TLI800EN Network Module

Part No. 557.202.080

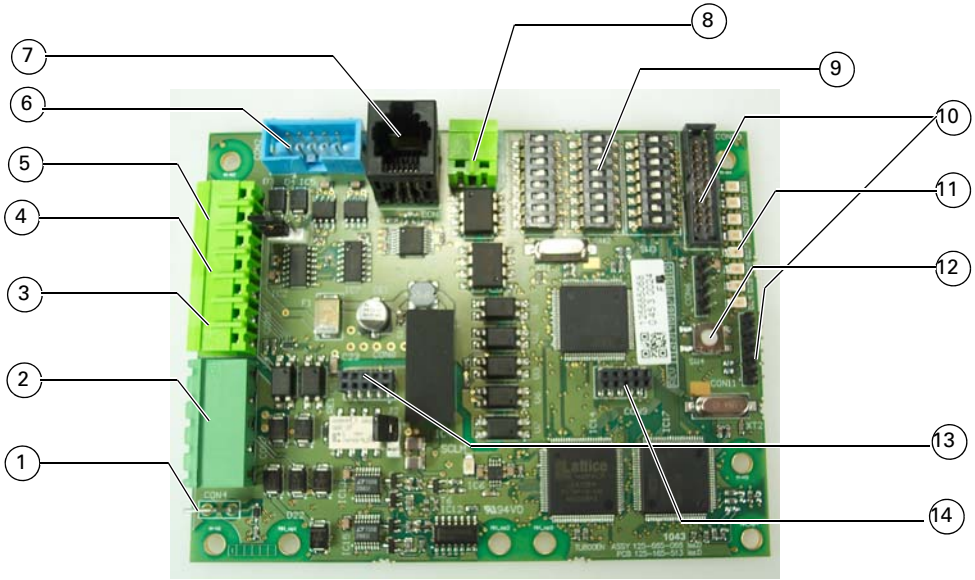

Fig. 1: TLI800EN network module
1– Earth / Unbonding
2– Network ports
3– FIC / Others I/O
4– Emergency I/O
5– Power supply
6– Host RS485 port
7– Host RS232 port
8– Emergency display port
9– Configuration switches
10–Auxiliary JTAG connectors
11–Indicators
12–RESET button
13–Left fibre optic module connector
14–Right fibre optic module connector

Introduction

The TLI800EN is used to:

- Connect up to 24 FireClass panels or other nodes to a single network.
- Connect the Emergency display used to display an alarm in case of a System fault.

Supported network communications media:

- Shielded twisted pair copper cable (RS485 standard).
- Fibre optic cable (multimode 50/125 µm or 62.5/125 µm).

Installation information

Installation of TLI800EN Network Interface Modules comprises the following:

- Installation of network cables.
- Cable continuity and insulation checks.
- Cable resistance and capacitance checks within metal cables.
- Discontinuity and attenuation check if the Fibre Optic Line is used.
- Installation of Power supply cable and Host system cable.
- Installation of Emergency I/O port connecting cable.
- Installation of FIC I/O port connecting cable.
- Installation of Emergency Display connecting cable if ED is applied.
- Installation of TLI800EN Network Interface Modules.
- Installation of optional FOM800 Modules (if used).

Cabling requirements

General

Refer to the cabling diagram (Fig. 3 on page 6) to ascertain the cable requirements of a typical system. The maximum distance between nodes of a circuit is 3000 m, but with reduced baud rate. Shielded twisted pair cable whose characteristics are within the cable parameters given in Table 1 on page 2 is recommended. The maximum recommended distance using TYCO (Pyrotenax) standard MICC (xLx) Fire Survival cable is 1200 m.

Examples of suitable cables are given in Table 2 on page 3.

Baud rate	Capacitance
115200	100 nF
76800	150 nF
57600	200 nF
38400	300 nF
19200	600 nF
9600	600 nF

Table 1: TLI800EN, Cable parameters, approximate maximum wire-to-wire capacitance
Maximum resistance = 40 Ohm for EN54-13 compliant installation.
Maximum resistance = 65 Ohm for proper function without compliance.(all baud rates)

If a longer distance has to be achieved or the cable is located in high Electromagnetic Interference environment, the Fibre Optic Module(s) should be used. Any combination of RS485 / Fibre Optic Ports is available. The maximum distance with FOM800 use is 5000 m. Examples of suitable fibre optic cables are given in Table 19 on page 14.

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, then 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 on page 2 and Table 2 on page 3.

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

Table 2: TLI800EN, Cable examples
Baudrate up to 115.2 kBd
** Baudrate up to 76.8 kBd*
*** Baudrate up to 57.6 kBd*
**** Baudrate up to 38.4 kBd*
***** Baudrate up to 19.2 kBd*
Line is not compliant with 10 % rule of EN 54-13
Not applicable

Metal cable routing

It is important to ensure the correct routing of metal cables in order to minimise coupling effects. In particular, power and network signal cables should *not* be run in the same conduit or trunking.

CAUTION

- If it is necessary to cross signal cables over power cables, the cross-over should be made at right angles.
- Network cables should also be segregated from PA lines.

Earthing

To ensure the required maximum EMC protection it is essential that the earthing of metal cable screens be carried out as shown in the wiring diagrams in
Fig. 5 on page 10 and/or Fig. 1 on page 11.

Network cable screen tails connected to the FireClass earth stud must be as short as possible. Screening must not be connected to Terminal Block of CON7, pin 3, but the proper earth stud has to be used.

Network cabling with metal cable

Check that the cabling is within the parameters given in Table 1 on page 2.

Check 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, renew any low-insulation cable.

Record the final readings obtained, and leave the records inside the FireClass housing.

Network Cabling With Fibre Optic Cable

If the Fibre Optic Rack is used, TLI800EN is connected with the rack through Patchcords or Pig-Tails.

If the Fibre Optic Rack is not used and the cables are led to Fire Panel housing directly, Pig-Tails have to be joined with cable fibres before the installation.

Join the ST Fibre Optic connectors with ST connectors of optic fibers.

Check the cabling for breaks and sudden folds with 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 obtained, and leave the records inside the FireClass housing.

Commissioning

Commissioning of the TLI800EN comprises the following:

- Cable continuity and insulation checks.
- Cable capacitance checks.
- Installation of the TLI800ENs.
- Installation of the FOM800s if they are used.
- Connection of equipment.
- If a new firmware version is required, refer to TIB905 for download instructions.

Equipment required

In order to carry out the commissioning procedure, the following equipment is required:

- A high voltage insulation tester (Megger).
- A capacitance meter.
- A simple Fibre-Optic tester if FOM800 module is used.
- If a new firmware version is expected to be downloaded, a PC (notebook) with a download cable and the correct programming software will be required. Refer to TIB905 for download instructions.

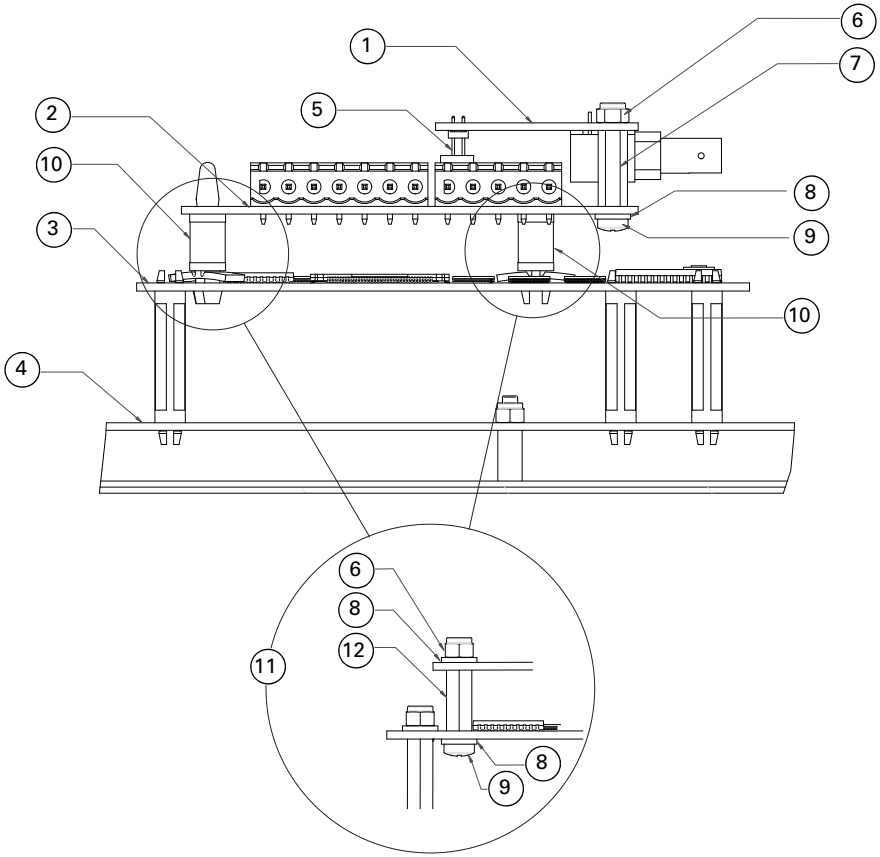

Fig. 2: TLI800EN mounting
1– FOM800 (optional fibre optic module)
2– TLI800EN
3– CPU800
4– FIM800
5– FOM connector
6– Nut
7– Metal stand-off (supplied with the FOM800, along with all other mounting hardware shown)
8– Plastic washer
9– Bolt head
10–Plastic stand-off (use for land-based applications)
11–Marine applications
12–Metal stand-off (use for marine applications)

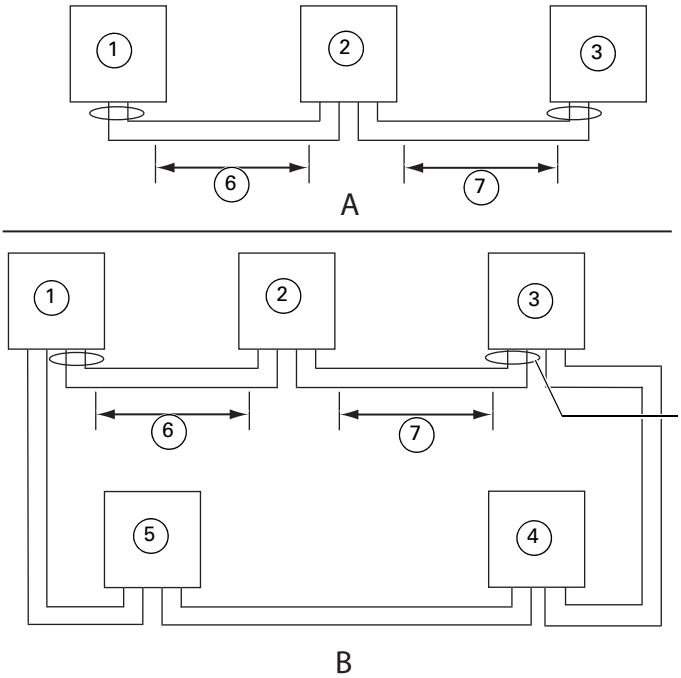

Fig. 3: Typical system cabling, A) Bus topology, B) Ring topology
1– Node 1
2– Node 2
3– Node 3
4– Node 4
5– Node 5
6– For typical cable requirements, see Tables 1 on page 2 and 2 on page 3
7– For fibre optic cable requirements, see Tables 19, 21, 22 and 23
In a bus topology configuration, the 'L' port connection on the first node and the 'R' port connection on the last node must be disabled in FireClass Express.

Commissioning procedure

How to perform the following checks

1 Check that the cabling is the same as the system drawing and that each cable is correctly marked.
2 Check that all FireClass panels to be connected to the network have been commissioned in the standalone mode and are powered down.
3 Repeat the high-voltage insulation, low voltage continuity and capacitance checks on all metal network cables (refer to Table 1 on page 2 for cable parameters).
NOTICE: It is *essential* that the installation is thoroughly checked before any equipment is connected.
4 Set the switches and headers for the correct configuration (refer to Fig. 4 on page 9 and Tables 3, 4, 5, 6, 8 and 11).
5 Configure the jumpers J1 and J2 (Table 18 on page 14).
6 If FOM800(s) are to be fitted, mount these to the TLI800EN board using the metal stand-

offs supplied with the FOM800. This is illustrated in Fig. 2 on page 5. Make sure the bolts, nuts and plastic washers are fitted as shown in the illustration.

NOTICE: The switch to the Fibre-Optic port is automatic when the module is plugged into the connector. The RS485 port is inactive if an FOM is installed.

7 Mount the TLI800EN to the CPU board.

For land applications use the supplied plastic stand-offs. For marine applications use the supplied metal stand-offs.

This is illustrated in Fig. 2 on page 5. For marine applications, make sure the bolts, nuts and plastic washers are fitted as shown in the illustration.

8 Connect the interface cable to CON3 on the TLI800EN and COM3 on the FIM (Table 15 on page 14).

9 Connect the metal network cabling (see Fig. 5 on page 10 and Table 17 on page 14).

10 Connect the power cable as shown in Fig. 5 on page 10 (see also Table 16 on page 14).

11 Connect the Fibre optic network cabling as shown in Fig. 1 on page 11.

12 To use the Emergency Alarm Signal feature, make one of the following connections:

– If the FireClass Panel is a Master Panel, connect the FIM H6 EMERGENCY ALARM INPUT to the TLI800EN Emergency I/O as shown in Fig. 5 on page 10.

– If the FireClass Panel is NOT a Master Panel, connect FIM H8 ALARM to TLI800EN FIC I/O as shown in Fig. 5 on page 10.

Do not make both connections as this will lead to a latched Alarm Signal, which can only be reset by turning off the FireClass Panel.

Note that emergency alarm wiring is required in all panels to achieve an EN54 approved network.

13 When all connections have been made, power up the controllers.

14 If a new firmware version is released, download both MCUs. Plug-in the download cable to CON3. Set the download mode of the Main MCU and download the MCU firmware as described in the relevant TIB. Cancel the download mode of Main MCU (Table 9 on page 12). Set the download mode of Emergency MCU and download the MCU firmware. Cancel the download mode of Emergency MCU (Table 9 on page 12). Reset the module.

NOTICE: If both MCUs are set to be downloaded, the mode is blocked. If the MCU code is corrupted, set the switch 2-6 (2-7) OFF during downloading. This blocks the Watchdogs (Table 10 on page 12).

15 Rectify any network faults, refer to Table 24 on page 15.

16 Using the controller functions, check that each controller can communicate with all other controllers.

17 Check that all configured inter-controller functions respond correctly.

Supplement 1, FOM800 installation

Installation of FOM800 Fibre Optic Module comprises the following:

- Installation of network cables.
- Discontinuity and attenuation check.
- Installation of FOM800 Module(s).

General cabling requirements of fibre-optic cables

Refer to the cabling diagram (Fig. 3 on page 6) to ascertain the cable requirements of a typical system. Any combination of RS485 / Fibre Optic Ports is available. The maximal distance with FOM800 is 5000 m.

General specification of Fibre Optic Cables is given with Table 19 on page 14.

Examples of suitable Fibre Optic Cables are given with Table 21 on page 15.

Examples of suitable Pig-Tails and Patch cords are given with Table 22 and 23 on page 15.

NOTICE

It is essential to use the pigtail or patch-cord with the same type of the fibre (diameter) as the one of the cable.

See the descriptions of Cabling and Commissioning above for details.

Supplement 2, Emergency Alarm Display installation

To display a Fire panel in an alarm condition in case of a System fault use an annunciator module ANN880 (557,202.022) connected through an MPM800 (557.202.012) to the TL800EN. In this case the maximum number of node addresses is limited to 80.

Installation of Emergency Alarm Display comprises the following

- Assembly of ANN880. The module is mounted in a separate housing placed next to the Fire panel housing. The MPM800 is mounted directly to the ANN880.
- Connect the TLI800EN CON1 pin 1 and pin 2 to the MPM800 TB2-1 and TB2-2 respectively.
- Configure the MPM800 personality to XBB-R.
- Set MPM800 address to 0.
- Set MPM800 baud rate to 19200.
- Switch SW2-2 on the TLI800EN to ON (Table 6 on page 12).

NOTICE

It is essential that the MPM800 and the TLI800EN use the same power supply.

Switch 1 position		Application
1-1	1-2	
OFF	OFF	Gateway/BMX
OFF	ON	BMI

Table 3: TLI800EN, Application setting

Switch 1 position		Application
1-1	1-2	
ON	OFF	Bridge
ON	ON	Reserved

Table 3: TLI800EN, Application setting (cont.)

Switch 1 position			Network baud rate
1-3	1-4	1-5	
ON	ON	ON	9600
OFF	ON	ON	19200
ON	OFF	ON	38400
OFF	OFF	ON	57600
ON	ON	OFF	76800
OFF	ON	OFF	115200 [a]
ON	OFF	OFF	Reserved
OFF	OFF	OFF	Reserved

Table 4: TLI800EN, Network baud rate

a– Recommended Baud rate

Switch 1 position	Network topology
1-6	
ON	Bus
OFF	Ring

Table 5: TLI800EN, Network topology

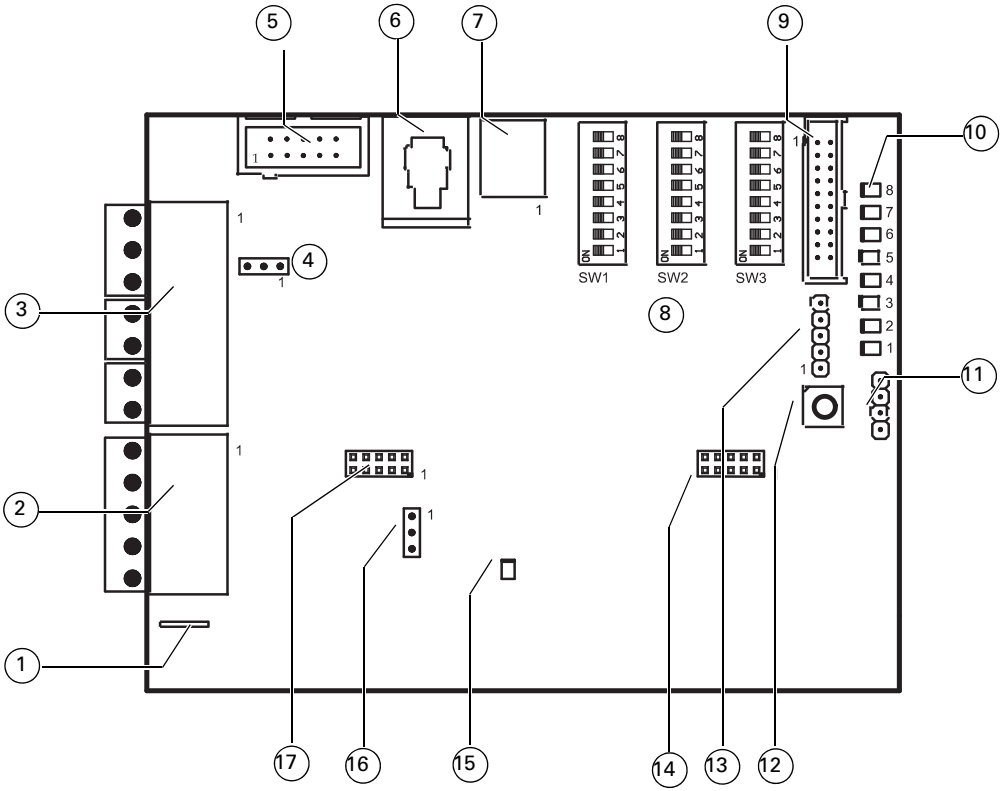

Fig. 4: Switches, Terminals and header
1– CON4, earth
2– CON7; see Table 17 on page 14
3– CON5; see Table 16 on page 14
4– J1; see Table 18 on page 14
5– CON2; see Table 14 on page 14
6– CON3; see Table 15 on page 14
7– CON1; see Table 13 on page 14
8– Switches 1. 2 and 3; see Tables 3, 4, 5, 6, 8, 9, 10 and 11
9– CON10, JTAG
10–LED Indicators; see Table 12 on page 13
11–CON11, JTAG
12–Pushbutton, reset
13–CON6, AUX
14–CON9, right fibre optic module
15–PON; see Table 12 on page 13
16–J2; see Table 18 on page 14
17–CON8, left fibre optic module

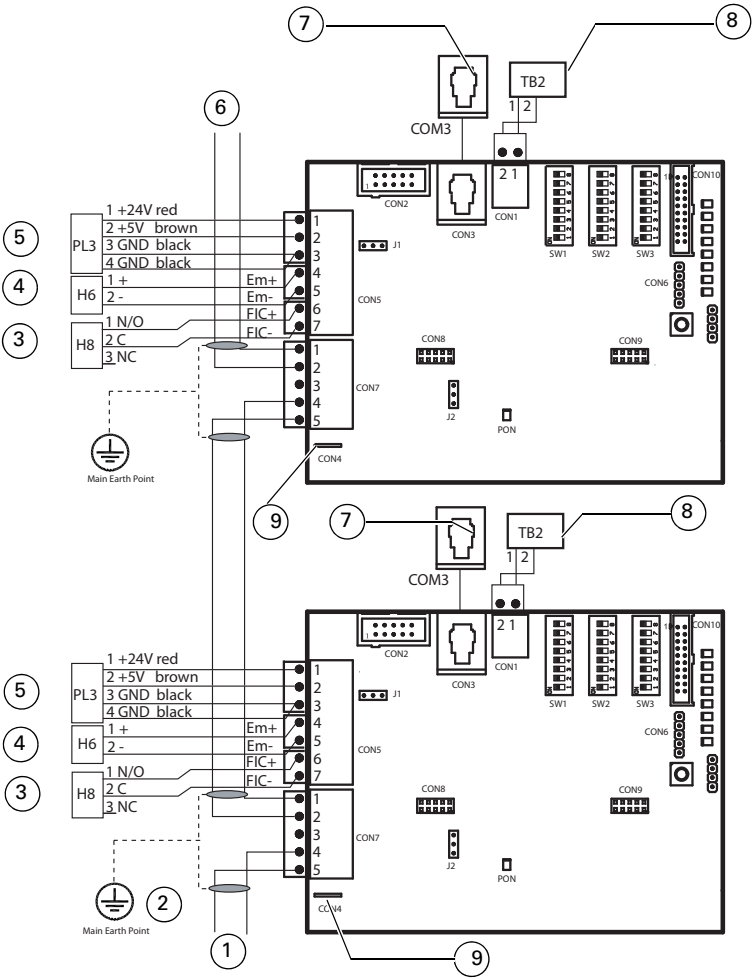

Fig. 5: Wiring diagram, RS485 network line.

1– RS-485 wiring to next node.

2– Cable shielding can be terminated at the panel earth stud.

3– Alarm relay, FIM. Note the information on this connection, and item 4 below, provided in Step 12 on page 7.

4– Emergency alarm input, on FIM.

5– Preformed power cable to PL3 (network power on FIM).

6– RS-485 wiring from previous node.

7– To COM3 serial port on FIM.

8– To MPM800/ANN880 TB2.

9– Connect earth lead between CON4 and chassis earth.

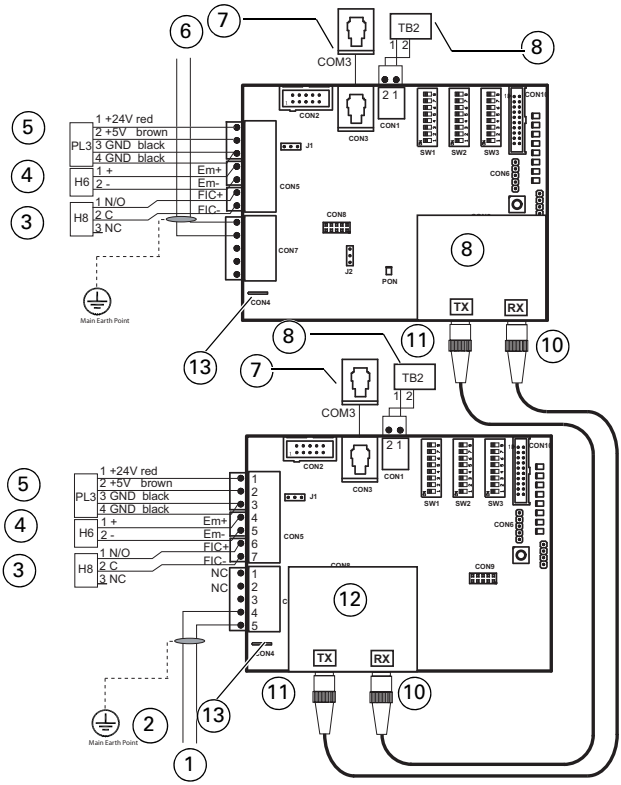

Fig. 1: Wiring diagram, RS485 network line combined with fibre optic line

1– RS-485 wiring to next node.

2– Cable shielding can be terminated at the panel earth stud.

3– Alarm relay on FIM. Note the information on this connection, and item 4 below are provided in Step 12 on page 7.

4– Emergency alarm input, on FIM.

5– Preformed power cable to PL3 (network power on FIM).

6– RS-485 wiring from previous node.

7– To COM3 serial port on FIM.

8– To MPM800/ANN880 TB2.

9– Right fibre optic port.

10–Fibre optic receiver RX.

11–Fibre optic transmitter TX.

12–Left fibre optic port.

13–Connect earth lead between CON4 and chassis earth.

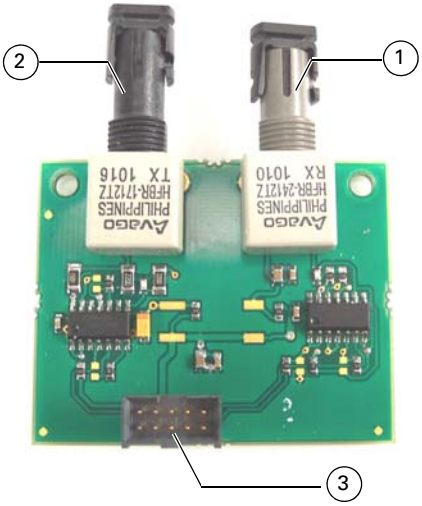

Fig. 6: FOM800 fibre-optic module
1– Fibre optic receiver
2– Fibre optic transmitter
3– Connector to TLI800EN

	Switch 2 position	Host interface
2-1	ON	Bus RS485
	OFF	RS232

Table 6: Setup of Host Interface

	Switch 2 position	State
2-2	ON	Enabled
	OFF	Disabled

Table 7: Setup of Emergency Display

Switch 2 position			Host interface baud rate
2-3	2-4	2-5	
ON	ON	ON	4800
OFF	ON	ON	9600
ON	OFF	ON	19200

Table 8: TLI800EN, Host interface baud rate setting

Switch 2 position			Host interface baud rate
2-3	2-4	2-5	
OFF	OFF	ON	38400
ON	ON	OFF	57600
OFF	ON	OFF	76800
ON	OFF	OFF	115200
OFF	OFF	OFF	Reserved

Table 8: TLI800EN, Host interface baud rate setting

	Switch position	Firmware upgrade of MCU
1-8	ON	Download mode after RESET (M MCU)
	OFF	Run
2-8	ON	Download mode after RESET (E MCU)
	OFF	Run

Table 9: TLI800EN, Setup for downloading mode

	Switch 2 position	Watchdog
2-6	ON	M MCU, enabled
	OFF	M MCU, disabled
2-7	ON	E MCU, enabled
	OFF	E MCU, disabled

Table 10: TLI800EN, Temporary switch-off of watchdogs

	Switch 3 position	Node address or Test option
3-8	ON	Switch 3 is reserved for test option

Table 11: TLI800EN, Node address setting

	Switch 3 position	Node address or Test option
	OFF	Switch 3 = node address
3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-7	3-1 = LSB 3-7 = MSB (OFF=0, ON=1)	Binary coded Node address

Table 11: TLI800EN, Node address setting (cont.)

TLI800EN network interface module LED indicators					
LED	**Colour**	**Function**	**State: ON**	**State: OFF**	**State: BLINKING**
1	RED	CHANNEL L RECEIVE	DATA RECEIVED AT HIGH SPEED	NO DATA RECEIVED	DATA IS RECEIVED
2	RED	CHANNEL L TRANSMIT	DATA TRANSMITTED AT HIGH SPEED	NO DATA TRANSMITTED	DATA IS TRANSMITTED
3	RED	CHANNEL R RECEIVE	DATA RECEIVED AT HIGH SPEED	NO DATA RECEIVED	DATA IS RECEIVED
4	RED	CHANNEL R TRANSMIT	DATA TRANSMITTED AT HIGH SPEED	NO DATA TRANSMITTED	DATA IS TRANSMITTED
5	GREEN	MAIN PROCESSOR RUNNING	RESET	MCU FAULT	NORMAL OPERATION
6	GREEN	EMERGENCY PROCESSOR RUNNING	RESET	MCU FAULT	NORMAL OPERATION
7	YELLOW	MAIN MCU - FAULT	FAULT DETECTED	NORMAL OPERATION	FAULT DETECTED
8	YELLOW	EMERGENCY MCU - FAULT	FAULT DETECTED	NORMAL OPERATION	FAULT DETECTED
PON	GREEN	DC/DC CONVERTER OUTPUT (POWER ON)	NORMAL OPERATION	HW FAULT	N/A

Table 12: TLI800EN, LED designations

Terminal No.	Signal
1	RS485 ED+
2	RS485 ED-

Table 13: TLI800EN, Terminal block CON1 - EMERGENCY DISPLAY - designations

Pin No.	Signal
1	GND
2	RS485 H+
3	RS485 H-
4	EMER I/O+
5	EMER I/O-
6	FIC I/O+
7	FIC I/O-
8	NC
9	NC
10	GND

Table 14: TLI800EN, Connector CON2 - RS485 to HOST SYSTEM - designations

Pin No.	Signal
1	COM (GND)
2	TX
3	RX
4	NC
5	NC
6	COM (GND)

Table 15: TLI800EN, Connector CON3 - RS232 to HOST SYSTEM - designations

Terminal No.	Signal
1	+24 V IN
2	+5 V IN
3	COM (GND)
4	EMER I/O+
5	EMER I/O-
6	FIC I/O+
7	FIC I/O-

Table 16: TLI800EN, Terminal block CON5 - POWER SUPPLY from HOST SYSTEM, EMERGENCY I/O and FIRE BRIGADE IS COMING I/O signals - designations

Terminal No.	Signal
1	RS485 L+
2	RS485 L-
3	EARTH (via CON4)
4	RS485 R+
5	RS485 R-

Table 17: TLI800EN, Terminal block CON7 - LEFT AND RIGHT NETWORK PORTS - designations

Header	Link 1-2	Link 2-3
J1	RS485 to HOST SYSTEM is terminated with 120R	RS485 to HOST SYSTEM is not terminated
J2	Normal state	Network node is bypassed

Table 18: TLI800EN Links, header configurations

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

Table 19: TLI800EN, Fibre optic cable parameters
** 4-way fibre optic cables (2 fibres are margin) are generally recommended.*

Connector	Description
TYCO 5492458-3	black short boot
TYCO 5492458-7	red short boot

Table 20: Examples of connectors compatible with ST standard

Tight buffered cables			
Manu-facturer	**Type**	**Description**	**Max. dis-tance**
Belden	GUMT204	4x50/125 OM2-fibre, multi-mode	4 km
Belden	GUMT104	4x62.5/125 OM1-fibre, multi-mode	5 km
Loose tube cables (with jelly-filled loose tube)			
Belden	GUSA204	4x50/125 OM2-fibre, multi-mode	4 km
Belden	GUSA104	4x62.5/125 OM1-fibre, multi-mode	5 km

Table 21: TLI800EN, Fibre-optic cable examples

Fibre type		Length	MPN
50/125	µm	2 m	0-5349569-4

Table 22: Fibre-Optic Pigtail Examples from AMP NETCONNECT (Tyco Electronics)

Fibre type		Length	MPN
62.5/125	µm	2 m	0-5349582-4

Table 22: Fibre-Optic Pigtail Examples from AMP NETCONNECT (Tyco Electronics)

Fibre type		Length	MPN
50/125	µm	1 m	0-5349561-1
50/125	µm	5 m	0-5349561-5
62.5/125	µm	1 m	0-5349574-1
62.5/125	µm	5 m	0-5349574-5

Table 23: Fibre-Optic ST-style duplex/ST-style duplex patchchord Examples from AMP NETCONNECT (Tyco Electronics)

Address 127 (Reserved function)

The TLI800EN will request its network configuration parameters from its host device on power-up/reset. If the host device is not present it will join the network using the network parameters it has stored. These may or may not be suitable for the network concerned. If you do not wish the TLI800EN to join the network you can set the address of the TLI800EN to 127 and press the reset button. When the host (with correct network parameters) is available change the address back to the correct value for the node concerned and press reset. This will ensure that the TLI800EN then requests and receives the correct network parameters from its host and it will then join the network.

Fault indicated (configured in FireClass Express)	Wiring style (if applicable)	Fault
Net card common	N/A	If active then one or more of the following faults is active
Net card left	Fibre Optic Module (FOM) not fitted	Short circuit or open circuit in network wiring on the left port
	Ring, with or without FOM	Nothing received by the left port

Table 24: TLI800EN, Network faults

Fault indicated (configured in FireClass Express)	Wiring style (if applicable)	Fault
Net card right	Fibre Optic Module (FOM) not fitted	Short circuit or open circuit in network wiring on the right port
	Ring, with or without FOM	Nothing received by the right port
Net card ground	N/A	Ground leakage current has been detected in the network wiring, left or right port
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 data has been lost
Net card ring cont.	Ring, with or without FOM	Transmissions from this TLI800EN are failing to return to this TLI800EN (echo not received)
Net card comms fail	N/A	Fault within the TLI800EN, e.g. micro processor fault, or the host panel is failing to communicate with the TLI800EN. Or the TLI800EN is failing to communicate with the MPM800 on the emergency display (if used).

Table 24: TLI800EN, Network faults (cont.)

FC-AP-TLI800EN-F, doc. version 3.0, 10. October 2019

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