MAN-00112 R 2.0
EasyGrid Base User Guide

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2 Product Certification

2.1 CE Information

Electronic test equipment is subject to the EMC Directive in the European Union. The EN61326 standard prescribes both emission and immunity requirements for laboratory, measurement, and control equipment.

This unit has been tested and found to comply with the limits for a Class B digital device.

Please refer to the Declaration of Conformity.

2.2 Independent Laboratory Testing

This unit has undergone extensive testing according to the European Union Directive and Standards. Tests were performed externally, at an independent, accredited laboratory. This guarantees the unerring objectivity and authoritative compliance of all test results.

Use of shielded remote I/O cables, with properly grounded shields and metal connectors, is recommended in order to reduce radio frequency interference that may emanate from these cables.

Shielded I/O cables are recommended to improve protection against lightning surge if unit or cables are installed in outdoor area. See certificate and tests of compliance.

EasyGrid Base has been extensively tested to stringent environmental standards to ensure it remains reliable when used under published specifications.

2.3 Declaration of conformity

EU Declaration of Conformity

Manufacturer Name:	**FISO Technologies Inc.**
Address:	500, Saint-Jean-Baptiste Ave., Suite 195, Quebec, QC, Canada G2E 5R9

We hereby declare under our sole responsibility that the following apparatus:

Product description: **Fiber optic thermometer**
Model number(s): **EasyGrid Base**
Product category: **Electrical equipment for measurement, control and laboratory use.**

Complies with the essential requirements of the following applicable European Directive:
2014/30/EU Electromagnetic Compatibility (EMC) Directive,
2011/65/EU Restriction of the use of certain Hazardous Substances (RoHS) Directive

Conformity is assessed in accordance to the following standards:

EMC Standards:

EN61326-1 : 2013	Emissions/Immunity requirements for laboratory Equipment	
EN60255-26 : 2013	Measuring Relays and protection equipment: electromagnetic compatibility requirements	
CISPR 11:2015 A1(2016) EN 55011:2016 A1(2017)	Measurement of conducted emission	Group 1, class A (Industrial)
CISPR 11:2015 A1(2016) EN 55011:2016 A1(2017)	Measurement of radiated emission	Group 1, class A (Industrial)
IEC 61000-4-2 : 2008 IEC 60255-22-2 : 2008[1]	Electrostatic discharge immunity	±8kV Contact Discharge ±15kV Air Discharge
IEC 61000-4-3 : 2006 A1(2007) A2(2010) IEC 60255-22-3 : 2007[1]	Radiated electromagnetic field immunity	10V/m, 80-3000MHz Spot frequencies : 80MHz, 160MHz, 380MHz, 450MHz, 900MHz, 1850MHz, 2150MHz: 10V/m
IEC 61000-4-4 : 2012 IEC 60255-22-4 : 2008[1]	Electrical fast transient immunity (EFT)	±4kV Power Lines, ±4kV I/O
IEEE C37.90.1: 2012	Fast Transient Surge Withstand Capability	±4kV Power Lines, ±4kV I/O
IEC 61000-4-5 : 2014 IEC 60255-22-5 : 2008[1]	Surge immunity	Power: ±2kV L-PE / ±1kV L-L I/O Ports: ±2kV L-PE / ±1kV L-L Communication Ports: ±2kV L-PE
IEC 61000-4-6 : 2013 IEC 60255-22-6 : 2001[1]	Conducted disturbance induced by RF fields	10Vrms
IEC 61000-4-8 : 2009	Power Frequency Magnetic Field immunity	100A/m permanent 300A/m short duration
IEC 61000-4-9 : 2016	Pulse magnetic field immunity	1000A/m
IEC 61000-4-11 : 2004	Voltage dips, short interruptions and voltage variation immunity	1 Cycle / 0%, 10 Cycles / 40%, 25 Cycles / 70%, 250 Cycles / 80%, 250 Cycles / 0%
IEC 60255-5 : 2000[2] IEC 60255-27 : 2013	Impulse voltage withstand test	±5kV
IEC 61000-4-18 : 2006 A1(2010) IEC 60255-22-1 : 2007[1] IEEE C37.90.1 : 2012	Burst disturbance	2.5kV 2s
IEEE C37.90 : 2005	Dielectric Strength (RS-485 Circuit Only)	4.2kV

[1] These standards have been replaced by IEC 60255-26:2013
[2] This standard has been replaced by IEC 60255-27:2013

Shock, vibration and transportation:

IEC 60255-21-1 : 1988	Vibration: response , endurance	Severity Class 2
IEC 60255-21-2 : 1988-10	Shock: response, withstand and bump test	Severity Class 2
IEC 60255-21-3 : 1993-09	Seismic test	Severity Class 2
MIL-STD-810G w/change1, (2014)	Transport vibrations (Method 514.7)	Category 4

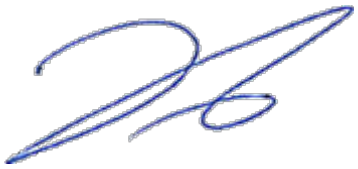
Environmental Affairs:

EN50581 : 2012	Articles manufactured on or after the Date of Issue of this declaration of Conformity do not contain any of the restricted substances in concentration/applications not permitted by the RoHS Directive

Supplementary information:

FCC Part 15 (2018) subpart B, Class A	This product meet the EMC requirement of the United States
ICES-003 (2016), Class A	This product meet the EMC requirement of the Canada
IPC-CC-830 MIL-I-46058C	Environmental protection, conformal coating

Signed for and on behalf of FISO Technologies Inc.



Issued in : Quebec, Qc, Canada
Date: **November 15th 2018**

Frederic Borne, General Manager, FISO Technologies Inc.

3 Safety Information

3.1 Conventions

Before using the product described in this guide, you should understand the following conventions:

DANGER

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. Do not proceed unless you understand and meet the required conditions.

WARNING

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, may result in component damage. Do not proceed unless you understand and meet the required conditions.

IMPORTANT

Refers to information about this product you should not overlook.

3.2 Safety Information

The level of radiation is below the level known to cause eye injury through accidental short-term exposure. However, avoid prolonged exposure to light emitted from the fiber and do not stare directly at a light beam, visible or not.

The following safety instructions must be observed whenever the EasyGrid Base is operated. Failure to comply with any of these instructions or with any precaution or warning contained in the Fiber Optic Thermometer and Client Software user's guide is in direct violation of the standards of design, manufacture and intended uses of the EasyGrid Base. FISO assumes no liability for the customer failure to comply with these safety requirements.

THIS PRODUCT IS NOT DESIGNED FOR USE IN LIFE SUPPORT OR CRITICAL APPLICATIONS.

In no case will FISO be liable to the buyer, or to any third parties, for any consequential damage or indirect damage which is caused by product failure, malfunction, or any other problem.

When using any electrical appliance, basic safety precautions should be followed, including the following:

FISO recommends using SEN-PS-EGRID power supply with your monitor and verify that the voltage specifications indicated on the power supply are compatible with the AC voltage and frequency delivered at the power outlet.

⚠ ***CAUTION***	Install the unit in a protective enclosure. ▲ Do not operate in wet/damp conditions. ▲ Do not expose to outdoor conditions. ▲ Do not operate in an explosive atmosphere. ▲ Keep product surfaces clean and dry.

⚠ ***WARNING***	*This equipment must be used as specified or the protection provided by the equipment may be compromised. You must use this product in a normal mode and should not deviate from the written instructions provided.*

3.3 Unpacking and Inspection

The EasyGrid Base monitor is shipped inside a carton designed to give maximum protection during shipment. If the outside of the shipping carton is damaged, notify your shipping department immediately. Your shipping department may want to notify the carrier.

If the shipping carton is not damaged, carefully remove and identify all of the components listed below. Contact FISO or your local representative if any of the components are missing. We recommend you save the shipping carton for future storage or transportation.

The EasyGrid Base package should include the following components:

- EasyGrid Base unit
- USB cable (micro)
- EasyClean ST Connector Cleaner (attached)
- FISO Flat head Screwdriver
- EasyGrid Base Getting Started document
- Calibration Certificate

4 Hardware Configuration

4.1 Introducing the EasyGrid Base

The EasyGrid Base fiber optic temperature measurement system is designed for real-time monitoring of transformer hotspot.

It can be configured to have 4, 6, 8, 10 or 12 channels. Monitors can be daisy chained in serial Modbus mode to a maximum of 247 units.

Each unit has multiple serial interfaces (1x USB and 1 x RS-485) and 1x optional Ethernet communication port.

Standard supported serial communication protocol is MODBUS.

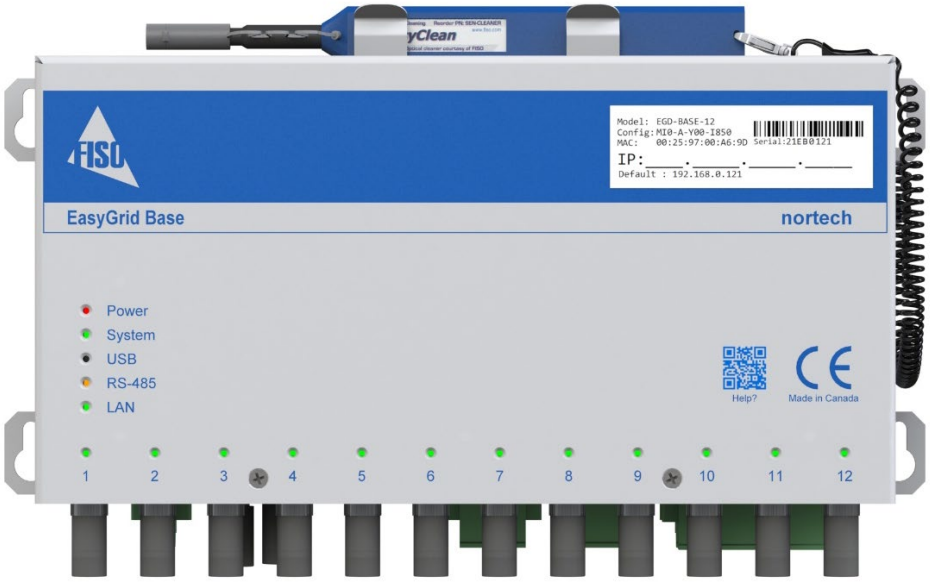
Optional supported Ethernet communication protocols are: IEC-61850, IEC-60870-5-104, DNP3 and TCP-IP MODBUS.

4.2 Front Panel Overview

EasyGrid Base displays a very slim and simple front panel showing the following status lights:

On Top

- EasyClean ST Connector Cleaner, don't ever look for it anymore, it is now permanently attached and available when you need it.



Front Left Side

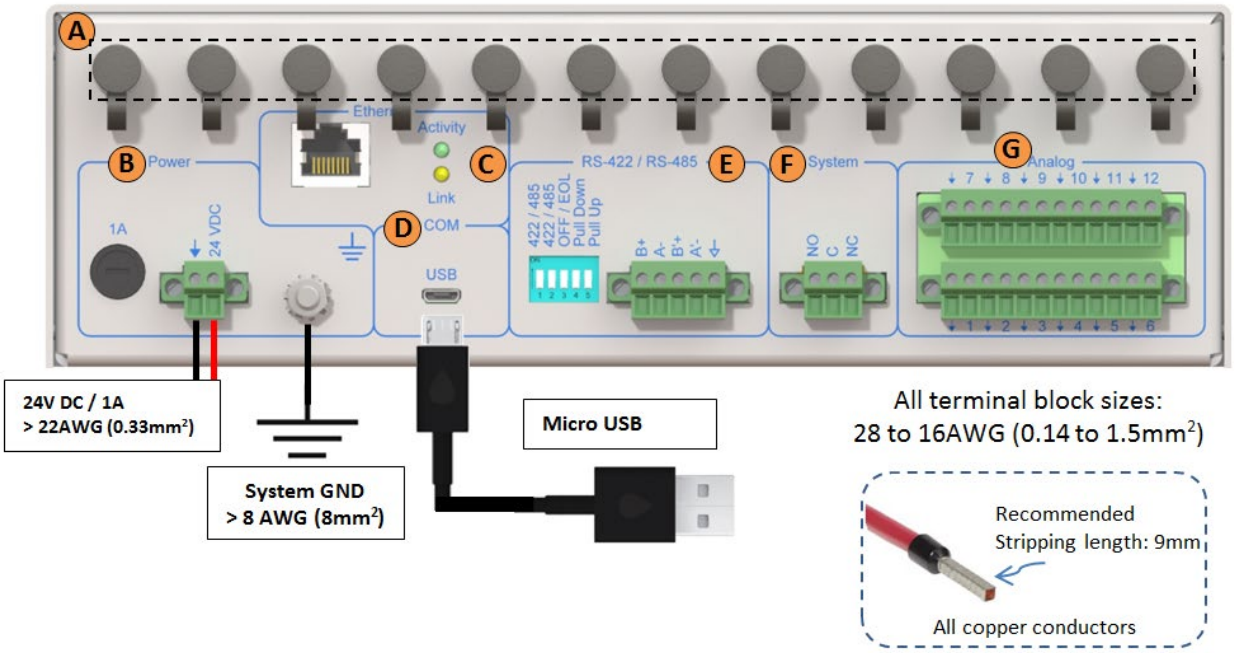
- Power LED
- System error LED
- USB activity LED
- RS-485 activity LED
- LAN activity LED

Front Bottom

- Each of the enabled channel's LED.

4.3 Lower Panel Overview

The side panel is packed with power input, connectivity options, fiber optic ports and analog outputs.



Here is a description of each zone of the side panel:

A. Fiber Optic ST Connectors for Temperature Sensors (Up to 12 channels)
    a. Please note the now attached dust covers for ease of channel protection when empty
B. Power Input 24V DC
    a. 1A fuse is added for further protection
    b. Ground connection available
C. Optional Ethernet COM port (CAT6 or FO)
    a. Usual network Link and Activity LED lights present
D. USB connection (micro connector)
    a. Used in correlation with the Nortech Client II software
E. RS-485 / RS-422 connection port
    a. DIP switch options include resistance load selection
F. Relay System
    a. To trigger an alarm or a system in a Normally Open or Closed fashion
G. Analog Outputs
    a. 1 per channel
    b. Up to 12 available
    c. Signal of 4-20mA configurable

4.4 Grounding Terminal

This terminal provides an additional level of immunity against electromagnetic interferences.

It should always be grounded trough a low inductive conductor (we recommend multiple braid 8 AWG copper wire) to insure adequate protection.

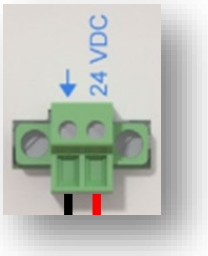
4.5 Powering the EasyGrid Base

The EasyGrid Base requires a **24 volts DC (± 5%)** supply. Power consumption: 15 Watts.

FISO recommends the use of Power Supply FISO PN: SEN-PS-EGRID .

The power input terminal block is located at the bottom left of the terminal face panel.

There is no Power Switch per say. As soon as connected, it is energized and powered up.



1. Connect the unit to the power supply using terminal block connectors V+, V-
2. Wire the power input terminal block to a power supply providing the required voltage and power.

Please refer to the power supply operating guide for important notices and installation information.

> ⚠ **WARNING**
> To avoid damage to the unit, make sure that the power fed into the input complies with technical specifications. No other voltage level or range is accepted.

4.6 Optical Connectors

The EasyGrid Base -**A**- is compatible with all FISO TPT-62_-**R1**-_ sensors.

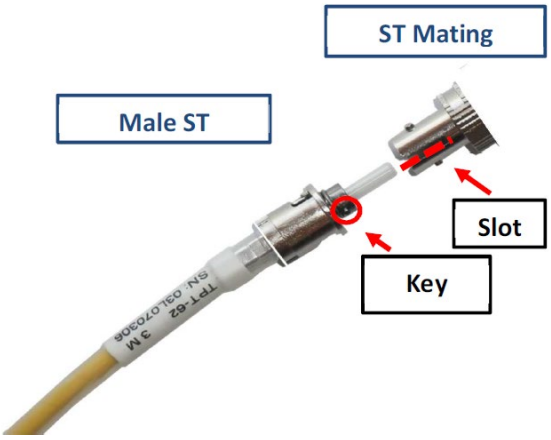
No calibration factor or calibration procedure is required to get accurate temperature measurements.

There can be up to 12 optical channels on each EasyGrid Base. Each channel is designed to be connected with a fibre Optic extension, an EasyThrough and a Fiber Optic sensor.

> ⚠ **CAUTION**
> Use care in handling fiber optic connectors. Always clean the fiber tip prior to insertion into the connector for optimum performance. For details on connector handling and maintenance, please refer to **Appendix A: Cleaning fiber optic connectors**

To connect a ST connector, follow these 5 steps:

1. Remove the protective cap from the Male ST Connector and ST Mating
2. Use the EasyClean tool to clean the Male ST connector and the ST Mating
3. Align the male connector key with the mating slot
4. Insert the connector in the mating
5. Twist to lock



4.7 Protective Dust Caps

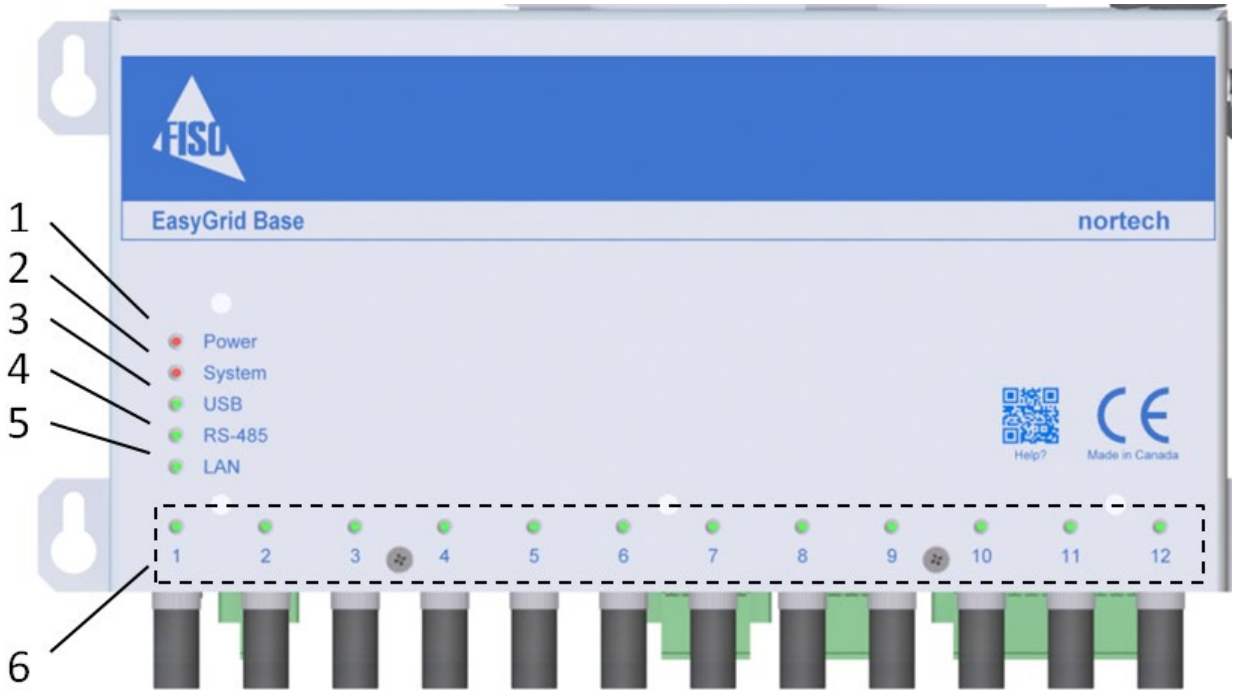
This monitor now includes permanently mounted protective dust caps for each individual optical connector. The cap(s) is designed to help you keep the connector(s) clean preventing the dust from accumulating inside when not in use.

The cap(s) just need to be pulled off to uncover the desired optical connector(s) and left dandling when a sensor is connected.

It is recommended to always put the protective caps back on when a channel is not in use and no sensor is connected.

4.8 LED Indicators Explained

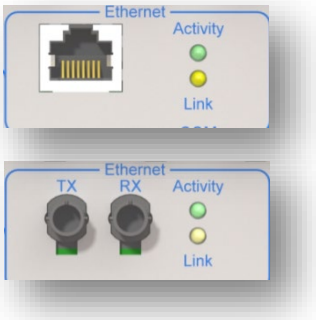
Front Panel LEDs



LED Name	Color	Indication
Power	RED	Device is powered ON
System	GREEN RED	System is functioning well without errors System error and/or sensor may be at fault
USB	AMBER (Blink)	Activity over the USB communication port
RS-485	AMBER (Blink)	Activity over RS-485 / RS-422 communication port
LAN	AMBER (Blink)	Activity over LAN communication port (optional)
Channel's	GREEN RED	Channel is enabled AND a sensor is detected Channel is enabled AND a sensor is NOT detected

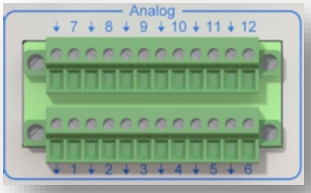
Lower Panel LEDs

The only two LEDs present on that panel are from the optional Ethernet communication port.



LED Name	Color	Indication
Activity	GREEN	Network cable is connected Network is detected
Link	YELLOW	Activity onto the network Device is communicating on the Network (WAN)

4.9 Analog Outputs



Each analog output offers a standard 4-20 mA factory configuration. Analog outputs provide a means of transmitting temperature data directly from the unit to an external data-gathering system or monitoring equipment. The EasyGrid Base provides one analog output for each temperature channel present in the unit.

Please refer to Channel Setup and Analog Output Scale section of the Nortech Client II User Guide for detailed information.

4.10 Connection - USB

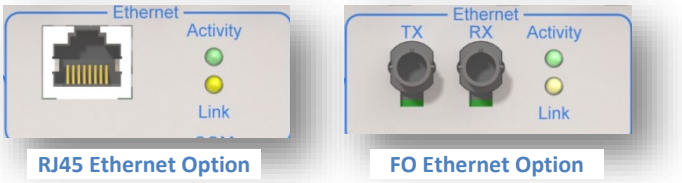
The USB configuration port is accessible off the side panel in the lower left section.

The USB port is used to link to a PC for parameter configuration, data retrieval and firmware update using the Client Software.

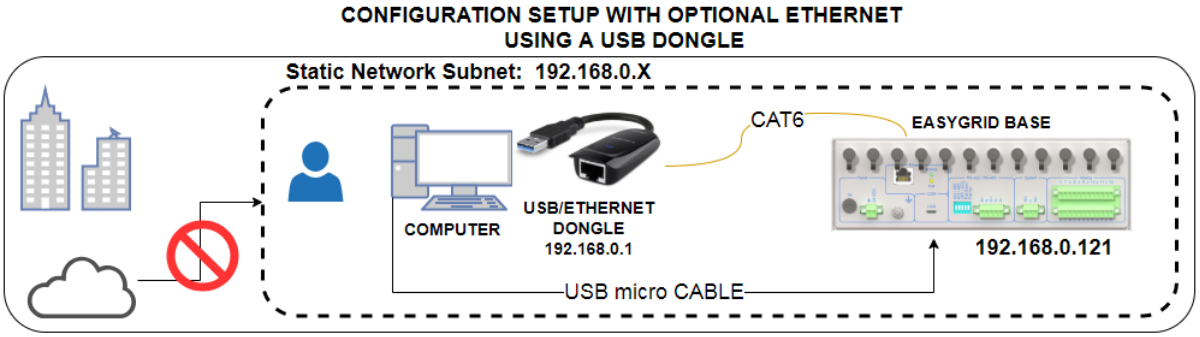
4.11 Connection - Ethernet

With the optional Ethernet port enabled, use either Copper or Fiber Optic to connect to it.

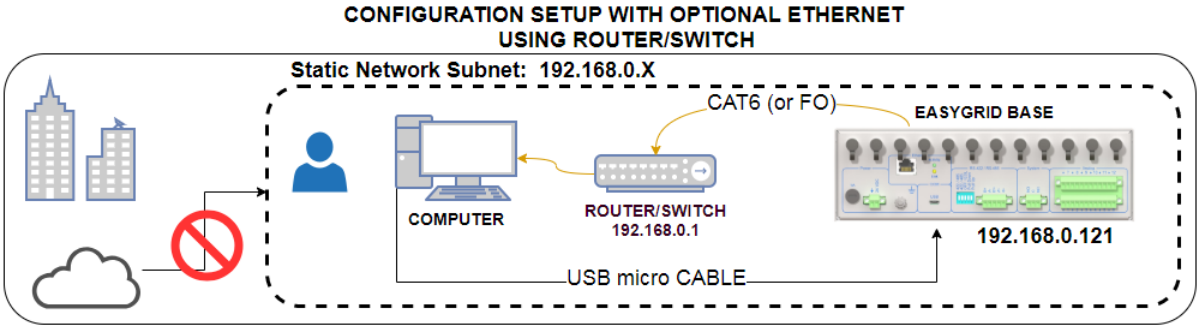
Configuring all IP settings can be achieved using the Nortech Client II while being directly connected into the COM port.



The configuration connection can be achieved in one of the 2 following configurations:



Option #1



Option #2

4.12 Connection – RS-485 / RS-422

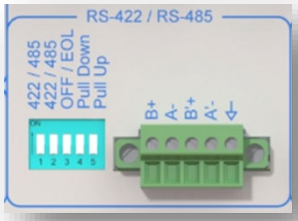
A RS-485 / RS-422 serial port is provided on the EasyGrid Base.
It can be used to connect the EasyGrid Base to any RS-485 or RS-422 communication bus.

It also allows multiple EasyGrid Base to be link together off the same communication bus.

The physical port is accessible using the dedicated terminal block.

The pin layout is the following:

LABEL	MODE	
	RS-422	RS-485
B+	RX+	DATA+
A-	RX-	DATA-
B'+	TX+	N/A
A'-	TX-	N/A
GND	GROUND	GROUND



A set of dip switches is used to configure the port. They are located at the left of the terminal block.

DIP switches positioned towards the **TOP are at the ON position.*
DIP switches positioned towards the **BOTTOM are at the OFF position.*

LABEL	DIP switch position		
	RS-485		RS-422
422 / 485	ON		OFF
422 / 485	ON		OFF
OFF / EOL	ON OFF	Adds 120Ω **End of Line** Resistance No **End of Line** Resistance	OFF
Pull Down	ON OFF	Adds 1kΩ **Pull Down** Resistance No **Pull Down** Resistance	OFF
Pull Up	ON OFF	Adds 1kΩ **Pull Up** Resistance No **Pull Up** Resistance	OFF

4.13 RS-485 / RS-422 Network Recommendations

FISO recommends the use of a two pairs, shielded twisted pair cable for RS-485 mode and a three pairs, shielded twisted pair cable for RS-422. The extra pair will be used for ground. The cable should have a 120Ω line impedance.

If the EasyGrid Base is at one end of the RS-485 cable, you must place an End of Line resistor. You can use the integrated EOL resistance with the OFF / EOL dip switch.

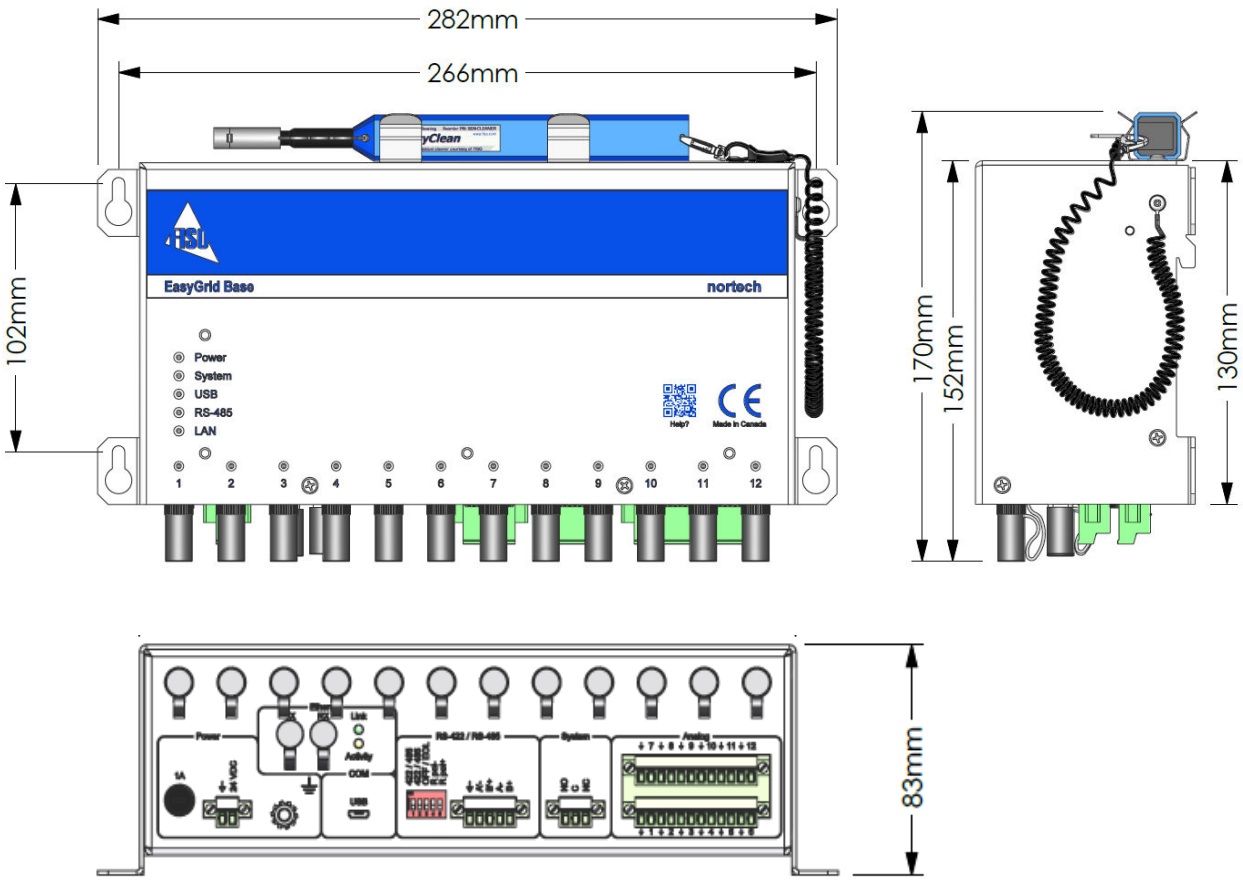
FISO recommends polarising the link in one place. You could use the integrated pull up and pull down resistors of the EasyGrid Base. To do so, place the Pull Up and the Pull Down dip switch to the top.

IMPORTANT

When linking more than 1 device together off the same network bus line, make sure that all units have a different network IDs in order to avoid communication conflicts.

The factory-defined address for all units is one “1”.

4.14 Physical Dimensions



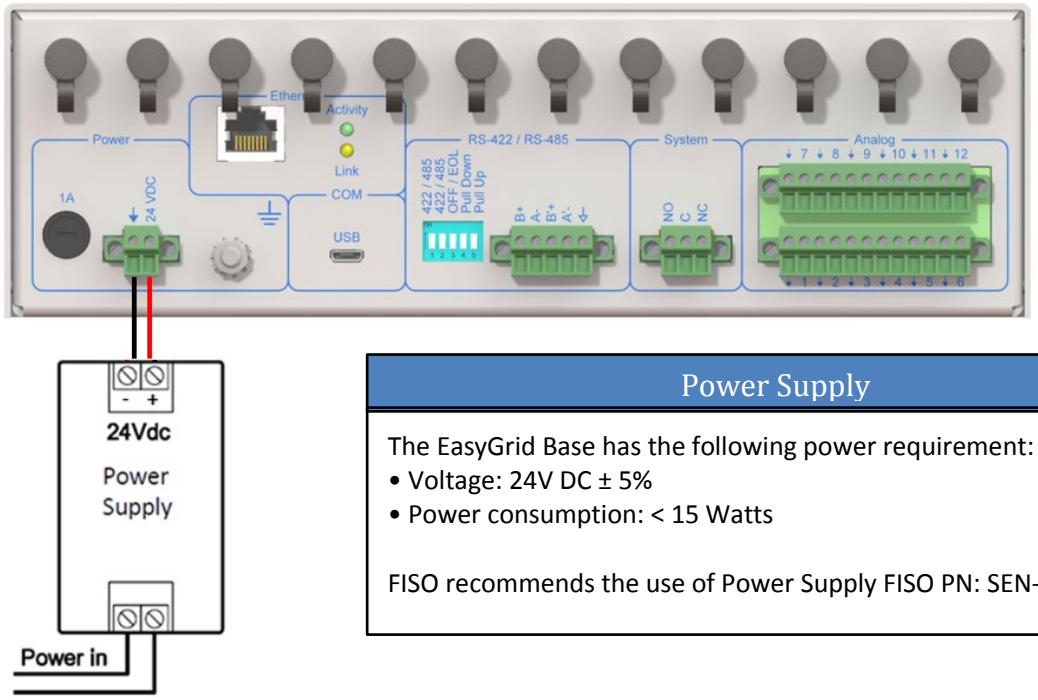
5 Wiring Information

5.1 General

- The following section is a recommendation; you must conform to your local electrical code
- Use copper wire, solid or stranded. Copper wire ferrules can be used with stranded conductors
- System GND -> 8 AWG (8mm^2) copper conductors required for grounding the EasyGrid Base for electromagnetic interference (EMI) purposes:
  - We recommend: Earth strap AMP# 1337670-3 or Crimp terminal AMP ring tongue terminal # 8-33460-2
  - Torque recommendation for M5 nut: 2Nm (18lb-in)
- All terminal blocks: 28 to 16AWG (0.14 to 1.5mm^2) copper conductors
- Note for 24V DC power, minimum wire size is 22AWG (0.33mm^2)

Terminal block	Part #	Manufacturer	Recommended screwdriver blade	Recommended torque	Recommended strip length	Wire size range
Power	1850851	Phoenix Contact	0.4 X 2.5mm	0.23Nm (2lb-in)	9mm	0.33 - 1.5mm²
RS-485 / RS-422	1850880	Phoenix Contact	0.4 X 2.5mm	0.23Nm (2lb-in)	9mm	0.14 - 1.5mm²
System Relay	1850864	Phoenix Contact	0.4 X 2.5mm	0.23Nm (2lb-in)	9mm	0.14- 1.5mm²
Analog Outputs	1850958	Phoenix Contact	0.4 X 2.5mm	0.23Nm (2lb-in)	9mm	0.14- 1.5mm²

5.2 Power



Power Supply

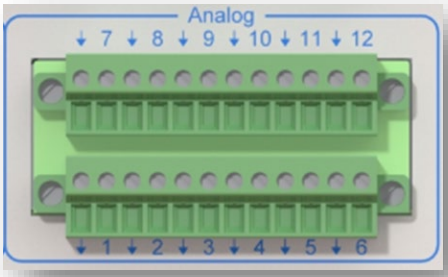
The EasyGrid Base has the following power requirement:
• Voltage: 24V DC ± 5%
• Power consumption: < 15 Watts

FISO recommends the use of Power Supply FISO PN: SEN-PS-EGRID.

CAUTION

When you chose the power supply, make sure to check the temperature derating in order to have 15W available for all the working temperature.

5.3 Analog output



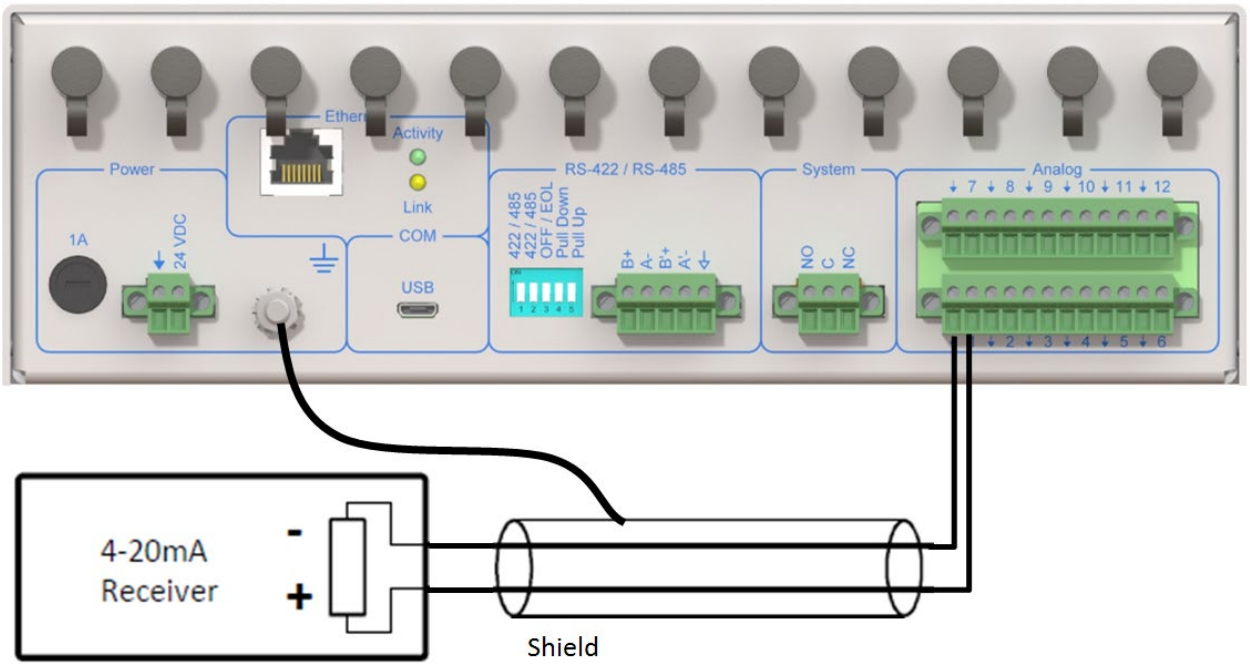
Analog outputs provide a means of transmitting temperature data directly from the unit to an external data-gathering system or monitoring equipment. The monitor provides one analog output for each temperature channel present in the unit.

The EasyGrid Base 4-20mA outputs are of type 3L, non-isolated, according to ISA-50.1-1982 (R1992)

The power supplies for the 4-20mA output is internally connected in the EasyGrid Base. Because of that feature, only two wires are required to realise the connection to the receiver.

FISO recommends a shielded twisted pair. All the EasyGrid Base 4-20mA outputs negative terminals are internally connected to the power supply ground and that ground is internally connected to the system GND at the M5 GND stud (bottom left of the EasyGrid Base case).

The cables shields must be grounded at only one end, we recommend to connect-them to the EasyGrid Base M5 GND stud.



In order to avoid ''ground loop'' errors, the EasyGrid Base 4-20mA outputs shall be connected to floating receivers, isolated receivers or have an isolator in the loop.

FISO recommends an input resistance of 250 ohms for the 4-20mA receivers. The maximum total resistance of the loop (including wire resistance) should be less than 800 ohms.

5.5 System Relay

The system relay is there to help you protect your transformer and alarm you should there be any issues with the monitor itself or one of its connected sensors.

The system relay operates in Fail-Safe mode.

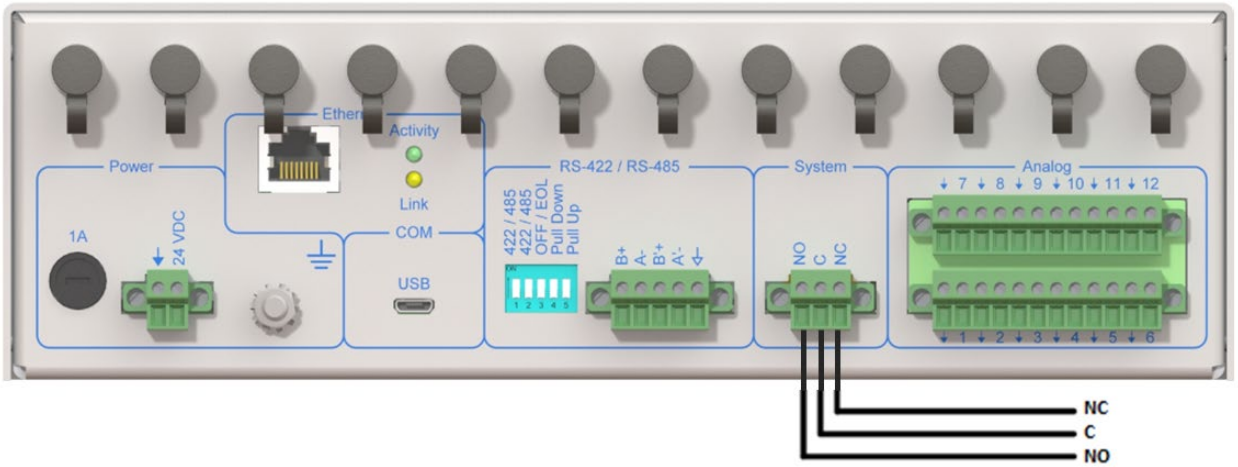
The relay has two possible default states:

- **Normally Closed**: When powering up, relay will remain de-energized, and in case of alarm, relay will be energized.
- **Normally Open**: When powering up, relay will be energized, and in case of power outage, power supply wiring cut-off the relay will be de-energized.

The following conditions will generate an alarm making the System Relay trigger:

- Power failure
- If a channel is at fault
- If the internal software is at fault
- If the system's hardware is at fault

At power up the EasyGrid Base system relay is in alarm until all the actives sensors gives valid reading, it could take up to 1minute (depending on the number of active channels) for the alarm condition to resume.
Systems relay Ratings: 1.5A @ 30VDC / 1A @ 120VAC / 0.5A @ 250VAC



5.6 RS-485 / RS-422

The EasyGrid Base RS-485 / RS-422 communication port is half duplex.

- FISO recommends the use of a two pairs, shielded twisted pair cable for RS-485 mode and a three pairs, shielded twisted pair cable for RS-422. The extra pair will be used for ground.
- If the EasyGrid Base is at one end of the cable you must place an End of Line resistor. You can use the integrated EOL resistance with the OFF / EOL dip switch.
- FISO recommends polarising the link in one place. You could use the integrated pull up and pull down resistors of the EasyGrid Base. To do so, place the Pull Up and the Pull Down dip switch to the top.

A and B Circuit Designators:

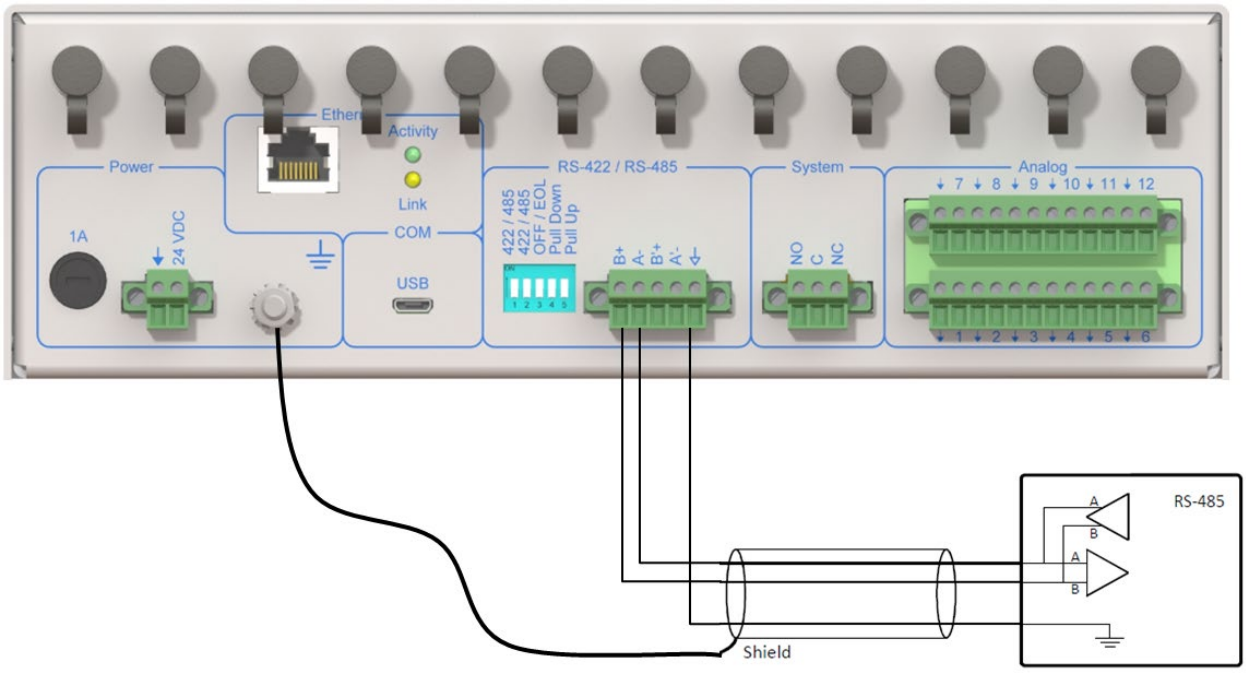
The 'A' and 'B' circuit designators are often a source of confusion.

To determine which terminal is 'A' and which is 'B', set the line to the 'Idle' or 'Off' state. Connect a multi-meter on the volts range across the 'A' and 'B' terminals. When the multi-meter reads a positive voltage, the positive terminal of the multi-meter is connected to 'B' and GND terminal is connected to 'A'.

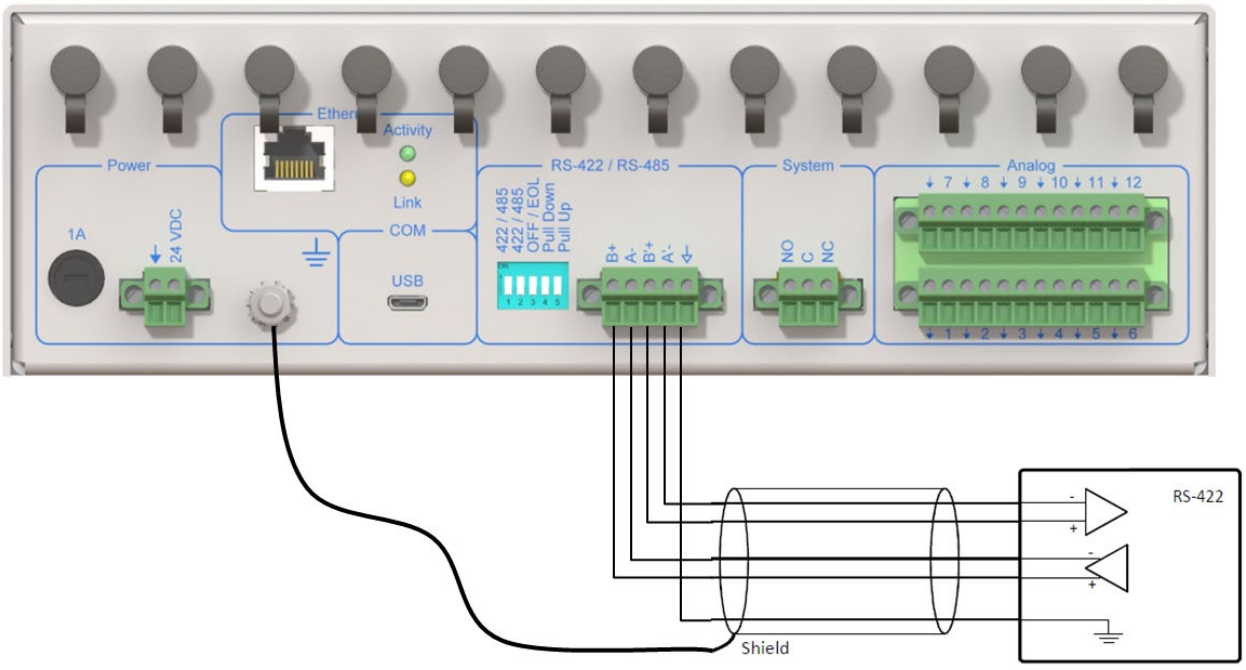
This is why we write 'B+' and 'A-' on the EasyGrid Base.

It is important to refer to the manufacturer's handbook or to test the line as in the previous paragraph.

RS-485 Wiring



RS-422 Wiring



6 Nortech Client II Software

Please refer to the Nortech Client II software guide available here:

https://fiso.com/monitor/easygrid-base/

7 Troubleshooting

7.1 Solving Common Problems

The following troubleshooting section was designed to help you solve technical problems.

Should the unit have to be returned for repair or if you need further assistance, please contact your reseller or FISO Customer Support directly.

Symptom	Possible Cause	Possible Solution
No power	Main power	Verify power input or try another power outlet.
	Power supply	Verify the power supply connection. If possible, try another power supply (with the same polarity), or test the voltage of the power supply. If the power supply is faulty, call your power supply supplier.
One or more units not detected on the network	There may be duplicated unit identification # on the network.	Verify each unit's network ID and reconfigure the network addressing accordingly.

The channel status LED turns red when there is something wrong with the channel.

Symptom	Possible Cause	Possible Solution
Channel LED is RED ●	Channel is enabled and but there is no sensor connected	Verify that you have in fact connected the sensor into that specific channel.
	Dirty connector	Using a fiber optic cleaner like the EasyClean provided with the unit, clean all connector ends of both the sensor and the channel.
	No signal or low signal from sensor	A damaged sensor will not return sufficient signal for the system to measure temperature. Investigate the fiber optic patch cord as a possible source of break.
Channel LED is blank ○	Your channel is not enabled	Using Nortech Client II software, you can enable that channel.
System LED is RED ●	There is a problem with at least 1 channel or the system itself	Verify that all Channel's LED are green. If one is red, there verify that channel's sensor. If all green, then further investigation is necessary using the Nortech Client II software to find out error codes if any. You may have to contact your reseller or FISO customer support to help.

7.2 Diagnostics: Sensor Light & Signal

The sensor light and Signal values gives an indication of the sensor health.

The “Light %” is related to the strength of the light required to make an accurate reading on a sensor, the lower the better.

The “Signal” value is related to the signal to noise ratio, the higher the better.

	Sensor connected directly at monitor		Sensors with EasyThrough and patch cord	
	Good value	Cleaning / investigate	Good value	Cleaning / investigate
Light	< 40%	> 40%	< 80%	> 80%
Signal	> 80%	< 80%	> 40%	< 40%

When theses diagnostic values are in the yellow area, you should investigate, clean the connectors and check for sharp bend.

7.5 Power Protection Fuse

Should it become necessary to verify or change the 1A protection fuse, proceed as following:

1. First, remove power from the unit
2. Using a flat head screw driver or a coin, unlock the fuse cap by doing a left half-turn
3. The fuse cap is spring-loaded and will self-pop-out when totally unscrewed as displayed
4. You can then verify the state of the fuse and replace it if necessary
5. You can then put it back doing the reverse operation while pushing it back in place
6. Using a flat head screw driver or a coin, lock the fuse cap by doing a right half-turn
7. Put the power back on and validate that it is now working

The FUSE details: 1A Fast 250VAC 5X20MM / Littelfuse 0235001.HXP or equivalent

8 Warranty and Service

8.1 General Information

FISO warrants this equipment against defects in material and workmanship for a period of five years and its fiber optic transducers and sensors for ninety (90) days from the date of original shipment.

FISO also warrants that this equipment will meet applicable specifications under normal use.

During the warranty period, FISO will, at its discretion, repair, replace, or issue credit for any defective product, as well as recalibrate the product free of charge should the equipment need to be repaired or if the original calibration is erroneous.

IMPORTANT

The warranty can become null and void if :

- **The equipment has been exposed to rain, condensation, salt spray.**
- **The equipment has been tampered with, repaired, or worked upon by unauthorized individuals or non-FISO personnel.**
- **The warranty sticker has been removed.**
- **Case screws, other than those specified in this guide, have been removed.**
- **The case has been opened.**
- **The equipment serial number has been altered, erased, or removed.**
- **The equipment has been misused, neglected, or damaged by accident.**

8.2 Liability

FISO shall not be liable for damages resulting from the use of the purchased product, nor shall be responsible for any failure in the performance of other items to which the purchased product is connected or the operation of any system of which the purchased product may be a part of.

FISO shall not be liable for damages resulting from improper usage or unauthorized modification of the product, its accompanying accessories and software.

8.3 Exclusions

FISO reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes on units previously purchased. Accessories, including but not limited to fuses, pilot lamps, and batteries used with FISO products are not covered by this warranty.

8.4 Certification

FISO certifies that this equipment has met its published specifications at the time of shipment from the factory.

8.5 Transportation

Maintain a temperature and humidity range within specifications when transporting the unit.

Transportation damage can occur from improper handling. The following steps are recommended to minimize the possibility of damage:

- Pack the unit in its original packing material when shipping.
- Keep the unit out of direct sunlight.
- Avoid unnecessary shock and vibration.

8.6 FISO Service Center

If your product requires servicing, contact your local FISO supplier or FISO Headquarters.

FISO Headquarters Service Center
500 St-Jean-Baptiste Avenue, Suite 195
Quebec City (Quebec)
CANADA G2E 5R9

Telephone: (418) 688-8065
Fax: (418) 688-8067
Email: support@fiso.com

8.7 Product disposal

Please refer to your local authorities or send back the device to your local FISO distributor.

Appendix A: Cleaning fiber optic connectors

The EasyClean is a high-performance device, designed to ease connector ferule end faces cleaning.
Read carefully the instructions below before using the device.

Important
The EasyClean is designed to clean the fiber optic connectors.
FISO is not liable for any damage caused in attempts to use this device to other applications.
Always keep the protection cap on when not in use to avoid contamination.

EasyClean tool general operation

The EasyClean is easy to use, but you need to be careful not to do the following:

- Do not use this tool to clean oily connector, as this will cause contamination of the cleaning cloth.
- Do not touch the cleaning cloth, as this will cause contamination.
- Do not pull the cleaning cloth, use only the device body.
- Do not attempt to disassemble as this can cause damage to the device and make is inoperable.
- Do not try to re-use the cleaning cloth as this will eliminate the cleaner's effectiveness
- Do not use this cleaner when the cloth is empty. This may cause damage to the connector.

The amount of cloth left in the tool is shown in the window located in the body.

	View of Indicator	View of the Nozzle end
Full	Cloth (White)	Tip (Black), Cloth (White), Slide
Little	Cloth (White), Red	Tip (Black), Cloth (White), Slide
Empty	Red	Tip (Black), No Cloth (Black), Slide

Here are typical inspection pictures of an optical connector made with a Fiber inspection probe

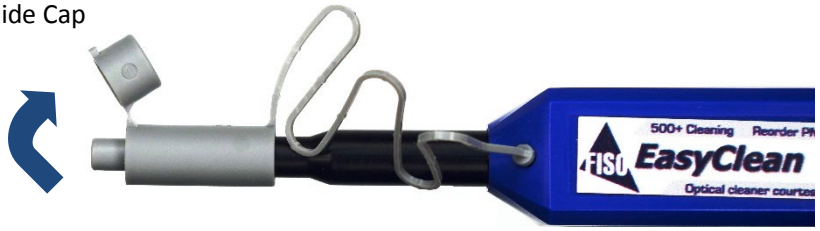

Before Cleaning


First click Cleaning


Second click Cleaning

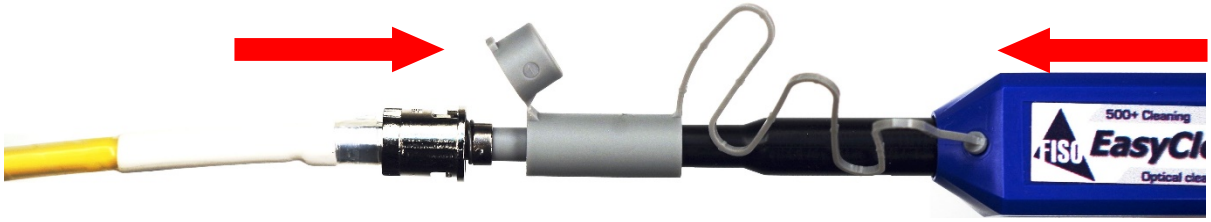
Cleaning the male ST connector

Step 1: Open the end-cover on the Guide Cap



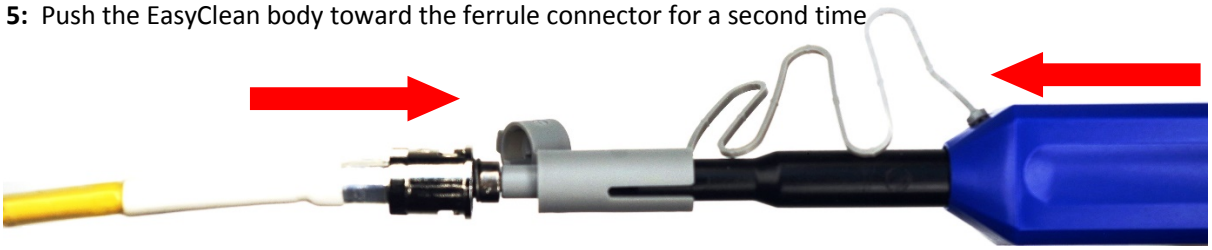
Step 2: Insert the Connector Ferule into the Guide Cap

Step 3: Push the EasyClean body toward the connector ferrule, the black neck will enter into the blue body and you will hear a Click. This will wipe the cleaning cloth against the connector face and remove contaminant.



Step 4: Rotate the EasyClean body 90°

Step 5: Push the EasyClean body toward the ferrule connector for a second time

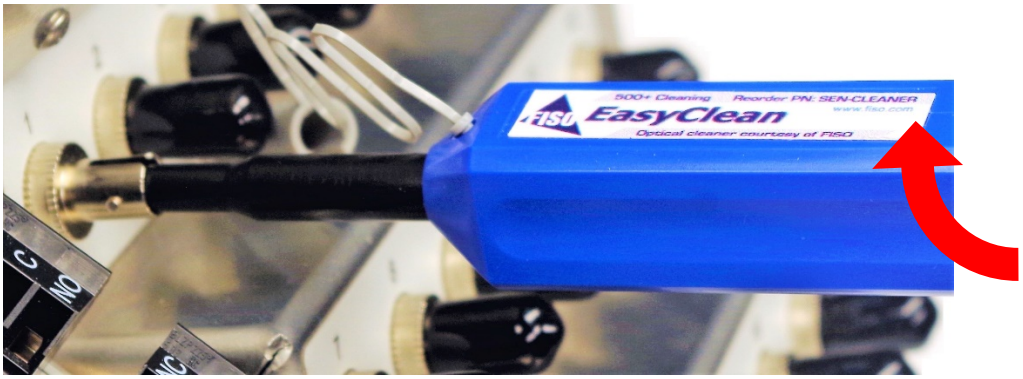


Cleaning the ST mating

Step 1: Remove the Guide Cap from the Device

Step 2: Insert the EasyClean tip in the mating, and push the outer body to clean the connector face

Step 3: Rotate the EasyClean body 90°



Step 4: Push the outer body a second time to clean the connector face