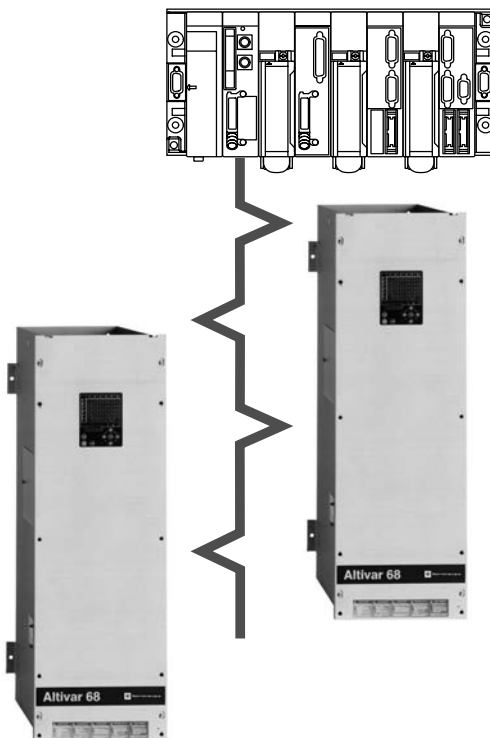


Altivar 68

Guide d'exploitation
User's manual

Coupleur de communication
Protocole Modbus
Communication coupler
Modbus protocol

VW3-A68303



Coupleur de communication protocole Modbus

Page 2

FRANÇAIS

Communication coupler Modbus protocol

Page 82

ENGLISH

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

As a rule, ***the drive power supply must be disconnected*** before any operation on either the electrical or mechanical parts of the installation or machine.

After the ALTIVAR has been switched off, ***wait for at least 1 minutes before working on the equipment*** is the time required for the capacitors to discharge. Check that the voltage between the + and - terminals is lower than 60 V --- .

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

This document is designed to be used in conjunction with the ATV-68 programming manual.

Contents

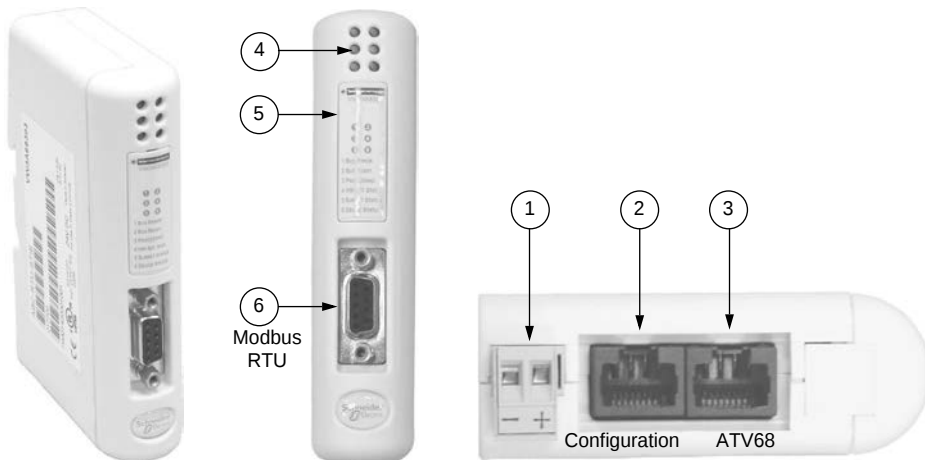
Hardware Installation	84
Presentation	84
Mounting the module on a DIN rail	85
Supplying the module with power	86
Connecting the module to the drive	87
Connecting the module to the Modbus network	89
Example of connection	90
Wiring recommendations	91
Pin-outs	91
Configuring the communication functions	92
Signalling	95
Notation Conventions	96
Parameter Conversion to Physical Values	97
Modbus Protocol	98
RTU mode	98
Principle	98
Addresses	98
Modbus functions	99
Exception responses	103
Calculating the CRC16	103
Module Modbus Data	104
Module Management	105
ATV68 Control and Monitoring	106
ATV68 Control	110
ATV68 Monitoring	116
Description of the ETA status word	116
Managing Communication Errors	121
PKW Parameter-Setting Service	122
ATV68 Configuration	128
Key to tables	128
B6. Serial Port configuration	128
D3. Configuration of analogue outputs	134
D4. Configuration of logic outputs	135
ATV68 Diagnostics	136
A4. Display reference values	139
Example of Use	141
List of Parameters	145

Presentation

This module acts as an interface between the drive terminal port and the Modbus network. Only one ATV68 can be connected to the module; the terminal port protocol is point-to-point (and RS232). The term gateway is used in other documents. The gateway is designed to interconnect two networks. A gateway can perform the function of a module.

VW3-A68303 includes the Modbus module for ATV68 shown below.

The cables and other connection accessories should be ordered separately.



Key:

- ① Module power supply plug-in connector (24V $\pm$ 10%).
- ② Female RJ45 connector for PC link and ABC Configurator software.
The Modbus module for ATV68 is factory-preset to operate in a standard mode, which don't request the ABC Configurator software. This manual describes the functions in this standard mode. The ABC Configurator software is included in the PowerSuite offer. It allows to:
 - modify the factory-preset of the module,
 - diagnose the module.The configurator has an online help which describes how to use it.
- ③ Female RJ45 connector for ATV68 link. Only one ATV68 can be connected to this port.
- ④ Six diagnostic LEDs.
- ⑤ Cover concealing the module configuration switches (see Configuring the communication functions section, page 93). The LED descriptive label is attached to this.
- ⑥ Modbus 9-pin female SUB-D connector.

Mounting the module on a DIN rail

Mounting the module



Start by placing the module rear base on the top of the rail, pushing downwards (1) to compress the module spring. Then push the module against the DIN rail (2) until the base of the module casing clips onto the rail.

Removing the module

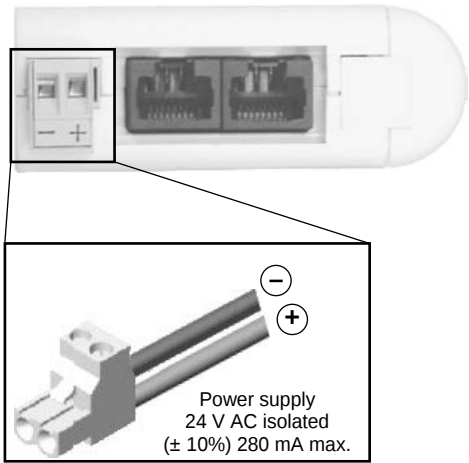


Start by pushing the module downwards (1) to compress the module spring. Then pull the bottom of the module casing forwards (2) until the back of the casing unclips from the rail.

Note: The spring also performs the function of earthing the module (Protective Earth).

Supplying the module with power

Modbus module for ATV68 — View of underside

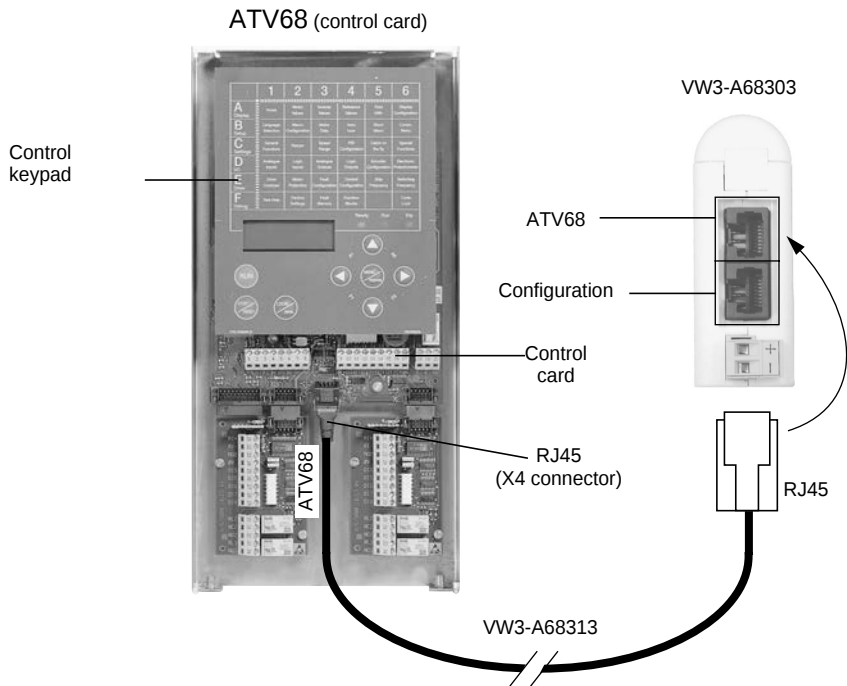


The module is not supplied by the drive, but requires a separate power supply.
Note: The negative terminal of the 24 V power supply should be connected to the installation earth.

Connecting the module to the drive

The connection accessories should be ordered separately (consult the catalogue).
During installation, the module and drive should be switched off.

- 1 Use the VW3-A68313 cable.
- 2 Remove the ATV68 cover.
- 3 Attach the "ATV68" connector to the control card X4 connector (RJ45 port) and the "Gateway" connector to the module RJ45 connector located closest to the front panel (marked "ATV68" on the following diagram).



Hardware Installation

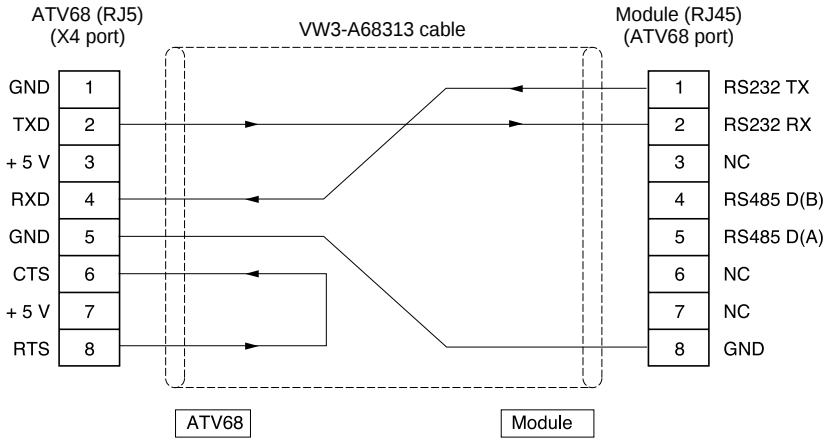
It is possible to communicate with the ATV68 when its power is switched off (line switch or circuit-breaker open).

To do this, it is necessary to connect an auxiliary control supply voltage:

- 24 V DC for the ATV68••N4 range (400 V/500 V)
- 230 V AC for the ATV68••Y range (690 V)

See the user manuals for how to connect the auxiliary control power supply.

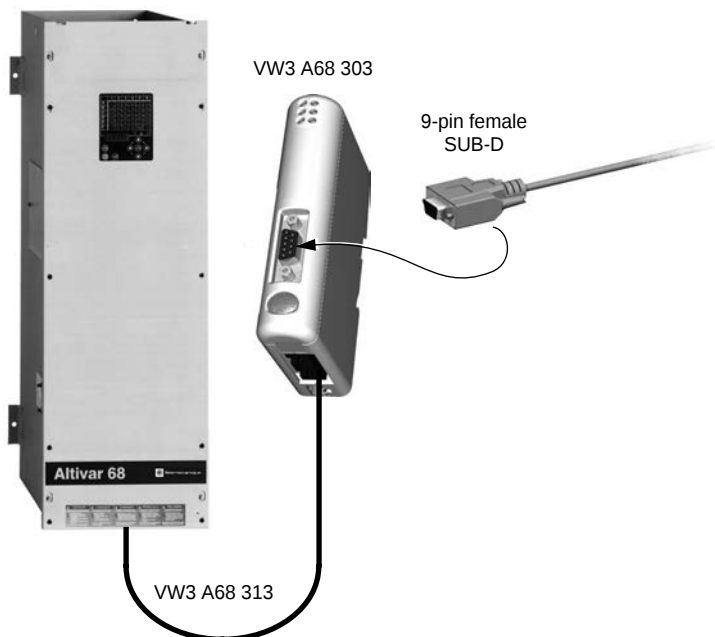
Pin-out for the ATV68-module cable:



Connecting the module to the Modbus network

The connection accessories should be ordered separately (consult the catalogue).

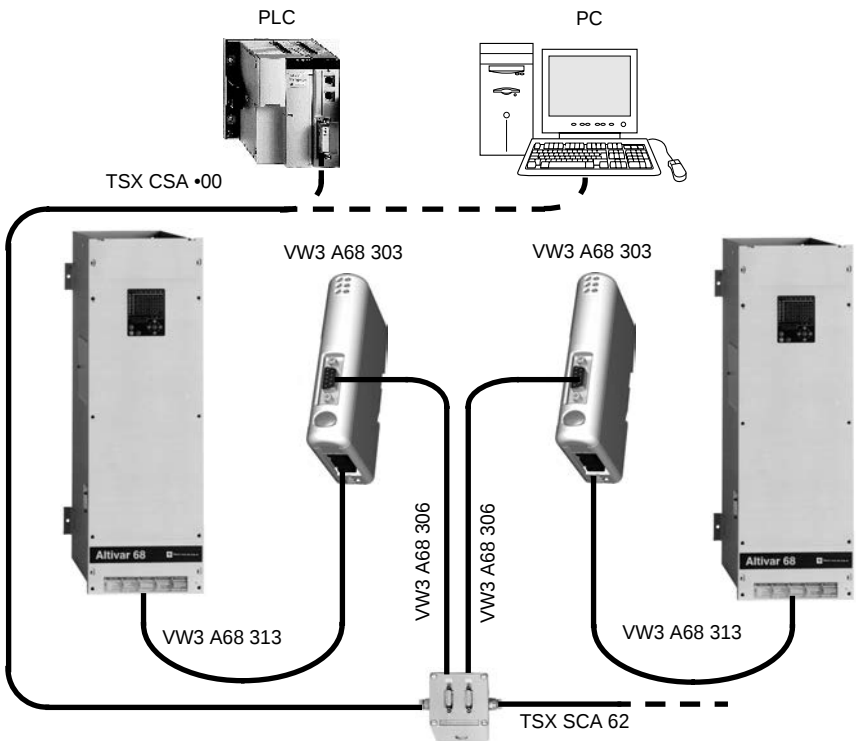
Attach the cable 9-pin male SUB-D connector to the 9-pin female SUB-D connector on the module front panel, as shown in the following diagram:



Example of connection

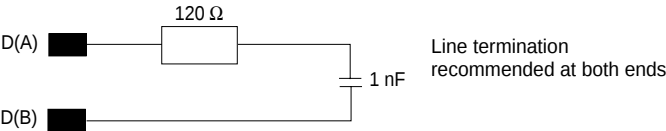
The Schneider Electric catalogue offers a variety of accessories to simplify equipment connection. Connection on TSXSACA62 and TSXSACA50 cable connectors is one example of the different options for connecting Modbus (please consult our catalogues).

- Shielded double twisted pair cable: TSXCSA100 (100 m)
TSXCSA200 (200 m)
TSXCSA500 (500 m)
- TSXSACA62
2-channel subscriber socket: This passive box can be used for connection on two screw terminals and two 15-pin female SUB-D connectors. It includes the line termination required when the socket is located at the end of the line.
- TSXSACA50 junction box: This passive box can be used for connection on three screw terminals. It includes line termination.
- Drop cables: VW3A8306 3 m long, equipped with 2 RJ45 and male SubD15 connectors.
VW3A8306D30 3 m long, equipped with an RJ45 connector, stripped at the other end.



Wiring recommendations

- Use a shielded cable with 2 pairs of twisted conductors
- Link the reference voltages together
- Maximum line length: 1000 metres
- Maximum drop length: 20 metres
- Cable routing: keep the bus separate from the power cables (30 cm minimum), make crossovers at right angles if necessary, connect the cable shielding to the ground of each device
- Add line terminations at both ends

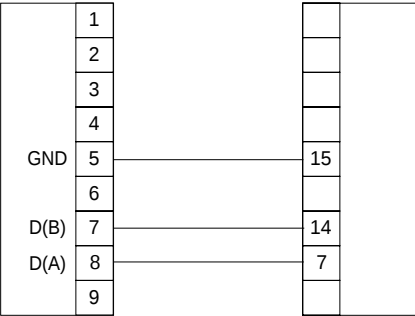


Pin-outs

- Modbus module for ATV68
9-pin female SUB-D

NC	1
RS232 - TX (not used)	2
RS232 - RX (not used)	3
NC	4
GND (GALV)	5
+ 5 (GALV)	6
RS485 B-LINE	7
RS485 A-LINE	8
NC	9

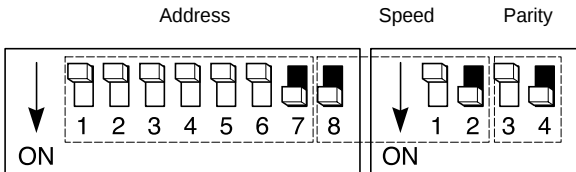
- VW3A68306 cable for TSX SCA 62
9-pin male SUB-D 15-pin male SUB-D



Configuring the communication functions

Configuration must be performed with the module switched off.

Both blocks of switches used to configure the communication functions are concealed behind the module cover ⑤ (see **Presentation** section, page 85). To remove this cover, simply slide the tip of a small screwdriver between the top of the cover and the module casing, then carefully remove the cover. Once the cover has been removed, take care not to touch any electrical circuits or electronic components. Both blocks of switches are represented schematically below, with each switch shown in its factory-set position:



A switch is at state 0 when it is in the OFF position and state ON 1 when it is in the ON position.

Any modification to the module communication functions will only take effect when the module is next switched on.

Note: When all the switches are in the OFF position, the LED ④ "Hardware Settings Status" turns red. This also occurs if an configuration is incorrect.

Coding the Modbus address

An Altivar 68 is identified on a Modbus bus by its module address, coded from 1 to 31.

The drive address corresponds to the binary number given by the ON (1) or OFF (0) position of switches 1 (MSB) to 7 (LSB) in the block of 8 switches. It should be configured before the module is switched on:



Hardware Installation

Switches		Modbus address
1 2 3 4 5 6 7 8	1 2 3 4	
0 0 0 0 0 0 0 x	x x x x	Invalid configuration
0 0 0 0 0 0 1 x	x x x x	1
0 0 0 0 0 1 0 x	x x x x	2
0 0 0 0 0 1 1 x	x x x x	3
0 0 0 0 1 0 0 x	x x x x	4
0 0 0 0 1 0 1 x	x x x x	5
0 0 0 0 1 1 0 x	x x x x	6
0 0 0 0 1 1 1 x	x x x x	7
0 0 0 1 0 0 0 x	x x x x	8
0 0 0 1 0 0 1 x	x x x x	9
0 0 0 1 0 1 0 x	x x x x	10
0 0 0 1 0 1 1 x	x x x x	11
0 0 0 1 1 0 0 x	x x x x	12
0 0 0 1 1 0 1 x	x x x x	13
0 0 0 1 1 1 0 x	x x x x	14
0 0 0 1 1 1 1 x	x x x x	15
0 0 1 0 0 0 0 x	x x x x	16

Switches		Modbus address
1 2 3 4 5 6 7 8	1 2 3 4	
0 0 1 0 0 0 1 x	x x x x	17
0 0 1 0 0 1 0 x	x x x x	18
0 0 1 0 0 1 1 x	x x x x	19
0 0 1 0 1 0 0 x	x x x x	20
0 0 1 0 1 0 1 x	x x x x	21
0 0 1 0 1 1 0 x	x x x x	22
0 0 1 0 1 1 1 x	x x x x	23
0 0 1 1 0 0 0 x	x x x x	24
0 0 1 1 0 0 1 x	x x x x	25
0 0 1 1 0 1 0 x	x x x x	26
0 0 1 1 0 1 1 x	x x x x	27
0 0 1 1 1 0 0 x	x x x x	28
0 0 1 1 1 0 1 x	x x x x	29
0 0 1 1 1 1 0 x	x x x x	30
0 0 1 1 1 1 1 x	x x x x	31
0 1 0 0 0 0 0 x to 1 1 1 1 1 1 1 x	x x x x	Invalid configurations

Coding the Modbus speed

The module speed should be identical to that of the Modbus master.

The factory setting is 19,200 bps.

The value of this speed depends on switch 8 (MSB) in the block of 8 switches and switches 1 and 2 (LSB) in the block of 4 switches.



Switches		Modbus speed
1 2 3 4 5 6 7 8	1 2 3 4	
x x x x x x x 0	0 0 x x	Invalid configuration
x x x x x x x 0	0 1 x x	1,200 bps
x x x x x x x 0	1 0 x x	2,400 bps
x x x x x x x 0	1 1 x x	4,800 bps
x x x x x x x 1	0 0 x x	9,600 bps
x x x x x x x 1	0 1 x x	19,200 bps
x x x x x x x 1	1 0 x x	Invalid configurations
x x x x x x x 1	1 1 x x	

Hardware Installation

Coding the Modbus parity

The module parity should be identical to that of the Modbus master. The factory setting is no parity.



Switches								Modbus parity				
1	2	3	4	5	6	7	8					1
x	x	x	x	x	x	x	x	x	x	0	0	Invalid configuration
x	x	x	x	x	x	x	x	x	x	0	1	No parity
x	x	x	x	x	x	x	x	x	x	1	0	Even
x	x	x	x	x	x	x	x	x	x	1	1	Odd

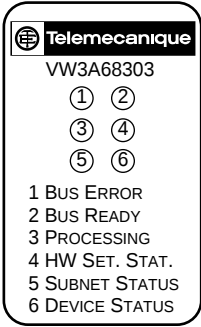
Examples of configuration



Address = 12
Speed = 9,600 bps
Parity = Even



Address = 5
Speed = 2,400 bps
Parity = No parity



① Bus Error		② Bus Ready	
Red	Modbus error. More than 10% of requests have an incorrect CRC value.	Green	Modbus operating normally
Off	Modbus operational or module not initialized	Off	Anomaly during module initialization
		Red	Modbus fault (time-out)
③ Processing		④ Hardware settings status	
Flashing green	Receiving a Modbus request or sending a Modbus response	Red	The module switches are all in the OFF state or Incorrect configuration
Off	No request is being processed	Green	Switch hardware configuration replaced by a software configuration
		Off	Switches OK and in use
⑤ Subnet Status		⑥ Device Status	
Off	Module not supplied with power	Off	Module not supplied with power
Flashing green	Initializing the ATV68-module link	Green	Initializing the module
Green	ATV68-module link OK	Flashing green	Module operational
Red	ATV68-module link fault	Red	Module internal fault
		Flashing green/red	Configuration missing



Note : If the “DEVICE STATUS” LED flashes according to a sequence beginning with one or more red flashes, you should make a note of the order in which this sequence occurs, and communicate this information to Schneider Electric’s repair department.

Notation Conventions

16#h	Value expressed in hexadecimal, equivalent to the notations H ,hex and 0x sometimes used in other documents Example: 16#0100 = 256
2#	Value expressed in binary. The number of ' • ' digits depends on the size of the represented data item. Each 4-bit byte is separated from the others by a space Examples: byte 2#0010 0111 = 39, word 2#0110 1001 1101 0001 = 16#69D1 = 27089
....	Decimal values are written without a prefix
Lo	Low-order byte in a word or low-order word in a double word
Hi	High-order byte in a word or high-order word in a double word
f	Frequencies (Hz or submultiple)
n	Speed of rotation (rpm)
Wxxx	Address of a Modbus word
Wxxx:y	Bit y of Modbus word xxx Example: W0: 12 = bit 12 of word 0

Parameter Conversion to Physical Values

N2 type of data (16-bit standardized value)

$$\text{Physical value} = \frac{\text{Parameter value}}{16384.0} \times \text{Standardization factor}$$

Example 1: Output frequency

Parameter value	16#09C4 = 2500
Standardization factor	163.84
Unit	Hz

$$\text{Frequency} = \frac{2500}{16384.0} \times 163.84 = 25.0 \text{ Hz}$$

Example 2: Power output on the motor shaft

Parameter value	16#1333 = 4915
Standardization factor	400.0
Unit	kW

$$\text{Power} = \frac{4915}{16384.0} \times 400.0 = 120 \text{ kW}$$

Example 3: Percentage

%	Binary	Hexadecimal	Decimal
199,9939	2#0111 1111 1111 1111	16#7FFF	32767
100,0000	2#0100 0000 0000 0000	16#4000	16384
0.0061	2#0000 0000 0000 0001	16#0001	1
0.0000	2#0000 0000 0000 0000	16#0000	0
-0.0061	2#1111 1111 1111 1111	16#FFFF	-1
-100,0000	2#1100 0000 0000 0000	16#C000	-16384
-200,0000	2#1000 0000 0000 0000	16#8000	-32768

T2 type of data (time constant 16)

$$\text{Physical value} = \text{Parameter value} \times \text{Standardization factor}$$

Example 4: Display of acceleration time (T2 type of data)

Parameter value	16#0064 = 100
Standardization factor	0.005 (5 ms internal clock)
Unit	s

$$\text{Time} = 100 \text{ dec} \times 0.005 \text{ s} = 0.5 \text{ s}$$

Other types of data (02, V2)

It is not necessary to repeat standardization.

Modbus Protocol

RTU mode

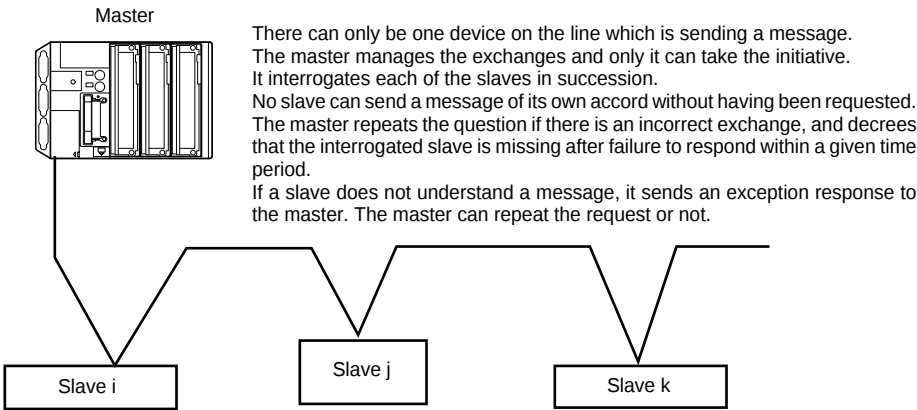
The transmission mode used is RTU mode. The frame does not contain a message header byte, nor any end of message bytes. It is defined as follows:



The data is transmitted in binary.
CRC16: cyclical redundancy check.
The end of the frame is detected after a silence ≥ 3 characters.

Principle

Modbus protocol is a master-slave protocol.



Direct slave-to-slave communications are not possible.

For slave-to-slave communication, the master application software must have been designed to permit this: interrogating one slave and sending the data received to the other slave.

Two types of dialog are possible between master and slaves:

- the master sends a request to a slave and waits for its response
- the master sends a request to all the slaves without waiting for a response (broadcast communication principle)

Addresses

- The drive Modbus address can be configured from 1 to 31
- Address 0 coded in a request sent by the master is reserved for broadcast communication. ATV68 drives take account of the request, but do not respond to it
- When the ATV68 is configured with address 0 (default value), it does not respond

Modbus functions

The following table indicates which Modbus functions are managed by the Modbus module for ATV68, and specifies the limits.

The "read" and "write" functions are defined as seen by the master.

Code (decimal)	Function name	Broadcast comm.	Max. value of N	Modbus standard name
3	Read N output words	NO	11 words max.	Read Holding Registers
4	Read N input words	NO	11 words max.	Read Input Registers
6	Write one output word	YES	—	Preset Single Register
8	Diagnostics	NO	—	Diagnostics
16	Write N output words	YES	11 words max.	Preset Multiple Regs

The content of the frames described below is systematically expressed in hexadecimal notation. The "16#" prefix has therefore been left out to make it easier to read.

Read N output words or N input words: functions 3 and 4

Function 3 is used to read output words (words which can be written and read by the master in the slave), whereas function 4 is used to read input words (word which the master can only read). Apart from their respective code, these two functions are strictly identical.

Request

Slave no.	03 or 04	No. of the 1st word		Number of words		CRC16
		Hi	Lo	Hi	Lo	
1 byte	1 byte	2 bytes		2 bytes		2 bytes

Response

Slave no.	03 or 04	Number of bytes read	Value of 1st word		-----	Value of last word		CRC16
			Hi	Lo		Hi	Lo	
1 byte	1 byte	1 byte	2 bytes			2 bytes		2 bytes

Example: read 5 words W6 to W10 (monitoring PZD2 to PZD6) in slave 2. The number of bytes read and present in the slave response equals 10 (16#0A).

Question	02	03	0006	0005	65FB
----------	----	----	------	------	------

Response	02	03	0A	25BC	10C0	0000	7CD1	457C	EB10
	Value of:		W6	W7	W8	W9	W10		

Write one output word: function 6

Function 6 is used to write an output word (word which can be written and read by the master in the slave).

Request and response (the frame format is identical)

Slave no.	06	Word number		Word value		CRC16
		Hi	Lo	Hi	Lo	
1 byte	1 byte	2 bytes		2 bytes		2 bytes

Example: write value 16#004D (77 in decimal notation) in word W1032 (1032 = 16#0408) of slave 2 (bus Link reference 3 = 77).

Question and Response	02	06	0408	004D	C93E
-----------------------	----	----	------	------	------

Diagnostics: function 8

Function 8 is used to read the value of one of the internal event counters of the Modbus module for ATV68 or to ask it to perform diagnostic commands. The code for this function is always accompanied by a sub-code, thus characterizing a diagnostic sub-function. The complete list of sub-codes that can be used with the Modbus module for ATV68 is given in a table appearing after the description of the request and response frames. A second table contains the descriptions of these sub-functions, as well as the data they use. Finally, the description of the “diagnostics” function ends with a short example (sub-function 0: echo of the master's request).

Request

Slave no.	08	Sub-code		Request data		CRC16
		Hi	Lo	Hi	Lo	
1 byte	1 byte	2 bytes		2 bytes		2 bytes

Response

Slave no.	08	Sub-code		Request data		CRC16
		Hi	Lo	Hi	Lo	
1 byte	1 byte	2 bytes		2 bytes		2 bytes

Sub-codes (decimal notation) and diagnostic sub-functions

Sub-Code	Name of diagnostic sub-function	Modbus standard name
0	Echo of the master's request	Return Query Data
10	Reset counters and diagnostics	Clear Counters and Diagnostic Register
12	Read number of requests received with checksum error	Return Bus Communication Error Count
13	Read number of exception responses	Return Bus Exception Error Count
14	Read number of requests addressed to the slave	Return Slave Message Count

Diagnostic sub-function data and description

Sub-Code	Request Data	Response Data	Function performed
0	XX YY	XX YY	This sub-function asks the interrogated slave to return, in its response, all the request data sent by the master (XX YY).
10	— —	— —	This sub-function asks the slave to reset the monitoring counters and the status indicators relating to its exchanges, ie. the Modbus error counters. These counters include those which are used by the other diagnostic functions, ie. the "CRC Error Counter", "Exception Illegal Function Counter", "Exception Illegal Address Counter", "Exception Data Value Counter" and "Received Queries Counter".
12	— —	XX YY	Reads the value (XX YY) of a 16-bit counter totalizing the number of requests received, with CRC error, by a slave. This error counter, "CRC Error Counter", is reset when the drive is switched on or the slave is restarted, as well as on execution of a "reset counters and diagnostics" command (sub-function 10).
13	— —	XX YY	Reads the sum (XX YY) of 16-bit counters totalizing the number of exception responses sent by the slave to a Modbus master. The three exception response counters affected by this sub-function, "Exception Illegal Function Counter", "Exception Illegal Address Counter" and "Exception Data Value Counter", are reset when the drive is switched on or the slave is restarted, as well as on execution of a "reset counters and diagnostics" command (sub-function 10). The first three types of exception response, described below and characterized by their error code, cause incrementation of one of the three counters presented above: • The "Exception Illegal Function Counter" counter is incremented by exception responses with error code = 1. • The "Exception Illegal Address Counter" counter is incremented by exception responses with error code = 2. • The "Exception Data Value Counter" counter is incremented by exception responses with error code = 3.
14	— —	XX YY	Reads the value (XX YY) of a 16-bit counter totalizing the number of requests addressed to the slave, whatever their type, including requests broadcast to all slaves. This request counter, "Received Queries Counter", is reset when the drive is switched on or the slave is restarted, as well as on execution of a "reset counters and diagnostics" command (sub-function 10).

Example: echo requested for slave 2, with the value 16#53DC for the echo data.

Request and Response	02	08	0000	53DC	DD51
----------------------	----	----	------	------	------

Write N output words: function 16 (16#10)

Function 16 is used to write output words (words which can be written and read by the master in the slave).

Request

Slave no.	10	No. of the 1st word		Number of words		Number of bytes	Value of 1st word		-----	Value of last word		CRC16
Hi	Lo	Hi	Lo	Hi	Lo		Hi	Lo		Hi	Lo	
1 byte	1 byte	2 bytes		2 bytes		1 byte	2 bytes			2 bytes		2 bytes

Response

Slave no.	10	No. of the 1st word		Number of words		CRC16
Hi	Lo	Hi	Lo	Hi	Lo	
1 byte	1 byte	2 bytes		2 bytes		2 bytes

Example: write values 16#0020 and 16#0100 (32 and 256 in decimal notation) in words W1032 and W1033 (16#0408 and 16#0409) of slave 2 (bus Link Reference 3 = 32 and bus Link Reference 4 = 256).

Request	02	10	0408	0002	04	0020	0100	CFD7
	Values to be written at addresses:				W1032	W1033		

Response	02	10	0408	0002	C109
----------	----	----	------	------	------

Exception responses

An exception response is returned by a slave when it cannot execute the request addressed to it.

Exception response format:

Slave no.	Response code	Error code	CRC16
1 byte	1 byte	1 byte	2 bytes

Response code: request function code + 16#80.

Error code:

- 1 = The function requested is not recognized by the slave.
- 2 = The bit and word addresses indicated when the request is made do not exist in the slave.
- 3 = The bit and word values indicated when the request is made are not permitted in the slave.
- 4 = The slave has begun to execute the request, but cannot continue processing it fully.

Calculating the CRC16

The CRC16 is calculated on all message bytes by applying the following method:

Initialize the CRC (16-bit register) with 16#FFFF.

From the 1st message byte to the last, enter:

CRC XOR <byte> —> CRC

Enter 8 times

Shift the CRC one bit to the right

If the output bit = 1, enter CRC XOR 16#A001—> CRC

End of entry

End of entry

The CRC obtained will be sent with the least significant bits first, then the most significant bits (unlike the other data contained in the Modbus frames).

XOR = exclusive OR.



Only the addresses and values defined in this document can be used. Any other address or value should be considered as reserved and should never be the object of a write operation. Failure to comply with this precaution risks causing drive malfunctions.

Service	Input words	Description
Module	W0	Module status word
Response PKW	W1	PKE
	W2	IND
	W3	PWE Hi
	W4	PWE Lo
Monitoring PZD	W5	ETA status word
	W6	Actual value 1 AO/AI
	W7	Actual value 2 AO/AI
	W8	Actual value 3 AO/AI
	W9	Actual value 4 AO/AI
	W10	Actual value 5 AO/AI

Service	Output words	Description
Request PKW	W1025	PKE
	W1026	IND
	W1027	PWE Hi
	W1028	PWE Lo
Control PZD	W1029	CMD control word
	W1030	Main reference 1
	W1031	Aux. reference 2
	W1032	Aux. reference 3
	W1033	Aux. reference 4
	W1034	Aux. reference 5

- To ensure consistency of the data, it is advisable to:
- Read all accessible input words in a single Modbus exchange (W0 to W10)
 - Write all accessible output words in a single Modbus exchange (W1025 to W1034)

These exchanges only occur between the Modbus master and the module. The module is responsible for transferring the output word values to the ATV68 to which it is connected, then retrieving the input word values from the drive.

It is important to maintain cyclic communication between the Modbus master and the module, even when the user does not need to modify either the drive status or commands. This avoids the Modbus communication timeout being tripped by the module.

Module status word (W0)

Bits	Name and Identifier	Description
15-13	—	Reserved
12	Subnet Status	= 0 : ATV68-module link not started or faulty = 1 : ATV68-module link OK
11-0	—	Reserved

Principle of ATV68 control and monitoring

The ATV68 drive is controlled in accordance with the PROFIDRIVE standard.
Two status charts are presented here: a simplified chart and a complete chart.
The common states of these charts are identified in the same way.

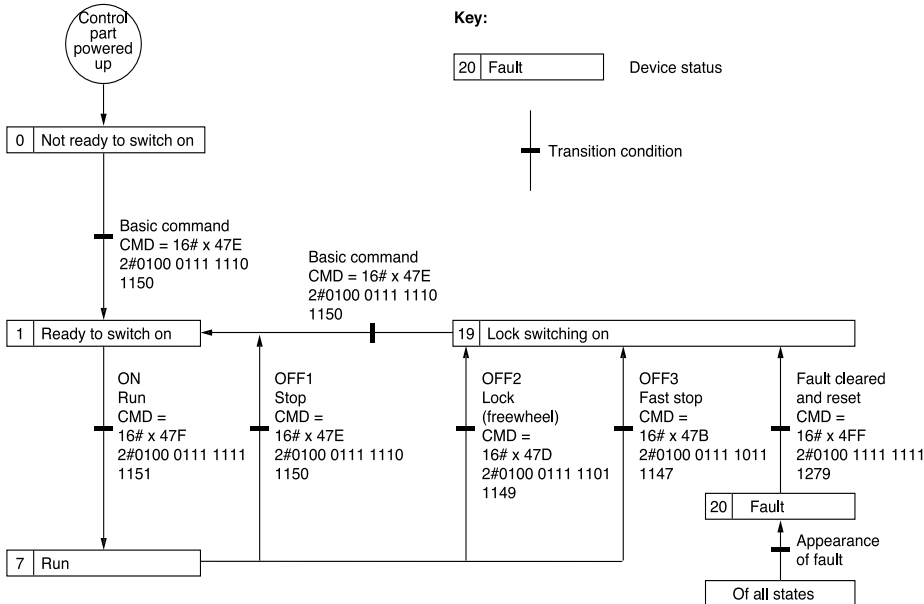
The PLC output words are used to control the drive (control PZD):

Control	Word	Description	Assignment
PZD1	W1029	CMD control word	B6.21: • bits 0 to 10: Profidrive standardized • bits 11 to 15 *: assignable
PZD2 *	W1030	Main reference 1	B6.06 (default value = not used)
PZD3 *	W1031	Aux. reference 2	B6.07 (default value = not used)
PZD4 *	W1032	Aux. reference 3	B6.08 (default value = not used)
PZD5 *	W1033	Aux. reference 4	B6.09 (default value = not used)
PZD6 *	W1034	Aux. reference 5	B6.10 (default value = not used)

The PLC input words are used to find out what stage the drive is at, and also which drive values have been read (monitoring PZD):

Monitoring	Word	Description	Assignment
PZD1	W5	ETA status word	B6.26: • bits 0 to 10: Profidrive standardized • bits 11 to 15 *: assignable
PZD2 *	W6	Actual value 1 AO/AI	B6.11 (default value = Output frequency)
PZD3 *	W7	Actual value 2 AO/AI	B6.13 (default value = Output speed)
PZD4 *	W8	Actual value 3 AO/AI	B6.15 (default value = Output current)
PZD5 *	W9	Actual value 4 AO/AI	B6.17 (default value = Output torque)
PZD6 *	W10	Actual value 5 AO/AI	B6.19 (default value = Output power)

Simplified Profidrive status chart

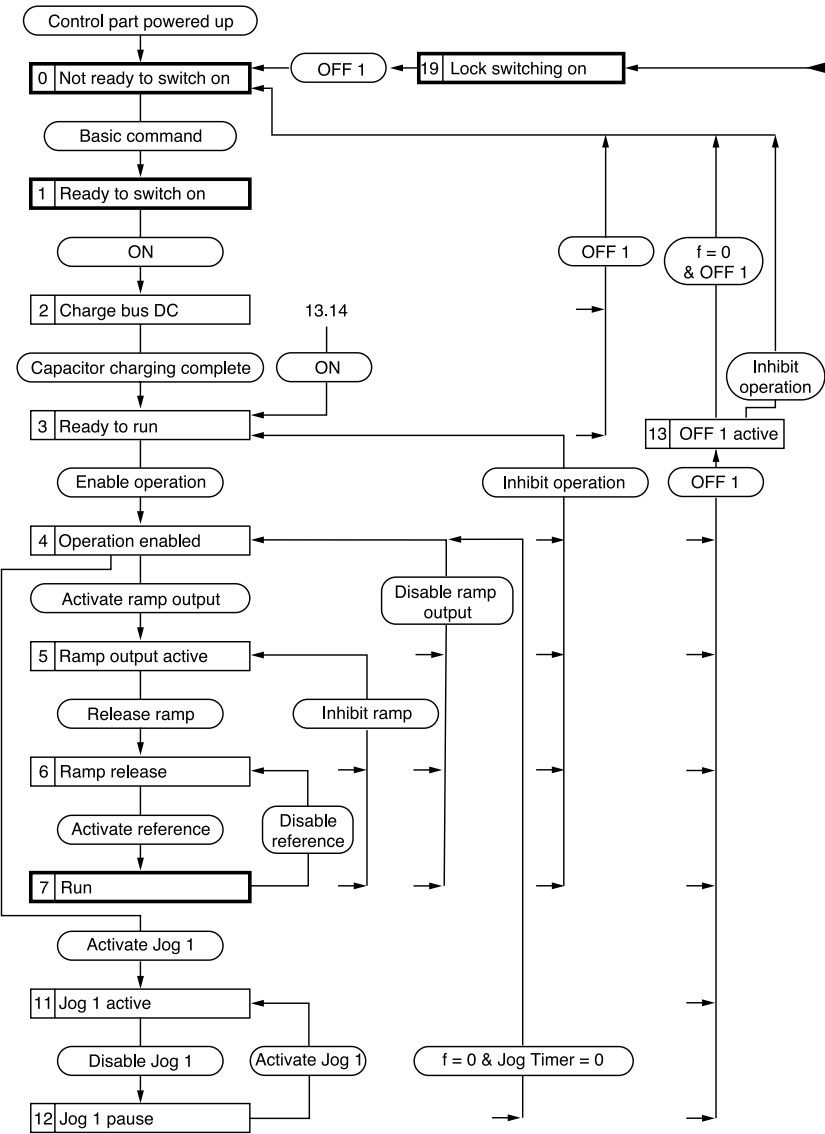


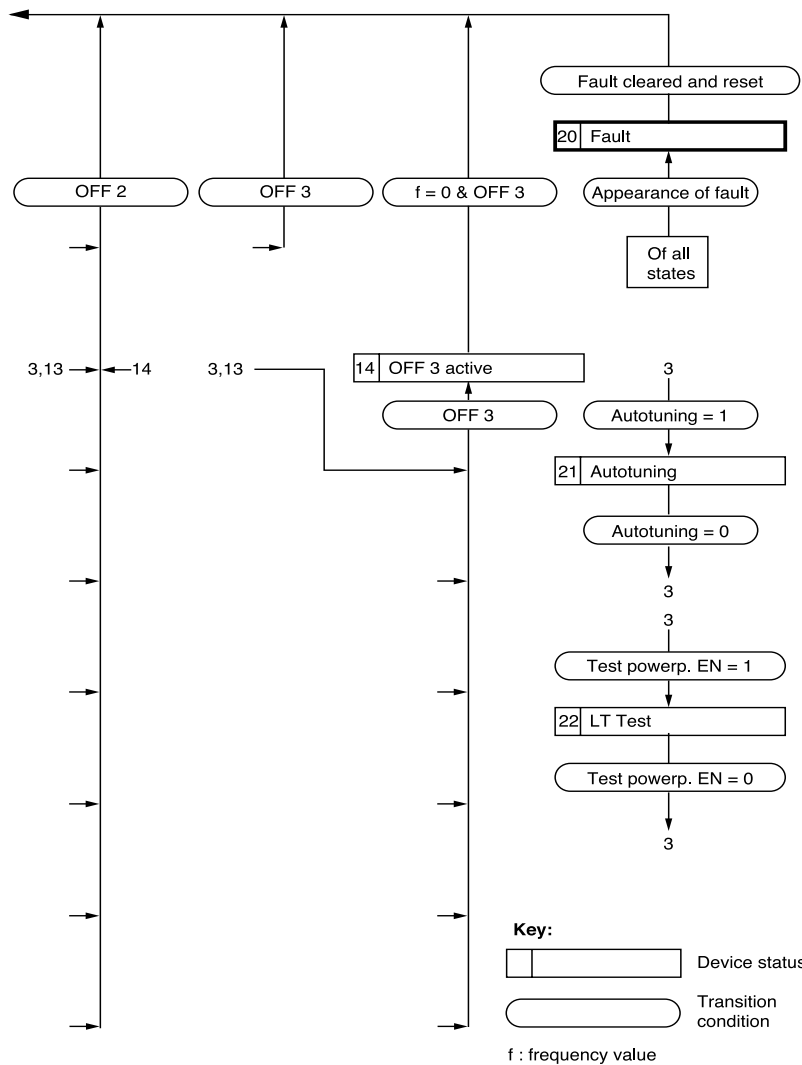
List of main states:		ETA Status Word bits				ETA masked	Mask
		15...12 *	11...8 *	7...4	3...0		
0	Not ready to switch on	x x x x	x x 1 x	x 0 x x	0 0 0 0	16#0200	16#024F
1	Ready to switch on	x x x x	x x 1 x	x 0 x x	0 0 0 1	16#0201	16#024F
3	Ready to run	x x x x	x x 1 x	x 0 x x	0 0 1 1	16#0203	16#024F
7	Run	x x x x	x x 1 x	x 0 1 1	0 1 1 1	16#0207 16#0237	16#024F 16#027F
19	Lock switching on	x x x x	x x 1 x	x 1 x x	0 0 0 0	16#0240	16#024F
20	Fault	x x x x	x x 1 x	x 0 x x	1 0 0 0	16#0208	16#024F

x : Bit state can be 0 or 1.

Complete Profidrive status chart

For more information, see the "F3 menu" in the programming manual.





Description of the CMD control word

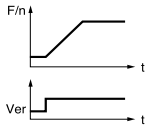
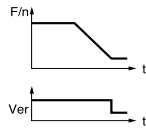
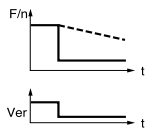
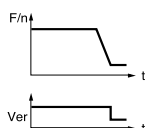
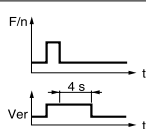
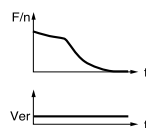
Bit 15	5 free bits which can be configured for internal or external commands	
Bit 14		
Bit 13		
Bit 12		
Bit 11		
Bit 10	Control by communication link enabled	Control by communication link disabled
Bit 9	---	---
Bit 8	Activate Jog 1	Disable Jog 1
Bit 7	External reset	---
Bit 6	Activate reference	Disable reference
Bit 5	Release ramp	Inhibit ramp
Bit 4	Activate ramp output	Disable ramp output
Bit 3	Enable operation (unlock)	Inhibit operation (lock/freewheel)
Bit 2	Operating condition	OFF 3 (fast stop)
Bit 1	Operating condition	OFF 2 (lock/freewheel stop)
Bit 0	On (run)	OFF1 (stop on ramp)
= 1		= 0

Bit	Value	Meaning	Comment
0	1	ON	Controls the change of the device status from "1 Ready to switch on" to "3 Ready to run", if the "power capacitor" stage (DC bus) has already been charged. If the "line contactor control" function is active, the device status changes to "2 Charge bus DC" while the capacitors are charging, and changes to "3 Ready to run" when the DC bus capacitors are charged.
	0	OFF 1 (stop on ramp)	After accepting the command, the device status changes to "13 OFF1 active" and stops the motor in accordance with the deceleration ramp. When the output frequency reaches 0 Hz, the device status changes, passing through "0 Not ready to switch on", to "1 Ready to switch on", if the basic command (bit 1 = 0, bit 2 = 1, bit 3 = 1 and bit 10 = 1) is applied. If a new ON command is sent during the deceleration phase, the value of the reference applied is executed in accordance with the acceleration ramp. The device status therefore changes to "7 Run". If the "line contactor control" function is active, the contactor is disabled on switching to "1 Ready to switch on".
1	1	Operating condition	"OFF2" command disabled. Command required to authorize operation.
	0	OFF2 (lock/ freewheel stop)	After accepting the command, the drive is locked, and the status changes to "19 Lock switching on". If the "line contactor control" function is active, the contactor is disabled. The OFF2 command can also be sent using the bus connector "Unlock" function. When the basic command (bit 1 = 0, bit 2 = 1, bit 3 = 1 and bit 10 = 1) is applied, the device status changes to "1 Ready to switch on".
2	1	Operating condition	"OFF3" command disabled. Command required to authorize operation.
	0	OFF3 (fast stop)	After accepting the command, the device status changes to "14 OFF3 active", producing the fastest possible motor stop at maximum power or at maximum voltage of the power capacitor stage (DC bus). When the output frequency reaches zero Hz, the device status changes to "19 Lock switching on". If the "line contactor control" function is active, the contactor is disabled. If the OFF3 command (bit 2 = 1) is cancelled during deceleration, the fast stop is still performed.

Bit	Value	Meaning	Comment
3	1	Enable operation (unlock)	After accepting the command, the drive is activated in the "3 Ready to run" (lock) status and the device status changes to "4 Operation enabled".
	0	Inhibit operation (lock/freewheel)	After accepting the command, the drive is locked, and the device status changes to "3 Ready to run". If the device status "13 OFF1 active" is applied, the drive is locked, and the status "0 Not ready to switch on" is applied. If the "line contactor control" function is active, the contactor is disabled. If the basic command (bit 1 = 0, bit 2 = 1, bit 3 = 1 and bit 10 = 1) is applied, the device status changes to "1 Ready to switch on". If the device status "14 OFF3 active" is applied, the action is still performed.
4	1	Activate ramp output	Device status "5 Ramp output active", the motor accelerates in accordance with the acceleration ramp.
	0	Disable ramp output	After accepting the command, the ramp output is reset. The motor stops at maximum power or at the maximum voltage for the power capacitor stage (DC bus). The device status changes to "4 Operation enabled".
5	1	Release ramp	Activation of status "6 Ramp release", used to unblock changes in the ramp.
	0	Inhibit ramp	After accepting the command, the after-ramp reference value is blocked, and stops changing. The device status changes to "5 Ramp output active".
6	1	Activate reference	After accepting the command, the selected reference value is used on the ramp input. The device status changes to "7 Run".
	0	Disable reference	After accepting the command, the ramp input is reset. This produces motor deceleration in accordance with the ramp set. The device status changes to "6 Ramp release".

Bit	Value	Meaning	Comment
7	1	External reset	The external reset command is accepted, on a positive state "20 Trip". When the current fault has been cleared, the status changes to "19 Lock switching on". If the fault persists, the device status remains "20 Trip". The external reset command can also be sent via the bus connector "External reset" function, and via the red STOP/Reset button located on the keypad.
	0	—	
8	1	Activate Jog 1	The command Activate Jog 1 is only accepted if the device status is "4 Operation enabled". For this reason, the motor accelerates as fast as possible to the frequency of the parameter in C1.13; the device status changes to "11 Jog 1 active".
	0	Disable Jog 1	The command is only accepted if "Activate Jog 1" has previously been set to "1". The motor returns to zero Hz as fast as possible, then changes to the state "12 Jog 1 Pause". If a new Jog 1 stop command is sent within two seconds, it is immediately executed. At the end of the "Jog Timer" 2 seconds, the device status returns to the initial status "4 Operation enabled".
9	1	Activate Jog 2	Command not available
	0	Disable Jog 2	Command not available
10	1	Control by communication link enabled	The drive is controlled by the PLC via Modbus. The control process data is now valid.
	0	Control by communication link disabled	The reaction depends on bit 9 of the ETA status word. Bit 9 = 0 (local mode). The drive is in local mode, the PLC can only perform monitoring. Bit 9 = 1 (control by communication link expected). The drive is in communication link mode, the ATV68 trips on "LS2 Loss". The drive reaction depends on the setting of parameter B6.03 "Type of stop on TO". An alarm is always sent.

Summary of the main commands

Function		CMD control word	
		Binary	Hexadecimal
ON Starting in accordance with the acceleration ramp		0000 0100 0111 1111	047F
OFF 1 Stop in accordance with the deceleration ramp		0000 0100 0111 1110 basic command	047E
OFF 2 Lock (freewheel stop)		0000 0100 0111 1101 produces the status "19 Lock switching on"	047D
OFF 3 Fast deceleration is performed up to the DC bus current or voltage limits		0000 0100 0111 1011 produces the status "19 Lock switching on"	047B
Jog 1		0000 0101 0000 1111	050F
Reset (External reset)		xxxx x1xx 1xxx xxxx	example: 0480

Key:
F/n = frequency or speed
Ver = lock

Assignment of the free bits 11 to 15 of the CMD control word

Bits 11 to 15 of the control word (CMD) are not fixed by Profidrive; they can be assigned to:

- internal commands (conforming to use of the logic input)
- external commands in a totally separate way from the ATV68 functions, for the transmission of data via the logic outputs (bit 10 of the CMD control word should be at 1)

Use	Free bits of the CMD control word
"Internal"	Logic input A Logic input B Logic input C Manual/Auto 2 nd Ramp External Trip EXT-Mot.Trip EXT-T Limit PID-enable Mains ON(OFF) ... (See parameters B6.21 to B6.25)
"External"	D4.00: 24V logic output D4.01: Relay output 1 D4.02: Relay output 2_2 D4.03: Relay output 3_2 (See configuration of logic outputs)

Assignment of communication link references

Communication link references 1 to 5 can be assigned to:

- internal values, such as for example speed reference "Freq.ref.man" and reference "PID-ref"; assignments made using parameters B6.06 to B6.10 respectively, for communication link references 1 to 5.
- external values, for the analogue outputs, without influencing control of the ATV68 (bit 10 of the CMD control word should equal 1 so that this data can be taken into account by the ATV68); assignments made using parameters D3.00 (for AO1) and D3.04 (for AO2), taking care that parameter B6.06 to B6.10 which corresponds to the communication link used be left as "not assigned". For these "external" values, it is possible to assign the same communication link reference to both analogue outputs AO1 and AO2, but there is no particular advantage to be gained.

Use	Communication link references
"Internal"	Freq.ref.man Freq.ref.aut F-ref correction Torque limit PID-ref. Actual PID Feedback Val. (See parameters B6.06 to B6.10)
"External"	D3.00: Analogue output 1 (AO1) D3.04: Analogue output 2_2 (AO2) (See configuration of analogue outputs)

The reference values are presented as standardized linear values (N2).

Description of the ETA status word

Bit 15	5 free bits which can be configured for internal or external states	
Bit 14		
Bit 13		
Bit 12		
Bit 11		
Bit 10	Threshold attained	Below the threshold
Bit 9	Control by communication link expected	Locked
Bit 8	Reference reached	Outside reference
Bit 7	Alarm	No alarm
Bit 6	Lock switching on	Switching on enabled
Bit 5	OFF 3 No	OFF 3 (fast stop)
Bit 4	OFF 2 No	OFF 2 (lock)
Bit 3	Trip	Trip inv.
Bit 2	Operation Enable	Operation inhibited
Bit 1	Ready to RUN	Not ready to run
Bit 0	Ready to switch on	Not ready to switch on
= 1		= 0

Bit	Value	Meaning	Comment
0	1	Ready to switch on	The device status is "1 Ready to switch on". The drive is locked. If the "line contactor control" function has been activated, the line contactor is disabled.
	0	Not ready to switch on	The device status is "0 Not ready to switch on" or "19 Lock switching on".
1	1	Ready to run	The device status is "3 Ready to run ". This means that the DC Bus stage is powered up, and there are no faults. However, the drive remains locked. If the "line contactor control" function has been activated, this control message is sent during the power capacitor charging phase: "2 Charge bus DC".
	0	Not ready to run	
2	1	Operation enabled	The states are "4 Operation enabled", "5 Ramp output active", "6 Ramp release", "7 Run", "13 OFF1 active", or "14 OFF3 active". The ATV68 is unlocked, the power bridge (IGBT) is active, the output terminals are powered up.
	0	Operation inhibited	
3	1	Trip	Fault present. The device status is "20 Trip". After the fault has disappeared and been reset, the status changes to "19 Lock switching on".
	0	Trip inv.	
4	1	OFF2 No	
	0	OFF2 (lock)	An OFF2 command has been sent.
5	1	OFF3 No	
	0	OFF3 (Fast Stop)	An OFF3 command has been sent.
6	1	Lock switching on	This state is obtained by the commands OFF2, OFF3 and "Enable operation" of the CMD control word, after the fault has been reset. This status is cleared by setting the parameters for bit 0 of the CMD control word = 0. With bit 1 of the CMD control word (OFF1), the "Lock switching ON" status no longer applies.
	0	Switching on enabled	
7	1	Alarm	An alarm has been sent, there is no need for an external reset.
	0	No alarm	

Bit	Value	Meaning	Comment
8	1	Reference reached	Comparison of the reference value and the actual value of the frequency or the speed. The tolerance band and time delay for starting and de-energization depend on parameter D4.08.
	0	Outside reference	
9	1	Control by communication link expected	When the ATV68 has been configured for "bus" mode using parameter B6.01, it asks the Modbus master to accept commands once the drive has been switched on (power or control). If the master does not accept commands, an alarm (ETA bit 7) is sent.
	0	Locked	The ATV68 has changed to local mode (control via the programming terminal keypad or via the terminals defined in local mode). If the master does not send a command via the communication link (CMD bit 10 = 0), an alarm is sent. If the drive is switched to remote mode again, the PLC should respond with a command via the communication link within 2 seconds, otherwise the drive is automatically switched back to local mode.
10	1	Threshold reached	The actual value of the frequency is $\geq$ the threshold in D4.06
	0	Below the threshold	The actual value of the frequency is $\leq$ the threshold in D4.07

Assignment of the free bits 11 to 15 of the ETA status word

Bits 11 to 15 of the ETA status word are not fixed by Profidrive, and they can be assigned to:

- internal states (conforming to the logic outputs)
- external states separate from the ATV68 functions

Use	Free bits of the ETA status word
"Internal"	Ready Run Trip Ready+Run Alarm Generat.oper Contactor control Local (remote) Motor frequency > threshold Lift Brake Output C1 ... (See parameters B6.26 to B6.30)
"External"	DI1 DI2 DI3 DI4 DI6_2 DI7_2 DI8_2 ... (See parameters B6.26 to B6.30)

Assignment of actual values

Actual values can be assigned to:

- internal actual values, such as the frequency output "f- out (signed)", the output current "Out.current", etc. (conforming to the ATV68 analogue outputs).
- external actual values (commands) coming from the analogue inputs, for external use by the Modbus master, without influencing control of the ATV68 (bit 10 of the CMD control word should be set to 1 so that this data can be made available to the Modbus master by the drive).

Actual values, like communication link reference values, are presented as standardized linear values (in Hz or as a %) (N2).

Use	Actual values
"Internal"	Output freq. (signed) Output freq. (unsigned) Out.current Torque (signed) Torque (unsigned) Motor power Motor voltage N-out sig (signed) N-out sig (unsigned) Internal frequ. reference Torque limit reference PID-ref. PID-feedback PID-error DC-voltage Fault number Drive status ... (See parameters B6.11 to B6.20)
"External"	Analogue input AIC Analogue input AI_2 Analogue input AIV ... (See parameters B6.11 to B6.20)

Managing communication errors on the Modbus network

When the Modbus connection is lost, the module can no longer communicate with the Modbus master. However, the connection to the drive remains operational and the module continues to communicate with it.

All the values of the PZD and PKW output data transmitted to the drive are reset when the Modbus time-out trips on the module. The duration of this time-out equals 10 seconds.

These resets include resetting Bit 10 of the CMD control word (W1029), and hence activation of “control by communication link disabled”.

Managing communication errors on the ATV68-module link

When the ATV68-module link is lost, the module can no longer communicate with the drive. However, the connection with the Modbus network remains operational.

- The drive trips at the end of 10 s + x s.
The type of fault or stop on timeout applied by the drive can be configured by parameter B6.03 (BUS fault). The value of x can be adjusted by parameter B6.04 (B6.03 Time delay).
- A second module time-out trips at the end of 10 s. From then on, all the PKW and PZD input word values transmitted to the Modbus master by the module are reset:

W1 to W10 = 16#0000

- The whole time that communication is stopped, the module informs the Modbus master, via bit 12 of the module status word (W0), that the ATV68-module link is no longer active (bit 12 = 0).

Example 1

- B6.03 = Fault / B6.04 = 4.0 s
If communication between the module and the drive is interrupted for more than 14 s, the drive performs a freewheel stop and the fault relay trips, changing to the “20 – Trip” status. To be able to control the drive again, the following sequence should be sent by the control word:
 - CMD = 16#x4FF = External reset, then
 - CMD = 16#x47E = Basic command

Example 2

- B6.03 = Deceleration / B6.04 = 5.0 s
If communication between the module and the drive is interrupted for more than 15 s, the drive stops on a ramp. The fault relay does not trip. To be able to control the drive again, the following value should be sent by the control word:
 - CMD = 16#x47E = Basic command

PKW Parameter-Setting Service

PKW, or configuration and adjustment process data, consist of 4 consecutive input and output words. They are used to read and write the drive parameter values.

Request PKW

Address	Words	Fields															
W1025	PKE	Request code				Parameter address											
		AK				PNU											
		15			12	11	10										0
W1026	IND	Reserved															
W1027	PWE Hi	High order parameter value															
W1028	PWE Lo	Low order parameter value															

Response PKW

Address	Words	Fields															
W1	PKE	Response code				Parameter address											
		AK				PNU											
		15			12	11	10										0
W2	IND	Reserved															
W3	PWE Hi	High order parameter value															
W4	PWE Lo	Low order parameter value															
		or Error code															

Principles for processing the PKW request/response

To perform a complete transaction, the Modbus master must first write the PKW request (W1025 to W1028), then read the PKW response words (W1 to W4) in an iterative manner, so long as the response corresponding to the PKW request is not available (comparison of the values of PKE and IND in the request and in the response).

The ATV68 retains its response values until the master formulates a new request, or until the communications change to downgraded mode.

- The master must identify the response to its request:
 - a) by evaluating the response code
 - b) by evaluating the parameter number (PNU)
 - c) if necessary by evaluating the parameter index
 - d) if necessary by evaluating the parameter value
- If there is no need to exchange information via PKW message handling, the master should use the "No command" request code.
- If the response code is 7 (error), a request code 0 (no command) must be sent to clear the error and be able to address this same parameter again.

Saving to the Flash EPROM

The modified parameters are not saved automatically in the event of loss of the electrical line supply. They are saved in the EPROM using the "PNU 971 – Record saved" parameter.

To launch this procedure, the parameter value should be at 1.
After saving, the parameter should be reset to 0.

AK Request codes (master → ATV68)

Request code	Meaning	Response code	
		pos.	neg.
0	No request	0	7
1	Read a parameter value	1.2	7
2	Write a parameter value (word)	1	7
3	Write a parameter value (double word, floating point)	2	7
6	Read the value of the table parameter	4.5	7

Only descriptive elements with a maximum length of 4 bytes can be transmitted to the PKW part.

AK Response codes (master → ATV68)

Response code	Meaning
0	No response
1	Correct reading or writing of a parameter value (word)
2	Correct reading or writing of a parameter value (double word, floating point)
4	Correct reading of a parameter value (word table)
5	Correct reading of the parameter value (double word table)
7	Error

PWE Parameter value - error code

The PWE field contains either the parameter value or the error code.

- The following types of data are possible:

For simple variables:	N2	16-bit standardized linear value
	O2	16-bit unsigned
	T2	16-bit time constant
	NF	32-bit floating point
	V2	16-bit sequence
For table:	OS4[]	String of 4 bytes (ASCII character table)
	O2[]	16-bit unsigned

Font: Characters (text) should be represented using the ISO/IEC 10367 Latin Alphabet character table no. 1 (= Windows font).

- In the event of an error response code (AK = 7), PKE Lo contains an error code.

Error code	Meaning
0	Incorrect logic address
1	Parameter writing refused
2	Value outside max. and min. limit
3	Error in the sub-index
4	No table
5	Incorrect type of data
9	Descriptive data not available
11	No parameter-setting priority for parameter (1)
13	Impossible to read text (or text table) during cyclic network operation
14	Impossible to read name during cyclic network operation
17	Request not taken into account because drive not locked
101	Incorrect request code (request not supported)
103	Access to parameter blocked by code
104	Unable to adjust the parameter, value or assignment already used
105	Type of table
106	Impossible to execute the request because Macro User 2 active or parameter locked (logic input). See B2.04

(1) This error will always be returned by the drive if the Modbus master attempts to access a parameter when parameter F6.02 has not been set to value 2 (Access mode = via RS232) from the terminal.

PKW Parameter-Setting Service

ASCII Code table

ISO/IEC 10 367 – Basic set GO – Additional set Latin Alphabet no. 1

hex	Char.	hex	Char.	hex	Char.	hex	Char.	hex	Char.	hex	Char.
20	Space	40	@	60	`	A1	í	C1	Á	E1	á
21	!	41	A	61	a	A2	¢	C2	Â	E2	â
22	"	42	B	62	b	A3	£	C3	Ã	E3	ã
23	§	43	C	63	c	A4	¤	C4	Ä	E4	ä
24	\$	44	D	64	d	A5	¥	C5	Å	E5	å
25	%	45	E	65	e	A6	¦	C6	Æ	E6	æ
26	&	46	F	66	f	A7	§	C7	Ç	E7	ç
27	'	47	G	67	g	A8	¨	C8	È	E8	è
28	(	48	H	68	h	A9	©	C9	É	E9	é
29	)	49	I	69	i	AA	ª	CA	Ê	EA	ê
2A	*	4A	J	6A	j	AB	«	CB	Ë	EB	ë
2B	+	4B	K	6B	k	AC	¬	CC	Ì	EC	ì
2C	,	4C	L	6C	l	AD	-	CD	Í	ED	í
2D	-	4D	M	6D	m	AE	®	CE	Î	EE	î
2E	.	4E	N	6E	n	AF	¯	CF	Ï	EF	ï
2F	/	4F	O	6F	o	B0	°	D0	Ð	F0	ð
30	0	50	P	70	p	B1	±	D1	Ñ	F1	ñ
31	1	51	Q	71	q	B2	²	D2	Ò	F2	ò
32	2	52	R	72	r	B3	³	D3	Ó	F3	ó
33	3	53	S	73	s	B4	´	D4	Ô	F4	ô
34	4	54	T	74	t	B5	µ	D5	Õ	F5	õ
35	5	55	U	75	u	B6	¶	D6	Ö	F6	ö
36	6	56	V	76	v	B7	·	D7	×	F7	÷
37	7	57	W	77	w	B8	¸	D8	Ø	F8	ø
38	8	58	X	78	x	B9	¹	D9	Ù	F9	ù
39	9	59	Y	79	y	BA	º	DA	Ú	FA	ú
3A	:	5A	Z	7A	z	BB	»	DB	Û	FB	û
3B	;	5B	[	7B	{	BC	¼	DC	Ü	FC	ü
3C	<	5C	\	7C		BD	½	DD	Ý	FD	ý
3D	=	5D	]	7D	}	BE	¾	DE	Þ	FE	þ
3E	>	5E	^	7E	~	BF	¿	DF	ß		
3F	¿	5F	_	7F	DEL	C0	À	E0	à		

Example 1: Reading the mechanical power (Menu A2.04, PNU 114)

	Request		
PKE	W 1025	16#	1072
IND	W 1026	16#	0000
PWE Hi	W 1027	16#	0000
PWE Lo	W 1028	16#	0000

Request code 1: Read a parameter value.
PNU = 114 = 16#72

	Response		
PKE	W1	16#	1072
IND	W2	16#	0000
PWE Hi	W3	16#	0000
PWE Lo	W4	16#	1333 = 4915

Response code 1: Correct reading of a parameter value.
Parameter A2.04 is described on page 80:
- Type N2
- Standardization factor B3.00 (Nominal power), 400 kW in the example
Physical value = $4915/16384.0 \times 400$ (standardization factor, eg. motor Pn) = 120 kW.

Example 2: Reading the causes of faults (Menu A2.04, PNU 823)

	Request		
PKE	W 1025	16#	1337
IND	W 1026	16#	0000
PWE Hi	W 1027	16#	0000
PWE Lo	W 1028	16#	0000

Request code 1: Read a parameter value.
PNU = 823 = 16#337

	Response		
PKE	W1	16#	1337
IND	W2	16#	0000
PWE Hi	W3	16#	0000
PWE Lo	W4	16#	0039 = 57

Response code 1: Correct reading of a parameter value.
Parameter F3.03 is described on pages 64 and 80:
- Type O2
- Value 57: 4/20 mA fault

Example 3: Writing the max. value of the analogue output (Menu D3.03, PNU 453)

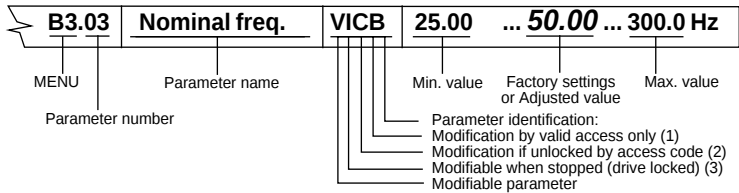
	Request		
PKE	W 1025	16#	21C5
IND	W 1026	16#	0000
PWE Hi	W 1027	16#	0000
PWE Lo	W 1028	16#	6000

Request code 2: Write a parameter value.
PNU = 453 = 16#1C5
Value to be written: 150 %
Parameter D3.03 is described on page 88:
- Type N2
- Standardization factor 100.0
Value of PWE = $150 / 100 * 16384.0 = 24576 = 16\#6000$.

	Response		
PKE	W1	16#	11C5
IND	W2	16#	0000
PWE Hi	W3	16#	0000
PWE Lo	W4	16#	6000

Response code 1: Correct writing of a parameter value.
PWE contains the written value.

Key to tables



B6. Serial Port configuration

In menu B6 "Communication parameters", the minimum configuration for starting Modbus communication is:

- B6.00 "Selection of the communication bus" at 2 "RS232/Gateway"
- B6.01 "Select remote" at:
 - 1 "Line, Gateway" if the command comes from a PLC via Modbus
 - 0 "Terminals" if the PLC is only monitoring the drive

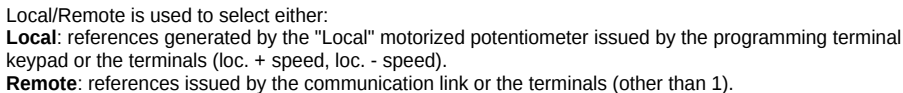
Menu	Name	Access	Default value - range
B6.00	Select bus	VICB	No bus
	0 ... no bus		
	1 ... PROFIBUS DP		Profibus DP
	2 ... RS232 / Gateway (19200 bauds)		FIPIO / Modbus / Modbus plus
	3 ... Gateway (35700 bauds)		
	To use the Modbus module, select value 2.		
B6.01	Select remote	VCB	Terminals
	0 ... Terminals		terminals + bit 11 to 15 of the CMD control word if bit 10 of the CMD control word = 1
	1 ... Line, Gateway		control word (CMD)
	Parameter B6.01 defines whether remote commands (Start, Stop) should be accepted via the terminals (logic inputs) or by using the control word (CMD) (bits 0-10) via the communication link.		
B6.02	Address	VCB	0 ... 0 ... 126
	Not used by the interface		

Menu	Name	Access	Default value - range
B6.03	BUS fault	VICB	Alarm
	0 ... Alarm		(immediately)
	1 ... Trip		(after the time set with B6.04)
	2 ... Lock		(after the time set with B6.04)
	3 ... Deceleration		(after the time set with B6.04)
	This parameter defines the drive reaction to a communication fault on the bus ATV68-module link. The effect can be delayed using parameter B6.04 (see B6.33 also).		
	0 ... Alarm		
	1 ... Trip: the drive performs a freewheel stop and generates a fault (the fault relay is tripped).		
	2 ... Lock: the drive performs a freewheel stop and does not generate a fault.		
	3 ... Deceleration: the drive stops the motor in accordance with the deceleration ramp and does not generate a fault.		
	For options 2 and 3: the drive restarts automatically if a run command has been enabled. For option 1: the drive only restarts after the fault has been reset, and a "Basic status" command and a run command have been issued.		
B6.04	Delay B6.03	VCB	0 ... 0.0 ... 3200.0 s
	This parameter sets the time delay for the reaction occurring after B6.03.		
B6.05	ON after OFF1,3	VICB	Not authorized
	0 ... not authorized		
	1 ... authorized		
	This parameter defines whether another start is possible during deceleration (caused by an OFF1 or OFF3 command). In the "not authorized" configuration, the drive is "locked" once the motor has come to a complete stop. The master should write the "Basic status" in the control word (CMD) before restarting.		

ENGLISH

0 ... not used			If the desired reference cannot be selected, it has already been assigned. See D1, etc.
1 ... Freq.ref.man	100% = fmax	C3.01	
2 ... Freq.ref.aut	100% = fmax	C3.01	
3 ... Freq. Correct.	100% = fmax	C3.01	
4 ... Torque Limit.	100% = nom.	motor torque	
5 ...PID-ref.	100% = 100%		
6 ... PID-feedback	100% = 100%		

LOC = Local
REM = Remote
LOC MP = Local motorized potentiometer

131

ATV68 Configuration

Menu	Name	Access	Default value - range
B6.10	Aux. reference 5	VICB	Not used
	For authorized settings see B6.06.		
B6.11	Actual val.1	VCB	Out.freq.sig
	0 ... not used		output not assigned
	1 ... f- out (signed)	A3.00	100% = high speed (C3.01)
	2 ... f- out (unsigned)		100% = high speed (C3.01)
	3 ... Out.current	A2.03	100% = nominal motor current (B3.01)
	4 ... Torque (signed)	A2.01	100% = nominal motor torque (B3.00, B3.04)
	5 ... (Torque) (unsigned)		100% = nominal motor torque (B3.00, B3.04)
	6 ... Motor power	A2.04	100% = nominal motor power (B3.00)
	7 ... Motor voltage		100% = nominal motor voltage (B3.02) V
	8 ... N-out sig (signed)		100% = high speed in rpm (C3.01 x 60/p) (1)
	9 ... N-out sig (unsigned)		100% = high speed in rpm (C3.01 x 60/p) (1)
	10 ... Int.f-ref		100% = high speed (C3.01). Internal frequency reference before the ramp and before slip compensation.
	11 ... Int. T-ref.	A4.13	100% = nominal motor torque (B3.00, B3.04) Torque limit internal reference
	12 ... PID-ref.	C4.00	100% = 100% (C4.00)
	13 ... PID-feedback	C4.01	100% = 100% (C4.01)
	14 ... PID-error		100% = 100% (C4.02)
	15 ... AIV	A4.00	100% = 10 V = 4000 hex
	16 ... AIC	A4.02	100% = 20 mA = 4000 hex
	17 ... AI_2	A4.04	100% = 20 mA = 4000 hex
	18 ... AI_3	A4.06	100% = 20 mA = 4000 hex
	19 ... DC voltage	A3.02	100% = 813 V on the ATV68 400 and 500; 1200 V on ATV68 700
	20 ... Th. State Mot.	A2.12	Thermal state M
	21 ... Braking Resistor Thermal	A3.12	
	22 ... Fault number	F3.02	
	23 ... Drive state	AI.03	Fault code (see programming manual) State, alarm or limit (see programming manual)
	24 ... Position Low	A2.13	
	24 ... Position High	A2.14	
	With this parameter, the information relating to the selected analogue value is assigned to the AO/AI actual value 1 with adequate standardization. All the actual values can be filtered by the adjustable "actual value filter".		
	Note: Assignment of the actual value configures the display values of the "Save" function in the ATV68SOFT PC software.		
	(1) where p = number of pairs of poles.		
B6.12	Act 1 filt.time	VCB	0.00 ... 0.10 ... 10.00 s
	Filter on B6.11		
B6.13	Aux.-act.val.2	VCB	n-output sig
B6.14	Act 2 filt.time	VCB	0.00 ... 0.10 ... 10.00 s
B6.15	Aux.-act.val.3	VCB	Out.current
B6.16	Act 3 filt.time	VCB	0.00 ... 0.10 ... 10.00 s
B6.17	Aux.-act.val.4	VCB	Torque

ATV68 Configuration

Menu	Name	Access	Default value - range
B6.18	Act 4 filt.time	VCB	0.00 ... 0.10 ... 10.00 s
B6.19	Aux.-act.val.5	VCB	Power
B6.20	Act 5 filt.time	VCB	0.00 ... 0.10 ... 10.00 s
For authorized settings see B6.11			
B6.21	Bit 11 Contr.W	VCB	Not used
0 ... not used			
1 ... 13 not permitted			
14 ...Pre-set A		See table of preset references	
15 ...Pre-set B			
16 ...Pre-set C			
17 ...Manual (Aut)		C1 = Manual reference	
18 ...Local/remote			
19 ...2.ramp			
20 ...User macro 2/1			
21 ...Not permitted			
22 ...External trip			
23 ...EXT-Mot.Trip		As a result, program with E3.02 as well	
24 ...Insulation fault		As a result, program with E2.11 as well	
25 ...Brake fault			
26 ...Not permitted			
27 ...EXT-T limit.			
28 ...PID active			
29 ...PID-enable			
30 ...Speed ctrl.act			
31 ...Brake open			
32 ...Mains ON(OFF)			
33 ...ON lock			
34 ...Force local			
35 ...Paramet-locked			
36 ...FWD (REV.)		In addition to F6.00 1 = Clockwise field	
Parameter B6.21 assigns the digital input commands corresponding to bit 11 of the CMD control word (configured in the master). For details concerning the function of these commands, refer to the ATV68 Programming manual. See "Parameter Group D2".			
B6.22	Bit 12 Contr.W	VCB	Not used
B6.23	Bit 13 Contr.W	VCB	Not used
B6.24	Bit 14 Contr.W	VCB	Not used
B6.25	Bit 15 Contr.W	VCB	Not used
For authorized settings see B6.21			

Menu	Name	Access	Default value - range
B6.26	Bit 11 Stat.-W (ETA)	VCB	DI1
	0 ... not used		
	1 ... Ready		
	2 ... Run		
	3 ... Trip		
	4 ... Ready+Run		
	5 ... Alarm		
	6 ... Generat.oper		
	7 ... Contact ctrl		
	8 ... Local (Remote)		
	9 ... f > f-level		
	10 ...Lift Brake		
	11 ...Output C1		
	12 ...Output C2		
	13 ...Output C3		
	14 ...Output C4		
	15 ...Output L5		
	16 ...Output L6		
	17 ...Thyrist.-ON		
	18 ...DI1 •	Contact closed = "1"	
	19 ...DI2	Contact closed = "1"	
	20 ...DI3	Contact closed = "1"	
	21 ...DI4	Contact closed = "1"	
	22 ...DI6_2	Contact closed = "1"	
	23 ...DI7_2	Contact closed = "1"	
	24 ...DI8_2	Contact closed = "1"	
	25 ...DI5_3	Contact closed = "1"	
	26 ...DI6_3	Contact closed = "1"	
	27 ...DI7_3	Contact closed = "1"	
	28 ...DI8_3	Contact closed = "1"	
	29 ...Manual		
	30 ...User Macro 2		
	31 ...EXT-T limit.		
	32 ...PID active		
	33 ...PID enabled		
	34 ...Speed ctrl.act		

Parameter B6.26 assigns bit 11 of the status word.

For a description of functions, see the Programming manual "Menu D4".

Note: Assignment of bits 11 to 15 of the STATUS word (ETA) configures the display values of the "Save" function in the ATV68SOFT PC software.

B6.27	Bit 12 Stat.-W (ETA)	VCB	DI2
B6.28	Bit 13 Stat.-W (ETA)	VCB	DI3
B6.29	Bit 14 Stat.-W (ETA)	VCB	DI4
B6.30	Bit 15 Stat.-W (ETA)	VCB	DI6_2

For authorized settings for B6.27 to B6.30 see B6.26

D3. Configuration of analogue outputs

The PLC can directly control the drive analogue outputs AO1 and AO2 using control words PZD2 to PZD6, ie. using communication link references 1 to 5.

Menu	Name	Access	Default value - range
D3.00	AO1-selection	VCB	not used
	0-14 see Programming manual		—
	15 Bus Main reference 1		100% = 16#4000
	15 Bus Aux. reference 2		100% = 16#4000
	15 Bus Aux. reference 3		100% = 16#4000
	15 Bus Aux. reference 4		100% = 16#4000
	15 Bus Aux. reference 5		100% = 16#4000
	20-21 see Programming manual		—
D3.04	AO2_2-selection	VCB	not used

Note: For this operating mode, parameters B6.06 to B6.10 (depending on the communication link reference to be used) should be left on the factory setting ("Not used"), thus leaving communication link references 1 to 5 unassigned. Bit 10 of the CMD control word should be set to 1 by the master ("Control by communication link OK") so that the module can take account of the communication link references.

D4. Configuration of logic outputs

The PLC can control the drive logic outputs directly using the free bits (bits 11 to 15) of the CMD control word.

Menu	Name	Access	Default value - range
D4.00	+24 dig.output	VC	+24 V
	0-19 see Programming manual		—
	20 Bus Cont.W 11.		The relay is energized if bit 11 of the CMD control word equals 1
	21 Bus Cont.W 12.		The relay is energized if bit 12 of the CMD control word equals 1
	22 Bus Cont.W 13.		The relay is energized if bit 13 of the CMD control word equals 1
	23 Bus Cont.W 14.		The relay is energized if bit 14 of the CMD control word equals 1
	24 Bus Cont.W 15.		The relay is energized if bit 15 of the CMD control word equals 1
	25-32 see Programming manual		—
D4.01	Relay output 1	VCB	Ready+Run
D4.02	Relay output 2_2	VCB	not used
D4.03	Relay output 3_2	VCB	not used

Note: For this operating mode, parameters B6.21 to B6.25 (depending on the free bit to be used) should be left on the factory setting ("Not used"), thus leaving bits 11 to 15 of the CMD control word unassigned. Bit 10 of the CMD control word should be set to 1 by the master ("Control by communication link OK") so that the module can take account of the references assigned to the free bits.

B6. Diagnostics for the Serial Port

Menu	Name	Access	Default value - range
B6.31	Slave status		Read only
B6.32	Trans. speed		Read only
B6.33	Watchdog status		Read only
B6.34	Com. PPO Type	VCB	Type 2
Parameters B6.31 to B6.34 are not significant in the case of Modbus.			
B6.35	Bus CMD word		Read only
Displays the control word (CMD) transmitted by the master in hexadecimal format.			
B6.36	Bus main ref. 1		Read only
B6.37	Bus aux. ref. 2		Read only
B6.38	Bus aux. ref. 3		Read only
B6.39	Bus aux. ref. 4		Read only
B6.40	Bus aux. ref. 5		Read only
Parameters B6.36 to B6.40 display the references supplied by the ATV68 in hexadecimal format.			
B6.41	Bus STATUS word		Read only
Displays the status word (ETA) generated by the ATV68 in hexadecimal format.			
B6.42	Bus actual val.1		Read only
B6.43	Bus actual val.2		Read only
B6.44	Bus actual val.3		Read only
B6.45	Bus actual val.4		Read only
B6.46	Bus actual val.5		Read only
Parameters B6.42 to B6.46 display the actual values supplied by the ATV68 in hexadecimal format.			
B6.47	STATUS requested		Read only
Displays the CMD control word which is valid internally, generated from CMD control word commands to the bus and from the terminals, if necessary. The position in the ATV68 status chart depends on the internal CMD control word. It is displayed in hexadecimal format.			

B6.48	Active state	Read only
	This parameter indicates the internal drive status conforming to the Profibus status chart. (This parameter is identical to parameter A3.11). For more details, see "Cyclic control and monitoring variable" and "ATV68 status chart".	
	0 ... Not Ready ON	
	1 ... Rdy. switch ON	
	2 ... Charge Bus DC	
	3 ... Ready to run	
	4 ... Oper. release	
	5 ... Ramp enable	
	6 ... Ramp release	
	7 ... Run	
	8 ... Flux.	
	9 ... Rel. brake 1	
	10 ...Crane active	
	11 ...JOG1 active	
	12 ...JOG1 pause	
	13 ...OFF1 active	
	14 ...OFF3 active	
	15 ...Close brake	
	16 ...Fr. DC-brake 1	
	17 ...Fr. DC-brake 2	
	18 ...OFF2 active	
	19 ...Lock switching on	
	20 ...Trip	
	21 ...Auto tune	
	22 ...Power test	
	23 ... Rel. brake 2	
	24 ... Rel. brake 3	
	25 ...Heating motor.	
	26 ...Trip condition 1	
	27 ...Trip condition 2	

ATV68 Diagnostics

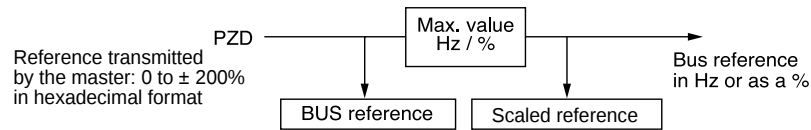
Menu	Name	Access	Default value - range
B6.49	Param. Buffer 1		Read only
B6.50	Param. Buffer 2		Read only
B6.51	Param. Buffer 3		Read only
B6.52	Param. Buffer 4		Read only
B6.53	Param. Buffer 5		Read only
B6.54	Param. Buffer 6		Read only
B6.55	Param. Buffer 7		Read only
B6.56	Config. Buffer 1		Read only
B6.57	Config. Buffer 2		Read only
B6.58	Diag. Buffer 1		Read only
B6.59	Diag. Buffer 2		Read only
B6.60	Diag. Buffer 3		Read only
B6.61	Diag. Buffer 4		Read only
B6.62	Diag. Buffer 5		Read only
B6.63	Diag. Buffer 6		Read only
B6.64	Global Control		Read only

Parameters B6.49 to B6.64 are not significant in the case of Modbus.

A4. Display reference values

Menu	Name	Access	Default value - range
A4.18	Bus Main Reference 1 scaled	Read only	
A4.19	Bus Aux. Reference 2 scaled	Read only	
A4.20	Bus Aux. Reference 3 scaled	Read only	
A4.21	Bus Aux. Reference 4 scaled	Read only	
A4.22	Bus Aux. Reference 5 scaled	Read only	

Parameters A4.18 to A4.22 display the bus references using the standardized value.



Causes of faults (parameter F3.03 / PNU 823)

Fault Number	Fault Text	Fault Number	Fault Text
0	Loss of +24V	35	AR-Flt. 1.0
1	UI-Flt.1.0	36	Power stage
2	UI-Flt.2.0	37	Int.Com3.0
3	UI-Flt.2.1	38	BU Fault
4	UI-Flt.3.0	39	Frequency error
5	UI-Flt.3.1	40	Overcurrent 2
6	UI-Flt.3.2	41	Card temperature
7	UI-Flt.4.0	42	Power supply fault
8	UI-Flt.4.1	43	Not used
9	UI-Flt.4.2	44	Not used
10	AR-Flt. 3.0	45	Not used
11	AR-Flt. 3.1	46	Not used
12	UI-Flt.5.0	47	Temperature of heatsink 2
13	UI-Flt.6.0	48	AR-Flt. 2.0
14	UI-Flt.7.0	49	Temperature of heatsink 1
15	Int.Com1.0	50	Bus comm. 2
16	Int.Com1.1	51	Undervoltage 1
17	Int.Com1.2	52	Undervoltage 2
18	Int.Com1.3	53	Crane overload
19	Int.Com2.0	54	External trip
20	Int.Com1.4	55	External motor trip
21	Com.card-Flt	56	Isolation Fault
22	Bus comm. 1	57	4/20 mA fault
23	AR-Flt. 3.2	58	Thermistor temperature exceeded?
24	Not used	59	PTC short-circuit
25	Not used	60	Motor thermal fault
26	Not used	61	Stall prot
27	Not used	62	Mot. overspeed
28	Not used	63	Encoder fault
29	Not used	64	Braking unit trip
30	Protection disabled	65	Thermal fault on the DC bus charging resistor
31	Not used	66	ON lock
32	Fault log	67	Braking resistor overload
33	Overcurrent 1	68	Process fault
34	Overvoltage	70	Underload

For all additional information on individual errors, see the Programming manual.

Configuration of the Modbus master

Application requirement:

- The master controls a drive located at address "1" and at one of the two ends of a Modbus network with the following characteristics:
 - Communication speed = 19,200 bauds
 - Parity = None
- The master sends:
 - the CMD control word without assignment of the free bits
 - the frequency reference
- The master receives:
 - the ETA status word with default assignments of the free bits
 - the motor frequency
 - the motor current (actual value 2)
 - the motor torque (actual value 3)

Object	Description
W1029	CMD control word
W1030	Main reference 1: Frequency reference
W1031	Aux. reference 2: Not used
W1032	Aux. reference 3: Not used
W1033	Aux. reference 4: Not used
W1034	Aux. reference 5: Not used
W5	ETA status word
W6	Actual value 1: Motor frequency
W7	Actual value 2: Motor current
W8	Actual value 3: Motor torque
W9	Actual value 4: Not used
W10	Actual value 5: Not used

Configuration of the Modbus module for ATV68

The slave address should be set at "1", the communication speed at "19,200 bauds" (factory setting) and the parity at "none" (factory setting).



Switches		Description
1 2 3 4 5 6 7 8	1 2 3 4	
0 0 0 0 0 1 x	x x x x	Module address on the Modbus network = 1.
x x x x x x x 1	0 1 x x	Communication speed on the Modbus RTU network = 19,200 bauds (factory setting).
x x x x x x x x	x x 0 1	No parity on the Modbus network (factory setting).

ATV68 configuration

The following settings should be applied to the drive itself. To apply these settings from the drive terminal keypad, parameter F6.02 must equal 0 (Access mode = via keypad). Settings marked with a large dot '•' do not need to be modified, as these are factory settings:

B6.00	Select bus	= 02 ... R232/Gateway	(19,200 bps)
B6.01	Select remote	= 01 ... Link, Gatew.	Control word (CMD)
B6.06	Main reference 1	= 02 ... Freq.ref.aut	100% = fmax C3.01
B6.07	Aux. reference 2	= 00 ... not used •	—
....			...
B6.10	Aux. reference 5	= 00 ... not used •	—
B6.11	Actual val.1	= 01 ... f- out (signed) •	100% = high speed (C3.01)
B6.13	Aux.-act.val.2	= 03 ... Out.current	100% = nominal motor current (B3.01)
B6.15	Aux.-act.val.3	= 04 ... Torque (signed)	100% = nominal motor torque (B3.00, B3.04)
B6.17	Aux.-act.val.4	= 00 ... not used	output not assigned
B6.19	Aux.-act.val.5	= 00 ... not used	output not assigned
B6.21	Bit 11 Contr.W	= 00 ... not used •	—
....			...
B6.25	Bit 15 Contr.W	= 00 ... not used •	—
B6.26	Bit 11 Stat.-W	= 18 ... DI1 •	Contact closed = "1"
B6.27	Bit 12 Stat.-W	= 19 ... DI2 •	Contact closed = "1"
B6.28	Bit 13 Stat.-W	= 20 ... DI3 •	Contact closed = "1"
B6.29	Bit 14 Stat.-W	= 21 ... DI4 •	Contact closed = "1"
B6.30	Bit 15 Stat.-W	= 22 ... DI6_2 •	Contact closed = "1"

Once these settings have been applied, parameter F6.02 should be set at 2 (Access mode = via RS232) so that the Modbus master can access any parameter via the PKW service.

Address	Drive description	Assigned by
W1029	Bits 0 to 10: CMD control word Bit 11 to 15: Free bits (not assigned)	— B6.21 to B6.25
W1030	Main link reference = Freq.ref.aut	B6.06
W1031	Aux. reference 2 = Not assigned	B6.07
W1032	Aux. reference 3 = Not assigned	B6.08
W1033	Aux. reference 4 = Not assigned	B6.09
W1034	Aux. reference 5 = Not assigned	B6.10
W5	Bit 0 to 10: ETA status word Bit 11: DI1 (default assignment) Bit 12: DI2 (default assignment) Bit 13: DI3 (default assignment) Bit 14: DI4 (default assignment) Bit 15: DI6_2 (default assignment)	— B6.26 B6.27 B6.28 B6.29 B6.30
W6	Main actual value = f- out (signed)	B6.11
W7	Actual value 2 = Out.current	B6.13
W8	Actual value 3 = Torque (signed)	B6.15
W9	Actual value 4 = Not assigned	B6.17
W10	Actual value 5 = Not assigned	B6.19

Exchanges on the bus

Master outputs

- **Control PZD1 (W1029) = CMD control word:** controls the drive according to the PROFIDRIVE standard (see **ATV68 Control and Monitoring** section).
- **Control PZD2 (W1030) = Main link reference = Freq.ref.aut as internal value:** 100% = fmax C3.01, irrespective of the setting of C3.01; main link reference = C3.01, in Hz, if W1030 = 16384 = 16#4000. To determine the numerical value to be applied to the "Freq.ref.aut" reference in PZD2 (W1030), expressed in Hz, use the following equation:

$$W1030 = \frac{16384 \times \text{Desired value (in Hz)}}{C3.01 \text{ (in Hz)}}$$

Example: C3.01 = 50 Hz and you wish to control the motor at 25 Hz. The value to be applied to word W1030 is given by the following equation:

$$W1030 = \frac{16384 \times 25}{50} = 8192 = 16\#2000$$

Master inputs

- **Module status word (W0):** The Modbus master monitors the value of bit 12 (Subnet Status) of word W0 to determine whether the ATV68-module link is working or not (see **ATV68 Control and Monitoring** section). If W0: 12 = 1, this means that the input data located in the module memory are updated periodically. If W0: 12 = 0, the values of the input data should not be taken into account by the Modbus master, since they have not been refreshed.
 - Link active if W0 = 16#1000
 - Link inactive if W0 = 16#0000
- **Monitoring PZD1 (W5) = ETA status word:** Reads the internal drive status according to the PROFIDRIVE standard (see **ATV68 Control and Monitoring** section).
- **Monitoring PZD2 (W6) = Main actual value = f- out (signed) as an internal value:** 100% = high speed (C3.01), irrespective of the setting of C3.01; Main actual value = C3.01, in Hz, if W6 = 16384 = 16#4000. To determine the actual value of the output frequency "f- out (signed)", expressed in Hz, as a function of the numerical value located in PZD2 (W6), use the following equation:

$$\text{Actual value (in Hz)} = \frac{W6 \times C3.01 \text{ (in Hz)}}{16384}$$

Example: C3.01 = 50 Hz and the read value is W6 = 16#2000 = 8192. The actual value of the output frequency "f- out (signed)", read in word W6, is given by the following equation:

$$\text{Actual value (in Hz)} = \frac{8192 \times 50}{16384} = 25 \text{ Hz}$$

Example of Use

- **Monitoring PZD3 (W7) = Actual value 2 = Out.current as an internal value:** 100% = nominal motor current (B3.01), irrespective of the setting of B3.01; Out.current = B3.01, in A, if W7 = 16384 = 16#4000. To determine the actual value of the output current "Out.current", expressed in A, as a function of the numerical value read in W7, use the following equation:

$$\text{Actual value (in A)} = \frac{W7 \times B3.01 \text{ (in A)}}{16384}$$

Example: 110 kW drive, B3.01 = 156.3 A and the read value is W7 = 16#2000 = 8192. The actual value of the output current "Out.current", read in word W7, is given by the following equation:

$$\text{Actual value (in A)} = \frac{8192 \times 156.3}{16384} = 78.15 \text{ A}$$

- **Monitoring PZD4 (W8) = Actual value 3 = Torque (signed) as an internal value:** 100% = nominal motor current Tn; Torque (signed) = 100% if W8 = 16384 = 16#4000. To determine the actual value of the torque "Torque (signed)", expressed as a % of Tn, as a function of the numerical value read in W8, use the following equation:

$$\text{Actual value (as a \% of Tn)} = \frac{W8 \times 100}{16384}$$

Example: The read value is W8 = 16#2000 = 8192. The actual value of the torque "Torque (signed)", read in word W8, is given by the following equation:

$$\text{Actual value (as a \% of Tn)} = \frac{8192 \times 100}{16384} = 50\% \text{ of Tn}$$

List of Parameters

Voltage:	
Reference:	
Serial no:	Code:
Customer/Company:	Supplier/Company:
Delivery date:	Commissioning date:

Parameter adjustments

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
A1 Display									
A 1 00	Configuration/ Settings	971	VB	O2	---	0	1	(0) Begin 0->1	
A 1 01	Device mode 1	100		O2	---	---	---	(5) Stop	
A 1 02	Control mode	891		O2	---	---	---	(0) Remote	
A 1 03	Device mode 2	101		O2	---	---	---	0	
A 1 04	LED state	102		O2	---	---	---	(1) READY	
A2 Display Motor value									
A 2 00	Speed	110		N2	16384.0	---	---	+0 rpm	
A 2 01	Torque	111		N2	Motor m nom. (B3.00/B3.04*60/2/π)	---	---	+0 Nm	
A 2 02	Motor load	112		N2	100.0	---	---	0%	
A 2 03	Motor current	113		N2	Device I nom. (A3.06)	---	---	0.0 A	
A 2 04	Mech. power	114		N2	Motor P nom. (B3.00)	---	---	+0.0 kW	
A 2 05	Apparent power	115		N2	SN (B3.01*B3.02)	---	---	0.0 kVA	
A 2 06	Motor voltage	116		N2	812.81875 (1200.0 at 690 V)	---	---	3 V	
A 2 07	Slip frequency	117		N2	163.84	---	---	0.0 Hz	
A 2 08	Linear speed [v]	118		NF	---	---	---	+0.00 m/min	
A 2 09	Speed of rotation [n]	119		NF	---	---	---	+0.00 rpm	
A 2 10	Process scaling	120	VCB	NF	---	-10,000	+10,000	+1,000	
A 2 11	Process scaling	121	VCB	NF	---	-10,000	+10,000	+1,000	
A3 Display Drive value									
A 3 00	Output freq.	130		N2	163.84	---	---	+0.00 Hz	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
A 3 01	Drive load	131		N2	100.0	---	---	0%	
A 3 02	DC-voltage	132		N2	812.81875 (1200.0 at 690 V)	---	---	604 V	
A 3 03	Heatsink temperature	133		N2	0.01	---	---	+32 ° C	
A 3 04	Switching frequency	134		O2	---	---	---	(0) 2.5 kHz	
A 3 05	Drive reference	802		OS4[4]	---	---	---	ATV68●●●●●	
A 3 06	Nom. drive current 'C'	136		NF	---	---	---	208 A	
A 3 07	Hardware vers.	803		OS4[4]	---	---	---	8844110.01	
A 3 08	Software-type	801		OS4[2]	---	---	---	PSR3_A1	
A 3 09	Software vers.	800		OS4[2]	---	---	---	8782400.04/04	
A 3 10	Serial No.	804		OS4[4]	---	---	---	123456	
A 3 11	Drive ETA status word (ZSW)	135		O2	---	---	---	(1) RdyswitchON	
A4 Display drive references									
A 4 00	AIV 0..10V	140		N2	100.0	---	---	+0.5%	
A 4 01	AIV scaled	141		N2	163.84 (100.0)	---	---	+0.25 Hz	
A 4 02	AIC 0(4)..20mA	142		N2	100.0	---	---	+0.0%	
A 4 03	AIC scaled	143		N2	163.84 (100.0)	---	---	+0.00 Hz	
A 4 04	AI_2 0(4)..20mA	144		N2	100.0	---	---	+0.0%	
A 4 05	AI_2 scaled	145		N2	163.84 (100.0)	---	---	+0.01 Hz	
A 4 06	AI_3 0(4)..20mA	146		N2	100.0	---	---	+0.0%	
A 4 07	AI_3 scaled	147		N2	163.84 (100.0)	---	---	+0.01 Hz	
A 4 08	Preset reference	148		N2	163.84 (100.0)	---	---	+0.00 Hz	
A 4 09	Local reference	149		N2	163.84 (100.0)	---	---	+0.00 Hz	
A 4 10	Remote reference	150		N2	163.84 (100.0)	---	---	+0.01 Hz	
A 4 11	Freq. before ramp	151		N2	163.84	---	---	+0.00 Hz	
A 4 12	Freq. after ramp	152		N2	163.84	---	---	+0.00 Hz	
A 4 13	Max. torque reference	153		N2	100.0	---	---	200.0%	
A 4 14	Digital input X1	160		O2	---	---	---	0	
A 4 15	Digital input X2	161		O2	---	---	---	1	
A 4 16	Digital input X3	162		O2	---	---	---	0	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
A 4 17	BUSCTRL word (STW)	154		V2	---	---	---	0406 hex	
A 4 18	Main reference 1	155		N2	163.84 (100.0)	---	---	+0.00 Hz	
A 4 19	Aux. reference 2	156		N2	163.84 (100.0)	---	---	+0.00 Hz	
A 4 20	Aux. reference 3	157		N2	163.84 (100.0)	---	---	+0.00 Hz	
A 4 21	Aux. reference 4	158		N2	163.84 (100.0)	---	---	+0.00 Hz	
A 4 22	Aux. reference 5	159		N2	163.84 (100.0)	---	---	+0.00 Hz	
A5 Time / kWh									
A 5 00	Motor operating hours	810		NF	---	---	---	0.00 hr	
A 5 01	Drive operating hours	812		NF	---	---	---	0.67 hr	
A 5 02	kWh metre [MWh]	811		NF	---	---	---	0.000 MWh	
A6 Display configuration									
A 6 00	Select zone 1	190	VCB	O2	---	0	19	(0) output freq.	
A 6 01	Select zone 2	191	VCB	O2	---	0	18	(11) Int. f-ref	
A 6 02	Select zone 3	192	VCB	O2	---	0	19	(5) Motor current	
A 6 03	Display Limits	193	VCB	O2	---	0	1	(0) no display	
B1 Choice of language									
B 1 00	Language Selection	850	VCB	O2	---	0	3	(1) English	
B2 Selection of an application macro									
B 2 00	Display macro	864		O2	---	---	---	(0) Conveyor	
B 2 01	Store USER Macro 1	861	VCB	O2	---	0	1	(0) Begin 0->1	
B 2 02	Store USER Macro 2	862	VCB	O2	---	0	1	(0) Begin 0->1	
B 2 03	Selection of the application macro	860	VICB	O2	---	0	11	(0) Conveyor	
B 2 04	Multi configuration/ motor	863	VCB	O2	---	0	2	(0) not active	
B3 Motor data									
B 3 00	Nominal power	10	VICB	NF	---	0.0	2500.0	132.0 kW	
B 3 01	Nominal current	11	VICB	NF	---	0.0	2500.0	239.0 A	
B 3 02	Nominal voltage	12	VICB	NF	---	0	1000	400 V	
B 3 03	Nominal frequency	13	VICB	NF	---	25	300	50 Hz	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
B 3 04	Nominal speed	14	VICB	NF	---	0	18000	1488 rpm	
B 3 05	Line voltage	16	VICB	O2		0	3	(0) 400V; 50/60Hz	
B 3 06	Overmodulation	17	VICB	O2		0	1	(0) not active	
B 3 07	Motor output filter	15	VICB	O2	---	0	1	(0) not used	
B4 Autotuning									
B 4 00	Autotuning	870	VICB	O2	---	0	1	(0) Begin 0->1	
B 4 01	Rotor coefficient	20	VICB	NF	---	0	999999	3611	
B 4 02	Rotor time Const.	21	VICB	NF	---	0.000	4.000	1.246 s	
B 4 03	Stator Resist.	22	VICB	NF	---	0.00	20000.00	15.24 mOhm	
B 4 04	Fluxing current	23	VICB	NF	---	0.0	2500.0	72.7 A	
B 4 05	Autotuning current	24		N2	Inom device (A3.06)	---	---	+0.0 A	
B6 Communication parameter									
B 6 00	Select bus	928	VICB	O2	---	0	2	(0) no bus	
B 6 01	Select remote	701	VICB	O2	---	0	1	(0) terminals	
B 6 02	Address	918	VCB	O2	---	0	126	Not used by the interface (0)	
B 6 03	BUS fault	703	VCB	O2	---	0	3	(0) Alarm	
B 6 04	Delay B6.03	704	VCB	T2	0.1	0.0	3200.0	0.0 s	
B 6 05	ON after OFF1,3	705	VICB	O2	---	0	1	(0) not authorized	
B 6 06	Main reference 1	880	VICB	O2	---	0	6	(0) not used	
B 6 07	Aux. reference 2	881	VICB	O2	---	0	6	(0) not used	
B 6 08	Aux. reference 3	882	VICB	O2	---	0	6	(0) not used	
B 6 09	Aux. reference 4	883	VICB	O2	---	0	6	(0) not used	
B 6 10	Aux. reference 5	884	VICB	O2	---	0	6	(0) not used	
B 6 11	Actual val.1	885	VCB	O2	---	0	19	(1) out.freq.sig	
B 6 12	Act 1 filt.time	709	VCB	T2	0.005	0.00	10.00	0.10 s	
B 6 13	Aux.-act.val.2	886	VCB	O2	---	0	19	(8) n-output sig	
B 6 14	Act 2 filt.time	711	VCB	T2	0.005	0.00	10.00	0.10 s	
B 6 15	Aux.-act.val.3	887	VCB	O2	---	0	19	(3) Output current	
B 6 16	Act 3 filt.time	713	VCB	T2	0.005	0.00	10.00	0.10 s	
B 6 17	Aux.-act.val.4	888	VCB	O2	---	0	19	(4) Torque	
B 6 18	Act 4 filt.time	715	VCB	T2	0.005	0.00	10.00	0.10 s	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
B 6 19	Aux.-act.val.5	889	VCB	O2	---	0	19	(6) Power	
B 6 20	Act 5 filt.time	717	VCB	T2	0.005	0.00	10.00	0.10 s	
B 6 21	Bit 11 Contr.W	933	VCB	O2	---	0	36	(0) not used	
B 6 22	Bit 12 Contr.W	934	VCB	O2	---	0	36	(0) not used	
B 6 23	Bit 13 Contr.W	935	VCB	O2	---	0	36	(0) not used	
B 6 24	Bit 14 Contr.W	936	VCB	O2	---	0	36	(0) not used	
B 6 25	Bit 15 Contr.W	937	VCB	O2	---	0	36	(0) not used	
B 6 26	Bit 11 Stat.-W	939	VCB	O2	---	0	34	(18) DI1	
B 6 27	Bit 12 Stat.-W	940	VCB	O2	---	0	34	(19) DI2	
B 6 28	Bit 13 Stat.-W	941	VCB	O2	---	0	34	(20) DI3	
B 6 29	Bit 14 Stat.-W	942	VCB	O2	---	0	34	(21) DI4	
B 6 30	Bit 15 Stat.-W	943	VCB	O2	---	0	34	(22) DI6_2	
B 6 31	Slave status	728		O2	---	---	---	Not used by the interface (3) ATV68 missing	
B 6 32	Trans. speed	963		O2	---	---	---	Not used by the interface (0) 12 MBaud	
B 6 33	Watchdog status	730	O2		---	---	---	Not used by the interface (0) not connected	
B 6 34	Com. PPO Type	731	VCB	O2	---	0	3	Not used by the interface (1) Type 2	
B 6 35	Contr.W on BUS	967		V2	---	---	---	0000 hex	
B 6 36	Bus main ref. 1	733		O2	---	---	---	0000 hex	
B 6 37	Bus aux. ref. 2	734		O2	---	---	---	0000 hex	
B 6 38	Bus aux. ref. 3	735		O2	---	---	---	0000 hex	
B 6 39	Bus aux. ref. 4	736		O2	---	---	---	0000 hex	
B 6 40	Bus aux. ref. 5	737		O2	---	---	---	0000 hex	
B 6 41	Bus STATUS word	968		V2	---	---	---	0031 hex	
B 6 42	Bus actual val.1	739		O2	---	---	---	0000 hex	
B 6 43	Bus actual val.2	740		O2	---	---	---	0000 hex	
B 6 44	Bus actual val.3	741		O2	---	---	---	0000 hex	
B 6 45	Bus actual val.4	742		O2	---	---	---	0000 hex	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
B 6 46	Bus actual val.5	743		O2	---	---	---	0000 hex	
B 6 47	STATUS requested	760		V2	---	---	---	0406 hex	
B 6 48	Active state	761		O2	---	---	---	(1) Rdy.switchON	
B 6 49	Param. Buffer 1	744		O2	---	---	---	Not used by the interface (0000 hex)	
B 6 50	Param. Buffer 2	745		O2	---	---	---	Same (0000 hex)	
B 6 51	Param. Buffer 3	746		O2	---	---	---	Same (0000 hex)	
B 6 52	Param. Buffer 4	747		O2	---	---	---	Same (0000 hex)	
B 6 53	Param. Buffer 5	748		O2	---	---	---	Same (0000 hex)	
B 6 54	Param. Buffer 6	749		O2	---	---	---	Same (0000 hex)	
B 6 55	Param. Buffer 7	750		O2	---	---	---	Same (0000 hex)	
B 6 56	Config. Buffer 1	751		O2	---	---	---	Same (0000 hex)	
B 6 57	Config. Buffer 2	752		O2	---	---	---	Same (0000 hex)	
B 6 58	Diag. Buffer 1	753		O2	---	---	---	Same (0000 hex)	
B 6 59	Diag. Buffer 2	754		O2	---	---	---	Same (0000 hex)	
B 6 60	Diag. Buffer 3	755		O2	---	---	---	Same (0000 hex)	
B 6 61	Diag. Buffer 4	756		O2	---	---	---	Same (0000 hex)	
B 6 62	Diag. Buffer 5	757		O2	---	---	---	Same (0000 hex)	
B 6 63	Diag. Buffer 6	758		O2	---	---	---	Same (0000 hex)	
B 6 64	Global Control	759		O2	---	---	---	Same (0000 hex)	
C1 General functions									
C 1 00	Inc.start Tor.	300	VCB	N2	100.0	0	30	1%	
C 1 01	Inc.steady Tor.	301	VCB	N2	163.84	5	45	10 Hz	
C 1 02	Stop mode	302	VCB	O2	---	0	2	(1) Decel. ramp	
C 1 03	Braking mode	316	VICB	O2	---	0	4	(0) no brake oper.	
C 1 04	Preset.ref.	303	VICB	O2	---	0	5	(0) not used	
C 1 05	Preset.ref. 1	304	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.00 Hz	
C 1 06	Preset.ref. 2	305	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.00 Hz	
C 1 07	Preset.ref. 3	306	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.00 Hz	
C 1 08	Preset.ref. 4	307	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.00 Hz	
C 1 09	Preset.ref. 5	308	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.00 Hz	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
C 1 10	Preset.ref. 6	309	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.00 Hz	
C 1 11	Preset.ref. 7	310	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.00 Hz	
C 1 12	Preset.ref. 8	311	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.00 Hz	
C 1 13	Jog-Frequency	312	VCB	N2	163.84	-10.00	+10.00	+0.00 Hz	
C 1 14	Economy mode	313	VCB	O2	---	0	4	(0) not active	
C2 Ramps									
C 2 00	Accel. ramp 1	320	VCB	T2	0.1	0.0	3200.0	5.0 s	
C 2 01	Decel. ramp 1	321	VCB	T2	0.1	0.0	3200.0	5.0 s	
C 2 02	Accel. ramp 2	322	VCB	T2	0.1	0.0	3200.0	20.1 s	
C 2 03	Decel. ramp 2	323	VCB	T2	0.1	0.0	3200.0	20.1 s	
C 2 04	S-ramp	324	VCB	O2	---	0	3	(0) no S ramp	
C 2 05	S-ramp mode	325	VCB	O2	---	0	1	(0) Begin + End	
C3 Speed range									
C 3 00	Min. frequency	330	VCB	N2	163.84	0.00	300.00	0.00 Hz	
C 3 01	Max. frequency	331	VCB	N2	163.84	25.00	300.00	50.00 Hz	
C 3 02	Dir. Enable	332	VICB	O2	---	0	2	(2) FW/RV active	
C4 PID configuration									
C 4 04	PID enable	344	VICB	O2	---	0	1	(0) no	
C 4 05	Prop. gain (kp)	345	VCB	N2	1600.0	0.0	3199.9	0.0%	
C 4 06	Integ.time (Tn)	346	VCB	T2	0.01	0.00	320.00	0.00 s	
C 4 07	Deriv.time (Tv)	347	VCB	T2	0.01	0.00	320.00	0.00 s	
C 4 08	Ref. acc. ramp	348	VCB	T2	0.1	0.0	3200.0	0.0 s	
C 4 09	Ref. dec. ramp	349	VCB	T2	0.1	0.0	3200.0	0.0 s	
C 4 10	Out. scaling -	351	VCB	N2	163.84	-300.00	+300.00	0.00 Hz	
C 4 11	Out. scaling +	352	VCB	N2	163.84	-300.00	+300.00	0.00 Hz	
C6 Special functions									
C 6 00	Contact. cont.	380	VICB	O2	---	0	1	(0) not active	
C 6 01	Crane-function	381	VICB	O2	---	0	2	(0) not active	
C 6 02	Release freq.	382	VCB	N2	163.84	0.0	20.0	1.7 Hz	
C 6 03	Release time	386	VCB	T2	0.005	0.0	160.0	0.3 s	
C 6 04	Engage freq.	387	VCB	N2	163.84	0.0	20.0	1.5 Hz	
C 6 05	Engage time	388	VCB	T2	0.005	0.0	160.0	0.3 s	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
C 6 06	DC braking time	383	VCB	T2	0.005	0.0	160.0	0.3 s	
C 6 07	DC braking curr	384	VCB	N2	100.0	0	150	100%	
C 6 08	Restart delay	389	VCB	T2	0.005	0.0	10.0	0.7 s	
C 6 09	Hoist mode	390	VCB	O2	---	0	1	(0) no	
C 6 10	Max (n)error.	385	VCB	N2	16384.0	0	300	5	
D1 Analogue inputs									
D 1 00	AIV-selection	400	VICB	O2	---	0	6	(0) not used	
D 1 01	AIV-value 0%	401	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.01 Hz	
D 1 02	AIV-value 100%	402	VCB	N2	163.84 (100.0)	-327.68	+327.67	+50.01 Hz	
D 1 03	AIV-filter time	403	VCB	T2	0.005	0.00	10.00	0.05 s	
D 1 04	AIC-selection	404	VICB	O2	---	0	6	(2) Freq.ref.aut	
D 1 05	AIC-level	405	VCB	O2	---	0	1	(1) 4-20mA	
D 1 06	AIC-value 0%	406	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.00 Hz	
D 1 07	AIC-value 100%	407	VCB	N2	163.84 (100.0)	-327.68	+327.67	+50.00 Hz	
D 1 08	AIC-filter time	408	VCB	T2	0.005	0.00	10.00	0.05 s	
D 1 09	AI_2-selection	409	VICB	O2	---	0	6	(0) not used	
D 1 10	AI_2-level	410	VCB	O2	---	0	1	(0) 0-20mA	
D 1 11	AI_2-value 0%	411	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.01 Hz	
D 1 12	AI_2-value 100%	412	VCB	N2	163.84 (100.0)	-327.68	+327.67	+50.01 Hz	
D 1 13	AI_2-filter time	413	VCB	T2	0.005	0.00	10.00	0.05 s	
D 1 14	AI_3-selection	414	VICB	O2	---	0	6	(0) not used	
D 1 15	AI_3-level	415	VCB	O2	---	0	1	(0) 0-20mA	
D 1 16	AI_3-value 0%	416	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.01 Hz	
D 1 17	AI_3-value 100%	417	VCB	N2	163.84 (100.0)	-327.68	+327.67	+50.01 Hz	
D 1 18	AI_3-filter time	418	VCB	T2	0.005	0.00	10.00	0.05 s	
D2 Logic inputs									
D 2 00	DI1-selection	441	VICB	O2	---	0	35	(1) Begin FWD	
D 2 01	DI2-selection	442	VICB	O2	---	0	35	(2) Begin REV	
D 2 02	DI3-selection	443	VICB	O2	---	0	35	(19) 2 nd ramp	
D 2 03	DI4-selection	444	VICB	O2	---	0	35	(26) EXT reinitial.	
D 2 04	DI6_2-selection	445	VICB	O2	---	0	35	(0) not used	
D 2 05	DI7_2-selection	446	VICB	O2	---	0	35	(0) not used	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
D 2 06	DI8_2-selection	447	VICB	O2	---	0	35	(0) not used	
D 2 07	DI5_3-selection	448	VICB	O2	---	0	35	(0) not used	
D 2 08	DI6_3-selection	449	VICB	O2	---	0	35	(0) not used	
D 2 09	DI7_3-selection	465	VICB	O2	---	0	35	(0) not used	
D 2 10	DI8_3-selection	466	VICB	O2	---	0	35	(0) not used	
D3 Analogue outputs									
D 3 00	AO1-selection	215	VCB	O2	---	0	21	(2) out.freq.sig mssg	
D 3 01	AO1_level	451	VCB	O2	---	0	1	(1) 4-20mA	
D 3 02	AO1-min. value	452	VCB	N2	100.0	-200	+200	+0%	
D 3 03	AO1-max. value	453	VCB	N2	100.0	-200	+200	+100%	
D 3 04	AO2_2-selection	216	VCB	O2	---	0	21	(0) not used	
D 3 05	AO2_2-level	455	VCB	O2	---	0	1	(1) 4-20mA	
D 3 06	AO2_2-min.value	456	VCB	N2	100.0	-200	+200	+0%	
D 3 07	AO2_2-max.value	457	VCB	N2	100.0	-200	+200	+100%	
D 3 08	AO2_3-selection	217	VCB	O2	---	0	21	(0) not used	
D 3 09	AO2_3-level	459	VCB	O2	---	0	1	(1) 4-20mA	
D 3 10	AO2_3-min.value	460	VCB	N2	100.0	-200	+200	+0%	
D 3 11	AO2_3-max.value	461	VCB	N2	100.0	-200	+200	+100%	
D4 Logic outputs									
D 4 00	+24 dig.output	200	VCB	O2	---	0	31	(25) ON (+24V)	
D 4 01	Output relay 1	201	VCB	O2	---	0	31	(4) Ready + Run	
D 4 02	Output relay 2_2	202	VCB	O2	---	0	31	(0) not used	
D 4 03	Output relay 3_2	203	VCB	O2	---	0	31	(0) not used	
D 4 04	Output relay 2_3	204	VCB	O2	---	0	31	(0) not used	
D 4 05	Output relay 3_3	205	VCB	O2	---	0	31	(0) not used	
D 4 06	f-Level ON	476	VCB	N2	163.84	0.00	300.00	5.01 Hz	
D 4 07	f-Level OFF	477	VCB	N2	163.84	0.00	300.00	2.01 Hz	
D 4 08	Hyst. f =f-ref	478	VCB	N2	163.84	0.1	10.0	0.5 Hz	
D5 Encoder configuration									
D 5 00	Encoder/Slipcom	570	VICB	O2	---	0	2	(0) no encoder	
D 5 01	Dyn. SlipCompens	581	VCB	O2	---	0	2	(0) low	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
D 5 02	Speed ctrl.act	571	VICB	O2	---	0	2	(0) not active	
D 5 03	Pulse/rotation	572	VICB	N2	16384.0	-10000	+10000	+1024	
D 5 04	Speed ctrl. Kp	573	VCB	N2	1638.4	0.0	200.0	0.0	
D 5 05	Speed ctrl. Tn	574	VCB	T2	0.005	0.00	10.00	0.00 s	
D 5 06	Speed ctrl.Stat	575	VCB	N2	1638.4	0.0	20.0	0.0%	
D 5 07	ActVal.PT1 time	576	VCB	T2	0.005	0.00	10.00	0.00 s	
D 5 08	ActVal.DT1 time	577	VCB	T2	0.005	0.00	1.00	0.00 s	
D 5 09	SetVal.PT1 time	578	VCB	T2	0.005	0.00	10.00	0.00 s	
D 5 10	Ref-Val.offer.D	579	VCB	N2	1638.4	0.0	10.0	0.0	
D 5 11	R-Val.offer.PT1	580	VCB	T2	0.005	0.00	1.00	0.00 s	
D6 Electronic potentiometer									
D 6 00	Loc.MP select.	480	VICB	O2	---	0	1	(0) Ref. freq.	
D 6 01	Loc.MP min. val.	481	VCB	N2	163.84 (100.0)	+0.00	+327.67	+0.00 Hz	
D 6 02	Loc.MP max. val.	482	VCB	N2	163.84 (100.0)	+0.00	+327.67	+50.00 Hz	
D 6 03	Loc.MP acc.time	483	VCB	T2	0.1	0.0	3200.0	10.0 s	
D 6 04	Loc.MP dec.time	484	VCB	T2	0.1	0.0	3200.0	10.0 s	
D 6 05	Loc.ref.storage	485	VCB	O2	---	0	1	(0) not active	
D 6 06	Rem.MP select.	486	VICB	O2	---	0	5	(0) not used	
D 6 07	Rem.MP min.val.	487	VCB	N2	163.84 (100.0)	-327.68	+327.67	+0.01 Hz	
D 6 08	Rem.MP max.val.	488	VCB	N2	163.84 (100.0)	-327.68	+327.67	+50.01 Hz	
D 6 09	Rem.MP acc.time	489	VCB	T2	0.1	0.0	3200.0	10.0 s	
D 6 10	Rem.MP dec.time	490	VCB	T2	0.1	0.0	3200.0	10.0 s	
D 6 11	Rem.MP control	492	VCB	O2	---	0	1	(1) terminals	
D 6 12	Rem.ref.storage	491	VCB	O2	---	0	1	(0) not active	
E1 Drive overload									
E 1 00	Curr. max.val	500	VCB	N2	100.0	10	150	150%	
E 1 01	Torque max.val.	501	VCB	N2	100.0	10	200	200%	
E2 Motor protection									
E 2 00	Thermistor input	522	VCB	O2	---	0	3	(0) not active	
E 2 01	Thermist.protec	511	VCB	O2	---	0	1	(0) trip	
E 2 02	I max at 0 Hz	512	VCB	N2	100.0	0	150	50%	
E 2 03	I max at f nom.	513	VCB	N2	100.0	30	150	100%	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
E 2 04	Therm.f-limit	514	VCB	N2	163.84	0	300	30 Hz	
E 2 05	Motor-tme const	515	VCB	T2	0.1067 (6.4s/60)	0	3200	5 min	
E 2 06	Stalling time	516	VCB	T2	0.1	0	160	60 s	
E 2 07	Stalling frequ.	517	VCB	N2	163.84	0	20	5 Hz	
E 2 08	Stalling curr.	518	VCB	N2	100.0	0	150	80%	
E 2 09	n. Prot.	519	VCB	O2	---	0	2	(1) trip	
E 2 10	N max motor	520	VCB	N2	16384.0	200	18000	3200 rpm	
E 2 11	EXT-mot.trip	523	VCB	O2	---	0	6	(0) not active	
E 2 12	M Delay f.	524	VCB	T2	0.005	0.0	160.0	1.0 s	
E3 Fault configuration									
E 3 00	Autorestart	530	VCB	O2	---	0	1	(0) not active	
E 3 01	Loss of 4-20mA	531	VCB	O2	---	0	3	(0) not active	
E 3 02	External trip	536	VCB	O2	---	0	6	(0) not active	
E 3 03	Delay f.	537	VCB	T2	0.005	0.0	160.0	0.0 s	
E 3 04	Insulation Fault	538	VCB	O2	---	0	6	(0) not active	
E 3 05	Insul. Delay f.	539	VCB	T2	0.005	0.0	160.0	10.0 s	
E 3 06	Trip of ext. BU	525	VCB	O2	---	0	6	(2) N.O.rdy+run	
E 3 07	Brake delay f.	526	VCB	T2	0.005	0.0	160.0	5.0 s	
E 3 08	Undervoltage	534	VCB	O2	---	0	2	(0) no trip	
E 3 09	Undervoltge delay	544	VCB	T2	0.005	0.0	20.0	2.0 s	
E 3 10	Local reset	535	VCB	O2	---	0	1	(1) active	
E4 Control configuration									
E 4 00	Loc/Rem ref.	540	VICB	O2	---	0	2	(0) Local/ remote	
E 4 01	Operate-Mode	541	VICB	O2	---	0	2	(0) Local/ remote	
E 4 02	Loc/Rem-switch	543	VICB	O2	---	0	1	(0) keypad	
E 4 03	Ctrl.mode local	545	VICB	O2	---	0	1	(0) keypad	
E 4 04	Local STOP	542	VCB	O2	---	0	1	(0) Loc. feedback only	
E5 Skip frequency									
E 5 00	Skip frequency	550	VCB	N2	163.84	5.00	300.00	5.00 Hz	
E 5 01	Hysteresis	551	VCB	N2	163.84	0.00	4.00	0.00 Hz	
E6 Switching frequency									

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
E 6 00	Min.pulse freq.	560	VCB	O2	---	0	2 (1)	(0) 2.5 kHz	
E 6 01	Max.switch.freq	561	VCB	O2	---	0	2 (1)	(0) 2.5 kHz	
F1 Contextual help on a fault									
F 1 00	Test power part	871	VICB	O2	---	0	1	(0) Begin 0->1	
F 1 01	Test-cont.part	872	VICB	O2	---	0	1	(0) Begin 0->1	
F 1 02	DC Bus Overvoltage	602		O2	---	0	4	(0) text	
F 1 03	DC Bus Undervoltage	603		O2	---	0	3	(0) text	
F 1 04	Overcurrent	604		O2	---	0	3	(0) text	
F 1 05	External trip	605		O2	---	0	3	(0) text	
F 1 06	4mA trip	606		O2	---	0	1	(0) text	
F 1 07	Motor Temp. (Thermistor)>>	607		O2	---	0	3	(0) text	
F 1 08	PTC short-circuit	608		O2	---	0	2	(0) text	
F 1 09	External motor fault	609		O2	---	0	2	(0) text	
F 1 10	Motor thermal fault	610		O2	---	0	3	(0) text	
F 1 11	Shaft stall	611		O2	---	0	3	(0) text	
F 1 12	Insulation fault	623		O2	---	0	2	(0) text	
F 1 13	Braking unit trip	627		O2	---	0	2	(0) text	
F 1 14	Overspeed	612		O2	---	0	1	(0) text	
F 1 15	Encoder fault	624		O2	---	0	2	(0) text	
F 1 16	Heatsink overheating	613		O2	---	0	3	(0) text	
F 1 17	T° C. card>>	614		O2	---	0	1	(0) text	
F 1 18	Power stage	615		O2	---	0	2	(0) text	
F 1 19	Fault on daughter board	616		O2	---	0	2	(0) text	
F 1 20	Internal fault	617		O2	---	0	2	(0) text	
F 1 21	Fault on control card	618		O2	---	0	0	(0) text	
F 1 22	Crane overload	619		O2	---	0	2	(0) text	
F 1 23	Bus comm. 1	620		O2	---	0	3	(0) text	
F 1 24	Bus comm. 2	621		O2	---	0	2	(0) text	
F 1 25	Communication option fault	622		O2	---	0	2	(0) text	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
F 1 26	T° fault on the DC bus charging resistor	629		O2	---	0	2	(0) text	
F 1 27	ON lock	628		O2	---	0	4	(0) text	
F 1 28	Loss of 24V	625		O2	---	0	2	(0) text	
F 1 29	Fault log	626		O2	---	0	2	(0) text	
F2 Factory settings									
F 2 00	Ret.fact.appli.	630	VICB	O2	---	0	1	(0) Begin 0->1	
F 2 01	Ret.fact.motor	631	VICB	O2	---	0	1	(0) Begin 0->1	
F3 Fault log									
F 3 00	Fault code	952		N2	16384.0	---	---	5	
F 3 01	Review	821	VB	O2	---	0	15	(0) last event	
F 3 02	Trip number	822		N2	16384.0	---	---	4	
F 3 03	Fault	823		O2	---	---	---	(58) Mot.temp >	
F 3 04	Operat.hours FI A	824		NF	---	---	---	380.09 hr	
F 3 05	F-out	825		N2	163.84	---	---	+42.00 Hz	
F 3 06	Speed	835		N2	16384.0	---	---	+1258 rpm	
F 3 07	Motor current	826		N2	Inom device (A3.06)	---	---	88 A	
F 3 08	DC-voltage	827		N2	812.81875 (1200.0 at 690 V)	---	---	615 V	
F 3 09	Heatsink Temp.	828		N2	0.01	---	---	+58 ° C	
F 3 10	Freq. after ramp	829		N2	163.84	---	---	+42.00 Hz	
F 3 11	Operate-Mode	830		O2	---	---	---	(0) remote	
F 3 12	Drive status (ETA)	831		O2	---	---	---	(7) run	
F 3 13	Drive cont.word (CMD)	832		V2	---	---	---	047F hex	
F 3 14	Drive status	833		O2	---	---	---	(1) n=n ref.	
F 3 15	Daughter card central card	834		V2	---	---	---	0000 hex	
F4 Function blocks									
F 4 00	C1 signal E1	680	VCB	O2	---	0	19	(0) 0.0%	
F 4 01	C1 filter f. E1	681	VCB	T2	0.005	0.0	160.0	0.1 s	
F 4 02	C1 Reference	682	VCB	N2	100.0	-200.0	+200.0	+0.0%	
F 4 03	C1 compFunction	683	VCB	O2	---	0	3	(0) E1 > E2	
F 4 04	C1 comHyst/ Band	684	VCB	N2	100.0	+0.0	+100.0	+5.0%	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
F 4 05	C1 time-funct	685	VCB	O2	---	0	3	(0) delay ON	
F 4 06	C1 time-set	686	VCB	T2	0.1	0.0	3200.0	0.0 s	
F 4 07	C1 selection	687	VICB	O2	---	0	33	(0) not used	
F 4 08	C2 signal E1	688	VCB	O2	---	0	19	(0) 0.0%	
F 4 09	C2 filter f. E1	689	VCB	T2	0.005	0.0	160.0	0.1 s	
F 4 10	C2 Reference	690	VCB	N2	100.0	-200.0	+200.0	+0.0%	
F 4 11	C2 compFunction	691	VCB	O2	---	0	3	(0) E1 > E2	
F 4 12	C2 comHyst/Band	692	VCB	N2	100.0	+0.0	+100.0	+5.0%	
F 4 13	C2 time-funct	693	VCB	O2	---	0	3	(0) delay ON	
F 4 14	C2 time-set	694	VCB	T2	0.1	0.0	3200.0	0.0 s	
F 4 15	C2 selection	695	VICB	O2	---	0	33	(0) not used	
F 4 16	C3 signal E1	640	VCB	O2	---	0	19	(0) 0.0%	
F 4 17	C3 filter f. E1	662	VCB	T2	0.005	0.0	160.0	0.1 s	
F 4 18	C3 signal E2	641	VCB	O2	---	0	6	(0) reference	
F 4 19	C3 filter f. E2	667	VCB	T2	0.005	0.0	160.0	0.1 s	
F 4 20	C3 Reference	642	VCB	N2	100.0	-200.0	+200.0	+0.0%	
F 4 21	C3 compFunction	643	VCB	O2	---	0	3	(0) E1 > E2	
F 4 22	C3 comHyst/Band	644	VCB	N2	100.0	+0.0	+100.0	+5.0%	
F 4 23	C3 signal D1	210	VCB	O2	---	0	45	(0) logical ZERO	
F 4 24	C3 signal D2	211	VCB	O2	---	0	45	(0) logical ZERO	
F 4 25	C3 log.'a'funct	647	VCB	O2	---	0	7	(1) OR	
F 4 26	C3 log.'b'funct	648	VCB	O2	---	0	7	(1) OR	
F 4 27	C3 time-funct	649	VCB	O2	---	0	3	(0) Delay ON	
F 4 28	C3 time-set	650	VCB	T2	0.1	0.0	3200.0	0.0 s	
F 4 29	C3 selection	668	VICB	O2	---	0	33	(0) not used	
F 4 30	C4 signal E1	651	VCB	O2	---	0	19	(0) 0.0%	
F 4 31	C4 filter f. E1	669	VCB	T2	0.005	0.0	160.0	0.1 s	
F 4 32	C4 signal E2	652	VCB	O2	---	0	6	(0) reference	
F 4 33	C4 filter f. E2	676	VCB	T2	0.005	0.0	160.0	0.1 s	
F 4 34	C4 Reference	653	VCB	N2	100.0	-200.0	+200.0	+0.0%	
F 4 35	C4 compFunction	654	VCB	O2	---	0	3	(0) E2 > E2	
F 4 36	C4 comHyst/Band	655	VCB	N2	100.0	0.0	100.0	5.0%	
F 4 37	C4 signal D1	212	VCB	O2	---	0	45	(0) logical ZERO	
F 4 38	C4 signal D2	213	VCB	O2	---	0	45	(0) logical ZERO	
F 4 39	C4 log.'a'funct	658	VCB	O2	---	0	7	(1) OR	

List of Parameters

Para. No.	Description	PNU	Code	Type D	Standardization	Min.	Max.	Trip	Value
F 4 40	C4 log.'b'funct	659	VCB	O2	---	0	7	(1) OR	
F 4 41	C4 time-funct	660	VCB	O2	---	0	3	(0) Delay ON	
F 4 42	C4 time-set	661	VCB	T2	0.1	0.0	3200.0	0.0 s	
F 4 43	C4 selection	677	VICB	O2	---	0	33	(0) not used	
F 4 44	L5 signal D1	585	VCB	O2	---	0	45	(0) logical ZERO	
F 4 45	L5 signal D2	586	VCB	O2	---	0	45	(0) logical ZERO	
F 4 46	L5 logic funct.	587	VCB	O2	---	0	7	(1) OR	
F 4 47	L5 time-funct	588	VCB	O2	---	0	3	(0) Delay ON	
F 4 48	L5 time-set	589	VCB	T2	0.1	0.0	3200.0	0.0 s	
F 4 49	L5 selection	590	VICB	O2	---	0	33	(0) not used	
F 4 50	L6 signal D1	591	VCB	O2	---	0	45	(0) logical ZERO	
F 4 51	L6 signal D2	592	VCB	O2	---	0	45	(0) logical ZERO	
F 4 52	L6 logic funct.	593	VCB	O2	---	0	7	(1) OR	
F 4 53	L6 time-funct	594	VCB	O2	---	0	3	(0) Delay ON	
F 4 54	L6 time-set	595	VCB	T2	0.1	0.0	3200.0	0.0 s	
F 4 55	L6 selection	596	VICB	O2	---	0	33	(0) not used	
F5									
F 5 02	SensA5kHz-Off.	672	VCB	N2	16384.0	-100	+1000	+0	
F 5 03	SensB5kHz-Off.	673	VCB	N2	16384.0	-1000	+1000	+0	
F 5 04	SensA10kHz-Off.	674	VCB	N2	16384.0	-1000	+1000	+0	
F 5 05	SensB10kHz-Off.	675	VCB	N2	16384.0	-1000	+1000	+0	
F6 Code									
F 6 00	Code	855	VB	N2	16384.0	0	9999	0	
F 6 01	Code value	856	VB	N2	16384.0	0	9999	0	
F 6 02	Paramet.-Access	927	V	O2	---	0	2	(0) keypad	

Caution: The following parameters only have a PNU number.

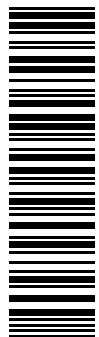
Reference and feedback parameters									
	Communication link reference	915		O2[6]	---	---	---	[...]	
	Communication link value	916		O2[6]	---	---	---	[...]	
	Freq.ref.man	790		N2	f_max(C3.01)/100.0	---	---	...	
	Freq.ref.aut	791		N2	f_max(C3.01)/100.0	---	---	...	
	F-ref correction	792		N2	f_max(C3.01)/100.0	---	---	...	

List of Parameters

Reference and feedback parameters									
	Torque limit ref.	793		N2	100.0	---	---	...	
	Output freq.	794		N2	f_max(C3.01)/100.0	---	---	...	
	Motor current	795		N2	Inom-Motor (B3.01)	---	---	...	
	Motor voltage	796		N2	Unom-Motor (B3.02)	---	---	...	
	Speed	797		N2	f_max(C3.01)/100.0 *60.0/ppz	---	---	...	
	Ref. val before ramp	798		N2	f_max(C3.01)/100.0	---	---	...	
	Ref. val after ramp	799	N2	100.0	---	---	...		
PC setup software: ATV68SOFT									
	ATV68SOFT LOCAL	890	V	O2	---	0	2	Not active	
	ATV68SOFT CMD	892		V2	---	---	---	...	
	ATV68SOFT local frequency reference	893		N2	f_max(C3.01)/100	---	---	...	
	ATV68SOFT local torque reference	894		N2	100.0	---	---	...	
	PZD watchdog	895	VCB	T2	0.005	1.00	160.00	10.0 s	
	PKW watchdog	896	VCB	T2	0.005	1.00	160.00	10.0 s	
Parameters for memory loss									
	PNU fault log	820		O2[116]	---				
	Factory Anomaly	970		O2	---				
List of existing and modified parameters									
	PNU existing Part 1	980		O2[116]	---	---	---	[...]	
	PNU existing Part 2	981		O2[116]	---	---	---	[...]	
	PNU existing Part 3	982		O2[116]	---	---	---	[...]	
	PNU existing Part 4	983		O2[116]	---	---	---	[...]	
	PNU existing Part 5	984		O2[116]	---	---	---	[...]	
	PNU existing Part 6	985		O2[116]	---	---	---	[...]	
	PNU modified Part 1	990		O2[116]	---	---	---	[...]	
	PNU modified Part 2	991		O2[116]	---	---	---	[...]	
	PNU modified Part 3	992		O2[116]	---	---	---	[...]	
	PNU modified Part 4	993		O2[116]	---	---	---	[...]	
	PNU modified Part 5	994		O2[116]	---	---	---	[...]	
	PNU modified Part 6	995		O2[116]	---	---	---	[...]	

VVDED301064

29820



0 01 62378 71101 5

W9 1623787 01 11 A01

2002-07