Altivar 312

Variable speed drives for asynchronous motors

Communication variables manual

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www.schneider-electric.com

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Contents

Important Information

NOTICE

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

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

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

⚠ DANGER

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

⚠ WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury or equipment damage.

⚠ CAUTION

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

CAUTION

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

PLEASE NOTE
The word "drive" as used in this manual refers to the controller portion of the adjustable speed drive as defined by NEC.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this product.

Before you begin

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

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the Altivar 312 drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this drive, including the printed circuit boards, operate at the line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- DO NOT touch unshielded components or terminal strip screw connections with voltage present.
- DO NOT short across terminals PA/+ and PC/– or across the DC bus capacitors.
- Before servicing the drive:
  - Disconnect all power, including external control power that may be present.
  - Place a “DO NOT TURN ON” label on all power disconnects.
  - Lock all power disconnects in the open position.
  - WAIT 15 MINUTES to allow the DC bus capacitors to discharge.
  - Measure the voltage of the DC bus between the PA/+ and PC/– terminals to ensure that the voltage is less than 42 Vdc.
  - If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive
- Install and close all covers before applying power or starting and stopping the drive.

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

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Read and understand this manual before installing or operating the Altivar 312 drive.
- Any changes made to the parameter settings must be performed by qualified personnel.

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

⚠ WARNING

DAMAGED DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.

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

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must
  - consider the potential failure modes of control paths and, for certain critical control functions,
  - provide a means to achieve a safe state during and after a path failure.

Examples of critical control functions are emergency stop and overtravel stop.

- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.[a]

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

a. For additional information, refer to NEMA ICS 1.1 (latest edition), “Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control” and to NEMA ICS 7.1 (latest edition), “Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems.”

Documentation structure

The following Altivar 312 technical documents are available on the Schneider Electric website (www.schneider-electric.com) as well as on DVD-ROM (reference VW3A8200).

Installation manual

This manual describes how to install and wire the drive.

Programming manual

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

Simplified manual

This manual is a simplified version of the User manual.

Quick Start sheet

The Quick Start describes how to wire and configure the drive to start motor quickly and simply for simple applications. This document is delivered with the drive.

Communication manuals: Modbus, CANopen, ...

These manuals describe the assembly, connection to the bus or network, signaling, diagnostics, and configuration of the communication-specific parameters.
They also describe the protocol communication services.

Communication variables manual

The Communication variables manual defines the drive control processes and the drive variables which can be accessed by the communication buses: Modbus, CANopen, ...

Presentation

The Altivar 312 can be connected directly to Modbus and CANopen buses by means of an RJ45 connector, which supports both protocols. The communication function provides access to the drive's configuration, adjustment, control and monitoring functions.

The "Communication variables" User's Manual defines the drive control processes and the drive variables which can be accessed by these buses.

It supplements each of the following manuals:
- Modbus
- CANopen
- Profibus
- DeviceNet

These documents should be referred to for the hardware and software setup specific to each bus.

We also recommend consulting the Programming Manual for additional explanations (operation, factory settings, etc).
If the SoMove software workshop is used, consult the on-line help provided.

The communication variables are listed with:
- their address •••• in decimal format for Modbus and Profibus,
- their index and subindex address ••••/•• in hexadecimal format for CANopen.

The rule to get the DeviceNet address from the Modbus address is described in the DeviceNet manual.

They are grouped into several different tables according to the following criteria:
- IEC 61800-7 (CiA 402)
- control variables
- monitoring variables
- identification variables
- configuration and adjustment variables

Read/write

Whether the parameters have read and/or write access is indicated in the "Read/Write" column with the following codes:
- **R**: read only, drive stopped or running
- **R/WS**: read access when drive stopped or running and write access only when drive stopped
- **R/W**: read and write access when drive stopped or running

Authorized addresses

⚠ WARNING

LOSS OF CONTROL

Only the addresses and values defined in this document can be used. Any other address or value must be considered to be reserved and must never be written to.

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

Control and reference channels

The control and the reference may originate from different channels:
- the terminal block
- the built-in keypad
- the remote display terminal
- Modbus
- CANopen, DeviceNet, Profibus

These channels are managed:
- either in priority mode,
- or in deterministic mode.

The "Function access level (LAC)" and "Mixed mode (CHCF)" parameters are used to select the run mode.
Operation is described in detail in the Programming Manual ("Control menu" section).

Priority stops

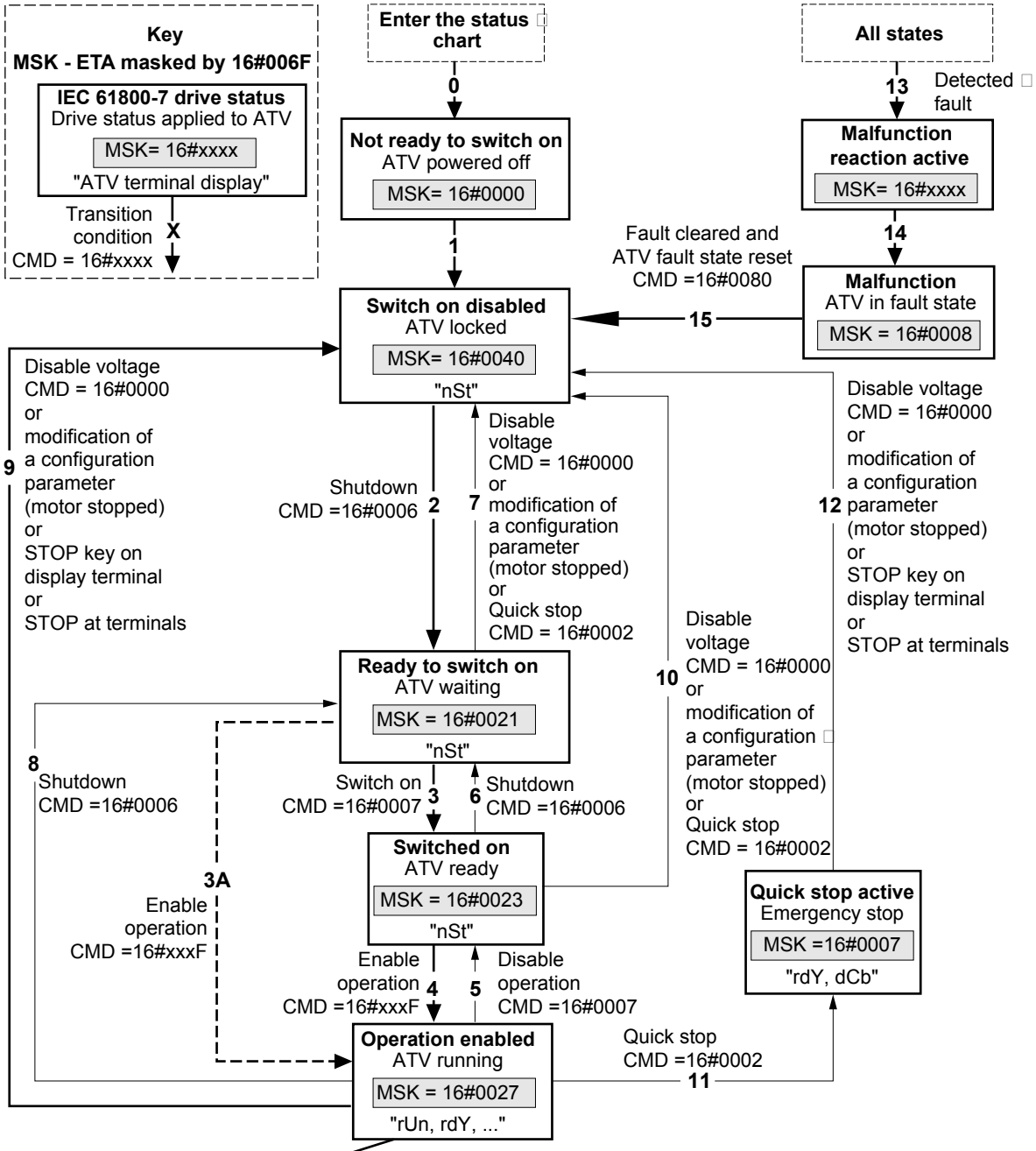
In line mode, stop requests which can be activated by the terminals or by the remote display terminal have priority:

Type of stop	From	Drivecom state reached	Actions for restoring control of the Altivar using the fieldbus
Fast stop	LI2 to LI6	"Operation enabled"	- Set the logic input assigned to the "fast stop" function to 1 (active at 0)
DC injection stop	LI2 to LI6	"Operation enabled"	- Set the logic input assigned to the "injection stop" function to 0 (active at 1)
Freewheel stop	LI2 to LI6	"Switch on disabled"	- Set the logic input assigned to the "freewheel stop" function to 1 (active at 0) - Perform the transitions required to return the drive to "run" status
3-wire control stop via STOP logic input (LI1)	LI1 (3-wire control)	"Switch on disabled"	- Set the logic input assigned to STOP to 1 (active at 0) - Perform the transitions required to return the drive to "run" status
Stop by the display terminal	STOP key	"Switch on disabled"	- Release the Stop key - Perform the transitions required to return the drive to "run" status

Communication bus monitoring

In the event of loss of communication the drive behaviour can be configured via the "SLL" or "COL" parameters (page 53). This configuration is saved if the power supply is disconnected.
In its factory setting, loss of communication triggers a detected fault (COF, CNF, SLF) with freewheel stopping.

IEC 61800-7 status chart



Examples:	Examples (default configuration):
ETA = 16#0627 : Normal stop or Forward operation, speed reached	CMD = 16#000F : Forward operation CMD = 16#080F : Reverse operation
ETA = 16#8627 : Reverse operation, speed reached	CMD = 16#100F : Stop (configured by "Stt")
ETA = 16#0227 : Forward operation, ACC or DEC	CMD = 16#200F : DC injection stop
ETA = 16#8227 : Reverse operation, ACC or DEC	CMD = 16#400F : Fast stop

Exiting the "Operation enabled" status via a "Disable voltage" (9) or "Shutdown" (8) command causes a freewheel stop.

Supervision and control in LINE mode

The Altivar control process using the communication bus is based on the CANopen CiA 402 profile status chart compatible with the IEC 61800-7 standard. Each state represents an aspect of the internal behaviour of the drive.

This chart evolves according to whether the control word is sent (CMD W8501) or an event occurs (example: lock following malfunction). The drive status can be identified by the value of the status word (ETA W3201).

Not ready to switch on (Initialization):

Communication is being initialized.
Transient state invisible to the communication bus.

Switch on disabled (Configuration):

Initialization of the drive is complete.
The configuration and adjustment parameters can be modified.
If all or part of the configuration and settings are to be loaded, we recommend disabling the consistency check function during the transfer (CMI W8504, bit 15 = 1). On completion of the transfer, the consistency check must be enabled (CMI W8504, bit 15 = 0).
The drive is locked.

Ready to switch on and Switched on (Drive initialized):

The drive is locked.
The power stage of the drive is ready to operate, but voltage has not yet been applied to the output.
The configuration and adjustment parameters can be modified, but modifying a configuration parameter returns the drive to the "Switch on disabled" state.

Operation enabled (Operational):

The drive is unlocked and voltage can be applied to the motor terminals.
Auto-tuning (tUn) requires an injection of current. The drive must therefore be in this state to perform this command.
The adjustment parameters can be modified even if a run command or a DC injection current is present. However, a configuration parameter can only be modified if the motor is stopped, and this returns the drive to the "Switch on disabled" state.

Quick stop active (Emergency stop active):

Fast stop
Restarting is only possible after the drive has changed to the "Switch on disabled" state.

Malfunction reaction active (Reaction on fault detection):

Transient state during which the drive performs an action appropriate to the type of detected fault.

Malfunction (detected fault):

The drive is locked.

Difference between a fast stop and a Quick stop

A fast stop (CMD = 16#400F) is a stop on a short ramp that maintains the drive in the "Operation enabled" state.
The drive remains locked after a fast stop.
A run command can be executed immediately after a fast stop.

A Quick stop (CMD = 16#0002) is an emergency stop that causes a stop on a short ramp followed by locking in the "Quick stop active" state.
To be able to restart the drive, you must first change to the "Switch on disabled" state via the "Disable voltage" command (CMD = 16#0000).
It is not possible, therefore, to execute a run command immediately after a Quick stop.

Note:
In access level "L1" or "L2" (parameter "LAC"):
- Priorities between channels are managed by the drive.
- At switch-on, the drive is in control via the terminals and changes automatically to the "Operation enabled" state. This means that, when a run command is applied (for example: CMD = 16#000F), it starts without needing to follow the IEC 61800-7 status chart procedure.

When the drive is controlled via a communication bus, it is advisable to configure the access level "LAC" = "L3":
- The active channel is set by configuring the following parameters: "mixed mode (CHCF)", "reference switching (rFC)", "control switching (CCS)", "configuration of control channel 1 (Cd1)", "configuration of control channel 2 (Cd2)", "configuration of reference 1 (Fr1)" and "configuration of reference 2 (Fr2)".
- At switch-on, the drive configured for control via the bus changes to the "Switch on disabled" state. This means that it must follow the IEC 61800-7 status chart procedure to be able to start, and to help prevent any unwanted behaviour.

CMD control word (W8501)

bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Fault state reset	0	0	0	Enable operation	Quick stop (active at 0)	Enable voltage	Switch on

bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
(1)	(1)	(1)	(1)	(1)	0	0	0

(1) This bit action depends on the LAC "Access levels" parameter and the functions configured by the user.
For example, to use bit 15 to switch the ramp, simply configure LAC = L3 (Access to advanced functions and management of mixed modes) and set the "Ramp switching rPS" configuration parameter to Cd15.

Command	Transition address	Final state	bit 7	bit 3	bit 2	bit 1	bit 0	Typical value of CMD (W8501)
			Reset	Enable operation	Quick stop	Enable voltage	Switch on	
Shut down	2, 6, 8	Ready to switch on	x	x	1	1	0	16#0006
Switch on	3	Switched on	x	x	1	1	1	16#0007
Enable operation	4	Operation enabled	x	1	1	1	1	16#000F
Disable operation	5	Switched on	x	0	1	1	1	16#0007
Disable voltage	7, 9, 10, 12	Switch on disabled	x	x	x	0	x	16#0000
Quick stop	11	Quick stop active	x	x	0	1	x	16#0002
	7, 10	Switch on disabled						
Fault state reset	15	Switch on disabled	0 → 1	x	x	x	x	16#0080

x: State not significant
0 → 1: Change from 0 to 1

ETA status word (W3201)

bit 7	bit 6	bit 5	bit 4
Alarm	Switch on disabled	Quick stop active at 0	0

bit 3	bit 2	bit 1	bit 0
Malfunction	Operation enabled	Switched on	Ready to switch on

bit 15	bit 14	bit 13	bit 12
Direction of rotation	Stop via STOP key	0	0

bit 11	bit 10	bit 9	bit 8
Reference exceeded	Reference reached	Forced local mode (active at 0)	0

State	bit 6	bit 5	bit 3	bit 2	bit 1	bit 0	MSK = ETA (W3201) masked by 16#006F
	Switch on disabled	Quick stop	Malfunction	Operation enabled	Switched on	Ready to switch on	
Not ready to switch on	0	x	0	0	0	0	16#0000 16#0020
Switch on disabled	1	x	0	0	0	0	16#0040 16#0060
Ready to switch on	0	1	0	0	0	1	16#0021
Switched on	0	1	0	0	1	1	16#0023
Operation enabled	0	1	0	1	1	1	16#0027
Malfunction	0	x	1	0	0	0	16#0008 16#0028
Malfunction reaction active	0	x	1	1	1	1	16#000F 16#002F
Quick stop active	0	0	0	1	1	1	16#0007

x: State not significant

Function compatibility

Incompatible functions

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

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 automatic injection on stopping is configured as DC (AdC = Ct).

Function compatibility table

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 which are not listed in this table are compatible.
If there is an incompatibility between functions, the first function configured will keep the remainder from being configured.

To configure a function, first check that incompatible functions are unassigned, especially those which are assigned in the factory settings.

	Summing inputs (factory setting)	+/- speed (1)	Management of limit switches	Preset speeds (factory setting)	PI regulator	Jog operation	Brake control	DC injection stop	Fast stop	Freewheel stop
Summing inputs (factory setting)		●		↑	●	↑				
+/- speed (1)	●			●	●	●				
Management of limit switches					●					
Preset speeds (factory setting)	←	●			●	↑				
PI regulator	●	●	●	●		●	●			
Jog operation	←	●		←	●		●			
Brake control					●	●		●		
DC injection stop							●			↑
Fast stop										↑
Freewheel stop								←	←	

(1) Excluding special application with reference channel Fr2.

● Incompatible functions Compatible functions N/A

Priority functions (functions which cannot be active at the same time):
← ↑ The function indicated by the arrow has priority over the other.

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

Function compatibility

Logic and analog input application functions

Each of the functions on the following pages can be assigned to one of the inputs.
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.**
The SUP- display menu (parameters LIA and AIA) can be used to display the functions assigned to each input in order to check their compatibility.

Before assigning a reference, a command or a function to a logic or analog input, check that this input has not already been assigned in the factory settings, and that no other input has been assigned to an incompatible or unwanted function.

- Example of incompatible function to be unassigned:
  To activate "+/- speed", first unassign the preset speeds and summing input 2.

The following table indicates the factory-set input assignments and the procedure for unassigning them.

Assigned input ATV312●●●	Function	Code	To unassign, set to:	Page
LI2	Reverse	rrS	nO	33
LI3	2 preset speeds	PS2	nO	42
LI4	4 preset speeds	PS4	nO	43
AI1	Reference 1	Fr1	Anything but AI1	35
LI1	Forward	tCC	2C or 3C	33
AI2	Summing input 2	SA2	nO	42

IEC 61800-7 variables

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
8601	6040	**CMDD**	R/W	**IEC 61800-7 control word** Identical to CMD (page 19). bit 0: "Switch on": active at 1 bit 1: "Disable Voltage": active at 0 bit 2: "Quick Stop": active at 0 bit 3: "Enable Operation": active at 1 bits 4 to 6: Reserved: set to 0 bit 7: Fault state reset: active on rising edge 0 -> 1 bits 8 to 10: Reserved: set to 0 For "Access level" LAC (page 35) = L1 or L2: bit 11 = 0: Forward direction command bit 11 = 1: Reverse direction command bit 12 = 0: No action bit 12 = 1: Stop command depending on the Stt "Stop type" parameter bit 13 = 0: No action bit 13 = 1: Injection stop command bit 14 = 0: No action bit 14 = 1: Fast stop command bit 15: Reserved: set to 0 For "Access level" LAC (page 35) = L3: Factory assignments bit 11 = 0: Forward direction command bit 11 = 1: Reverse direction command bit 12 = 0: No action bit 12 = 1: Stop command depending on the Stt "Stop type" parameter bit 13: No action bit 14: No action bit 15: No action Bits 11 to 15 can be assigned to the following functions: Ramp switching (rPS) Fast stop (FSt) DC injection (DCI) 2 preset speeds (PS2) 4 preset speeds (PS4) 8 preset speeds (PS8) 16 preset speeds (PS16) 2 preset PI references (Pr2) 4 preset PI references (Pr4) Switching for 2nd current limit (LC2) Switching, motor 2 (CHP) External fault (EtF) For example, to use bit 15 to switch the ramp, simply set the "Ramp switching" rPS configuration parameter (page 39) to Cd15.
8602	6042	**LFRD**	R/W	**Speed reference via the bus (signed value)** **CiA 402: vl target velocity** **IEC 61800-7: Nominal speed value** Unit: • 1 = 1 rpm if bit 9 of CMI (page 20) = 0 • 1 ≈ 0.018 Hz (resolution 32767 points = 600 Hz) if bit 9 of CMI = 1

IEC 61800-7 variables

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
8603	6041	**ETAD**	R	**IEC 61800-7 status word** Identical to ETA (page 21). bit 0: Ready to switch on bit 1: Switched on bit 2: Operation enabled bit 3 = 0: No detected faults bit 3 = 1: Malfunction, detected fault (FAI) bit 4: Voltage disabled bit 5: Quick stop bit 6: Switch on disabled bit 7 = 0: No alarm bit 7 = 1: Alarm present bit 8: Reserved bit 9 = 0: Forced local mode in progress (FLO) bit 9 = 1: No forced local mode bit 10 = 0: Reference not reached (transient state) bit 10 = 1: Reference reached (steady state) bit 11 = 0: LFRD reference normal bit 11 = 1: LFRD reference exceeded (< LSP or > HSP) Note: LFRD is expressed in rpm, LSP and HSP in Hz bits 12 and 13: Reserved bit 14 = 0: No stop imposed by STOP key on built-in keypad or on the remote display terminal bit 14 = 1: Stop imposed by STOP key on built-in keypad or on the remote display terminal bit 15 = 0: Forward rotation (output frequency) bit 15 = 1: Reverse rotation (output frequency)
8605	6043	**FRHD**	R	**Speed reference (signed ramp input)** **CiA 402: vl velocity demand** **IEC 61800-7: Reference speed variable** Unit: 1 rpm
8604	6044	**RFRD**	R	**Output speed (signed value)** **CiA 402: vl control effort** **IEC 61800-7: Actual speed value** Unit: • 1 = 1 rpm if bit 9 of CMI (page 20) = 0 • 1 ≈ 0.018 Hz (resolution 32767 points = 600 Hz) if bit 9 of CMI = 1
8606	603F	**ERRD**	R	**Fault code** **CiA 402: Error code** **IEC 61800-7: Malfunction code** 0000H = "nOF": No fault code saved 1000H = "CrF": Capacitor pre-charge detected fault or = "OLF": Motor overload or = "SOF": Motor overspeed 2310H = "OCF": Overcurrent 2320H = "OCF": Impeding short-circuit or = "OCF": Power module, specific to ATV312●D15● 2330H = "SCF": Motor short-circuit (to ground) 2340H = "OCF": Motor short-circuit (phase to phase) 3110H = "OSF": Line supply overvoltage 3120H = "USF": Line supply undervoltage 3130H = "PHF": Line supply phase loss 3310H = "ObF": DC bus overvoltage or = "OPF": Motor phase loss or = "OPF": Motor phase loss - 3 phases 4210H = "OHF": Drive overheating 5520H = "EEF": EEPROM memory 6100H = "InF": Internal 6300H = "CFF": Incorrect configuration (parameters) or = "CFI": Invalid configuration (parameters) 7300H = "LFF": 4 - 20 mA loss 7510H = "SLF": Modbus communication interruption 8100H = "COF": Communication interruption, line 2 (CANopen) 9000H = "EPF": External fault FF00H = "tnF": Auto-tuning was unsuccessful FF01H = "bLF": Brake control 7520H = "ILF": Optional internal link 7510H = "CNF": Communication interruption on the communication card

IEC 61800-7 variables

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
8607 - 8608	6046 / 1	**SMIL**	R/W	**Min. speed** **CiA 402: vl velocity min amount** **IEC 61800-7: Speed min amount** Low speed, equivalent to LSP (page 27), but in rpm Unit: 1 rpm 32-bit word (low order: 8607, high order: 8608) Adjustment range: 0 to HSP (page 27)
8609 - 8610	6046 / 2	**SMAL**	R/W	**Max. speed** **CiA 402: vl velocity max amount** **IEC 61800-7: Speed max amount** High speed, equivalent to HSP (page 27), but in rpm Unit: 1 rpm 32-bit word (low order: 8609, high order: 8610) Adjustment range: LSP (page 27) to tFR (page 31)
8611 - 8612	6048 / 1	**SPAL**	R/W	**Acceleration - Speed delta** Speed for calculation of acceleration ramp Unit: 1 rpm 32-bit word (low order: 8611, high order: 8612) Adjustment range: 1 to 65535
8613	6048 / 2	**SPAT**	R/W	**Acceleration - Time delta** Time for calculation of acceleration ramp (time to go from 0 to SPAL) Unit: 1 s Adjustment range: 0 to 65535
8614 - 8615	6049 / 1	**SPDL**	R/W	**Deceleration - Speed delta** Speed for calculation of deceleration ramp Unit: 1 rpm 32-bit word (low order: 8614, high order: 8615) Adjustment range: 1 to 65535
8616	6049 / 2	**SPDT**	R/W	**Deceleration - Time delta** Time for calculation of deceleration ramp (time to go from SPDL to 0) Unit: 1 s Adjustment range: 0 to 65535

Control variables

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
8501	2037 / 2	**CMD**	R/W	**Control word** bit 0: "Switch on": active at 1 bit 1: "Disable Voltage": active at 0 bit 2: "Quick Stop": active at 0 bit 3: "Enable Operation": active at 1 bits 4 to 6: Reserved: set to 0 bit 7: Fault state reset: active on rising edge 0 -> 1 bits 8 to 10: Reserved: set to 0 For "Access level" LAC (page 35) = L1 or L2: bit 11 = 0: Forward direction command bit 11 = 1: Reverse direction command bit 12 = 0: No action bit 12 = 1: Stop command depending on the Stt "Stop type" parameter bit 13 = 0: No action bit13 = 1: Injection stop command bit 14 = 0: No action bit14 = 1: Fast stop command bit 15: Reserved: set to 0 For "Access level" LAC (page 35) = L3: Factory assignments bit 11 = 0: Forward direction command bit 11 = 1: Reverse direction command bit 12 = 0: No action bit 12 = 1: Stop command depending on the Stt "Stop type" parameter bit 13: No action bit 14: No action bit 15: No action Bits 11 to 15 can be assigned to the following functions: Ramp switching (rPS) Fast stop (FSt) DC injection (DCI) 2 preset speeds (PS2) 4 preset speeds (PS4) 8 preset speeds (PS8) 16 preset speeds (PS16) 2 preset PI references (Pr2) 4 preset PI references (Pr4) Switching for 2nd current limit (LC2) Switching, motor 2 (CHP) External fault (EtF) For example, to use bit 15 to switch the ramp, simply set the "Ramp switching" rPS configuration parameter (page 39) to Cd15.
8502	2037 / 3	**LFr**	R/W	**Frequency reference via the bus (signed value)** Unit: • 1 = 0.1 Hz if bit 9 of CMI (page 20) = 0 • 1 ≈ 0.018 Hz (resolution 32767 points = 600 Hz) if bit 9 of CMI = 1
8503	2037 / 4	**PISP**	R/W	**PI regulator reference via the bus** Unit: 0.1% Adjustment range: 0 to 1000

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
8504	2037 / 5	**CMI**	R/W	**Extended control word** bit 0 = 0: No action bit 0 = 1: Recall factory settings command (1). This bit automatically resets to 0 when the request is taken into account. It is only active when the drive has come to a complete stop: ETI.4 = ETI.5 = 0. bit 1 = 0: No action bit 1 = 1: Save configuration/adjustments in EEPROM (2) if voltage is sufficient (no USF detected fault). This bit automatically resets to 0 when the request is taken into account. During saving (ETI.0 = 1), parameters cannot be written. bit 2: Reserved bit 3 = 0: No action bit 3 = 1: External fault. The drive's behaviour during an external fault is defined by parameter EPL (see page 52). bit 4 = 0: No action bit 4 = 1: Ramp switching command bits 4 to 8: Reserved bit 9 = 0: Normal resolution (references, output speed and ouput frequency in physical units: rpm and Hz) bit 9 = 1: High resolution (references, output speed and ouput frequency in 32767 points for 600 Hz) bits 10 to 12: Reserved bit 13 = 0: Drive not locked on standstill bit 13 = 1: Drive locked on standstill bit 14 = 0: Control with Modbus communication monitoring bit 14 = 1: Control with no Modbus communication monitoring (NTO) bit 15 = 0: Parameter consistency check bit 15 = 1: No parameter consistency check + drive locked on standstill (switching this bit to 0 will revalidate all parameters) **⚠ WARNING** **LOSS OF CONTROL** If the CMI bit 14 (NTO) is set to 1, communication monitoring will be inhibited. For safety reasons, inhibition of communication interuption should only be used for adjustment or special applications purpose. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**
5240	2016 / 29	**IOLR**	R/W	**Value of logic I/O** (0 = inactive, 1 = active) bits 0 to 7: Not accessible in write mode bit 8: Value of "R1" relay output, accessible in **write mode** if R1 is not assigned bit 9: Value of "R2" relay output, accessible in **write mode** if R2 is not assigned bit 10: Value of "LO" logic output, accessible in **write mode** if LO is not assigned bits 11 to 13: Reserved bit 14: Not accessible in write mode bit 15: Reserved
5261	2016 / 3E	**AO1R**	R/W	**Value of the analog output** AO1R is accessible in **write mode** if dO (page 34) is not assigned Variation range: 0 to 10000 The value 10000 corresponds to 10V if AO1t = 10U, or to 20 mA if AO1t = OA or 4A (page 34)

(1) The following configuration and adjustment parameters do not revert to their factory settings; they retain their current configuration:
- bFr (Standard motor frequency) page 28
- LCC (Control via remote display terminal) page 38
- COd (Terminal locking code) page 56
- Communication parameters, page 58

(2) **Note:** the EEPROM life limit is 1,000,000 write operations.

Monitoring variables

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
3201	2002 / 2	**ETA**	R	**Status word** bit 0: Ready to switch on bit 1: Switched on bit 2: Operation enabled bit 3 = 0: No detected fault bit 3 = 1: Malfunction, detected fault (FAI) bit 4: Voltage disabled (still equals 0) bit 5: Quick stop bit 6: Switch on disabled bit 7 = 0: No alarm bit 7 = 1: Alarm present bit 8: Reserved bit 9 = 0: Forced local mode in progress (FLO) bit 9 = 1: No forced local mode bit 10 = 0: Reference not reached (transient state) bit 10 = 1: Reference reached (steady state) bit 11 = 0: LFRD reference normal bit 11 = 1: LFRD reference exceeded (< LSP or > HSP) Note: LFRD is expressed in rpm, LSP and HSP in Hz bits 12 and 13: Reserved bit 14 = 0: No stop imposed by STOP key on built-in keypad or on the remote display terminal bit 14 = 1: Stop imposed by STOP key on built-in keypad or on the remote display terminal bit 15 = 0: Forward rotation (output frequency) bit 15 = 1: Reverse rotation (output frequency)
3202	2002 / 3	**rFr**	R	**Output frequency applied to the motor (signed value)** Unit: • 1 = 0.1 Hz if bit 9 of CMI (page 20) = 0 • 1 ≈ 0.018 Hz (resolution 32767 points = 600 Hz) if bit 9 of CMI = 1
3203	2002 / 4	**FrH**	R	**Frequency reference before ramp (absolute value)** Unit: 0.1 Hz
3204	2002 / 5	**LCr**	R	**Current in the motor** Unit: 0.1 A
3205	2002 / 6	**Otr**	R	**Motor torque** Unit: 1% 100% = Nominal motor torque, calculated using the configuration parameters.
3211	2002 / C	**OPr**	R	**Motor power** Unit: 1% 100% = Nominal motor power, calculated using the configuration parameters.
3207	2002 / 8	**ULn**	R	**Line voltage** Unit: 0.1 V (gives the line voltage via the DC bus, motor running or stopped)
3209	2002 / A	**tHd**	R	**Drive thermal state** Unit: 1% 100% = Nominal thermal state 118% = "OHF" threshold (drive overheating)
3210	2002 / B	**TDM**	R	**Max. thermal state reached by the drive** Unit: 1% 100% = Nominal thermal state 118% = "OHF" threshold (drive overheating) Automatically reset to zero when the drive is powered down.
9630	2042 / 1F	**tHr**	R	**Motor thermal state** Unit: 1% 100% = Nominal thermal state 118% = "OLF" threshold (motor overload)
3231	2002 / 20	**rtH**	R	**Operating time** Unit: 1 Hour Factory setting: 0 Adjustment range: 0 to 65535 Total time the motor has been powered up. Can be reset to zero by the rPr parameter (see page 55).

Monitoring variables

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
12002	205A / 3	**USPL**	R	**Motor speed in customer units - Low order** Unit: 1 USPL/USPH = rFr x SdS on 32 bits (see pages 21 and 28).
12003	205A / 4	**USPH**	R	**Motor speed in customer units - High order** Unit: 1 USPL/USPH = rFr x SdS on 32 bits (see pages 21 and 28).
3206	2002 / 7	**ETI**	R	**Extended status word** bit 0 = 0: Write parameters authorized bit 0 = 1: Write parameters not authorized (the drive is in the process of saving the current parameters from the RAM to the EEPROM) bit 1 = 0: No parameter consistency check + drive locked on standstill bit 1 = 1: Parameter consistency check bit 2 = 0: Fault state reset not authorized bit 2 = 1: Fault state reset authorized bit 3: Reserved bit 4 = 0: Motor stopped bit 4 = 1: Motor running bit 5 = 0: No DC injection bit 5 = 1: DC injection bit 6 = 0: Drive in steady state bit 6 = 1: Drive in transient state bit 7 = 0: No motor thermal overload alarm bit 7 = 1: Motor thermal overload alarm bit 8 = 0: No alarm if excessive braking bit 8 = 1: Alarm if excessive braking bit 9 = 0: Drive not accelerating bit 9 = 1: Drive accelerating bit 10 = 0: Drive not decelerating bit 10 = 1: Drive decelerating bit 11 = 0: No current limit alarm bit 11 = 1: Current limit alarm bit 12 = 0: Fast stop not in progress bit 12 = 1: Fast stop in progress bit 14 = 0 and bit 13 = 0: ATV controlled via terminal block or built-in keypad (ATV312....A) bit 14 = 0 and bit 13 = 1: ATV controlled via the remote display terminal bit 14 = 1 and bit 13 = 0: ATV controlled via ModBus bit 14 = 1 and bit 13 = 1: ATV controlled via CanOpen bit 15 = 0: Forward rotation requested (reference) bit 15 = 1: Reverse rotation requested (reference)
3250	2002 / 33	**LRS1**	R	**Extended status word No. 1** bit 0: Reserved bit 1 = 0: No drive detected fault bit 1 = 1: Drive detected fault bit 2 = 0: Motor stopped bit 2 = 1: Motor running bit 3: Reserved bit 4 = 0: Frequency threshold (Ftd) not reached bit 4 = 1: Frequency threshold (Ftd) reached bit 5 = 0: High speed not reached bit 5 = 1: High speed reached bit 6 = 0: Current threshold (Ctd) not reached bit 6 = 1: Current threshold (Ctd) reached bit 7 = 0: Speed reference not reached bit 7 = 1: Speed reference reached bit 8 = 0: No motor thermal overload alarm bit 8 = 1: Motor thermal overload alarm bit 9 = 0: No brake control (brake engaged) bit 9 = 1: Brake control in progress (brake released) bits 10 and 11: Reserved bit 12 = 0: No loss of 4-20 mA bit 12 = 1: Loss of 4-20 mA bit 13: Reserved bit 14 = 0: No drive thermal overload alarm bit 14 = 1: Drive thermal overload alarm bit 15: Reserved

Monitoring variables

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
3252	2002 / 35	**LRS3**	R	**Extended status word No. 3** bit 0 = 0: The reference is given by Fr1 bit 0 = 1: The reference is given by Fr2 bit 1 = 0: The command is given by Fr1 or Cd1 bit 1 = 1: The command is given by Fr2 or Cd2 bit 2 = 0: ACC and DEC are used as ramp parameters bit 2 = 1: ACC2 and DEC2 are used as ramp parameters bit 3 = 0: CLI is used for current limiting bit 3 = 1: CL2 is used for current limiting bits 4 to 10: Reserved bit 11 = 0: Motor 1 is not used bit 11 = 1: Motor 1 is used bit 12 = 0: Motor 2 is not used bit 12 = 1: Motor 2 is used bits 13 to 15: Reserved
3601	2006 / 2	**O1Ct**	R	**Option board 1 card type** 0 = "nO": No option 15 = "PbS": Profibus option 18 = "dnt": DeviceNet option
5240	2016 / 29	**IOLR**	R	**Value of logic I/O** (0 = inactive, 1 = active) bit 0: Value of logic input "LI1" bit 1: Value of logic input "LI2" bit 2: Value of logic input " LI3" bit 3: Value of logic input " LI4" bit 4: Value of logic input " LI5" bit 5: Value of logic input " LI6" bit 6: Reserved bit 7: Keypad presence: 0 = absent, 1 = present bit 8: Value of "R1" relay output, also accessible in **write mode** if R1 is not assigned bit 9: Value of "R2" relay output, also accessible in **write mode** if R2 is not assigned bit 10: Value of "LO" logic output, also accessible in **write mode** if LO is not assigned bit 11: Reserved bit 12: Reserved bit 13: Reserved bit 14: 0 = AOC/AOV logic output, 1 = AOC/AOV analog output bit 15: Reserved
5242	2016 / 2B	**AI1C**	R	**Value of analog input AI1** Unit: 1 mV Variation range: 0 to 10000
5243	2016 / 2C	**AI2C**	R	**Value of analog input AI2** Unit: 1 mV Variation range: -10000 to 10000
5244	2016 / 2D	**AI3C**	R	**Value of analog input AI3** Unit: 1 µA Variation range: 0 to 20000
5261	2016 / 3E	**AO1R**	R	**Value of the analog output** AO1R is also accessible in **write mode** if dO (page 34) is not assigned Variation range: 0 to 10000 The value 10000 corresponds to 10V if AO1t = 10U, or to 20 mA if AO1t = OA or 4A (page 34)
5281	2016 / 52	**AIV1**	R	**Value of the analog input image** Unit: % Variation range: 0.1 to 100%

Monitoring variables

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
7121	2029 / 16	**LFt**	R	**Last detected fault** The detected fault remains saved even if the cause disappears, and even after switching the drive off then on again. 0 = "nOF": No fault code saved 3 = "CFF": Incorrect configuration (parameters) 4 = "CFI": Invalid configuration (parameters) 5 = "SLF": Modbus communication interuption 6 = "ILF": Internal communcation interuption 7 = "CnF": Communication option card 8 = "EPF": External fault 9 = "OCF": Overcurrent 10 = "CrF": Capacitor pre-charge 13 = "LFF": 4 - 20 mA loss 16 = "OHF": Drive overheating 17 = "OLF": Motor overload 18 = "ObF": DC bus overvoltage 19 = "OSF": Line supply overvoltage 20 = "OPF": Motor phase loss 21 = "PHF": Line phase loss 22 = "USF": Line supply undervoltage 23 = "OCF": Motor short-circuit (phase to phase) 24 = "SOF": Motor overspeed 25 = "tnF": Auto-tuning was unsuccessful 26 = "IF1": Unknown rating 27 = "IF2": MMI card 28 = "IF3": MMI communication 29 = "IF4": Industrial EEPROM 30 = "EEF": EEPROM memory 31 = "OCF": Impeding short-circuit 32 = "SCF": Motor short-circuit (to ground) 33 = "OPF": Motor phase loss - 3 phases 34 = "COF": Communication interuption, fault line 2 (CANopen) 35 = "bLF": Brake control 36 = "OCF": Power module, specific to ATV312●D15● 55 = "SCF": Power module or motor short-circuit, detected at power up.
7132	2029 / 21	**CNF**	R	**Communication option detected fault**
7201	202A / 2	**DP1**	R	**Past detected fault No. 1** (Same format as "LFt" page 24)
7202	202A / 3	**DP2**	R	**Past detected fault No. 2** (Same format as "LFt" page 24)
7203	202A / 4	**DP3**	R	**Past detected fault No. 3** (Same format as "LFt" page 24)
7204	202A / 5	**DP4**	R	**Past detected fault No. 4** (Same format as "LFt" page 24)

Monitoring variables

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
7211	202A / C	**EP1**	R	**Status of past detected fault No. 1** bit 0 = Same as ETA.1: - 0: Drive not ready - 1: Drive ready (RDY) bit 1 = Same as ETA.5: - 0: Emergency stop in progress - 1: No emergency stop bit 2 = Same as ETA.6: - 0: No SWITCH ON DISABLED status - 1: SWITCH ON DISABLED status bit 3 = Same as ETA.9: Reserved bit 4 = Same as ETA.15: - 0: Forward rotation (output frequency) - 1: Reverse rotation (output frequency) bit 5 = Same as ETI.4: - 0: Motor stopped - 1: Motor running bit 6 = Same as ETI.5: - 0: No DC injection - 1: DC injection bit 7 = Same as ETI.7: - 0: No motor thermal overload alarm - 1: Motor thermal overload alarm bit 8 = Same as ETI.8: Reserved bit 9 = Same as ETI.9: - 0: Drive not accelerating - 1: Drive accelerating bit 10 = Same as ETI.10: - 0: Drive not decelerating - 1: Drive decelerating bit 11 = Same as ETI.11: - 0: No current limit alarm - 1: Current limit alarm bit 12 = Same as ETI.12: Reserved bits 13 and 14 = Same as ETI.13 and ETI.14: - bit 14 = 0 and bit 13 = 0: ATV controlled via terminal block or built-in keypad (ATV312....A) - bit 14 = 0 and bit 13 = 1: ATV controlled via the remote display terminal - bit 14 = 1 and bit 13 = 0: ATV controlled via ModBus - bit 14 = 1 and bit 13 = 1: ATV controlled via CanOpen bit 15 = Same as ETI.15: - 0: Forward rotation requested (reference) - 1: Reverse rotation requested (reference)
7212	202A / D	**EP2**	R	**Status of past detected fault No. 2** (Same format as "EP1")
7213	202A / E	**EP3**	R	**Status of past detected fault No. 3** (Same format as "EP1")
7214	202A / F	**EP4**	R	**Status of past detected fault No. 4** (Same format as "EP1")
6056	201E / 39	**ErCO**	R	**CANopen: error word** Unit: 1 Range: 0 to 4 0: "No error" 1: "Bus off error" 2: "Life time error" 3: "Net overrun" 4: "Heartbeat error"
8541	2037 / 2A	**CMI1**	R	**Image of Modbus extended control word** (received by the Modbus channel) Identical to CMI (page 20).
8542	2037 / 2B	**CMI2**	R	**Image of CANopen extended control word** (received by the CANopen channel) Identical to CMI (page 20).
8521	2037 / 16	**LFR1**	R	**Image of Modbus frequency reference** (received by the Modbus channel) Identical to LFr (page 19).

Identification variables

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
8522	2037 / 17	**LFR2**	R	**Image of CANopen frequency reference** (received by the CANopen channel) Identical to LFr (page 19).
8631	2038 / 20	**LFD1**	R	**Image of Modbus speed reference** Speed reference received by the Modbus channel Identical to LFRD (page 16)
8632	2038 / 21	**LFD2**	R	**Image of CANopen speed reference** Speed reference received by the CANopen channel Identical to LFRD (page 16)
8531	2037 / 20	**PIR1**	R	**Image of Modbus PI reference** (received by the Modbus channel) Identical to PISP (page 19).
8532	2037 / 21	**PIR2**	R	**Image of CANopen PI reference** (received by the CANopen channel) Identical to PISP (page 19).
3011	2000 / C	**NCV**	R	**Drive rating** 0 = unknown 1 = 018 (0.18 kW) 2 = 037 (0.37 kW) 3 = 055 (0.55 kW) 4 = 075 (0.75 kW) 5 = U11 (1.1 kW) 6 = U15 (1.5 kW) 7 = U22 (2.2 kW) 8 = U30 (3 kW) 9 = U40 (4 kW) 10 = U55 (5.5 kW) 11 = U75 (7.5 kW) 12 = D11 (11 kW) 13 = D15 (15 kW)
3012	2000 / D	**VCAL**	R	**Drive voltage** 0 = unknown 1 = M2 (200...240 V single phase) 2 = M3 (200...240 V 3-phase) 3 = N4 (380...500 V 3-phase) 4 = S6 (525...600 V 3-phase)
3017	2000 / 12	**INV**	R	**Nominal drive current** Unit: 0.1 A
3010	2000 / B	**ARE**	R	**Drive type** 0 = ATV312 1 = ATV312……(drive without built-in keypad) Europe 3 = ATV312……(drive with built-in keypad) Asia
3401	2004 / 2	**TSP**	R	**Drive firmware type** The firmware type is specified by an ASCII letter "128": ATV312
3302	2003 / 3	**UdP**	R	**Drive firmware version** Coded on 2 bytes. - low order byte: firmware upgrade index (UI) in hexadecimal format - high order byte: firmware version (V) in hexadecimal format Example : For V1.2 IE04, UdP = 16#1204

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
3105	2001 / 6	**LSP**	R/W	**Low speed** Unit: 0.1 Hz Factory setting: 0 Adjustment range: 0 to HSP (Motor frequency at min. reference)
3104	2001 / 5	**HSP**	R/W	**High speed** Unit: 0.1 Hz Factory setting: if bFr = 50: 500, if bFr = 60: 600 Adjustment range: LSP to tFr (Motor frequency at max. reference): Ensure that this setting is suitable for the motor and the application.
9622	2042 / 17	**ItH**	R/W	**Motor thermal protection - max. thermal current** Unit: 0.1 A Factory setting: According to drive rating Adjustment range: 0.2 to 1.5 In (1) Set ItH to the nominal current on the motor rating plate. Please refer to OLL on page 53 if you wish to suppress thermal protection. (1) In corresponds to the nominal drive current indicated in the Installation Manual and on the drive rating plate.
9623	2042 / 18	**UFr**	R/W	**IR compensation/Voltage boost** Unit: 1% Factory setting: 20 Adjustment range: 0 to 100 - For UFt (page 31) = n or nLd: IR compensation - For UFt = L or P: Voltage boost Used to optimize torque at very low speed (increase UFr if the torque is insufficient). Check that the value of UFr is not too high for when the motor is warm (instabilities can occur). **Note:** Modifying UFt (page 31) will cause UFr to return to the factory setting (20%).
9620	2042 / 15	**FLG**	R/W	**Frequency loop gain** Unit: 1% Factory setting: 20 Adjustment range: 1 to 100 Parameter active only if UFt (page 31) = n or nLd. The FLG parameter adjusts the following of the speed ramp on the basis of the inertia of the machine being driven. Too high a gain may result in operating instability.
9621	2042 / 16	**StA**	R/W	**Frequency loop stability** Unit: 1% Factory setting: 20 Adjustment range: 1 to 100 Parameter active only if UFt (page 31) = n or nLd. Used to adapt the return to steady state after a speed transient (acceleration or deceleration), according to the dynamics of the machine. Gradually increase the stability to avoid any overspeed.
9625	2042 / 1A	**SLP**	R/W	**Slip compensation** Unit: 1% Factory setting: 100 Adjustment range: 0 to 150 Parameter active only if UFt (page 31) = n or nLd. Used to adjust the slip compensation value fixed by nominal motor speed. The speeds given on motor rating plates are not necessarily exact. If slip setting < actual slip: the motor is not rotating at the correct speed in steady state. If slip setting > actual slip: the motor is overcompensated and the speed is unstable.
11301	2053 / 2	**JPF**	R/W	**Skip frequency** Unit: 0.1 Hz Factory setting: 0 Adjustment range: 0 to 5000 Used to avoid prolonged operation at a frequency range of ± 1 Hz around JPF. This function helps to prevent a speed which leads to resonance. Setting the function to 0 renders it inactive.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
11302	2053 / 3	**JF2**	R/W	**2nd skip frequency** Unit: 0.1 Hz Factory setting: 0 Adjustment range: 0 to 5000 Used to avoid prolonged operation at a frequency range of ± 1 Hz around JF2. This function helps to prevent a speed which leads to resonance. Setting the function to 0 renders it inactive.
9201	203E / 2	**CLI**	R/W	**Current limit** Unit: 0.1 A Factory setting: 1.5 In (1) Adjustment range: 0.25 to 1.5 In (1) Used to limit the torque and the temperature rise of the motor. (1) In corresponds to the nominal drive current indicated in the Installation Manual and on the drive rating plate.
11701	2057 / 2	**tLS**	R/W	**Low speed operating time** Unit: 0.1 s Factory setting: 0 (no time limit) Adjustment range: 0 to 9999 Following operation at LSP for a defined period, a motor stop is requested automatically. The motor restarts if the frequency reference is greater than LSP and if a run command is still present. **Note**, value 0 corresponds to an unlimited time.
11003	2050 / 4	**Ftd**	R/WS	**Motor frequency threshold** Unit: 0.1 Hz Factory setting: bFr Adjustment range: 0 to 5000 Motor frequency threshold above which the relay contact (R1 or R2 = FtA) closes or output AOV = 10 V (dO = StA)
11002	2050 / 3	**ttd**	R/WS	**Motor thermal state threshold** Unit: 1% Factory setting: 100 Adjustment range: 0 to 118 Motor thermal state threshold above which the relay contact (R1 or R2 = tSA) closes or output AOV = 10 V (dO = tSA)
11001	2050 / 2	**Ctd**	R/WS	**Motor current threshold** Unit: 0.1 A Factory setting: In (1) Adjustment range: 0 to 1.5 In (1) Motor current threshold above which the relay contact (R1 or R2 = CtA) closes or output AOV = 10 V (dO = CtA) (1) In corresponds to the nominal drive current indicated in the Installation Manual and on the drive rating plate.
12001	205A / 2	**SdS**	R/W	**USPL/USPH scale factor** (USPL/USPH = rFr x SdS) See USPL/USPH page 22. Unit: 0.1 Factory setting: 300 Adjustment range: 1 to 2000 **This parameter also affects the display parameter SPd1/SPd2/SPd3 in the** SUP- menu (See Programming Manual)
3015	2000 / 10	**bFr**	R/WS	**Standard motor frequency** Factory setting: 0 0 = "50" 1 = "60" 50 Hz: IEC 60 Hz: NEMA This parameter modifies the presets of the following parameters: HSP page 27, Ftd page 28, FrS page 29 and tFr page 31.
9601	2042 / 2	**UnS**	R/WS	**Nominal motor voltage given on the rating plate** Unit: 1 V Factory setting: According to drive rating Adjustment range according to drive rating: ATV312●●●M2: 100 to 240 V ATV312●●●M3: 100 to 240 V ATV312●●●N4: 100 to 500 V ATV312●●●S6: 100 to 600 V

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
9602	2042 / 3	**FrS**	R/WS	**Nominal motor frequency given on the rating plate** Unit: 0.1 Hz Factory setting: if bFr = 50: 500 if bFr = 60: 600 Adjustment range: 100 to 5000 **Note:** The ratio $\frac{\text{UnS (in volts)}}{\text{FrS (in Hz)}}$ must not exceed the following values: ATV312●●●M2: 7 max. ATV312●●●M3: 7 max. ATV312●●●N4: 14 max. ATV312●●●S6: 17 max.
9603	2042 / 4	**nCr**	R/WS	**Nominal motor current given on the rating plate** Unit: 0.1 A Factory setting: According to drive rating Adjustment range: 0.25 to 1.5 In (1) (1) In corresponds to the nominal drive current indicated in the Installation Manual and on the drive rating plate.
9604	2042 / 5	**nSP**	R/WS	**Nominal motor speed given on the rating plate** Unit: 1 rpm Factory setting: According to drive rating Adjustment range: 0 to 32767 RPM 0 to 9999 RPM then 10.00 to 32.76 KRPM If, rather than the nominal speed, the rating plate indicates the synchronous speed and the slip in Hz or as a %, calculate the nominal speed as follows: Nominal speed = Synchronous speed x $\frac{\text{100 - slip as a \%}}{\text{100}}$ or Nominal speed = Synchronous speed x $\frac{\text{50 - slip in Hz}}{\text{50}}$ (50 Hz motors) or Nominal speed = Synchronous speed x $\frac{\text{60 - slip in Hz}}{\text{60}}$ (60 Hz motors)
9606	2042 / 7	**COS**	R/WS	**Motor Cos Phi given on the rating plate** Unit: 0.01 Factory setting: According to drive rating Adjustment range: 50 to 100
9643	2042 / 2C	**rSC**	R/WS	**Cold state stator resistance** Factory setting: 0 0 = "nO": Function inactive. For applications which do not require high performance or do not tolerate autotuning (passing a current through the motor) each time the drive is switched on. 1 = "InIt": Activates the function. To improve low-speed performance whatever the thermal state of the motor. >1 = "XXXX" XXXX: Value of cold state stator resistance used, in mΩ. **Note:** **It is strongly recommended that this function is activated for Lifting and Handling applications.** The function should be activated (InIt) only when the motor is in cold state. When rSC = InIt, parameter tUn is forced to POn. At the next run command or the next power-up, the stator resistance is measured with an auto-tune. Parameter rSC then changes to this value (XXXX) and maintains it; tUn remains forced to POn. Parameter rSC remains at InIt as long as the measurement has not been performed. Value XXXX can be forced or changed using the jog dial (1). Procedure: - Check that the motor is cold. - Disconnect the cables from the motor terminals. - Measure the resistance between 2 of the motor terminals (U. V. W) without modifying its connection. - Use the jog dial to enter half the measured value. Increase the factory setting of UFr (page 27) to 100% rather than 20%. **Note:** Do not use rSC on any other setting than nO or tUn = POn with the flying restart function (FLr page 52).

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
9608	2042 / 9	**tUn**	R/WO	**Motor control auto-tuning** **⚠⚠ DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** • During auto-tuning the motor operates at nominal current. • Do not service the motor during auto-tuning. **Failure to follow these instructions will result in death or serious injury.** **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** • It is imperative that all the following parameters [Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated motor freq.] (nCr), [Rated motor speed] (nSP), and [Rated motor power] (nPr) or [Motor 1 Cosinus Phi.] (COS) are correctly configured before performing the auto-tuning. • When one or several parameters have been modified after auto-tuning execution, tUn will display nO and the procedure has to be performed again. **Failure to follow these instructions will result in death or serious injury.** Factory setting: 0 0 = "nO": Auto-tuning not performed. 112 = "YES": Auto-tuning is performed as soon as possible, then the parameter automatically switches to dOnE or nO in the event that auto-tuning was uncuccessful. tnF is displayed if tnL = YES, see page 53. 113 = "dOnE": Use of the values given the last time auto-tuning was performed. 114 = "rUn": Auto-tuning is performed every time a run command is sent. 115 = "POn": Auto-tuning is performed on every power-up. 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 LI1 to LI6: Auto-tuning is performed on the transition from 0 → 1 of a logic input assigned to this function. **Note:** tUn is forced to POn if rSC = InIt. Auto-tuning is only performed if no command has been activated. If a "freewheel stop" or "fast stop" function has been assigned to a logic input, this input must be set to 1 (active at 0). Auto-tuning may last for 1 to 2 seconds. Do not interrupt; wait for the display to change to "dOnE" or "nO".
9609	2042 / A	**tUS**	R	**Auto-tuning status** Factory setting: 0 0 =" tAb": The default stator resistance value is used to control the motor. 1 = "PEnd": Auto-tuning has been requested but not yet performed. 2 = "PrOG": Auto-tuning in progress. 3 = "FAIL": Auto-tuning unsuccessful. 4 = "dOnE": The stator resistance measured by the auto-tuning function is used to control the motor. 5 = "Strd": The cold state stator resistance (rSC other than nO) is used to control the motor.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
9607	2042 / 8	**UFt**	R/WS	**Selection of the type of voltage/frequency ratio** Factory setting: 2 0 = "L": Constant torque for motors connected in parallel or special motors 1 = "P": Variable torque for pump and fan applications 2 = "n": Sensorless flux vector control for constant torque applications 3 = "nLd": Energy saving, for variable torque applications not requiring high dynamics (behaves in a similar way to the P ratio at no load and the n ratio on load).
3107	2001 / 8	**nrd**	R/WS	**Noise reduction** Factory setting: 1 0 = "nO": Fixed frequency 1 = "YES": Frequency with random modulation Random frequency modulation helps to prevent any resonance which may occur at a fixed frequency.
3102	2001 / 3	**SFr**	R/W	**Switching frequency** Unit: 0.1 kHz Factory setting: 40 Adjustment range: 20 to 160 The frequency can be adjusted to reduce the noise generated by the motor. If the frequency has been set to a value higher than 4 kHz, in the event of excessive temperature rise, the drive will automatically reduce the switching frequency and increase it again once the temperature has returned to normal.
3103	2001 / 4	**tFr**	R/WS	**Maximum output frequency** Unit: 0.1 Hz Factory setting: if BFR = 50: 600 if BFR = 60: 720 Adjustment range: 100 to 5000
9101	203D / 2	**SrF**	R/WS	**Suppression of the speed loop filter** Factory setting: 0 0 = "nO": The speed loop filter is active (helps to prevent the reference being exceeded). 1 = "YES": The speed loop filter is suppressed (in position control applications, this reduces the response time and the reference may be exceeded).
8001	2032 / 2	**SCS**	R/WS	**Saving the configuration** Factory setting: 0 0 = "nO": Function inactive 2 = "Str1": Saves the current configuration (but not the result of auto-tuning) to EEPROM. SCS automatically switches to nO as soon as the save has been performed. This function is used to keep another configuration in reserve, in addition to the current configuration. When drives leave the factory the current configuration and the backup configuration are both initialized with the factory configuration. If the remote display terminal option is connected to the drive, the following additional selection options will appear: 11 = "FIL1" 12 = "FIL2" 13 = "FIL3" 14 = "FIL4" FIL1, FIL2, FIL3, FIL4 are files available in the remote display terminal's EEPROM memory for saving the current configuration. They can be used to store between 1 and 4 different configurations which can also be stored on or even transferred to other drives of the same rating. SCS automatically switches to nO as soon as the save has been performed.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
3052	2000 / 35	**CFG**	R/WS	**Source configuration** **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** Ensure that the selected macro configuration is compatible with the wiring diagram used. **Failure to follow these instructions will result in death or serious injury.** Factory setting: 1 Choice of source configuration. 0 = "StS": Run/stop configuration. Identical to the factory configuration apart from the I/O assignments: Logic inputs: LI1, LI2 (2 directions of operation): 2-wire transition detection control, LI1 = forward, LI2 = reverse LI3 to LI6: Inactive (not assigned) Analog inputs: AI1: Speed reference 0-10 V, AI2, AI3: Inactive (not assigned) Relay R1: The contact opens in the event of a detected fault (or drive off) Relay R2: Inactive (not assigned) Analog output AOC: 0-20 mA inactive (not assigned) 1 = "Std": Factory configuration **Note:** The assignment of CFG results directly in a return to the selected configuration.
8002	2032 / 3	**FCS**	R/WS	**Return to factory settings/Restore configuration** **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** Check that this change is compatible with the wiring diagram used. **Failure to follow these instructions will result in death or serious injury.** Factory setting: 0 0 = "nO": Function inactive 2 = "rEC1": The current configuration becomes identical to the backup configuration previously saved by SCS = Strl. rECI is only visible if the backup has been carried out. FCS automatically changes to nO as soon as this action has been performed. **64 = "InI": The current configuration is replaced by the configuration selected by parameter CFG (1). FCS automatically changes to nO as soon as this action has been performed.** If the remote display terminal option is connected to the drive, the following additional selection options appear, as long as the corresponding files have been loaded in the remote display terminal's EEPROM memory (0 to 4 files): 11 = "FIL1": display terminal file 1 not empty 12 = "FIL2": display terminal file 2 not empty 13 = "FIL3": display terminal file 3 not empty 14 = "FIL4": display terminal file 4 not empty They enable the current configuration to be replaced with one of the 4 configurations that may be loaded on the remote display terminal. FCS automatically changes to nO as soon as this action has been performed.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
11101	2051 / 2	**tCC**	R/WS	**2-wire/3-wire control** **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** • Modifying parameter tCC will cause parameters rrS, tCt and all other functions assigning logic input, to return to their factory setting. • Check that this change is compatible with the wiring diagram used. **Failure to follow these instructions will result in death or serious injury.** (Type of control) Factory setting: 0 Control configuration: 0 = "2C" = 2-wire control: The open or closed state of the input controls running or stopping. 1 = "3C" = 3-wire control (pulse control): A "forward" or "reverse" pulse is sufficient to control starting, a "stop" pulse is sufficient to control stopping. 2 = "LOC "= local control (drive RUN/STOP/RESET). Inactive if LAC, page 35 is est to L3.
11102	2051 / 3	**tCt**	R/WS	**Type of 2-wire control** **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** Check that 2-wire control type modification is compatible with the wiring diagram used. **Failure to follow these instructions will result in death or serious injury.** (parameter active only if tCC = 2C) Factory setting: 1 0 = "LEL ": State 0 or 1 is taken into account for run or stop. 1 = "trn": A change of state (transition or edge) is necessary to initiate operation, in order to help prevent accidental restarts after a break in the power supply. 2 = "PFO": State 0 or 1 is taken into account for run or stop, but the "forward" input takes priority over the "reverse" input.
11105	2051 / 6	**rrS**	R/WS	**Reverse operation via logic input** Factory setting: - if tCC = 0: 130 - if tCC = 1: 131 - if tCC = 2: 0 If rrS = nO, reverse operation is active, by means of negative voltage on AI2 for example. 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6
4434	200E / 23	**CrL3**	R/WS	**Value for low speed (LSP) on input AI3** Unit: 0.1 mA Factory setting: 40 Adjustment range: 0 to 200 CrL3 and CrH3 are used to configure the input for 0-20 mA, 4-20 mA, 20-4 mA, etc.
4444	200E / 2D	**CrH3**	R/WS	**Value for high speed (HSP) on input AI3** Unit: 0.1 mA Factory setting: 200 Adjustment range: 40 to 200 CrL3 and CrH3 are used to configure the input for 0-20 mA, 4-20 mA, 20-4 mA, etc.

(1) The following configuration and adjustment parameters do not revert to their factory settings; they retain their current configuration:
- bFr (Standard motor frequency) page 28
- LCC (Control via remote display terminal) page 38
- COd (Terminal locking code) page 56
- Communication parameters, page 58

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
4601	2010 / 2	**AO1t**	R/WS	**Configuration of the analog output** Factory setting: 2 1 = "10U": 0 - 10 V configuration (use terminal AOV) 2 = "0A": 0 - 20 mA configuration (use terminal AOC) 3 = "4A": 4 - 20 mA configuration (use terminal AOC)
5031	2014 / 20	**dO**	R/WS	**Analog/logic output AOC/AOV** Factory setting: 0 0 = "nO": Not assigned For the following assignments the output is analog type: 129 = "OCr": Motor current. 20 mA or 10 V corresponds to twice the nominal drive current. 130 = "OFr": Motor frequency. 20 mA or 10 V corresponds to the maximum frequency tFr (page 31). 132 = "Otr": Motor torque. 20 mA or 10 V corresponds to twice the nominal motor torque. 139 = "OPr": Power supplied by the drive. 20 mA or 10 V corresponds to twice the nominal drive power. For the following assignments the output is logic type (see diagram in the Installation Manual): **Note:** With these assignments, **configure AO1t = 0A**. 1 = "FLt": Drive detected fault 2 = "rUn": Drive running 4 = "FtA": Frequency threshold reached (Ftd parameter page 28) 5 = "FLA": High speed (HSP) reached 6 = "CtA": Current threshold reached (Ctd parameter page 28) 7 = "SrA": Frequency reference reached 8 = "tSA": Motor thermal threshold reached (ttd parameter page 28) 9 = "bLC": Brake sequence (for information, as this assignment can be only be activated or deactivated via the bLC parameter page 47) 12 = "APL": Loss of 4-20 mA signal, even if LFL = nO (page 59) The logic output is in state 1 (24 V) when the selected assignment is active, with the exception of FLt (state 1 if no drive has not detected a fault).
5001	2014 / 2	**r1**	R/WS	**Relay r1** Factory setting: 1 0 = "nO": Not assigned 1 = "FLt": Drive detected fault 2 = "rUn": Drive running 4= "FtA": Frequency threshold reached (Ftd parameter page 28) 5 = "FLA": High speed (HSP) reached 6 = "CtA": Current threshold reached (Ctd parameter page 28) 7 = "SrA": Frequency reference reached 8 = "tSA": Motor thermal threshold reached (ttd parameter page 28) 12 = "APL": Loss of 4-20 mA signal, even if LFL = nO (page 59) 129 = "LI1": Returns the value of LI1. 130 = "LI2": Returns the value of LI2. 131 = "LI3": Returns the value of LI3. 132 = "LI4": Returns the value of LI4. 133 = "LI5": Returns the value of LI5. 134 = "LI6": Returns the value of LI6. The relay is energized up when the selected assignment is active, with the exception of FLt (energized if the drive has not detected a fault).

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
5002	2014 / 3	**r2**	R/WS	**Relay r2** Factory setting: 0 0 = "nO": Not assigned 1 = "FLt": Drive detected fault 2 = "rUn": Drive running 4 = "FtA": Frequency threshold reached (Ftd parameter page 28) 5 = "FLA": High speed (HSP) reached 6 = "CtA": Current threshold reached (Ctd parameter page 28) 7 = "SrA": Frequency reference reached 8 = "tSA": Motor thermal threshold reached (ttd parameter page 28) 9 = "bLC": Brake sequence (for information, as this assignment can be only be activated or deactivated via the bLC parameter page 47) 12 = "APL": Loss of 4-20 mA signal, even if LFL = nO (page 59) 129 = "LI1": Returns the value of LI1. 130 = "LI2": Returns the value of LI2. 131 = "LI3": Returns the value of LI3. 132 = "LI4": Returns the value of LI4. 133 = "LI5": Returns the value of LI5. 134 = "LI6": Returns the value of LI6. The relay is energized when the selected assignment is active, with the exception of FLt (energized if the drive has not detected a fault).
3006	2000 / 7	**LAC**	R/WS	**Function access level** **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** • Assigning LAC to L3 will restore the factory settings of the Fr1 (below), Cd1 (page 37), CHCF (page 36), and tCC (page 33) parameters. • L3 can only be restored to L2 or L1 and L2 to L1 by means of a "factory setting" via FCS (page 32) or by setting bit 0 of CMI to 1 (page 20). • Check that this change is compatible with the wiring diagram used. **Failure to follow these instructions will result in death or serious injury.** Factory setting: 0 0 = "L1": Access to standard functions. Significantly, this level is interchangeable with ATV28. 1 = "L2": Access to advanced functions: - +/- speed (motorized potentiometer) - Brake control - Switching for second current limit - Motor switching - Management of limit switches 2 = L3: Access to advanced functions and management of mixed control modes.
8413	2036 / E	**Fr1**	R/WS	**Configuration reference 1** Factory setting: 1 = "AI1": Analog input AI1 2 = "AI2": Analog input AI2 3 = "AI3": Analog input AI3 16 = "AIV1": Potentiometer If LAC = L2 or L3, the following additional assignments are possible: 160 = "UPdt": (1) + speed/- speed via LI. See configuration page 45. 161 = "UpdH": (1) + speed/- speed using the jog dial. For operation, display the frequency rFr (see page 21.) The +/- speed function via jog dial is controlled from the SUP- menu by setting to parameter rFr. If LAC = L3, the following additional assignments are possible: 163 = "LCC": Reference via the remote display terminal, LFr parameter in the SEt- or SUP- menu. 164 = "Mdb": Reference via Modbus 167 = "nEt": Reference via CANopen

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
8414	2036 / F	**Fr2**	R/WS	**Configuration reference 2** Factory setting: 0 0 = "nO": Not assigned 1 = "AI1": Analog input AI1 2 = "AI2": Analog input AI2 3 = "AI3": Analog input AI3 16 = "AIV1": Potentiometer If LAC = L2 or L3, the following additional assignments are possible: 160 = "UPdt": (1) + speed/- speed via LI. See configuration page 45. 161 = "UpdH": (1) + speed/- speed using the jog dial. For operation, display the frequency rFr (see page 21). The +/- speed function via the jog dial is controlled from the SUP- menu by setting to parameter rFr. If LAC = L3, the following additional assignments are possible: 163 = "LCC": Reference via the remote display terminal, LFr parameter in the SEt- or SUP- menu. 164 = "Mdb": Reference via Modbus 167 = "nEt": Reference via CANopen
8411	2036 / C	**rFC**	R/WS	**Reference switching** Factory setting: 96 Parameter rFC can be used to select channel Fr1 or Fr2 or to configure a logic input or a control bit for remote switching of Fr1 or Fr2. 96 = "Fr1": Reference = Reference 1 97 = "Fr2": Reference = Reference 2 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following additional assignments are possible: 187 = "C111": bit 11 of the CMD control word (page 19) written by Modbus 188 = "C112": bit 12 of the CMD control word (page 19) written by Modbus 189 = "C113": bit 13 of the CMD control word (page 19) written by Modbus 190 = "C114": bit 14 of the CMD control word (page 19) written by Modbus 191 = "C115": bit 15 of the CMD control word (page 19) written by Modbus 203 = "C211": bit 11 of the CMD control word (page 19) written by CANopen 205 = "C213": bit 13 of the CMD control word (page 19) written by CANopen 206 = "C214": bit 14 of the CMD control word (page 19) written by CANopen 207 = "C215": bit 15 of the CMD control word (page 19) written by CANopen The reference can be switched with the drive running. Fr1 is active when the logic input or control word bit is at state 0. Fr2 is active when the logic input or control word bit is at state 1.
8401	2036 / 2	**CHCF**	R/WS	**Mixed mode** (control channels separated from reference channels) Factory setting: 1 Active if LAC = L3 1 = "SIM": Combined 2 = "SEP": Separate

(1) Note:
- You cannot assign UPdt to Fr1 or Fr2 and UPdH to Fr1 or Fr2 at the same time. Only one of the UPdt/UPdH assignments is permitted on each reference channel.
- The +/- speed function in Fr1 is incompatible with several functions (see page 14). Before configuring it, these functions must be unassigned, especially the summing inputs (set SA2 to nO page 42) and the preset speeds (set PS2 and PS4 to nO page 42) which are assigned in the factory settings.
- In Fr2, the +/- speed function is compatible with the preset speeds, summing inputs and the PI regulator.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
8424	2036 / 19	**Cd2**	R/WS	**Configuration of control channel 2** Factory setting: 10 Active if CHCF = SEP and LAC = L3 1 = "tEr": Terminal block control 2 = "LOC": Keypad control 3 = "LCC": Remote display terminal control 10 = "Mdb": Control via Modbus 20 = "nEt": Control via CANopen
8423	2036 / 18	**Cd1**	R/WS	**Configuration of control channel 1** Factory setting: 1 Active if CHCF = SEP and LAC = L3 1 = "tEr": Terminal block control 2 = "LOC": Keypad control 3 = "LCC": Remote display terminal control 10 = "Mdb": Control via Modbus 20 = "nEt": Control via CANopen
8421	2036 / 16	**CCS**	R/WS	**Control channel switching** Factory setting: 98 Active if CHCF = SEP and LAC = L3 Parameter CCS can be used to select channel Cd1 or Cd2 or to configure a logic input or a control bit for remote switching of Cd1 or Cd2. 98 = "Cd1": Control channel = Channel 1 99 = "Cd2": Control channel = Channel 2 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 187 = "C111": bit 11 of the CMD control word (page 19) written by Modbus 188 = "C112": bit 12 of the CMD control word (page 19) written by Modbus 189 = "C113": bit 13 of the CMD control word (page 19) written by Modbus 190 = "C114": bit 14 of the CMD control word (page 19) written by Modbus 191 = "C115": bit 15 of the CMD control word (page 19) written by Modbus 203 = "C211": bit 11 of the CMD control word (page 19) written by CANopen 204 = "C212": bit 12 of the CMD control word (page 19) written by CANopen 205 = "C213": bit 13 of the CMD control word (page 19) written by CANopen 206 = "C214": bit 14 of the CMD control word (page 19) written by CANopen 207 = "C215": bit 15 of the CMD control word (page 19) written by CANopen Channel 1 is active when the input or control word bit is at state 0. Channel 2 is active when the input or control word bit is at state 1. Switching channel may result in a change of direction of motor rotation.
8402	2036 / 3	**COP**	R/WS	**Copy channel 1 to channel 2** Factory setting: 0 Active if LAC = L3 Copying is only performed from channel 1 to channel 2. 0 = "nO": No copy 1 = "SP": Copy reference 2 = "Cd": Copy control 3 = "ALL": Copy control and reference Exceptions: • If channel 2 is controlled via the terminal block (2-wire or 3-wire control), channel 1 control is not copied. • If channel 2 reference is set via analog input (AI1, AI2, AI3 or AIV1), channel 1 reference is not copied. Reference copied: • If channel 2 is the +/- speed type, the output frequency applied to the motor (rFr) is copied. • In other cases (built-in keypad, remote display terminal or communication bus), the reference before ramp (FrH) is copied. **Note:** If channel 2 is a communication bus, the copy is "overwritten" as soon as a new control or reference is received by the bus.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
64003	2262 / 4	**LCC**	R/WS	**Control via remote display terminal** Factory setting: 0 Parameter active only with the remote display terminal option and if LAC = L1 or L2. 0 = "nO": Function inactive 1 = "YES": Enables control of the drive using the STOP/RESET, RUN and FWD/REV buttons on the display terminal. The speed reference is then given by parameter LFr page 19. Only the freewheel, fast stop and DC injection stop commands remain active on the terminal block. If the drive/terminal connection is cut or if the terminal has not been connected, the drive locks in an SLF detected fault.
64002	2262 / 3	**PSt**	R/WS	**Stop priority** **⚠ WARNING** **LOSS OF CONTROL** Do not set Pst to nO without external stop control. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Factory setting: 1 This function gives priority to the STOP key on the keypad or the STOP key on the remote display terminal, regardless of the control channel (terminal block or communication bus). 0 = "nO": Function inactive 1 = "YES": STOP key priority
64001	2262 / 2	**rOt**	R/WS	**Direction of operation authorized** Factory setting: 0 Direction of operation authorized for the RUN key. 0 = "dFr": Forward 1 = "drS": Reverse 2 = "bOt": Both directions are authorized.
9004	203C / 5	**rPt**	R/WS	**Type of ramp** Defines the shape of the acceleration and deceleration ramps. Factory setting: 0 0 = "LIn": Linear 1 = "S": S ramp 2 = "U": U ramp 3 = "CUS": Customized
9005	203C / 6	**tA1**	R/W	**Start of CUS-type acceleration ramp rounded** Unit: 1% (as % of total ramp time ACC or AC2) Factory setting: 10 Adjustment range: 0 to 100
9006	203C / 7	**tA2**	R/W	**End of CUS-type acceleration ramp rounded** Unit: 1% (as % of total ramp time ACC or AC2) Factory setting: 10 Adjustment range: 0 to 100 - tA1
9007	203C / 8	**tA3**	R/W	**Start of CUS-type deceleration ramp rounded** Unit: 1% (as % of total ramp time dEC or dE2) Factory setting: 10 Adjustment range: 0 to 100
9008	203C / 9	**tA4**	R/W	**End of CUS-type deceleration ramp rounded** Unit: 1% (as % of total ramp time dEC or dE2) Factory setting: 10 Adjustment range: 0 to 100 - tA3
9020	203C / 15	**Inr**	R/WS	**Ramp increment** Factory setting: 1 0 = "0.01" : Ramp can be set between 0.05 s and 327.6 s 1 = "0.1" : Ramp can be set between 0.1 s and 3276 s 2 = "1" : Ramp can be set between 1 s and 32760 s This parameter applies to parameters ACC, DEC, AC2 and DE2 **Note:** Modifying parameter Inr results in modification of the settings of parameters ACC, DEC, AC2 and DE2.

<table>
<tr><th>Modbus address</th><th>CANopen address</th><th>Code</th><th>Read/ Write</th><th>Name/Description/Possible values</th></tr>
<tr><td>9001</td><td>203C / 2</td><td>ACC</td><td>R/W</td><td>Acceleration ramp time
Unit: 0.1 s
Factory setting: 30
Adjustment range: According to parameter Inr
Defined for accelerating between 0 and the nominal frequency FrS (page 29).</td></tr>
<tr><td>9002</td><td>203C / 3</td><td>dEC</td><td>R/W</td><td>Deceleration ramp time
Unit: 0.1 s
Factory setting: 30
Adjustment range: According to parameter Inr
Defined for decelerating between the nominal frequency FrS (page 29) and 0.
Check that the value of dEC is not too low in relation to the load to be stopped.</td></tr>
<tr><td>9010</td><td>203C / B</td><td>rPS</td><td>R/WS</td><td>Ramp switching
Factory setting: 0
This function remains active regardless of the control channel.
0 = "nO": Not assigned
129 = "LI1": Logic input LI1
130 = "LI2": Logic input LI2
131 = "LI3": Logic input LI3
132 = "LI4": Logic input LI4
133 = "LI5": Logic input LI5
134 = "LI6": Logic input LI6

If LAC = L3, the following assignments are possible:

171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen
172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen
173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen
174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen
175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen

ACC and dEC are enabled when the logic input or control word bit is at state 0.
AC2 and dE2 are enabled when the logic input or control word bit is at state 1.</td></tr>
<tr><td>9011</td><td>203C / C</td><td>Frt</td><td>R/WS</td><td>Ramp switching threshold
Unit: 0.1 Hz
Factory setting: 0
Adjustment range: 0 to 5000
The second ramp is switched if the value of Frt is not equal to 0 (0 deactivates the function) and the output frequency is greater than Frt.
Threshold ramp switching can be combined with switching via LI or bit as follows:
<table>
<tr><th>LI or bit</th><th>Frequency</th><th>Ramp</th></tr>
<tr><td>0</td><td><Frt</td><td>ACC, dEC</td></tr>
<tr><td>0</td><td>>Frt</td><td>AC2, dE2</td></tr>
<tr><td>1</td><td><Frt</td><td>AC2, dE2</td></tr>
<tr><td>1</td><td>>Frt</td><td>AC2, dE2</td></tr>
</table></td></tr>
<tr><td>9012</td><td>203C / D</td><td>AC2</td><td>R/W</td><td>2nd acceleration ramp time
Unit: 0.1 s
Factory setting: 50
Adjustment range: According to parameter Inr
Enabled via logic input (rPS) or frequency threshold (Frt).</td></tr>
<tr><td>9013</td><td>203C / E</td><td>dE2</td><td>R/W</td><td>2nd deceleration ramp time
Unit: 0.1 s
Factory setting: 50
Adjustment range: According to parameter Inr
Enabled via logic input (rPS) or frequency threshold (Frt).</td></tr>
<tr><td>9003</td><td>203C / 4</td><td>brA</td><td>R/WS</td><td>Deceleration ramp adaptation
Factory setting: 1
Activating this function automatically adapts the deceleration ramp, if this has been set at too low a value for the inertia of the load.
0 = "nO": Function inactive
1 = "YES": Function active. The function is incompatible with applications requiring:
- positioning on a ramp
- the use of a braking resistor (the function may not operating correctly)
brA is forced to nO if brake control bLC is assigned (page 47).</td></tr>
</table>

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
11201	2052 / 2	**Stt**	R/WS	**Normal stop mode** Factory setting: 0 Stop mode on disappearance of the run command or appearance of a stop command. 0 = "rMP": On ramp 1 = "FSt": Fast stop 2 = "nSt": Freewheel stop 3 = "dCI": DC injection stop
11204	2052 / 5	**FSt**	R/WS	**Fast stop via logic input** Factory setting: 0 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen The stop is activated when the logic state of the input changes to 0 and the control word bit changes to 1. The fast stop is a stop on a reduced ramp via parameter dCF. If the input falls back to state 1 and the run command is still active, the motor will only restart if 2-wire level control has been configured (tCC = 2C and tCt = LEL or PFO, see page 33). In other cases, a new run command must be sent.
11230	2052 / 1F	**dCF**	R/WS	**Coefficient for dividing the deceleration ramp time for fast stopping** Unit: 1 Factory setting: 4 Adjustment range: 0 to 10 Parameter accessible if a fast stop has been assigned by one of the following parameters: Stt/FSt (page 40) or EPL/OHL/OLL/SLL/COL (page 59) or LFL/StP (page 59). Ensure that the reduced ramp is not too low in relation to the load to be stopped. The value 0 corresponds to the minimum ramp.
11203	2052 / 4	**dCI**	R/WS	**DC injection via logic input** **Note** This function is incompatible with the "Brake control" function (see page 14). Factory setting: 0 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen Braking is activated when the logic state of the input or control word bit is at 1.
11210	2052 / B	**IdC**	R/W	**Level of DC injection braking current activated via logic input or selected as stop mode** **Note:** This setting is not related to the "automatic standstill DC injection" function. Unit: 0.1 A Factory setting: 0.7 In (1) Adjustment range: 0 to In (1) After 5 seconds the injection current is peak limited at 0.5 Ith if it is set at a higher value. (1) In corresponds to the nominal drive current indicated in the Installation Manual and on the drive rating plate.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
11211	2052 / C	**tdC**	R/W	**Total DC injection braking time selected as normal stop mode** **Note:** This setting is not related to the "automatic standstill DC injection" function. Unit: 0.1 s Factory setting: 5 Adjustment range: 1 to 300
11202	2052 / 3	**nSt**	R/WS	**Freewheel stop via logic input** Factory setting: 0 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 The stop is activated when the logic state of the input is at 0. If the input falls back to state 1 and the run command is still active, the motor will only restart if 2-wire level control has been configured. In other cases, a new run command must be sent.
10401	204A / 2	**AdC**	R/W	**Automatic standstill DC injection** (at the end of the ramp) **⚠ ⚠ DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** Do not operate on the motor during DC injection. **Failure to follow these instructions will result in death or serious injury.** Factory setting: 1 0 = "nO": No injection 1 = "YES": Standstill injection for adjustable period 2 = "Ct": Continuous standstill injection **This parameter gives rise to the injection of current even if a run command has not been sent.**
10402	204A / 3	**tdC1**	R/W	**Automatic standstill DC injection time** Unit: 0.1 s Factory setting: 50 Adjustment range: 1 to 300
10403	204A / 4	**SdC1**	R/W	**Level of automatic standstill DC injection current** Unit: 0.1 A Factory setting: 0.7 In (1) Adjustment range: 0 to 1.2 In (1) **Note:** Check that the motor will withstand this current without overheating.
10404	204A / 5	**tdC2**	R/W	**2nd automatic standstill DC injection time** Unit: 0.1 s Factory setting: 0 Adjustment range: 0 to 300
10405	204A / 6	**SdC2**	R/W	**2nd level of standstill DC injection current** Unit: 0.1 A Factory setting: 0.5 In (1) Adjustment range: 0 to 1.2 In (1) **Note:** Check that the motor will withstand this current without overheating.

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

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
11801	2058 / 2	**SA2**	R/WS	**Summing input 2** **Note** The "Summing inputs" function may be incompatible with other functions (see page 14). Factory setting: 2 Can be used to sum one or two inputs to reference Fr1 only. 0 = "nO": Not assigned 1 = "AI1": Analog input AI1 2 = "AI2": Analog input AI2 3 = "AI3": Analog input AI3 16 = "AIV1": Potentiometer If LAC = L3, the following assignments are possible: 163 = "LCC": Reference via the remote display terminal, LFr parameter in the SEt- or SUP- menu. 164 = "Mdb": Reference via Modbus 167 = "nEt": Reference via CANopen
11802	2058 / 3	**SA3**	R/WS	**Summing input 3** **Note** The "Summing inputs" function may be incompatible with other functions (see page 14). Factory setting: 0 Can be used to sum one or two inputs to reference Fr1 only. 0 = "nO": Not assigned 1 = "AI1": Analog input AI1 2 = "AI2": Analog input AI2 3 = "AI3": Analog input AI3 16 = "AIV1": Potentiometer If LAC = L3, the following assignments are possible: 163 = Reference via the remote display terminal, LFr parameter in the SEt- or SUP- menu. 164 = "Mdb": Reference via Modbus 167 = "nEt": Reference via CANopen
11401	2054 / 2	**PS2**	R/WS	**2 preset speeds** Factory setting: if tCC = 1: 0 if tCC = 0 or 2: 131 Selecting the assigned logic input activates the function (1). 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen

(1) **Note:** The "Preset speeds" function may be incompatible with other functions (see page 14).

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
11402	2054 / 3	**PS4**	R/WS	**4 preset speeds** Factory setting: if tCC = 1: 0 if tCC = 0 or 2: 132 Selecting the assigned logic input activates the function (1). Check that PS2 has been assigned before assigning PS4. 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen
11403	2054 / 4	**PS8**	R/WS	**8 preset speeds** Factory setting: 0 Selecting the assigned logic input activates the function (1). Check that PS4 has been assigned before assigning PS8. 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen
11404	2054 / 5	**PS16**	R/WS	**16 preset speeds** Factory setting: 0 Selecting the assigned logic input activates the function (1). Check that PS8 has been assigned before assigning PS16. 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen

(1) **Note:** The "Preset speeds" function may be incompatible with other functions (see page 14).

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
11410	2054 / B	**SP2**	R/W	**2nd preset speed** Unit: 0.1 Hz Factory setting: 100 Adjustment range: 0 to 5000 (1)
11411	2054 / C	**SP3**	R/W	**3rd preset speed** Unit: 0.1 Hz Factory setting: 150 Adjustment range: 0 to 5000 (1)
11412	2054 / D	**SP4**	R/W	**4th preset speed** Unit: 0.1 Hz Factory setting: 200 Adjustment range: 0 to 5000 (1)
11413	2054 / E	**SP5**	R/W	**5th preset speed** Unit: 0.1 Hz Factory setting: 250 Adjustment range: 0 to 5000 (1)
11414	2054 / F	**SP6**	R/W	**6th preset speed** Unit: 0.1 Hz Factory setting: 300 Adjustment range: 0 to 5000 (1)
11415	2054 / 10	**SP7**	R/W	**7th preset speed** Unit: 0.1 Hz Factory setting: 350 Adjustment range: 0 to 5000 (1)
11416	2054 / 11	**SP8**	R/W	**8th preset speed** Unit: 0.1 Hz Factory setting: 400 Adjustment range: 0 to 5000 (1)
11417	2054 / 12	**SP9**	R/W	**9th preset speed** Unit: 0.1 Hz Factory setting: 450 Adjustment range: 0 to 5000 (1)
11418	2054 / 13	**SP10**	R/W	**10th preset speed** Unit: 0.1 Hz Factory setting: 500 Adjustment range: 0 to 5000 (1)
11419	2054 / 14	**SP11**	R/W	**11th preset speed** Unit: 0.1 Hz Factory setting: 550 Adjustment range: 0 to 5000 (1)
11420	2054 / 15	**SP12**	R/W	**12th preset speed** Unit: 0.1 Hz Factory setting: 600 Adjustment range: 0 to 5000 (1)
11421	2054 / 16	**SP13**	R/W	**13th preset speed** Unit: 0.1 Hz Factory setting: 700 Adjustment range: 0 to 5000 (1)
11422	2054 / 17	**SP14**	R/W	**14th preset speed** Unit: 0.1 Hz Factory setting: 800 Adjustment range: 0 to 5000 (1)
11423	2054 / 18	**SP15**	R/W	**15th preset speed** Unit: 0.1 Hz Factory setting: 900 Adjustment range: 0 to 5000 (1)
11424	2054 / 19	**SP16**	R/W	**16th preset speed** Unit: 0.1 Hz Factory setting: 1000 Adjustment range: 0 to 5000 (1)

(1) **Note:** The speed is limited by parameter HSP (page 27).

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
11110	2051 / B	**JOG**	R/WS	**Jog operation** Factory setting: if tCC = 0 or 2: 0 if tCC = 1: 132 Selecting the assigned logic input activates the function. 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 **Note,** the "JOG operation" function may be incompatible with other (see page 14).
11111	2051 / C	**JGF**	R/W	**Jog operation reference** Unit: 0.1 Hz Factory setting: 100 Adjustment range: 0 to 100
11501	2055 / 2	**USP**	R/WS	**+ speed (motorized potentiometer)** Factory setting: 0 Function active only if LAC = L2 or L3 and UPdt has been selected (see page 35). Selecting the assigned logic input activates the function (1). 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6
11502	2055 / 3	**dSP**	R/WS	**-speed (motorized potentiometer)** Factory setting: 0 Function active only if LAC = L2 or L3 and UPdt has been selected (see page 35). Selecting the assigned logic input activates the function (1). 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6
11503	2055 / 4	**Str**	R/WS	**Save reference** Factory setting: 0 Associated with the "+/- speed" function, this parameter can be used to save the reference: - When the run commands disappear (saved to RAM) - When the line supply or the run commands disappear (saved to EEPROM) On the next start-up, the speed reference is the last reference saved. 0 = "nO": No save 1 = "rAM": Save to RAM 2 = "EEP": Save to EEPROM
11901	2059 / 2	**PIF**	R/WS	**PI regulator feedback** Factory setting: 0 0 = "nO": Not assigned 1 = "AI1": Analog input AI1 2 = "AI2": Analog input AI2 3 = "AI3": Analog input AI3 **Note** The "PI Regulator" function is incompatible with several functions (see page 14). Before configuring it, these functions must be unassigned, especially the summing inputs (set SA2 to nO page 42) and the preset speeds (set PS2 and PS4 to nO page 42) which are assigned in the factory settings.
11941	2059 / 2A	**rPG**	R/W	**PI regulator proportional gain** Unit: 0.01 Factory setting: 100 Adjustment range: 1 to 10000 Contributes to dynamic performance during rapid changes in the PI feedback.

(1) Note: The "+/- speed" function is incompatible with several functions (see page 14). Before configuring it, these functions must be unassigned, especially the summing inputs (set SA2 to nO page 42) and the preset speeds (set PS2 and PS4 to nO page 42) which are assigned in the factory settings.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
11942	2059 / 2B	**rIG**	R/W	**PI regulator integral gain** Unit: 0.01 Factory setting: 100 Adjustment range: 1 to 10000 Contributes to static precision during slow changes in the PI feedback.
11903	2059 / 4	**FbS**	R/W	**PI feedback multiplication coefficient** Unit: 0.1 Factory setting: 10 Adjustment range: 1 to 1000 For process adaptation
11940	2059 / 29	**PIC**	R/W	**IReversal of the direction of correction of the PI regulator** Factory setting: 0 0 = "nO": normal 1 = "YES": reverse
11909	2059 / A	**Pr2**	R/WS	**2 preset PI references** Factory setting: 0 Selecting the assigned logic input activates the function. 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen
11910	2059 / B	**Pr4**	R/WS	**4 preset PI references** Factory setting: 0 Selecting the assigned logic input activates the function. Check that Pr2 has been assigned before assigning Pr4. 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen
11921	2059 / 16	**rP2**	R/W	**2nd preset PI reference** Unit: 0.1% Factory setting: 300 Adjustment range: 0 to 1000 Only active if Pr2 has been enabled by selecting an input.
11922	2059 / 17	**rP3**	R/W	**3rd preset PI reference** Unit: 0.1% Factory setting: 600 Adjustment range: 0 to 1000 Only active if Pr4 has been enabled by selecting an input.
11923	2059 / 18	**rP4**	R/W	**4th preset PI reference** Unit: 0.1% Factory setting: 900 Adjustment range: 0 to 1000 Only active if Pr4 has been enabled by selecting an input.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
11960	2059 / 3D	**rSL**	RW0	**Restart error threshold ("wake-up" threshold)** Unit: 0.1 Factory setting: 0 Adjustment range: 0 to 1000 If the "PI" and "Low speed operating time"(tLS) (see page 28) functions are configured at the same time, the PI regulator may attempt to set a speed lower than LSP. This results in unsatisfactory operation which consists of starting, operating at low speed then stopping, and so on… Parameter rSL (restart error threshold) can be used to set a minimum PI error threshold for restarting after a stop at prolonged LSP. The function is inactive if tLS = 0.
11908	2059 / 9	**PII**	R/WS	**Internal PI reference enabled** Factory setting: 0 0 = "nO": The PI regulator reference is Fr1, except for UPdH and UPdt (+/- speed cannot be used as the PI regulator reference). 1 = "YES": The PI regulator reference is internal via parameter rPI.
11920	2059 / 15	**rPI**	R/W	**Internal PI reference** Unit: 0.1% Factory setting: 0 Adjustment range: 0 to 1000
10001	2046 / 2	**bLC**	R/WS	**Brake control configuration** Factory setting: 0 Function active only if LAC = L2 or L3 (page 35). 0 = "nO": Not assigned 2 = "r2": Relay R2 64 = "dO": Logic output AOC If bLC is assigned, parameters FLr (page 52) and brA (page 39) are forced to nO, and parameter OPL (page 52) is forced to YES. bLC is forced to nO if OPL = OAC (page 52). **Note** This function may be incompatible with other functions (see page 14).
10002	2046 / 3	**brL**	R/WS	**Brake release frequency** Unit: 0.1 Hz Factory setting: According to drive rating Adjustment range: 0 to 100
10006	2046 / 7	**Ibr**	R/WS	**Motor current threshold for brake release** Unit: 0.1 A Factory setting: According to drive rating Adjustment range: 0 to 1.36 In (1) (1) In corresponds to the nominal drive current indicated in the Installation Manual and on the drive rating plate.
10004	2046 / 5	**brt**	R/WS	**Brake release time** Unit: 0.01 s Factory setting: 50 Adjustment range: 0 to 500
10003	2046 / 4	**bEn**	R/WS	**Brake engage frequency threshold** Unit: 0.1 Hz Factory setting: 65535 Adjustment range: 0 to LSP 65535 = "nO": Not set 0 to LSP: Adjustment range in Hz If bLC is assigned and bEn still equals nO, the drive will lock on a bLF detected fault on the first run command.
10005	2046 / 6	**bEt**	R/WS	**Brake engage time** Unit: 0.01 s Factory setting: 50 Adjustment range: 0 to 500
10007	2046 / 8	**bIP**	R/WS	**Brake release pulse** Factory setting: 0 0 = "nO": While the brake is releasing, the motor torque direction corresponds to the direction of rotation commanded. 1 = "YES": While the brake is releasing, the motor torque direction is forward, regardless of the direction of operation commanded. **Note:** Check that the motor torque direction for "Forward" control corresponds to the upward direction of the load. If necessary, reverse two motor phases.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
9202	203E / 3	**LC2**	R/WS	**Switching for second current limit** Factory setting: 0 Function active only if LAC = L2 or L3 (page 35). Selecting the assigned logic input activates the function. 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen CL1 is enabled when the logic input or control word bit is at state 0 (page 28). CL2 is enabled when the logic input or control word bit is at state 1 (page 48).
9203	203E / 4	**CL2**	R/W	**2nd current limit** Unit: 0.1 A Factory setting: 1.5 In (1) Adjustment range: 0.25 to 1.5 In (1) (1) In corresponds to the nominal drive current indicated in the Installation Manual and on the drive rating plate.
8011	2032 / C	**CHP**	R/WS	**Switching, motor 2** **CAUTION** **RISK OF DAMAGE TO THE MOTOR** The motor switching function disables motor thermal protection. An external means of motor thermal protection must therefore be provided; **Failure to follow these instructions can result in equipment damage** Factory setting: 0 Function active only if LAC = L2 or L3 (page 35). 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen LI or bit = 0: Motor 1 LI or bit = 1: Motor 2 **Note:** - If you use this function, do not use the tUn auto-tuning function (page 30) on motor 2 and do not configure tUn = rUn or POn. **- Changes to parameters are only taken into account when the drive is locked.**

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
9701	2043 / 2	**UnS2**	R/WS	**Nominal motor voltage (motor 2) given on the rating plate** Unit: 1 V Factory setting: According to drive rating Adjustment range: According to drive rating: ATV312●●●M2: 100 to 240 V ATV312●●●M3: 100 to 240 V ATV312●●●N4: 100 to 500 V ATV312●●●S6: 100 to 600 V
9702	2043 / 3	**FrS2**	R/WS	**Nominal motor frequency (motor 2) given on the rating plate** Unit: 0.1 Hz Factory setting: if bFr = 50: 500 if bFr = 60: 600 Adjustment range: 100 to 5000 **Note:** The ratio $\frac{\text{UnS (in volts)}}{\text{FrS (in Hz)}}$ must not exceed the following values: ATV312●●●M2: 7 max. ATV312●●●M3: 7 max. ATV312●●●N4: 14 max. ATV312●●●S6: 17 max.
9703	2043 / 4	**nCr2**	R/WS	**Nominal motor current (motor 2) given on the rating plate** Unit: 0.1 A Factory setting: According to drive rating Adjustment range: 0.25 to 1.5 In (1) (1) In corresponds to the nominal drive current indicated in the Installation Manual and on the drive rating plate.
9704	2043 / 5	**nSP2**	R/WS	**Nominal motor speed (motor 2) given on the rating plate** Unit: 1 rpm Factory setting: According to drive rating Adjustment range: 0 to 32767 If, rather than the nominal speed, the rating plate indicates the synchronous speed and the slip in Hz or as a %, calculate the nominal speed as follows: Nominal speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$ or Nominal speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors) or Nominal speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)
9706	2043 / 7	**COS2**	R/WS	**Motor Cos Phi (motor 2) given on the rating plate** Unit: 0.01 Factory setting: According to drive rating Adjustment range: 50 to 100
9707	2043 / 8	**UFt2**	R/W	**Selection of the type of voltage/frequency ratio for motor 2** Factory setting: 2 0 = "L": Constant torque for motors connected in parallel or special motors 1 = "P": Variable torque for pump and fan applications 2 = "n": Sensorless flux vector control for constant torque applications 3 = "nLd": Energy saving, for variable torque applications not requiring high dynamics (behaves in a similar way to the P ratio at no load and the n ratio on load).

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
9721	2043 / 16	**StA2**	R/W	**Frequency loop stability, motor 2** Unit: 1% Factory setting: 20 Adjustment range: 1 to 100 Parameter active only if UFt2 = n or nLd. Used to adapt the return to steady state after a speed transient (acceleration or deceleration), according to the dynamics of the machine. Gradually increase the stability to avoid any overspeed.
9725	2043 / 1A	**SLP2**	R/W	**Slip compensation, motor 2** Unit: 1% Factory setting: 100 Adjustment range: 0 to 150 Parameter active only if UFt2 = n or nLd. Used to adjust the slip compensation value fixed by nominal motor speed. The speeds given on motor rating plates are not necessarily exact. If slip setting < actual slip: the motor is not rotating at the correct speed in steady state. If slip setting > actual slip: the motor is overcompensated and the speed is unstable.
11601	2056 / 2	**LAF**	R/WS	**Forward limit switch** (1) Factory setting: 0 Function active only if LAC = L2 or L3 (page 35). 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6
11602	2056 / 3	**LAr**	R/WS	**Reverse limit switch** (1) Factory setting: 0 Function active only if LAC = L2 or L3 (page 35). 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6
11603	2056 / 4	**LAS**	R/WS	**Type of limit switch stop** Factory setting: 2 Function active only if LAC = L2 or L3 (page 35). 0 = "rMP": On ramp 1 = "FSt": Fast stop 2 = "nSt": Freewheel stop
9723	2043 / 18	**UFr2**	R/W	**IR compensation/Voltage boost, motor 2** Unit: 1% Factory setting: 20 Adjustment range: 0 to 100 For UFt2 = n or nLd: IR compensation. For UFt2 = L or P: Voltage boost. Used to optimize the torque at very low speed (increase UFr2 if the torque is insufficient). Check that the value of UFr2 is not too high for when the motor is warm (instabilities can occur). Modifying UFt2 will cause UFr2 to return to the factory setting (20%).
9720	2043 / 15	**FLG2**	R/W	**Frequency loop gain, motor 2** Unit: 1% Factory setting: 20 Adjustment range: 1 to 100 Parameter active only if UFt2 = n or nLd. The FLG2 parameter adjusts the drive's ability to follow the speed ramp based on the inertia of the machine being driven. Too high a gain may result in operating instability.

(1) **Note** This function is incompatible with the "PI Regulator" function (see page 14).

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
7122	2029 / 17	**Atr**	R/WS	**Automatic restart** **⚠⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** • The automatic restart can only be used on machines or installations which do not pose any danger to either personnel or equipment. • If the automatic restart is activated, R1 will only indicate a fault has been detected once the time-out period for the restart sequence has expired. • The equipment must be used in compliance with national and regional safety regulations. **Failure to follow these instructions will result in death or serious injury.** This is only possible for 2-wire level detection control (tCC = 2C and tCt = LEL or PFO). Factory setting: 0 0 = "nO": Function inactive 1 = "YES": Automatic restart, after locking on a detected fault, if the cause 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. 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. The following conditions permit this function: - External fault (EPF) - Loss of 4-20 mA reference (LFF) - CANopen interuption (COF) - Line overvoltage (OSF) - Loss of a line phase (PHF) - Loss of a motor phase (OPF) - DC bus overvoltage (ObF) - Motor overload (OLF) - Serial link (SLF) - Drive overheating (OHF) The drive status relay remains activated if this function is active. The speed reference and the operating direction must be maintained.
7123	2029 / 18	**tAr**	R/WS	**Max. duration of restart process** Factory setting: 0 0 = "5" : 5 minutes 1 = "10" : 10 minutes 2 = "30" : 30 minutes 3 = "1h": 1 hour 4 = "2h": 2 hours 5 = "3h": 3 hours 6 = "Ct": Unlimited (except for Loss of a motor phase OPF and Loss of a line phase PHF detected faults, when the process is limited to 3 hours) This parameter is active if Atr = YES. It can be used to limit the number of consecutive restarts on a recurrent detected fault.
7124	2029 / 19	**rSF**	R/WS	**Clearing the current detected fault** Factory setting: 0 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
3110	2001 / B	**FLr**	R/WS	**Flying restart (automatic catching a spinning load on ramp)** Factory setting: 0 Used to enable a smooth restart if the run command is maintained after the following events: - Loss of line supply or disconnection - Reset of current detected fault or automatic restart - Freewheel stop The speed given by the drive resumes from the estimated speed of the motor at the time of the restart, then follows the ramp to the reference speed. This function requires 2-wire control (tCC = 2C) with tCt = LEL or PFO. 0 = "nO": Function inactive 1 = "YES": Function active When the function is operational, it activates on each restart following one of the above events, resulting in a slight delay (1 second max). FLr is forced to nO if brake control (bLC) is assigned (page 47). **Note:** Do not use the flying restart function (FLr = YES) with auto-tuning on power-up (rSC or POn page 29).
7131	2029 / 20	**EtF**	R/WS	**External fault** Factory setting: 0 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 If LAC = L3 and LEt = HIG, the following assignments are possible: 171 = "Cd11": bit 11 of the CMD control word (page 19) written by Modbus or CANopen 172 = "Cd12": bit 12 of the CMD control word (page 19) written by Modbus or CANopen 173 = "Cd13": bit 13 of the CMD control word (page 19) written by Modbus or CANopen 174 = "Cd14": bit 14 of the CMD control word (page 19) written by Modbus or CANopen 175 = "Cd15": bit 15 of the CMD control word (page 19) written by Modbus or CANopen
7090	2028 / 5B	**LEt**	R/WS	**Configuration of external fault detection** Factory setting: 1 0 = "LO": The external fault is detected when the logic input assigned to EtF changes at state 0. **Note:** In this case, the external fault can not be assigned to a bit of Modbus or CANopen control word. 1 = "HIG": The external fault is detected when the logic input or the CMD control word bit assigned to EtF changes at state 1. **Note:** If LEt = HIG, EtF is assigned to a bit of Modbus or CANopen control word and there is no EtF detected fault, the change to LEt = LO causes an EtF external detected fault. In this case, It is necessary to switch off then to switch on the drive.
7006	2028 / 7	**EPL**	R/WS	**Stop mode in the event of an external fault EPF** Factory setting: 1 0 = "nO": External fault ignored 1 = "YES": Freewheel stop 6 = "rMP": Stop on ramp 7 = "FSt": Fast stop
9611	2042 / C	**OPL**	R/WS	**Configuration of motor phase loss detection** Factory setting: 1 0 = "nO": Function inactive 1 = "YES": Triggering of OPF detected fault 2 = "OAC": No OPF 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 FLr = nO. To be used with downstream contactor. OPL is forced to YES if brake control bLC is assigned (page 47). If OPL = OAC, bLC is forced to nO (page 47).
7002	2028 / 3	**IPL**	R/WS	**Configuration of line phase loss detection** Factory setting: 1 except for ATV312●●●M2: 0 This parameter is only active on 3-phase drives. 0 = "nO": Ignored 1 = "YES": Fast stop

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
7008	2028 / 9	**OHL**	R/WS	**Stop mode in the event of the drive overheating OHF** Factory setting: 1 0 = "nO": Ignored 1 = "YES": Freewheel stop 6 = "rMP": Stop on ramp 7 = "FSt": Fast stop
7009	2028 / A	**OLL**	R/WS	**Stop mode in the event of a motor overload OLF** Factory setting: 1 0 = "nO": Ignore 1 = "YES": Freewheel stop 6 = "rMP": Stop on ramp 7 = "FSt": Fast stop
7010	2028 / B	**SLL**	R/WS	**Stop mode in the event of a Modbus serial link interuption SLF** **⚠ WARNING** **LOSS OF CONTROL** If the "SLL" parameter is set to 0, communication monitoring will be inhibited. For safety reasons, "SLL" parameter should be restricted to the debug phase or to special applications. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Factory setting: 1 0 = "nO": Ignored 1 = "YES": Freewheel stop 6 = "rMP": Stop on ramp 7 = "FSt": Fast stop This parameter does not apply to the PowerSuite software workshop.
7011	2028 / C	**COL**	R/WS	**Stop mode in the event of a CANopen serial link interuption COF** **⚠ WARNING** **LOSS OF CONTROL** If the "COL" parameter is set to 0, communication monitoring will be inhibited. For safety reasons, the "COL" parameter should only be used for adjustment or special applications purpose. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Factory setting: 1 0 = "nO": Ignored 1 = "YES": Freewheel stop 6 = "rMP": Stop on ramp 7 = "FSt": Fast stop
7012	2028 / D	**tnL**	R/WS	**Configuration of auto-tuning status tnF** Factory setting: 1 0 = "nO": Ignored (the drive reverts to the factory settings) 1 = "YES": Drive locks if auto-tuning is unsuccessful. If rSC (see page 29) is other than nO, tnL is forced to YES.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
7003	2028 / 4	**LFL**	R/WS	**Stop mode in the event of a loss of 4 - 20 mA signal (LFF)** Factory setting: 0 0 = "nO": Ignored (only value possible if CrL3 ⩽ 3 mA, see page 33) 1 = "YES": Freewheel stop 4 = "LFF": The drive switches to the fallback speed (LFF parameter) 5 ="rLS": The drive maintains the speed at which it was operating when the loss occurred, and this speed is saved and stored as a reference until the signal is restored. 6 = "rMP": Stop on ramp 7 = "FSt": Fast stop The factory setting of LFL is forced to YES if CrH3 < CrL3 (see page 33) and nO is impossible. **Note:** Before setting LFL to YES, rMP or FSt, check the connection of input AI3. Otherwise, the drive may immediately switch to an LFF fault detection code.
7080	2028 / 51	**LFF**	R/WS	**Fallback speed** Unit: 0.1 Hz Factory setting: 100 Adjustment range: 0 to 5000 Fallback speed setting for stopping in the event of a detected fault.
7007	2028 / 8	**drn**	R/WS	**Derated operation in the event of an overvoltage** **CAUTION** **RISK OF DAMAGE TO THE DRIVE** If drn is set to YES, use a line choke (see catalog). **Failure to follow these instructions can result in equipment damage** Lowers the trip threshold of the USF fault detection in order to operate on line supplies with 50% voltage drops. Factory setting: 0 0 = "nO": Function inactive 1 = "YES": Function active In this case, a line choke must be used and the performance of the drive may be derated.
7004	2028 / 5	**StP**	R/WS	**Controlled stop on mains power break** Factory setting: 0 0 = "nO": Locking of the drive and freewheel stopping of the motor 1 = "MMS": This stop mode uses the inertia to maintain the drive power supply as long as possible. 2 = "rMP": Stop according to the valid ramp (dEC or dE2) 3 = "FSt": Fast stop, the stopping time depends on the inertia and the braking ability of the drive.
7125	2029 / 1A	**InH**	R/WS	**Fault detection inhibition assignment** **⚠ DANGER** **LOSS OF PERSONNEL AND EQUIPMENT PROTECTION** • Enabling the fault inhibition parameter (InH) will disable the drive controller protection features. • InH should not be enabled for typical applications of this equipment. • InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection poses a greater risk than personnel injury or equipment damage. **Failure to follow these instructions will result in death or serious injury** Disables all the drive protection devices. Factory setting: 0 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 Fault monitoring is active when the input is at state 0. It is inactive when the input is at state 1.

Configuration and adjustment variables

The following parameters (page 55 and 56) do not revert to their factory setting when using the "Return to factory settings" function.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
3120	2001 / 15	**rPr**	R/WS	**Operating time reset to zero** Factory setting: 0 0 = "nO": No 2 = "rtH": Operating time reset to zero The rPr parameter automatically falls back to nO as soon as the reset to zero is performed.
6001	201E / 2	**Add**	R/WS	**Modbus: Drive address** Unit: 1 Factory setting: 1 Adjustment range: 1 to 247
6003	201E / 4	**tbr**	R/WS	**Modbus: Transmission speed** Factory setting: 32 24 = "4.8" : 4800 bps 28 = "9.6" : 9600 bps 32 = "19.2": 19200 bps (Note: The remote display terminal can only be used with this value.)
6004	201E / 5	**tFO**	R/WS	**Modbus: communication format** Factory setting: 3 2 = "8O1": 8 data bits, odd parity, 1 stop bit 3 = "8E1": 8 data bits, even parity, 1 stop bit (Note: The remote display terminal can only be used with this value.) 4 = "8n1": 8 data bits, no parity, 1 stop bit 5 = "8n2": 8 data bits, no parity, 2 stop bits
6005	201E / 6	**ttO**	R/WS	**Modbus: Time-out** Unit: 0.1 s Factory setting: 100 Adjustment range: 1 to 100
6051	201E / 34	**AdCO**	R/WS	**CANopen: Drive address** Unit: 1 Factory setting: 0 Adjustment range: 0 to 127
6053	201E / 36	**bdCO**	R/WS	**CANopen: Transmission speed** Factory setting: 52 30 = "10.0": 10 kbps 34 = "20.0": 20 kbps 38 = "50.0": 50 kbps 52 = "125.0": 125 kbps 60 = "250.0": 250 kbps 68 = "500.0": 500 kbps 76 = "1000": 1000 kbps
8431	2036 / 20	**FLO**	R/WS	**Forced local mode** Factory setting: 0 0 = "nO": Not assigned 129 = "LI1": Logic input LI1 130 = "LI2": Logic input LI2 131 = "LI3": Logic input LI3 132 = "LI4": Logic input LI4 133 = "LI5": Logic input LI5 134 = "LI6": Logic input LI6 In forced local mode, the terminal block or display terminal regains control of the drive.
8432	2036 / 21	**FLOC**	R/WS	**Selection of the reference and control channel in forced local mode** Active only if LAC = 3 Factory setting: 1 In forced local mode, only the speed reference is taken into account. PI functions, summing inputs, etc. are not active. 1 = "AI1": Analog input AI1, logic inputs LI 2 = "AI2": Analog input AI2, logic inputs LI 3 = "AI3": Analog input AI3, logic inputs LI 16 = "AIV1": Potentiometer, RUN, STOP buttons 163 = "LCC": Remote display terminal: LFr reference page 19, RUN, STOP, FWD/REV buttons.

Modbus address	CANopen address	Code	Read/ Write	Name/Description/Possible values
3003	2000 / 4	**COd**	R/W	**Display terminal locking code** Allows access to the drive configuration only through an access code. When access is locked using a code, only the monitoring parameters can be accessed, with only a temporary choice of parameter displayed. **Note:** Before entering a code, do not forget to make a careful note of it. 0 = OFF: No access locking codes - To lock access, enter a code (2 to 9999). "On" appears on the screen to indicate that access has been locked. 1 = On: A code is locking access (2 to 9999) - To unlock access, enter the code. The code remains on the display and access is unlocked until the next power down. Access will be locked again on the next power-up. - If an incorrect code is entered, COd changes to "On" and access remain locked. 2 to 9999: Access is unlocked (the code remains on the screen) - To reactivate locking with the same code when access is unlocked, return to "On". - To lock access with a new code when access is unlocked, enter the new code. - To disable locking when access is unlocked, return to "OFF".
7128	2029 / 1D	**rP**	R/W	**Reset all the detected faults.** Factory setting: 0 0=No 1=Yes

Replacing an ATV28 with an ATV312

If necessary, it is easy to replace an ATV28 with a ATV312 in an installation communicating via Modbus.
In fact, most of the variables used in the ATV28 are found in the ATV312 with the same addresses (double addressing).

- To replace an ATV28, the ATV28 addresses in this table can be used, but **only these**. **All the other ATV28 addresses must be replaced** with those for the ATV312.
- For any new installation, we recommend using the new addresses, as this enables the number of Modbus requests to be reduced.

ATV 28 address	New address	Code
2	3003	COd
4	4434	CrL3
5	4444	CrH3
6	11101	tCC
10	6001	Add
40	3015	bFr
51	3102	SFr
52	3103	tFr
53	9602	FrS
55	9601	UnS
60	3107	nrd
61	9607	UFt
64	9003	brA
65	9011	Frt
110	5002	r2
151	9611	OPL
152	7002	IPL
155	3110	FLr
190	7007	drn
250	3104	HSP
251	3105	LSP
252	9001	ACC
253	9002	dEC
258	9622	ItH
260	9012	AC2
261	9013	dE2
262	11111	JGF
264	11410	SP2
265	11411	SP3

ATV 28 address	New address	Code
266	11412	SP4
267	11413	SP5
268	11414	SP6
269	11415	SP7
270	11210	IdC
272	11701	tLS
279	11941	rPG
280	11942	rIG
281	11903	FbS
282	11001	Ctd
283	11002	ttd
284	11003	Ftd
286	11301	JPF
287	11940	PIC
340	64001	rOt
400	8501	CMD
401	8502	LFR
402	8504	CMI
440	11920	rPI
450	3203	FrH
451	3202	rFr
453	3204	LCr
454	3207	ULn
455	9630	tHr
456	3209	tHd
457	7121	LFt
458	3201	ETA
459	3206	ETI
460	-	ETI2 (1)

ATV 28 address	New address	Code
462	7201	DP1
464	7202	DP2
466	7203	DP3
468	7204	DP4
478	5240	IOLR
482	5261	AO1R
487	3205	Otr
491	3211	OPr
530	3231	rtH
555	3017	INV
600	8606	ERRD
601	8601	CMDD
602	8603	ETAD
603	8602	LFRD
604	8605	FRHD
605	8604	RFRD
606	8607	SMIL
607	8608	SMIL
608	8609	SMAL
609	8610	SMAL
610	8611	SPAL
611	8612	SPAL
612	8613	SPAT
613	8614	SPDL
614	8615	SPDL
615	8616	SPDT
991	64003	LCC

(1) See the ATV28 communication variables manual.

Code index

Code index

Code index

Code	Modbus address	CANopen address	Name	Page
LRS3	3252	2002 / 35	Extended status word No. 3	23
LSP	3105	2001 / 6	Low speed	27
nCr	9603	2042 / 4	Nominal motor current given on the rating plate	29
nCr2	9703	2043 / 4	Nominal motor current (motor 2) given on the rating plate	49
NCV	3011	2000 / C	Drive rating	26
nrd	3107	2001 / 8	Noise reduction	31
nSP	9604	2042 / 5	Nominal motor speed given on the rating plate	29
nSP2	9704	2043 / 5	Nominal motor speed (motor 2) given on the rating plate	49
nSt	11202	2052 / 3	Freewheel stop via logic input	41
O1Ct	5241	2016 / 2A	Option board 1 card type	23
OHL	7008	2028 / 9	Stop mode in the event of the drive overheating OHF	53
OLL	7009	2028 / A	Stop mode in the event of a motor overload OLF	53
OPL	9611	2042 / C	Configuration of motor phase loss detection	52
OPr	3211	2002 / C	Motor power	21
Otr	3205	2002 / 6	Motor torque	21
PIC	11940	2059 / 29	IReversal of the direction of correction of the PI regulator	46
PIF	11901	2059 / 2	PI regulator feedback	45
PII	11908	2059 / 9	Internal PI reference enabled	47
PIR1	8531	2037 / 20	Image of Modbus PI reference	26
PIR2	8532	2037 / 21	Image of CANopen PI reference	26
PISP	8503	2037 / 4	PI regulator reference via the bus	19
Pr2	11909	2059 / A	2 preset PI references	46
Pr4	11910	2059 / B	4 preset PI references	46
PS16	11404	2054 / 5	16 preset speeds	43
PS2	11401	2054 / 2	2 preset speeds	42
PS4	11402	2054 / 3	4 preset speeds	43
PS8	11403	2054 / 4	8 preset speeds	43
PSt	64002	2262 / 3	Stop priority	38
r1	5001	2014 / 2	Relay r1	34
r2	5002	2014 / 3	Relay r2	35
rFC	8411	2036 / C	Reference switching	36
rFr	3202	2002 / 3	Output frequency applied to the motor (signed value)	21
RFRD	8604	6044	Output speed (signed value)	17
rIG	11942	2059 / 2B	PI regulator integral gain	46
rOt	64001	2262 / 2	Direction of operation authorized	38
rP	7128	2029 / 1D	Reset all the detected faults.	56
rP2	11921	2059 / 16	2nd preset PI reference	46
rP3	11922	2059 / 17	3rd preset PI reference	46
rP4	11923	2059 / 18	4th preset PI reference	46
rPG	11941	2059 / 2A	PI regulator proportional gain	45
rPI	11920	2059 / 15	Internal PI reference	47
rPr	3120	2001 / 15	Operating time reset to zero	55
rPS	9010	203C / B	Ramp switching	39
rPt	9004	203C / 5	Type of ramp	38
rrS	11105	2051 / 6	Reverse operation via logic input	33
rSC	9643	2042 / 2C	Cold state stator resistance	29
rSF	7124	2029 / 19	Clearing the current detected fault	51
rSL	11960	2059 / 3D	Restart error threshold ("wake-up" threshold)	47
rtH	3231	2002 / 20	Operating time	21
SA2	11801	2058 / 2	Summing input 2	42
SA3	11802	2058 / 3	Summing input 3	42
SCS	8001	2032 / 2	Saving the configuration	31
SdC1	10403	204A / 4	Level of automatic standstill DC injection current	41
SdC2	10405	204A / 6	2nd level of standstill DC injection current	41
SdS	12001	205A / 2	USPL/USPH scale factor	28

Code index

Code index

Code	Modbus address	CANopen address	Name	Page
UFr	9623	2042 / 18	IR compensation/Voltage boost	27
UFr2	9723	2043 / 18	IR compensation/Voltage boost, motor 2	50
UFt	9607	2042 / 8	Selection of the type of voltage/frequency ratio	31
UFt2	9707	2043 / 8	Selection of the type of voltage/frequency ratio for motor 2	49
ULn	3207	2002 / 5	Line voltage	21
UnS	9601	2042 / 2	Nominal motor voltage given on the rating plate	28
UnS2	9701	2043 / 2	Nominal motor voltage (motor 2) given on the rating plate	49
USP	11501	2055 / 2	+ speed (motorized potentiometer)	45
USPH	12003	205A / 4	Motor speed in customer units - High order	22
USPL	12002	205A / 3	Motor speed in customer units - Low order	22
VCAL	3012	2000 / D	Drive voltage	26
ZON	3010	2000 / B	Drive type	26

Address index

Modbus address	CANopen address	Code	Name	Page
3003	2000 / 4	**COd**	Display terminal locking code	56
3006	2000 / 7	**LAC**	Function access level	35
3010	2000 / B	**ZON**	Drive type	26
3011	2000 / C	**NCV**	Drive rating	26
3012	2000 / D	**VCAL**	Drive voltage	26
3015	2000 / 10	**bFr**	Standard motor frequency	28
3017	2000 / 12	**INV**	Nominal drive current	26
3052	2000 / 35	**CFG**	Source configuration	32
3102	2001 / 3	**SFr**	Switching frequency	31
3103	2001 / 4	**tFr**	Maximum output frequency	31
3104	2001 / 5	**HSP**	High speed	27
3105	2001 / 6	**LSP**	Low speed	27
3107	2001 / 8	**nrd**	Noise reduction	31
3110	2001 / B	**FLr**	Flying restart (automatic catching a spinning load on ramp)	52
3120	2001 / 15	**rPr**	Operating time reset to zero	55
3201	2002 / 2	**ETA**	Status word	21
3202	2002 / 3	**rFr**	Output frequency applied to the motor (signed value)	21
3203	2002 / 4	**FrH**	Frequency reference before ramp (absolute value)	21
3204	2002 / 8	**LCr**	Current in the motor	21
3205	2002 / 6	**Otr**	Motor torque	21
3206	2002 / 7	**ETI**	Extended status word	22
3207	2002 / 5	**ULn**	Line voltage	21
3209	2002 / A	**tHd**	Drive thermal state	21
3210	2002 / B	**TDM**	Max. thermal state reached by the drive	21
3211	2002 / C	**OPr**	Motor power	21
3231	2002 / 20	**rtH**	Operating time	21
3250	2002 / 33	**LRS1**	Extended status word No. 1	22
3252	2002 / 35	**LRS3**	Extended status word No. 3	23
3302	2000 / 4	**UdP**	Drive firmware version	26
3401	2004 / 2	**TSP**	Drive firmware type	26
4434	200E / 23	**CrL3**	Value for low speed (LSP) on input AI3	33
4444	200E / 2D	**CrH3**	Value for high speed (HSP) on input AI3	33
4601	2010 / 2	**AO1t**	Configuration of the analog output	34
5001	2014 / 2	**r1**	Relay r1	34
5002	2014 / 3	**r2**	Relay r2	35
5031	2014 / 20	**dO**	Analog/logic output AOC/AOV	34
5240	2016 / 29	**IOLR**	Value of logic I/O	23
5241	2016 / 2A	**O1Ct**	Option board 1 card type	23
5242	2016 / 2B	**AI1C**	Value of analog input AI1	23
5243	2016 / 2C	**AI2C**	Value of analog input AI2	23
5244	2016 / 2D	**AI3C**	Value of analog input AI3	23
5261	2016 / 3E	**AO1R**	Value of the analog output	23
6001	201E / 2	**Add**	Modbus: Drive address	55
6003	201E / 4	**tbr**	Modbus: Transmission speed	55
6004	201E / 5	**tFO**	Modbus: communication format	55
6005	201E / 6	**ttO**	Modbus: Time-out	55
6051	201E / 34	**AdCO**	CANopen: Drive address	55
6053	201E / 36	**bdCO**	CANopen: Transmission speed	55
6056	201E / 39	**ErCO**	CANopen: error word	25
7002	2028 / 3	**IPL**	Configuration of line phase loss detection	52
7003	2028 / 4	**LFL**	Stop mode in the event of a loss of 4 - 20 mA signal (LFF)	54
7004	2028 / 5	**StP**	Controlled stop on mains power break	54
7006	2028 / 7	**EPL**	Stop mode in the event of an external fault EPF	52
7007	2028 / 8	**drn**	Derated operation in the event of an overvoltage	54
7008	2028 / 9	**OHL**	Stop mode in the event of the drive overheating OHF	53

Address index

Modbus address	CANopen address	Code	Name	Page
7009	2028 / A	**OLL**	Stop mode in the event of a motor overload OLF	53
7010	2028 / B	**SLL**	Stop mode in the event of a Modbus serial link interuption SLF	53
7011	2028 / C	**COL**	Stop mode in the event of a CANopen serial link interuption COF	53
7012	2028 / D	**tnL**	Configuration of auto-tuning status tnF	53
7080	2028 / 51	**LFF**	Fallback speed	54
7090	2028 / 5B	**LEt**	Configuration of external fault detection	52
7121	2029 / 16	**LFt**	Last detected fault	24
7122	2029 / 17	**Atr**	Automatic restart	51
7123	2029 / 18	**tAr**	Max. duration of restart process	51
7124	2029 / 19	**rSF**	Clearing the current detected fault	51
7125	2029 / 1A	**InH**	Fault detection inhibition assignment	54
7128	2029 / 1D	**rP**	Reset all the detected faults.	56
7131	2029 / 20	**EtF**	External fault	52
7201	202A / 2	**DP1**	Past detected fault No. 1	24
7202	202A / 3	**DP2**	Past detected fault No. 2	24
7203	202A / 4	**DP3**	Past detected fault No. 3	24
7204	202A / 5	**DP4**	Past detected fault No. 4	24
7211	202A / C	**EP1**	Status of past detected fault No. 1	25
7212	202A / D	**EP2**	Status of past detected fault No. 2	25
7213	202A / E	**EP3**	Status of past detected fault No. 3	25
7214	202A / F	**EP4**	Status of past detected fault No. 4	25
8001	2032 / 2	**SCS**	Saving the configuration	31
8002	2032 / 3	**FCS**	Return to factory settings/Restore configuration	32
8011	2032 / C	**CHP**	Switching, motor 2	48
8401	2036 / 2	**CHCF**	Mixed mode (control channels separated from reference channels)	36
8402	2036 / 3	**COP**	Copy channel 1 to channel 2	37
8411	2036 / C	**rFC**	Reference switching	36
8413	2036 / E	**Fr1**	Configuration reference 1	35
8414	2036 / F	**Fr2**	Configuration reference 2	36
8421	2036 / 16	**CCS**	Control channel switching	37
8423	2036 / 18	**Cd1**	Configuration of control channel 1	37
8424	2036 / 19	**Cd2**	Configuration of control channel 2	37
8431	2036 / 20	**FLO**	Forced local mode	55
8432	2036 / 21	**FLOC**	Selection of the reference and control channel in forced local mode	55
8501	2037 / 2	**CMD**	Control word	19
8502	2037 / 3	**LFr**	Frequency reference via the bus (signed value)	19
8503	2037 / 4	**PISP**	PI regulator reference via the bus	19
8504	2037 / 5	**CMI**	Extended control word	20
8521	2037 / 16	**LFR1**	Image of Modbus frequency reference	25
8522	2037 / 17	**LFR2**	Image of CANopen frequency reference	26
8531	2037 / 20	**PIR1**	Image of Modbus PI reference	26
8532	2037 / 21	**PIR2**	Image of CANopen PI reference	26
8541	2037 / 2A	**CMI1**	Image of Modbus extended control word	25
8542	2037 / 2B	**CMI2**	Image of CANopen extended control word	25
8601	6040	**CMDD**	IEC 61800-7 control word	16
8602	6042	**LFRD**	Speed reference via the bus (signed value)	16
8603	6041	**ETAD**	IEC 61800-7 status word	17
8604	6044	**RFRD**	Output speed (signed value)	17
8605	6043	**FRHD**	Speed reference (signed ramp input)	17
8606	603F	**ERRD**	Fault code	17
8607 - 8608	6046 / 1	**SMIL**	Min. speed	18
8609 - 8610	6046 / 2	**SMAL**	Max. speed	18
8611 - 8612	6048 / 1	**SPAL**	Acceleration - Speed delta	18
8613	6048 / 2	**SPAT**	Acceleration - Time delta	18
8614 - 8615	6049 / 1	**SPDL**	Deceleration - Speed delta	18

Address index

Address index

Modbus address	CANopen address	Code	Name	Page
10403	204A / 4	**SdC1**	Level of automatic standstill DC injection current	41
10404	204A / 5	**tdC2**	2nd automatic standstill DC injection time	41
10405	204A / 6	**SdC2**	2nd level of standstill DC injection current	41
11001	2050 / 2	**Ctd**	Motor current threshold	28
11002	2050 / 3	**ttd**	Motor thermal state threshold	28
11003	2050 / 4	**Ftd**	Motor frequency threshold	28
11101	2051 / 2	**tCC**	2-wire/3-wire control	33
11102	2051 / 3	**tCt**	Type of 2-wire control	33
11105	2051 / 6	**rrS**	Reverse operation via logic input	33
11110	2051 / B	**JOG**	Jog operation	45
11111	2051 / C	**JGF**	Jog operation reference	45
11201	2052 / 2	**Stt**	Normal stop mode	40
11202	2052 / 3	**nSt**	Freewheel stop via logic input	41
11203	2052 / 4	**dCI**	DC injection via logic input	40
11204	2052 / 5	**FSt**	Fast stop via logic input	40
11210	2052 / B	**IdC**	Level of DC injection braking current activated via logic input or selected as stop mode	40
11211	2052 / C	**tdC**	Total DC injection braking time selected as normal stop mode	41
11230	2052 / 1F	**dCF**	Coefficient for dividing the deceleration ramp time for fast stopping	40
11301	2053 / 2	**JPF**	Skip frequency	27
11302	2053 / 3	**JF2**	2nd skip frequency	28
11401	2054 / 2	**PS2**	2 preset speeds	42
11402	2054 / 3	**PS4**	4 preset speeds	43
11403	2054 / 4	**PS8**	8 preset speeds	43
11404	2054 / 5	**PS16**	16 preset speeds	43
11410	2054 / B	**SP2**	2nd preset speed	44
11411	2054 / C	**SP3**	3rd preset speed	44
11412	2054 / D	**SP4**	4th preset speed	44
11413	2054 / E	**SP5**	5th preset speed	44
11414	2054 / F	**SP6**	6th preset speed	44
11415	2054 / 10	**SP7**	7th preset speed	44
11416	2054 / 11	**SP8**	8th preset speed	44
11417	2054 / 12	**SP9**	9th preset speed	44
11418	2054 / 13	**SP10**	10th preset speed	44
11419	2054 / 14	**SP11**	11th preset speed	44
11420	2054 / 15	**SP12**	12th preset speed	44
11421	2054 / 16	**SP13**	13th preset speed	44
11422	2054 / 17	**SP14**	14th preset speed	44
11423	2054 / 18	**SP15**	15th preset speed	44
11424	2054 / 19	**SP16**	16th preset speed	44
11501	2055 / 2	**USP**	+ speed (motorized potentiometer)	45
11502	2055 / 3	**dSP**	- speed (motorized potentiometer)	45
11503	2055 / 4	**Str**	Save reference	45
11601	2056 / 2	**LAF**	Forward limit switch	50
11602	2056 / 3	**LAr**	Reverse limit switch	50
11603	2056 / 4	**LAS**	Type of limit switch stop	50
11701	2057 / 2	**tLS**	Low speed operating time	28
11801	2058 / 2	**SA2**	Summing input 2	42
11802	2058 / 3	**SA3**	Summing input 3	42
11901	2059 / 2	**PIF**	PI regulator feedback	45
11903	2059 / 4	**FbS**	PI feedback multiplication coefficient	46
11908	2059 / 9	**PII**	Internal PI reference enabled	47
11909	2059 / A	**Pr2**	2 preset PI references	46
11910	2059 / B	**Pr4**	4 preset PI references	46
11920	2059 / 15	**rPI**	Internal PI reference	47

Address index

BBV51701
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