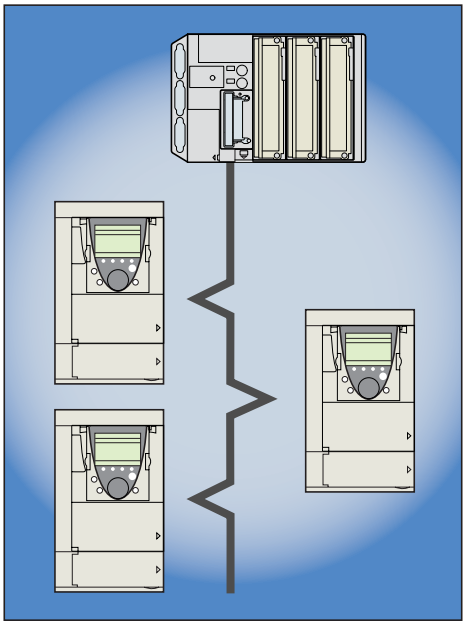
Altivar 61/71

CC-Link

User's manual

VW3 A3 317

Retain for future use



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Contents

NOTE

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

1. Important Information

NOTICE

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

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personnal injury if the instruction 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.

2. Before you begin

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 61/71 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

Thank you for purchasing the CC-Link option card (VW3A3317) for Altivar 71 and Altivar 61.

IMPORTANT : This communication option card is fully supported with the version V1.4 and above of the Altivar 61 firmware.
This communication option card is only supported with the version V1.6 and above of the Altivar 71 firmware. Specific versions of the Altivar 71 firmware are not supported.

For older versions, the option will operate normally , the only restriction consists on the address and in the baud rate information: these parameters are not displayed in the communication menu. These parameters are read only (defined by DIP-switches).
By Installing this board into the Altivar 61, data communication can be made with CC-Link V1.4 master controller (PLC,..).

The communication card has a connector for connection to the network.

Data exchanges give access to all Altivar 61/71 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

■ CC-Link manual

The present CC-Link user manual describes:
- connection to CC-Link,
- 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 61/71 technical documents. They are available on the Web site www.telemecanique.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 CC-Link 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 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 CC-Link 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 CC-Link card.

5. Notation

■ 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: (COM-).

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: (LFF).

■ Formats

Hexadecimal values are written as follows: 16# or 0x
Binary values are written as follows: 2#

■ Abbreviations

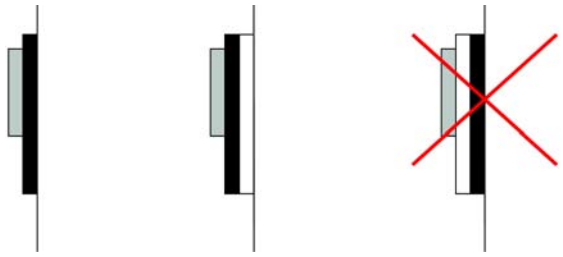
O = Optional
M = Mandatory

6. Hardware setup

6. 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.

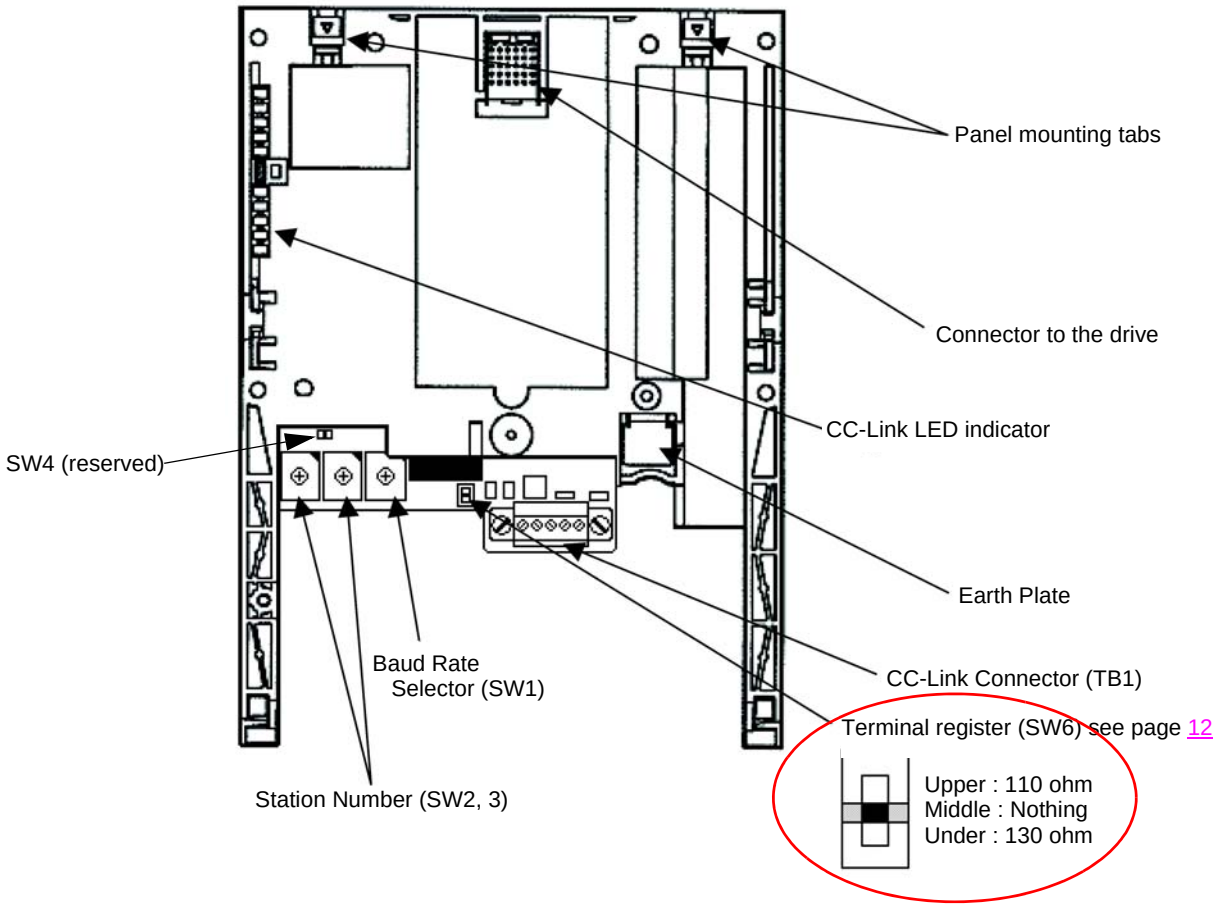
6. 2. Mounting the option card on the drive



CC-link cards position

The CC-link option card must be mounted in the top position when used with another option card.

6. 3. Hardware description

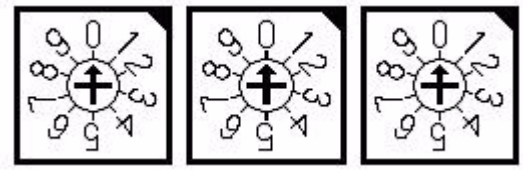


■ Important

SW4 and RJ-45 connector are reserved for Schneider internal use only !
SW4 : Right position : Normal operation
SW4 : Left position : Forbidden use

6. 4. Set the station number and baud rate

For the setting station number or communication speed to take effect, power needs to be turned off and then turned back on.



x10 x1 BAUD RATE

- Set the Station No.
  The station number can be set between 1 and 64. The switch x10 is set up the ten's place and x1 is set up the ones.
- Set the arrow (↑) of the corresponding switch to the required number.
- Set the transmission speed.
  (For details, refer to the CC-Link master unit manual.)

Setting Switch	0	1	2	3	4
Transmission Speed	156 kbps	625 kbps	2.5 Mbps	5 Mbps	10 Mbps

It causes an error when the switches are not set correct position (ex. set position between 0 and 1 switch label), set over 5.

7. Connecting to the bus

7. 1. Cable routing practices

When wiring Altivar 61/71 drives to a CC-Link 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.

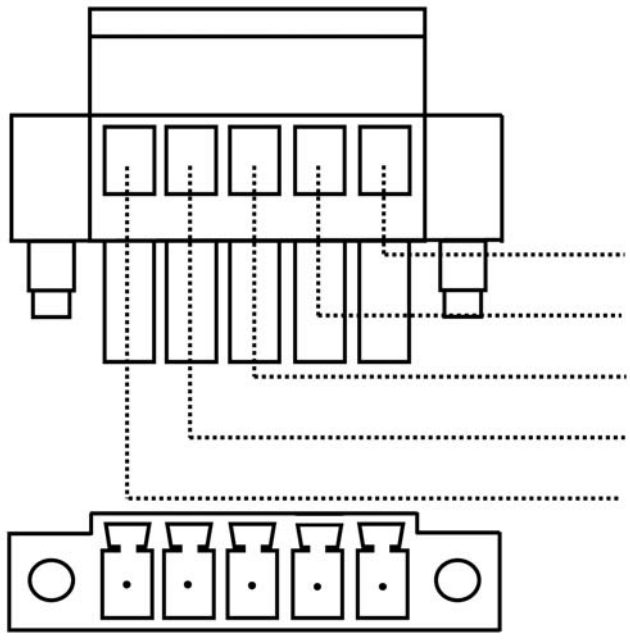
When planning cable routing within a building, follow these guidelines:
- Maintain a minimum separation of 1 m from the following equipment:
  - air conditioners and large blowers,
  - elevators and escalators,
  - radios and televisions,
  - intercom and security systems,
  - fluorescent, incandescent, 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.

7. 2. Card connector pinout

Below figure is the terminal to connect the CC-Link cable. Connection is screw connection. The terminal is a plug-type and the signal of each terminal is as follows.

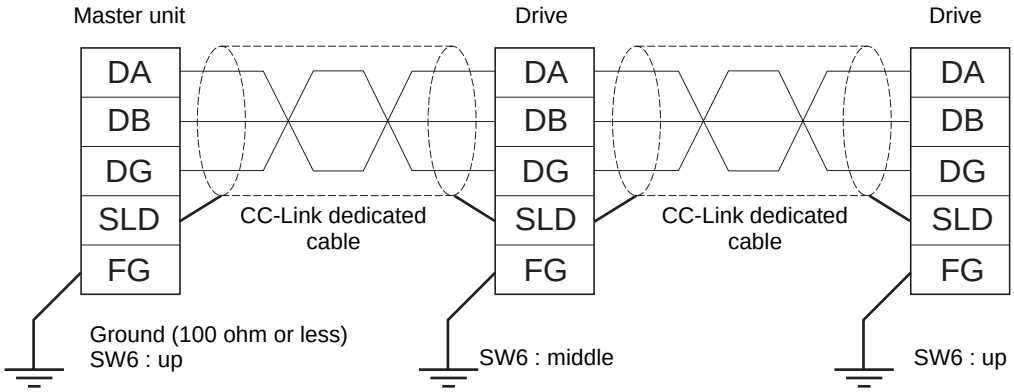


Symbol	Signal contents
FG	Fram ground
SLD	Shield
DG	Signal ground
DB	Communication data -
DA	Communication data +

8. Connection of Several Drives

Factory Automation can be applied with several drives which share CC-Link system as a remote device station, and are controlled and monitored by PLC user programs.

- Communication terminal DA, DB
  Set up the network using shielded twisted pair cable.
- Communication terminal DG
- Shield connection terminal SLD
  Please connect the shield line of the dedicated CC-Link cable with the SLD terminal.
- Connection of the frame ground terminal FG
  Grounding resistance is 100 ohm max.
- Line adaptation: the termination resistor is located on the communication card. the 3 position SW6 switch activate or not line adaptation:
  - SW6 up : 110 Ohms termination resistor activated.
  - SW6 middle : no termination.
  - SW6 down : 130 Ohms termination resistor activated



- Maximum number of units connected to one master station is 42 units (when only drives are connected).
- If any other units are included, the number of occupied station on the unit. So the connectable number of units is different.

9. Configuration

9. 1. Parameters configuration

The only parameter to configure is the time-out duration as defined in the following table. It is also possible, in this menu, to check the slave number and the baud rate which have been configured with the rotary switches of the card.

In the following menu [1.9 COMMUNICATION] (COM-) menu [CC-link] (CCL-) submenu.

Parameter	Possible values	Minimum value	Maximum value
[Address] (AdrC)	1 to 64 (read only)	-	-
[Baud rate] (Bdr)	[156kbps] (156) [625kbps] (625) [2.5Mbps] (2. 5M) [5Mbps] (5M) [10Mbps] (10M) (read only)	-	-
[Time - out] (tLP)	Time out in seconds. default value: 10.0 s	0 s	60.0 s

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

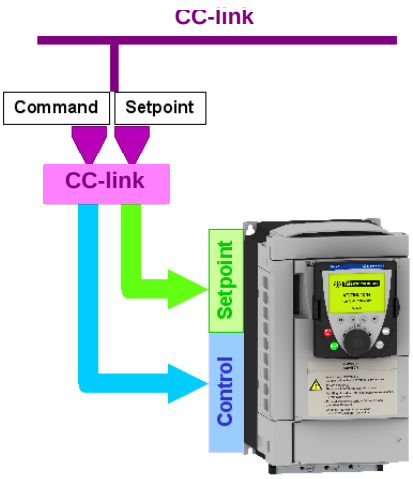
If the drive is only monitored by CC-link:
There is no configuration constraint.

If the drive is controlled by CC-link:
The parameter [Profile] (CHCF) must be configured to [Not separ.] (S IM) or [Separate] (SEP). [Not separ.] (S IM) is the default value.
It is not allowed to configure the parameter [Profile] (CHCF) to the value [8 serie] (SE8) or [I/O profile] (IO).
If a forbidden configuration is done, the drive will trip on [External fault com.] (EPF2).
However, if the I/O profile is configured and that no Command channel are assigned to the communication card, the drive will not trip.

9. Configuration

■ Control via CC-link

The command and the setpoint come from CC-link.



Configure the following parameters:

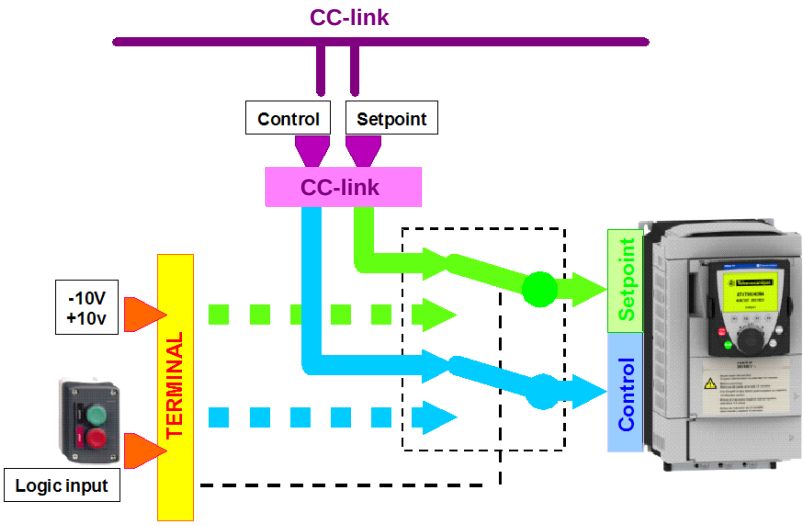
Parameter	Value	Comment
Profile	Non separate CiA402 profile	The run command are in CiA402 profile the command and the setpoint come from the same channel.
Setpoint 1 and command configuration	Network card	The setpoint and command come from CC-link.

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

Menu	Parameter	Value
[1.6 - COMMAND] (CtL-)	[Profile] (CHCF)	[Not separ.] (SIM): default value
	[Ref.1 chan] (Fr1)	[Com. card] (nEt)

■ Control via CC-link or via the terminals

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

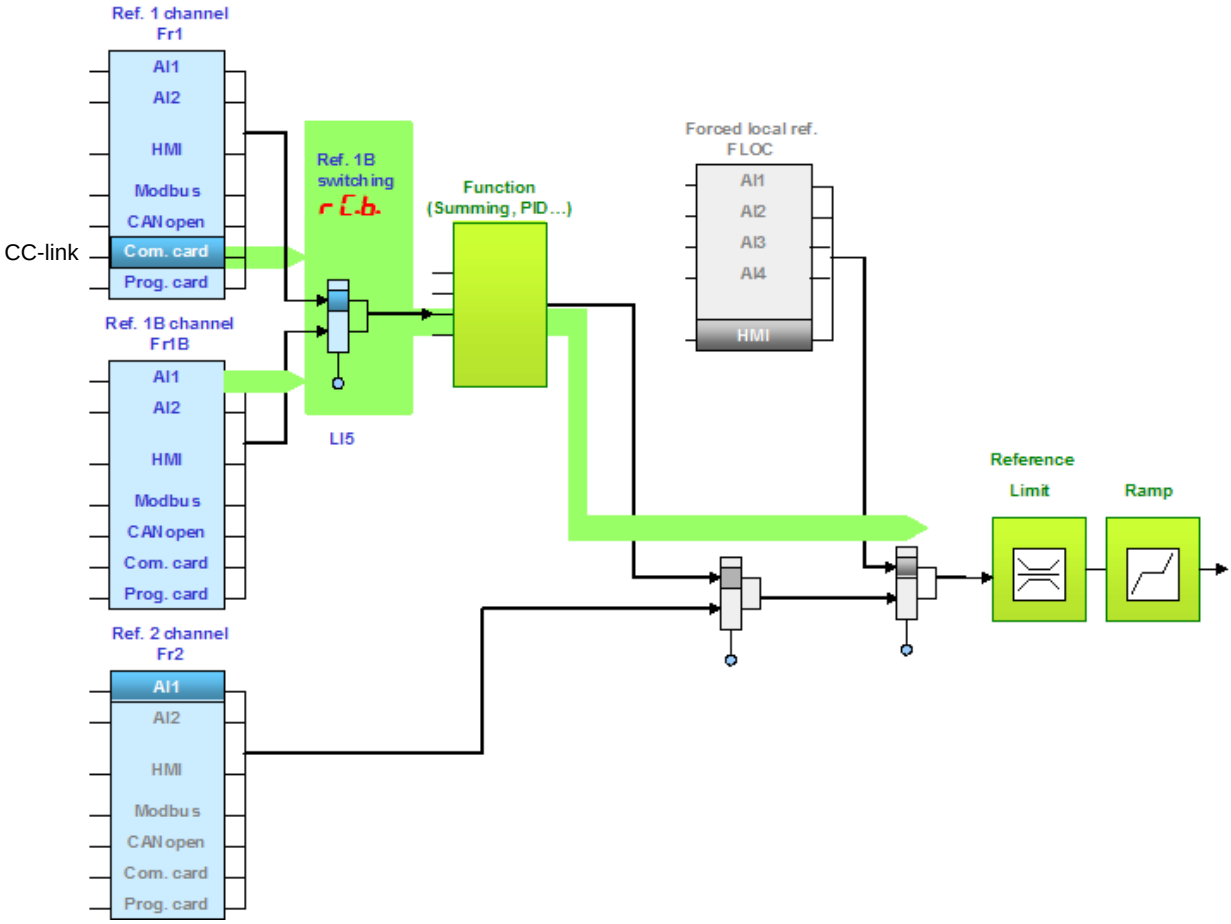


2 different use cases are described below. The setpoint is switched from CC-link to the terminals. In the first case, the application function applies and not in the second one.

Note:
With such operating mode, we advertize that the master controller must monitor the drive state (by polling significant points), thus when the control and/or the setpoint are switched back to CC-link, the controller will react properly (when the Drive is switched to local mode, all overridden commands are released).

Switching of control and setpoint from CC-link to the terminals with application function

Input LI5 is used to switch the control and the setpoint between CC-link 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 CC-link.
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 CC-link.
Command 2 configuration	Terminals	Command 2 comes from the terminals.
Command switching	Input LI5	Input LI5 switches the command

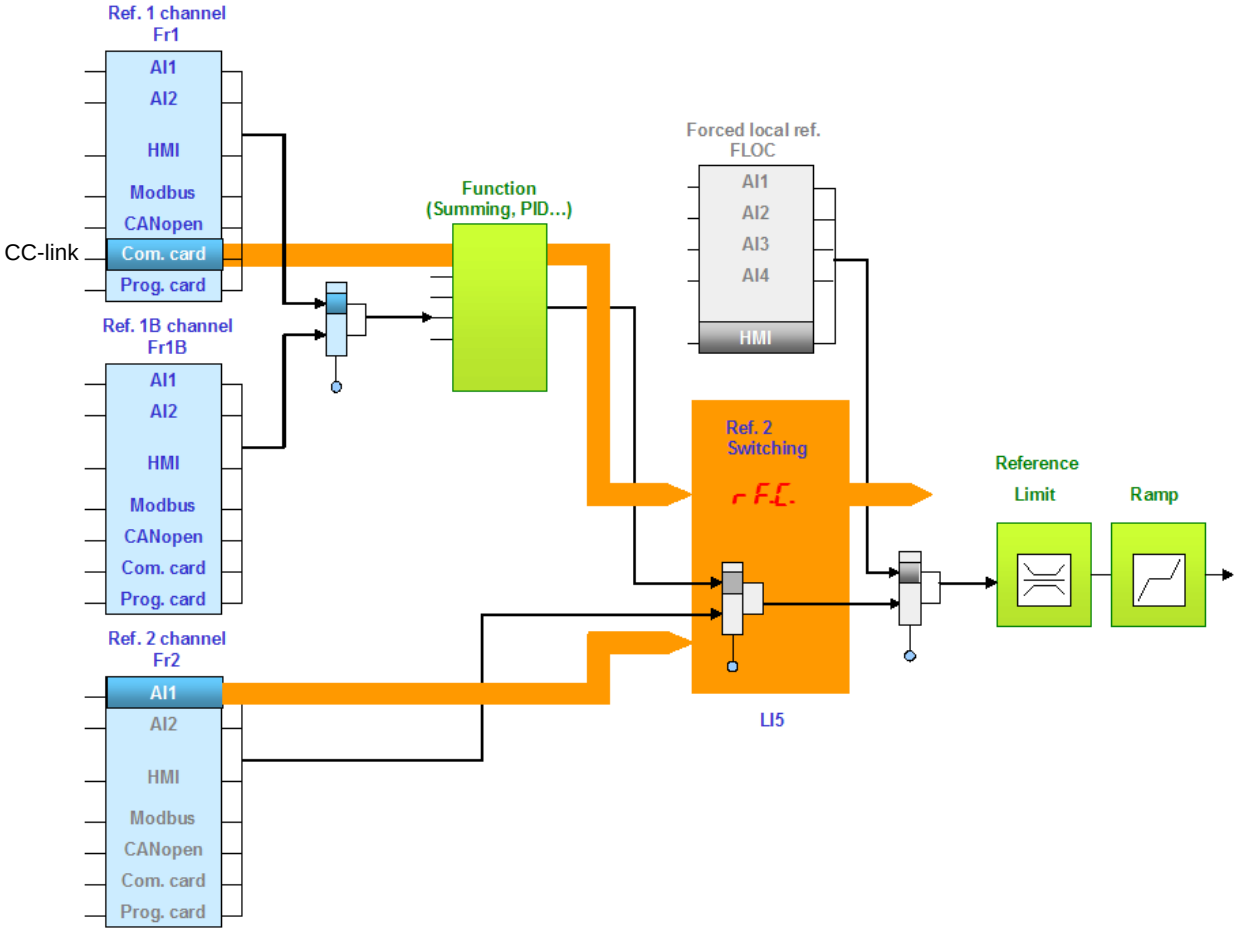
Setpoint 1B is directly connected to the functions of the drive. If switching to the terminals is performed, the functions that affect the reference (summing, PID, etc) are active.

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

Menu	Parameter	Value
[1.6 - COMMAND] (CtL-)	[Profile] (CHCF)	[Separate] (SEP)
	[Ref.1 channel] (Fr1)	[Com. card] (nEt)
	[Cmd channel 1] (cd1)	[Com. card] (nEt)
	[Cmd channel 2] (cd2)	[Terminals] (tEr)
	[Cmd switching] (CCS)	[LI5] (LI5)
[1.7 - APPLICATION FUNCT.] (FUn-) [REFERENCE SWITCH]	[Ref.1B channel] (Fr1b)	[Ref. AI1] (AI1)
	[Ref.1B switching] (rCb)	[LI5] (LI5)

Switching of control and setpoint from CC-link to the terminals without application function

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



Configure the following parameters:

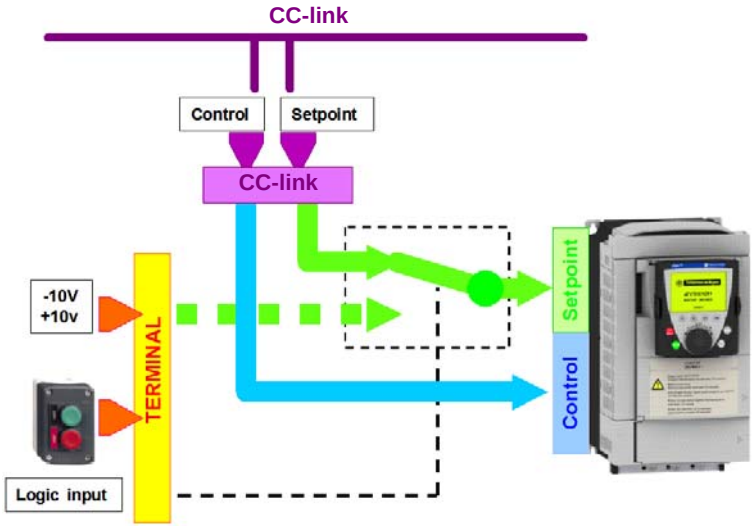
Parameter	Value	Comment
Profile	Non separate profile	The command and the setpoint come from the same channel.
Setpoint 1 configuration	Network card	Setpoint 1 and command 1 comes from CC-link.
Setpoint 2 configuration	Analog input 1 on the terminals	Setpoint 2 and command 2 comes from input AI1 on the 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] (CtL-)	[Profile] (CHCF)	[Not separ.] (SIM):default value
	[Ref.1 chan] (Fr1)	[Com. card] (nEt)
	[Ref.2 chan] (Fr2)	[AI1 ref.] (AI1)
	[Ref.2 switching] (rFC)	[LI5] (LI5)

■ Control via CC-link and setpoint switching

The command comes from CC-link.
The setpoint comes either from CC-link or from the terminals.
Depending on the configuration, the application function are activated or not.

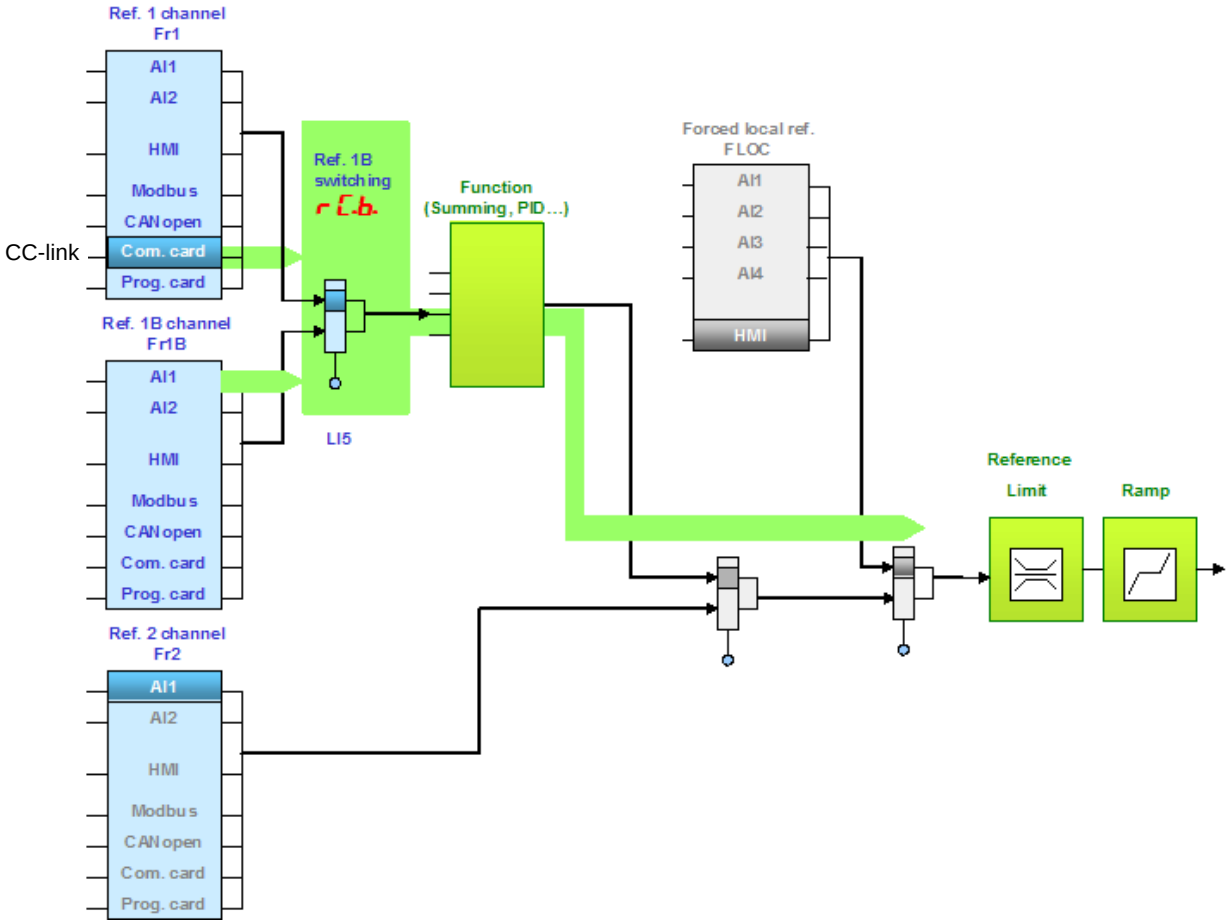


The command comes from CC-link. The setpoint comes either from CC-link or from the terminals. Depending on the configuration, the application functions are active or not.

Note:
With such operating mode, we advertize that the master controller must monitor the drive state (by polling significant points), thus when the control and/or the setpoint are switched back to CC-link, the controller will react properly (when the Drive is switched to local mode, all overridden commands are released).

Control via CC-link and switching of the setpoint at the terminals with application function

The command comes from CC-link. Input LI5 is used to switch the setpoint between CC-link 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 CC-link.
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 CC-link.
Command switching	Channel 1	Channel 1 is the command channel.

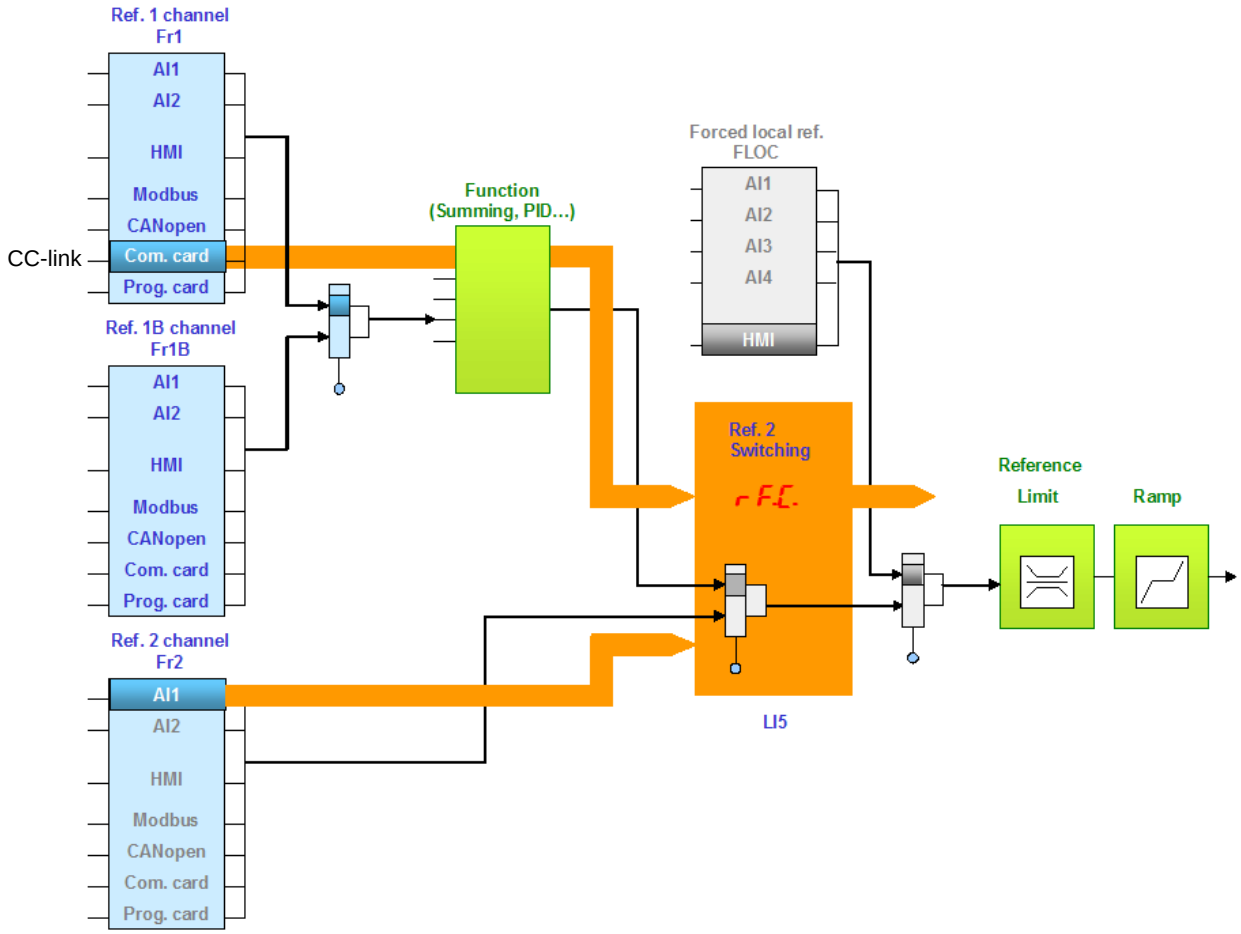
Reference 1B is directly connected to the functions of the drive. If switching to the terminals is performed, the functions that affect the reference (summing, PID, etc) are active.

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

Menu	Parameter	Value
[1.6 - COMMAND] (CtL-)	[Profile] (CHCF)	[Separate] (SEP)
	[Ref.1 channel] (Fr1)	[Com. card] (nEt)
	[Cmd channel 1] (cd1)	[Com. card] (nEt)
	[Cmd switching] (CCS)	[ch1 active] (Cd1)
[1.7 - APPLICATION FUNCT.] (FUn-) [REFERENCE SWITCH]	[Ref.1B channel] (Fr1b)	[Ref. AI1] (AI1)
	[Ref.1B switching] (rCb)	[LI5] (LI5)

Control via CC-link and switching of the setpoint at the terminals with application function

The command comes from CC-link. Input LI5 is used to switch the setpoint between CC-link 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 CC-link.
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 CC-link.
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] (CtL-)	[Profile] (CHCF)	[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] (CCS)	[ch1 active] (Cd1)

9. 3. Communication scanner

The communication scanner enables all the application-relevant parameters to be grouped in a successive list of monitor codes and command codes.

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

The 8 output variables are assigned using the 8 [Scan.Out● address] (nCA●) parameters. They are configured using the graphic display terminal via the [1.9 - COMMUNICATION] (COM-) menu, [COM. SCANNER OUTPUT] (OCS-) submenu.
Communication scanner outputs are accessible through CC-Link monitor codes 20 to 27

The 8 input variables are assigned using the 8 [Scan. IN● address] (nMA●) parameters. They are configured using the graphic display terminal via the [1.9 - COMMUNICATION] (COM-) menu, [COM. SCANNER INPUT] (ICS-) submenu.
Communication scanner inputs are accessible through CC-Link command codes 100 to 107

Enter the logic address of the parameter (see the Parameters Manual).
If a [Scan.Out● address] (nCA●) or [Scan. IN● address] (nMA●) 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] (nCA1)	Control word (CMd) (1)
[Scan. Out2 address] (nCA2)	Speed reference (LFrd)
[Scan. Out3 address] (nCA3)	Not used
[Scan. Out4 address] (nCA4)	Not used
[Scan. Out5 address] (nCA5)	Not used
[Scan. Out6 address] (nCA6)	Not used
[Scan. Out7 address] (nCA7)	Not used
[Scan. Out8 address] (nCA8)	Not used

Configuration parameter name	Default assignment of the input variable
[Scan. IN1 address] (nMA1)	Status word (EtA)
[Scan. IN2 address] (nMA2)	Output speed (rFrd)
[Scan. IN3 address] (nMA3)	Not used
[Scan. IN4 address] (nMA4)	Not used
[Scan. IN5 address] (nMA5)	Not used
[Scan. IN6 address] (nMA6)	Not used
[Scan. IN7 address] (nMA7)	Not used
[Scan. IN8 address] (nMA8)	Not used

(1) CMD and LFrd are given here as example. In practice, when the drive is operated from CC-Link, 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			☐
Scan. IN1 address	:		3201
Scan. IN2 address	:		8604
Scan. IN3 address	:		0
Scan. IN4 address	:		0
Scan. IN5 address	:		0
Code		Quick	☑
Scan. IN6 address	:		0
Scan. IN7 address	:		0
Scan. IN8 address	:		0

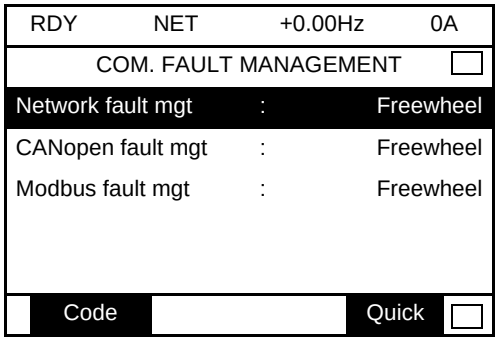
RDY	NET	+0.00Hz	0A
COM. SCANNER OUTPUT			☐
Scan. Out1 address	:		8501
Scan. Out2 address	:		8602
Scan. Out3 address	:		0
Scan. Out4 address	:		0
Scan. Out5 address	:		0
Code		Quick	☑
Scan. Out6 address	:		0
Scan. Out7 address	:		0
Scan. Out8 address	:		0

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

9. 4. Communication faults

A CC-Link fault is triggered if the CC-Link card does not receive any CC-Link messages (regardless of address) at its address within a predefined time period (time out defined by tLP). All CC-Link request types are taken into account (read, write, etc.).
The response of the drive in the event of a CC-Link 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] (FLt-) menu, [COM. FAULT MANAGEMENT] (CLL-) submenu.



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

Value	Meaning
[Freewheel] (YES)	Freewheel stop (factory setting)
[Ramp stop] (rMP)	Stop on ramp
[Fast stop] (FSt)	Fast stop
[DC injection] (dC I)	DC injection stop

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

Value	Meaning
[Ignore] (nO)	Fault ignored
[Per STT] (Stt)	Stop according to configuration of [Type of stop] (Stt).
[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] (FLt-) menu.

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.			☐
Address 1 select	:		3204
FORMAT 1	:		Signed
Address 2 select	:		3205
FORMAT 2	:		Signed
Address 3 select	:		7121
Code		Quick	☑
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. Inverter profile principle

10. 1. Description

The CC-link card for ATV61/71 complies with the inverter device category of the CC-link specification.

■ I/Os mapping

The remote device station is a compound set of 32 remote digital inputs(Rxn (1)), 32 remote digital outputs(Ryn) , 4 remote input registers (RWr) and 4 remote output registers(RWw).
The discrete inputs and outputs are used for basics such as run, stop, fault etc and for insure the handshake between the PLC and the drive when command or monitor functions are executed. These Rxn and Ryn are detailed on pages 25 and 26.
The 4 remote input registers and 4 remote output registers receive commands , monitor codes, actual values and setpoints. These RWr and RWw are detailed on page 24.

RXn0..F

0							
							F

RX(n+1)0..F

0							
							F

RWr(n..n+3)

16 bits word
-
-
-

Drive to external third device
(Mainly a PLC as Master station)

RYn0..F

0							
							F

RY(n+1)0..F

0							
							F

RWw(n..n+3)

16 bits word
-
-
-

External Third device to the drive
(Mainly a PLC as Master station)

(1) n : depends on the station number

10. 2. Functions

■ Basic operations

Basic operations are simple operation than can be initiated from simple Boolean commands:
- Start, reverse, stop the drive.
- Clear faults.
- Drive multipurpose bits (C30x). These bits can be configured for a very large usage.

■ Frequency control.

The frequency setpoint is directly written in RWw(n+1).
Note: The setpoint is given in Hz x 0.01. The range of this value must be comprised between 0 and 32767. All negative values are considered equal to 0.

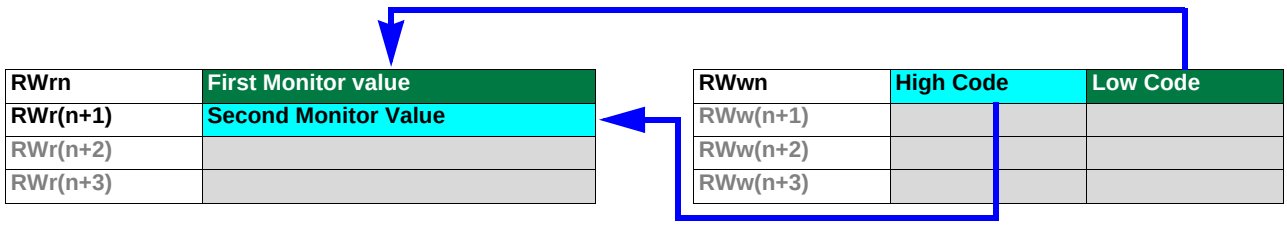
IMPORTANT : Beware that the frequency setpoint is updated by the drive when remote output RYnD is TRUE. If RYnD is FALSE, the frequency setpoint update is frozen.

■ Monitor functions.

Monitor functions are used to read actual values of the drive according to a monitor code. Part of this codes is mandatory , the rest is ATV61/71 specific. One Remote output register is used to define the monitored values (2 values are available simultaneously).
The Code defines a drive internal parameter. The table list which defines Code No/Parameter is detailed on page 27.
The low byte of RWwn (Monitor code register) receives the code of the first monitor value located in RWrn, the high byte of RWwn (Monitor code register) receives the code of the second monitor value located in RWr(n+1).
RYnC must be set to 1 to activate the operation, When RXnC rises, monitored values are available in their respective registers. RXnC falls when RYnC is also cleared. Monitored values are refreshed as long as code and RYnC are maintained.

Default monitored values:
If the highest byte of RWwn is equal to 0, the actual output frequency is continuously displayed in the second monitor register (RWr(n+1)).

■ Monitor functions : Registers usage



RWrn	First Monitor value
RWr(n+1)	Second Monitor Value
RWr(n+2)	
RWr(n+3)	

RWwn	High Code	Low Code
RWw(n+1)		
RWw(n+2)		
RWw(n+3)		

■ Command functions

Command functions are used to control the drive besides discrete I/Os.
The most used command is the frequency set point. Frequency set point is first written in RWn+1 and activated by turning on RYnD.

Frequency :
RWw(n+1) receives frequency setpoint (Hz x 0.01).
Note: The setpoint is given in Hz x 0.01. The range of this value must be comprised between 0 and 32767. All negative values are considered equal to 0.

Others command functions are executed as follow:
- RWn+2 receives the command code. this command code is detailed on page 29.
- RWn+3 receives additional information (parameter).

The function is started by turning on RYnF.
Particular case: write #1000 parameters command uses RYnA, RXnA, RYnB and RXnB instead of RYnF, RXnF (see page 38).

When the execution of the function is completed, RXnF turns ON. If the function requires a reply, the data can be read in RWrn+3. If RWrn+2 is null, the function is normally terminated, if RWrn+2 is not null the function has abnormally terminated. See page 31 for details.

■ Command functions :Registers usage

RWrn	
RWr(n+1)	
RWr(n+2)	Response code
RWr(n+3)	Read Data

RWwn	
RWw(n+1)	Set frequency
RWw(n+2)	Command code
RWw(n+3)	Data specific to command code

11. Details of the profile

Important note: In the following tables ATV61/71 parameters are indicated in red color followed by their logical address : **ETA** (8603). To get more information about these parameters please refer to the following guides:
❑ **ATV71 Communication parameters and ATV71programming guide** (both exist also for the ATV61).

11. 1. RX - remote digital inputs detail

This table describes remote digital inputs. **CL** column indicates that this command complies with CLPA profile. ATV logic addresses are represented between parenthesis and are expressed in base ten.

Remote inputs	CL	Name	Description	ATV Relative item
RXn0	●	Forward running	The drive is running forward	These 2 bits are the logical combination of **ETA** bit 2 and bit 15(8603) : bit 2 STOP/RUN , bit 15 Forward/reverse
RXn1	●	Reverse running	The drive is running backward	
RXn2		LI1 (1)	Value of LI1	**IL1R** bit 0 (5202)
RXn3		LI2	Value of LI2	**IL1R** bit 1 (5202)
RXn4		LI3	Value of LI3	**IL1R** bit 2 (5202)
RXn5		LI4	Value of LI4	**IL1R** bit 3 (5202)
RXn6		LI5	Value of LI5	**IL1R** bit 4 (5202)
RXn7		LI6	Value of LI6	**IL1R** bit 5 (5202)
RXn8		R1	Value of relay 1	**OL1R** bit 0 (5212)
RXn9		R2	Value of relay 2	**OL1R** bit 1 (5212)
RXnA		Address memorized	Address has been memorized (Command code 16#1000)	See page 38
RXnB		Value memorized	Value has been memorized (Command code 16#1000)	See page 38
RXnC	●	Monitoring operation complete		
RXnD	●	Frequency setting complete		
RXnE		Reserved		
RXnF	●	Command operation complete		
RX(n+1)0		reserved		
RX(n+1)1				
RX(n+1)2				
RX(n+1)3				
RX(n+1)4				
RX(n+1)5				
RX(n+1)6				
RX(n+1)7				
RX(n+1)8				
RX(n+1)9				
RX(n+1)A	●	Error status flag		**ETA** bit 3 (8603)
RX(n+1)B		Station ready	Remote device station ready	
RX(n+1)C				
RX(n+1)D				
RX(n+1)E		Reserved		
RX(n+1)F		Reserved		

11. Details of the profile

11. 2. RY - remote digital outputs detail

This table describes remote digital inputs. CL column indicates that this command complies with CLPA profile. ATV logic addresses are represented between parenthesis and are expressed in base ten.

Remote inputs	CL	Name	Description	ATV Relative item
RYn0	●	Forward run command	The drive starts forward when turned ON	(1)
RYn1	●	Reverse run command	The drive starts backward when turned ON	(1) (3)
RYn2			Freely assignable command bit	**C312**
RYn3			Freely assignable command bit	**C313**
RYn4			Freely assignable command bit	**C314**
RYn5			Freely assignable command bit	**C315**
RYn6				
RYn7				
RYn8				
RYn9		Drive stop	Stoppes the drive if ON	(2)
RYnA		Address memorized	Address has been memorized (Command code 16#1000)	See page 38
RYnB		Value memorized	Value has been memorized (Command code 16#1000)	See page 38
RYnC	●	Monitoring operation request		
RYnD	●	Frequency setting request		/10 ➡ **LFR**
RYnE		Reserved	Reserved	-
RYnF	●	Command operation request		NA
RY(n+1)0		Reserved		
RY(n+1)1				
RY(n+1)2				
RY(n+1)3				
RY(n+1)4				
RY(n+1)5				
RY(n+1)6				
RY(n+1)7				
RY(n+1)8				
RY(n+1)9				
RY(n+1)A	●	Error reset request flag		
RY(n+1)B				
RY(n+1)C				
RY(n+1)D				
RY(n+1)E		Reserved	Reserved	
RY(n+1)F		Reserved	Reserved	

(1) Forward, reverse commands are performed by the RYn0 and RYn1 bits. Priority is given to the oldest command, except when both bits are applied in the same PLC scancycle. In this last case priority is given forward.

(2) RYn9 stoppes the drive, but the drive doesn't restart when RYn9 fallbacks, a new start must be performed from RYn0 or RYn1.

(3) The reverse run command is managed by the bit C311. This implies that the user must not assign any function to this bit.

11. 3. CC-link Monitor codes

This chapter describes the correspondent parameter of the drive according to each monitor code available. For each Monitor code it establishes the link with the ATV parameter Address and unit. The behavior of this monitoring function is detailed on page 24.

■ Monitor codes :part1

Note: CL column indicates that this command complies with CLPA profile. ATV logic addresses are represented between parenthesis and are expressed in base ten.

Code Number	CL	Description	ATV logic address Base 10	ATV Code	Unit	Special Comments
16#00	●	Output frequency	(3202)	**RFr**	0.01Hz	
16#01	●	Output frequency	(3202)	**RFr**	0.01Hz	
16#02	●	Output current	(3204)	**LcR**	0.01A	
16#03	●	Output voltage	(3208)	**UOP**	0.1V	
16#04	●	None monitor	-	**-**	-	Returns 0
16#05	●	Frequency command value	(3202)	**RFR**	0.01Hz	To be multiplied by 10 for RFR
16#07	●	Output torque	(3205)	**OTR**	0.1%	
16#08	●	DC voltage	(3207)	**ULN**	0.1V	= Uln X v2
16#0E	●	Output power	(3211)	**OPR**	%	% of nominal power
16#13		None	-	**-**	-	
16#14	●	Retentive power-on time	(3231)	**rTH**	H	
16#17		Accumulation power on time	(3232)	**rthI**	-	Not resetable. Note units depends of **UNT** (**3234**)

11. Details of the profile

■ Monitor codes : part 2

Note: CL column indicates that this command complies with CLPA profile.

Code Number	CL	Description	ATV logic address Base 10	Code	Unit	Special Comments
16#1A		Retentive power	(3237)	**IPHR**	KWh	Resetable. Note units depends of **UNT** (3234)
16#1B		Analog input 1	(5232)	**AI1R**	-	AI1 real application image (0.. 8192)
16#1C		Analog input 2	(5324)	**AI2R**	-	AI2 real application image (0.. 8192)
16#1D		Analog input 3	(5235)	**AI3R**	-	AI3 real application image (0.. 8192)
16#1 E		Analog input 4	(5236)	**AI4R**	-	AI4 real application image (0.. 8192)
16#1F		-	-	**-**	-	Returns 0
16#20		Communication scanner 1	(12741)	**NM1**	-	Returns values of parameters defined in NMAx (See page 20)
16#21		Communication scanner 2	(12742)	**NM2**	-	
16#22		Communication scanner 3	(12743)	**NM3**	-	
16#23		Communication scanner 4	(12744)	**NM4**	-	
16#24		Communication scanner 5	(12745)	**NM5**	-	
16#25		Communication scanner 6	(12746)	**NM6**	-	
16#26		Communication scanner 7	(12747)	**NM7**	-	
16#27		Communication scanner 8	(12748)	**NM8**	-	
16#28		Logic inputs real image	(5202)	**IL1R**	-	**Logic inputs real image (bit0 = LI1 …)** Bit0 : " LI1 " logic inputs real image Bit1 : " LI2 " logic inputs real image Bit2 : " LI3 " logic inputs real image Bit3 : " LI4 " logic inputs real image Bit4 : " LI5 " logic inputs real image Bit5 : " LI6 " logic inputs real image Bit6 : " LI7 " logic inputs real image (1) Bit7 : " LI8 " logic inputs real image (1) Bit8 : " LI9 " logic inputs real image (1) Bit9 : " LI10 " logic inputs real image (1) Bit10 : " LI11 " logic inputs real image (2) Bit11 : " LI12 " logic inputs real image (2) Bit12 : " LI13 " logic inputs real image (2) Bit13 : " LI14 " logic inputs real image (2) Bit14 : ReservedBit15 : Reserved
			(1) : Logic I/O option card terminals (VW3 A3 201) (2) : Extended I/O option card terminals (VW3 13 202)			

11. Details of the profile

11. 4. CC-link Command codes

This chapter describes the correspondent parameter or the behavior of the drive according to each command code available. The behavior of this monitoring function is detailed on page 24.

■ Command codes

Note: CL column indicates that this command complies with CLPA profile.

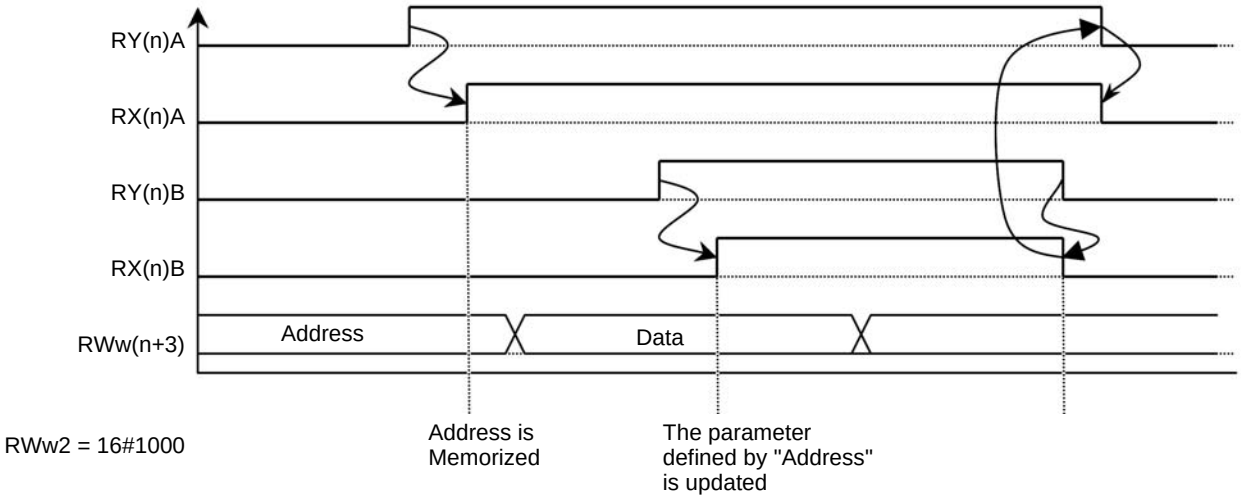
Code Number	CL	Command name	Description
16#2003		reserved	
16#1003		reserved	
16#1004		reserved	
16#2004		reserved	
16#74	●	Trip history 1	Errors history are stored byte by byte :Low byte : Latest fault : **LFT** (**7121**) or **DP0** (**7200**) High byte : previous fault (n-1) : **DP1** (**7201**)
16#75	●	Trip history 2	Errors history : Low byte : previous fault (n-2) : **DP2** (**7202**) High byte : previous fault (n-3) : **DP3** (**7203**)
16#76	●	Trip history 3	Errors history : Low byte : previous fault (n-4) : **DP4** (**7204**) High byte : previous fault (n-5) : **DP5** (**7205**)
16#77	●	Trip history 4	Errors history : Low byte : previous fault (n-6) : **DP6** (**7206**) High byte : previous fault (n-7) : **DP7** (**7207**)
16#FD	●	Drive reset	Reset the drive. RWw(n+3) must contain the following value :16#9696
16#100		Communication scanner out 1	Writes value located in RWw(n+3) in the communication scanner cell 1 code **NC1** Address (**12761**) (See page 20)
16#101		Communication scanner out 2	Writes value located in RWw(n+3) in the communication scanner cell 1 code **NC2** Address (**12762**) (See page 20)
16#102		Communication scanner out 3	Writes value located in RWw(n+3) in the communication scanner cell 1 code **NC3** Address (**12763**) (See page 20)
16#103		Communication scanner out 4	Writes value located in RWw(n+3) in the communication scanner cell 1 code **NC4** Address (**12764**) (See page 20)
16#104		Communication scanner out 5	Writes value located in RWw(n+3) in the communication scanner cell 1 code **NC5** Address (**12765**) (See page 20)
16#105		Communication scanner out 6	Writes value located in RWw(n+3) in the communication scanner cell 1 code **NC6** Address (**12766**) (See page 20)
16#106		Communication scanner out 7	Writes value located in RWw(n+3) in the communication scanner cell 1 code **NC7** Address (**12767**) (See page 20)
16#107		Communication scanner out 8	Writes value located in RWw(n+3) in the communication scanner cell 1 code **NC8** Address (**12768**) (See page 20)

■ Command codes (continued)

Code Number	CL	Command name	Description
16#1000		Parameter indirect access : Setting address with RYnA Setting value with RYnB	Address is first written in RWw(n+3) and RYnA is turned ON. The drives acknowledges by setting on RXnA. The data value is then written in RWw(n+1) and RYnB is turned ON. If RXnA is ON when RYnB the parameter update is done. **Exemple:** Changing the value of ACC. Write 16#1000 in RWw(n+2). Write 16#2329 in RWw(n+3), (MODBUS address of ACC). Set RYnA. When RXnA is ON then write the new value of ACC in RWw(n+3). Set RYnB When RXnB is On, the new value is updated. Clear the Command Code in RWw(n+2) and turns off RYnA and RYnB. See page 38.
16#1001		Parameter read function	**Exemple:** reading the value of ETA. This function returns in the register RWr(n+3) the value of the parameter which address is written in RWw(n+3). **Example:** RWw(n+3) receives 3201(ETA logical address), RWw(n+2) receives 16#1001. After execution of the function, (the drive sets ON RXnF). RWr(n+3) contains the actual value of ETA.
16#1002		Logic output write	**OL1R** (5212) **Logic outputs real image (bit0 = R1 ...) 8 Relays + 8 LO** Bit0 : "R1" relay real image Bit1 : "R2" relay real image Bit2 : "R3" relay real image (1) Bit3 : "R4" relay real image (2) Bit4 : Reserved Bit5 : Reserved Bit6 : Reserved Bit7 : Reserved Bit8 : "L01" logic outputs real image (1) Bit9 : "L02" logic outputs real image (1) Bit10 : "L03" logic outputs real image Bit11 : "L04" logic outputs real image Bit12 : Reserved Bit13 : Reserved Bit14 : Reserved Bit15 : Reserved
			(1) : Logic I/O option card terminals (VW3 A3 201) (2) : Extended I/O option card terminals (VW3 A3 202)

11. 5. Parameters write access detail

This function is useful to access to a specific parameter of the drive



NOTE: The RYnA output must be maintained ON during all the sequence. In practice, the card must check that RYnA is always ON when it detects the rising edge of RYnB.

■ Reply codes

- These code are written by the option card in the RWrn+2 register when an error occurs.

Code No	Description
16#00	Normal response (no error)
16#01	Write mode error

12. Diagnostics

12. 1. Checking the address

On the graphic display terminal or integrated display terminal, check the addres that has been coded on the switches using the [Address] (AdrC) parameter in the [1.9 COMMUNICATION] (COM-) menu.
This parameter cannot be modified.

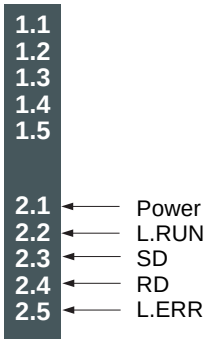
12. 2. Checking the communication

On the graphic display terminal, in the [1.2 - MONITORING] (SUP) menu [COMMUNICATION MAP] (CMM-) menu [DIAG NETWORK] (nEt):
Contents of the DIAG NETWORK sub menu with a CC-link communication board:

Parameter	Comment
[Address] (AdrC)	Display the device address (configured by rotary switches); The setting of these switches must (only) be done when the drive is powered off.
[Data rate used] (bdrU)	Display the baud rate of the card (configured by rotary switches)

12. 3. LEDs

The CC-Link card has 5 LEDs:



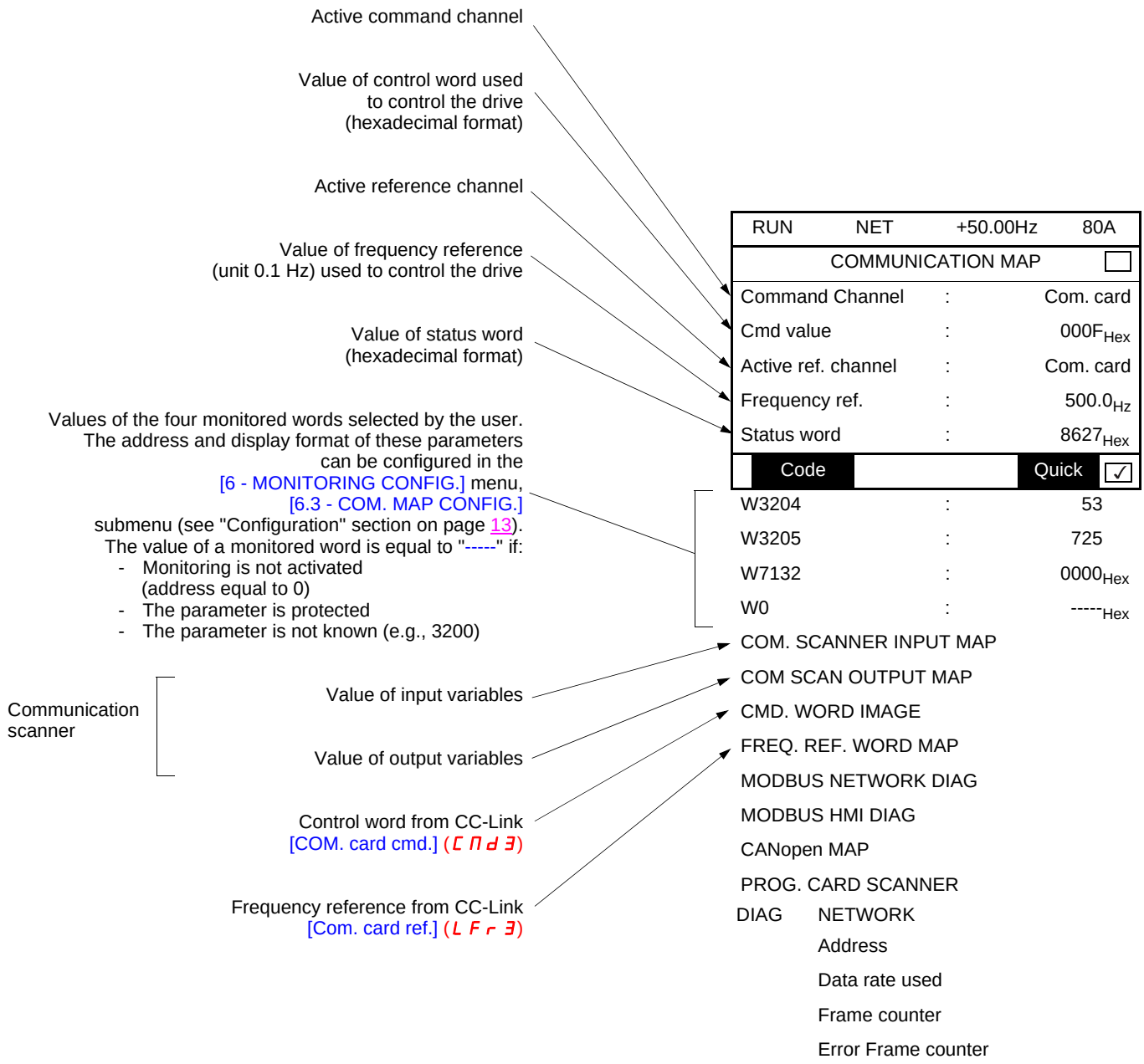
CCILink	Power	Light on red during transmission period.
	L.RUN	Light on red during communication.
	SD	Light on red during send the data of CC-Link.
	RD	Light on red during receive the data of CC-Link
	L.ERR	Light on red during communication error

State of LED				Cause
L.RUN	SD	RD	L.ERR	
●	◎	◎	◎	Normal communication is made but CRC error has occurred due to noise.
●	◎	◎	○	Normal communication
●	◎	○	◎	Hardware fault
●	◎	○	○	Hardware fault
●	○	◎	◎	Can not answer due to CRC error of receive data.
●	○	◎	○	Data sent to the host station does not reach destination.
●	○	○	◎	Hardware fault
●	○	○	○	Hardware fault (It is possible to unstable by disconnection.)
○	◎	◎	◎	Polling response is made but refresh receive is error in CRC.
○	◎	◎	○	Hardware fault
○	◎	○	◎	Hardware fault
○	◎	○	○	Hardware fault
○	○	◎	◎	Data sent to the host station is error in CRC.
○	○	◎	○	There is no data sent to the host station, or data sent to the host station can't be received to noise.
○	○	○	◎	Hardware fault
○	○	○	○	Can not receive data due to break in the cable, etc.
○	○	◎ or ○	●	Invalid baud rate or station number setting
●	◎	◎	◎	Baud rate or station number changed during operation.
○	○	○	○	WDT error occurrence (hardware fault), power off etc.

● : On ○ : Off ◎ : Flicker

12. 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:



12. 5. Communication scanner

On the graphic display terminal, in the [1.2 - MONITORING] (SUP-) menu ([COMMUNICATION MAP] (COM-) submenu):

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

Input variable	Scanner parameter
No. 1	[Com Scan In1 val.] (NM1)
No. 2	[Com Scan In2 val.] (NM2)
No. 3	[Com Scan In3 val.] (NM3)
No. 4	[Com Scan In4 val.] (NM4)
No. 5	[Com Scan In5 val.] (NM5)
No. 6	[Com Scan In6 val.] (NM6)
No. 7	[Com Scan In7 val.] (NM7)
No. 8	[Com Scan In8 val.] (NM8)

Output variable	Scanner parameter
No. 1	[Com Scan Out1 val.] (NC1)
No. 2	[Com Scan Out2 val.] (NC2)
No. 3	[Com Scan Out3 val.] (NC3)
No. 4	[Com Scan Out4 val.] (NC4)
No. 5	[Com Scan Out5 val.] (NC5)
No. 6	[Com Scan Out6 val.] (NC6)
No. 7	[Com Scan Out7 val.] (NC7)
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			☐
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	☑
Com Scan In6 val.	:		0
Com Scan In7 val.	:		0
Com Scan In8 val.	:		0

RUN	NET	+50.00Hz	80A
COM SCAN OUTPUT MAP			☐
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	☑
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

12. Diagnostics

12. 6. Communication fault

CC-Link communication faults are indicated by the red L.ERR on the CC-Link card.

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

It is possible to change the response of the drive in the event of a CC-Link communication fault (see page 21).
- [Com. network] (CnF) 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 CC-Link.
- Then, if a communication fault occurs on CC-Link, the drive will react according to the configuration (fault, maintain, fallback, etc.).

12. 7. Card fault

The [internal com. link] (ILF) fault appears when the following serious problems occur:
- Hardware fault on the CC-Link card
- Dialog fault between the CC-Link card and the drive

The response of the drive in the event of an [internal com. link] (ILF) 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] (ILF) fault:
- [Internal link fault 1] (ILF1) if the fault has occurred on option card no. 1 (installed directly on the drive)
- [Internal link fault 2] (ILF2) if the fault has occurred on option card no. 2 (installed on top of option card no. 1)

The CC-Link card can be in position 1 or 2.

The [Internal link fault 1] (ILF1) and [Internal link fault 2] (ILF2) parameters can only be accessed on the graphic display terminal in the [1.10 DIAGNOSTICS] (DGt-) menu, [MORE FAULT INFO] (AF1-) submenu.

Value	Description of the values of the [Internal link fault 1] (ILF1) and [Internal link fault 2] (ILF2) 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)

13. PLC operation

In this Chapter, you will find indications on how to establish the communication between a PLC and the drive.

13. 1. Addressing the drive

The communication card is recognized on a CC-link network as a remote device station and occupies one station.
As shown in the previous chapter it consists of 32 remote inputs, 32 remote outputs, 4 remote read words and 4 remote write words. The PLC must initiate the exchange between its CC-link master controller and its data area.
For example, one drive is installed on a CC-link network at address one. In this case the peripheral data will be found at the following address:

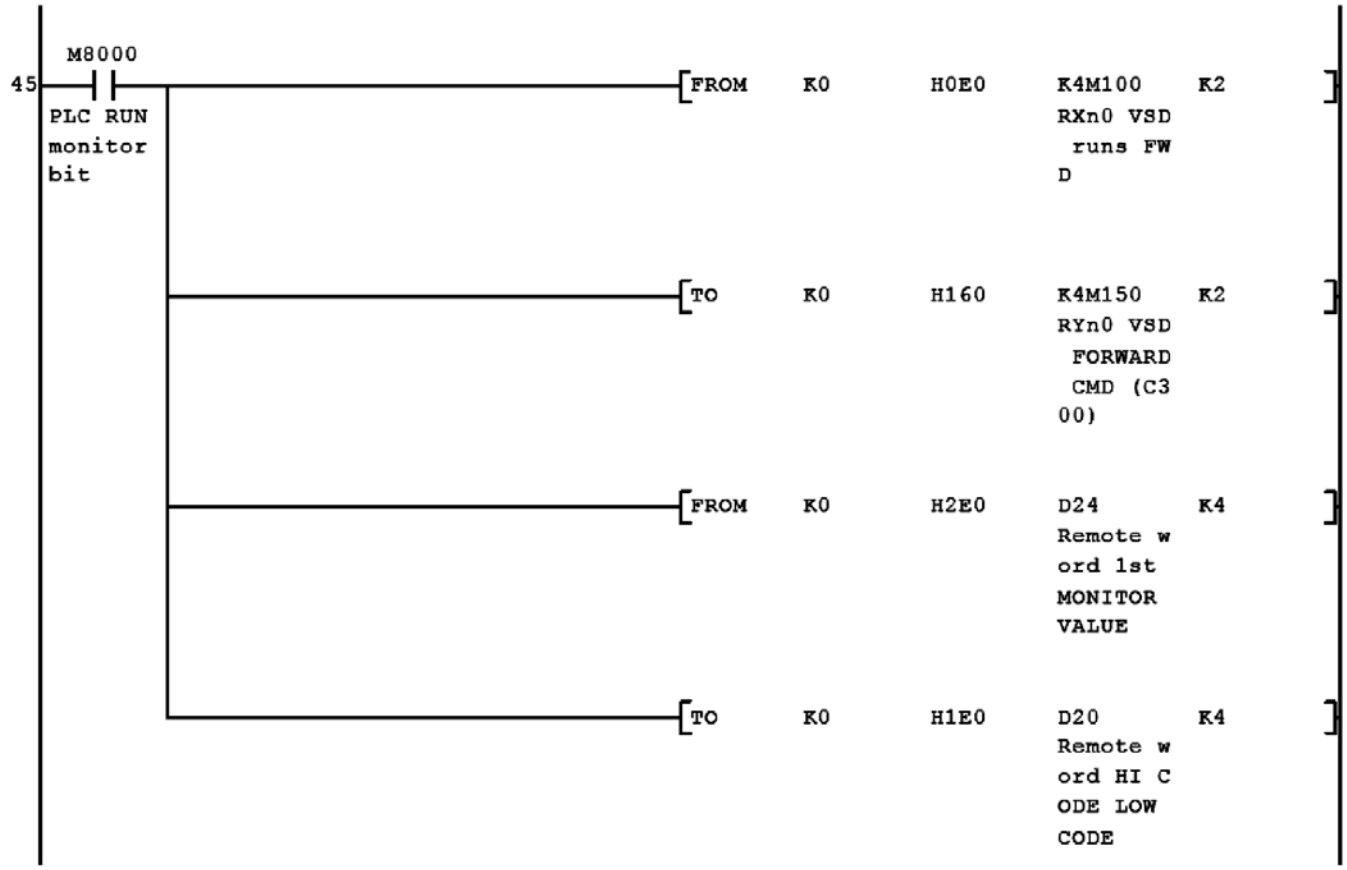
Remote device station 1	Controller address
Remote inputs RXn0..F	16#0E0 (1)
Remote inputs RX(n+1)0..F	16#0E1
Remote outputs RXn0..F	16#160
Remote outputs RX(n+1)0..F	16#161
Remote read words RWr	16#2E0
Remote write words RWw	16#1E0

(1) These addresses are defined for a station with address = 1. Please refer to your CC-link master controller reference manual for other addresses. According to the kind of master these values may change, they are specific to the controller.

In the following example, these peripheral data are transmitted/received in the PLC data area in the following locations:

Remote device station 1	PLC data
RXn0 to RXn1F	M100 to M131
RYn0 to RYn1F	M150 to M 181
RWw0 to 4	D20 to D23
RWr0 to 4	D24 to D27

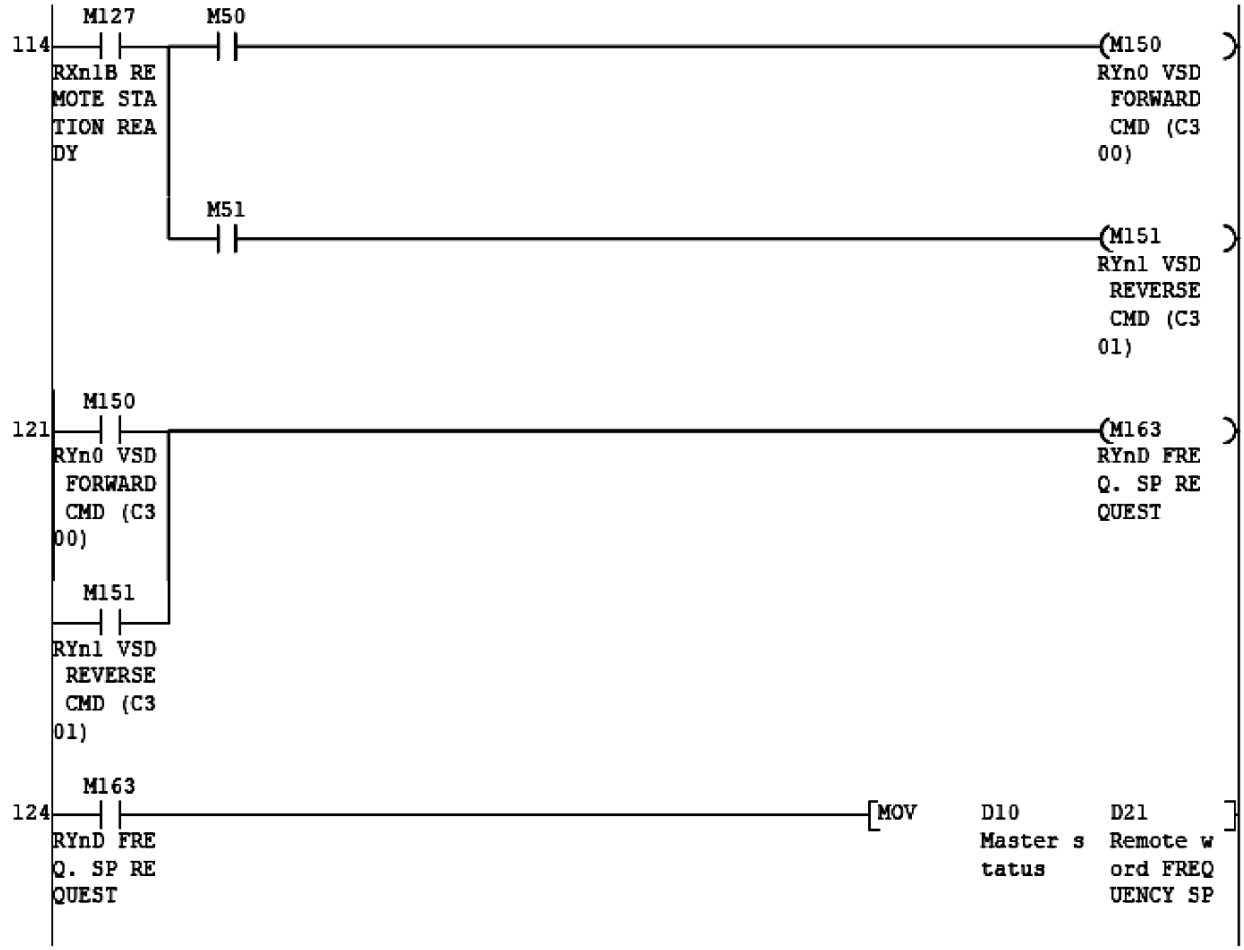
The exchanges are operated by using FROM and TO operators



(This example has been written for a Mitsubishi FX2N PLC equipped with an FX16 CC-link master controller.)

13. 2. Drive simple control example

The following example shows a simple control of the drive. M50 starts the drive forward, M51 starts the drive backward and D10 receives the frequency setpoint (Hz *100).



As long as M163 (image of RYnD) is ON the frequency setpoint is always refreshed. It is also possible to energize this bit only when a setpoint change is requested.

13. 3. Drive monitor functions

Monitor functions, described in chapter 11.2 and 12.3 are executed as follow:
- Write the monitor function code in the low byte or the high byte in RWwn
- Set output RYnC to ON.
- When RXnc turns ON, data are available in RWrn or RWr(n+1) according to the position of the monitor code in RWwn (low byte or high byte). Two monitor functions can be executed in the same time.

Example: reading the drive's output current and the AI1 analog input value.

According to the Previous PLC mapping (defined in 1.1)
- D20 receives 16#1B02, M162 (RYnC) is turned ON. (double request)
  - 16#1B : Returns current value of AI1.
  - 16#02 : Returns the drive's output current.
- The card replies by turning on M112 (RXnC). D24 contains the value of AI1 , D25 contains the output current value of the drive.

13. 4. Drive command functions

Command functions, described in 11.2 and 12.4 uses two registers RWw(n+2) and RWw(n+3).
- Write the command code in RWw(n+2), if this command code requires a parameter, this one should be written in RWw(n+3)
- Set output RYnF to ON
- When RXnF turns ON, the command code has been executed.

If the command function produces a return data, its value is available in RWr(n+3).
A response code is also generated by the card, its value is detailed in the following table:

Code No	Description
16#00	Normal response (no error)
16#01	Write mode error

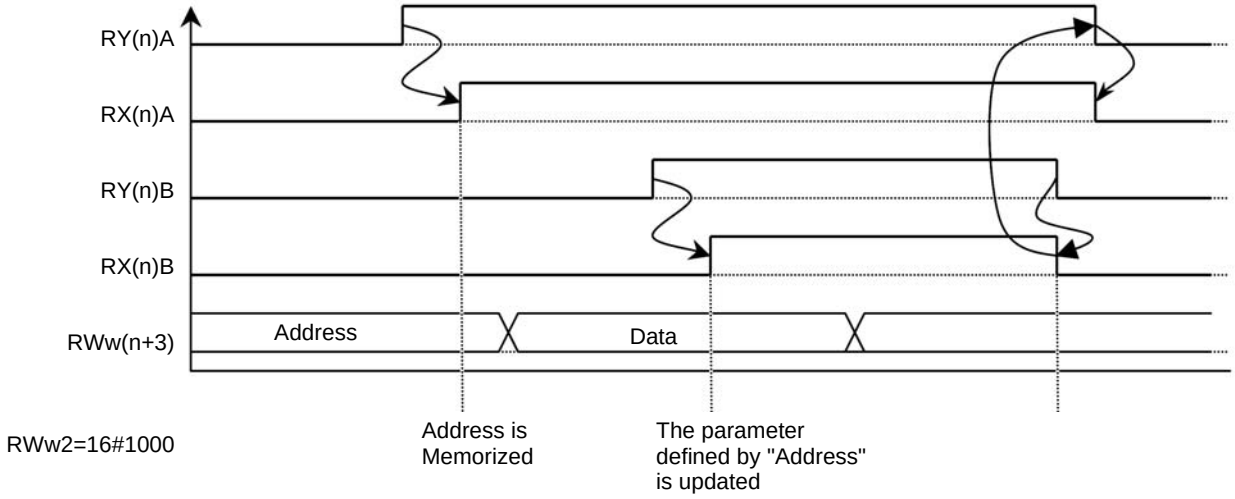
Example: Reading a parameter value.

The command code 16#1001 is able to read any drive parameter value by the mean of its MODBUS address.
- D22 receives the command code :16#1001
- D23 receives the MODBUS address of the parameter (9001 for ACC).
- RYnF is turned ON.
- When the remote input RXnF turns ON, the value of ACC is available in D27 (RWw(n+3))

13. 5. Modifying the drive parameters through indirect addressing

To modify drive parameters, the communication offers a mechanism based on a special "command" function which uses dedicated bits: RYnA, RYnB, RXnA and RXnB
This function is started by setting RYnA to ON and by writing 16#1000 in the command register RWw(n+2). In a first step RWw(n+3) receives the parameter address. This address is expressed in base 10, The communication card uses the MODBUS addresses to access to the parameters. (for more information about these addresses, please refer to the communication parameters manual of the ATV71 or ATV61).

The exchanges between the PLC and the communication card are detailed in the following time diagram:



Note: The RYnA output must be maintained ON during all the sequence. In practice, the card must check that RYnA is always ON when it detects the rising edge of RYnB.