Altivar Using EcoStruxure™ Control Expert

Altivar 58 and 58F Variable Speed Controllers

Setup Manual

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

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

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

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

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Safety Information

Important Information

NOTICE

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

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

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

⚠ DANGER

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

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

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

NOTICE

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PLEASE NOTE

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A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book

At a Glance

Document Scope

This manual describes software installation for Altivar 58 and 58F variable speed controllers.

Validity Note

This documentation is valid for EcoStruxure™ Control Expert 14.0 and later.

Product Related Information

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program, install, alter, and apply this product.

Follow all local and national safety codes and standards.

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

Part I
Altivar Variable Speed Controllers: General

Chapter 1
General Presentation of Altivar 58 and 58F Variable Speed Controllers

Subject of this Chapter

This chapter provides a general introduction to Altivar variable speed controllers (Altivar 58 and 58F).

What Is in This Chapter?

This chapter contains the following topics:

Altivar Variable Speed Controllers

General

This manual provides a detailed description of two types of Altivar variable speed controller:

- ATV 58•••••• *(see page 12)*,
- ATV 58F•••••• *(see page 12)*,

and a general description of two other types of Altivar variable speed controller:

- ATV 38•••••• *(see page 13)*,
- ATV 68•••••• *(see page 13)*.

Altivar 58

The Altivar 58 variable speed controller is a frequency converter for asynchronous, 3-phase 0.37 kW to 15 kW cage motors.

The operating principles for this controller are as follows:

- Start, Braking and Speed Control,
- Energy economy, PI controller,
- Speed loop with tachogenerator or pulse generator,
- Faster/slower, S and U ramps, preset speeds, step by step (JOG),
- On-the-fly restart,
- Current limit adaptation according to speed,
- Automatic slow operating speed time limit,
- ...

Altivar 58F

The Altivar 58F sensorless flux vector (SFV) variable speed controller with sensor is used for applications requiring torque and precision at very low speeds and high dynamics (horizontal and vertical handling, modular machines, etc.).

The operating principles for this controller are as follows:

- Start, process control, and deceleration and stop braking,
- Possibility of holding the motor torque at standstill,
- Energy economy, PID controller,
- Braking logic,
- Faster/slower, S and U ramps, preset speeds, step by step (JOG),
- Automatic recovery with speed search (on-the-fly restart),
- Automatic slow operating speed time limit,
- ...

Altivar 38

The Altivar 38 variable speed controller is a frequency converter for asynchronous, 3-phase 0.75 kW to 315 kW cage motors.

It is dedicated to the most common fluid control applications in industrial buildings and service buildings (HVAC): Heating Ventilation Air Conditioning.

Altivar 68

The Altivar 68 variable speed controller covers a range from 75 kW to 500 kW for high-torque applications, and from 90 kW to 630 kW for standard-torque applications, with a single voltage range of 400 V to 500 V.

The introduction of elements from the motor rating plate and an autotuning function when stopped, provide a high level of torque and a remarkable drive quality, even at very low rotation speeds (< 0.5 Hz).

List of Controllers Configurable on the Fipio Bus

General

There are four families of Altivar controllers that can be configured on the Fipio bus:

- ATV 38,
- ATV 58,
- ATV 58F,
- ATV 68.

Available References

The following table shows the reference numbers available for the Fipio bus.

Families	Available references	
ATV 38	ATV 38 PKW	
ATV 58	ATV 58•D	12M2 12N4 16N4 23N4 28N4 33N4 46N4 54N4 64N4 79N4
	ATV 58•U	09M2 18M2 18N4 29M2 29N4 41M2 41N4 54M2 54N4 72M2 72N4 90M2 90N4
	ATV 58HD	16M2X 23M2X 28M2X 33M2X 46M2X
	ATV 58 PKW	

Families	Available references	
ATV 58F	ATV 58F•D	12N4 16N4 23N4 28N4 33N4 46N4 54N4 64N4 79N4
	ATV 58F•U	18N4 29N4 41N4 54N4 72N4 90N4
	ATV 58F PKW	
ATV 68	ATV 68	

Part II
Software Implementation of Altivar Variable Speed Controllers

Subject of this Part

This part presents the implementation of Altivar 58 and 58F variable speed controllers using Control Expert software.

What Is in This Part?

This part contains the following chapters:

Chapter 2
General presentation

Overview

Introduction

The software installation for the modules is carried out from the various Control Expert editors:

- In offline mode,
- In online mode.

The following order of installation phases is recommended but it is possible to change the order of certain phases (for example, starting with the configuration phase).

Installation Phases with Processor

The following table shows the various phases of installation with the processor.

Phase	Description	Mode
Declaration of variables	Declaration of IODDT-type variables for the application-specific modules and variables of the project.	Offline (1)
Programming	Project programming.	Offline (1)
Configuration	Declaration of modules.	Offline
	Module channel configuration.	
	Entry of configuration parameters.	
Association	Association of IODDTs with the channels configured (variable editor).	Offline (1)
Generation	Project generation (analysis and editing of links).	Offline
Transfer	Transfer project to PLC.	Online
Adjustment / Debugging	Project debugging from debug screens, animation tables.	Online
	Modifying the program and adjustment parameters.	
Documentation	Building documentation file and printing miscellaneous information relating to the project.	Online (1)
Operation/Diagnostic	Displaying miscellaneous information necessary for supervisory control of the project.	Online
	Diagnostic of project and modules.	
Key:		
(1)	These various phases can also be performed in the other mode.	

Chapter 3
Software Configuration of Altivar Variable Speed Controllers

Subject of this Chapter

This chapter describes the Configuration aspect of software installation for Altivar 58 and 58F variable speed controllers.

What Is in This Chapter?

This chapter contains the following sections:

Section 3.1
Configuration of an Altivar Variable Speed Controller on the Fipio Bus: General

Description of the Configuration Screen for an Altivar 58 or 58F Variable Speed Controller on the Fipio Bus

At a Glance

This screen *(see Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual)*, divided into several areas, is used to configure the parameters of the Altivar 58 or 58F variable speed controller selected on the Fipio bus.

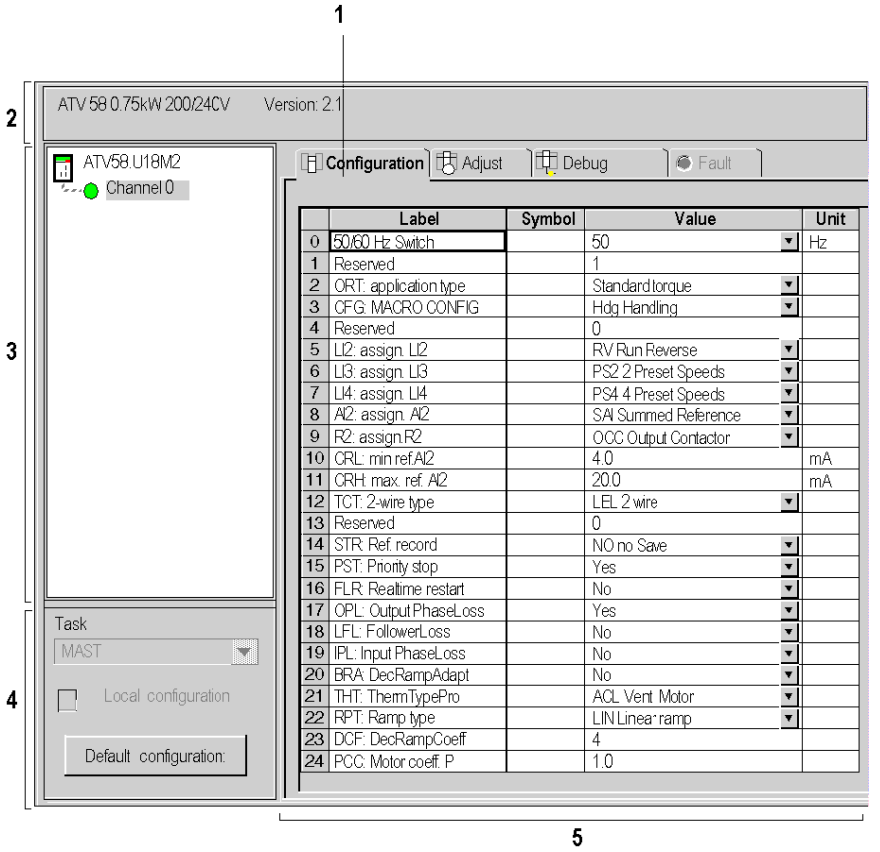
It also provides access to modification and debug screens (the latter accessible in online mode only).

NOTE: The manual modification of certain configuration and/or adjustment parameters leads to the automatic modification of the associated configuration and/or adjustment parameters.
A warning message will appear on the screen, with the automatically modified parameters displayed in blue.

NOTE: You can configure the **ATV 58• PKW**, **ATV 38 PKW** and **ATV 68** variable speed controllers by following the standard Fipio bus profiles *(see Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual)* procedure.

Illustration

This screen is used to display and modify parameters in offline mode.



	Label	Symbol	Value	Unit
0	50/60 Hz Switch		50	Hz
1	Reserved		1	
2	ORT: application type		Standard torque	
3	CFG: MACRO CONFIG		Hdg Handling	
4	Reserved		0	
5	LI2: assign. LI2		RV Run Reverse	
6	LI3: assign. LI3		PS2 2 Preset Speeds	
7	LI4: assign. LI4		PS4 4 Preset Speeds	
8	AI2: assign. AI2		SAI Summed Reference	
9	R2: assign.R2		OCC Output Contactor	
10	CRL: min ref.AI2		4.0	mA
11	CRH: max. ref. AI2		20.0	mA
12	TCT: 2-wire type		LEL 2 wire	
13	Reserved		0	
14	STR: Ref. record		NO no Save	
15	PST: Priority stop		Yes	
16	FLR: Realtime restart		No	
17	OPL: Output PhaseLoss		Yes	
18	LFL: FollowerLoss		No	
19	IPL: Input PhaseLoss		No	
20	BRA: DecRampAdapt		No	
21	THT: ThermTypePro		ACL Vent. Motor	
22	RPT: Ramp type		LIN Linear ramp	
23	DCF: DecRampCoeff		4	
24	PCC: Motor coeff. P		1.0	

Description

The following table shows the various elements of the configuration screen and their functions.

Number	Element	Function
1	Tabs	The tab in the foreground indicates the mode in progress (**Configuration** in this example). Every mode can be selected using the respective tab. The available modes are: ● **Configuration**, ● **Adjust**, ● **Debug**, accessible only in online mode, ● **Fault** (channel level) accessible only in online mode.
2	**Module** area	Gives a reminder of the device's shortened name. In online mode, this area also includes the three LEDs **Run**, **Err** and **IO**.
3	**Channel** area	Allows you: ● By clicking on the device reference number, to display the tabs: ❍ **Description** which gives the characteristics of the device, ❍ **I/O Objects** *(see EcoStruxure™ Control Expert, Operating Modes)* which is used to presymbolize the input/output objects, ❍ **Fault** which shows the device faults (only accessible in online mode). ● To select the channel, ● To display the **Symbol**, name of the channel defined by the user (using the variable editor).
4	**General parameters** area	The **Task** drop-down menu is used to select the type of associated task (**MAST** or **FAST**) in which the channels' implicit exchange objects will be exchanged. The **Local configuration** check box indicates: ● When unchecked: the configuration is sent to Altivar by the Control Expert software, ● When checked: the configuration is performed locally (for example, a serial link). The **Default configuration** button is used to return to the default parameters.
5	**Configuration** area	This is used to define the configuration parameters of the different channels. This area includes various columns: ● **Label**, which defines the available parameters *(see page 25)*, ● **Symbol**, which displays the symbol associated with the channel when it has been defined by the user (using the variable editor), ● **Value**, which is used to select the value to assign the parameter, ● **Unit**, which displays the measurement unit of the parameter.

Section 3.2
Configuration Parameters of the Altivar Variable Speed Controllers

Subject of this Section

This section presents the different configuration parameters of the Altivar 58 and 58F variable speed controllers.

What Is in This Section?

This section contains the following topics:

Altivar Variable Speed Controllers: Acceleration Type

Altivar 58

For controllers with a power rating greater than 7.5 kW at 200/240 V and 15 kW at 380/500 V: their power rating differs depending on whether they are used with the standard torque application (120% Cn) or high torque application (170% Cn).

The controllers are delivered in factory ‘high torque’ configuration.

Altivar 58F

There is only one type of application for Altivar 58F controllers: standard torque.

Altivar Variable Speed Controllers: Macro-Configuration

General

This parameter can always be displayed, but can only be modified in programming mode, when stopped and with the controller locked.

It can give an application an automatic configuration.

The following table describes the available applications.

Altivar	Available applications
ATV 58••••••	Handling (HDG).
	General use (GEN).
	Variable torque for pump and ventilator (VT) applications.
ATV 58F••••••	Handling (HDG).
	General use (GEN).

A macro-configuration automatically assigns inputs/outputs and parameters, thus activating the functions necessary to the application. The parameters connected to the programmed functions are available.

The controller's configuration can be customized by changing input/output assignment.

NOTE: You must make sure the programmed macro-configuration is compatible with the wiring diagram used. In particular, in the case of modification of the factory configuration: also modify the diagram where necessary.

Handling

Factory setting: Handling. Input/output assignment depending on macro-configuration.

		Hdg: Handling	GEn: General usage	VT: Variable controller (1)
LI1 logical input		forward	forward	forward
LI2 logical input		reverse	reverse	reverse
LI3 logical input		2 preset speeds	step by step operation	reference switching
LI4 logical input		4 preset speeds	freewheel stop (2)	injection braking
Analog In AI1	Altivar 58	summing reference	summing reference	speed reference 1
	Altivar 58F	speed reference	speed reference	-
Analog In AI2		summing reference	summing reference	speed reference 2
Relay R1		speed controller fault	speed controller fault	speed controller fault

		Hdg: Handling	GEn: General usage	VT: Variable controller (1)
Relay R2	Altivar 58	downstream contactor command	motor thermal state attained	frequency setpoint attained
	Altivar 58F	unassigned	unassigned	-
Key:				
(1)	Only for Altivar 58.			
(2)	Only for Altivar 58F: to start, the logical input must be tied to + 24 V (active function at 0).			

Drive Configuration Parameters

General

Parameters can only be modified when stopped, with the controller locked.

Drive performance can be optimized:

- By entering the values read on the rating plate in the drive menu,
- By triggering auto-tuning (on a standard asynchronous motor) using the console.

NOTE: Altivar 58 – case of using special motors (motors in parallel, tapered rotor or flux bypass motor-brake units, synchronized synchronous or asynchronous motors, asynchronous motors with resistant rotor):

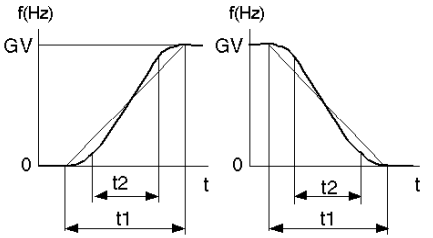
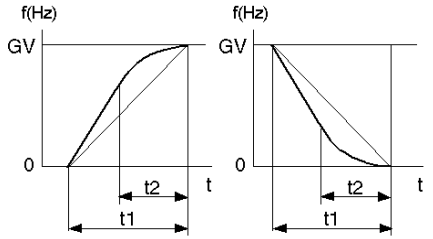
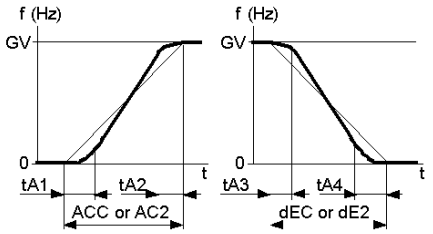
- Select the macro-configuration **Hdg: Handling** or the macro-configuration **GEN: General usage**,
- In the **Drive** menu, configure the **SPC special motor** parameter to **yes**,
- In the **Adjust** menu, adjust the **Compens. RI UFR** parameter to obtain satisfactory operation.

Parameters

The following table presents the configuration parameters for drive.

Label	Code	Description		Adjustment range	Factory setting
Nom. U Mot. - V	UNS	**ATV 58••••M2**	Nominal motor voltage read on the rating plate.	200 to 240 V	230 V
		ATV 58••••N4		200 to 500 V	400/460 V depending on the position of the 50/60 Hz switch.
		ATV 58F••••••			
Nom.Mot.Freq. - Hz	FRS	Nominal motor frequency read on the rating plate.		10 to 500 Hz	50/60 Hz depending on the position of the 50/60 Hz switch.
Nom.Mot.I - A	NCR	Nominal motor current read on the rating plate.		0.25 to 1.36 In (1)	According to drive caliber.
Nom.Mot.V -rpm	NSP	Nominal motor speed read on the rating plate.		0 to 9999 rpm	
Mot Phi Cos	COS	Motor Phi cosine read on the rating plate.		0.5 to 1	
Max Freq. - Hz	TFR	Maximum output frequency.		10 to 500 Hz	60/72 Hz
		The maximum value depends on the switching frequency.			Depending on the position of the 50/60 Hz switch.

Label	Code	Description		Adjustment range	Factory setting
Energy saving	NLD	**ATV 58••••••**	Optimizes motor efficiency. (2)	No-Yes	Yes
	-	**ATV 58F••••••**	Parameter not used by this controller.	-	-
AdaptRampDec	BRA	Activation of this function enables deceleration time to be increased, where this is adjusted to too low a value given the inertia of the charge, thus avoiding ObF switching to fault. This function may be incompatible with a ramp positioning and with the use of a braking resistor. The factory adjustment depends on the macro-configuration used: no in handling, yes for variable torque (3) and general usage. If relay R2 is assigned to the braking logical function, parameter brA remains locked on no.		No-Yes	No
F.Com. Ramp2- Hz	FRT	Ramp switching frequency. When the output frequency becomes greater than Frt, the ramp times taken into account are AC2 and dE2.		0 to HSP	0 Hz

Label	Code	Description	Adjustment range	Factory setting
Ramp type	RPT	Defines the speed of the acceleration and deceleration ramps. Linear Ramp	LIN	LIN
		S Ramp: 	S	The rounding coefficient is set, with t2 = 0.6 x t1, where t1 = adjusted ramp time.
		U Rampe: 	U	The rounding coefficient is set, with t2 = 0.5 x t1, where t1 = adjusted ramp time.
		Customized ramp: 	CUS (3)	TA1: adjustable from 0 to 100 % (ACC or AC2). TA2: adjustable from 0 (100 % - TA1) (ACC or AC2). TA3: adjustable from 0 to 100 % (DEC or dE2). TA4: adjustable from (100 % - TA3) (DEC or dE2).
Coef. RampDEC	DCF	Reduction coefficient of the deceleration ramp time when the fast stop function is active.	1 to 10	4
Internal ILim.- A	CLI	The current limit is used to limit heating of the motor.	0.25 to 1.36 In (1)	1.36 In

Label	Code	Description		Adjustment range	Factory setting
Coef. P mot.	PCC	**ATV 58••••••**	Defines the ratio between the nominal power of the controller and the lowest-power motor, when a logical input is assigned to the motor switch function.	0.2 to 1	1
	-	**ATV 58F••••••**	Parameter not used by this controller.	-	-
Switch Type.	SFT	Used to select a low frequency (LF) or high frequency (HF1 or HF2) switching. Switching type HF1 is intended for applications with a low load factor without controller derating. If the controller thermal state exceeds 95 %, the frequency automatically switches to 4 kHz. When the controller thermal state decreases to 70 %, the selected switching frequency is re-established. Switching type HF2 is intended for applications with a high load factor with controller derating of one rating. the drive parameters are automatically scaled (torque limit, thermal current, etc.).		LF-HF1-HF2	LF
Switching Freq.- kHz (4)	SFR	Used to select the switching frequency. The adjustment range depends on the SFt parameter.		0.5-1-2-4 kHz (5)	4 kHz
				8-12-16 kHz (6)	16 kHz
Noise Reduc.	NRD	This function modulates randomly the switching frequency to reduce motor noise.		No Yes	Yes (5) No (6)
Special Motor	SPC	This function extends the adjustment range of the UFR parameter from the aforementioned special motors *(see page 29)* adjustment menu. For PSM: this inhibits the detection of a **uncontrolled downstream switch** (especially useful for small motors). No: normal motor Yes: special motor (3) PSM: small motor		No Yes (3) PSM	No

Key:	
(1)	**In** corresponds to the nominal controller current specified in the catalog and on the controller's rating plate.
(2)	Only accessible in macro-configuration variable torque.
(3)	Only for Altivar 58.

Label	Code	Description	Adjustment range	Factory setting
(4)	The maximum operating frequency (TFR) is limited depending on the switching frequency *(see page 33)*.			
(5)	If SFT = LF.			
(6)	If SFT = HF1 or HF2.			

Maximum Operating Frequency

The maximum operating frequency (TFR) is limited depending on the switching frequency:

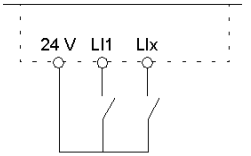
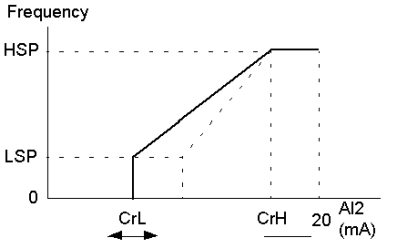
SFR(kHz)	0.5	1	2	4	8	12	16
TFR (Hz) **For Altivar 58**	62	125	250	500	500	500	500
TFR (Hz) **For Altivar 58F**	62	125	250	450	450	450	450

Terminal Configuration Parameters

Parameters

The following table shows the terminal configuration parameters:

Label	Code	Description	Values/Adjustment range	Factory setting
2-wire type	TCT	Defines the type of 2-wire command: ● Function of the state of the logical inputs (LEL: Lev. Detect.), ● Function of a change in state of the logical inputs (TRN: Trans. Detect.), ● Function of the logical input state, with forward direction always priority (Pfo: Priority Forward). (1)	LEL-TRN-PFO	LEL
Ref.Mini AI2- mA (2)	CRL	Minimum value of the signal on input AI2.	0 to 20 mA	4 mA
Ref.Max AI2- mA (2)	CRH	Maximum value of the signal on input AI2.	4 to 20 mA	20 mA
Set.Latch	STR	This function is associated with the faster / slower function, and is used to latch the setpoint: ● STR=NO: no setpoint latching (3), ● STR=RAM: when operation orders disappear (RAM latching), ● STR=EEPROM: when the supply network disappears (EEPROM latching), ● On the following start-up, the speed setpoint is the last setpoint to be latched (3): ❍ STR=SRE: no setpoint latching, maximum speed is limited to HSP and speed variation increases or decreases are limited to the SRP adjustment parameter around the setpoint.	NO-RAM-EEP	NO

Label	Code	Description	Values/Adjustment range	Factory setting
Prior. STOP	PST	This function gives priority to the STOP key, whatever the command channel (terminal or field bus).	No-Yes	Yes
Key:				
(1)	Wiring example:  LI1: forward. LIx: reverse.			
(2)	These two parameters are used to define the signal sent on AI2, and to configure the input for a 0-20 mA signal, 4-20 mA signal, 20-4 mA signal, etc.  			
(3)	Only for Altivar 58.			

Section 3.3
Configuration Parameters of the Altivar Variable Speed Controllers Inputs/Outputs

Subject of this Section

This section presents the different configuration parameters of the inputs/outputs of Altivar 58 and 58F. variable speed controllers.

What Is in This Section?

This section contains the following topics:

Function Compatibility Table

General

The selection of application functions can be limited by the incompatibility between certain functions. The functions not listed in the following tables are not affected by incompatibility.

NOTE: Stop functions take priority over operation orders.
Speed setpoints by logical order take priority over analog setpoints.

Altivar 58: Function Compatibility Table

The following table presents the compatibility between functions for Altivar 58 controllers.

	DC injection braking	Summing inputs Reg. tachogenerator or encoder	PI controller	Faster / Slower	Reference switching	Freewheel Stop	Fast Stop	Step by step operation	Preset speeds	Speed adjustment with tachogenerator or encoder	Torque limit with AI3	Torque limit with LI
DC injection braking	-					↑						
Summing inputs		-			X							
PI controller			-					X	X	X		
Faster / slower				-	X			↑	X			
Reference switching		X		X	-				X			
Freewheel stop	←					-	←					
Fast stop						↑	-					
Step by step operation			X	←				-	←			
Preset speeds			X	X	X			↑	-			
Speed adjustment with tachogenerator			X							-		

Torque limit with AI3											-	X
Torque limit with LI											X	-
Key:												
X	Incompatible functions.											
	Compatible functions.											
-	Not applicable.											
← ↑	Priority functions that cannot be active at the same time. The function indicated by the arrow takes priority over the other.											

Altivar 58F: Function Compatibility Table

The following table presents the compatibility between functions for Altivar 58F controllers.

	DC injection braking	Summing inputs Reg. tachogenerator or encoder	PID controller	Faster / Slower	Reference switching	Freewheel Stop	Fast Stop	Step by step operation	Preset speeds	Speed adjustment with tachogenerator or encoder	Torque limit with AI3	Torque limit with LI	Setpoint latching	FVC closed loop	Open/closed loop switching
DC injection braking	-					↑								X	
Summing inputs		-			X										
PID controller			-	X	X			X	X	X			X		X
Faster / slower			X	-	X			↑	X				X		
Reference switching		X	X	X	-				X						
Freewheel stop	←					-	←								←
Fast stop						↑	-								
Step by step operation			X	←				-	←				X		
Preset speeds			X	X	X			↑	-				X		
Speed adjustment with tachogenerator			X							-				X	
Torque limit with AI3											-	X			
Torque limit with LI											X	-			
Setpoint Latching			X	X				X	X				-		X

FVC closed loop	X					↑				X				-	
Open/closed loop switching			X										X		-
Key:															
X	Incompatible functions.														
	Compatible functions.														
-	Not applicable.														
← ↑	Priority functions that cannot be active at the same time. The function indicated by the arrow takes priority over the other.														

Logic Input Application Functions (Altivar 58 and 58F)

General

The logic input application functions that apply to Altivar 58 and Altivar 58F speed drives are the following:

- Operating direction: forward / reverse *(see page 40)*,
- 2-wire command *(see page 40)*,
- 3-wire command *(see page 40)*,
- Ramp switching *(see page 41)*,
- JOG Step by Step operation *(see page 41)*,
- faster / slower *(see page 41)*,
- preset speeds *(see page 42)*,
- reference switching *(see page 42)*,
- freewheel stop *(see page 42)*,
- DC injection stop *(see page 43)*,
- fast stop *(see page 43)*,
- motor switch:
  - for Altivar 58 *(see page 43)*,
  - for Altivar 58F *(see page 43)*,
- second torque limit *(see page 43)*,
- fault reset *(see page 43)*,
- local forcing *(see page 43)*,
- self-adjust *(see page 44)*.

Operating Direction: Forward / Reverse

Reverse operation can be removed in the case of application with a single motor rotation direction.

2-Wire Command

Operation (forward or reverse) and stopping are controlled by the same logical input, with state 1 (operation) or 0 (stop), or a change in state is taken into account.

3-Wire Command

Operation (forward or reverse) and stopping are controlled by 2 different logical inputs.

LI1 is always assigned to the stop function. Stop is set on opening (state 0). The pulse on the operation input is latched until opening of the stop input.

On power-up, or reset of a manual or automatic fault, the motor can only be supplied after first resetting to zero the orders ‘forward’, ‘reverse’, ‘injection stop’.

Ramp Switching

1st ramp: ACC, DEC; 2nd ramp: AC2, DE2.

There are two possible activation scenarios:

- By activating a logical input Lix,
- By detecting an adjustable frequency threshold.

If a logical input is assigned to the function, then the ramp can only be switched using this input.

JOG Step by Step Operation

Slow-speed operation pulse.

If the JOG contact is closed then operation direction contact activated, and the ramp value is 0.1 s, whatever the ACC, DEC, AC2 and DE2 adjustments.

If the direction contact is closed then the JOG contact activated, the adjusted ramps are used.

The parameters accessible in the adjustment menu are as follows:

- JOG speed,
- Anti-repeat timer (minimum time between 2 JOG commands).

Faster / Slower

Two types of operation are available:

- Use of single action buttons *(see page 45)*:
  - Two logical inputs are needed in addition to the operating direction(s). The input assigned to the **faster** command increases speed, the input assigned to the **slower** command reduces speed.
- Use of double action buttons *(see page 49)*:
  - Only one faster logical input is needed.

Preset Speeds

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

The assignment order to follow is as follows: PS2 (LIx), then PS4 (LIy), then PS8 (LIz).

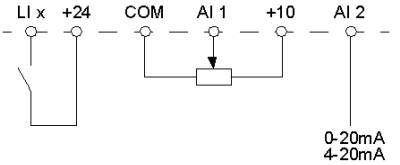
2 preset speeds		4 preset speeds			8 preset speeds			
Assign: LIx to PS2.		Assign: LIx to PS2 then LIy to PS4.			Assign: LIx to PS2, LIy to PS4 then LIz to PS8.			
Lix	Speed reference	Liy	Lix	Speed reference	Liz	LIy	LIx	Speed reference
0	LSP + setpoint	0	0	LSP + setpoint	0	0	0	LSP + setpoint
1	HSP	0	1	SP2	0	0	1	SP2
		1	0	SP3	0	1	0	SP3
		1	1	HSP	0	1	1	SP4
					1	0	0	SP5
					1	0	1	SP6
					1	1	0	SP7
					1	1	1	HSP

NOTE: To unassign logical inputs, the following order must be met: PS8 (LIz), then PS4 (LIy), then PS2 (LIz).

Reference Switching

Switching of two references (AI1 reference and AI2 reference) per order on logical input. This function automatically assigns AI2 to speed reference 2.

The following drawing shows the connection diagram.



AI2 Open contact.
AI1 Closed contact.

Freewheel Stop

This causes the motor to stop only by the resisting torque, and cuts the motor supply.

The freewheel stop is obtained on opening the logical input (state 0).

DC Injection Stop

The injection stop is obtained on closing the logical input (state 1).

Fast Stop

The stop is slowed by the deceleration ramp time, lowered by a reduction coefficient DCF, which appears in the drive menu.

The fast stop is obtained on opening the logical input (state 0).

Motor Switch: Altivar 58

This function is used to supply successively, using the same controller, two motors of differing power ratings, with the switching performed by an appropriate sequence at the output of the controller. The switching is carried out with the engine stopped, and the controller locked.

The following internal parameters are automatically switched by the logical order:

- Rated motor current,
- Brake release current,
- Injection current.

This function automatically inhibits the thermal protection of the second motor. Accessible parameter: PCC motor power ratio in the drive menu.

Motor Switch: Altivar 58F

This function is used to switch operation to open loop or closed loop. This is only possible if the controller is configured in closed loop (parameter CTR = FVC).

For this, FVC closed loop performance must have been previously optimized. After changing the state of the logical input assigned to this function, the switch is only actually performed at the next stop, with the controller locked.

Second Torque Limit

This is the reduction of the maximum motor torque when the logical input is active. The function is accessible using parameter TL2.

Fault Reset to Zero

Two types of reset to zero are available (parameter RST):

- Partial reset to zero *(see page 50)*,
- Total reset to zero *(see page 50)*.

Local Forcing

This is used to switch from a line command mode (serial link) to an offline mode (command using the terminal or the terminal).

Auto-Tuning

The switch to 1 of the assigned logical input triggers an auto-tuning, such as the TUN parameter in the Drive menu.

NOTE: The auto-tuning only takes place if where no command is activated. If a **Freewheel stop** or **Fast stop** function is assigned to a logical input, this input must be set to 1 (active at 0).
It is essential to configure the motor parameters (UNS, FRS, NCR, NSP, COS) before performing auto-tuning.
During auto-tuning, the motor absorbs its nominal current.

⚠ WARNING

UNEXPECTED APPLICATION BEHAVIOR

Do not interrupt the Auto-Tuning (this can last 1 minute).

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

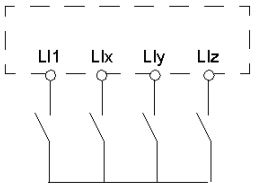
Logic Input Application Functions (Altivar 58 and 58F): faster / slower

Using the Single Action Buttons

This function provides access to the STR setpoint latching parameter in the Configuration menu:

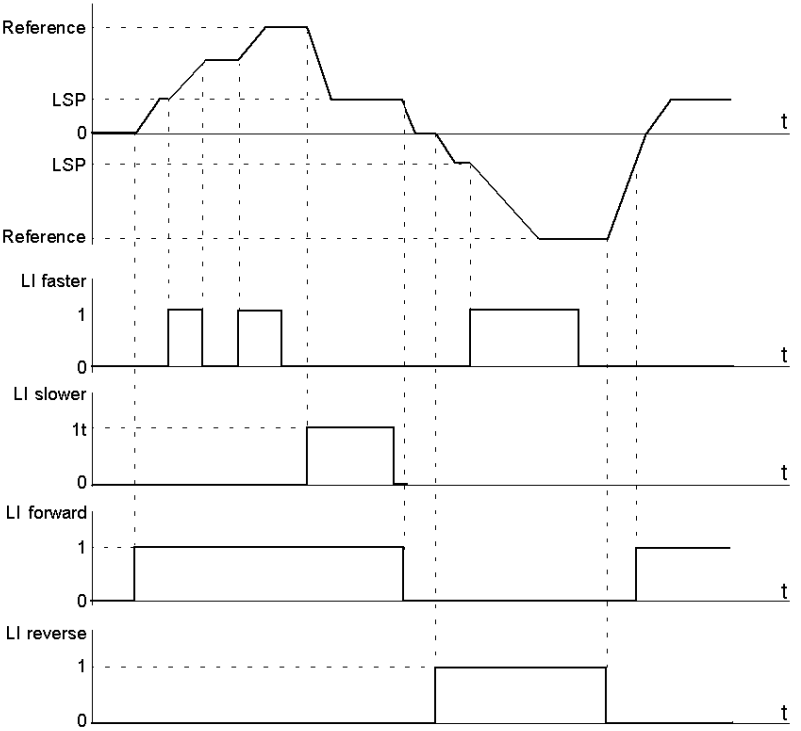
- Rotational speed is limited at the minimum to LSP,
- If STR = No, RAM or EEP, maximal rotational speed is set with analog references (for example, connect AI1 to +10 V).
  If the reference decreases to a point where it is less than rotational speed, then rotational speed is based on the reference. The increasing speed is provided by the active acceleration parameter (ACC, DEC or AC2, DC2),
- If STR = SRE, maximal rotational speed is determined by HSP.
  When the start command is given, the drive goes to the reference setpoint by following the ACC / DEC ramps. Activating faster / slower varies the speed around this setpoint by following the AC2 / DE2 ramps,
- Slower takes priority over faster,
- The SRP parameter is used to limit speed variation increases or decreases around the setpoint. This parameter represents a percentage of the setpoint,
- If the reference changes, the ratio between the reference and the setpoint of the faster / slower correction output is set.

The following is an example of the wiring diagram:

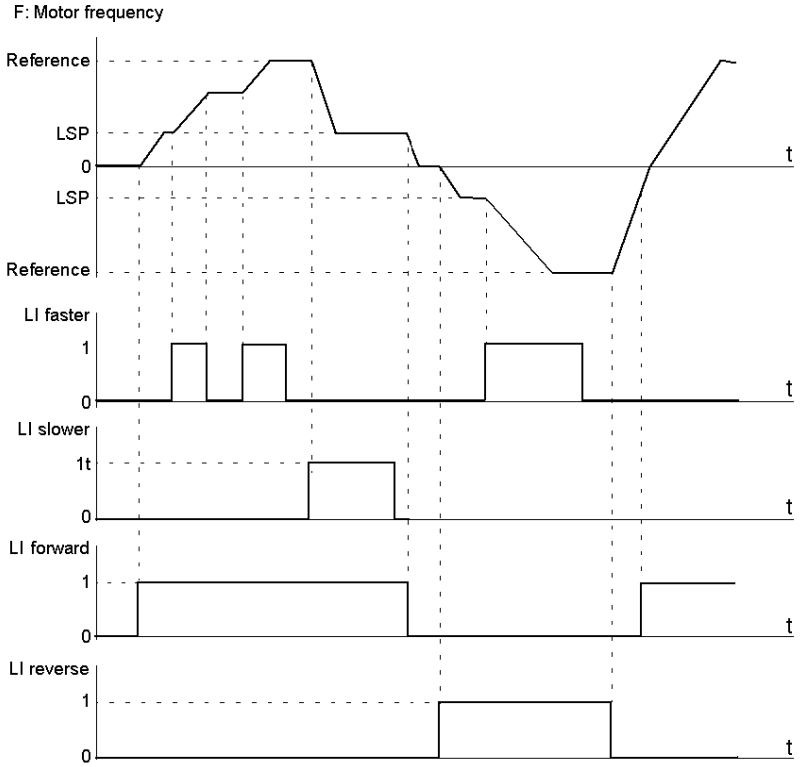


LI1 Forward.
LIx Reverse.
LIy Faster.
LIz Slower.

Faster / slower with single action push buttons and no setpoint latching: STR = No.

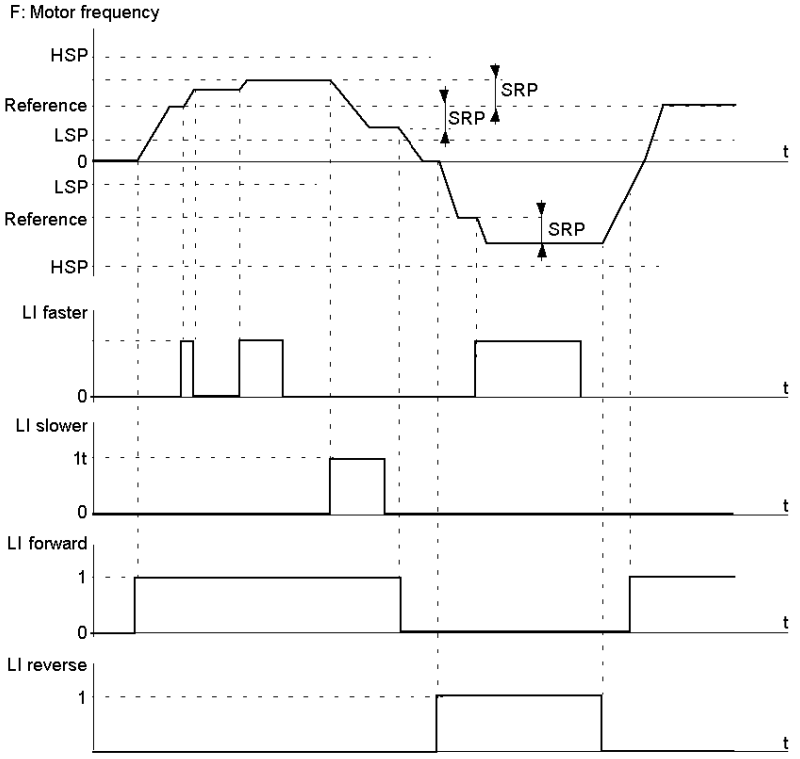


Faster / slower with single action push buttons and setpoint latching: STR = RAM (latching in RAM), STR = EEP (latching in EEPROM).



NOTE: Latching in RAM: On each faster / slower falling edge, the setpoint is latched. Thus, following a drive stop without power down, when a start command appears, the frequency increases to the latched value if the faster / slower values are not activated. Slower / faster still have priority.
Latching in EEPROM: On each faster / slower falling edge, the setpoint is latched. Thus, following a drive stop with or without power down, when a start command appears, the frequency increases to the latched value if the faster / slower values are not activated. Slower / faster still have priority.

Faster / slower with single action push buttons and no setpoint latching: STR = SRE.



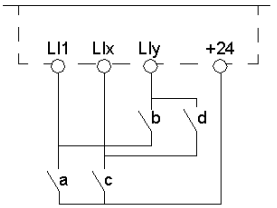
NOTE: Variations around the setpoint via faster / slower are carried out by following the AC2 / DE2 ramps.

Using the Double Action Buttons

A double action push button is provided for each rotational direction. Each pressing action closes a contact.

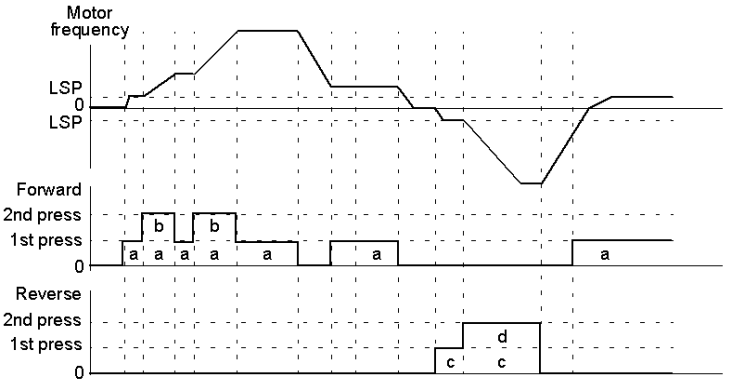
	Up position (slower)	1st press (speed maintained)	2nd press (faster)
Forward button	-	contact a	contacts a and b
Reverse button	-	contact c	contacts c and d

The following diagrams show an example of wiring:



LI1 Forward.
LIx Reverse.
LIy Faster.

Faster / slower with single action push buttons and setpoint latching.



NOTE: This faster/slower type is incompatible with the 3 wire command. In this case, the slower function is automatically assigned to the logic input having the higher index (for example: LI3 (faster), LI4 (slower)).
In this case, use of maximal speed is given by the setpoints applied to the analog inputs. For example, connect AI1 to +10V.

Logic Input Application Functions (Altivar 58 and 58F): Reset to Zero Fault

Partial Reset

The partial reset function (RST = RSP) can be used to clear the stored fault and reactivate the drive if the reason for the fault has disappeared.

The faults concerned by partial clearing are the following:

- Network overvoltage,
- Communication fault,
- Motor overheating,
- Bus DC overvoltage,
- Motor overload,
- Serial link fault,
- Motor phase loss,
- 4-20 mA loss,
- Drive overheating,
- Load veering,
- External error,
- Overspeed.

Total Reset

The total reset function (RST = RSG) is an inhibition (forced start) of all faults except SCF (motor short circuit) while the assigned logic input is closed.

Logic Input Application Functions (Altivar 58F)

General

The logic input application functions that apply only to Altivar 58F speed drives are the following:

- Setpoint latching *(see page 51)*,
- Motor fluxing *(see page 52)*,
- Torque limitation with A1 *(see page 52)*.

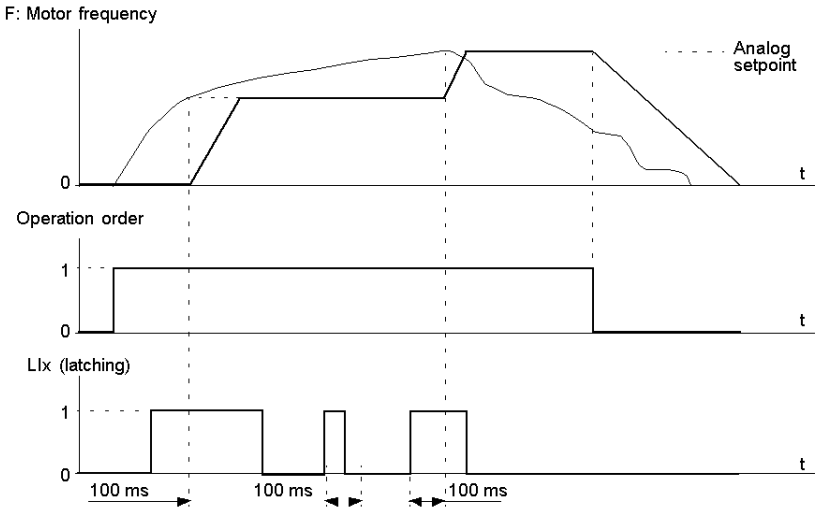
Setpoint Latching

This is the acknowledgement and latching of a speed setpoint level on the setpoint input, via a command on a logic input of a duration exceeding 0.1 s.

This function is used to:

- Control the speed of several drives alternatively with a single analog setpoint and a logic input for each drive,
- Enable a line reference (serial link) via a logic input on several drives. These allows motion synchronization by eliminating dispersions on the reference sending.

Setpoint acquisition takes place 100 ms following the rising edge and acquisition request. A new reference is acquired only if a new request is made.



Motor Fluxing

In order to rapidly obtain significant torque at startup, the magnetic flow in the motor must have been previously established.

This function can be chosen for either an open-loop or closed-loop drive:

- In continuous mode (FCT), the drive establishes the flux automatically upon power up,
- In non-continuous mode:
  - If an LI is assigned to the motor flux control, the flux is established once it has been enabled,
  - If an LI was not assigned or if the LI is not active during a start command, fluxing takes place at motor startup.

The value of the fluxing current equals 1.5 x NCR (nominal motor current configured) when the flux is established, and then is regulated to the value of the motor magnetizing current.

Torque Limitation with A1

This function is only accessible if an analog input is assigned when torque is limited:

- If the logic input is set to 0, the limitation is provided by the TL1 or TL2 adjustments,
- If the logic input is set to 1, the limitation is provided by the analog input assigned to this function.

Analog Input Application Functions (Altivar 58)

General

The analog input application functions (A12 assignment) that apply to Altivar 58 speed drives are the following:

- Summing speed reference,
- PI controller.

NOTE: The AI1 input is always the speed reference.

Summing Speed Reference

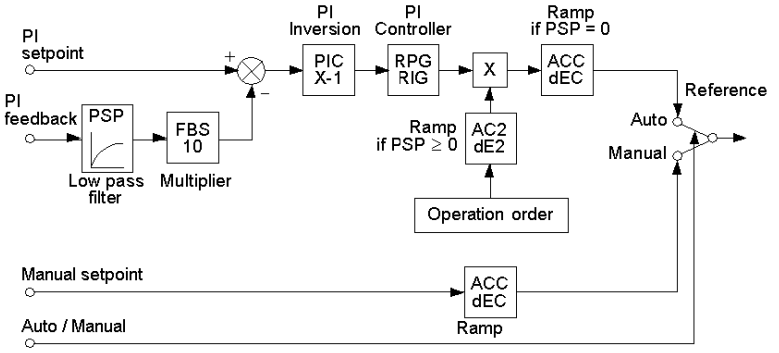
The frequency setpoints from AI2 and AI3 can be summed with AI1.

PI Controller, Diagram

This function can be used to regulate a process with a reference and feedback provided by a sensor. With the PI function, ramps are all linear, even if they are configured differently.

An example of usage is the regulation of traction via replica master.

PI controller function is active if an AI input is assigned to PI feedback. PID controller function is active if an AI input is assigned to PID feedback.



PI Controller, Description

The following table describes the elements of the diagram.

<table>
<tr><th>Element</th><th colspan="5">Description</th></tr>
<tr><td>PI setpoint</td><td colspan="5">● Setpoint via communication link (serial link) or
● 2 or 4 setpoints preset via logic inputs or
● AI1 analog input (+ AI2).</td></tr>
<tr><td>PI feedback</td><td colspan="5">● AI2 analog input.</td></tr>
<tr><td>Auto / Manual</td><td colspan="5">● LI logic input, for switching operation to speed regulation (manual), if LIx = 1, or PID regulation (auto) if LIx = 0,
● In automatic mode, it is possible to:
❍ Adapt the return by FBS,
❍ Correct PI inversion,
❍ Adjust the proportional and integral gains (RPG, RIG),
❍ Apply a ramp to establish the action of the PI (AC2) on starting if PSP > 0.
If PSP = 0, active ramps are ACC / DEC.
When stopped, ramp DEC is always used,
● The motor speed is limited between LSP and HSP,
● Values are displayed as percentages.</td></tr>
<tr><td rowspan="6">Preset setpoints</td><td colspan="5">2 or 4 preset setpoints require the use of 1 or 2 logic inputs respectively.</td></tr>
<tr><td colspan="2">2 preset setpoints</td><td colspan="3">4 preset setpoints</td></tr>
<tr><td colspan="2">Assign: LIx to PR2.</td><td colspan="3">Assign: LIx to PR2, then LIy to PR4.</td></tr>
<tr><td>LIx</td><td>Reference</td><td>LIy</td><td>LIx</td><td>Reference</td></tr>
<tr><td>0</td><td>Analog setpoint</td><td>0</td><td>0</td><td>Analog setpoint</td></tr>
<tr><td>1</td><td>Process max</td><td>0</td><td>1</td><td>PI2 (adjustable)</td></tr>
<tr><td colspan="2" rowspan="2"></td><td>1</td><td>0</td><td>PI3 (adjustable)</td></tr>
<tr><td>1</td><td>1</td><td>Process max (= 10 V)</td></tr>
</table>

Analog Input Application Functions (Altivar 58F)

General

The analog input application functions (A12 assignment) that apply to Altivar 58F speed drives are the following:

- Summing and subtraction speed reference *(see page 55)*,
- PID controller *(see page 56)*,
- Torque limitation *(see page 58)*.

NOTE: The AI1 input is always the speed reference.

Summing and Subtraction Speed Reference

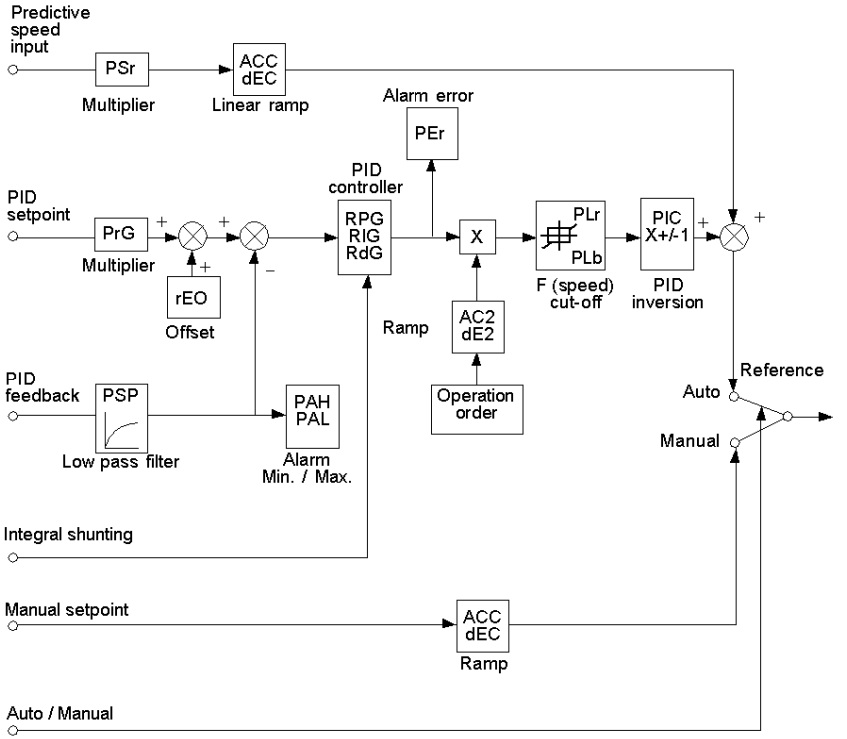
The setpoint frequency from AI2 can be summed with AI1.

PID Controller, Diagram

This function can be used to regulate a process with a reference and feedback provided by a sensor. A speed input gives an initial (or predictive) setpoint for startup. With the PID function, ramps are all linear, even if they are configured differently.

An example of usage is the regulation of traction via replica master.

PID controller function is active if an AI input is assigned to PID feedback.



PID Controller, Description

The following table describes the elements of the diagram.

<table>
<tr><th>Element</th><th colspan="5">Description</th></tr>
<tr><td>Speed input</td><td colspan="5">● Setpoint via communication link (serial link).</td></tr>
<tr><td>PID setpoint</td><td colspan="5">● Setpoint via communciation link (serial link) or
● 2 or 4 setpoints preset via logic inputs or
● AI1 (+ or - AI2) analog input.</td></tr>
<tr><td>PID feedback</td><td colspan="5">● AI2 analog input.</td></tr>
<tr><td>Integral shunting</td><td colspan="5">● LI logic input: integral shunted if LIx = 1.</td></tr>
<tr><td>Auto / Manual</td><td colspan="5">● LI logic input, for switching operation to speed regulation (manual), if LIx = 1, or PID regulation (auto) if LIx = 0,
● In automatic mode, it is possible to:
❍ Adapt the setpoint input to the process feedback: GAIN (PRG) and OFFSET (REO),
❍ Correct PID inversion,
❍ Adjust the proportional, integral and derivative gains (RPG, RIG and RDG),
❍ Use the Alarm on logic output if a threshold is exceeded (Max. feedback, Min. feedback and PID error),
❍ Assign an analog output for the PID setpoint, PID feedback and PID error,
❍ Limit the action of the PID according to the speed, with an adjustable base and ratio,
❍ Apply a ramp to establish the action of the PID on starting (AC2) and stopping (dE2),
● The motor speed is limited between LSP and HSP,
● Values are displayed as percentages.</td></tr>
<tr><td rowspan="8">Preset setpoints</td><td colspan="5">2 or 4 preset setpoints require the use of 1 or 2 logic inputs respectively.</td></tr>
<tr><td colspan="2">2 preset setpoints</td><td colspan="3">4 preset setpoints</td></tr>
<tr><td colspan="2">Assign: LIx to PR2.</td><td colspan="3">Assign: LIx to PR2, then LIy to PR4.</td></tr>
<tr><td>LIx</td><td>Reference</td><td>LIy</td><td>LIx</td><td>Reference</td></tr>
<tr><td>0</td><td>Analog setpoint</td><td>0</td><td>0</td><td>Analog setpoint</td></tr>
<tr><td>1</td><td>Process max</td><td>0</td><td>1</td><td>PI2 (adjustable)</td></tr>
<tr><td colspan="2" rowspan="2"></td><td>1</td><td>0</td><td>PI3 (adjustable)</td></tr>
<tr><td>1</td><td>1</td><td>Process max (= 10 V)</td></tr>
</table>

Torque Limit

AI2 analog input. The signal applied to AI acts in a linear way on the internal torque limit (TLI parameter in the configuration menu):

- If A = 0 V: limit = TLI x 0 = 0,
- If AI = 10 V: limit = TLI.

Examples of applications include:

- Load compensation,
- Torque correction,
- Traction correction,
- ...

Logical Output Application Functions (Altivar 58 and 58F)

General

The logical output application functions (relay R2) that apply to Altivar 58 and Altivar 58F speed drives are the following:

- downstream contactor command *(see page 59)*,
- drive running *(see page 59)*,
- frequency threshold attained *(see page 59)*,
- setpoint attained *(see page 59)*,
- fast speed attained *(see page 60)*,
- current threshold attained *(see page 60)*,
- thermal state attained *(see page 60)*,
- PID error *(see page 60)* (only for Altivar 58F),
- PID return alarm *(see page 60)* (only for Altivar 58F),
- brake command:
  - for Altivar 58 *(see page 60)*,
  - for Altivar 58F *(see page 60)*,
- loss of 4-20 mA *(see page 60)*,
- frequency threshold 2 attained *(see page 61)*.

Downstream Contactor Command

This function enables the speed drive to command a loop contactor (between the speed drive and the motor).

The request to close the contactor is made when an operation order appears.

The request to open the contactor is made when there is no more current in the motor.

If a DC injection braking function is configured, this must not be left to act too long when stopped, as the contactor will only open at the end of braking.

Drive Running (RUN)

The logical output is set to 1 if the output is supplied by the speed controller (presence of current), or if an operation order is present, with a zero reference.

Frequency Threshold Attained (FTA)

The logical output state is 1 if the motor frequency is greater than or equal to the frequency threshold set by FTD in the adjust menu.

Setpoint Attained (SRA)

The logical output state is 1 if the motor frequency is equal to the setpoint value.

Fast Speed Attained (FLA)

The logical output state is 1 if the motor frequency is equal to HSP.

Current Threshold Attained (CTA)

The logical output state is 1 if the motor current is greater than or equal to the current threshold set by CTD in the adjust menu.

Thermal State Attained (TSA)

The logical output state is 1 if the motor thermal state is greater than or equal to the thermal state threshold set by TTD in the drive screen's adjust menu.

PID Error (PEE)

NOTE: Only for Altivar 58F speed drives.

The logical output state is 1 if the PID controller output error is greater than the threshold set by the PER parameter.

PID Return Alarm (PFA)

NOTE: Only for Altivar 58F speed drives.

The logical output state is 1 if the PID return exceeds the range set by the PAH and PAL parameters.

Brake Command (BLC): Altivar 58

This function *(see page 62)* is used to manage an electro-magnetic brake using the controller, for vertical release applications. For horizontal movement brakes, use the Drive Running function.

Brake Command (BLC): Altivar 58F

This function *(see page 65)* is used to manage an electro-magnetic brake using the controller, for vertical and horizontal release applications, and for unbalanced machines (parking brake):

- Vertical release movement: maintain a motor torque in the slope direction during the opening and closing phases of the brake, in order to retain the load, and start smoothly when the brake releases,
- Horizontal release movement: synchronize the release of the brake on reaching the torque on start-up, and the closing of the brake when stopped at zero speed, to eliminate jolts.

Loss of 4-20 mA (APL)

The logical output is set to 1 if the signal on the 4-20 mA input is less than 2 mA.

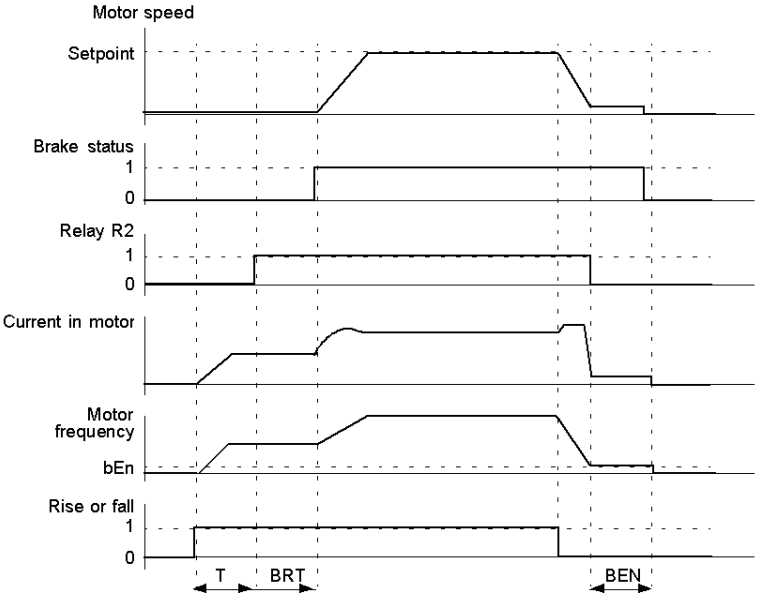
Frequency Threshold 2 Attained (F2A)

The logical output state is 1 if the motor frequency is greater than or equal to the frequency threshold set by F2D in the adjust menu.

Logic Output Application Functions: Altivar 58 Brake Command

Illustration

The following diagram shows an example of the brake command function.



T Time out not adjustable.

Description

The following table shows adjustments that can be accessed in the Setting menu.

Code	Label
BRL	Brake release frequency.
IBR	Brake release current.
BRT	Brake release time out.
BET	Brake engage frequency.
BEN	Brake engage time out.

Recommendations for use:

The following table presents adjustment recommendations for the brake command in a vertical release application.

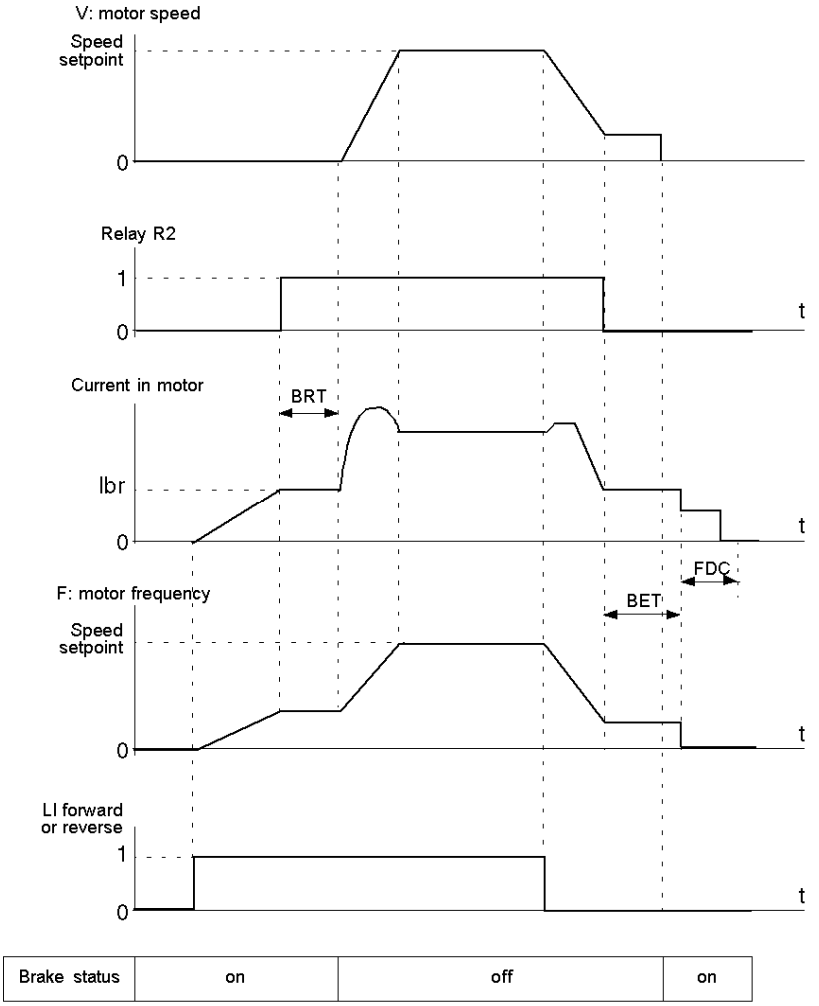
	Type of adjustment	Recommendation
1	Brake release frequency (BRL)	Adjust the brake release frequency to the value: ● Nominal slip multiplied by the nominal frequency in Hz (s x FS). Calculation Mode: ● slip = (Ns - Nr)/Ns, with: ❍ Ns = synchronism speed in rpm. For a 50 Hz network: Ns = 3000 rpm for a motor with 1 pair of poles, 1500 rpm for a motor with 2 pairs of poles, 1000 rpm for a motor with 3 pairs of poles and 750 rpm for motor with 4 pairs of poles. For a 60 Hz network: Ns = 3600 rpm for a motor with 1 pair of poles, 1800 rpm for a motor with 2 pairs of poles, 1200 rpm for a motor with 3 pairs of poles and 900 rpm for motor with 4 pairs of poles. ❍ Nr = nominal speed at nominal torque in rpm; use the speed shown on the motor plate. ● Release frequency = s x Fs, with: ❍ g = slip calculated previously. ❍ Fs = nominal motor frequency (shown on the motor plate). **Example:** for a motor with 2 pairs of poles, whose motor plate specifies 1430 rpm, 50 Hz network. ● s = (1500 - 1430) / 1500 = 0.0466. ● Brake release frequency = 0.0466 x 50 = 2.4 Hz. (1)
2	Brake release current (IBR).	Adjust the brake release current to the nominal current shown on the motor plate. (1)
3	Acceleration time	For the release applications, it is recommended that you adjust the acceleration ramps that exceed 0.5 seconds. Make sure that the drive does not exceed the current limitation. The same recommendation as above applies to deceleration. **Reminder:** for a release movement, brake resistance must be used, and you must ensure that the selected adjustments and configurations do not trigger a drop or loss of control of the load being lifted.
4	Brake release time out (BRT)	Adjust according to the brake type: this is the time the mechanical brake requires to open.

	Type of adjustment	Recommendation
5	Brake engage frequency (BET)	Adjust to 2 times the nominal slip (in the example, 2 x 2.4 = 4.8 Hz). Then adjust according to the result.
6	Brake engage time out (BEN)	Adjust according to the brake type: this is the time the mechanical brake requires to engage.
Key:		
(1)	**Remark:** the values indicated (release currency and frequency) correspond to theoretical values. If, during tests, torque based on the theoretical values proves insufficient: keep the brake release current at nominal motor current and lower brake release frequency (to 2/3 of nominal slip). If you are still not satisfied with the result, return to the theoretical values, then raise the brake release current (maximal value is imposed by the drive) and raise the brake release frequency gradually.	

Logic Output Application Functions: Altivar 58F Brake Command

Illustration

The following diagram shows an example of the brake command function, with open loop brake logic operation.



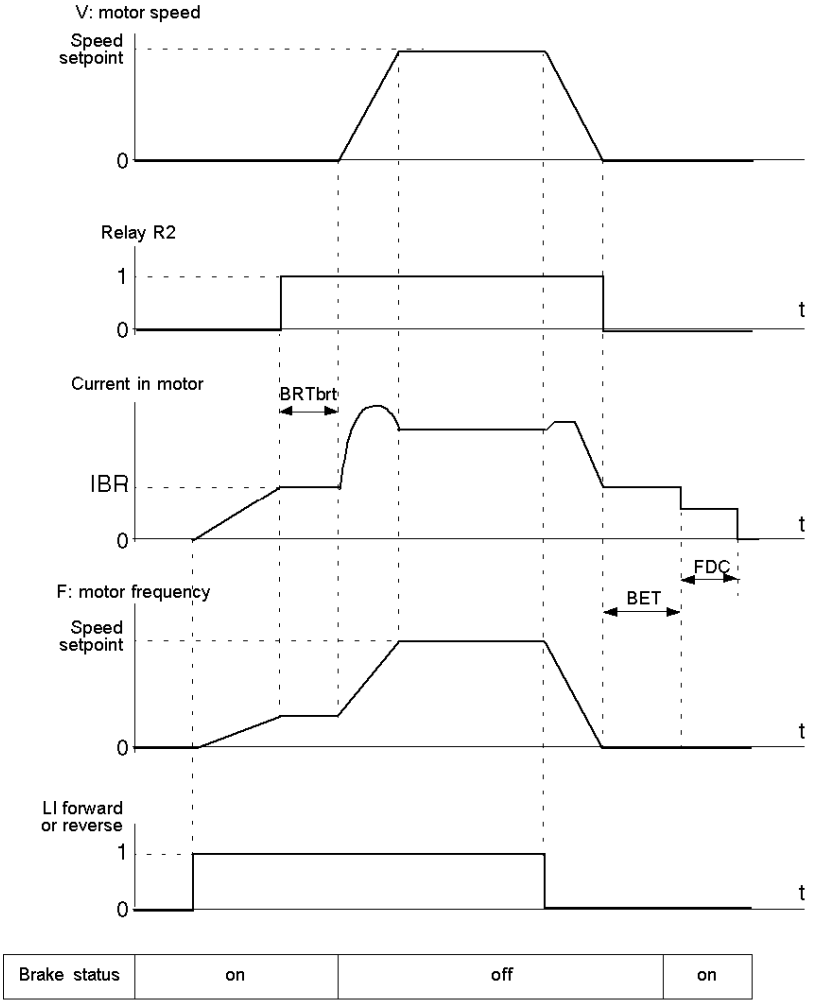
Description

The table below shows the different adjustments accessible in the drive screen's Adjust menu.

Code	Label
BRT	Brake release time out.
IBR	Brake release current.
BEN	Brake engage frequency.
BET	Brake engage time out.
TDC	DC injection braking time when stopped.
BIP	Brake release pulse. When set to **Yes**, it provides motor torque before brake release that is always in the **FW** (forward), direction, which for vertical release, should correspond to the raise direction. When set to **No**, the torque direction corresponds to the operating direction requested for horizontal release.

Illustration

The following diagram shows an example of the brake command function, with closed loop operation of brake logic.



Description

The following table shows adjustments that can be accessed in the Adjust menu.

Code	Label
BRT	Brake release time out.
IBR	Brake release current.
BET	Brake engage time out.
BIP	Brake release pulse. When set to **YES**, it provides motor torque before brake release that is always in the **FW** (forward), direction, which for vertical release, should correspond to the raise direction. When set to **NO**, the torque direction corresponds to the operating direction requested for horizontal release.
TDC	Time for which zero speed is maintained when stopped.

Recommendations for Use:

The following table presents adjustment recommendations for the brake command in a vertical release application (for a horizontal release application, set **IBR** to **0** (zero) and **BIP** to **NO**).

	Type of adjustment	Recommendation
1	Brake release pulse (BIP)	Select **YES**. Ensure that the **FW** rotational direction corresponds to raising the load.
2	Brake release current (IBR).	Adjust the brake release current to the nominal current shown on the motor plate. If during tests, torque is insufficient, increase brake release current (maximum value is imposed by the drive).
3	Acceleration time	For the release applications, it is recommended that you adjust the acceleration ramps that exceed 0.5 seconds. Make sure that the drive does not exceed the current limitation. The same recommendation as above applies to deceleration. **Reminder:** for a release movement, brake resistance must be used, and you must ensure that the selected adjustments and configurations do not trigger a drop or loss of control of the load being lifted.
4	Brake release time out (BRT)	Adjust according to the brake type: this is the time the mechanical brake requires to open.
5	Brake engage frequency (BEN)	In open loop operation (CTR = SVC), adjust to 2 times nominal slip, then adjust according to the result.
6	Brake engage time out (BET)	Adjust according to the brake type: this is the time the mechanical brake requires to engage.

Assignment of Inputs/Outputs

General

Assignments can only be modified when stopped, with the controller locked.

Factory configurations are pre-assigned by the selected macro-configuration.

Assignment of Configurable Inputs

The following table provides a summary of the assignments of configurable inputs.

Drive			AI2 analog input	3 logical inputs LI2 to LI4
NO: Not assigned	(Unassigned)		X	X
RV: Run Reverse	(Reverse direction)			X
RP2: Ramp Switching	(Ramp switching)			X
JOG: JOG Pulse	(Step by step operation)			X
+SP: faster	(Faster)			X
-SP: slower	(Slower)			X
PS2: 2 Preset Speeds	(2 preset speeds)			X
PS4: 4 Preset Speeds	(4 preset speeds)			X
PS8: 8 Preset Speeds	(8 preset speeds)			X
NST: Freewheel stop	(Freewheel stop)			X
DCI: DC Injection	(Injection stop)			X
FST: Fast Stop	(Fast stop)			X
CHP: Motor Switching	Altivar 58	(Motor switching)		X
	Altivar 58F	(Open / closed loop switch if CTR = FVC)		
TL2: Trq.Limit. 2	(Second torque limit)			X
FLO: Forced local				X
RST: Fault Reset				X
RFC: Switch Ref.				X
ATN: Auto Tuning				X
SPM: Setp.latch (1)	(Setpoint latching)			X
FLI: Motor flux (1)	(Motor fluxing)			X
PAU: PID Auto/man	(PID auto/manual) if AI2 = PIF			X
PIS: Int Shunt (1)	(PID integral shunt) if one AI = PIF			X

Drive		AI2 analog input	3 logical inputs LI2 to LI4
PR2: 2 PID setp	(2 PID preset setpoints) if AI2 = PIF		X
PR2: 4 PID setp	(4 PID preset setpoints) if AI2 = PIF		X
TLA: Torque limit (1)	(Torque limit by AI) if one AI = ATL		X
FR2: Speed ref. 2		X	
SAI: Summed Reference		X	
PIF: PI feedback		X	
DAI: Subtract ref (1)	(Subtract reference)	X	
ATL: Torque Limit 2 (1)	(Torque limit)	X	
Key:			
(1)	Only for Altivar 58F.		

Assignment of Configurable Outputs

The following table provides a summary of the assignments of configurable outputs.

Drive		Relay R2
NO: Unassigned	(Unassigned)	X
RUN: Drive running	(Drive running)	X
OCC: Contactor comm	(Downstream contactor command)	X
FTA: Freq.Th. Att.	(Frequency threshold attained)	X
FLA: HSP Attained	(HSP attained)	X
CTA: I.Th. Att.	(Current threshold attained)	X
SRA: Speed.Ref.Att.	(Speed reference attained)	X
TSA: Therm.Th.Att.	(Frequency attained) (Thermal threshold attained)	X
BLC: Brake Logic	(Brake logic)	X
PEE: PID error (1)	(PID error) if one AI = PIF	X
PFA: PID Feed alm (1)	(PID alarm feedback) if one AI = PIF	X

Drive		Relay R2
APL: Loss 4-20 mA	(Loss of reference 4-20 mA)	X
F2A: F2 Thr.Att	(2nd frequency threshold attained)	X
Key:		
(1)	Only for Altivar 58F.	

Parameters to Adjust

The following table provides a summary of the parameters to adjust.

I/O		Assignments	Parameters to adjust	
LI	RP2	Ramp switching	AC2 dE2	
LI	JOG	Step by step operation	JOG JGT	
LI	PS4	4 preset speeds	SP2-SP3	
LI	PS8	8 preset speeds	SP4-SP5-SP6-SP7	
LI	DCI	Injection stop	IDC	
LI	TL2	Second torque limit	TL2	
AI	PIR	PI controller	Altivar 58	RPG-RIG-FBS-PIC
			Altivar 58F	RPG-RIG-RDG-PIC-REO-PRG-PSR-PSP-PLR-PLB
R2	BLC	Braking logic	BRL-IBR-BRt-BEN-BET	
R2	FTA	Frequency threshold attained	FTD	
R2	CTA	Current threshold attained	CTD	
R2	TSA	Thermal threshold attained	TTD	
R2	APL	Loss of reference 4-20 mA	LFL	
R2	F2A	2nd frequency threshold attained	F2D	
R2 (1)	PEE	PID error	PER	
R2 (1)	PFA	PID feedback alarm	PAL - PAH	
Key:				
(1)	Only for Altivar 58F.			

Chapter 4
Adjusting the Altivar Variable Speed Controllers

Subject of this Chapter

This chapter describes the Adjustment aspect of software installation for Altivar 58 and 58F variable speed controllers.

What Is in This Chapter?

This chapter contains the following topics:

Description of the Adjustment Screen for an Altivar 58 or 58F Variable Speed Controller on the Fipio Bus

At a Glance

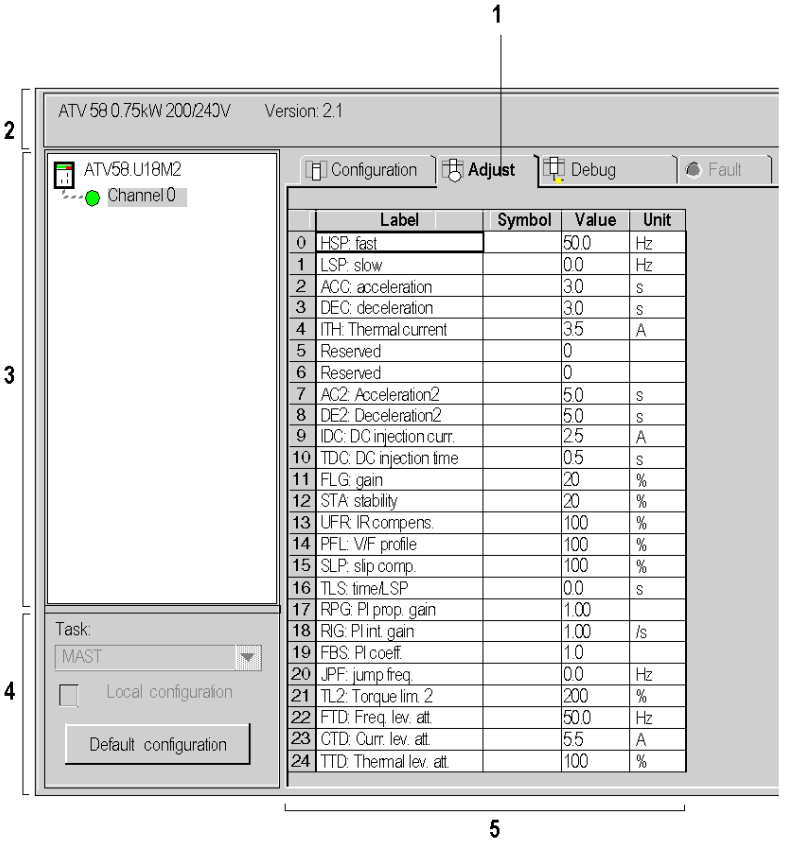
This screen, divided into several areas, is used to access the adjustment parameters of the Altivar 58 or 58F variable speed controller selected on the Fipio bus.

NOTE: The manual modification of certain configuration and/or adjustment parameters leads to the automatic modification of the associated configuration and/or adjustment parameters.
A warning message will appear on the screen, with the automatically modified parameters displayed in blue.

NOTE: You can access adjustment for the **ATV 58 PKW**, **ATV 38 PWK** and **ATV 68** variable speed controllers by following the standard Fipio bus profiles *(see Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual)* procedure.

Illustration

This screen is used to display and modify adjustment parameters.



	Label	Symbol	Value	Unit
0	HSP: fast		50.0	Hz
1	LSP: slow		0.0	Hz
2	ACC: acceleration		3.0	s
3	DEC: deceleration		3.0	s
4	ITH: Thermal current		3.5	A
5	Reserved		0	
6	Reserved		0	
7	AC2: Acceleration2		5.0	s
8	DE2: Deceleration2		5.0	s
9	IDC: DC injection curr.		2.5	A
10	TDC: DC injection time		0.5	s
11	FLG: gain		20	%
12	STA: stability		20	%
13	UFR: IR compens.		100	%
14	PFL: V/F profile		100	%
15	SLP: slip comp.		100	%
16	TLS: time/LSP		0.0	s
17	RPG: PI prop. gain		1.00	
18	RIG: PI int. gain		1.00	/s
19	FBS: PI coeff.		1.0	
20	JPF: jump freq.		0.0	Hz
21	TL2: Torque lim. 2		200	%
22	FTD: Freq. lev. att.		50.0	Hz
23	CTD: Curr. lev. att.		5.5	A
24	TTD: Thermal lev. att.		100	%

Description

The table below shows the different elements of the adjustment screen and their functions.

Number	Element	Function
1	Tabs	The tab in the foreground indicates the mode in progress (**Adjust** in this example). Each mode can be selected using the respective tab. The available modes are: ● **Configuration**, ● **Adjust**, ● **Debug**, accessible only in Online mode, ● **Fault** (channel level) accessible only in online mode.
2	**Module** zone	Gives a reminder of the device's shortened name. In online mode, this area also includes the three LEDs **Run**, **Err** and **IO**.
3	**Channel** zone	Allows you: ● By clicking on the device reference number, to display the tabs: ❍ **Description** which gives the characteristics of the device, ❍ **I/O Objects** *(see EcoStruxure™ Control Expert, Operating Modes)* which is used to presymbolize the input/output objects, ❍ **Fault** which shows the device faults (only accessible in online mode). ● To select the channel, ● To display the **Symbol**, name of the channel defined by the user (using the variable editor).
4	**General parameters** zone	The **Task** drop-down menu is used to select the type of associated task (**MAST** or **FAST**) in which the channels' implicit exchange objects will be exchanged. The **Local configuration** check box indicates: ● When unchecked: the configuration is sent to Altivar by the Control Expert software, ● When checked: the configuration is performed locally (for example, a serial link). The **Default parameters** button is used to return to the default parameters.
5	**Parameters in progress** zone	This is used to define the adjustment parameters of the different channels. This area includes various columns: ● **Label**, which defines the available parameters *(see page 77)*, ● **Symbol**, which displays the symbol associated with the channel when it has been defined by the user (using the variable editor), ● **Value**, which is used to select the value to assign the parameter, ● **Unit**, which displays the measurement unit of the parameter.

Adjustment Parameters

General

Adjustment parameters can be modified when the device is stopped or operating.

⚠ WARNING

UNEXPECTED APPLICATION BEHAVIOR

Before changing the Adjustment Parameters, stop connected devices or ensure that the consequences of the change on the application are acceptable.

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

NOTE: Ensure that changes made during operation pose no danger to personnel or hardware. It is preferable to make changes when the device is stopped.

Parameters

The LSP/HPS parameters can be handled with a simple application using Control Expert.

For example, if HSP_var and LSP_var are user application variables:

- If Speed is between the maximum speed and HSP_var, set Speed to the HSP_var
- If Speed is between LSP_var and 0, set Speed to the LSP_var

The following table shows the adjustment parameters.

Label	Code		Description	Adjustment range	Factory setting
Low speed - Hz	LSP	Low speed(7)		0 to HSP	0 Hz
High speed - Hz	HSP	High speed (7): Ensure that this setting is acceptable for the motor and the application.		LSP to TFR	50/60 Hz depending on the switch
Acceleration - s	ACC	**Altivar 58**	Acceleration and deceleration ramp times. Defined to range from 0 to nominal motor frequency (FRS).	0.1 to 999.9	3 s
		Altivar 58F		0.1 to 999.9	
Deceleration - s	DEC	**Altivar 58**		0.1 to 999.9	
		Altivar 58F		0.1 to 999.9	
I Thermal-A	ITH	Current used for motor thermal protection. Adjust ITH to the nominal intensity shown on the motor's rating plate.		1 to 1.36 In (6)	According to drive rating
Accel. 2- s (2)	AC2	**Altivar 58**	2nd ramp acceleration time.	0.05 to 999.9	5 s
		Altivar 58F		0.1 to 999.9	
Decel. 2- s (2)	DE2	**Altivar 58**	2nd ramp deceleration time.	0.05 to 999.9	5 s
		Altivar 58F		0.1 to 999.9	

Label	Code	Description		Adjustment range	Factory setting
I Inj. DC-A	IDC	DC injection braking intensity. After 30 seconds, the injection current peaks at 0.5 Ith if it has been set to a greater value.		0.10 to 1.36 In	According to drive caliber
DC-s Inj time	TDC	**Altivar 58**	DC injection braking time. If TDC = 30.1: continuous current injection when stopped. (3)	0 to 30 s 30.1 = permanent	0.5 s
		Altivar 58F	If CTR = SVC: DC injection braking time. If CTR = FVC: time for which zero speed is maintained when stopped.		
Gain - %	FLG	Frequency loop gain: enables adaptation of machine speed transients according to dynamics. For machines with high resistant torque or significant inertia with fast cycles, increase the gain progressively.		0 to 100	20
Stability - %	STA	Enables the load reached after a transient to be adapted according to machine dynamics. Progressively increase stability in order to eliminate speed overflows.		0 to 100	20
Compens. RI-%	UFR	Enables the default value or the value measured during autotuning to be adjusted. The adjustment range is extended to 800 % if the SPC parameter (special motor) in the drive menu is **YES**.		0 to 150 % or 0 to 800 %	100 %
U/f Profile - % (4)	PFL	Enables the quadratic supply law to be adjusted when the power saving function has been inhibited.		0 to 100 %	100 %
Slip Comp. -%	SLP	Enables slip compensation to be adjusted based on the value determined by nominal engine speed.		0 to 150 %	100 %
LSP-s time	TLS	Operating time at low speed. Following operation in LSP during a defined period, the motor is automatically requested to stop. The motor restarts if the reference frequency is greater than the LSP and if a start command is still present.		no - 0.1 to 999.9	no (no time limitation)
Prop. Gain PI	RPG	Proportional gain of the PI controller.		0.01 to 100	1
Int. gain PI - /s	RIG	Integral gain of the PI controller.		0.0 to 100/s	1/s
Der. gain PID (5)	RDG	Derived gain of the PID controller.		0.00 to 100.0	1

Label	Code	Description	Adjustment range	Factory setting
Offset PID (5)	REO	Enables the process range to be adapted. It is calculated by the user: $REO = \frac{Miniprocess - Retourmini}{Retourmaxi - Retourmini} \times 999$	-999 to 999	0
Cons. gain PI (5)	PRG	Enables the process range to be adapted. It is calculated by the user: $PRG = \frac{Maxiprocess - Miniprocess}{Retourmaxi - Retourmini} \times 999$	-999 to 999	999
Ret. Coef. PI (4)	FbS	Multiplication coefficient of PI feedback.	1 to 100	1
Inversion PI	PIC	Inversion of PI controller correction direction: • **NO**: normal, • **YES**: inverse.	No - Yes	No
Skip freq.-Hz	JPF	Skip frequency: prohibits prolonged operation on a frequency range of + 2.5 Hz around JPF. This function enables a critical speed causing resonance to be suppressed.	0 to HSP	0 Hz
Torque Lim. 2- %	TL2	Second torque limitation level activated by a logic input.	0 to 200 % (1)	200 %
Freq. Detect. - Hz	FTD	Motor frequency threshold beyond which the logic output changes to state 1.	LSP to HSP	50/60 Hz
Detection I - A	CTD	Current frequency threshold beyond which the logic output or the relay changes to state 1.	0.25 to 1.36 In (6)	1.36 In (6)
Therm detect- %	TTD	Motor thermal state threshold beyond which the logic output or the relay changes to state 1.	0 to 118 %	100 %
Brake Rel. Freq.-Hz	BRL	Brake release frequency.	0 to 10 Hz	0 Hz
Brake rel. I-A	IBR	Brake release current.	0 to 1.36 In (1)	0 A
Brake release time-s	BRT	Brake release time.	0 to 5 s	0 s

Label	Code	Description	Adjustment range	Factory setting
Brake engage freq.-Hz	BEN	Brake engage frequency.	0 to LSP	0 Hz
Brake engage time-s	BET	Brake engage time.	0 to 5 s	0 s
Key:				
(1)	100 % corresponds to nominal torque of a motor whose power level is the same as that associated with the drive.			
(2)	These parameters can be accessed if: ● The ramp switching threshold (FRT parameter) does not equal 0 Hz, or ● A logic input is assigned at ramp switching or ● AI is on PI return.			
(3)	After 30 seconds, IDC automatically peaks at 0.5 ItH if it has been set to a greater value.			
(4)	Only for Altivar 58.			
(5)	Only for Altivar 58.			
(6)	**In** corresponds to the nominal controller current specified in the catalog and on the controller's rating plate.			
(7)	It is recommended to leave the LSP and HSP values at their factory defaults.			

Chapter 5
Debugging the Altivar Variable Speed Controllers

Subject of this Chapter

This chapter describes the Debug aspect of software installation for Altivar 58 and 58F variable speed controllers.

What Is in This Chapter?

This chapter contains the following topics:

Description of the Debug Screen for an Altivar 58 or 58F Variable Speed Controller on the Fipio Bus

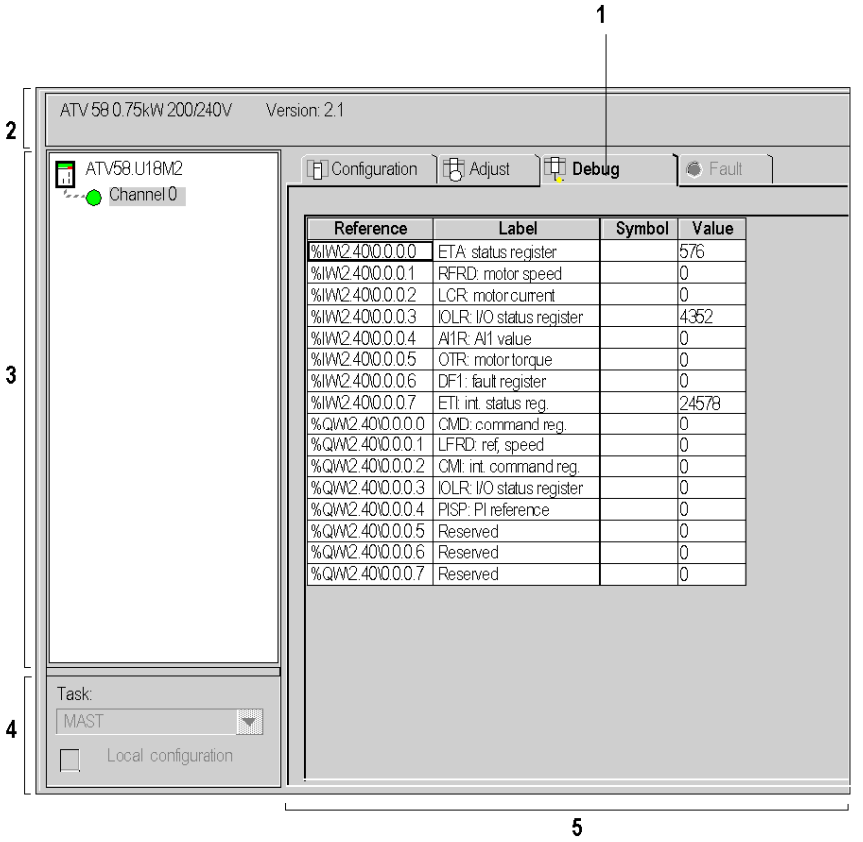
At a Glance

This screen *(see Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual)*, divided into several areas, is used to access the monitoring parameters of the Altivar 58 or 58F variable speed controller selected on the Fipio bus.

NOTE: You can access debugging for the **ATV 58 PKW**, **ATV 38 PWK** and **ATV 68** variable speed controllers by following the standard Fipio bus profiles *(see Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual)* procedure.

Illustration

This screen is used to display and modify monitoring parameters.



Reference	Label	Symbol	Value
%IW2.40\0.0.0.0	ETA: status register		576
%IW2.40\0.0.0.1	RFRD: motor speed		0
%IW2.40\0.0.0.2	LCR: motor current		0
%IW2.40\0.0.0.3	IOLR: I/O status register		4352
%IW2.40\0.0.0.4	AI1R: AI1 value		0
%IW2.40\0.0.0.5	OTR: motor torque		0
%IW2.40\0.0.0.6	DF1: fault register		0
%IW2.40\0.0.0.7	ETI: int. status reg.		24578
%QW2.40\0.0.0.0	CMD: command reg.		0
%QW2.40\0.0.0.1	LFRD: ref. speed		0
%QW2.40\0.0.0.2	CMI: int. command reg.		0
%QW2.40\0.0.0.3	IOLR: I/O status register		0
%QW2.40\0.0.0.4	PISP: PI reference		0
%QW2.40\0.0.0.5	Reserved		0
%QW2.40\0.0.0.6	Reserved		0
%QW2.40\0.0.0.7	Reserved		0

Description

The following table shows the different elements of the debug screen and their functions.

Number	Element	Function
1	Tabs	The tab in the foreground indicates the mode in progress (**Debug** in this example). Each mode can be selected using the respective tab. The available modes are: ● **Configuration**, ● **Adjust**, ● **Debug**, accessible only in online mode, ● **Fault** (channel level) accessible only in online mode.
2	**Module** zone	Gives a reminder of the device's shortened name. In online mode, this area also includes the three LEDs **Run**, **Err** and **IO**.
3	**Channel** zone	Allows you: ● By clicking on the device reference number, to display the tabs: ❍ **Description** which gives the characteristics of the device, ❍ **I/O Objects** *(see EcoStruxure™ Control Expert, Operating Modes)* which is used to presymbolize the input/output objects, ❍ **Fault** which shows the device faults (only accessible in online mode). ● To select the channel, ● To display the **Symbol**, name of the channel defined by the user (using the variable editor).
4	**General parameters** zone	These parameters are accessible in **Configuration** and **Adjustment** mode. In **Debug mode** they are grayed out.
5	**Parameters in progress** zone	This is used to define the configuration parameters of the different channels. This area includes various columns: ● **Label**, which defines the available parameters *(see page 84)*, ● **Symbol**, which displays the symbol associated with the channel when it has been defined by the user (using the variable editor), ● **Value**, which is used to select the value to assign the parameter, ● **Unit**, which displays the measurement unit of the parameter.

Monitoring Parameters

Parameters

The following table shows the monitoring parameters.

Label	Code	Function	Unit
Drive status	Drive status: indicates a fault or the motor operating phase.		-
	RDY	Drive ready.	
	RUN	Motor in steady state or start command present and reference value zero.	
	ACC	Accelerating.	
	DEC	Decelerating.	
	CLI	Current limit in progress.	
	DCB	Injection braking in progress.	
	NST	Freewheel stop command in progress.	
	OBR	Braking by adaptation of the deceleration ramp (see the drive menu).	
Freq. ref.	FRH	Frequency reference.	Hz
Out. Freq.	RFR	Output frequency applied to motor.	Hz
Motor speed	SPD	Motor speed estimated by drive.	rpm
Current in motor	LCN	Current in motor.	A
Line U	ULN	Mains voltage.	V
Mot. thermal state	THR	Mot. thermal state: 100 % corresponds to nominal motor thermal state. Over 118 %, the drive triggers OLF (motor overload fault).	%
Drive therm. state	THD	Drive thermal state: 100 % corresponds to nominal drive thermal state. Over 118 %, the drive triggers OHF (drive overheating fault). It can be retriggered at less than 70 %.	%
Last fault	LFT	Displays the last fault to have appeared.	-
Freq. ref.	LFR	This adjustment parameter appears in place of the FRH parameter when line mode is activated: LCC parameter in the command menu.	Hz

Maintenance

General

If an anomaly should occur during commissioning or operation, first ensure that all recommendations with regard to the environment, assembly and connections have been complied with. Refer to the Altivar Operation Guide.

⚠ DANGER

ELECTRIC SHOCK

Turn power off and wait for the condensers to discharge (about 3 minutes) before any intervention on the drive: the green Del LED on the drive's front panel will be switched off.

DC voltage at the + and - or PA and PB terminals can reach 900 V depending on network voltage.

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

Servicing

Altivar speed controllers do not require any preventative maintenance. Nonetheless, it is recommended that at regular intervals you:

- Check the state and tightening of the connections,
- Ensure that the temperature in the vicinity of the device remains at an acceptable level and that ventilation is still effective (average ventilator product life: 3 to 5 years according to operating conditions),
- If necessary, remove dust from the drive.

Maintenance Assistance

The first fault detected is stored and displayed on the terminal screen: The drive locks, the red LED lights up and the **R1** safety relay is triggered.

Fault Clearing

The following table describes the procedure to use when a non-resettable fault occurs.

Step	Action
1	Turn power off to the drive.
2	Locate the cause of the fault in order to eliminate it.
3	Reestablish the power supply: this clears the fault if the fault has disappeared. **Note**: In certain cases, an automatic restart may occur once the fault has disappeared, if this function was programmed.

Displayed Faults

List of Faults

The following table shows the list of displayed faults, as well as the likely cause and the solution recommended.

Displayed fault	Likely cause	Procedure, solution
PHF **PH CUT. RES**	Problem with the drive power supply or fuse blowout. Momentary phase cut.	• Check the power connection and fuses, • Reactivate.
USF **UNDERVOLTAGE**	Network voltage too low. Transitional voltage drop. Load resistor damaged.	• Check the network voltage, • Change the load resistor.
OSF **OVERVOLTAGE**	Network voltage too high.	• Check the network voltage.
OHF **DRIVE OVERHEAT**	Radiator temperature too high.	• Check the motor load and the drive ventilation, • Wait for the drive to cool down before reactivation.
OLF **MOT OVERLOAD**	Thermal triggering due to prolonged overload.	• Check the thermal protection adjustment, • Check the motor load (after approximately 7 minutes, reactivation is possible).
OBF **EXC BRAKING**	Braking too violent or driving load.	• Increase deceleration time, • Add braking resistance if necessary.
OPF **PH CUT. MOT**	Drive output phase cut.	• Check the motor connections.
LFF **LOSS 4-20 mA**	Loss of the 4-20 mA setpoint on input AI2.	• Check the connection of the setpoint circuits.
OCF **OVER CURRENT**	Ramp too short. Inertia or load too heavy. Mechanical blockage.	• Check the settings, • check the motor/drive/load dimensioning, • Check the frame status.
SCF **MOT SHORT CIRCUIT**	Short circuit or grounding on the drive output.	• Check the drive connection cables and motor insulation, • Check the drive transistor bridge.
CrF **LOAD RELAY**	Load relay command fault. Load resistor damaged.	• Check drive and load resistor connectors.
SLF **RS 485 CUT.**	Faulty connection on the drive terminal port.	• Check the connection on the drive terminal port.

Displayed fault	Likely cause	Procedure, solution
OTF **MOT OVERHEATING**	Motor temperature too high (CTP probes).	• Check motor ventilation,. • Check ambient temperature, • Check the motor load, • Check the type of probes used.
TSF **FAULT PTC PROBE**	Faulty connection of the probes to the drive.	• Check the connection of the probes to the drive. • Check the probes,
EEF **EEPROM FAULT**	EEPROM latching error	• Turn power off to the drive, • Reactivate.
INF **INTERNAL FAULT**	Internal fault. Connection fault.	• Check the drive connections.
EPF **EXTERNAL FAULT**	Fault triggered by an external device.	• Check the device that caused the fault, • Reactivate.
SPF **FDBK. SPEED CUT**	Absence of speed feedback	• Check the connection and mechanical coupling of the speed sensor.
ANF **VEERING**	Ramp not followed. Speed is the inverse of setpoint speed.	• Check the setting and the wiring of the speed feedback, • Check appropriateness of settings with regard to the load, • Check motor/drive dimensioning and the possible need for braking resistance.
SOF **OVERSPEED**	Instability. Driving load too heavy.	• Check the settings and parameters, • Add braking resistance. • Check the motor/drive/load dimensioning.
CNF **FAULT COM. NETWORK**	Communication fault on the field bus.	• Check the drive network connections, • Check the time-out.
ILF **FAULT INTERN. COM.**	Communication fault between the option and control card.	• Check the connection of the option card on the control card.
CFF	Error probably occurring during card loading:	

Displayed fault		Likely cause	Procedure, solution
	ERR. CALIBER-ENT	Change in card power rating,	• Check the drive hardware configuration (card power, others), • Turn power off to the drive, then reactivate, • Save the configuration in a file on the terminal, • Press **ENT** to return to the factory settings.
	ERR. OPTION-ENT	Change of option card type or installation of an option card if none existed previously and if the macro-configuration is **CUS**,	
	OPT. REMOVED-ENT	Option card removed	
	CKS. EEPROM-ENT	Stored configuration inconsistent (pressing **ENT** displays the message: **FacSetting? ENT/ESC**).	
CFI **CONFIG. FAULT**		The configuration sent to the drive via serial link is inconsistent.	• Check the configuration sent previously, • Send a configuration.

Chapter 6
Diagnostics of Altivar Variable Speed Controllers

Fault Configuration Parameters

Parameters

The following table shows the fault configuration parameters.

Label	Code	Description	Choices	Factory setting
Out Phase Loss	OPL	Used to validate the loss of the motor phase fault. (Elimination of the fault where a switch is used between the drive and the motor).	YES / NO	YES
In Phase Loss	IPL	Used to validate the loss of the network phase fault. (Elimination of the fault in the case of direct supply by a continuous bus) **Note:** This fault does not exist on **ATV58U09M2**, **U18M2**, **U29M2** and **U41M2**.	YES / NO	YES
ThermProType	THT	Defines the type of indirect motor thermal protection performed by the drive. If **PTC** probes are connected to the drive, this function is not available. ● **NO**: None: no thermal protection, ● Auto-cooled (**ACL**) motor: the drive takes into account a derating depending on the rotation frequency, ● Forced-cooled (**FCL**) motor: the drive does not take into account a derating depending on the rotation frequency.	NO / ACL /FCL	ACL
Loss of 4-20 mA	LFL	Used to validate the loss of reference 4-20 mA fault. This fault can only be configured if the min/max reference parameters AI2 (**CRL** and **CRH**) are greater than 3 mA, or if **CRL** > **CRH**. ● **NO**: no error, ● **YES**: immediate fault, ● **STT**: stop without fault, restart on signal feedback, ● **LSF**: stop then fault at the end of the stop, ● **LFF**: forcing to fallback speed adjusted by parameter **LFF**.	NO / YES / STT / LSF / LFF	NO

Label	Code	Description	Choices	Factory setting
Catch On Fly	FLR	Used to validate a jolt-free restart after the following events: ● Network power-outage or simple powering-down, ● Fault reset or automatic restart, ● Freewheel stop or injection stop with logical input, ● Uncontrolled power-outage downstream from the drive. If relay R2 is assigned to the braking logical function, parameter **FLR** remains locked on No.	YES / NO	NO

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