Altivar® 71

Variable Speed Drives for Synchronous and Asynchronous Motors

Programming Manual

30072-452-92

Retain for future use.

Specification 383
Software V2.8

Schneider Electric

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Please Note

The following symbols and special messages may appear in this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

A lightning bolt or ANSI man symbol in a “Danger” or “Warning” safety label on the equipment indicates an electrical hazard which, as indicated below, can or will result in personal injury if the instructions are not followed.

The exclamation point symbol in a safety message in a manual indicates potential personal injury hazards. Obey all safety messages introduced by this symbol to avoid possible injury or death.

Symbol	Name
	Lightning Bolt
	ANSI Man
	Exclamation Point

⚠ 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 or serious injury.

⚠ CAUTION

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

CAUTION

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

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 material.

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Before you begin

Read and understand these instructions before performing any procedure on this drive. [a]

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the Altivar® 71 drive. Installation, adjustment, repair, and maintenance 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 in this drive, including the printed circuit boards, operate at the line voltage. 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 PA/+ and PC/– or across the DC bus capacitors.
- 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. Then follow the "Bus voltage measurement" on page 18 to verify that the DC voltage is less than 42 V. The drive LED is not an indicator of the absence of DC bus voltage.
- Install and close all covers before applying power or starting and stopping the drive.

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

⚠ CAUTION

DAMAGED EQUIPMENT

Do not operate or install any drive that appears damaged.

Failure to follow these instructions can result in equipment damage.

⚠ WARNING

LOSS OF CONTROL FROM A COMMUNICATION INTERRUPTION

- 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. (1)
- Each implementation of an Altivar® 71 drive must be individually and thoroughly tested for proper operation before being placed into service.

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

1. 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

IMPROPER DRIVE OPERATION

- If the drive is not turned on for a long period, the performance of its electrolytic capacitors will be reduced.
- If the drive is stopped for a prolonged period, turn the drive on every two years for at least 5 hours to restore the performance of the capacitors, then check its operation.
- Do not connect the drive directly to line voltage. Increase the voltage gradually using an adjustable AC source. If the drive is not turned on for a long period, the performance of its electrolytic capacitors will be reduced.

Failure to follow these instructions can result in equipment damage.

a. The word “drive” as used in this bulletin refers to the controller portion of the adjustable speed drive as defined in the National Electrical Code (NEC).

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Documentation structure

The following Altivar® 71 (ATV 71) technical documents are available on the Schneider Electric website (www.schneider-electric.us), as well as on the CD-ROM supplied with the drive.

Installation Manual

This describes how to assemble and connect the drive.

Programming Manual

This describes the functions, parameters and use of the drive terminal (integrated display terminal and graphic display terminal).
The communication functions are not described in this manual, but in the manual for the bus or network used.

Communication Parameters Manual

This manual describes:

- The drive parameters with specific information for use via a bus or communication network.
- The operating modes specific to communication (state chart).
- The interaction between communication and local control.

Manuals for Modbus®, CANopen, Ethernet, Profibus, INTERBUS®, Uni-Telway, FIPIO™, and Modbus® Plus.

These manuals describe the assembly, connection to the bus or network, signalling, diagnostics, and configuration of the communication-specific parameters via the integrated display terminal or the graphic display terminal. They also describe the communication services of the protocols.

Terminology

Technical terms, terminology and the corresponding descriptions in this manual are intended to use the terms or definitions of the pertinent standards.
In the area of drive systems, this includes, but is not limited to, terms such as "fault", "fault reset", "failure", "error", "error message", "warning", "warning message", "alarm", etc.

Among others, these standards include:

- IEC 61800 series: "Adjustable speed electrical power drive systems"
- IEC 61800-7 series: "Adjustable speed electrical power drive systems
  - Part 7-1: "Generic interface and use of profiles for power drive systems - Interface definition"
- IEC 61158 series: "Industrial communication networks - Fieldbus specifications"
- IEC 61784 series: "Industrial communication networks - Profiles"
- IEC 61508 series: "Functional safety of electrical/electronic/programmable electronic safety-related systems"

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Software enhancements

Since the Altivar® 71 was first launched, it has benefited from the addition of several new functions. The software version has now been updated to V2.8. The new version can be substituted to the previous versions without making any changes.
Although this documentation relates to version V2.8, it can still be used with previous versions, as the updates merely involves the addition of new values and parameters. None of the previous versions parameters have been modified or removed.
The software version is indicated on the nameplate attached to the body of the drive.

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

Factory setting

NOTE: In version V1.1, the analog input was 0 to ± 10 V. In the new version this input has been set to 0 to + 10 V.
In version V1.1, analog output AO1 was assigned to the motor frequency. In the new version, this output is not assigned at all.

With the exception of these two parameters, the factory settings of version V1.1 remain the same in the new version. The new functions are factory-set to disabled.

Motor frequency range

The maximum output frequency has been extended from 1000 to 1600 Hz (depending on the drive rating and control profile).

New parameters and functions

Menu [1.2 MONITORING] (SUP-)

Addition of internal states and values relating to the new functions described below.

Menu [1.3 SETTINGS] (SEt-)

- [High torque thd.] (ttH), page 71.
- [Low torque thd.] (ttL), page 71.
- [Pulse warning thd.] (FqL), page 72.
- [Freewheel stop Thd.] (FFt), page72.

Menu [1.4 MOTOR CONTROL] (drC-)

- [rpm increment] (InSP), page 79.
- Extension of the following configurations to all drive ratings; previously limited to 45 kW (60 hp) for ATV71●●●M3X and to 75 kW (100 hp) for ATV71●●●N4:synchronous motor [Sync. mot.] (SYn), page 74, sinus filter [Sinus filter] (OFI), page 76, noise reduction [Noise reduction] (nrd), page 97, braking balance [Braking balance] (bbA), page 101.

Menu [1.5 INPUTS / OUTPUTS CFG] (I-O-)

- Input AI1 can now be configured to 0 to +10 V or 0 to ± 10 V via [AI1 Type] (AI1t), page 110.
- [AI net. channel] (AIC1), page 114.
- New methods of assigning relays and logic outputs, page 121: rope slack, high torque threshold, low torque threshold, motor in forward rotation, motor in reverse rotation, measured speed threshold reached, load variation detection.
- Analog output AO1 can now be used as a logic output and assigned to relay functions and logic outputs, page 126.
- New method of modifying the scale of analog outputs, page 128: using the parameters [Scaling AOx min] (ASLx) and [Scaling AOx max] (ASHx).
- New methods of assigning logic outputs, page 129: signed motor torque and measured motor speed.
- New methods of assigning alarm groups, page 132: rope slack, high torque threshold, low torque threshold, measured speed threshold reached, load variation detection.

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Software enhancements

Menu [1.7 APPLICATION FUNCT.] (Fun-)

- The summing, subtraction and multiplication reference functions can now be assigned to virtual input [Network AI] (AIU1), page 151.
- New parameter [Freewheel stop Thd.] (FFt), page 155 used to set a threshold for switching to freewheel at the end of a stop on ramp or fast stop.
- Brake engage at regulated zero speed [Brake engage at 0] (bECd), page 174.
- Weight [Weight sensor ass.] (PES), page 181 can now be assigned to virtual input [Network AI] (AIU1).
- New rope slack function page 185, with the parameters [Rope slack config.] (rSd) and [Rope slack trq level] (rStL).
- Use of the ramp [Acceleration 2] (AC2), page 193 when starting and waking up the PID function.
- The torque limitation [TORQUE LIMITATION] (tOL-), page 200 can now be configured in whole % or in 0.1% increments using [Torque increment] (IntP) and assigned to virtual input [Network AI] (AIU1).
- New stop at distance calculated after deceleration limit switch function page 208, with the parameters [Stop distance] (Std), [Rated linear speed] (nLS) and [Stop corrector] (SFd).
- Positioning by sensors or limit switch [POSITIONING BY SENSORS] (LPO-), page 209 can now be configured in positive logic or negative logic using [Stop limit config. (SAL) and [Slowdown limit cfg.] (dAL).
- Parameter set switching [PARAM. SET SWITCHING] (MLP-), page 212 can now be assigned to the frequency thresholds attained [Freq. Th. att.] (FtA) and [Freq. Th. 2 attain.] (F2A).
- New half-floor: [HALF FLOOR] (HFF-) menu, page 226.

Menu [1.8 FAULT MANAGEMENT] (FLt)

- Possibility of reinitializing the drive without turning it off, via [Product reset] (rP), page 231.
- Possibility of reinitializing the drive via a logic input without turning it off, using [Product reset assig.] (rPA), page 231.
- The possibility of configuring the "output phase loss" fault [Output Phase Loss] (OPL), page 235 to [Output cut] (OAC) has been extended to all drive ratings (previously limited to45 kW (60 hp) for ATV71●●●M3X and 75 kW (100 hp) for ATV71●●●N4).
- The external fault [EXTERNAL FAULT] (EtF-), page 238 can now be configured in positive or negative logic via [External fault config.] (LEt).
- New monitoring function based on speed measurement via "Pulse input" page 245, via the [FREQUENCY METER] (FqF-) menu.
- New function for detecting load variation page 247, via the [DYNAMIC LOAD DETECT] (dLd-) menu.
- Short-circuit faults on the braking unit can now be configured via [Brake res. fault Mgt] (bUb), page 249.

Menu [7 DISPLAY CONFIG.]

In [7.4 KEYPAD PARAMETERS] page 278, the [KEYPAD CONTRAST] and [KEYPAD STAND-BY] parameters to adjust the contrast and stand-by mode of the graphic display unit.

Enhancements made to version V1.3 (S383) in comparison to V1.2

New parameters and functions

Menu [1.4 MOTOR CONTROL] (drC-)

New option of operating with Closed-loop synchronous motor page 85
- [Angle auto-test] (ASA), page 86
- [Angle offset value] (ASU), page 87
- [Sync.CL] (FSY) assignment page 75 of parameter [Motor control type] (Ctt)

Menu [1.5 INPUTS / OUTPUTS CFG] (I-O-)

- [Resolver Exct. Freq.] (FrES) and [Resolver poles nbr] (rPPn), page 118

Menu [1.7 APPLICATION FUNCT.] (Fun-)

- New "Inspection" function, page 224, with [Inspection] (ISP) and [Inspection speed] (ISrF) parameters.

Enhancements made to version V1.7 (S383) in comparison to V1.3 (S383)

New parameters and functions

Menu [1.1 SIMPLY START] (SIM-)

- Addition of a [Lift] (LIFt) macro configuration to the [Macro configuration] (CFG) parameter page 45

Menu [1.3 SETTINGS] (SEt-)

New parameters:
- [Fr.Loop.Stab] (StA), page 60
- [FreqLoopGain] (FLG), page 60

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Menu [1.4 MOTOR CONTROL] (drC-)

This menu has been reorganized with parameters now appearing in a different order and some grouped under submenus to simplify configuration.
The new submenus are as follows:
- [ENCODER FEEDBACK] (EnS-), page 78
- [ASYNC. MOTOR] (ASY-), page 79
- [SYNCHRONOUS MOTOR] (SYn-), page 83
- [ANGLE TEST SETTING] (ASA-), page 86
- [FLUXING BY LI] (FLI-), page 88
- [AUTOMATIC TUNE] (tUn-), page 89
- [SPEED LOOP] (SSL-), page 92

New parameters:
- [Boost] (bOO), page 97
- [Action Boost] (FAb), page 97
- [Increment EMF] (IPHS), page 83
- [Read motor param.] (rEqP), page 84
- [Status motor param] (rEtP), page 84
- [Angle setting type] (ASt), pages 86 and 89
- [Angle auto test] (ASL), page 87
- [Angle setting activ.] (AtA), page 87
- [Angle setting status] (AStS), page 87
- [Speed loop type] (SSL), page 92
- [Inertia Mult. Coef.] (JMUL), page 92
- [Estim. app. inertia] (JESt), page 92
- [Application Inertia] (JAPL), page 93
- [Fr.Loop.Stab] (StA), page 93
- [FreqLoopGain] (FLG), page 93
- [Feed forward] (FFP), page 93
- [Bandwidth feedfor.] (FFU), page 93

Parameters moved from menu [1.7 APPLICATION FUNCT.] (Fun-):
- [Motor fluxing] (FLU), page 88
- [Fluxing assignment] (FLI), page 88
- [Auto-tune assign.] (tUL), page 91

Menu [1.5 INPUTS / OUTPUTS CFG] (I-O-)

New encoder parameters:
- [Encoder protocol] (UECP), page 119
- [Encoder supply volt.] (UECU), page 119
- [Sincos lines count] (UELC), page 119
- [SSI parity] (SSCP), page 119
- [SSI frame size] (SSFS), page 119
- [Nbr of revolution] (EnMr), page 119
- [Turn bit resolution] (Entr), page 119
- [SSI code type] (SSCd), page 120
- [Encoder filter activ.] (FFA), page 120
- [Encoder filter value] (FFr), page 120

Menu [1.7 APPLICATION FUNCT.] (Fun-)

Removal of the following parameters (now located in the [1.4 MOTOR CONTROL] (drC-) menu):
- [Motor fluxing] (FLU)
- [Fluxing assignment] (FLI)
- [Auto-tune assign.] (tUL)

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Enhancements made to version V1.9 (S383) in comparison to V1.7 (S383)

New parameters and functions

Menu [1.4 MOTOR CONTROL] (drC-)

- New method of assigning [Angle setting type] (ASt), page 89 : optimized measurement (without motion with memorization).

New parameter :
- [App. Inertia Coef.] (JACO), page 92.

Removal from the sub-menu [ASYNC. MOTOR] (ASY-) of the following parameters (now located directly in the [1.4 MOTOR CONTROL] (drC-) menu):
- [Boost] (bOO), page 97.
- [Action Boost] (FAb), page 97.

Menu [1.5 INPUTS / OUTPUTS CFG] (I-O-)

New encoder parameters:
- [Coder rotation inv.] (EnrI), page 117.
- [Clock frequency] (EnSP), page 120.

Menu [1.7 APPLICATION FUNCT.] (Fun-)

- New method of assigning for the parameters set switching [2 Parameter sets] (CHA1), page 212 and [3 Parameter sets] (CHA2), page 212 : switching during braking sequence. This new assignment allows to put higher gain when the brake is open and before the starting of the ramp (useful for lift application).

New sub-menu:
- [TOP Z MANAGEMENT] (tOP-), page 228 (the parameter can be accessed only if an encoder card VW 3A 411 has been inserted and if [Encoder type] (EnS) = [AABB] (AAbb).

New encoder parameter:
- [Stop on top Z] (tOSt), page 228.

Enhancements made to version V2.4 (S383) in comparison to V1.9 (S383)

New parameters and function

Menu [1.7 APPLICATION FUNCT.] (Fun-)

New sub-menu:
- [ROLLBACK MGT] (rbM-), page 179. Menu can be accessed:
  - only for ATV71●●●M3X drives up to 45 kW and for ATV71●●●N4 drives up to 75 kW,
  - if [Motor control type] (Ctt), page 74 = [Sync.CL] (FSY) or [FVC] (FUC),
  - if [Brake assignment] (bLC), page 173 is assigned.

New parameter of [ROLLBACK MGT] function:
- [Rollback MGT] (rbM), page 179.
- [Rbk Compensation] (rbC), page 179.
- [Rbk Damping] (rbd), page 179.

Enhancements made to version V2.8 (S383) in comparison to V2.4 (S383)

Menu Menu [1.7 APPLICATION FUNCT.] (FUn-)

- The adjustment range [Time to restart] (ttr), page 175 can now be configured to 0 to 15.00 s.

Menu [7 DISPLAY CONFIG.]

- Addition in [7.4 KEYPAD PARAMETERS] page 278 parameter [Power up menu] to choose the menu displayed on the drive on power up.

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Steps for setting up

INSTALLATION

☐ **1 Consult the Installation Manual**

PROGRAMMING
Procedure applicable if the factory configuration, page 13, and use of the [SIMPLY START] (SIM-) menu only are sufficient for the application.

■ 2 Power up without run command

- ☐ **If you are using a separate power supply for the control section, follow the instructions on page 19.**

■ 3 Select the language, if the drive has a graphic display terminal

■ 4 Configure the [SIMPLY START] (SIM-) menu

- ☐ **2-wire or 3-wire control**
- ☐ **Macro configuration**
- ☐ **Motor parameters**
  ☞ Perform an auto-tuning operation
- ☐ **Motor thermal current**
- ☐ **Acceleration and deceleration ramps**
- ☐ **Speed variation range**

■ 5 Start

Tips:

- **Before you start programming, complete the user setting tables, page 288.**
- **Perform an auto-tuning operation to optimize performance, page 47.**
- **If you get lost, return to the factory settings, page 262.**

☞ **NOTE:** Check that the wiring of the drive is compatible with its configuration.

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Factory configuration

Drive factory settings

The Altivar® 71 is factory-set for the most common operating conditions:
- Macro configuration: Start/Stop
- Motor frequency: 50 Hz
- Constant torque application with asynchronous motor and sensorless flux vector control
- Normal stop mode on deceleration ramp
- Stop mode in the event of a fault: freewheel
- Linear, acceleration and deceleration ramps: 3 seconds
- Low speed: 0 Hz
- High speed: 50 Hz
- Motor thermal current = rated drive current
- Standstill injection braking current = 0.7 x rated drive current, for 0.5 seconds
- No automatic starts after a fault
- Switching frequency 2.5 kHz or 4 kHz depending on drive rating
- Logic inputs:
  - LI1: forward, LI2: Forward (2 operating direction), 2-wire control on transition
  - L13, L14, LI5, LI6: inactive (not assigned)
- Analog inputs:
  - AI1: speed reference 0-+10 V
  - AI2: 0-20 mA, inactive (not assigned)
- Relay R1: The contact opens in the event of a fault (or drive off).
- Relay R2: Inactive (not assigned)
- Analog output AO1: 0-20 mA, inactive (not assigned)

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

Option card factory settings

The option card inputs/outputs are not factory-set.

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Application functions

The tables on pages 14 through 17 list the most common combinations of functions and applications, in order to guide your selection.

The applications in these tables relate to the following machines in particular:
- Hoisting: cranes, overhead cranes, gantries (vertical hoisting, translation, slewing), lifting platforms
- Elevators: elevators in retrofit up to 1.2 m/s
- Handling: palletizers/depalletizers, conveyors, roller tables
- Packing: carton packers, labeling machines
- Textiles: weaving looms, carding frames, washing machines, spinners, drawing frames
- Wood: automatic lathes, saws, milling
- High inertia: centrifuges, mixers, unbalanced machines (beam pumps, presses)
- Process

Each machine has its own special features, and the combinations listed here are neither mandatory nor exhaustive.

Some functions are designed specifically for a particular application. In this case, the application is identified by a tab in the margin on the relevant programming pages.

Motor control functions

Functions	Page	Applications							
		Hoisting	Lifts	Handling	Packin	Textiles	Wood	High inertia	Process
V/f ratio	74			■			■	■	
Sensorless flux vector control	74	■	■	■	■	■	■	■	■
Flux vector control with sensor	74	■	■	■	■	■	■	■	■
2-point vector control	74	■				■			
Open-loop synchronous motor	75					■			
Closed-loop synchronous motor	75		■			■			■
Output frequency of up to 1600 Hz	79					■	■		
Motor overvoltage limiting	98					■	■		
DC bus connection (see User's Manual)	—					■			■
Motor fluxing using a logic input	88	■		■	■				
Switching frequency of up to 16 kHz	76		■			■	■		
Auto-tuning	89	■	■	■	■	■	■	■	■

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Functions on speed references

Functions	Page	Applications							
		Hoisting	Lifts	Handling	Packing	Textiles	Wood	High inertia	Process
Differential bipolar reference	107	■		■	■				
Reference delinearization (magnifying glass effect)	109	■		■					
Frequency control input	142					■			■
Reference switching	143–150				■				
Reference summing	150				■				
Reference subtraction	150				■				
Reference multiplication	150				■				
S ramps	152	■	■	■					
Jog operation	159			■		■			■
Preset speeds	160	■	■	■	■			■	
+ speed/- speed using single action pushbuttons (1 step)	163								■
+ speed/- speed using double action pushbuttons (2 steps)	163	■							
+/- speed around a reference	165					■			■
Save reference	167								■
Inspection	224		■						

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Application-specific functions

Functions	Page	Applications							
		Hoisting	Lifts	Handling	Packing	Textiles	Wood	High inertia	Process
Fast stop	155						■	■	
Limit switch management	168	■	■	■					
Brake control	169	■	■	■					
Load measurement	180	■	■						
High-speed hoisting	182	■							
Rope slack	185	■							
PID regulator	187								■
Torque monitoring	196			■		■			■
Motor/generator torque limit	199			■		■		■	■
Load sharing	101	■		■					
Line contactor control	202	■		■			■		
Output contactor control	204		■						
Positioning by limit switches or sensors	206			■	■				
Stop at distance calculated after deceleration limit switch	208			■	■				
ENA system (mechanical with unbalanced load)	96							■	
Parameter switching	211	■	■	■	■	■	■	■	■
Motor or configuration switching	214	■		■	■				
Traverse control	217					■			
Stop configuration	155			■		■	■	■	
Evacuation	225		■						
Half floor	226		■						
Rollback management	179		■						

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Safety functions/fault management

Functions	Page	Applications							
		Hoisting	Lifts	Handling	Packing	Textiles	Wood	High inertia	Process
Power Removal (safety function, see User's Manual)	—	■	■	■	■	■	■	■	■
Deferred stop on thermal alarm	237		■						
Alarm handling	132	■	■	■	■	■	■	■	■
Fault management	230 – 251	■	■	■	■	■	■	■	■
IGBT tests	240	■	■	■	■	■	■	■	■
Catch a spinning load	232					■	■	■	
Braking resistor thermal protection	249	■	■	■	■				
Motor protection with PTC probes	230	■	■	■	■	■	■	■	■
Undervoltage management	239					■	■	■	
4-20mA loss	241	■	■	■		■	■		■
Uncontrolled output cut (output phase loss)	235			■					
Automatic restart	231			■					
Use of the "Pulse input" input to measure the speed of rotation of the motor	245	■	■	■					
Load variation detection	247	■							

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Setup - Preliminary recommendations

Bus voltage measurement

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in “Before you begin” starting on page 6 before performing this procedure.

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

The DC bus voltage can exceed 1,000 Vdc. Use a properly rated voltage-sensing device when performing this procedure. To measure the DC bus voltage:

1. Disconnect all power.
2. Wait 15 minutes to allow the DC bus to discharge.
3. Measure the voltage of the DC bus between the PA/+ and PC/– terminals to ensure that the voltage is less than 42 Vdc. These terminals are clearly labeled on each drive.
4. If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive.

Turning on and configuring the drive

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Before turning on and configuring the Altivar® 71, check that the PWR (POWER REMOVAL) input is deactivated (at state 0) in order to prevent unintended operation.
- Before turning on the drive, or when exiting the configuration menus, check that the inputs assigned to the run command are deactivated (at state 0) since they can cause the motor to start immediately.

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

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 equipment damage.

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Separate control section power supply

When the drive control section is powered independently of the power section (P24 and 0V terminals), whenever an option card is added or replaced, only the power section must be supplied with power next time the drive is powered up.
By default the new card would not be recognized and it would be impossible to configure it, thereby causing the drive to lock in fault mode.

Power switching via line contactor

CAUTION

EQUIPMENT DAMAGE

- Avoid operating the contactor frequently (premature aging of the filter capacitors).
- Cycle times < 60 s may result in damage to the pre-charge resistor.

Failure to follow these instructions can result in equipment damage.

User adjustment and extension of functions

- The display unit and buttons can be used to modify the settings and to extend the functions described in the following pages.
- Return to factory settings is made easy by the [1.12 FACTORY SETTINGS] (FCS-) menu, see page 260.
- There are three types of parameters:
  - Display: Values displayed by the drive
  - Adjustment: Can be changed during operation or when stopped
  - Configuration: Can only be modified when stopped and no braking is taking place. Can be displayed during operation.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Verify that changes made to the settings during operation do not present any danger.
- We recommend stopping the drive before making any changes.

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

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Starting

Important:

- In factory settings mode, the motor can only be supplied with power once the “forward”, “reverse” and “DC injection stop” commands have been reset:
  - On power-up or a manual fault reset or after a stop command
    If they have not been reset, the drive will display "nSt" but will not start.
- If the automatic restart function has been configured ([Automatic restart] (Atr) parameter in the [1.8-FAULT MANAGEMENT] (FLt-) menu, see page 231), these commands are taken into account without a reset being necessary.

Test on a low power motor or without a motor

- In factory settings mode, [Output Phase Loss] (OPL) detection page 235 is active (OPL = YES). To check the drive in a test or maintenance environment without having to switch to a motor with the same rating as the drive (particularly useful in the case of high power drives), deactivate [Output Phase Loss] (OPL = no).
- Configure [Motor control type] (Ctt) = [V/F 2pts] (UF2) or [V/F 5pts] (UF5) ([1.4-MOTOR CONTROL] (drC-) menu, see page 74).

CAUTION

LOSS OF THERMAL PROTECTION FEATURES

Motor thermal protection will not be provided by the drive if the motor current is less than 0.2 times the rated drive current. Provide an alternative means of thermal protection.

Failure to follow these instructions can result in equipment damage.

Using motors in parallel

- Configure [Motor control type] (Ctt) = [V/F 2pts] (UF2) or [V/F 5pts] (UF5) ([1.4-MOTOR CONTROL] (drC-) menu, see page 74)

CAUTION

LOSS OF THERMAL PROTECTION FEATURES

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.

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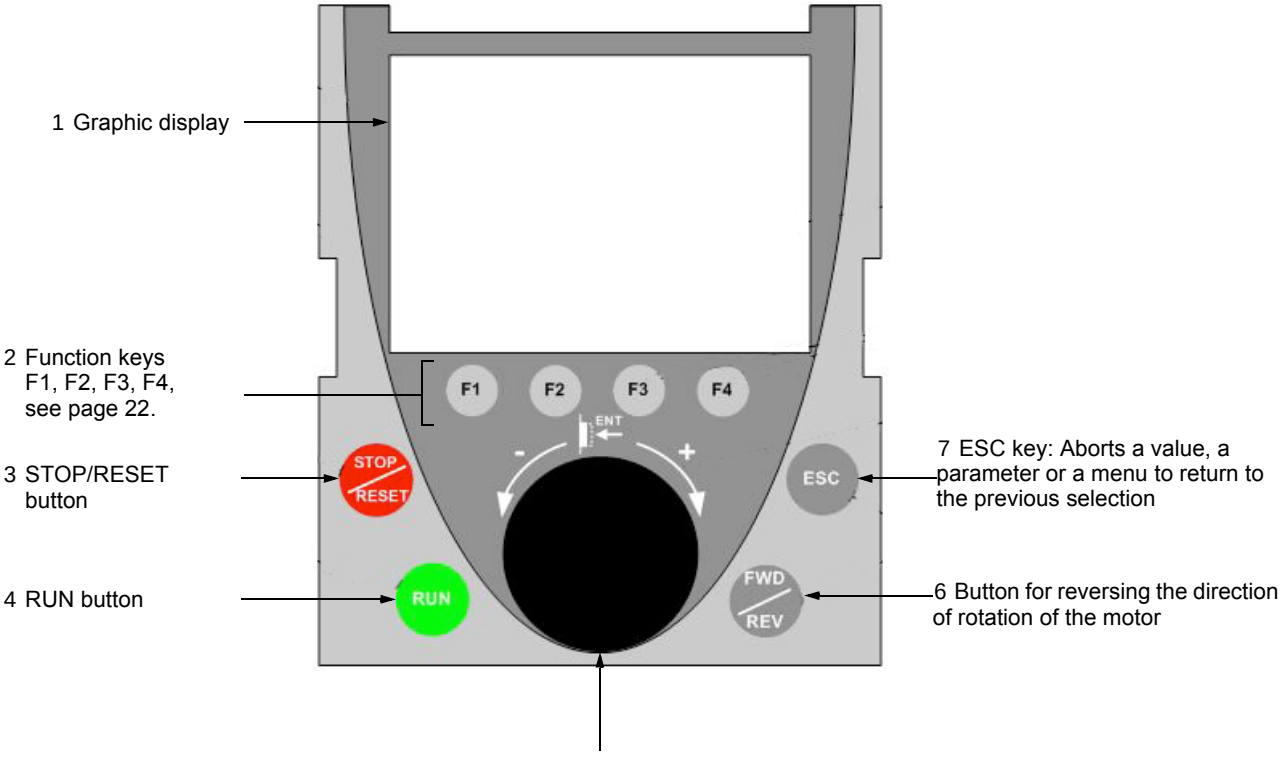
Graphic display terminal

The graphic display terminal can be disconnected and connected remotely (on the door of an enclosure for example) using the cables and accessories available as options.

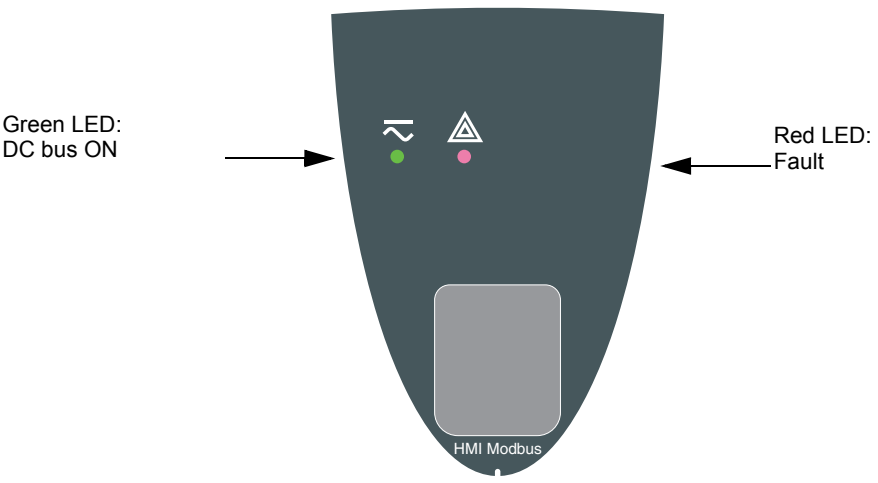
Description of terminal



NOTE: Buttons **3**, **4**, **5** and **6** can be used to control the drive directly, if control via the terminal is activated.

Disconnected terminal

When the terminal is disconnected, 2 LEDs become visible:



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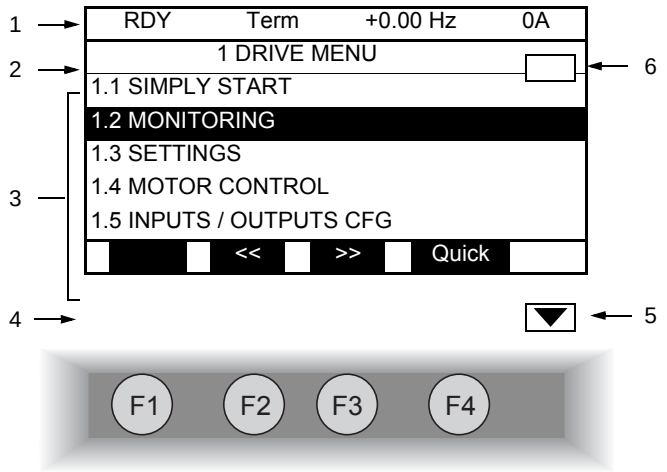
Description of the graphic screen



1 Display line. Its content can be configured; the factory settings show:
- The drive state (see page 23)
- The active control channel:
  - Term: Terminals
  - HMI: Graphic display terminal
  - MDB: Integrated Modbus
  - CAN: Integrated CANopen
  - NET: Communication card
  - APP: Controller Inside card
- Frequency reference
- Current in the motor

2 Menu line. Indicates the name of the current menu or submenu.

3 Menus, submenus, parameters, values, bar charts, etc., are displayed in drop-down window format on a maximum of 5 lines. The line or value selected by the navigation button is displayed in reverse video.

4 Section displaying the functions assigned to the F1 to F4 keys and aligned with them, for example:

- Code F1 : Displays the code of the selected parameter, such as, the code corresponding to the 7-segment display.
- HELP F1 : Contextual help
- << F2 : Navigate horizontally to the left, or go to previous menu/submenu or, for a value, go to the next digit up, displayed in reverse video (see the example on page 23).
- >> F3 : Navigate horizontally to the right or go to next menu/submenu (going to the [2 ACCESS LEVEL] menu in this example) or, for a value, go to the next digit down, displayed in reverse video (see the example on page 23).
- Quick F4 : Quick navigation, see page 27.

The function keys are dynamic and contextual.
Other functions (application functions) can be assigned to these keys via the [1.6 COMMAND] menu.
If a preset speed is assigned to a function key and if the function key is pressed, the motor will run at this preset speed until another preset speed or JOG is pressed, speed reference is changed, or Stop key is pressed.

5 Indicates that there are no more levels below this display window.
Indicates that there are more levels below this display window.

6 Indicates that this display window does not scroll further up.
Indicates that there are more levels above this display window.

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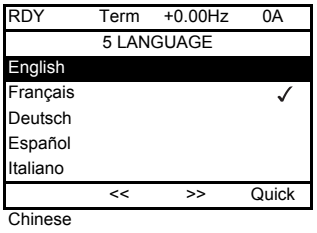
Drive state codes:

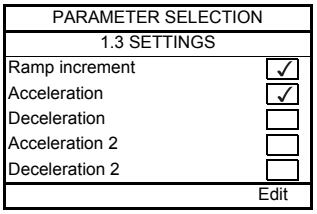
- ACC: Acceleration
- CLI: Current limit
- CTL: Controlled stop on input phase loss
- DCB: DC injection braking in progress
- DEC: Deceleration
- FLU: Motor fluxing in progress
- FST: Fast stop
- NLP: No line power (no line supply on L1, L2, L3)
- NST: Freewheel stop
- OBR: Auto-adapted deceleration
- PRA: Power Removal function active (drive locked)
- RDY: Drive ready
- RUN: Drive running
- SOC: Controlled output cut in progress
- TUN: Auto-tuning in progress
- USA: Undervoltage alarm
- ASA: Measurement of the phase-shift angle in progress
- ICC: Configuration encoder incorrect

Example configuration windows:



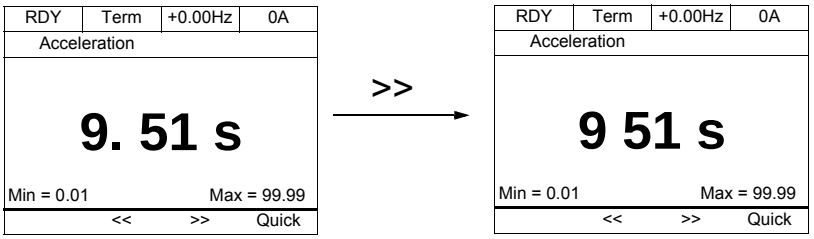
Chinese

When only one selection is possible, the selection made is indicated by ✓
Example: Only one language can be chosen.



When multiple selection is possible, the selections made are indicated by ✓
Example: A number of parameters can be chosen to form the [USER MENU].

Example configuration window for one value:



The << and >> arrows (keys F2 and F3) are used to select the digit to be modified, and the navigation button is rotated to increase or decrease this number.

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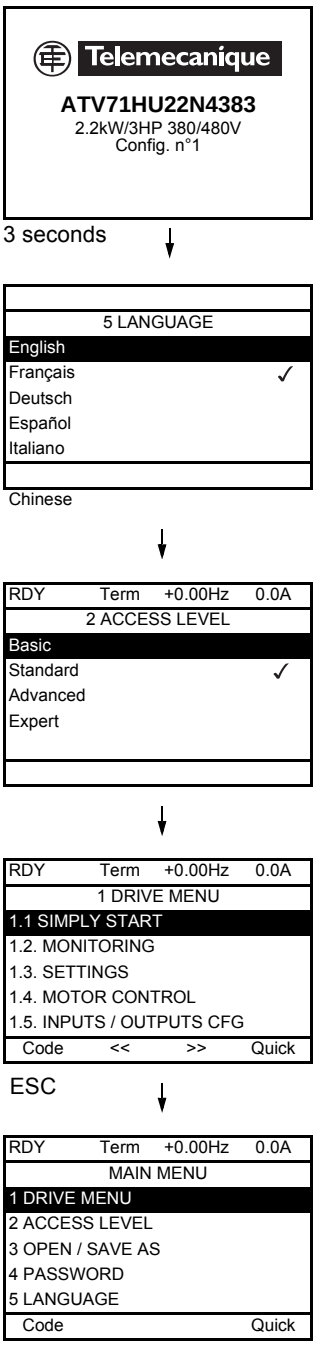
First power-up - [5. LANGUAGE] menu

The first time the drive is powered up, the user will automatically be guided through the menus as far as [1. DRIVE MENU].
The parameters in the [1.1 SIMPLY START] submenu must be configured and auto-tuning performed before the motor is started up.



Display for 3 seconds following power-up

Automatically switches to [5 LANGUAGE] menu 3 seconds later.
Select the language and press ENT.

Switches to [2 ACCESS LEVEL] menu (see page 33)
Select the access level and press ENT.

Switches to [1 DRIVE MENU] (see page 29)

Press ESC to return to [MAIN MENU]

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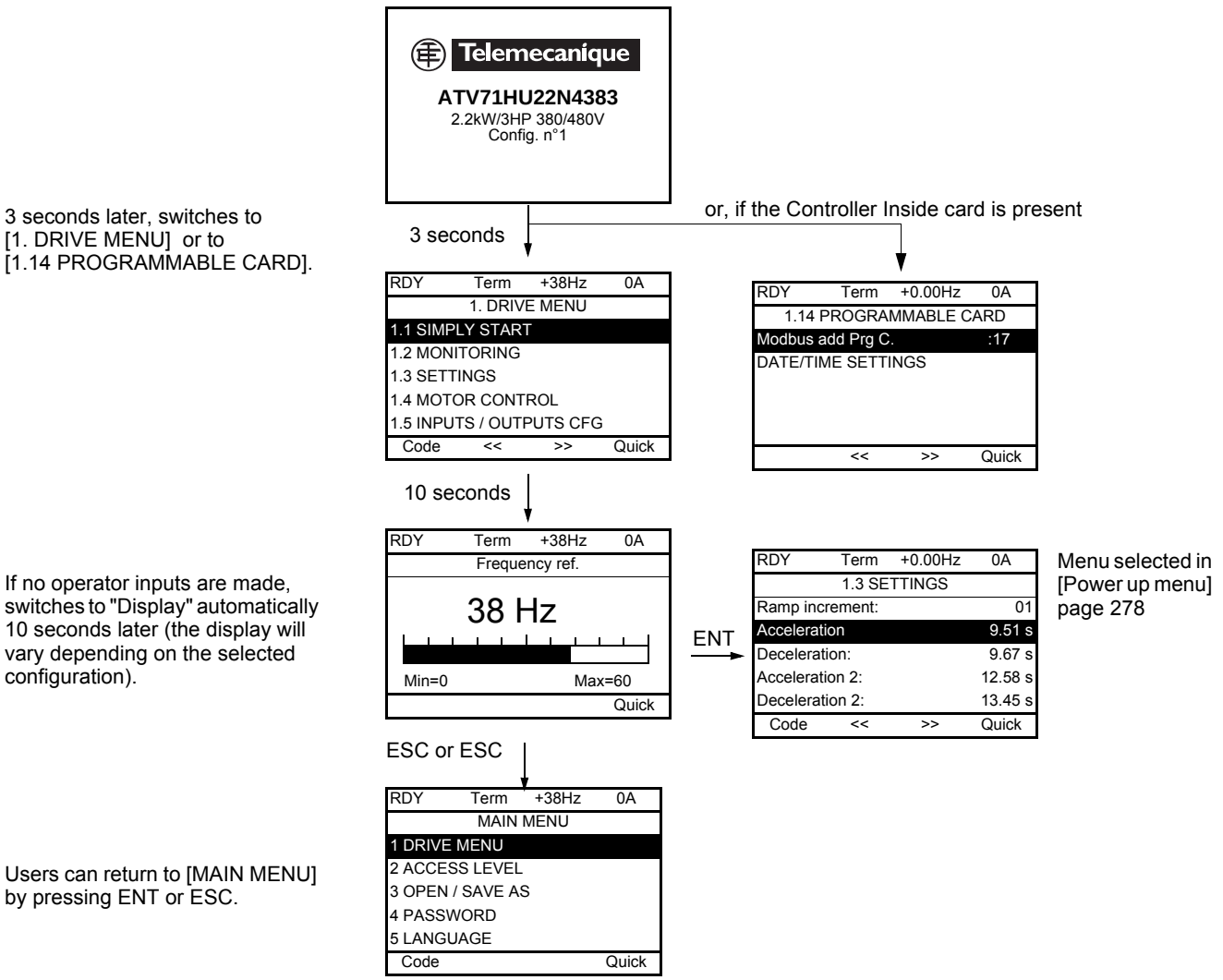
Subsequent power ups



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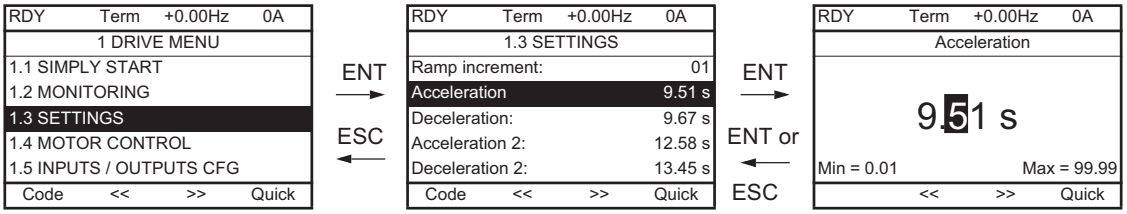
Programming: Example of accessing a parameter

Accessing the acceleration ramp



NOTES:

- To select a parameter:
  - Turn the navigation button to scroll vertically.
- To modify a parameter:
  - Use the << and >> keys (F2 and F3) to scroll horizontally and select the digit to be modified (the selected digit changes to white on a black background).
  - Turn the navigation button to modify the digit.
- To cancel the modification:
  - Press ESC.
- To save the modification:
  - Press the navigation button (ENT).

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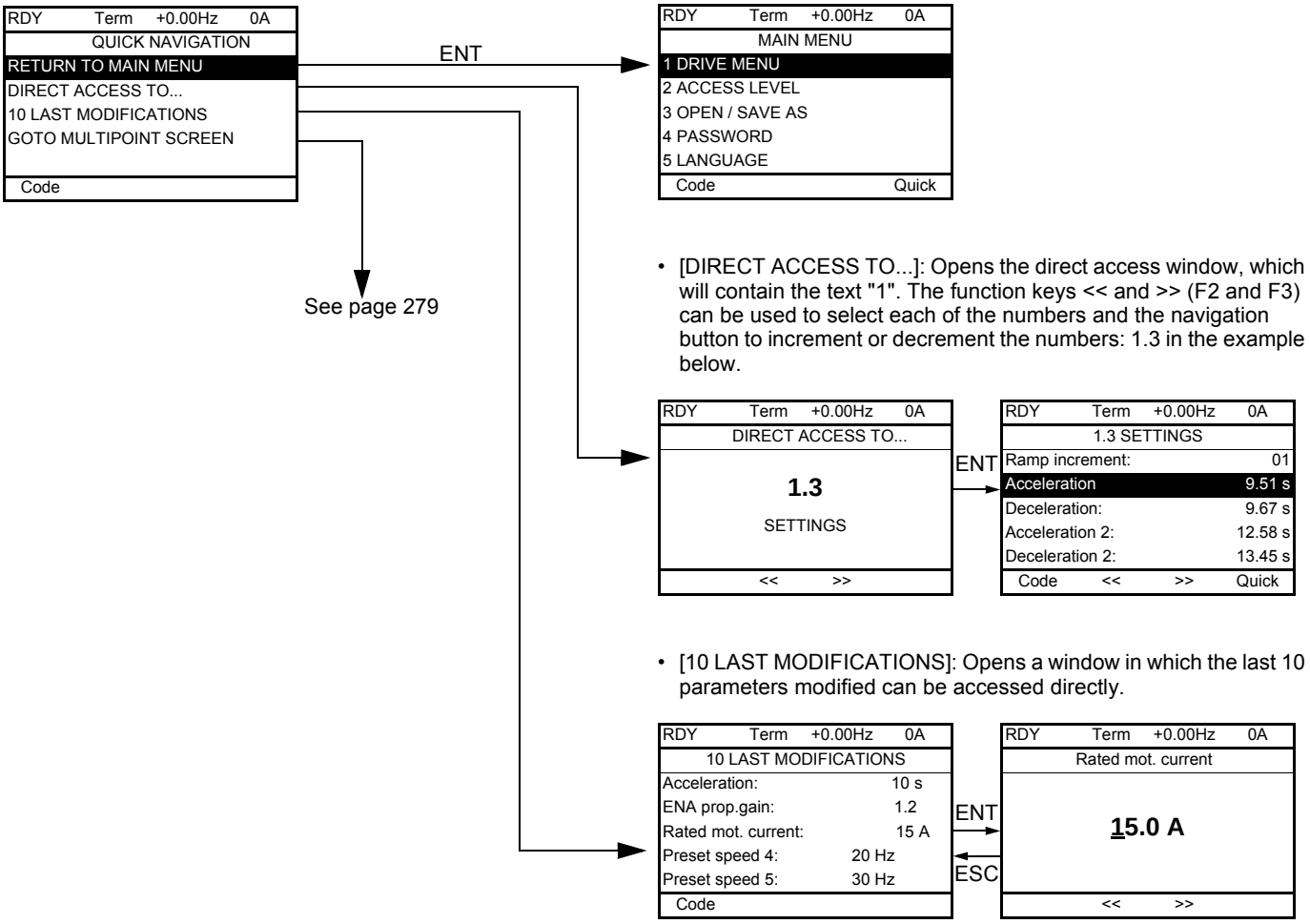
Quick navigation

If the "Quick" function is displayed above the F4 key, you can gain quick access to a parameter from any screen.

Example:

RDY	Term	+0.00Hz	0A
1.4 MOTOR CONTROL			
Standard mot. freq:		5 0Hz IEC	
Rated motor power:		0.37 kW (0.5 HP)	
Rated motor volt.:		206 V	
Rated mot. current:		1.0 A	
Rated motor freq.:		50.0 Hz	
Code	<<	>>	Quick

Press F4 to access the Quick screen, which contains 4 selection options.



- [HOME]: Return to [MAIN MENU].
- [DIRECT ACCESS TO...]: Opens the direct access window, which will contain the text "1". The function keys << and >> (F2 and F3) can be used to select each of the numbers and the navigation button to increment or decrement the numbers: 1.3 in the example below.
- [10 LAST MODIFICATIONS]: Opens a window in which the last 10 parameters modified can be accessed directly.

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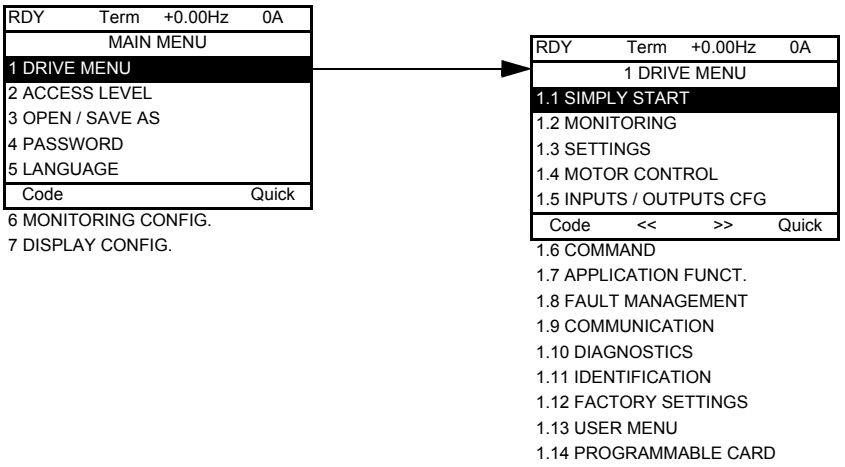
[MAIN MENU] - Menu mapping



Content of [MAIN MENU] menus

[1 DRIVE MENU]	See page 29
[2 ACCESS LEVEL]	Defines which menus can be accessed (level of complexity)
[3 OPEN / SAVE AS]	Can be used to save and recover drive configuration files
[4 PASSWORD]	Provides password protection for the configuration
[5 LANGUAGE]	Language selection
[6 MONITORING CONFIG.]	Customization of information displayed on the graphic display terminal during operation
[7 DISPLAY CONFIG.]	• Customization of parameters • Creation of a customized user menu • Customization of the visibility and protection mechanisms for menus and parameters

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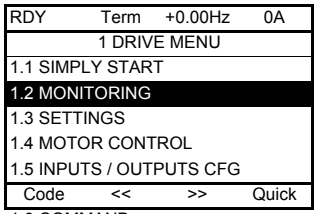
[1 DRIVE MENU]



1.6 COMMAND
1.7 APPLICATION FUNCT.
1.8 FAULT MANAGEMENT
1.9 COMMUNICATION
1.10 DIAGNOSTICS
1.11 IDENTIFICATION
1.12 FACTORY SETTINGS
1.13 USER MENU
1.14 PROGRAMMABLE CARD

Content of [1. DRIVE MENU] menus:

[1.1 SIMPLY START]:	Simplified menu for a quick start
[1.2 MONITORING]:	Visualization of current, motor and input/output values
[1.3 SETTINGS]:	Accesses the adjustment parameters, which can be modified during operation
[1.4 MOTOR CONTROL]:	Motor parameters (motor nameplate, auto-tuning, switching frequency, control algorithms, and so forth)
[1.5 INPUTS / OUTPUTS CFG]:	I/O configuration (scaling, filtering, 2-wire control, 3-wire control, and so forth)
[1.6 COMMAND]:	Configuration of command and reference channels (graphic display terminal, terminals, bus, and so forth.)
[1.7 APPLICATION FUNCT.]:	Configuration of application functions (e.g., preset speeds, PID, brake logic control, and so forth)
[1.8 FAULT MANAGEMENT]:	Configuration of fault management
[1.9 COMMUNICATION]:	Communication parameters (fieldbus)
[1.10 DIAGNOSTICS]:	Motor/drive diagnostics
[1.11 IDENTIFICATION]:	Identifies the drive and the internal options
[1.12 FACTORY SETTINGS]:	Access to configuration files and return to factory settings
[1.13 USER MENU]:	Specific menu set up by the user in the [7. DISPLAY CONFIG.] menu
[1.14 PROGRAMMABLE CARD]:	Configuration of optional Controller Inside card

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Integrated display terminal

Altivar® 71 drives can feature an integrated display terminal with a 7-segment 4-digit display. The graphic display terminal described on the previous pages can also be connected to these drives.

Functions of the display and the keys

- 2 Modbus status LEDs
- Four 7-segment displays
- Returns to the previous menu or parameter, or increases the displayed value
- Goes to the next menu or parameter, or decreases the displayed value
- 2 CANopen status LEDs
- Exits a menu or parameter, or aborts the displayed value to return to the previous value in the memory
- Enters a menu or parameter, or saves the displayed parameter or value

NOTES
- Pressing ▲ or ▼ does not store the selection.
- Press and hold down (>2 s) ▲ or ▼ to scroll through the data quickly.

Save and store the selection: ENT

The display flashes when a value is stored.

Normal display, with no detected fault present and no startup:

- 43.0: Display of the parameter selected in the SUP menu (default selection: motor frequency)
- CLI: Current limit
- CtL: Controlled stop on input phase loss
- dCb: DC injection braking in progress
- FLU: Motor fluxing in progress
- FSt: Fast stop.
- nLP: No line power (no line supply on L1, L2, L3)
- nSt: Freewheel stop
- Obr: Auto-adapted deceleration
- PrA: Power Removal function active (drive locked)
- rdY = Drive ready
- SOC: Controlled output cut in progress
- tUn: Auto-tuning in progress
- USA: Undervoltage alarm
- ASA: Measurement of the phase-shift angle in progress

The display flashes to indicate the presence of a detected fault.

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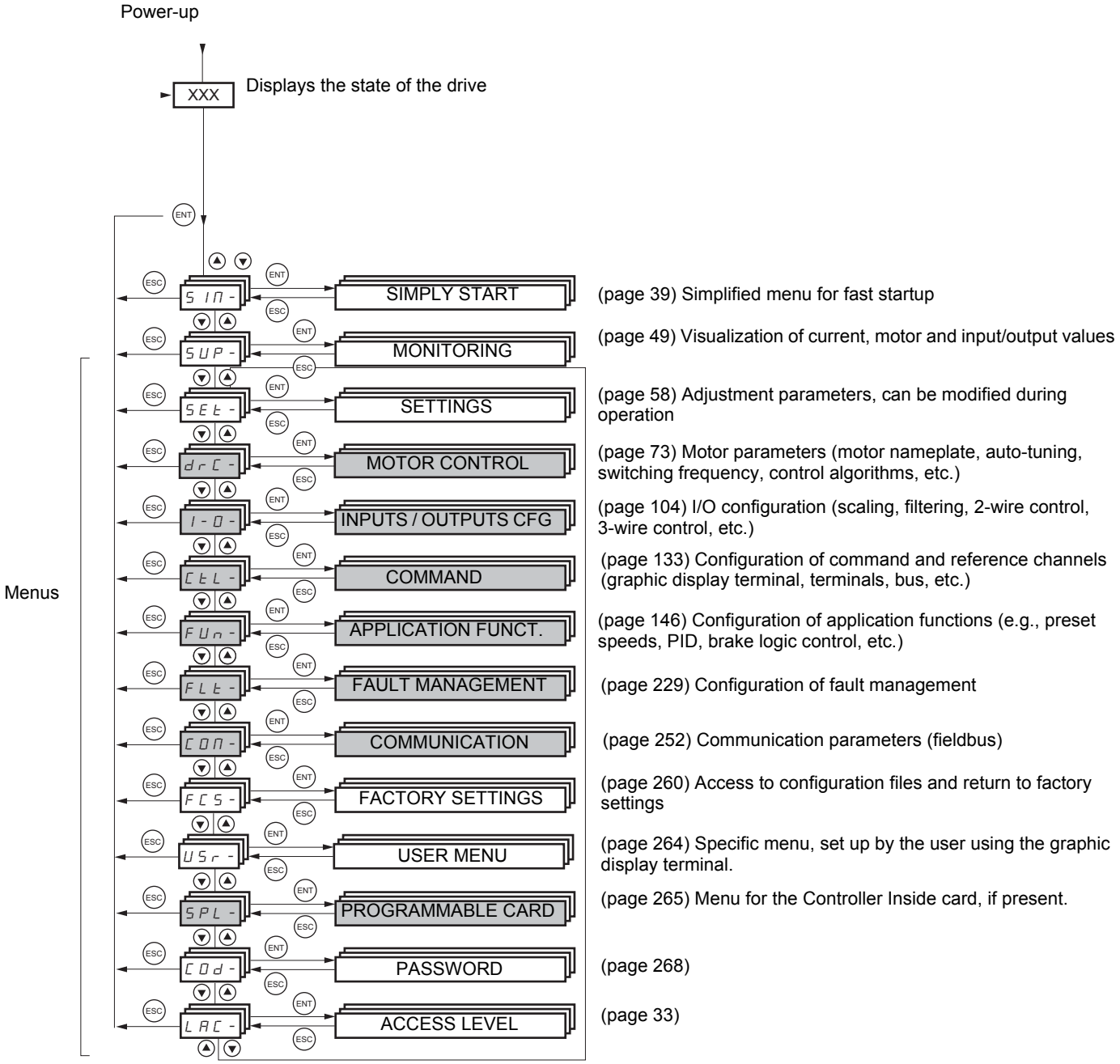
Accessing menus



A dash appears after menu and submenu codes to differentiate them from parameter codes.
Examples: FUn- menu, ACC parameter.

The grayed-out menus may not be accessible depending on the control access (LAC) configuration.

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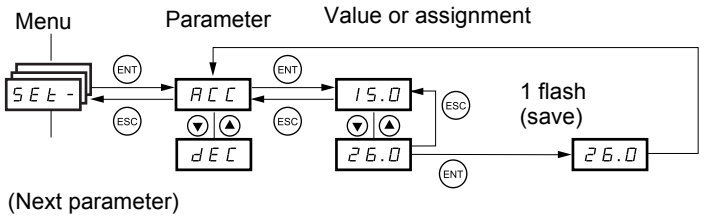
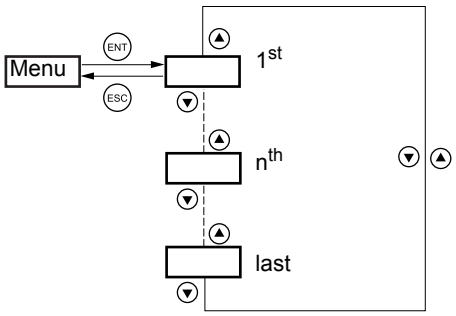
Accessing menu parameters

Save and store the displayed selection : ENT

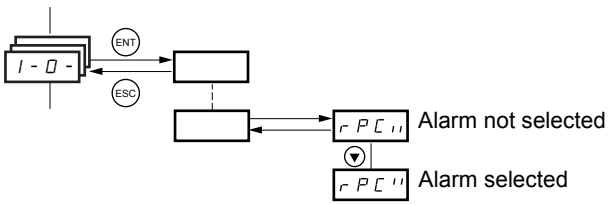


The display flashes when a value is stored.



All the menus are "drop-down" type menus, which means that after the last parameter, if you continue to press ▼ , you will return to the first parameter and, conversely, you can switch from the first parameter to the last parameter by pressing ▲ .

Selection of multiple assignments for one parameter



Example: List of group 1 alarms in [INPUTS / OUTPUTS CFG] (I-O-) menu
A number of alarms can be selected by "checking" them as follows.

The digit on the right indicates: selected

not selected.

The same principle is used for all multiple selections.

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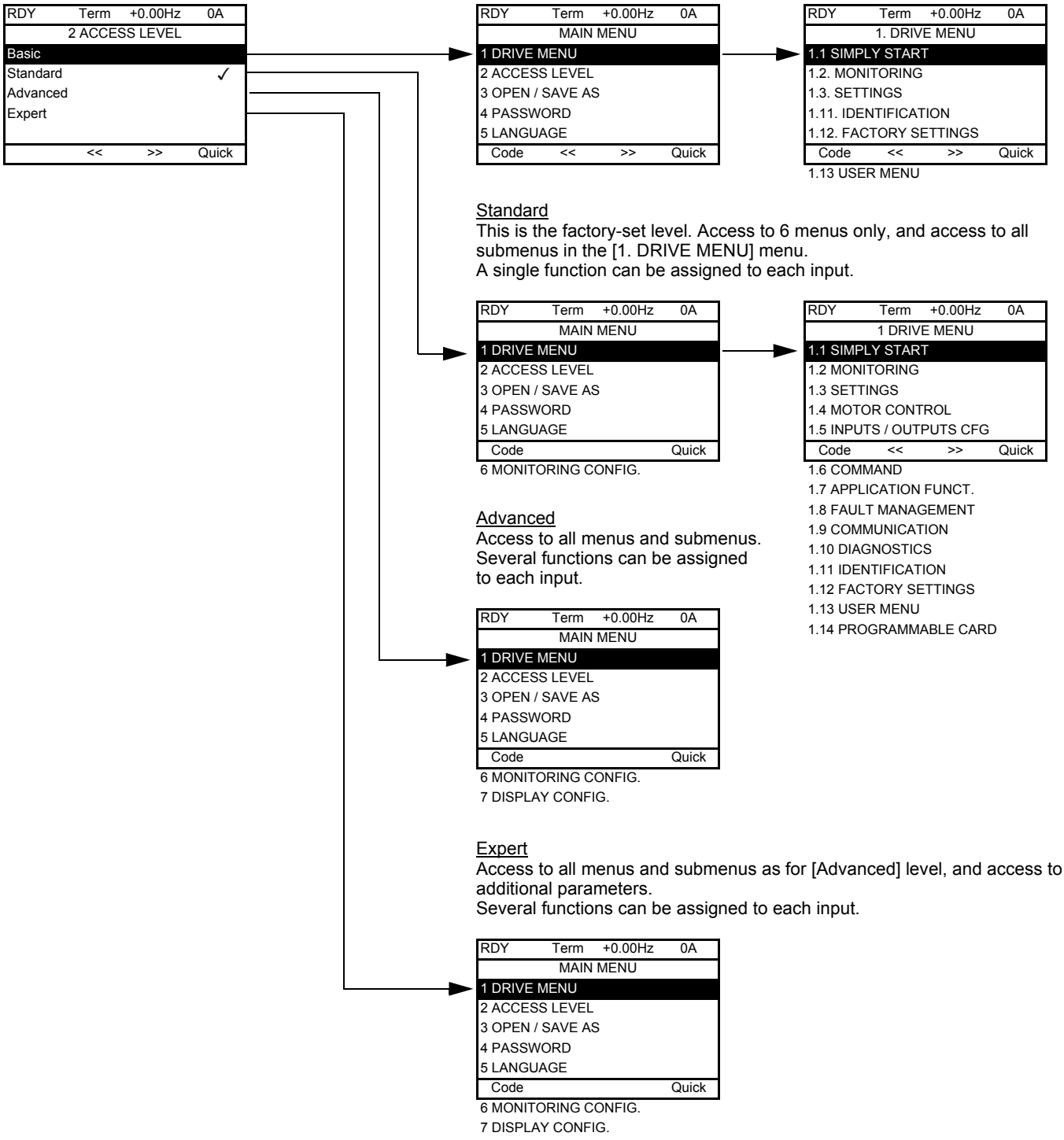
[2. ACCESS LEVEL] (LAC-)

With graphic display terminal



Basic
Access to 5 menus only, and access to 6 submenus only in the [1. DRIVE MENU] menu.
A single function can be assigned to each input.

Standard
This is the factory-set level. Access to 6 menus only, and access to all submenus in the [1. DRIVE MENU] menu.
A single function can be assigned to each input.

Advanced
Access to all menus and submenus.
Several functions can be assigned to each input.

Expert
Access to all menus and submenus as for [Advanced] level, and access to additional parameters.
Several functions can be assigned to each input.

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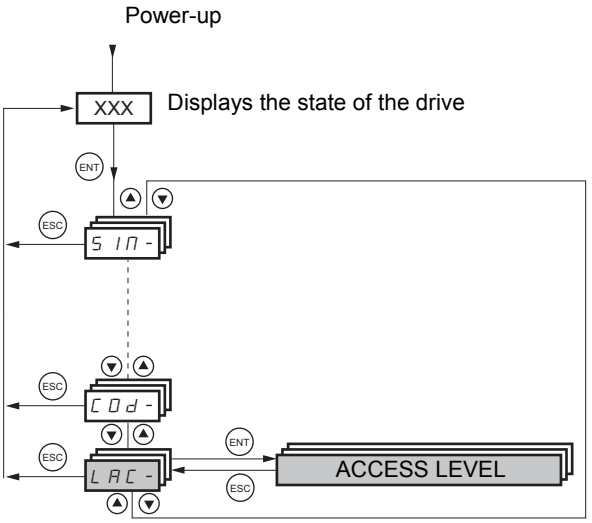
With integrated display terminal:



Code	Name/Description	Factory setting
LAC-		Std
bAS Std Adu EPr	• bAS: Limited access to SIM, SUP, SEt, FCS, USr, COd and LAC menus. Only one function can be assigned to each input. • Std: Access to all menus on the integrated display terminal. Only one function can be assigned to each input. • AdU: Access to all menus on the integrated display terminal. Several functions can be assigned to each input. • EPr: Access to all menus on the integrated display terminal and access to additional parameters. Several functions can be assigned to each input.	

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Comparison of the menus that can be accessed on the graphic display terminal/integrated display terminal

Graphic display terminal		Integrated display terminal	Access level
[2 ACCESS LEVEL]		LAC - (Access level)	Basic bAS / Standard Std (factory setting) / Advanced AdU / Expert EPr
[3 OPEN/SAVE AS]		—	
[4 PASSWORD]		COd - (Password)	
[5 LANGUAGE]		—	
[1 DRIVE MENU]	[1.1 SIMPLY START]	SIM - (Simply start)	
	[1.2 MONITORING]	SUP - (Monitoring)	
	[1.3 SETTINGS]	SEt - (Settings)	
	[1.11 IDENTIFICATION]	—	
	[1.12 FACTORY SETTINGS]	FCS - (Factory settings)	
	[1.13 USER MENU]	USr - (User menu)	
A single function can be assigned to each input.		A single function can be assigned to each input.	
	[1.4 MOTOR CONTROL]	drC - (Motor control)	
	[1.5 INPUTS / OUTPUTS CFG]	I-O - (I/O configuration)	
	[1.6 COMMAND]	CtL - (Command)	
	[1.7 APPLICATION FUNCT.]	FUn - (Application functions)	
	[1.8 FAULT MANAGEMENT]	FLt - (Fault management)	
	[1.9 COMMUNICATION]	COM - (Communication)	
	[1.10 DIAGNOSTICS]	—	
	[1.14 PROGRAMMABLE CARD] (1)	PLC - (Controller Inside card) (1)	
[6 MONITORING CONFIG.]		—	
A single function can be assigned to each input.		A single function can be assigned to each input.	
[7 DISPLAY CONFIG.]		—	
Several functions can be assigned to each input.		Several functions can be assigned to each input.	
Expert parameters		Expert parameters	
Several functions can be assigned to each input.		Several functions can be assigned to each input.	

1. Can be accessed if the Controller Inside card is present.

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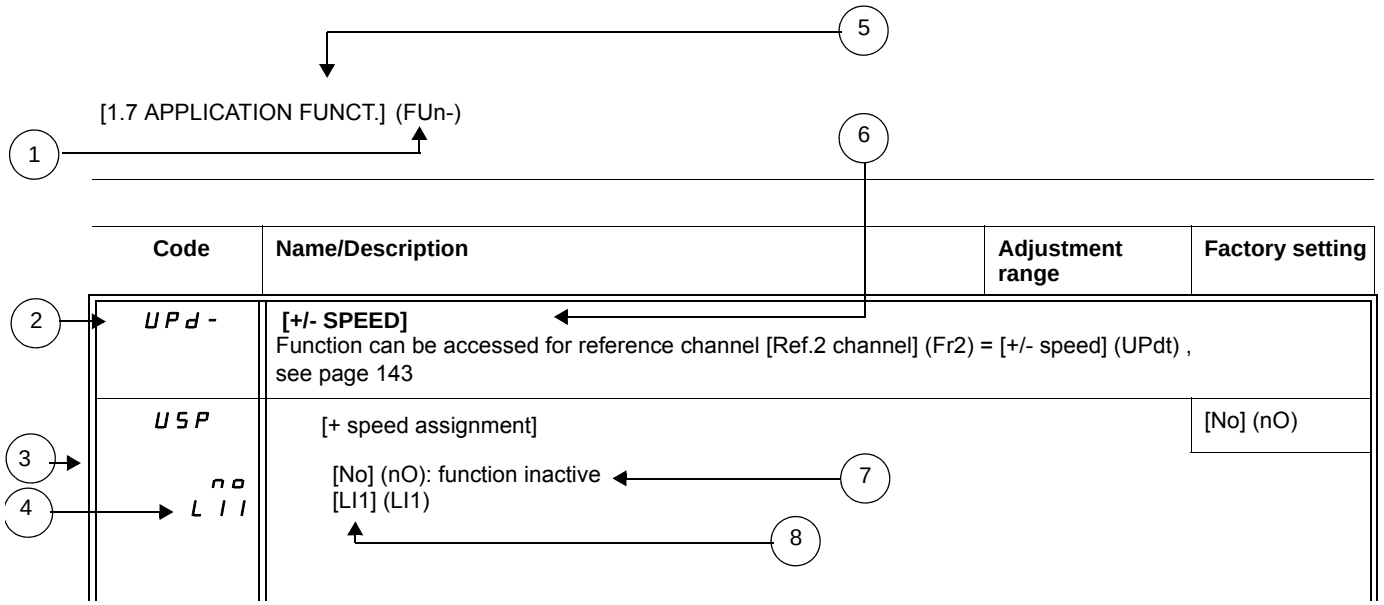
Structure of parameter tables

The parameter tables in the descriptions of the various menus can be used with both the graphic display terminal and the integrated display terminal. They, therefore, contain information for these two terminals in accordance with the description below.

Example:



1 Name of menu on 4-digit 7-segment display.

2 Submenu code on 4-digit 7-segment display.

3 Parameter code on 4-digit 7-segment display.

4 Parameter value on 4-digit 7-segment display.

5 Name of menu on graphic display terminal.

6 Name of submenu on graphic display terminal.

7 Name of parameter on graphic display terminal.

8 Value of parameter on graphic display terminal.

NOTE:

- The text in square brackets [ ] indicates what you will see on the graphic display terminal.
- The factory settings correspond to [Macro configuration] (CFG) = [Start/Stop] (StS). This is the macro configuration set at the factory.

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Interdependence of parameter values

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- The configuration of certain parameters modifies the adjustment range of other parameters.
- Changing the value of certain parameters may result in the modification of a factory setting or value you have already selected.
- Read and understand the ATV71 Programming Manual before configuring parameter values.

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

Example:

1. [Current Limitation] (CLI), page 66 set to 1.6 In or left at its factory setting, 1.5 In
2. [Switching freq.] (SFr), page 66 set to 1 kHz (and confirmed with "ENT") restricts [Current Limitation] (CLI) to 1.36 In
3. If [Switching freq.] (SFr) is increased to 4 kHz, [Current limitation] (CLI) is no longer restricted, but remains at 1.36 In. If you require 1.6 In, you must reset [Current Limitation] (CLI).

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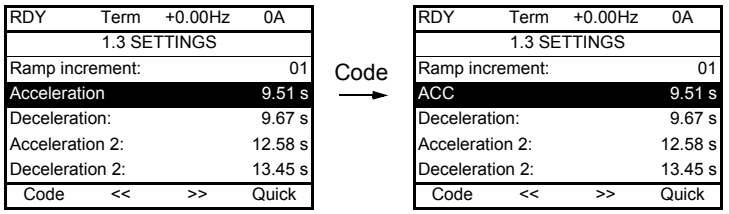
Finding a parameter in this document

The following assistance with finding explanations on a parameter is provided:

- **With the integrated display terminal:** Direct use of the parameter code index, page 292, to find the page giving details of the displayed parameter.
- **With the graphic display terminal:** Select the required parameter and press F1: [Code]. The parameter code is displayed instead of its name while the key is held down.

  Example: ACC



Then use the parameter code index, page 292, to find the page giving details of the displayed parameter.

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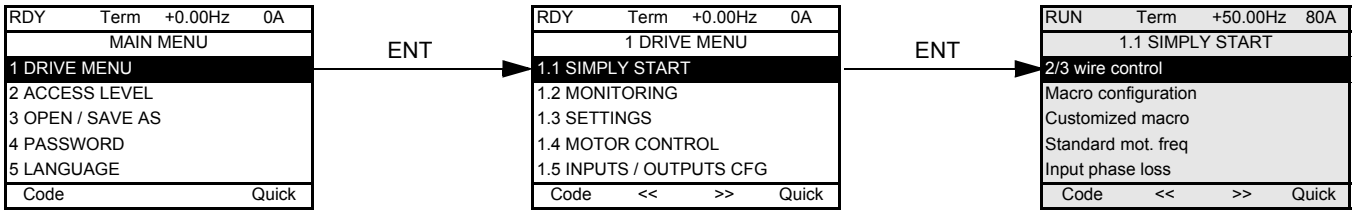
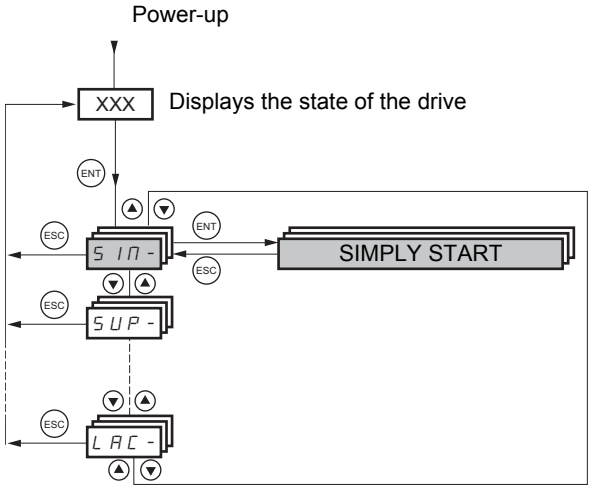
[1.1 SIMPLY START] (SIM-)

With graphic display terminal:



With integrated display terminal:



The [1.1-SIMPLY START] (SIM-) menu can be used for fast startup, which is sufficient for the majority of applications.

The parameters in this menu can only be modified when the drive is stopped and no run command is present, with the exception of Auto-tuning, which causes the motor to start up.
See the adjustment parameters beginning on page 53.

NOTE: The parameters of the [1.1 SIMPLY START] (SIM-) menu must be entered in the order in which they appear, as the later ones are dependent on the first ones.

Example: [2/3 wire control] (tCC) must be configured before any other parameters.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Changes to parameters in other menus may change the [1.1 SIMPLY START] (SIM-) parameter settings.
- Read and understand the ATV71 Programming Manual before configuring parameter values.

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

The [1.1 SIMPLY START] (SIM-) menu can be used to quickly configure key parameters to get the drive and motor running. Parameter modifications in other menus may modify the parameter settings in the [1.1 SIMPLY START] (SIM-) menu. As an example, configuration of motor parameters in [1.4 MOTOR CONTROL] (drC-) will be reflected in the [1.1 SIMPLY START] (SIM-) parameters.

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Macro configuration

Macro configuration provides a means of speeding up the configuration of functions for a specific field of application.
8 macro configurations are available:

- Start/stop (factory configuration)
- Handling
- General use
- Hoisting
- Lifts
- PID regulator
- Communication bus
- Master/slave

Selecting a macro configuration assigns the parameters in this macro configuration.

Each macro configuration can still be modified in the other menus.

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Macro configuration parameters

Assignment of the inputs

Input/ output	[Start/Stop]	[M. handling]	[Gen. Use]	[Hoisting]	[Lift]	[PID regul.]	[Network C.]	[Mast./ slave]
AI1	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel] (PID reference)	[Ref.2 channel] ([Ref.1 channel] = integrated Modbus) (1)	[Ref.1 channel]
AI2	[No]	[Summing ref. 2]	[Summing ref. 2]	[No]	[No]	[PID feedback]	[No]	[Torque reference]
AO1	[No]	[No]	[No]	[No]	[No]	[No]	[No]	[No]
R1	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]
R2	[No]	[No]	[No]	[Brk control]	[Brk control]	[No]	[No]	[No]
LI1 (2-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
LI2 (2-wire)	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]
LI3 (2-wire)	[No]	[2 preset speeds]	[Jog]	[Fault reset]	[2 preset speeds]	[PID integral reset]	[Ref. 2 switching]	[Trq/spd switching]
LI4 (2-wire)	[No]	[4 preset speeds]	[Fault reset]	[External fault]	[4 preset speeds]	[2 preset PID ref.]	[Fault reset]	[Fault reset]
LI5 (2-wire)	[No]	[8 preset speeds]	[Torque limitation]	[No]	[Fault reset]	[4 preset PID ref.]	[No]	[No]
LI6 (2-wire)	[No]	[Fault reset]	[No]	[No]	[No]	[No]	[No]	[No]
LI1 (3-wire)	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
LI2 (3-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
LI3 (3-wire)	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]
LI4 (3-wire)	[No]	[2 preset speeds]	[Jog]	[Fault reset]	[2 preset speeds]	[PID integral reset]	[Ref. 2 switching]	[Trq/spd switching]
LI5 (3-wire)	[No]	[4 preset speeds]	[Fault reset]	[External fault]	[4 preset speeds]	[2 preset PID ref.]	[Fault reset]	[Fault reset]
LI6 (3-wire)	[No]	[8 preset speeds]	[Torque limitation]	[No]	[Fault reset]	[4 preset PID ref.]	[No]	[No]

1. To start up with integrated Modbus, [Modbus Address] (Add) must first be configured, page 254.

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Assignment of the inputs *(continued)*

Input/ output	[Start/Stop]	[M. handling]	[Gen. Use]	[Hoisting]	[Lift]	[PID regul.]	[Network C.]	[Mast./ slave]
Option cards								
LI7 to LI14	[No]	[No]	[No]	[No]	[No]	[No]	[No]	[No]
LO1 to LO4	[No]	[No]	[No]	[No]	[No]	[No]	[No]	[No]
R3/R4	[No]	[No]	[No]	[No]	[No]	[No]	[No]	[No]
AI3, AI4	[No]	[No]	[No]	[No]	[No]	[No]	[No]	[No]
RP	[No]	[No]	[No]	[No]	[No]	[No]	[No]	[No]
AO2	[I motor]	[I motor]	[I motor]	[I motor]	[I motor]	[I motor]	[I motor]	[I motor]
AO3	[No]	[Sign. torque]	[No]	[Sign. torque]	[Sign. torque]	[PID Output]	[No]	[Motor freq.]
Graphic display terminal keys								
F1 key	[No]	[No]	[No]	[No]	[No]	[No]	Control via graphic display terminal	[No]
F2, F3, F4 keys	[No]	[No]	[No]	[No]	[No]	[No]	[No]	[No]

	In 3-wire control, the assignment of inputs LI1 to LI6 shifts.

NOTE: These assignments are reinitialized every time the macro configuration changes.

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Macro configuration parameters

Other configurations and settings

In addition to the assignment of I/O, other parameters are assigned only in the Hoisting, Lift and Mast./slave macro configurations.

Hoisting and lift:
- [Movement type] (bSt) = [Hoisting] (UEr), page 173
- [Brake contact] (bCI) = [No] (nO), page 173
- [Brake impulse] (bIP) = [No] (nO), page 173
- [Brake release I FW] (Ibr) = [Rated mot. current] (nCr), page 173
- [Brake Release time] (brt) = 0.5 s page 174
- [Brake release freq] (bIr) = [Auto] (AUtO), page 174
- [Brake engage freq] (bEn) = [Auto] (AUto), page 174
- [Brake engage time] (bEt) = 0.5 s page 174
- [Engage at reversal] (bEd) = [No] (nO), page 175
- [Jump at reversal] (JdC) = [Auto] (AUtO), page 175
- [Time to restart] (ttr) = 0 s page175
- [Current ramp time] (brr) = 0 s page 177
- [Low speed] (LSP) = Rated motor slip calculated by the drive, page 48
- [Output Phase Loss] (OPL), page 235 = [Yes] (YES), but it is forced to [No] (nO) if [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn). No further modifications can be made to this parameter.
- [Catch on the fly] (FLr) = [No] (nO), page 232. No further modifications can be made to this parameter.

Lift:
- [Feed forward] (FFP) = 0 % page 93

Mast./slave:
- [Motor control type] (Ctt) = [SVC I] (CUC), page 74

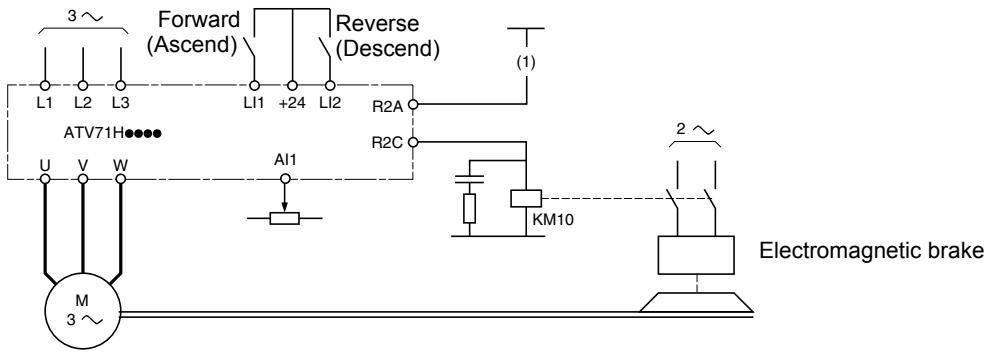
Note: These assignments are forced every time the macro configuration changes, except for [Motor control type] (Ctt) for the Mast./slave macro configuration, if it is configured in [FVC] (FUC).

Return to factory settings:
Returning to factory settings with [Config. Source] (FCSI) = [Macro-Conf] (InI), page 262 will return the drive to the selected macro configuration. The [Macro configuration] (CFG) parameter does not change, although [Customized macro] (CCFG) disappears.

NOTE: The factory settings that appear in the parameter tables correspond to [Macro configuration] (CFG) = [Start/Stop] (StS).
This is the macro configuration set at the factory.

Example diagrams for use with the macro configurations

[Hoisting] (HSt) diagram



1. A contact on the Preventa module must be inserted in the brake control circuit to engage it when the Power Removal function is activated (see connection diagrams in the Installation Manual).

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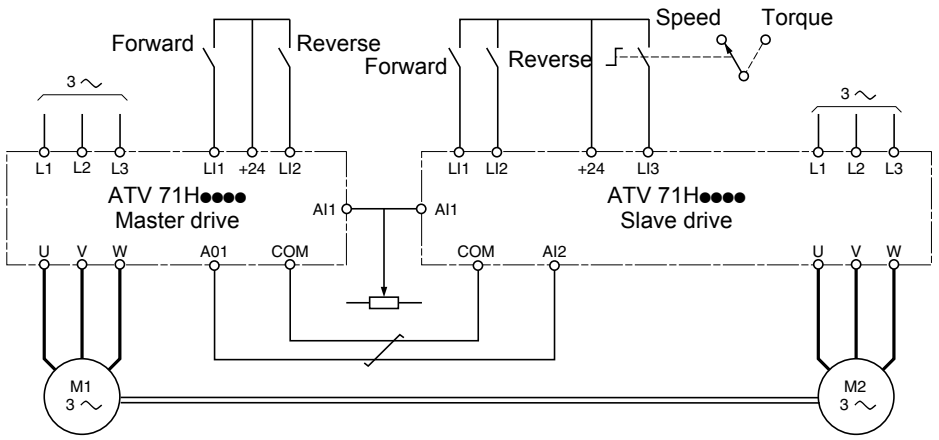
[Mast./slave] (MSL) diagram



When the two motors are mechanically connected, the Speed/torque contact closing results in operation in Mast./slave mode. The master drive regulates the speed and controls the slave drive in torque mode to ensure distribution of the load.

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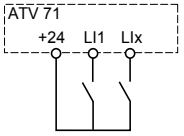
Code	Name/Description	Factory setting
tCC	**[2/3 wire control]**	[2 wire] (2C)
2C	[2 wire] (2C)	
3C	[3 wire] (3C)	

2-wire control: This is the input state (0 or 1) or edge (0 to 1 or 1 to 0), which controls running or stopping.

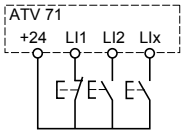
Example of "source" wiring:



LI1: forward
LIx: reverse

3-wire control (pulse commands): A "forward" or "reverse" pulse is sufficient to command starting, a "stop" pulse is sufficient to command stopping.

Example of "source" wiring:



LI1: stop
LI2: forward
LIx: reverse

⚠ WARNING

UNINTENDED PROGRAM CHANGES

- To change the assignment of [2/3 wire control] (tCC) press and hold down the “ENT” key for 2 s.
- The following function will be returned to factory settings: [2 wire type] (tCt), page 105 as will all functions which assign logic inputs.
- The macro configuration selected will also be reset it if has been customized (loss of custom settings).
- Verify that this change is compatible with the wiring diagram used.

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

CFG	**[Macro configuration]**	[Start/Stop] (StS)
StS	[Start/Stop] (StS): Start/stop	
HdG	[M. handling] (HdG): Handling	
HSt	[Hoisting] (HSt): Hoisting	
GEn	[Gen. Use] (GEn): General use	
PId	[PID regul.] (PId): PID regulation	
nEt	[Network C.] (nEt): Communication bus	
MSL	[Mast./slave] (MSL): Master/slave	
LIFt	[Lift] (LIFt): Lifts	

⚠ WARNING

UNINTENDED PROGRAM CHANGES

- To change the assignment of [Macro configuration] (CFG) press and hold down the “ENT” key for 2 s.
- Verify that the selected macro configuration is compatible with the wiring diagram used.

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

CCFG	**[Customized macro]**
YES	Read-only parameter, only visible if at least one macro configuration parameter has been modified. [Yes] (YES)

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Code	Name/Description	Adjustment range	Factory setting
bFr	**[Standard mot. freq]**		**[50Hz IEC] (50)**
	50 [50Hz IEC] (50): IEC 60 [60Hz NEMA] (60): NEMA This parameter modifies the presets of the following parameters:[Rated motor volt.] (UnS) below, [High speed] (HSP), page 48, [Freq. threshold] (Ftd), page 72, [Rated motor freq.] (FrS) and [Max frequency] (tFr) .		
IPL	[Input phase loss]		According to drive rating
	nO [Ignore] (nO): Ignored, to be used when the drive is supplied via a single-phase supply or by the DC bus. YES [Freewheel] (YES): Input phase loss fault is activated and drive freewheel stops. If one phase disappears, the drive switches to fault mode [Input phase loss] (IPL), but if 2 or 3 phases disappear, the drive continues to operate until it trips on an undervoltage fault. This parameter is only accessible in this menu on ATV71H037M3 to HU75M3 drives (used with a single phase supply).		
nPr	[Rated motor power]	According to drive rating	According to drive rating
	Rated motor power given on the nameplate, in kW if [Standard mot. freq] (bFr) = [50Hz IEC] (50), in hp if [Standard mot. freq] (bFr) = [60Hz NEMA] (60).		
UnS	[Rated motor volt.]	According to drive rating	According to drive rating and [Standard mot. freq] (bFr)
	Rated motor voltage given on the nameplate. ATV71●●●M3: 100 to 240 V ATV71●●●N4: 200 to 480 V		
nCr	[Rated mot. current]	0.25 to 1.5 In (1)	According to drive rating and [Standard mot. freq] (bFr)
	Rated motor current given on the nameplate.		
FrS	[Rated motor freq.]	10 to 500 Hz	50 Hz
	Rated motor frequency given on the nameplate. The factory setting is 50 Hz, or preset to 60 Hz if [Standard mot. freq] (bFr) is set to 60 Hz.		
nSP	[Rated motor speed]	0 to 60000 RPM	According to drive rating
	Rated motor speed given on the nameplate. 0 to 9999 rpm then 10.00 to 60.00 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: • Nominal speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$ or • Nominal speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors) or • Nominal speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)		
tFr	[Max frequency]	10 to 1600 Hz	60 Hz
	The factory setting is 60 Hz, or preset to 72 Hz if [Standard mot. freq] (bFr) is set to 60 Hz. The maximum value is limited by the following conditions: • It must not exceed 10 times the value of [Rated motor freq.] (FrS) • It must not exceed 500 Hz if the drive rating is higher than ATV71HD37 (values between 500 Hz and 1600 Hz are only possible for powers limited to 37 kW (50 hp).		

1. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

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Code	Name/Description	Factory setting
tUn	**[Auto tuning]**	[No] (nO)

⚠ 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.
- The line contactor or output contactor function is active during auto tuning.

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

nO [No] (nO): Auto-tuning not performed.
YES [Yes] (YES): Auto-tuning is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE).
dOnE [Done] (dOnE): Use of the values given the last time auto-tuning was performed.

⚠ CAUTION

CHANGE IN AUTO TUNE STATUS

- The following motor parameters must be correctly configured before starting auto tuning: [Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr).
- If one or more of these parameters is modified after auto tuning has been performed, [Auto tuning] (tUn) will be set to [No] (nO) and the procedure must be repeated.

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

- Auto-tuning is only performed 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 be taken into account after the auto-tuning sequence.
- If auto-tuning is unsuccessful, the drive displays [No] (nO) and, depending on the configuration of [Autotune fault mgt] (tnL), page 249, may switch to [Auto-tuning] (tnF) fault mode.
- Auto-tuning may last for 1 to 2 seconds. Do not interrupt the process. Wait for the display to change to "[Done] (dOnE)" or "[No] (nO)".

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

tUS	**[Auto tuning status]**	[Not done] (tAb)

(for information only, cannot be modified)

tAb [Not done] (tAb): The default stator resistance value is used to control the motor.
PEnd [Pending] (PEnd): Auto-tuning has been requested but not yet performed.
PrOG [In Progress] (PrOG): Auto-tuning in progress.
FAIL [Failed] (FAIL): Auto-tuning was unsuccessful.
dOnE [Done] (dOnE): The stator resistance measured by the auto-tuning function is used to control the motor.

⚠ 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.

⚠ CAUTION

UNINTENDED EQUIPMENT OPERATION

- The following motor parameters must be correctly configured before starting auto tuning:
  [Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr).
- If one or more of these parameters is modified after auto tuning has been performed, [Auto tuning] (tUn) will be set to [No] (nO) and the procedure must be repeated.

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

PHr	**[Output Ph rotation]**	[ABC] (AbC)
AbC ACb	[ABC] (AbC): Forward [ACB] (ACb): Reverse This parameter can be used to reverse the direction of rotation of the motor without reversing the wiring.	

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Parameters that can be changed during operation or when stopped

Code	Name/Description	Adjustment Range	Factory setting
ItH	**[Mot. therm. current]**	0.2 to 1.5 In (1)	According to drive rating
	Motor thermal protection current, to be set to the rated current indicated on the nameplate.		
ACC	[Acceleration]	0.1 to 999.9 s	3.0 s
	Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 46). Make sure that this value is compatible with the inertia being driven.		
dEC	[Deceleration]	0.1 to 999.9 s	3.0 s
	Time to decelerate from the [Rated motor freq.] (FrS) (page 46) to 0. Make sure that this value is compatible with the inertia being driven.		
LSP	[Low speed]		0
	Motor frequency at minimum reference, can be set between 0 and [High speed] (HSP).		
HSP	[High speed]		50 Hz
	Motor frequency at maximum reference, can be set between [Low speed] (LSP) and [Max frequency] (tFr). The factory setting changes to 60 Hz if [Standard mot. freq] (bFr) = [60Hz NEMA] (60). **CAUTION** **LOSS OF MOTOR FUNCTION** For permanent magnet synchronous motors, the maximum permissible speed must not be exceeded, otherwise demagnetization may occur. The maximum speed permitted by the motor, drive chain or application must not be exceeded at any time. **Failure to follow these instructions can result in equipment damage.**		

1. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

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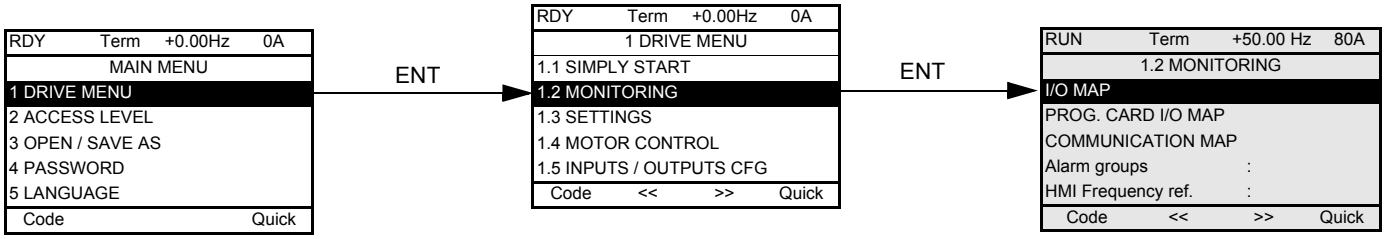
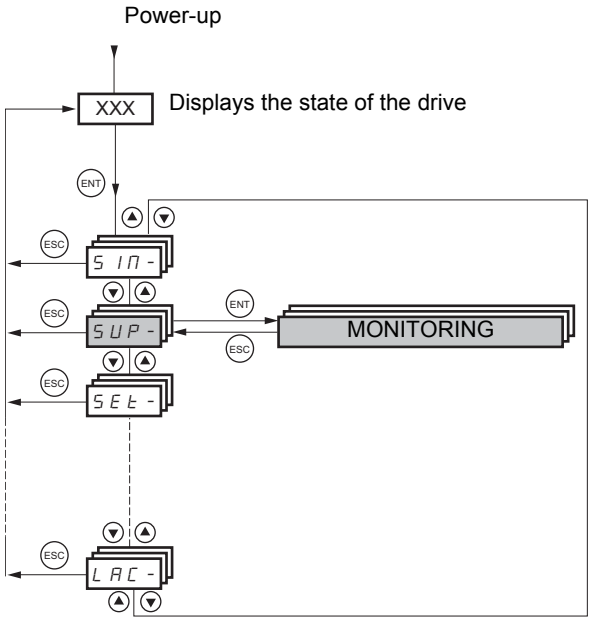
[1.2 MONITORING] (SUP-)

With graphic display terminal:



With integrated display terminal:



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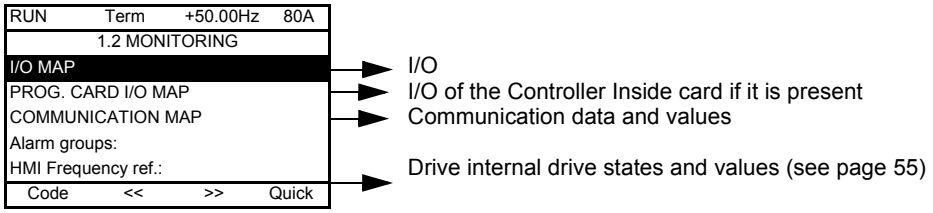
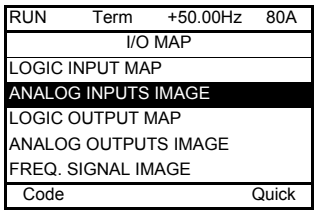
With graphic display terminal

This menu can be used to display the inputs/outputs, the drive internal states and values, and the communication data and values.



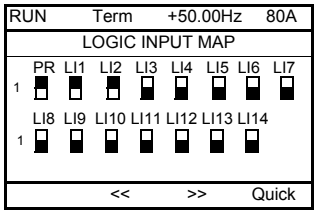
I/O



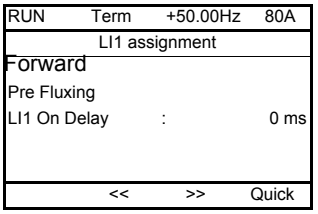
Move from one screen to another (from LOGIC INPUT MAP to FREQ. SIGNAL IMAGE) by turning the navigation button

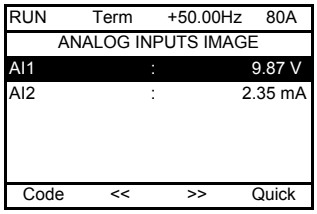
State 0

State 1

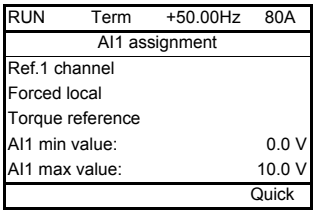


Access to the selected input or output configuration: Press ENT.



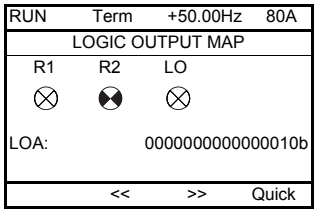


ENT

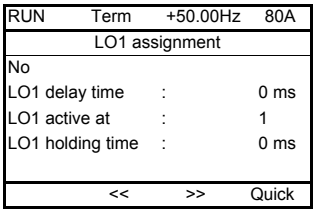


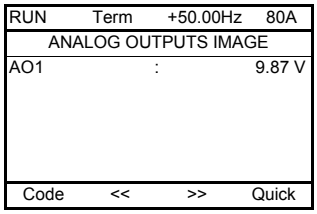
State 0

State 1

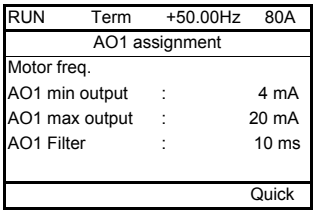


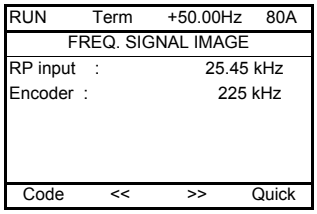
ENT



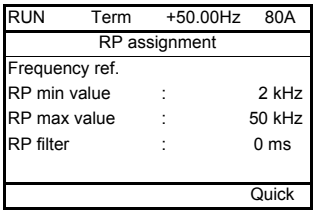


ENT





ENT



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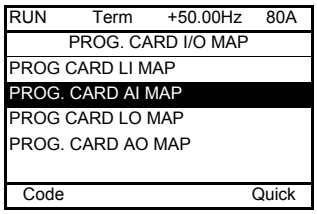
With graphic display terminal

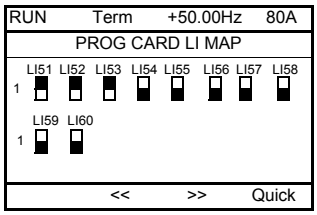
Controller Inside card I/O

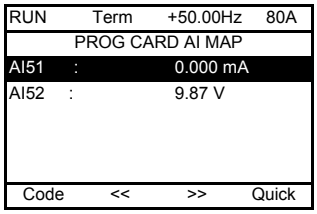


Move from one screen to another
(from PROG CARD LI MAP to PROG. CARD AO MAP)
by turning the navigation button

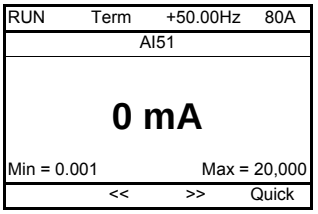
State 0

State 1



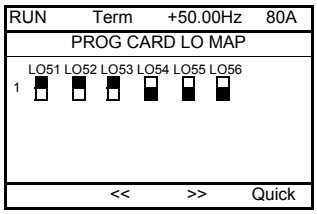


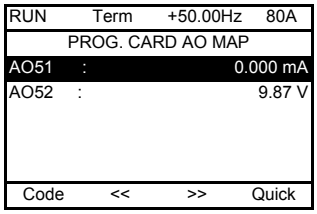
ENT



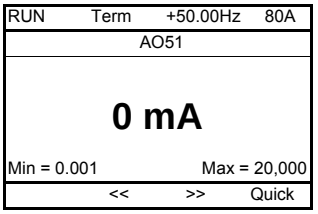
State 0

State 1





ENT



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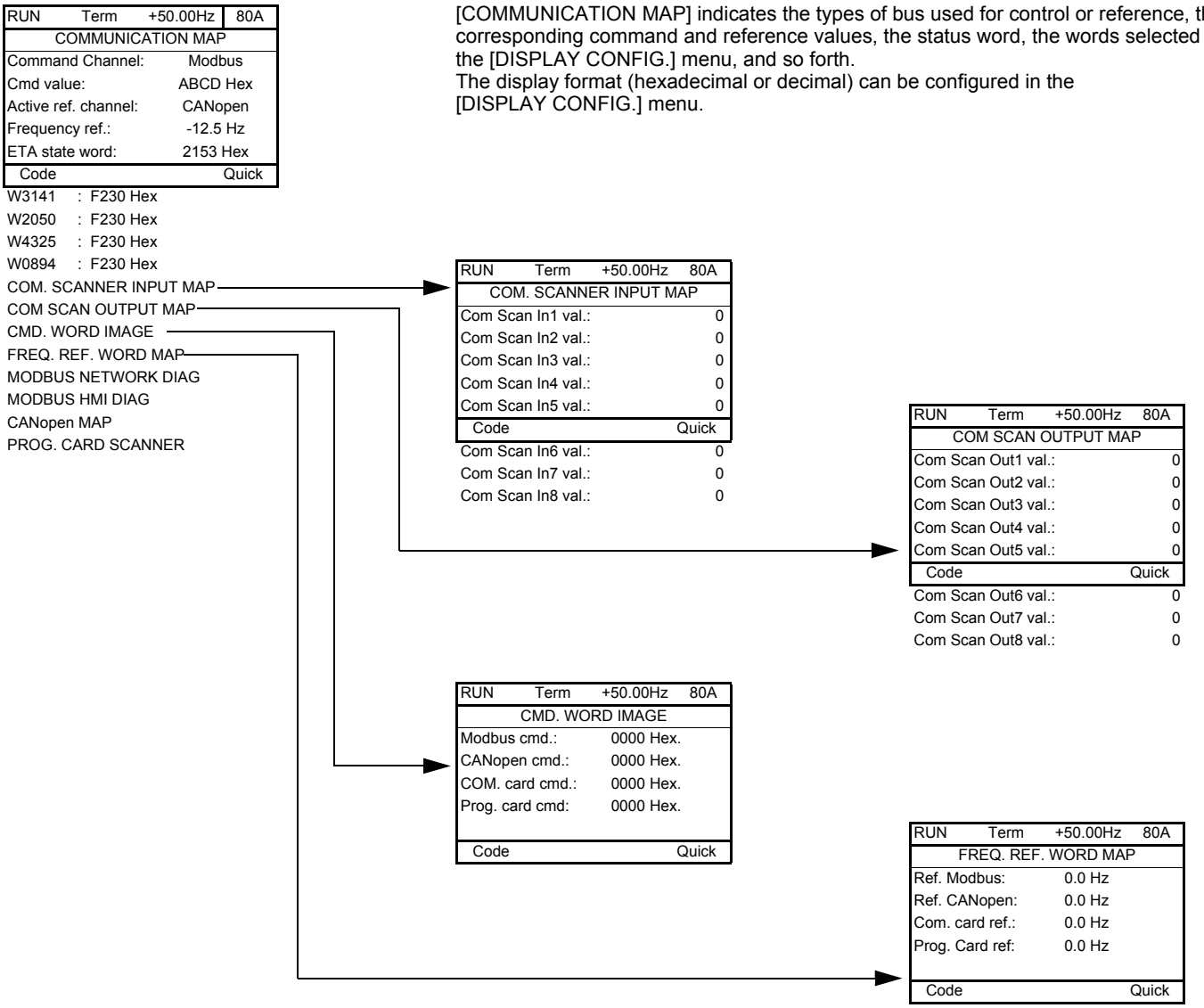
With graphic display terminal

Communication



[COMMUNICATION MAP] indicates the types of bus used for control or reference, the corresponding command and reference values, the status word, the words selected in the [DISPLAY CONFIG.] menu, and so forth.
The display format (hexadecimal or decimal) can be configured in the [DISPLAY CONFIG.] menu.

[COM. SCANNER INPUT MAP] and [COM SCAN OUTPUT MAP]:
Visualization of registers exchanged periodically (8 input and 8 output) for integrated Modbus and for fieldbus cards.

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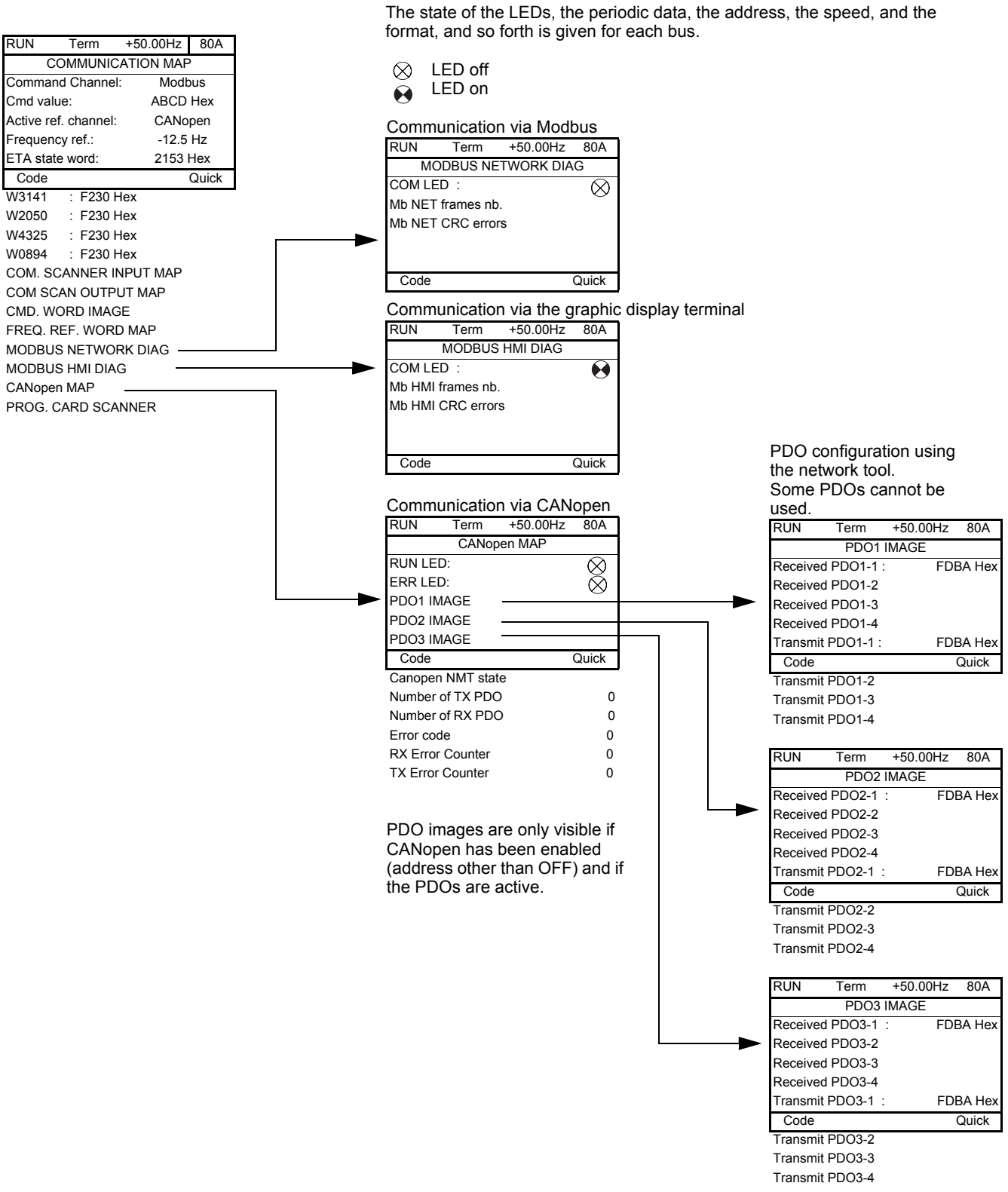
With graphic display terminal

Communication (continued)



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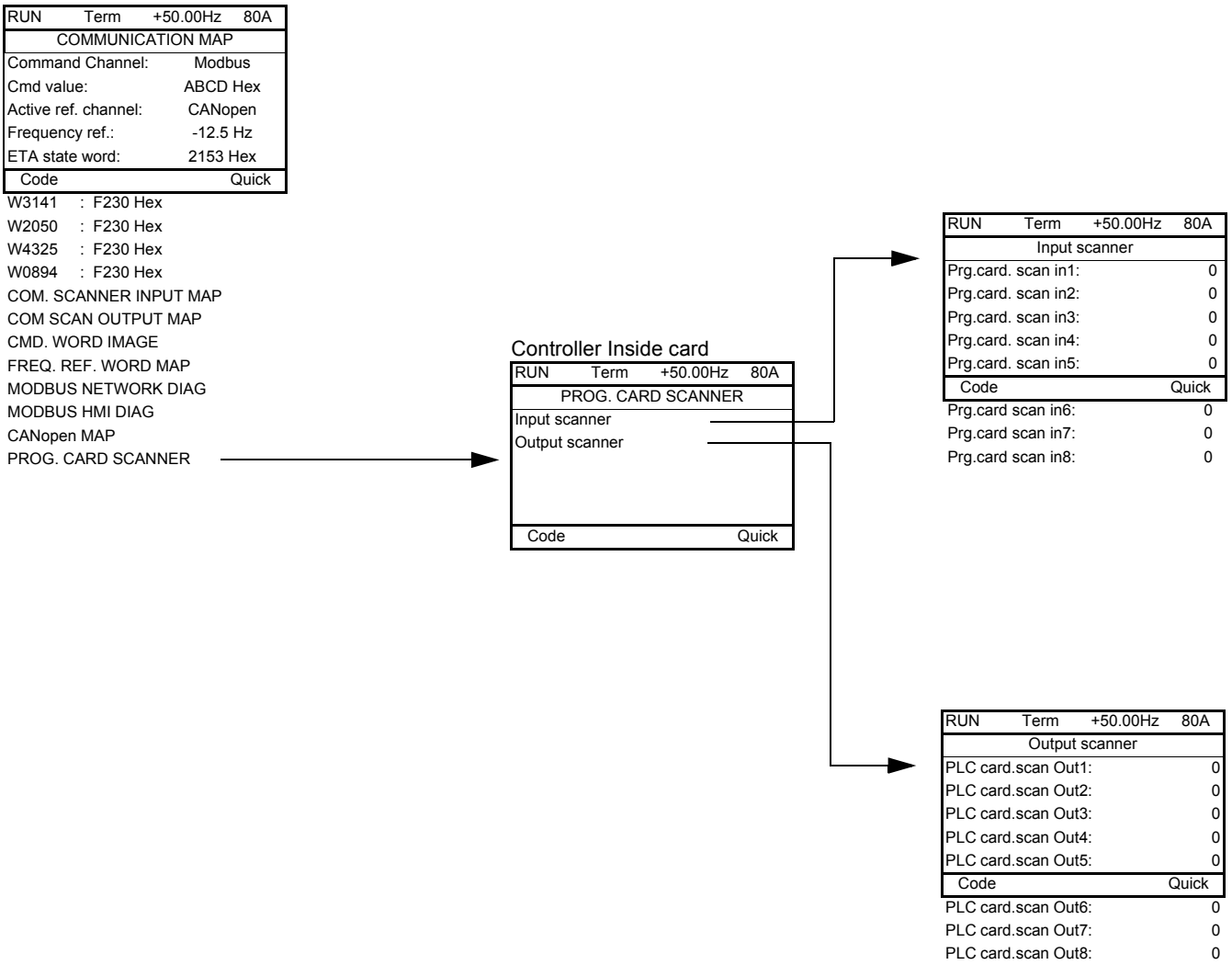
With graphic display terminal

Communication (continued)



[Input scanner] and [Output scanner]:
Visualization of registers exchanged periodically (8 input and 8 output).

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With graphic display terminal: Drive-internal states and values

Name	Description	
[Alarm groups] (ALGr)	Current alarm group numbers	
[HMI Frequency ref.] (LFr)	in Hz. Frequency reference via the graphic display terminal (can be accessed if the function has been configured).	
[Internal PID ref.] (rPI)	as a process value. PID reference via graphic display terminal (can be accessed if the function has been configured).	
[HMI torque ref.] (Ltr)	as a % of the rated torque. Torque reference via graphic display terminal.	
[Multiplying coeff.] (MFr)	as a % (can be accessed if [Multiplier ref. -] (MA2,MA3), page 151 has been assigned)	
[Frequency ref.] (FrH)	in Hz	
[Torque reference] (trr)	as a % of the rated torque (can be accessed if the function has been configured)	
[Output frequency] (rFr)	in Hz	
[Measured output fr.] (MMF)	in Hz: The measured motor speed is displayed if an encoder card has been inserted, otherwise 0 appears.	
[Pulse in. work. freq.] (FqS)	in Hz: Frequency of the "Pulse input" input used by the [FREQUENCY METER] (FqF-) function, page 246.	
[Motor current] (LCr)	in A	
[ENA avg speed] (AUS)	in Hz: The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES) (see page 96)	
[Motor speed] (SPd)	in rpm	
[Motor voltage] (UOP)	in V	
[Motor power] (OPr)	as a % of the rated power	
[Motor torque] (Otr)	as a % of the rated torque	
[Mains voltage] (ULn)	in V. Line voltage from the point of view of the DC bus, motor running or stopped.	
[Motor thermal state] (tHr)	as a %	
[Drv.thermal state] (tHd)	as a %	
[DBR thermal state] (tHb)	as a % (can only be accessed on high rating drives)	
[Consumption] (APH)	in Wh, kWh or MWh (accumulated consumption)	
[Run time] (rtH)	in seconds, minutes or hours (length of time the motor has been switched on)	
[Power on time] (PtH)	in seconds, minutes or hours (length of time the drive has been switched on)	
[IGBT alarm counter] (tAC)	in seconds (length of time the "IGBT temperature" alarm has been active)	
[PID reference] (rPC)	as a process value (can be accessed if the PID function has been configured)	
[PID feedback] (rPF)	as a process value (can be accessed if the PID function has been configured)	
[PID error] (rPE)	as a process value (can be accessed if the PID function has been configured)	
[PID Output] (rPO)	in Hz (can be accessed if the PID function has been configured)	
[Date/Time] (CLO)	Current date and time generated by the Controller Inside card (can be accessed if the card has been inserted)	
[- - - - -] (o02) to [- - - - -] (o06)	Words generated by the Controller Inside card (can be accessed if the card has been inserted)	
[Config. active] (CnFS)	Active configuration [Config. n°0, 1 or 2]	
[Utilized param. set] (CFPS)	[Set n°1, 2 or 3] (can be accessed if parameter switching has been enabled, see page 212)	
[ALARMS] (ALr-)	List of current alarms. If an alarm is present, a ✓ appears.	
[OTHER STATE] (SSt-)	List of secondary states:	
	[In motor fluxing] (FLX): In motor fluxing	[HSP attained] (FLA): High speed attained
	[PTC1 alarm] (PtC1): Probe alarm 1	[Load slipping] (AnA): Slipping alarm
	[PTC2 alarm] (PtC2): Probe alarm 2	[Set 1 active] (CFP1): Parameter set 1 active
	[LI6=PTC alarm] (PtC3): LI6 = PTC probe alarm	[Set 2 active] (CFP2): Parameter set 2 active
	[Fast stop in prog.] (FSt): Fast stop in progress	[Set 3 active] (CFP3): Parameter set 3 active
	[Current Th. attained] (CtA): Current threshold attained ([Current threshold] (Ctd), page 71)	[In braking] (brS): Drive braking
	[Freq. Th. attained] (FtA): Frequency threshold attained ([Freq. threshold] (Ftd), page 72)	[DC bus loading] (dbL): DC bus loading
	[Freq. Th. 2 attained] (F2A): 2nd frequency threshold attained ([Freq. threshold 2] (F2d), page 72)	[Forward] (MFrd): Motor running forward
	[Frequency ref. att.] (SrA): Frequency reference attained	[Reverse] (MrrS): Motor running in reverse
	[Motor th. state att.] (tSA): Motor 1 thermal state attained	[High torque alarm] (ttHA): Motor torque overshooting high threshold [High torque thd.] (ttH), page 71.
	[External fault alarm] (EtF): External fault alarm	[Low torque alarm] (ttLA): Motor torque undershooting low threshold [Low torque thd.] (ttL), page 71.
	[Auto restart] (AUtO): Automatic restart in progress	[Freq. meter Alarm] (FqLA): Measured speed threshold attained: [Pulse warning thd.] (FqL) page 72.
	[Remote] (FtL): Line mode control	
	[Auto-tuning] (tUn): Performing auto-tuning	
	[Undervoltage] (USA): Undervoltage alarm	
	[Cnfg.1 act.] (CnF1): Configuration 1 active	
	[Cnfg.2 act.] (CnF2): Configuration 2 active	

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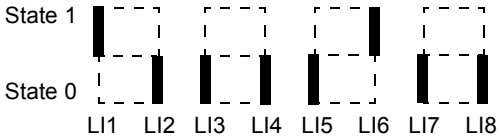
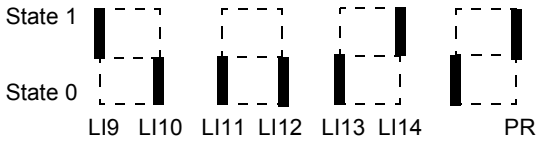
With integrated display terminal

This menu can be used to display the drive inputs, states and internal values.

Code	Name/Description
IO7 -	**I/O MAP**
LIA- LIA to LI4A	**Logic input functions** Can be used to display the functions assigned to each input. If no functions have been assigned, nO is displayed. Use the ▲ and ▼ arrows to scroll through the functions. If a number of functions have been assigned to the same input, check that they are compatible.
LIS1	**State of logic inputs LI1 to LI8** Can be used to visualize the state of logic inputs LI1 to LI8 (display segment assignment: high = 1, low = 0)  Example above: LI1 and LI6 are at 1; LI2 to LI5, LI7 and LI8 are at 0.
LIS2	**State of logic inputs LI9 to LI14 and Power Removal** Can be used to visualize the state of logic inputs LI9 to LI14 and PR (Power Removal) (display segment assignment: high = 1, low = 0)  Example above: LI9 and LI14 are at 1, LI10 to LI13 are at 0 and PR (Power Removal) is at 1.
AIA- AI1A AI2A AI3A AI4A	**Analog input functions** Can be used to display the functions assigned to each input. If no functions have been assigned, nO is displayed. Use the ▲ and ▼ arrows to scroll through the functions. If a number of functions have been assigned to the same input, check that they are compatible.

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With integrated display terminal: Drive-internal states and values

Code	Name/Description	Unit
ALGr	Alarm groups: Current alarm group numbers	—
rPI	Internal PID reference: PID reference via graphic display terminal (can be accessed if the function has been configured).	as a process value
MFr	Multiplication coefficient (can be accessed if [Multiplier ref. -] (MA2,MA3), page 151 has been assigned)	%
FrH	Frequency reference	Hz
trr	Torque reference: Can be accessed if the function has been configured	%.
rFr	Output frequency	Hz
MMF	The measured motor speed is displayed if an encoder card has been inserted, otherwise 0 appears.	Hz
FqS	Frequency of the "Pulse input" input used by the [FREQUENCY METER] (FqF-) function, page 246.	Hz
LCr	Motor current	A
AUS	ENA avg speed: The parameter can be accessed if EnA = YES (see page 96)	Hz
SPd	Motor speed	rpm
UOP	Motor voltage	V
OPr	Motor power	%
Otr	Motor torque	%
ULn	Line voltage: Line voltage from the point of view of the DC bus, motor running or stopped.	V
tHr	Motor thermal state	%
tHd	Drv thermal state	%
tHb	DBR thermal state: Can be accessed on high rating drives only.	%
APH	Power consumption	Wh, kWh or MWh
rtH	Run time: Length of time the motor has been turned on	seconds, minutes or hours
PtH	Power on time: Length of time the drive has been turned on	
tAC	IGBT alarm counter: Length of time the "IGBT temperature" alarm has been active	seconds
rPC	PID reference: Can be accessed if the PID function has been configured	as a process value
rPF	PID feedback: Can be accessed if the PID function has been configured	
rPE	PID error: Can be accessed if the PID function has been configured	
rPO	PID Output: Can be accessed if the PID function has been configured	Hz
CLO-	tIME, dAY: Current date and time generated by the Controller Inside card (can be accessed if the card has been inserted)	—
o02	Word generated by the Controller Inside card (can be accessed if the card has been inserted)	—
o03	Word generated by the Controller Inside card (can be accessed if the card has been inserted)	—
o04	Word generated by the Controller Inside card (can be accessed if the card has been inserted)	—
o05	Word generated by the Controller Inside card (can be accessed if the card has been inserted)	—
o06	Word generated by the Controller Inside card (can be accessed if the card has been inserted)	—
CnFS	Config. active: CnF0, 1 or 2 (can be accessed if motor or configuration switching has been enabled, see page 216)	—
CFPS	Utilized param. set: CFP1, 2 or 3 (can be accessed if parameter switching has been enabled, see page 212)	—

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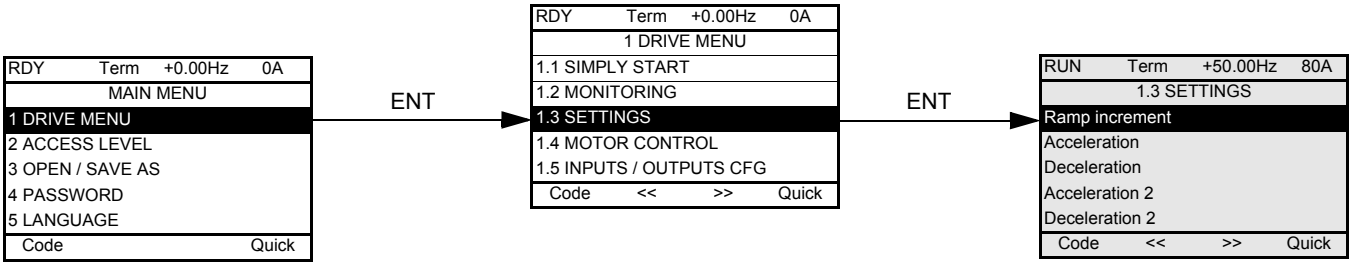
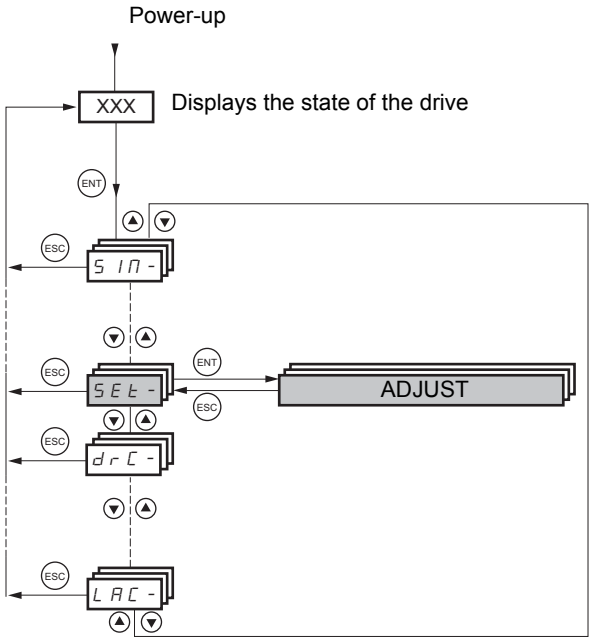
[1.3 SETTINGS] (SEt-)

With graphic display terminal:



With integrated display terminal:



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The adjustment parameters can be modified with the drive running or stopped.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Verify that changes made to the settings during operation do not present any danger.
- We recommend stopping the drive before making any changes.

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

Code	Name/Description	Adjustment range	Factory setting
Inr	**[Ramp increment]**	0,01 - 0,1 - 1	0,1
0.01 0.1 1	[0,01]: ramp up to 99.99 seconds [0,1]: ramp up to 999.9 seconds [1]: ramp up to 6000 seconds This parameter is valid for [Acceleration] (ACC), [Deceleration] (dEC), [Acceleration 2] (AC2) and [Deceleration 2] (dE2).		
ACC	[Acceleration]	0.01 to 6000 s (1)	3.0 s
	Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 79). Make sure that this value is compatible with the inertia being driven.		
dEC	[Deceleration]	0.01 to 6000 s (1)	3.0 s
	Time to decelerate from the [Rated motor freq.] (FrS) (page 79) to 0. Make sure that this value is compatible with the inertia being driven.		
AC2	[Acceleration 2]	0.01 to 6000 s (1)	5.0 s
★	See page 153 Time to accelerate from 0 to the [Rated motor freq.] (FrS). Make sure that this value is compatible with the inertia being driven.		
dE2	[Deceleration 2]	0.01 to 6000 s (1)	5.0 s
★	See page 153 Time to decelerate from the [Rated motor freq.] (FrS) to 0. Make sure that this value is compatible with the inertia being driven.		
tA1	[Begin Acc round]	0 to 100%	10%
★	See page 153 Rounding of start of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time.		
tA2	[End Acc round]	—	10%
★	See page 153 Rounding of end of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. Can be set between 0 and (100% - [Begin Acc round] (tA1))		
tA3	Begin Dec round]	0 to 100%	10%
★	See page 153 Rounding of start of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time.		

1. Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to [Ramp increment] (Inr).

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

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Code	Name/Description	Adjustment range	Factory setting
tA4	**[End Dec round]**		10%
★	See page 153 - Rounding of end of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time. - Can be set between 0 and (100% - [Begin Dec round] (tA3))		
LSP	**[Low speed]**		0 Hz
	Motor frequency at minimum reference, can be set between 0 and [High speed] (HSP).		
HSP	**[High speed]**		50 Hz
	Motor frequency at maximum reference, can be set between [Low speed] (LSP) and [Max frequency] (tFr). The factory setting changes to 60 Hz if [Standard mot. freq] (bFr) = [60Hz NEMA] (60). **CAUTION** **LOSS OF MOTOR FUNCTION** For permanent magnet synchronous motors, the maximum permissible speed must not be exceeded, otherwise demagnetization may occur. The maximum speed permitted by the motor, drive chain or application must not be exceeded at any time. **Failure to follow these instructions can result in equipment damage.**		
ItH	**[Mot. therm. current]**	0.2 to 1.5 In (1)	According to drive rating
	Motor thermal protection current, to be set to the rated current indicated on the nameplate.		
SPG	**[Speed prop. gain]**	0 to 1000%	40%
★	This parameter can be accessed if [Speed loop type] (SSL), page 92 = [Standard] (Std). Speed loop proportional gain.		
SIt	**[Speed time integral]**	1 to 1000%	100%
★	This parameter can be accessed if [Speed loop type] (SSL), page 92 = [Standard] (Std). Speed loop integral time constant.		
SFC	**[K speed loop filter]**	0 to 100%	0
★	This parameter can be accessed if [Speed loop type] (SSL), page 92 = [Standard] (Std). Speed loop filter coefficient.		
StA	**[Fr.Loop.Stab]**	0 to 100%	20%
★	This parameter can be accessed if [Speed loop type] (SSL), page 92 = [High perfor.] (HPF). Stability: Used to adapt the return to steady state after a speed transient, according to the dynamics of the machine. Gradually increase the stability to increase control loop attenuation and thus reduce any overspeed.		
FLG	**[FreqLoopGain]**	0 to 100%	20%
★	This parameter can be accessed if [Speed loop type] (SSL), page 92 = [High perfor.] (HPF). Frequency loop gain: Used to adapt the response of the machine speed according to the dynamics. Gradually increase the gain to increase the control loop passband.		

1. In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

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Standard speed loop - Parameter settings for [K speed loop filter] (SFC), [Speed prop. gain] (SPG) and [Speed time integral] (SIt)

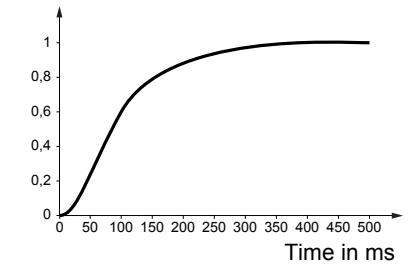
- The following parameters can only be accessed in vector control profiles: [Motor control type] (Ctt), page 74 = [SVC U] (UUC), [SVC I] (CUC), [FVC] (FUC), [Sync. mot.] (SYn) or [Sync.CL] (FSY) if [Speed loop type] (SSL), page 92 = [Standard] (Std) and if [ENA system] (EnA), page 96 = [Non] (nO).
- The factory settings are suitable for most applications.

General case: Setting for [K speed loop filter] (SFC) = 0

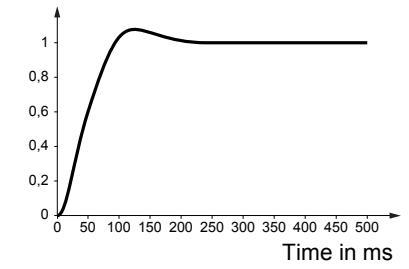
The regulator is an "IP" type with filtering of the speed reference, for applications requiring flexibility and stability (hoisting or high inertia, for example).

- [Speed prop. gain] (SPG) affects excessive speed.
- [Speed time integral] (SIt) affects the passband and response time.

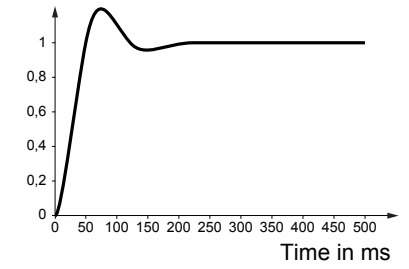
Initial response



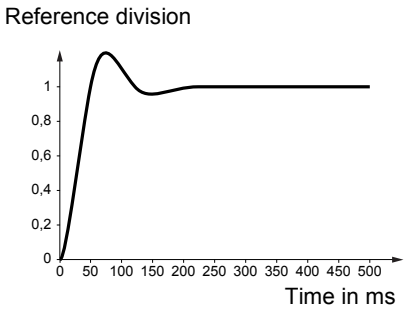
Reduction in SIT ↘



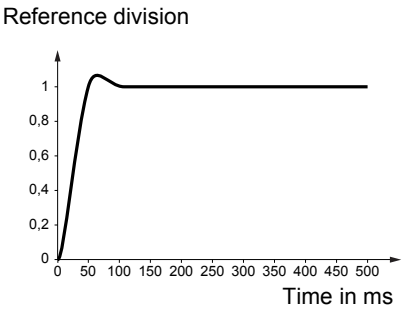
Reduction in SIT ↘↘



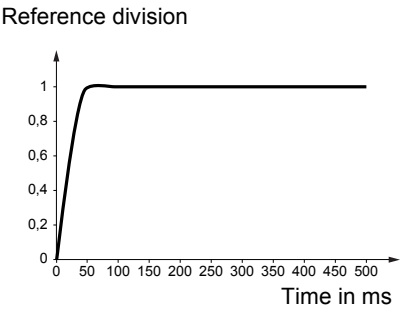
Initial response



Increase in SPG ↗



Increase in SPG ↗↗



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Special case: Parameter [K speed loop filter] (SFC) not 0

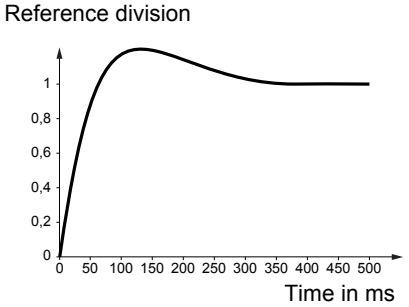
This parameter must be reserved for specific applications that require a short response time (trajectory positioning or servo control).

- When set to 100 as described above the regulator is a “PI” type, without filtering of the speed reference.
- Settings between 0 and 100 will obtain an intermediate function between the settings below and those on the previous page.

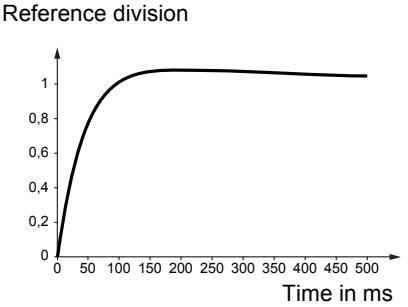
Example: Setting for [K speed loop filter] (SFC) = 100

- [Speed prop. gain] (SPG) affects the passband and response time.
- [Speed time integral] (SIt) affects excessive speed.

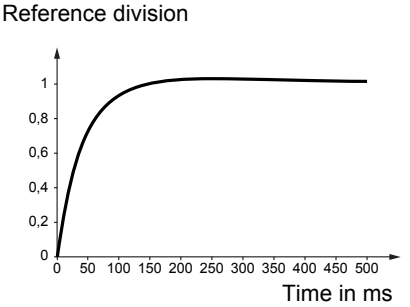
Initial response



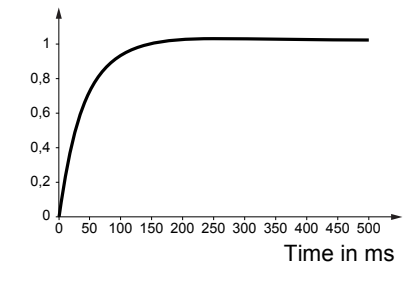
Reduction in SIT ↘



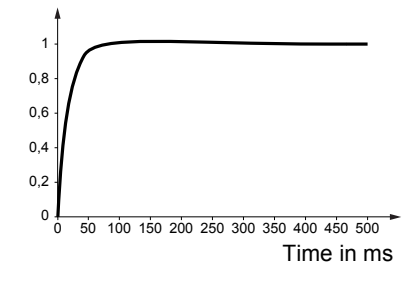
Reduction in SIT ↘↘



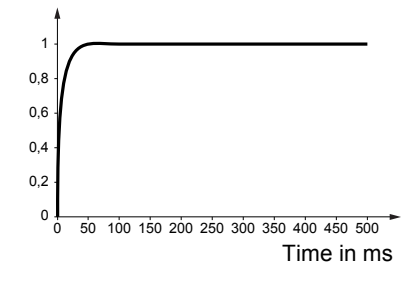
Initial response



Increase in SPG ↗



Increase in SPG ↗↗



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High performance speed loop - Parameter settings for [FreqLoopGain] (FLG) and [Fr.Loop.Stab] (StA)

These parameters can only be accessed if [Speed loop type] (SSL), page 92 = [High perf.] (HPF).

Inertia

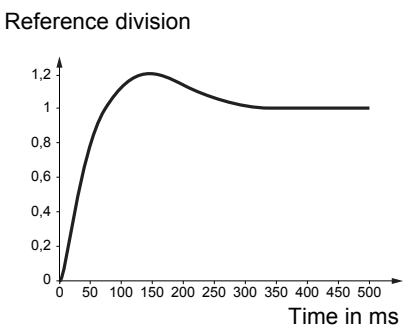
The [Estim. app. inertia] (JESt) parameter, page 92, is the default value of the inertia being driven, estimated by the drive based on the motor parameters. Speed loop default settings are determined by the drive from this inertia.
The value of the actual inertia being driven must be entered in the [Application Inertia] (JAPL) parameter, page 93. This value is then used by the drive to optimize speed loop settings, thus achieving the best results (provided that the exact value has been entered).
The [App. Inertia Coef.] (JACO) parameter, page 92, is used to fix the ratio between [Estim. app. inertia] (JESt), page 92 and [Application Inertia] (JAPL).

Gains

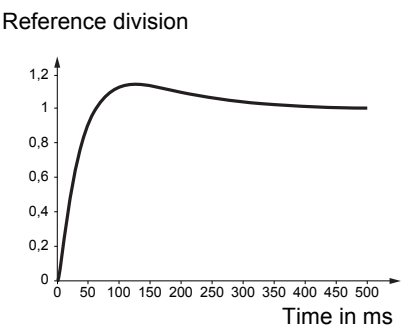
These parameters are used to adjust the response of the speed loop obtained from the inertia, in particular when this is not known.

- [Fr.Loop.Stab] (StA): Used to adapt the return to steady state after a speed transient, according to the dynamics of the machine. Gradually increase the stability to increase control loop attenuation and thus reduce any overspeed.
- [FreqLoopGain] (FLG): Used to adapt the response of the machine speed transients according to the dynamics (passband). For machines with high resistive torque, high inertia or fast cycles, increase the gain gradually.

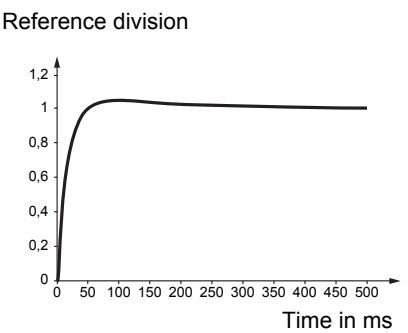
Initial response



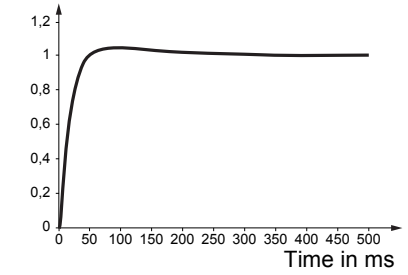
Increase in StA



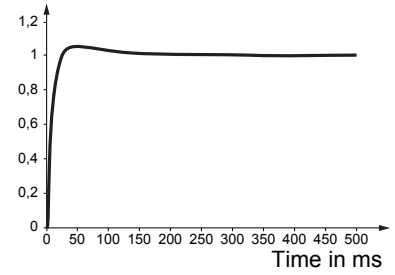
Increase in StA



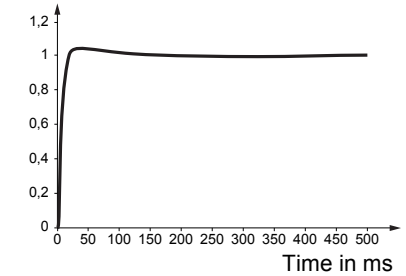
Initial response



Increase in FLG



Increase in FLG



Expert parameters

Two parameters from the [1.4 MOTOR CONTROL] (drC-) menu are accessible at Expert level and can be used to boost dynamics if necessary. See page 93.

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Code	Name/Description	Adjustment range	Factory setting
GPE	**[ENA prop.gain]**	1 to 9999	250
★	See page 96		
GIE	**[ENA integral gain]**	0 to 9999	100
★	See page 96		
UFr	**[IR compensation]**	25 to 200%	100%
★	See page 97		
SLP	**[Slip compensation]**	0 to 300%	100%
★	See page 81		
dCF	**[Ramp divider]**	0 to 10	4
★	See page 155		
IdC	**[DC inject. level 1]**	0.1 to 1.41 In (1)	0.64 In (1)
★	See page 156 Level of DC injection braking current activated via logic input or selected as stop mode. **CAUTION** **LOSS OF MOTOR FUNCTION** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.**		
tdI	**[DC injection time 1]**	0.1 to 30 s	0.5 s
★	See page 156 Maximum current injection time [DC inject. level 1] (IdC). After this time the injection current becomes [DC inject. level 2] (IdC2).		
IdC2	**[DC inject. level 2]**	0.1 In to [DC inject. level 1] (IdC)	0.5 In (1)
★	See page 156 Injection current activated by logic input or selected as stop mode, once period of time [DC injection time 1] (tdI) has elapsed. **CAUTION** **LOSS OF MOTOR FUNCTION** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.**		
tdC	**[DC injection time 2]**	0.1 to 30 s	0.5 s
★	See page 156 Maximum injection time [DC inject. level 2] (IdC2) for injection selected as stop mode only.		

1. In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

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Code	Name/Description	Adjustment range	Factory setting
SdC1 ★	**[Auto DC inj. level 1]**	0 to 1.2 In (1)	0.7 In (1)

Level of standstill DC injection current. This parameter can be accessed if [Auto DC injection] (AdC), page 157 is not [No] (nO)
This parameter is forced to 0 if [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn) or [Sync.CL] (FSY).

CAUTION

LOSS OF MOTOR FUNCTION

Verify that the motor will withstand this current without overheating.

Failure to follow these instructions can result in equipment damage.

tdC1 ★	**[Auto DC inj. time 1]**	0.1 to 30 s	0.5 s

Standstill injection time. This parameter can be accessed if [Auto DC injection] (AdC), page 157 is not [No] (nO)
If [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync. mot.] (SYn) or [Sync.CL] (FSY) this time corresponds to the zero speed maintenance time.

SdC2 ★	**[Auto DC inj. level 2]**	0 to 1.2 In (1)	0.5 In (1)

2nd level of standstill DC injection current.
This parameter can be accessed if [Auto DC injection] (AdC), page 157 is not [No] (nO)
This parameter is forced to 0 if [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn) or [Sync.CL] (FSY).

CAUTION

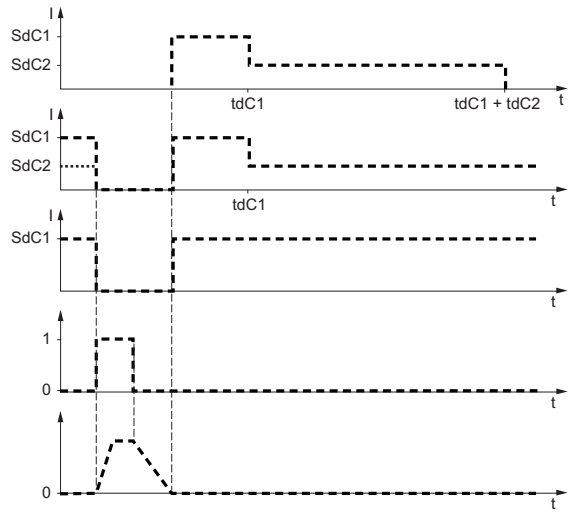
LOSS OF MOTOR FUNCTION

Verify that the motor will withstand this current without overheating.

Failure to follow these instructions can result in equipment damage.

tdC2 ★	**[Auto DC inj. time 2]**	0 to 30 s	0 s

2nd standstill injection time.
This parameter can be accessed if [Auto DC injection] (AdC), page 157 = [Yes] (YES)

AdC	SdC2	Operation
YES	x	
Ct	≠ 0	
Ct	= 0	
Run command		
Speed		

NOTE:
When [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync.CL] (FSY):

- [Auto DC inj. level 1] (SdC1),
- [Auto DC inj. level 2] (SdC2) and
- [Auto DC inj. time 2] (tdC2) are not accessible.

Only [Auto DC inj. time 1] (tdC1) can be accessed. This then corresponds to a zero speed maintenance time.

1. In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

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Code	Name/Description	Adjustment range	Factory setting
SFr	**[Switching freq.]**	According to rating	According to rating

Switching frequency setting.
Adjustment range: This can vary between 1 and 16 kHz, but the minimum and maximum values, as well as the factory setting, can be limited in accordance with the type of drive (ATV71H or W), the rating and the configuration of the S[Sinus filter] (OFI) and [Motor surge limit] (SUL) parameters, page 98.

If the value is less than 2 kHz, [Current Limitation] (CLI) and [I Limit. 2 value] (CL2), page 66 are limited to 1.36 In.
Adjustment with drive running:
- If the initial value is less than 2 kHz, it is not possible to increase it above 1.9 kHz while running.
- If the initial value is greater than or equal to 2 kHz, a minimum of 2 kHz must be maintained while running.

Adjustment with the drive stopped: No restrictions.

☞ **NOTE:** In the event of excessive temperature rise, the drive will automatically reduce the switching frequency and reset it once the temperature returns to normal.

If [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync.CL] (FSY) we do not recommend setting the switching frequency to a value less than 2 kHz (in order to avoid speed instability).

CAUTION

EXCESSIVE SWITCHING FREQUENCY

On ATV71●075N4 to U40N4 drives, if the RFI filters are disconnected (operation on an IT system), the drive's switching frequency must not exceed 4 kHz.

Failure to follow these instructions can result in equipment damage.

CLI	**[Current Limitation]**	0 to 1.65 In (1)	1.5 In (1)

Used to limit the motor current.
The adjustment range is limited to 1.36 In if [Switching freq.] (SFr), page 66 is less than 2 kHz.

☞ **NOTE:** If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss] (OPF) fault mode if this has been enabled (see page 235). If it is less than the no-load motor current, the limitation no longer has any effect.

CAUTION

LOSS OF MOTOR FUNCTION

Verify that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.

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

CL2 ★	**[I Limit. 2 value]**	0 to 1.65 In (1)	1.5 In (1)

See page 201
The adjustment range is limited to 1.36 In if [Switching freq.] (SFr), page 66 is less than 2 kHz.

☞ **NOTE:** If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss] (OPF) fault mode if this has been enabled (see page 235). If it is less than the no-load motor current, the limitation no longer has any effect.

CAUTION

LOSS OF MOTOR FUNCTION

Verify 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 equipment damage.

1. In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

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Code	Name/Description	Adjustment range	Factory setting
FLU	**[Motor fluxing]**		[No] (FnO)
FnC	[Not cont.] (FnC): Non-continuous mode		
FCt	[Continuous] (FCt): Continuous mode. This option is not possible if [Angle setting type] (ASt), page 86 or 89 is [With load] (brC) or if [Auto DC injection] (AdC), page 157 is [Yes] (YES) or if [Type of stop] (Stt), page 155 is [Freewheel] (nSt).		
FnO	[No] (FnO): Function inactive. This option is not possible if [Motor control type] (Ctt), page 74 = [SVC I] (CUC) or [FVC] (FUC).		
	If [Motor control type] (Ctt), page 74 = [SVC I] (CUC), [FVC] (FUC) or [Sync. mot.] (SYn), the factory setting is replaced by [Not cont.] (FnC).		
	If [Motor control type] (Ctt), page 74 = [SVC V] (UUC), the factory setting is replaced by [Not cont.] (FnC) at and above 55 kW (75 hp) for ATV71●●●pM3X and at and above 90 kW (120 hp) for ATV71●●●pN4.		
	If [Motor control type] (Ctt), page 74 = [Sync.CL] (FSY), [Motor fluxing] (FLU) is forced to [No] (FnO).		
	In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor. • In [Continuous] (FCt) mode, the drive automatically builds up flux when it is powered up. • In [Not cont.] (FnC) mode, fluxing occurs when the motor starts up.		
	The flux current is greater than nCr (configured rated motor current) when the flux is established and is then adjusted to the motor magnetizing current.		
	CAUTION **LOSS OF MOTOR FUNCTION** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.**		
	If [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn), the [Motor fluxing] (FLU) parameter MUST be active ([No] (FnO) is not permitted); this parameter causes rotor angle detection or alignment (depending on the configuration of [Angle setting type] (ASt), page 86) and not fluxing. • If [Brake assignment] (bLC), page 173 is not [No] (nO), the [Motor fluxing] (FLU) parameter has no effect. ☞ **NOTE:** If [Angle setting type] (ASt) = [W/o load] (nLd), the motor may rotate one full revolution during measurement.		
tLS	**[Low speed time out]**	0 to 999.9 s	0 s
	Maximum operating time at [Low speed] (LSP) (see page 48) Following operation at LSP for a defined period, a motor stop is requested automatically. The motor will restart if the reference is greater than LSP and if a run command is still present. Caution: A value of 0 indicates an unlimited period of time. ☞ **NOTE:** If [Low speed time out] (tLS) is not 0, [Type of stop] (Stt), page 155 is forced to [Ramp stop] (rMP) (only if a ramp stop can be configured).		
JGF	**[Jog frequency]**	0 to 10 Hz	10 Hz
★	See page 159 Reference in jog operation		
JGt	**[Jog delay]**	0 to 2.0 s	0.5 s
★	See page 159 Anti-repeat delay between 2 consecutive jog operations.		

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

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Code	Name/Description	Adjustment range	Factory setting
SP2	**[Preset speed 2]**	0 to 1600 Hz	10 Hz
★	See page 162 Preset speed 2		
SP3	**[Preset speed 3]**	0 to 1600 Hz	15 Hz
★	See page 162 Preset speed 3		
SP4	**[Preset speed 4]**	0 to 1600 Hz	20 Hz
★	See page 162 Preset speed 4		
SP5	**[Preset speed 5]**	0 to 1600 Hz	25 Hz
★	See page 162 Preset speed 5		
SP6	**[Preset speed 6]**	0 to 1600 Hz	30 Hz
★	See page 162 Preset speed 6		
SP7	**[Preset speed 7]**	0 to 1600 Hz	35 Hz
★	See page 162 Preset speed 7		
SP8	**[Preset speed 8]**	0 to 1600 Hz	40 Hz
★	See page 162 Preset speed 8		
SP9	**[Preset speed 9]**	0 to 1600 Hz	45 Hz
★	See page 162 Preset speed 9		
SP10	**[Preset speed 10]**	0 to 1600 Hz	50 Hz
★	See page 162 Preset speed 10		
SP11	**[Preset speed 11]**	0 to 1600 Hz	55 Hz
★	See page 162 Preset speed 11		
SP12	**[Preset speed 12]**	0 to 1600 Hz	60 Hz
★	See page 162 Preset speed 12		
SP13	**[Preset speed 13]**	0 to 1600 Hz	70 Hz
★	See page 162 Preset speed 13		
SP14	**[Preset speed 14]**	0 to 1600 Hz	80 Hz
★	See page 162 Preset speed 14		

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

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Code	Name/Description	Adjustment range	Factory setting
SP15	**[Preset speed 15]**	0 to 1600 Hz	90 Hz
★	See page 162 Preset speed 15		
SP16	**[Preset speed 16]**	0 to 1600 Hz	100 Hz
★	See page 162 Preset speed 16		
MFr	**[Multiplying coeff.]**	0 to 100%	100%
	Multiplying coefficient, can be accessed if [Multiplier ref.-] (MA2,MA3), page 151 has been assigned to the graphic terminal		
SrP	**[+/-Speed limitation]**	0 to 50%	10%
★	See page 166 Limitation of +/- speed variation		
rPG	**[PID prop. gain]**	0.01 to 100	1
★	See page 191 Proportional gain		
rIG	**[PID integral gain]**	0.01 to 100	1
★	See page 192 Integral gain		
rdG	**[PID derivative gain]**	0.00 to 100	0
★	See page 192 Derivative gain		
PrP	**[PID ramp]**	0 to 99.9 s	0
★	See page 192 PID acceleration/deceleration ramp, defined to go from [Min PID reference] (PIP1) to [Max PID reference] (PIP2) and vice versa.		
POL	**[Min PID output]**	- 500 to 500 or -1600 to 1600 according to rating	0 Hz
★	See page 192 Minimum value of regulator output in Hz		
POH	**[Max PID output]**	0 to 500 or 1600 according to rating	60 Hz
★	See page 192 Maximum value of regulator output in Hz		
PAL	**[Min fbk alarm]**	See page 192 (1)	100
★	See page 192 Minimum monitoring threshold for regulator feedback		
PAH	**[Max fbk alarm]**	See page 192 (1)	1000
★	See page 192 Maximum monitoring threshold for regulator feedback		

1. If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit. For Example: 15.65 for 15650.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

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Code	Name/Description	Adjustment range	Factory setting
PEr	**[PID error Alarm]**	0 to 65535 (1)	100
★	See page 192 Regulator error monitoring threshold		
P5r	**[Speed input %]**	1 to 100%	100%
★	See page 193 Multiplying coefficient for predictive speed input.		
rP2	**[Preset ref. PID 2]**	See page 195 (1)	300
★	See page 195 Preset PID reference		
rP3	**[Preset ref. PID 3]**	See page 195 (1)	600
★	See page 195 Preset PID reference		
rP4	**[Preset ref. PID 4]**	See page 195 (1)	900
★	See page 195 Preset PID reference		
Ibr	**[Brake release I FW]**	0 to 1.32 In (2)	0
★	See page 173 Brake release current threshold for lifting or forward movement		
Ird	**[Brake release I Rev]**	0 to 1.32 In (2)	0
★	See page 173 Brake release current threshold for lowering or reverse movement		
brt	**[Brake Release time]**	0 to 5.00 s	0 s
★	See page 174 Brake release time delay		
blr	**[Brake release freq]**	[Auto] (AUtO) 0 to 10 Hz	[Auto] (AUtO)
★	See page 174 Brake release frequency threshold		
bEn	**[Brake engage freq]**	[Auto] (AUtO) 0 to 10 Hz	[Auto] (AUtO)
★	See page 174 Brake engage frequency threshold		
tbE	**[Brake engage delay]**	0 to 5.00 s	0 s
★	See page 174 Time delay before request to engage brake. To delay the engaging of the brake, for horizontal movement only, if you wish the brake to engage when the drive comes to a complete stop.		

1. If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit. For Example: 15.65 for 15650.
2. In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

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Code	Name/Description	Adjustment range	Factory setting
bEt ★	**[Brake engage time]** See page 174 Brake engage time (brake response time)	0 to 5.00 s	0 s
JdC ★	**[Jump at reversal]** See page 175	[Auto] (Auto) 0 to 10 Hz	[Auto] (AUtO)
tbr ★	**[Time to restart]** See page 175 Time between the end of a brake engage sequence and the start of a brake release sequence	0 to 15.00 s	0 s
tLIM ★	**[Motoring torque lim]** See page 200 Torque limitation in generator mode, as a % or in 0.1% increments of the rated torque in accordance with the [Torque increment] (IntP) parameter, page 200.	0 to 300%	100%
tLIG ★	**[Gen. torque lim]** See page 200 Torque limitation in generator mode, as a % or in 0.1% increments of the rated torque in accordance with the [Torque increment] (IntP) parameter, page 200.	0 to 300%	100%
trH ★	**[Traverse freq. high]** See page 222	0 to 10 Hz	4 Hz
trL ★	**[Traverse freq. low]** See page 222	0 to 10 Hz	4 Hz
qSH ★	**[Quick step High]** See page 222	0 to [Traverse freq. high] (trH)	0 Hz
qSL ★	**[Quick step Low]** See page 222	0 to [Traverse freq. low] (trL)	0 Hz
CtdA	**[Current threshold]** Current threshold for [I attained] (CtA) function assigned to a relay or a logic output (see page 121).	0 to 1.5 In (1)	In (1)
ttHA	**[High torque thd.]** High current threshold for [High tq. att.] (ttHA) function assigned to a relay or a logic output (see page 121), as a % of the rated motor torque.	-300% to +300%	100%
ttLA	**[Low torque thd.]** Low current threshold for [Low tq. att.] (ttLA) function assigned to a relay or a logic output (see page 121), as a % of the rated motor torque.	-300% to +300%	50%

1. In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

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Code	Name/Description	Adjustment range	Factory setting
F 9 L	**[Pulse warning thd.]**	0 Hz to 30.00 kHz	0 Hz
★	Speed threshold measured by the FREQUENCY METER] FqF-) function, page 246, assigned to a relay or a logic output (see page 121).		
F t d	**[Freq. threshold]**	0.0 to 1600 Hz	[High speed] (HSP)
	Frequency threshold for [Freq.Th.att.] (FtA) function assigned to a relay or a logic output (see page 121), or used by the [PARAM. SET SWITCHING] (MLP-) function, page 212.		
F 2 d	**[Freq. threshold 2]**	0.0 to 1600 Hz	[High speed] (HSP)
	Frequency threshold for [Freq. Th. 2 attain.] (F2A) function assigned to a relay or a logic output (see page 121), or used by the [PARAM. SET SWITCHING] (MLP-) function, page 212.		
F F t	**[Freewheel stop Thd]**	0.0 to 1600 Hz	0.0 Hz
★	See page 155 This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold. It can be accessed if [Type of stop] (Stt) = [Fast stop] (FSt) or [Ramp stop] (rMP). 0.0: Does not switch to freewheel stop. 0,1 to 1600 Hz: Speed threshold below which the motor will switch to freewheel stop.		
t t d	**[Motor therm. level]**	0 to 118%	100%
★	See page 234 Trip threshold for motor thermal alarm (logic output or relay)		
L b C	**[Load correction]**	0 to 1000 Hz	0
★	See page 101 Rated correction in Hz.		

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

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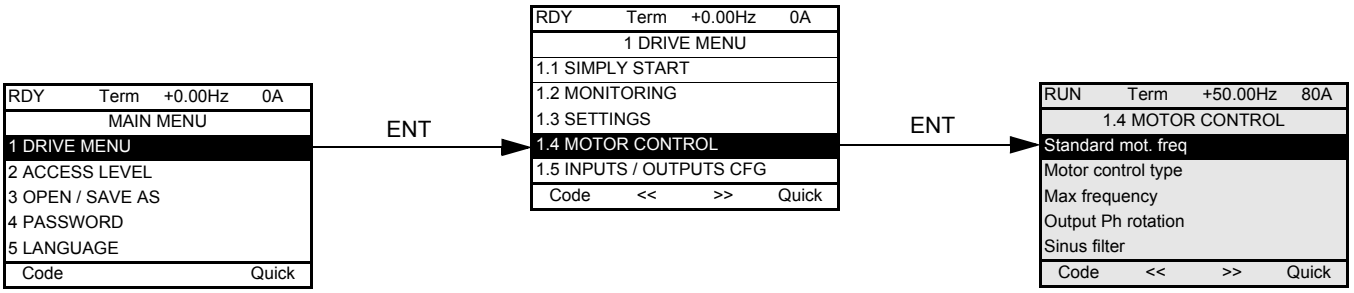
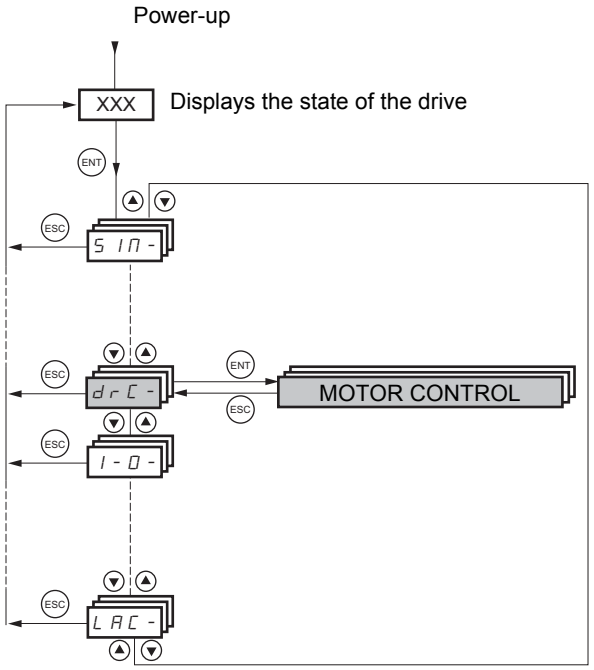
[1.4 MOTOR CONTROL] (drC-)

With graphic display terminal:



With integrated display terminal:



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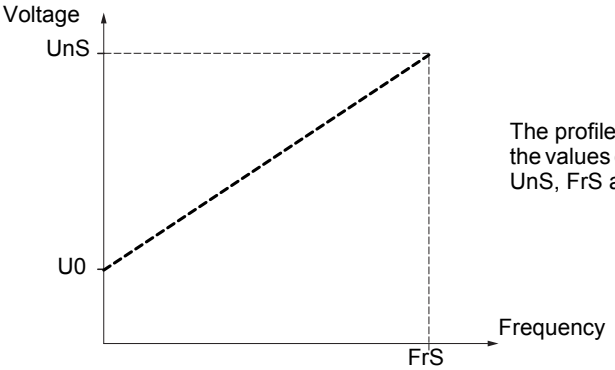
The parameters in the [1.MOTOR CONTROL] (drC-) menu can only be modified when the drive is stopped and no run command is present, with the following exceptions:
- [Auto tuning] (tUn), page 89 and [Angle auto-test] (ASA), page 86, which can cause the motor to start up.
- Parameters containing the sign ☾ in the code column, which can be modified with the drive running or stopped.

Code	Name/Description	Factory setting
bFr	[Standard mot. freq]	
50	[50Hz IEC] (50): IEC	
60	[60Hz NEMA] (60): *NEMA* This parameter modifies the presets of the following parameters: [High speed] (HSP), page 60, [Freq. threshold] (Ftd), page 72, [Rated motor volt.] (UnS), page 79, [Rated motor freq.] (FrS), page 79 and [Max frequency] (tFr) page 75.	
Ctt	[Motor control type]	[SVC V] (UUC)
UUC	[SVC V] (UUC): Open-loop voltage flux vector control with automatic slip compensation according to the load. This type of control is recommended when replacing an ATV58. It supports operation with a number of motors connected in parallel on the same drive (if the motors are identical).	
CUC	[SVC I] (CUC): Open-loop current flux vector control. This type of control is recommended when replacing an ATV58F used in an open-loop configuration. It does not support operation with a number of motors connected in parallel on the same drive.	
FUC	[FVC] (FUC): Closed-loop current flux vector control for motor with encoder. This selection is only possible if an encoder card has been detected. This function is not possible when using an incremental encoder that generates signal "A" only. This type of control is recommended when replacing an ATV58F used in a closed-loop configuration. It provides better performance in terms of speed and torque accuracy and enables torque to be obtained at zero speed. It does not support operation with a number of motors connected in parallel on the same drive. ☞ **NOTE:** It is essential that the encoder check detailed on page 77 is performed successfully before selecting [FVC] (FUC).	
UF2	[V/F 2pts] (UF2): Simple V/F profile without slip compensation. It supports operation with: Special motors (wound rotor, tapered rotor, and so forth.) A number of motors in parallel on the same drive High-speed motors Motors with a low power rating in comparison to that of the drive  The profile is defined by the values of parameters UnS, FrS and U0.	

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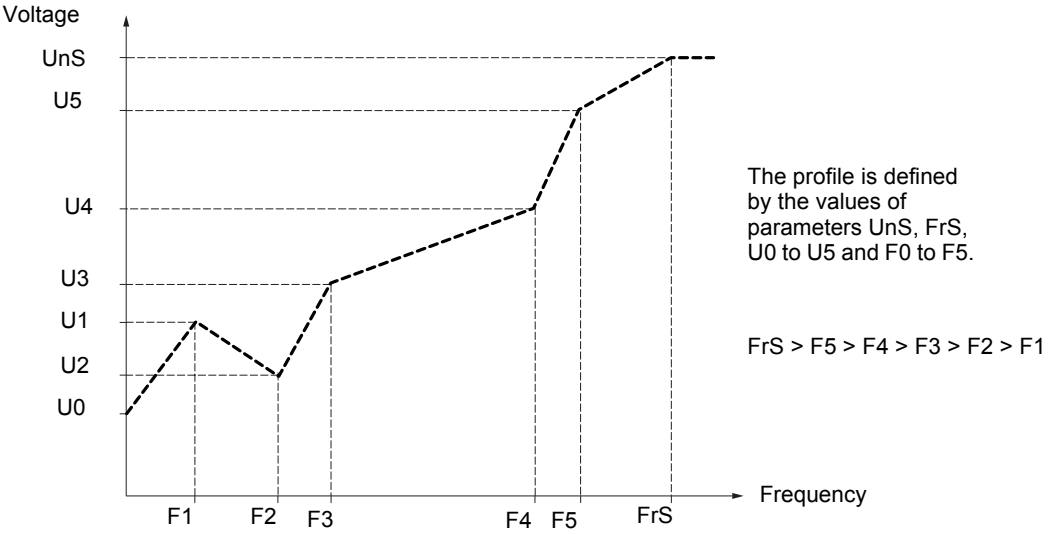
Code	Name/Description	Factory setting
Ctt	**[Motor control type] (continued)**	
UF5	[V/F 5pts] (UF5): 5-segment V/F profile: Similar to V/F 2 pts profile but also supports the avoidance of resonance (saturation).  The profile is defined by the values of parameters UnS, FrS, U0 to U5 and F0 to F5. FrS > F5 > F4 > F3 > F2 > F1	
SYn	[Sync. mot.] (SYn): For permanent magnet synchronous motors with sinusoidal electromotive force (EMF) only. This selection makes the asynchronous motor parameters inaccessible, and the synchronous motor parameters accessible.	
FSY	[Sync.CL] (FSY): Closed-loop synchronous motor. For permanent magnet synchronous motors with sinusoidal electromotive force (EMF) only, with encoder. This selection is only possible if an encoder card has been inserted. It makes the asynchronous motor parameters inaccessible, and the synchronous motor parameters accessible. This function is not possible, however, when using an incremental encoder that generates signal "A" only. ☞ **NOTE:** It is essential that the encoder check detailed on page 77 is performed successfully before selecting [Sync.CL] (FSY).	
tFr	[Max frequency]	10 to 1600 Hz
	The factory setting is 60 Hz, or preset to 72 Hz if [Standard mot. freq] (bFr) is set to 60 Hz. The maximum value is limited by the following conditions: It must not exceed 10 times the value of [Rated motor freq.] (FrS), page 79 for an asynchronous motor or [Nominal freq sync.] (FrSS), page 84 for a synchronous motor. It must not exceed 500 Hz if [Motor control type] (Ctt) (page 74) is not V/F or if the drive rating is higher than ATV71HD37. Values between 500 Hz and 1600 Hz are only possible in V/F control and for powers limited to 37 kW (50 hp). In this case, configure [Motor control type] (Ctt) before [Max frequency] (tFr).	
PHr	[Output Ph rotation]	[ABC] (AbC)
AbC ACb	[ABC] (AbC): Forward [ACB] (ACb): Reverse This parameter can be used to reverse the direction of rotation of the motor without reversing the wiring. ☞ **NOTE:** Do not modify the [Output Ph rotation] (PHr) parameter when [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync.CL] (FSY). The direction of rotation must be modified, if required, before or during the encoder check procedure detailed on page 77, when [Motor control type] (Ctt) is not [FVC] (FUC) or [Sync.CL] (FSY). Otherwise, checking and measuring procedures must be performed again ([Angle auto-test] (ASA) and [Angle offset value] (ASU) return to [No] (nO)).	

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Code	Name/Description	Adjustment range	Factory setting
OFI	[Sinus filter] (output line filter)		[No] (nO)

nO [No] (nO): No sinus filter
YES [Yes] (YES): Use of a sinus filter, to limit overvoltages on the motor and reduce the ground fault leakage current.
[Sinus filter] (OFI) is forced to [No] (nO) on ATV71p037M3 and ATV71p075N4.

NOTE: The settings for [Current Limitation] (CLI) and [I Limit. 2 value] (CL2), page 66 must be made once [Sinus filter] (OFI) has been set to [Yes] (YES) and [Motor control type] (Ctt), page 74 has been set to [V/F 2pts] (UF2) or [V/F 5pts] (UF5). This is due to the fact that for certain ratings, this configuration will result in a reduced factory setting (1.36 In) for current limitations.

CAUTION

MOTOR OVERHEATING

- If [Sinus filter] (OFI) is set to [Yes] (YES) and the maximum frequency exceeds 100 Hz or the motor type is synchronous, then the motor can overheat and the drive will trip on an overtemperature fault.
- Consult the motor manufacturer for the thermal capability of the motor when operating over the desired speed range.

Failure to follow these instructions can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
SFr ( )	[Switching freq.] (1)	According to rating	According to rating

Switching frequency setting.
Adjustment range: This can vary between 1 and 16 kHz, but the minimum and maximum values, as well as the factory setting, can be limited in accordance with the type of drive (ATV71H or W), the rating and the configuration of the [Sinus filter] (OFI) and [Motor surge limit.] (SUL) parameters, page 98.
If the value is less than 2 kHz, [Current Limitation] (CLI) and [I Limit. 2 value] (CL2), page 66 are limited to 1.36 In.
Adjustment with drive running:
- If the initial value is less than 2 kHz, it is not possible to increase it above 1.9 kHz while running.
- If the initial value is greater than or equal to 2 kHz, a minimum of 2 kHz must be maintained while running.

Adjustment with the drive stopped: No restrictions.

NOTE: In the event of excessive temperature rise, the drive will automatically reduce the switching frequency and reset it once the temperature returns to normal.

If [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync.CL] (FSY) we do not recommend setting the switching frequency to a value less than 2 kHz as this can cause speed instability.

CAUTION

EXCESSIVE SWITCHING FREQUENCY

Do not exceed a switching frequency of 4 kHz when using an ATV71●075N4 to U40N4 drive when the RFI filters are disconnected.

Failure to follow these instructions can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
CLI ( )	[Current Limitation] (1)	0 to 1.65 In (2)	1.5 In (2)

Used to limit the motor current.
The adjustment range is limited to 1.36 In if [Switching freq.] (SFr) is less than 2 kHz.

NOTE: If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss] (OPF) fault mode if this has been enabled (see page 235). If it is less than the no-load motor current, the limitation no longer has any effect.

CAUTION

LOSS OF MOTOR FUNCTION

Verify 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 equipment damage.

1. Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

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

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Selecting the encoder

Follow the recommendations in the catalog and the Installation Manual.

NOTE: When an encoder is used with a VW3 A3 408 or VW3 A3 409 card, it is only possible to configure the "encoder" input for speed feedback. Functions can only be configured as references or inputs with a VW3 A3 401 to 407 and VW3 A3 411 card.

When an encoder is used with a VW3 A3 409 card, the drive remains locked in stop mode (and displays nSt) if the encoder is not fully configured.

Encoder check procedure

This procedure applies to all types of encoder.

1. Configure the parameters of the encoder used, pages 117 to 120.
2. Set [Motor control type] (Ctt) to a value other than [FVC] (FUC) and [Sync.CL] (FSY), even if it is the required configuration. For example, use [SVC V] (UUC) for an asynchronous motor and [Sync. mot.] (SYn) for a synchronous motor.
3. Configure the motor parameters in accordance with the specifications on the rating plate.
   - Asynchronous motor (see page 79): [Rated motor power] (nPr), [Rated motor volt.] (UnS), [Rated mot. current] (nCr), [Rated motor freq.] (FrS), [Rated motor speed] (nSP).
   - Synchronous motor (see page 83): [Nominal I sync] (nCrS), [Nom motor spdsync] (nSPS), [Pole pairs.] (PPnS), [Syn. EMF constant] (PHS), [Autotune L d-axis] (LdS), [IAutotune L q-axis] (LqS), [Cust. stator R syn] (rSAS). [Current Limitation] (CLI) must not exceed the maximum motor current, otherwise demagnetization may occur.
4. Set [Encoder usage] (EnU) = [No] (nO).
5. Perform auto-tuning.
6. Set [Encoder check] (EnC) = [Yes] (YES).
7. Verify motor rotation.
8. Run the motor at approximately 15% of the rated speed for at least 3 seconds, and use the [1.2-MONITORING] (SUP-) menu to monitor its behavior.
9. If it trips on an [Encoder fault] (EnF), [Encoder check] (EnC) returns to [No] (nO).
   - Check the parameter settings and perform auto-tuning again (see steps 1 to 5 above).
   - Check that the mechanical and electrical operation of the encoder, its power supply and connections are all OK.
   - Reverse the direction of rotation of the motor ([Output Ph rotation] (PHr) parameter page 75) or the encoder signals.
10. Repeat the operations from step 6 onwards until [Encoder check] (EnC) changes to [Done] (dOnE).
11. If necessary, change [Motor control type] (Ctt) to [FVC] (FUC) or [Sync.CL] (FSY). In the case of [Sync.CL] (FSY), go on to perform the "Procedure for measuring the phase-shift angle between the motor and the encoder" on page 85.

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Code	Name/Description	Factory setting
EnS-	**[ENCODER FEEDBACK]** Can only be accessed if an encoder card has been inserted.	
EnC	[Encoder check]	[Not done] (nO)
	Check encoder feedback. See procedure on previous page. This parameter can be accessed if an encoder card has been installed (1). nO [Not done] (nO): Check not performed. YES [Yes] (YES): Activates monitoring of the encoder. dOnE [Done] (dOnE): Check performed successfully. The check procedure checks: The direction of rotation of the encoder/motor The presence of signals (wiring continuity) The number of pulses/revolution If an encoder fault is detected, the drive locks in [Encoder fault] (EnF) fault mode.	
EnU	[Encoder usage]	[No] (nO)
	This parameter can be accessed if an encoder card has been installed (1). nO [No] (nO): Function inactive. SEC [Fdbk monit.] (SEC): The encoder provides speed feedback for monitoring only. rEG [Spd fdk reg.] (rEG): The encoder provides speed feedback for regulation and monitoring. This configuration is automatic if the drive is configured for closed-loop operation ([Motor control type] (Ctt) = [FVC] (FUC) or [Sync.CL] (FSY). If [Motor control type] (Ctt) = [SVC V] (UUC) the encoder operates in speed feedback mode and enables static correction of the speed to be performed. This configuration is not accessible for other [Motor control type] (Ctt) values. PGr [Speed ref.] (PGr): The encoder provides a reference. Can only be selected with an incremental encoder card.	

1. The encoder parameters can only be accessed if the encoder card has been installed, and the available selections will depend on the type of encoder card used. The encoder configuration can also be accessed in the [1.5 - INPUTS / OUTPUTS CFG] (I/O) menu.

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Asynchronous motor parameters:

These parameters can be accessed if [Motor control type] (Ctt), page 74 = [SVC V] (UUC), [SVC I] (CUC), [FVC] (FUC), [V/F 2pts] (UF2) or [V/F 5pts] (UF5). In this case, the synchronous motor parameters cannot be accessed.

Code	Name/Description	Adjustment range
ASY-	**[ASYNC. MOTOR]** Can only be accessed if [Motor control type] (Ctt), page 74 = [SVC V] (UUC), [SVC I] (CUC), [FVC] (FUC), [V/F 2pts] (UF2), or [V/F 5pts] (UF5).	
nPr	[Rated motor power] Rated motor power given on the nameplate, in kW if [Standard mot. freq] (bFr) = [50Hz IEC] (50), in hp if [Standard mot. freq] (bFr) = [60Hz NEMA] (60).	Acc. to drive rating
UnS	[Rated motor volt.] Rated motor voltage given on the nameplate. ATV71●●●M3X: 100 to 240 V, ATV71●●●N4: 200 to 480 V	Acc. to drive rating
nCr	[Rated mot. current] Rated motor current given on the nameplate.	0.25 to 1.5 In (1)
FrS	[Rated motor freq.] Rated motor frequency given on the nameplate. The factory setting is 50 Hz, or preset to 60 Hz if [Standard mot. freq] (bFr) is set to 60 Hz. The maximum value is limited to 500 Hz if [Motor control type] (Ctt) (page 74) is not V/F or if the drive rating is higher than ATV71HD37. Values between 500 Hz and 1600 Hz are only possible in V/F control and for powers limited to 37 kW (50 hp). In this case, configure [Motor control type] (Ctt) before [Rated motor freq.] (FrS).	10 to 1600 Hz
InSP 1 10	[rpm increment] Increment of parameter [Rated motor speed] (nSP). [x1 rpm] (1): Increment of 1 rpm, to be used if [Rated motor speed] (nSP) does not exceed 65535 rpm. [x10 rpm] (10): Increment of 10 rpm, to be used if [Rated motor speed] (nSP) exceeds 65535 rpm. ☞ **NOTE:** Changing [rpm increment] (InSP) will restore [Rated motor speed] (nSP) to its factory setting.	
nSP	[Rated motor speed] Rated motor speed given on the nameplate. Adjustable between 0 and 65535 rpm if [rpm increment] (InSP) = [x1 rpm] (1) or between 0.00 and 96.00 krpm if [rpm increment] (InSP) = [x10 rpm] (10). 0 to 9999 rpm then 10.00 to 65.53 or 96.00 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: Rated speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$ or Rated speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors) or Rated speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)	0 to 96000 rpm

1. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

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Code	Name/Description	Adjustment range	Factory setting
ASY-	**[ASYNC. MOTOR]** (continued)		
U0	[U0] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 2pts] (UF2) or [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
U1	[U1]	0 to 600 or 1000 V according to rating	0
	V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)		
F1	[F1]	0 to 1600 Hz	0
	V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)		
U2	[U2]	0 to 600 or 1000 V according to rating	0
	V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)		
F2	[F2]	0 to 1600 Hz	0
	V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)		
U3	[U3]	0 to 600 or 1000 V according to rating	0
	V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)		
F3	[F3]	0 to 1600 Hz	0
	V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)		
U4	[U4]	0 to 600 or 1000 V according to rating	0
	V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)		
F4	[F4]	0 to 1600 Hz	0
	V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)		
U5	[U5] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F5	[F5]	0 to 1600 Hz	0
	V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)		

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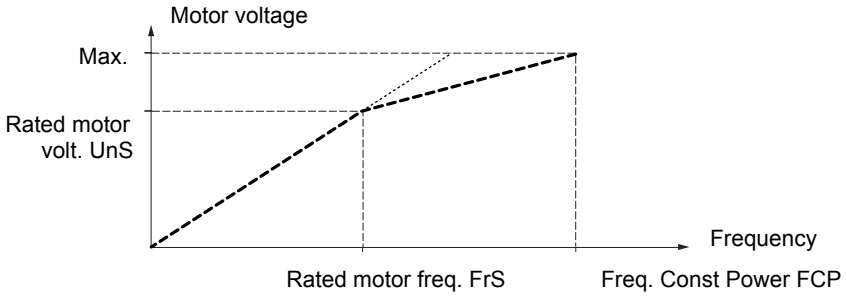
Code	Name/Description	Adjustment range	Factory setting
ASY-	**[ASYNC. MOTOR]** (continued)		
UC2	[Vector Control 2pt]		[No] (nO)
nO YES	[No] (nO): Function inactive. [Yes] (YES): Function active. Used in applications in which the motor rated speed and frequency need to be exceeded in order to optimize operation at constant power, or when the maximum voltage of the motor needs to be limited to a value below the line voltage. The voltage/frequency profile must then be adapted in accordance with the motor's capabilities to operate at maximum voltage UCP and maximum frequency FCP.  		
UCP	[V. constant power] This parameter can be accessed if [Vector Control 2pt] (UC2) = [Yes] (YES)	According to drive rating	According to drive rating and [Standard mot. freq] (bFr)
FCP	[Freq. Const Power] This parameter can be accessed if [Vector Control 2pt] (UC2) = [Yes] (YES)	According to drive rating and [Rated motor freq.] (FrS)	= [Standard mot. freq] (bFr)
SLP	[Slip compensation] (1)	0 to 300%	100%
( )	This parameter can be accessed if [Motor control type] (Ctt) is not [V/F 2pts] (UF2) or [V/F 5pts] (UF5). Adjusts the slip compensation around the value set by the rated motor speed. The speeds given on motor nameplates are not necessarily exact. • If slip setting < actual slip: The motor is not rotating at the correct speed in steady state, but at a speed lower than the reference. • If slip setting > actual slip: The motor is overcompensated and the speed is unstable.		

1. Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

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

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Asynchronous motor parameters that can be accessed in [Expert] mode

These include:
- Special parameters.
- Parameters calculated by the drive during auto-tuning, in read-only mode. For example, R1r, calculated cold stator resistance.
- The possibility of replacing some of these calculated parameters with other values, if necessary. For example, R1w, measured cold stator resistance.

When a parameter Xyw is modified by the user, the drive uses it in place of the calculated parameter Xyr.

If auto-tuning is performed or if one of the motor parameters on which auto-tuning depends is modified ([Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr)), parameters Xyw return to their factory setting.

Code	Name/Description	Factory setting
ASY-	[ASYNC. MOTOR] (continued)	
rSM	[Stator R measured] Cold stator resistance, calculated by the drive, in read-only mode. Value in milliohms (mΩ) up to 75 kW (100 hp), and in hundredths of milliohms (mΩ/100) above 75 kW (100 hp).	
IdM	[Idr] Magnetizing current in A, calculated by the drive, in read-only mode.	
LFM	[Lfr] Leakage inductance in mH, calculated by the drive, in read-only mode.	
trM	[T2r] Rotor time constant in mS, calculated by the drive, in read-only mode.	
nSL	[Nominal motor slip] Nominal slip in Hz, calculated by the drive, in read-only mode. To modify the nominal slip, modify the [Rated motor speed] (nSP) (page 79).	
PPn	[Poles pair number] Number of pairs of poles, calculated by the drive, in read-only mode.	
rSA	[Cust stator resist.] Cold state stator resistance (per winding), modifiable value. In milliohms (mΩ) up to 75 kW (100 hp), and in hundredths of milliohms (mΩ/100) above 75 kW (100 hp). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).	
IdA	[Idw] Magnetizing current in A, modifiable value.	
LFA	[Lfw] Leakage inductance in mH, modifiable value.	
trA	[Cust. rotor t const.] Rotor time constant in mS, modifiable value.	

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Synchronous motor parameters:

These parameters can be accessed if [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn) or [Sync.CL] (FSY). In this case, the asynchronous motor parameters cannot be accessed.

☞ **Important:** For synchronous motors, it is crucial to set the current limit. See [Current Limitation] (CLI), page 76.

CAUTION

LOSS OF MOTOR FUNCTION

Verify that the current limit parameter [Current Limitation] (CLI) is correct. Synchronous motors are susceptible to demagnetization.

Failure to follow these instructions can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
SYn-	[SYNCHRONOUS MOTOR] Can only be accessed if [Motor control type] (Ctt), page 74 = [Sync.CL] (FSY) or [Sync. mot.] (SYn).		
nCrS	[Nominal I sync.]	0.25 to 1.5 In (1)	Acc. to drive rating
	Rated synchronous motor current given on the nameplate.		
nSPS	[Nom motor spdsync]	0 to 60000 rpm	Acc. to drive rating
	Rated synchronous motor speed given on the nameplate. On the integrated display unit: 0 to 9999 rpm then 10.00 to 60.00 krpm.		
PPnS	[Pole pairs]	1 to 50	Acc. to drive rating
	Number of pairs of poles on the synchronous motor.		
IPHS	[Increment EMF]		[0.1mV/rpm] (0.1)
0.1 1	Increment for the [Syn. EMF constant] (PHS) parameter. [0.1mV/rpm] (0.1): 0.1 mV per rpm [1 mV/rpm] (1): 1mV per rpm		
PHS	[Syn. EMF constant]	0 to 65535	Acc. to drive rating
	Synchronous motor EMF constant, in 0.1 mV per rpm or 1 mV per rpm (peak voltage per phase), according to the value of [Increment EMF] (IPHS). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).		
LdS	[Autotune L d-axis]	0 to 655.3	Acc. to drive rating
	Axis "d" stator inductance in mH (per phase). On motors with smooth poles [Autotune L d-axis] (LdS) = [Autotune L q-axis] (LqS) = Stator inductance L.		
LqS	[Autotune L q-axis]	0 to 655.3	Acc. to drive rating
	Axis "q" stator inductance in mH (per phase). On motors with smooth poles [Autotune L d-axis] (LdS) = [Autotune L q-axis] (LqS) = Stator inductance L.		
rSAS	[Cust. stator R syn]	Acc. to drive rating	Acc. to drive rating
	Cold state stator resistance (per winding) The factory setting is replaced by the result of the auto-tuning operation, if it has been performed. The value can be entered by the user, if he knows it. Value in milliohms (mΩ) up to 75 kW (100 hp), and in hundredths of milliohms (mΩ/100) above 75 kW (100 hp). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).		

1. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

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Code	Name/Description	Adjustment range	Factory setting
SYn-	**[SYNCHRONOUS MOTOR]** (continued)		
rEPP	[Read motor param.]		[No] (nO)
	This parameter can only be used with BDH, BRH and BSH type motors from the Telemecanique range. Can only be accessed if [Encoder protocol] (UECP), page 119 = [Hiperface] (SCHP). Request to load motor parameters from the encoder EEPROM memory. nO [No] (nO): Loading not performed or was not successful. YES [Yes] (YES): Loading is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE). dOnE [Done] (dOnE): Loading done. The following parameters are loaded: [Angle offset value] (ASU), page 87, [Nom motor spdsync] (nSPS) page 83, [Nominal I sync.] (nCrS), page 83, [Pole pairs] (PPnS), page 83, [Syn. EMF constant] (PHS), page 83, [Cust. stator R syn] (rSAS), page 83, [Autotune L d-axis] (LdS), page 83, and [Autotune L q-axis] (LqS), page 83. ☞ **NOTE:** During loading the drive is in "Freewheel Stop" state with the motor turned off. If a line contactor or output contactor function has been configured, the contactor closes during loading.		
rEtP	[Status motor param]		[Not done] (tAb)
	Can only be accessed if [Encoder protocol] (UECP), page 119 = [Hiperface] (SCHP). Information on the request to load motor parameters from the encoder EEPROM memory (not modifiable). tAb [Not done] (tAb): Loading has not been performed, default motor parameters will be used. PrOG [In Progress] (PrOG): Loading in progress. FAIL [Failed] (FAIL): Loading was not successful. dOnE [Done] (dOnE): Loading completed successfully. CUS [Customized] (CUS): Loading completed successfully but one or more motor parameters have subsequently been modified by the user via the display terminal or serial link, or auto-tuning has been performed by [Auto-tuning] (tUn).		

Synchronous motor parameters that can be accessed in [Expert] mode

Code	Name/Description
SYn-	[SYNCHRONOUS MOTOR] (continued)
rSMS	[R1rS] Cold state stator resistance (per winding), in read-only mode. This is the drive factory setting or the result of the auto-tuning operation, if it has been performed. Value in milliohms (mΩ) up to 75 kW (100 hp), and in hundredths of milliohms (mΩ/100) above 75 kW (100 hp). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).
FrSS	[Nominal freq sync.] Motor frequency at rated speed in Hz, calculated by the drive (rated motor frequency), in read-only mode.

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Closed-loop synchronous motor

Operation on a synchronous motor in a closed loop configuration requires an encoder providing the exact position of the motor rotor. The phase-shift angle of the encoder in relation to the rotor must therefore be determined. The drive can perform this measurement automatically.

Selecting a resolver type encoder

☞ **The number of poles on the motor must be a whole multiple of the number of poles on the resolver.** For example, a 6-pole resolver will not operate with an 8-pole motor.
To obtain the best resolution, we recommend selecting a resolver with the same number of poles as the motor.

Procedure for measuring the phase-shift angle between the motor and the encoder

Preliminary remarks:
Select the [Angle setting type] (ASt) measuring mode according to the type of machine being driven:
- [Angle setting type] (ASt) = [W/o load] (nLd): Measurement with motion, if the rotation of the motor is free (no load, brake released) and will not cause injury or equipment damage. During measurement current flows through the motor, which may cause it to rotate one full revolution.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- During phase-shift angle measurement, the motor operates at rated current.
- Do not service the motor during the phase-shift angle measurement process.
- The line contactor or output contactor function is active during the phase-shift angle measurement process.

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

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Verify that the rotation of the motor will not cause any dangerous movements.

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

- [Angle setting type] (ASt) = [With load] (brC): Measurement without motion, motor with or without load, brake engaged or released. This mode is recommended for a lift, for example. You must adhere to the following instructions:
  - The motor rotor must not move during measurement, otherwise the result will be incorrect.
  - In some cases, the measurement current can cause tripping on [Overcurrent] (OCF); if so, use [W/o load] (nLd) mode. This occurs when using low-inductance motors, high-speed motors, or motors in which the rated voltage is well below the supply voltage of the drive.
  - In some cases, the measurement can cause tripping on [Angle error] (ASF). This occurs if the motor rotor has moved during measurement (only detected in closed-loop mode), a motor phase is disconnected or if the motor inductance is too high, thus limiting the measurement current (in this case, use [W/o load] (nLd) mode).
- [Angle setting type] (ASt) = [Optimized] (brCO): measurement without motion, possible with or without load, brake engaged or released. Optimization of the angle detection time starting from the second detection request, even after a power off of the product.

1. First, follow the "Encoder check procedure" on page 77.
2. Set [Motor control type] (Ctt) = [Sync.CL] (FSY).
3. If you have selected [Angle setting type] (ASt) = [W/o load] (nLd): measurement without motion, check that the motor rotates safely and can turn freely without resistive or driving torque. If these conditions are not met, the resulting measurement will be inaccurate.
4. Set [Angle auto-test] (ASA) = [Yes] (YES). The measurement is performed and [Angle auto-test] (ASA) changes to [Done] (dOnE). The [Angle offset value] (ASU) parameter changes from [No] (nO) to a numerical value proportional to the electrical angle measured (8191 = 360°).
5. If required, configure automatic measurements using [Angle setting activ.] (AtA). If [Angle setting type] (ASt) = [W/o load] (nLd), ensure that the conditions outlined here are met at all times.
   If using a relative encoder (incremental or SinCos), it is recommended that you set [Angle setting activ.] (AtA) = [Power On] (POn) or [Run order] (AUtO).
6. If [Angle error] (ASF) occurs, [Angle auto-test] (ASA) returns to [No] (nO).
   - Check that the parameters and instructions relating to this procedure have been carried out correctly and perform the measurement again.

Comments

The phase-shift angle must be re-measured each time:
- The motor is changed
- The encoder is changed
- The coupling between the motor and encoder is removed
- The [Output Ph rotation] (PHr) parameter is modified
- The [Coder rotation inv.] (EnRI) parameter is modified

If a relative encoder (incremental or SinCos) is used, measurement must be repeated each time the motor is turned off/on. It is therefore recommended that you set [Angle setting activ.] (AtA) = [Power On] (POn) or [Run order] (AUtO).

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Code	Name/Description	Adjustment range
ASA-	**[ANGLE TEST SETTING]** Can only be accessed if [Motor control type] (Ctt), page 74 = [Sync.CL] (FSY)	
ASt	[Angle setting type]	[With load] (brC)
	Mode for measuring the phase-shift angle between the motor and the encoder. brC [With load] (brC): Measurement without motion, possible with or without load, brake engaged or released. nLd [W/o load] (nLd): Measurement with motion, only for free motors (brake released), without load. brCO [Optimized] (brCO): Measurement without motion, possible with or without load, brake engaged or released. Optimization of the angle detection time starting from the second detection request, even after a power off of the product. ☞ **NOTE:** If [Angle setting type] (ASt) = [W/o load] (nLd), the motor may rotate one full revolution during measurement. If [Motor control type] (Ctt) = [Sync. mot.] (SYn) or [Sync.CL] (FSY) then [Angle setting type] (ASt) = [Optimized] (brCO)	
ASA	[Angle auto-test]	[No] (nO)
	Measurement of the phase-shift angle between the motor and the encoder. nO [No] (nO): Measurement not performed or has failed, or [Output Ph rotation] (PHr) has been modified, or [Coder rotation inv.] (EnRI) parameter has been modified. YES [Yes] (YES): Measurement is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE). dOnE [Done] (dOnE): Use of the value given the last time the measurement was performed.	

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- During phase-shift angle measurement, the motor operates at rated current.
- Do not service the motor during the phase-shift angle measurement process.
- The line contactor or output contactor function is active during the phase-shift angle measurement process.

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

Important:

- It is essential that all the motor parameters are configured correctly before performing *measurements*:
  - [Nominal I sync] (nCrS), [Current Limitation] (CLI), [Nom motor spdsync] (nSPS), [Pole pairs.] (PPnS), [Syn. EMF constant] (PHS), [Autotune L d-axis] (LdS), [lAutotune L q-axis] (LqS), [Cust. stator R syn] (rSAS).
- Measurement is only performed 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).
- Measurement takes priority over any run commands, which will be taken into account after the measurement sequence.
- If measurement cannot be read, the drive displays [No] (nO) and changes to [Angle Error] (ASF) mode.
- Measurement may take several seconds. Do not interrupt the process. Wait for the display to change to "[Done] (dOnE)" or "[No] (nO)".

☞ **NOTE:** If a line contactor or output contactor function has been configured, the contactor closes during measurement.

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Code	Name/Description	Adjustment range
ASA-	**[ANGLE TEST SETTING] (continued)**	
ASL	[Angle auto test]	[No] (nO)
	Measurement of the phase-shift angle between the motor and the encoder by means of a logic input or command bit. nO [No] (nO): Not assigned LI1 [LI1] (LI1) - - - : : [...] (...): See the assignment conditions on page 141. Measurement is performed when the assigned bit or input changes to 1. **⚠ DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH** • During phase-shift angle measurement, the motor operates at rated current. • Do not service the motor during the phase-shift angle measurement process. • The line contactor or output contactor function is active during the phase-shift angle measurement process. **Failure to follow these instructions will result in death or serious injury.** ☞ **NOTE:** If a line contactor or output contactor function has been configured, the contactor closes during measurement.	
AtA	[Angle setting activ.]	[No] (nO)
	Activation of automatic measurement of the phase-shift angle between the motor and encoder when using a relative encoder (incremental or SinCos). nO [No] (nO): Function inactive. POn [Power On] (POn): Measurement is performed on each power-up (1). AUtO [Run order] (AUtO): Measurement is performed on each run command if necessary, such as, if parameter [Angle offset value] (ASU) is set to [No] (nO). This option is recommended for use with a VW3 A3 401 to 407 card or with VW3 A3 411 card, when the line contactor function has been configured (loss of angle on each stop) (1). If [Angle setting activ.] (AtA) = [Power On] (POn) or [Run order] (AUtO), it is advisable to set [Angle setting type] (ASt) = [With load] (brC). **⚠ DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH** • During phase-shift angle measurement, the motor operates at rated current. • Do not service the motor during the phase-shift angle measurement process. • The line contactor or output contactor function is active during the phase-shift angle measurement process. **Failure to follow these instructions will result in death or serious injury.** ☞ **NOTE:** If a line contactor or output contactor function has been configured, the contactor closes during measurement.	
ASU	[Angle offset value]	[No] (nO)
	Phase-shift angle between the motor and the encoder. nO [No] (nO): Measurement has not been performed or could not be read, or [Output Ph rotation] (PHr) has been modified, or measurement has been lost due to powering down (1). - 0 to 8191: Phase-shift angle. 8191 corresponds to 360°.	
ASts	[Angle setting status]	[Not done] (tAb)
	Information on the phase-shift angle measurement between the motor and the encoder (cannot be modified). tAb [Not done] (tAb): Phase-shift angle not defined. PEnd [Pending] (PEnd): Measurement requested but not yet performed. PrOG [In Progress] (PrOG): Measurement in progress. FAIL [Failed] (FAIL): Measurement could not be read. dOnE [Done] (dOnE): Measurement performed successfully. CUS [Customized] (CUS): The phase-shift angle value has been entered by the user via the display terminal or serial link.	

1. Powering down causes a loss of measurement data in the following cases:
- With a VW3 A3 401 to 407 card:
  - Every time the power is turned off, even if the drive control section has a separate power supply (for example, the line contactor function has been configured).
- With a VW3 A3 409 card and a SinCos encoder:
  - Every time the power section is turned off, if the drive control section does not have a separate power supply.
  - Only when the drive control section is turned off (if it has a separate power supply via the 0 and P24 terminals).
  - If the number of poles of the resolver is not a multiple of the number of poles of the motor.

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Code	Name/Description	Factory setting
FLI-	**[FLUXING BY LI]** Cannot be accessed if [Motor control type] (Ctt), page 74 = [Sync.CL] (FSY).	
FLU ()	[Motor fluxing] (1)	[No] (FnO)
FnC	[Not cont.] (FnC): Non-continuous mode	
FCt	[Continuous] (FCt): Continuous mode. This option is not possible if [Angle setting type] (ASt), page 89 is [With load] (brC) or if [Auto DC injection] (AdC), page 157 is [Yes] (YES) or if [Type of stop] (Stt), page 155 is [Freewheel] (nSt).	
FnO	[No] (FnO): Function inactive. This option is not possible if [Motor control type] (Ctt), page 74 = [SVC I] (CUC) or [FVC] (FUC). If [Motor control type] (Ctt), page 74 = [SVC I] (CUC), [FVC] (FUC) or [Sync. mot.] (SYn), the factory setting is replaced by [Not cont.] (FnC). If [Motor control type] (Ctt), page 74 = [SVC V] (UUC), the factory setting is replaced by [Not cont.] (FnC) at and above 55 kW (75 hp) for ATV71●●●●M3X and at and above 90 kW (120 hp) for ATV71●●●●N4. In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor. In [Continuous] (FCt) mode, the drive automatically builds up flux when it is powered up. In [Not cont.] (FnC) mode, fluxing occurs when the motor starts up. The flux current is greater than nCr (configured rated motor current) when the flux is established and is then adjusted to the motor magnetizing current **CAUTION** **LOSS OF MOTOR FUNCTION** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.** If [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn), the [Motor fluxing] (FLU) parameter must be active ([No] (FnO) is not permitted); this parameter causes rotor angle detection or alignment (according to the configuration of [Angle setting type] (ASt), page 89) and not fluxing. If [Brake assignment] (bLC), page 173 is not [No] (nO), the [Motor fluxing] (FLU) parameter has no effect.	
FLI	[Fluxing assignment]	[No] (nO)
nO	[No] (nO): Function inactive	
LI1 - - -	[LI1] (LI1) : : [...] (...): See the assignment conditions on page 141. Assignment is only possible if [Motor fluxing] (FLU) = [Not cont.] (FnC): If an LI or a bit is assigned to the motor fluxing command, flux is built up when the assigned input or bit is at 1. If an LI or a bit has not been assigned, or if the assigned LI or bit is at 0 when a run command is sent, fluxing occurs when the motor starts.	

1. Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

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

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Code	Name/Description	Factory setting
FLI-	**[FLUXING BY LI]** (continued)	
ASt	[Angle setting type]	[With load] (brC)
	Rotor angle alignment or detection mode can be accessed if [Motor control type] (Ctt) page 74 = [Sync. mot.] (SYn). Mode for measuring the phase-shift angle between the motor and the encoder. [With load] (brC): Detection of angle without motion, possible with or without load, brake engaged or released. brC [W/o load] (nLd): Alignment with motion, only for free motors (brake released), without load. nLd [Optimized] (brCO): Measurement without motion, possible with or without load, brake engaged or released. brCO Optimization of the angle detection time starting from the second detection request, even after a power off of the product. ☞ **NOTE:** If [Angle setting type] (ASt) = [W/o load] (nLd), the motor may rotate one full revolution during measurement. If [Motor control type] (Ctt) = [Sync. mot.] (SYn) or [Sync.CL] (FSY) then [Angle setting type] (ASt) = [Optimized] (brCO)	
tUn-	**[AUTOMATIC TUNE]**	
tUn	[Auto tuning]	[No] (nO)

⚠ 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.
- The line contactor or output contactor function is active during auto tuning.

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

⚠ CAUTION

CHANGE IN AUTO TUNE STATUS

- The following motor parameters must be correctly configured before starting auto tuning: [Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr).
- If one or more of these parameters is modified after auto tuning has been performed, [Auto tuning] (tUn) will be set to [No] (nO) and the procedure must be repeated.

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

nO [No] (nO): Auto-tuning not performed.
YES [Yes] (YES): Auto-tuning is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE).
dOnE [Done] (dOnE): Use of the values given the last time auto-tuning was performed.
Auto-tuning is only performed 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 be taken into account after the auto-tuning sequence.
If auto-tuning fails, the drive displays [No] (nO) and, depending on the configuration of [Autotune fault mgt] (tnL) page 249, may switch to [Auto-tuning] (tnF) fault mode.
Auto-tuning may last for 1 to 2 seconds. Do not interrupt the process. Wait for the display to change to [Done] (dOnE) or [No] (nO).

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Code	Name/Description	Adjustment range
AUt	**[Automatic autotune]**	[No] (nO)

⚠ 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.
- The line contactor or output contactor function is active during auto tuning.

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

⚠ CAUTION

CHANGE IN AUTO TUNE STATUS

- The following motor parameters must be correctly configured before starting auto tuning: [Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr).
- If one or more of these parameters is modified after auto tuning has been performed, [Auto tuning] (tUn) will be set to [No] (nO) and the procedure must be repeated.

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

nO [No] (nO): Auto-tuning not performed.
YES [Yes] (YES): Auto-tuning is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE).

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Code	Name/Description	Factory setting
tUL	[Auto-tune assign.] **⚠ 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. • The line contactor or output contactor function is active during auto tuning. **Failure to follow these instructions will result in death or serious injury.** Assignment of auto-tuning to a logic input or control bit. nO [No] (nO): Not assigned LI1 [LI1] (LI1) - : - : - [...] (...): See the assignment conditions on page 141. Auto-tuning is performed when the assigned bit or input changes to 1. **⚠ CAUTION** **CHANGE IN AUTO TUNE STATUS** • The following motor parameters must be correctly configured before starting auto tuning: [Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr). • If one or more of these parameters is modified after auto tuning has been performed, [Auto tuning] (tUn) will be set to [No] (nO) and the procedure must be repeated. **Failure to follow these instructions can result in injury or equipment damage.**	
tUS	[Auto tuning state]	[Not done] (tAb)
	For information only, cannot be modified. tAb [Not done] (tAb): The default stator resistance value is used to control the motor. PEnd [Pending] (PEnd): Auto-tuning has been requested but not yet performed. PrOG [In Progress] (PrOG): Auto-tuning in progress. FAIL [Failed] (FAIL): Auto-tuning was not successful. dOnE [Done] (dOnE): The stator resistance measured by the auto-tuning function is used to control the motor. CUS [Customized] (CUS): Auto-tuning has been performed, but at least one parameter set by this auto-tuning operation has subsequently been modified. The [Auto tuning] (tUn) parameter then returns to [No] (nO). The following auto-tuning parameters are affected: • [Cust stator resist.] (rSA), [Idw] (IdA), [Lfw] (LFA) and [Cust. rotor t const.] (trA), page 82 for asynchronous motors • [Cust. stator R syn] (rSAS), page 83 for synchronous motors	

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Code	Name/Description	Adjustment range	Factory setting
SSL -	**[SPEED LOOP]** Cannot be accessed if [Motor control type] (Ctt), page 74 = [V/F 2pts] (UF2) or [V/F 5pts] (UF5).		
SSL Std HPF	[Speed loop type] Selection of speed loop type: [Standard] (Std): Standard speed loop [High perfor.] (HPF): High-performance speed loop. We advise to deactivate [Dec ramp adapt.] (brA) = [No] (nO) (see page 154)		[Standard] (Std)
SPG ( )	[Speed prop. gain] (1) This parameter can be accessed if [Speed loop type] (SSL) = [Standard] (Std). Speed loop proportional gain.	0 to 1000%	40%
SIt ( )	[Speed time integral] (1) This parameter can be accessed if [Speed loop type] (SSL) = [Standard] (Std). Speed loop integral time constant.	1 to 1000%	100%
SFC ( )	[K speed loop filter] (1) This parameter can be accessed if [Speed loop type] (SSL) = [Standard] (Std). Speed loop filter coefficient.	0 to 100	0
JMUL	[Inertia Mult. Coef.] This parameter can be accessed if [Speed loop type] (SSL) = [High perfor.] (HPF). Increment for [Application Inertia] (JAPL) and [Estim. app. inertia] (JESt) parameters, calculated by the drive, in read-only mode: - 0.1 gm^2, 1 gm^2, 10 gm^2, 100 gm^2, 1000 gm^2	—	—
JESt	[Estim. app. inertia] This parameter can be accessed if [Speed loop type] (SSL) = [High perfor.] (HPF). The inertia being driven is estimated by the drive according to the motor parameters, in read-only mode. Speed loop default settings are determined by the drive from this inertia. Increment given by [Inertia Mult. Coef.] (JMUL): - 0.1 gm^2, 1 gm^2, 10 gm^2, 100 gm^2 or 1000 gm^2	1 to 9999	—
JACO	[App. Inertia Coef.] This parameter can be accessed if [Speed loop type] (SSL) = [High perfor.] (HPF). Coefficient which fix the ratio between [Estim. app. inertia] (JESt) and [Application Inertia] (JAPL) parameters. The default value is equal to 1 or 30 if [Macro configuration] (CFG), page 45 = [Lift] (LIFt) and [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn) or [Sync.CL] (FSY). [Application Inertia] (JAPL) = [Estim. app. inertia] (JESt) x [App. Inertia Coef.] (JACO).	0.10 to 100	—

1. Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu. Advice on setting the parameters in this menu can be found on pages 61 to 63.

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

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Code	Name/Description	Adjustment range	Factory setting
SSL-	**[SPEED LOOP]** (continued)		
JAPL	[Application Inertia]	1 to 9999	—
	This parameter can be accessed if [Speed loop type] (SSL) = [High perfor.] (HPF). The value of the actual inertia being driven must be entered in this parameter. This value is then used by the drive to optimize speed loop settings, thus achieving the best results (provided that the exact value has been entered). [Application Inertia] (JAPL) = [Estim. app. inertia] (JESt) x [App. Inertia Coef.] (JACO), with [App. Inertia Coef.] (JACO) = 1 or 30 if [Macro configuration] (CFG), page 45 = [Lift] (LIFt) and [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn) or [Sync.CL] (FSY). Increment given by [Inertia Mult. Coef.] (JMUL): • 0.1 gm^2, 1 gm^2, 10 gm^2, 100 gm^2 or 1000 gm^2 **NOTE:** If a motor parameter is modified, the estimated inertia is recalculated and updated (parameters [Estim. app. inertia] (JESt) and [Inertia Mult. Coef.] (JMUL)). [Application Inertia] (JAPL) is also returned to its default value according to the new value of [Estim. app. inertia] (JESt). If an incorrect value is entered in the [Application Inertia] (JAPL)parameter, it can cause speed instability and loss of motor control, which could lead to a sudden drop (in hoisting and lift applications, for example). The inertia may vary significantly according to the application; in general, it is very high for lifts. As such, the default value does not guarantee correct operation. **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** It is essential to determine and enter the exact inertia value in high performance speed loop mode. **Failure to follow these instructions will result in death or serious injury.**		
STA ()	[Fr.Loop.Stab] (1) This parameter can be accessed if [Speed loop type] (SSL) = [High perfor.] (HPF). Stability: Used to adapt the return to steady state after a speed transient, according to the dynamics of the machine. Gradually increase the stability to increase control loop attenuation and thus reduce any overspeed.	0 to 100%	20%
FLG ()	[FreqLoopGain] (1) This parameter can be accessed if [Speed loop type] (SSL) = [High perfor.] (HPF). Frequency loop gain: Used to adapt the response of the machine speed transients according to the dynamics. For machines with high resistive torque, high inertia or fast cycles, increase the gain gradually.	0 to 100%	20%
Parameters that can be accessed in [Expert] mode			
FFP ()	[Feed forward] This parameter can be accessed if [Speed loop type] (SSL) = [High perfor.] (HPF). Percentage of the high-performance regulator feedforward term. 100% corresponds to the term calculated using the value of [Application Inertia] (JAPL), page 93.	0 to 200%	
FFU ()	[Bandwidth feedfor.] This parameter can be accessed if [Speed loop type] (SSL) = [High perfor.] (HPF). Bandwidth of the high-performance speed loop feedforward term, as a percentage of the predefined value.	20 to 500%	

1. Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu. Advice on setting the parameters in this menu can be found on pages 61 to 63**.**

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

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Recommended procedure for setting the high-performance speed loop

1. Enter the motor parameters. If you subsequently modify one of these, you will have to perform this entire procedure again.
2. The value of the actual inertia being driven must be entered in the [Application Inertia] (JAPL) parameter, page 93.

NOTE: If a motor parameter is modified, the estimated inertia is recalculated and updated (parameters [Estim. app. inertia] (JESt) and [Inertia Mult. Coef.] (JMUL)). [Application Inertia] (JAPL) is also returned to its default value according to the new value of [Estim. app. inertia] (JESt).

3. Check the speed loop response time by first setting [Feed forward] (FFP) to 0 (see graphs on next page).
4. If necessary, adjust the bandwidth and stability using parameters [Fr.Loop.Stab] (StA) and [FreqLoopGain] (FLG) (see page 63).
5. To optimize ramp following, increase the feedforward parameter [Feed forward] (FFP) as indicated on the next page until the best result is obtained.
6. Under exceptional circumstances, the feedforward term bandwidth can be adjusted (as shown on the next page) to further improve ramp following or to reduce the speed reference's sensitivity to noise.
7. If an incorrect value is entered in the [Application Inertia] (JAPL) parameter, page 93, it can cause speed instability and loss of motor control, which could lead to a sudden drop (in hoisting and lift applications, for example). The inertia may vary significantly according to the application; in general, it is very high for lifts. As such, the default value does not guarantee correct operation.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

It is essential to determine and enter the exact inertia value in high performance speed loop mode.

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

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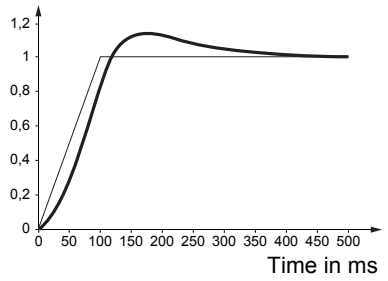
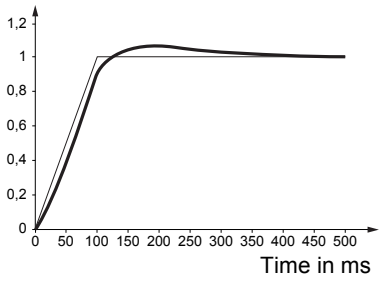
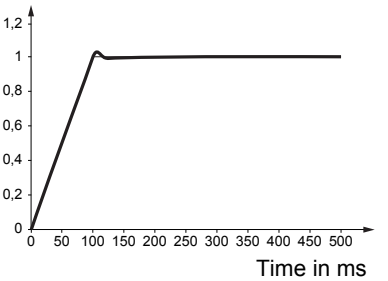
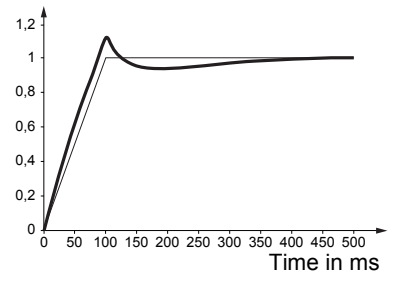
High-performance speed loop — Setting the [Feed forward] (FFP) and [Bandwidth feedfor.] (FFU) parameters

[Feed forward] (FFP)

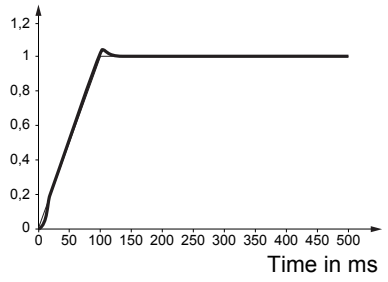
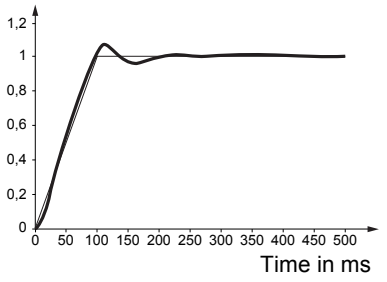
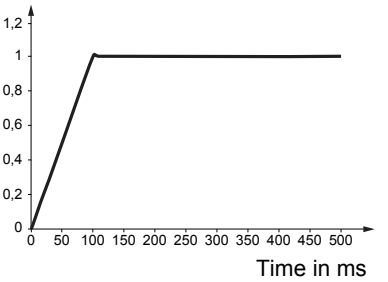
This is used to adjust the level of dynamic torque feedforward required for accelerating and decelerating the inertia. The effect of this parameter on ramp following is illustrated below. Increasing the value of FFP allows the ramp to be followed more closely. However, if the value is too high, overspeed occurs. The optimum setting is obtained when the speed follows the ramp precisely; this depends on the accuracy of the [Application Inertia] (JAPL) parameter, page 93, and the [Encoder filter value] (FFr) parameter setting, page 120.

Initial response with FFP = 0	**Increase in FFP** ↗	**Increase in FFP** ↗↗
Reference division	Reference division	Reference division
		
Time in ms	Time in ms	Time in ms

Increase in FFP ↗↗↗
Reference division

Time in ms

[Bandwidth feedfor.] (FFU)

This is used to adjust the bandwidth of the dynamic torque feedforward term. The effect of this parameter on ramp following is illustrated below. Decreasing the value of FFU reduces the effect of noise on the speed reference (torque ripple). However, too great a decrease in relation to the ramp settings (on short ramps) causes a delay, and ramp following is adversely affected. Increasing the value of FFU allows the ramp to be followed more closely, but also heightens noise sensitivity. The optimum setting is obtained by reaching the best compromise between ramp following and the existing noise sensitivity.

Initial response with FFU = 100%	**Reduction in FFU** ↘↘	**Increase in FFU** ↗↗
Reference division	Reference division	Reference division
		
Time in ms	Time in ms	Time in ms

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[ENA SYSTEM]

ENA SYSTEM is a control profile designed for rotating machines with unbalanced load. **It only applies to asynchronous motors.**
It is used primarily for oil pumps. The operating principle applied:
- Allows operation without a braking resistor
- Reduces mechanical stress on the rod
- Reduces line current fluctuations
- Reduces energy consumption by improving the electric power/current ratio

[ENA prop.gain]

This setting is used to achieve a compromise between the reduced energy consumption (and/or line current fluctuations) and the mechanical stress to which the rod is subject.
Energy is saved by reducing current fluctuations and increasing the current while retaining the same average speed.

[ENA integral gain]

This setting is used to smooth the DC bus voltage.
Start up the machine with a low integral and proportional gain (proportional 25% and integral 10%) in order to avoid an overvoltage trip in the absence of a braking resistor. See if these settings are suitable.

Recommended adjustments to be made during operation:

- To eliminate the braking resistor and, therefore, the increase in the DC bus voltage:
  Display the machine speed on the graphic display terminal.
  Reduce the integral gain value until the machine speed drops. When this point is reached, increase the integral gain until the machine speed stabilizes.
  Use the graphic display terminal or an oscilloscope to check that the DC bus voltage is stable.
- To save energy:
  Reducing the proportional gain (gradually) may increase energy savings by reducing the maximum value of the line current, but it will increase speed variations and, therefore, mechanical stress.
  The aim is to identify settings that will enable energy to be saved and minimize mechanical stress.
  When reducing the proportional gain, it may be necessary to readjust the integral gain in order to avoid an overvoltage trip.

  NOTE: Once the adjustments are complete, check that the pump starts up correctly. If the ENA integral gain setting is too low, this may lead to insufficient torque on startup.

[Reduction ratio]

This setting corresponds to the motor speed ahead of gearbox/speed after gearbox ratio. This parameter is used to display the average speed in Hz and the machine speed in customer units (e.g., in strokes per minute) on the graphic display terminal. In order to be displayed on the graphic display terminal, these values must be selected in the [1.2 MONITORING] (SUP-) menu.

Adjustment recommendations for prevention of tripping on an [Overspeed] (SOF) fault

ENA SYSTEM authorizes overspeed, which can trigger an [Overspeed] (SOF) fault. To avoid this, it is advisable to increase the value of the following parameters slightly:
- [Max frequency] (tFr), page 75
- [Overspd. pulse thd.] (FqA), page 246, if the frequency meter function is configured

Code	Name/Description	Adjustment range	Factory setting
SSL-	**[SPEED LOOP]** (continued)		
EnA	[ENA system]		[No] (nO)
	This parameter can be accessed if [Motor control type] (Ctt) = [SVC V] (UUC), see page 74. nO [No] (nO): Function inactive YES [Yes] (YES): Function active		
GPE ↻	[ENA prop.gain] (1)	1 to 9999	250
	This parameter can be accessed if [ENA system] (EnA) = [Yes] (YES)		
GIE ↻	[ENA integral gain] (1)	0 to 9999	100
	This parameter can be accessed if [ENA system] (EnA) = [Yes] (YES)		
rAP ↻	[Reduction ratio] (1)	10.0 to 999.9	10
	This parameter can be accessed if [ENA system] (EnA) = [Yes] (YES)		

1. Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

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

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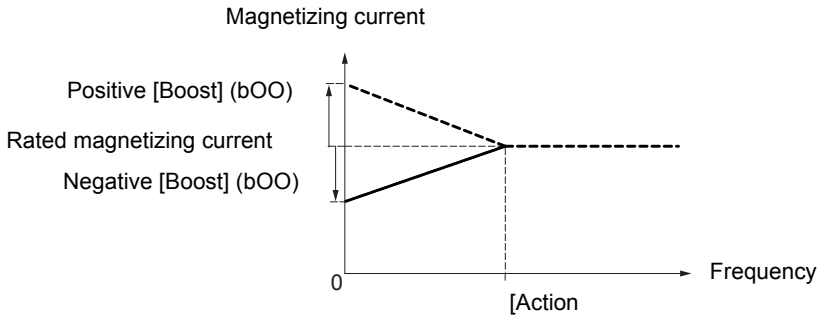
Code	Name/Description	Adjustment range	Factory setting
bOO	[Boost]	-100% to 100%	0
	The parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Motor control type] (Ctt), page 74 is different from [Sync.CL] (FSY). Adjustment of the motor magnetizing current at low speed, as a % of the rated magnetizing current. This parameter is used to increase or reduce the time taken to establish the torque. It allows gradual adjustment up to the frequency set by [Action Boost] (FAb). Negative values apply particularly to tapered rotor motors.  		
FAb	[Action Boost]	0 to 500 Hz	0
	The parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Motor control type] (Ctt), page 74 is different from [Sync.CL] (FSY). Frequency above which the magnetizing current is not longer affected by [Boost] (bOO).		
UFr ()	[IR compensation] (1) This parameter can be accessed if [Motor control type] (Ctt), page 74 is not [V/F 2pts] (UF2) or [V/F 5pts] (UF5). Used to optimize the torque at very low speed (increase [IR compensation] (UFr) if the torque is insufficient). Check that the [IR compensation] (UFr) value is not too high when the motor is warm (risk of instability).	25 to 200%	100%
nrd	[Noise reduction]		According to rating
nO	[No] (nO): Fixed frequency. Factory setting at and above 55 kW (75 hp) for ATV71●●●M3X and at and above 90 kW (120 hp) for ATV71●●●N4.		
YES	[Yes] (YES): Frequency with random modulation. Factory setting up to 45 kW (60 hp) for ATV71●●●M3X and up to 75 kW (100 hp) for the ATV71●●●N4. Random frequency modulation prevents any resonance, which may occur at a fixed frequency.		

1. Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

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

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Code	Name/Description	Factory setting
SUL	[Motor surge limit.]	[No] (nO)
	This function limits motor overvoltages and is useful in the following applications: - NEMA motors - Japanese motors - Spindle motors - Rewound motors	
nO	[No] (nO): Function inactive	
YES	[Yes] (YES): Function active	
	This parameter is forced to [No] (nO) if [Sinus filter] (OFI), page 76 = [Yes] (YES). This parameter can remain = [No] (nO) for 230/400 V motors used at 230 V, or if the length of cable between the drive and the motor does not exceed: - 4 m with unshielded cables - 10 m with shielded cables	
SOP	[Volt surge limit. opt]	10 µs
	Optimization parameter for transient overvoltages at the motor terminals. Accessible if [Motor surge limit.] (SUL) = [Yes] (YES). Set to 6, 8, or 10 µs, according to the following table.	

The value of the SOP parameter corresponds to the attenuation time of the cable used. It is defined to prevent the superimposition of voltage wave reflections resulting from long cable lengths. It limits overvoltages to twice the DC bus rated voltage.
The tables on the following page give examples of correspondence between the SOP parameter and the length of the cable between the drive and the motor. For longer cable lengths, a sinus filter or a dV/dt protection filter must be used.

- For motors in parallel, the sum of all the cable lengths must be taken into consideration. Compare the length given in the table row corresponding to the power for one motor with that corresponding to the total power, and select the shorter length. Example: Two 7.5 kW (10 hp) motors - take the lengths on the 15 kW (20 hp) table row, which are shorter than those on the 7.5 kW (10 hp) row, and divide by the number of motors to obtain the length per motor (with unshielded GORSE cable and SOP = 6, the result is 40/2 = 20 m maximum for each 7.5 kW (10 hp) motor).

In special cases (for example, different types of cable, different motor powers in parallel, different cable lengths in parallel, etc.), we recommend using an oscilloscope to check the overvoltage values obtained at the motor terminals.

To retain the overall drive performance, do not increase the SOP value unnecessarily.

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Tables giving the correspondence between the SOP parameter and the cable length, for 400 V line supply

Altivar® 71	Motor		Cable cross-section		Maximum cable length in meters					
Reference	Power				Unshielded GORSE cable Type H07 RN-F 4Gxx (yd)			Shielded GORSE cable Type GVCSTV-LS/LH (yd)		
	kW	hp	in mm^2	AWG	SOP = 10	SOP = 8	SOP = 6	SOP = 10	SOP = 8	SOP = 6
ATV71H075N4	0.75	1	1.5	14	109.36	76.55	49.21	114.83	92.96	71.08
ATV71HU15N4	1.5	2	1.5	14	109.36	76.55	49.21	114.83	92.96	71.08
ATV71HU22N4	2.2	3	1.5	14	120.30	71.08	49.21	114.83	92.96	71.08
ATV71HU30N4	3	-	1.5	14	120.30	71.08	49.21	114.83	92.96	71.08
ATV71HU40N4	4	5	1.5	14	120.30	71.08	49.21	114.83	92.96	71.08
ATV71HU55N4	5.5	7.5	2.5	14	131.23	71.08	49.21	114.83	92.96	71.08
ATV71HU75N4	7.5	10	2.5	14	131.23	71.08	49.21	114.83	92.96	71.08
ATV71HD11N4	11	15	6	10	125.77	65.62	49.21	109.36	82.02	60.15
ATV71HD15N4	15	20	10	8	114.83	65.62	43.74	109.36	76.55	54.68
ATV71HD18N4	18.5	25	10	8	125.77	65.62	38.28	164.04	82.02	54.68
ATV71HD22N4	22	30	16	6	164.04	65.62	43.74	164.04	76.55	54.68
ATV71HD30N4	30	40	25	4	164.04	60.15	38.28	164.04	76.55	54.68
ATV71HD37N4	37	50	35	5	218.72	71.08	54.68	164.04	76.55	54.68
ATV71HD45N4	45	60	50	0	218.72	60.15	32.81	164.04	65.62	43.74
ATV71HD55N4	55	75	70	2/0	218.72	54.68	27.34	164.04	60.15	32.81
ATV71HD75N4	75	100	95	4/0	218.72	49.21	27.34	164.04	60.15	32.81

continued next page

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Altivar® 71	Motor		Cable cross-section		Maximum cable length in meters					
Reference	Power				Shielded BELDEN cable Type 2950x (yd)			Shielded PROTOFLEX cable Type EMV 2YSLCY-J (yd)		
	kW	hp	in mm^2	AWG	SOP = 10	SOP = 8	SOP = 6	SOP = 10	SOP = 8	SOP = 6
ATV71H075N4	0.75	1	1.5	14	54.68	43.74	32.81			
ATV71HU15N4	1.5	2	1.5	14	54.68	43.74	32.81			
ATV71HU22N4	2.2	3	1.5	14	54.68	43.74	32.81			
ATV71HU30N4	3	-	1.5	14	54.68	43.74	32.81			
ATV71HU40N4	4	5	1.5	14	54.68	43.74	32.81			
ATV71HU55N4	5.5	7.5	2.5	14	54.68	43.74	32.81			
ATV71HU75N4	7.5	10	2.5	14	54.68	43.74	32.81			
ATV71HD11N4	11	15	6	10	54.68	43.74	32.81			
ATV71HD15N4	15	20	10	8	54.68	43.74	32.81			
ATV71HD18N4	18.5	25	10	8	54.68	43.74	32.81			
ATV71HD22N4	22	30	16	6				82.02	43.74	27.34
ATV71HD30N4	30	40	25	4				82.02	43.74	27.34
ATV71HD37N4	37	50	35	5				82.02	43.74	27.34
ATV71HD45N4	45	60	50	0				82.02	43.74	27.34
ATV71HD55N4	55	75	70	2/0				82.02	32.81	16.40
ATV71HD75N4	75	100	95	4/0				82.02	32.81	16.40

For 230/400 V motors used at 230 V, the [Motor surge limit.] (SUL) parameter can remain = [No] (nO).

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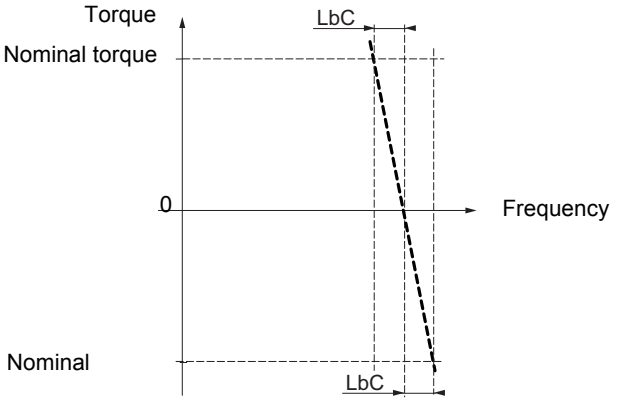
Code	Name/Description	Adjustment range	Factory setting
UbR ( )	[Braking level]		According to drive voltage rating
	DC bus voltage threshold above which the braking transistor cuts in to limit this voltage. ATV71●●●●M3●: factory setting 395 V. ATV71●●●●N4: factory setting 785 V. The adjustment range depends on the voltage rating of the drive and the [Mains voltage] (UrES) parameter, page 239.		
bbA	[Braking balance]		[No] (nO)
nO YES	[No] (nO): Function inactive [Yes] (YES): Function active, to be used on drives connected in parallel via their DC bus. Used to balance the braking power between the drives. The [Braking level] (Ubr) parameter must be set to the same value on the various drives. The value[Yes] (YES) is possible only if [Dec ramp adapt.] (brA) = [No] (nO) (see page 154)		
LbA	[Load sharing]		[No] (nO)
nO YES	When 2 motors are connected mechanically and therefore at the same speed, and each is controlled by a drive, this function can be used to improve torque distribution between the two motors. To do this, it varies the speed based on the torque. [No] (nO): Function inactive [Yes] (YES): Function active The parameter can only be accessed if [Motor control type] (Ctt), page 74 is not [V/F 2pts] (UF2) or [V/F 5pts] (UF5).		
LbC ( )	[Load correction] (1)	0 to 1000 Hz	0
	Rated correction in Hz. The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES)		



1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

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

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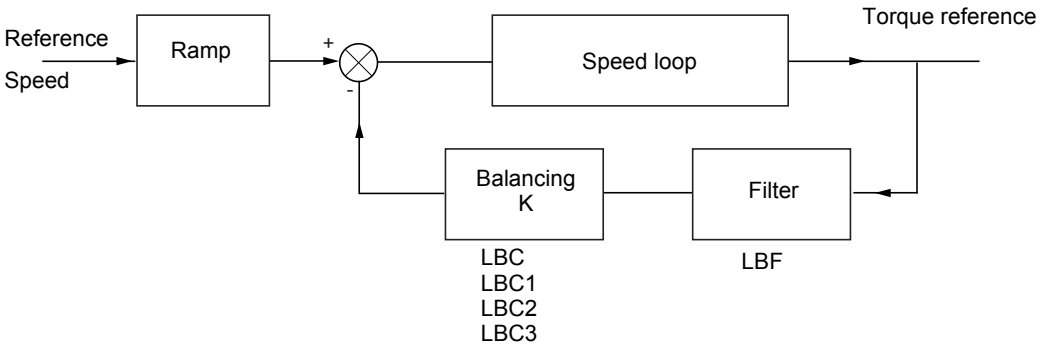
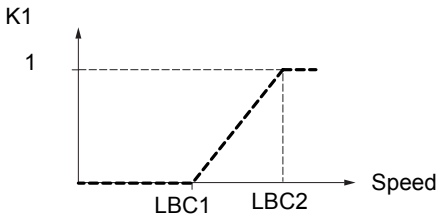
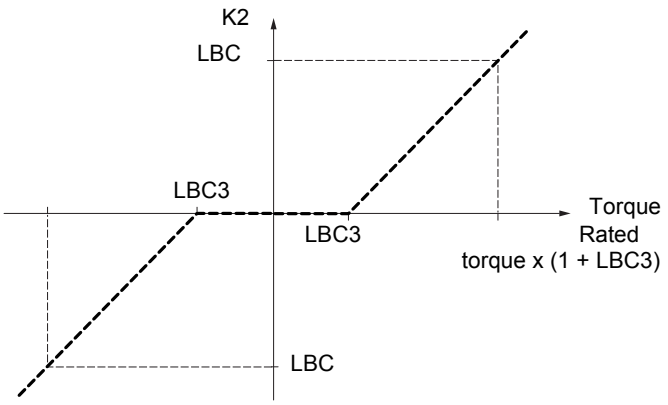
Load sharing, parameters that can be accessed at expert level

Principle



The load sharing factor K is determined by the torque and speed, with two factors K1 and K2 (K = K1 x K2).





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Code	Name/Description	Adjustment range	Factory setting
LbC1	[Correction min spd]	0 to 999.9 Hz	0
	The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) Minimum speed for load correction in Hz. Below this threshold, no corrections are made. Used to prevent correction at very low speed if this would hamper rotation of the motor.		
LbC2	[Correction max spd]	[Correction min spd] (LbC1) + 0.1 at 1000 Hz	0,1
	The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) Speed threshold in Hz above which maximum load correction is applied.		
LbC3	[Torque offset]	0 to 300%	0%
	The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) Minimum torque for load correction as a % of the rated torque. Below this threshold, no corrections are made. Used to avoid torque instabilities when the torque direction is not constant.		
LbF	[Sharing filter]	100 ms to 20 s	100 ms
	The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) Time constant (filter) for correction in ms. Used in the event of flexible mechanical coupling in order to avoid instabilities.		

Parameter that can be modified during operation or when stopped.

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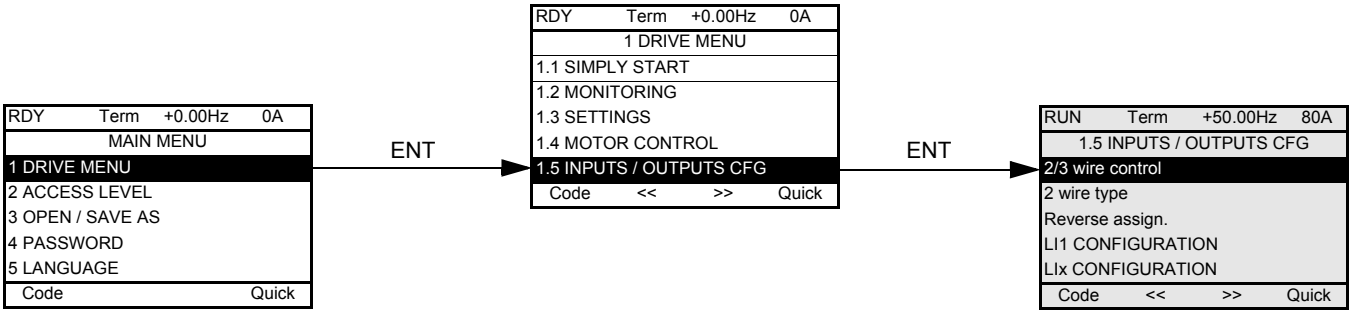
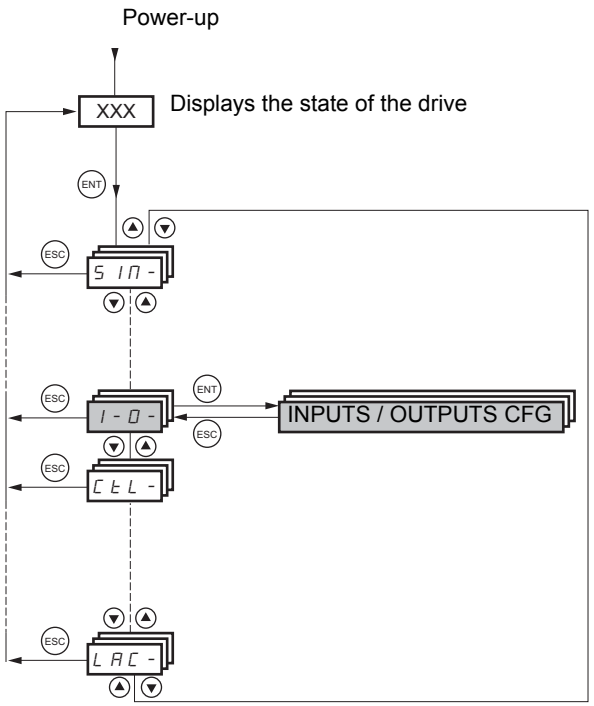
[1.5 INPUTS / OUTPUTS CFG] (I-O-)

With graphic display terminal:



With integrated display terminal:



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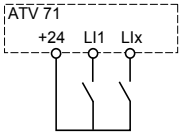
The parameters in the [1.5 INPUTS / OUTPUTS CFG] (I-O-) menu can only be modified when the drive is stopped and no run command is present.

Code	Name/Description	Factory setting
tCC	[2/3 wire control]	[2 wire] (2C)
2C	[2 wire] (2C)	
3C	[3 wire] (3C)	

2-wire control: This is the input state (0 or 1) or edge (0 to 1 or 1 to 0), which controls running or stopping.

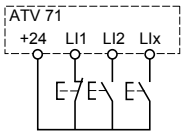
Example of source wiring:



LI1: forward
LIx: reverse

3-wire control (pulse commands): A forward or reverse pulse is sufficient to command starting, a stop pulse is sufficient to command stopping.

Example of source wiring:



LI1: stop
LI2: forward
LIx: reverse

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- To change the assignment of [2/3 wire control] (tCC) press and hold down the “ENT” key for 2 s.
- This causes the following functions to return to factory setting: [2 wire type] (tCt) and [Reverse assign.] (rrS) below, and all functions which assign logic inputs and analog inputs.
- The macro configuration selected will also be reset it if has been customized (loss of custom settings).
- It is advisable to configure this parameter before configuring the [1.6 COMMAND] (CtL-) and [1.7 APPLICATION FUNCT.] (FUn-) menus.
- Verify that this change is compatible with the wiring diagram used.

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

tCt	[2 wire type]	[Transition] (trn)
LEL	[Level] (LEL): State 0 or 1 is taken into account for run (1) or stop (0).	
trn	[Transition] (trn): A change of state (transition or edge) is necessary to initiate operation, in order to prevent accidental restarts after a break in the power supply.	
PFO	[Fwd priority] (PFO): State 0 or 1 is taken into account for run or stop, but the forward input always takes priority over the reverse input.	
rrS	[Reverse assign.]	[LI2] (LI2)
nO	[No] (nO): Not assigned	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted	
-	[LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted	
C101	[C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO)	
-	[C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO)	
-	[C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO)	
-	[C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO)	
Cd00	[CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs	
-	[CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs	
	Assignment of the reverse direction command.	

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Code	Name/Description	Adjustment range	Factory setting
L I -	**[LI1 CONFIGURATION]**		
L IA	[LI1 assignment] Read-only parameter, cannot be configured. It displays all the functions that are assigned to input LI1 in order to check for multiple assignments.		
L Id	[LI1 On Delay]	0 to 200 ms	0
	This parameter is used to take account of the change of the logic input to state 1 with a delay that can be adjusted between 0 and 200 milliseconds, in order to filter out possible interference. The change to state 0 is taken into account without delay. Check that the delay set does not pose a risk or lead to undesired operation. The relative order in which these inputs are taken into account may be modified according to the delay values of the various logic inputs, and thus lead to unintended operation. **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** Verify the sequence of logic inputs changing to state 1 when using [LI1 On Delay]. **Failure to follow these instructions will result in death or serious injury.**		
L - -	**[LIx CONFIGURATION]** All the logic inputs available on the drive are processed as in the example for LI1 above, up to LI6, LI10 or LI14, depending on whether or not option cards have been inserted.		

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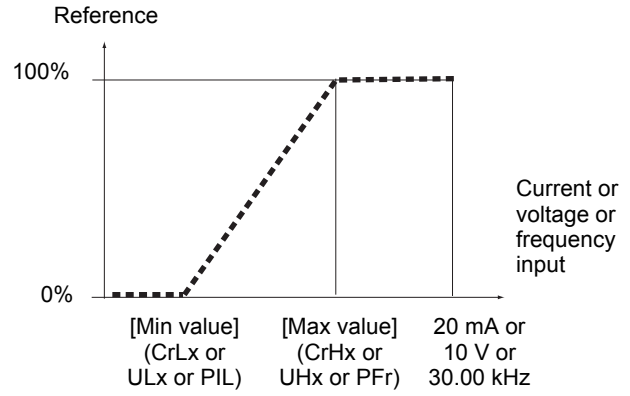
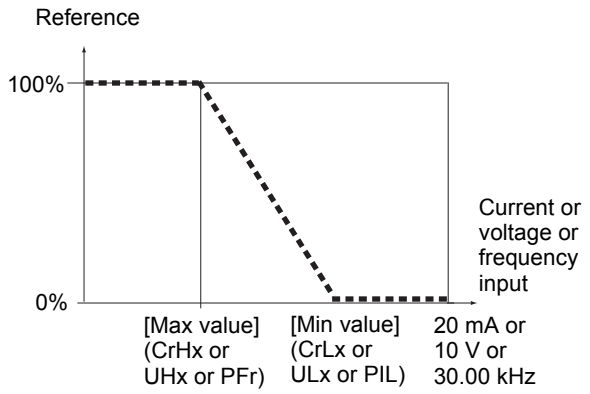
Configuration of analog inputs and Pulse input

The minimum and maximum input values (in volts, mA, etc.) are converted to % in order to adapt the references to the application.

Minimum and maximum input values:

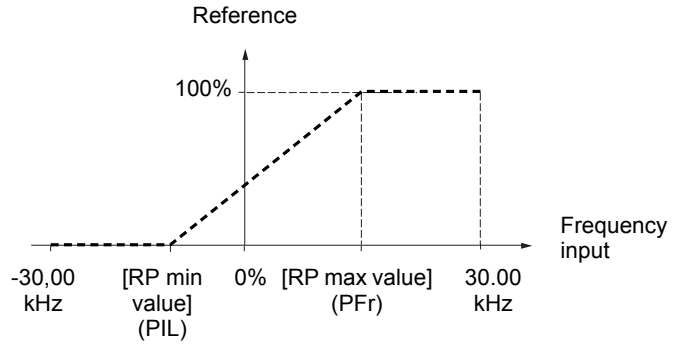
The minimum value corresponds to a reference of 0% and the maximum value to a reference of 100%. The minimum value may be greater than the maximum value:





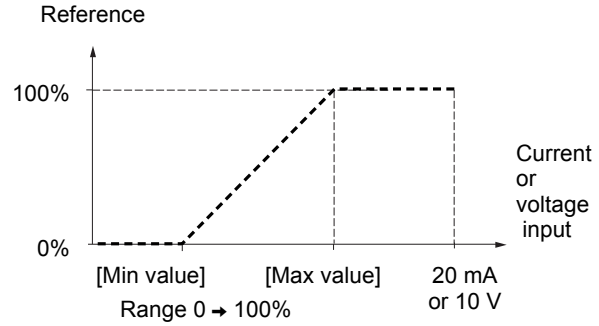
For +/- bidirectional inputs, the min. and max. are relative to the absolute value, for example, +/- 2 to 8 V.

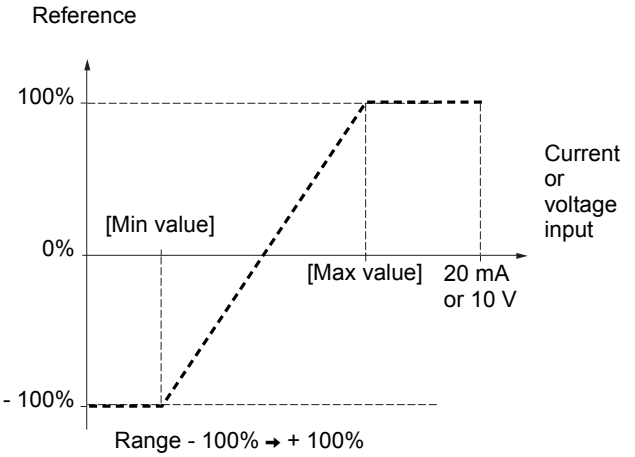
Negative min. value of Pulse input:



Range (output values): For analog inputs only

This parameter is used to configure the reference range to [0% ➞100%] or [-100% ➞ +100%] in order to obtain a bidirectional output from a unidirectional input.





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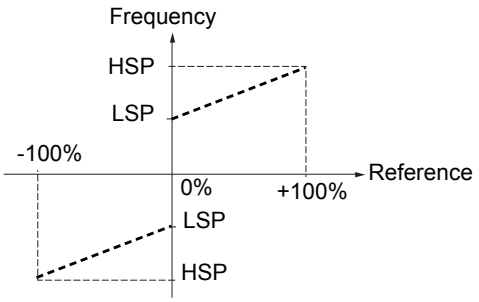
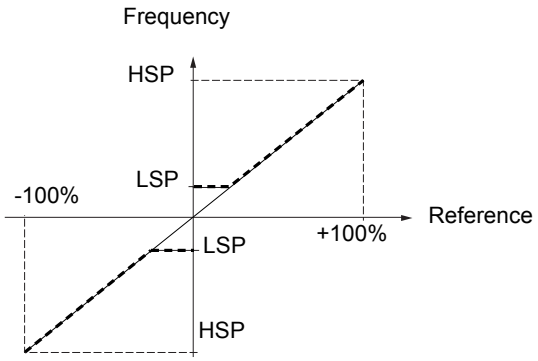
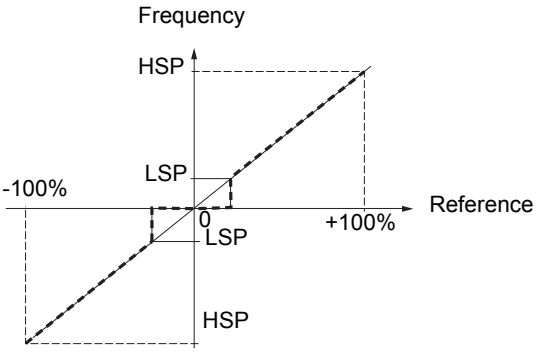
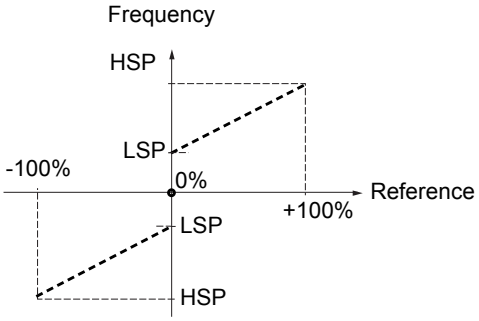
Code	Name/Description	Factory setting
bSP	[Reference template]	[Standard] (bSd)
bSd	[Standard] (bSd) 	At zero reference the frequency = LSP
bLS	[Pedestal] (bLS) 	At reference = 0 to LSP the frequency = LSP
bnS	[Deadband] (bnS) 	At reference = 0 to LSP the frequency = 0
bnS0	[Deadband 0] (bnS0) 	This operation is the same as [Standard] (bSd), except that in the following cases at zero reference, the frequency = 0: • The signal is less than [Min value], which is greater than 0 (example 1 V on a 2 - 10 V input) • The signal is greater than [Min value], which is greater than [Max value] (example 11 V on a 10 - 0 V input). If the input range is configured as bidirectional, operation remains identical to [Standard] (bSd).
	This parameter defines how the speed reference is taken into account, for analog inputs and Pulse input only. In the case of the PID regulator, this is the PID output reference. The limits are set by the [Low speed] (LSP) and [High speed] (HSP) parameters, page 60.	

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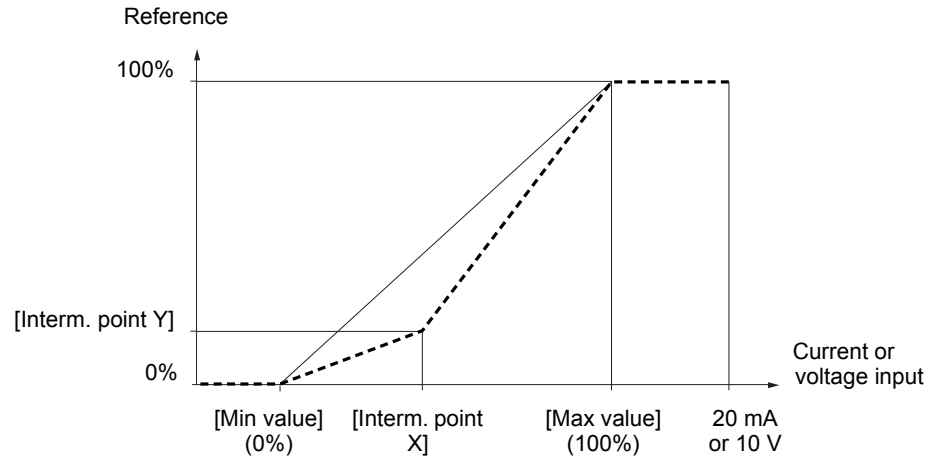
Delinearization: For analog inputs only

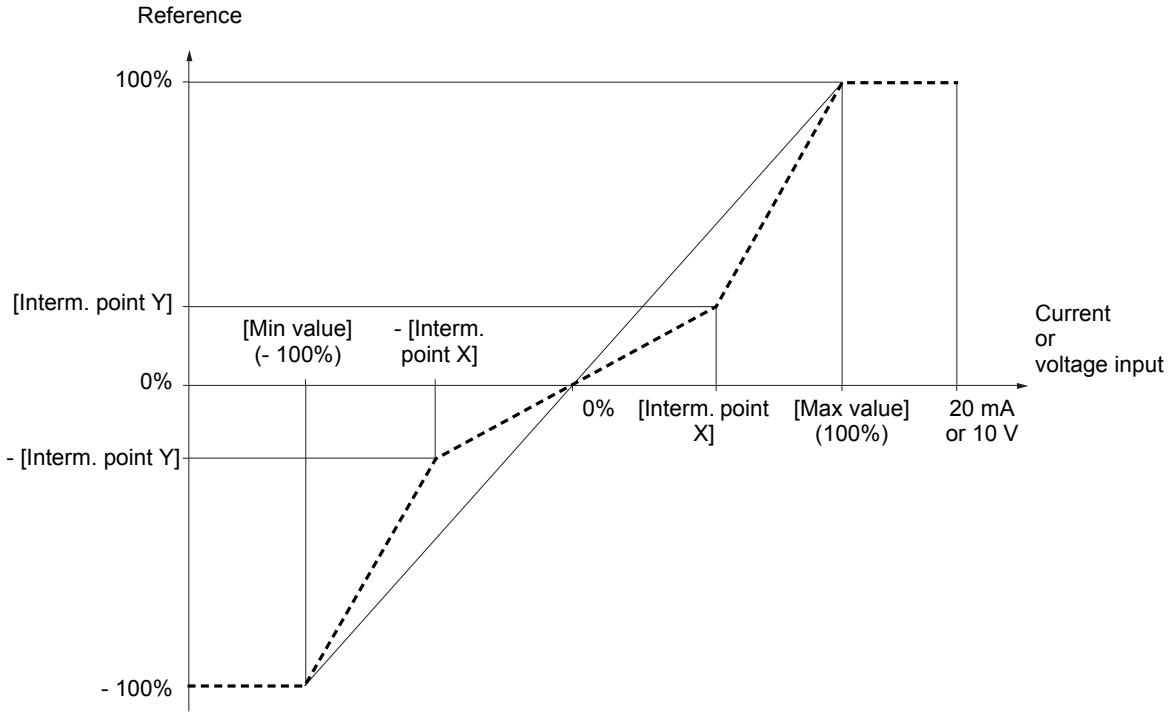
The input can be delinearized by configuring an intermediate point on the input/output curve of this input:

For range 0 ➡ 100%



NOTE: For [Interm. point X], 0% corresponds to [Min value] and 100% to [Max value]

For range -100% ➡ 100%



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Code	Name/Description	Adjustment range	Factory setting
AI1 -	**[AI1 CONFIGURATION]**		
AI1A	[AI1 assignment] Read-only parameter, cannot be configured. It displays all the functions associated with input AI1 in order to check, for example, for compatibility problems.		
AI1t	[AI1 Type]		[Voltage] (10U)
10U n10U	[Voltage] (10U): Positive voltage input (negative values are interpreted as zero: the input is unidirectional). [Voltage +/-] (n10U): Positive and negative voltage input (the input is bidirectional).		
UIL1	[AI1 min value]	0 to 10.0 V	0 V
UIH1	[AI1 max value]	0 to 10.0 V	10.0 V
AI1F	[AI1 filter]	0 to 10.00 s	0 s
	Interference filtering.		
AI1E	[AI1 Interm. point X]	0 to 100%	0%
	Input delinearization point coordinate. • 0% corresponds to [AI1 min value] (UIL1). • 100% corresponds to [AI1 max value] (UIH1).		
AI1S	[AI1 Interm. point Y]	0 to 100%	0%
	Output delinearization point coordinate (frequency reference).		

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Code	Name/Description	Adjustment range	Factory setting
AI2-	**[AI2 CONFIGURATION]**		
AI2A	[AI2 assignment] Read-only parameter, cannot be configured. It displays all the functions associated with input AI2 in order to check, for example, for compatibility problems.		
AI2t	[AI2 Type]		[Current] (0 A)
10U	[Voltage] (10U): Voltage input		
0A	[Current] (0 A): Current input		
CrL2	[AI2 min value]	0 to 20.0 mA	0 mA
	The parameter can be accessed if [AI2 Type] (AI2t) = [Current] (0 A)		
UIL2	[AI2 min value]	0 to 10.0 V	0 V
	The parameter can be accessed if [AI2 Type] (AI2t) = [Voltage] (10U)		
CrH2	[AI2 max. value]	0 to 20.0 mA	20.0 mA
	The parameter can be accessed if [AI2 Type] (AI2t) = [Current] (0 A)		
UIH2	[AI2 max. value]	0 to 10.0 V	10.0 V
	The parameter can be accessed if [AI2 Type] (AI2t) = [Voltage] (10U)		
AI2F	[AI2 filter]	0 to 10.00 s	0 s
	Interference filtering.		
AI2L	[AI2 range]		[0 - 100%] (POS)
POS	[0 - 100%] (POS): Unidirectional input		
nEG	[+/- 100%] (nEG): Bidirectional input Example: On a 0/10V input • 0V corresponds to reference -100% • 5V corresponds to reference 0% • 10V corresponds to reference + 100%		
AI2E	[AI2 Interm. point X]	0 to 100%	0%
	Input delinearization point coordinate. • 0% corresponds to [Min value] if the range is 0 → 100%. • 0% corresponds to $\frac{[\text{Max value}] + [\text{Min value}]}{2}$ if the range is -100% → + 100%. • 100% corresponds to [Max value].		
AI2S	[AI2 Interm. point Y]	0 to 100%	0%
	Output delinearization point coordinate (frequency reference).		

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Code	Name/Description	Adjustment range	Factory setting
AI3 -	**[AI3 CONFIGURATION]** Can be accessed if a VW3A3202 option card has been inserted		
AI3A	[AI3 assignment] Read-only parameter, cannot be configured. It displays all the functions associated with input AI3 in order to check, for example, for compatibility problems.		
AI3t	[AI3 Type]		[Current] (0 A)
0A	Read-only parameter, cannot be configured. [Current] (0 A): Current input		
CrL3	[AI3 min. value]	0 to 20.0 mA	0 mA
CrH3	[AI3 max. value]	0 to 20.0 mA	20.0 mA
AI3F	[AI3 filter]	0 to 10.00 s	0 s
	Interference filtering.		
AI3L	[AI3 range]		[0 - 100%] (POS)
POS nEG	[0 - 100%] (POS): Unidirectional input [+/- 100%] (nEG): Bidirectional input Example: On a 4 - 20 mA input - 4 mA corresponds to reference -100% - 12 mA corresponds to reference 0% - 20 mA corresponds to reference + 100% Since AI3 is, in physical terms, a bidirectional input, the [+/- 100%] (nEG) configuration must only be used if the signal applied is unidirectional. A bidirectional signal is not compatible with a bidirectional configuration.		
AI3E	[AI3 Interm. point X]	0 to 100%	0%
	Input delinearization point coordinate. • 0% corresponds to [Min value] (CrL3) if the range is 0 ➞ 100%. • 0% corresponds to $\frac{\text{[AI3 max. value] (CrH3) - [AI3 min. value] (CrL3)}}{2}$ if the range is -100% ➞ +100%. • 100% corresponds to [AI3 max. value] (CrH3).		
AI3S	[AI3 Interm. point Y]	0 to 100%	0%
	Output delinearization point coordinate (frequency reference).		

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Code	Name/Description	Adjustment range	Factory setting
AI4-	**[AI4 CONFIGURATION]** Can be accessed if a VW3A3202 option card has been inserted		
AI4A	[AI4 assignment] Read-only parameter, cannot be configured. It displays all the functions associated with input AI4 in order to check, for example, for compatibility problems.		
AI4t	[AI4 Type]		[Voltage] (10U)
10U 0A	[Voltage] (10U): Voltage input [Current] (0 A): Current input		
CrL4	[AI4 min value]	0 to 20.0 mA	0 mA
	The parameter can be accessed if [AI4 Type] (AI4t) = [Current] (0 A)		
UIL4	[AI4 min value]	0 to 10.0 V	0 V
	The parameter can be accessed if [AI4 Type] (AI4t) = [Voltage] (10U)		
CrH4	[AI4 max value]	0 to 20.0 mA	20.0 mA
	The parameter can be accessed if [AI4 Type] (AI4t) = [Current] (0 A)		
UIH4	[AI4 max value]	0 to 10.0 V	10.0 V
	The parameter can be accessed if [AI4 Type] (AI4t) = [Voltage] (10U)		
AI4F	[AI4 filter]	0 to 10.00 s	0 s
	Interference filtering.		
AI4L	[AI4 range]		[0 - 100%] (POS)
POS nEG	[0 - 100%] (POS): Unidirectional input [+/- 100%] (nEG): Bidirectional input Example: On a 0/10 V input - 0 V corresponds to reference -100% - 5 V corresponds to reference 0% - 10 V corresponds to reference + 100%		
AI4E	[AI4 Interm.point X]	0 to 100%	0%
	Input delinearization point coordinate. • 0% corresponds to [Min value] if the range is 0 → 100%. • 0% corresponds to $\frac{[\text{Max value}] + [\text{Min value}]}{2}$ if the range is -100% → + 100%. • 100% corresponds to [Max value].		
AI4S	[AI4 Interm.point Y]	0 to 100%	0%
	Output delinearization point coordinate (frequency reference).		

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Code	Name/Description	Factory setting
AUI-	**[VIRTUAL AI1]**	
AIC1	[AI net. channel]	[No] (nO)

Virtual input.
This parameter can also be accessed in the [PID REGULATOR] (PId-) submenu page 191.

- nO: [No] (nO): Not assigned (in this case, the virtual input does not appear in the analog input assignment parameters for the functions)
- Mdb: [Modbus] (Mdb): Integrated Modbus
- CAn: [CANopen] (CAn): Integrated CANopen
- nEt: [Com. card] (nEt): Communication card (if inserted)
- APP: [C.Insid. card] (APP): Controller Inside card (if inserted)

Scale: the value 8192 transmitted by this input is equivalent to 10 V on a 10 V input.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATON

- If the equipment switches to forced local mode (see page 255), the virtual input remains fixed at the last value transmitted.
- Do not use the virtual input and forced local mode in the same configuration.

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

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Code	Name/Description	Adjustment range	Factory setting
PLI-	**[RP CONFIGURATION]** Can be accessed if a VW3A3202 option card has been inserted		
PIA	[RP assignment] Read-only parameter, cannot be configured. It displays all the functions associated with the Pulse In input in order to check, for example, for compatibility problems.		
PIL	[RP min value]	- 30.00 to 30.00 kHz	0
	Frequency corresponding to the minimum speed		
PFr	[RP max value]	0 to 30.00 kHz	30.00 kHz
	Frequency corresponding to the maximum speed		
PFI	[RP filter]	0 to 1000 ms	0
	Interference filtering.		

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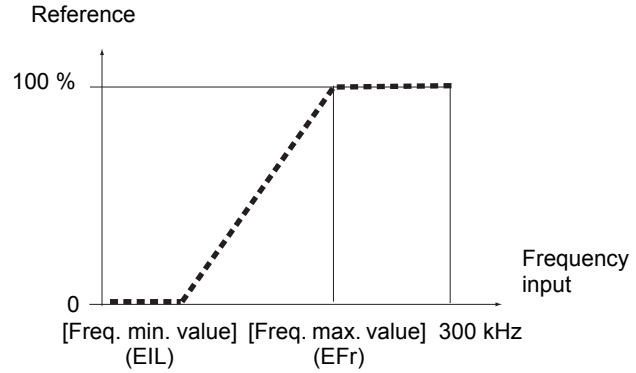
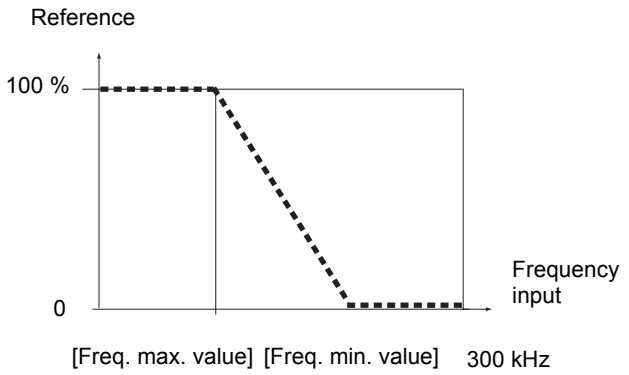
Configuration of the encoder input serving as a reference, with a frequency generator

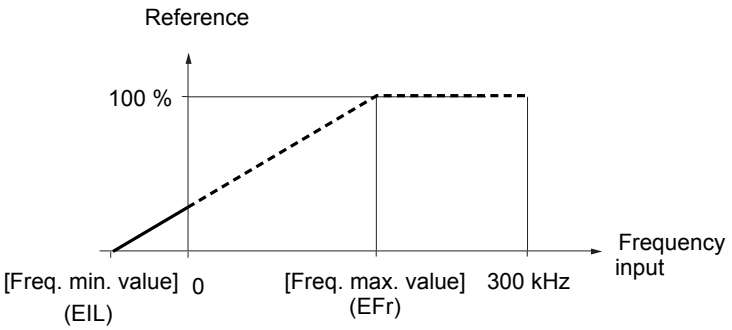
This reference is not signed, therefore the directions of operation must be given via the control channel (logic inputs, for example).

Minimum and maximum values (input values):

The minimum value corresponds to a minimum reference of 0% and the maximum value to a maximum reference of 100%. The minimum value may be greater than the maximum value. It may also be negative.







A reference can be obtained at zero frequency by assigning a negative value to the minimum value.

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The encoder configuration can also be accessed in the [1.4 MOTOR CONTROL] (drC-) menu.

NOTE: When an encoder is used with a VW3 A3 408 or VW3 A3 409 card, it is only possible to configure the "encoder" input for speed feedback. Functions can only be configured as references or inputs with a VW3 A3 401 to 407 or VW3 A3 411 card.

When an encoder is used with a VW3 A3 409 card, the drive remains locked in stop mode (displays nSt or nLP) if the encoder is not fully configured.

Code	Name/Description	Factory setting
IEn-	**[ENCODER CONFIGURATION]** The encoder parameters can only be accessed if an encoder card has been inserted, and the selections available will depend on the type of encoder card used.	
EnS	[Encoder type]	[AABB] (AAbb)
	This parameter can be accessed if an incremental encoder card has been installed. To be configured in accordance with the type of encoder used.	
AAbb	[AABB] (AAbb): For signals A, A-, B, B- or A, A-, B, B-, Z, Z-.	
Ab	[AB] (Ab): For signals A, B.	
A	[A] (1): For signal A. Value cannot be accessed if [Encoder usage] (EnU), page 117 = [Spd fdk reg.] (rEG).	
EnC	**[Encoder check]**	[Not done] (nO)
	Check encoder feedback. See procedure page 77. This parameter can be accessed if an encoder card has been installed and if [Encoder usage] (EnU), page 117 is not [Speed ref.] (PGr).	
nO	[Not done] (nO): Check not performed.	
YES	[Yes] (YES): Activates monitoring of the encoder.	
dOnE	[Done] (dOnE): Check performed successfully. The check procedure checks: - The direction of rotation of the encoder/motor - The presence of signals (wiring continuity) - The number of pulses/revolution If a fault is detected, the drive locks in [Encoder fault] (EnF) fault mode.	
EnU	[Encoder usage]	[No] (nO)
	The parameter can be accessed if an encoder card has been installed.	
nO	[No] (nO): Function inactive. In this case, the other parameters cannot be accessed.	
SEC	[Fdbk monit.] (SEC): The encoder provides speed feedback for monitoring only.	
rEG	[Spd fdk reg.] (rEG): The encoder provides speed feedback for regulation and monitoring. This configuration is automatic if the drive is configured for closed-loop operation ([Motor control type] (Ctt) = [FVC] (FUC) or [Sync.CL] (FSY)). If [Motor control type] (Ctt) = [SVC V] (UUC) the encoder operates in speed feedback mode and enables static correction of the speed to be performed. This configuration is not accessible for other [Motor control type] (Ctt) values.	
PGr	[Speed ref.] (PGr): The encoder provides a reference. Can only be selected with an incremental encoder card.	
Enr I	[Coder rotation inv.]	[No] (nO)
	The parameter can be accessed if an encoder card has been installed. Activation of coder rotation inversion. For some mountings, the direction of right-hand turn of the coder is reversed compare to that of the motor. In this case, the activation of this parameter is required to have a common direction of right-hand between the motor and the coder.	
nO	[No] (nO): Inversion activated.	
YES	[Yes] (YES): Inversion not activated	

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Code	Name/Description	Adjustment range	Factory setting
	[ENCODER CONFIGURATION] (continued)		
PGI	[Number of pulses]	100 to 1000	1024
	Number of pulses per encoder revolution. This parameter can be accessed if a VW3 A3 401 to 407 card or VW3 A3 411 has been installed.		
PGA	[Reference type]		[Encoder] (EnC)
	The parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr). EnC [Encoder] (EnC): Use of an encoder (incremental encoder only). PtG [Freq. gen.] (PtG): Use of a frequency generator (unsigned reference).		
EIL	[Freq. min. value]	- 300 to 300 kHz	0
	The parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr) and if [Reference type] (PGA) = [Freq. gen.] (PtG). Frequency corresponding to the minimum speed		
EFr	[Freq. max value]	0.00 to 300 kHz	300 kHz
	The parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr) and if [Reference type] (PGA) = [Freq. gen.] (PtG). Frequency corresponding to the maximum speed		
EFI	[Freq. signal filter]	0 to 1000 ms	0
	The parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr). Interference filtering.		
FrES	[Resolver Exct. Freq.]		[8 kHz] (8)
	Resolver excitation frequency. The parameter can be accessed if a VW3 A3 408 encoder card (for resolver) has been installed. 4 [4 kHz] (4): 4 kHz 8 [8 kHz] (8): 8 kHz 12 [12 kHz] (12): 12 kHz		
rPPn	[Resolver poles nbr]		[2 poles] (2P)
	Number of resolver poles. The parameter can be accessed if a VW3 A3 408 encoder card (for resolver) has been installed. 2P [2 poles] (2P): 2 poles, max. speed 7500 rpm 4P [4 poles] (4P): 4 poles, max. speed 3750 rpm 6P [6 poles] (6P): 6 poles, max. speed 2500 rpm 8P [8 poles] (8P): 8 poles, max. speed 1875 rpm ☞ **NOTE:** If the number of poles of the motor is not an integer multiple of the number of poles of the resolver, it is necessary to configure the parameter [Angle setting activ.] (AtA) = [Power On] (POn) or [Run order] (AUtO).		

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Code	Name/Description	Factory setting
	[ENCODER CONFIGURATION] (continued) **These parameters can be accessed if a VW3 A3 409 encoder card has been installed.**	
UECP	[Encoder protocol]	[Undefined] (Und)
	Type of encoder used. Und [Undefined] (Und): Not defined End [EnDat 2.1] (End): EnDat encoder SCHP [Hiperface] (SCHP): Hiperface encoder SC [SinCos] (SC): SinCos encoder SSI [SSI] (SSI): SSI encoder	
UECU	[Encoder supply volt.]	[Undefined] (Und)
	Rated voltage of encoder used. The parameter can be accessed if [Encoder protocol] (UECP) is not [Undefined] (Und). Und [Undefined] (Und): Not defined 5U [5 volts] (5U): 5 Volts. Only possible value if [Encoder protocol] (UECP) = [EnDat 2.1] (End). 8U [8 volts] (8U): 8 Volts 12U [12 volts] (12U): 12 Volts To make any changes to this parameter with the integrated display terminal, press and hold down the "ENT" key for 2 s for the change to be taken into account. When using the graphic display terminal, confirmation is requested.	
UELC	[Sincos lines count]	[Undefined] (Und)
	Number of lines. This parameter can be accessed if [Encoder protocol] (UECP) = [SinCos] (SC). Und [Undefined] (Und): Not defined - 1 to 10000: 1 to 10,000 lines	
SSCP	[SSI parity]	[Undefined] (Und)
	Parity. This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). Und [Undefined] (Und): Not defined nO [No parity] (nO): No parity Odd [Odd parity] (Odd): Odd parity EUEn [Even parity] (EUEn): Even parity	
SSFS	[SSI frame size]	[Undefined] (Und)
	Frame length (number of bits). This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). Und [Undefined] (Und): Not defined. Only possible value if [SSI parity] (SSCP) = [Undefined] (Und). - 10 to 27: 10 to 25 if [SSI parity] (SSCP) = [No parity] (nO). 12 to 27 if [SSI parity] (SSCP) = [Odd parity] (Odd) or [Even parity] (EUEn).	
EnMr	[Nbr of revolution]	[Undefined] (Und)
	Format of the number of revolutions (in number of bits). This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). Und [Undefined] (Und): Not defined. Only possible value if [SSI frame size] (SSFS) = [Undefined] (Und). - 0 to 15: 0 to [SSI frame size] (SSFS) - 10 if [SSI parity] (SSCP) = [No parity] (nO). 0 to [SSI frame size] (SSFS) - 12 if [SSI parity] (SSCP) = [Odd parity] (Odd) or [Even parity] (EUEn).	
Entr	[Turn bit resolution]	[Undefined] (Und)
	Resolution per revolution (in number of bits). This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). Und [Undefined] (Und): Not defined. Only value possible if[Nbr of revolution] (EnMr) = [Undefined] (Und). - 10 to 25: If [SSI parity] (SSCP) = [No parity] (nO), the maximum value is: [SSI frame size] (SSFS) - [Nbr of revolution] (EnMr). If [SSI parity] (SSCP) = [Odd parity] (Odd) or [Even parity] (EUEn), the maximum value is: [SSI frame size] (SSFS) - [Nbr of revolution] (EnMr) - 2.	

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Code	Name/Description	Adjustment range	Factory setting
	[ENCODER CONFIGURATION] (continued) **These parameters can be accessed if a VW3 A3 409 encoder card has been installed.**		
SSCd	[SSI code type]		[Undefined] (Und)
	Type of code. This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). Und [Undefined] (Und): Not defined bIn [Binary code (bIn): Binary code GrAY [Gray code] (GrAY): Gray code		
EnSP	[Clock frequency]		[500 kHz] (500)
	The parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Encoder protocol] (UECP) = [SSI] (SSI) or if [Encoder protocol] (UECP) = [EnDat 2.1] (End). Clock frequency for encoder "Endat" and encoder SSI. 160 [160 kHz] (160) 200 [200 kHz] (200) 300 [300 kHz] (300) 400 [400 kHz] (400) 500 [500 kHz] (500) 600 [600 kHz] (600) 700 [700 kHz] (700) 800 [800 kHz] (800)		
	These parameters can only be accessed when [ACCESS LEVEL] = [Expert] and an encoder card has been installed.		
FFA	[Encoder filter activ.]		[No] (nO)
	Activation of encoder feedback filter. nO [No] (no): Filter deactivated YES [Yes] (YES): Filter activated		
FFr	[Encoder filter value]	0 to 50 ms	Acc. to encoder type
	This parameter can be accessed if [Encoder filter activ.] (FFA) = [Yes] (YES). Encoder feedback filter time constant in milliseconds. This parameter can be modified during operation.		

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Code	Name/Description	Factory setting
r I -	**[R1 CONFIGURATION]**	
r 1	[R1 Assignment]	[No drive flt] (FLt)
nO	[No] (nO): Not assigned	
FLt	[No drive flt] (FLt): Drive OK (relay normally energized, and de-energized if there is a fault detected)	
rUn	[Drv running] (rUn): Drive running	
FtA	[Freq. Th. attain.] (FtA): Frequency threshold attained ([Freq. threshold] (Ftd), page 72)	
FLA	[HSP attain.] (FLA): High speed attained	
CtA	[I attained] (CtA): Current threshold attained ([Current threshold] (Ctd), page 71)	
SrA	[Freq.ref.att] (SrA): Frequency reference attained	
tSA	[Th.mot. att.] (tSA): Motor 1 thermal state attained	
PEE	[PID error al] (PEE): PID error alarm	
PFA	[PID fdbk al] (PFA): PID feedback alarm	
AP2	[AI2 Al. 4-20] (AP2): Alarm indicating absence of 4-20 mA signal on input A12	
F2A	[Freq. Th 2 attain.] (F2A): Frequency threshold 2 attained ([Freq. threshold 2] (F2d), page 72)	
tAd	[Th. drv. att.] (tAd): Drive thermal state attained	
rSdA	[Rope slack] (rSdA): Rope slack (see [Rope slack config.] (rSd) parameter page 186)	
ttHA	[High tq. att.] (ttHA): Motor torque overshooting high threshold[High torque thd.] (ttH), page 71.	
ttLA	[Low tq. att.] (ttLA): Motor torque undershooting low threshold[Low torque thd.] (ttL), page 71.	
MFrd	[Forward] (MFrd): Motor in forward rotation	
MrrS	[Reverse] (MrrS): Motor in reverse rotation	
tS2	[Th.mot2 att] (tS2): Motor 2 thermal state attained	
tS3	[Th.mot3 att] (tS3): Motor 3 thermal state attained	
AtS	[Neg Torque] (AtS): Negative torque (braking)	
CnF0	[Cnfg.0 act.] (CnF0): Configuration 0 active	
CnF1	[Cnfg.1 act.] (CnF1): Configuration 1 active	
CnF2	[Cnfg.2 act.] (CnF2): Configuration 2 active	
CFP1	[Set 1 active] (CFP1): Parameter set 1 active	
CFP2	[Set 2 active] (CFP2): Parameter set 2 active	
CFP3	[Set 3 active] (CFP3): Parameter set 3 active	
dbL	[DC charged] (dbL): DC bus charging	
brS	[In braking] (brS): Drive braking	
PrM	[P. removed] (PRM): Drive locked by Power Removal input	
FqLA	[Fr.met. alar.] (FqLA): Measured speed threshold attained: [Pulse warning thd.] (FqL), page 72.	
MCP	[I present] (MCP): Motor current present	
LSA	[Limit sw. att] (LSA): Limit switch attained	
dLdA	[Load alarm] (dLdA): Load variation detection (see page 248).	
AGI	[Alarm Grp 1] (AGI): Alarm group 1	
AG2	[Alarm Grp 2] (AG2): Alarm group 2	
AG3	[Alarm Grp 3] (AG3): Alarm group 3	
P1A	[PTC1 alarm] (P1A): Probe alarm 1	
P2A	[PTC2 alarm] (P2A): Probe alarm 2	
PLA	[LI6=PTC al.] (PLA): LI6 = PTC probe alarm	
EFA	[Ext. fault al] (EFA): External fault alarm	
USA	[Under V. al.] (USA): Undervoltage alarm	
UPA	[Uvolt warn] (UPA): Undervoltage warning	
AnA	[slipping al.] (AnA): Slipping alarm	
tHA	[Al. °C drv] (tHA): Drive overheating	
bSA	[Load mvt al] (bSA): Braking speed alarm	
bCA	[Brk cont. al] (bCA): Brake contact alarm	
SSA	[Lim T/I att.] (SSA): Torque limit alarm	
rtA	[Trq. ctrl. al.] (rtA): Torque control alarm	
tJA	[IGBT al.] (tJA): IGBT alarm	
bOA	[Brake R. al.] (bOA): Braking resistor temperature alarm	
APA	[Option al.] (APA): Alarm generated by the Controller Inside card.	
AP3	[AI3 Al. 4-20] (AP3): Alarm indicating absence of 4-20 mA signal on input AI3	
AP4	[AI4 Al. 4-20] (AP4): Alarm indicating absence of 4-20 mA signal on input AI4	
rdY	[Ready] (rdY): Drive ready	

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Code	Name/Description	Adjustment range	Factory setting
	[R1 CONFIGURATION] (continued)		
r Id	[R1 Delay time]	0 to 9999 ms	0
	The change in state only takes effect once the configured time has elapsed, when the information becomes true. The delay cannot be set for the [No drive flt] (FLt) assignment, and remains at 0.		
r IS	[R1 Active at]		[1] (POS)
POS nEG	Configuration of the operating logic: [1] (POS): State 1 when the information is true [0] (nEG): State 0 when the information is true Configuration [1] (POS) cannot be modified for the [No drive flt] (FLt) assignment.		
r IH	[R1 Holding time]	0 to 9999 ms	0
	The change in state only takes effect once the configured time has elapsed, when the information becomes false. The holding time cannot be set for the [No drive flt] (FLt) assignment, and remains at 0.		
r 2 -	**[R2 CONFIGURATION]**		
r 2	[R2 Assignment]		[No] (nO)
	Identical to R1 (see page 121) with the addition of (shown for information only as these selections can only be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu): [Brk control] (bLC): Brake contactor control [Input cont.] (LLC): Line contactor control [Output cont] (OCC): Output contactor control [End reel] (EbO): End of reel (traverse control function) [Sync. wobble] (tSY): "Counter wobble" synchronization [DC charging] (dCO): DC bus precharging contactor control		
r 2d	[R2 Delay time]	0 to 9999 ms	0
	The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.		
r 2S	[R2 Active at]		[1] (POS)
POS nEG	Configuration of the operating logic: [1] (POS): State 1 when the information is true [0] (nEG): State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		
r 2H	[R2 Holding time]	0 to 9999 ms	0
	The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.		

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Code	Name/Description	Adjustment range	Factory setting
r 3 -	**[R3 CONFIGURATION]** Can be accessed if a VW3A3201 option card has been installed		
r 3	[R3 Assignment] Identical to R2		[No] (nO)
r 3 d	[R3 Delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
r 3 S POS nEG	[R3 Active at] Configuration of the operating logic: [1] (POS): State 1 when the information is true [0] (nEG): State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		[1] (POS)
r 3 H	[R3 Holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0
r 4 -	**[R4 CONFIGURATION]** Can be accessed if a VW3A3202 option card has been installed		
r 4	[R4 Assignment] Identical to R2 (see page 122)		[No] (nO)
r 4 d	[R4 Delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
r 4 S POS nEG	[R4 Active at] Configuration of the operating logic: [1] (POS): State 1 when the information is true [0] (nEG): State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		**[1]** (POS)
r 4 H	[R4 Holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0

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Code	Name/Description	Adjustment range	Factory setting
LO1-	**[LO1 CONFIGURATION]** Can be accessed if a VW3A3201 option card has been installed		
LO1	[LO1 assignment]		[No] (nO)
	Identical to R1 (see page 121) with the addition of (shown for information only as these selections can only be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu): bLC [Brk control] (bLC): Brake contactor control LLC [Input cont.] (LLC): Line contactor control OCC [Output cont] (OCC): Output contactor control EbO [End reel] (EbO): End of reel (traverse control function) tSY [Sync. wobble] (tSY): "Counter wobble" synchronization dCO [DC charging] (dCO): DC bus precharging contactor control		
LO1d	[LO1 delay time]	0 to 9999 ms	0
	The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.		
LO1S	[LO1 active at]		[1] (POS)
	POS nEG Configuration of the operating logic: [1] (POS): State 1 when the information is true [0] (nEG): State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		
LO1H	[LO1 holding time]	0 to 9999 ms	0
	The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.		
LO2-	**[LO2 CONFIGURATION]** Can be accessed if a VW3A3201 option card has been installed		
LO2	[LO2 assignment]		[No] (nO)
	Identical to LO1.		
LO2d	[LO2 delay time]	0 to 9999 ms	0
	The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.		
LO2S	[LO2 active at]		[1] (POS)
	POS nEG Configuration of the operating logic: [1] (POS): State 1 when the information is true [0] (nEG): State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		
LO2H	[LO2 holding time]	0 to 9999 ms	0
	The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.		

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Code	Name/Description	Adjustment range	Factory setting
LO3-	**[LO3 CONFIGURATION]** Can be accessed if a VW3A3202 option card has been installed		
LO3	[LO3 assignment] Identical to LO1 (see page 124).		[No] (nO)
LO3d	[LO3 delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
LO3S POS nEG	[LO3 active at] Configuration of the operating logic: [1] (POS): State 1 when the information is true [0] (nEG): State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		[1] (POS)
LO3H	[LO3 holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0
LO4-	**[LO4 CONFIGURATION]** Can be accessed if a VW3A3202 option card has been installed		
LO4	[LO4 assignment] Identical to LO1 (see page 124).		[No] (nO)
LO4d	[LO4 delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
LO4S POS nEG	[LO4 active at] Configuration of the operating logic: [1] (POS): State 1 when the information is true [0] (nEG): State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		[1] (POS)
LO4H	[LO4 holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0

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Use of analog output AO1 as a logic output

Analog output AO1 can be used as a logic output, by assigning DO1. In this case, when set to 0 this output corresponds to the AO1 min. value (0 V or 0 mA, for example), and when set to 1 to the AO1 max. value (10 V or 20 mA, for example).
The electrical characteristics of this analog output remain unchanged. As these differ from logic output characteristics, it is important to ensure that they are compatible with the intended application.

Code	Name/Description	Adjustment range	Factory setting
dO1-	**[DO1 CONFIGURATION]**		
dO1	[DO1 assignment]		[No] (nO)
	Identical to R1 (see page 121) with the addition of (shown for information only as these selections can only be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu): bLC [Brk control] (bLC): Brake contactor control LLC [Input cont.] (LLC): Line contactor control OCC [Output cont] (OCC): Output contactor control EbO [End reel] (EbO): End of reel (traverse control function) tSY [Sync. wobble] (tSY): "Counter wobble" synchronization dCO [DC charging] (dCO): DC bus precharging contactor control		
dO1d	[DO1 delay time]	0 to 9999 ms	0
	The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.		
dO1S	[DO1 active at]		[1] (POS)
	Configuration of the operating logic: POS [1] (POS): State 1 when the information is true nEG [0] (nEG): State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		
dO1H	[DO1 holding time]	0 to 9999 ms	0
	The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.		

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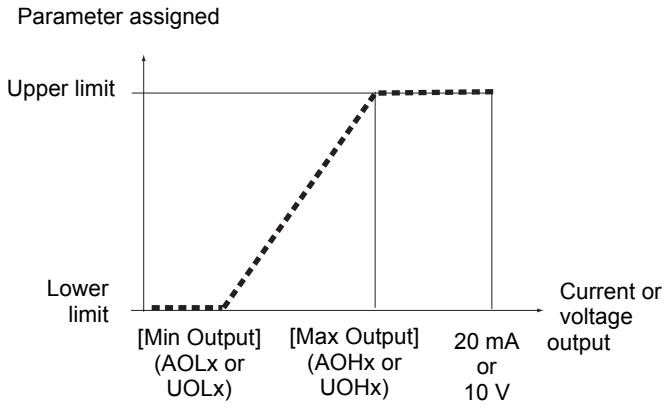
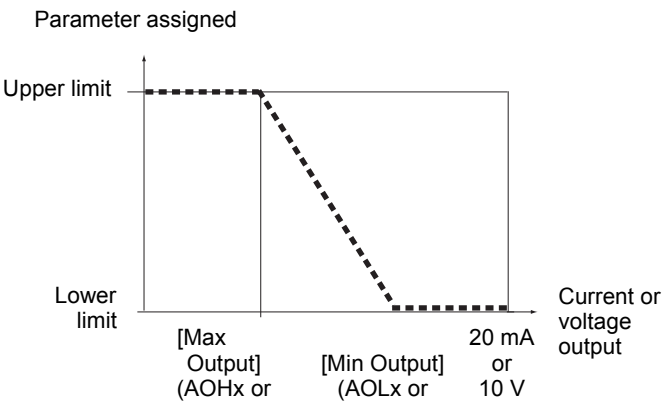
Configuration of analog outputs

Minimum and maximum values (output values):

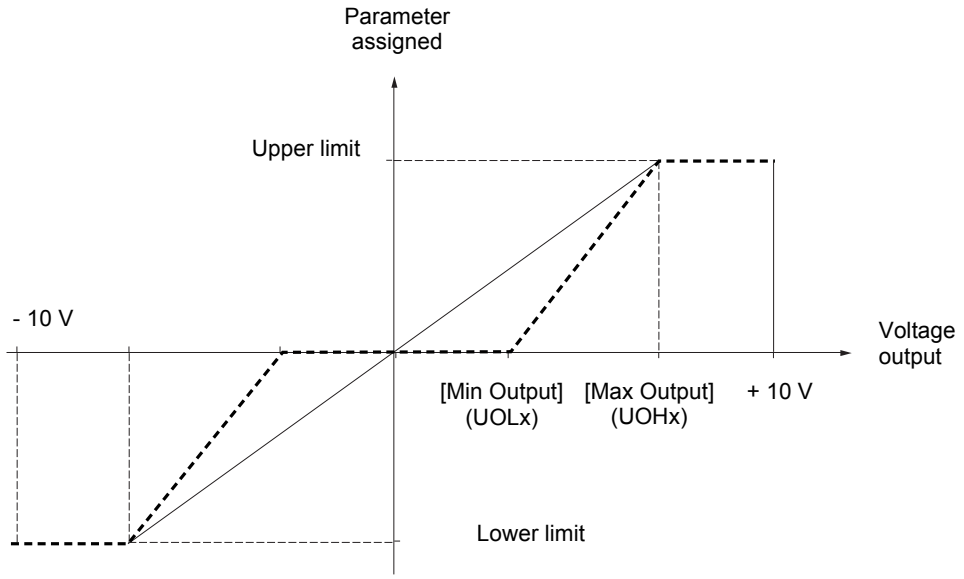
The minimum output value, in volts or mA, corresponds to the lower limit of the assigned parameter and the maximum value corresponds to its upper limit. The minimum value may be greater than the maximum value:





Outputs AO2 and AO3 configured as bipolar outputs (strongly recommended for signed parameters):

The [min Output] (UOLx) and [max Output] (UOHx) parameters are absolute values, although they function symmetrically. In the case of bipolar outputs, always set the maximum value higher than the minimum value.
The [max Output] (UOHx) corresponds to the upper limit of the assigned parameter, and the [min Output] (UOLx) corresponds to an average value between the upper and lower limits (0 for a signed and symmetrical parameter such as in the example below).



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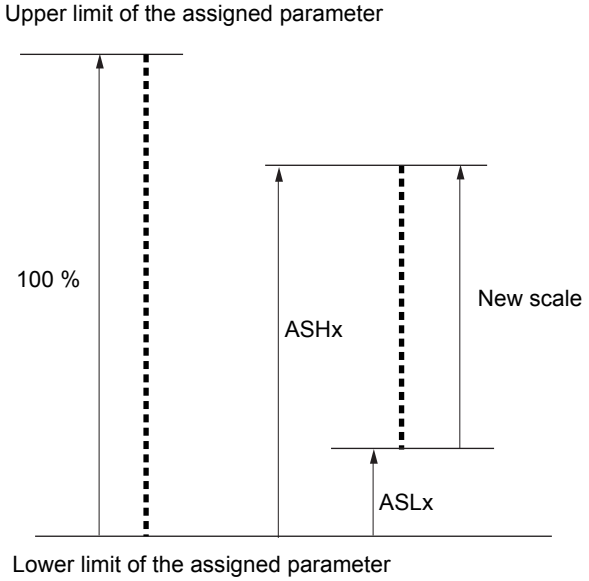
Scaling of the assigned parameter

The scale of the assigned parameter can be adapted in accordance with requirements by modifying the values of the lower and upper limits by means of two parameters for each analog output.
These parameters are given in %; 100% corresponds to the total variation range of the configured parameter, so:

- 100% = upper limit - lower limit For example, [Sign. torque] (Stq) which varies between -3 and +3 times the rated torque, 100% corresponds to 6 times the rated torque.

- The parameter [Scaling AOx min] (ASLx) modifies the lower limit: new value = lower limit + (range x ASLx). The value 0% (factory setting) does not modify the lower limit.
- The parameter [Scaling AOx max] (ASHx) modifies the upper limit: new value = lower limit + (range x ASLx). The value 100% (factory setting) does not modify the upper limit.
- [Scaling AOx min] (ASLx) must always be lower than [Scaling AOx max] (ASHx).



Application example 1

The value of the signed motor torque at the AO2 output is to be transferred with +/- 10 V, with a range of -2 Tr to +2 Tr.

- The parameter [Sign. torque.] (Stq) varies between -3 and +3 times the rated torque, or a range of 6 times the rated torque.
- [Scaling AO2 min] (ASL2) must modify the lower limit by 1x the rated torque, or 100/6 = 16.7% (new value = lower limit + (range x ASL2).
- [Scaling AO2 max] (ASH2) must modify the upper limit by 1x the rated torque, or 100 - 100/6 = 83.3 % (new value = lower limit + (range x ASH2).

Application example 2

The value of the motor current at the AO2 output is to be transferred with 0 - 20 mA, range 2 In motor, In motor being the equivalent of a 0.8 In drive.

- The parameter [I motor] (OCr) varies between 0 and 2 times the rated drive current, or a range of 2.5 times the rated drive current.
- [Scaling AO2 min] (ASL2) must not modify the lower limit, which therefore remains at its factory setting of 0%.
- [Scaling AO2 max] (ASH2) must modify the upper limit by 0.5x the rated motor torque, or 100 - 100/5 = 80 % (new value = lower limit + (range x ASH2).

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Code	Name/Description	Adjustment range	Factory setting
AO1-	**[AO1 CONFIGURATION]**		
AO1	[AO1 assignment]		[No] (nO)
nO	[No] (nO): Not assigned		
OCr	[I motor] (OCr): Current in the motor, between 0 and 2 In (In = rated drive current indicated in the Installation Manual and on the drive nameplate).		
OFr	[Motor freq.] (OFr): Output frequency, from 0 to [Max frequency] (tFr)		
OrP	[Ramp out.] (OrP): From 0 to [Max frequency] (tFr)		
trq	[Motor torq.] (trq): Motor torque, between 0 and 3 times the rated motor torque.		
Stq	[Sign. torque] (Stq): Signed motor torque, between -3 and +3 times the rated motor torque. The + sign corresponds to the motor mode and the - sign to the generator mode (braking).		
OrS	[sign ramp] (OrS): Signed ramp output, between - [Max frequency] (tFr) and + [Max frequency] (tFr)		
OPS	[PID ref.] (OPS): PID regulator reference between [Min PID reference] (PIP1) and [Max PID reference] (PIP2)		
OPF	[PID feedback] (OPF): PID regulator feedback between [Min PID feedback] (PIF1) and [Max PID feedback] (PIF2)		
OPE	[PID error] (OPE): PID regulator error between - 5 % and + 5 % of ([Max PID feedback] (PIF2) - [Min PID feedback] (PIF1))		
OPI	[PID Output] (OPI): PID regulator output between [Low speed] (LSP) and [High speed] (HSP)		
OPr	[Mot. power] (OPr): Motor power, between 0 and 2.5 times [Rated motor power] (nPr)		
tHr	[Mot thermal] (tHr): Motor thermal state, between 0 and 200% of the rated thermal state.		
tHd	[Drv thermal] (tHd): Drive thermal state, between 0 and 200% of the rated thermal state.		
tqMS	[Torque 4Q] (tqMS): Signed motor torque, between -3 and +3 times the rated motor torque. The + sign and the - sign correspond to the physical direction of the torque, regardless of mode (motor or generator). Example of usage: "master-slave" with the TORQUE CONTROL] (tOr-) function, page 197.		
OFrr	[Meas.mot.fr] (OFrr): Measured motor speed.		
OFS	[Sig. o/p frq.] (OFS): Signed output frequency, between - [Max frequency] (tFr) and + [Max frequency] (tFr)		
tHr2	[Mot therm2] (tHr2): Motor thermal state 2, between 0 and 200 % of the rated thermal state.		
tHr3	[Mot therm3] (tHr3): Motor thermal state 3, between 0 and 200% of the rated thermal state.		
Utr	[Uns. TrqRef] (Utr): Torque reference, between 0 and 3 times the rated motor torque		
Str	[Uns. TrqRef] (Str): Signed torque reference, between - 3 and + 3 times the rated motor torque		
tqL	[Torque lim.] (tqL): Torque limit, between 0 and 3 times the rated motor torque		
UOP	[Motor volt.] (UOP): Voltage applied to the motor, between 0 and [Rated motor volt.] (UnS)		
dO1	[dO1] (dO1): Assignment to a logic output. This assignment can only appear if [DO1 assignment] (dO1), page 126 has been assigned. This is the only possible choice in this case, and is only displayed for informational purposes.		
AO1t	[AO1 Type]		[Current] (0A)
10U	[Voltage] (10U): Voltage output		
0A	[Current] (0A): Current output		
AOL1	[AO1 min Output]	0 to 20.0 mA	0 mA
	The parameter can be accessed if [AO1 Type] (AO1t) = [Current] (0A)		
AOH1	[AO1 max Output]	0 to 20.0 mA	20.0 mA
	The parameter can be accessed if [AO1 Type] (AO1t) = [Current] (0A)		
UOL1	[AO1 min Output]	0 to 10.0 V	0 V
	The parameter can be accessed if [AO1 Type] (AO1t) = [Voltage] (10U)		
UOH1	[AO1 max Output]	0 to 10.0 V	10.0 V
	The parameter can be accessed if [AO1 Type] (AO1t) = [Voltage] (10U)		
ASL1	[Scaling AO1 min]	0 to 100.0 %	0 %
	Scaling of the lower limit of the assigned parameter, as a % of the maxiumum possible variation.		
ASH1	[Scaling AO1 max]	0 to 100.0 %	100.0 %
	Scaling of the upper limit of the assigned parameter, as a % of the maxiumum possible variation.		
AO1F	[AO1 Filter]	0 to 10.00 s	0 s
	Interference filtering. This parameter is forced to 0 if [AO1 asisgnment] (AO1) = [dO1] (dO1).		

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Code	Name/Description	Adjustment range	Factory setting
AO2-	**[AO2 CONFIGURATION]** Can be accessed if a VW3A3202 option card has been installed		
AO2	[AO2 assignment]		[No] (nO)
	Same assignments as AO1, without [dO1] (dO1).		
AO2t	[AO2 Type]		[Current] (0A)
10U	[Voltage] (10U): Voltage output		
0A	[Current] (0A): Current output		
n10U	[Voltage +/-] (n10U): Bipolar voltage output.		
AOL2	[AO2 min Output]	0 to 20.0 mA	0 mA
	The parameter can be accessed if [AO2 Type] (AO2t) = [Current] (0A)		
AOH2	[AO2 max Output]	0 to 20.0 mA	20.0 mA
	The parameter can be accessed if [AO2 Type] (AO2t) = [Current] (0A)		
UOL2	[AO2 min Output]	0 to 10.0 V	0 V
	The parameter can be accessed if [AO2 Type] (AO2t) = [Voltage] (10U) or [Voltage +/-] (n10U)		
UOH2	[AO2 max Output]	0 to 10.0 V	10.0 V
	The parameter can be accessed if [AO2 Type] (AO2t) = [Voltage] (10U) or [Voltage +/-] (n10U)		
ASL2	[Scaling AO2 min]	0 to 100.0 %	0 %
	Scaling of the lower limit of the assigned parameter, as a % of the maxiumum possible variation.		
ASH2	[Scaling AO2 max]	0 to 100.0 %	100.0 %
	Scaling of the upper limit of the assigned parameter, as a % of the maxiumum possible variation.		
AO2F	[AO2 Filter]	0 to 10.00 s	0 s
	Interference filtering.		

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Code	Name/Description	Adjustment range	Factory setting
AO3-	**[AO3 CONFIGURATION]** Can be accessed if a VW3A3202 option card has been installed		
AO3	[AO3 assignment]		[No] (nO)
	Same assignments as AO1, without [dO1] (dO1).		
AO3t	[AO3 Type]		[Current] (0A)
10U	[Voltage] (10U): Voltage output		
0A	[Current] (0A): Current output		
n10U	[Voltage +/-] (n10U): Bipolar voltage output.		
AOL3	[AO3 min Output]	0 to 20.0 mA	0 mA
	The parameter can be accessed if [AO3 Type] (AO3t) = [Current] (0A)		
AOH3	[AO3 max Output]	0 to 20.0 mA	20.0 mA
	The parameter can be accessed if [AO3 Type] (AO3t) = [Current] (0A)		
UOL3	[AO3 min Output]	0 to 10.0 V	0 V
	The parameter can be accessed if [AO3 Type] (AO3t) = [Voltage] (10U) or [Voltage +/-] (n10U)		
UOH3	[AO3 max Output]	0 to 10.0 V	10.0 V
	The parameter can be accessed if [AO3 Type] (AO3t) = [Voltage] (10U) or [Voltage +/-] (n10U)		
ASL3	[Scaling AO3 min]	0 to 100.0 %	0 %
	Scaling of the lower limit of the assigned parameter, as a % of the maxiumum possible variation.		
ASH3	[Scaling AO3 max]	0 to 100.0 %	100.0 %
	Scaling of the upper limit of the assigned parameter, as a % of the maxiumum possible variation.		
AO3F	[AO3 Filter]	0 to 10.00 s	0 s
	Interference filtering.		

The following submenus group the alarms into 1 to 3 groups, each of which can be assigned to a relay or a logic output for remote signaling. These groups can also be displayed on the graphic display terminal (see [6 MONITORING CONFIG.] menu) and viewed via the [1.2 MONITORING] (SUP) menu.
When one or a number of alarms selected in a group occurs, this alarm group is activated.

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Code	Name/Description
A1C-	**[ALARM GRP1 DEFINITION]** Selection to be made from the following list:
PLA	[LI6=PTC al.] (PLA): LI6 = PTC probe alarm
P1A	[PTC1 alarm] (P1A): Probe alarm 1
P2A	[PTC2 alarm] (P2A): Probe alarm 2
EFA	[Ext. fault al.] (EFA): External fault alarm
USA	[Under V. al.] (USA): Undervoltage alarm
AnA	[slipping al.] (AnA): Slipping alarm
CtA	[I attained] (CtA): Current threshold attained ([Current threshold] (Ctd), page 71)
FtA	[Freq.Th.att.] (FtA): Frequency threshold attained ([Freq. threshold] (Ftd), page 72)
F2A	[Freq. Th. 2 attain.] (F2A): Frequency threshold 2 attained ([Freq. Th. 2 attain] (F2d), page 72)
SrA	[Freq.ref.att] (SrA): Frequency reference attained
tSA	[Th.mot. att.] (tSA): Motor 1 thermal state attained
tS2	[Th.mot2 att] (tS2): Motor 2 thermal state attained
tS3	[Th.mot3 att] (tS3): Motor 3 thermal state attained
UPA	[Uvolt warn] (UPA): Undervoltage warning
FLA	[HSP attain.] (FLA): High speed attained
tHA	[Al. °C drv] (tHA): Drive overheating
bSA	[Load mvt al] (bSA): Braking speed alarm
bCA	[Brk cont. al] (bCA): Brake contact alarm
PEE	[PID error al] (PEE): PID error alarm
PFA	[PID fdbk al.] (PFA): PID feedback alarm
AP2	[AI2 Al. 4-20] (AP2): Alarm indicating absence of 4-20 mA signal on input A12
AP3	[AI3 Al. 4-20] (AP3): Alarm indicating absence of 4-20 mA signal on input AI3
AP4	[AI4 Al. 4-20] (AP4): Alarm indicating absence of 4-20 mA signal on input AI4
SSA	[Lim T/I att.] (SSA): Torque limit alarm
tAd	[Th. drv. att.] (tAd): Drive thermal state attained
tJA	[IGBT alarm] (tJA): IGBT alarm
rtA	[Torque Control al.] (rtA): Torque control alarm
bOA	[Brake R. al.] (bOA): Braking resistor temperature alarm
APA	[Option al.] (APA): Alarm generated by an option card.
UrA	[Regen. underV. al.] (UrA): Reserved.
rSdA	[Rope slack alarm] (rSdA): Rope slack (see [Rope slack config.] (rSd) parameter page 186)
ttHA	[High torque alarm] (ttHA): Motor torque overshooting high threshold [High torque thd.] (ttH), page 71.
ttLA	[Low torque alarm] (ttLA): Motor torque undershooting low threshold [Low torque thd.] (ttL), page 71.
FqLA	[Freq. meter Alarm] (FqLA): Measured speed threshold attained: [Pulse warning thd.] (FqL), page 72.
dLdA	[Dynamic load alarm] (dLdA): Load variation detection (see [DYNAMIC LOAD DETECT.] (dLd-), page 248).
	See the multiple selection procedure on page 32 for the integrated display terminal, and page 23 for the graphic display terminal.
A2C-	**[ALARM GRP2 DEFINITION]** Identical to [ALARM GRP1 DEFINITION] (A1C-)
A3C-	**[ALARM GRP3 DEFINITION]** Identical to [ALARM GRP1 DEFINITION] (A1C-)

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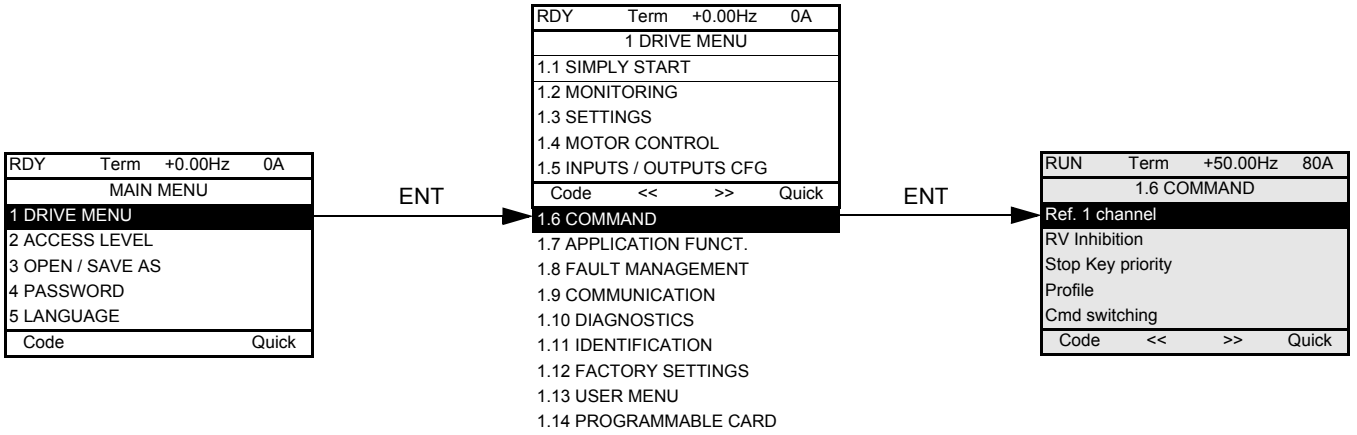
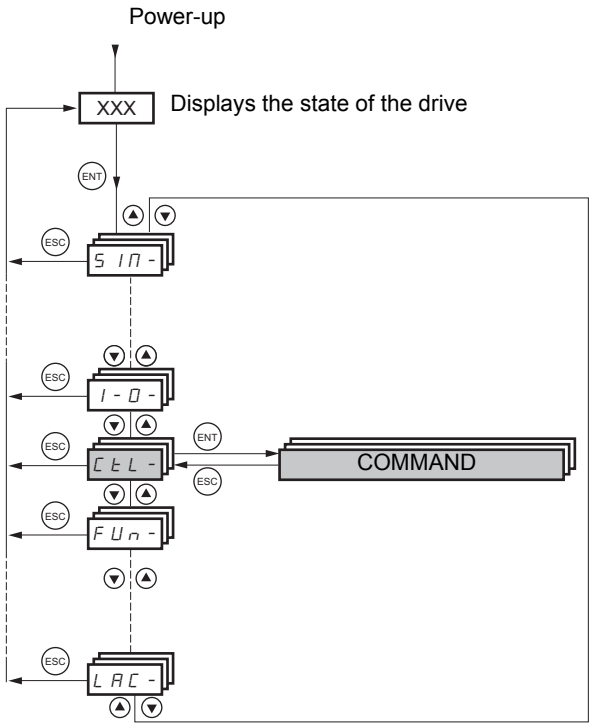
[1.6 COMMAND] (CtL-)

With graphic display terminal:



With integrated display terminal:



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The parameters in the [1.6 COMMAND] (CtL) menu can only be modified when the drive is stopped and no run command is present.

Command and reference channels

Run commands (forward, reverse, stop, etc.) and references can be sent using the following channels:

Control	Reference
• Terminals: logic inputs LI • Graphic display terminal • Integrated Modbus • Integrated CANopen • Communication card • Controller Inside card	• Terminals: analog inputs AI, frequency input, encoder • Graphic display terminal • Integrated Modbus • Integrated CANopen • Communication card • Controller Inside card • +/- speed via the terminals • +/- speed via the graphic display terminal

The behavior of the Altivar® 71 can be adapted according to requirements:

- [8 serie] (SE8): To replace an Altivar 58. See the Migration Manual.
- [Not separ.] (SIM): Command and reference are sent via the same channel.
- [Separate] (SEP): Command and reference may be sent via different channels.

In these configurations, control via the communication bus is performed in accordance with the DRIVECOM standard with only 5 freely-assignable bits (see Communication Parameters Manual). The application functions cannot be accessed via the communication interface.

- [I/O profile] (IO): The command and the reference can come from different channels. This configuration both simplifies and extends use via the communication interface.
  Commands may be sent via the logic inputs on the terminals or via the communication bus.
  When commands are sent via a bus, they are available on a word, which acts as virtual terminals containing only logic inputs.
  Application functions can be assigned to the bits in this word. More than one function can be assigned to the same bit.

NOTE: Stop commands from the terminals remain active even if the terminals are not the active command channel.

The integrated Modbus channel has 2 physical communication ports:
- The Modbus network port
- The Modbus HMI port

The drive does not differentiate between these two ports, but recognizes the graphic display terminal irrespective of the port to which it is connected.

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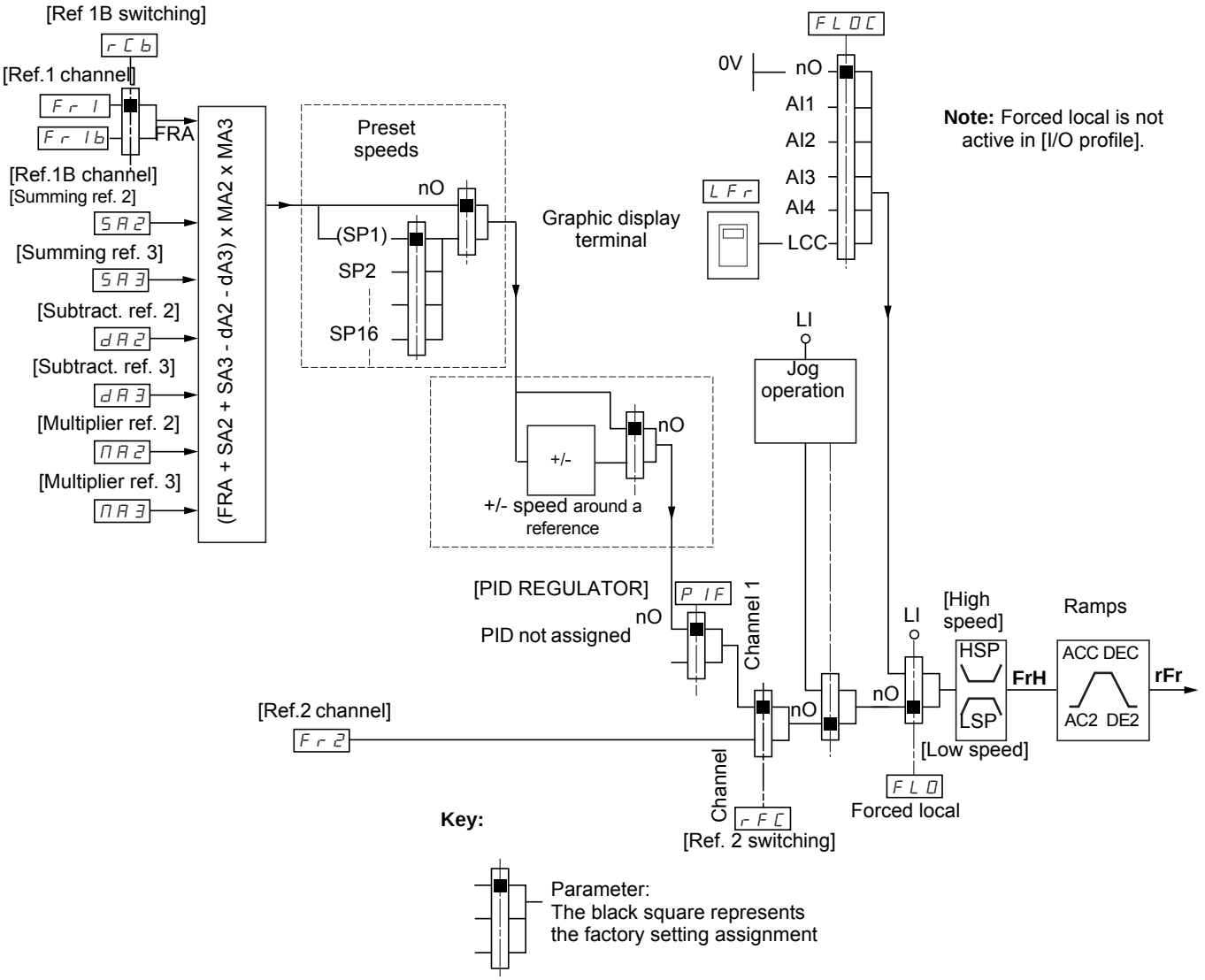
Reference channel for [Not separ.] (SIM), [Separate] (SEP) and [I/O profile] (IO) configurations, PID not configured



Instructions

Fr1, SA2, SA3, dA2, dA3, MA2, MA3:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

Fr1b, for SEP and IO:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

Fr1b, for SIM:

- Terminals, only accessible if Fr1 = terminals

Fr2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card, and +/- speed

NOTE: [Ref.1B channel] (Fr1b) and [Ref 1B switching] (rCb) must be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu.

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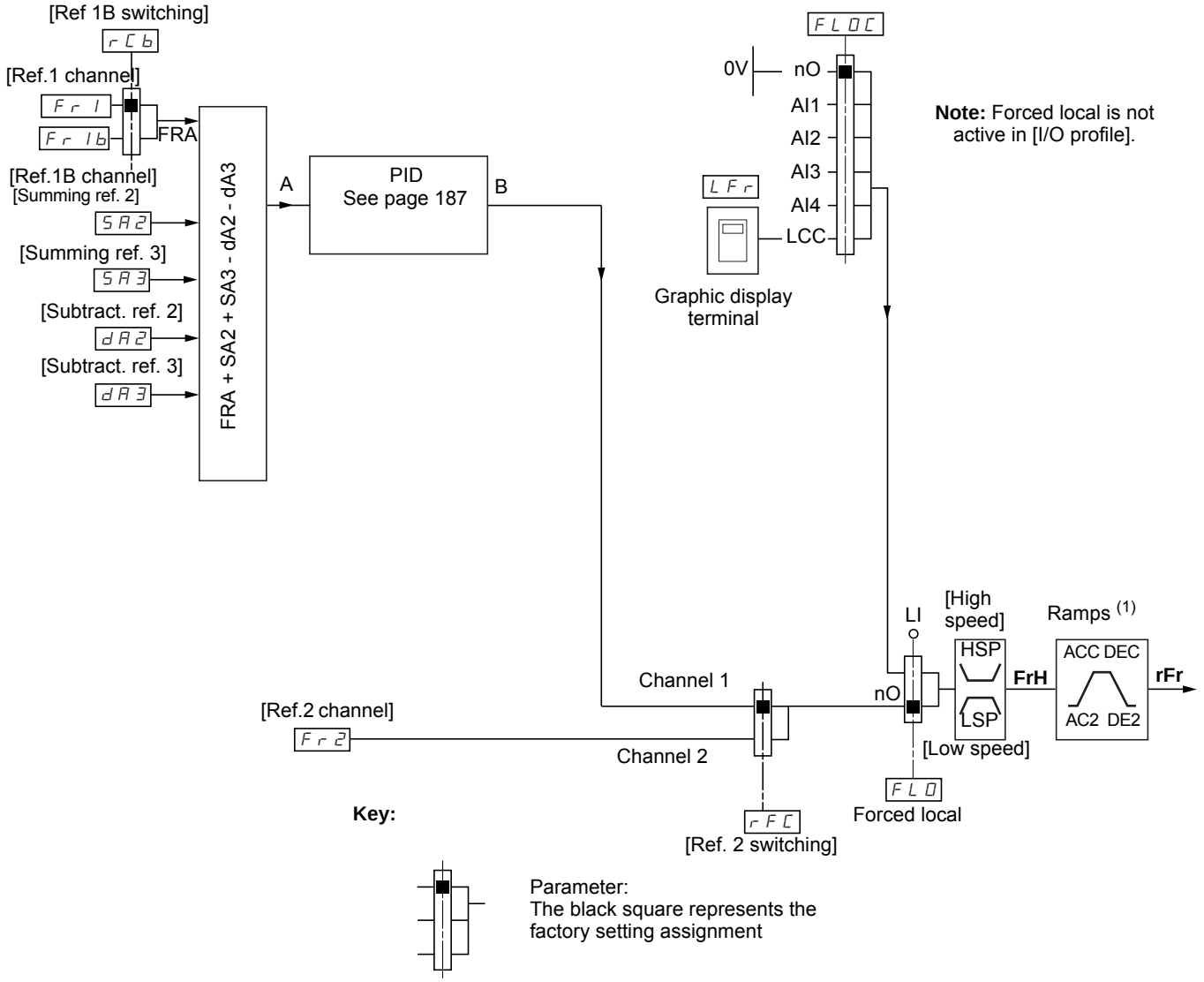
Reference channel for [Not separ.] (SIM), [Separate] (SEP) and [I/O profile] (IO) configurations, PID configured with PID references at the terminals



Instructions

Fr1:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

Fr1b, for SEP and IO:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

Fr1b, for SIM:

- Terminals, only accessible if Fr1 = terminals

SA2, SA3, dA2, dA3:

- Terminals only

Fr2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card, **and +/- speed**

(1) Ramps not active if the PID function is active in automatic mode.

NOTE: [Ref.1B channel] (Fr1b) and [Ref 1B switching] (rCb) must be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu.

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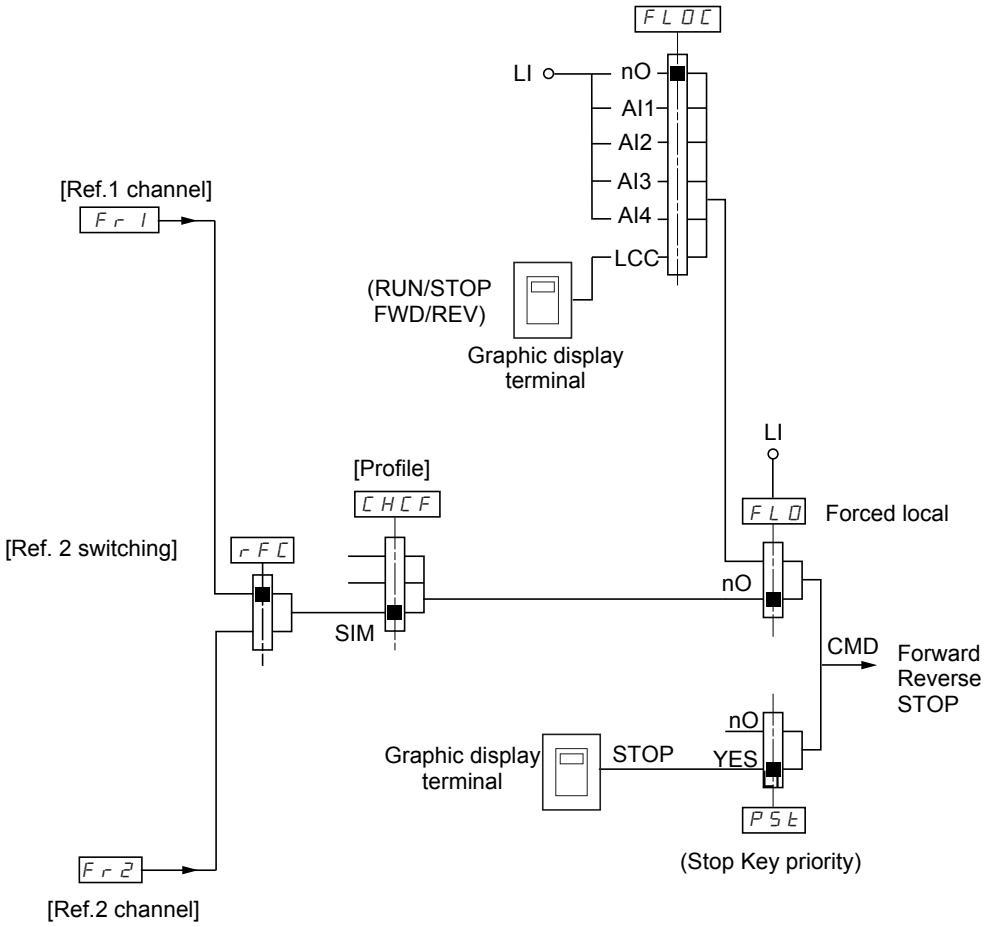
Command channel for [Not separ.] (SIM) configuration

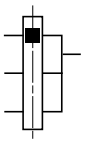
Reference and command, not separate

The command channel is determined by the reference channel. Parameters Fr1, Fr2, rFC, FLO and FLOC are common to reference and command.

Example: If the reference is Fr1 = AI1 (analog input at the terminals), control is via LI (logic input at the terminals).



Key:



Parameter:
The black square represents
the factory setting assignment

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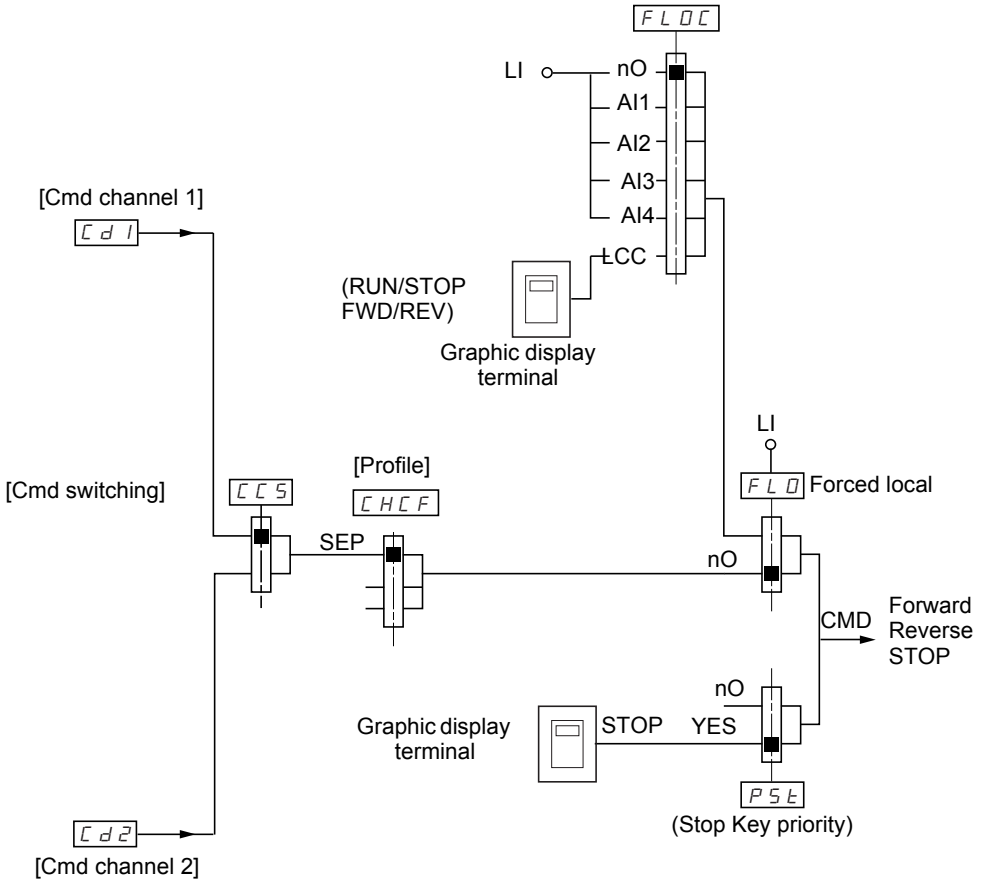
Command channel for [Separate] (SEP) configuration

Separate reference and command

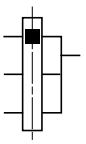
Parameters FLO and FLOC are common to reference and command.

Example—If the reference is in forced local mode via AI1 (analog input at the terminals), command in forced local mode is via LI (logic input at the terminals).

The command channels Cd1 and Cd2 are independent of the reference channels Fr1, Fr1b and Fr2.



Key:



Parameter:
The black rectangle represents the factory setting assignment, except for [Profile].

Commands

Cd1, Cd2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

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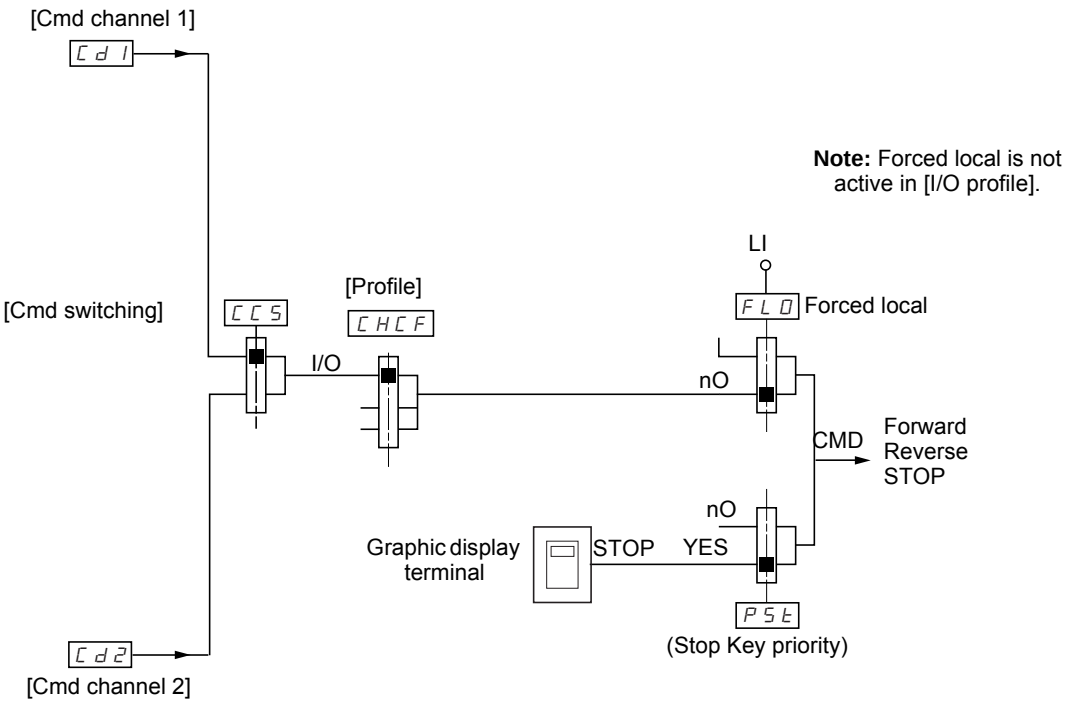
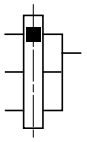
Command channel for [I/O profile] (IO) configuration

Separate reference and command, as in [Separate] (SEP) configuration

The command channels Cd1 and Cd2 are independent of the reference channels Fr1, Fr1b and Fr2.



Key:



Parameter:
The black rectangle represents the factory setting assignment, except for [Profile].

Commands

Cd1, Cd2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

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Command channel for [I/O profile] (IO) configuration

Selection of a command channel:

A command or an action can be assigned:
- To a fixed channel by selecting an LI input or a Cxxx bit:
  - By selecting e.g., LI3, this action will always be triggered by LI3 regardless of which command channel is switched.
  - By selecting e.g., C214, this action will always be triggered by integrated CANopen with bit 14 regardless of which command channel is switched.

- To a switchable channel by selecting a CDxx bit:
  - By selecting CD11, for example, this action will be triggered by
    LI12 if the terminals channel is active
    C111 if the integrated Modbus channel is active
    C211 if the integrated CANopen channel is active
    C311 if the communication card channel is active
    C411 if the Controller Inside card channel is active

If the active channel is the graphic display terminal, the functions and commands assigned to CDxx switchable internal bits are inactive.

NOTE: CD14 and CD15 can only be used for switching between 2 networks. They do not have equivalent logic inputs.

Terminals	Integrated Modbus	Integrated CANopen	Communication card	Controller Inside card	Internal bit, can be switched
—	—	—	—	—	CD00
LI2 (1)	C101 (1)	C201 (1)	C301 (1)	C401 (1)	CD01
LI3	C102	C202	C302	C402	CD02
LI4	C103	C203	C303	C403	CD03
LI5	C104	C204	C304	C404	CD04
LI6	C105	C205	C305	C405	CD05
LI7	C106	C206	C306	C406	CD06
LI8	C107	C207	C307	C407	CD07
LI9	C108	C208	C308	C408	CD08
LI10	C109	C209	C309	C409	CD09
LI11	C110	C210	C310	C410	CD10
LI12	C111	C211	C311	C411	CD11
LI13	C112	C212	C312	C412	CD12
LI14	C113	C213	C313	C413	CD13
—	C114	C214	C314	C414	CD14
—	C115	C215	C315	C415	CD15

1. If [2/3 wire control] (tCC), page 105 = [3 wire] (3C), LI2, C101, C201, C301, and C401 cannot be accessed.

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Assignment conditions for logic inputs and control bits

⚠ 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.

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

The following elements are available for every command or function that can be assigned to a logic input or a control bit:

[LI1] (LI1) to [LI6] (LI6)	Drive with or without option
[LI7] (LI7) to [LI10] (LI10)	With VW3A3201 logic I/O card
[LI11] (LI11) to [LI14] (LI14)	With VW3A3202 extended I/O card
[C101] (C101) to [C110] (C110)	With integrated Modbus in [I/O profile] (IO) configuration
[C111] (C111) to [C115] (C115)	With integrated Modbus regardless of configuration
[C201] (C201) to [C210] (C210)	With integrated CANopen in [I/O profile] (IO) configuration
[C211] (C211) to [C215] (C215)	With integrated CANopen regardless of configuration
[C301] (C301) to [C310] (C310)	With a communication card in [I/O profile] (IO) configuration
[C311] (C311) to [C315] (C315)	With a communication card regardless of configuration
[C401] (C401) to [C410] (C410)	With Controller Inside card in [I/O profile] (IO) configuration
[C411] (C411) to [C415] (C415)	With Controller Inside card regardless of configuration
[CD00] (Cd00) to [CD10] (Cd10)	In [I/O profile] (IO) configuration
[CD11] (Cd11) to [CD15] (Cd15)	Regardless of configuration

☞ **NOTE:** In [I/O profile] (IO) configuration, LI1 cannot be accessed and if [2/3 wire control] (tCC), page 105 = [3 wire] (3C), LI2, C101, C201, C301 and C401 cannot be accessed either. Inactive communication channels are not monitored (no lock following malfunction in the event of a communication bus failure).

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Ensure that the commands and functions assigned to bits C101 to C415 will not pose a risk in the event of the failure of the associated communication bus.

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

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Code	Name/Description	Factory setting
Fr1	[Ref.1 channel]	[AI1] (AI1)
AI1	[AI1] (AI1): Analog input	
AI2	[AI2] (AI2): Analog input	
AI3	[AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted	
AI4	[AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted	
LCC	[HMI] (LCC): Graphic display terminal	
Mdb	[Modbus] (Mdb): Integrated Modbus	
CAn	[CANopen] (CAn): Integrated CANopen	
nEt	[Com. card] (nEt): Communication card (if inserted)	
APP	[C.Insid. card] (APP): Controller Inside card (if inserted)	
PI	[RP] (PI): Frequency input, if VW3A3202 extension card has been inserted,	
PG	[Encoder] (PG): Encoder input, if encoder card has been inserted	
rIn	[RV Inhibition]	[No] (nO)
nO	[No] (nO)	
YES	[Yes] (YES) Inhibition of movement in reverse direction, does not apply to direction requests sent by logic inputs. - Reverse direction requests sent by logic inputs are taken into account. - Reverse direction requests sent by the graphic display terminal are not taken into account. - Reverse direction requests sent by the line are not taken into account. - Any reverse speed reference originating from the PID, summing input, etc., is interpreted as a zero reference.	
PSt	[Stop Key priority]	[Yes] (YES)
nO	[No] (nO)	
YES	[Yes] (YES): Gives priority to the STOP key on the graphic display terminal when the graphic display terminal is not enabled as the command channel. Press and hold down ENT for 2 seconds in order for any change in the assignment of [Stop Key priority] (PSt) to be taken into account. This will be a freewheel stop. If the active command channel is the graphic display terminal, the stop will be performed according to the [Type of stop] (Stt), page 155 irrespective of the configuration of [Stop Key priority] (PSt).	
	⚠ DANGER **UNINTENDED EQUIPMENT OPERATION** • The keypad stop key will be disabled if [Stop Key priority] (PSt) is set to [No] (nO). If [Stop Key priority] (PSt) is set to [No] (nO) the motor will not stop if the stop key is pressed. • An external stop command source must be installed to stop the motor. • To retain the stop key functionality set [Stop Key priority] (PSt) to [Yes] (YES). **Failure to follow these instructions will result in death or serious injury.**	
CHCF	[Profile]	[Not separ.] (SIM)
SE8	[8 serie] (SE8): ATV58 interchangeability (see Migration Manual). The [8 serie] (SE8) configuration is used to load, via PowerSuite, for example, an ATV58 drive configuration in an ATV71 that has already been set to this configuration.This assignment cannot be accessed if a Controller Inside card has been inserted. ☞ **NOTE:** Modifications to the configuration of the ATV71 must only be made using PowerSuite when it is in this configuration, otherwise operation cannot be guaranteed.	
SIM	[Not separ.] (SIM): Reference and command, not separate	
SEP	[Separate] (SEP): Separate reference and command. This assignment cannot be accessed in [I/O profile] (IO).	
IO	[I/O profile] (IO): I/O profile When [8 serie] (SE8) is selected and [I/O profile] (IO) is deselected, the drive automatically returns to the factory setting (this is mandatory). This factory setting only affects the [1 DRIVE MENU] menu. It does not affect either [1.9 COMMUNICATION] or [1.5 PROGRAMMABLE CARD]. - With the graphic display terminal, a screen appears to perform this operation. Follow the instructions on the screen. - With the integrated display terminal, press ENT and hold it down (for 2 s). This will save the selection and return to the factory setting.	

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Code	Name/Description	Factory setting
CCS	**[Cmd switching]**	[ch1 active] (Cd1)
	The parameter can be accessed if [Profile] (CHCF) = [Separate] (SEP) or [I/O profile] (IO)	
Cd1	[ch1 active] (Cd1): [Cmd channel 1] (Cd1) active (no switching)	
Cd2	[ch2 active] (Cd2): [Cmd channel 2] (Cd2) active (no switching)	
LI1	[LI1] (LI1)	
-	:	
-	:	
-	[...] (...): See the assignment conditions on page 141 (not CDOO to CD14).	
	If the assigned input or bit is at 0, channel [Cmd channel 1] (Cd1) is active. If the assigned input or bit is at 1, channel [Cmd channel 2] (Cd2) is active.	
Cd1	[Cmd channel 1]	[Terminals] (tEr)
tEr	[Terminals] (tEr): Terminals	
LCC	[HMI] (LCC): Graphic display terminal	
Mdb	[Modbus] (Mdb): Integrated Modbus	
CAn	[CANopen] (CAn): Integrated CANopen	
nEt	[Com. card] (nEt): Communication card (if inserted)	
APP	[C.Insid. card] (APP): Controller Inside card (if inserted)	
	The parameter is available if [Profile] (CHCF) = [Separate] (SEP) or [I/O profile] (IO).	
Cd2	[Cmd channel 2]	[Modbus] (Mdb)
tEr	[Terminals] (tEr): Terminals	
LCC	[HMI] (LCC): Graphic display terminal	
Mdb	[Modbus] (Mdb): Integrated Modbus	
CAn	[CANopen] (CAn): Integrated CANopen	
nEt	[Com. card] (nEt): Communication card (if inserted)	
APP	[C.Insid. card] (APP): Controller Inside card (if inserted)	
	The parameter is available if [Profile] (CHCF) = [Separate] (SEP) or [I/O profile] (IO).	
rFC	[Ref. 2 switching]	[ch1 active] (Fr1)
Fr1	[ch1 active] (Fr1): no switching, [Ref.1 channel] (Fr1) active	
Fr2	[ch2 active] (Fr2): no switching, [Ref.2 channel] (Fr2) active	
LI1	[LI1] (LI1)	
-	:	
-	:	
-	[...] (...): See the assignment conditions on page 141 (not CDOO to CD14).	
	If the assigned input or bit is at 0, channel [Ref.1 channel] (Fr1) is active. If the assigned input or bit is at 1, channel [Ref.2 channel] (Fr2) is active.	
Fr2	[Ref.2 channel]	[No] (nO)
nO	[No] (nO): Not assigned. If [Profile] (CHCF) = [Not separ.] (SIM) the command is at the terminals with a zero reference. If [Profile] (CHCF) = [Separate] (SEP) or [I/O profile] (IO) the reference is zero.	
AI1	[AI1] (AI1): Analog input	
AI2	[AI2] (AI2): Analog input	
AI3	[AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted	
AI4	[AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted	
UPdt	[+/- Speed] (UPdt): +/- Speed command	
LCC	[HMI] (LCC): Graphic display terminal	
Mdb	[Modbus] (Mdb): Integrated Modbus	
CAn	[CANopen] (CAn): Integrated CANopen	
nEt	[Com. card] (nEt): Communication card (if inserted)	
APP	[C.Insid. card] (APP): Controller Inside card (if inserted)	
PI	[RP] (PI): Frequency input, if VW3A3202 extension card has been inserted	
PG	[Encoder] (PG): Encoder input, if encoder card has been inserted	

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Code	Name/Description	Factory setting
COP	[Copy channel 1 <> 2]	[No] (nO)

Can be used to copy the current reference and/or the command by means of switching, in order to avoid speed surges, for example.
If [Profile] (CHCF), page 142 = [Not separ.] (SIM) or [Separate] (SEP), copying will only be possible from channel 1 to channel 2.
If [Profile] (CHCF) = [I/O profile] (IO), copying will be possible in both directions.

nO [No] (nO): No copy
SP [Reference] (SP): Copy reference
Cd [Command] (Cd): Copy command
ALL [Cmd + ref.] (ALL): Copy command and reference

- A reference or a command cannot be copied to a channel on the terminals.
- The reference copied is FrH (before ramp) unless the destination channel reference is set via +/- speed. In this case, the reference copied is rFr (after ramp).

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Copying the command and/or reference can change the direction of rotation.Verify that this is what is intended.

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

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As the graphic display terminal may be selected as the command and/or reference channel, its action modes can be configured.
The parameters on this page can only be accessed on the graphic display terminal, and not on the integrated display terminal.

Comments:
- The display terminal command/reference is only active if the command and/or reference channels from the terminal are active with the exception of [T/K] (command via the display terminal), which takes priority over these channels. Press [T/K] (command via the display terminal) again to revert control to the selected channel.
- Command and reference via the display terminal are impossible if the latter is connected to more than one drive.
- The JOG, preset speed and +/- speed functions can only be accessed if [Profile] (CHCF) = [Not separ.] (SIM).
- The preset PID reference functions can only be accessed if [Profile] (CHCF) = [Not separ.] (SIM) or [Separate] (SEP)
- The [T/K] (command via the display terminal) can be accessed regardless of the [Profile] (CHCF).

Name/Description	Factory setting
[F1 key assignment] - [No]: Not assigned - [Jog]: JOG operation - [Preset spd2]: Press the key to run the drive at the 2nd preset speed [Preset speed 2] (SP2), page 162. Press STOP to stop the drive. - [Preset spd3]: Press the key to run the drive at the 3rd preset speed [Preset speed 3] (SP3), page 162. Press STOP to stop the drive. - [PID ref. 2]: Sets a PID reference equal to the 2nd preset PID reference [Preset ref. PID 2] (rP2), page 195, without sending a run command. Only operates if [Ref.1 channel] (Fr1) = [HMI] (LCC). Does not operate with the [T/K] function. - [PID ref. 3]: Sets a PID reference equal to the 3rd preset PID reference [Preset ref. PID 3] (rP3), page 195, without sending a run command. Only operates if [Ref.1 channel] (Fr1) = [HMI] (LCC). Does not operate with the [T/K] function. - [+speed]: Faster, only operates if [Ref.2 channel] (Fr2) = [HMI] (LCC). Press the key to run the drive and increase the speed. Press STOP to stop the drive. - [- speed]: Slower, only operates if [Ref.2 channel] (Fr2) = [HMI] (LCC) and if a different key has been assigned to [+ speed]. Press the key to run the drive and decrease the speed. Press STOP to stop the drive. - [T/K]: Command via the display terminal: takes priority over [Cmd switching] (CCS) and over [Ref. 2 switching] (rFC).	[No]
[F2 key assignment] Identical to [F1 key assignment].	[No]
[F3 key assignment] Identical to [F1 key assignment].	[No]
[F4 key assignment] Identical to [F1 key assignment].	[No]
[HMI cmd.] When the [T/K] function is assigned to a key and that function is active, this parameter defines the behavior at the moment when control returns to the graphic display terminal. - [Stop]: Stops the drive (although the controlled direction of operation and reference of the previous channel are copied (to be taken into account on the next RUN command)). - [Bumpless]: Does not stop the drive (the controlled direction of operation and the reference of the previous channel are copied).	[Stop]

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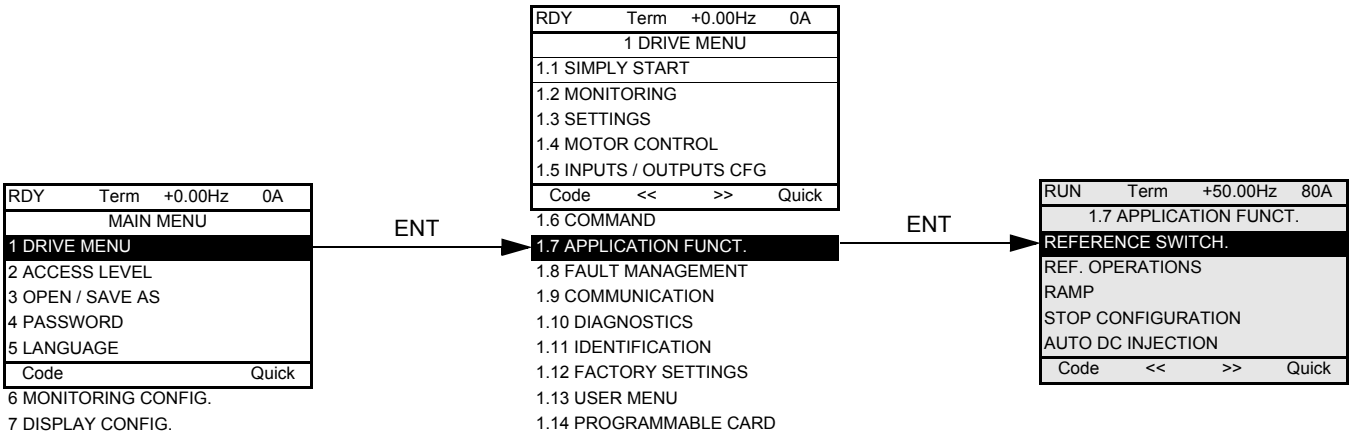
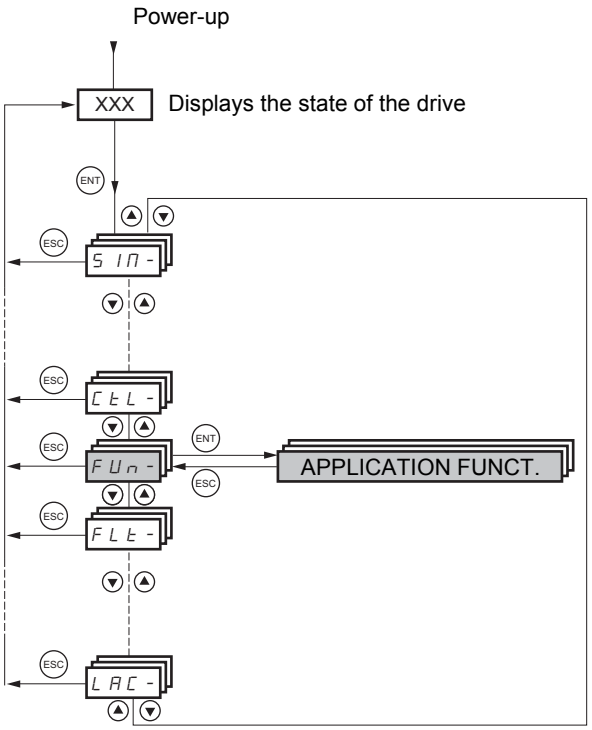
[1.7 APPLICATION FUNCT.] (FUn-)

With graphic display terminal:



With integrated display terminal:



Summary of functions:

Code	Name	Page
rEF-	[REFERENCE SWITCH.]	150
OAI-	[REF. OPERATIONS]	151
rPt-	[RAMP]	152
StT-	[STOP CONFIGURATION]	155
AdC-	[AUTO DC INJECTION]	157
JOG-	[JOG]	159
PSS-	[PRESET SPEEDS]	161
UPd-	[+/- SPEED]	164
SrE-	[+/-SPEED AROUND REF.]	166
SP□-	[MEMO REFERENCE]	167
LSt-	[LIMIT SWITCHES]	168
bLC-	[BRAKE LOGIC CONTROL]	173
rb□-	[ROLLBACK MGT]	179
EL□-	[EXTERNAL WEIGHT MEAS.]	181
HSH-	[HIGH SPEED HOISTING]	186
PId-	[PID REGULATOR]	191
Pr I-	[PID PRESET REFERENCES]	195
tOr-	[TORQUE CONTROL]	197
tOL-	[TORQUE LIMITATION]	200
CL I-	[2nd CURRENT LIMIT.]	201
LLC-	[LINE CONTACTOR COMMAND]	203
OCC-	[OUTPUT CONTACTOR CMD]	205
LPO-	[POSITIONING BY SENSORS]	209
□LP-	[PARAM. SET SWITCHING]	212
□□C-	[MULTIMOTORS/CONFIG.]	216
trO-	[TRAVERSE CONTROL]	222
ISP-	[INSPECTION MODE]	224
rFt-	[EVACUATION]	225
HFF-	[HALF FLOOR]	226
dCO-	[DC BUS SUPPLY]	227
tOP-	[TOP Z MANAGEMENT]	228

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The parameters in the [1.7 APPLICATION FUNCT.] (FUn-) menu can only be modified when the drive is stopped and there is no run command, except for parameters with a ( ) symbol in the code column, which can be modified with the drive running or stopped.

☞ **NOTE: Compatibility of functions—**The choice of application functions may be limited by the number of I/O and by the fact that some functions are incompatible with one another. Functions that are not listed in the table below are fully compatible.

If there is an incompatibility between functions, the first function configured will prevent the others being configured.

Each of the functions on the following pages can be assigned to one of the inputs or outputs.
A single input can activate several functions at the same time (reverse and 2nd ramp for example), The user must therefore ensure that these functions can be used at the same time. It is only possible to assign one input to several functions at [Advanced] (AdU) and [Expert] (EPr) levels.

Before assigning a command, reference or function to an input or output, the user must make sure that this input or output has not already been assigned and that another input or output has not been assigned to an incompatible or undesirable function.
The drive factory setting or macro configurations automatically configure functions, which may prevent other functions being assigned.
It may be necessary to unconfigure one or more functions in order to be able to enable another. Check the compatibility table on page148.

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Compatibility table

	Reference operations (page 151)	+/- speed (3) (page 164)	Management of limit switches (page 168)	Preset speeds (page 161)	PID regulator (page 191)	Traverse control (page 222)	JOG operation (page 159)	Brake logic control (page 173)	Catch on the fly (page 232)	DC injection stop (page 155)	Fast stop (page 155)	Freewheel stop (page 155)	Stop on top Z (page 228)	+/- speed around a reference (page 166)	High speed hoisting (page 186)	Torque control (page 197)	Load sharing (page 101)	Positioning by sensors (page 209)	Open-loop synchronous motor (page 83)	Closed-loop synchronous motor (page 85)	Measure of the angle motor /encoder (page 86)
Reference operations (page 151)				↑	●(4)		↑									●(1)					
+/- speed (3) (page 164)						●	●									●(1)					
Management of limit switches (page 168)					●																
Preset speeds (page 161)	←						↑									●(1)					
PID regulator (page 191)	●(4)		●			●	●	●						●	●	●(1)	●	●			
Traverse control (page 222)		●			●		●							●	●	●(1)					
JOG operation (page 159)	←	●		←	●	●		●						●	●	●(1)					
Brake logic control (page 173)					●		●		●	●						●			●		●(5)
Catch on the fly (page 232)								●								●(1)					
DC injection stop (page 155)								●			●(2)	↑	●(2)						●	●	
Fast stop (page 155)										●(2)		↑	●(2)								
Freewheel stop (page 155)										←	←		←								
Stop on top Z (page 228)										●(2)	●(2)	↑									
+/- speed around a reference (page 166)					●	●	●									●(1)					
High speed hoisting (page 186)					●	●	●									●		●			
Torque control (page 197)	●(1)	●(1)		●(1)	●(1)	●(1)	●(1)	●	●(1)					●(1)	●		●	●(1)	●		
Load sharing (page 101)					●											●					
Positioning by sensors (page 209)					●										●	●(1)					
Open-loop synchronous motor (page 83)								●		●						●					
Closed-loop synchronous motor (page 85)										●											
Measure of the angle motor /encoder (page 86)								●(5)													

1. Torque control and these functions are only incompatible while torque control mode is active.
2. Priority is given to the first of these two stop modes to be activated.
3. Excluding special application with reference channel Fr2 (see diagrams on pages 135 and 136).
4. Only the multiplier reference is incompatible with the PID regulator.
5. These 2 functions are incompatible only if [Angle setting type] (ASt) = [W/o load] (nLd).

● Incompatible functions Compatible functions Not applicable

Priority functions (functions, which cannot be active at the same time):

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

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

NOTE: This compatibility table does not affect commands that can be assigned to the keys of the graphic display terminal (see page 145).

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Incompatible functions

The following functions will be inaccessible or deactivated in the cases described below:
Automatic restart
This is only possible for control type [2/3 wire control] (tCC) = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO). See page 105.

Catch a spinning load

This is only possible for control type [2/3 wire control] (tCC) = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO). See page 105.
This function is locked if automatic injection on stop [Auto DC injection] (AdC) = [Continuous] (Ct). See page 157.

The SUP- monitoring menu (page 55) can be used to display the functions assigned to each input in order to check their compatibility.

When a function is assigned, a ✓ appears on the graphic display terminal, as illustrated in the example below:
If you attempt to assign a function that is incompatible with another function that has already been assigned, a message screen will appear:

RDY Term +0.00Hz 0A	
1.7 APPLICATION FUNCT.	
REFERENCE SWITCH.	
REF. OPERATIONS	
RAMP	✓
STOP CONFIGURATION	
AUTO DC INJECTION	
Code << >>	Quick

JOG

With the graphic display terminal:

RDY Term +0.00Hz 0A
INCOMPATIBILITY
The function can't be assigned because an incompatible function is already selected. See programming book.
ENT or ESC to continue

With the integrated display terminal:

COMP flashes until ENT or ESC is pressed.

When you assign a logic input, an analog input, a reference channel or a bit to a function, pressing the HELP button will display the functions that may already have been activated by this input, bit or channel.

When a logic input, an analog input, a reference channel or a bit that has already been assigned is assigned to another function, the following screens appear:

With the graphic display terminal:

RUN +50.00Hz 1250A +50.00Hz
WARNING - ASSIGNED TO
Ref. 2 switching
ENT->Continue ESC->Cancel

If the access level permits this new assignment, pressing ENT confirms the assignment.
If the access level does not permit this new assignment, pressing ENT results in the following display:

RUN +50.00Hz 1250A +50.00Hz
ASSIGNMENT FORBIDDEN
Un-assign the present functions, or select Advanced access level

With the integrated display terminal:
The code for the first function, which is already assigned, is displayed flashing.
If the access level permits this new assignment, pressing ENT confirms the assignment.
If the access level does not permit this new assignment, pressing ENT has no effect, and the message continues to flash. It is only possible to exit by pressing ESC.

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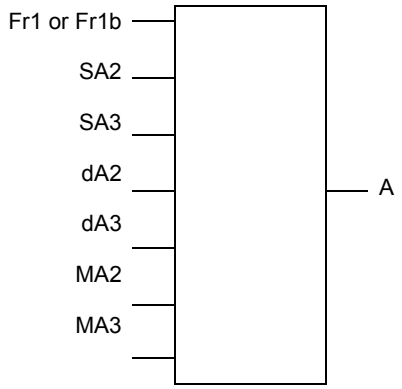
Summing input/Subtracting input/Multiplier



A = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3

- If SA2, SA3, dA2, dA3 are not assigned, they are set to 0.
- If MA2, MA3 are not assigned, they are set to 1.
- A is limited by the minimum LSP and maximum HSP parameters.
- For multiplication, the signal on MA2 or MA3 is interpreted as a %; 100% corresponds to the maximum value of the corresponding input. If MA2 or MA3 is sent via the communication bus or graphic display terminal, an MFr multiplication variable, page 55 must be sent via the bus or graphic display terminal.
- Reversal of the direction of operation in the event of a negative result can be inhibited (see page 142).

Code	Name/Description	Factory setting
rEF-	**[REFERENCE SWITCH.]**	
rCb	[Ref 1B switching] See the diagrams on pages 135 and 136.	[ch1 active] (Fr1)
Fr1	[ch1 active] (Fr1): no switching, [Ref.1 channel] (Fr1) active	
Fr1b	[ch1B active] (Fr1b): no switching, [Ref.1B channel] (Fr1b) active	
LI1 - - -	[LI1] (LI1) : : [...] (...): See the assignment conditions on page 141 (not CD00 to CD14). • If the assigned input or bit is at 0, [Ref.1 channel] (Fr1) is active (see page 142). • If the assigned input or bit is at 1, [Ref.1B channel] (Fr1b) is active. [Ref 1B switching] (rCb) is forced to [ch1 active] (Fr1) if [Profile] (CHCF) = [Not separ.] (SIM) with [Ref.1 channel] (Fr1) assigned via the terminals (analog inputs, encoder, pulse input); see page 142.	
Fr1b	[Ref.1B channel]	[No] (nO)
nO	[No] (nO): Not assigned	
AI1	[AI1] (AI1): Analog input	
AI2	[AI2] (AI2): Analog input	
AI3	[AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted	
AI4	[AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted	
LCC	[HMI] (LCC): Graphic display terminal	
Mdb	[Modbus] (Mdb): Integrated Modbus	
CAn	[CANopen] (CAn): Integrated CANopen	
nEt	[Com. card] (nEt): Communication card (if inserted)	
APP	[C.Insid. card] (APP): Controller Inside card (if inserted)	
PI	[RP] (PI): Frequency input, if VW3A3202 extension card has been inserted	
PG	[Encoder] (PG): Encoder input, if encoder card has been inserted	
	NOTE: In the following instances, only assignments via the terminals are possible: - [Profile] (CHCF) = [Not separ.] (SIM) with [Ref.1 channel] (Fr1) assigned via the terminals (analog inputs, encoder, pulse input); see page 142. - PID configured with PID references via the terminals	

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Code	Name/Description	Factory setting
dA1-	**[REF. OPERATIONS]** Reference = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3. See the diagrams on pages135 and 136. ☞ **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.	
SA2	[Summing ref. 2]	[No] (nO)
	Selection of a reference to be added to [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). nO: [No] (nO): No source assigned AI1: [AI1] (AI1): Analog input AI2: [AI2] (AI2): Analog input AI3: [AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted AI4: [AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted LCC: [HMI] (LCC): Graphic display terminal Mdb: [Modbus] (Mdb): Integrated Modbus CAn: [CANopen] (CAn): Integrated CANopen nEt: [Com. card] (nEt): Communication card (if inserted) APP: [C.Insid. card] (APP): Controller Inside card (if inserted) PI: [RP] (PI): Frequency input, if VW3A3202 extension card has been inserted PG: [Encoder] (PG): Encoder input, if encoder card has been inserted AIU1: [Network AI] (AIU1): Virtual input via communication bus, can be configured using [AI net. channel] (AIC1), page 114. **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** • If the equipment switches to forced local mode (see page 255), the virtual input remains fixed at the last value transmitted. • Do not use the virtual input and forced local mode in the same configuration. **Failure to follow these instructions will result in death or serious injury.**	
SA3	[Summing ref. 3]	[No] (nO)
	Selection of a reference to be added to [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.	
dA2	[Subtract. ref. 2]	[No] (nO)
	Selection of a reference to be subtracted from [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.	
dA3	[Subtract. ref. 3]	[No] (nO)
	Selection of a reference to be subtracted from [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.	
MA2	[Multiplier ref. 2]	[No] (nO)
	Selection of a multiplier reference [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.	
MA3	[Multiplier ref. 3]	[No] (nO)
	Selection of a multiplier reference [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.	

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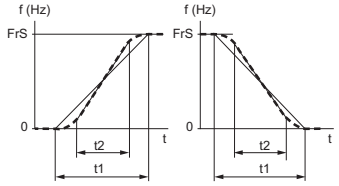
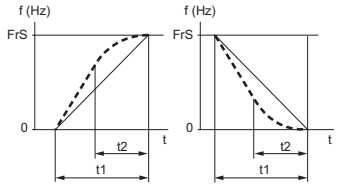
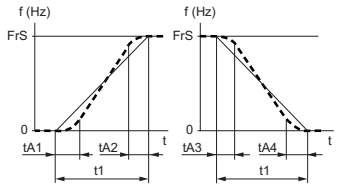
Code	Name/Description	Adjustment range	Factory setting
rPt-	**[RAMP]**		
rPt	**[Ramp type]**		[Linear] (LIn)
LIn	[Linear] (LIn)		
S	[S ramp] (S)		
U	[U ramp] (U)		
CUS	[Customized] (CUS)		
	S ramps  The rounding coefficient is fixed, where t2 = 0.6 x t1 and t1 = set ramp time.		
	U ramps  The rounding coefficient is fixed, where t2 = 0.5 x t1 and t1 = set ramp time.		
	Customized ramps  tA1: adjustable from 0 to 100% tA2: adjustable from 0 to (100% - tA1) tA3: adjustable from 0 to 100% tA4: adjustable from 0 to (100% - tA3) As a % of t1, where t1 = set ramp time		
Inr	[Ramp increment] (1)		[0.1] (0.1)
0.01	[0.01]: Ramp up to 99.99 seconds		
0.1	[0.1]: Ramp up to 999.9 seconds		
1	[1]: Ramp up to 6000 seconds This parameter is valid for [Acceleration] (ACC), [Deceleration] (dEC), [Acceleration 2] (AC2) and [Deceleration 2] (dE2).		
ACC	[Acceleration] (1)	0.01 to 6000 s (2)	3.0 s
	Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 79) or [Nominal freq sync.] (FrSS) (page 84). Make sure that this value is compatible with the inertia being driven.		
dEC	[Deceleration] (1)	0.01 to 6000 s (2)	3.0 s
	Time to decelerate from the [Rated motor freq.] (FrS) (page 79) or [Nominal freq sync.] (FrSS) (page 84) to 0. Make sure that this value is compatible with the inertia being driven.		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to [Ramp increment] (Inr).

Parameter that can be modified during operation or when stopped.

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Code	Name/Description	Adjustment range	Factory setting
	[RAMP] (continued)		
tA1	[Begin Acc round] (1) • Rounding of start of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. • Can be set between 0 and 100% • The parameter can be accessed if the [Ramp type] (rPt) is [Customized] (CUS).	0 to 100%	10%
tA2	[End Acc round] (1) • Rounding of end of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. • Can be set between 0 and (100% - [Begin Acc round] (tA1)) • The parameter can be accessed if the [Ramp type] (rPt) is [Customized] (CUS).		10%
tA3	[Begin Dec round] (1) • Rounding of start of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time. • Can be set between 0 and 100% • The parameter can be accessed if the [Ramp type] (rPt) is [Customized] (CUS).	0 to 100%	10%
tA4	[End Dec round] (1) • Rounding of end of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time. • Can be set between 0 and (100% - [Begin Dec round] (tA3)) • The parameter can be accessed if the [Ramp type] (rPt) is [Customized] (CUS).		10%
Frt	[Ramp 2 threshold] Ramp switching threshold The 2nd ramp is switched if the value of Frt is not 0 (0 deactivates the function) and the output frequency is greater than Frt.Threshold ramp switching can be combined with [Ramp switch ass.] (rPS) switching as follows: **LI or bit** / **Frequency** / **Ramp** 0 / <Frt / ACC, dEC 0 / >Frt / AC2, dE2 1 / <Frt / AC2, dE2 1 / >Frt / AC2, dE2	0 to 500 or 1600 Hz according to rating	0 Hz
rPS nO LI1 - - -	[Ramp switch ass.] [No] (nO): Not assigned [LI1] (LI1) : : [...] (...): See the assignment conditions on page 141. - ACC and dEC are enabled when the assigned input or bit is at 0. - AC2 and dE2 are enabled when the assigned input or bit is at 1.		[No] (nO)
AC2	[Acceleration 2] (1) Time to accelerate from 0 to the [Rated motor freq.] (FrS) or [Nominal freq sync.] (FrSS) (page 84). Make sure that this value is compatible with the inertia being driven. The parameter can be accessed if [Ramp 2 threshold] (Frt) > 0 or if [Ramp switch ass.] (rPS) is assigned.	0.01 to 6000 s (2)	5.0 s
dE2	[Deceleration 2] (1) Time to decelerate from [Rated motor freq.] (FrS) or [Nominal freq sync.] (FrSS) (page 84) to 0. Make sure that this value is compatible with the inertia being driven. The parameter can be accessed if [Ramp 2 threshold] (Frt) > 0 or if [Ramp switch ass.] (rPS) is assigned.	0.01 to 6000 s (2)	5.0 s

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to [Ramp increment] (Inr), page 152.

Parameter that can be modified during operation or when stopped.

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Code	Name/Description	Factory setting
	[RAMP] (continued)	
brA	**[Dec ramp adapt.]**	[Yes] (YES)

Activating this function automatically adapts the deceleration ramp, if this has been set at too low a value for the inertia of the load, which can cause an overvoltage fault.

nO [No] (nO): Function inactive

YES [Yes] (YES): Function active, for applications that do not require strong deceleration.

The following selections appear depending on the rating of the drive and [Motor control type] (Ctt), page 74. They enable stronger deceleration to be obtained than with [Yes] (YES). Use comparative testing to determine your selection.

When [Dec ramp adapt.] (brA) is configured on [High torq. X] (dYnX), the dynamic performances for braking are improved by the addition of a current flow component. The aim is to increase the iron loss and magnetic energy stored in the motor.

dYnA [High torq. A] (dYnA) : Addition of a constant current flow component.

dYnb [High torq. B] (dYnb) : Addition of a current flow component oscillating at 100 Hz

dYnC [High torq. C] (dYnC) : Addition of a current flow component oscillating at 200 Hz but with a greater amplitude.

[Dec ramp adapt.] (brA) is forced to [No] (nO) if the brake logic control[Brake assignment] (bLC) is assigned (page 173), or if [Braking balance] (bbA), page 101 = [Yes] (YES). The factory setting changes to [High torq. A] (dYnA) with certain ratings if [Sinus filter] (OFI), page 76 = [Yes] (YES).

The function is incompatible with applications requiring:

- Positioning on a ramp
- The use of a braking resistor (the resistor would not operate correctly)

If [Speed loop type] (SSL) = [High perfor.] (HPF), it is advisable de assign [Dec ramp adapt.] (brA) = [No] (nO) or [Yes] (YES) (see page 154).

CAUTION

LOSS OF MOTOR FUNCTION

Do not use [High torq. B] (dYnB) or [High torq. C] (dYnC) configurations if the motor is a permanent magnet synchronous motor, as it will be demagnetized.

Failure to follow these instructions can result in equipment damage.

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Code	Name/Description	Adjustment range	Factory setting
StP-	**[STOP CONFIGURATION]** **NOTE:** Some types of stop cannot be used with all other functions. Follow the instructions on page 147.		
Stt	[Type of stop]		[Ramp stop] (rMP)
	Stop mode on disappearance of the run command or appearance of a stop command. rMP [Ramp stop] (rMP): Stop on ramp. FSt [Fast stop] (FSt): Fast stop nSt [Freewheel stop] (nSt): Freewheel stop dCI [DC injection] (dCI): DC injection stop **NOTE:** f the "brake logic" function on page 173 has been enabled, or if [Low speed time out] (tLS), page **67** or **194** is not 0, only ramp type stops may be configured.		
FFt	[Freewheel stop Thd.] (1)	0.0 to 1600 Hz	0.0 Hz
	This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold. It can be accessed if [Type of stop] (Stt) = [Fast stop] (FSt) or [Ramp stop] (rMP). • 0.0: Does not switch to freewheel stop. • 0.1 to 1600 Hz: Speed threshold below which the motor will switch to freewheel stop.		
nSt	[Freewheel stop ass.]		[No] (nO)
	nO [No] (nO): Not assigned LI1 [LI1] (LI1) to [LI6] (LI6) - [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted - [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted C101 [C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO) - [C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO) - [C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO) - [C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO) Cd00 [CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] can be switched with possible logic inputs - [CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] can be switched without logic inputs The stop is activated when the input or the bit changes to 0. If the input returns to state 1 and the run command is still active, the motor will only restart if [2/3 wire control] (tCC), page 105 = [2 wire] (2C) and the [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO). If not, a new run command must be sent.		
FSt	[Fast stop assign.]		[No] (nO)
	NOTE: This function cannot be used with certain other functions. Follow the instructions on page 147. nO [No] (nO): Not assigned LI1 [LI1] (LI1) - : - : - [...] (...): See the assignment conditions on page 141. The stop is activated when the input changes to 0 or the bit changes to 1 (bit in [I/O profile] (IO) at 0). • If the input returns to state 1 and the run command is still active, the motor will only restart if [2/3 wire control] (tCC), page 105 = [2 wire] (2C) and the [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO). • If not, a new run command must be sent.		
dCF	[Ramp divider] (1)	0 to 10	4
	The parameter can be accessed if [Type of stop] (Stt) = [Fast stop] (FSt) and if [Fast stop assign.] (FSt) is not [No] (nO). The ramp that is enabled (dEC or dE2) is then divided by this coefficient when stop requests are sent. Value 0 corresponds to a minimum ramp time.		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

Parameter that can be modified during operation or when stopped.

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Code	Name/Description	Adjustment range	Factory setting
	[STOP CONFIGURATION] (continued)		
dCI	[DC injection assign.]		[No] (nO)
	NOTE: This function cannot be used with certain other functions. Follow the instructions on page 147.		
nO	[No] (nO): Not assigned		
LI1 - - -	[LI1] (LI1) : : [...] (...): See the assignment conditions on page 141.		
	DC injection braking is initiated when the assigned input or bit changes to state 1. If the input returns to state 1 and the run command is still active, the motor will only restart if [2/3 wire control] (tCC), page 105 = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO). If not, a new run command must be sent.		
IdC ( )	[DC inject. level 1] (1) (3)	0.1 to 1.41 In (2)	0.64 In (2)
	Level of DC injection braking current activated via logic input or selected as stop mode. The parameter can be accessed if [Type of stop] (Stt) = [DC injection] (dCI) or if [DC injection assign.] (dCI) is not [No] (nO).		
	CAUTION **OVERHEATING OF MOTOR** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.**		
tdI ( )	[DC injection time 1] (1) (3)	0.1 to 30 s	0.5 s
	Maximum current injection time [DC inject. level 1] (IdC). After this time the injection current becomes [DC inject. level 2] (IdC2). The parameter can be accessed if [Type of stop] (Stt) = [DC injection] (dCI) or if [DC injection assign.] (dCI) is not [No] (nO).		
IdC2 ( )	[DC inject. level 2] (1) (3)	0.1 In (2) to [DC inject. level 1] (IdC)	0.5 In (2)
	Injection current activated by logic input or selected as stop mode, once period of time [DC injection time 1] (tdI) has elapsed. The parameter can be accessed if [Type of stop] (Stt) = [DC injection] (dCI) or if [DC injection assign.] (dCI) is not [No] (nO).		
	CAUTION **OVERHEATING OF MOTOR** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.**		
tdC ( )	[DC injection time 2] (1) (3)	0.1 to 30 s	0.5 s
	Maximum injection time [DC inject. level 2] (IdC2) for injection, selected as stop mode only. The parameter can be accessed if [Stop type] (Stt) = [DC injection] (dCI).		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.
3. Warning: These settings are independent of the [AUTO DC INJECTION] (AdC-) function.

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

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Code	Name/Description	Adjustment range	Factory setting
AdC-	**[AUTO DC INJECTION]**		
AdC	[Auto DC injection] Automatic current injection on stopping (at the end of the ramp)		[Yes] (YES)
	nO: [No] (nO): No injection. YES: [Yes] (YES): Adjustable injection time. Ct: [Continuous] (Ct): Continuous standstill injection. **NOTE:** There is an interlock between this function and [Motor fluxing] (FLU), page 88. If [Motor fluxing] (FLU) = [Continuous] (FCt) [Auto DC injection] (Adc) must be [No] (nO). **NOTE:** This parameter gives rise to the injection of current even if a run command has not been sent. It can be accessed with the drive running.		
SdC1	[Auto DC inj. level 1] (1)	0 to 1.2 In (2)	0.7 In (2)
	Level of standstill DC injection current. This parameter can be accessed if [Auto DC injection] (AdC) is not [No] (nO) and cannot be accessed if [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync.CL] (FSY). This parameter is forced to 0 if [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn). **CAUTION** **OVERHEATING OF MOTOR** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.**		
tdC1	[Auto DC inj. time 1] (1)	0.1 to 30 s	0.5 s
	Standstill injection time. The parameter can be accessed if [Auto DC injection] (AdC) is not [No] (nO). If [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync. mot.] (SYn) this time corresponds to the zero speed maintenance time.		
SdC2	[Auto DC inj. level 2] (1)	0 to 1.2 In (2)	0.5 In (2)
	2nd level of standstill DC injection current. This parameter can be accessed if [Auto DC injection] (AdC) is not [No] (nO) and cannot be accessed if [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync.CL] (FSY). This parameter is forced to 0 if [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn). **CAUTION** **OVERHEATING OF MOTOR** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.**		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

Parameter that can be modified during operation or when stopped.

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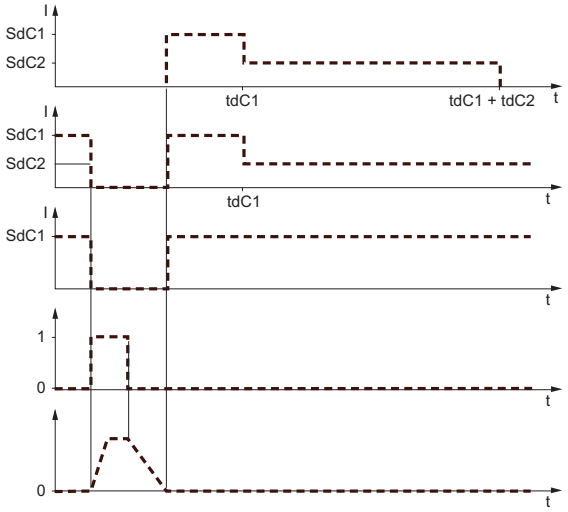
Code	Name/Description	Adjustment range	Factory setting
	[AUTO DC INJECTION] (continued)		
tdC2	[Auto DC inj. time 2] (1)	0 to 30 s	0 s
	2nd standstill injection time. The parameter can be accessed if [Auto DC injection] (AdC) = [Yes] (YES)		

AdC	SdC2	Operation
YES	x	
Ct	≠ 0	
Ct	= 0	
Run command		
Speed		

NOTE: When [Motor control type] (Ctt) page 74 = [FVC] (FUC) or [Sync.CL] (FSY):

[Auto DC inj. level 1] (SdC1), [Auto DC inj. level 2] (SdC2) and [Auto DC inj. time 2] (tdC2) cannot be accessed.

Only [Auto DC inj. time 1] (tdC1) can be accessed.

This then corresponds to a zero speed maintenance time.

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

Parameter that can be modified during operation or when stopped.

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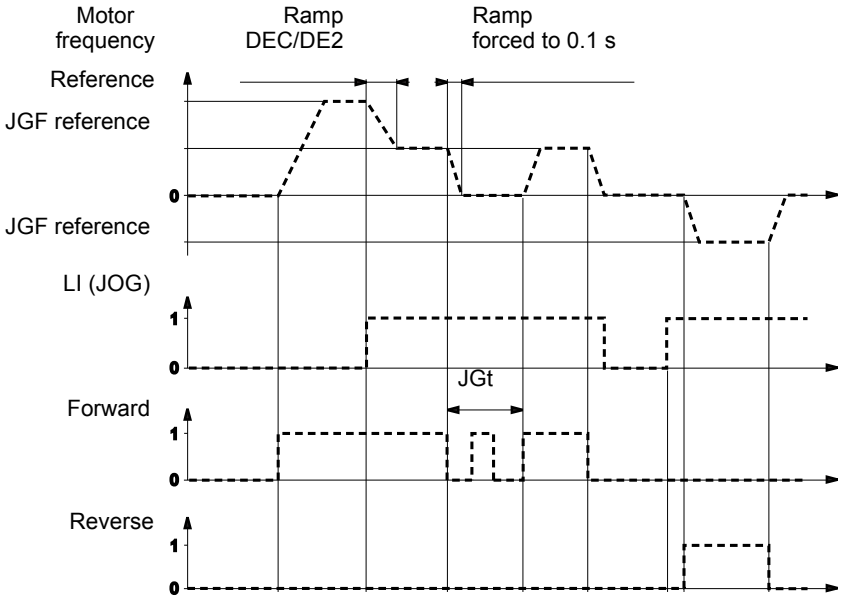
Code	Name/Description	Adjustment range	Factory setting
JOG-	**[JOG]** **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.		
JOG	[JOG]		[No] (nO)
	Pulse operation. The JOG function is only active if the command channel and the reference channels are on the terminals. Selecting the assigned logic input or bit activates the function. nO [No] (nO): Not assigned LI1 [LI1] (LI1) to [LI6] (LI6) - [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted - [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted C101 [C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO) profile - [C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO) profile - [C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO) profile - [C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO) profile Cd00 [CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] profile can be switched with possible logic inputs - [CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] profile can be switched without logic inputs The function is active when the assigned input or bit is at 1. Example: 2-wire control operation (tCC = 2C)  		
JGF	[Jog frequency] (1) The parameter can be accessed if [JOG] (JOG) is not [No] (nO). Reference in jog operation	0 to 10 Hz	10 Hz
JGt	[Jog delay] (1) The parameter can be accessed if [JOG] (JOG) is not [No] (nO). Anti-repeat delay between 2 consecutive jog operations.	0 to 2.0 s	0.5 s

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

Parameter that can be modified during operation or when stopped.

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Preset speeds

2, 4, 8, or 16 speeds can be preset, requiring 1, 2, 3 or 4 logic inputs respectively.

NOTE: You must configure 2 and 4 speeds in order to obtain 4 speeds.
You must configure 2, 4 and 8 speeds in order to obtain 8 speeds.
You must configure 2, 4, 8, and 16 speeds in order to obtain 16 speeds.

Combination table for preset speed inputs

16 speeds LI (PS16)	8 speeds LI (PS8)	4 speeds LI (PS4)	2 speeds LI (PS2)	Speed reference
0	0	0	0	Reference (1)
0	0	0	1	SP2
0	0	1	0	SP3
0	0	1	1	SP4
0	1	0	0	SP5
0	1	0	1	SP6
0	1	1	0	SP7
0	1	1	1	SP8
1	0	0	0	SP9
1	0	0	1	SP10
1	0	1	0	SP11
1	0	1	1	SP12
1	1	0	0	SP13
1	1	0	1	SP14
1	1	1	0	SP15
1	1	1	1	SP16

1. See the diagram on page 135: Reference 1 = (SP1).

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Code	Name/Description	Factory setting
PS5-	**[PRESET SPEEDS]** **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.	
PS2	[2 preset speeds]	[No] (nO)
nO	[No] (nO): Function inactive	
LI1 - - -	[LI1] (LI1) : : [...] (...): See the assignment conditions on page 141.	
PS4	[4 preset speeds]	[No] (nO)
nO	[No] (nO): Function inactive	
LI1 - - -	[LI1] (LI1) : : [...] (...): See the assignment conditions on page 141. To obtain 4 speeds you must also configure 2 speeds.	
PS8	[8 preset speeds]	[No] (nO)
nO	[No] (nO): Function inactive	
LI1 - - -	[LI1] (LI1) : : [...] (...): See the assignment conditions on page 141. To obtain 8 speeds you must also configure 2 and 4 speeds.	
PS16	[16 preset speeds]	[No] (nO)
nO	[No] (nO): Function inactive	
LI1 - - -	[LI1] (LI1) : : [...] (...): See the assignment conditions on page 141. To obtain 16 speeds you must also configure 2, 4 and 8 speeds.	

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Code	Name/Description	Adjustment range	Factory setting
	[PRESET SPEEDS] (continued)		
SP2	[Preset speed 2] (1)	0 to 1600 Hz	10 Hz
SP3	[Preset speed 3] (1)		15 Hz
SP4	[Preset speed 4] (1)		20 Hz
SP5	[Preset speed 5] (1)		25 Hz
SP6	[Preset speed 6] (1)		30 Hz
SP7	[Preset speed 7] (1)		35 Hz
SP8	[Preset speed 8] (1)		40 Hz
SP9	[Preset speed 9] (1)		45 Hz
SP10	[Preset speed 10] (1)		50 Hz
SP11	[Preset speed 11] (1)		55 Hz
SP12	[Preset speed 12] (1)		60 Hz
SP13	[Preset speed 13] (1)		70 Hz
SP14	[Preset speed 14] (1)		80 Hz
SP15	[Preset speed 15] (1)		90 Hz
SP16	[Preset speed 16] (1)		100 Hz
	The appearance of these [Preset speed x] (SPx) parameters is determined by the number of speeds configured.		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

Parameter that can be modified during operation or when stopped.

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+/- speed

Two types of operation are available.

1 **Use of single action buttons:** Two logic inputs are required in addition to the operating direction(s).
The input assigned to the “+ speed” command increases the speed, the input assigned to the “- speed” command decreases the speed.

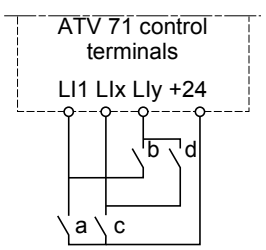
2 **Use of double action buttons:** Only one logic input assigned to “+ speed” is required.

+/- speed with double-press buttons:

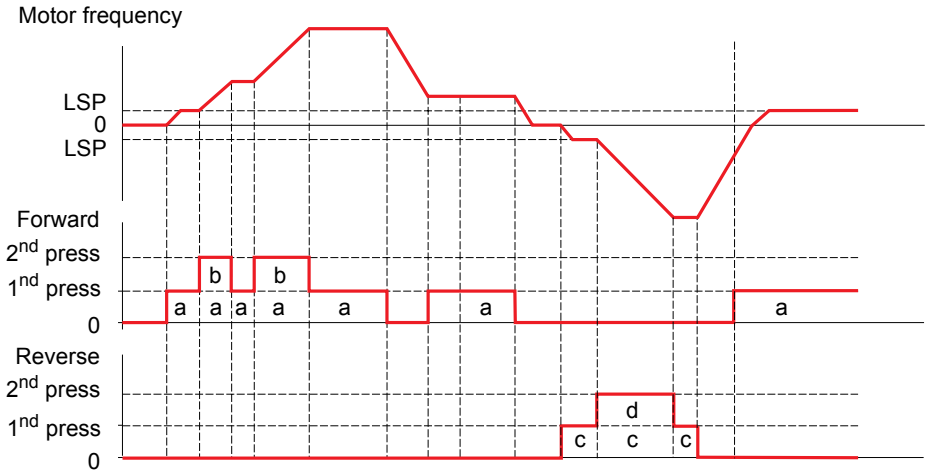
Description: 1 button pressed twice (2 steps) for each direction of rotation. A contact closes each time the button is pressed.

	Released (- speed)	1st press (speed maintained)	2nd press (faster)
Forward button	–	a	a and b
Reverse button	–	c	c and d

Example of wiring:



LI1: forward
LIx: Reverse
LIy: + speed



Do not use this +/-speed type with 3-wire control.

Whichever type of operation is selected, the max. speed is set by [High speed] (HSP) (see page 60).

NOTE: If the reference is switched via rFC (see page 143) from any one reference channel to another reference channel with "+/- speed", the value of reference rFr (after ramp) may be copied at the same time in accordance with the [Copy channel 1 --> 2] (COP) parameter, see page 144.

If the reference is switched via rFC (see page 143) from one reference channel to any other reference channel with "+/- speed", the value of reference rFr (after ramp) is always copied at the same time.

This prevents the speed being incorrectly reset to zero when switching takes place.

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Code	Name/Description	Factory setting
UPd-	**[+/- SPEED]** Function can be accessed if reference channel [Ref.2 channel] (Fr2) = [+/-Speed] (UPdt) see page 143. **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.	
USP	[+ speed assignment]	[No] (nO)
nO	[No] (nO): Function inactive	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted	
-	[LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted	
C101	[C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO)	
-	[C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO)	
-	[C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO)	
-	[C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO)	
CD00	[CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] can be switched with possible logic inputs	
-	[CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] can be switched without logic inputs	
	Function active if the assigned input or bit is at 1.	
dSP	[-Speed assignment]	[No] (nO)
nO	[No] (nO): Function inactive	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted	
-	[LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted	
C101	[C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO)	
-	[C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO)	
-	[C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO)	
-	[C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO)	
CD00	[CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] can be switched with possible logic inputs	
-	[CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] can be switched without logic inputs	
	Function active if the assigned input or bit is at 1.	
Str	[Reference saved]	[No] (nO)
	Associated with the "+/- speed" function, this parameter can be used to save the reference: • When the run commands disappear (saved to RAM) • When the line supply or the run commands disappear (saved to EEPROM) Therefore, the next time the drive starts up, the speed reference is the last reference saved.	
nO	[No] (nO): No save (the next time the drive starts up, the speed reference is [Low speed] (LSP), see page 48)	
rAM	[RAM] (rAM): Saved in RAM	
EEP	[EEprom] (EEP): Saved in EEPROM	

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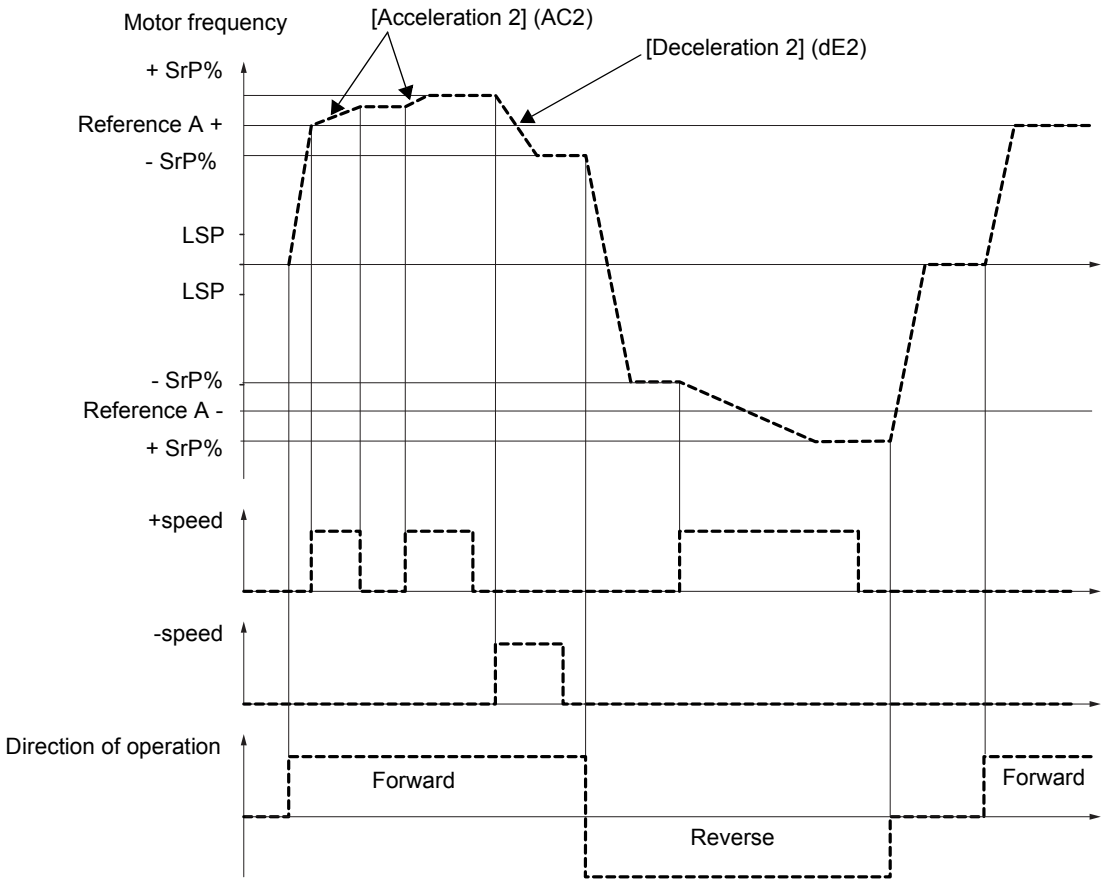
+/- speed around a reference

The reference is given by Fr1 or Fr1b with summing/subtraction/multiplication functions and preset speeds if relevant (see the diagram on page 135). For improved clarity, we will call this reference A. The action of the +speed and -speed buttons can be set as a % of this reference A. On stopping, the reference (A +/- speed) is not saved, so the drive restarts with reference A+ only.
The maximum total reference is always limited by [High speed] (HSP) and the minimum reference by [Low speed] (LSP), see page 60.

Example of 2-wire control:



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Code	Name/Description	Adjustment range	Factory setting
SrE-	**[+/-SPEED AROUND REF.]** The function can be accessed for reference channel [Ref.1 channel] (Fr1). **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.		
USI	[+ speed assignment]		[No] (nO)
nO	[No] (nO): Function inactive		
LI1 - - -	[LI1] (LI1) : : [...] (...): See the assignment conditions on page 141.		
	Function active if the assigned input or bit is at 1.		
dSI	[-Speed assignment]		[No] (nO)
nO	[No] (nO): Function inactive		
LI1 - - -	[LI1] (LI1) : : [...] (...): See the assignment conditions on page 141.		
	Function active if the assigned input or bit is at 1.		
SrP ()	[+/-Speed limitation]	0 to 50 %	10 %
	This parameter limits the variation range with +/- speed as a % of the reference. The ramps used in this function are[Acceleration 2] (AC2) and [Deceleration 2] (dE2). The parameter can be accessed if +/- speed is assigned.		
AC2	[Acceleration 2] (1)	0.01 to 6000 s (2)	5.0 s
	Time to accelerate from 0 to the [Rated motor freq.] (FrS) or [Nominal freq sync.] (FrSS), page 84. Make sure that this value is compatible with the inertia being driven. The parameter can be accessed if +/- speed is assigned.		
dE2	[Deceleration 2] (1)	0.01 to 6000 s (2)	5.0 s
	Time to decelerate from the [Rated motor freq.] (FrS) or [Nominal freq sync.] (FrSS), page 84 to 0. Make sure that this value is compatible with the inertia being driven. The parameter can be accessed if +/- speed is assigned.		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to [Ramp increment] (Inr), page 152.

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

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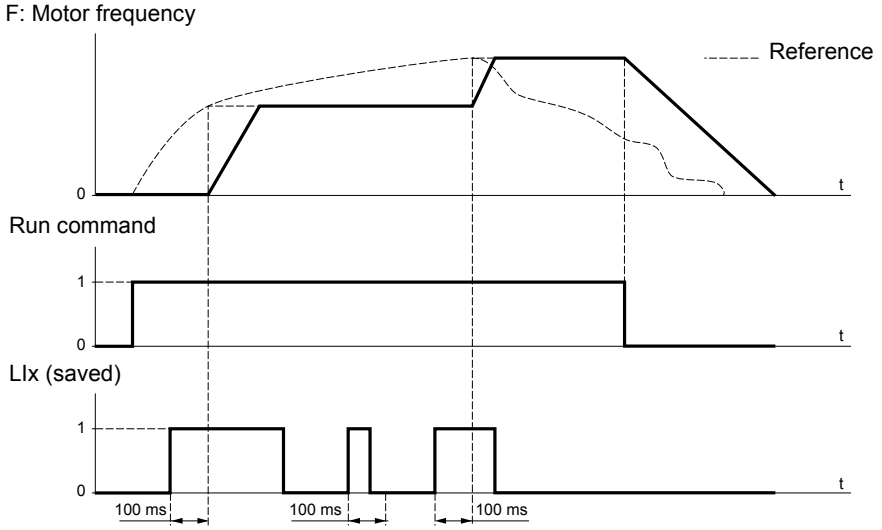
Save reference

Saving a speed reference value using a logic input command lasting longer than 0.1 s.

- This function is used to control the speed of several drives alternately via a single analog reference and one logic input for each drive.
- It is also used to confirm a line reference (communication bus or network) on several drives via a logic input. This allows movements to be synchronized by getting rid of variations when the reference is set.
- The reference is acquired 100 ms after the rising edge of the request. A new reference is not then acquired until a new request is made.



Code	Name/Description	Factory setting
SPn-	**[MEMO REFERENCE]**	
SPn	[Ref. memo ass.]	[No] (nO)
nO	[No] (nO): Function inactive	
LI1 - LI14	[LI1] (LI1) to [LI6] (LI6) [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted Assignment to a logic input Function active if the assigned input is at 1.	

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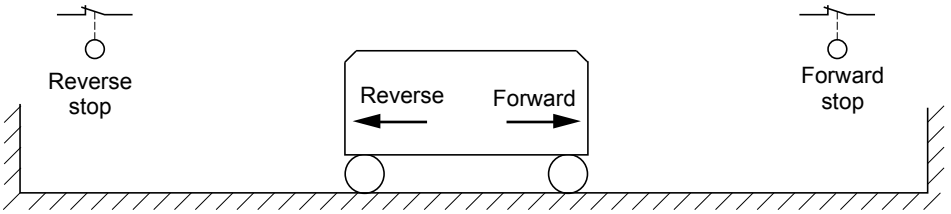
Limit switch management

This function can be used to manage trajectory limits using limit switches.

The stop mode is configurable.
When the stop contact is activated, startup in the other direction is authorized.

Example:



The stop is activated when the input is at 0 (contact open).

Code	Name/Description	Factory setting
LSt-	**[LIMIT SWITCHES]** **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.	
LAF	[Stop FW limit sw.]	[No] (nO)
nO	[No] (nO): Function inactive	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted	
-	[LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted	
C101	[C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO)	
-	[C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO)	
-	[C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO)	
-	[C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO)	
CdO0	[CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs	
-	[CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs	
LAr	[Stop RV limit sw.]	[No] (nO)
	Same assignments possible as for [Stop FW limit sw.] (LAF) below.	
LAS	[Stop type]	[Freewheel] (nSt)
rMP	[Ramp stop] (rMP)	
FSt	[Fast stop] (FSt)	
nSt	[Freewheel] (nSt) When the assigned input changes to 0, the stop is controlled in accordance with the selected type. Restarting is only authorized for the other operating direction once the motor has stopped. If the two inputs [Stop FW limit sw.] (LAF) and [Stop RV limit sw.] (LAr) are assigned and at state 0, restarting is not possible. The parameter can be accessed if [Stop FW limit sw.] (LAF) or [Stop RV limit sw.] (LAr) is assigned.	

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Brake logic control

Used to control an electromagnetic brake by the drive, for horizontal and vertical hoisting applications, and for unbalanced machines.

Principle:

Vertical hoisting movement:

In order to hold the load, maintain motor torque in the driving load holding direction during brake opening and closing, start smoothly when the brake is released and stop smoothly when the brake is engaged.

Horizontal movement:

Synchronize brake release with the build-up of torque during startup and brake engage at zero speed on stopping, to prevent jolting.

Recommended settings for brake logic control for a vertical hoisting application:

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Check that the selected settings and configurations will not result in the dropping or loss of control of the load being lifted.

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

1. Brake impulse (bIP): YES. Ensure that the direction of rotation FW corresponds to lifting the load.
   For applications in which the load being lowered is very different from the load being lifted, set BIP = 2 Ibr (e.g., ascent with a load and descent without a load).
2. Brake release current (Ibr and Ird if BIP = 2 Ibr): Adjust the brake release current to the rated current indicated on the motor.
   During testing, adjust the brake release current in order to hold the load smoothly.
3. Acceleration time: For hoisting applications it is advisable to set the acceleration ramps to more than 0.5 seconds. Ensure that the drive does not exceed the current limit.
   The same recommendation applies for deceleration.
   Reminder: For a hoisting movement, a braking resistor should be used.
4. Brake release time (brt): Set according to the type of brake. It is the time required for the mechanical brake to release.
5. Brake release frequency (bIr), in open-loop mode only: Leave in [Auto], adjust if necessary.
6. Brake engage frequency (bEn): Leave in [Auto], adjust if necessary.
7. Brake engage time (bEt): Set according to the type of brake. It is the time required for the mechanical brake to engage.

Recommended settings for brake logic control for a horizontal hoisting application:

1. Brake impulse (bIP): No
2. Brake release current (Ibr): Set to 0.
3. Brake release time (brt): Set according to the type of brake. It is the time required for the mechanical brake to release.
4. Brake engage frequency (bEn), in open-loop mode only: Leave in [Auto], adjust if necessary.
5. Brake engage time (bEt): Set according to the type of brake. It is the time required for the mechanical brake to engage.

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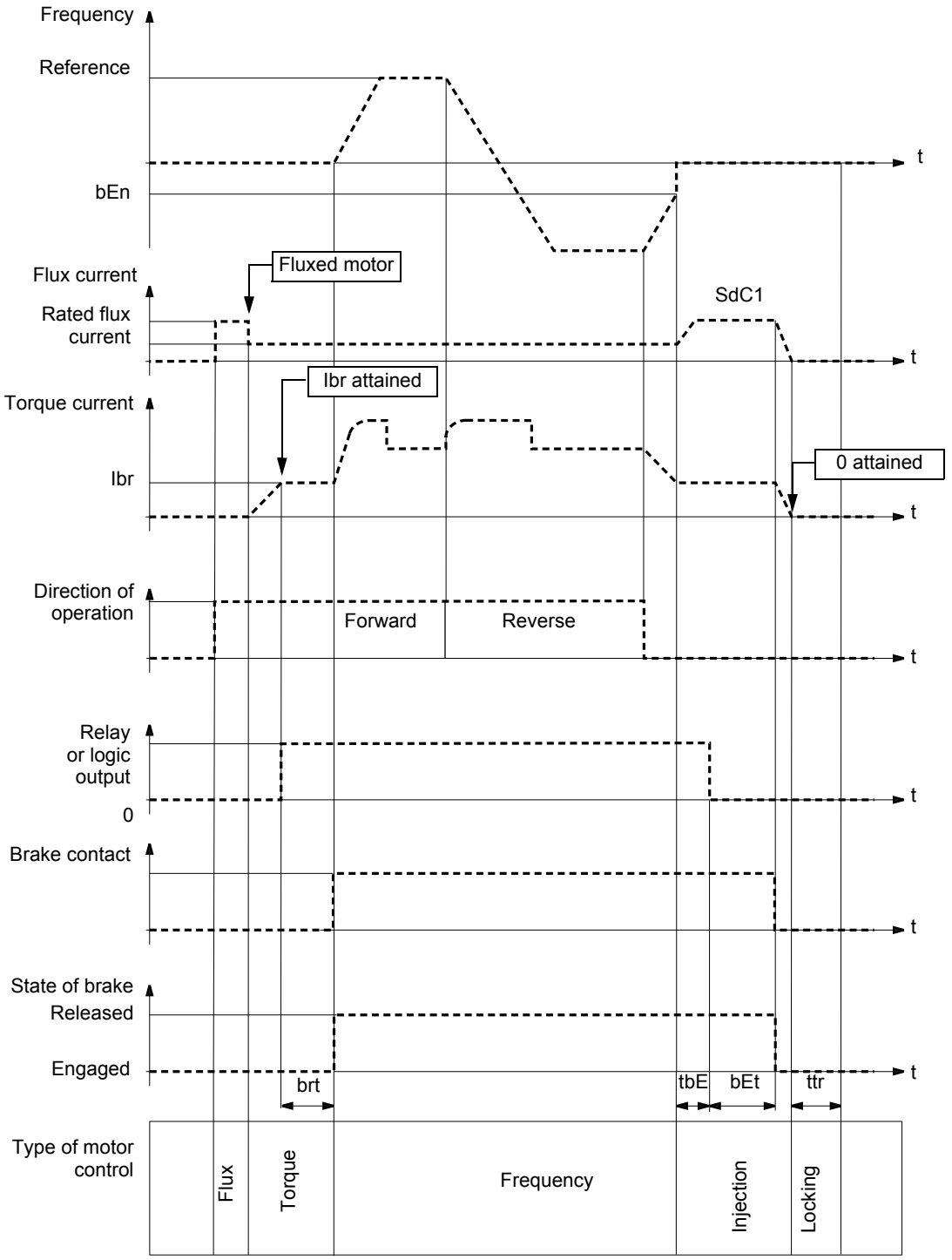
Brake logic control, horizontal movement in open-loop mode



Key:
- (bEn): [Brake engage freq]
- (bEt): [Brake engage time]
- (brt): [Brake Release time]
- (Ibr): [Brake release I FW]
- (SdC1): [Auto DC inj. level 1]
- (tbE): [Brake engage delay]
- (ttr): [Time to restart]

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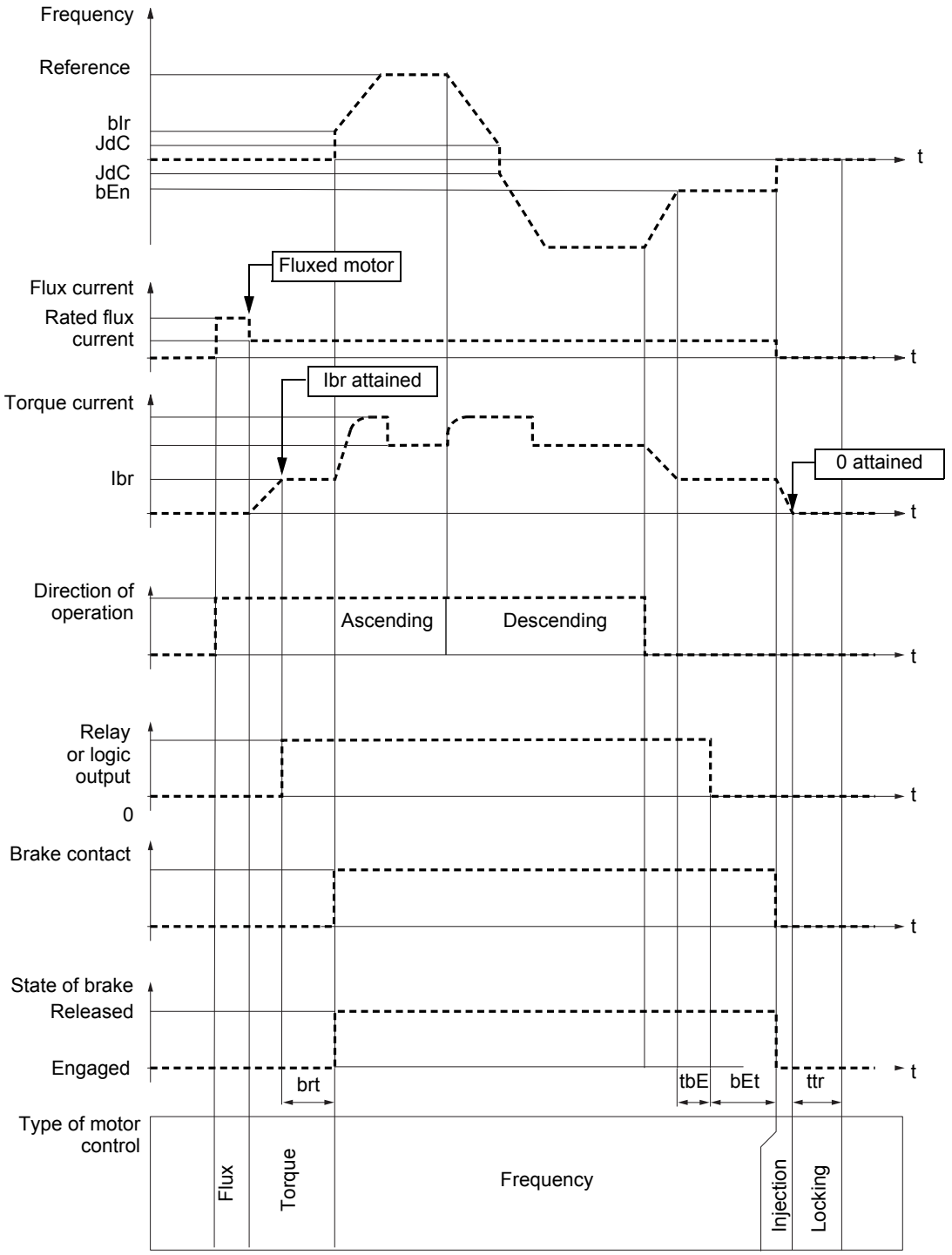
Brake logic control, vertical movement in open-loop mode



Key:
- (bEn): [Brake engage freq]
- (bEt): [Brake engage time]
- (bIr): [Brake release freq]
- (brt): [Brake Release time]
- (Ibr): [Brake release I FW]
- (JdC): [Jump at reversal]
- (tbE): [Brake engage delay]
- (ttr): [Time to restart]

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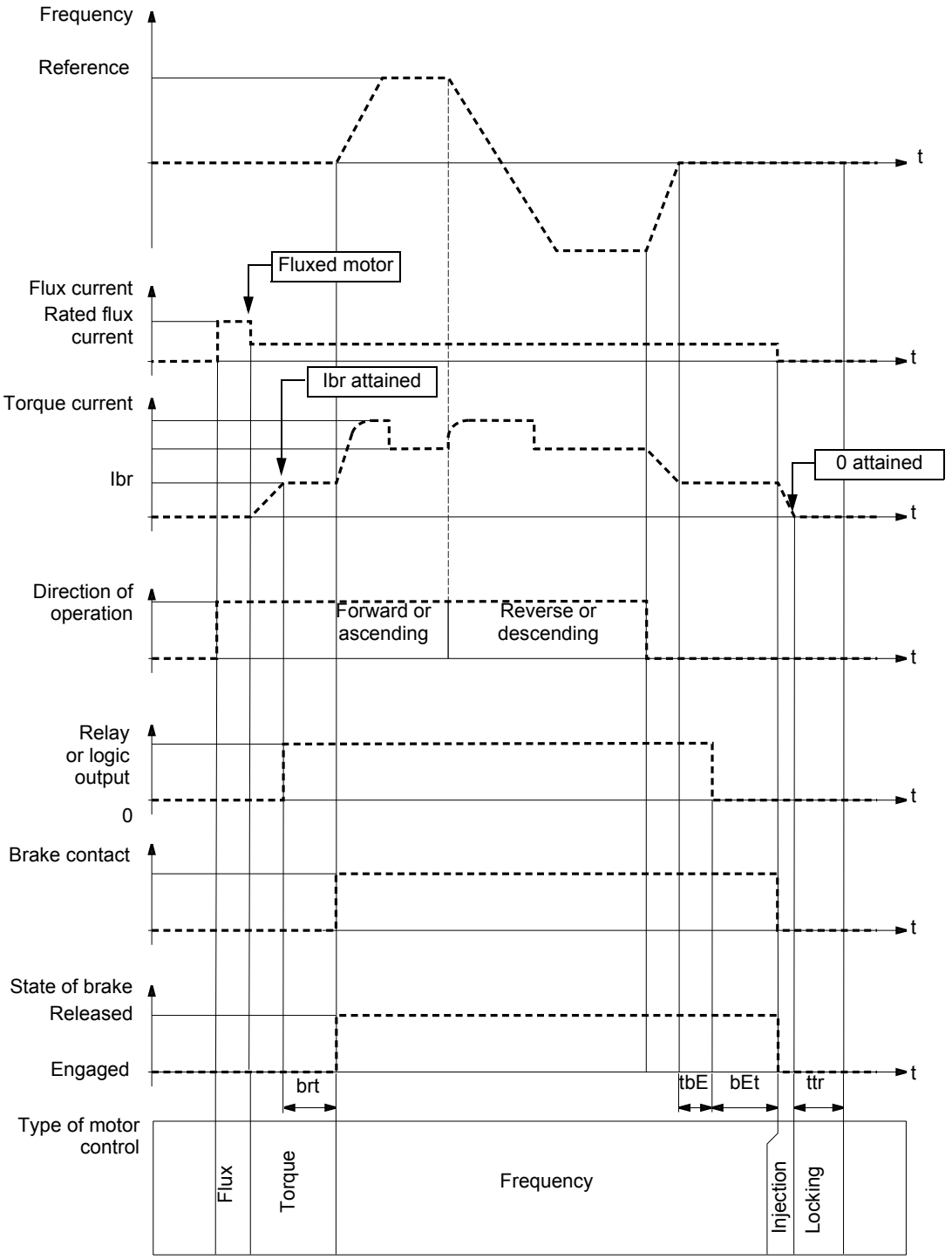
Brake logic control, vertical or horizontal movement in closed-loop mode



Key:
- (bEt): [Brake engage time]
- (brt): [Brake Release time]
- (Ibr): [Brake release I FW]
- (tbE): [Brake engage delay]
- (ttr): [Time to restart]

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Code	Name/Description	Adjustment range	Factory setting
bLC-	**[BRAKE LOGIC CONTROL]** **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.		
bLC	[Brake assignment]		[No] (nO)
	NOTE: If the brake is assigned, only a ramp stop is possible. Check the [Type of stop] (Stt) page 155.		
	Brake logic control can only be assigned if [Motor control type] (Ctt), page 74 = [SVC V] (UUC), [SVC I] (CUC), [FVC] (FUC), or if [Motor control type] (Ctt) = [V/F 2pts] (UF2) or [V/F 5pts] (UF5) for ATV71●●●N4 from 90 kW and for ATV71●●●M3X from 55 kW.		
	Logic output or control relay		
nO	[No] (nO): Function not assigned (in this case, none of the function parameters can be accessed).		
r2	[R2] (r2)		
-	to		
r4	[R4] (r4): Relay (selection extended to R3 or R4 if one or two I/O cards have been inserted).		
LO1	[LO1] (LO1)		
-	to		
LO4	[LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected).		
dO1	[dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1), page 129 = [No] (nO).		
bSt	[Movement type]		[Hoisting] (UEr)
HOr	[Traveling] (HOr): Resistive-load movement (translational motion of overhead crane, for example).		
	NOTE: If [Motor control type] (Ctt) = [V/F 2pts] (UF2) or [V/F 5pts] (UF5) for ATV71●●●N4 from 90 kW nd for ATV71●●●M3X from 55 kW, [Movement type] (bSt) is forced to [Traveling] (HOr).		
UEr	[Hoisting] (UEr): Driving-load movement (hoisting winch, for example). If [Weight sensor ass.] (PES), page 181 is not [No] (nO) [Movement type] (bSt) is forced to [Hoisting] (UEr).		
bCI	[Brake contact]		[No] (nO)
	If the brake has a monitoring contact (closed for released brake).		
nO	[No] (nO): Function inactive		
LI1	[LI1] (LI1)		
-	:		
-	:		
-	[...] (...): See the assignment conditions on page 141.		
bIP	[Brake impulse]		[No] (nO)
( )	The parameter can be accessed if [Weight sensor ass.] (PES) = [No] (nO) (see page 181) and if [Movement type] (bSt) = [Hoisting] (UEr).		
nO	[No] (nO): The motor torque is given in the required operating direction, at current Ibr.		
YES	[Yes] (YES): The motor torque is always Forward (check that this direction corresponds to ascending), at current Ibr.		
2 Ibr	[2 IBR] (2Ibr): The torque is in the required direction, at current Ibr for Forward and Ird for Reverse, for certain specific applications.		
Ibr ( )	[Brake release I FW] (1)	0 to 1.32 In (2)	0
	Brake release current threshold for ascending or forward movement The parameter can be accessed if [Weight sensor ass.] (PES) = [No] (nO) (see page 181).		
Ird ( )	[Brake release I Rev] (1)	0 to 1.32 In (2)	0
	Brake release current threshold for ascending or forward movement The parameter can be accessed if [Weight sensor ass.] (PES) = [No] (nO) (see page 181).		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

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

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Code	Name/Description	Adjustment range	Factory setting
	[BRAKE LOGIC CONTROL] (continued)		
brt	[Brake Release time] (1) Brake release time delay	0 to 5.00 s	0
blr	[Brake release freq] (1) Brake release frequency threshold (initialization of acceleration ramp). The parameter can be accessed if [Motor control type] (Ctt), page 74 is not [FVC] (FUC) or [Sync.CL] (FSY) and if [Movement type] (bSt), page 173 is [Hoisting] (UEr). AUtO: [Auto] (AUtO): The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters. -: 0 to 10 Hz: Manual control		[Auto] (AUtO)
bEn	[Brake engage freq] (1) Brake engage frequency threshold The parameter can be accessed if [Motor control type] (Ctt), page 74 is not [FVC] (FUC) or [Sync.CL] (FSY). AUtO: [Auto] (AUtO): The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters. -: 0 to 10 Hz: Manual control		[Auto] (AUtO)
bECd	[Brake engage at 0] Brake engages at regulated zero speed. The parameter can be accessed if [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync.CL] (FSY). Can be used to engage the brake at zero speed in closed-loop mode with speed regulation. This parameter can be used to adjust the brake engage delay once zero speed has been reached. If a speed other than zero is then required, the command to release the brake is sent following torque application. nO: [No] (nO): Brake does not engage at regulated zero speed. -: 0.0 to 30.0 s: Brake engage delay once zero speed is reached.		[No] (nO)
tbE	[Brake engage delay] (1) Time delay before request to engage brake. To delay brake engagement, if you wish the brake to be engaged when the drive comes to a complete stop.	0 to 5.00 s	0
bEt	[Brake engage time] (1) Brake engage time (brake response time)	0 to 5.00 s	0
SdC1	[Auto DC inj. level 1] (1) Level of standstill DC injection current. **NOTE:** The parameter can be accessed if [Motor control type] (Ctt), page 74 is not [FVC] (FUC) or [Sync.CL] (FSY) and if [Movement type] (bSt), page 173 is [Traveling] (HOr) **CAUTION** **OVERHEATING OF MOTOR** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.**	0 to 1.2 In (2)	0.7 In (2)

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

Parameter that can be modified during operation or when stopped.

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Code	Name/Description	Adjustment range	Factory setting
	[BRAKE LOGIC CONTROL] (continued)		
bEd ()	[Engage at reversal]		[No] (nO)
nO YES	[No] (nO): The brake does not engage. [Yes] (YES): The brake engages. Can be used to select whether or not the brake engages on transition to zero speed when the operating direction is reversed.		
JdC ()	[Jump at reversal] (1)	0 to 10.0 Hz	[Auto] (AUtO)
AUtO -	The parameter can be accessed if [Motor control type] (Ctt), page 74 is not [FVC] (FUC) or [Sync.CL] (FSY) and if [Movement type] (bSt), page 173 is [Hoisting] (UEr). [Auto] (AUtO): The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters. 0 to 10 Hz: Manual control When the reference direction is reversed, this parameter can be used to avoid loss of torque (and consequential release of load) on transition to zero speed. Parameter is not applicable if [Engage at reversal] (bEd) = [Yes] (YES).		
tbr ()	[Time to restart] (1)	0 to 15.00 s	0
	Time between the end of a brake engage sequence and the start of a brake release sequence		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

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

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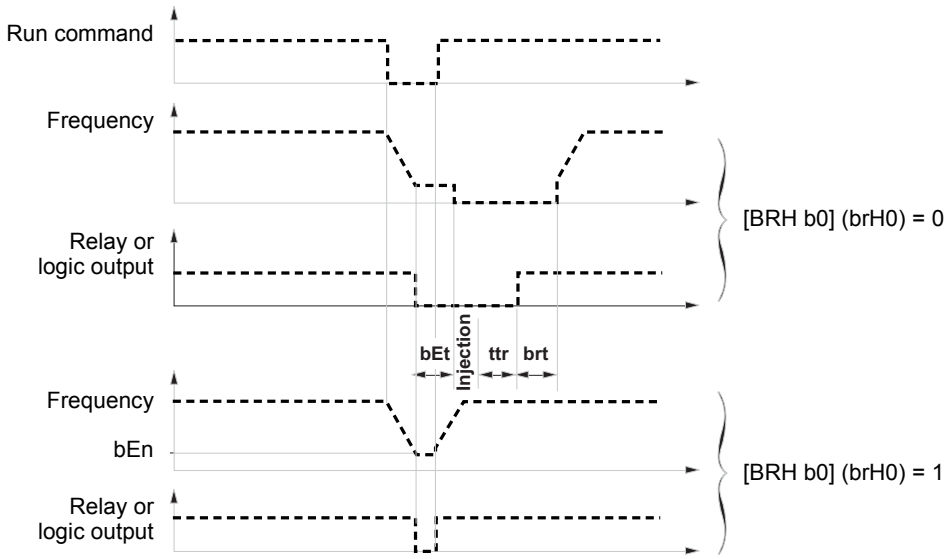
Brake control logic expert parameters

Code	Name/Description	Factory setting
brH0	[BRH b0]	0
0	Selection of the brake restart sequence if a run command is repeated while the brake is engaging. [0] (0): The engage/release sequence is executed in full.	
1	[1] (1): The brake is released immediately. Use in open-loop and closed-loop mode. • A run command may be requested during the brake engagement phase. Whether or not the brake release sequence is executed depends on the value selected for [BRH b0] (brH0).  Note: If a run command is requested during the "ttr" phase, the complete brake control sequence is initialized.	
brH1	[BRH b1]	0
0	Deactivation of the brake contact in steady state fault. [0] (0): The brake contact in steady state fault is active (fault if the contact is open during operation). The brF brake contact fault is monitored in all operating phases.	
1	[1] (1): The brake contact in steady state fault is inactive. The brF brake contact fault is only monitored during the brake release and engage phases.	

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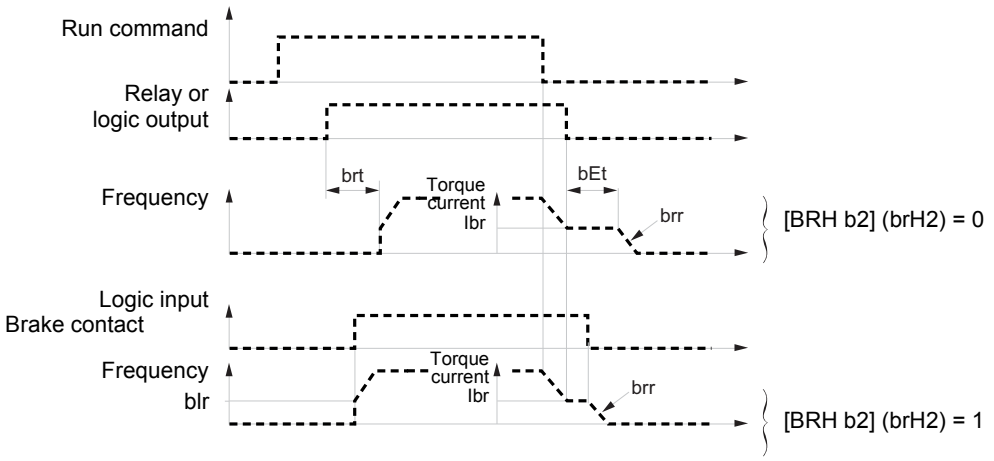
Code	Name/Description	Adjustment range	Factory setting
brH2	[BRH b2]		0
	Taking the brake contact into account for the brake control sequence.		
0	[0] (0): The brake contact is not taken into account.		
1	[1] (1): The brake contact is taken into account.		
	Use in open-loop and closed-loop mode. • If a logic input is assigned to the brake contact. [BRH b2] (brH2) = 0: During the brake release sequence, the reference is enabled at the end of the time [Brake Release time] (brt). During the brake engage sequence, the current changes to 0 according to the ramp [Current ramp time] (brr) at the end of the [Brake engage time] (bEt). [BRH b2] (brH2) = 1: When the brake is released, the reference is enabled when the logic input changes to 1. When the brake is engaged, the current changes to 0 according to the ramp [Current ramp time] (brr) when the logic input changes to 0.		
			
brH3	[BRH b3]		0
	In closed-loop mode only. Management of the absence of brake contact response, if it is assigned.		
0	☐ [0] (0): During the brake engage sequence, the brake contact must be open before the end of [Brake engage time] (bEt), otherwise the drive locks in a brF brake contact fault.		
1	☐ [1] (1): During the brake engage sequence, the brake contact must be open before the end of [Brake engage time] (bEt), otherwise a bCA brake contact alarm is triggered and zero speed is maintained.		
brH4	[BRH_b4]		0
	In closed-loop mode only. Activation of the speed loop at zero if a movement for which no command has been given occurs (measurement of a speed greater than a fixed min. threshold).		
0	[0] (0): No action in the event of a movement for which no command has been given.		
1	[1] (1): If a movement occurs for which no command has been given, the drive switches to zero speed regulation, with no brake release command, and a bSA alarm is triggered.		
brr	[Current ramp time]	0 to 5.00 s	0 s
	Torque current ramp time (increase and decrease) for a current variation equal to [Brake release I FW] (Ibr).		

Parameter that can be modified during operation or when stopped.

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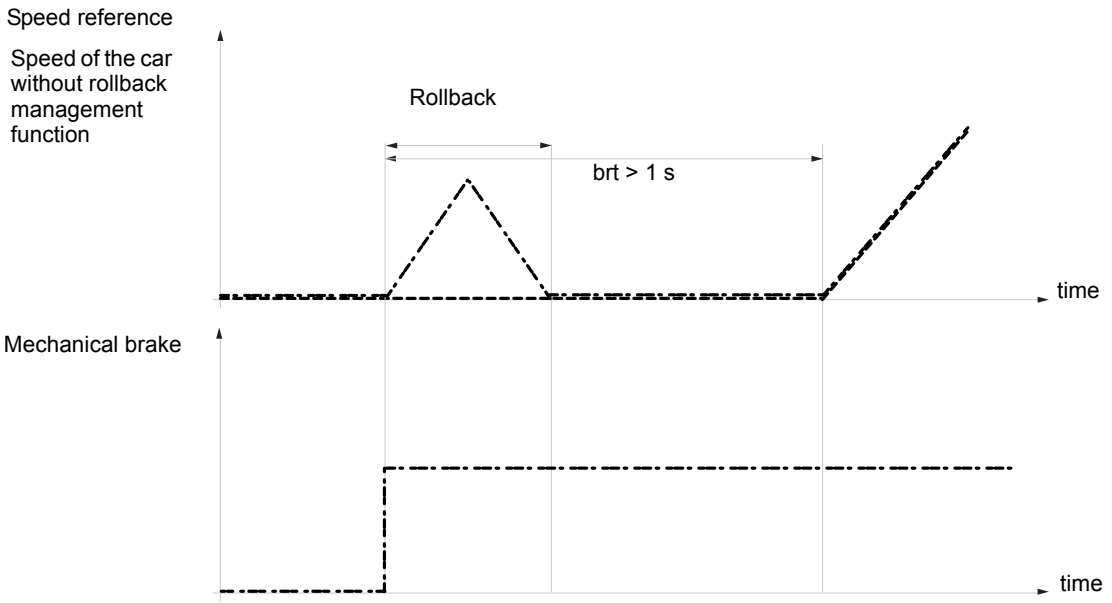
Rollback management

In some lift applications (gearless with high inertia), a jerk can be felt in the car at the very beginning of the movement when the break is opened. At this time, because no external weight sensor is used, the torque applied by the motor is not yet at the level required to hold the car. A little movement (up or down, depending on the overall balance occurs). This movement is know as "rollback".

The rollback management function is only available in closed loop ([Motor control type] (Ctt), page 74 = [Sync.CL] (FSY) or [FVC] (FUC)). It increases drive control stiffness during the mechanical brake release to cancel any movement during the brake opening time ([Brake Release time] (brt), page 174).



The [Rollback MGT] (rbM) function can be used to avoid the rollback effect once the following settings are done:
- The speed loop parameters must be set and must not be modified after the [Rollback MGT] (rbM) function activation.
- An adequate [Encoder filter value] (FFr), page 120 should be set and must not be modified after the [Rollback MGT] (rbM) function activation.
- An appropriate [Brake release I FW] (Ibr), page 173 can be set to apply a current level that corresponds to the more frequent load case (about 25 % of the full load).
- The opening brake sequence must be set with adequate [Brake Release time] (brt) (typically brt > 1 second).

Adjustment recommandations:
- Good speed loop setting is essential for satisfactory rollback compensation results (good tracking of the ramp and well damped response) The speed loop setting optimization initially has to be done with the rollback function disable ([Rollback MGT] (rbM) = [No] (no)).
- It is recommended to increase gradually [Rbk Compensation] (rbC) starting from 0 until rollback motion is reduced to the desired level.
- If vibrations occur while increasing [Rbk Compensation] (rbC) reduce the setting until the vibrations stop. It is possible to increase the damping by increasing the [Rbk Damping] (rbd) setting. This may allow an increase in [Rbk Compensation] (rbC).
- Note: Elevated [Rbk Damping] (rbd) setting may amplify the encoder quantization noise, so it is recommended to keep this setting as low as possible.
- Depending on the elevator system resonant frequencies and encoder feedback resolution, there will be a practical limit on the performance of the rollback compensation function. Low resolution encoders may not allow desired rollback management.

NOTE: Sufficient time must be allowed after the brake opening and prior the launch of the speed ramp for the rollback control stabilizes the elevator position.

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Code	Nom / Description	Adjustment range	Factory setting
rbM-	**[ROLLBACK MGT]** Menu can be accessed: - only for ATV71●●●M3X drives up to 45 kW and for ATV71●●●N4 drives up to 75 kW, - if [Motor control type] (Ctt), page 74 = [Sync.CL] (FSY) or [FVC] (FUC), - if [Brake assignment] (bLC), page 173 is assigned.		
rbM	[Rollback MGT]		[No] (nO)
	Activation of the Rollback management function nO [No] (nO) YES [Yes] (YES)		
rbC	[Rbk Compensation]	0 to 1000 %	100 %
	Parameter can be accessed if reference channel [Rollback MGT] (rbM) = [Yes] (YES) Proportionnal gain of the position controller		
rbd	[Rbk Damping]	0 to 1000 %	100 %
	Parameter can only be accessed in [ACCESS LEVEL] = [Expert] mode and if reference channel [Rollback MGT] (rbM) = [Yes] (YES). Differential gain of the position controller.		

Parameter that can be modified during operation or when stopped.

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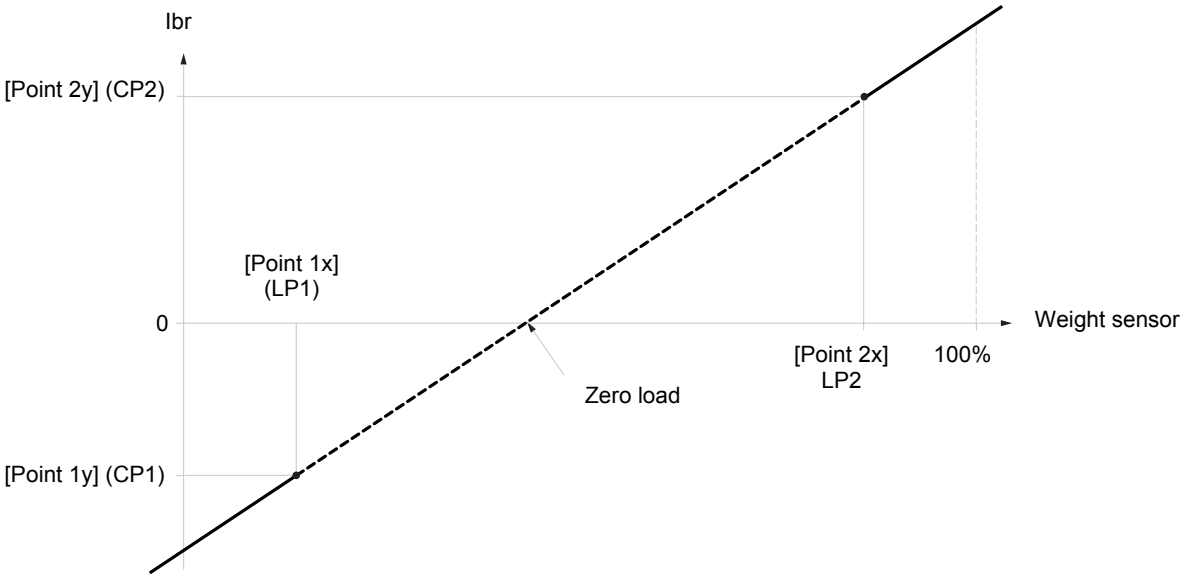
Load measurement

This function uses the information supplied by a weight sensor to adapt the current [Brake release I FW] (Ibr) of the [BRAKE LOGIC CONTROL] (bLC-) function. The signal from the weight sensor can be assigned to an analog input (usually a 4 - 20 mA signal), to the pulse-in input or to the encoder input, according to the type of weight sensor.

Examples:
- Measurement of the total weight of a hoisting winch and its load
- Measurement of the total weight of an elevator winch, the cabin and counterweight

The current [Brake release I FW] (Ibr) is adapted in accordance with the curve below.



This curve can represent a weight sensor on an elevator winch, where zero load on the motor occurs when the load in the cabin is not zero.

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Code	Name/Description	Adjustment range	Factory setting
ELM-	**[EXTERNAL WEIGHT MEAS.]**		
PES	[Weight sensor ass.]		[No] (nO)
	Function can be accessed if brake logic control is assigned (see page 173). If [Weight sensor ass.] (PES) is not [No] (nO), [Movement type] (bSt), page 173 is forced to [Hoisting] (UEr). [Weight sensor ass.] (PES) is not authorized in [U/F 2pts] (UF2) or [U/F 5pts] (UF5).		
nO	[No] (nO): Function inactive		
AI1	[AI1] (AI1): Analog input		
AI2	[AI2] (AI2): Analog input		
AI3	[AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted		
AI4	[AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted		
PI	[RP] (PI): Frequency input, if VW3A3202 extension card has been inserted		
PG	[Encoder] (PG): Encoder input, if encoder card has been inserted		
AIU1	[Network AI] (AIU1): Virtual input via communication bus, to be configured via [AI net. channel] (AIC1), page 114.		
	⚠ DANGER **UNINTENDED EQUIPMENT OPERATION** If the equipment switches to forced local mode (see page 255), the virtual input remains fixed at the last value transmitted. Do not use the virtual input and forced local mode in the same configuration. **Failure to follow these instructions will result in death or serious injury.**		
LP1	[Point 1 X]	0 to 99.99%	0
	0 to 99.99% of signal on assigned input. [Point 1x] (LP1) must be less than [Point 2x] (LP2). The parameter can be accessed if [Weight sensor ass.] (PES) is assigned.		
CP1	[Point 1Y]	-1.36 to +1.36 In (1)	- In
	Current corresponding to load [Point 1 X] (LP1), in A. The parameter can be accessed if [Weight sensor ass.] (PES) is assigned.		
LP2	[Point 2X]	0.01 to 100%	50%
	0.01 to 100% of signal on assigned input. [Point 2x] (LP2) must be greater than [Point 1x] (LP1). The parameter can be accessed if [Weight sensor ass.] (PES) is assigned.		
CP2	[Point 2Y]	-1.36 to +1.36 In (1)	0
	Current corresponding to load [Point 2x] (LP2), in A. The parameter can be accessed if [Weight sensor ass.] (PES) is assigned.		
IbrA ( )	[Ibr 4-20 mA loss]	0 to 1.36 In (1)	0
	Brake release current in the event of the loss of the weight sensor information. This parameter can be accessed if the weight sensor is assigned to an analog current input and the 4-20 mA loss fault is deactivated. Recommended settings: - 0 for elevators - Rated motor current for a hoisting application		

1. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

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

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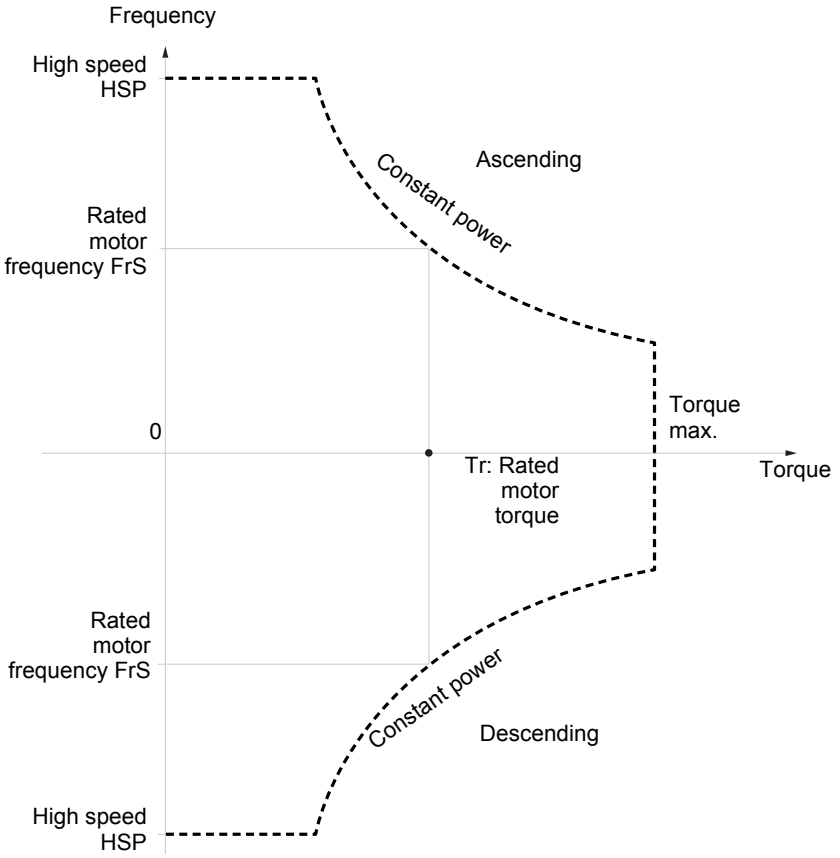
High-speed hoisting

This function can be used to optimize the cycle times for hoisting movements for zero or lightweight loads. It authorizes operation at "constant power" in order to reach a speed greater than the rated speed without exceeding the rated motor current.
The speed remains limited by the [High speed] (HSP) parameter, page 60.

The function acts on the speed reference pedestal and not on the reference itself.

Principle:



CAUTION

LOSS OF MOTOR FUNCTION

For permanent magnet synchronous motors, the maximum permissible speed must not be exceeded, otherwise demagnetization may occur. The maximum speed permitted by the motor, drive chain or application must not be exceeded at any time.

Failure to follow these instructions can result in equipment damage.

There are 2 possible operating modes:

- "Speed reference" mode: The maximum permissible speed is calculated by the drive during a speed step that is set so that the drive can measure the load.
- "Current limitation" mode: The maximum permissible speed is the speed that supports current limitation in motor mode, in the "Ascending" direction only. For the "Descending" direction, operation is always in "Speed reference" mode.

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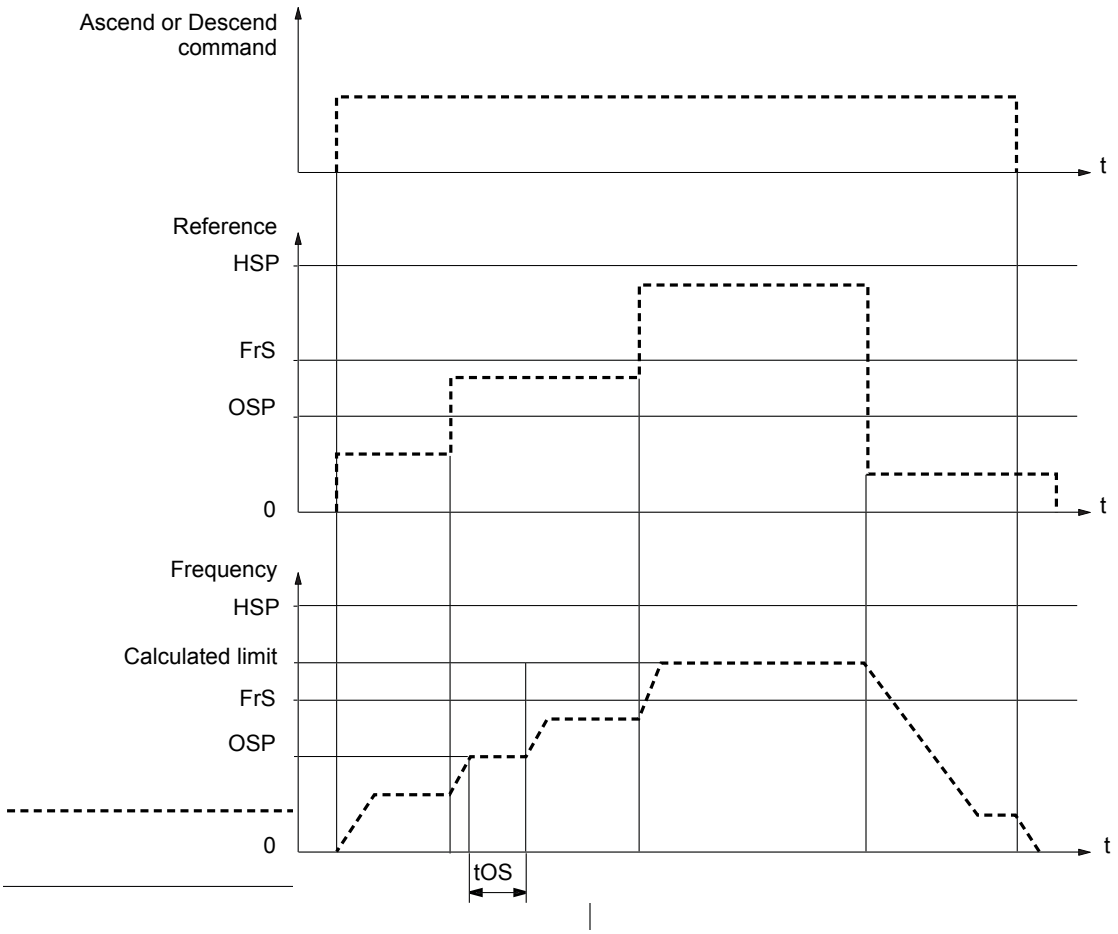
Speed reference mode



OSP: Adjustable speed step for load measurement
tOS: Load measuring time

Two parameters are used to reduce the speed calculated by the drive, for ascending and descending.

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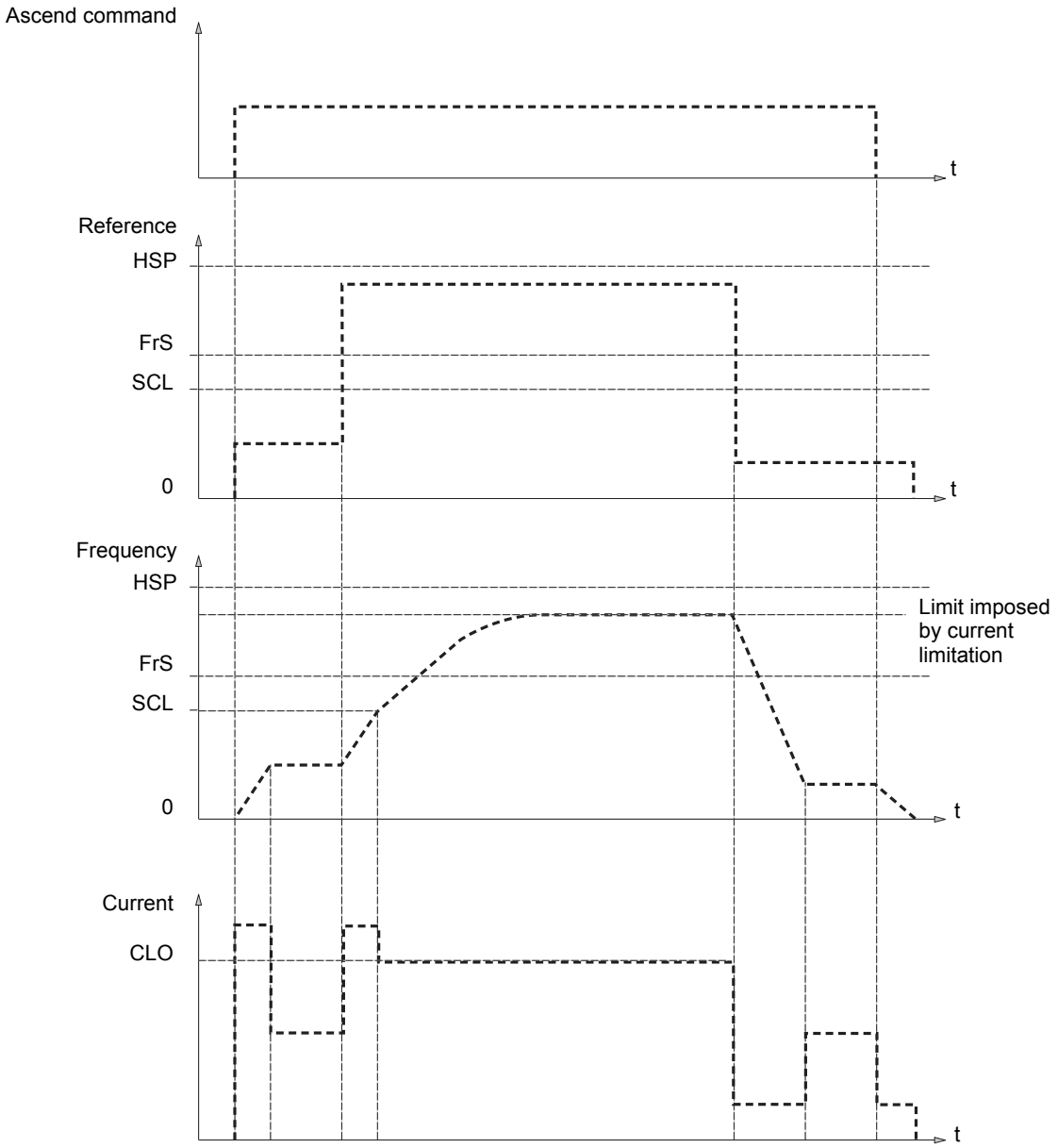
Current limiting mode



SCL: Adjustable speed threshold, above which current limitation is active
CLO: Current limitation for high-speed function

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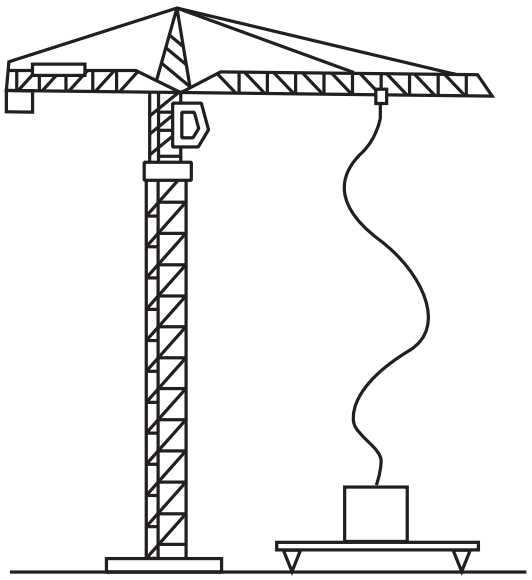
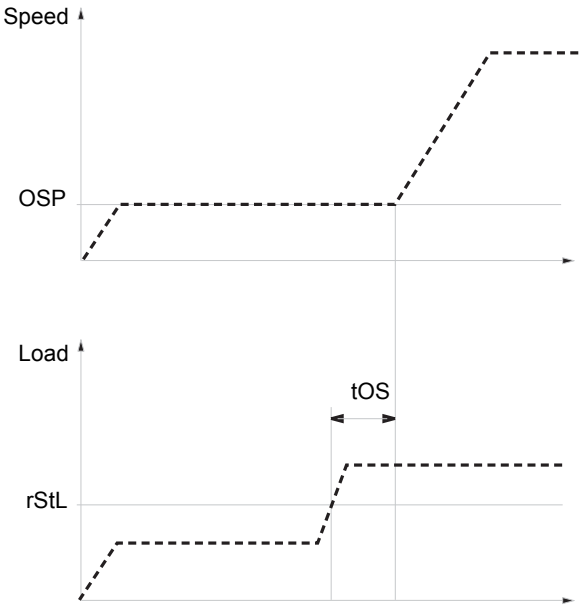
Rope slack

The "rope slack" function can be used to prevent starting up at high speed when a load has been set down ready for lifting but the rope is still slack (as illustrated below).





NOTE: Operation will only be optimized in speed reference mode: [High speed hoisting] (HSO) = [Speed ref] (SSO).

The speed step (OSP parameters) described on page 183 is used to measure the load. The effective measurement cycle will not be triggered until the load reaches the adjustable threshold rStL, which corresponds to the weight of the hook.

A logic output or a relay can be assigned to the indication of the "rope slack" state in the [1.5 INPUTS / OUTPUTS CFG] (I-O-) menu.

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Code	Name/Description	Adjustment range	Factory setting
HSH-	**[HIGH SPEED HOISTING]** **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.		
HSO	[High speed hoisting] nO [No] (nO): Function inactive SSO [Speed ref] (SSO): "Speed reference" mode CSO [I Limit] (CSO): "Current limitation" mode		[No] (nO)
COF ( )	[Motor speed coeff.] Speed reduction coefficient calculated by the drive for Ascending direction. The parameter can be accessed if [High speed hoisting] (HSO) = [Speed ref] (SSO).	0 to 100%	100%
COr ( )	[Gen. speed coeff] Speed reduction coefficient calculated by the drive for Descending direction. The parameter can be accessed if [High speed hoisting] (HSO) is not [No] (nO).	0 to 100%	50%
tOS ( )	[Load measuring tm.] Duration of speed step for measurement. The parameter can be accessed if [High speed hoisting] (HSO) is not [No] (nO).	0.1 s to 65 s	0.5 s
OSP ( )	[Measurement spd] Speed stabilized for measurement. The parameter can be accessed if [High speed hoisting] (HSO) is not [No] (nO).	0 to FrS or FrSS (1)	40 Hz
CLO ( )	[High speed I Limit] Current limitation at high speed. The parameter can be accessed if [High speed hoisting] (HSO) = [I Limit] (CSO). The adjustment range is limited to 1.36 In if [Switching freq.](SFr), page 66 is less than 2 kHz. **NOTE:** If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss] (OPF) fault mode if this has been enabled (see page 235).	0 to 1.65 In (2)	In
SCL ( )	[I Limit. frequency] Frequency threshold, above which the high-speed limitation current is active. The parameter can be accessed if [High speed hoisting] (HSO) = [I Limit] (CSO)	0 to 500 or 1600 Hz according to rating	40 Hz
rSd	[Rope slack config.] Rope slack function. The parameter can be accessed if [High speed hoisting] (HSO) is not [No] (nO). nO [No] (nO): Function inactive drl [Drive estim.] (drl): Measurement of the load by estimating the torque generated by the drive. PES [Ext. sensor] (PES): Measurement of the load using a weight sensor, can only be assigned if [Weight sensor ass.] (PES), page 181 is not [No] (nO). **NOTE:** Operation will only be optimized if [High speed hoisting] (HSO) = [Speed ref] (SSO).		[No] (nO)
rSEL	[Rope slack trq level] Adjustment threshold corresponding to a load weighing slightly more than the hook when off-load, as a % of the rated load. The parameter can be accessed if [Rope slack config.] (rSd) has been assigned.	0 to 100%	0%

1. [Rated motor freq.] (FrS), page 79 for an asynchronous motor or [Nominal freq sync.] (FrSS), page 84 for a synchronous motor.
2. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

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

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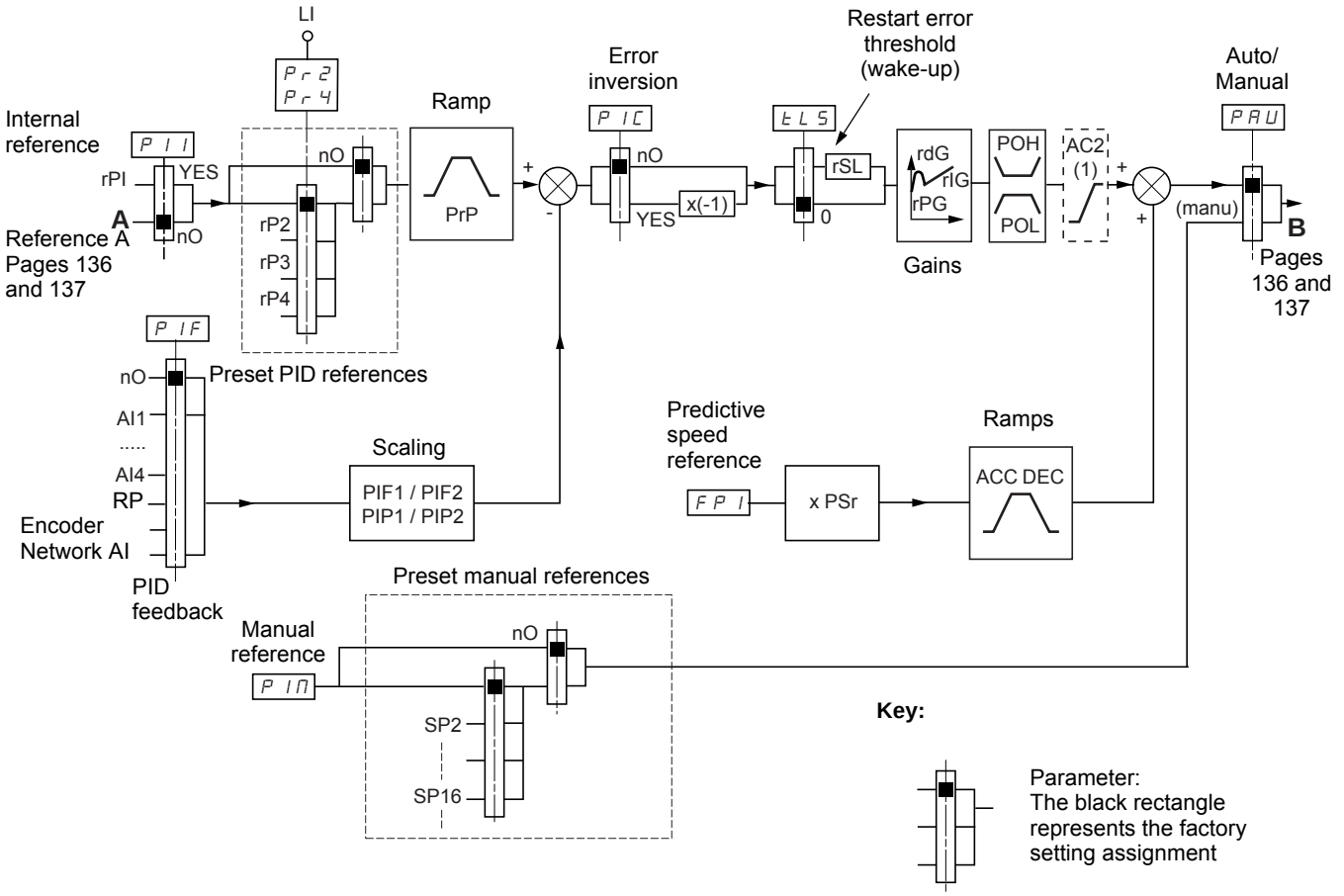
PID regulator

Block diagram

The function is activated by assigning an analog input to the PID feedback (measurement).



1. Ramp AC2 is only active when the PID function starts up and during PID "wake-ups".

PID feedback:
The PID feedback must be assigned to one of the analog inputs AI1 to AI4, to the frequency input or the encoder, according to whether any extension cards have been inserted.

PID reference:
The PID reference must be assigned to the following parameters:
- Preset references via logic inputs (rP2, rP3, rP4)
- In accordance with the configuration of [Act. internal PID ref.] (PII), pages 191:
  - Internal reference (rPI) or
  - Reference A (Fr1 or Fr1b, see page 136)

Combination table for preset PID references

LI (Pr4)	LI (Pr2)	Pr2 = nO	Reference
			rPI or A
0	0		rPI or A
0	1		rP2
1	0		rP3
1	1		rP4

A predictive speed reference can be used to initialize the speed on restarting the process.

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Scaling of feedback and references:

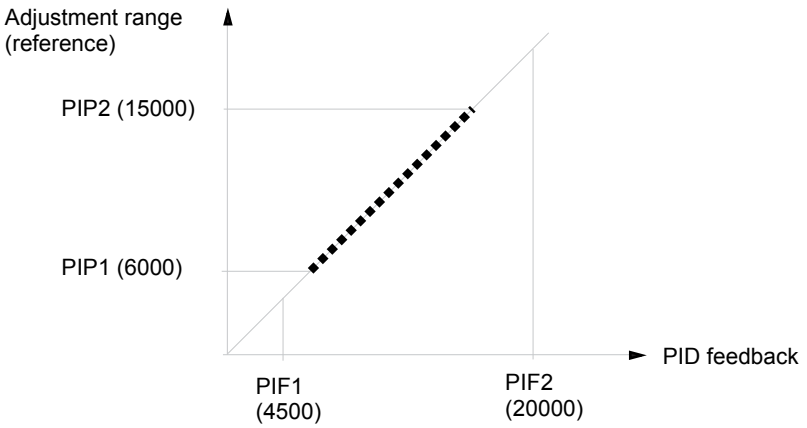
- PIF1, PIF2 parameters
  Can be used to scale the PID feedback (sensor range).
  This scale MUST be maintained for all other parameters.

- PIP1, PIP2 parameters
  Can be used to scale the adjustment range, such as, the reference. The adjustment range MUST lie within the sensor range.

  The maximum value of the scaling parameters is 32767. To facilitate installation, we recommend using values as close as possible to this maximum level, while retaining powers of 10 in relation to the actual values.

  Example (see graph below): Adjustment of the volume in a tank, between 6 m^3 and 15 m^3.
  - Sensor used 4-20 mA, 4.5 m^3 for 4 mA, 20 m^3 for 20 mA, with the result that PIF1 = 4500 and PIF2 = 20000.
  - Adjustment range 6 to 15 m^3, with the result that PIP1 = 6000 (min. reference) and PIP2 = 15000 (max. reference).
  - Example references:
    - rP1 (internal reference) = 9500
    - rp2 (preset reference) = 6500
    - rP3 (preset reference) = 8000
    - rP4 (preset reference) = 11200

    The [DISPLAY CONFIG.] menu can be used to customize the name of the unit displayed and its format.



Other parameters:

- rSL parameter:
  Can be used to set the PID error threshold, above which the PID regulator will be reactivated (wake-up) after a stop due to the max. time threshold being exceeded at low speed (tLS).

- Reversal of the direction of correction (PIC): If PIC = nO, the speed of the motor will increase when the error is positive, for example: pressure control with a compressor. If PIC = YES, the speed of the motor will decrease when the error is positive, for example: temperature control using a cooling fan.

- The integral gain may be short-circuited by a logic input.

- An alarm on the PID feedback may be configured and indicated by a logic output.

- An alarm on the PID error may be configured and indicated by a logic output.

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"Manual - Automatic" operation with PID

This function combines the PID regulator, the preset speeds and a manual reference. Depending on the state of the logic input, the speed reference is given by the preset speeds or by a manual reference input via the PID function.

Manual reference (PIM)
- Analog inputs AI1 to AI4
- Frequency input
- Encoder

Predictive speed reference (FPI)

- [AI1] (AI1): Analog input
- [AI2] (AI2): Analog input
- [AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted
- [AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted
- [RP] (PI): Frequency input, if VW3A3202 extension card has been inserted
- [Encoder] (PG): Encoder input, if encoder card has been inserted
- [HMI] (LCC): Graphic display terminal
- [Modbus] (Mdb): Integrated Modbus
- [CANopen] (CAn): Integrated CANopen
- [Com. card] (nEt): Communication card (if inserted)
- [C.Insid. card] (APP): Controller Inside card (if inserted)

Setting up the PID regulator

1. Configuration in PID mode
   See the diagram on page 187.
2. Perform a test in factory settings mode (in most cases, this will be sufficient).
   To optimize the drive, adjust rPG or rIG gradually and independently and observe the effect on the PID feedback in relation to the reference.
3. If the factory settings are unstable or the reference is incorrect
   - Perform a test with a speed reference in Manual mode (without PID regulator) and with the drive on load for the speed range of the system:
     — In steady state, the speed must be stable and comply with the reference and the PID feedback signal must be stable.
     — In transient state, the speed must follow the ramp and stabilize quickly, and the PID feedback must follow the speed.
     If this is not the case, see the settings for the drive and/or sensor signal and wiring.
   - Switch to PID mode.
   - Set brA to no (no auto-adaptation of the ramp).
   - Set the PID ramp (PrP) to the minimum permitted by the mechanism without triggering an ObF fault.
   - Set the integral gain (rIG) to minimum.
   - Leave the derivative gain (rdG) at 0.
   - Observe the PID feedback and the reference.
   - Switch the drive ON/OFF a number of times or vary the load or reference rapidly a number of times.
   - Set the proportional gain (rPG) in order to ascertain the best compromise between response time and stability in transient phases (slight overshoot and 1 to 2 oscillations before stabilizing).
   - If the reference varies from the preset value in steady state, gradually increase the integral gain (rIG), reduce the proportional gain (rPG) in the event of instability (pump applications), find a compromise between response time and static precision (see diagram).
   - Lastly, the derivative gain may permit the overshoot to be reduced and the response time to be improved, although this will make it more difficult to obtain a compromise in terms of stability, as it depends on 3 gains.
   - Perform in-production tests over the whole reference range.

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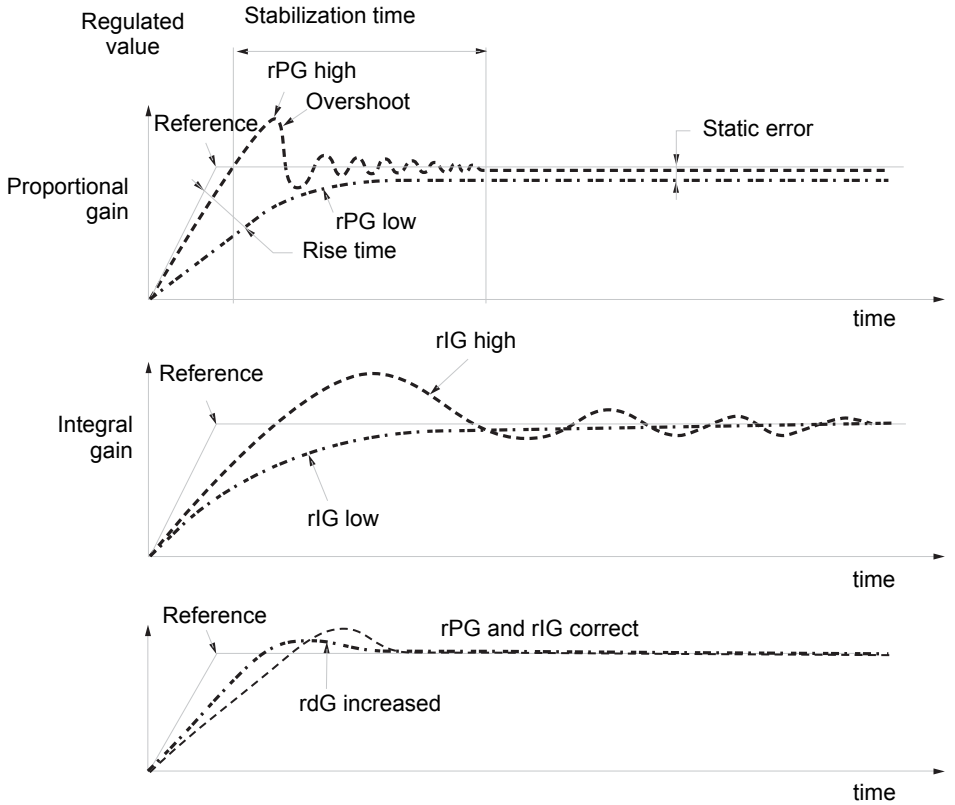

The oscillation frequency depends on the system kinematics.

Parameter	Rise time	Overshoot	Stabilization time	Static error
rPG ↗	↘↘	↗	=	↘
rIG ↗	↘	↗↗	↗	↘↘
rdG ↗	=	↘	↘	=

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Code	Name/Description	Adjustment range	Factory setting
PId-	**[PID REGULATOR]** **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.		
PIF	[PID feedback ass.]		[No] (nO)
nO	[No] (nO): Not assigned (function inactive) In this case, none of the function parameters can be accessed.		
AI1	[AI1] (AI1): Analog input		
AI2	[AI2] (AI2): Analog input		
AI3	[AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted		
AI4	[AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted		
PI	[RP] (PI): Frequency input, if VW3A3202 extension card has been inserted		
PG	[Encoder] (PG): Encoder input, if encoder card has been inserted		
AIU1	[Network AI] (AIU1): Virtual input via communication bus		
	NOTE: If the equipment switches to forced local mode (see page 255), the virtual input remains fixed at the last value transmitted.		
AIC1	[AI net. channel]		[No] (nO)
	The parameter can be accessed if [PID feedback ass.] (PIF) = [Network AI] (AIU1). This parameter can also be accessed in the [1.5 INPUTS / OUTPUTS CFG] (I-O-) menu.		
nO	[No] (nO): Not assigned		
Mdb	[Modbus] (Mdb): Integrated Modbus		
CAn	[CANopen] (CAn): Integrated CANopen		
nEt	[Com. card] (nEt): Communication card (if inserted)		
APP	[C.Insid. card] (APP): Controller Inside card (if inserted)		
PIF1 ( )	[Min PID feedback] (1) Value for minimum feedback. Adjustment range from 0 to [Max PID feedback] (PIF2) (2).		100
PIF2 ( )	[Max PID feedback] (1) Value for maximum feedback Adjustment range from [Min PID feedback] (PIF1) to 32767 (2).		1000
PIP1 ( )	[Min PID reference] (1) Minimum process value. Adjustment range from [Min PID feedback] (PIF1) to [Max PID reference] (PIP2) (2).		150
PIP2	[Max PID reference] (1) Maximum process value Adjustment range from [Min PID reference] (PIP1) to [Max PID feedback] (PIF2) (2).		900
PII	[Act. internal PID ref.]		[No] (nO)
	Internal PID regulator reference		
nO	[No] (nO): The PID regulator reference is given by Fr1 or Fr1b with summing/subtraction/multiplication functions (see the diagram on page 135).		
YES	[Yes] (YES): The PID regulator reference is internal via parameter rPI.		
rPI ( )	[Internal PID ref.] Internal PID regulator reference This parameter can also be accessed in the [1.2 MONITORING] (SUP-) menu. Adjustment range from [Min PID reference] (PIP1) to [Max PID reference] (PIP2) (2).		150
rPG ( )	[PID prop. gain] Proportional gain	0.01 to 100	1

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit. For Example: 15.65 for 15650.

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

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Code	Name/Description	Adjustment range	Factory setting
	[PID REGULATOR] (continued)		
rIG	[PID integral gain] Integral gain	0.01 to 100	1
rdG	[PID derivative gain] Derivative gain	0.00 to 100	0
PrP	[PID ramp] (1) PID acceleration/deceleration ramp, defined to go from [Min PID reference] (PIP1) to [Max PID reference] (PIP2) and vice versa.	0 to 99.9 s	0 s
PIC	[PID correct. reverse]		[No] (nO)
nO YES	[No] (nO) [Yes] (YES) Reversal of the direction of correction (PIC): If PIC = nO, the speed of the motor will increase when the error is positive. Example: pressure control with a compressor. If PIC = YES, the speed of the motor will decrease when the error is positive. Example: temperature control using a cooling fan.		
POL	[Min PID output] (1) Minimum value of regulator output in Hz	- 500 to 500 or -1600 to 1600 according to rating	0 Hz
POH	[Max PID output] (1) Maximum value of regulator output in Hz	0 to 500 or 1600 according to rating	60 Hz
PAL	[Min fbk alarm] (1) Minimum monitoring threshold for regulator feedback Adjustment range from [Min PID feedback] (PIF1) to [Max PID feedback] (PIF2) (2).		100
PAH	[Max fbk alarm] (1) Maximum monitoring threshold for regulator feedback Adjustment range from [Min PID feedback] (PIF1) to [Max PID feedback] (PIF2) (2).		1000
PEr	[PID error Alarm] (1) Regulator error monitoring threshold	0 to 65535 (2)	100
PIS	[PID integral reset]		[No] (nO)
nO LI1 - - -	[No] (nO): Function inactive [LI1] (LI1) : : [...] (...): See the assignment conditions on page 141. If the assigned input or bit is at 0, the function is inactive (the PID integral is enabled). If the assigned input or bit is at 1, the function is active (the PID integral is disabled).		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit. For Example: 15.65 for 15650.

Parameter that can be modified during operation or when stopped.

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Code	Name/Description	Adjustment range	Factory setting
	[PID REGULATOR] (continued)		
FPI	[Speed ref. assign.]		[No] (nO)
	PID regulator predictive speed input		
nO	[No] (nO): Not assigned (function inactive)		
AI1	[AI1] (AI1): Analog input		
AI2	[AI2] (AI2): Analog input		
AI3	[AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted		
AI4	[AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted		
LCC	[HMI] (LCC): Graphic display terminal		
Mdb	[Modbus] (Mdb): Integrated Modbus		
CAn	[CANopen] (CAn): Integrated CANopen		
nEt	[Com. card] (nEt): Communication card (if inserted)		
APP	[C.Insid. card] (APP): Controller Inside card (if inserted)		
PI	[RP] (PI): Frequency input, if VW3A3202 extension card has been inserted		
PG	[Encoder] (PG): Encoder input, if encoder card has been inserted		
PSr	[Speed input %] (1)	1 to 100%	100%
	Multiplying coefficient for predictive speed input. The parameter cannot be accessed if [Speed ref. assign.] (FPI) = [No] (nO).		
PAU	[Auto/Manual assign.]		[No] (nO)
nO	[No] (nO): The PID is always active.		
LI1	[LI1] (LI1)		
-	:		
-	:		
-	[...] (...): See the assignment conditions on page 141.		
	If the assigned input or bit is at 0, the PID is active. If the assigned input or bit is at 1, manual operation is active.		
AC2	[Acceleration 2] (1)	0.01 to 6000 s (3)	5.0 s
	Time to accelerate from 0 to the [Rated motor freq.] (FrS). Make sure that this value is compatible with the inertia being driven. Ramp AC2 is only active when the PID function starts up and during PID "wake-ups".		
PIM	[Manual reference]		[No] (nO)
	Manual speed input. The parameter can be accessed if [Auto/Manual assign.] (PAU) is not [No] (nO).		
nO	[No] (nO): Not assigned (function inactive)		
AI1	[AI1] (AI1): Analog input		
AI2	[AI2] (AI2): Analog input		
AI3	[AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted		
AI4	[AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted		
PI	[RP] (PI): Frequency input, if VW3A3202 extension card has been inserted		
PG	[Encoder] (PG): Encoder input, if encoder card has been inserted		
	The preset speeds are active on the manual reference if they have been configured.		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit. For Example: 15.65 for 15650.
3. Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to [Ramp increment] (Inr), page 152.

Parameter that can be modified during operation or when stopped.

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Code	Name/Description	Adjustment range	Factory setting
	[PID REGULATOR] (continued)		
tLS	**[Low speed time out]** (1)	0 to 999.9 s	0 s
	Maximum operating time at [Low speed] (LSP) (see page 48) Following operation at LSP for a defined period, a motor stop is requested automatically. The motor restarts if the reference is greater than LSP and if a run command is still present. Caution: Value 0 corresponds to an unlimited period. **NOTE:** If [Low speed time out] (tLS) is not 0, [Type of stop] (Stt), page 155 is forced to [Ramp stop] (rMP) (only if a ramp stop can be configured).		
rSL	[PID wake up thresh.]	0.0 to 100.0	0
	If the PID and Low speed operating time tLS functions are configured at the same time, the PID regulator may attempt to set a speed lower than LSP. This results in unsatisfactory operation, which consists of starting, operating at low speed then stopping, and so on… Parameter rSL (restart error threshold) can be used to set a minimum PID error threshold for restarting after a stop at prolonged LSP. The function is inactive if tLS = 0 or if rSL = 0.		

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Verify that unintended restarts will not present any danger.

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

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

Parameter that can be modified during operation or when stopped.

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Code	Name/Description	Factory setting
Pr I-	**[PID PRESET REFERENCES]** Function can be accessed if [PID feedback ass.] (PIF) is assigned.	
Pr2	[2 preset PID ref.]	[No] (nO)
nO LI1 - - -	[No] (nO): Function inactive [LI1] (LI1) : : [...] (...): See the assignment conditions on page 141. If the assigned input or bit is at 0, the function is inactive. If the assigned input or bit is at 1, the function is active.	
Pr4	[4 preset PID ref.]	[No] (nO)
nO LI1 - - -	Make sure that [2 preset PID ref.] (Pr2) has been assigned before assigning this function. [No] (nO): Function inactive [LI1] (LI1) : : [...] (...): See the assignment conditions on page 141. If the assigned input or bit is at 0, the function is inactive. If the assigned input or bit is at 1, the function is active.	
rP2	[2 preset PID ref.] (1)	300
	The parameter can be accessed if [Preset ref. PID 2] (Pr2) is assigned. Adjustment range from [Min PID reference] (PIP1) to [Max PID reference] (PIP2) (2).	
rP3	[3 preset PID ref.] (1)	600
	The parameter can be accessed if [Preset ref. PID 4] (Pr4) is assigned. Adjustment range from [Min PID reference] (PIP1) to [Max PID reference] (PIP2) (2).	
rP4	[4 preset PID ref.] (1)	900
	The parameter can be accessed if [Preset ref. PID 4] (Pr4) is assigned. Adjustment range from [Min PID reference] (PIP1) to [Max PID reference] (PIP2) (2).	

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit. For Example: 15.65 for 15650.

Parameter that can be modified during operation or when stopped.

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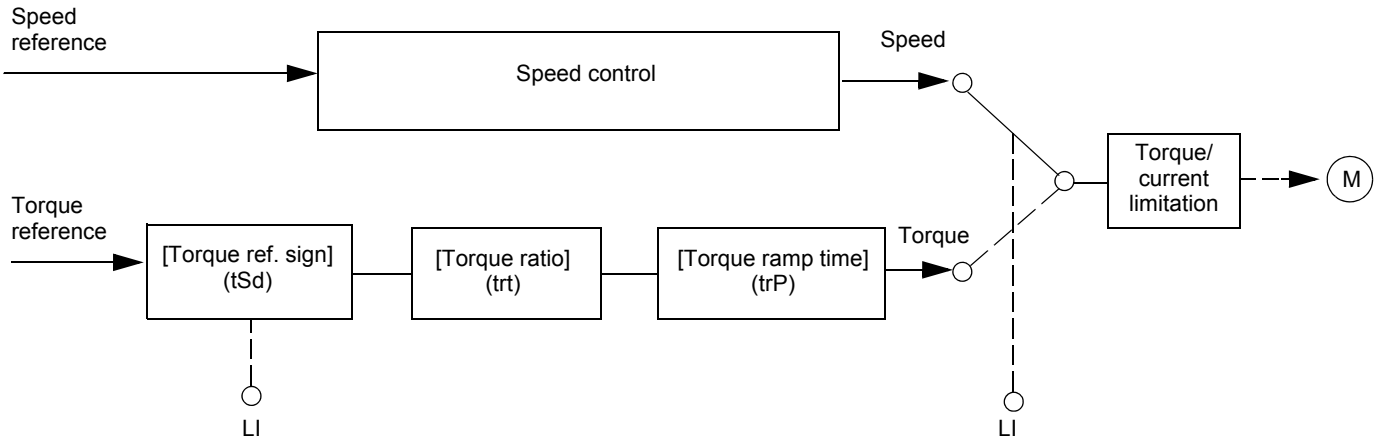
Torque regulation



The function can be used to switch between operation in speed regulation mode and operation in torque control mode.
In torque control mode, the speed may vary within a configurable "deadband". When it reaches a lower or upper limit, the drive automatically reverts to speed regulation mode (fallback) and remains at this limit speed. The regulated torque is therefore no longer maintained and two scenarios may occur.

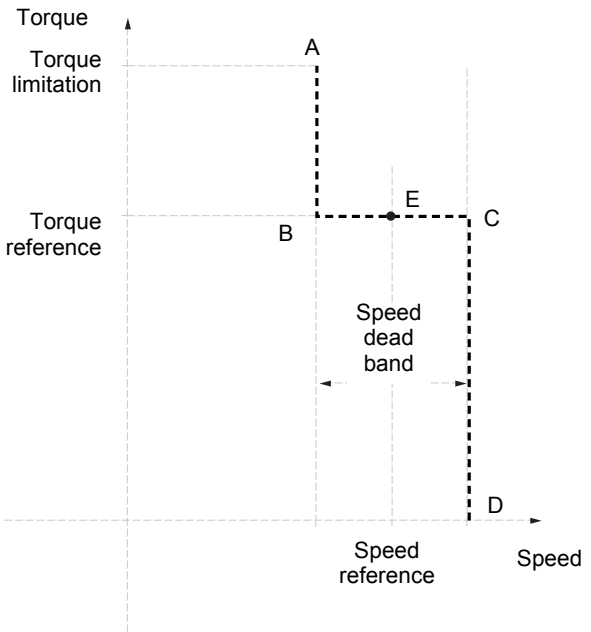
- If the torque returns to the required value, the drive will return to torque control mode.
- If the torque does not return to the required value at the end of a configurable period of time, the drive will switch to fault or alarm mode.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Verify that the changes in the behavior of the motor do not present any danger.

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



- AB and CD: Fallback to speed regulation
- BC: Torque control zone
- E: Ideal operating point

The torque sign and value can be transmitted via a logic output and an analog output.

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Code	Name/Description	Adjustment range	Factory setting
tOr-	**[TORQUE CONTROL]** This function can only be accessed for [Motor control type] (Ctt) = [SVC I] (CUC), [FVC] (FUC) or [Sync.CL] (FSY). ☞ **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.		
tSS	[Trq/spd switching]		[No] (nO)
nO	[No] (nO): Function inactive, thereby preventing access to other parameters.		
YES	[Yes] (YES): Permanent torque control		
LI1	[LI1] (LI1)		
-	:		
-	:		
-	[...] (...): See the assignment conditions on page 141.		
	If the assigned input or bit is at 1: Torque control If the assigned input or bit is at 0: Speed regulation		
tr1	[Torque ref. channel]		[No] (nO)
nO	[No] (nO): Not assigned (zero torque reference).		
AI1	[AI1] (AI1): Analog input		
AI2	[AI2] (AI2): Analog input		
AI3	[AI3] (AI3): Analog input, if VW3A3202 I/O card has been inserted		
AI4	[AI4] (AI4): Analog input, if VW3A3202 I/O card has been inserted		
LCC	[HMI] (LCC): Graphic display terminal		
Mdb	[Modbus] (Mdb): Integrated Modbus		
CAn	[CANopen] (CAn): Integrated CANopen		
nEt	[Com. card] (nEt): Communication card (if inserted)		
APP	[C.Insid. card] (APP): Controller Inside card (if inserted)		
PI	[RP] (PI): Frequency input, if VW3A3202 I/O card has been inserted		
PG	[Encoder] (PG): Encoder input, if encoder card has been inserted		
	100% of the reference corresponds to 300% of the rated torque.		
tSd	[Torque ref. sign]		[No] (nO)
nO	[No] (nO): Function inactive		
LI1	[LI1] (LI1)		
-	:		
-	:		
-	[...] (...): See the assignment conditions on page 141.		
	If the assigned input or bit is at 0, the torque sign is the same as the reference. If the assigned input or bit is at 1, the torque sign is the opposite of the reference.		
trt ()	[Torque ratio]	0 to 1000%	100%
	Coefficient applied to [Torque reference] (tr1).		
trP ()	[Torque ramp time]	0 to 99.99 s	3 s
	Rise and fall time for a variation of 100% of the rated torque.		
tSt	[Torque control stop]		[Speed] (SPd)
SPd	[Speed] (SPd): Speed regulation stop, in accordance with the type of stop configuration (see page 155)		
YES	[Freewheel] (YES): Freewheel stop		
SPn	[Spin] (SPn): Zero torque stop, but maintaining the flux in the motor. This type of operation is only possible if [Motor control type] (Ctt) = [FVC] (FUC) or [Sync.CL] (FSY).		
SPt ()	[Spin time]	0 to 3600 s	1
	The parameter can be accessed if [Torque control stop] (tSt) = [Spin] (SPn) Spin time following stop, in order to remain ready to restart quickly.		

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

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Code	Name/Description	Adjustment range	Factory setting
	[TORQUE CONTROL] (continued)		
dbP	[Positive deadband]	0 to 2 x [Max frequency] (tFr)	10 Hz
	Positive deadband. Value added algebraically to the speed reference. Example for dbP = 10: • If reference = +50 Hz: + 50 + 10 = 60 • If reference = - 50 Hz: - 50 + 10 = - 40		
dbn	[Negative deadband]	0 to 2 x [Max frequency] (tFr)	10 Hz
	Negative deadband. Value subtracted algebraically from the speed reference. Example for dbn = 10: • If reference = +50 Hz: + 50 - 10 = 40 • If reference = - 50 Hz: - 50 - 10 = - 60		
rtO	[Torque ctrl time out]	0 to 999.9 s	60
	Time following automatic exit of torque control mode in the event of a fault or alarm.		
tOb	[Torq. ctrl fault mgt] Response of drive once time [Torque ctrl time out] (rtO) has elapsed.		[Alarm] (ALrM)
ALrN	[Alarm] (ALrM)		
FLt	[Fault] (FLt): Fault with freewheel stop.		

NOTE: If the motor is equipped with an encoder assigned to speed feedback, the torque control function will trigger a [Load slipping] (AnF) fault. One of the following solutions should be applied:
- Set [Load slip detection] (Sdd), page 244 = [No] (nO).
- Set [Positive deadband] (dbP) and [Negative deadband] (dbn) each to a value less than 10% of the rated motor frequency.

Parameter that can be modified during operation or when stopped.

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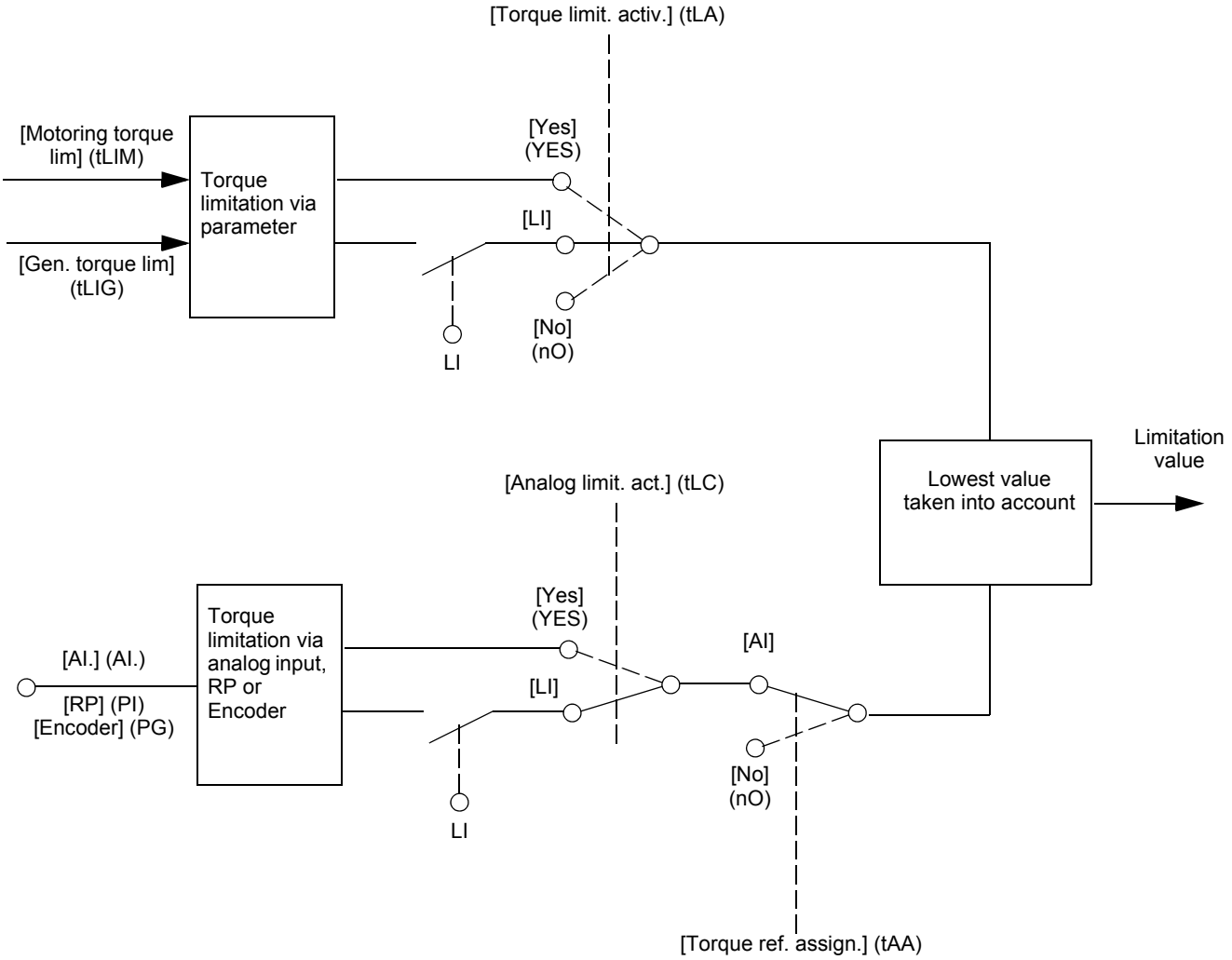
Torque limitation

There are two types of torque limitation:
- With a value that is fixed by a parameter
- With a value that is set by an analog input (AI, pulse or encoder)

If both types are enabled, the lowest value is taken into account. The two types of limitation can be configured or switched remotely using a logic input or via the communication bus.



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Code	Name/Description	Adjustment range	Factory setting
tOL-	**[TORQUE LIMITATION]** This function cannot be accessed in V/F profile mode.		
tLA	[Torque limit. activ.]		[No] (nO)
nO	[No] (nO): Function inactive		
YES	[Yes] (YES): Function always active		
LI1	[LI1] (LI1)		
-	:		
-	:		
-	[...] (...): See the assignment conditions on page 141.		
	If the assigned input or bit is at 0, the function is inactive. If the assigned input or bit is at 1, the function is active.		
InTP	[Torque increment]		[1 %] (1)
	The parameter cannot be accessed if [Torque limit. activ.] (tLA) = [No] (nO) Selection of units for the [Motoring torque lim] (tLIM) and [Gen. torque lim] (tLIG) parameters.		
0.1	[0,1%] (0.1): unit 0.1%.		
1	[1%] (1): unit 1%.		
tLIN ( )	[Motoring torque lim] (1)	0 to 300%	100%
	The parameter cannot be accessed if [Torque limit. activ.] (tLA) = [No] (nO) Torque limitation in motor mode, as a % or in 0.1% increments of the rated torque in accordance with the [Torque increment] (IntP) parameter.		
tLIG ( )	[Gen. torque lim] (1)	0 to 300%	100%
	The parameter cannot be accessed if [Torque limit. activ.] (tLA) = [No] (nO) Torque limitation in generator mode, as a % or in 0.1% increments of the rated torque in accordance with the [Torque increment] (IntP) parameter.		
tAA	[Torque ref. assign.]		[No] (nO)
	If the function is assigned, the limitation varies between 0% and 300% of the rated torque on the basis of the 0% to 100% signal applied to the assigned input. Examples: - 12 mA on a 4-20 mA input results in limitation to 150% of the rated torque. - 2.5 V on a 10 V input results in 75% of the rated torque.		
nO	[No] (nO): Not assigned (function inactive)		
AI1	[AI1] (AI1)		
-	to		
AI4	[AI4] (AI4): Analog input, if VW3A3202 I/O card has been inserted		
PI	[RP] (PI): Frequency input, if VW3A3202 I/O card has been inserted		
PG	[Encoder] (PG): Encoder input, if encoder card has been inserted		
AIU1	[Network AI] (AIU1): Virtual input via communication bus, to be configured via [AI net. channel] (AIC1) page 114.		

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- If the equipment switches to forced local mode (see page 255), the virtual input remains fixed at the last value transmitted.
- Do not use the virtual input and forced local mode in the same configuration.

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

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

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

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Code	Name/Description	Adjustment range	Factory setting
	[TORQUE LIMITATION] (continued)		
tLC	[Analog limit. act.]		[Yes] (YES)
YES LI1 - - -	The parameter can be accessed if [Torque ref. assign.] (tAA) is not [No] (nO). [Yes] (YES): The limitation depends on the input assigned by [Torque ref. assign.] (tAA). [LI1] (LI1) : : [...] (...): See the assignment conditions on page 141. If the assigned input or bit is at 0: • The limitation is specified by the [Motoring torque lim] (tLIM) and [Gen. torque lim.] (tLIG) parameters if [Torque limit. activ.] (tLA) is not [No] (nO). • No limitation if [Torque limit. activ.] (tLA) = [No] (nO). If the assigned input or bit is at 1: • The limitation depends on the input assigned by [Torque ref. assign.] (tAA). **NOTE:** If [Torque limitation] (tLA) and [Torque ref. assign.] (tAA) are enabled at the same time, the lowest value will be taken into account.		
CLI-	**[2nd CURRENT LIMIT.]**		
LC2	[Current limit 2]		[No] (nO)
nO LI1 - - -	[No] (nO): Function inactive. [LI1] (LI1) : : [...] (...): See the assignment conditions on page 141. If the assigned input or bit is at 0, the first current limitation is active. If the assigned input or bit is at 1, the second current limitation is active.		
CL2 ()	[I Limit. 2 value] (1)	0 to 1.65 In (2)	1.5 In (2)
	Second current limitation The parameter can be accessed if [Current limit 2] (LC2) is not [No] (nO). The adjustment range is limited to 1.36 In if [Switching freq.] (SFr), page 66 is less than 2 kHz. **NOTE:** If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss] (OPF) fault mode if this has been enabled (see page 235). If it is less than the no-load motor current, the limitation no longer has any effect. **CAUTION** **LOSS OF MOTOR FUNCTION** Verify 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 equipment damage.**		
CLI ()	**[Current Limitation]** (1)	0 to 1.65 In (2)	1.5 In (2)
	First current limitation The adjustment range is limited to 1.36 In if [Switching freq.] (SFr), page 66 is less than 2 kHz. **NOTE:** If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss] (OPF) fault mode if this has been enabled (see page 235). If it is less than the no-load motor current, the limitation no longer has any effect. **CAUTION** **LOSS OF MOTOR FUNCTION** Verify 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 equipment damage.**		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

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

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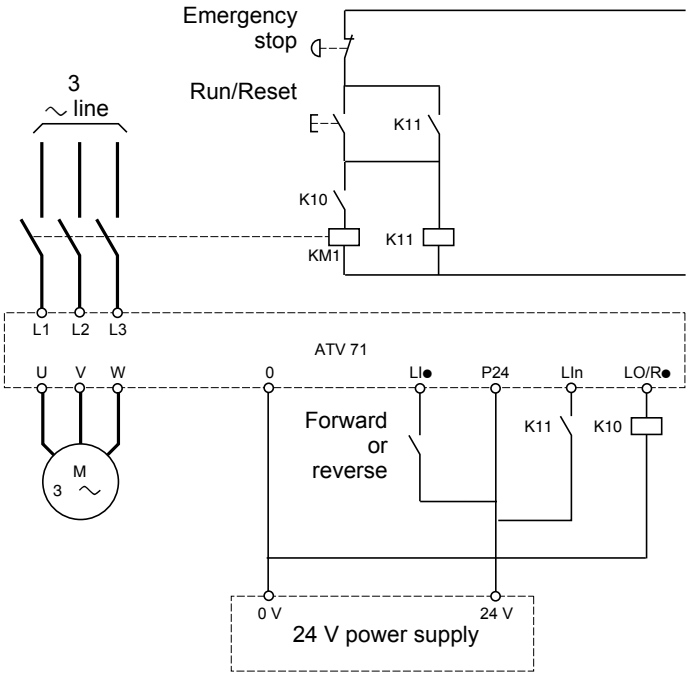
Line contactor command

The line contactor closes every time a run command (forward or reverse) is sent and opens after every stop, as soon as the drive is locked. For example, if the stop mode is stop on ramp, the contactor will open when the motor reaches zero speed.

NOTE: The drive control power supply must be provided via an external 24 V source.

Example circuit:



NOTE: The "Run/Reset" button must be pressed once the "Emergency stop" button has been released.

LI● = Run command [Forward] or [Reverse]
LO/R● = [Line contactor ass.] (LLC)
LIn = [Drive lock] (LES)

⚠CAUTION

EXCESSIVE LINE CONTACTOR SWITCHING

- Avoid operating the contactor frequently to avoid premature aging of the filter capacitors.
- Do not have cycle times less than 60 seconds.

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

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Code	Name/Description	Adjustment range	Factory setting
LLC-	**[LINE CONTACTOR COMMAND]**		
LLC	[Line contactor ass.]		[No] (nO)
	Logic output or control relay nO [No] (nO): Function not assigned (in this case, none of the function parameters can be accessed). LO1 [LO1] (LO1) - to LO4 [LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected). r2 [R2] (r2) - to r4 [R4] (r4): Relay (selection of R2 extended to R3 or R4 if one or two I/O cards have been inserted). dO1 [dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1), page 129 = [No] (nO).		
LES	[Drive lock]		[No] (nO)
	nO [No] (nO): Function inactive. LI1 [LI1] (LI1) - : - : - [...] (...): See the assignment conditions on page 141. The drive locks when the assigned input or bit changes to 0.		
LCt	[Mains V. time out]	5 to 999 s	5 s
	Monitoring time for closing of line contactor. If, once this time has elapsed, there is no voltage on the drive power circuit, the drive will lock with a Line contactor fault (LCF).		

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Output contactor command

This allows the drive to control a contactor located between the drive and the motor. The request for the contactor to close is made when a run command is sent. The request for the contactor to open is made when there is no longer any current in the motor.

⚠ WARNING

NO HOLDING TORQUE

- DC injection braking does not provide holding torque at zero speed.
- DC injection braking does not function during loss of power or detected faults.
- When required, use a separate brake for holding torque.

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

⚠ WARNING

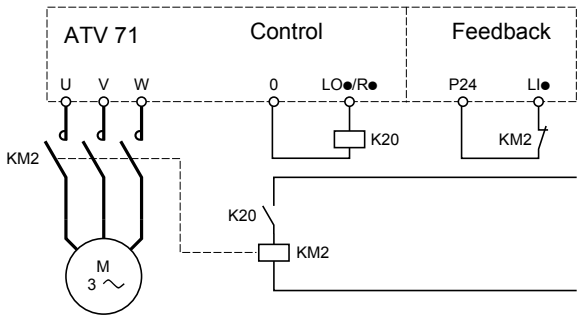
EXCESSIVE DC INJECTION BRAKING

- Application of DC injection braking for long periods of time can cause motor overheating and damage.
- Protect the motor from extended periods of DC injection braking.

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

Output contactor feedback

The corresponding logic input should be at 1 when there is no run command and at 0 during operation.
In the event of an inconsistency, the drive trips on an FCF2 fault if the output contactor fails to close (LIx at 1) and on an FCF1 fault if it is stuck (LIx at 0).
The parameter [Delay to motor run] (dbS) can be used to delay tripping in fault mode when a run command is sent and the [Delay to open cont.] (dAS) parameter delays the fault when a stop command is set.



The [Out. contactor ass.] (OCC) and [Output contact. fdbk] (rCA) functions can be used individually or together.

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Code	Name/Description	Adjustment range	Factory setting
OCC-	**[OUTPUT CONTACTOR CMD]**		
OCC	[Out. contactor ass.]		[No] (nO)
	Logic output or control relay nO [No] (nO): Function not assigned (in this case, none of the function parameters can be accessed). LO1 [LO1] (LO1) - to LO4 [LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected). r2 [R2] (r2) - to r4 [R4] (r4): Relay (selection of R2 extended to R3 or R4 if one or two I/O cards have been inserted). dO1 [dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1), page 129 = [No] (nO).		
rCA	[Output contact. fdbk]		[No] (nO)
	nO [No] (nO): Function inactive LI1 [LI1] (LI1) - : - : - [...] (...): See the assignment conditions on page 141. The motor starts up when the assigned input or bit changes to 0.		
dbS ( )	[Delay to motor run]	0.05 to 60 s	0.15
	Time delay for: • Motor control following the sending of a run command • Output contactor fault monitoring, if the feedback is assigned. If the contactor fails to close at the end of the set time, the drive will lock in FCF2 fault mode. • This parameter can be accessed if [Out. contactor ass.] (OCC) is assigned, or if [Output contact. fdbk] (rCA) is assigned. The time delay must be greater than the closing time of the output contactor.		
dAS ( )	[Delay to open cont.]	0 to 5.00 s	0.10
	Time delay for output contactor opening command following motor stop. This parameter can be accessed if [Output contact. fdbk] (rCA) is assigned. The time delay must be greater than the opening time of the output contactor. If it is set to 0, the fault will not be monitored. If the contactor fails to open at the end of the set time, the drive will lock in FCF1 fault mode.		

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

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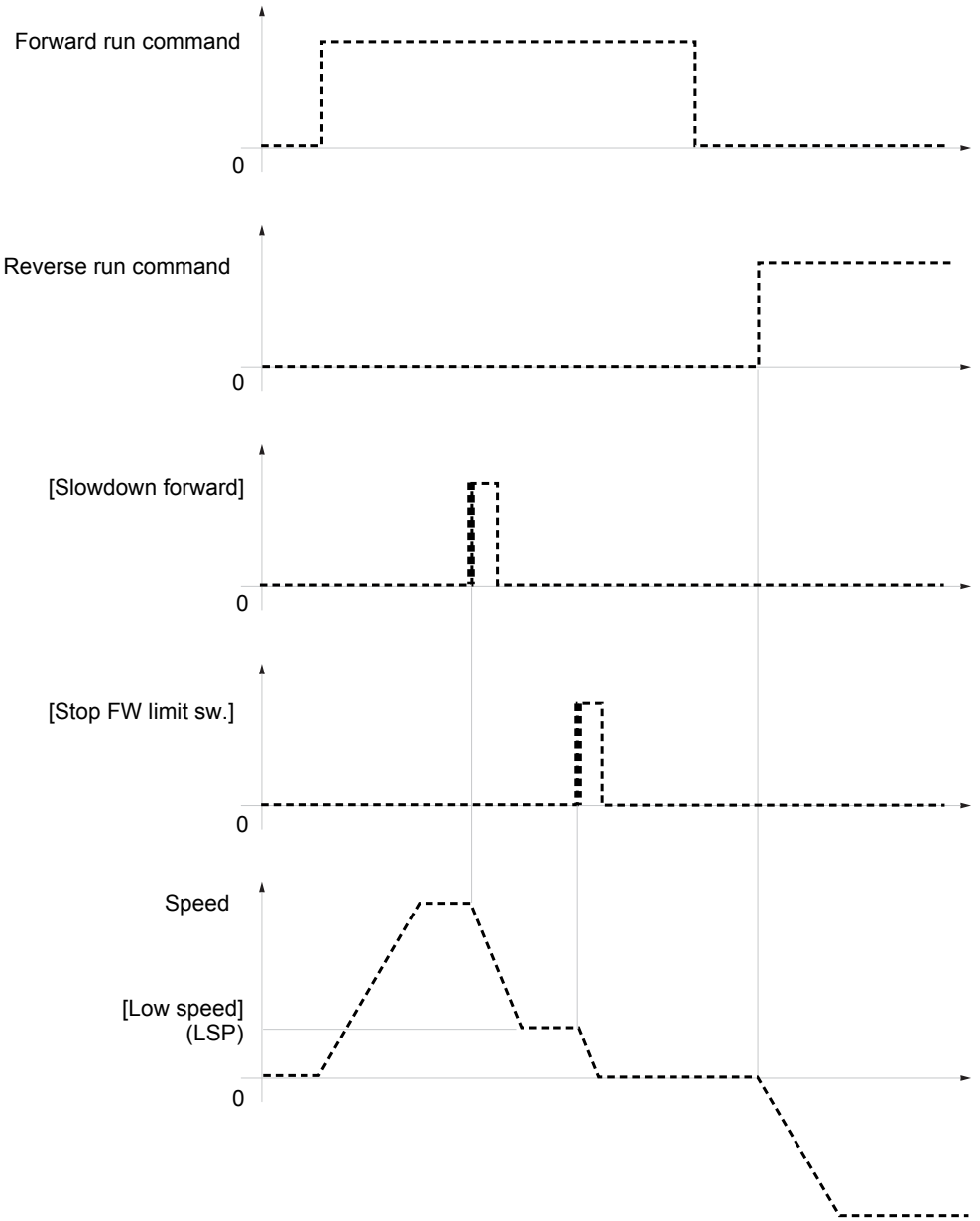
Positioning by sensors or limit switches

This function is used for managing positioning using position sensors or limit switches linked to logic inputs or using control word bits:
- Slowing down
- Stopping

The action logic for the inputs and bits can be configured on a rising edge (change from 0 to 1) or a falling edge (change from 1 to 0). The example below has been configured on a rising edge:



The slowdown mode and stop mode can be configured.
The operation is identical for both directions of operation. Slowdown and stopping operate according to the same logic, described below.

Example: Forward slowdown, on rising edge

- Forward slowdown takes place on a rising edge (change from 0 to 1) of the input or bit assigned to forward slowdown if this rising edge occurs in forward operation. The slowdown command is then memorized, even in the event of a power outage. Operation in the opposite direction is authorized at high speed. The slowdown command is deleted on a falling edge (change from 1 to 0) of the input or bit assigned to forward slowdown if this falling edge occurs in reverse operation.
- A bit or a logic input can be assigned to disable this function.
- Although forward slowdown is disabled while the disable input or bit is at 1, sensor changes continue to be monitored and saved.

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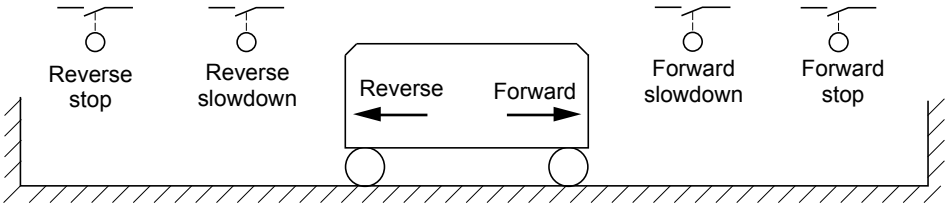
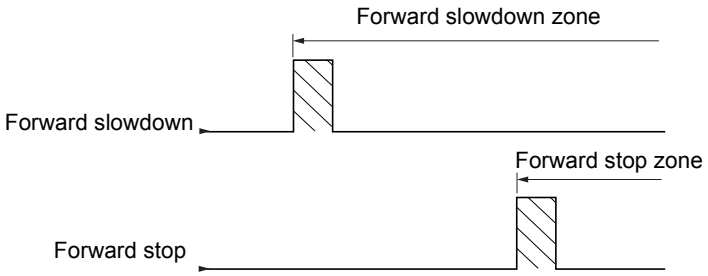
Example: Positioning on a limit switch, on rising edge



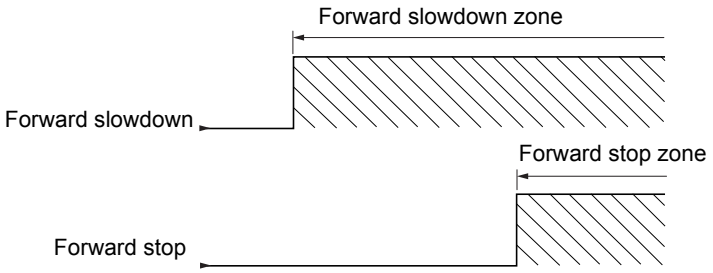
Operation with short cams:

In this instance, when operating for the first time or after restoring the factory settings, the drive must initially be started outside the slowdown and stop zones in order to initialize the function.



Operation with long cams:

In this instance, there is no restriction, which means that the function is initialized across the whole trajectory.



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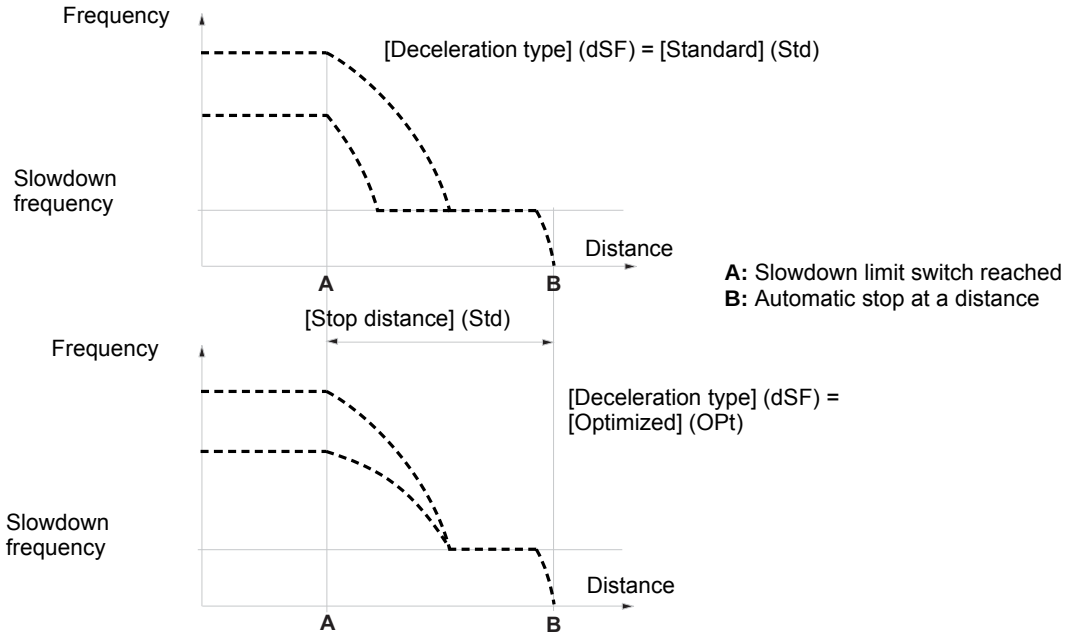
Stop at distance calculated after deceleration limit switch

This function can be used to control the stopping of the moving part automatically once a preset distance has been traveled after the slowdown limit switch.

On the basis of the rated linear speed and the speed estimated by the drive when the slowdown limit switch is tripped, the drive will induce the stop at the configured distance.
This function is useful in applications where one manual-reset overtravel limit switch is common to both directions. It will then only respond to help ensure safety if the distance is exceeded. The stop limit switch retains priority in respect of the function.

The [Deceleration type] (dSF) parameter can be configured to obtain either of the functions described below:



NOTE:

- If the deceleration ramp is modified while stopping at a distance is in progress, this distance will not be observed.
- If the direction is modified while stopping at a distance is in progress, this distance will not be observed.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Check that the parameters configured are consistent and that the required distance is possible.
- This function does not replace the stop limit switch, which remains necessary.

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

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Code	Name/Description	Factory setting
LPO-	**[POSITIONING BY SENSORS]** **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.	
SAF	[Stop FW limit sw.]	[No] (nO)
nO	[No] (nO): Not assigned	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted	
-	[LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted	
C101	[C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO)	
-	[C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO)	
-	[C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO)	
-	[C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO)	
CD00	[CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs	
-	[CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs	
SAr	[Stop RV limit sw.]	[No] (nO)
	Same assignments possible as for [Stop FW limit sw.] (SAF) above.	
SAL	[Stop limit config.]	[Active high] (HIG)
	The parameter can be accessed if at least one limit switch or one stop sensor has been assigned. It defines the positive or negative logic of the bits or inputs assigned to the stop.	
LO	[Active low] (LO): Stop controlled on a falling edge (change from 1 to 0) of the assigned bits or inputs.	
HIG	[Active high] (HIG): Stop controlled on a rising edge (change from 0 to 1) of the assigned bits or inputs.	
dAF	[Slowdown forward]	[No] (nO)
	Same assignments possible as for [Stop FW limit sw.] (SAF) above.	
dAr	[Slowdown reverse]	[No] (nO)
	Same assignments possible as for [Stop FW limit sw.] (SAF) above.	
dAL	[Slowdown limit cfg.]	[Active high] (HIG)
	The parameter can be accessed if at least one limit switch or one slowdown sensor has been assigned. It defines the positive or negative logic of the bits or inputs assigned to the slowdown.	
LO	[Active low] (LO): Slowdown controlled on a falling edge (change from 1 to 0) of the assigned bits or inputs.	
HIG	[Active high] (HIG): Slowdown controlled on a rising edge (change from 0 to 1) of the assigned bits or inputs.	

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Code	Name/Description	Adjustment range	Factory setting
	[POSITIONING BY SENSORS] (continued)		
CLS	[Disable limit sw.]		[No] (nO)
	The parameter can be accessed if at least one limit switch or one sensor has been assigned.		
nO	[No] (nO): Not assigned		
LI1	[LI1] (LI1)		
-	:		
-	:		
-	[...] (...): See the assignment conditions on page 141.		
	The action of the limit switches is disabled when the assigned bit or input is at 1. If, at this time, the drive is stopped or being slowed down by limit switches, it will restart up to its speed reference.		
PAS	[Stop type]		[Ramp stop] (rMP)
	The parameter can be accessed if at least one limit switch or one sensor has been assigned.		
rMP	[Ramp stop] (rMP): On ramp		
FSt	[Fast stop] (FSt): Fast stop (ramp time reduced by [Ramp divider] (dCF), see page 155)		
YES	[Freewheel] (YES): Freewheel stop		
dSF	[Deceleration type]		[Standard] (Std)
	The parameter can be accessed if at least one limit switch or one sensor has been assigned.		
Std	[Standard] (Std): Uses the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp (depending on which has been enabled).		
OPt	[Optimized] (OPt): The ramp time is calculated on the basis of the actual speed when the slowdown contact switches, in order to limit the operating time at low speed (optimization of the cycle time: the slowdown time is constant regardless of the initial speed).		
Std	[Stop distance]		[No] (nO)
	The parameter can be accessed if at least one limit switch or one sensor has been assigned.		
	Activation and adjustment of the "Stop at distance calculated after the slowdown limit switch" function.		
nO	[No] (nO): Function inactive (the next two parameters will, therefore, be inaccessible).		
-	0.01 yd to 10.94 yd: Stop distance range in yards.		
nLS	[Rated linear speed]	0.20 to 5.00 m/s	1.00 m/s
	The parameter can be accessed if at least one limit switch or one sensor has been assigned.		
	Rated linear speed in meters/second.		
SFd	[Stop corrector]	50 to 200%	100%
	The parameter can be accessed if at least one limit switch or one sensor has been assigned.		
	Scaling factor applied to the stop distance to compensate, for example, a non-linear ramp.		

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Parameter set switching [PARAM. SET SWITCHING]

A set of 1 to 15 parameters from the [1.3 SETTINGS] (SEt-) menu on page 58 can be selected and 2 or 3 different values assigned. These 2 or 3 sets of values can then be switched using 1 or 2 logic inputs or control word bits. This switching can be performed during operation (motor running).
It can also be controlled on the basis of one or two frequency thresholds, whereby each threshold acts as a logic input (0 = threshold not reached, 1 = threshold reached).

	Values 1	Values 2	Values 3
Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15
Input LI or bit or frequency threshold 2 values	0	1	0 or 1
Input LI or bit or frequency threshold 3 values	0	0	1

NOTE: Do not modify the parameters in the [1.3 SETTINGS] (SEt-) menu, because any modifications made in this menu ([1.3 SETTINGS] (SEt-)) will be lost on the next power-up. The parameters can be adjusted during operation in the [PARAM. SET SWITCHING] (MLP-) menu, on the active configuration.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

After switching to a parameter set, verify that the parameter assignments of the set are as intended for the motor selected.

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

NOTE: Parameter set switching cannot be configured from the integrated display terminal.
Parameters can only be adjusted on the integrated display terminal if the function has been configured previously via the graphic display terminal, by PowerSuite or via the bus or communication network. If the function has not been configured, the MLP- menu and the PS1-, PS2-, PS3- submenus will not appear.

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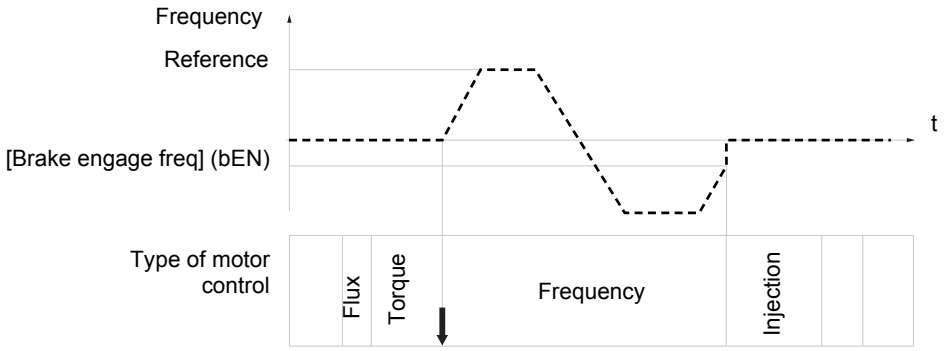
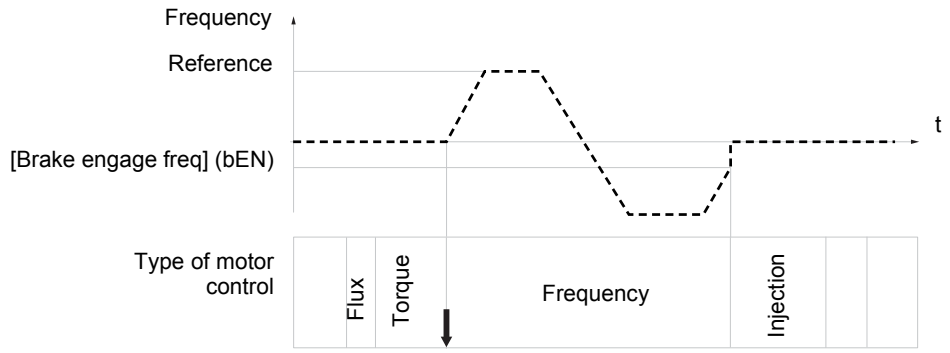
Code	Name/Description	Factory setting
nLP-	**[PARAM. SET SWITCHING]**	
CHA1	[2 parameter sets]	[No] (nO)
nO	[No] (nO): Function inactive.	
FtA	[Freq. Th.att.] (FtA): Switching via [Freq. threshold] (Ftd), page 72.	
F2A	[Freq. Th. 2 attain.] (F2A): Switching via [Freq. threshold 2] (Ftd), page 72.	
tAP	[Ramp Mode] (tAP): Switching during braking sequence. This new assignment allows for higher gain when the brake is open and before the starting of the ramp (useful for lift application).	
LI1	[LI1] (LI1)	
-	:	
-	:	
-	[...] (...): See the assignment conditions on page 141.	
	Switching 2 parameter sets	
CHA2	[3 parameter sets]	[No] (nO)
nO	[No] (nO): Function inactive.	
FtA	[Freq. Th.att.] (FtA): Switching via [Freq. threshold] (Ftd), page 72.	
F2A	[Freq. Th. 2 attain.] (F2A): Switching via [Freq. threshold 2] (Ftd), page 72.	
tAP	[Ramp Mode] (tAP): Switching during braking sequence. This new assignment allows for higher gain when the brake is open and before the starting of the ramp (useful for lift application).	
LI1	[LI1] (LI1)	
-	:	
-	:	
-	[...] (...): See the assignment conditions on page 141.	
	Switching 3 parameter sets	
	NOTE: In order to obtain 3 parameter sets, [2 parameter sets] must also be configured.	





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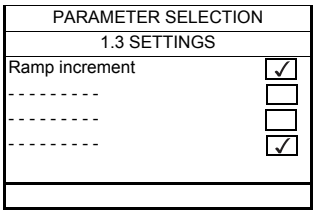
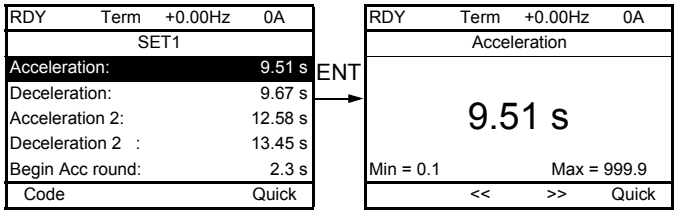
Code	Name/Description	Factory setting
	[PARAM. SET SWITCHING] (continued)	
SPS	[PARAMETER SELECTION] The parameter can only be accessed on the graphic display terminal if [2 parameter sets] is not [No]. Making an entry in this parameter opens a window containing all the adjustment parameters that can be accessed. Select 1 to 15 parameters using ENT (a tick then appears next to the parameter). Parameter(s) can also be deselected using ENT. **Example**  	
PS1-	[SET 1] The parameter can be accessed if at least 1 parameter has been selected in [PARAMETER SELECTION]. Making an entry in this parameter opens a settings window containing the selected parameters in the order in which they were selected. With the graphic display terminal:  With the integrated display terminal: Proceed as in the Settings menu using the parameters that appear.	
PS2-	[SET 2] The parameter can be accessed if at least 1 parameter has been selected in [PARAMETER SELECTION]. Procedure identical to [SET 1] (PS1-).	
PS3-	[SET 3] The parameter can be accessed if [3 parameter sets] is not [No] and if at least 1 parameter has been selected in [PARAMETER SELECTION]. Procedure identical to [SET 1] (PS1-).	

☞ **NOTE:** We recommend that a parameter set switching test is carried out while stopped and a check is made to ensure that it has been performed correctly.

Some parameters are interdependent and in this case may be restricted at the time of switching.

Interdependencies between parameters must be respected, even between different sets.

Example: The highest [Low speed] (LSP) must be below the lowest [High speed] (HSP).

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Motor or configuration switching [MULTIMOTORS/CONFIG.]

The drive may contain up to 3 configurations, which can be saved using the [1.12 FACTORY SETTINGS] (FCS-) menu, page 260. Each of these configurations can be activated remotely, enabling adaptation to:
- 2 or 3 different motors or mechanisms (multimotor mode)
- 2 or 3 different configurations for a single motor (multiconfiguration mode)

The two switching modes cannot be combined.

☞ **NOTE:** The following conditions MUST be observed:

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Motor or configuration switching can only take place when the drive is stopped.
- If a switching request is sent during drive operation, it will not be executed until the next stop.

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

- In the event of motor switching, the following additional conditions apply:
  - -When the motors are switched, the power and control terminals concerned must also be switched as appropriate.
  - -The maximum power of the drive must not be exceeded by any of the motors.
- All the configurations to be switched must be set and saved in advance in the same hardware configuration, this being the definitive configuration (option and communication cards). Failure to follow this instruction can cause the drive to lock on an [Incorrect config.] (CFF) fault.

Menu and parameters switched in multimotor mode

- [1.3 SETTINGS] (SEt-)
- [1.4 MOTOR CONTROL] (drC-)
- [1.5 INPUTS / OUTPUTS CFG] (I-O-)
- [1.6 COMMAND] (CtL-)
- [1.7 APPLICATION FUNCT.] (FUn-) with the exception of the [MULTIMOTORS/CONFIG.] function (to be configured once only)
- [1.8 FAULT MANAGEMENT] (FLt)
- [1.13 USER MENU]
- [USER CONFIG.]: The name of the configuration specified by the user in the [1.12 FACTORY SETTINGS] (FCS-) menu

Menu and parameters switched in multiconfiguration mode

As in multimotor mode, except for the motor parameters that are common to the three configurations:
- Rated current
- Thermal current
- Rated voltage
- Rated frequency
- Rated speed
- Rated power
- IR compensation
- Slip compensation
- Synchronous motor parameters
- Type of thermal protection
- Thermal state
- The auto-tuning parameters and motor parameters that can be accessed in expert mode
- Type of motor control

☞ **NOTE:** No other menus or parameters can be switched.

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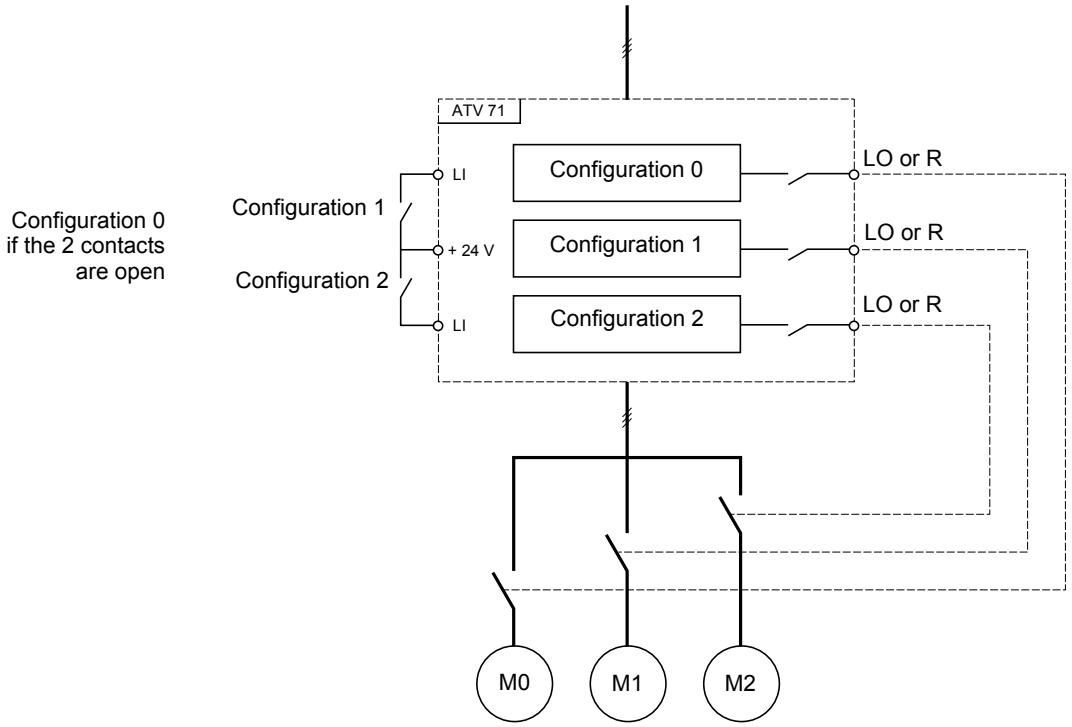
Switching command

Depending on the number of motors or selected configuration (2 or 3), the switching command is sent using one or two logic inputs. The table below lists the possible combinations.

LI 2 motors or configurations	LI 3 motors or configurations	Number of configuration or active motor
0	0	0
1	0	1
0	1	2
1	1	2

Schematic diagram for multimotor mode



Auto-tuning in multimotor mode

This auto-tuning can be performed:
- Manually using a logic input when the motor changes
- Automatically each time the motor is activated for the 1st time after switching on the drive, if the [Automatic autotune] (AUt) parameter on page 90 = [Yes] (YES).

Motor thermal states in multimotor mode:

The drive helps to protect the three motors individually. Each thermal state takes into account all stop times, including drive shutdowns. It is, therefore, not necessary to perform auto-tuning every time the power is switched on. It is sufficient to auto-tune each motor at least once.

Configuration information output

In the [1.5 INPUTS / OUTPUTS CFG] (I-O-) menu, a logic output can be assigned to each configuration or motor (2 or 3) for remote information transmission.

☞ **NOTE:** As the [1.5 INPUTS / OUTPUTS CFG] (I-O-) menu is switched, these outputs must be assigned in all configurations in which information is required.

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Code	Name/Description	Factory setting
MMC-	**[MULTIMOTORS/CONFIG.]**	
CHM	[Multimotors]	[No] (nO)
nO	[No] (nO): Multiconfiguration possible	
YES	[Yes] (YES): Multimotor possible	
CnF1	[2 Configurations]	[No] (nO)
nO	[No] (nO): No switching	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted	
-	[LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted	
C111	[C111] (C111) to [C115] (C115): With integrated Modbus	
-	[C211] (C211) to [C215] (C215): With integrated CANopen	
-	[C311] (C311) to [C315] (C315): With a communication card	
-	[C411] (C411) to [C415] (C415): With a Controller Inside card	
	Switching of 2 motors or 2 configurations	
CnF2	[3 Configurations]	[No] (nO)
nO	[No] (nO): No switching	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted	
-	[LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted	
C111	[C111] (C111) to [C115] (C115): With integrated Modbus	
-	[C211] (C211) to [C215] (C215): With integrated CANopen	
-	[C311] (C311) to [C315] (C315): With a communication card	
-	[C411] (C411) to [C415] (C415): With a Controller Inside card	
	Switching of 3 motors or 3 configurations **NOTE:** In order to obtain 3 motors or 3 configurations, [2 Configurations] (CnF1) must also be configured.	

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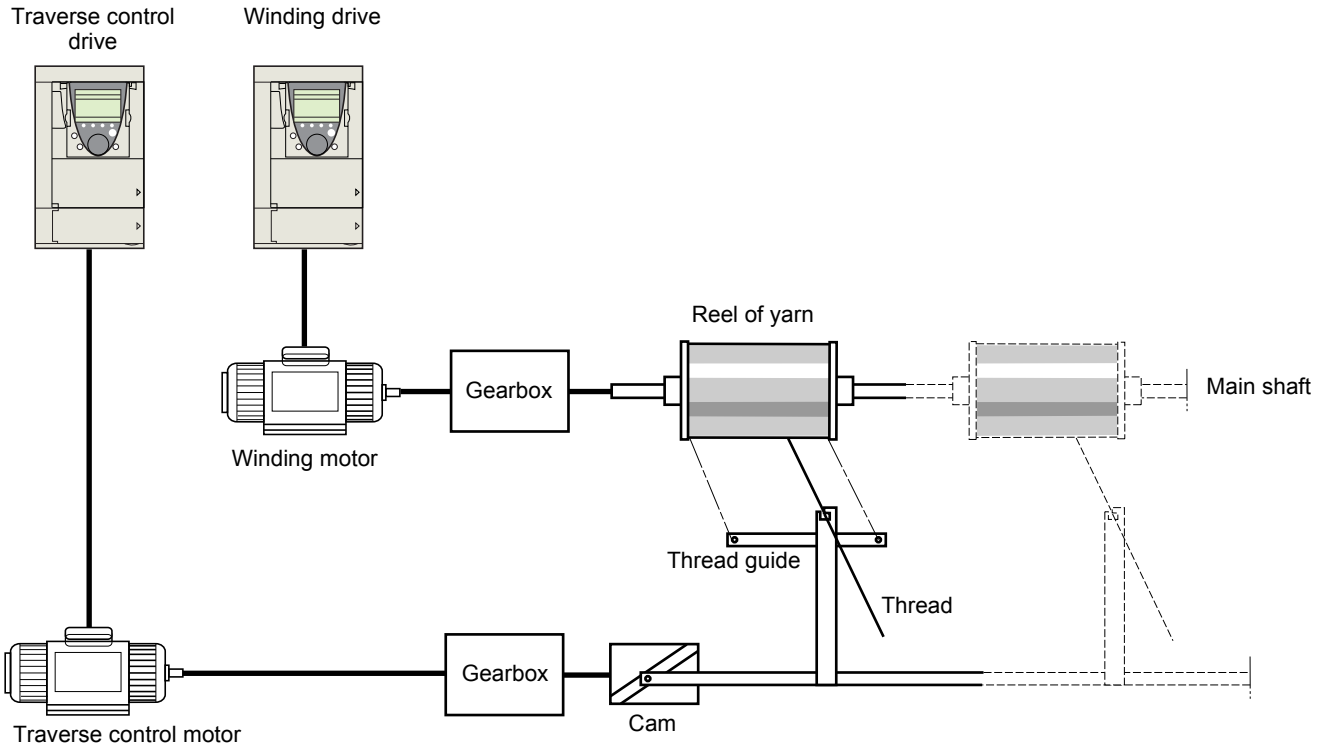
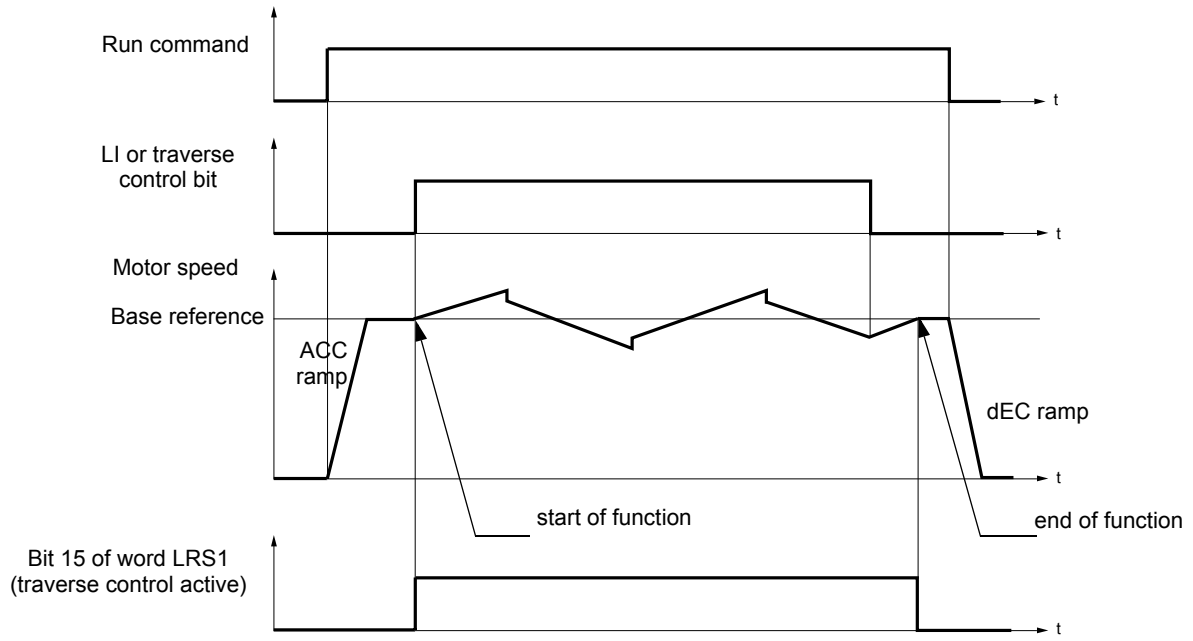
Traverse control

Function for winding reels of yarn (in textile applications)



The speed of rotation of the cam must follow a precise profile to ensure that the reel is steady, compact and linear:



The function starts when the drive has reached its base reference and the traverse control command has been enabled.
When the traverse control command is disabled, the drive returns to its base reference, following the ramp determined by the traverse control function. The function then stops, as soon as it has returned to this reference.
Bit 15 of word LRS1 is at 1 while the function is active.

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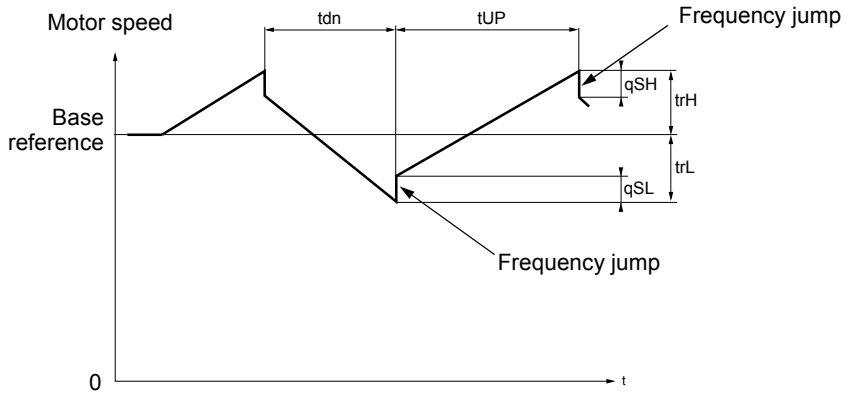
Function parameters:

These define the cycle of frequency variations around the base reference, as shown in the diagram below:

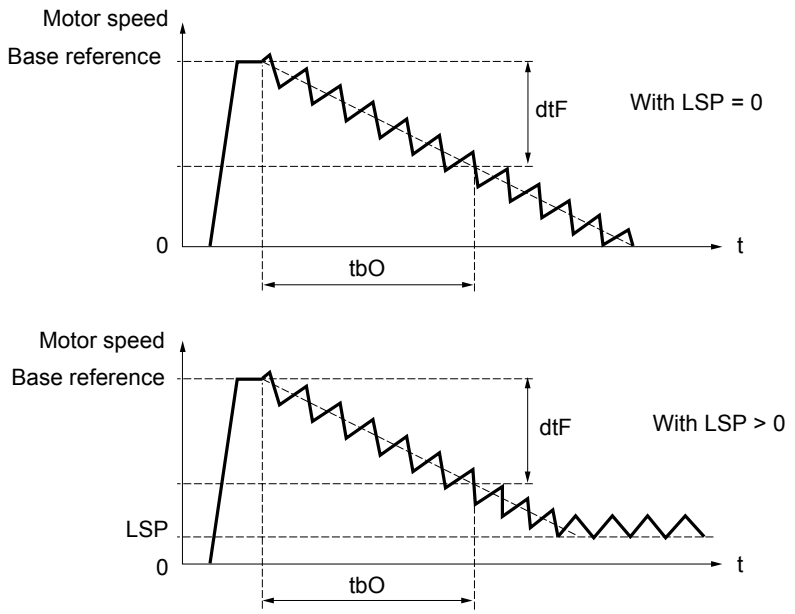


- trC: [Yarn control]: Assignment of the traverse control command to a logic input or to a communication bus control word bit
- tdn: [Traverse ctrl. decel] time, in seconds
- tUP: [Traverse ctrl. accel.] time, in seconds
- trH: [Traverse freq. high], in Hertz
- trL: [Traverse Freq. Low], in Hertz
- qSH: [Quick step High], in Hertz
- qSL: [Quick step Low], in Hertz

Reel parameters:

- tbO: [Reel time]: Time taken to make a reel, in minutes.
  This parameter is intended to signal the end of winding. When the traverse control operating time since command trC reaches the value of tbO, the logic output or one of the relays changes to state 1, if the corresponding function EbO has been assigned.
  The traverse control operating time EbOt can be monitored online by a communication bus and in the Monitoring menu.

- dtF: [Decrease ref. speed]: Decrease in the base reference.
  In certain cases, the base reference has to be reduced as the reel increases in size. The dtF value corresponds to time tbO. Once this time has elapsed, the reference continues to fall, following the same ramp. If low speed LSP is at 0, the speed reaches 0 Hz, the drive stops and must be reset by a new run command.
  If low speed LSP is not 0, the traverse control function continues to operate above LSP.



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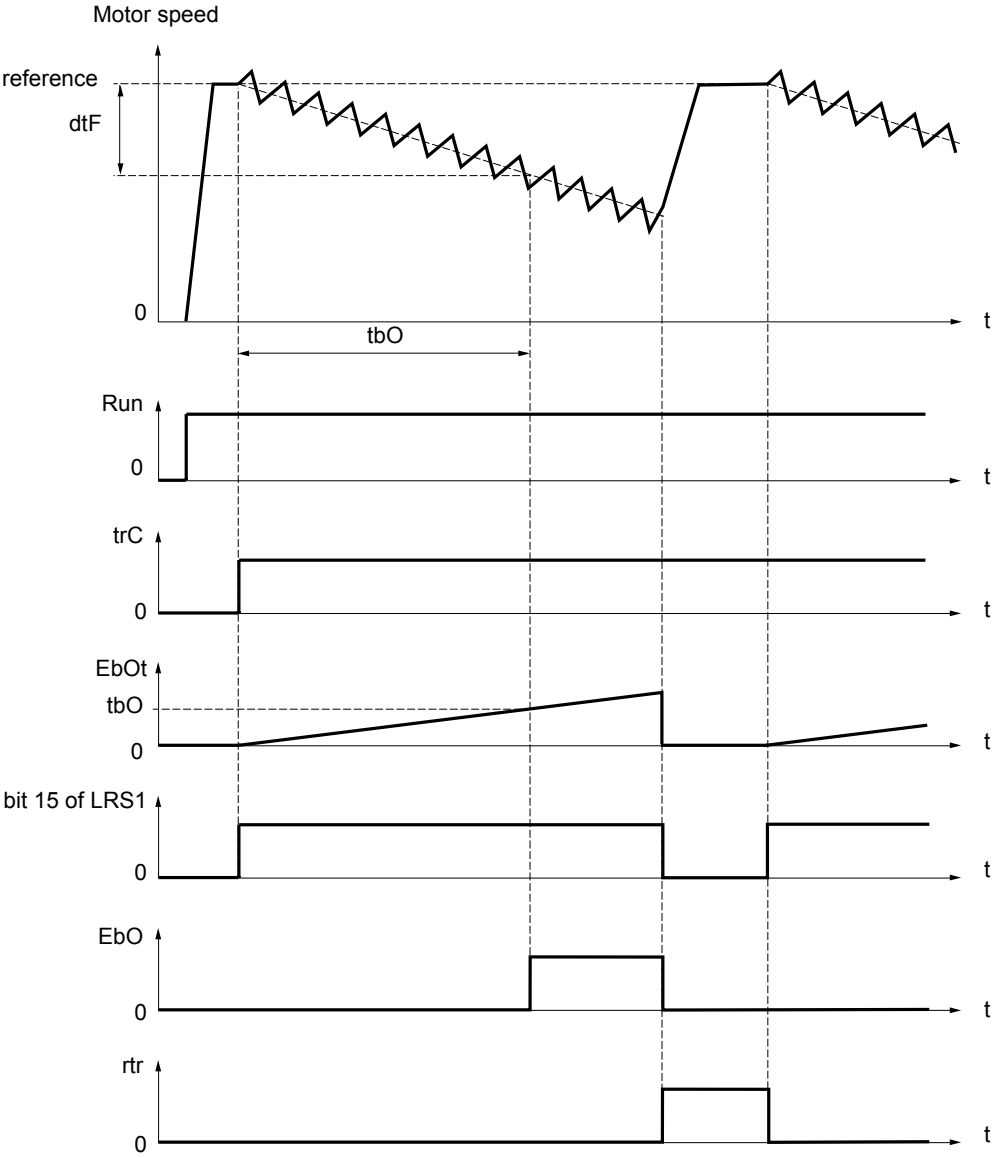
- rtr: [Init. traverse ctrl] Reinitialize traverse control.
This command can be assigned to a logic input or to a communication bus control word bit. It resets the EbO alarm and the EbOt operating time to zero and reinitializes the reference to the base reference. As long as rtr remains at 1, the traverse control function is disabled and the speed remains the same as the base reference.
This command is used primarily when changing reels.



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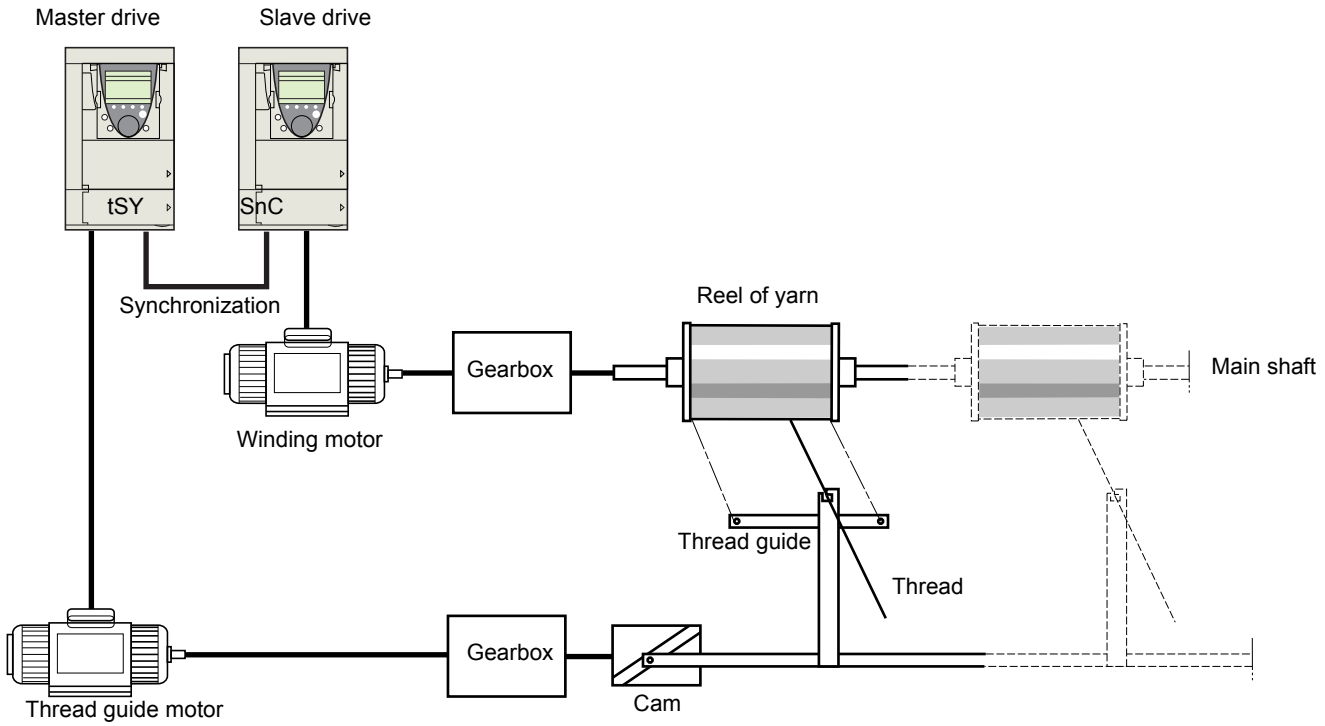
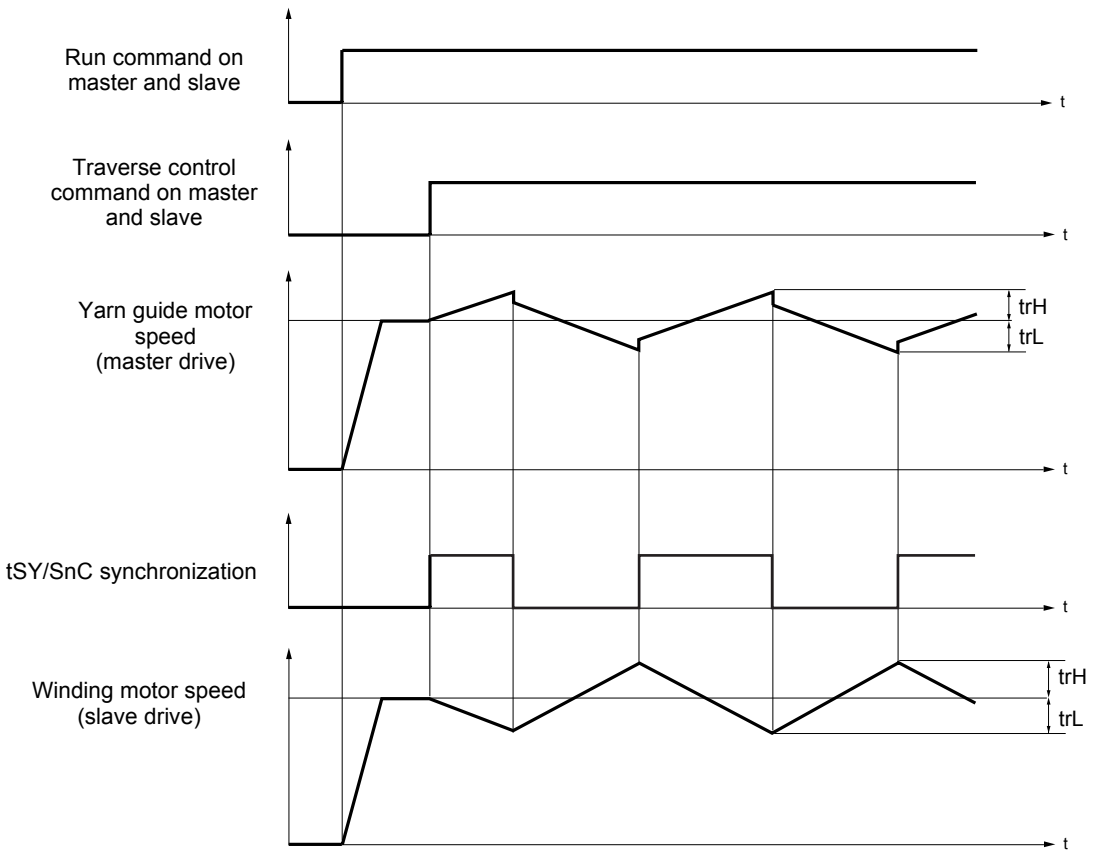
Counter wobble



The "Counter wobble" function is used in certain applications to obtain a constant yarn tension when the "Traverse control" function is producing considerable variations in speed on the yarn guide motor (trH and trL, see page 222).

Two motors must be used (one master and one slave).

The master controls the speed of the yarn guide, the slave controls the winding speed. The function assigns the slave a speed profile, which is in antiphase to that of the master. This means that synchronization is required, using one of the master's logic outputs and one of the slave's logic inputs.



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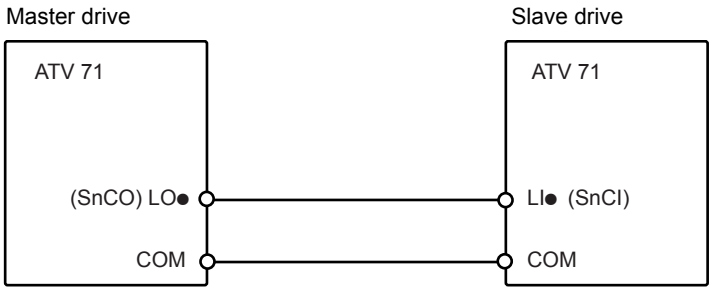
Connection of synchronization I/O



The starting conditions for the function are:
- Base speeds reached on both drives
- [Yarn control] (trC) input activated
- Synchronization signal present

NOTE: On the slave drive, the [Quick step High] (qSH) and [Quick step Low] (qSL) parameters should generally be left at zero.

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Code	Name/Description	Adjustment range	Factory setting
tr0-	**[TRAVERSE CONTROL]** **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.		
trC	[Yarn control]		[No] (nO)
nO	[No] (nO): Function inactive, thereby preventing access to other parameters.		
LI1	[LI1] (LI1)		
-	:		
-	:		
-	[...] (...): See the assignment conditions on page 141.		
	The traverse control cycle starts when the assigned input or bit changes to 1 and stops when it changes to 0.		
trH	[Traverse freq. high] (1)	0 to 10 Hz	4 Hz
trL	[Traverse Freq. Low] (1)	0 to 10 Hz	4 Hz
9SH	[Quick step High] (1)	0 to [Traverse freq. high] (trH)	0 Hz
9SL	[Quick step Low] (1)	0 to [Traverse Freq. Low] (trL)	0 Hz
tUP	[Traverse ctrl. accel.]	0.1 to 999.9 s	4 s
tdn	[Traverse ctrl. decel]	0.1 to 999.9 s	4 s
tb0	[Reel time]	0 to 9999 minutes	0 minute
	Reel execution time		
Eb0	[End reel]		[No] (nO)
nO	[No] (nO): Function not assigned.		
LO1	[LO1] (LO1)		
-	to		
LO4	[LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected).		
r2	[R2] (r2)		
-	to		
r4	[R4] (r4): Relay (selection of R2 extended to R3 or R4 if one or two I/O cards have been inserted).		
dO1	[dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1), page 129 = [No] (nO).		
	The assigned output or relay changes to state 1 when the traverse control operating time reaches the [Reel time] (tbO).		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

Parameter that can be modified during operation or when stopped.

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Code	Name/Description	Adjustment range	Factory setting
	[TRAVERSE CONTROL] (continued)		
SnC	[Counter wobble]		[No] (nO)
nO	[No] (nO): Function not assigned.		
LI1	[LI1] (LI1)		
-	:		
-	:		
-	[...] (...): See the assignment conditions on page 141.		
	Synchronization input. To be configured on the winding drive (slave) only.		
tSY	[Sync. wobble]		[No] (nO)
nO	[No] (nO): Function not assigned.		
LO1	[LO1] (LO1)		
-	to		
LO4	[LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected).		
r2	[R2] (r2)		
-	to		
r4	[R4] (r4): Relay (selection of R2 extended to R3 or R4 if one or two I/O cards have been inserted).		
dO1	[dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1), page 129 = [No] (nO).		
	Synchronization output. To be configured on the yarn guide drive (master) only.		
dtF	[Decrease ref. speed]	0 to 1600 Hz	0 Hz
	Decrease in the base reference during the traverse control cycle.		
rtr	[Init. traverse ctrl]		[No] (nO)
nO	[No] (nO): Function not assigned.		
LI1	[LI1] (LI1)		
-	:		
-	:		
-	[...] (...): See the assignment conditions on page 141.		
	When the state of the assigned input or bit changes to 1, the traverse control operating time is reset to zero, along with [Decrease ref. speed] (dtF).		

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Inspection

The inspection function is designed for "elevator" applications.
It can only be accessed if the "brake logic control" and "output contactor command" functions have already been assigned.

It is used for operation at a fixed preset speed that is independent of all other references and over which it takes priority. The whole trajectory of the elevator can thus be covered and the necessary checks performed.

This function requires:
- A logic input to control the inspection mode
- An appropriate frequency reference (inspection speed)

When the assigned logic input is at state 1, inspection mode is activated:
- When a run command is given, the motor starts up normally, with output contactor command and brake logic control, until it reaches the inspection speed.
- When the run command is disabled, the motor changes to freewheel stop and brake logic control and output contactor command functions are triggered immediately.

Code	Name/Description	Adjustment range	Factory setting
ISP-	**[INSPECTION MODE]**		
ISP	[Inspection]		[No] (nO)
	The parameter can be accessed if brake logic control [Brake assignment] (bLC), page 173 and [Out. contactor ass.] (OCC), page 205 are assigned.		
nO	[No] (nO): Function not assigned		
LI1	[LI1] (LI1) to [LI6] (LI6)		
-	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted		
LI14	[LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted.		
	Inspection mode is activated when the assigned input changes to state 1.		
ISrF	[Inspection speed]	0 to 25 Hz	12 Hz
↻	Value of the inspection mode frequency reference. The parameter can be accessed if [Inspection] (ISP) is not [No] (nO).		

↻ Parameter that can be modified during operation or when stopped

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Evacuation function

The evacuation function is designed for "elevator" applications. It is only accessible for ATV71●●●N4 (380/480 V) drives, up to 75 kW (100 hp) only.
When an elevator is stuck between 2 floors due to a power outage, it must be possible to evacuate its occupants within a reasonable period of time.
This function requires an emergency power supply to be connected to the drive.
This power supply is at a reduced voltage, and only allows a derated operating mode, at reduced speed, but with full torque.

The function requires:
- One logic input to control "evacuation" operation
- Reduction of the voltage monitoring threshold
- An appropriate low speed reference

Following a power outage, the drive can restart without going into [Undervoltage] (USF) fault mode if the corresponding logic input is at 1 at the same time.

CAUTION

INCORRECT CONFIGURATION

- This input must not be at 1 when the drive is powered from the line supply. To ensure this and also avoid any short-circuits, supply changeover contactors must be used.
- Set this input to 0 before connecting the emergency power supply to the line supply.

Failure to follow these instructions can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
rFt-	**[EVACUATION]** Function only accessible for ATV71●●●N4 (380/480 V) drives, up to 75 kW (100 hp) only.		
rFt	[Evacuation assign.]		[No] (nO)
nO	[No] (nO): Function not assigned.		
LI1	[LI1] (LI1) to [LI6] (LI6)		
-	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted		
LI14	[LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted.		
	Evacuation is activated when the assigned input is at 1, if the drive is stationary. Evacuation is activated when the assigned input is at 0, as soon as the drive stops.		
rSU	[Evacuation Input V.]	220 to 320 V	220 V
	Minimum permissible AC voltage value of the emergency power supply. The parameter can be accessed if [Evacuation assign.] (rFt) is not [No] (nO).		
rSP	[Evacuation freq.]		5 Hz
( )	Value of the "evacuation" mode frequency reference. The parameter can be accessed if [Evacuation assign.] (rFt) is not [No] (nO). The adjustment range is determined by the [Low speed] (LSP) (page 60), [Rated motor freq.] (FrS), page 79 for an asynchronous motor or [Nominal freq sync.] (FrSS), page 84 for a synchronous motor and [Rated motor volt.] (UnS), page 79 and by [Evacuation Input V.] (rSU) above. Example with an asynchronous motor: • If LSP < (FrS x rSU/UnS): rSP min. = LSP, rSP max. = (Frs x rSU/UnS) • If LSP ≥ (FrS x rSU/UnS): rSP = (Frs x rSU/UnS) With a synchronous motor: Same formula using FrSS in place of FrS and 400 V in place of UnS.		

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

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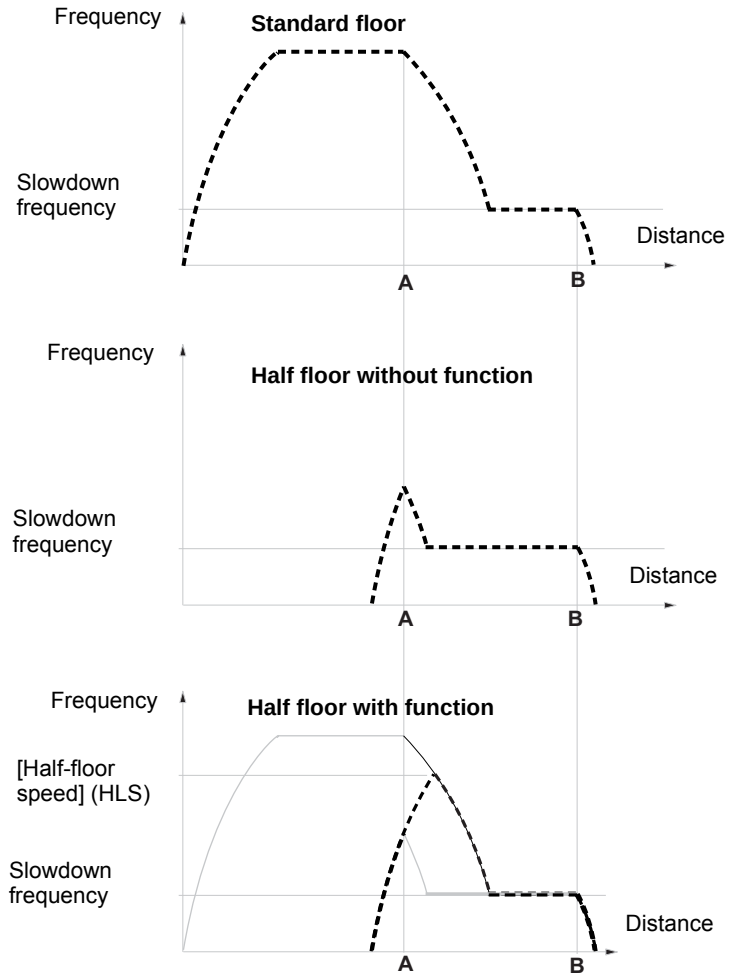
Half floor

The "half floor" function is designed for "elevator" applications.
When an elevator sets off from floors and half floors, the cycle time for half floors can be too long, as the elevator does not have time to reach full speed before crossing the slowdown limit switch. As a result, the slowdown time is unnecessarily long.
The "half floor" function can be used to compensate this by not triggering slowdown until the speed reaches a preset threshold [Half-floor speed] (HLS) in order that the final part of the path will be the same as for a standard floor.

The graphs below illustrate the various operating scenarios with and without the function:



A: Slowdown limit switch reached
B: Stop limit switch reached

The function is only activated if, when the slowdown limit switch is tripped, the motor frequency is less than [Half-floor speed] (HLS). Acceleration is then maintained up to this value prior to slowing down.
The final part of the path is identical to that of the standard floor.

Code	Name/Description	Factory setting
HFF-	**[HALF FLOOR]**	
HLS	[Half-floor speed]	[No] (nO)
	Activation and adjustment of the "half floor" function. This function has priority over all speed reference functions (preset speeds, for example) with the exception of those generated via fault monitoring (fallback speed, for example).	
nO	[No] (nO): Function inactive	
-	0.1 Hz to 500.0 Hz: Activation of the function by adjusting the motor frequency to be reached prior to slowing down.	

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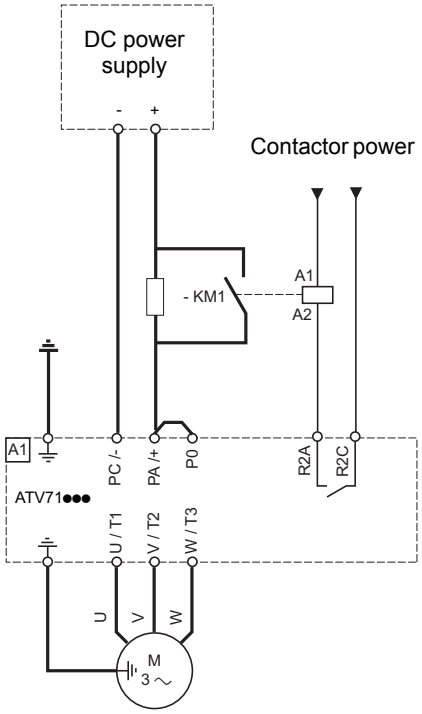
Direct power supply via DC bus

NOTE: This function is only accessible for ATV71●●●M3 ³ 18.5 kW (25 hp)and ATV71●●●N4 ³ 18.5 kW (25 hp) drives.

Direct power supply via the DC bus requires a protected direct current source with adequate power and voltage as well as a suitably dimensioned resistor and capacitor precharging contactor. Consult Schneider Electric for information about specifying these components.

The "direct power supply via DC bus" function can be used to control the precharging contactor via a relay or a logic output on the drive.

Example circuit using R2 relay:



Menu

Code	Name/Description	Factory setting
dCO-	**[DC BUS SUPPLY]** This function is only accessible for ATV71●●●M3 drives ≥ 18.5 kW (25 hp) and ATV71●●●N4 drives ≥18.5 kW (25 hp).	
dCO	[Precharge cont. ass.]	[No] (nO)
	Logic output or control relay	
nO	[No] (nO): Function not assigned.	
LO1	[LO1] (LO1)	
-	to	
LO4	[LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected).	
r2	[R2] (r2)	
-	to	
r4	[R4] (r4): Relay (selection of R2 extended to R3 or R4 if one or two I/O cards have been inserted).	
dO1	[dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1), page 129 = [No] (nO).	

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Top Z management

This function is only accessible if an encoder card VW3 A3 411 has been inserted and if [Encoder type] (EnS) = [AABB] (AAbb).

This function can be used for homing but it is necessary to have a low approach speed otherwise the drive trips on [Overbraking] (ObF) fault.

Code	Name/Description	Factory setting
tOP-	**[TOP Z MANAGEMENT]**	
tOSt	[Stop on top Z]	[No] (nO)
	NOTE: This function cannot be used with certain other functions. Follow the instructions on page 147.	
nO LI1 - - -	[No] (nO): Not assigned [LI1] (LI1) : : [...] (...): See the assignment conditions on page 141.	
	The stop is activated when the input changes to 1 or the bit changes to 1and after the detection of the following Top Z. If the input returns to state 0 and the run command is still active, the motor will only restart if [2/3 wire control] (tCC), page 105 = [2 wire] (2C) and the [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO). If not, a new run command must be sent.	

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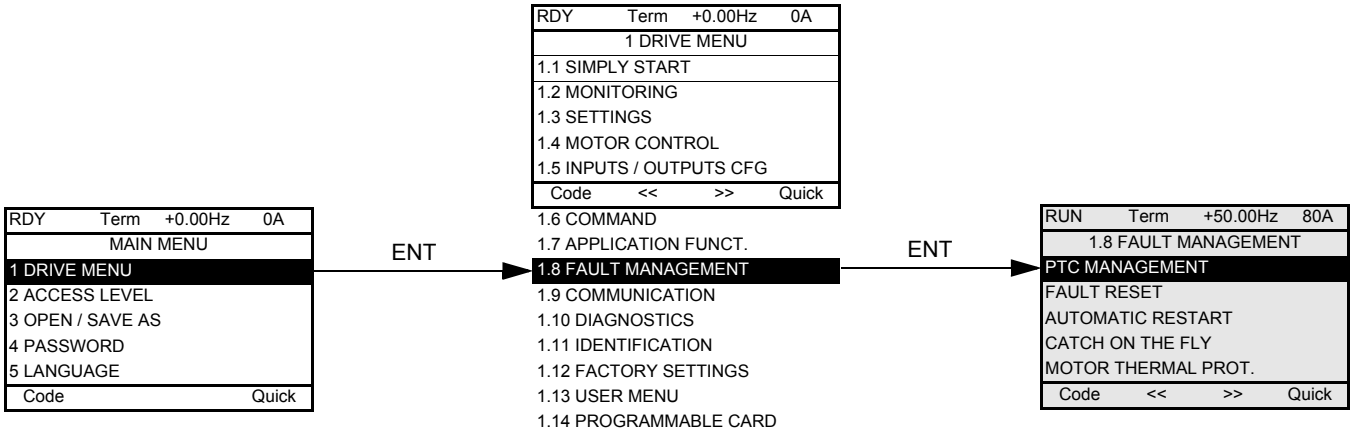
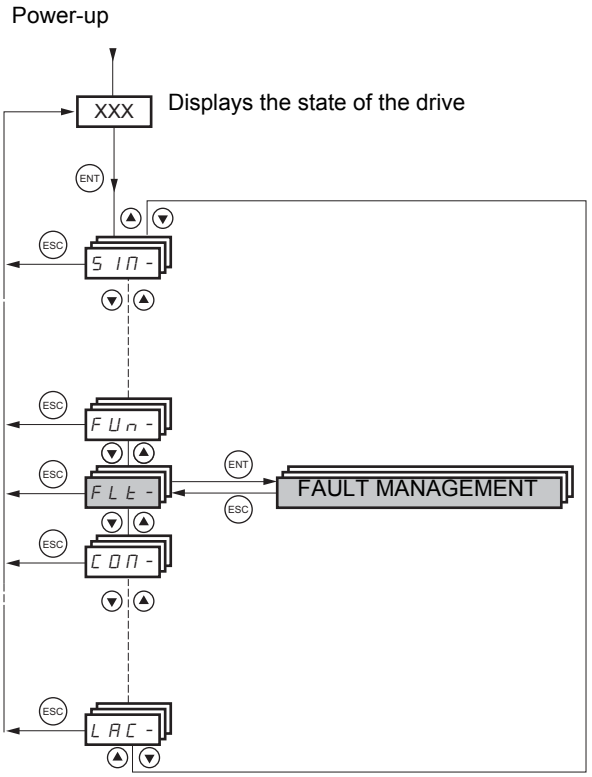
[1.8 FAULT MANAGEMENT] (FLt-)

With graphic display terminal:



With integrated display terminal:



Summary of functions:

Code	Name	Page
PtC-	[PTC MANAGEMENT]	230
rSt-	[FAULT RESET]	230
Atr-	[AUTOMATIC RESTART]	231
FLr-	[CATCH ON THE FLY]	232
tHt-	[MOTOR THERMAL PROT.]	234
OPL-	[OUTPUT PHASE LOSS]	235
IPL-	[INPUT PHASE LOSS]	235
OHL-	[DRIVE OVERHEAT]	236
SAt-	[THERMAL ALARM STOP]	237
EtF-	[EXTERNAL FAULT]	238
USb-	[UNDERVOLTAGE MGT]	239
t It-	[IGBT TESTS]	240
LFL-	[4-20mA LOSS]	241
InH-	[FAULT INHIBITION]	242
CLL-	[COM. FAULT MANAGEMENT]	243
Sdd-	[ENCODER FAULT]	244
t Id-	[TORQUE OR I LIM. DETECT]	244
FqF-	[FREQUENCY METER]	246
dLd-	[DYNAMIC LOAD DETECT.]	248
brP-	[DB RES. PROTECTION]	249
bUF-	[BU PROTECTION]	249
tnF-	[AUTO TUNING FAULT]	249
PPI-	[CARDS PAIRING]	250
LFF-	[FALLBACK SPEED]	251
FSt-	[RAMP DIVIDER]	251
dCI-	[DC INJECTION]	251

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The parameters in the [1.8 FAULT MANAGEMENT] (FLt-) menu can only be modified when the drive is stopped and there is no run command, except for parameters with a ( ) symbol in the code column, which can be modified with the drive running or stopped.

PTC probes

3 sets of PTC probes can be managed by the drive in order to help protect the motors:

- 1 on logic input LI6 converted for this use by switch SW2 on the control card.
- 1 on each of the 2 option cards VW3A3201 and VW3A3202.

Each of these sets of PTC probes is monitored for the following faults:

- Motor overheating
- Sensor break fault
- Sensor short-circuit fault

Protection via PTC probes does not disable protection via I^2t calculation performed by the drive (the two types of protection can be combined).

Code	Name/Description	Factory setting
PtC-	**[PTC MANAGEMENT]**	
PtCL	[LI6 = PTC probe]	[No] (nO)
	Can be accessed if switch SW2 on the control card is set to PTC.	
nO	[No] (nO): Not used	
AS	[Always] (AS): "PTC probe" faults are monitored permanently, even if the power supply is not connected (as long as the control remains connected to the power supply).	
rdS	[Power ON] (rdS): "PTC probe" faults are monitored while the drive power supply is connected.	
rS	[Motor ON] (rS): "PTC probe" faults are monitored while the motor power supply is connected.	
PtC1	[PTC1 probe]	[No] (nO)
	Can be accessed if a VW3A3201 option card has been inserted.	
nO	[No] (nO): Not used	
AS	[Always] (AS): "PTC probe" faults are monitored permanently, even if the power supply is not connected (as long as the control remains connected to the power supply).	
rdS	[Power ON] (rdS): "PTC probe" faults are monitored while the drive power supply is connected.	
rS	[Motor ON] (rS): "PTC probe" faults are monitored while the motor power supply is connected.	
PtC2	[PTC2 probe]	[No] (nO)
	Can be accessed if a VW3A3202 option card has been inserted.	
nO	[No] (nO): Not used	
AS	[Always] (AS): "PTC probe" faults are monitored permanently, even if the power supply is not connected (as long as the control remains connected to the power supply).	
rdS	[Power ON] (rdS): "PTC probe" faults are monitored while the drive power supply is connected.	
rS	[Motor ON] (rS): "PTC probe" faults are monitored while the motor power supply is connected.	
rSt-	**[FAULT RESET]**	
rSF	❑ **[Fault reset]**	[No] (nO)
	Manual fault reset	
nO	[No] (nO): Function inactive	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted	
-	[LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted	
C101	[C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO)	
-	[C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO)	
-	[C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO)	
-	[C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO)	
Cd00	[CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs	
-	[CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs	
	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 pages 282 to 286 for a list of faults that can be reset manually.	

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Code	Name/Description	Factory setting
rSt-	**[FAULT RESET]** (continued)	
rP	[Product reset]	[No] (nO)
	Parameter can only be accessed in [ACCESS LEVEL] = [Expert] mode. Drive reinitialization. Can be used to reset all faults without having to disconnect the drive from the power supply. nO [No] (nO): Function inactive YES [Yes] (YES): Reinitialization. Press and hold down the "ENT" key for 2 s. The parameter changes back to [No] (nO) automatically as soon as the operation is complete. The drive can only be reinitialized when locked. ☞ **NOTE:** Make sure that the cause of the fault that led to the drive locking has been removed before reinitializing.	
rPA	[Product reset assig.]	[No] (nO)
	Parameter can only be modified in [ACCESS LEVEL] = [Expert] mode. Drive reinitialization via logic input. Can be used to reset all faults without having to disconnect the drive from the power supply. The drive is reinitialized on a rising edge (change from 0 to 1) of the assigned input. The drive can only be reinitialized when locked. nO [No] (nO): Function inactive LI1 [LI1] (LI1) to [LI6] (LI6) - [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted LI14 [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted. To assign reinitialization, press and hold down the "ENT" key for 2 s. ☞ **NOTE:** Make sure that the cause of the fault that led to the drive locking has been removed before reinitializing.	
Atr-	**[AUTOMATIC RESTART]**	
Atr	[Automatic restart]	[No] (nO)
	nO [No] (nO): Function inactive YES [Yes] (YES): 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 the following attempts. The assigned fault relay remains activated if this function is active. The speed reference and the operating direction must be maintained. Use 2-wire control ([2/3 wire control] (tCC) = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL) see page 105). . **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** Verify that an automatic restart will not endanger personnel or equipment. **Failure to follow these instructions will result in death or serious injury.** If the restart has not taken place once the configurable time tAr has elapsed, the procedure is aborted and the drive remains locked until it is turned off and then on again. The faults, which permit this function, are listed on page 285:	
tAr	[Max. restart time]	[5 minutes] (5)
	5 [5 min] (5): 5 minutes 10 [10 minutes] (10): 10 minutes 30 [30 minutes] (30): 30 minutes 1h [1 hour] (1h): 1 hour 2h [2 hours] (2h): 2 hours 3h [3 hours] (3h): 3 hours Ct [Unlimited] (Ct): Unlimited This parameter appears if [Automatic restart] (Atr) = [Yes] (YES). It can be used to limit the number of consecutive restarts on a recurrent fault.	

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Code	Name/Description	Adjustment range	Factory setting
FLr-	**[CATCH ON THE FLY]** **NOTE:** This function cannot be used with certain other functions. Follow the instructions on page 147.		
FLr	**[Catch on the fly]**		[No] (nO)
	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 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. nO [No] (nO): Function inactive YES [Yes] (YES): Function active When the function is operational, it activates at each run command, resulting in a slight delay of the current (0.5 s max.). [Catch on the fly] (FLr) is forced to [No] (nO) if brake logic control [Brake assignment] (bLC) is assigned (page 173) or if [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync.CL] (FSY), or if, in open-loop control, [Auto DC injection] (AdC), page 157 = [Continuous] (Ct).		
UCb	[Sensitivity]	0.4 to 15%	0.6%
	The parameter can be accessed at and above 55 kW (75 hp) for the ATV71●●●M3X and at and above 90 kW (120 hp) for the ATV71●●●N4. Adjusts the catch-on-the-fly sensitivity around the zero speed. Decrease the value if the drive is not able to perform the catch on the fly, and increase it if the drive locks on a fault as it performs the catch on the fly.		

Parameter that can be modified during operation or when stopped.

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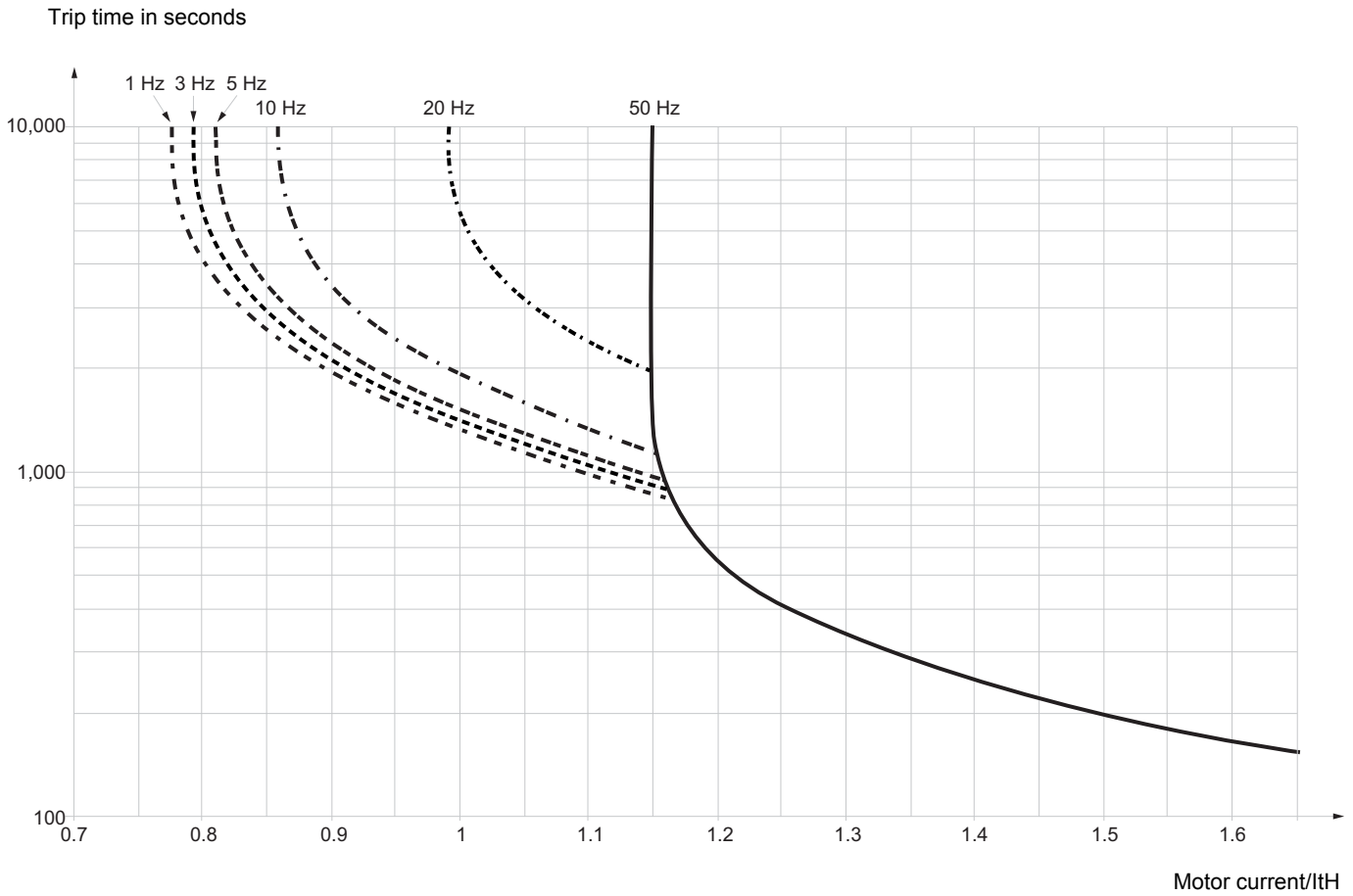
Motor thermal protection

Function:

Thermal protection by calculating the I^2t.

NOTE: The memory of the motor thermal state is saved when the drive is switched off. The power-off time is used to recalculate the thermal state the next time the drive is switched on.

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



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Code	Name/Description	Adjustment range	Factory setting
tHt-	**[MOTOR THERMAL PROT.]**		
tHt	[Motor protect. type]		[Self cooled] (ACL)
nO	[No] (nO): No protection.		
ACL	[Self cooled] (ACL): For self-cooled motors		
FCL	[Force-cool] (FCL): For force-cooled motors		
	Note: A fault trip will occur when the thermal state reaches 118% of the rated state and reactivation will occur when the state falls back below 100%.		
ttd	[Motor therm. level] (1)	0 to 118%	100%
	Trip threshold for motor thermal alarm (logic output or relay)		
ttd2	[Motor2 therm. level]	0 to 118%	100%
	Trip threshold for motor 2 thermal alarm (logic output or relay)		
ttd3	[Motor3 therm. level]	0 to 118%	100%
	Trip threshold for motor 3 thermal alarm (logic output or relay)		
OLL	[Overload fault mgt]		[Freewheel] (YES)
	Type of stop in the event of a motor thermal fault.		
nO	[Ignore] (nO): Fault detection ignored.		
YES	[Freewheel] (YES): Freewheel stop.		
Stt	[Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g., according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	[fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (2).		
rLS	[Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (2).		
rMP	[Ramp stop] (rMP): Stop on ramp.		
FSt	[Fast stop] (FSt): Fast stop.		
dCI	[DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 147.		

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
2. Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

Parameter that can be modified during operation or when stopped.

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Code	Name/Description	Adjustment range	Factory setting
OPL -	**[OUTPUT PHASE LOSS]**		
OPL	[Output Phase Loss]		[Yes] (YES)
nO YES OAC	[No] (nO): Function inactive [Yes] (YES): Tripping on OPF fault with freewheel stop. [Output cut] (OAC): No fault triggered, but management of the output voltage in order to avoid an overcurrent when the link with the motor is re-established and catch on the fly performed (even if this function has not been configured). This configuration is not possible at and above 55 kW (75 hp) for ATV71●●●M3X and at and above 90 kW (120 hp) for ATV71●●●N4 if [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn) or [Sync.CL] (FSY). **NOTE:** Note: [Output phase loss] (OPL) is forced to [No] (nO) if [Motor control type] (Ctt), page 74 = [Sync. mot.] (SYn). For other [Motor control type] (Ctt) configurations, [Output phase loss] (OPL) is forced to [Yes] (YES) if brake logic control is configured (see page 173).		
OdT ( )	[OutPh time detect]	0.5 to 10 s	0.5 s
	Time delay for taking the [Output Phase Loss] (OPL) fault into account.		
IPL -	**[INPUT PHASE LOSS]**		
IPL	[Input phase loss]		According to drive rating
nO YES	[Ignore] (nO): Fault detection ignored, to be used when the drive is supplied via a single phase supply or by the DC bus. [Freewheel] (YES): Fault with freewheel stop. If one phase disappears, the drive switches to fault mode [Input phase loss] (IPL) but if 2 or 3 phases disappear, the drive continues to operate until it trips on an undervoltage fault. Factory setting: [Ignore] (nO) for ATV71p037M3 to U30M3, [Freewheel] (YES) for all others.		

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

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Code	Name/Description	Adjustment range	Factory setting
OHL -	**[DRIVE OVERHEAT]**		
OHL	[Overtemp fault mgt]		[Freewheel] (YES)
	Behavior in the event of the drive overheating		
nO	[Ignore] (nO): Fault detection ignored.		
	CAUTION **RISK OF EQUIPMENT DAMAGE** • The drive and motor are no longer protected in the event of thermal alarm stops. This invalidates the warranty. • Verify that the possible consequences do not present any risk. **Failure to follow these instructions can result in equipment damage.**		
YES	[Freewheel] (YES): Freewheel stop.		
Stt	[Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g., according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	[fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).		
rLS	[Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).		
rMP	[Ramp stop] (rMP): Stop on ramp.		
FSt	[Fast stop] (FSt): Fast stop.		
dCI	[DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 147.		
	NOTE: A fault trip will occur when the thermal state reaches 118% of the rated state and reactivation will occur when the state falls back below 90%.		
tHA	[Drv therm. state al]	0 to 118%	100%
	Trip threshold for drive thermal alarm (logic output or relay)		

1. Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

Parameter that can be modified during operation or when stopped.

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Deferred stop on thermal alarm

This function is designed in particular for elevator applications. It prevents the elevator stopping between two floors if the drive or motor overheats, by authorizing operation until the next stop. At the next stop, the drive is locked until the thermal state falls back to a value, which undershoots the set threshold by 20%. Example: A trip threshold set at 80% enables reactivation at 60%.
One thermal state threshold must be defined for the drive, and one thermal state threshold for the motor(s), which will trip the deferred stop.

Code	Name/Description	Adjustment range	Factory setting
SAt -	**[THERMAL ALARM STOP]**		
SAt	**[Thermal alarm stop]**		[No] (nO)
nO YES	[No] (nO): Function inactive (in this case, the following parameters cannot be accessed) [Yes] (YES): Freewheel stop on drive or motor thermal alarm		
tHA ( )	[Drv therm. state al] Thermal state threshold of the drive tripping the deferred stop.	0 to 118%	100%
ttd ( )	[Motor therm. level] Thermal state threshold of the motor tripping the deferred stop.	0 to 118%	100%
ttd2 ( )	[Motor2 therm. level] Thermal state threshold of the motor 2 tripping the deferred stop.	0 to 118%	100%
ttd3 ( )	[Motor3 therm. level] Thermal state threshold of the motor 3 tripping the deferred stop.	0 to 118%	100%

CAUTION

OVERHEATED EQUIPMENT

- The drive and motor are no longer monitored if Thermal Alarm Stop is set to No.
- Verify that the possible consequences do not present any danger.

Failure to follow these instructions can result in equipment damage.

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

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Code	Name/Description	Adjustment range	Factory setting
EtF-	**[EXTERNAL FAULT]**		
EtF	[External fault ass.]		[No] (nO)
nO	[No] (nO): Function inactive		
LI1	[LI1] (LI1)		
-	:		
-	:		
-	[...] (...): See the assignment conditions on page 141.		
	If the assigned bit is at 0, there is no external fault. If the assigned bit is at 1, there is an external fault. Logic can be configured via [External fault config] (LEt) if a logic input has been assigned.		
LEt	[External fault config]		[Active high] (HIG)
	Parameter can be accessed if the external fault has been assigned to a logic input. It defines the positive or negative logic of the input assigned to the fault.		
LO	[Active low] (LO): Fault on falling edge (change from 1 to 0) of the assigned input.		
HIG	[Active high] (HIG): Fault on rising edge (change from 0 to 1) of the assigned input.		
EPL	[External fault mgt]		[Freewheel] (YES)
	Type of stop in the event of an external fault		
nO	[Ignore] (nO): Fault detection ignored.		
YES	[Freewheel] (YES): Freewheel stop.		
Stt	[Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g., according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	[fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).		
rLS	[Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).		
rMP	[Ramp stop] (rMP): Stop on ramp.		
FSt	[Fast stop] (FSt): Fast stop.		
dCI	[DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 147.		

1. Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

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Code	Name/Description	Adjustment range	Factory setting
USb-	**[UNDERVOLTAGE MGT]**		
USb	[UnderV. fault mgt]		[Flt&R1open] (0)
	Behavior of the drive in the event of an undervoltage		
0	[Flt&R1open] (0): Fault and fault relay open.		
1	[Flt&R1close] (1): Fault and fault relay closed.		
2	[Alarm] (2): Alarm and fault relay remains closed. The alarm can be assigned to a logic output or a relay.		
UrES	[Mains voltage]	According to drive voltage rating	According to drive voltage rating
	Rated voltage of the line supply in V. **For ATV71ATV71●●●M3:**		
200	[200V ac] (200): 200 Volts AC		
220	[220V ac] (220): 220 Volts AC		
240	[240V ac] (240): 240 Volts AC		
260	[260V ac] (260): 260 Volts AC (factory setting)		
	For ATV71●●●N4:		
380	[380V ac] (380): 380 Volts AC		
400	[400V ac] (400): 400 Volts AC		
440	[440V ac] (440): 440 Volts AC		
460	[460V ac] (460): 460 Volts AC		
480	[480V ac] (480): 480 Volts AC (factory setting)		
USL	[Undervoltage level] Undervoltage trip level setting in V. The adjustment range and factory setting are determined by the drive voltage rating and the [Mains voltage] (UrES) value.		
USt	[Undervolt. time out]	0.2 s to 999.9 s	0.2 s
	Time delay for taking undervoltage into account		
StP	[UnderV. prevention]		[No] (nO)
	Behavior in the event of the undervoltage fault prevention level being reached		
nO	[No] (nO): No action		
nMS	[DC Maintain] (MMS): This stop mode uses the inertia to maintain the DC bus voltage as long as possible.		
rMP	[Ramp stop] (rMP): Stop following an adjustable ramp [Max stop time] (StM).		
LnF	[Lock-out] (LnF): Lock (freewheel stop) without fault		
tSn	[UnderV. restart tm]	1.0 s to 999.9 s	1.0 s
	Time delay before authorizing the restart after a complete stop for [UnderV. prevention] (StP) = [Ramp stop] (rMP), if the voltage has returned to normal.		
UPL	[Prevention level] Undervoltage fault prevention level setting in V, which can be accessed if [UnderV. prevention] (StP) is not [No] (nO). The adjustment range and factory setting are determined by the drive voltage rating and the [Mains voltage] (UrES) value.		
Stn ( )	[Max stop time]	0.01 to 60.00 s	1.00 s
	Ramp time if [UnderV. prevention] (StP) = [Ramp stop] (rMP).		
tbS ( )	[DC bus maintain tm]	1 to 9999 s	9999 s
	DC bus maintain time if [UnderV. prevention] (StP) = [DC Maintain] (MMS).		

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

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Code	Name/Description	Factory setting
tIt-	**[IGBT TESTS]**	
Strt	[IGBT test]	[No] (nO)
nO YES	[No] (nO): No test [Yes] (YES): The IGBTs are tested on power up and every time a run command is sent. These tests cause a slight delay (a few ms). If the tests are not passed, the drive will lock. The following conditions can be detected: - Drive output short-circuit (terminals U-V-W): SCF display - IGBT did not pass the test: xtF, where x indicates the number of the IGBT concerned - IGBT short-circuited: x2F, where x indicates the number of the IGBT concerned	

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Code	Name/Description	Factory setting
LFL-	**[4-20mA LOSS]**	
LFL2	[AI2 4-20mA loss]	[Ignore] (nO)
nO	[Ignore] (nO): Fault detection ignored. This configuration is the only one possible if [AI2 min. value] (CrL2), page 111 is not greater than 3 mA or if [AI2 Type] (AI2t), page 111 = [Voltage] (10U).	
YES	[Freewheel] (YES): Freewheel stop.	
Stt	[Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g., according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).	
rLS	[Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).	
rMP	[Ramp stop] (rMP): Stop on ramp.	
FSt	[Fast stop] (FSt): Fast stop.	
dCI	[DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 147.	
LFL3	[AI3 4-20mA loss]	[Ignore] (nO)
nO	[Ignore] (nO): Fault detection ignored. This configuration is the only one possible if [AI3 min. value] (CrL3), page 112 is not greater than 3 mA.	
YES	[Freewheel] (YES): Freewheel stop.	
Stt	[Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g., according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).	
rLS	[Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).	
rMP	[Ramp stop] (rMP): Stop on ramp.	
FSt	[Fast stop] (FSt): Fast stop.	
dCI	[DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 147.	
LFL4	[AI4 4-20mA loss]	[Ignore] (nO)
nO	[Ignore] (nO): Fault detection ignored. This configuration is the only one possible if [AI4 min. value] (CrL4), page 113 is not greater than 3 mA or if [AI4 Type] (AI4t), page 113 = [Voltage] (10U).	
YES	[Freewheel] (YES): Freewheel stop.	
Stt	[Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g., according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).	
rLS	[Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).	
rMP	[Ramp stop] (rMP): Stop on ramp.	
FSt	[Fast stop] (FSt): Fast stop.	
dCI	[DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 147.	

1. Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

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Parameter can be accessed in [Expert] mode.

Code	Name/Description	Factory setting
InH-	**[FAULT INHIBITION]**	
InH	[Fault inhibit assign.]	[No] (nO)

To assign fault inhibit, press and hold down the “ENT” key for 2 s.

⚠ DANGER

LOSS OF PERSONNEL AND EQUIPMENT PROTECTION

- Enabling the fault inhibition parameter (InH) will disable the drive protection features.
- InH should not be enabled for typical applications of this equipment.
- InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection poses a greater risk than personnel injury or equipment damage.

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

nO
LI1
-
-
-

[No] (nO): Function inactive
[LI1] (LI1)
:
:
[...] (...): See the assignment conditions on page 141.
If the assigned input or bit is at 0, fault monitoring is active. If the assigned input or bit is at 1, fault monitoring is inactive. Active faults are cleared on a rising edge (change from 0 to 1) of the assigned input or bit.

NOTE: The Power Removal function and any assigned faults that prevent any form of operation are not affected by this function.
A list of faults affected by this function appears on pages 282 to 287.

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Code	Name/Description	Factory setting
CLL-	**[COM. FAULT MANAGEMENT]**	
CLL	[Network fault mgt]	[Freewheel] (YES)
	Behavior of the drive in the event of a communication fault with a communication card	
nO	[Ignore] (nO): Fault detection ignored.	
YES	[Freewheel] (YES): Freewheel stop.	
Stt	[Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g., according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).	
rLS	[Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).	
rMP	[Ramp stop] (rMP): Stop on ramp.	
FSt	[Fast stop] (FSt): Fast stop.	
dCI	[DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 147.	
COL	[CANopen fault mgt]	[Freewheel] (YES)
	Behavior of the drive in the event of a communication fault with integrated CANopen	
nO	[Ignore] (nO): Fault detection ignored.	
YES	[Freewheel] (YES): Freewheel stop.	
Stt	[Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g., according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).	
rLS	[Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).	
rMP	[Ramp stop] (rMP): Stop on ramp.	
FSt	[Fast stop] (FSt): Fast stop.	
dCI	[DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 147.	
SLL	[Modbus fault mgt]	[Freewheel] (YES)
	Behavior of the drive in the event of a communication fault with integrated Modbus	
nO	[Ignore] (nO): Fault detection ignored.	
YES	[Freewheel] (YES): Freewheel stop.	
Stt	[Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g., according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).	
rLS	[Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).	
rMP	[Ramp stop] (rMP): Stop on ramp.	
FSt	[Fast stop] (FSt): Fast stop.	
dCI	[DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 147.	

1. Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

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Code	Name/Description	Adjustment range	Factory setting
Sdd-	**[ENCODER FAULT]** Can be accessed if the encoder option card has been inserted and the encoder is used for speed feedback (see page 78).		
Sdd	[Load slip detection]		[No] (nO)
nO YES	[No] (nO): Load slip is not monitored. Only the alarm may be assigned to a logic output or a relay. [Yes] (YES): Load slip is monitored. [Load slip detection] (Sdd) is forced to [Yes] (YES) if [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync.CL] (FSY). The fault is triggered by comparison with the ramp output and the speed feedback, and is only effective for speeds greater than 10% of the [Rated motor freq.] (FrS), see page 79. In the event of a fault, the drive will switch to a freewheel stop, and if the brake logic control function has been configured, the brake command will be set to 0.		
ECC	[Encoder coupling]		[No] (nO)
nO YES	[No] (nO): Encoder coupling is not monitored. [Yes] (YES): Encoder coupling is monitored. If the brake logic control function has been configured, the factory setting changes to [Yes] (YES). [Encoder coupling] (ECC) = [Yes] (YES) is only possible if [Load slip detection] (Sdd) = [Yes] (YES) and [Motor control type] (Ctt), page 74 = [FVC] (FUC) or [Sync.CL] (FSY) and [Brake assignment] (bLC), page 173 is not [No] (nO). The fault monitored is the break in the mechanical coupling of the encoder. In the event of a fault, the drive will switch to a freewheel stop, and if the brake logic control function has been configured, the brake command will be set to 0.		
ECt	[Encoder check time]	2 to 10 s	2 s
	Encoder faults filtering time. The parameter can be accessed if [Encoder coupling] (ECC) = [Yes] (YES)		
tId-	**[TORQUE OR I LIM. DETECT]**		
SSb	[Trq/I limit. stop]		[Ignore] (nO)
nO YES Stt LFF rLS rMP FSt dCI	Behavior in the event of switching to torque or current limitation [Ignore] (nO): Limitation ignored. [Freewheel] (YES): Freewheel stop. [Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g., according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. [fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1). [Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1). [Ramp stop] (rMP): Stop on ramp. [Fast stop] (FSt): Fast stop. [DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 147.		
StO ()	[Trq/I limit. time out]	0 to 9999 ms	1000 ms
	(If fault has been configured) Time delay for taking SSF "Limitation" fault into account		

1. Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

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

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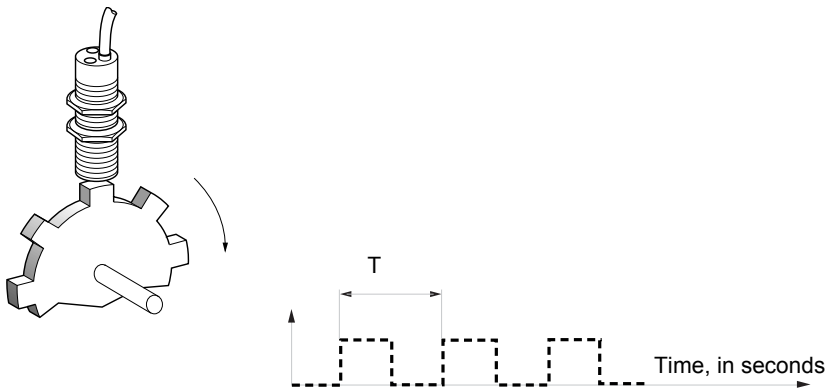
Use of the "Pulse input" input to measure the speed of rotation of the motor

This function uses the "Pulse input" input from the VW3A3202 extension card and can, therefore, only be used if this card has been inserted and if the "Pulse input" input is not being used for another function.

Example of use

An indexed disk driven by the motor and connected to a proximity sensor can be used to generate a frequency signal that is proportional to the speed of rotation of the motor.



When applied to the "Pulse input" input, this signal supports:
- Measurement and display of the motor speed: signal frequency = 1/T. This frequency is displayed by means of the [Pulse in. work. freq.] (FqS) parameter, page 55 or 57.
- Overspeed detection (if the measured speed exceeds a preset threshold, the drive will trip on a fault).
- Brake failure detection, if brake logic control has been configured: If the speed does not drop sufficiently quickly following a command to engage the brake, the drive will trip on a fault. This function can be used to detect worn brake linings.
- Detection of a speed threshold that can be adjusted using [Pulse warning thd.] (FqL), page 72 and is assignable to a relay or logic output, see page 121.

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Code	Name/Description	Adjustment range	Factory setting
F9F-	**[FREQUENCY METER]** Can be accessed if a VW3A3202 option card has been inserted		
F9F	[Frequency meter]		[No] (nO)
nO YES	Activation of the speed measurement function. [No] (nO): Function inactive, In this case, none of the function parameters can be accessed. [Yes] (YES): Function active, assignment only possible if no other functions have been assigned to the "Pulse input" input.		
F9C	[Pulse scal. divisor]	1.0 to 100.0	1.0
	• Scaling factor for the "Pulse input" input (divisor). The frequency measured is displayed by means of the [Pulse in. work. freq.] (FqS) parameter, page 55 or 57.		
F9A	[Overspd. pulse thd.]		[No] (nO)
nO -	Activation and adjustment of overspeed monitoring: [Overspeed] (SOF) fault. [No] (nO): No overspeed monitoring. 1 Hz to 30.00 Hz: Adjustment of the frequency tripping threshold on the "Pulse input" input divided by [Pulse scal. divisor] (FqC).		
tdS	[Pulse overspd delay]	0.0 s to 10.0 s	0.0 s
	Time delay for taking overspeed fault into account		
Fdt	[Level fr. pulse ctrl]		[No] (nO)
nO -	Activation and adjustment of monitoring for the input Pulse input (speed feedback): [Speed fdback loss] (SPF) fault. [No] (nO): No monitoring of speed feedback. 0.1 Hz to 500.0 Hz: Adjustment of the motor frequency threshold for tripping a speed feedback fault (difference between the estimated frequency and the measured speed).		
F9t	[Pulse thd. wo Run]		[No] (nO)
nO -	Activation and adjustment of brake failure monitoring: [Brake feedback] (brF). If brake logic control [Brake assignment] (bLC), page 173 is not configured, this parameter is forced to [No] (nO). [No] (nO): No brake monitoring. 1 Hz to 1000 Hz: Adjustment of the motor frequency threshold for tripping a brake failure fault (detection of speeds other than zero).		
t9b	[Pulse thd. wo Run]	0.0 s to 10.0 s	0.0 s
	Time delay for taking brake failure fault into account.		

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Load variation detection

This detection is only possible with the "high-speed hoisting" function. It can be used to detect if an obstacle has been reached, triggering a sudden (upward) increase or (downward) decrease in the load.
Load variation detection triggers a [Dynamic load fault] (dLF) fault. The [Dyn. load Mgt.] (dLb) parameter can be used to configure the response of the drive in the event of this fault.
Load variation detection can also be assigned to a relay or a logic output.

There are two possible detection modes, depending on the configuration of high-speed hoisting:

"Speed reference" mode

[High speed hoisting] (HSO), page 186 = [Speed ref] (SSO).
Torque variation detection.

During high-speed operation, the load is compared to that measured during the speed step. The permissible load variation and its duration can be configured. If exceeded, the drive switches to fault mode.

"Current limitation" mode

[High speed hoisting] (HSO), page 186 = [Current Limit] (CSO).

On ascend, during high-speed operation, an increase in load will result in a drop in speed. Even if high-speed operation has been activated, if the motor frequency drops below the [I Limit Frequency] (SCL) threshold page 186 the drive will switch to fault mode.
On descend, operation takes the form of "speed reference" mode.

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Code	Name/Description	Adjustment range	Factory setting
dLd-	**[DYNAMIC LOAD DETECT.]** Load variation detection. This can be accessed if [High speed hoisting] (HSO), page 186 is not [No] (nO).		
tLd	[Dynamic load time]		[No] (nO)
	Activation of load variation detection and adjustment of time delay for taking load variation fault[Dynamic load fault] (dLF) into account. nO [No] (nO): No load variation detection. - 0.00 s to 10.00 s: Adjustment of the time delay for taking fault into account.		
dLd	[Dynamic load time]	1 to 100 %	100 %
	Adjustment of the trip threshold for load variation detection, as a % of the load measured during the speed step.		
dLb	[Dyn. load Mgt.]		[Freewheel] (YES)
	Behavior of the drive in the event of a load variation fault. nO [Ignore] (nO): Fault detection ignored. YES [Freewheel] (YES): Freewheel stop. Stt [Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt), page 155, without tripping the drive. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel, (e.g. according to [2/3 wire control] (tCC) and [2 wire type] (tCt), page 105 if control is via the terminals). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. LFF [Fallback spd.] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1). rLS [Spd maint.] (rLS): The drive maintains the speed at the time the fault occurred, as long as the fault persists and the run command has not been removed (1). rMP [Ramp stop] (rMP): Stop on ramp. FSt [Fast stop] (FSt): Fast stop.		

1. Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

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Code	Name/Description	Adjustment range	Factory setting
brP-	**[DB RES. PROTECTION]**		
brO	[DB res. protection]		[No] (nO)
nO	[No] (nO): No braking resistor protection (thereby preventing access to the other function parameters).		
YES	[Alarm] (YES): Alarm. The alarm may be assigned to a logic output or a relay (see page 121)		
FLt	[Fault] (FLt): Switch to fault code (bOF) and stop the drive (freewheel stop).		
	☞ **NOTE:** The thermal state of the resistor can be displayed on the graphic display terminal. It is calculated for as long as the drive control remains connected to the power supply.		
brP ( )	[DB Resistor Power]	0.1 kW (0.13 hp) to 1000 kW (1333 hp)	0.1 kW (0.13 hp)
	This parameter can be accessed if [DB res. protection] (brO) is not [No] (nO). Rated power of the resistor used.		
brU ( )	[DB Resistor value]	0.1 to 200 ohms	0.1 ohms
	This parameter can be accessed if [DB res. protection] (brO) is not [No] (nO). Rated value of the braking resistor in ohms.		
bUF-	**[BU PROTECTION]** This can be accessed from 55 kW (75 hp) upwards for the ATV71●●●M3X and from 90 kW (120 hp) upwards for the ATV71●●●N4.		
bUb	[Brake res. fault Mgt]		[Freewheel] (YES)
	Management of short-circuit [DB unit sh. circuit] (bUF) and overheating [Internal- th. sensor] (InFb) in the braking unit.		
nO	[Ignore] (nO): Fault detection ignored. Configuration to be used if there is no resistor or braking unit connected to the drive.		
YES	[Freewheel] (YES): freewheel stop.		
tnF-	**[AUTO TUNING FAULT]**		
tnL	[Autotune fault mgt]		[Freewheel] (YES)
nO	[Ignore] (nO): Fault detection ignored.		
YES	[Freewheel] (YES): Freewheel stop.		

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

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Card pairing

Function can only be accessed in [Expert] mode.
This function is used to detect whenever a card has been replaced or the software has been modified in any way.
When a pairing password is entered, the parameters of the cards currently inserted are stored. On every subsequent power-up these parameters are verified and, in the event of a discrepancy, the drive locks in HCF fault mode. Before the drive can be restarted you must revert to the original situation or re-enter the pairing password.

The following parameters are verified:
- The type of card for: all cards.
- The software version for: the two control cards, the VW3A3202 extension card, the Controller Inside card and the communication cards.
- The serial number for: the two control cards.

Code	Name/Description	Adjustment range	Factory setting
PPI-	**[CARDS PAIRING]**		
PPI	[Pairing password]	OFF to 9999	[OFF] (OFF)
	The [OFF] (OFF) value signifies that the card pairing function is inactive. The [ON] (On) value signifies that card pairing is active and that an access code must be entered in order to start the drive in the event of a card pairing fault. As soon as the code has been entered the drive is unlocked and the code changes to [ON] (On). - The PPI code is an unlock code known only to Schneider Electric Product Support.		

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Code	Name/Description	Adjustment range	Factory setting
LFF-	**[FALLBACK SPEED]**		
LFF	[Fallback speed] Selection of the fallback speed	0 to 1600 Hz	0 Hz
FSt-	**[RAMP DIVIDER]**		
dCF ↻	[Ramp divider] (1) The ramp that is enabled (dEC or dE2) is then divided by this coefficient when stop requests are sent. Value 0 corresponds to a minimum ramp time.	0 to 10	4
dCI-	**[DC INJECTION]**		
IdC ↻	[DC inject. level 1] (1) (3) Level of DC injection braking current activated via logic input or selected as stop mode. **CAUTION** **EXCESSIVE MOTOR TEMPERATURE** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.**	0.1 to 1.41 In (2)	0.64 In (2)
tdI ↻	[DC injection time 1] (1) (3) Maximum current injection time [DC inject. level 1] (IdC). After this time the injection current becomes [DC inject. level 2] (IdC2).	0.1 to 30 s	0.5 s
IdC2 ↻	[DC inject. level 2] (1) (3) Injection current activated by logic input or selected as stop mode, once period of time [DC injection time 1] (tdI) has elapsed. **CAUTION** **EXCESSIVE MOTOR TEMPERATURE** Verify that the motor will withstand this current without overheating. **Failure to follow these instructions can result in equipment damage.**	0.1 In (2) to [DC inject. level 1] (IdC)	0.5 In (2)
tdC ↻	[DC injection time 2] (1) (3) Maximum injection time [DC inject. level 2] (IdC2) for injection, selected as stop mode only. (Can be accessed if [Type of stop] (Stt) = [DC injection] (dCI)).	0.1 to 30 s	0.5 s

1. The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) and [1.7 APPLICATION FUNCT.] (FUn-) menus.
2. In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.
3. Warning: These settings are independent of the [AUTO DC INJECTION] (AdC-) function.

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

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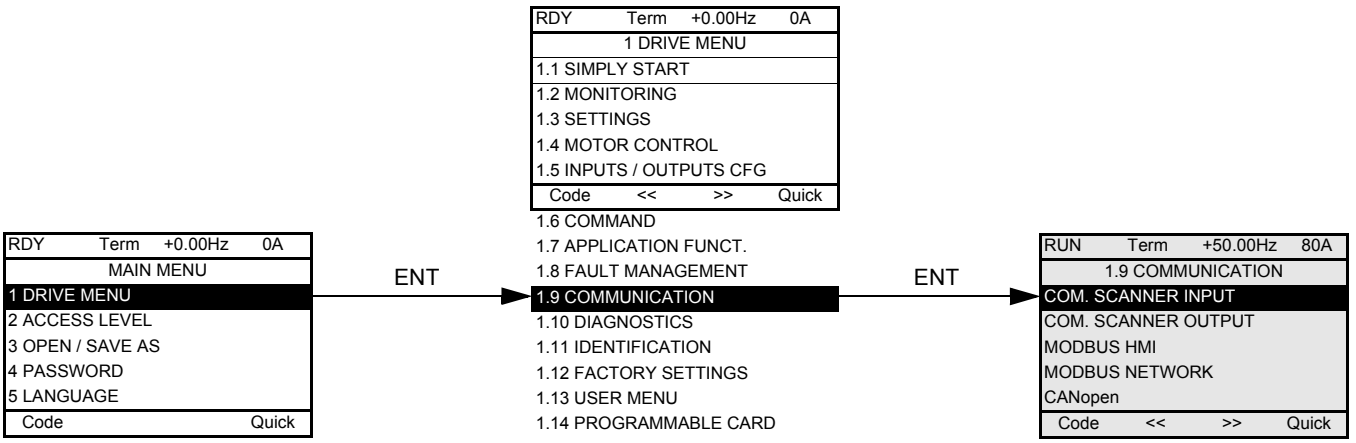
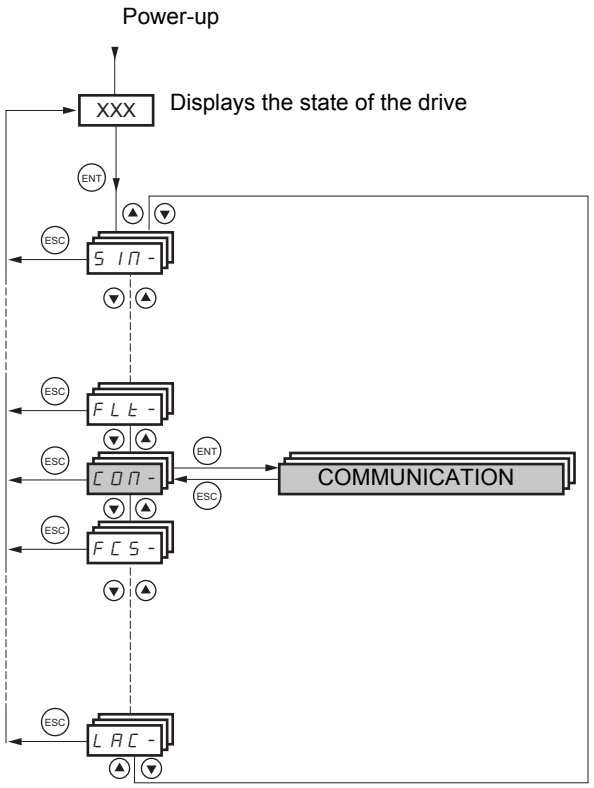
[1.9 COMMUNICATION] (COM-)

With graphic display terminal:



With integrated display terminal:



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Code	Name/Description	Factory setting
	[COM. SCANNER INPUT] **Only accessible via graphic display terminal**	
nMA1	[Scan. IN1 address] Address of the 1st input word.	3201
nMA2	[Scan. IN2 address] Address of the 2nd input word.	8604
nMA3	[Scan. IN3 address] Address of the 3rd input word.	0
nMA4	[Scan. IN4 address] Address of the 4th input word.	0
nMA5	[Scan. IN5 address] Address of the 5th input word.	0
nMA6	[Scan. IN6 address] Address of the 6th input word.	0
nMA7	[Scan. IN7 address] Address of the 7th input word.	0
nMA8	[Scan. IN8 address] Address of the 8th input word.	0
	[COM. SCANNER OUTPUT] **Only accessible via graphic display terminal**	
nCA1	[Scan.Out1 address] Address of the 1st output word.	8501
nCA2	[Scan.Out2 address] Address of the 2nd output word.	8602
nCA3	[Scan.Out3 address] Address of the 3rd output word.	0
nCA4	[Scan.Out4 address] Address of the 4th output word.	0
nCA5	[Scan.Out5 address] Address of the 5th output word.	0
nCA6	[Scan.Out6 address] Address of the 6th output word.	0
nCA7	[Scan.Out7 address] Address of the 7th output word.	0
nCA8	[Scan.Out8 address] Address of the 8th output word.	0

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Code	Name/Description	Factory setting
Nd2-	**[MODBUS HMI]** Communication with the graphic display terminal	
tbr2	[HMI baud rate] 9.6 or 19.2 kbps via the integrated display terminal. 9600 or 19200 bauds via the graphic display terminal. The graphic display terminal only operates if [HMI baud rate] (tbr2) = 19200 bauds (19.2 kbps). In order for any change in the assignment of [HMI baud rate] (tbr2) to be taken into account you must: - Provide confirmation in a confirmation window if using the graphic display terminal - Press the ENT key for 2 s if using the integrated display terminal	19.2 kbps
tFO2	[HMI format] Read-only parameter, cannot be modified.	8E1
Nd1-	**[MODBUS NETWORK]**	
Add	[Modbus Address] OFF to 247	OFF
ANOA	[Modbus add Prg C.] Modbus address of the Controller Inside card OFF at 247 The parameter can be accessed if the Controller Inside card has been inserted and depending on its configuration (please consult the specific documentation).	OFF
ANOC	[Modbus add Com.C.] Modbus address of the communication card OFF to 247 The parameter can be accessed if a communication card has been inserted and depending on its configuration (please consult the specific documentation).	OFF
tbr	[Modbus baud rate] 4.8 - 9.6 - 19.2 - 38.4 kbps on the integrated display terminal. 4800, 9600, 19200 or 38400 bauds on the graphic display terminal.	19.2 kbps
tFO	[Modbus format] 8O1 - 8E1 - 8n1, 8n2	8E1
ttO	[Modbus time out] 0.1 to 30 s	10.0 s
CnO-	**[CANopen]**	
AdCO	[CANopen address] OFF to 127	OFF
bdCO	[CANopen bit rate] 50 - 125 - 250 - 500 kbps - 1 Mbps	125 kbps
ErCO	[Error code] Read-only parameter, cannot be modified.	

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Code	Name/Description	Factory setting
-	**[COMMUNICATION CARD]** See the specific documentation for the card used.	
LCF-	**[FORCED LOCAL]**	
FLO	[Forced local assign.]	[No] (nO)
nO	[No] (nO): Function inactive	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-		
LI14	[LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted	
	Forced local mode is active when the input is at state 1. [Forced local assign.] (FLO) is forced to [No] (nO) if [Profile] (CHCF), page 142 = [I/O profile] (IO).	
FLOC	[Forced local Ref.]	[No] (nO)
nO	[No] (nO): Not assigned (control via the terminals with zero reference).	
AI1	[AI1] (AI1): Analog input	
AI2	[AI2] (AI2): Analog input	
AI3	[AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted	
AI4	[AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted	
LCC	[HMI] (LCC): Assignment of the reference and command to the graphic display terminal. Reference: [HMI Frequency ref.] (LFr), page 55, command: RUN/STOP/FWD/REV buttons.	
PI	[RP] (PI): Frequency input, if VW3A3202 extension card has been inserted	
PG	[Encoder] (PG): Encoder input, if encoder card has been inserted	
	If the reference is assigned to an analog input, [RP] (PI) or [Encoder] (PG) the command is automatically assigned to the terminals as well (logic inputs)	
FLOT	[Time-out forc. local]	10.0 s
	0.1 to 30 s The parameter can be accessed if [Forced local assign.] (FLO) is not [No] (nO). Time delay before communication monitoring is resumed on leaving forced local mode.	

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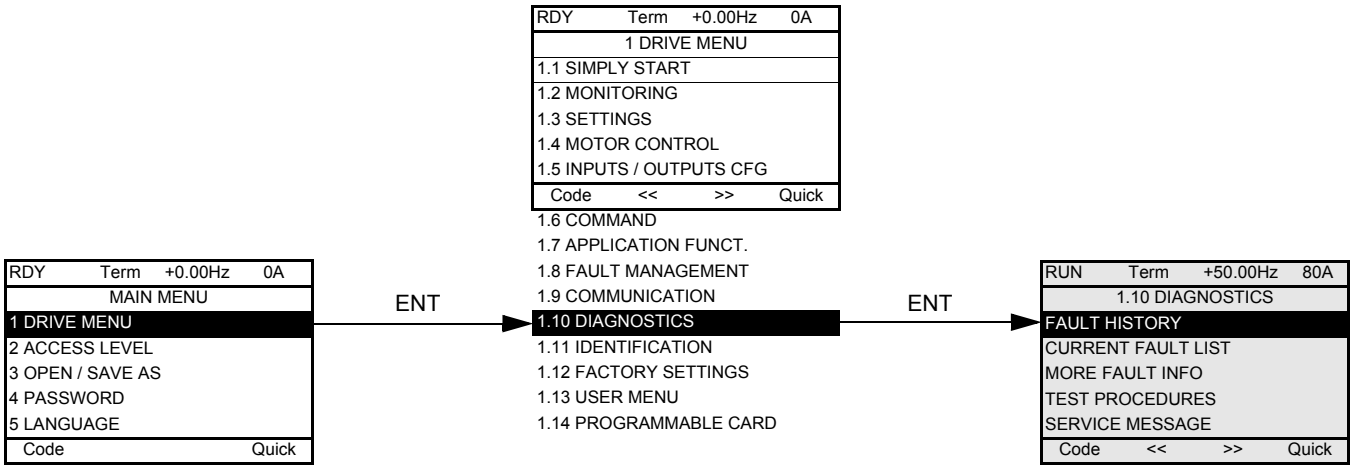
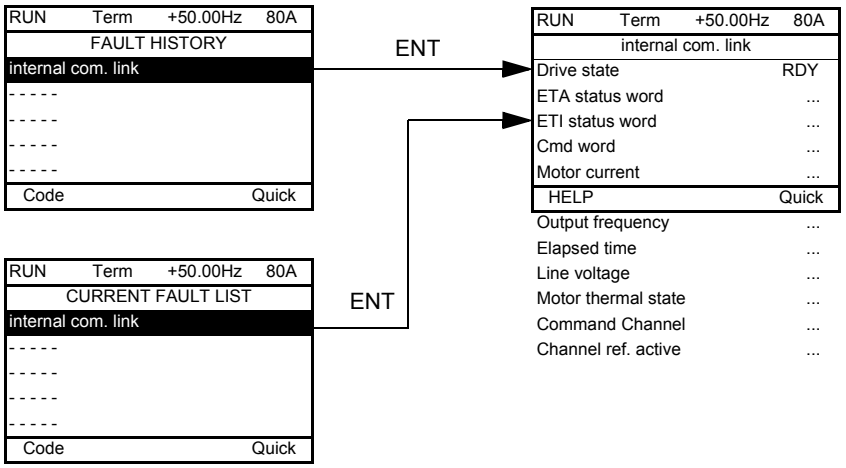
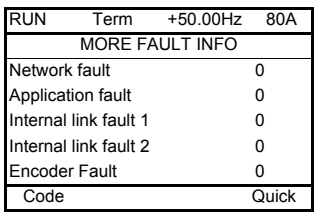
[1.10 DIAGNOSTICS]

This menu can only be accessed with the graphic display terminal.





This screen indicates the state of the drive at the moment the selected fault occurred.



This screen indicates the number of communication faults, for example, with the option cards. Number: from 0 to 65535

For [Encoder Fault], which is only visible if a VW3 A3 408 or VW3 A3 409 has been inserted, the figure displayed corresponds to one of the fault codes summarized in the table on page 257.

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Summary table of types of [Encoder Fault]

Code	Description of the error
0	No error, except if the control section has a separate power supply, in which case the power section must be turned on to display the actual code.
1	Internal UE/MC communication fault (CRC fault)
2	Internal UE/MC communication fault (time out)
16	Synchronization error (PLL error)
17	Encoder signal cut or short-circuited
18	PUC emulation fault
19	Resolver: Unstable feedback signal
20	Internal card communication fault
21	Resolver: Feedback signal too weak
22	Resolver: Feedback signal too strong
23	Encoder overcurrent
32	EnDAT: CRC error
33	EnDAT: Start bit not detected
34	EnDAT: EEP access error
35	EnDAT: Incorrect EEP value
48	Hiperface: Incoherent SinCos signal
49	Hiperface: Time out
50	Hiperface: Unknown encoder
51	Hiperface: CRC error
64	SinCos: Incoherent SinCos signal
80	SSI: Parity error
81	SSI: Invalid data
96	The position is not available
4096	ABZ Esim : Top Z error

[THYRISTORS TEST] is only accessible for ATV71●●●M3 ≥ 18.5 kW and ATV71●●●N4 ≥ 18.5 kW drives.

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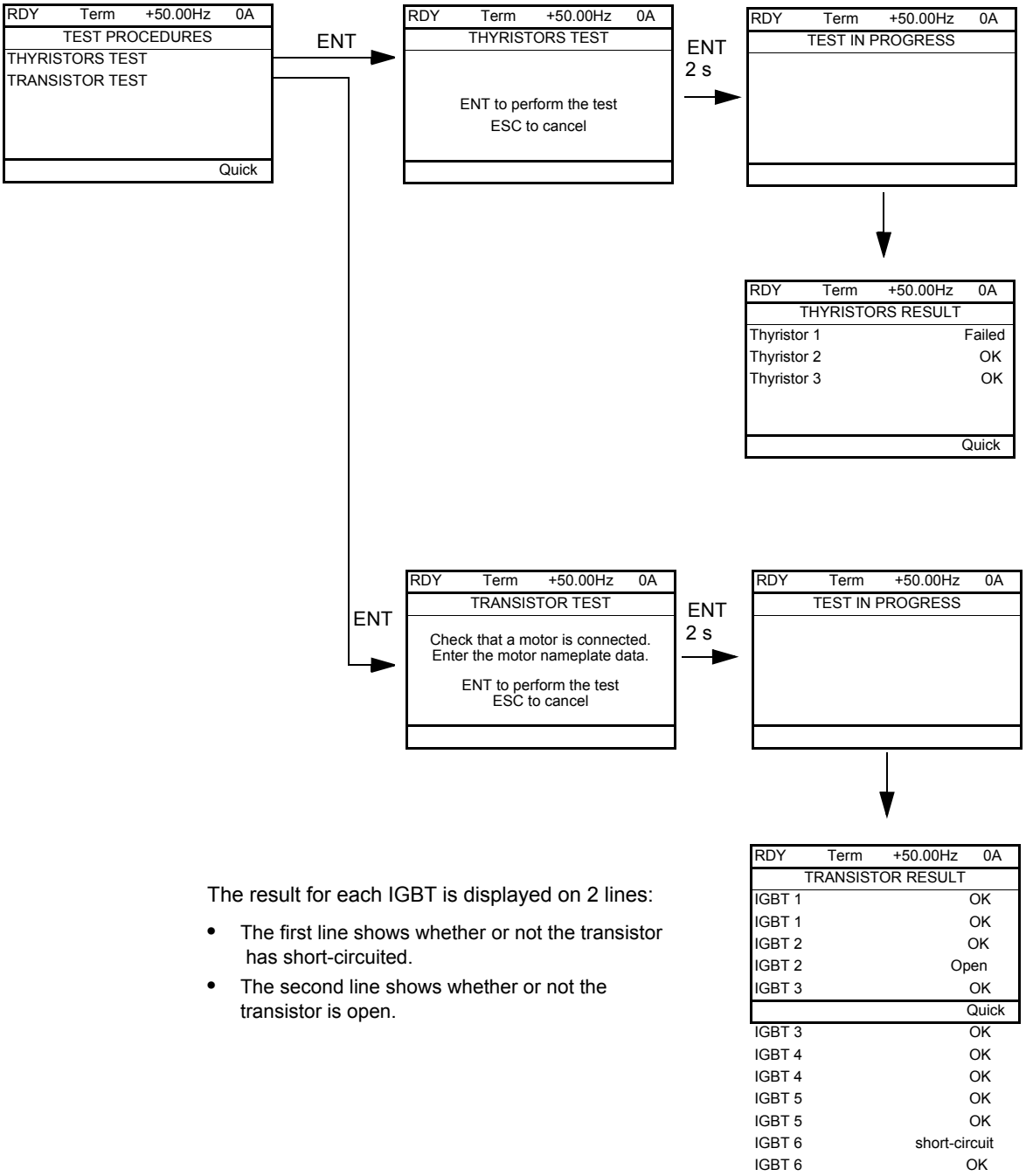

The result for each IGBT is displayed on 2 lines:

- The first line shows whether or not the transistor has short-circuited.
- The second line shows whether or not the transistor is open.

NOTE: To start the tests, press and hold down (2 s) the ENT key.

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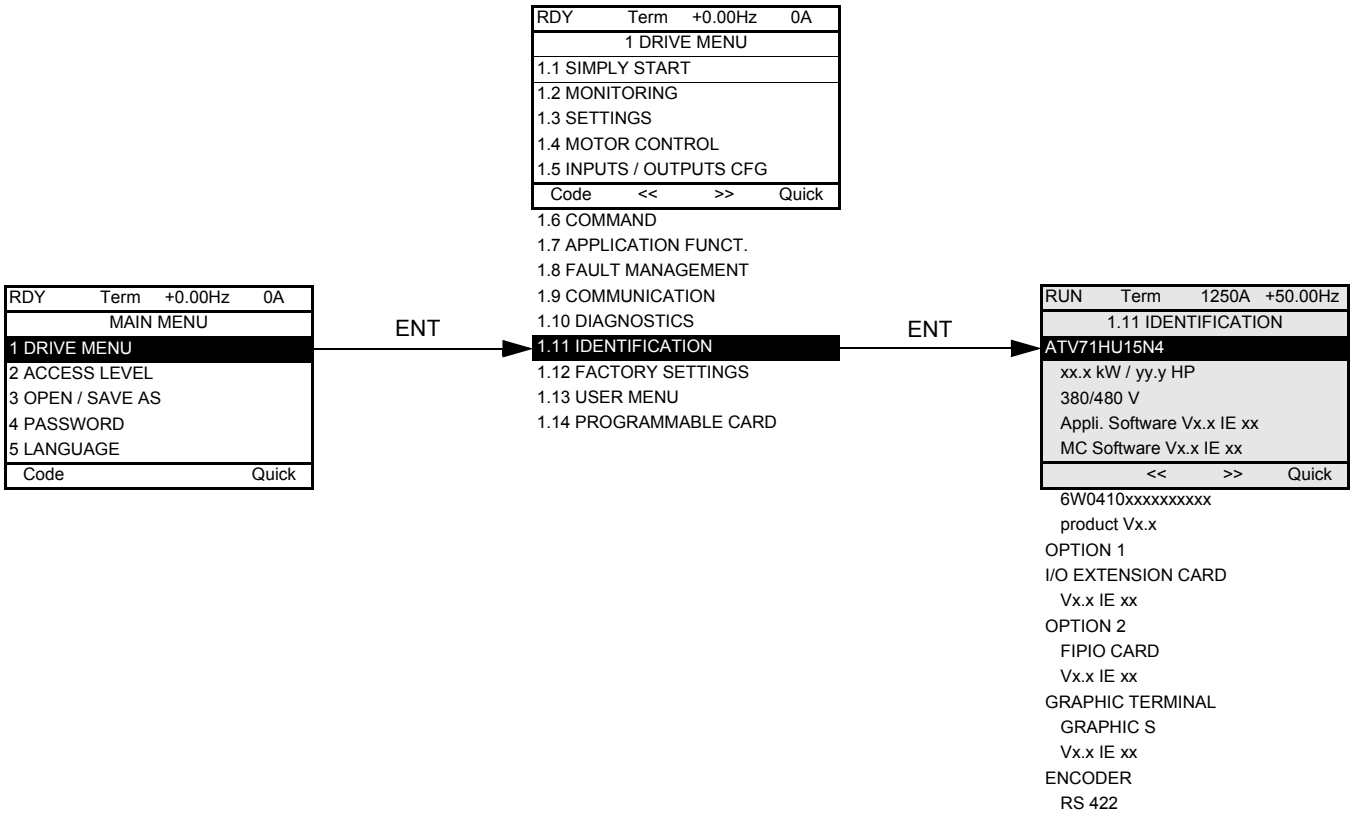
[1.11 IDENTIFICATION]



The [1.11 IDENTIFICATION] menu can only be accessed on the graphic display terminal.
This is a read-only menu that cannot be configured. It enables the following information to be displayed:

- Drive reference, power rating and voltage
- Drive software version
- Drive serial number
- Type of options present, with their software version

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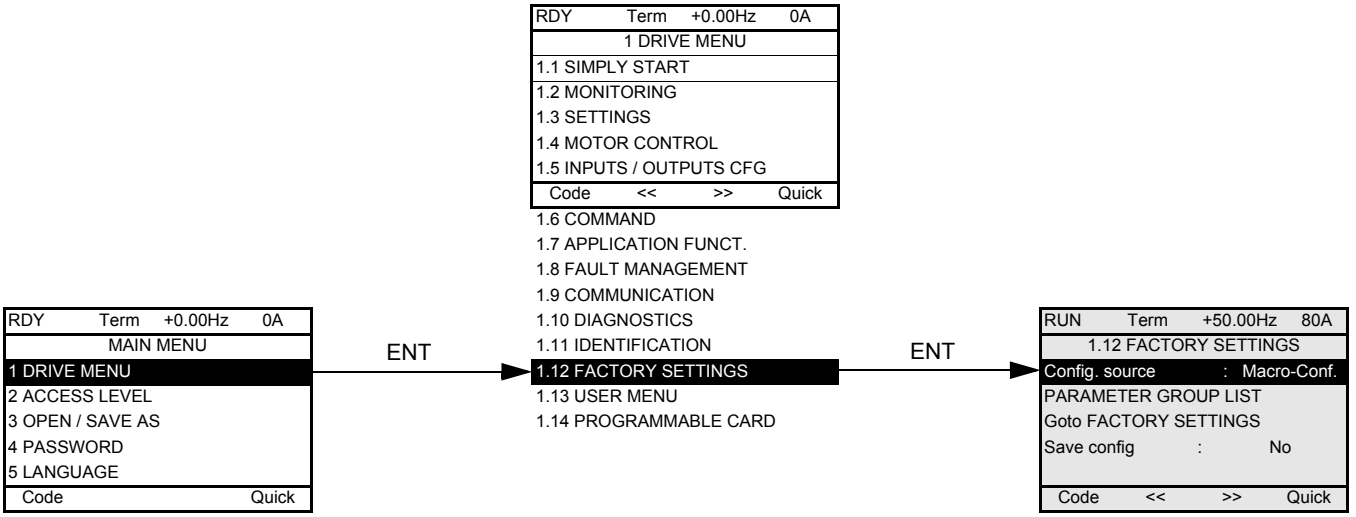
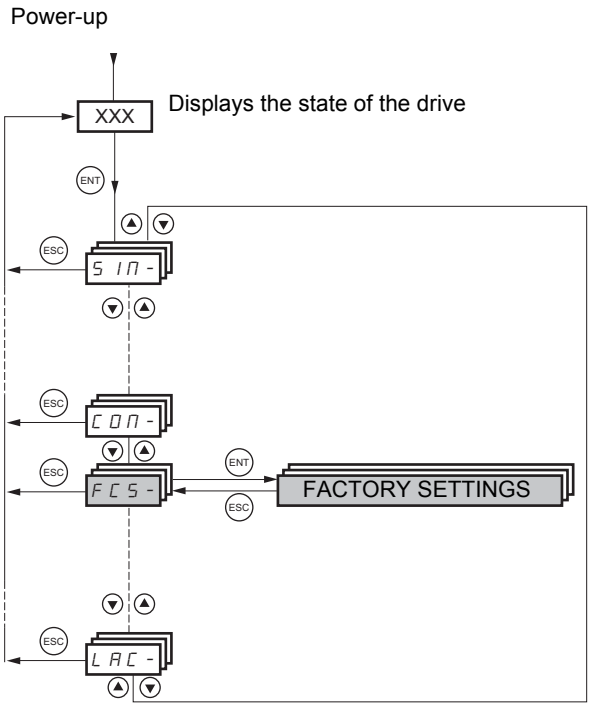
[1.12 FACTORY SETTINGS] (FCS-)

With graphic display terminal:



With integrated display terminal:



The [1.12 FACTORY SETTINGS] (FCS-) menu is used to:

- Replace the current configuration with the factory configuration or a previously saved configuration.
  All or part of the current configuration can be replaced: select a group of parameters in order to select the menus you wish to load with the selected source configuration.
- Save the current configuration to a file.

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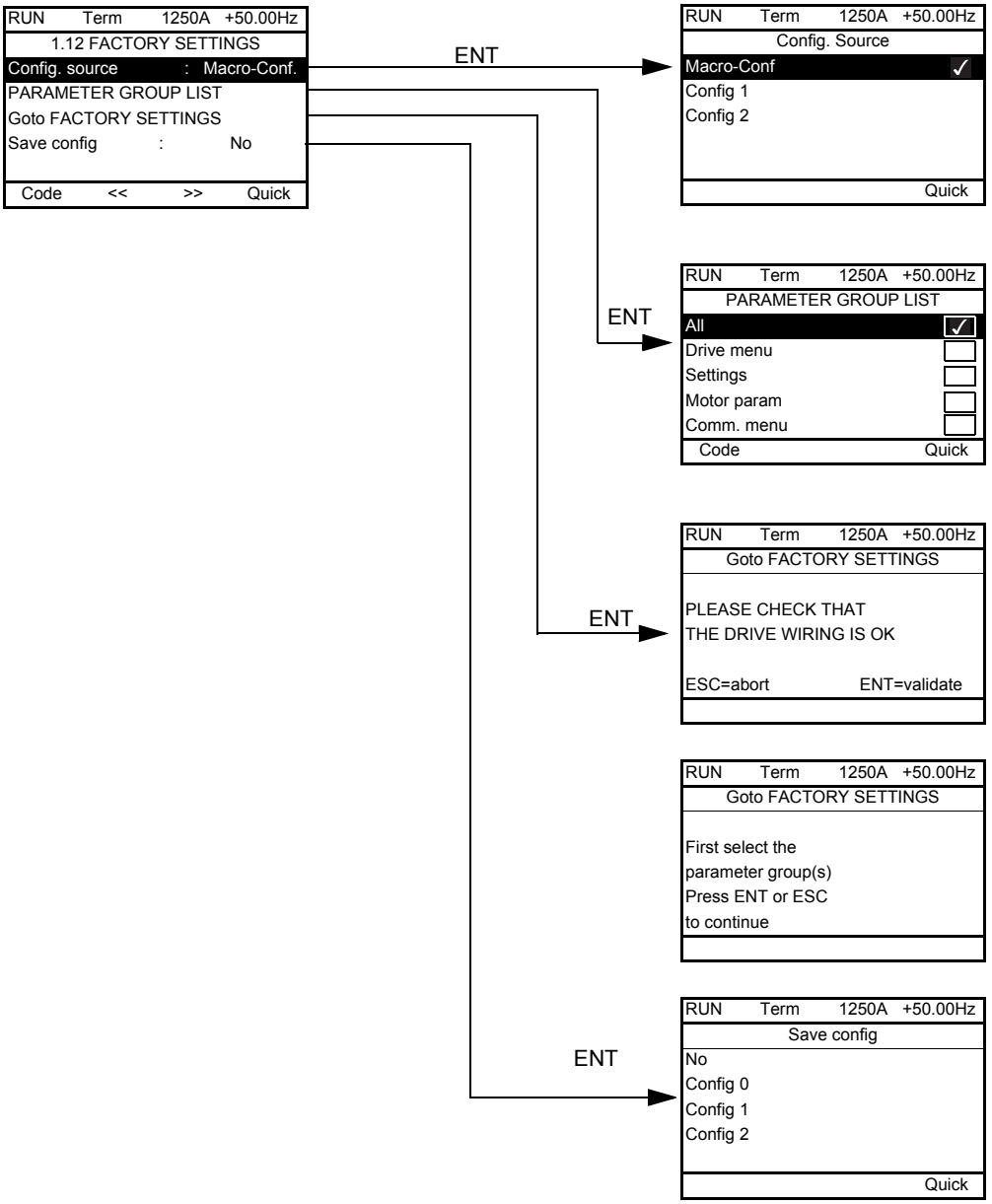

Selection of source configuration

Selection of the menus to be replaced

Note: In factory configuration and after a return to "factory settings", [PARAMETER GROUP LIST] will be empty.

Command to return to "factory settings"

This window appears if no group of parameters is selected.

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Code	Name/Description
FCSI	[Config. Source] Choice of source configuration. InI [Macro-Conf] (InI) Factory configuration, return to selected macro configuration. CFG1 [Config 1] (CFG1) CFG2 [Config 2] (CFG2) If the configuration switching function is configured, it will not be possible to access [Config 1] (CFG1) and [Config 2] (CFG2).
Fry-	[PARAMETER GROUP LIST] Selection of menus to be loaded ALL [All] (ALL): All parameters. drM [Drive menu] (drM): The [1 DRIVE MENU] menu without [1.9 COMMUNICATION] and [1.14 PROGRAMMABLE CARD]. In the [7 DISPLAY CONFIG.] menu, [Return std name] page 286 returns to [No]. SEt [Settings] (SEt): The [1.3 SETTINGS] menu without the [IR compensation] (UFr), [Slip compensation (SLP) and [Mot. therm. current] (ItH) parameters MOt [Motor param] (MOt): Motor parameters, see list below. The following selections can only be accessed if [Config. Source] (FCSI) = [Macro-Conf.] (InI): COM [Comm. menu] (COM): The [1.9 COMMUNICATION] menu without either [Scan. In1 address] (nMA1) to [Scan. In8 address] (nMA8) or [Scan.Out1 address] (nCA1) to [Scan.Out8 address] (nCA8). PLC [Prog. card menu] (PLC): The [1.14 PROGRAMMABLE CARD] menu MOn [Monitor config.] (MOn): The [6 MONITORING CONFIG.] menu dIS [Display config.] (dIS): The [7 DISPLAY CONFIG.] menu See the multiple selection procedure on page 32 for the integrated display terminal and page 23 for the graphic display terminal. ☞ In factory configuration and after a return to "factory settings", [PARAMETER GROUP LIST] will be empty.
GFS	[Goto FACTORY SETTINGS] It is only possible to revert to the factory settings if at least one group of parameters has previously been selected. With the integrated display terminal: nO - No YES - Yes: The parameter changes back to nO automatically as soon as the operation is complete. With the graphic display terminal: see previous page
SCSI	**[Save config]** nO [No] (nO): Str0 [Config 0] (Str0): Press and hold down the "ENT" key for 2 s. Str1 [Config 1] (Str0): Press and hold down the "ENT" key for 2 s. Str2 [Config 2] (Str0): Press and hold down the "ENT" key for 2 s. The active configuration to be saved does not appear for selection. For example, if it is [Config 0] (Str0), only [Config 1] (Str1) and [Config 2] (Str2) appear. The parameter changes back to [No] (nO) as soon as the operation is complete.

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List of motor parameters

[1.4 MOTOR CONTROL] (drC-) menu:

[Rated motor power] (nPr) - [Rated motor volt.] (UnS) - [Rated mot current] (nCr) - [Rated motor freq.] (FrS) - [Rated motor speed] (nSP) - [Auto tuning] (tUn) - [Auto tuning status] (tUS) - [Angle auto-test] (ASA) - [Angle offset value] (ASU) - [U0] (U0) to [U5] (U5) - [F1] (F1) to [F5] (F5) - [V. constant power] (UCP) - [Freq. Const Power] (FCP) - [Nominal I sync] (nCrS) - [Nom motor spdsync] (nSPS) - [Pole pairs.] (PPnS) - [Syn. EMF constant] (PHS) - [Autotune L d-axis] (LdS) - [Autotune L q-axis] (LqS) - [Cust. stator R syn] (rSAS) - [IR compensation] (UFr) - [Slip compensation] (SLP) - motor parameters that can be accessed in [Expert] mode pages 79, 82 and 84.

[1.3 SETTINGS] (SEt-) menu:

[Mot. therm. current] (ItH)

Example of total return to factory settings

1. [Config. Source] (FCSI) = [Macro-Conf] (InI)
2. [PARAMETER GROUP LIST] (FrY-) = [All] (ALL)
3. [Goto FACTORY SETTINGS] (GFS = YES)

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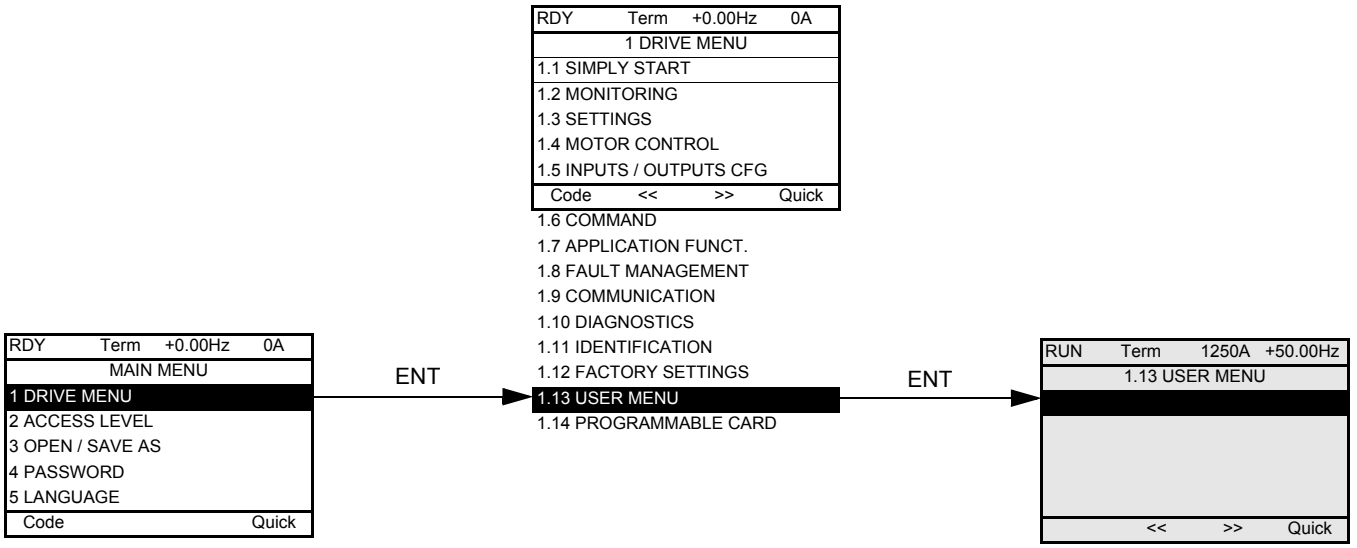
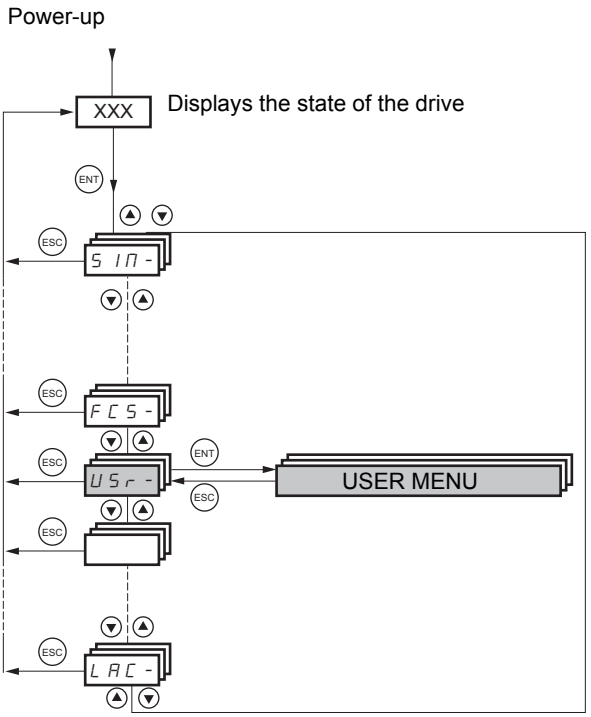
[1.13 USER MENU] (USr-)

This menu contains the parameters selected in the [7 DISPLAY CONFIG.] menu on page 274.

With graphic display terminal:



With integrated display terminal:



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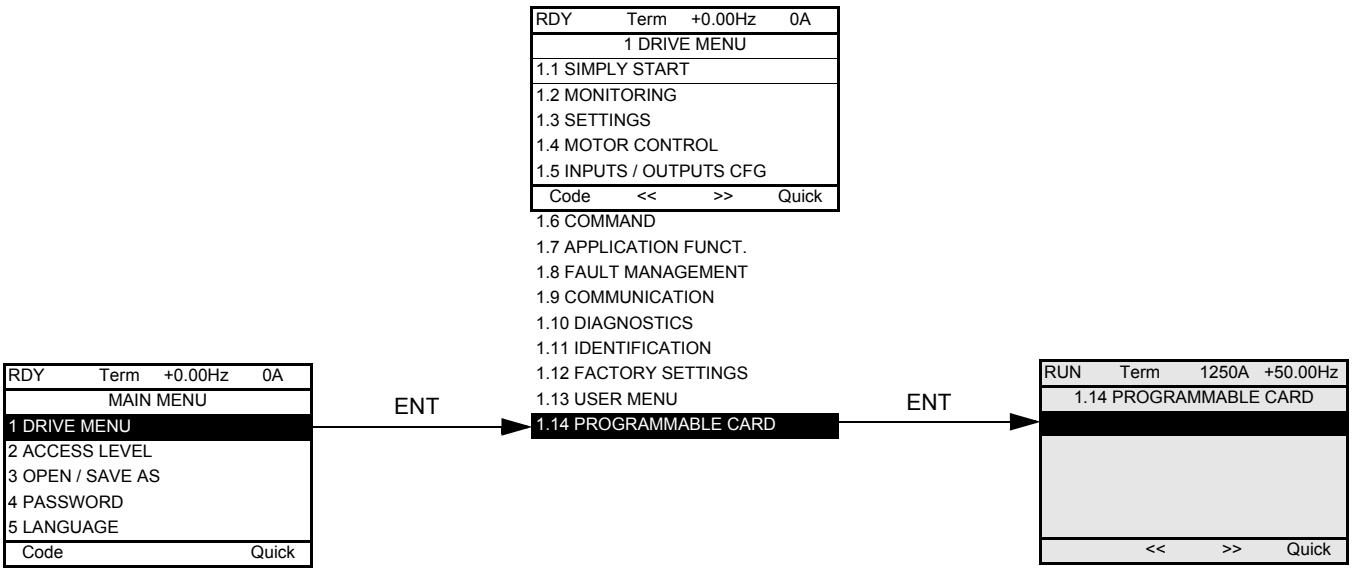
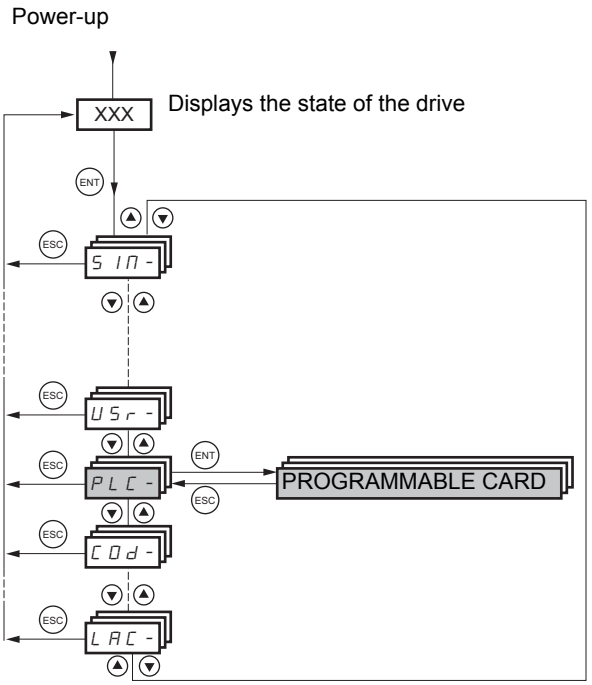
[1.14 PROGRAMMABLE CARD] (PLC-)

This menu can only be accessed if a Controller Inside card has been inserted. Please refer to the documentation specific to this card.

With graphic display terminal:



With integrated display terminal:



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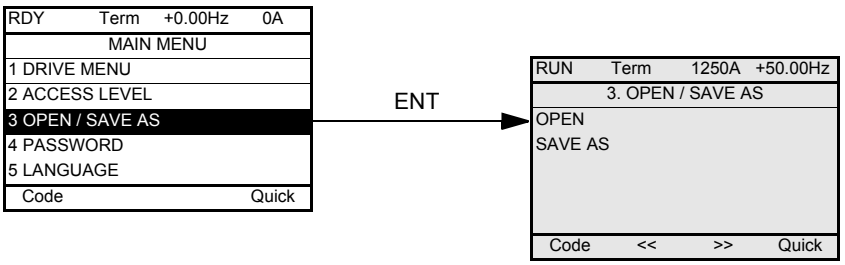
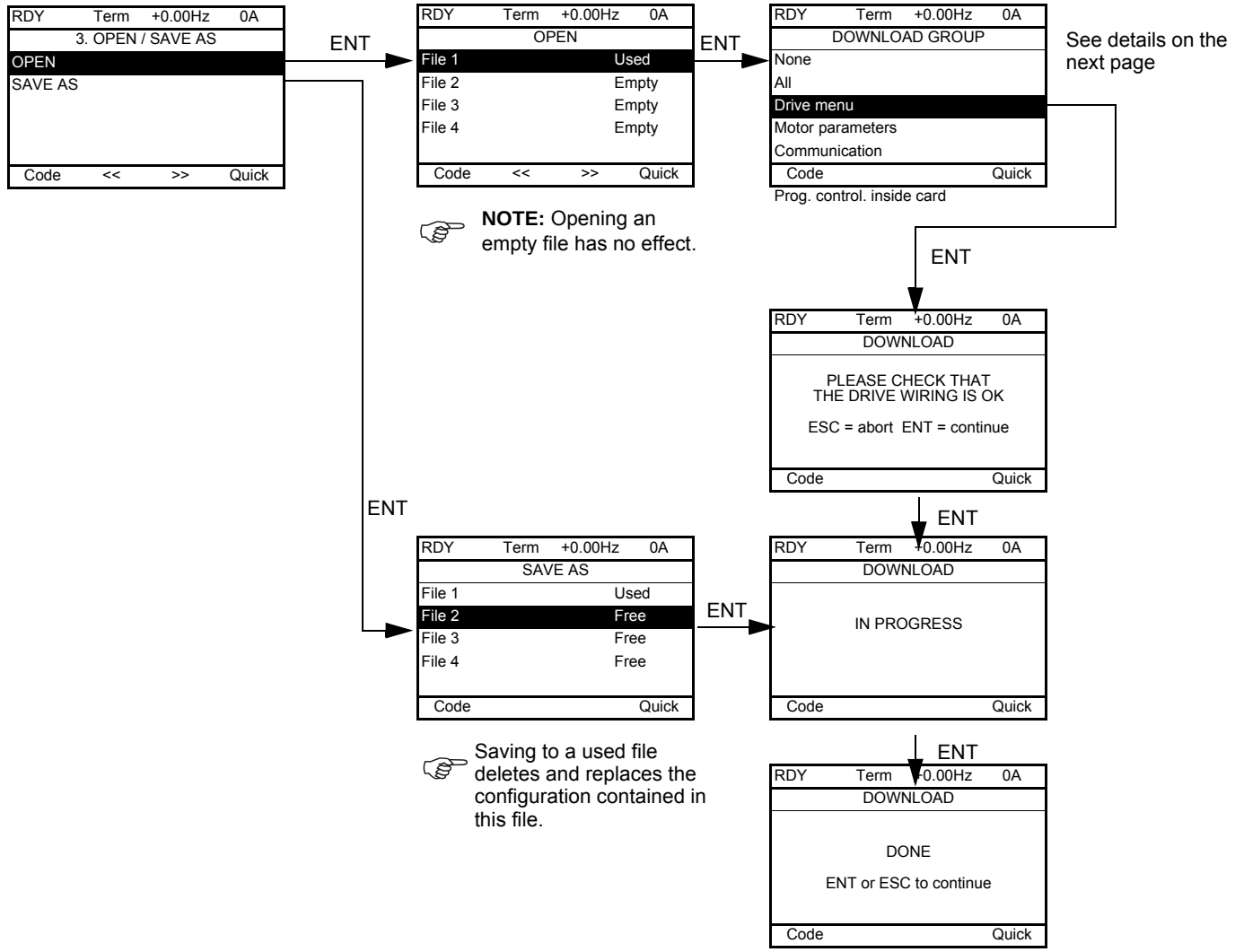
[3. OPEN/SAVE AS]

This menu can only be accessed with the graphic display terminal.



[Open]: To download one of the 4 files from the graphic display terminal to the drive.
[SAVE AS]: To download the current drive configuration to the graphic display terminal.

NOTE: Download between drive and graphic display terminal (and vice-versa), can be done only when the motor is stopped.



Various messages may appear when the download is requested:
- [IN PROGRESS]
- [DONE]
- Error messages if download not possible
- [Motor parameters are NOT COMPATIBLE. Do you want to continue?]: In this case the download is possible, but the parameters will be restricted.

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[DOWNLOAD GROUP]

[None]:		No parameters
[All]:		All parameters in all menus
[Drive menu]:		The entire [1 DRIVE MENU] without [1.9 COMMUNICATION] and [1.14 PROGRAMMABLE CARD].
[Motor parameters]:	[Rated motor power] (nPr)	In the [1.4 MOTOR CONTROL] (drC-) menu
	[Rated motor volt.] (UnS)	
	[Rated mot. current] (nCr)	
	[Rated motor freq.] (FrS)	
	[Rated motor speed] (nSP)	
	[Auto tuning] (tUn)	
	[Auto tuning status] (tUS)	
	[Angle auto-test] (ASA)	
	[Angle offset value] (ASU)	
	[U0] (U0) to [U5] (U5)	
	[F1] (F1) to [F5] (F5)	
	[V. constant power] (UCP)	
	[Freq. Const Power] (FCP)	
	[Nominal I sync.] (nCrS)	
	[Nom motor spdsync] (nSPS)	
	[Pole pairs] (PPnS)	
	[Syn. EMF constant] (PHS)	
	[Autotune L d-axis] (LdS)	
	[Autotune L q-axis] (LqS)	
	[Cust. stator R syn] (rSAS)	
	[IR compensation] (UFr)	
	[Slip compensation] (SLP)	
	The motor parameters that can be accessed in [Expert] mode, page 79, 82 and 84.	
	[Mot. therm. current] (ItH)	In the [1.3 SETTINGS] (SEt-) menu
[Communication]:		All the parameters in the [1.9 COMMUNICATION] menu
[Prog. control. inside card]:		All the parameters in the [1.14 PROGRAMMABLE CARD] menu

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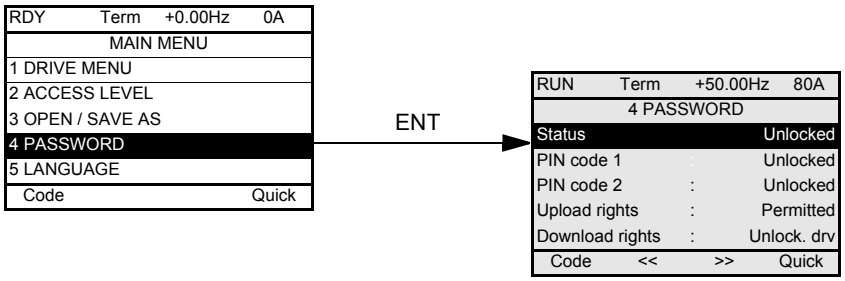
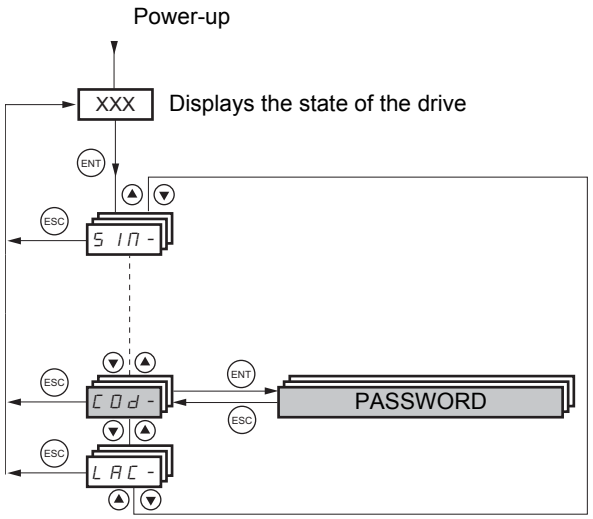
[4. PASSWORD] (COd-)

With graphic display terminal:

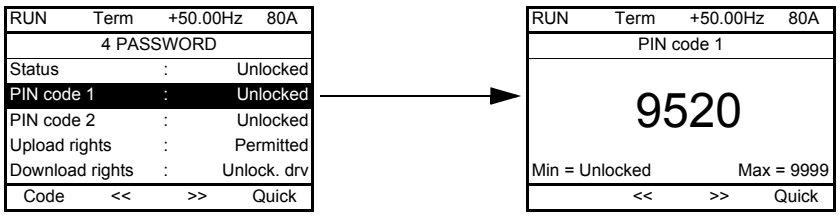


With integrated display terminal:



Enables the configuration to be protected with an access code or a password to be entered in order to access a protected configuration.

Example with graphic display terminal:



- The drive is unlocked when the PIN codes are set to [unlocked] (OFF) (no password) or when the correct code has been entered. All menus are visible.
- Before protecting the configuration with an access code, you must:
  - Define the [Upload rights] (ULr) and [Download rights] (dLr).
  - Make a careful note of the code and keep it in a safe place where you will always be able to find it.
- The drive has 2 access codes, enabling 2 access levels to be set up.
  - PIN code 1 is a public unlock code: 6969.
  - PIN code 2 is an unlock code known only to Schneider Electric Product Support. It can only be accessed in [Expert] mode.
  - Only one PIN1 or PIN2 code can be used - the other must remain set to [OFF] (OFF).

NOTE: When the unlock code is entered, the user access code appears.

The following items are access-protected:
- Return to factory settings ([1.12 FACTORY SETTINGS] (FCS-) menu).
- The channels and parameters protected by the [1.13 USER MENU] as well as the menu itself.
- The custom display settings ([7 DISPLAY CONFIG.] menu).

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Code	Name/Description	Adjustment range	Factory setting
CSt	[Status]		[Unlocked] (ULC)
	Information parameter, cannot be modified. LC [Locked] (LC): The drive is locked by a password. ULC [Unlocked] (ULC): The drive is not locked by a password.		
COd	[PIN code 1]	OFF to 9999	[OFF] (OFF)
	1st access code. The value [OFF] (OFF) indicates that no password has been set [Unlocked]. The value [ON] (On) indicates that the drive is locked and an access code must be entered in order to unlock it. Once the correct code has been entered, it remains on the display and the drive is unlocked until the next time the power supply is disconnected. - PIN code 1 is a public unlock code: 6969.		
COd2	[PIN code 2]	OFF to 9999	[OFF] (OFF)
	Parameter can only be accessed in [Expert] mode. 2nd access code. The value [OFF] (OFF) indicates that no password has been set [Unlocked]. The value [ON] (On) indicates that the drive is locked and an access code must be entered in order to unlock it. Once the correct code has been entered, it remains on the display and the drive is unlocked until the next time the power supply is disconnected. - PIN code 2 is an unlock code known only to Schneider Electric Product Support. When [PIN code 2] (COd2) is not set to OFF, the [1.2 MONITORING] (SUP-) menu is the only one visible. Then if [PIN code 2] (COd2) is set to OFF (drive unlocked), all menu are visible. If the display settings are modified in [7 DISPLAY CONFIG.] menu, and if [PIN code 2] (COd2) is not set to OFF, the visibility configured is kept. Then if [PIN code 2] (COd2) is set to OFF (drive unlocked), the visibility configured in [7 DISPLAY CONFIG.] menu is kept.		
ULr	[Upload rights]		[Permitted] (ULr0)
	Read or copy the current configuration to the drive. ULr0 [Permitted] (ULr0): The current drive configuration can always be uploaded to the graphic display terminal or PowerSuite. ULr1 [Not allowed] (ULr1): The current drive configuration can only be uploaded to the graphic display terminal or PowerSuite if the drive is not locked by an access code or if the correct code has been entered.		
dLr	[Download rights]		[Unlock. drv] (dLr1)
	Writes the current configuration to the drive or downloads a configuration to the drive dLr0 [Locked drv] (dLr0): A configuration file can only be downloaded to the drive if the drive is locked by an access code, which is the same as the access code for the configuration to be downloaded. dLr1 [Unlock. drv] (dLr1): A configuration file can be downloaded to the drive or a configuration in the drive can be modified if the drive is unlocked (access code entered) or is not locked by an access code. dLr2 [Not allowed] (dLr2): Download not authorized. dLr3 [Lock/unlock] (dLr3): Combination of [Locked drv.] (dLr0) and [Unlock. drv] (dLr1).		

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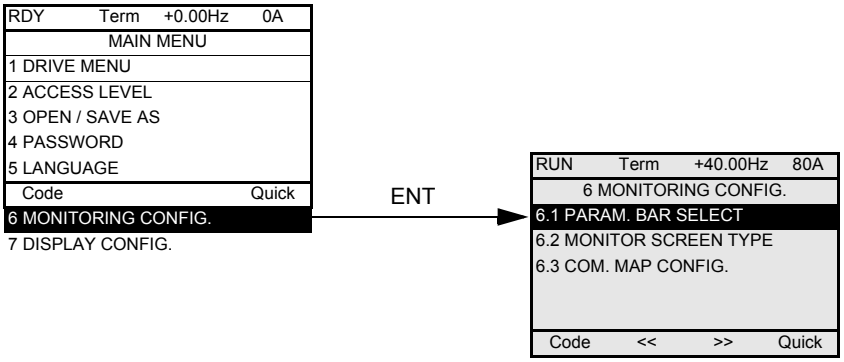
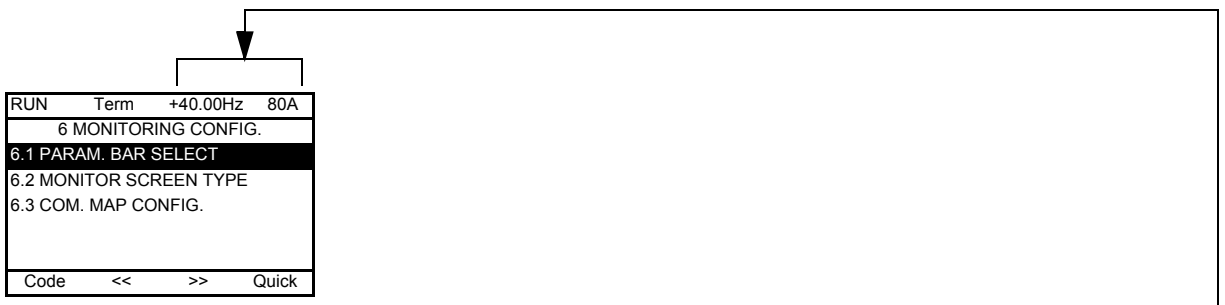
[6 MONITORING CONFIG.]

This menu can only be accessed with the graphic display terminal.



This can be used to configure the information displayed on the graphic display screen during operation.



[6.1. PARAM. BAR SELECT]: Selection of 1 to 2 parameters displayed on the top line (the first 2 cannot be modified).

[6.2. MONITOR SCREEN TYPE]: Selection of parameters displayed in the centre of the screen and the display mode (digital values or bar graph format).

[6.3. COM. MAP CONFIG.]: Selection of the words displayed and their format.

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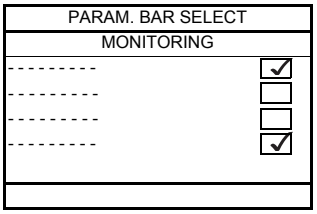
Name/Description
[6.1 PARAM. BAR SELECT]

[Alarm groups]

[Frequency ref.]	in Hz: parameter displayed in factory configuration.
[Torque reference]	as a %
[Output frequency]	in Hz
[Motor current]	in A: parameter displayed in factory configuration.
[ENA avg speed]	in Hz
[Motor speed]	in rpm
[Motor voltage]	in V
[Motor power]	in W
[Motor torque]	as a %
[Mains voltage]	in V
[Motor thermal state]	as a %
[Drv. thermal state]	as a %
[DBR thermal state]	as a %
[Consumption]	in Wh or kWh depending on drive rating
[Run time]	in hours (length of time the motor has been switched on)
[Power on time]	in hours (length of time the drive has been switched on)
[IGBT alarm counter]	in seconds (total time of IGBT overheating alarms)
[PID reference]	as a %
[PID feedback]	as a %
[PID error]	as a %
[PID Output]	in Hz
[- - - - 02]	Word generated by the Controller Inside card (can be accessed if the card has been inserted)
to	
[- - - - 06]	Word generated by the Controller Inside card (can be accessed if the card has been inserted)
[Config. active]	CNFO, 1 or 2 (see page 214)
[Utilized param. set]	SET1, 2 or 3 (see page 213)

Select the parameter using ENT (a ☑ then appears next to the parameter). Parameter(s) can also be deselected using ENT. 1 or 2 parameters can be selected.

Example:



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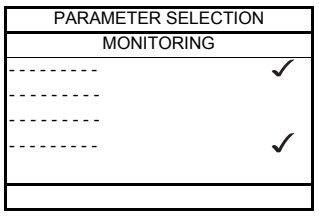
Name/Description
[6.2. MONITOR SCREEN TYPE]
[Display value type]
[Digital]: Display of one or two digital values on the screen (factory configuration). [Bar graph]: Display of one or two bar graphs on the screen. [List]: Display a list of between one and five values on the screen.
[PARAMETER SELECTION]

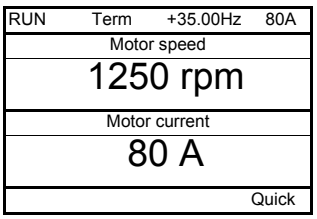
[Alarm groups]	can only be accessed if [Display value type] = [List]
[Frequency ref.]	in Hz: parameter displayed in factory configuration.
[Torque reference]	as a %
[Output frequency]	in Hz
[Motor current]	in A
[ENA avg speed]	in Hz
[Motor speed]	in rpm
[Motor voltage]	in V
[Motor power]	in W
[Motor torque]	as a %
[Mains voltage]	in V
[Motor thermal state]	as a %
[Drv. thermal state]	as a %
[DBR thermal state]	as a %
[Consumption]	in Wh or kWh depending on drive rating
[Run time]	in hours (length of time the motor has been switched on)
[Power on time]	in hours (length of time the drive has been switched on)
[IGBT alarm counter]	in seconds (total time of IGBT overheating alarms)
[PID reference]	as a %
[PID feedback]	as a %
[PID error]	as a %
[PID Output]	in Hz
[- - - - 02] to [- - - - 06]	Word generated by the Controller Inside card (can be accessed if the card has been inserted)
[Config. active]	CNFO, 1 or 2 (see page 214), can only be accessed if [Display value type] = [List]
[Utilized param. set]	SET1, 2 or 3 (see page 213), can only be accessed if [Display value type] = [List]

Select the parameter(s) using ENT (a ☑ then appears next to the parameter). Parameter(s) can also be deselected using ENT.

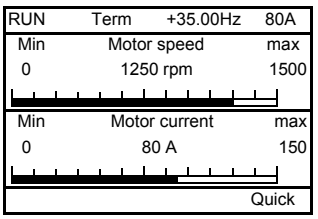


Examples include:

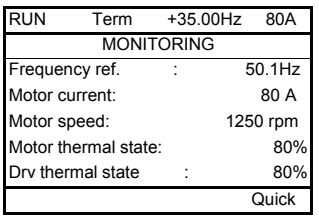
Display of 2 digital values



Display of 2 bar graphs



Display of a list of 5 values



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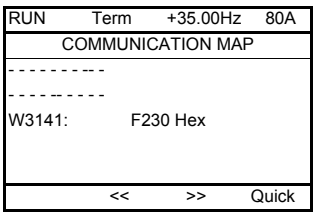
Name/Description
[6.3. COM. MAP CONFIG.]
[Word 1 add. select.]
Select the address of the word to be displayed by pressing the <<, >> (F2 and F3) keys and rotating the navigation button.
[Format word 1]
Format of word 1. [Hex]: Hexadecimal [Signed]: Decimal with sign [Unsigned]: Decimal without sign
[Word 2 add. select.]
Select the address of the word to be displayed by pressing the <<, >> (F2 and F3) keys and rotating the navigation button.
[Format word 2]
Format of word 2. [Hex]: Hexadecimal [Signed]: Decimal with sign [Unsigned]: Decimal without sign
[Word 3 add. select.]
Select the address of the word to be displayed by pressing the <<, >> (F2 and F3) keys and rotating the navigation button.
[Format word 3]
Format of word 3. [Hex]: Hexadecimal [Signed]: Decimal with sign [Unsigned]: Decimal without sign
[Word 4 add. select.]
Select the address of the word to be displayed by pressing the <<, >> (F2 and F3) keys and rotating the navigation button.
[Format word 4]
Format of word 4. [Hex]: Hexadecimal [Signed]: Decimal with sign [Unsigned]: Decimal without sign
It will then be possible to view the selected words in the [COMMUNICATION MAP] submenu of the [1.2 MONITORING] menu. **Example:** 

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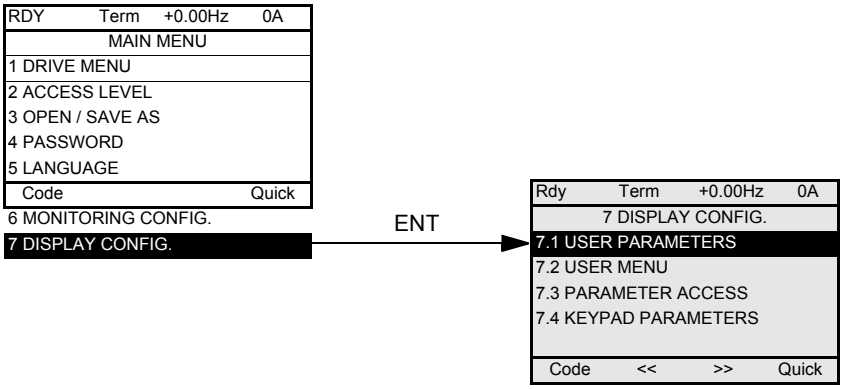
[7 DISPLAY CONFIG.]

This menu can only be accessed with the graphic display terminal. It can be used to customize parameters or a menu and to access parameters.



7.1: USER PARAMETERS: Customization of 1 to 15 parameters.

7.2 USER MENU: Creation of a customized menu.

7.3 PARAMETER ACCESS: Customization of the visibility and protection mechanisms of menus and parameters.

7.4 KEYPAD PARAMETERS: Adjustment of the contrast and stand-by mode of the graphic display terminal (parameters stored in the terminal rather than in the drive).Choice of the menu displayed on power up.

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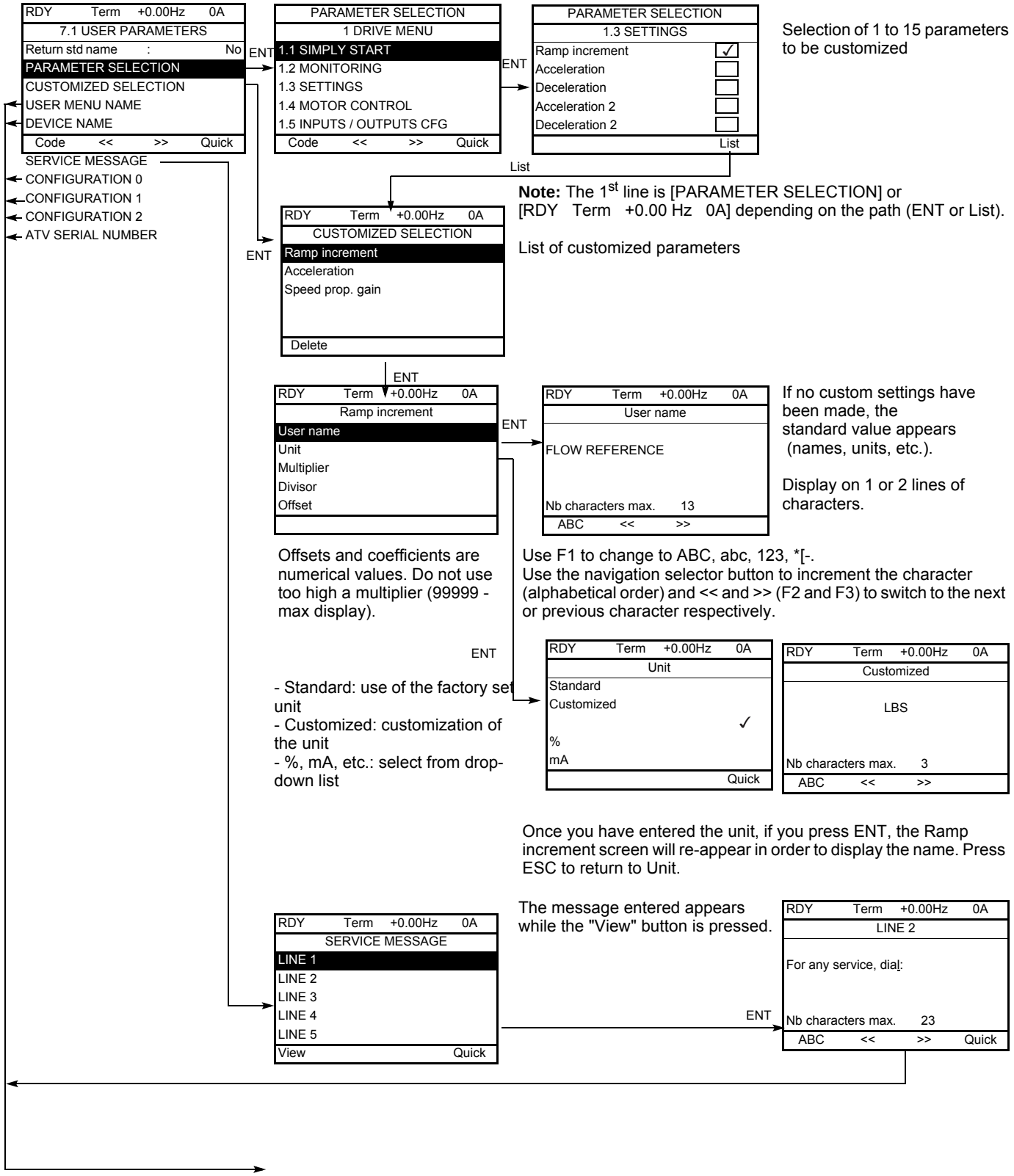
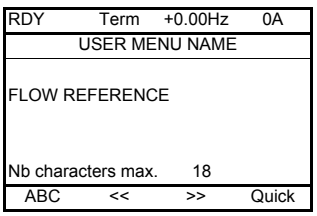
If [Return std name] = [Yes] the display reverts to standard but the custom settings remain stored.





Names (USER MENU NAME, DRIVE NAME, configuration, serial no., lines of messages, names of units, etc.) are customized as in the example of the parameter name shown opposite.
If no custom settings have been made, the standard value appears (names, units, etc.).
Display on 1 or 2 lines of characters.
Use F1 to change to ABC, abc, 123, *[-.
Use the navigation selector button to increment the character (alphabetical order) and << and >> (F2 and F3) to switch to the next or previous character respectively.

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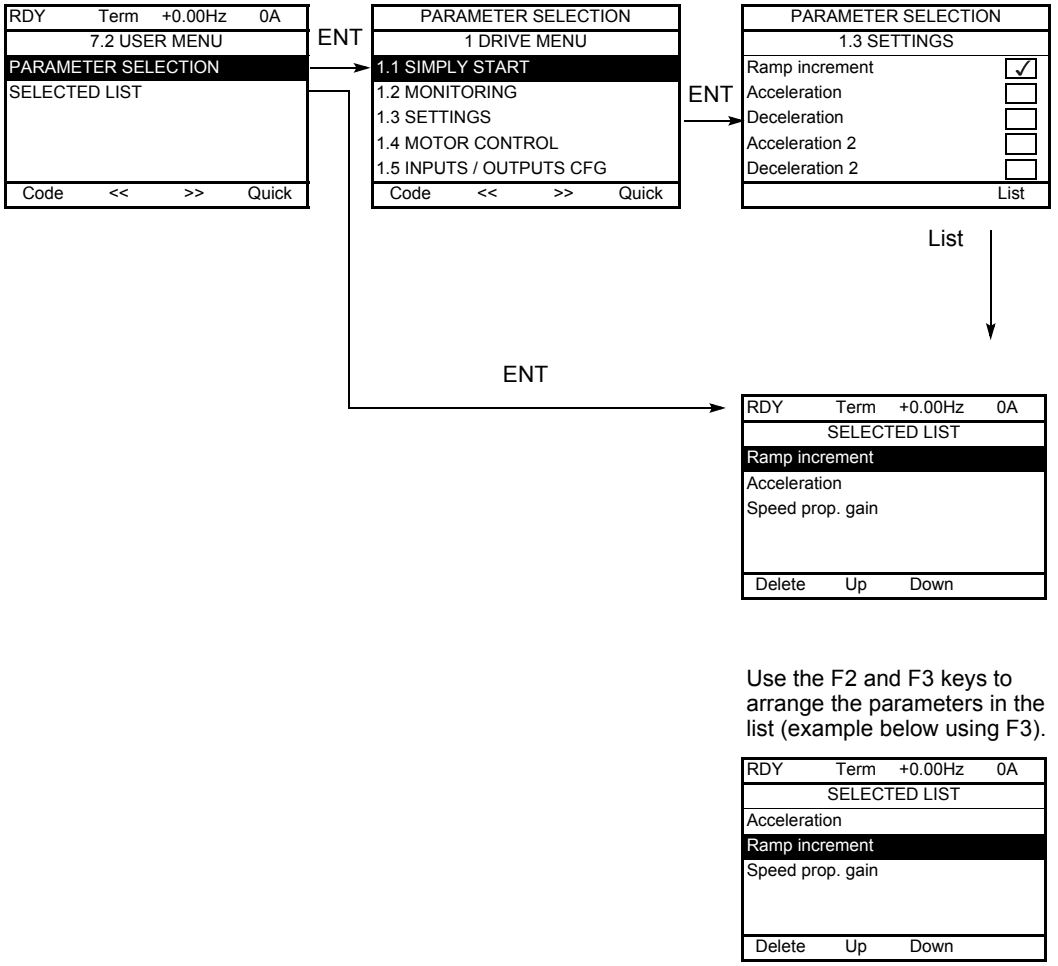

Selection of parameters included in the user menu

NOTE: The 1st line is [PARAMETER SELECTION] or [RDY Term +0.00 Hz 0A] depending on the path (ENT or List).

Parameter list making up the user menu.

Use the F2 and F3 keys to arrange the parameters in the list (example below using F3).

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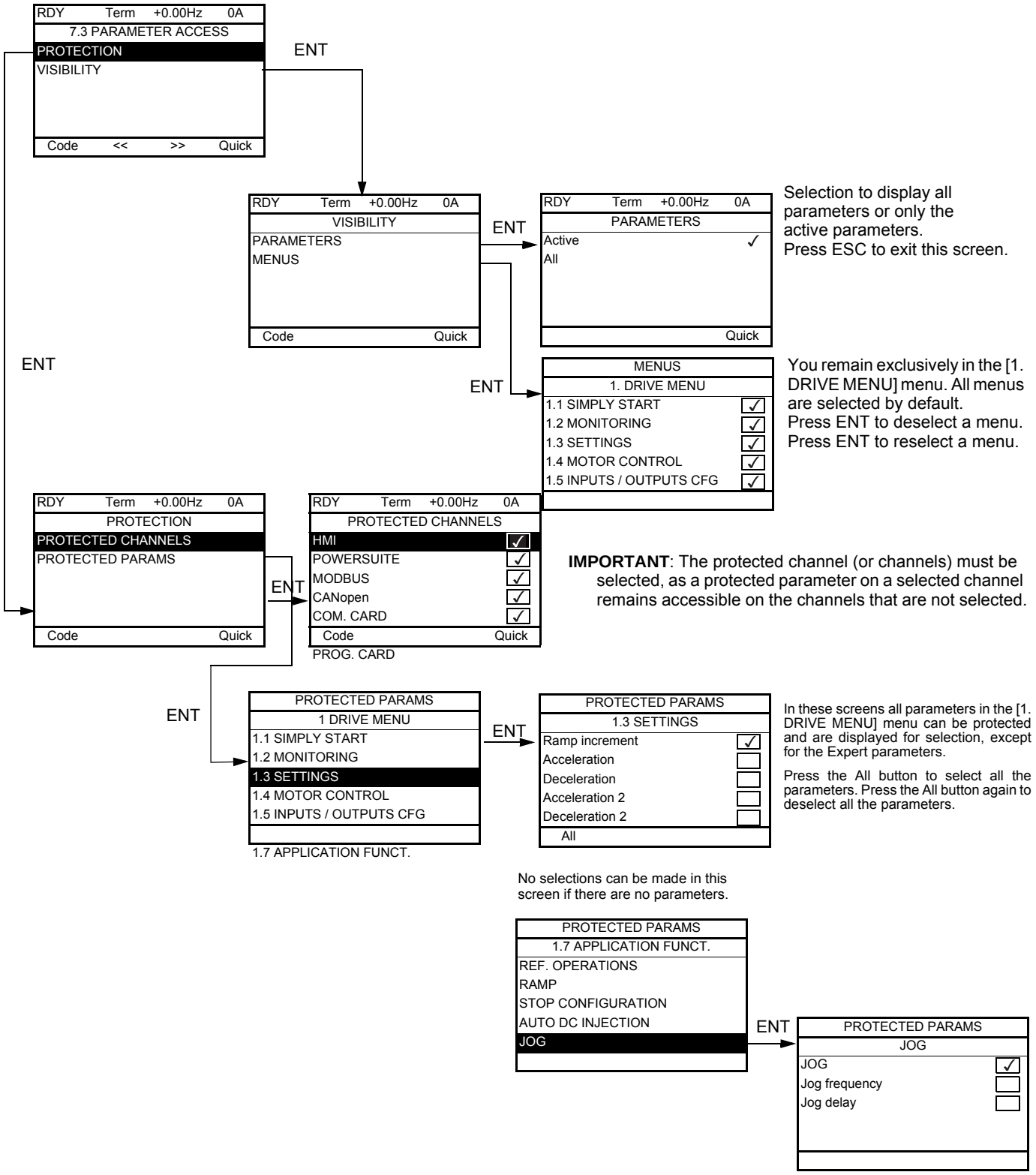

NOTE: The protected parameters are no longer accessible and are not, therefore, displayed for the selected channels.

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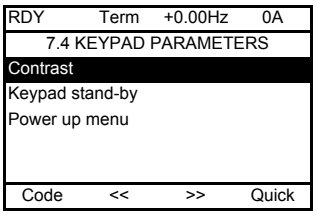

Name/Description	Adjustment range	Factory setting
[Keypad contrast]	0 to 100 %	50 %
Adjustment of contrast on graphic display unit.		
[Keypad stand-by]		[5]
Configures and adjusts the stand-by mode of the graphic display unit. • [No]: No stand-by mode. • [1] to [10]: Adjusts the time during which the terminal is to remain idle before stand-by mode is triggered, in minutes. After this idle time, the display backlight turns off and the contrast is reduced. The screen returns to normal operation when a key or the navigation button is pressed. It also returns to normal operation if the terminal exits the normal display mode, for example, if a fault occurs.		
[Power up menu]		[Main menu]
Choose the menu which appears on the product menu when it is powered up • [Drive menu.]: Display the drive menu. • [Sim. start]: Display the simply start menu. • [Monitoring]: Display the monitoring menu. • [Settings]: Display the setting menu. • [Mot. Ctrl]: Display the motor control menu. • [I/O Conf.]: Display the inputs outputs configuration menu. • [Command]: Display the command menu. • [Appli. fun.]: Display the application function menu. • [Fault mgt]: Display the fault management menu. • [Com.]: Display the communication menu. • [Diagnostics]: Display the diagnostic menu. • [Ident.]: Display the identification menu. • [Factory Set.]: Display the factory setting. • [User menu]: Display the user manu. • [CI menu]: Display the drive menu. • [Main menu]: Display the main menu.		

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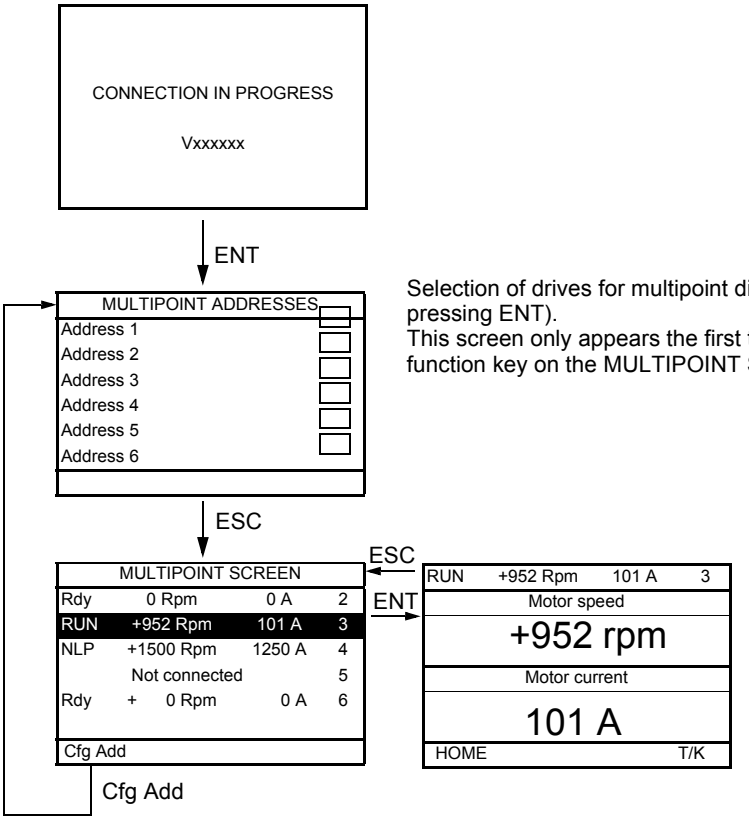
[MULTIPOINT SCREEN]

Communication is possible between a graphic display terminal and a number of drives connected on the same bus. The addresses of the drives must be configured in advance in the [1.9 COMMUNICATION] menu using the [Modbus Address] (Add) parameter, page 254.

When a number of drives are connected to the same display terminal, the terminal automatically displays the following screens:



Selection of drives for multipoint dialog (select each address and check the box by pressing ENT).
This screen only appears the first time the drive is powered up, or if the "Cfg Add" function key on the MULTIPOINT SCREEN is pressed (see below).

Selection of a drive for multipoint dialog

In multipoint mode, the command channel is not displayed. From left to right, the state, then the 2 selected parameters and finally the drive address appear.

All menus can be accessed in multipoint mode. Only drive control via the graphic display terminal is not authorized, apart from the Stop key, which locks all the drives.
If a drive has detected a fault, this drive is displayed.

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Maintenance

Servicing

The Altivar® 71 does not require any preventive maintenance. It is nevertheless advisable to perform the following regularly:
- Check the condition and tightness of the connections.
- Ensure that the temperature around the unit remains at an acceptable level and that ventilation is effective (average service life of fans: 3 to 5 years, depending on the operating conditions).
- Remove any dust from the drive.

Assistance with maintenance, fault display

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

The first fault detected is saved and displayed, and the drive locks.

The drive switching to fault mode can be indicated remotely via a logic output or a relay, which can be configured in the [1.5 INPUTS / OUTPUTS CFG] (I-O-) menu. See [R1 CONFIGURATION] (r1-) on page 121.

Menu [1.10 DIAGNOSTICS]

This menu can only be accessed with the graphic display terminal. It displays faults and their cause in plain text and can be used to carry out tests, see page 256.

Clearing the fault

Disconnect the drive power supply in the event of a non-resettable fault.
Wait for the display to disappear completely.
Find the cause of the fault and correct it.

The drive is unlocked after a fault:
- By switching off the drive until the display disappears completely, then switching on again
- Automatically in the scenarios described for the [AUTOMATIC RESTART] (Atr-) function, page 231
- By means of a logic input or control bit assigned to the [FAULT RESET] (rSt-) function, page 230
- By pressing the STOP/RESET button on the graphic display terminal

Menu [1.2 MONITORING] (SUP-):

This is used to prevent and find the causes of faults by displaying the drive state and its current values.
It can be accessed with the integrated display terminal.

Spares and repairs:

Consult Schneider Electric product support.

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Detected faults and troubleshooting

Drive does not start, no detected fault code displayed

- If the display does not light up, check the power supply to the drive.
- The assignment of the "Fast stop" or "Freewheel" functions will prevent the drive starting if the corresponding logic inputs are not powered up. The ATV71 then displays [Freewheel] (nSt) in freewheel stop and [Fast stop] (FSt) in fast stop. This is normal since these functions are active at zero so that the drive will be stopped if there is a wire break.
- Make sure that the run command input or inputs are activated in accordance with the selected control mode ([2/3 wire control] (tCC) and [2 wire type] (tCt) parameters, page 105).
- If an input is assigned to the limit switch function and this input is at zero, the drive can only be started up by sending a command for the opposite direction (see pages 168 and 206).
- If the reference channel or command channel is assigned to a communication bus, when the power supply is connected, the drive will display [Freewheel] (nSt) and remain in stop mode until the communication bus sends a command.
- When an encoder is used with a VW3 A3 409 card, if the encoder is not fully configured, the drive remains locked in stop mode (displays [NST] (nSt) or [NLP] (nLP)).

Conditions requiring a power reset

The cause of the fault must be removed before resetting the drive by performing a power reset.
AnF, ASF, brF, ECF, EnF, SOF, SPF and tnF faults can also be reset remotely by means of a logic input or control bit ([Fault reset] (rSF) parameter, page 230).
AnF, EnF, InFA, InFb, SOF, SPF, and tnF faults can be inhibited and cleared remotely by means of a logic input or control bit ([Fault inhibit assign.] (InH) parameter, page 242).

⚠ DANGER

LOSS OF PERSONNEL AND EQUIPMENT PROTECTION

- Enabling the fault inhibition parameter (InH) will disable the drive controller protection features.
- InH should not be enabled for typical applications of this equipment.
- InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection poses a greater risk than personnel injury or equipment damage.

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

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Code	Name	Probable cause	Remedy
AI2F	[AI2 input]	• Non-conforming signal on analog input AI2	• Check the wiring of analog input AI2 and the value of the signal.
AnF	[Load slipping]	• The encoder speed feedback does not match the reference	• Check the motor, gain and stability parameters. • Add a braking resistor. • Check the size of the motor/drive/load. • Check the encoder's mechanical coupling and its wiring. • If the "torque control" function is used, see "Note" on page 198.
ASF	[Angle Error]	• A modification has changed the phase-shift angle between the motor and the encoder or resolver • The "Procedure for measuring the phase-shift angle between the motor and the encoder" page 85 was unsuccessful or has not been performed • for the motor control [Sync. mot.] (SYn), an incorrect setting of the speed loop, when the reference goes through 0.	• See comments on page 85. • Repeat the "Procedure for measuring the phase-shift angle between the motor and the encoder" page 85.
bOF	[DBR overload]	• The braking resistor is under excessive stress	• Check the size of the resistor and wait for it to cool down • Check the [DB Resistor Power] (brP) and [DB Resistor value] (brU) parameters, page 249.
brF	[Brake feedback]	• The brake feedback contact does not match the brake logic control • The brake does not stop the motor quickly enough (detected by measuring the speed on the "Pulse input" input).	• Check the feedback circuit and the brake logic control circuit • Check the mechanical state of the brake • Check the brake linings
bUF	[DB unit sh. Circuit]	• Short-circuit output from braking unit • Braking unit not connected	• Check the wiring of the braking unit and the resistor. • Check the braking resistor • The monitoring of this fault must be disabled by the [Brake res. fault Mgt.] (bUb) parameter, page 249 if there is no resistor or braking unit connected to the drive, at and above 55 kW (75 hp) for ATV71●●●M3X and at and above 90 kW (120 hp) for ATV71●●●N4.
CrF1	[Precharge]	• Charging relay control fault or charging resistor damaged	• Turn the drive off and then back on again • Check the internal connections • Inspect/repair the drive
CrF2	[Thyr. soft charge]	• DC bus charging fault (thyristors)	
ECF	[Encoder coupling]	• Break in encoder's mechanical coupling	• Check the encoder's mechanical coupling

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Conditions requiring a power reset (continued)

Code	Name	Probable cause	Remedy
EEF1	[Control Eeprom]	• Internal memory or control card	• Check the environment (electromagnetic compatibility) • Turn off, reset, return to factory settings • Inspect/repair the drive
EEF2	[Power Eeprom]	• Internal memory or power card	
EnF	[Encoder]	• Encoder feedback error	• Check all the configuration parameters for the encoder used. • Refer to the [1.10 DIAGNOSTICS] menu for the value of parameter RESE. • Check that the encoder's mechanical and electrical operation, its power supply and connections are all correct. • If necessary, reverse the direction of rotation of the motor ([Output Ph rotation] (PHr) parameter, page 75) or the encoder signals.
FCF1	[Out. contact. stuck]	• The output contactor remains closed although the opening conditions have been met	• Check the contactor and its wiring • Check the feedback circuit
HdF	[IGBT desaturation]	• Short-circuit or grounding at the drive output	• Check the cables connecting the drive to the motor, and the motor insulation. • Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu.
ILF	[Internal com. link]	• Communication error between option card and drive	• Check the environment (electromagnetic compatibility) • Check the connections • Check that no more than 2 option cards (max. permitted) have been installed on the drive • Replace the option card • Inspect/repair the drive
InF1	[Rating error]	• The power card is different from the card stored	• Check the reference of the power card
InF2	[Incompatible PB]	• The power card is incompatible with the control card	• Check the reference of the power card and its compatibility.
InF3	[Internal serial link]	• Communication error between the internal cards	• Check the internal connections • Inspect/repair the drive
InF4	[Internal-mftg zone]	• Internal data inconsistent	• Recalibrate the drive (performed by Schneider Electric Product Support).
InF6	[Internal - fault option]	• The option installed in the drive is not recognized	• Check the reference and compatibility of the option.
InF7	[Internal-hard init.]	• Initialization of the drive is incomplete	• Turn off and reset.
InF8	[Internal-ctrl supply]	• The control power supply is incorrect	• Check the control section power supply
InF9	[Internal- I measure]	• The current measurements are incorrect	• Replace the current sensors or the power card. • Inspect/repair the drive
InFA	[Internal-mains circuit]	• The input stage is not operating correctly	• Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu. • Inspect/repair the drive
InFb	[Internal- th. sensor]	• The drive temperature sensor is not operating correctly • The braking unit's temperature sensor is not operating correctly.	• Replace the drive temperature sensor • Inspect/repair the drive • Replace the braking unit's temperature sensor • Inspect/repair the braking unit • The monitoring of this fault must be disabled by the [Brake res. fault Mgt.] (bUb) parameter, page 249 if there is no braking unit connected to the drive.
InFC	[Internal-time meas.]	• Electronic time measurement component	• Inspect/repair the drive
InFE	[Internal- CPU]	• Internal microprocessor	• Turn off and reset. Inspect/repair the drive.

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Conditions requiring a power reset (continued)

Code	Name	Probable cause	Remedy
OCF	[Overcurrent]	• Parameters in the [SETTINGS] (SEt-) and [1.4 MOTOR CONTROL] (drC-) menus 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.
PrF	[Power removal]	• Associated with the Power Removal Function	• Inspect/repair the drive
SCF1	[Motor short circuit]	• Short-circuit or grounding at the drive output • Significant earth leakage current at the drive output if several motors are connected in parallel	• Check the cables connecting the drive to the motor, and the motor insulation. • Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu. • Reduce the switching frequency. • Connect chokes in series with the motor. • Check the adjustment of speed loop and brake.
SCF2	[Impedant sh. circuit]		
SCF3	[Ground short circuit]		
SPF	[Speed fdback loss]	• No resolver or encoder feedback signal • No Top Z signal after the activation of the Top Z function and 2 cycles. • No signal on "Pulse input", if the input is used for speed measurement	• Check the wiring between the encoder or resolver and the drive. • Check the encoder or resolver. • Check all the configuration parameters for the encoder used. • Refer to the [1.10 DIAGNOSTICS] menu for the value of parameter RESE. • Check the wiring of the input cable and the detector used
tnF	[Auto-tuning]	• Special motor or motor whose power is not suitable for the drive • Motor not connected to the drive	• Check that the motor/drive are compatible • Check that the motor is present during auto-tuning • If an output contactor is being used, close it during auto-tuning

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Auto-Reset conditions (customer configured)

These faults can also be reset by turning on and off or by means of a logic input or control bit ([Fault reset] (rSF) parameter, page 230). APF, CnF, COF, EPF1, EPF2, FCF2, LFF2, LFF3, LFF4, ObF, OHF, OLF, OPF1, OPF2, OSF, OtF1, OtF2, OtFL, PHF, PtF1, PtF2, PtFL, SLF1, SLF2, SLF3, SrF, SSF and tJF faults can be inhibited and cleared remotely by means of a logic input or control bit ([Fault inhibit assign.] (InH)parameter, page 242).

⚠ DANGER

LOSS OF PERSONNEL AND EQUIPMENT PROTECTION

- Enabling the fault inhibition parameter (InH) will disable the drive controller protection features.
- InH should not be enabled for typical applications of this equipment.
- InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection poses a greater risk than personnel injury or equipment damage.

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

Code	Name	Probable cause	Remedy
APF	[Application fault]	• Controller Inside card error	• Please refer to the card documentation
bLF	[Brake control]	• Brake release current not reached • Brake engage frequency threshold [Brake engage freq] (bEn) only regulated when brake logic control is assigned	• Check the drive/motor connection • Check the motor windings • Check the [Brake release I FW] (Ibr) and [Brake release I Rev] (Ird) settings, page 173 • Apply the recommended settings for [Brake engage freq] (bEn).
CnF	[Com. network]	• Communication error on communication card	• Check the environment (electromagnetic compatibility) • Check the wiring. • Check the time-out • Replace the option card • Inspect/repair the drive
COF	[CANopen com.]	• Interruption in communication on the CANopen bus	• Check the communication bus. • Check the time-out • Refer to the CANopen User's Manual
EPF1	[External flt-LI/Bit]	• Fault triggered by an external device, depending on user	• Check the device which caused the fault, and reset
EPF2	[External fault com.]	• Fault triggered by a communication network	• Check for the cause of the fault and reset
FCF2	[Out. contact. open.]	• The output contactor remains open although the closing conditions have been met	• Check the contactor and its wiring • Check the feedback circuit
LCF	[input contactor]	• The drive is not turned on even though [Mains V. time out] (LCt) has elapsed.	• Check the contactor and its wiring • Check the time-out • Check the line/contactor/drive connection
LFF2 **LFF3** **LFF4**	[AI2 4-20mA loss] [AI3 4-20mA loss] [AI4 4-20mA loss]	• Loss of the 4-20 mA reference on analog input AI2, AI3 or AI4	• Check the connection on the analog inputs.
ObF	[Overbraking]	• Braking too sudden or driving load	• Increase the deceleration time • Install a braking resistor if necessary • Activate the [Dec ramp adapt.] (brA) function, page 154, if it is compatible with the application
OHF	[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.
OLF	[Motor overload]	• Triggered by excessive motor current	• Check the setting of the motor thermal protection, check the motor load. Wait for the drive to cool down before restarting.
OPF1	[1 output phase loss]	• Loss of one phase at drive output	• Check the connections from the drive to the motor

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Auto-Reset conditions (customer configured) (continued)

Code	Name	Probable cause	Remedy
OPF2	[3 motor phase loss]	• Motor not connected or motor power too low • Output contactor open • Instantaneous instability in the motor current	• Check the connections from the drive to the motor • If an output contactor is being used, parameterize [Output Phase Loss] (OPL) = [Output cut] (OAC), page 235. • Test on a low power motor or without a motor:In factory settings mode, motor phase loss detection is active [Output Phase Loss] (OPL) = [Yes] (YES). To check the drive in a test or maintenance environment, without having to use a motor with the same rating as the drive (in particular for high power drives), deactivate motor phase loss detection [Output Phase Loss] (OPL) = [No] (nO) • Check and optimize the following parameters: [IR compensation] (UFr), page 97, [Rated motor volt.] (UnS) and [Rated mot. current] (nCr), page 79 and perform [Auto-tuning] (tUn), page 89.
OSF	[Mains overvoltage]	• Line voltage too high • Disturbed mains supply	• Check the line voltage
OtF1	[PTC1 overheat]	• Overheating of the PTC1 probes detected	• Check the motor load and motor size. • Check the motor ventilation. • Wait for the motor to cool before restarting • Check the type and state of the PTC probes
OtF2	[PTC2 overheat]	• Overheating of the PTC2 probes detected	
OtFL	[LI6=PTC overheat]	• Overheating of PTC probes detected on input LI6	
PtF1	[PTC1 probe]	• PTC1 probes open or short-circuited	• Check the PTC probes and the wiring between them and the motor/drive
PtF2	[PTC2 probe]	• PTC2 probes open or short-circuited	
PtFL	[LI6=PTC probe]	• PTC probes on input LI6 open or short-circuited	
SCF4	[IGBT short circuit]	• Power component fault	• Perform a test via the [1.10 DIAGNOSTICS] menu. • Inspect/repair the drive
SCF5	[Motor short circuit]	• Short-circuit at drive output	• Check the cables connecting the drive to the motor, and the motor's insulation • Perform tests via the [1.10 DIAGNOSTICS] menu. • Inspect/repair the drive
SLF1	[Modbus com.]	• Interruption in communication on the Modbus bus	• Check the communication bus. • Check the time-out • Refer to the Modbus User's Manual
SLF2	[PowerSuite com.]	• Communication with PowerSuite	• Check the PowerSuite connecting cable. • Check the time-out
SLF3	[HMI com.]	• Communication with the graphic display terminal	• Check the terminal connection • Check the time-out
SrF	[TORQUE TIME OUT FLT]	• The time-out of the torque control function is attained	• Check the function's settings • Check the state of the mechanism
SSF	[Torque/current lim]	• Switch to torque limitation	• Check if there are any mechanical problems • Check the parameters of [TORQUE LIMITATION] (tLA-), page 200 and the parameters of thE [TORQUE OR I LIM. DETECT.] (tId-) fault, page 244).
tJF	[IGBT overheat]	• Drive overheated	• Check the size of the load/motor/drive. • Reduce the switching frequency. • Wait for the motor to cool before restarting

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Auto-Reset conditions

The USF fault can be inhibited and cleared remotely by means of a logic input or control bit ([Fault inhibit assign.] (InH) parameter, page 242).

⚠ DANGER

LOSS OF PERSONNEL AND EQUIPMENT PROTECTION

- Enabling the fault inhibition parameter (InH) will disable the drive controller protection features.
- InH should not be enabled for typical applications of this equipment.
- InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection poses a greater risk than personnel injury or equipment damage.

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

Code	Name	Probable cause	Remedy
CFF	[Incorrect config.]	• Option card changed or removed • Control card replaced by a control card configured on a drive with a different rating • The current configuration is inconsistent	• Check that there are no card errors. • In the event of the option card being changed/removed deliberately, see the remarks below • Check that there are no card errors. • In the event of the control card being changed deliberately, see the remarks below • Return to factory settings or retrieve the backup configuration, if it is valid (see page 262)
CFI	[Invalid config.]	• Invalid configuration The configuration loaded in the drive via the bus or communication network is inconsistent.	• Check the configuration loaded previously. • Load a compatible configuration
dLF	[Dynamic load fault]	• Abnormal load variation	• Check that the load is not blocked by an obstacle • Removal of a run command causes a reset
HCF	[Cards pairing]	• The [CARDS PAIRING] (PPI-) function, page 250, has been configured and a drive card has been changed	• In the event of a card error, reinsert the original card • Confirm the configuration by entering the [Pairing password] (PPI) if the card was changed deliberately
PHF	[Input phase loss]	• Drive incorrectly supplied or a fuse blown • Failure of one phase • 3-phase ATV71 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 the fault by [Input phase loss] (IPL) = [No] (nO). (page 235)
USF	[Undervoltage]	• Line supply too low • Transient voltage dip	• Check the voltage and the parameters of [UNDERVOLTAGE MGT] (USb-), page 239

Option card changed or removed

When an option card is removed or replaced by another, the drive locks in [Incorrect config.] (CFF) fault mode on power-up. If the card has been deliberately changed or removed, the fault can be cleared by pressing the ENT key twice, which causes the factory settings to be restored (see page 262) for the parameter groups affected by the card. These are as follows:

Card replaced by a card of the same type
- I/O cards: [Drive menu] (drM)
- Encoder cards: [Drive menu] (drM)
- Communication cards: only the parameters that are specific to communication cards
- Controller Inside cards: [Prog. card menu] (PLC)

Card removed (or replaced by a different type of card)
- I/O card: [Drive menu] (drM)
- Encoder card: [Drive menu] (drM)
- Communication card: [Drive menu] (drM) and parameters specific to communication cards
- Controller Inside card: [Drive menu] (drM) and [Prog. card menu] (PLC)

Control card changed

When a control card is replaced by a control card configured on a drive with a different rating, the drive locks in [Incorrect config.] (CFF) fault mode on power-up. If the card has been deliberately changed, the fault can be cleared by pressing the ENT key twice, which causes all the factory settings to be restored.

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User settings tables

Menu [1.1 SIMPLY START] (SIM-)

Code	Name	Factory setting	Customer setting
tCC	[2/3 wire control]	[2 wire] (2C)	
CFG	[Macro configuration]	[Start/Stop] (StS)	
bFr	[Standard mot. freq]	[50 Hz] (50)	
nPr	[Rated motor power]	According to drive rating	
UnS	[Rated motor volt.]	According to drive rating	
nCr	[Rated mot. current]	According to drive rating	
FrS	[Rated motor freq.]	50 Hz	
nSP	[Rated motor speed]	According to drive rating	
tFr	[Max frequency]	60 Hz	
PHr	[Output Ph rotation]	ABC	
ItH	[Mot. therm. current]	According to drive rating	
ACC	[Acceleration]	3.0 s	
dEC	[Deceleration]	3.0 s	
LSP	[Low speed]	0	
HSP	[High speed]	50 Hz	

Functions assigned to I/O

Inputs Outputs	Functions assigned
LI1	
LI2	
LI3	
LI4	
LI5	
LI6	
LI7	
LI8	
LI9	
LI10	
LI11	
LI12	
LI13	
LI14	

Inputs Outputs	Functions assigned
LO1	
LO2	
LO3	
LO4	
AI1	
AI2	
AI3	
AI4	
R1	
R2	
R3	
R4	
RP	
Encoder	

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Other parameters (table to be created by the user)

Code	Name	Customer setting

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Inr			59				152				
InSP				79							
IntP							200				
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Ird			70				173				
ISP							224				
ISrF							224				
ItH	48		60								
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JAPL				93							
JdC			71				175				
JESt				92							
JGF			67				159				
JGt			67				159				
J□UL				92							
JOG							159				
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LbC3				103							
LbF				103							
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LIS1		56									
LIS2		56									
LLC							203				
LO1					124						
LO1d					124						
LO1H					124						
LO1S					124						
LO2					124						
LO2d					124						
LO2H					124						
LO2S					124						
LO3					125						
LO3d					125						
LO3H					125						
LO3S					125						
LO4					125						
LO4d					125						
LO4H					125						
LO4S					125						
LP1							181				
LP2							181				
L9S				83							
LSP	48		60								
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nCA1									253		
nCA2									253		
nCA3									253		
nCA4									253		
nCA5									253		
nCA6									253		
nCA7									253		
nCA8									253		
nCr	46		79								
nCrS				83							
nLS							210				
n□A1									253		
n□A2									253		
n□A3									253		
n□A4									253		
n□A5									253		

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n□A7									253		
n□A8									253		
nPr	46		79								
nrd				97							
nSL				82							
nSP	46		79								
nSPS				83							
nSt							155				
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o03		55, 57									
o04		55, 57									
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o06		55, 57									
OCC							205				
Odt								235			
OFI				76							
OHL								236			
OLL								234			
OPL								235			
OPr		55, 57									
OSP							186				
PAH			69				192				
PAL			69				192				
PAS							210				
PAU							193				
PEr			70				192				
PES							181				
PFI					115						
PFr					115						
PGA					118						
PGI				118	118						
PHS				83							
PHr	47			75							
PIA					115						
PIC							192				
PIF							191				
PIF1							191				
PIF2							191				
PII							191				
PIL					115						
PI□							193				
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PIP2							191				

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PIS							192				
POH			69				192				
POL			69				192				
PPI								250			
PPn				82							
PPnS				83							
Pr2							195				
Pr4							195				
PrP			69				192				
PS1-							213				
PS2-							213				
PS3-							213				
PS2							161				
PS4							161				
PSB							161				
PS16							161				
PSr			70				193				
PSt						142					
PtC1								230			
PtC2								230			
PtCL								230			
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9SH			71				222				
9SL			71				222				
r1					121						
r1d					122						
r1H					122						
r1S					122						
r2					122						
r2d					122						
r2H					122						
r2S					122						
r3					123						
r3d					123						
r3H					123						
r3S					123						
r4					123						
r4d					123						
r4H					123						
r4S					123						
rAP				96							
rb□							179				
rbC							179				
rbd							179				

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rCb							150				
rdG			69				192				
rE9P				84							
rEtP				84							
rFC						143					
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rIG			69				192				
rIn						142					
rP								231			
rP2			70				195				
rP3			70				195				
rP4			70				195				
rPA								231			
rPC		55, 57									
rPE		55, 57									
rPF		55, 57									
rPG			69				191				
rPI							191				
rPO		55, 57									
rPPn					118						
rPS							153				
rPt							152				
rrS					105						
rSA				82							
rSAS				83							
rSd							186				
rSF								230			
rSL							194				
rS□				82							
rS□S				84							
rSP							225				
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rSU							225				
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rtO							198				
rtr							223				
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SA3							151				
SAF							209				
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SAr							209				
SAt								237			

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SCSI										262	
SdC1			65				157, 174				
SdC2			65				157				
Sdd								244			
SFC			60	92							
SFC			60								
SFd							210				
SFr			66	76							
SIt			60	92							
SIt			60								
SLL								243			
SLP			64	81							
SnC							223				
SOP				98							
SP2			68				162				
SP3			68				162				
SP4			68				162				
SP5			68				162				
SP6			68				162				
SP7			68				162				
SP8			68				162				
SP9			68				162				
SP10			68				162				
SP11			68				162				
SP12			68				162				
SP13			68				162				
SP14			68				162				
SP15			69				162				
SP16			69				162				
SPd		55, 57									
SPG			60	92							
SP□							167				
SPt							197				
SrP			69				166				
SSb								244			
SSCd					120						
SSCP					119						
SSFS					119						
SSL				92							
StA			60	93							
Std							210				
St□								239			
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StP								239			
Str							164				
Strt								240			
Stt							155				
SUL				98							
tA1			59				153				
tA2			59				153				
tA3			59				153				
tA4			60				153				
tAA							200				
tAC		55, 57									
tAr								231			
tbE			70				174				
tbO							222				
tbr									254		
tbr2									254		
tbS								239			
tCC	45				105						
tCt					105						
td1			64				156	251			
tdC			64				156	251			
tdC1			65				157				
tdC2			65				158				
tdn							222				
tdS								246			
tFO									254		
tFO2									254		
tFr	46		75								
tHA								236, 237			
tHd		55, 57									
tHr		55, 57									
tHt								234			
tLA							200				
tLC							201				
tLd								248			
tL1G			71				200				
tL1□			71				200				
tLS			67				194				
tnL								249			
tOb							198				
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trA				82							
trC							222				
trH			71				222				
trL			71				222				
tr□				82							
trP							197				
trr		55, 57									
trt							197				
tSd							197				
tS□								239			
tSS							197				
tSt							197				
tSY							223				
ttd			72					234, 237			
ttd2								234, 237			
ttd3								234, 237			
ttH			71								
ttL			71								
ttO								254			
ttr			71				175				
tUL				91			91				
tUn	47			89							
tUP							222				
tUS	47			91							
U0				80							
U1				80							
U2				80							
U3				80							
U4				80							
U5				80							
Ubr				101							
UC2				81							
UCb								232			
UCP				81							
UECP					119						
UECU					119						
UELC					119						
UFr			64	97							
UIH1					110						
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ULn		55, 57									
ULr											269
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UOH1					129						
UOH2					130						
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UOL1					129						
UOL2					130						
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UOP		55, 57									
UPL								239			
UrES								239			
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USI							166				
USL								239			
USP							164				
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