

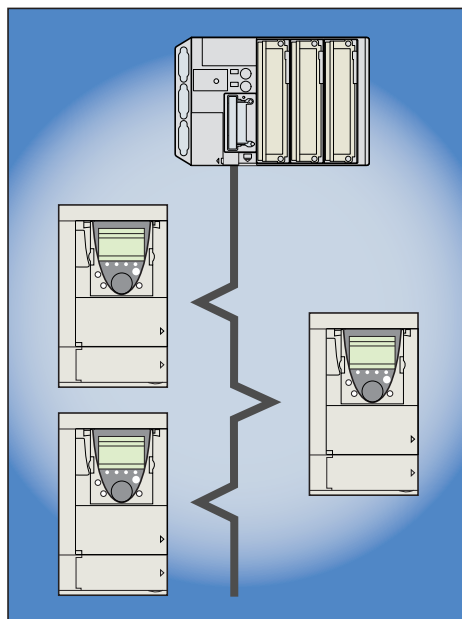
# Altivar 61

## BACnet card

### User's manual

VW3 A3 319

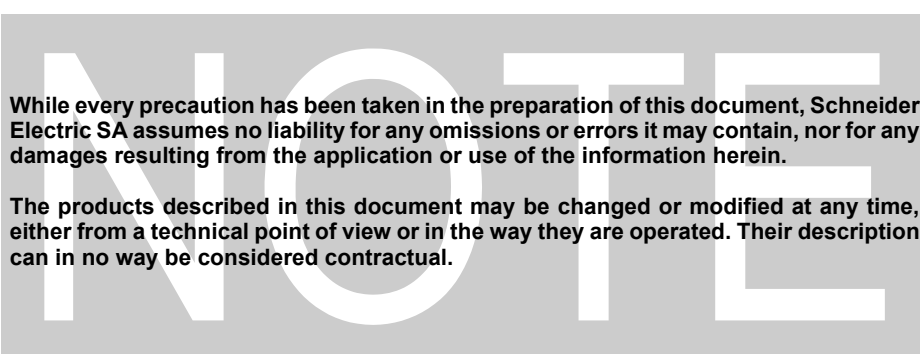
08/2012



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# 1. Important Information

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## NOTICE

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



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



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

## DANGER

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

## WARNING

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

## CAUTION

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

## PLEASE NOTE

Electrical equipment should be serviced only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. This document is not intended as an instruction manual for untrained persons.  
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## 2. Before you begin

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

### DANGER

#### HAZARDOUS VOLTAGE

- Read and understand the Installation Manual before installing or operating the Altivar 61 drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical standards in force concerning protective grounding of all equipment.
- Many parts of this variable speed drive, including the printed circuit cards, operate at the line voltage. **DO NOT TOUCH.** Use only electrically insulated tools.
- **DO NOT** touch unshielded components or terminal strip screw connections with voltage present.
- **DO NOT** short across terminals PA and PC or across the DC bus capacitors.
- Install and close all the covers before applying power or starting and stopping the drive.
- Before servicing the variable speed drive
  - Disconnect all power.
  - Place a “DO NOT TURN ON” label on the variable speed drive disconnect.
  - Lock the disconnect in the open position.
- Disconnect all power including external control power that may be present before servicing the drive. **WAIT 15 MINUTES** to allow the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure given in the Installation Manual to verify that the DC voltage is less than 45 VDC. The drive LEDs are not accurate indicators of the absence of DC bus voltage.

**Electric shock will result in death or serious injury.**

### CAUTION

#### DAMAGED EQUIPMENT

Do not install or operate any drive that appears damaged.  
**Failure to follow this instruction can result in equipment damage.**

### 3. Introduction

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Thank you for purchasing the BACnet option card (VW3A3319) for Altivar 61 drive.

**IMPORTANT** : This communication option card is only supported with the version V1.2 and above of the Altivar 61 firmware.

By installing this board into the Altivar 61, data communication can be made with a host computer or other device via BACnet network.

The communication card has a 4-pole open style connector for connection to the network: A, B, GND, SCR.

Data exchanges give access to all Altivar 61 functions:

- Control (start, stop, reset, setpoint),
- Monitoring (status, current, voltage, thermal state...),
- Diagnostics (alarms).

The graphic display terminal or the integrated display terminal can be used to access numerous functions for communication configuration and diagnostics.

## 4. Documentation structure

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### ■ BACnet manual

The present BACnet user manual describes:

- connection to BACnet,
- configuration of the communication-specific parameters via the integrated HMI or the graphic HMI,
- diagnostics,
- networks variables.

You will also find important information in other Altivar 61 technical documents. They are available on the Web site [www.schneider-electric.com](http://www.schneider-electric.com) and on the CDROM delivered with each drive.

### ■ Installation manual

The installation manual describes:

- how to assemble the drive (particularly how to mount the BACnet card),
- how to connect the drive.

### ■ Programming manual

The programming manual describes:

- the functions and parameters of the drive,
- how to use the drive HMI (integrated HMI and graphic HMI).

### ■ Communication parameters manual

The Communication parameters manual describes:

- the operating modes specific to communication (CiA 402 state chart),
- the interaction between communication and local control (HMI and terminals),
- the drive parameters with specific information for use via a communication network (addresses, formats, etc).

When using the BACnet card, some sections of the Communication parameters manual are not relevant :

- profiles,
- I/O profile
- DSP 402 profile.

The description of drive parameters is useful only if you use the parameters access function of the BACnet card (MBOX PARAM, MBOX DATA) or the communication scanner function (COM SCAN OUT1, COM SCAN IN1).

## 5. Notation

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### ■ Drive terminal displays

The graphic display terminal menus are shown in square brackets.

Example: [1.9 COMMUNICATION].

The integrated 7-segment display terminal menus are shown in round brackets with a "-" at the end.

Example: (C D P -).

Parameter names displayed on the graphic display terminal are written in square brackets.

Example: [Fallback speed]

Parameter codes displayed on the integrated 7-segment display terminal are written in round brackets.

Example: (L F F).

### ■ Formats

Hexadecimal values are written as follows: 16# or 0x

Binary values are written as follows: 2#

### ■ Abbreviations

O = Optional

M = Mandatory

## 6. Quick start

Operation	Refer to
<b>A How to realize a factory setting of the drive</b> In the menu: <a href="#">[1 DRIVE MENU]</a> <a href="#">[1.12 FACTORY SETTINGS]</a> <ul style="list-style-type: none"> <li>• Select <a href="#">[Config. Source]</a>: Macro-conf,</li> <li>• Select <a href="#">[PARAMETER GROUP LIST]</a>: All</li> </ul>	Programming manual <a href="#">[1.12 FACTORY SETTINGS]</a> (F L 5 -)
<b>B How to configure main BACnet communication parameters:</b> In the menu: <a href="#">[1 DRIVE MENU]</a> <a href="#">[1.9 COMMUNICATION]</a> <a href="#">[BACnet]</a> <ul style="list-style-type: none"> <li>• Check <a href="#">[Address]</a> (BACnet MAC address)</li> <li>• Configure <a href="#">[Bit rate]</a></li> <li>• Configure <a href="#">[Instance number]</a> (also called "Device node ID")</li> </ul> <p><u>: You must power cycle the drive to apply these parameters to the BACnet card.</u></p>	7. Configuration 7. 1. Communication parameters
<b>C How to configure control is from BACnet</b> In the menu: <a href="#">[1 DRIVE MENU]</a> <a href="#">[1.6 COMMAND]</a> <ul style="list-style-type: none"> <li>• Change <a href="#">[Ref.1 channel]</a> from "AI1" to "Com. card"</li> </ul>	7. Configuration 7. 3. Control
<b>D Handle the drive by the BACnet controller</b> <ul style="list-style-type: none"> <li>• Control the velocity setpoint by the analog value INPUT REF 1,</li> <li>• Control start / stop by the binary value RUN/STOP CMD,</li> <li>• Control direction of rotation by the binary value FWD/REV CMD,</li> <li>• Monitor if the drive is controlled local or remote (BACnet) by the binary value HAND/AUTO ACT,</li> <li>• Monitor the running / stopped state by the binary value RUN/STOP ACT,</li> <li>• Monitor the actual direction of rotation by the binary value FWD/REV ACT,</li> <li>• Monitor the actual speed or frequency by the analog value OUTPUT SPEED or ACTUAL FREQ.</li> </ul> <p><b>Note:</b> send first the reference (INPUT REF 1) before sending (RUN/STOP CMD) in order to start the drive.</p> <p><b>Fault handling:</b></p> <ul style="list-style-type: none"> <li>• Monitor the fault state by the binary value FAULT ACT,</li> <li>• Monitor the fault detail by the analog value LAST FLT,</li> <li>• Remote reset the fault by the binary value FAULT RESET.</li> </ul>	
<b>E Switch local / remote by the drive HMI</b> Press F4 key (marked TK) to switch alternately from between BACnet and HMI.  The right of the upper display line: <ul style="list-style-type: none"> <li>- REM: control by BACnet,</li> <li>- LOC: control by HMI.</li> </ul>	Programming manual Graphic display terminal Description of the graphic screen
<b>F Diagnose BACnet communication by the drive HMI</b> In the menu: <a href="#">[1 DRIVE MENU]</a> <a href="#">[1.2 - MONITORING]</a> <a href="#">[COMMUNICATION MAP]</a> <a href="#">[DIAG NETWORK]</a> <ul style="list-style-type: none"> <li>• Monitor the frame and error frame counters.</li> </ul>	8. Diagnostics 8. 3. Control - Command
<b>G Diagnose BACnet communication by the drive HMI</b> In the menu: <a href="#">[1 DRIVE MENU]</a> <a href="#">[1.2 - MONITORING]</a> <a href="#">[COMMUNICATION MAP]</a> <ul style="list-style-type: none"> <li>• Check that the Command Channel is Com. card,</li> <li>• Check that Active ref. channel is Com. card.</li> </ul>	8. Diagnostics 8. 9. Communication
<b>H Disable network fault for testing</b> In the menu: <a href="#">[1 DRIVE MENU]</a> <a href="#">[1.8 FAULT MANAGEMENT]</a> (F L 8 -) Configure <a href="#">[COM. FAULT MANAGEMENT]</a> to <a href="#">[ignore]</a> .	Programming manual <a href="#">[1.8 FAULT MANAGEMENT]</a> (F L 8 -)



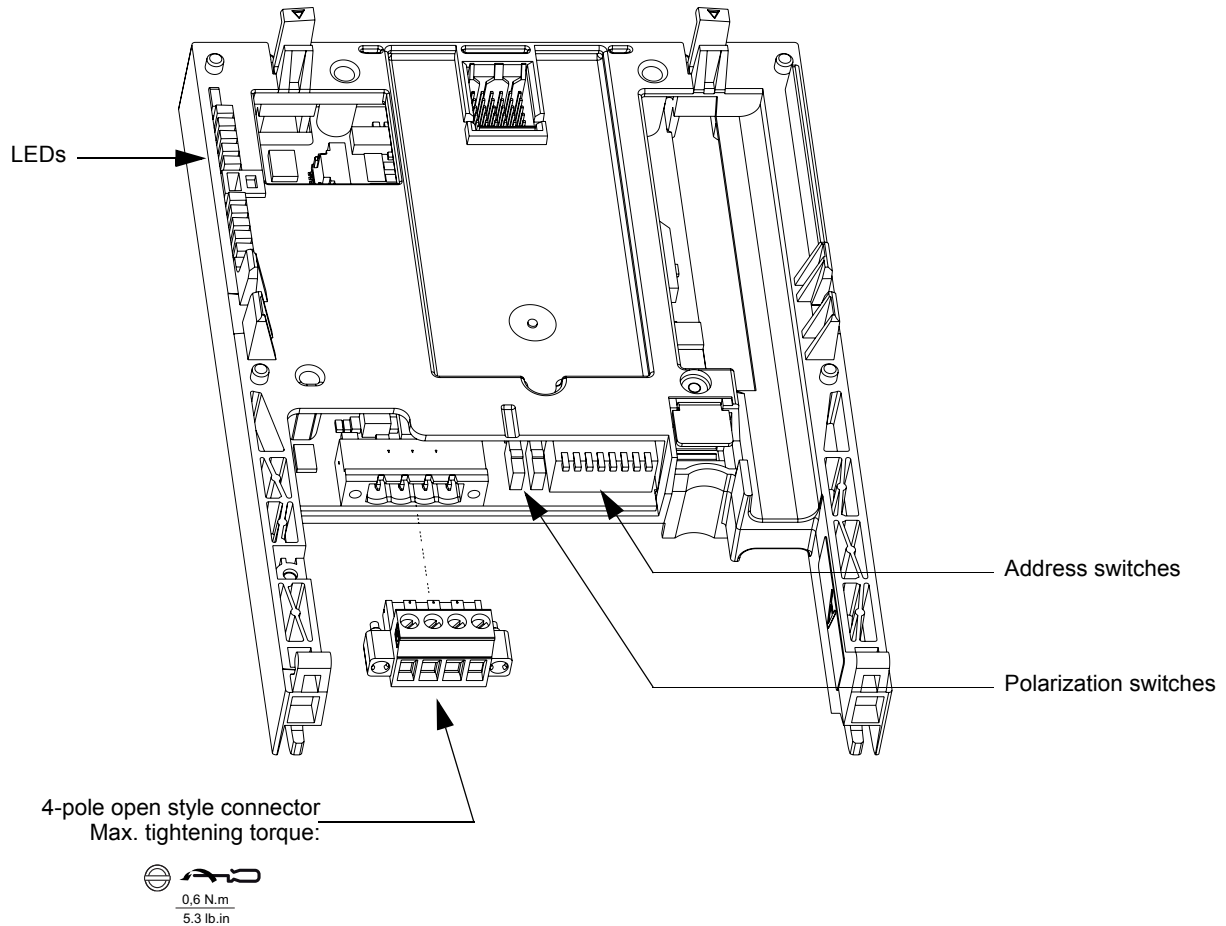
## 7. Hardware setup

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### 7. 1. Receipt

- Check that the card reference printed on the label is the same as that on the delivery note corresponding to the purchase order.
- Remove the option card from its packaging and check that it has not been damaged in transit.

### 7. 2. Hardware description



### 7. 3. Installing the card in the drive

Refer to the "Installation manual".

# 7. Hardware setup

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## 7. 4. Switch coding

### ■ Choosing polarization

Set both switches to the lower position.



Polarization to the RS 485 line at 4.7 kΩ.

### ■ Coding the address

The switches are used to encode the address (1 to 127) of the drive on the bus.

The switch settings must not be changed when the drive is powered on.

The correspondence between the value and the position of the switch is as follows:

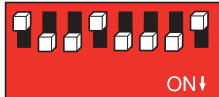
- 0 = OFF = Switch in upper position,
- 1 = ON = Switch in lower position.

The address is binary-coded.

Examples :



Address 11 = 2#000 1011



Address 110 = 2#110 1110

## 7. Hardware setup

The table below indicates the positions of the switches for all configurable addresses:

Address	Switches 1234 5678	Address	Switches 1234 5678	Address	Switches 1234 5678	Address	Switches 1234 5678	Address	Switches 1234 5678
0	0000 0000	52	0011 0100	104	0110 1000	127	1001 1100	127	1101 0000
1	0000 0001	53	0011 0101	105	0110 1001		1001 1101		1101 0001
2	0000 0010	54	0011 0110	106	0110 1010		1001 1110		1101 0010
3	0000 0011	55	0011 0111	107	0110 1011		1001 1111		1101 0011
4	0000 0100	56	0011 1000	108	0110 1100		1010 0000		1101 0100
5	0000 0101	57	0011 1001	109	0110 1101		1010 0001		1101 0101
6	0000 0110	58	0011 1010	110	0110 1110		1010 0010		1101 0110
7	0000 0111	59	0011 1011	111	0110 1111		1010 0011		1101 0111
8	0000 1000	60	0011 1100	112	0111 0000		1010 0100		1101 1000
9	0000 1001	61	0011 1101	113	0111 0001		1010 0101		1101 1001
10	0000 1010	62	0011 1110	114	0111 0010		1010 0110		1101 1010
11	0000 1011	63	0011 1111	115	0111 0011		1010 0111		1101 1011
12	0000 1100	64	0100 0000	116	0111 0100		1010 1000		1101 1100
13	0000 1101	65	0100 0001	117	0111 0101		1010 1001		1101 1101
14	0000 1110	66	0100 0010	118	0111 0110		1010 1010		1101 1110
15	0000 1111	67	0100 0011	119	0111 0111		1010 1011		1101 1111
16	0001 0000	68	0100 0100	120	0111 1000		1010 1100		1110 0000
17	0001 0001	69	0100 0101	121	0111 1001		1010 1101		1110 0001
18	0001 0010	70	0100 0110	122	0111 1010		1010 1110		1110 0010
19	0001 0011	71	0100 0111	123	0111 1011		1010 1111		1110 0011
20	0001 0100	72	0100 1000	124	0111 1100		1011 0000		1110 0100
21	0001 0101	73	0100 1001	125	0111 1101		1011 0001		1110 0101
22	0001 0110	74	0100 1010	126	0111 1110		1011 0010		1110 0110
23	0001 0111	75	0100 1011		0111 1111		1011 0011		1110 0111
24	0001 1000	76	0100 1100		1000 0000		1011 0100		1110 1000
25	0001 1001	77	0100 1101		1000 0001		1011 0101		1110 1001
26	0001 1010	78	0100 1110		1000 0010		1011 0110		1110 1010
27	0001 1011	79	0100 1111		1000 0011		1011 0111		1110 1011
28	0001 1100	80	0101 0000		1000 0100		1011 1000		1110 1100
29	0001 1101	81	0101 0001		1000 0101		1011 1001		1110 1101
30	0001 1110	82	0101 0010		1000 0110		1011 1010		1110 1110
31	0001 1111	83	0101 0011		1000 0111		1011 1011		1110 1111
32	0010 0000	84	0101 0100		1000 1000		1011 1100		1111 0000
33	0010 0001	85	0101 0101		1000 1001		1011 1101		1111 0001
34	0010 0010	86	0101 0110		1000 1010		1011 1110		1111 0010
35	0010 0011	87	0101 0111		1000 1011		1011 1111		1111 0011
36	0010 0100	88	0101 1000		1000 1100		1100 0000		1111 0100
37	0010 0101	89	0101 1001	127	1000 1101		1100 0001		1111 0101
38	0010 0110	90	0101 1010		1000 1110		1100 0010		1111 0110
39	0010 0111	91	0101 1011		1000 1111		1100 0011		1111 0111
40	0010 1000	92	0101 1100		1001 0000		1100 0100		1111 1000
41	0010 1001	93	0101 1101		1001 0001		1100 0101		1111 1001
42	0010 1010	94	0101 1110		1001 0010		1100 0110		1111 1010
43	0010 1011	95	0101 1111		1001 0011		1100 0111		1111 1011
44	0010 1100	96	0110 0000		1001 0100		1100 1000		1111 1100
45	0010 1101	97	0110 0001		1001 0101		1100 1001		1111 1101
46	0010 1110	98	0110 0010		1001 0110		1100 1010		1111 1110
47	0010 1111	99	0110 0011		1001 0111		1100 1011		1111 1111
48	0011 0000	100	0110 0100		1001 1000		1100 1100		
49	0011 0001	101	0110 0101		1001 1001		1100 1101		
50	0011 0010	102	0110 0110		1001 1010		1100 1110		
51	0011 0011	103	0110 0111		1001 1011		1100 1111		

Address 0 generally reserved.

## 8. Connecting to the bus

### 8. 1. Cable routing practices

When wiring Altivar 61 drives to a BACnet network, follow all wiring practices required by national and local electrical codes. Also observe the following guidelines:

- Avoid areas of high temperature, moisture, vibration, or other mechanical stress.
- Secure the cable where necessary to prevent its weight and the weight of other cables from pulling or twisting the cable.
- Use cable ducts, raceways, or other structures to protect the cable. Use these structures for signal wiring paths. They must not contain power wiring.
- Avoid sources of electrical interference that can induce noise into the cable. Use the maximum practicable separation from such sources.

When planning cable routing within a building, follow these guidelines:

- Maintain a minimum separation of 1 m from the following equipment:
  - air conditioners and large blowers,
  - elevators and escalators,
  - radios and televisions,
  - intercom and security systems,
  - fluorescent, incandescent, and neon lighting fixtures.
- Maintain a minimum separation of 3 m from the following equipment:
  - line and motor power wiring,
  - transformers,
  - generators,
  - alternators.

When wiring in electrical equipment rooms or large electrical equipment line-ups, observe the following guidelines for cable segregation and separation of circuits:

- Use metallic conduit for drive wiring. Do not run control network and power wiring in the same conduit.
- Separate non-metallic conduits or cable trays used to carry power wiring from metallic conduit carrying low-level control network wiring by at least 300 mm.
- Separate metallic conduits carrying power wiring or low-level control network wiring by at least 80 mm.
- Cross the metallic conduits and non-metallic conduits at right angles whenever power and control network wiring cross.
- Attenuate conducted emissions from the drive to the line in some installations to prevent interference with telecommunication, radio, and sensitive electronic equipment. Such instances may require attenuating filters. Consult the Altivar catalog for selection and application of these filters.

### 8. 2. Card connector pinout

Contact no.	Signal
B	+
A	-
GND	GND
SCR	Shield

- The cable sheath should be stripped off by about 10 mm (0.4 in).
- For wiring the terminals, use a slotted screwdriver with a 0.6 mm (0.02 in) thick and 3.5 mm (0.14 in) width blade.
- Tightening torque for the terminal block is 0.5 to 0.6 N-m (0.37-0.44 ft-lb)

Various notation exist for RS485 signals, the table below may be helpful.

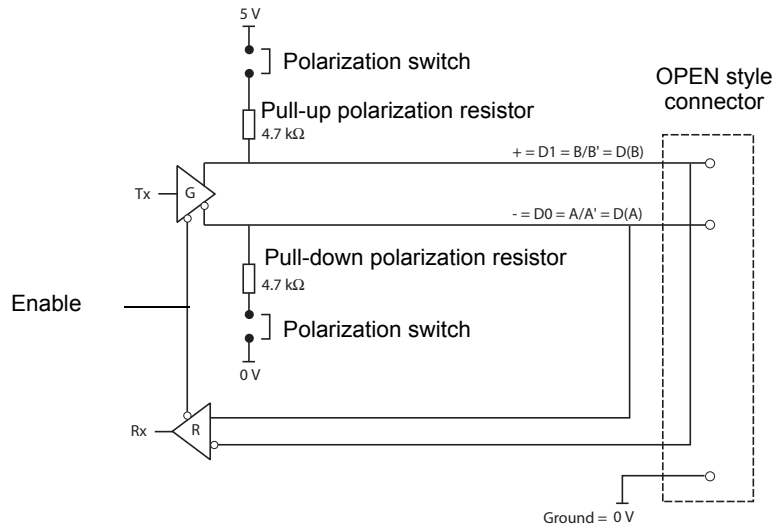
BACnet	EIA/TIA-485	Modbus	Jbus	Uni-Telway
+	B/B'	D1	RD+/TD+ or L+	D(B)
-	A/A'	D0	RD-/TD- or L-	D(A)
Ground	C/C'	Common		0 VL

## 8. Connecting to the bus

### 8.3. RS485 schematic for the card

The RS485 interface on the BACnet card is electrically isolated from the drive.

Schematic diagram:



The polarization switches are used to connect or disconnect the pull-up and pull-down resistors.

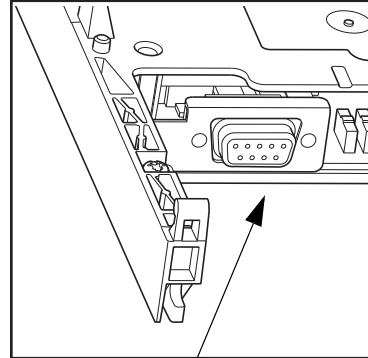
## 8. Connecting to the bus

### 8.4. Dsub 9-pin connector

If you have the older option card VW3 A3 315:

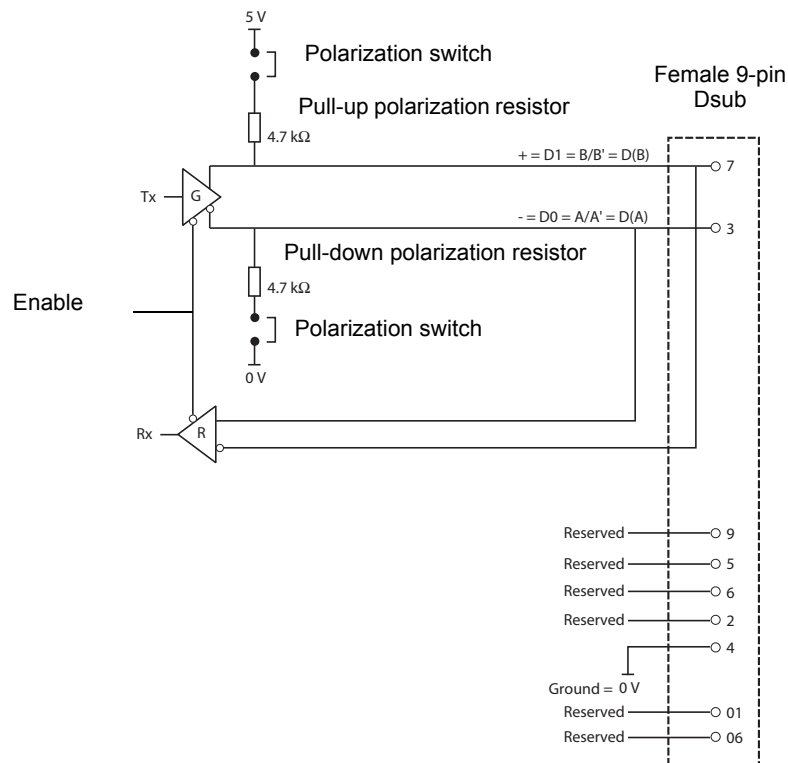
The communication card has a Dsub 9-pin connector for connection to the network.

Contact no.	Signal
1	Reserved (do not connect)
2	RXD0 = RD(A)
3	-
4	Ground
5	RxD1 = RD(B)
6	RxD1 = RD(B)
7	+
8	Reserved (do not connect)
9	Supply (5 V)



Dsub 9-pin connector

You can also use an additional Dsub 9-pin to open style adapter to connect the network cable to the card



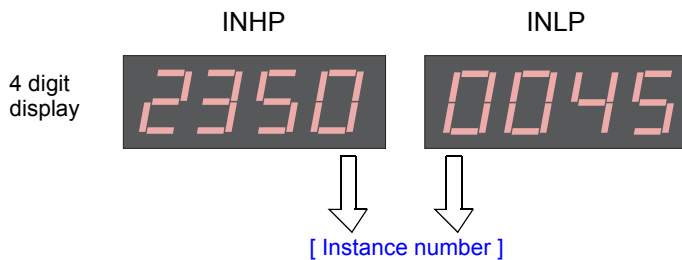
# 9. Configuration

## 9. 1. Communication parameters

Configure the following parameters in the [1.9 - COMMUNICATION] (C O N -) menu, [BACnet] (B A C N) submenu. These parameters can only be modified when the motor is stopped. Modifications will be taken into account by the drive after power cycled.

Parameter	Possible values	Terminal display	Default value
[Address] (A D R C)	1 to 127	[1] ( 1) to [127] ( 1 2 7)	Value taken from the address switches
[Bit rate] (B D R)	AUTO 9600 bit/s 19200 bit/s 38400 bit/s 76800 bit/s	[AUTO] (A A) [9600 Bd] ( 9 6) [19200 Bd] ( 1 9 2) [38400 Bd] ( 3 8 4) [76800 Bd] ( 7 6 8)	[AUTO] (A A)
[Format] (F D R)		[8-N-1] (B n 1)	[8-N-1] (B n 1) Display parameter (read only)
[Time - out] (E L P)	Communication time-out in seconds x 0.1. 1 to 60s	[1] ( 1) to [600] ( 6 0 0)	[10] ( 1 0)
[Instance number] (I n H P) and (I n L P)	Device instance number: 0 to 4194303 (1) INHP: 0 to 4194 * INLP: 0 to 999	[1] ( 1) [0] ( 0) to [4194] ( 4 1 9 4) [0] ( 0) to [999] ( 9 9 9)	[1] ( 1) [0] ( 0) [1] ( 1)
[Max Master] (M M N)	Max Master device address on the MS/TP subnet: 0 to 127 (2)	[0] ( 0) to [127] ( 1 2 7)	[127] ( 1 2 7)
[Max Info frames] (M I F)	Max information frames: 1 to 100 (3)	[1] ( 1) to [100] ( 1 0 0)	[10] ( 1 0)
[Data rate used] (B D R U)	Displays the baud rate used on the BACNet network, this value is useful when the baud rate parameter is set to AUTO.	[9600] ( 9 6) [19200] ( 1 9 2) [38400] ( 3 8 4) [76800] ( 7 6 8)	-
[Frame counter] (E F C)	Displays the total number of frames received by the communication card since the last power ON.	-	-
[Invalid Frame counter] (E F C)	Displays the total number of bad frames received by the communication card since the last power ON.	-	-

\* : detail of the instance number edition on the local HMI.  
(1) Sometimes also named BACnet device ID.



Example: 2350045 is the value for the instance number. On the local HMI INHP will receive the value of 2350 and INLP will receive 045.

- (2) When defining this number ensure that its value is not lower than the device Address (ADRC) defined by switches. If this value is lower than ADRC, an EPF2 fault will be generated.
- (3) Max information frames defines max. number of frames that can be sent before passing token to next master.

# 9. Configuration

## 9.2. Control

Numerous configurations are possible. For more information, refer to the Programming Manual and the Parameters Manual. The following configurations are just some of the possibilities available.

### ■ Allowed configurations

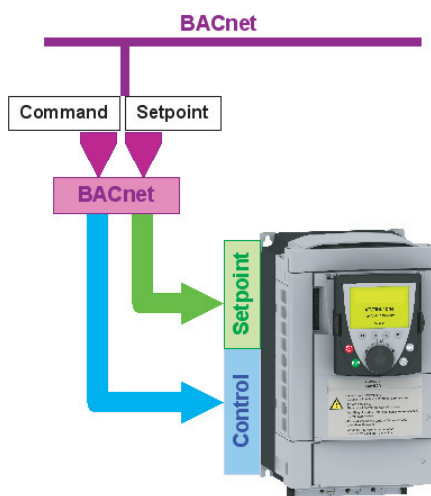
If the drive is only monitored by BACnet:  
There is no configuration constraint.

If the drive is controlled by BACnet:

The parameter [Profile] (CHCF) must be configured to [Not separ.] (SIN) or [Separate] (SEP). [Not separ.] (SIN) is the default value. It is not allowed to configure the parameter [Profile] (CHCF) to the value [8 serie] (SEB) or [I/O profile] (IO). If a forbidden configuration is done, the drive will trip on [External fault com.] (EPF2).

### ■ Control via BACnet

The command and the setpoint come from BACnet.



Configure the following parameters:

Parameter	Value	Comment
Profile	Non separate CiA402 profile	The run command are in CiA402 profile the command and the setpoint come from the same channel.
Setpoint 1 and command configuration	Network card	The setpoint and command come from BACnet.

Configuration via the graphic display terminal or the integrated display terminal:

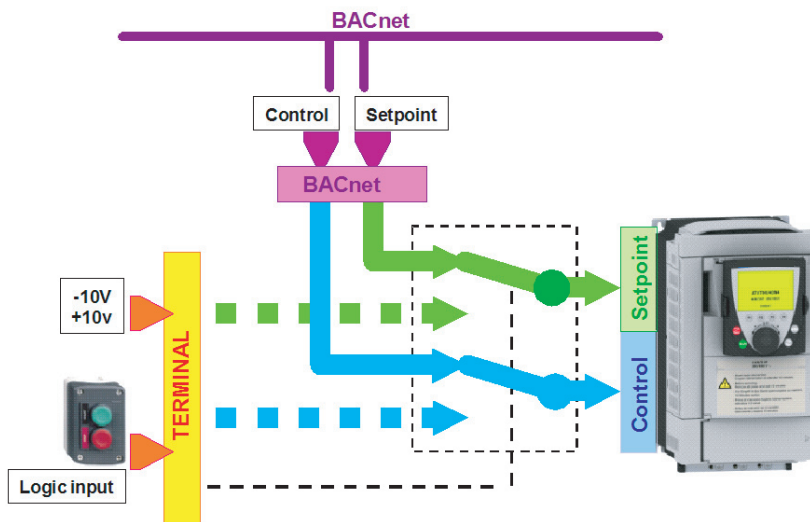
Menu	Parameter	Value
[1.6 - COMMAND] (CEL -)	[Profile] (CHCF)	[Not separ.] (SIN):default value
	[Ref.1 chan] (FR1)	[Com. card] (NET)



## 9. Configuration

### ■ Control via BACnet or via the terminals

The command and the setpoint both come from BACnet or the terminals.  
Depending on the configuration, the application function are activated or not.

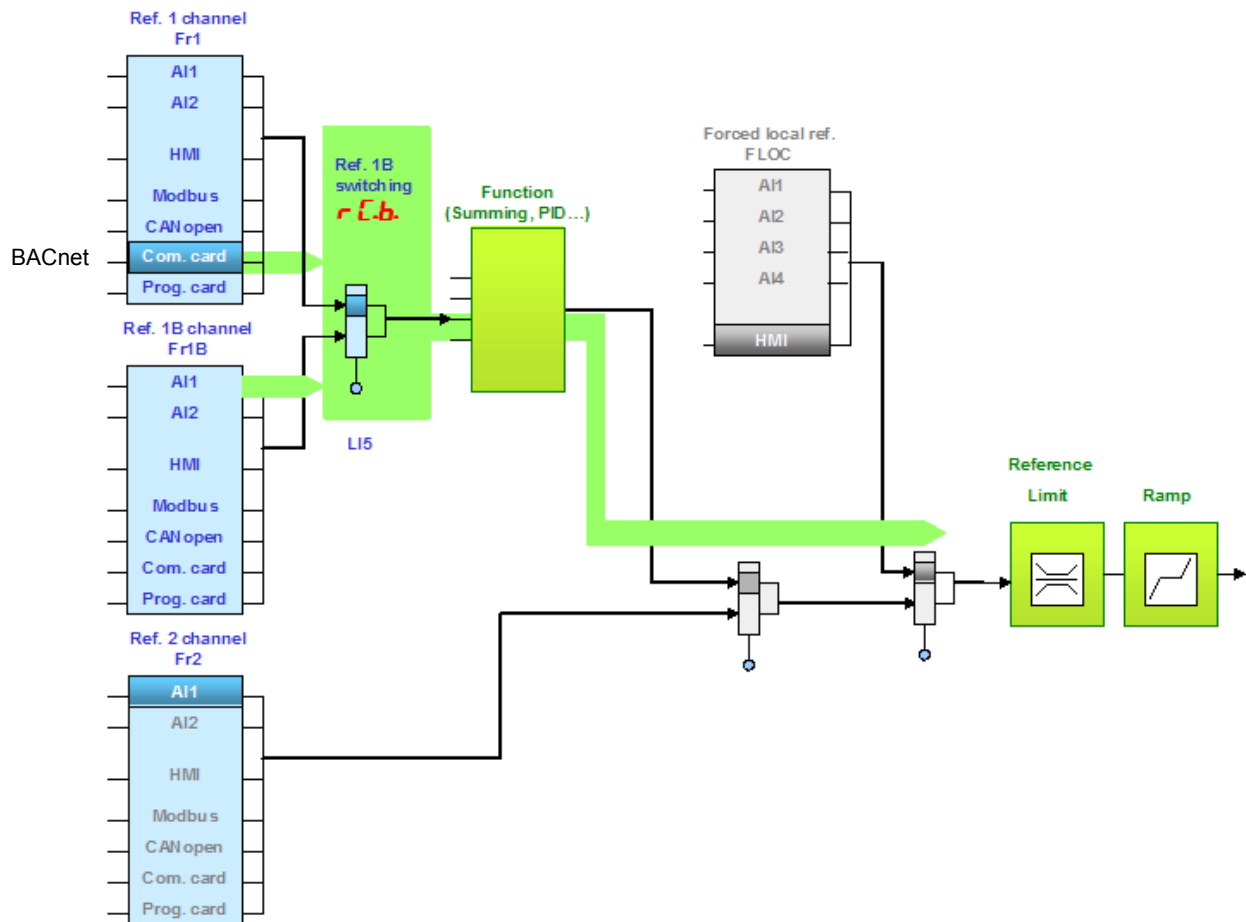


2 different use cases are described below. The setpoint is switched from BACnet to the terminals. In the first case, the application function applies and not in the second one.

## 9. Configuration

### Switching of control and setpoint from BACnet to the terminals with application function

Input LI5 is used to switch the control and the setpoint between BACnet and the terminals. When switched to the terminals, the application functions (summing...) remain active.



Configure the following parameters:

Parameter	Value	Comment
Profile	Separate profile	The command and the setpoint can come from different channels.
Setpoint 1 configuration	Network card	Setpoint 1 comes from BACnet.
Setpoint 1B configuration	Analog input 1 on the terminals	Setpoint 1B comes from input AI1 on the terminals.
Setpoint switching	Input LI5	Input LI5 switches the setpoint (1 ↔ 1B).
Command 1 configuration	Network card	Command 1 comes from BACnet.
Command 2 configuration	Terminals	Command 2 comes from the terminals.
Command switching	Input LI5	Input LI5 switches the command

Setpoint 1B is directly connected to the functions of the drive. If switching to the terminals is performed, the functions that affect the reference (summing, PID, etc) are active.

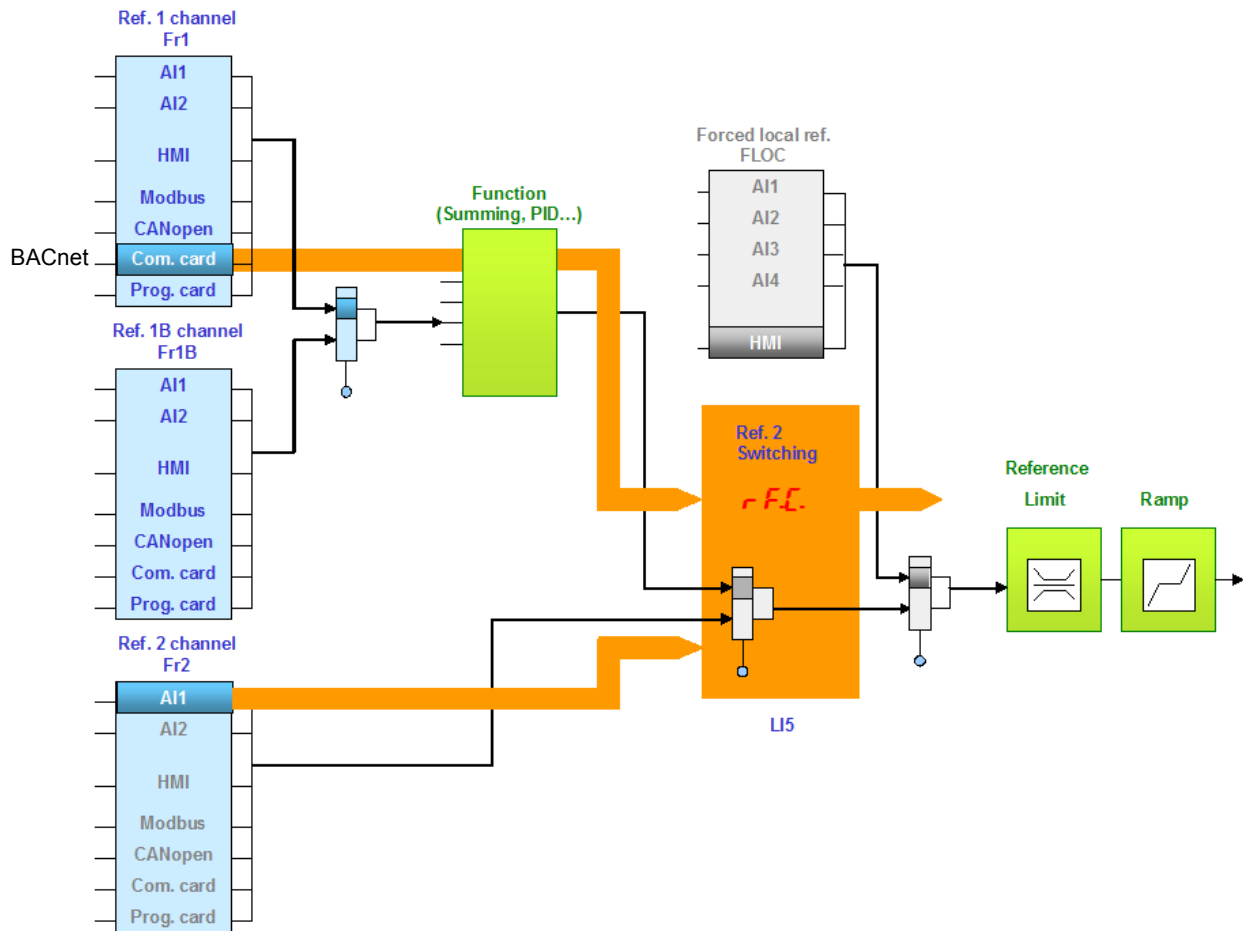
Configuration via the graphic display terminal or the integrated display terminal:

Menu	Parameter	Value
[1.6 - COMMAND] (CLL-)	[Profile] (CHF)	[Separate] (SEP)
	[Ref.1 channel] (Fr1)	[Com. card] (NET)
	[Cmd channel 1] (cd1)	[Com. card] (NET)
	[Cmd channel 2] (cd2)	[Terminals] (TER)
	[Cmd switching] (CL5)	[LI5] (LI5)
[1.7 - APPLICATION FUNCT.] (FUN-) [REFERENCE SWITCH]	[Ref.1B channel] (Fr1b)	[Ref. AI1] (AI1)
	[Ref.1B switching] (rCb)	[LI5] (LI5)

## 9. Configuration

### Switching of control and setpoint from BACnet to the terminals without application function

Input LI5 is used to switch the control and the setpoint between BACnet and the terminals. When switched to the terminals, the application functions (summing...) are not active.



Configure the following parameters:

Parameter	Value	Comment
Profile	Non separate profile	The command and the setpoint come from the same channel.
Setpoint 1 configuration	Network card	Setpoint 1 and command 1 comes from BACnet.
Setpoint 2 configuration	Analog input 1 on the terminals	Setpoint 2 and command 2 comes from input AI1 on the terminals.
Setpoint switching	Input LI5	Input LI5 switches the setpoint (1 ↔ 2) and the command.

Configuration via the graphic display terminal or the integrated display terminal:

Menu	Parameter	Value
[1.6 - COMMAND] (C E L -)	[Profile] (C H C F)	[Not separ.] (S I N):default value
	[Ref.1 chan] (F r 1)	[Com. card] (r E E)
	[Ref.2 chan] (F r 2)	[AI1 ref.] (R I I)
	[Ref.2 switching] (r F L)	[LI5] (L I 5)

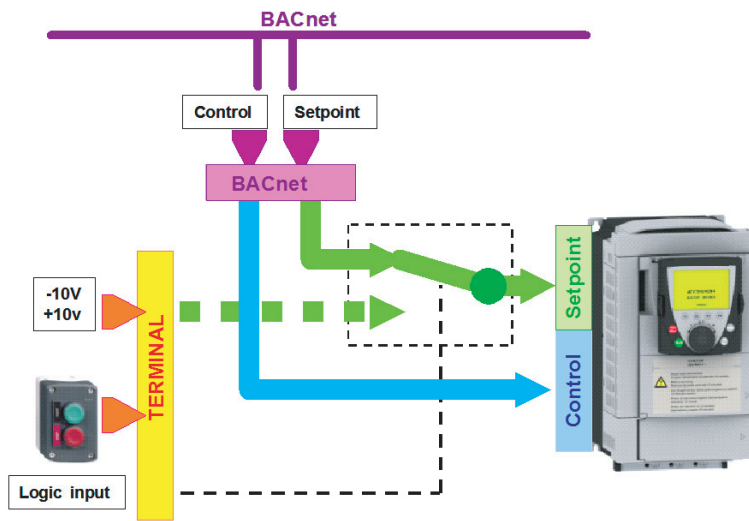
## 9. Configuration

### ■ Control via BACnet and setpoint switching

The command comes from BACnet.

The setpoint comes either from BACnet or from the terminals.

Depending on the configuration, the application function are activated or not.

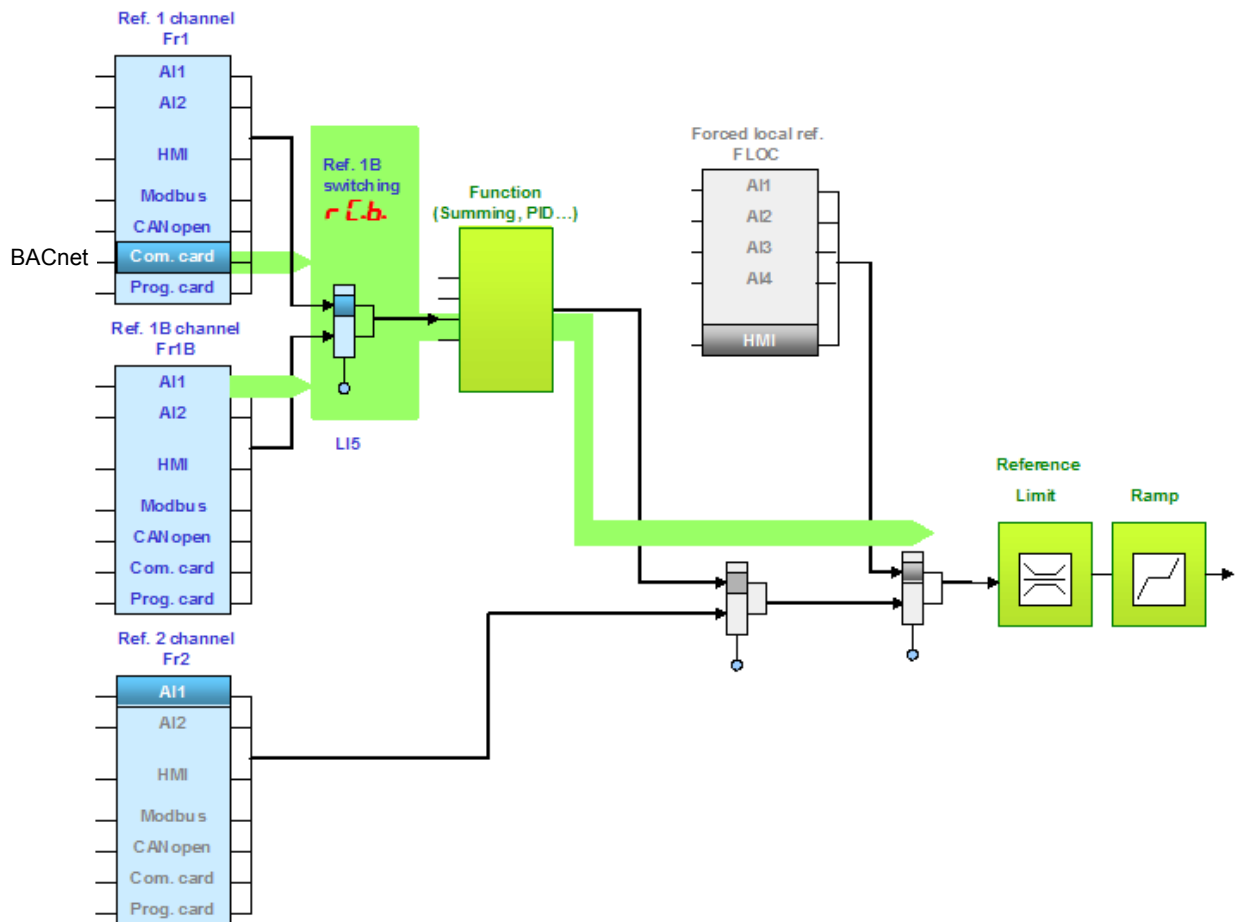


The command comes from BACnet. The setpoint comes either from BACnet or from the terminals. Depending on the configuration, the application functions are active or not.

# 9. Configuration

## Control via BACnet and switching of the setpoint at the terminals with application function

The command comes from BACnet. Input LI5 is used to switch the setpoint between BACnet and the terminals. When switched to the terminals, the application functions (summing...) remain active.



Configure the following parameters:

Parameter	Value	Comment
Profile	Separate profile	The command and the setpoint can come from different channels.
Setpoint 1 configuration	Network card	Setpoint 1 comes from BACnet.
Setpoint 1B configuration	Analog input 1 on the terminals	Setpoint 1B comes from input AI1 on the terminals.
Setpoint switching	Input LI5	Input LI5 switches the reference (1 ↔ 1B).
Command 1 configuration	Network card	Command 1 comes from BACnet.
Command switching	Channel 1	Channel 1 is the command channel.

Reference 1B is directly connected to the functions of the drive. If switching to the terminals is performed, the functions that affect the reference (summing, PID, etc) are active.

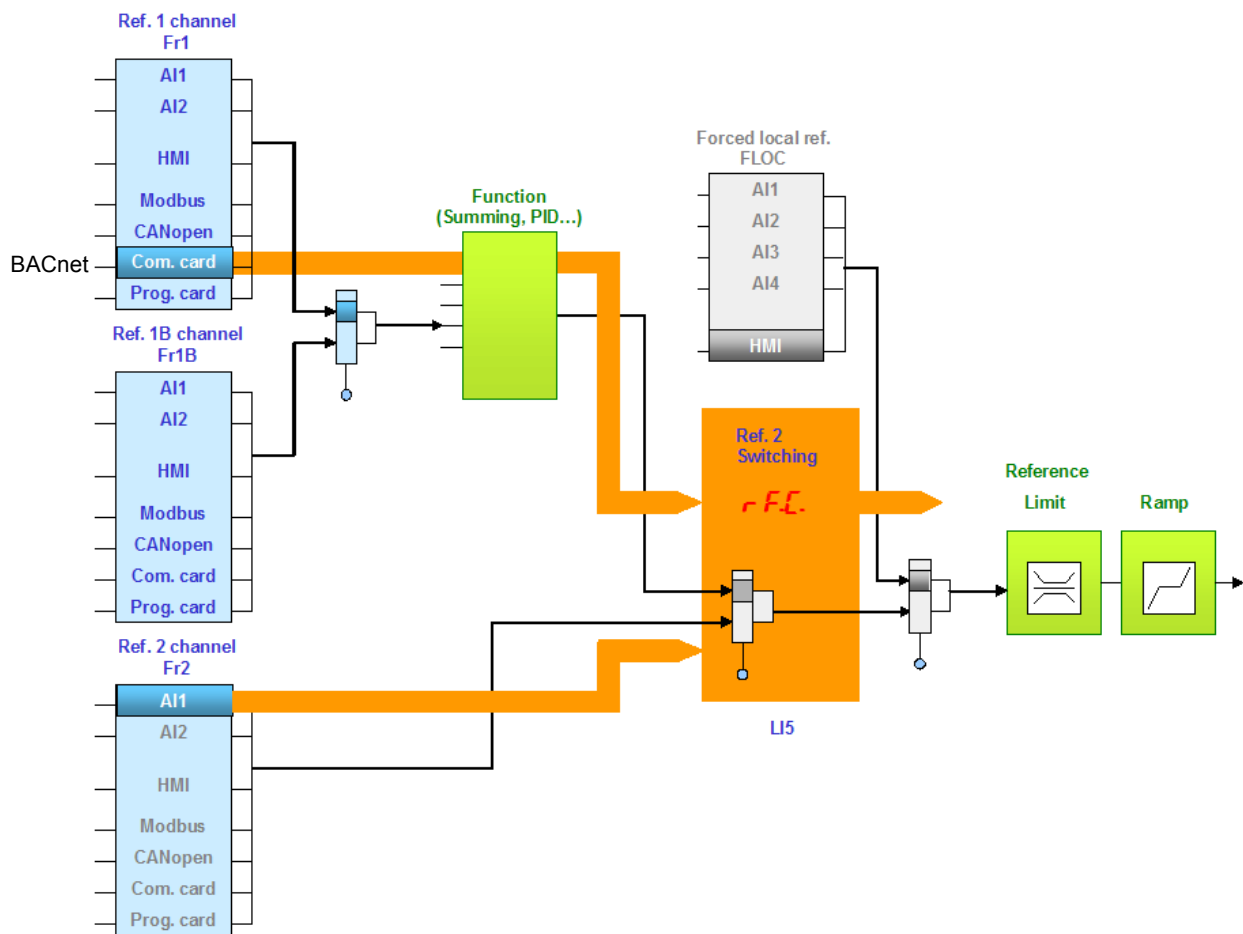
Configuration via the graphic display terminal or the integrated display terminal:

Menu	Parameter	Value
[1.6 - COMMAND] (C L L -)	[Profile] (C H C F)	[Separate] (S E P)
	[Ref.1 channel] (F r 1)	[Com. card] (n E E)
	[Cmd channel 1] (c d 1)	[Com. card] (n E E)
	[Cmd switching] (C C 5)	[ch1 active] (C d 1)
[1.7 - APPLICATION FUNCT.] (F U n -) [REFERENCE SWITCH]	[Ref.1B channel] (F r 1b)	[Ref. AI1] (A I 1)
	[Ref.1B switching] (r C b)	[LI5] (L I 5)

## 9. Configuration

### Control via BACnet and switching of the setpoint at the terminals with application function

The command comes from BACnet. Input LI5 is used to switch the setpoint between BACnet and the terminals. When switched to the terminals, the application functions (summing...) are not active.



Configure the following parameters:

Parameter	Value	Comment
Profile	Separate profile	The command and the setpoint can come from different channels.
Setpoint 1 configuration	Network card	Setpoint 1 comes from BACnet.
Setpoint 2 configuration	Analog input 1 on the terminals	Setpoint 2 comes from input AI1 on the terminals.
Setpoint switching	Input LI5	Input LI5 switches the setpoint (1↔ 2).
Command 1 configuration	Network card	Command 1 comes from BACnet.
Command switching	Channel 1	Channel 1 is the command channel.

Setpoint 1B is connected to the functions (Summing, etc) that remain active even after switching.

Configuration via the graphic display terminal or the integrated display terminal:

Menu	Parameter	Value
[1.6 – COMMAND] (CLL-)	[Profile] (CHF)	[Separate] (SEP)
	[Ref.1 chan] (Fr1)	[Com. card] (NET)
	[Ref.2 chan] (Fr2)	[AI1 ref.] (AI1)
	[Ref 2 switching] (rFc)	[LI5] (LI5)
	[Cmd channel 1] (Cd1)	[Com. card] (NET)
	[Cmd switching] (CL5)	[ch1 active] (Cd1)

## 9. Configuration

### 9.3. Communication scanner

The communication scanner enables all the application-relevant parameters to be grouped in a collection of Av's (BACnet analog value objects): COMSCANOUTØ to COMSCANOUT7 and COMSCANINØ to COMSCANIN7.

The communication scanner provides also a link with the "controller inside" card.

The 8 output variables are assigned using the 8 [Scan.Out address] (n L A ●) parameters. They are configured using the graphic display terminal via the [1.9 - COMMUNICATION] (C D P -) menu, [COM. SCANNER OUTPUT] (D C S -) submenu.

The 8 input variables are assigned using the 8 [Scan.IN address] (n P A ●) parameters. They are configured using the graphic display terminal via the [1.9 - COMMUNICATION] (C D P -) menu, [COM. SCANNER INPUT] (I C S -) submenu.

Enter the logic address of the parameter (see the Parameters Manual).

If a [Scan.Out address] (n L A ●) or [Scan.IN address] (n P A ●) parameter equals zero, the corresponding variable is not used by the drive.

These 16 assignment parameters are described in the tables below:

Configuration parameter name	Default assignment of the output variable
[Scan. Out1 address] (n L A 1)	Control word (CMd) (1)
[Scan. Out2 address] (n L A 2)	Speed reference (LFrd)
[Scan. Out3 address] (n L A 3)	Not used
[Scan. Out4 address] (n L A 4)	Not used
[Scan. Out5 address] (n L A 5)	Not used
[Scan. Out6 address] (n L A 6)	Not used
[Scan. Out7 address] (n L A 7)	Not used
[Scan. Out8 address] (n L A 8)	Not used

Configuration parameter name	Default assignment of the input variable
[Scan. IN1 address] (n P A 1)	Status word (EtA)
[Scan. IN2 address] (n P A 2)	Output speed (rFrd)
[Scan. IN3 address] (n P A 3)	Not used
[Scan. IN4 address] (n P A 4)	Not used
[Scan. IN5 address] (n P A 5)	Not used
[Scan. IN6 address] (n P A 6)	Not used
[Scan. IN7 address] (n P A 7)	Not used
[Scan. IN8 address] (n P A 8)	Not used

(1) CMD and LFrd are given here as example. In practice, when the drive is operated from BACnet, these two words are already controlled by the communication card.

**Example of configuration via the graphic display terminal:**

RDY	NET	+0.00Hz	0A
COM. SCANNER INPUT			<input type="checkbox"/>
Scan. IN1 address	:		3201
Scan. IN2 address	:		8604
Scan. IN3 address	:		0
Scan. IN4 address	:		0
Scan. IN5 address	:		0
Code		Quick	<input checked="" type="checkbox"/>
Scan. IN6 address	:		0
Scan. IN7 address	:		0
Scan. IN8 address	:		0

RDY	NET	+0.00Hz	0A
COM. SCANNER OUTPUT			<input type="checkbox"/>
Scan. Out1 address	:		8501
Scan. Out2 address	:		8602
Scan. Out3 address	:		0
Scan. Out4 address	:		0
Scan. Out5 address	:		0
Code		Quick	<input checked="" type="checkbox"/>
Scan. Out6 address	:		0
Scan. Out7 address	:		0
Scan. Out8 address	:		0

**Note:**

Any modification to parameters [Scan.Out address] (n L A ●) or [Scan.IN address] (n P A ●) must be made with the motor stopped. The master controller program should be updated to take account of this modification.

## 9. Configuration

### 9. 4. Communication faults

A BACnet fault is triggered if the BACnet card does not receive any BACnet messages (regardless of address) at its address within a predefined time period (time out defined by tLP). All BACnet request types are taken into account (read, write, etc.). The response of the drive in the event of a BACnet communication fault can be configured.

Configuration can be performed using the graphic display terminal or integrated display terminal using the [Network fault mgt] (CLL) parameter in the [1.8 FAULT MANAGEMENT] (FLE-) menu, [COM. FAULT MANAGEMENT] (CLL-) submenu.

RDY	NET	+0.00Hz	0A
COM. FAULT MANAGEMENT			<input type="checkbox"/>
Network fault mgt	:	Freewheel	
CANopen fault mgt	:	Freewheel	
Modbus fault mgt	:	Freewheel	
Code		Quick	<input type="checkbox"/>

The values of the [Network fault mgt] (CLL) parameter, which trigger a [Com. network] (ENF) drive fault, are:

Value	Meaning
[Freewheel] (YES)	Freewheel stop (factory setting)
[Ramp stop] (RNP)	Stop on ramp
[Fast stop] (FSE)	Fast stop
[DC injection] (DCI)	DC injection stop

The values of the [Network fault mgt] (CLL) parameter, which do not trigger a drive fault, are:

Value	Meaning
[Ignore] (ND)	Fault ignored
[Per STT] (SEE)	Stop according to configuration of [Type of stop] (SEE).
[fallback spd] (LFF)	Switch to fallback speed, maintained as long as the fault is present and the run command is not disabled.
[Spd maint.] (RLS)	The drive maintains the speed at the time the fault occurred, as long as the fault persists and the run command has not been removed.

The fallback speed can be configured via the [Fallback speed] (LFF) parameter in the [1.8 – FAULT MANAGEMENT] (FLE-) menu.



# 9. Configuration

## 9. 5. Monitored parameters

It is possible to select up to 4 parameters to display their values in the [1.2 - MONITORING] menu ([COMMUNICATION MAP] submenu) on the graphic display terminal.

The selection is made via the [6 – MONITOR CONFIG.] menu ([6.3 - CONFIG. COMM. MAP] submenu).

Each parameter [Address 1 select] ... [Address 4 select] can be used to choose the logic address of the parameter. Select an address of zero to disable the function.

In the example given here, the monitored words are:

- Parameter 1 = Motor current (LCr): logic address 3204; signed decimal format
- Parameter 2 = Motor torque (Otr): logic address 3205; signed decimal format
- Parameter 3 = Last fault occurred (LFt): logic address 7121; hexadecimal format
- Disabled parameter: address 0; default format: hexadecimal format

RDY	NET	+0.00Hz	0A
6.3 CONFIG. COMM. MAP.			<input type="checkbox"/>
Address 1 select	:		3204
FORMAT 1	:		Signed
Address 2 select	:		3205
FORMAT 2	:		Signed
Address 3 select	:		7121
<b>Code</b>		<b>Quick</b>	<input checked="" type="checkbox"/>
FORMAT 3	:		Hex
Address 4 select	:		0
FORMAT 4	:		Hex

One of the three display formats below can be assigned to each monitored word:

Format	Range	Terminal display
Hexadecimal	0000 ... FFFF	[Hex]
Signed decimal	-32,767 ... 32,767	[Signed]
Unsigned decimal	0 ... 65,535	[Unsigned]

# 10. Diagnostics

## 10. 1. Checking the address

On the graphic display terminal or integrated display terminal, check the address that has been coded on the switches using the [Address] (A d r C) parameter in the [1.9 COMMUNICATION] (C O N -) menu, [BACnet] (B A C n) submenu. This parameter cannot be modified.

The address switches are only read at power on, cycle the power to update value.

## 10. 2. Checking the communication

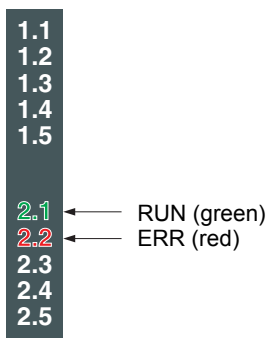
On the graphic display terminal, in the [1.2 - MONITORING] (S U P) menu [COMMUNICATION MAP] (C O N -) menu [DIAG NETWORK] (n E t):

Contents of the DIAG NETWORK sub menu with a BACnet communication board:

Parameter	Comment
[Address] (ADRC)	Displays the device address (configured by DIP switches). The setting of these switches must (only) be done when the drive is powered off.
[Data rate used] (BDRU)	Displays the baud rate used by the communication, these value may be useful when the baud rate parameter is set to AUTO.
[Frame counter] (TFC)	Displays the total number of frames received by the communication card since the last power ON.
[Invalid Frame counter] (EFC)	Displays the total number of bad frames received by the communication card since the last power ON.

## 10. 3. LEDs

The BACnet card has 2 LEDs, RUN and ERR, which are visible through the drive cover.



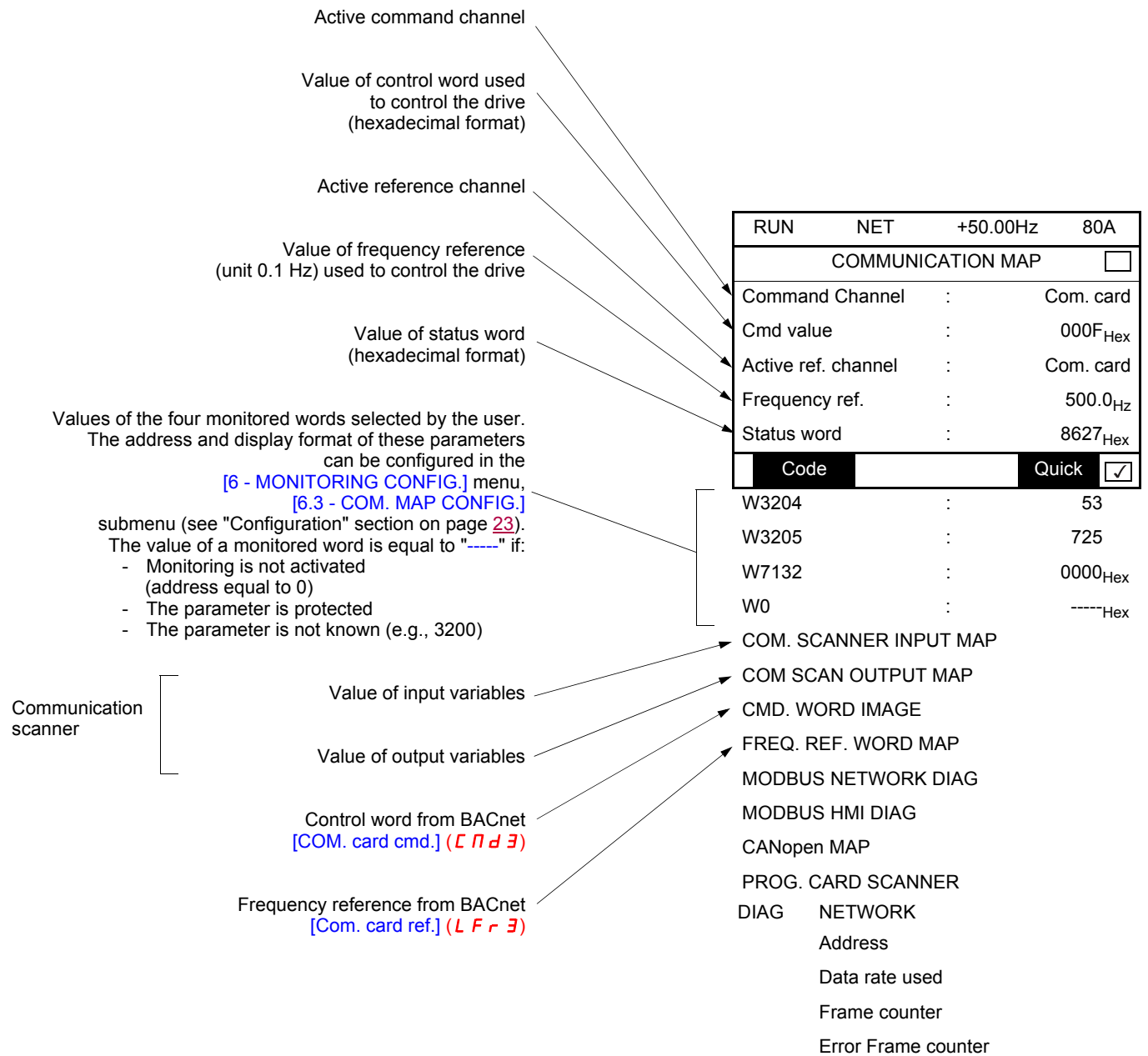
Green RUN LED	Meaning	Corrective action
Flashing intermittent	Normal operation	-
Flashing 3 times in 2 seconds, Off for 1 second.	Waiting for Auto baud rate detection	-

Red ERR LED	Meaning	Corrective action
Flashing intermittent	Invalid message received	<ul style="list-style-type: none"> <li>Check the environment (electromagnetic compatibility).</li> <li>Check the communication parameter configuration (protocol, speed, format).</li> <li>Check that the slave address is unique.</li> </ul>
Flashing 5 times /second	BACnet board failure	<ul style="list-style-type: none"> <li>Replace the communication card.</li> </ul>
Flashing 3 times /second Off for 1 second	Communication loss detected	<ul style="list-style-type: none"> <li>Check the environment (electromagnetic compatibility).</li> <li>Check the card/drive connection</li> </ul>
On 0.5s Off 0.5s (with green LED also lighted)	Invalid configuration detected, causes an EPF2 fault	<ul style="list-style-type: none"> <li>ADRC is greater than Max Master parameter.</li> <li>CHCF : Wrong profile selected (must be Sep or Non-Sep only).</li> <li>Not valid release of ATV61.</li> </ul>

# 10. Diagnostics

## 10.4. Control - Command

On the graphic display terminal only, the [1.2 - MONITORING] menu ([COMMUNICATION MAP] submenu) can be used to display control-signal diagnostic information between the drive and the master:



# 10. Diagnostics

## 10.5. Communication scanner

On the graphic display terminal, in the [1.2 - MONITORING] (5 U P -) menu ([COMMUNICATION MAP] (E П П -) submenu):

- The [COM. SCANNER INPUT MAP] ( I S A -) submenu is used to display the value of the 8 communication scanner input variables [Com Scan In● val.] (NM●).
- The [COM SCAN OUTPUT MAP] ( O S A -) submenu is used to display the value of the 8 communication scanner output variables [Com Scan Out● val.] (NC●).

Input variable	Scanner parameter	Output variable	Scanner parameter
No. 1	[Com Scan In1 val.] (NM1)	No. 1	[Com Scan Out1 val.] (NC1)
No. 2	[Com Scan In2 val.] (NM2)	No. 2	[Com Scan Out2 val.] (NC2)
No. 3	[Com Scan In3 val.] (NM3)	No. 3	[Com Scan Out3 val.] (NC3)
No. 4	[Com Scan In4 val.] (NM4)	No. 4	[Com Scan Out4 val.] (NC4)
No. 5	[Com Scan In5 val.] (NM5)	No. 5	[Com Scan Out5 val.] (NC5)
No. 6	[Com Scan In6 val.] (NM6)	No. 6	[Com Scan Out6 val.] (NC6)
No. 7	[Com Scan In7 val.] (NM7)	No. 7	[Com Scan Out7 val.] (NC7)
No. 8	[Com Scan In8 val.] (NM8)	No. 8	[Com Scan Out8 val.] (NC8)

Configuration of these variables is described in the "Configuration" section.

Example of communication scanner display on the graphic display terminal:

RUN	NET	+50.00Hz	80A
COM. SCANNER INPUT MAP			<input type="checkbox"/>
Com Scan In1 val.	:		34359
Com Scan In2 val.	:		600
Com Scan In3 val.	:		0
Com Scan In4 val.	:		0
Com Scan In5 val.	:		0
Code		Quick	<input checked="" type="checkbox"/>
Com Scan In6 val.	:		0
Com Scan In7 val.	:		0
Com Scan In8 val.	:		0

RUN	NET	+50.00Hz	80A
COM SCAN OUTPUT MAP			<input type="checkbox"/>
Com Scan Out1 val.	:		15
Com Scan Out2 val.	:		598
Com Scan Out3 val.	:		0
Com Scan Out4 val.	:		0
Com Scan Out5 val.	:		0
Code		Quick	<input checked="" type="checkbox"/>
Com Scan Out6 val.	:		0
Com Scan Out7 val.	:		0
Com Scan Out8 val.	:		0

In this example, only the first two variables have been configured (default assignment).

[Com Scan In1 val.] = [34343] Status word = 34359 = 16#8637 → Drivecom "Operation enabled" state, reverse operation, speed reached

[Com Scan In2 val.] = [600] Output speed = 600 → 600 rpm

# 10. Diagnostics

## 10. 6. Communication fault

BACnet communication faults are indicated by the red ERR LED on the BACnet card.

In the factory default configuration, a communication time-out fault will trigger a resettable [Com. network] (L n F) drive fault and initiate a freewheel stop.

It is possible to change the response of the drive in the event of a BACnet communication fault (see the Configuration section).

- [Com. network] (L n F) drive fault (freewheel stop, stop on ramp, fast stop or DC injection braking stop)
- No drive fault (stop, maintain, fallback)

The Parameters Manual contains a detailed description of how to manage communication faults (see the "Communication monitoring" section).

- Following initialization (power-up), the drive checks that at least one command or reference parameter has been written for the first time by BACnet.
- Then, if a communication fault occurs on BACnet, the drive will react according to the configuration (fault, maintain, fallback, etc.).

## 10. 7. Card fault

The [internal com. link] ( I L F ) fault appears when the following serious problems occur:

- Hardware fault on the BACnet card
- Dialog fault between the BACnet card and the drive

The response of the drive in the event of an [internal com. link] ( I L F ) fault cannot be configured, and the drive trips with a freewheel stop. This fault cannot be reset.

Two diagnostic parameters can be used to obtain more detailed information about the origin of the [internal com. link] ( I L F ) fault:

- [Internal link fault 1] ( I L F 1 ) if the fault has occurred on option card no. 1 (installed directly on the drive)
- [Internal link fault 2] ( I L F 2 ) if the fault has occurred on option card no. 2 (installed on top of option card no. 1)

The BACnet card can be in position 1 or 2.

The [Internal link fault 1] ( I L F 1 ) and [Internal link fault 2] ( I L F 2 ) parameters can only be accessed on the graphic display terminal in the [1.10 DIAGNOSTICS] ( D G E - ) menu, [MORE FAULT INFO] ( A F I - ) submenu.

Value	Description of the values of the [Internal link fault 1] ( I L F 1 ) and [Internal link fault 2] ( I L F 2 ) parameters
0	No fault
1	Loss of internal communication with the drive
2	Hardware fault detected
3	Error in the EEPROM checksum
4	Faulty EEPROM
5	Faulty Flash memory
6	Faulty RAM memory
7	Faulty NVRAM memory
8	Faulty analog input
9	Faulty analog output
10	Faulty logic input
11	Faulty logic output
101	Unknown card
102	Exchange problem on the drive internal bus
103	Time out on the drive internal bus (500 ms)

# 11. Network objects

## 11. 1. List of type supported by ATV61

- Drive I/O.
- Control.
- Parameters access.
- Identification.

## 11. 2. Drive I/O

### ■ Binary inputs

#### Binary input object instance summary

The following table summarizes the binary input object supported:

ID	Object name	Description	Active/Inactive text	Access
Binary input #0	RO 1 ACT	Indicates status of relay R1	ON/OFF	R
Binary input #1	RO 2 ACT	Indicates status of relay R2	ON/OFF	R
Binary input #2	RO 3 ACT	Indicates status of relay R3 (1)	ON/OFF	R
Binary input #6	DI 1 ACT	Value of LI1	ON/OFF	R
Binary input #7	DI 2 ACT	Value of LI2	ON/OFF	R
Binary input #8	DI 3 ACT	Value of LI3	ON/OFF	R
Binary input #9	DI 4 ACT	Value of LI3	ON/OFF	R
Binary input #10	DI 5 ACT	Value of LI5	ON/OFF	R
Binary input #11	DI 6 ACT	Value of LI6	ON/OFF	R
Binary input #12	DI 7 ACT	Value of LI7 (1)	ON/OFF	R
Binary input #13	DI 8 ACT	Value of LI8 (1)	ON/OFF	R
Binary input #14	DI 9 ACT	Value of LI9 (1)	ON/OFF	R
Binary input #15	DI 10 ACT	Value of LI10 (1)	ON/OFF	R
Binary input #16	DI 11 ACT	Value of LI11 (2)	ON/OFF	R
Binary input #17	DI 12 ACT	Value of LI12 (2)	ON/OFF	R
Binary input #18	DI 13 ACT	Value of LI13 (2)	ON/OFF	R
Binary input #19	DI 14 ACT	Value of LI14 (2)	ON/OFF	R
Binary input #20	DI 15 ACT	Indicates status of logic output (1)	ON/OFF	R
Binary input #21	DI 16 ACT	Indicates status of logic output (1)	ON/OFF	R

(1): Logic I/O option card terminals (VW3 A3 201).

(2): Extended I/O option card terminals (VW3 A3 202).

### ■ Binary outputs

#### Binary output object instance summary

The following table summarizes the binary output object supported:

ID	Object name	Description	Active/Inactive text	Access
Binary Output #0	RO1 CMD	R1 relay out accessible if not assigned	ON/OFF	C
Binary Output #1	RO2 CMD	R2 relay out accessible if not assigned	ON/OFF	C
Binary Output 2	RO3 CMD	R3 relay out accessible if not assigned (1)	ON/OFF	C
Binary Output #3	RO4 CMD	R4 relay out accessible if not assigned (2)	-/-	C
Binary Output #4	RO5 CMD	R5 relay out accessible if not assigned	-/-	C
Binary Output #5	RO6 CMD	R6 relay out accessible if not assigned	-/-	C
Binary Output #6	RO7 CMD	Logic output accessible if not assigned (1)	ON/OFF	C
Binary Output #7	RO8 CMD	Logic output accessible if not assigned (1)	ON/OFF	C

(1): Logic I/O option card terminals (VW3 A3 201).

(2): Extended I/O option card terminals (VW3 A3 202).

# 11. Network objects

## ■ Analog inputs

### Analog input object instance summary

The following table summarizes the analog input objects supported:

ID	Object name	Description	Units	Access
Analog Input #0	<b>ANALOG INPUT 1</b>	Analog input 1 value	%	R
Analog Input #1	<b>ANALOG INPUT 2</b>	Analog input 2 value	%	R
Analog Input #2	<b>ANALOG INPUT 3</b>	Analog input 3 value (2)	%	R
Analog Input #3	<b>ANALOG INPUT 4</b>	Analog input 4 value (2)	%	R
Analog Input #4	<b>ANALOG INPUT 5</b>	Analog input 5 value	%	R

(2): Extended I/O option card terminals (VW3 A3 202).

## ■ Analog output

### Analog output object instance summary

The following table summarizes the analog output objects supported:

ID	Object name	Description	Units	Access
Analog Output #0	<b>AO1 COMMAND</b>	Analog output value	%	C
Analog Output #1	<b>AO2 COMMAND</b>	Analog output value (2)	%	C
Analog Output #2	<b>AO3 COMMAND</b>	Analog output value (2)	%	C

(2): Extended I/O option card terminals (VW3 A3 202).

## 11. 3. Control objects

### ■ ATV61 binary values

#### ATV61 binary value object instance summary

The following table summarizes the binary value objects supported:

ID	Object name	Description	Active/Inactive text	Access
Binary Value #0	<b>RUN/STOP ACT</b>	Indicates the drive status.	READY/RUNS	R
Binary Value #1	<b>FWD/REV ACT</b>	Indicates the motor rotation's direction.	FWD/REV	R
Binary Value #2	<b>FAULT ACT</b>	Indicates the drive's fault status.	FAULTED/NONE	R
Binary Value #4	<b>HAND/AUTO ACT</b>	Indicates if the drive is locally controller or not.	HAND/AUTO	R
Binary Value #7	<b>DRIVE READY</b>	The VSD is ready and waits a start command.	NOT READY/READY	R
Binary Value #8	<b>AT SETPOINT</b>	The VSD has reached the target speed.	NO/REACHED	R
Binary Value #10	<b>RUN/STOP CMD</b>	Commands a drive start.	START/STOP	C
Binary Value #11	<b>FWD/REV CMD</b>	Commands a motor direction's change.	FWD/REV	C
Binary Value #14	<b>FAULT RESET</b>	Resets faults	RESET/NO	C
Binary Value #15	<b>MBOX READ</b>	Command to read parameter *	READ/RESET	C
Binary Value #16	<b>MBOX WRITE</b>	Command to write parameter *	WRITE/RESET	C
Binary Value #18	<b>C311CMD</b>	Controls C311 ATV61 internal bit	OFF/ON	C
Binary Value #19	<b>C312CMD</b>	Controls C312 ATV61 internal bit	OFF/ON	C
Binary Value #20	<b>C313CMD</b>	Controls C313 ATV61 internal bit	OFF/ON	C
Binary Value #21	<b>C314CMD</b>	Controls C314 ATV61 internal bit	OFF/ON	C
Binary Value #22	<b>C315CMD</b>	Controls C315 ATV61 internal bit	OFF/ON	C

\* : See chapter 8.4 for more details

# 11. Network object

## ■ Analog values

The following collection of analog values are also accessible through the parameter access group.

### Analog value object instance summary

The following table summarizes the analog value objects supported:

ID	Object name	Description (Code)	Units	Access
Analog value #0	<b>OUTPUT SPEED</b>	Output speed	rmp	R
Analog value #1	<b>OUTPUT FREQ</b>	Output frequency	Hz	R
Analog value #2	<b>DC BUS VOLT</b>	DC bus voltage	V	R
Analog value #3	<b>OUTPUT VOLT</b>	Motor voltage	V	R
Analog value #4	<b>CURRENT</b>	Motor current	A	R
Analog value #5	<b>TORQUE</b>	Motor torque	%	R
Analog value #6	<b>POWER</b>	Motor power	%	R
Analog value #7	<b>DRIVE TEMP</b>	Drive thermal state	%	R
Analog value #8	<b>KWH (R)</b>	Energy counter (erasable)	kWh	R
Analog value #9	<b>KWH (NR)</b>	Energy counter (not erasable)	kWh	R
Analog value #10	<b>PRC PID FBCK</b>	PID regulator feedback	%	R
Analog value #11	<b>PRC PID DEV</b>	PID regulator feedback	%	R
Analog value #14	<b>RUN TIME (R)</b>	Operating time	H	R
Analog value #15	<b>MOTOR TEMP</b>	Motor temperature	%	R
Analog value #16	<b>INPUT REF 1</b>	Velocity / frequency setpoint from BACnet	%	C
Analog value #18	<b>LAST FLT</b>	Error code	-	R
Analog value #19	<b>PREV FLT 1</b>	Previous fault (occurred before LASTFLT)	-	R
Analog value #20	<b>PREV FLT 2</b>	Previous fault (occurred before PREVFLT1)	-	R
Analog value #21	<b>AO 1 ACT</b>	Analog output 1 level	%	R
Analog value #22	<b>AO 2 ACT</b>	Analog output 2 level	%	R
Analog value #23	<b>ACCEL1 TIME</b>	Acceleration time	S	W
Analog value #24	<b>DECEL1 TIME</b>	Deceleration time	S	W
Analog value #25	<b>MBOX PARAM</b>	Parameter number (1)	-	W
Analog value #26	<b>MBOX DATA</b>	Parameter value	-	W
Analog value #27	<b>EXT PID STPT</b>	PID regulator setpoint via the bus	%	C
Analog value #28	<b>COM SCAN OUT1</b>	General purpose AV → Comm. Scan.	-	W
Analog value #29	<b>COM SCAN OUT2</b>	General purpose AV → Comm. Scan.	-	W
Analog value #30	<b>COM SCAN OUT3</b>	General purpose AV → Comm. Scan.	-	W
Analog value #31	<b>COM SCAN OUT4</b>	General purpose AV → Comm. Scan.	-	W
Analog value #32	<b>COM SCAN OUT5</b>	General purpose AV → Comm. Scan.	-	W
Analog value #33	<b>COM SCAN OUT6</b>	General purpose AV → Comm. Scan.	-	W
Analog value #34	<b>COM SCAN OUT7</b>	General purpose AV → Comm. Scan.	-	W
Analog value #35	<b>COM SCAN OUT8</b>	General purpose AV → Comm. Scan.	-	W
Analog value #36	<b>COM SCAN IN1</b>	General purpose AV ← Comm. Scan.	-	R
Analog value #37	<b>COM SCAN IN2</b>	General purpose AV ← Comm. Scan.	-	R
Analog value #38	<b>COM SCAN IN3</b>	General purpose AV ← Comm. Scan.	-	R
Analog value #39	<b>COM SCAN IN4</b>	General purpose AV ← Comm. Scan.	-	R
Analog value #40	<b>COM SCAN IN5</b>	General purpose AV ← Comm. Scan.	-	R
Analog value #41	<b>COM SCAN IN6</b>	General purpose AV ← Comm. Scan.	-	R
Analog value #42	<b>COM SCAN IN7</b>	General purpose AV ← Comm. Scan.	-	R
Analog value #43	<b>COM SCAN IN8</b>	General purpose AV ← Comm. Scan.	-	R

(1)Parameter Modbus internal address. Refer to "Communication parameter" user's manual.



# 11. Network object

## 11. 4. Drive objects

Property	Objects Type						
	DEVICE	BINARY INPUT	BINARY OUTPUT	BINARY VALUE	ANALOG INPUT	ANALOG OUTPUT	ANALOG VALUE
OBJECT_IDENTIFIER	●	●	●	●	●	●	●
OBJECT_NAME	●	●	●	●	●	●	●
OBJECT_TYPE	●	●	●	●	●	●	●
SYSTEM_STATUS	●	-	-	-	-	-	-
VENDOR_NAME	●	-	-	-	-	-	-
VENDOR_IDENTIFIER	●	-	-	-	-	-	-
MODEL_NAME	●	-	-	-	-	-	-
FIRMWARE_REVISION	●	-	-	-	-	-	-
APPLICATION_SOFTWARE_VERSION	●	-	-	-	-	-	-
PROTOCOL_VERSION	●	-	-	-	-	-	-
PROTOCOL_REVISION	●	-	-	-	-	-	-
PROTOCOL_SERVICES_SUPPORTED	●	-	-	-	-	-	-
PROTOCOL_OBJECT_TYPES_SUPPORTED	●	-	-	-	-	-	-
OBJECT_LIST	●	-	-	-	-	-	-
MAX_APDU_LENGTH_ACCEPTED	●	-	-	-	-	-	-
SEGMENTATION_SUPPORTED	●	-	-	-	-	-	-
APDU_TIMEOUT	●	-	-	-	-	-	-
NUMBER_OF_APDU_RETRIES	●	-	-	-	-	-	-
MAX_MASTER	●	-	-	-	-	-	-
MAX_INFO_FRAMES	●	-	-	-	-	-	-
DEVICE_ADDRESS_BINDING	●	-	-	-	-	-	-
DATABASE_REVISION	●	-	-	-	-	-	-
PRESENT_VALUE	-	●	●	●	●	●	●
STATUS_FLAGS	-	●	●	●	●	●	●
EVENT_STATE	-	●	●	●	●	●	●
OUT_OF_SERVICE	-	●	●	●	●	●	●
UNITS	-	-	-	-	●	●	●
PRIORITY_ARRAY	-	-	●	● <sup>(1)</sup>	-	●	● <sup>(1)</sup>
RELINQUISH_DEFAULT	-	-	●	● <sup>(1)</sup>	-	●	● <sup>(1)</sup>
POLARITY	-	●	●	-	-	-	-
ACTIVE_TEXT	-	●	●	●	-	-	-
INACTIVE_TEXT	-	●	●	●	-	-	-

(1) : only for command parameters only.

## 12. Network services

### 12. 1. List of services

	Drive I/O		Operating mode		Parameters access		Identification	
<b>BACnet Environment</b>	BACnet service (BIBB)	Objects type	BACnet service (BIBB)	Objects type	BACnet service (BIBB)	Objects type	BACnet service (BIBB)	Objects type
	ReadProperty (DS-RP-B) ReadProperty Multiple (DS-RPM-B) WriteProperty (DS-WP-B) WriteProperty Multiple (DS-WPM-B)	BI, BO <sup>1</sup> , AI, AO	ReadProperty (DS-RP-B) ReadProperty Multiple (DS-WPM-B) WriteProperty (DS-WP-B) WriteProperty Multiple (DS-WPM-B)	BV, AV.	ReadProperty (DS-RP-B) ReadProperty Multiple (DS-RPM-B) WriteProperty (DS-WP-B) WriteProperty Multiple (DS-WPM-B)	BV, AV.	ReadProperty (DS-RP-B) ReadProperty Multiple (DS-RPM-B) WriteProperty (DS-WP-B) WriteProperty Multiple (DS-WPM-B)	Device Object
					Reinitialize Device (DM-RD-B)	NA		
<b>VSD's Environment</b>	Access to all drive's wired I/Os.		Controls the drive in normal operation.		Enables Drive's parameters access		Delivers information Relative to the drive	

<sup>1</sup> If complies with operating mode

## 12. Network services

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### 12. 2. List of available BACnet services.

BACnet Service	BIBB	Family	Drive requested action
ReadProperty	( DS-RP-B)	Data Sharing	Provides the current value of one of its object property
WriteProperty	(DS-WP-B)	Data Sharing	Modifies the current value of one of its object property
WriteMultipleProperty	(DS-WPM-B)*	Data Sharing	Write several properties of several objects
ReadMultipleProperty	(DS-RPM-B)*	Data Sharing	Read several properties of several objects
Who-Is	( DM-DDB-B)	Device and Network Management	The drive provides information about its attributes and responds to requests to identify itself.
I-Am	( DM-DDB-B)	Device and Network Management	
Who-Has	( DM-DOB-B)	Device and Network Management	The drive provides address information about its objects upon request.
I-Have	(DM-DOB-B)	Device and Network Management	
DeviceCommunication Control	(DM-DCC-B)	Device and Network Management	The drive responds to communication control exercised by the external device.
ReinitializeDevice	( DM-RD-B)*	Device and Network Management	The drive performs reinitialisation requests from the A device

#### ■ Access to the VSD objects collection.

To control the VSD the external application must modify the present values of binary and analog objects. To do this, the external controller must use the following services:

- `ReadProperty`, `WriteProperty`, `ReadPropertyMultiple`, `WritePropertyMultiple`.

These services allow to read or to write the properties of all the objects. From the list of objects refer to the Programming guide manual and to the Communication parameters manual.

## 12. Network services

### 12.3. Additional functions

Besides the services of “datasharing” the communication card provides the following functions.

#### ■ Full parameters access.

By the use of indirect access, it is possible to read or write any of the internal parameters of the VSD. This functionality is assured by these four objects:

MBOX DATA, MBOX PARAM, MBOX READ, MBOX WRITE.

##### • Reading

Write the logic address of the parameter to the present value property of the object MBOX PARAM.  
Set present value property of the object MBOX READ to “read”.  
The current value of the parameter can be read in the present value property of MBOX DATA.

##### • Writing a parameter

Write the logic address of the parameter to the present value property of the object MBOX PARAM.  
Write the new value in the present value property of the object MBOX DATA.  
Set present value property of the object MBOX WRITE to “write”.

**Note:** MBOX READ and MBOX WRITE automatically return back to inactive once command sent. Always return 0 when read.

Important note: The modified parameters are not saved in EEPROM non-volatile memory, If you want to do this, you need to specify it by writing the CMI bit 1 to 1. The command is only active if the drive is stopped.

#### ■ Identification.

Information relative to the VSD are stored in a unique object: ATV 61 (Device object type). The following list of properties describes the content of this object. The type of these properties is character string.

Property (Member of ATV 61)	Description
VendorName	Brand label
ModelName	VSD part reference
Firmware_Revision	Communication card software version
Application_Software_Version	Control card software version
Location	Not supported
Description	Corresponds to the Device name edited character string with the HMI. (Pan0 .. 7)

#### ■ Factory settings.

It is also possible to restore the settings by the use of the “ReinitializeDevice” service.

This service requires one parameter.

- Reinitialization state.

The value of the Reinitialization state parameter may be WARMSTART, STARTBACKUP, ENDBACKUP, STARTRESTORE. For the VSD the value of this parameter should be WARMSTART. The other values have no action and will be rejected.

#### ■ Freely assignable objects.

The binary value objects BV18 to BV22 correspond to bits (C311 to C315) within the ATV.

By default these bits are not used, but it is possible to assign them to an additional function. The HMI (or the commissioning software) must be used to configure the use of these objects.

The details of the assignment possibilities of these bits are explained in the “Programming guide”.



