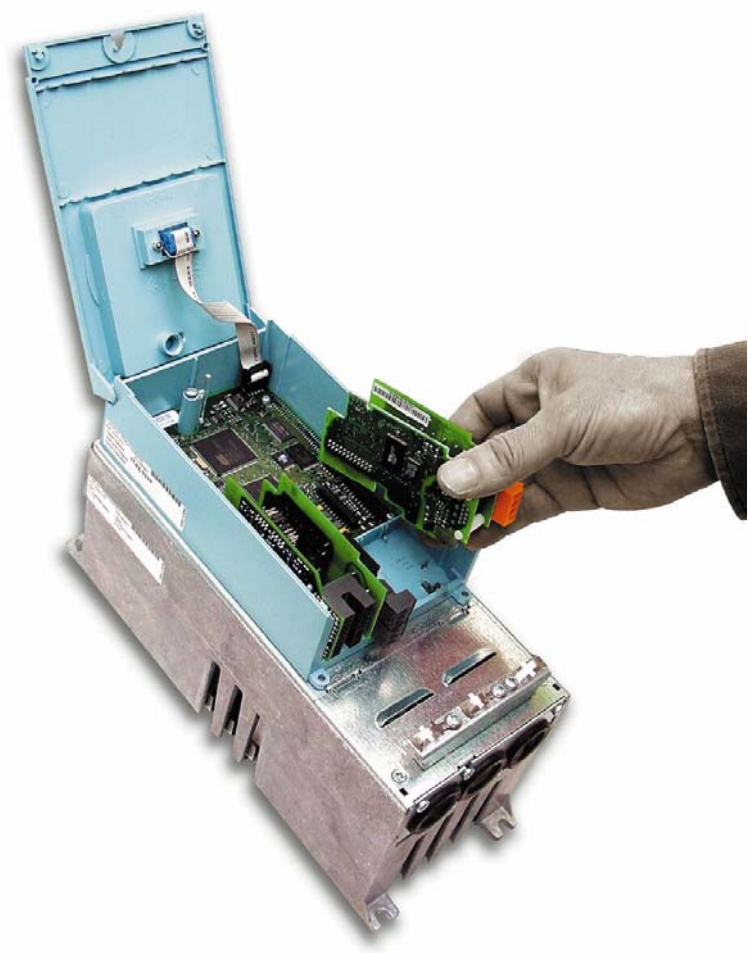
Honeywell

User Manual



NX series

LonWorks & BACnet User Manual

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Fieldbus	Typecodes of the products		
	Honeywell code	Honeywell North America code	Manufacturer's code
LonWorks	NXOPTC4	32006630-001	OPT-C4
Bacnet	NXOPTCJ	32006630-013	OPT-CJ

Honeywell product information and product manuals can be downloaded from following sites depending on geographical area:

Honeywell EMEA (Europe, Middle East and Africa) products:

http://ecc.emea.honeywell.com/products
The inverter products can be found from *'Building control products'* section in category *'Frequency inverters'.*

Honeywell North America products:

http://Customer.honeywell.com/vfd
The VFD product manuals can be found from *'Marketing & Technical Materials'* section in category *'Product literature'.*

1. General

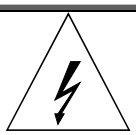
Honeywell NX frequency converters can be connected to the LonWorks® network using a fieldbus C4 option board. The converter can then be controlled, monitored and programmed from the Host system.

The LonWorks® C4 option board shall be installed in slot E on the control C4 option board of the frequency converter.

LonWorks technology has been developed by Echelon Corporation. LonWorks network is used in applications like industry and building automation, controlling household electronics, medical instrumentation and many others. The target of the LonWorks network is to provide a common vendor independent communication network for intelligent devices.

In a LonWorks network, no central control or master-slave architecture is needed. Nodes on a network communicate with each other using LonTalk® protocol. Interoperable nodes use Standard Network Variable Types (SNVT) for communicating over the network. The definition of an SNVT includes units, a range, and an increment. Honeywell C4 option board uses only Standard Network Variable Types for the data types.

All network variables are either input (data is coming from the network to the device) or output (data is sent to the network by the device) network variables. When network variables on different nodes on the network have been bound together by an installation tool, passing of data is automatic between the right nodes. Only the same type of network variables can be bound together, so it is very important to have compatible interfaces.

 **WARNING!**	**Internal components and circuit boards are at high potential when the frequency converter is connected to the power source. This voltage is extremely dangerous and may cause death or severe injury if you come into contact with it.**

2. LonWorks C4 Option Board Technical Data

2.1 General

LonWorks connections	Interface	Pluggable connector (5 mm)
Communications	Channel type	TP/FT-10
	Transfer cable	Twisted pair
	Baud rate	78 Kbit/s
Environment	Ambient operating temperature	–10°C…50°C
	Storing temperature	–40°C…70°C
	Humidity	<95%, no condensation allowed
	Altitude	Max. 1000 m
	Vibration	0.5 G at 9…200 Hz
Safety		Fulfils EN50178 standard

Table 1. LonWorks technical data

2.2 Physical Media and Wiring

LONWORKS networks can be implemented on many different physical media. Honeywell OPT-C4 option board is equipped with an FT-X1 transceiver supporting the Free Topology transformer coupled network, which allows the network wire to be connected as bus, star, loop or combination of these. This media reaches a communication speed of 78kBits/s. The FT-X1 transceiver is compatible with Echelon's LPT-10 Link Power Transceiver, and these transceivers can communicate with each other on a single twisted pair cable.

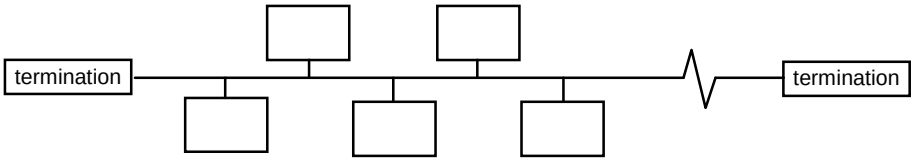


Figure 1. Doubly Terminated Bus Topology

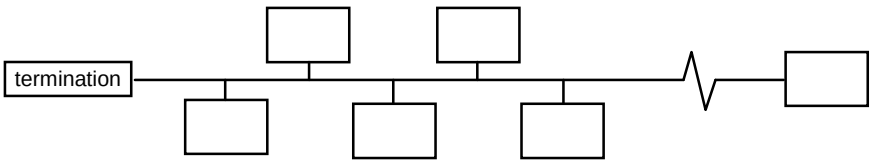


Figure 2. Singly Terminated Bus Topology

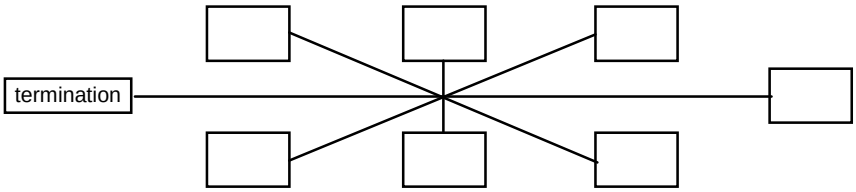


Figure 3. Star Topology

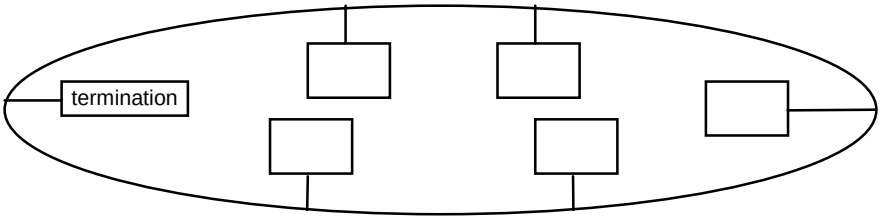


Figure 4. Loop Topology

Up to 64 FTT-10 transceiver nodes are allowed per network segment, the individual segments can be connected together by a router. See Table 3 for recommended cable types and cable lengths for FTT-10. Even if unshielded cable types are recommended to be used with this type of transceiver, it is still highly recommended to use only shielded cables with frequency converters. Attention should be paid to proper grounding of the shield to ensure bus operation. Grounding of the shield should be done at both ends of the cable.

Cable type	Max. doubly terminated bus length	Max. free topology wire length	Max. node-to-node distance
Belden 85102 (unshielded)	2700 m	500 m	500 m
Belden 8471 LONAK 2x1,3 (unshielded)	2700 m	500 m	400 m
Level IV, 22AWG LONAK 2x2x0,65 (unshielded)	1400 m	500 m	400 m
JY (St) Y 2x2x0.8mm LONAK 2x2x0,8 (shielded)	900 m	500 m	320 m

Table 2. Line length for different transmission speeds

2.3 Profiles

LonMark Functional Profiles describe in detail the application layer interface, including the network variables, configuration properties, and default and power-up behaviors required on LonMark devices for specific, commonly used control functions.

2.3.1 Variable Speed Drive Profile

Leading manufacturers of drive technology have jointly defined the LonMark profile. The profile specifies how the drives are to be parameterized and how the setpoints and actual values are to be transmitted. This enables drives from different vendors to be exchanged. The profile contains necessary specifications for speed control and positioning. It specifies the basic drive functions while leaving sufficient freedom for application-specific expansions and further developments.

3. LonWorks Fieldbus C4 Option Board Layout and Connections

Honeywell LonWorks Fieldbus C4 Option Board is connected to the fieldbus through 3-pin pluggable bus connector. The communication with the control C4 Option board takes place through the standard Honeywell Interface C4 Option Board Connector.

3.1 LonWorks Opt-C4 Option Board

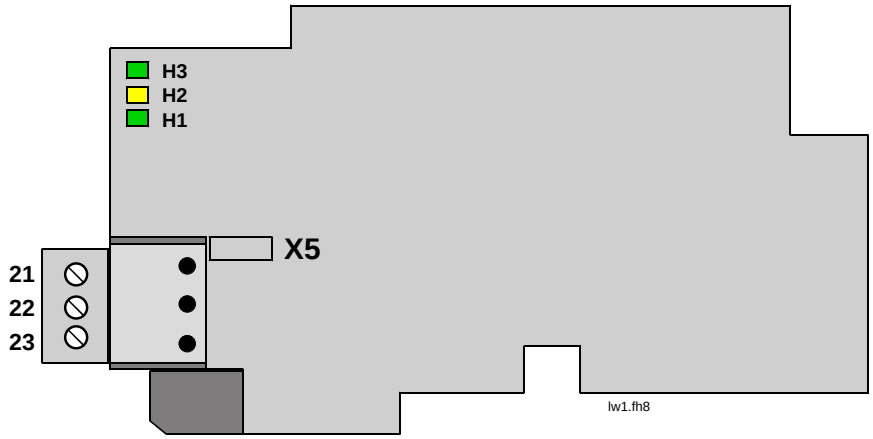


Figure 5. Honeywell I/O Boards C4 option board OPT

Signal	Connector	Description
A1	21	Data
A2	22	Data
0Shield	23	Shield

Table 3. OPT-C4 bus connector signals

3.2 Grounding Of Bus Cable Shield In Opt-C4

The bus cable shield can be grounded to the frame of the frequency converter through an RC filter located on the OPT-C4 option board.

Note: Normally, the C4 option board has already been installed in slot E of the control C4 Option board. It is not necessary to detach the whole C4 Option board for the grounding of the bus cable shield. Just detach the terminal block.

3.2.1 Grounding the bus cable shield directly to the frequency converter frame using the RC-filter

1 Strip about 5 cm of the cable as shown in the picture.

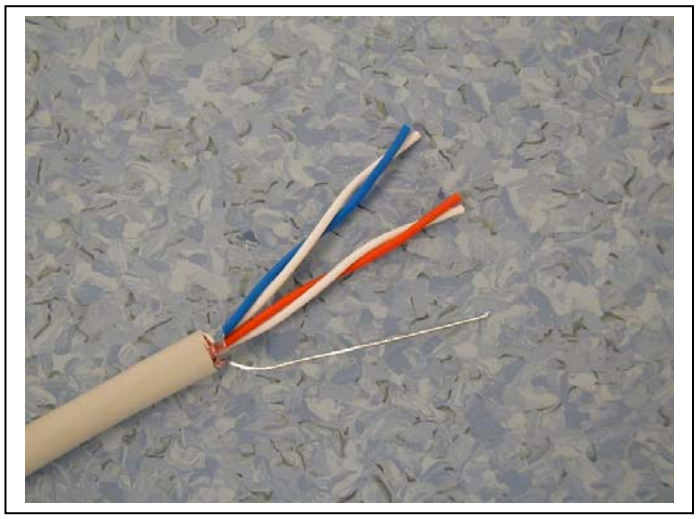


Figure 6.

2 Leave no more than 7 mm of the data cable outside the terminal block (Figure 7) and strip the data cables at about 5 mm to fit in the terminals (Figure 8).

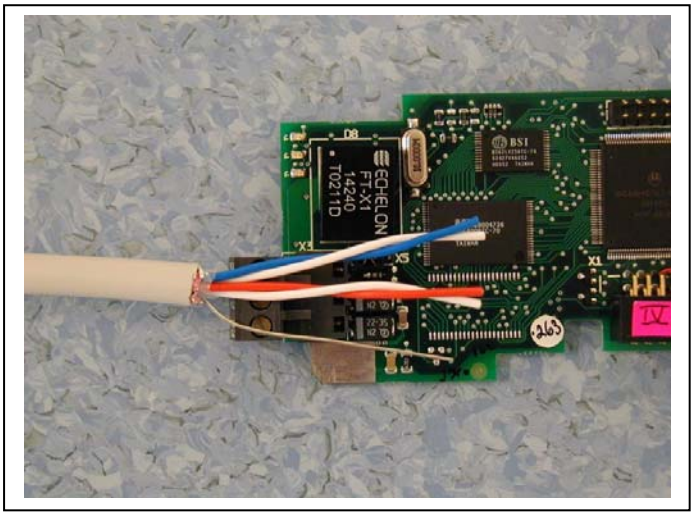


Figure 7.

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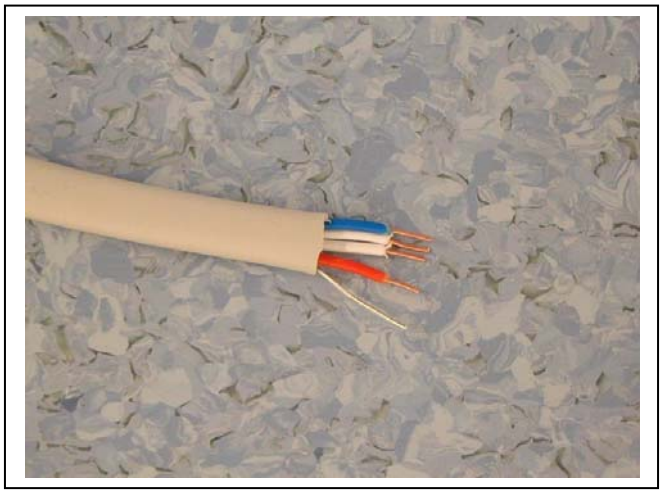


Figure 8.

3 Insert the data cables and the shield in their respective terminals. See Table 3.

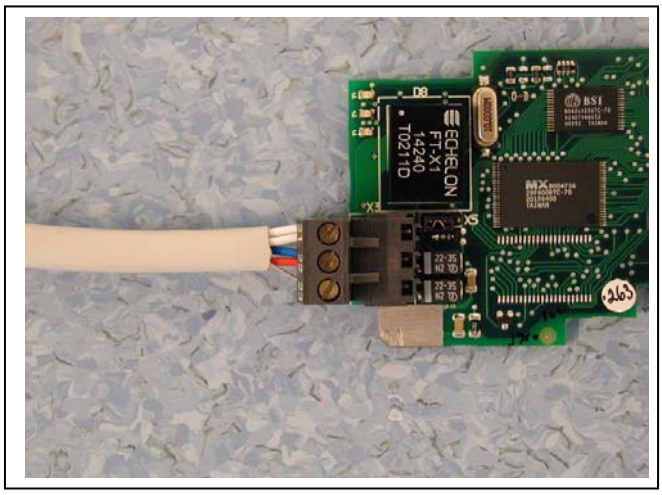


Figure 9.

4 If the LonWorks C4 option board was detached from the control unit place it into slot E of the control C4 option board (see C4 option board installation on page 14). Otherwise attach the terminal block. Fix the cable on the frame with the clamp.

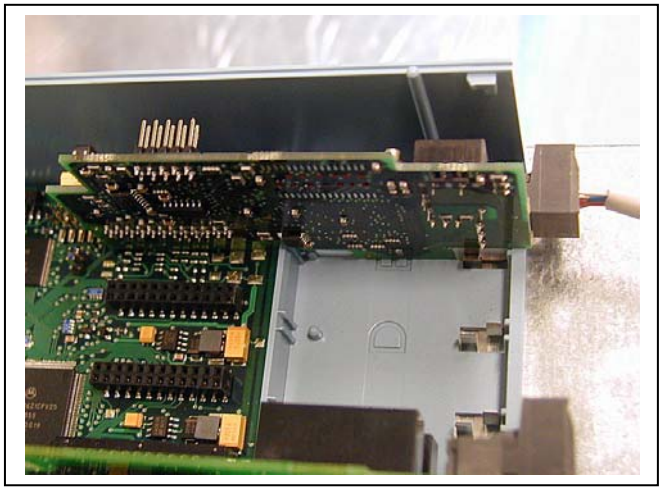


Figure 10.

3.3 Bus Termination Resistor

To assure a proper data transmission, termination of the network segments is required. Depending on the type of network, either one or two terminations are necessary. Free topology network segment requires only one termination whereas a doubly terminated bus topology requires two.

The jumper X5 on the Honeywell LonWorks C4 option board must be set accordingly. Use 94-ohm termination resistance when only one termination is needed and 47-ohm for two terminations.

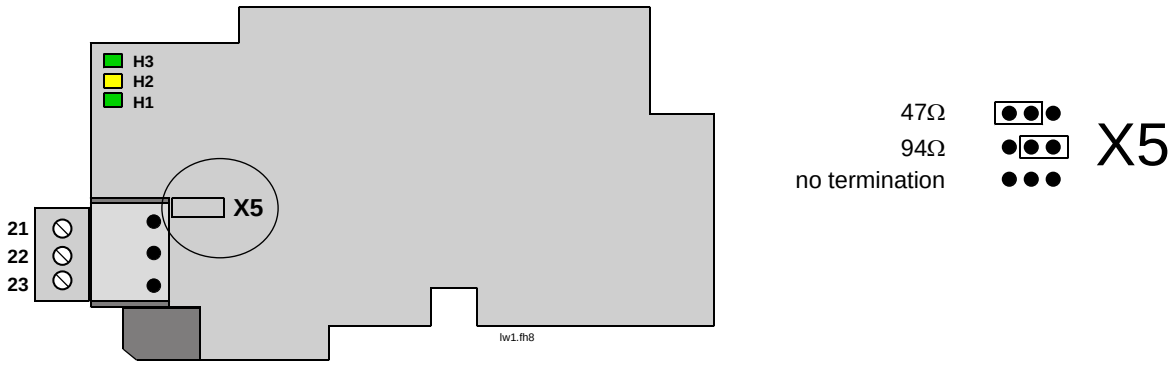


Figure 11. Using jumper X5 to set the bus termination

3.4 Led Indications

The three LED indications next to the connector show the present statuses of the Neuron (green H3), the LonWorks C4 option board (yellow H2) and the Fieldbus Module (green H1). From the user's viewpoint, the first two are the most significant.

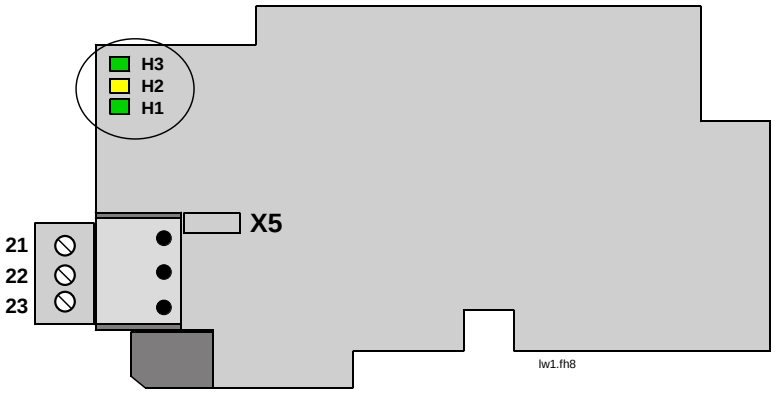


Figure 12. LED indications on the LonWorks C4 option board

H3	Neuron Service LED	GREEN
H2	C4 Option Board Status	YELLOW
H1	Bus Status	GREEN

Neuron status (H3) GREEN

LED is:	Meaning:	State Code
OFF	Configured	4
ON	Applicationless and Unconfigured	3
Flashing	Unconfigured	2

C4 Option Board status LED (H2) YELLOW

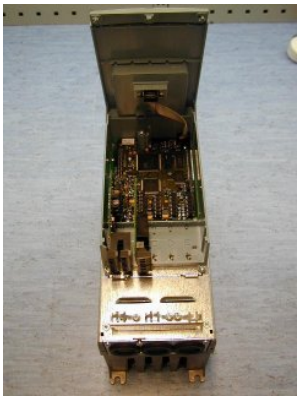
LED is:	Meaning:
OFF	C4 Option board not activated
ON	C4 Option board in initialisation state waiting for activation command from the frequency converter
Blinking fast (once/1 s)	C4 Option board is activated and in RUN state C4 Option board is ready for external communication
Blinking slow (once/5 s)	C4 Option board is activated and in FAULT state Internal fault on C4 option board

Bus status LED (H1) GREEN

LED is:	Meaning:
OFF	Fieldbus module is waiting for parameters from the frequency converter No external communication
ON	Fieldbus module is activated Parameters received and module activated Module is waiting for messages from the bus
Blinking very fast for 5s (once/0.2 s)	Fieldbus module has received a wink request.
Blinking fast (once/1 s)	Module is activated and receiving messages from the bus
Blinking slow (once/5 s)	Module is in FAULT state No messages from Net within the watchdog time Bus broken, cable loose

4. Installation of Honeywell NX LonWorks C4 Option Board

NOTE	MAKE SURE THAT THE FREQUENCY CONVERTER **IS SWITCHED OFF** BEFORE AN OPTION OR FIELDBUS C4 OPTION BOARD IS CHANGED OR ADDED!

A	Honeywell NX frequency converter	
B	Remove the cable cover.	
C	Open the cover of the control unit.	

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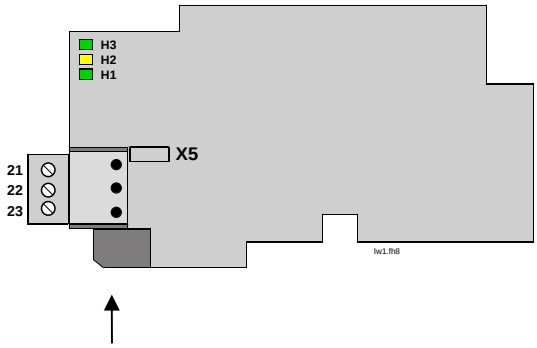
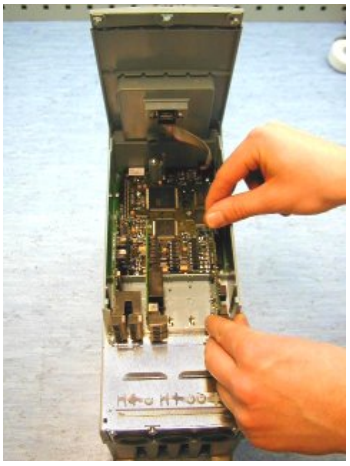
D

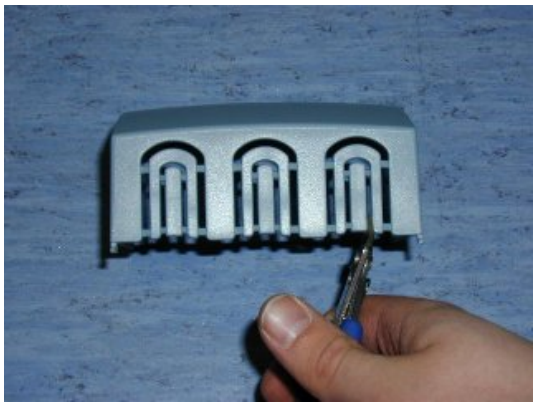
Install LonWorks C4 option board in slot E on the control C4 option board of the frequency converter. Make sure that the grounding plate (see below) fits tightly in the clamp.





E

Make a sufficiently wide opening for your cable by cutting the grid as wide as necessary.

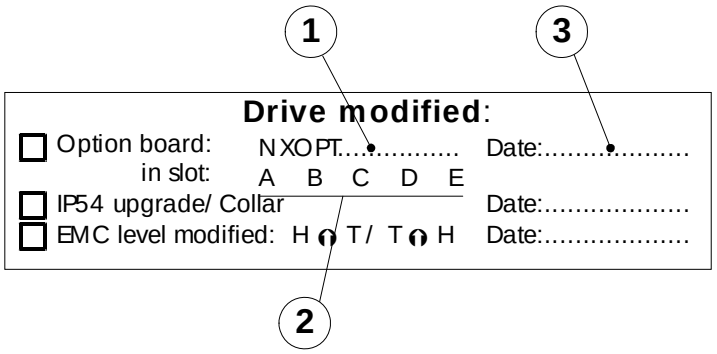


F

Close the cover of the control unit and the cable cover.

4.1 C4 Option Board Information Sticker

The LonWorks C4 option board package delivered by the factory includes a sticker (shown below). Please mark the C4 option board type (1), the slot into which the C4 option board is mounted (2) and the mounting date (3) on the sticker. Finally, attach the sticker on your drive.



5. Commissioning

READ FIRST CHAPTER 8 ‘COMMISSIONING’ in the User manual of the drive type used (see page 4 for download instructions for manuals).

5.1 Fieldbus C4 Option Board Parameters

The Honeywell LonWorks C4 option board is commissioned with the control keypad by giving values to appropriate parameters in menu **M7** (for locating the expander C4 option board menu, see NX User's Manual, Chapter 7).

Expander C4 Option Board menu (M7)

The *Expander C4 option board menu* makes it possible for the user 1) to see what expander C4 option boards are connected to the control C4 option board and 2) to reach and edit the parameters associated with the expander C4 option board.
Enter the following menu level **(G#)** with the *Menu button right*. At this level, you can browse through slots A to E with the *Browser buttons* to see what expander C4 option boards are connected. On the lowermost line of the display you also see the number of parameter groups associated with the C4 option board.
If you still press the *Menu button right* once you will reach the parameter group level including one parameter *(Service pin)*.

LonWorks parameters

To commission the LonWorks C4 Option board, enter the parameter G7.5.1.1 from the *Parameters* group (G7.5.1). Give the desired value to the LonWorks parameter.

#	Name	Default	Range	Description
1	Service Pin	0	0..1	Broadcasts a service pin message to the network.

Table 4. LonWorks parameters

5.2 Start-Up Test

Frequency converter application

Choose Fieldbus *(Bus/Comm)* for the active control place (see NX User's Manual, Chapter 7.3.3).

Master software

1. Write 100.0 1 to *nviDrvSpeedStpt*.
2. Frequency converter status is RUN and output frequency is 1.00 * *nviDrvSpeedScale*
3. Write 0.0 0 to *nviDrvSpeedStpt*
4. Frequency converter status is STOP.

If nvoDrvStats bit 3 = 1 Status of frequency converter is FAULT.

6. LonWorks Interface

Features of the LonWorks interface:

- Direct control of Honeywell NX (e.g. Run, Stop, Direction, Speed reference, Fault reset)
- Full access to all Honeywell NX parameters
- Monitor Honeywell NX status (e.g. Output frequency, Output current, Fault code)

6.1 General

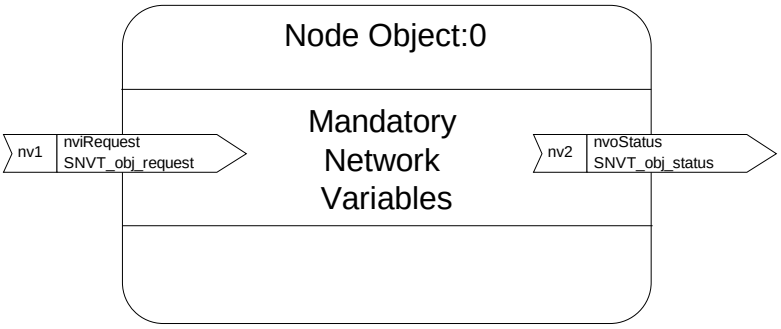


Figure 13. The Node object diagram

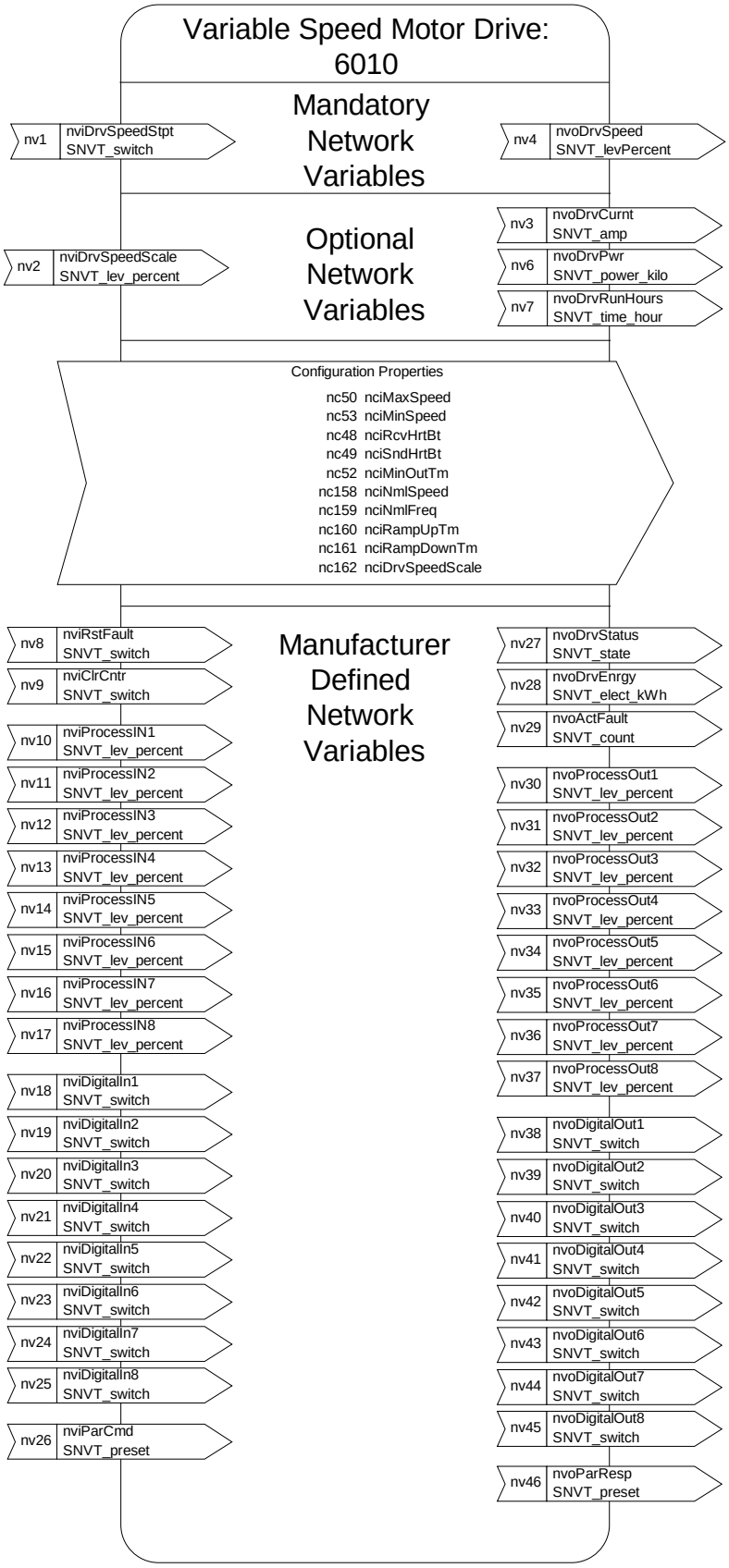


Figure 14. The Variable Speed Motor Drive object diagram

6.2 Input Network Variables

Function	Variable Name	SNVT type	Min. Value	Max. Value
Node Object request	nviRequest	SNVT_obj_request		
Driver speed setpoint	nviDrvSpeedStpt	SNVT_switch	n/a	n/a
Driver set point speed scaling	nviDrvSpeedScale	SNVT_lev_percent	-163.840%	163.830%
Reset fault	nviRstFault	SNVT_switch	n/a	n/a
Clear kWh trip or Drive total running hours trip counters	nviClrCntr	SNVT_switch	1	2
Process In Data	nviProcessIn1..8	SNVT_lev_percent	0	65535
Digital Inputs	nviDigitalIn1..8	SNVT_switch	0	4
Parameter Set	nviParCmd	SNVT_preset	n/a	n/a

Table 5. Network input variables

nviRequest
This input network variable provides the mechanism to request a particular mode for the Node object or the Variable Speed Motor Drive object within a node. Supported requests are RQ_NORMAL, RQ_UPDATE_STATUS, RQ_CLEAR_STATUS, RQ_REPORT_MASK, RQ_DISABLED, RQ_ENABLE and RQ_CLEAR_ALARM.

nviDrvSpeedStpt
This input network variable provides control and a low resolution speed setpoint

state	value	command
0	NA	Stop
1	0	0%
1	1 to 200	0.5 to 100%
1	201 to 255	100.0%
0xFF	NA	Auto

Table 6.

nviDrvSpeedScale
This input netork variable provides scaling for *nviDrvSpeedStpt*. Negative values indicate a motor direction in reverse. For example, if the *nviDrvSpeedStpt* value is 50% and *nviDrvSpeedScale* -150%, then the actual speed setpoint is –75%, or 0.75 times the nominal speed in reverse direction. The valid range is –163,840% to 163,830. The value *0x7FFF* (+163,835%) will be handled as an invalid value. 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.

nviRstFault
This input network variable provides a fault reset. Setting value 1 for State and a non-zero value for Value will reset an active fault in Honeywell NX. Default value is 0; 0.

State	Value	Command
0	any	no action (0; 0)
1	0	no action (0; 1)
1	> 0	reset fault (200 ; 0)
-1 (0xFF)	any	invalid (no action)

Table 7.

nviClrCntr
This input network variable provides a mechanism to clear the kWh trip counter or the Drive total running hours trip counter.
1 MWh trip counter
2 Operation day trip counter

nviProcessIn1..8
These input network variables are sent directly to the application (see more detailed explanation in chapter 6.5 Process Data) The valid range is 0 to 65535 (-163,840 to 163,835).

nviDigitalIn1..8
These input network variables are sent directly to the application (see more detailed explanation in chapter 6.5 Process Data) Default value is 0; 0.

state	value	command
0	any	off (0; 0)
1	0	off (0; 1)
1	> 0	on (200; 1)
-1 (0xFF)	any	invalid (no action)

Table 8.

nviParCmd
This input network variable is used to read and write the parameters. The parameter addresses are determined in the application. Every parameter and actual value has been given an ID number in the application. The ID numbering of the parameter as well as the parameter ranges and steps can be found in the application manual in question. The parameter value must be given without decimals. Find the ID numbers of each parameter/actual value in the application manual. The ID numbers are grouped as follows:

Parameter ID	Group	Description
0	Not used	
1 … 98	**Actual Values**	
99	**Active Fault Code**	
100	Not Used	
101… 899	**Parameter**	
900 … 999	Reserved	Reserved for LonWorks C4 option board internal usage
1000	Not Used	
1001…1999	**Parameter**	

Table 9. Grouping of ID numbers

Examples

Data format in examples is:
- learn selector <byte(3) byte(2) byte(1) byte(0)> day hour minute second millisecond
x = meaningless.

Example1

Write to parameter number 102 (Max frequency "Basic Application par. ID102") value 4500 (45Hz).

Write command to nviParSet
- LN_LEARN_CURRENT 102 <x x 11 94> x x x x

If the write command is successful then nvoParOut value is
- LN_LEARN_CURRENT 102 <0 0 11 94> 0 0 0 0

If the write command fails then nvoParOut value is
- LN_NUL 102 <0 0 11 94> 0 0 0 0

Example2

Read parameter number 112 (Nominal speed of the motor "Basic Application par. ID112") default value 1440 (1440 rpm).
Read command to nviParSet

- LN_RECALL 112 <x x x x> x x x x

If the read command is successful then nvoParOut value is

- LN_RECALL 112 <0 0 5 A0> 0 0 0 0

If the read command fails then nvoParOut value is

- LN_ LN_NUL 112 <0 0 0 0> 0 0 0 0

6.3 Output Network Variables

Function	Variable Name	SNVT type	Min. Value	Max. Value
Node Object status	nvoStatus	SNVT_obj_status		
Drive speed feedback	nvoDrvSpeed	SNVT_lev_percent	-163.840%	+163.830%
Actual motor current	nvoDrvCurnt	SNVT_amp	0.0A	3276.7A
Actual drive power	nvoDrvPwr	SNVT_power_kilo	0,0 kW	6553,5 kW
Drive total running hours	nvoDrvRunHours	SNVT_time_hour	0 h	65535
Status word	nvoDrvStatus	SNVT_state	n/a	n/a
kWh trip counter	nvoDrvEnrgy	SNVT_elect_kwh	0kWh	65535kWh
Active fault code	nvoActFault	SNVT_count	0	41
Process Out	nvoProcessOut1..8	SNVT_ lev_percent	0	65535
Digital Out	nvoDigitalOut1..8	SNVT_switch	0	4
Parameter Out	nvoParResp	SNVT_preset	-	-

Table 10. Network output variables

NvoStatus
This output network variable reports the status for Node object or Variable Speed Motor Drive object.

Field	Description
object_id	ID of object within node
invalid_id	1 means requested ID is not implemented in this node
invalid_request	1 means request for unimplemented function
disabled	1 means object disabled
electrical_fault	1 means drive is faultefd
in_alarm	1 means drive is in alarm
report_mask	1 means status is an event mask

Table 11.

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

nvoDrvCurnt
This output network variable provides the drive output current in amperes.

nvoDrvPwr
This output network variable provides the drive output power in kW.

nvoDrvRunHours
This output network variable provides the drive resettable operation time counter for the motor in running hours. The maximum value for used SNVT is 65535 h. On the frequency converter the value can go much higher. If the counter exceeds the SNVT's maximum value, the network variable stays at its maximum. In such cases the real value can be seen on Honeywell NX's operating keypad.

nvoDrvStatus
This output network variable provides the drive status.

Bit	Description	
	Value = 0	**Value = 1**
0	Not Ready	Ready
1	FC stopped	Running
2	Clockwise	Counterclockwise
3	No fault	Fault active
4	No warning	Warning active
5	Reference ≠ Actual value	Reference = Actual value

Table 12. Status word bit descriptions

nvoDrvEnrgy
This output network variable provides the drive resettable energy consumption counter. The maximum value for used SNVT is 65535 kWh. On the frequency converter the value can go much higher. If the counter exceeds the SNVT's maximum value, the network variable stays at its maximum. In such cases the real value can be seen on Honeywell NX's operating keypad.

nvoActFault
This output network variable provides the drive active fault code. If the value is 0 the frequency converter has no fault. See the fault code list in NX Frequency Converter User's Manual for fault identification.

nvoProcessOut1..8
These output network variables are sent directly from the application (see more detailed explanation in chapter 6.5 Process Data) The valid range is 0 to 65535 (-163,840 to 163,835).

nvoDigitalOut1..8
These output network variables are sent directly from the application (see more detailed explanation in chapter 6.5 Process Data).

state	value	command
0	0	off (0; 0)
1	200 (0xC8)	on (200; 1)
-1 (0XfF)	any	invalid (NULL)

Table 13.

nvoParResp
explained in chapter **nviParSet.**

6.4 Network Configuration Variables

Function	Variable Name	SNVT type
Maximum motor speed	nciMaxSpeed	SCPTmaxSetpoint
Minimum motor speed	nciMinSpeed	SCPTminSetpoint
Receive heartbeat time	nciRcvHrtBt	SCPTmaxRcvTime
Send heartbeat time	nciSndHrtBt	SCPTmaxSndTime
Minimum output time	nciMinOutTime	SCPTminSndTime
Nominal motor speed in RPM	nciNmlSpeed	SCPTnomRPM
Nominal motor frequency	nciNmlFreq	SCPTnomFreq
Minimum ramp up time	nciRampUpTm	SCPTrampUpTm
Minimum ramp down time	nciRampDownTm	SCPTrampDownTm
Default value for nviDrvSpeedScale	nciDrvSpeedScale	SCPTdefScale

Table 14. Network configuration variables

nciMaxSpeed
This configuration property is used to define the maximum speed of a motor. The value is entered as a percentage of nominal speed in RPM, as defined by the Nominal Speed (nciNmlSpeed) configuration value. The value of the maximum speed must be validated against the value of the minimum speed as follows:

-163.840 ≤ minimum speed ≤ maximum speed ≤ 163.830

nciMinSpeed
This configuration property is used to define the minimum speed of the motor. The value is entered as a percentage 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 ≤ minimum speed ≤ maximum speed ≤ 163.830

nciRcvHrtBt
This configuration property is used to control the maximum time that elapses after the last update of the network variables nviDrvSpeedStpt or nviDrvSpeedScale before the VSD object starts to use the default values.

nciSndHrtBt
This configuration property defines the maximum period that expires before the network variables nvoDrvSpeed, nvoDrvCurnt and nvoDrvPwr are automatically updated.

nciMinOutTime
This configuration property defines the minimum period of automatic network variable tansmission.

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 speeds for the motor, based on the configuration properties nciMinSpeed, nciMaxSpeed (entered as a percentage of nominal speed).

nciNmlFreq
This configuration property is used to provide the nominal frequency for the motor.

nciRampUpTm
Defines the acceleration time for Honeywell NX. The valid range is 0.0 to 6,553.4 sec (0.1 sec).

nciRampDownTm
Defines the deceleration time for Honeywell NX. The valid range is 0.0 to 6,553.4 sec (0.1 sec).

nciDrvSpeedScale
This configuration property is used as the default value for *nviDrvSpeedScale*. This value will be adopted at power-up and in case no input variable within the specified Receive Heartbeat time is received.

6.5 Process Data

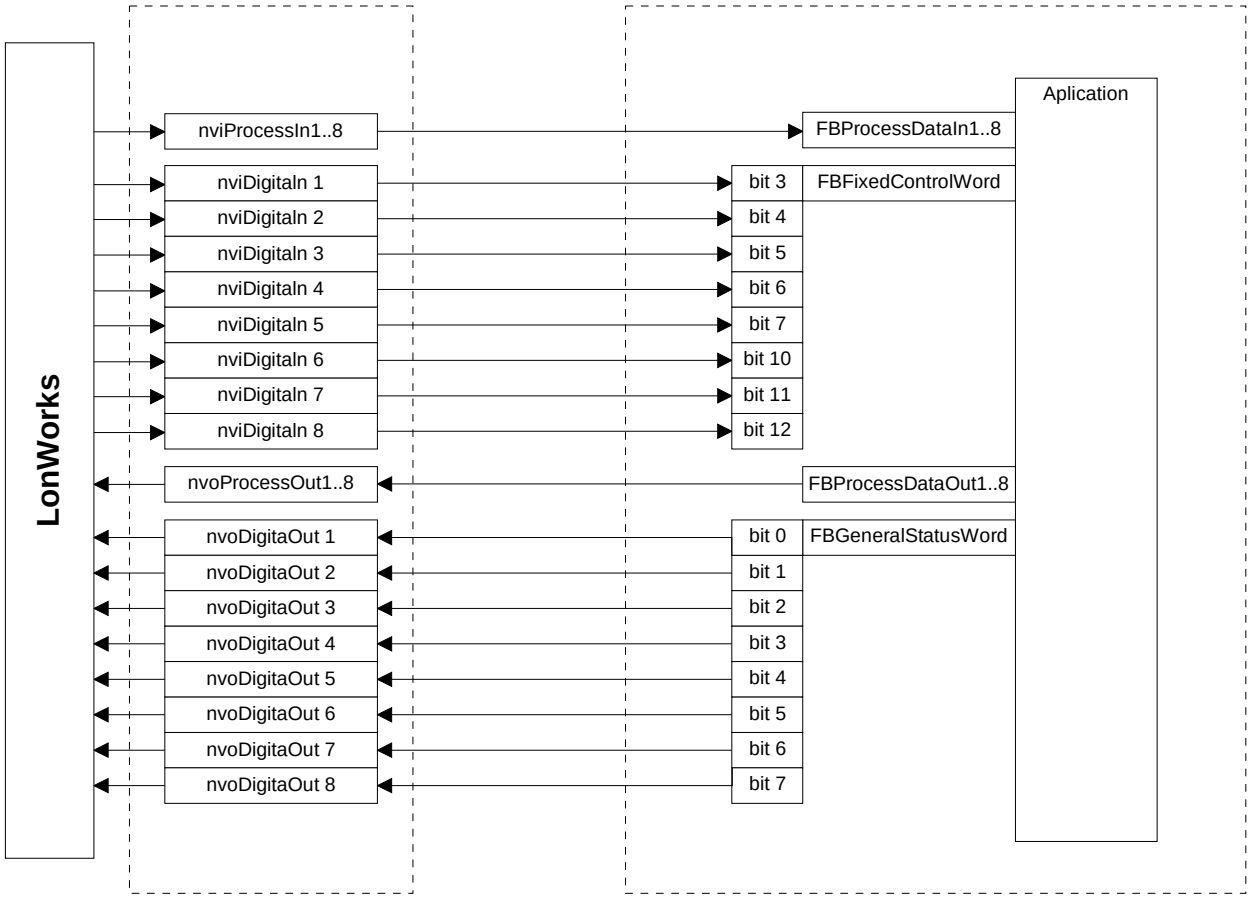


Figure 15. Control of frequency converter through LonWorks

7. Fault Tracking

The table below presents the faults related to the LonWorks C4 option board. For more information, see also NX User's Manual, Chapter 9.

The **LonWorks C4 option board status LEDs** are described in more detail in Chapter 3.4.

Fault code	Fault	Possible cause	Correcting measures
37	Device change	C4 Option board changed.	Reset
38	Device added	C4 Option board added.	Reset
39	Device removed	C4Option board removed.	Reset
40	Device unknown	Unknown option board.	
53	Fieldbus fault	The received heartbeat time has expired.	Check the installation. If installation is correct contact the nearest Honeywell distributor.
54	Slot fault	Defective C4 option board or slot	Check the C4 option board and slot. Contact the nearest Honeywell distributor.

Table 15. LonWorks C4 option board faults

You can define with parameters how the frequency converter shall react to certain faults:

Code	Parameter	Min	Max	Unit	Step	Default	ID	Note
P2.7.22	Response to fieldbus fault	0	3		1	0	733	**0**=No response **1**=Warning **2**=Fault,stop acc. to 2.4.7 **3**=Fault,stop by coasting
P2.7.23	Response to slot fault	0	3		1	0	734	**0**=No response **1**=Warning **2**=Fault,stop acc. to 2.4.7 **3**=Fault,stop by coasting

Table 16. Frequency converter responses to faults

8. Appendix 1

Process Data OUT

The nodes can read the frequency converter's actual values using process data variables. *Basic, Standard, Local/Remote, Multi-Step, PID control and Pump and fan control* applications use process data as follows:

Data	Value	Unit	Scale
Process data OUT 1	Output Frequency	Hz	0,01 Hz
Process data OUT 2	Motor Speed	rpm	1 rpm
Process data OUT 3	Motor Current	A	0,1 A
Process data OUT 4	Motor Torque	%	0,1 %
Process data OUT 5	Motor Power	%	0,1 %
Process data OUT 6	Motor Voltage	V	0,1 V
Process data OUT 7	DC link voltage	V	1 V
Process data OUT 8	Active Fault Code	-	-

The *Multipurpose Control Application* has a selector parameter for every Process Data. The monitoring values and drive parameters can be selected using the ID number (see NX All in One Application Manual, Tables for monitoring values and parameters). Default selections are as in the table above.

Process Data IN
Process Data is used with All-inOne applications as follows:

Basic, Standard, Local/Remote, Multi-Step applications

Data	Value	Unit	Step
PD1 – PD8	Not used	-	-

Multipurpose control application

Data	Value	Unit	Step
Process Data IN1	Torque Reference	%	0.1%
Process Data IN2	Free Analogue INPUT	%	0.01%
Process Data IN3	Adjust Input	%	0.01%
PD3 – PD8	Not Used	-	-

PID control and Pump and fan control applications

Data	Value	Unit	Step
Process Data IN1	Reference for PID controller	%	0.01%
Process Data IN2	Actual Value 1 to PID controller	%	0.01%
Process Data IN3	Actual Value 2 to PID controller	%	0.01%
PD4–PD8	Not Used	-	-

9. General Info

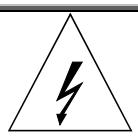
Instead of sending and receiving information to and from frequency converters through I/O, you can connect them to a fieldbus.

Honeywell NX frequency converters can be connected to the RS-485 bus using a fieldbus CJ option board. The converter can then be controlled, monitored and programmed from the host system.

BACnet is also known by names Direct Digital Control Systems and Building Management Systems. BACnet technology is used mostly in building automation, lightning control, air conditioning and in heating automation. The protocol is an upper level net protocol suitable for large building automation projects.

BACnet stands for **B**uilding **A**utomation and **C**ontrol **Net**work. BACnet is a true non-propriatery open protocol communication standard conceived by a consortium of building management, system users and manufacturers.

If you purchase your BACnet CJ option board separately, please note that it shall be installed in **slot E** on the control CJ option board of the frequency converter.

 **WARNING!**	**Internal components and circuit boards are at high potential when the frequency converter is connected to the power source. This voltage is extremely dangerous and may cause death or severe injury if you come into contact with it.**

10. BACnet CJ Option Board Technical data

Connections	Interface	**OPT-CJ**: Pluggable connector (5.08mm)
	Data transfer method	RS-485 MS/TP, half-duplex
	Transfer cable	Twisted pair (1 pair and shield)
	Electrical isolation	500 VDC
Communications	BACnet MS/TP	As described in ANSI/ASHRAE Standards 135-2004
	Baud rate	9600, 19200, 38400 and 76800 baud (supports autobaud detection)
	MAC Addresses	1 to 127
Environment	Ambient operating temperature	–10°C…55°C
	Storing temperature	–40°C…60°C
	Humidity	<95%, no condensation allowed
	Altitude	Max. 1000 m
	Vibration	0.5 G at 9…200 Hz
Safety		Fulfils EN50178 standard

Table 17. BACnet technical data

10.1 System Software versions

OPT-CJ BACnet option board is supported from system software versions:

- NXL NXL00005V149.VCN
- NXS NXS00001V161.VCN
- NXP NXP00002V160.VCN

Autobaud detection and BACnet specific fault codes (readable from panel) are added from system software versions:

- NXL NXL00005V248.VCN
- NXS NXS00001V163.VCN
- NXP NXP00002V162.VCN

Communication timeout is available from system SW versions. When not supported, the default is 10 seconds.

- NXL NXL00005V254.VCN
- NXS NXS00001V167.VCN
- NXP NXP00002V168.VCN

OPT-CJ software version **OPTCJ_10522V009** and **newer**:
New baud rate 76800 from software versions:

- NXL: NXL00005V257.VCN
- NXS: NXS00001V170.VCN
- NXP: NXP00002V171.VCN

11. Bacnet Fieldbus CJ Option Board Layout and Connections

Honeywell BACnet CJ option board is connected to the fieldbus through a 5-pin pluggable bus connector.
The communication with the control board of the frequency converter takes place through the standard Honeywell Interface CJ Option Board Connector.

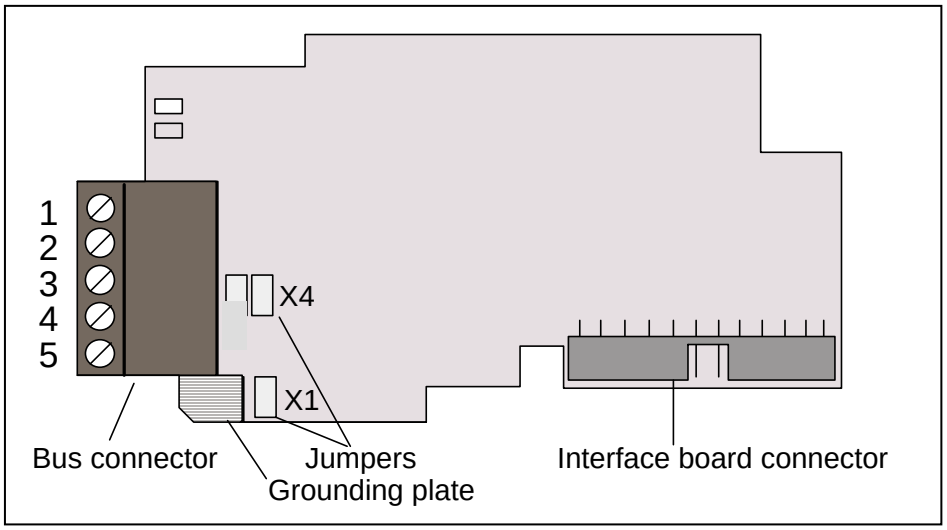


Figure 16. Honeywell BACnet CJ option board OPT

Signal	Connector	Description
NC*	1*	No connection
VP	2	Supply voltage – plus (5V)
RxD/TxD –N	3	Receive/Transmit data – A
RxD/TxD –P	4	Receive/Transmit data – B
DGND	5	Data ground (reference potential for VP)
*You can use this pin (1) to bypass the cable shield to the next slave		

Table 18. OPT-CJ bus connector signals

12. Grounding Cable Shield

12.1 Grounding by clamping the cable to the converter frame (recommended)

This manner of grounding is the most effective and especially recommended when the distances between the devices are relatively short or if the device is the last device on the net.

Note: Normally, the CJ option board has already been installed in slot D or slot E of the control CJ option board. It is not necessary to detach the whole CJ option board for the grounding of the bus cable shield. Just detach the terminal block.

1 Strip about 5 cm of the cable and cut off the grey cable shield.
Remember to do this for both bus cables (except for the last device). See pictures below.

2 Leave no more than 1 cm of the cable outside the terminal block and strip the data cables at about 0.5 cm to fit in the terminals. See pictures below.
Note: Do this for both bus cables.

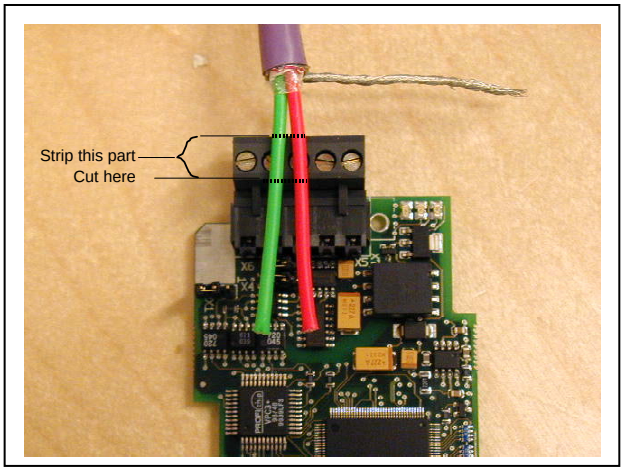
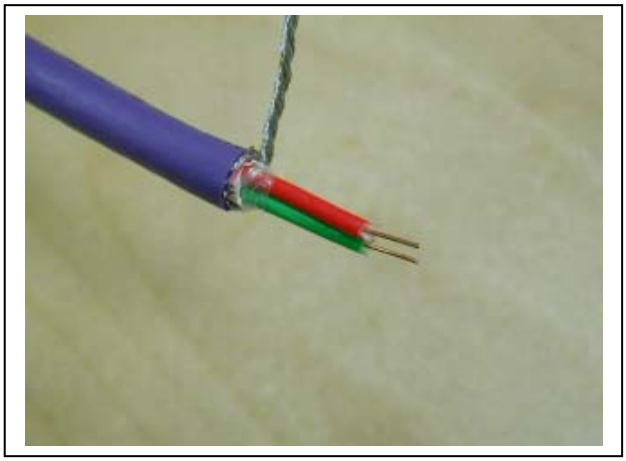


Figure 17.



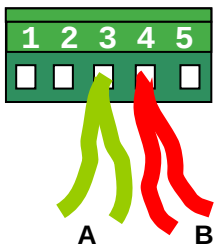


Figure 18.

3 Insert the data cables **of both cables** into terminals #3 (Line B) and #4 (Line A).

4 Strip the cable at such a distance from the terminal that you can fix it to the frame with the grounding clamp. See pictures below:

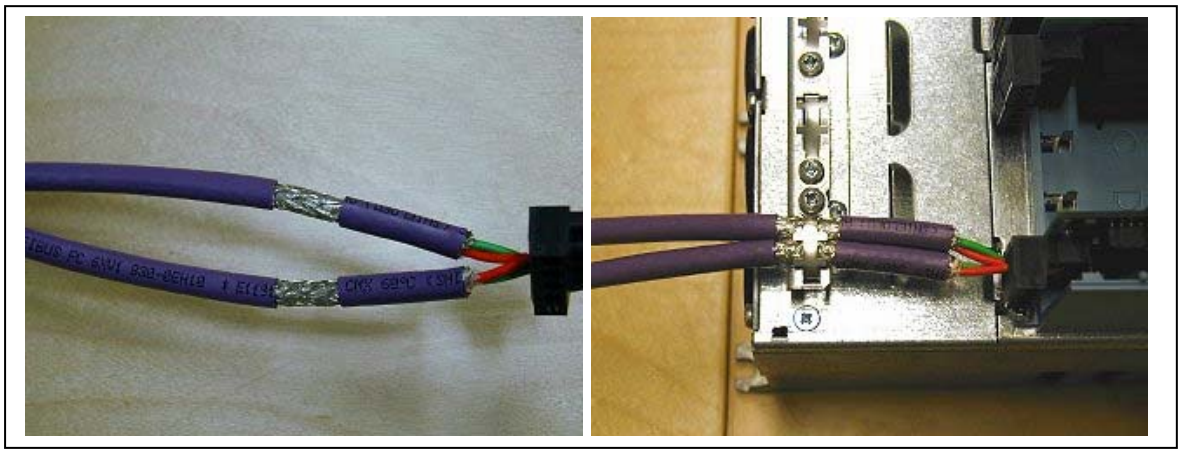


Figure 19.

12.2 Grounding only one point on the net

In this manner of grounding, the shield is connected to ground only at the last device on the net in the same way as described in chapter 12.1. Other devices of the net just pass the shield.
We recommend you to use an Abico connector to fit the shields into the terminal.

1. Strip about 5 cm of the cable and cut off the grey cable shield. Remember to do this for both bus cables (except for the last device).

2. Leave no more than 1 cm of the cable outside the terminal block and strip the data cable at about 0.5 cm to fit in the terminals. See Figure 20.

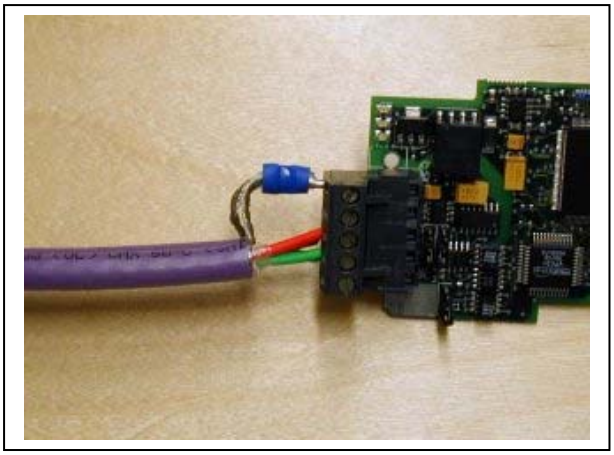


Figure 20.

Note! Do this for both cables.

3. Fix both the cables on the frame with the clamp. See Figure 21.

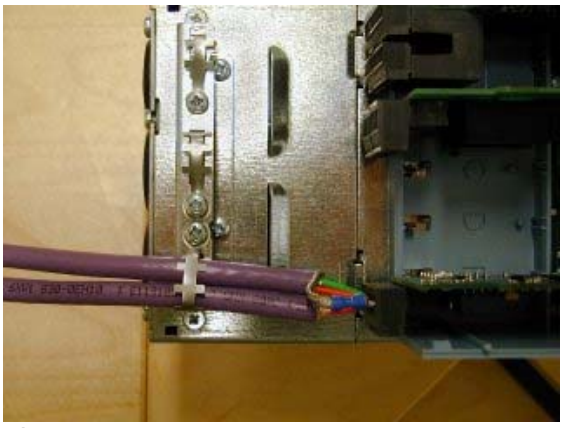


Figure 21.

12.3 Bus Terminal Resistors

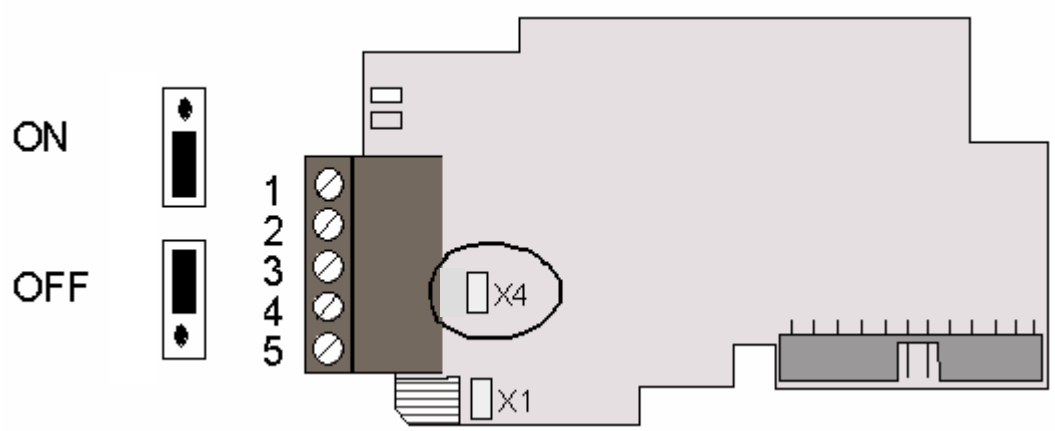


Figure 22. Using jumper X4 to set the bus termination

If Honeywell is the last device of the fieldbus line the bus termination must be set. Use jumper X4 (ON position). See Figure 22.

Note: Jumper X1 is only used when D9 type connector is assembled (Not used with BACnet protocol)

12.4 Bus Biasing

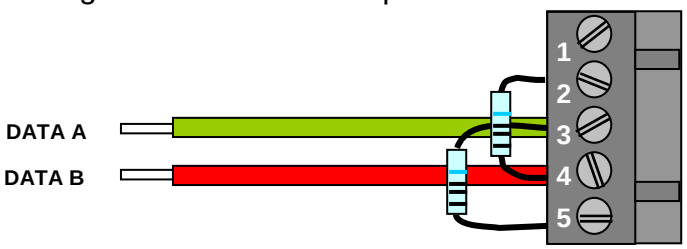
Bus biasing is required to ensure faultless communication between devices at RS-485 bus. Bus biasing makes sure that the bus state is at proper potential when no device is transmitting. Without biasing, faulty messages can be detected when the bus is in idle state. RS-485 bus state should be neather +0,200..+7V or –0,200..-7V. Illegal bus state is <200mV..-200mV.

Number of nodes	Bias resistance
2-5	1.8 kohm
5-10	2.7 kohm
11-20	12 kohm
21-30	18 kohm
31-40	27 kohm

Table 19. Bias resistor size vs number of node

***Fail safe* biasing in OPT-CJ option board**

Connect resistor biasing resistors between pins #2 and #4 as well as pins #3 and #5 as shown in picture.



Matters related to this are discussed in the application note *Failsafe Biasing of Differential Buses* (an-847.pdf) published by National Semiconductor (www.national.com).

13. Led Indications

The two LED indications next to the connector show the present statuses of the BACnet CJ option board (yellow) and the Fieldbus Module (green).

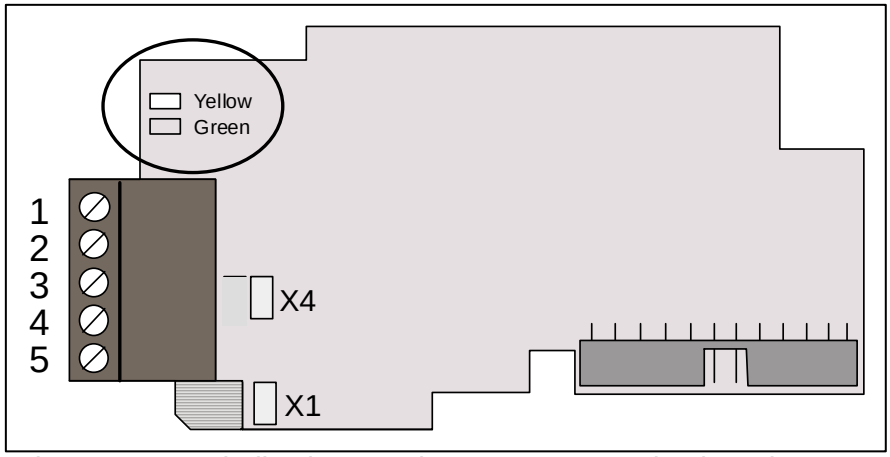


Figure 23. LED indications on the BACnet CJ option board

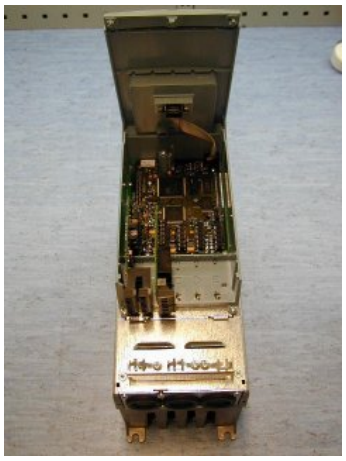
BACnet CJ option board status LED (BS) YELLOW

LED is:	Meaning:
OFF	CJ Option board not activated
ON	CJ Option board in initialisation state waiting for activation command from the frequency converter
Blinking fast (once/sec)	CJ Option board is activated and in RUN state • CJ Option board is ready for external communication
Blinking slow (once/5 secs)	CJ Option board is activated and in FAULT state • Internal fault of CJ option board

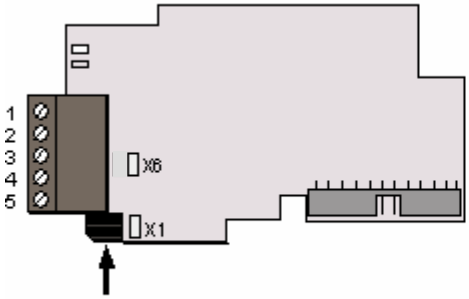
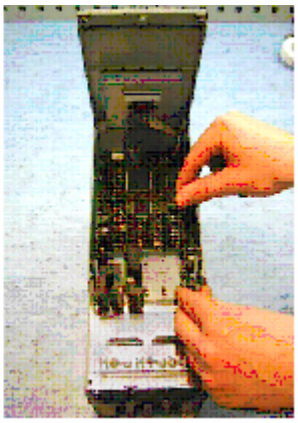
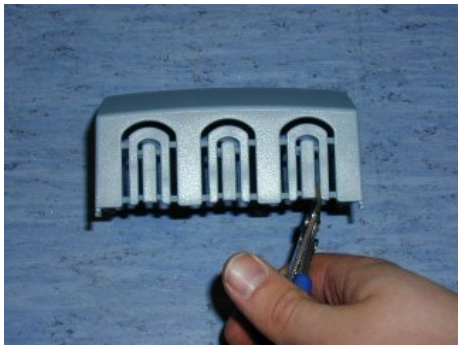
Fieldbus status LED (FS) GREEN

LED is:	Meaning:
OFF	Fieldbus module is waiting for parameters from the frequency converter • No external communication
ON	Fieldbus module is activated • Parameters received and module activated • Module is waiting for messages from the bus
Blinking fast (once/sec)	Module is activated and receiving messages from the bus
Blinking slow (once/5 secs)	Module is in FAULT state • No messages from Master within the watchdog time • Bus broken, cable loose or Master off line

14. Installation of Honeywell NX BACnet CJ Option Board

A	Honeywell NX frequency converter.	
B	Remove the cable cover.	
C	Open the cover of the control unit.	

Continues on next page

D	Install BACnet CJ option board in slot E on the control CJ option board of the frequency converter. Make sure that the grounding plate (see below) fits tightly in the clamp.  
E	Make a sufficiently wide opening for your cable by cutting the grid as wide as necessary. 
F	Close the cover of the control unit and the cable cover. 

15. Commissioning

READ FIRST CHAPTER 8 'COMMISSIONING' in the User manual of the drive type used (see page 4 for download instructions for manuals).

Note! You must select Fieldbus as the active control place, if you wish to control the frequency converter through fieldbus. See NX User's Manual, Chapter 7.3.3.1.

15.1 Fieldbus CJ Option Board Parameters

The Honeywell BACnet CJ option board is commissioned with the control keypad by giving values to appropriate parameters in menu **M7** (for locating the expander CJ option board menu see NX User's Manual, Chapter 7).

15.2 Expander CJ Option Board Menu (M7)

The *Expander CJ option board menu* makes it possible for the user 1) to see what expander CJ option boards are connected to the control CJ option board and 2) to reach and edit the parameters associated with the expander CJ option board.

Enter the following menu level **(G#)** with the *Menu button right*. At this level, you can browse through slots A to E with the *Browser buttons* to see what expander CJ option boards are connected. On the lowermost line of the display you also see the number of parameter groups associated with the CJ option board.

If you still press the *Menu button right* once you will reach the parameter group level where there are two groups: Editable parameters and Monitored values. A further press on the *Menu button right* takes you to either of these groups.

15.3 BACnet Parameters

To commission the RS-485 CJ option board, enter the level P7.5.1.# from the *Parameters* group (G7.5.1). Give desired values to all RS-485 parameters (see Figure 24 and Table 20).

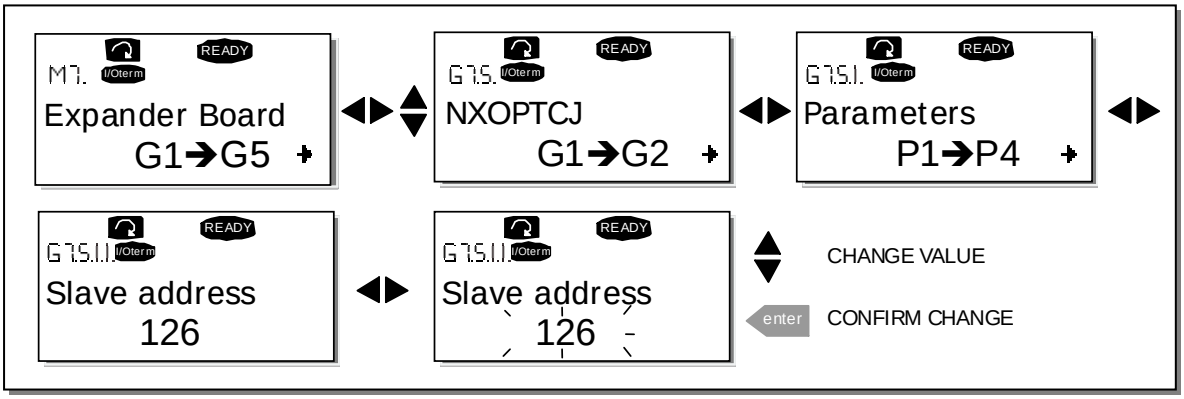


Figure 24. Changing the BACnet CJ option board commissioning parameter values

#	Name	Default	Range	Description
1	MAC ADDRESS	1	1…127	
2	BAUD RATE	1	0 - Auto 1 – 9600 baud 2 – 19200 baud 3 – 38400 baud 4 – 76800 baud	Communication speed
3	INDEX NR.	Counting number	0-65535	Instance Number. Zero means that unique default device object instance number is used.
4	Comm. time-out	10 s	0 = OFF 10 – 60 s	Communication time-out 0 = Not in use

Table 20. BACnet CJ option board parameters

15.3.1 Ms/Tp Mac Address (P7.X.1.1)

The parameters of every device must be set before connecting to the bus. Especially the parameters *MAC Address* and *Baud Rate* must be the same as in the master configuration.
The first parameter, MAC (Medium Access Control) address, must be unique on the network to which it is connected. The same MAC address may be used on a device on another network within the internetwork.
Addresses 128-254 are reserved for slaves. Addresses 1-127 are valid for both masters and slaves. The portion of the address space that is actually used for masters in a particular installation is determined by the value of the Max_Master property of the Device object.
It is recommended that MAC address 0 be reserved for use by the MS/TP router and 255 is reserved for broadcasts.

15.3.2 Baud Rate (P7.X.1.2)

Select the communication speed for the network. Default value is 9600 baud. 0 (– Auto) means that automatic baud rate detection is used. The used Baudrate is shown in monitor menu.

15.3.3 Instance Number (P7.X.1.3)

The Device Object's Instance number must be unique across the entire BACnet internetwork because it is used to uniquely identify the BACnet devices. It may be used to conveniently identify the BACnet device from other devices during installation.
If 0 (default) is selected, the Device Instance number is read from Drive. This unique number is then shown in Monitor menu. If any other value than zero is selected, the value is used as Device Object’s Instance number. The actual value is shown in monitor menu.

15.3.4 Communication Time-Out

BACnet CJ option board initiates a communication error if the communication is broken for as long as defined by the parameter Communication time-out. Communication time-out is disabled when the parameter is given the value 0. The step for setting the time-out time is 10 seconds.

15.3.5 Communication Status (V7.X.2.1)

To see the present status of the RS-485 fieldbus, enter the *Comm.Status* page from *Monitor menu* (G7.5.2). See Figure 25 and Table 21 below.

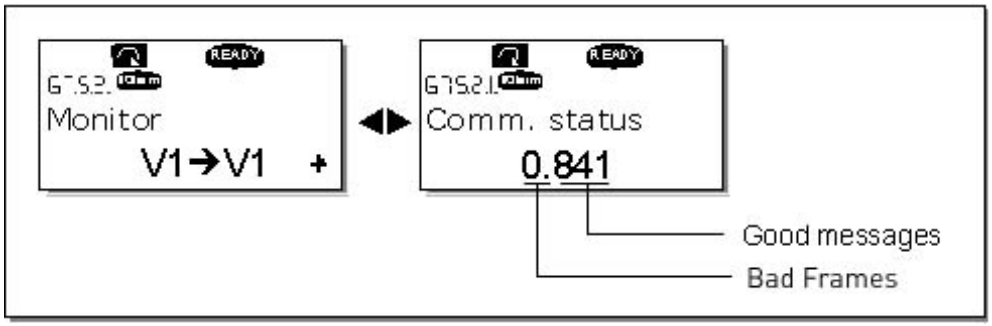


Figure 25. Communication status

Good messages	
0…999	Number of messages received without communication errors
Bad Frames	
0…64	Number of messages received with CRC or parity errors

Table 21. BACnet message indications

15.3.6 Baud Rate (V7.x.2.2)

Shows the actual baud rate.

15.3.7 Fault (V7.x.2.3)

Shows BACnet fault codes. See Table 24 from Chapter 16.

15.3.8 Index Nr. (V7.x.2.4)

Shows the Device Object's Instance number.

15.4 Annex - Protocol Implementation Conformance Statement (Normative)

(This annex is part of this Standard and is required for its use.)

BACnet Protocol Implementation Conformance Statement

Date: May 31, 2005
Vendor Name: Honeywell
Product Name: Honeywell Drive – xxx (xxx = MAC ID)
Product Model Number: OPTCJ
Applications Software Version: 10522 Firmware Revision: 1 BACnet Protocol Revision: 4

Product Description:

BACnet CJ Option board is designed for Honeywell NX family devices.

BACnet Standardized Device Profile (Annex L):

BACnet Application Specific Controller (B-ASC)

List all BACnet Interoperability Building Blocks Supported (Annex K): DS-RP-B, DS-WP-B, DM-DDB-B, DM-DOB-B.

Segmentation Capability:

☐ Segmented requests supported Window Size _____
☐ Segmented responses supported Window Size _____

Standard Object Types Supported:

An object type is supported if it may be present in the device. For each standard Object Type supported provide the following data:
1) Whether objects of this type are dynamically creatable using the CreateObject service
2) Whether objects of this type are dynamically deletable using the DeleteObject service
3) List of the optional properties supported
4) List of all properties that are writable where not otherwise required by this standard
5) List of proprietary properties and for each its property identifier, datatype, and meaning
6) List of any property range restrictions

Data Link Layer Options:

MS/TP master (Clause 9), baud rate(s): 9600, 19200, 34800, 76800 (supports autobaud detection)

Device Address Binding:

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.) ☐Yes ■ No

Networking Options:

☐ Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
☐ Annex H, BACnet Tunneling Router over IP
☐ BACnet/IP Broadcast Management Device (BBMD)

Does the BBMD support registrations by Foreign Devices? ☐ Yes ☐ No

Character Sets Supported:

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

■ ANSI X3.4 ☐ IBM™/Microsoft™ DBCS ☐ ISO 8859-1
☐ ISO 10646 (UCS-2) ☐ ISO 10646 (UCS-4) ☐ JIS C 6226

If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports.

15.5 Object Map

Object types and properties supported

Property	Object Type		
	Device	Binary Value	Analog Value
Object Identifier	X	X	X
Object Name	X	X	X
Object Type	X	X	X
System Status	X		
Vendor Name	X		
Vendor Identifier	X		
Model Name	X		
Firmware Revision	X		
Appl Software revision	X		
Protocol Version	X		
Protocol Revision	X		
Services Supported	X		
Object Types supported	X		
Object List	X		
Max APDU Length	X		
Segmentation Support	X		
APDU Timeout	X		
Number ADPU Retries	X		
Max Master	X		
Max Info Frames	X		
Device Address Binding	X		
Database Revision	X		
Preset Value		X	X
Status Flags		X	X
Event State		X	X
Out-of-Service		X	X
Units			X
Priority Array		X*)	X*)
Relinquish Default		X*)	X*)
Polarity			
Active Text		X	
Inactive Text		X	

Figure 26. Object types and properties supported

* Only with commandable values

15.5.1 Binary Value Object

Instance ID	Object Name	Description	Inactive / Active	Present Value Access Type
BV0	Ready State	Indicates whether the drive is ready or not	Not Ready / Ready	R
BV1	Run/Stop State	Indicates whether the drive is running or stopped	Stop / Run	R
BV2	Fwd/Rev State	Indicates the rotation direction of the motor	Fwd / Rev	R
BV3	Fault State	Indicates if a fault is active	OK / Fault	R
BV4	Warning State	Indicates if a warning is active	OK / Warning	R
BV5	At Setpoint	Ref. Frequency reached	False / True	R
BV6	At Zero Speed	Motor Running at zero speed	False / True	R
BV7	General 0	Application specific bit from drives General Status Word	0 / 1	R
BV8	General 1	Application specific bit from drives General Status Word	0 / 1	R
BV9	General 2	Application specific bit from drives General Status Word	0 / 1	R
BV10	General 3	Application specific bit from drives General Status Word	0 / 1	R
BV11	General 4	Application specific bit from drives General Status Word	0 / 1	R
BV12	General 5	Application specific bit from drives General Status Word	0 / 1	R
BV13	General 6	Application specific bit from drives General Status Word	0 / 1	R
BV14	General 7	Application specific bit from drives General Status Word	0 / 1	R
BV15	Run/Stop CMD	Command to start drive (FB control is active)	Stop / Run	C
BV16	Fwd/Rev CMD	Command to change rotational direction (FB control is active)	Fwd / Rev	C
BV17	Reset Fault	Command to reset Active Fault from dirve	0 / Reset	C
BV18	FBFixedControlWord Bit_3	Application Specific bit From the Fixed Control Word	0 / 1	C
BV19	FBFixedControlWord Bit_4	Application Specific bit From the Fixed Control Word	0 / 1	C
BV20	FBFixedControlWord Bit_5	Application Specific bit From the Fixed Control Word	0 / 1	C
BV21	FBFixedControlWord Bit_6	Application Specific bit From the Fixed Control Word	0 / 1	C
BV22	FBFixedControlWord Bit_7	Application Specific bit From the Fixed Control Word	0 / 1	C

Continues on next page

BV23	FBFixedControlWord Bit_8	Application Specific bit From the Fixed Control Word	0 / 1	C
BV24	FBFixedControlWord Bit_9	Application Specific bit From the Fixed Control Word	0 / 1	C
BV25	FBFixedControlWord Bit_10	Application Specific bit From the Fixed Control Word	0 / 1	C
BV26	FBFixedControlWord Bit_11	Application Specific bit From the Fixed Control Word	0 / 1	C
BV27	FBFixedControlWord Bit_12	Application Specific bit From the Fixed Control Word	0 / 1	C
BV28	FBFixedControlWord Bit_13	Application Specific bit From the Fixed Control Word	0 / 1	C
BV29	FBFixedControlWord Bit_14	Application Specific bit From the Fixed Control Word	0 / 1	C
BV30	FBFixedControlWord Bit_15	Application Specific bit From the Fixed Control Word	0 / 1	C

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays & relinquish defaults.

15.5.2 Analog Value Object

Instance ID	Object Name	Description	Units	Present Value Access Type
AV0	Frequency Setpoint	Frequency Setpoint	Hz	R
AV1	Output Frequency	Output Frequency	Hz	R
AV2	Motor Speed	Motor Speed	Rpm	R
AV3	Load (power)	Motor Shaft Power	Percent	R
AV4	Kilowatt Hours total	Megawatt Hour Counter (Total)	kWh	R
AV5	Motor Current	Motor Current	Amps	R
AV6	DC link Voltage	DC link Voltage	Volts	R
AV7	Motor Voltage	Motor Voltage	Volts	R
AV8	Unit Temperature	Heatsink Temperature **NOT IN NXL -series**	° C	R
AV9	Motor Torque	In % of motor nominal Torque	Percent	R
AV10	Operating Days	Operating Days (resettable)	Day	R
AV11	Operating Hours	Operating Hours (resettable)	Hour	R
AV12	Kilowatt Hours	Kilowatt Hours (resettable)	kWh	R
AV13	Torque Reference	Torque Reference **NOT IN NXL -series**	Percent	R
AV14	Temperature Rise	Calculated motor temperature 100,0% = nominal temperature of motor **NOT IN NXL -series**	Percent	R
AV15	FBProcessDataOut1	Application specific	-32768.0 to +32767.0 resolution 1.0	R
AV16	FBProcessDataOut2	Application specific	-32768.0 to +32767.0 resolution 1.0	R
AV17	FBProcessDataOut3	Application specific	-32768.0 to +32767.0 resolution 1.0	R
AV18	FBProcessDataOut4	Application specific	-32768.0 to +32767.0 resolution 1.0	R
AV19	FBProcessDataOut5	Application specific	-32768.0 to +32767.0 resolution 1.0	R
AV20	FBProcessDataOut6	Application specific	-32768.0 to +32767.0 resolution 1.0	R
AV21	FBProcessDataOut7	Application specific	-32768.0 to +32767.0 resolution 1.0	R
AV22	FBProcessDataOut8	Application specific	-32768.0 to +32767.0 resolution 1.0	R
AV23	Active Fault Code	Active Fault Code	-	R
AV24	Speed Reference	Speed Reference, percentage of nominal speed	Percent	C
AV25	Current Limit	Current Limit	Amps	W
AV26	Min Frequency	Minimum Frequency	Hz	W

Continues on next page

AV27	Maximum Frequency	Maximum Frequency	Hz	W
AV28	Accel Time	Acceleration Time	seconds	W
AV29	Decel Time	Deceleration Time	seconds	W
AV30	FBProcessDataIN 1	Application specific	-32768.0 to +32767.0 resolution 1.0	C
AV31	FBProcessDataIN 2	Application specific	-32768.0 to +32767.0 resolution 1.0	C
AV32	FBProcessDataIN 3	Application specific	-32768.0 to +32767.0 resolution 1.0	C
AV33	FBProcessDataIN 4	Application specific	-32768.0 to +32767.0 resolution 1.0	C
AV34	AnyParam ID	ID number that is used in AV35	0.0 to 65535.0 resolution 1.0	W
AV35	AnyParam Value	Value of ID defined by AV34	-32768.0 to +32767.0 resolution	W
AV36	FBFixedControlWord PDI 0	1) (see next page)		C
AV37	FBGeneralControlWord PDI 1	2) (see next page)		C
AV38	FBFixedStatusWord PDO 0	3) (see next page)		R
AV39	FBGeneralStatusWord PDO 1	4) (see next page)		R

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays & relinquish defaults.

Note: These Analog Value objects are introduced in BACnet SW version: OPTCJ_10522V009.vcn

1) FBFixedControlWord PDI 0, bit encoding (All-in-One Applications)

B0=RUN; 0=Stop, 1=Run
B1=DIRECTION; 0=Fwd, 1=Rev
B2=FaultRST; Reset on rising edge
B3-15 Application Specific

2) FBGeneralControlWord PDI 1, bit encoding

Application Specific

3) FBFixedStatusWord (MCStatus) PDO 0, bit encoding

B0=Ready; 0=not ready, 1=ready
B1=Run; 0=stopped, 1=running
B2=Direction; 0=clockwise, 1=counterclockwise
B3=Fault; 1=the FC is faulted and stopped (?)
B4=Warning; 1=warning
B5=AtReference; 1=at reference speed
B6=ZeroSpeed; 1=at zero speed
B7=FluxReady; 1=flux ready
B8=TCSpeedLimitActive;
B9=DetectedEncoderDirection;
B10=UVFastStop;
B11=DC brake status 1=DC brake active
B12-15 Firmware Specific

* Not all the bits are supported in every application

4) FBGeneralStatusWord PDO 1, bit encoding

   Application Specific

16. Fault Tracking

The table below presents the faults related to the BACnet CJ option board. For more information, see also NX User's Manual, Chapter 9.
The **BACnet CJ option board status LEDs** have been described in more detail in Chapter 13.

Fault code	Fault	Possible cause	Correcting measures
37	Device change	CJ Option board changed.	Reset
38	Device added	CJ Option board added.	Reset
39	Device removed	CJ Option board removed.	Reset
40	Device unknown	Unknown option board.	
53	Fieldbus fault	-The CJ option board has lost all contact with other devices on the network. - Duplicate MAC ID (Bad Frames in "Comm. status" is incremented every time a frame is received from a device with the same MAC id on the same segment.)	Check the installation. If installation is correct contact the nearest Honeywell distributor. Check that MAC ID is unique.
54	Slot fault	Defective CJ option board or slot.	Check the CJ option board and slot. Contact the nearest Honeywell distributor.

Table 22. RS-485 CJ option board faults

You can define with parameters how the frequency converter shall react to certain faults:

Code	Parameter	Min	Max	Unit	Step	Default	ID	Note
P2.7.22	Response to fieldbus fault	0	3		1	0	733	**0**=No response **1**=Warning **2**=Fault,stop acc. to 2.4.7 **3**=Fault,stop by coasting
P2.7.23	Response to slot fault	0	3		1	0	734	**0**=No response **1**=Warning **2**=Fault,stop acc. to 2.4.7 **3**=Fault,stop by coasting

Table 23. Frequency converter responses to faults

These BACnet Specific fault codes can be read from panel V7.x.2.3 (x is the used, D=4, E=5).

Fault code	Fault	Possible cause	Correcting measures
0	None		
1	Sole Master	Only device on the network	Add devices
2	Duplicate MAC ID	Some other device has the same MAC ID	Check MAC Addresses
3	Baudrate fault	Option card notices traffic, but can't lock to the selected baudrate.	Check Baudrate

Table 24. BACnet specific faults

The MSTP- and BACnet-stack on the CJ option board uses files from BACnetSim, a GPL'd project on SourceForge. The licence for BACnetSim is GPL with a special exception that allows linking without requiring the rest of the code to be GPL'd. The source code for the GPL'd parts can be downloaded from SourceForge.

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