ATV303

Variable speed drives for asynchronous motors

User manual

01/2011

380 V...460 V three-phase, power rating 0.37 kW to 11 kW

S1B39938

Schneider Electric

Contents

Important information

NOTICE

Read these instructions carefully, and 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 injury hazards that exist at this point. 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.

CAUTION

CAUTION, 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 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.

Before you begin

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

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Read and understand this manual before installing or operating the ATV303 starter. Installation, adjustment, repair, and maintenance of this starter must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this drive, including the printed circuit boards, operate at the line voltage (380V). DO NOT TOUCH. Use only electrically insulated tools.
- DO NOT touch unshielded components or terminal strip screw connections with voltage present.
- DO NOT short across terminals PA/+ and PB.
- Before servicing the drive:
  - Disconnect all power, including external control power that may be present.
  - Place a "DO NOT TURN ON" label on all power disconnects.
  - Lock all power disconnects in the open position.
  - WAIT 15 MINUTES to allow the DC bus capacitors to discharge. The drive LEDs are not indicators of the absence of DC bus voltage.
- Close cover before turning on the power.

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 ATV303 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.

⚠ CAUTION

RISK OF DAMAGE TO THE DRIVE

The drive should be cleaned and maintained on a regular basis when operating in high temperature, humid, greasy, chemical, dusty or vibrating environments to prevent reduced driver lifespan and equipment damage.

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

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must
  - consider the potential failure modes of control paths and, for certain 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 and overtravel stop.

- 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 (a).

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

a. For 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 309 (page 49) to 03.

CAUTION

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.

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 ATV303 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 7).

3. Mount the drive

- ☐ Mount the drive in accordance with the instructions in this document (page 11).
- ☐ Install any options required.

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

4. Wire the drive (page 12)

- ☐ 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 23)

- ☐ 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

Prior to 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.

Prior to configuring the drive

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Read and understand this manual before installing or operating the ATV303 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 a different rating to the drive. In case of smaller motors, there is no specific calculation. The estimated motor current has to be set at Motor thermal current 6 0 4.0 parameter (page 81). In case of large motors (with up to 2 times the capacity of the drive), e.g., using a 4 kW motor in conjunction with a 2.2 kW drive, motor current and actual motor power must not exceed the rated current and power of the drive.

Line contactor

CAUTION

RISK OF DAMAGE TO THE DRIVE

- Avoid frequent operation of the contactor 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 6 0 5 (page 81) is active (6 0 5 = 0 1). To check the drive in a test or maintenance environment without having to switch to a motor with the same rating as the drive (particularly useful in the case of high power drives), deactivate Output Phase loss 6 0 5 (6 0 5 = 0 0).
- In Motor control menu 3 0 0 - set Motor control type 3 0 9 (page 49) to 0 3.

CAUTION

RISK OF DAMAGE TO THE MOTOR

Motor thermal protection will not be provided by the drive if the nominal motor 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

Three-phase supply voltage: 380V...460V 50/60 Hz

For three Phase Output 380V...460V motors

Motor	Line supply (input)				Drive (output)			Reference	Size
Power indicated on plate (1)	Maximum line current (2)		Apparent power	Power dissipated at nominal current	Nominal Current In	Max. transient current for			
	at 380 V	at 460 V				60 s	2 s		
kW	A	A	kVA	W	A	A	A		
0.37	2.1	1.8	1.4	19.6	1.5	2.3	3.0	ATV303H037N4	Size 1
0.75	3.5	3.1	2.5	28.8	2.3	3.5	4.6	ATV303H075N4	Size 1
1.5	6.5	5.4	4.3	51.0	4.1	6.2	8.2	ATV303HU15N4	Size 2
2.2	8.8	7.2	5.7	65.5	5.5	8.3	11.0	ATV303HU22N4	Size 2
3	11.1	9.2	7.3	80.2	7.1	10.7	14.2	ATV303HU30N4	Size 3
4	13.7	11.4	9.1	102.7	9.5	14.3	19.0	ATV303HU40N4	Size 3
5.5	21.3	14.3	11.4	141.5	12.6	18.9	25.2	ATV303HU55N4	Size 3
7.5	26.6	22.4	17.8	203.9	17	25.5	34.0	ATV303HU75N4	Size 4
11	36.1	30.4	24.2	294.7	24	36.0	48.0	ATV303HD11N4	Size 4

(1) These power ratings are for a Switching frequency range of 4 kHz, in continuous operation. The Switching frequency range is adjustable from 2 to 12 kHz.
Above 4 kHz, the drive will reduce the Switching frequency range if an excessive temperature rise occurs. 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

(2) Line current network requirements:
* ⩽ 4kW, network short circuit current Isc ⩽ 5kA
* > 4kW, network short circuit current Isc ⩽ 22kA

⚠ WARNING

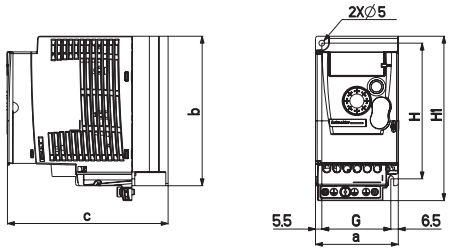
RISK OF DRIVE DESTRUCTION

The drive will be damaged if it operates above the nominal current (In) for an extended period of time.
Operating time should not exceed 60 s at 1.5 x In, or 2 s at 2 x In.

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

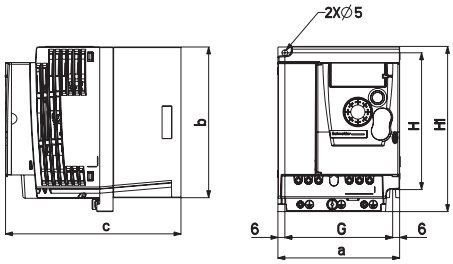
Dimensions and weights

ATV303H037N4, ATV303H075N4



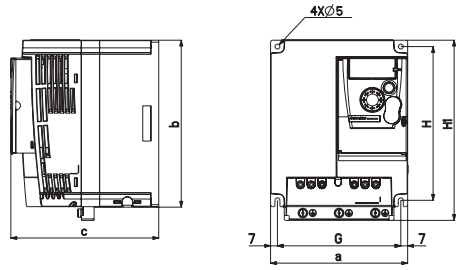
ATV303H	a mm (in.)	b mm (in.)	c mm (in.)	G mm (in.)	H mm (in.)	H1 mm (in.)	Ø mm (in.)	For screws	Weight kg (lb)
037N4	72 (2.83)	130 (5.12)	130 (5.12)	60 (2.36)	118 (4.65)	143 (5.63)	5 (0.20)	M4	0.8 (1.8)
075N4	72 (2.83)	130 (5.12)	140 (5.51)	60 (2.36)	118 (4.65)	143 (5.63)	5 (0.20)	M4	0.8 (1.8)

ATV303HU15N4, ATV303HU22N4



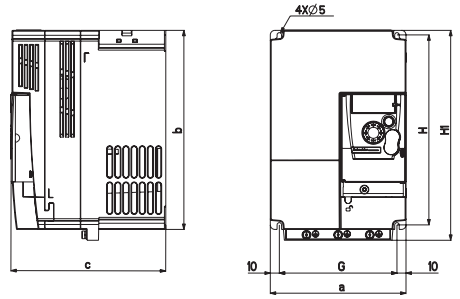
ATV303H	a mm (in.)	b mm (in.)	c mm (in.)	G mm (in.)	H mm (in.)	H1 mm (in.)	Ø mm (in.)	For screws	Weight kg (lb)
U15N4	105 (4.13)	130 (5.12)	151 (5.94)	93 (3.66)	118 (4.65)	143 (5.63)	5 (0.20)	M4	1.1 (2.43)
U22N4	105 (4.13)	130 (5.12)	151 (5.94)	93 (3.66)	118 (4.65)	143 (5.63)	5 (0.20)	M4	1.1 (2.43)

ATV303HU30N4, ATV303HU40N4, ATV303HU55N4



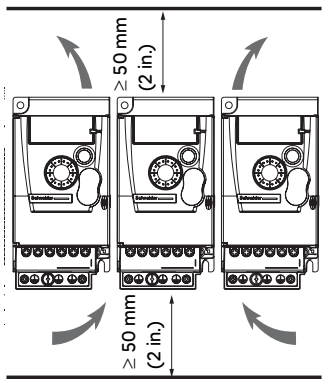
ATV303H	a mm (in.)	b mm (in.)	c mm (in.)	G mm (in.)	H mm (in.)	H1 mm (in.)	Ø mm (in.)	For screws	Weight kg (lb)
U30N4	140 (5.51)	171 (6.73)	151 (5.94)	126 (4.96)	157 (6.18)	184 (7.24)	5 (0.20)	M4	1.8 (3.97)
U40N4	140 (5.51)	171 (6.73)	151 (5.94)	126 (4.96)	157 (6.18)	184 (7.24)	5 (0.20)	M4	1.8 (3.97)
U55N4	140 (5.51)	171 (6.73)	151 (5.94)	126 (4.96)	157 (6.18)	184 (7.24)	5 (0.20)	M4	1.8 (3.97)

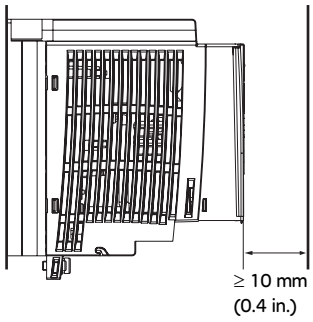
ATV303HU75N4, ATV303HD11N4



ATV303H	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)
U75N4	150 (5.91)	220 (8.66)	171 (6.73)	130 (5.12)	210 (8.27)	232 (9.13)	5 (0.20)	M4	3.7 (8.16)
D11N4	150 (5.91)	220 (8.66)	171 (6.73)	130 (5.12)	210 (8.27)	232 (9.13)	5 (0.20)	M4	3.7 (8.16)

Mounting





Install the drive vertically, at ±10°.
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 drive.

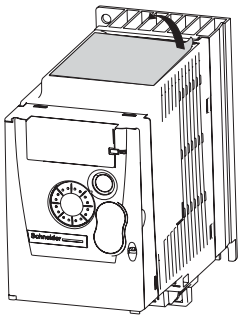
Free space in front of unit: 10 mm (0.4 in.) minimum.

When IP20 protection is adequate, we recommend that the vent cover(s) on the top of the drive be removed, as shown below.

We recommend that the drive is installed on a dissipative surface.

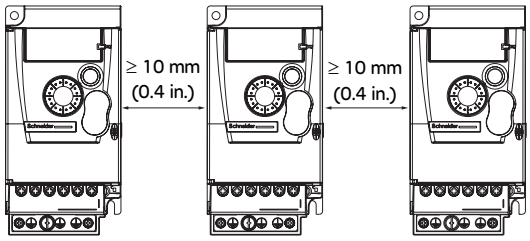
Drive installation should employ fastening washers and screws in combination.

Removing the vent cover



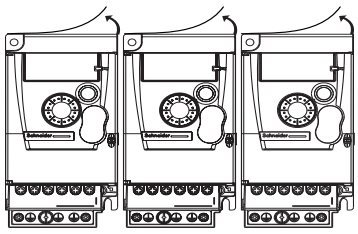
Mounting types

Type A mounting



Free space ⩾ 10 mm (0.4 in.) on each side, with vent cover fitted. Mounting type A is suitable for drive operation at surrounding air temperatures less than or equal to 55°C.
When temperature exceeds 55°C, the top vent cover should be removed to ensure cooling.

Type B mounting



Drives mounted side-by-side with vent covers removed. Mounting type B is suitable for drive operation at surrounding air temperatures less than or equal to 55°C.

With these types of mounting, drives with a Switching frequency range of 4 kHz can be used up to an ambient temperature of 55°C.

At ambient temperatures between +55°C and +65°C:
- Remove top safeguard covers on drives
- Derate current by 1.5% for every 1°C of temperature rise
- Switching frequency range will adjust according to the internal temperature of the drive

Recommendations

Keep power cables separate from devices containing 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

Adhere to wire size recommendations contained in local codes and standards.
Before wiring power terminals, connect the ground terminal to the grounding screws located below the output terminals.
The drive must be grounded in accordance with the applicable safety standards.
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 single-phase drives and type B for 3-phase drives. Choose a suitable model incorporating:

- High frequency 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 30mA devices.

In this case, choose devices with high interference immunity, such as RCDs with SI type leakage protection.
If the installation includes several drives, provide one "residual current device" per drive.

Control

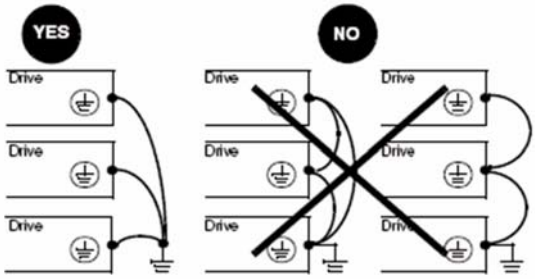
For control and speed reference circuits, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm (1 and 2 in.). Connect the shielding to ground.

Length of motor cables

Please use output filters for shielded motor cable lengths longer than 25 m (82 ft) and unshielded cables longer than 50 m (164 ft). For accessory part numbers, please refer to the catalogue.

Equipment Grounding

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



- 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.
- Do not connect the drive to a power feeder whose short-circuit capacity exceeds the drive short-circuit current rating, ⩽ 4kW, 5kA, > 4kW, 22kA.

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

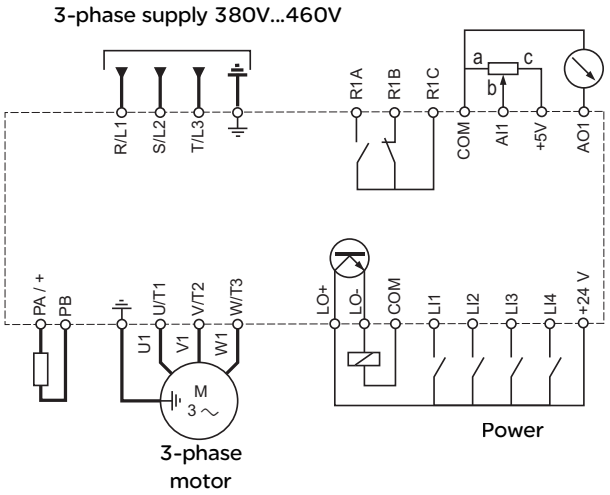
⚠ DANGER

HAZARD OF FIRE OR ELECTRIC SHOCK

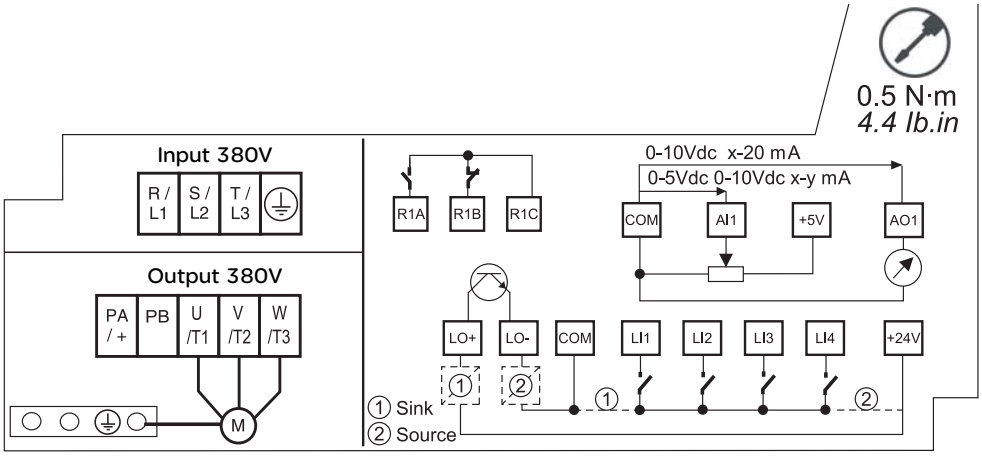
- To avoid overheating and loose wiring, wiring must meet the wire size and tightening torque requirements provided in this manual.
- DO NOT connect multiple wires to the mains without first clamping them together in a ring terminal.
- For drives ⩽ 4kW, the length of stripped wire of wires connecting motors and drives and connecting to brake resistors should not exceed 10 mm (0.4 in.).
- Pull the connected wires outward to insure they are connected securely.

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

General wiring diagram



Wiring label

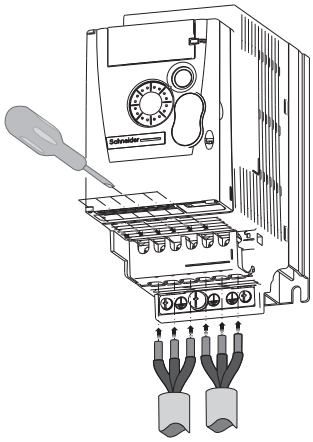


Power terminals

The incoming line power terminals and output terminals to the motor are located 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

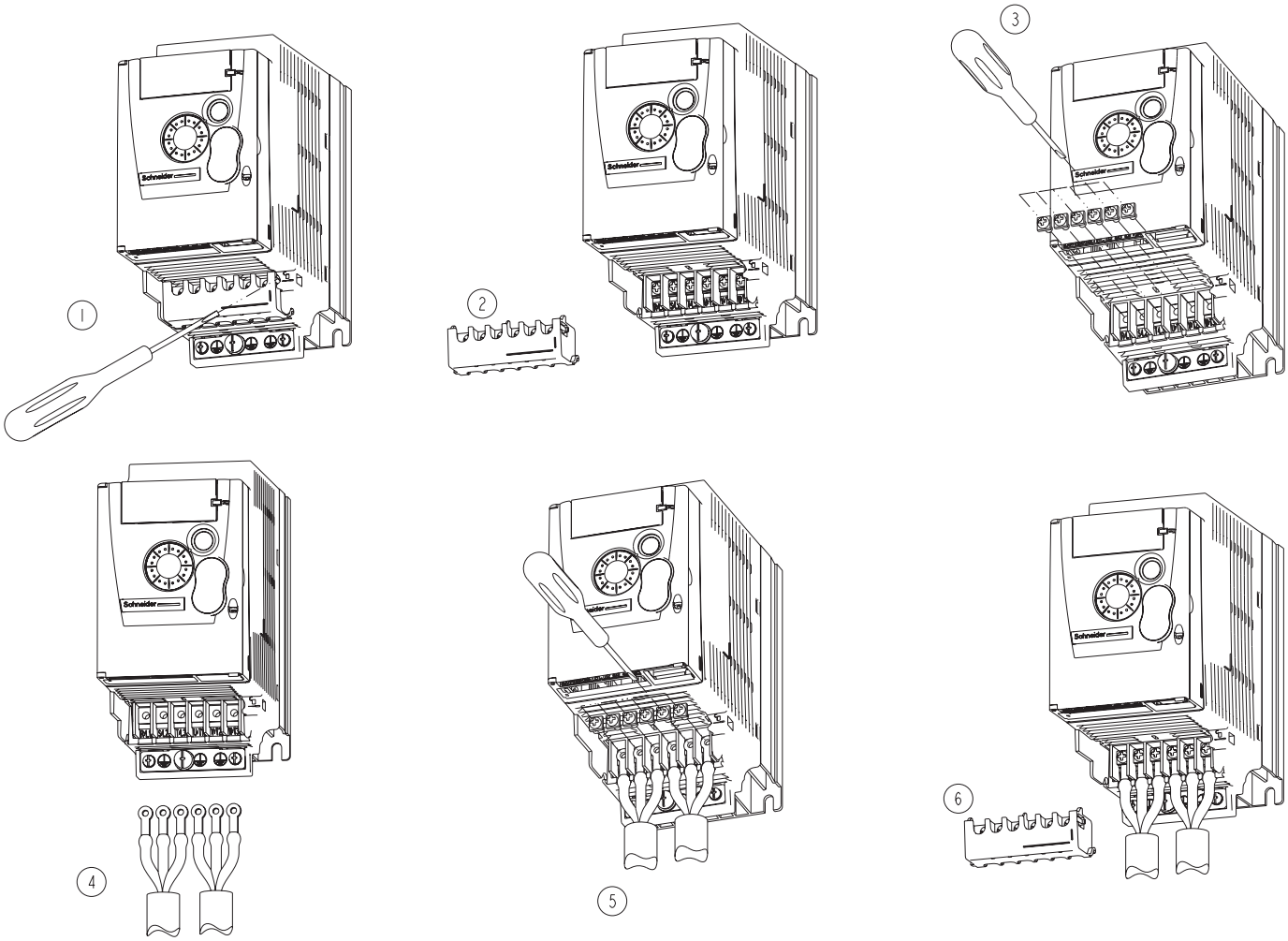
RISK OF BODY INJURY

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

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

Power terminals

Access to the terminals if you use ring terminals

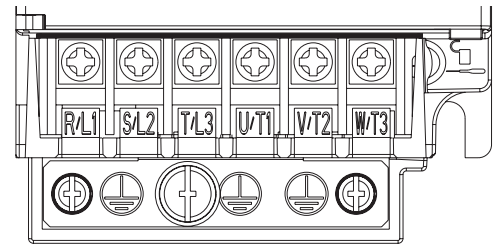


Characteristics and functions of power terminals

Terminal	Function	For ATV303
⏚	Ground terminal	All ratings
R/L1 - S/L2 - T/L3	Power input terminal	All ratings
PA/+	Brake resistor terminal (DC Bus + output)	ATV303HU15N4...ATV303HD11N4
PB	Brake resistor terminal	ATV303HU15N4...ATV303HD11N4
U/T1 - V/T2 - W/T3	Motor wiring terminal	All ratings

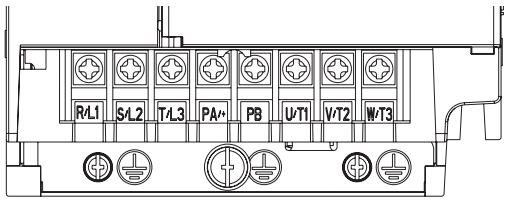
Power terminals

Arrangement of the power terminals



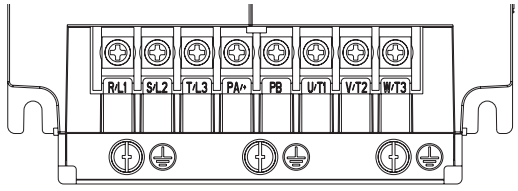
R/L1	S/L2	T/L3	U/T1	V/T2	W/T3

ATV303H	Applicable wire size (1) mm^2	Recommended wire size (2) mm^2	Tightening torque (3) N·m (lb.in)
037N4 075N4	**1.5**~2.5	2.5	0.8~1 (7.1 to 8.9)



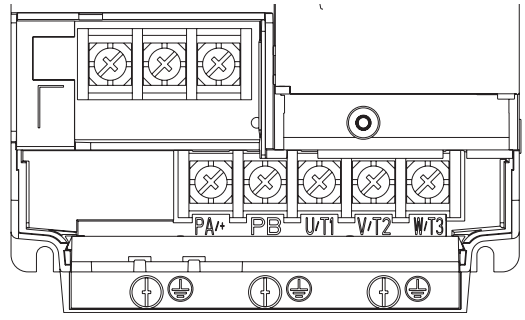
R/L1	S/L2	T/L3	PA/+	PB	U/T1	V/T2	W/T3

ATV303H	Applicable wire size (1) mm^2	Recommended wire size (2) mm^2	Tightening torque (3) N·m (lb.in)
U15N4 U22N4	**1.5**~2.5	2.5	0.8~1 (7.1 to 8.9)



R/L1	S/L2	T/L3	PA/+	PB	U/T1	V/T2	W/T3

ATV303H	Applicable wire size (1) mm^2	Recommended wire size (2) mm^2	Tightening torque (3) N·m (lb.in)
U30N4 U40N4 U55N4	**1.5**~4 **2.5**~4 4	2.5 4 4	1.2~1.4 (10.6 to 12.4)



R/L1	S/L2	T/L3					
			PA/+	PB	U/T1	V/T2	W/T3

ATV303H	Applicable wire size (1) mm^2	Recommended wire size (2) mm^2	Tightening torque (3) N·m (lb.in)
U75N4 D11N4	**6**~10 10	10 10	2.2~2.4 (19.5 to 21.2)

(1) The value in bold corresponds to the minimum wire gauge to permit secureness.
(2) 70°C copper cable (minimum wire size for rated use).
(3) Recommended to maximum value.

Recommended screwdriver(s)

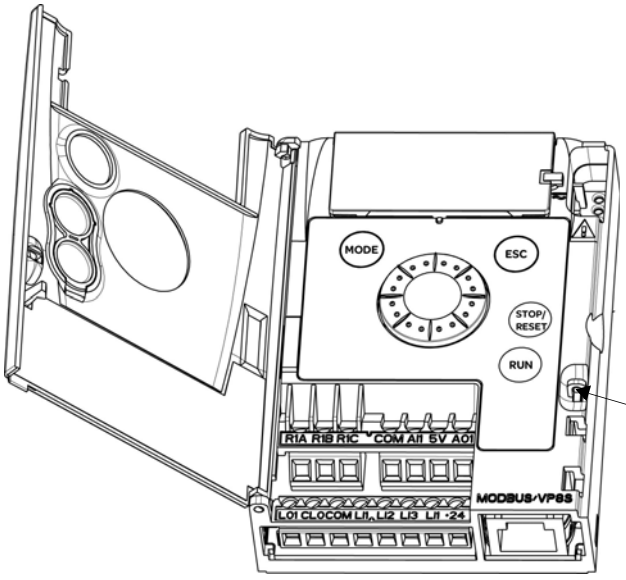
For ⩽ 5.5kW drive terminal wiring, a Phillips-head screwdriver PH1 (Φ4.5) is recommended.
For 7.5kW and 11kW terminal wiring, a Phillips-head screwdriver PH2 (Φ6) is recommended.

Control terminals

Keep the control circuits away from the power cables. For control and speed reference circuits, we recommend using shielded twisted cables with a pitch of between 25 and 50mm (1 and 2 in.). Connect the shield to ground as outlined on page 25.

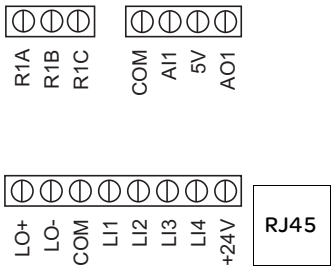
Access to the control terminals

To access the control terminals, open the cover.
Note: For information regarding HMI button functions, see "HMI description" on page 25.



It is possible to lock the cover with a lead seal.

Arrangement of 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	+5V 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 V supply provided by the drive
RJ45	Modbus network or remote display panel interface.

ATV303 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.

Recommended screwdriver(s)

Control terminal wiring requires a Phillips-head screwdriver PH0 (Φ3).

Characteristics and functions of the control terminals

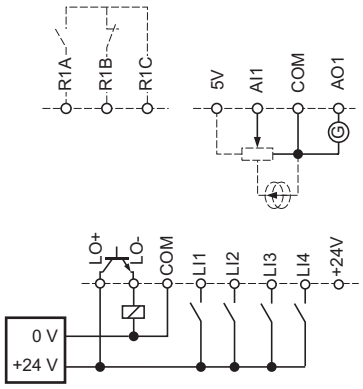
Terminal	Function	Electrical characteristics
R1A	NO contact of the relay	Minimum switching capacity: • 5mA for 24 V ⎓ Maximum switching capacity: • on inductive load (cos φ = 0.4 and L/R = 7 ms): 2A for 250V ∿ and 30V ⎓ • on resistive load (cos φ = 1 and L/R = 0): 3A for 250V ∿, 4A for 30V ⎓ • response time: 30ms 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: ± 1% at 25°C (77°F) • linearity: ± 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 kΩ Analog current input x to y mA, impedance: 250 Ω
5V	Power supply for reference potentiometer	• precision: ± 5% • maximum current: 10 mA
AO1	Voltage or current analog output	• resolution: 8 bits • precision: ± 1% at 25°C (77°F) • linearity: ± 0.3% (of full scale) • sampling time: 4 ms (max. 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 kΩ, maximum 10 mA (100 mA in open collector) • linearity: ± 1% • sampling time: 20 ms ± 1 ms.
LO-	Common of the logic output (emitter)	
LI1 LI2 LI3 LI4	Logic inputs	Programmable logic inputs • +24 V power supply (maximum 30 V) • impedance: 3.5 kΩ • 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 V supply provided by the drive	+24 V -15% +20% protected against short-circuits and overloads. Maximum customer current available: 100 mA

Control connection diagrams

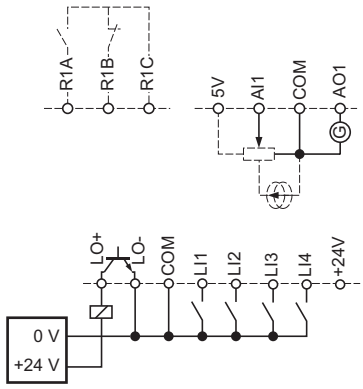
Logic inputs type 203 parameter (page 44) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- Set the parameter to 00 for Source operation.
- Set the parameter to 01 for Sink operation.

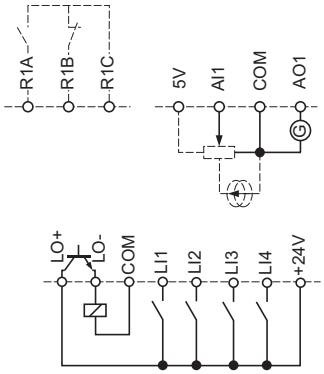
Source - using external supply



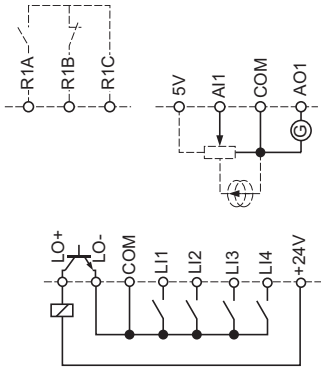
Sink - using external supply



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.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Do not used a PLC to command the logic input of the drive in sink mode.
- If this behaviour is required, contact Schneider Office for additional information.

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

Electromagnetic compatibility (EMC)

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. See Wiring recommendations on page 12.

Precautionary principles

- 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. The 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 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, 100 V 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, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm (0.98 and 1.97 in.).
- Ensure maximum separation between the power supply cable (line supply) and the motor cable.
- 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 then via the filter output cable.

⚠ ⚠ 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.

Check list

Read carefully the safety information in the user manual and the catalogue. 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

- For drive mounting types and recommendations on the ambient temperature, please refer to the instructions regarding Mounting and temperature conditions on page 11.
- Mount the drive vertically as specified. See instructions regarding Mounting and temperature conditions on page 11.
- 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 catalogue.
- Mount options required for your application. Please refer to catalogue.

2. Electrical installation

- Connect the drive to the ground. See Equipment grounding on page 12.
- Ensure that the input power voltage corresponds to the drive nominal voltage and connect the line supply as shown in the General wiring diagram on page 14.
- Wire the control terminals as required. See Control terminals on page 18. Separate the power cable and the control cable according to EMC compatibility rules on page 21.
- 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 3 0 1 (as shown on page 38) at the first power-up. Check that the frequency defined by 3 0 1 (the factory setting is 50 Hz) is in accordance with the frequency of the motor. See First power-up on page 27. For subsequent power-ups, you will see - - 0 0 on the HMI.
- MyMenu (upper part of CONF mode) allows you to configure the drive for most applications (see page 38).
- Factory / recall customer parameter set 1 0 2 function (page 39) allows you to reset the drive to factory settings at any time.

Factory configuration

Drive factory settings

The ATV303 is factory-set for the most common operating conditions (motor rating according to drive rating):

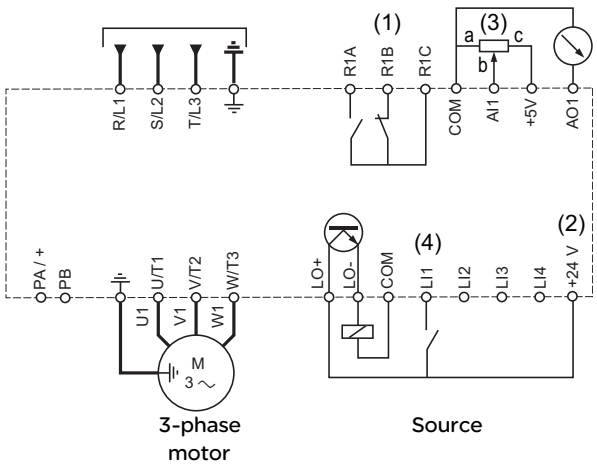
- Display: drive ready (- - 00) with motor stopped or motor frequency reference while running
- Automatic adaptation of the deceleration ramp in the event of overvoltage on braking
- No automatic restarting after a detected fault is cleared
- Logic inputs:
  - LI1: forward (2-wire transitional control)
  - LI2, LI3, LI4: no assignment
- Logic output: LO1: no assignment
- Analog input: AI1 (0 to + 5 V) speed reference
- Relay R1: fault as default setting. R1A opens and R1B closes when a fault is detected or no line voltage is present.
- Analog output AO1: no assignment

Code	Description	Value	Page
30 1	Standard motor frequency	50 Hz	49
304	Rated motor voltage	380V	49
501.0	Acceleration	3 s	57
501.1	Deceleration	3 s	57
512.0	Low speed	0 Hz	38 75
512.2	High speed	50 Hz	77
309	Motor control type	Standard U/F law	49
310	IR compensation	100%	50
604.0	Motor thermal current	equal to nominal motor current (value determined by drive rating)	81
504.1	Automatic DC injection current	0.7 x rated drive current, for 0.5 seconds.	60
315	Switching frequency	4 kHz	51

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

Drive factory wiring diagram

ATV312●●●●N4



(1) R1 relay contacts, for remote indication of the drive status.
(2) Internal + 24 V ⎓. If an external source is used (+ 30 V ⎓ maximum), connect the 0 V of the source to the COM terminal, and do not use the + 24 V ⎓ terminal on the drive.
(3) Reference potentiometer SZ1RV1202 (2.2 kΩ) or similar (10 kΩ maximum).
(4) Forward.

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 when "automatic restart" function is enabled, fault detection menu 600 -, Automatic restart 602.0 parameter (page 78) set to 0 1.
- via a logic input when this input is assigned to the "drive reset" function, fault detection menu 600 - menu, Detected fault reset assignment 601 (page 78) set to L●H.
- by using the "run" key on the drive to reset section fault. See Reset all previous detected faults via Run key 614 parameter (page 83).

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. Other ratings do contain a built-in cooling fan. There are two cooling fan run modes: in the first, the fan runs when drive is running; in the second, the fan runs when the drive thermal state requires ventilation. The fan runs only runs when the drive thermal state requires ventilation.

Motor thermal detection

Function:

Thermal detection by calculating the I^2t.

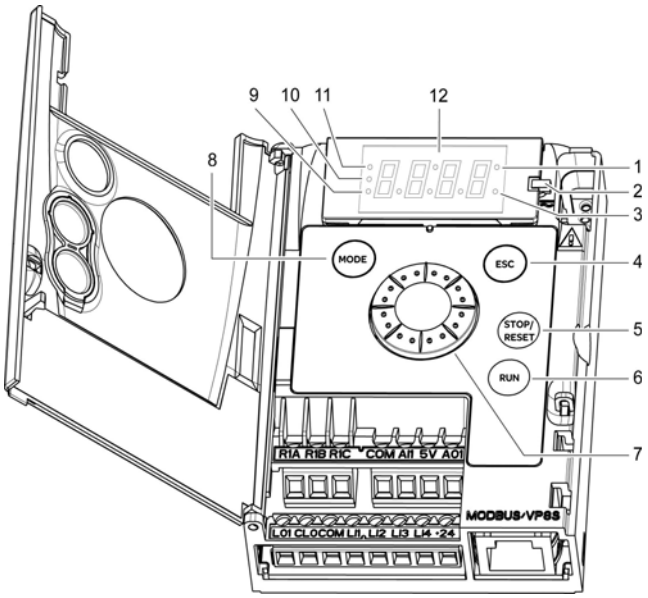
Note: The motor thermal state memo returns to zero when the drive power is cycled if Motor thermal state memo 604.3 parameter (page 81) is not set to 0 1.

CAUTION
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 memo • Running multiple motors • Running motors rated at less than 20% of the rated drive current • Using motor switching **Failure to follow these instructions can result in equipment damage.**

CAUTION
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.
5. STOP/RESET button: stops the motor (could be hidden by door if function disabled). **Important: See instructions for "RUN/ STOP" cover removal.**
6. RUN button: Controls motor run forward if the function is configured (can be hidden by door if function disabled).
7. Jog Dial
   - Acts as a potentiometer in local mode
   - For navigation when turned clockwise or counterclockwise
   - And selection / validation when pushed
   This action is represented by the symbol on the right.

8. MODE button
   Switches between the control/programming modes. 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. Four "7-segment" displays

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

⚠ CAUTION

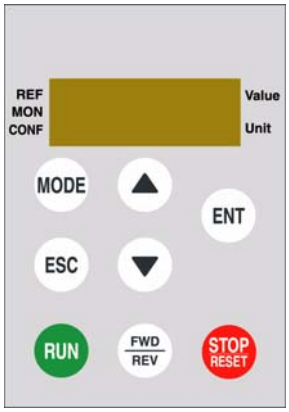
LOSS OF CONTROL

The stop buttons on ATV303 drive and on the remote keypad display can be programmed to not have priority. To retain stop key priority, set Stop key priority 405 parameter (page 55) to 01. Do not set 405 parameter to 00 unless exterior stopping method(s) exist.

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

Remote control

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



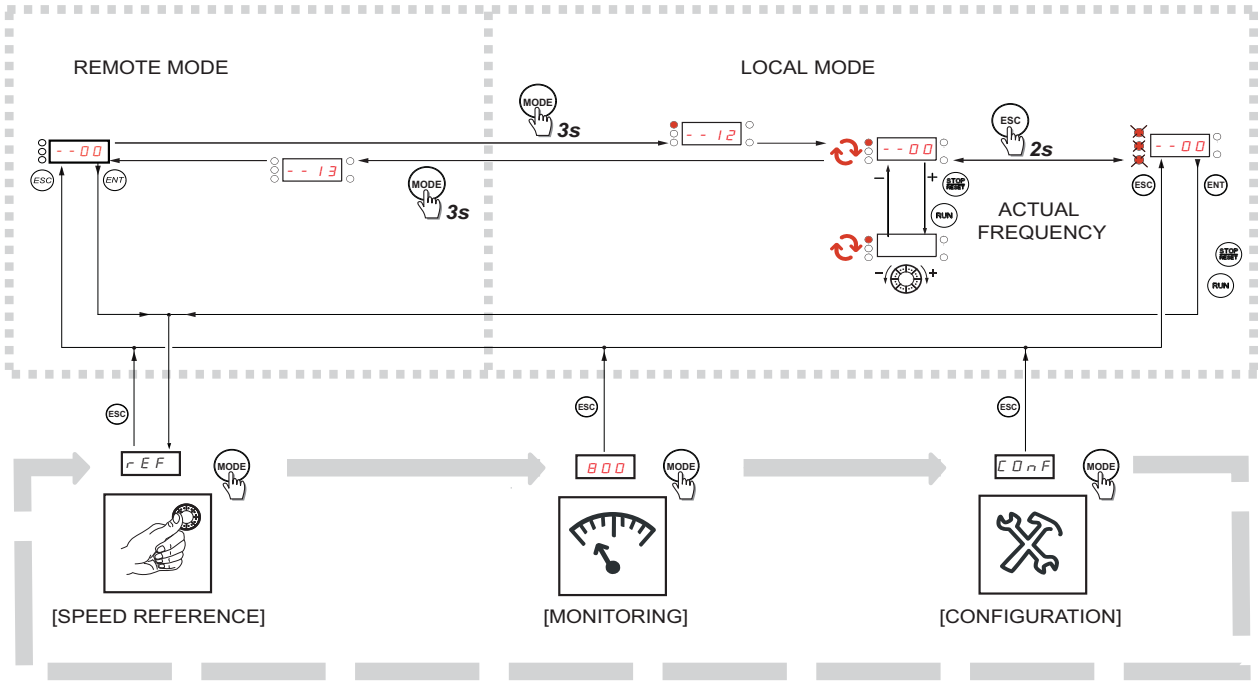
Important: When connected, the remote control shows an exact copy of the drive display. It is fully interoperable with the embedded keypad.

First power-up

At first power-up you are prompted to set Standard motor frequency 3 0 1 (page 49). Next time power is applied - - 0 0 appears. Operating mode selection is then possible using the MODE or JOG key as detailed below.

Menus structure

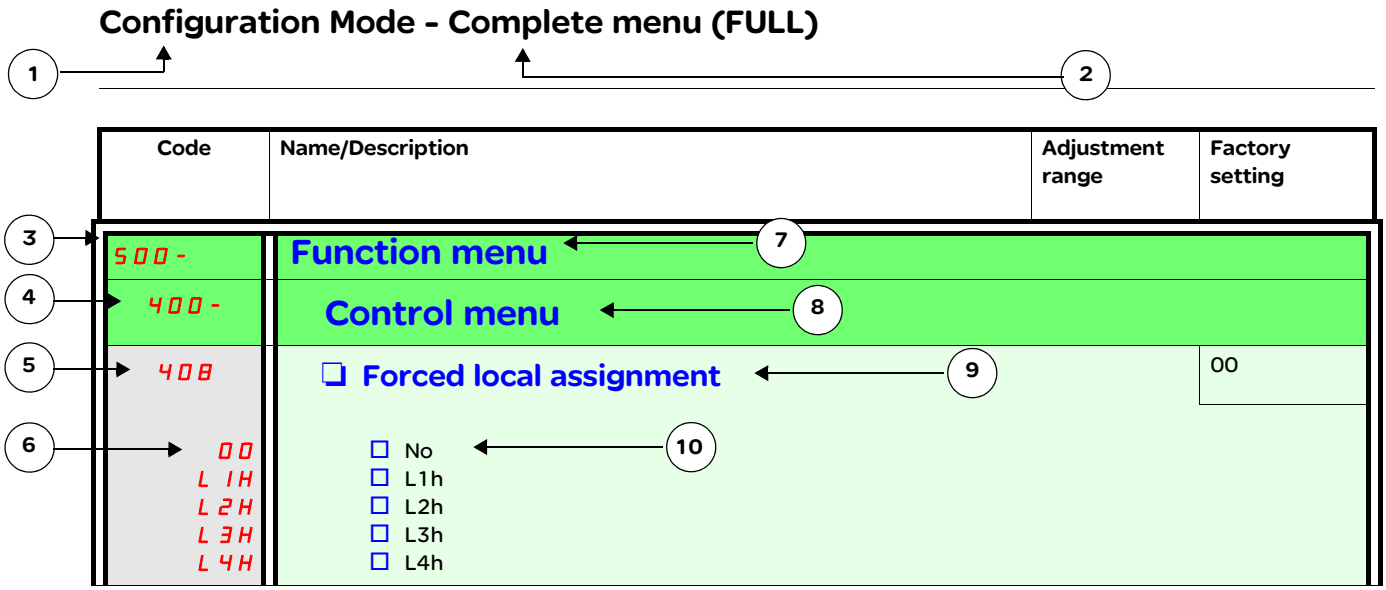
Access to menus and parameters is possible through the Reference (r E F) mode (page 32), Monitoring (8 0 0 -) mode (page 32) and Configuration (C 0 n F) mode (page 37). Switching between these modes is possible at any time using the MODE key or Jog Dial on the keyboard. The first MODE key depression moves from current position to the top of the branch. A second depression switches to next mode.



Structure of parameter tables

The mode, sectional, menu, sub-menu and parameter table structure is laid out below.
Note: Parameters containing the sign ( ) in the code column can be modified with the drive running or stopped.

Example:



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

Function compatibility table

	Preset speed (page 64)	PI regulator (page 66)	Jog operation (page 61)	Auto DC injection (page 60)	Catch on the fly (page 79)	Fast stop (page 59)	Freewheel (page 59)
Preset speed (page 64)			↑				
PI regulator (page 66)			●				
Jog operation (page 61)	←	●		←			
Auto DC injection (page 60)			↑				↑
Catch on the fly (page 79)							←
Fast stop (page 59)							↑
Freewheel (page 59)				←	↑	←	

● Incompatible functions

Compatible functions

Not applicable

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

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

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

Reference Mode rEF

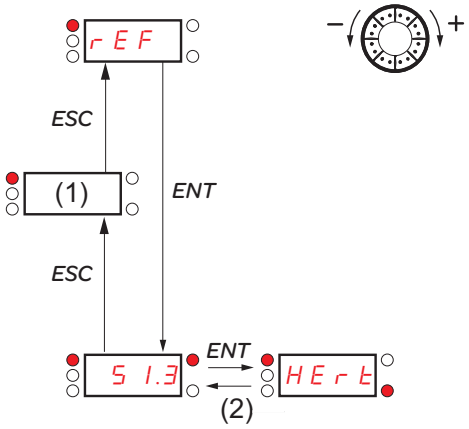
Use the reference mode to monitor and if local control is enabled (Reference channel 1 401 page 55 = 183), adjust the actual reference value by rotating the jog dial.
When local control is enabled, the jog dial of the HMI acts as a potentiometer to change the reference value up and down within the limits preset by other parameters (512.0 and 512.2). 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 1 407 page 56, 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 determined by the choice made in Reference channel 1 401 page 55.

Organization tree

(1) Determined by active reference channel.
Possible values:
402
403
801
59.11
806

(2) 2 s or ESC

Displayed parameter value and unit of the diagram are given as examples.



Value - Unit

Code	Name/Description	Adjustment range	Factory setting
402 ↻ (1)	❑ **External reference value** Frequency reference visible if reference channel active is remote display. Reference channel 1 401 (page 55) set to 163. or Forced local reference 409 (page 56) set to 163. This parameter allows modification of the frequency reference with the jog dial. Visibility determined by drive settings.	-400 to +400 Hz	-
403 ↻ (1)	❑ **Analog input virtual** This parameter allows modification of the frequency reference by analog input. Reference channel 1 401 (page 55) set to 183 or Forced local reference 409 (page 56) set to 183 or PID manual reference 59.18 (page 68) set to 02. Visibility determined by drive settings.	0 to 100% of 512.2 parameter value	-
801 01 63 164 183	❑ **Speed reference** Actual frequency reference. This parameter is in read-only mode. Visibility determined by drive settings. ☐ Analog input terminal ☐ Remote display ☐ Modbus ☐ Integrated display with Jog dial	512.0 parameter value - 512.2 parameter value	-
59.11 ↻ (1)	❑ **Internal PID reference value** This parameter allows modification of the PID internal reference with the jog dial. Visibility determined by drive settings.	0 to 100%	-
806	❑ **PID reference value value** This parameter is the PID reference value expressed as a %.	0 to 100%	-

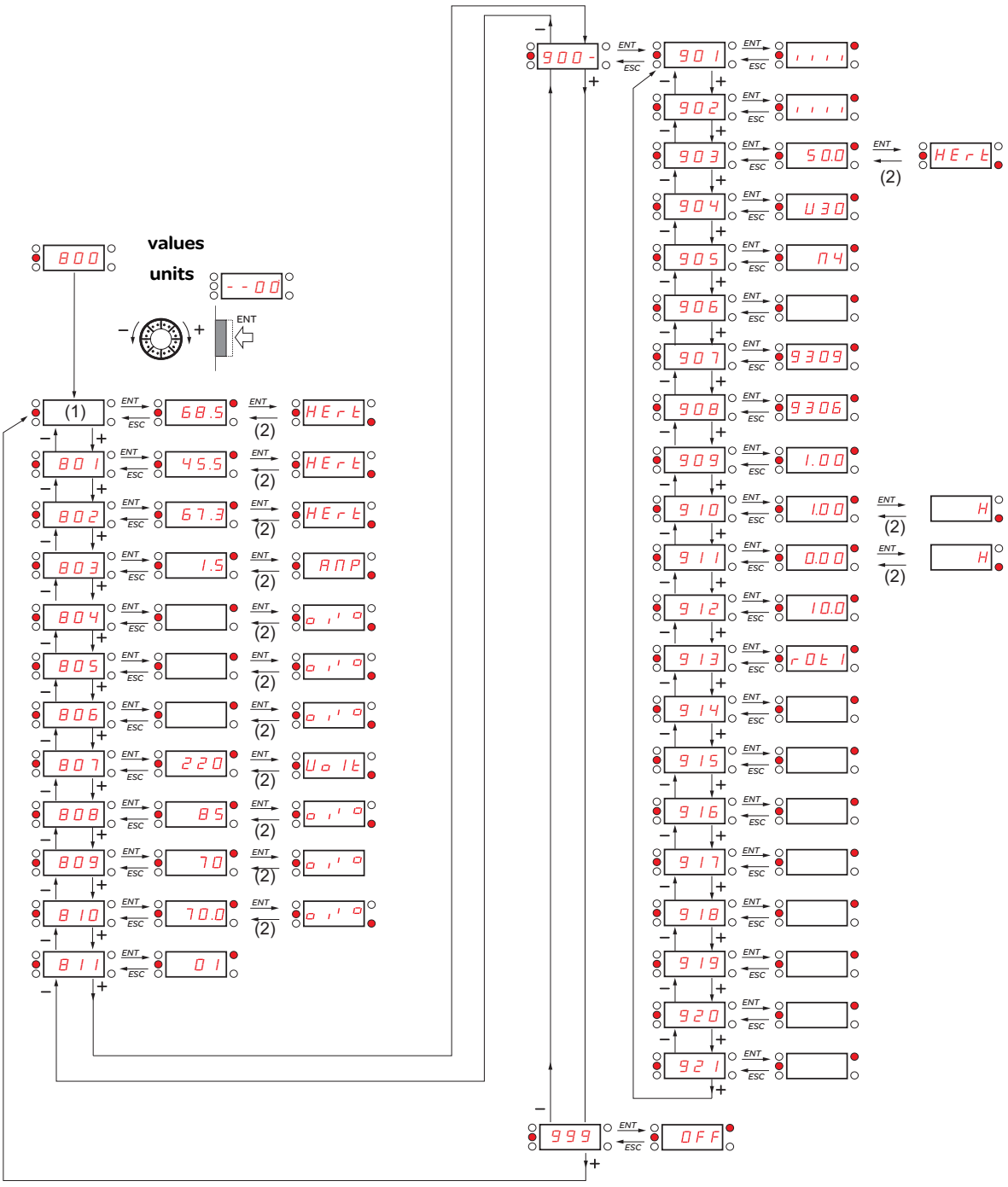
(1) It is not necessary to press ENT key to confirm modification of the reference.

↻ 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 802 (page 32).
While the value of the desired new monitoring parameter is being displayed, press the jog dial button a second time to display the unit.

Organization tree



(1) Determined by active reference channel.
Possible values:
402
403

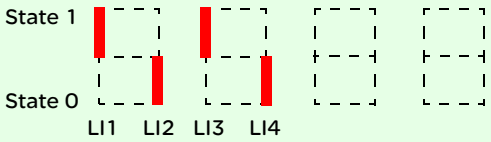
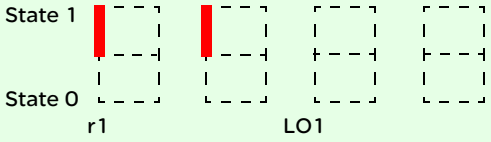
(2) 2 s or ESC

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

Code	Name/Description	Unit
402 ↻	❑ **External reference value** External keypad or local force mode configured. Forced local reference 409 (page 56) set to 163 and Forced local assignment 408 (page 56) is not 00. Displays the Actual speed reference coming from the remote keypad. This value is not visible in factory setting.	Hz
403 ↻	❑ **Analog input virtual** Embedded keypad active or local force mode configured. Forced local reference 409 (page 56) set to 183 and Forced local assignment 408 (page 56) is not 00. Displays the Actual speed reference coming from the jog dial. This value is not visible in factory setting.	%
801	❑ **Speed reference** Actual frequency reference	Hz
802	❑ **Output frequency** This parameter provides the estimated motor speed. It corresponds to the estimated motor frequency (on the motor shaft). In Standard motor control type 03 (page 49), Output frequency 802 is equal to motor stator frequency. In motor control type 309 selection of high performance motor control type 00 (page 49), Output frequency 802 is equal to the frequency corresponding to estimated motor speed. Range: -400 to 400 Hz	Hz
803	❑ **Motor current** Estimation of the effective motor current (output of the drive) 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
804	❑ **PID error** Visible only if the PID function is configured [PID feedback assignment 59.00 (page 66) set to 00]. See PID diagram on page 65.	%
805	❑ **PID feedback** Visible only if the PID function is configured [PID feedback assignment 59.00 (page 66) set to 00]. See PID diagram on page 65.	%
806	❑ **PID reference** Visible only if the PID function is configured [PID feedback assignment 59.00 (page 66) set to 00]. See PID diagram on page 65.	%
807	❑ **Main voltage** Line voltage from the point of view of the DC bus, motor running or stopped.	V
808	❑ **Motor thermal state** Display of the motor thermal state. Above 118%, drive displays (page 88) Motor overload F013 fault.	%
809	❑ **Drive thermal state** Display of the drive thermal state. Above 118%, drive displays (page 88) Drive overheat F011 fault.	%
810	❑ **Output power** The parameter displays the ratio between "estimated motor power (on the shaft) versus drive rating."	%

↻ Parameter that can be modified during operation or when stopped.

Code	Name/Description
b11	**❑ Product status** This parameter displays the state of the drive and motor.
--00	☐ Drive ready
--01	☐ Drive running, the last 6-segment digit to the right of the code also indicates direction and speed
--02	☐ Acceleration, the last 6-segment digit to the right of the code also indicates direction and speed
--03	☐ Deceleration, the last 6-segment digit to the right of the code also indicates direction and speed
--04	☐ DC injection braking in progress
--05	☐ Current limitation state, 4-segment digit blinks
--06	☐ Freewheel stop control
--07	☐ Auto-adapted deceleration
--08	☐ Controlled stop on mains phase loss
--09	☐ Auto-tuning in progress
--10	☐ Fast stop state
--11	☐ No line power state. When the control part is energized via the RJ45 connector and there is no line voltage and no run order present.
--12	☐ Drive in back state
--13	☐ Remote control mode
--14	☐ Local control mode

Code	Name/Description	Unit
900-	**Maintenance menu** **Parameters of 900- cannot be selected for monitoring.**	
901	**❑ State of logic inputs LI1 to LI4** Can be used to visualize the state of the 4 logic inputs.  Example above: LI1 and LI3 are at 1; LI2 and LI4 are at 0.	-
902	**❑ State of the logic output LO1 and relay R1** Can be used to visualize the state of the logic output. 	-
903	**❑ Display of high speed value** Displays frequency corresponding to the high speed value. Range from Low speed 5 12.0 (page 38) to Maximum frequency 308 (page 49). Visible only if 2 High speed assignment 5 12.3 or 4 High speed assignment 5 12.4 (page 77) is configured.	Hz
904	**❑ Drive Power rating** Indicates the drive power rating. This is part the of the drive reference. Refer to page 10. Possible values: 037 = 0.37 kW 075 = 0.75 kW U15 = 1.5 kW U22 = 2.2 kW U30 = 3 kW U40 = 4 kW U55 = 5.5kW U75 = 7.5kW D11 = 11kW	-
905	**❑ Drive voltage rating** Indicates the Drive rate voltage. This is part of the drive reference, see page 9. Possible values: N4= 360V~460V 3-phase in, 360V~460V 3-phase out	-
906	**❑ Specific Product Number** This parameter is used to identify the specific version of the product. Visible only if 906 is non-zero.	-
907	**❑ Card 1 Software Version** Application software version Example: 1105 for 1.1 ie 05 1 (version, major), 1 (version, minor), 05 (ie, evolution number)	-
908	**❑ Card 2 Software Version** Motor control software version Example: 1105 for 1.1 ie 05 1 (version, major), 1 (version, minor), 05 (ie, evolution number)	-

Code	Name/Description	Unit
900 -	**Maintenance menu (continued)**	
909	**❑ Run elapsed time display**	0.01

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.

Hours	Display
1	0.01
10	0.10
100	1.00
1000	10.0
10000	100

910	**❑ Power On time display**	0.01

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.

911	**❑ Fan time display**	0.01

Range: 0 to 65535 hours. Value displayed is as described in the table above. Parameter resettable by customer.

912	**❑ Process elapsed time**	0.01

Range: 0 to 65535 hours. Value displayed is as described in the table above. Parameter resettable by customer.

913 rOt0 rOt1 r1t0 r1t1	**❑ Modbus communication status**	-

- ☐ Modbus no reception, no transmission = communication idle
- ☐ Modbus no reception, transmission
- ☐ Modbus reception, no transmission
- ☐ Modbus reception and transmission

914	**❑ Last fault 1**	-

This parameter describes the Last fault.

915	**❑ State of drive at fault 1**	-

This parameter describes the drive state at the moment of the first detected fault.

bit 0	bit 1	bit 2	bit 3	bit 4
ETA.1: Switched on	ETA.5: Fast 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

Parameter that can be modified during operation or when stopped.

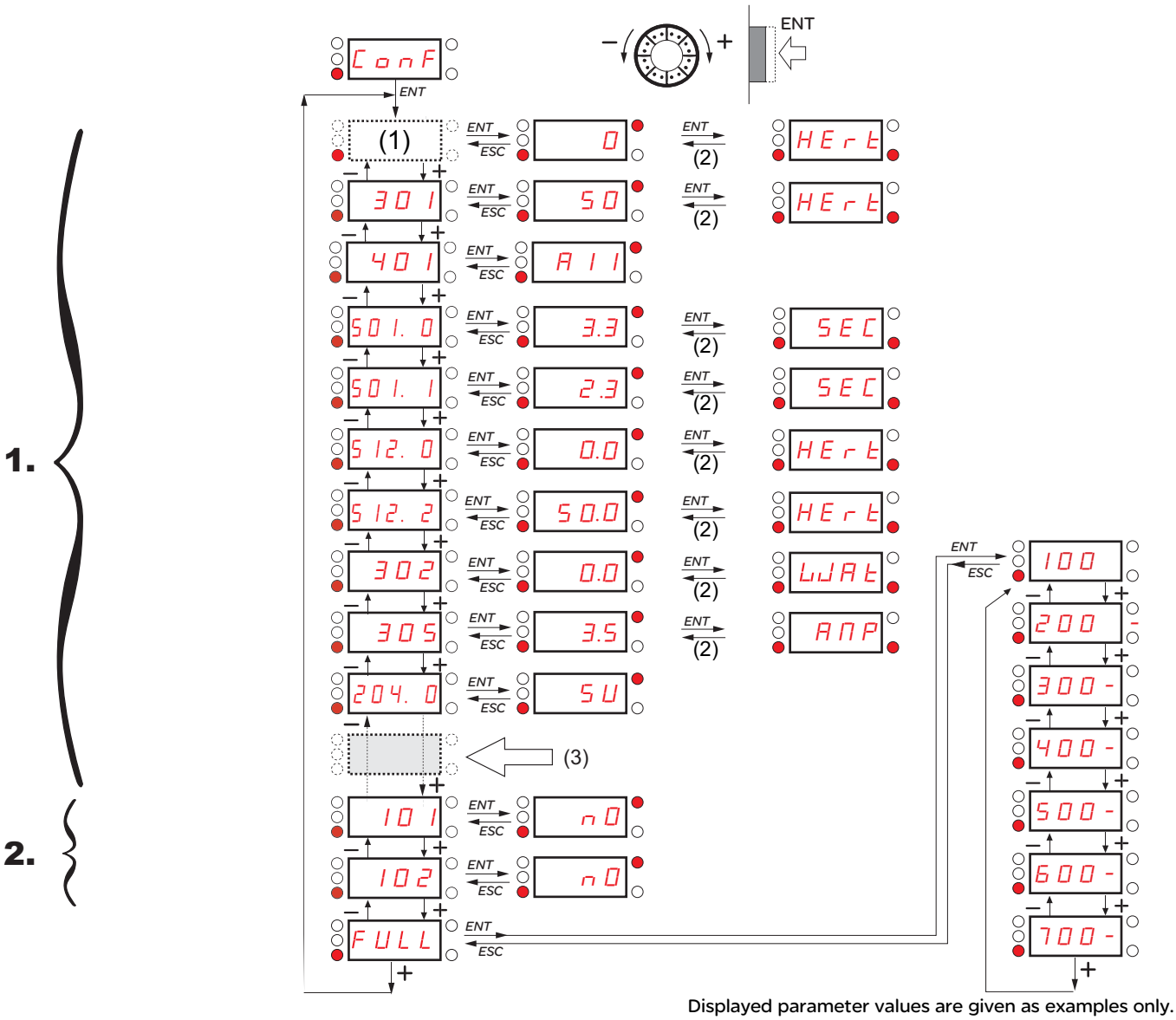
Code	Name/Description	Adjustment range	Factory setting
900-	**Maintenance menu** (continued)		
916	❑ **Last fault 2** This parameter describes the second detected fault.		-
917	❑ **State of drive at fault 2** This parameter describes the drive state at the moment of the second detected fault. See 915.		-
918	❑ **Last fault 3** This parameter describes the third detected fault.		-
919	❑ **State of drive at fault 3** This parameter describes the drive state at the moment of the third detected fault. See 915.		-
920	❑ **Last fault 4** This parameter describes the fourth detected fault.		-
921	❑ **State of drive at fault 4** This parameter describes the drive state at the moment of the fourth detected fault. See 915.		-
999 OFF On	❑ **HMI Password** Possible state value: ☐ Password disabled ☐ Password activated Range: 2 - 9999 If you have lost your password, please contact Schneider Electric. This parameter is used to restrict access to the drive. To lock the drive, go to the HMI Password 999 parameter and enter a password within the above range. Once activated, the password state changes to On: Password protection only enables access to Reference (rEF) (see page 36) mode and Monitor (MOn-) (see page 37) mode, except when using SoMove. Return to factory settings or access to FULL section are disabled. To unlock the drive, go to the 999 parameter, enter the valid password, then press ENT. Password protection removal is then possible and carried out by entering OFF using the jog dial and then pressing ENT.	2 - 9999	OFF

Configuration mode, ConF

The Configuration mode comprises 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 permits to access to all other parameters. It includes 6 sub-menus:
   - Macro-configuration 100- (page 40)
   - Input Output menu 200- (page41)
   - Motor Control menu 300- (page 49)
   - Control menu 400- (page 55)
   - Function menu 500- (page 57)
   - Fault detection menu 600- (page 77)
   - Communication menu 700- (page 84)

Organization tree



Displayed parameter values are given as examples only.

(1) Determined by active reference channel. (2) 2 s or ESC
Possible values: 402 or 403

Code	Name/Description	Adjustment range	Factory setting
402 ↻	**❑ External reference value** This parameter allows modification of the frequency reference with the jog dial. External keypad active or local force mode configured. Forced local reference 409 (page 56) set to 163 and Forced local assignment 408 (page 56) not 00. Visibility determined by the drive settings.	-400 Hz to 400 Hz	-
403 ↻	**❑ Analog input virtual** This parameter allows modification of the frequency reference when: • Forced local reference 409 (page 56) is set to 183 • and Forced local assignment 408 (page 56) is not 00 Visible if reference channel active is integrated jog dial (Reference channel 1 401 set to 183).	0% to 100%	-
301	**❑ Standard motor frequency** External keypad active or local force mode configured. (409 =163)(not visible in the factory setting) 00 ☐ 50 Hz 01 ☐ 60 Hz Set to 50 Hz or 60 Hz, taken from the motor rating plate. Changing 301 sets back parameters: 306, 213 and 512.2: 50 Hz or 60 Hz 604.0 is set to 305 305: According to drive rating 302: Watt or HP 307: According to drive rating 308: 60 Hz or 72 Hz		50 Hz
401	**❑ Reference channel 1** This parameter allows selection of the reference source. 01 ☐ Analog input terminal 163 ☐ Remote display 164 ☐ Modbus 184 ☐ Integrated display with Jog dial		01
501.0 ↻	**❑ Acceleration** Acceleration time between 0 Hz and the Rated motor frequency 306 (page 49). Make sure that this value is compatible with the inertia being driven.	0.0 s to 999.9 s	3.0 s
501.1 ↻	**❑ Deceleration** Time to decelerate from the Rated motor frequency 306 (page 49) 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
512.0 ↻	**❑ Low speed** Motor frequency at minimum reference. If 512.2, 512.5, 512.6 and 512.7 are already set then 512.0 is limited to the minimum of those values.	0 Hz to 512.2 parameter value	0 Hz
512.2 ↻	**❑ High speed** Motor frequency at maximum reference. Check that this setting is appropriate for the motor and the application. The values of 512.2, 512.5, 512.6 and 512.7 are independent but each 512.2 value is linked to the values of Low speed 512.0 and Maximum frequency 308 (page 49) according to the following rules: • 512.2 is limited to 512.0 and 308 (512.0 ⩽ 512.2x ⩽ 308). • If 308 is decreased below the current 512.2 value, then 512.2 automatically decreases to the new value of 308. Once 512.2, 512.5, 512.6 and 512.7 are set, 512.0 is limited to their minimum.	512.0 value to 308 value (Hz)	50 or 60 Hz (determined by 301), max. 308 value

↻ Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
302	**❑ Rated Motor Power** Visible only if Motor parameter choice 319 (page 52) is set to the Nominal motor power of [00]. If 302 is available, 303 disappears. Nominal motor power is given on the nameplate. Motors can range from five ratings lower up to two ratings higher than the drive rating. Performance is optimized when there is a maximum of one rating difference. If Standard motor frequency 301 (page 38) is set to 50 Hz, the Rated Motor Power 302 unit will be kW.	Drive power -5 to +2	Determined by drive rating
101 00 01 2 s	**❑ Store customer parameter set** This function creates a backup of the present configuration: ☐ Function inactive ☐ Saves the current configuration in the drive memory. 101 automatically switches to 00 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.		00
102 00 02 64 2 s	**❑ Factory / recall customer parameter set** This function permits restoration of a configuration. ☐ Function inactive As soon as one of the following action has been performed, 102 automatically changes to 00. ☐ The current configuration becomes identical to the backup configuration previously saved by 101. As soon as this action has been performed, 102 automatically changes to 0002 is only visible if the backup has been carried out. If this value appears, 64 is not visible. ☐ The current configuration becomes identical to the factory setting. If this value appears, 64 is not visible. **⚠ 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.**		00

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

How to control the drive locally

In factory setting, RUN, STOP and jog dial are inactive. To control the drive locally, adjust the following parameters:
Set Reference channel 1 401 (page 55) to 183 (use integrated display with jog dial).

LI assignment information

It is possible with ATV303 to use multi assignment function (ie: 501.4 and 503 on the same LI).
It is also possible on some functions to assign LIH (high) or LIL (low), which means that the assigned function will be activated to high (LIH) or low level (LIL) of LI.

Code	Name/Description	Adjustment range	Factory setting
100	❑ **Macro-configuration**		StS

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Check that the selected macro configuration is compatible with the wiring diagram used.

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

Macro configuration provides a shortcut to configure a set of parameters suited to a specific field of application.

3 macro configurations are available:

- 00 ☐ Start/stop. Only forward is assigned.
- 04 ☐ PID regulation. Activate PID function, dedicate AI1 for feedback and AIV1 for reference.
- 09 ☐ Speed. Allocate LI to a preset speed which provides a means of configuring speed functions for a specific field of application.

2 s

Selecting a macro configuration assigns the parameters in this macro configuration.
Each macro configuration can still be modified in other menus.

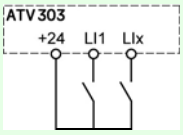
Input / output or parameter	Start/stop	PID regulation	Speed
AI1	Ref. channel 1	PID feedback	NONE
AIV1	NONE	Ref. channel 1	
AO1	NONE		
LO1	NONE		
R1	No drive detected fault		
L1h (2-wire)	Forward		
L2h (2-wire)	NONE		Reverse
L3h (2-wire)	NONE	Auto/Manual	2 preset speeds
L4h (2-wire)	NONE		4 preset speeds
L1h (3-wire)	Stop		
L2h (3-wire)	Forward		
L3h (3-wire)	NONE		Reverse
L4h (3-wire)	NONE	Auto/Manual	2 preset speeds
401 (Reference source 1)		Integrated Jog dial	Integrated Jog dial
309 (Motor control type)		Pump: 309=06	
404 (Reverse inhibition)		Yes	
204.0 (AI1 type)		10A	
LFL 1 (4-20 mA signal loss)		YES	
507.3 (Preset speed 2)			10.0Hz
507.4 (Preset speed 3)			25.0Hz
507.5 (Preset speed 4)			50.0Hz
319 (Motor parameter choice)			Motor power factor
504.0 (Automatic DC injection)	Limited DC injection	Limited DC injection	Limited DC injection

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

Code	Name/Description	Adjustment range	Factory setting
200 -	**I/O MENU**		
201	**❑ Type of control**		00

00

☐ 2 wire type control (see page 44)
The open or closed state of the input controls running and stopping.
Example of "source" wiring:

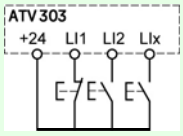


LI1: forward
LIx: reverse

2 s

01

☐ 3-wire control (see page 44)
"Forward" or "reverse" pulse send a run command. A "stop" pulse sends a stop command.
Example of "source" wiring:



LI1: stop
LI2: forward
LIx: reverse

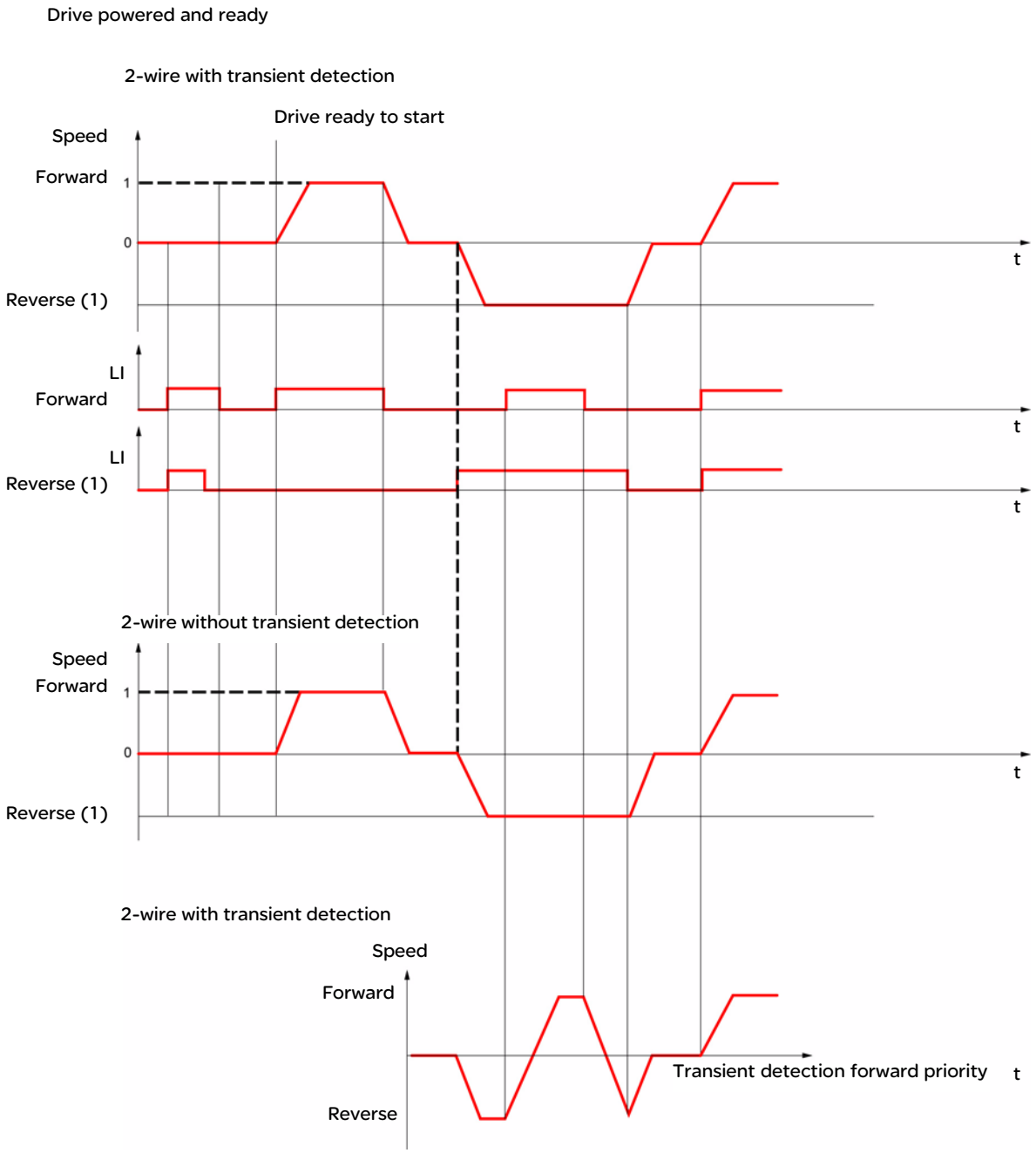
⚠ DANGER

UNINTENDED EQUIPMENT OPERATION
The 2-wire type control 202 (page 44) function will be returned to factory settings as will all functions which assign logic inputs.
The macro configuration selected will also be reset if it has been customized (loss of custom settings).
Check that the change of macro configuration is compatible with the wiring diagram used.

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

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

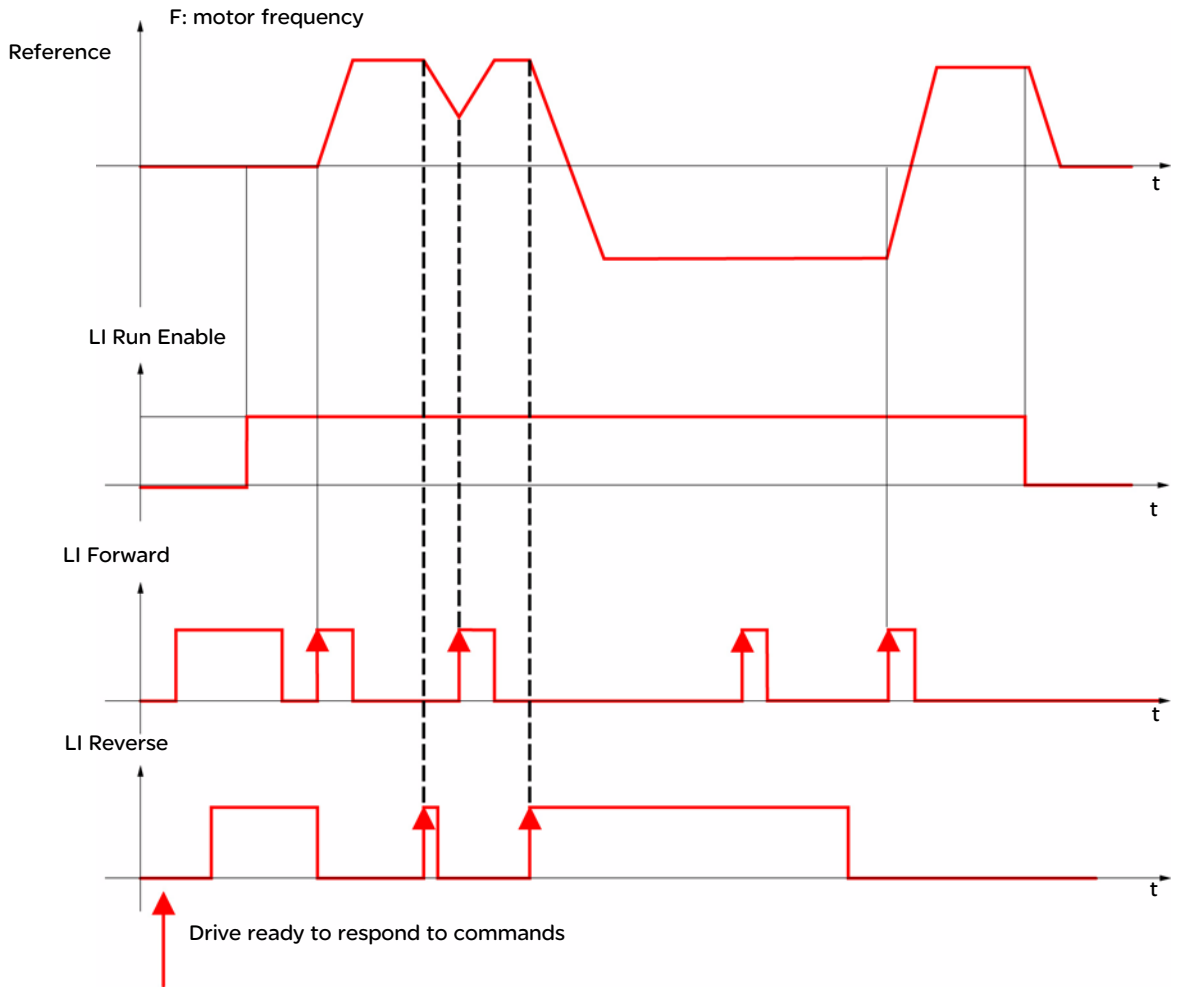
2 wire type control diagrams (see page 44)



(1) Reverse is not factory assigned. See Reverse direction 503 (page 59).

Simultaneous issuing of Forward and Reverse commands will start the motor in the Forward direction.

3-wire control diagrams (see page 44)



Code	Name/Description	Adjustment range	Factory setting
200 -	**I/O MENU (continued)**		
202	**❑ 2-wire type control**		01

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION
Check that the modification of the 2-wire type control is compatible with the wiring diagram used.

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

2-wire type control parameter can only be accessed if Type of control 201 (page 41) is set to 2C.

- 00 ☐ Level 0/1: Run or stop determined by level state 0 or 1.
- 01 ☐ Transition: A change of state (transition or edge) is necessary to initiate operation, to help prevent accidental restarts after a power supply interruption.
- 02 ☐ Priority FW: Run or stop determined by state 0 or 1, but "forward" input takes priority over the "reverse" input.

203	**❑ Logic inputs type**		00

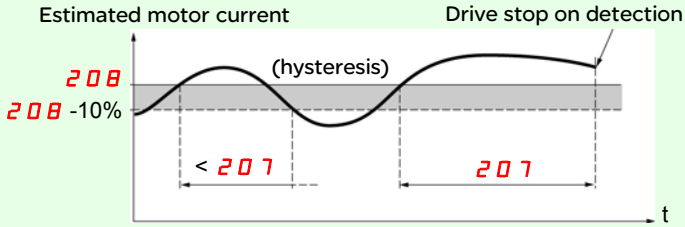
- 00 ☐ Positive: the inputs are active (state 1) at a voltage equal to or higher than 11 V (for example +24 V terminal). They are inactive (state 0) when the drive is disconnected or at a voltage lower than 5 V.
- 01 ☐ Negative: the inputs are active (state 1) at a voltage lower than 10 V (for example COM terminal). They are inactive (state 0) at a voltage equal to or higher than 16 V or when the drive is disconnected.

See Control connection diagrams on page 24.

Code	Name/Description	Adjustment range	Factory setting
200 -	**I/O MENU (continued)**		
204 -	**AI1 CONFIGURATION MENU**		
204.0	**❑ AI1 type**		5U
	This function establishes an interface between the analog input signal and drive internal value. 5U ☐ Voltage: 0-5 Vdc 10U ☐ Voltage: 0-10 Vdc 0A ☐ Current: x-y mA. Range determined by the AI1 current scaling parameter of 0% 204. 1 and AI1 current scaling parameter of 100% 204.2 settings below. See page 45. L IU ☐ Logic input		
204. 1	**❑ AI1 current scaling parameter of 0%** Visible only if AI1 type 204.0 is set to 0A.	0 - 20 mA	4 mA
204.2	**❑ AI1 current scaling parameter of 100%** Visible only if AI1 type 204.0 is set to 0A.	0 - 20 mA	20 mA
200 -	**I/O MENU (continued)**		
205	**❑ R1 assignment**		01
	00 ☐ Not assigned 01 ☐ No fault 02 ☐ Drive run 04 ☐ Frequency threshold reached 05 ☐ Motor frequency when max. reference value reached 5 12.2 06 ☐ I threshold reached 07 ☐ Frequency reference reached 08 ☐ Motor thermal threshold reached 21 ☐ Underload alarm 22 ☐ Overload alarm 123 ☐ 4-20 mA signal loss visible only if 204.0 is set to 0A (see above).		

Code	Name/Description	Adjustment range	Factory setting
200 -	**I/O MENU (continued)**		
206 -	**LO1 CONFIGURATION MENU**		
206.0	**❑ LO1 assignment**		00
00	☐ Not assigned		
01	☐ No fault		
02	☐ Drive run		
04	☐ Frequency threshold reached		
05	☐ Motor frequency when max. reference value reached 512.2		
06	☐ I threshold reached		
07	☐ Frequency reference reached		
08	☐ Motor thermal threshold reached		
21	☐ Underload alarm		
22	☐ Overload alarm		
123	☐ 4-20 mA signal loss visible only if 204.0 is set to 0A (see above).		
126	☐ Auxiliary pump		
206.1	**❑ LO1 status (output active level)**		00
00	☐ Positive logic: active high		
01	☐ Negative logic: active low		
200 -	**I/O MENU (continued)**		
207	**❑ Application Overload time delay**	0 to 100 s	0 s

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 208, an Application Overload time delay 207 is activated. Once this time delay 207 has elapsed, if the current is still greater than the overload threshold 208 -10%, the drive will stop running and display Process overload.
Overload detection is only active when the system is in steady state (Actual speed reference reached).
A value of 0 will disable application overload detection.



208 ( )	**❑ Application Overload threshold**	70% - 150% of 305 parameter value 70% - 150%	90% of 305 parameter value

Visible only if Overload time delay 207 above is not 0.
This parameter is used to detect an "application overload". 208 can be adjusted between 70 and 150% of the rated drive current. This is not the same as a motor or drive thermal overload.

209 ( )	**❑ Overload fault duration start**	0-6 min.	0 min.

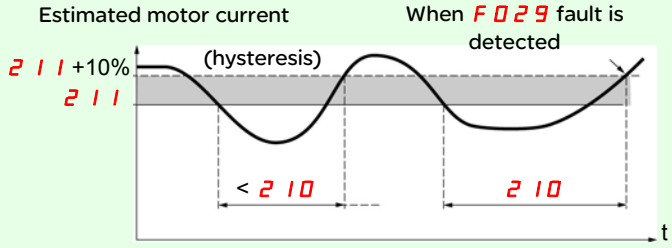
If 6002.001, the drive will automatically restart after this time delay following the overload fault F012.
Minimum time permitted between an overload being detected and any automatic restart.
In order for an automatic restart to be possible, the maximum restart time 602.1 (page 78) must exceed that of this parameter by at least one minute.

Visible only if the "Overload time delay 207" above is not set to 0.

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

Code	Name/Description	Adjustment range	Factory setting
200 -	**I/O MENU (continued)**		
210	**❑ Application underload time delay**	0 to 100 s	0 s

210 can be adjust between 0 to 100 s
If the motor current undershoots the underload threshold 211 for longer than the adjustable time delay 210, the drive will stop running and display F029 (Underload fault), see page 89.



Underload detection is only active when the system is in steady state (Actual speed reference reached).
A value of 0 will disable application underload detection.

211 ( )	**❑ Application Underload threshold**	20% to 100% of 305 parameter	60%

Visible only if Underload time delay 210 is not set to 0. This parameter is used to detect an application underload condition on the motor. Application Underload threshold 211 can be adjusted between 20 and 100% of the rated drive current.

212 ( )	**❑ Underload fault duration start**	0-6 min.	0 min.

If 602.001, the drive will automatically restart after this time delay following the underload fault F029.
Minimum time permitted between an underload being detected and any automatic restart.
In order for an automatic restart to be possible, the maximum restart time 602.1 (page 78) must exceed that of this parameter by at least one minute.

Visible only if the "Application underload time delay 210" above is not set to 0.

213 ( )	**❑ Motor frequency threshold**	0 to 400 Hz	50 or 60 Hz, Determined by drive rating

Visible only if R1 assignment 205 (page 45) or LO1 assignment 206.0 (page 46) is set to 04.

214 ( )	**❑ Motor current threshold**	0 to 1.5 In (1)	In

Visible only if R1 assignment 205 (page 45) or LO1 assignment 206.0 (page 46) is set to 04.

215 ( )	**❑ Motor thermal state threshold**	0 to 118% of 808 parameter	100%

Visible only if R1 assignment 205 (page 45) is set to 08.
Trip threshold for motor thermal alarm (logic output or relay)

(1) In = rated drive current

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

200 -
300 -
400 -
500 -
600 -
700 -

Code	Name/Description	Adjustment range	Factory setting
200 -	**I/O MENU (continued)**		
216 -	**AO1 configuration menu**		
216.0	**❑ AO1 assignment**		00
	This parameter is used to set the value of an analog output.		
00	☐ Not assigned		
129	☐ Estimated motor current		
130	☐ Estimated motor frequency		
131	☐ Ramp output		
135	☐ PID reference value - Visible only if PID feedback assignment 59.00 (page 66) is not set to 00.		
136	☐ PID feedback - Visible only if PID feedback assignment 59.00 (page 66) is not set to 00.		
137	☐ PID error - Visible only if PID feedback assignment 59.00 (page 66) is not set to 00.		
139	☐ Output power		
140	☐ Motor thermal state		
141	☐ Drive thermal state		
216.1	**❑ AO1 type**		0A
	This parameter provides type selection for the drive analog output signal.		
10U	☐ Voltage: 0-10 Vdc		
0A	☐ Current: 0-20 mA		
4A	☐ Current: 4-20 mA		

Code	Name/Description	Adjustment range	Factory setting
300 -	**Motor control menu**		
301	❑ **Standard motor frequency** See page 38.		50 Hz
302	❑ **Rated Motor Power** See page 39.	Drive power -5 to drive power +2	Determined by drive rating
303	❑ **Rated motor cos phi** This parameter is visible only if Motor parameter choice 319 (page 52) is set to [00]. If Rated motor cos phi 303 is available, Rated Motor Power 302 disappears. Power factor (pf) is given on the motor rating plate. **Note:** Do not confuse this with motor "Service Factor". Setting 303 to 1 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	Determined by drive rating
304	❑ **Rated motor voltage** Nominal motor voltage is given on the nameplate. If the line voltage is less than the nominal motor voltage, Rated motor voltage 304 should be set to the value of the line voltage applied to the drive terminals.	360 to 460V	380V
305	❑ **Rated motor current** Nominal motor current is given on the nameplate. Motor thermal current 604.0 (page 81) varies according to the nominal motor current 305.	0.25 In to 1.5 In (1)	Determined by drive rating
306	❑ **Rated motor frequency** Nominal motor frequency is given on the nameplate. The factory setting is 50 Hz, or preset to 60 Hz [if Standard motor frequency 301 (page 38) is set to 60 Hz].	10 to 400 Hz	50 Hz
307	❑ **Rated motor speed** Nominal motor speed is given on the nameplate.	0 to 24000 rpM	Determined by drive rating
308	❑ **Maximum frequency** Maximum frequency 308 gives the upper value possible for High speed 512.2 (page 77). The factory setting is 60 Hz, or preset to 72 Hz [if Standard motor frequency 301 (page 49) is set to 60 Hz].	10 to 400 Hz	60 Hz
309	❑ **Motor control type** Permits selection of motor control types suitable for application and performance requirements.		03
00	☐ Performance: Sensorless vector control with internal speed loop based on a voltage feedback calculation. For applications requiring high performance during starting or operation.		
03	☐ Standard: 2 point V/F control without internal speed loop. For simple applications that do not require high performance. Simple motor control law maintaining a constant Voltage Frequency ratio, permits adjustment of curve start point. This law is generally used for motors connected in parallel. Some applications using motors in parallel or with high performance requirements may require use of the "high performance" (00) control type.		
06	☐ Pump: U^2/F; for dedicated use with variable torque fan and pump applications not requiring high starting torque.		

(1) In = rated drive current

Code	Name/Description	Adjustment range	Factory setting
300 -	**Motor control menu** (continued)		
310	**❑ IR compensation**	25 to 200%	100%

Used to optimize torque at very low speed, or to adapt to special cases (for example, for motors connected in parallel, decrease IR compensation 310). If there is insufficient torque at low speed, increase IR compensation 310. Too high a value can cause the motor not to start (locking) or to change to current limiting mode.

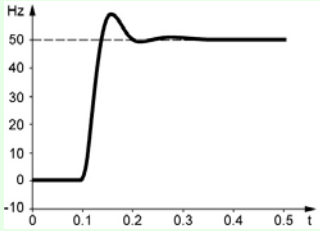
311	**❑ Slip compensation**	0 to 150%	100%

Visible only if Motor control type 309 (page 49) is not set to 06.
Used to adjust the slip compensation around the value set by the nominal motor slip, or to adjust to special circumstances (for example, for motors connected in parallel, decrease Slip compensation 311).
If the set slip compensation is lower than the actual slip compensation, the motor will not run at nominal speed in a steady state but at a speed lower than the reference.
If the set slip compensation is greater than the actual slip compensation, the motor speed becomes unstable.

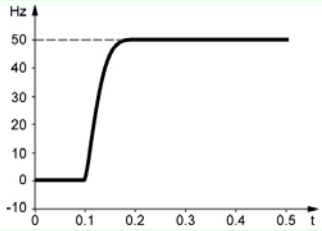
312	**❑ Frequency loop stability**	0 to 100%	20%

The 312 parameter can be used to reduce overshoots and oscillations at the end of acceleration. After a period of acceleration or deceleration, 312 adjusts the return value of the steady state to the dynamic value of the equipment;
Too high a value can cause an extended response time.
Too low a value can cause overspeed, or even instability.

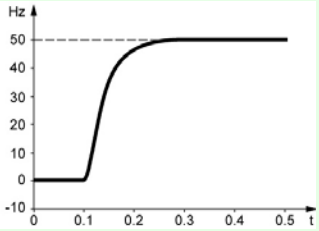
Low 312 parameter value
In this case, increase 312



Correct 312 parameter value



High 312 parameter value
In this case, reduce 312

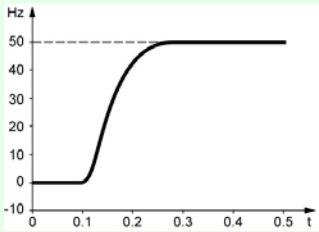


Visible only if Motor control type 309 (page 49) is set to 00.

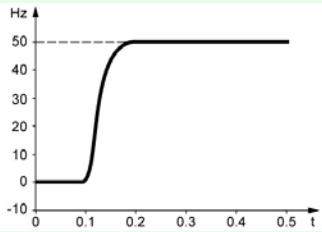
313	**❑ Frequency loop gain**	0 to 100%	20%

The 313 parameter adjusts the slope of the speed increase according to the inertia of the machine being driven.
Too high a value can cause overspeed, or even instability.
Too low a value can cause an extended response time.

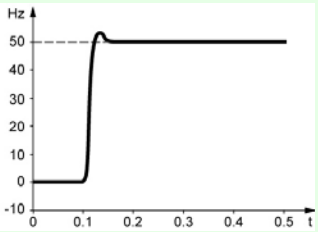
Low 313 parameter value
In this case, increase 313



Correct 313 parameter value

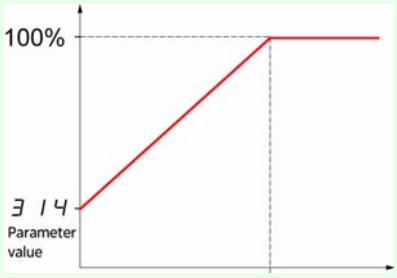


High 313 parameter value
In this case, reduce 313



Visible only if Motor control type 309 (page 49) is set to 00.

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
300 -	**Motor control menu (continued)**		
314 ( )	**❑ Flux Profile** This function defines the magnetizing current at zero frequency as a % of the rated magnetizing current. Adjustment curve for PUMP law  Visible only if Motor control type 309 (page 49) is set to 06.	0 to 100%	20%
315 ( )	**❑ Switching frequency** Switching frequency range setting. In the event of overheating, the drive automatically decreases the Switching frequency range. Returns to its original value once the temperature has returned to normal.	2 to 12 kHz	4 kHz
317 00 01	**❑ Motor noise reduction** Noise refers to audible noise. Means of adjusting motor noise must be provided to satisfy environmental requirements. Random frequency modulation avoids possible noise resonance that can occur at fixed frequency. ☐ No ☐ Yes		00

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

Code	Name/Description	Adjustment range	Factory setting
300 -	**Motor control menu** (continued)		
318	❑ **Auto-tuning**		00

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK OR ARC FLASH

- During auto-tuning, the motor operates at rated current.
- Do not service the motor during auto-tuning.

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

⚠ WARNING

LOSS OF CONTROL

The following parameters (see page 49) must be correctly configured before starting auto-tuning: 304, 306, 305, 307 and 302 or 303.

If one or more of these parameters is modified after auto-tuning has been performed, 318 will return to 00 and the procedure must be repeated.

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

00 ☐ 00: Use factory parameters for standard motors
01 ☐ 01: Launches auto-tuning
02 ☐ 02: Auto-tuning has already been performed

Attention:

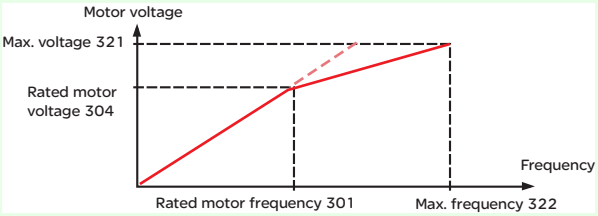
- Auto-tuning must be performed with the motor connected and cold.
- The parameters Rated Motor Power 302 (page 39) and Rated motor current 305 (page 49) must be consistent.
- Auto-tuning is performed only if no stop command has been activated. If a freewheel stop or fast stop function has been assigned 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 10 seconds. Do not interrupt. Wait for the display to change to 02 or 00.
- Re-perform auto-tuning after motor cables are replaced to ensure effectiveness of motor control.

☞ **Note:** During auto-tuning, the motor operates at rated current.

319	❑ **Motor parameter choice**		00

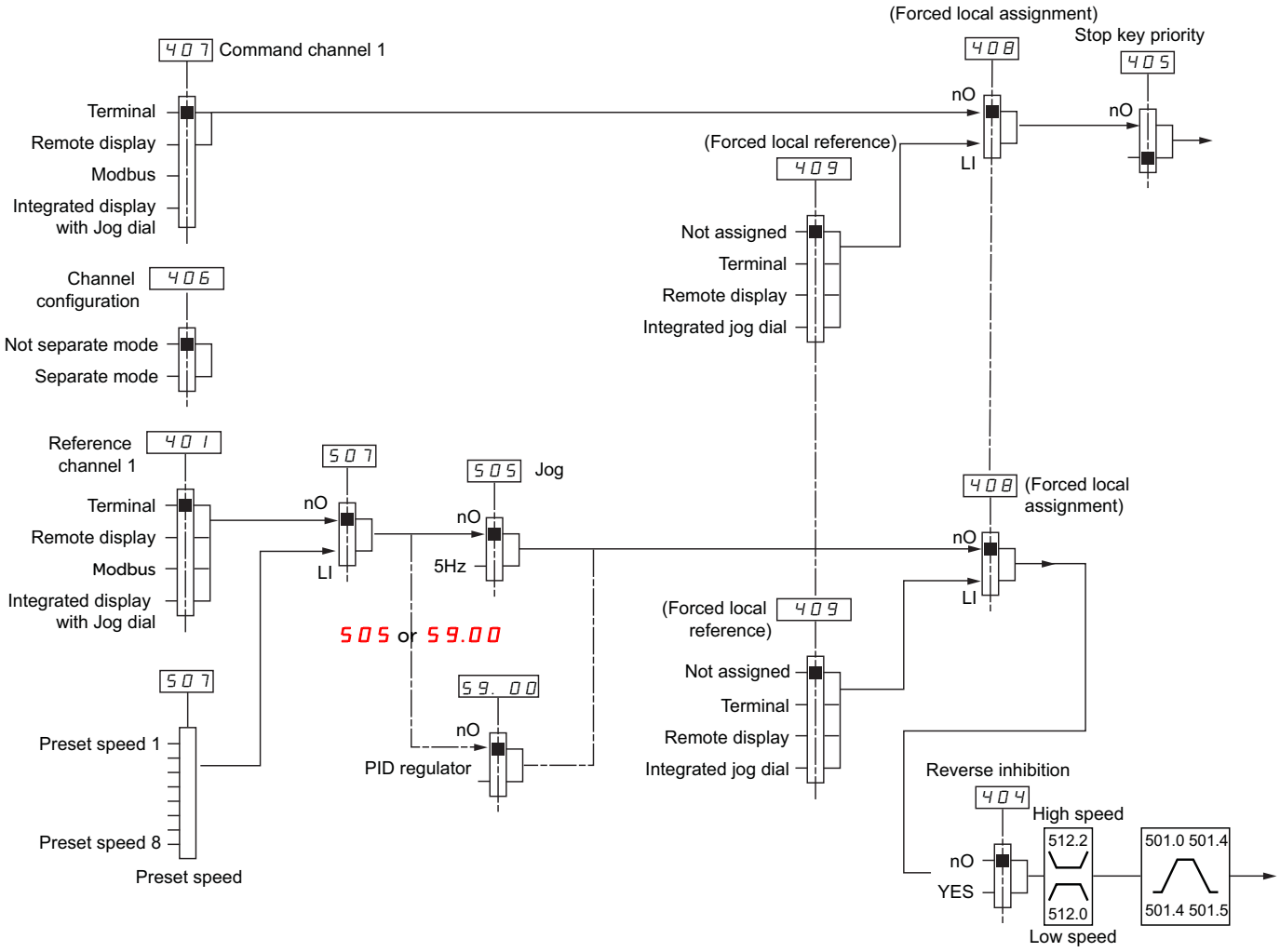
This parameter allows to choose which motor parameter will be configured (power or power factor).

00 ☐ Rated Motor Power (page 39)
01 ☐ Rated motor cos phi (page 49)

Code	Name/Description	Adjustment range	Factory setting
320 00 01	❑ **Vector control 2 points** ☐ [00] No ☐ [01] Yes For use in the following application contexts: when the rated speed and rated frequency of the motor must be exceeded for optimization of operation performance at constant power, or when the maximum voltage of the motor must be limited to a certain value below the main voltage. The U/F diagram must therefore be modified according to the motor's work ability at maximum voltage and Top frequency.  		00
321	❑ **Max voltage of constant power** Visible if 320 = YES	314 parameter value ~ 460V	380V
322	❑ **Max frequency of constant power** Visible if 320 = YES	306 parameter value ~ 400Hz	50Hz

Control menu

Control channel diagram

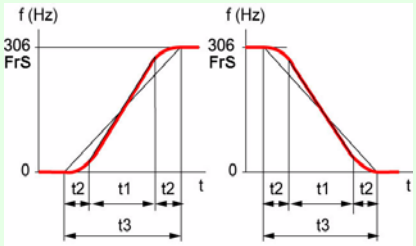
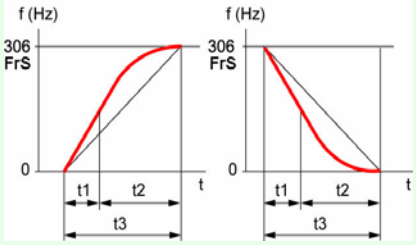


Code	Name/Description	Adjustment range	Factory setting
400 -	**Control menu**		
401 01 163 164 183	**❑ Reference channel 1** ☐ Anolog terminal ☐ Remote display ☐ Modbus ☐ Integrated display with Jog dial This parameter is already included in the "MyMenu" section (page 38).		01
402 ( )	**❑ External reference value** This parameter is already included in the "MyMenu" section (page 38).	-400 Hz to 400 Hz	-
403 ( )	**❑ Analog input virtual** This parameter is already included in the "MyMenu" section (page 38).	0% to 100%	
404 00 01	**❑ Reverse inhibition** Inhibition of movement in the 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 communication line are not taken into account. - Any reverse Actual speed reference originating from the PID, summing input etc., is interpreted as a zero reference (0 Hz). ☐ No ☐ Yes		00
405 2 s 00 01	**❑ 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 not the drive keypad or the remote display. **⚠ WARNING** **LOSS OF CONTROL** Do not select "00" unless exterior stopping method(s) exist. **Failure to follow these instructions can result in death, serious injury or equipment damage.** ☐ No: Stop inactive ☐ Yes: Stop active It is advised in case this function is set to 01 to use the front door cover or the optional display cover on the "run" and "stop" keys.		01
406 00 01	**❑ Channel configuration** Channel configuration 406 allows the selection of: - Combined mode (command and reference come from the same channel) - Separate mode (command and reference come from different channels) ☐ Combined mode ☐ Separate mode		00

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.

Code	Name/Description	Adjustment range	Factory setting
400 -	**Control menu** (continued)		
407 01 02 03 10	**❑ Command channel 1** This parameter permits selection of the command channel. ☐ Terminals ☐ Local ☐ Remote display ☐ Modbus Visible only if Channel configuration 406 (page 55) is set to Seperate.		01
408 00 L1H - L4H LUH	**❑ Forced local assignment** ☐ Function inactive ☐ L1h - L4H, LUH: Forced local mode is active when the input is at state 1.		00
409 00 01 163 183	**❑ Forced local reference** Visible only if Forced local assignment 408 is not set to 00 ☐ Not assigned ☐ Analog input terminal ☐ Remote display ☐ Integrated display with Jog dial		00

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu**		
501 -	**Ramp menu**		
501.0	**❑ Acceleration** Acceleration time between 0 Hz and the Rated motor frequency 306 (page 49). Make sure this value is compatible with the inertia being driven.	0.0 s to 999.9 s	3.0 s
501.1	**❑ Deceleration** Time to decelerate from the Rated motor frequency 306 (page 49) to 0 Hz. Make sure this value is compatible with the inertia being driven.	0.0 s to 999.9 s	3.0 s
501.2 00 01 02	**❑ Ramp shape assignment** ☐ Linear ☐ S Shape ☐ U Shape S Shape  The rounding coefficient is fixed, wherein t1 = 0.6 x set ramp time (linear) t2 = 0.4 x set ramp time (round) t3 = 1.4 x ramp time U Shape  The rounding coefficient is fixed, wherein t1 = 0.5 x set ramp time (linear) t2 = set ramp time (round) t3 = 1.5 x ramp time		00
501.3 00 L1H L2H L3H L4H LUH L1L L2L L3L L4L LUL	**❑ Ramp switching commutation** ☐ Not assigned ☐ L1H: LI1 active high ☐ L2H: LI2 active high ☐ L3H: LI3 active high ☐ L4H: LI4 active high ☐ LUH: LIU active high ☐ L1L: LI1 active low ☐ L2L: LI2 active low ☐ L3H: LI3 active low ☐ L4H: LI4 active low ☐ LUL: LIU active low See LI assignment information on page 39.		00

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
501 -	**Ramp menu** (continued)		
501.4	❑ **Acceleration 2** Visible only if Ramp switching commutation 501.3 (page 57) is not set to 00. Second acceleration ramp time, adjustable from 0.0 to 999.9 s This ramp becomes the active ramp only when PID is used to perform start and wake-up phases. See PID: wake up level (page 70).	0.0 to 999.9 s	5.0 s
501.5	❑ **Deceleration 2** Visible only if Ramp switching commutation 501.3 (page 57) is not set to 00. Second deceleration ramp time, adjustable from 0.0 to 999.9 s	0.0 to 999.9 s	5.0 s
501.6	❑ **Decel Ramp Adaptation assignment**		01
00	☐ Function inactive. The drive will decelerate based on normal deceleration time settings. This setting is compatible with optional dynamic braking (if used).		
01	☐ This function automatically increases deceleration time when stopping or reducing the speed of high inertia loads to help prevent DC bus overvoltage or overbraking.		
02	☐ 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 generated by braking. 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 501.6 to 00.**		

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
502 -	**Stop configuration menu**		
502.0	❑ **Type of stop** Stop mode on disappearance of the run command or appearance of a stop command. ☐ 00 Ramp stop ☐ 08 Fast stop ☐ 13 Freewheel stop		00
502.1	❑ **Freewheel stop assignment** This stop type is activated when the input or corresponding register 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 201 (page 41) = 2C and 2-wire type control 202 (page 44) = 00 or 02. If not, a new run command must be sent. ☐ 00 Not assigned ☐ L1L: LI1 active Low to stop ☐ L2L: LI2 active Low to stop ☐ L3L: LI3 active Low to stop ☐ L4L: LI4 active Low to stop ☐ LUL: LIU active Low to stop		00
502.2	❑ **Fast stop assignment** ☐ 00 Not assigned ☐ L1L: LI1 active Low to stop ☐ L2L: LI2 active Low to stop ☐ L3L: LI3 active Low to stop ☐ L4L: LI4 active Low to stop ☐ LUL: LIU active Low to stop		00
502.3 ( )	❑ **Ramp divider** Visible only if Fast stop assignment 502.2 (page 59) is not set to 00 or 502.2 is set to 08 Fast stop (page 59). When stop requests are sent the active ramp time [Deceleration 501.1 (page 38) or Deceleration 2 501.5 (page 58)] is divided by this coefficient.	1 to 10	4

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
503	❑ **Reverse direction** LI1 - LI4: choice of the input assigned to the reverse command ☐ 00 Function inactive ☐ L1H: L1 active high ☐ L2H: L2 active high ☐ L3H: L3 active high ☐ L4H: L4 active high ☐ LUH: LIU active high		00

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

200 -
300 -
400 -
500 -
600 -
700 -

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
504 -	**AUTO DC INJECTION MENU**		
504.0 ( ) 00 01 02	❑ **Automatic DC injection** ☐ No DC injected current ☐ Time limited DC injection ☐ Continuous DC injection		01
504.1 ( )	❑ **Automatic DC injection current** Visible only if Automatic DC injection 504.0 is not set to 00. Injection current on stopping and continuous DC injection.	0 to 120% of nominal motor current	70%
504.2 ( )	❑ **Automatic DC injection time** Visible only if Automatic DC injection 504.0 is not set to 00. Injection time on stopping.	0.1 to 30 s	0.5 s

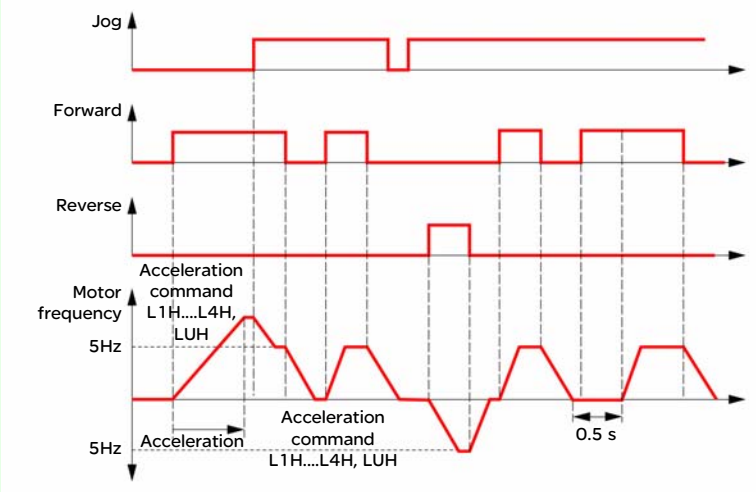
( ) Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
505	❑ **Jog assignment**		00

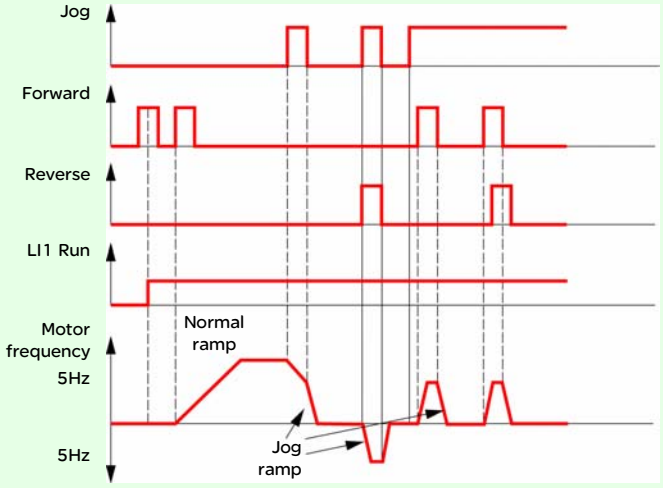
This parameter employs a 2 or 3-wire control related logic input, providing step by step control of motor running. The jog frequency is fixed at 5 Hz. Acceleration and deceleration ramps taken into account in the Jog function are 0.1 s.

- 00 ☐ Function inactive
- LI1H ☐ L1h: L1 active high
- LI2H ☐ L2H: LI2 active high
- LI3H ☐ L3h: LI2 active high
- LI4H ☐ L4h: LI4 active high
- LIUH ☐ LUh: LIU active high

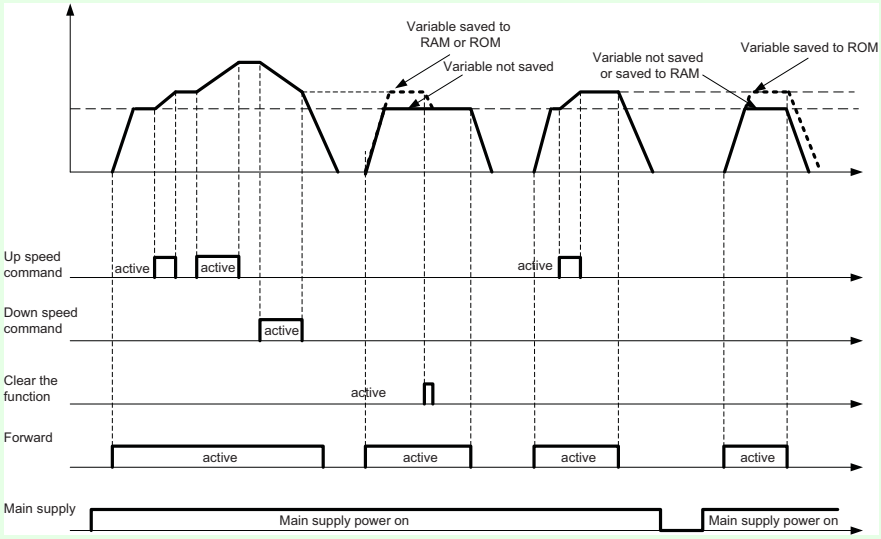
2 wire type control



3-wire control



200 -
300 -
400 -
500 -
600 -
700 -

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
506 -	**Speed up and down**		
506.0	❑ **Up speed command**		00
00 L1H L2H L3H L4H LUH	00: Function inactive L1H: LI1 active high L2H: LI2 active high L3H: LI2 active high L4H: LI4 active high LUH: LIU active high		
506.1	❑ **Down speed command**		00
00 L1H L2H L3H L4H LUH	00: Function inactive L1H: LI1 active high L2H: LI2 active high L3H: LI2 active high L4H: LI4 active high LUH: LIU active high		
			
506.2	❑ **Store**		00
	Up speed/down speed command will change the initial speed reference. Eventually it produces an overall "speed increment". This speed increment accumulates over time depending on the actions of Lix and Liy. It is therefore necessary to keep a record of speed incrementation when changing speed reference. Visible only if parameter 506.0 and 506.1 are configured.		
00 01 02	☐ Do not save. Variables not saved after the RUN command has disappeared. ☐ Save to RAM. Variables saved to RAM after STOP command ends and disappear when power off. ☐ Save to ROM. Variables saved to ROM when power off.		

Code	Name/Description	Adjustment range	Factory setting
506 -	**Speed up and down (continued)**		
506.3	**❑ Clear the function**		00
	When the CLEAR command is activated, acceleration and deceleration commands are deactivated. All speed increments are reset when the CLEAR command is activated, regardless of the save method used. Visible only if parameter 506.0 and 506. 1 are configured.		
00	☐ [00], Function inactive		
L 1H	☐ [L1H], LI1 active high		
L 2H	☐ [L2H], LI2 active high		
L 3H	☐ [L3H], LI3 active high		
L 4H	☐ [L4H], LI4 active high		
L UH	☐ [LUH], LIU active high		
159	☐ The function is cleared when [159] acceleration and deceleration commands activate simultaneously.		
506.4	**❑ Reactivity of +/- speed around ref.**	0 - 100%	0%
	An experience value between 0 to 100% is used to change the rapidity of response for acceleration and deceleration command inputs. Visible only if parameters 506.0 and 506. 1 are configured.		
	☐ 0 ~ 100%(0)		

Preset speeds

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

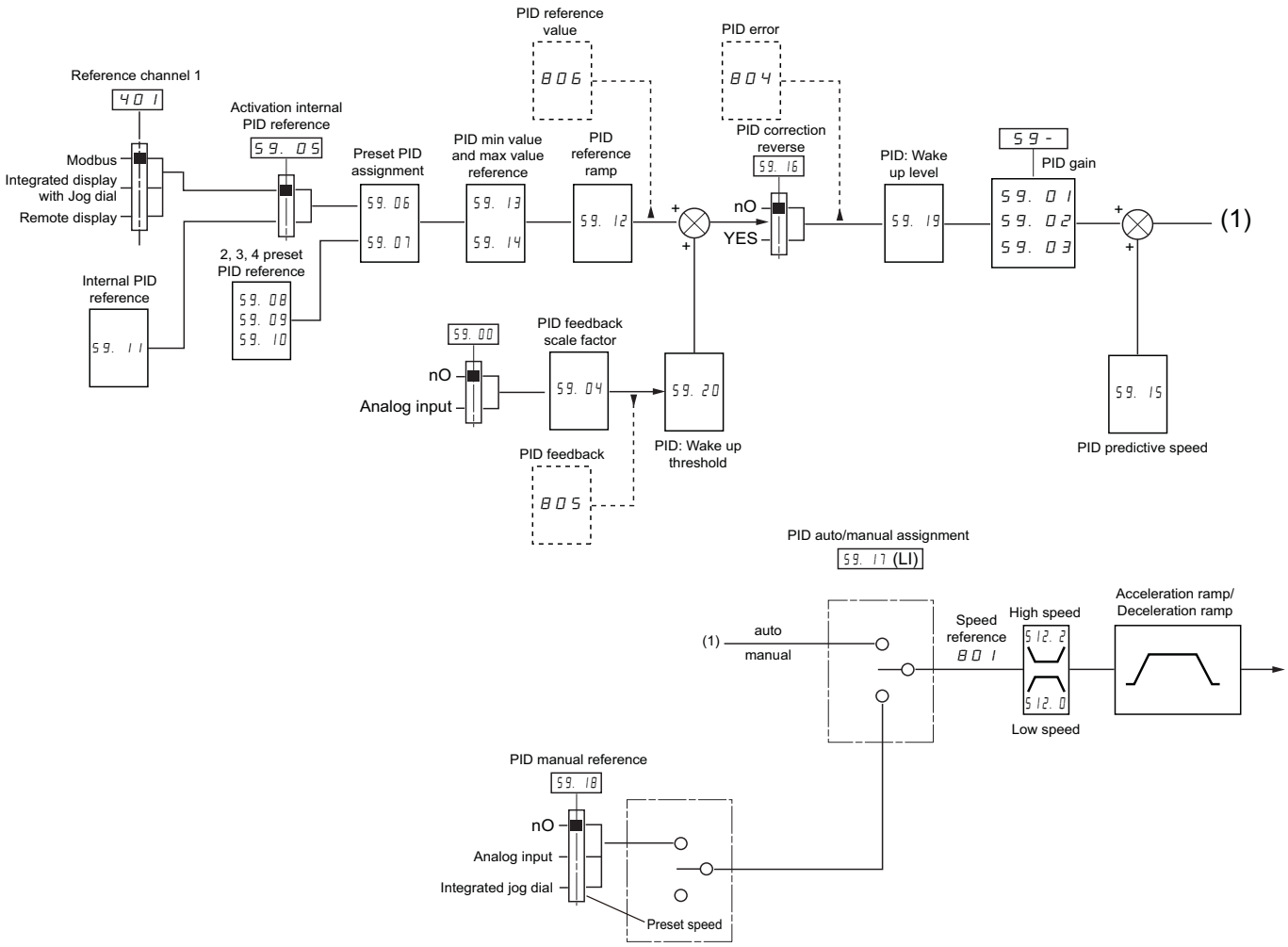
Combination table for preset speed inputs

8 speeds LI (507.2)	4 speeds LI (507.1)	2 speeds LI (507.0)	Speed reference
0	0	0	Preset speed
0	0	1	Preset speed 2
0	1	0	Preset speed 3
0	1	1	Preset speed 4
1	0	0	Preset speed 5
1	0	1	Preset speed 6
1	1	0	Preset speed 7
1	1	1	Preset speed 9

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
507 -	**Preset speed menu**		
507.0	❑ **2 preset speeds** ☐ Function inactive ☐ L1h: L1 high activation level ☐ L2h: LI2 active high ☐ L3h: LI3 active high ☐ L4h: LI4 active high ☐ LUh: active high 00 L1H L2H L3H L4H LUH		00
507.1	❑ **4 preset speeds** As 507.0		00
507.2	❑ **8 preset speeds** As 507.0		00
507.3 ( )	❑ **Preset speed 2** Visible only if 2 preset speeds 507.0 is not set to 00.	0 to 400 Hz	10 Hz
507.4 ( )	❑ **Preset speed 3** Visible only if 4 preset speeds 507.1 is not set to 00.	0 to 400 Hz	15 Hz
507.5 ( )	❑ **Preset speed 4** Visible only if 2 preset speeds 507.0 and 4 preset speeds 507.1 are not set to 00.	0 to 400 Hz	20 Hz
507.6 ( )	❑ **Preset speed 5** Visible only if 8 preset speeds 507.2 is not set to 00.	0 to 400 Hz	25 Hz
507.7 ( )	❑ **Preset speed 6** Visible only if 2 preset speeds 507.0 and 8 preset speeds 507.2 are not set to 00.	0 to 400 Hz	30 Hz
507.8 ( )	❑ **Preset speed 7** Visible only if 4 preset speeds 507.1 and 8 preset speeds 507.2 are not set to 00.	0 to 400 Hz	35 Hz
507.9 ( )	❑ **Preset speed 8** Visible only if 2 preset speeds 507.0, 4 preset speeds 507.1 and 8 preset speeds 507.2 are not set to 00.	0 to 400 Hz	40 Hz
508 ( )	❑ **Skip frequency** ☐ This parameter prevents prolonged operation within an adjustable range around 508 frequency of ±1 Hz. 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.

PID diagram


PID reference value
806
PID error
804
Reference channel 1
401
Activation internal PID reference
59. 05
PID correction reverse
59. 16
PID: Wake up level
59. 19
59 -
PID gain
59. 01
59. 02
59. 03
Modbus
Integrated display with Jog dial
Remote display
Preset PID assignment
59. 06
59. 07
PID min value and max value reference
59. 13
59. 14
PID reference ramp
59. 12
nO
YES
(1)
2, 3, 4 preset PID reference
59. 08
59. 09
59. 10
Internal PID reference
59. 11
59. 00
PID feedback scale factor
59. 04
59. 20
nO
Analog input
PID: Wake up threshold
59. 15
PID predictive speed
PID feedback
805
PID auto/manual assignment
59. 17 (LI)
(1)
auto
manual
Speed reference
801
High speed
512. 2
512. 0
Low speed
Acceleration ramp/ Deceleration ramp
PID manual reference
59. 18
nO
Analog input
Integrated jog dial
Preset speed

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
59 -	**PID menu**		
59.00	**❑ PID feedback assignment**		00
00	☐ Not assigned.		
01	☐ Analog terminal. Choice not possible if 401 is set to 00.		
59.01 ( )	**❑ PID proportional gain**	0.01 to 100	1
	Visible only if PID feedback assignment 59.00 is not set to 00.		
59.02 ( )	**❑ PID integral gain**	0.01 to 100	1
	Visible only if PID feedback assignment 59.00 is not set to 00.		
59.03 ( )	**❑ PID derivative gain**	0.00 to 100.00	0.00
	Visible only if PID feedback assignment 59.00 is not set to 00.		
59.04 ( )	**❑ PID feedback scale factor**	0.1 to 100.0	1.0
	This parameter gives the relation between process range and feedback range. Visible only if PID feedback assignment 59.00 is not set to 00.		
59.05	**❑ Activation internal PID reference value**		00
	Visible only if PID feedback assignment 59.00 is not set to 00.		
00	☐ No		
01	☐ Yes		
59.06	**❑ 2 preset PID assignment**		00
	Visible only if PID feedback assignment 59.00 is not set to 00.		
00	☐ None		
L1H	☐ L1h		
L2H	☐ L2h		
L3H	☐ L3h		
L4H	☐ L4h		
LUH	☐ LUH		

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

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
59 -	**PID menu** (continued)		
59.07	**❑ 4 preset PID assignment** Visible only if PID feedback assignment 59.00 (page 66) is not set to 00. ☐ None ☐ L1h ☐ L2h ☐ L3h ☐ L4h ☐ LUH Before assigning 4 preset PID assignment 59.07, 2 preset PID assignment 59.06 (page 66) must be assigned.		00 00 LIH L2H L3H L4H LUH
59.08	**❑ 2 preset PID reference value** Visible only if PID feedback assignment 59.00 (page 66) and 2 preset PID assignment 59.06 (page 66) are not set to 00.	0 to 100%	25%
59.09	**❑ 3 preset PID reference value** Visible only if PID feedback assignment 59.00 (page 66) and 4 preset PID assignment 59.07 (page 66) are not set to 00.	0 to 100%	50%
59.10	**❑ 4 preset PID reference value** Visible only if PID feedback assignment 59.00 (page 66), 2 preset PID assignment 59.06 and 4 preset PID assignment 59.07 (page 66) are not set to 00.	0 to 100%	75%
59.11	**❑ Internal PID reference value** Visible only if PID feedback assignment 59.00 (page 66) is not set to 00 and Activation internal PID reference value 59.05 (page 66) is set to 01 or Reference channel 1 401 (page 38) is set to 163.	0 to 100%	0%
59.12	**❑ PID reference value ramp** Visible only if PID feedback assignment 59.00 (page 66) is not set to 00.	0 to 100%	0%
59.13	**❑ PID min value reference** Visible only if PID feedback assignment 59.00 (page 66) is not set to 00.	0 to 100%	0%
59.14	**❑ PID max value reference** Visible only if PID feedback assignment 59.00 (page 66) is not set to 00.	0 to 100%	100%
59.15	**❑ PID predictive speed** This parameter allows direct attainment of a set speed reference. Visible only if PID feedback assignment 59.00 (page 66) is not set to 00.	0.1 to 400 Hz	nO

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

200 -
300 -
400 -
500 -
600 -
700 -

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
59 -	**PID menu** (continued)		
501.4 ( )	**❑ Acceleration 2** This parameter only can be activated when the system is starting. Second acceleration ramp time, adjustable from 0.1 to 999.9 s. The time required to accelerate from 0 to Rated motor frequency 306 (page 49). Make sure that this value is compatible with the inertia being driven. Visible only if PID feedback assignment 59.00 (page 66) and PID predictive speed 59.15 (page 67) are not set to 00.	0.0 to 999.9 s	5.0 s
59.16 00 01	**❑ PID correction reverse** This parameter will reverse the internal error value of PID system. ☐ No ☐ Yes Visible only if PID feedback assignment 59.00 (page 66) is not set to 00.		00
59.17 00 L1H L2H L3H L4H LUH	**❑ PID auto/manual assignment** At state 0 of input, PID is active. At state 1 of input, manual run is active. ☐ No ☐ L1h: LI1 active high ☐ L2h: LI2 active high ☐ L3h: LI3 active high ☐ L4h: LI4 active high ☐ LUh: LIU active high Visible only if PID feedback assignment 59.00 (page 66) is not set to 00.		00
59.18 00 01 02	**❑ PID manual reference** This parameter can disable the PID and enable the standard manual reference. ☐ No ☐ Anolog terminal ☐ Integrated display with Jog dial Visible only if PID feedback assignment 59.00 (page 66) and PID auto/manual assignment 59.17 (page 68) are not set to 00.		00
512.1 ( )	**❑ Low speed operating time** A motor stop is requested automatically following a defined period of operation at Low speed 512.0 (page 75). The motor restarts if the frequency reference is greater than Low speed 512.0 and if a run command is still present. Note: 00 value corresponds to an unlimited period. Visible only if PID feedback assignment 59.00 (page 66) is not set to 00.	0.1 to 999.9 s	00

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

Code	Name/Description	Adjustment range	Factory setting
5 0 0 -	**Function menu** (continued)		
5 9 -	**PID menu** (continued)		
5 9. 1 9	❑ **PID: wake up level**	0 to 100%	0%
	If PID functions and Low speed operating time 5 1 2. 1 are set at the same time, the PID regulator may try to set a speed lower than Low speed 5 1 2.0. This will result in unwanted operations consisting of starting, running at Low speed 5 1 2.0, stopping and so on. Parameter PID: wake up level 5 9. 1 9 can be used to set a minimum PID error threshold to restart after a prolonged stop below Low speed 5 1 2.0. Visible only if PID feedback assignment 5 9.0 0 (page 66) and Low speed operating time 5 1 2. 1 (page 68) are not set to 0 0.		
5 9.2 0 ( )	❑ **PID: Wake up threshold**	0 to 100%	0%
	If PID correction reverse 5 9. 1 6 (page 68) is set to nO, this parameter can be used to set the PID feedback threshold. Following a stop caused by exceeding the maximum time at low speed 5 1 2. 1, the PID regulator is reactivated (wake-up) when this threshold is exceeded. If 5 9. 1 6 is set to 0 1, the PID regulator is reactivated (wake-up) when this threshold is exceeded, following a stop caused by exceeding the maximum time at low speed 5 1 2. 1. Visible only if PID feedback assignment 5 9.0 0 (page 66) and Low speed operating time 5 1 2. 1 (page 75) is not set to 0 0.		

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

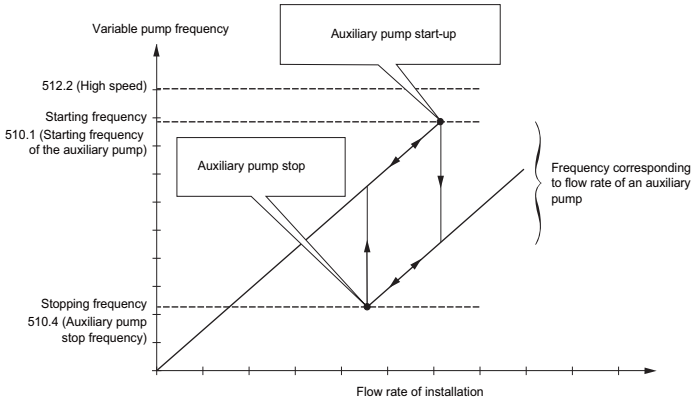
Selecting operating mode

ATV303 provides 2 possible operating modes:

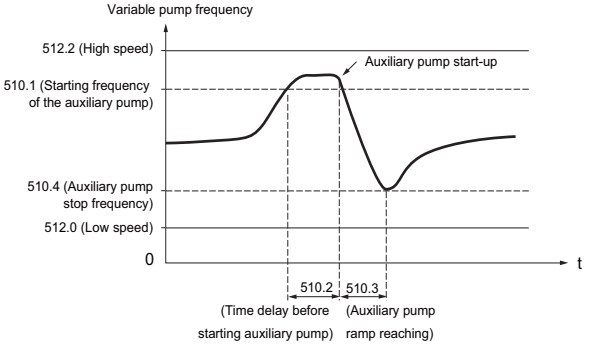
- Single frequency conversion mode: 1 frequency conversion pump
- Single frequency conversion combined with auxiliary pump mode: 1 frequency conversion pump and 1 constant speed pump

Auxiliary pump control

PID regulator output (frequency reference of the frequency conversion pump) is used to control the starting or stopping of an auxiliary pump (with hysteresis), as shown in the diagram below:

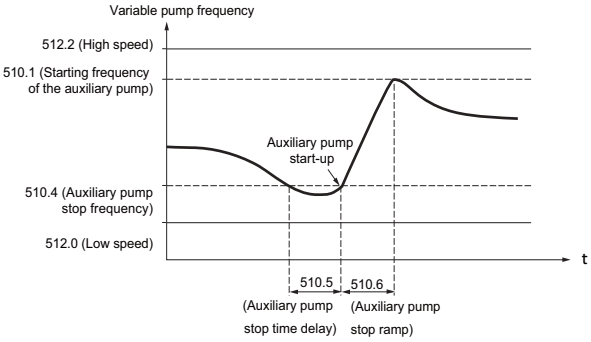


When the frequency exceeds the starting threshold (510.1), a time delay (510.2) is started to avoid the effects of transient flow fluctuations. If after this time delay, the frequency remains higher than the starting threshold, an auxiliary pump is started. When the start command is sent, the frequency conversion pump will adjust its active speed reference to the auxiliary pump stop frequency (510.4), the time taken for the speed change being equivalent to the time taken for the auxiliary pump to reach the rated speed (510.3). Parameter 510.3 will reduce as far as possible the impact shock generated during the start process of the starting pump.



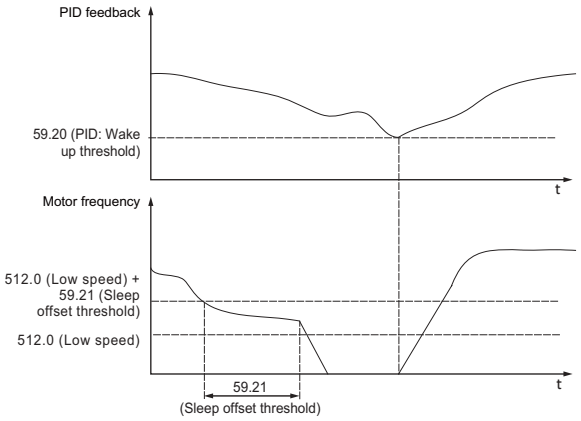
When the frequency is below the stopping threshold (510.4), a time delay (510.5) is used to avoid the effects of transient flow fluctuations. If after this time delay, the frequency remains below the stopping threshold, the auxiliary pump is stopped.

When the start command is sent, the frequency conversion pump will adjust its active speed reference to the Starting frequency auxiliary pump (510.1), the time taken for the speed change being equivalent to the time taken for the auxiliary pump to stop (510.6). Parameter 510.6 will reduce as far as possible the impact shock generated during the start process of the starting pump.



"Sleep" function / "Wake-up" function

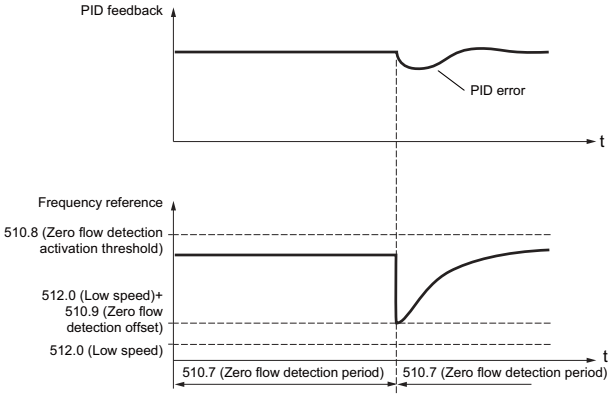
This function is used to stop the frequency conversion pump when flow rate is zero (auxiliary pumps have stopped). In this case, if the frequency of the frequency conversion pump is below the "sleep" threshold (512+59.21), the frequency conversion pump will stop after this time delay (512.1) if the frequency remains below 512.0+59.21. This is "Sleep" mode.
To switch to "wake-up" mode, the pressure feedback must drop to below the "wake-up" threshold UPP. The frequency conversion pump is then started.



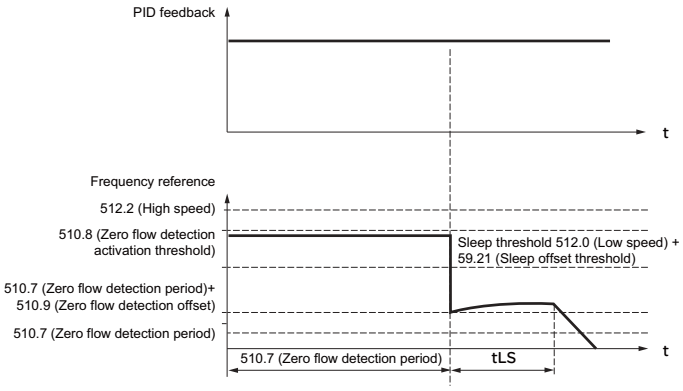
Zero flow detection

This function is activated when the auxiliary pump has stopped and the motor frequency is below the threshold 510.8.

This function is used in applications where zero flow cannot be detected by the sleep function alone. Forces drive frequency reference interval to 512+510.9 (interval is 510.7) to monitor zero flow.
- If the request is still present, the PI error increases and the drive will restart.



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



Code	Name/Description	Adjustment range	Factory setting
59.21	❑ **Sleep offset threshold** 0 ~ 512.2 (*0)	0 to 512.2	0 Hz
59.22	❑ **PID feedback supervision threshold** 0 - 100% (*0)	0 - 100%	0 (No)
59.23	❑ **PID supervision function time delay** 0 - 300s (*0)	0 - 300s	0 s
59.24	❑ **Maximum frequency detection Hysteresis**	0 to 512.2	0 Hz
59.25	❑ **PID feedback supervision**		00
00	☐ Alarm ignore		
01	☐ Freewheel stop		
04	☐ Fall back speed		
59.26	❑ **Fall back speed** 0~ high speed frequency (*0).	0 to 512.2	0 Hz
510-	**PUMP SUB-MENU**		
207	❑ **Application Overload time delay** ☐ Overload detection time delay ☐ Value of zero will inactivate the function and make other parameters unaccessable. ☐ 0 - 100s (*0)	0-100 s	5 s
208	❑ **Application Overload threshold** The overload detection threshold is expressed as a percentage of [Nominal motor current] (nCr). To activate the function, this value must be smaller than the limit current.	70 - 150 % In	90%
209	❑ **Overload fault duration** If [Overload fault management] (604.2) = [alarm ignore], then this parameter will be unaccessable. Minimum time allowed between overload detection and any automatic restart. To perform an automatic restart, the value of the [Automatic restart] (602.1) must exceed this parameter by at least one minute.	0-6 min.	0 min.
210	❑ **Application underload time delay** Value of zero will inactivate the function and make other parameters unaccessable.	0-100 s	0 s
211	❑ **Application Underload threshold** The underload threshold at zero frequency is expressed as a percentage of rated motor torque.	20%-100%	60%

Code	Name/Description	Adjustment range	Factory setting
2 12	❑ **Underload fault duration** Minimum time allowed between underload detection and any automatic restart. To perform an automatic restart, the value of the [Automatic restart] (6 0 2. 1) must exceed this parameter by at least one minute.	0-6 min.	-
S 10.0 0 0 0 1	❑ **Selecting operating mode** ☐ No: single frequency conversion mode ☐ Yes: single frequency conversion combined with auxiliary pump mode If S 10.0 = [0 1], digital output L 0 will automatically assign value pump switching.		
S 10. 1	❑ **Starting frequency of the auxiliary pump**	0- 3 0 8 parameter value	S 12.2 parameter value
	The auxiliary pump will start if this frequency is exceeded and after the pump start time delay (value of S 10.2).		
S 10.2	❑ **Time delay before starting auxiliary pump**	0-999.9s	2 s
	This time avoids the effects of transient pressure fluctuations and so avoids vibrations generated during pump starting and stopping.		
S 10.3	❑ **Auxiliary pump ramp reaching**	0-999.9s	2 s
S 10.4	❑ **Auxiliary pump stop frequency**	0- 3 0 8 parameter value	0Hz
	The auxiliary pump will stop below this frequency after the auxiliary pump stop delay (value of S 10.5).		
S 10.5	❑ **Auxiliary pump stop time delay**	0-999.9s	2 s
	This time avoids the effects of transient pressure fluctuations and so avoids vibrations generated during pump starting and stopping.		
S 10.6	❑ **Auxiliary pump stop ramp**	0-999.9s	2 s
S 10.7	❑ **Zero flow detection period**	0-20 min.	0 min.
	Function inactive if value is 0.		
S 10.8	❑ **Zero flow detection activation threshold**	0-400Hz	0Hz
	Below this threshold function activated if S 10. 7 value >0 and the auxiliary pump is stopped.		
S 10.9	❑ **Zero flow detection offset**	0-400Hz	0Hz

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
511 -	**CURRENT LIMITATION MENU**		
511.0	**❑ 2nd current limitation commutation**		00

Assignment
- ☐ 00: Function inactive
- ☐ L1H: LI1 active high
- ☐ L2H: LI2 active high
- ☐ L3H: LI3 active high
- ☐ L4H: LI4 active high
- ☐ LUH: LIU active high
- ☐ L1L: LI1 active low
- ☐ L2L: LI2 active low
- ☐ L3L: LI3 active low
- ☐ L4L: LI4 active low
- ☐ LUL: LIU 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 (page 39).

511.1 ( )	**❑ Current limitation**	0.25 to 1.5 In (1)	1.5 In

First current limitation.

CAUTION

RISK OF DAMAGE TO THE MOTOR
Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.

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

511.2 ( )	**❑ Current limitation 2**	0.25 to 1.5 In (1)	1.5 In

Second current limitation.
This function allows reduction of the drive current limit.

Visible only if 2nd current limitation commutation 511.0 (page 74) is not set to 00.

CAUTION

RISK OF DAMAGE TO THE MOTOR
Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.

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

(1) In = rated drive current

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

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
512 -	**Speed limit menu**		
512.0	❑ **Low speed** Motor frequency at minimum reference. This parameter is already included in the "MyMenu" section (page 38).	0 Hz to 512.2 parameter value	0 Hz
512.1	❑ **Low speed operating time** Following operation at Low speed 512.0 for a defined period, a motor stop is requested automatically. The motor restarts if the reference value is greater than Low speed 512.0 and if a run command is still present. **Note:** 00 corresponds to an unlimited period.	0.1 to 999.9 s	00

Code	Name/Description	Adjustment range	Factory setting
5 13	❑ Cooling fan control		01
00	☐ Fan runs while drive is running		
01	☐ Temperature control mode, fan starting and stopping controlled on basis of IGBT temperature		

High speed configuration

The logic inputs enable selection of the desired high speed.

Desired High speed	Setting	
	Parameter	State
5 12.2	5 12.3	00
	5 12.4	00
5 12.5	5 12.3	assigned
	5 12.4	00
5 12.6	5 12.3	00
	5 12.4	assigned
5 12.7	5 12.3	assigned
	5 12.4	assigned

Code	Name/Description	Adjustment range	Factory setting
500 -	**Function menu** (continued)		
5 12 -	**Speed limit menu**		
5 12.2 ( )	**❑ High speed**	512.0 to 308 parameter value	50 or 60 Hz determined by 301 parameter value, maximum 308 parameter value
	Motor frequency at maximum reference can be set in the range Low speed 5 12.0 to Maximum frequency 308 (page 49). If 308 falls below the value defined for 5 12.2, 5 12.2 automatically drops to the new value of 308. This parameter is already included in the "MyMenu" section (page 38).		
5 12.3	**❑ 2 High speed assignment**		00
00 L 1H L 2H L 3H L 4H L UH	☐ None ☐ L1h: LI1 active high ☐ L2h: LI2 active high ☐ L3h: LI3 active high ☐ L4h: LI4 active high ☐ LUh: LIU active high		
5 12.4	**❑ 4 High speed assignment**		00
00 L 1H L 2H L 3H L 4H L UH	☐ None ☐ L1h: LI1 active high ☐ L2h: LI2 active high ☐ L3h: LI3 active high ☐ L4h: LI4 active high ☐ LUh: LIU active high		
5 12.5 ( )	**❑ High speed 2**	512.0 to 308	As 512.2 parameter value
	Visible only if 2 High speed assignment 5 12.3 is not set to 00.		
5 12.6 ( )	**❑ High speed 3**	512.0 to 308	As 512.2 parameter value
	Visible only if 4 High speed assignment 5 12.4 is not set to 00.		
5 12.7 ( )	**❑ High speed 4**	512.0 to 308	As with 512.2 parameter value
	Visible only if 2 High speed assignment 5 12.3 and 4 High speed assignment 5 12.4 are not set to 00.		

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

Code	Name/Description	Adjustment range	Factory setting
600 -	**FAULT DETECTION MANAGEMENT MENU**		
601	**❑ Detected fault reset assignment**		00
	Manual fault reset. ☐ 00 Function inactive ☐ L1H: LI1 active high ☐ L2H: LI2 active high ☐ L3H: LI3 active high ☐ L4H: LI4 active high ☐ LUH: LIU 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 graphic display terminal performs the same function. See also Diagnostics and Troubleshooting (page 88).		
602 -	**Automatic restart menu**		
602.0	**❑ Automatic restart**		00
	⚠ DANGER **UNINTENDED EQUIPMENT OPERATION** Check that an automatic restart will not endanger personnel or equipment in any way. **Failure to follow these instructions will result in death or serious injury.**		
	This function permits definition of drive behaviour following a fault. If validated, this function allows an automatic restart following a fault (if the cause of the fault has disappeared and the other operating conditions permit the restart). ☐ 00 Function inactive. ☐ 01 Automatic restart after locking on a fault, if the fault 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 subsequent attempts. The drive fault relay remains activated if this function is active. The speed reference and the operating direction must be maintained. Use 2 wire type control (Type of control 201 (page 41) = 00 and 2-wire type control 202 (page 44) = 00). If the restart has not taken place once the Max. automatic restart 602.1 has elapsed, the procedure is aborted and the drive remains locked until it is turned off and then on again. The faults which permit use of this function are listed on page 90.		
602.1	**❑ Max. automatic restart**		5 min.
	☐ 00 5 min. ☐ 01 10 min. ☐ 02 30 min. ☐ 03 1 hr ☐ 04 2 hr ☐ 05 3 hr ☐ 06 Infinite Visible only if Automatic restart 602.0 is not set to 00. This parameter can be used to limit the number of consecutive restarts on a recurrent fault.		

Code	Name/Description	Adjustment range	Factory setting
600 -	**FAULT DETECTION MANAGEMENT MENU (continued)**		
603	**❑ Catch on the fly**		00

This function is used to enable a smooth restart if the run command is maintained after the following events:
- 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.

00	☐ Function inactive
01	☐ Function active

Motor thermal protection

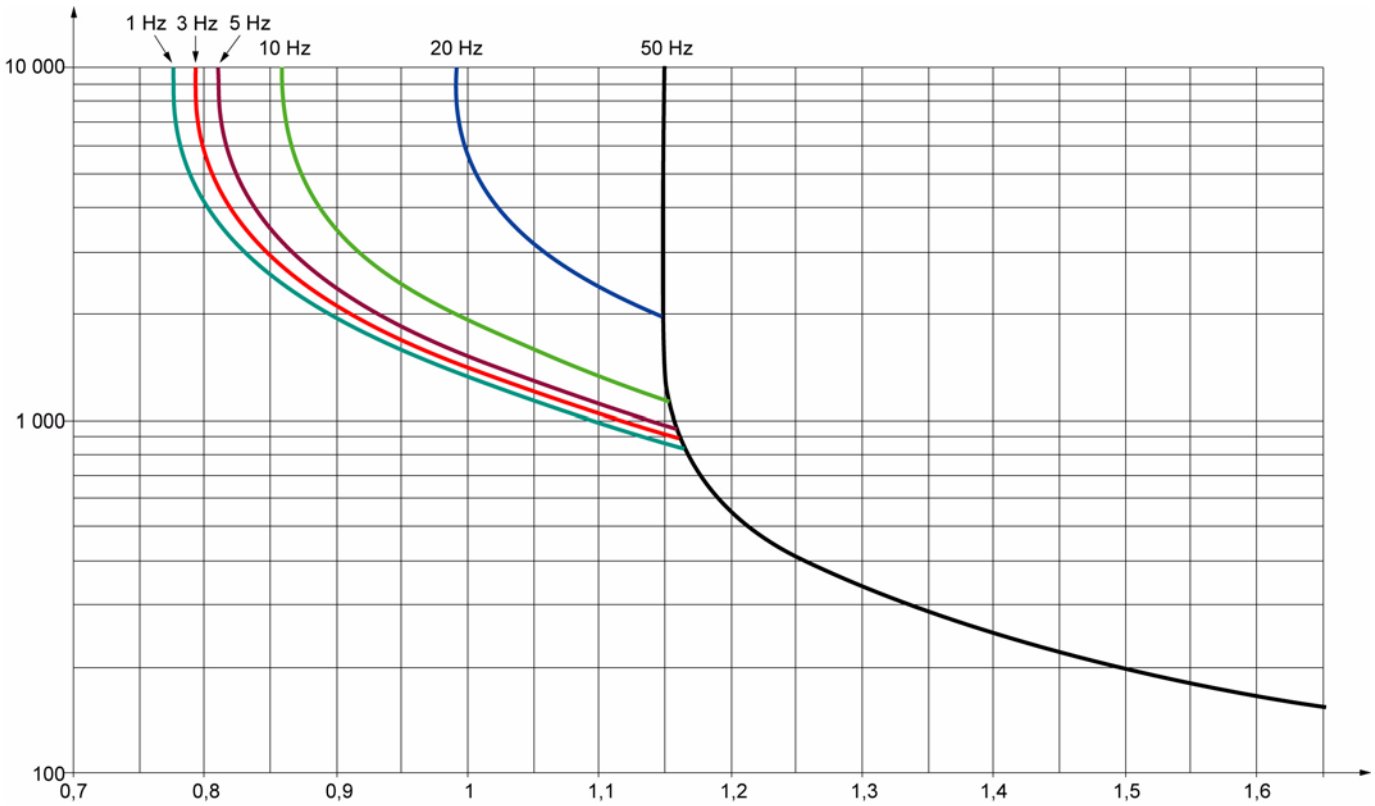
Function:

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 need be considered, regardless of the motor frequency.

Trip time in seconds



Motor current/604.0 parameter value

CAUTION

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 memo
- Running multiple motors
- Running motors rated at less than 0.2 times the nominal drive current
- When using motor switching

Failure to follow these instructions can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
600 -	**FAULT DETECTION MANAGEMENT MENU (continued)**		
604 -	**Motor Thermal Protection menu**		
604.0 ( )	**❑ Motor thermal current** Current used for motor thermal detection. Set ItH to the nominal current on the motor rating plate.	0.2 to 1.5 In (1)	Determined by drive rating
604.1 00 01	**❑ Motor protection type** ☐ Self-ventilated ☐ Motor-ventilated		00
604.2 00 01	**❑ Overload fault management** Type of stop in the event of a motor thermal fault. ☐ Fault ignored ☐ Freewheel stop Overload fault management Setting 604.2 to 00 inhibits the Motor overload fault FO 13 (page 89). **CAUTION** **RISK OF DAMAGE TO THE MOTOR** If 604.2 is set to 00, 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.**		01
604.3 00 01	**❑ Motor thermal state memo** ☐ Motor thermal state not stored at power off ☐ Motor thermal state is stored at power off		00
600 -	**FAULT DETECTION MANAGEMENT MENU (continued)**		
605 00 01	**❑ Output Phase loss** ☐ Function inactive ☐ Tripping on FO 14 (1 phase loss) or FO 15 (3 phase loss) fault with freewheel stop.		01
606 00 01	**❑ Input Phase loss** ☐ Fault ignored ☐ Fault with freewheel stop If one phase disappears, the drive switches to fault mode, but if 2 or 3 phases disappear, the drive continues to operate until it trips on an undervoltage fault.		01

(1) In = rated drive current

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

Code	Name/Description	Adjustment range	Factory setting
600 -	**FAULT DETECTION MANAGEMENT MENU (continued)**		
607 -	**Undervoltage menu**		
607.0	**❑ Undervoltage detected fault management**		00
	Behaviour of the drive in the event of an undervoltage 00 ☐ Detected fault and R1 relay open 01 ☐ Detected fault and R1 relay closed		
607.1	**❑ Undervoltage prevention**		00
	Behaviour in the event of the undervoltage fault prevention level being reached 00 ☐ No action (freewheel) 02 ☐ Stop following an adjustable ramp Undervoltage ramp deceleration time 607.2.		
607.2 ( )	**❑ Undervoltage ramp deceleration time**	0.0 to 10.0 s	1.0 s
	Undervoltage prevention 607.1 = 02 gives this ramp time.		
600 -	**FAULT DETECTION MANAGEMENT MENU (continued)**		
608	**❑ IGBT Test**		00
	00 ☐ No test 01 ☐ 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): F018, F019, F021 display - IGBT faulty: F020 display, where x indicates the number of the IGBT concerned IGBT short-circuited: x2F, where x indicates the number of the IGBT concerned		
609	**❑ 4-20mA loss Behaviour**		00
	00 ☐ Fault ignored. This configuration is only possible if AI1 current scaling parameter of 0% 204.1 (page 45) is not greater than 3 mA or AI1 type 204.0 = 0A. 01 ☐ Freewheel stop		
610	**❑ Detected fault inhibition assignment**		00
	To assign fault inhibit, press and hold down the ENT key for 2 s. 00 ☐ Function inactive L1H ☐ L1h: LI1 active high L2H ☐ L2h: LI2 active high L3H ☐ L3h: LI3 active high L4H ☐ L4h: LI4 active high LUH ☐ LUh: LIU active high		
2 s	**CAUTION** **RISK OF EQUIPMENT DAMAGE** Inhibiting faults results in the drive not being protected. This invalidates the warranty. Check that the possible consequences do not present any risk. **Failure to follow these instructions can result in equipment damage.**		

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.

Code	Name/Description	Adjustment range	Factory setting
600 -	**FAULT DETECTION MANAGEMENT MENU (continued)**		
611	**❑ Modbus detected fault management**		01

Behaviour of the drive in the event of a communication fault with integrated Modbus.

00 ☐ Fault ignored
01 ☐ Freewheel stop

⚠ WARNING

LOSS OF CONTROL

If Modbus detected fault management 611 is set to 00, communication control will be inhibited. For safety reasons, inhibition of communication fault should only be used for adjustment or special applications purposes.

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

612	**❑ Degraded line supply operation**		00

Lowers the tripping threshold of the F030 fault to operate on a line supply down to 50% of nominal line voltage. In this case, a line choke must be used and the performance of the drive controller cannot be guaranteed.

00 ☐ No
01 ☐ Yes

613	**❑ Reset power run**		00

This function will initialize the settings in the Monitor (800 -) section, menu 900 - (page 34).

00 ☐ No
07 ☐ Reset fan time display

614 ( )	**❑ Reset all previous detected faults via Run key**		00

If this function is active and the RUN key on the equipment panel is pressed for at least 2 s, some detected faults (1) can be reset.
This function is only effective for 2-wire or 3-wire control.
If type of control 201 (page 41) = 00 and 2 wire type control 202 (page 44) = 00 and the RUN command is still valid, the drive will run the motor after the fault is reset.
To change the assignment of this parameter, press the ENT key for 2 s.

(1) These faults include: F001, F002, F006, F008, F010, F014, F015, F017, F018, F019, F020, F021, F025, F027 and F028.

00 ☐ Inactive
01 ☐ Active

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

If parameter 614 is set to 1, press RUN key for 2 s and some detected faults (1) will be cleared.

- Check and ensure that this action does not pose any danger to persons or equipment.
- This function should only be used in special cases and is not recommended for use in typical equipment applications.

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

2 s

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.

Code	Name/Description	Adjustment range	Factory setting
700 -	**Communication menu**		
701	❑ **Modbus address**	OFF to 247	OFF
	Modbus address is adjustable in the range OFF to 247. When OFF, communication is not active.		
702	❑ **Modbus baud rate**		19.2
24	☐ 4.8 kbps		
28	☐ 9.6 kbps		
32	☐ 19.2 kbps		
36	☐ 38.4 kbps		
703	❑ **Modbus format**		8E1
02	☐ 8o1		
03	☐ 8E1		
04	☐ 8N1		
05	☐ 8N2		
704	❑ **Modbus time out**	0.1 to 30 s	10 s
	The drive detects a Modbus fault if the drive does not receive a Modbus request within a predefined time period (time out).		
705 -	**Input scanner menu** (values are expressed in hexadecimal)		
705.0	❑ **Com scanner read address parameter 1**		0C81
	Address of the 1st input word.		
705.1	❑ **Com scanner read address parameter 2**		219C
	Address of the 2nd input word.		
705.2	❑ **Com scanner read address parameter 3**		0
	Address of the 3rd input word.		
705.3	❑ **Com scanner read address parameter 4**		0
	Address of the 4th input word.		
706 -	**Output scanner menu** (values are expressed in hexadecimal)		
706.0	❑ **Com scanner write address parameter 1**		2135
	Address of the 1st input word.		
706.1	❑ **Com scanner write address parameter 2**		219A
	Address of the 2nd input word.		
706.2	❑ **Com scanner write address parameter 3**		0
	Address of the 3rd input word.		
706.3	❑ **Com scanner write address parameter 4**		0
	Address of the 4th input word.		

Code	Name/Description	Adjustment range	Factory setting
700 -	**Communication menu** (continued)		
707 -	**Input scanner access menu** (values are expressed in hexadecimal)		
707.0	❑ **Com scanner read address value 1** Value of the 1st input word.		ETA value
707.1	❑ **Com scanner read address value 2** Value of the 2nd input word.		RFRD value
707.2	❑ **Com scanner read address value 3** Value of the 3rd input word.		0
707.3	❑ **Com scanner read address value 4** Value of the 4th input word.		0
708 -	**Output scanner access menu** (values are expressed in hexadecimal)		
708.0 ( )	❑ **Com scanner write address value 1** Value of the 1st output word.		CMD value
708.1 ( )	❑ **Com scanner write address value 2** Value of the 2nd output word.		LFRD value
708.2 ( )	❑ **Com scanner write address value 3** Value of the 3rd output word.		0
708.3 ( )	❑ **Com scanner write address value 4** Value of the 4th output word.		0

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

Servicing

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the instructions provided in "Before you begin" before executing the operations described in this section.
Failure to execute these operations can result in death or serious injury.

Guarantee limitation

Schneider Electric does not take responsibility for the product if it is opened by persons other than a Schneider Electric representative.

Services

Environment	Related parts	Actions	Periodicity
Product impact	Enclosure - Control panel (LED display)	Check drive display part	Once per month
Corrosion	Terminals - connectors - screws	Check and clean	
Dust	Terminals - fans - vents		
Temperature	Product setting	Check and optimize	
Cooling	Fan	Check fan operation	
		Replace fan	As required
Vibration	Terminal connections	Check connection torque	Once per month

Spares and repairs

Products with maintenance provided. Please contact the customer care center.

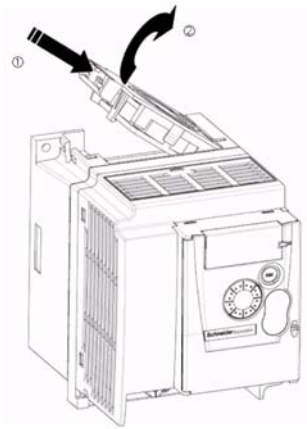
Prolonged storage

For products that have been stored for more than 2 years, voltage should be gradually increased in product capacitors.

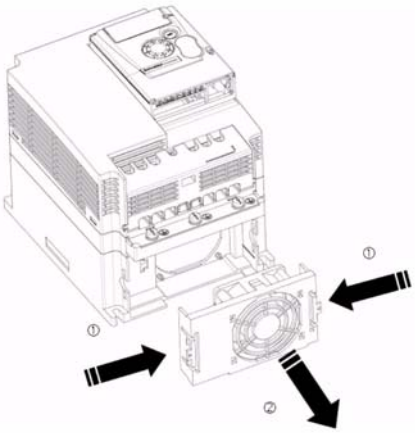
Fan replacement

Fan spares can be ordered for the ATV303. Contact the Schneider Electric Customer Care Center for details.

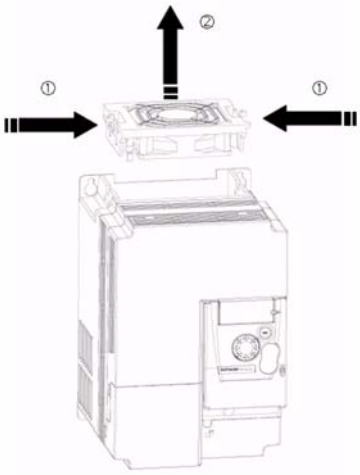
① Grasp the protruding part of fan bayonet mount ② Uncouple the connected parts and remove the fan



ATV303HU15N4
ATV303HU22N4



ATV303HU30N4
ATV303HU40N4
ATV303HU55N4



ATV303HU75N4
ATV303HD11N4

Servicing

The ATV303 does not require any preventive maintenance. However, it is advisable to perform the following checks regularly:

- Check environment 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

Disconnect the drive power supply in the event of a non-resettable fault.
Wait for the display to go off completely.
Find the cause of the detected fault and correct it.
Restore power to the drive.
The detected fault will no longer be present if its cause has been corrected.
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 13) to verify that the DC voltage is less than 42 V. The drive LED is not an accurate indicator 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 status of the drive and its current values shown on the display menu as an aid for finding the causes of detected faults.

Spares and repairs:

Serviceable product. Refer to spares replacement catalogue.

Procedure following prolonged storage

⚠ WARNING

RISK OF EXPLOSION AT POWER UP

Following a long period in storage capacitors can display problems. Following a storage time of between 2 and 3 years:

- Use one AC variable voltage supply, connected between L1, L2 and L3.
- Increase AC supply voltage to have:
  - 25% of rated voltage for 30 min
  - 50% of rated voltage for 30 min
  - 75% of rated voltage for 30 min
  - 100% of rated voltage for 30 min

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

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 phase connections, see page 19).
- The assignment of the "Fast stop" or "Freewheel" functions will prevent the drive starting if the corresponding logic inputs are not powered up. The ATV303 then displays 502.1 in freewheel stop mode and --01 in fast stop mode. --00 is displayed at freewheel stop end. This is normal, since these functions are active at zero so drive can safely stop in case of wire break. Assignment of LI to be checked in the CONF/FULL/500-/502- menu.
- Make sure that the run command input(s) is activated in accordance with the selected control mode (parameters in CONF/FULL/200- menu Type of control 201 (page 41) and 2-wire type control 202 (page 44).
- If the reference channel or command channel is assigned to Modbus, the drive displays "502.1" freewheel stop when the power supply is connected and remains in stop mode until the communication bus sends a command.
- "RUN" key is inactive in factory setting. Adjust parameters Reference channel 1 401 (page 55) and Command channel 1 407 (page 56) to control the drive locally (CONF/FULL/400- menu). See "How to control the drive locally" (page 45).

Fault detection codes which cannot be reset automatically

The cause of the fault must be removed before resetting by cycling power to the drive.

F025 and F028 faults can also be reset remotely by means of a logic input (in CONF/FULL/600- menu, parameter Detected fault reset assignment 601 (page 78).

F007, F025 and F028 faults can be inhibited and cleared remotely by means of a logic input (parameter Detected fault inhibition assignment 610 (page 82).

Code	Name	Possible causes	Remedy
F001	Precharge	• Charging relay control fault or charging resistor damaged	• Turn the drive off and then back on again. • Check the connections. • Check the stability of the main supply. • Contact local Schneider Electric representative.
F002	Unknown drive rating	• Power card and stored card versions different	• Contact local Schneider Electric representative.
F003	Unknown or incompatible power board	• The power card is incompatible with the control card	• Contact local Schneider Electric representative.
F004	Internal serial link fault	• Communication fault between the internal cards	• Contact local Schneider Electric representative.
F005	Invalid industrialization zone	• Internal data inconsistent	• Contact local Schneider Electric representative.
F006	Current measurement circuit	• Current measurement is not correct due to hardware circuit fault	• Contact local Schneider Electric representative.
----	Problem with application firmware	• Failed application firmware update using the Multi-Loader tool	• Re-download application firmware.
F007	Internal thermal sensor fault	• The drive temperature sensor is not operating correctly • The drive is in short circuit or open	• Contact local Schneider Electric representative.
F008	Internal CPU	• Internal microprocessor fault	• Turn the drive off and then back on again. • Contact local Schneider Electric representative.

Fault detection codes that cannot be reset automatically (continued)

Code	Name	Possible causes	Remedy
F 0 1 0	Overcurrent	• Parameters in the Motor control menu 3 0 0 - page 55 are not correct • Inertia or load too high • Mechanical locking	• Check the parameters. • Check the size of the motor/drive/load. • Check the state of the mechanism. • Connect line motor chokes. • Reduce the Switching frequency range 3 1 5 page 51. • Check the ground connection of drive, motor cable and motor insolation.
F 0 1 8	Motor short-circuit	• Short-circuit or grounding at the drive output • Ground fault while in run state • Motor switching while in run state • Significant current leakage to ground while several motors are connected in parallel	• Check the cables connecting the drive to the motor and the motor insulation. • Connect line motor chokes.
F 0 1 9	Ground short-circuit		
F 0 2 0	IGBT short circuit	• Internal power component short circuit detected at power on	• Contact local Schneider Electric representative.
F 0 2 5	Overspeed	• Instability • Overspeed associated with the inertia of the application	• Check the motor. • If overspeed is 10% more than Top frequency 3 0 8 (page 49) 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).
F 0 2 8	Autotuning fault	• Motor not connected to the drive • Motor phase loss • Special motor • Motor is rotating (being driven by the load, for example)	• Check that the motor/drive are compatible. • Check that the motor is present during autotuning. • If an output contactor is being used downstream, close it during auto-tuning. • Check that the motor is completely stopped.

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

These faults can also be reset by turning on and off or by means of a logic input (parameter Detected fault reset assignment 601 (page 78). F011, F013, F014, F015, F016, F022, F024 and F027 faults can be inhibited and cleared by means of a logic input [Detected fault inhibition assignment 610 (page 82)].

Code	Name	Possible causes	Remedy
F033	AI1 current loss	Detected if: • Analog input AI1 is configured as current • AI1 current scaling parameter of 0% 204. 1 (page 45) is greater than 3 mA • Analog input current is lower than 2 mA	• Check the terminal connection.
F009	Overbraking	• Sudden braking or load inertia too high	• Increase the deceleration time. • Install a module unit with a braking resistor if necessary. • Check the main supply voltage to ensure it is under the maximum acceptable (20% over maximum main supply during run status).
F011	Drive overheat	• Drive temperature too high	• 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 on page 12.
F012	Process overload	• Process overload	• Check that drive parameters and application processes are compatible.
F013	Motor overload	• Triggered by excessive motor current	• Check configuration of motor thermal protection and motor load.
F014	1 Output phase loss	• Loss of one phase on drive output	• Check the connections from the drive to the motor. • If using a downstream contactor, make sure the connection, cable and contactor are right.
F015	3 Output phases loss	• Motor not connected • Motor power too low, below 6% of the rated drive current • Output contactor open • Transient instability in the motor current	• 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 605 page 81 = 01. 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 605 = 00. • Check and optimize IR compensation 310 page 50, Rated motor voltage 304 page 49 and Rated motor voltage 305 page 49 and then perform Auto-tuning 318 page 52.
F016	Main overvoltage	• Line voltage too high: - At drive power on, supply is 10% over the maximum acceptable voltage level - At power with no run command, 20% over maximal line supply • Disturbed mains supply	• Check the line voltage.

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

Code	Name	Possible causes	Remedy
F017	Input phase loss	• Drive incorrectly supplied or a fuse blown • Failure of one phase • 3-phase ATV303 used on a single-phase line supply • Unbalanced load • This protection only operates with the drive on load	• Check the power connection and the fuses. • Use a 3-phase line supply. • Disable reporting of this fault type by setting Input Phase loss detection detection 606 (page 81) to 00.
F021	Load short circuit	• Short-circuit at drive output • Short circuit detection at the run command or DC injection command if parameter IGBT Test 608 (page 82) is set to 01	• Check the cables connecting the drive to the motor and the condition of motor insulation.
F022	Modbus interruption	• Interrupted communication on the Modbus network	• Check the connections of communication bus. • Check the time-out (parameter Modbus time out 704 page 84). • Refer to the Modbus user manual.
F024	HMI communication	• Communication fault when using external display terminal	• Check the terminal connection.
F029	Process underload	• Process underload • Time that motor current is below the Application Underload threshold 211 (page 47) exceeds the Application underload time delay 210 (page 47) to protect the application	• Check that drive parameters and application processes are compatible.
F027	IGBT overheat	• Drive overheated • IGBT internal temperature is too high for the ambient temperature and load	• Check the size of the load/motor/drive. • Reduce the Switching frequency 315 page 51. • Wait for the drive to cool down before restarting.

Fault detection codes that will be reset as soon as their causes disappear

USF faults can be inhibited and cleared remotely by means of a logic input parameter Detected fault inhibition assignment 6 10 (page 82).

Code	Name	Possible causes	Remedy
F031	Incorrect configuration	• HMI block replaced by an HMI block configured on a drive with a different rating • The current configuration of customer parameters is inconsistent	• 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.
F032 (1)	Invalid configuration	• 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	• Check the configuration loaded previously. • Load a compatible configuration.
F030	Undervoltage	• Line supply too low • Transient voltage dip	• Check the voltage and parameters on the Undervoltage phase loss menu 607- (page 81).

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

Some detected faults that are reset by pressing the RUN key

See Reset all previous detected faults via Run key F614 parameter (page 83).

HMI block changed

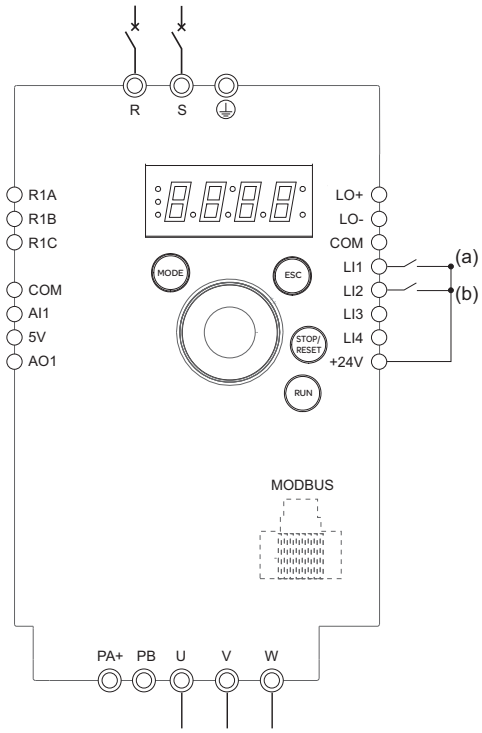
When an HMI block is replaced by an HMI block configured on a drive with a different rating, the drive locks in Incorrect configuration F031 fault mode on power-up. If the card has been deliberately changed, the fault can be cleared by pressing the ENT key twice, which **restores all the factory settings**.

Remote keypad error messages

Code	Name	Description
In It:	Auto-initialization on start	• Macro controller initialization • Searching communication configuration
COM.E (1)	Communication error	• 50 ms time out error • This message appears after 220 retry attempts
A - 17 (1)	Key alarm	• Key pressed down for longer than 10 seconds • Membrane switch disconnected • Keypad woken up while a key is being pressed
clr (1)	Confirm fault reset	• This message appears if the STOP key is pressed while the keypad is displaying a fault
dEU.E (1)	Drive mismatch	• Drive type (brand) does not match keypad type (brand)
rOM.E (1)	ROM abnormality	• ROM abnormality detected by checksum calculation
rAM.E (1)	RAM abnormality	• Keypad RAM abnormality detected
CPU.E (1)	Other fault	• Other fault

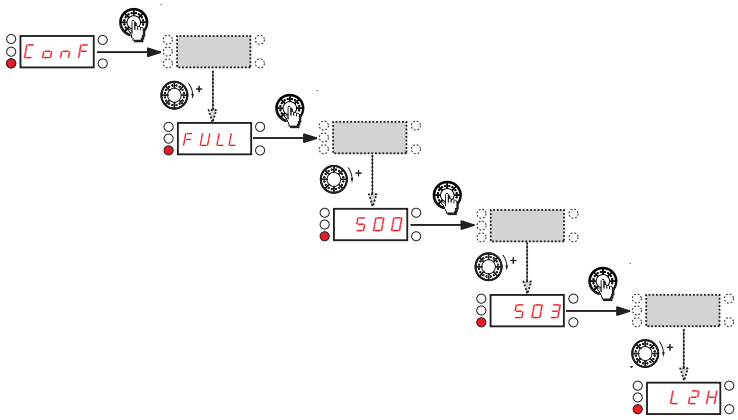
(1) Flashing

2-wire type control (source)



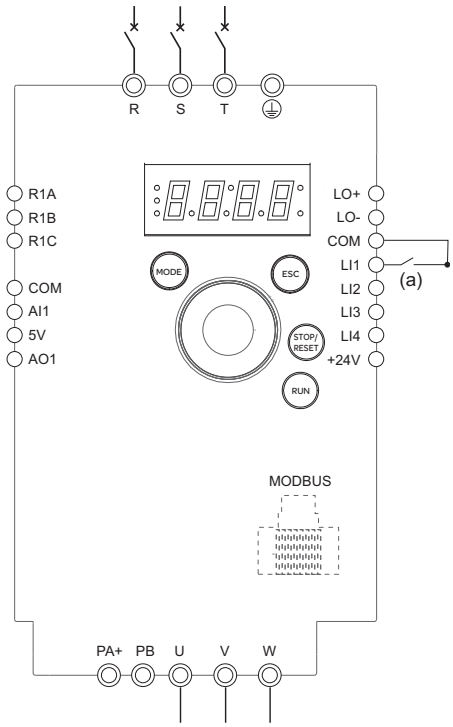
(a): Run Forward (b): Run Reverse

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, i.e. Factory / recall customer parameter set `102` (page 39) = `64`.
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 parameter Reverse direction `503` (page 59) to `L 12H`.



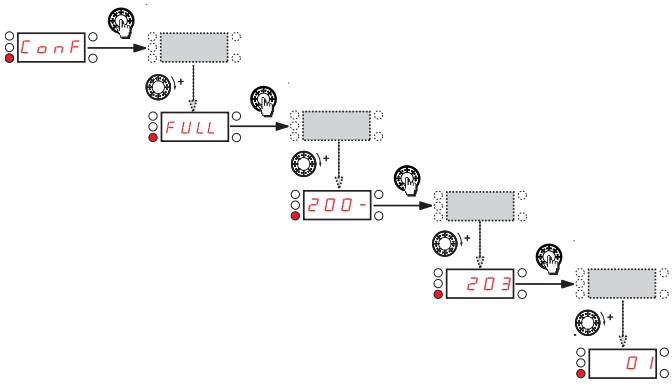
9. Start

3-wire control (sink)



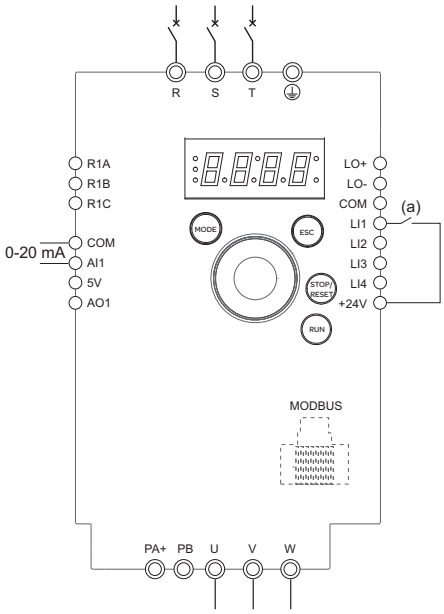
(a): Run Forward

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, i.e. Factory / recall customer parameter set `102` (page 39) = `64`.
6. Set `201` to `3C` (see page 41).
7. Set the motor parameters (in `CONF` mode) only if the factory configuration of the drive is not suitable.
8. Perform an auto-tuning.
9. Set parameter Logic inputs type `203` (page 44) to `01`.



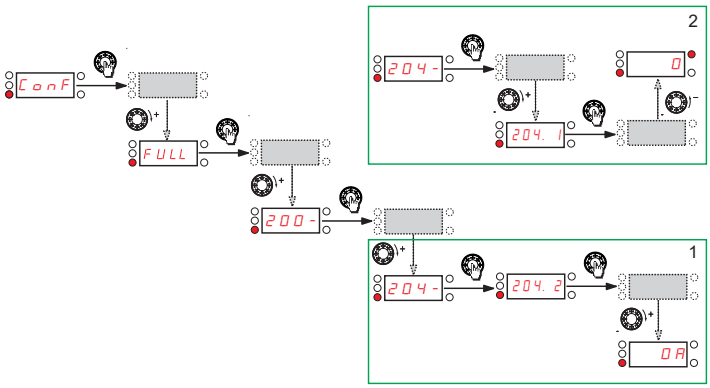
10. Start

Speed control 0-20 mA (source)



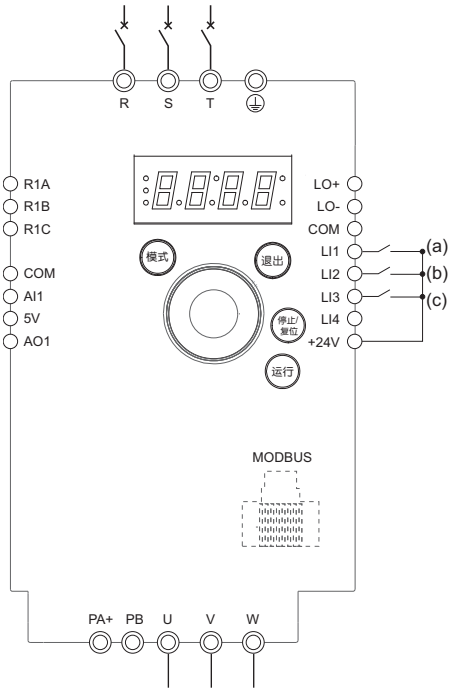
(a) Run Forward

1. Connect the ground terminal to the grounding screws located below the output terminals.
2. Connect the power terminals.
3. Connect the logic input LI1 and analog input AI1.
4. Turn on the drive without giving a run command.
5. Assign factory settings to the drive, i.e. Factory / recall customer parameter set `102` (page 39) = `64`.
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 AI1 type `204.0` (page 45) to `0A`, AI1 current scaling parameter of 0% `204.1` (page 45) to 0 A.
   Check that AI1 current scaling parameter of 100% `204.2` (page 45) is set to 20 mA.



9. Start

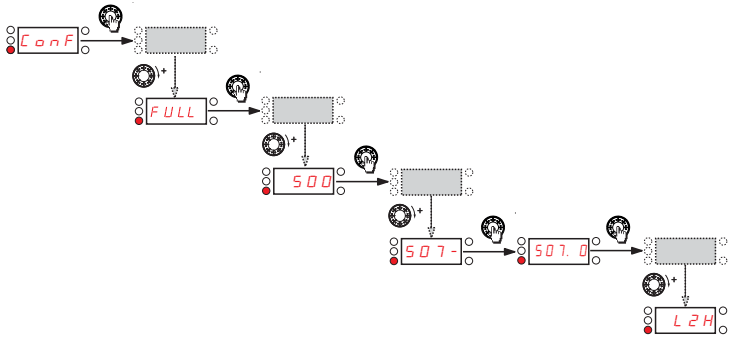
4 preset speeds (source)



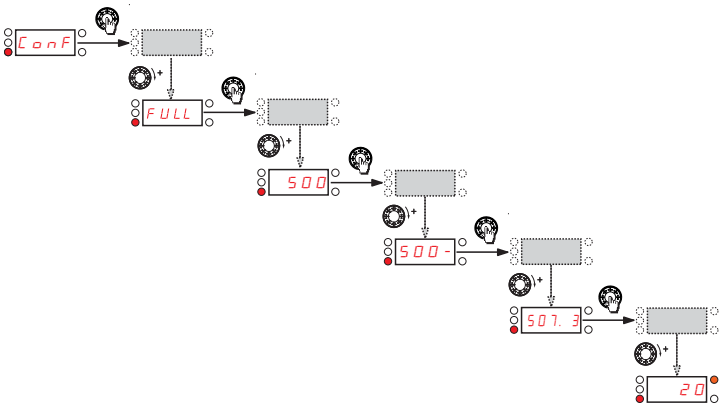
(a): Run Forward
(b): 2 preset speeds (c): 4 preset speeds

Important: Please refer to Function compatibility table (page 35).

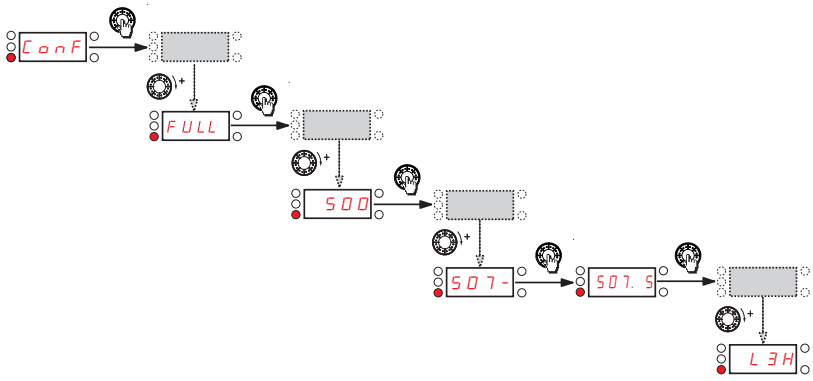
1. Connect the ground terminal to the grounding screws located below the output terminals.
2. Connect the power terminals.
3. Connect the logic inputs.
4. Turn on the drive without giving a run command.
5. Assign factory settings to the drive, i.e. Factory / recall customer parameter set `102` (page 39) = `64`.
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 2 preset speeds `507.0` (page 64) to `L2H`.



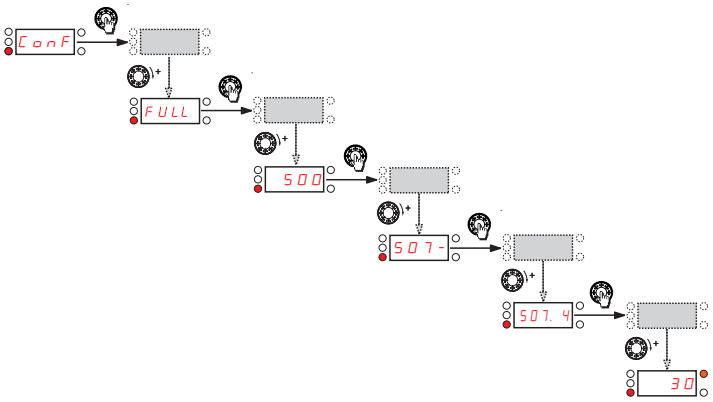
9. Set Preset speed 2 `507.3` (page 64) to 20 Hz.



Set preset speed 4 `507.5` (page 64) to `L3H`.

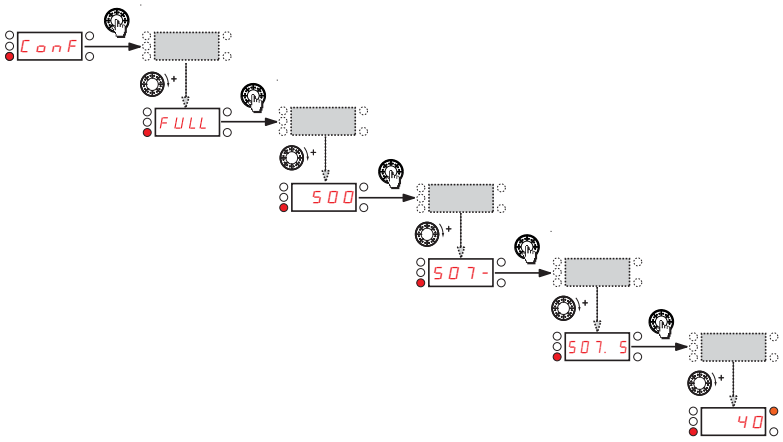


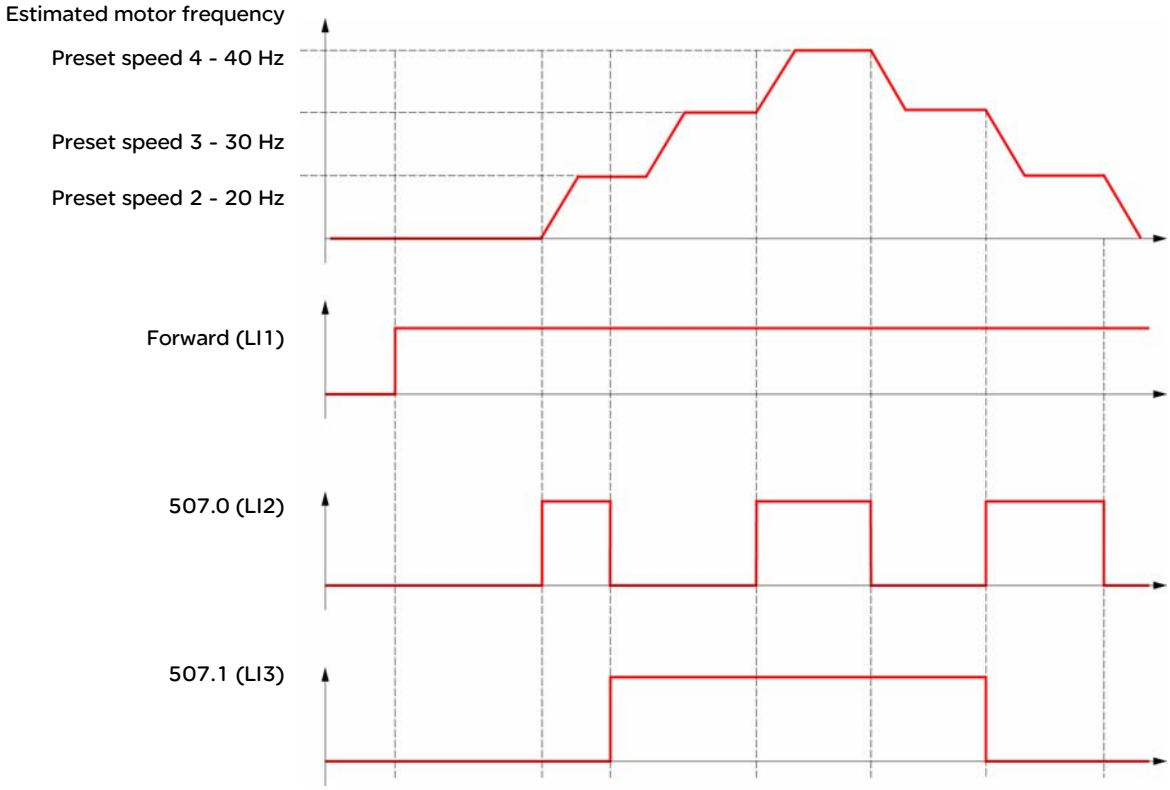
Set Preset speed 3 SO 7.4 (page 64) to 30 Hz.



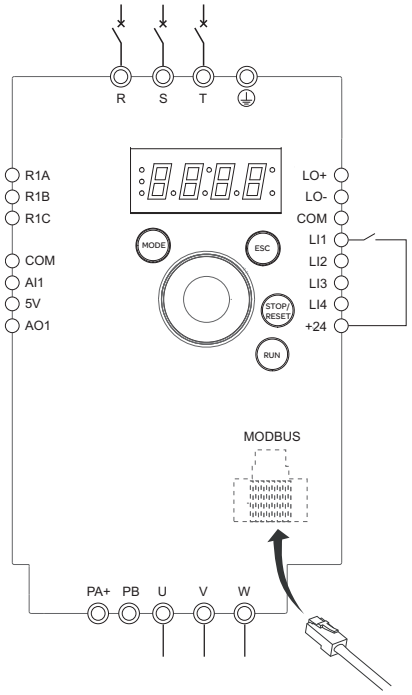
4 preset speeds (source) continued

Set Preset speed 4 507.5 (page 64) to 40 Hz.





Terminal command channel and Modbus reference channel

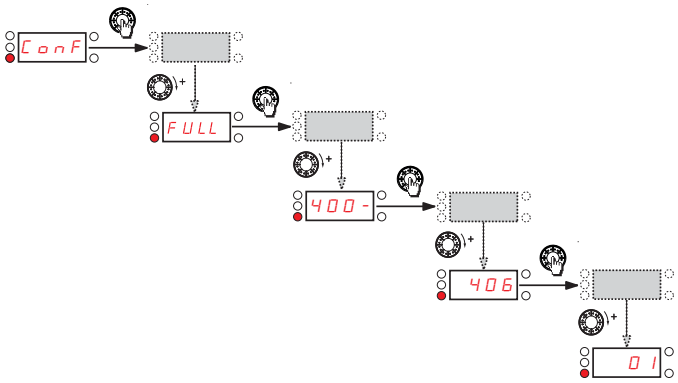


(a): Run Forward

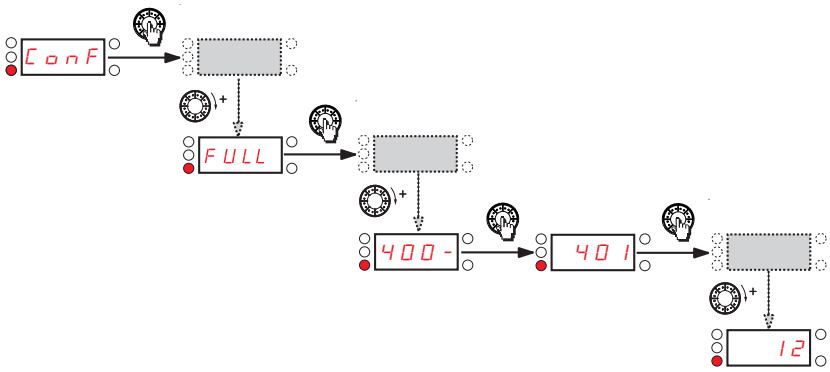
(a)

Important: Please refer to the Function compatibility table (page 35).

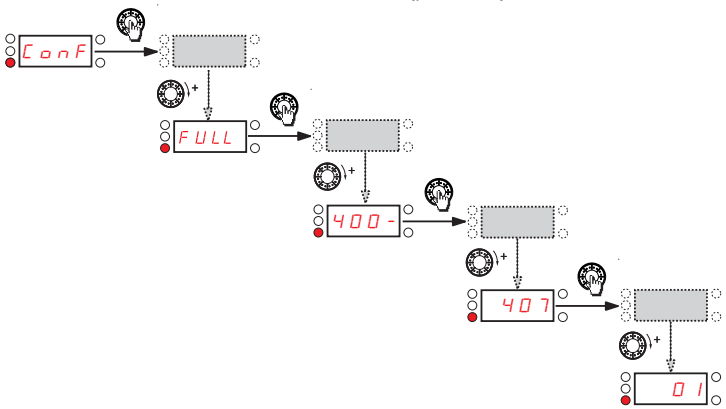
1. Connect the ground terminal to the grounding screws located below the output terminals.
2. Connect the power terminals.
3. Connect the logic input LI1 and plug RJ45 cable connector to the Modbus socket.
4. Turn on the drive without giving a run command.
5. Assign factory settings to the drive, i.e. set Factory / recall customer parameter set `102` (page 39) to `64`.
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 `406` (page 55) to `01`.



Set Reference channel 1 `401` (page 55) to `12`.



Check that Command channel 1 `407` (page 56) is set to `01`.



9. Start

Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
5 0 1.4	58 68	Acceleration 2	s	0.0 to 9 9 9.9	-	5 s	
5 0 1.0	38 57	Acceleration	s	0.0 to 9 9 9.9	-	3.0 s	
5 0 4.0	60	Automatic DC injection		0 0 0 1 0 2	No Yes Continuous	Yes	
7 0 1	84	Modbus address		O F F to 2 4 7	-	Off	
4 0 3	30 32 38 55	Analog input virtual	%	0 to 1 0 0	-	-	
2 1 6.0	48	AO1 assignment		0 0 0 C r 0 F r 0 r P 0 P S 0 P F 0 P E 0 P r t H r t H d	None Motor current Estimated motor frequency Ramp output PID reference value PID feedback PID error Output power Motor thermal state Drive thermal state	00	
2 1 6. 1	48	AO1 type		1 0 U 0 A 4 A	Voltage Current Current	0A	
6 0 2.0	78	Automatic restart		n 0 0 1	No Yes	00	
3 0 1	38 49	Standard motor frequency	Hz	0 0 0 1	-	50 Hz	
5 0 1.6	58	Decel Ramp Adaptation assignment		0 0 0 1 0 2	No Yes Motor braking	Yes	
9 0 7	34	Card 1 Software Version	-	-	-	-	-
9 0 8	34	Card 2 Software Version	-	-	-	-	-
4 0 7	56	Command channel 1		0 1 0 2 0 3 1 0	Terminals Local Remote display Modbus		
1 0 0	40	Macro-configuration	-	-	-	-	-
4 0 6	55	Channel configuration		0 1 0 2	Simultaneous mode Separate mode	01	
5 1 1	74	CURRENT LIMITATION MENU	A	0.2 5 to 1.5	-	1.5 A	

Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
511.2	74	Current limitation 2	A	0.25 to 1.5	-	1.5 A	
999	36	HMI Password	-	OFF On	Password disabled Password activated	OFF	
913	35	Modbus communication status	-	rOt0 rOt1 rlt0 rlt1	-	-	
303	49	Rated motor cos phi	-	0.5 to 1	-	Determined by drive rating	
204.2	45	AI1 current scaling parameter of 100%	mA	0 to 20	-	20 mA	
CrL1	45	AI1 current scaling parameter of 0%	mA	0 to 20	-	4 mA	
214	47	Motor current threshold	In	0 to 1.5	-	InV	
309	49	Motor control type	-	00 03 06	Standard High performance Pump	00	
502.3	59	Ramp divider		1 to 10	-	4	
501.5	58	Deceleration 2	s	0.0 to 999.9	-	5 s	
914	35	Last fault 1	-	See page 93		-	-
916	35	Last fault 2	-	See page 93		-	-
918	36	Last fault 3	-	See page 93		-	-
920	36	Last fault 4	-	See page 93		-	-
612	83	Degraded line supply operation		00 01	No Yes	00	
915	35	State of drive at fault 1	-	-	-	-	-
917	36	State of drive at fault 2	-	-	-	-	-
919	36	State of drive at fault 3	-	-	-	-	-
921	36	State of drive at fault 4	-	-	-	-	-
102	39	Factory / recall customer parameter set	-	00 64 02	No REC IN INI	00	
313	50	Frequency loop gain	%	0 to 100	-	20%	
408	56	Forced local assignment		00 L1H L2H L3H L4H	No L1h L2h L3h L4h	00	

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
409	56	Forced local reference		00 AI1 LCC AIU1	None Terminal HMI Jog Dial	00	
603	79	Catch on the fly		00 01	No Yes	00	
401	38 55	Reference channel 1		01 163 164 183	Terminal HMI Modbus Jog Dial	01	
801	30	Speed reference		AI1 LCC Mdb AIU1	Terminal HMI Modbus Jog Dial		
306	49	Rated motor frequency	Hz	10 to 400	-	50 or 60 Hz (301)	
502.2	59	Fast stop assignment		00 L1L L2L L3L L4L	NONE L1L: LI1 active low L2L: LI2 active low L3L: LI3 active low L4L: LI4 active low	00	
213	47	Motor frequency threshold	Hz	0 to 400	-	50 or 60 Hz	
911	35	Fan time display		0.01 to 999	-	-	-
512.2	38 77	High speed	Hz	512.0 to 308	-	50 or 60 Hz	
512.5	77	High speed 2	Hz	512.0 to 308	-	50 or 60 Hz determined by 301 and max. 308	
512.6	77	High speed 3	Hz	As 512.5	As HS2	As 512.5	
512.7	77	High speed 4	Hz	As 512.5	As HS2	As 512.5	
903	34	Display of high speed value	-	-	-	-	-
610	82	Detected fault inhibition assignment		00 L1H L2H L3H L4H	NONE L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high	00	
606	81	Input Phase loss	-	00 01	No Yes	Yes	
604	81	Motor thermal current	A	0.2 to 1.5	-	Determined by drive rating	
505	61	Jog assignment		00 L1H L2H L3H L4H	None L1h: LI1 active high L2h: LI2 active high L3h: LI2 active high L4h: LI4 active high	00	
508	64	Skip frequency	Hz	0 to 400	-	0 Hz	

Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
5 1 1.0	74	2nd current limitation commutation		0 0 L 1H L 2H L 3H L 4H L 1L L 2L L 3L L 4L	NONE 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	00	
803	32	Motor current	A	-	-	-	-
609	82	4-20mA loss Behaviour		0 0 0 1	No Yes	00	
402	32 38 55	External reference value	-	-400 to 400	-	0	
901	34	State of logic inputs LI1 to LI4	-	-	-	-	-
208	46	Application Overload threshold	% of In	70 to 150	-	90 %	
902	34	State of the logic output LO1 and relay R1	-	-	-	-	-
512	38 75	Low speed	Hz	0 to 512.2	-	0 Hz	
211	47	Application Underload threshold	% of In	20 to 100	-	60 %	
319	52	Motor parameter choice	-	0 0 0 1	00 01	01	
604.3	81	Motor thermal state memo	-	n 0 YES	No Yes	nO	
708.0	85	Com scanner write address value 1					
708.1	85	Com scanner write address value 2					
708.2	85	Com scanner write address value 3					
708.3	85	Com scanner write address value 4					
706.0	84	Com scanner write address parameter 1				2135	
706.1	84	Com scanner write address parameter 2				219C	
706.2	84	Com scanner write address parameter 3				0	
706.3	84	Com scanner write address parameter 4					

Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
305	49	Rated motor current	A (1)	0.25 to 1.5	-	Determined by drive rating	
904	34	Drive Power rating					
707.0	85	Com scanner read address value 1					
707.1	85	Com scanner read address value 2					
707.2	85	Com scanner read address value 3					
707.3	85	Com scanner read address value 4					
705.0	84	Com scanner read address parameter 1	-			0C81	
705.1	84	Com scanner read address parameter 2	-			219C	
705.2	84	Com scanner read address parameter 3	-			0	
705.3	84	Com scanner read address parameter 4	-			0	
203	44	Logic inputs type	-	00 01	Positive logic Negative logic	00	
302	39 49	Rated Motor Power	kW or HP	-	-	Determined by drive rating	
317	51	Motor noise reduction		00 01	No Yes	00	
307	49	Rated motor speed	rpm	0 to 32767	-	Determined by drive rating	
502.1	59	Freewheel stop assignment		00 L1L L2L L3L L4L	No L1L: LI1 active low L2L: LI2 active low L3L: LI3 active low L4L: LI4 active low	00	
604.2	81	Overload fault management	-	nO YES	No Yes	Yes	
605	81	Output Phase loss	-	00 01	No Yes	Yes	
810	32	Output power	%	-	-	-	-
59.17	68	PID auto/manual assignment		00 L1H L2H L3H L4H	No L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high	00	
912	35		0.01	-	-	-	-
314	51	Flux Profile	%	0 to 100		20%	
59.16	68	PID correction reverse	-	00 01	No Yes	00	

(1) In = rated drive current

Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
59.00	66	PID feedback assignment		00 01	None Terminal	00	
59.05	66	Activation internal PID reference value		00 01	No Yes	00	
59.18	68	PID manual reference		00 AI1 AIU	No Terminal AIV	00	
59.06	66	2 preset PID assignment	-	00 L1H L2H L3H L4H	None L1h L2h L3h L4h	00	
59.07	67	4 preset PID assignment		59.06	As 59.06	00	
59.12	67	PID reference value ramp	s	0 to 99.9	-	0 s	
507.0	64	2 preset speeds		00 L1H L2H L3H L4H	None L1h: LI1 active high L2h: LI2 active high L3h: LI2 active high L4h: LI4 active high	00	
507.1	64	4 preset speeds		507.0	As 507.0	00	
507.2	64	8 preset speeds		507.0	As 507.0	00	
405	55	Stop key priority		00 01	No Yes	Yes	
910	35	Power On time display		0.01 to 999	-	-	-
205	45	R1 assignment	-	00 01 02 04 05 06 07 08 21 22 123	Not assigned No error detected Drive run Frequency threshold reached 512.2 reached I threshold reached Frequency reference reached Motor thermal state reached Underload alarm Overload alarm AI1 Al. 4-20	01	
59.03	66	PID derivative gain		0.00 to 100.00	-	0.00	
802	32	Output frequency	Hz	-	-	-	
59.02	66	PID integral gain		0.01 to 100	-	1	
404	55	Reverse inhibition		00 01	No Yes	00	

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
S9.08	67	2 preset PID reference value	%	0 to 100	-	25%	
S9.09	67	3 preset PID reference value	%	0 to 100	-	50%	
S9.10	67	4 preset PID reference value	%	0 to 100	-	75%	
806	32	PID reference	-	-	-	-	-
804	32	PID error	-	-	-	-	-
805	32	PID feedback	-	-	-	-	-
S9.01	66	PID proportional gain		0.01 to 100	-	1	
S9.14	67	PID max value reference	% PID	0 to 100	-	100%	
S9.11	67	Internal PID reference value	% PID	0 to 100	-	0%	
S9.13	67	PID min value reference	% PID	0 to 100	-	0%	
613	83	Reset power run		00 01	Function inactive Reset fan time display	00	
S01.3	57	Ramp switching commutation		00 L1H L2H L3H L4H L1L L2L L3L L4L	None 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	00	
S01.2	57	Ramp shape assignment		00 01 02	Linear S-shape U-shape	00	
S03	59	Reverse direction	-	00 L1h L2H L3H L4H	Function inactive L1h active high L2h active high L3h active high L4h active high	00	
601	78	Detected fault reset assignment	-	00 L1H L2H L3H L4H	None L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high	00	
S9.19	70	PID: wake up level	%	0 to 100	-	0%	
909	35	Run elapsed time display	0.01h	0.01 to 999	-	-	-
101	39	Store customer parameter set	-	00 01	No Yes	00	
S04.1	60	Automatic DC injection current	A	0 to 1.2		0.7 A	
315	51	Switching frequency	kHz	2 to 16	-	12	
S9.15	67	PID predictive speed	-	n0 to 400	-	00	

Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
S12.3	77	2 High speed assignment	-	00 L1H L2H L3H L4H	None L1h: LI1 active high L2h: LI2 active high L3h: LI3 active high L4h: LI4 active high	00	
S12.4	77	4 High speed assignment	-	As S12.3	As S12.3	00	
611	83	Modbus detected fault management		00 01	No Yes	Yes	
311	50	Slip compensation	% of nSL	0 to 150	-	100%	
S07.3	64	Preset speed 2	-	-	-	-	-
S07.4	64	Preset speed 3	-	-	-	-	-
S07.5	64	Preset speed 4	-	-	-	-	-
S07.6	64	Preset speed 5	Hz	0 to 400	-	25 Hz	
S07.7	64	Preset speed 6	Hz	0 to 400	-	30 Hz	
S07.8	64	Preset speed 7	Hz	0 to 400	-	35 Hz	
S07.9	64	Preset speed 8	Hz	0 to 400	-	40 Hz	
906	34	Specific Product Number	-	-	-	-	-
312	50	Frequency loop stability	%	0 to 100	-	20%	
811	33	Product status	-	-	-	-	-
607.2	82	Undervoltage ramp deceleration time	s	0.0 to 10.0	-	1.0 s	
607.1	82	Undervoltage prevention	-	00 02	No Ramp stop	00	
608	82	IGBT Test		00 01	No Yes	00	
S02.0	59	Type of stop		00 01 02	Ramp stop Fast stop Freewheel stop	00	
602.1	78	Max. automatic restart		5 10 30 1H 2H 3H nH	5 min. 10 min. 30 min. 1 hr 2 hr 3 hr Infinite	5 min.	
702	84	Modbus baud rate		4.8 9.6 19.2 38.4	4.8 kbps 9.6 kbps 19.2 kbps 38.4 kbps	19.2 kbps	
201	41	Type of control	-	00 01	2 wire type control 3-wire control	00	
202	44	2-wire type control	-	00 01 02	0/1 level Transition Priority FW	00	

Parameter index

Code	Page	Name	Unit	Possible value / Function		Factory setting	User setting
504.2	60	Automatic DC injection time	s	0.1 to 30		0.5 s	
703	84	Modbus format	-	00 01 02 03	8o1 8E1 8n1 8n2	8E1	
308	49	Maximum frequency	Hz	10 to 400		60 or 72 Hz (to 301)	
809	32	Drive thermal state	-	-	-	-	-
808	32	Motor thermal state	%	-	-	-	-
604.1	81	Motor protection type	-	ACL FCL	Self-ventilated Motor-ventilated	ACL	
512.1	68 75	Low speed operating time	s	0.1 to 999.9	-	nO	
207	46	Application Overload time delay	s	0 to 100	-	5 s	
215	47	Motor thermal state threshold	% of tHr	0 to 118		100%	
704	84	Modbus time out	-	0.1 to 30	-	10	
318	52	Auto-tuning	-	00 01 02	No Yes Complete	00	
310	50	IR compensation	%	25 to 200	-	100%	
807	32	Main voltage	V	-	-	-	-
210	47	Application underload time delay	s	0 to 100	-	5 s	
304	49	Rated motor voltage	V	100 to 480	-	230 V	
59.20	70	PID: Wake up threshold	%	0 to 100	-	0	
607.0	82	Undervoltage detected fault management	-	0 1	Detected fault + R1 open Detected fault + R1 closed	0	
905	34	Drive voltage rating	-	00	-	-	-
614	83	Reset all previous detected faults via Run key	-	00 01	Inactive Active	00	-

Notes

Notes

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