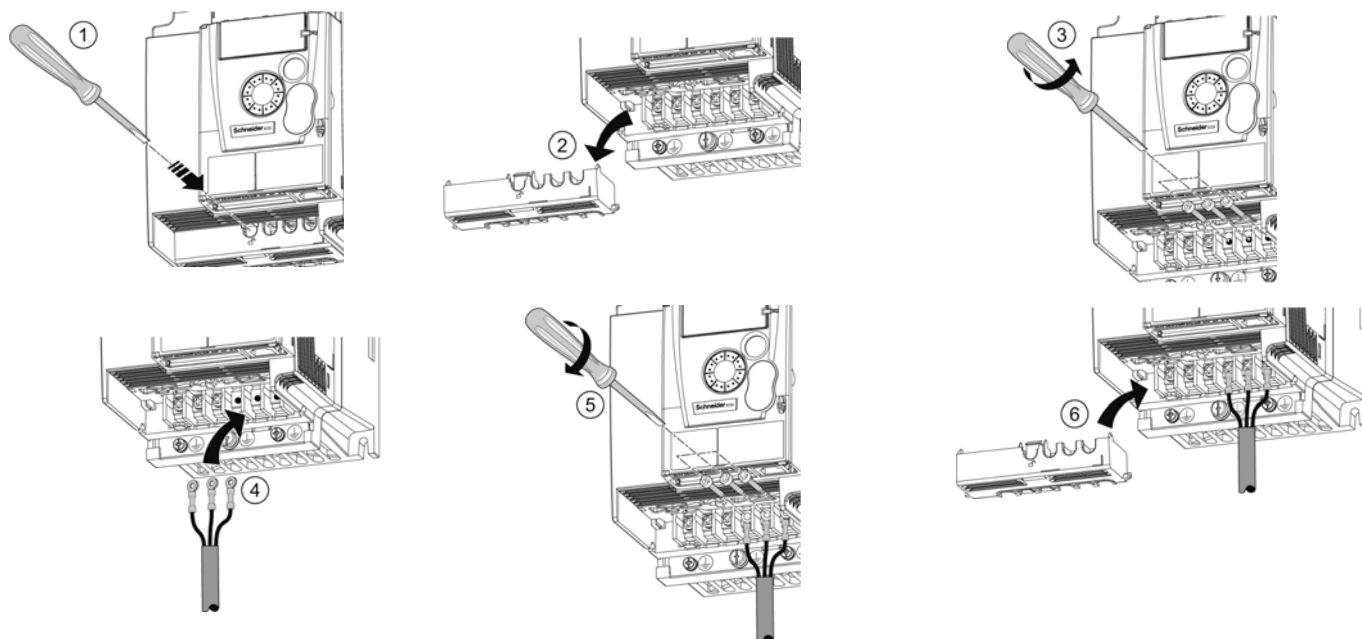


A) IT jumper on ATV12●●●●M2

B) Grounding screws located below the output terminals.

Power terminals

Access to the motor terminals if you use ring terminals



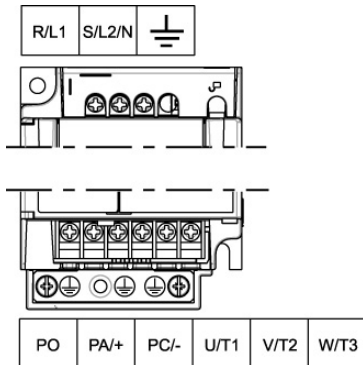
Characteristics and functions of power terminals

Terminal	Function	For ATV12
⏚	Ground terminal	All ratings
R/L1 - S/L2/N	Power supply	1-phase 100...120 V
R/L1 - S/L2/N		1-phase 200...240 V
R/L1 - S/L2 - T/L3		3-phase 200...240 V
PA/+	+ output (dc) to the braking module DC Bus (visible part on wiring trap)	All ratings
PC/-	- output (dc) to the braking module DC Bus (visible part on wiring trap)	All ratings
PO	Not used	
U/T1 - V/T2 - W/T3	Outputs to the motor	All ratings

Power terminals

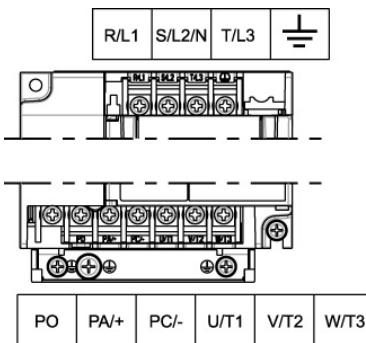
Arrangement of the power terminals

ATV12H 018F1, 037F1, 0●●M2, 0●●M3



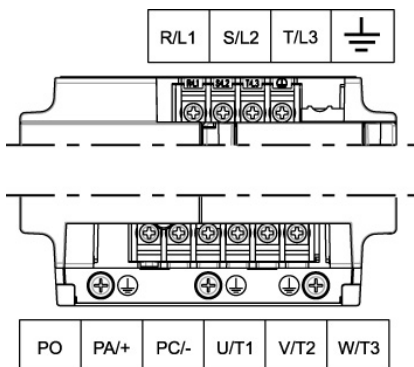
ATV12H	Applicable wire size (1) mm ² (AWG)	Recommended wire size (2) mm ² (AWG)	Tightening torque (3) N·m (lb.in)
018F1 037F1 0●●M2 0●●M3	2 to 3.5 (14 to 12)	2 (14)	0.8 to 1 (7.1 to 8.9)

ATV12H 075F1, U●●M2, U15M3, U22M3



ATV12H	Applicable wire size (1) mm ² (AWG)	Recommended wire size (2) mm ² (AWG)	Tightening torque (3) N·m (lb.in)
075F1 U●●M2	3.5 to 5.5 (12 to 10)	5.5 (10)	1.2 to 1.4 (10.6 to 12.4)
U15M3 U22M3	2 to 5.5 (14 to 10)	2 (14) for U15M3 3.5 (12) for U22M3	

ATV12H U30M3, U40M3



ATV12H	Applicable wire size (1) mm ² (AWG)	Recommended wire size (2) mm ² (AWG)	Tightening torque (3) N·m (lb.in)
U30M3 U40M3	5.5 (10)	5.5 (10)	1.2 to 1.4 (10.6 to 12.4)

- (1) The value in bold corresponds to the minimum wire gauge to permit secureness.
 (2) 75°C (167 °F) copper cable (minimum wire size for rated use)
 (3) Recommended to maximum value.

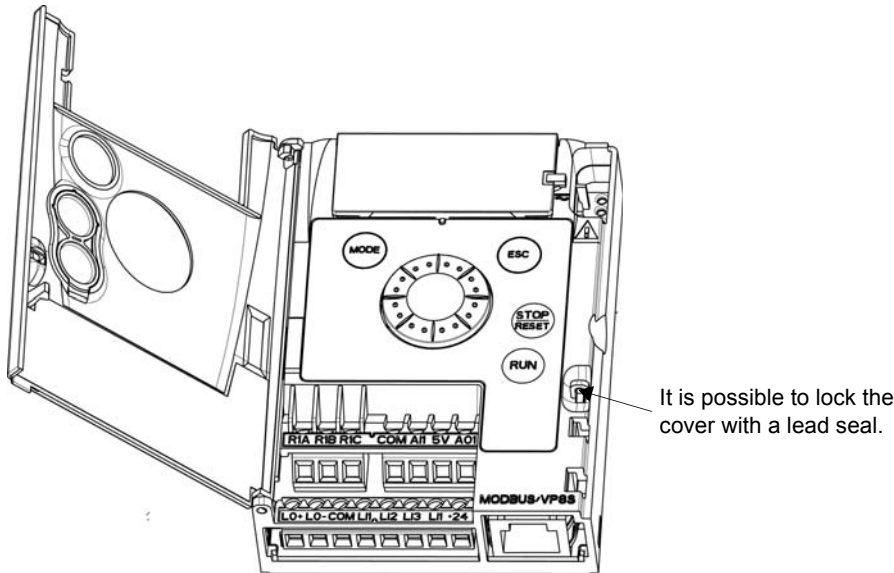
Control terminals

Keep the control circuits away from the power cables. For control and speed reference circuits, it is recommended to use shielded twisted cables with a pitch of between 25 and 50 mm (1 and 2 in.), connecting the shielding as outlined on page [26](#).

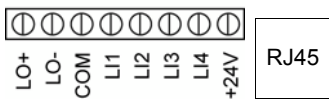
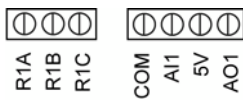
Access to the control terminals

To access the control terminals, open the cover.

Note: For information regarding HMI button functions, see "HMI description" on page [32](#).



Arrangement of the control terminals



- R1A Normally open (NO) contact of the relay
- R1B Normally closed (NC) contact of the relay
- R1C Common pin of the relay
- COM COMmon of analog and logic I/Os
- AI1 Analog Input
- 5V +5VDC supply provided by the drive
- AO1 Analog Output
- LO+ Logic Output (collector)
- LO- Common of the Logic Output (emitter)
- COM COMmon of analog and logic I/Os
- LI1 Logic Input
- LI2 Logic Input
- LI3 Logic Input
- LI4 Logic Input
- +24V +24 VDC supply provided by the drive
- RJ45 Connection for SoMove software, Modbus network or remote display.

Note: To connect cables, use a slotted screwdriver 0.6 x 3.5.

ATV12 Control terminals	Applicable wire size (1) mm ² (AWG)	Tightening torque (2) N·m (lb.in)
R1A, R1B, R1C	0.75 to 1.5 (18 to 16)	0.5 to 0.6 (4.4 to 5.3)
Other terminals	0.14 to 1.5 (26 to 16)	

(1) The value in bold corresponds to the minimum wire gauge to permit secureness.

(2) Recommended to maximum value.

Control terminals

Characteristics and functions of the control terminals

Terminal	Function	Electrical characteristics
R1A	NO contact of the relay	Min. switching capacity: • 5 mA for 24 V --- Maximum switching capacity: • 2 A for 250 V \sim and for 30 V --- on inductive load ($\cos \varphi = 0.4$ and $L/R = 7$ ms) • 3 A for 250 V \sim and 4 A for 30 V --- on resistive load ($\cos \varphi = 1$ and $L/R = 0$) • response time: 30 ms maximum.
R1B	NC contact of the relay	
R1C	Common pin of the relay	
COM	Common of analog and logic I/Os	
AI1	Voltage or current analog input	• resolution: 10 bits • precision: $\pm 1\%$ at 25°C (77°F) • linearity: $\pm 0.3\%$ (of full scale) • sampling time: 20 ms ± 1 ms Analog voltage input 0 to +5 V or 0 to +10 V (maximum voltage 30 V) impedance: 30 k Ω Analog current input x to y mA, impedance: 250 Ω
5V	+5 VDC power supply for reference potentiometer	• precision: $\pm 5\%$ • maximum current: 10 mA
AO1	Voltage or current analog output (collector)	• resolution: 8 bits • precision: $\pm 1\%$ at 25°C (77°F) • linearity: $\pm 0.3\%$ (of full scale) • refresh time: 4 ms (maximum 7 ms) Analog voltage output: 0 to +10 V (maximum voltage +1%) • minimum output impedance: 470 Ω Analog current output: x to 20 mA • maximum output impedance: 800 Ω
LO+	Logic output	• voltage: 24 V (maximum 30 V) • impedance: 1 k Ω , maximum 10 mA (100 mA in open collector) • linearity: $\pm 1\%$ • refresh time: 20 ms ± 1 ms.
LO-	Common of the logic output (emitter)	
L11 L12 L13 L14	Logic inputs	Programmable logic inputs • +24 VDC power supply (maximum 30 V) • impedance: 3.5 k Ω minimum • state: 0 if < 5 V, state 1 if > 11 V in positive logic • state: 1 if < 10 V, state 0 if > 16 V or switched off (not connected) in negative logic • sampling time: < 20 ms ± 1 ms.
+24V	+ 24 VDC supply provided by the drive	+ 24 VDC -15% $+20\%$ protected against short-circuits and overloads. Maximum customer current available 100 mA

Control terminals

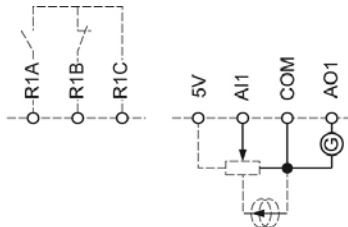
Control connection diagrams

The **Logic inputs type nPL** parameter page [51](#) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

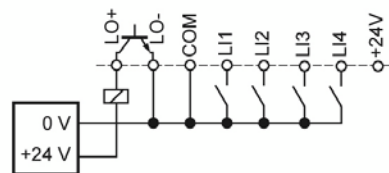
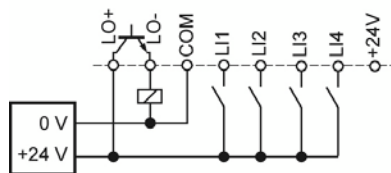
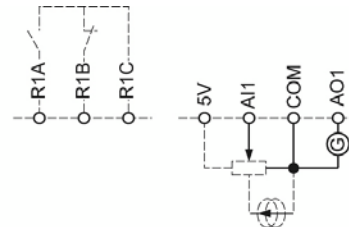
- Set the parameter to **PDS** for Source operation.
- Set the parameter to **nED** for internal Sink operation.
- Set the parameter to **EnED** for external Sink operation.

Note: The modification will be taken into account only at the next control power-on.

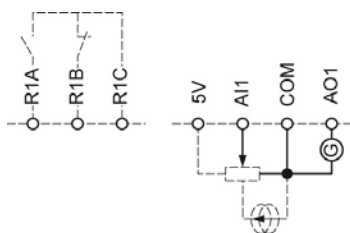
Source - using external supply



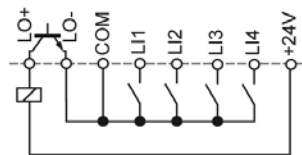
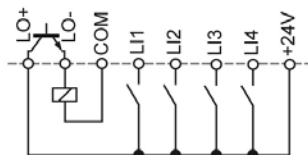
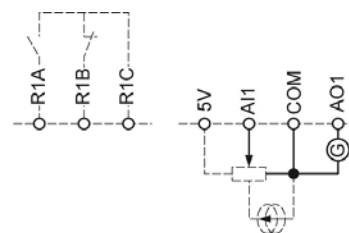
Sink - using external supply



Source - using internal supply



Sink - using internal supply



⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- The accidental grounding of logic inputs configured for Sink Logic can result in unintended activation of drive functions.
- Protect the signal conductors against damage that could result in unintentional conductor grounding.
- Follow NFPA 79 and EN 60204 guidelines for proper control circuit grounding practices.

Failure to follow these instructions will result in death or serious injury.

Electromagnetic Compatibility (EMC), wiring

Principle and precautions

IMPORTANT: The high frequency equipotential ground connection between the drive, motor, and cable shielding does not eliminate the need to connect the ground (PE) conductors (green-yellow) to the appropriate terminals on each unit. To help accomplish this, the user must follow the following points:

- Grounds between the drive, motor, and cable shielding must have high frequency equipotentiality.
- When using shielded cable for the motor, use a 4-conductor cable so that one wire will be the ground connection between the motor and the drive. Size of the ground conductor must be selected in compliance with local and national codes. The shield can then be grounded at both ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for the Dynamic Brake (DB) resistors, use a 3-conductor cable so that one wire will be the ground connection between the DB resistor assembly and the drive. Size of the ground conductor must be selected in compliance with local and national codes. The shield can then be grounded at both ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for control signals, if the cable is connecting equipment that is close together and the grounds are bonded together, then both ends of the shield can be grounded. If the cable is connected to equipment that may have a different ground potential, then ground the shield at one end only to prevent large currents from flowing in the shield. The shield on the ungrounded end may be tied to ground with a capacitor (for example: 10 nF, 100V or higher) in order to provide a path for the higher frequency noise.
- Keep the control circuits away from the power circuits. For control and speed reference circuits, use of shielded twisted cables with a pitch of between 25...50 mm (1 and 2 in.) is recommended.
- Ensure maximum separation between the power supply cable (line supply) and the motor cable and also ensure maximum separation between the control cables and any power cables.
- The motor cables must be at least 0.5 m (20 in.) long.
- Do not use surge arresters or power factor correction capacitors on the variable speed drive output.
- If using an additional input filter, it should be mounted as close as possible to the drive and connected directly to the line supply via an unshielded cable. Link 1 on the drive is via the filter output cable.
- For installation of the optional EMC plate and instructions for meeting IEC 61800-3 standard, refer to the section entitled "Installing the EMC plates" and the instructions provided with the EMC plates.

DANGER

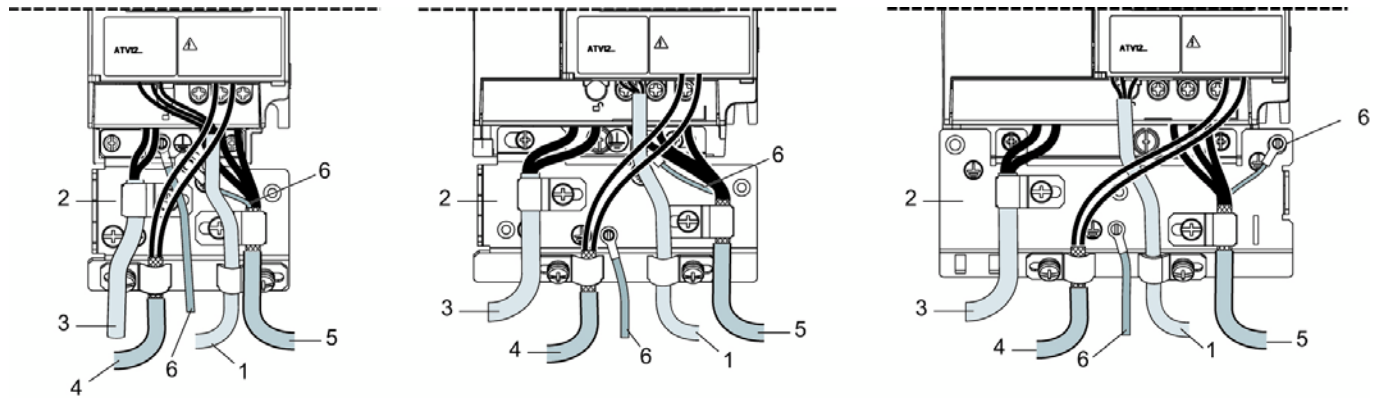
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Do not expose cable shielding except where connected to ground at the metal cable glands and underneath the grounding clamps.
- Ensure that there is no risk of the shielding coming into contact with live components.

Failure to follow these instructions will result in death or serious injury.

Wiring

Installation diagram (example)



1. Non-shielded wires for the output of the status relay contacts.
2. Sheet steel grounded casing not supplied with the drive, to be mounted as indicated on the diagram.
3. PA and PC terminals, to the braking module DC bus
4. Shielded cable for connecting the control/signalling wiring.
For applications requiring several conductors, use small cross-sections (0.5 mm^2 , 20 AWG).
The shielding must be connected to ground at both ends. The shielding must be continuous and intermediate terminals must be in EMC shielded metal boxes.
5. Shielded cable for motor connection with shielding connected to ground at both ends.
This shielding must be continuous, and if there are any intermediate terminals, they must be in an EMC shielded metal box. The motor cable PE grounding conductor (green-yellow) must be connected to the grounded casing.
6. Grounding conductor, cross-section 10 mm^2 (6 AWG) according to IEC 61800-5-1 standard.
7. Power input (non-shielded cable)

Attach and ground the shielding of cables 4 and 5 as close as possible to the drive:

- Expose the shielding.
- Use cable clamps of an appropriate size on the parts from which the shielding has been exposed, to attach them to the casing.
The shielding must be clamped tightly enough to the metal plate to ensure correct contact.
- Types of clamp: stainless steel (delivered with the optional EMC plate).

Wiring

EMC conditions for ATV12●●●●M2

C1 EMC category is reached if length of shielded cable is 5 m (16.4 ft) maximum and **Switching frequency $5 F r$** page 59 is 4, 8 or 12 kHz. C2 EMC category is reached if length of shielded cable is 10 m (32.8 ft) maximum and **Switching frequency $5 F r$** is 4, 8 or 12 kHz and if length of shielded cable is 5 m (16.4 ft) maximum for all other values of **Switching frequency $5 F r$** .

Internal EMC filter on ATV12●●●●M2

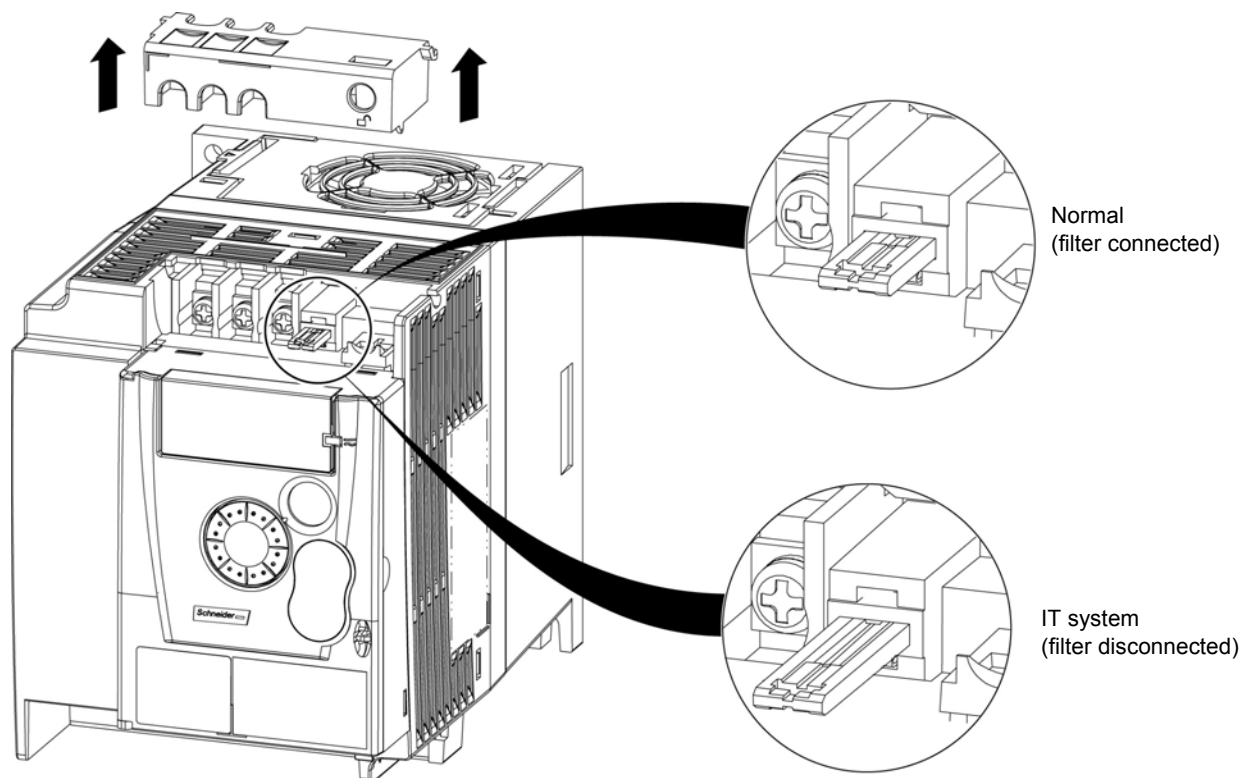
All ATV12●●●●M2 drives have a built-in EMC filter. As a result they exhibit leakage current to ground. If the leakage current creates compatibility problems with your installation (residual current device or other), then you can reduce the leakage current by opening the IT jumper as shown below. In this configuration EMC compliance is not guaranteed.

NOTICE

DRIVE LIFETIME REDUCTION

On ATV12●●●●M2 ratings, if the filters are disconnected, the drive's switching frequency must not exceed 4 kHz. Refer to **Switching frequency $5 F r$** page 59 for adjustment,

Failure to follow these instructions can result in equipment damage.



Check list

Read carefully the safety information in the user manual and the catalog. Before starting up the drive, please check the following points regarding mechanical and electrical installations, then use and run the drive.

For complete documentation, refer to www.schneider-electric.com.

1. Mechanical installation

- Refer to the Mounting and temperature conditions instructions on page [13](#) for drive mounting types and recommendations on the ambient temperature.
- Mount the drive vertically as specified, see Mounting and temperature conditions instructions on page [13](#).
- The use of the drive must be in agreement with the environments defined by the standard 60721-3-3 and according to the levels defined in the catalog.
- Mount the options required for your application, refer to the catalog.

2. Electrical installation

- Connect the drive to the ground, see Equipment grounding on page [16](#).
- Ensure that the input power voltage corresponds to the drive nominal voltage and connect the line supply as shown in General wiring diagram on page [18](#).
- Ensure you use appropriate input power fuses and circuit breaker, see in the Annex (S1A58684) delivered with the drive.
- Wire the control terminals as required, see Control terminals on page [23](#). Separate the power cable and the control cable according to the EMC compatibility rules on page [26](#).
- The ATV12●●●●M2 range integrates an EMC filter. The leakage current can be reduced using the IT jumper as explained in the paragraph Internal EMC filter on ATV12●●●●M2 on page [28](#).
- Ensure that motor connections correspond to the voltage (star, delta).

3. Use and run the drive

- Start the drive and you will see **Standard motor frequency** *b F r* page [45](#) at the first power-on. Check that the frequency defined by the frequency *b F r* (the factory setting is 50 Hz) is in accordance with the frequency of the motor, see First power-up on page [34](#). For the following power-on, you will see *r d y* on the HMI.
- MyMenu (upper part of CONF mode) allows you to configure the drive for most applications (see page [45](#)).
- **Factory / recall customer parameter set** *F L 5* function page [46](#) allows you to reset the drive with factory settings.

Factory configuration

Drive factory settings

The Altivar 12 is factory-set for the most common operating conditions (motor rating according to drive rating):

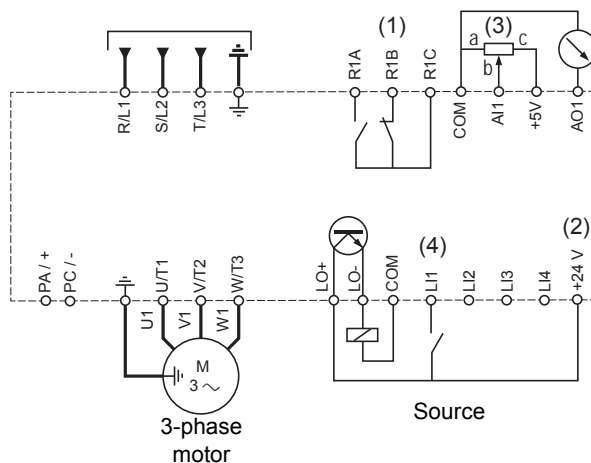
- Display: drive ready (*r d y*) motor stopped or motor frequency reference while running
- Automatic adaptation of the deceleration ramp in the event of overvoltage on braking.
- No automatic restarting after a detected fault is cleared
- Logic inputs:
 - LI1: forward (2-wire transitional control)
 - LI2, LI3, LI4: no assignment
- Logic output: LO1: no assignment
- Analog input: AI1 (0 to + 5 V) speed reference
- Relay R1: the contact opens in the event of a detected fault (or drive off)
- Analog output AO1: no assignment

Code	Description	Value	page
<i>b F r</i>	Standard motor frequency	50 Hz	45
<i>U n S</i>	Rated motor voltage	230 V	57
<i>A C C</i>	Acceleration	3 seconds	64
<i>d E C</i>	Deceleration	3 seconds	64
<i>L S P</i>	Low speed	0 Hz	45 89
<i>H S P</i>	High speed	50 Hz	90
<i>C t t</i>	Motor control type	Standard U/F law	57
<i>U F r</i>	IR compensation (law U/F)	100%	58
<i>I t h</i>	Motor thermal current	equal to nominal motor current (value determined by drive rating)	94
<i>S d C I</i>	Automatic DC injection current	0.7 x nominal drive current, for 0.5 seconds.	67
<i>S F r</i>	Switching frequency	4 kHz	59

If the above values are compatible with the application, the drive can be used without changing the settings.

Drive factory wiring diagram

ATV12●●●●M3



(1) R1 relay contacts, for remote indication of the drive status.

(2) Internal + 24 V \equiv . If an external source is used (+ 30 V \equiv maximum), connect the 0 V of the source to the COM terminal, and do not use the + 24 V \equiv terminal on the drive.

(3) Reference potentiometer SZ1RV1202 (2.2 k Ω) or similar (10 k Ω maximum).

(4) Forward

Basic functions

Status relay, unlocking

The R1 status relay is energized when the drive power is applied with no fault detected. It de-energizes in the event of a detected fault or when the drive power is removed.

The drive is reset after a detected fault:

- by switching off the drive until the display disappears completely, then switching on again
- automatically in the cases described in the "automatic restart" function, **F L E** - menu, **Automatic restart A E r** page **91** set to **Y E S**
- via a logic input when this input is assigned to the "drive reset" function, **F L E** - menu, **Detected fault reset assignment r S F** page **91** set to L•H.

Drive thermal detection

Thermal detection is provided by a built-in PTC probe in the power module.

Drive ventilation

Ratings up to 0.75 kW (1 HP) do not include a fan. The fan runs only when the drive thermal state requires ventilation.

Motor thermal detection

Function:

Thermal detection by calculating the I^2t .

Note: The motor thermal state memory returns to zero when the drive power is cycled if **Motor thermal state memo P E P** page **94** is not set to **Y E S**.

NOTICE

RISK OF DAMAGE TO THE MOTOR

The use of external overload protection is required under the following conditions:

- Repowering up the product since there is no motor thermal state memory.
- Running multiple motors
- Running motors rated at less than 20% of the nominal drive current
- Using motor switching

Failure to follow these instructions can result in equipment damage.

NOTICE

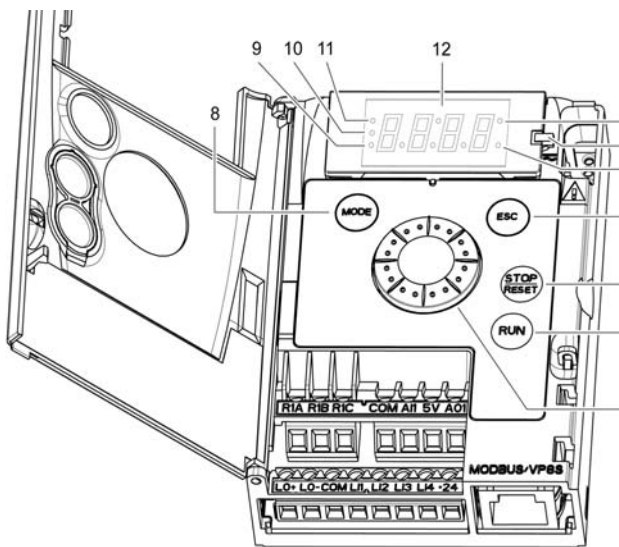
MOTOR OVERHEATING


- This drive does not provide direct thermal protection for the motor.
- Use of a thermal sensor in the motor may be required for protection at all speeds or loading conditions.
- Consult the motor manufacturer for the thermal capability of the motor when operated over the desired speed range

Failure to follow these instructions can result in equipment damage.

HMI description

Functions of the display and keys



1. Value LED (a) (b).
 2. Charge LED
 3. Unit LED (c)
 4. ESC button: Exits a menu or parameter, or aborts the displayed value to return to the previous value in the memory. In LOCAL configuration, 2 s press on ESC button switches between the control/programming modes.
 5. STOP button: stops the motor (could be hidden by door if function disabled). **Note: See instructions for "RUN/STOP" cover removal.**
 6. RUN button: Starts running in LOCAL configuration and in REMOTE configuration if the function is configured (could be hidden by door if function disabled).
 7. Jog dial
 - Acts as a potentiometer in LOCAL configuration and in REMOTE configuration if the function is configured.
 - For navigation when turned clockwise or counterclockwise
 - and selection / validation when pushed.This action is represented by this symbol 
 8. MODE button
 - Switches between the control/programming modes. 3s press on MODE button switches between the REMOTE/LOCAL configurations.
 - The MODE button is only accessible with the HMI door open.
 9. CONFIGURATION mode LED (b)
 10. MONITORING mode LED
 11. REFERENCE mode LED
 12. 4 x 7-segment displays
- Note:** In LOCAL configuration, the three Leds 9, 10, 11 are blinking simultaneously in programming mode and are working as a Led chaser in control mode.

(a) If illuminated, indicates that a **value** is displayed, for example, **D.5** is displayed for "0.5"

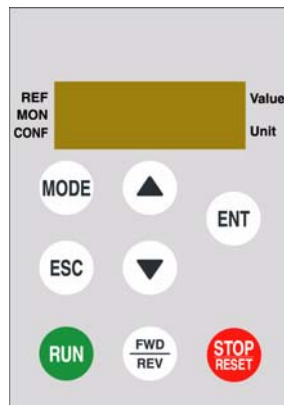
(b) When changing a value the Configuration mode LED and the value LED are on steady.

(c) If illuminated, indicates that a **unit** is displayed, for example, AMP is displayed for "Amps"

Programming

Remote control

Remote operation and programming by HMI is possible using the optional remote HMI part VW3A1006. The dimensions are 70 mm (2.76 in) x 50 mm (2.76 in).



Note: when connected, the remote control shows an exact copy of the drive display, it is totally interactive with the embedded keypad.

Note: Set the remote keypad with

- Modbus rate = 19.2 Kbps, (see **L b r**)
- Modbus format = 8E1, 8 bit, even parity, 1 stop bit (see **L F D**)

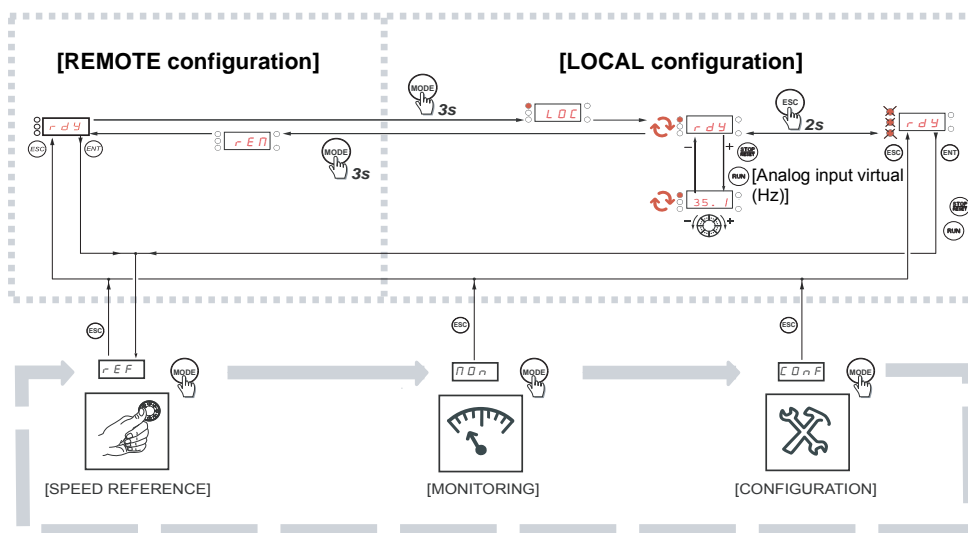
Programming

First power-up

At first power-up you are prompted to set **Standard motor frequency** *b F r* page 45. Next time power is applied *r d y* appears. Operating mode selection is then possible using the MODE key as detailed below.

Menus structure

Access to menus and parameters is possible through 3 modes: Reference *r E F* page 37, Monitoring *Π D n* page 38 and Configuration *C O n F* page 44. Switching between these modes is possible at any time using the MODE key or Jog Dial on keyboard. The first press on the MODE key moves from the current position to the top of the branch. A second press switches to the next mode.



Menu customization using SoMove

ATV12 factory settings enable drive operation with most applications. You can use SoMove software to customize the "MyMenu" and FULL menus of *C O n F* mode (see page 44), by selecting which menus and parameters will be hidden or accessible for the user. Once the configuration has been adjusted, it can be downloaded to the ATV12 by connecting the drive to the computer or by downloading the configuration through the multiloader or simpleloader.

SoMove can be used to operate the drive for testing and commissioning.



Description	References
SoMove	-
USB/RJ45 cable	TCSMCNAM3M002P
Simple-loader tool	VW3A8120
Multi-loader tool	VW3A8121
Bluetooth adapter	VW3A8114

For further information, please consult the SoMove help.

Structure of parameter tables

The modes, sections, menus, submenus and parameter tables description is organized as below.

Note: Parameters containing the sign (C) in the code column can be modified with the drive running or stopped

Example:

Configuration Mode - Complete menu (FULL)

Code	Name / Description	Adjustment range	Factory setting
3 → FU n -	7 → Function menu		
4 → C t L -	8 → Control menu		
5 → F L D	9 → <input type="checkbox"/> Forced local assignment		n0
6 → n0 L 1H L 2H L 3H L 4H	10 → <input type="checkbox"/> No <input type="checkbox"/> L1h <input type="checkbox"/> L2h <input type="checkbox"/> L3h <input type="checkbox"/> L4h		

- | | |
|--|---|
| 1. Name of mode | 6. Value code |
| 2. Name of section, if any | 7. Name of menu |
| 3. Menu code on 4-digit display, followed by a "-" | 8. Name of submenu |
| 4. Submenu code on 4-digit display, if any | 9. Parameter description |
| 5. Parameter code | 10. Possible value(s) / state of parameter, if any. |

Function compatibility table

	Preset speed (page 70)	PI regulator (page 72)	Jog operation (page 68)	Auto DC injection (page 67)	Catch on the fly (page 92)	Fast stop (page 66)	Freewheel (page 66)
Preset speed (page 70)			↑				
PI regulator (page 72)			●				
Jog operation (page 68)	↑	●		↑			
Auto DC injection (page 67)			↑				↑
Catch on the fly (page 92)							↑
Fast stop (page 66)							↑
Freewheel (page 66)				↑	↑	↑	

Incompatible functions
 Compatible functions
 Not applicable

Priority function (function which can be active at the same time)

← ↑ The function indicated by the arrow has priority over the other.

Stop functions have priority over run commands.
 Speed references via logic command have priority over analog references.

Reference Mode rEF

Use the reference mode to monitor and if local control is enabled ([Reference channel 1 F r I](#) page 45 set to *A I U I*) adjust the actual reference value by rotating the jog dial.

When local control is enabled, the jog dial on the HMI acts as a potentiometer to change the reference value up and down within the limits preset by other parameters (LSP or HSP). There is no need to press the ENT key to confirm the change of the reference.

If local command mode is disabled, using [Command channel 1 C d I](#) page 63, only reference values and units are displayed. The value will be "read only" and cannot be modified by the jog dial (the reference is no longer given by the jog dial but from an AI or other source).

The actual reference displayed depends on the choice made in [Reference channel 1 F r I](#) page 62.

Organization tree

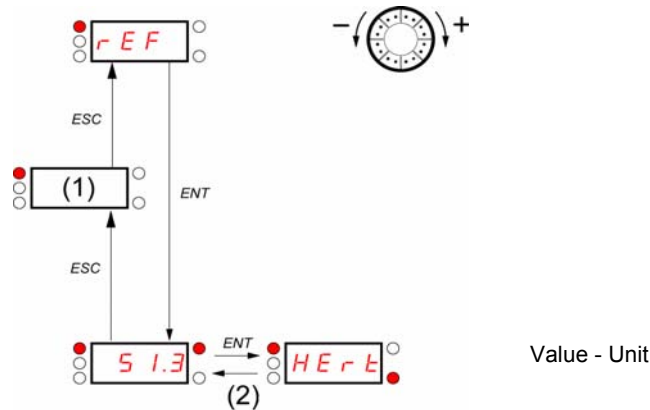
(1) Depending on the active reference channel

Possible values:

- L F r*
- A I U I*
- F r H*
- r P I*
- r P C*

(2) 2s or ESC

Displayed parameter value and unit of the diagram is given as examples



Code	Name/Description	Adjustment range	Factory settings
<i>L F r</i> (1)	<input type="checkbox"/> External reference value Frequency reference visible if reference channel active is remote display. Reference channel 1 <i>F r I</i> page 62 set to <i>L C C</i> or Forced local reference <i>F L D C</i> page 63 set to <i>L C C</i> . This parameter allows to modify the frequency reference with the jog dial. Visibility depends on the drive settings.	-400 to +400 Hz	-
<i>A I U I</i> (1)	<input type="checkbox"/> Analog input virtual This parameter allows to modify the frequency reference with an analog input. Reference channel 1 <i>F r I</i> page 62 set to <i>A I U I</i> or Forced local reference <i>F L D C</i> page 63 set to <i>A I U I</i> or PID manual reference <i>P I N</i> page 74 set to <i>A I U I</i> . Visibility depends on the drive settings.	0 to 100 % of HSP	-
<i>F r H</i> <i>A I I</i> <i>L C C</i> <i>P d b</i> <i>A I U I</i>	<input type="checkbox"/> Speed reference Actual frequency reference. This parameter is in read-only mode. Visibility depends on the drive settings. <ul style="list-style-type: none"> <input type="checkbox"/> Terminal <input type="checkbox"/> Remote display <input type="checkbox"/> Modbus <input type="checkbox"/> Integrated display with Jog dial 	0 Hz to HSP	-
<i>r P I</i> (1)	<input type="checkbox"/> Internal PID reference This parameter allows to modify the PID internal reference with the jog dial. Visibility depends on the drive settings.	0 to 100%	-
<i>r P C</i>	<input type="checkbox"/> PID reference value This parameter is the PID reference expressed as a %.	0 to 100%	-

(1) It is not necessary to press the ENT key to confirm the modification of the reference.

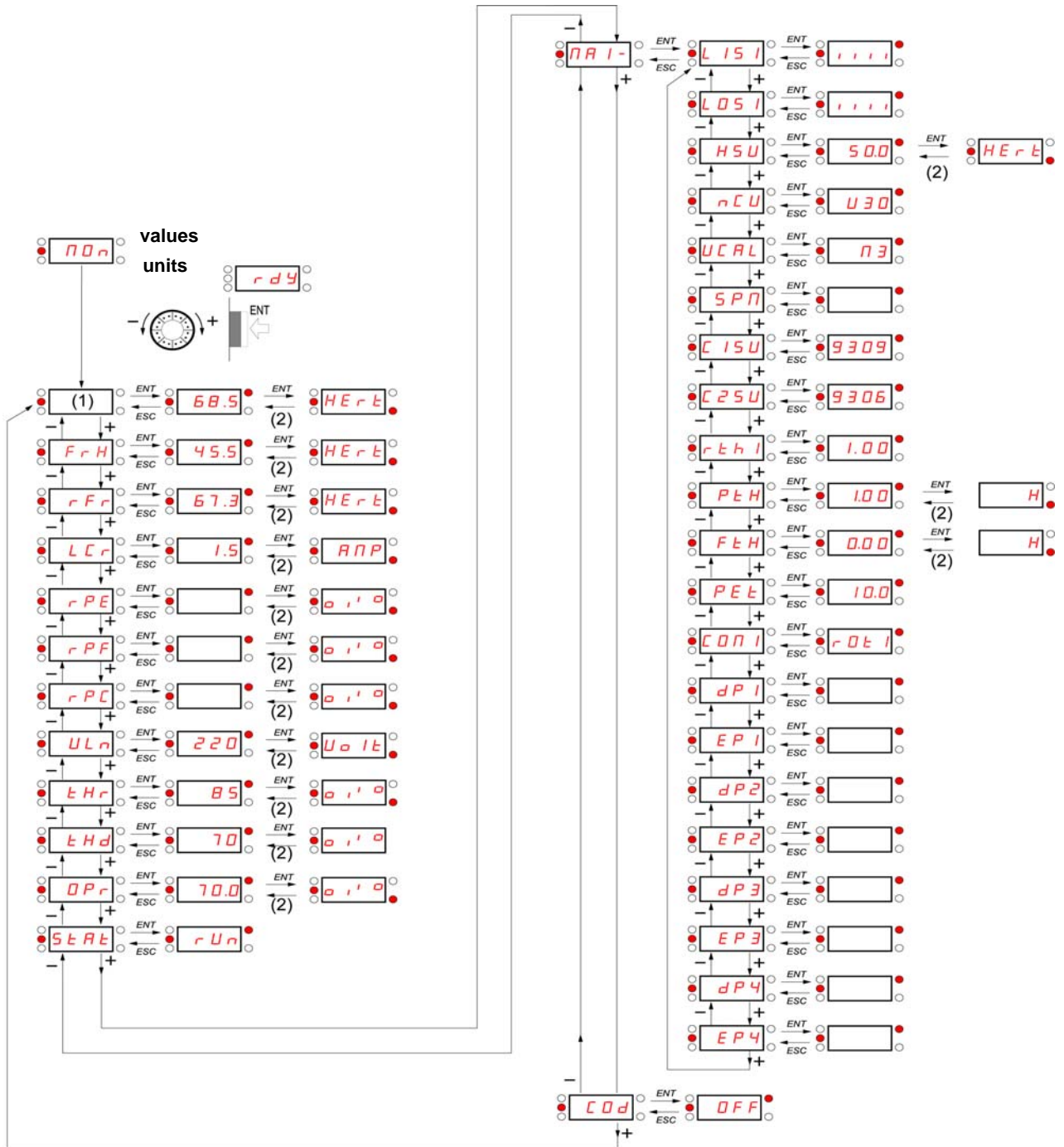
Parameter that can be modified during operation or when stopped.

Monitoring mode MOn

When the drive is running, the value displayed is that of one of the monitoring parameters. The default value displayed is the motor **Output frequency** rFr page 39.

While the value of the desired new monitoring parameter is being displayed, press a second time on the jog dial button to display the units.

Organization tree



(1) Depending on reference channel active.



Possible values:

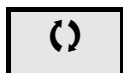
LFr
 $AIU1$

(2) 2 sec or ESC

Displayed parameter values and units of the diagram are given as examples.

Monitoring mode MOn

Code	Name/Description	Unit
LFr 	<input type="checkbox"/> External reference value External keypad or local force mode configured. Forced local reference FLDC page 63 set to LCC and Forced local assignment FL0 page 63 different to n0 . Displays the speed reference coming from the remote keypad. This value is not visible in factory setting.	Hz
AUII 	<input type="checkbox"/> Analog input virtual Embedded keypad active or local force mode configured, Forced local reference FLDC page 63 set to AUII and Forced local assignment FL0 page 63 different to n0 . Displays the speed reference coming from the jog dial. This value is not visible in factory setting.	%
F r H	<input type="checkbox"/> Speed reference Actual frequency reference.	Hz
r F r	<input type="checkbox"/> Output frequency This function provides the estimated motor speed. It corresponds to the estimated motor frequency (on the motor shaft). In Standard law Std page 57, the Output frequency r F r is equal to stator frequency. In Performance law PErF page 57, the Output frequency r F r motor speed is equal to the estimated motor speed. Range: -400 to 400 Hz	Hz
LCr	<input type="checkbox"/> Motor current Estimation of the effective motor current from phase current measurements with an accuracy of 5%. During DC injection, the current displayed is the maximum value of current injected in the motor.	A
r PE	<input type="checkbox"/> PID error Visible only if the PID function is configured (PID feedback assignment P IF page 72 set to n0). See PID diagram on page 71	%
r PF	<input type="checkbox"/> PID Feedback Visible only if PID function configured (PID feedback assignment P IF page 72 set to n0). See PID diagram on page 71	%
r PC	<input type="checkbox"/> PID reference Visible only if PID function configured (PID feedback assignment P IF page 72 set to n0). See PID diagram on page 71	%
ULn	<input type="checkbox"/> Main voltage Line voltage from the point of view of the DC bus, motor running or stopped.	V
t Hr	<input type="checkbox"/> Motor thermal state Display of the motor thermal state. Above 118%, the drive trips in Motor overload DL F page 110.	%
t Hd	<input type="checkbox"/> Drive thermal state Display of the drive thermal state. Above 118%, the drive trips in Drive overheat DH F page 110.	%
OPr	<input type="checkbox"/> Output power This parameter displays the motor power (on the shaft) that is estimated by the drive.	%

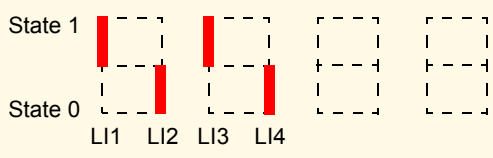
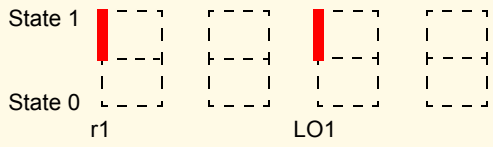


Parameter that can be modified during operation or when stopped.


Monitoring mode MOn

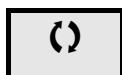
Code	Name/Description
<p><i>S t A t</i></p> <p><i>r d Y</i></p> <p><i>r U n</i></p> <p><i>A C C</i></p> <p><i>d E c</i></p> <p><i>d C b</i></p> <p><i>C L I</i></p> <p><i>n S t</i></p> <p><i>O b r</i></p> <p><i>C t L</i></p> <p><i>t U n</i></p> <p><i>F S t</i></p> <p><i>n L P</i></p> <p><i>F r F</i></p> <p><i>r E n</i></p> <p><i>L O C</i></p>	<p><input type="checkbox"/> Product status</p> <p>This parameter shows the state of the drive and motor.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Drive ready <input type="checkbox"/> Drive running, the last 6 segments to the right of the code also indicate direction and speed. <input type="checkbox"/> Acceleration, the last 6 segments to the right of the code also indicate direction and speed. <input type="checkbox"/> Deceleration, the last 6 segments to the right of the code also indicate direction and speed. <input type="checkbox"/> DC injection braking in progress <input type="checkbox"/> Current limit, the 4 segments located on right down of display are blinking. <input type="checkbox"/> Freewheel stop control <input type="checkbox"/> Auto-adapted deceleration <input type="checkbox"/> Controlled stop on mains phase loss <input type="checkbox"/> Auto-tuning in progress <input type="checkbox"/> Fast stop <input type="checkbox"/> No line power. When the control part is energized via the RJ45 connector and there is no power on the main input and no run order is present. <input type="checkbox"/> Drive is running and using the withdrawal reference <i>L F F</i> <input type="checkbox"/> Remote configuration <input type="checkbox"/> Local configuration

Monitoring mode MOn

Code	Name/Description	Unit
PA1-	Maintenance menu Parameters of MAI menu cannot be selected for monitoring	
L151	<input type="checkbox"/> State of logic inputs LI1 to LI4 Can be used to visualize the state of the 4 logic inputs LI. State 1  State 0 LI1 LI2 LI3 LI4 Example above: LI1 and LI3 are at 1; LI2 and LI4 are at 0.	-
L051	<input type="checkbox"/> State of the logic output LO1 and relay R1 Can be used to visualize the state of the LO. State 1  State 0 r1 LO1	-
HSU	<input type="checkbox"/> Display of high speed value Display of high-speed value. Range Low speed L5P page 45 to Maximum frequency LFr page 57. Visible only if 2 HSP assignment SH2 or 4 HSP assignment SH4 page 90 is configured.	Hz
nCU	<input type="checkbox"/> Drive Power rating Indicates the drive rating. This value is part of the drive reference, see page 11. Possible values: 018 = 0.18 kW (0.25 HP) 037 = 0.37 kW (0.50 HP) 055 = 0.55 kW (0.75 HP) 075 = 0.75 kW (1 HP) U15 = 1.5 kW (2 HP) U22 = 2.2 kW (3 HP) U30 = 3 kW (3 HP) U40 = 4 kW (5 HP)	-
UCAL	<input type="checkbox"/> Drive voltage rating Drive rate supply voltage. This value is part of the drive reference, see page 11. Possible values: F1 = 100-120 V 1-phase in, 200-240 V 3-phase out M2 = 200-240 V 1-phase in, 200-240 V 3-phase out M3 = 200-240 V 3-phase in, 200-240 V 3-phase out	-
SPn	<input type="checkbox"/> Specific Product Number This parameter is used in order to identify the possible specification of the product. Visible only if SPn is different to zero.	-
C15U	<input type="checkbox"/> Card 1 Software Version Application software version. Example: 1105 for 1.1 ie 05. 1 (version, major). 1 (version, minor). 05 (ie, evolution number)	-
C25U	<input type="checkbox"/> Card 2 Software Version Motor software version. Example: 1105 for 1.1 ie 05. 1 (version, major). 1 (version, minor). 05 (ie, evolution number)	-

Monitoring mode MOn

Code	Name/Description	Unit																														
PAR1-	Maintenance menu (continued)																															
rEH1	<input type="checkbox"/> Run elapsed time display Total time the motor has been powered up. Range: 0 to 65535 hours. Value displayed is as described in the table below. Parameter resettable by services <table border="1"> <thead> <tr> <th>Hours</th> <th>Display</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.01</td> </tr> <tr> <td>10</td> <td>0.10</td> </tr> <tr> <td>100</td> <td>1.00</td> </tr> <tr> <td>1000</td> <td>10.0</td> </tr> <tr> <td>10000</td> <td>100</td> </tr> </tbody> </table>	Hours	Display	1	0.01	10	0.10	100	1.00	1000	10.0	10000	100	0.01																		
Hours	Display																															
1	0.01																															
10	0.10																															
100	1.00																															
1000	10.0																															
10000	100																															
PEH	<input type="checkbox"/> Power On time display Total time the drive has been powered on. Range: 0 to 65535 hours. Value displayed is as described in the table above. Parameter resettable by services.	0.01																														
FEH	<input type="checkbox"/> Fan time display Range: 0 to 65535 hours. Value displayed is as described in the table above. Parameter resettable by customer.	0.01																														
PEE 	<input type="checkbox"/> Process elapsed time Range: 0 to 65535 hours. Value displayed is as described in the table above. Parameter resettable by customer.	0.01																														
CON1 r0t0 r0t1 r1t0 r1t1	<input type="checkbox"/> Modbus communication status <input type="checkbox"/> Modbus no reception, no transmission = communication idle <input type="checkbox"/> Modbus no reception, transmission <input type="checkbox"/> Modbus reception, no transmission <input type="checkbox"/> Modbus reception and transmission	-																														
dP1	<input type="checkbox"/> Last detected fault 1 This parameter describes the last detected fault.	-																														
EPI	<input type="checkbox"/> State of drive at detected fault 1 This parameter describes the state at the moment of the first detected fault. <table border="1"> <thead> <tr> <th>bit 0</th> <th>bit 1</th> <th>bit 2</th> <th>bit 3</th> <th>bit 4</th> </tr> </thead> <tbody> <tr> <td>ETA.1: Switched on</td> <td>ETA.5: Quick stop</td> <td>ETA.6: Switch on disabled</td> <td>Forced local enabled</td> <td>ETA.15: Motor rotation in forward direction (or stopped)</td> </tr> <tr> <th>bit 5</th> <th>bit 6</th> <th>bit 7</th> <th>bit 8</th> <th>bit 9</th> </tr> <tr> <td>ETI.4: Run order present</td> <td>ETI.5: DC injection running</td> <td>ETI.7: Motor thermal threshold reached</td> <td>ETI.8: Reserved</td> <td>ETI.9: Product in acceleration</td> </tr> <tr> <th>bit 10</th> <th>bit 11</th> <th>bit 12</th> <th>bit 13 - 14</th> <th>bit 15</th> </tr> <tr> <td>ETI.10: Product in deceleration</td> <td>ETI.11: Current limitation or torque limitation is running</td> <td>Fast stop in progress</td> <td>ETI.14= 0 + ETI.13=0: Drive controlled by terminal or local keypad ETI.14= 0 + ETI.13=1: Drive controlled by remote keypad ETI.14= 1 + ETI.13=0: Drive controlled by Modbus ETI.14= 1 + ETI.13=0: Reserved</td> <td>ETI.15: Reverse direction applied to the ramp</td> </tr> </tbody> </table>	bit 0	bit 1	bit 2	bit 3	bit 4	ETA.1: Switched on	ETA.5: Quick stop	ETA.6: Switch on disabled	Forced local enabled	ETA.15: Motor rotation in forward direction (or stopped)	bit 5	bit 6	bit 7	bit 8	bit 9	ETI.4: Run order present	ETI.5: DC injection running	ETI.7: Motor thermal threshold reached	ETI.8: Reserved	ETI.9: Product in acceleration	bit 10	bit 11	bit 12	bit 13 - 14	bit 15	ETI.10: Product in deceleration	ETI.11: Current limitation or torque limitation is running	Fast stop in progress	ETI.14= 0 + ETI.13=0: Drive controlled by terminal or local keypad ETI.14= 0 + ETI.13=1: Drive controlled by remote keypad ETI.14= 1 + ETI.13=0: Drive controlled by Modbus ETI.14= 1 + ETI.13=0: Reserved	ETI.15: Reverse direction applied to the ramp	-
bit 0	bit 1	bit 2	bit 3	bit 4																												
ETA.1: Switched on	ETA.5: Quick stop	ETA.6: Switch on disabled	Forced local enabled	ETA.15: Motor rotation in forward direction (or stopped)																												
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ETI.4: Run order present	ETI.5: DC injection running	ETI.7: Motor thermal threshold reached	ETI.8: Reserved	ETI.9: Product in acceleration																												
bit 10	bit 11	bit 12	bit 13 - 14	bit 15																												
ETI.10: Product in deceleration	ETI.11: Current limitation or torque limitation is running	Fast stop in progress	ETI.14= 0 + ETI.13=0: Drive controlled by terminal or local keypad ETI.14= 0 + ETI.13=1: Drive controlled by remote keypad ETI.14= 1 + ETI.13=0: Drive controlled by Modbus ETI.14= 1 + ETI.13=0: Reserved	ETI.15: Reverse direction applied to the ramp																												



Parameter that can be modified during operation or when stopped.

Monitoring mode MOn

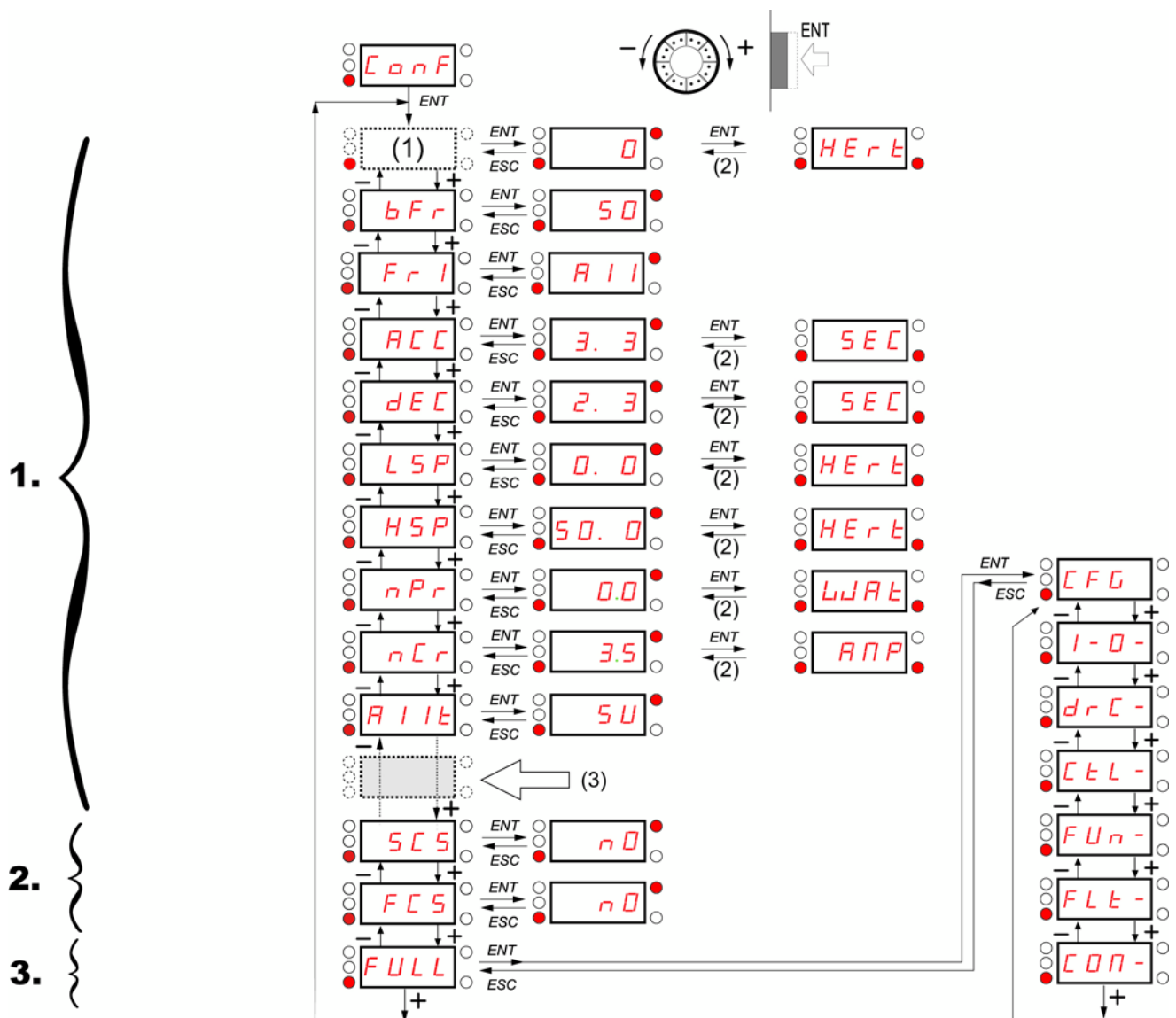
Code	Name/Description	Adjustment range	Factory setting
Pr 1-	Maintenance menu (continued)		
dP2	<input type="checkbox"/> Last detected fault 2 This parameter describes the second detected fault.		-
EP2	<input type="checkbox"/> State of drive at detected fault 2 This parameter describes the state at the moment of the second detected fault. See EP1 .		-
dP3	<input type="checkbox"/> Last detected fault 3 This parameter describes the third detected fault.		-
EP3	<input type="checkbox"/> State of drive at detected fault 3 This parameter describes the state at the moment of the third detected fault. See EP1 .		-
dP4	<input type="checkbox"/> Last detected fault 4 This parameter describes the fourth detected fault.		-
EP4	<input type="checkbox"/> State of drive at detected fault 4 This parameter describes the state at the moment of the fourth detected fault. See EP1 .		-
COd	<input type="checkbox"/> HMI Password Possible state value: <input type="checkbox"/> Code disabled <input type="checkbox"/> Code activated Range 2 to 9999 If you have lost your code, please contact Schneider Electric. This parameter is used to restrict access to the drive. To lock the drive, go to the HMI Password COd parameter, enter a code within the above range. Once activated, the code state changes to On : The protection enables only access to rEF (see page 37) and non (see page 38) modes, except when using SoMove. Return to factory settings or access to FULL section are disabled, Download configuration from SoMove is possible, Upload configuration to SoMove is disabled. To unlock the drive, go to the COd parameter, enter the valid code, then press ENT. Code protection removal is then possible and carried out by entering OFF using the jog dial, then press ENT.	2 to 9999	OFF
OFF On			

Configuration Mode ConF

Configuration mode includes 3 parts:

1. MyMenu includes 11 factory set parameters (among them 9 visible by default). Up to 25 parameters are available for user customization using SoMove software.
2. store/recall parameter set: these 2 functions are used to store and recall customer settings.
3. FULL: This menu provides access to all other parameters. It includes 6 submenus:
 - Macro-configuration *CFG* - page 47
 - Input Output menu *I-O* - page 48
 - Motor control menu *drc* - page 58
 - Control menu *CTL* - page 62
 - Function menu *FUn* - page 64
 - Fault detection management menu *FLt* - page 91
 - Communication menu *CON* - page 98.

Organization tree



Displayed parameter values are given as examples only

(1) Depending on reference channel active.
Possible values: *LFR* or *RIU I*

(2) 2 seconds or ESC.




(3) plus 14 other customizable parameters selectable (in "FULL" list) using SoMove.

Configuration Mode - MyMenu

Code	Name/Description	Adjustment range	Factory setting
LFr ()	<input type="checkbox"/> External reference value This parameter allows to modify the frequency reference with the jog dial. External keypad or local force mode configured. Forced local reference FLDC page 63 set to LCC and Forced local assignment FLD page 63 different to nD . Visibility depends on the drive settings.	-400 Hz to 400 Hz	-
AUII ()	<input type="checkbox"/> Analog input virtual This parameter allows to modify the frequency reference when <ul style="list-style-type: none"> • Forced local reference FLDC page 63 is set to AUII • and Forced local assignment FLD page 63 is different to nD. Visible if reference channel active is integrated display (Reference channel 1 FrI set to AUII).	0% to 100%	-
bFr 50 60	<input type="checkbox"/> Standard motor frequency External keypad or local force mode configured (FLOC = LCC) (not visible in the factory setting). <ul style="list-style-type: none"> <input type="checkbox"/> 50 Hz <input type="checkbox"/> 60 Hz Set to 50 Hz or 60 Hz, taken from the motor rating plate. Changing bFr sets back parameters: <ul style="list-style-type: none"> FrS, Ftd and HSP: 50 Hz or 60 Hz tFr is set to nCr nCr according to drive rating nPr Watt or HP nSP according to drive rating tFr 60 Hz or 72 Hz 		50 Hz
FrI AII LCC Ndb AUII	<input type="checkbox"/> Reference channel 1 This parameter allows selection of the reference source. <ul style="list-style-type: none"> <input type="checkbox"/> Terminal <input type="checkbox"/> Remote display <input type="checkbox"/> Modbus <input type="checkbox"/> Integrated display with Jog dial 		A11
ACC ()	<input type="checkbox"/> Acceleration Acceleration time between 0 Hz and the Rated motor frequency FrS page 57. Make sure that this value is compatible with the inertia being driven.	0.0 s to 999.9 s	3.0 s
DEC ()	<input type="checkbox"/> Deceleration Time to decelerate from the Rated motor frequency FrS page 57 to 0 Hz. Make sure that this value is compatible with the inertia being driven.	0.0 s to 999.9 s	3.0 s
LSP ()	<input type="checkbox"/> Low speed Motor frequency at minimum reference If HSP , HSP2 , HSP3 and HSP4 are already set then LSP is limited to the minimum of those values.	0 Hz to HSP	0 Hz
HSP ()	<input type="checkbox"/> High speed Motor frequency at maximum reference. Check that this setting is appropriate for the motor and the application. The values of HSP , HSP2 , HSP3 and HSP4 are independent but each HSP value is linked to the values of Low speed LSP and Maximum frequency tFr page 57 according to the following rules: <ul style="list-style-type: none"> • HSPx is limited to LSP and tFr ($LSP \leq HSPx \leq tFr$). • If tFr is decreased below the current HSPx value, then HSPx automatically decreases to the new value of tFr. • Once HSP, HSP2, HSP3 and HSP4 are set, LSP is limited to their minimum. 	LSP to tFr (Hz)	50 or 60 Hz according to BFr, max TFr

() Parameter that can be modified during operation or when stopped.

Configuration Mode - MyMenu

Code	Name/Description	Adjustment range	Factory setting
<i>nPr</i>	<input type="checkbox"/> Rated Motor Power Visible only if Motor parameter choice <i>nPr</i> page 60 is set to <i>nPr</i> . If <i>nPr</i> is available <i>CoS</i> disappears. Rated motor power given on the nameplate. Motors can range from 5 ratings lower up to 2 ratings higher than the drive rating.. Performance is optimized when there is a maximum of one rating difference. If Standard motor frequency <i>bFr</i> page 45 is set to 50Hz, the Rated motor power <i>nPr</i> unit will be kW, otherwise it will be HP.	NCV -5 to NCV +2	According to drive rating
<i>SCS</i> <i>nD</i> <i>StrI</i>  2 s	<input type="checkbox"/> Store customer parameter set This function creates a backup of the present configuration: <input type="checkbox"/> Function inactive <input type="checkbox"/> Saves the current configuration in the drive memory. <i>SCS</i> automatically switches to <i>nD</i> as soon as the save has been performed. When a drive leaves the factory, the current configuration and the backup configuration are both initialized with the factory configuration.		n0
<i>FCS</i> <i>nD</i> <i>rECI</i> <i>Ini</i> <i>InII</i>  2 s	<input type="checkbox"/> Factory / recall customer parameter set This function permits to restore a configuration. <input type="checkbox"/> Function inactive. <i>FCS</i> automatically changes to <i>nD</i> as soon as one of the following actions has been performed. <input type="checkbox"/> The current configuration becomes identical to the backup configuration previously saved by <i>SCS</i> . <i>FCS</i> automatically changes to <i>nD</i> as soon as this action has been performed. <i>rECI</i> is only visible if the backup has been carried out. If this value appears, <i>Ini</i> is not visible. <input type="checkbox"/> The current configuration becomes identical to the factory setting. If this value appears, <i>InII</i> is not visible. <input type="checkbox"/> The current configuration becomes identical to the backup configuration previously defined by SoMove software. If this value appears, <i>Ini</i> and <i>rECI</i> are not visible.		n0
 DANGER			
UNINTENDED EQUIPMENT OPERATION Check that the modification of the current configuration is compatible with the wiring diagram used. Failure to follow these instructions will result in death or serious injury.			



To change the assignment of this parameter press the "ENT" key for 2 s.

How to control the drive locally

In factory settings "RUN" and the jog dial are inactive. To control the drive locally, adjust the following parameter: set **Reference channel 1** *Fri* page 45 to *RiUI* (Integrated display with jog dial).

LI assignment information

It is possible with ATV12 to use multi assignment function (ie: *AC2* and *r r 5* on the same LI).

It is also possible on some functions to assign LIH (high) or LII (low), which means that the assigned function will be activated to high (LIH) or low level (LII) of LI.

Configuration Mode - Complete menu (FULL)


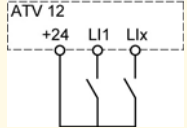

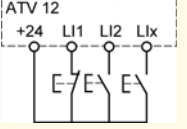
Code	Name/Description	Adjustment range	Factory setting																																																																																																
CFG	<input type="checkbox"/> Macro-configuration		StS																																																																																																
SEL PID SPd	<div style="text-align: center; background-color: black; color: white; padding: 5px;"> DANGER </div> <p>UNINTENDED EQUIPMENT OPERATION Check that the selected macro configuration is compatible with the wiring diagram used.</p> <p>Failure to follow these instructions will result in death or serious injury.</p> <p>Macro configuration provides a shortcut to configure a set of parameters suited to a specific field of application. 3 macro configurations are available:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Start/stop. Only forward is assigned <input type="checkbox"/> PID regulation. Activate PID function, dedicated AI1 for feedback and AIV1 for reference. <input type="checkbox"/> Speed. Allocate LI to preset speed (same allocation as ATV11) which provides a means of speeding up the configuration of functions for a specific field of application. <p>Selecting a macro configuration assigns the parameters in this macro configuration. Each macro configuration can still be modified in the other menus.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Input / output or parameter</th> <th>Start / Stop</th> <th>PID regulation</th> <th>Speed</th> </tr> </thead> <tbody> <tr> <td>AI1</td> <td>Ref. channel 1</td> <td>PID feedback</td> <td>No</td> </tr> <tr> <td>AIV1</td> <td>No</td> <td colspan="2">Reference channel 1</td> </tr> <tr> <td>AO1</td> <td colspan="3">No</td> </tr> <tr> <td>LO1</td> <td colspan="3">No</td> </tr> <tr> <td>R1</td> <td colspan="3">No drive detected fault</td> </tr> <tr> <td>L1h (2-wire)</td> <td colspan="3">Forward</td> </tr> <tr> <td>L2h (2-wire)</td> <td>No</td> <td colspan="2">Reverse</td> </tr> <tr> <td>L3h (2-wire)</td> <td>No</td> <td>Auto/Manual</td> <td>2 preset speeds</td> </tr> <tr> <td>L4h (2-wire)</td> <td>No</td> <td colspan="2">4 preset speeds</td> </tr> <tr> <td>L1h (3-wire)</td> <td colspan="3">Stop</td> </tr> <tr> <td>L2h (3-wire)</td> <td colspan="3">Forward</td> </tr> <tr> <td>L3h (3-wire)</td> <td>No</td> <td colspan="2">Reverse</td> </tr> <tr> <td>L4h (3-wire)</td> <td>No</td> <td>Auto / Manual</td> <td>2 preset speeds</td> </tr> <tr> <td><i>F r I</i> (Reference channel 1)</td> <td></td> <td><i>R I U I</i></td> <td><i>R I U I</i></td> </tr> <tr> <td><i>C E E</i> (Motor control type)</td> <td></td> <td><i>P U N P</i></td> <td></td> </tr> <tr> <td><i>r I n</i> (Reverse inhibition)</td> <td></td> <td><i>Y E S</i></td> <td></td> </tr> <tr> <td><i>R I I E</i> (AI1t type)</td> <td></td> <td><i>O R</i></td> <td></td> </tr> <tr> <td><i>L F L I</i> (4-20 mA loss)</td> <td></td> <td><i>Y E S</i></td> <td></td> </tr> <tr> <td><i>S P 2</i> (Preset speed 2)</td> <td></td> <td></td> <td><i>10.0</i></td> </tr> <tr> <td><i>S P 3</i> (Preset speed 3)</td> <td></td> <td></td> <td><i>25.0</i></td> </tr> <tr> <td><i>S P 4</i> (Preset speed 4)</td> <td></td> <td></td> <td><i>50.0</i></td> </tr> <tr> <td><i>P P C</i> (Motor parameter choice)</td> <td></td> <td></td> <td><i>C O S</i></td> </tr> <tr> <td><i>R d C</i> (Automatic DC injection)</td> <td><i>Y E S</i></td> <td><i>Y E S</i></td> <td><i>Y E S</i></td> </tr> </tbody> </table>			Input / output or parameter	Start / Stop	PID regulation	Speed	AI1	Ref. channel 1	PID feedback	No	AIV1	No	Reference channel 1		AO1	No			LO1	No			R1	No drive detected fault			L1h (2-wire)	Forward			L2h (2-wire)	No	Reverse		L3h (2-wire)	No	Auto/Manual	2 preset speeds	L4h (2-wire)	No	4 preset speeds		L1h (3-wire)	Stop			L2h (3-wire)	Forward			L3h (3-wire)	No	Reverse		L4h (3-wire)	No	Auto / Manual	2 preset speeds	<i>F r I</i> (Reference channel 1)		<i>R I U I</i>	<i>R I U I</i>	<i>C E E</i> (Motor control type)		<i>P U N P</i>		<i>r I n</i> (Reverse inhibition)		<i>Y E S</i>		<i>R I I E</i> (AI1t type)		<i>O R</i>		<i>L F L I</i> (4-20 mA loss)		<i>Y E S</i>		<i>S P 2</i> (Preset speed 2)			<i>10.0</i>	<i>S P 3</i> (Preset speed 3)			<i>25.0</i>	<i>S P 4</i> (Preset speed 4)			<i>50.0</i>	<i>P P C</i> (Motor parameter choice)			<i>C O S</i>	<i>R d C</i> (Automatic DC injection)	<i>Y E S</i>	<i>Y E S</i>	<i>Y E S</i>
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2 s																																																																																																			



To change the assignment of this parameter press the "ENT" key for 2 s.

Configuration Mode - Complete menu (FULL)

I - 0 -
d r C -
C L L -
F U N -
F L L -
C O N -

Code	Name/Description	Adjustment range	Factory setting
I - 0 -	Input Output menu		
<p> <input type="checkbox"/> 2 C  2 s </p>	<p> <input type="checkbox"/> Type of control The open or closed state of the input controls the running or stopping. Example of "source" wiring: </p>  <p>LI1: forward LIx: reverse</p>		2C
<p> <input type="checkbox"/> 3 C  2 s </p>	<p> <input type="checkbox"/> 3-wire control (see page 51) "forward" or "reverse" pulse is sufficient to command starting, a "stop" pulse is sufficient to command stopping Example of "source" wiring: </p>  <p>LI1: stop LI2: forward LIx: reverse</p>		
<p>⚠ DANGER</p> <p>UNINTENDED EQUIPMENT OPERATION When this parameter is changed, 2 wire type control 2 C page 51 and all the assignments involving the logic inputs will revert to their default values. Check that this change is compatible with the wiring diagram used.</p> <p>Failure to follow these instructions will result in death or serious injury.</p>			



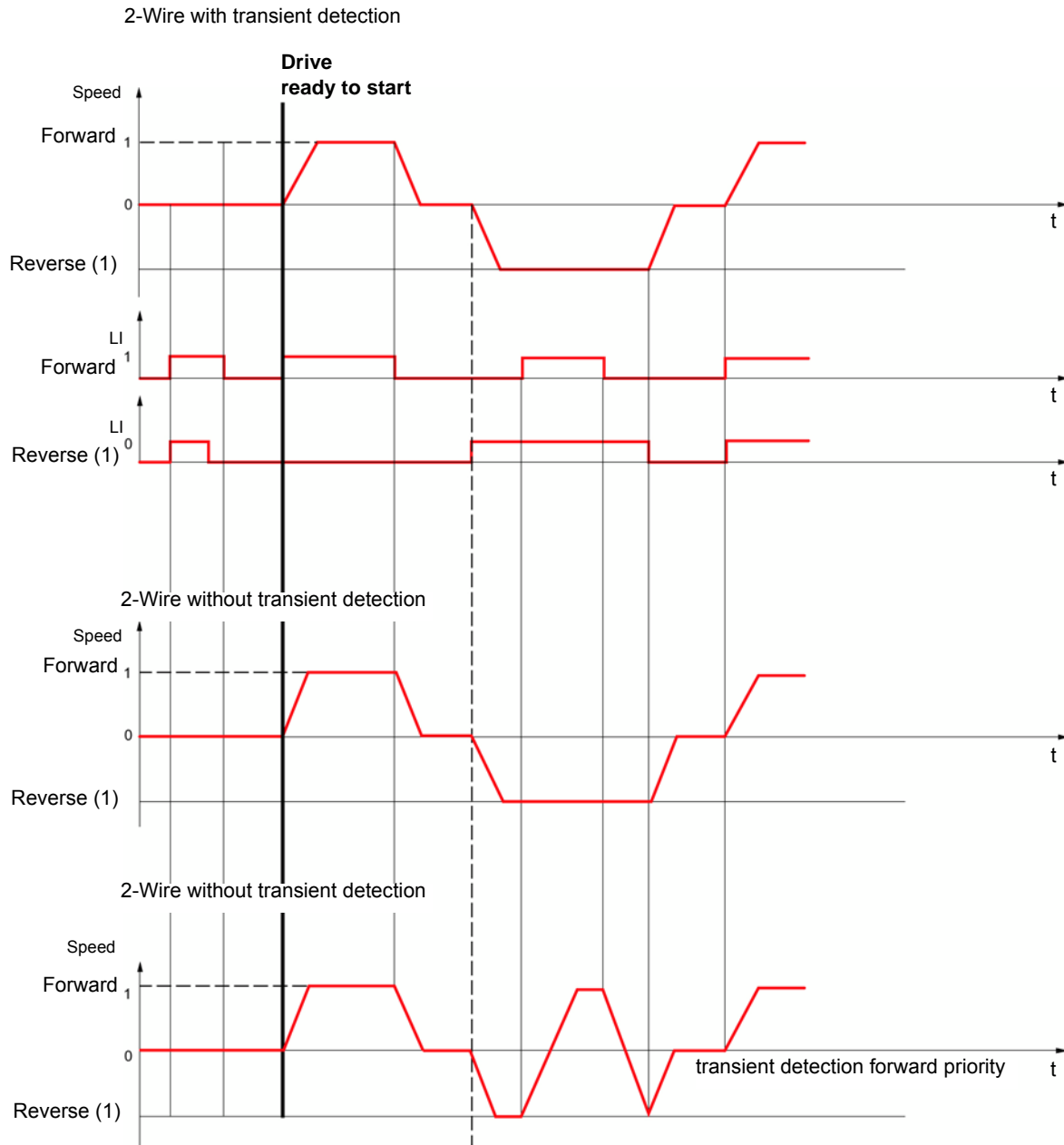
To change the assignment of this parameter press the "ENT" key for 2 s.

Configuration Mode - Complete menu (FULL)

I - 0 -
 d r C -
 C t L -
 F U N -
 F L t -
 C O N -

2 wire control diagrams (see page 51)

Drive powered and ready



(1) Reverse is not factory assigned. See [Reverse direction](#) r r 5 page 66.

Forward and Reverse realized in same time provides motor starting in Forward direction.

Configuration Mode - Complete menu (FULL)

I - 0 -

d r C -

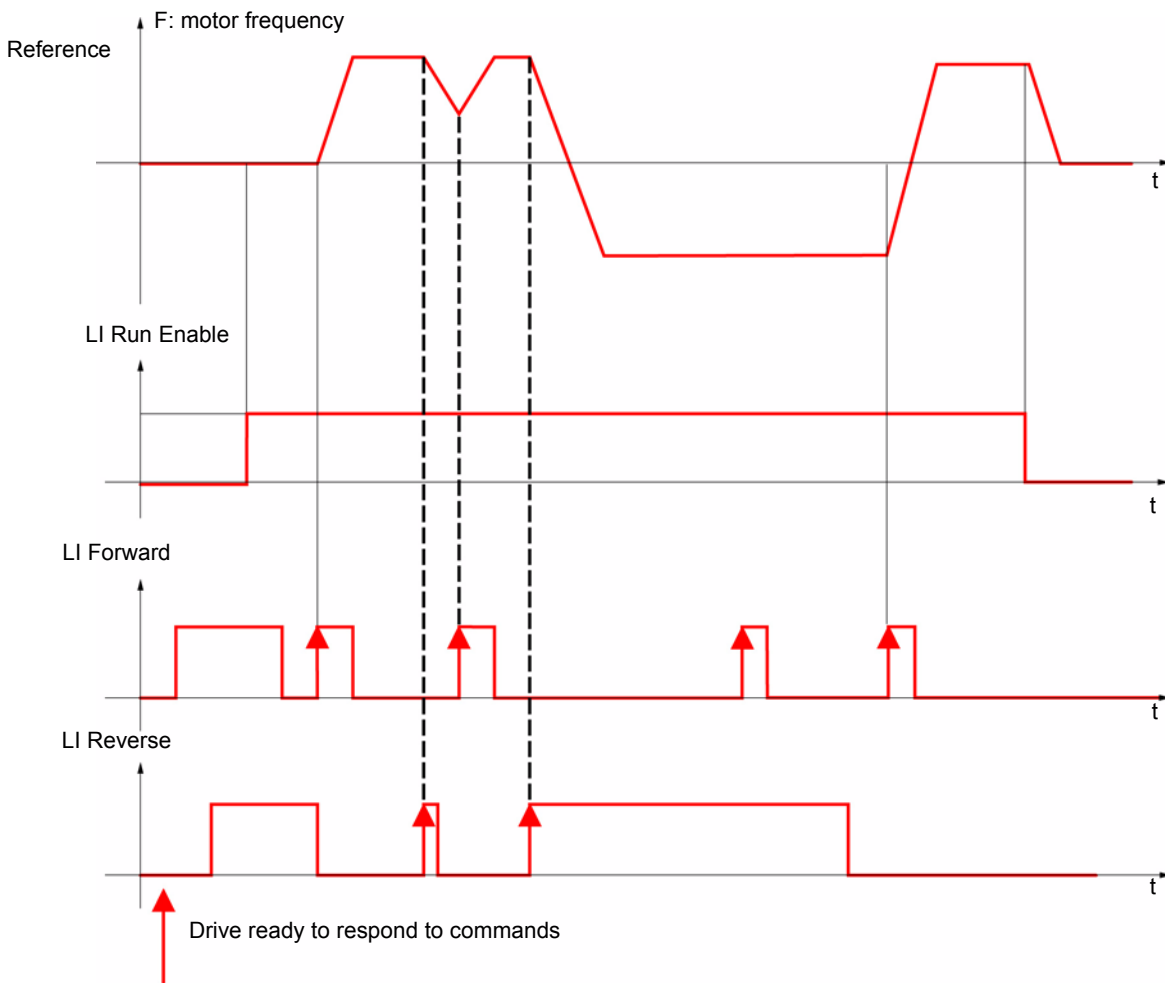
C t L -

F U N -

F L L -

C O N -

3-wire control diagram (see page 51)



Configuration Mode - Complete menu (FULL)

I - 0 -
dr C -
C E L -
F U N -
F L E -
C O N -

Code	Name/Description	Adjustment range	Factory setting
I - 0 -	Input Output menu (continued)		
E C E	<input type="checkbox"/> 2 wire type control		trn
L E L E r n P F D	<p style="text-align: center;">⚠ DANGER</p> <p>UNINTENDED EQUIPMENT OPERATION Check that the modification of the 2 wire type control is compatible with the wiring diagram used.</p> <p>Failure to follow these instructions will result in death or serious injury.</p> <p>2-wire type control parameter can only be accessed if Type of control E C E page 48 is set to P C .</p> <ul style="list-style-type: none"> <input type="checkbox"/> Level: State 0 or 1 is taken into account for run or stop. <input type="checkbox"/> Transition: A change of state (transition or edge) is necessary to initiate operation, to help prevent accidental restarts after a power supply interruption. <input type="checkbox"/> Priority FW: State 0 or 1 is taken into account for run or stop, but the "forward" input takes priority over the "reverse" input. 		
n P L P O S n E G E n E G	<input type="checkbox"/> Logic inputs type		POS
	<ul style="list-style-type: none"> <input type="checkbox"/> Positive: the inputs are active (state 1) at a voltage equal to or higher than 11 V (for example +24 V terminal). They are inactive (state 0) when the drive is disconnected or at a voltage lower than 5 V. <input type="checkbox"/> Negative using internal supply: the inputs are active (state 1) at a voltage lower than 10 V (for example COM terminal). They are inactive (state 0) at a voltage equal to or higher than 16 V or when the drive is disconnected. <input type="checkbox"/> Negative using external supply: the inputs are active (state 1) at a voltage lower than 10 V (for example COM terminal). They are inactive (state 0) at a voltage equal to or higher than 16 V. <p>Note: The modification will be taken into account only at the next control power-on.</p> <p>See Control connection diagrams, page 25.</p>		


Configuration Mode - Complete menu (FULL)

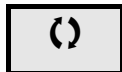
I - 0 -
d r C -
C t L -
F U N -
F L t -
C O N -

Code	Name/Description	Adjustment range	Factory setting
I - 0 -	Input Output menu (continued)		
A I I -	AI1 configuration menu		
A I I t	<input type="checkbox"/> AI1 type This function makes interface from the analog input signal to a drive internal value. <input type="checkbox"/> Voltage: 0-5 Vdc <input type="checkbox"/> Voltage: 0-10 Vdc <input type="checkbox"/> Current: x-y mA. Range determined by the AI1 current scaling parameter of 0% C r L I and AI1 current scaling parameter of 100% C r H I settings below, see page 52.		5U
S U I O U O A			
C r L I	<input type="checkbox"/> AI1 current scaling parameter of 0% Visible only if AI1 type A I I t is set to O A	0 to 20 mA	4 mA
C r H I	<input type="checkbox"/> AI1 current scaling parameter of 100% Visible only if AI1 type A I I t is set to O A	0 to 20 mA	20 mA
I - 0 -	Input Output menu (continued)		
r I	<input type="checkbox"/> R1 assignment <input type="checkbox"/> Not assigned <input type="checkbox"/> No error detected <input type="checkbox"/> Drive run <input type="checkbox"/> Frequency threshold reached <input type="checkbox"/> HSP reached <input type="checkbox"/> I threshold reached <input type="checkbox"/> Frequency reference reached <input type="checkbox"/> Motor thermal reached <input type="checkbox"/> Underload alarm <input type="checkbox"/> Overload alarm <input type="checkbox"/> AI1 AI. 4-20 - Visible only if A I I t is set to O A (see above)		FLt
n O F L t r U n F t A F L A C t A S r A t S A U L A O L A A P I			
	Note: Relay R1 can be assigned to upstream protection to avoid overvoltage in the drive: <ul style="list-style-type: none"> • Connect fault relay R1 to the contactor, see schematic page 18. • Use Relay R1 (R1 assignment r I) with protection. • Use LO1 assignment L O I (page 53) for remote indication of the drive status. 		

Configuration Mode - Complete menu (FULL)

I - 0 -
dr C -
C t L -
F U N -
F L t -
C O N -

Code	Name/Description	Adjustment range	Factory setting
I - 0 -	Input Output menu (continued)		
L O 1 -	LO1 Configuration menu (LO1-)		
L O 1	<input type="checkbox"/> LO1 assignment Allows to adapt the logic output to the application need.		nO
nO FLt rUn FLA CLtA SrA tSA ULtA OLA APt	<input type="checkbox"/> Not assigned <input type="checkbox"/> No error detected <input type="checkbox"/> Drive run <input type="checkbox"/> Frequency threshold reached <input type="checkbox"/> HSP reached <input type="checkbox"/> I threshold reached <input type="checkbox"/> Frequency reference reached <input type="checkbox"/> Motor thermal reached <input type="checkbox"/> Underload alarm <input type="checkbox"/> Overload alarm <input type="checkbox"/> AI1 AI. 4-20 - Visible only if AI1t is set to OA (see above)		
	When ndE = YES , output LO1 is forced to PNP (See page 78).		
L O 1 S	<input type="checkbox"/> LO1 status (output active level)		POS
	 WARNING		
	LOSS OF CONTROL When LO1S = NEG and LO1 is set to FLt , The output will be active when the drive will detect a fault. The drive status will not be detected if the wiring is damaged for any reason. Do not select " NEG " unless you are sure that your signal will be present in any case.		
	Failure to follow these instructions can result in death, serious injury, or equipment damage.		
POS NEG	<input type="checkbox"/> Positive: high activation level <input type="checkbox"/> Negative: low activation level		



Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I - 0 -
d r C -
C t L -
F U N -
F L t -
C O n -

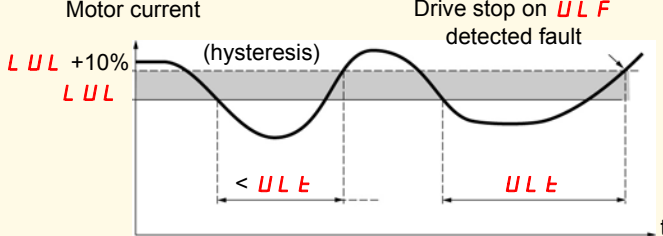
Code	Name/Description	Adjustment range	Factory setting
I - 0 -	Input Output menu (continued)		
t O L	<input type="checkbox"/> Application Overload time delay <p>This function can be used to stop the motor in the event of an application overload. This is not a motor or drive thermal overload. If the motor current exceeds the Application Overload threshold L O C, an Application Overload time delay t O L is activated. Once this time delay t O L has elapsed, if the current is still greater than the overload threshold L O C -10%, the drive will stop running and display D L C Process overload.</p> <p>Overload detection is only active when the system is in steady state (speed reference reached). A value of 0 will disable application overload detection.</p>	0 to 100 s	0 s
L O C (↻)	<input type="checkbox"/> Application Overload threshold <p>Visible only if Application Overload time delay t O L above is not set to 0. This parameter is used to detect an "application overload". L O C can be adjusted between 70 and 150% of the nominal drive current. This is not a motor or drive thermal overload.</p>	70 to 150% of nCr	90% of of nCr
F t O (↻)	<input type="checkbox"/> Time delay before automatic start for the overload fault <p>If Atr = YES the drive restarts automatically after an overload fault D L C once this time delay has elapsed. Minimum time permitted between an overload being detected and any automatic restart.</p> <p>In order for an automatic restart to be possible, the value of Maximum restart time t A r page 91 must exceed that of this parameter by at least one minute.</p> <p>Visible only if Application Overload time delay t O L above is not set to n 0.</p>	0 to 6 min	0 min



Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I - 0 -
d r C -
C L L -
F U N -
F L L -
C O N -

Code	Name/Description	Adjustment range	Factory setting
I - 0 -	Input Output menu (continued)		
U L L	<input type="checkbox"/> Application underload time delay U L L can be adjusted between 0 and 100 s. If the motor current undershoots the underload threshold L U L for longer than the adjustable time delay U L L, the drive will stop running and display U L F (Process underload fault) page 111.  <p>Motor current</p> <p>Drive stop on U L F detected fault</p> <p>L U L +10%</p> <p>L U L</p> <p>< U L L</p> <p>U L L</p> <p>t</p> <p>Underload detection is only active when the system is in steady state (speed reference reached). A value of 0 will disable application underload detection.</p>	0 to 100 s	0 s
L U L (C)	<input type="checkbox"/> Application Underload threshold Visible only if Application underload time delay U L L is not set to 0. This parameter is used to detect an application underload condition on the motor. Application Underload threshold L U L can be adjusted between 20 and 100% of the nominal drive current.	20 to 100% of nCr	60%
F L U (C)	<input type="checkbox"/> Time delay before automatic start for the underload fault If Atr = YES the drive restarts automatically after an underload fault U L F once this time delay has elapsed. Minimum time permitted between an overload being detected and any automatic restart. In order for an automatic restart to be possible, the value of Maximum restart time t A r page 91 must exceed that of this parameter by at least one minute. Visible only if Application underload time delay U L L above is not set to n 0.	0 to 6 min	0 min
F L d (C)	<input type="checkbox"/> Motor frequency threshold Visible only if R1 assignment r I page 52 or a LO1 assignment L O I page 53 is set to F L A.	0 to 400 Hz	50 or 60 Hz According to drive rating
C L d (C)	<input type="checkbox"/> Motor current threshold Visible only if R1 assignment r I page 52 or a LO1 assignment L O I page 53 is set to C L A.	0 to 1.5 In (1)	InV
t L d (C)	<input type="checkbox"/> Motor thermal state threshold Visible only if R1 assignment r I page 52 is set to t S A. Trip threshold for motor thermal alarm (logic output or relay)	0 to 118% of tHr	100%

(1) In = nominal drive current

(C) Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I - 0 -
 d r C -
 C L L -
 F U N -
 F L L -
 C O N -

Code	Name/Description	Adjustment range	Factory setting	
I - 0 -	Input Output menu (continued)			
A O 1 -	AO1 configuration menu			
A O 1	<input type="checkbox"/> AO1 assignment This parameter is used to set the value of an analog output. <ul style="list-style-type: none"> <input type="checkbox"/> Not assigned <input type="checkbox"/> Motor current, between 0 and 2 In (In = rated drive current indicated on the drive nameplate) <input type="checkbox"/> Output frequency, from 0 to Max frequency <i>f_{Fr}</i> <input type="checkbox"/> Ramp output, from 0 to Max frequency <i>f_{Fr}</i> <input type="checkbox"/> PID reference, between 0 and 100% of the PID set point - Visible only if PID feedback assignment <i>P I F</i> page 72 is not set to <i>n 0</i> <input type="checkbox"/> PID feedback, between 0 and 100% of the PID feedback - Visible only if PID feedback assignment <i>P I F</i> page 72 is not set to <i>n 0</i> <input type="checkbox"/> PID error, between - 5 % and + 5 % of the PID feedback - Visible only if PID feedback assignment <i>P I F</i> page 72 is not set to <i>n 0</i> <input type="checkbox"/> Output power, between 0 and 2.5 times Rated motor power <i>n P r</i> <input type="checkbox"/> Motor thermal state, between 0 and 200% of the rated thermal state <input type="checkbox"/> Drive thermal state, between 0 and 200% of the rated thermal state 		n0	
A O 1 t	<input type="checkbox"/> AO1 type This parameter provides the interface between the drive internal value and an analog output signal. <ul style="list-style-type: none"> <input type="checkbox"/> Voltage: 0-10 Vdc <input type="checkbox"/> Current: 0-20 mA <input type="checkbox"/> Current: 4-20 mA 			0A
I O U O A 4 A				

Configuration Mode - Complete menu (FULL)

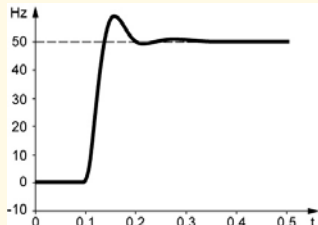
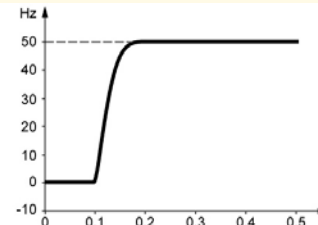
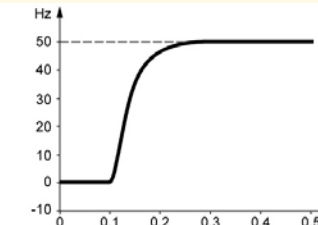
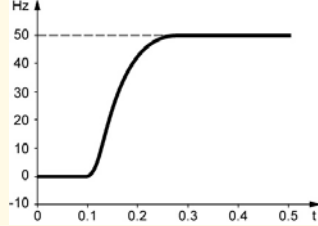
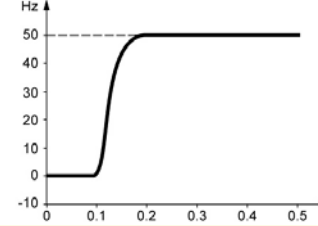
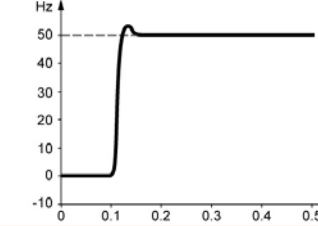
I - D -
d r C -
C E L -
F U N -
F L E -
C O N -

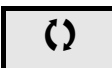
Code	Name/Description	Adjustment range	Factory setting
d r C -	Motor control menu		
b F r	<input type="checkbox"/> Standard motor frequency See page 45 .		50 Hz
n P r	<input type="checkbox"/> Rated motor power See page 46 .	NCV -5 to NCV +2	According to drive rating
C o S	<input type="checkbox"/> Rated motor cos phi Visible only if Motor parameter choice <i>n P C</i> page 60 is set to <i>C o S</i> . If Rated motor cos phi <i>C o S</i> is available Rated motor power <i>n P r</i> disappears. Motor nameplate power factor (pf). Note: Do not confuse this with motor "Service Factor". Setting <i>C o S</i> to or very near to 1 may result in unsatisfactory motor operation. If the motor power factor is not indicated on the nameplate, leave this parameter at the factory default (approximately 0.80)	0.5 to 1	According to drive rating
U n S	<input type="checkbox"/> Rated motor voltage Rated motor voltage given on the nameplate. If the line voltage is less than the rated motor voltage, Rated motor voltage <i>U n S</i> should be set to the value of the line voltage applied to the drive terminals.	100 to 480 V	230 V
n C r	<input type="checkbox"/> Rated motor current Rated motor current given on the nameplate. Rated motor current <i>n C r</i> modifies Motor thermal current <i>I t H</i> page 94 .	0.25 In to 1.5 In (1)	According to drive rating
F r S	<input type="checkbox"/> Rated motor frequency Rated motor frequency given on the nameplate. The factory setting is 50 Hz, or preset to 60 Hz if Standard motor frequency <i>b F r</i> page 45 is set to 60 Hz.	10 to 400 Hz	50 Hz
n S P	<input type="checkbox"/> Rated motor speed Rated motor speed given on the nameplate.	0 to 24000 rpm	According to drive rating
t F r	<input type="checkbox"/> Maximum frequency Maximum frequency <i>t F r</i> gives the upper value possible for High speed <i>H S P</i> page 90 . The factory setting is 60 Hz, or preset to 72 Hz if Standard motor frequency <i>b F r</i> page 57 is set to 60 Hz.	10 to 400 Hz	60 Hz
C E t	<input type="checkbox"/> Motor control type		Std
P E r F	<input type="checkbox"/> Performance: SVCU; Sensorless vector control with internal speed loop based on voltage feedback calculation. For applications needing high performance during starting or operation.		
S t d	<input type="checkbox"/> Standard: U/F 2 points (Volts/Hz) without internal speed loop For simple applications that do not require high performance. Simple motor control law keeping a constant Voltage Frequency ratio, with a possible adjustment of the curve bottom. This law is generally used for motors connected in parallel. Some specific applications with motors in parallel and high performance levels may require <i>P E r F</i> .		
P U N P	<input type="checkbox"/> Pump: U ² /F; dedicated to variable torque pump and fan applications that do not require high starting torque.		

(1)In = nominal drive current

Configuration Mode - Complete menu (FULL)

I - 0 -
d r C -
C L L -
F U N -
F L L -
C O N -

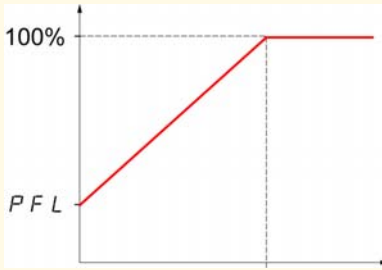
Code	Name/Description	Adjustment range	Factory setting
Motor control menu (continued)			
U F r ()	<input type="checkbox"/> IR compensation (law U/F) Used to optimize torque at very low speed, or to adapt to special cases (for example: for motors connected in parallel, decrease IR compensation (law U/F) U F r). If there is insufficient torque at low speed, increase IR compensation (law U/F) U F r . Too high a value can cause the motor not to start (locking) or a change to current limiting mode.	25 to 200%	100%
S L P ()	<input type="checkbox"/> Slip compensation Visible only if Motor control type C L L page 57 is not set to P U N P Used to adjust the slip compensation around the value set by the nominal motor slip, or to adapt to special cases (example: for motors connected in parallel, decrease Slip compensation S L P). If the set slip compensation is lower than the actual slip compensation, the motor doesn't run at nominal speed at steady state but at a speed lower than the reference. If the set slip compensation is greater than the actual slip compensation, motor speed is unstable.	0 to 150%	100%
S L A ()	<input type="checkbox"/> Frequency loop stability The S L A parameter can be used to reduce overshoots and oscillations at the end of acceleration. After a period of acceleration or deceleration, S L A adapts the return to a steady state to the dynamics of the machine; Too high a value causes an extended response time. Too low a value causes an overshoot, or even instability.	0 to 100%	20%
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Low S L A In this case, increase S L A</p>  </div> <div style="text-align: center;"> <p>Correct S L A</p>  </div> <div style="text-align: center;"> <p>High S L A In this case, reduce S L A</p>  </div> </div> <p>Visible only if Motor control type C L L page 57 is set to P E r F.</p>			
F L G ()	<input type="checkbox"/> Frequency loop gain The F L G parameter adjusts the slope of the speed increase according to the inertia of the machine being driven. Too high a value causes an overshoot, or even instability. Too low a value causes an extended response time	0 to 100%	20%
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Low F L G In this case, increase F L G</p>  </div> <div style="text-align: center;"> <p>Correct F L G</p>  </div> <div style="text-align: center;"> <p>High F L G In this case, reduce F L G</p>  </div> </div> <p>Visible only if Motor control type C L L page 57 is set to P E r F.</p>			



Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I - 0 -
drC -
CEE -
FUN -
FLE -
CON -

Code	Name/Description	Adjustment range	Factory setting
Motor control menu (continued)			
PFL ()	<input type="checkbox"/> Flux Profile It defines the magnetizing current at zero frequency, as a % of the rated magnetizing current Adjustment of PUMP law. 	0 to 100%	20%
Visible only if Motor control type CEE page 57 is set to PUMP			
SFr ()	<input type="checkbox"/> Switching frequency Switching frequency setting. In the event of overheating, the drive automatically decreases the switching frequency. It is restored to its original value when the temperature returns to normal.	2 to 16 kHz	4 kHz
NOTICE			
RISK OF DAMAGE TO THE DRIVE			
On ATV12...M2 ratings, if the filters are disconnected, the drive's switching frequency must not exceed 4 kHz.			
Failure to follow these instructions can result in equipment damage.			
SFE HF1 HF2	<input type="checkbox"/> Switching frequency type The motor switching frequency will always be modified (reduced) when the internal temperature of the drive is too high. <input type="checkbox"/> HF1: Heating optimization. Allows the system to adapt the switching frequency according to the motor frequency. <input type="checkbox"/> HF2: Motor noise optimization (for high switching frequency). Allows system to keep a constant chosen switching frequency (SFr) whatever the motor frequency (rFr). In the event of overheating, the drive automatically decreases the switching frequency. It is restored to its original value when the temperature returns to normal.		HF1
nr d n0 YES	<input type="checkbox"/> Motor noise reduction Noise means audible noise. Depending on the environment it must be possible to adjust the motor noise. Random frequency modulation avoids possible resonance noises that can occur at fixed frequency. <input type="checkbox"/> No <input type="checkbox"/> Yes		n0

() Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

l - 0 -
 drC -
 CLL -
 FUN -
 FLt -
 CON -

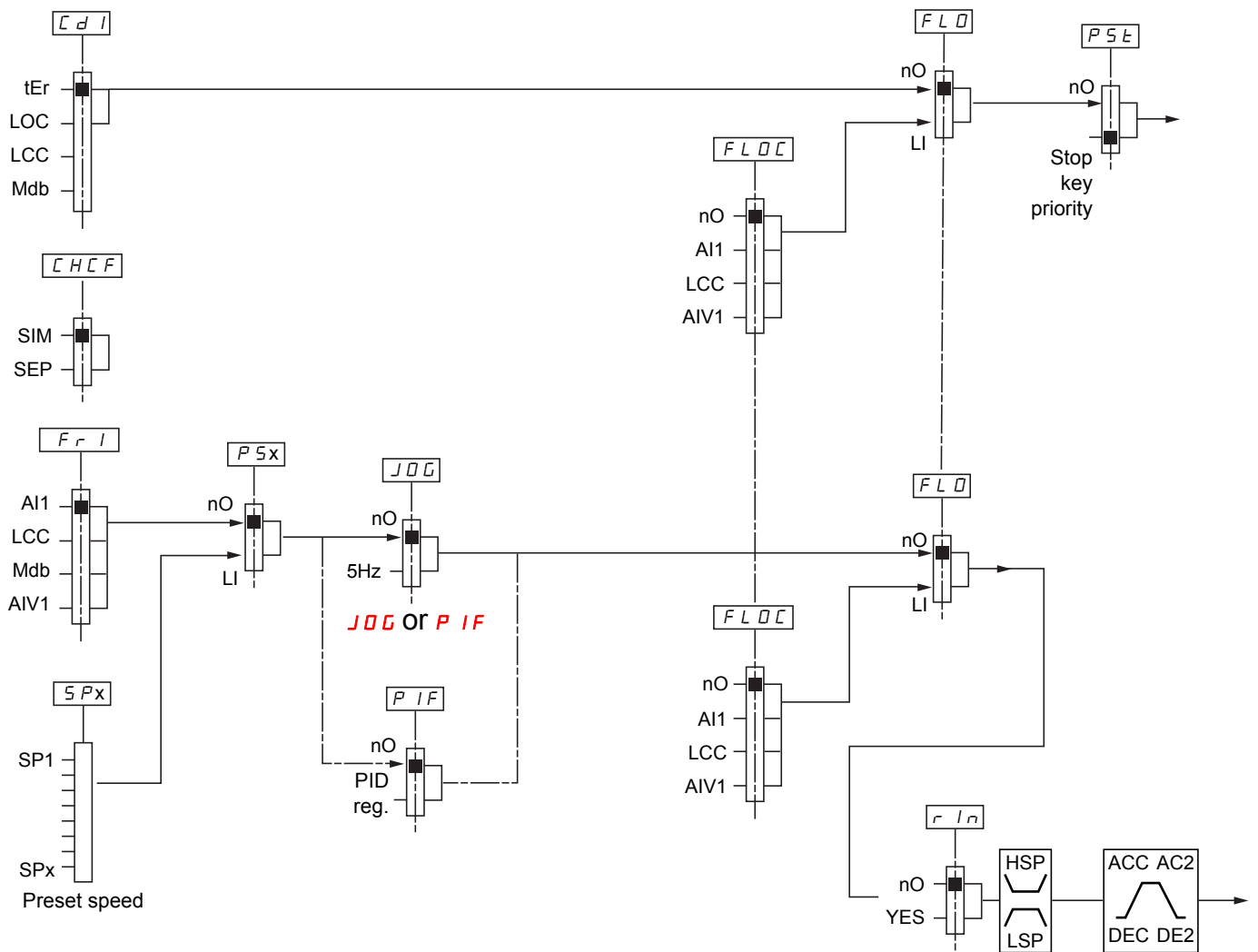
Code	Name/Description	Adjustment range	Factory setting
drC -	Motor control menu (continued)		
tUn	<input type="checkbox"/> Auto-tuning		nO
	<p style="text-align: center;">⚡ ⚠ DANGER</p> <p>HAZARD OF ELECTRIC SHOCK OR ARC FLASH</p> <ul style="list-style-type: none"> • During auto-tuning, the motor operates at rated current. • Do not service the motor during auto-tuning. <p>Failure to follow these instructions will result in death or serious injury.</p>		
	<p style="text-align: center;">⚠ WARNING</p> <p>LOSS OF CONTROL</p> <ul style="list-style-type: none"> • It is essential that the following parameters UnS, FrS, nCr, nSP, and nPr or CO5 are correctly configured before starting auto-tuning. • When one or more of these parameters have been changed after auto-tuning has been performed, tUn will return nO and the procedure will have to be repeated. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>		
nO YES dOnE	<input type="checkbox"/> No: When factory parameters of standard motors <input type="checkbox"/> Yes: Launches auto-tuning <input type="checkbox"/> Done: If auto-tuning has already been performed		
	<p>Attention:</p> <ul style="list-style-type: none"> • Auto-tuning must be performed with the motor connected and cold. • Parameters Rated Motor Power nPr page 46 and Rated motor current nCr page 57 must be consistent. • Auto-tuning is performed only if no stop command has been activated. If a freewheel stop or fast stop function has been assigned to a logic input, this input must be set to 1 (active at 0). • Auto-tuning takes priority over any run or prefluxing commands, which will take effect after the auto-tuning sequence. • Auto-tuning may last for 1 to 2 seconds. Do not interrupt, wait for tUn value to change to dOnE or nO. <p>Note: During auto-tuning the motor operates at rated current.</p>		
nPr CO5	<input type="checkbox"/> Motor parameter choice		nPr
	<p>This parameter allows to choose which motor parameter will be configured (nPr or CO5).</p> <input type="checkbox"/> Rated Motor Power nPr page 46 <input type="checkbox"/> Rated motor cos phi CO5 page 57		

Configuration Mode - Complete menu (FULL)

I - 0 -
dr C -
C E L -
FUN -
FL E -
CON -

Control menu

Control channel diagram



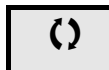
Configuration Mode - Complete menu (FULL)

I - 0 -
dr C -
C E L -
F U N -
F L E -
C O N -

Code	Name/Description	Adjustment range	Factory setting
C E L -	Control menu		
F r 1 A I 1 L C C M d b A I U 1	<input type="checkbox"/> Reference channel 1 <input type="checkbox"/> Terminal <input type="checkbox"/> Remote display <input type="checkbox"/> Modbus <input type="checkbox"/> Integrated display with Jog dial This parameter is already included in "my menu" section, page 45.		AI1
L F r ()	<input type="checkbox"/> External reference value This parameter is already included in "my menu" section, page 45.	- 400 Hz to 400 Hz	-
A I U 1 ()	<input type="checkbox"/> Analog input virtual This parameter is already included in "my menu" section, page 45.	0% to 100%	
r In n 0 Y E S	<input type="checkbox"/> Reverse inhibition Inhibition of movement in reverse direction, does not apply to direction requests sent by logic inputs. - Reverse direction requests sent by logic inputs are taken into account. - Reverse direction requests sent by the display are not taken into account. - Reverse direction requests sent by the line are not taken into account. - Any reverse speed reference originating from the PID, etc., is interpreted as a zero reference (0 Hz). <input type="checkbox"/> No <input type="checkbox"/> Yes		n0
P S t ⌚ 2 s	<input type="checkbox"/> Stop key priority This parameter can enable or disable the stop button located on the drive and remote display. Disabling the stop button is effective if the active command channel is different from the drive keypad or remote display <div style="text-align: center;">⚠ WARNING</div> <div>LOSS OF CONTROL</div> You are going to disable the stop button located on the drive and remote display Do not select n 0 unless exterior stopping methods exist. Failure to follow these instructions can result in death, serious injury, or equipment damage.		YES
C H C F n 0 Y E S	<input type="checkbox"/> Channel configuration Channel configuration C H C F allows the selection of: - Not separate mode, (command and reference come from the same channel) - Separate mode (command and reference come from different channel) <input type="checkbox"/> Not separate mode <input type="checkbox"/> Separate mode It is advised in case this function is set to Y E S to use the front door cover or the option display cover on "run" and "stop" keys.		
S I N S E P			SIM



To change the assignment of this parameter press the "ENT" key for 2 s.



Parameter that can be modified during operation or when stopped.

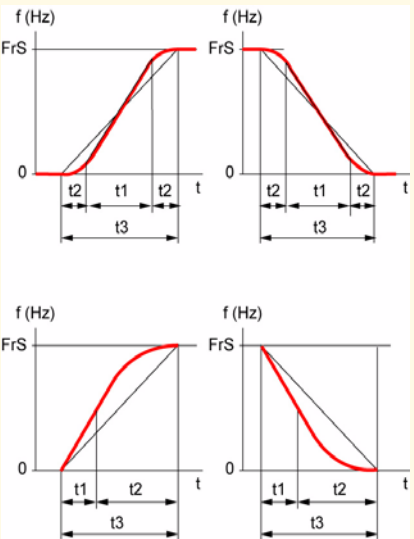
Configuration Mode - Complete menu (FULL)

I - 0 -
drC -
C t L -
FUN -
FLt -
CON -

Code	Name/Description	Adjustment range	Factory setting
C t L -	Control menu (continued)		
C d I tEr L O C L C C nDb	<input type="checkbox"/> Command channel 1 This parameter allows selection of the command channel. <input type="checkbox"/> Terminals <input type="checkbox"/> Local <input type="checkbox"/> Remote display <input type="checkbox"/> Modbus This parameter is available if Channel configuration C H C F page 62 is set to Separate		tEr
F L O nO L 1H - L 4H	<input type="checkbox"/> Forced local assignment <input type="checkbox"/> Function inactive <input type="checkbox"/> L1h to L4h: Forced local mode is active when the input is at state 1.		nO
F L O C nO A I I L C C A I U I	<input type="checkbox"/> Forced local reference Visible only if Forced local assignment F L O is not set to nO . <input type="checkbox"/> Not assigned <input type="checkbox"/> Terminal <input type="checkbox"/> Remote display <input type="checkbox"/> Integrated display with jog dial		nO

Configuration Mode - Complete menu (FULL)

I-D-
d r C -
C L L -
F U N -
F L L -
C O N -


Code	Name/Description	Adjustment range	Factory setting
FUN -	Function menu		
rPt -	Ramp menu		
ACC ()	<input type="checkbox"/> Acceleration Acceleration time between 0 Hz and the Rated motor frequency FrS page 57. Make sure that this value is compatible with the inertia being driven.	0.0 s to 999.9 s	3.0 s
DEC ()	<input type="checkbox"/> Deceleration Time to decelerate from the Rated motor frequency FrS page 57 to 0 Hz Make sure that this value is compatible with the inertia being driven.	0.0 s to 999.9 s	3.0 s
rPt L I n S U ()	<input type="checkbox"/> Ramp shape assignment <input type="checkbox"/> Linear <input type="checkbox"/> S shape <input type="checkbox"/> U shape  <p>The rounding coefficient is fixed, t1 = 0.6 set ramp time (linear) t2 = 0.4 set ramp time (round) t3 = 1.4 set ramp time</p> <p>The rounding coefficient is fixed, t1 = 0.5 set ramp time (linear) t2 = set ramp time (round) t3 = 1.5 set ramp time</p>		Lin
rPS nO L 1H L 2H L 3H L 4H L 1L L 2L L 3L L 4L	<input type="checkbox"/> Ramp switching commutation <input type="checkbox"/> Not assigned <input type="checkbox"/> L1H: LI1 active High <input type="checkbox"/> L2H: LI2 active High <input type="checkbox"/> L3H: LI3 active High <input type="checkbox"/> L4H: LI4 active High <input type="checkbox"/> L1L: LI1 active low <input type="checkbox"/> L2L: LI2 active low <input type="checkbox"/> L3L: LI3 active low <input type="checkbox"/> L4L: LI4 active low See LI assignment information on page 46.		nO

() Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I-D-
drC-
CLL-
FUN-
FLt-
CON-

Code	Name/Description	Adjustment range	Factory setting
FUn-	Function menu (continued)		
rPt-	Ramp menu (continued)		
AC2 ()	<input type="checkbox"/> Acceleration 2 Visible only if Ramp switching commutation rPS page 64 is not set to n0 . Second acceleration ramp time, adjustable from 0.0 to 999.9 s This ramp will be the active ramp when using PID for the start and wake-up phases only, see PID wake up level page 75.	0.0 to 999.9 s	5.0 s
DE2 ()	<input type="checkbox"/> Deceleration 2 Visible only if Ramp switching commutation rPS page 64 is not set to n0 . Second deceleration ramp time, adjustable from 0.0 to 999.9 s	0.0 to 999.9 s	5.0 s
brA n0 YES dYnA	<input type="checkbox"/> Decel Ramp Adaptation assignment <input type="checkbox"/> Function inactive. The drive will decelerate based on the normal deceleration adjustment. This setting is compatible with optional dynamic braking if used. <input type="checkbox"/> This function automatically increases deceleration time when stopping or reducing the speed of high inertia loads to help prevent DC bus overvoltage or overbraking. <input type="checkbox"/> Motor Braking: This mode allows the drive to attempt the most rapid stop possible without the use of a dynamic brake resistor. It uses motor losses to dissipate energy from regeneration. This function may be incompatible with positioning. This function should not be used when an optional braking resistor and module are being used. Attention: When using a braking resistor set brA to n0.		YES

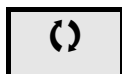
 Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I-D-
drC-
cLl-
FUN-
FLl-
con-

Code	Name/Description	Adjustment range	Factory setting
FUn-	Function menu (continued)		
Stt-	Stop configuration menu		
Stt	<input type="checkbox"/> Type of stop Stop mode on disappearance of the run command and appearance of a stop command <input type="checkbox"/> Ramp stop <input type="checkbox"/> Fast stop <input type="checkbox"/> Freewheel		rMP
rNP FSt nSt			
nSt	<input type="checkbox"/> Freewheel stop assignment The stop is activated when the input or the bit changes to 0. If the input returns to state 1 and the run command is still active, the motor will only restart if Type of control lCl page 48 = 2C and 2 wire type control lCl page 51 = LEL or PF0 . If not, a new run command must be sent. <input type="checkbox"/> Not assigned <input type="checkbox"/> L1L: LI1 Active Low to stop <input type="checkbox"/> L2L: LI2 Active Low to stop <input type="checkbox"/> L3L: LI3 Active Low to stop <input type="checkbox"/> L4L: LI4 Active Low to stop		nO
nO L1L L2L L3L L4L			
FSt	<input type="checkbox"/> Fast stop assignment <input type="checkbox"/> Not assigned <input type="checkbox"/> L1L: LI1 Active Low to stop <input type="checkbox"/> L2L: LI2 Active Low to stop <input type="checkbox"/> L3L: LI3 Active Low to stop <input type="checkbox"/> L4L: LI4 Active Low to stop		nO
nO L1L L2L L3L L4L			
dCF ()	<input type="checkbox"/> Ramp divider Visible only if Fast stop assignment FSt page 63 is not set to nO or if FSt is set to Type of stop Stt page 66. The ramp that is enabled (Deceleration dE1 page 45 or Deceleration 2 dE2 page 65) is then divided by this coefficient when stop requests are sent. Value 10 corresponds to a minimum ramp time.	1 to 10	4







Code	Name/Description	Adjustment range	Factory setting
FUn-	Function menu (continued)		
rrS	<input type="checkbox"/> Reverse direction LI1 to LI4: choice of the input assigned to the reverse command <input type="checkbox"/> Function inactive <input type="checkbox"/> L1h: L1 active high <input type="checkbox"/> L2h: L2 active high <input type="checkbox"/> L3h: L3 active high <input type="checkbox"/> L4h: L4 active high		nO
nO L1H L2H L3H L4H			




Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

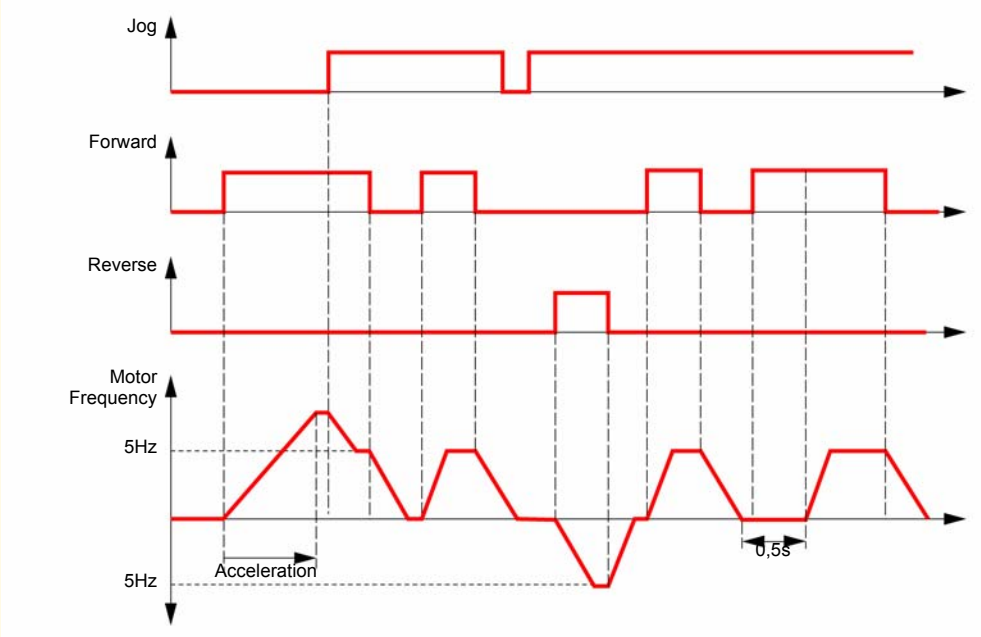
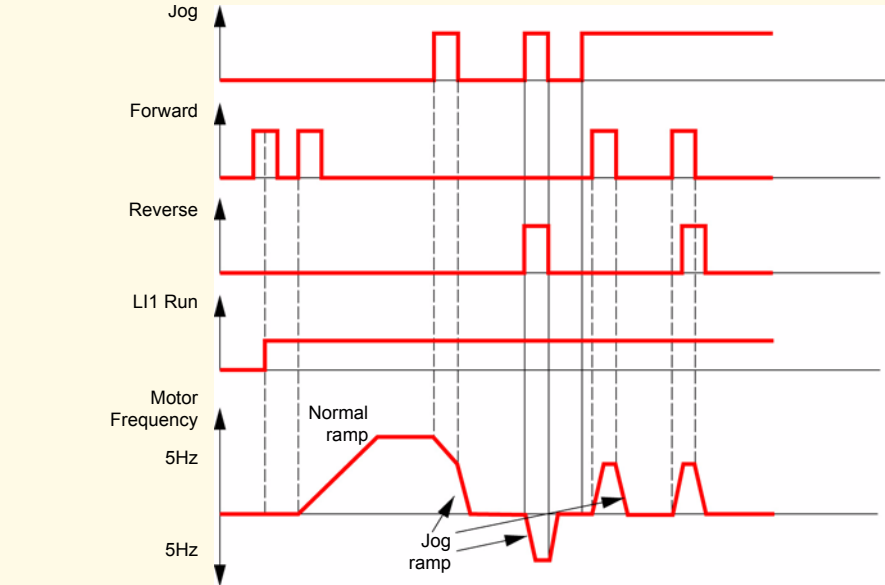
I-D-
drC-
CLL-
FUN-
FLt-
CON-

Code	Name/Description	Adjustment range	Factory setting
FUn-	Function menu (continued)		
AdC-	Auto DC injection menu		
AdC	<input type="checkbox"/> Automatic DC injection		YES
	 DANGER		
	<p>HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH When AdC = Ct, the injection of current is done even if a run command has not been sent. Check this action will not endanger personnel or equipment in any way.</p> <p>Failure to follow these instructions will result in death or serious injury.</p>		
	 WARNING		
	<p>NO HOLDING TORQUE</p> <ul style="list-style-type: none"> • DC injection braking does not provide any holding torque at zero speed. • DC injection braking does not work when there is a loss of power or when the drive detects a fault. • Where necessary, use a separate brake to maintain torque levels. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>		
nD YES Ct	<input type="checkbox"/> Automatic DC injection current	0 to 120% of nCr	70%
	NOTICE		
	<p>RISK OF DAMAGE TO THE MOTOR Check that the motor will withstand this current without overheating.</p> <p>Failure to follow this instruction can result in equipment damage.</p> <p>Visible only if Automatic DC injection AdC is not set to nD. Injection current on stopping and continuous DC injection.</p>		
EdC I	<input type="checkbox"/> Automatic DC injection time	0.1 to 30 s	0.5 s
	NOTICE		
	<p>RISK OF DAMAGE TO THE MOTOR</p> <ul style="list-style-type: none"> • Long periods of DC injection braking can cause overheating and damage the motor. • Protect the motor by avoiding long periods of DC injection braking. <p>Failure to follow these instructions can result in equipment damage.</p> <p>Visible only if Automatic DC injection AdC is not set to nD. Injection time on stopping.</p>		

 Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I-D-
drC-
CtL-
FUN-
FLt-
CON-

Code	Name/Description	Adjustment range	Factory setting
FUN-	Function menu (continued)		
JOG	<p><input type="checkbox"/> Jog assignment</p> <p>This parameter provides step by step control of motor running, using a logic input associated with a 2 and 3-wire control logic input. The jog frequency is fixed at 5 Hz. Acceleration and deceleration ramps taken into account in the Jog function are 0.1 s.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Function inactive. <input type="checkbox"/> L1h: LI1 active high <input type="checkbox"/> L2h: LI2 active high <input type="checkbox"/> L3h: LI2 active high <input type="checkbox"/> L4h: LI4 active high 		n0
n0 L1H L2H L3H L4H	<p>2-wire control</p>  <p>3 wire control</p> 		

Configuration Mode - Complete menu (FULL)

I - 0 -
d r C -
C E L -
F U N -
F L E -
C O N -

Preset speeds

2, 4, or 8 speeds can be preset, requiring 1, 2 or 3 logic inputs respectively

Combination table for preset speed inputs

8 speeds LI (PS8)	4 speeds LI (PS4)	2 speeds LI (PS2)	Speed reference
0	0	0	Reference
0	0	1	SP2
0	1	0	SP3
0	1	1	SP4
1	0	0	SP5
1	0	1	SP6
1	1	0	SP7
1	1	1	SP8

Configuration Mode - Complete menu (FULL)

I-D-
drc-
ccl-
FUN-
FLt-
CON-

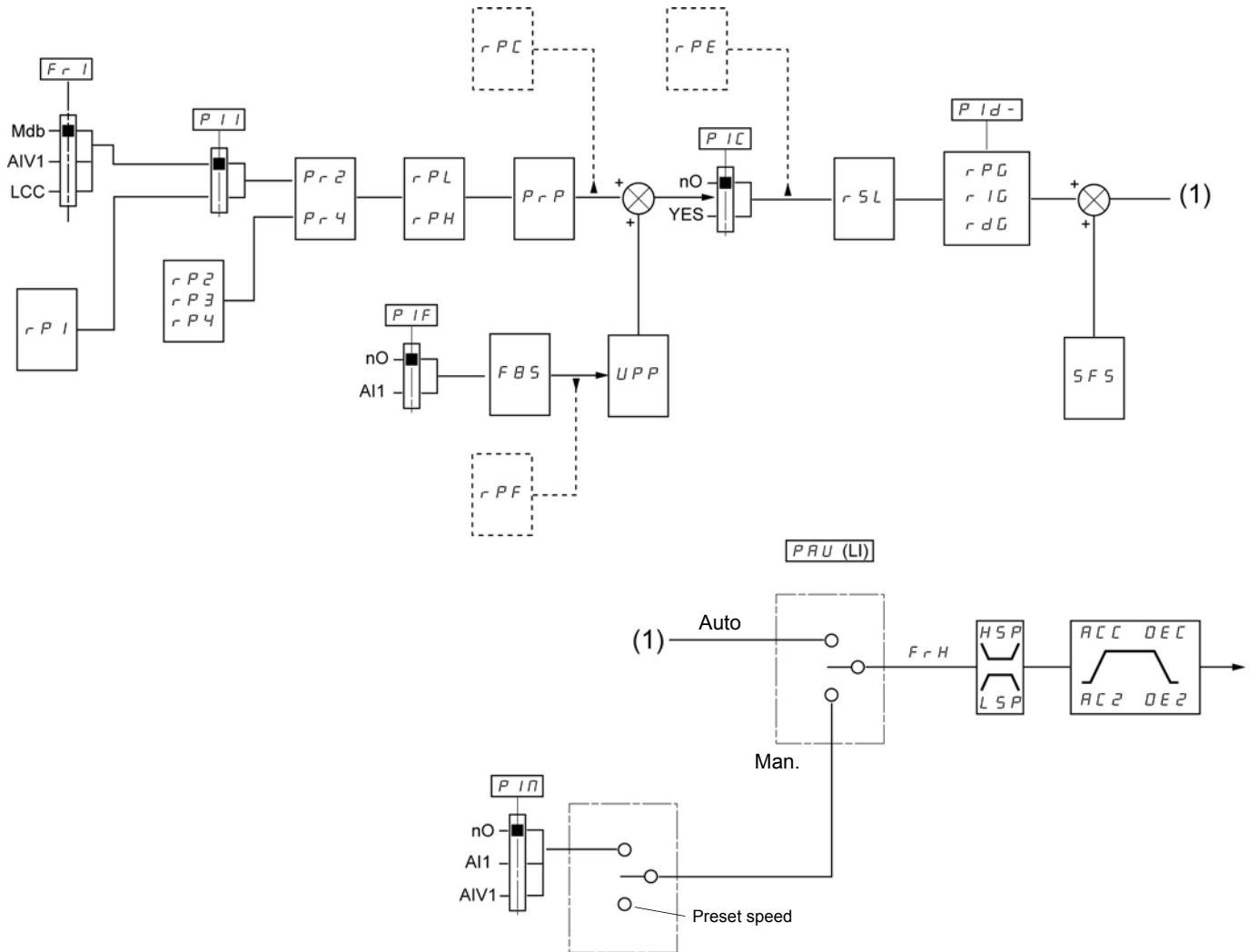
Code	Name/Description	Adjustment range	Factory setting
FUn-	Function menu (continued)		
P55-	Preset speed menu		
P52 <i>n0</i> <i>L1H</i> <i>L2H</i> <i>L3H</i> <i>L4H</i>	<input type="checkbox"/> 2 Preset speeds <input type="checkbox"/> Function inactive <input type="checkbox"/> L1h: LI1 active high <input type="checkbox"/> L2h: LI2 active high <input type="checkbox"/> L3h: LI2 active high <input type="checkbox"/> L4h: LI4 active high		n0
P54	<input type="checkbox"/> 4 Preset speeds as P52		n0
P5B	<input type="checkbox"/> 8 Preset speeds as P52		n0
SP2 ()	<input type="checkbox"/> Preset speed 2 Visible only if 2 Preset speeds P52 is not set to <i>n0</i> .	0 to 400 Hz	10 Hz
SP3 ()	<input type="checkbox"/> Preset speed 3 Visible only if 4 Preset speeds P54 is not set to <i>n0</i> .	0 to 400 Hz	15 Hz
SP4 ()	<input type="checkbox"/> Preset speed 4 Visible only if 2 Preset speeds P52 and 4 Preset speeds P54 are not set to <i>n0</i> .	0 to 400 Hz	20 Hz
SP5 ()	<input type="checkbox"/> Preset speed 5 Visible only if 8 Preset speeds P5B is not set to <i>n0</i> .	0 to 400 Hz	25 Hz
SP6 ()	<input type="checkbox"/> Preset speed 6 Visible only if 2 Preset speeds P52 and 8 Preset speeds P5B are not set to <i>n0</i> .	0 to 400 Hz	30 Hz
SP7 ()	<input type="checkbox"/> Preset speed 7 Visible only if 4 Preset speeds P54 and 8 Preset speeds P5B are not set to <i>n0</i> .	0 to 400 Hz	35 Hz
SP8 ()	<input type="checkbox"/> Preset speed 8 Visible only if 2 Preset speeds P52 , 4 Preset speeds P54 and 8 Preset speeds P5B are not set to <i>n0</i> .	0 to 400 Hz	40 Hz
JPF ()	<input type="checkbox"/> Skip frequency <input type="checkbox"/> This parameter prevents prolonged operation around the regulated frequency. This function can be used to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.	0 to 400 Hz	0 Hz

() Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I-D-
d r C -
C E L -
F U N -
F L E -
C O N -

PID diagram



Configuration Mode - Complete menu (FULL)

I - 0 -
dr C -
C L L -
FUN -
FL L -
CON -

Code	Name/Description	Adjustment range	Factory setting
FUn-	Function menu (continued)		
PId-	PID menu		
P IF n0 A I I	<input type="checkbox"/> PID feedback assignment <input type="checkbox"/> Not assigned <input type="checkbox"/> Terminal. Choice not possible if Fr1 is set to AI1		n0
r PG ()	<input type="checkbox"/> PID proportional gain Visible only if PID feedback assignment P IF is not set to n0.	0.01 to 100	1
r IG ()	<input type="checkbox"/> PID integral gain Visible only if PID feedback assignment P IF is not set to n0.	0.01 to 100	1
r dG ()	<input type="checkbox"/> PID derivative gain Visible only if PID feedback assignment P IF is not set to n0.	0.00 to 100.00	0.00
F b S ()	<input type="checkbox"/> PID feedback scale factor This parameter gives the relation between process range and feedback range. Visible only if PID feedback assignment P IF is not set to n0.	0.1 to 100.0	1.0
P I I n0 Y E S	<input type="checkbox"/> Activation internal PID reference Visible only if PID feedback assignment P IF is not set to n0. <input type="checkbox"/> No <input type="checkbox"/> Yes		n0
P r 2 n0 L 1 H L 2 H L 3 H L 4 H	<input type="checkbox"/> 2 preset PID assignment Visible only if PID feedback assignment P IF is not set to n0. <input type="checkbox"/> No <input type="checkbox"/> L1h <input type="checkbox"/> L2h <input type="checkbox"/> L3h <input type="checkbox"/> L4h		n0



Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)



I - 0 -
d r C -
C t L -
F U n -
F L t -
C O n -


Code	Name/Description	Adjustment range	Factory setting
FUn-	Function menu (continued)		
PId-	PID menu (continued)		
Pr4 n0 L1H L2H L3H L4H	<input type="checkbox"/> 4 preset PID assignment Visible only if PID feedback assignment P IF page 72 is not set to n0 . <input type="checkbox"/> No <input type="checkbox"/> L1h <input type="checkbox"/> L2h <input type="checkbox"/> L3h <input type="checkbox"/> L4h 2 preset PID assignment Pr2 page 72 must be assigned before assigning 4 preset PID assignment Pr4 .		n0
rP2 ()	<input type="checkbox"/> 2 preset PID reference Visible only if PID feedback assignment P IF page 72 and 2 preset PID assignment Pr2 page 72 are not set to n0 .	0 to 100%	25%
rP3 ()	<input type="checkbox"/> 3 preset PID reference Visible only if PID feedback assignment P IF page 72 and 4 preset PID assignment Pr4 page 72 are not set to n0 .	0 to 100%	50%
rP4 ()	<input type="checkbox"/> 4 preset PID reference Visible only if PID feedback assignment P IF page 72 and 2 preset PID assignment Pr2 and 4 preset PID assignment Pr4 page 72 are not set to n0 .	0 to 100%	75%
rP1 ()	<input type="checkbox"/> Internal PID reference Visible only if PID feedback assignment P IF page 72 is not set to n0 and if Activation internal PID reference P I I page 72 is set to YES or Reference channel 1 F r I page 45 is set to LCC .	0 to 100%	0%
PrP ()	<input type="checkbox"/> PID reference ramp Visible only if PID feedback assignment P IF page 72 is not set to n0 .	0 to 99,9 s	0 s
rPL ()	<input type="checkbox"/> PID min value reference Visible only if PID feedback assignment P IF page 72 is not set to n0 .	0 to 100%	0%
rPH ()	<input type="checkbox"/> PID max value reference Visible only if PID feedback assignment P IF page 72 is not set to n0 .	0 to 100%	100%
SFS	<input type="checkbox"/> PID predictive speed This parameter allows to go directly to a set speed reference. Visible only if PID feedback assignment P IF page 72 is not set to n0 .	0.1 to 400 Hz	n0

() Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I - 0 -
drC -
CLL -
FUN -
FLt -
CON -

Code	Name/Description	Adjustment range	Factory setting
FUn -	Function menu (continued)		
PId -	PID menu (continued)		
AC2 	<input type="checkbox"/> Acceleration 2 This parameter is active only when the system is starting. Second acceleration ramp time, adjustable from 0.1 to 999.9 s Time to accelerate from 0 to the Rated motor frequency F r 5 page 57. Make sure that this value is compatible with the inertia being driven. Visible only if PID feedback assignment P IF page 72 and PID predictive speed 5 F 5 page 73 are not set to n0 .	0.0 to 999.9 s	5.0 s
PIC n0 YES	<input type="checkbox"/> PID correction reverse This parameter will reverse the internal error value of PID system. <input type="checkbox"/> No <input type="checkbox"/> Yes Visible only if PID feedback assignment P IF page 72 is not set to n0 .		n0
PAU n0 L1H L2H L3H L4H	<input type="checkbox"/> PID auto/manual assignment At state 0 of input, PID is active. At state 1 of input, manual run is active <input type="checkbox"/> No <input type="checkbox"/> L1h: LI1 active high <input type="checkbox"/> L2h: LI2 active high <input type="checkbox"/> L3h: LI3 active high <input type="checkbox"/> L4h: LI4 active high Visible only if PID feedback assignment P IF page 72 is not set to n0 .		n0
PIN n0 A11 A1U1	<input type="checkbox"/> PID manual reference This parameter allows to disable the PID and to run on a standard manual system. <input type="checkbox"/> No <input type="checkbox"/> Terminal <input type="checkbox"/> AIV1 Visible only if PID feedback assignment P IF page 72 and PID auto/manual assignment PAU page 74 are not set to n0 .		n0
ELS 	<input type="checkbox"/> Low speed operating time Following operation at Low speed L 5 P page 89 for a defined period, a motor stop is requested automatically. The motor restarts if the frequency reference is greater than Low speed L 5 P and if a run command is still present. Note: n0 value corresponds to an unlimited period. Visible only if PID feedback assignment P IF page 72 is not set to n0 .	0.1 to 999.9 s	n0

 Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I - 0 -
dr C -
CLL -
FUN -
FL E -
CON -

Code	Name/Description	Adjustment range	Factory setting
FUn -	Function menu (continued)		
PId -	PID menu (continued)		
r 5L	<input type="checkbox"/> PID wake up level	0 to 100%	0%
	<p style="text-align: center;">⚠ DANGER</p> <p>UNINTENDED EQUIPMENT OPERATION Check that unintended restarts will not present any danger.</p> <p>Failure to follow these instructions will result in death or serious injury.</p> <p>If PID functions and Low speed operating time EL5 are set at the same time, the PID regulator may try to set a speed lower than LSP, resulting in unwanted operation consisting of start, running at LSP, stopping and so on...</p> <p>Parameter PID wake up level r 5L is used to set a minimum PID error threshold to restart after a prolonged stop at LSP.</p> <p>Visible only if PID feedback assignment P IF page 72 and Low speed operating time EL5 page 74 are not set to n0.</p>		
UPP ()	<input type="checkbox"/> Wake-up threshold	0 to 100%	0%
	<p style="text-align: center;">⚠ DANGER</p> <p>UNINTENDED EQUIPMENT OPERATION Check that unintended restarts will not endanger personnel or equipment in any way.</p> <p>Failure to follow these instructions will result in death or serious injury.</p> <p>If PID correction reverse P IC page 74 is set to n0, enables to set the PID feedback threshold beyond which the PID regulator is reactivated (wake-up), following a stop caused by exceeding the EL5 maximum time in low speed.</p> <p>If P IC is set to YES, enables to set the PID feedback threshold above which the PID regulator is reactivated (wake-up), following a stop caused by exceeding the EL5 maximum time in low speed.</p> <p>Visible only if PID feedback assignment P IF page 72 and Low speed operating time EL5 page 89 are not set to n0.</p>		
5LE ()	<input type="checkbox"/> Sleep Threshold Offset	0 to HSP	1 Hz
	<p>Adjustable restart threshold (offset) following a stop after prolonged operation at Low speed LSP + Sleep Offset Threshold 5LE, in Hz. The motor restarts if the reference rises above (LSP + 5LE) and if a run command is still present.</p> <p>Visible only if Low speed time out EL5 page xx is not set to n0 and if PID feedback assignment P IF page 72 is not set to n0.</p>		

() Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I-D-
drc-
CEL-
FUN-
FLE-
CON-

Code	Name/Description	Adjustment range	Factory setting
FUn-	Function menu (continued)		
PId-	PID menu (continued)		
LPI ()	<input type="checkbox"/> PI feedback supervision threshold An alarm can be assigned to a relay or a logic output. Adjustment range: <input type="checkbox"/> No: Function inactive (it will not be possible to access the other function parameters) <input type="checkbox"/> between minimum and maximum PID feedback. Visible only if PID feedback assignment PIF page 72 is not set to nD .	n0 to 100%	n0
LPI ()	<input type="checkbox"/> PI feedback supervision function time delay Visible only if PI feedback supervision threshold LPI above is not set to nD .	0 to 600 s	0 s
APD ()	<input type="checkbox"/> Maximum frequency detection hysteresis Visible only if PI feedback supervision threshold LPI above is not set to nD .	0 to HSP	0 Hz
NP I	<input type="checkbox"/> PI feedback supervision Fallback mode for the PI feedback supervision function. <input type="checkbox"/> YES : freewheel stop <input type="checkbox"/> LFF : switch to fallback speed LFF as long as the fault is present and the run command is not disabled. Visible only if PI feedback supervision threshold LPI above is not set to nD .		YES
LFF	<input type="checkbox"/> Fallback speed Fallback speed for PID regulator feedback supervision fault.	0 to HSP	0 Hz

() Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I - 0 -
dr C -
C t L -
FUN -
FL t -
C 0 n -

Code	Name/Description	Adjustment range	Factory setting
F U n -	Function menu (continued)		
P I d -	PID menu (continued)		
P n P -	Pump sub-menu		
t O L	<input type="checkbox"/> Application Overload time delay See page 54 Visible only if PID feedback assignment P I F page 72 is not set to n 0 .	0 to 100 s	0 s
L O C ()	<input type="checkbox"/> Application Overload threshold See page 54 Visible only if Application Overload time delay t O L above is not set to n 0 .	70 to 150% of nCr	90%
F t D ()	<input type="checkbox"/> Time delay before automatic start for the overload fault If A t r = Y E S the drive restarts automatically after an overload fault O L C once this time delay has elapsed. Minimum time permitted between an overload being detected and any automatic restart. In order for an automatic restart to be possible, the value of Maximum restart time t A r page 91 must exceed that of this parameter by at least one minute. Visible only if Application Overload time delay t O L above is not set to n 0 .	0 to 6 min	0 min
U L t	<input type="checkbox"/> Application underload time delay See page 55 Visible only if PID feedback assignment P I F page 72 is not set to n 0 .	0 to 100 s	0 s
L U L ()	<input type="checkbox"/> Application Underload threshold See page 55 Visible only if Application underload time delay U L t above is not set to n 0 .	20 to 100% of nCr	60%

() Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I-D-
drc-
ccl-
FUN-
FLt-
CON-

Code	Name/Description	Adjustment range	Factory setting
FUn-	Function menu (continued)		
PI d-	PID menu (continued)		
PNP-	Pump sub-menu (continued)		
FtU ()	<input type="checkbox"/> Time delay before automatic start for the underload fault If Atr = YES the drive restarts automatically after an underload fault ULF once this time delay has elapsed. Minimum time permitted between an underload being detected and any automatic restart. In order for an automatic restart to be possible, the value of Maximum restart time Atr page 91 must exceed that of this parameter by at least one minute. Visible only if Application underload time delay ULt above is not set to nD .	0 to 6 min	0 min
ndE	<input type="checkbox"/> Selecting the operating mode <input type="checkbox"/> nD : single variable mode <input type="checkbox"/> YES : single variable mode with auxiliary pump When ndE = YES , output LO1 is forced to PNP (see page 53). Visible only if PID feedback assignment PIF page 72 is not set to nD .		nO
FOn ()	<input type="checkbox"/> Starting frequency of the auxiliary pump Above this frequency and after the pump starting time delay tDn , the auxiliary pump starts. Visible only if Selecting the operating mode ndE above is not set to nD .	0 to tFr	HSP
tDn ()	<input type="checkbox"/> Time delay before starting the auxiliary pump This time is necessary to avoid the effects of transient pressure fluctuation and thus prevent oscillation (pump starting/stopping). Visible only if Selecting the operating mode ndE above is not set to nD .	0 to 999.9 s	2 s
rDn ()	<input type="checkbox"/> Ramp for reaching the auxiliary pump nominal speed Visible only if Selecting the operating mode ndE above is not set to nD .	0 to 999.9 s	2 s
FDF ()	<input type="checkbox"/> Auxiliary pump stopping frequency Below this frequency and after the time delay for stopping the auxiliary pump tDF , the pump stops. Visible only if Selecting the operating mode ndE above is not set to nD .	0 to tFr	0 Hz

() Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

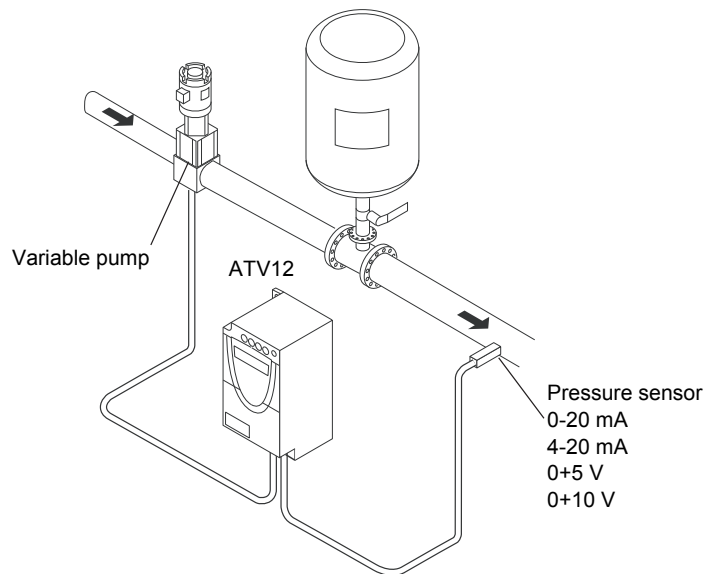
Code	Name/Description	Adjustment range	Factory setting
FUn-	Function menu (continued)		
PI d-	PID menu (continued)		
PNP-	Pump sub-menu (continued)		
tDF ()	<input type="checkbox"/> Time delay before the auxiliary pump stop command This time is necessary to avoid the effects of transient pressure fluctuation and thus prevent oscillation (pump starting/stopping) Visible only if Selecting the operating mode ndE above is not set to nD .	0 to 999.9 s	2 s
rDF ()	<input type="checkbox"/> Ramp for auxiliary pump stopping Visible only if Selecting the operating mode ndE above is not set to nD .	0 to 999.9 s	2 s
nFd	<input type="checkbox"/> Zero flow detection period The value 0 deactivates zero flow detection. Visible only if PID feedback assignment PIF page 70 is not set to nO.	nO to 20 min	nO
FFd ()	<input type="checkbox"/> Zero flow detection activation threshold Below this threshold, if nFd > 0 and the auxiliary pump is stopped, zero flow detection is activated. Visible only if Zero flow detection period nFd above is not set to nD .	0 to 400 Hz	0 Hz
LFd ()	<input type="checkbox"/> Zero flow detection offset Visible only if Zero flow detection period nFd above is not set to nD .	0 to 400 Hz	0 Hz

() Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

Architecture of the pumping installation

Single variable mode - 1 single variable speed pump



Enter the values given on the motor rating plate in the Motor control menu drC

First level adjustment parameters

ACC Acceleration: 0.7 s

DEC Deceleration: 0.7 s

LSP Low speed: 30 Hz

HSP high-speed: 60 Hz

Analog input menu Alt

AI1 Scale of analog input AI1: 0-20 mA

Motor control menu drC

SLP Nominal motor slip: 0 Hz

FLG Frequency loop gain: 70%

UR IR compensation: 0%

Application functions menu FUN

CC 2-wire type control: LEL

PI sub-menu

PIF Assignment of the PI function feedback: AI1

rPG PI regulator proportional gain: 5.00

rIG PI regulator integral gain: 8.00

rPI Internal PI regulator reference: 39%

rSL Restart error threshold: 40%

PII Supervision of the PI regulator function: LFF

LPI PI feedback supervision threshold: 17%

tPI PI feedback supervision function time delay: 1 s

LFF Fallback speed: 50 Hz

Pump sub-menu PMP

nFd Zero flow detection: 1 min

FFd Zero flow detection activation threshold: 50 Hz

LFd Zero flow detection offset: 5 Hz

tLS Sleep threshold operating time: 3 s

SFS Quick start threshold: 25 Hz

SLE Sleep threshold offset: 10 Hz

Automatic DC injection sub-menu AdC

AdC Automatic DC injection assignment: nO

Automatic restart function Atr

Atr Automatic restart: YES

Fault menu FLt

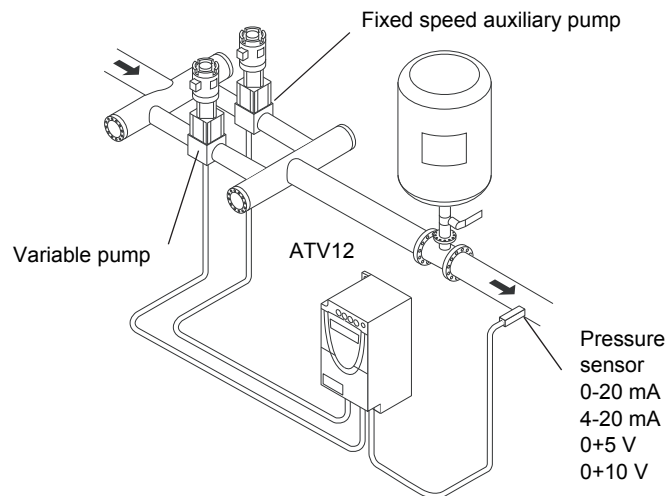
LDC Overload threshold: 11%

FtD Time delay before automatic start for the overload fault: 1

RPD Frequency hysteresis reached: 2 Hz

Configuration Mode - Complete menu (FULL)

Single variable with auxiliary pump mode - 1 variable speed pump (variable pump) and one fixed speed pump (auxiliary pump)



The auxiliary pump is controlled by the Altivar 12 via logic output LO.

Enter the values given on the motor rating plate in the Motor control menu drC

First level adjustment parameters

ACC Acceleration: 0.1 s

DEC Deceleration: 0.1 s

LSP Low speed: 35 Hz

Analog input menu Alt

AI1E Scale of analog input AI1: 0-20 mA

Motor control menu drC

SLP Nominal motor slip: 0 Hz

FLG Frequency loop gain: 70%

UFr IR compensation: 0%

Application functions menu FUn

LEL 2-wire type control: LEL

PI sub-menu

PIF Assignment of the PI function feedback: AI1

rPG PI regulator proportional gain: 5.00

rIG PI regulator integral gain: 8.00

rPI Internal PI regulator reference: 51%

rSL Restart error threshold: 42%

Pump sub-menu PMP

ndE Selecting the operating mode: YES

FOn Starting frequency of the auxiliary pump: 49 Hz

tOn Time delay before starting the auxiliary pump: 1 s

rOn Ramp for reaching the nominal speed of the auxiliary pump: 1 s

FOf Stopping frequency of the auxiliary pump: 39.6 Hz

tOf Time delay before the auxiliary pump stop command: 1 s

rOf Ramp for stopping the auxiliary pump: 1 s

nFd Zero flow detection: 1 min

FFd Zero flow detection activation threshold: 42 Hz

LFd Zero flow detection offset: 2 Hz

ELs Sleep threshold operating time: 5 s

SLe Sleep threshold offset: 3 Hz

LOI Assignment as logic/analog output PMP

Automatic DC injection sub-menu AdC

AdC Automatic DC injection assignment: nO

Automatic restart function Atr

Ar Automatic restart: YES

Fault menu FLt

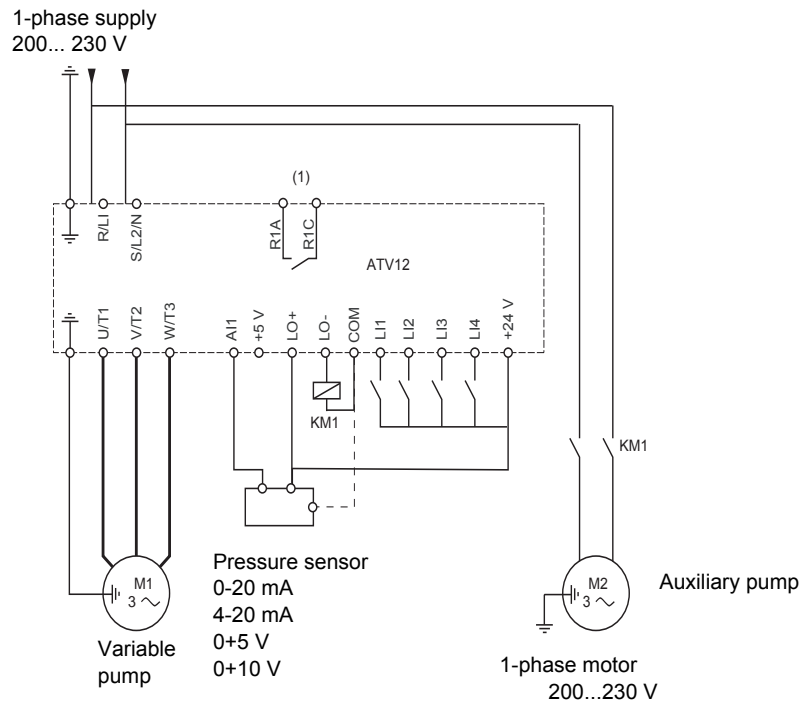
tUL Underload function time delay 5 s

LUL Underload threshold: 59%

FtU Time delay before automatic restart for the underload fault: 1

Configuration Mode - Complete menu (FULL)

Connection diagram



(1) Fault relay contacts, for remote indication of the drive status.

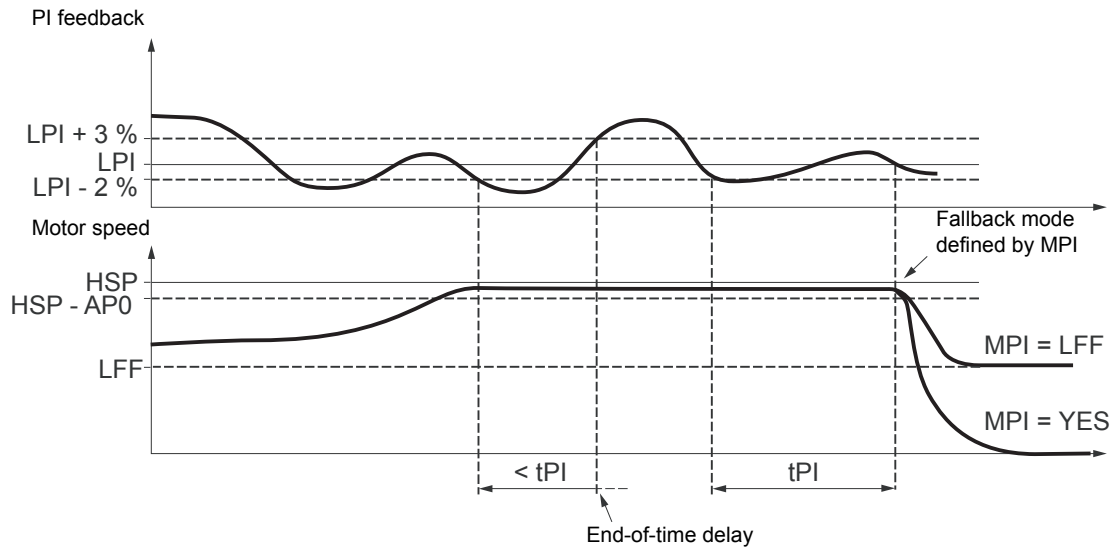
Note: Fit interference suppressors to all inductive circuits near the drive or connected to the same circuit (relays, contactors, solenoid valves, etc.).

Note: This wiring example is in source using internal supply.

Configuration Mode - Complete menu (FULL)

PI feedback supervision (MPI)

Used to define the operating mode in the event of detection of a PI feedback lower than the limit set.



Once the variable pump is running at maximum speed (higher than HSP - AP0) and at the same time the PI feedback is lower than the supervision threshold LPI - 2%, a time delay t_{PI} is launched. If at the end of this time delay the value of the PI feedback is still lower than the supervision threshold LPI + 3%, the drive switches to fallback mode as defined by parameter MPI.

- MPI = YES:

The drive will perform a freewheel stop and will display fault code SPIF.

- MPI = LFF:

The drive will run at a fixed frequency LFF and will display fault code FrF.

In both cases the drive reverts to PI regulation mode as soon as the PI feedback is higher than the supervision threshold LPI + 3%.

In single variable with auxiliary pump mode (MdE = YES), the PI feedback supervision function is only active when both pumps are operating.

Configuration Mode - Complete menu (FULL)

Pump submenu PMP

The principal objective is to control a complete pumping installation using a single ATV12 drive by providing constant pressure whatever the flow rate.

The system is operated using an auxiliary fixed speed pump, and one variable speed pump, which is unable to provide the full flow range required on its own. A PI regulator is used for drive control. The pressure sensor provides system feedback.

The variable speed pump is called a variable pump.

The fixed speed pump is called an auxiliary pump.

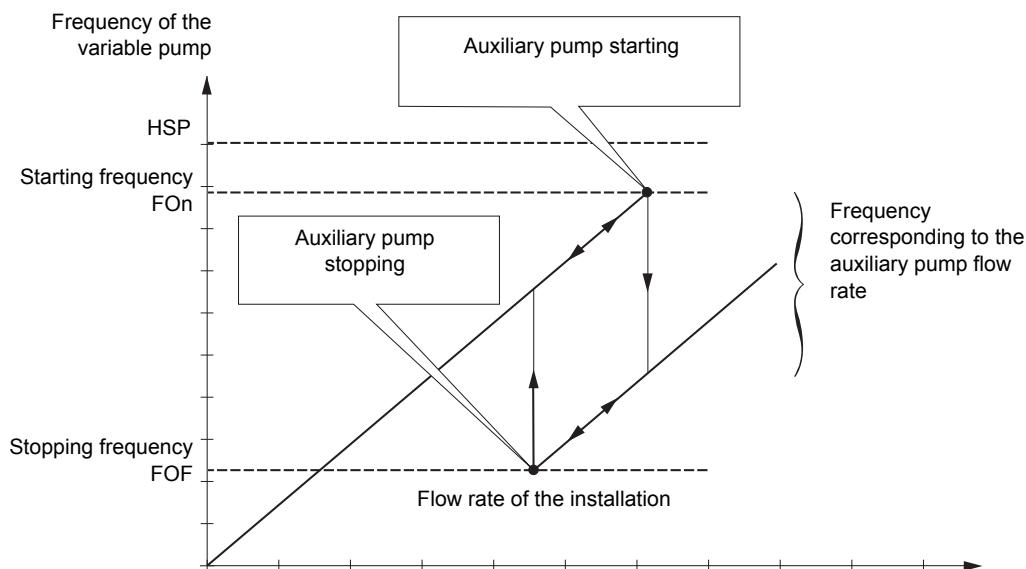
Selecting the operating mode

The ATV12 offers 2 operating modes:

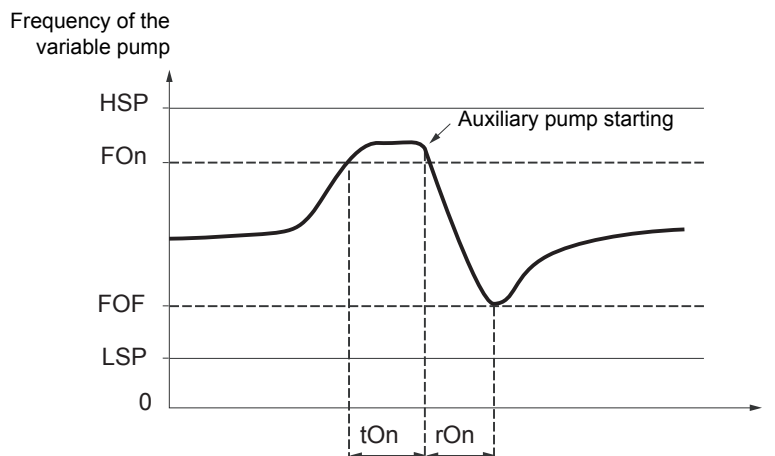
- Single variable mode: 1 single variable speed pump (variable pump).
- Single variable with auxiliary pump mode: 1 variable speed pump (variable pump) and one fixed speed pump (auxiliary pump).

Control of the auxiliary pump

The PI regulator output (frequency reference of the variable pump) is used to control starting or stopping of the auxiliary pump with hysteresis, as shown in the figure below:

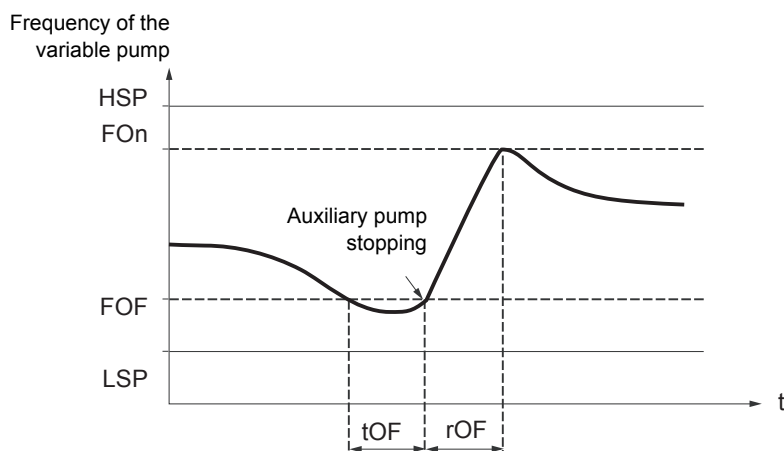


When the frequency exceeds the starting threshold (FOn), a time delay (tOn) is launched to avoid the effects of transient flow fluctuations. If after this time delay, the frequency remains higher than the starting threshold, the auxiliary pump is started. When the start command is sent, the variable pump will go from its current speed reference to the auxiliary pump stopping frequency (FOF) following a ramp (rOn) that equals the time taken for the auxiliary pump to reach its nominal speed. Parameter rOn is used to minimize the booster effect on starting the auxiliary pump.



Configuration Mode - Complete menu (FULL)

When the frequency is lower than the stopping threshold (FOF), a time delay is launched (tOF) to avoid the effects of transient flow fluctuations. If after this time delay, the frequency remains lower than the stopping threshold, the auxiliary pump is stopped. When the stop command is sent, the variable pump will go from its current speed reference to the auxiliary pump starting frequency (FOn) following a ramp (rOF) that equals the auxiliary pump stopping time. Parameter rOF is used to minimize the booster effect on stopping the auxiliary pump.

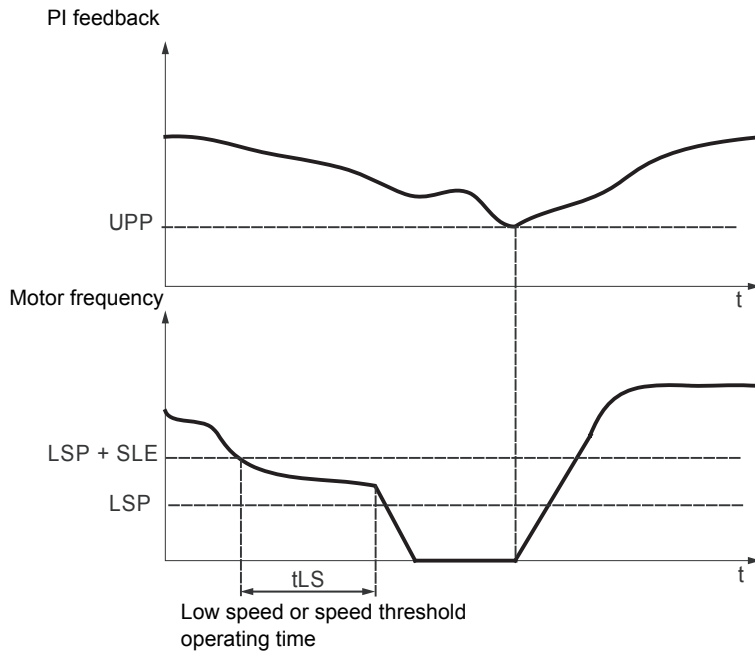


Configuration Mode - Complete menu (FULL)

"Sleep" function/"Wake-up" function

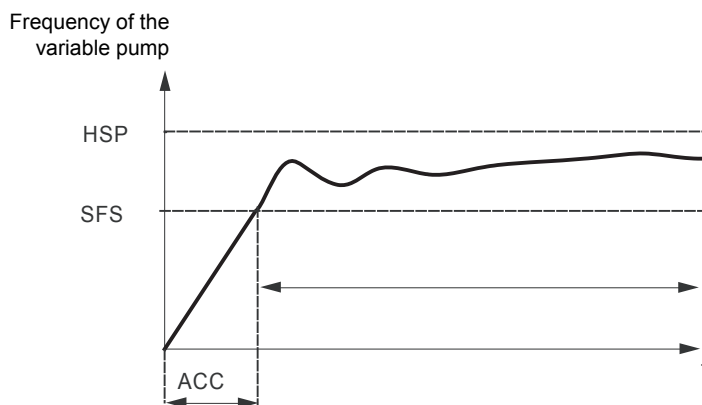
This function is used to stop the variable pump when there is zero flow (auxiliary pump stopped). In this case, if the frequency of the variable pump is lower than the "sleep" threshold ($LSP + SLE$), a time delay (t_{LS}) is launched. If, after this time delay, the frequency remains lower than threshold $LSP + SLE$, the variable pump then stops. The installation is in "sleep" mode.

To switch to "wake-up" mode, the pressure feedback must drop to below the "wake-up" threshold UPP . The variable pump is then started.



Quick start function

The quick start function can be used to overcome problems linked to high rPG and rIG gains (instability on starting). The drive accelerates until it reaches the quick start threshold SFS following a ramp ACC . Once the threshold has been reached, the PI regulator is activated.



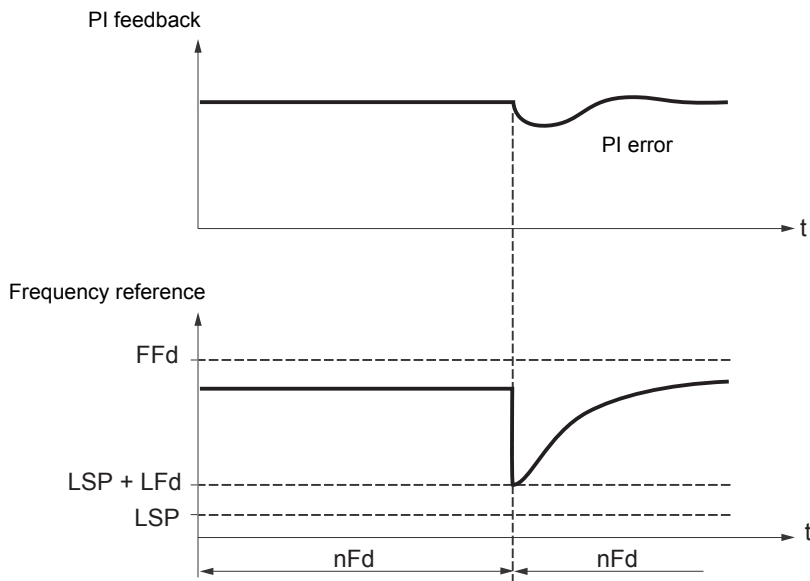
Configuration Mode - Complete menu (FULL)

Zero flow detection

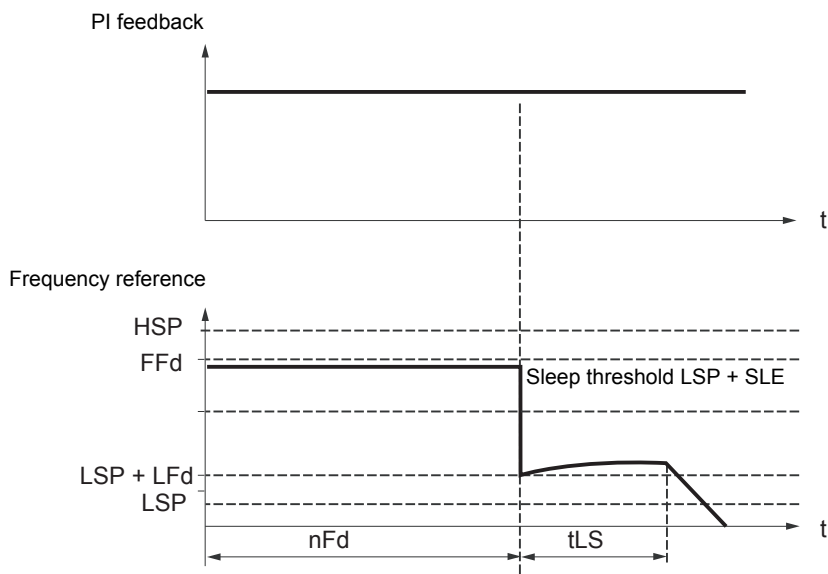
This function is only active when the auxiliary pump is stopped and the motor frequency is below threshold FFd .

This function is used in applications where zero flow cannot be detected by the sleep function alone. It forces the drive frequency reference to $LSP + LFd$ periodically (at each time interval nFd) in order to test for zero flow.

- If the request is still present, the PI error increases, causing the drive to restart.





- If the request is no longer present (zero flow), the PI error will not increase.




- Set the sleep function so that the drive switches to sleep mode when zero flow is detected ($LFd \leq SLE$).

Configuration Mode - Complete menu (FULL)

I - 0 -
drC -
CLL -
FUN -
FLt -
CON -



Code	Name/Description	Adjustment range	Factory setting
FUn -	Function menu (continued)		
CL1 -	Current limitation menu		
LC2	<input type="checkbox"/> 2nd current limitation commutation Assignment <input type="checkbox"/> Function inactive. <input type="checkbox"/> L1H: LI1 active high <input type="checkbox"/> L2H: LI2 active high <input type="checkbox"/> L3H: LI3 active high <input type="checkbox"/> L4H: LI4 active high <input type="checkbox"/> L1L: LI1 active low <input type="checkbox"/> L2L: LI2 active low <input type="checkbox"/> L3L: LI3 active low <input type="checkbox"/> L4L: LI4 active low If the assigned input is at 0, the first current limitation is active. If the assigned input is at 1, the second current limitation is active. See LI assignment information on page 46		n0
CL1 	<input type="checkbox"/> Current limitation First current limitation.	0.25 to 1.5 In (1)	1.5 In
NOTICE			
RISK OF DAMAGE TO THE MOTOR AND THE DRIVE			
Check that the motor will withstand this current. Check that the profile mission complies with the derating curve given in the installation manual.			
Failure to follow this instruction can result in equipment damage.			
CL2 	<input type="checkbox"/> Current limitation 2 Second current limitation This function allows reduction of the drive current limit. Visible only if 2nd current limitation commutation LC2 is not set to n0 .	0.25 to 1.5 In (1)	1.5 In
NOTICE			
RISK OF DAMAGE TO THE MOTOR AND THE DRIVE			
Check that the motor will withstand this current. Check that the profile mission complies with the derating curve given in the installation manual.			
Failure to follow this instruction can result in equipment damage.			


(1)In = nominal drive current

 Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I - 0 -
drC -
CLL -
FUN -
FLt -
CON -

Code	Name/Description	Adjustment range	Factory setting
FUn -	Function menu (continued)		
SPL -	Speed limit menu		
LSP 	<input type="checkbox"/> Low speed Motor frequency at minimum reference. This parameter is already included in "my menu" section, page 45 .	0 Hz to HSP	0 Hz
ELS 	<input type="checkbox"/> Low speed operating time Following operation at Low speed LSP for a defined period, a motor stop is requested automatically. The motor restarts if the frequency reference is greater than Low speed LSP and if a run command is still present. Note: n0 corresponds to an unlimited period.	0.1 to 999.9 s	n0

 Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I - 0 -
d r C -
C t t L -
F U n -
F L t -
C O n -

high-speed configuration

The logic inputs enable selection of the desired high-speed.

Desired high-speed	Setting	
	Parameter	State
HSP	SH2	n0
	SH4	n0
HSP2	SH2	assigned
	SH4	n0
HSP3	SH2	n0
	SH4	assigned
HSP4	SH2	assigned
	SH4	assigned

Code	Name/Description	Adjustment range	Factory setting
FUn -	Function menu (continued)		
SPL -	Speed limit menu		
HSP ()	<input type="checkbox"/> High speed Motor frequency at maximum reference, can be set between Low speed LSP and Maximum frequency tFr page 57. If tFr is decreased below the value defined for HSP , then HSP automatically decreases to the new value of tFr . This parameter is already included in "my menu" section, page 45.	LSP to tFr	50 or 60 Hz according to BFr, max TFr
SH2 n0 L1H L2H L3H L4H	<input type="checkbox"/> 2 HSP assignment <input type="checkbox"/> No <input type="checkbox"/> L1h: LI1 active high <input type="checkbox"/> L2h: LI2 active high <input type="checkbox"/> L3h: LI3 active high <input type="checkbox"/> L4h: LI4 active high		n0
SH4 n0 L1H L2H L3H L4H	<input type="checkbox"/> 4 HSP assignment <input type="checkbox"/> No <input type="checkbox"/> L1h: LI1 active high <input type="checkbox"/> L2h: LI2 active high <input type="checkbox"/> L3h: LI3 active high <input type="checkbox"/> L4h: LI4 active high		n0
HSP2 ()	<input type="checkbox"/> High speed 2 Visible only if 2 HSP assignment SH2 is not set to n0.	LSP to tFr	as HSP
HSP3 ()	<input type="checkbox"/> High speed 3 Visible only if 4 HSP assignment SH4 is not set to n0.	LSP to tFr	as HSP
HSP4 ()	<input type="checkbox"/> High speed 4 Visible only if 2 HSP assignment SH2 and 4 HSP assignment SH4 are not set to n0.	LSP to tFr	as HSP

() Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I - 0 -
d r C -
C L L -
F U N -
F L L -
C O N -

Code	Name/Description	Adjustment range	Factory setting	
FLL -	Fault detection management menu			
rSF	<input type="checkbox"/> Detected fault reset assignment Manual fault reset. <input type="checkbox"/> Function inactive <input type="checkbox"/> L1h: LI1 active high <input type="checkbox"/> L2h: LI2 active high <input type="checkbox"/> L3h: LI3 active high <input type="checkbox"/> L4h: LI4 active high Faults are reset when the assigned input or bit changes to 1, if the cause of the fault has disappeared. The STOP/RESET button on the display terminal performs the same function. See also Diagnostics and Troubleshooting on page 108 .		n0	
n0 L1H L2H L3H L4H				
ARr -	Automatic restart menu			
ARr	<input type="checkbox"/> Automatic restart		n0	
n0 YES	<div style="background-color: black; color: white; text-align: center; padding: 5px;">⚠ DANGER</div> <p>UNINTENDED EQUIPMENT OPERATION</p> <ul style="list-style-type: none"> • The automatic restart can only be used on machines or installations which do not pose any danger to either personnel or equipment. • If the automatic restart is activated, R1 will only indicate a fault has been detected once the time-out period for the restart sequence has expired. • The equipment must be used in compliance with national and regional safety regulations. <p>Failure to follow these instructions will result in death or serious injury.</p> <p>This function defines drive behavior upon detection of a fault. If validated, this function allows an automatic restart of the drive when the cause of the detected fault has disappeared and the other operating conditions permit the restart.</p> <input type="checkbox"/> Function inactive <input type="checkbox"/> Automatic restart, after locking on a detected fault, if the cause has disappeared and the other operating conditions permit the restart. The restart is performed by a series of automatic attempts separated by increasingly longer waiting periods: 1 s, 5 s, 10 s, then 1 minute for the following attempts. The drive status relay remains activated if this function is active. The speed reference and the operating direction must be maintained. Use 2-wire control (Type of control LCC page 48 = 2C and 2 wire type control LCL page 51 = LEL). If the restart has not taken place once the Max. automatic restart time ARr has elapsed, the procedure is aborted and the drive remains locked until it is turned off and then on again. The detected faults, which permit this function, are listed on page 110 :			
ARr	<input type="checkbox"/> Max. automatic restart time		5 min	
5 10 30 1H 2H 3H CL	<input type="checkbox"/> 5 min <input type="checkbox"/> 10 min <input type="checkbox"/> 30 min <input type="checkbox"/> 1 hour <input type="checkbox"/> 2 hours <input type="checkbox"/> 3 hours <input type="checkbox"/> Infinite Visible only if Automatic restart ARr is not set to n0 . It can be used to limit the number of consecutive restarts on a recurrent fault.			

Configuration Mode - Complete menu (FULL)

I - 0 -
 d r C -
 C E L -
 F U N -
 F L t -
 C O N -

Code	Name/Description	Adjustment range	Factory setting
FLt -	Fault detection management menu (continued)		
FLr	<input type="checkbox"/> Catch on the fly Used to enable a smooth restart if the run command is maintained after the following events: <ul style="list-style-type: none"> • Loss of line supply or disconnection • Reset of current fault or automatic restart • Freewheel stop. The speed given by the drive resumes from the estimated speed of the motor at the time of the restart, then follows the ramp to the reference speed. This function requires 2-wire level control.		n0
n0 YES	<input type="checkbox"/> Function inactive <input type="checkbox"/> Function active		

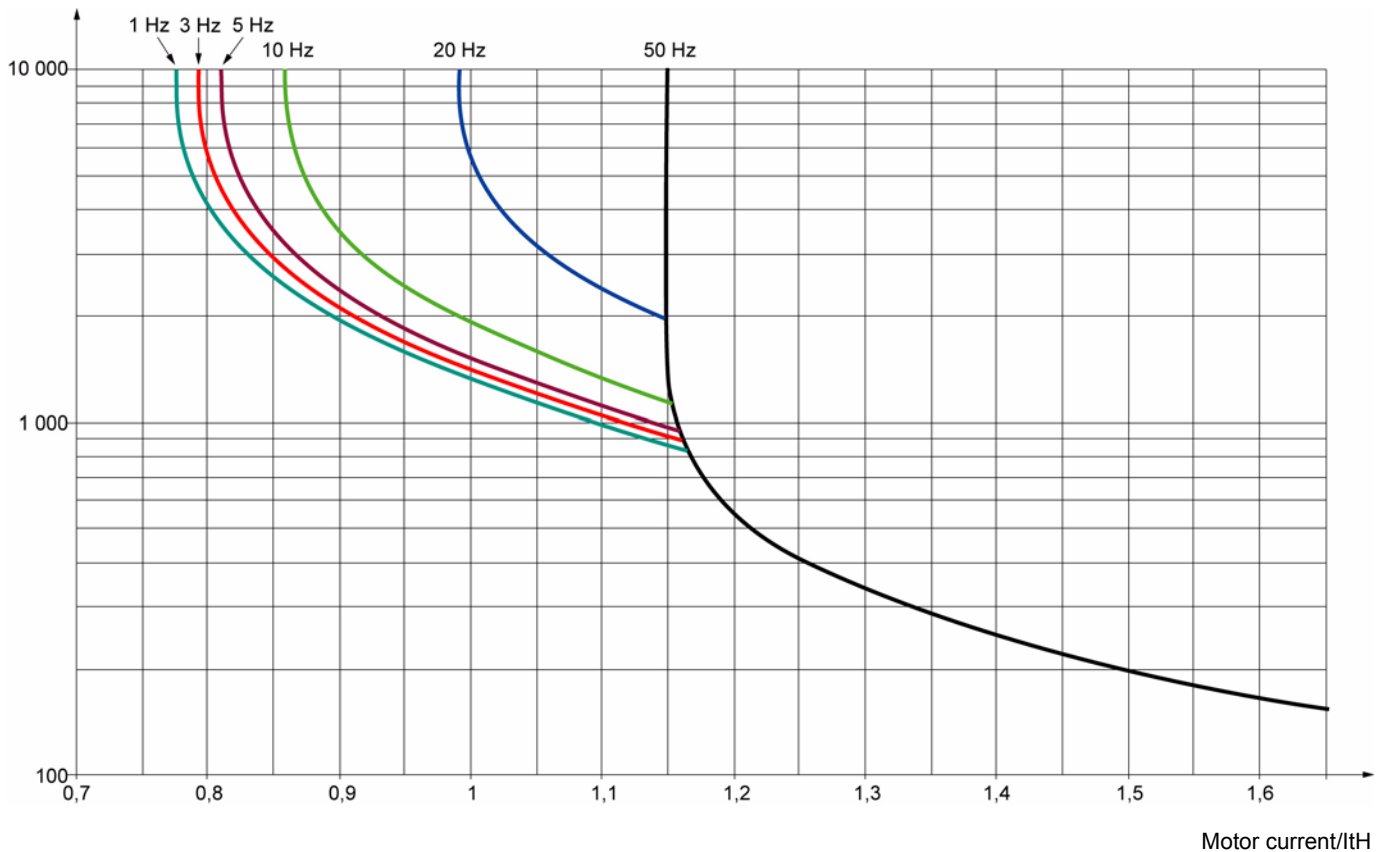
Motor thermal protection

Function:

Thermal protection by calculating the I^2t .

- Naturally-cooled motors:
The tripping curves depend on the motor frequency.
- Force-cooled motors:
Only the 50 Hz tripping curve needs to be considered, regardless of the motor frequency.

Trip time in seconds



NOTICE

RISK OF DAMAGE TO THE MOTOR

The use of external overload protection is required under the following conditions:

- Repowering up the product since there is no motor thermal state memory.
- Running multiple motors
- Running motors rated at less than 0.2 times the nominal drive current
- Using motor switching

Failure to follow these instructions can result in equipment damage

Configuration Mode - Complete menu (FULL)

1-0-
drC-
CEL-
FUN-
FLC-
CON-




Code	Name/Description	Adjustment range	Factory setting
FLC-	Fault detection management menu (continued)		
ELC-	Motor thermal protection menu		
IEH 	<input type="checkbox"/> Motor thermal current Current used for the motor thermal detection. Set Ith to the nominal current on the motor rating plate.	0.2 to 1.5 In (1)	According to drive rating
ELC ACL FCL	<input type="checkbox"/> Motor protection type <input type="checkbox"/> Self-ventilated <input type="checkbox"/> Motor-ventilated		ACL
OLL nO YES	<input type="checkbox"/> Overload fault management Type of stop in the event of a motor thermal fault. <input type="checkbox"/> Fault ignored <input type="checkbox"/> Freewheel stop Setting Overload fault management OLL to nO inhibits the Motor overload OLF page 110.		YES
NOTICE			
RISK OF DAMAGE TO THE MOTOR If OLL is set to nO , motor thermal protection is no longer provided by the drive. Provide an alternative means of thermal protection. Failure to follow these instructions can result in equipment damage.			
PEP nO YES	<input type="checkbox"/> Motor thermal state memo <input type="checkbox"/> Motor thermal state not stored at power off. <input type="checkbox"/> Motor thermal state is stored at power off.		nO
FLC-	Fault detection management menu (continued)		
OPL nO YES	<input type="checkbox"/> Output Phase loss If OPL is set to nO , loss of cable is not detected. Provide an alternative means of thermal protection. Check this action will not endanger personnel or equipment in any way Failure to follow these instructions will result in death or serious injury. <input type="checkbox"/> Function inactive <input type="checkbox"/> Tripping on OPF1 (1 phase loss) or OPF2 (3-phase loss) fault with freewheel stop.		YES
IPL nO YES	<input type="checkbox"/> Input Phase loss This parameter is only accessible in this menu on 3-phases drives. <input type="checkbox"/> Fault ignored. To be used when the drive is supplied via a single phase supply. <input type="checkbox"/> Fault with freewheel stop. If one phase disappears, the drive switches to fault mode Input Phase loss IPL but if 2 or 3 phases disappear, the drive continues to operate until it trips on an undervoltage fault.		According to drive rating

(1)In = nominal drive current

Parameter that can be modified during operation or when stopped.

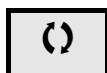
Configuration Mode - Complete menu (FULL)

I - 0 -
drC -
CEL -
FUN -
FLt -
CON -

Code	Name/Description	Adjustment range	Factory setting
FLt -	Fault detection management menu (continued)		
USB -	Undervoltage menu		
USB 0 1	<input type="checkbox"/> Undervoltage fault management Behavior of the drive in the event of an undervoltage <input type="checkbox"/> Detected fault and R1 relay open. <input type="checkbox"/> Detected fault and R1 relay closed.		0
SE P n0 rPP	<input type="checkbox"/> Undervoltage prevention Behavior in the event of the undervoltage fault prevention level being reached <input type="checkbox"/> No action (freewheel) <input type="checkbox"/> Stop following an adjustable ramp Undervoltage ramp deceleration time SE P .		n0
SE P (C)	<input type="checkbox"/> Undervoltage ramp deceleration time Ramp time if Undervoltage prevention SE P = rPP .	0.0 to 10.0 s	1.0 s
FLt -	Fault detection management menu (continued)		
SE r t n0 YES	<input type="checkbox"/> IGBT test <input type="checkbox"/> No test <input type="checkbox"/> The IGBTs are tested on power up and every time a run command is sent. These tests cause a slight delay (a few ms). In the event of a fault, the drive will lock. The following faults can be detected: - Drive output short-circuit (terminals U-V-W): SCF display - IGBT: xtF, where x indicates the number of the IGBT concerned IGBT short-circuited: x2F, where x indicates the number of the IGBT concerned		n0
LFL I n0 YES	<input type="checkbox"/> 4-20 mA loss behavior <input type="checkbox"/> Fault ignored. This configuration is the only one possible if AI1 current scaling parameter of 0% CrL I page 52 is not greater than 3 mA or if AI1 type R I I t = IOU . <input type="checkbox"/> Freewheel stop.		n0
InH n0 L1H L2H L3H L4H  2 s	<input type="checkbox"/> Detected fault inhibition assignment To assign fault inhibit, press and hold down the "ENT" key for 2 s. <input type="checkbox"/> Function inactive <input type="checkbox"/> L1h: LI1 active high <input type="checkbox"/> L2h: LI2 active high <input type="checkbox"/> L3h: LI3 active high <input type="checkbox"/> L4h: LI4 active high Following detected faults can be inhibited: InFb, SDF, t n F, OHF, OLF, OPF 1, OPF 2, OSF, SLF 1, SLF 2, SLF 3, t JF, and USF.		n0
  DANGER			
LOSS OF PERSONNEL AND EQUIPMENT PROTECTION Enabling the fault inhibition parameter InH will disable the drive controller protection features.			
<ul style="list-style-type: none"> • InH should not be enabled for typical applications of this equipment. • InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection poses a greater risk than personnel injury or equipment damage. 			
Failure to follow these instructions will result in death or serious injury.			



To change the assignment of this parameter press the "ENT" key for 2 s.



Parameter that can be modified during operation or when stopped.

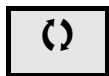
Configuration Mode - Complete menu (FULL)

I - 0 -
d r C -
C L L -
F U N -
F L L -
C O N -

Code	Name/Description	Adjustment range	Factory setting
FLL -	Fault detection management menu (continued)		
SLL n0 YES	<input type="checkbox"/> Modbus fault management Behavior of the drive in the event of a communication fault with integrated Modbus. <input type="checkbox"/> Fault ignored <input type="checkbox"/> Freewheel stop		YES
⚠ WARNING			
LOSS OF CONTROL			
If Modbus fault mgt SLL is set to n0 , communication control will be inhibited. For safety reasons, inhibition of communication fault should only be used for adjustment or special applications purpose.			
Failure to follow these instructions can result in death, serious injury, or equipment damage.			
drn	<input type="checkbox"/> Degraded line supply operation		n0
NOTICE			
RISK OF DAMAGE TO THE DRIVE			
When Derated operation = Yes, use a line choke.			
Failure to follow these instructions can result in equipment damage.			
Lowers the tripping threshold of the USF fault to operate on a line supply down to 50% of nominal line voltage. In this case, the performance of the drive cannot be guaranteed			
n0 YES	<input type="checkbox"/> n0 <input type="checkbox"/> Yes		
rPr (C) n0 FtH	<input type="checkbox"/> Reset power run This reset will initialize the settings located on n0n section, menu PAI - , page 41 . <input type="checkbox"/> n0 <input type="checkbox"/> Reset fan time display		n0



2 s To change the assignment of this parameter press the "ENT" key for 2 s.



Parameter that can be modified during operation or when stopped.

Configuration Mode - Complete menu (FULL)

I-D-
drC-
cLL-
FUN-
FLt-
CON-

Code	Name/Description	Adjustment range	Factory setting
FLt-	Fault detection management menu (continued)		
E t F -	External fault		
E t F	<input type="checkbox"/> External fault assignment Assignment of the external fault event to a logic input <input type="checkbox"/> Function inactive <input type="checkbox"/> LI1 active High <input type="checkbox"/> LI2 active High <input type="checkbox"/> LI3 active High <input type="checkbox"/> LI3 active High <input type="checkbox"/> LI1 active low <input type="checkbox"/> LI2 active low <input type="checkbox"/> LI3 active low <input type="checkbox"/> LI3 active low		n0
n0 L1H L2H L3H L4H L1L L2L L3L L4L			
E P L	<input type="checkbox"/> Stop type - external fault Type of stop in the event of an external fault <input type="checkbox"/> External fault ignored <input type="checkbox"/> Freewheel stop <input type="checkbox"/> Switch to Fallback speed L F F as long as the external fault is present and the run command is not disabled.		n0
n0 YES LFF			
L F F	<input type="checkbox"/> Fallback speed Selection of the fallback speed in case of external fault event. Visible only if Stop type - external fault E P L is not set to Fallback speed L F F . Note: This parameter can also be accessed in the PID menu .	0 to HSP	0 Hz

Configuration Mode - Complete menu (FULL)

1-0-
drC-
CLL-
FUN-
FLt-
CON-

Code	Name/Description	Adjustment range	Factory setting
CON -	Communication menu		
	Note: For following parameters, the modifications will be taken into account only at the next control power-on.		
Add	<input type="checkbox"/> Modbus address Modbus address is adjustable from OFF to 247 . When OFF , communication is not active.	OFF to 247	OFF
lbr 4.8 9.6 19.2 38.4	<input type="checkbox"/> Modbus baud rate <input type="checkbox"/> 4.8 kbps <input type="checkbox"/> 9.6 kbps <input type="checkbox"/> 19.2 kbps <input type="checkbox"/> 38.4 kbps		19.2
lFD 8o1 8E1 8n1 8n2	<input type="checkbox"/> Modbus format <input type="checkbox"/> 8o1 <input type="checkbox"/> 8E1 <input type="checkbox"/> 8N1 <input type="checkbox"/> 8N2		8E1
ltd	<input type="checkbox"/> Modbus time out The drive detects a Modbus fault if it does not receive any Modbus request at its address within a predefined time period (time-out).	0.1 to 30 s	10 s
ICS -	Input scanner menu (values are expressed in hexadecimal)		
nPA1	<input type="checkbox"/> Com scanner read address parameter 1 Address of the first input word.		0C81
nPA2	<input type="checkbox"/> Com scanner read address parameter 2 Address of the second input word.		219C
nPA3	<input type="checkbox"/> Com scanner read address parameter 3 Address of the third input word.		0
nPA4	<input type="checkbox"/> Com scanner read address parameter 4 Address of the fourth input word.		0
OCS -	Output scanner menu (values are expressed in hexadecimal)		
nCA1	<input type="checkbox"/> Com scanner write address parameter 1 Address of the first output word.		2135
nCA2	<input type="checkbox"/> Com scanner write address parameter 2 Address of the second output word.		219A
nCA3	<input type="checkbox"/> Com scanner write address parameter 3 Address of the third output word.		0
nCA4	<input type="checkbox"/> Com scanner write address parameter 4 Address of the fourth output word.		0

Configuration Mode - Complete menu (FULL)

I-D-
drC-
CtL-
FUN-
FLt-
CON-

Code	Name/Description	Adjustment range	Factory setting
C00-	Communication menu (continued)		
15A-	Input scanner access menu (values are expressed in hexadecimal)		
n01	<input type="checkbox"/> Com scanner read address value 1 Value of the first input word		ETA VALUE
n02	<input type="checkbox"/> Com scanner read address value 2 Value of the second input word		RFRD value
n03	<input type="checkbox"/> Com scanner read address value 3 Value of the third input word		8000
n04	<input type="checkbox"/> Com scanner read address value 4 Value of the 4rd input word		8000
05A-	Output scanner access menu (values are expressed in hexadecimal)		
nC1 ()	<input type="checkbox"/> Com scanner write address value 1 Value of the first output word		CMD value
nC2 ()	<input type="checkbox"/> Com scanner write address value 2 Value of the second output word		LFRD value
nC3 ()	<input type="checkbox"/> Com scanner write address value 3 Value of the third output word		8000
nC4 ()	<input type="checkbox"/> Com scanner write address value 4 Value of the fourth output word		8000

 Parameter that can be modified during operation or when stopped.

Maintenance

Servicing

The Altivar 12 does not require any preventive maintenance. However, it is advisable to perform the following checks regularly:

- The condition and tightness of connections.
- Ensure that the temperature around the unit remains at an acceptable level and that ventilation is effective. Average service life of fans: 10 years.
- Remove any dust from the drive.
- Ensure proper fan operation.
- Physical damage to covers.

Assistance with maintenance, detected fault display

If a problem arises during setup or operation, ensure that the recommendations relating to the environment, mounting and connections have been observed.

The first fault detected is stored and displayed, flashing, on the screen: the drive locks and the status relay R1 contact opens.

Clearing the detected fault

In the event of a non-resettable detected fault:

- Remove/cut the power to the drive.
- WAIT 15 MINUTES to allow the DC bus capacitors to discharge. Then follow the "Bus Voltage Measurement Procedure", page [14](#) to verify that the DC voltage is less than 42 V. The drive LEDs are not indicators of the absence of DC bus voltage.
- Find and correct the detected fault.
- Restore power to the drive to confirm the detected fault has been rectified.

Certain detected faults can be programmed for automatic restart after the cause has disappeared.

These detected faults can also be reset by cycling power to the drive or by means of a logic input or control bit.

Display menu

Use the display menu to show the status of the drive and its current values as an aid for finding the causes of detected faults.

Spares and repairs

Serviceable product: Refer to the catalog for replacement of spare parts.

Procedure after a long time storage

NOTICE

RISK OF DEGRADED PERFORMANCE DUE TO CAPACITOR AGING

The product capacitor performances after a long time storage above 2 years can be temporarily degraded and therefore following reforming procedure should be applied. In that case, before using the product, apply the following procedure:

- Use a variable AC supply connected between L1 and L2.
- Increase AC supply voltage to have:
 - 80% of rated voltage during 30 min
 - 100% of rated voltage for another 30 min

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Migration ATV11 - ATV12

The ATV12 is compatible with the ATV11 (latest version), nevertheless some differences can exist between both drives. Both models (ATV11 and ATV12) are available in heatsink or base plate versions.

Attention: ATV11 "E" Dimensions are given without potentiometer, add 7 mm depth for new dimension.

Dimensions

Attention: these dimensions concern fixing holes.

Power rating		ATV product	Drive	G (width)		H (height)		c (depth)	
kW	HP			mm	in.	mm	in.	mm	in.
0.18	0.25	12	018F1	60	2.36	131	5.16	102	4.01
0.18	0.25	11	U05F1U/A	60	2.36	131	5.16	101 (+7)	3.98 (+0.27)
0.18	0.25	12	018M2	60	2.36	131	5.16	102	4.01
0.18	0.25	11	U05M2 E/U/A	60	2.36	131	5.16	101 (+7)	3.98 (+0.27)
0.18	0.25	12	018M3	60	2.36	131	5.16	102	4.01
0.18	0.25	11	U05M3 U/A	60	2.36	131	5.16	101 (+7)	3.98 (+0.27)
0.37	0.5	12	037F1	60	2.36	120	4.72	121	4.76
0.37	0.5	11	U09F1 U/A	60	2.36	131	5.16	125 (+7)	4.92 (+0.27)
0.37	0.5	12	037M2	60	2.36	120	4.72	121	4.76
0.37	0.5	11	U09M2 E	60	2.36	120	4.72	125	4.92
0.37	0.5	11	U09M2 U/A	60	2.36	131	5.16	125 (+7)	4.92 (+0.27)
0.37	0.5	12	037M3	60	2.36	120	4.72	121	4.76
0.37	0.5	11	U09M3 U/A	60	2.36	131	5.16	125 (+7)	4.92 (+0.27)
0.55	0.75	12	055M2	60	2.36	120	4.72	131	5.16
0.55	0.75	11	U12M2 E	60	2.36	120	4.72	138	5.43
0.75	1	12	075M2	60	2.36	120	4.72	131	5.16
0.75	1	11	U18M2E	60	2.36	120	4.72	138	5.43
0.75	1	11	U18M2 U/A	60	2.36	131	5.16	138 (+7)	5.43 (+0.27)
0.75	1	12	075M3	60	2.36	120	4.72	131	5.16
0.75	1	11	U18M3 U/A	60	2.36	131	5.16	138 (+7)	5.43 (+0.27)
0.75	1	12	075F1	93	3.66	120	4.72	156	6.14
0.75	1	11	U18F1 U/A	106	4.17	131	5.16	156 (+7)	6.14 (+0.27)
1.5	2	12	U15M2	93	3.66	120	4.72	156	6.14
1.5	2	11	U29M2	106	4.17	131	5.16	156 (+7)	6.14 (+0.27)
2.2	3	12	U22M2	93	3.66	120	4.72	156	6.14
2.2	3	11	U41M2 E/U/A	106	4.17	131	5.16	156 (+7)	6.14 (+0.27)
1.5	2	12	U15M3	93	3.66	120	4.72	131	5.16
1.5	2	11	U29M3 U/A	106	4.17	131	5.16	156 (+7)	6.14 (+0.27)
2.2	3	12	U22M3	93	3.66	120	4.72	131	5.16
2.2	3	11	U41M3 U/A	106	4.17	131	5.16	156 (+7)	6.14 (+0.27)
3	4	12	U30M3	126	4.96	159	6.26	141	5.55
3	4	11	-	-	-	-	-	-	-
4	5.5	12	U40M3	126	4.96	159	6.26	141	5.55
4	5.5	11	-	-	-	-	-	-	-

Migration ATV11 - ATV12

Terminals

Power

- Before wiring power terminals, connect the ground terminal of the grounding screws located below the output terminals to the protective ground (see indicator B page 20).
- The power connections are available without removing the power terminal cover. Nevertheless, if necessary, it is possible to remove them using an adapted tool (IP20 protection requirement). Cover to be removed in case of using ring terminals (pressure stress is 14 N for size 1 and 20 N for sizes 2 and 3).
- Pay attention to the input ground terminal located **on the right of the connector** (was on left on ATV11). The ground connection is clearly indicated on the input power terminal cover and the screw colour is green.

Control

⚠ WARNING

IMPROPER CONTROL WIRING PRACTICES

- The ATV12 drive internal supply is 24 V rather than 15 V on ATV11. When replacing ATV11 drive with an ATV12, a voltage adaptor, reference VW3A9317 must be connected to the 24 V supply if it is used to supply external automation systems. Using the 24 V to supply the LI does not require any adaptor.
- When replacing ATV11 drive with an ATV12 drive, verify that all wiring connections to the ATV12 drive comply with all wiring instructions in this manual.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

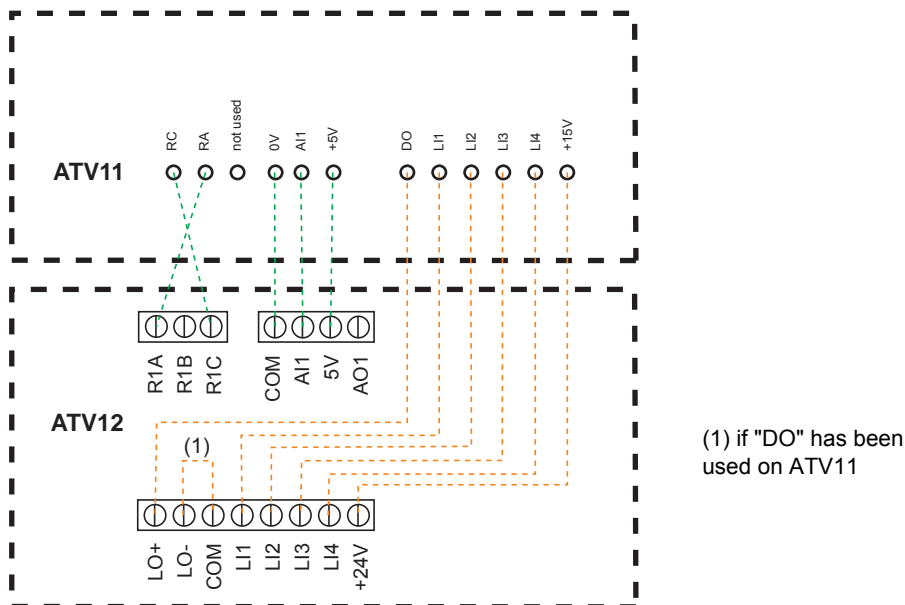
⚡ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The drive panel must be properly grounded before power is applied.
- Use the provided ground connecting point. The ground terminal (green screw) is at the opposite location it was on the ATV11.

Failure to follow these instructions will result in death or serious injury.

Note: The control terminals are arranged and marked differently:



(1) On ATV11 DO is an analog output that can be configured as a logic output. On ATV12, depending on your configuration, DO can be linked to LO1 or AO1.

The ATV11 integrates an internal supply voltage of 15V, ATV12 now integrates an internal supply of 24V.

Migration ATV11 - ATV12

Settings

The information below explains the differences between the ATV11 and ATV12 to assist with replacement. This information is helpful for the management of drive embedded HMI (RUN, STOP keypad and potentiometer to dial).

Replacing an ATV11...E

The ATV11E does not have RUN / STOP buttons neither potentiometer.

The ATV12 in factory settings is equivalent to ATV11E.

LI2 to LI4 and AO1 are not assigned on ATV12.

Replacing an ATV11...U

The main change is on the bFr and HSP settings. It is now 50 Hz as factory setting on ATV12.

EMC filters are now integrated in ATV12●●●●M2.

LI2 to LI4 and AO1 are not assigned on ATV12.

Replacing an ATV11...A

EMC filters are now integrated in ATV12●●●●M2.

LI2 to LI4 and AO1 are not assigned on ATV12.

The active command channel is on terminals for ATV12 (was front keypad on ATV11...A).

To make embedded HMI active, it is necessary to set [Reference channel 1 F r I](#) page [45](#) to **R I U I**

Replacing an ATV11...E327

LI2 to LI4 and AO1 are not assigned on ATV12.

The active command channel is on terminal for ATV12 (was front keypad on ATV11...A).

ATV12 factory setting characteristics: see page [30](#).

Migration ATV11 - ATV12

Functions - Comparison with ATV11●●●E versions

Function	ATV11		ATV12		Comments, Action
	Code	Value	Code	Value	
Frequency	<i>b F r</i>	50	<i>b F r</i>	50	No change.
high-speed	<i>H S P</i>	50	<i>H S P</i>	50	No change.
LI operation Logic	-	(Positive)	<i>r P L</i>	POS	"Depend on LI assignment on each function (LI1 to LI4 L or H). See function assignment page 51 "
Integrated EMC filter	-	Yes	-	Yes	No change.
LI assignment	<i>L 1 1</i>	Forward	<i>L 1 1</i>	Forward	No change.
	<i>L 1 2</i>	Reverse	<i>L 1 2</i>	-	Change rrS (CO nF, FULL, Fun, rrS), LI2.
	<i>L 1 3</i>	2 Preset speed	<i>L 1 3</i>	-	Change PS2 (CO nF, FULL, Fun, PSS, Pr2), LI3.
	<i>L 1 4</i>	4 Preset speed	<i>L 1 4</i>	-	Change PS4 (CO nF, FULL, Fun, PSS, Pr4), LI4.
Speed reference	<i>S P 2</i>	10	<i>S P 2</i>	10	No change.
	<i>S P 3</i>	25	<i>S P 3</i>	15	Change SP3 (CO nF, FULL, Fun, PSS, SP3), 25.
	<i>S P 4</i>	50	<i>S P 4</i>	20	Change SP4 (CO nF, FULL, Fun, PSS, SP4), 50.
AO assignment	(<i>d O</i> , <i>A C t</i>), <i>r F r</i>	Motor frequency	<i>A O 1</i>	-	Change AO1 (CO nF, FULL, I-O, AO1-,AO1), OFr.
AI assignment	(<i>A I t</i> , <i>A C t</i>), <i>S U</i>	Speed ref. 5V	<i>A I I t</i>	Speed ref. 5V	No change.
Command channel	<i>L S r</i>	-	<i>F r 1</i>	-	No change.
	<i>S S r</i>	-	<i>F L O</i>	-	No change. (possible setting on FLO & FLOC)
			<i>F L O C</i>	-	
Motor parameter choice	<i>C O S</i>	According to rating	<i>C O S</i>	-	COS is visible only if Motor parameter choice "MPC" is set to COS. Change MPC (CO nF, FULL, drC-, MPC), COS. Change COS (CO nF, FULL, drC-, COS), According to rating.
Motor control type	unchangeable	SVC	<i>C t t</i>	STD (U/F)	Change CTT (CO nF, FULL, drC-, CTT), PERF (SVCU).
Application Underload time delay	<i>t U L</i>	5	<i>U L t</i>	0	The function is deactivated in factory setting.
Application Overload time delay	<i>t O L</i>	5	<i>O L t</i>	0	The function is deactivated in factory setting.

Migration ATV11 - ATV12

Functions - Comparison with ATV11●●●U versions

Function	ATV11		ATV12		Comments, Action
	Code	Value	Code	Value	
Frequency	<i>bFr</i>	60	<i>bFr</i>	50	Change bFr (CO _n F, bFr), 50.
high-speed	<i>HSP</i>	60	<i>HSP</i>	50	Change HSP (CO _n F, HSP), 50.
LI operation Logic	-	(Positive)	<i>nPL</i>	POS	"Depend on LI assignment on each function (LI1 to LI4 L or H). See function assignment page 51 "
Integrated EMC filter	-	Yes	-	Yes	"Possible to disable filter using IT jumper. See page 28 ."
LI assignment	<i>L11</i>	Forward	<i>L11</i>	Forward	No change.
	<i>L12</i>	Reverse	<i>L12</i>	-	Change rrS (CO _n F, FULL, Fun, rrS), LI2.
	<i>L13</i>	2 Preset speeds	<i>L13</i>	-	Change PS2 (CO _n F, FULL, Fun, PSS, Pr2), LI3.
	<i>L14</i>	4 Preset speeds	<i>L14</i>	-	Change PS4 (CO _n F, FULL, Fun, PSS, Pr4), LI4.
Speed reference	<i>SP2</i>	10	<i>SP2</i>	10	No change.
	<i>SP3</i>	25	<i>SP3</i>	15	Change SP3 (CO _n F, FULL, Fun, PSS, SP3), 25.
	<i>SP4</i>	50	<i>SP4</i>	20	Change SP4 (CO _n F, FULL, Fun, PSS, SP4), 50.
AO assignment	(<i>dO</i> , <i>ACt</i>), <i>rFr</i>	Motor frequency	<i>AO1</i>	-	Change AO1 (CO _n F, FULL, I-O, AO1-,AO1), OFr.
AI assignment	(<i>AI1</i> , <i>ACt</i>), <i>SU</i>	Speed ref. 5V	<i>AI1</i>	Speed ref. 5V	No change.
Command channel	<i>LSr</i>	-	<i>Fr1</i>	-	No change.
	<i>SSr</i>	-	<i>FLO</i>	-	No change. (possible setting on FLO & FLOC)
			<i>FLOC</i>	-	
Motor parameter choice	<i>COS</i>	According to rating	<i>COS</i>	-	COS is visible only if Motor parameter choice "MPC" is set to COS. Change MPC (CO _n F, FULL, drC-, MPC), COS. Change COS (CO _n F, FULL, drC-, COS), According to rating.
Motor control type	unchangeable	SVC	<i>CTT</i>	STD (U/F)	Change CTT (CO _n F, FULL, drC-, CTT), PERF (SVCU).
Application Underload time delay	<i>tUL</i>	5	<i>ULt</i>	0	The function is deactivated in factory setting.
Application Overload time delay	<i>tOL</i>	5	<i>OLt</i>	0	The function is deactivated in factory setting.

Migration ATV11 - ATV12

Functions - Comparison with ATV11●●●A versions

Function	ATV11		ATV12		Comments, Action
	Code	Value	Code	Value	
Frequency	<i>b F r</i>	50	<i>b F r</i>	50	No change.
high-speed	<i>H S P</i>	50	<i>H S P</i>	50	No change.
LI operation Logic	-	(Positive)	<i>r P L</i>	POS	"Depend on LI assignment on each function (LI1 to LI4 L or H). See function assignment page 51 "
Integrated EMC filter	-	No	-	Yes	"Possible to disable filter using IT jumper. See page 28 ."
LI assignment	<i>L 1 1</i>	Forward	<i>L 1 1</i>	Forward	No change.
	<i>L 1 2</i>	Reverse	<i>L 1 2</i>	-	Change rrS (CO nF, FULL, Fun, rrS), LI2.
	<i>L 1 3</i>	2 Preset speeds	<i>L 1 3</i>	-	Change PS2 (CO nF, FULL, Fun, PSS, Pr2), LI3.
	<i>L 1 4</i>	4 Preset speeds	<i>L 1 4</i>	-	Change PS4 (CO nF, FULL, Fun, PSS, Pr4), LI4.
Speed reference	<i>S P 2</i>	10	<i>S P 2</i>	10	No change.
	<i>S P 3</i>	25	<i>S P 3</i>	15	Change SP3 (CO nF, FULL, Fun, PSS, SP3), 25.
	<i>S P 4</i>	50	<i>S P 4</i>	20	Change SP4 (CO nF, FULL, Fun, PSS, SP4), 50.
AO assignment	(<i>d O</i> , <i>A C t</i>), <i>r F r</i>	Motor frequency	<i>A O 1</i>	-	Change AO1 (CO nF, FULL, I-O, AO1-,AO1), OFr.
AI assignment	(<i>A I t</i> , <i>A C t</i>), <i>S U</i>	Speed ref. 5V	<i>A I t</i>	Speed ref. 5V	No change.
Command channel	<i>L S r</i>	LOC	<i>F r 1</i>	AI1	Change FR1 (CO nF, FULL, CtL-, FR1), AIU1.
	(<i>t C C</i> , <i>A c t</i>), <i>L O C</i>	Local control (RUN / STOP)	<i>C H C F</i>	SIM	No change.
		<i>C d 1</i>	-		
Motor parameter choice	<i>C O S</i>	According to rating	<i>C O S</i>	-	COS is visible only if Motor parameter choice "MPC" is set to COS. Change MPC (CO nF, FULL, drC-, MPC), COS. Change COS (CO nF, FULL, drC-, COS), According to rating.
Motor control type	unchangeable	SVC	<i>C t t</i>	STD (U/F)	Change CTT (CO nF, FULL, drC-, CTT), PERF (SVCU).
Application Underload time delay	<i>t U L</i>	5	<i>U L t</i>	0	The function is deactivated in factory setting.
Application Overload time delay	<i>t O L</i>	5	<i>O L t</i>	0	The function is deactivated in factory setting.

Migration ATV11 - ATV12

Functions - Comparison with ATV11●●●E327 versions

Function	ATV11		ATV12		Comments, Action
	Code	value	Code	value	
Frequency	<i>b F r</i>	50	<i>b F r</i>	50	No change.
high-speed	<i>H S P</i>	50	<i>H S P</i>	50	No change.
LI operation Logic	-	(Positive)	<i>n P L</i>	POS	"Depend on LI assignment on each function (LI1 to LI4 L or H). See function assignment page 51 "
Integrated EMC filter	-	Yes	-	Yes	"Possible to disable filter using IT jumper. See page 28 ."
Li assignment	<i>L 1 1</i>	Forward	<i>L 1 1</i>	Forward	No change.
	<i>L 1 2</i>	Reverse	<i>L 1 2</i>	-	Change rrS (CO nF, FULL, Fun, rrS), LI2.
	<i>L 1 3</i>	2 Preset speeds	<i>L 1 3</i>	-	Change PS2 (CO nF, FULL, Fun, PSS, Pr2), LI3.
	<i>L 1 4</i>	4 Preset speeds	<i>L 1 4</i>	-	Change PS4 (CO nF, FULL, Fun, PSS, Pr4), LI4.
Speed reference	<i>S P 2</i>	10	<i>S P 2</i>	10	No change.
	<i>S P 3</i>	25	<i>S P 3</i>	15	Change SP3 (CO nF, FULL, Fun, PSS, SP3), 25.
	<i>S P 4</i>	50	<i>S P 4</i>	20	Change SP4 (CO nF, FULL, Fun, PSS, SP4), 50.
AO assignment	(<i>d O</i> , <i>A C E</i>), <i>r F r</i>	Motor frequency	<i>A O 1</i>	-	Change AO1 (CO nF, FULL, I-O, AO1-,AO1), OFr.
AI assignment	(<i>A I E</i> , <i>A C E</i>), <i>S U</i>	Speed ref. 5V	<i>A I I E</i>	Speed ref. 5V	No change.
Command channel	<i>L S r</i>	LOC	<i>F r 1</i>	AI1	Change FR1 (CO nF, FULL, CtL-, FR1), AIU1.
	(<i>E C C</i> , <i>A c E</i>), <i>L O C</i>	Local control (RUN / STOP)	<i>C H C F</i>	SIM	No change.
		<i>C d 1</i>	-		
Motor parameter choice	<i>C O S</i>	Acc. to rating	<i>C O S</i>	-	COS is visible only if Motor parameter choice "MPC" is set to COS. Change MPC (CO nF, FULL, drC-, MPC), COS. Change COS (CO nF, FULL, drC-, COS), Acc. To rating.
Motor control type	unchangeable	SVC	<i>C T T</i>	STD (U/F)	Change CTT (CO nF, FULL, drC-, CTT), PERF (SVCU).
Application Underload time delay	<i>t U L</i>	5	<i>U L E</i>	0	The function is deactivated in factory setting.
Application Overload time delay	<i>t O L</i>	5	<i>O L E</i>	0	The function is deactivated in factory setting.

Diagnostics and Troubleshooting

Drive does not start, no error code displayed

- If the display does not light up, check the power supply to the drive (ground and input phases connection, see page [20](#)).
- The assignment of the "Fast stop" or "Freewheel" functions will prevent the drive starting if the corresponding logic inputs are not powered up. The ATV12 then displays **nSE** in freewheel stop and **FSE** in fast stop, it will display **rdy** in freewheel stop. This is normal since these functions are active at zero so that the drive will be stopped if there is a wire break. Assignment of LI to be checked in **CDF/FULL/FUN-SE-** menu.
- Make sure that the run command input(s) is activated in accordance with the selected control mode (parameters **Type of control** **CC** page [48](#) and **2 wire type control** **CC** page [51](#), in **CDF/FULL/ID-** menu).
- If the reference channel or command channel is assigned to Modbus, when the power supply is connected, the drive displays "**nSE**" freewheel and remain in stop mode until the communication bus sends a command.
- In factory setting "RUN" button is inactive. Adjust parameters **Reference channel 1** **Frl** page [62](#) and **Command channel 1** **Cdl** page [63](#) to control the drive locally (**CDF/FULL/CEL-** menu). See How to control the drive locally page [46](#).

Fault detection codes that cannot be cleared automatically

The cause of the detected fault must be removed before clearing by turning off and then on.

SDF and **ENF** faults can also be cleared remotely by means of a logic input (parameter **Detected fault reset assignment** **rSF** page [91](#) in **CDF/FULL/FL-** menu).

Code	Name	Possible causes	Remedy
CrFI	Precharge	<ul style="list-style-type: none"> • Charging relay control fault or charging resistor damaged 	<ul style="list-style-type: none"> • Turn the drive off and then back on again • Check the connections • Check the stability of the main supply • Contact your local Schneider Electric representative
InF1	Unknown drive rating	<ul style="list-style-type: none"> • The power card is different from the card stored 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
InF2	Unknown or incompatible power board	<ul style="list-style-type: none"> • The power card is incompatible with the control card 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
InF3	Internal serial link	<ul style="list-style-type: none"> • Communication interruption between the internal cards 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
InF4	Invalid industrialization zone	<ul style="list-style-type: none"> • Inconsistent internal data 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
InF9	Current measurement circuit	<ul style="list-style-type: none"> • Current measurement is not correct due to hardware circuit 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
- - - -	Problem of application Firmware	<ul style="list-style-type: none"> • Invalid application firmware update using the Multi-Loader tool 	<ul style="list-style-type: none"> • Flash again the application firmware of the product
InFb	Internal thermal sensor detected fault	<ul style="list-style-type: none"> • The drive temperature sensor is not operating correctly • The drive is in short circuit or open 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
InFE	Internal CPU	<ul style="list-style-type: none"> • Internal microprocessor 	<ul style="list-style-type: none"> • Turn the drive off and then back on again • Contact local Schneider Electric representative

Diagnostics and Troubleshooting

Fault detection codes that cannot be cleared automatically (continued)

Code	Name	Possible causes	Remedy
OCF	Overcurrent	<ul style="list-style-type: none"> Parameters in the Motor control menu d r C - page 57 are not correct Inertia or load too high Mechanical locking 	<ul style="list-style-type: none"> Check the parameters Check the size of the motor/drive/load Check the state of the mechanism Connect line chokes Reduce the Switching frequency 5 F r page 59 Check the ground connection of drive, motor cable and motor insulation.
SCF1	Motor short circuit	<ul style="list-style-type: none"> Short-circuit or grounding at the drive output Ground fault during running status Commutation of motors during running status Significant current leakage to ground if several motors are connected in parallel 	<ul style="list-style-type: none"> Check the cables connecting the drive to the motor, and the motor insulation Connect motor chokes
SCF3	Ground short circuit		
SCF4	IGBT short circuit	<ul style="list-style-type: none"> Internal power component short circuit detected at power-on 	<ul style="list-style-type: none"> Contact your local Schneider Electric representative
SOF	Overspeed	<ul style="list-style-type: none"> Instability Overspeed associated with the inertia of the application 	<ul style="list-style-type: none"> Check the motor Overspeed is 10% more than Maximum frequency E F r page 57 so adjust this parameter if necessary Add a braking resistor Check the size of the motor/drive/load Check parameters of the speed loop (gain and stability)
ENF	Auto-tuning	<ul style="list-style-type: none"> Motor not connected to the drive One motor phase loss Special motor Motor is rotating (being driven by the load, for example) 	<ul style="list-style-type: none"> Check that the motor/drive are compatible Check that the motor is present during auto-tuning If an output contactor is being used, close it during auto-tuning Check that the motor is completely stopped

Diagnostics and Troubleshooting

Fault detection codes that can be cleared with the automatic restart function, after the cause has disappeared

These detected faults can also be cleared by turning on and off or remotely by means of a logic input (parameter [Detected fault reset assignment r 5 F](#) page [91](#)).

Code	Name	Possible causes	Remedy
L F F I	AI current lost fault	Detection if: <ul style="list-style-type: none"> Analog input AI1 is configured as current AI1 current scaling parameter of 0% C r L I page 52 is greater than 3 mA Analog input current is lower than 2 mA 	<ul style="list-style-type: none"> Check the terminal connection
O b F	Overbraking	<ul style="list-style-type: none"> Braking too sudden or driving load too high 	<ul style="list-style-type: none"> Increase the deceleration time Install a module unit with a braking resistor if necessary Check the line supply voltage, to be sure that it is under the maximum acceptable (20% over maximum line supply during run status)
O H F	Drive overheating	<ul style="list-style-type: none"> Drive temperature too high 	<ul style="list-style-type: none"> Check the motor load, the drive ventilation and the ambient temperature. Wait for the drive to cool down before restarting. See Mounting and temperature conditions page 13.
O L C	Process overload	<ul style="list-style-type: none"> Process overload 	<ul style="list-style-type: none"> Check the process and the parameters of the drive to be in phase
O L F	Motor overload	<ul style="list-style-type: none"> Triggered by excessive motor current 	<ul style="list-style-type: none"> Check the setting of the motor thermal protection, check the motor load.
O P F 1	1 output phase loss	<ul style="list-style-type: none"> Loss of one phase at drive output 	<ul style="list-style-type: none"> Check the connections from the drive to the motor In case of using downstream contactor, check the right connection, cable and contactor
O P F 2	3 output phase loss	<ul style="list-style-type: none"> Motor not connected Motor power too low, below 6% of the drive nominal current Output contactor open Instantaneous instability in the motor current 	<ul style="list-style-type: none"> Check the connections from the drive to the motor Test on a low-power motor or without a motor: In factory settings mode, motor phase loss detection is active Output Phase loss detection O P L page 94 = Y E 5. To check the drive in a test or maintenance environment, without having to use a motor with the same rating as the drive, deactivate motor phase loss detection Output Phase loss detection O P L = n 0 Check and optimize the following parameters: IR compensation (law U/F) U F r page 58, Rated motor voltage U n 5 page 57 and Rated motor current n C r page 57 and perform an Auto-tuning t U n page 60.
O S F	Main overvoltage	<ul style="list-style-type: none"> Line voltage too high: <ul style="list-style-type: none"> At drive power-on only, the supply is 10% over the maximum acceptable voltage level Power with no run order, 20% over the maximum line supply Disturbed line supply 	<ul style="list-style-type: none"> Turn Off the Drive. Check and adjust the line voltage. After line come back to nominal voltage (within tolerance) do power On. If intermittent O S F code appear, set Relay R1 to F L t and it can be connected to upstream protection to avoid overvoltage in the drive. In this case L O I can be used for others drive status see page 53

Diagnostics and Troubleshooting

Fault detection codes that can be cleared with the automatic restart function, after the cause has disappeared (continued)

Code	Name	Possible causes	Remedy
PHF	Input phase loss	<ul style="list-style-type: none"> • Drive incorrectly supplied or a fuse blown • Failure of one phase • 3-phase ATV12 used on a 1-phase line supply • Unbalanced load • This protection only operates with the drive on load 	<ul style="list-style-type: none"> • Check the power connection and the fuses. • Use a 3-phase line supply. • Disable the fault by setting Input Phase loss detection IPL page 94 = 00.
SCFS	Load short circuit	<ul style="list-style-type: none"> • Short-circuit at drive output • Short circuit detection at the run order or DC injection order if parameter IGBT test S t r t page 95 is set to YES 	<ul style="list-style-type: none"> • Check the cables connecting the drive to the motor, and the motor's insulation
SLF1	Modbus communication	<ul style="list-style-type: none"> • Interruption in communication on the Modbus network 	<ul style="list-style-type: none"> • Check the connections of communication bus. • Check the time-out (Modbus time out t t 0 parameter page 98) • Refer to the Modbus user manual
SLF2	SoMove communication	<ul style="list-style-type: none"> • Communication interruption with SoMove 	<ul style="list-style-type: none"> • Check the SoMove connecting cable. • Check the time-out
SLF3	HMI communication	<ul style="list-style-type: none"> • Communication interruption with the external display terminal 	<ul style="list-style-type: none"> • Check the terminal connection
SPIF	PI Feedback detected fault	<ul style="list-style-type: none"> • PID feedback below lower limit 	<ul style="list-style-type: none"> • Check the PID function feedback • Check the PI feedback supervision threshold L P I and time delay t P I, page 76.
ULF	Process underload fault	<ul style="list-style-type: none"> • Process underload • Motor current below the Application Underload threshold L U L parameter page 55 during a period set by Application underload time delay U L t parameter page 55 to protect the application. 	<ul style="list-style-type: none"> • Check the process and the parameters of the drive to be in phase
t JF	IGBT overheat	<ul style="list-style-type: none"> • Drive overheated • IGBT internal temperature is too high according to ambient temperature and load 	<ul style="list-style-type: none"> • Check the size of the load/motor/drive. • Reduce the Switching frequency S F r page 59. • Wait for the drive to cool before restarting
EPFI	External detected fault by logic input	<ul style="list-style-type: none"> • Event triggered by an external device, depending on user 	<ul style="list-style-type: none"> • Check the device which caused the trip and reset.

Diagnostics and Troubleshooting

Faults codes that will be cleared as soon as their causes disappear

The USF fault can be cleared remotely by means of a logic input (parameter [Detected fault reset assignment - 5 F](#) page [91](#)).

Code	Name	Possible causes	Remedy
CF F	Incorrect configuration	<ul style="list-style-type: none">HMI block replaced by an HMI block configured on a drive with a different ratingThe current configuration of customer parameters is inconsistent	<ul style="list-style-type: none">Return to factory settings or retrieve the backup configuration, if it is valid.If the fault remains after reverting to the factory settings, contact your local Schneider Electric representative
CF I (1)	Invalid configuration	<ul style="list-style-type: none">Invalid configuration The configuration loaded in the drive via the bus or communication network is inconsistent. The configuration upload has been interrupted or is not fully finished.	<ul style="list-style-type: none">Check the configuration loaded previously.Load a compatible configuration
CF I2	Download invalid configuration	<ul style="list-style-type: none">Interruption of download operation with Loader or SoMove	<ul style="list-style-type: none">Check connection with Loader or SoMove.To reset the default re-start the download operation or restore the factory setting
US F	Undervoltage	<ul style="list-style-type: none">Line supply too lowTransient voltage dip	<ul style="list-style-type: none">Check the voltage and the parameters of Undervoltage Phase Loss Menu U5 b - page 95.

(1) When the CFI is present in the past fault menu, it means the configuration has been interrupted or is not fully finished.

HMI block changed

When an HMI block is replaced by an HMI block configured on a drive with a different rating, the drive locks in Incorrect configuration **CF F** fault mode on power-up. If the card has been deliberately changed, the fault can be cleared by returning to factory setting.

Diagnostics and Troubleshooting

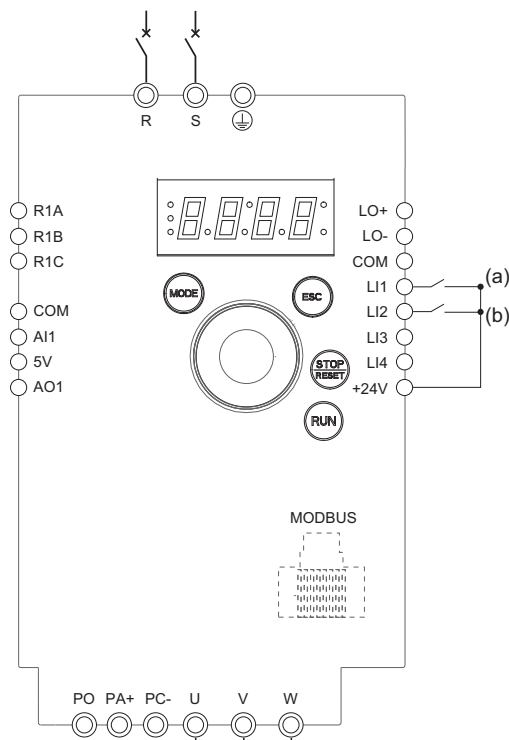
Fault detection codes displayed on the remote display terminal

Code	Name	Description
<i>In It</i>	On initializing itself	<ul style="list-style-type: none">• Micro controller initializing• Communication configuration search
<i>C O N . E</i> (1)	Communication error	<ul style="list-style-type: none">• It has 50ms time-out error.• This message is shown after 220 retry attempts.
<i>A - 1 7</i> (1)	Key alarm	<ul style="list-style-type: none">• Key has been pressed consecutively for more than 10 seconds.• Membrane switch disconnected.• Keypad woken up while a key is being pressed.
<i>c L r</i> (1)	Confirm Fault reset	<ul style="list-style-type: none">• This message appears if the STOP key is pressed when there is a keypad fault.
<i>d E U . E</i> (1)	Drive mismatch	<ul style="list-style-type: none">• Drive type (brand) did not match with keypad type (brand)
<i>r O N . E</i> (1)	ROM abnormality	<ul style="list-style-type: none">• Keypad ROM abnormality detected by the checksum calculation.
<i>r A N . E</i> (1)	RAM abnormality	<ul style="list-style-type: none">• Keypad RAM abnormality detected.
<i>C P U . E</i> (1)	The other defect	<ul style="list-style-type: none">• The other detected fault.

(1) Flashing

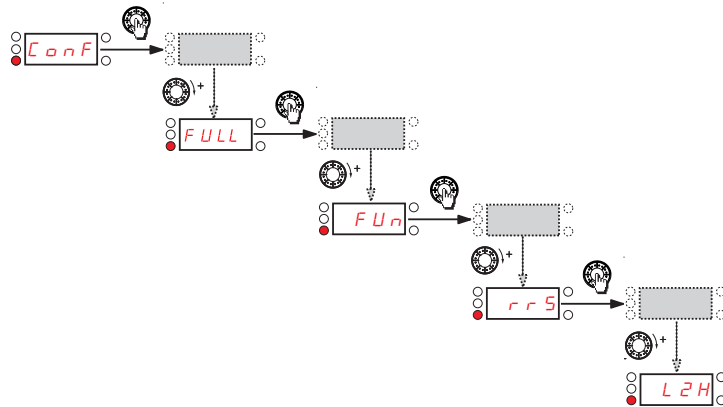
Application notes

2-wire control (source)



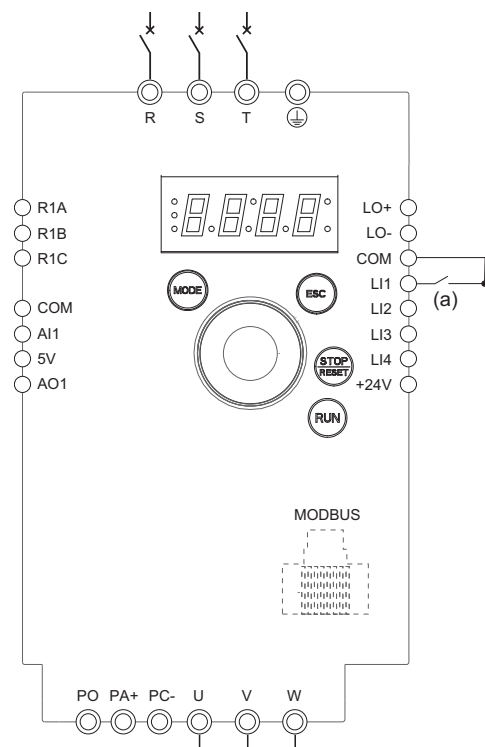
(a): Run Forward (b): Run Reverse

1. Connect the ground terminal to the grounding screws located below the output terminals.
2. Connect the power terminals.
3. Connect the logic inputs.
4. Turn on the drive without giving a run command.
5. Assign factory settings to the drive, **Factory / recall customer parameter set F C 5** page 46 set to **In 1**.
6. Set the motor parameters (in CO_nF mode) only if the factory configuration of the drive is not suitable.
7. Perform an auto-tuning.
8. Set **Reverse direction r r 5** parameter page 66 to **L 1 2 H**



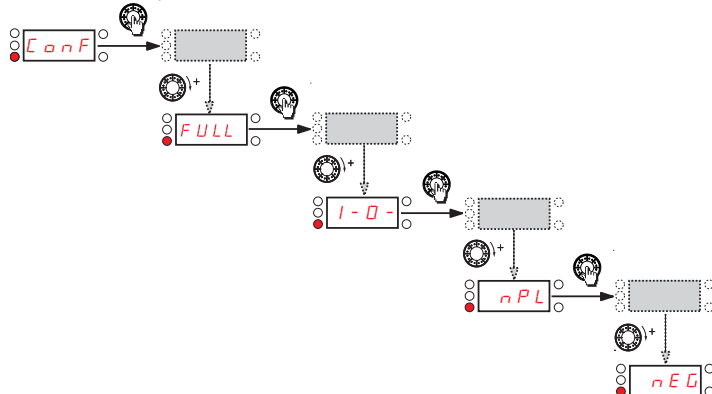
9. Start

3-wire control (sink)



(a): Run Forward

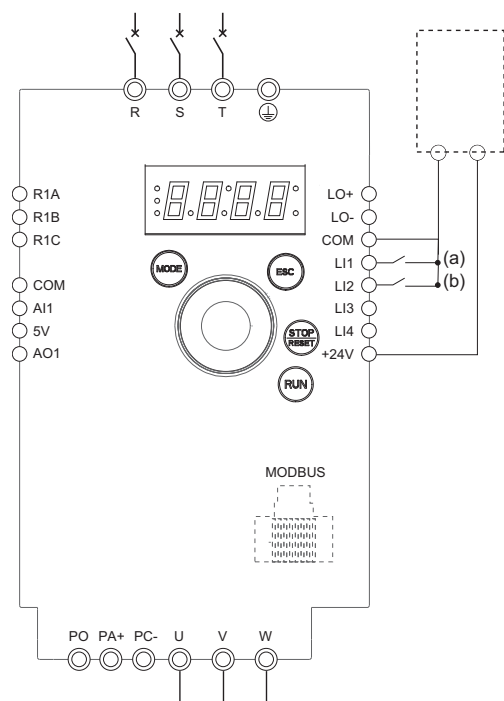
1. Connect the ground terminal to the grounding screws located below the output terminals.
2. Connect the power terminals.
3. Connect the logic inputs.
4. Turn on the drive without giving a run command.
5. Assign factory settings to the drive, **Factory / recall customer parameter set F C 5** page 46 set to **In 1**.
6. Set **t C C** to **3 C** see page 48
7. Set the motor parameters (in C O_nF mode) only if the factory configuration of the drive is not suitable.
8. Perform an auto-tuning.
9. Set **Logic inputs type n P L** parameter page 51 to **n E G**



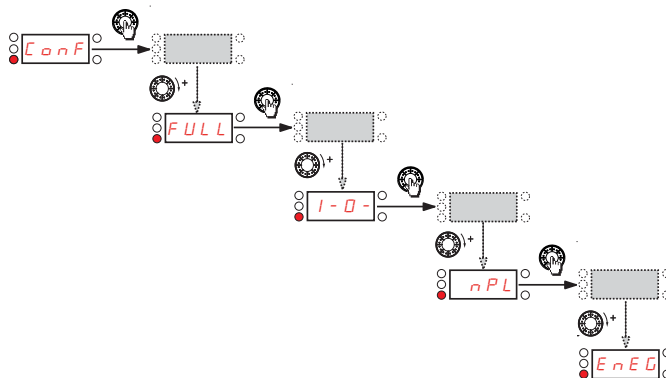
10. Start

Application notes

2-wire control (sink)



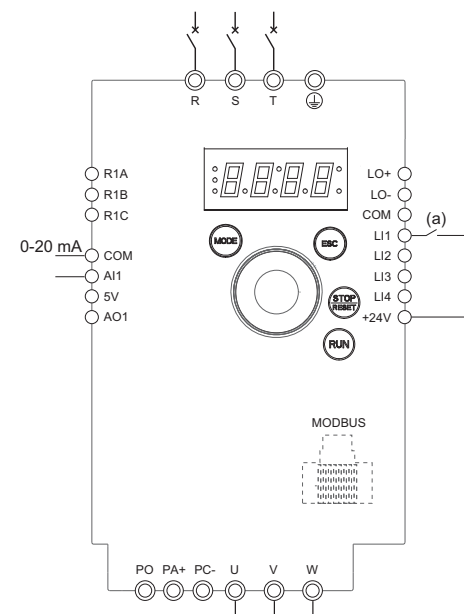
1. Connect the ground terminal to the grounding screws located below the output terminals.
2. Connect the power terminals.
3. Connect the logic inputs.
4. Turn on the drive without giving a run command.
5. Assign factory settings to the drive, **Factory / recall customer parameter set F C 5** page 46 set to **In I**.
6. Set **t C C** to **3 C** see page 48
7. Set the motor parameters (in **C O n F** mode) only if the factory configuration of the drive is not suitable.
8. Perform an auto-tuning.
9. Set **Logic inputs type n P L** parameter page 51 to **E n E G**



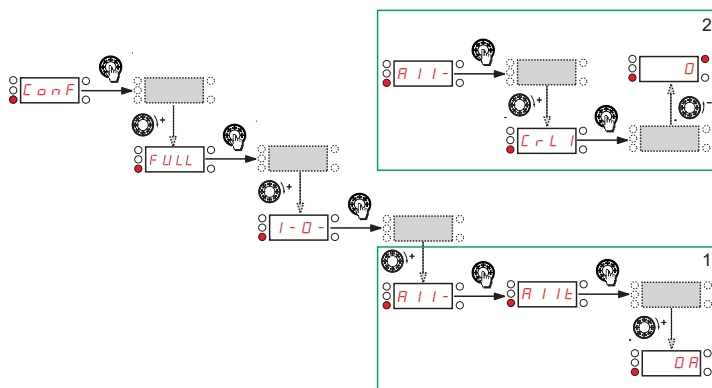
(a): Run Forward

10. Start

Speed control 0-20 mA (source)



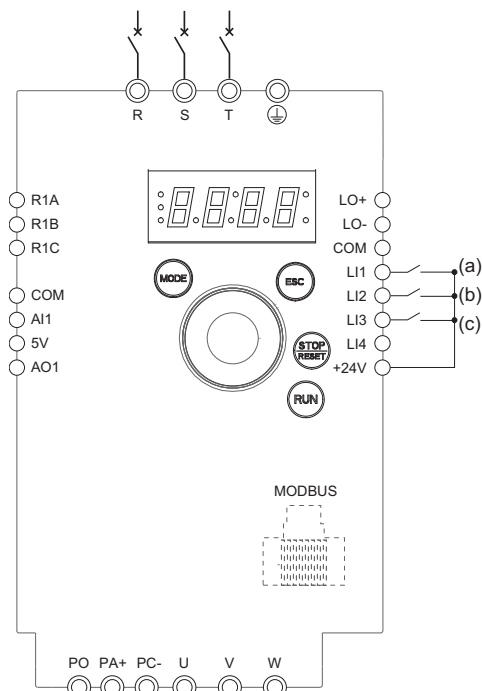
1. Connect the ground terminal to the grounding screws located below the output terminals.
2. Connect the power terminals.
3. Connect the logic input LI1 and analog input AI1.
4. Turn on the drive without giving a run command.
5. Assign factory settings to the drive, **Factory / recall customer parameter set F C 5** page 46 set to **In I**.
6. Set the motor parameters (in **C O n F** mode) only if the factory configuration of the drive is not suitable.
7. Perform an auto-tuning.
8. Set **AI1 type A I I t** page 52 to **0 A** and **AI1 current scaling parameter of 0% C r L I** page 52 to 0 A. Check that **AI1 current scaling parameter of 100% C r H I** page 52 is set to 20 mA.



(a) Run Forward

9. Start.

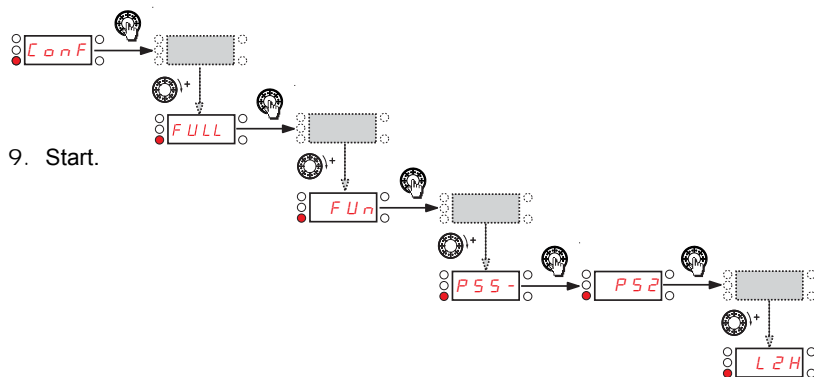
4 Preset speeds (source)



(a): Run Forward
(b): 2 preset speeds (c): 4 preset speeds

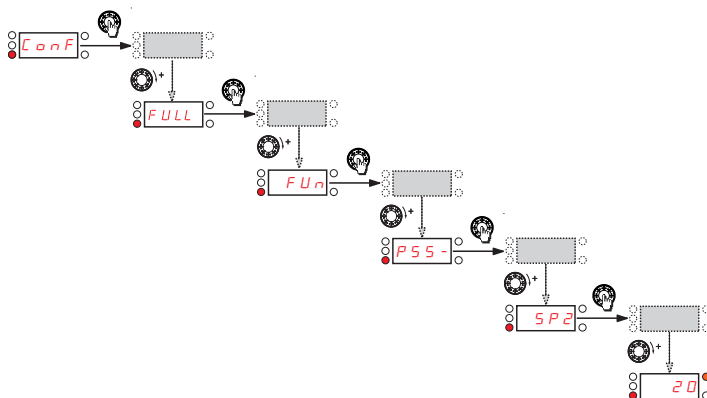
Note: Refer to Function compatibility table page 36.

1. Connect the ground terminal to the grounding screws located below the output terminals.
2. Connect the power terminals.
3. Connect the logic inputs.
4. Turn on the drive without giving a run command.
5. Assign factory settings to the drive, [Factory / recall customer parameter set FC5](#) page 46 set to **1n1**.
6. Set the motor parameters (in CO_NF mode) only if the factory configuration of the drive is not suitable.
7. Perform an auto-tuning.
8. Set 2 Preset speeds **PS2** page 70 to **L2H**.

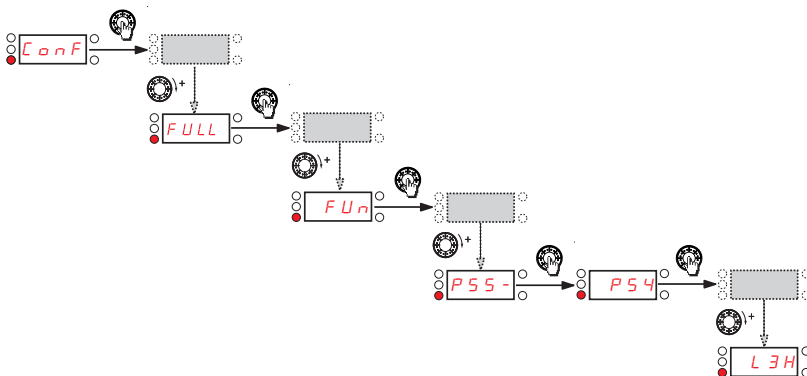


9. Start.

Set Preset speed 2 **SP2** page 70 to 20 Hz.

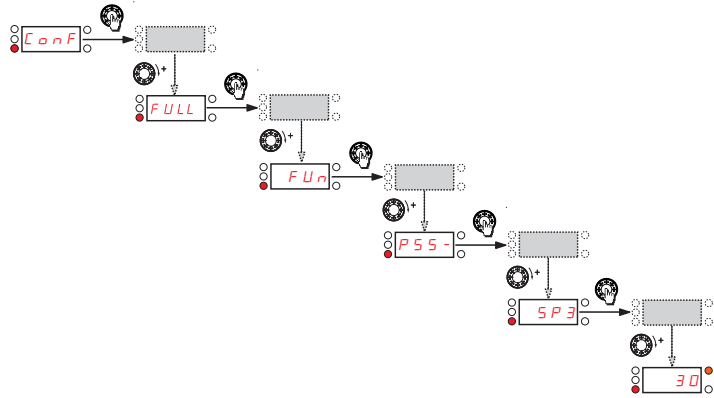


Set 4 Preset speeds **PS4** page 70 to **L3H**.



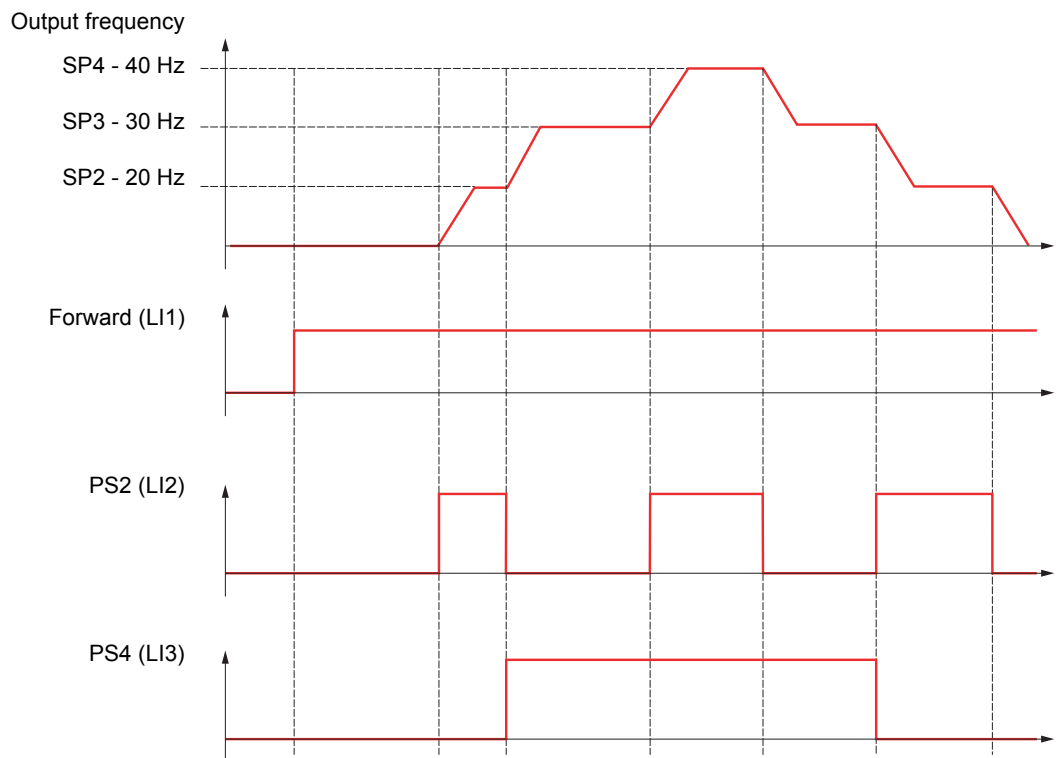
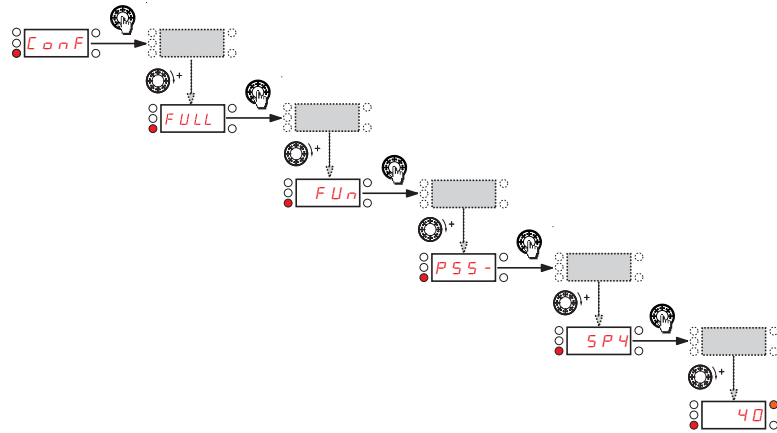
Application notes

Set Preset speed 3 **SP3** page 70 to 30 Hz.

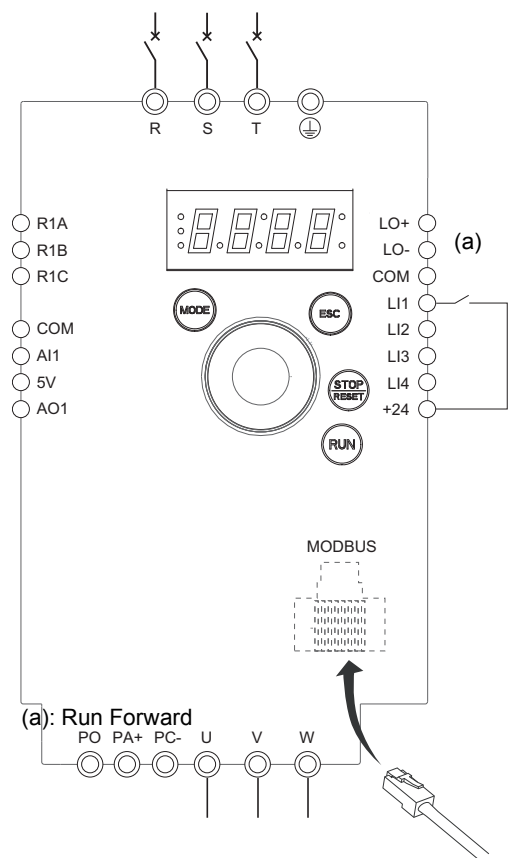


4 Preset speeds (source) continued

Set Preset speed 4 **SP4** page **70** to 40 Hz.

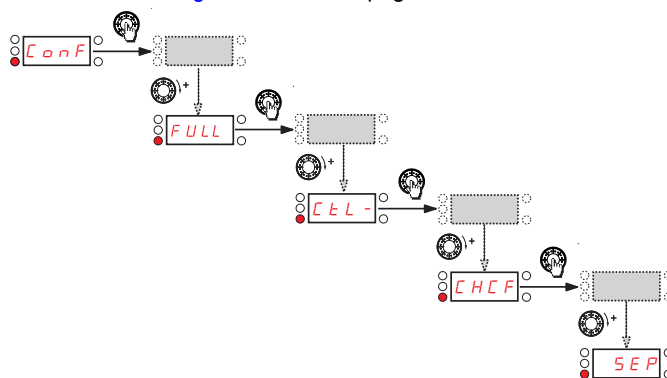


Terminals command channel with Modbus reference channel

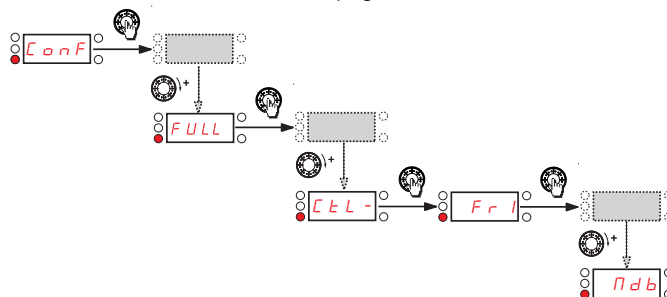


Note: Refer to Function compatibility table page 36.

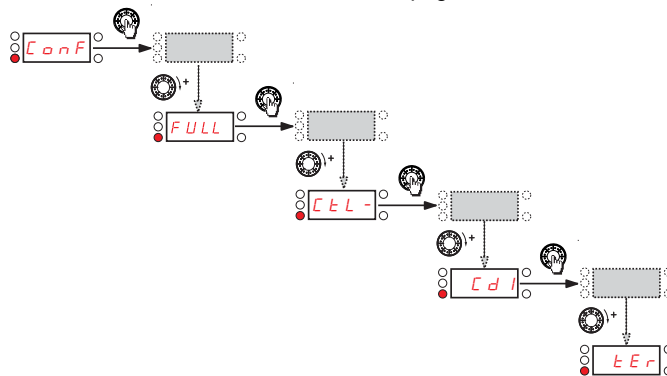
1. Connect the ground terminal to the grounding screws located below the output terminals.
2. Connect the power terminals.
3. Connect the logic input L1 and plug RJ45 cable to the Modbus socket.
4. Turn on the drive without giving a run command.
5. Assign factory settings to the drive, **Factory / recall customer parameter set F C 5** page 46 set to **In 1**.
6. Set the motor parameters (in COnF mode) only if the factory configuration of the drive is not suitable.
7. Perform an auto-tuning.
8. Set **Channel configuration C H C F** page 62 to **S E P**.



Set **Reference channel 1 F r 1** page 62 to **Π d b**.



Check that **Command channel 1 C d 1** page 63 is set to **t E r**.



9. Start

Short-circuit rating and branch circuit protection

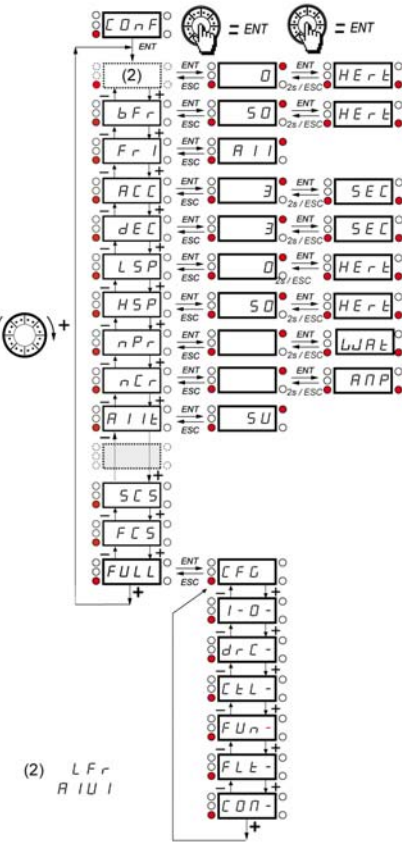
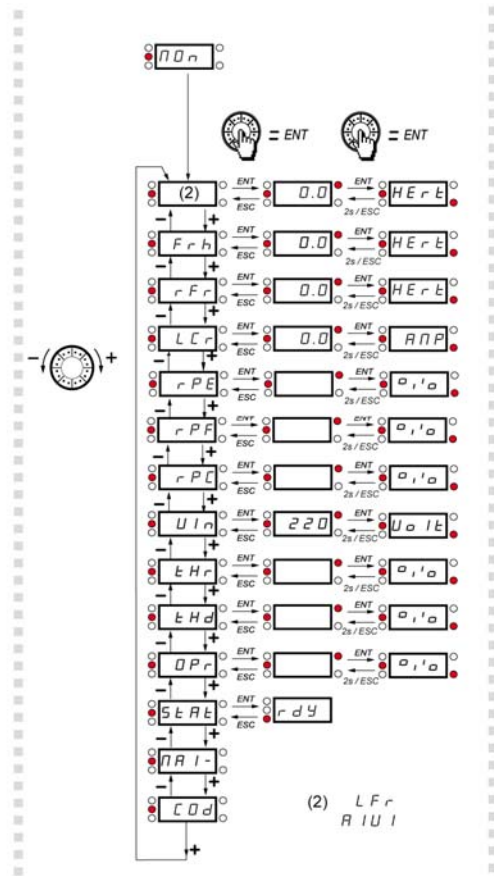
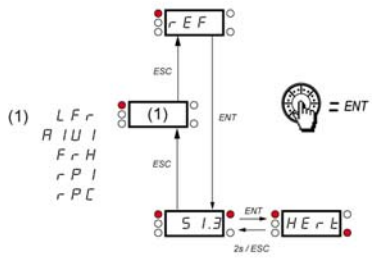
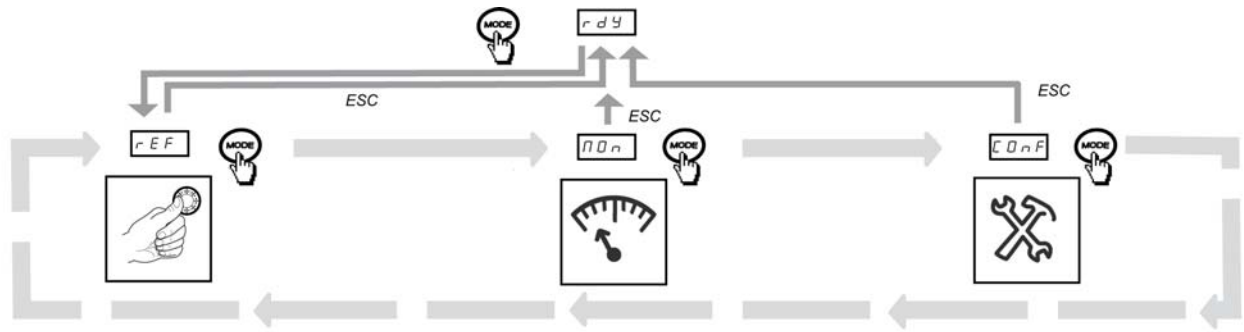
Recommended fuse ratings for UL and CSA requirements

Use the fuses recommended in the Quick Start Annex (S1A58684) delivered with the product as well as on the Schneider Electric website www.schneider-electric.com.

1-phase wiring

See the ATV12 Quick Start annex (S1A58684) available with the product as well as on the Schneider Electric website www.schneider-electric.com.

Organization tree



Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
<i>ACC2</i>	65 74	Acceleration 2	s	<i>0.0</i> to <i>999.9</i>	–	5 s	
<i>ACC</i>	45 64	Acceleration	s	<i>0.0</i> to <i>999.9</i>	–	3.0 s	
<i>ADC</i>	67	Automatic DC injection		<i>n0</i> <i>YES</i> <i>ct</i>	No Yes Continuous	YES	
<i>ADD</i>	98	Modbus address		<i>0FF</i> to <i>247</i>	–	Off	
<i>AI1t</i>	52	AI1 type	–	<i>5U</i> <i>10U</i> <i>0A</i>	Voltage Voltage Current	5U	
<i>AIU1</i>	37 39 45 62	Analog input virtual	%	<i>0</i> to <i>100</i>	–	–	
<i>AO1</i>	56	AO1 assignment		<i>n0</i> <i>DCr</i> <i>DFr</i> <i>DrP</i> <i>OP5</i> <i>OPF</i> <i>OPE</i> <i>OPr</i> <i>tHr</i> <i>tHd</i>	No Motor current Output frequency Ramp output PID reference PID feedback PID error Output power Motor thermal state Drive thermal state	n0	
<i>AO1t</i>	56	AO1 type		<i>10U</i> <i>0A</i> <i>4A</i>	Voltage Current Current	0A	
<i>ARr</i>	91	Automatic restart		<i>n0</i> <i>YES</i>	No Yes	n0	
<i>bFr</i>	45 57	Standard motor frequency	Hz	<i>50</i> <i>60</i>	–	50 Hz	
<i>brA</i>	65	Decel Ramp Adaptation assignment		<i>n0</i> <i>YES</i> <i>dYnA</i>	No Yes Motor braking	YES	
<i>C15U</i>	41	Card 1 Software Version	–	–	–	–	–
<i>C25U</i>	41	Card 2 Software Version	–	–	–	–	–
<i>Cd1</i>	63	Command channel 1		<i>tEr</i> <i>L0C</i> <i>LCC</i> <i>nDb</i>	Terminals Local Remote display Modbus		
<i>CFG</i>	47	Macro-configuration	–	–	–	–	–
<i>CHF</i>	62	Channel configuration		<i>5IN</i> <i>SEP</i>	Simultaneous mode Separate mode	SIM	
<i>CL1</i>	88	Current limitation	A	<i>0.25</i> to <i>1.5</i>	–	1.5 A	

Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
<i>CL2</i>	88	Current limitation 2	A	<i>0.25</i> to <i>1.5</i>	–	1.5 A	
<i>COd</i>	43	HMI Password	–	<i>OFF</i> <i>On</i>	Code disabled Code activated	OFF	
<i>CON1</i>	42	Modbus communication status	–	<i>r0t0</i> <i>r0t1</i> <i>r1t0</i> <i>r1t1</i>	–	–	
<i>COS</i>	57	Rated motor cos phi	–	<i>0.5</i> to <i>1</i>	–	according to drive rating	
<i>CrH1</i>	52	A11 current scaling parameter of 100%	mA	<i>0</i> to <i>20</i>	–	20 mA	
<i>CrL1</i>	52	A11 current scaling parameter of 0%	mA	<i>0</i> to <i>20</i>	–	4 mA	
<i>Ctd</i>	55	Motor current threshold	In	<i>0</i> to <i>1.5</i>	–	InV	
<i>Ctt</i>	57	Motor control type	–	<i>Std</i> <i>PERF</i> <i>PUMP</i>	Standard Performance Pump	Std	
<i>dCF</i>	66	Ramp divider		<i>1</i> to <i>10</i>	–	4	
<i>dE2</i>	65	Deceleration 2	s	<i>0.0</i> to <i>999.9</i>	–	5 s	
<i>dEC</i>	45 64	Deceleration	s	<i>0.0</i> to <i>999.9</i>	–	3.0 s	
<i>dP1</i>	42	Last detected fault 1	–	see page 108		–	–
<i>dP2</i>	42	Last detected fault 2	–	see page 108		–	–
<i>dP3</i>	43	Last detected fault 3	–	see page 108		–	–
<i>dP4</i>	43	Last detected fault 4	–	see page 108		–	–
<i>drr</i>	96	Degraded line supply operation		<i>n0</i> <i>YES</i>	No Yes	n0	
<i>EP1</i>	42	State of drive at detected fault 1	–	–	–	–	–
<i>EP2</i>	43	State of drive at detected fault 2	–	–	–	–	–
<i>EP3</i>	43	State of drive at detected fault 3	–	–	–	–	–
<i>EP4</i>	43	State of drive at detected fault 4	–	–	–	–	–
<i>EPL</i>	97	Stop type - external fault	–	<i>n0</i> <i>YES</i> <i>LFF</i>	No Yes LFF	YES	–
<i>EtF</i>	97	External fault assignment	–	<i>n0</i> <i>L1H</i> <i>L2H</i> <i>L3H</i> <i>L4H</i> <i>L1L</i> <i>L2L</i> <i>L3L</i> <i>L4L</i>	Non active L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high L1L: LI1 active low L2L: LI2 active low L3L: LI3 active low L4L: LI4 active low	n0	–

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Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
<i>F b S</i>	72	PID feedback scale factor	PID	<i>0. 1</i> to <i>100. 0</i>	–	1.0	
<i>F C S</i>	46	Factory / recall customer parameter set	–	<i>n 0</i> <i>r E C</i> <i>l n</i> <i>l n l</i>	No REC IN INI	n0	
<i>F F d</i>	79	Zero flow detection activation threshold	Hz	<i>0</i> to <i>400</i>	–	0 Hz	
<i>F L G</i>	58	Frequency loop gain	%	<i>0</i> to <i>100</i>	–	20%	
<i>F L O</i>	63	Forced local assignment		<i>n 0</i> <i>L 1 H</i> <i>L 2 H</i> <i>L 3 H</i> <i>L 4 H</i>	No L1h L2h L3h L4h	n0	
<i>F L O C</i>	63	Forced local reference		<i>n 0</i> <i>A 1 I</i> <i>L C C</i> <i>A 1 U 1</i>	No Terminal HMI Jog dial	n0	
<i>F L r</i>	92	Catch on the fly		<i>n 0</i> <i>Y E S</i>	No Yes	n0	
<i>F O n</i>	78	Starting frequency of the auxiliary pump	Hz	<i>0</i> à <i>£ F r</i>	–	HSP	
<i>F O F</i>	78	Auxiliary pump stopping frequency	Hz	<i>0</i> à <i>£ F r</i>	–	0 Hz	
<i>F r 1</i>	45 62	Reference channel 1		<i>A 1 I</i> <i>L C C</i> <i>M d b</i> <i>A 1 U 1</i>	Terminal HMI Modbus Jog dial	A1	
<i>F r H</i>	37	Speed reference		<i>A 1 I</i> <i>L C C</i> <i>M d b</i> <i>A 1 U</i>	Terminal HMI Modbus Jog dial		
<i>F r S</i>	57	Rated motor frequency	Hz	<i>10</i> to <i>400</i>	–	50 or 60 Hz (to bFr)	
<i>F S £</i>	66	Fast stop assignment		<i>n 0</i> <i>L 1 L</i> <i>L 2 L</i> <i>L 3 L</i> <i>L 4 L</i>	No L1L: L11 active low L2L: L12 active low L3L: L13 active low L4L: L14 active low	n0	
<i>F £ d</i>	55	Motor frequency threshold	Hz	<i>0</i> to <i>400</i>	–	50 or 60 Hz	
<i>F £ H</i>	42	Fan time display		<i>0. 0 1</i> to <i>999</i>	–	–	–
<i>F £ O</i>	54 77	Time delay before automatic start for the overload fault	min			0 min	
<i>F £ U</i>	55 78	Time delay before automatic start for the underload fault	min			0 min	
<i>H S P</i>	45 90	High speed	Hz	<i>L S P</i> to <i>£ F r</i>	–	50 or 60 Hz	
<i>H S P 2</i>	90	High speed 2	Hz	<i>L S P</i> to <i>£ F r</i>	–	50 or 60 Hz according to BFr, max TFr	
<i>H S P 3</i>	90	High speed 3	Hz	as <i>H S P 2</i>	as HS2	as <i>H S P 2</i>	

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Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
<i>HSP4</i>	90	High speed 4	Hz	as <i>HSP2</i>	as HS2	as <i>HSP2</i>	
<i>HSU</i>	41	Display of high speed value	–	–	–	–	–
<i>INH</i>	95	Detected fault inhibition assignment		<i>n0</i> <i>L1H</i> <i>L2H</i> <i>L3H</i> <i>L4H</i>	Non active L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high	n0	
<i>IPL</i>	94	Input Phase loss	–	<i>n0</i> <i>YES</i>	No Yes	YES	
<i>Ith</i>	94	Motor thermal current	A	<i>0.2</i> to <i>1.5</i>	–	according to drive rating	
<i>JOG</i>	68	Jog assignment		<i>n0</i> <i>L1H</i> <i>L2H</i> <i>L3H</i> <i>L4H</i>	No L1h: LI1 active high L2h: LI2 active high L3h: LI2 active high L4h: LI4 active high	n0	
<i>JPF</i>	70	Skip frequency	Hz	<i>0</i> to <i>400</i>	–	0 Hz	
<i>L C 2</i>	88	2 nd current limitation commutation		<i>n0</i> <i>L1H</i> <i>L2H</i> <i>L3H</i> <i>L4H</i> <i>L1L</i> <i>L2L</i> <i>L3L</i> <i>L4L</i>	No L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high L1L: LI1 active low L2L: LI2 active low L3L: LI3 active low L4L: LI4 active low	n0	
<i>L C r</i>	39	Motor current	A	–	–	–	–
<i>L F d</i>	79	Zero flow detection offset	Hz			0 Hz	
<i>L F F</i>	76 97	Fallback speed	Hz	<i>0</i> to <i>HSP</i>	–	0 Hz	
<i>L F L 1</i>	95	4-20 mA loss behavior		<i>n0</i> <i>YES</i>	No Yes	n0	
<i>L F r</i>	39 45 62	External reference value	–	<i>-400</i> to <i>400</i>	–	0	
<i>L I S 1</i>	41	State of logic inputs LI1 to LI4	–	–	–	–	–
<i>L O C</i>	54 77	Application Overload threshold	% of NCR	<i>70</i> to <i>150</i>	–	90 %	
<i>L O 1</i>	53	LO1 assignment		as <i>r 1</i>	as <i>r 1</i>	n0	
<i>L O 1 S</i>	53	LO1 status (output active level)		<i>POS</i> <i>NEG</i>	Positive Negative	POS	
<i>L O S 1</i>	41	State of the logic output LO1 and relay R1	–	–	–	–	–
<i>L P 1</i>	76	PI feedback supervision threshold				n0	
<i>L S P</i>	45 89	Low speed	Hz	<i>0</i> to <i>HSP</i>	–	0 Hz	

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Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
<i>LUL</i>	<u>55</u> <u>77</u>	Application Underload threshold	% of In	<i>20</i> to <i>100</i>	–	60 %	
<i>n d E</i>	<u>78</u>	Selecting the operating mode				nO	
<i>n P C</i>	<u>60</u>	Motor parameter choice	–	<i>n P r</i> <i>C O S</i>	nPr COS	nPr	
<i>n P I</i>	<u>76</u>	Maximum frequency detection hysteresis				YES	
<i>n t n</i>	<u>94</u>	Motor thermal state memo	–	<i>n O</i> <i>Y E S</i>	No Yes	nO	
<i>n C 1</i>	<u>99</u>	Com scanner write address value 1					
<i>n C 2</i>	<u>99</u>	Com scanner write address value 2					
<i>n C 3</i>	<u>99</u>	Com scanner write address value 3					
<i>n C 4</i>	<u>99</u>	Com scanner write address value 4					
<i>n C A 1</i>	<u>98</u>	Com scanner write address parameter 1				2135	
<i>n C A 2</i>	<u>98</u>	Com scanner write address parameter 2				219C	
<i>n C A 3</i>	<u>98</u>	Com scanner write address parameter 3				0	
<i>n C A 4</i>	<u>98</u>	Com scanner write address parameter 4					

Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
<i>nCr</i>	57	Rated motor current	A (1)	<i>0.25</i> to <i>1.5</i>	–	according to drive rating	
<i>nCU</i>	41	Drive Power rating					
<i>nFd</i>	79	Zero flow detection period				nO	
<i>nPI1</i>	99	Com scanner read address value 1					
<i>nPI2</i>	99	Com scanner read address value 2					
<i>nPI3</i>	99	Com scanner read address value 3					
<i>nPI4</i>	99	Com scanner read address value 4					
<i>nPA1</i>	98	Com scanner read address parameter 1	–			0C81	
<i>nPA2</i>	98	Com scanner read address parameter 2	–			219C	
<i>nPA3</i>	98	Com scanner read address parameter 3	–			0	
<i>nPA4</i>	98	Com scanner read address parameter 4	–			0	
<i>nPL</i>	51	Logic inputs type	–	<i>POS</i> <i>NEG</i>	Positive Negative	POS	
<i>nPr</i>	46 57	Rated Motor Power	kW or HP	–	–	according to drive rating	
<i>nrd</i>	59	Motor noise reduction		<i>nO</i> <i>YES</i>	No Yes	nO	
<i>nSP</i>	57	Rated motor speed	rpm	<i>0</i> to <i>32767</i>	–	according to drive rating	
<i>nSt</i>	66	Freewheel stop assignment		<i>nO</i> <i>L1L</i> <i>L2L</i> <i>L3L</i> <i>L4L</i>	No L1L: LI1 active low L2L: LI2 active low L3L: LI3 active low L4L: LI4 active low	nO	
<i>OLL</i>	94	Overload fault management	–	<i>nO</i> <i>YES</i>	No Yes	YES	
<i>OPL</i>	94	Output Phase loss	–	<i>nO</i> <i>YES</i>	No Yes	YES	
<i>OPr</i>	39	Output power	%	–	–	–	–
<i>PAU</i>	74	PID auto/manual assignment		<i>nO</i> <i>L1H</i> <i>L2H</i> <i>L3H</i> <i>L4H</i>	No L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high	nO	
<i>PEt</i>	42	Process elapsed time	0.01	–	–	–	–
<i>PFL</i>	59	Flux Profile	%	<i>0</i> to <i>100</i>		20%	
<i>PIC</i>	74	PID correction reverse	–	<i>nO</i> <i>YES</i>	No Yes	nO	

(1) In = nominal drive current

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Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
<i>P I F</i>	72	PID feedback assignment		<i>n 0</i> <i>A 1 1</i>	No Terminal	n0	
<i>P I I</i>	72	Activation internal PID reference		<i>n 0</i> <i>Y E 5</i>	No Yes	n0	
<i>P I n</i>	74	PID manual reference		<i>n 0</i> <i>A 1 1</i> <i>A 1 U</i>	No Terminal AIV	n0	
<i>P r 2</i>	72	2 preset PID assignment	–	<i>n 0</i> <i>L 1 H</i> <i>L 2 H</i> <i>L 3 H</i> <i>L 4 H</i>	No L1h L2h L3h L4h	n0	
<i>P r 4</i>	73	4 preset PID assignment		<i>P r 2</i>	as <i>P r 2</i>	n0	
<i>P r P</i>	73	PID reference ramp	s	<i>0</i> to <i>99.9</i>	–	0 s	
<i>P S 2</i>	70	2 Preset speeds		<i>n 0</i> <i>L 1 H</i> <i>L 2 H</i> <i>L 3 H</i> <i>L 4 H</i>	No L1h: LI1 active high L2h: LI2 active high L3h: LI2 active high L4h: LI4 active high	n0	
<i>P S 4</i>	70	4 Preset speeds		<i>P S 2</i>	as <i>P S 2</i>	n0	
<i>P S 8</i>	70	8 Preset speeds		<i>P S 2</i>	as <i>P S 2</i>	n0	
<i>P S t</i>	62	Stop key priority		<i>n 0</i> <i>Y E 5</i>	No Yes	YES	
<i>P t H</i>	42	Power On time display		<i>0.01</i> to <i>999</i>	–	–	–
<i>r 1</i>	52	R1 assignment	–	<i>n 0</i> <i>F L t</i> <i>r U n</i> <i>F t A</i> <i>F L A</i> <i>C t A</i> <i>S r A</i> <i>t S A</i> <i>U L A</i> <i>O L A</i> <i>A P 1</i>	Not assigned No detected error Drive run Frequency threshold reached HSP reached I threshold reached Frequency reference reached Motor thermal reached Underload alarm Overload alarm AI1 AI. 4-20	FLt	
<i>r d G</i>	72	PID derivative gain		<i>0.00</i> to <i>100.00</i>	–	0.00	
<i>r F r</i>	39	Output frequency	Hz	-	–	–	
<i>r I G</i>	72	PID integral gain		<i>0.01</i> to <i>100</i>	–	1	
<i>r I n</i>	62	Reverse inhibition		<i>n 0</i> <i>Y E 5</i>	No Yes	n0	
<i>r D F</i>	79	Ramp for auxiliary pump stopping	s			2 s	
<i>r D n</i>	78	Ramp for reaching the auxiliary pump nominal speed	s			2 s	

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Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
<i>r P2</i>	73	2 preset PID reference	%	<i>0</i> to <i>100</i>	–	25%	
<i>r P3</i>	73	3 preset PID reference	%	<i>0</i> to <i>100</i>	–	50%	
<i>r P4</i>	73	4 preset PID reference	%	<i>0</i> to <i>100</i>	–	75%	
<i>r PC</i>	39	PID reference	–	–	–	–	–
<i>r PE</i>	39	PID error	–	–	–	–	–
<i>r PF</i>	39	PID Feedback	–	–	–	–	–
<i>r PG</i>	72	PID proportional gain		<i>0.01</i> to <i>100</i>	–	1	
<i>r PH</i>	73	PID max value reference	% PID	<i>0</i> to <i>100</i>	–	100%	
<i>r P1</i>	73	Internal PID reference	% PID	<i>0</i> to <i>100</i>	–	0%	
<i>r PL</i>	73	PID min value reference	% PID	<i>0</i> to <i>100</i>	–	0%	
<i>r Pr</i>	96	Reset power run		<i>n0</i> <i>FtH</i>	Function inactive Reset fan time display	n0	
<i>r PS</i>	64	Ramp switching commutation		<i>n0</i> <i>L1H</i> <i>L2H</i> <i>L3H</i> <i>L4H</i> <i>L1L</i> <i>L2L</i> <i>L3L</i> <i>L4L</i>	No L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high L1L: LI1 active low L2L: LI2 active low L3L: LI3 active low L4L: LI4 active low	n0	
<i>r Pt</i>	64	Ramp shape assignment		<i>Lln</i> <i>S</i> <i>U</i>	Linear S shape U shape	Lln	
<i>r r5</i>	66	Reverse direction	–	<i>n0</i> <i>L1h</i> <i>L2H</i> <i>L3H</i> <i>L4H</i>	Function inactive L1h active high L2h active high L3h active high L4h active high	n0	
<i>r SF</i>	91	Detected fault reset assignment	–	<i>n0</i> <i>L1H</i> <i>L2H</i> <i>L3H</i> <i>L4H</i>	No L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high	n0	
<i>r SL</i>	75	PID wake up level	%	<i>0</i> to <i>100</i>	–	0%	
<i>r tH1</i>	42	Run elapsed time display	0.01h	<i>0.01</i> to <i>999</i>	–	–	–
<i>SCS</i>	46	Store customer parameter set	–	<i>n0</i> <i>Setr1</i>	No Yes	n0	
<i>SdC1</i>	67	Automatic DC injection current	A	<i>0</i> to <i>1.2</i>		0.7 A	
<i>SFr</i>	59	Switching frequency	kHz	<i>2</i> to <i>16</i>	–	4	
<i>SFS</i>	73	PID predictive speed	–	<i>n0</i> to <i>400</i>	–	n0	
<i>SFt</i>	59	Switching frequency type	–	<i>HF1</i> <i>HF2</i>	HF1 HF2	HF1	

Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
<i>SH2</i>	90	2 HSP assignment	–	<i>n0</i> <i>L1H</i> <i>L2H</i> <i>L3H</i> <i>L4H</i>	No L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high	nO	
<i>SH4</i>	90	4 HSP assignment	–	as <i>SH2</i>	as <i>SH2</i>	nO	
<i>SLE</i>	75	Sleep Threshold Offset	Hz			1 Hz	
<i>SLL</i>	96	Modbus fault management		<i>n0</i> <i>YES</i>	No Yes	YES	
<i>SLP</i>	58	Slip compensation	% of nSL	<i>0</i> to <i>150</i>	–	100%	
<i>SP2</i>	70	Preset speed 2	–	–	–	–	–
<i>SP3</i>	70	Preset speed 3	–	–	–	–	–
<i>SP4</i>	70	Preset speed 4	–	–	–	–	–
<i>SP5</i>	70	Preset speed 5	Hz	<i>0</i> to <i>400</i>	–	25 Hz	
<i>SP6</i>	70	Preset speed 6	Hz	<i>0</i> to <i>400</i>	–	30 Hz	
<i>SP7</i>	70	Preset speed 7	Hz	<i>0</i> to <i>400</i>	–	35 Hz	
<i>SP8</i>	70	Preset speed 8	Hz	<i>0</i> to <i>400</i>	–	40 Hz	
<i>SPn</i>	41	Specific Product Number	–	–	–	–	–
<i>STR</i>	58	Frequency loop stability	%	<i>0</i> to <i>100</i>	–	20%	
<i>STAT</i>	40	Product status	–	–	–	–	–
<i>STn</i>	95	Undervoltage ramp deceleration time	s	<i>0.0</i> to <i>10.0</i>	–	1.0 s	
<i>STP</i>	95	Undervoltage prevention	–	<i>n0</i> <i>rNP</i>	No Ramp stop	nO	
<i>STrt</i>	95	IGBT test		<i>n0</i> <i>YES</i>	No Yes	nO	
<i>Stt</i>	66	Type of stop		<i>rNP</i> <i>FSt</i> <i>nSt</i>	Ramp stop Fast stop Freewheel	rMP	
<i>TAr</i>	91	Max. automatic restart time		<i>5</i> <i>10</i> <i>30</i> <i>1H</i> <i>2H</i> <i>3H</i> <i>Ct</i>	5 min 10 min 30 min 1 h 2 h 3 h Infinite	5 min	
<i>Tbr</i>	98	Modbus baud rate		<i>4.8</i> <i>9.6</i> <i>19.2</i> <i>38.4</i>	4.8 kbps 9.6 kbps 19.2 kbps 38.4 kbps	19.2 kbps	
<i>TCC</i>	48	Type of control	–	<i>2C</i> <i>3C</i>	2 wire control 3 wire control	2C	
<i>Tct</i>	51	2 wire type control	–	<i>LEL</i> <i>trn</i> <i>PFO</i>	Level Transition Priority FW	trn	

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Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
<i>t d C I</i>	67	Automatic DC injection time	s	<i>0. 1</i> to <i>30</i>		0.5 s	
<i>t F D</i>	98	Modbus format	–	<i>8 0 1</i> <i>8 E 1</i> <i>8 n 1</i> <i>8 n 2</i>	8o1 8E1 8n1 8n2	8E1	
<i>t F r</i>	57	Maximum frequency	Hz	<i>10</i> to <i>400</i>		60 or 72 Hz (to bFr)	
<i>t H d</i>	39	Drive thermal state	–	–	–	–	–
<i>t H r</i>	39	Motor thermal state	%	–	–	–	–
<i>t H t</i>	94	Motor protection type	–	<i>A C L</i> <i>F C L</i>	Self-ventilated Moto-ventilated	ACL	
<i>t L S</i>	74 89	Low speed operating time	s	<i>0. 1</i> to <i>999. 9</i>	–	nO	
<i>t O F</i>	79	Time delay before the auxiliary pump stop command	s			2 s	
<i>t O L</i>	54 77	Application Overload time delay	s	<i>0</i> to <i>100</i>	–	5 s	
<i>t O n</i>	78	Time delay before starting the auxiliary pump	s			2 s	
<i>t P I</i>	76	PI feedback supervision function time delay	s			0 s	
<i>t t d</i>	55	Motor thermal state threshold	% of tHr	<i>0</i> to <i>118</i>		100%	
<i>t t O</i>	98	Modbus time out	–	<i>0. 1</i> to <i>30</i>	–	10	
<i>t U n</i>	60	Auto-tuning	–	<i>n O</i> <i>Y E S</i> <i>d O n E</i>	No Yes Done	nO	
<i>U F r</i>	58	IR compensation (law U/F)	%	<i>25</i> to <i>200</i>	–	100%	
<i>U L n</i>	39	Main voltage	V	–	–	–	–
<i>U L t</i>	55 77	Application underload time delay	s	<i>0</i> to <i>100</i>	–	5 s	
<i>U n S</i>	57	Rated motor voltage	V	<i>100</i> to <i>480</i>	–	230 V	
<i>U P P</i>	75	Wake-up threshold	%	<i>0</i> to <i>100</i>	–	0	
<i>U S b</i>	95	Undervoltage fault management	–	<i>0</i> <i>1</i>	Detected fault + R1 open Detected fault + R1 closed	0	
<i>U C A L</i>	41	Drive voltage rating	–	–	–	–	–

