PNI800 FireClass FC700 Series Network Interface Card
Part No. 557.202.844

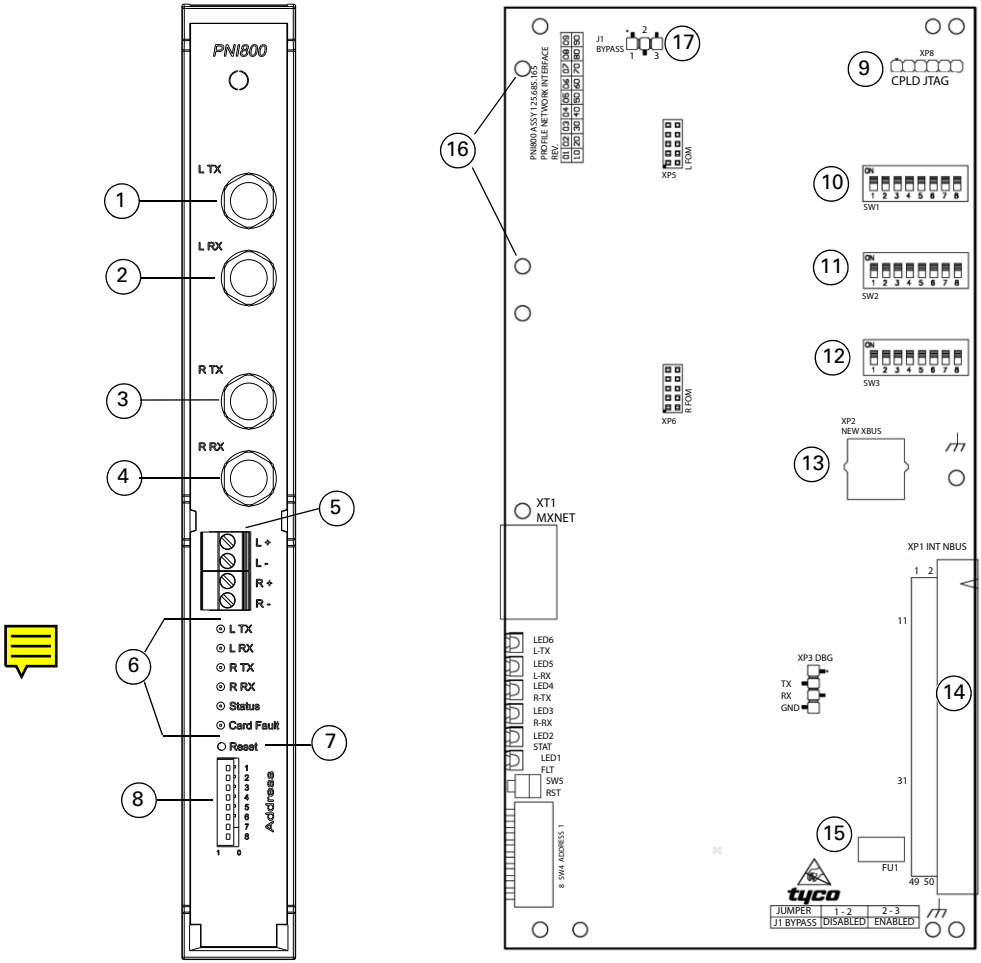

Fig. 1: PNI800 FireClass FC700 Network Interface Card

1– Left fibre optic module-TX
2– Left fibre optic module - RX
3– Right fibre optic module - TX
4– Right fibre optic module - RX
5– FCNet connector
6– Optical indicators
7– Reset button
8– NBUS address configuration switch
9– CPLD JTAG connector
10–DIP Switch SW1
11–DIP Switch SW2
12–DIP Switch SW3
13–XP2-Zonal LED panel connector
***CAUTION**: Connecting a PC to the XP2-Zonal LED panel connector will damage the PNI800.*
14–XP1-Slot backplane (Internal NBUS) connector
15–FU1- Slot backplane supply fuse
16–Fibre-optic module mounting holes
17–Bypass Enable

Introduction

The PNI800 network interface slot card is used to connect up to 99 FireClass FC700 Series panels or other nodes to a single network. The card can be used with the FC700 Series panels. It supports the following network media types:

- Shielded twisted pair copper cables (RS485 standard).
- Fibre-optic cables (multi-mode 50/125 micrometres (µm) or 62.5/125 µm).

Installation

This is an overview of the steps you need to perform to install the PNI800:

1 Install the network cables.
2 Perform cable continuity and insulation checks.
3 For metal cables, perform cable resistance and capacitance checks.
4 If a fibre-optic cable is used, perform a discontinuity check and an attenuation check.
5 Install the FOM800 modules (if used).
6 Install the PNI800 network interface cards.

Cabling requirements

Refer to Fig. 2 and Fig. 3 to review the network topologies for a typical system. The maximum distance between nodes in a circuit is 3000 m, but with a reduced baud rate.
Check Table 1 for recommended shielded twisted pair cable parameters. The maximum recommended distance using TYCO (Pyrotenax) standard MICC(xLx) Fire Survival cable is 1200m. Refer to Table 2 to see examples of suitable cables.

Baud rate	Max. wire-to-wire Capacitance
115200	100nF
76800	150nF
57600	200nF
38400	300nF
19200	600nF
9600	600nF

Table 1: PNI800, Cable parameters, approximate maximum wire-to-wire capacitance

Max. resistance = 40 Ohm for a EN54-13 compliant installation.
Max. resistance = 65 Ohm for proper function without EN54-13 compliance (all baud rates).
For recommended cables, refer to Table 2.
If a longer distance is required or the cable is located in an environment with high electromagnetic interference, use fibre-optic module(s).

NOTICE

Non EN 54 part 4 powered Network Nodes.
In a Bus topology network when a node is used for a host that is not EN approved, the combined twisted pair cable distance (sum of both distances to the right node and to the left node) that will separate neighbouring FireClass controllers when the power to the node in the middle is turned off, must not exceed the value listed in Table 1 and Table 2.

Examples	Line length [km]										
	1		1.5		2		2.5		3		
Cable	R	C	R	C	R	C	R	C	R	C	Comment
J-Y(St) 1x2x0.8 LG	37	100	55 [1]	150 [1]	73	200	92	250	110	300	Low cost Solid Flame retardant Screened
Belden 9460	21	98	32 [1]	146 [1]	43 [2]	195 [2]	53 [3]	244 [3]	64	293	Stranded Shielded
Belden 9574	20 [2]	190 [2]	30 [3]	285 [3]	41 [4]	380 [4]	51 [4]	475 [4]	61	570	Solid Fire protective signals
Tyco MICC 2TS	15 [2]	210 [2]	22 [3]	315 [3]	30 [4]	420 [4]	37 [4]	525 [4]	45 [4]	630 [4]	Solid Shielded Enhanced grade fire survival

Table 2: PNI800 cable examples
Baud rate up to 115.2 kBd
[1] Baud rate up to 76.8 kBd
[2] Baud rate up to 57.6 kBd
[3] Baud rate up to 38.4 kBd
[4] Baud rate up to 19.2 kBd

Metal cable routing

Ensure that metal cables are correctly routed to minimise coupling effects. Do not run power and network signal cables in the same conduit or trunking.

CAUTION

- If it is necessary to cross-signal cables over power cables, make the crossover at right angles.
- Segregate network cables from PA lines.

Metal network cabling

If you use metal network cables, make the following checks:

- Ensure that the cabling is within the parameters shown in Table 1.
- Ensure that the insulation resistance exceeds 1M ohm. Reverse the polarity of the tester and repeat the check.
- Locate and rectify any faults found. If necessary, replace any low-insulation cable.
- Record the final readings you obtain and leave the records inside the panel housing.

Fibre-optic network cabling

If you use fibre-optic network cables, make the following checks:

- If you are using a fibre-optic rack, check that the PNI800 connects with the rack through patch-cords or pig-tails.
- If you are not using a fibre-optic rack and the cables connect to the fire panel housing directly, ensure that the pig-tails join with the cable fibres before the installation.
- Connect fibre-optic cables to fibre-optic connectors 1-4 shown in Fig. 1. Observe the L to R TX/RX pairing. Refer to Fig. 7.
- Ensure that the cabling does not have breaks or sudden folds and that it does not have a radius that is smaller than the specified value for the cable.
- Locate and rectify any faults found. If you are in doubt, check the fibre-optic line with a fibre-optic tester for discontinuity and attenuation.
- Record the final readings you obtain and leave the records inside the panel housing.

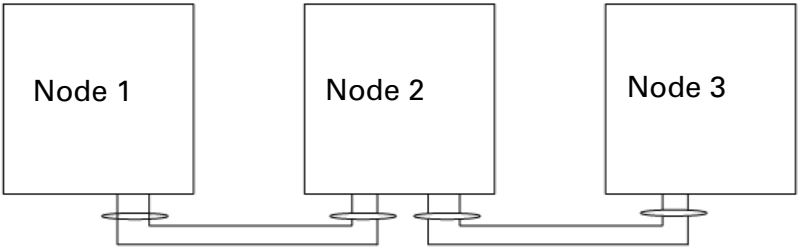

Fig. 2: Typical system cabling in a bus topology.

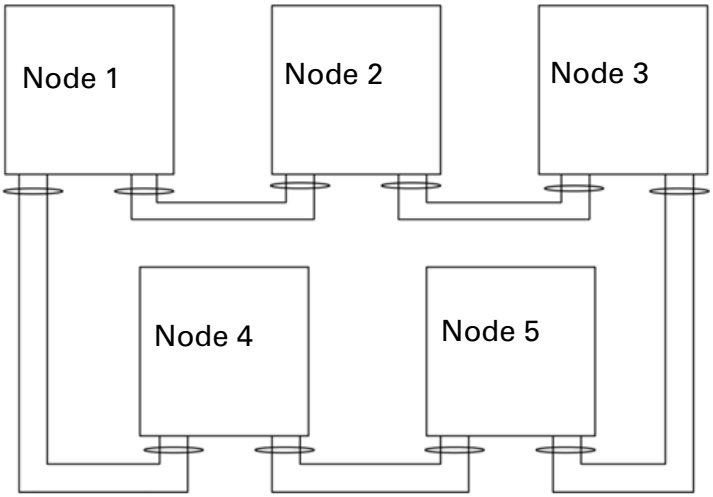

Fig. 3: Typical system cabling in a ring topology

Commissioning procedure checks

1 Check that the cabling matches the system drawing and that each cable is correctly marked.
2 Check that all of the panels that you want to connect to the network are commissioned in stand alone mode and that they are powered down.
3 Repeat the high voltage insulation, the low voltage continuity checks and the capacitance checks on all metal network cables. Refer to Table 1 for cable parameters.

NOTICE

Check the installation thoroughly before connecting the equipment.

4 Set switches and headers for the correct configuration. Refer to Fig. 1 and Tables 4 to 14.
5 Configure jumper J1. Refer to Table 3.
6 If you need to fit Fibre-Optic Modules (FOM800), mount them to the PNI800 card using the metal stand-offs supplied with the FOM800. For more information, see the "FOM800 installation (optional)" section.

NOTICE

The switch to the fibre-optic port is automatic when the module is plugged into the connector. The RS485 port is inactive if a FOM800 is installed.

7 Line up the slot card against the side rails and slide it backwards until it clicks into the bracket. Ensure that the card fits firmly.
8 Strip a necessary length of the incoming network cable and shorten the shielding wire. Connect the shield wire to the earth bar and lead the wires to the network connector.
9 Connect the fibre-optic network cabling as shown in Fig. 7 and fit the Fibre-Optic holder (item 6). Secure the Fibre-Optic holder with the screw (item 7) to the slot backpane cage.
10 If a new firmware version is released, refer to the steps in the relevant TIB to download it.
11 Rectify any network faults. For more information, refer to Table 21.
12 Using the controller functions, check that each controller can communicate with all other controllers.
13 Check that all configured inter-controller functions respond correctly.

Equipment required

To carry out the commissioning procedure, you need the following equipment:

- A high voltage insulation tester (a megger).
- A capacitance meter.
- A simple fibre-optic tester if you are using a FOM800 module.

Note: In a bus topology configuration, you must disable the 'L' port connection on the first node and the 'R' port connection on the last node in FireClass Express.

Commissioning Mode

Use commissioning mode to check the cabling. Commissioning mode sets the PNI800 transmitting test messages to the right when a break in normal network traffic allows. If test messages are received from the left from another unit, a reply is sent left. To enable commissioning mode, complete these steps:

1 Set the address SW 4-8 to "1" (refer to item 8 in Fig. 1). Then, reset the PNI800 card or power it on to enable commissioning mode.
2 Connect the right port cabling to the node. On the next node on the right, attach one of these cables to the left port RX to make the L RX LED and the L TX LED on that node blink regularly (refer to item 6 in Fig. 1).
3 Complete this network segment by attaching the second cable to the left port TX. The regular blink changes to a regular pulse and on the source node, the R RX LED and the R TX LED appears to pulse in time with the green status LED.
4 When you commission all of the nodes in the network in this way and the network is complete, set SW 4-8 to "0" and reset each node. After the reset, each node receives a configuration from the panel before re-joining the network.

FOM800 installation (optional)

This is an overview of the steps required to install the FOM800:

- Installation of network cables
- A discontinuity and an attenuation check
- Installation of FOM800 module(s)

General cabling requirements for fibre-optic cables

Refer to Fig. 7 to view an example of a mixed wiring system. Any combination of RS485/fibre-optic ports is available. The maximum cable distance for the FOM800 is 5000m. For general specifications and examples of suitable fibre-optic cables, refer to Tables 19 and 20.

NOTICE

Use a pig-tail or a patch cord with the same diameter as the cable.

Fibre Optic Module assembly (optional)

The panel enclosure has breakout pieces that allow the optical connectors of the FOM800 to protrude.

To assemble the FOM800, refer to Fig. 4 and complete these steps:

1 Detach the front panel of the slot card by removing the screws (refer to item 2 in Fig. 4).

2 Remove the breakout(s) for the FOM800 on the slot card front panel.

3 Remove the breakout for the bolt (item 7) in the front panel.

4 Place the screws and the supplied nylon washers (refer to item 3 in Fig. 4) into the PNI800 holes and screw them into the metal stands (item 4). Secure them firmly. Each FOM800 requires two stands.

5 Fit the FOM800 to the board and secure with screws (item 5). The fibre optic connectors of the FOM800 modules are secured to the front panel with the nuts and the lock washers provided.

6 If you require a second FOM800, repeat the steps.

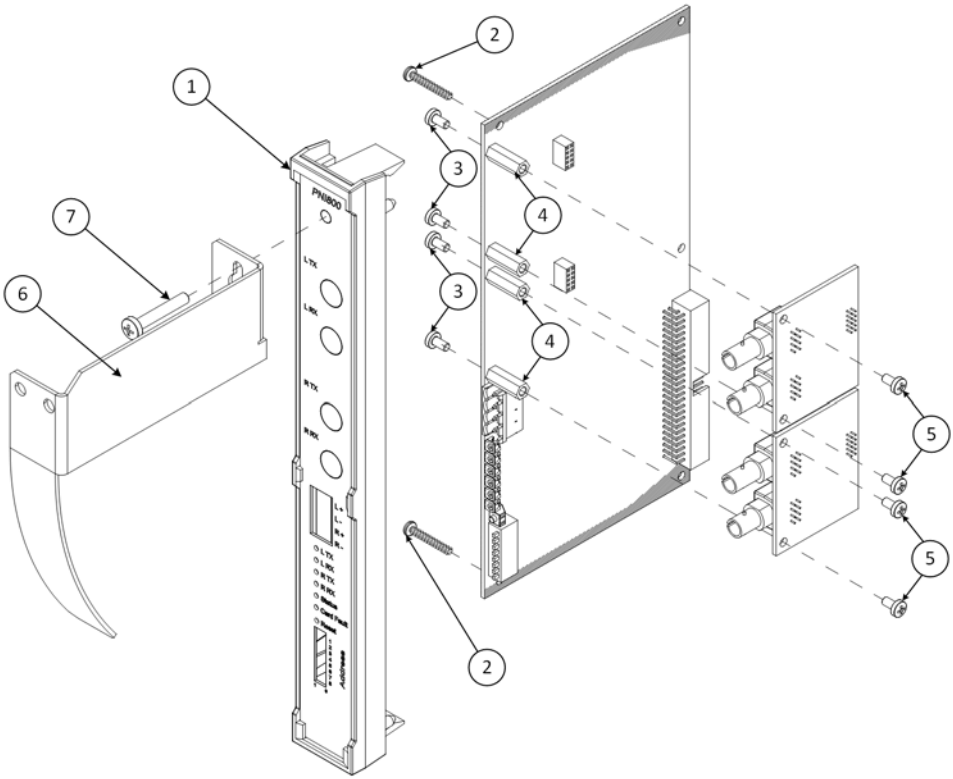

Fig. 4: FOM800 assembly

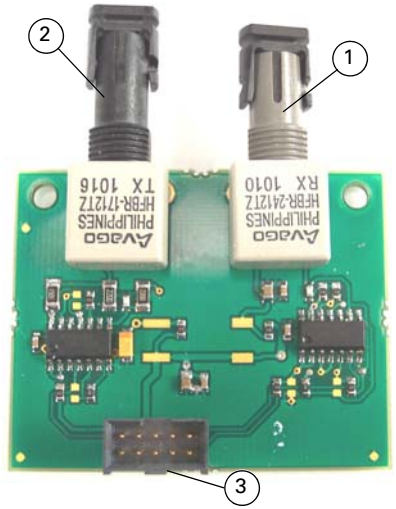

Fig. 5: FOM800 fibre-optic module
1– Fibre-optic receiver
2– Fibre-optic transmitter
3– Connector to PNI800

Installing the Emergency Alarm Display

To display a fire panel alarm condition in the event of a system fault, use an annunciator module PZ8X (part number: 557.202.858) connected to the PNI800. The maximum number of node addresses is 80. To install an emergency alarm display, complete these steps:

1 Assemble the PZ8X LED annunciator user interface module. It is fitted to the bottom door slot of the panel housing.
2 Connect the cable going to the PZ8X to the PNI800 XP2 connector.
3 Move the SW2-2 position on the PNI800 to ON. Refer to Table 7.
4 On the other end of cable, strip the conductors and push the wires into the WAGO terminal block supplied, refer to Fig. 6. Push the springs inside the terminal block to ensure that the wires are firmly fixed.
5 Plug the terminal block into the zonal display.
6 Configure the FCZ4DS / FCZ8DS address.

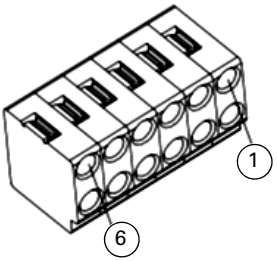

Fig. 6: WAGO terminal block wiring connection (numbered from right to left):
1– Orange -+24V
2– Orange/White - Dimming
3– Green - ground
4– Green/White - SDA
5– Blue - ground
6– Blue/White - SCL

Bypass mode

J1	
Pos. 1-2	**Pos. 2-3**
Normal mode	Node bypassed

Table 3: J1 jumper setting

Note: If enabled, bypass mode makes a hardware bridge between the left metallic network port and the right metallic network port. Bypass mode is automatically activated if the PNI800 card is powered down or if both processors are reset.

Switch 1 position		Application
1	**2**	
OFF	OFF	Gateway
ON	OFF	Bridge
ON	ON	Hub
OFF	ON	Reserved

Table 4: Card mode setting

Switch 1 position			Network baud rate
3	**4**	**5**	
ON	ON	ON	9600
OFF	ON	ON	19200
ON	OFF	ON	38400
OFF	OFF	ON	57600
ON	ON	OFF	76800
OFF	ON	OFF	115200*
ON	OFF	OFF	Reserved
OFF	OFF	OFF	Reserved

Table 5: Network baud rate setting
** default setting in normal operation, depending on the cable used*

Switch 1	Network topology
Position 6	
ON	Bus
OFF	Ring*

Table 6: Network topology
** default setting in normal operation*

SW2	Host interface
pos. 1	
ON	RS232
OFF	NBUS*

Table 7: Host interface setting
** default setting in normal operation*

SW2	Emergency display
Position 2	
ON	Enabled
OFF	Disabled*

Table 8: Emergency display enable/disable
** default setting in normal operation*

SW2			Network Left and Right Terminator
pos .3	**pos. 4**	**pos. 5**	
OFF	OFF	OFF	Left and Right Enabled* (default)
OFF	ON	OFF	Left Disabled
OFF	OFF	ON	Right Disabled
OFF	ON	ON	Left and Right Disabled
ON	OFF	OFF	Reserved
ON	OFF	ON	Reserved
ON	ON	OFF	Reserved
ON	ON	ON	Reserved

Table 9: Network interface terminator setting for metal cable
** default setting in normal operation for Bus and Ring network topology*

SW2 position 8	EMER. MCU FW upgrade mode
ON	Enabled. Mode is activated after RESET
OFF	Disabled*

Table 10: Emergency MCU FW upgrade mode enable
** default setting in normal operation*

SW1 Position 8	MAIN MCU FW upgrade mode
ON	Enabled. Mode is activated after RESET
OFF	Disabled*

Table 11: MAIN MCU FW upgrade mode enable
** default setting in normal operation*

SW3 Position 1..7	Network address
ON	Binary coded network address SW 3.1=LSB SW 3.7=MSB
OFF	ON=1 OFF=0

Table 12: Network address setting

SW4 Position 8	Commissioning mode
ON	RESET or power ON to enable commissioning mode. For more information, see the "Equipment required"section.
OFF*	Disabled. After the reset, each node receives a configuration from the panel before re-joining the network. For more information, see the "Equipment required"section.

Table 13: Commissioning mode address setting
** default setting in normal operation*

SW4 position 1..7	NBUS address
ON	Binary coded NBUS address SW 4.1=LSB SW 4.7=MSB
OFF	ON=1 OFF=0

Table 14: NBUS address setting

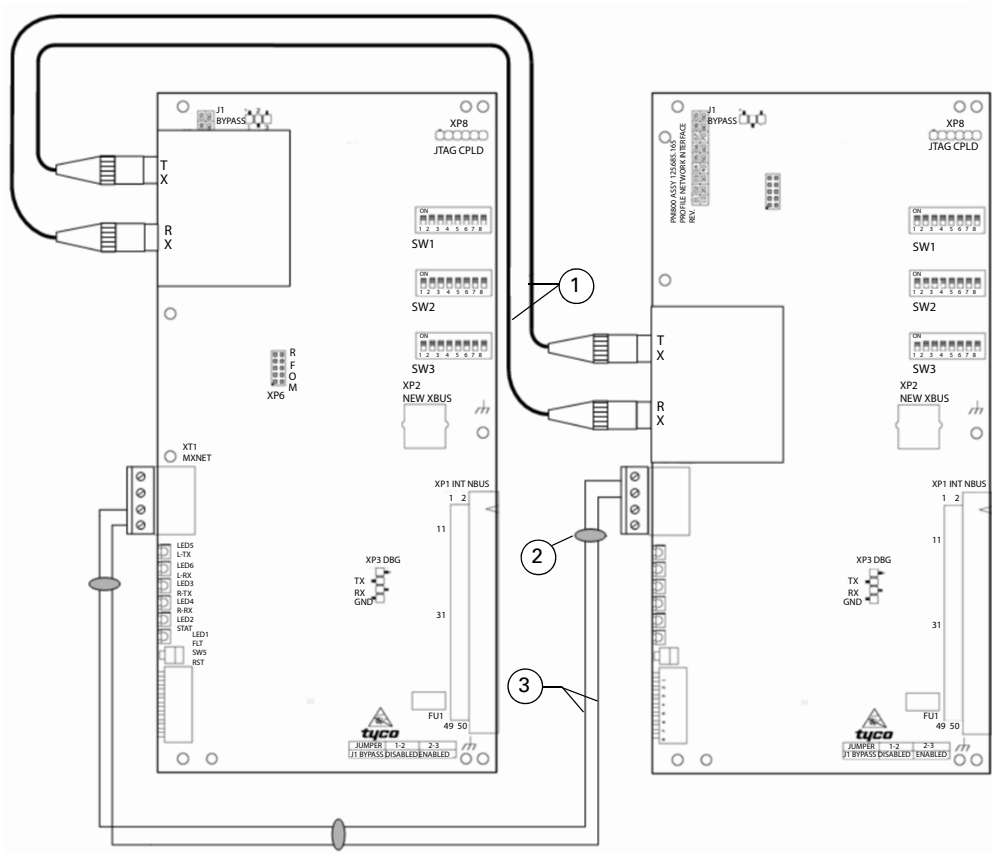

Fig. 7: Wiring diagram example, RS485 network line combined with fibre-optic line
1– To next FCNet node (optical way)
2– Cable shielding (has to be terminated at the panel earth stud)
3– From previous FCNet node (metallic)

Fault indicator				
LED	**Colour**	**Function**	**State**	**Description**
FAULT	YELLOW	FAULT INDICATOR	ON	Fault found on PNI800 card (For example, the token isn't available, a blown fuse, or other issues)
			OFF	No fault present

Table 15: Fault indicator

LED2-STATUS LED (green)			
LED	**Colour**	**Blinking rate**	**Description**
STATUS	GREEN	0.1 sec ON 0.9 sec OFF	Firmware Update Mode, wrong firmware
		0.9 sec ON 0.1 sec OFF	Configuration Mode, wrong configuration
		OFF permanent	Code Flash programming mode or microprocessor is out of order
		0.1 sec ON 0.1 sec OFF	Emergency operating mode – emergency microprocessor is active
		0.5 sec ON 0.5 sec OFF	Normal function
		ON permanently	Normal function – emergency microprocessor is not available

Table 16: Status indicator

Connector	Description
TYCO 5492458-3	Black short boot
TYCO 5492458-7	Red short boot

Table 17: Recommended connectors

Fibre specification		Maximum distance
4x50/125* (OM2-fibre)	multi-mode	4 km
4x62.5/125* (OM1-fibre)*	multi-mode	5 km

Table 18: Fibre specification

	Manufacturer	Type	Description	Max. distance
Tight buffered cables	Belden	GUMT202	2x50/125,OM2-fibre, multi-mode	4km
	Belden	GUMT102	2x62.5/125,OM1-fibre, multi-mode	5km
Loose tube cables (with jelly-filled loose tube)	Belden	GUSN202	2x50/125,OM2-fibre, multi-mode	4km
	Belden	GUSN102	2x62.5/125,OM1-fibre, multi-mode	5km

Table 19: Recommended cables for FOM800 modules

Pig tail type	MPN	Manufacturer	Length
OM1, tight buffer	FT1ST900PS01	Belden	2 m
OM3, tight buffered	FT3ST900PS01	Belden	2 m

Table 20: Recommended pig-tails

Fault indicated (configured in FireClass Express)	Wiring style (if applicable)	Fault
P1 Net card common	N/A	If this fault is active, then one or more of the faults in the rows underneath is active
P2 Net card left	Fibre Optic Module (FOM800) not fitted	Short circuit or open circuit in network wiring on the left port
	Ring, with or without FOM800	Nothing received by the left port
P3 Net card right	Fibre Optic Module (FOM800) not fitted	Short circuit or open circuit in network wiring on the right port
	Ring, with or without FOM800	Nothing received by the right port
P4 Net card ground	N/A	A ground leakage current has been detected in the network wiring, left or right port
P5 Net card data trans	N/A	Failure to obtain a correct network acknowledgement to transmitted data, or data is being received with incorrect sequence numbers, indicating that data has been lost
P6 Net card ring cont.	Ring, with or without FOM800	Transmissions from this PNI800 are failing to return to this PNI800 (echo not received)
P7 Net card comms fail	N/A	Fault within the PNI800, for example, a micro-processor fault, or the host panel is failing to communicate with the PNI800.

Table 21: Network faults

120.515.888_FC-FC700-AP-PNI800-F, doc. version 1.0, 20. May 2019

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Tyco Fire & Security GmbH, Victor von Bruns-Strasse 21, 8212 Neuhausen am Rheinfall, Switzerland