ACOPOSinverter P84

Variable speed drives for synchronous and asynchronous motors

Software V2.7

Programming Manual

Version: 0.20 (February 2011)
Model number: MAxxxxxxx-ENG

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Manual history

Version	Date	Comment
0.20	February 2011	Editorial modifications
0.11	August 2010	Editorial modifications
0.10	June 2009	First edition

Before you begin

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

⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand the Installation Manual before installing or operating the ACOPOSinverter P84 drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical standards in force concerning protective grounding of all equipment.
- Many parts of this variable speed 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 terminals PA/+ and PC/- or across the DC bus capacitors.
- Install and close all the covers before applying power or starting and stopping the drive.
- Before servicing the variable speed drive
  - Disconnect all power.
  - Place a “DO NOT TURN ON” label on the variable speed drive disconnect.
  - Lock the disconnect in the open position.
- Disconnect all power including external control power that may be present before servicing the drive. WAIT 15 MINUTES to allow the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure given in the Installation Manual to verify that the DC voltage is less than 42 V. The drive LEDs are not accurate indicators of the absence of DC bus voltage.

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 this instruction can result in equipment damage.

INSTALLATION

☐ **1 Consult the Installation Manual**

PROGRAMMING

Procedure applicable if the factory configuration, page 7, 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 12.

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 256.**
- **Perform an auto-tuning operation to optimize performance, page 37.**
- **If you get lost, return to the factory settings, page 230.**

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

Factory configuration

Drive factory settings

The ACOPOSinverter P84 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
  - LI3, LI4, 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.

Application functions

The tables on the following pages show 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	Packing	Textiles	Wood	High inertia	Process
V/f ratio	63			■			■	■	
Sensorless flux vector control	63	■	■	■	■	■	■	■	■
Flux vector control with sensor	63	■	■	■	■	■	■	■	■
2-point vector control	63	■				■			
Open-loop synchronous motor	63					■			
Output frequency of up to 1600 Hz	61					■	■		
Motor overvoltage limiting	75					■	■		
DC bus connection (see catalogue/installation manual)	-					■			■
Motor fluxing using a logic input	138	■		■	■				
Switching frequency of up to 16 kHz	74		■			■	■		
Auto-tuning	62	■	■	■	■	■	■	■	■

Application functions

Functions on speed references

Functions	Page	Applications							
		Hoisting	Lifts	Handling	Packing	Textiles	Wood	High inertia	Process
Differential bipolar reference	83	■		■	■				
Reference delinearization (magnifying glass effect)	85	■		■					
Frequency control input	109					■			■
Reference switching	110 - 119				■				
Reference summing	118				■				
Reference subtraction	118				■				
Reference multiplication	118				■				
S ramps	121	■	■	■					
Jog operation	129			■		■			■
Preset speeds	130	■	■	■	■			■	
+ speed / - speed using single action pushbuttons (1 step)	133								■
+ speed / - speed using double action pushbuttons (2 steps)	133	■							
+/- speed around a reference	135					■			■
Save reference	137								■

Application functions

Application-specific functions

Functions	Page	Applications							
		Hoisting	Lifts	Handling	Packing	Textiles	Wood	High inertia	Process
Fast stop	125						■	■	
Limit switch management	139	■	■	■					
Brake control	141	■	■	■					
Load measurement	150	■	■						
High-speed hoisting	152	■							
Rope slack	155	■							
PID regulator	159								■
Torque monitoring	168			■		■			■
Motor/generator torque limit	171			■		■		■	■
Load sharing	77	■		■					
Line contactor control	175	■		■			■		
Output contactor control	177		■						
Positioning by limit switches or sensors	179			■	■				
Stop at distance calculated after deceleration limit switch	181			■	■				
ENA system (mechanical with unbalanced load)	72							■	
Parameter switching	184	■	■	■	■	■	■	■	■
Motor or configuration switching	187	■		■	■				
Traverse control	191					■			
Stop configuration	125			■		■	■	■	
Evacuation	198		■						
Half floor	199		■						

Application functions

Safety functions/fault management

Functions	Page	Applications							
		Hoisting	Lifts	Handling	Packing	Textiles	Wood	High inertia	Process
Power Removal (safety function, see catalogue/ installation manual)	-	■	■	■	■	■	■	■	■
Deferred stop on thermal alarm	210		■						
Alarm handling	99	■	■	■	■	■	■	■	■
Fault management	202 to 220	■	■	■	■	■	■	■	■
IGBT tests	213	■	■	■	■	■	■	■	■
Catch a spinning load	206					■	■	■	
Braking resistor thermal protection	218	■	■	■	■				
Motor protection with PTC probes	202	■	■	■	■	■	■	■	■
Undervoltage management	212					■	■	■	
4-20mA loss	214	■	■	■		■	■		■
Uncontrolled output cut (output phase loss)	208			■					
Automatic restart	205			■					
Load variation detection	157	■							

Turning on and configuring the drive

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Before turning on and configuring the ACOPOSinverter P84, 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 this instruction can result in equipment damage.

Separate control section power supply

Only supply power to the power section the next time the drive is powered up when:
A) The drive control section is powered independently of the power section (P24 and 0V terminals).
B) Whenever an option card is added or replaced.

Power switching via line contactor

⚠ CAUTION

RISK OF EQUIPMENT DAMAGE

- Avoid operating the contactor frequently (premature ageing 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 228.
- There are three types of parameter:
  - 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

- Check 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.

Setup - Preliminary recommendations

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 205), these commands are taken into account without a reset being necessary.

Firmware of the 8I0IF248.300-1

The firmware is a component of Automation Runtime. The module is automatically changed to this version.
To update the firmware included in Automation Studio, a hardware upgrade must be carried out (see Online Help "Project Management - Automation Studio Upgrade").

Test on a low power motor or without a motor

- In factory settings mode, [Output Phase Loss] detection (OPL) page 208 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 63)

⚠ CAUTION

UNINTENDED EQUIPMENT OPERATION

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 this instruction 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 63)

⚠ CAUTION

UNINTENDED EQUIPMENT OPERATION

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

Failure to follow this instruction can result in equipment damage.

Using motor with nominal voltage lower than drive supply voltage

- Configure [Vector Control 2pt] (VC2) = [Yes] (YES) ([1.4-MOTOR CONTROL] (drC-) menu, see page 65)

⚠ CAUTION

UNINTENDED EQUIPMENT OPERATION

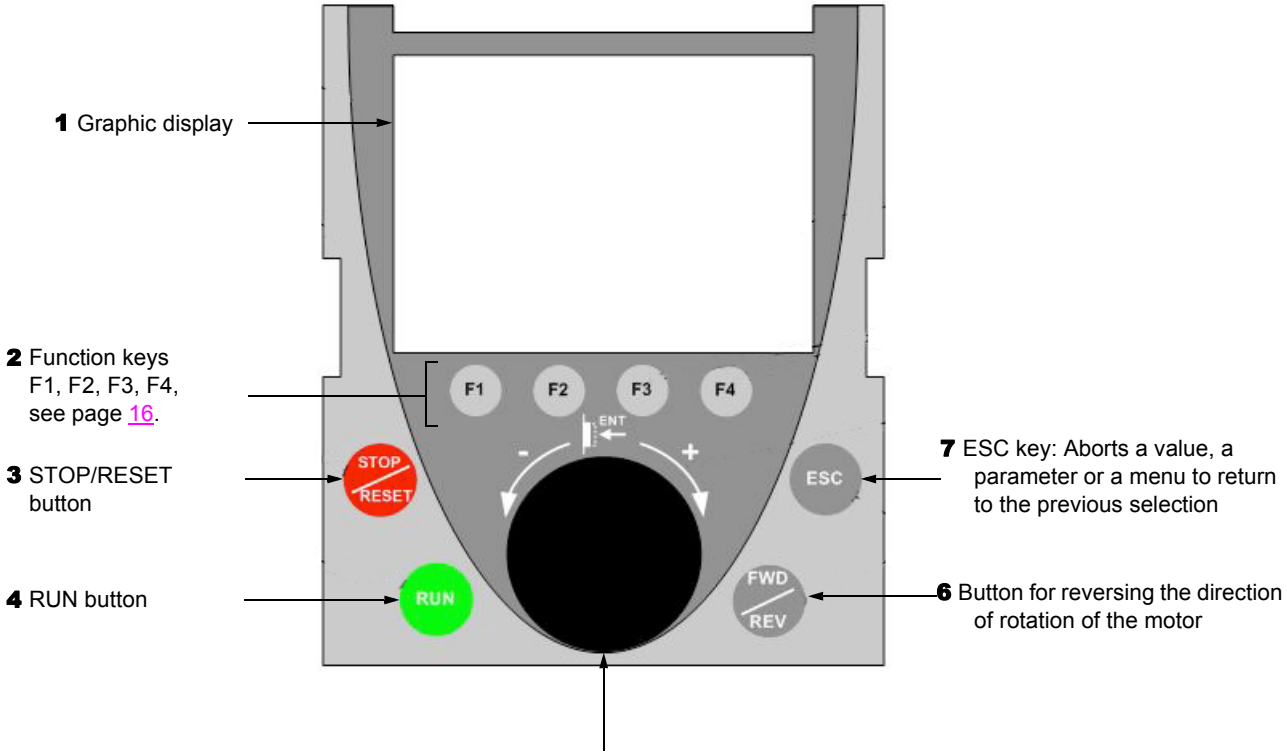
- To protect a motor which has a nominal voltage lower than drive supply voltage, it is mandatory to use [Vector Control 2pt] (VC2) function in order to limit maximal voltage of the motor lower than network voltage.
- Nevertheless, it is necessary to check that instantaneous voltage applied to the motor (link to DC bus voltage) are compatible with characteristics of this one.

Failure to follow these instructions can result in equipment damage.

Graphic display terminal

Although the graphic display terminal is optional (see catalog). 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 (see catalog).

Description of terminal



1 Graphic display

2 Function keys F1, F2, F3, F4, see page 16.

3 STOP/RESET button

4 RUN button

5 Navigation button:

- Press (ENT): - To save the current value
  - To enter the selected menu or parameter
- Turn CW/ CCW: - To increment or decrement a value
  - To go to the next or previous line
  - To increase or decrease the reference if control via the terminal is activated

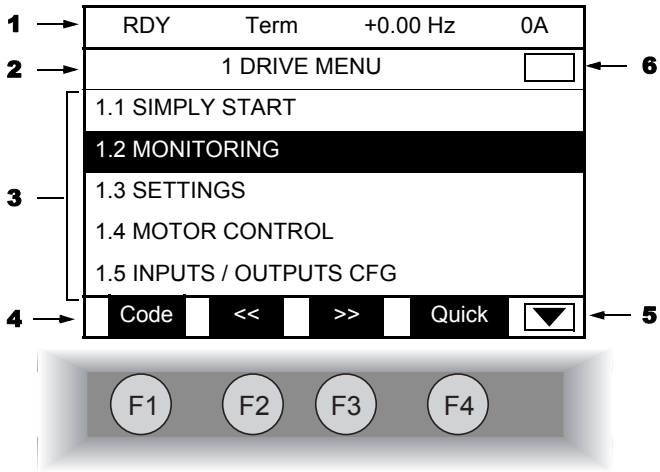
6 Button for reversing the direction of rotation of the motor

7 ESC key: Aborts a value, a parameter or a menu to return to the previous selection

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

Graphic display terminal

Description of the graphic screen



1. Display line. Its content can be configured; the factory settings show:
- The drive state (see page 17)
- The active control channel:
  - Term: Terminals
  - HMI: Graphic display terminal
  - CAN: Integrated communication interface
  - NET: communication 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, i.e., 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 18).
- >> 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 18).
- Quick F4 : Quick navigation, see page 22.

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.

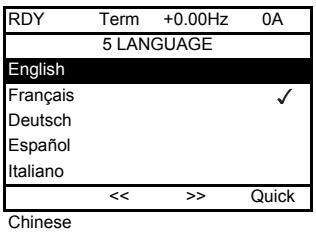
5. Indicates that there are no more levels below this display window.
Indicates that there are more levels below this display window.

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

Drive state codes:

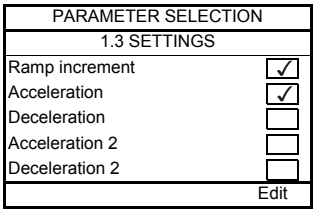
- ACC: Acceleration
- CLI: Current limit
- CTL: Controlled stop on input phase loss
- DCB: DC injection braking in progress
- DEC: Deceleration
- FLU: Motor fluxing in progress
- FST: Fast stop
- NLP: No line power (no line supply on L1, L2, L3)
- NST: Freewheel stop
- OBR: Auto-adapted deceleration
- 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

Example configuration windows:



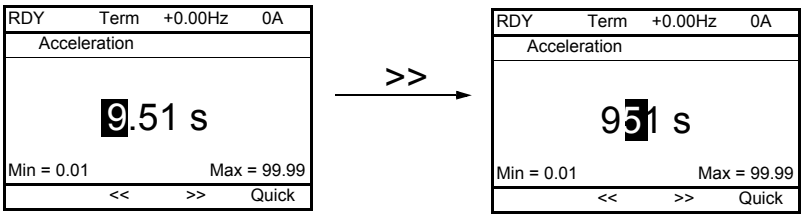
Chinese

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.

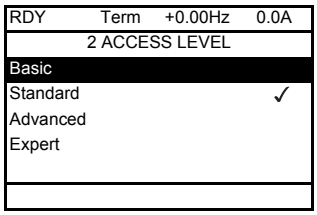
First power-up - [5. LANGUAGE] menu

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.

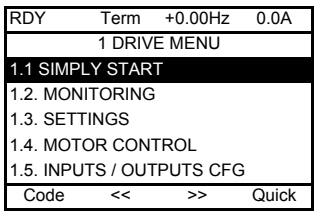
Display for 3 seconds following power-up

3 seconds

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

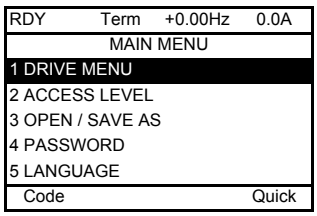


Switches to [2 ACCESS LEVEL] menu (see page 232)
Select the access level and press ENT.



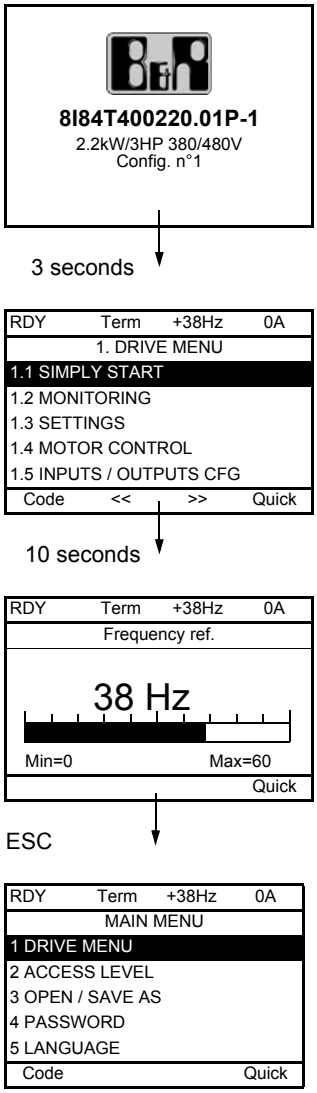
Switches to [1 DRIVE MENU] (see page 24)

ESC



Press ESC to return to [MAIN MENU]

Subsequent power ups



3 seconds later, switches to [1. DRIVE MENU]

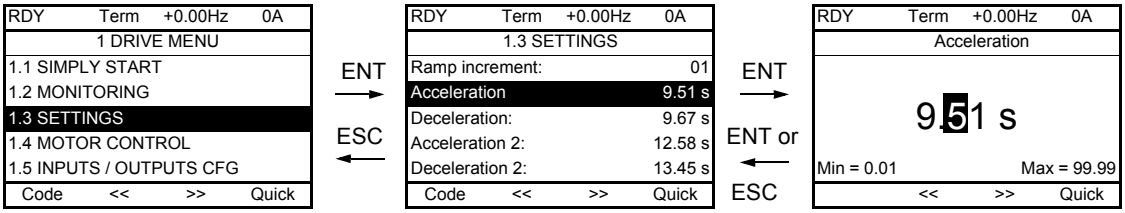
If no operator inputs are made, switches to "Display" automatically 10 seconds later (the display will vary depending on the selected configuration).

Users can return to [MAIN MENU] by pressing ENT or ESC.

Menu selected in [Power up menu] page 247

Programming: Example of accessing a parameter

Accessing the acceleration ramp



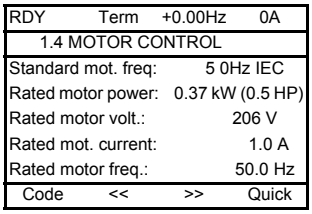
Note:

- 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).

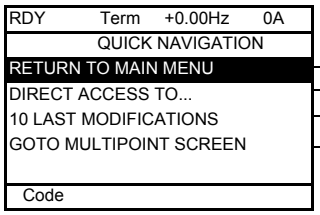
Quick navigation

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

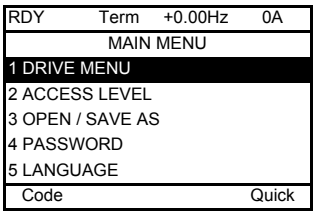
Example:



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

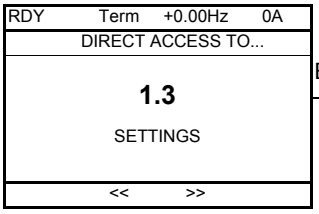


ENT

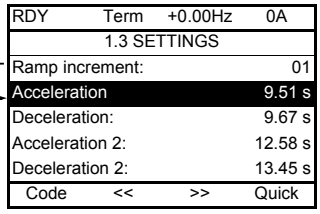


See page 248

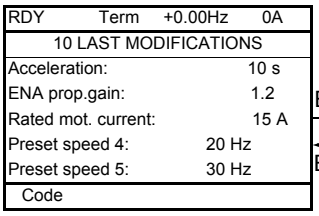
- [HOME]: Return to [MAIN MENU].
- [DIRECT ACCESS TO...] : Opens the direct access window, which will contain the text "1". The function keys << and >> (F2 and F3) can be used to select each of the numbers and the navigation button to increment or decrement the numbers: 1.3 in the example below.



ENT

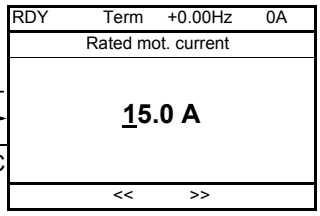


- [10 LAST MODIFICATIONS]: Opens a window in which the last 10 parameters modified can be accessed directly.

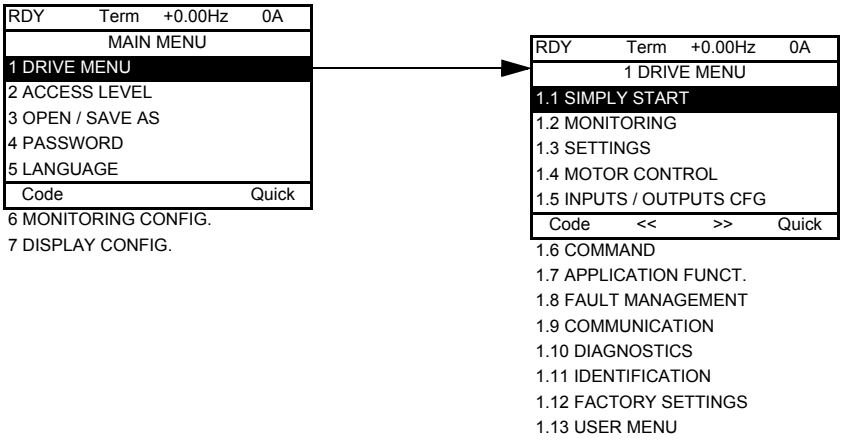


ENT

ESC



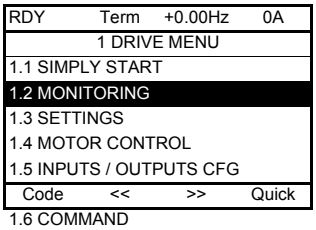
[MAIN MENU] - Menu mapping



Content of [MAIN MENU] menus

[1 DRIVE MENU]	See next page
[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

[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

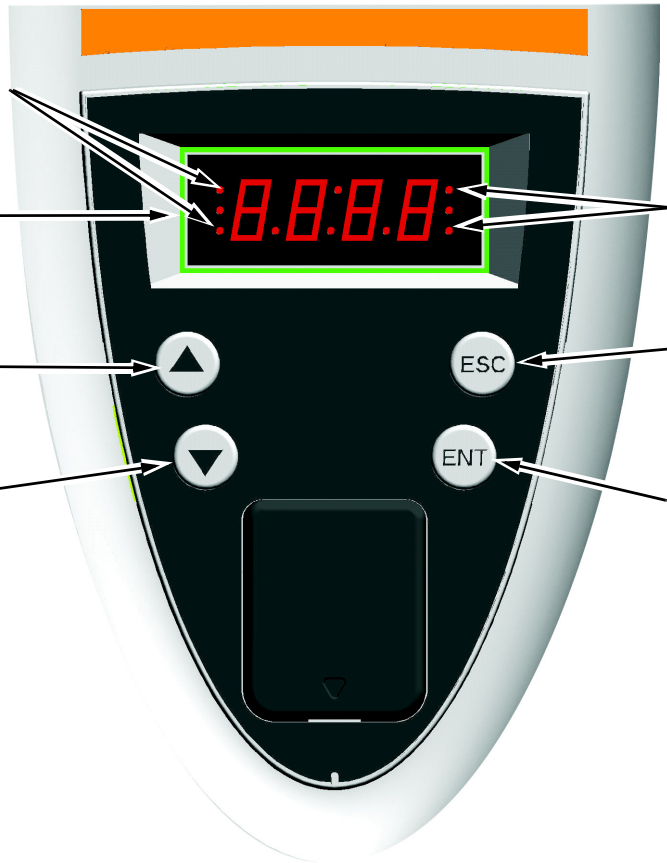
Content of [1. DRIVE MENU] menus:

[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, etc.)
[1.5 INPUTS / OUTPUTS CFG]:	I/O configuration (scaling, filtering, 2-wire control, 3-wire control, etc.)
[1.6 COMMAND]:	Configuration of command and reference channels (graphic display terminal, terminals, bus, etc.)
[1.7 APPLICATION FUNCT.] :	Configuration of application functions (e.g., preset speeds, PID, brake logic control, etc.)
[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

Integrated display terminal

All ACOPOSinverter P84 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 as an option.

Functions of the display and the keys



- HMI status LED
- 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 status LEDs for communication
- 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

Note: **• 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

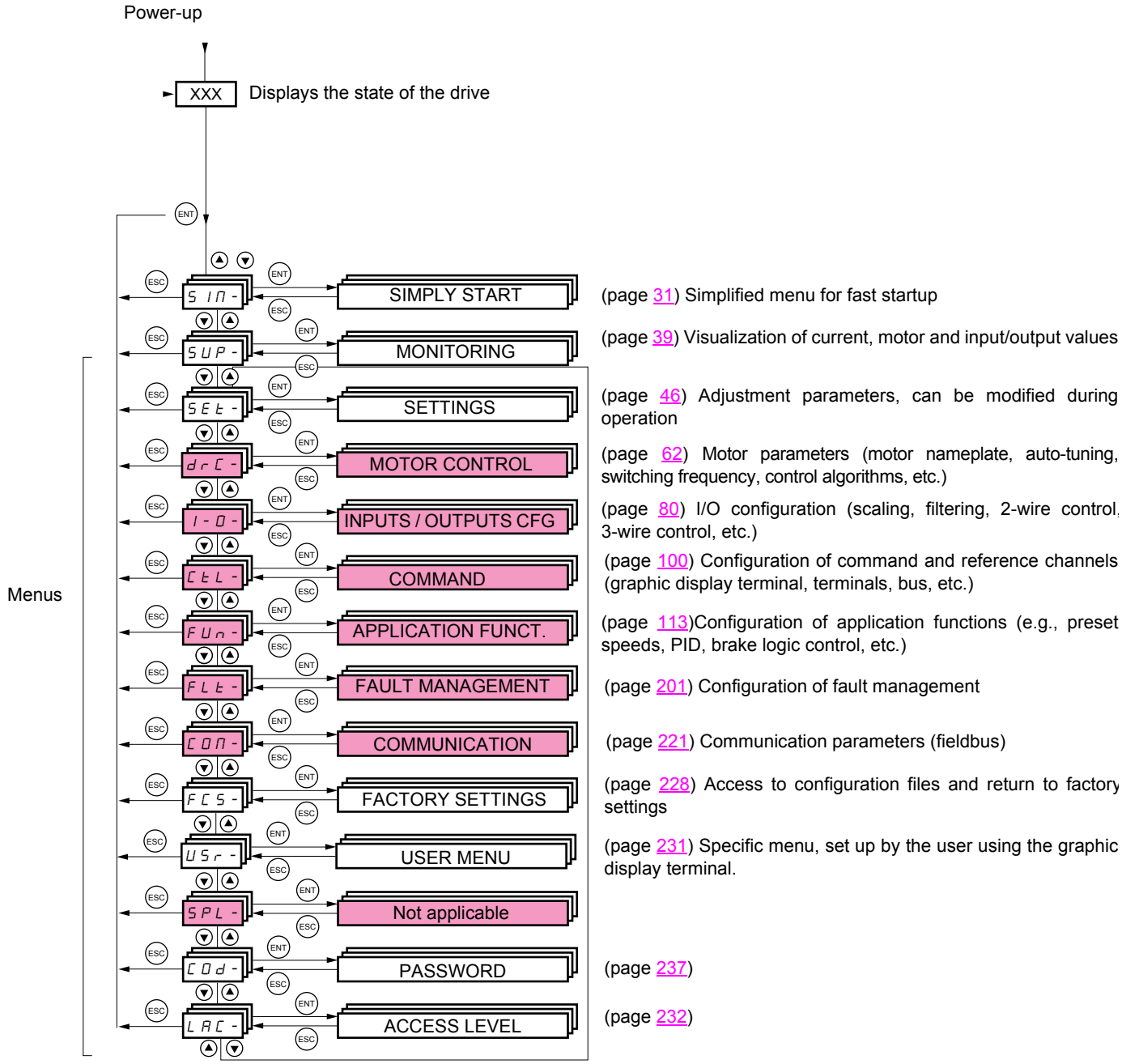
The display flashes when a value is stored.

Normal display, with no 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

The display flashes to indicate the presence of a fault.

Accessing menus



(page 31) Simplified menu for fast startup

(page 39) Visualization of current, motor and input/output values

(page 46) Adjustment parameters, can be modified during operation

(page 62) Motor parameters (motor nameplate, auto-tuning, switching frequency, control algorithms, etc.)

(page 80) I/O configuration (scaling, filtering, 2-wire control, 3-wire control, etc.)

(page 100) Configuration of command and reference channels (graphic display terminal, terminals, bus, etc.)

(page 113)Configuration of application functions (e.g., preset speeds, PID, brake logic control, etc.)

(page 201) Configuration of fault management

(page 221) Communication parameters (fieldbus)

(page 228) Access to configuration files and return to factory settings

(page 231) Specific menu, set up by the user using the graphic display terminal.

(page 237)

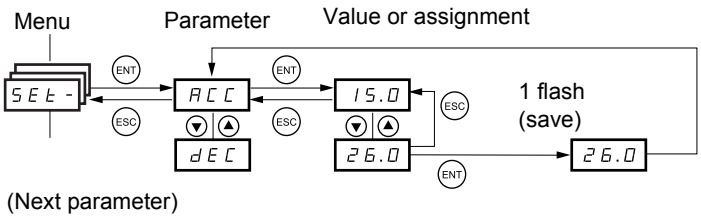
(page 232)

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

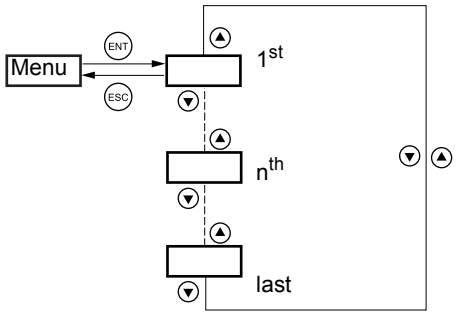
The grayed-out menus may not be accessible depending on the control access (LAC) configuration.

Accessing menu parameters

Save and store the displayed selection : ENT

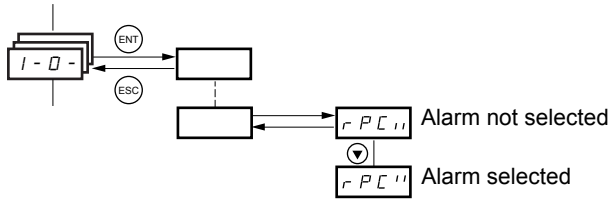


The display flashes when a value is stored.



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] menu (I-O-)
A number of alarms can be selected by "checking" them as follows.

The digit on the right indicates:  selected

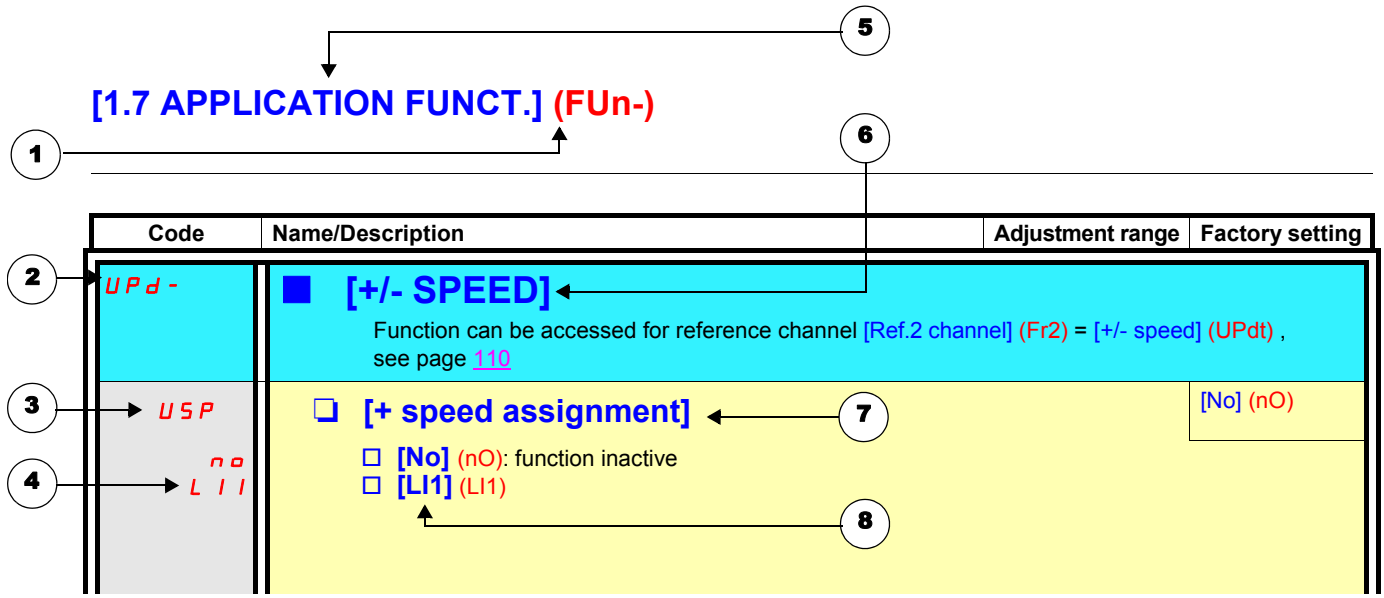
 not selected.

The same principle is used for all multiple selections.

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/ in B&R Automation Studio
6. Name of submenu on graphic display terminal/ in B&R Automation Studio /
7. Name of parameter on graphic display terminal/ in B&R Automation Studio
8. Value of parameter on graphic display terminal/ in B&R Automation Studio

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.

Interdependence of parameter values

The configuration of certain parameters modifies the adjustment range of other parameters, in order to reduce the risk of errors. **This may result in the modification of a factory setting or a value you have already selected.**

Example:

1. [Current Limitation] (CLI) page 53 set to 1.6 In or left at its factory setting, 1.5 In
2. [Switching freq.] (SFr) page 53 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).

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 259, 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

RDY	Term	+0.00Hz	0A
1.3 SETTINGS			
Ramp increment:			01
Acceleration			9.51 s
Deceleration:			9.67 s
Acceleration 2:			12.58 s
Deceleration 2:			13.45 s
Code	<<	>>	Quick

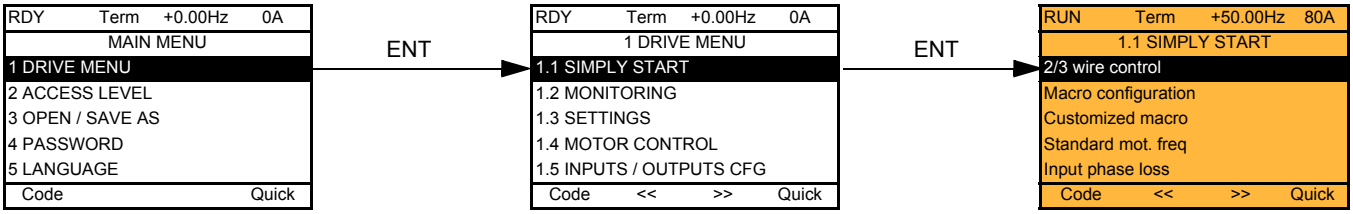
Code →

RDY	Term	+0.00Hz	0A
1.3 SETTINGS			
Ramp increment:			01
ACC			9.51 s
Deceleration:			9.67 s
Acceleration 2:			12.58 s
Deceleration 2:			13.45 s
Code	<<	>>	Quick

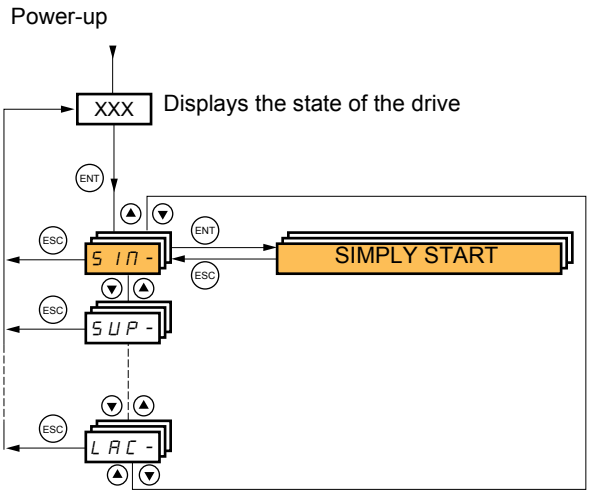
Then use the parameter code index, page 259, to find the page giving details of the displayed parameter.

[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 following exceptions:

- Auto-tuning, which causes the motor to start up
- The adjustment parameters on page 38

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

The [1.1 SIMPLY START] (SIM-) menu should be configured **on its own or before the other drive configuration menus**. If a modification has previously been made to any of them, in particular in [1.4 MOTOR CONTROL] (drC-), some [1.1 SIMPLY START] (SIM-) parameters may be changed, for example, the motor parameters, if a synchronous motor has been selected. Returning to the [1.1 SIMPLY START] (SIM-) menu after modifying another drive configuration menu **is unnecessary** but does not pose any risk. Changes following modification of another configuration menu **are not described**, to avoid unnecessary complication in this section.

Macro configuration

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

- Start/stop (factory configuration)
- Handling
- General use
- Hoisting
- 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.

Macro configuration parameters

Assignment of the inputs/outputs

Input/ output	[Start/Stop]	[M. handling]	[Gen. Use]	[Hoisting]	[PID regul.]	[Network C.]	[Mast./ slave]
AI1	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel] (PID reference)	[Ref.2 channel] ([Ref.1 channel] = integrated communication interface	[Ref.1 channel]
AI2	[No]	[Summing ref. 2]	[Summing ref. 2]	[No]	[PID feedback]	[No]	[Torque reference]
AO1	[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]
R2	[No]	[No]	[No]	[Brk control]	[No]	[No]	[No]
LI1 (2-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
LI2 (2-wire)	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]
LI3 (2-wire)	[No]	[2 preset speeds]	[Jog]	[Fault reset]	[PID integral reset]	[Ref. 2 switching]	[Trq/spd switching]
LI4 (2-wire)	[No]	[4 preset speeds]	[Fault reset]	[External fault]	[2 preset PID ref.]	[Fault reset]	[Fault reset]
LI5 (2-wire)	[No]	[8 preset speeds]	[Torque limitation]	[No]	[4 preset PID ref.]	[No]	[No]
LI6 (2-wire)	[No]	[Fault reset]	[No]	[No]	[No]	[No]	[No]
LI1 (3-wire)	Stop	Stop	Stop	Stop	Stop	Stop	Stop
LI2 (3-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
LI3 (3-wire)	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]
LI4 (3-wire)	[No]	[2 preset speeds]	[Jog]	[Fault reset]	[PID integral reset]	[Ref. 2 switching]	[Trq/spd switching]
LI5 (3-wire)	[No]	[4 preset speeds]	[Fault reset]	[External fault]	[2 preset PID ref.]	[Fault reset]	[Fault reset]
LI6 (3-wire)	[No]	[8 preset speeds]	[Torque limitation]	[No]	[4 preset PID ref.]	[No]	[No]
Graphic display terminal keys							
F1 key	[No]	[No]	[No]	[No]	[No]	Control via graphic display terminal	[No]
F2, F3, F4 keys	[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.

Macro configuration parameters

Other configurations and settings

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

Hoisting:

- [Movement type] (bSt) = [Hoisting] (UEr) page 145
- [Brake contact] (bCI) = [No] (nO) page 145
- [Brake impulse] (bIP) = [No] (nO) page 145
- [Brake release I FW] (Ibr) = [Rated mot. current] (nCr) page 145
- [Brake Release time] (brt) = 0.5 s page 146
- [Brake release freq] (bIr) = [Auto] (AUtO) page 146
- [Brake engage freq] (bEn) = [Auto] (AUto) page 146
- [Brake engage time] (bEt) = 0.5 s page 146
- [Engage at reversal] (bEd) = [No] (nO) page 147
- [Jump at reversal] (JdC) = [Auto] (AUtO) page 147
- [Time to restart] (ttr) = 0 s page147
- [Current ramp time] (brr) = 0 s page 149
- [Low speed] (LSP) = Rated motor slip calculated by the drive, page 38
- [Output Phase Loss] (OPL) = [Yes] (YES) page 208. No further modifications can be made to this parameter.
- [Catch on the fly] (FLr) = [No] (nO) page 206. No further modifications can be made to this parameter.

Mast./slave:

- [Motor control type] (Ctt) = [SVC I] (CUC) page 63

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:

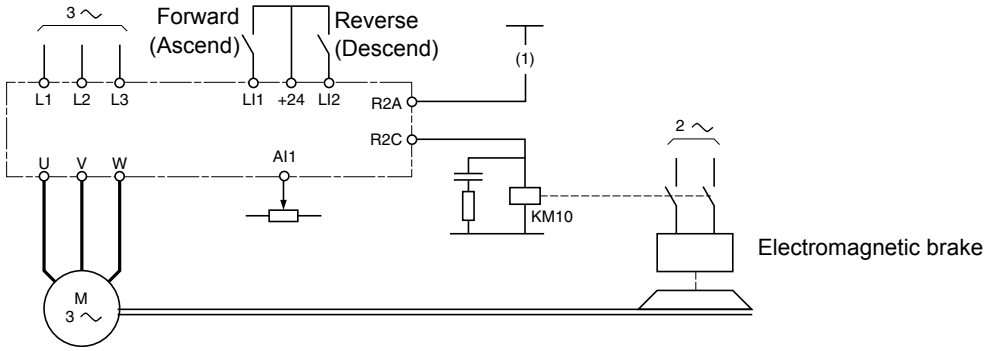
Returning to factory settings with [Config. Source] (FCSI) = [Macro-Conf] (InI) page 230 will return the drive to the selected macro configuration. The [Macro configuration] (CFG) parameter does not change, although [Customized macro] (CCFG) disappears.

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.

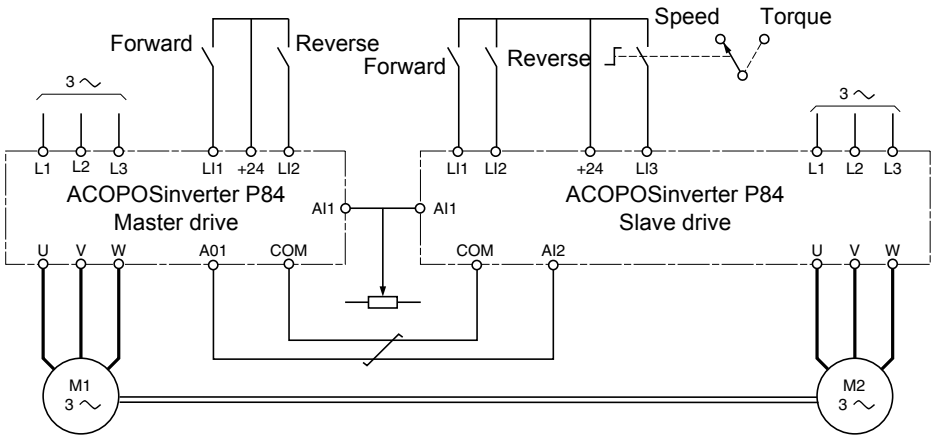
Example diagrams for use with the macro configurations

[Hoisting] (HSt) diagram



(1) A contact on a safety PLC (e.g. X20 SafeLOGIC with X20SO****) must be inserted in the brake control circuit to engage it safely when the "Power Removal" safety function is activated (see connection diagrams in the Installation Manual).

[Mast./slave] (MSL) diagram

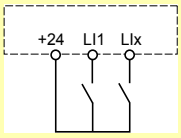


When the two motors are mechanically connected, the Speed/torque contact closing results in operation in Mast./slave mode. The master drive regulates the speed and controls the slave drive in torque mode to ensure distribution of the load.

Code	Name/Description	Adjustment range	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.

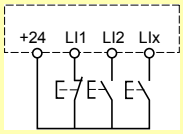
Example of "sink" wiring:



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 "sink" wiring:



LI1: stop
LI2: forward
LIx: reverse

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

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 81 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).
Check 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		

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

To change the assignment of [Macro configuration] (CFG) press and hold down the “ENT” key for 2 s.
Check 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]**		
	Read-only parameter, only visible if at least one macro configuration parameter has been modified.		
YES	☐ **[Yes]** (YES)		

[1.1 SIMPLY START] (SIM-)

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 38, [Freq. threshold] (Ftd) page 59, [Rated motor freq.] (FrS) and [Max frequency] (tFr) .		
IPL	❑ **[Input phase loss]**		According to drive rating
nO	☐ **[Ignore]** (nO): Fault ignored, to be used when the drive is supplied via a single-phase supply or by the DC bus.		
YES	☐ **[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.		
	This parameter is only accessible in this menu on 8I84T200037.01P-1 to 8I84T200750.01P-1drives (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. 8I84T2*****.01P-1: 100 to 240 V - 8I84T4*****.01P-1: 200 to 480		
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 for drives rated higher than 37 kW (50 HP).		

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

Code	Name/Description	Factory setting
tUn	❑ **[Auto tuning]**	[No] (nO)
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:** • It is essential that all motor parameters ([Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr)) are configured correctly before starting auto-tuning. If at least one of these parameters is modified after auto-tuning has been performed, [Auto tuning] (tUn) will return to [No] (nO) and must be repeated. • 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 218, 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 has failed.	
dOnE	☐ **[Done]** (dOnE): The stator resistance measured by the auto-tuning function is used to control the motor.	
PHr	❑ **[Output Ph rotation]**	[ABC] (AbC)
AbC	☐ **[ABC]** (AbC): Forward	
ACb	☐ **[ACB]** (ACb): Reverse This parameter can be used to reverse the direction of rotation of the motor without reversing the wiring.	

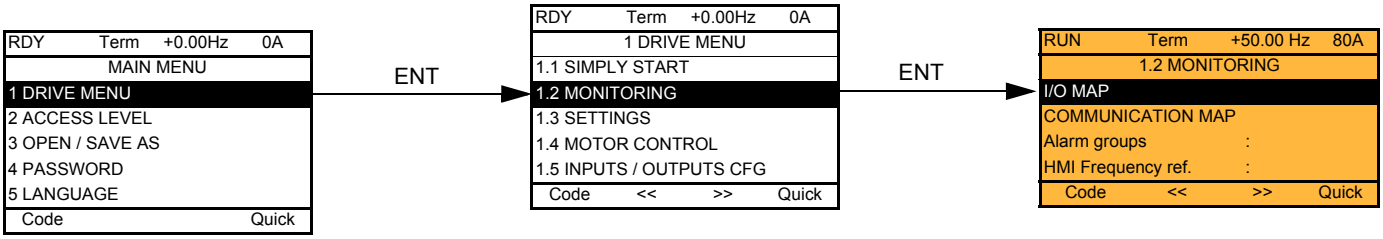
Parameters that can be changed during operation or when stopped

Code	Name/Description	Adjustment Range	Factory setting
ItH	❑ **[Mot. therm. current]** Motor thermal protection current, to be set to the rated current indicated on the nameplate.	0.2 to 1.5 In (1)	According to drive rating
ACC	❑ **[Acceleration]** Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 36). Make sure that this value is compatible with the inertia being driven.	0.1 to 999.9 s	3.0 s
dEC	❑ **[Deceleration]** Time to decelerate from the [Rated motor freq.] (FrS) (page 36) to 0. Make sure that this value is compatible with the inertia being driven.	0.1 to 999.9 s	3.0 s
LSP	❑ **[Low speed]** Motor frequency at minimum reference, can be set between 0 and [High speed] (HSP).		0
HSP	❑ **[High speed]** 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).		50 Hz

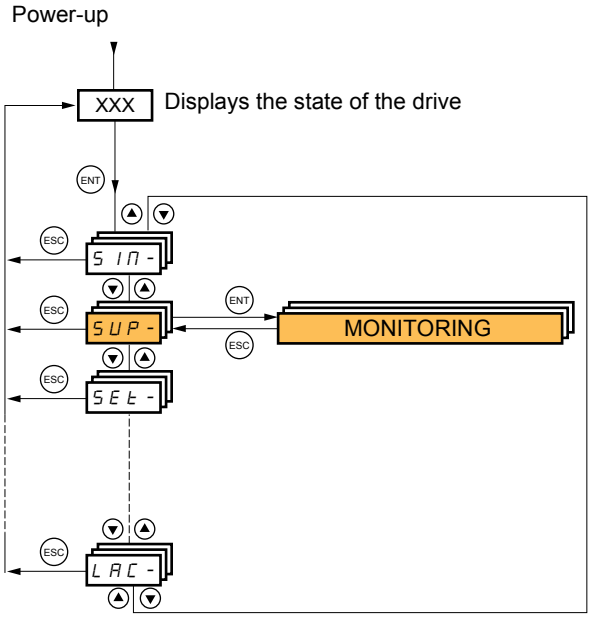
(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

[1.2 MONITORING] (SUP-)

With graphic display terminal:

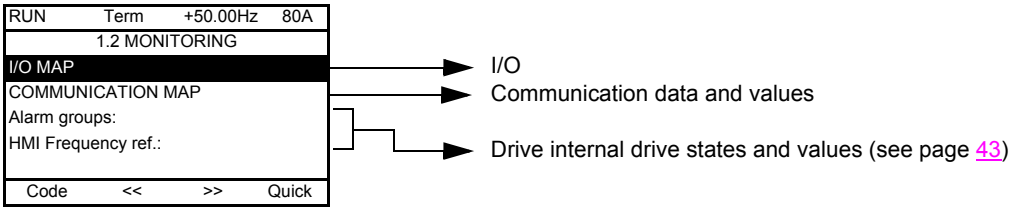


With integrated display terminal:

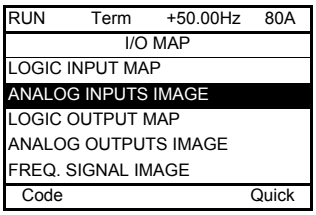


With graphic display terminal

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



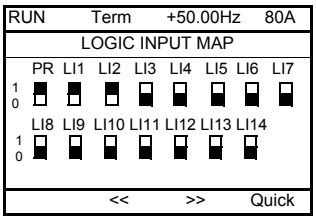
I/O



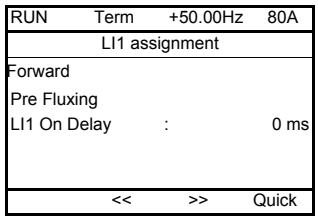
Move from one screen to another (from LOGIC INPUT MAP to FREQ. SIGNAL IMAGE) by turning the navigation button

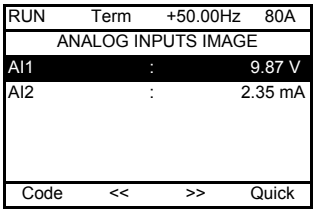
State 0

State 1

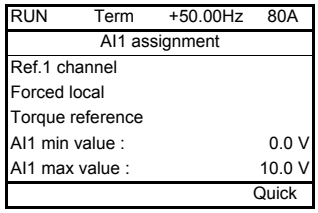


Access to the selected input or output configuration: Press ENT.



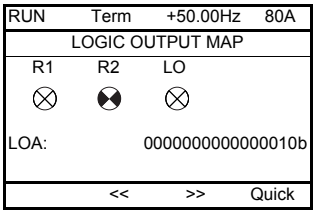


ENT

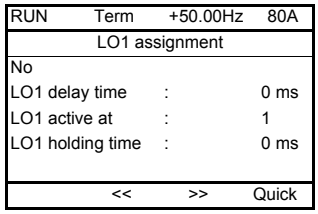


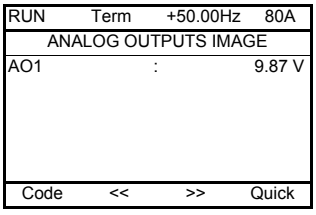
State 0

State 1

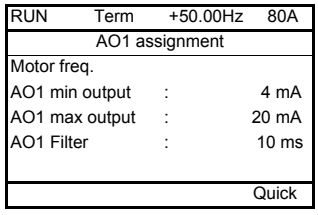


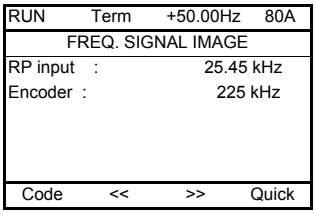
ENT



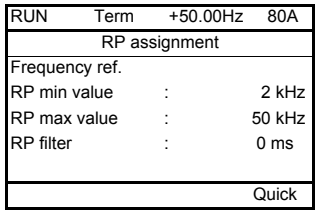


ENT



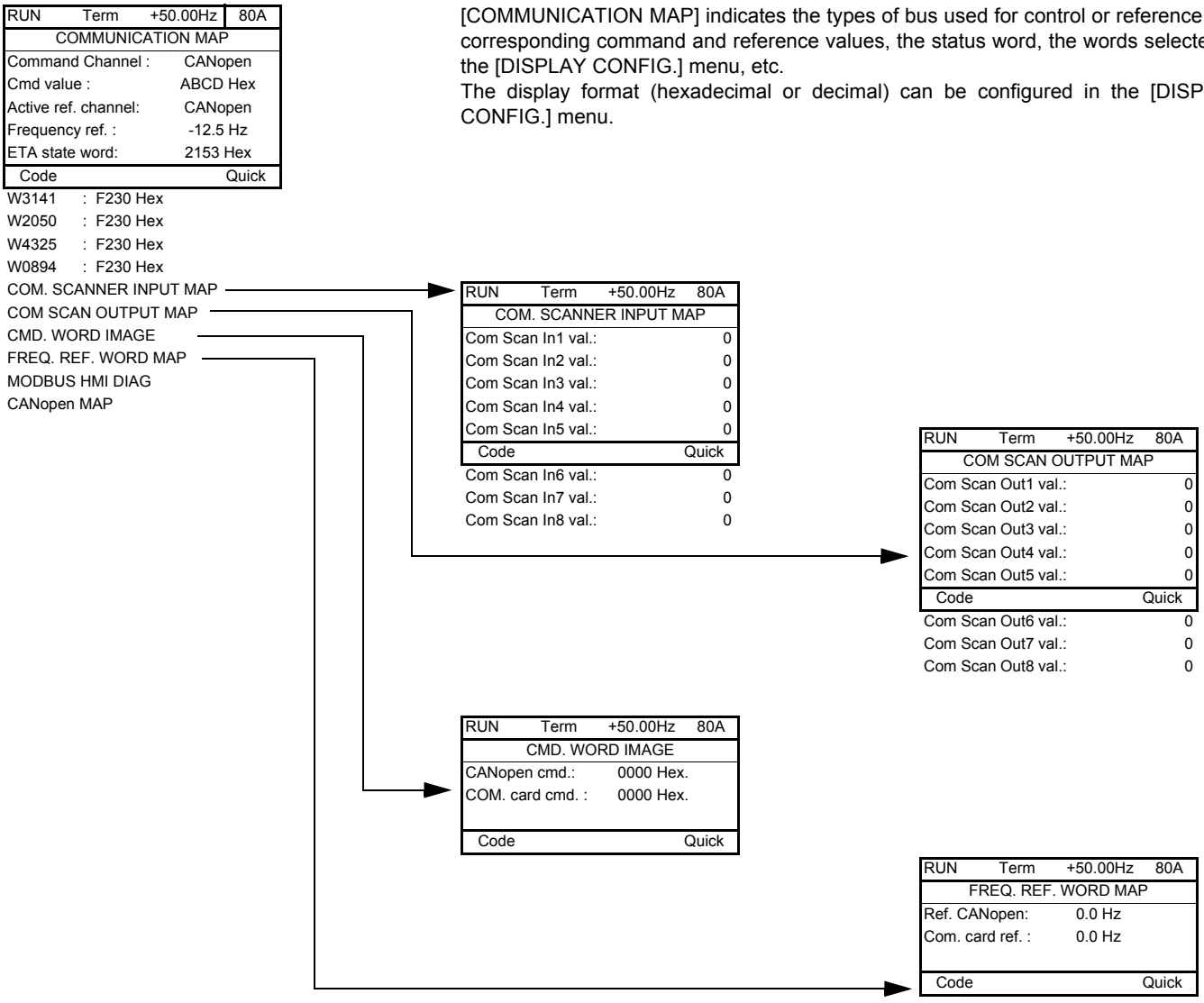


ENT



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, etc.
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).

With graphic display terminal

Communication (continued)

The state of the LEDs, the periodic data, the address, the speed, and the format, etc,. is given for each bus.

⊗ LED off
◐ LED on

RUN	Term	+50.00Hz	80A
COMMUNICATION MAP			
Command Channel :		CANopen	
Cmd value :		ABCD Hex	
Active ref. channel:		CANopen	
Frequency ref. :		-12.5 Hz	
ETA state word:		2153 Hex	
Code			Quick

W3141 : F230 Hex
W2050 : F230 Hex
W4325 : F230 Hex
W0894 : F230 Hex
COM. SCANNER INPUT MAP
COM SCAN OUTPUT MAP
CMD. WORD IMAGE
FREQ. REF. WORD MAP
MODBUS HMI DIAG
CANopen MAP

Communication via the graphic display terminal

RUN	Term	+50.00Hz	80A
MODBUS HMI DIAG			
COM LED :			◐
Mb HMI frames nb.			
Mb HMI CRC errors			
Code			Quick

Communication via CANopen

RUN	Term	+50.00Hz	80A
CANopen MAP			
RUN LED:			⊗
ERR LED:			⊗
PDO1 IMAGE			
PDO2 IMAGE			
PDO3 IMAGE			
Code			Quick

Canopen NMT state
Number of TX PDO 0
Number of RX PDO 0
Error code 0
RX Error Counter 0
TX Error Counter 0

PDO images are only visible if CANopen has been enabled (address other than OFF) and if the PDOs are active.

PDO configuration using the B&R Automation Studio. Some PDOs cannot be used.

RUN	Term	+50.00Hz	80A
PDO1 IMAGE			
Received PDO1-1 :			FDBA Hex
Received PDO1-2			
Received PDO1-3			
Received PDO1-4			
Transmit PDO1-1 :			FDBA Hex
Code			Quick

Transmit PDO1-2
Transmit PDO1-3
Transmit PDO1-4

RUN	Term	+50.00Hz	80A
PDO2 IMAGE			
Received PDO2-1 :			FDBA Hex
Received PDO2-2			
Received PDO2-3			
Received PDO2-4			
Transmit PDO2-1 :			FDBA Hex
Code			Quick

Transmit PDO2-2
Transmit PDO2-3
Transmit PDO2-4

RUN	Term	+50.00Hz	80A
PDO3 IMAGE			
Received PDO3-1 :			FDBA Hex
Received PDO3-2			
Received PDO3-3			
Received PDO3-4			
Transmit PDO3-1 :			FDBA Hex
Code			Quick

Transmit PDO3-2
Transmit PDO3-3
Transmit PDO3-4

[1.2 MONITORING] (SUP-)

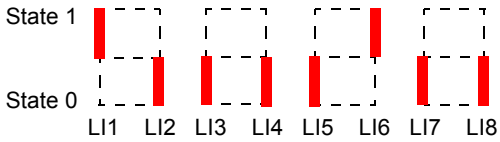
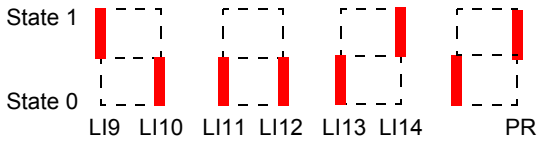
With graphic display terminal: Drive-internal states and values

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 120 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.
[Motor current] (LCr)	in A
[ENA avg speed] (AVS)	in Hz: The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES) (see page 73)
[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)
[Config. active] (CnFS)	Active configuration [Config. n°0, 1 or 2]
[Utilised param. set] (CFPS)	[Set n°1, 2 or 3] (can be accessed if parameter switching has been enabled, see page 185)
[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
- [LI6=PTC alarm] (PtC3): LI6 = PTC probe alarm
- [Fast stop in prog.] (FSt): Fast stop in progress
- [Current Th. attained] (CtA): Current threshold attained ([Current threshold] (Ctd) page 58)
- [Freq. Th. attained] (FtA): Frequency threshold attained ([Freq. threshold] (Ftd) page 59)
- [Freq. Th. 2 attained] (F2A): 2nd frequency threshold attained ([Freq. threshold 2] (F2d) page 59)
- [Frequency ref. att.] (SrA): Frequency reference attained
- [Motor th. state att.] (tSA): Motor 1 thermal state attained
- [External fault alarm] (EtF): External fault alarm
- [Auto restart] (AUtO): Automatic restart in progress
- [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
- [HSP attained] (FLA): High speed attained
- [Load slipping] (AnA): Slipping alarm
- [Set 1 active] (CFP1): Parameter set 1 active
- [Set 2 active] (CFP2): Parameter set 2 active
- [Set 3 active] (CFP3): Parameter set 3 active
- [In braking] (brS): Drive braking
- [DC bus loading] (dbL): DC bus loading
- [Forward] (MFrd): Motor running forward
- [Reverse] (MrrS): Motor running in reverse
- [High torque alarm] (ttHA): Motor torque overshooting high threshold [High torque thd.] (ttH) page 58.
- [Low torque alarm] (ttLA): Motor torque undershooting low threshold [Low torque thd.] (ttL) page 58.

With integrated display terminal

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

Code	Name/Description	Adjustment range	Factory setting
IOM-	**I/O MAP**		
LIA-	**Logic input functions**		
LIA to LI4A	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-	**Analog input functions**		
AI1A AI2A	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.		

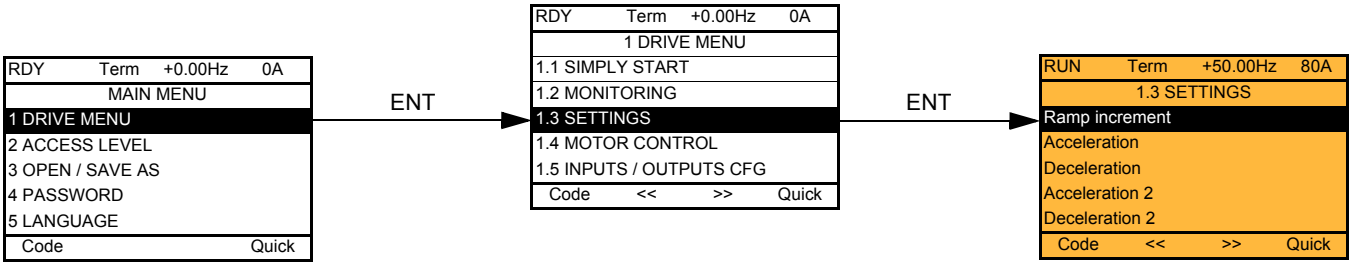
[1.2 MONITORING] (SUP-)

With integrated display terminal: Drive-internal states and values

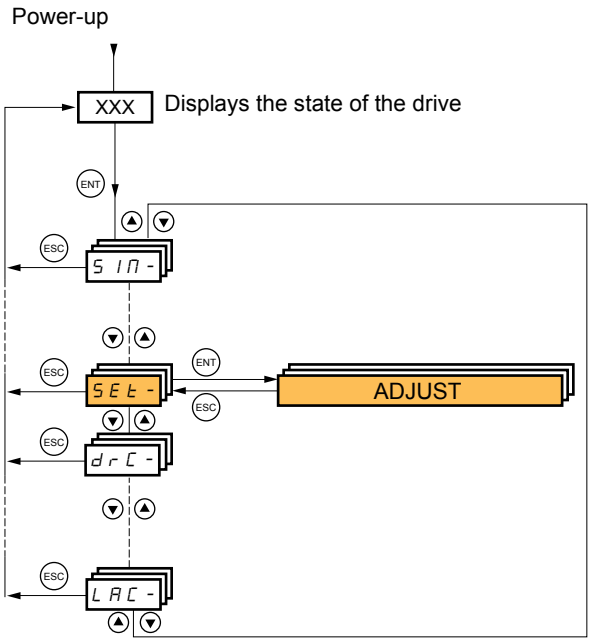
Code	Name/Description	Unit
ALGr	**Alarm groups:** Current alarm group numbers	
rPI	**Internal PID reference:** PID reference via graphic display terminal (can be accessed if the function has been configured).	as a process value
MFr	**Multiplication coefficient** (can be accessed if [Multiplier ref. -] (MA2,MA3) page 120 has been assigned)	%
FrH	**Frequency ref.**	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
LCr	**Motor current**	A
AUS	**ENA avg SPEED:** The parameter can be accessed if EnA = YES (see page 73)	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
CnFS	**Config. active:** CnF0, 1 or 2 (can be accessed if motor or configuration switching has been enabled, see page 190)	
CFPS	**Utilised param. set:** CFP1, 2 or 3 (can be accessed if parameter switching has been enabled, see page 185)	

[1.3 SETTINGS] (SEt-)

With graphic display terminal:



With integrated display terminal:



[1.3 SETTINGS] (SEt-)

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

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Check 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 ( ) 0.01 0.1 1	❑ **[Ramp increment]** ☐ **[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).	0,01 - 0,1 - 1	0,1
ACC ( )	❑ **[Acceleration]** Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 61). Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	3.0 s
dEC ( )	❑ **[Deceleration]** Time to decelerate from the [Rated motor freq.] (FrS) (page 61) to 0. Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	3.0 s
AC2 ★	❑ **[Acceleration 2]** See page 123 Time to accelerate from 0 to the [Rated motor freq.] (FrS). Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	5.0 s
dE2 ★	❑ **[Deceleration 2]** See page 123 Time to decelerate from the [Rated motor freq.] (FrS) to 0. Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	5.0 s
tA1 ★	❑ **[Begin Acc round]** See page 122 Rounding of start of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time.	0 to 100%	10%
tA2 ★	❑ **[End Acc round]** See page 122 - 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))		10%
tA3 ★	❑ **[Begin Dec round]** See page 122 Rounding of start of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time.	0 to 100%	10%

(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.

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

Code	Name/Description	Adjustment range	Factory setting
tA4 ★	❑ **[End Dec round]** See page 122 - 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))		10%
LSP	❑ **[Low speed]** Motor frequency at minimum reference, can be set between 0 and [High speed] (HSP).		0 Hz
HSP	❑ **[High speed]** 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).		50 Hz
ItH	❑ **[Mot. therm. current]** Motor thermal protection current, to be set to the rated current indicated on the nameplate.	0.2 to 1.5 In (1)	According to drive rating
SPG	❑ **[Speed prop. gain]** Speed loop proportional gain	0 to 1000%	40%
SIt	❑ **[Speed time integral]** Speed loop integral time constant.	1 to 1000%	100%
SFC	❑ **[K speed loop filter]** Speed loop filter coefficient.	0 to 100	0

(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.

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 63 = [SVC V] (UUC), [SVC I] (CUC), [FVC] (FUC), or [Sync. mot.] (SYn) and if [ENA system] (EnA) page 73 = [No] (nO).
- The factory settings are suitable for most applications.

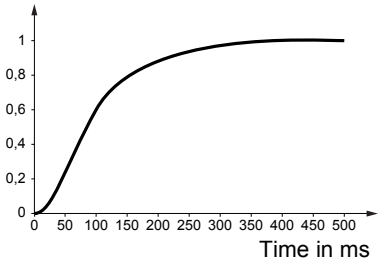
General case: Setting for [K speed loop filter] (SFC) = 0

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.

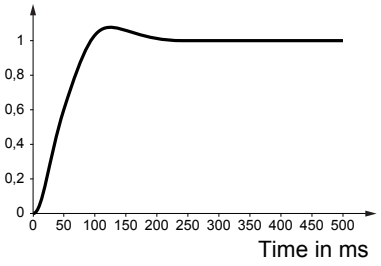
Initial response

Reference division



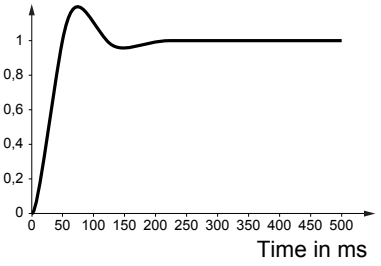
Reduction in SIT ↘

Reference division



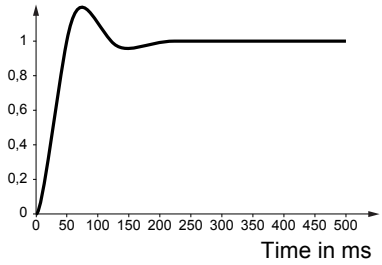
Reduction in SIT ↘↘

Reference division



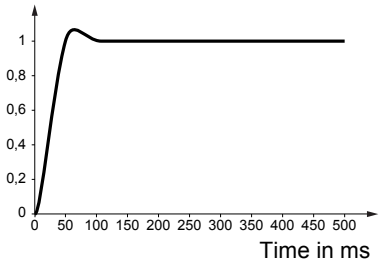
Initial response

Reference division



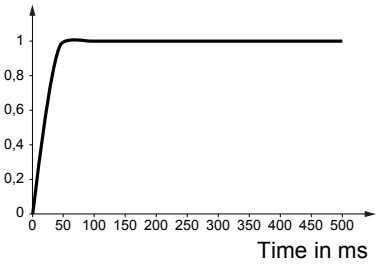
Increase in SPG ↗

Reference division



Increase in SPG ↗↗

Reference division



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).

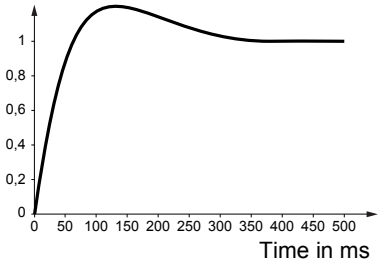
- When set to 100 as described above the regulator is a “PI” type, without filtering of the speed reference.
- Settings between 0 and 100 will obtain an intermediate function between the settings below and those on the previous page.

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.

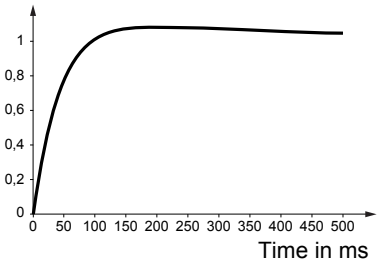
Initial response

Reference division



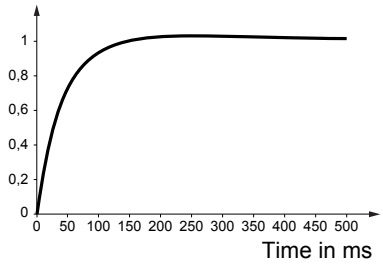
Reduction in SIT ↘

Reference division



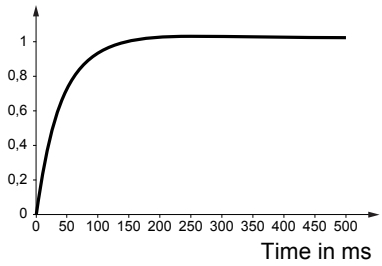
Reduction in SIT ↘↘

Reference division



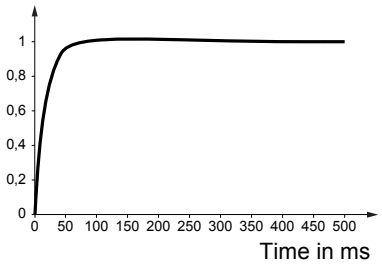
Initial response

Reference division



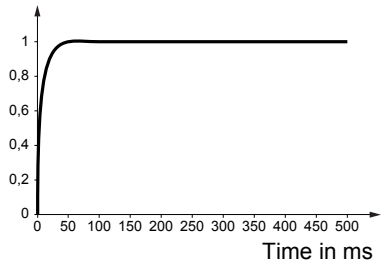
Increase in SPG ↗

Reference division



Increase in SPG ↗↗

Reference division

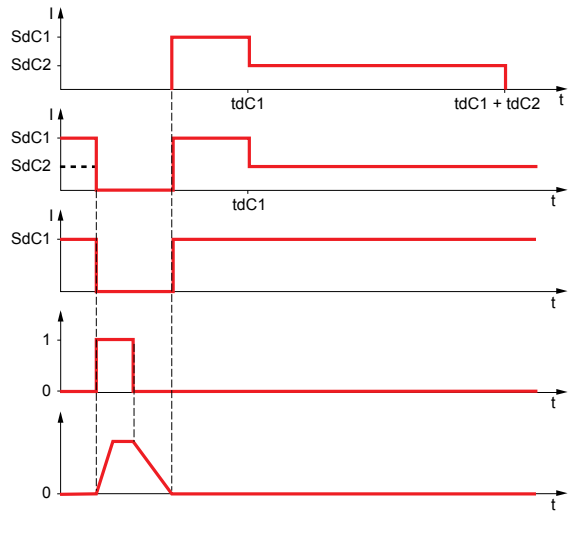


Code	Name/Description	Adjustment range	Factory setting
GPE ★	❑ [ENA prop.gain] See page 73	1 to 9999	250
G IE ★	❑ [ENA integral gain] See page 73	0 to 9999	100
UFr ★	❑ [IR compensation] See page 66	25 to 200%	100%
SLP ★	❑ [Slip compensation] See page 66	0 to 300%	100%
dCF ★	❑ [Ramp divider] See page 125	0 to 10	4
IdC ★	❑ [DC inject. level 1] See page 126 Level of DC injection braking current activated via logic input or selected as stop mode. **CAUTION** Check that the motor will withstand this current without overheating. **Failure to follow this instruction can result in equipment damage.**	0.1 to 1.41 In (1)	0.64 In (1)
tdI ★	❑ [DC injection time 1] See page 126 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] See page 126 Injection current activated by logic input or selected as stop mode, once period of time [DC injection time 1] (tdI) has elapsed. **CAUTION** Check that the motor will withstand this current without overheating. **Failure to follow this instruction can result in equipment damage.**	0.1 In (2) to [DC inject. level 1] (IdC)	0.5 In (1)
tdC ★	❑ [DC injection time 2] See page 126 Maximum injection time [DC inject. level 2] (IdC2) for injection selected as stop mode only.	0.1 to 30 s	0.5 s

(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.

Code	Name/Description	Adjustment range	Factory setting
SdC1 ★	❑ **[Auto DC inj. level 1]** Level of standstill DC injection current. This parameter can be accessed if [Auto DC injection] (AdC) page 127 is not [No] (nO) This parameter is forced to 0 if [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn). **CAUTION** Check that the motor will withstand this current without overheating. **Failure to follow this instruction can result in equipment damage.**	0 to 1.2 In (1)	0.7 In (1)
tdC1 ★	❑ **[Auto DC inj. time 1]** Standstill injection time. This parameter can be accessed if [Auto DC injection] (AdC) page 127 is not [No] (nO) If [Motor control type] (Ctt) page 63 = [FVC] (FUC) or [Sync. mot.] (SYn) this time corresponds to the zero speed maintenance time.	0.1 to 30 s	0.5 s
SdC2 ★	❑ **[Auto DC inj. level 2]** 2nd level of standstill DC injection current. This parameter can be accessed if [Auto DC injection] (AdC) page 127 is not [No] (nO) This parameter is forced to 0 if [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn). **CAUTION** Check that the motor will withstand this current without overheating. **Failure to follow this instruction can result in equipment damage.**	0 to 1.2 In (1)	0.5 In (1)
tdC2 ★	❑ **[Auto DC inj. time 2]** 2nd standstill injection time. This parameter can be accessed if [Auto DC injection] (AdC) page 127 = [Yes] (YES)	0 to 30 s	0 s

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

Note: When [Motor control type] (Ctt) page 63 = [FVC] (FUC):
[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.

★ 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.

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, the rating (power and voltage) and the configuration of the [Sinus filter] (OFI) and [Motor surge limit] (SVL) parameters, page 75.

If the value is less than 2 kHz, [Current Limitation] (CLI) and [I Limit. 2 value] (CL2) page 53 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.

☞ **Note:** If [Motor control type] (Ctt) page 63 = [FVC] (FUC), we do not recommend setting the switching frequency to a value less than 2 kHz (in order to avoid speed instability).
.

CAUTION

On 8I84T400075.01P-1 to 8I84T400400.01P-1, 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 this instruction can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
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 53 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 208). If it is less than the no-load motor current, the limitation no longer has any effect.

CAUTION

Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.
Failure to follow this instruction can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
CL2 ★	❑ [I Limit. 2 value]	0 to 1.65 In (1)	1.5 In (1)

See page 174
The adjustment range is limited to 1.36 In if [Switching freq.] (SFr) page 53 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 208). If it is less than the no-load motor current, the limitation no longer has any effect.

CAUTION

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

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
FLU ↻	**❑ [Motor fluxing]**		[No] (FnO)
	☐ **[Not cont.]** (FnC): Non-continuous mode ☐ **[Continuous]** (FCt): Continuous mode. This option is not possible if [Auto DC injection] (AdC) page 127 is [Yes] (YES) or if [Type of stop] (Stt) page 125 is [Freewheel] (nSt). ☐ **[No]** (FnO): Function inactive This option is not possible if [Motor control type] (Ctt) page 63 = [SVCI] (CUC) or [FVC] (FUC). If [Motor control type] (Ctt) page 63 = [SVCI] (CUC), [FVC] (FUC) or [Sync. mot.] (SYn) the factory setting is replaced by [Not cont.] (FnC). 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** Check that the motor will withstand this current without overheating. **Failure to follow this instruction can result in equipment damage.** If [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn), the [Motor fluxing] (FLU) parameter causes the alignment of the rotor and not the fluxing. If [Brake assignment] (bLC) page 145 is not [No] (nO), the [Motor fluxing] (FLU) parameter has no effect.		
tLS ↻	**❑ [Low speed time out]** Maximum operating time at [Low speed] (LSP) (see page 38) 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 125 is forced to [Ramp stop] (rMP) (only if a ramp stop can be configured).	0 to 999.9 s	0 s
JGF ★	**❑ [Jog frequency]** See page 129 Reference in jog operation	0 to 10 Hz	10 Hz
JGt ★	**❑ [Jog delay]** See page 129 Anti-repeat delay between 2 consecutive jog operations.	0 to 2.0 s	0.5 s

(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.

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

Code	Name/Description	Adjustment range	Factory setting
SP2 ★	❑ [Preset speed 2] See page 132 Preset speed 2	0 to 1600 Hz	10 Hz
SP3 ★	❑ [Preset speed 3] See page 132 Preset speed 3	0 to 1600 Hz	15 Hz
SP4 ★	❑ [Preset speed 4] See page 132 Preset speed 4	0 to 1600 Hz	20 Hz
SP5 ★	❑ [Preset speed 5] See page 132 Preset speed 5	0 to 1600 Hz	25 Hz
SP6 ★	❑ [Preset speed 6] See page 132 Preset speed 6	0 to 1600 Hz	30 Hz
SP7 ★	❑ [Preset speed 7] See page 132 Preset speed 7	0 to 1600 Hz	35 Hz
SP8 ★	❑ [Preset speed 8] See page 132 Preset speed 8	0 to 1600 Hz	40 Hz
SP9 ★	❑ [Preset speed 9] See page 132 Preset speed 9	0 to 1600 Hz	45 Hz
SP10 ★	❑ [Preset speed 10] See page 132 Preset speed 10	0 to 1600 Hz	50 Hz
SP11 ★	❑ [Preset speed 11] See page 132 Preset speed 11	0 to 1600 Hz	55 Hz
SP12 ★	❑ [Preset speed 12] See page 132 Preset speed 12	0 to 1600 Hz	60 Hz
SP13 ★	❑ [Preset speed 13] See page 132 Preset speed 13	0 to 1600 Hz	70 Hz
SP14 ★	❑ [Preset speed 14] See page 132 Preset speed 14	0 to 1600 Hz	80 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.

Code	Name/Description	Adjustment range	Factory setting
SP 15 ★	❑ [Preset speed 15] See page 132 Preset speed 15	0 to 1600 Hz	90 Hz
SP 16 ★	❑ [Preset speed 16] See page 132 Preset speed 16	0 to 1600 Hz	100 Hz
MFr	❑ [Multiplying coeff.] Multiplying coefficient, can be accessed if [Multiplier ref.-] (MA2,MA3) page 120 has been assigned to the graphic terminal	0 to 100%	100%
SrP ★	❑ [+/-Speed limitation] See page 136 Limitation of +/- speed variation	0 to 50%	10%
rPG ★	❑ [PID prop. gain] See page 163 Proportional gain	0.01 to 100	1
r IG ★	❑ [PID integral gain] See page 164 Integral gain	0.01 to 100	1
rdG ★	❑ [PID derivative gain] See page 164 Derivative gain	0.00 to 100	0
PrP ★	❑ [PID ramp] See page 164 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
POL ★	❑ [Min PID output] See page 164 Minimum value of regulator output in Hz	- 500 to 500 or -1600 to 1600 according to rating	0 Hz
POH ★	❑ [Max PID output] See page 164 Maximum value of regulator output in Hz	0 to 500 or 1600 according to rating	60 Hz
PAL ★	❑ [Min fbk alarm] See page 164 Minimum monitoring threshold for regulator feedback	See page 164 (1)	100
PAH ★	❑ [Max fbk alarm] See page 164 Maximum monitoring threshold for regulator feedback	See page 164 (1)	1000

(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, e.g., 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.

[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
PEr ★	❑ **[PID error Alarm]** See page 164 Regulator error monitoring threshold	0 to 65535 (1)	100
PSr ★	❑ **[Speed input %]** See page 165 Multiplying coefficient for predictive speed input.	1 to 100%	100%
rP2 ★	❑ **[Preset ref. PID 2]** See page 167 Preset PID reference	See page 167 (1)	300
rP3 ★	❑ **[Preset ref. PID 3]** See page 167 Preset PID reference	See page 167 (1)	600
rP4 ★	❑ **[Preset ref. PID 4]** See page 167 Preset PID reference	See page 167 (1)	900
Ibr ★	❑ **[Brake release I FW]** See page 145 Brake release current threshold for lifting or forward movement	0 to 1.32 In (2)	0
Ird ★	❑ **[Brake release I Rev]** See page 145 Brake release current threshold for lowering or reverse movement	0 to 1.32 In (2)	0
brt ★	❑ **[Brake Release time]** See page 146 Brake release time delay	0 to 5.00 s	0 s
blr ★	❑ **[Brake release freq]** See page 146 Brake release frequency threshold	[Auto] (AUtO) 0 to 10 Hz	[Auto] (AUtO)
bEn ★	❑ **[Brake engage freq]** See page 146 Brake engage frequency threshold	[Auto] (AUtO) 0 to 10 Hz	[Auto] (AUtO)
tbE ★	❑ **[Brake engage delay]** See page 146 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.	0 to 5.00 s	0 s

(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, e.g., 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.

[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
bEt ★	❑ **[Brake engage time]** See page 146 Brake engage time (brake response time)	0 to 5.00 s	0 s
JdC ★	❑ **[Jump at reversal]** See page 147	[Auto] (AUtO) 0 to 10 Hz	[Auto] (AUtO)
tEr ★	❑ **[Time to restart]** See page 147 Time between the end of a brake engage sequence and the start of a brake release sequence	0.00 to 15.00 s	0.00 s
tL IM ★	❑ **[Motoring torque lim]** See page 172 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 172.	0 to 300%	100%
tL IG ★	❑ **[Gen. torque lim]** See page 172 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 172.	0 to 300%	100%
trH ★	❑ **[Traverse freq. high]** See page 196	0 to 10 Hz	4 Hz
trL ★	❑ **[Traverse freq. low]** See page 196	0 to 10 Hz	4 Hz
9SH ★	❑ **[Quick step High]** See page 196	0 to [Traverse freq. high] (trH)	0 Hz
9SL ★	❑ **[Quick step Low]** See page 196	0 to [Traverse freq. low] (trL)	0 Hz
Ctd	❑ **[Current threshold]** Current threshold for [I attained] (CtA) function assigned to a relay or a logic output (see page 92).	0 to 1.5 In (1)	In (1)
ttH	❑ **[High torque thd.]** High current threshold for [High tq. att.] (ttHA) function assigned to a relay or a logic output (see page 92), as a % of the rated motor torque.	-300% to +300%	100%
ttL	❑ **[Low torque thd.]** Low current threshold for [Low tq. att.] (ttLA) function assigned to a relay or a logic output (see page 92), 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.

[1.3 SETTINGS] (SEt-)

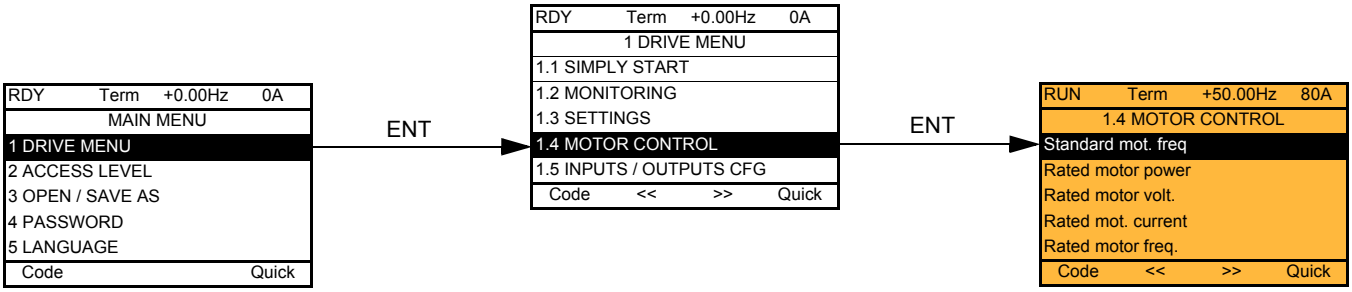
Code	Name/Description	Adjustment range	Factory setting
FtH	❑ **[Freq. threshold]**	0.0 to 1600 Hz	[High speed] (HSP)
	Frequency threshold for [Freq.Th.att.] (FtA) function assigned to a relay or a logic output (see page 92), or used by the [PARAM. SET SWITCHING] (MLP-) function, page 185.		
F2d	❑ **[Freq. 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 92), or used by the [PARAM. SET SWITCHING] (MLP-) function, page 185.		
FFt ★	❑ **[Freewheel stop Thd]**	0.0 to 1600 Hz	0.0 Hz
	See page 125 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.		
ttd ★	❑ **[Motor therm. level]**	0 to 118%	100%
	See page 208 Trip threshold for motor thermal alarm (logic output or relay)		
JPF	❑ **[Skip Frequency]**	0 to 500 or 1,600 Hz according to rating	0 Hz
	Skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.		
JF2	❑ **[Skip Frequency 2]**	0 to 500 or 1,600 Hz according to rating	0 Hz
	2nd skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.		
JF3	❑ **[3rd Skip Frequency]**	0 to 500 or 1,600 Hz according to rating	0 Hz
	3rd skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.		
JFH	❑ **[Skip.Freq.Hysteresis]**	0.1 to 10 Hz	1 Hz
	Parameter visible if at least one skip frequency [Skip Frequency] (JPF), [Skip Frequency 2] (JF2) or [3rd Skip Frequency] (JF3) is different from 0. Skip frequency range: between (JPF – JFH) and (JPF + JFH), for example. This adjustment is common to all 3 frequencies (JPF, JF2 and JF3).		
LbC ★	❑ **[Load correction]**	0 to 1000 Hz	0
	Rated correction in Hz. See page 77		
trt ( )	❑ **[Torque ratio]**	0 to 1000%	100%
	Coefficient applied to [Torque reference] (tr1).		

★ 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.

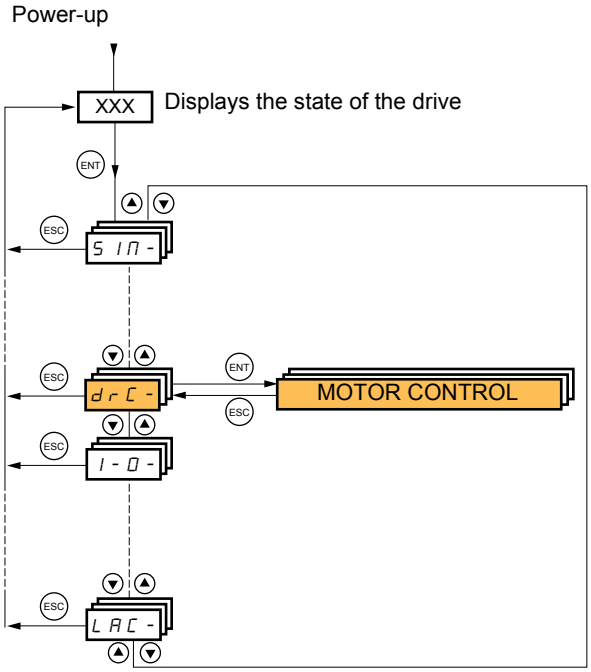
( ) Parameter that can be modified during operation or when stopped.

[1.4 MOTOR CONTROL] (drC-)

With graphic display terminal:



With integrated display terminal:



[1.4 MOTOR CONTROL] (drC-)

The parameters in the [1.4 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 62, which may 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	Adjustment range	Factory setting
bFr 50 60	❑ **[Standard mot. freq]** ☐ **[50Hz IEC]** (50): IEC ☐ **[60Hz NEMA]** (60) : NEMA This parameter modifies the presets of the following parameters: [High speed] (HSP) page 38, [Freq. threshold] (Ftd) page 59, [Rated motor volt.] (UnS), [Rated motor freq.] (FrS) and [Max frequency] (tFr).		[50Hz IEC] (50)
nPr	❑ **[Rated motor power]** The parameter cannot be accessed if [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn). 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).	According to drive rating	According to drive rating
UnS	❑ **[Rated motor volt.]** The parameter cannot be accessed if [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn). Rated motor voltage given on the nameplate. 8I84T2******.01P-1: 100 to 240 V - 8I84T4*****.01P-1: 200 to 480 V	According to drive rating	According to drive rating and [Standard mot. freq] (bFr)
nCr	❑ **[Rated mot. current]** The parameter cannot be accessed if [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn). Rated motor current given on the nameplate.	0.25 to 1.5 In (1)	According to drive rating and [Standard mot. freq] (bFr)
FrS	❑ **[Rated motor freq.]** The parameter cannot be accessed if [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn). 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 63) is not V/F, or for drives rated higher than 37 kW. 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	50 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.		[x1 rpm]
nSP	❑ **[Rated motor speed]** The parameter cannot be accessed if [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn). 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: • 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)	0 to 96000 rpm	According to drive rating

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

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
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 [Motor control type] (Ctt) (page 63) is not V/F or for drives rated higher than 37 kW 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).		
tUn	❑ **[Auto tuning]** (1)		[No] (nO)
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:** • It is essential that all the motor parameters are correctly configured before starting auto-tuning. - Asynchronous motor: [Rated motor volt.](UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr) - Synchronous motor: [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) If one or more of these parameters is modified after auto-tuning has been performed, [Auto tuning] (tUn) will return to [No] (nO) and the procedure must be repeated. • 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 218, 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.		
AUt	❑ **[Automatic autotune]**		[No] (nO)
nO	☐ **[No]** (nO): Function inactive		
YES	☐ **[Yes]** (YES): Auto-tuning is performed on every power-up. **Caution:** Same comments as for [Auto tuning] (tUn) above. If [Profile] (CHCF) = [8 serie] (SE8), then [Automatic autotune] (AUt) is fixed to [No] (nO).		
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 has failed.		
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 R syn] (rSAS) page 66, [Cust stator resist.] (rSA), [Idw] (IdA), [LFw] (LFA) and [T2w] (trA) page 67.		
PHr	❑ **[Output Ph rotation]** (1)		[ABC] (AbC)
AbC	☐ **[ABC]** (AbC): Forward		
ACb	☐ **[ACB]** (ACb): Reverse This parameter can be used to reverse the direction of rotation of the motor without reversing the wiring. ☞ **Do not modify the [Output Ph rotation] (PHr) parameter when [Motor control type] (Ctt) page 63 = [FVC] (FUC)**. The direction of rotation must be modified, if required, before or during the procedure to check the encoder page 70 when [Motor control type] (Ctt) is not [FVC] (FUC).		

(1) Cannot be configured in Automation Studio.

Code	Name/Description	Adjustment range	Factory setting
Ctt	❑ **[Motor control type]**		[SVC V] (UUC)

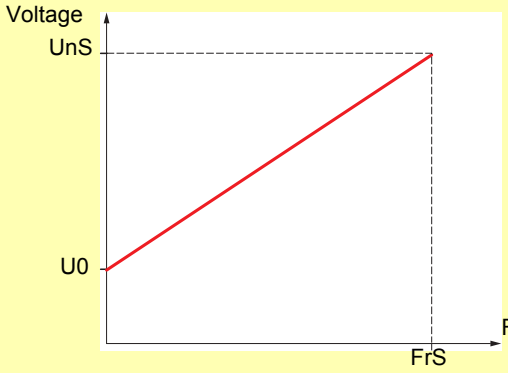
UUC ☐ **[SVC V]** (UUC): Open-loop voltage flux vector control with automatic slip compensation according to the load. It supports operation with a number of motors connected in parallel on the same drive (if the motors are identical).

CUC ☐ **[SVC I]** (CUC): Open-loop current flux vector control. 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 motors with incremental encoder type sensor; this option can only be selected if an incremental encoder card has been inserted. This function is not possible, however, when using an encoder that generates signal "A" only.
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.

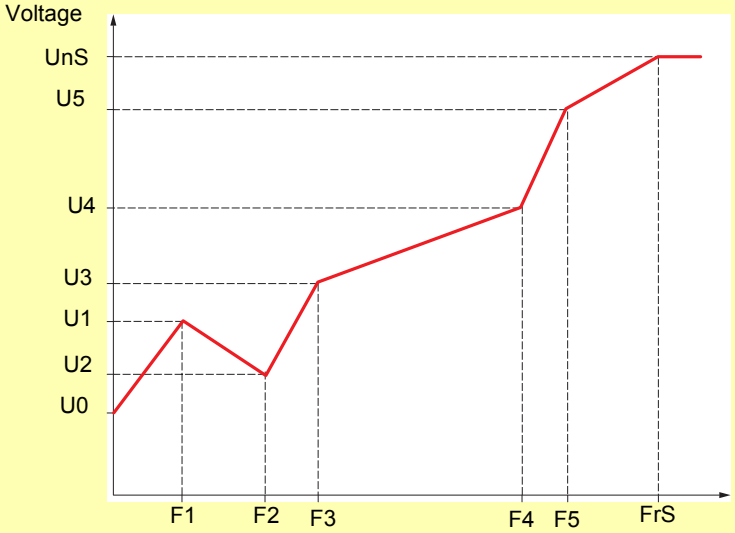
☞ **It is essential that the encoder check page 70 is performed successfully before selecting [FVC] (FUC).**

UF2 ☐ **[V/F 2pts]** (UF2): Simple V/F profile without slip compensation. It supports operation with:
- Special motors (wound rotor, tapered rotor, etc.)
- 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.

UF5 ☐ **[V/F 5pts]** (UF5): 5-segment V/F profile: As V/F 2 pts profile but also supports the avoidance of resonance (saturation).



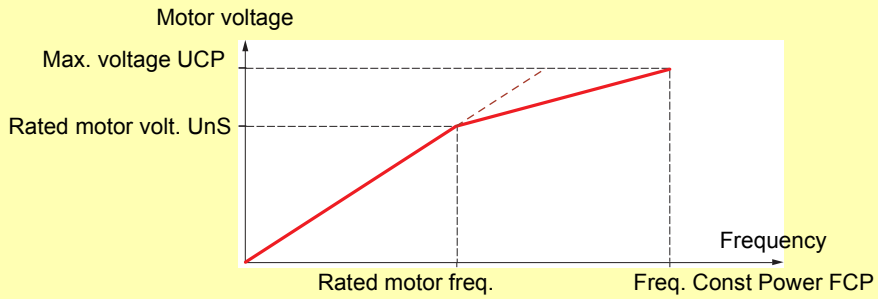
The profile is defined by the values of parameters UnS, FrS, U0 to U5 and F0 to F5.

FrS > F5 > F4 > F3 > F2 > F1

SYn ☐ **[Sync. mot.]** (SYn): For synchronous permanent magnet motors with sinusoidal electromotive force (EMF) only.
This selection makes the asynchronous motor parameters inaccessible, and the synchronous motor parameters accessible.

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
U 0	❑ **[U0]** V/F profile setting. The 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
U 1	❑ **[U1]** V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F 1	❑ **[F1]** V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 1600 Hz	0
U 2	❑ **[U2]** V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F 2	❑ **[F2]** V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 1600 Hz	0
U 3	❑ **[U3]** V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F 3	❑ **[F3]** V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 1600 Hz	0
U 4	❑ **[U4]** V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F 4	❑ **[F4]** V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 1600 Hz	0
U 5	❑ **[U5]** V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F 5	❑ **[F5]** V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 1600 Hz	0

Code	Name/Description	Adjustment range	Factory setting
UC2 nO YES	❑ **[Vector Control 2pt]** The parameter can be accessed if [Motor control type] (Ctt) is not [Sync. mot.] (SYn). ☐ **[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.  		[No] (nO)
UCP	❑ **[V. constant power]** The parameter can be accessed if [Vector Control 2pt] (VC2) = [Yes] (YES)	According to drive rating	According to drive rating and [Standard mot. freq] (bFr)
FCP	❑ **[Freq. Const Power]** The parameter can be accessed if [Vector Control 2pt] (VC2) = [Yes] (YES)	According to drive rating and [Rated motor freq.] (FrS)	= [Standard mot. freq] (bFr)

Synchronous motor parameters:

These parameters can be accessed if [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn). In this case, the asynchronous motor parameters cannot be accessed.

Code	Name/Description	Adjustment range	Factory setting
nCrS	❑ **[Nominal I sync.]** Rated synchronous motor current given on the nameplate.	0.25 to 1.5 In (2)	According to drive rating
nSPS	❑ **[Nom motor spdsync]** Rated motor speed given on the nameplate. On the integrated display unit: 0 to 9999 rpm then 10.00 to 60.00 krpm.	0 to 60000 rpm	According to drive rating
PPnS	❑ **[Pole pairs]** Number of pairs of poles on the synchronous motor.	1 to 50	According to drive rating
PHS	❑ **[Syn. EMF constant]** Synchronous motor EMF constant, in mV per rpm (peak voltage per phase). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).	0 to 65535	According to drive rating
LdS	❑ **[Autotune L d-axis]** 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.	0 to 655.3	According to drive rating
LqS	❑ **[Autotune L q-axis]** 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.	0 to 655.3	According to drive rating
rSAS	❑ **[Cust. stator R syn]** 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), 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).	According to drive rating	According to drive rating

Code	Name/Description	Adjustment range	Factory setting
UFr ❮❯	❑ **[IR compensation]** (1) The parameter can be accessed if [Motor control type] (Ctt) is not [V/F 2pts] (UF2) and [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%
SLP ❮❯	❑ **[Slip compensation]** (1) The parameter can be accessed if [Motor control type] (Ctt) is not [V/F 2pts] (UF2), [V/F 5pts] (UF5) and [Sync. mot.] (SYn). 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.	0 to 300%	100%

(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.

[1.4 MOTOR CONTROL] (drC-)

Motor parameters that can be accessed in [Expert] mode.

These include:

- 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 by 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.

Asynchronous motor

If an auto-tuning operation 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 settings.

Code	Name/Description
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), 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]** Rated slip in Hz, calculated by the drive, in read-only mode. To modify the rated slip, modify the [Rated motor speed] (nSP) (page 61).
PPn	❑ **[Pr]** 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), 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	❑ **[T2w]** Rotor time constant in mS, modifiable value.

Synchronous motor

Code	Name/Description
r S П S	❑ **[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), 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).
F r S S	❑ **[Nominal freq sync.]** Motor frequency at rated speed in Hz, calculated by the drive (rated motor frequency), in read-only mode.

Selecting the encoder

Follow the recommendations in the catalog and the Installation Manual.

Code	Name/Description	Adjustment range	Factory setting
EnS	❑ **[Encoder type]**		[AABB] (AAbb)
	The parameter can be accessed if an incremental encoder card has been inserted (1). To be configured in accordance with the type of card and encoder used. AAbb ☐ **[AABB]** (AAbb): For signals A, A-, B, B-. Ab ☐ **[AB]** (Ab): For signals A, B. A ☐ **[A]** (A): For signal A. Value cannot be accessed if [Encoder usage] (EnU) page 71 = [Spd fdk reg.] (rEG).		
PGI	❑ **[Number of pulses]**	100 to 5000	1024
	Number of pulses per encoder revolution. The parameter can be accessed if an incremental encoder card has been inserted (1).		

(1) The encoder parameters can only be accessed if the encoder card has been inserted, 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.

Encoder check procedure

This procedure applies to all types of encoder.

1. Set [Motor control type] (Ctt) to a value other than [FVC] (FUC) 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.

2. Configure the motor parameters in accordance with the specifications on the rating plate.
   - Asynchronous motor (see page 61): [Rated motor power] (nPr), [Rated motor volt.] (UnS), [Rated mot. current] (nCr), [Rated motor freq.] (FrS), [Rated motor speed] (nSP).
   - Synchronous motor (see "Synchronous motor parameters" on page 66): [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). [Current limitation] (CLI) must not exceed the maximum motor current, **otherwise demagnetization may occur**.

3. Set [Encoder usage] (EnU) = [No] (nO).

4. Perform auto-tuning.

5. In the case of an incremental encoder, set [Encoder type] (EnS) and [Number of pulses] (PGI) page 69 according to the encoder used.

6. Set [Encoder check] (EnC) = [Yes] (YES)

7. Check that the rotation of the motor is safe.

8. Set the motor rotating at stabilized speed ≈ 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 (see points 1 to 4 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 62) or the encoder signals.

10. Repeat the operations from step 5 onwards until [Encoder check] (EnC) changes to [Done] (dOnE).

11. If necessary, change [Motor control type] (Ctt) to [FVC] (FUC).

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
EnC	❑ **[Encoder check]** Encoder feedback check. See procedure on previous page. The parameter can be accessed if an encoder card has been inserted (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 a fault is detected, the drive locks in [Encoder fault] (EnF) fault mode.		[Not done] (nO)
EnU	❑ **[Encoder usage]** The parameter can be accessed if an encoder card has been inserted (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). 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.		[No] (nO)

(1) The encoder parameters can only be accessed if the encoder card has been inserted, 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.

[ENA SYSTEM]

ENA SYSTEM is a control profile designed for rotating machines with unbalanced load.
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 occurring, it is advisable to increase the value of the following parameters slightly:

- [Max frequency] (tFr) page 62

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
EnA nO YES	❑ **[ENA system]** The parameter can be accessed if [Motor control type] (Ctt) = [SVC V] (UUC), see page 63. ☐ **[No]** (nO) : Function inactive ☐ **[Yes]** (YES) : Function active.		[No] (nO)
GPE ()	❑ **[ENA prop.gain]** (1) The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES)	1 to 9999	250
GIE ()	❑ **[ENA integral gain]** (1) The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES)	0 to 9999	100
rAP ()	❑ **[Reduction ratio]** (1) The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES)	10.0 to 999.9	10

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

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

Code	Name/Description	Adjustment range	Factory setting
OFI nO YES	❑ **[Sinus filter]**		[No] (nO)

☐ **[No]** (nO): No sinus filter
☐ **[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 8I84T200037.01P-1 and 8I84T400075.01P-1.

☞ **Note:** The settings for [Current Limitation] (CLI) and [I Limit. 2 value] (CL2) page 53 must be made once [Sinus filter] (OFI) has been set to [Yes] (YES) and [Motor control type] (Ctt) page 63 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

If [Sinus filter] (OFI) = [Yes] (YES), [Motor control type] (Ctt) page 63 must be [V/F 2pts] (UF2), [V/F 5pts] (UF5), (or [SVC V] (UUC) **only** up to 45 kW for 8I84T2*****.01P-1 and 75 KW 8I84T4*****.01P-1), and [Max frequency] (tFr) **must not exceed 100 Hz**.
Failure to follow this instruction can result in equipment damage.

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, the rating (power and voltage) and the configuration of the [Sinus filter] (OFI) and [Motor surge limit] (SVL) parameters, page 75.

If the value is less than 2 kHz, [Current Limitation] (CLI) and [I Limit. 2 value] (CL2) page 53 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.

☞ **Note:** If [Motor control type] (Ctt) page 63 = [FVC] (FUC), we do not recommend setting the switching frequency to a value less than 2 kHz (in order to avoid speed instability).

CAUTION

On 8I84T400075.01P-1 to 8I84T400400.01P-1, 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 this instruction can result in equipment damage.

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 208). If it is less than the no-load motor current, the limitation no longer has any effect.

CAUTION

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

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
nrd	❑ **[Noise reduction]** ☐ **[No]** (nO): Fixed frequency. Factory setting at and above 8I84T409000.01P-1. ☐ **[Yes]** (YES): Frequency with random modulation. Factory setting up to 8I84T204500.01P-1 and 8I84T407500.01P-1. Random frequency modulation prevents any resonance, which may occur at a fixed frequency. nO YES		According to rating
SUL	❑ **[Motor surge limit.]** This function limits motor overvoltages and is useful in the following applications: - NEMA motors - Japanese motors - Spindle motors - Rewound motors ☐ **[No]** (nO) : Function inactive ☐ **[Yes]** (YES) : Function active This parameter is forced to [No] (nO) if [Sinus filter] (OFI) previous page = [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 nO YES		[No] (nO)
SOP	❑ **[Volt surge limit. opt]** Optimization parameter for transient overvoltages at the motor terminals. Can be accessed if [Motor surge limit.] (SVL) = [Yes] (YES). Set to 6, 8, or 10 µs, according to the following table.		10 µs

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.

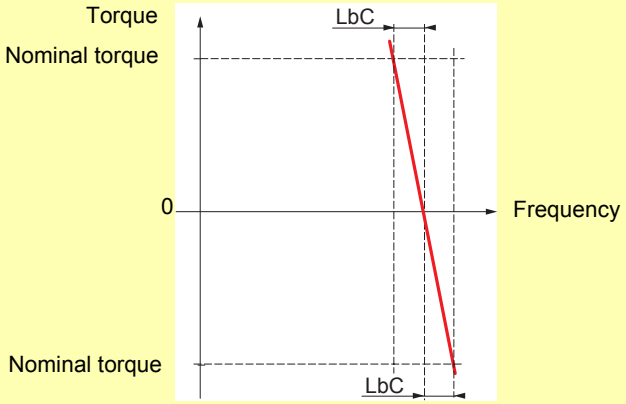
To retain the overall drive performance, do not increase the SOP value unnecessarily.

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

ACOPOSinverter P84	Motor		Cable cross-section		Maximum cable length in meters					
Reference	Power				Unshielded "GORSE" cable Type H07 RN-F 4Gxx			Shielded "GORSE" cable Type GVCSTV-LS/LH		
	kW	HP	in mm^2	AWG	**SOP = 10**	**SOP = 8**	**SOP = 6**	**SOP = 10**	**SOP = 8**	**SOP = 6**
8I84T400075.01P-1	0.75	1	1.5	14	109.36 yd	76.55 yd	49.21 yd	114.83 yd	92.96 yd	71.08 yd
8I84T400150.01P-1	1.5	2	1.5	14	109.36 yd	76.55 yd	49.21 yd	114.83 yd	92.96 yd	71.08 yd
8I84T400220.01P-1	2.2	3	1.5	14	120.30 yd	71.08 yd	49.21 yd	114.83 yd	92.96 yd	71.08 yd
8I84T400300.01P-1	3	-	1.5	14	120.30 yd	71.08 yd	49.21 yd	114.83 yd	92.96 yd	71.08 yd
8I84T400400.01P-1	4	5	1.5	14	120.30 yd	71.08 yd	49.21 yd	114.83 yd	92.96 yd	71.08 yd
8I84T400550.01P-1	5.5	7.5	2.5	14	131.23 yd	71.08 yd	49.21 yd	114.83 yd	92.96 yd	71.08 yd
8I84T400750.01P-1	7.5	10	2.5	14	131.23 yd	71.08 yd	49.21 yd	114.83 yd	92.96 yd	71.08 yd
8I84T401100.01P-1	11	15	6	10	125.77 yd	65.62 yd	49.21 yd	109.36 yd	82.02 yd	60.15 yd
8I84T401500.01P-1	15	20	10	8	114.83 yd	65.62 yd	43.74 yd	109.36 yd	76.55 yd	54.68 yd
8I84T401850.01P-1	18.5	25	10	8	125.77 yd	65.62 yd	38.28 yd	164.04 yd	82.02 yd	54.68 yd
8I84T402200.01P-1	22	30	16	6	164.04 yd	65.62 yd	43.74 yd	164.04 yd	76.55 yd	54.68 yd
8I84T403000.01P-1	30	40	25	4	164.04 yd	60.15 yd	38.28 yd	164.04 yd	76.55 yd	54.68 yd
8I84T403700.01P-1	37	50	35	5	218.72 yd	71.08 yd	54.68 yd	164.04 yd	76.55 yd	54.68 yd
8I84T404500.01P-1	45	60	50	0	218.72 yd	60.15 yd	32.81 yd	164.04 yd	65.62 yd	43.74 yd
8I84T405500.01P-1	55	75	70	2/0	218.72 yd	54.68 yd	27.34 yd	164.04 yd	60.15 yd	32.81 yd
8I84T407500.01P-1	75	100	95	4/0	218.72 yd	49.21 yd	27.34 yd	164.04 yd	60.15 yd	32.81 yd

ACOPOSinverter P84	Motor		Cable cross-section		Maximum cable length in meters					
Reference	Power				Shielded "BELDEN" cable Type 2950x			Shielded "PROTOFLEX" cable Type EMV 2YSLCY-J		
	kW	HP	in mm^2	AWG	**SOP = 10**	**SOP = 8**	**SOP = 6**	**SOP = 10**	**SOP = 8**	**SOP = 6**
8I84T400075.01P-1	0.75	1	1.5	14	54.68 yd	43.74 yd	32.81 yd			
8I84T400150.01P-1	1.5	2	1.5	14	54.68 yd	43.74 yd	32.81 yd			
8I84T400220.01P-1	2.2	3	1.5	14	54.68 yd	43.74 yd	32.81 yd			
8I84T400300.01P-1	3	-	1.5	14	54.68 yd	43.74 yd	32.81 yd			
8I84T400400.01P-1	4	5	1.5	14	54.68 yd	43.74 yd	32.81 yd			
8I84T400550.01P-1	5.5	7.5	2.5	14	54.68 yd	43.74 yd	32.81 yd			
8I84T400750.01P-1	7.5	10	2.5	14	54.68 yd	43.74 yd	32.81 yd			
8I84T401100.01P-1	11	15	6	10	54.68 yd	43.74 yd	32.81 yd			
8I84T401500.01P-1	15	20	10	8	54.68 yd	43.74 yd	32.81 yd			
8I84T401850.01P-1	18.5	25	10	8	54.68 yd	43.74 yd	32.81 yd			
8I84T402200.01P-1	22	30	16	6				82.02 yd	43.74 yd	27.34 yd
8I84T403000.01P-1	30	40	25	4				82.02 yd	43.74 yd	27.34 yd
8I84T403700.01P-1	37	50	35	5				82.02 yd	43.74 yd	27.34 yd
8I84T404500.01P-1	45	60	50	0				82.02 yd	43.74 yd	27.34 yd
8I84T405500.01P-1	55	75	70	2/0				82.02 yd	32.81 yd	16.40 yd
8I84T407500.01P-1	75	100	95	4/0				82.02 yd	32.81 yd	16.40 yd

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

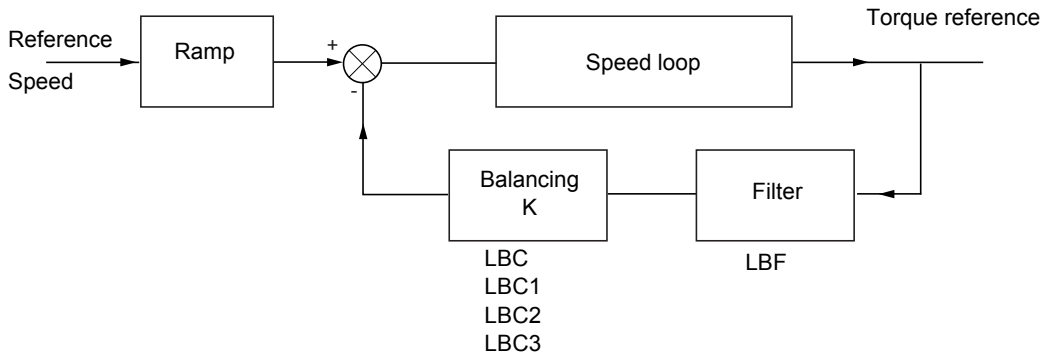
Code	Name/Description	Adjustment range	Factory setting
UbR	❑ **[Braking level]** DC bus voltage threshold above which the braking transistor cuts in to limit this voltage. 8I84T2*****.01P-1: factory setting 395 V. 8I84T4*****.01P-1: factory setting 785 V. The adjustment range depends on the voltage rating of the drive and the [Mains voltage] (UrES) parameter, page 212.		According to drive voltage rating
bbA nO YES	❑ **[Braking balance]** ☐ **[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] (Vbr) 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 124)		[No] (nO)
LbA nO YES	❑ **[Load sharing]** 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 63 is not [V/F 2pts] (UF2) or [V/F 5pts] (UF5).		[No] (nO)
LbC	❑ **[Load correction]** (1) Rated correction in Hz. The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) 	0 to 1000 Hz	0

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

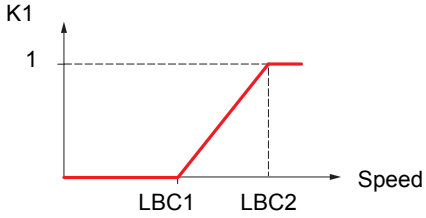
Parameter that can be modified during operation or when stopped.

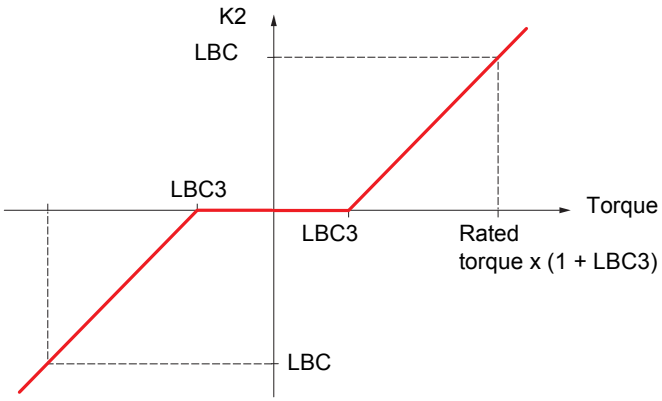
Load sharing, parameters that can be accessed at expert level

Principle



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





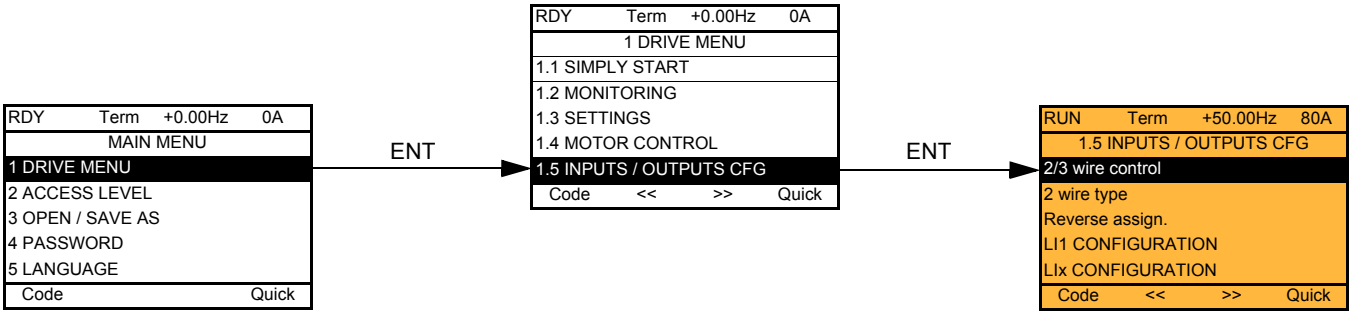
[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
LbC1	❑ **[Correction min spd]** 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.	0 to 999.9 Hz	0
LbC2	❑ **[Correction max spd]** The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) Speed threshold in Hz above which maximum load correction is applied.	[Correction min spd] (LbC1) + 0.1 at 1000 Hz	0,1
LbC3	❑ **[Torque offset]** 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.	0 to 300%	0%
LbF	❑ **[Sharing filter]** 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.	100 ms to 20 s	100 ms

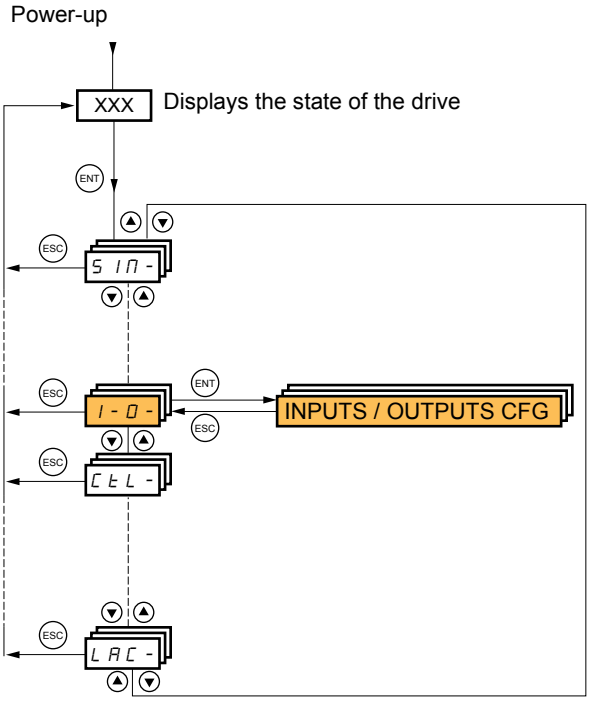
Parameter that can be modified during operation or when stopped.

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

With graphic display terminal:



With integrated display terminal:



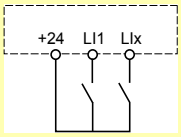
[1.5 INPUTS / OUTPUTS CFG] (I-O-)

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	Adjustment range	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.

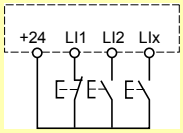
Example of "sink" wiring:



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 "sink" wiring:



LI1: stop
LI2: forward
LIx: reverse

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

To change the assignment of [2/3 wire control] (tCC) press and hold down the “ENT” key for 2 s.
It 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.
Check that this change is compatible with the wiring diagram used.
Failure to follow these instructions can 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)		
C101	☐ **[C101]** (C101) to **[C115]** (C115): Not applicable		
-	☐ **[C201]** (C201) to **[C215]** (C215): With integrated communication interface in [I/O profile] (IO)		
-	☐ **[C301]** (C301) to **[C315]** (C315): With a communication 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.		

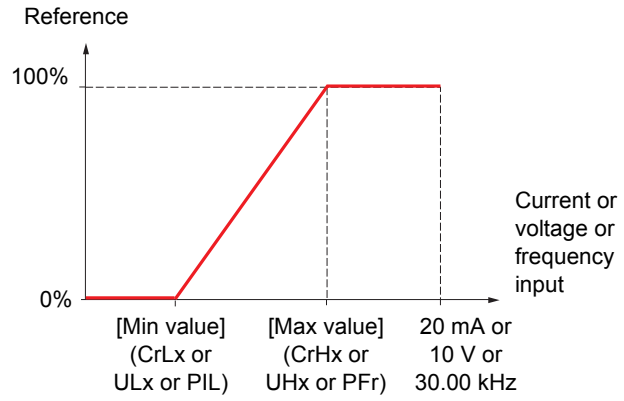
Code	Name/Description	Adjustment range	Factory setting
L I -	**■ [LI1 CONFIGURATION]**		
L IA	**❑ [LI1 assignment]** Read-only parameter, cannot be configured. It displays all the functions that are assigned to input LI1 in order to check for multiple assignments.		
L Id	**❑ [LI1 On Delay]** This parameter 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. **⚠ WARNING** **UNINTENDED EQUIPMENT OPERATION** 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. **Failure to follow these instructions can result in death or serious injury.**	0 to 200 ms	0
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.		

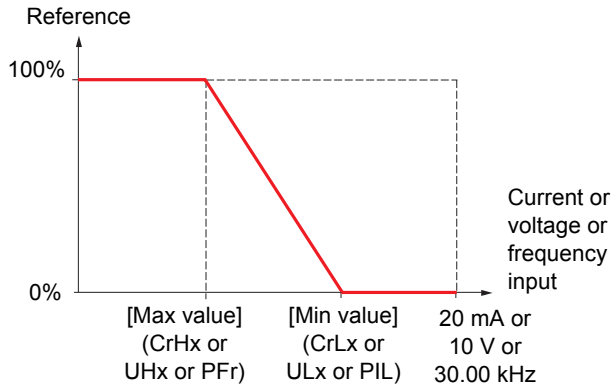
Configuration of analog inputs and Pulse input

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:

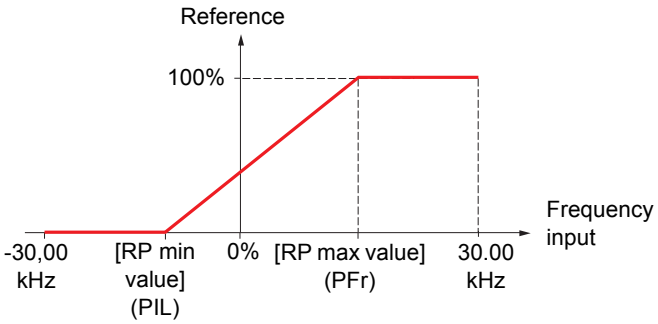
The minimum value corresponds to a reference of 0% and the maximum value to a reference of 100%. The minimum value may be greater than the maximum value:





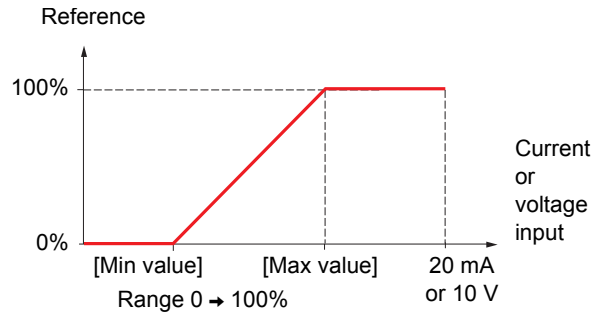
For +/- bidirectional inputs, the min. and max. are relative to the absolute value, for example, +/- 2 to 8 V.

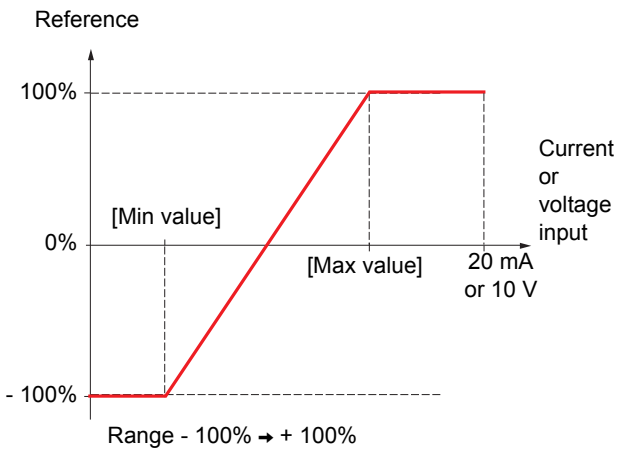
Negative min. value of Pulse input:



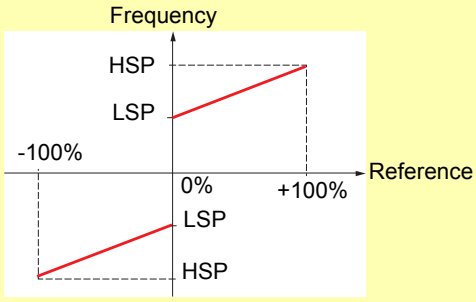
Range (output values): For analog inputs only

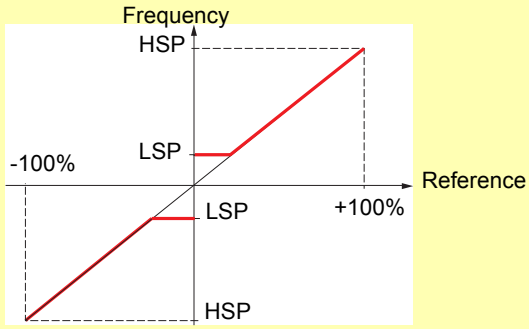
This parameter is used to configure the reference range to [0% ➞100%] or [-100% ➞ +100%] in order to obtain a bidirectional output from a unidirectional input.

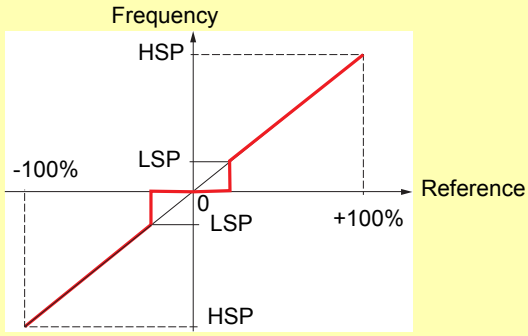


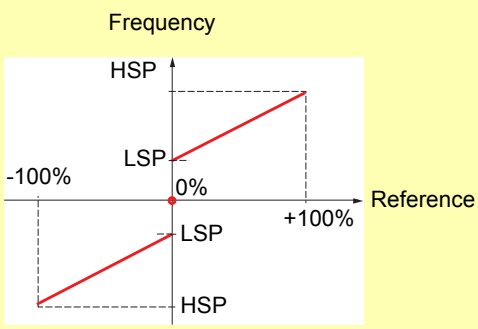


Code	Name/Description	Adjustment range	Factory setting
bSP	❑ [Reference template]		[Standard] (bSd)
bSd	☐ [Standard] (bSd)	At zero reference the frequency = LSP	
bLS	☐ [Pedestal] (bLS)	At reference = 0 to LSP the frequency = LSP	
bnS	☐ [Deadband] (bnS)	At reference = 0 to LSP the frequency = 0	
bnS0	☐ [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).	







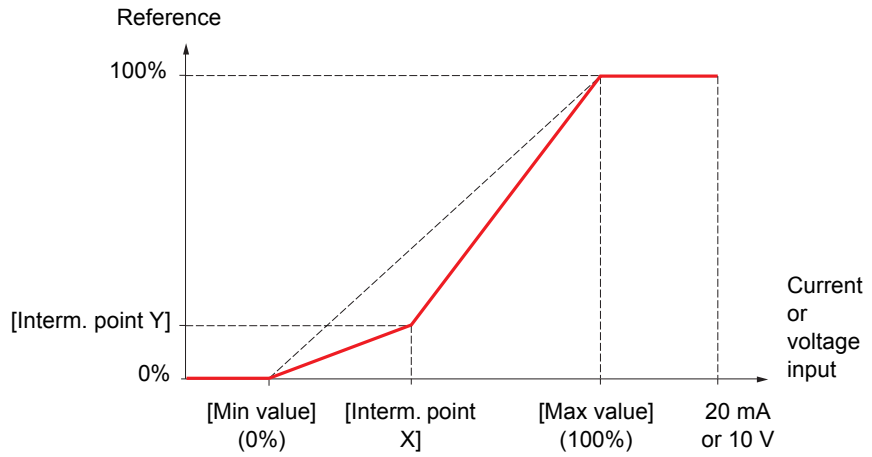


This parameter defines how the speed reference is taken into account, for analog inputs and Pulse input only. In the case of the PID regulator, this is the PID output reference.
The limits are set by the [Low speed] (LSP) and [High speed] (HSP) parameters, page 38

Delinearization: For analog inputs only

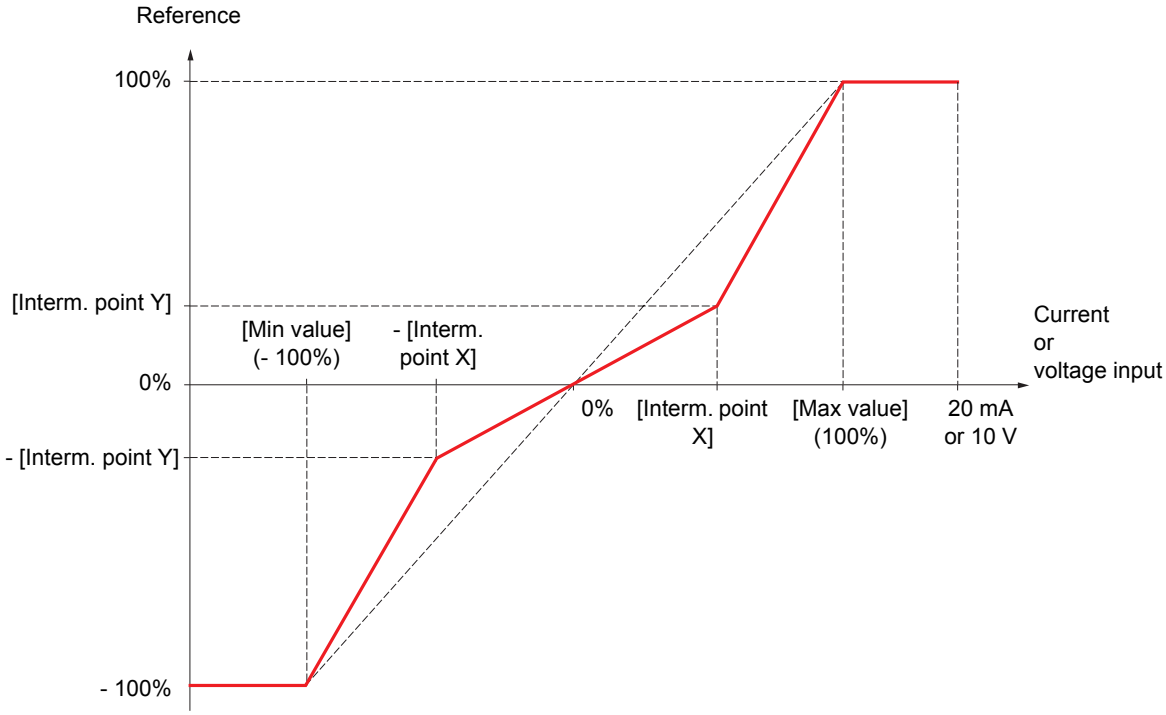
The input can be delinearized by configuring an intermediate point on the input/output curve of this input:

For range 0 ➙ 100%



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

For range -100% ➙ 100%



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	☐ **[Voltage]** (10U): Positive voltage input (negative values are interpreted as zero: the input is unidirectional).		
n10U	☐ **[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]** Interference filtering.	0 to 10.00 s	0 s
AI1E	**❑ [AI1 Interm. point X]** Input delinearization point coordinate. • 0% corresponds to [AI1 min value] (UIL1). • 100% corresponds to [AI1 max value] (UIH1).	0 to 100%	0%
AI1S	**❑ [AI1 Interm. point Y]** Output delinearization point coordinate (frequency reference).	0 to 100%	0%

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 10U 0A	**[AI2 Type]** ☐ **[Voltage]** (10U): Voltage input ☐ **[Current]** (0 A): Current input		[Current] (0 A)
CrL2	**[AI2 min value]** The parameter can be accessed if [AI2 Type] (AI2t) = [Current] (0 A)	0 to 20.0 mA	0 mA
UIL2	**[AI2 min value]** The parameter can be accessed if [AI2 Type] (AI2t) = [Voltage] (10U)	0 to 10.0 V	0 V
CrH2	**[AI2 max. value]** The parameter can be accessed if [AI2 Type] (AI2t) = [Current] (0 A)	0 to 20.0 mA	20.0 mA
UIH2	**[AI2 max. value]** The parameter can be accessed if [AI2 Type] (AI2t) = [Voltage] (10U)	0 to 10.0 V	10.0 V
AI2F	**[AI2 filter]** Interference filtering.	0 to 10.00 s	0 s
AI2L POS nEG	**[AI2 range]** ☐ **[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%		[0 - 100%] (POS)
AI2E	**[AI2 Interm. point X]** 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].	0 to 100%	0%
AI2S	**[AI2 Interm. point Y]** Output delinearization point coordinate (frequency reference).	0 to 100%	0%

Code	Name/Description	Adjustment range	Factory setting
AU1-	**[VIRTUAL AI1]**		
AIC1	**[AI net. channel]**		[No] (nO)

Virtual input.
This parameter can also be accessed in the [PID REGULATOR] (PId-)submenu page 163.

- 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): Not applicable
- CAn **[CANopen]** (CAN/PLK): Integrated communication interface (POWERLINK, CANopen)
- nEt **[Com. card]** (nEt): Communication card (if inserted)

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

WARNING

UNINTENDED EQUIPMENT OPERATION

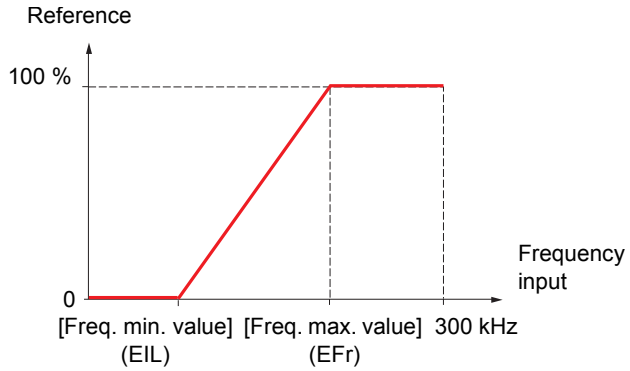
If the equipment switches to forced local mode (see page 224), the virtual input remains fixed at the last value transmitted.
Do not use the virtual input and forced local mode in the same configuration.
Failure to follow these instructions can result in death or serious injury.

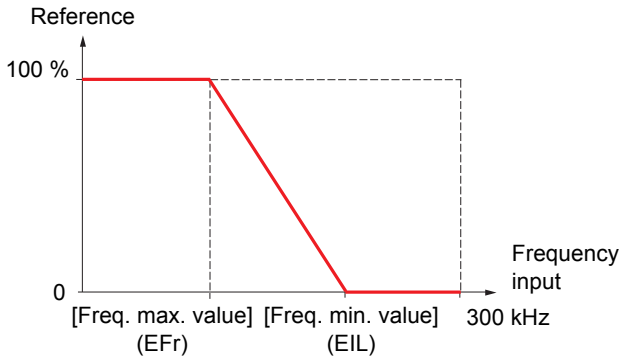
Configuration of the encoder input serving as a reference, with a frequency generator

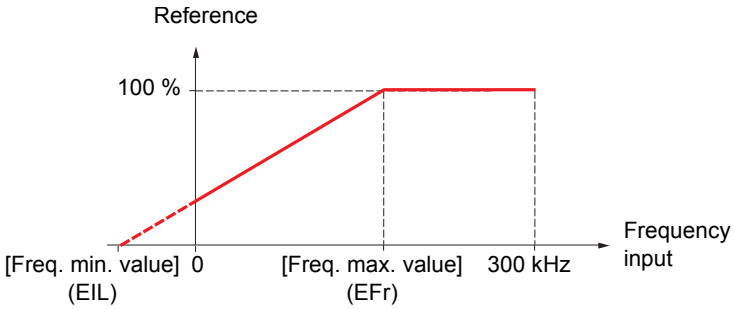
This reference is not signed, therefore the directions of operation must be given via the control channel (logic inputs, for example).

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.

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

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

Code	Name/Description	Adjustment range	Factory setting
IEn-	**[ENCODER CONFIGURATION]** The encoder parameters can only be accessed if the encoder card has been inserted, and the available selections will depend on the type of encoder card used.		
EnS	**[Encoder type]** The parameter can be accessed if an incremental encoder card has been inserted. To be configured in accordance with the type of encoder used. AAbb ☐ **[AABB]** (AAbb): For signals A, A-, B, B-. Ab ☐ **[AB]** (Ab): For signals A, B. A ☐ **[A]** (A): For signal A. Value cannot be accessed if [Encoder usage] (EnU) page 91 = [Spd fdk reg.] (rEG).		[AABB] (AAbb)
EnC	**[Encoder check]** Checks the encoder feedback. See procedure page 70. The parameter can be accessed if an encoder card has been inserted and if [Encoder usage] (EnU) page 91 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.		[Not done] (nO)

Code	Name/Description	Adjustment range	Factory setting
	[ENCODER CONFIGURATION] (continued)		
EnU	**[Encoder usage]**		[No] (nO)
	The parameter can be accessed if an encoder card has been inserted. ☐ **[No]** (nO): Function inactive. In this case, the other parameters cannot be accessed. ☐ **[Fdbk monit.]** (SEC): The encoder provides speed feedback for monitoring only. ☐ **[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). 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. ☐ **[Speed ref.]** (PGr): The encoder provides a reference. Can only be selected with an incremental encoder card.		
PGI	**[Number of pulses]**	100 to 5000	1024
	Number of pulses per encoder revolution. The parameter can be accessed if an incremental encoder card has been inserted.		
PGA	**[Reference type]**		[Encoder] (EnC)
	The parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr). ☐ **[Encoder]** (EnC) : Use of an encoder. ☐ **[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.		

Code	Name/Description	Adjustment range	Factory setting
r 1-	**[R1 CONFIGURATION]**		
r 1	**[R1 Assignment]**		[No drive flt] (FLt)

- ☐ **[No]** (nO): **Not assigned**
- ☐ **[No drive flt]** (FLt): Drive not faulty (relay normally energized, and de-energized if there is a fault)
- ☐ **[Drv running]** (rUn): Drive running
- ☐ **[Freq. Th. attain.]** (FtA): Frequency threshold attained ([Freq. threshold] (Ftd) page 59)
- ☐ **[HSP attain.]** (FLA): High speed attained
- ☐ **[I attained]** (CtA): Current threshold attained ([Current threshold] (Ctd) page 58)
- ☐ **[Freq.ref.att]** (SrA): Frequency reference attained
- ☐ **[Th.mot. att.]** (tSA): Motor 1 thermal state attained
- ☐ **[PID error al]** (PEE): PID error alarm
- ☐ **[PID fdbk al]** (PFA): PID feedback alarm
- ☐ **[AI2 AI. 4-20]** (AP2): Alarm indicating absence of 4-20 mA signal on input A12
- ☐ **[Freq. Th 2 attain.]** (F2A): Frequency threshold 2 attained ([Freq. threshold 2] (F2d) page 59)
- ☐ **[Th. drv. att.]** (tAd): Drive thermal state attained
- ☐ **[Rope slack]** (rSdA): Rope slack (see [Rope slack config.] parameter (rSd) page 156)
- ☐ **[High tq. att.]** (ttHA): Motor torque overshooting high threshold[High torque thd.] (ttH) page 58.
- ☐ **[Low tq. att.]** (ttLA): Motor torque undershooting low threshold[Low torque thd.] (ttL) page 58.
- ☐ **[Forward]** (MFrd): Motor in forward rotation
- ☐ **[Reverse]** (MrrS): Motor in reverse rotation
- ☐ **[Th.mot2 att]** (tS2): Motor 2 thermal state attained
- ☐ **[Th.mot3 att]** (tS3): Motor 3 thermal state attained
- ☐ **[Neg Torque]** (AtS): Negative torque (braking)
- ☐ **[Cnfg.0 act.]** (CnF0): Configuration 0 active
- ☐ **[Cnfg.1 act.]** (CnF1): Configuration 1 active
- ☐ **[Cnfg.2 act.]** (CnF2): Configuration 2 active
- ☐ **[Set 1 active]** (CFP1): Parameter set 1 active
- ☐ **[Set 2 active]** (CFP2): Parameter set 2 active
- ☐ **[Set 3 active]** (CFP3): Parameter set 3 active
- ☐ **[DC charged]** (dbL): DC bus charging
- ☐ **[In braking]** (brS): Drive braking
- ☐ **[P. removed]** (PRM): Drive locked by "Power removal" input
- ☐ **[I present]** (MCP): Motor current present
- ☐ **[Limit sw. att]** (LSA): Limit switch attained
- ☐ **[Load alarm]** (dLdA): Load variation detection (see page 158).
- ☐ **[Alarm Grp 1]** (AGI): Alarm group 1
- ☐ **[Alarm Grp 2]** (AG2): Alarm group 2
- ☐ **[Alarm Grp 3]** (AG3): Alarm group 3
- ☐ **[LI6=PTC al.]** (PLA): LI6 = PTC probe alarm
- ☐ **[Ext. fault al]** (EFA): External fault alarm
- ☐ **[Under V. al.]** (USA): Undervoltage alarm
- ☐ **[Uvolt warn]** (UPA): Undervoltage warning
- ☐ **[slipping al.]** (AnA): Slipping alarm
- ☐ **[AI. °C drv]** (tHA): Drive overheating
- ☐ **[Load mvt al]** (bSA): Braking speed alarm
- ☐ **[Brk cont. al]** (bCA): Brake contact alarm
- ☐ **[Lim T/I att.]** (SSA): Torque limit alarm
- ☐ **[Trq. ctrl. al.]** (rtA): Torque control alarm
- ☐ **[IGBT al.]** (tJA): IGBT alarm
- ☐ **[Brake R. al.]** (bOA): Braking resistor temperature alarm
- ☐ **[Ready]** (rdY): Drive ready

Code	Name/Description	Adjustment range	Factory setting
	[R1 CONFIGURATION] (continued)		
r Id	**[R1 Delay time]**	0 to 60000 ms (1)	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.		
r2-	**[R2 CONFIGURATION]**		
r2	**[R2 Assignment]**		[No] (nO)
	Identical to R1 (see page 92) 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.		
r2d	**[R2 Delay time]**	0 to 60000 ms (1)	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.		
r2S	**[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.		
r2H	**[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.		

(1) 0 to 9999 ms then 10.00 to 60.00 s on the integrated display terminal.

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.

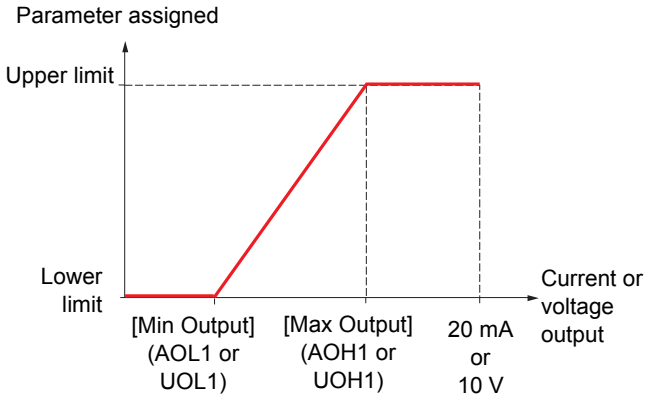
Code	Name/Description	Adjustment range	Factory setting
dO1-	**■ [DO1 CONFIGURATION]**		
dO1	**❑ [DO1 assignment]**		[No] (nO)
	Identical to R1 (see page 92) with the addition of (shown for information only as these selections can only be configured in the [1.7 APPLICATION FUNCT.] (Fun-)) menu: bLC **[Brk 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 60000 ms (1)	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.		

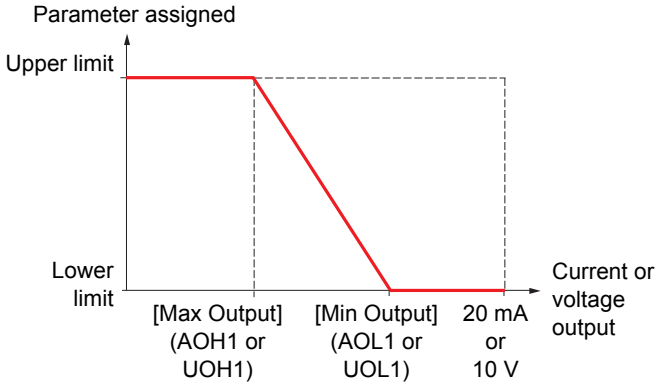
(1) 0 to 9999 ms then 10.00 to 60.00 s on the integrated display terminal.

Configuration of analog output

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:



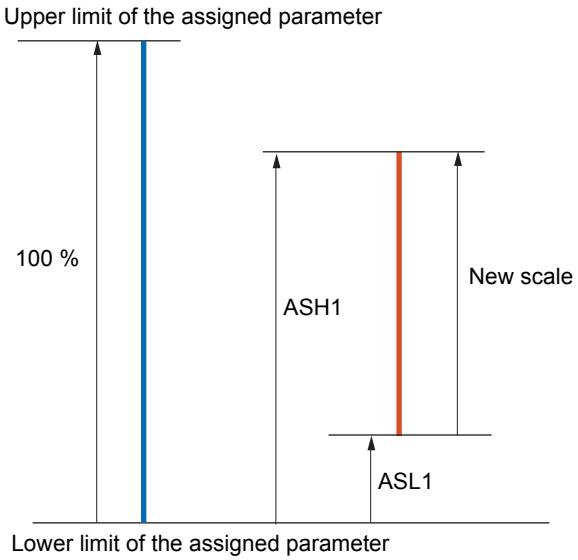


Scaling of the assigned parameter

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 the 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 AO1 min] (ASL1) modifies the lower limit: new value = lower limit + (range x ASL1). The value 0% (factory setting) does not modify the lower limit.
- The parameter [Scaling AO1 max] (ASH1) modifies the upper limit: new value = lower limit + (range x ASL1). The value 100% (factory setting) does not modify the upper limit.
- [Scaling AO1 min] (ASL1) must always be lower than [Scaling AO1 max] (ASH1).



Application example

The value of the motor current at the AO1 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 AO1 min] (ASL1) must not modify the lower limit, which therefore remains at its factory setting of 0%.

[Scaling AO1 max] (ASH1) must modify the upper limit by 0.5x the rated motor torque, or 100 - 100/5 = 80 % (new value = lower limit + (range x ASH1).

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 169.		
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]** (Utr): 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 94 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)		

Code	Name/Description	Adjustment range	Factory setting
AO1-	■ [AO1 CONFIGURATION] (continued)		
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).		

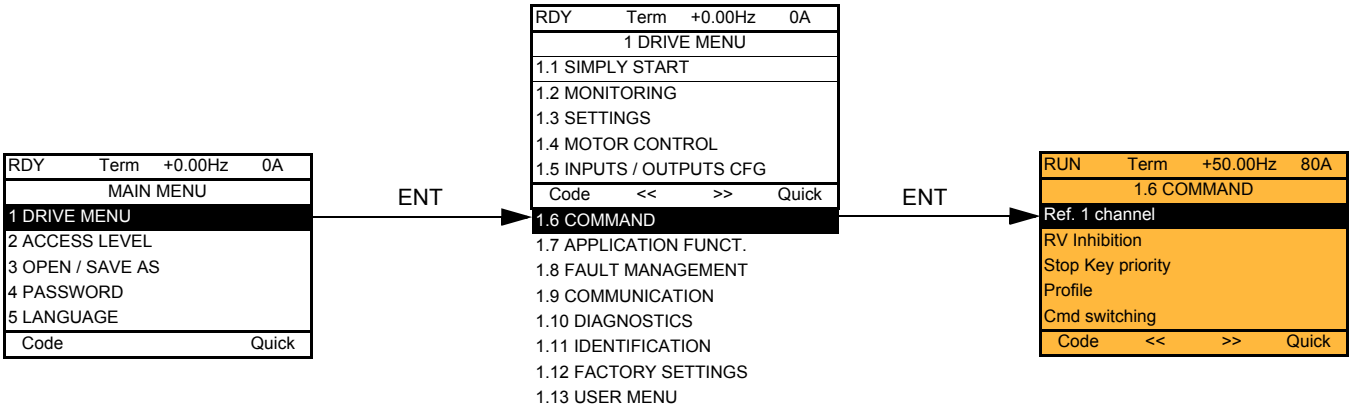
[1.5 INPUTS / OUTPUTS CFG] (I-O-)

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.

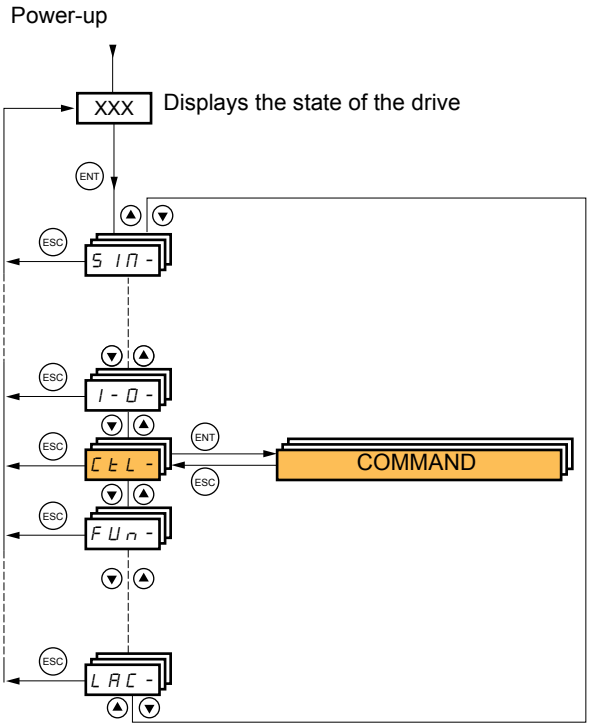
Code	Name/Description	Adjustment range	Factory setting
A1C-	**[ALARM GRP1 DEFINITION]**		
	Selection to be made from the following list: ☐ **[LI6=PTC al.]** (PLA): LI6 = PTC probe alarm ☐ **[Ext. fault al.]** (EFA): External fault alarm ☐ **[Under V. al.]** (USA): Undervoltage alarm ☐ **[slipping al.]** (AnA): Slipping alarm ☐ **[I attained]** (CtA): Current threshold attained ([Current threshold] (Ctd) page 58) ☐ **[Freq.Th.att.]** (FtA): Frequency threshold attained ([Freq. threshold] (Ftd) page 59) ☐ **[Freq. Th. 2 attain.]** (F2A): Frequency threshold 2 attained ([Freq. Th. 2 attain] (F2d) page 59) ☐ **[Freq.ref.att]** (SrA): Frequency reference attained ☐ **[Th.mot. att.]** (tSA): Motor 1 thermal state attained ☐ **[Th.mot2 att]** (tS2): Motor 2 thermal state attained ☐ **[Th.mot3 att]** (tS3) : Motor 3 thermal state attained ☐ **[Uvolt warn]** (UPA): Undervoltage warning ☐ **[HSP attain.]** (FLA): High speed attained ☐ **[AI. °C drv]** (tHA): Drive overheating ☐ **[Load mvt al]** (bSA): Braking speed alarm ☐ **[Brk cont. al]** (bCA): Brake contact alarm ☐ **[PID error al]** (PEE): PID error alarm ☐ **[PID fdbk al.]** (PFA): PID feedback alarm ☐ **[AI2 AI. 4-20]** (AP2): Alarm indicating absence of 4-20 mA signal on input A12 ☐ **[Lim T/I att.]** (SSA): Torque limit alarm ☐ **[Th. drv. att.]** (tAd): Drive thermal state attained ☐ **[IGBT alarm]** (tJA): IGBT alarm ☐ **[Torque Control al.]** (rtA): Torque control alarm ☐ **[Brake R. al.]** (bOA): Braking resistor temperature alarm ☐ **[Option al.]** (APA): Alarm generated by an option card. ☐ **[Regen. underV. al.]** (UrA): Reserved. ☐ **[Rope slack alarm]** (rSdA) : Rope slack (see [Rope slack config.] (rSd) parameter page 156) ☐ **[High torque alarm]** (ttHA): Motor torque overshooting high threshold [High torque thd.] (ttH) page 58. ☐ **[Low torque alarm]** (ttLA) : Motor torque undershooting low threshold[Low torque thd.] (ttL) page 58. ☐ **[Dynamic load alarm]** (dLdA): Load variation detection (see[DYNAMIC LOAD DETECT.] (dLd-) page 158). See the multiple selection procedure on page 27 for the integrated display terminal, and page 18 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-)		

[1.6 COMMAND] (CtL-)

With graphic display terminal:



With integrated display terminal:



[1.6 COMMAND] (CtL-)

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 communication interface • Communication card	• Terminals: analog inputs AI, frequency input, encoder • Graphic display terminal • Integrated communication interface • Communication card • +/- speed via the terminals • +/- speed via the graphic display terminal

The behavior of the ACOPOSinverter P84 can be adapted according to requirements:

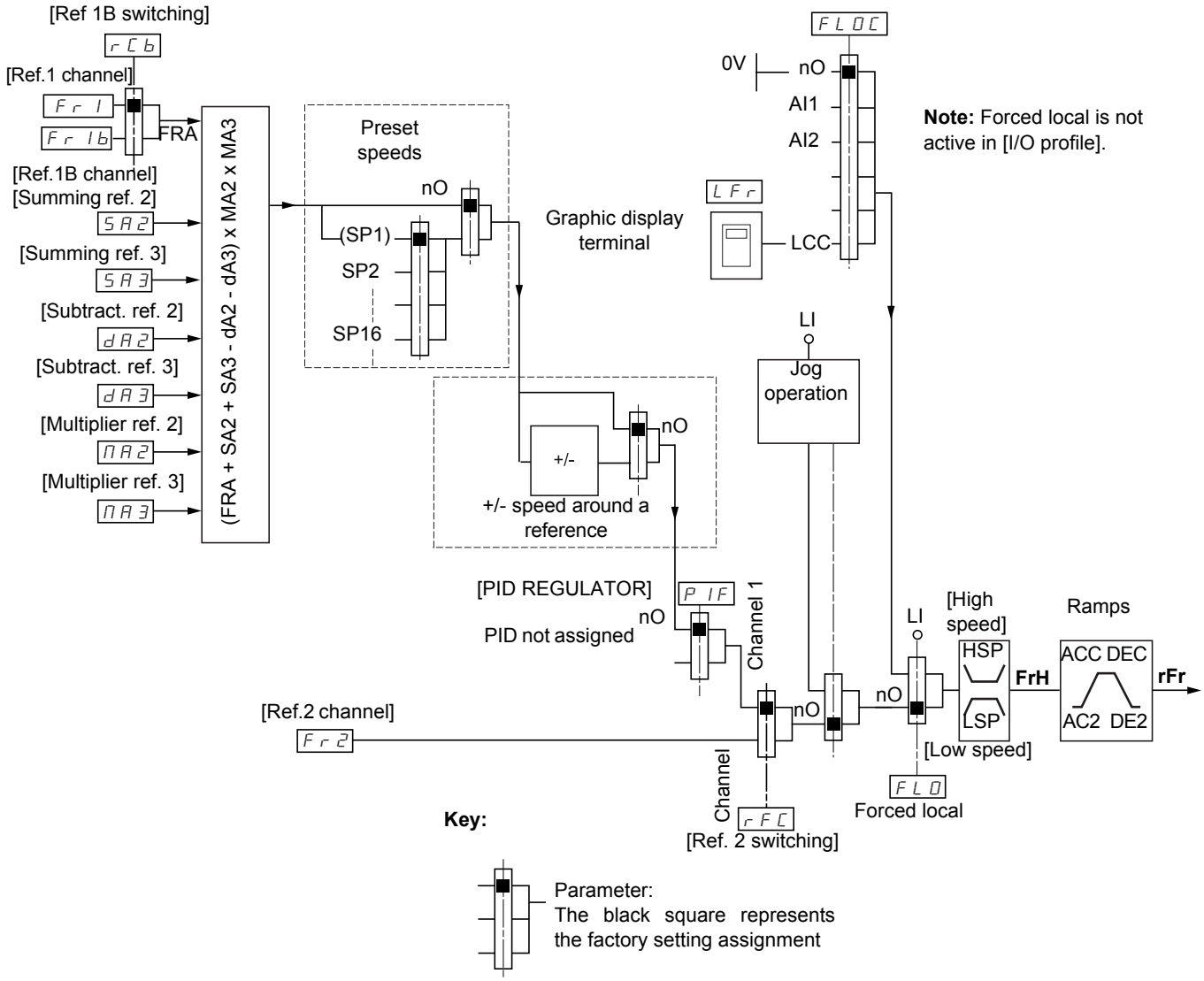
- [8 serie] (SE8): Not applicable.
- [Not separ.] (SIM): Command and reference are sent via the same channel.
- [Separate] (SEP): Command and reference may be sent via different channels.

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.

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 communication interface, communication card

Fr1b, for SEP and IO:

- Terminals, graphic display terminal, integrated communication interface, communication card

Fr1b, for SIM:

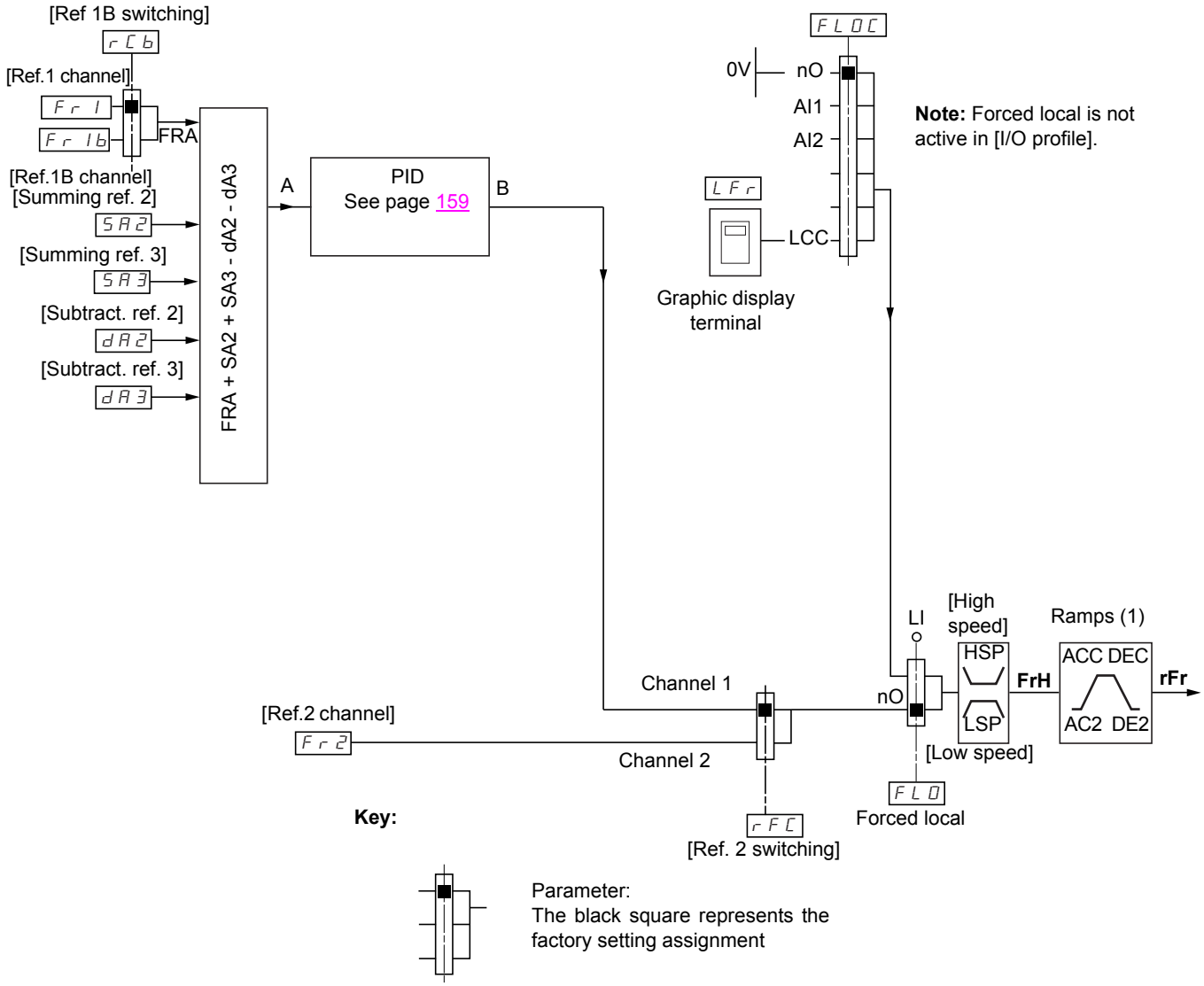
- Terminals, only accessible if Fr1 = terminals

Fr2:

- Terminals, graphic display terminal, integrated communication interface, communication card and **+/- speed**

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

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 communication interface, communication card

Fr1b, for SEP and IO:

- Terminals, graphic display terminal, integrated communication interface, communication card

Fr1b, for SIM:

- Terminals, only accessible if Fr1 = terminals

SA2, SA3, dA2, dA3:

- Terminals only

Fr2:

- Terminals, graphic display terminal, integrated communication interface, communication card and **+/- speed**

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

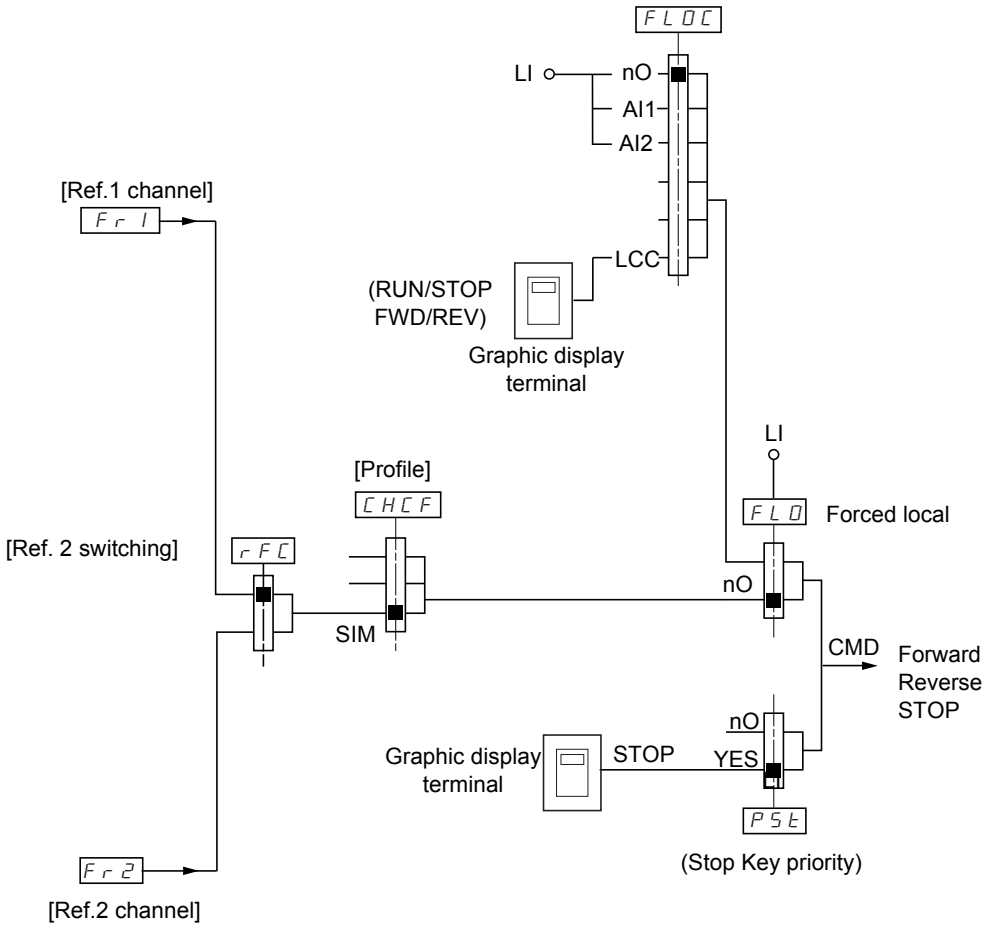
Note :[Ref.1B channel] (Fr1b) and [Ref 1B switching] (rCb) must be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu.

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

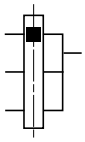
Reference and command, not separate

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

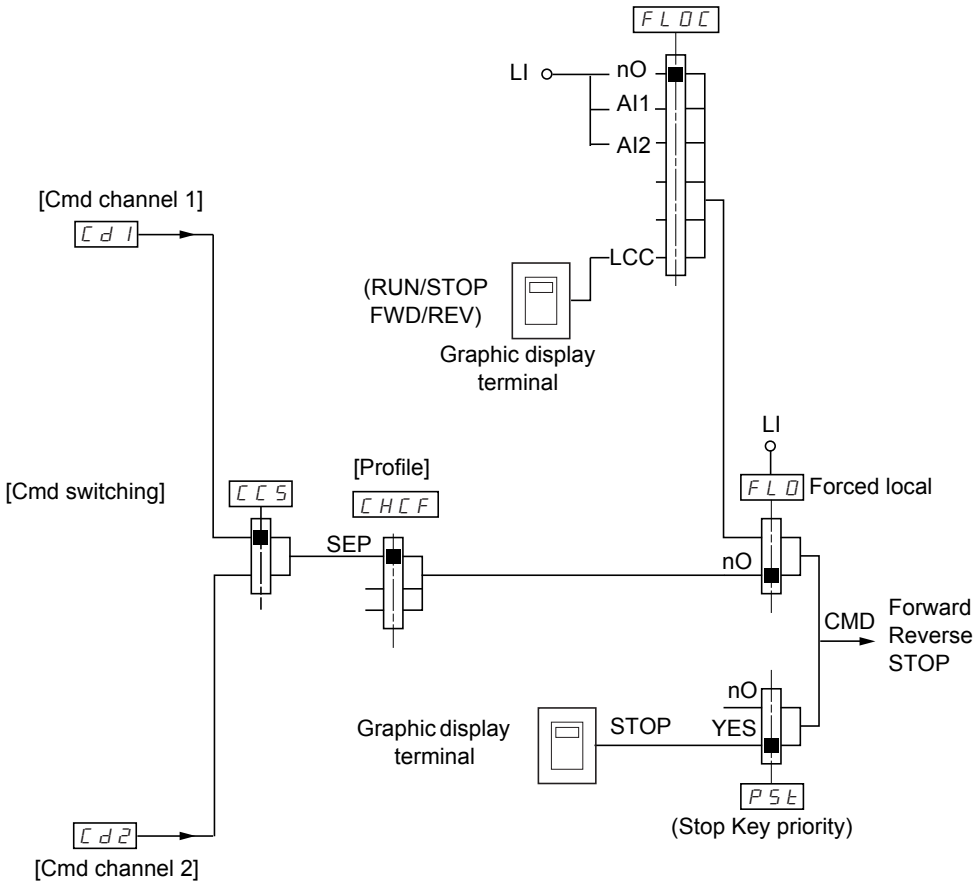
Command channel for [Separate] (SEP) configuration

Separate reference and command

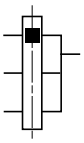
Parameters FLO and FLOC are common to reference and command.

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

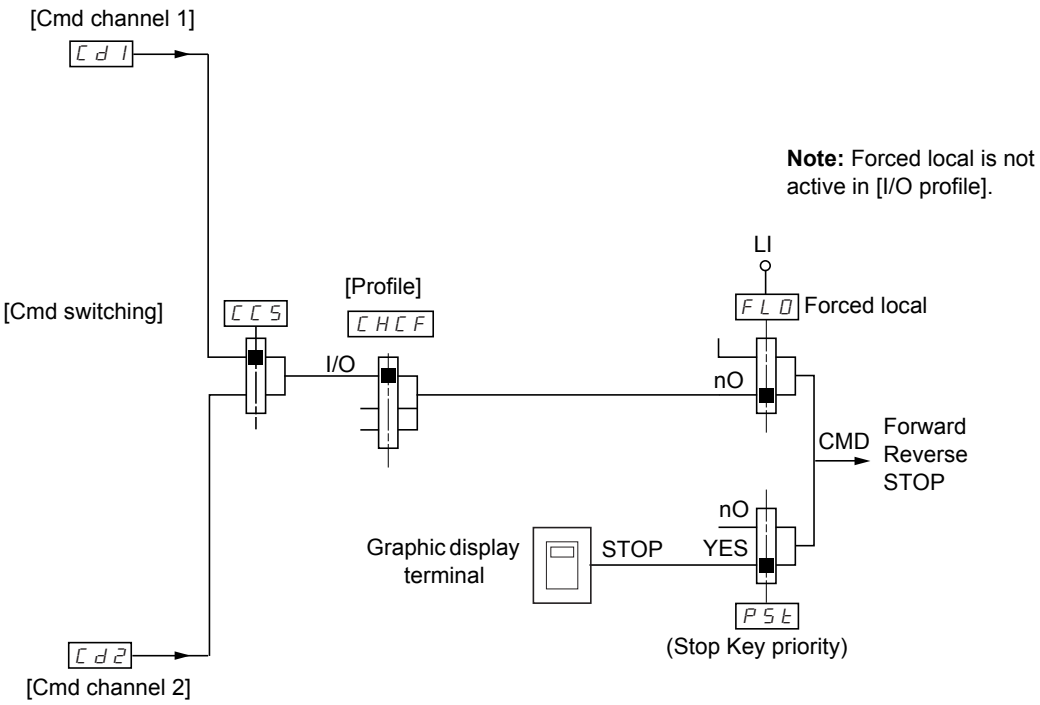
Cd1, Cd2:

- Terminals, graphic display terminal, integrated communication interface, communication card

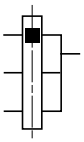
Command channel for [I/O profile] (IO) configuration

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 communication interface, communication card

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 communication interface with bit 14 regardless of which command channel is switched.

- To a switchable channel by selecting a CDxx bit:
  - By selecting, e.g., CD05, this action will be triggered by
    LI6 if the terminals channel is active
    C105 not applicable
    C205 if the integrated communication interface channel is active
    C305 if the communication 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.

Terminals	Integrated communication interface	Communication card	Internal bit, can be switched
			CD00
LI2 (1)	C201 (1)	C301 (1)	CD01
LI3	C202	C302	CD02
LI4	C203	C303	CD03
LI5	C204	C304	CD04
LI6	C205	C305	CD05
-	C206	C306	CD06
-	C207	C307	CD07
-	C208	C308	CD08
-	C209	C309	CD09
-	C210	C310	CD10
-	C211	C311	CD11
-	C212	C312	CD12
-	C213	C313	CD13
-	C214	C314	CD14
-	C215	C315	CD15

(1) If [2/3 wire control] (tCC) page 81 = [3 wire] (3C), LI2, C201 and C301 cannot be accessed.

Assignment conditions for logic inputs and control bits

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
[C101] (C101) to [C110] (C110)	Not applicable
[C111] (C111) to [C115] (C115)	Not applicable
[C201] (C201) to [C210] (C210)	With integrated communication interface in [I/O profile] (IO) configuration
[C211] (C211) to [C215] (C215)	With integrated communication interface 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
[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 81 = [3 wire] (3C), LI2, C201, and C301 cannot be accessed either.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Inactive communication channels are not monitored (no lock following malfunction in the event of a communication bus failure). Make sure that the commands and functions assigned to bits C101 to C315 will not pose a risk in the event of the failure of the associated communication bus.

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

[1.6 COMMAND] (CtL-)

Code	Name/Description	Adjustment range	Factory setting
Fr1	❑ **[Ref.1 channel]**		[AI1] (AI1) (1)
AI1	☐ **[AI1]** (AI1): Analog input		
AI2	☐ **[AI2]** (AI2): Analog input		
LCC	☐ **[HMI]** (LCC): Graphic display terminal		
Mdb	☐ **[Modbus]** (Mdb): Not applicable		
CAn	☐ **[CANopen]** (CAN/PLK): Integrated communication interface (POWERLINK, CANopen)		
nEt	☐ **[Com. card]** (nEt): Communication card (if 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 (0 Hz).		
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 125 irrespective of the configuration of [Stop Key priority] (PSt).		
CHCF	❑ **[Profile]**		[Not separ.] (SIM)
SE8	☐ **[8 serie]** (SE8): Not applicable		
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.		

(1) When using POWERLINK, the factory setting is changed automatically to [CANopen] (CAN).

[1.6 COMMAND] (CtL-)

Code	Name/Description	Adjustment range	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 108 (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) (1)
tEr	☐ **[Terminals]** (tEr): Terminals		
LCC	☐ **[HMI]** (LCC): Graphic display terminal		
Mdb	☐ **[Modbus]** (Mdb): Not applicable		
CAn	☐ **[CANopen]** (CAN/PLK): Integrated communication interface (POWERLINK, CANopen)		
nEt	☐ **[Com. card]** (nEt): Communication card (if inserted)		
	The parameter is available if [Profile] (CHCF) = [Separate] (SEP) or [I/O profile] (IO).		
Cd2	❑ **[Cmd channel 2]**		[Modbus] (Mdb) (2)
tEr	☐ **[Terminals]** (tEr): Terminals		
LCC	☐ **[HMI]** (LCC): Graphic display terminal		
Mdb	☐ **[Modbus]** (Mdb): Not applicable		
CAn	☐ **[CANopen]** (CAN/PLK): Integrated communication interface (POWERLINK, CANopen)		
nEt	☐ **[Com. card]** (nEt): Communication 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 108 (not CDOO to CD14).		
	If the assigned input or bit is at 0, channel [Ref.1 channel] (Fr1) is active. If the assigned bit or input 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		
UPdt	☐ **[+/- Speed]** (UPdt) : +/- Speed command		
LCC	☐ **[HMI]** (LCC): Graphic display terminal		
Mdb	☐ **[Modbus]** (Mdb): Not applicable		
CAn	☐ **[CANopen]** (CAN/PLK): Integrated communication interface (POWERLINK, CANopen)		
nEt	☐ **[Com. card]** (nEt): Communication card (if inserted)		
PG	☐ **[Encoder]** (PG): Encoder input, if encoder card has been inserted		

(1) When using POWERLINK, the factory setting is changed automatically to [CANopen] (CAN).
(2) When using POWERLINK, the factory setting is changed automatically to [Terminals] (tEr).

Code	Name/Description	Adjustment range	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 109 = [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).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Copying the command and/or reference can change the direction of rotation.
Check that this is safe.
Failure to follow these instructions can result in death or serious injury.

[1.6 COMMAND] (CtL-)

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.

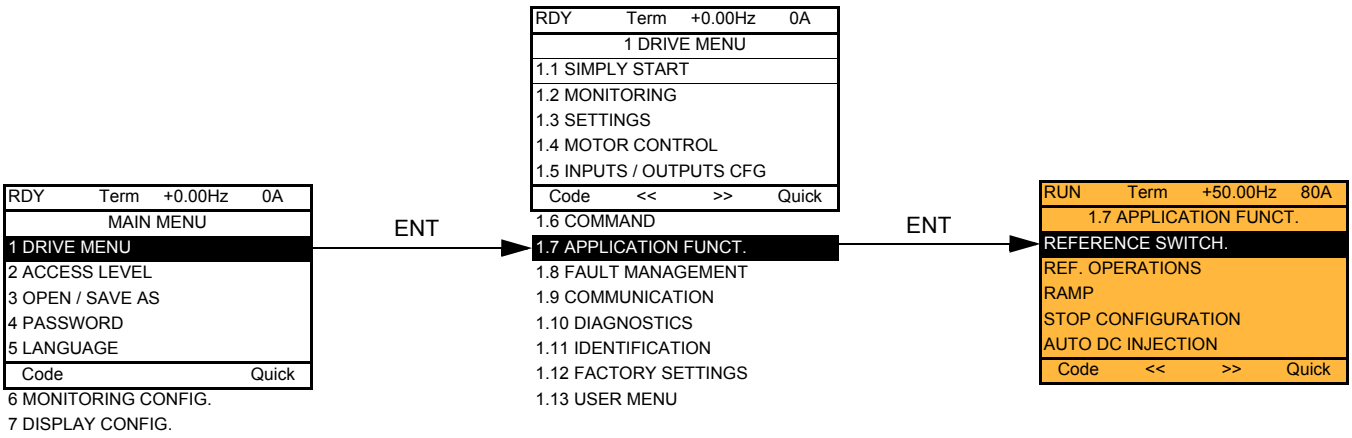
Comments:

- 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).

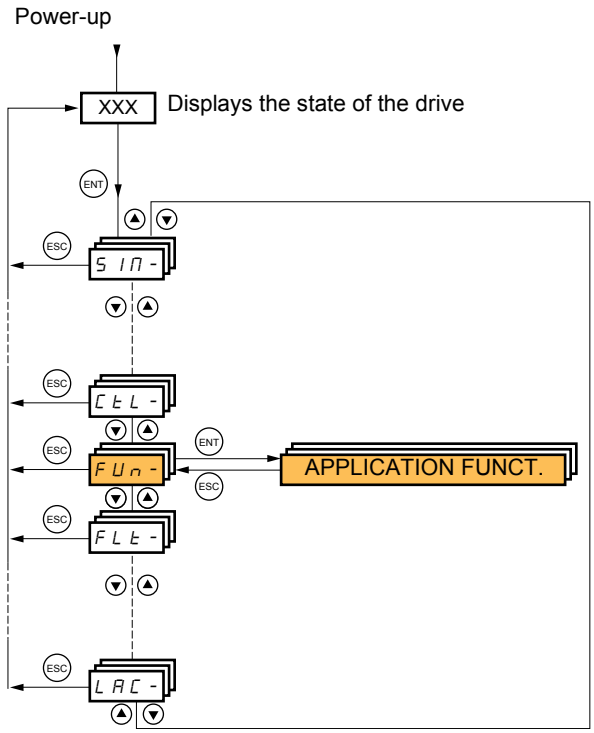
Name/Description	Adjustment range	Factory setting
❑ **[F1 key assignment]**		[No]
☐ **[No]**: Not assigned ☐ **[Jog]** : JOG operation ☐ **[Preset spd2]**: Press the key to run the drive at the 2nd preset speed [Preset speed 2] (SP2) page 132. Press STOP to stop the drive. ☐ **[Preset spd3]**: Press the key to run the drive at the 3rd preset speed [Preset speed 3] (SP3) page 132. 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 167, 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 167, 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).		
❑ **[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]

[1.7 APPLICATION FUNCT.] (FUn-)

With graphic display terminal:



With integrated display terminal:



Summary of functions:

Code	Name	Page
rEF-	[REFERENCE SWITCH.]	119
OAI-	[REF. OPERATIONS]	120
rPt-	[RAMP]	121
Stt-	[STOP CONFIGURATION]	125
AdC-	[AUTO DC INJECTION]	127
JOG-	[JOG]	129
PSS-	[PRESET SPEEDS]	131
UPd-	[+/- SPEED]	134
SrE-	[+/-SPEED AROUND REF.]	136
SPM-	[MEMO REFERENCE]	137
FLI-	[FLUXING BY LI]	138
LSt-	[LIMIT SWITCHES]	140
bLC-	[BRAKE LOGIC CONTROL]	145
ELM-	[EXTERNAL WEIGHT MEAS.]	151
HSH-	[HIGH SPEED HOISTING]	156
PId-	[PID REGULATOR]	163
PrI-	[PID PRESET REFERENCES]	167
tOr-	[TORQUE CONTROL]	169
tOL-	[TORQUE LIMITATION]	172
CLI-	[2nd CURRENT LIMIT.]	174
LLC-	[LINE CONTACTOR COMMAND]	176
OCC-	[OUTPUT CONTACTOR CMD]	178
LPO-	[POSITIONING BY SENSORS]	182
nLP-	[PARAM. SET SWITCHING]	185
nMC-	[MULTIMOTORS/CONFIG.]	190
tnL-	[AUTO TUNING BY LI]	190
trO-	[TRAVERSE CONTROL]	196
rFt-	[EVACUATION]	198
HFF-	[HALF FLOOR]	199
dCO-	[DC BUS SUPPLY]	200

[1.7 APPLICATION FUNCT.] (FUn-)

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 below.

Compatibility table

	Reference operations (page 120)	+/- speed (3) (page 134)	Management of limit switches (page 140)	Preset speeds (page 131)	PID regulator (page 163)	Traverse control (page 196)	JOG operation (page 129)	Brake logic control (page 145)	Catch on the fly (page 206)	DC injection stop (page 125)	Fast stop (page 125)	Freewheel stop (page 125)	+/- speed around a reference (page 136)	High speed hoisting (page 156)	Torque control (page 169)	Load sharing (page 77)	Positioning by sensors (page 182)	Open-loop synchronous motor (page 66)
Reference operations (page 120)				↑	●(4)		↑								●(1)			
+/- speed (3) (page 134)						●	●								●(1)			
Management of limit switches (page 140)					●													
Preset speeds (page 131)	←						↑								●(1)			
PID regulator (page 163)	●(4)		●			●	●	●					●	●	●(1)	●	●	
Traverse control (page 196)		●			●		●						●	●	●(1)			
JOG operation (page 129)	←	●		←	●	●		●					●	●	●(1)			
Brake logic control (page 145)					●		●		●	●					●			●
Catch on the fly (page 206)								●							●(1)			
DC injection stop (page 125)								●			●(2)	↑						●
Fast stop (page 125)										●(2)		↑						
Freewheel stop (page 125)										←	←							
+/- speed around a reference (page 136)					●	●	●								●(1)			
High speed hoisting (page 156)					●	●	●								●			
Torque control (page 169)	●(1)	●(1)		●(1)	●(1)	●(1)	●(1)	●	●(1)				●(1)	●		●	●(1)	●
Load sharing (page 77)					●										●			
Positioning by sensors (page 182)					●										●(1)			
Open-loop synchronous motor (page 66)								●		●					●			

(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 102 and 103).
(4) Only the multiplier reference is incompatible with the PID regulator.

● 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 112).

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 81.

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 81.
This function is locked if automatic injection on stop [Auto DC injection] (AdC) = [Continuous] (Ct). See page 127.

The SUP- monitoring menu (page 39) 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:

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

JOG

If you attempt to assign a function that is incompatible with another function that has already been assigned, an alarm message will appear:

With the graphic display terminal:

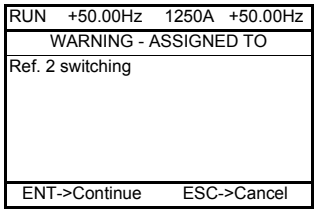
RDY	Term	+0.00Hz	0A
INCOMPATIBILITY			
The function can't be assigned because an incompatible function is already selected. See programming book.			
ENT or ESC to continue			

With the integrated display terminal:
COMP flashes until ENT or ESC is pressed.

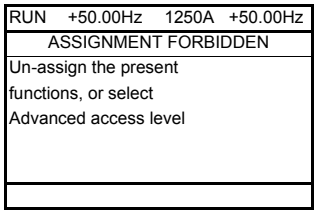
When you assign a logic input, an analog input, a reference channel or a bit to a function, pressing the HELP button will display the functions that may already have been activated by this input, bit or channel.

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:



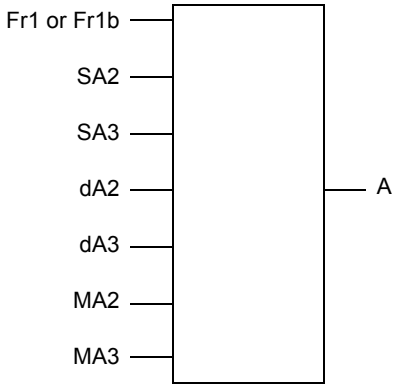
If the access level permits this new assignment, pressing ENT confirms the assignment.
If the access level does not permit this new assignment, pressing ENT results in the following display:



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.

Summing input/Subtracting input/Multiplier

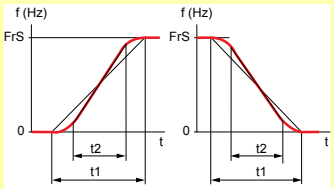
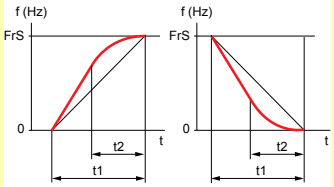
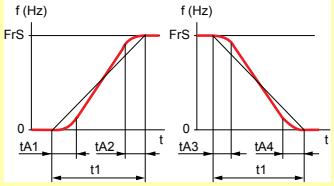


A = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3

- 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 43 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 109).

Code	Name/Description	Adjustment range	Factory setting
rEF-	**[REFERENCE SWITCH.]**		
rCb	**[Ref 1B switching]** See the diagrams on pages 102 and 103. ☐ **[ch1 active]** (Fr1): no switching, [Ref.1 channel] (Fr1) active ☐ **[ch1B active]** (Fr1b): no switching, [Ref.1B channel] (Fr1b) active ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108 (not CDOO to CD14). • If the assigned input or bit is at 0, [Ref.1 channel] (Fr1) is active (see page 109). • 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 109.		[ch1 active] (Fr1)
Fr1 Fr1b LI1 - - -			
Fr1b	**[Ref.1B channel]** ☐ **[No]** (nO): Not assigned ☐ **[AI1]** (AI1): Analog input ☐ **[AI2]** (AI2): Analog input ☐ **[HMI]** (LCC): Graphic display terminal ☐ **[Modbus]** (Mdb): Not applicable ☐ **[CANopen]** (CAN/PLK): Integrated communication interface (POWERLINK, CANopen) ☐ **[Com. card]** (nEt): Communication card (if inserted) ☐ **[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 109. - PID configured with PID references via the terminals		[No] (nO)
nO AI1 AI2 LCC Mdb CAn nEt PG			

Code	Name/Description	Adjustment range	Factory setting
dA1-	**[REF. OPERATIONS]** Reference = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3. See the diagrams on pages 102 and 103. **Note:** This function cannot be used with certain other functions. Follow the instructions on page 114.		
SA2	**[Summing ref. 2]** Selection of a reference to be added to [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). ☐ **[No]** (nO): No source assigned ☐ **[AI1]** (AI1): Analog input ☐ **[AI2]** (AI2): Analog input ☐ **[HMI]** (LCC): Graphic display terminal ☐ **[Modbus]** (Mdb): Not applicable ☐ **[CANopen]** (CAN/PLK): Integrated communication interface (POWERLINK, CANopen) ☐ **[Com. card]** (nEt): Communication card (if inserted) ☐ **[Encoder]** (PG): Encoder input, if encoder card has been inserted ☐ **[Network AI]** (AIV1): Virtual input via communication bus, can be configured using [AI net. channel] (AIC1) page 88. **⚠ WARNING** **UNINTENDED EQUIPMENT OPERATION** If the equipment switches to forced local mode (see page 224), 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 can result in death or serious injury.**	[No] (nO)	
nO AI1 AI2 LCC Mdb CAn nEt PG AIV1			
SA3	**[Summing ref. 3]** 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.	[No] (nO)	
dA2	**[Subtract. ref. 2]** 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.	[No] (nO)	
dA3	**[Subtract. ref. 3]** 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.	[No] (nO)	
MA2	**[Multiplier ref. 2]** Selection of a multiplier reference [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.	[No] (nO)	
MA3	**[Multiplier ref. 3]** Selection of a multiplier reference [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.	[No] (nO)	

Code	Name/Description	Adjustment range	Factory setting
rPt-	**[RAMP]**		
rPt LIn S U CUS	**[Ramp type]** ☐ **[Linear]** (LIn) ☐ **[S ramp]** (S) ☐ **[U ramp]** (U) ☐ **[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		[Linear] (LIn)
Inr 0.01 0.1 1	**[Ramp increment]** (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).		[0,1] (0.1)
ACC	**[Acceleration]** (1) Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 61). Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (2)	3.0 s
dEC	**[Deceleration]** (1) Time to decelerate from the [Rated motor freq.] (FrS) (page 61) to 0. Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (2)	3.0 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).

Parameter that can be modified during operation or when stopped.

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%

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

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
	[RAMP] (continued)		
Frt	**[Ramp 2 threshold]**	0 to 500 or 1600 Hz according to rating	0 Hz

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

rPS nO LI1 - - -	**[Ramp switch ass.]** ☐ **[No]** (nO): Not assigned ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. - 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). 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) 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 121.

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

Code	Name/Description	Adjustment range	Factory setting
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 63. 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 145), or if [Braking balance] (bbA) page 77 = [Yes] (YES). The factory setting changes to [High torq. A] (dYnA) with certain ratings if [Sinus filter] (OFI) page 74 = [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)

CAUTION

Do not use [High torq. A] (dYnA), [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 this instruction can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
StE-	**[STOP CONFIGURATION]** **Note:** Some types of stop cannot be used with all other functions. Follow the instructions on page 114.		
Stt rMP FSt nSt dCI	**[Type of stop]**		[Ramp stop] (rMP)
	Stop mode on disappearance of the run command or appearance of a stop command. ☐ **[Ramp stop]** (rMP): Stop on ramp. ☐ **[Fast stop]** (FSt): Fast stop ☐ **[Freewheel stop]** (nSt): Freewheel stop ☐ **[DC injection]** (dCI): DC injection stop **Note:** If the "brake logic" function on page 145 has been enabled, or if [Low speed time out] (tLS) page 54 or 166 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 nO LI1 C101 - - CdOO -	**[Freewheel stop ass.]**		[No] (nO)
	☐ **[No]** (nO): Not assigned ☐ **[LI1]** (LI1) to **[LI6]** (LI6) ☐ **[C101]** (C101) to **[C115]** (C115): Not applicable ☐ **[C201]** (C201) to **[C215]** (C215): With integrated communcation interface in [I/O profile] (IO) ☐ **[C301]** (C301) to **[C315]** (C315): With a communication card in [I/O profile] (IO) ☐ **[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 81 = [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 nO LI1 - - -	**[Fast stop assign.]**		[No] (nO)
	Note: This function cannot be used with certain other functions. Follow the instructions on page 114. ☐ **[No]** (nO): Not assigned ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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 81 = [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.

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 114.

- nO: **[No]** (nO): Not assigned
- LI1 - - -: **[LI1]** (LI1) : : **[...]** (...): See the assignment conditions on page 108.

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 81 = [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

Check that the motor will withstand this current without overheating.
Failure to follow this instruction 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

Check that the motor will withstand this current without overheating.
Failure to follow this instruction 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.

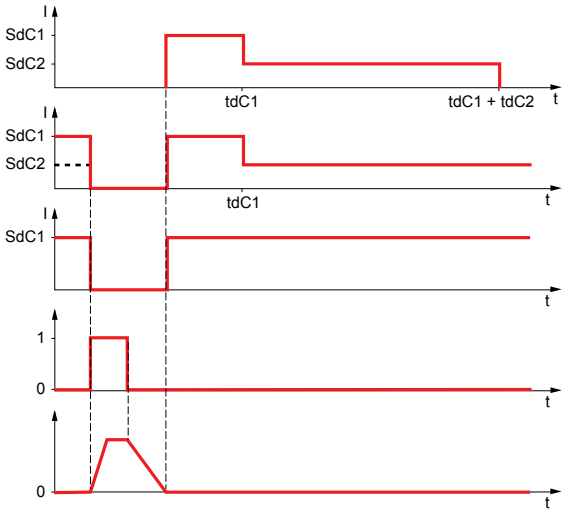
( ) Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
AdC-	**[AUTO DC INJECTION]**		
AdC	**[Auto DC injection]**		[Yes] (YES)
	Automatic current injection on stopping (at the end of the ramp) ☐ **[No]** (nO): No injection. ☐ **[Yes]** (YES): Adjustable injection time. ☐ **[Continuous]** (Ct): Continuous standstill injection. **Warning**, there is an interlock between this function and [Motor fluxing] (FLU) page 138. 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 [Auto DC injection] (AdC) is not [No] (nO). This parameter is forced to 0 if [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn).. **CAUTION** Check that the motor will withstand this current without overheating. **Failure to follow this instruction 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 63 = [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. The parameter can be accessed if [Auto DC injection] (AdC) is not [No] (nO). This parameter is forced to 0 if [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn).. **CAUTION** Check that the motor will withstand this current without overheating. **Failure to follow this instruction 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.

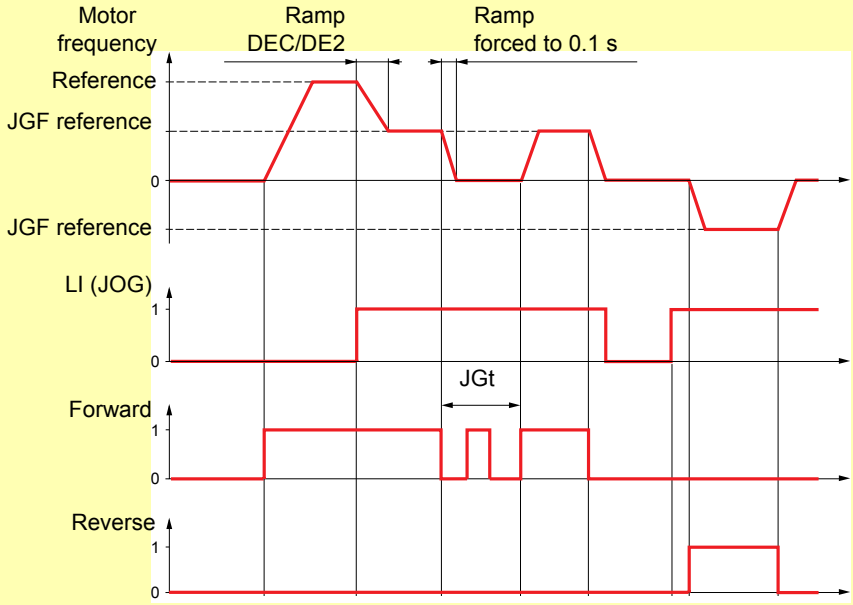
Code	Name/Description	Adjustment range	Factory setting
	[AUTO DC INJECTION] (continued)		
tdC2	**[Auto DC inj. time 2]** (1) 2nd standstill injection time. The parameter can be accessed if [Auto DC injection] (AdC) = [Yes] (YES.)	0 to 30 s	0 s

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

Note: When [Motor control type] (Ctt) page 63 = [FVC] (FUC):
[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.

Code	Name/Description	Adjustment range	Factory setting
JOG-	**[JOG]** **Note:** This function cannot be used with certain other functions. Follow the instructions on page 114.		
JOG	**[JOG]** 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): Not assigned ☐ **[LI1]** (LI1) to **[LI6]** (LI6) ☐ **[C101]** (C101) to **[C115]** (C115): Not applicable ☐ **[C201]** (C201) to **[C215]** (C215): With integrated communication interface in [I/O profile] (IO) profile ☐ **[C301]** (C301) to **[C315]** (C315): With a communication card in [I/O profile] (IO) profile ☐ **[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)  	[No] (nO)	
JGF	**[Jog frequency]** (1)	0 to 10 Hz	10 Hz
	The parameter can be accessed if [JOG] (JOG) is not [No] (nO). Reference in jog operation		
JGt	**[Jog delay]** (1)	0 to 2.0 s	0.5 s
	The parameter can be accessed if [JOG] (JOG) is not [No] (nO). Anti-repeat delay between 2 consecutive jog operations.		

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

Parameter that can be modified during operation or when stopped.

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 102: Reference 1 = (SP1).

Code	Name/Description	Adjustment range	Factory setting
PSS-	**■ [PRESET SPEEDS]** **Note:** This function cannot be used with certain other functions. Follow the instructions on page 114.		
PS2	**❑ [2 preset speeds]**		[No] (nO)
nO	☐ **[No]** (nO): Function inactive		
LI1 - - -	☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108.		
PS4	**❑ [4 preset speeds]**		[No] (nO)
nO	☐ **[No]** (nO): Function inactive		
LI1 - - -	☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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 108. 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 108. To obtain 16 speeds you must also configure 2, 4 and 8 speeds.		

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.

+/- 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.

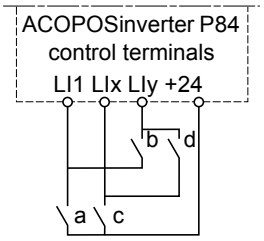
2. **Use of double action buttons:** Only one logic input assigned to “+ speed” is required.

+/- speed with double-press buttons:

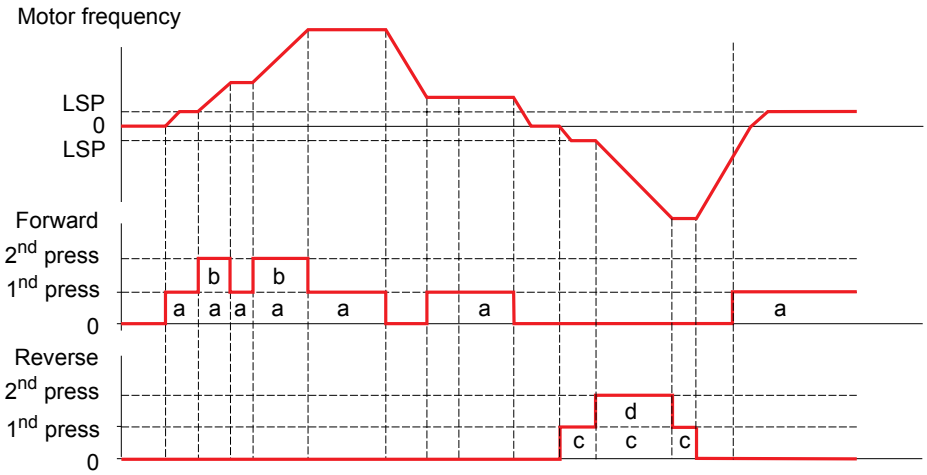
Description: 1 button pressed twice (2 steps) for each direction of rotation. A contact closes each time the button is pressed.

	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 38).

Note:
If the reference is switched via rFC (see page 110) 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 111.
If the reference is switched via rFC (see page 110) 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.

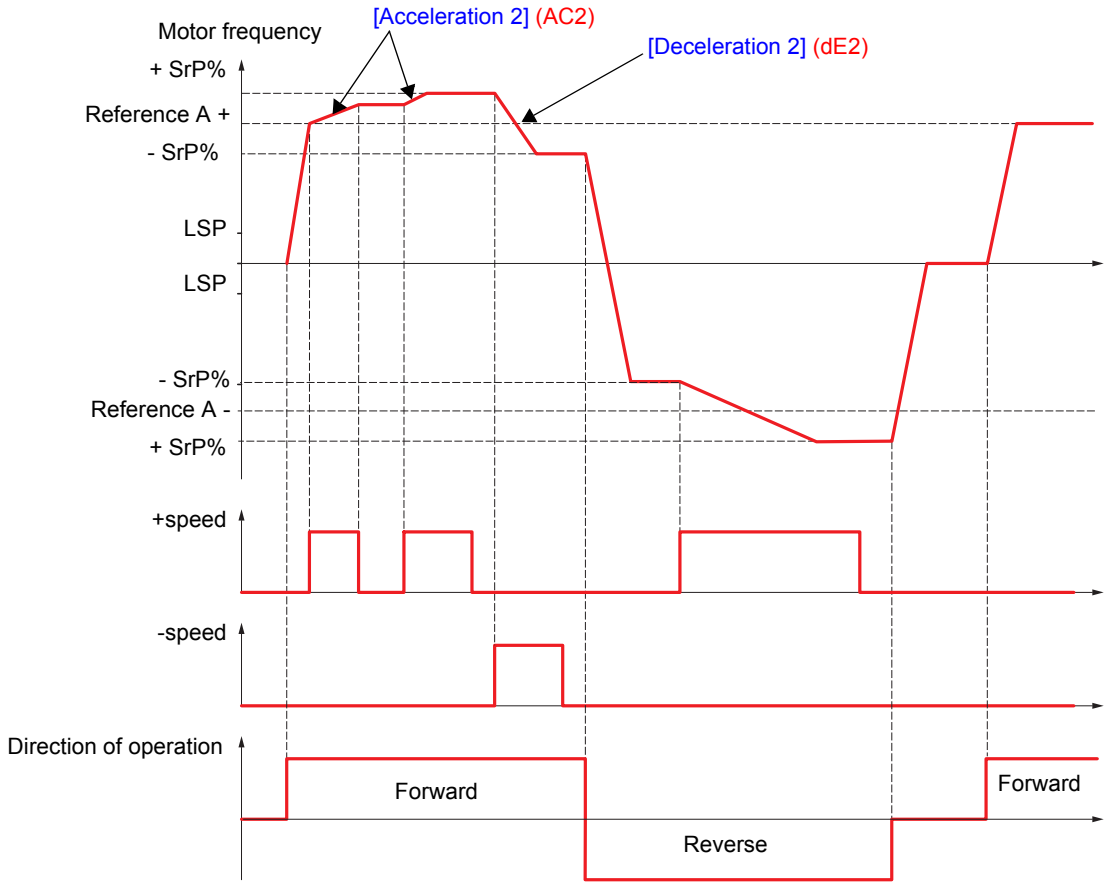
This prevents the speed being incorrectly reset to zero when switching takes place.

Code	Name/Description	Adjustment range	Factory setting
UPd-	**■ [+/- SPEED]** Function can be accessed if reference channel [Ref.2 channel] (Fr2) = [+/-Speed] (UPdt) see page 110. **Note:** This function cannot be used with certain other functions. Follow the instructions on page 114.		
USP	**❑ [+ speed assignment]** ☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) to **[LI6]** (LI6) ☐ **[C101]** (C101) to **[C115]** (C115): Not applicable ☐ **[C201]** (C201) to **[C215]** (C215): With integrated communication interface in [I/O profile] (IO) ☐ **[C301]** (C301) to **[C315]** (C315): With a communication card in [I/O profile] (IO) ☐ **[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.		[No] (nO)
dSP	**❑ [-Speed assignment]** ☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) to **[LI6]** (LI6) ☐ **[C101]** (C101) to **[C115]** (C115): Not applicable ☐ **[C201]** (C201) to **[C215]** (C215): With integrated communication interface in [I/O profile] (IO) ☐ **[C301]** (C301) to **[C315]** (C315): With a communication card in [I/O profile] (IO) ☐ **[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.		[No] (nO)
Str	**❑ [Reference saved]** 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 save (the next time the drive starts up, the speed reference is [Low speed] (LSP), see page 38) ☐ **[RAM]** (rAM): Saved in RAM ☐ **[EEprom]** (EEP): Saved in EEPROM		[No] (nO)

+/- 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 102). 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 38.

Example of 2-wire control:



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 114.		
USI nO LI1 - - -	**[+ speed assignment]** ☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. Function active if the assigned input or bit is at 1.		[No] (nO)
dSI nO LI1 - - -	**[-Speed assignment]** ☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. Function active if the assigned input or bit is at 1.		[No] (nO)
SrP ()	**[+/-Speed limitation]** 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.	0 to 50 %	10 %
AC2 ()	**[Acceleration 2]** (1) Time to accelerate from 0 to the [Rated motor freq.] (FrS). Make sure that this value is compatible with the inertia being driven. The parameter can be accessed if +/- speed is assigned.	0.01 to 6000 s (2)	5.0 s
dE2 ()	**[Deceleration 2]** (1) Time to decelerate from the [Rated motor freq.] (FrS) to 0. Make sure that this value is compatible with the inertia being driven. The parameter can be accessed if +/- speed is assigned.	0.01 to 6000 s (2)	5.0 s

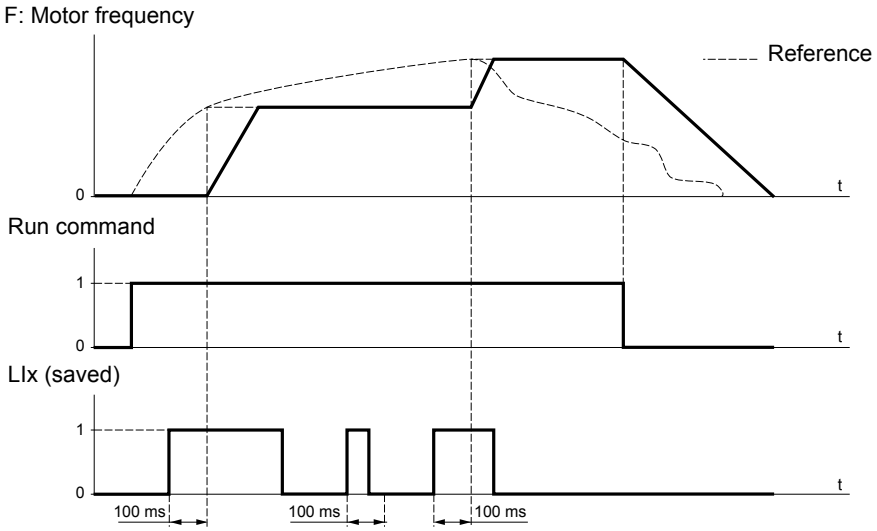
(1) The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.
(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to [Ramp increment] (Inr) page 121.

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

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	Adjustment range	Factory setting
SPn-	**[MEMO REFERENCE]**		
SPn	**[Ref. memo ass.]**		[No] (nO)
nO LI1 - LI6	☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) to **[LI6]** (LI6) Assignment to a logic input Function active if the assigned input is at 1.		

Code	Name/Description	Adjustment range	Factory setting
FLI-	**[FLUXING BY LI]**		
FLU	**[Motor fluxing]**	(1)	[No] (FnO)
FnC	☐ **[Not cont.]** (FnC): Non-continuous mode		
FCt	☐ **[Continuous]** (FCt): Continuous mode. This option is not possible if [Auto DC injection] (AdC) page 127 is [Yes] (YES) or if [Type of stop] (Stt) page 125 is [Freewheel] (nSt).		
FnO	☐ **[No]** (FnO): Function inactive This option is not possible if [Motor control type] (Ctt) page 63 = [SVCI] (CUC) or [FVC] (FUC). If [Motor control type] (Ctt) page 63 = [SVCI] (CUC), [FVC] (FUC) or [Sync. mot.] (SYn) or [SVC V] (UUC) at and above 8I84T409000.01P-1 the factory setting is replaced by [Not cont.] (FnC).		
	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 Check that the motor will withstand this current without overheating. **Failure to follow this instruction can result in equipment damage.**		
	If [Motor control type] (Ctt) page 63 = [Sync. mot.] (SYn), the [Motor fluxing] (FLU) parameter causes the alignment of the rotor and not the fluxing. If [Brake assignment] (bLC) page 145 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 108.		
	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) The parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

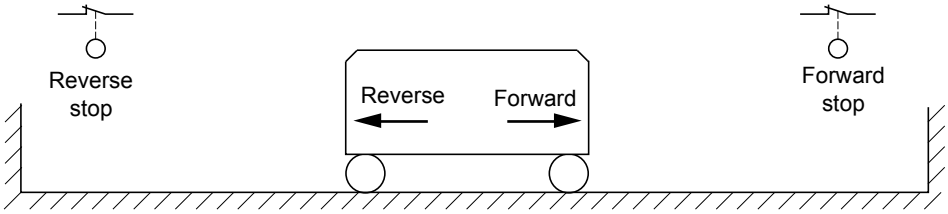
Parameter that can be modified during operation or when stopped.

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	Adjustment range	Factory setting
LSt-	**[LIMIT SWITCHES]** **Note:** This function cannot be used with certain other functions. Follow the instructions on page 114.		
LAF	**[Stop FW limit sw.]** ☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) to **[LI6]** (LI6) ☐ **[C101]** (C101) to **[C115]** (C115): Not applicable ☐ **[C201]** (C201) to **[C215]** (C215): With integrated communication interface in [I/O profile] (IO) ☐ **[C301]** (C301) to **[C315]** (C315): With a communication card in [I/O profile] (IO) ☐ **[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		[No] (nO)
LAr	**[Stop RV limit sw.]** Same assignments possible as for [Stop FW limit sw.] (LAF) below.		[No] (nO)
LAS	**[Stop type]** ☐ **[Ramp stop]** (rMP) ☐ **[Fast stop]** (FSt) ☐ **[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 will be impossible. The parameter can be accessed if [Stop FW limit sw.] (LAF) or [Stop RV limit sw.] (LAr) is assigned.		[Freewheel] (nSt)

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:

Maintain motor torque in the driving load holding direction during brake opening and closing, in order to hold the load, 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:

⚠ WARNING

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.

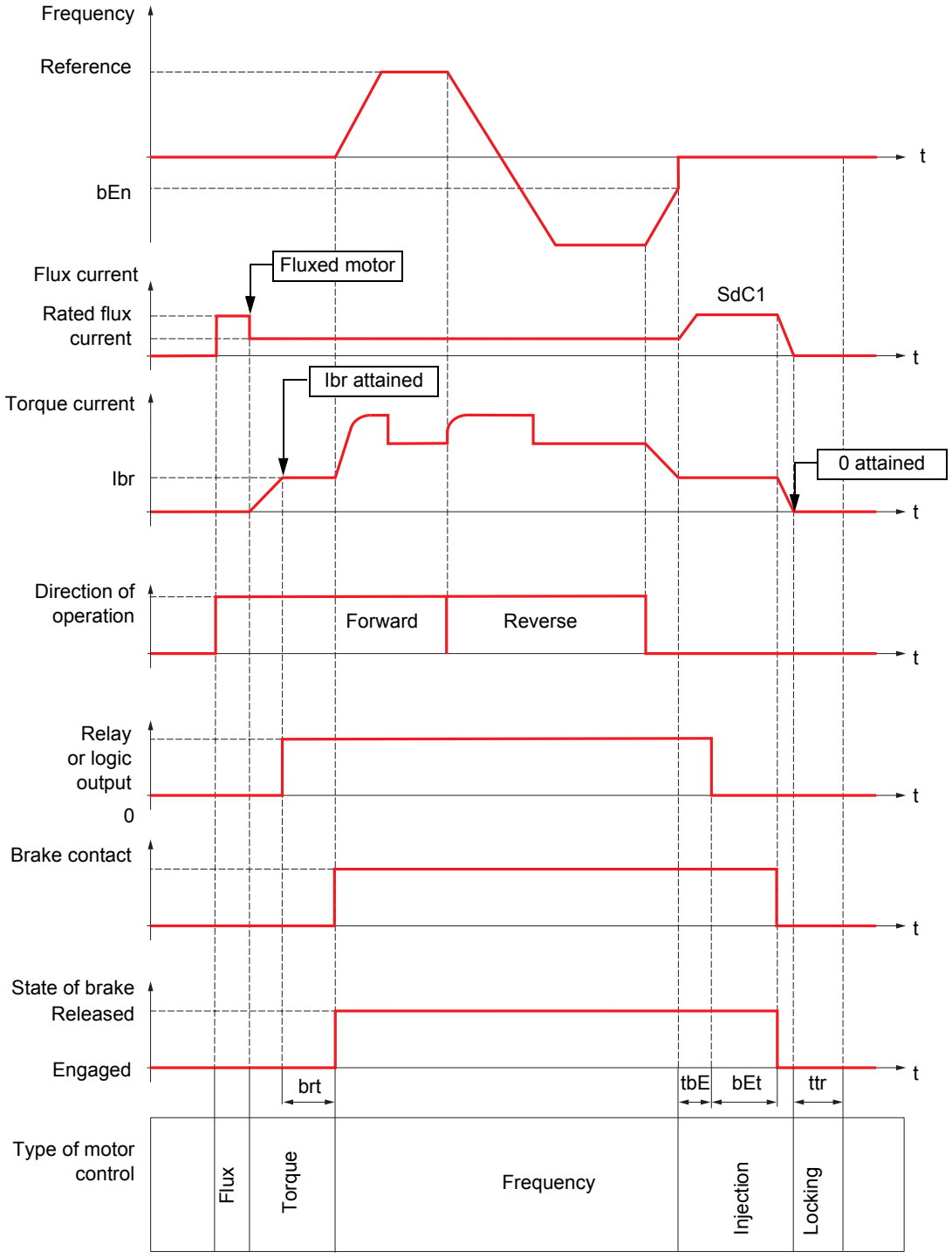
Failure to follow these instructions can result in death or serious injury.

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 always with a load and descent always 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:

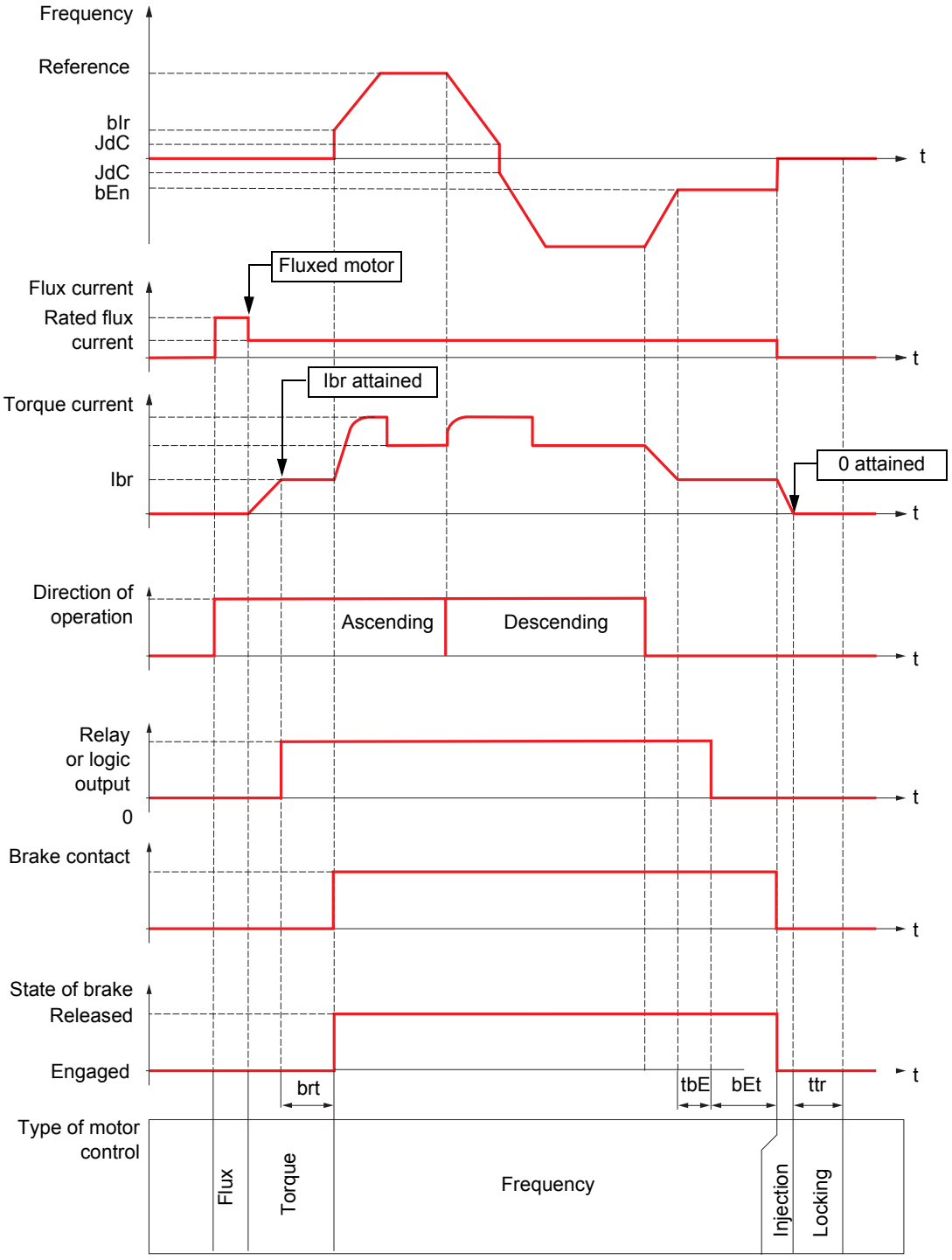
1. Brake impulse (bIP): No
2. Brake release current (Ibr): Set to 0.
3. Brake release time (brt): Set according to the type of brake. It is the time required for the mechanical brake to release.
4. Brake engage frequency (bEn), in open-loop mode only: Leave in [Auto], adjust if necessary.
5. Brake engage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

Brake logic control, horizontal movement in open-loop mode



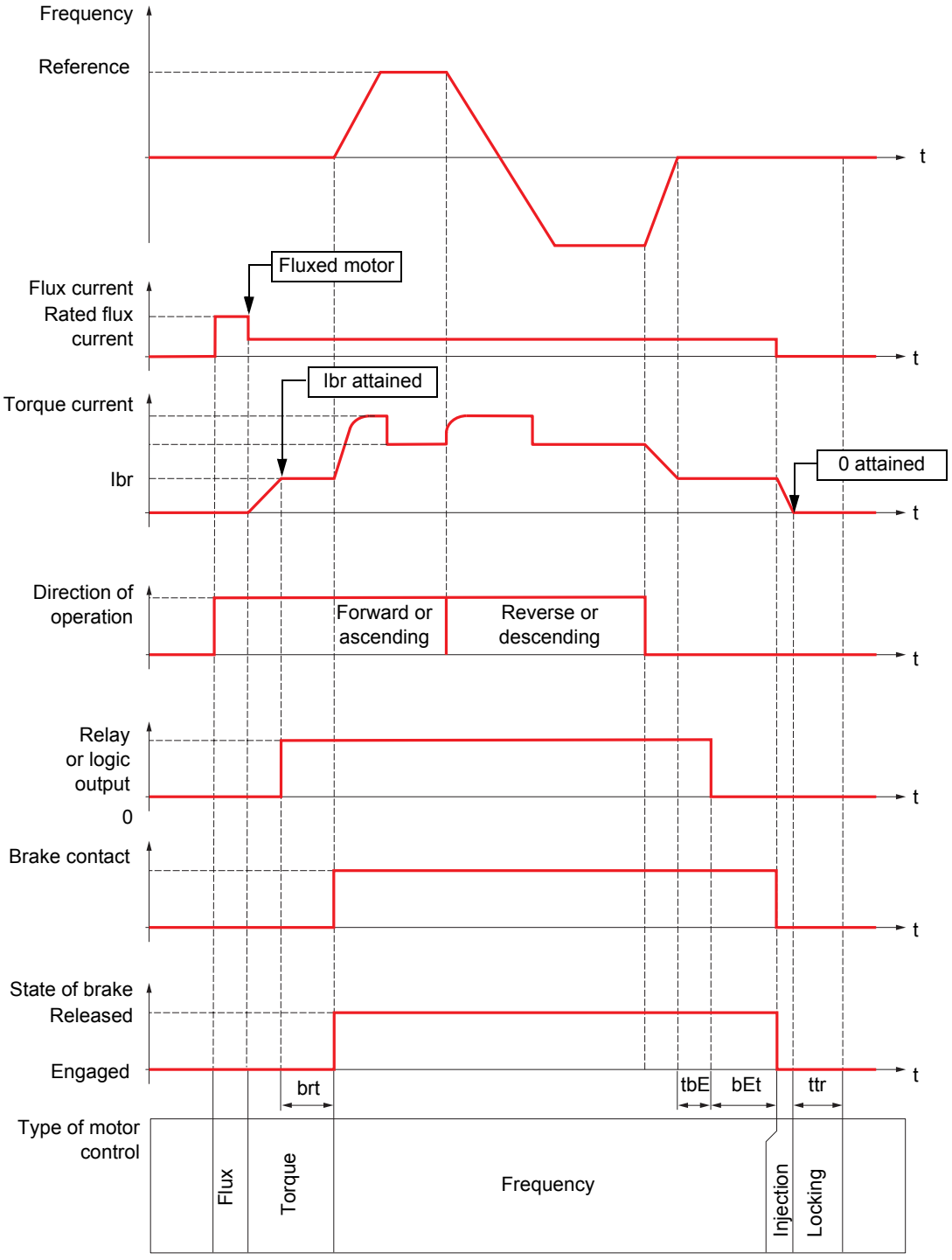
Key:
- (bEn): [Brake engage freq]
- (bEt): [Brake engage time]
- (brt): [Brake Release time]
- (Ibr): [Brake release I FW]
- (SdC1): [Auto DC inj. level 1]
- (tbE): [Brake engage delay]
- (ttr): [Time to restart]

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]

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]

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 114.		
bLC	**[Brake assignment]** **Note: If the brake is assigned, only a ramp stop is possible.** Check the [Type of stop] (Stt) page 125. Brake logic control can only be assigned if [Motor control type] (Ctt) page 63 = [SVC V] (UUC), [SVC I] (CUC) or [FVC] (FUC), or if [Motor control type] (Ctt) = [V/F 2pts] (UF2) or [V/F 5pts] (UF5) for 8I84T409000.01P-1 and above 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) dO1 **[dO1]** (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 97 = [No] (nO).		[No] (nO)
bSt	**[Movement type]** 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 8I84T409000.01P-1 and above [Movement type] (bSt) is forced to [Traveling] (HOr). UEr **[Hoisting]** (UEr): Driving-load movement (hoisting winch, for example). If [Weight sensor ass.] (PES) page 151 is not [No] (nO) [Movement type] (bSt) is forced to [Hoisting] (UEr).		[Hoisting] (UEr)
bCI	**[Brake contact]** 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 108.		[No] (nO)
bIP ( )	**[Brake impulse]** The parameter can be accessed if [Weight sensor ass.] (PES) = [No] (nO) (see page 151) 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. 2Ibr **[2 IBR]** (2Ibr): The torque is in the required direction, at current Ibr for Forward and Ird for Reverse, for certain specific applications.		[No] (nO)
Ibr ( )	**[Brake release I FW]** (1) Brake release current threshold for ascending or forward movement The parameter can be accessed if [Weight sensor ass.] (PES) = [No] (nO) (see page 151).	0 to 1.32 In (2)	0
Ird ( )	**[Brake release I Rev]** (1) Brake release current threshold for descending or reverse movement The parameter can be accessed if [Brake impulse] (bIP) = [2 IBR] (2Ibr).	0 to 1.32 In (2)	0

(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.

Code	Name/Description		Adjustment range	Factory setting
	[BRAKE LOGIC CONTROL] (continued)			
brt	**[Brake Release time]**	(1)	0 to 5.00 s	0
	Brake release time delay			
blr	**[Brake release freq]**	(1)		[Auto] (AUtO)
	Brake release frequency threshold (initialization of acceleration ramp). The parameter can be accessed if [Motor control type] (Ctt) page 63 is not [FVC] (FUC) and if [Movement type] (bSt) page 145 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			
bEn	**[Brake engage freq]**	(1)		[Auto] (AUtO)
	Brake engage frequency threshold The parameter can be accessed if [Motor control type] (Ctt) page 63 is not [FVC] (FUC). 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			
bECd	**[Brake engage at 0]**			[No] (nO)
	Brake engages at regulated zero speed. The parameter can be accessed if [Motor control type] (Ctt) page 63 = [FVC] (FUC). 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.			
tbE	**[Brake engage delay]**	(1)	0 to 5.00 s	0
	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.			
bEt	**[Brake engage time]**	(1)	0 to 5.00 s	0
	Brake engage time (brake response time)			
SdC1	**[Auto DC inj. level 1]**	(1)	0 to 1.2 In (2)	0.7 In (2)
	Level of standstill DC injection current. **Note:** The parameter can be accessed if [Motor control type] (Ctt) page 63 is not [FVC] (FUC) and if [Movement type] (bSt) page 145 is [Traveling] (HOr). **CAUTION** Check that the motor will withstand this current without overheating. **Failure to follow this instruction 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.

Code	Name/Description		Adjustment range	Factory setting
	[BRAKE LOGIC CONTROL] (continued)			
bEd	**[Engage at reversal]**			[No] (nO)
nO	☐ **[No]** (nO): The brake does not engage.			
YES	☐ **[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)
	The parameter can be accessed if [Motor control type] (Ctt) page 63 is not [FVC] (FUC) and if [Movement type] (bSt) page 145 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 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)	0.00 to 15.00 s	0.00
	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.

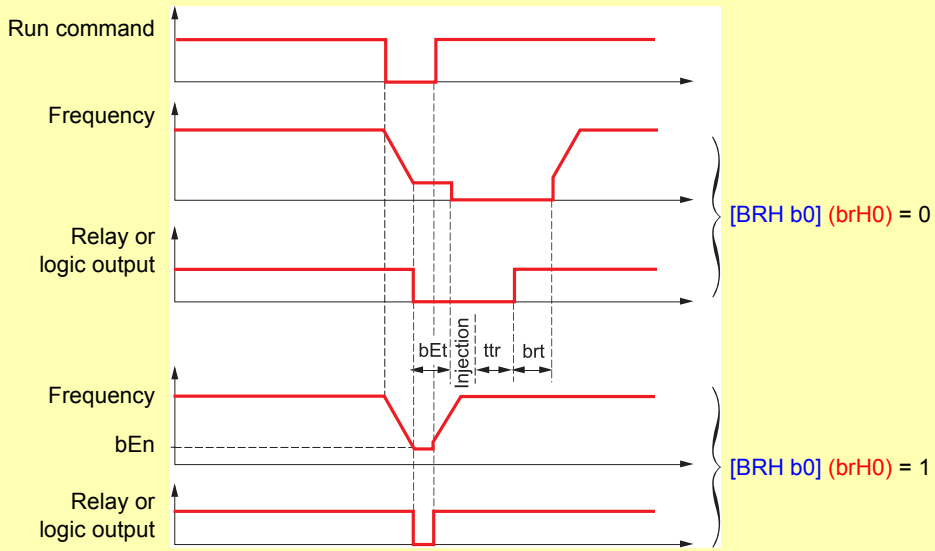
Brake control logic expert parameters

Code	Name/Description	Adjustment range	Factory setting
brH0	❏ [BRH b0]		0
0	☐ [0] (0): The engage/release sequence is executed in full.		
1	☐ [1] (1): The brake is released immediately.		

Selection of the brake restart sequence if a run command is repeated while the brake is engaging.

Use in open-loop and closed-loop mode.

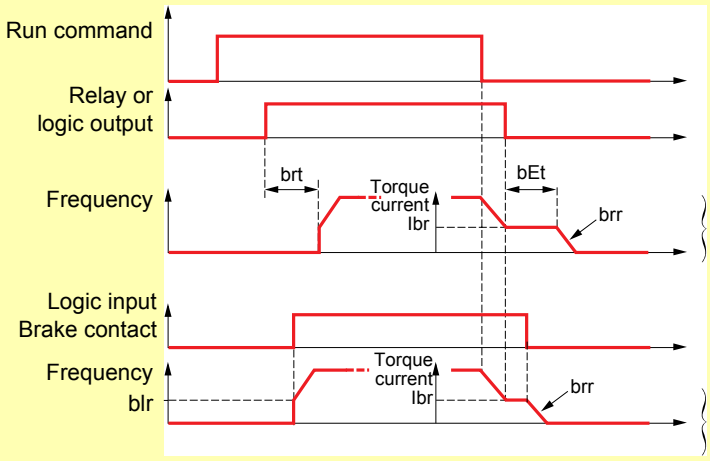
- A run command may be requested during the brake engagement phase. Whether or not the brake release sequence is executed depends on the value selected for [BRH b0] (brH0).



Note: If a run command is requested during the "ttr" phase, the complete brake control sequence is initialized.

brH1	❏ [BRH b1]		0
0	☐ [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.		

Deactivation of the brake contact in steady state fault.

Code	Name/Description	Adjustment range	Factory setting
brH2 0 1	❏ **[BRH b2]** Taking the brake contact into account for the brake control sequence. ☐ **[0]** (0): The brake contact is not taken into account. ☐ **[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.  		0
brH3 0 1	❏ **[BRH b3]** In closed-loop mode only. Management of the absence of brake contact response, if it is assigned. ☐ **[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): 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.		0
brH4 0 1	❏ **[BRH_b4]** 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): No action in the event of a movement for which no command has been given. ☐ **[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.		0
brr ↻	❏ **[Current ramp time]** Torque current ramp time (increase and decrease) for a current variation equal to [Brake release I FW] (Ibr).	0 to 5.00 s	0 s

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

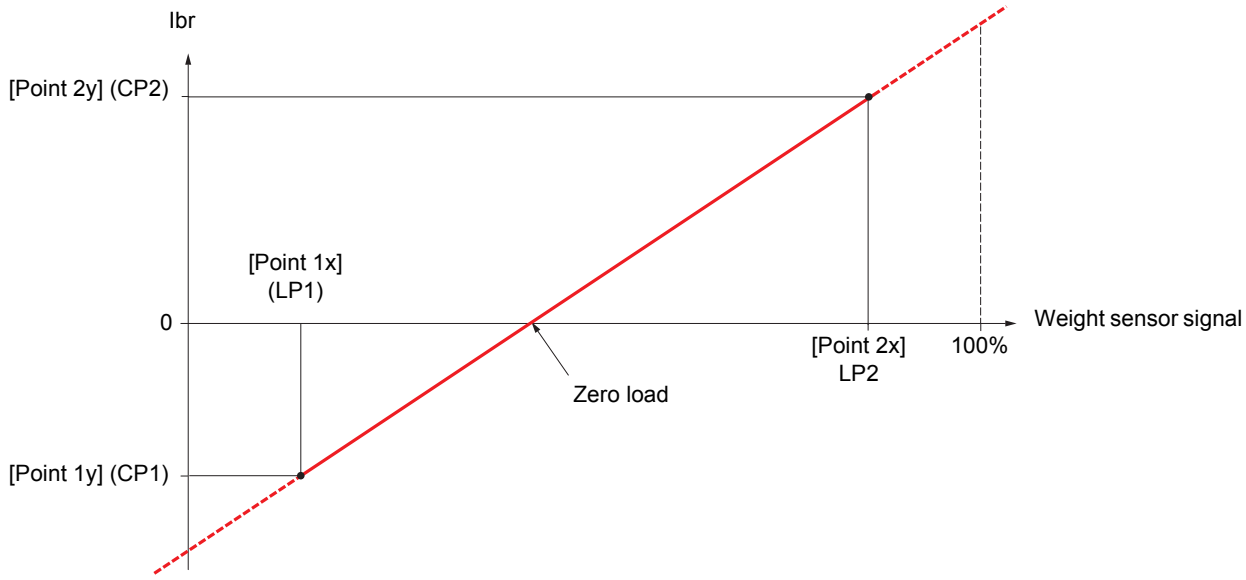
Load measurement

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) 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.

Code	Name/Description	Adjustment range	Factory setting
ELn-	**[EXTERNAL WEIGHT MEAS.]**		
PES	**[Weight sensor ass.]**		[No] (nO)
	Function can be accessed if brake logic control is assigned (see page 145). If [Weight sensor ass.] (PES) is not [No] (nO), [Movement type] (bSt) page 145 is forced to [Hoisting] (UEr). ☐ **[No]** (nO): Function inactive ☐ **[AI1]** (AI1): Analog input ☐ **[AI2]** (AI2): Analog input ☐ **[Encoder]** (PG): Encoder input, if encoder card has been inserted ☐ **[Network AI]** (AIV1): Virtual input via communication bus, to be configured via [AI net. channel] (AIC1) page 88.		
	⚠ WARNING **UNINTENDED EQUIPMENT OPERATION** If the equipment switches to forced local mode (see page 224), 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 can 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.

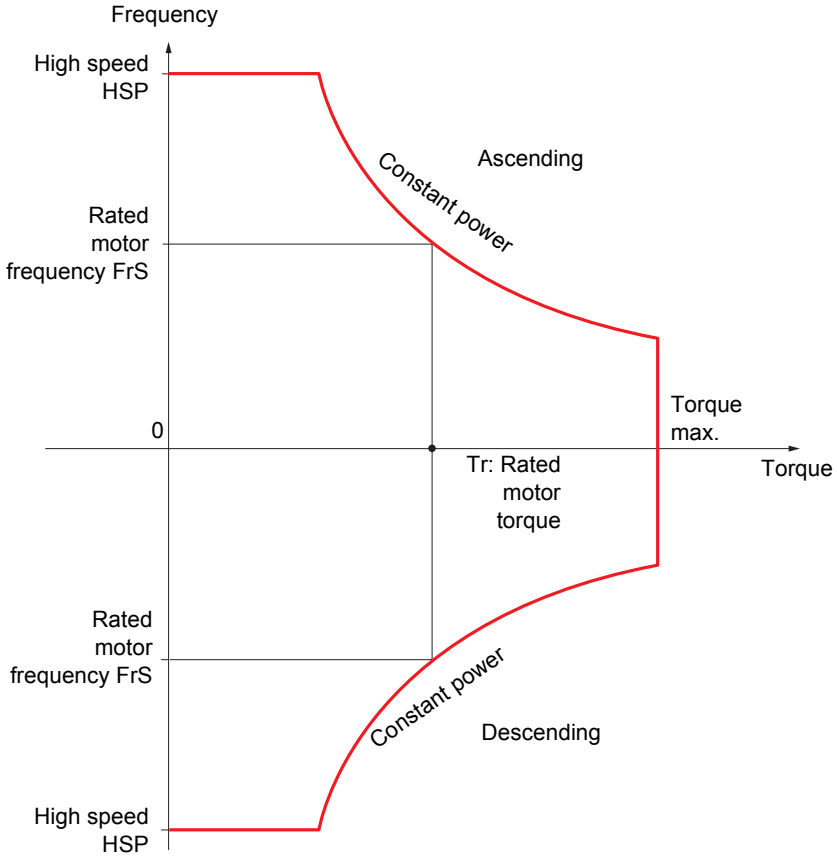
↻ Parameter that can be modified during operation or when stopped.

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 38.

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

Principle:

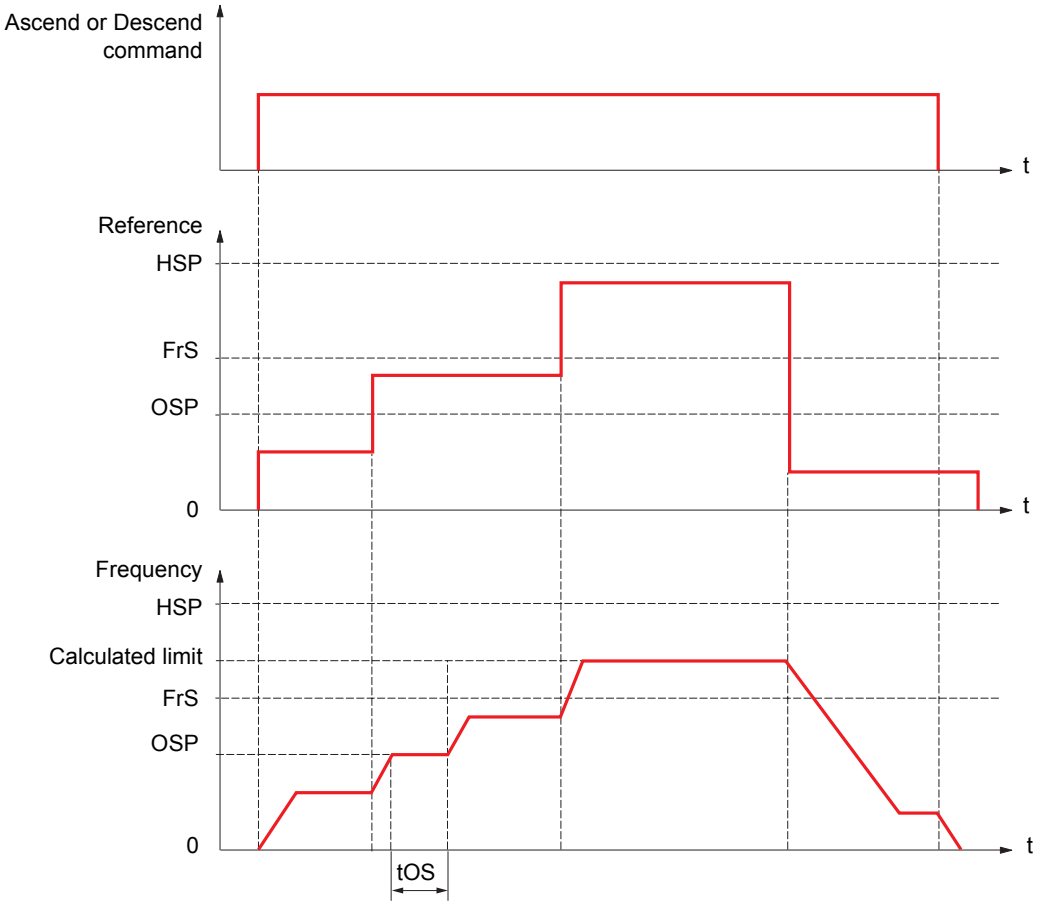


[1.7 APPLICATION FUNCT.] (FUn-)

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.

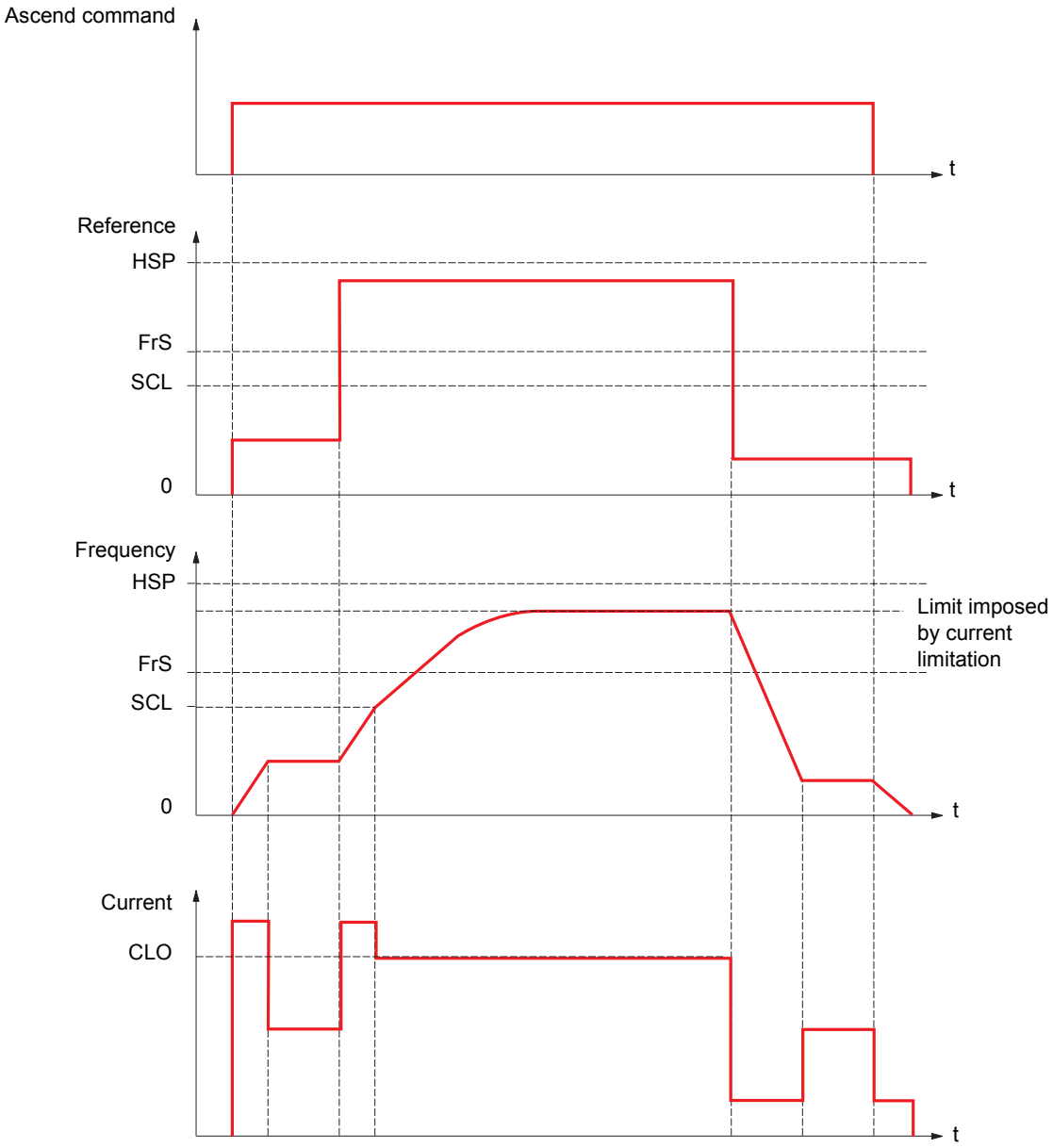
Speed reference mode



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.

Current limiting mode

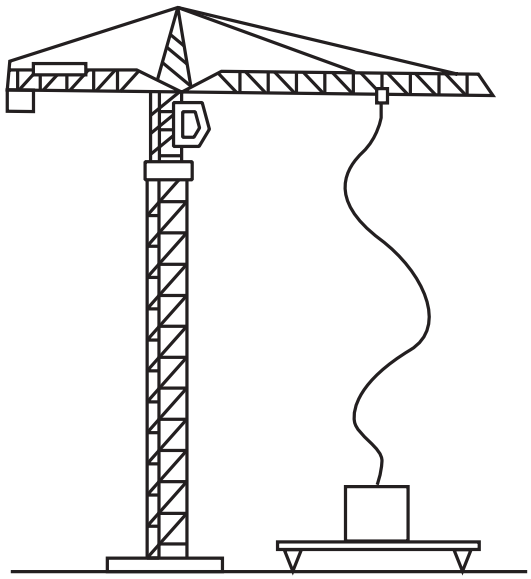


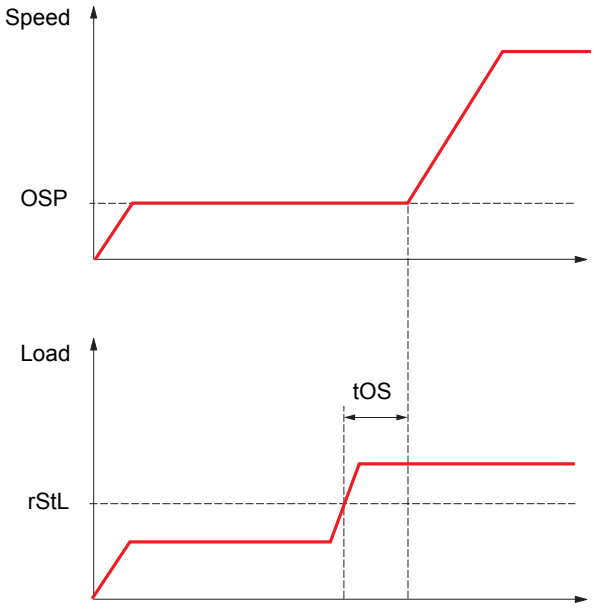
SCL: Adjustable speed threshold, above which current limitation is active
CLO: Current limitation for high-speed function

☞ **Note:** The speed reached for a specific current will be lower in case of network undervoltage in comparison with nominal network voltage.

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).





The speed step (OSP parameters) described on page 153 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.

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 114.		
HSO nO SSO CSO	**[High speed hoisting]** ☐ **[No]** (nO): Function inactive ☐ **[Speed ref]** (SSO): "Speed reference" mode ☐ **[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 [Rated motor freq.] (FrS)	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 53 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 208).	0 to 1.65 In (1)	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 nO drI PES	**[Rope slack config.]** Rope slack function. The parameter can be accessed if [High speed hoisting] (HSO) is not [No] (nO). ☐ **[No]** (nO): Function inactive ☐ **[Drive estim.]** (drl): Measurement of the load by estimating the torque generated by the drive. ☐ **[Ext. sensor]** (PES): Measurement of the load using a weight sensor, can only be assigned if [Weight sensor ass.] (PES) page 151 is not [No] (nO).		[No] (nO)
rStL	**[Rope slack trq level]** Adjustment threshold corresponding to a load weighing slightly less than the hook when off-load, as a % of the rated load. The parameter can be accessed if [Rope slack trq level] (rSd) has been assigned.	0 to 100%	0%

(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.

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] fault (dLF). 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 156 = [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 156 = [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 156 the drive will switch to fault mode. The detection is realised only for a positive variations of the load and only in the high speed area (area upper to [I Limit. frequency] (SCL)).

On descend, operation takes the form of "speed reference" mode.

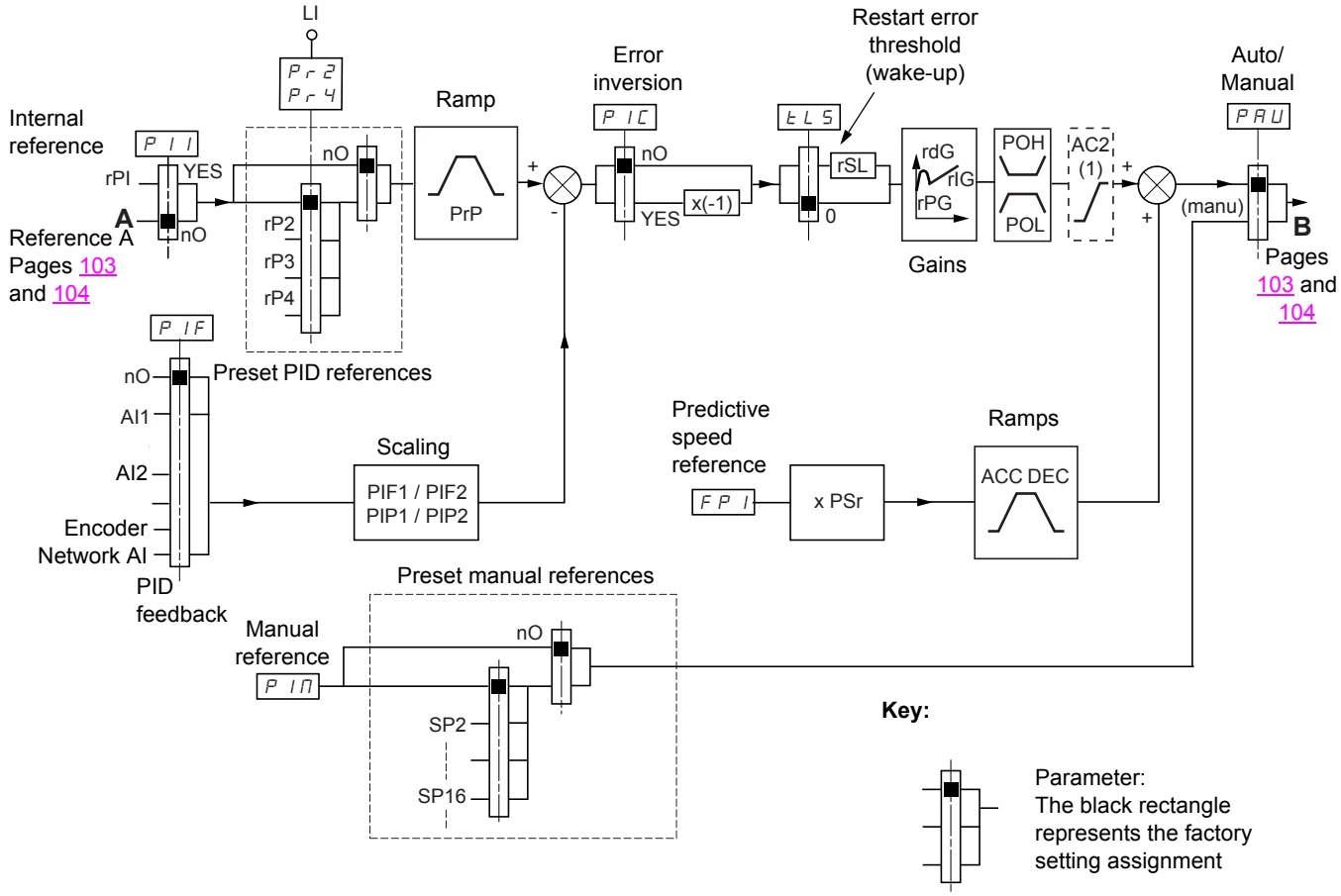
Code	Name/Description	Adjustment range	Factory setting
dLd-	**[DYNAMIC LOAD DETECT.]** Load variation detection. This can be accessed if [High speed hoisting] (HSO) page 156 is not [No] (nO).		
tLd	❏ **[Dynamic load time]** Activation of load variation detection and adjustment of time delay for taking 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.		[No] (nO)
dLd	❏ **[Dynamic load time]** Adjustment of the trip threshold for load variation detection, as a % of the load measured during the speed step.	1 to 100 %	100 %
dLb	❏ **[Dyn. load Mgt.]** Behavior of the drive in the event of a load variation fault. nO ☐ **[Ignore]** (nO): Fault ignored. YES ☐ **[Freewheel]** (YES): Freewheel stop. Stt ☐ **[Per STT]** (Stt): Stop according to configuration of[Type of stop] (Stt) page 125, without tripping fault. 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 81 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.		[Freewheel] (YES)

(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.

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, AI2 or encoder.

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 163:
  - Internal reference (rPI) or
  - Reference A (Fr1 or Fr1b, see page 103)

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.

Scaling of feedback and references:

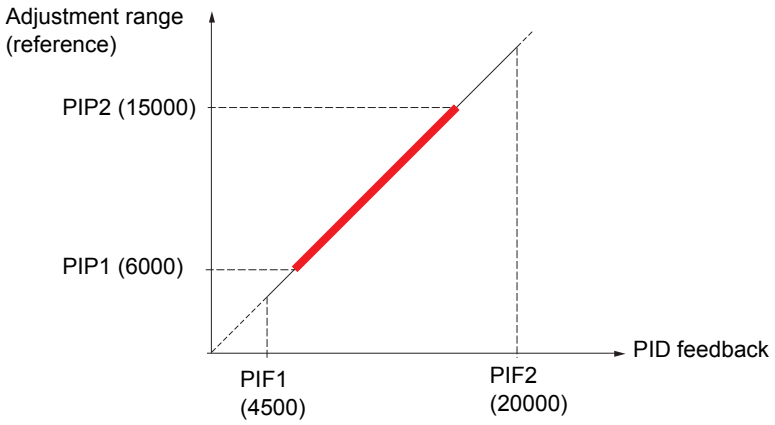
- PIF1, PIF2 parameters
  Can be used to scale the PID feedback (sensor range).
  This scale MUST be maintained for all other parameters.

- PIP1, PIP2 parameters
  Can be used to scale the adjustment range, i.e., 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.

"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 AI2
- Encoder

Predictive speed reference (FPI)

- [AI1] (AI1): Analog input
- [AI2] (AI2): Analog input
- [Encoder] (PG): Encoder input, if encoder card has been inserted
- [HMI] (LCC): Graphic display terminal
- [Modbus] (Mdb): Not applicable
- [CANopen] (CAN/PLK): Integrated communication interface (POWERLINK, CANopen)
- [Com. card] (nEt): Communication card (if inserted)

Setting up the PID regulator

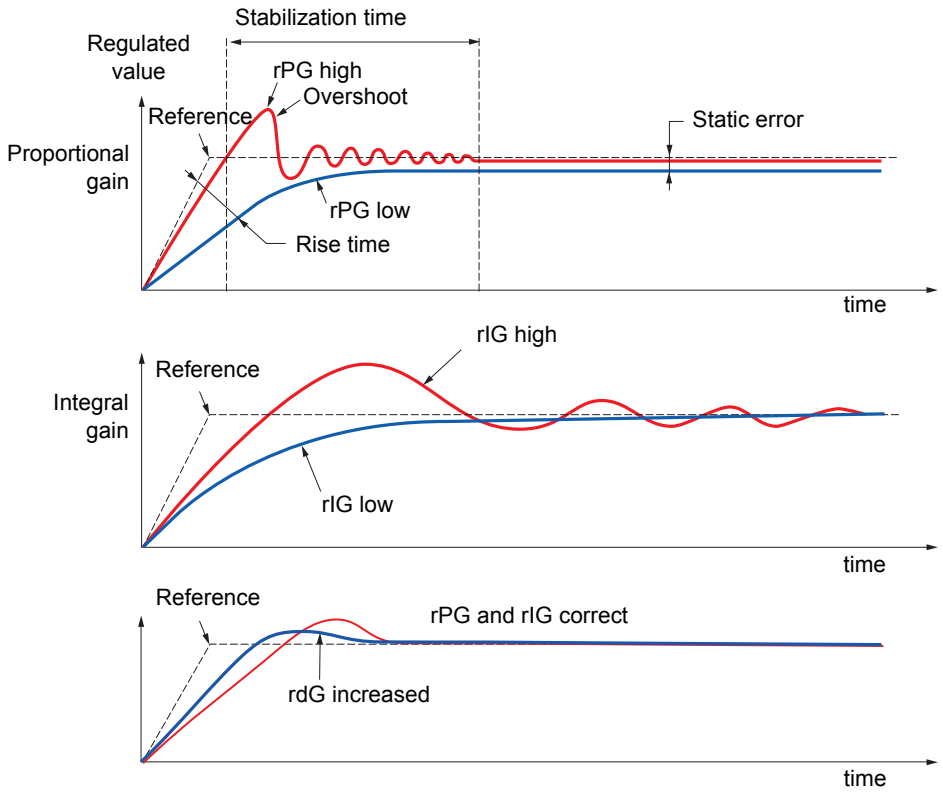
1. **Configuration in PID mode**
   See the diagram on page 159.

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.



The oscillation frequency depends on the system kinematics.

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

[1.7 APPLICATION FUNCT.] (FUn-)

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 114.		
PIF	**[PID feedback ass.]** ☐ **[No]** (nO): Not assigned (function inactive) In this case, none of the function parameters can be accessed. ☐ **[AI1]** (AI1): Analog input ☐ **[AI2]** (AI2): Analog input ☐ **[Encoder]** (PG): Encoder input, if encoder card has been inserted ☐ **[Network AI]** (AIV1): Virtual input via communication bus **Note:** If the equipment switches to forced local mode (see page 224), the virtual input remains fixed at the last value transmitted.		[No] (nO)
AIC1	**[AI net. channel]** The parameter can be accessed if [PID feedback ass.] (PIF) = [Network AI] (AIV1). This parameter can also be accessed in the [1.5 INPUTS / OUTPUTS CFG] (I-O-) menu. ☐ **[No]** (nO): **Not assigned** ☐ **[Modbus]** (Mdb): Not applicable ☐ **[CANopen]** (CAN/PLK): Integrated communication interface (POWERLINK, CANopen) ☐ **[Com. card]** (nEt): Communication card (if inserted)		[No] (nO)
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.]** Internal PID regulator reference ☐ **[No]** (nO): The PID regulator reference is given by Fr1 or Fr1b with summing/subtraction/multiplication functions (see the diagram on page 102). ☐ **[Yes]** (YES): The PID regulator reference is internal via parameter rPI.		[No] (nO)
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, e.g., 15.65 for 15650.

❮❯ Parameter that can be modified during operation or when stopped.

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 nO YES	**[PID correct. reverse]** ☐ **[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.		[No] (nO)
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 nO LI1 - - -	**[PID integral reset]** ☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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).		[No] (nO)

(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,
e.g., 15.65 for 15650.

Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
	[PID REGULATOR] (continued)		
FPI	**[Speed ref. assign.]**		[No] (nO)
	PID regulator predictive speed input ☐ **[No]** (nO): Not assigned (function inactive) ☐ **[AI1]** (AI1): Analog input ☐ **[AI2]** (AI2): Analog input ☐ **[HMI]** (LCC): Graphic display terminal ☐ **[Modbus]** (Mdb): Not applicable ☐ **[CANopen]** (CAN/PLK): Integrated communication interface (POWERLINK, CANopen) ☐ **[Com. card]** (nEt): Communication card (if inserted) ☐ **[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): The PID is always active. ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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".		
PIN	**[Manual reference]**		[No] (nO)
	Manual speed input. The parameter can be accessed if [Auto/Manual assign.] (PAU) is not [No] (nO). ☐ **[No]** (nO): Not assigned (function inactive) ☐ **[AI1]** (AI1): Analog input ☐ **[AI2]** (AI2): Analog input ☐ **[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,
e.g., 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 121.

Parameter that can be modified during operation or when stopped.

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 38) 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 125 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. **WARNING** **UNINTENDED EQUIPMENT OPERATION** Check that unintended restarts will not present any danger. **Failure to follow these instructions can 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.

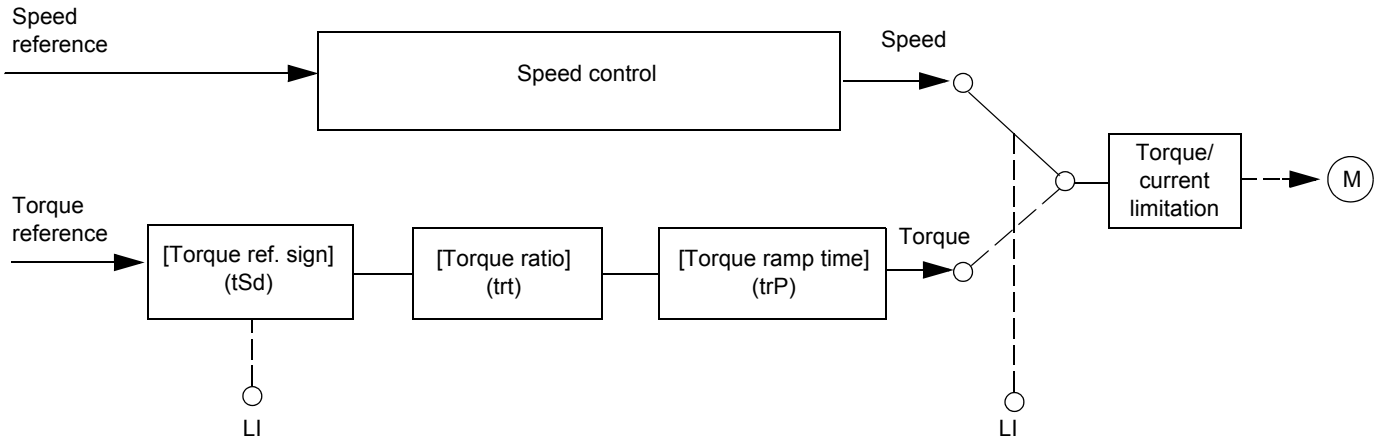
[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
Pr I-	**■ [PID PRESET REFERENCES]** Function can be accessed if [PID feedback ass.] (PIF) is assigned.		
Pr2 nO LI1 - - -	**❑ [2 preset PID ref.]** ☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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.		[No] (nO)
Pr4 nO LI1 - - -	**❑ [4 preset PID ref.]** 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 108. 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.		[No] (nO)
rP2 ( )	**❑ [2 preset PID ref.]** (1) 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).		300
rP3 ( )	**❑ [3 preset PID ref.]** (1) 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).		600
rP4 ( )	**❑ [4 preset PID ref.]** (1) 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).		900

(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, e.g., 15.65 for 15650.

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

Torque regulation



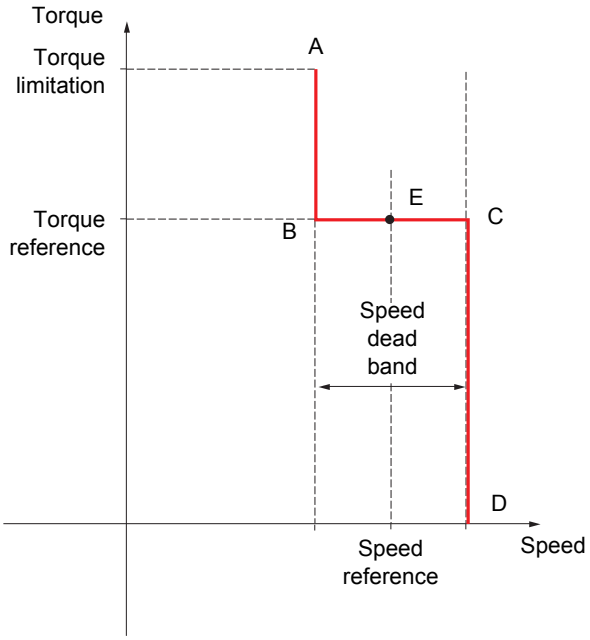
The function can be used to switch between operation in speed regulation mode and operation in torque control mode.
In torque control mode, the speed may vary within a configurable "deadband". When it reaches a lower or upper limit, the drive automatically reverts to speed regulation mode (fallback) 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.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Check that the changes in the behavior of the motor do not present any danger.
Failure to follow these instructions can 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.

Code	Name/Description	Adjustment range	Factory setting
tOr-	**[TORQUE CONTROL]** This function can only be accessed for [Motor control type] (Ctt) = [SVC I] (CUC) or [FVC] (FUC). **Note 1:** This function cannot be used with certain other functions. Follow the instructions on page 114. **Note 2:** This function is not compatible with the fault management of [Load slipping] (AnF).		
tSS nO YES LI1 - - -	**[Trq/spd switching]** ☐ **[No]** (nO): Function inactive, thereby preventing access to other parameters. ☐ **[Yes]** (YES): Permanent torque control ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. If the assigned input or bit is at 1: Torque control If the assigned input or bit is at 0: Speed regulation		[No] (nO)
trI nO AI1 AI2 LCC Mdb CAn nEt PG	**[Torque ref. channel]** ☐ **[No]** (nO): Not assigned (zero torque reference). ☐ **[AI1]** (AI1): Analog input ☐ **[AI2]** (AI2): Analog input ☐ **[HMI]** (LCC): Graphic display terminal ☐ **[Modbus]** (Mdb): Not applicable ☐ **[CANopen]** (CAN/PLK): Integrated communication interface (POWERLINK, CANopen) ☐ **[Com. card]** (nEt): Communication card (if inserted) ☐ **[Encoder]** (PG): Encoder input, if encoder card has been inserted 100% of the reference corresponds to 300% of the rated torque.		[No] (nO)
tSd nO LI1 - - -	**[Torque ref. sign]** ☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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.		[No] (nO)
trt ( )	**[Torque ratio]** Coefficient applied to [Torque reference] (tr1).	0 to 1000%	100%
trP ( )	**[Torque ramp time]** Rise and fall time for a variation of 100% of the rated torque.	0 to 99.99 s	3 s
tSt SPd YES SPn	**[Torque control stop]** ☐ **[Speed]** (SPd): Speed regulation stop, in accordance with the type of stop configuration (see page 125) ☐ **[Freewheel]** (YES): Freewheel stop ☐ **[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).		[Speed] (SPd)
SPt ( )	**[Spin time]** The parameter can be accessed if [Torque control stop] (tSt) = [Spin] (SPn) Spin time following stop, in order to remain ready to restart quickly.	0 to 3600 s	1

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

Code	Name/Description	Adjustment range	Factory setting
	[TORQUE CONTROL] (continued)		
dbP	**[Positive deadband]** 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	0 to 2 x [Max frequency] (tFr)	10 Hz
dbn	**[Negative deadband]** 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	0 to 2 x [Max frequency] (tFr)	10 Hz
rtO	**[Torque ctrl time out]** Time following automatic exit of torque control mode in the event of a fault or alarm.	0 to 999.9 s	60
tOb	**[Torq. ctrl fault mgt]** Response of drive once time [Torque ctrl time out] (rtO) has elapsed.		[Alarm] (ALrM)
ALrM	☐ **[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 217 = [No] (nO).
• Set both [Positive deadband] (dbP) and [Negative deadband] (dbn) to a value less than 10% of the rated motor frequency.

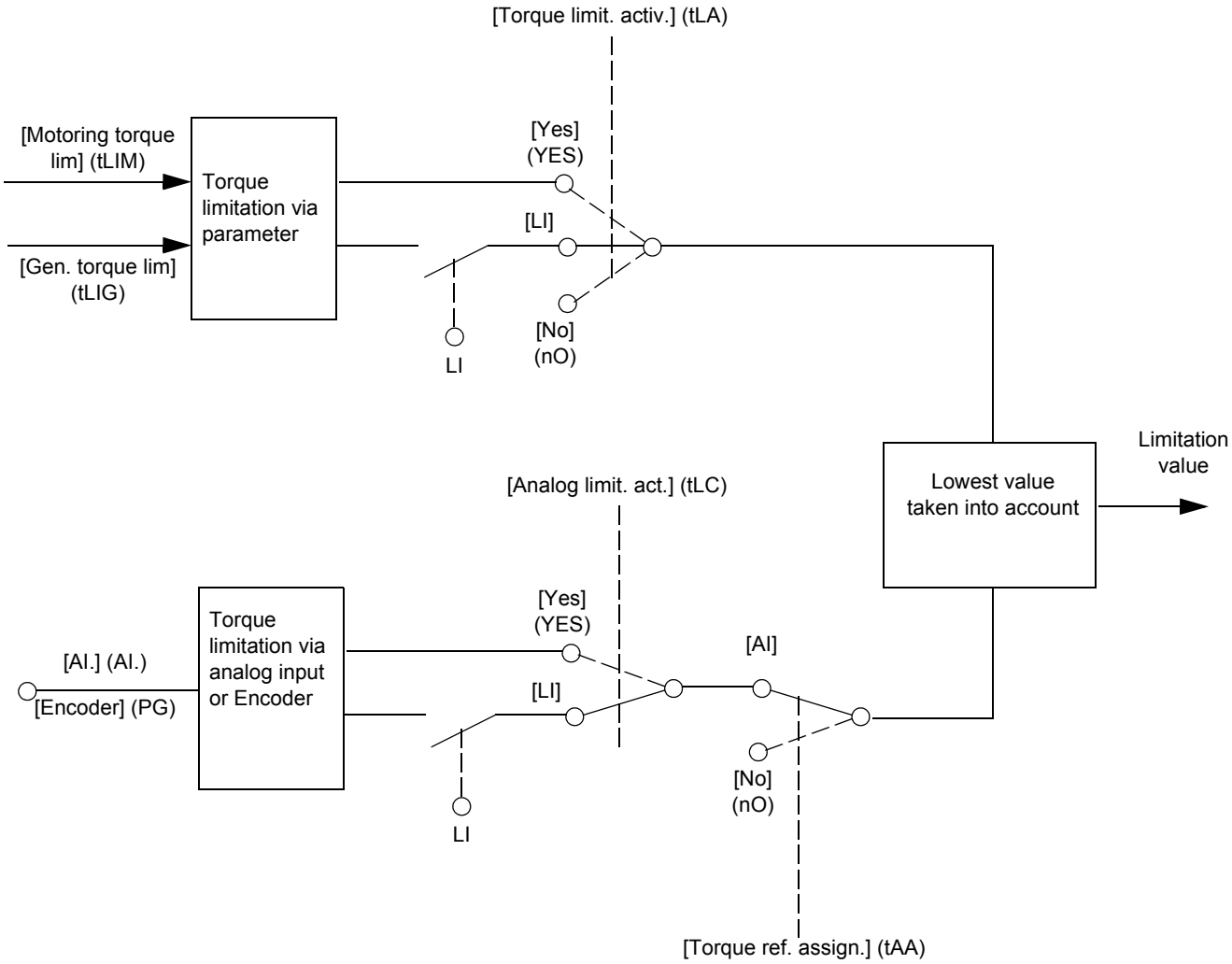
Parameter that can be modified during operation or when stopped.

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 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.



Code	Name/Description	Adjustment range	Factory setting
tOL-	**■ [TORQUE LIMITATION]** This function cannot be accessed in V/F profile mode.		
tLA nO YES LI1 - - -	**❑ [Torque limit. activ.]** ☐ **[No]** (nO): Function inactive ☐ **[Yes]** (YES): Function always active ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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.		[No] (nO)
InTP 0.1	**❑ [Torque increment]** 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) : unit 0.1%. ☐ **[1%]** (1): unit 1%.		[1 %] (1)
tLIN ( )	**❑ [Motoring torque lim]** (1) 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.	0 to 300%	100%
tLIG ( )	**❑ [Gen. torque lim]** (1) 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.	0 to 300%	100%
tAA nO AI1 AI2 PG AIV1	**❑ [Torque ref. assign.]** 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): Not assigned (function inactive) ☐ **[AI1]** (AI1) **[AI2]** (AI2): ☐ **[Encoder]** (PG): Encoder input, if encoder card has been inserted ☐ **[Network AI]** (AIV1): Virtual input via communication bus, to be configured via [AI net. channel] (AIC1) page 88.		[No] (nO)

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

If the equipment switches to forced local mode (see page 224), 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 can 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.

Code	Name/Description	Adjustment range	Factory setting
	■ [TORQUE LIMITATION] (continued)		
ELC	**❑ [Analog limit. act.]**		[Yes] (YES)

The parameter can be accessed if [Torque ref. assign.] (tAA) is not [No] (nO).

YES
LI1
-
-
-

- ☐ **[Yes]** (YES): The limitation depends on the input assigned by [Torque ref. assign.] (tAA).
- ☐ **[LI1]** (LI1)
  :
  :
- ☐ **[...]** (...): See the assignment conditions on page 108.

If the assigned input or bit is at 0:

- The limitation is specified by the [Motoring torque lim] (tLIM) and [Gen. torque lim.] parameters (tLIG) 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.

Code	Name/Description	Adjustment range	Factory setting
CL1-	**[2nd CURRENT LIMIT.]**		
LC2 nO LI1 - - -	**[Current limit 2]** ☐ **[No]** (nO): Function inactive. ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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.		[No] (nO)
CL2	**[I Limit. 2 value]** (1) 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 53 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 208). If it is less than the no-load motor current, the limitation no longer has any effect. **CAUTION** Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization. **Failure to follow this instruction can result in equipment damage.**	0 to 1.65 In (2)	1.5 In (2)
CL1	**[Current Limitation]** (1) First current limitation The adjustment range is limited to 1.36 In if [Switching freq.] (SFr) page 53 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 208). If it is less than the no-load motor current, the limitation no longer has any effect. **CAUTION** Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization. **Failure to follow this instruction can result in equipment damage.**	0 to 1.65 In (2)	1.5 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.

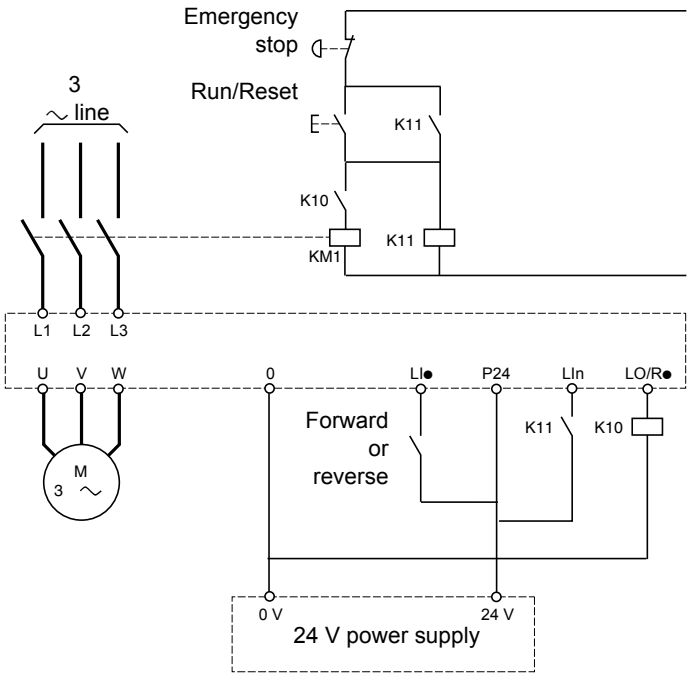
Parameter that can be modified during operation or when stopped.

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
This function can only be used for a small number of consecutive operations with a cycle time longer than 60 s (in order to avoid premature aging of the filter capacitor charging circuit). **Failure to follow this instruction can result in equipment damage.**

Code	Name/Description	Adjustment range	Factory setting
LLC-	**[LINE CONTACTOR COMMAND]**		
LLC	**[Line contactor ass.]**		[No] (nO)
nO r2 dO1	Logic output or control relay ☐ **[No]** (nO): Function not assigned (in this case, none of the function parameters can be accessed).. **[R2]** (r2) ☐ **[dO1]** (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 97 = [No] (nO).		
LES	**[Drive lock]**		[No] (nO)
nO LI1 - - -	☐ **[No]** (nO): Function inactive. ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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).		

Output contactor command

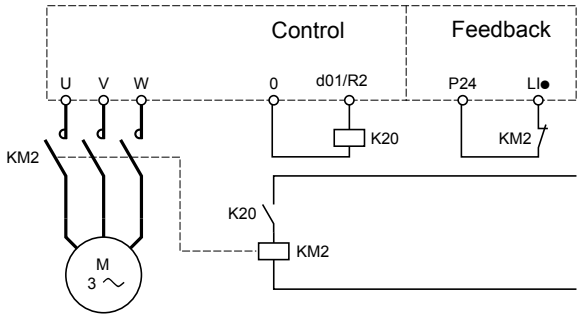
This allows the drive to control a contactor located between the drive and the motor. The request for the contactor to close is made when a run command is sent. The request for the contactor to open is made when there is no longer any current in the motor.

CAUTION
If a DC injection braking function has been configured it should not be left operating too long in stop mode, as the contactor only opens at the end of braking. **Failure to follow this instruction can result in 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.

Note:
Fault FCF2 (contactor failing to close) can be reset by the run command changing state from 1 to 0 (0 --> 1 --> 0 in 3-wire control).



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

Code	Name/Description	Adjustment range	Factory setting
OCC-	**[OUTPUT CONTACTOR CMD]**		
OCC nO r2 dO1	**[Out. contactor ass.]** Logic output or control relay ☐ **[No]** (nO): Function not assigned (in this case, none of the function parameters can be accessed). **[R2]** (r2) ☐ **[dO1]** (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 97 = [No] (nO).		[No] (nO)
rCA nO LI1 - - -	**[Output contact. fdbk]** ☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) : : ☐ **[...]** (...) : See the assignment conditions on page 108. The motor starts up when the assigned input or bit changes to 0.		[No] (nO)
dbS ( )	**[Delay to motor run]** 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.	0.05 to 60 s	0.15
dAS ( )	**[Delay to open cont.]** 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.	0 to 5.00 s	0.10

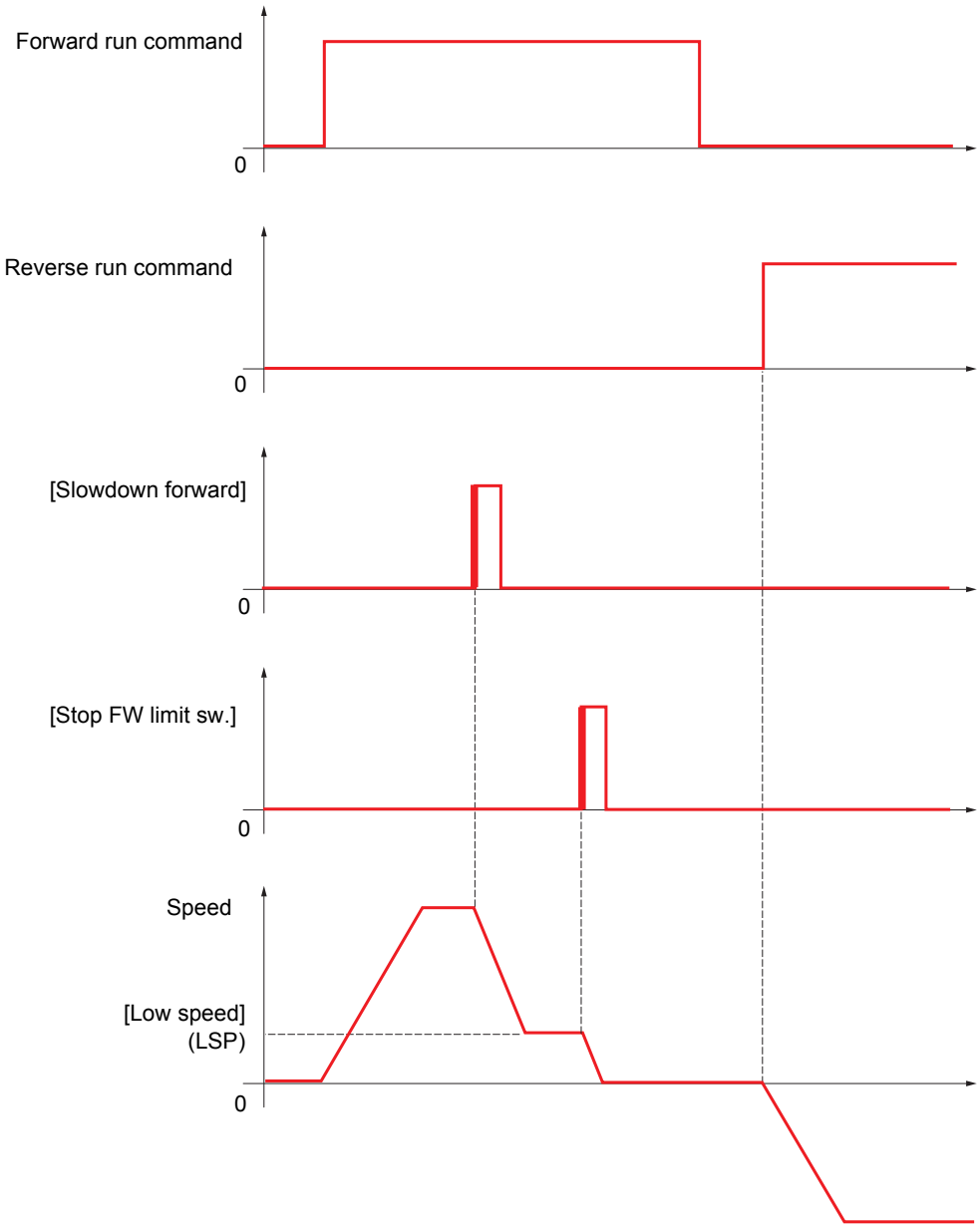
( ) Parameter that can be modified during operation or when stopped.

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:

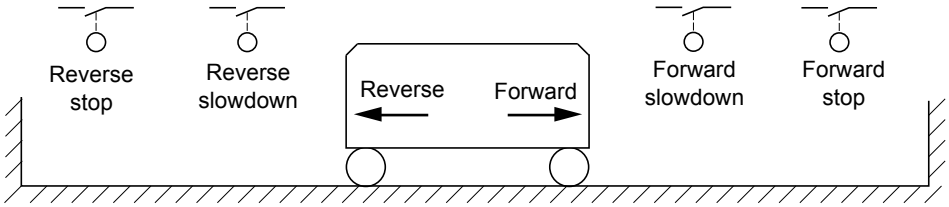


The slowdown mode and stop mode can be configured.
The operation is identical for both directions of operation. Slowdown and stopping operate according to the same logic, described below.

Example: Forward slowdown, on rising edge

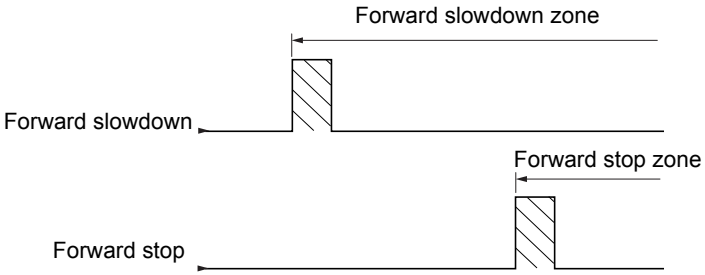
- Forward slowdown takes place on a rising edge (change from 0 to 1) of the input or bit assigned to forward slowdown if this rising edge occurs in forward operation. The slowdown command is then memorized, even in the event of a power outage. Operation in the opposite direction is authorized at high 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.

Example: Positioning on a limit switch, on rising edge



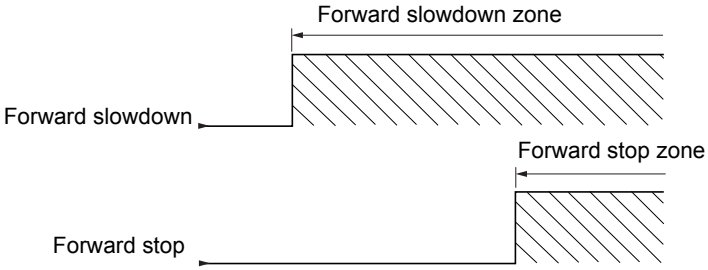
Operation with short cams:

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.

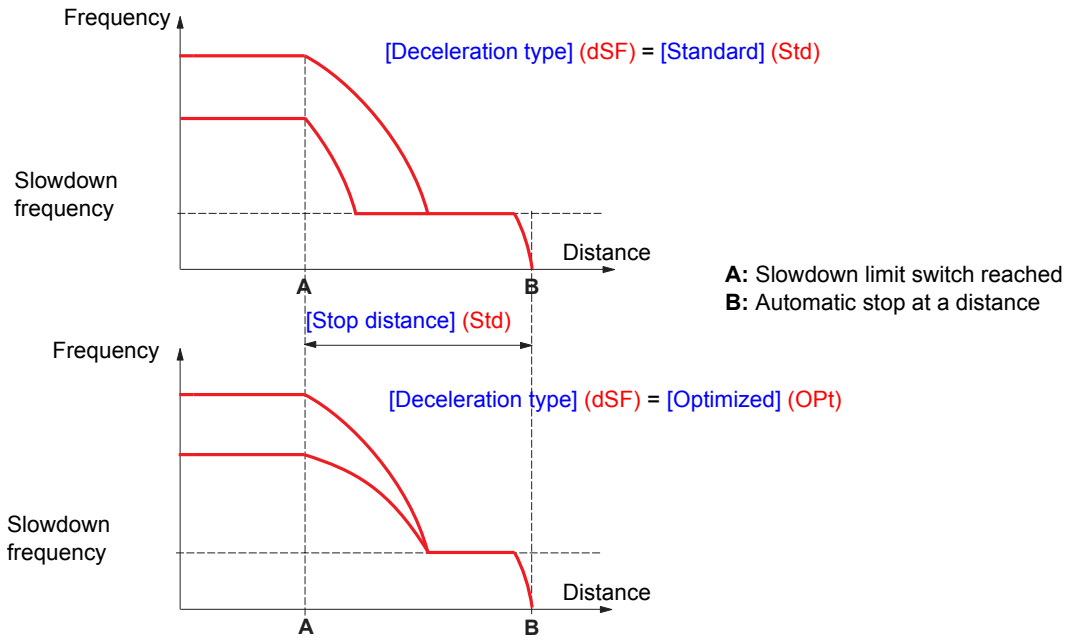


Stop at distance calculated after deceleration limit switch

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 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.

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⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Check that the parameters configured are consistent (in particular, you should check that the required distance is possible).
- This function does not replace the stop limit switch, which remains necessary for safety reasons.

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

Code	Name/Description	Adjustment range	Factory setting
LPO-	**[POSITIONING BY SENSORS]** **Note:** This function cannot be used with certain other functions. Follow the instructions on page 114.		
SAF	**[Stop FW limit sw.]** ☐ **[No]** (nO): Not assigned ☐ **[LI1]** (LI1) to **[LI6]** (LI6) ☐ **[C101]** (C101) to **[C115]** (C115): Not applicable ☐ **[C201]** (C201) to **[C215]** (C215): With integrated communication interface in [I/O profile] (IO) ☐ **[C301]** (C301) to **[C315]** (C315): With a communication card in [I/O profile] (IO) ☐ **[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		[No] (nO)
SAr	**[Stop RV limit sw.]** Same assignments possible as for [Stop FW limit sw.] (SAF) above.		[No] (nO)
SAL	**[Stop limit config.]** 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. ☐ **[Active low]** (LO): Stop controlled on a falling edge (change from 1 to 0) of the assigned bits or inputs. ☐ **[Active high]** (HIG): Stop controlled on a rising edge (change from 0 to 1) of the assigned bits or inputs.		[Active high] (HIG)
dAF	**[Slowdown forward]** Same assignments possible as for [Stop FW limit sw.] (SAF) above.		[No] (nO)
dAr	**[Slowdown reverse]** Same assignments possible as for [Stop FW limit sw.] (SAF) above.		[No] (nO)
dAL	**[Slowdown limit cfg.]** 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. ☐ **[Active low]** (LO): Slowdown controlled on a falling edge (change from 1 to 0) of the assigned bits or inputs. ☐ **[Active high]** (HIG): Slowdown controlled on a rising edge (change from 0 to 1) of the assigned bits or inputs.		[Active high] (HIG)

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): Not assigned ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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. ☐ **[Ramp stop]** (rMP): On ramp ☐ **[Fast stop]** (FSt): Fast stop (ramp time reduced by [Ramp divider] (dCF), see page 125) ☐ **[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. ☐ **[Standard]** (Std): Uses the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp (depending on which has been enabled). ☐ **[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): 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.		

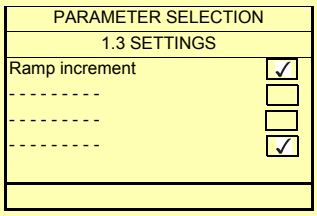
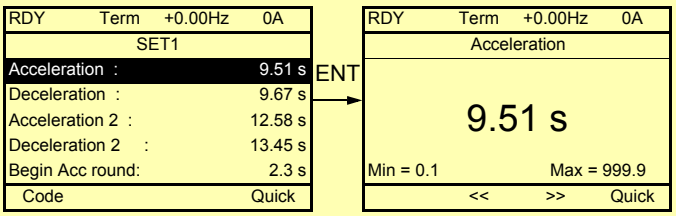
Parameter set switching [PARAM. SET SWITCHING]

A set of 1 to 15 parameters from the [1.3 SETTINGS] (SEt-) menu on page 46 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).

	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	0	1	0 or 1
Input LI or bit	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.

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 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.

Code	Name/Description	Adjustment range	Factory setting
nLP-	**[PARAM. SET SWITCHING]**		
CHA1	**[2 parameter sets]** ☐ **[No]** (nO): Function inactive. ☐ **[Freq. Th.att.]** (FtA): Switching via [Freq. threshold] (Ftd) page 59. ☐ **[Freq. Th. 2 attain.]** (F2A): Switching via [Freq. threshold 2] (Ftd) page 59. ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. Switching 2 parameter sets		[No] (nO)
CHA2	**[3 parameter sets]** ☐ **[No]** (nO): Function inactive. ☐ **[Freq. Th.att.]** (FtA): Switching via [Freq. threshold] (Ftd) page 59. ☐ **[Freq. Th. 2 attain.]** (F2A): Switching via [Freq. threshold 2] (Ftd) page 59. ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. Switching 3 parameter sets **Note:** In order to obtain 3 parameter sets, [2 parameter sets] must also be configured.		[No] (nO)
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.		

Code	Name/Description	Adjustment range	Factory setting
	■ [PARAM. SET SWITCHING] (continued)		
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).

[1.7 APPLICATION FUNCT.] (FUn-)

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 228.
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:

- Switching may only take place when stopped (drive locked). If a switching request is sent during operation, it will not be executed until the next stop.
- 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

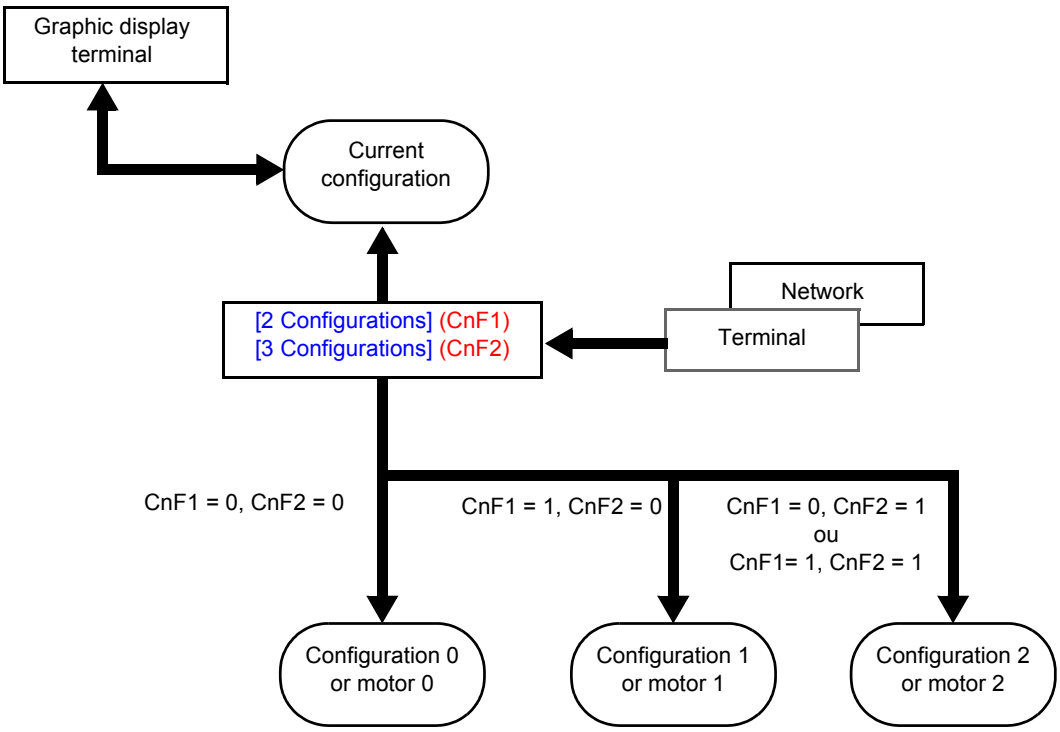
Note: No other menus or parameters can be switched.

Transfer of a drive configuration to another one, with graphic display terminal, when the drive uses [MULTIMOTORS/CONFIG.] function

Let A be the source drive and B the drive addressed. In this example, switching are controled by logic input.

1. Connect graphic display terminal to the drive A.
2. Put logic input LI ([2 Configurations] (CnF1)) and LI ([3 Configurations] (CnF2)) to 0.
3. Download configuration 0 in a file of graphic display terminal (example : file 1 of the graphic display terminal).
4. Put logic input LI ([2 Configurations] (CnF1)) to 1 and leave logic input LI ([3 Configurations] (CnF2)) to 0.
5. Download configuration 1 in a file of graphic display terminal (example : file 2 of the graphic display terminal).
6. Put logic input LI ([3 Configurations] (CnF2)) to 1 and leave logic input LI ([2 Configurations] (CnF1)) to 1.
7. Download configuration 2 in a file of graphic display terminal (example : file 3 of the graphic display terminal).
8. Connect graphic display terminal to the drive B.
9. Put logic input LI ([2 Configurations] (CnF1)) and LI ([3 Configurations] (CnF2)) to 0.
10. Make a factory setting of the drive B.
11. Download the configuration file 0 in the drive (file 1 of graphic display terminal in this example).
12. Put logic input LI ([2 Configurations] (CnF1)) to 1 and leave logic input LI ([3 Configurations] (CnF2)) to 0.
13. Download the configuration file 1 in the drive (file 2 of graphic display terminal in this example).
14. Put logic input LI ([3 Configurations] (CnF2)) to 1 and leave logic input LI ([2 Configurations] (CnF1)) to 1.
15. Download the configuration file 2 in the drive (file 3 of graphic display terminal in this example).

Nota: Steps 6, 7, 14 et 15 are necessary only if [MULTIMOTORS/CONFIG.] function is used with 3 configurations or 3 motors.

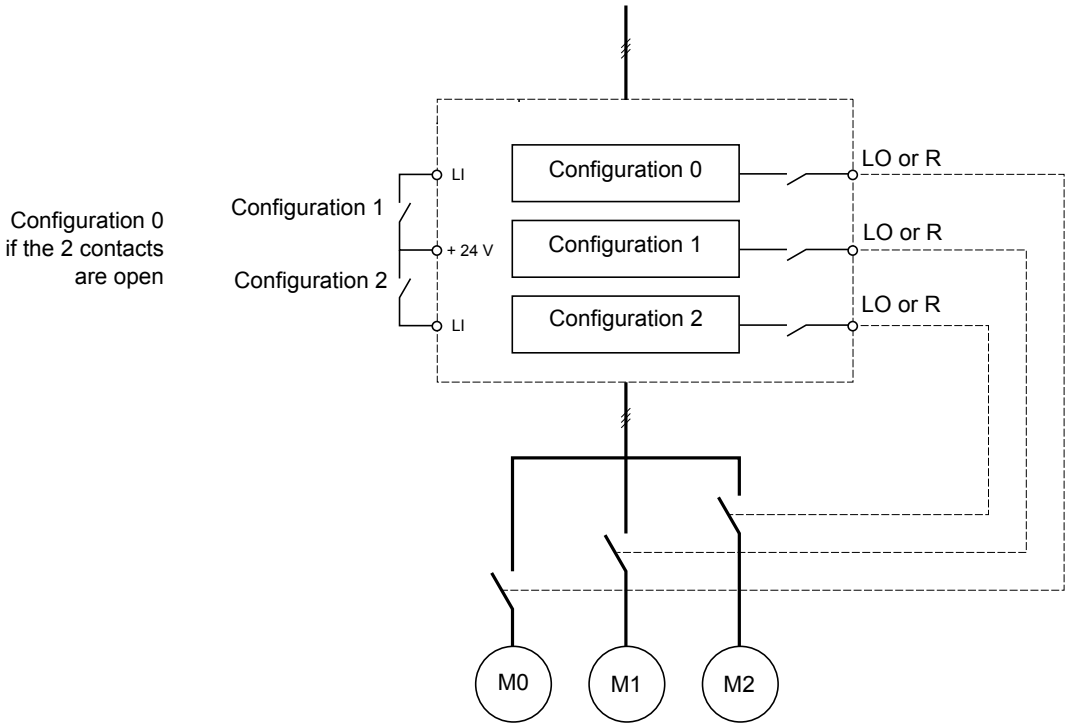


Switching command

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 62 = [Yes] (YES).

Motor thermal states in multimotor mode:

The drive protects 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.

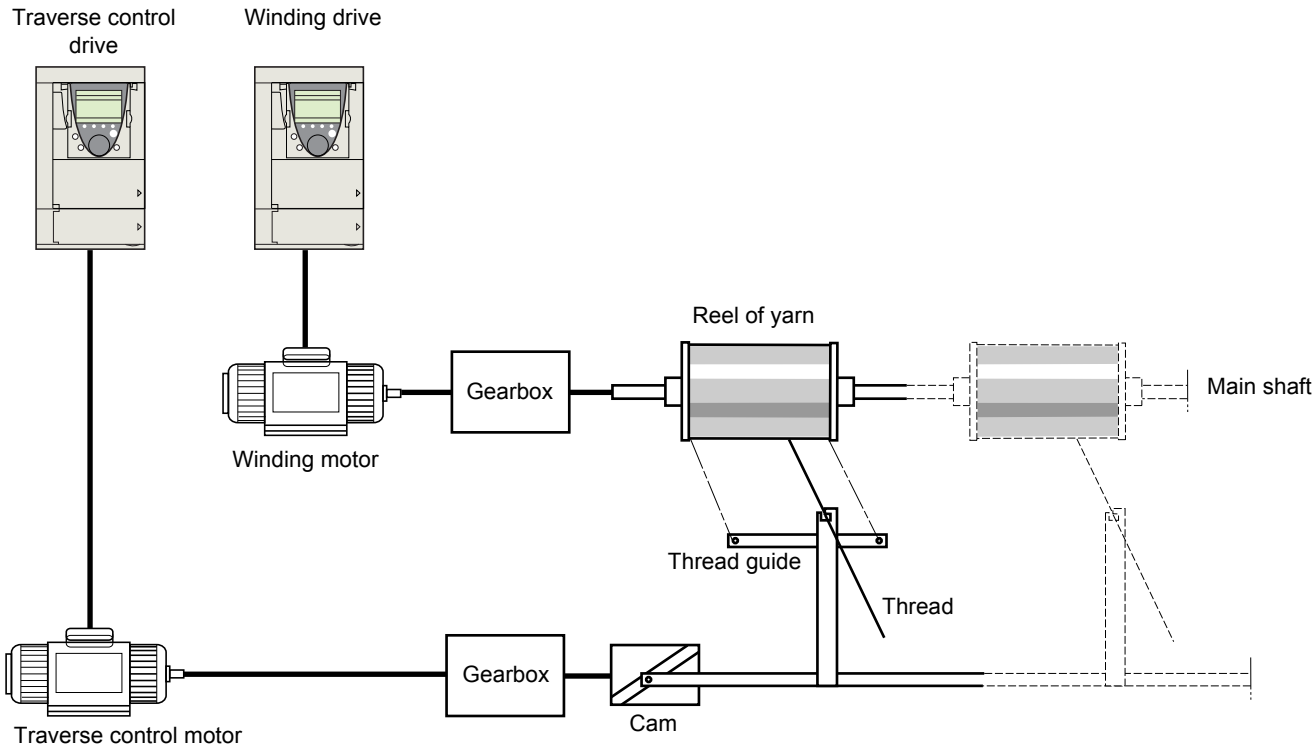
[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
nnC-	**[MULTIMOTORS/CONFIG.]**		
CHn	**[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)		
C111	☐ **[C111]** (C111) to **[C115]** (C115): Not applicable		
-	☐ **[C211]** (C211) to **[C215]** (C215): With integrated communication interface		
-	☐ **[C311]** (C311) to **[C315]** (C315): With a communication card		
	Switching of 2 motors or 2 configurations		
CnF2	**[3 Configurations]**		[No] (nO)
nO	☐ **[No]** (nO): No switching		
LI1	☐ **[LI1]** (LI1) to **[LI6]** (LI6)		
C111	☐ **[C111]** (C111) to **[C115]** (C115): Not applicable		
-	☐ **[C211]** (C211) to **[C215]** (C215): With integrated communication interface		
-	☐ **[C311]** (C311) to **[C315]** (C315): With a communication 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.		

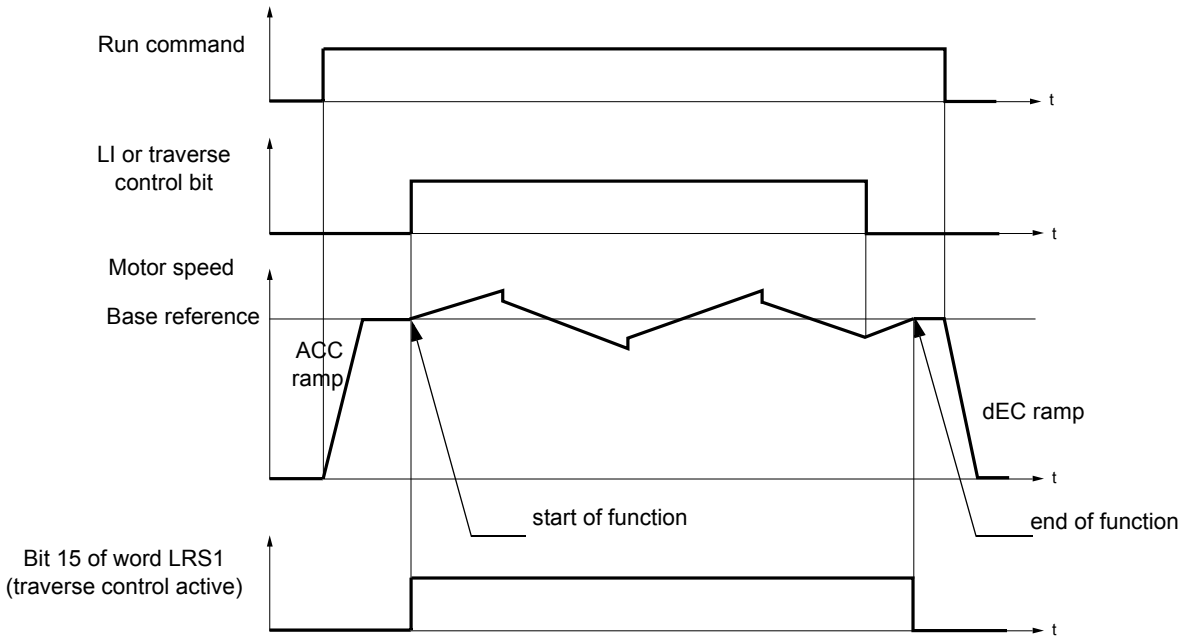
Code	Name/Description	Adjustment range	Factory setting
tnL-	**[AUTO TUNING BY LI]**		
tUL	**[Auto-tune assign.]**		[No] (nO)
nO	☐ **[No]** (nO): Not assigned		
LI1	☐ **[LI1]** (LI1)		
-	:		
-	:		
-	☐ **[...]** (...): See the assignment conditions on page 108.		
	Auto-tuning is performed when the assigned input or bit changes to 1.		
	Note: Auto-tuning causes the motor to start up.		

Traverse control

Function for winding reels of yarn (in textile applications)



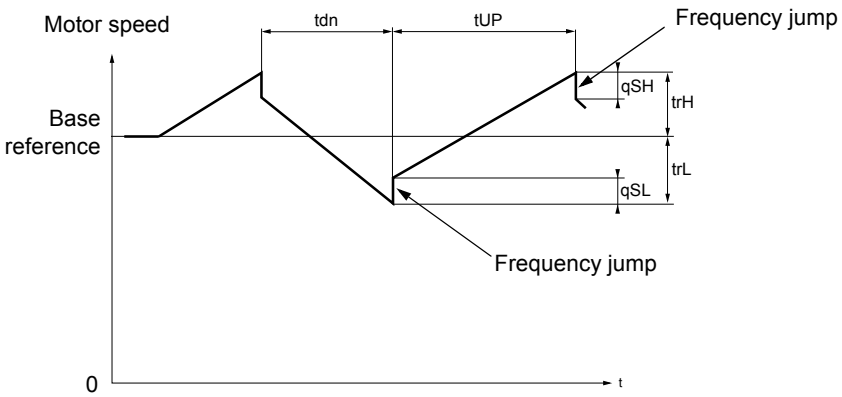
The speed of rotation of the cam must follow a precise profile to ensure that the reel is steady, compact and linear:



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.

Function parameters:

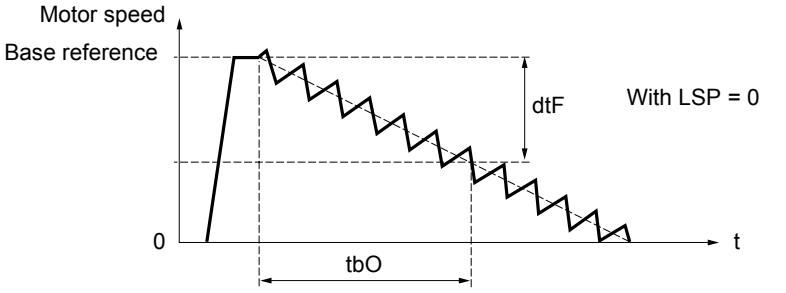
These define the cycle of frequency variations around the base reference, as shown in the diagram below:

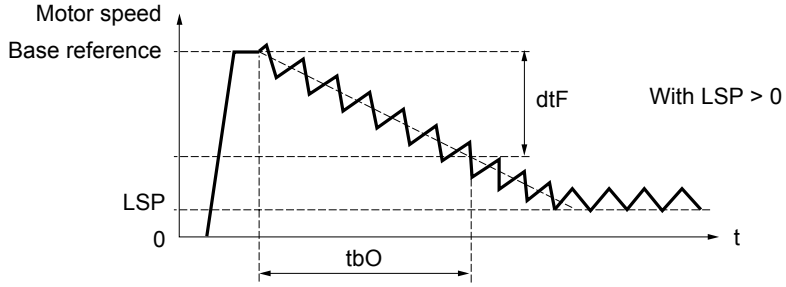


- trC: [Yarn control]: Assignment of the traverse control command to a logic input or to a communication bus control word bit
- tdn: [Traverse ctrl. decel] time, in seconds
- tUP: [Traverse ctrl. accel.] time, in seconds
- trH: [Traverse freq. high], in Hertz
- trL: [Traverse Freq. Low], in Hertz
- qSH: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

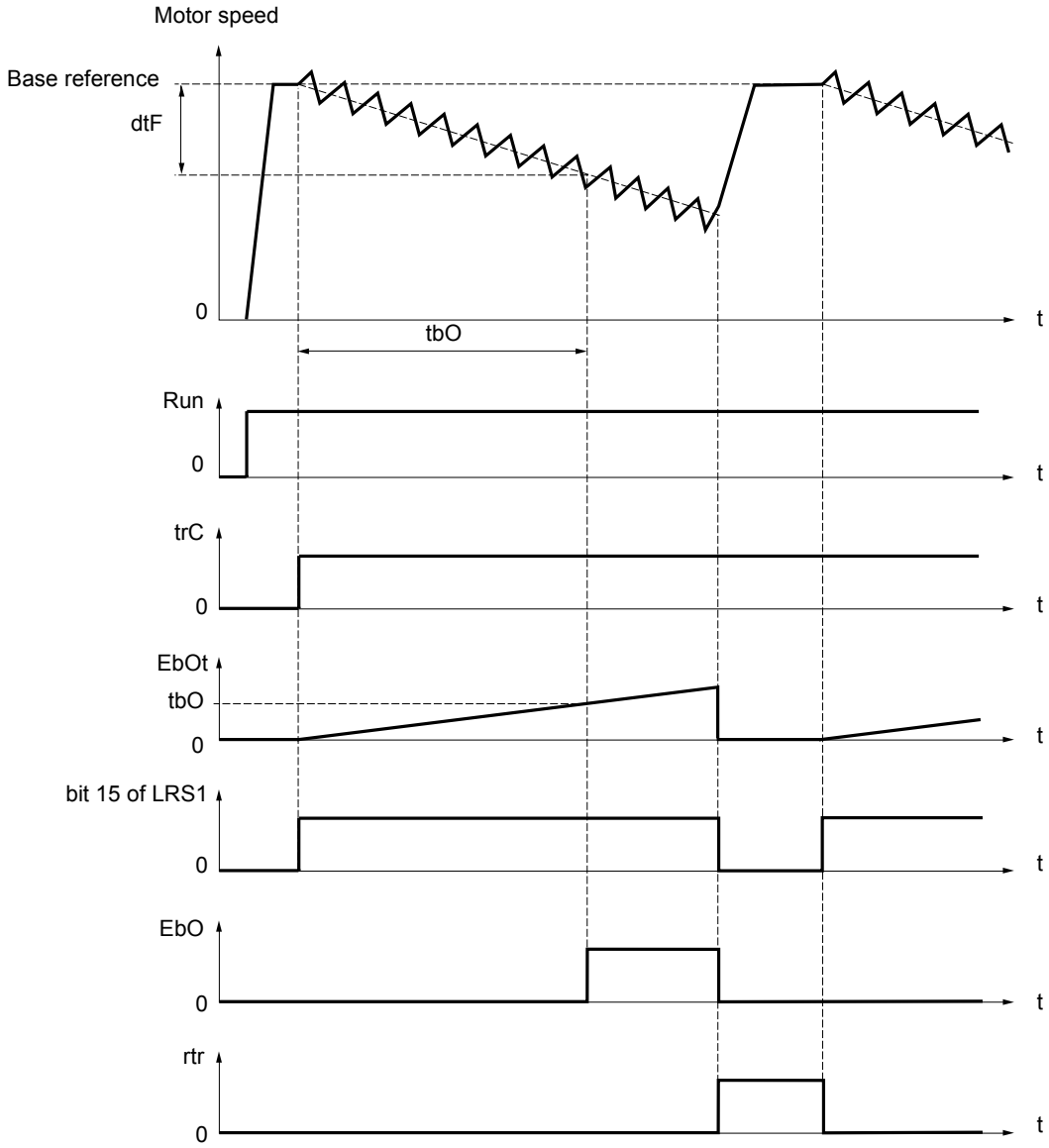
Reel parameters:

- 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.

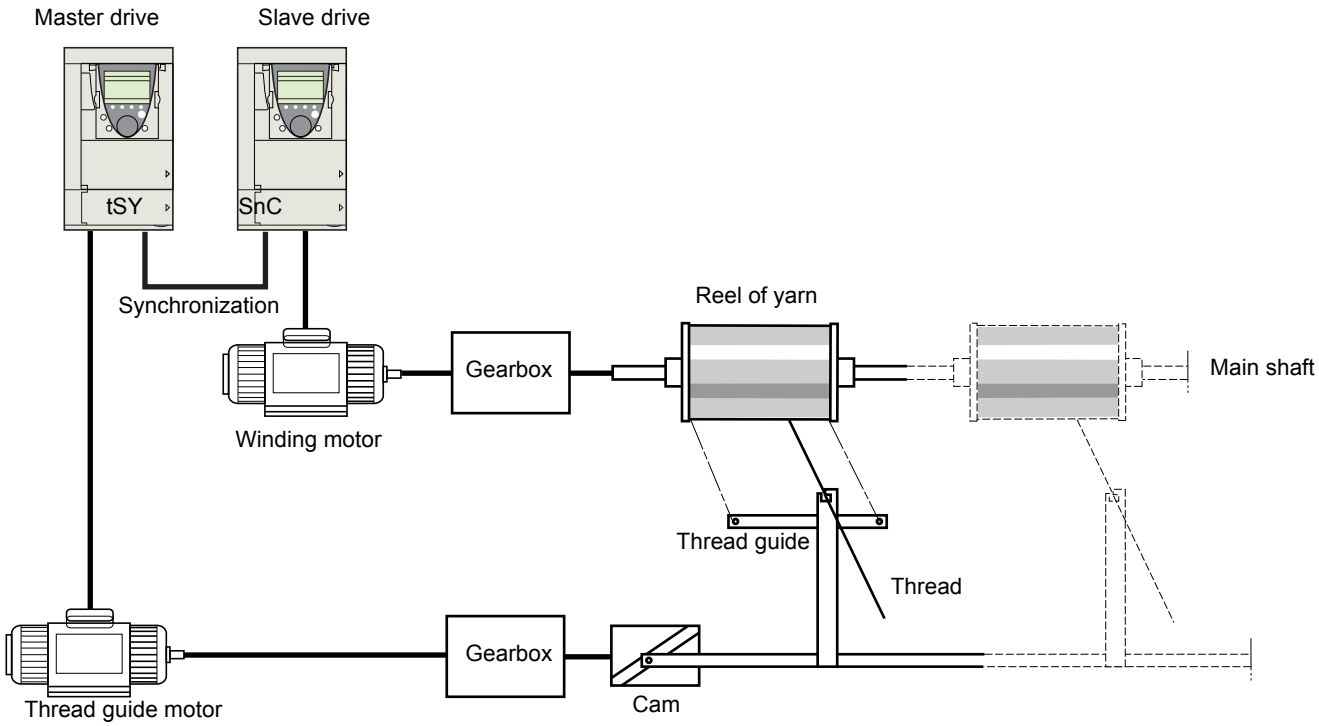




- rtr: [Init. traverse ctrl] Reinitialize traverse control.
  This command can be assigned to a logic input or to a communication bus control word bit. It resets the EbO alarm and the EbOt operating time to zero and reinitializes the reference to the base reference. As long as rtr remains at 1, the traverse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



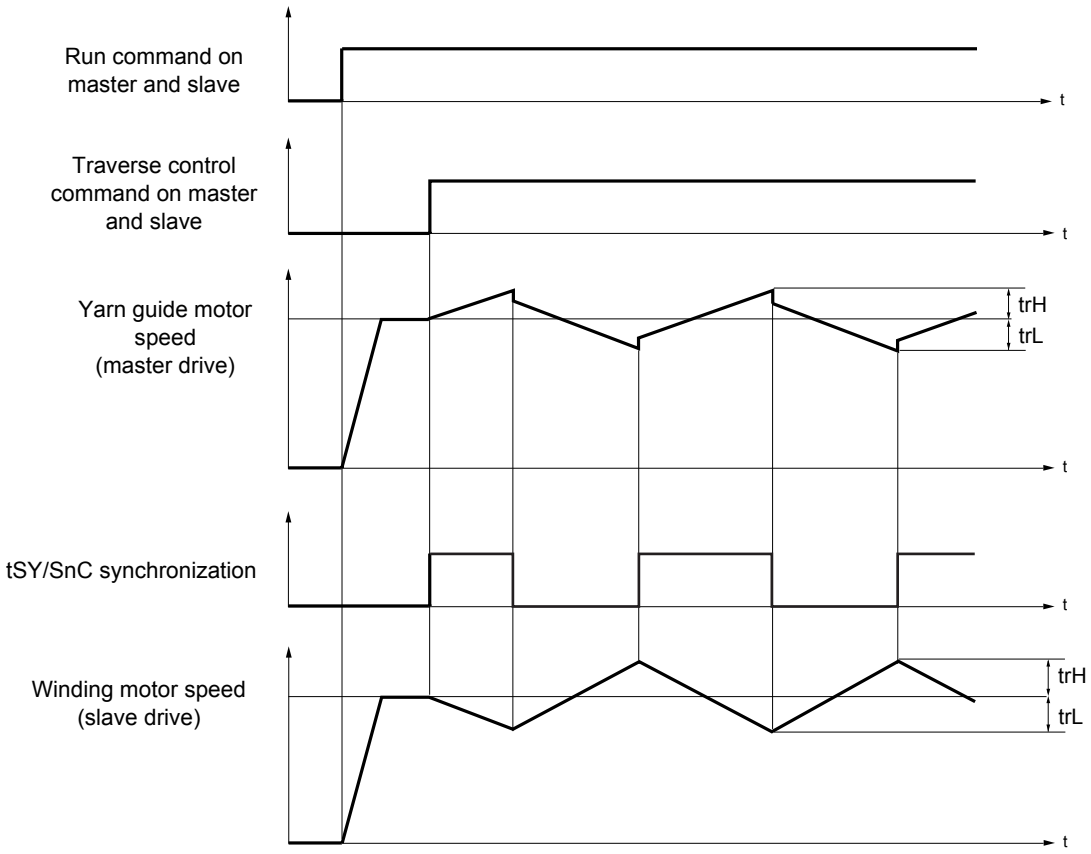
Counter wobble



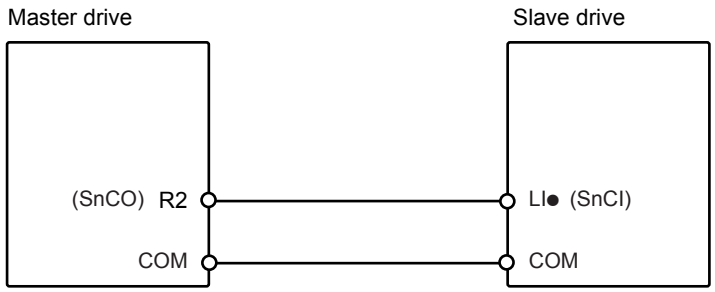
The "Counter wobble" function is used in certain applications to obtain a constant yarn tension when the "Traverse control" function is producing considerable variations in speed on the yarn guide motor (trH and trL, see page 196).

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.



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.

Code	Name/Description		Adjustment range	Factory setting
trO-	**[TRAVERSE CONTROL]** **Note:** This function cannot be used with certain other functions. Follow the instructions on page 114.			
trC nO LI1 - - -	**[Yarn control]** ☐ **[No]** (nO): Function inactive, thereby preventing access to other parameters. ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. The "traverse control" cycle starts when the assigned input or bit changes to 1 and stops when it changes to 0.			[No] (nO)
trH ()	**[Traverse freq. high]**	(1)	0 to 10 Hz	4 Hz
trL ()	**[Traverse Freq. Low]**	(1)	0 to 10 Hz	4 Hz
qSH ()	**[Quick step High]**	(1)	0 to [Traverse freq. high] (trH)	0 Hz
qSL ()	**[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
tbO ()	**[Reel time]** Reel execution time		0 to 9999 minutes	0 minute
EbO nO r2 dO1	**[End reel]** ☐ **[No]** (nO): Function not assigned. ☐ **[R2]** (r2) ☐ **[dO1]** (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 97 = [No] (nO). The assigned output or relay changes to state 1 when the traverse control operating time reaches the [Reel time] (tbO).			[No] (nO)

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

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

Code	Name/Description	Adjustment range	Factory setting
	[TRAVERSE CONTROL] (continued)		
SnC nO LI1 - - -	**[Counter wobble]** ☐ **[No]** (nO): Function not assigned. ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. Synchronization input. To be configured on the winding drive (slave) only.		[No] (nO)
tSY nO r2 dO1	**[Sync. wobble]** ☐ **[No]** (nO): Function not assigned. ☐ **[R2]** (r2) ☐ **[dO1]** (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 97 = [No] (nO). Synchronization output. To be configured on the yarn guide drive (master) only.		[No] (nO)
dtF ( )	**[Decrease ref. speed]** Decrease in the base reference during the traverse control cycle.	0 to 1600 Hz	0 Hz
rtr nO LI1 - - -	**[Init. traverse ctrl]** ☐ **[No]** (nO): Function not assigned. ☐ **[LI1]** (LI1) : : ☐ **[...]** (...): See the assignment conditions on page 108. 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).		[No] (nO)

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

Evacuation function

The evacuation function is designed for "elevator" applications. It is only accessible for drives 8I84T400075.01P-1 to 8I84T407500.01P-1.
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

- 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.

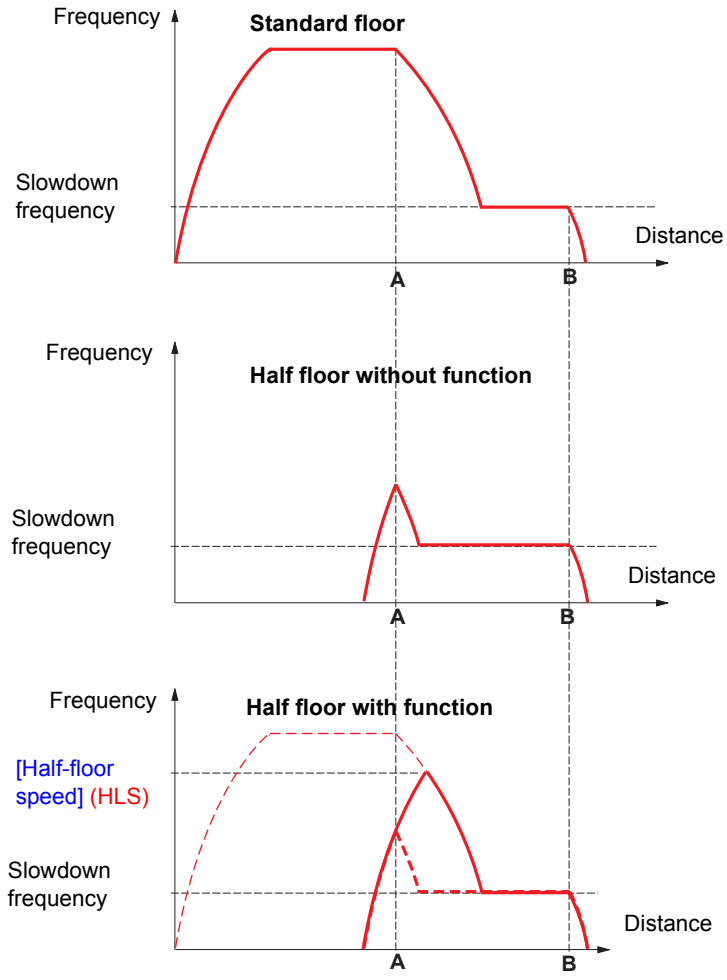
Code	Name/Description	Adjustment range	Factory setting
rFt-	**■ [EVACUATION]** Function only accessible for drives 8I84T400075.01P-1 to 8I84T407500.01P-1.		
rFt nO LI1 - LI6	**❑ [Evacuation assign.]** ☐ **[No]** (nO): Function not assigned. ☐ **[LI1]** (LI1) to **[LI6]** (LI6) Evacuation is activated 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.		[No] (nO)
rSU	**❑ [Evacuation Input V.]** Minimum permissible AC voltage value of the emergency power supply. The parameter can be accessed if [Evacuation assign.] (rFt) is not [No] (nO). • 8I84T4*****.01P-1: range from 220 to 320 V, factory setting 220 V.	220 to 320 V	220 V
rSP ( )	**❑ [Evacuation freq.]** 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 48), [Rated motor freq.] (FrS) and [Rated motor volt.] (UnS) (page 61) parameters and by [Evacuation Input V.] (rSU) above. • 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).		5 Hz

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

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	Adjustment range	Factory setting
HFF-	**[HALF FLOOR]**		
HLS	**[Half-floor speed]** 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): 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.		[No] (nO)

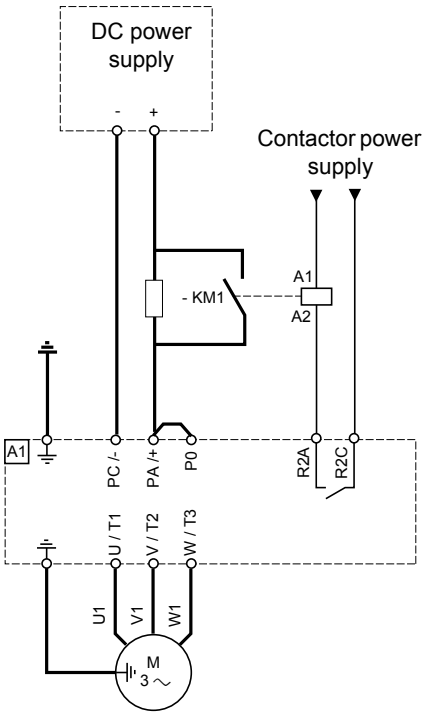
Direct power supply via DC bus

This function is only accessible for drives with power rating ⩾ 18.5 kW.

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 B&R 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 input on the drive.

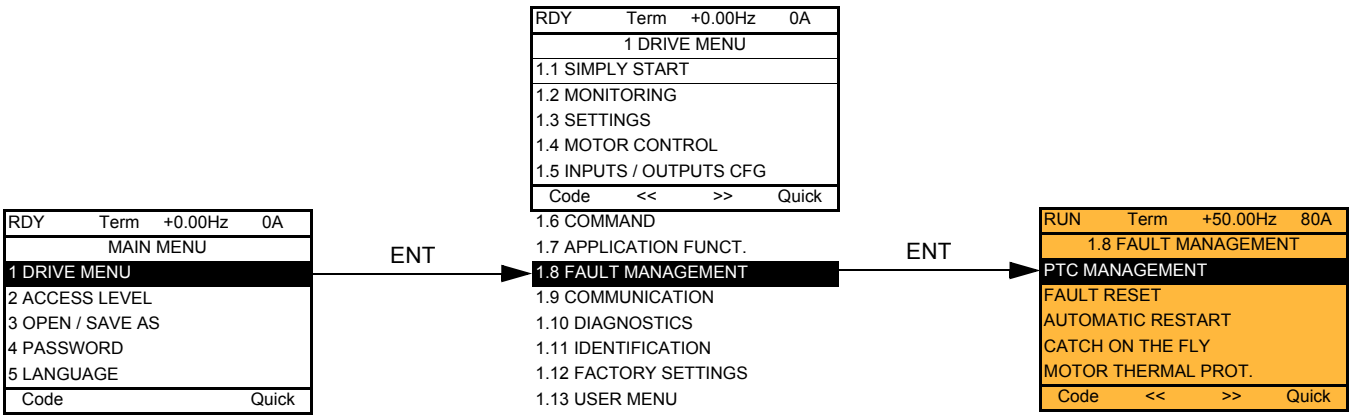
Example circuit using R2 relay:



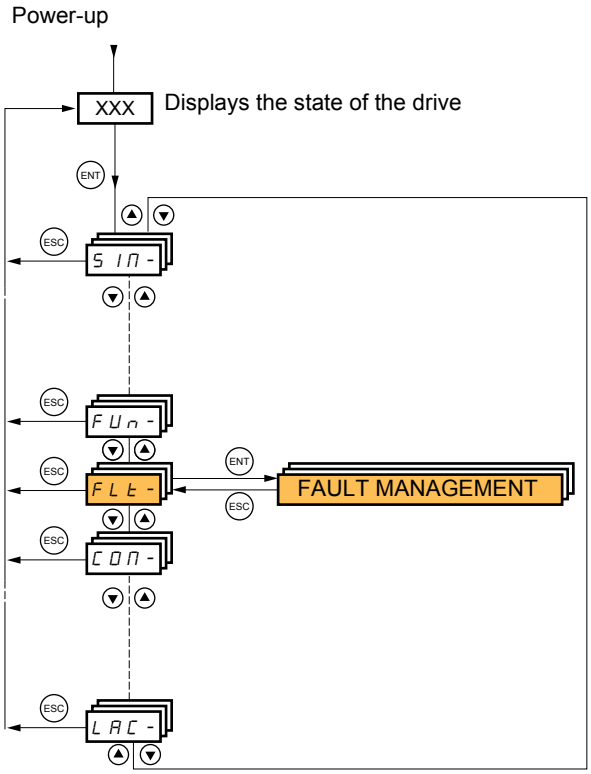
Code	Name/Description	Adjustment range	Factory setting
dCO-	**[DC BUS SUPPLY]** This function is only accessible for drives with a power rating ⩾ 18.5 kW.		
dCO	**[Precharge cont. ass.]** Logic output or control relay ☐ **[No]** (nO): Function not assigned. ☐ **[R2]** (r2) **[dO1]** (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 97 = [No] (nO). nO r2 dO1		[No] (nO)

[1.8 FAULT MANAGEMENT] (FLt-)

With graphic display terminal:



With integrated display terminal:



Summary of functions:

Code	Name	Page
PtC-	[PTC MANAGEMENT]	203
rSt-	[FAULT RESET]	204
Atr-	[AUTOMATIC RESTART]	205
FLr-	[CATCH ON THE FLY]	206
tHt-	[MOTOR THERMAL PROT.]	208
OPL-	[OUTPUT PHASE LOSS]	208
IPL-	[INPUT PHASE LOSS]	209
OHL-	[DRIVE OVERHEAT]	209
SAt-	[THERMAL ALARM STOP]	210
EtF-	[EXTERNAL FAULT]	211
USb-	[UNDERVOLTAGE MGT]	212
t It-	[IGBT TESTS]	213
LFL-	[4-20mA LOSS]	214
InH-	[FAULT INHIBITION]	215
CLL-	[COM. FAULT MANAGEMENT]	216
Sdd-	[ENCODER FAULT]	217
t Id-	[TORQUE OR I LIM. DETECT]	217
dLd-	[DYNAMIC LOAD DETECT.]	158
brP-	[DB RES. PROTECTION]	218
bUF-	[BU PROTECTION]	218
tnF-	[AUTO TUNING FAULT]	218
PPI-	[CARDS PAIRING]	219
LFF-	[FALLBACK SPEED]	220
FSt-	[RAMP DIVIDER]	220
dCI-	[DC INJECTION]	220

[1.8 FAULT MANAGEMENT] (FLt-)

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 protect the motors:

- 1 on logic input LI6 converted for this use by switch "**SW4 and SW5**" on the control card.

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).

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
PtC-	**[PTC MANAGEMENT]**		
PtCL	**[LI6 = PTC probe]**		[No] (nO)
	Can be accessed if switch **SW4 and SW5** 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.		

Code	Name/Description	Adjustment range	Factory setting
rSt-	**[FAULT RESET]**		
rSF	**[Fault reset]**		[No] (nO)
nO LI1 C101 - - Cd00 -	Manual fault reset ☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) to **[LI6]** (LI6) ☐ **[C101]** (C101) to **[C115]** (C115): Not applicable ☐ **[C201]** (C201) to **[C215]** (C215): With integrated communication interface in [I/O profile] (IO) ☐ **[C301]** (C301) to **[C315]** (C315): With a communication card in [I/O profile] (IO) ☐ **[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 250 to 254 for a list of faults that can be reset manually.		
rP	**[Product reset]**		[No] (nO)
nO YES	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): Function inactive ☐ **[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. **CAUTION** Make sure that the cause of the fault that led to the drive locking has been removed before reinitializing. **Failure to follow this instruction can result in equipment damage.**		
rPA	**[Product reset assig.]**		[No] (nO)
nO LI1 - LI6	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): Function inactive ☐ **[LI1]** (LI1) to **[LI6]** (LI6) To assign reinitialization, press and hold down the "ENT" key for 2 s. **CAUTION** Make sure that the cause of the fault that led to the drive locking has been removed before reinitializing. **Failure to follow this instruction can result in equipment damage.**		

Code	Name/Description	Adjustment range	Factory setting
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 drive 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 81).		
	⚠ WARNING **UNINTENDED EQUIPMENT OPERATION** **Check that an automatic restart will not endanger personnel or equipment in any way.** **Failure to follow these instructions can 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 253:		
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.		

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 114.		
FLr	**[Catch on the fly]** Used to enable a smooth restart if the run command is maintained after the following events: • Loss of line supply or disconnection • Reset of current fault or automatic restart • Freewheel stop. The speed given by the drive resumes from the estimated speed of the motor at the time of the restart, then follows the ramp to the reference speed. This function requires 2-wire level control. 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 145) or if [Motor control type] (Ctt) page 63 = [FVC] (FUC) or if, in open-loop control, [Auto DC injection] (AdC) page 127 = [Continuous] (Ct).		[No] (nO)
UCb	**[Sensitivity]** Parameter accessible at and above 8I84T409000.01P-1. 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.	0.4 to 15%	0.6%

Parameter that can be modified during operation or when stopped.

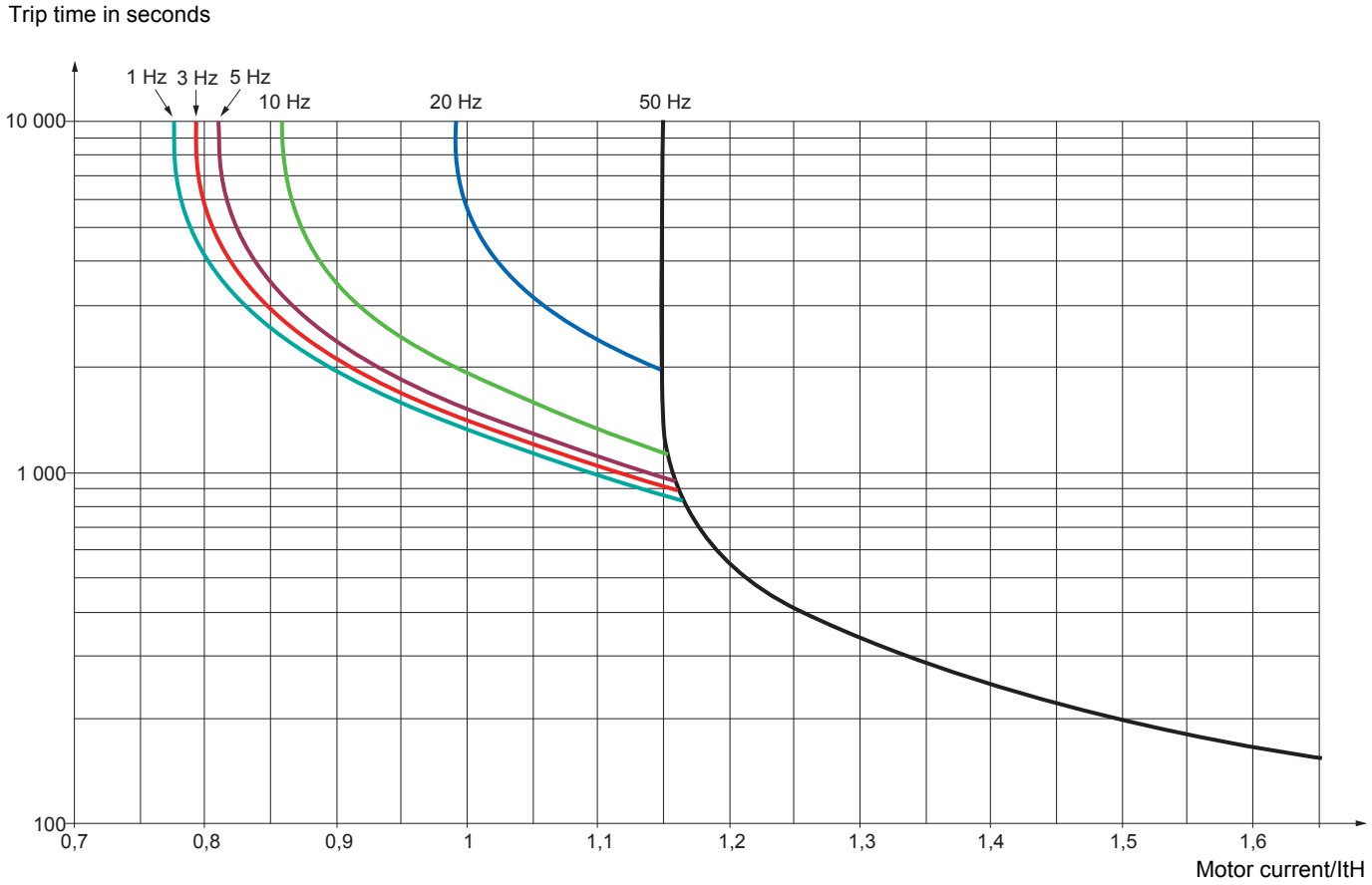
Motor thermal protection

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.



[1.8 FAULT MANAGEMENT] (FLt-)

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) Trip threshold for motor thermal alarm (logic output or relay)	0 to 118%	100%
ttd2	**[Motor2 therm. level]** Trip threshold for motor 2 thermal alarm (logic output or relay)	0 to 118%	100%
ttd3	**[Motor3 therm. level]** Trip threshold for motor 3 thermal alarm (logic output or relay)	0 to 118%	100%
OLL	**[Overload fault mgt]**		[Freewheel] (YES)
	Type of stop in the event of a motor thermal fault.		
nO	☐ **[Ignore]** (nO): Fault ignored.		
YES	☐ **[Freewheel]** (YES): Freewheel stop.		
Stt	☐ **[Per STT]** (Stt): Stop according to configuration of [Type of stop] (Stt) page 125, 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 81 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 114.		
OPL-	**[OUTPUT PHASE LOSS]**		
OPL	**[Output Phase Loss]**		[Yes] (YES)
nO	☐ **[No]** (nO): Function inactive		
YES	☐ **[Yes]** (YES): Tripping on OPF fault with freewheel stop.		
OAC	☐ **[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). **Note:** [Output phase loss] (OPL) is forced to [No] (nO) if [Motor control type] (Ctt) page 63 = [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 145).		
Odt	**[OutPh time detect]** Time delay for taking the [Output Phase Loss] (OPL) fault into account.	0.5 to 10 s	0.5 s

(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.

IPL- ■ [INPUT PHASE LOSS]

IPL ❏ [Input phase loss]

According to drive rating

- nO ☐ **[Ignore]** (nO): Fault ignored, to be used when the drive is supplied via a single phase supply or by the DC bus.
- YES ☐ **[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 8I84T200037.01P-1 to 8I84T200300.01P-1, [Freewheel] (YES) for all others.

OHL- ■ [DRIVE OVERHEAT]

OHL ❏ [Overtemp fault mgt]

[Freewheel] (YES)

CAUTION

RISK OF EQUIPMENT DAMAGE

Inhibiting faults results in the drive not being protected. This invalidates the warranty.
Check that the possible consequences do not present any risk.
Failure to follow these instructions can result in equipment damage.

Behavior in the event of the drive overheating

- nO ☐ **[Ignore]** (nO): Fault ignored.
- YES ☐ **[Freewheel]** (YES): Freewheel stop.
- Stt ☐ **[Per STT]** (Stt): Stop according to configuration of [Type of stop] (Stt) page 125, 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 81 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 114.

  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)

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

(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.

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 nO YES	**[Thermal alarm stop]** ☐ **[No]** (nO) : Function inactive (in this case, the following parameters cannot be accessed) ☐ **[Yes]** (YES) : Freewheel stop on drive or motor thermal alarm **CAUTION** The drive and motor are no longer protected in the event of thermal alarm stops. This invalidates the warranty. Check that the possible consequences do not present any risk. **Failure to follow this instruction can result in equipment damage.**		[No] (nO)
tHA ()	**[Drv therm. state al]** (1) Thermal state threshold of the drive tripping the deferred stop.	0 to 118%	100%
ttd ()	**[Motor therm. level]** (2) Thermal state threshold of the motor tripping the deferred stop.	0 to 118%	100%
ttd2 ()	**[Motor2 therm. level]** (2) Thermal state threshold of the motor 2 tripping the deferred stop.	0 to 118%	100%
ttd3 ()	**[Motor3 therm. level]** (2) Thermal state threshold of the motor 3 tripping the deferred stop.	0 to 118%	100%

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

(1) The parameter can also be accessed in the [1.8 FAULT MANAGEMENT] (FLt-) menu, see page 209.
(2) The parameter can also be accessed in the [1.8 FAULT MANAGEMENT] (FLt-) menu, see page 208.

[1.8 FAULT MANAGEMENT] (FLt-)

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 108.		
	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 ignored.		
YES	☐ **[Freewheel]** (YES): Freewheel stop.		
Stt	☐ **[Per STT]** (Stt): Stop according to configuration of [Type of stop] (Stt) page 125, 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 81 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 114.		

(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.

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 ☐ **[Flt&R1open]** (0): Fault and fault relay open. ☐ **[Flt&R1close]** (1): Fault and fault relay closed. ☐ **[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 8I84T2*****.01P-1: ☐ **[200V ac]** (200): 200 Volts AC ☐ **[220V ac]** (220): 220 Volts AC ☐ **[240V ac]** (240): 240 Volts AC ☐ **[260V ac]** (260): 260 Volts AC (factory setting) For 8I84T4*****.01P-1: ☐ **[380V ac]** (380): 380 Volts AC ☐ **[400V ac]** (400): 400 Volts AC ☐ **[440V ac]** (440): 440 Volts AC ☐ **[460V ac]** (460): 460 Volts AC ☐ **[480V ac]** (480): 480 Volts AC (factory setting)		
USL	**[Undervoltage level]**		
	Undervoltage fault 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 fault into account		
StP	**[UnderV. prevention]**		[No] (nO)
	Behavior in the event of the undervoltage fault prevention level being reached ☐ **[No]** (nO): No action ☐ **[DC Maintain]** (MMS): This stop mode uses the inertia to maintain the DC bus voltage as long as possible. ☐ **[Ramp stop]** (rMP): Stop following an adjustable ramp [Max stop time] (StM). ☐ **[Lock-out]** (LnF): Lock (freewheel stop) without fault		

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
USb-	**[UNDERVOLTAGE MGT]** (continued)		
tSM	**[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.		
StM	**[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).		
tIt-	**[IGBT TESTS]**		
Stt	**[IGBT test]**		[No] (nO)
nO	☐ **[No]** (nO): No test		
YES	☐ **[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). In the event of a fault, the drive will lock. The following faults can be detected: - Drive output short-circuit (terminals U-V-W): SCF display - IGBT faulty: xtF, where x indicates the number of the IGBT concerned - IGBT short-circuited: x2F, where x indicates the number of the IGBT concerned		

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
LFL-	**[4-20mA LOSS]**		
LFL2	**[AI2 4-20mA loss]**		[Ignore] (nO)

- ☐ **[Ignore]** (nO): Fault ignored. This configuration is the only one possible if [AI2 min. value] (CrL2) page 87 is not greater than 3 mA or if [AI2 Type] (AI2t) page 87 = [Voltage] (10U).
- ☐ **[Freewheel]** (YES): Freewheel stop.
- ☐ **[Per STT]** (Stt): Stop according to configuration of [Type of stop] (Stt) page 125, 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 81 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 114.

(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.

[1.8 FAULT MANAGEMENT] (FLt-)

Parameter can be accessed in [Expert] mode.

Code	Name/Description	Adjustment range	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.

CAUTION

RISK OF EQUIPMENT DAMAGE

Inhibiting faults results in the drive not being protected. This invalidates the warranty.
Check that the possible consequences do not present any risk.
Failure to follow these instructions can result in equipment damage.

- nO **[No]** (nO): Function inactive
- LI1 **[LI1]** (LI1)
- \- :
- \- :
- \- **[...]** (...) : See the assignment conditions on page 108.

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 reset on a rising edge (change from 0 to 1) of the assigned input or bit.

Note: The "Power Removal" function and any faults that prevent any form of operation are not affected by this function.
A list of faults affected by this function appears on pages 250 to 255.

Code	Name/Description	Adjustment range	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 ignored.		
YES	☐ **[Freewheel]** (YES): Freewheel stop.		
Stt	☐ **[Per STT]** (Stt): Stop according to configuration of [Type of stop] (Stt) page 125, 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 81 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 114.		
COL	**❑ [CANopen fault mgt]**		[Freewheel] (YES)
	Behavior of the drive in the event of a communication fault with integrated communication interface		
nO	☐ **[Ignore]** (nO): Fault ignored.		
YES	☐ **[Freewheel]** (YES): Freewheel stop.		
Stt	☐ **[Per STT]** (Stt): Stop according to configuration of [Type of stop] (Stt) page 125, 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 81 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 114.		
SLL	**❑ [Modbus fault mgt]**		[Freewheel] (YES)
	Not applicable		

(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.

[1.8 FAULT MANAGEMENT] (FLt-)

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 71).		
Sdd	**❑ [Load slip detection]**		[No] (nO)
nO	☐ **[No]** (nO): Fault not monitored. Only the alarm may be assigned to a logic output or a relay.		
YES	☐ **[Yes]** (YES): Fault monitored. [Load slip detection] (Sdd) is forced to [Yes] (YES) if [Motor control type] (Ctt) page 63 = [FVC] (FUC). 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 61. 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	☐ **[No]** (nO): Fault not monitored.		
YES	☐ **[Yes]** (YES): Fault 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 63 = [FVC] (FUC) and [Brake assignment] (bLC) page 145 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	2.0 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)
	Behavior in the event of switching to torque or current limitation		
nO	☐ **[Ignore]** (nO): Fault ignored.		
YES	☐ **[Freewheel]** (YES): Freewheel stop.		
Stt	☐ **[Per STT]** (Stt): Stop according to configuration of [Type of stop] (Stt) page 125, 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 81 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 114.		
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		

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

(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.

[1.8 FAULT MANAGEMENT] (FLt-)

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 92)		
FLt	☐ **[Fault]** (FLt): Switch to fault (bOF) with locking of 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]** Parameter accessible at and above 8I84T409000.01P-1.		
bUb	**❑ [Brake res. fault Mgt]**		[Freewheel] (YES)
	Management of short-circuit [DB unit sh. circuit] (bUF) and overheating [Internal- th. sensor] (InFb) faults in the braking unit.		
nO	☐ **[Ignore]** (nO): Fault 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 ignored.		
YES	☐ **[Freewheel]** (YES): Freewheel stop.		

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

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 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 B&R Product Support.		

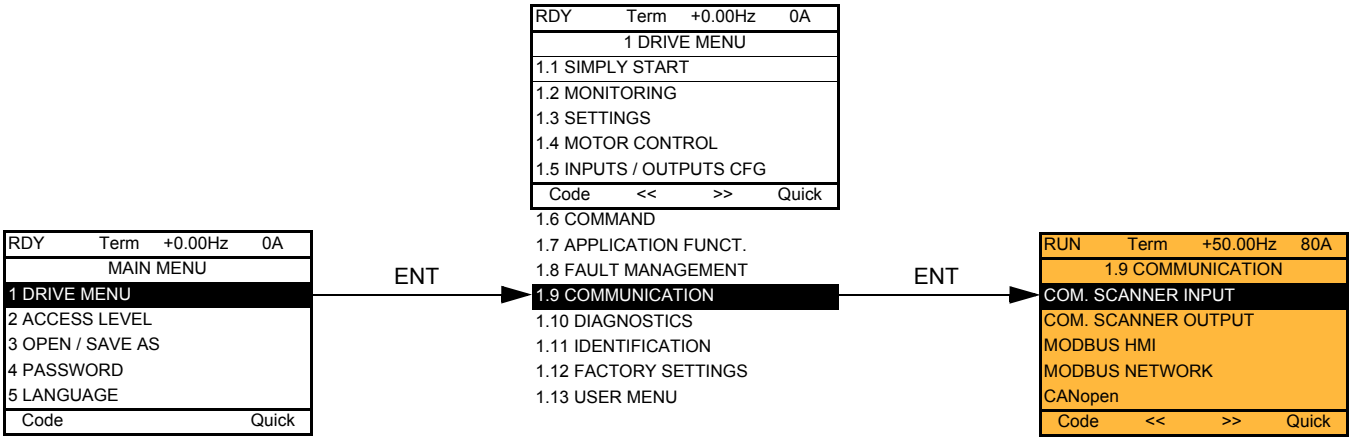
Code	Name/Description		Adjustment range	Factory setting
LFF-	**[FALLBACK SPEED]**			
LFF	**[Fallback speed]** Selection of the fallback speed		0 to 1600 Hz	0 Hz
FSt-	**[RAMP DIVIDER]**			
dCF ↻	**[Ramp divider]** The ramp that is enabled (dEC or dE2) is then divided by this coefficient when stop requests are sent. Value 0 corresponds to a minimum ramp time.	(1)	0 to 10	4
dCI-	**[DC INJECTION]**			
IdC ↻	**[DC inject. level 1]** Level of DC injection braking current activated via logic input or selected as stop mode. **CAUTION** Check that the motor will withstand this current without overheating. **Failure to follow this instruction can result in equipment damage.**	(1) (3)	0.1 to 1.41 In (2)	0.64 In (2)
tdI ↻	**[DC injection time 1]** Maximum current injection time [DC inject. level 1] (IdC). After this time the injection current becomes [DC inject. level 2] (IdC2).	(1) (3)	0.1 to 30 s	0.5 s
IdC2 ↻	**[DC inject. level 2]** Injection current activated by logic input or selected as stop mode, once period of time [DC injection time 1] (tdI) has elapsed. **CAUTION** Check that the motor will withstand this current without overheating. **Failure to follow this instruction can result in equipment damage.**	(1) (3)	0.1 In (2) to [DC inject. level 1] (IdC)	0.5 In (2)
tdC ↻	**[DC injection time 2]** 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)).	(1) (3)	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.

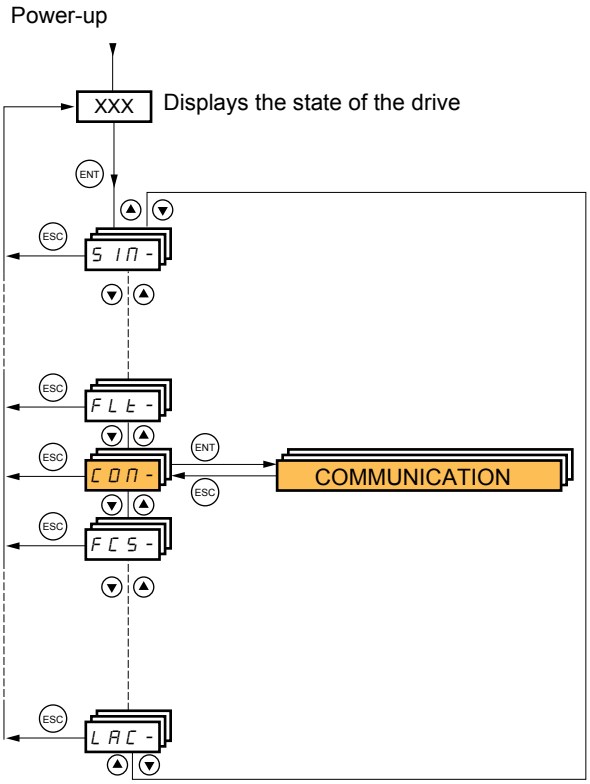
↻ Parameter that can be modified during operation or when stopped.

[1.9 COMMUNICATION] (COM-)

With graphic display terminal:



With integrated display terminal:



Code	Name/Description	Adjustment range	Factory setting
ICS	**■ [COM. SCANNER INPUT]** **Only accessible via graphic display terminal**		
nNA1	❑ **[Scan. IN1 address]** Address of the 1st input word.		3201
nNA2	❑ **[Scan. IN2 address]** Address of the 2nd input word.		8604
nNA3	❑ **[Scan. IN3 address]** Address of the 3rd input word.		0
nNA4	❑ **[Scan. IN4 address]** Address of the 4th input word.		0
nNA5	❑ **[Scan. IN5 address]** Address of the 5th input word.		0
nNA6	❑ **[Scan. IN6 address]** Address of the 6th input word.		0
nNA7	❑ **[Scan. IN7 address]** Address of the 7th input word.		0
nNA8	❑ **[Scan. IN8 address]** Address of the 8th input word.		0
OCS	**■ [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

[1.9 COMMUNICATION] (COM-)

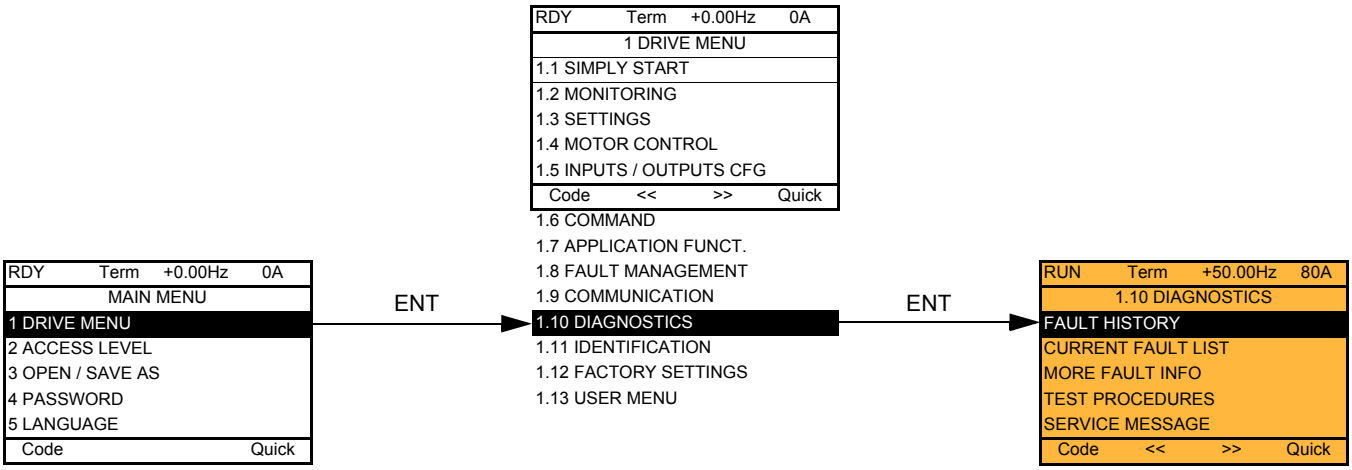
Code	Name/Description	Adjustment range	Factory setting
Md2-	**[MODBUS HMI]** Communication with the graphic display terminal		
tbr2	**[HMI baud rate]** 9.6 or 19.2 kbps via the integrated display terminal. 9600 or 19200 bauds via the graphic display terminal. The graphic display terminal only operates 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
Md1-	**[MODBUS NETWORK]**		
	Not applicable		
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.		

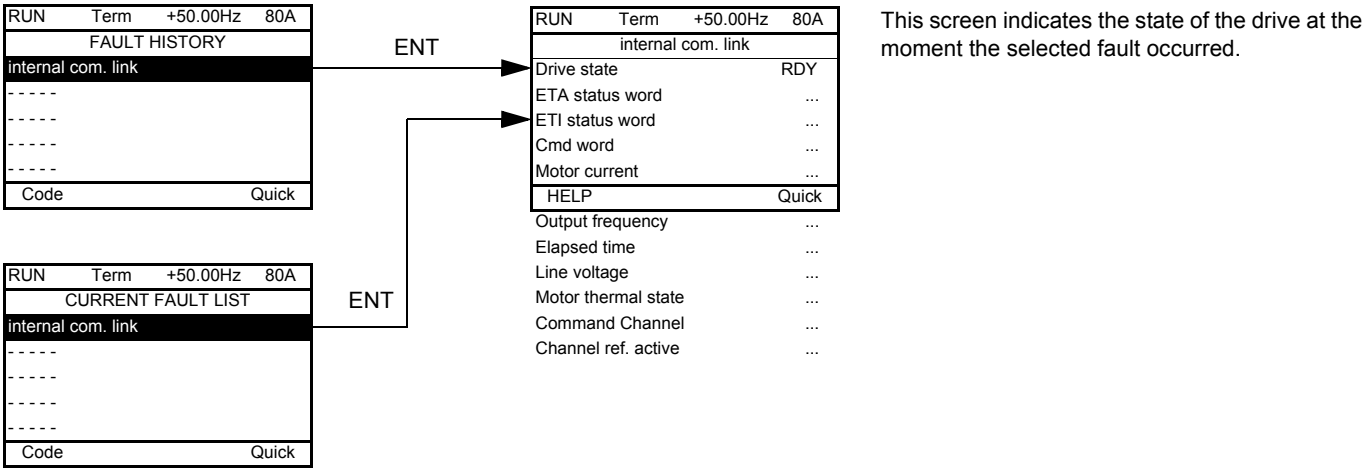
[1.9 COMMUNICATION] (COM-)

Code	Name/Description	Adjustment range	Factory setting
-	**[COMMUNICATION CARD]**		
	See the specific documentation for the card used.		
LCF-	**[FORCED LOCAL]**		
FLO	❏ **[Forced local assign.]**		[No] (nO)
nO LI1 - LI6	☐ **[No]** (nO): Function inactive ☐ **[LI1]** (LI1) to **[LI6]** (LI6) 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 109 = [I/O profile] (IO).		
FLOC	❏ **[Forced local Ref.]**		[No] (nO)
nO AI1 AI2 LCC PG	☐ **[No]** (nO): Not assigned (control via the terminals with zero reference). ☐ **[AI1]** (AI1): Analog input ☐ **[AI2]** (AI2): Analog input ☐ **[HMI]** (LCC): Assignment of the reference and command to the graphic display terminal. Reference: [HMI Frequency ref.] (LFr), page 43, command: RUN/STOP/FWD/REV buttons. ☐ **[Encoder]** (PG): Encoder input, if encoder card has been inserted If the reference is assigned to an analog input 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.		

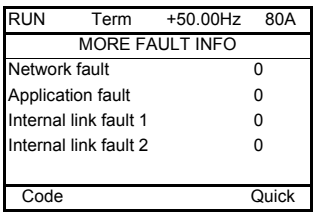
[1.10 DIAGNOSTICS]

This menu can only be accessed with the graphic display terminal.





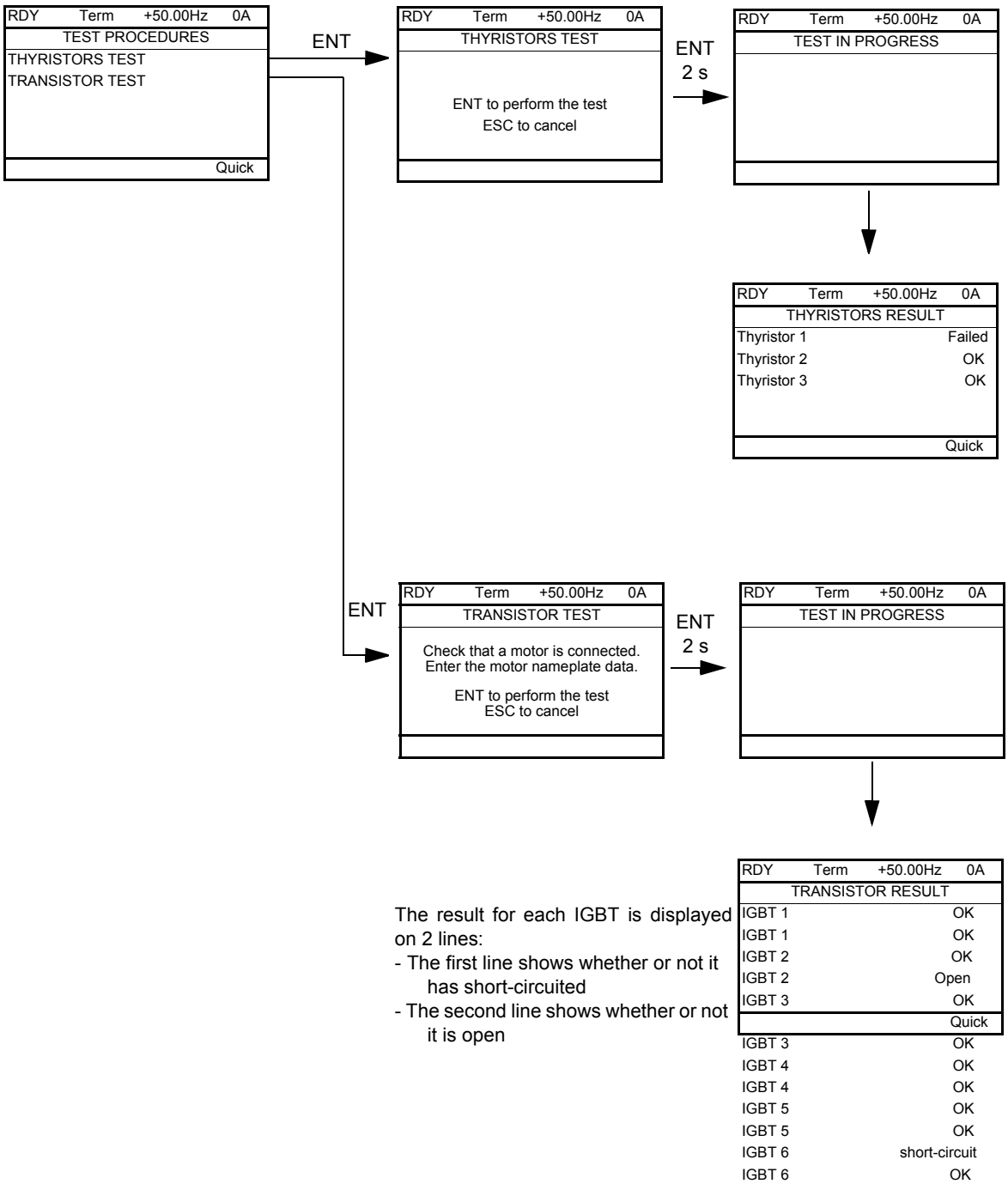
This screen indicates the state of the drive at the moment the selected fault occurred.



This screen indicates the number of communication faults, for example, with the option cards.
Number: from 0 to 65535

[1.10 DIAGNOSTICS]

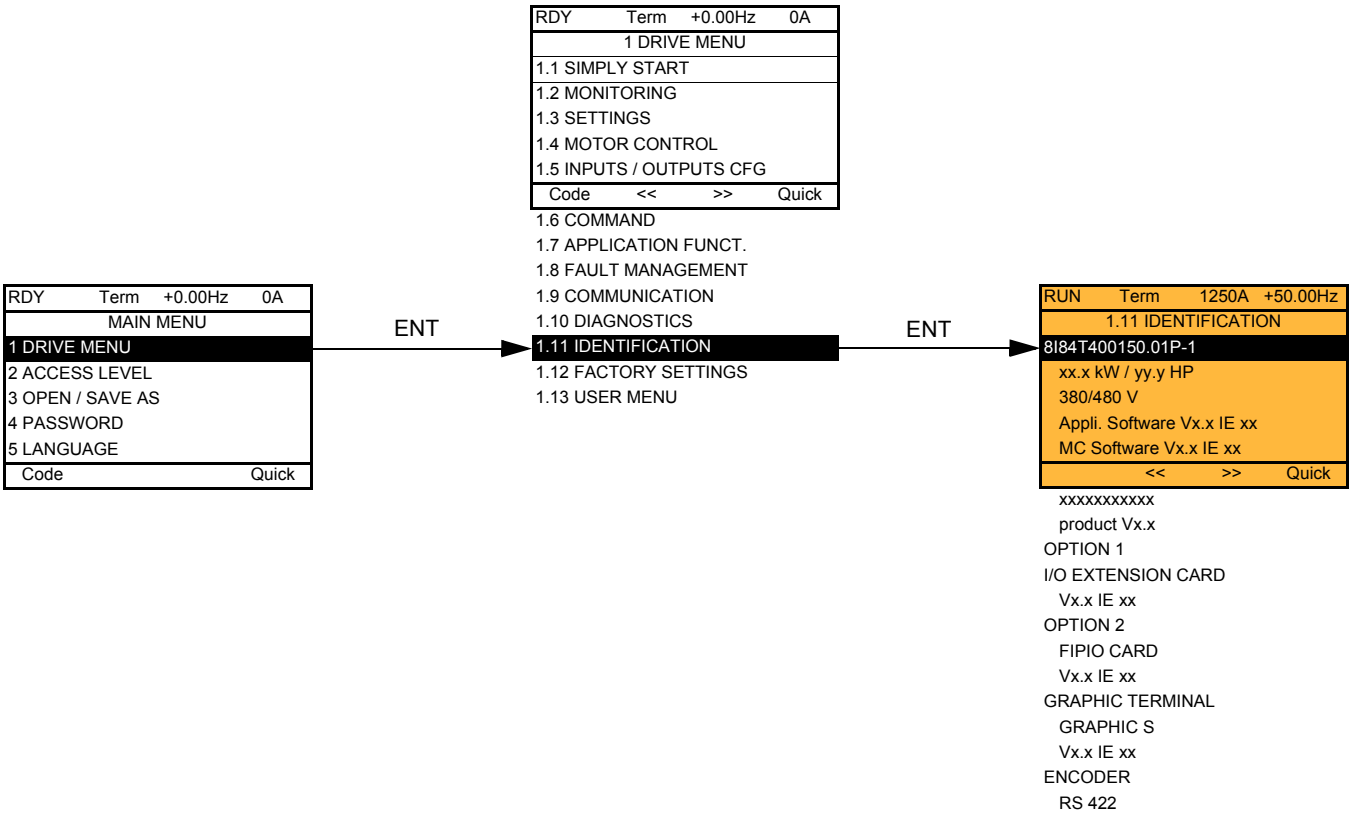
[THYRISTORS TEST] is only accessible for drives with a power rating ≥ 18,5 kW.



The result for each IGBT is displayed on 2 lines:
- The first line shows whether or not it has short-circuited
- The second line shows whether or not it is open

Note: To start the tests, press and hold down (2 s) the ENT key.

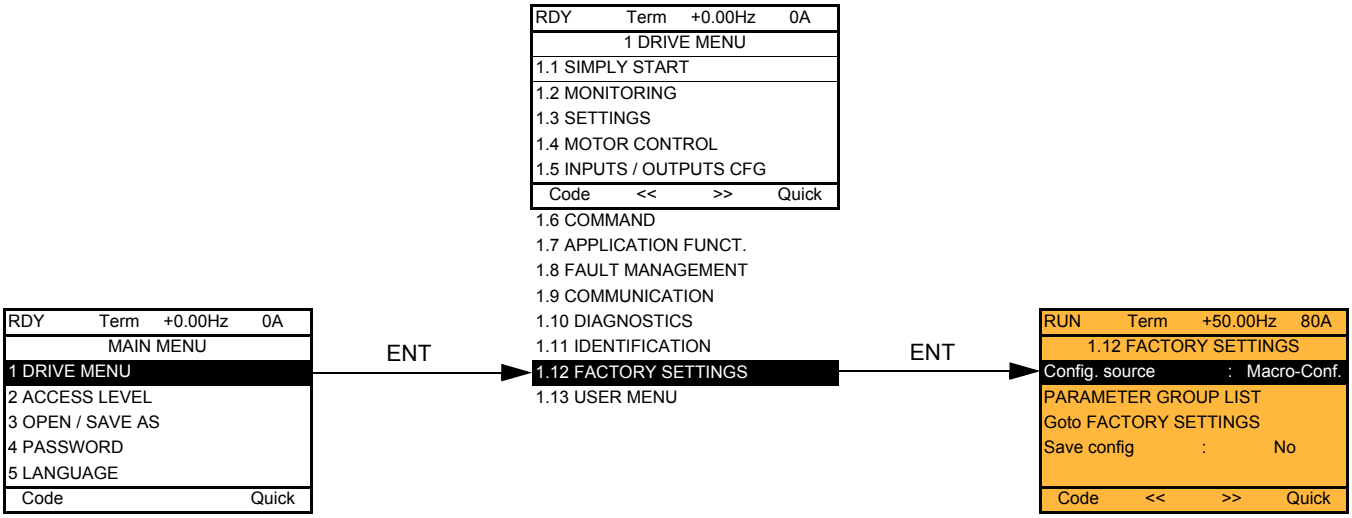
[1.11 IDENTIFICATION]



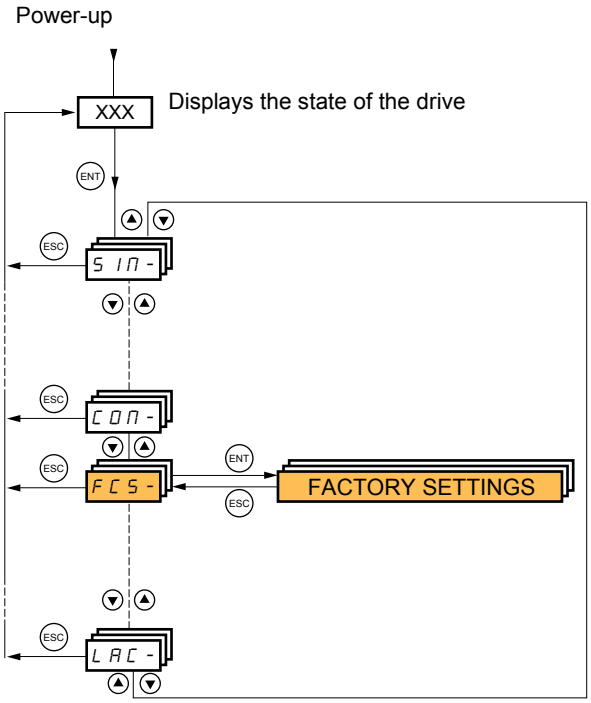
The [1.11 IDENTIFICATION] menu can only be accessed on the graphic display terminal.
This is a read-only menu that cannot be configured.

[1.12 FACTORY SETTINGS] (FCS-)

With graphic display terminal:



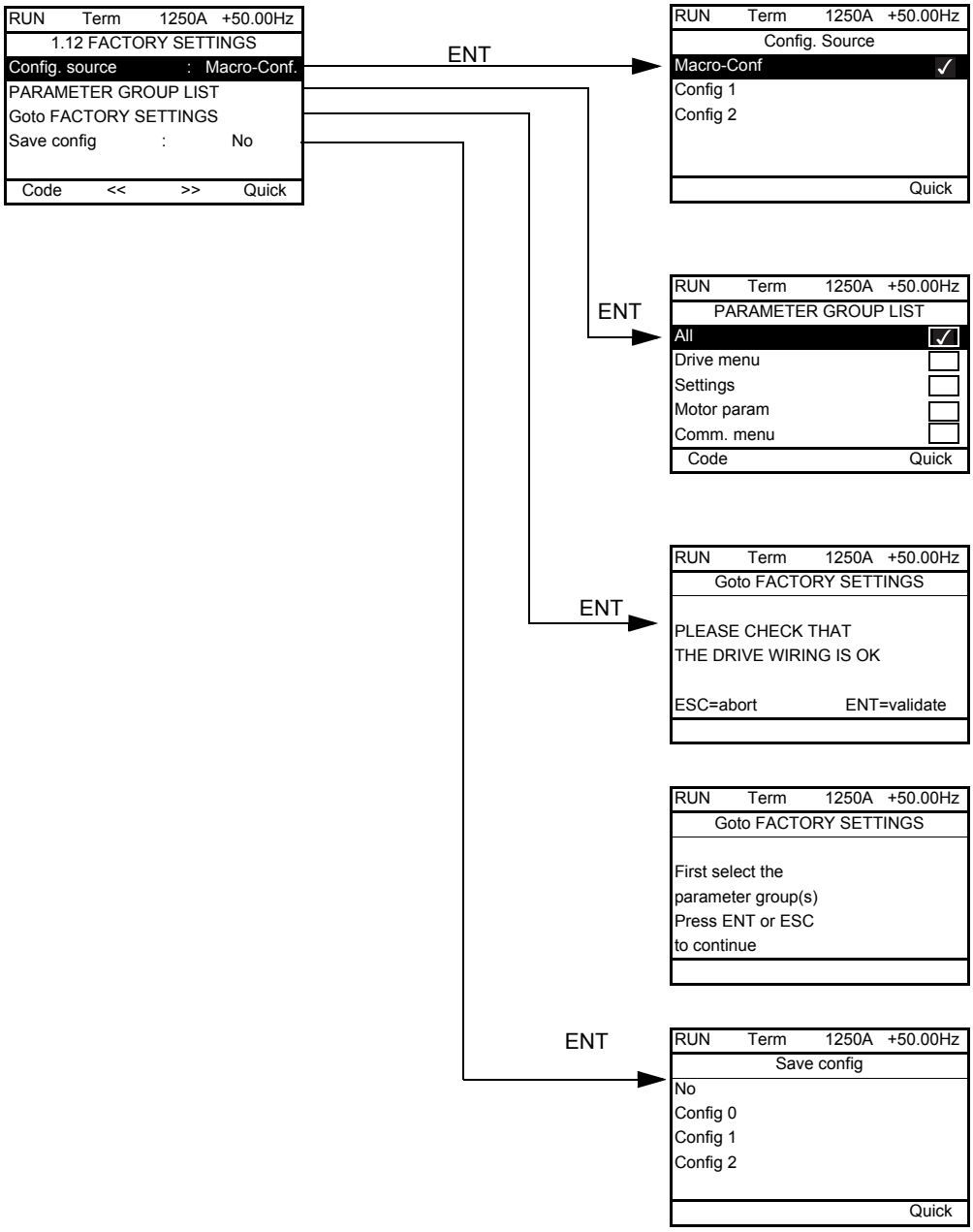
With integrated display terminal:



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.

[1.12 FACTORY SETTINGS] (FCS-)



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.

[1.12 FACTORY SETTINGS] (FCS-)

Code	Name/Description
FCSI	❑ **[Config. Source]** Choice of source configuration. ☐ **[Macro-Conf]** (InI) Factory configuration, return to selected macro configuration. ☐ **[Config 1]** (CFG1) ☐ **[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 parameters. ☐ **[Drive menu]** (drM): The [1 DRIVE MENU] menu without [1.9 COMMUNICATION]. In the[7 DISPLAY CONFIG.]menu, [Return std name] page 244 returns to [No]. ☐ **[Settings]** (SEt): The [1.3 SETTINGS] menu without the [IR compensation] (UFr), [Slip compensation (SLP) and [Mot. therm. current] (ItH) parameters ☐ **[Motor param]** (MOt):motor parameters, see list below. The following selections can only be accessed if [Config. Source] (FCSI) = [Macro-Conf.] (InI): ☐ **[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). ☐ **[Monitor config.]** (MOn): the [6 MONITORING CONFIG.] menu. ☐ **[Display config.]** (dIS): the [7 DISPLAY CONFIG.] menu. See the multiple selection procedure on page 27 for the integrated display terminal and page 18 for the graphic display terminal. ☞ **Note:** 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 - 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): ☐ **[Config 0]** (Str0): Press and hold down the "ENT" key for 2 s. ☐ **[Config 1]** (Str0): Press and hold down the "ENT" key for 2 s. ☐ **[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.

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) - [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 page 67.

[1.3 SETTINGS] (SEt-) menu:

[Mot. therm. current] (ItH)

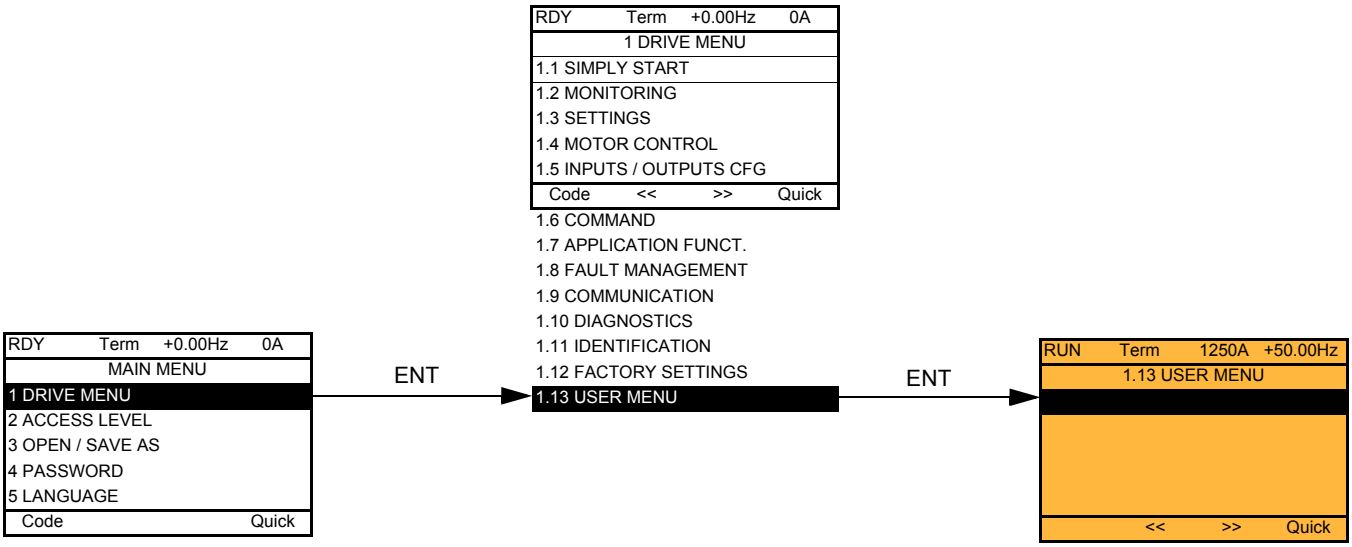
Example of total return to factory settings

1. [Config. Source] (FCSI) = [Macro-Conf] (InI)
2. [PARAMETER GROUP LIST] (FrY-) = [All] (ALL)
3. [Goto FACTORY SETTINGS] (GFS = YES)

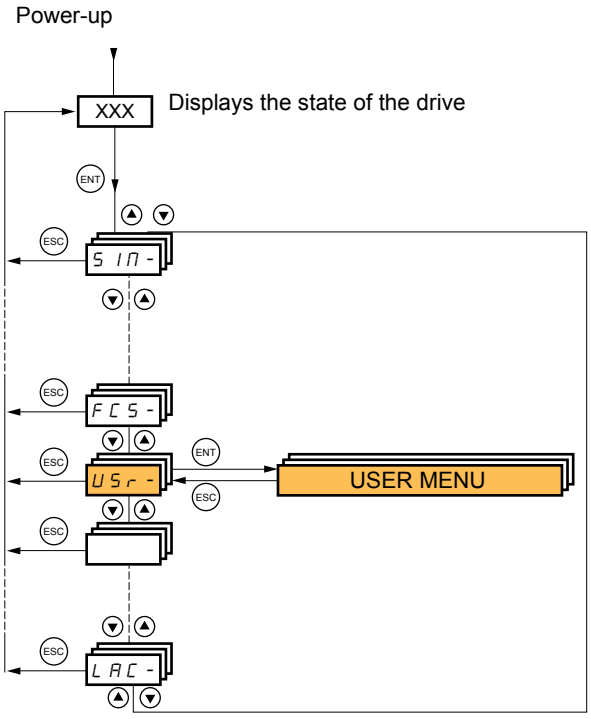
[1.13 USER MENU] (USr-)

This menu contains the parameters selected in the [7 DISPLAY CONFIG.] menu on page 243.

With graphic display terminal:

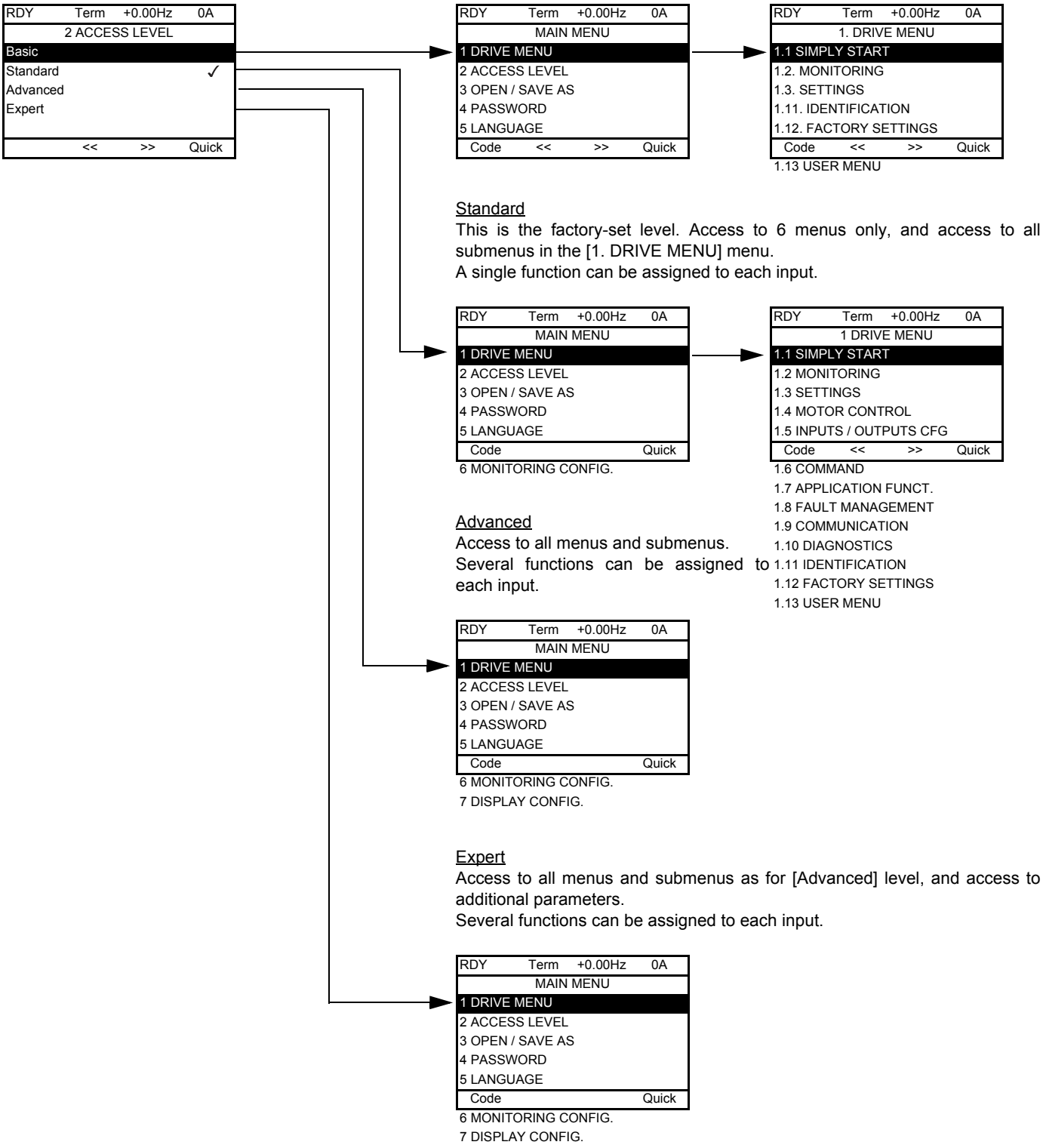


With integrated display terminal:



[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.

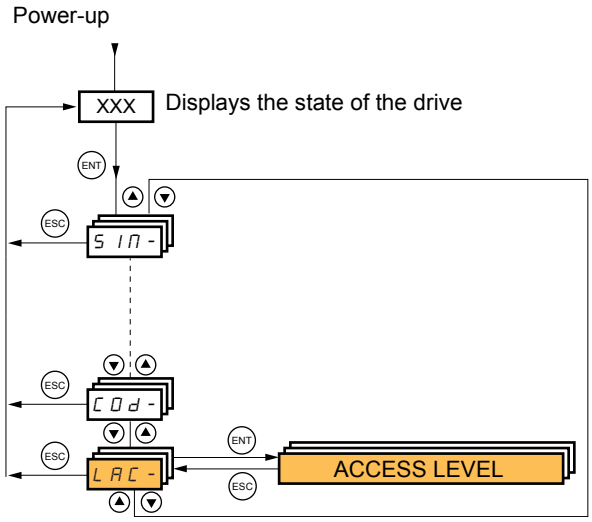
Standard
This is the factory-set level. Access to 6 menus only, and access to all submenus in the [1. DRIVE MENU] menu.
A single function can be assigned to each input.

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.

[2. ACCESS LEVEL] (LAC-)

With integrated display terminal:



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

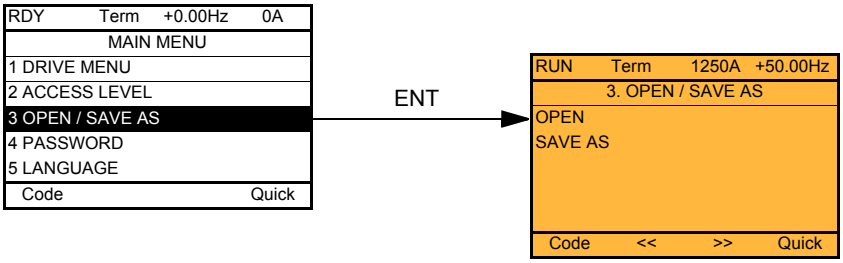
[2. ACCESS LEVEL] (LAC-)

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

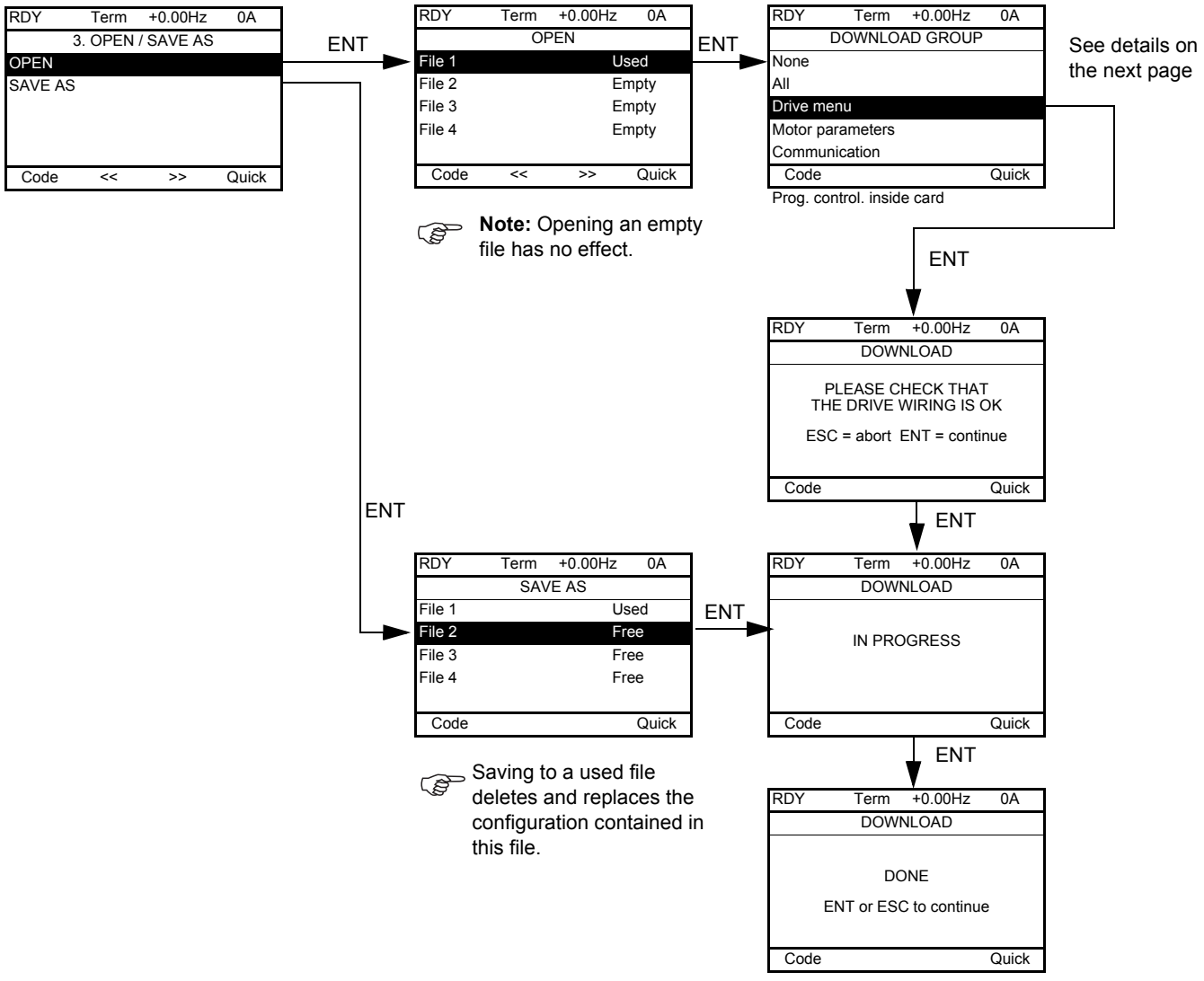
Graphic display terminal		Integrated display terminal	Access level
[2 ACCESS LEVEL]		LAC - (Access level)	Basic bAS / Standard Std (factory setting) / Advanced AdU / Expert EPr
[3 OPEN/SAVE AS]		-	
[4 PASSWORD]		COd - (Password)	
[5 LANGUAGE]		-	
[1 DRIVE MENU]	[1.1 SIMPLY START]	SIM - (Simply start)	
	[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)	Standard Std (factory setting) / Advanced AdU / Expert EPr
	[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]	-	
[6 MONITORING CONFIG.]		-	
A single function can be assigned to each input.		A single function can be assigned to each input.	
[7 DISPLAY CONFIG.]		-	Advanced AdU / Expert EPr
Several functions can be assigned to each input.		Several functions can be assigned to each input.	
Expert parameters		Expert parameters	Expert EPr
Several functions can be assigned to each input.		Several functions can be assigned to each input.	

[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.



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.

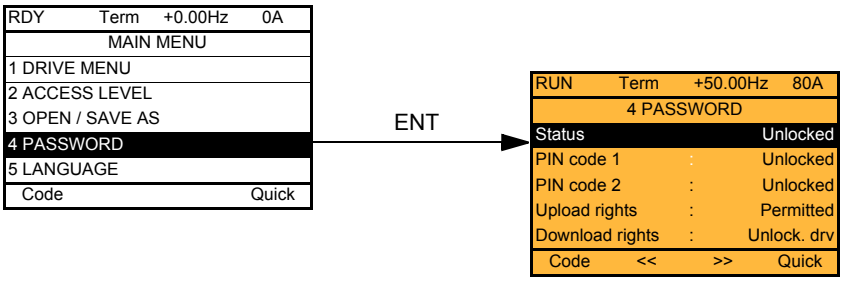
[3. OPEN/SAVE AS]

[DOWNLOAD GROUP]

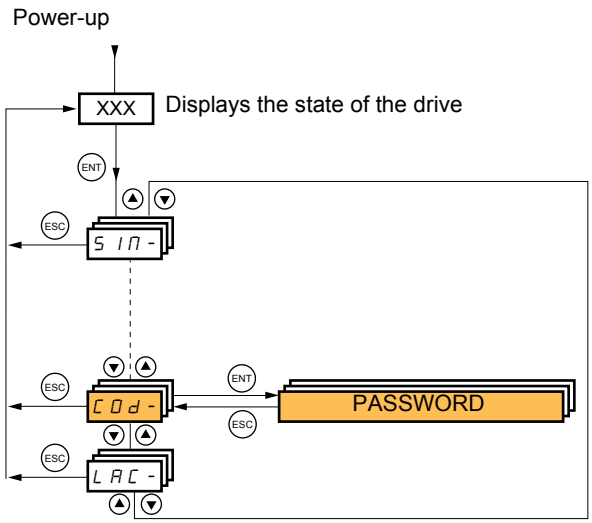
[None] :		No parameters
[All]:		All parameters in all menus
[Drive menu] :		The entire [1 DRIVE MENU] without [1.9 COMMUNICATION].
[Motor parameters]:	[Rated motor power] (nPr)	in the [1.4 MOTOR CONTROL] (drC-) menu
	[Rated motor volt.] (UnS)	
	[Rated mot. current] (nCr)	
	[Rated motor freq.] (FrS)	
	[Rated motor speed] (nSP)	
	[Auto tuning] (tUn)	
	[Auto tuning status] (tUS)	
	[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 67	
	[Mot. therm. current] (ItH)	in the [1.3 SETTINGS] (SEt-) menu
[Communication] :		All the parameters in the [1.9 COMMUNICATION] menu

[4. PASSWORD] (COd-)

With graphic display terminal:

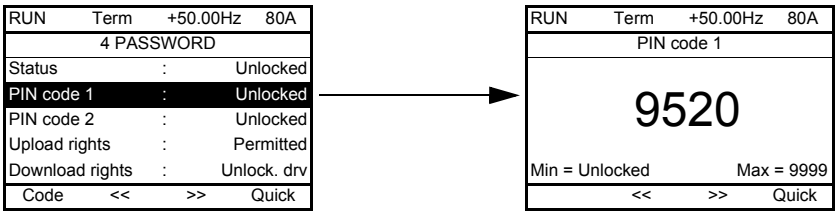


With integrated display terminal:



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 B&R 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.

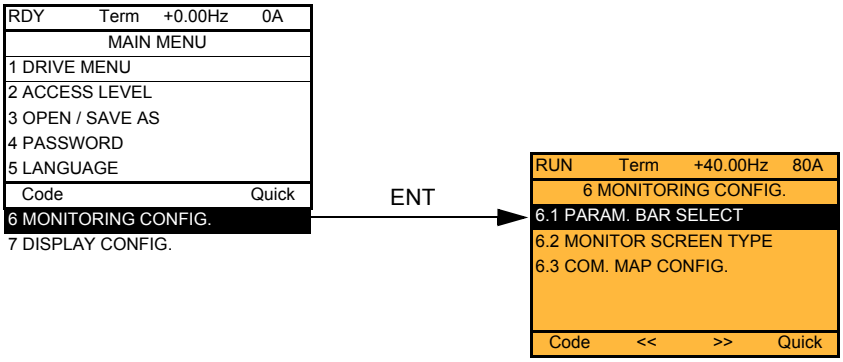
The following items are access-protected:
- Return to factory settings ([1.12 FACTORY SETTINGS] (FCS-) menu.
- The channels and parameters protected by the [1.13 USER MENU] as well as the menu itself.
- The custom display settings ([7 DISPLAY CONFIG.] menu).

[4. PASSWORD] (COd-)

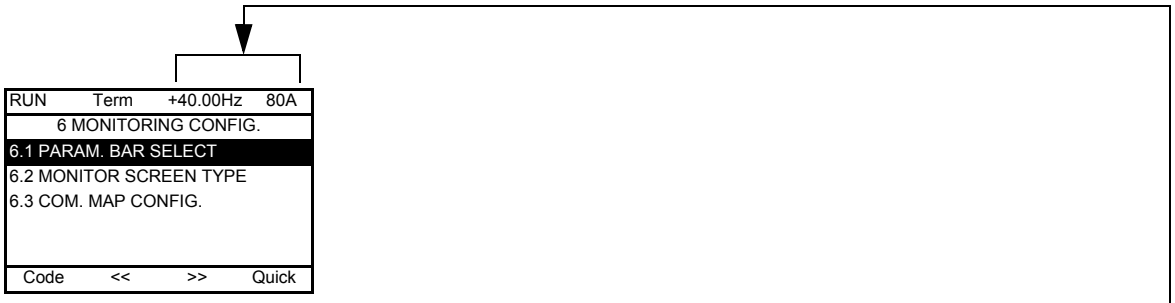
Code	Name/Description	Adjustment range	Factory setting
CSt	❑ **[Status]**		[Unlocked] (ULC)
	Information parameter, cannot be modified. ☐ **[Locked]** (LC): The drive is locked by a password. ☐ **[Unlocked]** (ULC): The drive is not locked by a password.		
COd	❑ **[PIN code 1]**	OFF to 9999	[OFF] (OFF)
	1st access code. The value [OFF] (OFF) indicates that no password has been set [Unlocked]. The value [ON] (On) indicates that the drive is protected 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 protected 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 B&R 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 menus 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. ☐ **[Permitted]** (ULr0): The current drive configuration can always be uploaded to the graphic display terminal ☐ **[Not allowed]** (ULr1): The current drive configuration can only be uploaded to the graphic display terminal if the drive is not protected 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 ☐ **[Locked drv]** (dLr0): A configuration file can only be downloaded to the drive if the drive is protected by an access code, which is the same as the access code for the configuration to be downloaded. ☐ **[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 protected by an access code. ☐ **[Not allowed]** (dLr2): Download not authorized. ☐ **[Lock/unlock]** (dLr3): Combination of [Locked drv.] (dLr0) and [Unlock. drv] (dLr1).		

[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.

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
- ☐ **[Config. active]** CNFO, 1 or 2 (see page 187)
- ☐ **[Utilised param. set]** SET1, 2 or 3 (see page 185)

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:

PARAM. BAR SELECT	
MONITORING	
---------	☑
---------	☐
---------	☐
---------	☑

Name/Description

■ [6.2. MONITOR SCREEN TYPE]

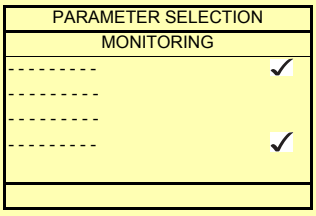
❑ [Display value type]

- ☐ **[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]

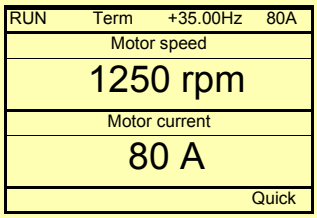
☐ **[Alarm groups]**	can only be accessed if [Display value type] = [List]
☐ **[Frequency ref.]**	in Hz: parameter displayed in factory configuration.
☐ **[Torque reference]**	as a %
☐ **[Output frequency]**	in Hz
☐ **[Motor current]**	in A
☐ **[ENA avg speed]**	in Hz
☐ **[Motor speed]**	in rpm
☐ **[Motor 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
☐ **[Config. active]**	CNFO, 1 or 2 (see page 187), can only be accessed if [Display value type] = [List]
☐ **[Utilised param. set]**	SET1, 2 or 3 (see page 185), 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.

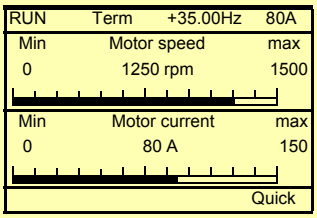


Examples include:

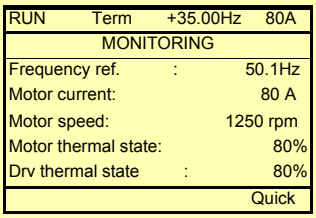
Display of 2 digital values



Display of 2 bar graphs



Display of a list of 5 values



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.]

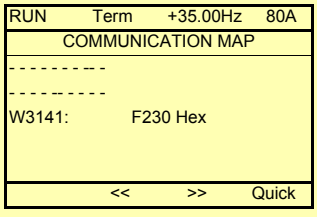
Select the address of the word to be displayed by pressing the <<, >> (F2 and F3) keys and rotating the navigation button.

❑ [Format word 4]

Format of word 4.

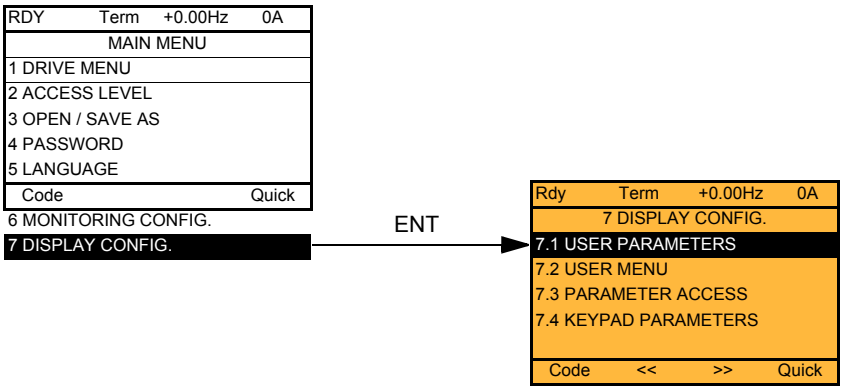
- ☐ **[Hex]**: Hexadecimal
- ☐ **[Signed]** : Decimal with sign
- ☐ **[Unsigned]** : Decimal without sign

It will then be possible to view the selected words in the [COMMUNICATION MAP] submenu of the [1.2 MONITORING] menu.
Example:



[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.



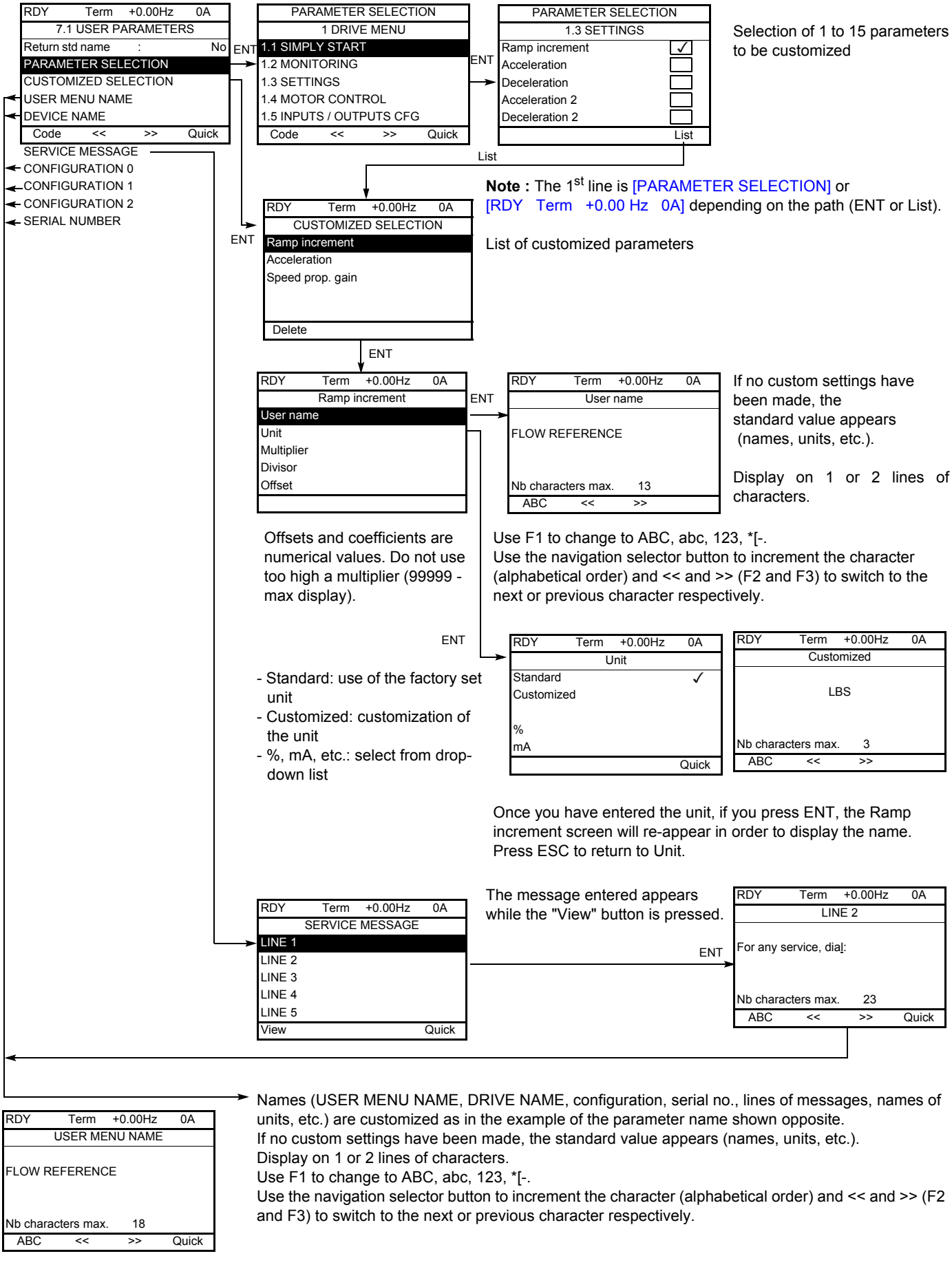
7.1: USER PARAMETERS: Customization of 1 to 15 parameters.

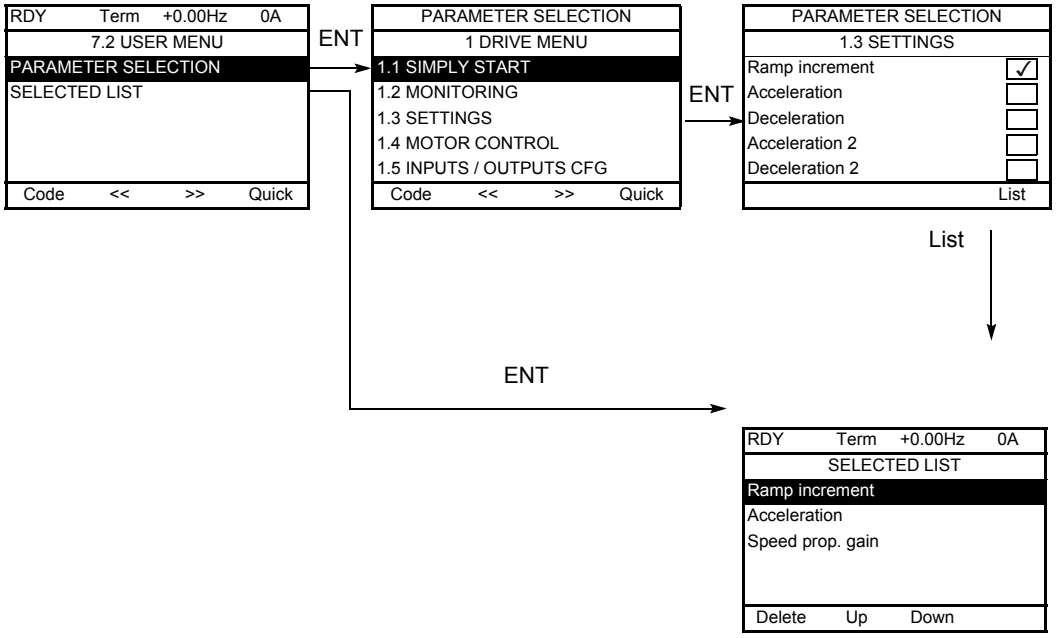
7.2 USER MENU: Creation of a customized menu.

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.

If [Return std name] = [Yes] the display reverts to standard but the custom settings remain stored.



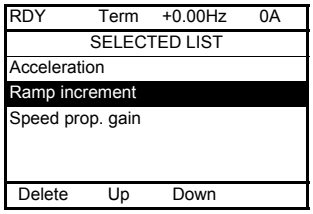


Selection of parameters included in the user menu

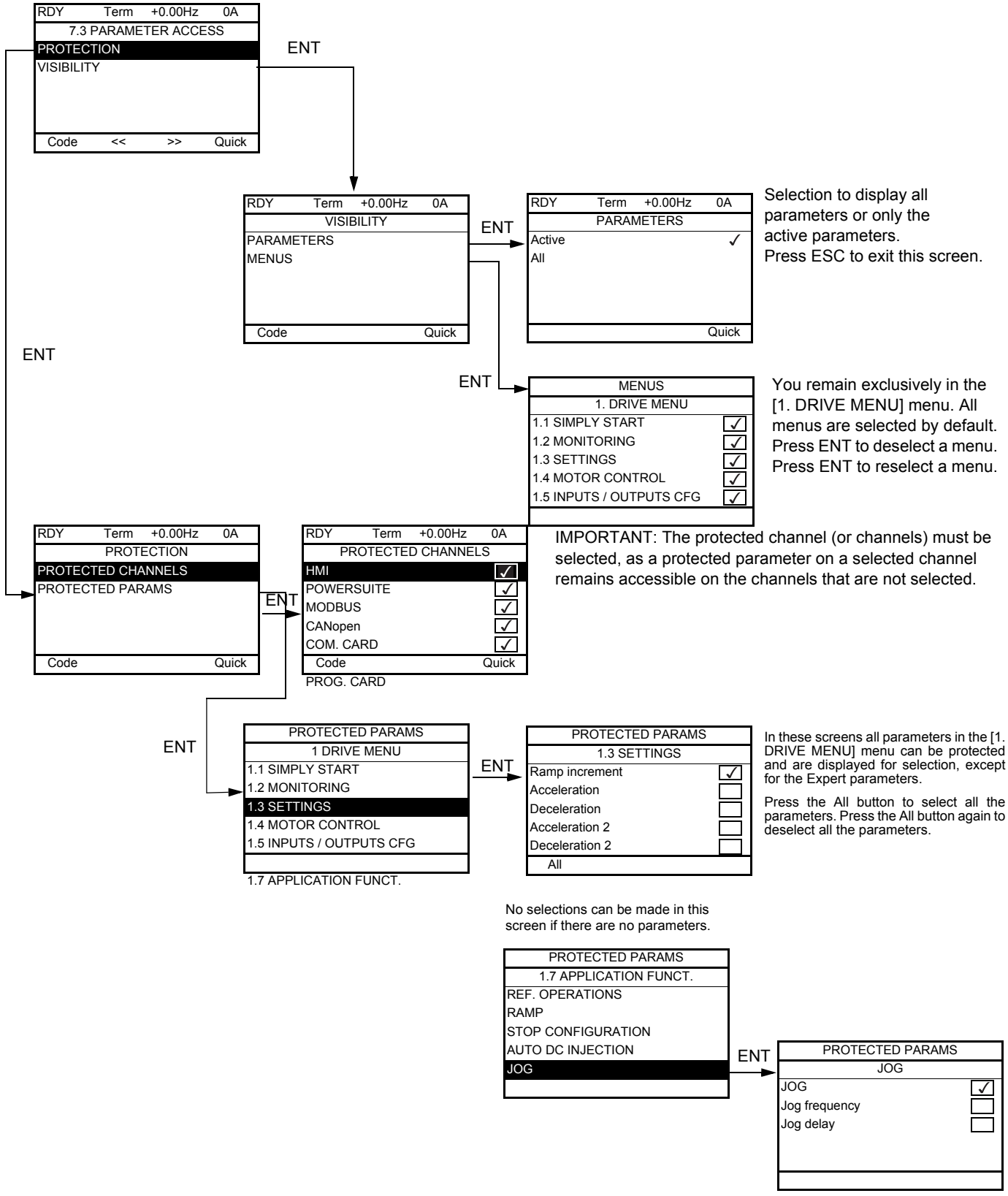
Note: The 1st line is [PARAMETER SELECTION] or [RDY Term +0.00 Hz 0A] depending on the path (ENT or List).

Parameter list making up the user menu.

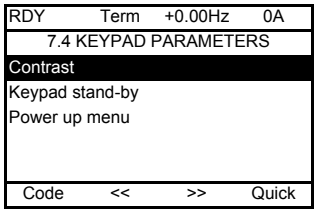
Use the F2 and F3 keys to arrange the parameters in the list (example below using F3).



[7 DISPLAY CONFIG.]



Note: The protected parameters are no longer accessible and are not, therefore, displayed for the selected channels.

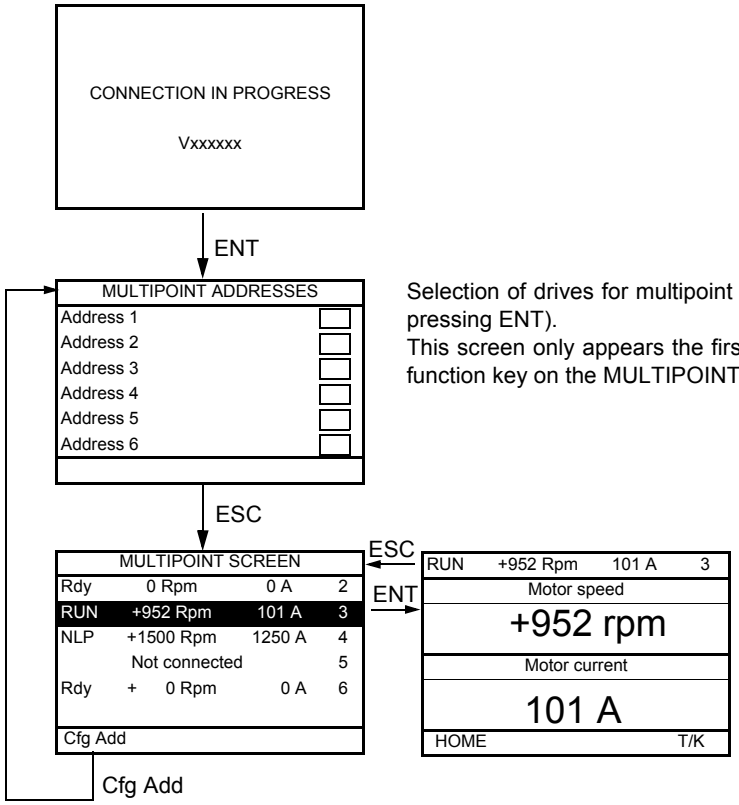


Name/Description	Adjustment range	Factory setting
❑ **[Keypad contrast]** Adjustment of contrast on graphic display unit.	0 to 100 %	50 %
❑ **[Keypad stand-by]** Configures and adjusts the stand-by mode of the graphic display unit. ☐ **[No]**: No stand-by mode. ☐ **[1]** to **[10]**: Adjusts the time 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.		[5]
❑ **[Power up menu]** Choice of menu which appears on the product on power-up ☐ **[Drive menu]**: Displays the drive menu. ☐ **[Sim. start]**: Displays the simply start menu. ☐ **[Monitoring]**: Displays the monitoring menu. ☐ **[Settings]**: Displays the settings menu. ☐ **[Mot. Ctrl]**: Displays the control motor menu. ☐ **[I/O Conf.]**: Displays the inputs / outputs configuration menu. ☐ **[Command]**: Displays the command menu. ☐ **[Appli. fun.]**: Displays the application function menu. ☐ **[Fault mgt]**: Displays the fault management menu. ☐ **[Com.]**: Displays the communication menu. ☐ **[Diagnostics]**: Displays the diagnostics menu. ☐ **[Ident.]**: Displays the identification menu. ☐ **[Factory Set]**: Displays the factory settings menu. ☐ **[User menu]**: Displays the user menu. ☐ **[CI menu]**: Displays the card CI menu. ☐ **[Main menu]**: Displays the main menu.		[Main menu]

[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.

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 there is a fault on a drive, this drive is displayed.

Servicing

The ACOPOSinverter P84 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, for example, [R1 CONFIGURATION] (r1-) page 92.

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 225.

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 in order to 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 205
- By means of a logic input or control bit assigned to the [FAULT RESET] (rSt-) function, page 204
- 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 the local B&R office.

Faults - Causes - Remedies

Drive does not start, no fault 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 ACOPOSinverter P84 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 safely 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 81).
- 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 139 and 179).
- 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.

Faults, which cannot be reset automatically

The cause of the fault must be removed before resetting by turning off and then back on.
AnF, 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 204).
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 215).

Fault	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 170.
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] (brV) parameters, page 218.
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 218 if there is no resistor or braking unit connected to the drive at and above 8I84T409000.01P-1.
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
EEF1	[Control Eeprom]	• Internal memory fault, control card	• Check the environment (electromagnetic compatibility) • Turn off, reset, return to factory settings • Inspect/repair the drive
EEF2	[Power Eeprom]	• Internal memory fault, power card	
EnF	[Encoder]	• Encoder feedback fault	• Check [Number of pulses] (PGI) and [Encoder type] (EnS) page 69. • 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 62) 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

Faults, which cannot be reset automatically (continued)

Fault	Name	Probable cause	Remedy
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 fault 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 fault between the internal cards	• Check the internal connections • Inspect/repair the drive
InF4	[Internal-mftg zone]	• Internal data inconsistent	• Recalibrate the drive (performed by B&R 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 218 if there is no braking unit connected to the drive.
InFC	[Internal-time meas.]	• Fault on the electronic time measurement component	• Inspect/repair the drive
InFE	[internal- CPU]	• Internal microprocessor fault	• Turn off and reset. Inspect/repair the drive.
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]	• Fault with the drive's "Power removal" safety 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. • Increase the [Time to restart] (ttr), page 58.
SCF2	[Impedant sh. circuit]		
SCF3	[Ground short circuit]		
SOF	[Overspeed]	• Instability or driving load too high	• Check the motor, gain and stability parameters. • Add a braking resistor. • Check the size of the motor/drive/load.

Faults, which cannot be reset automatically (continued)

Fault	Name	Probable cause	Remedy
SPF	[Speed fdback loss]	• Encoder feedback signal missing • Signal on "Pulse input" missing, if the input is used for speed measurement	• Check the wiring between the encoder and the drive • Check the encoder • 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

Faults - Causes - Remedies

Faults that can be reset with the automatic restart function, after the cause has disappeared

These faults can also be reset by turning on and off or by means of a logic input or control bit ([Fault reset] (rSF) parameter, page 204). 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 215).

Fault	Name	Probable cause	Remedy
APF	[Application fault]	• Controller Inside card fault	• 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 145 • Apply the recommended settings for [Brake engage freq] (bEn).
CnF	[Com. network]	• Communication fault 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 integrated communication interface	• Check the communication bus. • Check the time-out
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	[AI2 4-20mA loss]	• Loss of the 4-20 mA reference on analog input AI2	• 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 124, 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

Faults - Causes - Remedies

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

Fault	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 208. • 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 66, [Rated motor volt.] (UnS) and [Rated mot. current] (nCr) page 61 and perform [Auto-tuning] (tUn) page 62.
OSF	[Mains overvoltage]	• Line voltage too high • Disturbed mains supply	• Check the line voltage
OtFL	[LI6=PTC overheat]	• Overheating of PTC probes detected on input LI6	• 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
PtFL	[LI6=PTC probe]	• PTC probes on input LI6 open or short-circuited	• Check the PTC probes and the wiring between them and the motor/drive
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
SLF3	[HMI com.]	• Fault communicating 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 172 and the parameters of the [TORQUE OR I LIM. DETECT.] (tId-) fault, page 217).
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

Faults - Causes - Remedies

Faults that can be reset as soon as their causes disappear

The USF fault can be inhibited and cleared remotely by means of a logic input or control bit ([Fault inhibit assign.] (InH) parameter, page 215).

Fault	Name	Probable cause	Remedy
CFF	[Incorrect config.]	• Option card changed or removed	• Check that there are no card errors. • In the event of the option card being changed/removed deliberately, see the remarks below
		• Control card replaced by a control card configured on a drive with a different rating	• Check that there are no card errors. • In the event of the control card being changed deliberately, see the remarks below
		• The current configuration is inconsistent	• Return to factory settings or retrieve the backup configuration, if it is valid (see page 230)
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 219, 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 ACOPOSinverter P84 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 209)
USF	[Undervoltage]	• Line supply too low • Transient voltage dip	• Check the voltage and the parameters of [UNDERVOLTAGE MGT] (USb-), page 212

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 230) for the parameter groups affected by the card. These are as follows:

Card replaced by a card of the same type

- Encoder cards: [Drive menu] (drM)
- Communication cards: only the parameters that are specific to communication cards

Card removed (or replaced by a different type of card)

- Encoder card: [Drive menu] (drM)
- Communication card: [Drive menu] (drM) and parameters specific to communication cards

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.**

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	

User settings tables

Other parameters (table to be created by the user)

Code	Name	Customer setting

Code	Name	Customer setting

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AIC-					99						
A2C-					99						
A3C-					99						
AC2			47				123 136 165				
ACC	38		47				121				
AdC							127				
AdCO									223		
AI1A		44			86						
AI1E					86						
AI1F					86						
AI1S					86						
AI1t					86						
AI2A		44			87						
AI2E					87						
AI2F					87						
AI2L					87						
AI2S					87						
AI2t					87						
AIC1					88		163				
ALGr		43, 45									
AO1					97						
AO1F					98						
AO1t					97						
AOH1					97						
AOL1					97						
APH		43, 45									
ASH1					98						
ASL1					98						
Atr								205			
AU1-					88						
AUS		43, 45									
AUt				62							
bbA				77							
bC1							145				
bdCO									223		

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bECd							146				
bEd							147				
bEn			57				146				
bEt			58				146				
bFr	36			61							
b IP							145				
b Ir			57				146				
bLC							145				
brA							124				
brHD							148				
brH1							148				
brH2							149				
brH3							149				
brH4							149				
brD								218			
brP								218			
brr							149				
brt			57				146				
brU								218			
bSP					84						
bSt							145				
bUb								218			
CCFG	35										
CCS						110					
Cd1						110					
Cd2						110					
CFG	35										
CFPS		43, 45									
CHA1							185				
CHA2							185				
CHCF						109					
CHn							190				
CL2			53				174				
CL1			53	74			174				
CLL								216			
CLO							156				

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CLS							183				
CnF1							190				
CnF2							190				
CnFS		43, 45									
COd											238
COd2											238
COF							156				
COL								216			
COP						111					
COr							156				
CP1							151				
CP2							151				
CrH2					87						
CrL2					87						
CSt											238
Ctd			58								
Ctt				63							
dA2							120				
dA3							120				
dAF							182				
dAL							182				
dAr							182				
dAS							178				
dbn							170				
dbP							170				
dbS							178				
dCF			51				125	220			
dCI							126				
dCO							200				
dE2			47				123, 136				
dEC	38		47				121				
dLb							158				
dLd							158				
dLr											238
dOI					94						

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dOId					94						
dOIH					94						
dOIS					94						
dSF							183				
dSI							136				
dSP							134				
dtF							197				
Eb0							196				
ECC								217			
ECt								217			
EFI					91						
EFr					91						
EIL					91						
EnA				73							
EnC				71	90						
EnS				69	90						
EnU				71	91						
EPL								211			
ErC0									223		
EtF								211			
F1				64							
F2				64							
F2d			59								
F3				64							
F4				64							
F5				64							
FCP				65							
FCS1										230	
FFt			59				125				
FL1							138				
FLO									224		
FLOC									224		
FLOt									224		
FLr								206			
FLU			54				138				
FP1							165				

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Fr1						109					
Fr1b							119				
Fr2						110					
FrH		43, 45									
FrS	36			61							
FrSS				68							
Frt							123				
Fry-										230	
FSt							125				
Ftd			59								
GFS										230	
GIE			51	73							
GPE			51	73							
HFF-							199				
HLS							199				
HSO							156				
HSP	38		48								
Ibr			57				145				
IbrA							151				
IdA				67							
IdC			51				126	220			
IdC2			51				126	220			
IdN				67							
InH								215			
Inr			47				121				
InSP				61							
IntP							172				
IPL	36							209			
Ird			57				145				
ItH	38		48								
JdC			58				147				
JF2			59								
JF3			59								
JFH			59								
JGF			54				129				
JGt			54				129				

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JOG							129				
JPF			59								
LIA to LI4A		44			82						
LId to LI4d					82						
LAF							140				
LAr							140				
LAS							140				
LbA				77							
LbC			59	77							
LbC1				79							
LbC2				79							
LbC3				79							
LbF				79							
LC2							174				
LCr		43, 45									
LCt							176				
Ld5				66							
LES							176				
LEt								211			
LFA				67							
LFF								220			
LFL2								214			
LFn				67							
LIS1		44									
LIS2		44									
LLC							176				
LP1							151				
LP2							151				
L95				66							
LSP	38		48								
nA2							120				
nA3							120				
nFr		43, 45	56								
nnF		43, 45									
nCA1									222		
nCA2									222		

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nCA3									222		
nCA4									222		
nCA5									222		
nCA6									222		
nCA7									222		
nCA8									222		
nCr	36			61							
nCrS				66							
nLS							183				
nMA1									222		
nMA2									222		
nMA3									222		
nMA4									222		
nMA5									222		
nMA6									222		
nMA7									222		
nMA8									222		
nPr	36			61							
nrd				75							
nSL				67							
nSP	36			61							
nSPS				66							
nSt							125				
OCC							178				
Odt								208			
OFI				74							
OHL								209			
OLL								208			
OPL								208			
OPr		43, 45									
OSP							156				
PAH			56				164				
PAL			56				164				
PAS							183				
PAU							165				
PEr			57				164				

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PES							151				
PGA					91						
PGI				69	91						
PHS				66							
PHr	37			62							
PIC							164				
PIF							163				
PIF1							163				
PIF2							163				
PII							163				
PIN							165				
PIP1							163				
PIP2							163				
PIS							164				
POH			56				164				
POL			56				164				
PPI								219			
PPn				67							
PPnS				66							
Pr2							167				
Pr4							167				
PrP			56				164				
PS1-							185				
PS2-							186				
PS3-							186				
PS2							131				
PS4							131				
PS8							131				
PS16							131				
PSr			57				165				
PSt						109					
PtCL								203			
PtH		43, 45									
9SH			58				196				
9SL			58				196				
r1					92						

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rId					93						
rIH					93						
rIS					93						
r2					93						
r2d					93						
r2H					93						
r2S					93						
rAP				73							
rCA							178				
rCb							119				
rdG			56				164				
rFC						110					
rFr		43, 45									
rFt-							198				
rIG			56				164				
rIn						109					
rP								204			
rP2			57				167				
rP3			57				167				
rP4			57				167				
rPA								204			
rPC		43, 45									
rPE		43, 45									
rPF		43, 45									
rPG			56				163				
rPI							163				
rPO		43, 45									
rPS							123				
rPt							121				
rrS					81						
rSA				67							
rSAS				66							
rSd							156				
rSF								204			
rSL							166				
rSn				67							

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