FIBERSYSTEM

# Fiber Optic Transfer Trip Link
# 23-450 , 23-452 , 23-453


# Technical manual

# About this manual

## About the contents of this manual

The information in this document may be changed at any time without notice..

## Table of Contents

# Version and revision history.

**Revision history for product:**

23-450
Revision 0.
Valid from serial number: *FS02333 (2003-10-30).*
Functional ground screw added: *FS-02370 (2004-02-02).*
23-452
Revision 0.
Valid from serial number: *5502755 (2004-07-08).*
23-453
Revision 0.
Valid from serial number: *(2005-03-30).*

**Revision history for this document.**

Revision 0.
2003-12-10, AnNy, document created.
Revision 1.
2004-01-30, AnNy, Pictures updated. Functional ground added.
Revision 2.
2004-02-05, AnNy, Physical size corrected. Part list corrected.
Revision 3.
2004-07-08, AnNy, Product 23-452 added – singlemode and BI 220VDC.
Revision 4.
2004-08-26, AnNy, Information on power supply connectors corrected.
Revision 5.
2005-03-29, AnNy, Product 23-453 added – singlemode and BI 110VDC.

**Document properties.**
Last saved: 2005-03-29 14:05
Filename: Technical Manual 90-20-0105R5.doc

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# General description

## Functional

The Fiber Optic Transfer Trip Link is intended to extend binary functions over medium and long distances. E.g. transfer trip.
The link can be delivered with fiber optic components for distances up to 80km. The protocol used by the link is designed to have high security..

The transfer trip time is around 8ms from Binary Input to Binary Output.

The link is designed for duplex mode, (2 fibers). 4 signals can be transferred in each direction. The link can also be used in simplex mode, (1 fiber). Note that the remote alarm function has no relevance in simplex mode..

Every binary input is "sampled" with 25Msamples per second.
The sampled input data is filtered for changes over a period of 1ms.
The filtered input data is sent as a data message on the fiber.

In order to increase the security, for example against disturbances, the protocol on the fiber, needs 4 consecutive equal data messages before any change of the Binary output.
In addition there is a fiber optic link-control, indicating correct received data messages. This is indicated to the user by a "Link OK" – LED.

There is also a "Local alarm" – LED, and a "Local alarm" relay. (Contact open at no error). The relay and the LED are activated when an error is found. For example, at link loss.
Both the "Local Alarm"-LED and -relay has a latched function. When an error is detected in the local unit, the Local Alarm-LED is lit and the Local Alarm-relay is activated. They stay activated until the Reset alarm button is pressed.

In duplex mode, the "Local alarm" – indication is sent to the remote unit, and there indicated as "Remote alarm".
There is one "Remote alarm" – LED, and one "Remote alarm" relay.
The Remote Alarm-LED and relay has a monostable latch function. An error detected in the remote unit will be sent to the local unit and indicated by Remote Alarm-LED and relay. When the remote unit no longer detects errors, Link-OK, Remote Alarm-LED and the relay, are inactivated. Short remote error pulses are prolonged to some seconds of time, to make sure all Remote Alarms are detectable and visualized.

Both "Local alarm" and "Remote alarm" relay outputs have the same data as for the Binary outputs. See "Features".

# Features

**Transfer Trip**

| | |
|---|---|
| Typical operate time | ≤8ms |
| Typical reset time | 3ms |

**Binary Inputs**

The 4 binary inputs has optical isolation, (optocoupler).
2kV immunity common mode.

| | |
|---|---|
| 23-450 | Rated Voltage 110/125 V DC ±20%, (88-150VDC). Power consumption, max 0.2 W/input. (Multimode fiber). |
| 23-452 | Rated Voltage 220/250 V DC +20%, (176-300VDC). Power consumption, max 0.4 W/input. (Singlemode fiber). |
| 23-453 | Rated Voltage 110/125 V DC ±20%, (88-150VDC). Power consumption, max 0.2 W/input. (Singlemode fiber). |

Other rated voltages are quoted on request.

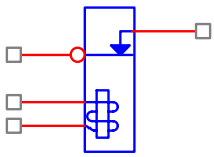
**Binary Outputs**

| | |
|---|---|
| Making capacity | 30A 0.2s , 10A 1.0s |
| Continiuos current | 8A |
| Breaking capacity AC | 250V/8A |
| Breaking capacity DC | 48V/1A , 110V/0.4A , 220V/0.2A , 250V/0.15A |

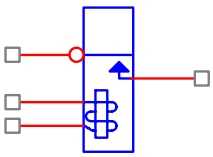
Specify wanted contact function at order.

| | |
|---|---|
| A | Normally Open. |
| B | Normally Closed. |

("Normally" means idle on fiber (Input inactive), or no connection on the link).



Normally Closed



Normally Open

Other relays and functions, are quoted on request.

**Fiberoptic and data transfer protocol**

| | |
|---|---|
| Data speed | 125Mbit/s |

**Optical data for option Multimode – 23-450**

| | |
|---|---|
| Wavelength | 1300nm |
| Fiber optical connector | SC |
| Optical System budget | 10dB with multimode fiber, (62.5/125 um) |
| Typical distance | 2km |

**Optical data for option Singlemode – 23-452 and 23-453**

| | |
|---|---|
| Wavelength | 1550nm |
| Fiber optical connector | SC |
| Optical System budget | 31dB with singlemode fiber, (9/125 um) |
| Typical distance | 80km |

**Power Supply.**

48V DC to 250V DC, ± 20%
110V AC to 230V AC, 50Hz, ± 20%.

| | |
|---|---|
| AC and DC connector | IEC 320, 3 pin. |
| Power consumption <20W. | |

Specify supply voltage or connector at order.

**Transfer Trip time**

The propagation delay for a signal in a fiber optic cable is about 5ns/m.
At 2 km of fiber this gives a delay of 0,01ms.
At 80km of fiber this gives a delay of 0,4ms.
The delay of the Binary input is 1 ms.
The delay of the Binary output is ≤7ms.

The typical transfer trip time is ≤8ms.

**Physical size**

The unit is intended to be mounted in a 19" rack.
By adjusting, the rack mount brackets, the unit can also be mounted on a wall or similar.

| | |
|---|---|
| Height | 45 mm |
| Width | 483 mm (380 mm without rack mount brackets). |
| Depth | 173 mm (from front to back, connectors excluded). |
| Weight | 3 kg |

# Unpacking.

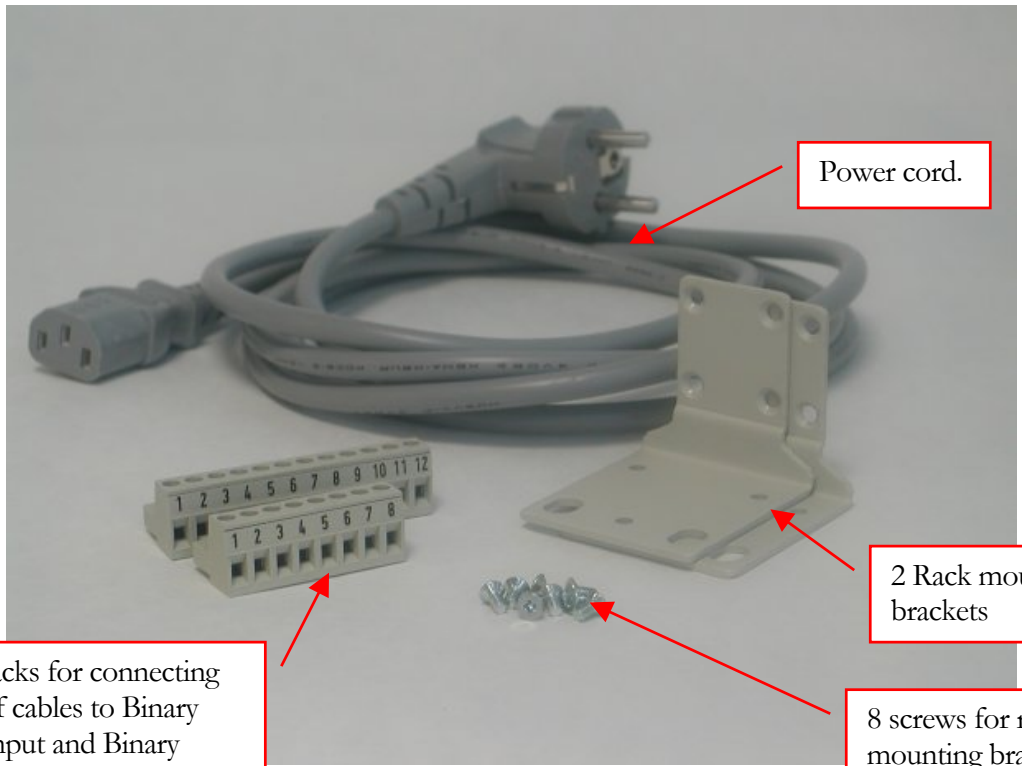
Check that all packing material has no damage. If damages are discovered on packing material, contact your shipping company, before unpacking.

The delivered product consists of several parts. Check that all part are present according to list, and have no damage.

**Product 23-450 / 23-452 / 23-453 consists of:**

| | Quantity | Part number | Description |
|---|---|---|---|
| 1 | 1 | 23-450,<br>23-452<br>or<br>23-453 | Fiber Optic Transfer Trip Link<br>*(Part number includes all parts in this list).* |
| 2 | 2 | 60-00-5387 | Rack Mounting Bracket |
| 3 | 8 | 50-65-1673 | Screw, MFX-H M3x5 FZB |
| 4 | 1 | 50-65-0106 | Power cord, 1.8m European connector. |
| 5 | 1 | 50-55-0313 | 8 pin Phoenix MSTB2,5/8-ST-5,08 F |
| 6 | 1 | 50-55-0314 | 12 pin Phoenix MSTB2,5/12-ST-5,08 F |
| 7 | 4 | 50-65-5030 | Rubber feet |

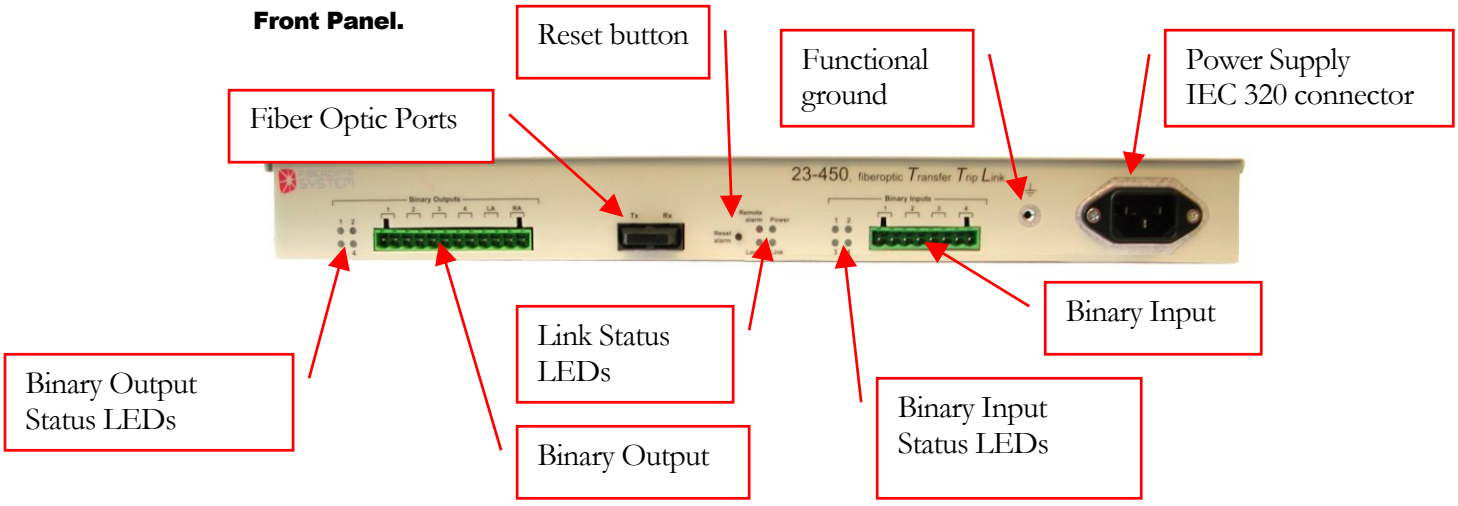

23-450, *(Part number includes all parts in list above).*



# Installation.

**Serial number.**
The products serial number is the best way for Fiberdata System to identify the product.
If the serial number is not noted on your delivery notes, please add the serial number to your own product documentation. This will be useful at future contact with Fiberdata System.

**Front Panel.**




**Back Panel.**
There are no connections or indications on the back panel.

**Binary Inputs.**
The binary inputs, are designed to be used with DC-voltage.
23-450 85 to 150VDC.
23-452 176 to 300VDC
23-453 85 to 150VDC.

Don't connect any other voltage source.
(Other voltage ranges can be quoted on request).

The connections must be made observing the polarity of the signal.

Connections are made to the screw terminals of the 8 pin Poenix-connector delivered with the product. Item 5 in the part list, under "Unpacking", in this manual.

| Binary Input signal | Terminal |
|---|---|
| Input 1 + | Pin 1 |
| Input 1 - | Pin 2 |
| Input 2 + | Pin 3 |
| Input 2 - | Pin 4 |
| Input 3 + | Pin 5 |
| Input 3 - | Pin 6 |
| Input 4 + | Pin 7 |
| Input 4 - | Pin 8 |

All binary inputs are galvanically separated by the use of optocouplers.

### Binary Outputs

The binary outputs are potential free contacts of electromechanical relays.
Check under "Features" in this document for relay data.

Connections are made to the screw terminals of the 12 pin Poenix-connector delivered with the product. Item 6 in the part list under "Unpacking" in this manual.

| Binary Output signal | Terminal |
|---|---|
| Output 1 | Pin 1 |
| Output 1 | Pin 2 |
| Output 2 | Pin 3 |
| Output 2 | Pin 4 |
| Output 3 | Pin 5 |
| Output 3 | Pin 6 |
| Output 4 | Pin 7 |
| Output 4 | Pin 8 |

### Alarm Relays Outputs

The Alarm outputs are potential free contacts of electromechanical relays.
Check under "Features" in this document for relay data.

Connections are made to the screw terminals of the 12 pin Poenix-connector delivered with the product. Item 6 in the part list under "Unpacking" in this manual.

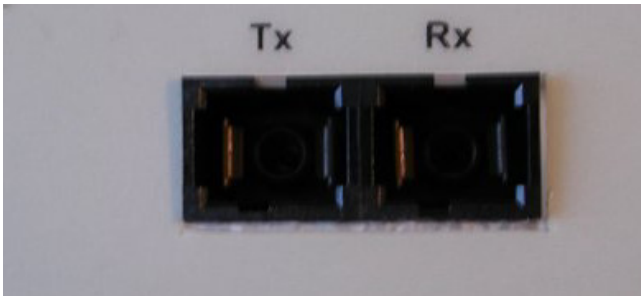
| Binary Output signal | Terminal |
|---|---|
| Local Alarm | Pin 9 |
| Local Alarm | Pin 10 |
| Remote Alarm | Pin 11 |
| Remote Alarm | Pin 12 |

### Fiber Optic Port.

The fiber optic connector is of SC type.
Make sure that the right type of fiber is used. Multi mode type for Multimode-option, (MM), and single mode fiber for singlemode-option, (SM).

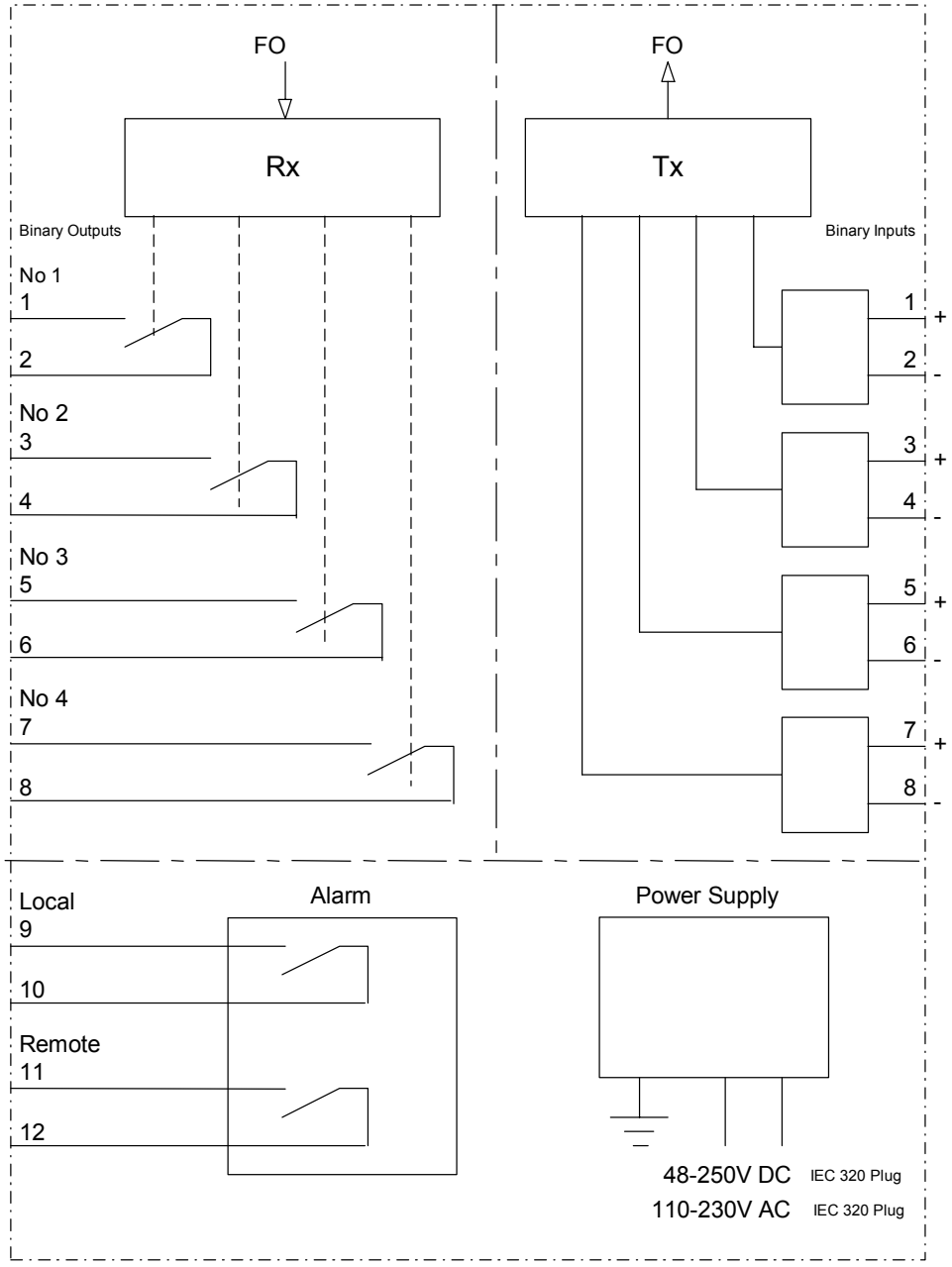
Confirm that the attenuation of the fiber optic cable, including splices and patch cables, doesn't exceed the system budget. Don't forget to add a safety margin. Minimum safety margin is 3dB.

Make sure that the local fiber optic transmitter, marked Tx, is connected to the remote units fiber optic receiver, marked Rx.
And local Rx shall be connected to remote Tx.



Fiber Optic Port.

**Connection diagram.**




**Functional earth/ground.**

To the left of the IEC 320 power supply connector, a reference ground/earth skrew is available.
Protective ground shall be connected to the IEC 320 power supply connector.

# Start and usage.

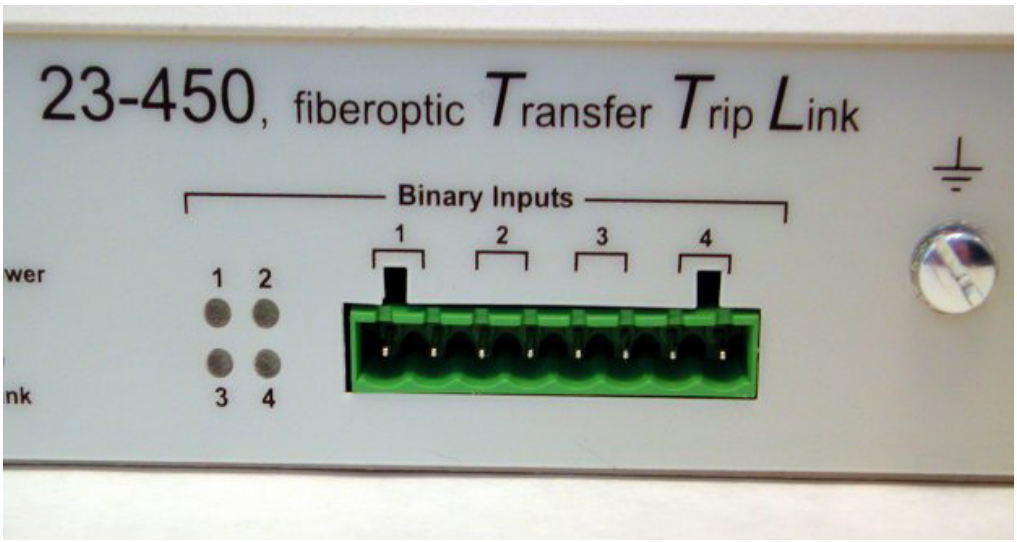
**Power on.**
Connect the power cord to the unit and then to mains.
Connect fibers.
Press Reset alarm button on both sides of the link.

Now Link Ok shall be lit, (green).
If the link doesn't work, try to cross-connect the fibers at one end. Press Reset alarm button again.

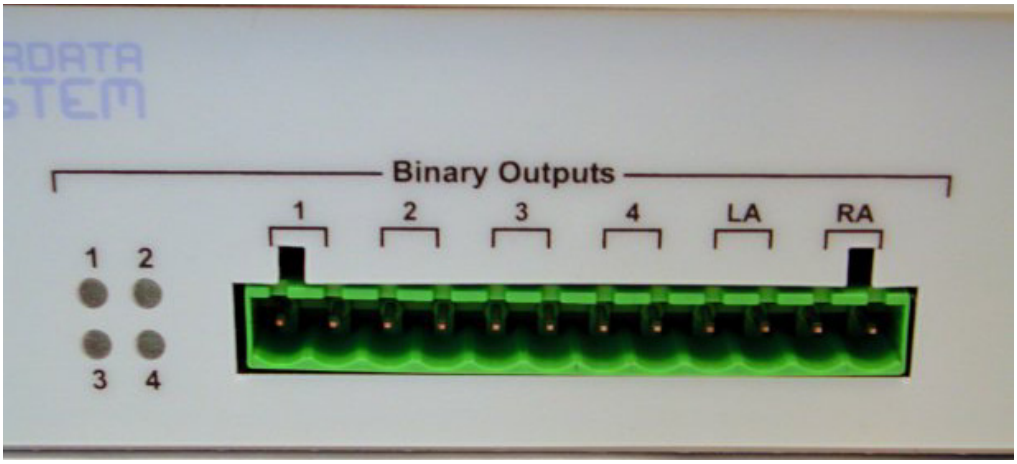
**LED-status.**

There are 4 LED-indicators for link-status, 4 LED-indicators for Binary Input status and 4 LED-indicators for Binary Output status.

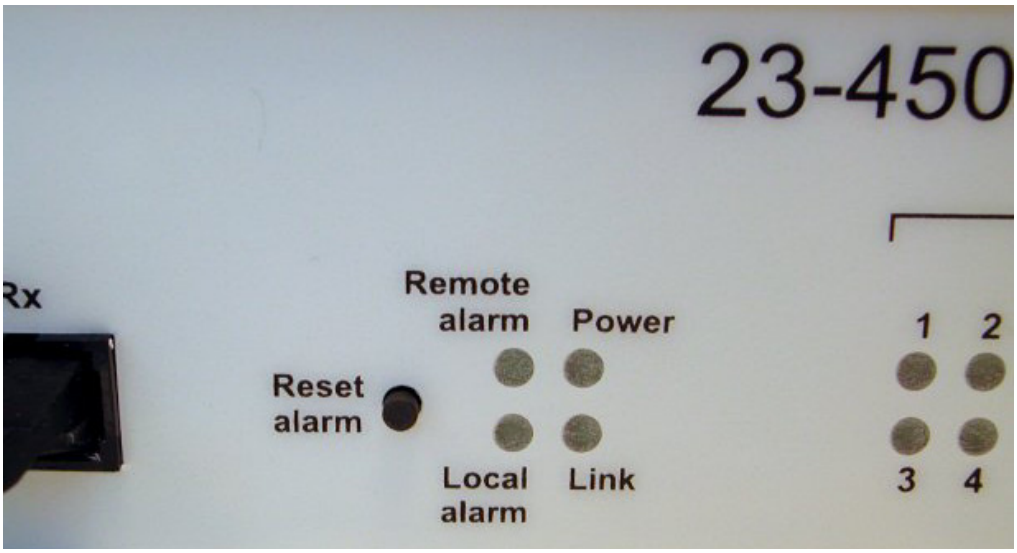
| | | |
|---|---|---|
| Link OK | Green | Data carrier/sync detected at fiber input/Rx. |
| Power ON | Green | |
| Remote alarm | Red | Remote alarm. (Remote unit has detected link error). |
| Local alarm | Red | Local alarm (Link error detected in unit). |
| Binary Inputs 1, 2 ,3 ,4 | Green | Status of Input signals. |
| Binary Outputs 1, 2, 3, 4 | Green | Status of Output relays. |



Binary Input Status LEDs.



Binary Output Status LEDs.



Link Status LEDs and Reset alarm button.

If Local alarm is triggered it will be activated, LED lit, until Reset alarm button is pressed.

Remote alarm is only used/valid in duplex mode, (2 fibers). The Remote alarm LED shows the status of the remote unit. The Remote alarm LED will only be active as long as the remote unit detects an error, (no memory function).

# Technical support

Before contacting technical support, we beg you to first read the manual once again..
If you still have problems or questions, don't hesitate to contact help desk. Please gather all relevant information, including serial number, about your installation before contacting help desk.

Our technical support can be reached at:
Fibersystem AB
Gardsfogdevagen 18B
S-16866 Bromma
Sweden
Telephone: +46-8-564 828 80 • telefax: +46-8-28 33 50
Helpdesk: 08-564 828 80
Web: http://www.fibersystem.se/
E-mail addresses can be found on our web-site.

## CE - mark

The product described in this manual , is designed to apply to the specifications of the EMC-directive 89/336EEC and to low voltage directive..

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