# Altivar 71

Programming manual

Variable speed drives
for asynchronous motors



*a brand of*
**Schneider**
**Electric**

**Telemecanique**

# Table of contents

# Warnings

When the drive is powered up, the power components and some of the control components are connected to the line supply. It is extremely dangerous to touch them. *The drive cover must be kept closed.*

In general, *the drive power supply must be disconnected* before any operation on either the electrical or mechanical parts of the installation or machine.
After the ALTIVAR has been switched off, *wait for 15 minutes and allow the indicator light to go out before working on the equipment. This is the time required for the capacitors to discharge.*

The motor can be stopped during operation by inhibiting start commands or the speed reference while the drive remains powered up. If personnel safety requires prevention of sudden restarts, electronic locking is performed by the Altivar 71's "Power Removal" function and the use of connection diagrams conforming to category 3 of standard EN954-1 and integrity level 2 according to IEC/EN 61508*.*

The drive is fitted with safety devices which, in the event of a fault, can shut down the drive and consequently the motor. The motor itself may be stopped by a mechanical blockage. Finally, voltage variations, especially line supply failures, can also cause shutdowns.
Unless the "Power Removal" safety function has been activated, if the cause of the shutdown disappears, there is a risk of restarting, which may endanger certain machines or installations, especially those, which must conform to safety regulations.

*In this case the user must take precautions against the possibility of restarts, in particular by using a low speed detector to cut off power to the drive if the motor performs an unprogrammed shutdown.*

The drive must be installed and set up in accordance with both international IEC and national standards. Bringing the device into conformity is the responsibility of the systems integrator who must observe the EMC directive and the LV directive within the European Union.

The Altivar 71 must be considered as a component: it is neither a machine nor a device ready for use in accordance with European directives (machinery directive and electromagnetic compatibility directive). It is the responsibility of the end user to ensure that the machine meets reference standards.

The drive must not be used as a safety device for machines posing a potential risk of material damage or personal injury (lifting equipment, for example). In such applications, overspeed checks and checks to ensure that the trajectory remains under constant control must be made by separate devices, which are independent of the drive.

The products and equipment described in this document may be changed or modified at any time, either from a technical point of view or in the way they are operated. Their description can in no way be considered contractual.

# Steps for setting up the drive

## INSTALLATION

☐ **1** Consult the Installation Manual

## PROGRAMMING

■ **2** Power-up without run command

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

■ **4** Configure the [SIMPLY START] menu

## Tips:

- Before you start programming, complete the user settings tables (page **xx**).

- Perform an auto-tuning operation to optimize performance (page **xx**).

- If you get lost, revert to the factory settings (page **xx**).

# Factory configuration

## Drive factory settings

The Altivar 71 is factory-set for the most common operating conditions:
- Macro-configuration: Start/Stop
- **Motor** frequency (bFr): 50 Hz
- Constant torque application with sensorless flux vector control (Ctt = UUC)
- Normal stop mode on deceleration ramp (Stt = rMP)
- Stop mode in the event of a fault: Freewheel
- Linear ramps (ACC, dEC): 3 seconds
- Low speed (LSP): 0 Hz
- High speed (HSP): 50 Hz
- Motor thermal current (ItH) = Rated motor current (value depending on drive rating)
- Standstill injection braking current (SdC1) = 0.7 x rated drive current, for 0.5 seconds
- No automatic restarting after a fault
- Switching frequency 4 kHz for drives up to 18 kW; 2.5 kHz for higher power ratings
- Logic inputs:
  - LI1, LI2 (2 directions of operation): 2-wire control on transition, LI1 = forward, LI2 = reverse
  - LI3, LI4, LI5, LI6: Inactive (not assigned)
- Analog inputs:
  - AI1: Speed reference 0 -10 V
  - AI2: 4-20 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: 0-10 V, inactive (not assigned)

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

## Option card factory settings

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

# Your application functions

The tables on the following pages list the most common function/application combinations in order to assist you in making your selections. The applications listed in these tables concern the following machines in particular:
- **Hoisting:** Cranes, overhead cranes, gantries (vertical lifting, translation, slewing), lifting platforms
- **Elevators:** Elevator in retrofit up to 1.2 ms
- **Handling:** Palletizers/depalletizers, conveyors, roller tables
- **Packing:** Carton packers, labeling machines
- **Textiles:** Weaving looms, cards, washing machines, spinners, drawing frames
- **Wood:** Automatic lathes, saws, milling
- **High inertia:** Centrifuges, mixers, unbalanced machines (beam pumps, presses)
- **Process**

**The combinations listed are neither mandatory nor exhaustive. Every machine has its own particular features.**

**Some functions have been designed specifically for a given 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 | Elevators | Handling | Packing | Textiles | Wood | High inertia | Process |
| V/f ratio | | | | ■ | | | ■ | ■ | |
| Sensorless flux vector control | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Flux vector control with sensor | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 2-point vector control | | ■ | | | | ■ | | | |
| Open-loop synchronous motor | | | | | | ■ | | | |
| Output frequency 1000 Hz | | | | | | ■ | ■ | | |
| Stressless PWM | | | | | | ■ | ■ | | |
| DC bus connection | | | | | | ■ | | | ■ |
| Reversible module connection | | ■ | ■ | ■ | | | | | |
| Motor fluxing via logic input | | ■ | | ■ | ■ | | | | |
| Switching frequency up to 16 kHz. | | | ■ | | | ■ | ■ | | |
| Auto-tune | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

# Your application functions

## Functions on speed references

| Functions | Page | Applications | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Hoisting | Elevators | Handling | Packing | Textiles | Wood | High inertia | Process |
| Differential bipolar reference | | ■ | | ■ | ■ | | | | |
| Reference delinearization (magnifying glass effect) | | ■ | | ■ | | | | | |
| Frequency control input | | | | | | ■ | | | ■ |
| Reference switching | | | | | ■ | | | | |
| Reference summing | | | | | ■ | | | | |
| Reference subtraction | | | | | ■ | | | | |
| Reference multiplication | | | | | ■ | | | | |
| S ramps | | ■ | ■ | ■ | | | | | |
| Jog operation | | | | ■ | | ■ | | | ■ |
| Preset speeds | | ■ | ■ | ■ | ■ | | | ■ | |
| +/- speed via single-action buttons | | | | | | | | | ■ |
| +/- speed via double-action buttons | | ■ | | | | | | | |
| +/- speed around a reference | | | | | | ■ | | | ■ |
| Save reference | | | | | | | | | ■ |

# Your application functions

## Specific application functions

| Functions | Page | Applications | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Hoisting | Elevators | Handling | Packing | Textiles | Wood | High inertia | Process |
| Fast stop | | | | | | | ■ | ■ | |
| Management of limit switches | | ■ | ■ | ■ | | | | | |
| Brake control | | ■ | ■ | ■ | | | | | |
| Load measurement | | ■ | ■ | | | | | | |
| High-speed hoisting | | ■ | | | | | | | |
| PID regulator | | | | | | | | | ■ |
| Torque regulation | | | | ■ | | ■ | | | ■ |
| Limitation of motor/generator torque | | | | ■ | | ■ | | ■ | ■ |
| Load sharing | | ■ | | ■ | | | | | |
| Line contactor control | | ■ | | ■ | | | ■ | | |
| Output contactor control | | | ■ | | | | | | |
| Positioning on limit switches | | | | ■ | ■ | | | | |
| ENA system | | | | | | | | ■ | |
| Multiparameter | | | | | | | | | |
| Multimotor | | ■ | | ■ | ■ | | | | |
| Multiconfiguration | | | | | | | | | |
| Traverse control | | | | | | ■ | | | |
| Configuration of stops | | | | ■ | | ■ | ■ | ■ | |

# Your application functions

## Safety/fault management functions

| Functions | Page | Applications | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Hoisting | Elevators | Handling | Packing | Textiles | Wood | High inertia | Process |
| Power Removal (safety function) | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Alarm handling | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Fault management | | | | | | | | | |
| IGBT tests | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Catch on the fly | | | | | | ■ | ■ | ■ | |
| Thermal protection for braking resistors | | ■ | ■ | ■ | ■ | | | | |
| Motor protection with PTC probes | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Undervoltage management | | | | | | ■ | ■ | ■ | |
| Loss follower | | ■ | ■ | ■ | | ■ | ■ | | ■ |
| Uncontrolled output cut | | | | ■ | | | | | |
| Automatic restart | | | | | | | | | |

## Communication functions

| Functions | Page | Applications | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Hoisting | Elevators | Handling | Packing | Textiles | Wood | High inertia | Process |
| Modbus | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| CANopen | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Communication scanner | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

# Setup - Preliminary recommendations

## Switching on and configuring the drive

⚠ **Before** switching on and configuring the drive:
- Check that the line voltage is compatible with the supply voltage range of the drive (see pages 3 and 4 of the ATV 71 Installation Manual). The drive may be damaged if the line voltage is not compatible.
- Ensure the logic inputs are switched off (state 0) to prevent accidental starting. Otherwise, an input assigned to the run command may cause the motor to start immediately on exiting the configuration menus.

## Power switching via line contactor

⚠ - **Use inputs LI1 to LI6 to control the drive.**
Avoid operating the contactor frequently (premature ageing of the filter capacitors).
- **These instructions are vital for cycles < 60 s, otherwise the load resistor may be damaged.**

## User settings and extension of functions

- The display unit and buttons can be used to modify the settings and to extend the functions described on the following pages.
- **Reverting to factory settings** is made easy by the [1.12 FACTORY SETTINGS] (FCS-) menu, see page xx.
- There are three types of parameter:
  - Display: Values displayed by the drive
  - Setting: 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.

⚠ - **If possible, changes should only be made when the drive is at a standstill.**
- **If changes to settings have to be made during operation, make sure that they do not endanger equipment or personnel in any way.**

## Starting

**Important:**
- In the following cases, the motor can only be supplied with power after first resetting the "forward", "reverse" and "DC injection stop" commands:
  - In factory settings mode
  - 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.
- These commands are taken into account without a reset being necessary if the automatic restart function has been configured ([Automatic restart] (Atr) parameter in the [1.8-FAULT MANAGEMENT] (FLt-) menu, see page 173),

## Test on a low-power motor or without a motor

- In factory settings mode, [Output phase loss] detection is active (OPL = YES), see page xx. 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" detection (OPL = NO).
- Configure [Motor control type] (Ctt) = [V/F 2pts] (UF2) or [V/f 5pts] (UF5) ([1.4-MOTOR CONTROL] (drC-) menu, see page 56).

⚠ - Motor thermal protection will not be provided by the drive if the motor current is less than 0.2 times the rated drive current.

## 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 56).

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

# Graphic display terminal

Although the graphic terminal is optional for low-power drives, it is a standard component on high-power drives (see catalog). The 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 the terminal
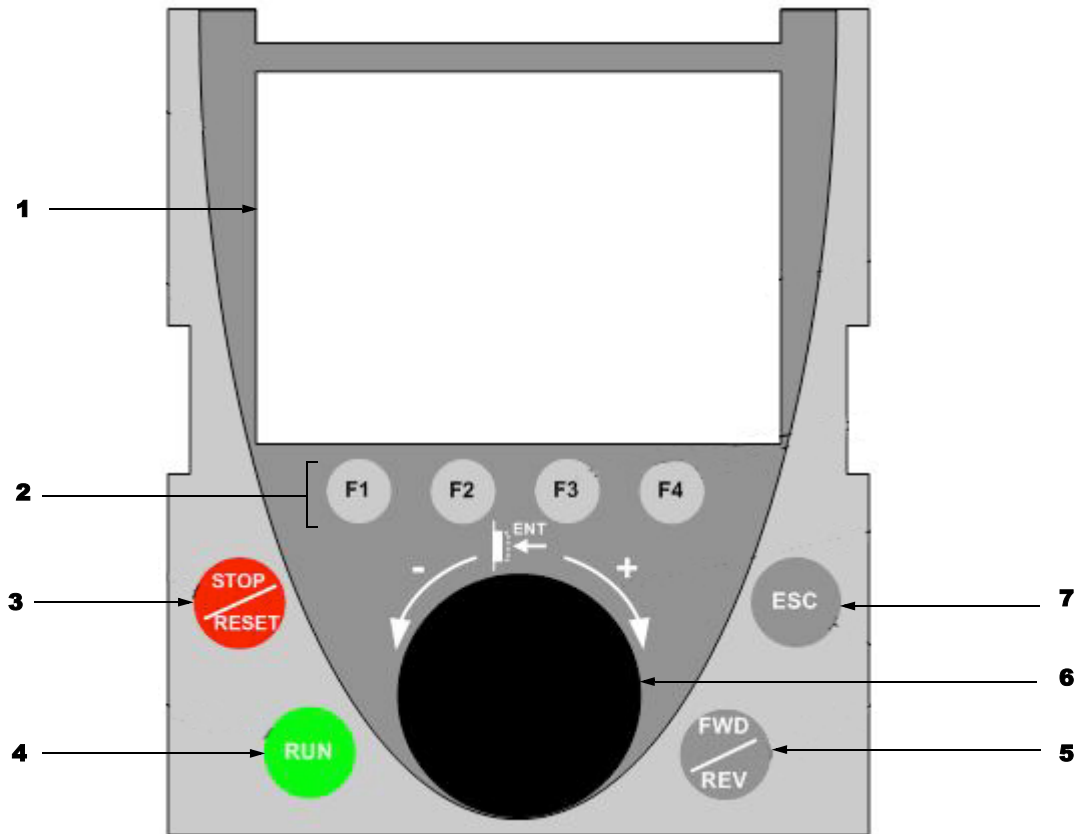


**1.** Graphic display

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

**3.** STOP/RESET button

**4.** RUN button

**5.** Button for reversing the direction of rotation of the motor

**6.** Navigation button
- Press:          - To save the current value (ENT)
- Turn CW/     - To increment or decrement a value
  CCW:          - To switch to the next or previous line

**7.** ESC button: To clear a value, a parameter or a menu and revert to the previous selection

**Note:** Buttons 3, 4 and 6 can be used to control the drive directly.

# Graphic display terminal

## Description of the graphic screen

| 1 → | RDY | Term | +0.00 Hz | 0 A |
|---|---|---|---|---|
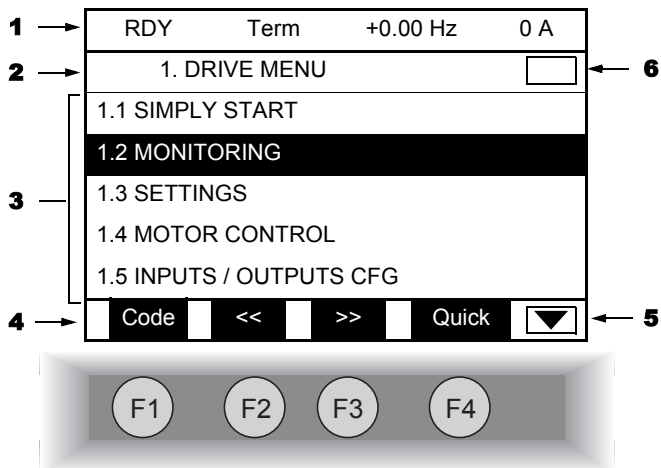
**1.** Display line. Its content is configurable. In factory settings mode, it indicates:
- The drive status (see page 14)
- The active control channel:
  - Term: Terminals
  - LCC: Graphic display terminal
  - MDB: Modbus
  - CAN: CANopen
  - NET: Communication card
  - APP: Programmable card
- Frequency reference
- Current in the motor

**2.** Menu line. Indicates the name of the current menu or sub-menu

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

**4.** Display functions assigned to keys F1 to F4, aligned with these keys, for example:

- Code (F1): Displays the code of the selected parameter, i.e. the code corresponding to the 7-segment display.

- >> (F3): Navigate horizontally to the right or switch to next menu/sub-menu (switching to the [2-LEVEL ACCESS] menu in this example) or, for a value, switch to the next digit down, displayed in reverse video (see the example below).

- << (F2): Navigate horizontally to the left, or switch to previous menu/sub-menu or, for a value, switch to the next digit up, displayed in reverse video (see the example below).

- Quick (F4): Quick navigation, see page 19.

- HELP: Contextual help

The function keys are dynamic and contextual.
Other functions (application functions) can be assigned to these keys via the [1.6-COMMAND] menu.

**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 there are no more levels above this display window.
▲ Indicates that there are more levels above this display window.

# Graphic display terminal

## Drive status 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
- SOC: Controlled output cut in progress
- TUN: Auto-tuning in progress
- USA: Undervoltage alarm

# Graphic display terminal

**Example configuration windows:**

| RDY | Term | +0.00 Hz | 0 A |
|-----|------|----------|-----|
| 5. LANGUAGE ||||
| **ENGLISH** ||||
| FRANCAIS ||| ✓ |
| DEUTSCH ||||
| ESPANOL ||||
| ITALIANO ||||
| | << | >> | Quick |

CHINESE

When only one possible selection can be made, that selection is indicated by ✓

| PARAMETER SELECTION |||
|-----|------|------|
| 1.3 SETTINGS |||
| Ramp increment || ☑ |
| Acceleration || ☑ |
| Deceleration || ☐ |
| Acceleration 2 || ☐ |
| Deceleration 2 || ☐ |
| | | Edit |

When a number of possible selections can be made, these selections are indicated by ☑

**Example configuration window for one value:**

| RDY | Term | +0.00 Hz | 0 A |
|-----|------|----------|-----|
| ACCELERATION ||||
| | | | |
| | **9**.51 s | | |
| | | | |
| Min = 0.01 Max = 9999 ||||
| | << | >> | Quick |

>>
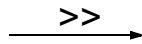
| RDY | Term | +0.00 Hz | 0 A |
|-----|------|----------|-----|
| ACCELERATION ||||
| | | | |
| | 9.**5**1 s | | |
| | | | |
| Min = 0.01 Max = 9999 ||||
| | << | >> | Quick |

# Graphic display terminal

## 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] sub-menu must be configured and auto-tuning performed before the motor is started up.
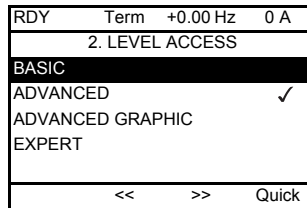


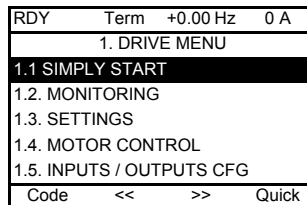Display for 3 seconds following power-up

3 seconds
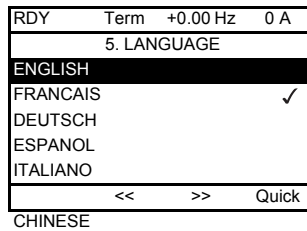


Switches to [5. LANGUAGE] menu automatically 3 seconds later.
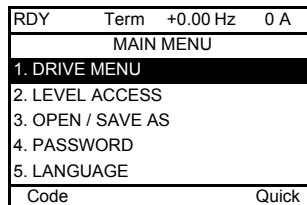Select the language and press ENT.

ESC



Switches to [2. LEVEL ACCESS] menu (see page 25)
Select the access level and press ENT.

ESC



Switches to [1. DRIVE MENU]
(see page 21)

ESC



Press ESC to return to [MAIN MENU]

# Graphic display terminal

## Subsequent power-ups

```
┌─────────────────────────────┐
│   (⊞) Telemecanique         │
│                             │
│      ATV71HU22N4            │
│    2.2kW/3HP 380/480V       │
│                             │
└─────────────────────────────┘
```

3 seconds ↓

```
┌─────────────────────────────┐
│RDY     Term    +38 Hz   0 A │
│        1. DRIVE MENU        │
│ 1.1 SIMPLY START            │
│ 1.2 MONITORING              │
│ 1.3 SETTINGS                │
│ 1.4 MOTOR CONTROL           │
│ 1.5 INPUTS / OUTPUTS CFG    │
│ Code    <<      >>    Quick │
└─────────────────────────────┘
```

Switches to [1. DRIVE MENU] 3 seconds later.

10 seconds ↓

```
┌─────────────────────────────┐
│RDY     Term    +38 Hz   0 A │
│        Frequency ref        │
│                             │
│         38 Hz               │
│  _____        │
│ Min=0            Max=60     │
│                      Quick  │
└─────────────────────────────┘
```

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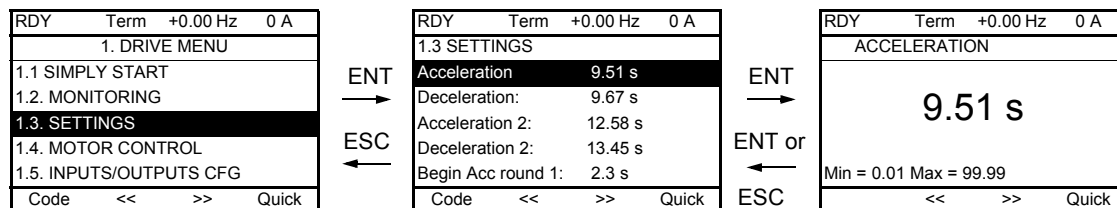
ENT or ESC ↓

```
┌─────────────────────────────┐
│RDY     Term    +38 Hz   0 A │
│        MAIN MENU            │
│ 1. DRIVE MENU               │
│ 2. LEVEL ACCESS             │
│ 3. OPEN / SAVE AS           │
│ 4. PASSWORD                 │
│ 5. LANGUAGE                 │
│ Code    <<      >>    Quick │
└─────────────────────────────┘
```

May revert to [MAIN MENU] by pressing ENT or ESC.

# Graphic display terminal

## Programming: Example of accessing a parameter

### Accessing the acceleration ramp

| RDY | Term | +0.00 Hz | 0 A |
|-----|------|----------|-----|
| 1. DRIVE MENU | | | |
| 1.1 SIMPLY START | | | |
| 1.2. MONITORING | | | |
| 1.3. SETTINGS | | | |
| 1.4. MOTOR CONTROL | | | |
| 1.5. INPUTS/OUTPUTS CFG | | | |
| Code | << | >> | Quick |

ENT →
ESC ←

| RDY | Term | +0.00 Hz | 0 A |
|-----|------|----------|-----|
| 1.3 SETTINGS | | | |
| Acceleration | | 9.51 s | |
| Deceleration: | | 9.67 s | |
| Acceleration 2: | | 12.58 s | |
| Deceleration 2: | | 13.45 s | |
| Begin Acc round 1: | | 2.3 s | |
| Code | << | >> | Quick |

ENT →
ENT or ← ESC

| RDY | Term | +0.00 Hz | 0 A |
|-----|------|----------|-----|
| ACCELERATION | | | |
| | 9.51 s | | |
| Min = 0.01 Max = 99.99 | | | |
| | << | >> | Quick |

Note:

- To select a parameter:
  - Turn the navigation button to scroll vertically.

- To modify a parameter:
  - Use << and >> to scroll horizontally and select the digit to be modified.
  - Turn the navigation button to modify the digit.

- To cancel the modification:
  - Press ESC.

- To save the modification:
  - Press the navigation button (ENT).

# Graphic display terminal

## Quick navigation

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

**Example:**

```
RDY      Term     +0.00      0 A
                    Hz
*     1.4 MOTOR CONTROL *
Standard mot. freq: 50 Hz IEC
Rated motor power: 0.37 kW
Rated motor volt.: 206 V
Rated mot. current: 1.0 A
Rated motor speed: 1480 rpm
         <<       >>     Quick
```

Press F4 to access the Quick screen.
There are 4 options.

```
RDY      Term   +0.00 Hz    0 A
*    QUICK NAVIGATION *
RETURN TO MAIN MENU
DIRECT ACCESS TO
10 LAST MODIFICATIONS
RETURN MULTIPOINT SCREEN

   Code
```

ENT

See page xx

- [HOME]: Return to [MAIN MENU].

```
RDY      Term   +0.00 Hz    0 A
            MAIN MENU
1.DRIVE MENU
2. LEVEL ACCESS
3. OPEN / SAVE AS
4. PASSWORD
5. LANGUAGE
   Code                  Quick
```

- [DIRECT ACCESS TO]: Opens the direct access window, which will contain the text "1.1": sub-menu 1 of menu 1. The function keys << and >> 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.

```
RDY      Term   +0.00 Hz    0 A
*    DIRECT ACCESS TO *


           1.3


         <<       >>
```

ENT

```
RDY      Term   +0.00 Hz    0 A
1.3 SETTINGS
Acceleration          9.51 s
Deceleration:         9.67 s
Acceleration 2:       12.58 s
Deceleration 2:       13.45 s
Begin Acc round 1:    2.3 s
   Code    <<    >>    Quick
```

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

```
RDY      Term   +0.00 Hz    0 A
*    10 LAST MODIFICATIONS *
Acceleration: 10 s
ENA prop. gain: 1,2
Rated mot. current: 15 A
Preset speed 4: 20 Hz
Preset speed 5: 30 Hz
   Code
```

ENT

ESC

```
RDY      Term   +0.00 Hz    0 A
*    RATED MOT. CURRENT *


          15.0 A


         <<       >>
```

# Graphic display terminal

## [MAIN MENU] - Menu mapping

```
RDY      Term    +0.00 Hz    0 A
           MAIN MENU
1.DRIVE MENU
2. LEVEL ACCESS
3. OPEN / SAVE AS
4. PASSWORD
5. LANGUAGE
  Code     <<      >>     Quick
 6. DISPLAY CONFIG.
 7. MONITORING CONFIG.
```

```
RDY      Term    +0.00 Hz    0 A
          1. DRIVE MENU
1.1 SIMPLY START
1.2 MONITORING
1.3 SETTINGS
1.4 MOTOR CONTROL
1.5 INPUTS / OUTPUTS CFG
  Code     <<      >>     Quick
1.6 COMMAND
1.7 APPLICATION FUNCT.
1.8 FAULT MANAGEMENT
1.9 COMMUNICATION
1.10 DIAGNOSTICS
1.11 IDENTIFICATION
1.12 FACTORY SETTINGS
1.13 USER MENU
1.14 PROG. CARD
```

## Content of [MAIN MENU] menus

| | |
|---|---|
| [1. DRIVE MENU] | See over |
| [2. LEVEL ACCESS] | 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] | Password protection for configuration |
| [5. LANGUAGE] | Language selection |
| [6. DISPLAY CONFIG. ] | • Customization of parameters<br>• Creation of a customized user menu<br>• Customization of the visibility of protection mechanisms for menus and parameters |
| [7. MONITORING CONFIG.] | Customization of information displayed on the graphic terminal during operation |

# Graphic display terminal

## [1. DRIVE MENU]

```
RDY       Term   +0.00 Hz   0 A
             1. DRIVE MENU
1.1 SIMPLY START
1.2 MONITORING
1.3 SETTINGS
1.4 MOTOR CONTROL
1.5 INPUTS / OUTPUTS CFG
   Code      <<        >>     Quick
```
1.6 COMMAND
1.7 APPLICATION FUNCT.
1.8 FAULT MANAGEMENT
1.9 COMMUNICATION
1.10 DIAGNOSTICS
1.11 IDENTIFICATION
1.12 FACTORY SETTINGS
1.13 USER MENU
1.14 PROG. CARD

## Content of [1. DRIVE MENU] menus

| | |
|---|---|
| [1.1 SIMPLY START]: | Simplified menu for fast startup |
| [1.2 MONITORING]: | Visualization of current, motor and input/output values |
| [1.3 SETTINGS]: | Setting parameters, can be modified during operation |
| [1.4 MOTOR CONTROL]: | Motor parameters (motor rating plate, 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 (terminals, display terminal, 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]: | Identification of drive and 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 [6. DISPLAY CONFIG.] menu |
| [1.14 PROG. CARD]: | Configuration of optional programmable card |

# Integrated display terminal

Low-power Altivar 71 drives (see catalog) 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



- 2 Modbus status LEDs
- 4 7-segment displays
- 2 CANopen status LEDs
- Returns to the previous menu or parameter, or increases the displayed value
- Goes to the next menu or parameter, or decreases the displayed value
- Exits a menu or parameter, or aborts the displayed value to return to the previous value in the memory
- Enters a menu or a parameter, or saves the displayed parameter or value

⚠ • **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 starting:**

- 43.0: Display of the parameter selected in the SUP menu (default selection: motor frequency).
  In current limit mode, the display flashes.
- 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
- PrA: Power Removal function active (drive locked)
- rdY: Drive ready
- SOC: Controlled output cut in progress
- tUn: Auto-tuning in progress.

**If there is a fault, the display flashes.**

# Integrated terminal

## Accessing menus

Power-up

XXX  Displays the drive status

(ENT)

Menus

S IN -  →  SIMPLY START  (page 28) Simplified menu for fast startup

S UP -  →  MONITORING  (page 36) Visualization of current, motor and input/output values

S E t -  →  SETTINGS  (page xx) Setting parameters, can be modified during operation

d r C -  →  MOTOR CONTROL  (page 54) Motor parameters (motor rating plate, auto-tuning, switching frequency, control algorithms, etc.)

I - O -  →  INPUTS / OUTPUTS CFG  (page 65) I/O configuration (scaling, filtering, 2-wire control, 3-wire control, etc.)

C t L -  →  CONTROL  (page 86) Configuration of command and reference channels (terminals, display terminal, bus, etc.)

F U n -  →  APPLICATION FUNCT.  (page 99) Configuration of application functions (e.g.: preset speeds, PID, brake logic control, etc.)

F L t -  →  FAULT MANAGEMENT  (page 171) Configuration of fault management

C O N -  →  COMMUNICATION  (page xx) Communication parameters (fieldbus)

F C S -  →  FACTORY SETTINGS  (page xx) Access to configuration files and return to factory settings

U S r -  →  USER MENU  (page xx) Specific menu, set up by the user using the graphic display terminal.

L A C -  →  LEVEL ACCESS  (page 25)

C O d -  →  PASSWORD  (page 194)

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

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

# Integrated terminal

## Accessing menu parameters

**Save and store the selection:** (ENT)



Menu     Parameter    Value or assignment

(Next parameter)

The display flashes when a value is stored.
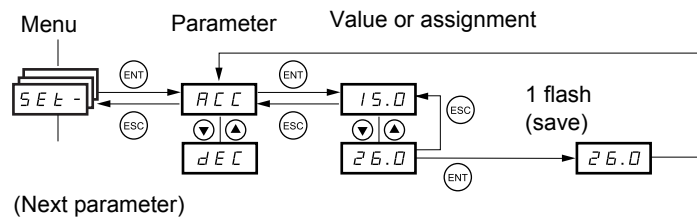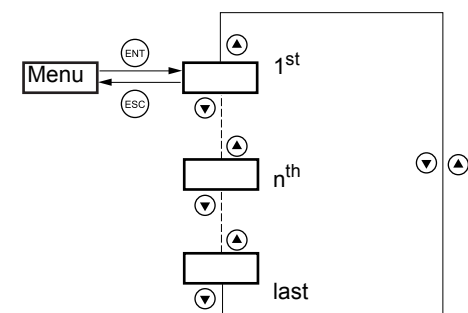


All the menus are "drop-down" type menus, which means that after the last parameter, if you continue to press ▼ , you will return to the first parameter and, conversely, you can switch from the first parameter to the last parameter by pressing ▲ .
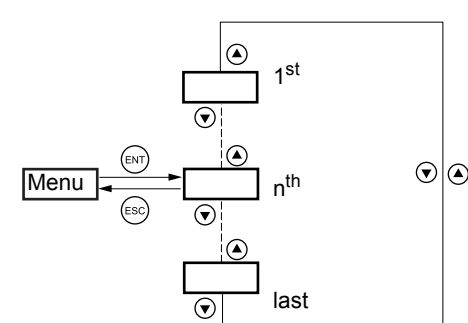


If, after modifying any of the parameters ($n^{th}$), you quit a menu and return to this menu without having accessed another menu in the meantime, you will be taken directly to the $n^{th}$ parameter (see below). If, in the meantime, you have accessed another menu or have restarted the system, you will always be taken to the first parameter in the menu (see above).

## Selection of multiple assignments for one parameter



Alarm not selected
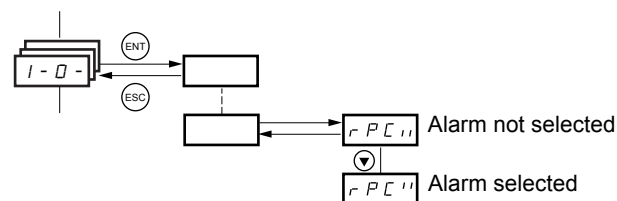
Alarm selected

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.

# [2. LEVEL ACCESS] (LAC-)

## With graphic display terminal

BASIC
Access to 5 menus only, and access to 6 sub-menus only in the
[1. DRIVE MENU] menu

```
RDY      Term   +0.00 Hz   0 A
         LEVEL ACCESS
BASIC
ADVANCED                      ✓
ADVANCED GRAPHIC
EXPERT

         <<      >>     Quick
```

```
RDY      Term   +0.00 Hz   0 A
           MAIN MENU
1. DRIVE MENU
2. LEVEL ACCESS
3. OPEN / SAVE AS
4. PASSWORD
5. LANGUAGE
   Code                  Quick
```

```
RDY      Term   +0.00 Hz   0 A
          1. DRIVE MENU
1.1 SIMPLY START
1.2. MONITORING
1.3. SETTINGS
1.11. IDENTIFICATION
1.12. FACTORY SETTINGS
   Code                  Quick
1.13 USER MENU
```

ADVANCED
Access to 6 menus only, and access to all sub-menus in the
[1. DRIVE MENU]

```
RDY      Term   +0.00 Hz   0 A
           MAIN MENU
1. DRIVE MENU
2. LEVEL ACCESS
3. OPEN / SAVE AS
4. PASSWORD
5. LANGUAGE
   Code                  Quick
```

```
RDY      Term   +0.00 Hz   0 A
          1. DRIVE MENU
1.1 SIMPLY START
1.2 MONITORING
1.3 SETTINGS
1.4 MOTOR CONTROL
1.5 INPUTS / OUTPUTS CFG
   Code    <<     >>     Quick
1.6 COMMAND
1.7 APPLICATION FUNCT.
1.8 FAULT MANAGEMENT
1.9 COMMUNICATION
1.10 DIAGNOSTICS
1.11 IDENTIFICATION
1.12 FACTORY SETTINGS
1.13 USER MENU
1.14 PROG. CARD
```

ADVANCED GRAPHIC
Access to all menus and sub-menus

```
RDY      Term   +0.00 Hz   0 A
           MAIN MENU
1. DRIVE MENU
2. LEVEL ACCESS
3. OPEN / SAVE AS
4. PASSWORD
5. LANGUAGE
   Code    <<     >>     Quick
 6. DISPLAY CONFIG.
 7. MONITORING CONFIG.
```

EXPERT
Access to all menus and sub-menus as for [ADVANCED GRAPHIC] level, and
access to additional parameters.

```
RDY      Term   +0.00 Hz   0 A
           MAIN MENU
1. DRIVE MENU
2. LEVEL ACCESS
3. OPEN / SAVE AS
4. PASSWORD
5. LANGUAGE
   Code    <<     >>     Quick
 6. DISPLAY CONFIG.
 7. MONITORING CONFIG.
```

## With integrated display terminal:

| Code | Name/Description | Factory setting |
|------|------------------|-----------------|
| LAC- | | AdU |
| | • bAS: Limited access to SIM, SUP, SEt, FCS, USr, COd and LAC menus<br>• AdU: Access to all menus on the integrated terminal<br>• EPt: Access to all menus on the integrated terminal and access to additional parameters | |

# [2. LEVEL ACCESS] (LAC-)

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

| Graphic display terminal | | Integrated display terminal | Level access | | | |
|---|---|---|---|---|---|---|
| [2. LEVEL ACCESS] | | LAC- (Level access) | BASIC bAS | ADVANCED AdU | ADVANCED GRAPHIC (graphic terminal only) | EXPERT EPt |
| [3. OPEN / SAVE AS] | | - | | | | |
| [4. PASSWORD] | | COd- (Password) | | | | |
| [5. LANGUAGE] | | - | | | | |
| [1. DRIVE MENU] | 1.1 SIMPLY START | SIN- (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 | - | | | | |
| | 1.4 MOTOR CONTROL | drC- (Motor control) | | | | |
| | 1.5 INPUTS / OUTPUTS CFG | I-O- (I/O configuration) | | | | |
| | 1.6 COMMAND | CtL- (Command) | | | | |
| | 1.7 APPLICATION FUNCT. | FUn- (Application functions) | | | | |
| | 1.8 FAULT MANAGEMENT | FLt- (Fault management) | | | | |
| | 1.9 COMMUNICATION | CON- (Communication) | | | | |
| | 1.10 DIAGNOSTICS | - | | | | |
| | 1.14 PROG. CARD | - | | | | |
| [6. DISPLAY CONFIG. ] | | - | | | | |
| [7. MONITORING CONFIG.] | | - | | | | |
| Expert parameters | | Expert parameters | | | | |

# Structure of parameter tables

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

**Example:**

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

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| UPd - | ■ **[+/- SPEED]**<br>Function can be accessed for reference channel [Ref.2 channel] (Fr2) = [+/- speed] (UPd) see page 96 | | [No] (nO) |
| USP | ❏ **[+Speed assign.]**<br>□ **[No]** (nO): Function inactive<br>□ **[LI1]** (LI1) | | |
| L I I | | | |
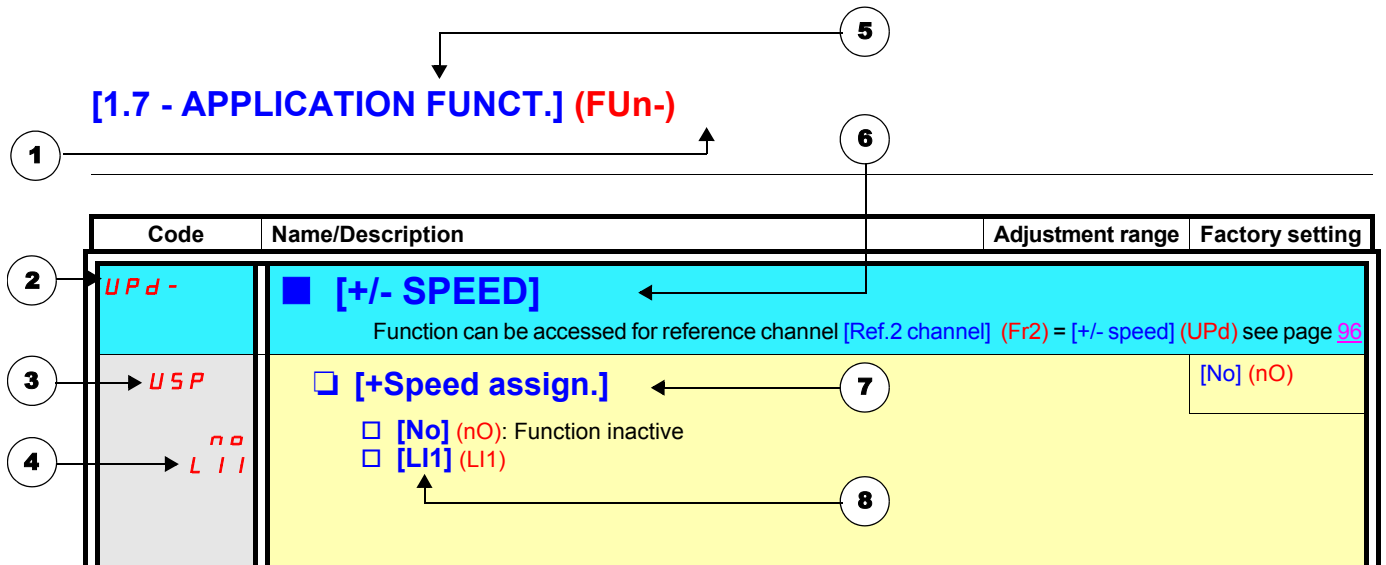
**Note:** The text in square brackets [ ] indicates what you will see on the graphic display terminal.

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

**2.** Sub-menu code on 4-digit "7-segment" display

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

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

**5.** Name of menu on graphic display terminal

**6.** Name of sub-menu on graphic display terminal

**7.** Name of parameter on graphic display terminal

**8.** Value of parameter on graphic display terminal

# [1.1 - SIMPLY START] (SIM-)

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. Auto-tuning may cause the motor to start up.

- With the exception of the [Macro configuration] (CFG), the parameters in this menu can be accessed in other menus.

## Macro configuration

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

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

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

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

# [1.1 - SIMPLY START] (SIM-)

## 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 ] | PID reference | [Ref. 2 channel] ([Ref. 1 channel] from bus) | [Ref. 1 channel] |
| AI2 | [Not assigned] | [Summing ref. 2] | [Summing ref. 2] | [Not assigned] | [PID feedback] | [Not assigned] | [Torque ref. channel] |
| AO1 | [Motor freq.] | [Motor freq.] | [Motor freq.] | [Motor freq.] | [Motor freq.] | [Motor freq.] | [Signed torq] |
| R1 | [Faulty] | [Faulty] | [Faulty] | [Faulty] | [Faulty] | [Faulty] | [Faulty] |
| R2 | [Not assigned] | [Not assigned] | [Not assigned] | [Brk control] | [Not assigned] | [Not assigned] | [Not assigned] |
| LI1 (2-wire) | Forward | Forward | Forward | Forward | Forward | Forward | Forward |
| LI2 (2-wire) | [Reverse] | [Reverse] | [Reverse] | [Reverse] | [Reverse] | [Reverse] | [Reverse] |
| LI3 (2-wire) | [Not assigned] | [2 preset speeds] | [JOG] | [Fault reset] | [PID integral reset] | [Ref2. switching] | [Channel switching] |
| LI4 (2-wire) | [Not assigned] | [4 preset speeds] | [Fault reset] | [Ext. fault assign.] | [2 PID presets] | [Fault reset] | [Fault reset] |
| LI5 (2-wire) | [Not assigned] | [8 preset speeds] | [Torque limitation] | [Not assigned] | [4 PID presets] | [Not assigned] | [Not assigned] |
| LI6 (2-wire) | [Not assigned] | [Fault reset] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] |
| 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) | [Not assigned] | [2 preset speeds] | [JOG] | [Fault reset] | [PID integral reset] | [Ref2. switching] | [Channel switching] |
| LI5 (3-wire) | [Not assigned] | [4 preset speeds] | [Fault reset] | [Ext. fault assign.] | [2 PID presets] | [Fault reset] | [Fault reset] |
| LI6 (3-wire) | [Not assigned] | [8 preset speeds] | [Torque limitation] | [Not assigned] | [4 PID presets] | [Not assigned] | [Not assigned] |
| Option cards | | | | | | | |
| LI7 (2-wire) | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] |
| LI7 (3-wire) | [Not assigned] | [Fault reset] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] |
| LI8 to LI14 | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] |
| LO1 to LO4 | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] |
| R3/R4 | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] |
| AI3, AI4 | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] |
| Pulse in | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] |
| AO2 | [I motor] | [I motor] | [I motor] | [I motor] | [I motor] | [I motor] | [I motor] |
| AO3 | [Not assigned] | [Signed torq] | [Not assigned] | [Signed torq] | [PID error] | [Not assigned] | [Motor freq.] |
| Keys on the graphic display terminal | | | | | | | |
| Key F1 | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | Command via graphic terminal | [Not assigned] |
| Keys F2,F3, F4 | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [Not assigned] | [No | |

[      ]  In 3-wire control, the assignment of inputs LI1 to LI7 shifts.

**Note:** These assignments are forced every time the macro configuration changes.

# [1.1 - SIMPLY START] (SIM-)

## Macro configuration parameters

### Other configurations and settings

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

**Hoisting:**
- [Movement type] (bSt) = [Hoisting] (UEr) page 126
- [Brake contact] (bCI) = [No] (nO) page 126
- [Brake impulse] (bIP) = [No] (nO) page 126
- [Brake release I FW] (Ibr) = [Rated mot. current] (nCr) page 126
- [Brake Release time] (brt) = 0.5 s page 126
- [Brake release freq] (bIr) = [Auto] (AUtO) page 126
- [Brake engage freq] (bEn) = [Auto] (AUto) page 127
- [Brake engage time] (bEt) = 0.5 s page 127
- [Engage at reversal] (bEd) = [No] (nO) page 127
- [Jump at reversal] (JdC) = [Auto] (AUtO) page 127
- [Time to restart] (ttr) = 0 s page127
- [Current ramp time] (brr) = 0 s page 128
- [Low speed] (LSP) = Rated motor slip calculated by the drive, page xx
- [Output Phase Loss] (OPL) = [Yes] (YES) page 176. No further modifications can be made to this parameter.
- [Catch on the fly] (FLr) = [No] (nO) page 174. No further modifications can be made to this parameter.

**Mast./slave:**
- [Motor control type] (Ctt) = [SVC I] (CUC) page 56

**Note:** These assignments are forced every time the macro configuration changes.
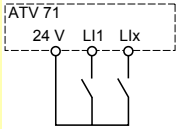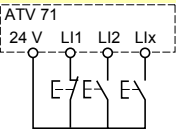
**Return to factory settings:**
Returning to factory settings with [Config. Source] (?) = [Macro configuration] (?) page 189 will return the drive to the selected macro configuration, and not to the [Start/stop] (StS) factory settings macro configuration. The [Macro configuration] (CFG) parameter does not change, although [Customized macro (CCFG) disappears.

# [1.1 - SIMPLY START] (SIM-)

Example diagrams for use with the macro configuration

# [1.1 - SIMPLY START] (SIM-)

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| tCC<br><br>2C<br>3C | ❏ **[2/3 wire control]**<br><br>  ☐ **[2 wire]** (2C)<br>  ☐ **[3 wire]** (3C)<br><br>2-wire control: The open or closed state of the input controls the running or stopping.<br><br>Example of "source" wiring:<br><br>ATV 71<br>24 V  LI1  LIx<br>         LI1: forward<br>         LIx: reverse<br><br>3-wire control (pulse control): a "forward" or "reverse" pulse is sufficient to command starting, a "stop" pulse is sufficient to command stopping.<br><br>Example of "source" wiring:<br><br>ATV 71<br>24 V  LI1  LI2  LIx<br>         LI1: stop<br>         LI2: forward<br>         LIx: reverse<br><br>⚠ Any change in the assignment of [2/3 wire] (tCC) must be confirmed on the graphic display terminal and the "ENT" key must be pressed and held down (2 s) on the integrated terminal.<br>The following function will be returned to factory settings: [2 wire type] (tCt) page 65 as will all functions associated with logic inputs.<br>The macro configuration selected will also be reset if it has been customized (loss of custom settings). | | [2 wire] (2C) |
| CFG<br><br>HdG<br>HSt<br>GEn<br>PId<br>nEt<br>MSL<br>StS | ❏ **[Macro configuration]**<br><br>  ☐ **[M. handling.]** (HdG): Handling<br>  ☐ **[Hoisting]** (HSt): Hoisting<br>  ☐ **[Gen. Use]** (GEn): General use<br>  ☐ **[PID regul.]** (PId): PID regulation<br>  ☐ **[Network C.]** (nEt): Communication bus<br>  ☐ **[Mast./slave]** (MSL): Master/slave<br>  ☐ **[Start/stop]** (StS): Start/stop<br><br>⚠ Any change in the [Macro configuration] (CFG) must be confirmed on the graphic display terminal and the "ENT" key must be pressed and held down (2 s) on the integrated terminal.<br><br>⚠ Ensure that the selected macro configuration is compatible with the wiring diagram used. | | [Start/Stop] (StS) |
| CCFG | ❏ **[Customized macro]**<br><br>Read-only parameter, only visible if at least one macro configuration parameter has been modified. | | |

# [1.1 - SIMPLY START] (SIM-)

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| bFr<br>50<br>60 | ❏ **[Standard mot. freq]**<br>  ☐ **[50 Hz]** (50): IEC<br>  ☐ **[60 Hz]** (60): NEMA<br>  This parameter modifies the presets of the following parameters: [High speed] (HSP) page xx, [Freq. threshold] (Ftd) page xx, [Rated motor freq.] (FrS) (page 53) et [Max frequency] (tFr) page 53. | | [50 Hz] (50) |
| nPr | ❏ **[Rated motor power]**<br><br>Rated motor power given on the rating plate | According to drive rating | According to drive rating |
| UnS | ❏ **[Rated motor volt.]**<br><br>Rated motor voltage given on the rating plate<br>ATV71●●●M3X: 100 to 240 V<br>ATV71●●●N4: 100 to 480 V | According to drive rating | According to drive rating |
| nCr | ❏ **[Rated mot. current]**<br><br>Rated motor current given on the rating plate | 0.25 to 1.5 In (1) | According to drive rating |
| FrS | ❏ **[Rated motor freq.]**<br><br>Rated motor power given on the rating plate<br>The factory setting is 50 Hz, or 60 Hz if bFr is set to 60 Hz. | 10 to 1000 Hz | 50 Hz |
| nSP | ❏ **[Rated motor speed]**<br><br>Rated motor speed given on the rating plate<br>0 to 9999 RPM then 10.00 to 32.76 KRPM on the integrated terminal.<br>If, rather than the rated speed, the rating plate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows:<br><br>• Rated speed = Synchronous speed x $\dfrac{100 - \text{slip as a \%}}{100}$<br>  or<br>• Rated speed = Synchronous speed x $\dfrac{50 - \text{slip in Hz}}{50}$ (50 Hz motors)<br>  or<br>• Rated speed = Synchronous speed x $\dfrac{60 - \text{slip in Hz}}{60}$ (60 Hz motors) | 0 to 32767 RPM | According to drive rating |
| tFr | ❏ **[Max frequency]**<br><br>The factory setting is 60 Hz, or preset to 72 Hz if [Standard mot. freq] (bFr) is set to 60 Hz.<br>The maximum value is limited by the following conditions:<br><br>• It must not exceed 10 times the value of [Rated motor freq.] (FrS) (page 53)<br>• It must not exceed 500 Hz if [Motor control type] (Ctt) (page 56) is not V/F or if the drive rating is higher than ATV71HD37.<br>  In fact, values between 500 Hz and 1000 Hz are only possible in V/F control and for powers limited to 37 kW.<br>  In this case, configure [Motor control type] (Ctt) before [Max frequency] (tFr). | 10 to 1000 Hz | 60 Hz |

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

| Code | Name/Description | | Factory setting |
|---|---|---|---|
| tUn<br><br>nO<br>YES<br>dOnE<br>POn | ❑ **[Auto-tuning]**<br><br>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.<br>☐ **[No]** (nO): Auto-tuning not performed.<br>☐ **[Yes]** (YES): Auto-tuning is performed as soon as possible. Once it is complete, the parameter changes to [Done] (dOnE).<br>☐ **[Done]** (dOnE): Use of the values given the last time auto-tuning was performed.<br>☐ **[Power on]** (POn): Auto-tuning is performed on every power-up.<br>**Warning:**<br>• 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).<br>• Auto-tuning takes priority over any run or prefluxing commands, which will be taken into account after the auto-tuning sequence.<br>• If auto-tuning fails, the drive will display [No] (nO) and switch to fault mode [AUTO-TUNING] (tnF).<br>• 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)".<br><br>⚠ During auto-tuning the motor operates at rated current. | | [No] (nO) |
| tUS<br><br>tAb<br>PEnd<br>PrOG<br>FAIL<br>dOnE | ❑ **[Auto-tuning status]**<br><br>(information only, cannot be modified)<br>☐ **[Not done]** (tAb): The default stator resistance value is used to control the motor.<br>☐ **[Pending]** (PEnd): Auto-tuning has been requested but not yet performed.<br>☐ **[In Progress]** (PrOG): Auto-tuning in progress.<br>☐ **[Failed]** (FAIL): Auto-tuning has failed.<br>☐ **[Done]** (dOnE): The stator resistance measured by the auto-tuning function is used to control the motor. | | [Not done] (tAb) |
| PHr<br><br>AbC<br>ACb | ❑ **[Output Ph rotation]**<br><br>☐ **[ABC]** (AbC): Forward<br>☐ **[ACB]** (ACb): Reverse<br>This parameter can be used to reverse the direction of rotation of the motor without reversing the wiring. | | ABC |
| ItH | ❑ **[Mot. therm. current]**<br><br>Motor thermal protection current, to be set to the rated current indicated on the rating plate. | 0.2 to 1.5 In (1) | According to drive rating |

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

# [1.1 - SIMPLY START] (SIM-)

| Code | Name/Description | | Factory setting |
|---|---|---|---|
| ACC | ❏ **[Acceleration]** | 0.1 to 999.9 s | 3.0 s |
| | Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 33). Make sure that this value is compatible with the inertia being driven. | | |
| dEC | ❏ **[Deceleration]** | 0.1 to 999.9 s | 3.0 s |
| | Time to decelerate from the [Rated motor freq.] (FrS) (page 33²D'b2) to 0. Make sure that this value is compatible with the inertia being driven. | | |
| LSP | ❏ **[Low speed]** | | 0 |
| | Motor frequency at minimum reference, can be set between 0 and [High speed] (HSP). | | |
| HSP | ❏ **[High speed]** | | 50 Hz |
| | Motor frequency at maximum reference, can be set between [Low speed] (LSP) and [Max frequency] (tFr). The factory setting changes to 60 Hz if [Standard mot. freq] (bFr) = [60 Hz] (60). | | |

# [1.2 - MONITORING] (SUP-)

## With graphic display terminal

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

```
RUN      Term    +50.00 Hz   80 A
           1.2 MONITORING
I/O MAPS
COMMUNICATION MAPS
Alarm groups
HMI Frequency ref.
Internal PID ref.
   Code      <<      >>     Quick
```

→ I/O

→ Communication variables

→ Internal drive variables (see page 39)
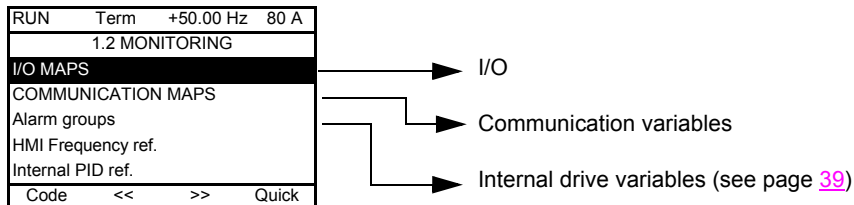
### I/O

```
RUN      Term    +50.00 Hz   80 A
              I/O MAPS
Logic inputs map
Analog inputs image
Logic outputs map
Analog outputs image
Freq. signal image
   Code                    Quick
```

Switch from one screen to another
(from Logic inputs map
to Analog outputs image)
by pressing the function keys <<
and >>

State 0

State 1

```
RUN      Term    +50.00 Hz   80 A
           Logic inputs map
   PR LI1 LI2 LI3 LI4 LI5 LI6
 1
 0
   LI7 LI8 LI9 LI10 LI11 LI12 LI13 LI14
 1
 0
LIA: 00000000000000111b
              <<      >>     Quick
```

Access to the selected input or
output configuration:
Press ENT

```
RUN      Term    +50.00 Hz   80 A
           LI1 CONFIGURATION
FORWARD
RAMP 2 SWITCH ASS.
Delay time          :  10 ms

              <<      >>     Quick
```

```
RUN      Term    +50.00 Hz   80 A
          Analog inputs image
AI1=9.87 V
AI2=2.35 mA



   Code      <<      >>     Quick
```

ENT

```
RUN      Term    +50.00 Hz   80 A
           AI1 CONFIGURATION
Ref. 1 channel
Forced local channel
Torque reference
AI1 min value               0.0 V
AI1 max value              10.0 V
                             Quick
```

State 0

State 1

```
RUN      Term    +50.00 Hz   80 A
           Logic outputs map
   R1  R2   LO

    ⊗    ◑    ⊗

LOA: 0000000000000010b
              <<      >>     Quick
```

ENT

```
RUN      Term    +50.00 Hz   80 A
           LO1 CONFIGURATION
BRAKE LOGIC CONTROL
Delay time          :  10 ms
Active at           :  1
Holding time        :  20 ms
              <<      >>     Quick
```

```
RUN      Term    +50.00 Hz   80 A
          Analog outputs image
AO1=9.87 V



   Code      <<      >>     Quick
```

ENT

```
RUN      Term    +50.00 Hz   80 A
           AO1 CONFIGURATION
MOTOR CURRENT
MIN                 :  4 mA
MAX                 :  20 mA
FILTER              :  10 ms
                             Quick
```

# [1.2 - MONITORING] (SUP-)

## With graphic display terminal

### Communication

```
RUN      Term    +50.00 Hz   80 A
        COMMUNICATION MAP
Cmd Channel:            Modbus
Cmd value:              ABCD Hex
Active ref. channel:    CANopen
Frequency ref:          -12.5 Hz
Status word:            2153 Hex
    Code                    Quick
```
W3141: F230 Hex
W2050: F230 Hex
W4325: F230 Hex
W0894: F230 Hex
COM. SCAN INPUT MAP
COM. SCAN OUTPUT MAP
CMD. WORD IMAGE
FREQ. REF. WORD MAP
MODBUS HMI DIAG
MODBUS NETWORK DIAG
CANopen MAP
PROG. CARD SCANNER

[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.

```
RUN      Term    +50.00 Hz   80 A
       COM. SCAN INPUT MAP
Com Scan In1 val.:
Com Scan In2 val.:
Com Scan In3 val.:
Com Scan In4 val.:
Com Scan In5 val.:
    Code                    Quick
```
Com Scan In6 val.:
Com Scan In7 val.:
Com Scan In8 val.:

```
RUN      Term    +50.00 Hz   80 A
       COM. SCAN OUTPUT MAP
Com Scan Out1 val.: 0
Com Scan Out2 val.:
Com Scan Out3 val.:
Com Scan Out4 val.:
Com Scan Out5 val.:
    Code                    Quick
```
Com Scan Out6 val.:
Com Scan Out7 val.:
Com Scan Out8 val.:

```
RUN      Term    +50.00 Hz   80 A
        CMD. WORD IMAGE
Modbus cmd.:         0000 Hex.
CANopen cmd.:        0000 Hex.
COM card cmd.:       0000 Hex.
Prog. Card cmd:      0000 Hex.

    Code                    Quick
```

```
RUN      Term    +50.00 Hz   80 A
       FREQ. REF. WORD MAP
Modbus ref.:            0.0 Hz
CANopen ref.:           0.0 Hz
COM card ref.:          0.0 Hz
Prog. Card ref.:        0.0 Hz

    Code                    Quick
```

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

# [1.2 - MONITORING] (SUP-)

## With graphic display terminal

### Communication (continued)

```
RUN      Term    +50.00 Hz   80 A
       COMMUNICATION MAPS
Cmd Channel:            Modbus
Cmd value:             ABCD Hex
Active ref. channel:    CANopen
Frequency ref:          -12.5 Hz
Status word:            2153 Hex
  Code                      Quick
```
W3141: F230 Hex
W2050: F230 Hex
W4325: F230 Hex
W0894: F230 Hex
COM. SCAN INPUT MAP
COM. SCAN OUTPUT MAP
CMD. WORD IMAGE
FREQ. REF. WORD MAP
MODBUS HMI DIAG
MODBUS NETWORK DIAG
CANopen MAP
PROG. CARD SCANNER

The state of the LEDs, the periodic data, the address, speed, format, etc. are indicated for each bus.

⊗  LED off
◓  LED on

Communication via Modbus
```
RUN      Term    +50.00 Hz   80 A
       MODBUS HMI DIAG
COM LED:                      ⊗



  Code                      Quick
```

Communication via the graphic display terminal
```
RUN      Term    +50.00 Hz   80 A
       MODBUS NETWORK DIAG
COM LED:                      ⊗



  Code                      Quick
```

Communication via CANopen
```
RUN      Term    +50.00 Hz   80 A
         CANopen MAP
RUN LED:                      ⊗
ERR LED:                      ⊗
PDO 1 image
PDO 6 image
PDO 21 image
  Code                      Quick
```

Programmable card
```
RUN      Term    +50.00 Hz   80 A
       PROG. CARD SCANNER
Input scanner
Output scanner



  Code                      Quick
```

PDO configuration using the network tool. Some PDOs cannot be used.
```
RUN      Term    +50.00 Hz   80 A
            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    +50.00 Hz   80 A
            PDO6 image
Received PDO6-1 :        FDBA Hex
Received PDO6-2
Received PDO6-3
Received PDO6-4
Transmit PDO6-1 :        FDBA Hex
  Code                      Quick
```
Transmit PDO6-2
Transmit PDO6-3
Transmit PDO6-4

```
RUN      Term    +50.00 Hz   80 A
           PDO21 image
Received PDO21-1 :       FDBA Hex
Received PDO21-2
Received PDO21-3
Received PDO21-4
Transmit PDO21-1 :       FDBA Hex
  Code                      Quick
```
Transmit PDO21-2
Transmit PDO21-3
Transmit PDO21-4

# [1.2 - MONITORING] (SUP-)

## With graphic display terminal

### Internal drive variables
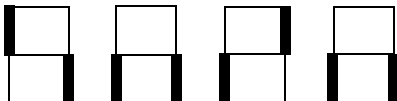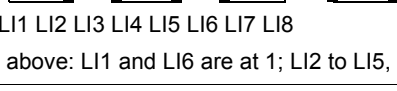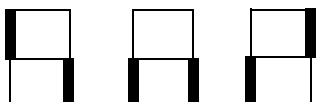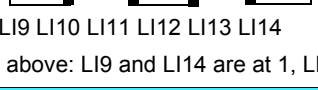
| Name/Description | |
|---|---|
| [Alarm groups] (ALGr) | Current alarm group numbers |
| [HMI Frequency ref.] (LFr) | in Hz. Frequency reference via the graphic terminal (can be accessed if the function has been configured). |
| [Internal PID ref.] (rPI) | in process value. PID reference via graphic terminal (can be accessed if the function has been configured). |
| [HMI torque ref.] (Ltr) | as a %. Torque reference via graphic terminal. |
| [Multiplying coeff.] (MFr) | as a % (can be accessed if [Multiplier ref.-] (MA2,MA3) page 103 has been assigned on the graphic terminal) |
| [Frequency ref] (FrH) | in Hz |
| [Torque reference] (?) | as a % (can be accessed if the function has been configured) |
| [Output frequency] (rFr) | in Hz |
| [Motor current] (LCr) | in A |
| [Avg speed] (AVS) | in RPM: The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES) (see page 61) |
| [Motor speed] (SPd) | in RPM |
| [Motor voltage] (UOP) | in V |
| [Motor power] (OPr) | in W |
| [Mains voltage] (ULn) | in V. Mains 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 % |
| [Consumption] (APH) | in kWh |
| [Run time] (rtH) | in hours (length of time the motor has been switched on) |
| [Power on time] (PtH) | in 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 % (can be accessed if the PID function has been configured) |
| [PID feedback] (rPF) | as a % (can be accessed if the PID function has been configured) |
| [PID error] (rPE) | as a % (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) |
| [Object 01] (o01) | Word generated via programmable card (can be accessed if the card has been inserted) |
| [Object 02] (o02) | Word generated via programmable card (can be accessed if the card has been inserted) |
| [Object 03] (o03) | Word generated via programmable card (can be accessed if the card has been inserted) |
| [Object 04] (o04) | Word generated via programmable card (can be accessed if the card has been inserted) |
| [Object 05] (o05) | Word generated via programmable card (can be accessed if the card has been inserted) |
| [Current config.] (CnFS) | CNFSO, 1 or 2 (can be accessed if configuration switching has been enabled, see page xx) |
| [Current param. set] (?) | SETO, 1 or 2 (can be accessed if parameter switching has been enabled, see page xx) |
| [ALARMS] (ALr-) | List of current alarms. If an alarm is present, a ✓ appears. |
| [OTHER STATUS] (SSt-) | List of secondary statuses: |
| | - Current attained |
| | - Freq. attained |
| | - Freq. ref. attained |
| | - Mot.th. attained |
| | - Forced to local |
| | - HSP attained |
| | - In motor fluxing |
| | - PTC1 alarm |
| | - PTC2 alarm |
| | - PTC3 alarm |
| | - In fast stop |
| | - Ext. fault alarm |
| | - Auto restart |
| | - In auto-tuning |
| | - Underv. prevent. |
| | - Slipping alarm |
| | - DC bus loading |
| | - No. P. supply |
| | - In freewheel |
| | - In DC injection |
| | - In current limit. |
| | - In acceleration |
| | - In deceleration |
| | - Output cut |
| | - Drive ready |

## With integrated display terminal

This menu can be used to display the drive inputs and internal variables.

## Inputs

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| *L IA -* | ■ **Logic input functions** | | |
| *L O IA*<br>to<br>*L I4A* | **Logic input functions**:<br><br>Can be used to display the functions assigned to each input. If no functions have been assigned, nO is displayed.<br>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. | | |
| *L IS I* | **State of logic inputs**:<br><br>Can be used to visualize the state of logic inputs LI1 to LI8<br>(display segment assignment: high = 1, low = 0)<br><br>State 1<br><br>State 0<br>LI1 LI2 LI3 LI4 LI5 LI6 LI7 LI8<br><br>Example above: LI1 and LI6 are at 1; LI2 to LI5, LI7 and LI8 are at 0. | | |
| *L IS2* | **State of logic inputs**:<br><br>Can be used to visualize the state of logic inputs LI9 to LI14<br>(display segment assignment: high = 1, low = 0)<br><br>State 1<br><br>State 0<br>LI9 LI10 LI11 LI12 LI13 LI14<br><br>Example above: LI9 and LI14 are at 1, LI10 to LI13 are at 0. | | |
| *A IA -* | ■ **Analog input functions** | | |
| *A I IA*<br>*A I2A*<br>*A I3A*<br>*A I4A* | 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

### Internal drive variables

| Code | Name/Description | Unit |
|------|------------------|------|
| ALGr | **Alarm groups:** Current alarm group numbers | |
| FrH | **Frequency ref** | Hz |
| Ltr | **Torque reference:** Can be accessed if the function is configured | %. |
| rFr | **Output frequency** | Hz |
| LCr | **Motor current** | A |
| AUS | **Average speed:** The parameter can be accessed if EnA = YES (see page 61) | RPM |
| SPd | **Motor speed** | RPM |
| UOP | **Motor voltage** | V |
| OPr | **Motor power** | W |
| ULn | **Mains voltage:** Mains voltage from the point of view of the DC bus, motor running or stopped. | V |
| tHr | **Motor thermal state** | % |
| tHd | **Drv. thermal state** | % |
| APH | **Consumption** | kWh |
| rtH | **Run time:** Length of time the motor has been switched on | hours |
| PtH | **Power on time:** Length of time the drive has been switched on | hours |
| 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 | % |
| 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 |
| o01 | **Object 01:** Word generated via programmable card (can be accessed if the card has been inserted) | |
| o02 | **Object 02:** Word generated via programmable card (can be accessed if the card has been inserted) | |
| o03 | **Object 03:** Word generated via programmable card (can be accessed if the card has been inserted) | |
| o04 | **Object 04:** Word generated via programmable card (can be accessed if the card has been inserted) | |
| o05 | **Object 05:** Word generated via programmable card (can be accessed if the card has been inserted) | |
| CnFS | **Current config.:** CNF0, 1 or 2 (can be accessed if configuration switching has been enabled, see page 162) | |
| IFrC | **Current param. set:** SEt0, 1 or 2 (can be accessed if configuration switching has been enabled, see page 158) | |

# [1.3 - SETTINGS] (SEt-)

⚠️ **The settings parameters can be modified with the drive running or stopped.**
Check that it is safe to make changes during operation. Changes should preferably be made in stop mode.

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| Inr ★ | ❏ **[Ramp increment]**<br><br>See page 104 | 0.01 - 0.1 - 1 | 0.1 |
| ACC ★ | ❏ **[Acceleration]**<br><br>See page 104<br>Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 53). Make sure that this value is compatible with the inertia being driven. | 0.01 to 9999 | 3.0 s |
| dEC ★ | ❏ **[Deceleration]**<br><br>See page 104<br>Time to decelerate from the [Rated motor freq.] (FrS) (page 53) to 0. Make sure that this value is compatible with the inertia being driven. | 0.01 to 9999 | 3.0 s |
| AC2 ★ | ❏ **[Acceleration 2]**<br><br>See page 106<br>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 9999 | 5.0 s |
| dE2 ★ | ❏ **[Deceleration 2]**<br><br>See page 106<br>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 9999 | 5.0 s |
| tA1 ★ | ❏ **[Begin Acc round]**<br><br>See page 105<br>Rounding of start of deceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. | 0 to 100% | 10% |
| tA2 ★ | ❏ **[End Acc round]**<br><br>See page 105<br>　- Rounding of end of deceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time.<br>　- Can be set between 0 and (100% - [Begin Acc 1 round] (tA1)) | | 10% |
| tA3 ★ | ❏ **[Begin Dec round]**<br><br>See page 105<br>Rounding of start of deceleration ramp as a % of ramp time [Deceleration] (dEC) or [Deceleration 2] (dE2). | 0 to 100% | 10% |
| tA4 ★ | ❏ **[End Dec round]**<br><br>See page 105<br>　- Rounding of end of deceleration ramp as a % of ramp time [Deceleration] (dEC) or [Deceleration 2] (dE2).<br>　- Can be set between 0 and 100% - ([Begin Dec 3 round] (tA3)) | | 10% |
| LSP | ❏ **[Low speed]**<br><br>Motor frequency at minimum reference, can be set between 0 and [High speed] (HSP). | | 0 Hz |

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

# [1.3 - SETTINGS] (SEt-)

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| HSP | ❑ **[High speed]** | | 50 Hz |
| | Motor frequency at maximum reference, can be set between [Low speed] (LSP) and [Max frequency] (tFr). The factory setting changes to 60 Hz if [Standard mot. freq] (bFr) = [60 Hz] (60). | | |
| ItH | ❑ **[Mot. therm. current]** | 0.2 to 1.5 In (1) | According to drive rating |
| | Motor thermal protection current, to be set to the rated current indicated on the rating plate. | | |
| SFC | ❑ **[K speed loop filter** | 0 to 100 | 65 |
| | Speed loop filter coefficient | | |
| SPG | ❑ **[Speed prop. gain]** | 0 to 1,000% | 40% |
| | Speed loop proportional gain | | |
| SIt | ❑ **[Speed time integral]** | 1 to 1,000% | 100% |
| | Speed loop integral time constant | | |

(1) In corresponds to the rated drive current indicated in the Installation Manual or on the drive rating plate.

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

# [1.3 - SETTINGS] (SEt-)

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

- These parameters can only be accessed in vector control profiles: [Motor control type] (Ctt) page 56 = [SVC U] (UUC), [SVC I] (CUC), [FVC] (FUC) and [Sync. Mot] (SYn) and if [ENA system] (EnA) page 61 = [No] (nO).

- The factory settings are suitable for most applications.

### Parameter [K speed loop filter] (SFC):

This parameter conditions the action of two other parameters.
- Set to 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).

- Set to 100, the regulator is a "PI" type, without filtering of the speed reference, for applications requiring a short response time (position control, for example).

- Settings between 0 and 100 will obtain an intermediate function.

### Setting with [K speed loop filter] (SFC) = 0

- [Speed prop. gain] (SPG) affects excessive speed.

- [Speed time integral] (SIt) affects the passband and response time.

**Initial response**

Reference division



Time in ms

**Reduction in SIT** ↘

Reference division



Time in ms

**Reduction in SIT** ↘↘

Reference division



Time in ms

**Initial response**

Reference division



Time in ms

**Increase in SPG** ↗

Reference division



Time in ms

**Increase in SPG** ↗↗

Reference division
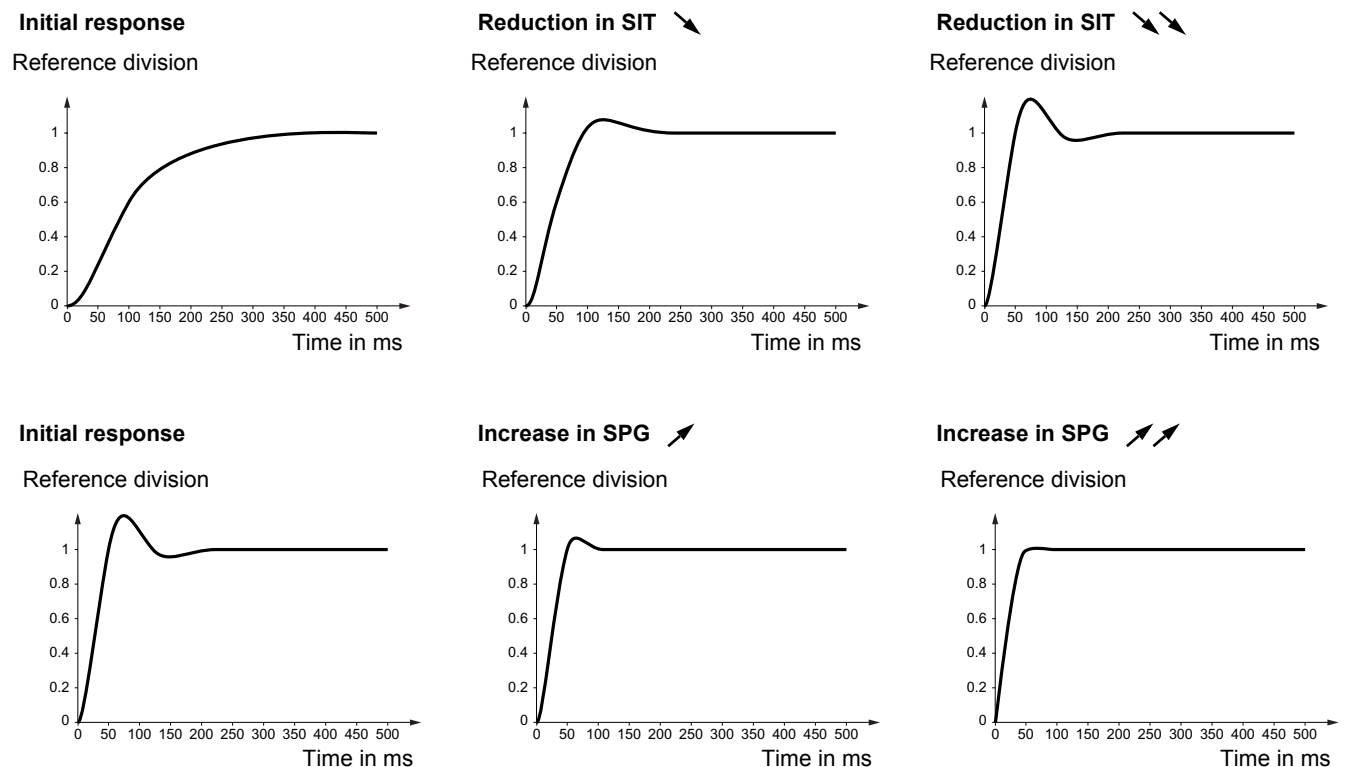


Time in ms

# [1.3 - SETTINGS] (SEt-)

## Setting with [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



Time in ms

**Reduction in SIT** ↘

Reference division



Time in ms

**Reduction in SIT** ↘↘

Reference division



Time in ms

**Initial response**

Reference division



Time in ms

**Increase in SPG** ↗

Reference division



Time in ms

**Increase in SPG** ↗↗

Reference division



Time in ms

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| GPE ★ | ❑ **[ENA prop. gain]**<br>See page 61 | 1 to 9999 | 250 |
| GIE ★ | ❑ **[ENA integral gain]**<br>See page 61 | 0 to 9999 | 100 |
| UFr ★ | ❑ **[IR compensation]**<br>See page 54 | 25 to 200% | 100% |
| SLP ★ | ❑ **[Slip compensation]**<br>See page 54 | 0 to 150% | 100% |
| dCF ★ | ❑ **[Ramp divider]**<br>See page 107 | 0 to 10 | 4 |
| IdC ★ | ❑ **[DC inject. level 1]**<br>See page 108<br>Level of DC injection braking current activated via logic input or selected as stop mode. | 0.1 to 1.5 In (1) | 0.64 In (1) |
| IdC2 ★ | ❑ **[DC inject. level 2]**<br>See page 108<br>Level of DC injection braking current activated via logic input or selected as stop mode. | 0.1 to 1.5 In (1) | 0.64 In (1) |
| tdI ★ | ❑ **[DC inject. time 1]**<br>See page 108<br>Maximum current injection time [DC inject. level 1] (IdC). Once this time has elapsed, the injection current becomes [DC inject. level 2] (IdC2) until the stop command disappears. | 0.1 to 30 s | 5 s |
| tdC ★ | ❑ **[DC inject. time 2]**<br>See page 108<br>Maximum injection time [DC inject. level 2] (IdC2) for injection selected as stop mode only. | 0.1 to 30 s | 5 s |
| AdC | ❑ **[Auto DC injection]**<br>See page 109<br>Automatic current injection on stopping (at the end of the ramp) | | [Yes] (YES) |
| SdC1 ★ | ❑ **[I inject. DC auto 1]**<br>See page 109<br>Level of standstill DC injection current. The parameter can be accessed if [Auto DC injection] (AdC) is set to a value other than [No] (nO). | 0 to 1.2 In (1) | 0.7 In (1) |
| tdC1 ★ | ❑ **[Auto DC inj. time 1]**<br>See page 109<br>Standstill injection time. The parameter can be accessed if [Auto DC injection] (AdC) is set to a value other than [No] (nO). | 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 rating plate.

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

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| SdC2 ★ | ❏ **[I inject. DC auto 2]**<br><br>See page 109<br>2nd level of standstill DC injection current | 0 to 1.2 In (1) | 0.5 In (1) |
| tdC2 ★ | ❏ **[Auto DC inj. time 2]**<br><br>See page 109<br>2nd standstill injection time | 0 to 30 s | 0 s |
| SFr ★ | ❏ **[Switching freq.]**<br><br>See page 62<br>The switching frequency is set in accordance with the drive rating and the [Switch. freq type] (SFt). | | 0 |
| CL1 ★ | ❏ **[Current Limitation]**<br><br>See page 148<br>Used to limit the torque and the temperature rise of the motor. | 0 to 1.65 In (1) | 1.5 In (1) |
| CL2 ★ | ❏ **[I Limit. 2 value]**<br><br>See page 148 | 0 to 1.65 In (1) | 1.5 In (1) |
| FLU<br>nO<br>FnC<br>FCt | ❏ **[Motor fluxing]**<br><br>☐ **[No]** (nO): Function inactive<br>☐ **[Non cont.]** (FnC): Non-continuous mode<br>☐ **[Continuous]** (FCt): Continuous mode.<br><br>In order to obtain rapid high torque on startup, magnetic flux needs to be already established in the motor.<br>• This function can be selected in open or closed-loop operation.<br>• In continuous mode (FCt), the drive automatically builds up flux when it is powered up.<br>• In non-continuous mode:<br>  - If an LI is assigned to the motor fluxing command, flux is built up when the command is confirmed (see [Fluxing assignment] (FLI) page 119).<br>  - If no LI is assigned or if it is not active when a run command is given, the motor is fluxed when it starts up.<br>• 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. | | [No] (nO) |
| tLS | ❏ **[Low speed time out]**<br><br>Maximum operating time at [Low speed] (LSP)<br>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.<br>Caution: Value 0 corresponds to an unlimited period. | 0 to 999.9 s | 0 s |
| JGF ★ | ❏ **[Jog frequency]**<br><br>See page 110<br>Reference in pulse mode | 0 to 10 Hz | 10 Hz |
| JGt | ❏ **[Jog delay]**<br><br>See page 110<br>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 rating plate.

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

# [1.3 - SETTINGS] (SEt-)

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| S P 2 ★ | ❏ **[Preset speed 2]**<br>See page 113<br>Preset speed 2 | 0 to 1000 Hz | 10 Hz |
| S P 3 ★ | ❏ **[Preset speed 3]**<br>See page 113<br>Preset speed 3 | 0 to 1000 Hz | 15 Hz |
| S P 4 ★ | ❏ **[Preset speed 4]**<br>See page 113<br>Preset speed 4 | 0 to 1000 Hz | 20 Hz |
| S P 5 ★ | ❏ **[Preset speed 5]**<br>See page 113<br>Preset speed 5 | 0 to 1000 Hz | 25 Hz |
| S P 6 ★ | ❏ **[Preset speed 6]**<br>See page 113<br>Preset speed 6 | 0 to 1000 Hz | 30 Hz |
| S P 7 ★ | ❏ **[Preset speed 7]**<br>See page 113<br>Preset speed 7 | 0 to 1000 Hz | 35 Hz |
| S P 8 ★ | ❏ **[Preset speed 8]**<br>See page 113<br>Preset speed 8 | 0 to 1000 Hz | 40 Hz |
| S P 9 ★ | ❏ **[Preset speed 9]**<br>See page 113<br>Preset speed 9 | 0 to 1000 Hz | 45 Hz |
| S P 10 ★ | ❏ **[Preset speed 10]**<br>See page 113<br>Preset speed 10 | 0 to 1000 Hz | 50 Hz |
| S P 11 ★ | ❏ **[Preset speed 11]**<br>See page 113<br>Preset speed 11 | 0 to 1000 Hz | 55 Hz |
| S P 12 ★ | ❏ **[Preset speed 12]**<br>See page 113<br>Preset speed 12 | 0 to 1000 Hz | 60 Hz |
| S P 13 ★ | ❏ **[Preset speed 13]**<br>See page 113<br>Preset speed 13 | 0 to 1000 Hz | 70 Hz |
| S P 14 ★ | ❏ **[Preset speed 14]**<br>See page 113<br>Preset speed 14 | 0 to 1000 Hz | 80 Hz |

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

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# [1.3 - SETTINGS] (SEt-)

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| SP 15 ★ | ❏ **[Preset speed 15]**<br><br>See page 113<br>Preset speed 15 | 0 to 1000 Hz | 90 Hz |
| SP 16 ★ | ❏ **[Preset speed 16]**<br><br>See page 113<br>Preset speed 16 | 0 to 1000 Hz | 100 Hz |
| NFr | ❏ **[Multiplying coeff.]**<br><br>Multiplying coefficient, can be accessed if [Multiplier ref.-] (MA2,MA3) page 103 has been assigned on the graphic display terminal | 0 to 100% | |
| SrP ★ | ❏ **[+/- speed limitation]**<br><br>See page 117<br>Limitation of +/- speed variation | 0 to 100% | 10% |
| rPG ★ | ❏ **[PID prop. gain]**<br><br>See page 139<br>Proportional gain | 0.01 to 100% | 1 |
| rIG ★ | ❏ **[PID integral gain]**<br><br>See page 139<br>Integral gain | 0.01 to 100% | 1 |
| rdG ★ | ❏ **[PID derivative gain]**<br><br>See page 139<br>Derivative gain | 0.01 to 100% | 0 |
| PrP ★ | ❏ **[PID ramp]**<br><br>See page 140<br>Derivative gain | 0.01 to 100% | 0 |
| POL ★ | ❏ **[Min PID output]**<br><br>See page 140<br>Minimum value of regulator output in Hz | 0 to 500 or 1000 according to rating | 0 Hz |
| POH ★ | ❏ **[Max PID output]**<br><br>See page 140<br>Maximum value of regulator output in Hz | 0 to 500 or 1000 according to rating | 60 Hz |
| PAL ★ | ❏ **[Min fbk alarm]**<br><br>See page 140<br>Minimum monitoring threshold for regulator feedback | 0 to 65535 (1) | 100 |
| PAH ★ | ❏ **[Max fbk alarm]**<br><br>See page 140<br>Maximum monitoring threshold for regulator feedback | 0 to 65535 (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 corresponding function is also accessible and adjustable from within the configuration menu, to aid programming their description is detailed in these menus, on the pages indicated.

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|-----------------|-----------------|
| PEr ★ | ❑ **[PID error Alarm]**<br><br>See page 140<br>Regulator error monitoring threshold | 0 to 65535 (1) | 100 |
| PSr ★ | ❑ **[Speed input %]**<br><br>See page 141<br>Multiplying coefficient for predictive speed input | 1 to 100% | 100% |
| rP2 ★ | ❑ **[Preset ref. PID 2]**<br><br>See page 142<br>Preset PID reference | 0 to 65535 (1) | 300 |
| rP3 ★ | ❑ **[Preset ref. PID 3]**<br><br>See page 142<br>Preset PID reference | 0 to 65535 (1) | 600 |
| rP4 ★ | ❑ **[Preset ref. PID 4]**<br><br>See page 142<br>Preset PID reference | 0 to 65535 (1) | 900 |
| bIP ★ | ❑ **[Brake impulse]**<br><br>See page 126 | | [No] (nO) |
| Ibr ★ | ❑ **[Brake release I FW]**<br><br>See page 126<br>Brake release current threshold for forward movement | 0 to 1.32 In (2) | 0 |
| Ird ★ | ❑ **[Brake release I RV]**<br><br>See page 126<br>Brake release current threshold for reverse movement | 0 to 1.32 In (2) | 0 |
| brt ★ | ❑ **[Brake Release time**<br><br>See page 126<br>Brake release time delay | 0 to 5.00 s | 0 s |
| bIr ★ | ❑ **[Brake release freq]**<br><br>See page 126<br>Brake release frequency threshold | | [Auto] (AUtO) |
| bEn ★ | ❑ **[Brake engage freq]**<br><br>See page 127<br>Brake engage frequency threshold | | [Auto] (AUtO) |
| tbE ★ | ❑ **[Brake engage time]**<br><br>See page 127<br>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 rating plate.

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

# [1.3 - SETTINGS] (SEt-)

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| bEt ★ | ❑ **[Brake engage time]**<br><br>See page 127<br>Brake engage time (brake response time) | 0 to 5.00 s | 0 s |
| JdC ★ | ❑ **[Jump at reversal]**<br><br>See page 127 | | [Auto] (AUtO) |
| ttr ★ | ❑ **[Time to restart]**<br><br>See page 127<br>Time between the end of a brake engage sequence and the start of a brake release sequence | 0 to 5.00 s | 0 s |
| tL IM ★ | ❑ **[Motoring torque lim]**<br><br>See page 147<br>Torque limitation in motor mode, as a % of the rated torque. | 0 to 300% | 100% |
| tL IG ★ | ❑ **[Gen. torque lim]**<br><br>See page 147<br>Torque limitation in generator mode, as a % of the rated torque. | 0 to 300% | 100% |
| trH ★ | ❑ **[Traverse high]**<br><br>See page 168 | 0 to 10 Hz | 4 Hz |
| trL ★ | ❑ **[Traverse low]**<br><br>See page 168 | 0 to 10 Hz | 4 Hz |
| qSH ★ | ❑ **[Quick step High]**<br><br>See page 168 | 0 to [Traverse high] (trH) | 0 Hz |
| qSL ★ | ❑ **[Quick step Low]**<br><br>See page 168 | 0 to [Traverse low] (trL) | 0 Hz |
| Ctd | ❑ **[Current threshold]**<br><br>Current threshold for [I attained] (CtA) function assigned to a relay or logic output (see page 77). | 0 to 1.5 In (1) | In (1) |
| Ftd | ❑ **[Freq. threshold]**<br><br>Frequency threshold for [Freq. attain.] function (FtA) assigned to a relay or logic output (see page 82). | 0 to 1000 Hz | 50 Hz |
| ttd ★ | ❑ **[Motor therm. level]**<br><br>See page 176<br>Trip threshold for motor thermal alarm (logic output or relay) | 0 to 118% | 100% |
| LbC ★ | ❑ **[Load correction]**<br><br>See page 63<br>Rated correction in Hz. | 0 to | 0 |

(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 corresponding function is also accessible and adjustable from within the configuration menu, to aid programming their description is detailed in these menus, on the pages indicated.

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| L b C 1 ★ | ❑ **[Correction low]**<br><br>See page 64<br>Minimum speed for load correction in Hz | 0 to | 0 |
| L b C 2 ★ | ❑ **[Correction high]**<br><br>See page 64<br>Speed threshold in Hz above which maximum load correction is applied | 0 to | 0 |
| L b C 3 ★ | ❑ **[Torque offset]**<br><br>See page 64<br>Minimum torque for load correction as a % of the rated torque | 0 to 300% | 0% |

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

# [1.4 - MOTOR CONTROL] (drC-)

The parameters in the [1.4 - MOTOR CONTROL] menu can only be modified when the drive is stopped and no run command is present. Auto-tuning may cause the motor to start up.

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| bFr<br>50<br>60 | ❏ **[Standard mot. freq]**<br><br>☐ **[50 Hz]** (50): IEC<br>☐ **[60 Hz]** (60): NEMA<br>This parameter modifies the presets of the following parameters: [High speed] (HSP) page xx, [Freq. threshold] (Ftd) page xx, [Rated motor freq.] (FrS) (page 53) and[Max frequency] (tFr) page 53. | | [50 Hz] (50) |
| nPr | ❏ **[Rated motor power]**<br><br>Rated motor power given on the rating plate | According to drive rating | According to drive rating |
| UnS | ❏ **[Rated motor volt.]**<br><br>Rated motor voltage given on the rating plate<br>ATV71●●●M3X: 100 to 240 V<br>ATV71●●●N4: 100 to 480 V | According to drive rating | According to drive rating |
| nCr | ❏ **[Rated mot. current]**<br><br>Rated motor current given on the rating plate | 0.25 to 1.5 In (1) | According to drive rating |
| FrS | ❏ **[Rated motor freq.]**<br><br>Rated motor power given on the rating plate<br>The factory setting is 50 Hz, or 60 Hz if bFr is set to 60 Hz. | 10 to 1000 Hz | 50 Hz |
| nSP | ❏ **[Rated motor speed]**<br><br>Rated motor speed given on the rating plate<br>0 to 9999 RPM then 10.00 to 32.76 KRPM on the integrated terminal.<br>If, rather than the rated speed, the rating plate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows:<br><br>• Rated speed = Synchronous speed x $\dfrac{100 - \text{slip as a \%}}{100}$<br>  or<br>• Rated speed = Synchronous speed x $\dfrac{50 - \text{slip in Hz}}{50}$ (50 Hz motors)<br>  or<br>• Rated speed = Synchronous speed x $\dfrac{60 - \text{slip in Hz}}{60}$ (60 Hz motors) | 0 to 32767 RPM | According to drive rating |
| tFr | ❏ **[Max frequency]**<br><br>The factory setting is 60 Hz, or preset to 72 Hz if [Standard mot. freq] (bFr) is set to 60 Hz.<br>The maximum value is limited by the following conditions:<br><br>• It must not exceed 10 times the value of [Rated motor freq.] (FrS) (page 53)<br>• It must not exceed 500 Hz if [Motor control type] (Ctt) (page 56) is not V/F or if the drive rating is higher than ATV71HD37.<br>In fact, values between 500 Hz and 1000 Hz are only possible in V/F control and for powers limited to 37 kW.<br>In this case, configure [Motor control type] (Ctt) before [Max frequency] (tFr). | 10 to 1000 Hz | 60 Hz |

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

| Code | Name/Description | | | Factory setting |
|------|-----------------|---|---|-----------------|
| tUn<br><br>nO<br>YES<br>dOnE<br>POn | ❏ **[Auto-tuning]**<br><br>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.<br>☐ **[No]** (nO): Auto-tuning not performed.<br>☐ **[Yes]** (YES): Auto-tuning is performed as soon as possible. Once it is complete, the parameter changes to [Done] (dOnE).<br>☐ **[Done]** (dOnE): Use of the values given the last time auto-tuning was performed.<br>☐ **[Power on]** (POn): Auto-tuning is performed on every power-up.<br>**Warning:**<br>• 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).<br>• Auto-tuning takes priority over any run or prefluxing commands, which will be taken into account after the auto-tuning sequence.<br>• If auto-tuning fails, the drive will display [No] (nO) and switch to fault mode [AUTO-TUNING] (tnF).<br>• 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)".<br><br>⚠ During auto-tuning the motor operates at rated current. | | | [No] (nO) |
| tUS<br><br>tAb<br>PEnd<br>PrOG<br>FAIL<br>dOnE | ❏ **[Auto-tuning status]**<br><br>(information only, cannot be modified)<br>☐ **[Not done]** (tAb): The default stator resistance value is used to control the motor.<br>☐ **[Pending]** (PEnd): Auto-tuning has been requested but not yet performed.<br>☐ **[In Progress]** (PrOG): Auto-tuning in progress.<br>☐ **[Failed]** (FAIL): Auto-tuning has failed.<br>☐ **[Done]** (dOnE): The stator resistance measured by the auto-tuning function is used to control the motor. | | | [Not done] (tAb) |
| PHr<br><br>AbC<br>ACb | ❏ **[Output Ph rotation]**<br><br>☐ **[ABC]** (AbC): Forward<br>☐ **[ACB]** (ACb): Reverse<br>This parameter can be used to reverse the direction of rotation of the motor without reversing the wiring. | | | ABC |
| UFr | ❏ **[IR compensation]**<br><br>The parameter can be accessed if [Motor control type] (Ctt) = [SVC U] (UUC) or [SVC I] (CUC).<br>Used to optimize the torque at very low speed (increase [IR compensation] (UFr) if the torque is insufficient).<br>Check that the value of [IR compensation] (UFr) is not too high for when the motor is warm (risk of instability). | (1) | 25 to 200% | 100% |
| SLP | ❏ **[Slip compensation]**<br><br>The parameter can be accessed if [Motor control type] (Ctt) = [SVC U] (UUC) or [SVC I] (CUC).<br>Used to adjust the slip compensation value fixed by motor rated speed.<br>The speeds given on motor rating plates are not necessarily exact.<br>• If slip setting < actual slip: the motor is not rotating at the correct speed in steady state.<br>• If slip setting > actual slip: the motor is overcompensated and the speed is unstable. | (1) | 0 to 150% | 100% |

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

# [1.4 - MOTOR CONTROL] (drC-)

Parameters that can be accessed in [EXPERT] mode.
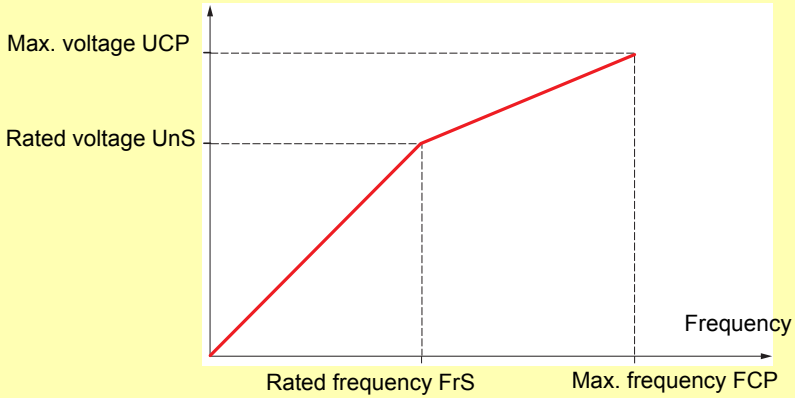
| Code | Name |
|------|------|
| r S Π | ❏ [R1r] |
| I d Π | ❏ [Idr] |
| L F Π | ❏ [LFr] |
| t r Π | ❏ [T2r] |
| n S L | ❏ [NSLr] |
| P P n | ❏ [Pr] |
| r S A | ❏ [R1w] |
| I d A | ❏ [Idw] |
| L F A | ❏ [Lfw] |
| t r A | ❏ [T2w] |

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| Ctt | ❏ **[Motor control type]** | | [SVC U] (UUC) |

UUC ☐ **[SVC U]** (UUC): Open-loop flux vector control only. This type of control is recommended when replacing an ATV58. It supports operation with a number of motors connected in parallel on the same drive.

CUC ☐ **[SVC I]** (CUC): Open-loop flux vector control. This type of control is recommended when replacing an ATV58F used in an open-loop configuration. It does not support operation with a number of motors connected in parallel on the same drive.

FUC ☐ **[FVC]** (FUC) : Closed-loop flux vector control for motor with incremental encoder type sensor. This type of control is recommended when replacing an ATV58F used in a closed-loop configuration. It is more advanced 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.

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 motors in parallel on the same drive
  - High-speed motors
  - Motors with a low power rating in comparison to that of the drive

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

FrS > F5 > F4 > F3 > F2 > F1

SYn ☐ **[Sync. mot.]** (SYn): For synchronous permanent magnet motors with sinusoidal electromotive force (EMF) only.

# [1.4 - MOTOR CONTROL] (drC-)

| Code | Name/Description | | Adjustment range | Factory setting |
|------|------------------|---|------------------|-----------------|
| U 0 | ❏ **[U0]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 2pts] (UF2) or [V/F 5pts] (UF5) | (1) | According to rating | 0 |
| U 1 | ❏ **[U1]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5) | (1) | According to rating | 0 |
| F 1 | ❏ **[F1]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5) | (1) | According to rating | 0 |
| U 2 | ❏ **[U2]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5) | (1) | According to rating | 0 |
| F 2 | ❏ **[F2]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5) | (1) | According to rating | 0 |
| U 3 | ❏ **[U3]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5) | (1) | According to rating | 0 |
| F 3 | ❏ **[F3]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5) | (1) | According to rating | 0 |
| U 4 | ❏ **[U4]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5) | (1) | According to rating | 0 |
| F 4 | ❏ **[F4]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5) | (1) | According to rating | 0 |
| U 5 | ❏ **[U5]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5) | (1) | According to rating | 0 |
| F 5 | ❏ **[F5]** <br><br> V/F profile setting. The parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5) | (1) | According to rating | 0 |

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

# [1.4 - MOTOR CONTROL] (drC-)

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| UC2<br><br>nO<br>YES | ❑ **[Vector Control 2pt]**<br><br>The parameter can be accessed if [Motor control type] (Ctt) = [SVC U] (UUC) or [SVC I] (CUC) or [FVC] (FVC).<br>☐ **[No]** (nO): Function inactive.<br>☐ **[Yes]** (YES): Function active.<br>Used in applications on which the rated frequency and speed need to be exceeded in order to optimize operation at constant power.<br>This requires the drive output voltage to be greater than the rated motor 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.<br><br>Motor voltage<br><br>Max. voltage UCP<br><br>Rated voltage UnS<br><br>Frequency<br>Rated frequency FrS    Max. frequency FCP | | [No] (nO) |
| UCP | ❑ **[V. constant power]**<br><br>The parameter can be accessed if [Vector Control 2pt] (UC2) = [Yes] (YES) | According to rating | = [Rated motor volt.] (UnS) |
| FCP | ❑ **[Freq. Cst. Power]**<br><br>The parameter can be accessed if [Vector Control 2pt] (UC2) = [Yes] (YES) | According to rating | = [Rated motor freq.] (FrS) |
| EnS<br><br>AAbb<br>Ab<br>A | ❑ **[Encoder signals]**<br><br>The parameter can be accessed if an encoder card has been inserted.<br>To be configured in accordance with the type of encoder used.<br>☐ **[AABB]** (AAbb): For signals A, A-, B, B-.<br>☐ **[AB]** (Ab): For signals A, B.<br>☐ **[A]** (A): For signal A. | | [No] (nO) |
| PG1 | ❑ **[Number of pulses]**<br><br>Number of pulses per revolution.<br>The parameter can be accessed if an encoder card has been inserted (1). | 100 to 5000 | 1024 |

(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.

# [1.4 - MOTOR CONTROL] (drC-)

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| E n C <br><br><br> n O <br> Y E S <br><br><br><br> d O n E | ❏ **[Encoder check]** <br><br> Check encoder feedback. See procedure page xx. <br> The parameter can be accessed if an encoder card has been inserted (1) and if [Encoder use] (EnU) is set to a value other than [PGR->NotDef] (PGr). <br> ☐ **[No]** (nO): Check not performed. <br> ☐ **[Yes]** (YES): Initiates the check. <br><br> ⚠ This selection causes the motor to start to turn. <br><br> ☐ **[Done]** (dOnE): Check performed successfully. <br> The check procedure checks: <br>   - The direction of rotation of the encoder/motor (ENF3 fault) <br>   - The presence of signals (wiring continuity, ENF2 fault) <br>   - The number of pulses/revolution (ENF1 fault) <br> If a fault is detected, the drive locks in ENFx fault mode. | | [No] (nO) |
| E n U <br><br><br> n O <br> S E C <br> r E G <br><br><br><br> P G r | ❏ **[Encoder use]** <br><br> The parameter can be accessed if an encoder card has been inserted (1). <br> ☐ **[No]** (nO): Function inactive, In this case, the other parameters cannot be accessed. <br> ☐ **[spd sec. Fdk]** (SEC): The encoder provides speed feedback for monitoring only. <br> ☐ **[spd regul fdk]** (rEG): The encoder provides speed feedback for regulation and monitoring. This configuration is automatic if the drive has been configured for closed-loop operation and is only supported by this type of operation. <br> ☐ **[PGR->NotDef]** (PGr): The encoder serves as a reference. | | [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.

# [1.4 - MOTOR CONTROL] (drC-)

## ENA SYSTEM

ENA SYSTEM is a control profile for rotating machines with unbalanced load.
It is used primarily in oil pumps. The operating principle applied supports:
- Operation without a braking resistor
- Reduced mechanical stress on the rod
- Reduced line current fluctuations
- Reduced energy consumption by improving the electric power/current ratio

### ENA prop. gain

This setting is made in order 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 settings to be made during operation:

- To eliminate the braking resistance and therefore increase the DC bus voltage:
  Call up the machine speed on the graphic display terminal.
  Reduce the value of the integral gain until the machine speed drops. When it does, 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:
  It may be possible to save even more energy by reducing the proportional gain (gradually) in reducing the maximum value of the line current but this 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 settings are complete, check that the pump starts up correctly. Lack of torque on startup may be due to the ENA integral gain being set too low.

### 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., strokes per minute) on the graphic display terminal.  In order to be displayed on the graphic terminal, these values must be selected in the [1.2 - MONITORING] (SUP-) menu.

# [1.4 - MOTOR CONTROL] (drC-)

| Code | Name/Description | | Adjustment range | Factory setting |
|------|-----------------|---|------------------|-----------------|
| E n A<br><br>n O<br>YES | ❏ **[ENA system]**<br><br>The parameter can be accessed if [Motor control type] (Ctt) = [SVC U] (UUC), see page 56.<br>☐ **[No]** (nO) : Function inactive<br>☐ **[Yes]** (YES) : Function active. | | | [No] (nO) |
| G P E | ❏ **[ENA prop. gain]**<br><br>The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES) | (1) | 1 to 9999 | 250 |
| G I E | ❏ **[ENA integral gain]**<br><br>The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES) | (1) | 0 to 100% | 100% |
| r A P | ❏ **[Reduction ratio]**<br><br>The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES) | (1) | 10.0 to 999.9 | 10 |

(1) The parameter can also be accessed in the [1.3 - SETTINGS] (SEt-) menu.
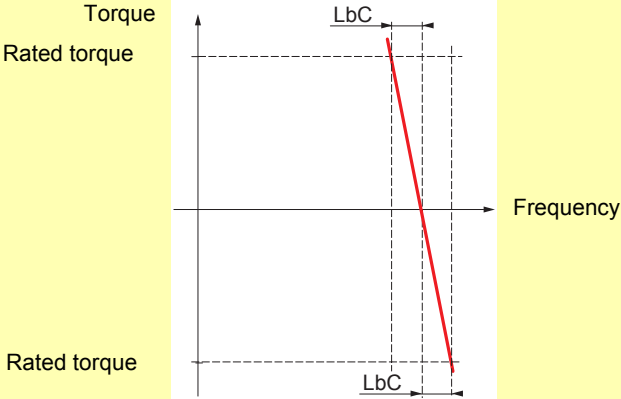
# [1.4 - MOTOR CONTROL] (drC-)

| Code | Name/Description | Factory setting | |
|------|-----------------|-----------------|---|
| CLI | ❑ **[Current Limitation]** (1)<br><br>Used to limit the torque and the temperature rise of the motor.<br>⚠ Warning: If the setting is lower than 0.25 In, the drive may lock following a fault [Output Phase Loss] (OPF) if this function has been enabled (see page 176) | 0 to 1.65 In (2) | 1.5 In (2) |
| SFr | ❑ **[Switching freq.]** (1)<br><br>Switching frequency setting.<br>⚠ In the event of excessive temperature rise, the drive will automatically reduce the switching frequency and reset it once the temperature returns to normal. | 1 to 16 kHz | ≤18 kW: 4 kHz<br>>18 kW: 2.5 kHz |
| nrd<br><br>YES<br>nO | ❑ **[Noise reduction]**<br><br>❑ **[Yes]** (YES): Frequency with random modulation<br>❑ **[No]** (nO): Fixed frequency<br>Random frequency modulation prevents any resonance which may occur at a fixed frequency. | [Yes] (YES) if the [Switch. freq type] (SFt) = [Low freq.] (LF)<br>[No] (nO) if the [Switch. freq type] (SFt) = [High freq.] (HF) | |
| SUL<br><br><br><br>nO<br>YES | ❑ **[Motor surge limit.]**<br><br>This function limits motor overvoltages and is useful in the following applications:<br>  - NEMA motors<br>  - Japanese motors<br>  - Spindle motors<br>  - Rewound motors<br><br>❑ **[No]** (nO) : Function inactive<br>❑ **[Yes]** (YES) : | [No] (nO) | |
| SOP | ❑ **[Volt surge lim opt.]**<br><br>Optimization parameter for transient overvoltages at motor terminals.<br>Set to 6, 8 or 10 μs. | 10 μs | |
| Ubr | ❑ **[Braking level]** (1)<br><br>DC bus voltage threshold above which the braking transistor cuts in to limit this voltage.<br>The adjustment range and factory setting depend on the drive's voltage and power rating. | | |
| bbA<br><br>nO<br>YES | ❑ **[Braking balance]**<br><br>The parameter can be accessed if [Decel. ramp adapt] (brA) = [No] (nO) (see page 106)<br>❑ **[No]** (nO) : Function inactive<br>❑ **[Yes]** (YES) : Active function, to be used on drives connected in parallel via their DC bus. Used to balance the braking power between the drives. The [Braking level] (Ubr) parameter, page 62, must be set to the same value on the various drives. | [No] (nO) | |

(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 rating plate.

# [1.4 - MOTOR CONTROL] (drC-)

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| L b A<br><br>n O<br>Y E S | ❏ **[Load sharing]**<br><br>When 2 motors are connected mechanically and therefore forced to the same speed, and each is controlled by a drive, this function can be used to improve torque distribution between the two motors. For this, it varies the speed based on the torque, having the same effect as slip.<br>☐ **[No]** (nO) : Function inactive<br>☐ **[Yes]** (YES) : Function active<br>This parameter is only visible if [Motor control type] (Ctt) = [SVC I] (CUC) (see page 56). | | | [No] (nO) |
| L b C | ❏ **[Load correction]**<br><br>Rated correction in Hz.<br>The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES)<br><br>Torque<br>Rated torque<br><br>Frequency<br><br>Rated torque | (1) | 0 to ? | 0 |

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

# [1.4 - MOTOR CONTROL] (drC-)

## Load sharing, parameters that can be accessed at expert level

### Principle
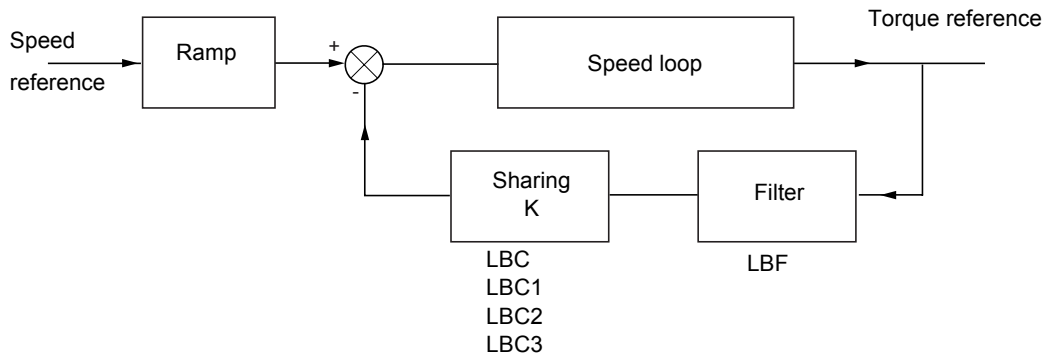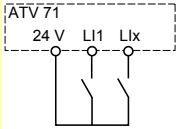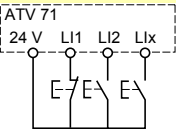


The load sharing factor K is determined by the torque and speed, with two factors K1 and K2 (K = K1 x K2).





| Code | Name/Description | | Adjustment range | Factory setting |
|------|-----------------|---|------------------|-----------------|
| L b C 1 | ❏ **[Correction low]** | (1) | 0 to ?Hz | 0 |
| | The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES)<br>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 cause the motor to start to turn. | | | |
| L b C 2 | ❏ **[Correction high]** | (1) | 0 to ?Hz | 0 |
| | The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES)<br>Speed threshold in Hz above which maximum load correction is applied. | | | |
| L b C 3 | ❏ **[Torque offset]** | (1) | 0 to 300% | 0% |
| | The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES)<br>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. | | | |
| L b F | ❏ **[Sharing filter]** | (1) | 0 to 20 s | 0 ms |
| | The parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES)<br>Time constant (filter) for correction in ms. Used in the event of elastic mechanical coupling in order to avoid instabilities. | | | |

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

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

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| tCC<br><br>2C<br>3C | ❏ **[2/3 wire control]**<br><br>☐ **[2 wire]** (2C)<br>☐ **[3 wire]** (3C)<br><br>2-wire control: The open or closed state of the input controls running or stopping.<br><br>Example of "source" wiring:<br><br>ATV 71<br>24 V  LI1  LIx<br><br>LI1: forward<br>LIx: reverse<br><br>3-wire control (pulse control): a "forward" or "reverse" pulse is sufficient to command starting, a "stop" pulse is sufficient to command stopping.<br><br>Example of "source" wiring:<br><br>ATV 71<br>24 V  LI1  LI2  LIx<br><br>LI1: stop<br>LI2: forward<br>LIx: reverse<br><br>⚠ Any change in the assignment of [2/3 wire] (tCC) must be confirmed on the graphic display terminal and the "ENT" key must be pressed and held down (2 s) on the integrated terminal.<br>The [2 wire type] (rrS) and [Rev. assignment] (tCt) functions below will be returned to factory settings, along with all functions associated with logic inputs.<br>We recommend that this parameter is configured before configuring the [1.6 COMMAND] (CtL-) and [1.7 APPLICATION FUNCT.] (FUn-) menus. | | [2 wire] (2C) |
| tCt<br><br>LEL<br>trn<br><br>PFO | ❏ **[2 wire type]**<br><br>☐ **[Level ]** (LEL): State 0 or 1 is taken into account for run (1) or stop (0).<br>☐ **[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.<br>☐ **[Prior. FW]** (PFO): State 0 or 1 is taken into account for run or stop, but the "forward" input always takes priority over the "reverse" input. | | [Level ] (LEL) |
| rrS<br><br>nO<br>LI1<br>-<br>-<br>- | ❏ **[Rev. assignment]**<br><br>☐ **[No]** (nO): Not assigned<br>☐ **[LI1]** (LI1)<br>　　：<br>　　：<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>Assignment of the reverse direction command. | | [LI2] (LI2) |

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

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| L I - | ■ **[LI1 CONFIGURATION]** | | |
| L O 1A | ❏ **[LI1 assignment]** | | |
| | Read-only parameter, cannot be configured.<br>It displays all the functions that are assigned to input LI1 in order to check multiple assignments. | | |
| L O 1d | ❏ **[LI1 On Delay]** | 0 to 2000 ms | 0 |
| | This parameter is used to take account of the change of the logic input to state 1 with a delay that can be adjusted between 0 and 2000 milliseconds, in order to filter out possible interference. The change to state 0 is taken into account without delay.<br><br>⚠ Make sure that the delay set does not pose a risk or lead to undesired operation. | | |
| 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. | | |

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

## Configuration of analog inputs and Pulse input

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

### 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:
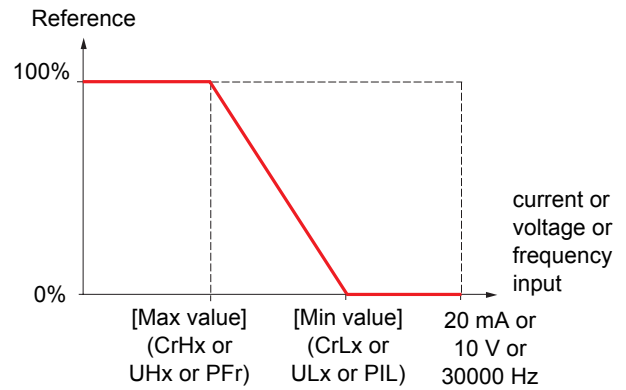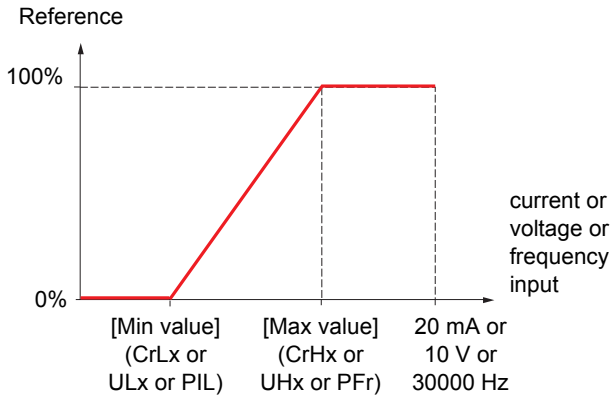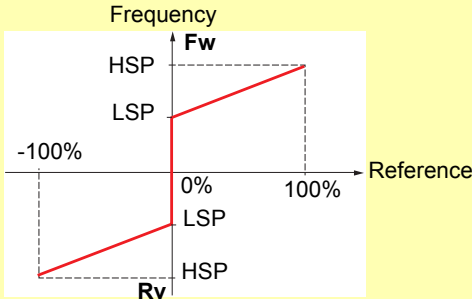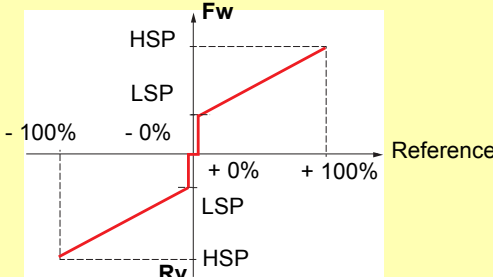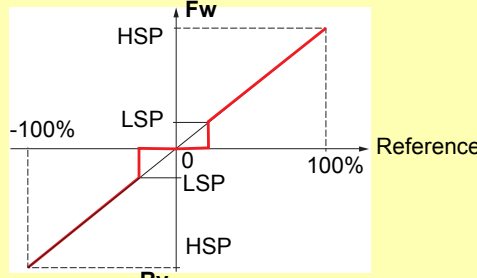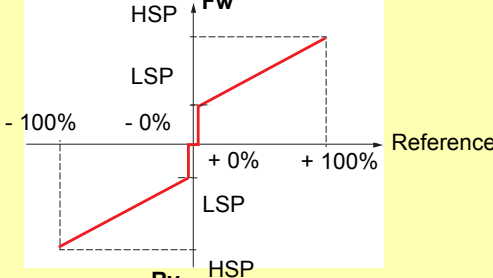


### Range (output values): For analog inputs only

This parameter is used to set the reference range to [0% ➜100%] or [-100% ➜ +100%] in order to obtain a bipolar output from a unipolar input.

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| b 5 P | ❏ **[Reference template]** | | [Standard] (bsd) |
| b 5 d | ☐ **[Standard]** (bSd) | | At zero reference the frequency = LSP |



| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| b n 5 0 | ☐ **[Deadband 0%]** (bnS0) | | This function is the same as [Standard] (bSd), with the exception that at zero reference, the frequency = 0. |



| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| b L 5 | ☐ **[Pedestal]** (bLS) | | At zero reference the frequency = LSP |



| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| b n 5 | ☐ **[Deadband]** (bnS) | | At zero reference the frequency = 0 |



This parameter defines how the speed reference is taken into account, regardless of the reference channel. 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 xx.

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

## 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%
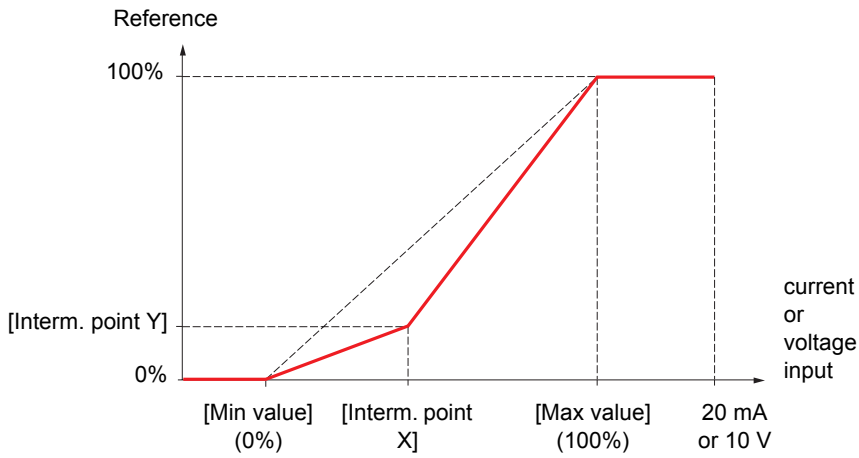


**Note:** For [Interm. point X], 0% corresponds to [Min value] and 100% to [Max value]

For range -100% → 100%

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| AI1 - | ■ **[AI1 CONFIGURATION]** | | |
| AI1A | ❏ **[AI1 assignment]**<br><br>Read-only parameter, cannot be configured.<br>It displays all the functions associated with input AI1 in order to check, for example, for compatibility problems. | | |
| AI1t<br><br>10U | ❏ **[AI1 type]**<br><br>Read-only parameter, cannot be configured.<br>☐ **[Voltage]** (10U): Voltage input | | [Voltage] (10U) |
| 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]**<br><br>Interference filtering. | 0 to 10.00 s | 0 s |
| AI1E | ❏ **[AI1 Interm. point X]**<br><br>Input delinearization point coordinate.<br>• 0% corresponds to [AI1 min value] (UIL1).<br>• 100% corresponds to [AI1 max value] (UIH1). | 0 to 100% | 0% |
| AI1S | ❏ **[AI1 Interm. point Y]**<br><br>Output delinearization point coordinate (frequency reference). | 0 to 100% | 0% |

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| AI2- | ■ **[AI2 CONFIGURATION]** | | |
| AI2A | ❏ **[AI2 assignment]**<br><br>Read-only parameter, cannot be configured.<br>It displays all the functions associated with input AI2 in order to check, for example, for compatibility problems. | | |
| AI2t<br><br>10U<br>0 A | ❏ **[AI2 type]**<br><br>☐ **[Voltage]** (10U): Voltage input<br>☐ **[Current]** (0 A): Current input | | [Current] (0 A) |
| CrL2 | ❏ **[AI2 min. value]**<br><br>The parameter can be accessed if [AI2 Type] (AI2t) = [Current] (0 A) | 0 to 20.0 mA | 4.0 mA |
| CrH2 | ❏ **[AI2 max value]**<br><br>The parameter can be accessed if [AI2 Type] (AI2t) = [Current] (0 A) | 0 to 20.0 mA | 20.0 mA |
| UIL2 | ❏ **[AI2 min. value]**<br><br>The parameter can be accessed if [AI2 Type] (AI2t) = [Voltage] (10U) | 0 to 10.0 V | 0 V |
| UIH2 | ❏ **[AI2 max value]**<br><br>The parameter can be accessed if [AI2 Type] (AI2t) = [Voltage] (10U) | 0 to 10.0 V | 10.0 V |
| AI2F | ❏ **[AI2 filter]**<br><br>Interference filtering. | 0 to 10.00 s | 0 s |
| AI2L<br><br>POS<br>nEG | ❏ **[AI2 range]**<br><br>☐ **[0 --> 100%]** (POS): One-way input<br>☐ **[-100% --> +100%]** (nEG): Two-way input<br>Example: On a 0/10 V input<br>  - 0 V corresponds to reference -100%<br>  - 5 V corresponds to reference 0%<br>  - 10 V corresponds to reference +100% | | [0 --> 100%] (POS) |
| AI2E | ❏ **[AI2 Interm. point X]**<br><br>Input delinearization point coordinate.<br>• 0% corresponds to [Min value] if the range is 0 → 100%.<br>• 0% corresponds to $\dfrac{\text{[Max value] - [Min value]}}{2}$ + [Min value] if the range is -100% → + 100%.<br>• 100% corresponds to [Max value]. | 0 to 100% | 0% |
| AI2S | ❏ **[AI2 Interm. point Y]**<br><br>Output delinearization point coordinate (frequency reference). | 0 to 100% | 0% |

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| *AI3 -* | ■ **[AI3 CONFIGURATION]**<br>Can be accessed if an option card has been inserted | | |
| *AI3A* | ❏ **[AI3 assignment]**<br><br>Read-only parameter, cannot be configured.<br>It displays all the functions associated with input AI3 in order to check, for example, for compatibility problems. | | |
| *AI3t*<br><br>*0 A* | ❏ **[AI3 type]**<br><br>Read-only parameter, cannot be configured.<br>☐ **[Current]** (0 A): Current input | | [Current] (0 A) |
| *CrL3* | ❏ **[AI3 min value]** | 0 to 20.0 mA | 4.0 mA |
| *CrH3* | ❏ **[AI3 max. value]** | 0 to 20.0 mA | 20.0 mA |
| *AI3F* | ❏ **[AI3 filter]**<br><br>Interference filtering. | 0 to 10.00 s | 0 s |
| *AI3L*<br><br>*POS*<br>*nEG* | ❏ **[AI3 range]**<br><br>☐ **[0 --> 100%]** (POS): One-way input<br>☐ **[-100% --> +100%]** (nEG): Two-way input<br>Example: On a 4 - 20 V input<br>  - 4 mA corresponds to reference -100%<br>  - 12 mA corresponds to reference 0%<br>  - 20 mA corresponds to reference +100%<br>As, in physical terms, AI3 is a two-way input, the configuration [-100% --> +100%] (nEG) must only be used if the signal applied is a one-way signal. A two-way signal is not compatible with a two-way configuration. | | [0 --> 100%] (POS) |
| *AI3E* | ❏ **[AI3 Interm. point X]**<br><br>Input delinearization point coordinate.<br>• 0% corresponds to [A13 min. value] (CrL3) if the range is 0 → 100%.<br>• 0% corresponds to $\dfrac{\text{[max value] (CrH3) - [min value] (CrL3)}}{2}$ + [min value] (CrL3) if the range is -100% → +100 %.<br>• 100% corresponds to [max value] (CrH3). | 0 to 100% | 0% |
| *AI3S* | ❏ **[AI3 Interm. point Y]**<br><br>Output delinearization point coordinate (frequency reference). | 0 to 100% | 0% |

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| A I4 - | ■ **[AI4 CONFIGURATION]**<br>Can be accessed if an option card has been inserted | | |
| A I4A | ❏ **[AI4 assignment]**<br><br>Read-only parameter, cannot be configured.<br>It displays all the functions associated with input AI2 in order to check, for example, for compatibility problems. | | |
| A I4b<br><br>I0 U<br>0 A | ❏ **[AI4 type]**<br><br>☐ **[Voltage]** (10U): Voltage input<br>☐ **[Current]** (0 A): Current input | | [Current] (0 A) |
| C r L4 | ❏ **[AI4 min. value]**<br><br>The parameter can be accessed if [AI4 Type] (AI4t) = [Current] (0 A) | 0 to 20.0 mA | 4.0 mA |
| C r H4 | ❏ **[AI4 max value]**<br><br>The parameter can be accessed if [AI4 Type] (AI4t) = [Current] (0 A) | 0 to 20.0 mA | 20.0 mA |
| U IL4 | ❏ **[AI4 min. value]**<br><br>The parameter can be accessed if [AI4 Type] (AI4t) = [Voltage] (10U) | 0 to 10.0 V | 0 V |
| U IH4 | ❏ **[AI4 max value]**<br><br>The parameter can be accessed if [AI4 Type] (AI4t) = [Voltage] (10U) | 0 to 10.0 V | 10.0 V |
| A I4F | ❏ **[AI4 filter]**<br><br>Interference filtering. | 0 to 10.00 s | 0 s |
| A I4L<br><br>P 0S<br>n E G | ❏ **[AI4 range]**<br><br>☐ **[0 --> 100%]** (POS): One-way input<br>☐ **[-100% --> +100%]** (nEG): Two-way input<br>Example: On a 0/10 V input<br>  - 0 V corresponds to reference -100%<br>  - 5 V corresponds to reference 0%<br>  - 10 V corresponds to reference +100% | | [0 --> 100%] (POS) |
| A I4E | ❏ **[AI4 Interm. X]**<br><br>Input delinearization point coordinate.<br>• 0% corresponds to [Min value] if the range is 0 ➜ 100%.<br><br>• 0% corresponds to $\dfrac{\text{[Max value] - [Min value]}}{2}$ + [Min value] if the range is -100% ➜ + 100%.<br><br>• 100% corresponds to [Max value]. | 0 to 100% | 0% |
| A I4S | ❏ **[AI4 Interm.Y]**<br><br>Output delinearization point coordinate (frequency reference). | 0 to 100% | 0% |

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

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| *P IA -* | ■ **[PULSE IN CONFIGURATION]**<br>Can be accessed if an option card has been inserted | | |
| *P IA* | ❑ **[Assignment]**<br><br>Read-only parameter, cannot be configured.<br>It displays all the functions associated with the Pulse input in order to check, for example, for compatibility problems. | | |
| *P IL* | ❑ **[RP min value]**<br><br>Frequency corresponding to the minimum speed | 0 to 3000 (x 10 Hz) | 0 |
| *P F r* | ❑ **[RP max value]**<br><br>Frequency corresponding to the maximum speed | 0 to 3000 (x 10 Hz) | 0 |
| *P F I* | ❑ **[RP filter]**<br><br>Interference filtering. | 0 to 1000 ms | 0 |

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

## Configuration of the encoder input serving as a reference

### 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.
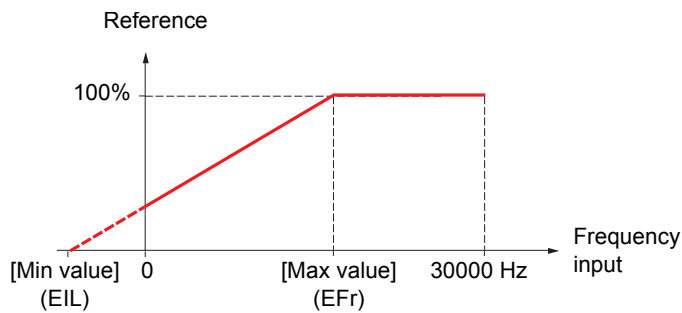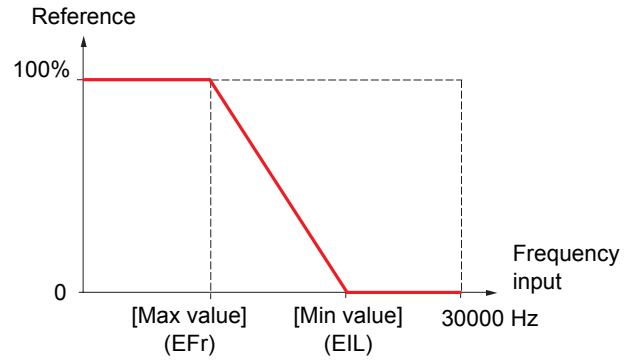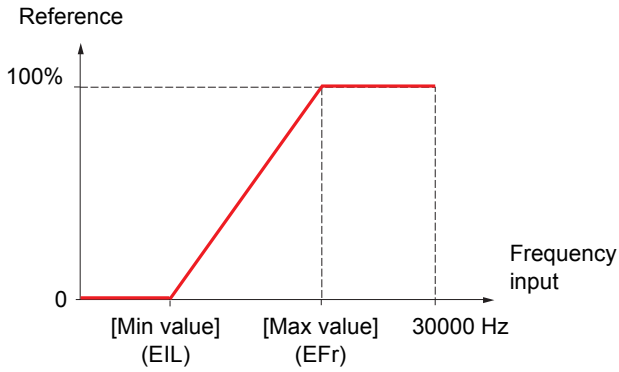


A reference can be obtained at zero frequency by assigning a negative value to the minimum value.

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

The encoder 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 [1.4 - MOTOR CONTROL] (drC-) menu.

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| PG - | ■ **[ENCODER CONFIGURATION]**<br>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<br><br>AAbb<br>Ab<br>A | ❏ **[Encoder signals]**<br><br>The parameter can be accessed if an encoder card has been inserted.<br>To be configured in accordance with the type of encoder used.<br>▢ **[AABB]** (AAbb): For signals A, A-, B, B-.<br>▢ **[AB]** (Ab): For signals A, B.<br>▢ **[A]** (A): For signal A. | | [No] (nO) |
| PG1 | ❏ **[Number of pulses]**<br><br>Number of pulses per revolution.<br>The parameter can be accessed if an encoder card has been inserted. | 100 to 5000 | 1024 |
| EnC<br><br><br>nO<br>YES<br><br><br><br>dOnE | ❏ **[Encoder check]**<br><br>Check encoder feedback. See procedure page xx.<br>The parameter can be accessed if an encoder card has been inserted and if [Encoder use] (EnU) is set to a value other than [PGR->NotDef] (PGr).<br>▢ **[No]** (nO): Check not performed.<br>▢ **[Yes]** (YES): Initiates the check.<br><br>⚠ This selection causes the motor to start to turn.<br><br>▢ **[Done]** (dOnE): Check performed successfully.<br>The check procedure checks:<br>- The direction of rotation of the encoder/motor (ENF3 fault)<br>- The presence of signals (wiring continuity, ENF2 fault)<br>- The number of pulses/revolution (ENF1 fault)<br>If a fault is detected, the drive locks in ENFx fault mode. | | [No] (nO) |
| EnU<br><br>nO<br>SEC<br>rEG<br><br><br><br>PGr | ❏ **[Encoder use]**<br><br>The parameter can be accessed if an encoder card has been inserted.<br>▢ **[No]** (nO): Function inactive, In this case, the other parameters cannot be accessed.<br>▢ **[spd sec. Fdk]** (SEC): The encoder provides speed feedback for monitoring only.<br>▢ **[spd regul fdk]** (rEG): The encoder provides speed feedback for regulation and monitoring. This configuration is automatic if the drive has been configured for closed-loop operation and is only supported by this type of operation.<br>▢ **[PGR->NotDef]** (PGr): The encoder serves as a reference. | | [No] (nO) |
| PGA<br><br>EnC<br>PtG | ❏ **[Reference type]**<br><br>The parameter can be accessed if [Encoder use] (EnU) = [PGR->NotDef] (PGr).<br>▢ **[Encoder]** (EnC): Use of an encoder.<br>▢ **[Freq. gen.]** (PtG): Use of a frequency generator. | | [Encoder] (EnC) |
| EIL | ❏ **[Freq. min value]**<br><br>The parameter can be accessed if [Encoder use] (EnU) = [PTG->NotDef] (PGr) and if [ ] (PGA) = [ ] (PtG). Frequency corresponding to the minimum speed | 0 to 3000 (x 10 Hz) | 0 |
| EFr | ❏ **[Freq. max value]**<br><br>The parameter can be accessed if [Encoder use] (EnU) = [PTG->NotDef] (PGr) and if [ ] (PGA) = [ ] (PtG). Frequency corresponding to the maximum speed | 0 to 3000 (x 10 Hz) | 0 |
| EF1 | ❏ **[Freq. signal filter]**<br><br>The parameter can be accessed if [Encoder use] (EnU) = [PTG->NotDef] (PGr) and if [ ] (PGA) = [ ] (PtG). Interference filtering. | 0 to 1000 ms | 0 |

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| r1- | ■ **[R1 CONFIGURATION]** | | |
| r1 | ❏ **[R1 Assignment]** | | [drive fault] (FLt) |
| nO | ☐ **[Not assign.]** (nO): Not assigned | | |
| FLt | ☐ **[drive fault]** (FLt): Drive fault | | |
| rUn | ☐ **[Drv running]** (rUn): Drive running | | |
| FtA | ☐ **[Freq. attain.]** (FtA): Frequency attained | | |
| FLA | ☐ **[HSP attain.]** (FLA): High speed attained | | |
| CtA | ☐ **[I attained]** (CtA): Current threshold attained | | |
| SrA | ☐ **[Freq.ref.att.]** (SrA): Frequency reference attained | | |
| tSA | ☐ **[Th. mot. att.]** (tSA): Motor thermal state 1 attained | | |
| PEE | ☐ **[PID error al]** (PEE): PID error alarm | | |
| PFA | ☐ **[PID fdbk al.]** (PFA): PID feedback alarm | | |
| APL | ☐ **[4-20 mA loss]** (APL): Alarm indicating absence of 4-20 mA signal | | |
| tAd | ☐ **[Th. drv. att.]** (tAd): Drive thermal state attained | | |
| tSA2 | ☐ **[Th. mot2. att.]** (tSA2): Motor thermal state 2 attained | | |
| tSA3 | ☐ **[Th. mot3. att.]** (tSA3): Motor thermal state 3 attained | | |
| AtS | ☐ **[Torque +/-]** (AtS): Torque sign? | | |
| CnF0 | ☐ **[Conf. 1 active]** (CnF0): Configuration 1 active | | |
| CnF1 | ☐ **[Conf. 2 active]** (CnF1): Configuration 2 active | | |
| CnF2 | ☐ **[Conf. 3 active]** (CnF2): Configuration 3 active | | |
| CFP1 | ☐ **[set 1 active]** (CFP1): | | |
| CFP2 | ☐ **[set 2 active]** (CFP2): | | |
| CFP3 | ☐ **[set 3 active]** (CFP3): | | |
| dbL | ☐ **[DC charged]** (dbL): DC bus loading | | |
| brS | ☐ **[In braking]** (brS): Drive braking | | |
| PrM | ☐ **[P. removed]** (PRM): | | |
| LSA | ☐ **[LSA]** (LSA): | | |
| AG1 | ☐ **[Alarm group 1]** (AGI): Alarm group 1 | | |
| AG2 | ☐ **[Alarm group 2]** (AG2): Alarm group 2 | | |
| AG3 | ☐ **[Alarm group 3]** (AG3): Alarm group 3 | | |
| P1A | ☐ **[PTC1 alarm]** (P1A): Probe alarm motor 1 | | |
| P2A | ☐ **[PTC2 alarm]** (P2A): Probe alarm motor 2 | | |
| PLA | ☐ **[PTC3 alarm]** (PLA): Probe alarm motor 3 | | |
| EFA | ☐ **[Ext. fault al]** (EFA): External fault alarm | | |
| USA | ☐ **[Underv. al]** (USA): Undervoltage alarm | | |
| UPA | ☐ **[prevent. <U]** (UPA): Undervoltage prevention | | |
| AnA | ☐ **[slipping al.]** (AnA): Slipping alarm | | |
| tHA | ☐ **[Al. °D'b0C drv.]** (tHA): IGBT alarm | | |
| bSA | ☐ **[Load mvt al]** (bSA): Braking speed alarm | | |
| bCA | ☐ **[Brk cont. al]** (bCA): Brake contact alarm | | |
| SSA | ☐ **[Lim T/I att.]** (SSA): Torque limit alarm | | |
| rtA | ☐ **[Trq. reg. al.]** (rtA): | | |
| LCC | ☐ **[Line cont.]** (LCC): Line contactor control | | |
| rrM | ☐ **[P. removed]** (rrM): PWR active | | |
| rdY | ☐ **[Drive ready]** (rdY): Drive ready | | |
| OCC | ☐ **[output cont.]** (OCC): Output contactor control | | |
| MCP | ☐ **[I present]** (MCP): Motor current present | | |
| EbO | ☐ **[Spool end]** (EbO): Spool end (traverse control function) | | |
| CLO | ☐ **[Sync Wobble]** (CLO): "Counter wobble" synchronization | | |
| r1d | ❏ **[R1 Delay time]** <br><br> For the assignment of [Line cont.] (LCC), the delay time cannot be set above 0. <br> The change in state only takes effect once the configured time has elapsed, when the information becomes true. | 0 to 9999 ms | 0 |
| r1S <br><br> 0 <br> 1 | ❏ **[R1 Active at]** <br><br> Configuration of the operating logic: <br> ☐ **[0]**: State 0 when the information is true <br> ☐ **[1]**: State 1 when the information is true <br> For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), state 1 cannot be modified. | | 1 |

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| r1- | ■ **[R1 CONFIGURATION]** (continued) | | |
| r1H | ❏ **[R1 Holding time]** | 0 to 9999 ms | 0 |
| | For the assignment of [Line cont.] (LCC), the holding time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false. | | |
| r2- | ■ **[R2 CONFIGURATION]** | | |
| r2 | ❏ **[R2 Assignment]** | | [No] (nO) |
| bLC | Identical to R1 (see page 77), plus: □ **[Brk control]** (bLC): Brake contactor control, for information as this selection can only be configured in the [APPLICATION FUNCT.] (Fun-) menu | | |
| r2d | ❏ **[R2 Delay time]** | 0 to 9999 ms | 0 |
| | For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the delay time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true. | | |
| r2S | ❏ **[R2 Active at]** | | 1 |
| 0 1 | Configuration of the operating logic: □ **[0]**: State 0 when the information is true □ **[1]**: State 1 when the information is true For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), state 1 cannot be modified. | | |
| r2H | ❏ **[R2 Holding time]** | 0 to 9999 ms | 0 |
| | For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the holding time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false. | | |
| r3- | ■ **[R3 CONFIGURATION]** Can be accessed if an option card has been inserted | | |
| r3 | ❏ **[R3 Assignment]** | | [No] (nO) |
| bLC | Identical to R1 (see page 77), plus: □ **[Brk control]** (bLC): Brake contactor control, for information as this selection can only be configured in the [APPLICATION FUNCT.] (Fun-) menu | | |
| r3d | ❏ **[R3 Delay time]** | 0 to 9999 ms | 0 |
| | For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the delay time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true. | | |
| r3S | ❏ **[R3 Active at]** | | 1 |
| 0 1 | Configuration of the operating logic: □ **[0]** : State 0 when the information is true □ **[1]** : State 1 when the information is true For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), state 1 cannot be modified. | | |
| r3H | ❏ **[R3 Holding time]** | 0 to 9999 ms | 0 |
| | For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the holding time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false. | | |

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

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| r4- | ■ **[R4 CONFIGURATION]**<br>Can be accessed if an option card has been inserted | | |
| r4<br><br>bLC | ❏ **[R4 Assignment]**<br><br>Identical to R1 (see page 77), plus:<br>☐ **[Brk control]** (bLC): Brake contactor control, for information as this selection can only be configured in the [APPLICATION FUNCT.] (Fun-) menu | | [No] (nO) |
| r4d | ❏ **[R4 Delay time]**<br><br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the delay time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true. | 0 to 9999 ms | 0 |
| r4S<br><br>0<br>1 | ❏ **[R4 Active at]**<br><br>Configuration of the operating logic:<br>☐ **[0]**: State 0 when the information is true<br>☐ **[1]**: State 1 when the information is true<br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), state 1 cannot be modified. | | 1 |
| r4H | ❏ **[R4 Holding time]**<br><br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the holding time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false. | 0 to 9999 ms | 0 |

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| **LO1-** | ■ **[LO1 CONFIGURATION]**<br>Can be accessed if an option card has been inserted | | |
| **LO1**<br><br>**bLC** | ❑ **[LO1 assignment]**<br><br>Identical to R1 (see page 77), plus:<br>☐ **[Brk control]** (bLC): Brake contactor control, for information as this selection can only be configured in the [APPLICATION FUNCT.] (Fun-) menu | | [No] (nO) |
| **LO1d** | ❑ **[LO1 delay time]**<br><br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the delay time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true. | 0 to 9999 ms | 0 |
| **LO1S**<br><br>**0**<br>**1** | ❑ **[LO1 active at]**<br><br>Configuration of the operating logic:<br>☐ **[0]**: State 0 when the information is true<br>☐ **[1]**: State 1 when the information is true<br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), state 1 cannot be modified. | | 1 |
| **LO1H** | ❑ **[LO1 holding time]**<br><br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the holding time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false. | 0 to 9999 ms | 0 |
| **LO2-** | ■ **[LO2 CONFIGURATION]**<br>Can be accessed if an option card has been inserted | | |
| **LO2**<br><br>**bLC** | ❑ **[LO2 assignment]**<br><br>Identical to R1 (see page 77), plus:<br>☐ **[Brk control]** (bLC): Brake contactor control, for information as this selection can only be configured in the [APPLICATION FUNCT.] (Fun-) menu | | [No] (nO) |
| **LO2d** | ❑ **[LO2 delay time]**<br><br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the delay time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true. | 0 to 9999 ms | 0 |
| **LO2S**<br><br>**0**<br>**1** | ❑ **[LO2 active at]**<br><br>Configuration of the operating logic:<br>☐ **[0]**: State 0 when the information is true<br>☐ **[1]**: State 1 when the information is true<br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), state 1 cannot be modified. | | 1 |
| **LO2H** | ❑ **[LO2 holding time]**<br><br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the holding time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false. | 0 to 9999 ms | 0 |

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

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| LO3- | ■ **[LO3 CONFIGURATION]**<br>Can be accessed if an option card has been inserted | | |
| LO3<br><br>bLC | ❑ **[LO3 assignment]**<br><br>Identical to R1 (see page 77), plus:<br>☐ **[Brk control]** (bLC): Brake contactor control, for information as this selection can only be configured in the [APPLICATION FUNCT.] (Fun-) menu | | [No] (nO) |
| LO3d | ❑ **[LO3 delay time]**<br><br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the delay time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true. | 0 to 9999 ms | 0 |
| LO3S<br><br>0<br>1 | ❑ **[LO3 active at]**<br><br>Configuration of the operating logic:<br>☐ **[0]**: State 0 when the information is true<br>☐ **[1]**: State 1 when the information is true<br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), state 1 cannot be modified. | | 1 |
| LO3H | ❑ **[LO3 holding time]**<br><br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the holding time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false. | 0 to 9999 ms | 0 |
| LO4- | ■ **[LO4 CONFIGURATION]**<br>Can be accessed if an option card has been inserted | | |
| LO4<br><br>bLC | ❑ **[LO4 assignment]**<br><br>Identical to R1 (see page 77), plus:<br>☐ **[Brk control]** (bLC): Brake contactor control, for information as this selection can only be configured in the [APPLICATION FUNCT.] (Fun-) menu | | [No] (nO) |
| LO4d | ❑ **[LO4 delay time]**<br><br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the delay time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true. | 0 to 9999 ms | 0 |
| LO4S<br><br>0<br>1 | ❑ **[LO4 active at]**<br><br>Configuration of the operating logic:<br>☐ **[0]**: State 0 when the information is true<br>☐ **[1]**: State 1 when the information is true<br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), state 1 cannot be modified. | | 1 |
| LO4H | ❑ **[LO4 holding time]**<br><br>For the assignments of [Brk control] (bLC) and [Line cont.] (LCC), the holding time cannot be set above 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false. | 0 to 9999 ms | 0 |

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| | ■ **[LIST OF ALARMS]** | | |
| AG1 | ❏ **[Alarm Grp 1]** | | |
| | Selection to be made in the following list: | | |
| P1A | ☐ **[PTC1 alarm]** (P1A): Probe alarm motor 1 | | |
| P2A | ☐ **[PTC2 alarm]** (P2A): Probe alarm motor 2 | | |
| PLA | ☐ **[PTC3 alarm]** (PLA): Probe alarm motor 3 | | |
| CtA | ☐ **[I attained]** (CtA): Current threshold reached | | |
| FtA | ☐ **[Freq. attain.]** (FtA): Frequency attained | | |
| SrA | ☐ **[Freq.ref.att.]** (SrA): Frequency reference attained | | |
| EFA | ☐ **[Ext. fault al]** (EFA): External fault alarm | | |
| tAd | ☐ **[Th. ATV att.]** (tAd): Drive thermal state attained | | |
| tSA | ☐ **[Th. mot. att.]** (tSA): Motor thermal state 1 attained | | |
| tSA2 | ☐ **[Th. mot2 att]** (tSA2): Motor thermal state 2 attained | | |
| tSA3 | ☐ **[Th. mot3 att]** (tSA3): Motor thermal state 3 attained | | |
| USA | ☐ **[Underv. al]** (USA): Undervoltage alarm | | |
| UPA | ☐ **[prevent. <U]** (UPA): Undervoltage prevention | | |
| FLA | ☐ **[HSP attain.]** (FLA): High speed attained | | |
| AnA | ☐ **[slipping al.]** (AnA): Slipping alarm | | |
| tHA | ☐ **[Al. °C drv.]** (tHA): IGBT alarm | | |
| bSA | ☐ **[Load mvt al]** (bSA): Braking speed alarm | | |
| bCA | ☐ **[Brk cont. al]** (bCA): Brake contact alarm | | |
| PEE | ☐ **[PID error al]** (PEE): PID error alarm | | |
| PFA | ☐ **[PID fdbk al.]** (PFA): PID feedback alarm | | |
| APL | ☐ **[4-20 mA loss]** (APL): Alarm indicating absence of 4-20 mA signal | | |
| SSA | ☐ **[Lim T/I att.]** (SSA): Torque limit alarm | | |
| rtA | ☐ **[Trq. reg. al.]** (rtA): | | |
| tS4 | ☐ **[TS4]** (tS4): | | |
| | See the selection procedure on page 23 for the integrated terminal and page 15 for the graphic display terminal. | | |
| AG2 | ❏ **[Alarm Grp 2]** | | |
| | Identical to [Alarm Grp 1] (AG1) | | |
| AG3 | ❏ **[Alarm Grp 3]** | | |
| | Identical to [Alarm Grp 1] (AG1) | | |

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

## Configuration of analog outputs

### Minimum and maximum values (output values):

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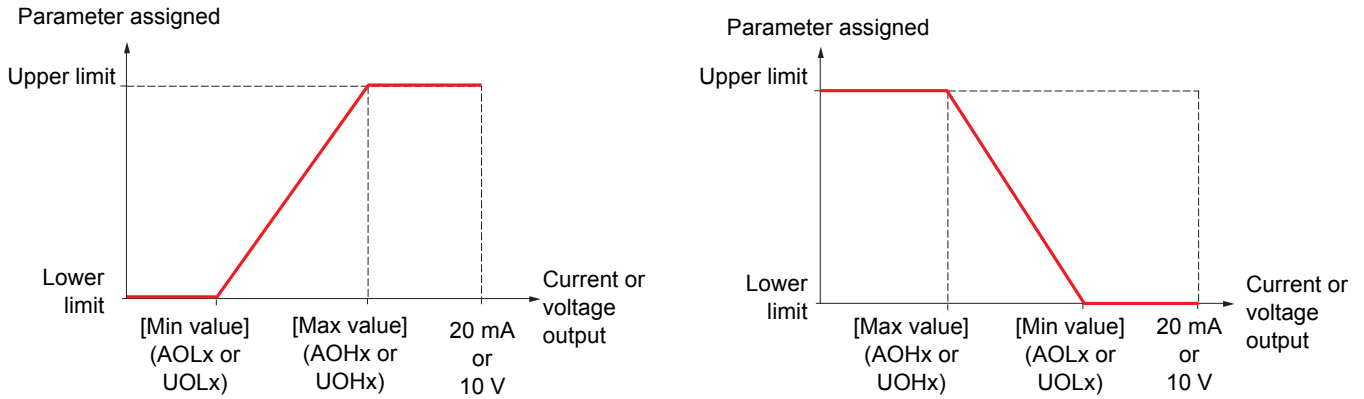


### Outputs AO2 and AO3 configured as bipolar outputs:

The [min value] (UOLx) and [max value] (UOHx) parameters are absolute values, although they function symmetrically. In the case of bipolar outputs, always set the maximum value higher than the minimum value.

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| AO1- | ■ **[AO1 CONFIGURATION]** | | |
| AO1 | ❏ **[AO1 assignment]** | | [No] (nO) |
| nO | ☐ **[Not assign.]** (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 rating plate). | | |
| OFr | ☐ **[Motor freq.]** (OFr): Output frequency, between 0 and [Max frequency] (tFr) | | |
| OrP | ☐ **[Ramp out.]** (OrP): Between 0 and [Max frequency] (tFr) | | |
| trq | ☐ **[Motor torq.]** (trq): Motor torque, between 0 and 3 times the rated motor torque | | |
| Stq | ☐ **[Signed torq]** (Stq): Signed motor torque, between -3 and +3 times the rated motor torque | | |
| OrS | ☐ **[signed rmp]** (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 integral]** (OPI): PID regulator integral 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. Therm]** (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 | | |
| OFS | ☐ **[Sig. out. frq.]** (OFS): Signed output frequency, between - [Max frequency] (tFr) and + [Max frequency] (tFr) | | |
| tHr2 | ☐ **[MotTherm2]** (tHr2): Thermal state of motor 2, between 0 and 200% of the rated thermal state | | |
| tHr3 | ☐ **[MotTherm3]** (tHr3): Thermal state of motor 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 | ☐ **[Sign trq ref]** (Str): Signed torque reference, between -3 and +3 times the rated motor torque | | |
| tqL | ☐ **[Lim. Couple]** (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) | | |
| AO1t | ❏ **[AO1 Type]** | | [Voltage] (10U) |
| 10U | ☐ **[Voltage]** (10U): Voltage output | | |
| 0A | ☐ **[Current]** (0 A): Current output | | |
| AOL1 | ❏ **[AO1 min Output]** The parameter can be accessed if [AO1 Type] (AO1t) = [Current] (0 A) | 0 to 20.0 mA | 4.0 mA |
| AOH1 | ❏ **[AO1 max Output]** The parameter can be accessed if [AO1 Type] (AO1t) = [Current] (0 A) | 0 to 20.0 mA | 20.0 mA |
| UOL1 | ❏ **[AO1 min Output]** The parameter can be accessed if [AO1 Type] (AO1t) = [Voltage] (10U) | 0 to 10.0 V | 0 V |
| UOH1 | ❏ **[AO1 max Output]** The parameter can be accessed if [AO1 Type] (AO1t) = [Voltage] (10U) | 0 to 10.0 V | 10.0 V |
| AO1F | ❏ **[AO1 Filter]** Interference filtering. | 0 to 10.00 s | 0 s |

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| AO2 - | ■ **[AO2 CONFIGURATION]**<br>Can be accessed if an option card has been inserted | | |
| AO2 | ❑ **[AO2 assignment]**<br>Same assignments as AO1 | | [No] (nO) |
| AO2t<br>10U<br>0A<br>n10U | ❑ **[AO2 Type]**<br>☐ **[Voltage]** (10U): Voltage output<br>☐ **[Current]** (0 A): Current output<br>☐ **[Voltage +/-]** (n10U): Bipolar voltage output | | [Voltage] (10U) |
| AOL2 | ❑ **[AO2 min output]**<br>The parameter can be accessed if [AO2 Type] (AO2t) = [Current] (0 A) | 0 to 20.0 mA | 4.0 mA |
| AOH2 | ❑ **[AO2 max Output]**<br>The parameter can be accessed if [AO2 Type] (AO2t) = [Current] (0 A) | 0 to 20.0 mA | 20.0 mA |
| UOL2 | ❑ **[AO2 min output]**<br>The parameter can be accessed if [AO2 Type] (AO2t) = [Voltage] (10U) or [Voltage +/-] (n10U) | 0 to 10.0 V | 0 V |
| UOH2 | ❑ **[AO2 max Output]**<br>The parameter can be accessed if [AO2 Type] (AO2t) = [Voltage] (10U) or [Voltage +/-] (n10U) | 0 to 10.0 V | 10.0 V |
| AO2F | ❑ **[AO2 Filter]**<br>Interference filtering. | 0 to 10.00 s | 0 s |
| AO3 - | ■ **[AO3 CONFIGURATION]**<br>Can be accessed if an option card has been inserted | | |
| AO3 | ❑ **[AO3 assignment]**<br>Same assignments as AO1 | | [No] (nO) |
| AO3t<br>10U<br>0A<br>n10U | ❑ **[AO3 Type]**<br>☐ **[Voltage]** (10U): Voltage output<br>☐ **[Current]** (0 A): Current output<br>☐ **[Voltage +/-]** (n10U): Bipolar voltage output | | [Voltage] (10U) |
| AOL3 | ❑ **[AO3 min Output]**<br>The parameter can be accessed if [AO3 Type] (AO3t) = [Current] (0 A) | 0 to 20.0 mA | 4.0 mA |
| AOH3 | ❑ **[AO3 max Output]**<br>The parameter can be accessed if [AO3 Type] (AO3t) = [Current] (0 A) | 0 to 20.0 mA | 20.0 mA |
| UOL3 | ❑ **[AO3 min Output]**<br>The parameter can be accessed if [AO3 Type] (AO3t) = [Voltage] (10U) or [Voltage +/-] (n10U) | 0 to 10.0 V | 0 V |
| UOH3 | ❑ **[AO3 max Output]**<br>The parameter can be accessed if [AO3 Type] (AO3t) = [Voltage] (10U) or [Voltage +/-] (n10U) | 0 to 10.0 V | 10.0 V |
| AO3F | ❑ **[AO3 Filter]**<br>Interference filtering. | 0 to 10.00 s | 0 s |

# [1.6 - COMMAND] (CtL-)

## Command and reference channels

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

| Command | Reference |
|---|---|
| • Terminals: Logic inputs LI<br>• Graphic display terminal (RJ45 socket)<br>• Modbus<br>• CANopen<br>• Communication cards<br>• Programmable card | • Terminals: Analog inputs AI, frequency input, encoder<br>• Graphic display terminal (RJ45 socket)<br>• Modbus<br>• CANopen<br>• Communication card<br>• Programmable card<br>• +/- speed via the terminals<br>• +/- speed via the graphic display terminal |

The Altivar 71 supports various command and reference combinations:
- ATV58 type: To replace an Altivar 58. See the Substitution Guide.
- Not separate mode: Command and reference are sent via the same channel.
- Separate mode: Command and reference may be sent via different channels.
- I/O mode: Command and reference may be sent via different channels.
  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 behaves as virtual terminals containing only logic inputs.
  Application functions can be assigned to the bits in this word. One bit may contain several assignments.
  In other command modes, control via the bus takes place in accordance with standard DSP402 (see the Communication Variables Manual) with 5 bits only that can be freely assigned.

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

# [1.6 - COMMAND] (CtL-)

## Reference channel for not separate mode (SIM), separate mode (SEP) and I/O mode, PID not configured
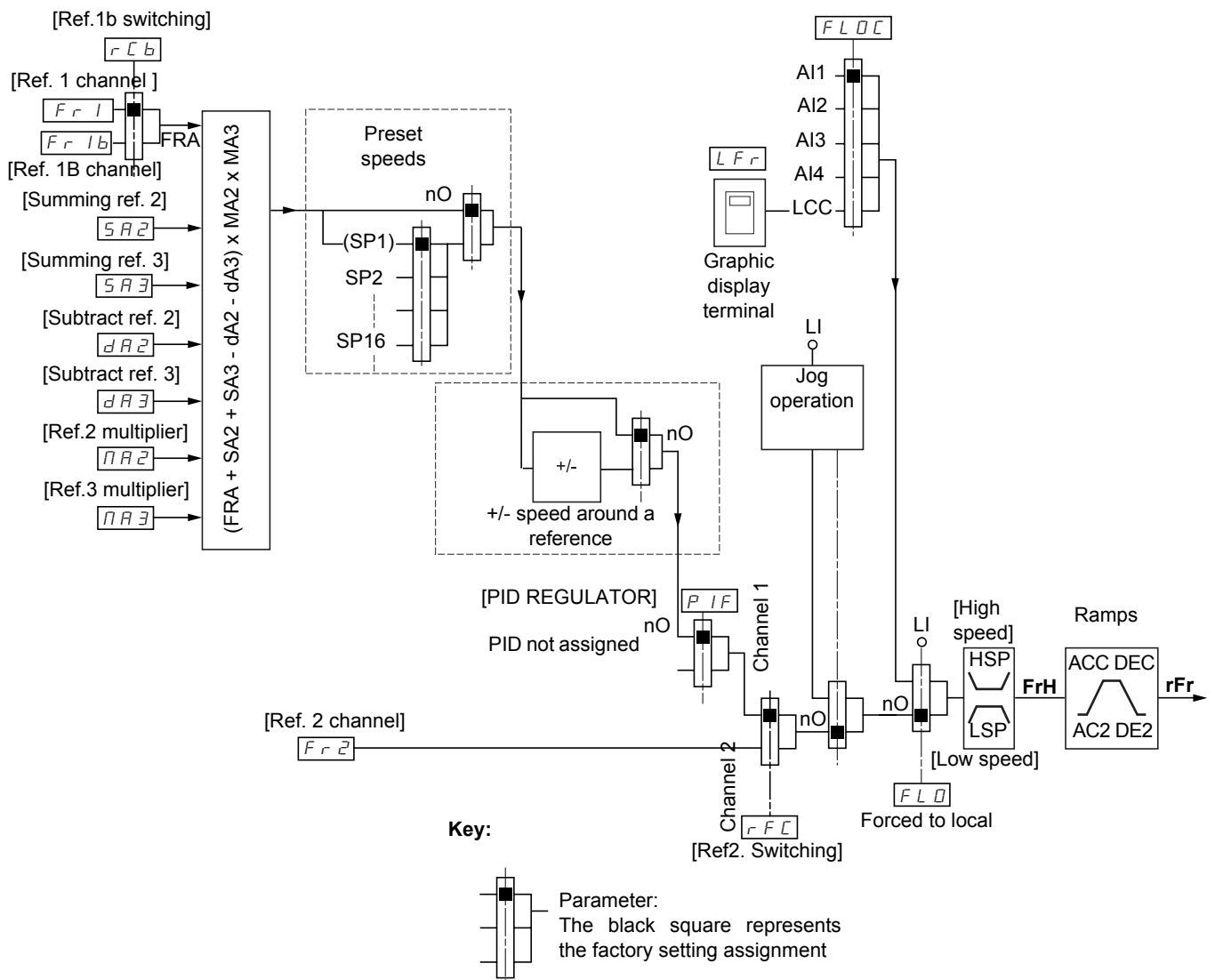


### References

**Fr1, SA2, SA3, dA2, dA3, MA2, MA3:**
- terminals, graphic display terminal, Modbus, CANopen, communication cards, programmable card

**Fr1b, for SEP and I/O:**
- terminals, graphic display terminal, Modbus, CANopen, communication cards, programmable card

**Fr1b, for SIM:**
- terminals, only accessible if Fr1 = terminals

**Fr2:**
- terminals, graphic display terminal, Modbus, CANopen, communication cards, programmable card, **and +/- speed**

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

# [1.6 - COMMAND] (CtL-)

## Reference channel for not separate mode (SIM), separate mode (SEP) and I/O mode, PID configured with PID references at the terminals
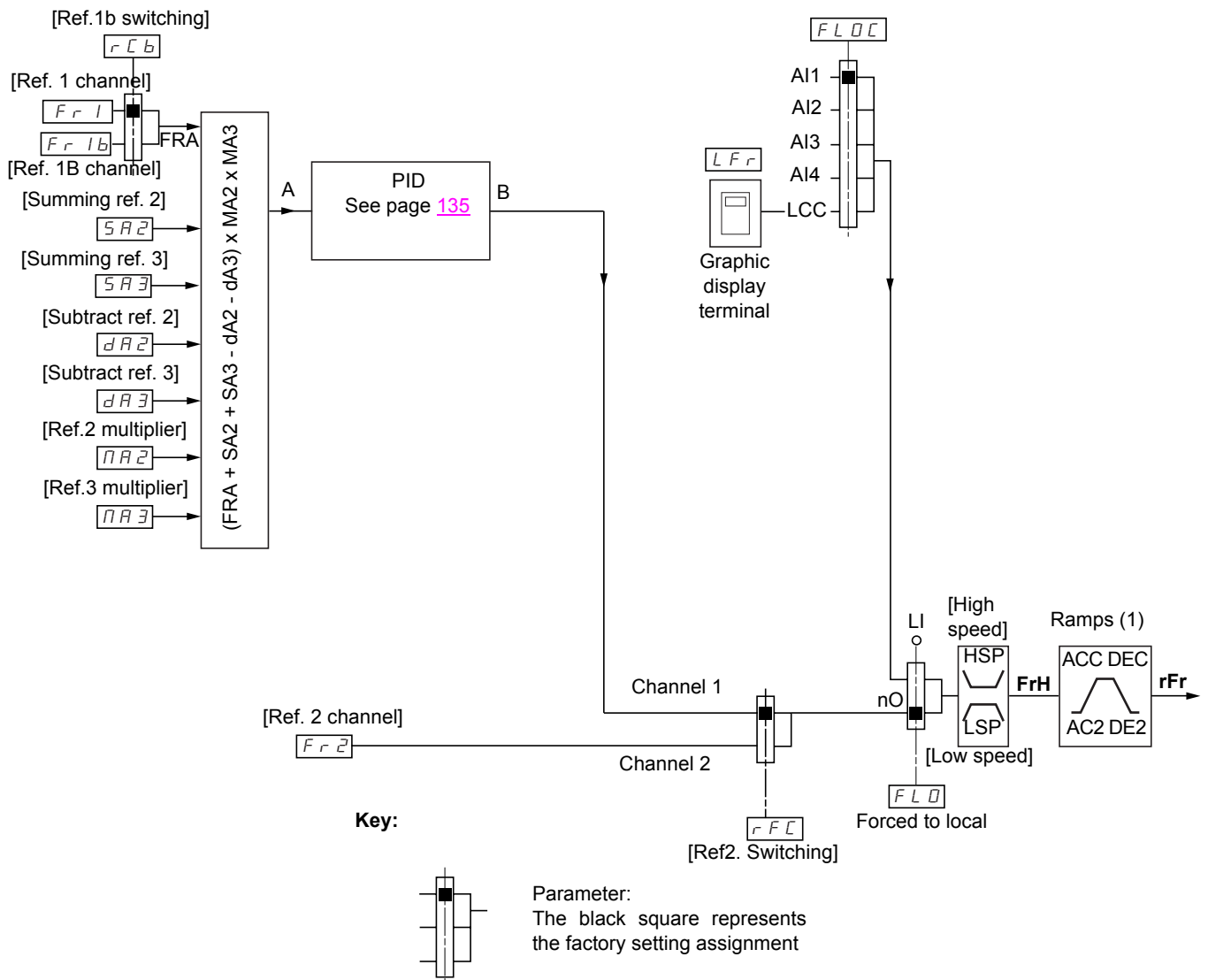


### References

**Fr1, Fr1b, SA2, SA3, dA2, dA3, MA2, MA3:**

- terminals

**Fr2:**

- terminals, graphic display terminal, Modbus, CANopen, communication cards, programmable 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 [APPLICATION FUNCT.] (Fun-) menu.

# [1.6 - COMMAND] (CtL-)

## Reference channel for separate mode (SEP), not separate mode (SIM) and I/O mode, PID configured with PID references online
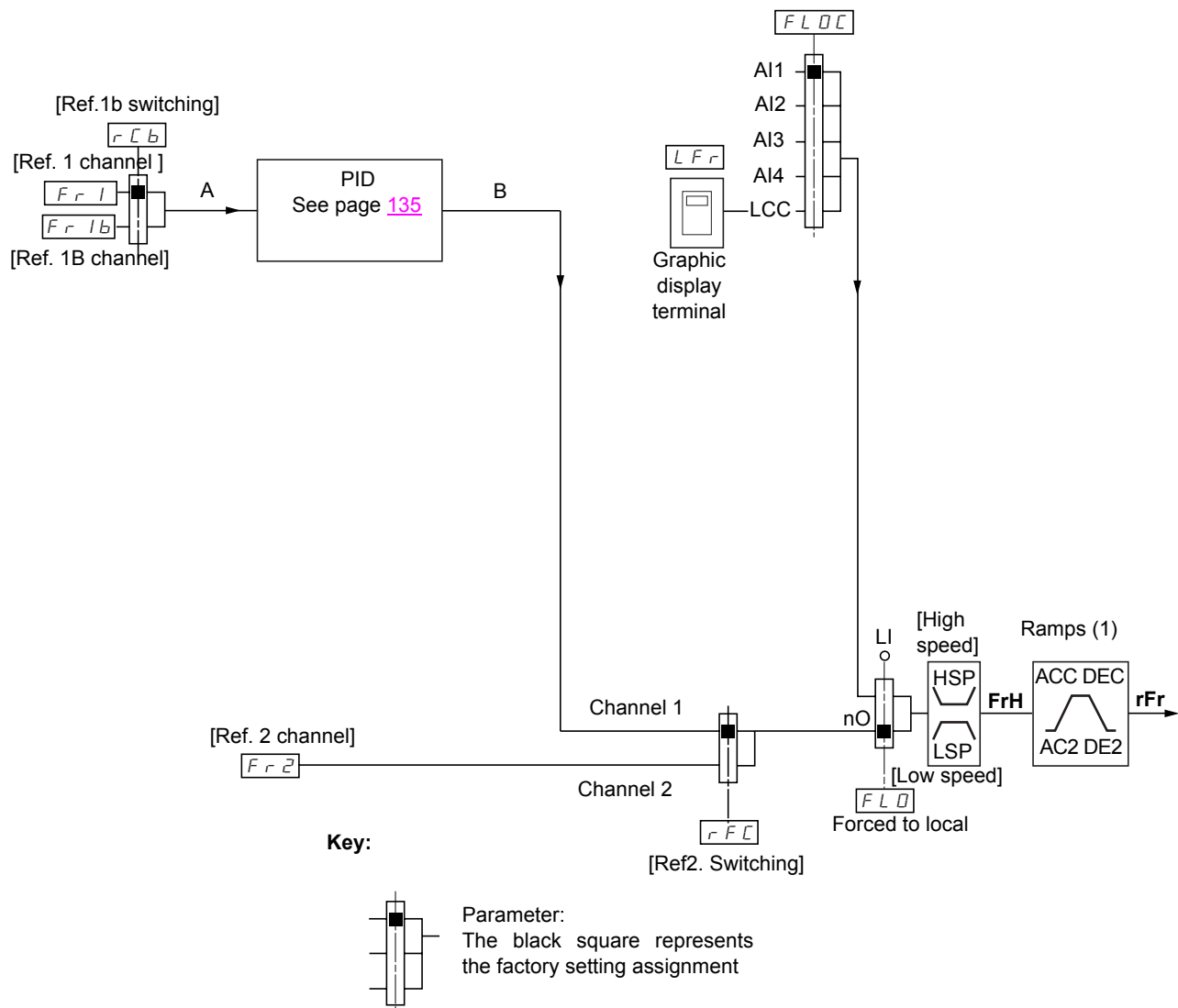


## References

**Fr1:**
- graphic display terminal, Modbus, CANopen, communication cards, programmable card

**Fr1b, for SEP and I/O:**
- graphic display terminal, Modbus, CANopen, communication cards, programmable card

**Fr1b, for SIM:**
- inaccessible

**Fr2:**
- terminals, graphic display terminal, Modbus, CANopen, communication cards, programmable 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 [APPLICATION FUNCT.] (Fun-) menu.

# [1.6 - COMMAND] (CtL-)

## Command channel for not separate mode (SIM)

### Combined reference and command

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

Example: If the reference 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
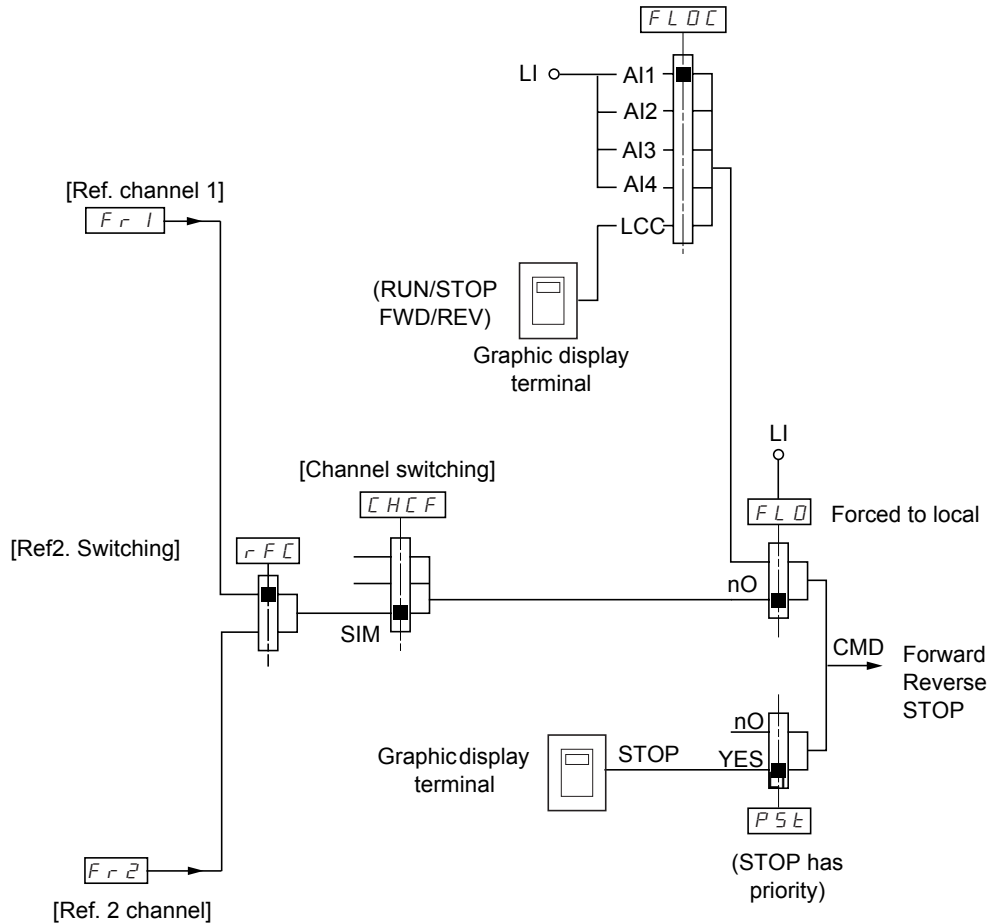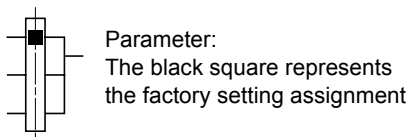
# [1.6 - COMMAND] (CtL-)

## Command channel for separate mode (SEP)

### Separate mode (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), control 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:**
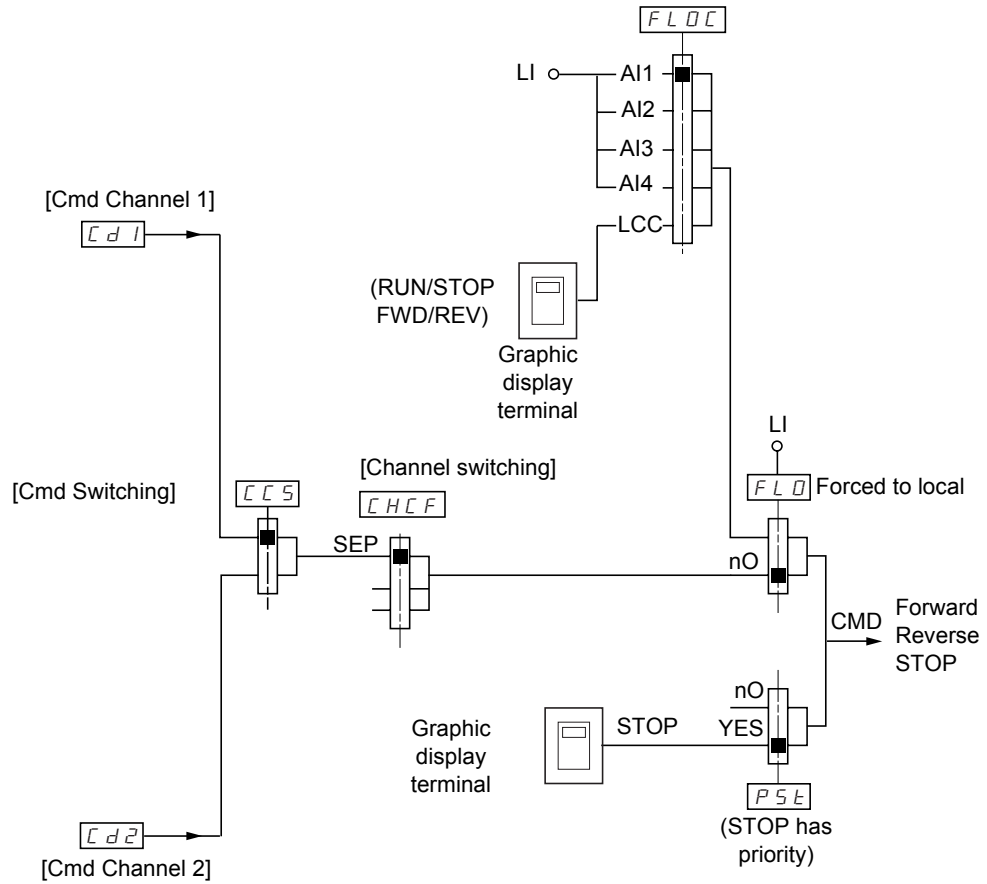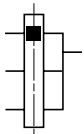
Parameter:
The black square represents
the factory setting assignment

## Commands

### Cd1, Cd2:

- terminals, graphic display terminal, Modbus, CANopen, communication cards, programmable card

# [1.6 - COMMAND] (CtL-)

## Command channel for I/O mode

### Separate mode (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), control 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:**
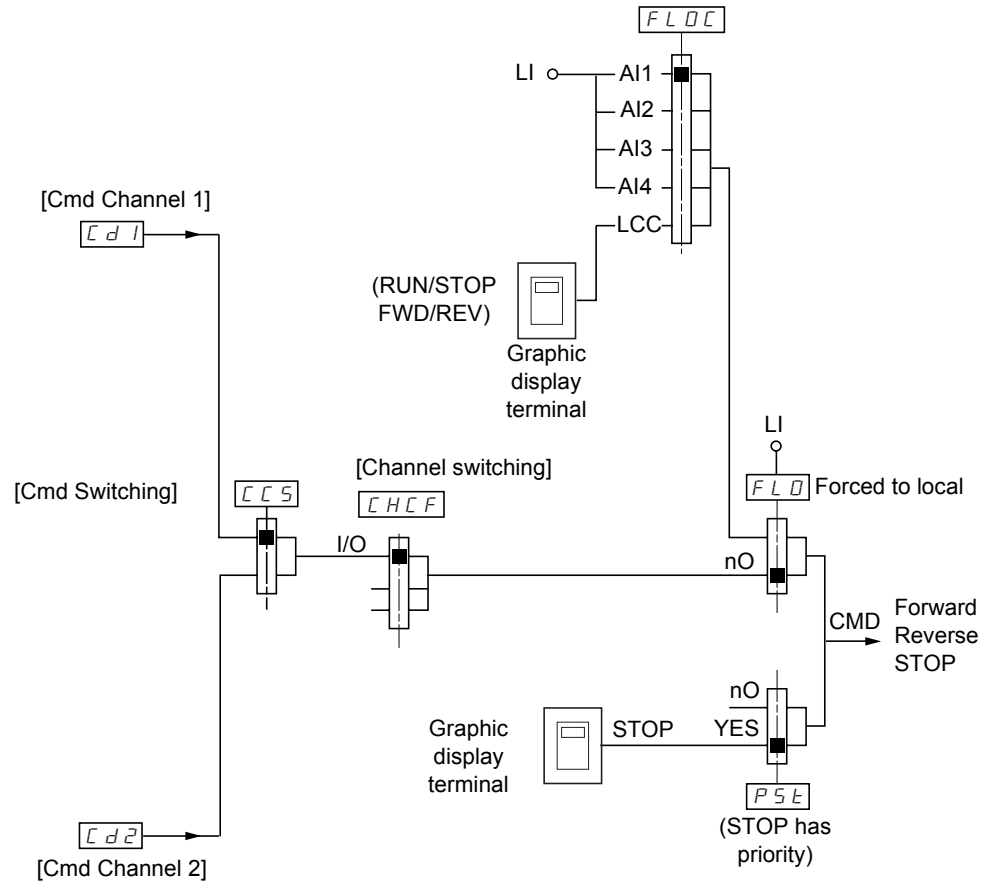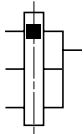
Parameter:
The black square represents
the factory setting assignment

## Commands

### Cd1, Cd2:

• terminals, graphic display terminal, Modbus, CANopen, communication cards, programmable card

# [1.6 - COMMAND] (CtL-)

## Command channel for [I/O mode]

### 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 CANopen with bit C214 regardless of which command channel is switched.

- Can be switched by selecting a switchable bit CDxx:
  - By selecting e.g., CD11, this action will be triggered by:
  LI12 if the terminals channel is active
  C111 if the Modbus channel is active
  C211 if the CANopen channel is active
  C311 if the communication channel card is active
  C411 if the programmable card channel is active

**Note:**
- CD14 and CD15 can only be used for switching between 2 networks. They do not have equivalent logic inputs.
- The command for switching the command channel cannot be switched by the latter.

| Terminals | Modbus | CANopen | Communication card | Programmable card | Internal bit, can be switched |
|-----------|--------|---------|--------------------|--------------------|-------------------------------|
| LI1 | C100 | C200 | C300 | C400 | CD00 |
| LI2 | C101 | C201 | C301 | C401 | CD01 |
| LI3 | C102 | C202 | C302 | C402 | CD02 |
| LI4 | C103 | C203 | C303 | C403 | CD03 |
| LI5 | C104 | C204 | C304 | C404 | CD04 |
| LI6 | C105 | C205 | C305 | C405 | CD05 |
| LI7 | C106 | C206 | C306 | C406 | CD06 |
| LI8 | C107 | C207 | C307 | C407 | CD07 |
| LI9 | C108 | C208 | C308 | C408 | CD08 |
| LI10 | C109 | C209 | C309 | C409 | CD09 |
| LI11 | C110 | C210 | C310 | C410 | CD10 |
| LI12 | C111 | C211 | C311 | C411 | CD11 |
| LI13 | C112 | C212 | C312 | C412 | CD12 |
| LI14 | C113 | C213 | C313 | C413 | CD13 |
| - | C114 | C214 | C314 | C414 | CD14 |
| - | C115 | C215 | C315 | C415 | CD15 |

# [1.6 - COMMAND] (CtL-)

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

| | |
|---|---|
| [LI1] (LI1) to [LI6] (LI6) | |
| [LI7] (LI7) to [LI10] (LI10) | If logic I/O card present |
| [LI11] (LI11) to [LI14] (LI14) | If I/O extension card present |
| [C100] (C100) to [C110] (C110) | With Modbus in I/O mode |
| [C111] (C111) to [C115] (C115) | With Modbus regardless of the mode |
| [C200] (C200) to [C210] (C210) | With CANopen in I/O mode |
| [C211] (C211) to [C215] (C215) | With CANopen regardless of the mode |
| [C300] (C300) to [C310] (C310) | With a communication card in I/O mode |
| [C311] (C311) to [C315] (C315) | With a communication card regardless of the mode |
| [C400] (C400) to [C410] (C410) | With programmable card in I/O mode |
| [C411] (C411) to [C415] (C415) | With programmable card regardless of the mode |
| [CD00] (Cd00) to [CD13] (Cd13) | In I/O mode can be switched with possible logic inputs |
| [CD14] (Cd14) to [CD15] (Cd15) | In I/O mode can be switched without logic inputs |

# [1.6 - COMMAND] (CtL-)

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| **Fr1**<br>A I 1<br>A I 2<br>A I 3<br>A I 4<br>P I<br>P G<br>L C C<br>Π d b<br>C A n<br>n E t<br>A P P | ❑ **[Ref.1 channel]**<br><br>☐ **[AI1]** (AI1): Analog input<br>☐ **[AI2]** (AI2): Analog input<br>☐ **[AI3]** (AI3): Analog input, if extension card present<br>☐ **[AI4]** (AI4): Analog input, if extension card present<br>☐ **[Pulse input]** (PI): Frequency input, if card present<br>☐ **[Encoder ref.]** (PG): Encoder input, if card present<br>☐ **[HMI]** (LCC): Graphic display terminal<br>☐ **[Modbus]** (Mdb): Modbus<br>☐ **[CANopen]** (CAn): CANopen<br>☐ **[Com. card]** (nEt): Communication card (if present)<br>☐ **[Prog. card]** (APP): Programmable card (if present) | | [AI1] (AI1) |
| **r I n**<br>n O<br>Y E S | ❑ **[RV Inhibition]**<br><br>☐ **[No]** (nO)<br>☐ **[Yes]** (YES)<br>Inhibition of movement in reverse direction, does not apply to direction requests sent by logic inputs.<br>  - Reverse direction requests sent by logic inputs are taken into account.<br>  - Reverse direction requests sent by the graphic display terminal are not taken into account.<br>  - Reverse direction requests sent by the line are not taken into account.<br>  - Any inverse speed reference originating from the PID, summing input, etc., is interpreted as a zero reference. | | [No] (nO) |
| **P S t**<br>n O<br>Y E S | ❑ **[Stop Key priority]**<br><br>☐ **[No]** (nO)<br>☐ **[Yes]** (YES): Gives priority to the STOP key on the graphic display terminal regardless of the command channel enabled.<br>ENT must be pressed and held down (2 s) in order for any change in the assignment of [Stop Key priority] (PSt) to be taken into account.<br>This stop is a freewheel stop if the active command channel is not the graphic display terminal. If the active command channel is the graphic display terminal, the stop will be performed in accordance with the setting in [Type of stop] (Stt) on page 107. | | [Yes] (YES) |
| **C H C F**<br>S I Π<br>S E P<br>I O<br>S E 8 | ❑ **[Channel config.]**<br><br>☐ **[Not separ.]** (SIM): Combined reference and command<br>☐ **[Separate]** (SEP): Separate reference and command<br>☐ **[I/O mode]** (IO): I/O mode<br>☐ **[8 serie]** (SE8): ATV58 interchangeability (see Substitution Guide). | | [Not separ.] (SIM) |
| **C C S**<br><br>C d 1<br>C d 2<br><br>L I 1<br>-<br>-<br>- | ❑ **[Cmd Switching]**<br><br>Parameter can be accessed if [Channel config.] (CHCF) = [Separate] (SEP) or [I/O mode] (IO)<br>☐ **[Cmd Channel 1]** (Cd1): [Cmd channel 1] (Cd1) active (no switching)<br>☐ **[Cmd Channel 2]** (Cd2): [Cmd Channel 2] (Cd2) active (no switching)<br><br>☐ **[LI1]** (LI1)<br>    :<br>    :<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>If the state of the input or bit assigned is at 0, channel [Cmd Channel 1] (Cd1) is active.<br>If the state of the input or bit assigned is at 1, channel [Cmd Channel 2] (Cd2) is active. | | [Cmd Channel 1] (Cd1) |

# [1.6 - COMMAND] (CtL-)

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| **Cd1**<br><br>tEr<br>LCC<br>Mdb<br>CAn<br>nEt<br>APP | ❏ **[Cmd Channel 1]**<br><br>☐ **[Terminals]** (tEr): Terminals<br>☐ **[HMI]** (LCC): Graphic display terminal<br>☐ **[Modbus]** (Mdb): Modbus<br>☐ **[CANopen]** (CAn): CANopen<br>☐ **[Com. card]** (nEt): Communication card (if present)<br>☐ **[Prog. card]** (APP): Programmable card (if present) | | [Terminals] (tEr) |
| **Cd2**<br><br>tEr<br>LCC<br>Mdb<br>CAn<br>nEt<br>APP | ❏ **[Cmd Channel 2]**<br><br>☐ **[Terminals]** (tEr): Terminals<br>☐ **[HMI]** (LCC): Graphic display terminal<br>☐ **[Modbus]** (Mdb): Modbus<br>☐ **[CANopen]** (CAn): CANopen<br>☐ **[Com. card]** (nEt): Communication card (if present)<br>☐ **[Prog. card]** (APP): Programmable card (if present)<br>The parameter can be accessed if [Channel config.] (CHCF) = [Separate] (SEP) or [I/O mode] (IO). | | [Modbus] (Mdb) |
| **rFC**<br><br>Fr1<br>Fr2<br><br>L11<br>-<br>-<br>- | ❏ **[Ref2. Switching]**<br><br>☐ **[Ref. 1 channel]** (Fr1): no switching<br>☐ **[Ref. 2 channel]** (Fr2): no switching<br><br>☐ **[LI1]** (LI1)<br>    :<br>    :<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>If the state of the input or bit assigned is at 0, channel [Ref. 1 channel] (Fr1) is active.<br>If the state of the input or bit assigned is at 1, channel [Ref. 2 channel] (Fr2) is active. | | [Ref. 1 channel] (Fr1) |
| **Fr2**<br><br>AI1<br>AI2<br>AI3<br>AI4<br>PI<br>PG<br>UPd<br>LCC<br>Mdb<br>CAn<br>nEt<br>APP | ❏ **[Ref. 2 channel]**<br><br>The parameter can be accessed if [Ref2. Switching] (rFC) is set to a value other than [Ref.1 channel] (Fr1).<br>☐ **[AI1]** (AI1): Analog input<br>☐ **[AI2]** (AI2): Analog input<br>☐ **[AI3]** (AI3): Analog input, if extension card present<br>☐ **[AI4]** (AI4): Analog input, if extension card present<br>☐ **[Pulse input]** (PI): Frequency input, if card present<br>☐ **[Encoder ref.]** (PG): Encoder input, if card present<br>☐ **[+/-Speed]** (UPd): +/-Speed command<br>☐ **[HMI]** (LCC): Graphic display terminal<br>☐ **[Modbus]** (Mdb): Modbus<br>☐ **[CANopen]** (CAn): CANopen<br>☐ **[Com. card]** (nEt): Communication card (if present)<br>☐ **[Prog. card]** (APP): Programmable card (if present) | | AI2 |
| **COP**<br><br>nO<br>SP<br>Cd<br>ALL | ❏ **[Copy channel 1->2]**<br><br>Copying is only performed from channel 1 to channel 2.<br>The parameter can be accessed if [Channel config.] (CHCF) is set to a value other than [8 serie] (SE8)<br>☐ **[No]** (nO): No copy<br>☐ **[Reference]** (SP): Copy reference<br>☐ **[Command]** (Cd): Copy command<br>☐ **[Cmd + ref.]** (ALL): Copy command and reference<br>  - If channel 2 is controlled via the terminals, the channel 1 command is not copied.<br>  - If channel 2 reference is set via AI1, AI2, AI3, AI4, the encoder input or the frequency input, channel 1 reference is not copied.<br>  - The reference copied is FrH (before ramp) unless the channel 2 reference is set via +/- speed. In this case, the reference copied is rFr (after ramp).<br><br>⚠ Copying the command and/or reference may change the direction of rotation. | | [No] (nO) |

# [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 following parameters can only be accessed on the graphic display terminal, but not on the integrated terminal.

**Notes:**

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

# [1.6 - COMMAND] (CtL-)

| Name/Description | Adjustment range | Factory setting |
|---|---|---|
| ❏ **[F1 key assignment]**<br>    ☐ **[No]** : Not assigned<br>    ☐ **[JOG]** : JOG operation<br>    ☐ **[Preset speed 2]** : $2^{nd}$ preset speed<br>    ☐ **[Preset speed 3]**: $3^{rd}$ preset speed<br>    ☐ **[PID ref. 2]**: $2^{nd}$ preset PID reference<br>    ☐ **[PID ref. 3]** : $3^{rd}$ preset PID reference<br>    ☐ **[+Speed]**: Faster<br>    ☐ **[-Speed]**: Slower<br>    ☐ **[HMI command]**: Command via the display terminal: Takes priority over [Cmd switching] (OIr) and [Ref2. Switching] (rFC). | | [No] (nO) |
| ❏ **[F2 key assignment]**<br>    ☐ **[No]**: Not assigned<br>    ☐ **[JOG]**: JOG operation<br>    ☐ **[Preset speed 2]**: $2^{nd}$ preset speed<br>    ☐ **[Preset speed 3]**: $3^{rd}$ preset speed<br>    ☐ **[PID ref. 2]** : $2^{nd}$ preset PID reference<br>    ☐ **[PID ref. 3]**: $3^{rd}$ preset PID reference<br>    ☐ **[+Speed]**: Faster<br>    ☐ **[-Speed]**: Slower<br>    ☐ **[HMI command]**: Command via the display terminal: Takes priority over [Cmd switching] (OIr) and [Ref2. Switching] (rFC). | | [No] (nO) |
| ❏ **[F3 key assignment]**<br>    ☐ **[No]** : Not assigned<br>    ☐ **[JOG]**: JOG operation<br>    ☐ **[Preset speed 2]**: $2^{nd}$ preset speed<br>    ☐ **[Preset speed 3]**: $3^{rd}$ preset speed<br>    ☐ **[PID ref. 2]**: $2^{nd}$ preset PID reference<br>    ☐ **[PID ref. 3]**: $3^{rd}$ preset PID reference<br>    ☐ **[+Speed]**: Faster<br>    ☐ **[-Speed]**: Slower<br>    ☐ **[HMI command]**: Command via the display terminal: Takes priority over [Cmd switching] (OIr) and [Ref2. Switching] (rFC). | | [No] (nO) |
| ❏ **[F4 key assignment]**<br>    ☐ **[No]**: Not assigned<br>    ☐ **[JOG]**: JOG operation<br>    ☐ **[Preset speed 2]**: $2^{nd}$ preset speed<br>    ☐ **[Preset speed 3]**: $3^{rd}$ preset speed<br>    ☐ **[PID ref. 2]**: $2^{nd}$ preset PID reference<br>    ☐ **[PID ref. 3]**: $3^{rd}$ preset PID reference<br>    ☐ **[+Speed]**: Faster<br>    ☐ **[-Speed]**: Slower<br>    ☐ **[HMI command]**: Command via the display terminal: Takes priority over [Cmd switching] (OIr) and [Ref2. Switching] (rFC). | | [No] (nO) |
| ❏ **[HMI command]**<br>    When the function [HMI command] (LCC) is assigned to a key and if this key is active, this parameter defines the response when control is returned to the graphic display terminal.<br>    ☐ **[Bumpless]** : Command and reference from previous channel are copied<br>    ☐ **[Stop]** : Command and reference from previous channel are canceled and the drive comes to a standstill | | |

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

⚠ Function compatibility

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 remainder 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**.

**Before assigning a command, a reference or a 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 these 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.

| | Ref. operation (page 103) | +/- speed (3) (page 115) | Management of limit switches (page 121) | Preset speeds (page 112) | PID regulator (page 139) | Traverse control (page 168) | JOG operation (page 110) | Brake logic control (page 126) | Catch on the fly (page 174) | Output contactor (page 152) | DC injection stop (page 107) | Fast stop (page 107) | Freewheel stop (page 107) | +/- speed around a reference (page 117) | High speed hoisting (page 134) | Torque regulation (page 144) | Load sharing (page 63) | Position control using limit switches (page 155) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref. operation (page 103) | ▨ | | | ↑ | ● | | ↑ | | | | | | | | | ●(1) | | |
| +/- speed (3) (page 115) | | ▨ | | | | ● | ● | | | | | | | | | ●(1) | | |
| Management of limit switches (page 121) | | | ▨ | | ● | | | | | | | | | | | | | |
| Preset speeds (page 112) | ← | | | ▨ | | | ↑ | | | | | | | | | ●(1) | | |
| PID regulator (page 139) | ● | | ● | | ▨ | ● | ● | ● | | | | | | ● | ● | ●(1) | ● | ● |
| Traverse control (page 168) | | ● | | | ● | ▨ | ● | ● | | | | | | ● | ● | ●(1) | | |
| JOG operation (page 110) | ← | ● | | ← | ● | ● | ▨ | ● | | | | | | ● | ● | ●(1) | | |
| Brake logic control (page 126) | | | | | ● | ● | ● | ▨ | ● | ● | ● | | | | | ●(1) | | |
| Catch on the fly (page 174) | | | | | | | | ● | ▨ | | | | | | | ●(1) | | |
| Output contactor (page 152) | | | | | | | | ● | | ▨ | | | | | | | | |
| DC injection stop (page 107) | | | | | | | | ● | | | ▨ | ●(2) | ↑ | | | | | |
| Fast stop (page 107) | | | | | | | | | | | ●(2) | ▨ | ↑ | | | | | |
| Freewheel stop (page 107) | | | | | | | | | | | ← | ← | ▨ | | | | | |
| +/- speed around a reference (page 117) | | | | | ● | ● | ● | | | | | | | ▨ | | ●(1) | | |
| High speed hoisting (page 134) | | | | | ● | ● | ● | | | | | | | | ▨ | ● | | ● |
| Torque regulation (page 144) | ●(1) | ●(1) | | ●(1) | ●(1) | ●(1) | ●(1) | ●(1) | ●(1) | | | | | ●(1) | ● | ▨ | ● | ●(1) |
| Load sharing (page 63) | | | | | ● | | | | | | | | | | | ● | ▨ | |
| Position control using limit switches (page 155) | | | | | ● | | | | | | | | | | ● | ●(1) | | ▨ |

(1) Torque regulation and speed reference functions are only incompatible while torque regulation 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 87, 88 and 89).

● Incompatible functions   ☐ Compatible functions   ▨ N/A

Priority functions (functions that 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.

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

## Incompatible functions

The following functions will be inaccessible or deactivated in the cases described below:

### Automatic restart

This is only possible for 2-wire level detection control (tCC = 2C and tCt = LEL or PFO).

### Catch on the fly

This is only possible for 2-wire level detection control (tCC = 2C and tCt = LEL or PFO).
This function is locked if the automatic DC injection on stopping is configured as Continuous (AdC = Ct).

The SUP- monitoring menu (page 36) 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   +0.00 Hz    0 A
      1.7 APPLICATION FUNCT.
REFERENCE SWITCHING
REF. OPERATION
RAMP                          ✓
STOP CONFIGURATION
JOG
   Code     <<      >>     Quick
```

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

**With graphic display terminal:**

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

```

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

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

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

## Summing input/Subtracting input/Multiplier
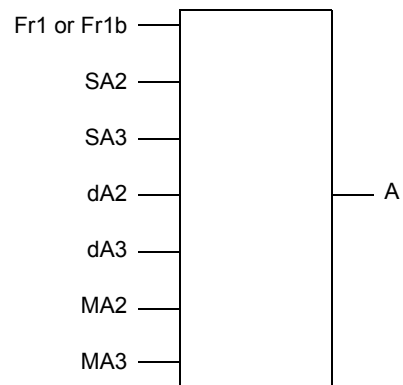


A = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3

- 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 (see page 39) must be sent via the bus or graphic display terminal.
- The reversal of the direction of operation in the event of a negative result can be inhibited (see page 95).
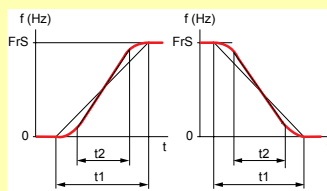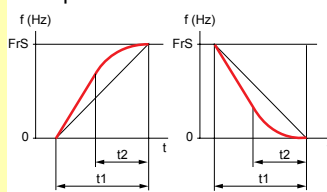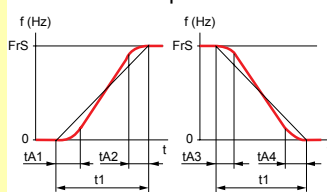
| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| rEF- | ■ **[REFERENCE SWITCH]** | | |
| rCb | ❏ **[Ref.1B switching]** | | [No] (nO) |
| | See the diagrams on pages 87, 88 and 89. | | |
| nO | ☐ **[No]** (nO): no switching | | |
| LI1<br>-<br>-<br>- | ☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94. | | |
| | • If the state of the input or bit assigned is at 0, [Ref.1 channel] (Fr1) is active (see page 95).<br>• If the state of the input or bit assigned is at 1, [Ref.1B channel] (Fr1) is active. | | |
| Fr1b | ❏ **[Ref.1B channel]** | | [No] (nO) |
| | This parameter can be accessed if [Ref.1b switching] (rCb) is set to a value other than [No] (nO) | | |
| nO<br>AI1<br>AI2<br>AI3<br>AI4<br>PI<br>PG<br>LCC<br>Mdb<br>CAn<br>nEt<br>APP | ☐ **[No]** (nO): No source assigned<br>☐ **[AI1]** (AI1): Analog input<br>☐ **[AI2]** (AI2): Analog input<br>☐ **[AI3]** (AI3): Analog input, if extension card present<br>☐ **[AI4]** (AI4): Analog input, if extension card present<br>☐ **[Pulse input]** (PI): Frequency input, if card present<br>☐ **[Encoder ref.]** (PG): Encoder input, if card present<br>☐ **[HMI]** (LCC): Graphic display terminal<br>☐ **[Modbus]** (Mdb): Modbus<br>☐ **[CANopen]** (CAn): CANopen<br>☐ **[Com. card]** (nEt): Communication card (if present)<br>☐ **[Prog. card]** (APP): Programmable card (if present)<br>**Note**:<br>In the following instances, only assignments via the terminals are possible:<br>  - [Channel config.] (CHCF) = [Not separ.] (SIM) page 95<br>  - PID configured with PID references via the terminals | | |

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| OA1- | ■ **[REF. OPERATIONS]**<br>Reference = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3. See the diagrams on pages 87 and 88.<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | |
| SA2<br><br>nO<br>AI1<br>AI2<br>AI3<br>AI4<br>PI<br>PG<br>LCC<br>Mdb<br>CAn<br>nEt<br>APP | ❏ **[Summing ref. 2]**<br><br>Selection of a reference to be added to [Ref. 1 channel] (Fr1) or [Ref. 1B channel] (Fr1b).<br>☐ **[No]** (nO): No source assigned<br>☐ **[AI1]** (AI1): Analog input<br>☐ **[AI2]** (AI2): Analog input<br>☐ **[AI3]** (AI3): Analog input, if extension card present<br>☐ **[AI4]** (AI4): Analog input, if extension card present<br>☐ **[Pulse input]** (PI): Frequency input, if card present<br>☐ **[Encoder ref.]** (PG): Encoder input, if card present<br>☐ **[HMI]** (LCC): Graphic display terminal<br>☐ **[Modbus]** (Mdb): Modbus<br>☐ **[CANopen]** (CAn): CANopen<br>☐ **[Com. card]** (nEt): Communication card (if present)<br>☐ **[Prog. card]** (APP): Programmable card (if present) | | [No] (nO) |
| SA3 | ❏ **[Summing ref. 3]**<br><br>Selection of a reference to be added to [Ref. 1 channel] (Fr1) or [Ref. 1B channel] (Fr1b).<br>• Possible assignments are identical to [Summing ref. 2] (SA2) above. | | [No] (nO) |
| dA2 | ❏ **[Subtract ref. 2]**<br><br>Selection of a reference to be subtracted from [Ref. 1 channel] (Fr1) or [Ref. 1B channel] (Fr1b).<br>• Possible assignments are identical to [Summing ref. 2] (SA2) above. | | [No] (nO) |
| dA3 | ❏ **[Subtract ref. 3]**<br><br>Selection of a reference to be subtracted from [Ref. 1 channel] (Fr1) or [Ref. 1B channel] (Fr1b).<br>• Possible assignments are identical to [Summing ref. 2] (SA2) above. | | [No] (nO) |
| MA2 | ❏ **[Ref.2 multiplier]**<br><br>Selection of a reference to be multiplied with [Ref. 1 channel] (Fr1) or [Ref. 1B channel] (Fr1b).<br>• Possible assignments are identical to [Summing ref. 2] (SA2) above. | | [No] (nO) |
| MA3 | ❏ **[Ref.3 multiplier]**<br><br>Selection of a reference to be multiplied with [Ref. 1 channel] (Fr1) or [Ref. 1B channel] (Fr1b).<br>• Possible assignments are identical to [Summing ref. 2] (SA2) above. | | [No] (nO) |

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| | ■ **[RAMPS]** | | |
| rPt <br><br> L In <br> S <br> U <br> CUS | ❑ **[Ramp Shape]**<br><br>☐ **[Linear]** (LIn)<br>☐ **[S ramp]** (S)<br>☐ **[U ramp]** (U)<br>☐ **[Customized]** (CUS)<br><br>S ramps<br><br>The curve coefficient is fixed,<br>where t2 = 0.6 x t1<br>and t1 = set ramp time.<br><br>U ramps<br><br>The curve coefficient is fixed,<br>where t2 = 0.5 x t1<br>and t1 = set ramp time.<br><br>Customized ramps<br><br>tA1: Adjustable from 0 to 100% (of t1)<br>tA2: Adjustable from 0 to (100% - tA1) (of t1)<br>tA3: Adjustable from 0 to 100% (of t1)<br>tA4: Adjustable from 0 to (100% - tA3) (of t1)<br><br>where t1 = set ramp time | | [Linear] (LIn) |
| Inr <br><br> 0. 01 <br> 0. 1 <br> 1 | ❑ **[Ramp increment]**<br><br>☐ **[0.01]**: Ramp up to 99.99 seconds<br>☐ **[0.1]**: Ramp up to 999.9 seconds<br>☐ **[1]**: Ramp up to 9999 seconds<br>This parameter is valid for [Acceleration] (ACC), [Deceleration] (dEC), [Acceleration 2] (AC2) et [Deceleration 2] (dE2). | (1) | 0.1 |
| ACC | ❑ **[Acceleration]**<br><br>Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 53). Make sure that this value is compatible with the inertia being driven. | (1)<br><br>0.01 to 9999 s | 3.0 s |
| dEC | ❑ **[Deceleration]**<br><br>Time to decelerate from the [Rated motor freq.] (FrS) (page 53) to 0. Make sure that this value is compatible with the inertia being driven. | (1)<br><br>0.01 to 9999 s | 3.0 s |

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

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| | ■ **[RAMPS]** (continued) | | | |
| tA1 | ❏ **[Begin Acc round]** | (1) | 0 to 100% | 10% |
| | - Rounding of start of deceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. <br> - Can be set between 0 and 100% <br> - The parameter can be accessed if the [Ramp Shape] (rPt) is [Customized] (CUS). | | | |
| tA2 | ❏ **[End Acc round]** | (1) | | 10% |
| | - Rounding of end of deceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. <br> - Can be set between 0 and (100% - [Begin Acc 1 round] (tA1)) <br> - The parameter can be accessed if the [Ramp Shape] (rPt) is [Customized] (CUS). | | | |
| tA3 | ❏ **[Begin Dec round]** | (1) | 0 to 100% | 10% |
| | - Rounding of start of deceleration ramp as a % of ramp time [Deceleration] (dEC) or [Deceleration 2] (dE2). <br> - Can be set between 0 and 100% <br> - The parameter can be accessed if the [Ramp Shape] (rPt) is [Customized] (CUS). | | | |
| tA4 | ❏ **[End Dec round]** | (1) | | 10% |
| | - Rounding of end of deceleration ramp as a % of ramp time [Deceleration] (dEC) or [Deceleration 2] (dE2). <br> - Can be set between 0 and 100% - ([Begin Dec 3 round] (tA3)) <br> - The parameter can be accessed if the [Ramp Shape] (rPt) is [Customized] (CUS). | | | |

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

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| | ■ **[RAMPS]** (continued) | | |
| *Frt* | ❏ **[Ramp 2 threshold]** | 0 to [Max frequency] (tFr) | 0 Hz |
| | Ramp switching threshold<br>The 2nd ramp is switched if the value of Frt is set to a value other than 0 (0 deactivates the function) and the output frequency is greater than Frt.<br>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 |

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| *rPS*<br><br>*nO*<br><br>*LI1*<br>-<br>-<br>- | ❏ **[Ramp switch ass.]**<br><br>☐ **[No]** (nO): Not assigned.<br><br>☐ **[LI1]** (LI1)<br>:<br>:<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>   - ACC and dEC are enabled when the state of the input or bit assigned is at 0.<br>   - AC2 and dE2 are enabled when the state of the input or bit assigned is at 1. | | [No] (nO) |
| *AC2* | ❏ **[Acceleration 2]** (1)<br><br>Time to accelerate from 0 to the [Rated motor freq.] (FrS). Make sure that this value is compatible with the inertia being driven.<br>The parameter can be accessed if [Ramp 2 threshold] (Frt) > 0 or if [Ramp switch ass.] (rPS) is assigned. | 0.01 to 9999 s | 5.0 s |
| *dE2* | ❏ **[Deceleration 2]** (1)<br><br>Time to decelerate from the [Rated motor freq.] (FrS) to 0. Make sure that this value is compatible with the inertia being driven.<br>The parameter can be accessed if [Ramp 2 threshold] (Frt) > 0 or if [Ramp switch ass.] (rPS) is assigned. | 0.01 to 9999 s | 5.0 s |
| *brA*<br><br><br><br>*nO*<br>*YES*<br><br>*dYnA*<br>*dYnb*<br>*dYnU*<br>*brA* | ❏ **[Dec ramp adapt]**<br><br>Activating this function automatically adapts the deceleration ramp, if this has been set at too low a value for the inertia of the load.<br>☐ **[No]** (nO): Function inactive.<br>☐ **[Yes]** (YES): Function active.<br>The following selections appear in accordance with the drive rating (high ratings).<br>☐ **[High torq.A]** (dYnA)<br>☐ **[High torq.B]** (dYnb)<br>☐ **[High torq.V]** (dYnU)<br>☐ **[Dec ramp adapt]** (brA) is forced to [No] (nO) if the brake logic control [brake assignment] (bLC) has been assigned (page 126).<br>The function is incompatible with applications requiring:<br>   - positioning on a ramp<br>   - the use of a braking resistor (no guarantee of the function operating correctly) | | [No] (nO) |

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

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| **Stt -** | ■ **[STOP CONFIGURATION]** | | |
| **Stt**<br><br>rMP<br>FSt<br>nSt<br>dCI | ❏ **[Type of stop]**<br><br>Stop mode on disappearance of the run command or appearance of a stop command.<br>☐ **[Ramp stop]** (rMP): On ramp<br>☐ **[Fast stop]** (FSt): Fast stop<br>☐ **[Freewheel]** (nSt): Freewheel stop<br>☐ **[DC injection]** (dCI): DC injection stop<br><br>**Note:** If the "brake logic" function on page 126 has been enabled, only ramp type stops may be configured. | | **[Ramp stop]** (rMP) |
| **nSt**<br><br>nO<br>LI1<br>-<br>C100<br>-<br>-<br>-<br>Cd00<br>- | ❏ **[Freewheel assign.]**<br><br>☐ **[No]** (nO): Not assigned<br>☐ **[LI1]** (LI1) to **[LI6]** (LI6)<br>☐ **[LI7]** (LI7) to **[LI10]** (LI10): If logic I/O card present<br>☐ **[LI11]** (LI11) to **[LI14]** (LI14): If I/O extension card present<br>☐ **[C100]** (C100) to **[C115]** (C115): With Modbus in I/O mode<br>☐ **[C200]** (C200) to **[C215]** (C215): With CANopen in I/O mode<br>☐ **[C300]** (C300) to **[C315]** (C315): With a communication card in I/O mode<br>☐ **[C400]** (C400) to **[C415]** (C415): With a programmable card in I/O mode<br>☐ **[CD00]** (Cd00) to **[CD13]** (Cd13): In I/O mode can be switched with possible logic inputs<br>☐ **[CD14]** (Cd14) to **[CD15]** (Cd15): In I/O mode can be switched without logic inputs<br><br>The stop is activated when the logic state of the input or bit is at 0. If the input returns to state 1 and if the run command is still active, the motor will only restart if [2/3 wire control] (tCC) page 65 = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEC) or [Prior. FW] (PFO). If not, a new run command must be sent. | | **[No]** (nO) |
| **FSt**<br><br>nO<br>LI1<br>-<br>-<br>-<br>- | ❏ **[Fast stop assign.]**<br><br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99.<br>☐ **[No]** (nO): Not assigned<br><br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>The stop is activated when the logic state of the input changes to 0 or the logic state of the bit changes to 1(bit state 0 in I/O mode). If the input returns to state 1 and if the run command is still active, the motor will only restart if [2/3 wire control] (tCC) page 65 = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEC) or [Prior. FW] (PFO). If not, a new run command must be sent. | | **[No]** (nO) |
| **dCF** | ❏ **[Ramp divider]**<br><br>The parameter can be accessed for [Type of stop] (Stt) = [Fast stop] (FSt) and for [Fast stop assign.] (FSt) set to a value other than [No] (nO).<br>The ramp enabled (dEC or dE2) is then divided by this coefficient when stop requests are sent.<br>The value 0 corresponds to the minimum ramp time. | (1)<br><br>0 to 10 | 4 |

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

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| | ■ **[STOP CONFIGURATION]** (continued) | | |
| dC1<br><br>nO<br>L I 1<br>-<br>-<br>- | ❑ **[DC injection assign.]**<br><br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99.<br>☐ **[No]** (nO): Not assigned<br><br>☐ **[LI1]** (LI1)<br>:<br>:<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>DC injection braking is initiated when the input or bit assigned changes to state 1.<br>If the input returns to state 1 and if the run command is still active, the motor will only restart if [2/3 wire control] (tCC) page 65 = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEC) or [Prior. FW] (PFO). If not, a new run command must be sent. | | **[No]** (nO) |
| IdC | ❑ **[DC inject. level 1]** (1) (3)<br><br>Level of DC injection braking current activated via logic input or selected as stop mode. | 0.1 to 1.5 In (2) | 0.64 In (2) |
| td 1 | ❑ **[DC inject. time 1]** (1) (3)<br><br>Maximum current injection time [DC inject. level 1] (IdC). Once this time has elapsed, the injection current becomes [DC inject. level 2] (IdC2) until the stop command disappears. | 0.1 to 30 s | 5 s |
| IdC2 | ❑ **[DC inject. level 2]** (1) (3)<br><br>Injection current activated by logic input or selected as stop mode, once period of time [DC inject. time 1] (tdI) has elapsed. | 0.1 to 1.5 In (2) | 0.64 In (2) |
| tdC | ❑ **[DC inject. time 2]** (1) (3)<br><br>Maximum injection time [DC inject. level 2] (IdC2) for injection selected as stop mode only.<br>([Type of stop] (Stt) = [DC injection] (dCI).) | 0.1 to 30 s | 5 s |

(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 rating plate.
(3) Warning: These settings are independent of the [AUTO DC INJECTION] function.

| Code | Name/Description | | | Adjustment range | Factory setting |
|------|-----------------|---|---|-----------------|-----------------|
| **AdC -** | ■ **[AUTO DC INJECTION]** | | | | |
| **AdC**<br><br>**nO**<br>**YES**<br>**Ct** | ❏ **[Auto DC injection]** | | | | [Yes] (YES) |
| | Automatic current injection on stopping (at the end of the ramp)<br>☐ **[No]** (nO): No injection<br>☐ **[Yes]** (YES): Adjustable injection time<br>☐ **[Cont. ]** (Ct): Continuous standstill injection<br>⚠ 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** | ❏ **[I inject. DC auto 1]** | (1) | | 0 to 1.2 In (2) | 0.7 In (2) |
| | Level of standstill DC injection current. The parameter can be accessed if [Auto DC injection] (AdC) is set to a value other than [No] (nO).<br>⚠ Check that the motor will withstand this current without overheating. | | | | |
| **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 set to a value other than [No] (nO). | | | | |
| **SdC2** | ❏ **[I inject. DC auto 2]** | (1) | | 0 to 1.2 In (2) | 0.5 In (2) |
| | 2nd level of standstill DC injection current.<br>The parameter can be accessed if [Auto DC injection] (AdC) is set to a value other than [No] (nO).<br>⚠ Check that the motor will withstand this current without overheating. | | | | |
| **tdC2** | ❏ **[Auto DC inj. time 2]** | (1) | | 0 to 30 s | 0 s |
| | 2nd standstill injection time<br>The parameter can be accessed if [Auto DC injection] (AdC) = [Yes] (YES). | | | | |

| AdC | SdC2 | Operation |
|-----|------|-----------|
| YES | x | SdC1 / SdC2 ... tdC1 ... tdC1 + tdC2 |
| Ct | ≠ 0 | SdC1 / SdC2 ... tdC1 |
| Ct | = 0 | SdC1 ... |
| Run command | | 1 / 0 |
| Speed | | 0 |
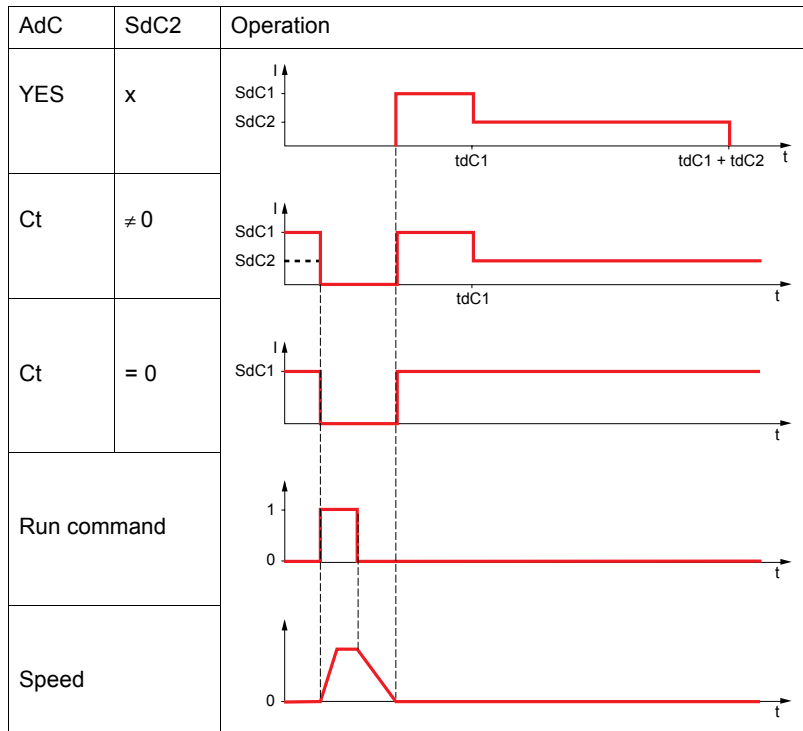
**Note:** In flux vector control mode with sensor, [Auto DC inj. level 1] (SdC1), [Auto DC inj. level 2] (SdC2) and [Auto DC inj. time 2] (tdC2) cannot be accessed. Only [Auto DC inj. time 1] (tdC1) can be accessed.

(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 rating plate.

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| JOG- | ■ **[JOG]**<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | |
| JOG<br><br>nO<br><br>LI1<br>-<br>-<br>- | ❑ **[JOG assignment]**<br><br>Pulse operation.<br>Selecting the assigned logic input or bit activates the function.<br>☐ **[No]** (nO): Not assigned<br><br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>The function is active when the input or bit assigned is at 1.<br><br>☐ Example: 2-wire control operation (tCC = 2C)<br><br> | | [No] (nO)<br>If tCC = 3C: [LI4] |
| JGF | ❑ **[Jog frequency]** | (1)    0 to 10 Hz | 10 Hz |
| | The parameter can be accessed if [JOG assignment] (JOG) is set to a value other than [No] (nO.).<br>Reference in pulse operation | | |
| JGt | ❑ **[JOG delay]** | (1)    0 to 2.0 s | 0.5 s |
| | The parameter can be accessed if [JOG assignment] (JOG) is set to a value other than [No] (nO.).<br>Anti-repeat delay between 2 consecutive jog operations. | | |

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

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

## Preset speeds

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

⚠️ **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 : Reference 1 = (SP1).

**Elevator**

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| PSS- | ■ **[PRESET SPEEDS]**<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | |
| PS2<br>nO<br>LI1<br>-<br>-<br>- | ❏ **[2 preset speeds]**<br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94. | | [LI5] (LI5) |
| PS4<br>nO<br>LI1<br>-<br>-<br>- | ❏ **[4 preset speeds]**<br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>You must also configure 2 speeds in order to obtain 4 speeds. | | [LI6] (LI6) |
| PS8<br>nO<br>LI1<br>-<br>-<br>- | ❏ **[8 preset speeds]**<br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>You must also configure 2 and 4 speeds in order to obtain 8 speeds. | | [No] (nO) |
| PS16<br>nO<br>LI1<br>-<br>-<br>- | ❏ **[16 preset speeds]**<br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>You must also configure 2, 4 and 8 speeds in order to obtain 16 speeds. | | [No] (nO) |

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

| Code | Name/Description | | Adjustment range | Factory setting |
|------|------------------|------|------------------|-----------------|
| | ■ **[PRESET SPEEDS]** (continued) | | | |
| S P 2 | ❑ **[Preset speed 2]** | (1) | 0 to 1000 Hz | 10 Hz |
| S P 3 | ❑ **[Preset speed 3]** | (1) | | 15 Hz |
| S P 4 | ❑ **[Preset speed 4]** | (1) | | 20 Hz |
| S P 5 | ❑ **[Preset speed 5]** | (1) | | 25 Hz |
| S P 6 | ❑ **[Preset speed 6]** | (1) | | 30 Hz |
| S P 7 | ❑ **[Preset speed 7]** | (1) | | 35 Hz |
| S P 8 | ❑ **[Preset speed 8]** | (1) | | 40 Hz |
| S P 9 | ❑ **[Preset speed 9]** | (1) | | 45 Hz |
| S P 10 | ❑ **[Preset speed 10]** | (1) | | 50 Hz |
| S P 11 | ❑ **[Preset speed 11]** | (1) | | 55 Hz |
| S P 12 | ❑ **[Preset speed 12]** | (1) | | 60 Hz |
| S P 13 | ❑ **[Preset speed 13]** | (1) | | 70 Hz |
| S P 14 | ❑ **[Preset speed 14]** | (1) | | 80 Hz |
| S P 15 | ❑ **[Preset speed 15]** | (1) | | 90 Hz |
| S P 16 | ❑ **[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.

## +/- 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 action buttons:

Description: 1 button pressed twice for each direction of rotation. Each press closes a contact.

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

Wiring example:

LI1: forward
LIx: reverse
LIy: + speed
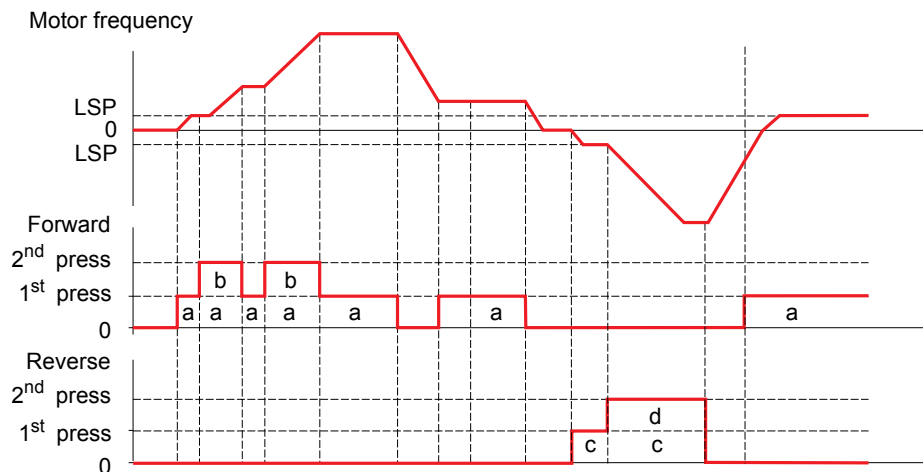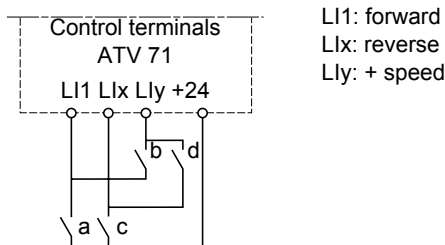


Do not use this +/-speed type with 3-wire control.

**Whichever type of operation is selected, the max. speed is set by HSP (see page xx).**

**Note:**
If the reference is switched via rFC (see page 96) from any 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 parameter [Copy channel 1 --> 2 Cmd and Ref] (COP), see page 96.
If the reference is switched via rFC (see page 96) from a reference channel with "+/- speed" to any other reference channel, 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]**<br><br>Function can be accessed for reference channel [Ref.2 channel ] (Fr2) = [+/- speed] (UPd) see page 96.<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | |
| USP<br><br>nO<br><br>LI1<br>-<br>-<br>- | ❏ **[+Speed assign.]**<br><br>☐ **[No]** (nO): Function inactive<br><br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>Function active if the state of the input or bit assigned is at 1. | | [No] (nO) |
| dSP<br><br>nO<br><br>LI1<br>-<br>-<br>- | ❏ **[-Speed assign.]**<br><br>☐ **[No]** (nO): Function inactive<br><br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>Function active if the state of the input or bit assigned is at 1. | | [No] (nO) |
| Str<br><br><br><br><br><br>nO<br>rAM<br>EEP | ❏ **[Reference saved]**<br><br>Associated with the "+/- speed" function, this parameter can be used to save the reference:<br>• When the run commands disappear (saved to RAM)<br>• When the mains supply or the run commands disappear (saved to EEPROM)<br><br>On the next start-up, the speed reference is the last reference saved.<br>☐ **[No]** (nO): No save (on the next startup, the speed reference is the [Low speed] (LSP), see page xx)<br>☐ **[RAM]** (rAM): Save to RAM<br>☐ **[E2Prom]** (EEP): Save to EEPROM | | [No] (nO) |

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

## +/- 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 87). For improved clarity, we will call this reference 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 the [High speed] (HSP) and the minimum reference by [Low speed] (LSP), see page xx.

Example of 2-wire control:

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

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| **SrE-** | ■ **[+/-SPEED AROUND REF.]**<br>Function can be accessed for reference channel [Ref.1 channel] (Fr1).<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | | |
| **US1**<br>**nO**<br>**L11**<br>-<br>-<br>- | ❏ **[+Speed assign.]**<br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>Function active if the state of the input or bit assigned is at 1. | | | [No] (nO) |
| **dS1**<br>**nO**<br>**L11**<br>-<br>-<br>- | ❏ **[-Speed assign.]**<br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>Function active if the state of the input or bit assigned is at 1. | | | [No] (nO) |
| **SrP** | ❏ **[+/-Speed limitation]**<br><br>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). | | 0 to 100% | 10% |
| **AC2** | ❏ **[Acceleration 2]**<br><br>Time to accelerate from 0 to the [Rated motor freq.] (FrS). Make sure that this value is compatible with the inertia being driven.<br>The parameter can be accessed if +/- speed is assigned. | (1) | 0.01 to 9999 s | 5.0 s |
| **dE2** | ❏ **[Deceleration 2]**<br><br>Time to decelerate from the [Rated motor freq.] (FrS) to 0. Make sure that this value is compatible with the inertia being driven.<br>The parameter can be accessed if +/- speed is assigned. | (1) | 0.01 to 9999 s | 5.0 s |

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

## Reference saving:

Saving the speed reference value of the analog input 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 setpoint and a logic input for each drive.
- It is also used to confirm a line reference (serial link) on several drives via a logic input. This allows movements to be synchronized by getting rid of variations when the reference is sent.
- The setpoint is acquired 100 ms after the rising edge of the request. A new reference is not then acquired until a new request is made.

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

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| SPM- | ■ **[REFERENCE IN MEMORY]** | | |
| SPM<br><br>nO<br><br>LI1<br>-<br>-<br>- | ❏ **[Ref. memo. ass.]**<br><br>☐ **[No]** (nO): Function inactive<br><br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>Function active if the state of the input or bit assigned is at 1. | | [No] (nO) |
| FLI- | ■ **[FLUXING BY LI]** | | |
| FLI<br><br>nO<br><br>LI1<br>-<br>-<br>- | ❏ **[Fluxing assignment]**<br><br>☐ **[No]** (nO): Function inactive<br><br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>Function active if the state of the input or bit assigned is at 1.<br><br>Assignment only possible if [Motor fluxing] (FLU) page 47 = [Non cont.] (FnC).<br><br>Motor fluxing:<br>In order to obtain rapid high torque on startup, magnetic flux needs to be already established in the motor.<br>• This function can be selected in open or closed-loop operation.<br>• In continuous mode (FCt), the drive automatically builds up flux when it is powered up.<br>• In non-continuous mode:<br>  - If an LI is assigned to the motor fluxing command, flux is built up when the command is confirmed.<br>  - If no LI is assigned or if it is not active when a run command is given, the motor is fluxed when it starts up.<br>• 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. | | [No] (nO) |

## 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 state of the input is at 0 (contact open).

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| ?L 5 t - | ■ **[LIMIT SWITCH MANAGEMENT]**<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | |
| L A F<br>n 0<br>L I 1<br>-<br>-<br>L I 4 | ❑ **[Stop FW limit sw.]**<br>  ☐ **[No]** (nO): Function inactive<br>  ☐ **[LI1]** (LI1)<br>   ⋮<br>   ⋮<br>  ☐ **[LI4]** (LI4): See the assignment conditions on page 94. | | [No] (nO) |
| L A r<br>n 0<br>L I 1<br>-<br>-<br>L I 4 | ❑ **[Stop RV limit sw.]**<br>  ☐ **[No]** (nO): Function inactive<br>  ☐ **[LI1]** (LI1)<br>   ⋮<br>   ⋮<br>  ☐ **[LI4]** (LI4): See the assignment conditions on page 94. | | [No] (nO) |
| L A 5<br>n 5 t<br>r N P<br>F 5 t | ❑ **[Type of stop]**<br>  ☐ **[Freewheel]** (nSt)<br>  ☐ **[Ramp stop]** (rMP)<br>  ☐ **[Fast stop]** (FSt)<br>  When the state of 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.<br>  If the two inputs [Stop FW limit sw.] (LAF) and [Stop RV limit sw.] (LAr) are assigned to state 0, restarting will be impossible.<br>  The parameter can be accessed if [Stop FW limit sw.] (LAF) or [Stop RV limit sw.] (LAr) is assigned. | | [Freewheel] (nSt) |

Handling

Elevators

Hoisting

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

## Brake logic control

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

### Principle:

### Vertical hoisting movement:
Maintain motor torque in the load holding direction during brake opening and closing, in order to hold the load, and start smoothly when the brake is released.

### Horizontal movement:
Synchronize brake release with the build-up of torque during start-up and brake engage at zero speed on stopping, to prevent jolting.

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

**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 nominal 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.
Note: For a hoisting movement, a braking resistor should be used. Ensure that the settings and configurations selected cannot cause a drop or a loss of control of the lifted load.

**4.** Brake release delay (brt):
Adjust according to the type of brake. It is the time required for the mechanical brake to release.

**5.** Brake release frequency (bIr):
Leave in [Auto], adjust if necessary.

**6.** Brake engage frequency (bEn):
Leave in [Auto], adjust if necessary.

**7.** Brake engage time (bEt):
Adjust according to the type of brake. It is the time required for the mechanical brake to engage.

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

**1.** Brake impulse (bIP): No

**2.** Brake release current (Ibr): Set to 0.

**3.** Brake release delay (brt):
Adjust according to the type of brake. It is the time required for the mechanical brake to release.

**4.** Brake release frequency (bIr):
Leave in [Auto], adjust if necessary.

**5.** Brake engage frequency (bEn):
Leave in [Auto], adjust if necessary.

**6.** Brake engage time (bEt):
Adjust according to the type of brake. It is the time required for the mechanical brake to engage.

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

## Horizontal movement, open-loop control
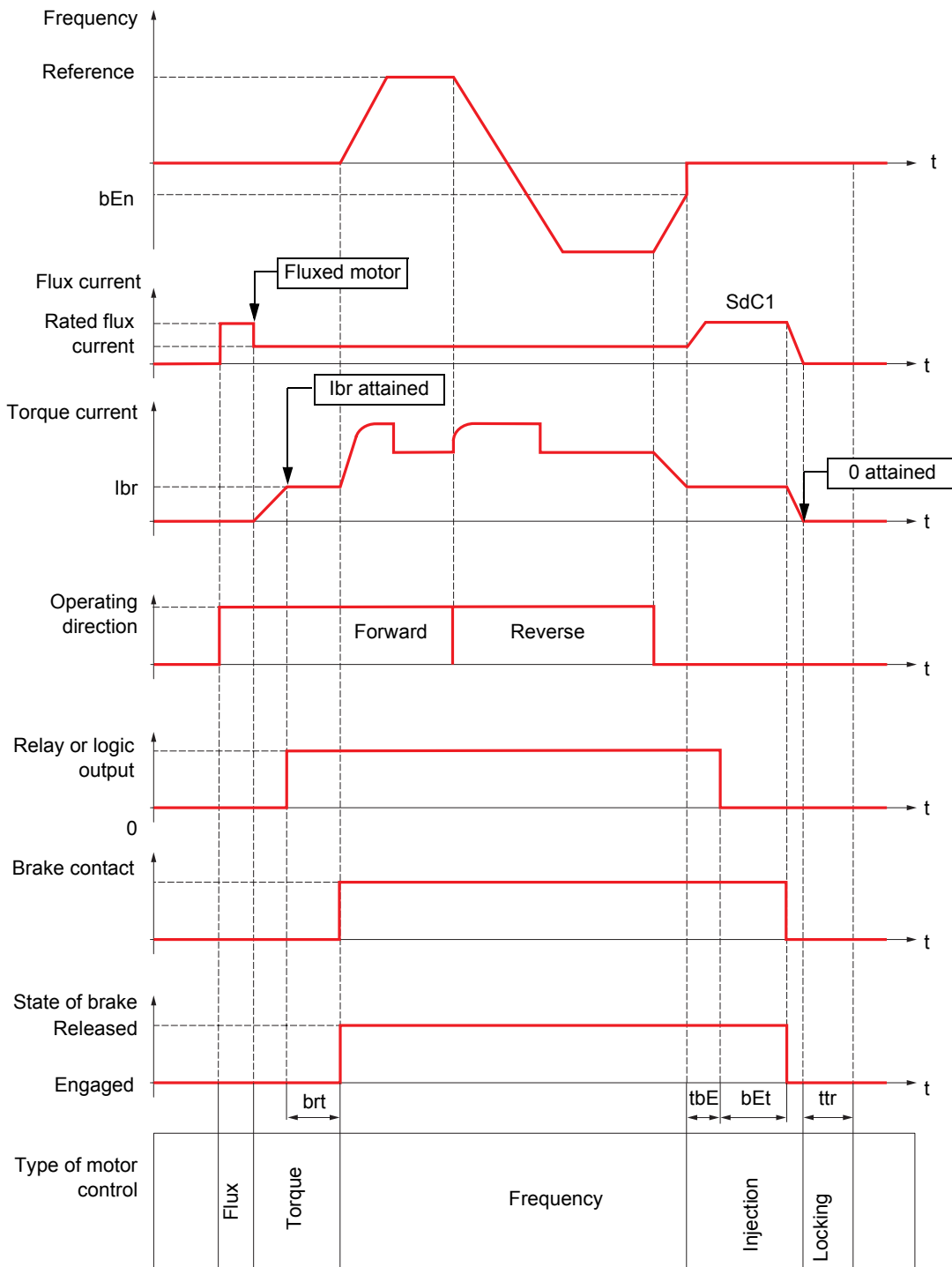


Key:
- (bEn): [Brake engage freq]
- (bEt): [Brake engage time]
- (brt): [Brake Release time]
- (Ibr): [Brake release I FW]
- (SdC1): [I inject. DC auto 1]
- (tbE): [Brake engage time]
- (ttr): [Time to restart]

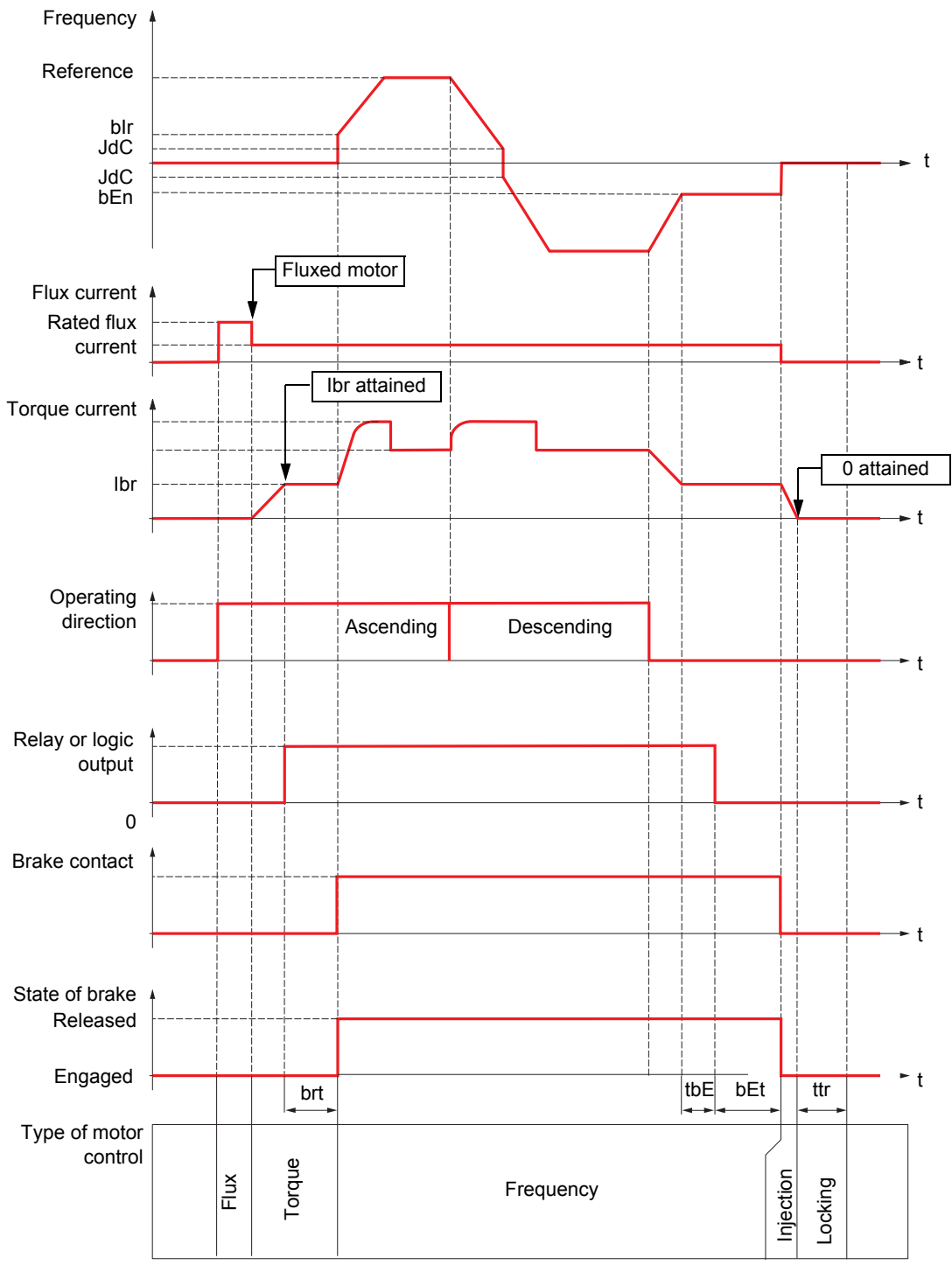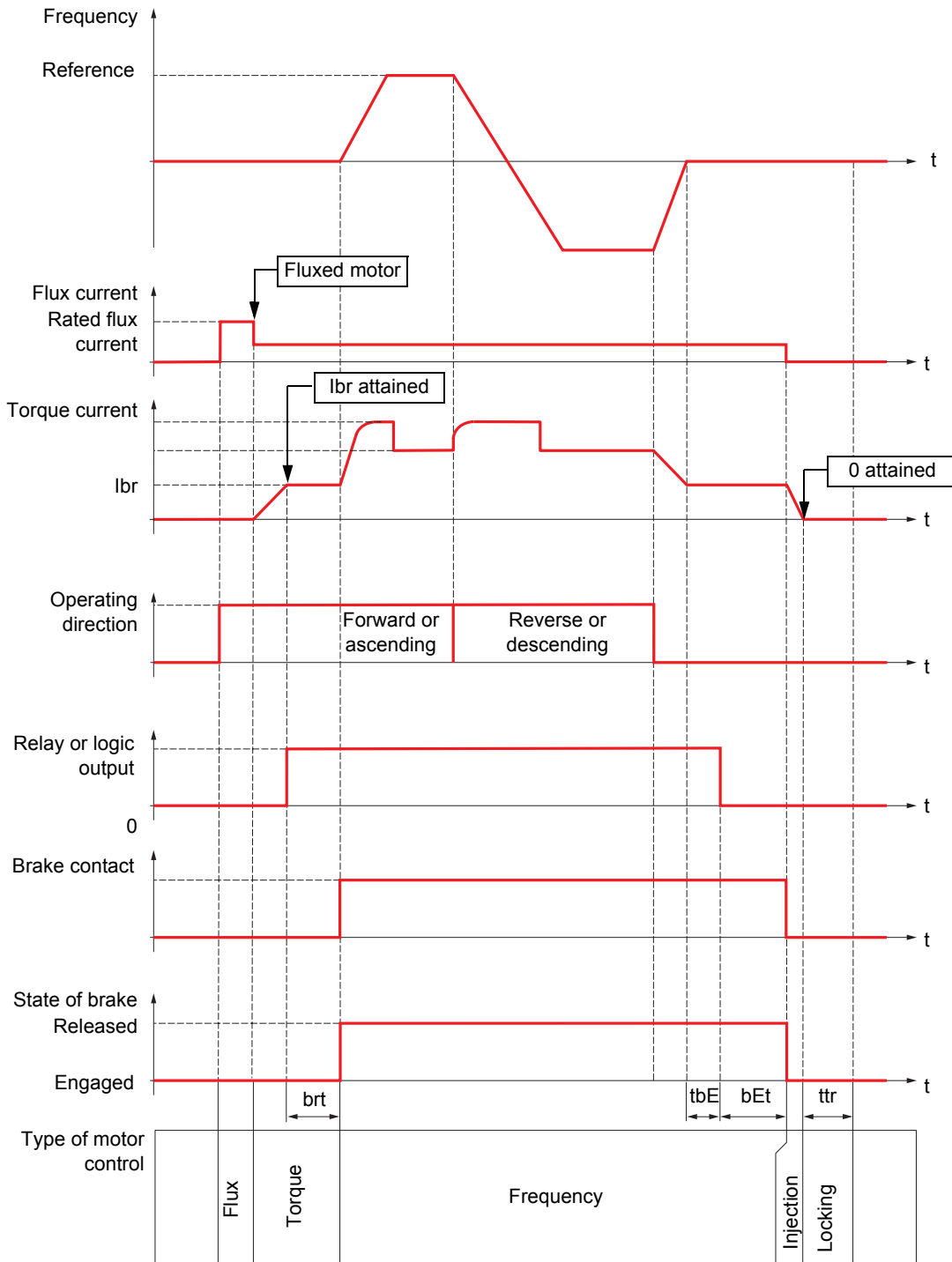## Vertical movement, open-loop control



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 time]
- (ttr): [Time to restart]

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

## Vertical or horizontal movement, closed-loop control



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

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

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| bLC - | ■ **[BRAKE LOGIC CONTROL]**<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | |
| bLC<br><br>nO<br>LO1<br>-<br>LO4<br>r2<br>-<br>r4 | ❏ **[brake assignment]**<br><br>⚠ **If the brake is assigned, only ramp stops and fast stops are possible.** Check the [Type of stop] (Stt) page 107.<br>Logic output or control relay<br>☐ **[No]** (nO): Function not assigned (in this case, none of the function parameters can be accessed).<br>☐ **[LO1]** (LO1)<br>to<br>**[LO4]** (LO4): Logic output (if an extension card has been inserted, LO1 to LO2 or LO4 can be selected).<br>☐ **[R2]** (r2)<br>to<br>**[R4]** (r4): Relay (selection extended to R3 or R4 if an extension card has been inserted). | | [No] (nO) |
| bSt<br><br>UEr<br>HOr | ❏ **[Movement type]**<br><br>☐ **[Hoisting]** (UEr): Driving-load movement (hoisting winch, for example).<br>☐ **[Traveling]** (HOr): Resistive-load movement (overhead crane movement, for example). | | [Hoisting] (UEr) |
| bC1<br><br>nO<br>LI1<br>-<br>-<br>LI4 | ❏ **[Brake contact]**<br><br>If the brake is fitted with a monitoring contact (closed for released brake).<br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[LI4]** (LI4): See the assignment conditions on page 94. | | [No] (nO) |
| bIP<br><br>nO<br>YES<br>2Ibr | ❏ **[Brake impulse]**<br><br>The parameter can be accessed if [Weight sensor ass.] (PES) = [No] (nO) (see page 130).<br>☐ **[No]** (nO): The motor torque is given in the required operating direction.<br>☐ **[Yes]** (YES): The motor torque is always Forward (check that this direction corresponds to lifting).<br>☐ **[2 IBR]** (2Ibr): The torque is in the required direction, Ibr for Forward and Ird for Reverse.<br>If the [Movement type] (bSt) is [Traveling] (HOr), [Brake impulse] (bIP) is forced to [No] (nO). | | [No] (nO) |
| Ibr | ❏ **[Brake release I FW]** (1)<br><br>Brake release current threshold for Ascending or Forward movement | 0 to 1.32 In (2) | 0 |
| Ird | ❏ **[Brake release I RV]** (1)<br><br>Brake release current threshold for Descending or Reverse movement<br>The parameter can be accessed if [Brake impulse] (bIP) = 2 Ibr | 0 to 1.32 In (2) | 0 |
| brt | ❏ **[Brake Release time]** (1)<br><br>Brake release time delay | 0 to 5.00 s | 0 |
| bIr<br><br>AUtO<br>- | ❏ **[Brake release freq]** (1)<br><br>Brake release frequency threshold<br>☐ **[Auto]** (AUtO): The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters.<br>☐ **0 to 10 Hz**: Manual control | | [Auto] (AUtO) |

(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 rating plate.

| Code | Name/Description | | Adjustment range | Factory setting |
|------|------------------|---|------------------|-----------------|
| | ■ **[BRAKE LOGIC CONTROL]** (continued) | | | |
| bEn AUtO - | ❏ **[Brake engage freq]** <br><br> Brake engage frequency threshold <br> ☐ **[Auto]** (AUtO): The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters. <br> ☐ **0 to 10 Hz**: Manual control | (1) | | [Auto] (AUtO) |
| tbE | ❏ **[Brake engage time]** <br><br> Time delay before request to engage brake. To delay the engaging of the brake, for horizontal movement only, if you wish the brake to engage when the drive comes to a complete stop. | (1) | 0 to 5.00 s | 0 |
| bEt | ❏ **[Brake engage time]** <br><br> Brake engage time (brake response time) | (1) | 0 to 5.00 s | 0 |
| SdC1 | ❏ **[I inject. DC auto 1]** <br><br> Level of standstill DC injection current <br> ⚠ The parameter can be accessed if brake logic control is assigned. Check that the motor will withstand this current without overheating. | (1) | 0 to 1.2 In (2) | 0.7 In (2) |
| bEd nO YES | ❏ **[Engage at reversal]** <br><br> ☐ **[No]** (nO): The brake does not engage. <br> ☐ **[Yes]** (YES): The brake engages. <br> Can be used to select if the brake engages or not on transition to zero speed when the operating direction is inverted. | | | [No] (nO) |
| JdC AUtO - | ❏ **[Jump at reversal]** <br><br> ☐ **[Auto]** (AUtO): The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters. <br> ☐ **0 to 10 Hz**: Manual control <br> In closed-loop control, this parameter is forced to zero. It is also forced to zero in open-loop control if the [Movement type] (bSt) is [Traveling] (HOr). <br> When the reference direction is inverted, 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). | (1) | 0 to 10.0 Hz | [Auto] (AUtO) |
| ttr | ❏ **[Time to restart]** <br><br> Time between the end of a brake engage sequence and the start of a brake release sequence | | 0 to 5.00 s | 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 rating plate.

Handling

Elevators

Hoisting

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

## Brake logic control expert parameters

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| brH0 | ❏ [BRH_b0] | | 0 |
| brH1 | ❏ [BRH_b1] | | 0 |
| brH2 | ❏ [BRH_b2] | | 0 |
| brH3 | ❏ [BRH_b3] | | 0 |
| brH4 | ❏ [BRH_b4] | | 0 |
| brr | ❏ [Current ramp time] | 0 to 5.00 s | 0 s |

*Handling*

*Elevators*

*Hoisting*

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

## External weight measurement:

This function uses the information provided by a weight sensor via an analog input (usually a 4 - 20 mA signal) to adapt the current [Brake release I FW] (Ibr) of the Brake logic control function.

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

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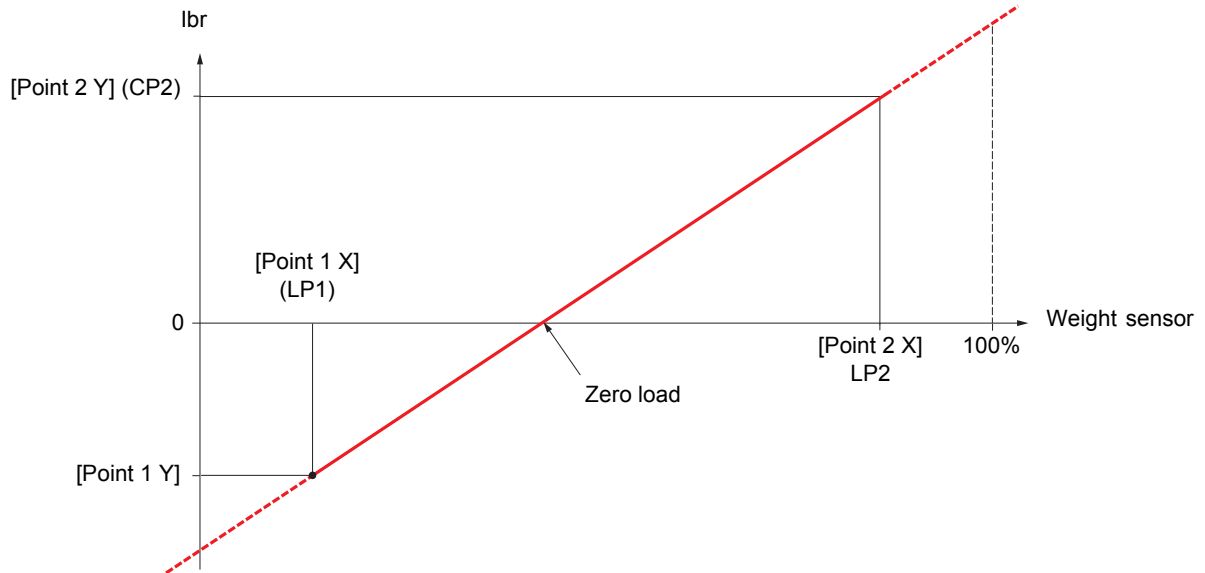


This curve can illustrate a weight sensor on an elevator winch, where the zero load on the motor indicates that the load in the cabin is not equal to zero.

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

**Elevators**

**Hoisting**

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| | ■ **[EXTERNAL WEIGHT MEAS.]** | | | |
| PES<br>nO<br>AI1<br>-<br>AI4 | ❏ **[Weight sensor ass.]**<br>☐ **[No]** (nO): Function inactive<br>☐ **[AI1]** (AI1)<br>to<br>**[AI4]** (AI4): Analog input assigned<br>Function can be accessed if brake logic control is assigned (see page 126). | | | [No] (nO) |
| LP1 | ❏ **[Point 1 X]** (1)<br>0 to 100% of signal on analog input<br>[Point 1 X] (LP1) must be less than [Point 2 X] (LP2).<br>The parameter can be accessed if [Weight sensor ass.] (PES) is assigned. | | 0 to 100% | 0 |
| CP1 | ❏ **[Point 1 Y]** (1)<br>Current corresponding to load [Point 1 X] (LP1), in A.<br>The parameter can be accessed if [Weight sensor ass.] (PES) is assigned. | | -1.36 to +1.36 In (2) | - In |
| LP2 | ❏ **[Point 2 X]** (1)<br>0 to 100% of signal on analog input<br>[Point 2 X] (LP2) must be greater than [Point 1 X] (LP1).<br>The parameter can be accessed if [Weight sensor ass.] (PES) is assigned. | | 0 to 100% | 100% |
| CP2 | ❏ **[Point 2 Y]** (1)<br>Current corresponding to load [Point 2 X] (LP2), in A.<br>The parameter can be accessed if [Weight sensor ass.] (PES) is assigned. | | -1.36 to +1.36 In (2) | + In |
| IbrA | ❏ **[Ibr 4-20 mA loss]** (1)<br>Brake release current in the event of the loss of the weight sensor information.<br>This parameter can be accessed if the weight sensor is assigned to an analog current input and the 4-20 mA loss fault has been deactivated.<br>Recommended settings:<br>- 0 for elevators<br>- Rated motor current for a hoisting application | | 0 to 1.32 In | 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 rating plate.

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

## 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 xx.

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

**Principle:**
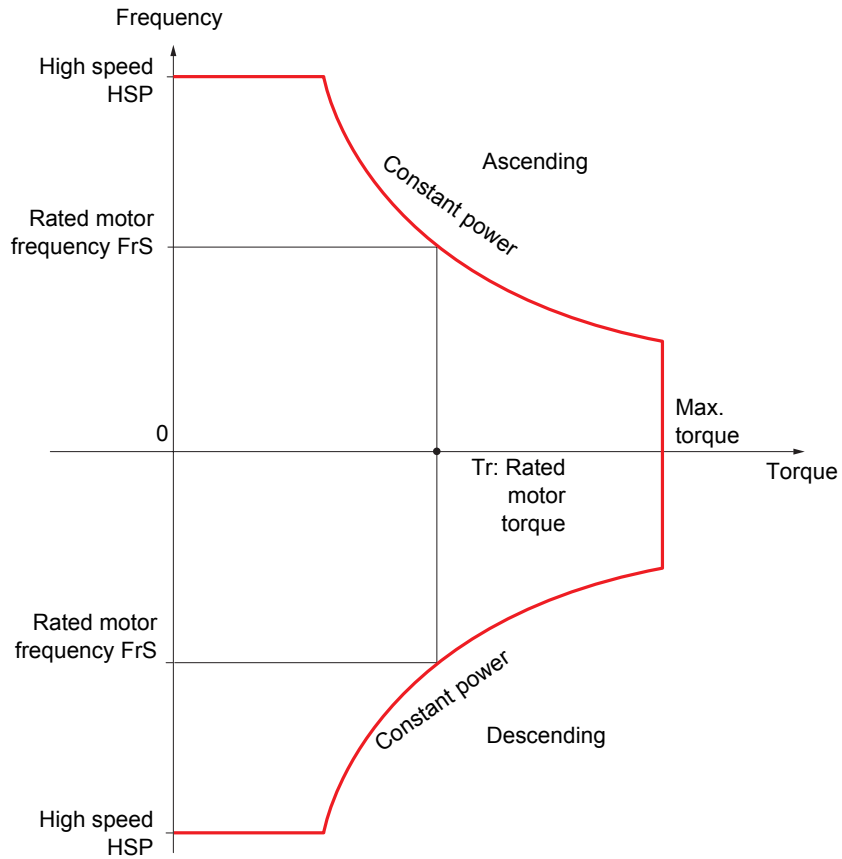
# [1.7 - APPLICATION FUNCT.] (FUn-)

Two operating modes are possible:

- "Speed reference" mode: The maximum permissible speed is calculated by the drive during a speed phase set in order 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
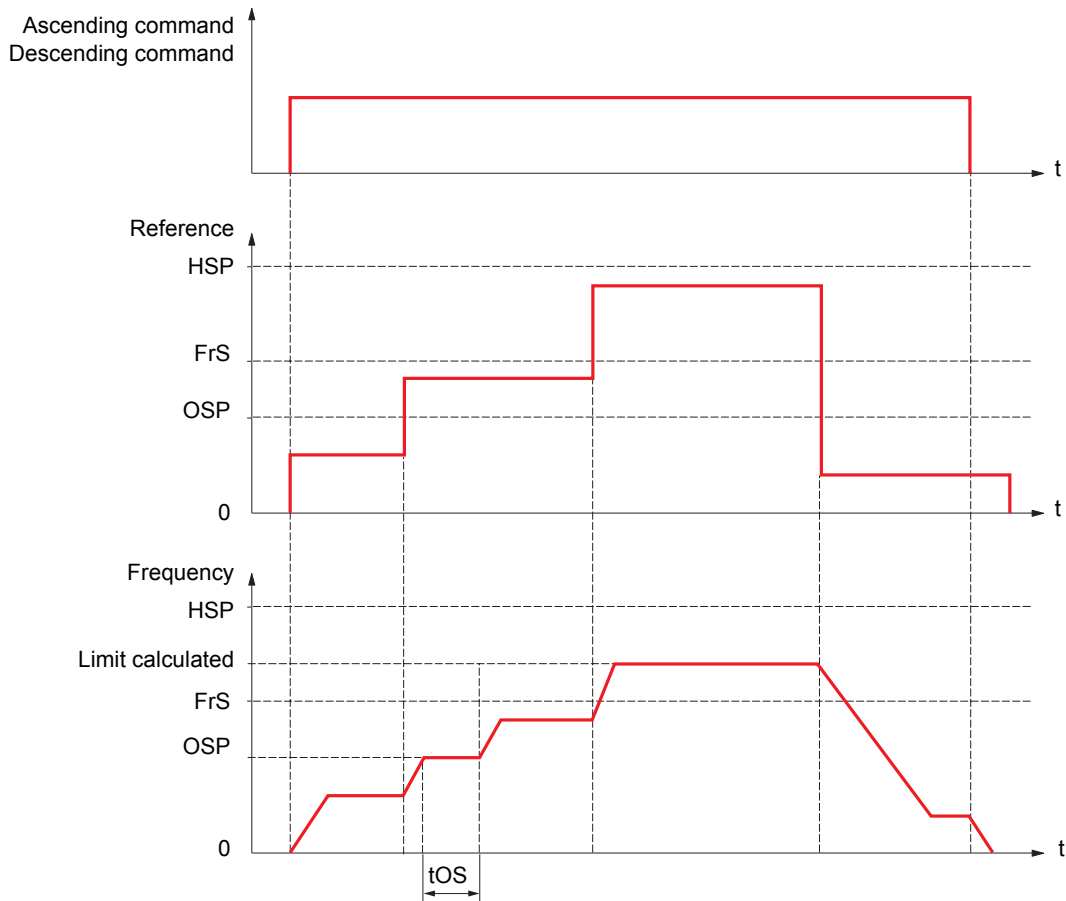


OSP: Adjustable speed phase for load measurement
tOS: Load measuring time

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

## Current limitation mode
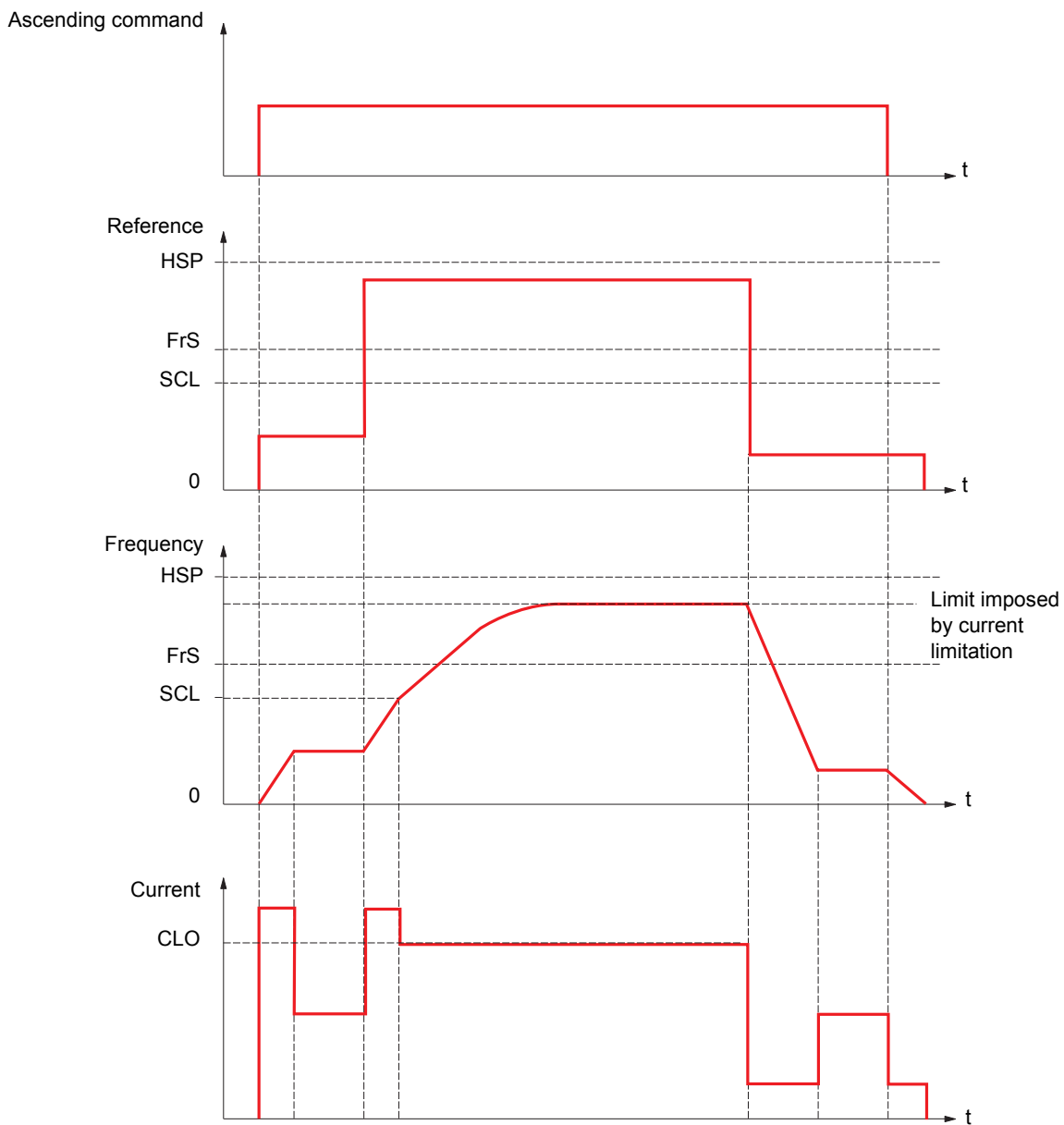


SCL: Adjustable speed threshold, above which current limitation is active
CLO: Current limitation for high-speed function

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

**Hoisting**

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| **HSO -** | ■ **[HIGH SPEED HOISTING]** <br> Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | | |
| **HSO** <br><br> **nO** <br> **SSO** <br> **CSO** | ❏ **[High speed hoisting]** <br> ☐ **[No]** (nO): Function inactive <br> ☐ **[Speed ref]** (SSO): "Speed reference" mode <br> ☐ **[Current Limit]** (CSO): "Current limitation" mode | | | [No] (nO) |
| **COF** | ❏ **[Motor speed coeff.]** <br><br> Speed reduction coefficient calculated by the drive for Ascending direction. <br> The parameter can be accessed if [High speed hoisting] (HSO) = [Speed ref] (SSO) | (1) | 0 to 100% | 100% |
| **COr** | ❏ **[Gen. speed coeff]** <br><br> Speed reduction coefficient calculated by the drive for Descending direction. <br> The parameter can be accessed if [High speed hoisting] (HSO) = [Speed ref] (SSO) | (1) | 0 to 100% | 100% |
| **tOS** | ❏ **[Load measuring tm.]** <br><br> Duration of speed phase for measurement. <br> The parameter can be accessed if [High speed hoisting] (HSO) = [Speed ref] (SSO) | (1) | 0.1 s to 65 s | 1 s |
| **OSP** | ❏ **[Measurement spd]** <br><br> Speed stabilized for measurement. <br> The parameter can be accessed if [High speed hoisting] (HSO) = [Speed ref] (SSO) | (1) | 0 to FrS | 40 Hz |
| **CLO** | ❏ **[High speed I Limit]** <br><br> Current limitation at high speed. <br> The parameter can be accessed if [High speed hoisting] (HSO) = [Lim. Courant] (CSO) | (1) | 0.25 to 1.5 In (2) | In |
| **SCL** | ❏ **[I Limit. frequency]** <br><br> Frequency threshold, above which the high-speed limitation current is active. <br> The parameter can be accessed if [High speed hoisting] (HSO) = [Lim. Courant] (CSO) | (1) | 0 to HSP | 40 Hz |

(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 rating plate.

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

## PID regulator

### Block diagram

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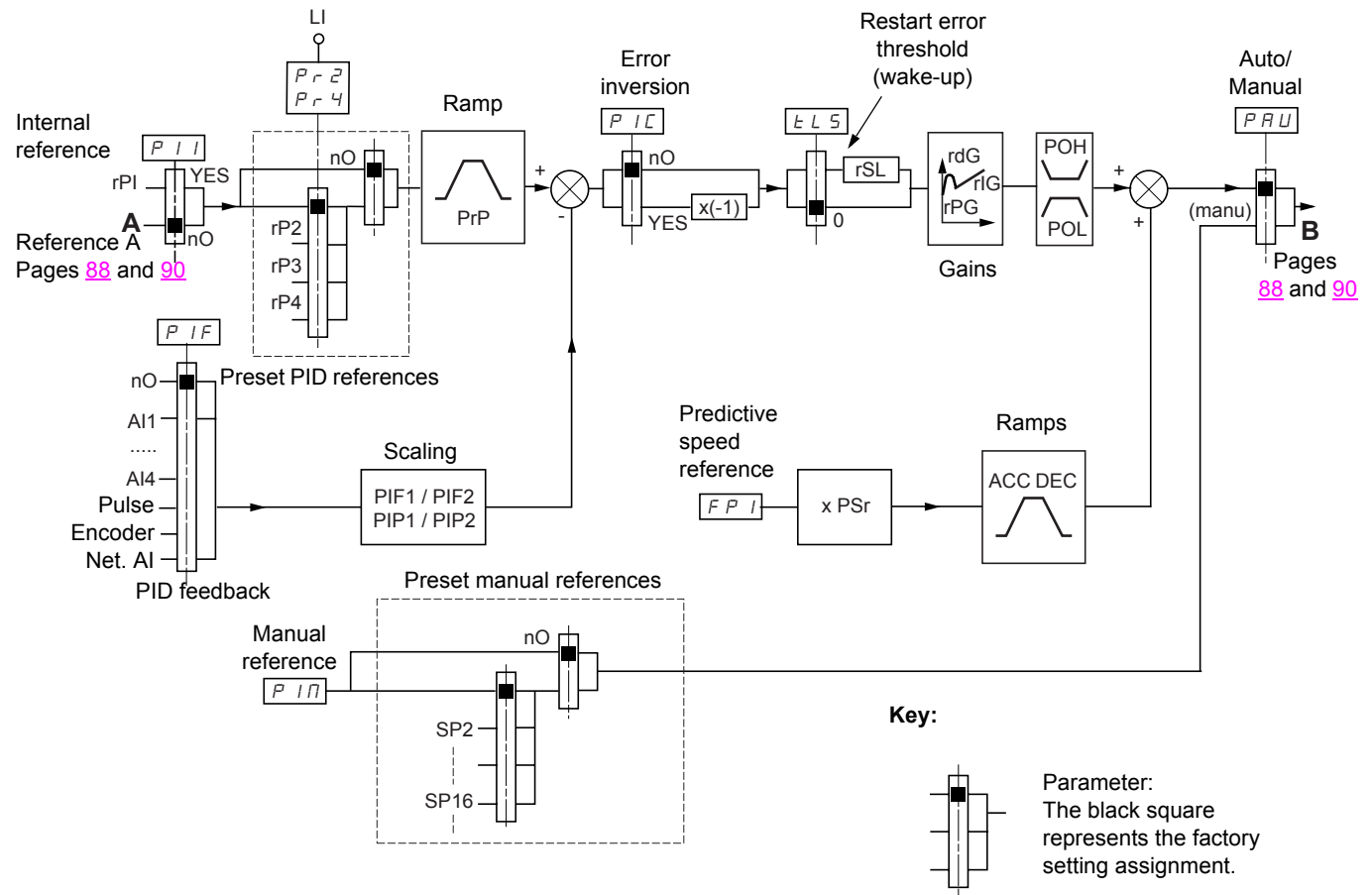


**PID feedback:**
The PID feedback must be assigned to one of the analog inputs AI1 to AI4, to the frequency input or the encoder, in accordance with the use of extension cards.

**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) page 139:
      - Internal reference (rPI) or
      - Reference A (Fr1 or Fr1b, see pages 88 and 89)
Combination table for preset PID references

| LI (Pr4) | LI (Pr2) | Pr2 = nO | Speed |
|----------|----------|----------|-------|
|          |          |          | 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.

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

**Scaling of feedback and references:**

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

- Parameters PIP1, PIP2
  Can be used to scale the adjustment range.
  **Example**: Adjustment of the volume of 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 (use values as close as possible to the maximum format (65535), while retaining powers of 10 in relation to the actual values).
    - Adjustment range 6 to 15 m$^3$, with the result that PIP1 = 6000 and PIP2 = 15000.
    - 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.

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

## "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 with the PID function.

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

**Predictive speed reference (FPI)**

- [AI1] (AI1): Analog input
- [AI2] (AI2): Analog input
- [AI3] (AI3): Analog input, if extension card present
- [AI4] (AI4): Analog input, if extension card present
- [Pulse input] (PI): Frequency input, if card present
- [Encoder ref.] (PG): Encoder input, if card present
- [HMI] (LCC): Graphic display terminal
- [Modbus] (Mdb): Modbus
- [CANopen] (CAn): CANopen
- [Com. card] (nEt): Communication card (if present)
- [Prog. card] (APP): Programmable card (if present)

## Setting up the PID regulator

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

**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 cabling.

- Switch to PID mode.
- Set brA to no (no auto-adaptation of the ramp).
- Set the speed ramps (AC2, dE2) to the minimum permitted by the mechanics 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.
- Set the proportional gain (rPG) in order to ascertain the ideal 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 be at the expense of a compromise in stability that is more difficult to achieve, as it depends on 3 gains.
- Perform in-production tests over the whole reference range.

*Process*
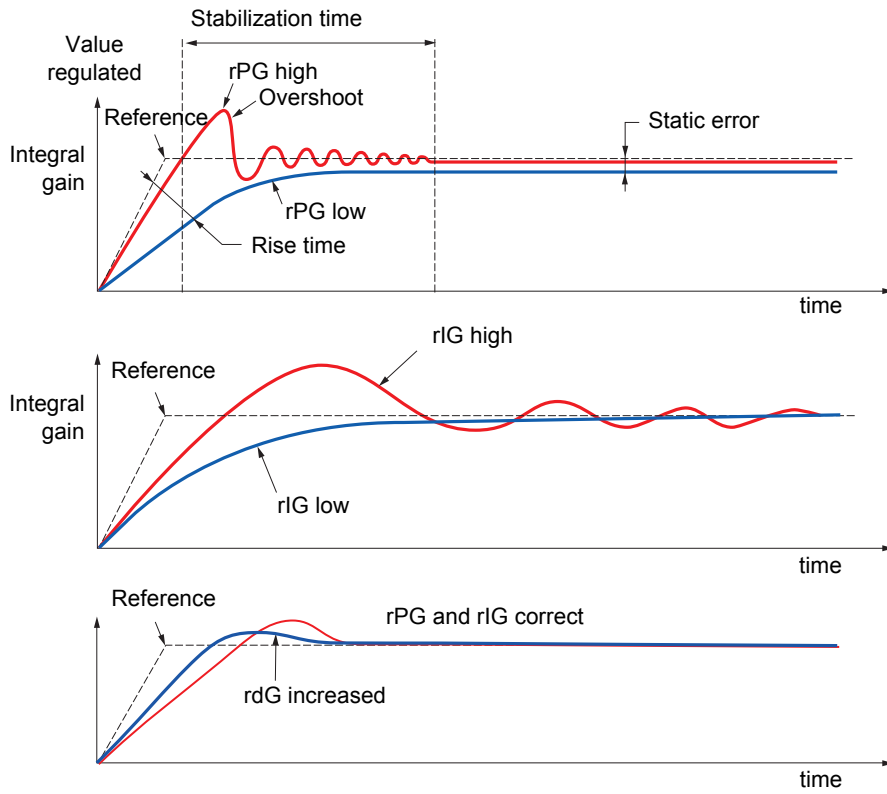


The oscillation frequency depends on the system kinematics.

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

| Code | Name/Description | | Adjustment range | Factory setting |
|------|-----------------|---|------------------|-----------------|
| PId- | ■ **[PID REGULATOR]**<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | | |
| PIF<br><br>nO<br>AI1<br>AI2<br>AI3<br>AI4<br>PI<br>PG<br>AIU1 | ❏ **[PID feedback ass.]**<br>☐ **[No]** (nO): Not assigned (function inactive) In this case, none of the function parameters can be accessed.<br>☐ **[AI1]** (AI1): Analog input<br>☐ **[AI2]** (AI2): Analog input<br>☐ **[AI3]** (AI3): Analog input, if extension card present<br>☐ **[AI4]** (AI4): Analog input, if extension card present<br>☐ **[Pulse input]** (PI): Frequency input, if card present<br>☐ **[Encoder ref]** (PG): Encoder input, if card present<br>☐ **[Net AI1]** (AIU1): Feedback via communication bus | | | **[No]** (nO) |
| AIC1<br><br>nO<br>Mdb<br>CAn<br>nEt<br>APP | ❏ **[AI net. channel]**<br>The parameter can be accessed if [PID feedback ass.] (PIF) = [Net AI1] (AIU1).<br>☐ **[No]** (nO): Not assigned<br>☐ **[Modbus]** (Mdb): Modbus<br>☐ **[CANopen]** (CAn): CANopen<br>☐ **[Com. card]** (nEt): Communication card (if present)<br>☐ **[Prog. card]** (APP): Programmable card (if present) | | | **[No]** (nO) |
| PIF1 | ❏ **[Min PID feedback]**<br>Value for minimum feedback | (1) | 0 to 65535 (2) | 100 |
| PIF2 | ❏ **[Max PID feedback]**<br>Value for maximum feedback | (1) | 0 to 65535 (2) | 1000 |
| PIP1 | ❏ **[Min PID reference]**<br>Minimum process value | (1) | 0 to 65535 (2) | 150 |
| PIP2 | ❏ **[Max PID reference]**<br>Maximum process value | (1) | 0 to 65535 (2) | 900 |
| PII<br><br>nO<br>YES | ❏ **[Act. internal PID ref.]**<br>Internal PID regulator reference<br>☐ **[No]** (nO): The PID regulator reference is given by Fr1 or Fr1b with summing/subtraction/multiplication functions and preset speeds if relevant (see the diagram on page 87).<br>☐ **[Yes]** (YES): The PID regulator reference is internal via parameter rPI. | | | **[No]** (nO) |
| rPI | ❏ **[Internal PID ref.]**<br>Internal PID regulator reference<br>The parameter can be accessed if [Act. ref. PID int] (PII) = [Yes] (YES). | (1) | 0 to 65535 (2) | 0 |
| rPG | ❏ **[PID prop. gain]**<br>Proportional gain | (1) | 0.01 to 100 | 1 |
| rIG | ❏ **[PID integral gain]**<br>Integral gain | (1) | 0.01 to 100 | 1 |
| rdG | ❏ **[PID derivative gain]**<br>Derivative gain | (1) | 0.00 to 100 | 0 |

(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.

*Process*

*Process*

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| | ■ **[PID REGULATOR]** (continued) | | | |
| PrP | ❏ **[PID ramp]** | (1) | 0 to 99.9 s | 0 |
| | PID acceleration/deceleration ramp, defined to go from [Min PID reference] (PIP1) to [Max PID reference] (PIP2) and vice versa. | | | |
| PIC / nO / YES | ❏ **[PID correct. reverse]** | (1) | | [No] (nO) |
| | ☐ **[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, 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. | | | |
| POL | ❏ **[Min PID output]** | (1) | 0 to 500 or 1000 according to rating | 0 Hz |
| | Minimum value of regulator output in Hz | | | |
| POH | ❏ **[Max PID output]** | (1) | 0 to 500 or 1000 according to rating | 60 Hz |
| | Maximum value of regulator output in Hz | | | |
| PAL | ❏ **[Min fbk alarm]** | (1) | 0 to 65535 (2) | 100 |
| | Minimum monitoring threshold for regulator feedback | | | |
| PAH | ❏ **[Max fbk alarm]** | (1) | 0 to 65535 (2) | 1000 |
| | Maximum monitoring threshold for regulator feedback | | | |
| PEr | ❏ **[PID error Alarm]** | (1) | 0 to 65535 (2) | 100 |
| | Regulator error monitoring threshold | | | |
| PIS / nO / LI1 / - / - / - | ❏ **[PID integral reset]** | | | [No] (nO) |
| | ☐ **[No]** (nO): Function inactive | | | |
| | ☐ **[LI1]** (LI1) | | | |
| | ☐ **[...]** (...): See the assignment conditions on page 94. If the state of the input or bit assigned is at 0, the function is inactive (the PID integral is enabled). If the state of the input or bit assigned is at 1, the function is active (the PID integral is disabled). | | | |
| FPI / nO / AI1 / AI2 / AI3 / AI4 / PI / PG / LCC / Mdb / CAn / nEt / APP | ❏ **[Speed ref. assign.]** | | | [No] (nO) |
| | PID regulator predictive speed input | | | |
| | ☐ **[No]** (nO): Not assigned (function inactive) | | | |
| | ☐ **[AI1]** (AI1): Analog input | | | |
| | ☐ **[AI2]** (AI2): Analog input | | | |
| | ☐ **[AI3]** (AI3): Analog input, if extension card present | | | |
| | ☐ **[AI4]** (AI4): Analog input, if extension card present | | | |
| | ☐ **[Pulse input]** (PI): Frequency input, if card present | | | |
| | ☐ **[Encoder ref]** (PG): Encoder input, if card present | | | |
| | ☐ **[HMI]** (LCC): Graphic display terminal | | | |
| | ☐ **[Modbus]** (Mdb): Modbus | | | |
| | ☐ **[CANopen]** (CAn): CANopen | | | |
| | ☐ **[Com. card]** (nEt): Communication card (if present) | | | |
| | ☐ **[Prog. card]** (APP): Programmable card (if present) | | | |

(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.

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| | ■ **[PID REGULATOR]** (continued) | | | |
| PSr | ❑ **[Speed input %]** | (1) | 1 to 100% | 100% |
| | Multiplying coefficient for predictive speed input<br>The parameter can be accessed if [Speed ref. assign.] (FPI) = [No] (nO) | | | |
| PAU<br><br>nO<br>LI1<br>-<br>-<br>- | ❑ **[Auto / manual]**<br><br>☐ **[No]** (nO): The PID is always active.<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>If the state of the input or bit assigned is at 0, the PID is active.<br>If the state of the input or bit assigned is at 1, the PID is inactive. | | | [No] (nO) |
| PIN<br><br>nO<br>AI1<br>AI2<br>AI3<br>AI4<br>PI<br>PG | ❑ **[Manual Ref.]**<br><br>Manual speed input<br>☐ **[No]** (nO): Not assigned (function inactive)<br>☐ **[AI1]** (AI1): Analog input<br>☐ **[AI2]** (AI2): Analog input<br>☐ **[AI3]** (AI3): Analog input, if extension card present<br>☐ **[AI4]** (AI4): Analog input, if extension card present<br>☐ **[Pulse input]** (PI): Frequency input, if card present<br>☐ **[Encoder ref]** (PG): Encoder input, if card present<br>The preset speeds are active on the manual reference if they have been configured. | | | [No] (nO) |
| rSL | ❑ **[PID wake-up threshold]** | | 0 to 65535 (2) | 0 |
| | If the "PID" and "Low speed operating time"(tLS) functions (see page xx) are configured at the same time, the PID regulator may attempt to set a speed lower than LSP.<br>This results in unsatisfactory operation which consists of starting, operating at low speed then stopping, and so on…<br>Parameter rSL (restart error threshold) can be used to set a minimum PID error threshold for restarting after a stop at prolonged LSP.<br>The function is inactive if tLS = 0 or if rSL = 0. | | | |

(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.

Process

**Process**

| Code | Name/Description | | Adjustment range | Factory setting |
|------|------------------|---|------------------|-----------------|
| P r 1 - | ■ **[PID PRESET REFERENCES]**<br>Function cannot be accessed if [PID feedback ass.] (PIF) is assigned. | | | |
| P r 2<br><br>n O<br>L I 1<br>-<br>-<br>- | ❏ **[2 preset PID ref.]**<br><br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>If the state of the input or bit assigned is at 0, the function is inactive.<br>If the state of the input or bit assigned is at 1, the function is active. | | | [No] (nO) |
| P r 4<br><br>n O<br>L I 1<br>-<br>-<br>- | ❏ **[4 preset PID ref.]**<br><br>☐ Make sure that [2 preset PID ref] (Pr2) has been assigned before performing this function.<br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>If the state of the input or bit assigned is at 0, the function is inactive.<br>If the state of the input or bit assigned is at 1, the function is active. | | | [No] (nO) |
| r P 2 | ❏ **[Preset ref. PID 2]**<br><br>The parameter can be accessed if [2 preset PID ref.] (Pr2) is assigned. | (1) | 0 to 65535 (2) | 300 |
| r P 3 | ❏ **[Preset ref. PID 3]**<br><br>The parameter can be accessed if [4 preset PID ref.] (Pr4) is assigned. | (1) | 0 to 65535 (2) | 600 |
| r P 4 | ❏ **[Preset ref. PID 4]**<br><br>The parameter can be accessed if [4 preset PID ref.] (Pr4) is assigned. | (1) | 0 to 65535 (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.

# [1.7 - APPLICATION FUNCT.] (FUn-)
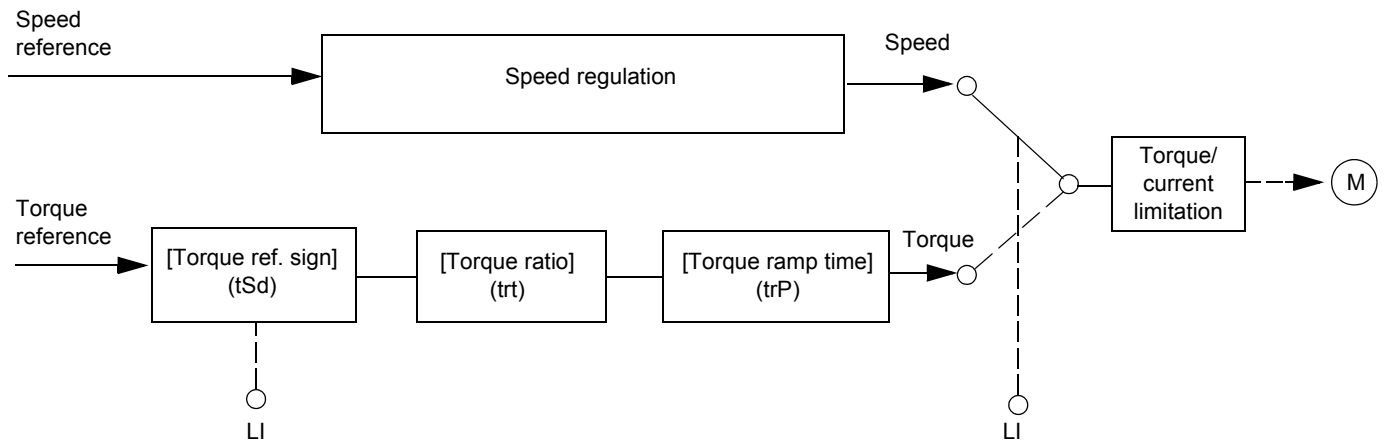
## Torque regulation



The function can be used to switch between speed regulation mode and torque regulation mode.

In torque regulation mode, the speed may vary within a configurable "deadband". When it reaches a lower or upper limit, the drive automatically reverts to speed regulation (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 regulation.
- 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.
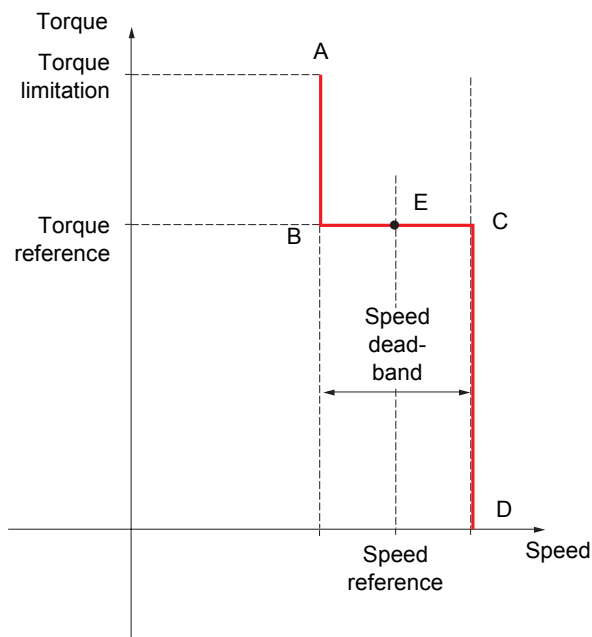


- AB and CD: "Fallback" to speed regulation
- BC: Torque regulation zone
- E: Ideal operating point

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 REGULATION]**<br>This function can only be accessed for [Motor control type] (Ctt) = [SVC I] (CUC) or [FVC] (FUC).<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | | |
| tSS<br><br>nO<br>YES<br>LI1<br>-<br>-<br>- | ❏ **[Trq/spd switching]**<br><br>☐ **[No]** (nO): Function inactive, thereby preventing access to other parameters.<br>☐ **[Yes]** (YES): Permanent torque regulation<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>If the state of the input or bit assigned is at 1: Torque regulation.<br>If the state of the input or bit assigned is at 0: Speed regulation. | | | [No] (nO) |
| tr1<br><br>AI1<br>AI2<br>AI3<br>AI4<br>PI<br>PG<br>LCC<br>Mdb<br>CAn<br>nEt<br>APP | ❏ **[Torque ref. channel]**<br><br>☐ **[AI1]** (AI1): Analog input<br>☐ **[AI2]** (AI2): Analog input<br>☐ **[AI3]** (AI3): Analog input, if extension card present<br>☐ **[AI4]** (AI4): Analog input, if extension card present<br>☐ **[Pulse input]** (PI): Frequency input, if card present<br>☐ **[Encoder ref.]** (PG): Encoder input, if card present<br>☐ **[HMI]** (LCC): Graphic display terminal<br>☐ **[Modbus]** (Mdb): Modbus<br>☐ **[CANopen]** (CAn): CANopen<br>☐ **[Com. card]** (nEt): Communication card (if present)<br>☐ **[Prog. card]** (APP): Programmable card (if present) | | | [No] (nO) |
| tSd<br><br>nO<br>LI1<br>-<br>-<br>- | ❏ **[Torque ref. sign]**<br><br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>If the state of the input or bit assigned is at 0, the torque sign is the same as the reference.<br>If the state of the input or bit assigned is at 1, the torque sign is the opposite of the reference. | | | [No] (nO) |
| trt | ❏ **[Torque ratio]**<br><br>Coefficient applied to the [Torque reference] (tr1). | (1) | 1 to 1,000% | 100% |
| trP | ❏ **[Torque ramp time]**<br><br>Torque rise and fall time for a variation of 100% of the reference. | (1) | 0 to 99.99s | 0 |
| tSt<br><br>SPd<br>nSt<br>SPn | ❏ **[Torque regul. stop]**<br><br>☐ **[Speed]** (SPd): Speed regulation stop, in accordance with the type of stop configuration (see page 107)<br>☐ **[Freewheel]** (nSt): Freewheel stop<br>☐ **[Spin]** (SPn): Zero torque stop, but conserving flux in the motor. This type of operation is only possible if [Motor control type] (Ctt) = [FVC] (FUC). | | | [Speed] (SPd) |
| SPt | ❏ **[Spin time]**<br><br>The parameter can be accessed if [Torque regul. stop] (tSt) = [Spin] (SPn)<br>Spin time following stop, in order to remain ready to restart quickly. | | 0 to 3600 s | 1 |

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

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| | ■ **[TORQUE REGULATION]** (continued) | | |
| dbP | ❏ **[Positive deadband]** | 0 to 1000 Hz | 10 Hz |
| | Positive deadband.<br>Value added algebraically to speed reference.<br>Example for dbP = 10:<br>• If reference = +50 Hz: + 50 + 10 = 60<br>• If reference = - 50 Hz: - 50 + 10 = - 40 | | |
| dbn | ❏ **[Negative deadband]** | 0 to 1000 Hz | 10 Hz |
| | Negative deadband.<br>Value subtracted algebraically from speed reference.<br>Example for dbn = 10:<br>• If reference = +50 Hz: + 50 - 10 = 40<br>• If reference = - 50 Hz: - 50 - 10 = - 60 | | |
| rtO | ❏ **[R. torque time out]** | 0 to 999.9 s | 60 |
| | Time following automatic exit of torque regulation mode in the event of a fault or alarm. | | |
| tOb<br><br>ALrM<br>FLt | ❏ **[R. torque flt mgt]**<br>Response of drive once time [R. torque time out] (rtO) has elapsed.<br>□ **[Alarm]** (ALrM)<br>□ **[Fault]** (FLt) | | [Alarm] (ALrM) |

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

## Torque limit

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

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

| Code | Name/Description | | Adjustment range | Factory setting |
|------|-----------------|---|------------------|-----------------|
| tLA- | ■ **[TORQUE LIMITATION]**<br>This function cannot be accessed in V/F profile mode. | | | |
| tLA<br><br>nO<br>YES<br>LI1<br>-<br>-<br>- | ❑ **[AI torque lim. activ.]**<br><br>☐ **[No]** (nO): Function inactive<br>☐ **[Yes]** (YES): Function always active<br>☐ **[LI1]** (LI1)<br>:<br>:<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>If the state of the input or bit assigned is at 0, the function is inactive.<br>If the state of the input or bit assigned is at 1, the function is active. | | | **[No]** (nO) |
| tLIM | ❑ **[Motoring torque lim]** (1)<br><br>The parameter cannot be accessed if [AI torque lim. activ.] (tLA) = [No] (nO)<br>Torque limitation in motor mode, as a % of the rated torque. | | 0 to 300% | 100% |
| tLIG | ❑ **[Gen. torque lim]** (1)<br><br>The parameter cannot be accessed if [AI torque lim. activ.] (tLA) = [No] (nO)<br>Torque limitation in generator mode, as a % of the rated torque. | | 0 to 300% | 100% |
| tAI<br><br>nO<br>AI1<br>-<br>AI4<br>PI<br>PG | ❑ **[Torque ref. assign]**<br><br>☐ **[No]** (nO): Not assigned (function inactive)<br>☐ **[AI1]** (AI1)<br>to<br>**[AI4]** (AI4): Analog input<br>☐ **[Pulse]** (PI): Frequency input<br>☐ **[Encoder ref.]** (PG): Encoder input<br>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.<br>Examples:<br>  - 12 mA on a 4-20 mA input results in limitation to 150% of the rated torque.<br>  - 2.5 V on a 10 V input results in 75% of the rated torque. | | | **[No]** (nO) |
| tLC<br><br>YES<br>LI1<br>-<br>-<br>- | ❑ **[Analog limit. Activ.]**<br><br>The parameter can be accessed if [Torque ref. assign] (tAI) is set to a value other than [No] (nO).<br>☐ **[Yes]** (YES): The limitation depends on the value assigned with [Torque ref. assign] (tAI).<br>☐ **[LI1]** (LI1)<br>:<br>:<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>If the state of the input or bit assigned is at 0:<br>• The limitation is given by the parameters [Motoring torque lim] (tLIM) and [Gen. torque lim] (tLIG) if [AI torque lim. activ.] (tLA) is set to a value other than [No] (nO).<br>• No limitation if [AI torque lim. activ.] (tLA) = [No] (nO).<br>If the state of the input or bit assigned is at 1:<br>• The limitation depends on the value assigned with [Torque ref. assign] (tAI).<br>**Note:** If [AI torque lim. activ.] (tLA) and [Torque ref. assign] (tAI) are enabled at the same time, the lowest value is taken into account. | | | **[No]** (nO) |

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

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| **CLI-** | ■ **[2nd CURRENT LIMIT.]** | | | |
| **LC2**<br><br>nO<br>LI1<br>-<br>-<br>- | ❏ **[Activ. I Limit. 2]**<br><br>☐ **[No]** (nO): Function inactive.<br>☐ **[LI1]** (LI1)<br>    :<br>    :<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>If the state of the input or bit assigned is at 0, the first current limitation is active.<br>If the state of the input or bit assigned is at 1, the second current limitation is active. | | | **[No] (nO)** |
| **CLI** | ❏ **[Current Limitation]**         (1)<br><br>Used to limit the torque and the temperature rise of the motor.<br>⚠ Warning: If the setting is lower than 0.25 In, the drive may lock following a fault [Output Phase Loss] (OPF) if this function has been enabled (see page 176) | | 0 to 1.65 In (2) | 1.5 In (2) |
| **CL2** | ❏ **[I Limit. 2 value]**       (1)<br><br>⚠ Warning: If the setting is lower than 0.25 In, the drive may lock following a fault [Output Phase Loss] (OPF) if this function has been enabled (see page 176) | | 0 to 1.65 In (2) | 1.5 In |

(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 rating plate.

## Line contactor control

Example circuit:
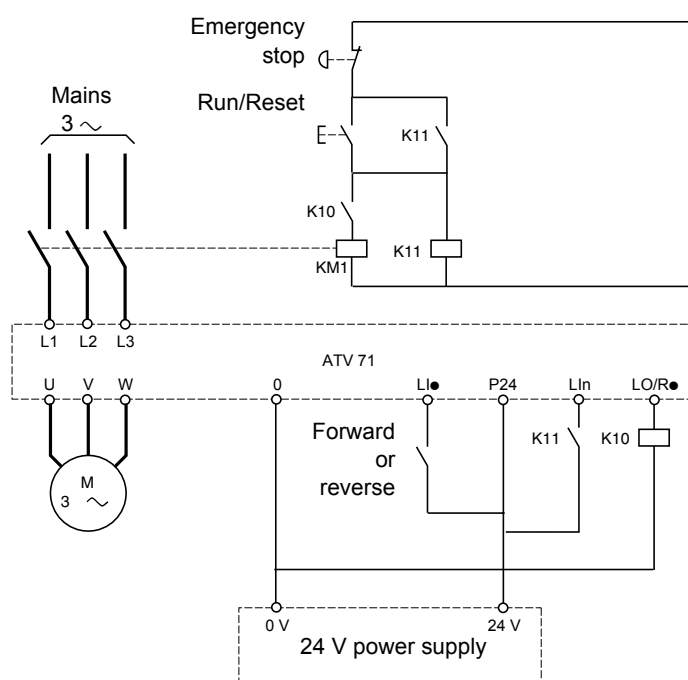
**Note:** The "Run/Reset" button must be pressed once the "Emergency stop" button has been released.

The drive control power supply must be provided via an external 24 V source.
**This function can only be used for a small number of consecutive maneuvers with a cycle shorter than 60 s (in order to avoid premature aging of the filter capacitor charging circuit).**

The line contactor closes every time a run command (forward or reverse) is sent and opens after every stop.

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| **LLC -** | ■ **[LINE CONTACTOR COMMAND]** | | |
| **LLC**<br><br>**nO**<br>**LO1**<br>-<br>**LO4**<br>**r1**<br>-<br>**r4** | ❏ **[Line contact. assign]**<br><br>Logic output or control relay<br>☐ **[No]** (nO): Function not assigned (in this case, none of the function parameters can be accessed).<br>☐ **[LO1]** (LO1)<br>    to<br>    **[LO4]** (LO4): Logic output (if an extension card has been inserted, LO1 to LO2 or LO4 can be selected).<br>☐ **[R1]** (r1)<br>    to<br>    **[R4]** (r4): Relay (selection extended from R1 to R2 to include R3 or R4 if an extension card has been inserted). | [No] (nO) | |
| **LES**<br><br>**nO**<br>**LI1**<br>-<br>-<br>- | ❏ **[Drive lock assign.]**<br><br>☐ **[No]** (nO): Function inactive.<br>☐ **[LI1]** (LI1)<br>    :<br>    :<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>The drive locks when the state of the input or bit assigned changes to 0. | [No] (nO) | |
| **LCt** | ❏ **[Mains V. time out]**<br><br>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" (LCF) fault. | 5 to 999 s | 5 s |

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

## Output contactor command

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.

⚠️ 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.

## Output contactor feedback

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

**Note:**
Fault FCF1 (contactor failing to close) can be reset by the run command changing state from 1 to 0 (0 --> 1 --> 0 in 3 wire control).
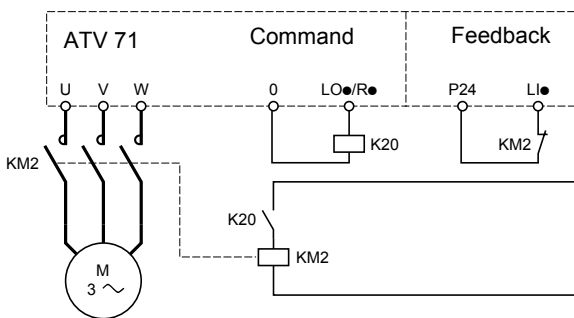


The functions [Output contact ass.] (OCC) and [Output contact. fbk] (rCA) can be used individually or together.

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| OCC - | ■ **[OUTPUT CONTACTOR CMD]**<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | | |
| OCC<br><br>nO<br>LO1<br>-<br>LO4<br>r1<br>-<br>r4 | ❏ **[Output contact ass.]**<br><br>Logic output or control relay<br>☐ **[No]** (nO): Function not assigned (in this case, none of the function parameters can be accessed).<br>☐ **[LO1]** (LO1)<br>to<br>**[LO4]** (LO4): Logic output (if an extension card has been inserted, LO1 to LO2 or LO4 can be selected).<br>☐ **[R1]** (r1)<br>to<br>**[R4]** (r4): Relay (selection extended from R1 to R2 to include R3 or R4 if an extension card has been inserted). | | | **[No]** (nO) |
| rCA<br><br>nO<br>LI1<br>-<br>-<br>- | ❏ **[Output contact. fbk]**<br><br>☐ **[No]** (nO): Function inactive.<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>The motor starts up when the state of the input or bit assigned changes to 0. | | | **[No]** (nO) |
| dbS | ❏ **[Time to motor run]**<br><br>Time delay for:<br>• Motor control following the sending of a run command<br>• 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 FCF1 fault mode.<br>This parameter can be accessed if [output cont.] (OCC) is assigned or if [Output contact. fbk] (rCA) is assigned.<br>The time delay must be greater than the closing time of the output contactor. | (1) | 0.05 to 60 s | 0.15 |
| dAS | ❏ **[Time to open cont.]**<br><br>Time delay for output contactor opening command following motor stop.<br>This parameter can be accessed if [Output contact. fbk] (rCA) is assigned.<br>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.<br>If the contactor fails to open at the end the set time, the drive will lock in FCF2 fault mode. | (1) | 0 to 5.00 s | 0.10 |

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

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

## Positioning on limit switches or sensors

This function can be used for position management using position sensors or limit switch contacts for:
- Slowing down
- Low speed
- Stopping
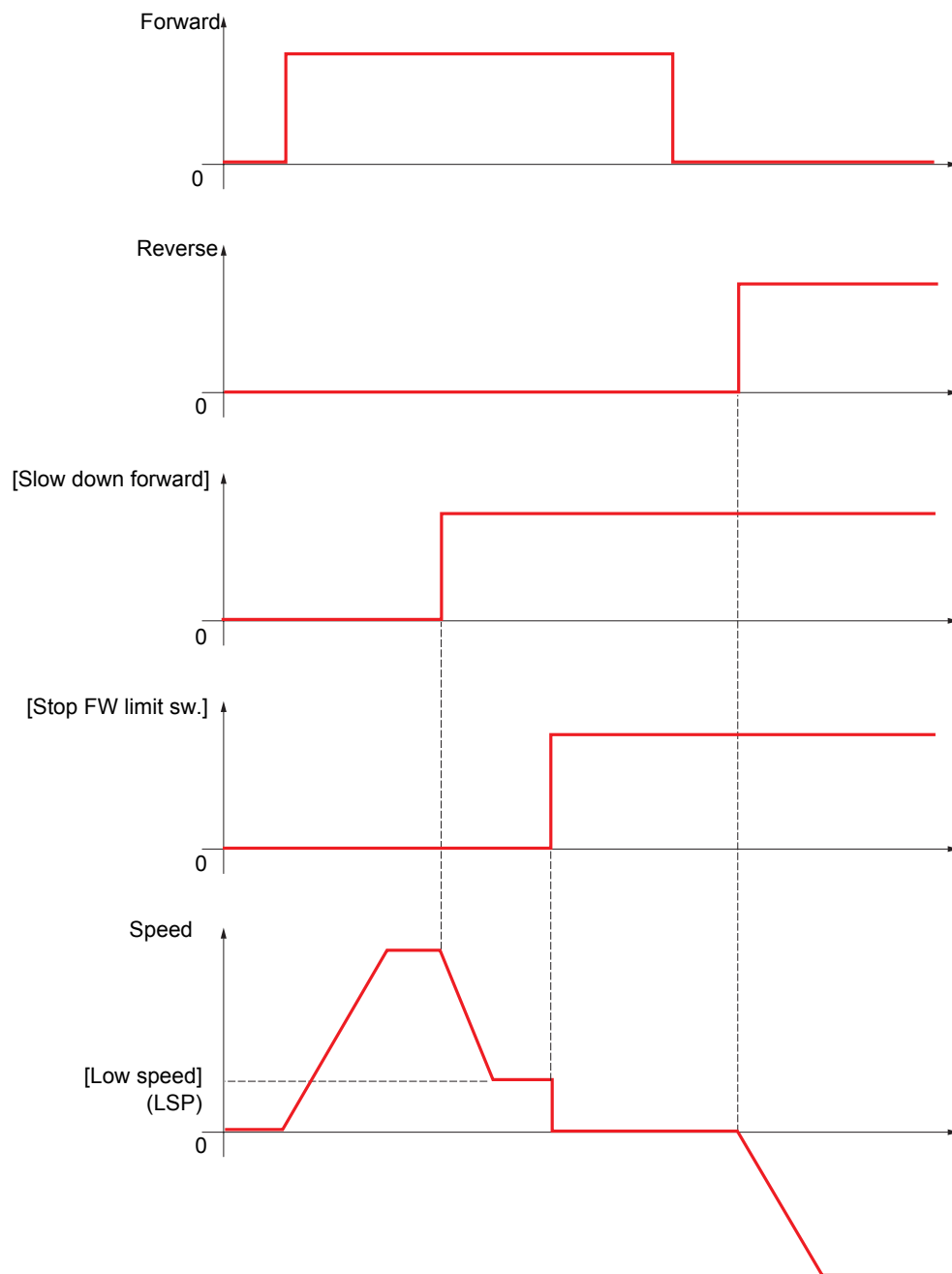


The deceleration mode and stop mode can be configured.
When the slow down contact and/or stop contact is activated, starting in the opposite direction is authorized, even at high speed.
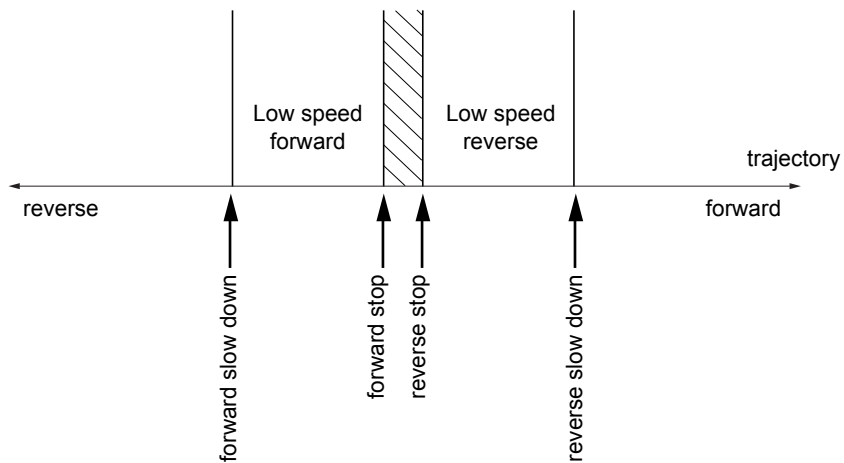
- Slowing down and stopping are activated when the state of the input is at 0 (contact open).
- A bit or logic input can be assigned to disable the function in order to restart or not stop on the position.

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

**Example 1: Positioning using limit switches**
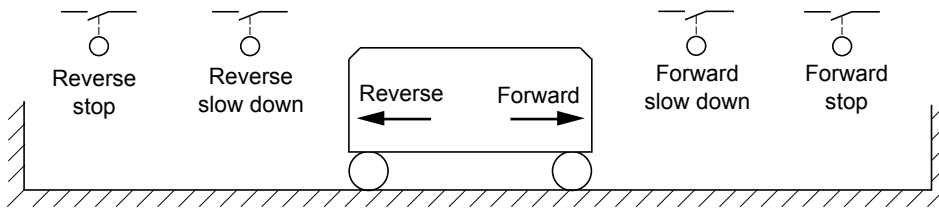


**Example 2: Positioning on a target zone**



The disable contact can be used to restart in order to cross the target.

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| **LPO-** | ■ **[POSITIONING BY SENSORS]**<br>Warning: This function cannot be used with all other functions. Observe the precautions on page <u>99</u>. | | |
| **SAF**<br><br>nO<br>LI1<br>-<br>-<br>- | ❑ **[Stop FW limit sw.]**<br><br>☐ **[No]** (nO): Not assigned<br>☐ **[LI1]** (LI1)<br> :<br> :<br> :<br>☐ **[...]** (...): See the assignment conditions on page <u>94</u>.<br>Stop in forward direction, controlled when the state of the bit or input assigned is at 0. | | **[No]** (nO) |
| **SAr**<br><br>nO<br>LI1<br>-<br>-<br>- | ❑ **[Stop RV limit sw.]**<br><br>☐ **[No]** (nO): Not assigned<br>☐ **[LI1]** (LI1)<br> :<br> :<br> :<br>☐ **[...]** (...): See the assignment conditions on page <u>94</u>.<br>Stop in reverse direction, controlled when the state of the bit or input assigned is at 0. | | **[No]** (nO) |
| **dAF**<br><br>nO<br>LI1<br>-<br>-<br>- | ❑ **[Slow down forward]**<br><br>☐ **[No]** (nO): Not assigned<br>☐ **[LI1]** (LI1)<br> :<br> :<br> :<br>☐ **[...]** (...): See the assignment conditions on page <u>94</u>.<br>Slow down in forward direction, controlled when the state of the bit or input assigned is at 0. | | **[No]** (nO) |
| **dAr**<br><br>nO<br>LI1<br>-<br>-<br>- | ❑ **[Slow down reverse]**<br><br>☐ **[No]** (nO): Not assigned<br>☐ **[LI1]** (LI1)<br> :<br> :<br> :<br>☐ **[...]** (...): See the assignment conditions on page <u>94</u>.<br>Slow down in reverse direction, controlled when the state of the bit or input assigned is at 0. | | **[No]** (nO) |
| **CLS**<br><br>nO<br>LI1<br>-<br>-<br>- | ❑ **[Disable limit sw.]**<br><br>☐ **[No]** (nO): Not assigned<br>☐ **[LI1]** (LI1)<br> :<br> :<br> :<br>☐ **[...]** (...): See the assignment conditions on page <u>94</u>.<br>If the state of the input or bit assigned is at 1, the limit switches will be deactivated. If, at this time, the drive was stopped or being slowed down via limit switches, it will restart up to its speed reference. | | **[No]** (nO) |

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| | ■ **[POSITIONING BY SENSORS]** (suite) | | |
| PAS | ❏ **[Type of stop]** | | [Ramp stop] (rMP) |
| rΠP<br>FSt<br>nSt | ☐ **[Ramp stop]** (rMP): On ramp<br>☐ **[Fast stop]** (FSt): Fast stop (ramp time reduced by [Ramp divider] (dCF), see page 107)<br>☐ **[Freewheel]** (nSt): Freewheel stop | | |
| dSF | ❏ **[Deceleration type]** | | [NO] (Std) |
| Std<br><br>OPt | ☐ **[NO]** (Std): Uses the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp (depending on which has been enabled).<br>☐ **[YES]** (OPt): The ramp time is calculated on the basis of the actual speed when the slow down contact switches, in order to limit the operating time at low speed (optimization of the cycle time: the slow down time is constant regardless of the initial speed). | | |

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

## Parameter set switching [PARAMETER SET SWITCH.]

A set of 1 to 15 parameters can be selected in the [1.3 SETTINGS] (SEt-) menu, to which 2 or 3 different values can be assigned. These 2 or 3 sets of values can 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<br>Parameter 2<br>Parameter 3<br>Parameter 4<br>Parameter 5<br>Parameter 6<br>Parameter 7<br>Parameter 8<br>Parameter 9<br>Parameter 10<br>Parameter 11<br>Parameter 12<br>Parameter 13<br>Parameter 14<br>Parameter 15 | Parameter 1<br>Parameter 2<br>Parameter 3<br>Parameter 4<br>Parameter 5<br>Parameter 6<br>Parameter 7<br>Parameter 8<br>Parameter 9<br>Parameter 10<br>Parameter 11<br>Parameter 12<br>Parameter 13<br>Parameter 14<br>Parameter 15 | Parameter 1<br>Parameter 2<br>Parameter 3<br>Parameter 4<br>Parameter 5<br>Parameter 6<br>Parameter 7<br>Parameter 8<br>Parameter 9<br>Parameter 10<br>Parameter 11<br>Parameter 12<br>Parameter 13<br>Parameter 14<br>Parameter 15 | Parameter 1<br>Parameter 2<br>Parameter 3<br>Parameter 4<br>Parameter 5<br>Parameter 6<br>Parameter 7<br>Parameter 8<br>Parameter 9<br>Parameter 10<br>Parameter 11<br>Parameter 12<br>Parameter 13<br>Parameter 14<br>Parameter 15 |
| Input LI or bit<br>2 values | 0 | 1 | 0 or 1 |
| Input LI or bit<br>3 values | 0 | 0 | 1 |

⚠️ These parameters can no longer be modified in the [1.3 SETTINGS] (SEt-) menu. Any modifications made in the [1.3 SETTINGS] (SEt-) menu will be lost the next time the power supply is disconnected. Parameter settings can be made during operation in the [PARAMETER SET SWITCH.] (MLP-) menu, in relation to the active configuration.

**Note:** Parameter set switching cannot be configured on the integrated display terminal.
Parameters can simply be adjusted on the integrated display terminal if the function has been configured in advance using the graphic display terminal, PowerSuite or serial link. If the function has not been configured, the MLP- menu and its parameters SEt1, SEt2, SEt3 will not appear.

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

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| ΠLP- | ■ **[PARAMETER SET SWITCH.]** | | |
| CHA1 | ❏ **[2 parameter sets]**<br><br>☐ **[No]**: Function inactive.<br>☐ **[LI1]**<br>:<br>:<br>:<br>☐ **[...]**: See the assignment conditions on page 94.<br>Switching 2 parameter sets | | [No] |
| CHA2 | ❏ **[3 parameter sets]**<br><br>☐ **[No]**: Function inactive.<br>☐ **[LI1]**<br>:<br>:<br>:<br>☐ **[...]**: See the assignment conditions on page 94.<br>Switching 3 parameter sets<br>**Note:** In order to obtain 3 parameter sets, [2 parameter sets] must also be configured. | | [No] |
| SPS | ❏ **[PARAMETER SELECTION]**<br><br>The parameter can be accessed if [2 parameter sets] or [3 parameter sets] is set to a value other than [No].<br>Making an entry in this parameter opens a window containing all the adjustment parameters that can be accessed.<br>With graphic display terminal: Select 1 to 15 parameters by pressing ENT or the Select button (a tick will appear after the selections) or deselect by pressing ESC.<br>Example:<br><br>RUN     Term     +35.00 Hz   80 A<br>    PARAMETER SELECTION<br>- - - - - - - - -          ✓<br>- - - - - - - - -          ☐<br>- - - - - - - - -          ☐<br>- - - - - - - - -          ✓ | | |
| SEt1 | ❏ **[SET 1]**<br><br>The parameter can be accessed if at least 1 parameter has been selected in [PARAMETER SELECTION].<br>Making an entry in this parameter opens a settings window containing the selected parameters **in the order in which they were selected**.<br>With graphic display terminal:<br><br>RDY   Term   +0.00 Hz   0 A<br>PARAMETERS 1<br>Acceleration          9.51 s<br>Deceleration:        9.67 s<br>Acceleration 2:     12.58 s<br>Deceleration 2:     13.45 s<br>Begin Acc round 1:   2.3 s<br>   Code            Quick<br><br>ENT →<br><br>RDY   Term   +0.00 Hz   0 A<br>    ACCELERATION<br><br>    9.51 s<br><br>Min = 0.01 Max = 9999<br>   <<      >>      Quick<br><br>With integrated display terminal:<br>Proceed as in the settings menu using the parameters that appear. | | |

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| | ■ **[PARAMETER SET SWITCH.]** (continued) | | |
| SEt2 | ❏ **[SET 2]**<br><br>The parameter can be accessed if at least 1 parameter has been selected in [PARAMETER SELECTION]. Procedure identical to [SET 1] (SEt1). | | |
| SEt3 | ❏ **[SET 3]**<br><br>The parameter can be accessed if [3 parameter sets] is set to a value other than [No] and if at least 1 parameter has been selected in [PARAMETER SELECTION]. Procedure identical to [SET 1] (SEt1). | | |

⚠ **We recommend that a parameter set switching test is carried out on stopping and a check is made to ensure that it has been performed correctly. Some parameters are actually interdependent and in this case may be written at the time of switching.**

**Interdependencies between parameters must be respected, <u>even between different sets</u>.**

**Example: All [Low speed] (LSP) settings must be lower than all [High speed] (HSP) settings.**

# [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 188.
Each of these configurations can be activated remotely, supporting adaptation to:
- 2 or 3 different motors or mechanical systems (multimotor mode)
- 2 or 3 different configurations for a single motor (multiconfiguration mode)

The two switching modes cannot be combined.
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 associated power and control terminals must also be switched as appropriate.
    - The maximum power of the drive must not be exceeded by any of the motors.

## 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 CONF.] ( ). 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 multimotor mode, with the exception of the motor parameters in the [1.4 MOTOR CONTROL] (drC-) menu, which are common to three configurations:
- Rated current
- Thermal current
- Rated voltage
- Rated frequency
- Rated speed
- Rated power
- IR compensation
- Slip compensation
- Type of thermal protection
- Thermal state
- Auto-tuning parameters

## Note:

**No other menus or parameters can be switched.**

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

## 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<br>2 motors or configurations | LI<br>3 motors or configurations | Number of configuration<br>or active motor |
|:---:|:---:|:---:|
| 0 | 0 | 1 |
| 1 | 0 | 2 |
| 0 | 1 | 3 |
| 1 | 1 | 3 |

**Schematic diagram for multimotor mode**
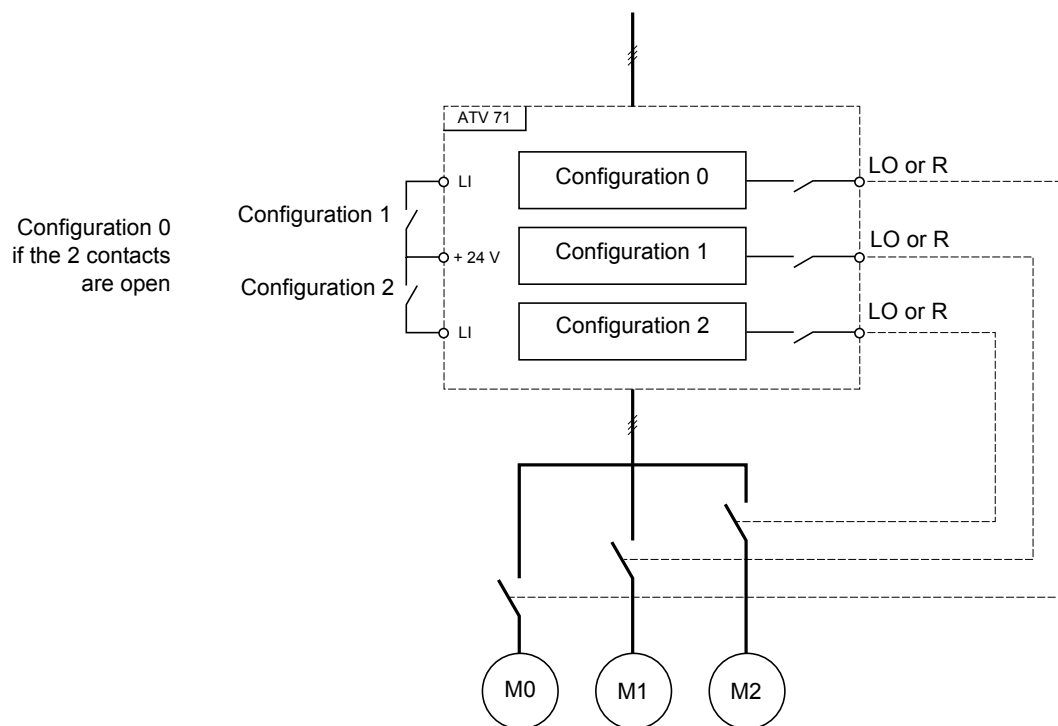


## Auto-tuning in multimotor mode

This auto-tuning can be performed:
- Manually using a logic input when the motor changes
- Automatically each time the motor is activated for the 1$^{st}$ time following drive power up, if the [Auto tuning] (tUn) parameter = [Power on] (POn).

### 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.

## Output of configuration information

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.

**Warning:**
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 |
|------|------------------|------------------|-----------------|
| MMC | ■ **[MULTIMOTORS/CONF.]** | | |
| CHM<br><br>nO<br>YES | ❏ **[Multimotors]**<br><br>☐ **[No]** (nO): Multiconfigurations possible<br>☐ **[Yes]** (YES): Multimotors possible | | [No] (nO) |
| CnF1<br><br>nO<br>LI1<br>-<br>-<br>- | ❏ **[2 configurations]**<br><br>☐ **[No]** (nO): No switching.<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>Switching of 2 motors or 2 configurations | | [No] (nO) |
| CnF2<br><br>nO<br>LI1<br>-<br>-<br>- | ❏ **[3 configurations]**<br><br>☐ **[No]** (nO): No switching<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>Switching of 3 motors or 3 configurations<br><br>**Note:** In order to obtain 3 motors or 3 configurations, [2 configurations] (CnF1) must also be configured. | | [No] (nO) |
| tnL-<br><br> | ■ **[AUTO TUNING BY LI]** | | |
| tnL<br><br>nO<br>LI1<br>-<br>-<br>- | ❏ **[Auto tuning assign.]**<br><br>☐ **[No]** (nO): Not assigned<br>☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>Auto-tuning is performed when the state of the input or bit assigned changes to 1.<br><br>⚠ Auto-tuning will cause the motor to start up. | | [No] (nO) |

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

## Traverse control

Function for winding spools of thread (in textile applications)
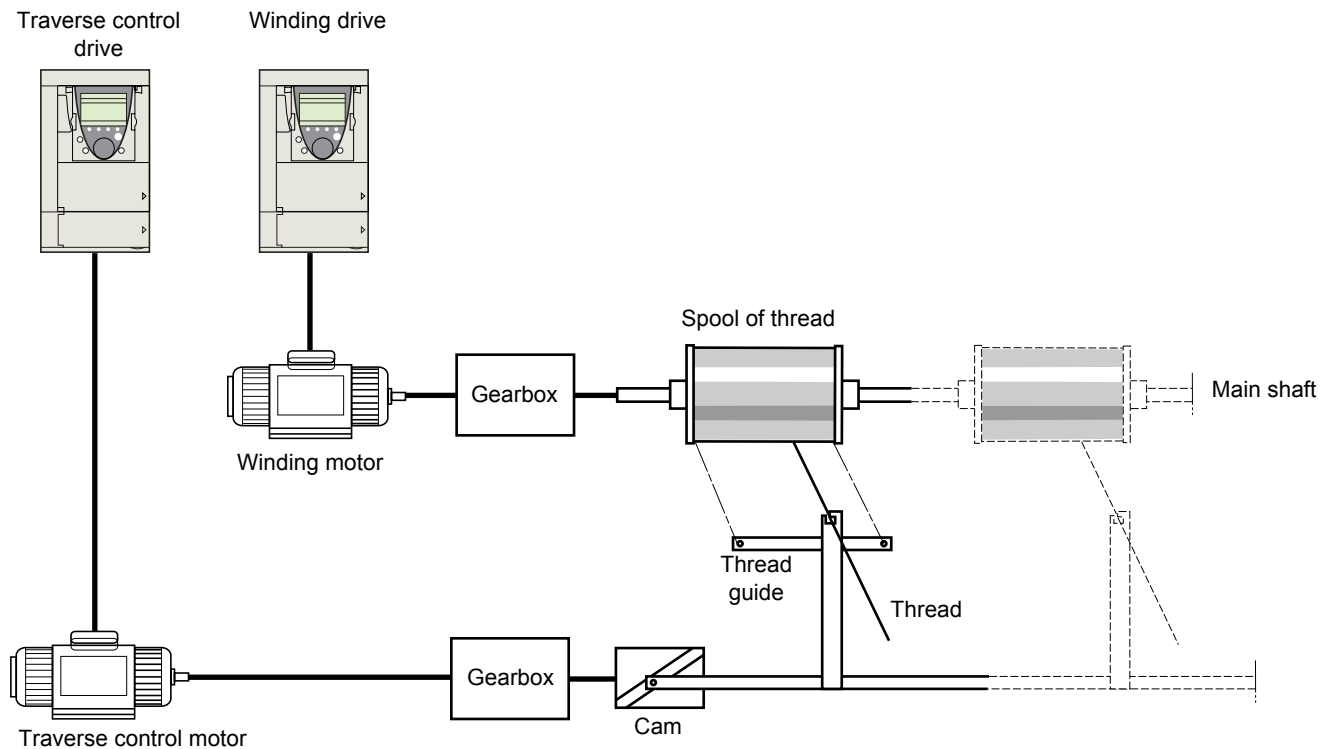
The cam speed of rotation must follow a precise profile to ensure that the spool is steady, compact and linear:
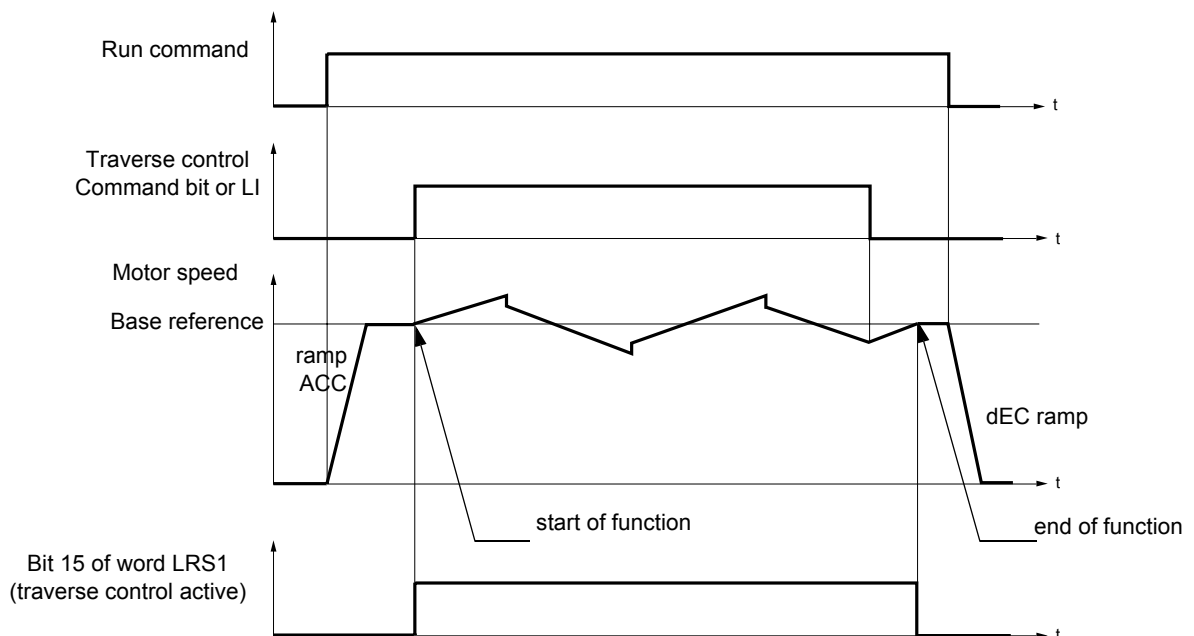


When the function is configured ([Yarn control] (trC) is set to a value other than [No] (nO)), the ramp type is forced to linear.

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.

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

**Function parameters:**

They define the cycle of frequency variations around the base reference, as shown in the figure below:
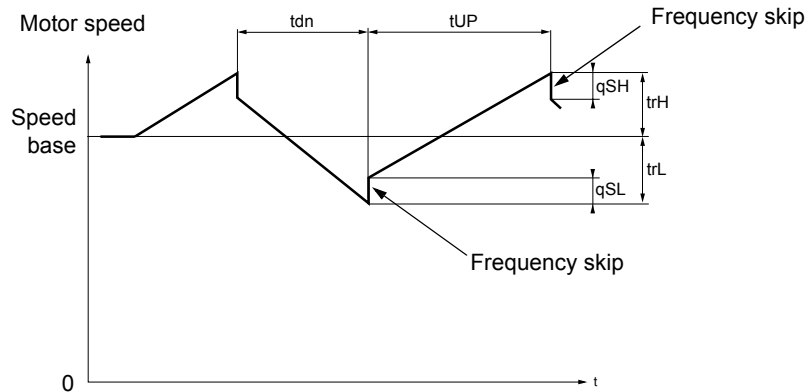


- trC: [Yarn control]: Assignment of the traverse control command to a logic input or to a communication bus control word bit
- tdn: [decel. traverse control] time, in seconds
- tUP: [accel. traverse control] time, in seconds
- trH: [traverse high], in Hertz
- trL: [traverse low], in Hertz
- qSH: [Quick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

**Spool parameters:**

- tbO: [Spool time]: Time taken to make a spool, 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 Display menu.

- dtF: [Ref. delta]: Decrease in the base reference.
  In certain cases, it is necessary to reduce the base reference as and when the spool increases in size. The value dtF corresponds to the 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 anything but 0, the traverse control function continues to operate above LSP.
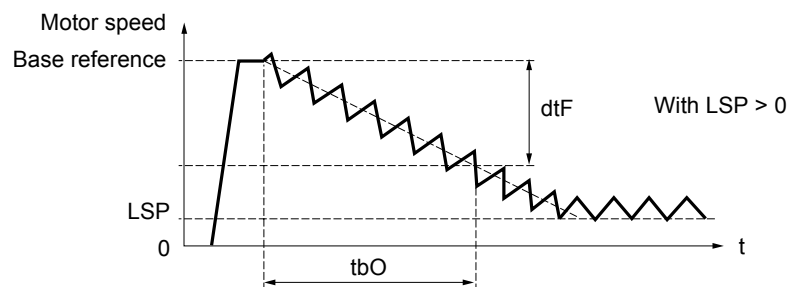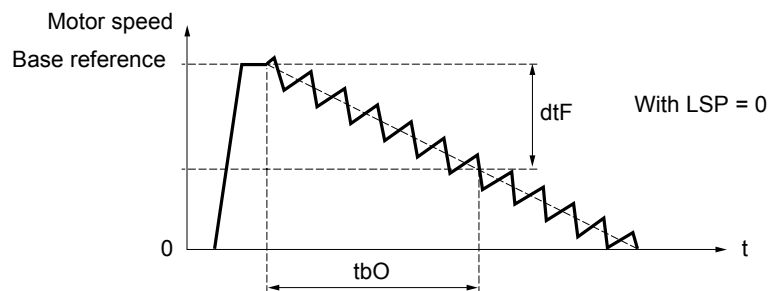
# [1.7 - APPLICATION FUNCT.] (FUn-)

- rtr: [Init traverse control]: 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 inhibited and the speed remains the same as the base reference.
This command is mainly used when changing spools.



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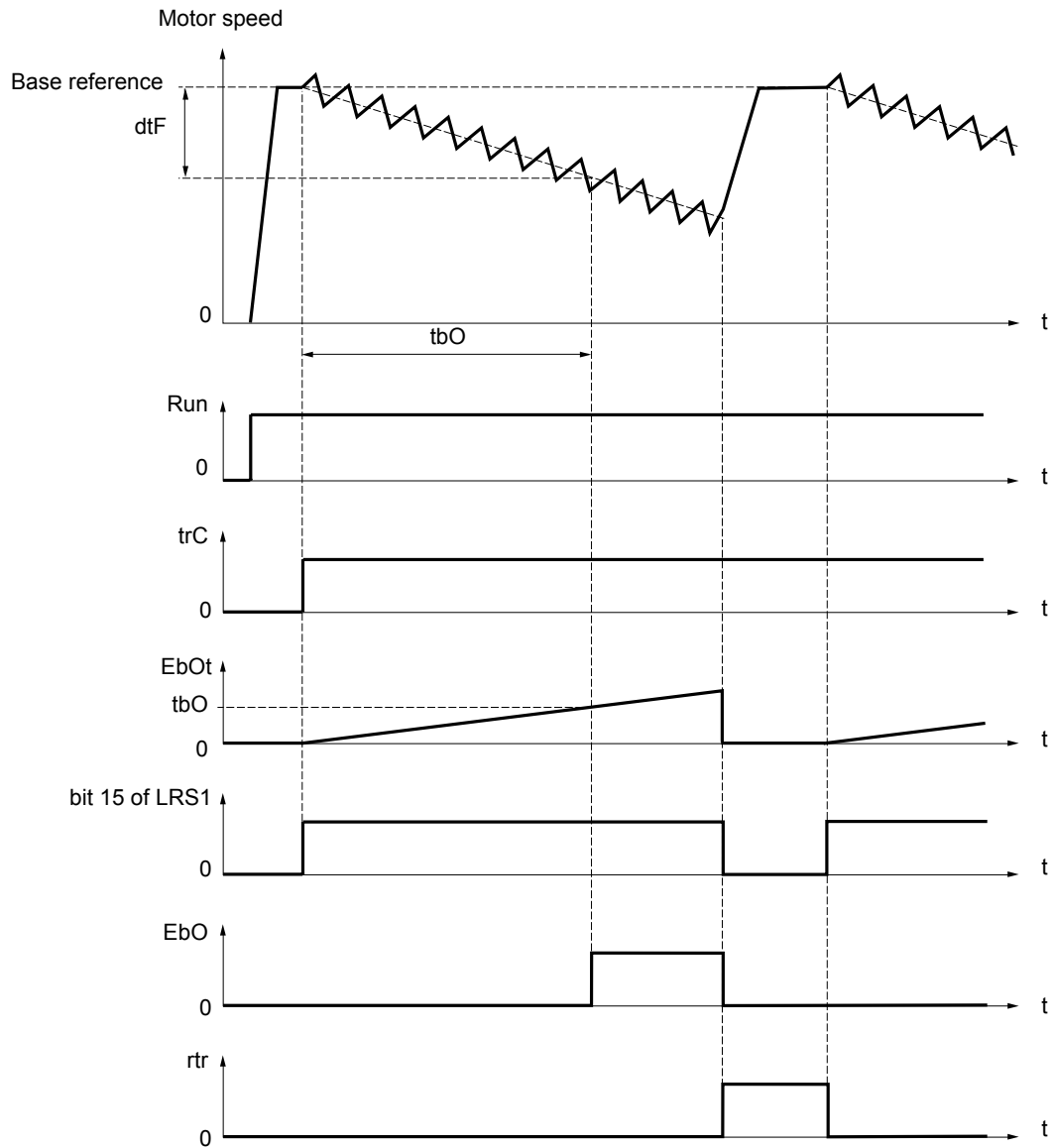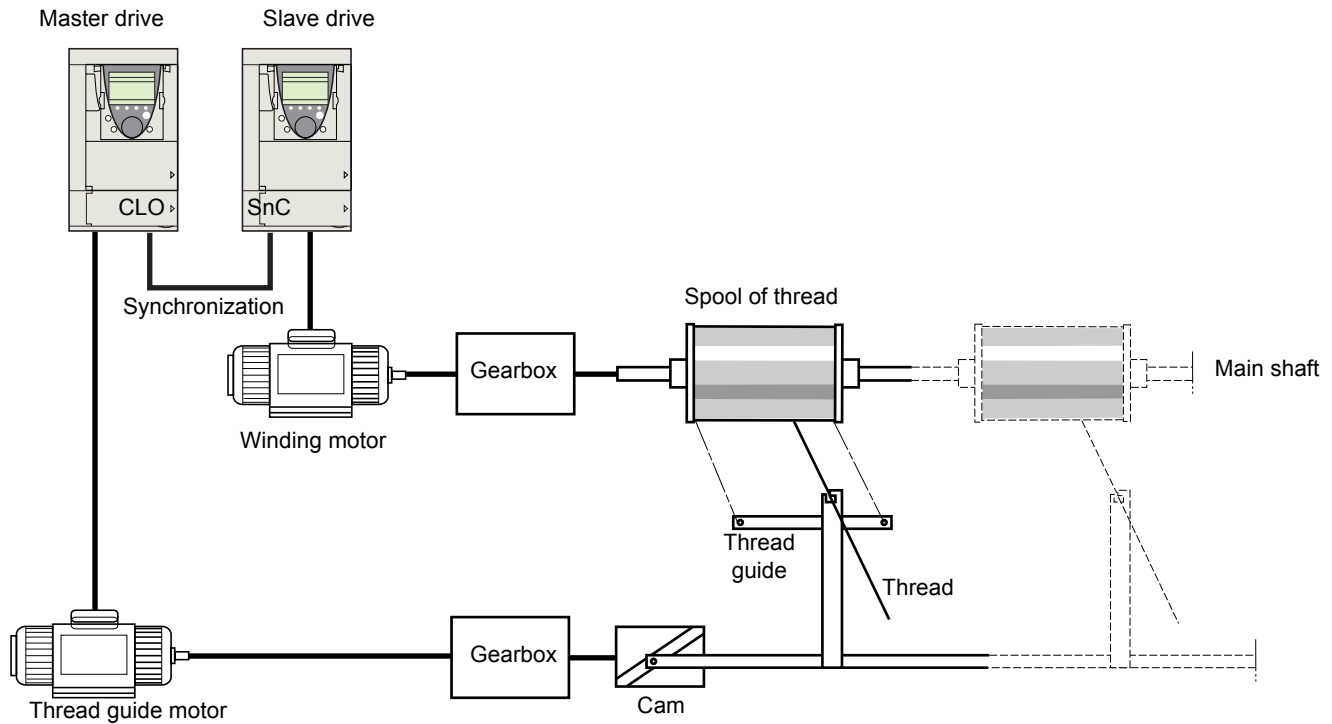
## Counter wobble

The "Counter wobble" function is used, in certain applications, to obtain a constant thread tension when the Traverse control function causes significant variations in speed on the thread guide motor (trH and trL see page 168).

**Two special "Traverse control" drives must be used (a master and a slave).**

The master controls the speed of the thread guide, the slave controls the winding speed. The function gives the slave a speed ratio in anti-phase with that of the master. A synchronization operation is therefore necessary, using a master logic output and a slave logic input.
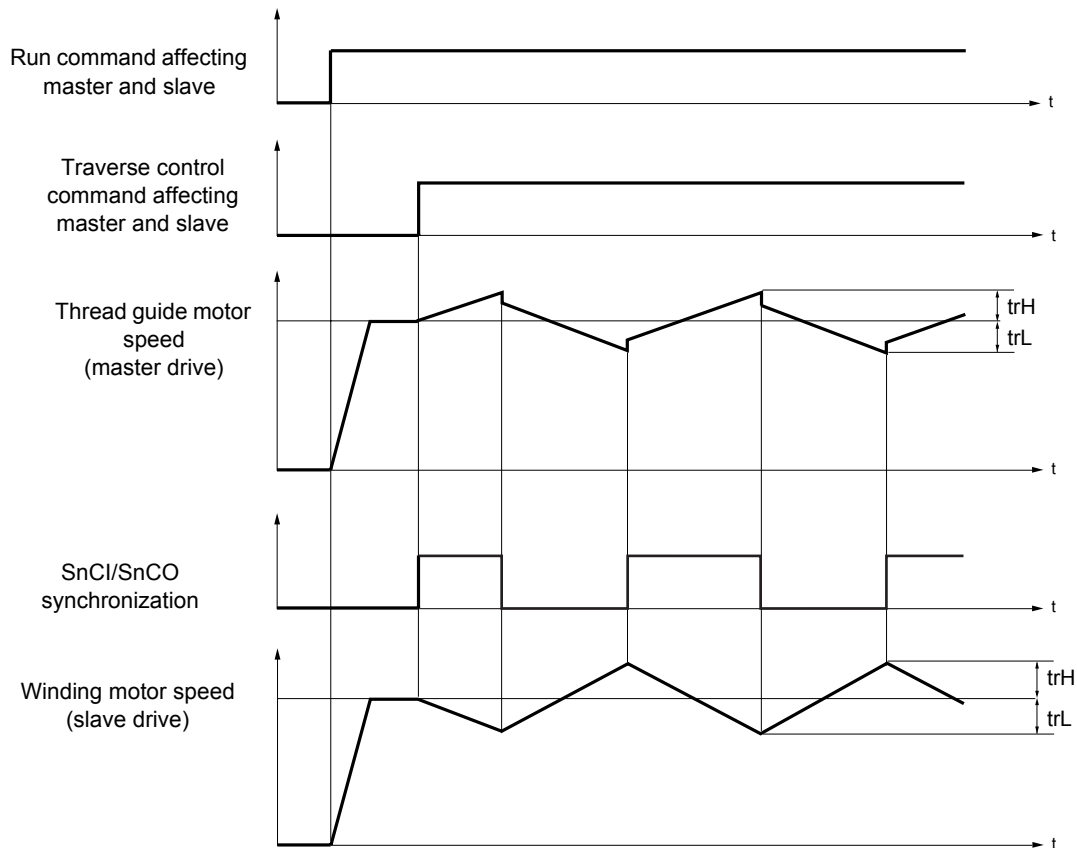
# [1.7 - APPLICATION FUNCT.] (FUn-)

## Connecting the synchronization I/O

Master drive

ATV 71

(SnCO) LO●

COM

Slave drive

ATV 71

LI● (SnCI)

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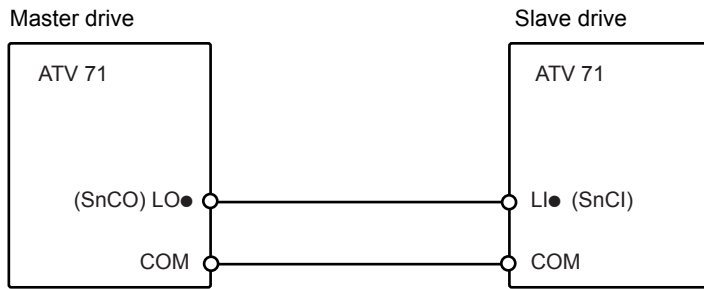
The starting conditions for the function are:
- Base speeds of both drives reached
- [Yarn control] (trC) input activated
- Synchronization signal present

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

**Textiles**

| Code | Name/Description | | Adjustment range | Factory setting |
|------|------------------|---|------------------|-----------------|
| trC- | ■ **[TRAVERSE CONTROL]**<br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | | |
| trC<br>nO<br>LI1<br>-<br>-<br>- | ❑ **[Yarn control]**<br><br>❑ **[No]** (nO): Function inactive, thereby preventing access to other parameters.<br>❑ **[LI1]** (LI1)<br>⋮<br>⋮<br>❑ **[...]** (...): See the assignment conditions on page 94.<br>The "traverse control" cycle starts when the state of the input or bit assigned changes to 1 and stops when it changes to 0. | | | [No] (nO) |
| trH | ❑ **[Traverse high]** | (1) | 0 to 10 Hz | 4 Hz |
| trL | ❑ **[Traverse low]** | (1) | 0 to 10 Hz | 4 Hz |
| qSH | ❑ **[Quick step High]** | (1) | 0 to [Traverse high] (trH) | 0 Hz |
| qSL | ❑ **[Quick step Low]** | (1) | 0 to [Traverse low] (trL) | 0 Hz |
| tUP | ❑ **[Accel. traverse control]** | (1) | 0.1 to 999.9 s | 4 s |
| tdn | ❑ **[Decel. traverse control]** | (1) | 0.1 to 999.9 s | 4 s |
| tbO | ❑ **[Spool time]**<br><br>Spool execution time | (1) | 0 to 9999 minutes | 0 s |
| EbO<br>nO<br>LO1<br>-<br>LO4<br>r1<br>-<br>r4 | ❑ **[Spool end]**<br><br>❑ **[No]** (nO): Function not assigned.<br>❑ **[LO1]** (LO1)<br>to<br>**[LO4]** (LO4): Logic output (if an extension card has been inserted, LO1 to LO2 or LO4 can be selected).<br>❑ **[R1]** (r1)<br>to<br>❑ **[R4]** (r4): Relay (selection extended from R1 to R2 to include R3 or R4 if an extension card has been inserted).<br>The output or relay assigned changes to state 1 when the traverse control operating time reaches the [Spool time] (tbO). | | | [No] (nO) |
| dtF | ❑ **[Ref. delta]**<br><br>Decrease in the base reference during the traverse control cycle. | (1) | 0 to 1000 Hz | 0 |
| rtr<br>nO<br>LI1<br>-<br>-<br>- | ❑ **[Init traverse control]**<br><br>❑ **[No]** (nO): Function not assigned.<br>❑ **[LI1]** (LI1)<br>⋮<br>⋮<br>❑ **[...]** (...): See the assignment conditions on page 94.<br>When the state of the input or bit assigned changes to 1, the traverse control operating time is reset to zero, along with the [Ref. delta] (dtF). | | | [No] (nO) |

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

**Textiles**

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| | ■ **[TRAVERSE CONTROL]** (continued) | | |
| SnC1<br>nO<br>LI1<br>-<br>-<br>- | ❏ **[Counter wobble]**<br>  ☐ **[No]** (nO): Function not assigned.<br>  ☐ **[LI1]** (LI1)<br>    :<br>    :<br>  ☐ **[...]** (...): See the assignment conditions on page 94.<br>  To be configured on the winding drive (slave) only. | | [No] (nO) |
| SnCO<br>nO<br>LO1<br>-<br>LO4<br>r1<br>-<br>r4 | ❏ **[Sync. wobble]**<br>  ☐ **[No]** (nO): Function not assigned.<br>  ☐ **[LO1]** (LO1)<br>    to<br>    **[LO4]** (LO4): Logic output (if an extension card has been inserted, LO1 to LO2 or LO4 can be selected).<br>  ☐ **[R1]** (r1)<br>    to<br>  ☐ **[R4]** (r4): Relay (selection extended from R1 to R2 to include R3 or R4 if an extension card has been inserted).<br>  The output or relay assigned changes to state 1 when the traverse control operating time reaches the [Spool time] (tbO).<br>  To be configured on the thread guide drive (master) only. | | [No] (nO) |

*Textiles*

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| OIr- | ■ **[CMD SWITCHING]** | | |
| OIr | ❏ **[Cmd switching]** | | [No] (nO) |
| nO YES | ☐ **[No]** (nO) : Operation with non-reversible unit<br>☐ **[Yes]** (YES) : Operation with reversible unit | | |
| LI1<br>-<br>-<br>- | ☐ **[LI1]** (LI1)<br>⋮<br>⋮<br>☐ **[...]** (...): See the assignment conditions on page 94.<br><br>If the state of the input or bit assigned is at 0, operation is with a non-reversible unit.<br>If the state of the input or bit assigned is at 1, operation is with a reversible unit. | | |

# [1.8 - FAULT MANAGEMENT] (FLt-)

## PTC probes

3 sets of PTC probes can be managed by the drive in order to protect the motors:

- 1 on logic input LI6 transformed for this application with an "LI6" switch on the control card.
- 1 on each of the 2 option cards

Each of these two 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<br><br>nO | ❏ **[LI6 = PTC probe]**<br><br>Can be accessed if the LI6 switch on the control card is set to PTC.<br>☐ **[No]** (nO): Not used<br>☐ **[Always]** (xx): "PTC probe" faults are monitored permanently, even if the power supply is not connected.<br>☐ **[Power on]** (xx): "PTC probe" faults are monitored when the drive power supply is connected.<br>☐ **[At mot. run]** (xx): "PTC probe" faults are monitored when the motor power supply is connected. | | [No] (nO) |
| PtC1<br><br>nO | ❏ **[PTC1 probe]**<br><br>Can be accessed if an option card has been inserted<br>☐ **[No]** (nO): Not used<br>☐ **[Always]** (xx): "PTC probe" faults are monitored permanently, even if the power supply is not connected.<br>☐ **[Power on]** (xx): "PTC probe" faults are monitored when the drive power supply is connected.<br>☐ **[At mot. run]** (xx): "PTC probe" faults are monitored when the motor power supply is connected. | | [No] (nO) |
| PtC2<br><br>nO | ❏ **[PTC2 probe]**<br><br>Can be accessed if an option card has been inserted<br>☐ **[No]** (nO): Not used<br>☐ **[Always]** (xx): "PTC probe" faults are monitored permanently, even if the power supply is not connected.<br>☐ **[Power on]** (xx): "PTC probe" faults are monitored when the drive power supply is connected.<br>☐ **[At mot. run]** (xx): "PTC probe" faults are monitored when the motor power supply is connected. | | [No] (nO) |
| rSt- | ■ **[FAULT RESET]** | | |
| rSF<br><br>nO<br>LI1<br>-<br>-<br>- | ❏ **[Fault reset]**<br><br>Manual fault reset<br>☐ **[No]** (nO): Function inactive.<br>☐ **[LI1]** (LI1)<br>:<br>:<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>The faults are reset when the state of the input or bit assigned changes to 1, if the cause of those faults has disappeared.<br>The STOP/RESET button on the graphic display terminal performs the same function.<br>See page xx for a list of faults that can be reset manually. | | [No] (nO) |

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| **Atr -** | ■ **[AUTOMATIC RESTART]** | | |
| **Atr**<br>**nO**<br>**YES** | ❏ **[Automatic restart]** <br> <br>  ☐ **[No]** (nO): Function inactive <br>  ☐ **[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 min for the following periods. <br> The drive fault relay remains activated if this function is active. The speed reference and the operating direction must be maintained. <br> Use 2-wire control ([2/3 wire control] (tCC) = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL), see page 65). <br> <br> ⚠ **Check that an accidental start does not endanger personnel or equipment, in any way.** <br> <br> 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 powered down then powered up. <br> The following faults permit this function: <br>  - External fault (EPF) <br>  - Loss of 4-20 mA reference (LFF) <br>  - CANopen fault (COF) <br>  - Mains overvoltage (OSF) <br>  - Input phase loss (PHF) <br>  - Output phase loss (OPF) <br>  - DC bus overvoltage (ObF) <br>  - Motor overload (OLF) <br>  - Serial link (SLF) <br>  - Drive overheating (OHF) <br>  - Communication (COF) <br>  - PTC probes (OtF) <br>  - Torque limitation (SSF) | | [No] (nO) |
| **tAr**<br>**5**<br>**10**<br>**30**<br>**1h**<br>**2h**<br>**3h**<br>**Ct** | ❏ **[max time restart]** <br> <br>  ☐ **[5 minutes]** (5): 5 minutes <br>  ☐ **[10 minutes]** (10): 10 minutes <br>  ☐ **[30 minutes]** (30): 30 minutes <br>  ☐ **[1 hour]** (1h): 1 hour <br>  ☐ **[2 hours]** (2h): 2 hours <br>  ☐ **[3 hours]** (3h): 3 hours <br>  ☐ **[Unlimited]** (Ct): Unlimited <br> This parameter appears if [Automatic restart] (Atr) = [Yes] (YES). It can be used to limit the number of consecutive restarts on a recurrent fault. | | [5 minutes] (5) |

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| FLr- | ■ **[CATCH ON THE FLY]**<br><br>Warning: This function cannot be used with all other functions. Observe the precautions on page 99. | | |
| FLr<br><br>nO<br>YES | ❏ **[Catch on the fly]**<br><br>Used to enable a smooth restart if the run command is maintained after the following events:<br>• Loss of mains supply or disconnection<br>• Reset of current fault or automatic restart<br>• Freewheel stop<br>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.<br>This function requires 2-wire level control.<br>☐ **[No]** (nO): Function inactive<br>☐ **[Yes]** (YES): Function active<br>When the function is operational, it activates at each run command, resulting in a slight delay (1 second max.).<br>[Catch on the fly] (FLr) is forced to [No] (nO) if the brake logic command [brake assignment] (bLC) is assigned (page 126). | | [No] (nO) |
| UCb | ❏ **[Sensitivity]**<br><br>The parameter can be accessed at and above 55 kW for the ATV71●●●M3X and at and above 90 kW for the ATV71●●●N4.<br>Adjusts the catch-on-the-fly sensitivity around the zero speed.<br>The parameter can be accessed if [Catch on the fly] (FLr) = [Yes] (YES). | 0.4 to 15 % | 12 % |

# [1.8 - FAULT MANAGEMENT] (FLt-)

## Motor thermal protection

### Function:

Thermal protection by calculating the $I^2t$.

⚠️ **Caution:** The memory of the motor thermal state returns to zero when the drive control is disconnected.

- 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.

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| tHt - | ■ **[MOTOR THERMAL PROT.]** | | |
| tHt<br><br>nO<br>ACL<br>FCL | ❏ **[Type Protect. Mot]**<br><br>☐ **[No]** (nO): No protection.<br>☐ **[Self cooled]** (ACL): For self-cooled motors<br>☐ **[Force-cooled]** (FCL): For force-cooled motors | | [Self cooled] (ACL) |
| ttd | ❏ **[Motor therm. level]**<br><br>Trip threshold for motor thermal alarm (logic output or relay)<br>**Note:** A fault trip will occur when the thermal state reaches 118% of the rated state and reclosing will occur when the state falls back below 100%. | 0 to 118% | 100% |
| OLL<br><br>nSt<br>LFF<br>rLS<br>rMP<br>FSt | ❏ **[Overload fault mgt]**<br><br>Type of stop in the event of a thermal motor fault<br>☐ **[Freewheel]** (nSt): Freewheel stop<br>☐ **[Fallbck spd]** (LFF): Switch to fallback speed<br>☐ **[Spd maint.]** (rLS): The drive maintains the speed at the time the fault occurred.<br>☐ **[Ramp stop]** (rMP): Stop on ramp<br>☐ **[Fast stop]** (FSt): Fast stop | | [Freewheel] (nSt) |
| OPL - | ■ **[OUTPUT PHASE LOSS]** | | |
| OPL<br><br>nO<br>YES<br>OAC | ❏ **[Output Phase Loss]**<br><br>☐ **[No]** (nO): Function inactive.<br>☐ **[Yes]** (YES): Triggering of OPF fault<br>☐ **[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 flying restart (even if this function has not been configured).<br>**Note:** [Output Phase Loss] (OPL) is forced to [Yes] (YES) if brake logic control has been configured (see page 126). | | [Yes] (YES) |
| Odt | ❏ **[OPF det. time]**<br><br>Time delay for taking into account of [Output Phase Loss] (OPL) fault | 0.5 to 10 s | 0.5 s |
| IPL - | ■ **[INPUT PHASE LOSS]** | | |
| IPL<br><br>nO<br>YES | ❏ **[Input phase loss]**<br><br>☐ **[No]** (nO): Fault ignored<br>☐ **[Yes]** (YES): Fault, with freewheel stop.<br>This configuration can only be accessed on 3-phase drives.<br>If one phase is lost, the drive will trip with an [Input phase loss] (IPL) fault. However, if 2 or 3 phases are lost, the drive will continue to operate until it trips with an undervoltage fault. | | [Yes] (YES) |

# [1.8 - FAULT MANAGEMENT] (FLt-)

## Drive thermal protection

### Functions:

Thermal protection by PTC probe fitted on the heatsink or integrated in the power module.
Indirect protection of the drive against overloads by tripping in the event of an overcurrent. Typical tripping points:

- Motor current = 185 % of rated drive current: 2 seconds
- Motor current = 150% of rated drive current: 60 seconds
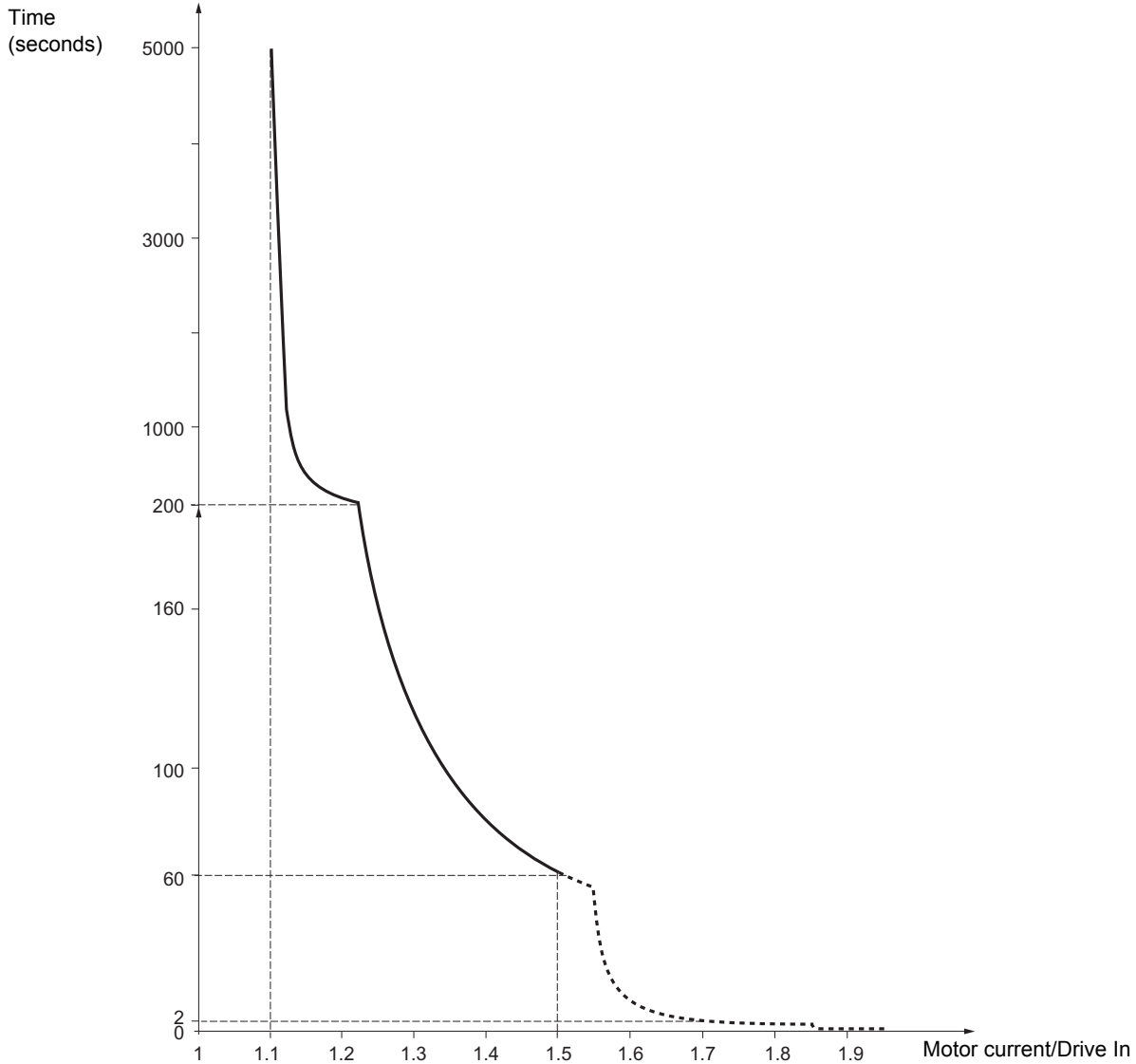


## Drive ventilation

The fan starts up when the drive is powered up then shuts down after 10 seconds if a run command has not been received.
The fan is powered automatically when the drive is unlocked (operating direction + reference). It is powered down a few seconds after the drive is locked (motor speed < 0.2 Hz and injection braking completed).

# [1.8 - FAULT MANAGEMENT] (FLt-)

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| OHL - | ■ **[DRIVE OVERHEAT]** | | |
| OHL | ❏ **[Drive overheat]** | | [Freewheel] (nSt) |
| nO nSt LFF rLS rNP FSt | Behavior in the event of the drive overheating<br>☐ **[No]** (nO): Fault ignored<br>☐ **[Freewheel]** (nSt): Freewheel stop.<br>☐ **[Fallbck spd]** (LFF): Switch to fallback speed<br>☐ **[Spd maint.]** (rLS): The drive maintains the speed at the time the fault occurred.<br>☐ **[Ramp stop]** (rMP): Stop on ramp<br>☐ **[Fast stop]** (FSt): Fast stop | | |
| tHA | ❏ **[Al. °C ATV]** | 0 to 118% | 100% |
| | Trip threshold for drive thermal alarm (logic output or relay)<br>**Note:** A fault trip will occur when the thermal state reaches 118% of the rated state and reclosing will occur when the state falls back below x%. | | |
| EtF - | ■ **[EXTERNAL FAULT]** | | |
| EtF | ❏ **[Ext. fault assign.]** | | [No] (nO) |
| nO LI1 - - - | ☐ **[No]** (nO): Function inactive.<br>☐ **[LI1]** (LI1)<br>:<br>:<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>No external fault if the state of the input or bit assigned is at 0.<br>External fault if the state of the input or bit assigned is at 1. | | |
| EPL | ❏ **[External fault mgt]** | | [Freewheel] (nSt) |
| nSt LFF rLS rNP FSt | Type of stop in the event of an external fault<br>☐ **[Freewheel]** (nSt): Freewheel stop.<br>☐ **[Fallbck spd]** (LFF): Switch to fallback speed<br>☐ **[Spd maint.]** (rLS): The drive maintains the speed at the time the fault occurred.<br>☐ **[Ramp stop]** (rMP): Stop on ramp<br>☐ **[Fast stop]** (FSt): Fast stop | | |

# [1.8 - FAULT MANAGEMENT] (FLt-)

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| USb- | ■ **[UNDERVOLTAGE (USF)]** | | | |
| USb<br><br>0<br>1<br>2 | ❏ **[Undervoltage mgt]**<br><br>Behavior of the drive in the event of an undervoltage<br>☐ **[Flt&R1open]** (0): Fault and fault relay open.<br>☐ **[Flt&R1close]** (1): Fault and fault relay closed.<br>☐ **[Alarm]** (2): Alarm and fault relay remains closed. The alarm may be assigned to a logic output or a relay. | | | [Flt&R1open] (0) |
| USL | ❏ **[Undervoltage level]**<br><br>• Setting for the level at which the undervoltage fault will be tripped | ATV71●●●M3 | nn to nn V | nn V |
| | | ATV71●●●M4 | nn to nn V | nn V |
| | | ATV71●●●S6x | nn to nn V | nn V |
| USt | ❏ **[Undervolt. time out]**<br><br>Time delay for taking into account of undervoltage fault | | 0.00 s to 10.00 s | 0.20 s |
| StP<br><br>nO<br><br>MMS<br><br>rMP | ❏ **[UnderV. prevention]**<br><br>Behavior in the event of the undervoltage fault prevention level being reached<br>☐ **[No]** (nO): No action<br>☐ **[Lock]** (xx): Lock (freewheel stop) without fault<br>☐ **[DC maintain]** (MMS): This stop mode uses the inertia to maintain the DC bus voltage as long as possible.<br>☐ **[Ramp stop]** (rMP): Stop following an adjustable ramp time [Max stop time] (StM). | | | [No] (nO) |
| UPL | ❏ **[Prev. level]**<br><br>Setting for undervoltage fault prevention level, if [UnderV. prevention] (StP) is set to a value other than [No] (nO). | ATV71●●●M3 | nn to nn V | nn V |
| | | ATV71●●●M4 | nn to nn V | nn V |
| | | ATV71●●●S6x | nn to nn V | nn V |
| StM | ❏ **[Max stop time]**<br><br>Ramp time if [UnderV. prevention] (StP) = [Ramp stop] (rMP). | | 0 to 655.35 s | 0.00 s |
| tbS | ❏ **[DC bus maintain tm]**<br><br>Ramp time if [UnderV. prevention] (StP) = [DC maintain] (MMS). | | 0 to 655.35 s | 0.00 s |
| tIt- | ■ **[IGBT TESTS]** | | | |
| Strt<br><br>nO<br>YES | ❏ **[IGBT tests]**<br><br>☐ **[No]** (nO): No test<br>☐ **[Yes]** (YES): The IGBTs are tested on power up and every time a run command is sent. These tests cause a slight delay (approx. ?? ms). In the event of a fault, the drive will lock. The following faults can be detected:<br>  - Drive output short-circuit (terminals U-V-W): SCF display<br>  - IGBT faulty: xtF, where x indicates the number of the IGBT concerned<br>  - IGBT short-circuited: x2F, where x indicates the number of the IGBT concerned | | | [No] (nO) |

# [1.8 - FAULT MANAGEMENT] (FLt-)

| Code | Name/Description | Adjustment range | Factory setting |
|------|------------------|------------------|-----------------|
| **LFL -** | ■ **[4-20mA LOSS]** | | |
| **LFL** **nO** | ❏ **[4-20mA loss]**<br>☐ **[No]** (nO): Fault ignored. This configuration is the only one possible if none of the [AI- min. value] (CrL.) values are greater than 3 mA.<br>☐ **[Flt and stop]** (xx): Lock on 4-20 mA loss and stop<br>☐ **[Stop]** (xx): Stop on fault without lock | | [No] (nO) |
| **- - -** **nSt** **LFF** **rMP** **FSt** | ❏ **[Stop 4-20 mA loss]**<br><br>Stop mode in the event of a [4-20 loss] (LFL) fault<br>☐ **[Freewheel]** (nSt): Freewheel stop<br>☐ **[Fallbck spd]** (LFF): Switch to fallback speed<br>☐ **[Ramp stop]** (rMP): Stop on ramp<br>☐ **[Fast stop]** (FSt): Fast stop | | [Freewheel] (nSt) |
| **InH -** | ■ **[FAULT INHIBITION]** | | |
| **InH** **nO** **LI1** **-** **-** **-** | ❏ **[Fault inhibit assign.]**<br><br>⚠ **Inhibiting faults may damage the drive beyond repair. This would invalidate the guarantee.**<br><br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>:<br>:<br>☐ **[...]** (...): See the assignment conditions on page 94.<br>If the state of the input or bit assigned is at 0, fault monitoring is active. If the state of the input or bit assigned is at 1, fault monitoring is inactive. All active faults are reset on a rising edge (from 0 to 1) of the input or bit assigned.<br>**Note:** This function cannot be used to clear the "Power Removal" fault. | | [No] (nO) |

# [1.8 - FAULT MANAGEMENT] (FLt-)

| Code | Name/Description | Adjustment range | Factory setting |
|------|-----------------|------------------|-----------------|
| COF - | ■ **[COM. FAULT MANAGEMENT]** | | |
| CLL | ❏ **[Network fault mgt]** | | [No] (nO) |
| nO<br>nSt<br>LFF<br>rLS<br>rMP<br>FSt | Behavior of the drive in the event of a communication fault on a communication card<br>☐ **[No]** (nO): No stop<br>☐ **[Freewheel]** (nSt): Freewheel stop<br>☐ **[Fallbck spd]** (LFF): Switch to fallback speed<br>☐ **[Spd maint.]** (rLS): The drive maintains the speed at the time the fault occurred.<br>☐ **[Ramp stop]** (rMP): Stop on ramp<br>☐ **[Fast stop]** (FSt): Fast stop | | |
| COL | ❏ **[CANopen fault mgt]** | | [No] (nO) |
| nO<br>nSt<br>LFF<br>rLS<br>rMP<br>FSt | Behavior of the drive in the event of a communication fault with CANopen<br>☐ **[No]** (nO): No stop<br>☐ **[Freewheel]** (nSt): Freewheel stop<br>☐ **[Fallbck spd]** (LFF): Switch to fallback speed<br>☐ **[Spd maint.]** (rLS): The drive maintains the speed at the time the fault occurred.<br>☐ **[Ramp stop]** (rMP): Stop on ramp<br>☐ **[Fast stop]** (FSt): Fast stop | | |
| ttO | ❏ **[Modbus time out]**<br><br>Configuration time out | 0.1 to 10.0 s | 10.0 s |
| SLL | ❏ **[Modbus fault mgt]** | | [No] (nO) |
| nO<br>nSt<br>LFF<br>rLS<br>rMP<br>FSt | Behavior of the drive in the event of a communication fault with Modbus<br>☐ **[No]** (nO): No stop<br>☐ **[Freewheel]** (nSt): Freewheel stop<br>☐ **[Fallbck spd]** (LFF): Switch to fallback speed<br>☐ **[Spd maint.]** (rLS): The drive maintains the speed at the time the fault occurred.<br>☐ **[Ramp stop]** (rMP): Stop on ramp<br>☐ **[Fast stop]** (FSt): Fast stop | | |

# [1.8 - FAULT MANAGEMENT] (FLt-)

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| **5dd -** | ■ **[ENCODER FAULT]**<br>Can be accessed if the option card has been inserted and the encoder is used for speed feedback (see page xx). | | |
| **5dd**<br>**no**<br>**YES** | ❏ **[Load slip. detect.]**<br><br>☐ **[No]** (nO): Fault not monitored. Only the alarm may be assigned to a logic output or a relay.<br>☐ **[Yes]** (YES): Fault monitored.<br>The fault is triggered by comparison with the ramp output and speed feedback and is only effective for speeds greater than 10% of the [High speed] (HSP), see page xx.<br>In the event of a fault, the drive switches to freewheel stop and if the brake logic control function has been configured, the brake control is set to 0. | | [Yes] (YES) |
| **ECC**<br>**nO**<br>**YES** | ❏ **[Encoder coupling]**<br><br>☐ **[No]** (nO): Fault not monitored. Only the alarm may be assigned to a logic output or a relay.<br>☐ **[Yes]** (YES): Fault monitored.<br>If the brake logic control function has been configured, the factory setting changes to [Yes] (YES).<br>The fault monitored is the break in the mechanical encoder coupling.<br>In the event of a fault, the drive switches to freewheel stop and if the brake logic control function has been configured, the brake control is set to 0. | | [No] (nO) |
| **ECt** | **[Encoder check time]**<br><br>Encoder faults filtering time | | |
| **tld -** | ■ **[TORQUE OR I LIM. DETECT.]** | | |
| **SSA**<br>**nO** | ❏ **[Torque or I lim. detect.]**<br><br>Behavior in the event of switching to torque or current limitation<br>☐ **[No]** (nO): Fault ignored<br>☐ **[Alarm]** (xx): Alarm. The alarm may be assigned to a logic output or a relay (see page 77).<br>☐ **[Fault]** (xx): Switch to "Limitation" fault (SSF) | | [No] (nO) |
| **StO** | ❏ **[Trq/I limit. time out]**<br><br>(If fault has been configured.)<br>Time delay for taking into account of SSF "Limitation" fault | 0.00 s to 10.00 s | 00.0 s |
| **SSb**<br>**nSt**<br>**rMP**<br>**FSt** | ❏ **[Trq/I limit. stop]**<br><br>(If fault has been configured.)<br>☐ **[Freewheel]** (nSt): Freewheel stop<br>☐ **[Ramp stop]** (rMP): Stop on ramp<br>☐ **[Fast stop]** (FSt): Fast stop | | [Freewheel] (nSt) |

# [1.8 - FAULT MANAGEMENT] (FLt-)

| Code | Name/Description | | Adjustment range | Factory setting |
|---|---|---|---|---|
| brO- | ■ **[DB RES. PROTECTION]** Function can be accessed for drives 75 kW and higher only. | | | |
| brO nO | ❏ **[DB res. protection]** ☐ **[No]** (nO): No braking resistor protection (thereby preventing access to the other function parameters). ☐ **[Lock]** (xx): Switch to fault (bOF) with locking of drive (freewheel stop). ☐ **[Alarm]** (xx): Alarm. The alarm may be assigned to a logic output or a relay (see page 77). Braking time in seconds **Note:** The thermal state of the resistor can be shown on the graphic display terminal. It is calculated for as long as the drive control remains connected to the power supply. | | | [No] (nO) |
| brP | ❏ **[DB Resistor Power]** Rated power of the resistor used | | 1 kW to 1000 kW | 1 kW |
| brU | ❏ **[DB Resistor value]** Rated value of the braking resistor in ohms | | 0.1 to 200 ohms | 0.1 ohms |
| LFF- | ■ **[FALLBACK SPEED]** Can be accessed if the fallback speed has been selected as a response to a fault. | | | |
| LFF | ❏ **[Fallback speed]** • Can be set between [Low speed] (LSP) and [High speed] (HSP), see page xx. | | | 0 |
| dCF- | ■ **[RAMP DIVIDER]** | | | |
| dCF | ❏ **[Ramp divider]** The parameter can be accessed if a fast stop has been selected as a type of fault stop. The ramp enabled (dEC or dE2) is then divided by this coefficient when stop requests are sent. The value 0 corresponds to the minimum ramp time. | | 0 to 10 | 4 |

# [1.9 - COMMUNICATION] (COM-)

```
RUN     Term    +50.00 Hz   1250 A
          1.9 COMMUNICATION
COM. SCANNER INPUT
COM. SCANNER OUTPUT
MODBUS HMI
MODBUS NETWORK
CANopen
   Code      <<       >>     Quick
FORCED TO LOCAL
```

# [1.9 - COMMUNICATION] (COM-)

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| - ICS | ■ **[COM. SCANNER INPUT]** | | |
| nMA1 | ❑ **[Scan. IN1 address]**<br>Address of the 1st input word | | |
| nMA2 | ❑ **[Scan. IN2 address]**<br>Address of the 2nd input word | | |
| nMA3 | ❑ **[Scan. IN3 address]**<br>Address of the 3rd input word | | |
| nMA4 | ❑ **[Scan. IN4 address]**<br>Address of the 4th input word | | |
| nMA5 | ❑ **[Scan. IN5 address]**<br>Address of the 5th input word | | |
| nMA6 | ❑ **[Scan. IN6 address]**<br>Address of the 6th input word | | |
| nMA7 | ❑ **[Scan. IN7 address]**<br>Address of the 7th input word | | |
| nMA8 | ❑ **[Scan. IN8 address]**<br>Address of the 8th input word | | |
| OCS- | ■ **[COM. SCANNER OUTPUT]** | | |
| nCA1 | ❑ **[Scan.Out1 address]**<br>Address of the 1st output word | | |
| nCA2 | ❑ **[Scan.Out2 address]**<br>Address of the 2nd output word | | |
| nCA3 | ❑ **[Scan.Out3 address]**<br>Address of the 3rd output word | | |
| nCA4 | ❑ **[Scan.Out4 address]**<br>Address of the 4th output word | | |
| nCA5 | ❑ **[Scan.Out5 address]**<br>Address of the 5th output word | | |
| nCA6 | ❑ **[Scan.Out6 address]**<br>Address of the 6th output word | | |
| nCA7 | ❑ **[Scan.Out7 address]**<br>Address of the 7th output word | | |
| nCA8 | ❑ **[Scan.Out8 address]**<br>Address of the 8th output word | | |

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| - | ■ **[MODBUS HMI]**<br>Communication with the graphic display terminal | | |
| - | ❏ **[HMI address]**<br>Read-only parameter, cannot be modified. | | 21 |
| - | ❏ **[HMI speed]** | | |
| - | ❏ **[HMI format]**<br>Read-only parameter, cannot be modified. | | 8E1 |
| - | ■ **[MODBUS ]** | | |
| - | ❏ **[Modbus Address]** | | |
| - | ❏ **[Modbus bitrate]** | | |
| - | ❏ **[Modbus format]** | | |
| - | ■ **[CANopen]** | | |
| - | ❏ **[CANopen address]** | | |
| - | ❏ **[CANopen bitrate]** | | |
| - | ■ **[COMMUNICATION CARD]**<br>See the specific documentation for the card used. | | |
| - | ■ **[FORCED TO LOCAL]** | | |
| FLO<br>nO<br>LI1<br>-<br>LI4 | ❏ **[Forced local assign.]**<br>☐ **[No]** (nO): Function inactive<br>☐ **[LI1]** (LI1)<br>to<br>**[LI14]** (LI14): Assignment to a logic input.<br><br>Forcing to local is activated when the state of the input is at 1. | | [No] (nO) |
| FLOC<br>AI1<br>-<br>AI4<br>LCC | ❏ **[Forced local Ref.]**<br>☐ **[AI1]** (AI1)<br>to<br>☐ **[AI4]** (AI4): Assignment of the reference to an analog input; control is then also automatically assigned to the terminals (logic inputs).<br>☐ **[HMI]** (LCC): Assignment of the reference and command to the graphic display terminal.<br>Reference: [HMI Frequency ref.] (LFr), page 39, control: RUN/STOP buttons. | | [AI1] (AI1) |

# [1.11 - IDENTIFICATION]

```
RUN    +50.00 Hz   1250 A  +50.00 Hz
            1.11 IDENTIFICATION
ATV71HU15N4
   xx.x kW/yy.y HP
   380/480 V
   Application Vx.x IE xx
   Motor Control Vx.x IE xx
            <<        >>      Quick
   6W0410xxxxxxxxxx
   product Vx.x
OPTION 1
I/O EXTENSION CARD
   Vx.x IE xx
   6W0410xxxxxxxxxx
OPTION 2
   FIPIO CARD
   Vx.x IE xx
   6W0410xxxxxxxxxx
HMI
   GRAPHIC S
   Vx.x IE xx
   6W0410xxxxxxxxxx
ENCODER
   RS 422
   6W0410xxxxxxxxxx
```

The [1.11 - IDENTIFICATION] menu can only be accessed on the graphic display terminal.
This is a read-only menu that cannot be configured. It enables the following information to be displayed:

- Drive reference, power rating and voltage
- Drive software version
- Drive serial number
- Type of options available, with their software version and serial number

# [1.12 - FACTORY SETTINGS] (Fst-)

The [1.12 - FACTORY SETTINGS] (Fst-) menu can be used to replace the current configuration with the factory configuration or a configuration saved previously.

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.

```
RUN      Term      1250 A  +50.00 Hz
        1.12 FACTORY SETTINGS
Config. Source :  macro-conf
PARAMETER GROUP LIST
GOTO FACTORY SETTINGS
Config. Source

  Code      <<        >>      Quick
```

ENT →

Selection of source configuration

```
RUN      Term      1250 A  +50.00 Hz
              Config Source
Macro-Configuration          ☑
Configuration 1
Configuration 2



                            Quick
```

ENT →

Selection of menus to be replaced

```
RUN      Term      1250 A  +50.00 Hz
       PARAMETER GROUP LIST
All                          ☑
ATV config                   ☐
Settings                     ☐
Via motor                    ☐
COMM menu                    ☐
   Code                    Quick
```

ENT →

Command to return to "factory settings"

```
RUN      Term      1250 A  +50.00 Hz
       GOTO FACTORY SETTINGS


      PLEASE CHECK THAT
      THE DRIVE WIRING IS OK

  ESC=ABORT  ENT=VALIDATE
```

```
RUN      Term      1250 A  +50.00 Hz
       GOTO FACTORY SETTINGS


        SELECT FIRST THE
      PARAMETER GROUP LIST

       ENT OR ESC TO ABORT
```

```
RUN      Term      1250 A  +50.00 Hz
             Save conf.
No
Config. 1
Config. 2
Config. 3

                            Quick
```

# [1.12 - FACTORY SETTINGS] (Fst-)

| Code | Name/Description |
|---|---|
| FCS1 | ❏ **[Config. Source]**<br><br>Selection of source configuration<br>☐ **[Macro-Config]** (???) Factory configuration, return to selected macro-configuration.<br>☐ **[Configuration 1]** (???)<br>☐ **[Configuration 2]** (???)<br><br>If the configuration switching function has been configured, it will not be possible to access [Configuration 1] (???) and [Configuration 2] (???). |
| FrY | ❏ **[Parameter group list]**<br><br>Selection of menus to be loaded<br>☐ **[All]** (???)<br>☐ **[Drive menu]** (???)<br>☐ **[Settings]** (???)<br>☐ **[Motor control]** (???)<br>☐ **[Communication]** (???)<br>☐ **[Prog. card]** (???)<br>☐ **[Monitoring config.]** (???)<br>☐ **[Display config.]** (???) |
| GFS<br><br>nO<br>YES | ❏ **[Goto factory settings]**<br><br>☐ **[No]** (nO)<br>☐ **[Yes]** (YES) The parameter changes back to [No] (nO) automatically as soon as the operation is complete. |
| SCS<br><br>nO<br>Str0<br>Str1<br>Str2 | ❏ **[Save conf.]**<br><br>☐ **[No]** (nO)<br>☐ **[Config. 0]** (Str0)<br>☐ **[Config. 1]** (Str1)<br>☐ **[Config. 2]** (Str2)<br>The active configuration to be saved does not appear for selection. For example, if you wish to save [Conf. 0] (Str0), only [Conf. 1] (Str1) and [Conf. 2] (Str2) will appear. The parameter changes back to [No] (nO) automatically as soon as the operation is complete. |

# [1.13 - USER MENU]

This menu can only be accessed with the graphic display terminal. It contains the parameters selected in the [DISPLAY CONFIG.] menu on page 196.

# [1.14 - PROG. CARD]

Please refer to the documentation specific to the programmable card.

# [3. OPEN / SAVE AS]

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

```
RDY        Term    +0.00 Hz    0 A
          3. OPEN / SAVE AS
OPEN
SAVE AS




  Code       <<        >>      Quick
```

[OPEN] : To download one of the 4 files from the graphic display terminal to the drive.
[SAVE AS]: To download the current configuration from the drive to the graphic display terminal.

# [3. OPEN / SAVE AS]

| Name/Description |
|---|

## ■ [OPEN]

### ❏ [Open file]

- ☐ **[1]**
- ☐ **[2]**
- ☐ **[3]**
- ☐ **[4]**

Opens a file stored on the graphic display terminal in order to download it to the drive connected to the terminal.

### ❏ [Parameter group list]

- ☐ **[All]** : All parameters
- ☐ **[Drive]** : Motor parameters only (menu: 1.4 MOTOR CONTROL).
- ☐ **[Communication]** : Communication parameters (menu: 1.9 COMMUNICATION).

### ❏ [Download]

- ☐ **[No]**
- ☐ **[Yes]**: The parameters selected with [Parameter group list] in the selected file are downloaded to the current drive configuration.

**Note:**
- A message appears prompting you to check that the drive wiring is compatible with the configuration before confirming the download.
- A warning message will appear if the configuration is incompatible with the drive rating or its hardware configuration (option cards).

## ■ [SAVE AS]

### ❏ [To file]

- ☐ **[No]**
- ☐ **[1]**
- ☐ **[2]**
- ☐ **[3]**
- ☐ **[4]**

Selects the file on the graphic display terminal to which the current drive configuration is to be downloaded.

### ❏ [Download]

- ☐ **[No]**
- ☐ **[Yes]**: Downloads the current drive configuration to the selected file on the display terminal.

# [4. PASSWORD] (COd-)

Enables the configuration to be protected with an access code or a password to be entered in order to access a protected configuration.

Example:

| RUN | Term | +50.00 Hz | 80 A |
|---|---|---|---|
| 4. PASSWORD | | | |
| Status | : Not locked | | |
| PIN code 1 | : 0000 | | |
| PIN code 2 | : 0000 | | |
| Upload rights | : Not allowed | | |
| Download rights | : Unlock. drv | | |
| Code | << | >> | Quick |

| RUN | Term | +50.00 Hz | 80 A |
|---|---|---|---|
| PIN code 1 | | | |
| | 9520 | | |
| Min = 0000 Max = 9999 | | | |
| | << | >> | Quick |

- The drive is unlocked when the PIN codes are at 0 (no password) or if the correct code has been entered.

- Before protecting the configuration with an access code, you must:
  - Define the upload [Upload rights] (xx) and download [Download rights] (xx) rights
  - 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 an unlock code: 6969. Those in possession of this document will of course already be aware of this code.
  - PIN code 2 is an unlock code known only to Schneider Electric Product Support.

**Note:** When the unlock code is entered, the user access code appears.

The following items are access-protected:

- Return to factory settings (menu [1.12 FACTORY SETTINGS] (FCS-).
- The channels and parameters protected by the [1.13 USER MENU] (xx) menu, as well as the menu itself.
- The custom display settings (menu [6. DISPLAY CONFIG.]).

# [4. PASSWORD] (COd-)

| Code | Name/Description | Adjustment range | Factory setting |
|---|---|---|---|
| *CSt* | ❏ **[Status]** <br><br>  ☐ **[Not locked]** (xx) <br>  ☐ **[Locked]** (xx) | | |
| *COd* | ❏ **[PIN code 1]** <br><br>  1<sup>st</sup> access code. The value 0000 indicates that a password has not been set. The value ✱✱✱✱ 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. | 0 to 9999 | 0000 |
| *COd2* | ❏ **[PIN code 2]** <br><br>  2<sup>nd</sup> access code. The value 0000 indicates that a password has not been set. The value ✱✱✱✱ 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. | 0 to 9999 | 0000 |
| *ULr* | ❏ **[Upload rights]** <br>  (read or copy current configuration to drive) <br><br>  ☐ **[not allowed]** (xxx): The current drive configuration can only be uploaded to the graphic display terminal or PowerSuite if the drive is not protected by an access code or if the correct code is entered. <br>  ☐ **[Allowed]** (xxx): The current drive configuration can always be uploaded to the graphic display terminal or PowerSuite. | | |
| *dLr* | ❏ **[Download rights]** <br>  (writes the current configuration to the drive or downloads a configuration to the drive) <br><br>  ☐ **[Locked drv]** (xxx): 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. <br>  ☐ **[Unlock. drv]** (xxx): 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. <br>  ☐ **[Always]** (xxx): Combination of [Locked drv] (xxx) and [Unlock. drv] (xxx). options | | |

# [6. 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.

```
Rdy      Term     +0.00 Hz    0 A
          6 DISPLAY CONFIG.
6.1 USER PARAMETERS
6.2 USER MENU
6.3 PARAMETER ACCESS


   Code      <<       >>      Quick
```

6.1 USER PARAMETERS: Customization of 1 to 15 parameters.

6.2 USER MENU: Creation of a customized menu.

6.3 PARAMETER ACCESS: Customization of the visibility of protection mechanisms for menus and parameters.

```
RDY      Term   +0.00 Hz   0 A
      6.1 USER PARAMETERS
Return std names:          NO
PARAMETER SELECTION
CUSTOMIZED SELECTION
USER MENU NAME
DRIVE NAME
      <<        >>      Quick
SERVICE MESSAGE
CONF0
CONF1
CONF2
ATV SERIAL NUMBER
```

```
      PARAMETER SELECTION
         1.3 SETTINGS
Ramp increment              ✓
Acceleration                ☐
Deceleration                ☐
Acceleration 2              ☐
Deceleration 2              ☐
                          List
```

ENT

Selection of 1 to 15 parameters to be customized

Edit

```
RDY      Term   +0.00 Hz   0 A
      CUSTOMIZED SELECTION
Ramp increment
Acceleration
Loop Gain


   Delete
```

ENT

List of customized parameters

ENT

```
RDY      Term   +0.00 Hz   0 A
         Ramp increment
User name
Unit
Multiplier
Divider
Offset
```

ENT

```
RDY      Term   +0.00 Hz   0 A
            User name

FLOW REFERENCE


Max. no. of characters 13
   ABC      <<        >>
```

If no custom settings have been made, the default setting (names, units, etc.) appears.

Display on 1 or 2 lines of characters

Offsets and coefficients are numerical values.

Use F1 to change to ABC, abc, 123, *[-.
Use the navigation selector switch to increment the character (alphabetical order) and << and >> to switch to the next or previous character respectively.

ENT

```
RDY      Term   +0.00 Hz   0 A
            UNIT
Customized unit             ✓
Hz
Rpm
°C
Gallon per hour
   ABC      <<        >>
```

```
RDY      Term   +0.00 Hz   0 A
         Customized unit

         LBS


Max. no. of characters 3
   ABC      <<        >>
```

Once you have entered the unit, if you press ENT, the Ramp increment screen will re-appear in order to display the name. Press ESC to return to UNIT.

The message entered appears while the "View" button is pressed.

```
RDY      Term   +0.00 Hz   0 A
         SERVICE MESSAGE
Line 1
Line 2
Line 3
Line 4
Line 5
View                     Quick
```

ENT

```
RDY      Term   +0.00 Hz   0 A
            Line 1

For any service, dial:


Max. no. of characters 24
   ABC      <<        >>    Quick
```

Names (USER MENU NAME, DRIVE NAME, lines of messages, names of units, etc.) are customized as in the example of the parameter name shown opposite.
If no custom settings have been made, the default setting appears (names, units, etc.).
Display on 1 or 2 lines of characters
Use F1 to change to ABC, abc, 123, *[-.
Use the navigation selector switch to increment the character (alphabetical order) and << and >> to switch to the next or previous character respectively.

```
RDY      Term   +0.00 Hz   0 A
            User name

FLOW REFERENCE


Max. no. of characters 13
   ABC      <<        >>
```

# [6. DISPLAY CONFIG.]

```
RDY     Term   +0.00 Hz    0 A
        6.2 USER MENU
PARAMETER SELECTION
SELECTED LIST


   Code     <<      >>     Quick
```

ENT →

```
     PARAMETER SELECTION
        1.3 SETTINGS
Ramp increment              ✓
Acceleration                ☐
Deceleration                ☐
Acceleration 2              ☐
Deceleration 2              ☐
                          List
```

Selection of parameters included in the user menu

Edit ↓

ENT →

```
RDY     Term   +0.00 Hz    0 A
        SELECTED LIST
Ramp increment
Acceleration
Loop Gain


   Delete    up     down
```

Parameter list
making up the user menu
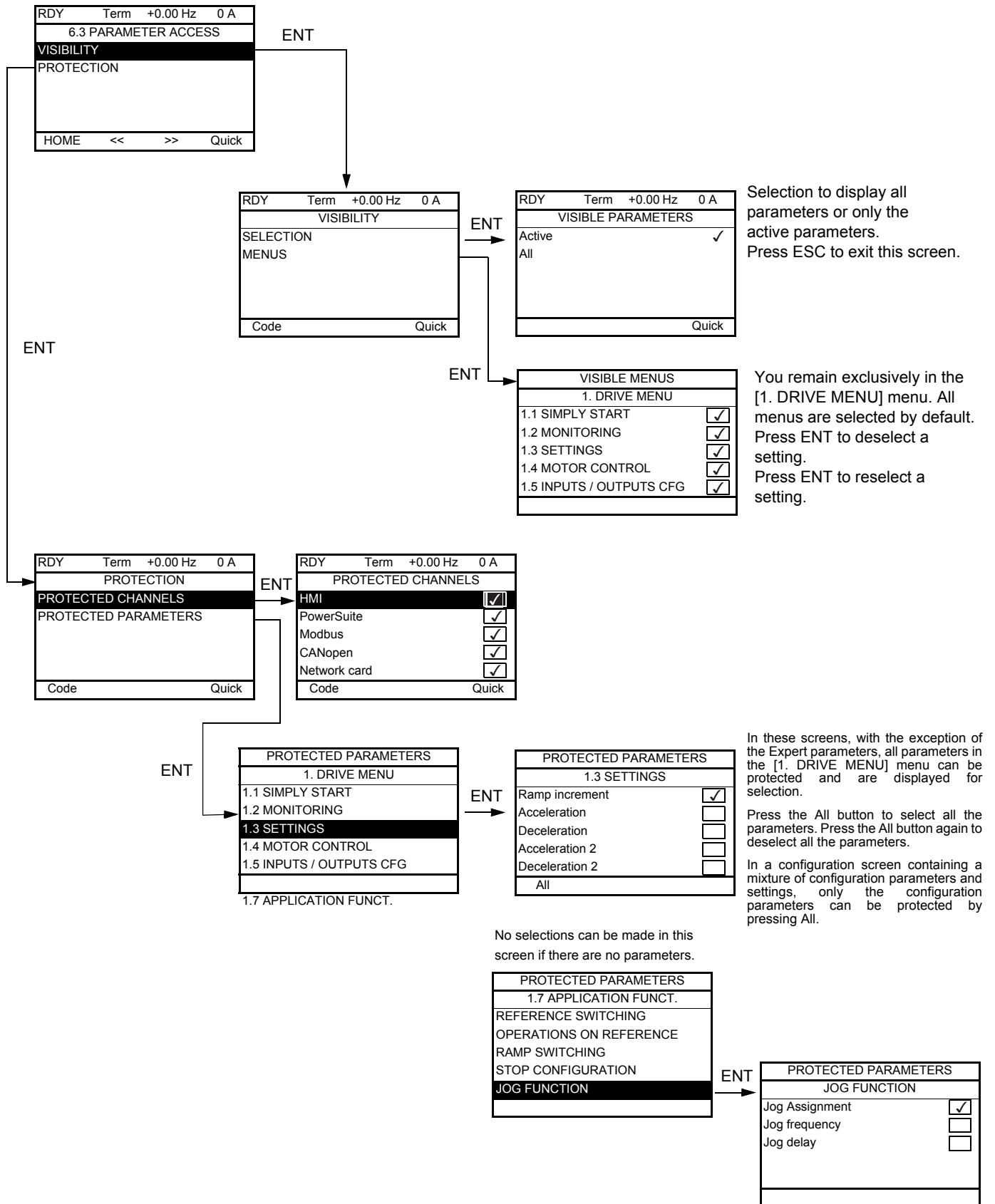
Use the F2 and F3 keys to arrange the parameters in the list (example below using F3).

```
RDY     Term   +0.00 Hz    0 A
        SELECTED LIST
Acceleration
Ramp increment
Loop Gain


   Delete    up     down
```

# [6. DISPLAY CONFIG.]

```
RDY      Term   +0.00 Hz    0 A
        6.3 PARAMETER ACCESS
VISIBILITY
PROTECTION



HOME      <<        >>      Quick
```

ENT

```
RDY      Term   +0.00 Hz    0 A
              VISIBILITY
SELECTION
MENUS




Code                       Quick
```

ENT

```
RDY      Term   +0.00 Hz    0 A
          VISIBLE PARAMETERS
Active                         ✓
All




                           Quick
```

Selection to display all parameters or only the active parameters.
Press ESC to exit this screen.

ENT

```
           VISIBLE MENUS
            1. DRIVE MENU
1.1 SIMPLY START           ☑
1.2 MONITORING             ☑
1.3 SETTINGS               ☑
1.4 MOTOR CONTROL          ☑
1.5 INPUTS / OUTPUTS CFG   ☑

```

You remain exclusively in the [1. DRIVE MENU] menu. All menus are selected by default.
Press ENT to deselect a setting.
Press ENT to reselect a setting.

ENT

```
RDY      Term   +0.00 Hz    0 A
             PROTECTION
PROTECTED CHANNELS
PROTECTED PARAMETERS



Code                       Quick
```

ENT

```
RDY      Term   +0.00 Hz    0 A
          PROTECTED CHANNELS
HMI                        ☑
PowerSuite                 ✓
Modbus                     ✓
CANopen                    ✓
Network card               ☑
Code                       Quick
```

ENT

```
        PROTECTED PARAMETERS
            1. DRIVE MENU
1.1 SIMPLY START
1.2 MONITORING
1.3 SETTINGS
1.4 MOTOR CONTROL
1.5 INPUTS / OUTPUTS CFG

1.7 APPLICATION FUNCT.
```

ENT

```
        PROTECTED PARAMETERS
            1.3 SETTINGS
Ramp increment             ✓
Acceleration               ☐
Deceleration               ☐
Acceleration 2             ☐
Deceleration 2             ☐
            All
```

In these screens, with the exception of the Expert parameters, all parameters in the [1. DRIVE MENU] menu can be protected and are displayed for selection.

Press the All button to select all the parameters. Press the All button again to deselect all the parameters.

In a configuration screen containing a mixture of configuration parameters and settings, only the configuration parameters can be protected by pressing All.

No selections can be made in this screen if there are no parameters.

```
        PROTECTED PARAMETERS
        1.7 APPLICATION FUNCT.
REFERENCE SWITCHING
OPERATIONS ON REFERENCE
RAMP SWITCHING
STOP CONFIGURATION
JOG FUNCTION

```

ENT

```
        PROTECTED PARAMETERS
            JOG FUNCTION
Jog Assignment             ✓
Jog frequency              ☐
Jog delay                  ☐


```

# [7. MONITORING CONFIG.]

This menu can only be accessed with the graphic display terminal.
It can be used to configure the information displayed on the graphic screen during operation.

```
RUN      Term    +40.00 Hz   80 A
          7. MONITORING CONFIG.
7.1. PARAM. LINE SELECT.
7.2. MONITOR SCREEN TYPE
7.3. COM. MAP CONFIG.


          <<        >>      Quick
```

[7.1. PARAM. LINE SELECT]: Selection of 1 to 2 parameters displayed on the top line (the first 2 cannot be modified).

[7.2. MONITOR SCREEN TYPE]: Selection of parameters displayed in the centre of the screen and the display mode (values in digital or bar graph format).

[7.3. COM. MAP CONFIG.]: Selection of word displayed and its format.

# [7. MONITORING CONFIG.]

## Internal drive variables

| Name/Description |
|---|

■ **[PARAM. LINE SELECT.]**

| ☐ **[Output frequency]** | in Hz |
| ☐ **[Motor current]** | in A |
| ☐ **[Avg speed]** | in RPM: The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES) (see page *61*) |
| ☐ **[Motor speed]** | in RPM |
| ☐ **[Motor voltage]** | in V |
| ☐ **[Motor power]** | in W |
| ☐ **[Mains voltage]** | in V |
| ☐ **[DC bus voltage]** | in V |
| ☐ **[Motor thermal state]** | as a % |
| ☐ **[Drv. thermal state]** | as a % |
| ☐ **[Consumption]** | in kWh |
| ☐ **[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) |

Select the parameter by pressing ENT or the Select button (an "x" will then appear after the parameter) or deselect it by pressing ESC.
1 or 2 parameters can be selected (the first 2 are fixed).

Example:

```
RUN      Term    +35.00 Hz   80 A
     8.1. PARAM. LINE SELECT.
- - - - - - - - -   x
- - - - - - - - -
- - - - - - - - -   x
- - - - - - - - -


  Select     <<       >>     Quick
```

| Name/Description |
| --- |

## ■ [MONITOR SCREEN TYPE]

### ❏ [BAR GRAPH]

☐ [Bar graph no.]: Select 1 or 2.
☐ [PARAMETER SELECTION]

- [HMI Frequency ref.]       in Hz
- [Output frequency]        in Hz
- [Motor current]          in A
- [Avg speed]            in RPM: The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES) (see page 61).
- [Motor speed]           in RPM
- [Motor voltage]          in V
- [Motor power]           in W
- [Mains voltage]          in V
- [DC bus voltage]         in V
- [Motor thermal state]       as a %
- [Drv. thermal state]       as a %
- [PID reference]          as a %
- [PID feedback ass.]        as a %
- [PID error]            as a %
- [PID Output]           in Hz

Select the parameter or parameters by pressing ENT or the Select button (an "x" will then appear after the parameter) or deselect by pressing ESC.

```
RUN      Term    +35.00 Hz   80 A
       PARAMETER SELECTION
- - - - - - - - -   x
- - - - - - - - -
- - - - - - - - -
- - - - - - - - -   x


 Select     <<      >>     Quick
```

Examples:

2 bar graphs

```
RUN      Term    +35.00 Hz   80 A
Min       MOTOR SPEED      max
0          1250 rpm      1500
▬▬▬▬▬▬▬▬▬▬
Min      MOTOR CURRENT     max
0           80 A        150
▬▬▬▬▬▬▬▬▬▬
           <<      >>     Quick
```

1 bar graph

```
RUN      Term    +35.00 Hz   80 A
          MOTOR SPEED

       1250 rpm
▬▬▬▬▬▬▬▬▬▬
Min=0            Max=1500
           <<      >>     Quick
```

# [7. MONITORING CONFIG.]

| Name/Description |
| --- |

## ■ [MONITOR SCREEN TYPE] (continued)

### ❏ [DIGITAL VALUES]

☐ **[Dig. val. no.]**: Select 1, 2 or 5
☐ **[PARAMETER SELECTION]**

- [HMI Frequency ref.]      in Hz
- [Output frequency]      in Hz
- [Motor current]      in A
- [Avg speed]      in RPM: The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES) (see page 61).
- [Motor speed]      in RPM
- [Motor voltage]      in V
- [Motor power]      in W
- [Mains voltage]      in V
- [DC bus voltage]      in V
- [Motor thermal state]      as a %
- [Drv. thermal state]      as a %
- [Consumption]      in kWh
- [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 (length of time the "IGBT temperature" alarm has been active)
- [PID reference]      as a %
- [PID feedback]      as a %
- [PID error]      as a %
- [PID Output]      in Hz
- [Object 01]      Word generated by the programmable card
- [Object 02]      Word generated by the programmable card
- [Object 03]      Word generated by the programmable card
- [Object 04]      Word generated by the programmable card
- [Current config.]      CNFSO, 1 or 2 (see page xx)
- [Current param. set]      SETO, 1 or 2 (see page xx)

Select the parameter or parameters by pressing ENT or the Select button (an "x" will then appear after the parameter) or deselect by pressing ESC.
Example:

```
RUN       Term     +35.00 Hz   80 A
          PARAMETER SELECTION
- - - - - - - - -   x
- - - - - - - - -
- - - - - - - - -
- - - - - - - - -   x

  Select      <<        >>     Quick
```

| Display of 2 values | Display of 1 value | Display of 5 values |
| --- | --- | --- |

```
RUN       Term   +35.00 Hz  80 A
          MOTOR SPEED
        1250 rpm
          MOTOR CURRENT
          80 A
          <<        >>     Quick
```

```
RUN       Term   +35.00 Hz  80 A
          MOTOR SPEED

        1250 rpm

          <<        >>     Quick
```

```
RUN       Term   +35.00 Hz  80 A
          MONITORING SCREEN.
FREQUENCY REF   : 50.1 Hz
CURRENT          : 80 A
MOTOR SPEED      : 1250 rpm
MOTOR THERMAL    : 80%
DRIVE THERMAL    : 80%
          <<        >>     Quick
```

# [7. MONITORING CONFIG.]

| Name/Description |
|---|

## ■ [COM. MAP CONFIG.]

### ❏ [Word selection]

Select the address of the word to be displayed (turn the navigation button).

### ❏ [Format]

☐ **[Hexadecimal]**
☐ **[Decimal]**
A confirmation screen appears:

```
RUN      Term     +35.00 Hz   80 A
           WORD SELECTED

              3141


          <<        >>     Quick
```

You will be able to see the value of the selected word in the [COMMUNICATION MAP] menu, which is a sub-menu of the [1.3 DISPLAY] menu.
Example:

```
RUN      Term     +35.00 Hz   80 A
          COMMUNICATION MAPS
- - - - - - - -- -
- - - - -- - - -
W3141: F230 Hex


          <<        >>     Quick
```

# [MULTIPOINT SCREEN]

Dialog can take place 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, page 184.

When a number of drives are connected to the same display terminal, the terminal automatically shows the following screens:

```
┌─────────────────────────────┐
│           WARNING           │
│ CONNECTION IN PROGRESS       │
│ After x seconds,             │
│ Time out fault or, press     │
│ ENT: for multi point         │
│ connection                   │
├─────────────────────────────┤
│    <<        >>      Quick   │
└─────────────────────────────┘
```

↓ ENT

```
┌─────────────────────────────┐
│      MULTIPOINT ADDRESS     │
│ ADDRESS 1              □     │
│ ADDRESS 2              □     │
│ ADDRESS 3              □     │
│ ADDRESS 4              □     │
│ ADDRESS 5              □     │
│ ADDRESS 6              □     │
├─────────────────────────────┤
│    <<        >>       Edit   │
└─────────────────────────────┘
```
Selection of drives for multipoint dialog

↓ ENT

```
┌─────────────────────────────┐     ┌──────────────────────────────┐
│     MULTIPOINT SCREEN       │ ESC │ RUN    +1500 rpm   1250 A  03 │
│ Rdy     0 rpm      0 A   02 │ ◄── │       MOTOR SPEED             │
│ RUN   +1500 rpm  1250 A  03 │ ENT │                              │
│ NLP   +1500 rpm  1250 A  04 │ ──► │       952 rpm                │
│         Not connected    05 │     │       MOTOR CURRENT          │
│ Rdy   + 0 rpm      0 A   06 │     │                              │
│ Rdy   + 0 rpm      0 A   10 │     │       101 A                  │
├─────────────────────────────┤     ├──────────────────────────────┤
│    <<        >>       Edit   │     │ HOME                  Quick  │
└─────────────────────────────┘     └──────────────────────────────┘
```
Selection of a drive for multipoint dialog

In multipoint mode, the command channel is not displayed. The status, the 2 selected parameters and the drive address appear.

# Maintenance

## Service

The Altivar 71 does not require any preventative maintenance. It is nevertheless advisable to perform the following regularly:
- Check the condition and tightness of connections.
- Ensure that the temperature around the unit remains at an acceptable level and that ventilation is effective (average service life of fans: 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, ensure 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 e.g., [R1 CONFIGURATION] (r1-) on page 77.

## [1.10 DIAGNOSTICS] menu

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 xx.

## Clearing the fault

Cut the power supply to the drive in the event of a non-resettable fault.
Wait for the display to go off 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 on page 173
- By means of a logic input or command bit assigned to the [FAULT RESET] (rSt-) function on page 172
- By pressing the STOP/RESET button on the graphic display terminal

## [1.2 MONITORING] (SUP-) menu:

This is used to prevent and find the causes of faults by displaying the drive status and its current values.
It can be accessed with the integrated display terminal.

## Spares and repairs:

Consult Schneider Electric Product Support.

# 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 stop" functions will prevent the drive from starting if the corresponding logic inputs are not powered up. The ATV71 then displays [Freewheel] (nSt) in freewheel stop and [Fast stop] (FSt) in fast stop. This is normal since these functions are active at zero so that the drive will be stopped 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 65.
- 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 120 and 153).
- 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 switching off and then on again.
SPF, AnF, SOF, tnF, bLF, brF, OPF1, OPF2 and OPF3 faults can be reset remotely by means of a logic input or command bit ([FAULT RESET] (rSF-)) parameter, page 172).

| Fault | Probable cause | Remedy |
|---|---|---|
| *bLF*<br>Brake sequence | • Brake release current not attained<br><br>• Brake engage frequency threshold [Brk eng. freq.] (bEn) only regulated when brake logic control is assigned. | • Check the drive/motor connection.<br>• Check the motor windings.<br>• Check the [I brk rel. lift.] (Ibr) and [I brk rel. lower] (Ird) settings, page 126.<br>• Make the recommended settings for [Brk eng. freq.] (bEn), unregulated. |
| *CrF*<br>Capacitor load circuit | • Load relay control fault or charging resistor damaged | • Replace the drive. |
| *EEF1*, *EEF2*<br>EEPROM fault | • Internal memory fault | • Check the environment (electromagnetic compatibility).<br>• Replace the drive. |
| *InF1* to *InFb*<br>Internal fault | • Internal fault | • Check the environment (electromagnetic compatibility).<br>• Replace the drive. |
| *OCF*<br>Overcurrent | • Parameters in the [SETTINGS] (SEt-) and [1.4 MOTOR CONTROL] (drC-) menus are not correct.<br>• Inertia or load too high<br>• Mechanical locking | • Check the parameters.<br>• Check the size of the motor/drive/load.<br>• Check the state of the mechanism. |
| *SCF1* to *SCF5*<br>Motor short-circuit | • Short-circuit or earthing at the drive output<br>• 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 insulation of the motor.<br>• Reduce the switching frequency.<br>• Connect chokes in series with the motor. |
| *SOF*<br>Overspeed | • Instability or<br>• Driving load too high | • Check the motor, gain and stability parameters.<br>• Add a braking resistor.<br>• Check the size of the motor/drive/load. |
| *tnF*<br>Auto-tuning fault | • Special motor or motor whose power is not suitable for the drive<br><br>• Motor not connected to the drive | • [Motor control type] (Ctt) = [V/F 2pts] (UF2) or [V/F 5pts] (UF5) ([1.4-MOTOR CONTROL] (drC-) menu) page 56.<br>• Check the presence of the motor during auto-tuning.<br>• If an output contactor is being used, close it during auto-tuning. |
| *SPF*<br>Encoder feedback loss | • Encoder feedback signal missing | • Check the wiring between the encoder and the drive.<br>• Check the encoder. |
| *AnF*<br>Load slipping fault | • The encoder speed feedback does not match the reference. | • Check the motor, gain and stability parameters.<br>• Add a braking resistor.<br>• Check the size of the motor/drive/load.<br>• Check the mechanical coupling of the encoder. |
| *EcF*<br>Encoder coupling | • The mechanical coupling of the encoder has come loose. | • Check the mechanical coupling of the encoder. |
| *brF*<br>Brake contact | • The brake feedback contact does not match the brake logic control. | • Check the feedback circuit and the brake logic control circuit. |
| *PrF*<br>Power removal | • Fault in the "Power removal" control circuit | • Replace the drive. |

# Faults - Causes - Remedies

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

These faults can also be reset by disconnecting and reconnecting the power supply or by means of a logic input or command bit ([FAULT RESET] (rSt-) parameter, page 172).

| Fault | Probable cause | Remedy |
|---|---|---|
| *COF*<br>CANopen fault | • Interruption in communication on the CANopen bus | • Check the communication bus.<br>• Please refer to the product-specific documentation. |
| *EPF 1*, *EPF 2*<br>External fault | • According to user | • According to user |
| *LFF*<br>4-20 mA loss | • Loss of the 4-20 mA reference on an analog input | • Check the connection on the analog inputs. |
| *ObF*<br>Overvoltage<br>during deceleration | • Overbraking<br>or driving load | • Increase the deceleration time.<br>• Install a braking resistor if necessary.<br>• Activate the [Dec ramp adapt] (brA) function on page 106, if it is compatible with the application. |
| *OHF*<br>Drive overheat | • Drive temperature too high | • Check the motor load, the drive ventilation and the environment. Wait for the motor to cool before restarting. |
| *OLF*<br>Motor overload | • Triggered by motor current too high | • Check the ItH setting for the motor thermal protection, check the motor load. Wait for the motor to cool before restarting. |
| *OPF 1*<br>1 output phase loss<br><br>*OPF 2*<br>2 output phase loss<br><br>*OPF 3*<br>3 output phase loss | • Loss of one phase at drive output<br>• Output contactor open<br>• Motor not connected or motor power too low<br>• Instantaneous instability in the motor current | • Check the connections from the drive to the motor.<br>• If an output contactor is being used, parameter [Output Phase Loss] (OPL) = [Output cut] (OAC) page 176.<br>• Test on a low power motor or without a motor: In factory settings mode, output phase loss detection is active [Output Phase Loss] (OPL) = [Yes] (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 detection by setting [Output Phase Loss]. (OPL) = [No] (nO).<br>• Check and optimize the following parameters: [IR compensation] (UFr) page 54, [Rated motor volt.] (UnS) and [Rated mot. current] (nCr) page 53, and perform [Auto tuning] (tUn) page 54. |
| *OSF*<br>Overvoltage | • Mains voltage too high<br>• Disturbed mains | • Check the mains voltage. |
| *PHF*<br>Mains phase<br>loss | • Drive incorrectly supplied or a fuse blown<br>• Loss of one phase<br>• 3-phase ATV71 used on a single-phase mains supply<br>• Unbalanced load<br>This protection only operates with the drive on load. | • Check the power connection and the fuses.<br><br>• Reset.<br>• Use a 3-phase mains supply.<br><br>• Disable the fault by setting [Input phase loss] (IPL) = [No] (nO), page )176. |
| *ILF*<br>Internal communication | • Communication fault between option card and drive | • Check the environment (electromagnetic compatibility).<br>• Replace the option card.<br>• Replace the drive. |
| *SLF 1*<br>Modbus fault | • Interruption in communication on the Modbus bus | • Check the communication bus.<br>• Please refer to the product-specific documentation. |
| *ILF*<br>Internal communication | • Communication fault between option card and drive | • Check the environment (electromagnetic compatibility).<br>• Replace the option card.<br>• Replace the drive. |
| *CnF*<br>Communication card | • Communication fault on communication card | • Check the environment (electromagnetic compatibility).<br>• Replace the option card.<br>• Replace the drive. |
| *PtF 1*<br>PTC1 probe feedback | • PTC probes on motor 1 open or short-circuited | • Check the PTC probes and the wiring between them and the motor/drive. |
| *PtF 2*<br>PTC2 probe feedback | • PTC probes on motor 2 open or short-circuited | |
| *PtF 1*<br>PTC3 probe feedback | • PTC probes on motor 3 open or short-circuited | |

# Faults - Causes - Remedies

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

These faults can also be reset by disconnecting and reconnecting the power supply or by means of a logic input or command bit ().

| Fault | Probable cause | Remedy |
|---|---|---|
| *OtF1*<br>PTC1 probes temperature | • Detection of overheating of PTC probes on motor 1 | • Check the motor load and dimensions.<br>• Wait for the motor to cool before restarting. |
| *OtF2*<br>PTC2 probes temperature | • Detection of overheating of PTC probes on motor 2 | |
| *OtF3*<br>PTC3 probes temperature | • Detection of overheating of PTC probes on motor 3 | |
| *APF*<br>Application card | • Programmable card fault | • Please refer to the card-specific documentation. |
| *SLF2*<br>PowerSuite | • Fault communicating with PowerSuite | • Check the PowerSuite connecting cable. |
| *SSF*<br>Torque limitation | • Switch to torque limitation | • Check if there are any mechanical problems.<br>• Check the [TORQUE LIMITATION] (tLA-) parameters on page 147 and the [TORQUE/CURRENT LIM. DET.] (SSA-) parameters on page 182). |
| *SLF3*<br>Graphic display terminal | • Fault communicating with the graphic display terminal | • Check the terminal connection. |
| *tJF*<br>IGBT overheat | • IGBT temperature too high | • Check the size of the motor/drive/load.<br>• Wait for the motor to cool before restarting. |

## Faults, which can be reset as soon as their causes disappear

| Fault | Probable cause | Remedy |
|---|---|---|
| *CFF*<br>Configuration fault | • The current configuration is inconsistent | • Return to factory settings or retrieve the backup configuration, if it is valid. See page xx |
| *CF1*<br>Configuration fault via serial link | • Invalid configuration<br>The configuration loaded in the drive via the serial link is inconsistent. | • Check the configuration loaded previously.<br>• Load a compatible configuration. |
| *USF*<br>Undervoltage | • Mains supply too low<br>• Transient voltage dip<br>• Damaged load resistor | • Check the voltage and the voltage parameter.<br><br>• Replace the drive. |

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