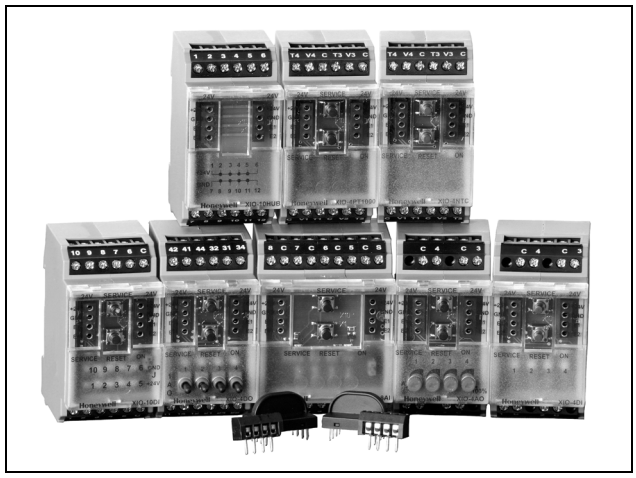
Honeywell

Compact I/O Modules

XIO-10DI, XIO-4DI, XIO-4NTC, XIO-4PT1000, XIO-8AI, XIO-4DO, XIO-4AO, XIO-10HUB

PRODUCT DATA



FEATURES

- **LONMARK compliant.**
- **LON FTT10 interface.**
- **Compact design.**
- **Easy end-to-end installation with connectors.**
- **Especially suited for remote installation with Excel 5000 systems.**
- **Service LED and operating LED.**
- **Position indication via LEDs.**
- **Status LEDs for digital inputs.**
- **Output modules with manual switches for local override.**
- **Infinitely variable overriding of analog outputs with manual feedback.**
- **Feedback of manual position.**

GENERAL

The Honeywell LON® Compact I/O modules are LONMARK® compliant analog and digital input/output modules designed for decentralized, space-saving installation in control cabinets and distributor boxes. Due to their small size, the modules are perfectly suited for mounting in remote locations.

The input modules scan signals and states of conventional sensors and contacts and send the acquired values via network variables to other LONMARK modules. The output modules convert commands from the LON network into analog or digital control commands.

The modules are especially suited for decentralized mounting in combination with the Excel 5000 system.

Each module has its own LON interface for autonomous operation. Terminal connectors are available for time-saving module connections in end-to-end installation.

Additional modules are available for connecting the LON network and the power supply, as well as for additional terminals.

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74-4043

AVAILABLE MODULES

The following module types are available:

Module	Description
XIO-10DI	Input module with 10 inputs (potential-free or with 24 V) for acquiring messages and measured values.
XIO-4DI	Input module with 4 inputs for acquiring messages and measured values with potential-free contacts.
XIO-4NTC	Input module with 8 analog inputs, 4 temperature and 4 voltage, suitable to collect temperature data with NTC 20K sensors and voltages.
XIO-4PT1000	Input module with 8 analog inputs, 4 temperature and 4 voltage, suitable to collect temperature with PT 1000 sensors and voltages.
XIO-8AI	Universal analog input module for 8 resistance sensors or active sensors.
XIO-4DO	Digital output module with 4 relays.
XIO-4AO	Analog output module with 4 configurable outputs in the 0 to 10 V range.
XIO-10HUB	Terminal module.

The compact input/output modules are equipped with screw terminals for the field connections. The connection to the LON network and to the 24 V power supply is realized with plug connectors on top of the modules.

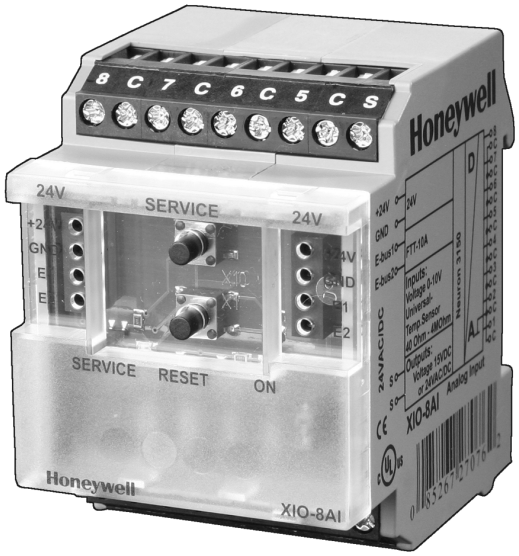
Individual devices can be connected with the included connector, using four screw terminals. This type of connection is only suitable for small conductor cross-sections (e.g., telephone cable).

A connection module of the same design is available for end-to-end connection of several modules. The connection module features screw terminals for the LON network and 24 V power supply connections. The connections between the modules themselves (power supply and LON) are realized with the included plug connectors. The maximum load applied to the cross-connections realized by plug connectors is 2.5 A. Therefore, the number of modules that can be connected end-to-end is limited to 15.

If additional terminals are needed, e.g., more ground or 24 V terminals for the power supply of external sensors and actuators, additional terminal strips may be used. These will provide the internal voltage of 24 V or internally bridged potential-free terminals.

MODULE DESCRIPTION

Analog Input Module XIO-8AI



The XIO-8AI Analog Input Module has 8 inputs, which can be wired to passive resistance sensors or active sensors (voltage inputs) as needed. For active sensors, the permissible input D.C. voltage is 0 to 10 V. Resistance sensors can work in a range of 40 Ohm to 4 Megohm. The setting of the ranges and input of the sensor characteristic curves with 10 support points for linearization is performed with an LNS® plug-in.

The sensors have screw connectors to the module. Two additional terminals with 15 VDC or 24 VAC are available for the power supply of active sensors. The voltage is set with a plug-in bridge. Additional terminals may be provided by terminal modules.

For each input, the measured values are made available in different formats (resistance, voltage, temperature, percent) by multiple network variables (See Software Description).

Connection of XIO-8AI

Passive sensors are connected to the “1-8” and “C” terminals, respectively; for example 1 and C. For active sensors, the polarity should be observed. Furthermore, it should be noted that the “C” terminals are the internal ground and connected to each other.

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Honeywell Automation and Control Products Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care
   1885 Douglas Drive North
   Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9.
International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

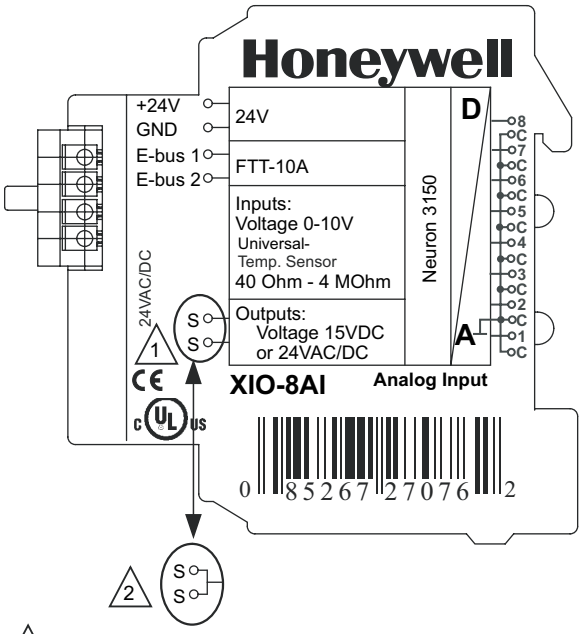


Fig. 1. XIO-8AI Pin Assignment.

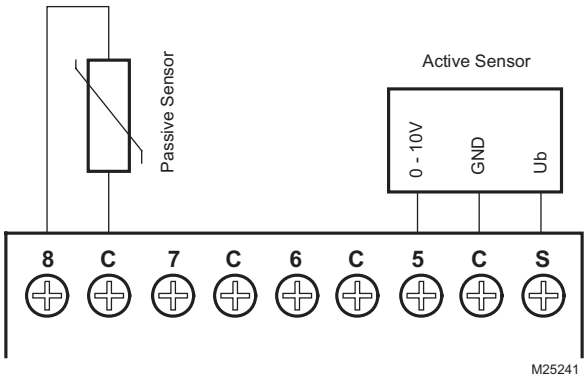


Fig. 2. XIO-8AI Connection Example.

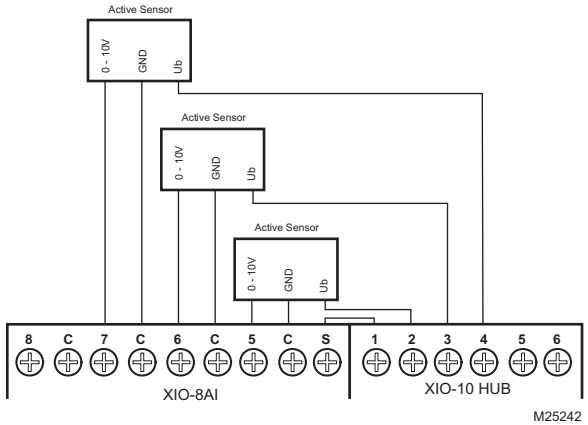


Fig. 3. XIO-8AI With XIO-10HUB Connection Example.

XIO-8AI Specifications

Electrical Ratings:
Supply Operating Voltage: 20 to 28 V AC/DC.
Current Consumption: 57 mA (AC) / 30 mA (DC).
Duty cycle: 100%.
Recovery time: 550 ms.

Terminal Blocks:
Supply and Bus: 16 AWG (1.5 mm^2).
(Terminal block and strapping plug included in packing).
Analog Inputs: 14 AWG (2.5 mm^2).

Display:
Operation: green LED.
Function: yellow LED for status (service).

LON Interface:
Transceiver: FTT10A free topology.
Neuron: 3150, 64k Flash.
Data format: standard network variables (SNVT).
Transmission rate: 78 kBit/s.
Maximum Length:
line topology 8858 ft. (2700 m) / 64 nodes.
free topology 1640 ft. (500 m) / 64 nodes.
Cabling: twisted pair.

Temperature Ratings:
Operating: 23° F to 131° F (-5° C to +55° C).
Storage: -4° F to +158° F (-20° C to +70° C).

Dimensions (W x H x D):
2.0 x 2.7 x 2.6 in. (30 x 68 x 65 mm).

Weight: 4.4 ounces (125d g).

Mounting Position: Any.

Mounting: DIN rail per EN 50022.

Input:
Temperature Range: selectable.

NOTE: Temperature input for all sensors is in the range of 40 Ω up to 4 MΩ.

Resolution: 0.2 K.
Error: approximately ± 0.4° F (±0.2° C).
Voltage input: 0 to 10 V DC.
Resolution: 10 mV (0.0 to 100%).
Error: approximately ±100 mV.

Construction Material:
Housing and Terminal Blocks: Polyamide 6.6 V0.
Faceplate: Polycarbonate.

Protective Circuitry:
Operating Voltage: polarity reversal protection.

Protection:
IP40 housing DIN 40050.
IP20 terminal blocks DIN 40050.

Approvals:
UL 916, Standard for Energy Management Equipment.
European Community Mark (CE) Listed.

XIO-8AI Software Description

The network variables for providing the measured values and the configuration variables are grouped into different objects.

The configuration variables are set with an LNS plug-in.

The module contains a node object and, for each measured value input, an “Open Loop Sensor” type object.

XIO-8AI Node Object

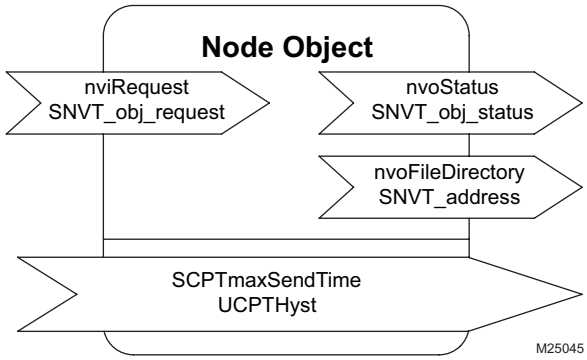


Fig. 4. XIO-8AI Node Objects.

The node object monitors and controls the functions of the different objects in the device. The basic functions ‘Object Status’ and ‘Object Request’ required by LONMARK are supported.

Furthermore, the node object contains variables for setting the transmission behavior.

SCPTmaxSendTime **SNVT_time_sec**
All output variables described below will be issued, at the latest, at the end of the preset period even without status change.
Time settings: 0 (timer function off-state) to 6553.8 s (factory setting 60 s)

UCPTHyst **SNVT_temp_p**
Setting of the hysteresis; the output variables nvoHigh and nvoLow switch over when the hysteresis is expired (factory setting 2 Kelvin).

Objects for measured values

For each input, there is a LONMARK object available with the variables described below.

nvoTemp_1...8 **SNVT_temp**
Depending on the input signal of 0...10 V and the settings UCPTTempHigh and UCPTTempLow, and/or the resistance of the set temperature sensor, the output variable provides a value expressed as ° C, with one digit after the comma.

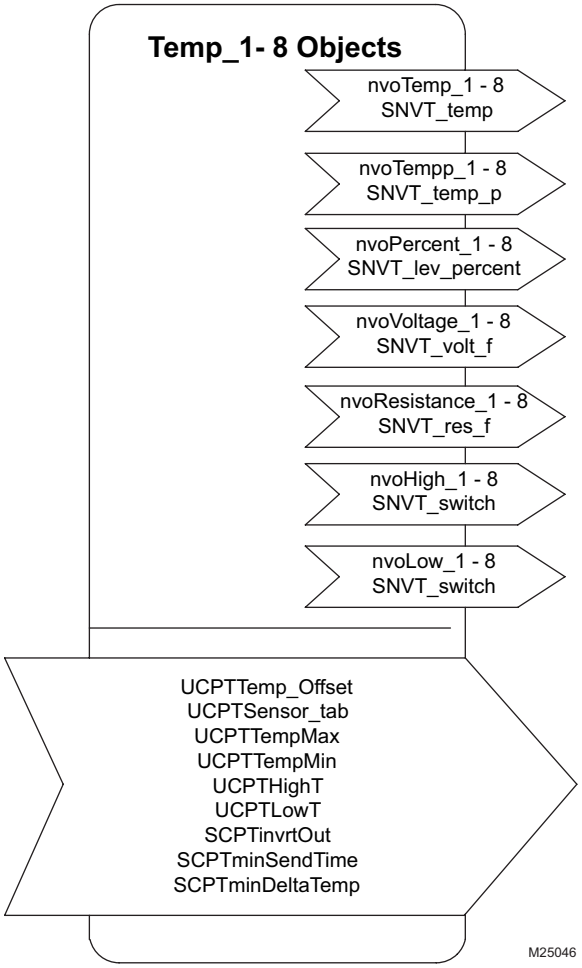


Fig. 5. XIO-8AI Temp Objects.

nvoTemp_1...8 **SNVT_temp**
The output variable supplies a value with format ° C depending on the input signal of 0 to 10.0 V and the settings in UCPTTempHigh and UCPTTempLow and/or the resistance of the selected temperature sensor.

nvoTemp_1...8 **SNVT_temp_p**
See Temp_1...8 but with 0.01° C format.

nvoPercent_1...8 **SNVT_lev_percent**
The output variable supplies a value with format 0 to 100.0% for voltage measurements depending on the input signal of 0 to 10.0 Volt.

nvoVoltage_1...8 **SNVT_volt_f**
The output variable supplies a value with format 0 to 10.0 Volt for voltage measurements depending on the input voltage.

nvoResistance_1...8 **SNVT_res_f**
The output variable supplies a value with format Ohm depending on the input signal of 40 Ohm to 4 MOhm.

nvoHigh_1...8 **SNVT_switch**
When exceeding the temperature set in UCPTHighT the output variable changes from 0,0 0 to 100,0 1. When under-running the temperature set in UCPTHighT plus the hysteresis set in UCPTHyst the output variable changes from 100,01 to 0,0 0.

nvoLow_1...8 **SNVT_switch**
When under-running the temperature set in UCPTLowT the output variable changes from 0,0 0 to 100,0 1. When exceeding the temperature set in UCPTLowT plus the hysteresis in UCPTHyst the output variable changes from 100,0 1 to 0,0 0.

UCPTTemp_Offset **SNVT_temp**
The respective measurand can be readjusted in steps of 0.1 K.

UCPTSensor_tab
Contains a table for defining the input characteristics for the measurements. The first 10 values are the temperatures for the working range of the sensor in ascending order. The next 10 values are the corresponding resistance values. Then follows a 30-digit placeholder for the sensor designation and after that, switch ST_ON for resistance measurement and ST_OFF for voltage measurement.

Factory setting: NTC20k in range -22° F to 266° F (-30° C to 130° C).

UCPTTempMax **SNVT_temp Werk:** + 302° F (+150° C)
UCPTTempMin **SNVT_temp Werk:** - 58° F (-50° C)
The temperature output variables are calculated during voltage measurements according to a 0 to 10 Volt input signal and the selected range.

UCPTHighT **SNVT_temp Werk:** +212° F (+100° C)
UCPTLowT **SNVT_temp Werk:** -14° F (-10° C)
Setting of the thresholds nvoHigh and nviLow to make the switch variables switch over.

SCPTinvrtOut **SNVT_lev_disc**
Inverting the values at nvoHigh or nvoLow.

Configuration

Preferably, the settings are set with an LNS plug-in. The plug-in is divided into several tabs.

The general settings (MaxSendTime, hysteresis) are set under the “Information” tab.

The basic settings for the inputs are set under tabs “Channel1” to “Channel8”. This includes the sending behavior (MinSendTime, MinDeltaTemp), measured value correction, possibly the range, as well as limit values. The current measured values can be read in online operation.

The sensor characteristic lines can be edited and assigned to inputs under tabs “SensorTab 1” to “SensorTab 8.” Preset characteristic curves for common sensor types can be imported from a standard directory with the “Read File” button. Likewise, user defined characteristic curves that were created can be saved there or in a different location.

Analog Input Module XIO-4NTC

The XIO-4NTC LON Analog Input Module is a LON module with 8 analog inputs, 4 temperature and 4 voltage, suitable to collect temperature data with NTC 20K sensors and voltage values. In a LON installation, all 8 inputs can be scanned simultaneously by standard network variables, SNVT.

Connection of XIO-4NTC

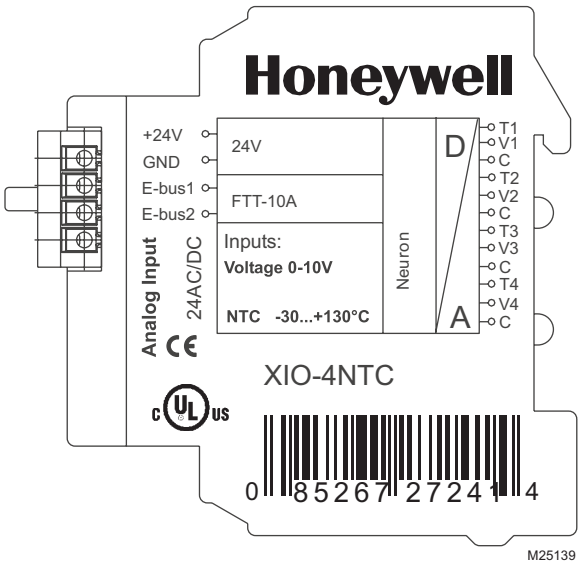


Fig. 6. XIO-4NTC Pin Assignment.

XIO-4NTC Specifications

Electrical Ratings:
Supply Operating Voltage: 20 to 28 V AC/DC.
Current Consumption: 67 mA (AC) / 24 mA (DC).

Duty cycle: 100%.
Recovery time: 550 ms.

Terminal Blocks:
Supply and Bus: 16 AWG (1.5 mm²).
(terminal block and jumper plug included with packing unit).
Analog Inputs: 14 AWG (2.5 mm²).

Display:
Operation: green LED.
Function: yellow LED for status (service).

LON Interface:
Transceiver: FTT10A free topology.
Neuron: 3120, 3K EEPROM.
Data format: standard network variables (SNVT).
Transmission rate: 78 kBit/s.
Maximum Length:
Line topology: 8858 ft. (2700 m) / 64 nodes.
Free topology: 1640 ft. (500 m) / 64 nodes.
Cabling: Twisted Pair.

Temperature Ratings:
Operating: 23° F to 131° F (-5 °C to +55 °C).
Storage: -4° F to +158° F (-20 °C to +70 °C).

Humidity Range:
5 to 85% RH, non-condensing, in accordance with EN 60721-3-3 climatic class 3k3.

Dimensions (W x H x D):
1.4 x 2.8 x 2.6 in. (35 x 70 x 65 mm).

Weight: 3.0 ounces (84 grams).

Mounting Position: Any.

Mounting: DIN rail per EN 50022.

Input:
Temperature input for NTC 20K sensor:
-22° F to +266° F (-30° C to +130° C).
Resistive sensor resolution: 0.2 kΩ.
Resistive temperature error: ±0.4° F (±0.2° C) between 32° F and 212° F (0° C and 100° C).
Voltage input: 0 to 10 V DC.
Maximum: 11 V DC.
Voltage sensor resolution: 10 mV (0.0 to 100%).
Voltage temperature error: about ±100 mV.
Input impedance 10 kΩ.

Construction Material:
Housing and Terminal Blocks: Polyamide 6.6 V0.
Faceplate: Polycarbonate.

Protective circuitry:
Operating voltage: polarity reversal protection.

Protection:
IP40 housing DIN 40050.
IP20 terminal blocks DIN 40050.

XIO-4NTC Software Description

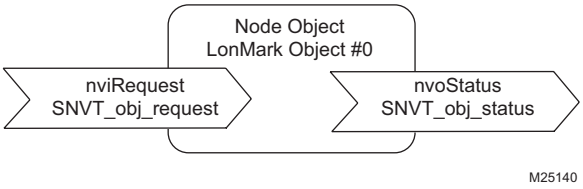
The network variables for providing the measured values and the configuration variables are grouped into different objects.

The configuration variables are set with an LNS plug-in.

The module contains a node object and, for each measured value input, an application object for temperature and voltage inputs.

Node Objects

The Node Object monitors and controls the functions of the different objects in the device. It supports the basic functions Object-Status and Object-Request required by LONMARK.



Application Objects

The application objects contain the functions status record of the analog inputs and data exchange. There are two types of Application Objects used by the XIO-4NTC: Temperature and Voltage.

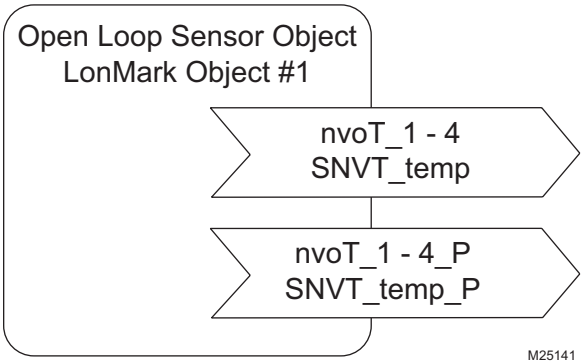


Fig. 7. XIO-4NTC Temperature Object.

nvoT[1..4] (index 2..5)
SNVT type **SNVT_temp**
NTC 20K temperature values between -22° F (-30.0° C) and 266° F (+130.0° C) are measured at the inputs and issued to the LON bus.

nvoT[1..4]P (index 6..9)
SNVT type **SNVT_temp_p**
See nvoT[1...4] but with 0.01K issue.

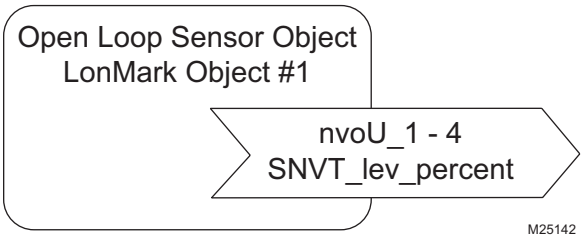


Fig. 8. XIO-4NTC Voltage Object.

nvoU[1..4] (index 10..13)
SNVT type **SNVT_lev_percent**
Voltages between 0 and 10.0 volts DC are measured at the inputs and issued to the LON bus.

Configuration Variables

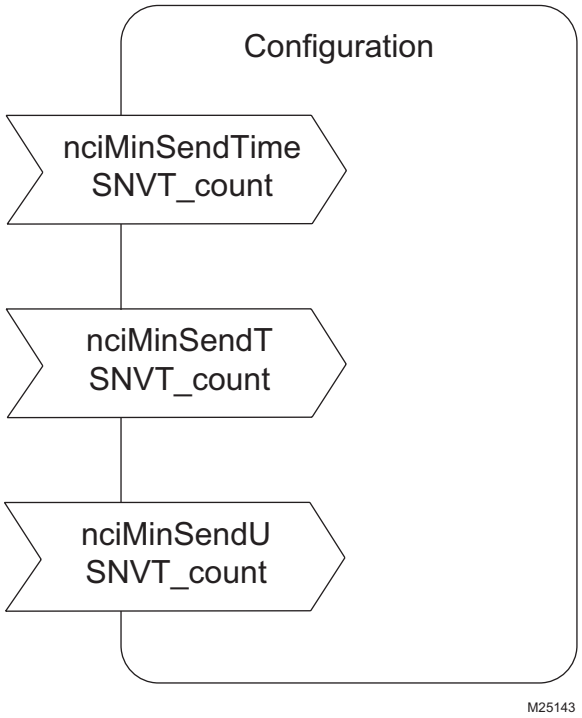


Fig. 9. XIO-4NTC Configuration Variables.

nciMinSendTime (index 14)
SNVT type **SNVT_count**
All output variables described above are issued even without status change at the end of a preset period of time. Thus the device reports periodically to the system.
Time settings: 0 timer turned off.
1 .. 60 timer time in seconds (factory setting 0).

nciMinSendT (index 15)
SNVT type **SNVT_count**
Guaranteed interval between two temperature values.
Time settings: 0 timer turned off.
1 .. 60 timer time in seconds (factory setting 0).

nciMinSendU (index 16)
SNVT type **SNVT_count**
Guaranteed interval between two voltage values.
Time settings: 0 timer turned off.
1.. 60 timer time in seconds (factory setting 0).

Balancing variables

NOTE: The variables AD[0..7], m[0..7] and t[0..7] are designed to balance the inputs.

AD[0..7] (Index 17 .. 24)
SNVT type **SNVT_count**
Raw data of the analog to digital converter.
AD[0..3] for temperature inputs.
AD[4..7] for voltage inputs.

m[0..7] (Index 25 .. 32)
SNVT type **SNVT_count_f**
Coefficient for the linearization of the temperature.
m[0..3] for temperature inputs.
m[4..7] for voltage inputs (is not used).

t[0..7] (Index 33 .. 40)
SNVT type **SNVT_count_inc**
Offset for the analogue to digital value.
t[0..3] for temperature inputs.
t[4..7] for voltage inputs.

The balance values are calculated by the factory as shown below:

Temperature inputs
A resistance of 820 Ω ±1% is applied to each temperature input.
AD[0] Index 17 is fed as measuring value A.
A resistance of 300 k Ω ±1% is applied to each temperature input.
AD[0] Index 17 is fed as measuring value B.
The calculation 3619/(value B - value A) is written in m[0] Index 25.
The calculation 371 - (value A * m[0]) is written in t[0] Index 33.
The same applies for temperature inputs 2 to 4.

Voltage inputs
5 volts DC are applied to the voltage inputs.
t[4] Index 33 is increased or lessened until input U1 Index 10 shows 50%.
The same applies for voltage inputs 2 to 4.

Configuration

Preferably, the settings are set with an LNS plug-in. The plug-in is divided into several tabs.

The general settings (MaxSendTime, hysteresis) are set under the “Information” tab.

The basic settings for the inputs are set under tabs “Channel1” to “Channel8”. This includes the sending behavior (MinSendTime, MinDeltaTemp), measured value correction, possibly the range, as well as limit values. The current measured values can be read in online operation.

The sensor characteristic lines can be edited and assigned to inputs under tabs “SensorTab 1” to “SensorTab 8.” Preset characteristic curves for common sensor types can be imported from a standard directory with the “Read File” button. Likewise, own characteristic curves that were created can be saved there or in a different location.

Analog Input Module XIO-4PT1000

The XIO-4PT1000 LON Analog Input Module is a LON module with 8 analog inputs, 4 temperature and 4 voltage, suitable to collect temperatures with PT 1000 sensors and voltages. In a LON installation, all 8 inputs can be scanned simultaneously by standard network variables, SNVT.

Connection of XIO-4PT1000

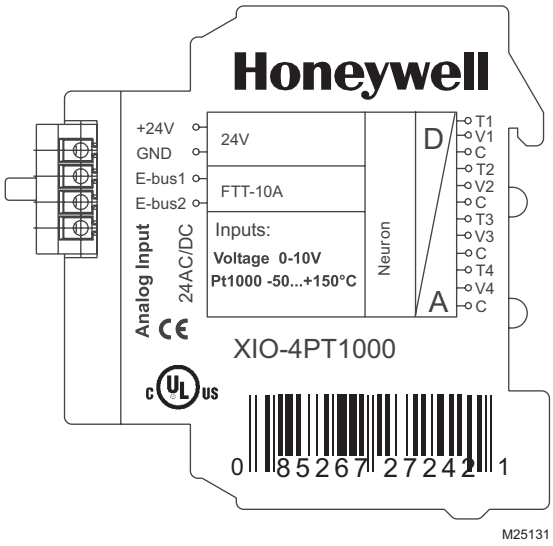


Fig. 10. XIO-4PT1000 Pin Assignment.

XIO-4PT1000 Specifications

Electrical Ratings:
Supply Operating Voltage: 20 to 28 V AC/DC.
Current Consumption: 67 mA (AC) / 24 mA (DC).
Duty cycle: 100%.
Recovery time: 550 ms.

Terminal Blocks:
Supply and Bus: 16 AWG (1.5 mm²).
(terminal block and jumper plug included with each unit).
Analog Inputs: 14 AWG (2.5 mm²).

Display:
Operation: green LED.
Function: yellow LED for status (service).

LON Interface:
Transceiver: FTT10A free topology.
Neuron: 3120, 3K EEPROM.
Data format: standard network variables (SNVT).
Transmission rate: 78 kBit/s.
Maximum Length:
Line topology: 8858 ft. (2700 m) / 64 nodes.
Free topology: 1640 ft. (500 m) / 64 nodes.
Cabling: Twisted Pair.

Temperature Ratings:
Operating: 23° F to 131° F (-5° C to +55° C).
Storage: -4° F to +158° F (-20° C to +70° C).

Humidity Range:
5 to 85% RH, non-condensing, in accordance with EN 60721-3-3 climatic class 3k3.

Dimensions (W x H x D):
1.4 x 2.7 x 2.4 in. (35 x 68 x 60 mm).

Weight: 3.0 ounces (84 grams).

Mounting Position: Any.

Mounting: DIN rail per EN 50022.

Input:
Temperature input range for platinum 1000 sensor:
-58° F to 302° F (-50° C to +150° C).
Resistive input sensor resolution: 0.1 kΩ.
Resistive input temperature error: ±0.2° F (±0.1° C).
Voltage input: 0 ... 10 V DC.
Maximum: 11 V DC.
Voltage input sensor resolution: 10 mV (0.0 ... 100%).
Voltage input temperature error: ±100 mV.
Input impedance: 10 kΩ.

Construction Material:
Housing and Terminal Blocks: Polyamide 6.6 V0.
Faceplate: Polycarbonate.

Protective circuitry:
Operating voltage: polarity reversal protection.

Protection:
IP40 housing DIN 40050.
IP20 terminal blocks DIN 40050.

XIO-4PT1000 Software Description

The network variables for providing the measured values and the configuration variables are grouped into different objects.

The configuration variables are set with an LNS plug-in.

The module contains a node object and, for each measured value input, an application object for temperature and voltage inputs.

Node Object

The Node Object monitors and controls the functions of the different objects in the device. It supports the basic functions Object-Status and Object-Request required by LONMARK.

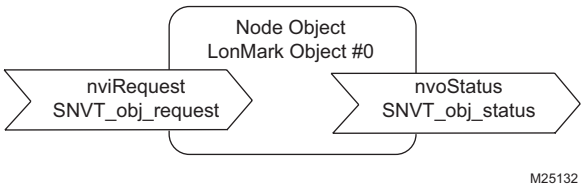


Fig. 11. XIO-4PT1000 Node Object.

APPLICATION OBJECTS

The application objects contain the functions status record of the analog inputs and data exchange. There are two types of Application Objects used by the XIO-4NTC: Temperature and Voltage.

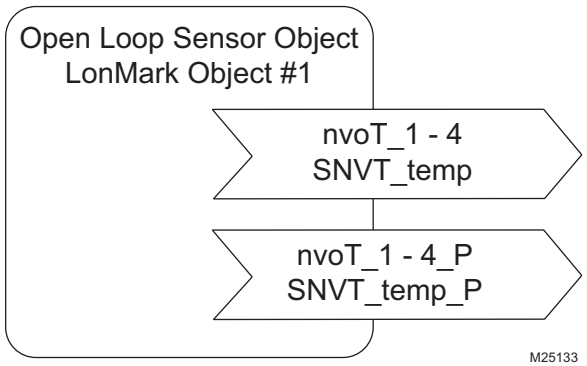


Fig. 12. XIO-4PT1000 Temperature Object.

nvoT[1..4] (index 2..5)
SNVT type **SNVT_temp**
Platinum 1000 temperature values between -58° F (-50.0° C) and 302° F (+150.0° C) are measured at the inputs and issued to the LON bus.

nvoT[1..4]P (index 6..9)
SNVT type **SNVT_temp_p**
See nvoT[1..4] but with 0.01K issue.

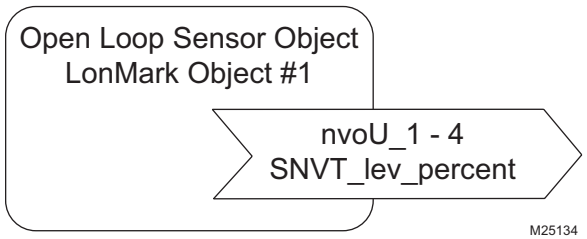


Fig. 13. XIO-4PT1000 Voltage Object.

nvoU[1..4] (index 10..13) **SNVT_lev_percent**
Voltages between 0 and 10.0 volts DC are measured at the inputs and issued to the LON bus.

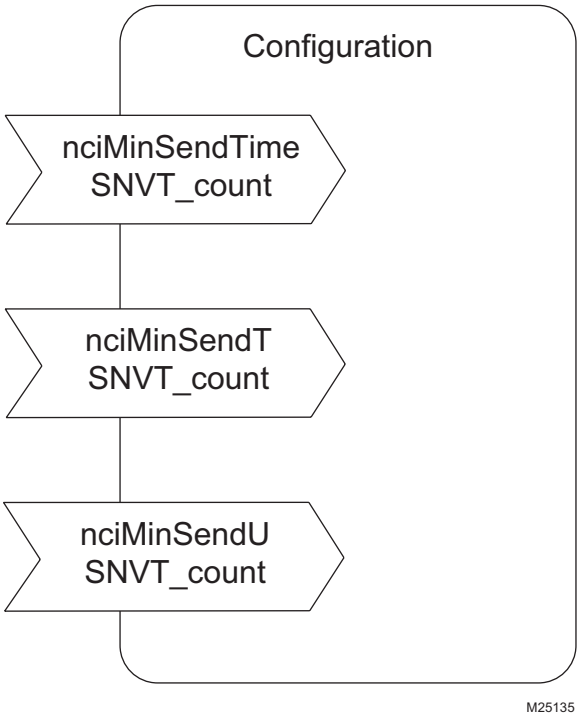


Fig. 14. XIO-4PT1000 Configuration Variables.

nciMinSendTime (index 14)
SNVT type **SNVT_count**
All output variables described above are issued even without a status change at the end of a preset period of time. Thus the device reports periodically to the system.
Time settings: 0 timer turned off.
1 .. 60 timer time in seconds (factory setting 0).

nciMinSendT (index 15)
SNVT type **SNVT_count**
Guaranteed interval between two temperature values.
Time settings: 0 timer turned off.
1 .. 60 timer time in seconds (factory setting 0).

nciMinSendU (index 16)
SNVT type **SNVT_count**
Guaranteed interval between two voltage values.
Time settings: 0 timer turned off.
1.. 60 timer time in seconds (factory setting 0).

Configuration

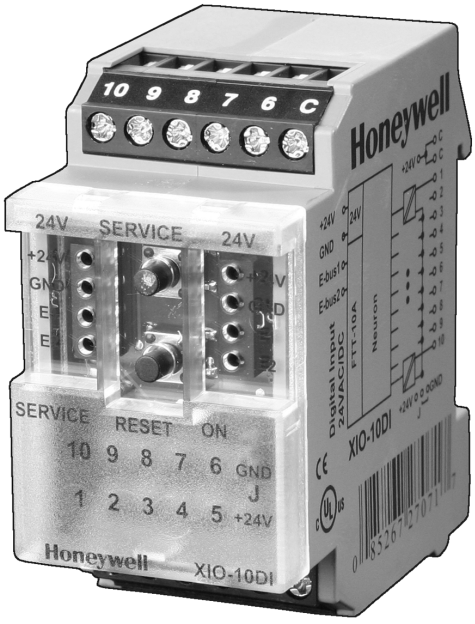
Preferably, the settings are set with an LNS plug-in. The plug-in is divided into several tabs.

The general settings (MaxSendTime, hysteresis) are set under the “Information” tab.

The basic settings for the inputs are set under tabs “Channel1” to “Channel8”. This includes the sending behavior (MinSendTime, MinDeltaTemp), measured value correction, possibly the range, as well as limit values. The current measured values can be read in online operation.

The sensor characteristic lines can be edited and assigned to inputs under tabs “SensorTab 1” to “SensorTab 8.” Preset characteristic curves for common sensor types can be imported from a standard directory with the “Read File” button. Likewise, own characteristic curves that were created can be saved there or in a different location.

Digital Input Module XIO-10DI



The XIO-10DI Digital Input Module has 10 inputs, which can be wired to potential-free contacts or 24 V contacts as needed.

The input state is indicated by the yellow LED (LED is illuminated if the contact is closed) and represented by an output variable. The messages of the input states at the output variables can be individually inverted.

The number of switching cycles at the inputs is counted and represented by a separate network variable for each input. Thereby, the module can be used to record the pulses from contact-making counters.

The transmission behavior of the output variables can be configured (See Software Description).

Connection of XIO-10DI

The input terminals 1-10 and the C terminals (“Common”) should be wired to potential-free switches or contacts.

Depending on the settings of the plug-in bridge under the front molding, the inputs can be operated as contact and voltage inputs (A1, 24 V AC/DC, plug-in bridge J - A2) or as contact inputs with switch to ground when activated (A2, plug-in bridge J-A1).

When using external 24 V, it is especially important that the entire circuit refers to the same reference potential.

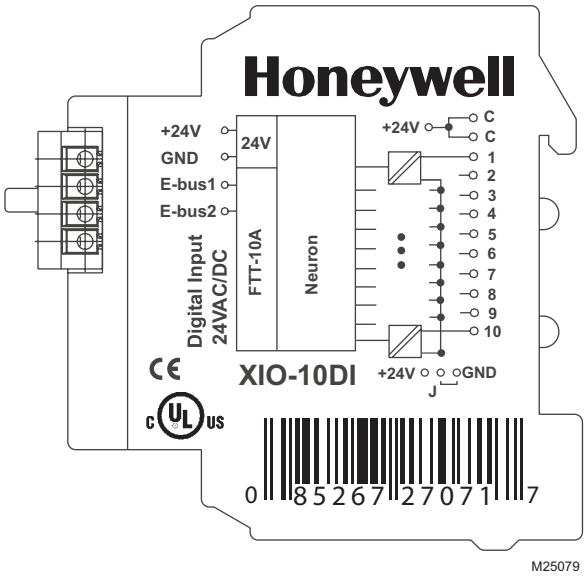
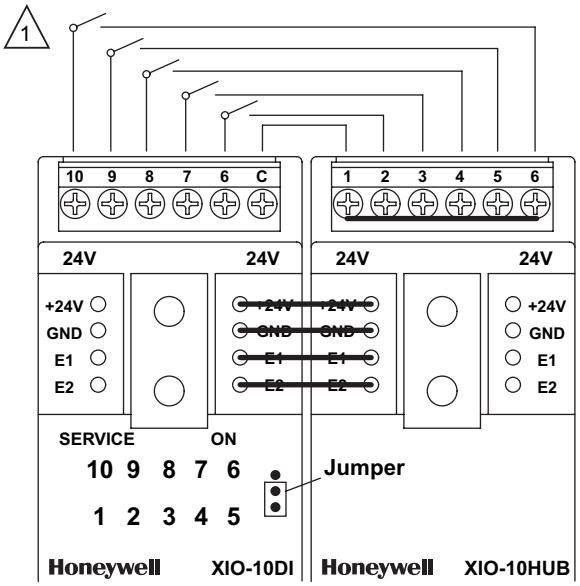


Fig. 15. XIO-10DI Pin Assignment.



1 Each switch has two 14 AWG (2.5 mm^2) connectors.

NOTE: ADDITIONAL WIRING POINTS, ONLY ONE WIRE / CONNECTOR; ALSO FOR RELAY OUTPUT.

M25073

Fig. 16. XIO-10DI Connection Example.

XIO-10DI Specifications

Electrical Ratings:
Supply Operating Voltage: 20 to 28 V AC/DC.
Current Consumption: 63 mA (AC) / 21 mA (DC).

Duty cycle: 100%.
Recovery time: 550 ms.

Terminal Blocks:
Supply and Bus: 16 AWG (1.5 mm²).
(terminal block and strapping plug included with packing).
Digital Inputs: 14 AWG (2.5 mm²).

LON Interface:
Transceiver: FTT10A free topology.
Neuron: FT3150, 64K Flash downloadable.
Data format: standard network variables (SNVT).
Transmission rate: 78 kBit/s.
Maximum Length:
Line topology: 8858 ft. (2700 m) / 64 nodes.
Free topology: 1640 ft. (500 m) / 64 nodes.
Cabling: Twisted Pair.

Display:
Operation: green LED.
Function: yellow LED for status (service).
Input Status: yellow LEDs.

Temperature Ratings:
Operating: 23° F to 131° F (-5 °C to +55 °C).
Storage: -4° F to +158° F (-20 °C to +70 °C).

Dimensions (W x H x D):
1.4 x 2.8 x 2.6 in. (35 x 70 x 65 mm).

Weight: 2.9 ounces (83 grams).

Mounting Position: Any.

Mounting: DIN rail per EN 50022.

Construction Material:
Housing and Terminal Blocks: Polyamide 6.6 V0.
Faceplate: Polycarbonate.

Protective circuitry:
Operating voltage: polarity reversal protection.

Protection :
IP40 housing DIN 40050.
IP20 terminal blocks DIN 40050.

XIO-10DI Software Description

The module provides the network variables for the status messages of the inputs, which are grouped into several LONMARK objects. In addition, there are network variables available for counter values, so that the inputs can be used to count pulses from contact-making counters.

The configuration variables are set with an LNS plug-in.

The module contains a node object and, for each digital input, an “Open Loop Sensor” type object.

Node Objects

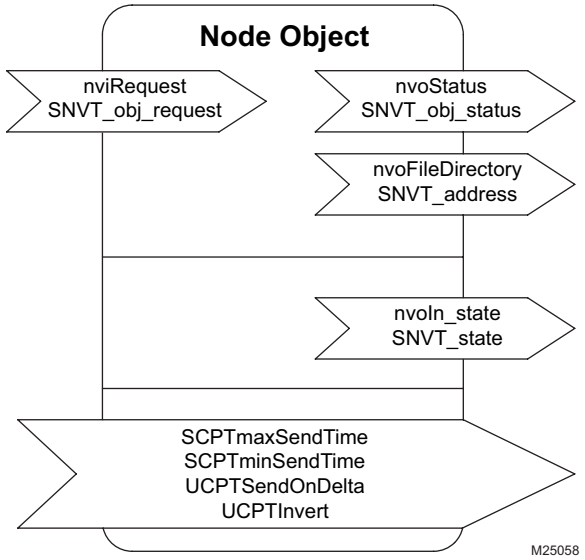


Fig. 17. XIO-10DI Node Objects.

The node object monitors and controls the functions of the different objects in the device. The basic functions ‘Object Status’ and ‘Object Request’ required by LONMARK are supported.

Furthermore, the node object contains the collective variable with the states of all inputs, as well as variables for setting the transmission behavior.

nvoIn_state **SNVT_state**
Status of the inputs.
Assignment:
nvoIn_state.bit0 = input 1… bit9 = input 10
Contact closed nvoIn_state.bit[0...9] = 1
Contact open nvoIn_state.bit[0...9] = 0

SCPTmaxSendTime **SNVT_time_sec**
All output variables described below will be issued at the latest at the end of the preset period even without status change.
Time settings: 0 timer function off-state
6553.4 s (factory setting 60 s)

SCPTminSendTime **SNVT_time_sec**
Two successive status changes will not be issued before the end of the preset MinSendTime.
Time settings: 0 timer function off-state
6553.4 s (factory setting 1 s)

UCPTSendOnDelta **SNVT_count**
The counter reading will only be issued when a preset counter difference to the previously issued value is reached.

UCPTInvert **SNVT_state**
This configuration variable is used to invert the input signals. Each input corresponds to one bit of the variable with the following function:
UCPTInvert.bit[0...9] = 0 contact closed;
nvoDiValue_1...10 set.
UCPTInvert.bit[0...9] = 1 contact open;
nvoDiValue_1...10 set.

Objects for Digital Inputs

Each digital input is represented by a separate LONMARK object.

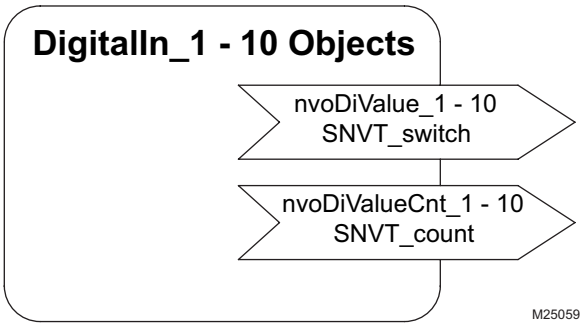


Fig. 18. XIO-10DI Digital Input Objects.

nvoDiValue_1...10 **SNVT_switch**
Status of the inputs at UCPTInvert.bit[0...9] = 0
Contact closed nvoDiValue_1...10 = 100,0 1
Contact open nvoDiValue_1...10 = 0,0 0
If UCPTInvert.bit[0...9] = 1, the function is reversed.
The inputs can be individually inverted.

nvoDiValueCnt_1...10 **SNVT_count**
Counter of the positive impulse edges at the input.
Reset value = 65535. Counted measurand = 1.

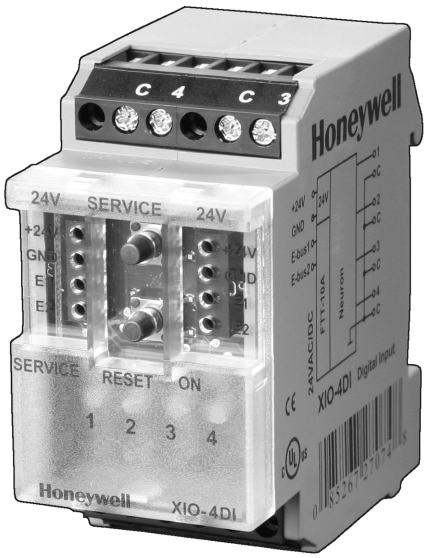
Configuration

Preferably, the settings are set with an LNS plug-in. The plug-in is divided into several tabs.

All settings, such as transmission behavior and inversion, are set under the “Information” tab.

In online operation, the current states and counted values can be read under the “DigIn 1-5” and “DigIn 6-10” tabs.

Digital Input Module XIO-4DI



The XIO-4DI Digital Input Module has 4 inputs, which can be wired to potential-free contacts for acquiring operating and malfunction messages.

The input state is indicated by the yellow LED (LED is illuminated if the contact is closed) and presented by an output variable. The messages of the input states at the output variables can be individually inverted.

The status messages for all inputs are provided in a collective variable.

The number of switching cycles at the inputs is counted and represented by a separate network variable for each input. Thereby, the module can be used to record the pulses from contact-making counters.

The transmission behavior of the output variables can be configured (See Software Description).

Connection of XIO-4DI

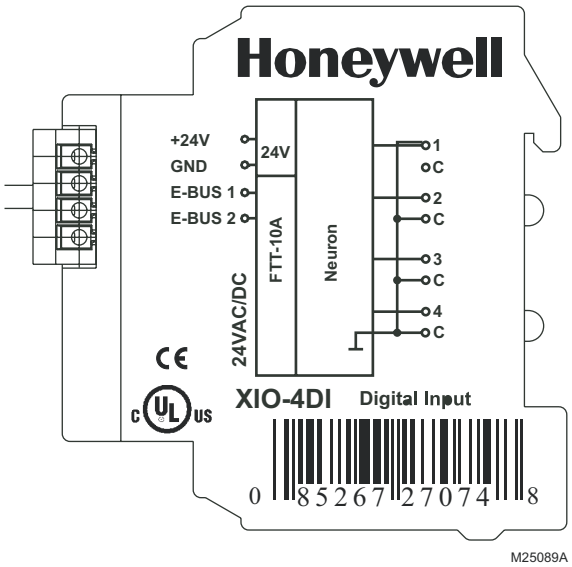


Fig. 19. XIO-4DI Pin Assignment.

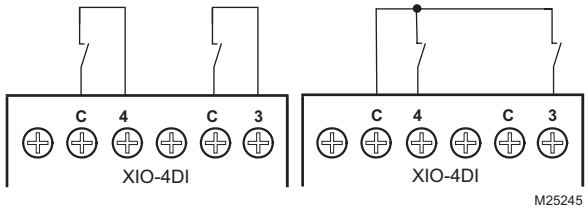


Fig. 20. XIO-4DI Connection Example.

XIO-4DI Specifications

Electrical Ratings:
Supply Operating Voltage: 20 to 28 V AC/DC.
Current Consumption: 63 mA (AC) / 21mA (DC).
Duty cycle: 100%.
Recovery time: 550 ms.

Terminal Blocks:
Supply and Bus: 16 AWG (1.5 mm^2)
(Terminal block and strapping plug included in packing).
Digital Inputs: 14 AWG (2.5 mm^2).

Display:
Operation: green LED.
Function; yellow LED for status (service).
Input status: yellow LEDs

LON Interface
Transceiver: FTT10A free topology.
Neuron: 3120, 2k EEPROM downloadable.
Data format: standard network variables (SNVT).
Transmission rate: 78 kBit/s.
Maximum Length:
line topology 8958 ft. (2700 m) / 64 nodes.
free topology 1640 ft. (500 m) / 64 nodes.
Cabling: twisted pair.

Temperature Ratings:
Operating: 23° F to 131° F (-5° C to +55° C).
Storage: -4° F to +158° F (-20° C to +70° C).

Dimensions (W x H x D):
1.4 x 2.7 x 2.6 in. (35 x 70 x 65 mm).

Weight: 2.9 ounces (83 g).

Mounting: DIN rail per EN 50022.

Mounting: Any.

Construction Material:
Housing and Terminal Blocks: Polyamide 6.6 V0.
Faceplate: Polycarbonate.

Protective Circuitry:
Operating Voltage: polarity reversal protection.

Protection:
IP40 housing DIN 40050.
IP20 terminal blocks DIN 40050.

Approvals:
UL 916, Standard for Energy Management Equipment.
European Community Mark (CE) Listed.

XIO-4DI Software Description

The module provides the network variables for the status messages of the inputs, which are grouped into several LONMARK objects. In addition, there are network variables available for counting values, so that the inputs can be used to count pulses from contact-making counters.

The configuration variables are set with an LNS plug-in.

The module contains a node object and, for each digital input, an “Open Loop Sensor” type object.

Node Object

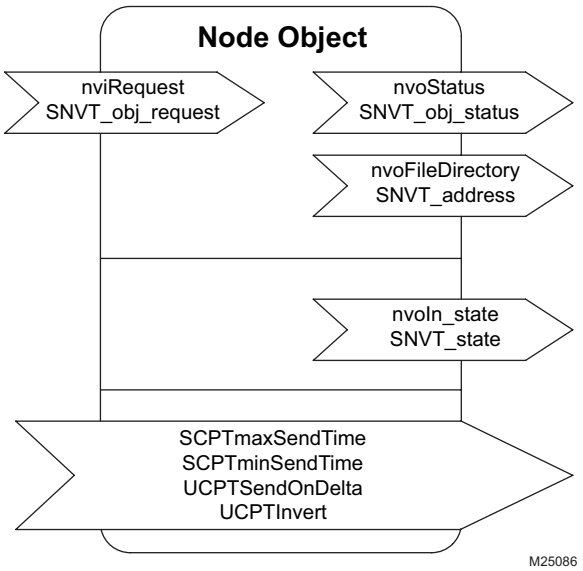


Fig. 21. XIO-4DI Node Objects.

The node object monitors and controls the functions of the different objects in the device. The basic functions ‘Object Status’ and ‘Object Request’ required by LonMark are supported.

Furthermore, the node object contains the collective variable with the states of all inputs, as well as variables for setting the transmission behavior.

nvoIn_state SNVT_state
This variable contains the states of all inputs in the form of bits. Each state is represented by a bit. The following allocation applies:
Assignment: nvoIn_state.bit0 = input 1, bit3 = input 4.
Contact closed nvoIn_state.bit[0...3] = 0

SCPTmaxSendTime SNVT_time_sec
All output variables described below will be issued at the latest at the end of the preset period even without status change.
Time settings: 0 (timer function off-state) to 6553.4 s (factory setting 60 s)

SCPTminSendTime SNVT_time_sec
Two successive status changes will not be issued before the end of the preset MinSendTime.
Time settings: 0 (timer function off-state) to 6553.4 s (factory setting 1 s)

UCPTSendOnDelta SNVT_count
The counter reading will only be issued when a preset counter difference to the previously issued value is reached.

UCPTInvert SNVT_state
This configuration variable is used to invert the inputs. Each input corresponds to one bit of the variable with the following function:
UCPTInvert.bit[0...3] = 0 contact closed;
nvoDiValue_1...4 set.
UCPTInvert.bit[0...3] = 1 contact open;
nvoDiValue_1...4 set.

Objects for Digital Inputs

Each digital input is represented by a separate LONMARK object.

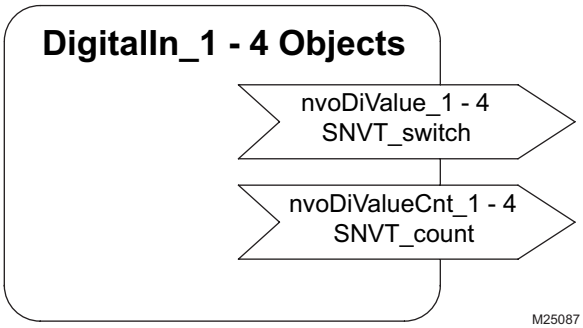


Fig. 22. XIO-4DI Digital Input Objects.

nvoDiValue_1...4 **SNVT_switch**
Status of inputs with UCPTInvert=0:
Contact closed nvoDiValue_1...4 - 100,0 1
Contact open nvoDiValue_1...4 = 0,0 0

nvoDiValueCnt_1...4 **SNVT_count**
Counter of the positive impulse edges at the input.
Reset value = 65535.

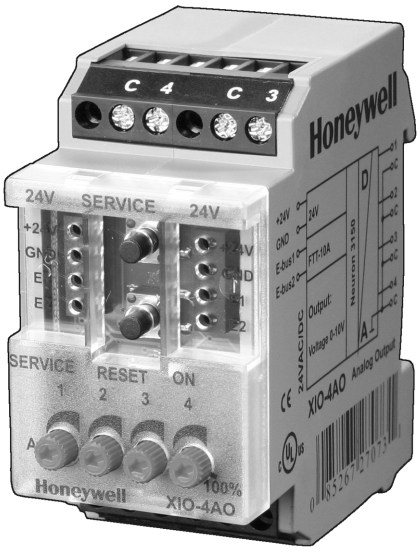
Configuration

Preferably, the settings are set with an LNS plug-in. The plug-in is divided into several tabs.

All settings, such as transmission behavior and inversion, are set under the “Information” tab.

In online mode, the current states and counted values can be read under the “DigIn 1-4” tab.

Analog Output Module XIO-4AO



The XIO-4AO Analog Output Module has 4 outputs for actuating regulating elements, such as valve and regulator drives with a D.C. voltage signal in the 0 to 10 Volt range. SNVT_lev_percent or SNVT_switch type variables can be used for actuation in automatic mode. Both variables work with equality of access. This makes the module flexible for use in different applications, in particular with the Excel 5000 system.

An LNS plug-in can set the output signals in the 0...10 V range. For example, the output can be defined to pass through a range of 2...5 V instead of 0...10 V with a command of 0...100%.

Each output is equipped with a hand potentiometer for local overriding into the desired position. The manual position always works in the 0 to 10 Volt range, regardless of the output configuration.

The respective command is acknowledged by a SNVT_switch type output variable. The state “manual position” is additionally signaled by a separate variable.

Furthermore, the module has a separate, SNVT_switch type overriding variable, which commands the respective output to a configurable fixed value. This command takes priority over other network variables. Overriding due to a binary event can be realized this way. Overriding always works in the 0 to 10 Volt range, regardless of the output configuration.

Connection of XIO-4AO

Connect the regulating signal for the drives to the terminals marked “1-4”. Ground is connected to the “C” terminals; for example, terminals 1 and C for output 1. 24 V power supply to the drives can be achieved with additional terminals of module XIO-10HUB. Care should be taken that the load on the internal connection with bridge connectors does not exceed 2.5 A (sum total of all currents including module supply).

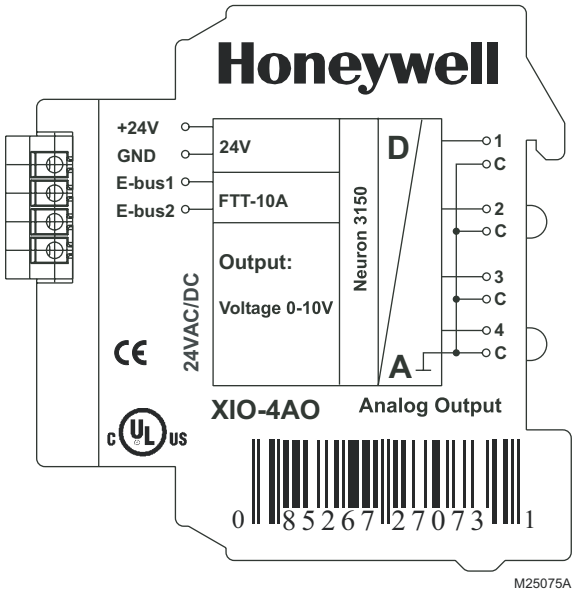


Fig. 23. XIO-4AO Pin Assignment.

Larger currents require module XIO-10HUB with internally bridged terminals, which is connected to the transformer via external cables, thereby not applying load to the internal bridge connection.

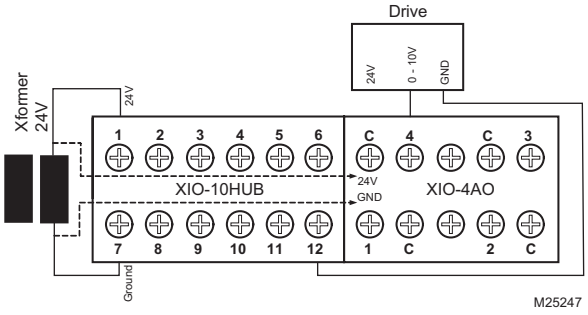


Fig. 24. XIO-4AO Connection Example With XIO-10HUB.

XIO-4AO Specifications

Electrical Ratings:
Supply Operating Voltage: 20 to 28 V AC/DC.
Current Consumption: 150 mA (AC) / 70 mA (DC).

Duty cycle: 100%.
Recovery time: 550 ms.

Terminal Blocks:
Supply and Bus: 16 AWG (1.5 mm²).
(terminal block and strapping plug included with packing).
Analog Outputs: 14 AWG (2.5 mm²).

LON Interface:
Transceiver: FTT10A free topology.
Neuron: FT3150, 64K Flash downloadable.
Data format: standard network variables (SNVT).
Transmission rate: 78 kBit/s.
Maximum Length:
Line topology: 8858 ft. (2700 m) / 64 nodes.
Free topology: 1640 ft. (500 m) / 64 nodes.
Cabling: Twisted Pair.

Display:
Operation: green LED.
Function: yellow LED for status (service).

Temperature Ratings:
Operating: 23° F to 131° F (-5 °C to +55 °C).
Storage: -4° F to +158° F (-20 °C to +70 °C).

Dimensions (W x H x D):
1.4 x 2.8 x 2.6 in. (35 x 70 x 65 mm).

Weight: 3 ounces (84 grams).

Mounting Position: Any.

Mounting: DIN rail per EN 50022.

Output:
Output voltage: 0 to 10 V DC.
Output current (10 VDC): 5 mA.
Resolution: 10 mV.
Error: maximum ±100 mV.

Construction Material:
Housing and Terminal Blocks: Polyamide 6.6 V0.
Faceplate: Polycarbonate.

Protective circuitry:
Operating voltage: polarity reversal protection.

Protection :
IP40 housing DIN 40050.
IP20 terminal blocks DIN 40050.

XIO-4AO Software Description

The variables for operating commands and feedback as well as the corresponding configuration variables are grouped into different objects.

The configuration variables are set with an LNS plug-in.

The module contains a node object and an “Open Loop Actuator” type object for each output.

NODE OBJECT

The node object monitors and controls the functions of the different objects in the device. The basic functions ‘Object Status’ and ‘Object Request’ required by LONMARK are supported.

In addition, the node object contains transmission settings.

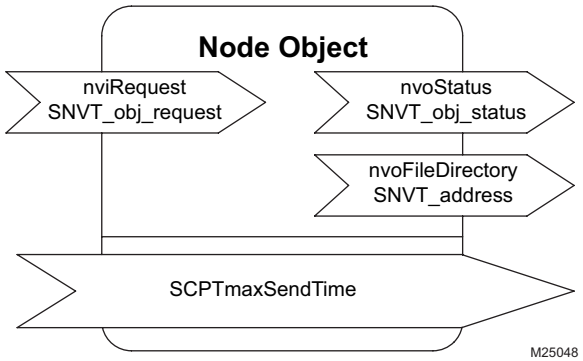


Fig. 25. XIO-4AO Node Object.

SCPTmaxSendTime **SNVT_time_sec**
All output variables described below will be issued at the latest at the end of the preset period even without status change.
Time settings: 0 (timer function off-state) to 6553.4 s (factory setting 60 s).

Objects for analog outputs

Each analog output is represented by a separate LONMARK object. This object also contains the settings for the respective output.

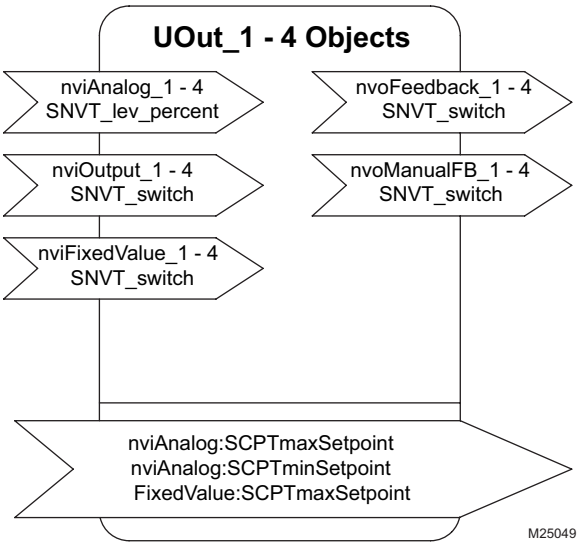


Fig. 26. XIO-4AO Analog Outputs.

nviAnalog_1...4 SNVT_lev_percent
The output signal voltages corresponding to the variables.
nviAnalog_1...4 = 0...100%
Output1..4 = 0..10 V DC

nviOutput_1...4 SNVT_switch
The outputs signal voltages corresponding to the value portion of the variables. The state portion is discounted.
nviOutput_1...4 = 0...100% x
Output1..4 = 0..10 V DC

The input variables described above are equal. The output supplies the last received value. Therefore it is necessary to work without Heartbeat when using both input variables.

nviFixedValue_1...4 SNVT_switch
Overrides the outputs to the percentages that are preset in SCPTmaxSetPoint. Only the state portion will be interpreted.
nviFixedValue_1...4 = x.x (-)1
Output1..4 = SCPTmaxSetpoint
nviFixedValue_1...4 = x.x 0
Output1..4 = nviAnalog_1...4 or
nviOutput_1...4

nvoFeedback_1...4 SNVT_switch
Transmits the feedback value of the object. The value portion transmits the value of nviAnalog_1...4 or value portion of nviOutput. The state portion transmits the operation mode:
Automatic: x% +1
Manual: x% -1

nvoManualFB_1...4 SNVT_switch
Transmits feedback of manual operation.
Potentiometer on left stop = Automatic 100,0 1
Potentiometer not on left stop = manual 0,0 0

nviAnalog:SCPTmaxSetpoint SNVT_lev_percent
Upper range limit of the output in percent. When entering 85% for example the output adopts a voltage of 8.5 V with a value of 100% in the input variables.
Value settings: 0...100%

nviAnalog:SCPTminSetpoint SNVT_lev_percent
Lower range limit of the output in percent. When entering 15% for example the output adopts a voltage of 1.5 V with a value of 0% in the input variables. The total range results of both settings. When maxSetpoint = 85 and minSetpoint = 15 and an input value between 0 and 100% of a voltage between 1.5 and 8.5 results at the output .
Value settings: 0...100%

FixedValue:SCPTmaxSetpoint SNVT_lev_percent
Preset percentage when using FixedValue_1...4.
Value settings: 0...100%

Configuration

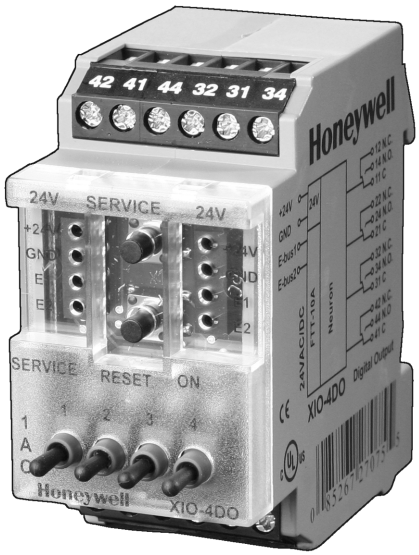
Preferably, the settings are set with an LNS plug-in.

Transmission behavior can be set under the “Information” tab.

Tabs UOut1 to UOut4 are used for range settings and the pre-setting for the fixed value command.

In online operation, the plug-in also allows reading the current operating commands and feedback.

Digital Output Module XIO-4DO



The XIO-4DO Digital Output Module is used to switch electrical units, such as fans, pumps, etc. Four independent relays with one potential-free change-over contact are available for this purpose.

Actuation in automatic mode is performed by SNVT_switch type network variables.

The module has manual switches (0-AUTO-1), which can locally override individual outputs.

The command state can be read out by feedback variables, which also have the manual position encrypted. In addition, manual switching is represented by separate network variables.

The output function can be inverted for each output individually with an LNS plug-in (ON command releases the relay).

Furthermore, a wiping function with adjustable delay time can be configured for each output individually (not effective in manual mode).

The relay status is indicated by a yellow LED (LED is lighted if the relay has picked up).

Special network variables are available for linking with door installation modules.

Connection of XIO-4DO

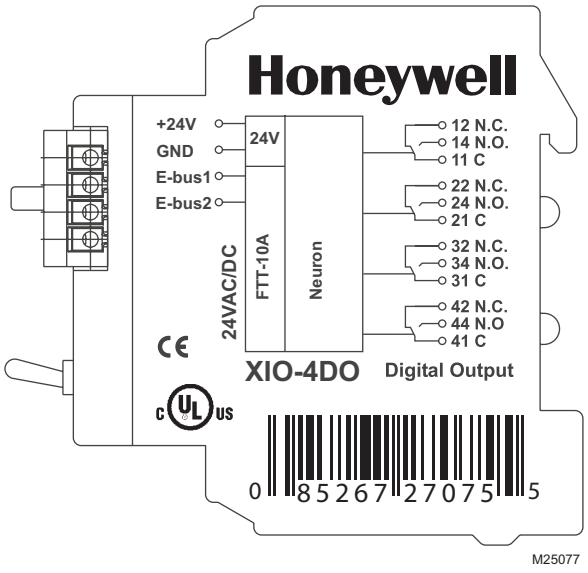


Fig. 27. XIO-4DO Pin Assignment.

Connect to terminals x1 (root) and x4 (NO) or x2 (NC, e.g., at terminals 11 and 14 for output 1).

The permissible contact load is 5 A. The sum of maximum permissible at the four contacts must not exceed 12 A.

NOTE: The use of support terminal module XIO-10HUB for 230 V applications is not permissible. The module is only approved for voltages of 60 V maximum.

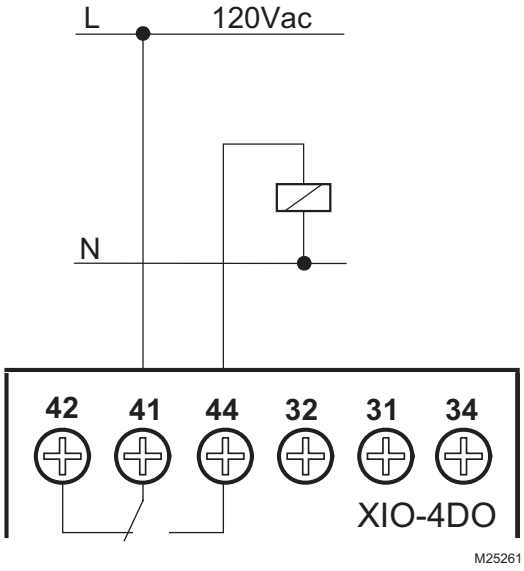


Fig. 28. XIO-4DO Connection Example.

XIO-4DO Specifications

Electrical Ratings:
Supply Operating Voltage: 20 to 28 V AC/DC.
Current Consumption: 205 mA (AC) / 67 mA (DC).

Duty cycle: 100%.
Recovery time: 550 ms.

Terminal Blocks:
Supply and Bus: 16 AWG (1.5 mm²).
(terminal block and strapping plug included with packing).
Digital Outputs: 14 AWG (2.5 mm²).

LON Interface:
Transceiver: FTT10A free topology.
Neuron: 3120, 2K Flash downloadable.
Data format: standard network variables (SNVT).
Transmission rate: 78 kBit/s.
Maximum Length:
Line topology: 8858 ft. (2700 m) / 64 nodes.
Free topology: 1640 ft. (500 m) / 64 nodes.
Cabling: Twisted Pair.

Display:
Operation: green LED.
Function: yellow LED for status (service).
Output status: yellow LED.

Temperature Ratings:
Operating: 23° F to 131° F (-5 °C to +55 °C).
Storage: -4° F to +158° F (-20 °C to +70 °C).

Dimensions (W x H x D):
1.4 x 2.8 x 2.9 in. (35 x 70 x 74 mm).

Weight: 4 ounces (104 grams).

Mounting Position: Any.

Mounting: DIN rail per EN 50022.

Output:
Output contact: 4 changeover contacts.
Contact material: AgNi.
Switching voltage: 250 V AC.
Nominal current: 5 A.
Total current for all contacts: maximum 12 A.
Contact fuse: 5 A.
Mechanical endurance: 1.5 x 10^7 switching cycles.
Electrical endurance: 1.5 x 10^5 switching cycles.
Permissible switching frequency: 6/min. at nominal current.

Construction Material:
Housing and Terminal Blocks: Polyamide 6.6 V0.
Faceplate: Polycarbonate.

Protective circuitry:
Operating voltage: polarity reversal protection.

Protection:
IP40 housing DIN 40050.
IP20 terminal blocks DIN 40050.

XIO-4DO Software Description

The network variables for switching commands and feedback as well as the corresponding configuration variables are grouped into different objects.

The configuration variables are set with an LNS plug-in.

The module contains a node object and, for each output, an “Open Loop Actuator” type object.

The variables for linking to door installation modules are located in a special object.

Node Object

The node object monitors and controls the functions of the different objects in the device. The basic functions ‘Object Status’ and ‘Object Request’ required by LONMARK are supported.

In addition, the node object contains transmission settings.

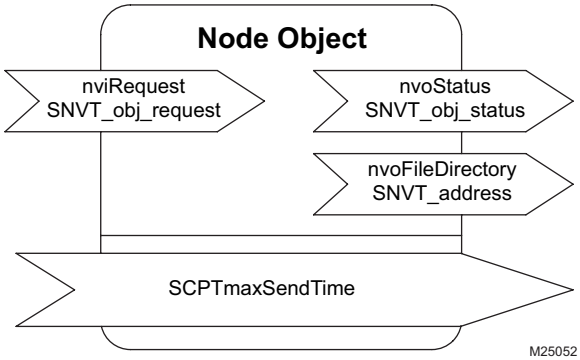


Fig. 29. XIO-4DO Node Object.

SCPTmaxSendTime **SNVT_time_sec**
All output variables described below will be issued at the latest at the end of the preset period even without status change.
Time settings: 0 timer function off-state
6553.4 s (factory setting 60 s)

Objects for Digital Outputs

Each digital output is represented by a separate LONMARK object. This object also contains the settings for the respective output.

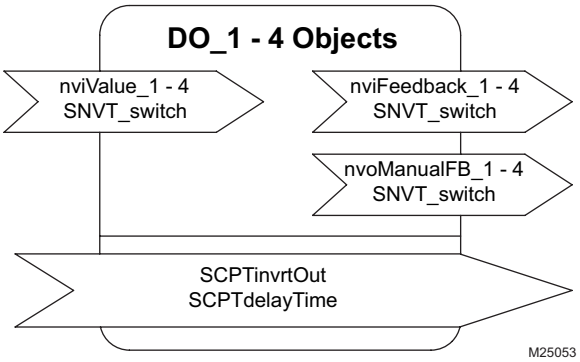


Fig. 30. XIO-4DO Digital Output Objects.

nvoManualFB_1...4 **SNVT_switch**
Transmits the manual control feedback.
Manual switch on automatic 100,0 1
Manual switch on "0" or “1” 0,0 0

SCPTinvrtOut **SNVT_lev_disc**
Inverting the relay switching states when actuated by nviValue_1...4.
Applicable values:
ST_ON contact open; nviValue_1...4 set.
ST_OFF contact closed; nviValue_1...4 set.

SCPTdelayTime **SNVT_time_sec**
Wiper function. When nviValue_1...4 is set and the preset period is over the relay changes status. In the manual mode the wiper function is off-state.
Applicable values:0 wiper function off-state
6553.4 s (factory setting 0 s)

nviValue_1...4 **SNVT_switch**
The respective relay is switched on through the nviValue_1...4 variable with a value having a value portion above 0 and a state portion of 1, in all other cases the relay is switched off.

nvoFeedback_1...4 **SNVT_switch**
Transmits the feedback value of the object.
Automatic mode ON: 100,0 1
Automatic mode OFF: 0,0 0
Manual mode ON: 100,0 -1
Manual mode OFF: 0,0 -1

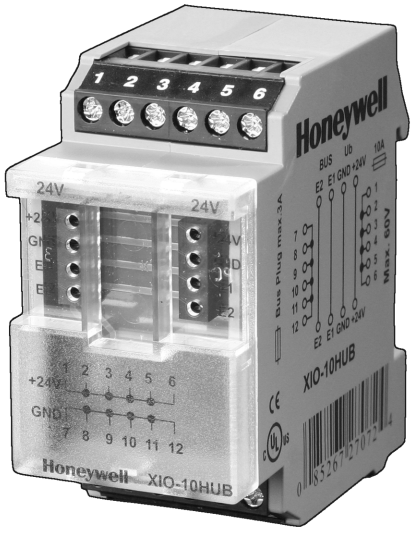
Configuration

Preferably, the settings are set with an LNS plug-in. The plug-in is divided into several tabs.

The general settings are set under the “Information” tab.

The settings for the individual outputs, such as inversion and wiping function, are made under tabs “Dig.Out1” to “Dig.Out4.” In online operation, the current states can be read and commands executed under these tabs.

Terminal Module XIO-10HUB



The XIO-10HUB Terminal Module provides additional support terminals, e.g., for the power supply of external drives. The terminals are not connected to the internal 24 V and ground wires; thus, they can be used individually. Six (6) terminals each are bridged among each other.

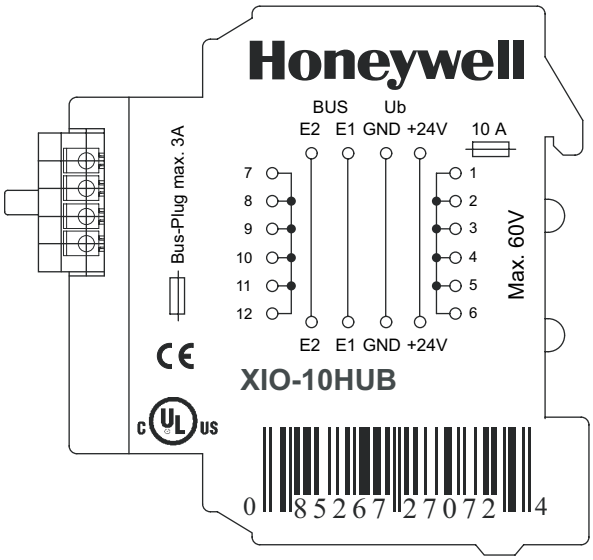


Fig. 31. XIO-10HUB Pin Assignment.

The terminals are approved for maximum 60 V.

A typical application would be the power supply of external drives.

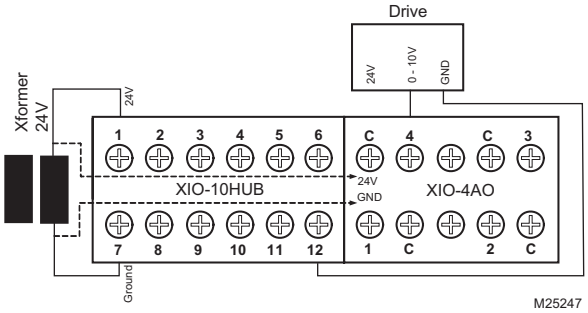
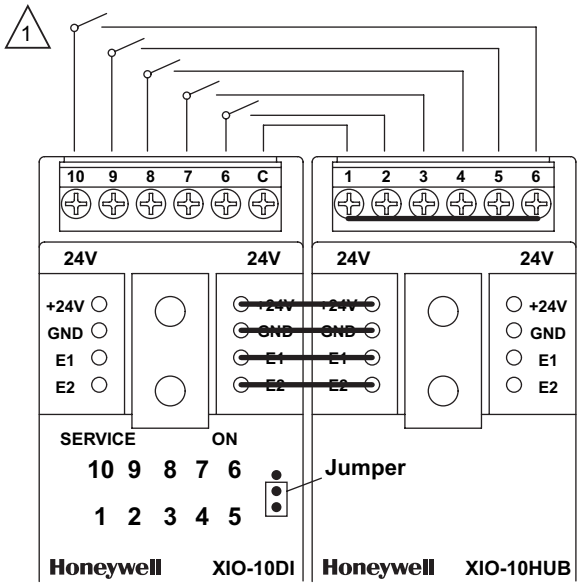


Fig. 32. XIO-10HUB Application Example.



1 Each switch has two 14 AWG (2.5 mm^2) connectors.

NOTE: ADDITIONAL WIRING POINTS, ONLY ONE WIRE / CONNECTOR; ALSO FOR RELAY OUTPUT.

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Fig. 33. XIO-10DI Connection Example.

XIO-10HUB Specifications

Electrical Ratings:
Supply Operating Voltage: 10 to 28 V AC/DC.
LED Current Consumption: 0 mA (AC) / 0 mA (DC).
Load:
- Nominal Current:
  - Bus: 2.5 A maximum.
  - Contacts: 8.0 A maximum.
- Prefusing:
  - Bus: 3.0 A maximum.
  - Contacts: 10.0 A maximum.

Terminal Blocks:
Supply and Bus: 16 AWG (1.5 mm^2) or 14 AWG (2.5 mm^2)
(Terminal block and strapping plug included in packing).

Temperature Ratings:
Operating: 23° F to 131° F (-5° C to +55° C).
Storage: -4° F to +158° F (-20° C to +70° C).

Dimensions (W x H x D):
1.4 x 2.7 x 2.8 in. (35 x 70 x 71 mm).

Weight: 2.6 ounces (75 g).

Mounting Position: Any.

Construction Material:
Housing and Terminal Blocks: Polyamide 6.6 V0.
Faceplate: Polycarbonate.

Protection:
IP40 housing DIN 40050.
IP20 terminal blocks DIN 40050.

Approvals:
UL 916, Standard for Energy Management Equipment.
European Community Mark (CE) Listed.

PLUG-INS

The Plug-Ins are available for download from the following website: Http://plugin.ge51.honeywell.de/

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Golden Valley, MN 55422
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