



MAN-00095 R 2.0

EasyGrid LT User Guide



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Units of measurement in this document conform to SI standards and practices

Fiso Technologies Inc.

500, Ave St-Jean-Baptiste, suite 195

Québec (Québec)

G2E 5R9, Canada

Tel : +1 418 688 8065

Fax : +1 418 688 8067

info@fiso.com

www.fiso.com



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

2.3 Declaration of conformity

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

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

Product description: Fiber optic thermometer
Model number(s): EasyGrid-LT
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 11:2009 (ED5 2010-3) EN 55011:2009 +A1 2010	Measurement of conducted emission	Group 1, class A (Industrial)
CISPR 11:2009 (ED5 2010-3) EN 55011:2009 +A1 2010	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 : 2008 IEC 60255-22-4 : 2008 ¹	Electrical fast transient immunity (EFT)	±4kV Power Lines, ±4kV I/O
IEEE C37.90.1: 2012	Surge Withstand Capability (SWC)	±4kV Power Lines, ±4kV I/O
IEC 61000-4-5 : 2005 IEC 60255-22-5 : 2008 ¹	Surge immunity	Power: ±2kV L-PE / ±1kV L-L
IEC 61000-4-6 : 2008 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 : 2001	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

¹ These standards have been replaced by IEC 60255-26:2013

² This standard has been replaced by IEC 60255-27:2013



IEC 61000-4-18 : 2011 IEC 60255-22-1 : 2007 ¹ IEEE C37.90.1 : 2012	Damped Oscillatory Wave Immunity Test	2.5kV
IEEE C37.90 : 2005	Dielectric Strength (RS-485 Circuit Only)	4.2kV

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
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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: Tuesday, August 27, 2019

Frederic Borne, General Manager, FISO Technologies Inc.



3 Safety Information

3.1 Safety Conventions

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

 DANGER	<i>Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Do not proceed unless you understand and meet the required conditions.</i>
 WARNING	<i>Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. Do not proceed unless you understand and meet the required conditions.</i>
 CAUTION	<i>Indicates a potentially hazardous situation which, if not avoided, may result in component damage. Do not proceed unless you understand and meet the required conditions.</i>
 IMPORTANT	<i>Refers to information about this product you should not overlook.</i>

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 LT 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 LT. 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	<i>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.</i>

3.3 Unpacking and Inspection

The EasyGrid LT 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 LT package should include the following components:

- ▲ EasyGrid LT unit
- ▲ Power terminal wires (16 AWG)
- ▲ USB interface cable
- ▲ EasyClean ST Connector Cleaner
- ▲ Calibration Certificate
- ▲ EasyGrid LT User Guide
- ▲ Nortech Client software installation CD

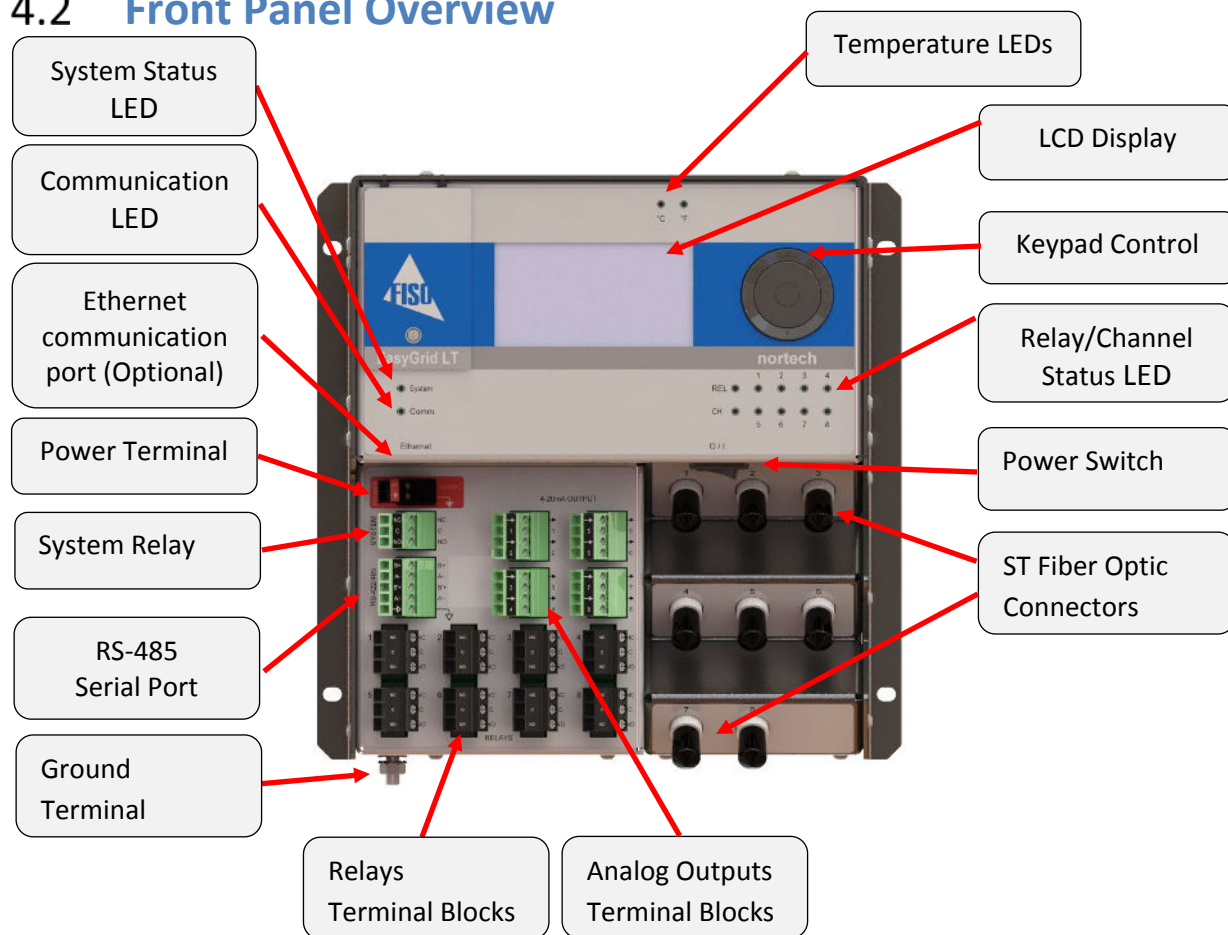
4 Hardware Configuration

4.1 Introducing the EasyGrid LT

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

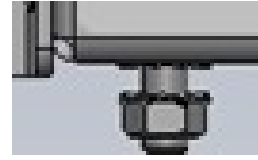
It can be configured to have 2, 4, 6 or 8 channels. Monitors can be daisy chained to a limit of 32 units, which give the possibility to have up to 256 channels in a single system. Each unit has multiple serial interfaces (1x USB and 1 x RS485) and 1x optional Ethernet communication port. Standard supported communication protocols are Nortech and MODBUS. Optional supported communication protocols are IEC-61850, IEC-60870-5-104, DNP3 and TCP/IP-MODBUS.

4.2 Front Panel Overview



4.3 Grounding Terminal

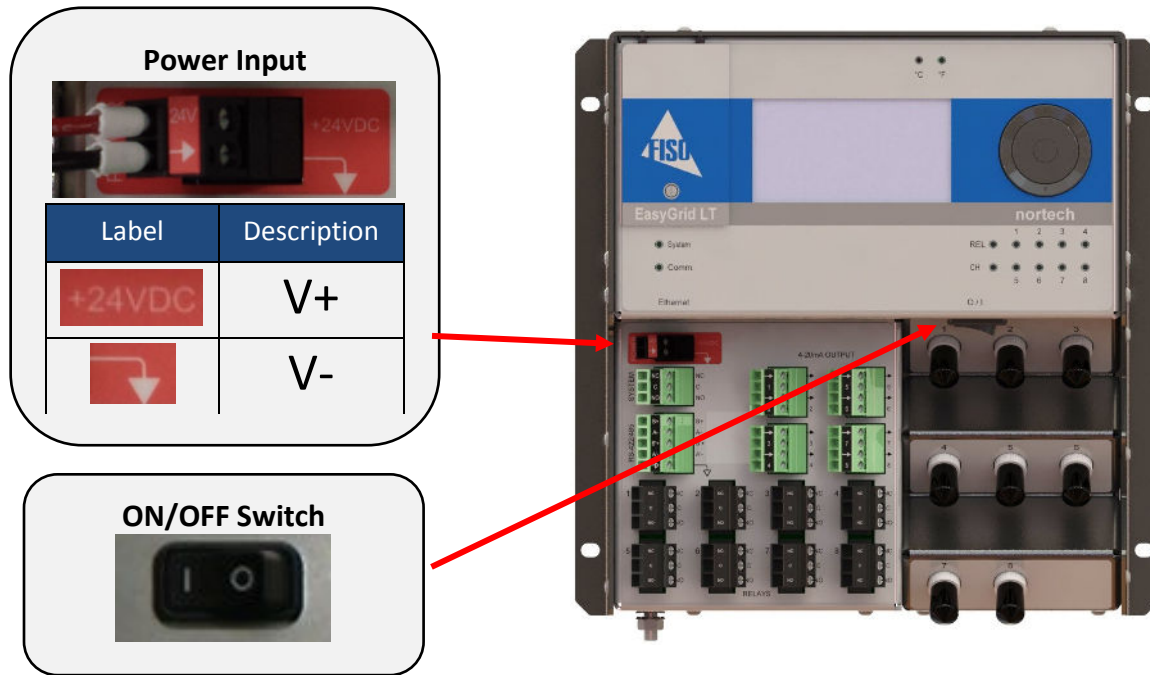
This terminal provides an additional level of immunity against electromagnetic interferences. It should always be grounded through a low inductive conductor (we suggest multiple braid 8 AWG copper wire) to insure adequate protection.



4.4 Powering the EasyGrid LT

The EasyGrid LT requires a **24 volts DC ($\pm 5\%$)** supply.

The power input terminal block is located on the top left of the terminal panel of the unit.



1. Make sure that power is off when connecting the power supply to the unit.
2. Connect the unit to the power supply using terminal block connectors V+, V-.
3. Wire the power input terminal block to a power supply providing the required voltage and power.
4. To power ON, press the **I** on the switch. To power OFF, press the **O** on the switch.

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.



4.5 Optical Connector

The EasyGrid LT -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 8 optical channels on each EasyGrid LT.

Each channel is designed to be connected with a fibre Optic extension, an EasyThrough and a Fiber Optic sensor.

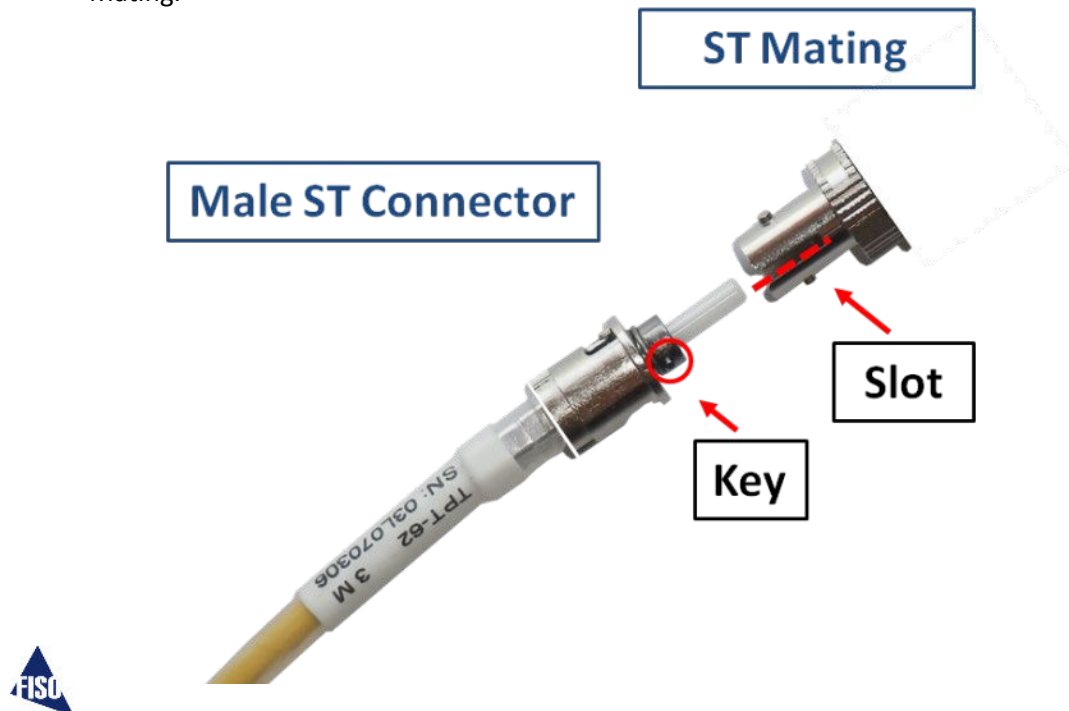


CAUTION

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. Using the EasyClean tool, clean the Male ST connector and the ST Mating.
3. Align the male connector alignment key with the mating slot.
4. Insert ceramic ferrule of the Male ST connector in the ST Mating.
5. After making sure it is properly inserted, Push and Twist to lock the spring loaded ring to the ST Mating.



4.6 LCD Display

The LCD display allows visualization of the key information directly on the unit. The main display is showing the real-time temperature values.

By **pressing the MAIN MENU/SELECT Button**, at the center of the Keypad, the user can scroll all the other available screens.

1	21.7	21.5	2
3	21.3	22.1	4
5	21.5	21.8	6
7	21.4	21.2	8

The EasyGrid LT LCD supports two languages:

- ▲ English
- ▲ Chinese

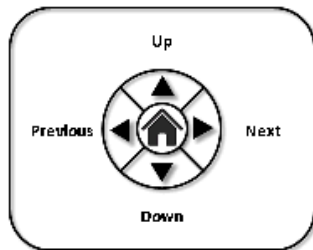
Refer to the Navigation Section to learn more about the different views.

4.7 Display Menus Overview

The navigation between the different screen modes is done using the **Keypad** buttons.

Keypad functions are:

KEYPAD FUNCTIONS



The Previous Arrow Key will allow you to go to the Previous option or Decrement the value
The Next Arrow Key will allow you to go to the Next option or Increment the value



The Up Arrow Key will allow you to go to the Previous Menu or Selection
The Down Arrow Key will allow you to go to the Next Menu or Selection



The Main Menu / Select Key will allow you to return to the Main Menu or Confirm a selection
N.B. Holding down the Main Menu / Select Key for 3 seconds will take you directly to the Temperature display

Available displays are:

- ▲ **Main Menu:** Lists the display menus.
- ▲ **Temp:** Displays the real-time temperature read by the sensor or the sensor state when in error.
- ▲ **Analog Output:** Displays the real-time analog output in mA read for each sensor.
- ▲ **Alarm:** Displays the states of all 8 relays.
- ▲ **Alarm System:** Displays the state of the alarm system fault relay.
- ▲ **Diagnostic:** Displays the real-time temperature read by the sensor or the sensor state when in error, diagnostic value related to the lamp strength and sensor signal.
- ▲ **Mega Log:** Displays the percentage/usage of mega log.
- ▲ **Event Log:** Displays the percentage/usage of event log.
- ▲ **Statistic:** Displays the minimum, maximum and average temperature read by the sensor since the last reset.
- ▲ **Statistic Reset:** Allows erasing of minimum, maximum and average for all channels.

- ▲ **Temp Unit:** Displays/changes the current temperature unit. (°C or °F)
- ▲ **Led Output:** Displays/changes the active led output mode (Sensor or Relay/Alarm).
- ▲ **Nortech Address:** Displays/changes the Nortech protocol Node ID.
- ▲ **Modbus Address:** Displays/changes the Modbus protocol Node ID.
- ▲ **Modbus Type:** Displays/changes the Modbus protocol communication type.
- ▲ **Modbus Speed:** Displays/changes the Modbus protocol communication speed.
- ▲ **Factory Default:** Allows reset to factory original configuration, it also restores the factory reference for all channels.
- ▲ **System Info:** Displays model, serial number and firmware version.
- ▲ **System Status:** Displays the state of the system, when in error, please refer to the trouble shooting section.
- ▲ **System Temperature:** Displays the current internal system temperature (inside the unit).
- ▲ **Communication Info:** Displays current communication configuration; type (Nortech / Modbus), speed (115200 / 19200) and address (1 to 32 / 1 to 247).
- ▲ **Date & Time:** Displays current date and time settings of the unit.
- ▲ **Language:** Displays/changes language.

4.8 Display Description

Main Menu

Main Menu

	T e m p e r a t u r e
	A n a l o g O u t p u t
→	A l a r m
	D i a g n o s t i c
	D a t a L o g
	S t a t i s t i c
	S e t t i n g
	I n f o r m a t i o n
	中 文

Main Menu / Select

Confirms selection

Description

→ : Selected display menu

Temperature (Initialization)

Temperature (Initialization)

1	→	# # #		# # #	2
3		# # #		# # #	4
5		# # #		# # #	6
T e m p ° C					

Temperature (Initialization)

1	→	# # #		# # #	2
3		# # #		# # #	4
5		# # #		# # #	6
7		# # #		# # #	8

Description

: Channel is not yet ready

→ : Channel currently in reading

Temperature

Temperature				Description
1 →	2 0 . 1	L o w	2	### : Channel is not yet ready
3	- 1 2 . 0	1 0 9 . 2	4	20.1 : Channel temperature value
5	E r r o r	- 5 . 9	6	Error : Channel is in error (no signal or bad signal)
	T e m p	° C		Calib : Channel bad or missing calibration
1 →	6 8 . 2	L o w	2	Low : Channel value is below calibration (< -40 °C)
3	1 0 . 4	2 3 8 . 6	4	High : Channel value is over calibration (> 230 °C)
5	E r r o r	2 1 . 4	6	Off : Channel is currently disabled
	T e m p	° F		→ : Channel currently in reading

Analog Output

Analog Output				Description
1 →	7 . 6 3	2 0 . 0 0	2	4.53 : Channel analog output value in mA (milliampere)
3	5 . 6 9	1 3 . 0 1	4	-- : Channel as not yet an analog output value or is disabled
5	2 0 . 0 0	6 . 0 6	6	→ : Channel currently in reading
	A n a l o g	m A		

Alarm

Alarm				Description
1	O f f	O f f	2	Off : Alarm conditions are not met
3	E x e r t	O n	4	On : Alarm conditions are met
5	O f f	- - -	6	Exert : Alarm is currently in exerciser mode, this is to exercise the relay associated to the alarm without having an alarm signal
	A l a r m			--- : Alarm is currently disabled

Alarm System

Alarm System				Description
	A l a r m	S y s t e m		Off : Alarm system conditions are not met
	O n			On : Alarm system conditions are met

Diagnostic

Diagnostic			
D i a g n o s t i c	C H	1	
T e m p	2 0 . 1	° C	
L i g h t	8 . 0	%	
S i g n a l	9 4 . 0	%	

Temp Description

: Channel is not yet ready

20.1 : Channel temperature value

Error : Channel is in error (no signal or bad signal)

Calib : Channel bad or missing calibration

Low : Channel value is below calibration (< -40 °C)

High : Channel value is over calibration (> 230 °C)

Off : Channel is currently disabled

Light Description

Sensor connect directly (without patch cord or Easy Through)

- Light < 25 : Excellent
- 25 < Light < 40 : Good
- Light > 40 : Not very good

Sensor with a patch cord and/or Easy Through

- Light < 40 : Excellent
- 40 < Light < 80 : Good
- Light > 80 : Not very good

Signal Description

Sensor connect directly (without patch cord or Easy Through)

- Signal > 88 : Excellent
- 80 < Signal < 88 : Good
- Signal < 80 : Not very good

Sensor with a patch cord and/or Easy Through

- Signal > 80 : Excellent
- 40 < Signal < 80 : Good
- Signal < 40 : Not very good

Mega Log (when available)

Mega Log			
M e g a	L o g		
4 4 . 7 0 3	%		
2 1 9 4 9 3	/	4 9 1 0 0 8	
O n	C l e a r		→

Mega Log Erasing

M e g a	L o g
E r a s i n g	
5 4	%



Execute clear action if confirm into the next window

Description

44.703 % : Log usage in percent

219493 / 491008 : Current log number and maximum log

On : Current state of the mega log, could also be off

Clear : Clear all the logs

54 % : Log erasing progress in percent

Event Log (when available)

Event Log E v e n t L o g 1 0 . 0 4 9 % 1 2 9 6 6 / 1 2 9 0 2 4 C l e a r → Event Log Erasing E v e n t L o g E r a s i n g 5 4 %	→ Execute clear action if confirm into the next window <u>Description</u> 10.049 % : Log usage in percent 12966 / 129024: Current log number and maximum log Clear : Clear all the logs 54 % : Log erasing progress in percent
---	---

Statistic

Statistic <table><tr><td>S t a t i s t i c</td><td>C H</td><td>1</td></tr><tr><td>M i n i m u m</td><td>2 0 . 1</td><td>° C</td></tr><tr><td>M a x i m u m</td><td>2 5 . 4</td><td>° C</td></tr><tr><td>A v e r a g e</td><td>2 2 . 3</td><td>° C</td></tr></table>			S t a t i s t i c	C H	1	M i n i m u m	2 0 . 1	° C	M a x i m u m	2 5 . 4	° C	A v e r a g e	2 2 . 3	° C	Description Minimum 20.1 : Channel temperature minimum value ---.- : Channel as not yet a minimum value or is disable
S t a t i s t i c	C H	1													
M i n i m u m	2 0 . 1	° C													
M a x i m u m	2 5 . 4	° C													
A v e r a g e	2 2 . 3	° C													
	Description Maximum 25.4 : Channel temperature maximum value ---.- : Channel as not yet a maximum value or is disable														
	Description Average 22.3 : Channel temperature average value ---.- : Channel as not yet an average value or is disable														

Statistic

Statistic S t a t i s t i c R e s e t →	→ Execute reset action if confirm into the next window Confirm and go back to Temperature window <u>Description</u> Reset : Reset the maximum, minimum and average temperature value of all channels
---	--

Temp Unit

Temp Unit T e m p U n i t ° C C h a n g e → Temp Unit T e m p U n i t ° F C h a n g e →	→ Execute temperature unit change action <u>Description</u> °C : Temperature is displayed in °C in all windows °F : Temperature is displayed in °F in all windows
--	--

Led Output

Led Output

L e d O u t p u t
A l a r m
C h a n g e →

Led Output

L e d O u t p u t
S e n s o r
C h a n g e →



Execute led output change action

Description

Alarm : Channel led is displaying alarm state

- Led Green : Alarm conditions are not met
- Led Red : Alarm conditions are met
- Led Amber : Alarm is currently in exerciser mode, this is to exercise the relay associated to the alarm without having an alarm signal
- Led Off : Alarm is currently disabled

Sensor : Channel les is displaying sensor state

- Led Green : Sensor signal and light quality is excellent
- Led Green Blinking : Channel is not yet ready
- Led Amber : Channel is in reference mode
- Led Amber Blinking : Sensor signal or light quality is good or is acquiring a new reference
- Led Red : Error situation
- Led Red Blinking : Sensor signal or light is not very good
- Led Off : Channel is currently disabled

Nortech Address

Nortech Address

N o r t e c h A d d r e s s
1
← - + →



Execute address change action

DescriptionCurrent Nortech Address for **Nortech** protocol.Range

1 to 32

Modbus Address

Modbus Address

M o d b u s A d d r e s s
1
← - + →



Execute address change action

DescriptionCurrent Modbus Address for **Other** protocols than Nortech.Range

1 to 247

Modbus Type

Modbus Type	
M o d b u s	T y p e
R T U	
C h a n g e →	



Execute Modbus Type change action

Description

Users can select one of the 2 COM configurations:

- RTU
- ASCII

Note

RTU is to be selected for MODBUS TCP-IP, IEC 61850, IEC 60870-5-104 and DNP 3.0

Modbus Speed

Modbus Speed	
M o d b u s	S p e e d
1 9 2 0 0	
C h a n g e →	



Execute Modbus Speed change action

Description

Communication speed for Modbus RTU and Modbus Ascii.

Range

9 600
19 200

Note

Modbus Speed for MODBUS TCP-IP, IEC 61850, IEC 60870-5-104 and DNP 3.0 shall be set to 19200

Factory Default

Factory Default	
F a c t o r y	D e f a u l t
R e s e t →	



Execute reset action if confirm into the next window Confirm and go back to window Temperature

Description

Reset: Reset all the channel enable, offset, reference and analog output configuration (Minimum and Maximum) to the factory settings.

Factory setting for those parameters are :

- Channel Enable is true
- Channel Offset is equal to 0
- Channel Reference are the one set at the factory (FISO)
- Analog Output Minimum is equal to -40.0 °C
- Analog Output Maximum is equal to 225.0 °C

System Info

System Info	Description										
<table border="1"> <thead> <tr> <th colspan="2">System Info</th></tr> </thead> <tbody> <tr> <td>S y s t e m I n f o</td><td></td></tr> <tr> <td>M o d e l</td><td>E G D - L T - 8</td></tr> <tr> <td>S e r i a l</td><td>1 4 N R 0 0 0 1</td></tr> <tr> <td>V e r s i o n</td><td>4 . 4 . 4 . 0</td></tr> </tbody> </table>	System Info		S y s t e m I n f o		M o d e l	E G D - L T - 8	S e r i a l	1 4 N R 0 0 0 1	V e r s i o n	4 . 4 . 4 . 0	Model : Device model Serial : Device serial number (UID) Version : Device current firmware version
System Info											
S y s t e m I n f o											
M o d e l	E G D - L T - 8										
S e r i a l	1 4 N R 0 0 0 1										
V e r s i o n	4 . 4 . 4 . 0										

System Status

System Status	Description								
<table border="1"> <thead> <tr> <th colspan="2">System Status</th></tr> </thead> <tbody> <tr> <td>S y s t e m S t a t u s</td><td></td></tr> <tr> <td>N o F a u l t</td><td></td></tr> </tbody> </table>	System Status		S y s t e m S t a t u s		N o F a u l t		No Fault : System status is good (no problem found) Error # : System status is not good (problem found)		
System Status									
S y s t e m S t a t u s									
N o F a u l t									
<table border="1"> <thead> <tr> <th colspan="2">System Status (Error)</th></tr> </thead> <tbody> <tr> <td>S y s t e m S t a t u s</td><td></td></tr> <tr> <td>E r r o r</td><td></td></tr> <tr> <td>4 0</td><td></td></tr> </tbody> </table>	System Status (Error)		S y s t e m S t a t u s		E r r o r		4 0		N.B. Error 40 is when a sensor is in error, go to the Temperature display to see on which channel a sensor is defective. For other errors please call Fiso.
System Status (Error)									
S y s t e m S t a t u s									
E r r o r									
4 0									

System Temperature

System Temperature	Description						
<table border="1"> <thead> <tr> <th colspan="2">System Temperature</th></tr> </thead> <tbody> <tr> <td>S y s t e m T e m p</td><td></td></tr> <tr> <td>3 3 . 3 ° C</td><td></td></tr> </tbody> </table>	System Temperature		S y s t e m T e m p		3 3 . 3 ° C		33.3 : System internal temperature
System Temperature							
S y s t e m T e m p							
3 3 . 3 ° C							

Communication Info

Communication Info	→ Execute change action from Address to Config										
<table border="1"> <thead> <tr> <th colspan="2">Communication Info</th></tr> </thead> <tbody> <tr> <td>C o m I n f o</td><td></td></tr> <tr> <td>T y p e</td><td>N o r t e c h</td></tr> <tr> <td>S p e e d</td><td>1 1 5 2 0 0</td></tr> <tr> <td>A d d r e s s</td><td>1</td></tr> </tbody> </table>	Communication Info		C o m I n f o		T y p e	N o r t e c h	S p e e d	1 1 5 2 0 0	A d d r e s s	1	<u>Description</u> Type : Nortech (Fiso proprietary protocol), Modbus RTU protocol or Modbus ASCII protocol Speed : Nortech 115200 bps or Modbus 19200 bps or 9600 bps Address : Device current address Config : • First Info : data bits (8 bits) • Second Info : Parity (N = None, E= Even, O = Odd) • Third Info : stop bits (1 bit or 2 bits)
Communication Info											
C o m I n f o											
T y p e	N o r t e c h										
S p e e d	1 1 5 2 0 0										
A d d r e s s	1										
<table border="1"> <thead> <tr> <th colspan="2">Communication Info</th></tr> </thead> <tbody> <tr> <td>C o m I n f o</td><td></td></tr> <tr> <td>T y p e</td><td>N o r t e c h</td></tr> <tr> <td>S p e e d</td><td>1 1 5 2 0 0</td></tr> <tr> <td>C o n f i g</td><td>8 - N - 1</td></tr> </tbody> </table>	Communication Info		C o m I n f o		T y p e	N o r t e c h	S p e e d	1 1 5 2 0 0	C o n f i g	8 - N - 1	
Communication Info											
C o m I n f o											
T y p e	N o r t e c h										
S p e e d	1 1 5 2 0 0										
C o n f i g	8 - N - 1										

Date & Time

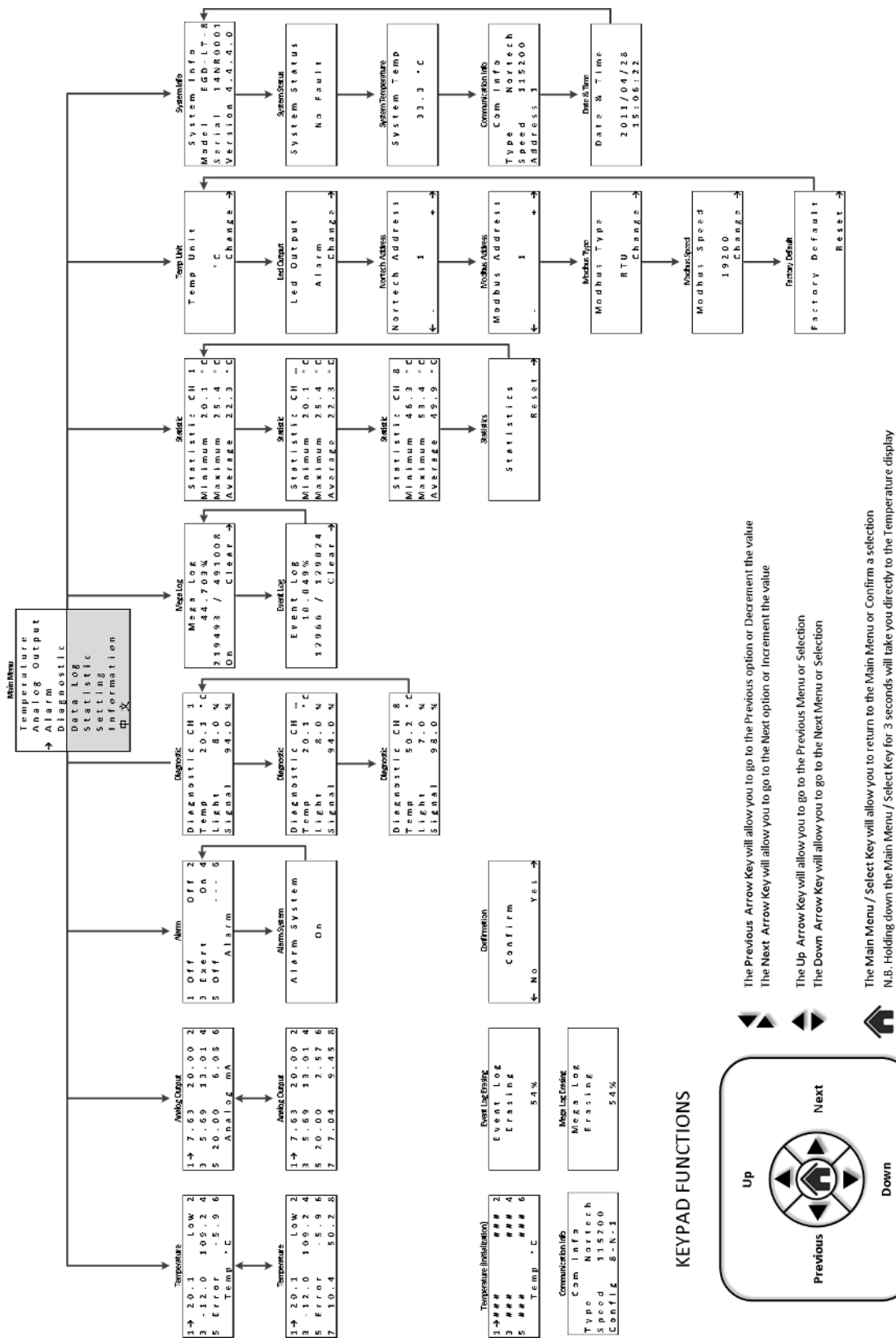
Date & Time	Description								
<table border="1"> <thead> <tr> <th colspan="2">Date & Time</th></tr> </thead> <tbody> <tr> <td>D a t e & T i m e</td><td></td></tr> <tr> <td>2 0 1 3 / 1 0 / 1 8</td><td></td></tr> <tr> <td>1 5 : 0 6 : 2 2</td><td></td></tr> </tbody> </table>	Date & Time		D a t e & T i m e		2 0 1 3 / 1 0 / 1 8		1 5 : 0 6 : 2 2		Date : Date format is Year / Month / Day (YYYY/MM/DD) Time : Time format is Hour : Minute : Second (HH/MM/SS) N.B. Time is in 24 Hour format
Date & Time									
D a t e & T i m e									
2 0 1 3 / 1 0 / 1 8									
1 5 : 0 6 : 2 2									



Confirmation	
Confirmation C o n f i r m ← N o Y e s →	← No : Cancel the current action → Yes : Confirm the current action Description Confirmation required for certain action execution



4.9 Navigation Flow chart



4.10 LED Indicators

4.10.1 System Status LED

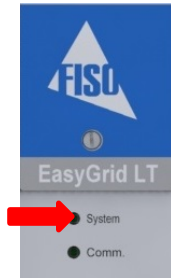
The System Status LED on the front panel changes color depending on the current unit situation.

System Status

The different LED states are:

Color	State	Description
Green	Steady	MODBUS, IEC or DNP3.0 protocol in function
Amber	Steady	Nortech protocol in function
Red	Steady	System Error or at least one sensor is Faulty

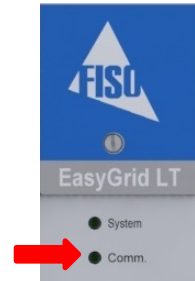
When the LED blinks red, an error situation related to the unit has occurred. Refer to the trouble shooting section or contact FISO technical support.



4.10.2 Communication Status LED

The different LED states for communication are:

Color	State	Description
Off	None	No activity on the communication bus
Amber	Blink	Activity on the communication bus



4.10.3 Relay/Alarm Status LED

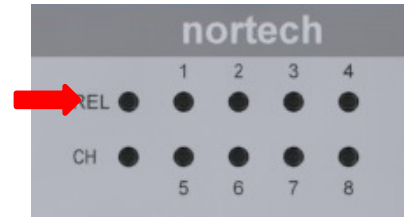
When the Alarm LED Output mode is selected, the REL LED is green.

Each numbered LED corresponds to a relay.

For example, LED 1 corresponds to relay 1, LED 2 corresponds to relay 2 and so on.

The different LED states are:

Color	State	Description
Green	Steady	Alarm relay condition is not met.
Amber	Steady	Alarm Relay is in exerciser mode
Red	Steady	Alarm relay condition is met.
Off	Steady	Alarm relay is inactive



4.10.4 Sensor Channel Status LED

When the Sensor LED Output mode is selected, the CH LED is green.

Each numbered LED corresponds to a sensor.

For example, LED 1 corresponds to channel 1, LED 2 corresponds to channel 2 and so on.

The different LED states are:

Color	State	Description
Green	Steady	Sensor connected and excellent signal and light quality
Green	Blink	Initial channel scan
Amber	Steady	Channel is in reference mode
Amber	Blink	Sensor connected and good signal or light quality
Red	Steady	Error situation
Red	Blink	Sensor connected and not very good signal or light quality
Off	Steady	Channel not available or channel OFF



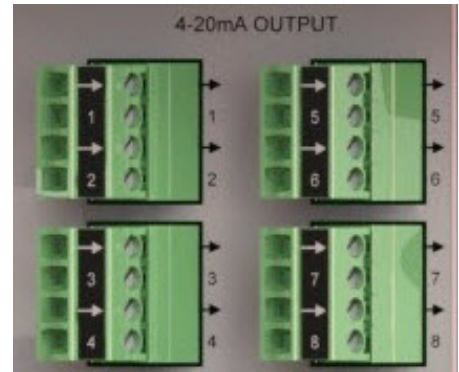
When the LED turns red, an error situation related to the sensor has occurred. Please refer to the Troubleshooting section, for details on the possible errors.

4.11 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 LT 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 User Guide for detailed information.



4.12 Communication Configuration

4.12.1 USB

The USB configuration port is accessible under the protection door on the left front panel.

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

You can download-it here: <https://fiso.com/monitor/easygrid-lt/>



To use the USB port the two dipswitch must be to the left.

4.12.2 RS-485/RS-422 Ports

A RS-485/RS-422 serial port is provided on the EasyGrid LT.

It can be used to connect the EasyGrid LT to any RS485 or RS422 communication bus.

The communication protocols available over the RS-485/RS-422 serial port are: Modbus RTU, Modbus ASCII or Nortech.



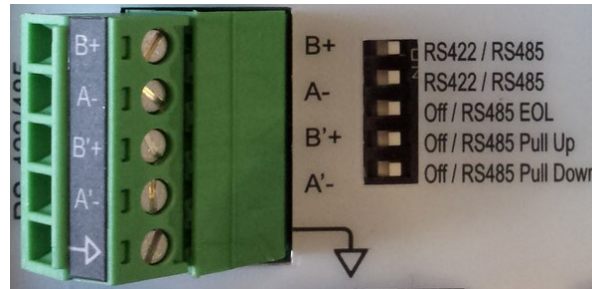
IMPORTANT

When linking many EasyGrid LT on the same party line, make sure that all units have a different network ID. The factory-defined address for all units is one (1).

The port is accessible using the dedicated terminal block.

The pin layout is the following

Label	RS-422 Mode	RS-485 Mode
B+	RX +	Data +
A-	RX -	Data -
B'+	TX +	Do Not Apply
A'-	TX -	Do Not Apply
GND	Ground	Ground



A set of dip switches is used to configure the port. They are located at the right of the terminal block. A sticker is provided to secure the dip switches after configuration.

Switch	RS-422 Mode	RS-485 Mode
RS422/RS485	Must be Left	Must be Right
RS422/RS485	Must be Left	Must be Right
RS485 EOL R	Must be Left	Right: Adds a 120Ω End of Line resistor Left: No end of line resistor
RS485 Pull Up	Must be Left	Right: Adds a 1kΩ <u>pull up</u> resistor Left: No <u>pull up</u> resistor
RS485 Pull Down	Must be Left	Right: Adds a 1kΩ <u>pull down</u> resistor Left: No <u>pull down</u> resistor

FISO recommends using a shielded cable with 2 twisted pairs, one pair will be used for the A- and B+ signals and the other pair will be used for the RS-485 signal ground.

The shield of the cable should be connected to the case ground.



The cable should be at least 24 AWG and it should have a 120Ω line impedance.

FISO recommends biasing the RS-485 BUS in one place on the RS-485 network. (Normally at the master or near the master)

You can use the integrated RS485 Pull Up and RS485 Pull Down to do so.

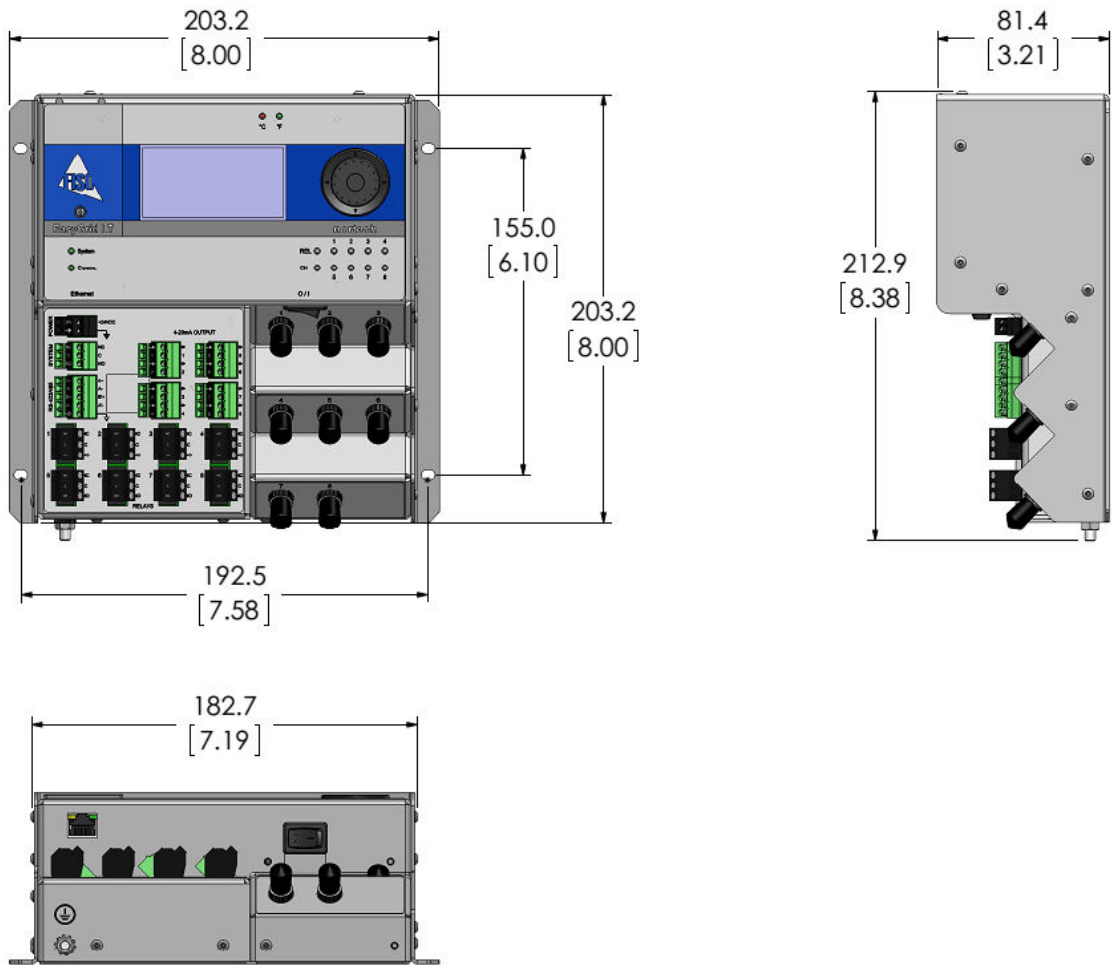
Biasing the RS-485 BUS line will prevent unknown voltage on these lines (RS-485 BUS floating).

Leaving the RS-485 BUS floating may result in conditioner communication failure.

FISO also recommends to place two 120Ω termination resistors, one at each end of the network.

You can use the integrated 120Ω termination resistor to do so.

4.13 Physical dimensions



5 Wiring information

5.1 General

 DANGER	<i>The following section is a recommendation, you must conform with your local electrical code.</i>
---	--

Use copper wire, solid or stranded. Copper wire ferrules can be used with stranded conductors.

Here is a table with the part numbers of the different removable terminal blocks, recommendation for screwdriver, torque, strip length and wire size range.

Terminal block	Part number	Manufacturer	Recommended screwdriver blade	Recommended torque	Recommended strip length	Wire size range
Power	1827635	Phoenix Contact	0.4 x 2.5mm	0.23Nm	7mm	0.33 – 1.5mm ² (22 to 14AWG)
Analog outputs	1803594	Phoenix Contact	0.4 x 2.5mm	0.23Nm	7mm	0.2 – 1.5mm ² (28 to 14AWG)
System relay	1803581	Phoenix Contact	0.4 x 2.5mm	0.23Nm	7mm	0.2 – 1.5mm ² (28 to 14AWG)
RS-422/485	1803604	Phoenix Contact	0.4 x 2.5mm	0.23Nm	7mm	0.2 – 1.5mm ² (28 to 14AWG)
Relays	1946570000	Weidmuller	0.6 x 3.5mm	0.45Nm	8mm	0.2 – 2.5mm ² (28 to 12AWG)

System GND

A 8 AWG (8mm²) copper conductor is required for grounding the EasyGrid LT for electromagnetic interference (emi) purposes, we recommend:

- Earth strap AMP# 1337670-3
- or Crimp terminal AMP ring tongue terminal # 8-33460-2

The torque recommendation for M5 nut: 2Nm (18lb-in)

5.2 Power



CAUTION

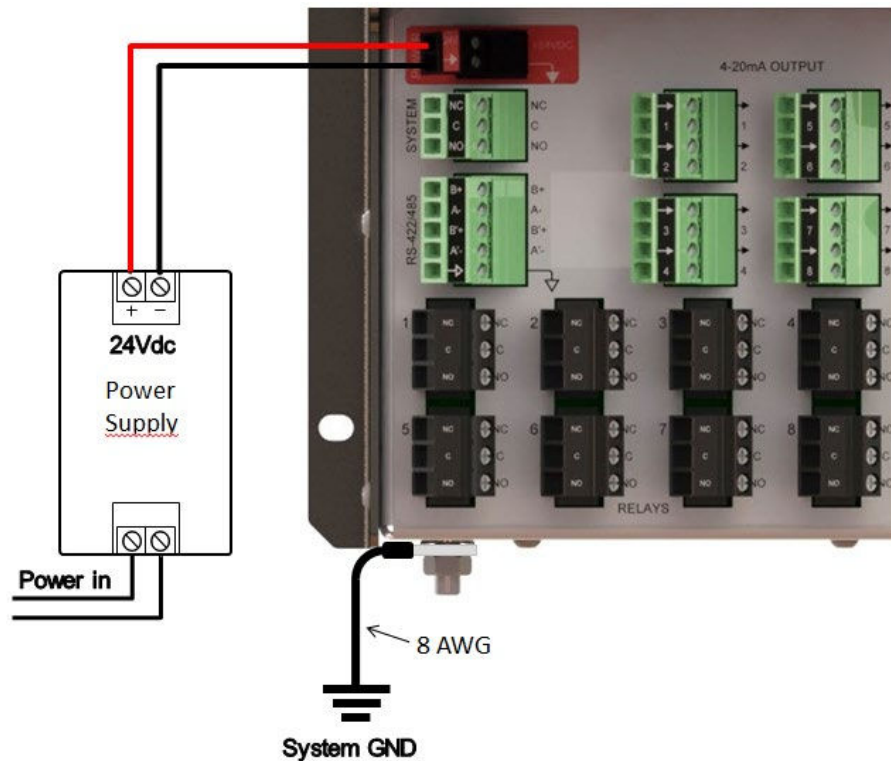
When you chose the power supply, make sure to check the temperature derating in order to have 15W available for all the working temperature.

Power supply:

The EasyGrid LT has the following power requirement:

- Voltage: 24 Vdc $\pm$ 5%
- Power consumption: 15 Watts

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

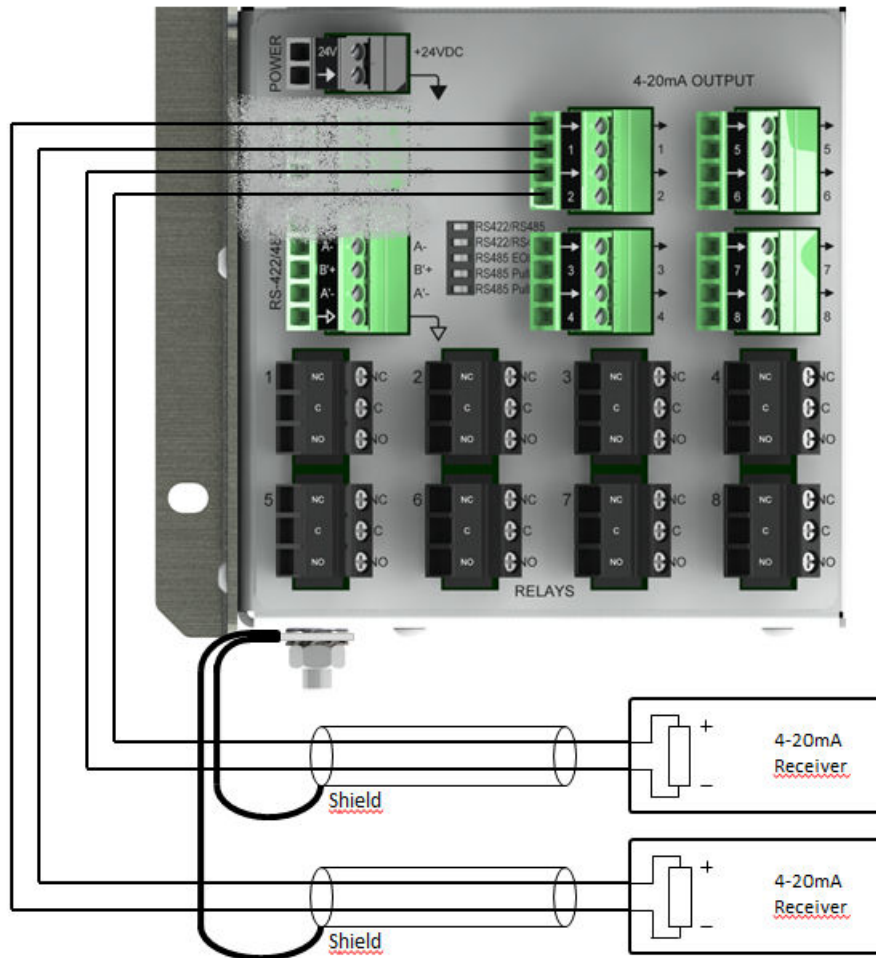


System Ground:

8 AWG (8mm²) copper conductors required for grounding the EasyGrid LT for electromagnetic interference (EMI) purposes. FISO recommends Earth strap AMP# 1337670-3 or Crimp terminal AMP ring tongue terminal # 8-33460-2. M5 nut Torque recommendation for system ground is 2Nm (18lb-in).

5.3 Analog output

- The EasyGrid LT 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 LT . 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 LT 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 LT case)
- The cables shields must be grounded at only one end, we recommend to connect-them to the EasyGrid LT M5 GND stud.
- In order to avoid "ground loop" errors, the EasyGrid LT 4-20mA outputs shall be connected to: floating receivers or 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 400 ohms.



5.4 System relay

Systems relay maximum capacity: 1.5A @ 30VDC / 1A @ 120VAC / 0.5A @ 250VAC

The EasyGrid LT System relay tells you if the EasyGrid LT and his sensors are working properly. This relay is of failsafe type.

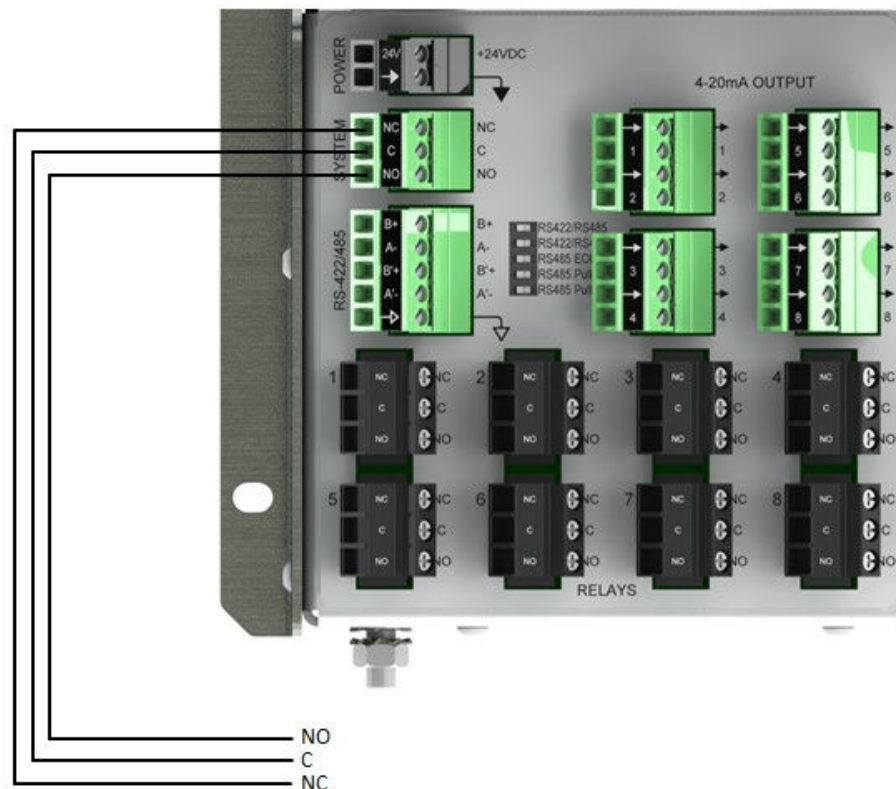
Failsafe operation means that when in alarm, the relay contacts are in their "normal," de-energized, or "shelf-state" positions. In other words, normally closed relays contacts are closed in alarm, and normally open relays contacts are open in alarm.

The following conditions will give an alarm on the system relay (the relay close the circuit between the common (C) and the normally close (NC) terminal):

- power failure, or
- invalid reading of an active temperature channel, or
- internal error of the EasyGrid LT , or
- EasyGrid LT WatchDog time out

At power up the EasyGrid LT system relay is in alarm until all the actives sensors gives valid reading, it could take up to 1minute for the alarm condition to resume.

When the EasyGrid LT is in good working condition, the system relay closes the circuit between the common (C) and the normally open (NO) terminals.



5.5 RS-422/485

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

- Please refer to the Communication Configuration section for dip switch settings
- 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 LT 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/RS485 EOL R dip switch.
- FISO recommends polarising the link in one place. You could use the integrated pull up and pull down resistors of the EasyGrid LT. To do so, place the Off/RS485 Pull Up and the Off/RS485 Pull Down dip switch to the right.

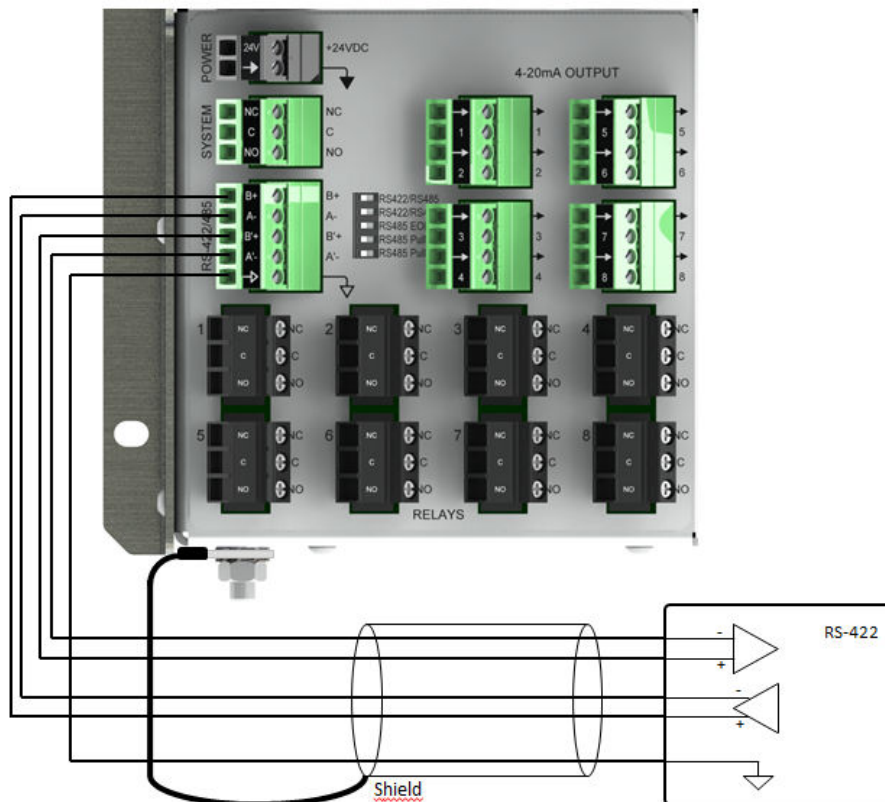
A and B Circuit Designators:

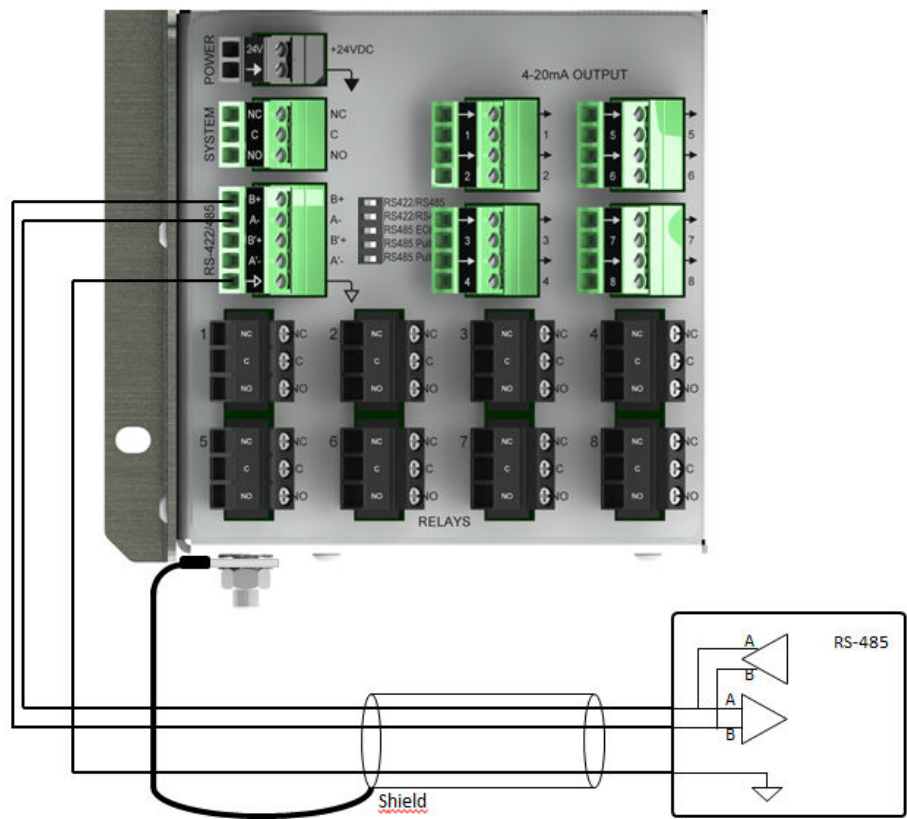
The 'A' and 'B' circuit designators are often a source of confusion.

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 LT.

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





5.6 Relays

Relays maximum capacity: 5A @ 250VAC / 5A @ 30VDC

In order to keep the EasyGrid LT internal temperature to the lowest achievable temperature, the EasyGrid LT relays are programmed for normal operation (non-failsafe).

In normal operation, the following are true:

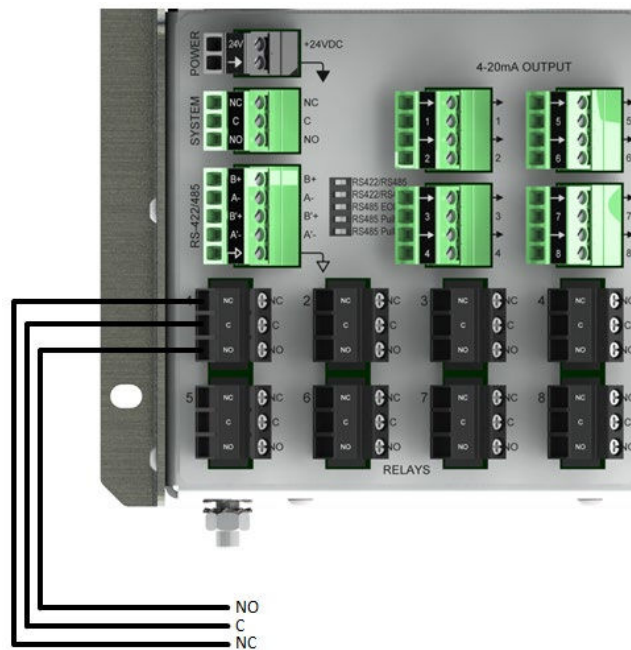
- Under non-alarm conditions, the relay closes the circuit between the common and the N.C. (normally closed) terminals.
- Under alarm conditions, the relay changes state to close the circuit between the common and the N.O. (normally open) terminals.

If you need a specific relay programmed for failsafe operation you could do so, but keep in mind that each activated relay coil dissipate 0.5W (4W if all the 8 relays are in failsafe mode).

FISO recommends you to set for failsafe operation only the required relays.

In failsafe operation, the following are true:

- Under non-alarm conditions, the relay closes the circuit between the common and the N.O. terminals.
- Under alarm or loss-of-power conditions, the relay changes state to close the circuit between the common and the N.C. terminals.



6 Nortech Client Software

Please refer to the MAN-00083 Nortech Client software guide included on the CD.

You can download-it here: <https://fiso.com/monitor/easygrid-lt/>



7 Troubleshooting

7.1 Solving Common Problems

The following troubleshooting guide was designed to help you solve technical problems. If the unit has to be returned for repair, or if you need any assistance, please contact FISO Customer Support.

Symptom	Possible cause	Possible solution
No power	Not powered up	Turn on the ON/OFF switch, located above the optical connectors.
	Main power	Try another main 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	Unique identification of each unit may be incorrectly entered	Reconfigure the network addressing.

The channel status LED turns red when there is something wrong with the channel. The error code appears in the display of the temperature channel in the measurement display mode.

EasyGrid LT displays	Code	Error Description	Possible Cause	Possible Solution
Low	Error 1	Signal Too Low (out of range)	Measured temperature is lower than the minimum permitted temperature.	Ensure minimum sensor temperature is greater than -40 °C. Check the offset value in Nortech Client.
High	Error 2	Signal Too High (out of range)	Measured temperature is greater than the maximum permitted temperature.	Ensure maximum sensor temperature is less than 225 °C. Check the offset value in Nortech Client.
Error	Error 3	Excessive Back Reflection	Excessive back reflection. The ratio of reference signal to reflected signal is too high.	Clean connectors, check connectors for scratches, perform another reference.
Error	Error 4	Unknown signal	Unknown signal.	Ensure sensor is operating within temperature specifications.
---	Error 5	Unknown		
Error	Error 6	Signal Shape	Not enough light, due to bad connections, dirty connections, weak sensor, weak light source.	Ensure that all connections are clean. Ensure sensor is properly connected.
Error	Error 7	Signal Not Ok		
Calib	Error 8	No Calibration	Missing calibration or calibration is unusable.	Return unit to factory for calibration.

7.2 Diagnostics

7.2.1 Sensor Light & Signal values

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.

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:

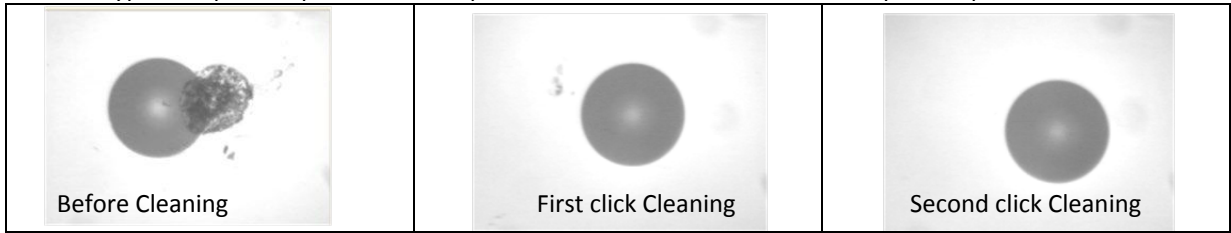
- Do not use this tool to clean oily connector, as this will cause contamination of the cleaning cloth.
- Do not touch the cleaning cloth, as this will cause contamination.
- Do not pull the cleaning cloth, use only the device body.
- Do not attempt to disassemble as this can cause damage to the device 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)
Little	Cloth (White) Red	Tip (Black) Cloth (White)
Empty	Red	Tip (Black) No Cloth (Black)

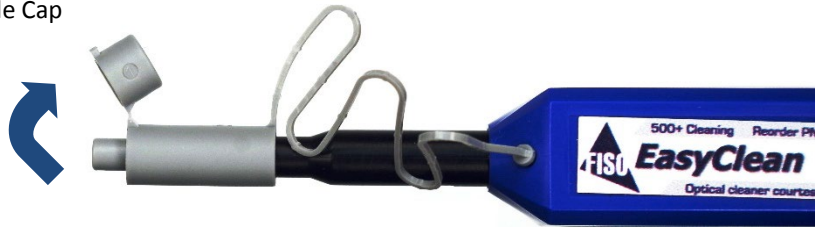


Here are typical inspection pictures of an optical connector made with a Fiber inspection probe



Cleaning the male ST connector

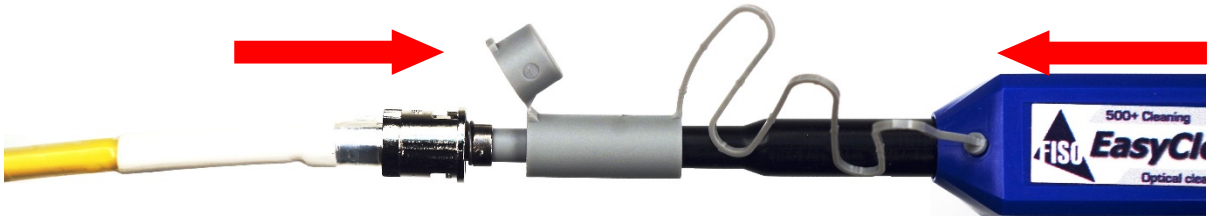
Step 1: Open the end-cover on the Guide Cap



Step 2: Insert the Connector Ferrule 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°

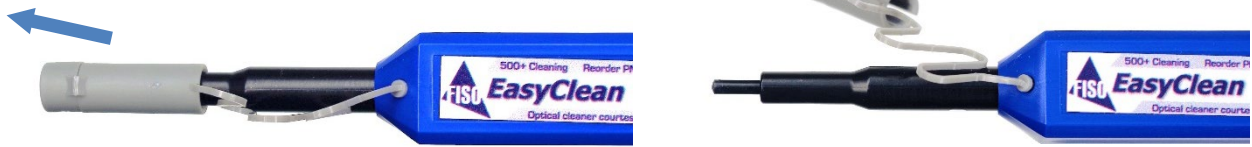


Step 5: Push the EasyClean body toward the ferrule connector for a second time



Cleaning the ST mating

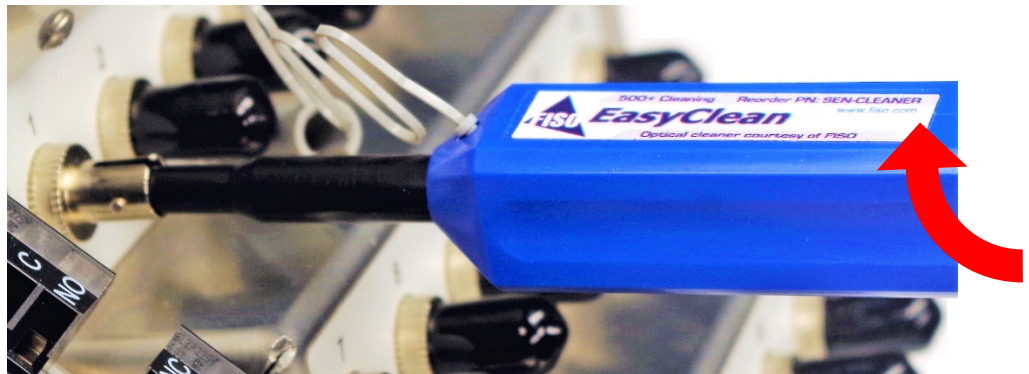
Step 1: Remove the Guide Cap from the Device



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

