ALTIVAR ® 66

PCMCIA communication card
UNI-TELWAY, MODBUS/JBUS
protocols

VW3-A66301

Serial link via graphic keypad port

User's manual

Telemecanique
GROUPE SCHNEIDER

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Introduction

The communication card reference **VW3-A66301** is designed for use with Altivar 66 speed controllers fitted with VW3-A66205, VW3-A66201Q or VW3-A66202Q communication interfaces.

It is designed to integrate these power switching components into modern control system architectures by enabling them to be connected to a multidrop industrial bus.

Data exchanges enable all functions of the Altivar 66 to be used :

• function configuration,
• remote downloading of settings,
• control and supervision,
• monitoring,
• diagnostics.

The **VW3-A66301** communication card, in extended type 3 PCMCIA format, has a 3 m connection cable fitted with a 15-pin SUB-D connector.

This card manages the following communication protocols :

• UNI-TELWAY,
• MODBUS, RTU / JBUS,
• MODBUS ASCII.

Note : PCMCIA : Personal Computer Memory Card International Association

For optimum use of this manual, we recommend that you read the section entitled "Communication principle". In addition, use the index at the end of this manual to help you find Altivar 66 parameters.

Hardware setup

Installing the card

• **Receipt** :
Ensure that the card reference printed on the label is the same as that on the delivery note corresponding to the delivery advice.
Remove the packaging and check that the communication option card has not been damaged in transit.

• **Installing the card in the speed controller** :
Before starting work on the controller, disconnect the power supply and wait for the capacitors to discharge (around 1 minute after switching off).

Red LED indicating presence of voltage on DC bus

Captive screws

Before mounting, remove the cover from the J10 connector on the control card

The example opposite is a **VW3-A66205** card
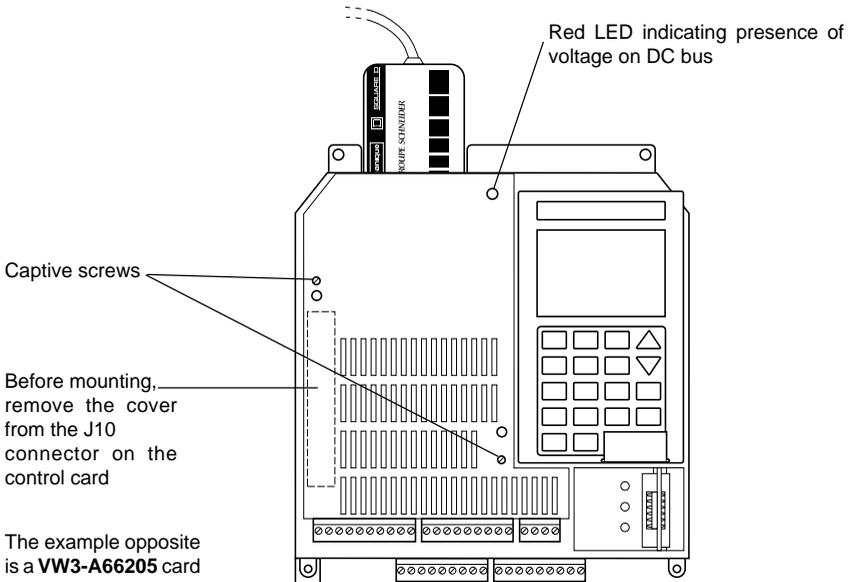
• **Mounting precautions** :
To access the slot for mounting the extension card, unlock the protective cover and pivot it from right to left.
Check that there is no voltage on the DC bus : red LED off.
Remove the IP20 protective cover from the J10 connector on the control card.
Mount the option card on the control card by plugging it into the J10 terminal block, press on both sides of the J10 connector with your fingers to plug it in securely, and fix it using the two captive screws.

Hardware setup

Installing the card

Once the communication interface **(VW3-A66205**, **VW3-A66201Q** or **VW3-A66202Q)** has been mounted in the speed controller :

• Insert the **VW3-A66301** communication card into its slot so that the 3-meter connection cable is pointing to the left outside the speed controller.
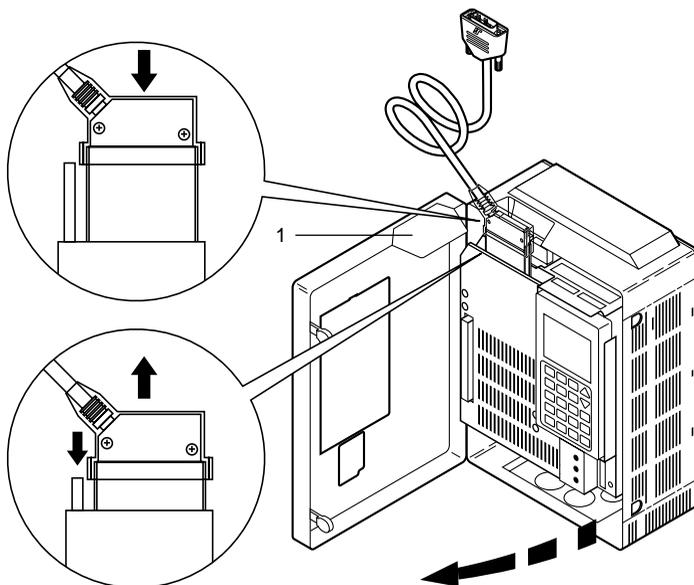
Note : For ratings of ATV66-U41N4 to D12N4 / ATV66-U41M2 to U90M2 break off the precut (1) tab.

Hardware setup

Connection to multidrop bus

SUB-D connector pin configuration

The transmission interface is electrically isolated from the speed controller in accordance with the RS 485 and RS 422 (RS 232 C compatible) standards. It is available on a 15-pin SUB-D connector.
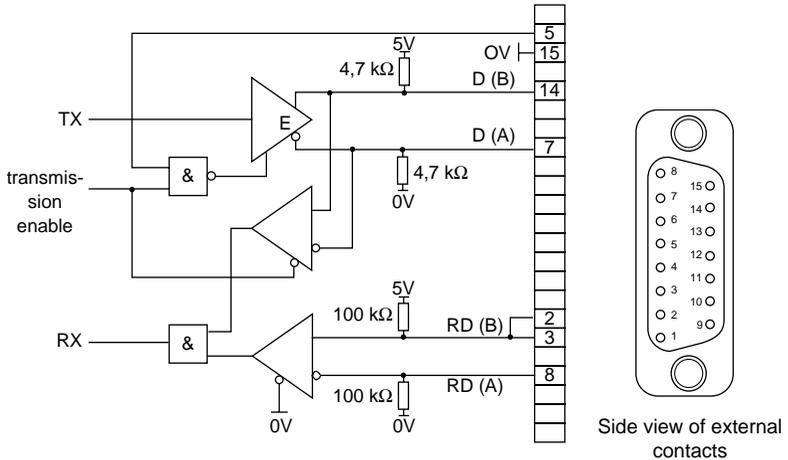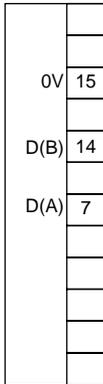
Side view of external contacts

Connection to standard RS 485 bus

Pins to be used

Recommendations

- use a shielded cable with 2 pairs of twisted conductors,
- connect the reference potentials to each other,
- maximum length of line : 1000 meters,
- maximum length of drop cable : 20 meters,
- do not connect more than 28 stations to one bus,
- cable routing : keep the bus away from the power cables (at least 30 cm) with any crossovers at right angles, and connect the cable shielding to the ground of each device,
- fit a line terminator at both ends of the line.
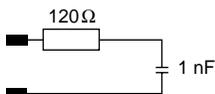
Zt line terminator recommended at both ends of the line

Hardware setup

Connection to multidrop bus

Various accessories are available to facilitate connection of equipment.

– Cables for **TSX-CSA…** bus sold in lengths of 100, 200 or 500 m.

– **TSX-SCA62** subscriber connector

This passive unit consists of a printed circuit fitted with screw terminal blocks and enables two devices to be connected to the bus. It includes an end of line terminator when the connector is at the end. The switches in the socket must be positioned in the following manner :

switch number	switch position
2	OFF
3	OFF
5	OFF

the position of the other switches has no effect.

Example of connection to UNI-TELWAY bus

TSX-SCM 21.6 ← TSX-CSB015

TSX-SCA62

TSX-CSAXXX

VW3-A66205 or
VW3-A66201Q
VW3-A66202Q

VW3-A66301

ALTIVAR-66   ALTIVAR-66   ALTIVAR-66
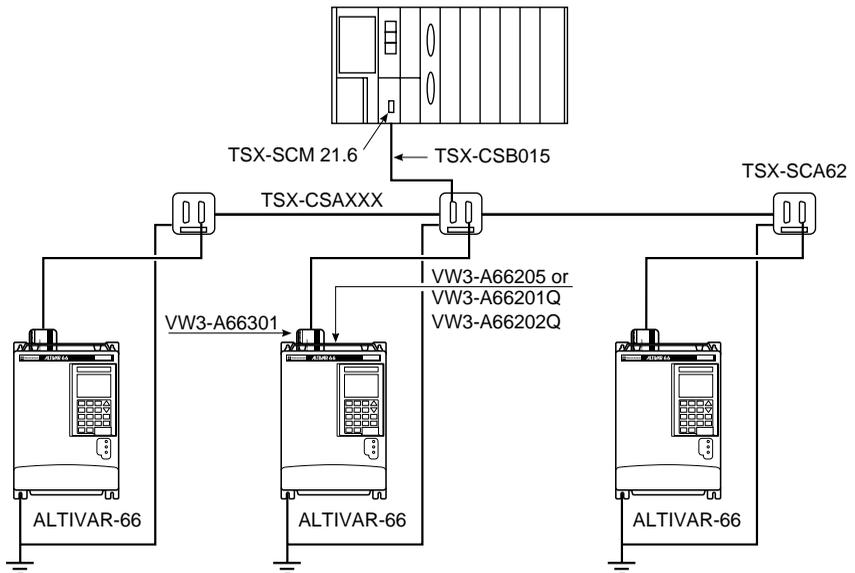
Note : it is imperative that the earths are connected between the TSX-SCA unit and the Altivar 66 to ensure the system operates correctly.
In addition, these connections must be as short as possible.

Hardware setup

Connection to multidrop bus

Connection to standard RS 422 bus

Pins to be used

0V	15
D(B)	14
D(A)	7
RD(B)	3
RD(A)	8
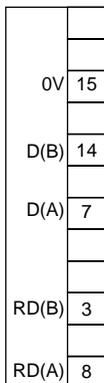
RS 232 C connection

Pins to be used

	5
	15
	14
	7	T X — data transmission
	2
	3	SG — common
	8	R X — data reception
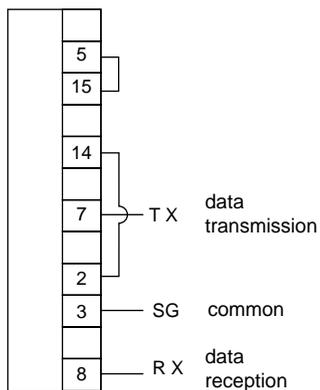
Software setup

Configuration of the communication functions

Initial power-up

To gain a good understanding of accessing the various menus we recommend that you consult the speed controller programming manual.

A message appears on the screen on initial power-up which enables identification of the option.

```
OPT. :VW3A66205


    INSTALLED
REMEMBER YOU NEED TO
CONFIGURE THE OPTION
ENT to continue
```

The reference number of the chosen card and its version appear after OPT.

Confirm acknowledgment of the option by pressing ENT. This reconfigures the speed controller to its factory settings.

ENT   ESC

```
DRIVE IDENTIFICATION
ATV66U41N4 , DC ,V3.2
Power    : 2.2kW/3HP
In= 5.8A,Imax= 8.0A
SUPPLY   : 400-415 V
▼,▲
OPT.1 VW3A66205
```

In the drive identification menu, it is possible to check the reference number, the drive number and option 3 selected using the directional ▼ ▲ keys.

```
       FAULT
OPT. :VW3A66205
  IS NOT RECOGNIZED
  OR
  HAS BEEN REMOVED
ENT to continue
```

This screen appears on power-up if an option has been removed which was configured during a previous power-up.

ENT   ESC

```
 TO RESET THE FAULT
YOU NEED TO REINSTALL
OPT.:VW3A66205

or initialize drive
to factory settings
ENT to initialize
```

Cut the general power supply to the speed controller before reinstalling the extension card .

Software setup

Configuration of the communication functions

```
        ┌─────────────────────────────────┐
        │           MAIN MENU             │
        ├─────────────────────────────────┤
        │  PARAMETER SETTING              │
        │  I/O MAP                        │
        │  FAULT HISTORY                  │
        │  DISPLAY CONFIGURATION          │
        │  KEYPAD CONFIGURATION           │
        │  DRIVE CONFIGURATION            │
        │  GENERAL CONFIGURATION          │
        │  DIAGNOSTIC MODE                │
        │  DRIVE INITIALIZATION           │
    ▲   │  ACCESS LOCK                    │
    ▼   │  COMMUNICATION                  │
        │  COMM. STATE                    │
        └─────────────────────────────────┘
```

ENT →

```
        ┌─────────────────────────────────┐
        │         ACCESS LOCK             │
        ├─────────────────────────────────┤
    ▲   │  PARTIAL UNLOCK                 │
    ▼   │  TOTAL UNLOCK                   │
        └─────────────────────────────────┘
```
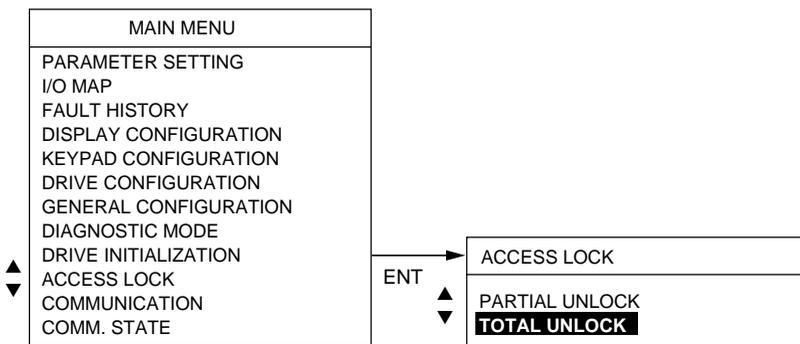
Configuration

After installing the option, select menu 11 "Communication" to access the card configuration.
(To move around use the ▼ ▲ keys)
To access menu 11, remember to unlock the access to menus.

ENT

```
        ┌─────────────────────────────────┐
        │    11- COMMUNICATION            │
        ├─────────────────────────────────┤
        │ PROTOCOL      :   UTW           │
    a ← │ ADDRESS       :    0            │
    b ← │ TRAN. SPEED   :   9.6           │
    c ← │ FORMAT      : 8.1 STOP          │
    d ← │ PARITY        :  ODD            │
        └─────────────────────────────────┘
```
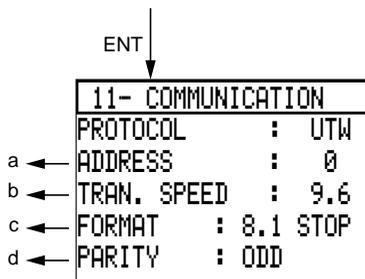
This menu includes 5 parameters for configuring the address, protocol, transmission speed, frame format and parity.

When a factory setting is made with the PCMCIA card present : menu 11 remains configured.

Protocol

```
        ┌─────────────────────────────────┐
        │ ---                             │
        │ UNI-TELWAY                      │
    a → │ Modbus RTU                      │
        │ Modbus ASC                      │
        │ FIPIO                           │
        ├─────────────────────────────────┤
        │ MODBUS +                        │
        │ INTERBUS-S                      │
        └─────────────────────────────────┘
```
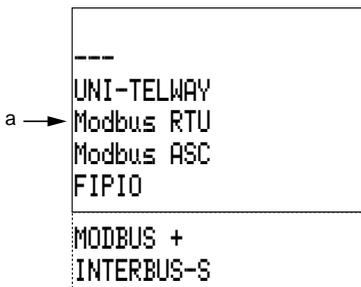
(Modbus RTU = Jbus)

Address

The default address setting is to 0 (not configured) and the maximum is 31.

Software setup

Configuration of the communication functions

Transfer speed

```
0.3
0.6
1.2
b → 2.4
4.8
9.6
19.2
```
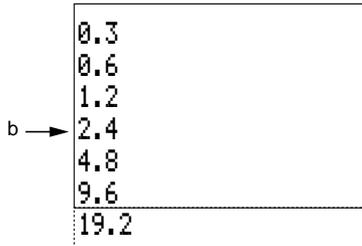
- Transmission speed setting from 300 bits/s to 19,200 bits/s.

Default setting of 9,600 bits/s.

Frame format

```
7b  1 stop
7b  2 stop
c → 8b  1 stop
8b  2 stop
```
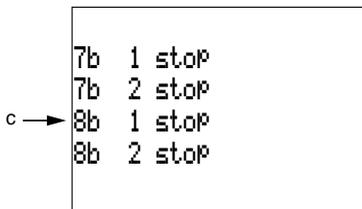
- Frame format. There are 4 formats
  7 bits with 1 or 2 stop bits
  8 bits with 1 or 2 stop bits.

Parity

```
NO
d → ODD
EVEN
```
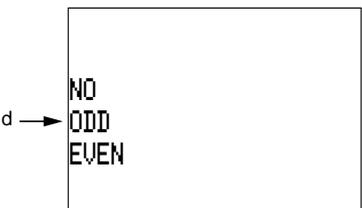
Parity assignment.

The format is fixed for UNITELWAY (8 bits 1 stop ODD)
For Modbus RTU : only the 8-bit format is available.

Only the following formats are permitted :

8 bits   1 stop   all selections are possible.
8 bits   2 stop   only NO.
7 bits   NO cannot be selected.

Software setup

Communication state

Menu 12 on the graphic keypad displays the communication state.

"Card missing" display

```
┌─────────────────────┐
│   12  COMM. STATE   │
├─────────────────────┤
│                     │
│ Card Missing        │
│                     │
│                     │
│ See Menu 11         │
└─────────────────────┘
```

In this case, the communication card is missing or not yet configured.

"Communication card present" display

```
┌─────────────────────┐
│   12  COMM. STATE   │
│ VW3A66301     V1.0  │
│ UTW/Modbus    ADR. 0│
│ Not configured      │
│                     │
│ See Menu 11         │
└─────────────────────┘
```

Note : the "UTW / Modbus" indication is unique and corresponds to the name of the option card. It is irrelevant whether the protocol is UNI-TELWAY or Modbus .
"Not configured" indicates that the card has been identified but the protocol has not been configured.
"Configuration error" indicates that the identified card does not correspond to the protocol configured.

Card display during operation

```
┌─────────────────────┐
│   12  COMM. STATE   │
│ VW3A66301     V1.0  │
│ UTW/Modbus    ADR. 0│
│ Bus active          │◄──
│ CPT Message   00000 │
│                     │
└─────────────────────┘
```

Different network states are possible with the communication card :
initializing, bus active, bus inactive

Software setup

Diagnostics

Fault

For the communication fault codes refer to the user's manual for the PCMCIA communication card interface.

Additional diagnostics

Check the state of the 2 indicator lamps on the front panel of the VW3-A66301 communication card.
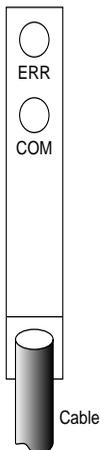
Lamp status : 0 = off   1/2 = flashing   1 = on

COM lamp green	ERR lamp red	Probable cause	Corrective action
1	0	Normal operation	
1/2	0	Incorrect communication configuration, or communication fault with the Altivar 66	Check configuration. Ensure software is compatible.
0	1	Bus communication fault	Check position of the switches of the TSX-SCA 62 subscriber connector of the Altivar 66 (when off). Check connections, presence configuration and operation of link master.
0	0	PCMCIA card or speed controller fault	Remove the PCMCIA card and check the Altivar 66. Replace the Altivar 66 or the card as necessary.

Description of protocols

UNI-TELWAY requests

List of requests
The following table describes the requests accepted by the Altivar 66 and their limits.
Details of the coding of the requests are given in the UNI-TELWAY reference manual.

Request	Code (hex)	Altivar 66
Identification	H'0F'	Yes
Protocol version	H'30'	Yes
Status	H'31'	Yes
Mirror	H'FA'	Yes
Read error counters	H'A2'	Yes
Reset counters	H'A4'	Yes
Read a bit	H'00'	Yes
Write a bit	H'10'	Yes
Read a word	H'04'	Yes
Write a word	H'14'	Yes
Read objects	H'36'	63 words max.
Write objects	H'37'	60 words max.
Event		Yes
data	–	2 words
Specific	H'F2'	See later

Identification request
Response code	= H'3F'
Product type	= H'14' for Altivar
Sub-type	= H'66' Altivar 66
Product version	= H'XX' software version (e.g. : H'21' for V2.1)
ASCII string*	= product reference (e.g. : VAR-66U29N4)

* The first byte of an ASCII string always corresponds to the length of the string.

Status request
Response code	= H'61'
Current status	= H'XX'
(present at	bit 0 : internal fault
high state)	bit 1 : correctable fault
	bit 2 : uncorrectable fault
	bit 3 : not significant
	bit 4 : not significant
	bit 5 : not significant
	bit 6 : speed controller stopped (RDY or SLC or fault)
	bit 7 : speed controller in LOCAL control
Status mask	= H'C7' indicates the significant bits for the current status

Description of protocols

UNI-TELWAY requests

Requests to read and write objects

These requests are used to access several words within the limits described on the previous page.
These requests can be coded by specifying :

Question code (TXTi,C)	= H'36' (read) or H'37' (write)
Category	= 0...7
Segment	= H'68' (internal word)
Object type	= H'06' for a byte (8 bits) in read-only or H'07' for a word (16 bits) in read and write
Object address	= H'xxxx'
Etc.	

Reserved or unused words are read as 0 and if written they have no meaning.
The response to the "write objects" request is accepted if at least one word is written.

Example : programming on a TSX7 PLC using a text block.
READ words W2020 to W3023 of the Altivar 66.

– Using word type object = H'07'

Transmission text block	Reception text block
TxTi,C = H'0736' (category + request)	TxTi,V = H'66' (confirm)
TxTi,L = 6	TxTi,S = 9 (9 bytes received)
+ transmission table	+ reception table

Internal word segment
Word type

H'07'	H'68'
2020	
4	

→ 4 words to read

→ Number of first word
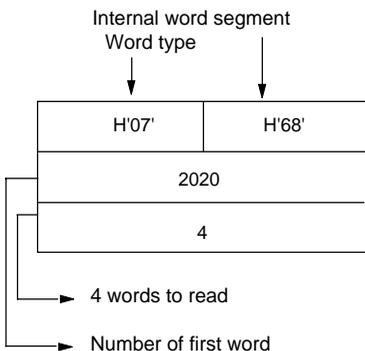
W2020 (Lo)	H'07'
W2021 (Lo)	W2020 (Hi)
W2022 (Lo)	W2021 (Hi)
W2023 (Lo)	W2022 (Hi)
	W2023 (Hi)

The data received in the reception table is offset by one byte. It is the application program which must correct the data (for example by successive offsets) before using it.

Description of protocols

UNI-TELWAY requests

– **Using byte type object = H'06'**

Transmission text block	Reception text block
TxTi,C = H'0736' (category + request)	TxTi,V = H'66' (confirm)
TxTi,L = 6	TxTi,S = 10 (10 bytes received)
+ Transmission table	+ Reception table

Internal word segment
Type of byte

H'06'	H'68'
4039	
9	

W2019 (Hi)	H'06'
W2020	
W2021	
W2022	
W2023	

9 bytes to read (most significant bit of W2019 + 8 bytes comprising W2020 to W2023)

Number of first byte
(most significant bit of W2019 has address 2 x 2019 + 1 = 4039)
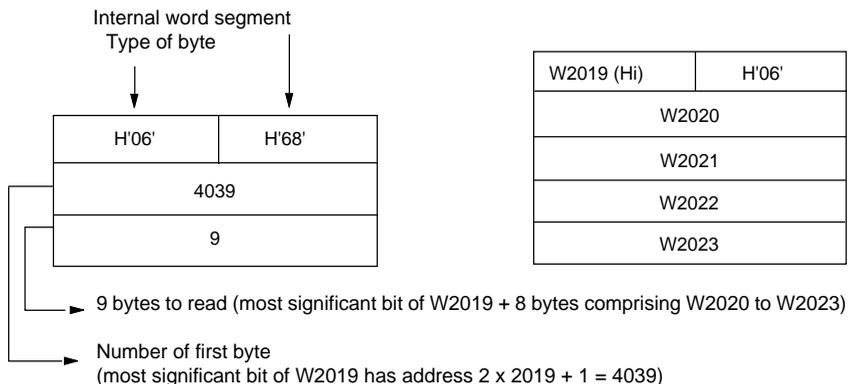
This programming enables words to be correctly positioned in the reception table.

Event data

The Altivar 66 transmits data on its own initiative to the UNI-TELWAY link master without having first received a question.

This data is sent via the "unsolicited data" request and does not require a response from the receiver.

Data is transmitted in the following two cases :
– When a fault appears or disappears (rising or falling edge at status register bit W2040,2).
– When the speed controller is controlled locally via one of its logic inputs, if the input is assigned to this function (rising or falling edge at this input), or via the local key on the interface for the PCMCIA communication card.

Size of event data : 2 words of 16 bits sent in the following order :
– STR status register (word W2040).
– FLT fault register (word W2051).

UNI-TELWAY requests

Summary :
the use of event data with a TSX PLC requires :

– Correct configuration of the UNI-TELWAY link master module.
– Regular monitoring of the indicators which display changes in the value of the data.
– Acquisition of this data via the request to read event data.

Specific control request
This request is used to control the Altivar 66 and to obtain in return the data essential for controlling the speed controller.

Request format

Request code	: byte	= H'F2'
Category	: byte	= 0...7
Specific request code	: byte	= 0
Reserved	: byte	= 0
Command	: word	= COM
Set point	: word	= FRH
Acceleration	: word	= ACC
Deceleration	: word	= DEC

Confirm format

Request code	: byte	= H'F2'
Specific response code	: byte	= H'30'
Reserved	: byte	= 0
Set point	: word	= FRH
Status register	: word	= STR
Fault register	: word	= FLT
Motor current	: word	= LCR

Negative response

Response code	: byte	= H'FD'

Cause : incorrect number of parameters

Description of protocols

MODBUS / JBUS protocol

General

The exchange of data between computer systems, PLCs and other intelligent systems must be performed using a common language.

This language should be as simple as possible and understood by everyone involved. Nevertheless it must be possible to check every exchange to ensure the integrity of the transfers. The variables exchanged are therefore inserted in a frame which generally comprises the following :

Heading	Address	Request	Data	Check	End

Each protocol defines the presence, the format and the contents of the various groups of variables which surround the data zone.

This structuring makes it possible to define the start and the size of messages, if necessary the system to which the data is addressed, the type of function required, the variables themselves, a control parameter and an end code which validates the whole message.

The form and content of this frame are different for each type of protocol.

In the remainder of this document the MODBUS and JBUS functions will be referred to under the term MODBUS.

MODBUS frames

Two transmission modes can be used, only one of them being used in a system.

RTU mode

The frame defined for the MODBUS protocol has neither message heading bytes nor end of message bytes. It is defined as follows :

Address	Request	Data	CRC16
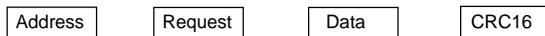
The data is transmitted in binary code.
CRC16 : cyclical redundancy check.
The end of the frame is detected on a silence of 3 characters or more.

ASCII mode

The frame is complete and defined in the following way :

Heading	Address	Request	Data	LRC	End "CRLF"

– heading = ":" (H'3A),
– data is coded in ASCII : each byte is divided into 2 four-bit bytes, each
   of which is coded by an ASCII character (0 to F),
– LRC : longitudinal redundancy check,
– end : "CR" "LF" (H'0D and H'0A).

Description of protocols

MODBUS / JBUS protocol

Principle

The MODBUS protocol is a dialogue protocol which creates a hierarchical structure (a master and several slaves).

The MODBUS protocol enables the master to interrogate one or more intelligent slaves. A multidrop link connects the master and slaves.

Two types of dialogue are possible between master and slaves :

– the master talks to a slave and waits for its response,

– the master talks to all slaves without waiting for a response (broadcasting principle).

The slaves are numbered from 1 to 31 and number 0 is reserved for broadcasting.

The master manages the exchange and only it can take the initiative. The master repeats the question when there is an incorrect exchange, and declares the interrogated slave absent if no response is received within a given time envelope. Only one device can transmit on the line at any time. No slave can send a message itself unless it is invited to do so.
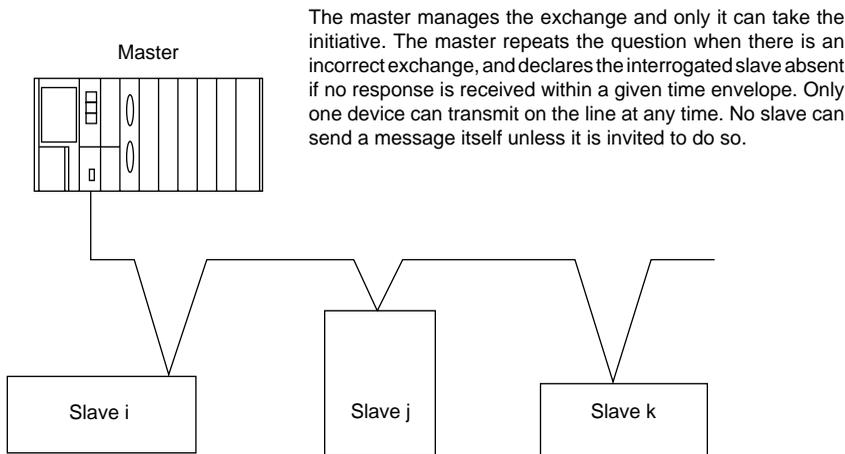
Note

No lateral communication (i.e. slave to slave) can be performed directly.

The application software of the master must therefore be designed to interrogate a slave and send back data received to another slave.

Description of protocols

MODBUS / JBUS protocol

Accessible data

The MODBUS protocol enables data (bits and words) to be exchanged between a master and several slaves, and checks these exchanges.

Consequently, bit areas are defined in each slave unit which will be read or written by the master.

An input object can only be read.
An output object can be read or written.
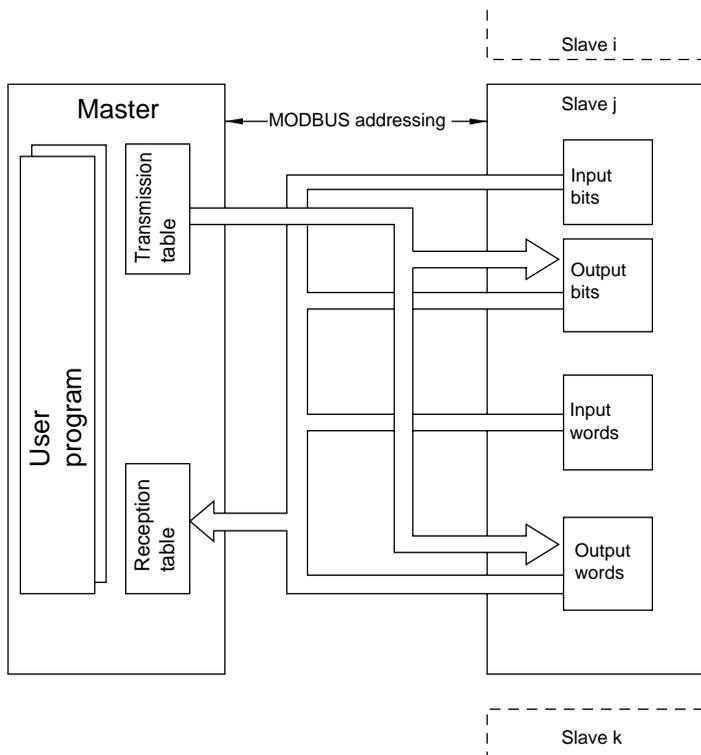
Exchanges

The master, or supervision device, takes the initiative in exchanges. This master addresses a slave by supplying it with four types of data :
– the address of the slave,
– the function required of the slave,
– the data area (variable depending on the request),
– the exchange check.

The link master waits for the response of the slave before transmitting the next message, thus avoiding any conflict on the line. Operation in half duplex is therefore authorized.

Description of protocols

MODBUS / JBUS protocol

Control and monitoring

All control of exchanges between two units which are communicating via asynchronous serial link naturally includes exception messages when exchange faults occur. Various incorrect messages may be sent to a slave. In this event, the slave will tell the master that it does not understand, and the master will decide whether or not to repeat the exchange.
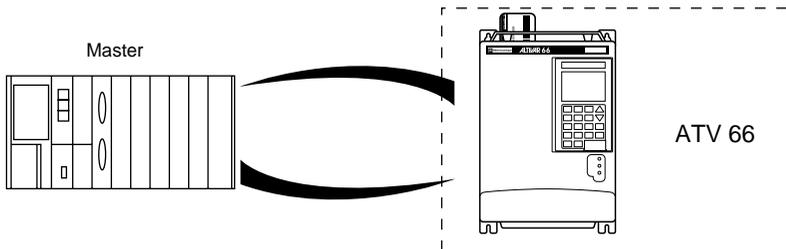
The master has access to a certain amount of data which is stored and managed by the slave. The master can access this data using special function codes (diagnostic mode, read event counter, etc).

Description of protocols

MODBUS / JBUS protocol

MODBUS functions

MODBUS functions include :
– main functions for exchanging data,
– additional functions for exchange diagnostics.

The following table shows the functions which are managed by the ALTIVAR 66 communication option, and specifies its limits.

Definitions of "read" and "write" functions are understood from the point of view of the master.

Code	Type of functions	B	ALTIVAR 66
01	Read N output bits		1 max
02	Read N input bits		1 max
03	Read N output words		63 max
04	Read N input words		63 max
05	Write one output bit	B	Yes
06	Write one output word	B	Yes
08	Diagnostics (see details below)		Yes
11	Read event counter		Yes
16	Write N output words	B	60 max

Functions marked "B" can be broadcast.
The message transmitted by the master must specify slave number = 0.
A response message is never returned.

Detailed information on functions

Code 01 :   read N output bits.
              This function is used to read output bits (bits which can be written and read in the slave by the master).

Code 02 :   read N input bits.
              As above, but applies to input bits (bits which the master can only read).

Code 03 :   read N output words.
              This function is used to read output words (words which can be written and read in the slave by the master).

Code 04 :   read N input words.
              As above, but applies to input words (words which the master can only read).

Code 05 :   write an output bit.
              Used to set an output bit to 0 or 1 (can only be accessed in write).

Code 06 :   write an output word.
              Used to write a 16-bit output word (can only be accessed in write).

Description of protocols

MODBUS / JBUS protocol

Diagnostic function code 08 is always accompanied by a sub-code.

Code 08/00 :   echo.
This function requests the interrogated slave to send back the whole message sent by the master.

Code 08/01 :   channel reinitialization.
This function is used to reinitialize communication of a slave and in particular to make it leave listen only mode (LOM) by sending data item H'0000 or H'FF00.

Code 08/03 :   change of ASCII delimiter.
In ASCII mode, messages are delimited by the line feed character (LF = H'0A). This function is used to change this character.

Code 08/04 :   change to LOM mode.
This function is used to command a slave to change to listen only mode (LOM). In this mode the slave does not process messages which are addressed to it, and only transmits a response when the channel is reinitialized.

Code 08/0A :   counter reset.
This function resets to zero all the counters monitoring the exchanges of a slave.

Code 08/0B :   number of correct messages seen on the line without CRC or checksum error.
This function reads a 16-bit counter (incremented from 0 to H'FFFF) which totals the messages seen on the line and processed by the slave.

Code 08/0C :   number of messages received with checksum error (reads a 16-bit counter).

Code 08/0D :   number of exception responses.
Reads a 16-bit counter which totals the number of exception messages transmitted to the master by a slave (following an incorrect frame).

Code 08/0E :   number of messages addressed to the slave except for broadcasts.
Reads a 16-bit counter which totals the number of all types of messages addressed to the slave.

Code 08/0F :   number of broadcast messages received.
Reads a 16-bit counter which totals the number of all types of messages addressed to the slave.

Code 08/10 :   reads number of NAQ responses. The value read is always 0.

Code 08/11 :   reads the number of non-ready responses from the slave. The value read is always 0.

Code 08/12 :   reads the number of characters which are not processed (incorrect).

Description of protocols

MODBUS / JBUS protocol

Code 11 :   read event counter.
               – a status (always zero),
               – a counter which is incremented each time a correct message sent to the slave
               is received (form and content) except for exception messages.

Code 16 :   write N output words.
               This function enables the master to write output words to the slave
               (words which can be written or read).

Description of protocols

MODBUS / JBUS protocol

Details of frames (RTU mode)

Read N bits : function 1 or 2

Question

Slave no.	01 or 02	No. of 1st bit		Number of bits		CRC16
		Hi	Lo	Hi	Lo	
1 byte	1 byte	2 bytes		2 bytes		2 bytes

Response

Slave no.	01 or 02	Number of bytes read	Value	------------	Value	CRC16
1 byte	1 byte	1 byte				2 bytes

Example : read bit B4 of slave 2

Question	02	01	0004	0001	BC38	

Response	02	01	01	00	51CC	if B4 = 0
	02	01	01	01	900C	if B4 = 1

Bit B4 can always be used and can be read at 1 or at 0.

Read N words : function 3 or 4

Question

Slave no.	03 or 04	No. of first 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 byte

Example : read words W3020 to W3023 of slave 2

Question	02	04	0BCC	0004	33E1

Response	02	04	08	xxxx	--------------------	xxxx	CRC16

Value
of W3020

Value
of W3023

Description of protocols

MODBUS / JBUS protocol

Write an output bit : function 5

Question

Slave no.	05	Bit no. Hi | Lo	Bit value	CRC16
1 byte	1 byte	2 bytes	2 bytes	2 bytes

The "bit value" field has two possible values only, and can take no other value :
– bit at 0 = 0000
– bit at 1 = FF00

Response

Slave no.	05	Bit no. Hi | Lo	Bit value	CRC16
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Example : write value 1 in bit B3 of slave 2

Question and response	02	05	0003	FF00	7C09

Write an output word : function 6

Question

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

Response

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

Example : write value H'0315' = 789 in word W3022
of slave 2 (ACC = 78.9 s)

Question and response	02	06	0BCE	0315	2B1D

Description of protocols

MODBUS / JBUS protocol

Diagnostic : function 8

Question and response

Slave no.	08	Sub-code	Data	CRC16
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Sub-code	Question data	Response data	Function executed
00	XX YY	XX YY	Echo
01	00 00	00 00	Reinitialization
03	XX 00	XX 00	XX = new delimiter
04	00 00	No response	Change to LOM mode
0A	00 00	00 00	Reset counters to 0
0B	00 00	XX YY	XXYY = counter value
0C	00 00	XX YY	XXYY = counter value
0D	00 00	XX YY	XXYY = counter value
0E	00 00	XX YY	XXYY = counter value

Read event counter : function 11 (H'0B')

Question

Slave no.	0B	CRC16
1 byte	1 byte	2 bytes

Response

Slave no.	0B	00 00	Counter value Hi Lo	CRC16
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Write N output words : function 16 (H'10')

Question

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

Response

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

Example : write values 2 and 3 in words W3022 and W3023 of slave 2

Question	02	10	0BCE	0002	04	0002	0003	E3C6

Response	02	10	0BCE	0002	2220

Description of protocols

MODBUS / JBUS protocol

Exception responses

An exception response is given by a slave when it is unable to perform the request which is addressed to it.

Format of an exception response :

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

Response code : function code of the request + H'80 (the most significant bit is set to 1).

Error code :   1 = the function requested is not recognized by the slave.
                    2 = the bit and word numbers (addresses) indicated in the request do not exist in the slave.
                    3 = the bit and word values indicated in the request are not permissible in the slave.
                    4 = the slave has started to execute the request but cannot continue to execute it completely.

CRC16 calculation

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

Initialize the CRC (16-bit register) to H'FFFF.

Enter the first to the last byte of the message :
        CRC   XOR   <byte> —> CRC
        Enter   8 times
                Move the CRC one bit to the right
                If the output bit = 1, enter CRC XOR H'A001—> CRC
        End enter

End enter

The low order byte of the CRC obtained will be transmitted first, followed by the high order ones.
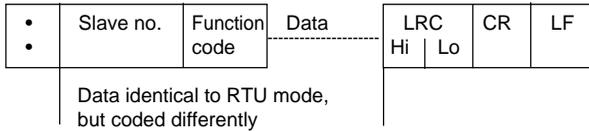
XOR = exclusive OR.

Description of protocols

MODBUS / JBUS protocol

ASCII mode

In this mode, the MODBUS frame has the following structure :

• •	Slave no.	Function code	Data	LRC Hi | Lo	CR	LF

Data identical to RTU mode, but coded differently

Delimiters : ":" = H'3A', CR = H'0D', LF = H'0A'.

Data : the data field is analogous to the RTU frames, but coded in ASCII characters. Each byte is divided into 2 four-bit bytes, each of which is coded by its ASCII equivalent.

Example : the byte containing the slave number 06 will be coded by 2 ASCII characters "0" and "6", i.e. by H'30' and H'36'.

LRC : modulo 256 hexadecimal sum of the contents of the frame (without the delimiters) before ASCII coding, 2's complement.
The byte obtained is then coded in the form of 2 ASCII characters as above.

Example : write value 1 in bit B3 of slave 2

Question and response

Hexadecimal

3A	30 32	30 35	30303033	46463030	4637	0D	0A

ASCII

:	0 2	0 5	0 0 0 3	F F 0 0	F 7	CR	LF

LRC calculation

Sum of the bytes in the frame :
H'02' + H'05' + H'00' + H'03' + H'FF' + H'00' = H'109' = 265

Modulo sum 256 : H'09' = 9

Modulo sum 256 2's complement :
H'100' - H'09' = 256 - 9 = 247 = H'F7'

Description of protocols

Graphic keypad serial link

General

Communication via serial link from the ALTIVAR 66 keypad port enables all data generated by the microprocessor controlling the speed controller to be accessed. Data is always available in read only form. The speed controller can be controlled (change frequency set point, start, etc) either via the serial link in LINE mode, or by local commands in LOCAL mode.

NOTE : In the description of the keypad port serial link, all characters are in ASCII code (see ASCII code table on page 88).

Connection

SUB-D connector pin configuration
The transmission interface is electrically isolated from the speed controller in accordance with the RS 485 and RS 422 (RS 232 C compatible) standards. It is available on a 9-pin SUB-D connector .
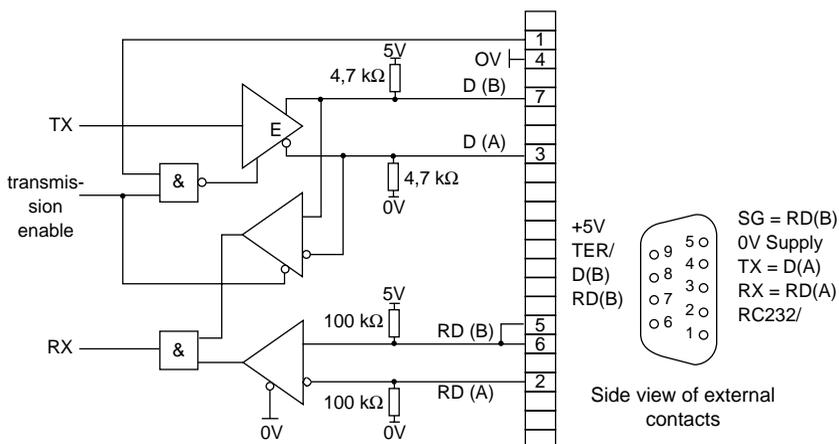
Connection to standard RS 485 bus
Pins to be used
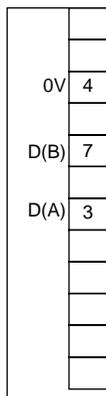
Recommendations
• use a shielded cable with 2 pairs of twisted conductors,
• connect the reference potentials between them,
• cable routing : keep the bus away from the power cables (at least 30 cm), with any crossovers at right angles, and connect the cable shielding to the ground of each device,
• fit a line terminator at both ends of the line.

Description of protocols
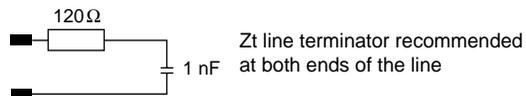
Graphic keypad serial link

120 Ω

1 nF

Zt line terminator recommended
at both ends of the line

Connection to standard RS 422

0V	4
D(B)	7
D(A)	3
RD(B)	6
RD(A)	2

Pins to be used

Connection to standard RS 232 C

	1
	4
	6
	3
	7
	5
	2

Pins to be used

T X — data transmission

SG — common

R X — data reception
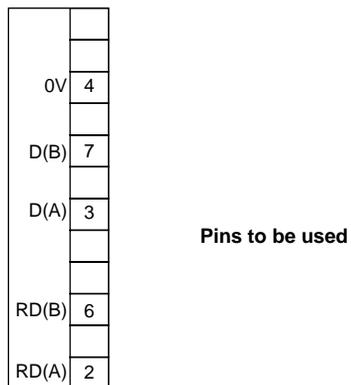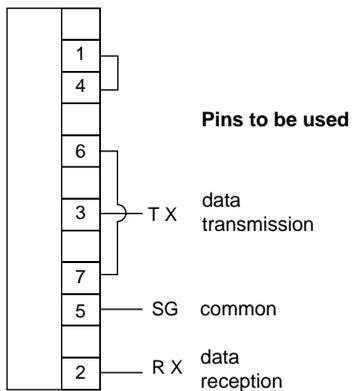
Description of protocols

Graphic keypad serial link

Definition of the link

9600 Baud asynchronous link

Format 1 start bit
  8 data bits
  1 odd parity bit
  1 stop bit

All these parameters are fixed. The link is of the master-slave type, with the speed controller as slave. Only one of the two stations can transmit at any given moment (half duplex link).

Definition of the protocol

Dialogue is in question / response form :
The master asks a question and waits for the response within a given time (50 to 350 ms). If there is any uncertainty (parity or frame error, etc) the speed controller will not respond. If this occurs check that all of the link parameters are correct.

The messages are delimited by the start characters "?" for a question and ">" for a response, and the end characters LF or CR.

Question

Start	Question code	Data 1	Separator (*)	Data 2 (*)	End
?	See table on page 28	Number of word or bit	1 or 2 characters <SP> or @	Value	either <LF> or <CR>

(*) write only

Data 1 : Number of word or bit :
  integer between 0 and + 32767.
  The = sign is optional as are zeroes to the left of the number.
  Example : 55 or +00055

Data 2 : Value of word or bit :
  - Word : integer between -32768 and +32767.
  The = sign is optional as are zeroes to the left of the number.
  Example : 55 or +00055
      -2345 or -02345
  - Bit : 0 or 1.

Response

Start	Response code	Data 3(**)	End
>	See table on page 28	Value	<LF> <CR>

(**) read only

Data 1 : - Word: 6 characters, fixed format
  Examples : +00034, -21254
  - Bit : 0 or 1.

Description of protocols

Graphic keypad serial link

Table of requests

	Question code	Response code Positive	Negative
Read bit	A	A	N
Write bit	B	Y	N
Read word	C	C	N
Write word	D	Y	N
Mirror	M	M	N
Read 10 words	E	E	N

If response is negative :
- Number of bit or word does not exist.
- Question code does not exist.
- Incorrect question format (but with first character = ?).
- Write while the speed controller is not in LINE mode.
- Change of operating mode while the motor is not stopped.
- Change of operating mode which does not correspond to chart.

Request E enables 10 words to be read or written consecutively.

Communication test : mirror

The mirror request returns the character string sent and can be used for the communication test.

Question :   ?M12345<LF><CR>
Response :   >M12345<LF><CR>

Read bit

Bit to inhibit communication check : Read bit B4

Question :   ?A4<LF><CR> or   ?A+00004<LF><CR>
Response :   >A0<LF><CR> if bit = 0 (check active)
Response :   >A1<LF><CR> if bit = 1 (check inactive)

Write bit

Change to LINE mode : write value 1 in bit B3.

Question :   ?B3<SP>1<LF><CR>
Response :   >Y<LF><CR>

Read word

Value of analog input AI1 : read word W2044.

Question :   ?C2044<LF><CR>
Response :   >C+00100<LF><CR> (AI1 value = 100%)

Write word

Frequency set point at 50 Hz : write word W2021.

Question :   ?D2021<SP>3310<LF><CR>
Response :   >Y<LF><CR>

Description of protocols

Graphic keypad serial link

Table of ASCII codes used

Dec.	Hex.	Character
10	0A	LF line feed
13	0D	
32	20	SP space
43	2B	+
45	2D	-
48	30	0
49	31	1
50	32	2
51	33	3
52	34	4
53	35	5
54	36	6
55	37	7
56	38	8
57	39	9
62	3E	>
63	3F	?
64	40	@
65	41	A
66	42	B
67	43	C
68	44	D
77	4D	M
78	4E	N
89	59	Y

Communication principle

Data structure

The adjustment, control, supervision and monitoring of the Altivar 66 are performed using data (or objects) which are specific to this product.

This data essentially consists of :

• BITS : named Bi (i = bit number) which are used to execute logic commands.

   Example : B5 = start/stop command.

• WORDS (of 16 bits) : named Wi (i = word number) to be used for storing either integer values (from - 32768 to + 32767), or 16 independent logic states (these words are then called registers).

   Examples :

   W2021 = frequency set point (digital value),
   W2040 = register (16 status bits).

   Notation : W2040.2 designates the bit in row 2 of register W2040.

Accessing data

The tables in the section on ATV 66 variables list the parameters which can be accessed via the communication link. The exact function of each parameter and its effect on the behavior of the speed controller are described in the speed controller programming manual and catalogue.

Certain data can be accessed in both read and write : these are the bits and words corresponding to adjustments, commands or the configuration. This data is used by the speed controller.

However, data generated by the speed controller can only be accessed in read : signalling or fault data, for example. If written, they have no meaning and are rejected.

Order in which data is processed

Where several types of parameter are written by the same request, the order in which parameters are processed is important in order to determine their validity. This order is as follows :
   1) configuration parameters,
   2) writing to 1 of bits W2020.1 and W2020.2 (DLI and FLI)
   3) adjustment parameters,
   4) command parameters (except W2020.1 and W2020.2)

Communication principle

Protection of access to configuration and settings

The configuration semaphore write protects the access to the configuration, adjustment and locking parameters (W199). The processor which writes word W198 = 1 reserves the semaphore and prohibits all write access to the parameters write-protected by other processors (graphic keypad, PC software and devices connected to buses). The configuration semaphore (W198 = 0) must be freed by the processor which reserved it.

The speed controller can operate normally when the configuration semaphore is reserved. Only the locking (W199 = 1) prevents starting.

The semaphore will return to its free state :

  – in the event of a communication fault, or
  – if after 60 seconds no request has been transmitted to the Altivar 66 by the
     processor which reserved it.

The configuration semaphore is reserved :

  – by the keypad in a configuration menu.
  – by the forced local function (in this case the reserving processor "loses" the semaphore).
  – by the OEM locking function.

Using configuration semaphore is optional as it is automatically reserved on locking when a controller stops (W199 = 1).

Protection of access to commands

The command semaphore write protects the access to the command objects (bits or words). The processor which writes word W2235 to 1 reserves the semaphore and prohibits all write access to commands by other processors (PC software). The command semaphore (W2235 = 0) must be freed by the processor which reserved it.

Note : It is possible to control the speed controller without having reserved the command semaphore.

The command semaphore is freed :

  – in the event of a communication fault,
  – if after 60 seconds no request has been transmitted to the Altivar by the processor
     which reserved the semaphore.

The command semaphore is reserved by the forced local function (in this case the reserving processor "loses" the semaphore).

Protection of access in forced local mode

No writing is permitted during local forcing (when using the graphic keypad or logic input). The forced local function automatically reserves the command and configuration semaphores even if they have already been reserved.

Protection of access in OEM locked mode (function accessed by PC software)

Access locking signaled by W2049,2 = 1 prohibits reading of the configuration and adjustments. It also prohibits writing by reserving the configuration semaphore.

Communication principle

Loading a configuration

This section deals with the complete loading of a configuration or a modification which requires several write messages. To ensure consistency of the configuration, carry out the following sequence :
– Lock the Altivar 66 **in stop mode** (W199 = 1).
– First write message,
– Second write message,
– etc.
– Unlock the Altivar 66 (W199 = 0).

Locking is refused if the motor is operating or if the configuration semaphore is reserved (see the section entitled "Modifying the configuration" on the next page).

When the speed controller is locked in stop mode :
- it is not possible to start the motor
- the configuration consistency check is inhibited.

Unlocking starts the configuration consistency test and enables the motor to be restarted.

Unlocking is refused when the configuration is invalid (W2049.1 = 1). If this occurs load a new configuration.

Note : if the configuration semaphore is free before locking, it is automatically reserved by the processor which locks it and is freed on unlocking.
During locking : only the locked processor can write the configuration.
it is not possible to enter a graphic keypad configuration menu.

To load a valid configuration, we recommend that you first read the value of the parameters, having first established a suitable configuration using the graphic keypad or the PC software.

Nonsignificant words are read at 8000H. Writing of nonsignificant words has no effect. If you have to write nonsignificant words to limit the number of messages when loading the configuration, they must be written at 8000H. This ensures that the configuration you have loaded will be compatible with future versions of ALTIVAR 66 software.

Example : the speed controller I/O are always assigned by default to functions (LI4 is assigned to JOG). If you wish to assign the preset speed function to LI4 you must :
1 - lock the controller
2 - disable the JOG function (W890 = 0)
3 - disable input LI4 (W891 = 0)
4 - enable the preset speed function (W830 = 1 ; W831 = 1)
5 - assign this function to LI4 (W832 = 4)

Make sure that the resource (input / output) used for the new function is free. Otherwise, completely disable the function using this resource.

Invalid configuration

There are 4 main causes of invalid configurations :
– An incorrect parameter value,
– Two inputs or two outputs assigned to the same "application function" (brake control, etc.),
– Not all of the compulsory parameters forming a function have been configured,
– Several incompatible functions have been enabled.

In each case the speed controller adapts the configuration and changes to "invalid configuration" state.

Communication principle

Modifying the configuration

To make a simple modification to the configuration send a request to the Altivar 66 to :
    – Write words,
    – Write an object or a table.
Writing is refused :
    – If the motor is operating (W2040.8 = 1),
    or
    – If the configuration semaphore is reserved (W2049.3 = 1),
        • By another processor (W198 = 1 or W199 = 1 or W2049.1 = 1),
        • By the keypad in a configuration menu,
        • By OEM locking (W2049.2 = 1),
        • By local forcing (W2040.5 = 1).
The response is negative or exceptional if the configuration obtained is invalid.

Configuration examples

1) Programming of the loss follower fault with skip to a frequency of 20 Hz.

Lock the configuration (W199 = 1).
Send the following 3 write requests :

    W755,12 = 1   (function enabled)
    W767 = 200   (skip frequency)
    W768 = 1   (skip to frequency enabled)

Unlock the configuration.

2) Fast controlled stop via logic input :

Send a request to write an object to the following 4 words :

    W920,0 = 1 enabling of controlled stop,
    W921 = 1 activation by logic input,
    W922 = 3 for LI3.
    W923 = 1 fast stop.

Note : remember to disable LI3 before assigning it.

3) Alternate ramps by frequency threshold :

Lock the configuration.
Send the following write requests :

    W270 = 1 ramp switched,
    W271 = 0 linear ramp (acceleration),
    W274 = 0 linear ramp (deceleration),
    W277 = 1 switching by frequency threshold,
    W279 = 400 activation frequency threshold (400 x 0.1 or 40 Hz)
    W282 = 100 duration of second acceleration ramp (100 x 0.1 or 10 Hz)
    W283 = 100 duration of second deceleration ramp (100 x 0.1 or 10 Hz)

Unlock the configuration.

Note :
The configuration must be locked if the addresses are not consecutive.

Communication principle

Before transmitting the PLC configuration to the speed controller, use the table below to check that the functions selected are compatible.

Table showing application functions which are not compatible

The ● indicates incompatibility	RUN REVERSE	JOG	+ / - SPEED	SET POINT MEMORY	PRESET SPEEDS	SPEED REFERENCE	AUTO / MANUAL	CONTROLLED STOP	SHUTDOWN	TERMINAL / KEYPAD	BYPASS	BRAKE SEQUENCE	PI	SWITCH MOT. SEL/PAR.	TACH FEEDBACK	ORIENT	CYCLE	DOUBLE RAMP
RUN REVERSE	▓												●					
JOG		▓						●					●					
+ / - SPEED			▓	●	●								●				●	
SET POINT MEMORY			●	▓	●		●						●	●		●		
PRESET SPEEDS			●	●	▓								●				●	
SPEED REFERENCE						▓							●					
AUTO / MANUAL				●			▓						●					
CONTROLLED STOP								▓				●		●		●		
SHUTDOWN		●							▓			●	●	●		●	●	
TERMINAL / KEYPAD										▓			●					
BYPASS											▓					●	●	
BRAKE SEQUENCE								●	●			▓	●					
PI	●	●	●	●	●	●	●		●	●		●	▓			●	●	●
SWITCH MOT. SEL/PAR.				●				●	●					▓		●		
TACH FEEDBACK													●		▓			
ORIENT				●				●	●			●	●	●		▓	●	
CYCLE			●		●				●		●		●			●	▓	●
DOUBLE RAMP													●				●	▓

Table showing parameters which are not compatible

	Constant torque			Variable torque	
	NORMAL control	HIGH TORQUE control	SPECIAL control	NORMAL control	NOLD control
Nominal current					
Nominal frequency					
Nominal voltage					
IR compensation				●	●
Damping					
Rotation normalization : ABC					
Current limit					
Slip compensation				●	●
Brake sequence				●	●
Voltage boost	●			●	●
Motor torque limit	●		●	●	●
Generator torque limit	●		●	●	●
Bandwidth	●		●	●	●
Profile	●	●	●		●
Voltage reduction				●	●
Current limit adaptation	●	●	●		
Multimotor/PAR M1					
M2		●			
M3		●			

Communication principle

Controlling the speed controller

Control mode

The Altivar 66 speed controller can be controlled in local mode via the terminal block or the graphic keypad, or remotely via the communication bus.
However, it is possible to control set points and logic commands of the controller separately.

The possible sources of commands are thus :
  • Terminal block => local mode,
  • Graphic keypad => local mode,
  • Communication bus => total or partial line mode.

Menu 5 Keypad Config. is used to select the command source for local mode (see the product programming guide).
The communication bus can at any moment request that the control mode is changed by setting bits DLI and FLI of the command register :
  DLI = 1 : partial line mode on the logic run commands, set points are enabled via the terminal block,
  FLI = 1 : partial line mode on the set points, logic commands are enabled via the terminal block.
The control mode thus depends on both the state of bits DLI and FLI and the configuration of the keypad supplied with menu 5.
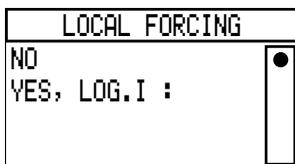

Caution : the STOP key on the graphic keypad and Run Permitted (LI1) are always active, irrespective of the current control mode. After a stop ordered by the keypad the bus is restarted on the rising edge of the Run bit of the command register (which changes from state 0 to state 1).

Local forcing

It is possible to force operation to terminal block or keypad local mode (depending on the state of the T/K function).
Any write request or command received by the bus is thus prohibited. Only requests to read the configuration or monitoring parameters are permitted.
To do this, the Forced Local function in menu 7.2 must be configured or the F1 key of the keypad must be assigned to this function in menu 5.1.

```
┌─────────────────────┐
│    LOCAL FORCING     │
├─────────────────────┤
│NO                 ●  │
│YES, LOG.I :          │
│                      │
│                      │
└─────────────────────┘
```

NO : forced local not enabled
YES : selection of the associated logic input

Local forcing via the terminal block : activating the LI assigned to local forcing causes a switch to terminal block forced local mode. Logic commands and set points are taken via the terminal block. On exiting local forcing (deactivation of LI), the controller returns to the previous control mode, maintaining the operating direction.

Local forcing via the graphic keypad : pressing the F1 key assigned to local forcing causes a switch to keypad forced local mode. Logic commands and set points are taken at the keypad, the operating direction is maintained. On exiting local forcing (F1 pressed again), the controller returns to the previous control mode, maintaining the operating direction.

Switching between control modes

DLI	FLI	T/K	Current control mode depending on the state of the bits
0	0	0	Terminal block local
0	0	1	Graphic keypad local
0	1	0 or 1	Analog set point in line mode and terminal block logic command
1	0	0 or 1	Analog set point in term. block local mode and logic command in line mode
1	1	0 or 1	Total line

T/K : state of the terminal block/keypad configuration in local mode
DLI : state of the "on-line logic command" bit in word W2020,1
FLI : state of the "on-line set point" bit in word W2020,2

Switching between terminal block and keypad modes always causes the motor to stop.
Switching between local mode and line mode (total or partial) takes account of logic commands
and set points of the new command source.

Note : whatever the current mode, if the logic input assigned to the Forced Local function is in
a high state, or if the F1 key on the keypad is selected, the controller switches to Forced Local
mode.

Controlling the application functions via the bus, depending on the various control modes

Function which can be activated by the bus	DLI partial mode	FLI partial mode	Total line mode
Reverse operation	yes (W2031,1)	yes (sign of set point W2021)	yes
Jog	no	no	no
+ / - speed	no	no	no
Set point memory	no	no	no
Preset speeds	yes (W2031,4,5,6)	yes	no
Speed reference	no (value at terminal block)	yes (W2021)	yes (W2021)
Auto / Man	yes (W2031,2)	no	no
Controlled stop on threshold (always active if enabled)	no	no	no
Controlled stop by LI	yes	no	yes
Shutdown	yes	yes	yes
Bypass (always activated locally)	no	no	no
PI regulator	no	no	no
Switch motor / parameters	yes (W2020,11,12)	no	yes (W2020,11,12)
Stop command for orient (sensor input always on term. block)	yes (W2020,7 + ,5)	no	yes (W2020,7 + ,5)
Cycles	no	no	no
Double ramp switching	yes (W2020,3)	no	yes (W2020,3)
Default current limit (always active)	yes (config. word)	yes (W2024)	yes (W2024)
Current limit on freq. threshold	yes (config. word)	yes (W2024)	yes (W2024)
Current limit on LI	yes (config. word W265 + W2031,0)	yes (W2024)	yes (W2024 + W2031,0)

Controlling the application functions via the bus, depending on the various control modes (continued)

Function which can be activated by the bus	DLI partial mode	FLI partial mode	Total line mode
Current limit on AI	yes (value at terminal block)	yes (W2024)	yes (W2024)
Default voltage reduction	yes (config. word)	yes (W2028)	yes (W2028)
Voltage reduction on threshold	yes (config. word)	yes (W2028)	yes (W2028)
Voltage reduction on LI	yes (config. word : W2020,10)	yes (W2028)	yes (W2028 + W2020,10)
Voltage reduction on AI	yes (value at terminal block)	yes (W2028)	yes (W2028)
Default torque limit	yes (default value)	yes (W2025 + W2026)	yes (W2025 + W2026)
Torque limit on freq. threshold	yes (config. word)	yes (W2025 + W2026)	yes (W2025 + W2026)
Torque limit on LI	yes (config. word + W2031,3)	yes (W2025 + W2026)	yes (W2025 + W2026 + W2031,3)
Torque limit on AI	yes (value at terminal block)	yes (W2025 + W2026)	yes (W2025 + W2026)
Customer fault	yes (W2020,14)	no	yes (W2020,14)

Checking the communication bus

Bit NTO of the command register (W2020,4) is used to inhibit the communication check.
If bit NTO = 1, the controller no longer takes account of communication errors from the communication bus or the serial link.
For safety reasons, this should only be used in the debug phase.

Altivar 66 variables

Certain Altivar 66 variables can be accessed at two different addresses :
• in the 200 to 3000 address zone reserved for the Altivar 66,
• in the 0 to 127 address zone already used by the Altivar 45.2.

1– Address zone reserved for the Altivar 66 (200 to 3000)
This address zone contains all the speed controller parameters for optimum use of the facilities of the Altivar 66.

2– Address zone (0 to 127) common to the Altivar 66 and the Altivar 45.2
This address zone should only be used when integrating an Altivar 66 into a control system which until now has only included Altivar 45.2 controllers. Not all of the Altivar 66 parameters appear here, in particular those functions available using the Altivar 66 but not the Altivar 45.2. In certain cases, using these addresses avoids the necessity of modifying the program.
Any small differences in comparison with the Altivar 45.2 are indicated in the comments.

Range

The range permitted by the speed controller is specified for each parameter.
Writing of an incorrect value is always accepted, but will be automatically adjusted by the speed controller.

Unit

Words are always expressed as integer values, either signed (-32768 to +32767) or unsigned (0 to 65535). The unit is defined for each of them.

Example : W2000 : high speed, unit = 0.1 Hz,
        W2000 : 455 corresponds to high speed = + 45.5 Hz.

Values on switching on

Each time it is switched on the Altivar 66 is initialized with the configuration and adjustments stored in its EEPROM memory.

ADJUSTMENT WORDS (read and write)

These parameters may be adjusted with the motor **stopped or running**.

WORD	RANGE	UNIT	DESCRIPTION	PRESET
W1993	0…9999		Proportional gain	100
W1994	0…9999		Integral gain	0
W1995	-9999…9999		Gain	9999
W1996	-4096…4096		Offset	0
W1997	0…9999		Fault ratio	100
W1998	0…9999		Keypad PI set point value	0
W1999	0…600	0.1Hz	Keypad speed reference value	0
W2000	W2001…W301	0.1Hz	High speed	
W2001	W*…W2000	0.1Hz	Low speed	
W2002	1...9999	0.1s	1st acceleration ramp time	3 s
W2003	1...9999	0.1s	1st deceleration ramp time	3 s
W2004	1...9999	0.1s	2nd acceleration ramp time	5 s
W2005	1...9999	0.1s	2nd deceleration ramp time	5 s
W2006	1...100	0.1Hz	Slip compensation : motor value	3 Hz
W2007	0...800 **	1 %	IR compensation	100 %
W2008	0...100	1 %	Profile	20 %
W2009	0...100	1 %	BOOST voltage	20 %
W2010	0...800 **	1 %	Damping	20 %
W2011	0...100	0.1%	Bandwidth	20 %
W2012	45%Invar...115%Invar	0.1 A	Thermal protection	Nominal motor current 1 (W214)

W* = Max. between W247 and W250

** Depends on torque type :   – High torque 150
                                 – Special 800
                                 – Other 100

In Var : W2205.

Altivar 66 variables

COMMAND WORDS (read and write)

Command register

WORD	DESCRIPTION	POSSIBLE VALUES
W2020	Speed controller reset	W2020,0 = 0 no request
		W2020,0 = 1 reset request
	Assignment of logic commands in line mode (DLI)	W2020,1 = 0 logic commands in local mode
		W2020,1 = 1 logic commands in line mode
	Assignment of set points in line mode (FLI)	W2020,2 = 0 set point in local mode
		W2020,2 = 1 set point in line mode
	Ramp 2 command	W2020,3 = 0 ramp 1 command
		W2020,3 = 1 ramp 2 command
	Communication check inhibited (NTO)	W2020,4 = 0 communication check activated
		W2020,4 = 1 communication check disactivated
	Start/Stop command (RUN)	W2020,5 = 0 stop request
		W2020,5 = 1 start request
	DC injection braking command (DCB)	W2020,6 = 0 no DC injection
		W2020,6 = 1 DC injection command
	Select orient stop	W2020,7 = 0 select orient stop
		W2020,7 = 1 select normal stop
		(warning : operation reversed compared to freewheel and fast stops)
	Select freewheel stop	W2020,8 see table below
	Select fast stop	W2020,9 see table below
	Voltage reduction command	W2020,10 = 0 no voltage reduction
		W2020,10 = 1 voltage reduction according to the commanded or configured value
	Select motor a	W2020,11 see table below
	Select motor b	W2020,12 see table below
	Reserved	W2020,13
	External fault command (EFL)	W2020,14 = 0 no external fault
		W2020,14 = 1 external fault present
	Reserved	W2020,15

⚠️ **Important** : it is imperative to set the bits (1 and 2) of word W2020 to 1 to access the logic commands and the ATV set point via serial link.

It is necessary to activate LI1 to start the motor.

The DLI and FLI bits are accepted first when writing.

Freewheel stop (W2020.8)	Fast stop (W2020.9)	Stop on stop request (W2020.5 = 0 → 1)
0	0	Normal stop
1	1	Freewheel stop
1	0	Freewheel stop
0	1	Fast stop

Select motor a (W2020.11)	Select motor b (W2020.12)	*	*
0	0	motor 1	1 parameter
1	0	motor 2	2 parameters
0	1	motor 3	3 parameters
1	1	No switching	No switching

* Depending on the configuration selected (multiparameter or multimotor)

COMMANDS

Altivar 66 variables

COMMAND WORDS (read and write)

Additional command register

WORD	DESCRIPTION	POSSIBLE VALUES
W2031	Current limit command	W2031,0 = 0 default limit W2031,0 = 1 current limit depending on the configured or commanded value
	Operating direction	W2031,1 = 0 run forward W2031,1 = 1 run reverse
	Auto / man command	W2031,2 = 0 auto set point W2031,2 = 1 man set point
	Motor and generator torque limit command	W2031,3 = 0 default limit W2031,3 = 1 torque limit depending on the configured or commanded values
	Preset speeds selection a	W2031,4 see table below
	Preset speeds selection b	W2031,5 see table below
	Preset speeds selection c	W2031,6 see table below
	Reserved	W2031,7 –> W2031,15

Selection a	Selection b	Selection c	Number of preset speeds
0	0	0	no preset speed
1	0	0	1 preset speed
0	1	0	2 preset speeds
1	1	0	3 preset speeds
0	0	1	4 preset speeds
1	0	1	5 preset speeds
0	1	1	6 preset speeds
1	1	1	7 preset speeds

Frequency set point in line mode

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W2021	-32767 .. 32767	-	frequency set point in line mode	26478 represents 400 Hz -26478 represents -400 Hz

Current and torque limit and voltage reduction

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W2024	400...1500	0.1 %	Current limit value	value expressed as a % of the nominal motor current
W2025	0...200%	1 %	Motor torque limit value	
W2026	0...200%	1 %	Generator torque limit value	
W2027			Reserved	
W2028	20...100 %	1 %	Motor voltage reduction value	value expressed as a % of the nominal motor voltage

Altivar 66 variables

COMMAND WORDS (read and write)

Analog and logic output command

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W2022			Reserved	W2022,0
			State of logic output LO1	W2022,1=0 low state W2022,1=1 high state
			State of logic output LO2	W2022,2=0 low state W2022,2=1 high state
			Reserved	W2022,3 and W2022,4
			State of output relay RO2	W2022,5=0 low state W2022,5=1 high state
			State of output relay RO3	W2022,6=0 low state W2022,1=1 high state
			State of output relay RO4	W2022,7=0 low state W2022,1=1 high state
W2023	0…4095		Value of output AO1	Depends on type of signal configured :
W2029	0…4095		Value of output AO2	0 corresponds to 0 mA or 4 mA
W2030	0…4095		Value of output AO3	4095 corresponds to 20 mA

⚠ Important : outputs LO, RO, and AO must be deactivated before use.

C O M M A N D S

Altivar 66 variables

SIGNALLING WORDS (read-only)

Status register

WORD	DESCRIPTION	POSSIBLE VALUES
W2040	All commands assigned in LOCAL mode	W2040,0 = 0 Commands assigned in line mode
		W2040,0 = 1 All commands assigned in local mode
		(terminal block or keypad)
	Speed controller ready (RDY or SLC)	W2040,1 = 0 Speed controller not ready
		W2040,1 = 1 Speed controller ready
	Faulty (FLT)	W2040,2 = 0 No speed controller fault
		W2040,2 = 1 Speed controller faulty
	Reset authorized	W2040,3 = 0 Reset not authorized
		W2040,3 = 1 Reset authorized
	Brake release relay energized	W2040,4 = 0 Brake release relay not energized
		W2040,4 = 1 Brake release relay energized
	Speed controller forced in LOCAL mode	W2040,5 = 0 Speed controller not forced
		W2040,5 = 1 Speed controller forced in LOCAL mode
	Communication check inhibited (NTO)	W2040,6 = 0 Communication fault monitoring
		W2040,6 = 1 No communication fault monitoring
	Resettable fault	W2040,7 = 0 Speed controller has no resettable fault
		W2040,7 = 1 Speed controller has resettable fault
	Motor running	W2040,8 = 0 Motor stopped
		W2040,8 = 1 Motor running
	Actual direction of rotation	W2040,9 = 0 Forward operation
		W2040,9 = 1 Reverse operation
	DC injection braking	W2040,10 = 0 No current injection
		W2040,10 = 1 Current injection in progress
	Steady state	W2040,11 = 0 Speed controller not in steady state
		W2040,11 = 1 Speed controller in steady state
	Motor thermal overload alarm	W2040,12 = 0 Speed controller has no motor overload fault
		W2040,12 = 1 Speed controller has motor overload fault
	Overbraking alarm	W2040,13 = 0 Speed controller has no DC bus overvoltage fault
		W2040,13 = 1 Speed controller has DC bus overvoltage fault
	Current limit	W2040,14 = 0 Speed controller not in current limit
		W2040,14 = 1 Speed controller in current limit
	No power present (NLP)	W2040,15 = 0 Speed controller has no AC phase failure
		W2040,15 = 1 Speed controller has AC phase failure

S I G N A L L I N G

Altivar 66 variables

SIGNALLING WORDS (read-only)

Complimentary status register

WORD	DESCRIPTION	POSSIBLE VALUES
W2047	Local control mode terminal block/keypad	W2047,0 = 0 Local control via terminal block W2047,0 = 1 Local control via keypad
	On line logic commands	W2047,1 = 0 On line logic commands not activated W2047,1 = 1 On line logic commands activated
	On line set point commands	W2047,2 = 0 On line set point commands not activated W2047,2 = 1 On line set point commands activated
	Dynamic braking (BRK)	W2047,3 = 0 Braking not active W2047,3 = 1 Braking active
	Fast stop in progress	W2047,4 = 0 Fast stop not in progress W2047,4 = 1 Fast stop in progress
	Controlled stop on loss of AC supply	W2047,5 = 0 Stop not in progress W2047,5 = 1 Stop in progress
	Output voltage deactivated freewheel stop	W2047,6 = 0 Power bridge controlled W2047,6 = 1 Power bridge not controlled
	Orient complete	W2047,7 = 0 Oriented stop is incomplete or not in progress W2047,7 = 1 Oriented stop is complete (function operates for 1 sec)
	Decelerating (DEC)	W2047,8 = 0 Speed controller not in deceleration phase W2047,8 = 1 Speed controller in deceleration phase
	Accelerating (ACC)	W2047,9 = 0 Speed controller not in acceleration phase W2047,9 = 1 Speed controller in acceleration phase
	Motor selection	W2047,10 State of motor selection or parameter set (a)
	Motor selection	W2047,11 State of motor selection or parameter set (b)
	Reserved	W2047,12
	Speed controller thermal alarm	W2047,13 = 0 Speed controller has no thermal overload fault W2047,13 = 1 Speed controller has thermal overload fault
	Reserved	W2047,14
	Stopped via the keypad	W2047,15 = 0 Speed controller has not been stopped by keypad W2047,15 = 1 Speed controller has been stopped by keypad (valid from the deceleration phase)

Altivar 66 variables

SIGNALLING WORDS (read-only)

Complimentary status register

WORD	DESCRIPTION	POSSIBLE VALUES
W2048	JOG in progress	W2048,0 = 0 JOG function not in progress
		W2048,0 = 1 JOG function in progress
	Shutdown completed	W2048,1 = 0 Shutdown not completed
		W2048,1 = 1 Shutdown completed
	Cycle completed	W2048,2 = 0 Cycle function not completed
		W2048,2 = 1 Cycle function completed
	Ramp 2 in progress	W2048,3 = 0 Ramp 1
		W2048,3 = 1 Ramp 2
	Auto/Man state	W2048,4 = 0 Manual activated
		W2048,4 = 1 Automatic activated
	Frequency threshold 1 reached	W2048,5 = 0 Frequency threshold 1 not reached
		W2048,5 = 1 Frequency threshold 1 reached
	Frequency threshold 2 reached	W2048,6 = 0 Frequency threshold 2 not reached
		W2048,6 = 1 Frequency threshold 2 reached
	Current threshold 1 reached	W2048,7 = 0 Current threshold 1 not reached
		W2048,7 = 1 Current threshold 1 reached
	Current threshold 2 reached	W2048,8 = 0 Current threshold 2 not reached
		W2048,8 = 1 Current threshold 2 reached
	Thermal threshold 1 reached	W2048,9 = 0 Thermal threshold 1 not reached
		W2048,9 = 1 Thermal threshold 1 reached
	Thermal threshold 2 reached	W2048,10 = 0 Thermal threshold 2 reached
		W2048,10 = 1 Thermal threshold 2 reached
	No ramp follow	W2048,11 = 0 Ramp follow
		W2048,11 = 1 No ramp follow
	External contactor in active state	W2048,12 = 0 Contactor not activated (Bypass mode)
		W2048,12 = 1 Contactor activated (Bypass mode)
	Direction of rotation requested	W2048,13 = 0 Forward operation
		W2048,13 = 1 Reverse operation

WORD	DESCRIPTION	POSSIBLE VALUES
W2049	Speed controller locked when stopped	W2049,0 = 0 Speed controller not locked when stopped
		W2049,0 = 1 Speed controller locked when stopped
	Invalid configuration	W2049,1 = 0 Valid configuration
		W2049,1 = 1 Invalid configuration
	OEM access protection indicator	W2049,2 = 0 not protected
		W2049,2 = 1 protected
	State of configuration semaphore	W2049,4 = 0 Semaphore free
		W2049,4 = 1 Semaphore reserved
	State of command semaphore	W2049,5 = 0 Semaphore free
		W2049,5 = 1 Semaphore reserved

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Altivar 66 variables

SIGNALLING WORDS (read-only)

Register of faults

WORD	POSSIBLE VALUES
W2050	= 0 No fault
	= 1 AC line overvoltage
	= 2 DC bus overvoltage
	= 3 DC bus undervoltage
	= 4 Ground fault
	= 5 Phase short-circuit
	= 6 ± 15 V supply
	= 7 Rating not recognized
	= 8 AC supply phase failure
	= 9 Motor overload
	= 10 Customer fault
	= 11 Speed controller thermal overload
	= 12 Overspeed
	= 13 Tachogenerator feedback loss
	= 14 Serial link loss
	= 15 Loss follower
	= 16 Memory failure
	= 17 DC bus load
	= 18 Isolation timeout (Bypass)
	= 19 Process timeout (Bypass)
	= 20 DB resistor absent
	= 21 DB resistor thermal protection
	= 22 Transistor short-circuit
	= 23 Open transistor
	= 24 Output phase loss
	= 25 Control card supply
	= 26 Peak current limit
	= 27 Reserved
	= 28 Disconnection of an I/O card
	= 29 Backdriving fault

Register of faults present (bit at 1 : fault present)

WORD	POSSIBLE VALUES
W2051	W2051,0 Unlisted internal + other ATV66 fault
	W2051,1 Serial link break
	W2051,2 Reserved
	W2051,3 Reserved
	W2051,4 DC bus undervoltage
	W2051,5 AC supply overvoltage
	W2051,6 In-phase loss
	W2051,7 Speed controller overtemperature
	W2051,8 Speed feedback not present, overspeed
	W2051,9 Phase short-circuit or ground short-circuit
	W2051,10 DC bus overvoltage
	W2051,11 Reserved
	W2051,12 Motor overload
	W2051,13 Output phase loss
	W2051,14 Reserved
	W2051,15 Precharge failure

S I G N A L L I N G

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SIGNALLING WORDS (read-only)

WORD	DESCRIPTION	POSSIBLE VALUES
W2140	Indicates position of marker on 1 of the 8 past faults	from 0 to 9
W2141	Past fault 1 : speed controller status	= 0 No fault
W2143	Past fault 2 : speed controller status	= 1 Acceleration
W2145	Past fault 3 : speed controller status	= 2 Deceleration
W2147	Past fault 4 : speed controller status	= 3 Steady state
W2149	Past fault 5 : speed controller status	= 4 Dynamic braking
W2151	Past fault 6 : speed controller status	= 5 Ready
W2153	Past fault 7 : speed controller status	= 6 DC injection
W2155	Past fault 8 : speed controller status	= 7 Current limit
		= 8 Reserved
		= 9 Reserved
		=10 Locking on run permitted
		=11 Faulty
		=12 Jog
W2142	Past fault 1 : fault name	= 0 No fault
W2144	Past fault 2 : fault name	= 1 AC supply overvoltage
W2146	Past fault 3 : fault name	= 2 DC bus overvoltage
W2148	Past fault 4 : fault name	= 3 DC bus undervoltage
W2150	Past fault 5 : fault name	= 4 Earth fault
W2152	Past fault 6 : fault name	= 5 Phase short-circuit
W2154	Past fault 7 : fault name	= 6 Power supply ± 15 V
W2156	Past fault 8 : fault name	= 7 Rating not recognized
		= 8 One phase missing
		= 9 Motor overload
		= 10 User fault
		= 11 Speed controller thermal overload
		= 12 Overspeed
		= 13 Tachogenerator feedback loss
		= 14 Serial link loss
		= 15 Loss of 4-20 mA current input
		= 16 Memory fault
		= 17 DC bus load
		= 18 Isolation timeout (Bypass)
		= 19 Process timeout (Bypass)
		= 20 Braking resistor missing
		= 21 Thermal protection of braking resistor
		= 22 Transistor short-circuit
		= 23 Transistor open
		= 24 Motor phase fault
		= 25 Control card supply
		= 26 Peak current limit
		= 27 Reserved
		= 28 Disconnection of an I/O card
		= 29 Back driving fault

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Altivar 66 variables

SIGNALLING WORDS (read-only)

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W2041	-32768...32767		Output frequency	400 Hz = 26478
W2042		0.1 A	Output current	
W2052		0.1 kW	Output power	
W2053		1 V	Output voltage	
W2054		1 V	Supply voltage	
W2055		1 V	Bus voltage	
W2056		1 %	Motor thermal state value	
W2057		1 %	Speed controller thermal state value	For rating > 7.5 kW
W2058		H	Motor running time elapsed (hours)	Total time = W2058, W2059
W2059		min	Motor running time elapsed (minutes)	
W2060		rpm	Output speed	
W2061			Machine speed reference (customer unit)	Frequency set point x scale factor (W734)
W2062			Machine frequency (customer unit)	Output frequency x scale factor (W734)

SIGNALLING WORDS (read-only)

WORD	RANGE	UNIT	DESCRIPTION	COMMENTS
W2074	0...2		No. of motor running or set parameter number	= 0 Motor 1 = 1 Motor 2 = 2 Motor 3
W2075	1...8		Current cycle step	= 1 step 1 = 2 step 2 = 3 step 3 = 4 step 4 = 5 step 5 = 6 step 6 = 7 step 7 = 8 step 8
W2076	0...7		Current preset speed number	= 0 set point = 1 preset speed 1 = 2 preset speed 2 = 3 preset speed 3 = 4 preset speed 4 = 5 preset speed 5 = 6 preset speed 6 = 7 preset speed 7

* Depending on the configuration selected (either multimotor, or multiparameter).

WORD	RANGE	DESCRIPTION	POSSIBLE VALUES
W2200	0...22	Commercial rating for speed controller in constant torque	= 0 Not significant = 1 Reserved = 2 Reserved = 3 Speed controller 2.2 kW - 3 HP = 4 Speed controller 3 kW - 4 HP = 5 Speed controller 4 kW - 5 HP = 6 Speed controller 5.5 kW - 7.5 HP = 7 Speed controller 7.5 kW - 10 HP = 8 Speed controller 11 kW - 15 HP = 9 Speed controller 15 kW - 20 HP = 10 Reserved = 11 Speed controller 22 kW - 30 HP = 12 Speed controller 30 kW - 40 HP = 13 Speed controller 37 kW - 50 HP = 14 Speed controller 45 kW - 60 HP = 15 Speed controller 55 kW - 75 HP = 16 Speed controller 75 kW - 100 HP = 17 Speed controller 90 kW - 125 HP = 18 Speed controller 110 kW - 150 HP = 19 Speed controller 132 kW - 200 HP = 20 Speed controller 160 kW - 250 HP = 21 Speed controller 200 kW - 300 HP = 22 Speed controller 220 kW - 350 HP = 23 Reserved

S I G N A L L I N G

Altivar 66 variables

SIGNALLING WORDS (read-only)

WORD	RANGE	UNIT	DESCRIPTION	COMMENTS
W2201	0...23		Configured speed controller rating	Same as previous rating with = 1 Speed controller 0.75 kW - 1HP = 2 Speed controller 1.5 kW - 2 HP = 10 Speed controller 18.5 kW - 20 HP = 23 Speed controller 250 kW - 400 HP
W2202			Speed controller voltage range	= 0 Not significant = 1 Voltage 208 - 240 V = 2 Voltage 380 - 460 V
W2203			AC frequency recognized or not	= 0 Not known = 1 50 Hz = 2 60 Hz
W2205		0.1A	Altivar nominal current	Depending on the rating, AC voltage and torque type
W2206		0.1A	Speed controller maximum current	Depending on the rating, AC voltage and torque type
W2071			Motor nominal voltage	= 0 Voltage 208 - 240 V = 1 Voltage 380 - 415 V = 2 Voltage 440 - 460 V

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W2211	0...1		Memory card present	= 0 Absent = 1 Present
W2212	0...1		Communication Interface Option	= 0 Non connected = 1 Connected
W2213	0...1		Graphic keypad present	= 0 Non connected = 1 Connected
W2214	0...3		I/O option present	= 0 No option = 1 24 V DC option card = 2 115 V AC option card
W2216	-1...5		PCMCIA communication card type	= 0 No option = 1 UNI-TELWAY / Modbus/Jbus = 2 Reserved = 3 FIP I/O = 4 Modbus + = 5 INTERBUS S = -1 Unknown option

Altivar 66 variables

SIGNALLING WORDS (read-only)

WORD	DESCRIPTION	POSSIBLE VALUES
W2043	Display of activation of LI1	W2043,1 = 0 Input inactive
		W2043,1 = 1 Input active
	Display of activation of LI2	W2043,2 = 0 Input inactive
		W2043,2 = 1 Input active
	Display of activation of LI3	W2043,3 = 0 Input inactive
		W2043,3 = 1 Input active
	Display of activation of LI4	W2043,4 = 0 Input inactive
		W2043,4 = 1 Input active
	Display of activation of LI5	W2043,5 = 0 Input inactive
		W2043,5 = 1 Input active
	Display of activation of LI6	W2043,6 = 0 Input inactive
		W2043,6 = 1 Input active
	Display of activation of LI7	W2043,7 = 0 Input inactive
		W2043,7 = 1 Input active
	Display of activation of LI8	W2043,8 = 0 Input inactive
		W2043,8 = 1 Input active
	Display of activation of LO1	W2043,9 = 0 Input inactive
		W2043,9 = 1 Input active
	Display of activation of LO2	W2043,10 = 0 Input inactive
		W2043,10 = 1 Input active
	Display of activation of R1	W2043,11 = 0 Input inactive
		W2043,11 = 1 Input active
	Display of activation of R2	W2043,12 = 0 Input inactive
		W2043,12 = 1 Input active
	Display of activation of R3	W2043,13 = 0 Input inactive
		W2043,13 = 1 Input active
	Display of activation of R4	W2043,14 = 0 Input inactive
		W2043,14 = 1 Input active

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Altivar 66 variables

SIGNALLING WORDS (read-only)

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W2044	0...100	1 %	Value of analog input AI1	0% for 0 V and 100 % for 10 V
W2063	0...100	1 %	Value of analog input AI2	0% for 0 mA and 100 % for 20 mA
W2064	0...100	1 %	Value of analog input AI3	0% for 0 V and 100 % for 10 V
W2065	0...100	1 %	Value of analog input AI4	0% for 0 mA and 100 % for 20 mA
W2100			Assignment of analog input AI1 (preset)	= 0 Not assigned = 1 Current limit = 2 Voltage reduction = 3 Frequency set point a = 4 Frequency set point b = 5 Frequency set point c = 8 PI Man set point = 9 Sensor feedback = 10 PI set point = 11 Torque limit
W2101			Assignment of analog input AI2 (preset)	= 0 Not assigned = 1 Current limit = 2 Voltage reduction = 3 Frequency set point a = 4 Frequency set point b = 5 Frequency set point c = 8 PI Man set point = 9 Sensor feedback = 10 PI set point = 11 Torque limit
W2102			Assignment of analog input AI3	= 0 Not assigned (preset without I/O) = 1 Current limit = 2 Voltage reduction = 3 Frequency set point a = 4 Frequency set point b = 5 Frequency set point c (preset with I/O) = 6 Tachogenerator speed feedback = 8 PI Man set point = 9 Sensor feedback = 10 PI set point = 11 Torque limit
W2103			Assignment of analog input AI4	= 0 Not assigned (preset) = 1 Current limit = 2 Voltage reduction = 3 Frequency set point a = 4 Frequency set point b = 5 Frequency set point c = 8 PI Man set point = 9 Sensor feedback = 10 PI set point = 11 Torque limit

SIGNALLING

SIGNALLING WORDS (read-only)

Display of assignment of analog outputs

WORD	RANGE	DESCRIPTION	POSSIBLE VALUES
W2104		Assignment of analog output AO1 (preset)	= 0 Not assigned = 1 Motor current = 2 Motor frequency = 3 Output power = 4 Motor torque = 5 Output voltage = 6 Motor thermal state = 7 Ramp output = 8 PI set point = 9 Sensor feedback = 10 PI error = 11 PI error integrator
W2105		Assignment of analog output AO2 (preset)	= 0 Not assigned = 1 Motor current = 2 Motor frequency = 3 Output power = 4 Motor torque = 5 Output voltage = 6 Motor thermal state = 7 Ramp output = 8 PI set point = 9 Sensor feedback = 10 PI error = 11 PI error integrator
W2106		Assignment of analog output AO3 (preset)	= 0 Not assigned = 1 Motor current = 2 Motor frequency = 3 Output power = 4 Motor torque = 5 Output voltage = 6 Motor thermal state = 7 Ramp output = 8 PI set point = 9 Sensor feedback = 10 PI error = 11 PI error integrator

SIGNALLING

Altivar 66 variables

SIGNALLING WORDS (read-only)

Display of assignment of logic outputs

WORD	DESCRIPTION	POSSIBLE VALUES
W2107	Preset assignment of LO1 : set point reached	= 0 No assignment
W2108	Preset assignment of LO2 : current limit	= 1 Speed controller ready
W2111	Preset assignment of R1 : fault	= 2 Run
W2112	Preset assignment of R2 : run	= 3 Set point reached
W2113	Preset assignment of R3 : thermal state level 1	= 4 Forward operation
W2114	Preset assignment of R4 : speed controller ready	= 5 Reverse operation
		= 6 Graphic keypad command
		= 7 Auto / Man : automatic position
		= 8 Current limit
		= 9 Torque limit
		= 10 Fault
		= 11 Speed controller thermal alarm
		= 12 Loss of AI2
		= 13 No ramp follow
		= 14 TACH feedback fault
		= 15 Overspeed (frequency)
		= 16 Frequency threshold 1 reached
		= 17 Frequency threshold 2 reached
		= 18 Current threshold 1 reached
		= 19 Current threshold 2 reached
		= 20 Thermal threshold 1 reached
		= 21 Thermal threshold 2 reached
		= 22 Reserved
		= 23 Braking command
		= 24 Shutdown completed
		= 25 Orient complete
		= 26 Cycle complete
		= 27 Cycle fault
		= 28 Run command signal (BYPASS)
		= 29 JOG in progress
		= 30 Reserved
		= 31 Reserved
		= 32 PI error exceeded
		= 33 PI max error exceeded
		= 34 PI min error exceeded

Altivar 66 variables

SIGNALLING WORDS (read-only)

Display of assignment of logic inputs

WORD	DESCRIPTION	POSSIBLE VALUES
W2115	Assignment of LI1 : Stop (not reconfigurable)	Depends on the 2-wire / 3-wire configuration
		= 1 Stop (not reconfigurable)
		= 2 Run (not reconfigurable)
W2116	Assignment of LI2 : Forward operation (not reconfigurable)	= 3 Forward operation (not reconfigurable)
W2117	Assignment of LI3 : Reverse operation	= 0 Not assigned
W2118	Assignment of LI4 : JOG	= 4 Reverse operation
W2119	Assignment of LI5 : Preset speed a	= 5 Current limit
W2120	Assignment of LI6 : Preset speed b	= 6 Voltage reduction
W2121	Assignment of LI7 : Preset speed c	= 7 Ramp switching
W2122	Assignment of LI8 : Fault reset	= 8 JOG
		= 9 + speed
		= 10 - speed
		= 11 Controlled stop
		= 12 Start cycle with I/O card
		= 13 Reset cycle with I/O card
		= 14 Cycle blocked with I/O card
		= 15 Cycle next stop with I/O card
		= 16 Set point memory
		= 17 Preset speed a command
		= 18 Preset speed b command
		= 19 Preset speed c command with I/O card
		= 20 Indexing command with I/O card
		= 21 Indexing pulse with I/O card
		= 22 Local control
		= 23 Auto/man
		= 24 Terminal block/keypad
		= 25 Input assigned to process (Bypass)
		= 26 Input assigned to starting (Bypass)
		= 27 Parameter selection / motor a
		= 28 Parameter selection / motor b
		= 29 Customer fault
		= 30 Reset fault (RAZ fault)
		= 31 Run Auto
		= 32 Reserved
		= 33 Auto/Man (PI)
		= 34 Reverse direction (PI)
		= 35 Reserved
		= 36 Torque limit

S I G N A L L I N G

Altivar 66 variables

CONFIGURATION WORDS (read and write)
Access to variables management

Semaphores and locking when stopped

WORD	RANGE	DESCRIPTION	COMMENTS
W198		Configuration semaphore	0 = Free
			1 = Reserved
W199		Speed controller locked when stopped	0 = Not locked
			1 = Locked
W2235		Command semaphore	0 = Free
			1 = Reserved

See section "Communication principle"

Access to speed controller adjustments

WORD	RANGE	UNIT	DESCRIPTION	COMMENTS
W748			Type of access to speed controller data via keypad	0 = Partial access
				1 = Total access

Altivar 66 variables

CONFIGURATION WORDS (read and write)
Basic configuration of speed controller and motor

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W211			Motor nominal frequency type	= 0 Frequency 50 Hz
				= 1 Frequency 60 Hz
				= 2 Special frequency

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W212	25...Fmax VAR	1Hz	Motor nominal frequency	

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W301	W212...Fmax VAR	0.1Hz	Motor maximum frequency	

High speed

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W302	W303...W301	0.1Hz	High speed	50 Hz if 50 Hz supply
				60 Hz if 60 Hz supply

Low speed

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W303	0...W302	0.1Hz	Low speed	Preset at 0.0 Hz

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W213			Motor nominal voltage	= 0 Nominal voltage 208 V
				= 1 Nominal voltage 220 V
				= 2 Nominal voltage 230 V
			Preset supply voltage	= 3 Nominal voltage 240 V
				= 4 Nominal voltage 380 V
			Preset 50Hz supply	= 5 Nominal voltage 400 V
				= 6 Nominal voltage 415 V
				= 7 Nominal voltage 440 V
			Preset 60 Hz supply	= 8 Nominal voltage 460 V

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W214	45% Inom VAR	0.1A	Motor nominal current	Preset at In 0.9 speed controller
	105% Inom VAR			

VAR nominal current depends on the torque type, supply frequency, speed controller rating and motor rating
F max VAR :
Constant torque : 400 Hz for Altivar 66 U41N4 to D79N4
                          Altivar 66 U41M2 to D46M2
                 200 Hz for Altivar 66 C10N4 to C31N4
Variable torque : 75/90 Hz (50 Hz/60Hz supply)

WORD	RANGE	UNIT	DESCRIPTION
W219	300…24000	rpm	Motor nominal speed configuration

* When the multi-motor function is being used, nominal speed configuration by motor 2 is done
via word W419 and for motor 3 via word W619.

Altivar 66 variables

CONFIGURATION WORDS (read and write)
Basic configuration of speed controller and motor

WORD	DESCRIPTION	POSSIBLE VALUES
W200	2- or 3-wire control	= 0 2-wire control (preset) = 1 3-wire control
W201	Torque type	= 0 Constant torque (preset) = 1 Variable torque = 2 Low noise variable torque
W206	Control type	= 0 Normal control (preset) = 1 NOLD control = 2 High torque control = 3 Special motor control
W202	Motor power Only applicable to U41 rating (preset)	= 1 Motor 0.75 kW - 1 HP = 2 Motor 1.5 kW - 2 HP = 3 Motor 2.2 kW - 3 HP
W210	Direction of phase rotation	W210,1 = 0 Phase rotation ABC (preset) W210,1 = 1 Phase rotation ACB

Configuration of torque limit

WORD	RANGE	UNIT	DESCRIPTION	COMMENTS
W320			Torque limit type	= 0 Torque limit by fault = 1 Torque limit by logic input = 2 Torque limit by analog input
W321			Torque limit assignment of activating logic input	= 0 No logic input assigned = 1 Reserved = 2 Reserved = 3 Logic input LI3 on basic product = 4 Logic input LI4 on basic product = 5 Logic input LI5 (I/O card) = 6 Logic input LI6 (I/O card) = 7 Logic input LI7 (I/O card) = 8 Logic input LI8 (I/O card)
W322			Torque limit assignment of activating analog input	= 0 No analog input assigned = 1 Analog input AI1 = 2 Analog input AI2 = 3 Analog input AI3 (I/O card) = 4 Analog input AI4 (I/O card)
W215 or W323	0...200	1%	Torque limit in generator phase	Only in constant torque HIGH TORQUE (preset at 200%)
W216 or W324	0...200	1%	Torque limit in motor phase	Only in constant torque HIGH TORQUE (preset at 200%)

Altivar 66 variables

CONFIGURATION WORDS (read and write)

Configuration of slip compensation

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W225			Enabling of slip compensation	W225,0 = 0 Function not enabled
				W225,0 = 1 Function enabled
W226			Slip compensation type	= 0 No compensation
			(preset)	= 1 Automatic compensation
				= 2 Manual compensation
W227	1..100	0.1Hz	Slip compensation value	Preset at 3.0 Hz

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W228	0...IR Comp max	1%	IR compensation value	Only for constant torque, preset at 100%

Max IR comp : Depends on control type :   - High torque…150 %

       - Special…800 %

       - Normal…100 %

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W229	0...100	1%	Profile	Only for variable torque and if NORMAL
				has been selected (preset at 20 %)

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W230	0...100	1%	Voltage boost	Only for constant torque HIGH TORQUE
				or SPECIAL (preset at 20%)

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W231	1...Stab max	1%	Damping	Preset at 20%

Max. damping :   800 % for Normal control variable torque and Special control constant torque

       100 % otherwise

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W232	0...100	1%	Bandwidth	Only for constant torque control
				HIGH TORQUE (preset at 20%)

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Altivar 66 variables

CONFIGURATION WORDS (read and write)

Configuration of braking sequence

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W245			Enabling of braking sequence	W245,0 = 0 Function not enabled (preset)
				W245,0 = 1 Function enabled
W246			Brake control logic output	= 0 No logic output assigned
				= 1 Logic output LO1
				= 2 Logic output LO2
				= 3 Reserved
				= 4 Logic output R2
				= 5 Logic output R3 (I/O card)
				= 6 Logic output R4 (I/O card)
W247	0...W303	0.1Hz	Brake dwell frequency	From 0 to LS (low speed) Preset at 0 Hz
W248	0...W214	0.1 A	Brake dwell current level	From 0 to In (In = motor nominal current)
				Preset at 0 A
W249	0...50	0.1s	Brake dwell time	Preset at 0.0 s
W250	0...W303	0.1Hz	Brake release frequency	Preset at 0.0 Hz
W251	0...50	0.1s	Brake release time	Preset at 0.0 s
W252	50...150	1%	DC injection level	Preset at 70 %
W253	0...301	0.1s	DC injection time	Preset at 2 s

Summary of analog inputs

WORD	RANGE	DESCRIPTION	POSSIBLE VALUES
W810		Limitation to 0 of the summing of analog inputs assigned to the frequency set point	W810,2 = 0 Function not enabled
			W810,2 = 1 Function enabled (preset)
W811		Analog input : frequency set point «a»	= 0 No analog input
			= 1 Analog input AI1 (preset)
			= 2 Analog input AI2
			= 3 Analog input AI3 (I/O card)
			= 4 Analog input AI4 (I/O card)
W812		Analog input : frequency set point «b»	= 0 No analog input
			= 1 Analog input AI1
			= 2 Analog input AI2 (preset)
			= 3 Analog input AI3 (I/O card)
			= 4 Analog input AI4 (I/O card)
W813		Analog input : frequency set point «c»	= 0 No analog input (preset)
			= 1 Analog input AI1
			= 2 Analog input AI2
			= 3 Analog input AI3 (I/O card)
			= 4 Analog input AI4 (I/O card) (preset)

Altivar 66 variables

CONFIGURATION WORDS (read and write)

Configuration of current limit

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W260			Enabling of current limit	W260,0 = 0 Function not enabled (preset)
				W260,0 = 1 Function enabled
W261			Current limit type	= 0 No current limit (preset)
				= 1 Limit via frequency level
				= 2 Limit via logic input
				= 3 Limit via analog input
W262			Logic input to activate current limit	= 0 No logic input assigned
				= 1 Reserved
				= 2 Reserved
				= 3 Logic input LI3 on basic product
				= 4 Logic input LI4 on basic product
				= 5 Logic input LI5 (I/O card)
				= 6 Logic input LI6 (I/O card)
				= 7 Logic input LI7 (I/O card)
				= 8 Logic input LI8 (I/O card)
W263			Analog input for current limit	= 0 No analog input
				= 1 Analog input AI1
				= 2 Analog input AI2
				= 3 Analog input AI3 (I/O card)
				= 4 Analog input AI4 (I/O card)
W264	0... Fmax VAR	0.1Hz	Activation frequency level	Preset at 60 Hz if 60 Hz supply
				50 Hz if 50 Hz supply
W265	40 % of I nom VAR ...I xx	0.1A	Limit current	I xx depends on torque type selected, supply frequency and speed controller rating
				Constant torque 60Hz $\Rightarrow$ 150 %. I nom ATV
				Constant torque 50Hz $\Rightarrow$ 136 %. I nom ATV
				Variable torque $\Rightarrow$ 110 %. I nom ATV

Altivar 66 variables

CONFIGURATION WORDS (read and write)

Configuration of acceleration and deceleration

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W270			Enabling of ramp switching (alternate ramp)	W270,0 = 0 Function not enabled (preset) W270,0 = 1 Function enabled
W271			Acceleration type	= 0 Linear ramp (preset) = 1 S ramp = 2 U ramp
W272	0...100	1%	Rounding coefficient for S acceleration ramps	Preset at 20 %
W273	0...100	1%	Rounding coefficient for U acceleration ramps	Preset at 50 %
W274			Deceleration type	= 0 Linear ramp (preset) = 1 S ramp = 2 U ramp
W275	0...100	1%	Rounding coefficient for S deceleration ramps	Preset at 20 %
W276	0...100	1%	Rounding coefficient for U deceleration ramps	Preset at 50 %
W277			Ramp switching type (alternate ramp)	= 0 Not assigned (preset) = 1 Switching by frequency level = 2 Switching by logic input
W278			Logic input for ramp switching	= 0 No logic input (preset) = 1 Reserved = 2 Reserved = 3 Logic input LI3 on basic product = 4 Logic input LI4 on basic product = 5 Logic input LI5 (I/O card) = 6 Logic input LI6 (I/O card) = 7 Logic input LI7 (I/O card) = 8 Logic input LI8 (I/O card)
W279	0...Fmax VAR	0.1Hz	Activation frequency level	Preset at 30.0 Hz
W280	1...9999	0.1s	Duration of first acceleration ramp	Preset at 3.0 s
W281	1...9999	0.1s	Duration of first deceleration ramp	Preset at 3.0 s
W282	1...9999	0.1s	Duration of second acceleration ramp	Preset at 5.0 s
W283	1...9999	0.1s	Duration of second deceleration ramp	Preset at 5.0 s

Configuration of skip frequencies

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W290			Skip frequency range 1	W290,1 = 0 2 Hz (default) W290,1 = 1 5 Hz
			Skip frequency range 2	W290,2 = 0 2 Hz (default) W290,2 = 1 5 Hz
			Skip frequency range 3	W290,3 = 0 2 Hz (default) W290,3 = 1 5 Hz
W291	0...Fmax VAR	0.1Hz	Skip frequency value 1	Preset at 0.0 Hz
W292	0...Fmax VAR	0.1Hz	Skip frequency value 2	Preset at 0.0 Hz
W293	0...Fmax VAR	0.1Hz	Skip frequency value 3	Preset at 0.0 Hz

Altivar 66 variables

CONFIGURATION WORDS (read and write)

Configuration of reverse operation function

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W880			Enabling of reverse function	W880,0 = 0 Function not enabled
				W880,0 = 1 Function enabled (preset)
W881			Logic input for enabling Run / Reverse	= 0 No logic input assigned
				= 1 Reserved
				= 2 Reserved
			Preset	= 3 Logic input LI3 on basic product
				= 4 Logic input LI4 on basic product
				= 5 Logic input LI5 (I/O card)
				= 6 Logic input LI6 (I/O card)
				= 7 Logic input LI7 (I/O card)
				= 8 Logic input LI8 (I/O card)

Configuration of JOG function

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W890			Enabling of JOG function	W890.0 = 0 Function not enabled
				W890,0 = 1 Function enabled (preset)
W891			Logic input for JOG activation	= 0 No logic input assigned
				= 1 Reserved
				= 2 Reserved
				= 3 Logic input LI3 on basic product
			Preset	= 4 Logic input LI4 on basic product
				= 5 Logic input LI5 (I/O card)
				= 6 Logic input LI6 (I/O card)
				= 7 Logic input LI7 (I/O card)
				= 8 Logic input LI8 (I/O card)
W892			Logic output for signalling enabling of JOG	= 0 No logic output assigned (preset)
				= 1 Logic output LO1
				= 2 Logic output LO2
				= 3 Reserved
				= 4 Logic output R2
				= 5 Logic output R3 (I/O card)
				= 6 Logic output R4 (I/O card)
W893	2...100	0.1Hz	JOG set point frequency	Preset at 5.0 Hz
W894	2...100	0.1s	Dead time between two JOG pulses	Preset at 0.5 s

Altivar 66 variables

CONFIGURATION WORDS (read and write)

Configuration of + speed / - speed function

WORD	DESCRIPTION	POSSIBLE VALUES
W820	Enabling of + speed / - speed function	W820,0 = 0 Function not enabled (preset)
		W820,0 = 1 Function enabled
W821	Type of + / - speed	= 0 Function not enabled (preset)
		= 1 Enabling with memorization of speed reference
		= 2 Enabling without memorization of speed reference
W822	Logic input for - speed	= 0 No logic output assigned (preset)
		= 1 Reserved
		= 2 Reserved
		= 3 Logic input LI3 on basic product
		= 4 Logic input LI4 on basic product
		= 5 Logic input LI5 (I/O card)
		= 6 Logic input LI6 (I/O card)
		= 7 Logic input LI7 (I/O card)
		= 8 Logic input LI8 (I/O card)
W823	Logic input for + speed	= 0 No logic output assigned (preset)
		= 1 Reserved
		= 2 Reserved
		= 3 Logic input LI3 on basic product
		= 4 Logic input LI4 on basic product
		= 5 Logic input LI5 (I/O card)
		= 6 Logic input LI6 (I/O card)
		= 7 Logic input LI7 (I/O card)
		= 8 Logic input LI8 (I/O card)

CONFIGURATION WORDS (read and write)

Configuration of preset speeds

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W830			Enabling of preset speeds	W830,0 = 0 Function not enabled (preset) W830,0 = 1 Function enabled (preset with I/O option)
W831			Choice of number of preset speeds	= 0 No preset speed (preset) = 1 One preset speed = 2 Three preset speeds = 3 Seven preset speeds (preset with I/O option)
W832			Select via logic input (a)	= 0 No logic input assigned (preset)
W833			Select via logic input (b)	= 1 Reserved
W834			Select via logic input (c)	= 2 Reserved
				= 3 Logic input LI3 on basic product = 4 Logic input LI4 on basic product (preset) = 5 Logic input LI5 (I/O card) preset : (a) with I/O card = 6 Logic input LI6 (I/O card) preset : (b) with I/O card = 7 Logic input LI7 (I/O card) preset : (c) with I/O card = 8 Logic input LI8 (I/O card)
W835	0...Fmax VAR	0.1Hz	Speed 1 value	Preset at 5.0 Hz
W836	W835…Fmax VAR	0.1Hz	Speed 2 value	Preset at10.0 Hz
W837	W836…Fmax VAR	0.1Hz	Speed 3 value	Preset at 15.0 Hz
W838	W837…Fmax VAR	0.1Hz	Speed 4 value	Preset at 20.0 Hz
W839	W838…Fmax VAR	0.1Hz	Speed 5 value	Preset at 25.0 Hz
W840	W839…Fmax VAR	0.1Hz	Speed 6 value	Preset at 30.0 Hz
W841	W840…Fmax VAR	0.1Hz	Speed 7 value	Preset at 35.0 Hz

F max VAR :
Constant torque : 400 Hz for Altivar 66 U41N4 to D79N4
                                     Altivar 66 U41M2 to D46M2
                                 200 Hz for Altivar 66 C10N4 to C31N4
Variable torque : 75/90 Hz (50 Hz/60Hz supply)

The value of preset speed 1 must be less than the value of preset speed 2,
which must be less than the value of preset speed 3,
which must be less than the value of preset speed 4,
which must be less than the value of preset speed 5,
which must be less than the value of preset speed 6,
which must be less than the value of preset speed 7, whatever the number of preset speeds.

C O N F I G U R A T I O N

Altivar 66 variables

CONFIGURATION WORDS (read and write)

Configuration of Auto/Man function

WORD	DESCRIPTION	POSSIBLE VALUES
W860	Auto/Man	W860, 0 = 0 Not enabled (preset)
		W860, 0 = 1 Enabled via logic input
W861	Auto / manual switching logic input	= 0 No logic input assigned (preset)
		= 1 Reserved
		= 2 Reserved
		= 3 Logic input LI3 on basic product
		= 4 Logic input LI4 on basic product
		= 5 Logic input LI5 (I/O card)
		= 6 Logic input LI6 (I/O card)
		= 7 Logic input LI7 (I/O card)
		= 8 Logic input LI8 (I/O card)
W862	Automatic run logic input	= 0 No logic input assigned (preset)
		= 1 Reserved
		= 2 Reserved
		= 3 Logic input LI3 on basic product
		= 4 Logic input LI4 on basic product
		= 5 Logic input LI5 (I/O card)
		= 6 Logic input LI6 (I/O card)
		= 7 Logic input LI7 (I/O card)
		= 8 Logic input LI8 (I/O card)

Configuration of local forcing

WORD	RANGE	UNIT	DESCRIPTION	COMMENTS
W910			Enabling of local forcing	W910, 0 = Function not enabled (preset)
				W910, 1 = Function enabled
W911			Local forcing via logic input	= 0 No logic input assigned
				= 1 Reserved
				= 2 Reserved
				= 3 Logic input LI3 on basic product
				= 4 Logic input LI4 on basic product
				= 5 Logic input LI5 (I/O card)
				= 6 Logic input LI6 (I/O card)
				= 7 Logic input LI7 (I/O card)
				= 8 Logic input LI8 (I/O card)

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Altivar 66 variables

CONFIGURATION WORDS (read and write)

Configuration of controlled stop

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W920			Enabling of controlled stop	W920,0 = 0 Function not enabled (preset)
				W920,0 = 1 Function enabled
			Activation input active level	W920,1 = 0 active at 0 (preset)
				W920,1 = 1 active at 1
W921			Controlled stop : type of input activation	= 0 No controlled stop (preset)
				= 1 Activation via logic input
				= 2 Activation on frequency level
				= 3 Activation via logic input
				or frequency level
W922			Stop command via logic input	= 0 No logic input assigned (preset)
				= 1 Reserved
				= 2 Reserved
				= 3 Logic input LI3 on basic product
				= 4 Logic input LI4 on basic product
				= 5 Logic input LI5 (I/O card)
				= 6 Logic input LI6 (I/O card)
				= 7 Logic input LI7 (I/O card)
				= 8 Logic input LI8 (I/O card)
W923			Type of controlled stop activated via logic input	= 0 Freewheel stop (preset)
				= 1 Fast stop
				= 2 DC injection stop
W924			Type of controlled stop activated via frequency level	= 0 Freewheel stop (preset)
				= 1 Fast stop
				= 2 DC injection stop
W925	0…Fmax VAR	0.1 Hz	Frequency level adjustment	Preset at 0 Hz
W926	50…150	1%	Percentage of DC current injected	Preset at 70% (same as W955)
W927	0…301	0.1 s	Adjustment of DC current injection time	Preset at 2 s (same as W956)

F max VAR : (W2204)

Constant torque : 400 Hz for Altivar 66 U41N4 to D79N4

                                   Altivar 66 U41M2 to D46M2

                    200 Hz for Altivar 66 C10N4 to C31N4

Variable torque : 75/90 Hz (50 Hz/60Hz supply)

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Altivar 66 variables

CONFIGURATION WORDS (read and write)

Configuration of shutdown

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W940			Shutdown	W940,0 = 0 Function not enabled (preset)
				W940,0 = 1 Function enabled
W941			Logic output to signal shutdown completed	= 0 No logic output assigned (preset)
				= 1 Logic output LO1
				= 2 Logic output LO2
				= 3 Reserved
				= 4 Logic output R2
				= 5 Logic output R3 (I/O card)
				= 6 Logic output R4 (I/O card)
W942	1...600	0.1s	Low speed dwell time	Preset at 1.0 s

Configuration of Bypass

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W970			Bypass	W970,0 = 0 Function not enabled (preset)
				W970,0 = 1 Function enabled
W971			Start input OK	= 0 No logic input assigned (preset)
				= 1 Reserved
				= 2 Reserved
W972			Process input	= 3 Logic input LI3 on basic product
				= 4 Logic input LI4 on basic product
				= 5 Logic input LI5 (I/O card)
				= 6 Logic input LI6 (I/O card)
				= 7 Logic input LI7 (I/O card)
				= 8 Logic input LI8 (I/O card)
W973			Contactor control logic output	= 0 No logic output assigned (preset)
				= 1 Logic output LO1
				= 2 Logic output LO2
				= 3 Reserved
				= 4 Logic output R2
				= 5 Logic output R3 (I/O card)
				= 6 Logic output R4 (I/O card)
W974	2...100	0.1s	Decay time	Preset at 2.0 s
W975	2...3000	0.1s	Sequence time	Preset at 5.0 s
W976	2...3000	0.1s	Process time	Preset at 5.0 s

CONFIGURATION

Altivar 66 variables

Configuration of PI function

WORD	RANGE	DESCRIPTION	POSSIBLE VALUES
W1040		Enabling of PI function	W1040,0 = 1 Function enabled W1040,0 = 0 Not enabled (preset)
W1041		Authorizing the direction of rotation Preset	W1041,0 = 1 Forward/reverse direction permissible W1041,0 = 0 Only forward direction permissible
		Increase in the PI error Preset	W1041,1 = 1 Increase in the PI error : decrease in the speed of the motor. W1041,1 = 0 Increase in the PI error : increase in the speed of the motor.
		PI set point via the Preset keypad	W1041,2 = 1 No PI set point via the graphic keypad W1041,2 = 0 PI set point via the graphic keypad
		Man. set point via the Preset keypad	W1041,3 = 1 No speed reference via graphic keypad W1041,3 = 0 Speed reference via the graphic keypad

Management of PI alarm

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W1048	-9999… W1049		Minimum value for triggering the alarm	Preset at : 0
W1049	-9999… W1048		Maximum value for triggering the alarm	Preset at : 1000

Configuration of PI function

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W1043	-9999…9999		Gain	Preset at : 9999
W1044	-9999…9999		Offset	Preset at : 0
W1046	-9999…9999		Min. feedback value for the sensor in user-defined units	Preset at : 0
W1047	-9999…9999		Max. feedback value for the sensor in user-defined units	Preset at : 1000
W1053	0…1000	0.1 %	PI error ratio	Preset at : 100 %
W1054	0…9999		PI set point value for the graphic keypad	Preset at : 0
W1055	0…4000	0.1 Hz	Speed reference value for the graphic keypad	Preset at 0 Hz
W1056	1…9999	%	Proportional gain	Preset at 100 %
W1057	0…9999		Integral gain	Preset at 0

Altivar 66 variables

Assignment of I/O for the PI function

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W1042	0…4		Assignment of analog input for the PI set point	W1042 = 0 Not assigned W1042 = 1 Analog input AI1 W1042 = 2 Analog input AI2 W1042 = 3 Analog input AI3 (I/O card) W1042 = 4 Analog input AI4 (I/O card)
W1045	0…4		Assignment of analog input for the sensor feedback	W1045 = 0 Not assigned W1045 = 1 Analog input AI1 W1045 = 2 Analog input AI2 W1045 = 3 Analog input AI3 (I/O card) W1045 = 4 Analog input AI4 (I/O card)
W1050	0…4		Assignment of analog input for the speed reference	W1050 = 0 Not assigned W1050 = 1 Analog input AI1 W1050 = 2 Analog input AI2 W1050 = 3 Analog input AI3 (I/O card) W1050 = 4 Analog input AI4 (I/O card)
W1051	0…8		Assignment of logic input switching between man/auto mode	W1051 = 0 Not assigned W1051 = 1 Reserved W1051 = 2 Reserved W1051 = 3 Logic input LI3 W1051 = 4 Logic input LI4 W1051 = 5 Logic input LI5 (I/O card) W1051 = 6 Logic input LI6 (I/O card) W1051 = 7 Logic input LI7 (I/O card) W1051 = 8 Logic input LI8 (I/O card)
W1052	0…8		Assignment of logic input for reversing the direction of rotation	W1052 = 0 Not assigned W1052 = 1 Reserved W1052 = 2 Reserved W1052 = 3 Logic input LI3 W1052 = 4 Logic input LI4 W1052 = 5 Logic input LI5 (I/O card) W1052 = 6 Logic input LI6 (I/O card) W1052 = 7 Logic input LI7 (I/O card) W1052 = 8 Logic input LI8 (I/O card)
W1058	0…3		Assignment of analog output for the PI set point	W1058 = 0 Not assigned W1058 = 1 Analog output AO1 W1058 = 2 Analog output AO2 W1058 = 3 Analog output AO3
W1059	0…3		Assignment of analog output for the PI feedback	W1059 = 0 Not assigned W1059 = 1 Analog output AO1 W1059 = 2 Analog output AO2 W1059 = 3 Analog output AO3
W1060	0…3		Assignment of analog output for the PI error	W1060 = 0 Not assigned W1060 = 1 Analog output AO1 W1060 = 2 Analog output AO2 W1060 = 3 Analog output AO3

Altivar 66 variables

Assignment of I/O for the PI function

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W1061	0…3		Assignment of analog output for the PI integrator	W1061 = 0 Not assigned W1061 = 1 Analog output AO1 W1061 = 2 Analog output AO2 W1061 = 3 Analog output AO3
W1062	0…8		Assignment of logic output indicating that the error has exceeded the set value	W1062 = 0 Not assigned W1062 = 1 Logic output LO1 W1062 = 2 Logic output LO2 W1062 = 3 Reserved W1062 = 4 Logic output R2 W1062 = 5 Logic output R3 (I/O card) W1062 = 6 Logic output R4 (I/O card)
W1063	0…8		Assignment of logic output indicating that the process feedback is greater than the maximum set value	W1063 = 0 Not assigned W1063 = 1 Logic output LO1 W1063 = 2 Logic output LO2 W1063 = 3 Reserved W1063 = 4 Logic output R2 W1063 = 5 Logic output R3 (I/O card) W1063 = 6 Logic output R4 (I/O card)
W1064	0…8		Assignment of logic output indicating that the process feedback is greater than the minimum set value	W1064 = 0 Not assigned W1064 = 1 Logic output LO1 W1064 = 2 Logic output LO2 W1064 = 3 Reserved W1064 = 4 Logic output R2 W1064 = 5 Logic output R3 (I/O card) W1064 = 6 Logic output R4 (I/O card)

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Altivar 66 variables

Multimotor and multiparameter functions

The use of multimotor and multiparameter functions can be dangerous (especially when switching motors); it is therefore advisable to read the instructions in the ATV66 user manual thoroughly.

To simplify this document, a list of multimotor and multiparameter functions and parameters is provided at the end of the manual (indicated by the letters M and P).

The multimotor function is used to configure up to three motors. These motors can be configured using the same data or independently. However, even though the functions or parameters are multimotor, the inputs and outputs of the speed controller are not. In fact, if the user decides to configure different I/O for each motor, then only the last assignment will actually be taken into account.

Data structure

• The configuration of motor 1 is between words W206 and W324.
• The configuration of motor 2 is between words W406 and W524 (same as motor 1 + 200).
• The configuration of motor 3 is between words W606 and W724 (same as motor 1 + 400).

Example : W214, nominal current for motor 1.
W414, nominal current for motor 2.
W614, nominal current for motor 3.

The display variables monitor the motor which is currently running (word W2074 gives the parameter set or the number of the current motor).

Similarly, for the multiparameter function, the functions and parameters which can be accessed using this function are indicated at the end of this manual (by the letter P).

Altivar 66 variables

Configuration of multimotor and multiparameter functions

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES	
W901	0…5		Configuration of multimotor and multiparameter functions	= 0	1 motor
				= 2	2 motors
				= 3	2 parameter sets
				= 4	3 motors
				= 5	3 parameter sets

Assignment of logic inputs for multimotor and multiparameter functions

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES	
W902	0…8		Assignment of LIa (selecting the set of parameters or motor)	W902 = 0 Not assigned	(preset)
				W902 = 1 Reserved	
				W902 = 2 Reserved	
				W902 = 3 Logic input LI3	
				W902 = 4 Logic input LI4	
				W902 = 5 Logic input LI5 (I/O card)	
				W902 = 6 Logic input LI6 (I/O card)	
				W902 = 7 Logic input LI7 (I/O card)	
				W902 = 8 Logic input LI8 (I/O card)	
W903	0…8		Assignment of LIb (selecting the set of parameters or motor)	W903 = 0 Not assigned	(preset)
				W903 = 2 Reserved	
				W903 = 3 Logic input LI3	
				W903 = 4 Logic input LI4	
				W903 = 5 Logic input LI5 (I/O card)	
				W903 = 6 Logic input LI6 (I/O card)	
				W903 = 7 Logic input LI7 (I/O card)	
				W903 = 8 Logic input LI8 (I/O card)	

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Altivar 66 variables

PCMCIA memory card / ATV66 transfer - via line

A configuration that is saved on a PCMCIA memory card is called a page. A card consists of up to 16 different configurations or pages.

To transfer from the memory card to the ATV66 :

–Initialize the transfer status register W2190 (optional). This places the transfer data in one of the following states : no card, card incompatible or ready to transfer.

– Request a transfer from the memory card to the ATV66, or a transfer from the ATV66 to the memory card W1700. The transfer is performed immediately. Consult the status register W2190 to confirm the transfer has been successful.

– Process the response obtained : if the reponse is NO, this means that there are insufficient access rights (motor running or semaphore configuration already reserved).

Transfer

WORD	DESCRIPTION	POSSIBLE VALUES
W1700	Selection of range to transfer	W1700,0 to W1700,7 =
		= 1 Page no. 1
		= 2 Page no. 2
		= 3 Page no. 3
		= 4 Page no. 4
		= 5 Page no. 5
		= 6 Page no. 6
		= 7 Page no. 7
		= 8 Page no. 8
		= 9 Page no. 9
		= 10 Page no. 10
		= 11 Page no. 11
		= 12 Page no.12
		= 13 Page no. 13
		= 14 Page no. 14
		= 15 Page no. 15
		= 16 Page no. 16
	Command to be used for the transfer	W1700,8 to W1700,15 =
		= 0 Word W2191 update : page identification
		= 1 Reinitializion of the transfer status register : W2190
		= 2 Request a transfer from the memory card to the speed controller
		= 3 Request a transfer from the speed controller to the memory card

Altivar 66 variables

Transfer status register

WORD	DESCRIPTION	POSSIBLE VALUES
W2190	Status of memory card/ ATV66 transfer	W2190,0 to W2190,7 =
		= 0 Ready to transfer
		= 1 Transfert correct
		= 2 No PCMCIA card present
		= 3 PCMCIA card incompatible
		= 4 Transfert incorrect (eg : page no. or transfer order incorrect)
		= 5 Transfer error (eg : write-protection by PCMCIA card switch)
		= 6 Page incompatible
		= 7 Blank page
	PCMCIA memory card removed	W2190.8 = 1 card removed or changed
		W2190.8 = 0 no card change

Page identification

WORD	DESCRIPTION	POSSIBLE VALUES
W2191	No. of selected page	W2191,0 to W2191,7 =
		= 1 Page no. 1
		= 2 Page no. 2
		= 3 Page no. 3
		= 4 Page no. 4
		= 5 Page no. 5
		= 6 Page no. 6
		= 7 Page no. 7
		= 8 Page no. 8
		= 9 Page no. 9
		= 10 Page no. 10
		= 11 Page no. 11
		= 12 Page no.12
		= 13 Page no. 13
		= 14 Page no. 14
		= 15 Page no. 15
		= 16 Page no. 16
	Blank page	W2191,8, 8 = 1 blank page
		W2191,8, 8 = 0 page not blank

CONFIGURATION WORDS (read and write)
Configuration of the intermediate parameters with I/O card

Configuration of voltage reduction

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W310			Voltage reduction	W310,0 = 0 Function not enabled (preset)
				W310,0 = 1 Function enabled
W311			Choice of reduction type	= 0 No reduction (preset)
				= 1 Activation on frequency threshold
				= 2 Activation via logic input
				= 3 Level of analog input
W312			Voltage reduction via logic input	= 0 No logic output assigned (preset)
				= 1 Reserved
				= 2 Reserved
				= 3 Logic input LI3 on basic product
				= 4 Logic input LI4 on basic product
				= 5 Logic input LI5 (I/O card)
				= 6 Logic input LI6 (I/O card)
				= 7 Logic input LI7 (I/O card)
				= 8 Logic input LI8 (I/O card)
W313			Voltage reduction via analog input	= 0 No logic output assigned (preset)
				= 1 Analog input AI1
				= 2 Analog input AI2
				= 3 Analog input AI3 (I/O card)
				= 4 Analog input AI4 (I/O card)
W314*	0…Fmax VAR	0.1Hz	Voltage reduction via frequency threshold	Preset at 60 Hz if 60 Hz supply
				Preset at 50 Hz if 50 Hz supply
W315	20...100	1%	Voltage reduction coefficient	Preset at 100%

* F max VAR : (W2204)

Constant torque :   400 Hz for Altivar 66 U41N4 to D79N4

                                  Altivar 66 U41M2 to D46M2

                          200 Hz for Altivar 66 C10N4 to C31N4

Variable torque : 75/90 Hz (50 Hz/60Hz supply)

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Altivar 66 variables

CONFIGURATION WORDS (read and write)
Configuration of the intermediate parameters with I/O card

Configuration of tachogenerator feedback

WORD	RANGE	DESCRIPTION	POSSIBLE VALUES
W870		Enabling of tachogenerator feedback	W870,0 = 0 Function not enabled (preset)
			W870,0 = 1 Function enabled
W871		Assignment of speed feedback input	= 0 No analog input (preset)
			= 3 Analog input AI3 (I/O card)

Configuration of orient

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W950			Enabling of orient	W950,0 = 0 Function not enabled (preset)
				W950,0 = 1 Function enabled
W951			Assignment of logic input for command	= 0 No logic input assigned (preset)
				= 1 Reserved
W952			Assignment of synchronization logic input	= 2 Reserved
				= 3 Logic input LI3 on basic product
				= 4 Logic input LI4 on basic product
				= 5 Logic input LI5 (I/O card)
				= 6 Logic input LI6 (I/O card)
				= 7 Logic input LI7 (I/O card)
				= 8 Logic input LI8 (I/O card)
W953			Orient : signalling logic output to signal orient completed	= 0 No logic output assigned (preset)
				= 1 Logic output LO1
				= 2 Logic output LO2
				= 3 Reserved
				= 4 Logic output R2
				= 5 Logic output R3 (I/O card)
				= 6 Logic output R4 (I/O card)
W954	0...100	0.1 s	Shutdown	Preset at 1.0 s
W955	50...150	1%	Percentage of DC injection	Preset at 70 %
W956	0...301	0.1 s	DC injection time	Preset at 2.0 s

Memorization of speed reference

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W850			Memorization of speed reference	W850,0 = 0 Function not enabled (preset)
				W850,0 = 1 Function enabled
W851			Memorization of speed reference via logic input	= 0 No logic input assigned (preset)
				= 1 Reserved
				= 2 Reserved
				= 3 Logic input LI3 on basic product
				= 4 Logic input LI4 on basic product
				= 5 Logic input LI5 (I/O card)
				= 6 Logic input LI6 (I/O card)
				= 7 Logic input LI7 (I/O card)
				= 8 Logic input LI8 (I/O card)

Altivar 66 variables

CONFIGURATION WORDS (read and write)
Configuration of the intermediate parameters with I/O card

Configuration of cycle function

WORD	RANGE	DESCRIPTION	POSSIBLE VALUES
W1000		Enabling of cycle function	W1000,0 = 0 Function not enabled (preset)
			W1000,0 = 1 Function enabled
		Step 1 frequency sign	W1000,8 = 0 Positive sign (preset)
			W1000,8 = 1 Negative sign
		Step 2 frequency sign	W1000,9 = 0 Positive sign (preset)
			W1000,9 = 1 Negative sign
		Step 3 frequency sign	W1000,10 = 0 Positive sign (preset)
			W1000,10 = 1 Negative sign
		Step 4 frequency sign	W1000,11 = 0 Positive sign (preset)
			W1000,11 = 1 Negative sign
		Step 5 frequency sign	W1000,12 = 0 Positive sign (preset)
			W1000,12 = 1 Negative sign
		Step 6 frequency sign	W1000,13 = 0 Positive sign (preset)
			W1000,13 = 1 Negative sign
		Step 7 frequency sign	W1000,14 = 0 Positive sign (preset)
			W1000,14 = 1 Negative sign
		Step 8 frequency sign	W1000,15 = 0 Positive sign (preset)
			W1000,15 = 1 Negative sign
W1001		Logic input for cycle start	= 0 No logic input assigned
			= 1 Reserved
W1002		Logic input for cycle reset	= 2 Reserved
			= 3 Logic input LI3 on basic product
W1003		Logic input for cycle pause	= 4 Logic input LI4 on basic product
			= 5 Logic input LI5 (I/O card)
W1004		Logic input for change to next step	= 6 Logic input LI6 (I/O card)
			= 7 Logic input LI7 (I/O card)
			= 8 Logic input LI8 (I/O card)
W1005		Logic output for cycle over	= 0 No logic input assigned
			= 1 Logic output LO1
W1006		Logic output for cycle fault	= 2 Logic output LO2
			= 3 Reserved
			= 4 Logic output R2
			= 5 Logic output R3 (I/O card)
			= 6 Logic output R4 (I/O card)

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Altivar 66 variables

CONFIGURATION WORDS (read and write)
Configuration of the intermediate parameters with I/O card

Configuration of cycle function (continued)

WORD	RANGE	UNIT	DESCRIPTION	PRESET
W1007	0...250		Step 1 number of sub-cycles	0
W1008	0...250		Step 2 number of sub-cycles	0
W1009	0...250		Step 3 number of sub-cycles	0
W1010	0...250		Step 4 number of sub-cycles	0
W1011	0...250		Step 5 number of sub-cycles	0
W1012	0...250		Step 6 number of sub-cycles	0
W1013	0...250		Step 7 number of sub-cycles	0
W1014	0...250		Step 8 number of sub-cycles	0
W1015	0...Fmax VAR	0.1Hz	Step 1 Frequency	30.0 Hz
W1016	1...9999	0.1s	Step 1 Ramp time	3.0 s
W1017	0...6000	1s	Step 1 Step duration	30 s
W1018	0...Fmax VAR	0.1Hz	Step 2 Frequency	30.0 Hz
W1019	1...9999	0.1s	Step 2 Ramp time	3.0 s
W1020	0...6000	1s	Step 2 Step duration	0 s
W1021	0...Fmax VAR	0.1Hz	Step 3 Frequency	30.0 Hz
W1022	1...9999	0.1s	Step 3 Ramp time	3,0 s
W1023	0...6000	1s	Step 3 Step duration	0 s
W1024	0...Fmax VAR	0.1Hz	Step 4 Frequency	30.0 Hz
W1025	1...999	0.1s	Step 4 Ramp time	3,0 s
W1026	0...6000	1s	Step 4 Step duration	0 s
W1027	0...Fmax VAR	0.1Hz	Step 5 Frequency	30.0 Hz
W1028	1...999	0.1s	Step 5 Ramp time	3.0 s
W1029	0...6000	1s	Step 5 Step duration	0 s
W1030	0...Fmax VAR	0.1Hz	Step 6 Frequency	30.0 Hz
W1031	1...999	0.1s	Step 6 Ramp time	3.0 s
W1032	0...6000	1s	Step 6 Step duration	0 s
W1033	0...Fmax VAR	0.1Hz	Step 7 Frequency	30.0 Hz
W1034	1...999	0.1s	Step 7 Ramp time	.0 s
W1035	0...6000	1s	Step 7 Step duration	0 s
W1036	0...Fmax VAR	0.1Hz	Step 8 Frequency	30.0 Hz
W1037	1...999	0.1s	Step 8 Ramp time	3.0 s
W1038	0...6000	1s	Step 8 Step duration	0 s

F max VAR :

Constant torque : 400 Hz for Altivar 66 U41N4 to D79N4

Altivar 66 U41M2 to D46M2

200 Hz for Altivar 66 C10N4 to C31N4

Variable torque : 75/90 Hz (50 Hz/60Hz supply)

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Altivar 66 variables

CONFIGURATION WORDS (read and write)
I/O configuration

Assignment of negative signs to analog inputs AI2, AI3 and AI4

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W775			Assignment of negative sign to AI2	W775,2 = 0 Negative sign not enabled (preset) W775,2 = 1 Negative sign enabled
			Assignment of negative sign to AI4	W775,3 = 0 Negative sign not enabled (preset) W775,3 = 1 Negative sign enabled
			Assignment of negative sign to AI4	W775,4 = 0 Negative sign not enabled (preset) W775,4 = 1 Negative sign enabled

Analog input AI2 AI3 AI4 current input type

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W776			Current type of input AI 2	W776 = 0 Input 0 - 20 mA W776 = 1 Input 4 - 20 mA (preset) W776 = 2 Input 20 - 4 mA W776 = 3 Input X - 20 mA (see W779)
W777			Voltage type of input AI 3	W777 = 4 Input +/- 10 V (preset) W777 = 5 Input 0 / +10 V W777 = 6 Input 0 / -10V
W778			Current type of input AI 4	W778 = 0 Input 0 - 20 mA W778 = 1 Input 4 - 20 mA (preset) W778 = 2 Input 20 - 4 mA

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W779	0...200	0.1mA	Entry of a value for AI2	Preset at 4.0 mA for X - 20 mA

Altivar 66 variables

CONFIGURATION WORDS (read and write)
I/O configuration

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W780			Type of signal of analog output AO1	= 0 Output 0 - 20 mA (preset) = 1 Output 4 - 20 mA
W781			Type of signal of analog output AO2	= 0 Output 0 - 20 mA (preset) = 1 Output 4 - 20 mA
W782			Type of signal of analog output AO3	= 0 Output 0 - 20 mA (preset) = 1 Output 4 - 20 mA

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W783			Assignment of analog output AO1	= 0 Not assigned = 1 Motor current = 2 Motor frequency(preset) = 3 Motor power = 4 Motor torque = 5 Motor voltage = 6 Motor thermal state = 7 Ramp output = 8 PI set point = 9 Sensor feedback = 10 PI error = 11 PI error integrator
W784			Assignment of analog output AO2	= 0 Not assigned = 1 Motor current (preset) = 2 Motor frequency = 3 Motor power = 4 Motor torque = 5 Motor voltage = 6 Motor thermal state = 7 Ramp output = 8 PI set point = 9 Sensor feedback = 10 PI error = 11 PI error integrator
W785			Assignment of analog output AO3	= 0 Not assigned (preset) = 1 Motor current = 2 Motor frequency = 3 Motor power (preset with I/O card) = 4 Motor torque = 5 Motor voltage = 6 Motor thermal state = 7 Ramp output = 8 PI set point = 9 Sensor feedback = 10 PI error = 11 PI error integrator
W786	0...Fmax VAR	0.1Hz	Logic output activation frequency level 1	Preset at 25.0 Hz
W787	0...Fmax VAR	0.1Hz	Logic output activation frequency level 2	Preset at 0.0 Hz
W788	10...150	1%	Logic output activation current level 1	Preset at 100%
W789	10...150	1%	Logic output activation current level 2	Preset at 50%
W790	0...200	1%	Logic output activation thermal state 1	Preset at 100%
W791	0...200	1%	Logic output activation thermal state 2	Preset at 10%
W792	0...100	1%	Logic output activation torque level	Preset at 100%

F max VAR :
Constant torque : 400 Hz forAltivar 66 U41N4 to D79N4
                          Altivar 66 U41M2 to D46M2
              200 Hz for Altivar 66 C10N4 to C31N4
Variable torque : 75/90 Hz (50 Hz/60Hz supply)

CONFIGURATION WORDS (read and write)
I/O configuration

WORD	DESCRIPTION	POSSIBLE VALUES
W793	Assignment of logic output LO1	= 0 Not assigned
W794	Assignment of logic output LO2	= 1 Speed controller ready
W798	Assignment of logic output R2	= 2 Speed controller running
W799	Assignment of logic output R3	= 3 Set point reached
W800	Assignment of logic output R4	= 4 Forward operation
		= 5 Reverse operation
		= 6 Keypad control
		= 7 Auto/Man automatic position
		= 8 Current limit
		= 9 Torque limit
		= 10 Fault
		= 11 Speed controller thermal alarm
		= 12 Loss of AI2
		= 13 No ramp follow (with I/O card)
		= 14 Tachogenerator feedback fault (with I/O card)
		= 15 Overspeed (with I/O card)
		= 16 Frequency threshold 1 reached
		= 17 Frequency threshold 2 reached (with I/O card)
		= 18 Current threshold 1 reached
		= 19 Current threshold 2 reached (with I/O card)
		= 20 Thermal state threshold 1 reached
		= 21 Thermal state threshold 2 reached (with I/O card)
		= 22 Reserved
		= 23 Brake release
		= 24 Shutdown
		= 25 Orient complete
		= 26 Cycle complete
		= 27 Cycle fault
		= 28 Bypass command
		= 29 JOG
		= 30 Reserved
		= 31 Reserved
		= 32 PI error exceeded
		= 33 (PI) max error exceeded
		= 34 (PI) min error exceeded

CONFIGURATION

CONFIGURATION WORDS (read and write)
Configuration of the keypad

WORD	DESCRIPTION	POSSIBLE VALUES
W740	Assignment of F1 key (preset)	= 0 Not assigned = 1 Direction of rotation = 2 JOG = 3 Reserved = 4 Fault reset = 5 Scrolling of bargraph = 6 Preset speed 1 = 7 Preset speed 2 = 8 Start cycle function = 9 Cycle function : change to next cycle = 10 Cycle function : cycle reset = 11 Local control

WORD	DESCRIPTION	POSSIBLE VALUES
W741	Assignment of a logic input to F2 key (preset)	= 0 Not assigned = 1 Direction of rotation = 2 JOG = 3 Terminal block/keypad switching = 4 Reset fault = 5 Scrolling of bargraph = 6 Preset speed 1 = 7 Preset speed 2 = 8 Start cycle function = 9 Cycle function : change to next cycle = 10 Cycle function : cycle reset = 11 Reserved

WORD	DESCRIPTION	POSSIBLE VALUES
W742	Assignment of a logic input to F3 key (preset)	= 0 Not assigned = 1 Direction of rotation = 2 JOG = 3 Reserved = 4 Fault reset = 5 Scrolling of bargraph = 6 Preset speed 1 = 7 Preset speed 2 = 8 Start cycle function = 9 Cycle function : change to next cycle = 10 Cycle function : cycle reset = 11 Reserved

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Altivar 66 variables

CONFIGURATION WORDS (read and write)
Configuration of the keypad

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W743			Terminal block / keypad control	= 0 Control via terminal block (preset) = 1 Control via keypad = 2 Switching via logic input = 3 Switching via F2 key
W744			Logic input for Terminal block/ Graphic keypad switching	= 0 No logic input assigned (preset) = 1 Reserved = 2 Reserved = 3 Logic input LI3 on basic product = 4 Logic input LI4 on basic product = 5 Logic input LI5 (I/O card) = 6 Logic input LI6 (I/O card) = 7 Logic input LI7 (I/O card) = 8 Logic input LI8 (I/O card)
W745	0...Fmax VAR	0.1Hz	Keypad preset speed 1	Preset at 0.0 Hz
W746	0...Fmax VAR	0.1Hz	Keypad preset speed 2	Preset at 0.0 Hz
W747	2...100	0.1Hz	JOG frequency	Preset at 5.0 Hz

W747 and W893 = same word

CONFIGURATION WORDS (read and write)
Configuration of faults

Fault configuration register

WORD	DESCRIPTION	POSSIBLE VALUES
W755	Automatic restart	W755,1 = 0 Not enabled (preset)
		W755,1 = 1 Enabled
	Enabling of power loss function	W755,2 = 0 Not enabled (preset)
		W755,2 = 1 Enabled
	Enabling of input phase failure function	W755,3 = 0 Not enabled
		W755,3 = 1 Enabled (preset)
	Enabling of motor phase fault function	W755,4 = 0 Not enabled
		W755,4 = 1 Enabled (preset)
	Enabling of DB resistor protection	W755,5 = 0 Not enabled (preset)
		W755,5 = 1 Enabled
	Check presence of braking resistor	W755,6 = 0 Not enabled (preset)
		W755,6 = 1 Enabled
	Enabling of speed controller reset	W755,7 = 0 Not enabled (preset)
		W755,7 = 1 Enabled
	External fault	W755,8 = 0 Not enabled (preset)
		W755,8 = 1 Enabled
	Logic input active state (0 or 1)	W755,9 = 0 Active at low state
		W755,9 = 1 Active at high state
	Current adaptation (variable torque)	W755,10 = 0 Not enabled (preset)
		W755,10 = 1 Enabled
	Enabling of flying restart function	W755,11 = 0 Not enabled
		W755,11 = 1 Enabled (preset)
	Enabling of loss follower	W755,12 = 0 Not enabled (preset)
		W755,12 = 1 Enabled
	Enabling of thermal protection	W755,13 = 0 Not enabled
		W755,13 = 1 Enabled (preset)

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CONFIGURATION WORDS (read and write)
Configuration of faults

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W756			Stopping methods on a fault	= 0 Normal stop
				= 1 Fast stop
				= 2 Freewheel stop (preset)

Configuration of automatic restart

WORD	RANGE	UNIT	DESCRIPTION	COMMENT
W757	1...5		Number of possible restarts	Preset at 5
W758	1...600	1s	Locking time	Preset at 30 s

Type of motor overload

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W759	0...3		Type of motor overload	= 0 No protection
				= 1 Motor self-cooled
				= 2 Motor force-cooled
				= 3 Manual tuning of motor minimum
				speed at full load
				(preset at 50%) W761
W760	45%..115% of W214	0.1A	Thermal tripping current	Factory preset at 0.9 times speed controller nominal current
W761	0…100	1%	Minimum speed at full load	Preset at 50%
W762	0…100	1%	Maximum current at zero frequency	Preset at 50%
W763		0.1Ω	Value of braking resistor	
W764		1W	Power of braking resistor	

WORD	RANGE	UNIT	DESCRIPTION	COMMENT
W765			Reset speed controller via logic input	= 0 No logic input assigned
				= 1 Reserved
W766			External fault : activation logic input	= 2 Reserved
				= 3 Logic input LI3
				= 4 Logic input LI4
				= 5 Logic input LI5 (I/O card)
				= 6 Logic input LI6 (I/O card)
				= 7 Logic input LI7 (I/O card)
				= 8 Logic input LI8 (I/O card)

Altivar 66 variables

CONFIGURATION WORDS (read and write)
Configuration of faults

Loss follower

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W767	0...Fmax VAR	0.1 Hz	Frequency set point if loss follower occurs	Programming of a reference speed (preset at 0 Hz)
W768			Type of action in the event of loss of current input :	= 0 No detection (preset) = 1 Skip to frequency = 2 Change to fault mode

Type of flying restart

WORD	RANGE	UNIT	DESCRIPTION	POSSIBLE VALUES
W769			Type of flying restart	= 0 On ramp (preset) = 1 Current limit = 2 No restart

F max VAR :

Constant torque : 400 Hz for Altivar 66 U41N4 to D79N4

Altivar 66 U41M2 to D46M2

200 Hz for Altivar 66 C10N4 to C31N4

Variable torque : 75/90 Hz (50 Hz/60Hz supply)

Altivar 66 variables

CONFIGURATION WORDS (read and write)
Configuration of the keypad display

WORD	DESCRIPTION	POSSIBLE VALUES
W730	Configuration of graphics	= 0 One bargraph (preset)
		= 1 Two bargraphs
		= 2 Four parameters
W731	Configuration of bargraph 1	= 0 Set point frequency (preset)
W732	Configuration of bargraph 2	= 1 Output frequency
		= 2 Output current
		= 3 Motor torque
		= 4 Output power
		= 5 Output voltage
		= 6 Supply voltage
		= 7 Bus voltage
		= 8 Motor thermal state
		= 9 Speed controller thermal state
		= 10 Motor speed
		= 11 Machine set point (user unit)
		= 12 Machine speed (user unit)
		= 15 PI feedback
		= 16 PI set point

WORD	RANGE	UNIT	DESCRIPTION
W734	1...100		Scale factor of machine units

*The machine units of the set point and machine speed variables are entered via the graphic keypad

WORD	DESCRIPTION	POSSIBLE VALUES
W749	Language	= 1 German
		= 2 English
		= 3 Spanish
		= 4 French
		= 5 Italian
		= 6 Reserved
		= 7 Swedish

C O N F I G U R A T I O N

Altivar 66 variables

ADDRESS ZONE COMMON TO ALTIVAR 66 AND ALTIVAR 45 2

Command bits (read and write) of words W0 and W1

BIT	NAME	DESCRIPTION	NOTES
B0	TST	De-energization of speed controller safety relay	Always read at 0
B1	RST	Speed controller reset	(active on transition
B2	CLO	Assignment of commands in LOCAL mode	from 0 to 1)
B3	CLI	Assignment of commands in LINE mode	
B4	NTO	Inhibition of communication check	
B5	RUN	Start/stop command	
B6	REV	Reverse direction of rotation = change frequency set point sign	
B7	DCB	Braking control	
B8	CAL	Selection of freewheel stop	
B9	CAR	Selection of fast stop	
B10	RTM	Motor voltage reduction	

Adjustment words (read and write)

WD	NAME	RANGE ATV45.2	RANGE ATV66	UNITS	DESCRIPTION	COMMENTS
W2	CGL	0..5	0..100	0.1 Hz	Slip compensation	
W4	RLI	5..150%	50...1360	0.10%	Reduction of current limit	
W6	IBR	0.2..1.5 In	50...150 (%)	0.1 A	Braking current amplitude	
W7	IAR	0.2..1.5 In	50...150 (%)	0.1 A	DC amplitude when stopping	
W8	TAR	0.5..4 s	0...301	0.1 s	DC injection time when stopping	
W9	UFR	0..100	0..100	1	Voltage/frequency ratio adjustment coefficient	Adjustment word : Voltage Boost
W10	ITH	0.45..1.05 In	50...115	0.1 A	Motor thermal protection	
W11	GBF	0..100	0..100	0.1	Frequency loop gain	
W12	FR1	0.. HSP	0.. HSP	0.1 Hz	Skip frequency 1	
W13	FR2	0.. HSP	0.. HSP	0.1 Hz	Skip frequency 2	
W14	LSP	0.. HSP	0.. HSP	0.1 Hz	Minimum frequency	
W15	HSP	LSP..f max	LSP..f max	0.1 Hz	Maximum frequency	
W16	ACC	0.2.. 990 s	1...9999	0.1 s	Acceleration time	
W17	DEC	0.2.. 990 s	1...9999	0.1 s	Deceleration time	

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Command register

WORDS	NAME	RANGE ATV66	RANGE ATV 45.2	UNITS	DESCRIPTION
W18	COM	–		–	Command register
	–				W18,0 Speed controller reset
	DLI				W18,1 Assignment of logic commands in LINE mode
	FLI				W18,2 Assignment of set points in LINE mode
					W18,3 Reserved
	NTO				W18,4 Inhibit communication check
	RUN				W18,5 Stop/Start command
	DCB				W18,6 DC injection braking control
	–				W18,7 Reserved
	CAL				W18,8 Selection of freewheel stop
	CAR				W18,9 Selection of fast stop
	RTM				W18,10 Motor voltage reduction control
	–				W18,11 Reserved
	–				W18,12 Reserved
	–				W18,13 Reserved
	–				W18,14 Reserved
	–				W18,15 Storage in EEPROM
W19	FRH	LSP .. HSP		0.1 Hz	Frequency set point

Altivar 66 variables

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Configuration words (read and write)

WORDS	NAME	RANGE	RANGE ATV45.2	UNITS ATV66	DESCRIPTION
W53		0.2.. 990 s	1...9999	0.1 s	Acceleration time 2
W54		0.2.. 990 s	1...9999	0.1 s	Deceleration time 2
W61		W62.. 10Hz	0...LSP	0.1 Hz	Brake application level
W62		0 Hz .. W61	0...LSP	0.1 Hz	Brake release level
W63		0.. 4 s	0...50	0.1 s	Brake application time

REGISTER OF PAST FAULTS (read only)

Configuration words (read only)

WORDS	NAME	RANGE	RANGE ATV45.2	UNITS ATV66	DESCRIPTION
W120					Register of 1st past fault
W121					Register of 2nd past fault
W121					Register of 3rd past fault
W121					Register of 4th past fault
W121					Register of 5th past fault
W121					Register of 6th past fault
W121					Register of 7th past fault
W127					Register of 8th past fault

Altivar 66 variables

ADDRESS ZONE COMMON TO ALTIVAR 66 AND ALTIVAR 45 2 (read only)

Status register

WORDS	NAME	RANGE ATV45.2		DESCRIPTION (corresponding to state 1)
W20	STR			Status register
	LOC		1	W20,0 All commands assigned in LOCAL mode
	RDY		2	W20,1 Speed controller ready
	FAI		4	W20,2 Faulty
	REN		8	W20,3 Reset authorized
	BOR		16	W20,4 Brake release relay energized
	FLO		32	W20,5 Speed controller forced in LOCAL mode
	NTO		64	W20,6 Communication check inhibited
	CFA		128	W20,7 Resettable fault
	RNG		256	W20,8 Motor running
	RVE		512	W20,9 Actual direction of rotation
	BRE		1024	W20,10 DC injection braking
	SST		2048	W20,11 Steady state
	OVL		4096	W20,12 Motor thermal overload alarm
	OBR		8292	W20,13 Overbraking alarm
	LIM		16384	W20,14 Current limit
	PWD		32768	W20,15 Power not present

Fault register

BIT	NAME	RANGE ATV45.2		DESCRIPTION
W21	FLT			Fault register
	INF		1	W21,0 Internal fault
	SLP		2	W21,1 Serial link break
			4	W21,2 Reserved
	SRF		8	W21,3 Reserved
	USF		16	W21,4 DC bus undervoltage
	OSF		32	W21,5 AC line overvoltage
	PHF		64	W21,6 Phase break
	OHF		128	W21,7 Speed controller overtemperature
	SPF		256	W21,8 Speed feedback not present, overspeed
	OCF		512	W21,9 Phase short-circuit or ground short-circuit
	OBF		1024	W21,10 DC bus overvoltage
	OBF		2048	W21,11 DC bus overvoltage
	OLF		4096	W21,12 Motor overload
	OLF		8192	W21,13 Output phase loss
			16384	W21,14 Reserved
	CRF		32768	W21,15 Precharge failure

Altivar 66 variables

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Signalling words (read only)

WORDS	NAME	RANGE ATV45.2	RANGE ATV66	UNIT	DESCRIPTION
W22	LCR			0.1 A	Motor current
W23	RFR			0.1 Hz	Rotation frequency
W24	THR			0.10%	Motor thermal state
W25	ULN			0.1 V	AC supply voltage
W26	CHM			0.10%	Motor load
W27	–			–	Reserved
W28	–			–	Reserved
W30	DAI	0.. 1000	0...100		Value of speed controller analog input
W31	–	–			Reserved
W32	–	–			Reserved

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* High torque available on motor 1 only - M = Multimotor - P = Multiparameter

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M = Multimotor - P = Multiparameter

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