Altivar 212

Variable speed drives for asynchronous motors

LONWORKS® communication manual
VW3 A21 212

01/2011

Schneider Electric

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.
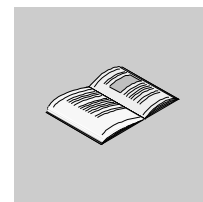
When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

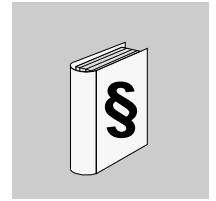Failure to observe this information can result in injury or equipment damage.

Table of Contents

Safety Information

Important Information

NOTICE

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

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

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

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

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

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

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

PLEASE NOTE

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

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

About the Book
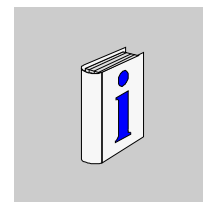
At a Glance

Document Scope

The purpose of this document is to:

- install the card in the drive,
- show you how to configure the Altivar 212 to use LONWORKS® for monitoring and control.

NOTE: Read and understand this document and all related documents (see below) before installing, operating, or maintaining your ATV212.

Validity Note

This documentation is valid for the Altivar 212 LONWORKS fieldbus.

Related Documents

Title of Documentation	Reference Number
ATV212 Quick Start	S1A53825
ATV212 Installation manual	S1A53832
ATV212 Programming manual	S1A53838
ATV212 Modbus manual	S1A53844
ATV212 Metasys N2 manual	S1A53846
ATV212 Apogée FLN P1 manual	S1A53847
ATV212 BACnet manual	S1A53845
ATV212 other option manuals: see www.schneider-electric.com	

You can download the latest versions of these technical publications and other technical information on www.schneider-electric.com.

Product Related Information

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION
- Read and understand this manual before installing or operating the Altivar 212 drive.
- Any changes made to the parameter settings must be performed by qualified personnel.

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

⚠⚠ DANGER

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

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

⚠ WARNING

DAMAGE DRIVE EQUIPMENT
Do not operate or install any drive or drive accessory that appears damaged.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

LOSS OF CONTROL
- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link (1).

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

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

Introduction

1

Thank you for purchasing the LONWORKS® option card (VW3 A21 212) for Altivar 212 drive.

By installing this card into the Altivar 212, data communication can be made with a host computer or other device via LONWORKS® network.

The communication card has an open-style 3-pin connector for connection to the network. It supports free topology (TP/FT-10) at 78 kbit/s.

Data exchanges give access to all Altivar 212 functions:

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

The LONWORKS resource files (.XIF...) that provide the network configuration tools (LonMaker®...) with device information are available on www.schneider-electric.com.

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Hardware setup

2

What's in this Chapter?

This chapter contains the following topics:

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.
- The LONWORKS card is shipped together with the following accessories. On opening the packing case, check to see if the following accessories are contained or not.
    - 1 cabling label,
    - 3 neuron ID labels (barcode EAN128),
    - 1 screw.

Opening the drive

1 Any procedure in this section must be performed when product is powered off.

⚡ ⚠ **DANGER**
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH
Read and understand the instructions in "About the book" chapter, before performing the procedure in this section.
Failure to follow these instructions will result in death or serious injury.

2 Open the ATV212 front cover.

ATV212H products up to 22 kW

Turn the screw on the front panel 90° counter-clockwise to align the dot on the screw with the unlock position.

To avoid damaging the screw, do not apply excessive force or turn the screw more than 90°.
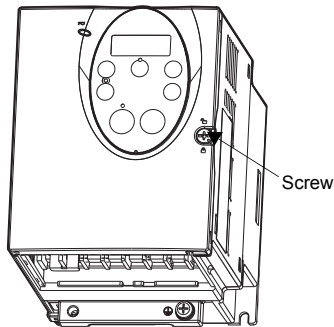
Screw

Pull the front panel toward you and swing it open to the left
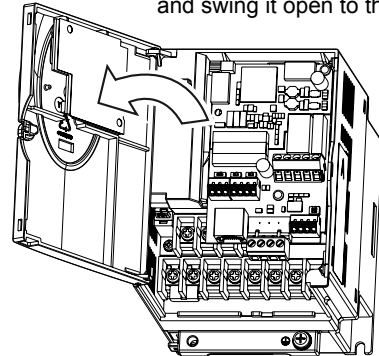
ATV212H products from 22 kW

Remove the screws.
Lift off the cover.
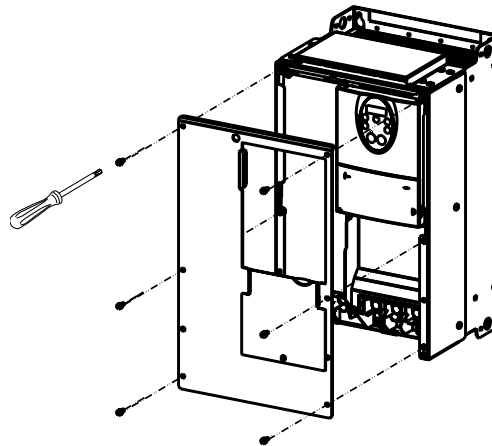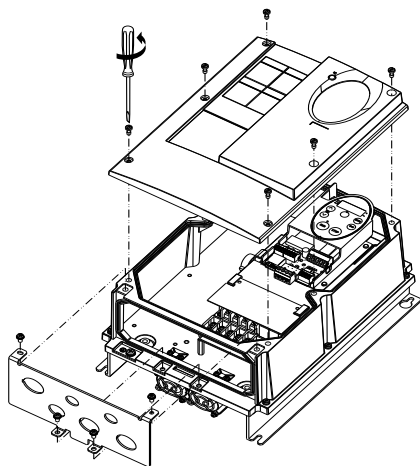
ATV212W up to 7.5 kW　　　　　　**ATV212W above 7.5 kW**
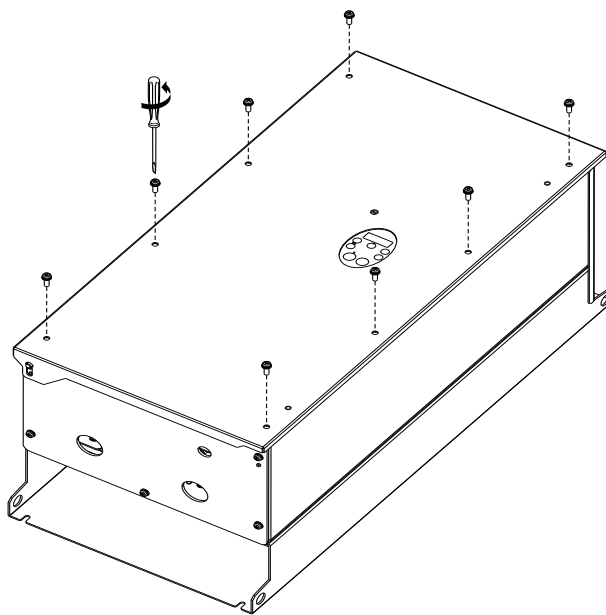
Installing the LONWORKS communication card in ATV212

> ### ⚠ DANGER
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> - Do not plug or unplug the terminal board while drive is powered.
> - Check the tightening of the mounting screw after any manipulation on the terminal board.
>
> **Failure to follow these instructions will result in death or serious injury.**
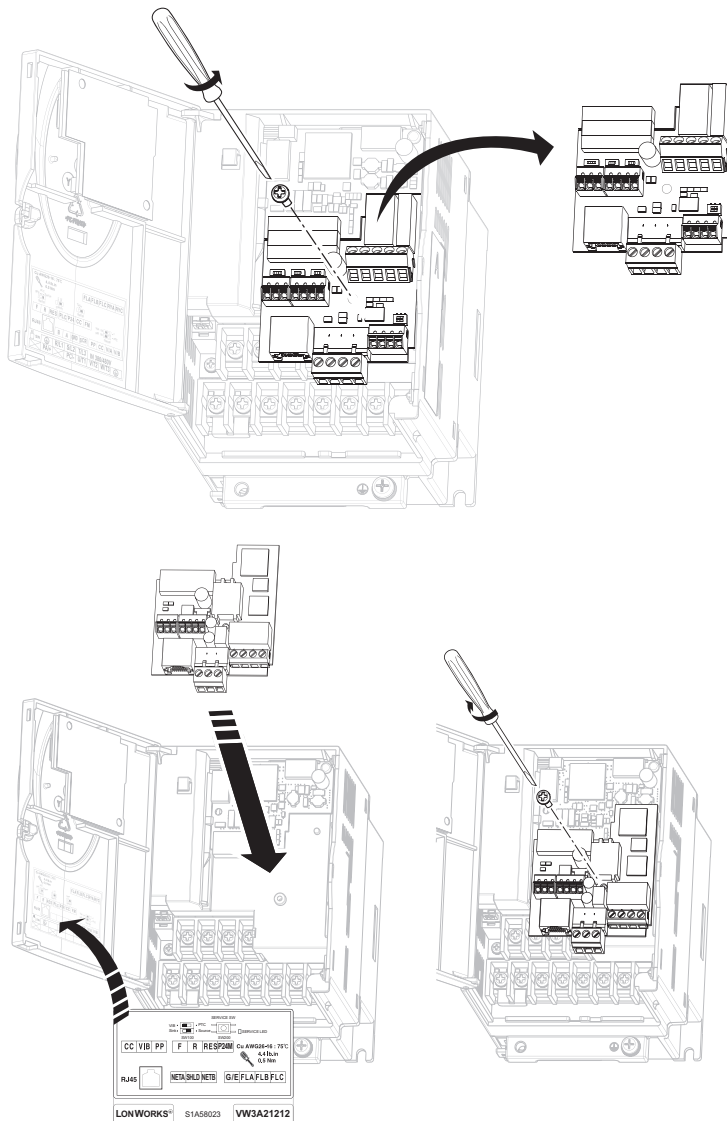
1 Open the ATV212 front cover, remove the terminal board mounting screw and take off the ATV212 standard terminal board. See paragraph How to open the front cover, page 13. Be careful not to lose the terminal board mounting screw when removed since it may be used again. On drives from 0.75 to 2.2 kW the board features a plastic tag to hold the mounting screw in place.

2 Make the power and control wiring connections before installing communication card.

3 Install the LONWORKS communication card. Fit the board mounting screw (M3 tapping type) and tighten to 0.7 to 0.8 Nm

4 Stick the cabling label for communication card on the standard cabling label stuck on front cover (internal side) ATV212. And stick the communication card nameplate close to the standard nameplate. Be careful not to cover slits on the ATV212 enclosure.

Note: To install or remove the terminal board, make it slide in or out in parallel with board.

Hardware description

SW200 (1)
Commissioning button

Connector to drive

Selector switch SW100
- VIB function
  (VIB/PTC)
- Logic for F, R, RES terminal
  (SINK/SOURCE)

Service LED

VIB — PTC
SINK — SOURCE

Terminal board
mounting screw
hole (M3 screw)

CC VIB PP   F R RES P24M

RJ45

RJ45 port

G/E FLA FLB FLC

NETA SHLD NETB

LONWORKS OpenStyle connector
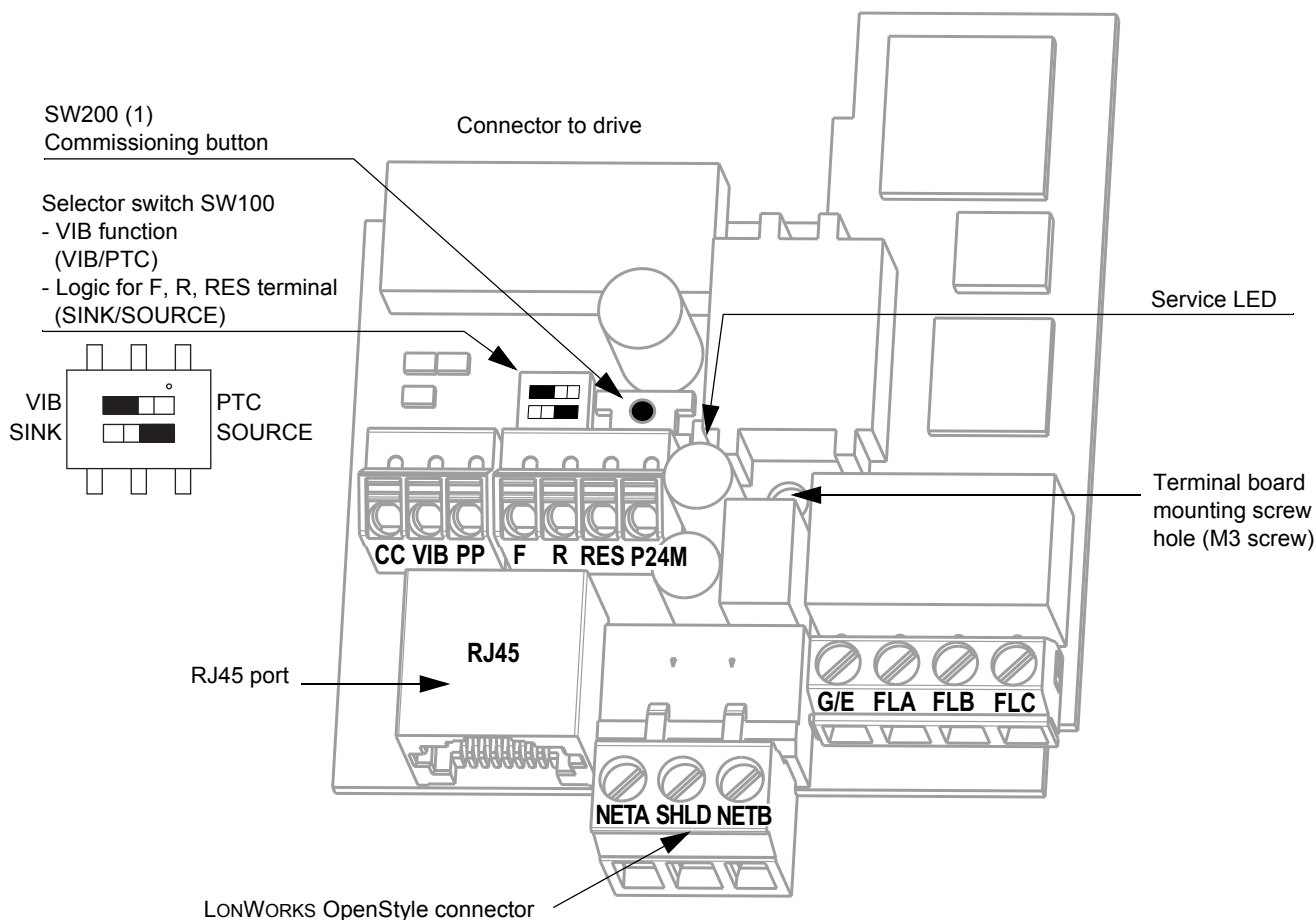
(1) The SW200 switch enables to send the network address to the master.

Use of open Style Connector

General

Use the open style connector to connect the drive to LONWORKS fieldbus. Connection details are given in the "Connecting to the bus" section page 19.

<div style="background:black;color:white">⚠ DANGER</div>

UNINTENDED EQUIPMENT OPERATION
- Modify only the setting of the switches when the product is switched off.
- Do not change the setting of the SW100 unless your system is wired for SINK logic.

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

⚠ **CAUTION**

RISK OF BODY INJURY
Use a screwdriver to change the position of the switches.
Failure to follow these instructions can result in injury or equipment damage.

Description of terminals

Terminal symbol	Function	Electrical specifications	Internal circuits
CC	Control circuit equipotential terminal	-	-
VIB	Multifunction programmable analog input. It has speed setpoint function in the default setting (0 to 50 Hz frequency with 0 to 10 Vdc input). In addition, this terminal can be used as PTC (2) input by setting switch SW100 and the parameters [Mot PTC selection] F 6 4 5 and [PTC resistor value] F 6 4 6.	Voltage: 10 Vdc Internal impedance: 30 kΩ	
PP	Voltage supply for reference potentiometer.	Voltage: 10 Vdc Max current: 10 mA Protected against short circuits.	
F	Multifunctional programmable logic input. It has forward rotation function in default setting. ON: forward rotation drive OFF: slowdown and stop	No voltage contact input 24 Vdc 5 mA or less. SINK/SOURCE can be selected with SW100.	
R	Multifunctional programmable logic input. It has Preset speed 1 in default setting.		
RES	Multifunctional programmable logic input. It has Fault Reset in default setting		
P24M	24 VDC power supply output	24 Vdc 50 mA	
NETA	LONWORKS transmission data / reception data.	No polarity.	
SHLD	LONWORKS communication shield terminal.	This terminal is not connected to any other circuit of the card. Ground this terminal in a location separated from the ground of power line.	
NETB	LONWORKS transmission data / reception data.	No polarity.	Spark gap
G/E	Grounding terminal	Please connect to network ground.	
FLA FLB FLC	Multifunctional programmable relay contact outputs. Default setting is set to detect the activation of the drive protection function. Contact across FLA-FLC is closed and FLB-FLC is open during normal operation.	30 Vdc, 0.5 A 250 Vac, 1 A (cos φ = 1) 250 Vac, 0.5A (cos φ = 0.4)	

(1) Voltage conversion

(2) PTC (Positive Temperature Coefficient): Resettable thermal fuse resistor for over current protection.

Connecting to the bus

3

What's in this Chapter?

This chapter contains the following topics:

Topology

The LONWORKS card supports free topology (TP/FT-10) wiring and operates as well with bus, loop or star topologies:

Free topology system

Free topology has many advantages:

1. The installer is free to select the method of wiring that best suits the installation, reducing the need for advanced planning and allowing last minute changes at the installation site.

2. If installers have been trained to use one style of wiring for all installations, free topology technology can be introduced without requiring retraining.

3. Retrofit installations with existing wiring plants can be accommodated with minimal, if any rewiring.

Typical wiring topologies

Doubly terminated bus topology

Star topology

Loop topology

Mixed topology
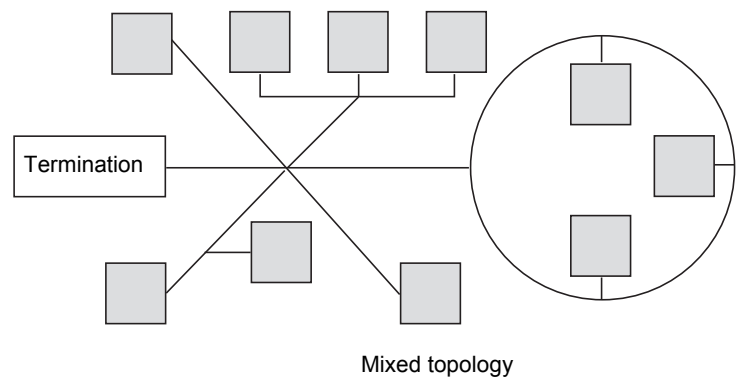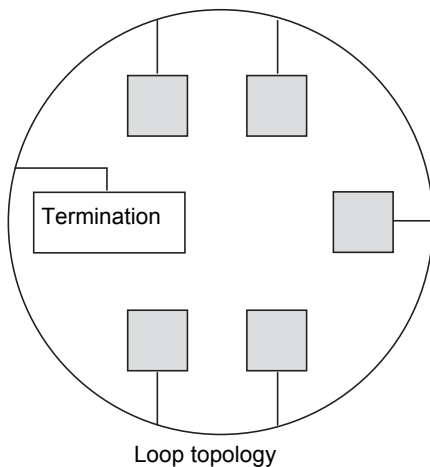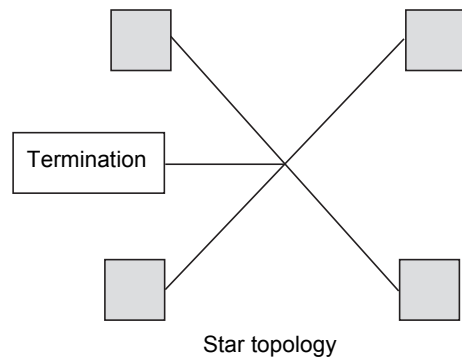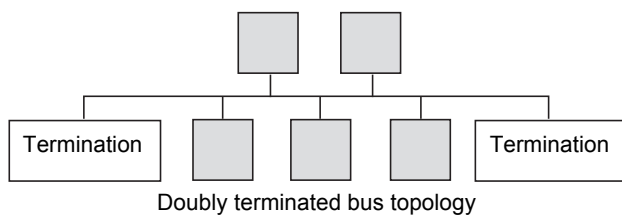
Cable routing practices

<table>
<tr><td colspan="2">⚠ **DANGER**</td></tr>
<tr><td colspan="2">**UNINTENDED EQUIPMENT OPERATION DUE TO IMPROPER WIRING PRACTICES**
• Follow the wiring practices described in this document in addition to those already required by the National Electrical Code and local electrical codes.
• Check the power connections before energizing the drive.
• If replacing another drive, verify that all wiring connections to the ATV212 drive comply with all wiring instructions in this manual.
Failure to follow these instructions will result in death or serious injury.</td></tr>
</table>

Network wiring guidelines

When wiring Altivar 212 drives to a LONWORKS network, 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. Route the power cables apart from these structures.
• Avoid sources of electrical interference that can induce noise into the cable. Use the maximum practicable separation from such sources.

Cable routing guidelines

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

• Maintain a minimum separation of 1 m (3.3 ft) 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 (9.8 ft) from the following equipment:
- line and motor power wiring,
- transformers,
- generators,
- alternators.

Electrical equipment rooms or large electrical equipment line-ups

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. Route control, network and power wiring in separate conduits.
• Separate non-metallic conduits or cable trays carrying power wiring from metallic conduit carrying low-level control network wiring by at least 305 mm (12 in.).
• Separate metallic conduits carrying power wiring or low-level control network wiring by at least 76 mm (3 in.).
• Whenever power and control wiring cross, the metallic conduits and non-metallic conduits or trays will cross at right angles.
• If necessary, use filters to attenuate conducted emissions from the drive to the line to help prevent interference with telecommunication, radio, and sensitive electronic equipment. Consult the Altivar catalog for selection and application of these filters.

Connecting the LONWORKS connector

Card connector pinout

The figure and the table below show the pin-outs of the card connectors and the removable LONWORKS female connector attaches to the network cable.

NETA ———   ——— NETB

SHLD
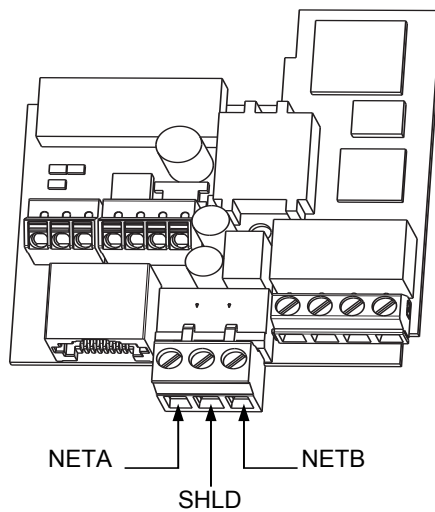
Wiring

- Cable sheath should be peeled off by about 10 mm (0.39 in.).
- For wiring work, use a fat blade screwdriver with a 0.6 mm (0.024 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 (4.42 to 5.31 lb.in).

Configuration

4

What's in this Chapter?

This chapter contains the following topics:

Communication parameters

Access to the parameters

Parameters	Location
[Command mode sel] (*C П O d*) [Frequency mode sel] (*F П O d*)	[PROGRAMMING MENU] Programming mode
[Remote spd ref 2] (*F 2 0 7*)	[EXTENDED MENU] *F - - -* submenu of [PROGRAMMING MENU] Programming mode.
Other parameters	[COMMUNICATION MENU] *C O П* submenu of [PROGRAMMING MENU] Programming mode.

Configuration

Configure the following parameter. Select LONWORKS communication protocol by setting [Network protocol] (*F 8 2 9*) to *5* [LonWorks]. This parameter can only be modified when the motor is stopped.

Note: On ATV21 *F 8 2 9* is set to *1* for LONWORKS protocol.

When disconnecting the card, the drive displays *E r r 5* following a factory set time-out of 3 seconds.

If the drive displays *E r r 5*:

• Check that *F 8 2 9* = *5*.
• Check that the LONWORKS card is connected.
• Check that standard IO card is not connected instead of LONWORKS card.

The baud rate is fixed: 78000 bit/s.

Modifications will be taken into account by the drive after power cycled.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION
Refer to «Serial communication parameters» in the Altivar 212 Programming manual, for more information on how to set these serial communication parameters.
Failure to follow these instructions will result in death or serious injury.

Parameters	Possible values	Default value
[Command mode sel] (*C П O d*) Remote mode start/stop control source	*0* [Logic inputs]: Control terminal logic input *1* [HMI]: Graphic display terminal *2* [Communication]: Serial communication	*0*
[Frequency mode sel] (*F П O d*) Remote mode primary speed reference source	*1* [Ref source VIA]: VIA *2* [Ref source VIB]: VIB *3* [HMI reference]: Graphic display terminal *4* [Serial com ref.]: Serial communication *5* [+/- Speed]: +/- speed from external contact	*2*
[Remote spd ref 2] (*F 2 0 7*) Remote mode secondary speed reference source	*1* [VIA] *2* [VIB] *3* [HMI]: Graphic display terminal *4* [Communication].: Serial communication *5* [+/- Speed]: +/- speed from external contact	*2*
[Com channel choice] (*F 8 0 7*) Communication channel choice	*0* [RJ45] *1* [Open style]	*1*
[Network protocol] (*F 8 2 9*) Communication protocol	*1* [Mdb RTU]: Modbus® RTU protocol *2* [Metasys N2]: Metasys® N2 protocol *3* [Apogee P1]: APOGEE® FLN P1 protocol *4* [BACnet]: BACnet® protocol *5* [Lonworks]: LONWORKS® protocol	*1*

Command and speed reference channels

CΠ0d and *FΠ0d* drive parameters are used to set the channel for command and speed reference (first source).

F207 drive parameter is used to set the second source of speed reference. Switching between source 1 and 2 is done by *F200* parameter or logical input when set to this function.

F807 sets the communication channel (RJ45 or Open Style network connector).
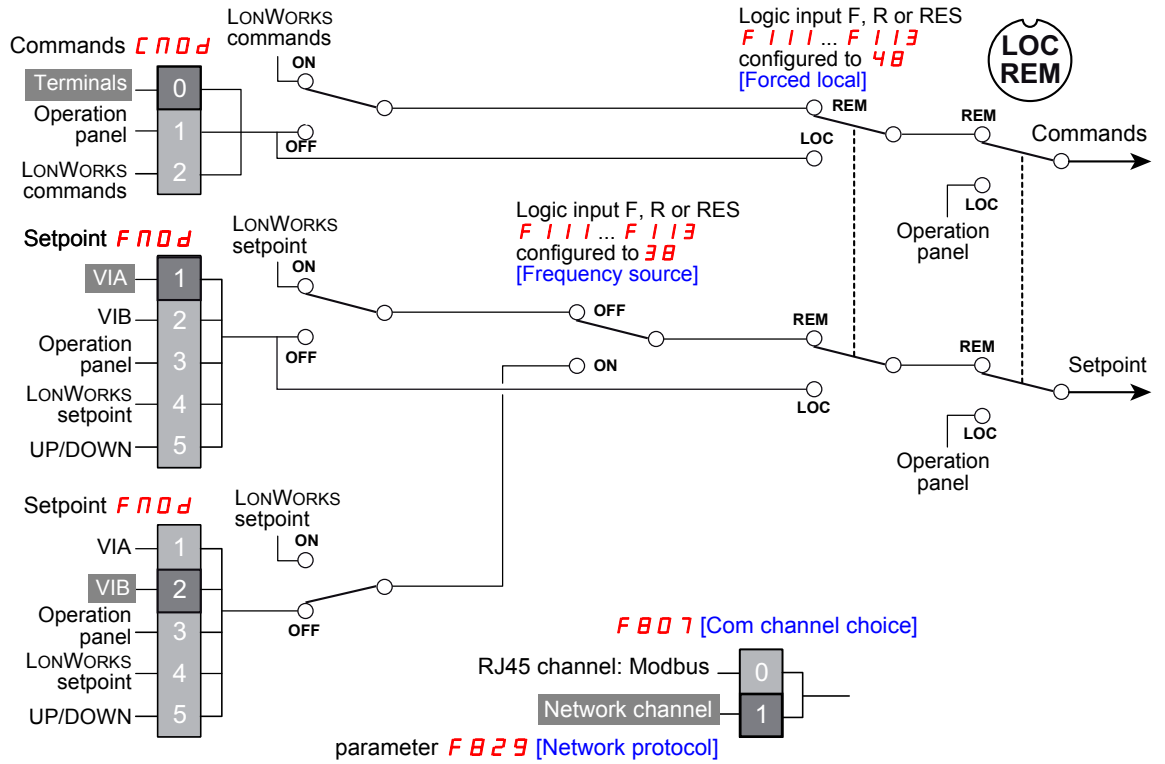
Configuration of the control

The drive can be controlled (command and speed reference) by the LONWORKS network as well as by many other canals:

- I/O,
- Terminal (Local terminal, Graphic Keypad),
- RJ45 communication (Modbus).

The following figure shows the configuration for the command canal (Cmd SetPoint) and speed reference canal (Speed SetPoint)

The ATV212 can receive commands and speed setpoint from the LONWORKS network or from the terminals (F, R, RES, VIB).

The LOC/REM key of the drive HMI is available to switch the control to the HMI.

Input F, R, RES can be configured to switch the control from the LONWORKS to the terminals.

Control by the LONWORKS

Commands and setpoint come from the LONWORKS network.

The LOC/REM key is active.
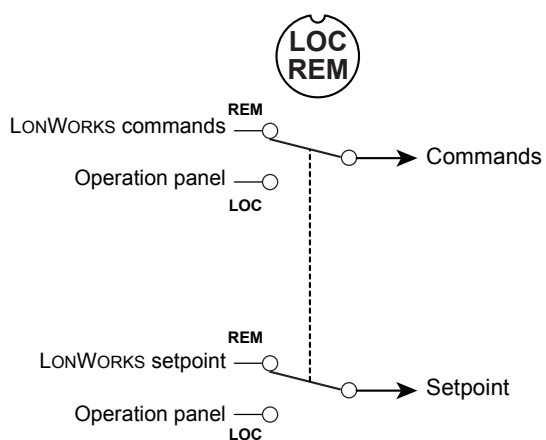
Control by terminals, monitoring by the LONWORKS network

Commands and setpoint come from the terminals.

The drive is monitored by the LONWORKS network.

The LOC/REM key is active.

Access to the parameters

Parameters	Location
[Command mode sel] (C П O d) [Frequency mode sel] (F П O d)	[PROGRAMMING MENU] Programming mode
[Com channel choice] (F 1 1 2)	[I/O MENU] I O submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameter	Setting
[Command mode sel] (C П O d) Remote mode start/stop control source	O [Logic inputs]: Control terminal logic input
[Frequency mode sel] (F П O d) Remote mode primary speed reference source	2 [Ref source VIB]: VIB
[LI R selection] (F 1 1 2) R Logic Input Function	4 8 [Forced local]: Forced switching from remote to local control

Control by the LONWORKS network, switching to terminals by logic input

The commands and the setpoint come from the LONWORKS network if logic input R is OFF.
The commands and the setpoint come from the terminals if logic input R is ON.
The function ⁴ ᵇ [Forced local] is assigned to the logic input R.
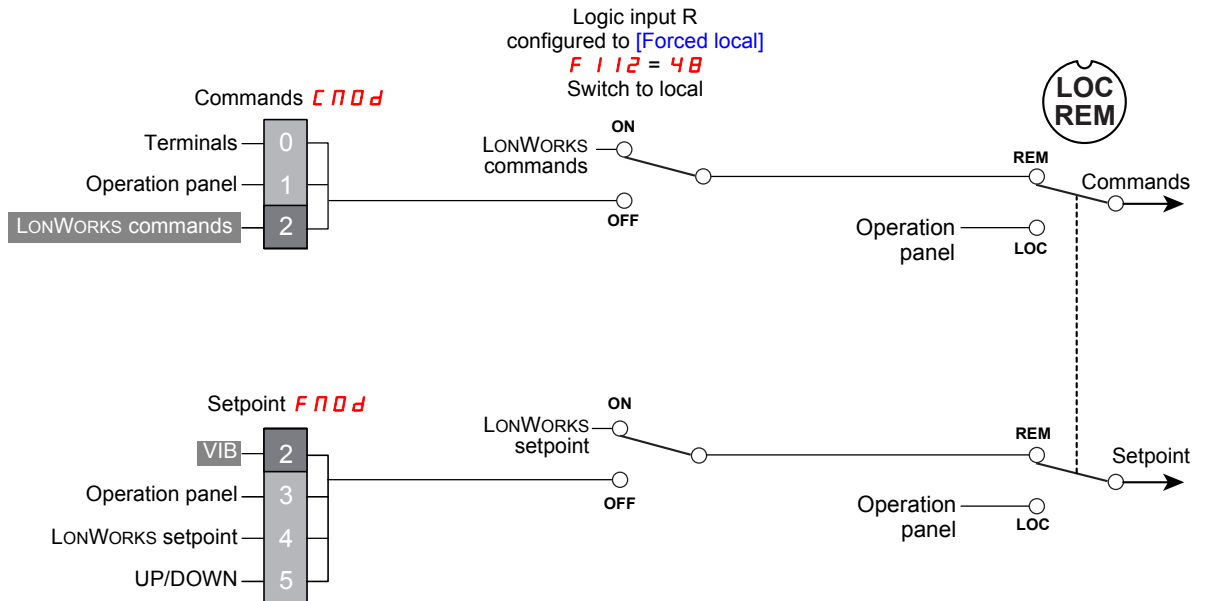
The LOC/REM key is valid.

Access to the parameters

Parameters	Location
[Command mode sel] (C N O d) [Frequency mode sel] (F N O d)	[PROGRAMMING MENU] Programming mode
[Com channel choice] (F I I 2)	[I/O MENU] I O submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameter	Setting
[Command mode sel] (C N O d) Remote mode start/stop control source	O [Logic inputs]: Control terminal logic input
[Frequency mode sel] (F N O d) Remote mode primary speed reference source	2 [Ref source VIB]: VIB
[LI R selection] (F I I 2) R Logic Input Function	⁴ ᵇ [Forced local]: Forced switching from remote to local control

Command by the LONWORKS network, setpoint by the LONWORKS network or the terminals switch by a logic input.

The commands come from the LONWORKS network.
The setpoint comes from the LONWORKS network if logic input R is OFF.
The setpoint comes from the terminals if logic input R is ON.
The function ЧＢ [Forced local] is assigned to the logic input R.

The LOC/REM key is valid.

Access to the parameters

Parameters	Location
[Command mode sel] (ＣⓃＯ d) [Frequency mode sel] (ＦⓃＯ d)	[PROGRAMMING MENU] Programming mode
[Com channel choice] (Ｆ ｌ ｌ ２)	[I/O MENU] Ｉ Ｏ submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameter	Setting
[Command mode sel] (ＣⓃＯ d) Remote mode start/stop control source	２ [Communication]: Serial communication
[Frequency mode sel] (ＦⓃＯ d) Remote mode primary speed reference source	２ [Ref source VIB]: VIB
[LI R selection] (Ｆ ｌ ｌ ２) R Logic Input Function	ЧＢ [Forced local]: Forced switching from remote to local control

Setpoint by the LONWORKS network, switching commands to terminals by logic input

The commands and the setpoint come from the LONWORKS network if logic input R is OFF.
The commands come from the LONWORKS network if logic input R is OFF.
The commands come from the terminals if logic input R is ON.
The setpoint comes from the LONWORKS network.
The function 4 8 [Forced local] is assigned to the logic input R.

The LOC/REM key is valid.

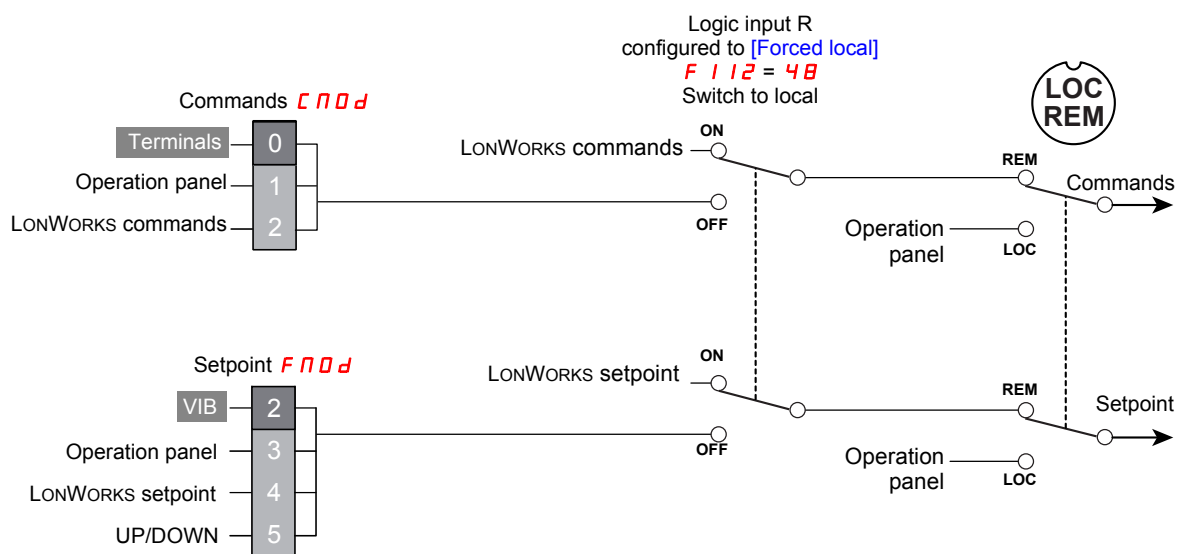### Access to the parameters

Parameters	Location
[Command mode sel] (C N O d) [Frequency mode sel] (F N O d)	[PROGRAMMING MENU] Programming mode
[Com channel choice] (F 1 1 2)	[I/O MENU] I O submenu of [PROGRAMMING MENU] Programming mode.

Description.

Parameter	Setting
[Command mode sel] (C N O d) Remote mode start/stop control source	0 [Logic inputs]: Control terminal logic input
[Frequency mode sel] (F N O d) Remote mode primary speed reference source	4 [Serial com ref.]: Serial communication
[LI R selection] (F 1 1 2) R Logic Input Function	4 8 [Forced local]: Forced switching from remote to local control

Configuring the behaviour on configuration interruption
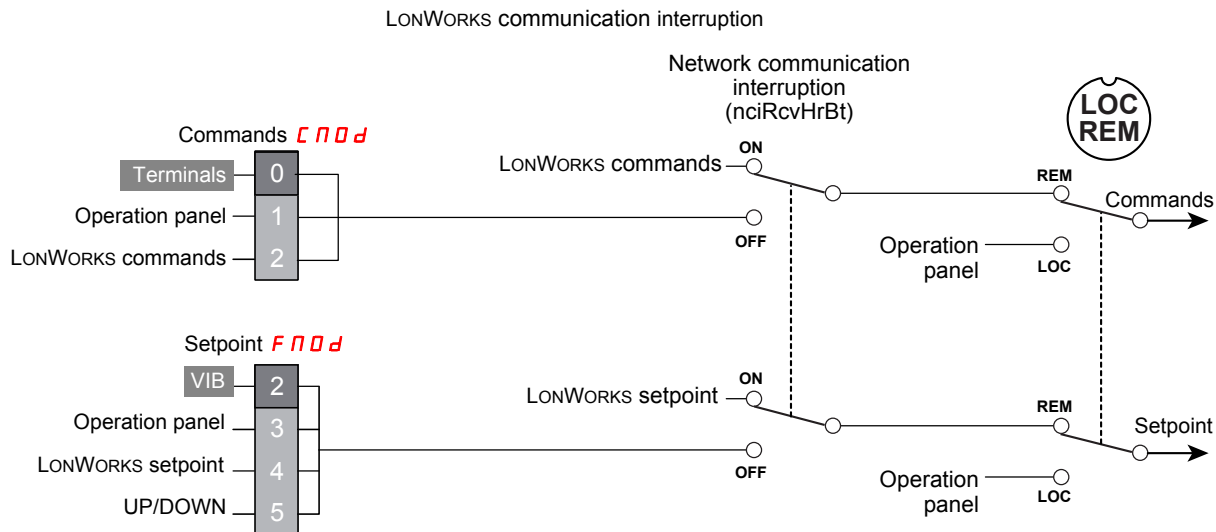
Access to the parameters

Parameters	Location
[Command mode sel] (*C Π O d*) [Frequency mode sel] (*F Π O d*)	[PROGRAMMING MENU] Programming mode
[Com channel choice] (*F B 5 1*)	[COMMUNICATION MENU] *C O Π* submenu of [PROGRAMMING MENU] Programming mode.

Configuration

If you want the drive to switch to terminal control in case of LONWORKS communication interruption, configure:

Parameter	Setting
[Command mode sel] (*C Π O d*) Remote mode start/stop control source	*O* [Logic inputs]: Control terminal logic input
[Frequency mode sel] (*F Π O d*) Remote mode primary speed reference source	*2* [Ref source VIB]: VIB
[Com. fault setting] (*F B 5 1*) Drive behavior after a communication interruption	*O* [Ramp stp (F/Cmod)]: Communication release

Diagnostics

5

What's in this Chapter?

This chapter contains the following topics:

Communication detected fault

Configure the heartbeat

The activity on the LONWORKS network is controlled according to the LONWORKS configuration property Receive Heartbeat Time (nciRcvHrtBt).

nciRcvHrtBt is the time out value on the reception of 3 input network variables:

- Drive Speed Setpoint (nviDrvSpeedStpt),
- Drive Speed Setpoint Scaling (nviDrvSpeedScale),
- Frequency setpoint (nviInvSetFreq).

Refer to the description of this network variable.

Configure the drive behaviour

- If you want to ignore LONWORKS communication interruption set nciRcvHrtBt to *0*.
- If you want the drive to react on LONWORKS communication interruption set the parameter [Com. fault setting] (*F B S 1*) accessible in the [COMMUNICATION MENU] *C O N* submenu of [PROGRAMMING MENU] Programming mode.

Parameter description	Possible value	Default value
[Com. fault setting] (*F B S 1*) Drive behavior after a communication interruption	*0*: [Ramp stp (F/Cmod)]: Communication release (no trip) *1*: [No active]: Deceleration stop (no trip) *2*: [Ramp stop]: Deceleration stop (no trip) *3*: [Freewheel]: Coast stop (no trip) *4*: [Err5 or Err8]: Trip (error 8)	*4*

⚠ WARNING

LOSS OF CONTROL
If nciRcvHrtBt is set to 0, communication control will be inhibited.
For safety reasons, inhibiting the communication interruption detection should be restricted to the debug phase or to special application.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

LOSS OF CONTROL
Know and understand the setting of parameter *F B S 1*. This parameter controls the behavior of the drive in the event of a network communication interruption. If the value of *F B S 1* is *0*, *1*, *2*, or *3*, the drive will not trip on an *E r r B*.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

List of type supported by ATV212 Service LED
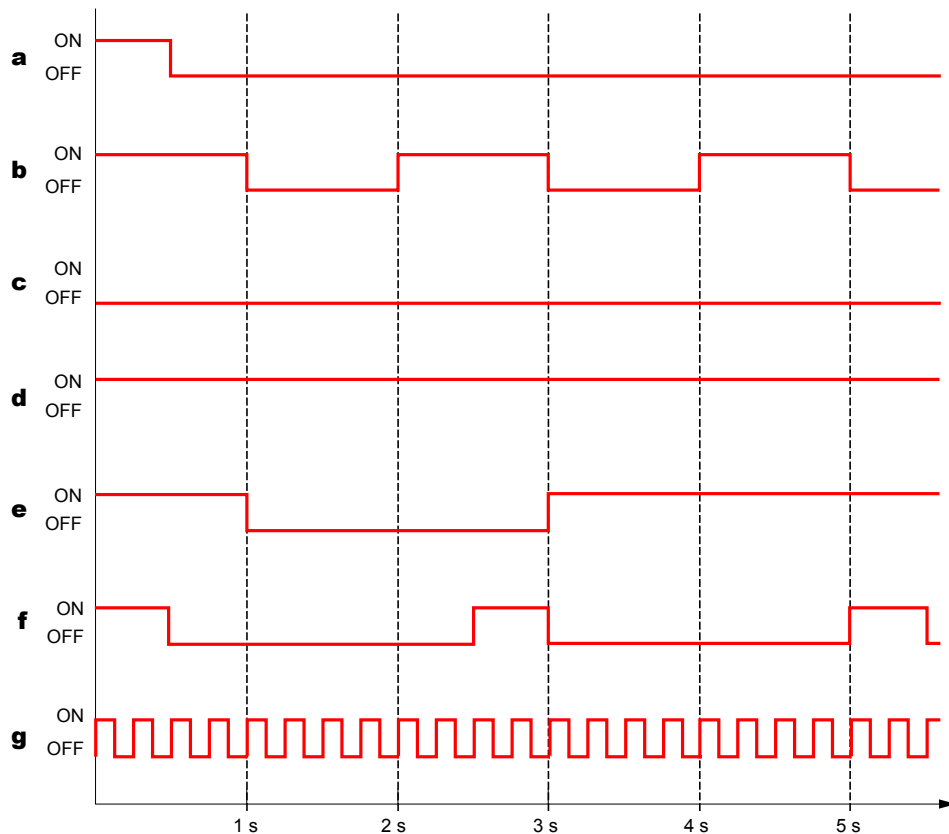
Cases	Display	Description and solutions
a	LED momentarily turns ON then continues to be OFF.	**Normal** When the program is in the condition of "Configured" status, LED momentarily turns ON when the inverter is turned ON. Then the LED continues to be OFF. The LONWORKS neuron chip indicates "Configured" status that means the normal condition.
b	LED blinks every 1 second.	**Unconfigured** This is a normal action of the "Unconfigured" device. Configure the LONWORKS card through the LONWORKS network. If the device is not "Unconfigured", internal application program is broken. Download the application through the LONWORKS network. If it remains, the card needs to be replaced.
c	Although the inverter is turned on, LED remains OFF.	**Abnormal** Check the connection between the inverter and the option card. If abnormality is not found after checking, the card needs to be replaced.
d	LED continues to be ON.	
e	LED is ON then OFF when the inverter is turned on, then it continues to be ON.	**Abnormal** Application program of the LONWORKS neuron chip is abnormal. Download the application through the LONWORKS network. If it remains, the card needs to be replaced.
f	LED blinks during 0.5 second.	**Abnormal** A watch dog is suspected. If the same indication appears after resetting the power, the card needs to be replaced.
g	LED flickers (Approximately 10Hz to 30Hz)	**Abnormal** The LONWORKS neuron chip is abnormal. The card needs to be replaced.

Troubleshooting

Phenomenon	Description and solutions
No reply from the LONWORKS card	Check for proper termination resistor(s) installed on the network. After checking the service LED status, see the previous section.
Errors in network variable	Check the inverter parameter setting. Check the network cables are not near the power cables.

Functional profile

6

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Objects supported	38
LonMark Node Object profile	38
LonMark Variable Speed Motor Drive profile	39

Objects supported

The LONWORKS card for ATV212 complies to the LonMark functional profile variable Speed Motor Drive (specification 6010-11).

According to this profile 2 objects are supported:

- the node object (specification 0000-20),
- the variable speed motor drive object.
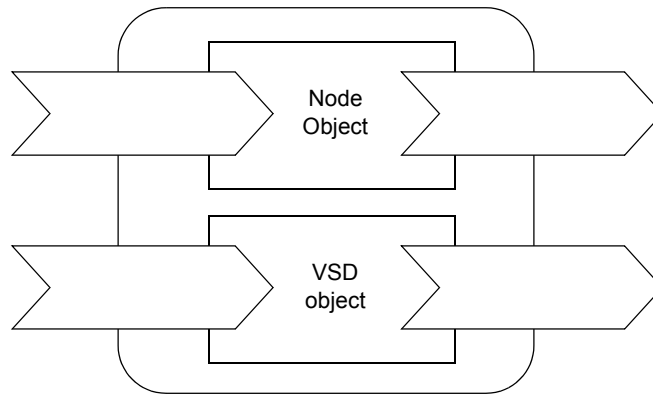
LONMARK Node Object profile
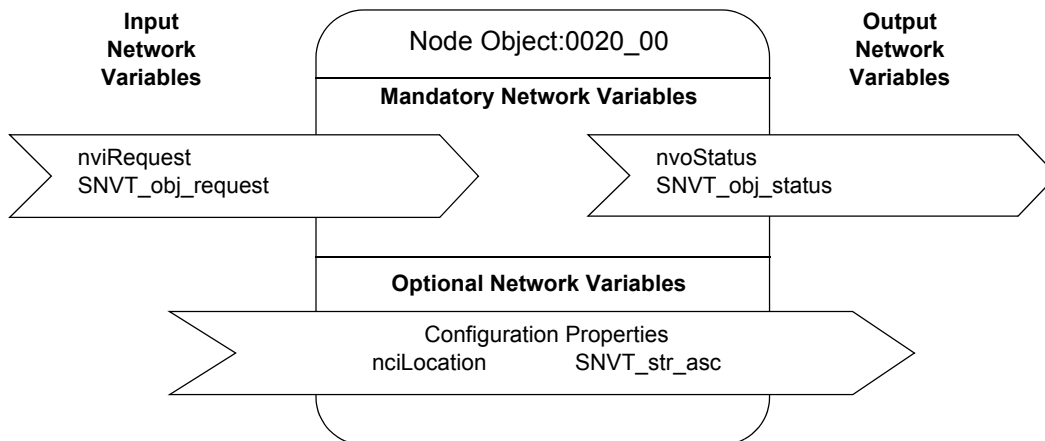
LONMARK Variable Speed Motor Drive profile
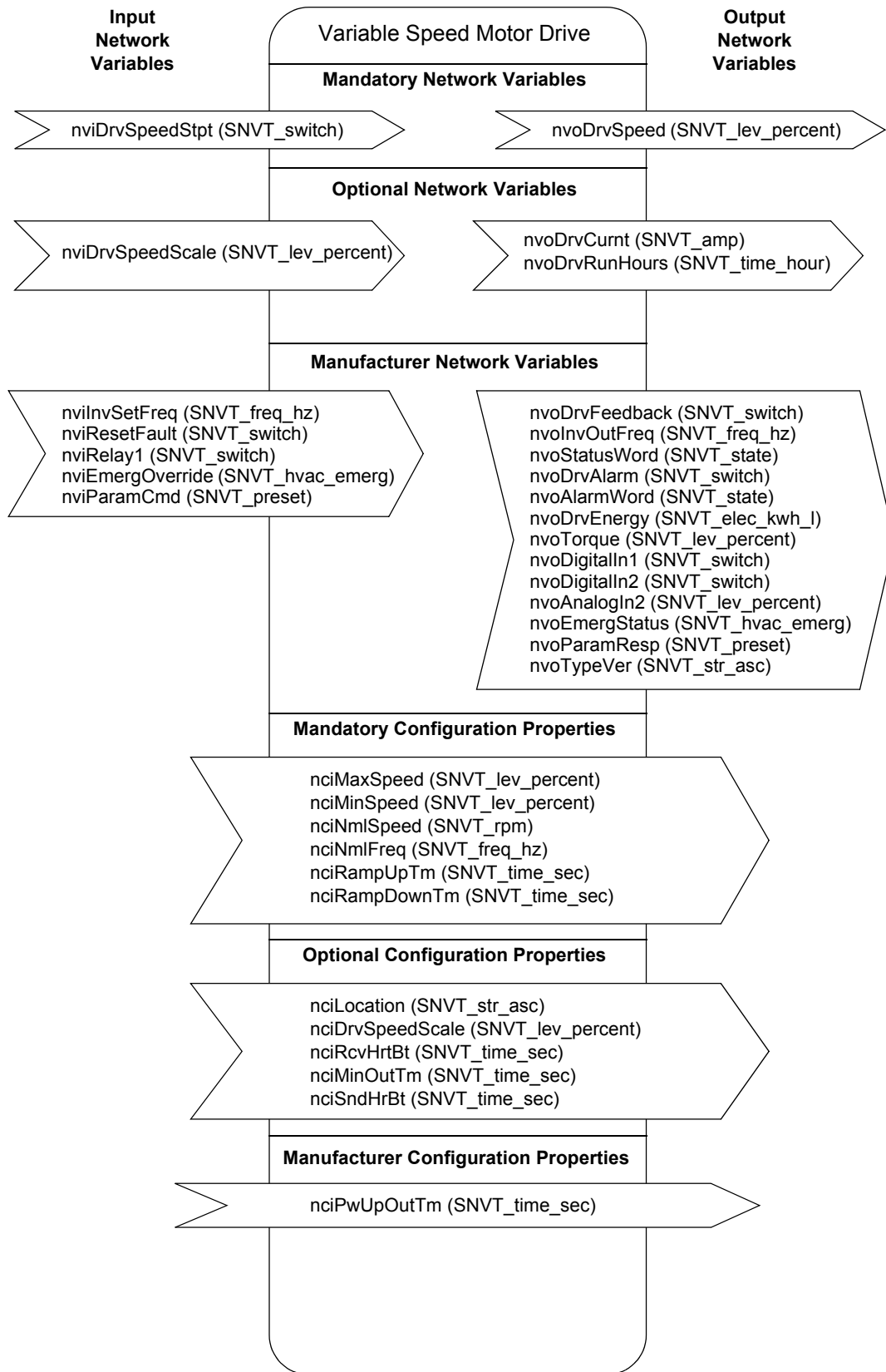
Network variables and configuration properties

7

What's in this Chapter?

This chapter contains the following topics:

List of network variables and configuration properties

Commands and setpoints

Name	SNVT	Definition	Description
nviDrvSpeedStpt	SNVT_lev_percent	Drive Speed Setpoint	Variable Speed Motor Drive object (M)
nviDrvSpeedScale	SNVT_lev_percent	Drive Speed Setpoint Scaling	Variable Speed Motor Drive object (O)
nviInvSetFreq	SNVT_freq_hz	Frequency setpoint	Manufacturer specific
nviResetFault	SNVT_switch	Detected fault reset command	Manufacturer specific
nviRequest	SNVT_obj_request	Object Request	Node object (M)

Status and output velocity

Name	SNVT	Definition	Description
nvoDrvSpeed	SNVT_lev_percent	Drive Speed Feedback	Variable Speed Motor Drive object (M)
nvoDrvFeedback	SNVT_switch	Drive velocity feedback	Manufacturer specific
nvoInvOutFreq	SNVT_freq_hz	Output frequency	Manufacturer specific
nvoStatusWord	SNVT_state	Drive status	Manufacturer specific
nvoStatus	SNVT_obj_status	Object Status	Node object (M)

Alarms

Name	SNVT	Definition	Description
nvoDrvAlarm	SNVT_switch	Alarm code	Manufacturer specific
nvoAlarmWord	SNVT_state	Alarm status	Manufacturer specific

Measurements

Name	SNVT	Definition	Description
nvoDrvCurnt	SNVT_amp	Drive Output Current	Variable Speed Motor Drive object (O)
nvoDrvRunHours	SNVT_time_hour	Drive Total Running Hours	Variable Speed Motor Drive object (O)
nvoDrvEnergy	SNVT_elec_kwh_l	Energy consumption	Manufacturer specific
nvoTorque	SNVT_lev_percent	Torque	Manufacturer specific

Monitoring of digital inputs

Name	SNVT	Definition	Description
nvoDigitalIn1	SNVT_switch	State of digital input F	Manufacturer specific
nvoDigitalIn2	SNVT_switch	State of digital input R	Manufacturer specific

Monitoring of analog inputs

Name	SNVT	Definition	Description
nvoAnalogIn2	SNVT_lev_percent	Value of analog input VIB	Manufacturer specific

Control of digital outputs

Name	SNVT	Definition	Description
nviRelay1	SNVT_switch	Command of relay FLA	Manufacturer specific

Emergency

Name	SNVT	Definition	Description
nviEmergOverride	SNVT_hvac_emerg	Emergency command	Manufacturer specific
nvoEmergStatus	SNVT_hvac_emerg	Emergency feedback	Manufacturer specific

Adjustment

Name	SNVT	Definition	Description
nciMaxSpeed	SNVT_lev_percent	Maximum Motor Speed	Variable Speed Motor Drive object (M)
nciMinSpeed	SNVT_lev_percent	Minimum Motor Speed	Variable Speed Motor Drive object (M)
nciNmlSpeed	SNVT_rpm	Nominal Motor Speed in RPM	Variable Speed Motor Drive object (M)
nciDrvSpeedScale	SNVT_lev_percent	Drive Speed Setpoint Scaling	Default value for nviDrvSpeedScale
nciNmlFreq	SNVT_freq_hz	Nominal Motor Frequency	Variable Speed Motor Drive object (M)
nciRampUpTm	SNVT_time_sec	Minimum Ramp Up Time	Variable Speed Motor Drive object (M)
nciRampDownTm	SNVT_time_sec	Minimum Ramp Down Time	Variable Speed Motor Drive object (M)

Parameter access

Name	SNVT	Definition	Description
nviParamCmd	SNVT_preset	Parameter access command	Manufacturer specific
nvoParamResp	SNVT_preset	Parameter access response	Manufacturer specific

Identification

Name	SNVT	Definition	Description
nciLocation	SNVT_str_asc	Location Label	Variable Speed Motor Drive object (O)
nvoTypeVer	SNVT_str_asc	Drive identification	Manufacturer specific

Network management

Name	SNVT	Definition	Description
nciSndHrtBt	SNVT_time_sec	Send Heartbeat Time	Variable Speed Motor Drive object (M)
nciRcvHrtBt	SNVT_time_sec	Receive Heartbeat Time	Variable Speed Motor Drive object (O)
nciMinOutTm	SNVT_time_sec	Minimum Send Time	Variable Speed Motor Drive object (O)
nciPwUpOutTm	SNVT_time_sec	Initial inhibition time	Manufacturer specific

Commands and setpoints

Drive Speed Setpoint (nviDrvSpeedStpt)

This input network variable provides start/stop control and velocity setpoint.

Name	nviDrvSpeedStpt
SNVT reference	SNVT_lev_percent
SNVT index	81
Definition	Drive Speed Setpoint
Unit	0.5%
Default value	AUTO (0xFF)

Range

State	Value	Command	Comment
0 (FALSE)	NA	Stop	The drive is stopped, the drive function is disabled and power is not applied to the motor.
0xFF	NA	AUTO controlled stop	
1 (TRUE)	0	0%	The drive function is enabled and power may be applied to the motor.
1 (TRUE)	1 ... 200	0.5 ... 100.0%	
1 (TRUE)	201 ... 255	100.0%	

The default value (AUTO) will be adopted at power-up and in case of not receiving an update within the specified Receive Heartbeat time.
The network variable nviInvSetFreq permits the control of the drive by a frequency setpoint instead of percentage.

Drive Speed Setpoint Scaling (nviDrvSpeedScale)

This input network variable provides scaling for nviDrvSpeedStpt.
Negative values indicate a motor direction in reverse.

For example, if the nviDrvSpeedStpt value is 50% and nviDrvSpeedScale is -150%, then the actual speed setpoint is -75%, or 0.75 times the nominal speed in the reverse direction.

Name	nviDrvSpeedScale
SNVT reference	SNVT_lev_percent
SNVT index	81
Unit	0.005%
Range	-163.840% ... 163.830% 0x7FFF = +163.835%: invalid value
Definition	Drive Speed Setpoint Scaling

Default value is determined by nciDrvSpeedScale. This value will be adopted at power-up and in case of not receiving an update within the specified Receive Heartbeat time.

Default Value for nviDrvSpeedScale (nciDrvSpeedScale)

This configuration property is used as the default value for nviDrvSpeedScale.
When the LONWORKS card is initialized, this network variable returns to default value (100%).

Name	nciDrvSpeedScale
SCPT reference	SCPTdefScale
SCPT index	162
SNVT reference	SNVT_lev_percent
SNVT index	81
Unit	0.005%
Range	-163.840% ... 163.830% 0x7FFF = +163.835%: invalid value
Definition	Default Value for nviDrvSpeedScale
Default value	100.000%

Frequency setpoint (nviInvSetFreq)

This variable is the frequency setpoint alternative to the percentage velocity setpoint (value of SNVT_Swith nviDrvSpeedStpt).

When the setting value of nviDrvSpeedScale is negative, the motor reverse-rotates.

The drive is operated according to nciDrvSpeed when the variable is 3276.7 Hz.

The default value is 0x7FFF = 3 276.7 Hz: invalid. It will be adopted at power-up and in case of not receiving an update within the specified Receive Heartbeat time.

Speed Setpoint provided by nviInvSetFreq is limited by value of nciMaxSpeed and nciMinSpeed.

Name	nviInvSetFreq
SNVT reference	SNVT_freq_hz
SNVT index	76
Unit	0.1 Hz
Range	0.0 ... 200.0 Hz 0x7FFF = 3276.7 Hz: invalid
Definition	Frequency setpoint

Range

nviInvSetFreq	nviDrvSpeedStpt		Operation
	state	value	
N/A	0	N/A	0Hz
3276.7Hz (0x7FFF)	1	value	Drive the speed provided by "nviDrvSpeedStpt"
0.0 to 3276.6 Hz	1	N/A	Drive the speed provided by "nviInvSetFreq"

Reset command (nviResetFault)

The reset command resets the drive when the drive is in fault state and if the resetable detected fault has been cleared.

Name	nviResetFault
SNVT reference	SNVT_switch
SNVT index	95
Format	No / Reset; NA/100%
Definition	Detected fault reset command

Range

State	Value	Command	Comment
0	any	Invalid	
1	> 0	Reset command	Value must be >0 to perform the reset command, not only state set to 1.
1	0	Invalid (no command)	

Object request (nviRequest)

This input network variable provides the mechanism to request an operation or a mode for a functional block within the drive.

Name	nviRequest
SNVT reference	SNVT_obj_request
SNVT index	92
Definition	Object request

No	Member name	Description
255	RQ_NUL	Invalid value
	object_id	Stores the object ID.
0	RQ_NORMAL	If the specified functional block was in the disabled state, this request cancels that state, and returns the functional block to normal operation. If the functional block was already in the normal state, a request to enter the normal state is not an error. After device reset, the state of functional blocks on the device is application-specific. (Mandatory for LonMark Node Object)
1	RQ_DISABLED	Makes the drive object invalid and brings the motor to a controlled stop. (Mandatory for LonMark Variable Speed Motor Drive profile)
2	RQ_UPDATE_STATUS	Request the object status (nvoStatus) to be updated. (Mandatory for LonMark Node Object)
5	RQ_REPORT_MASK	Changes to "1".bit (disabled, in_alarm, report_mask) supported by object status (nvoStatus) (Mandatory for LonMark Node Object)
7	RQ_ENABLE	Makes the drive object valid. (Mandatory for LonMark Variable Speed Motor Drive profile)
9	RQ_CLEAR_STATUS	Clears all bits of the object status (nvoStatus) to "0".
10	RQ_CLEAR_ALARM	Detected fault reset command. Clears to "0" in_alarm bit of object status (nvoStatus). (Mandatory for LonMark Variable Speed Motor Drive profile)
3	RQ_SELF_TEST	Not supported.
4	RQ_UPDATE_ALARM	Not supported.
6	RQ_OVERRIDE	Not supported.
8	RQ_RMV_OVERRIDE	Not supported.
11	RQ_ALARM_NOTIFY_ENABLED	Not supported.

12	RQ_ALARM_NOTIFY_DISABLED	Not supported.
13	RQ_MANUAL_CTRL	Not supported.
14	RQ_REMOTE_CTRL	Not supported.
15	RQ_PROGRAM	Not supported.
16	RQ_CLEAR_RESET	Not supported.
17	RQ_RESET	Not supported.

Status and output velocity

Drive Speed Feedback (nvoDrvSpeed)

This output network variable provides the speed of the drive as a percentage of the nominal speed.

Name	nvoDrvSpeed
SNVT reference	SNVT_lev_percent
SNVT index	81
Unit	0.005%
Range	-163.840% to 163.830% 0x7FFF = +163.835%: invalid
Definition	Drive Speed Feedback

This value is transmitted immediately when its value has changed significantly.

Additionally, this network variable will also be transmitted as a heartbeat output on a regular basis as specified by the Maximum Send Time (nciSndHrtBt) configuration value.

This LONWORKS network variable is linked to the drive parameter: [Operation frequency] (*F □ □ □*).

Drive Velocity feedback (nvoDrvFeedback)

This variable monitors Stopped / Running status of the drive and the output velocity of as a percentage of the nominal speed of the drive (unit = 0.5%). It is the output image of nviDrvSpeedStpt.

Name	nvoDrvFeedback
SNVT reference	SNVT_switch
SNVT index	95
Format	Stopped / Running; Actual speed
Unit of value	0.5%
Range of value	0 ... 127.5%
Definition	Drive velocity feedback

State	Description
0 (FALSE)	Stopped
1 (TRUE)	Running

Value	Description
0... 255	0.0 ... 127.5% value = Drive Frequency / nciNmlFreq / abs (nviDrvSpeedScale)

Output frequency (nvoInvOutFreq)

This variable monitors the output velocity (0.1 Hz unit) of the drive.

Name	nvoInvOutFreq
SNVT reference	SNVT_freq_hz
SNVT index	76
Unit	0.1Hz
Definition	Output frequency

Drive status (nvoStatusWord)

This variable monitors the status of the drive by a bit field.

Name	nvoStatusWord
SNVT reference	SNVT_state
SNVT index	83
Definition	Drive status

Bit nb	Description	Link to ATV212 internal parameter
0	**Detected fault** *0* [No fault] *1* [Fault]	Inverter operating status (*Fd01*) bit 1
1	**Warning** *0* [No warning] *1* [Warning]	Inverter operating status (*Fd01*) bit 2
2	**Running** *0* [Stopped] *1* [Running]	Inverter operating status (*Fd01*) bit 10
3	**Rotation** *0* [Forward] *1* [Reverse]	Inverter operating status (*Fd01*) bit 9
4	**Ready** *0* [Disable] *1* [Enable]	Inverter operating status (*Fd01*) bit 13
5	**Command from the network** *0* [Not from the network] *1* [From the network]	Inverter operating command mode status (*FE45*).
6	**Setpoint from the network** *0* [Not from the network] *1* [From the network]	Inverter operating setpoint mode status (*FE46*) = 4.
7	**At setpoint** *0* [Setpoint not reached (accelerating or decelerating)] *1* [Setpoint reached]	
8 to 15	[Reserved]	

Object Status (nvoStatus)

This output network variable indicates various status within the drive.

Name	nvoStatus
SNVT reference	SNVT_obj_status
SNVT index	93
Definition	Object Status

No	Member name	Description
	object_id	Returns the value written to object_id of object request (nviRequest). (Mandatory for LonMark Node Object)
0	invalid_id	1 means requested ID is not implemented in the drive. (Mandatory for LonMark Node Object)
1	invalid_request	1 means request is not implemented in the drive.
2	disabled	1 means object disabled. Under the disabled state, Output network variables belonging to the functional block are not propagated to the network. However, it must be possible to poll the output network variables of a functional block in this state. The functional block must not respond to any updates received on its input network variables, but it must support reading and writing of any configuration properties belonging to the functional block. If the functional block was already in the disabled state, a request to disable the functional block is not an error. If the Node Object functional block is disabled, any other request to the Node Object functional block are not disabled. Status and alarm reporting via the "nvoStatus" outputs is not disabled when the Node Object functional block is disabled.
3	out_of_limits	Not supported.
4	open_circuit	Not supported.
5	out_of_service	Not supported.
6	mechanical fault	Not supported.
7	feedback_failure	Not supported.
8	over_range	Not supported.
9	under_range	Not supported.
10	electrical_fault	Not supported.
11	unable_to_measure	Not supported.
12	comm_failure	Not supported.
13	fail_self_test	Not supported.
14	self_test_in_progress	Not supported.
15	locked_out	Not supported.
16	manual_control	Not supported.
17	in_alarm	1 means the drive is in detected fault or in alarm condition.
18	in_override	Not supported.
19	report_mask	1 means nvoStatus is an event mask. When RQ_REPORT_MASK is required by nvi_request, nvoStatus reports as "1" the supported status bit (disabled, in_alarm, report_mask). (Mandatory for LonMark Node Object)
20	programming_mode	Not supported.
21	programming_fail	Not supported.
22	alarm_notify_disabled	Not supported.
23	reset_complete	Not supported.
24-31	Reserved	Reserved Bits

Alarms

Alarm code (nvoDrvAlarm)

This variable monitors the fault state of the drive.

Name	nvoDrvAlarm
SNVT reference	SNVT_switch
SNVT index	95
Format	Normal / Alarm; don't care

Range

State	Value	Status
0	0	No fault
1	200 (0xC8)	Fault
-1 (0xFF)	0 ... 200	Invalid

This LONWORKS network variable is linked to the drive parameters:

State: Operating status (*F d O 1*) bit 1.

Fault code: Alarm information monitor (*F C 9 0*).

Alarm status (nvoAlarmWord)

This variable monitors the fault state of the drive by the bit 0 and additional detail by bits 1 ... 6. Bit 0 is redundant with nvoDrvAlarm.

Name	nvoAlarmWord
SNVT reference	SNVT_state
SNVT index	83
Format	16 booleans

Bit nb	Description	ATV212 mapping
0	**Detected fault** *O* [No fault] *1* [Fault]	Inverter operating status (*F d O 1*) bit 1
1	**Supply detected fault** (supply overvoltage, phase loss ...) *O* [No fault] *1* [Fault]	Trip code monitor (*F C 9 0*) = 8, 30
2	**Drive detected fault** (overheat, power module fault, hardware, memory, internal communication, resistor ...) *O* [No fault] *1* [Fault]	Trip code monitor (*F C 9 0*) = 13, 16, 37, 38, 39, 47, 52, 33, 34, 18, 19, 20, 21, 22, 23, 25, 26, 51, 53, 55, 56, 58
3	**Motor detected fault** (faults downstream of the drive: braking overvoltage, phase loss, overheating ...) *O* [No fault] *1* [Fault]	Trip code monitor (*F C 9 0*) = 1, 2, 3, 4, 5, 6, 7, 14, 9, 10, 11, 12, 32, 84, 46, 40, 85, 86
4	**Process detected fault** (overload, underload ...) *O* [No fault] *1* [Fault]	Trip code monitor (*F C 9 0*) = 29, 57
5	**External detected fault** (inputs, outputs, encoder, contactor, brake, ...) *O* [No fault] *1* [Fault]	Trip code monitor (*F C 9 0*) = 15, 17, 50, 54, 36, 43, 44
6	**Communication interruption** *O* [No fault] *1* [Fault]	Trip code monitor (*F C 9 0*) = 24, 27
7 to 15	[Reserved]	

Measurements

Drive Output Current (nvoDrvCurnt)

This output network variable provides the drive output current (0.1 A).

Name	nvoDrvCurnt
SNVT reference	SNVT_amp
SNVT index	1
Unit	0.1 A
Range	0 ... 3 276.6 0x7FFF = +3 276.7: invalid
Definition	Drive Output Current

This value is transmitted immediately when its value has changed significantly. Additionally, this network variable will also be transmitted as a heartbeat output on a regular basis as specified by the Maximum Send Time (nciSndHrtBt) configuration value.

This value will be updated no faster than the Minimum Send Time (nciMinOutTm).

Drive Total Running Hours (nvoDrvRunHours)

This output network variable provides the total operation time for the motor in running hours.

Name	nvoDrvPwr
SNVT reference	SNVT_time_hour
SNVT index	124
Unit	1 h
Range	0 ... 65 534 h 0xFFFF = 65 535 h: invalid
Definition	Drive Total Running Hours

This value is transmitted immediately when its value has changed.

Energy consumption (nvoDrvEnergy)

This variable monitors the energy cumulative consumption of the drive.

Name	nvoDrvEnergy
SNVT reference	SNVT_elec_kwh_l
SNVT index	146
Unit	0.1 kWh
Range	0 ... 42 949 672.9 kWh
Definition	Energy consumption

If an overflow occurred, the value returns to 0.

Torque actual value (nvoTorque)

This variable monitors the motor torque. The unit is 0.005% of "Nominal motor torque". The "Nominal motor torque" is not accessible as a drive parameter. It is the result of the other characteristics.

Name	nvoTorque
SNVT reference	SNVT_lev_percent
SNVT index	81
Unit	0.005% of Nominal motor torque
Range	0% ... 163.830%

This LONWORKS network variable is linked to the drive parameter: [Output torque] ($F E I B$)

Monitoring of digital inputs

Monitoring of digital input F (nvoDigitalIn1)

This variable monitors the value of digital input F.

Name	nvoDigitalIn1
SNVT reference	SNVT_switch
SNVT index	95
Definition	Value of the digital input F

This LONWORKS network variable is linked to the drive parameter: Value of input F, [Input terminal information] (F d 0 6).

Monitoring of digital input R (nvoDigitalIn2)

This variable monitors the value of digital input R.

Name	nvoDigitalIn2
SNVT reference	SNVT_switch
SNVT index	95
Definition	Value of the digital input R

This LONWORKS network variable is linked to the drive parameter: Value of input R, [Input terminal information] (F d 0 6).

Monitoring of analog inputs

Monitoring of analog input VIB (nvoAnalogIn2)

This variable monitors the analog input VIB (%).

Name	nvoAnalogIn2
SNVT reference	SNVT_lev_percent
SNVT index	81
Unit	0.005%
Range	0.000% ... 100.000%
Definition	Value of the analog input VIB

This LONWORKS network variable is linked to the drive parameter: [Analog input value VIB monitor] (F E 3 6).

The adjustment of analogue input is possible by setting the parameters F 4 7 2 and F 4 7 3 (refer to ATV212 programming manual).

Control of digital outputs

Control of relay FL (nviRelay1)

This variable enables the command of relay FL of the drive if it is assigned to parameter F 1 3 2 at 38.

Name	nviRelay1
SNVT reference	SNVT_switch
SNVT index	95
Definition	Command of relay FL

This LONWORKS network variable is linked to the drive parameter: Relay FL, [Terminal Output Data] (F A 5 0) bit 0.

Emergency

Emergency command (nviEmergOverride)

This variable produces an emergency stop of the drive.

The emergency state disappears after the trip has been released by nviEmergOverride with value 0.

Then it is possible to reset the drive by nviResetFault or a local command.

Name	nviEmergOverride
SNVT reference	SNVT_hvac_emerg
SNVT index	103

Value	Action	Comment
0	Drive trip release	EMERG_NORMAL (No Emergency mode)
1	Emergency stop	EMERG_PRESSURIZE (Emergency pressurize mode)
2		EMERG_DEPRESSURIZE (Emergency depressurize mode)
3		EMERG_ PURGE (Emergency purge mode)
4		EMERG_SHUTDOWN (Emergency shutdown mode)
5		EMERG_FIRE
6 ... 0xFF		...

Emergency stop can be configured by parameter [Ext. fault stop Mode] (*F b O 3*) to coast stop, slowdown stop or emergency DC braking.

Emergency status (nvoEmergStatus)

This variable monitors the emergency status of the drive. It provides the response against an emergency stop of the inverter (nviEmergOverride). When the node received "nviEmergOverride", it propagates the information to the network.

Name	nvoEmergStatus
SNVT reference	SNVT_hvac_emerg
SNVT index	103

Value	Action	Comment
0	No emergency stop	EMERG_NORMAL (No Emergency mode)
1	Emergency stop	EMERG_PRESSURIZE (Emergency pressurize mode)
2		EMERG_DEPRESSURIZE (Emergency depressurize mode)
3		EMERG_ PURGE (Emergency purge mode)
4		EMERG_SHUTDOWN (Emergency shutdown mode)
5		EMERG_FIRE
6 ... 0xFF		...

Adjustment

Maximum Motor Speed (nciMaxSpeed)

This configuration property is used to define the maximum speed of the motor.

The value is entered as a percent of nominal speed in RPM, as defined by the Nominal Motor Frequency (nciNmlFreq) configuration value. The value of the maximum speed must be validated against the value of the minimum speed as follows:

-163.840% $\leqslant$ minimum speed $\leqslant$ maximum speed $\leqslant$ 163.830%

Name	nciMaxSpeed
SCPT reference	SCPTmaxSetpoint
SCPT index	50
SNVT reference	SNVT_lev_percent
SNVT index	81
Unit	0.005%
Range	-163.840% ... 163.830% 163 835% = 32 767 = 0x7FFF: invalid
Default value	100.000%
Definition	Maximum Motor Speed

This LONWORKS configuration property is linked to the drive parameter: [Upper limit freq] (*UL*).
nciMaxSpeed is also subject to the *UL* limitations.
By editing nciMaxSpeed, the LONWORKS card changes the *UL* , automatically.

Minimum Motor Speed (nciMinSpeed)

This configuration property is used to define the minimum speed of the motor.

The value is entered as a percent of nominal speed in RPM, as defined by the Nominal Speed (nciNmlSpeed) configuration value. The value of the minimum speed must be validated against the value of the maximum speed as follows:

-163.840% $\leqslant$ minimum speed $\leqslant$ maximum speed $\leqslant$ 163.830%

Name	nciMinSpeed
SCPT reference	SCPTminSetpoint
SCPT index	53
SNVT reference	SNVT_lev_percent
SNVT index	81
Unit	0.005%
Range	-163.840% ... 163.830% 163 835% = 32 767 = 0x7FFF: invalid
Default value	0.000%
Definition	Minimum Motor Speed

This LONWORKS configuration property is linked to the drive parameter: [Low limit frequency] (*L L*).
By editing nciMinSpeed, the LONWORKS card changes the *L L* automatically.

Nominal Motor Speed in RPM (nciNmlSpeed)

This configuration property is used to provide the nominal speed of the motor in RPM. This value is necessary to determine the minimum and maximum speed for the motor, based on the configuration properties nciMinSpeed, nciMaxSpeed (entered as percent of nominal speed).

Name	nciNmlSpeed
SCPT reference	SCPTnomRPM
SCPT index	158
SNVT reference	SNVT_rpm
SNVT index	102
Unit	rpm
Range	0 ... 65534 rpm (65535 rpm is invalid)
Definition	Nominal Motor Speed in RPM
Default value	1800 rpm

Nominal Motor Frequency (nciNmlFreq)

⚠ WARNING

LOSS OF CONTROL
Changing this value while the motor is running may cause the motor running at unexpected speed.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

This configuration property is used to provide the nominal frequency of the motor. It should be set to the rated frequency of the motor. This value must be set correctly because the number of motor pole is calculated from this value and nciNmlSpeed.

Name	nciNmlFreq
SCPT reference	SCPTnomFreq
SCPT index	159
SNVT reference	SNVT_freq_hz
SNVT index	76
Unit	0.1 Hz
Range	0.0 ... 100.0 Hz (65535 Hz is invalid)
Definition	Nominal Motor Frequency
Default value	60.0 Hz

⚠ WARNING

LOSS OF CONTROL
Changing this value while the motor is running may cause the motor running at unexpected speed.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Minimum Ramp Up Time (nciRampUpTm)

This configuration property determines the ramp up time of the motor.

Name	nciRampUpTm
SCPT reference	SCPTrampUpTm
SCPT index	160
SNVT reference	SNVT_time_sec
SNVT index	107
Unit	0.1 s
Range	0.1 to [Acceleration time 1] (ACC) limitation (The value out of range is invalid)
Definition	Minimum Ramp Up Time
Default value	10.0 s

This LONWORKS configuration property is linked to the drive parameter [Acceleration time 1] (ACC).

Minimum Ramp Down Time (nciRampDownTm)

This configuration property determines the ramp down time of the motor.

Name	nciRampDownTm
SCPT reference	SCPTrampDownTm
SCPT index	161
SNVT reference	SNVT_time_sec
SNVT index	107
Unit	0.1 s
Range	0.1 to [Deceleration time 1] ($d E C$) (The value out of range is invalid)
Definition	Minimum Ramp Down Time
Default value	10.0 s

This LONWORKS configuration property is linked to the drive parameter: [Deceleration time 1] ($d E C$).

Parameter access

nviParamCmd, nvoParamResp

A controller node can monitor or modify any drive parameter by supporting the Parameter access command and the Parameter access response functions. These functions allow a controller complete access to the features of the drive and the ability to configure drives with predefined settings, using the network variables nviParamCmd and nvoParamResp.

Name	nviParamCmd
SNVT reference	SNVT_preset
SNVT index	94
Format	Structure, 14 bytes
Definition	Parameter access command

Name	nvoParamResp
SNVT reference	SNVT_preset
SNVT index	94
Format	Structure, 14 bytes
Definition	Parameter access response

The following definitions describe how the fields of SNVT_preset are used by the LONWORKS card of the drive:

Learn

This field contains the function code for the ATV212. The values for this field are:

Value	Element	Action
3	LN_REPORT_VALUE	Read command
2	LN_LEARN_VALUE	Write command (to the EEPROM)

Any other value in this field will result in an error message in the Parameter access response.

Selector

This field contains the drive parameter communication number, written in decimal notation, that is to be written or read. Requests for undefined parameters will result in an error message in the Parameter access response.

The controlling device should compare the parameter address of the response message to the requested parameter address to determine that the information received is the requested information and not a response to another controller or from another drive.

The drive parameters are described in the Altivar 212 programming manual and Modbus communication manual, with their logic address and possible values.

Value

This array contains the parameter information to and from the drive. All drive parameters use INT or UINT (16 bit words signed or unsigned).

The most significant byte of data will be stored in value [2] and the least significant byte of data will be stored in value [3].

In the event of an error message, the drive will send 0xFF in value [0] and an error code in value [3].

Error codes

Code	Meaning
1	Illegal function for the addressed node
2	Illegal parameter address
3	Illegal data value
4	Illegal access (writing prohibited)

Day, Hour, Minute, Second, Millisecond

The time fields are not supported by the LONWORKS card. The drive will respond to parameter access requests as soon as they are received. Any values in the time fields of the Parameter access command will be ignored. All time fields will be set to "0" in the Parameter access response.

Example 1: Read access

A controller node reads the value of Trip code (address *FC90*). Now, *OL1* trip (trip code is 13 decimal) occurs. The value is 000D hex. The controller node sends/receives the following data.

Field	Send (nviParamCmd)	Receive (nviParamResp)
learn	LN_REPORT_VALUE	LN_REPORT_VALUE
selector	FC90 hex	FC90 hex
value[0]	N/A	00 hex
value[1]	N/A	00 hex
value[2]	N/A	00 hex
value[3]	N/A	0D hex
day ,hour, minute, second, millisecond	N/A	0

Example 2: Write access

The controller node writes cumulative energy clear command (address *FA20*). The data value is 0002 hex. The controller node sends/receives the following data.

Field	Send (nviParamCmd)	Receive (nviParamResp)
learn	LN_LEARN_VALUE	LN_LEARN_VALUE
selector	FA20 hex	FA20 hex
value[0]	00 hex	00 hex
value[1]	00 hex	00 hex
value[2]	00 hex	00 hex
value[3]	02 hex	02 hex
day ,hour, minute, second, millisecond	N/A	0

Note: After sending cumulative energy clear command, 0000 hex should be re-written into *FA20*.

Example 3: Illegal access

Illegal data is written to the inverter parameter [Motor 2 rated Volt] (*F171*), (Base frequency voltage, address 0171).

The upper limit value is 330.0V (200 V class). In case of writing 360.0V, the unit of this parameter is 0.1V and the data value is converted to hex, so the value is 0E10 hex. The controller node sends/receives the following data (out of range error).

Field	Send (nviParamCmd)	Receive (nviParamResp)
learn	LN_LEARN_VALUE	LN_LEARN_VALUE
selector	0171 hex	0171 hex
value[0]	00 hex	FF hex
value[1]	00 hex	00 hex
value[2]	0E hex	00 hex
value[3]	10 hex	03 hex
day ,hour, minute, second, millisecond	N/A	0

Identification

Location Label (nciLocation)

This configuration property can optionally be used to provide more descriptive physical location information than can be provided by the Neuron Chip's 6 byte location string. The string may be loaded from the LONWORKS network.

Name	nciLocation
SCPT reference	SCPT_Location
SCPT index	17
SNVT reference	SNVT_str_asc
SNVT index	36
Range	Any NULL terminated ASCII string of 31 bytes total length (30 bytes ares available because 31th byte is a NULL)
Default value	The default value is an ASCII string containing all zeros ("\0").
Definition	Location Label

Identification (nvoTypeVer)

This variable provides identification data from the drive (Brand, commercial reference, version).

Name	nvoTypeVer
SNVT reference	SNVT_str_asc
SNVT index	36
Format	ASCII string (ended by NULL terminator)
Definition	Identification of the drive

The string is composed of: Brand, space, commercial reference, space, "V", major revision (1 character), ".", minor revision (maximum 2 characters)

Example:

Telemeca ATV212H075N4 V1.83

Network management

Send Heartbeat Time (nciSndHrtBt)

This configuration property defines the maximum period of time that expires before automatic update of the network variables:

- nvoDrvSpeed,
- nvoDrvCurnt,
- nvoDrvRunHours,
- nvoStatusWord,
- nvoDrvFeedback,
- nvoInvOutFreq,
- nvoDrvAlarm,
- nvoTorque,
- nvoDrvEnergy,
- nvoDigitalIn1,
- nvoDigitalIn2,
- nvoAnalogIn2.

Name	nciSndHrtBt
SCPT reference	SCPTmaxSendTime
SCPT index	49
SNVT reference	SNVT_time_sec
SNVT index	107
Unit	0.1 s
Range	0.0 ... 6 553.4 s (6553.5 s is invalid)
Default value	0.0 (no automatic update)
Definition	Send Heartbeat Time

Receive Heartbeat Time (nciRcvHrtBt)

This configuration property is used to control the maximum time that elapses after the last update of at least one of the network variables:

- Drive Speed Setpoint (nviDrvSpeedStpt),
- Drive Speed Setpoint Scaling (nviDrvSpeedScale),
- Frequency setpoint (nviInvSetFreq).

When these variables are not updated within the heartbeat time the LONWORKS card will detect a communication interruption and nviDrvSpeed, nviDrvSpeedScale and nviInvSetFreq will return to their initial value. The timer starts when drive receive the first update of one of these network variables.

It is possible to configure the behaviour of the drive in case of LONWORKS communication interruption, please refer to page 34.

Name	nciRcvHrtBt
SCPT reference	SCPTmaxRcvTime
SCPT index	48
SNVT reference	SNVT_time_sec
SNVT index	107
Unit	0.1 s
Range	0.0 ... 6 553.4 s (6553.5 s is invalid) 0.0 (no interruption detection)
Default value	0.0 (no interruption detection)
Definition	Receive Heartbeat Time

Minimum Send Time (nciMinOutTm)

This configuration property defines the minimum period of time between automatic network variable transmissions. This function is active prior to "nciSndHrtBt".

Name	nciMinOutTm
SCPT reference	SCPTminSendTime
SCPT index	52
SNVT reference	SNVT_time_sec
SNVT index	107
Unit	0.1 s
Range	0.0 ... 6553.4 s (6553.5 s is invalid)
Default value	0.5 s
Definition	Minimum Send Time

Power supply start waiting time (nciPwUpOutTm)

Waiting time until the drive starts transmission after reset or power on.

When a setting value is 0, transmission will start after the initialization of the LONWORKS card is finished.

This configuration property freezes the transmission of the network variables concerned by nciSndHrtBt:

- nvoDrvSpeed,
- nvoDrvCurnt,
- nvoDrvRunHours,
- nvoStatusWord,
- nvoDrvFeedback,
- nvoInvOutFreq,
- nvoDrvAlarm,
- nvoTorque,
- nvoDrvEnergy,
- nvoDigitalIn1,
- nvoDigitalIn2,
- nvoAnalogIn2.

Name	nciPwUpOutTm
SCPT reference	SCPTpwrUpDelay
SCPT index	72
SNVT reference	SNVT_time_sec
SNVT index	107
Unit	0.1 s
Range	0.0 ... 6 553.4 s Values 300.0 ... 6 553.4 are limited to 300.0 s 0.0: Transmission starts immediately after initialisation of the LONWORKS card is finished.
Default value	0.0 s
Definition	Power supply start waiting time