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# EasyGrid (E-GRID)

## User Guide

MAN-00084 R 12.0

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

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## 2 Product Certification

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### 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 A digital device. Contact FISO for access to the Declaration of Conformity.

### 2.2 Independent Laboratory Testing

This unit has undergone extensive testing according to the European Union Directive and Standards. All pre-qualification tests were performed internally, at FISO, while final 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 an outdoor area. See certificate and tests of compliance.

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

Contact FISO for any inquiry related to monitor certification.

## 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  
**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 <sup>1</sup>	Electrostatic discharge immunity	±8kV Contact Discharge ±15kV Air Discharge
IEC 61000-4-3 : 2006 A1(2007) A2(2010) IEC 60255-22-3 : 2007 <sup>1</sup>	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 <sup>1</sup>	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 : 2014 IEC 60255-22-5 : 2008 <sup>1</sup>	Surge immunity	Power: ±2kV L-PE / ±1kV L-L
IEC 61000-4-6 : 2013 IEC 60255-22-6 : 2001 <sup>1</sup>	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 : 1993 A1:2000	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 <sup>2</sup> IEC 60255-27 : 2013	Impulse voltage withstand test	±5kV
IEC 61000-4-18 : 2006 A1(2010) IEC 60255-22-1 : 2007 <sup>1</sup> IEEE C37.90.1 : 2012	Damped Oscillatory Wave Immunity Test	2.5kV

<sup>1</sup> These standards have been replaced by IEC 60255-26:2013

<sup>2</sup> 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	Transport vibrations (Method 514.6)	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 (2016) 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 manual, you should understand the following conventions:

 <b>DANGER</b>	<i>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.</i>
 <b>WARNING</b>	<i>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.</i>
 <b>CAUTION</b>	<i>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.</i>
 <b>IMPORTANT</b>	<i>Refers to information about this product you should not overlook.</i>

## 3.2 Safety Information

The level of radiation from the monitor light sources 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 any light beam, visible or not.

The following safety instructions must be observed whenever the EasyGrid is operated. Failure to comply with any of these instructions or with any precaution or warning contained in the Nortech 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. 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 HUMAN APPLICATIONS.**

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

FISO recommends using the qualified power supply available for purchase with your EasyGrid and verify that the voltage specifications indicated on the power supply are compatible with the AC voltage and frequency delivered at the power outlet.



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

- ▲ Do not operate in wet/damp conditions.
- ▲ Do not expose to outdoor conditions. Install the unit in a protective enclosure.
- ▲ 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.*

**CAUTION**

*There are no user serviceable parts inside the Nortech EasyGrid. Adjusting parts inside the unit can affect instrument performance. If you adjust parts, you will need to verify the equipment for good performance. Refer servicing of any other parts to qualified personnel.*

### 3.3 Unpacking and Inspection

The EasyGrid unit is shipped inside a cardboard box designed to give maximum protection during shipment. If the shipping box external surface is damaged, notify your shipping department immediately. Your shipping department may want to notify the carrier.

If the shipping box 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 box for future storage or transportation.

The EasyGrid package should include the following components:

- ▲ Nortech EasyGrid
- ▲ Power terminal wires (16 AWG)
- ▲ USB interface cable
- ▲ ST Optical Connector EasyClean Cleaner
- ▲ Calibration Certificate
- ▲ EasyGrid User Guide
- ▲ Nortech Client software installation removable storage device

## 4 First Steps

### 4.1 Introducing the Nortech EasyGrid

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

It can be configured to have 4 to 18 channels. Modules can be daisy chained to a maximum of 32, which gives the possibility to have up to 576 channels in a single system. Each unit has multiple serial interfaces (1 x USB and 1 x RS485) and 1x optional Ethernet communication port. Supported communication protocols are Nortech and MODBUS (RTU and ASCII). Optional supported communication protocols are IEC-61850, IEC-60870-5-104, DNP3 and TCP/IP-MODBUS, either through an RJ45 output or an ST optical output.

### 4.2 Quick Start

#### 4.2.1 Installing the EasyGrid

The EasyGrid must be installed in a control cabinet to protect it against the outdoor environment. Select a control cabinet that is suitable to your climatic environment with heating, cooling, and/or corrosion resistance.

In addition, it is a best practice to install the control cabinet in a way that it will be oriented in the shade (not in direct sunlight). If the control cabinet includes a window, direct sunlight on the monitor screen may reduce its lifetime.

 **CAUTION**

*Remove the LCD protective film from the touchscreen after installation*

 **CAUTION**

*Do not install the monitor such that it will be in direct sunlight each day*

## 4.2.2 Powering the EasyGrid

The EasyGrid requires **24 volts DC ( $\pm 10\%$ )** power. The power input terminal block is coloured orange for additional visual aid.

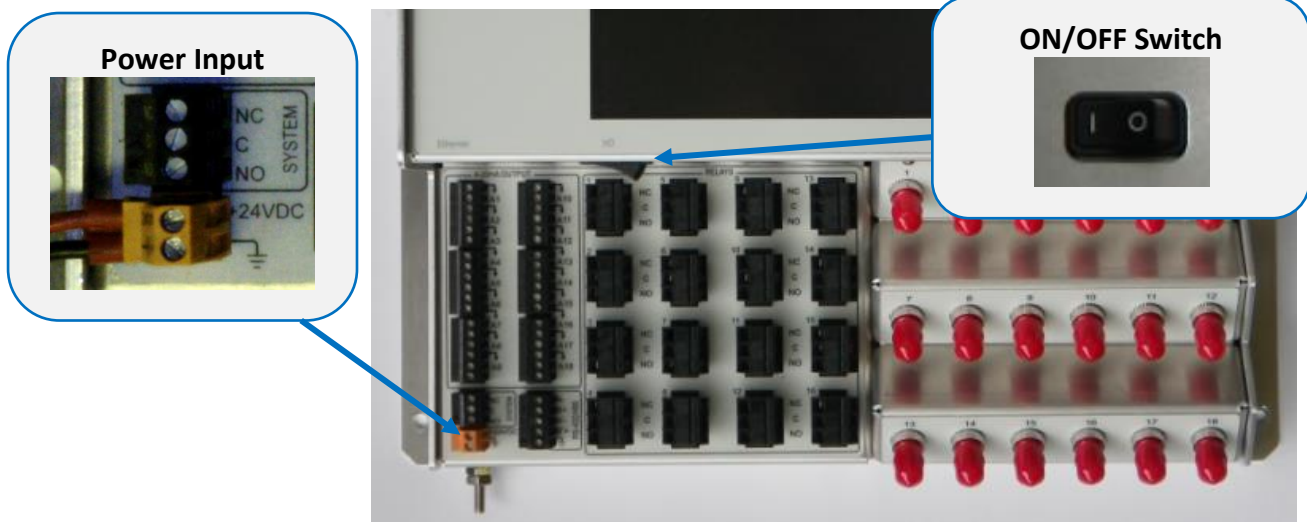
**⚠ CAUTION**

**DO NOT APPLY AC POWER TO THE MONITOR.**

*Applying AC power to the input terminal block will cause a short circuit and requires factory replacement of the entire motherboard. This is a costly repair and must be avoided.*

**⚠ WARNING**

*Make sure to have a power supply providing the specified power and compatible with your local power outlet*



1. Make sure that the power switch is OFF when connecting the power supply to the unit.
2. Wire the power input terminal block to a power supply providing the required voltage and respect connector polarity.
3. Power up the unit using the ON/OFF switch located on the panel above the relay terminal block.

### 4.2.3 Handling Optical Cable

The core of any fiber optic cable is made of glass. For this reason, it should be handled with care and should not be viewed like a standard conventional electrical cable. If it is pinched, twisted, bent sharply or crushed, the glass core will break and the light attenuation will occur at this point.

#### Fiber optic sensors are pretty robust but...

- Avoid sharp bend
- Avoid kinking, twisting
- Avoid putting any tension on the cable
- Avoid dropping connector on hard surfaces



Like your car windshield or your glasses, the optical connector must stay clean to give good results.

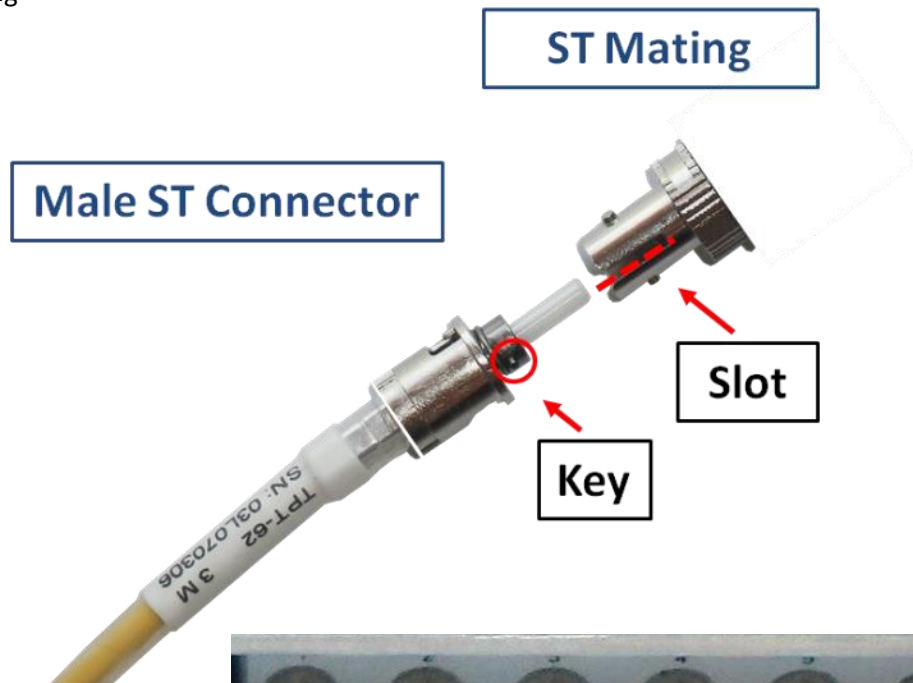
Clean both connectors each time you connect them, because a small particle of dust on one connector could scratch both connectors. See [Appendix A: Cleaning Fiber Optic Connectors](#) for more details.

Always keep the protective cap on. It protects the optical connector when they are not connected.

## 4.2.4 Connecting Temperature Sensors

The EasyGrid is compatible with all FISO TPT-62 sensors. No calibration factor or calibration procedure is required to get accurate temperature measurements.

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



### 4.2.5 Reading Temperature Measurements

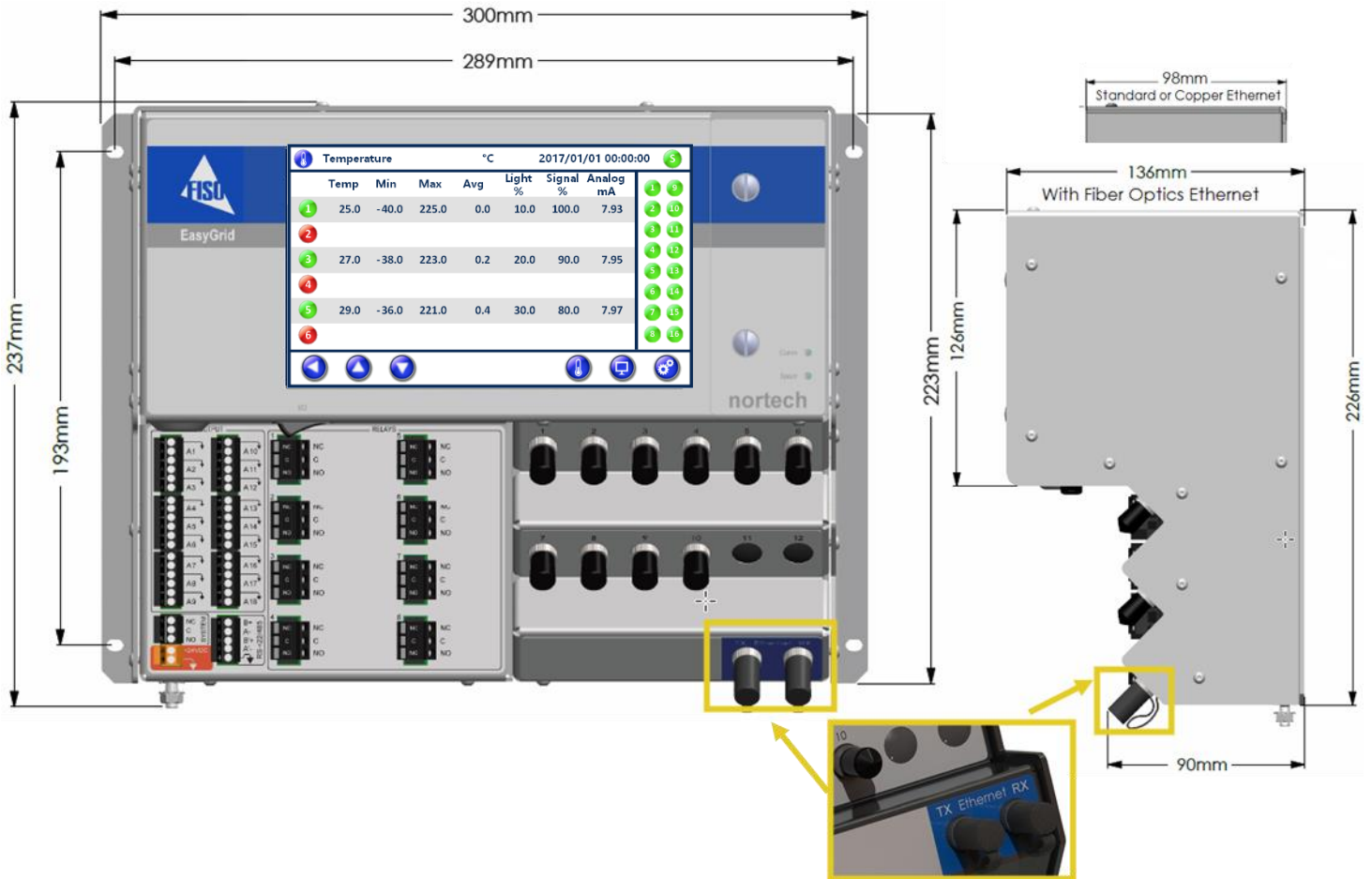
With the power switch to ON and sensors connected you can read the temperature of each sensor on the EasyGrid display, up to 18 channels at one time, as displayed below.

Temperature		°C	2017/01/01 00:00:00		S
Temp	Temp	Temp	Temp	Temp	Temp
1 25.0	7 31.0	13 37.0	1	9	
2	8	14	2	10	
3 27.0	9 33.0	15 39.0	3	11	
4	10	16	4	12	
5 29.0	11 35.0	17 41.0	5	13	
6	12	18	6	14	
			7	15	
			8	16	

For more information on FISO system characteristics, maintenance and installation, refer to document **MAN-00098 Nortech System Installation User Guide**.

# 5 Hardware Configuration

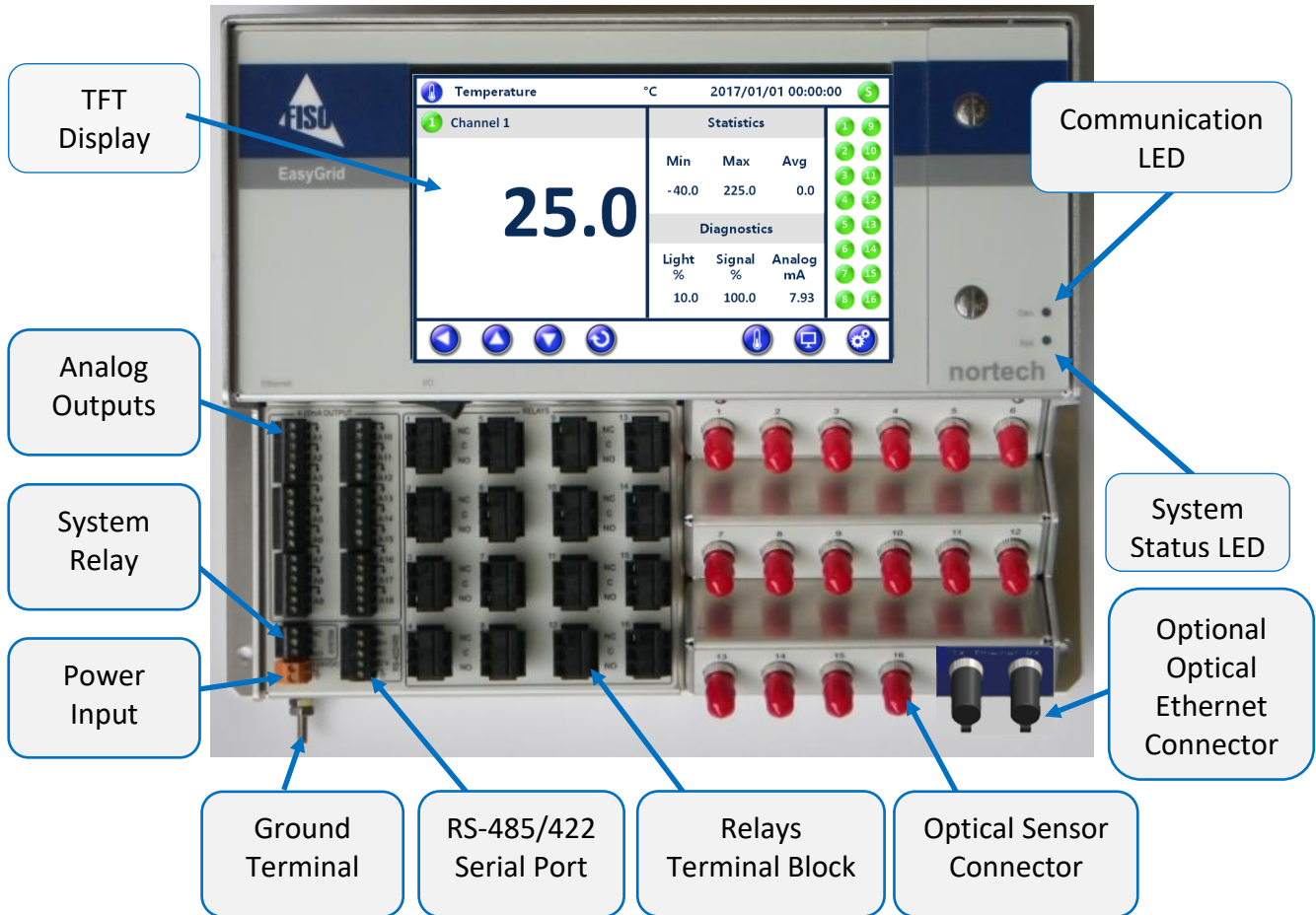
## 5.1 Dimensions



All EasyGrid monitors ordered with the Fiber Optics Ethernet communication will be of 136mm in depth for the top portion of the monitor, as shown above. If the EasyGrid is ordered with Standard (No Ethernet) communication option or the Copper Ethernet option, the depth of the top portion of the monitor will be of 98mm.

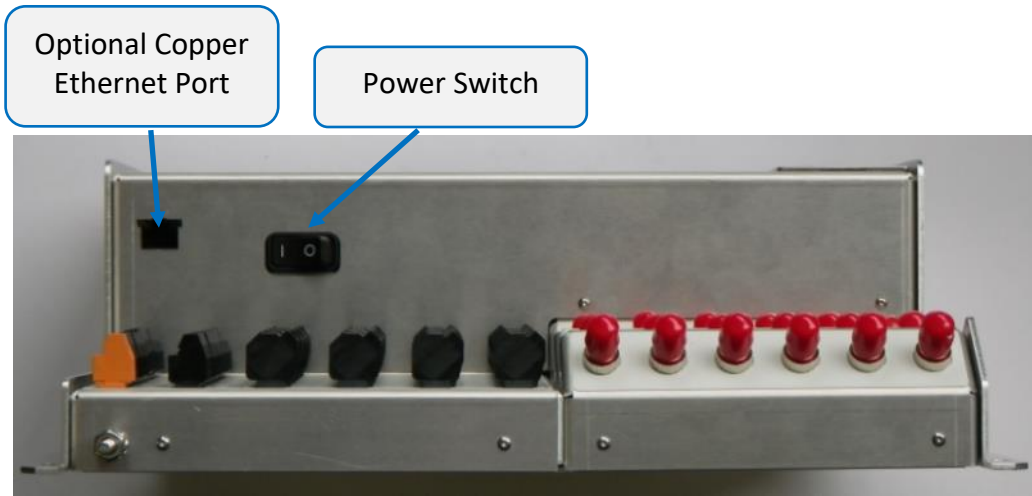
When the Fiber Optic Ethernet communication option is selected, the ST/PC type, TX & RX optical connectors will be located in the bottom right corner of the front connector panel.

## 5.2 Front Panel Overview

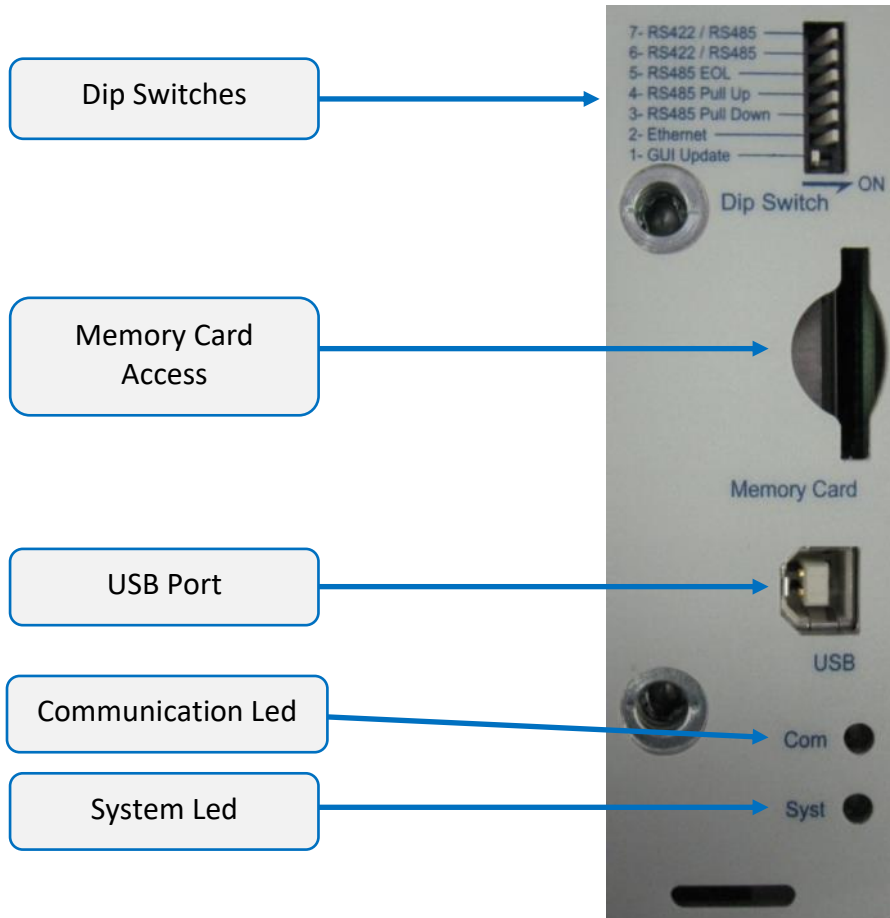




### 5.3 Bottom Panel Overview



### 5.4 Maintenance Panel Overview



## 5.5 TFT Display

The EasyGrid offers a large 17.8 cm (7") color touch screen. From any screen, you can use the bottom navigation bar to access: Any Temperature Display Screens, the Monitoring Menu or the Settings Menu.

Top and bottom rows of the TFT display:


The screenshot shows the main temperature display screen. At the top, it displays the date and time '2017/01/01 00:00:00', the temperature unit '°C', and the screen title 'Temperature'. The main display area shows 'Channel 1' with a large temperature reading of '25.0'. To the right, there are 'Statistics' (Min: -40.0, Max: 225.0) and 'Diagnosis' (Light: 10.0%, Signal: 100.0%) sections. A 'System Relay' status is shown as 'Not Triggered' with a green 'S' icon. A numeric keypad (1-16) is on the right side. The bottom navigation bar contains several icons: back, scroll up/down, refresh, save, temperature, monitoring, and settings.


**Callouts and Explanations:**

- YYYY/MM/DD HH:MM:SS = Date and Time**: Points to the top right date and time display.
- Icon and name of the active screen**: Points to the temperature icon and 'Temperature' title.
- Selected temperature unit**: Points to the '°C' unit.
- System Relay**: Shows 'Not Triggered' with a green 'S' icon and 'Triggered' with a red 'S' icon.
- Control Buttons**:
  - Back to the previous page
  - Scroll Up or Down to the next displayed screen
  - Enable/Disable Automatic Scrolling mode
- Main Menu Buttons**:
  - Go to Temperature Display Screen
  - Go to Monitoring Menu
  - Go to Settings Menu
- Save Button (In Settings Menus)**: Press to save a created or modified parameter.
- Alarm Relays State**: Shows 'Not Triggered' with a green '1' icon and 'Triggered' with a red '1' icon.

## 5.6 Action Buttons or State Icons

To help during navigate through the various Settings and Monitoring displays, one basic interface information is important to know.

Contoured round knobs, for example , are Action Buttons; they allow parameter modification or function selection.

Round knobs without contour, for example , are State Icons; they simply provide information on the state of the related parameter or function.

## 5.7 Communication and System Status LED

The System Status and the Communication Status LED on the front panel change color depending on the current unit situation.



### Communication Status

The different LED modes and their meanings are:

Color	State	Description
Off	Any	No activity on the communication bus
Amber	Blink	Activity on the communication bus

### System Status

The different LED modes and their meanings 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
Any	Blink	Memory card synchronisation in progress

## 5.8 USB Configuration Port

The USB configuration interface is accessible in the maintenance panel.



The port serves two purposes:

- ▲ Communicating with a PC through Nortech Client Software to configure the EasyGrid monitor parameters, retrieve stored data, upload data or operate the EasyGrid monitor.
- ▲ Upload updated version of the firmware.

## 5.9 Power Input

The EasyGrid accepts only **24 volts DC ( $\pm 10\%$ ), 40W**.

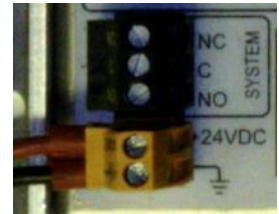


### **WARNING**

*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.*

Connect the unit to the power supply using terminal block connectors 24VDC and ground.

Please refer to your power-supply operation manual for important notices and installation information.



## 5.10 Power Switch

The power ON/OFF switch is located above the relay terminal blocks

Once all wires are connected, press **I** on the switch to power ON the unit. To power OFF, press the **O** on the switch.

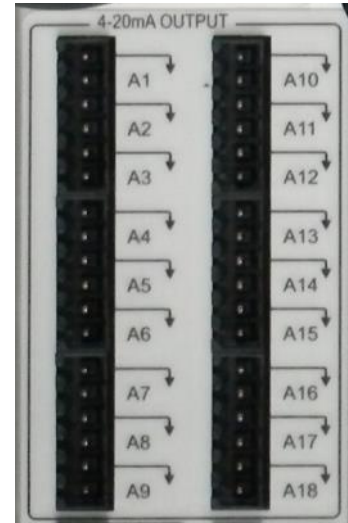


## 5.11 Analog Output

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 provides one output for each temperature channel present in the unit.

Wire length and gauge are related when connecting analog outputs. For a run of 100 m or less, recommended gage is 24 AWG or greater. The longer the run, the smaller the recommended gage will be. Recommendations call for shielded wire, or for installation in a metal conduit.



Label	Channel	Description	Label	Channel	Description
GND1	1	Analog Output Ground	GND10	10	Analog Output Ground
A1	1	Analog Output	A10	10	Analog Output
GND2	2	Analog Output Ground	GND11	11	Analog Output Ground
A2	2	Analog Output	A11	11	Analog Output
GND3	3	Analog Output Ground	GND12	12	Analog Output Ground
A3	3	Analog Output	A12	12	Analog Output
GND4	4	Analog Output Ground	GND13	13	Analog Output Ground
A4	4	Analog Output	A13	13	Analog Output
GND5	5	Analog Output Ground	GND14	14	Analog Output Ground
A5	5	Analog Output	A14	14	Analog Output
GND6	6	Analog Output Ground	GND15	15	Analog Output Ground
A6	6	Analog Output	A15	15	Analog Output
GND7	7	Analog Output Ground	GND16	16	Analog Output Ground
A7	7	Analog Output	A16	16	Analog Output
GND8	8	Analog Output Ground	GND17	17	Analog Output Ground
A8	8	Analog Output	A17	17	Analog Output
GND9	9	Analog Output Ground	GND18	18	Analog Output Ground
A9	9	Analog Output	A18	18	Analog Output

## 5.12 RS-485/RS-422 Ports

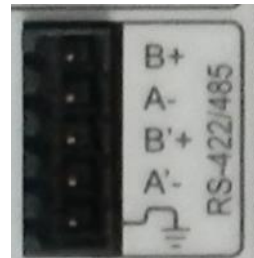
A RS-485/RS-422 serial port is provided on the EasyGrid. It can be used to connect the EasyGrid to any RS485 or RS422 communication bus. It also allows multiple EasyGrid monitors to be link together.

**⚠ IMPORTANT**

*When linking many EasyGrid monitors 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 are used to configure the port. They are located behind the access plate on the right of the screen

Switch	RS-422 Mode	RS-485 Mode
7	Must be <b>Left</b>	Must be <b>Right</b>
6	Must be <b>Left</b>	Must be <b>Right</b>
5	Must be <b>Left</b>	<b>Right:</b> Adds a 120Ω End of Line resistor <b>Left:</b> No end of line resistor
4	Must be <b>Left</b>	<b>Right:</b> Adds a 1kΩ <u>pull up</u> resistor <b>Left:</b> No <u>pull up</u> resistor
3	Must be <b>Left</b>	<b>Right:</b> Adds a 1kΩ <u>pull down</u> resistor <b>Left:</b> No <u>pull down</u> resistor

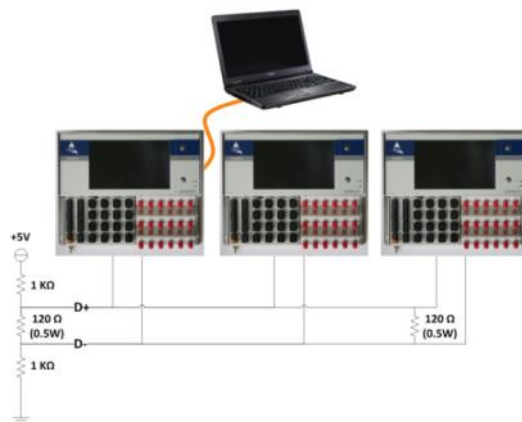
FISO recommends shielded, twisted pair wiring, 24 AWG with 120Ω line impedance to connect the RS-485 interface to the network.

FISO also recommends biasing the RS-485 BUS using pull-down and pull-up 1 KΩ resistors. 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 NORTECH conditioner communication failure.

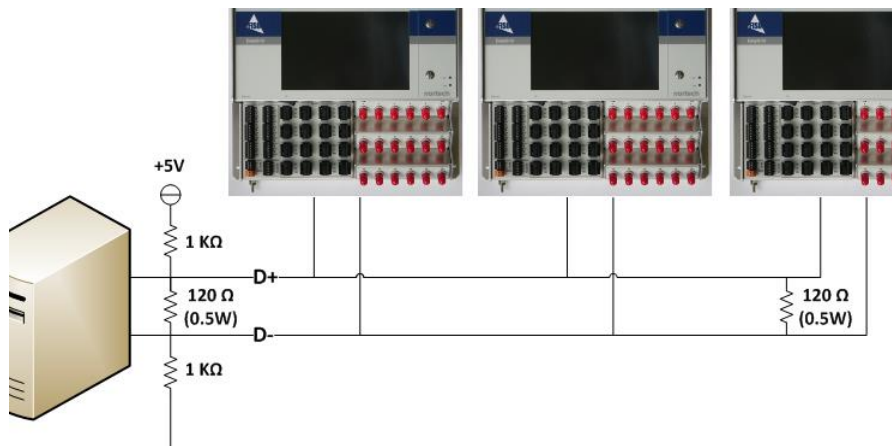
You must identify the host device on the RS-485 network and then proceed with its 485 BUS line biasing, as shown above.

Two termination resistors must be installed and have the same characteristic impedance value as the twisted wire used on the 485 network. RS485 network termination resistors typical values are respectively 120Ω and ½ Watt.

In **Nortech mode**, it is possible to connect up to 32 units together. When all units are connected on the same RS-485 bus, this allows a user to execute the software configuration from a single USB port.



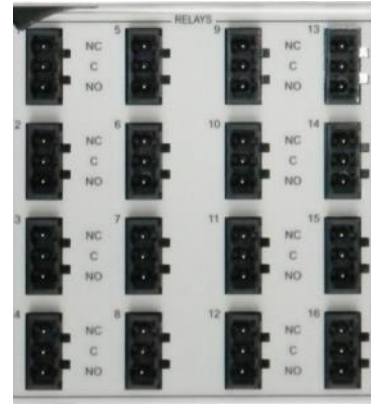
In **MODBUS mode**, it is possible to connect up to 247 units.



## 5.13 Programmable Alarm/Relay Terminal Block

All relay terminal block connectors are form-C relay interfaces.

Relays 1 to 16 are programmable. The programming of the relay is accomplished either through the EasyGrid display or from a PC with the Nortech Client software.



Mode	Power Off			Normal			Cond. Met			Exerciser		
	NC	COM	NO	NC	COM	NO	NC	COM	NO	NC	COM	NO
Normal												
Fail Safe												



### 5.14 System Relay (Fail Safe)

The system relay is a form-C relay that will open or close depending on the status of the system faults. It is always configured in Fail Safe mode.



Mode	Power Off			Normal			Cond. Met		
	NC	COM	NO	NC	COM	NO	NC	COM	NO
Fail Safe									

### 5.15 Protective Conductor 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 12 or 10 AWG copper wire) to insure adequate grounding.



## 5.16 Optical Connector

There can be up to 18 optical channels on each EasyGrid monitor. Each channel is designed to mate with an ST/PC type connector, normally from an extension cable as part of the optical link to a TPT-62 sensor, at the measurement position. All components along the link should use optical fiber with 62µm core diameter.

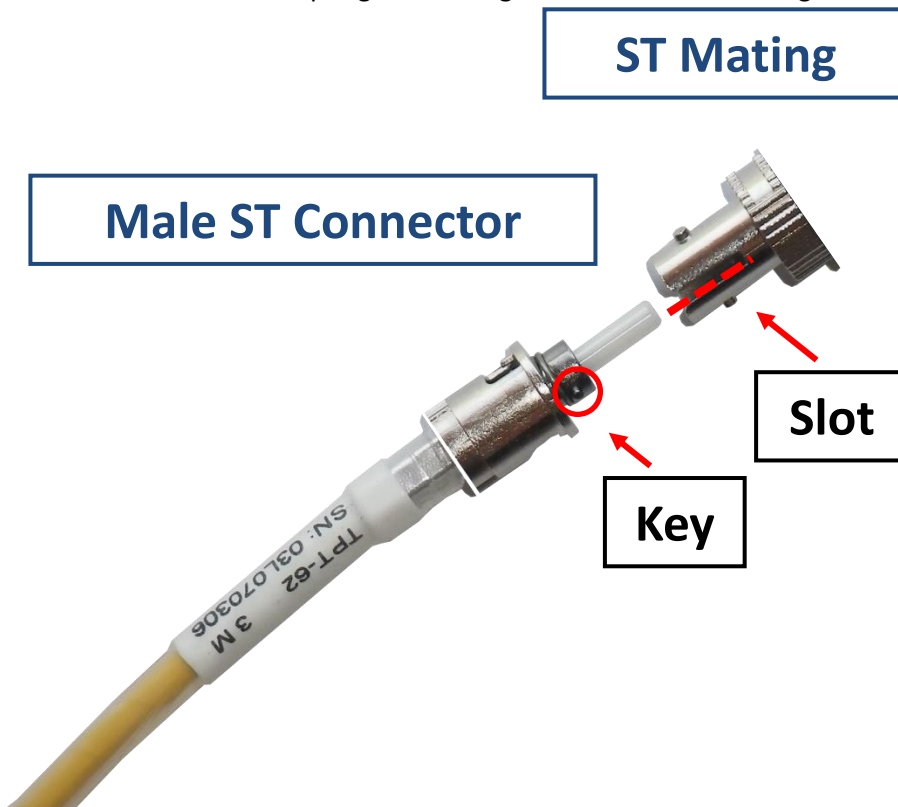


**⚠ CAUTION**

*Use care in handling fiber optic connectors. For optimum performance, always clean the fiber tips prior the insertion into the connector. For details on connector handling, cleaning and maintenance, please refer to the **MAN-00098 Nortech System Installation User Guide**.*

To connect an ST connector, follow these five 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 key with the mating slot.
4. Insert the connector ferule straight in the mating
5. Push and twist the spring loaded ring to lock both sections together



## 5.17 Ethernet Port (Optional)

When the EasyGrid is ordered with an Ethernet communication protocol (IEC61850, Modbus TCP/IP, DNP 3.0 or IEC60870-5-104) to be used over a copper network, the bottom plate will be fitted with an Ethernet port (RJ-45) above the analog output terminal block. The port is dedicated to the selected communication protocol.



When Ethernet is to be used over a fiber optic network, then the TX & RX optical connectors will be located in the bottom right corner of the front connector panel.



### Ethernet Specification


- Over Copper:
  - Standard : IEEE 802.3
  - Physical Layer : 10/100Base-T
  - Data Rate 10/100 Mbps (auto-sensing)
  - Mode : Half-duplex and full-duplex support (auto-sensing)
  - Connector : RJ-45
- Over Fiber
  - 100BASE-FX
  - Fiber : MM 50µm or 62.5µm
  - Connector : ST/PC
  - Distance : 2km
  - Wavelength :1310nm

For more information, refer to document **MAN-00099 Nortech Communication Configuration User Guide**.

# 6 Firmware Settings

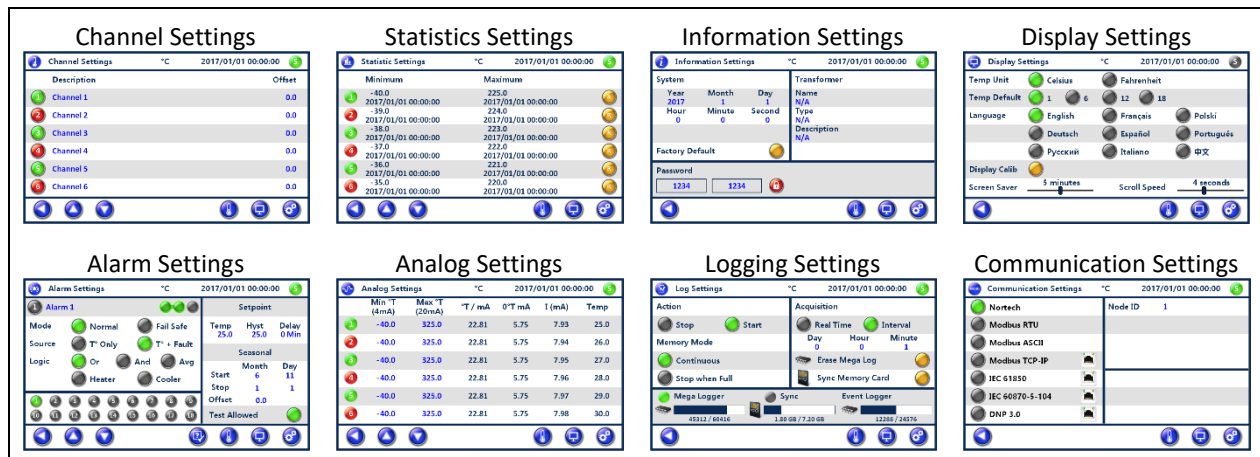
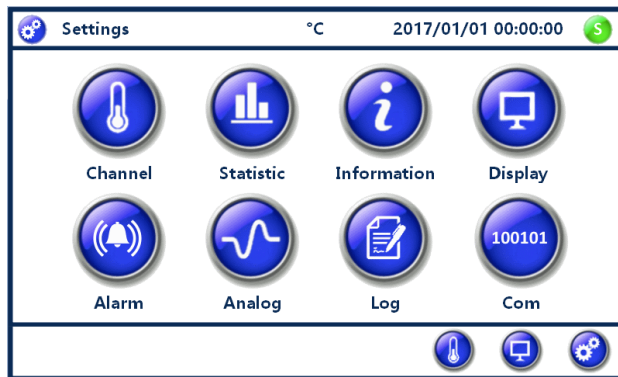
All EasyGrid firmware parameters can be set from the unit TFT screen or from the supplied Nortech Client PC application.

The EasyGrid Firmware is designed to optimize the user-device experience, whether you are programming the parameters of operation or looking-up various information. The firmware screen interface utilizes icons to facilitate user operation of the monitor.

From the EasyGrid display, the Settings menu can be accessed at all-time using the  button, unless the access has been password protected.

Pressing  brings the **Settings** menu page from where you can select from eighth sub-menus:

- Channel
- Alarm
- Statistic
- Analog (Outputs)
- Information
- Log (Data Logging)
- Display
- Com (Communication)



## 6.1 Channel Settings



This screen allows parameter customization associated to all optical channels; use the bottom row buttons to scroll through all the Channels.

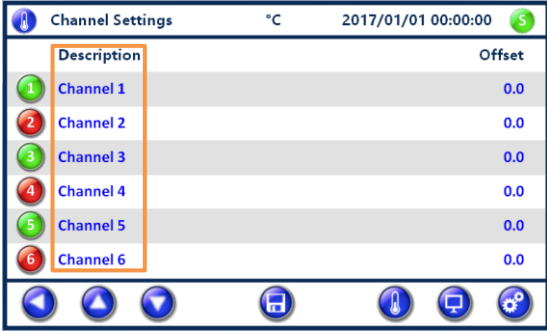

Channel Settings		°C	2017/01/01 00:00:00	S
Description	Offset			
1 Channel 1	0.0			
2 Channel 2	0.0			
3 Channel 3	0.0			
4 Channel 4	0.0			
5 Channel 5	0.0			
6 Channel 6	0.0			

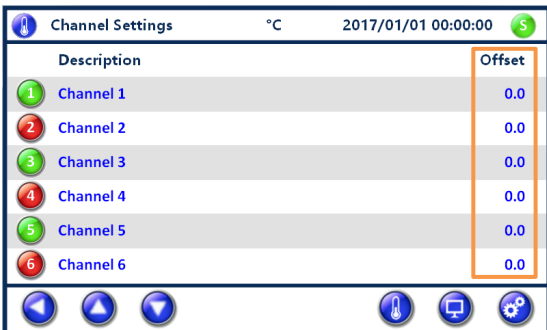

NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



### Activation

	<p><b>Description</b></p> <p>Pressing a left column numbered icon  or  .... allows activation of a channel. Press on Icon to Activate or Deactivate a channel.</p> <hr/> <p><b>Range</b></p> <p><b>Green:</b> Channel is activated  .</p> <p><b>Grey:</b> Channel is deactivated  . The channel is not scanned.</p> <p><b>Red:</b> Channel is activated but in fault  .</p>
--	---

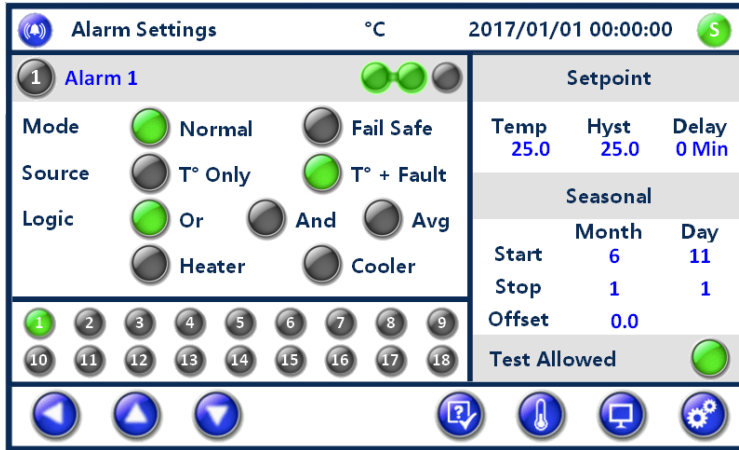
Description	
	<p><b>Description</b></p> <p>Associates a description to the channel. Press in the desired field to customize the channel description.</p>
	<p><b>Range</b></p> <p>Any string of characters (max 18 characters). Press  to exit or  to confirm.</p>


Offset	
	<p><b>Description</b></p> <p>Applies a negative or positive offset value to the measured temperature so that the displayed value is modified. Press on the field to change the offset value.</p>
	<p><b>Range</b></p> <p>Any negative or positive value, as long as the resulting displayed temperature value is within the calibration range. Press  to exit or  to confirm.</p>

## 6.2 Alarm Settings






Each relay must be programmed separately; use the bottom row buttons to scroll through all the Alarms. This section explains the different parameters and their functionality.



NOTE: After a parameter is created or modified, remember to press the  button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



Activation	
	<p><b>Description</b></p> <p>Pressing the numbered icon  allows activation of this Alarm. Press on Icon to Activate or Deactivate the Alarm.</p>
	<p><b>Range</b></p> <p><b>Green:</b> Alarm is activated  .</p> <p><b>Grey:</b> Alarm is deactivated  .</p>


Description	
	<p><b>Description</b></p> <p>Associate a description to the Alarm by pressing on the field to edit the Alarm description. Type in a description using the Alpha Numeric key pad.</p> <hr/> <p><b>Range</b></p> <p>Any string of characters (max 18 characters). Press  to exit or  to confirm.</p>

Operation	
	<p><b>Description</b></p> <p>Displays the relay position for reference purposes during the setting of the Alarm conditions.</p> <hr/> <p><b>Range</b></p> <p><b>Normal:</b> When conditions are not met the relay is in the Normally-Closed position. </p> <p><b>Fail Safe:</b> When conditions are not met the relay is in the Normally-Open position. </p>

Mode	Power Off			Normal			Cond. Met			Exerciser			
	NC	COM	NO	NC	COM	NO	NC	COM	NO	NC	COM	NO	
Normal													
Fail Safe													

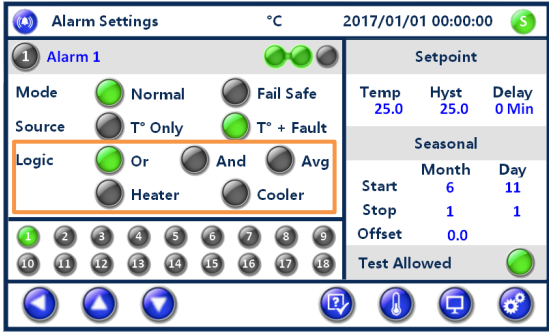



Mode	
	<p><b>Description</b></p> <p>Select the original mode of operation of the relay by pressing on the desired option. The active option icon will then turn green.</p> <hr/> <p><b>Range</b></p> <p><b>Normal:</b> The original relay position will be in the Normally Closed (NC) position.  <b>Fail Safe:</b> The original relay position will be in the Normally Opened (NO) position.</p>

NOTE: After a parameter is created or modified, remember to press the  button when prompted, before leaving the active screen so that the parameter is stored or the action executed.

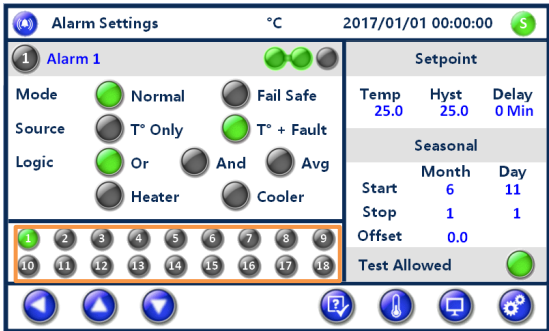


Source	
	<p><b>Description</b></p> <p>Select the source of information for the relay to Trig On by pressing on the desired option. The active option icon will then turn green.</p> <hr/> <p><b>Range</b></p> <p><b>T° Only:</b> Relay will Trig On only from the Temperature Setpoint parameters.  <b>T° + Channel Fault:</b> Relay will Trig On from the Temperature Setpoint parameters or a Channel Fault.</p>

Logic	
	<p><b>Description</b></p> <p>Select the logic used to control the relay by pressing on the desired option. The active option icon will then turn green.</p> <p><b>Range</b></p> <p><b>OR:</b> Condition is met when ANY of the selected channels temperature is ABOVE the Setpoint.  <b>AND:</b> Condition is met when ALL of the selected channels temperature are ABOVE the Setpoint.  <b>AVERAGE:</b> Condition is met when the AVERAGE temperature of the selected channels is ABOVE the Setpoint.  <b>HEATER CONTROL:</b> Condition is met when the EasyGrid Internal temperature is BELOW the Setpoint.  <b>COOLER CONTROL:</b> Condition is met when the EasyGrid Internal temperature is ABOVE the Setpoint.</p>

NOTE: After a parameter is created or modified, remember to press the  button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



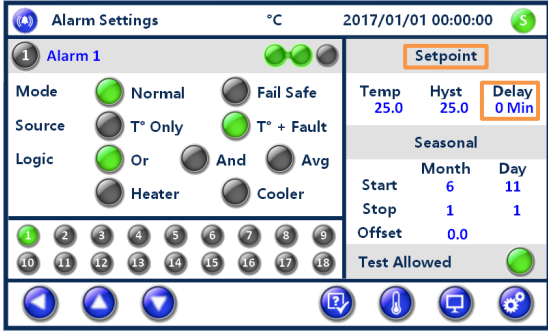
Channels List	
	<p><b>Description</b></p> <p>Select channels used for the operation of the relay by pressing the channel number icons. A single, multiple or all channels can be selected. The selected channel icons will then turn green.</p> <p>To unselect a channel, press on the desired icon, it will turn back to grey.</p> <p><b>Range</b></p> <p>A single, multiple or all temperature channels can be selected.</p>

Setpoint Temperature	Description
	<p>Set the temperature trig point used in the operation of the relay. Press in the Temp field to edit the temperature value. Type in a value using the Numeric key pad.</p>
	<p><b>Range</b></p> <p>Any negative or positive value, as long as the resulting displayed temperature value is within the calibration range.</p> <p>Press  to exit or  to confirm.</p>

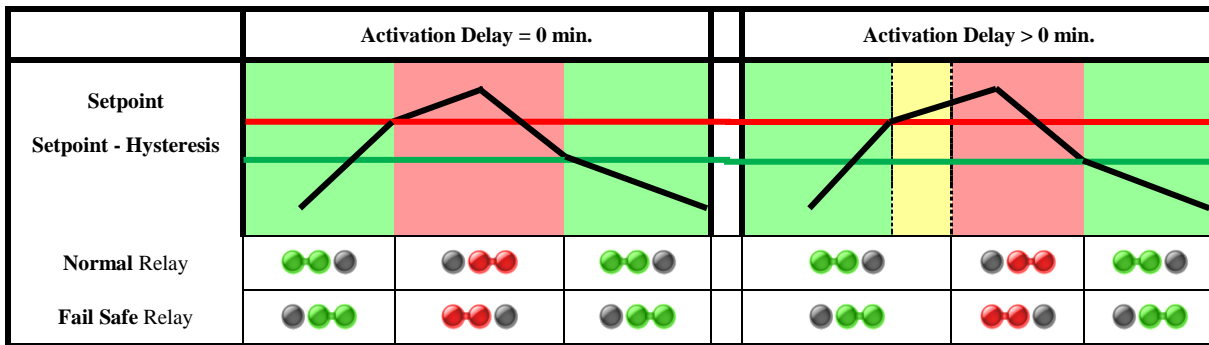
NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



Hysteresis	Description
	<p>Set the hysteresis value to be used in the operation of the relay. Press in the Hyst field to edit the hysteresis value. Type in a value using the Numeric key pad.</p>
	<p><b>Range</b></p> <p>Any positive value, as long as the resulting temperature value is less than :  <math>(\text{setpoint} - (-40^\circ)) / 2</math>.</p> <p>Press  to exit or  to confirm.</p>

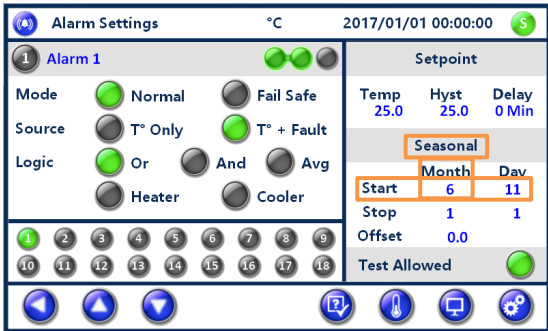
Activation Delay	Description
	<p>Set a time delay between the moment the conditions are met and the relay operation. Press in the Delay field to edit the delay value. Type in a value using the Numeric key pad.</p>
	Range
	<p>0 to 59 minutes. Press  to exit or  to confirm.</p>

The graphic below helps understanding the concepts of Hysteresis and Activation delay.



NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



Seasonal Offset - Start Month	Description
	<p>Define the first month of the Seasonal Offset period by pressing on the corresponding digit. Type in a value using the Numeric key pad. * Same for ALL Alarms/Relays.</p>
	Range
	<p>1 to 12 (January to December). Press  to exit or  to confirm.</p>

NOTE: The Seasonal Offset function can be set from any of the Setting Alarm/Relay screens, but it applies to all the Alarms/Relays of your monitor. The Seasonal Offset parameters then have to be the same for all Alarms/Relays.

Seasonal Offset - Start Day	Description
	<p>Define the first day of the month of the Seasonal Offset period by pressing on the corresponding digit. Type in a value using the Numeric key pad. * Same for ALL Alarms/Relays.</p>
	Range
	<p>1 to 31. Press  to exit or  to confirm.</p>

NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



Seasonal Offset - Stop Month	Description
	<p>Define the last month of the Seasonal Offset period by pressing on the corresponding digit. Type in a value using the Numeric key pad. * Same for ALL relays.</p>
	Range
	<p>1 to 12 (January to December). Press  to exit or  to confirm.</p>


Seasonal Offset - Stop Day	Description
	<p>Define the day of the last month of the Seasonal Offset period by pressing on the corresponding digit. Type in a value using the Numeric key pad. * Same for ALL relays</p>
	Range
	<p>1 to 31. Press  to exit or  to confirm.</p>

Seasonal Offset	
	<p><b>Description</b></p> <p>Set the Seasonal offset value to offset the relay Setpoint for the selected period by pressing on the corresponding digit. Type in a value using the Numeric key pad.</p> <p>For example, Setpoint may be decreased by 5°C for the summer period.</p> <p>This function is inactive when the offset is 0.0°C.</p> <p>* Same for ALL relays</p> <p><b>Range</b></p> <p>Any positive or negative value, as long as the resulting temperature value is within the calibration range.</p> <p>Press  to exit or  to confirm.</p>

NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.




Test Allowed	
	<p><b>Description</b></p> <p>Allows testing of the specific relay in the test option screen .</p> <p><b>Range</b></p> <p><b>Allowed:</b> The relay can be tested .</p> <p><b>Not Allowed:</b> No tests are allowed on this relay .</p>

NOTE: After a parameter is created or modified, remember to press the  button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



### Test Relay Screen


**Description**


To access the Test Relay screen, press the Test Option icon  in the bottom row of any Alarm Settings screen.

The left column of the Test Relay screen shows the Alarms/Relays that have been Allowed for testing

---

**Range**

**Allowed:** The relay can be tested  .

**Not Allowed:** No test is allowed on this relay  .

NOTE: When the Test Relay screen is displayed, normal operation of the Alarms/Relays is suspended, so that the Relays can be tested without conflicting with the Alarm parameters that have been set. After the testing of the Relays has been completed, make sure that you leave the Test Relay screen, so that all Relays come back to normal operation.

**Test Relay Screen – Testing a Relay Operation**

Test Relay		°C	2017/01/01 00:00:00		
Description	Exercise	Period (Min)	Cycle (Day)	Fail Safe	Relay NC COM NO
1 Alarm 1	●			●	●●●
2 Alarm 2	●	1	2	●	
3 Alarm 3	●			●	
4 Alarm 4	●	2	4	●	●●●
5 Alarm 5	●			●	
6 Alarm 6	●	3	6	●	

**Description**

The right column, titled Relay, displays the pre-test state of each specific relay as set in each Alarm Settings page.

To test a relay operation, press on the desired relay state picture, ●●● under the Relay column.

To cancel the test, press again on the same relay state picture.

**Range**

For example, see Alarm 4 as shown in the screen to the left.

**Pre-Test State:** ●●●

**State Under Test:** ●●●

Test Relay		°C	2017/01/01 00:00:00		
Description	Exercise	Period (Min)	Cycle (Day)	Fail Safe	Relay NC COM NO
1 Alarm 1	●			●	●●●
2 Alarm 2	●	1	2	●	
3 Alarm 3	●			●	
4 Alarm 4	●	2	4	●	●●●
5 Alarm 5	●			●	
6 Alarm 6	●	3	6	●	

NOTE: When a Relay is under forced test state, the visual state icon will be yellow (●●●), to indicate that a test is being performed, so not to be confused with a Relay being truly triggered.

**Test Relay Screen – Fail Safe Mode**

Test Relay		°C	2017/01/01 00:00:00		
Description	Exercise	Period (Min)	Cycle (Day)	Fail Safe	Relay NC COM NO
1 Alarm 1	●			●	●●●
2 Alarm 2	●	1	2	●	
3 Alarm 3	●			●	
4 Alarm 4	●	2	4	●	
5 Alarm 5	●			●	
6 Alarm 6	●	3	6	●	●●●

**Description**

The column titled Fail Safe, displays the selected Mode of Operation of each relay as set in each Alarm Settings page.

This information confirms the Relay Pre-Test State.

**Range**

For example, see Alarm 6 as shown in the screen to the left.

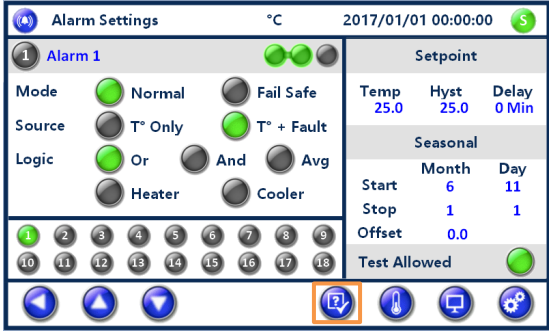
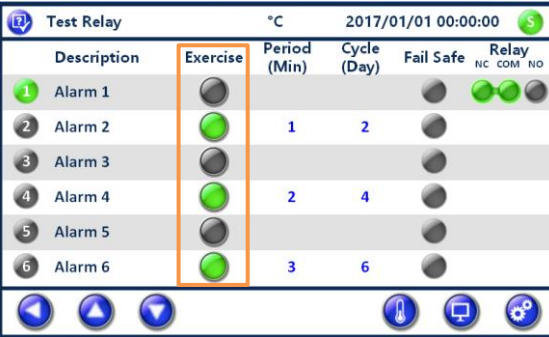
**Pre-Test State:** ●●●

**State Under Test:** ●●●


Test Relay		°C	2017/01/01 00:00:00		
Description	Exercise	Period (Min)	Cycle (Day)	Fail Safe	Relay NC COM NO
1 Alarm 1	●			●	●●●
2 Alarm 2	●	1	2	●	
3 Alarm 3	●			●	
4 Alarm 4	●	2	4	●	
5 Alarm 5	●			●	
6 Alarm 6	●	3	6	●	●●●



### Exerciser Function – Enable






**Description**


To access the Exerciser Function found in the Test Relay screen, press the Test Option icon  in the bottom row of any Alarm Settings screen. Each individual Relay can be configured to be exercised (for example to make sure a set of cooling fans are functioning properly) on a regular basis. Enable the Exerciser Function for a specific Alarm/Relay by pressing the icon corresponding to the Alarm/Relay number you wish to Enable.

---

**Range**

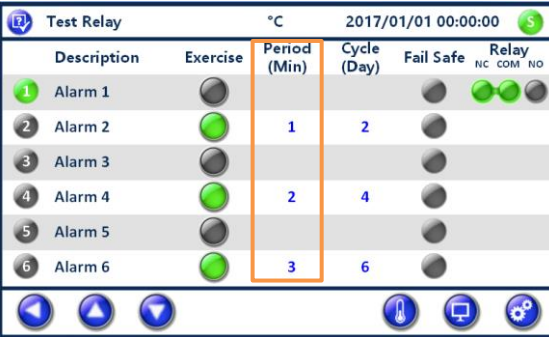
**Enable:** Exerciser Function is active  .

**Disable:** Exerciser Function is inactive  .

NOTE: After a parameter is created or modified, remember to press the  button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



### Exerciser Period





**Description**

Each individual Relay can be configured to be exercised for a different duration of time (Period). Select the Exerciser Period by pressing the digit corresponding to the Alarm/Relay number you wish to set.

---

**Range**

1 to 59 minutes.

Press  to exit or  to confirm.

### Exerciser Cycle

? Test Relay

°C

2017/01/01 00:00:00 S

#	Description	Exercise	Period (Min)	Cycle (Day)	Fail Safe	Relay NC COM NO
1	Alarm 1					
2	Alarm 2		1	2		
3	Alarm 3					
4	Alarm 4		2	4		
5	Alarm 5					
6	Alarm 6		3	6		

**Description**

Each individual Relay can be configured to be exercised at a different interval (Cycle). Select the Exerciser Cycle by pressing the digit corresponding to the Alarm/Relay number you wish to set.

---

**Range**

1 to 31 days.

Press to exit or to confirm.

NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



### 6.3 Statistic Settings



This screen allows you to reset statistics associated to each individual channel as desired; use the bottom row buttons to scroll through all the Channels.

Reset for Channel #1

Statistic Settings		°C	2017/01/01 00:00:00	\$
	Minimum		Maximum	
1	-40.0 2017/01/01 00:00:00		225.0 2017/01/01 00:00:00	R
2	-39.0 2017/01/01 00:00:00		224.0 2017/01/01 00:00:00	R
3	-38.0 2017/01/01 00:00:00		223.0 2017/01/01 00:00:00	R
4	-37.0 2017/01/01 00:00:00		222.0 2017/01/01 00:00:00	R
5	-36.0 2017/01/01 00:00:00		221.0 2017/01/01 00:00:00	R
6	-35.0 2017/01/01 00:00:00		220.0 2017/01/01 00:00:00	R

Reset		Description
		<p><b>Description</b></p> <p>Allows resetting (zeroing) of a specific channel statistics. Press on the desired Reset icon</p>

## 6.4 Analog Output Settings



This screen allows you to customize the analog output scale; use the bottom row buttons to scroll through all the Channels. For each channel, there is six parameters. Two of them can be configured (in light blue color) and four of them are either measured or calculated results.

Analog Settings		°C		2017/01/01 00:00:00		
	Min °T (4mA)	Max °T (20mA)	°T / mA	0°T mA	I (mA)	Temp
1	-40.0	325.0	22.81	5.75	7.93	25.0
2	-40.0	325.0	22.81	5.75	7.94	26.0
3	-40.0	325.0	22.81	5.75	7.95	27.0
4	-40.0	325.0	22.81	5.75	7.96	28.0
5	-40.0	325.0	22.81	5.75	7.97	29.0
6	-40.0	325.0	22.81	5.75	7.98	30.0

### Set Min T°

Analog Settings		°C		2017/01/01 00:00:00		
	Min °T (4mA)	Max °T (20mA)	°T / mA	0°T mA	I (mA)	Temp
1	-40.0	325.0	22.81	5.75	7.93	25.0
2	-40.0	325.0	22.81	5.75	7.94	26.0
3	-40.0	325.0	22.81	5.75	7.95	27.0
4	-40.0	325.0	22.81	5.75	7.96	28.0
5	-40.0	325.0	22.81	5.75	7.97	29.0
6	-40.0	325.0	22.81	5.75	7.98	30.0

**Description**

Temperature value desired to correspond to 4mA on the output terminal can be defined by pressing on the corresponding digit. Type in a value using the Numeric key pad.

---

**Range**

Any negative or positive value, as long as the resulting displayed temperature value is within the calibration range.

Press  to exit or  to confirm.

NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



### Set Max T°

	Min °T (4mA)	Max °T (20mA)	°T / mA	0°T mA	I (mA)	Temp
1	-40.0	325.0	22.81	5.75	7.93	25.0
2	-40.0	325.0	22.81	5.75	7.94	26.0
3	-40.0	325.0	22.81	5.75	7.95	27.0
4	-40.0	325.0	22.81	5.75	7.96	28.0
5	-40.0	325.0	22.81	5.75	7.97	29.0
6	-40.0	325.0	22.81	5.75	7.98	30.0

**Description**

Temperature value desired to correspond to 20mA on the output terminal can be defined by pressing on the corresponding digit. Type in a value using the Numeric key pad.

---

**Range**

Any negative or positive value, as long as the resulting displayed temperature value is within the calibration range.

Press to exit or to confirm.

NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



### Resulting °T / mA

	Min °T (4mA)	Max °T (20mA)	°T / mA	0°T mA	I (mA)	Temp
1	-40.0	325.0	22.81	5.75	7.93	25.0
2	-40.0	325.0	22.81	5.75	7.94	26.0
3	-40.0	325.0	22.81	5.75	7.95	27.0
4	-40.0	325.0	22.81	5.75	7.96	28.0
5	-40.0	325.0	22.81	5.75	7.97	29.0
6	-40.0	325.0	22.81	5.75	7.98	30.0

**Description**

Resulting value of Temperature Degrees per mA, according to the set Min °T & Max °T.

### Resulting 0°T mA

	Min °T (4mA)	Max °T (20mA)	°T / mA	0°T mA	I (mA)	Temp
1	-40.0	325.0	22.81	5.75	7.93	25.0
2	-40.0	325.0	22.81	5.75	7.94	26.0
3	-40.0	325.0	22.81	5.75	7.95	27.0
4	-40.0	325.0	22.81	5.75	7.96	28.0
5	-40.0	325.0	22.81	5.75	7.97	29.0
6	-40.0	325.0	22.81	5.75	7.98	30.0

#### Description

Resulting value in mA corresponding to the value of 0°T, according to the set Min °T & Max °T.

### Resulting I (mA)

	Min °T (4mA)	Max °T (20mA)	°T / mA	0°T mA	I (mA)	Temp
1	-40.0	325.0	22.81	5.75	7.93	25.0
2	-40.0	325.0	22.81	5.75	7.94	26.0
3	-40.0	325.0	22.81	5.75	7.95	27.0
4	-40.0	325.0	22.81	5.75	7.96	28.0
5	-40.0	325.0	22.81	5.75	7.97	29.0
6	-40.0	325.0	22.81	5.75	7.98	30.0

#### Description

Resulting value in mA of the current (I) measured on the output terminal, according to the set Min °T & Max °T.

Measured Temperature value							Description
							Measured temperature value corresponding to the current (I) measured on the output terminal.
1	-40.0	325.0	22.81	5.75	7.93	25.0	
2	-40.0	325.0	22.81	5.75	7.94	26.0	
3	-40.0	325.0	22.81	5.75	7.95	27.0	
4	-40.0	325.0	22.81	5.75	7.96	28.0	
5	-40.0	325.0	22.81	5.75	7.97	29.0	
6	-40.0	325.0	22.81	5.75	7.98	30.0	

Here are the formulas for the Analog Output.

The Analog Output is represented by a straight-line equation of this form:  $y = mx$

<b>Formula</b>	$(y \text{ } ^\circ\text{C} - \text{AnaOutMin } ^\circ\text{C}) = m \frac{^\circ\text{C}}{\text{mA}} \times (x \text{ mA} - \text{AnaOutMin mA})$
<b>m</b>	$m \frac{^\circ\text{C}}{\text{mA}} = \frac{(\text{AnaOutMax } ^\circ\text{C} - \text{AnaOutMin } ^\circ\text{C})}{(\text{AnaOutMax mA} - \text{AnaOutMin mA})}$
<b>y</b>	$y \text{ } ^\circ\text{C} = \left( m \frac{^\circ\text{C}}{\text{mA}} \times (x \text{ mA} - \text{AnaOutMin mA}) \right) + \text{AnaOutMin } ^\circ\text{C}$
<b>x</b>	$x \text{ mA} = \left( \frac{(y \text{ } ^\circ\text{C} - \text{AnaOutMin } ^\circ\text{C})}{m \frac{^\circ\text{C}}{\text{mA}}} \right) + \text{AnaOutMin mA}$

Parameter	Symbol
Set Min T°	AnaOutMin °C
Set Max T°	AnaOutMax °C
°C / mA	m
I (mA)	x
T°	y

All channels share the same original, factory-set, configuration: the scale factor is 16.56 °C/mA.

This setting results in the 0 °C offset to be at 6.42 mA, the minimum 4 mA scale limit to be at -40 °C and the maximum 20 mA scale limit to be at 225 °C.

For example, if the loop reads 7.69 mA, the corresponding temperature for that channel is then 21.03 °C:  
 $(7.69 \text{ mA} - 6.42 \text{ mA}) \times 16.56 \text{ } ^\circ\text{C}/\text{mA} = 21.03 \text{ } ^\circ\text{C}$ .

## 6.5 Information Settings



This screen allows setting of general system and transformer parameters.


System			Transformer	
Year	Month	Day	Name	
2017	1	1	N/A	
Hour	Minute	Second	Type	
0	0	0	N/A	
Description			N/A	
Factory Default				
Password				
1234		1234		


System parameters	
	<p><b>Description</b></p> <p>Allows Date and Time setting of the EasyGrid Internal Real Time Clock by pressing on the desired digit. Type in a value using the Numeric key pad.</p> <hr/> <p><b>Range</b></p> <p>According to each parameter. Press  to exit or  to confirm.</p>

NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.















Factory Default	
	<p><b>Description</b> Allows return to the original EasyGrid Factory Settings by pressing on the Factory Default  button.</p> <p><b>Range</b> N/A</p>

NOTE: After a parameter is created or modified, remember to press the  button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



Transformer Information	
	<p><b>Description</b> Allows linking a Name, Type and Description to the Transformer or other Equipment the FISO system is installed on. Select the field to edit, type in the desired information using the Alpha Numeric key pad.</p> <p><b>Range</b> Any string of characters (max 18 characters). Press  to exit or  to confirm.</p>

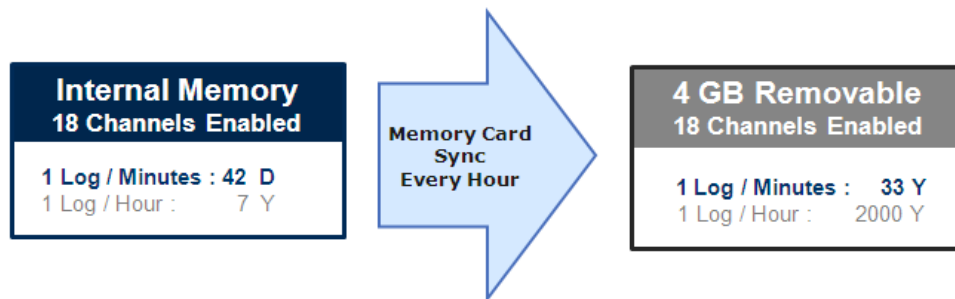
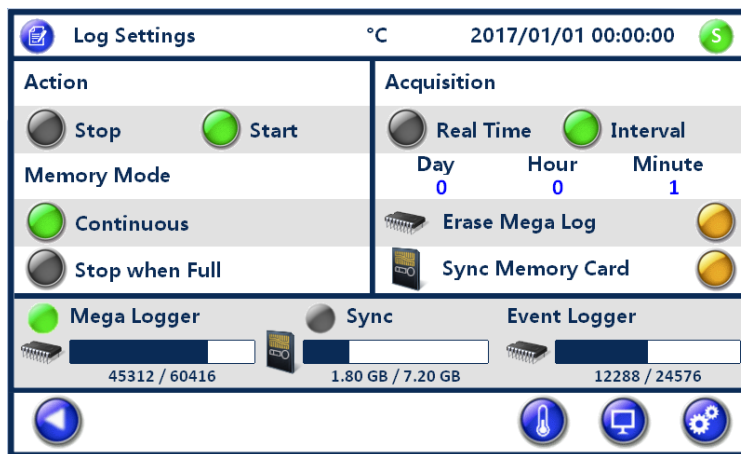
Password Protection	
	<p><b>Description</b></p> <p>Allows the User to Activate or Deactivate the password protection feature, used to protect the various parameter settings. First, the password (4-digit number) has to be entered in both numerical fields by pressing in the desired field then type in a value using the Numeric key pad, then press on  to confirm. Password 1234 is used as an example here. If mismatching numbers are entered, you will not be able to Activate the password protection and you will be prompted to correct the mismatch.</p> <p>When your password is set, press the lock  icon, the main Settings Menu will then be displayed with the lock  icon now present in the bottom row.</p> <p>To access any Settings screen, the password is now required. Press the lock  icon and enter the password using the Numeric key pad, then press on  to confirm. The password protection is now De-Activated and access to any Settings screen is now possible.</p> <p><b>If desired, the password protection needs to be Re-Activated following parameter modifications, in the same way it was originally set.</b></p> <p><b>Range</b></p> <p>Password requires 4 numerical digits. Press  to exit or  to confirm.</p>

## 6.6 Log Settings




This screen allows the configuration of parameters for the data logging function. The data logger will record the following information during each set period:

- Live Temperature for each channel
- Maximum Temperature for each channel
- Minimum Temperature for each channel
- Average Temperature for each channel
- Sensor status and Diagnostic values
- Status of each Relay
- Timestamp



The data is saved in the EasyGrid 16MB internal memory at the defined period. Every hour the data is copied in the external memory card when present in the monitor. If the memory card is removed for an extended time, the acquired data during the absence of the memory card will be synchronized when the card will be inserted back.

Action	
	<p><b>Description</b></p> <p>Allows Starting or Stopping an acquisition by pressing on the desired option. The active option icon will then turn green.</p> <p>The Mega Logger icon will turn green and the fill bar will slowly increment as well as the log amount underneath.</p> <p><b>Range</b></p> <p><b>Stop</b></p> <p><b>Start</b></p>

NOTE: After a parameter is created or modified, remember to press the  button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



Memory Mode	
	<p><b>Description</b></p> <p>Allows selection of the memory storage Mode by pressing on the desired option. The active option icon will then turn green.</p> <p><b>Range</b></p> <p><b>Continuous:</b> Older data is erased to make room for newer data.</p> <p><b>Stop when Full:</b> The acquisition is stopped when the memory is full.</p>

Acquisition Frequency	
	<p><b>Description</b></p> <p>Allows selection of the data acquisition frequency by pressing on the desired option. The active option icon will then turn green.</p> <p><b>Range</b></p> <p><b>Real Time:</b> The data is stored as fast as the monitor refreshes each channel's measured temperature value.  <b>Interval:</b> The data is stored according to the set frequency. The frequency value can be defined by pressing on the corresponding digit. Press  to exit or  to confirm.</p>

NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



Erase Mega Log	
	<p><b>Description</b></p> <p>Allows erasing the acquired data from the internal Mega Logger memory storage by pressing on the  button. The Mega Logger fill bar will go back to empty and a fill scroll will start during the erasing procedure. When done, the fill bar will go back to empty.</p> <p><b>Range</b></p> <p>N/A</p>

Synchronize Memory Card	
	<p><b>Description</b></p> <p>Allows to force the synchronization of the Memory Card to the internal Memory data by pressing on the Sync Memory Card button.</p> <p>The Sync button over the fill bar, indicates when a synchronization is in progress.</p> <p>Note that Memory Card synchronization is done automatically every hour by the monitor.</p> <p><b>Range</b></p> <p>Sync In Progress: </p> <p>Sync Not In Progress: </p>

NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



Mega Logger Fill Bar	
	<p><b>Description</b></p> <p>Provides information on the fill level of the Mega Logger (Internal Memory)</p> <p><b>Range</b></p> <p>N/A</p>

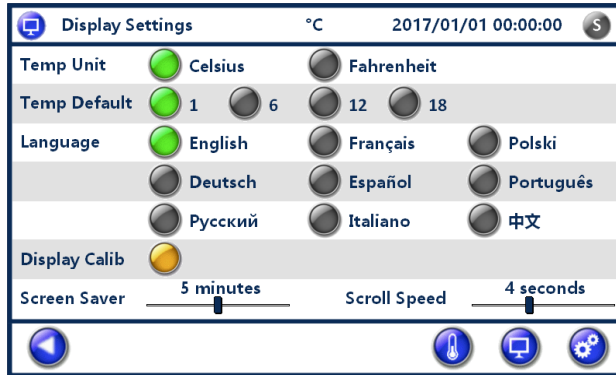
Memory Card Fill Bar	
	<p><b>Description</b> Provides information on the fill level of the Memory Card (External Memory)</p> <hr/> <p><b>Range</b> N/A</p>

Event Logger Fill Bar	
	<p><b>Description</b> Provides information on the fill level of the Event Logger Memory. The Event Logger is an Internal Memory which automatically stores monitor state and parameter values at the moment any event occurs on the monitor, such as triggered Relays, monitor or sensor faults, others. This logger information is practical for FISO trouble shooting purposes and might be requested when operation issues are reported to FISO service centers.</p> <hr/> <p><b>Range</b> N/A</p>

## 6.7 Display Settings



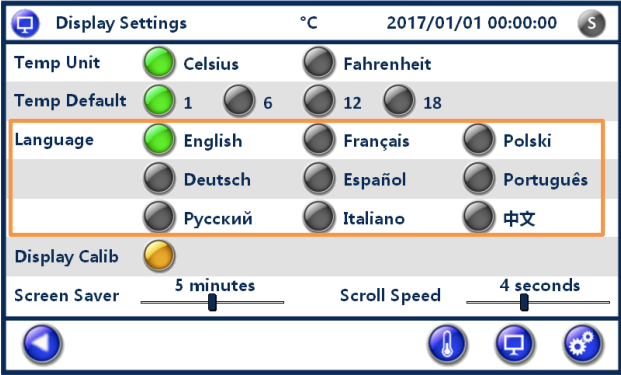

This screen provides access to the parameters related to the EasyGrid display.



T° Unit	
	<p><b>Description</b></p> <p>Select the Temperature unit by pressing on the desired option. The active option icon will then turn green.</p> <hr/> <p><b>Range</b></p> <p>Celsius : °C Fahrenheit : °F</p>

Temp Default	
	<p><b>Description</b></p> <p>Select the Default number of channels to be displayed in the original temperature Screen by pressing on the desired option. The active option icon will then turn green.</p> <hr/> <p><b>Range</b></p> <p>Any of the 4 offered options.</p>



Language	
	<p><b>Description</b></p> <p>Select the desired display language by pressing on the desired option. The active option icon will then turn green.</p> <hr/> <p><b>Range</b></p> <p>Any of the offered options.</p>
Display Calibration	
	<p><b>Description</b></p> <p>Runs touch screen calibration, the display returns to the Display Settings screen when calibration is completed. Follow instructions and touch the screen as indicated.</p> <hr/> <p><b>Range</b></p> <p>N/A</p>

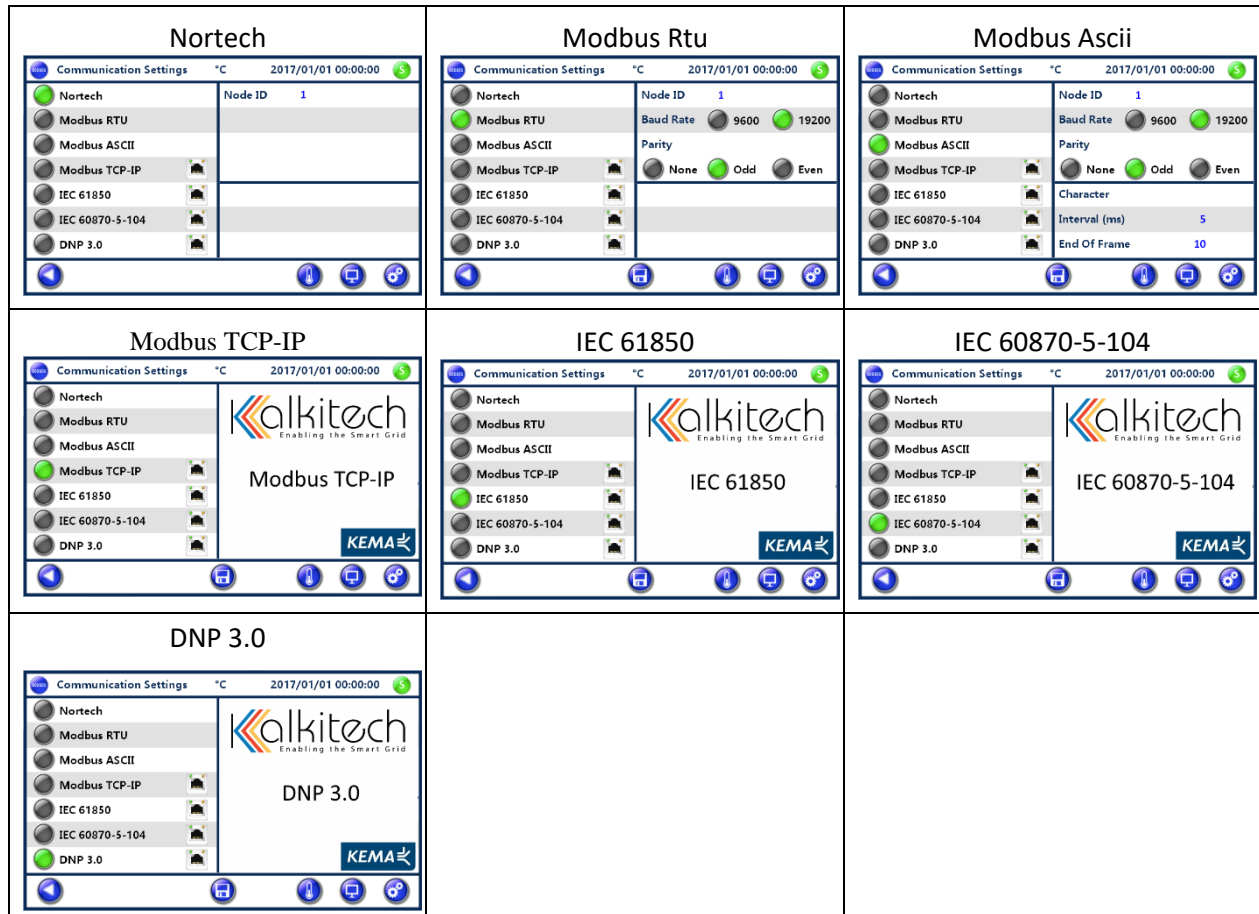
Screen Saver	
<p>The screenshot shows the 'Display Settings' menu. At the top, it says 'Display Settings' with a temperature unit of '°C' and a date/time of '2017/01/01 00:00:00'. Below this are several settings: 'Temp Unit' (Celsius selected), 'Temp Default' (1 selected), 'Language' (English selected), and 'Display Calib' (yellow indicator). At the bottom, there are two sliders: 'Screen Saver' set to '5 minutes' and 'Scroll Speed' set to '4 seconds'. The 'Screen Saver' slider is highlighted with an orange box.</p>	<p><b>Description</b></p> <p>Time before the screen saver is activated. If set to 0 the screen saver is deactivated.</p> <p><b>Range</b></p> <p><b>0 to 10 minutes</b></p>

Scroll Speed	
<p>The screenshot shows the 'Display Settings' menu. At the top, it says 'Display Settings' with a temperature unit of '°C' and a date/time of '2017/01/01 00:00:00'. Below this are several settings: 'Temp Unit' (Celsius selected), 'Temp Default' (1 selected), 'Language' (English selected), and 'Display Calib' (yellow indicator). At the bottom, there are two sliders: 'Screen Saver' set to '5 minutes' and 'Scroll Speed' set to '4 seconds'. The 'Scroll Speed' slider is highlighted with an orange box.</p>	<p><b>Description</b></p> <p>Time before the next screen will be displayed when the Scroll option is activated. If set to 0 the scroll option is deactivated.</p> <p><b>Range</b></p> <p><b>0 to 10 seconds</b></p>

## 6.8 Communication Settings



This section covers communication parameters setting.



Users can select the desired communication protocol from one of the seven available options:

- Nortech
- MODBUS RTU
- MODBUS ASCII
- MODBUS TCP-IP
- IEC 61850 (available with optional gateway)
- IEC 60870-5-104 (available with optional gateway)
- DNP 3.0 (available with optional gateway)


Protocol Selection (Modbus RTU Example)	
	<p><b>Description</b></p> <p>Allows selection of the desired communication protocol by pressing on the desired option.</p> <hr/> <p><b>Range</b></p> <p>Activated: </p> <p>Not Activated: </p>

NOTE: After a parameter is created or modified, remember to press the button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



Node ID (Modbus RTU Example)	
	<p><b>Description</b></p> <p>Allows setting of the desired node ID number using the Numeric key pad generated by pressing in the numerical field.</p> <hr/> <p><b>Range</b></p> <p><b>Nortech Protocol : 1 to 32</b></p> <p><b>Modbus Protocol: 1 to 247</b></p> <p>Press  to exit or  to confirm.</p>

Baud Rate (Modbus RTU Example)	
	<p><b>Description</b></p> <p>Allows selection of the Baud Rate by pressing on the desired option.</p> <hr/> <p><b>Range</b></p> <p>Activated: </p> <p>Not Activated: </p>

NOTE: After a parameter is created or modified, remember to press the  button when prompted, before leaving the active screen so that the parameter is stored or the action executed.



Parity (Modbus RTU Example)	
	<p><b>Description</b></p> <p>Allows selection of the Parity type by pressing on the desired option.</p> <hr/> <p><b>Range</b></p> <p>Activated: </p> <p>Not Activated: </p>



The same process will need to be accomplished to set the required parameters for each different Communication Protocol that is selected for operation of the EasyGrid monitor.


Refer to document **MAN-00099 Nortech Communication Configuration User Guide** for detailed communications configurations information.


# 7 Monitoring Screens

The EasyGrid Firmware is designed to optimize the user experience, whether you are programming the parameters of operation or looking-up various information. The firmware interface uses icons to facilitate the user-device experience.

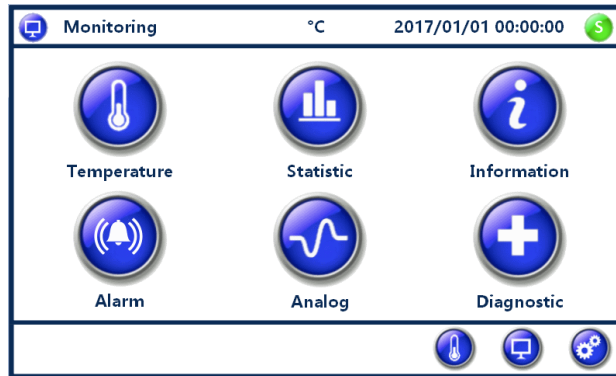
Values and various parameters can be monitored from the unit TFT screen or with the Nortech Client software.

On the EasyGrid screen the monitored information can be accessed at any time using the  or  buttons.

Pressing  from any screen, the user can access the last viewed temperature page and scroll through the different possible temperature channels.

Pressing  generates the Monitoring menu page from where you can select between 6 sub-menu pages for the following information:

- Temperature
- Alarm
- Statistic
- Analog
- Information
- Diagnostic

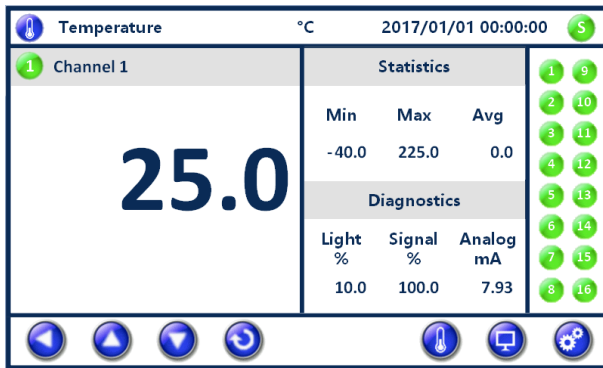


## 7.1 Temperature Values & Alarm State

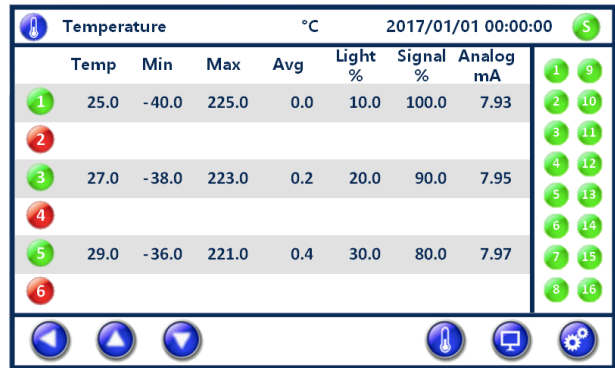


To view the measured temperature values screen press the button from the Monitoring Screen or from the bottom row of the screen; use the bottom row buttons to scroll through all the Channels. There is 4 different Temperature display screen options, the main difference from screen to screen is the number of channels that are displayed per screen and the amount of related parameters shown.

In each page the status of the Alarms, each linked to their respective Relay, is displayed on the right hand side, if the 8 or 16 relay controller option has been selected at procurement time.



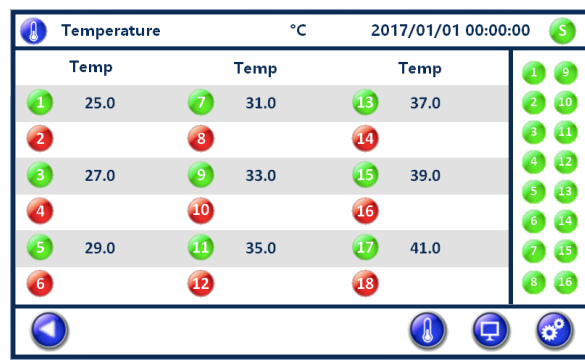
1 Channel display with 16 relays



6 Channel display with 16 relays



12 Channel display with 16 relays

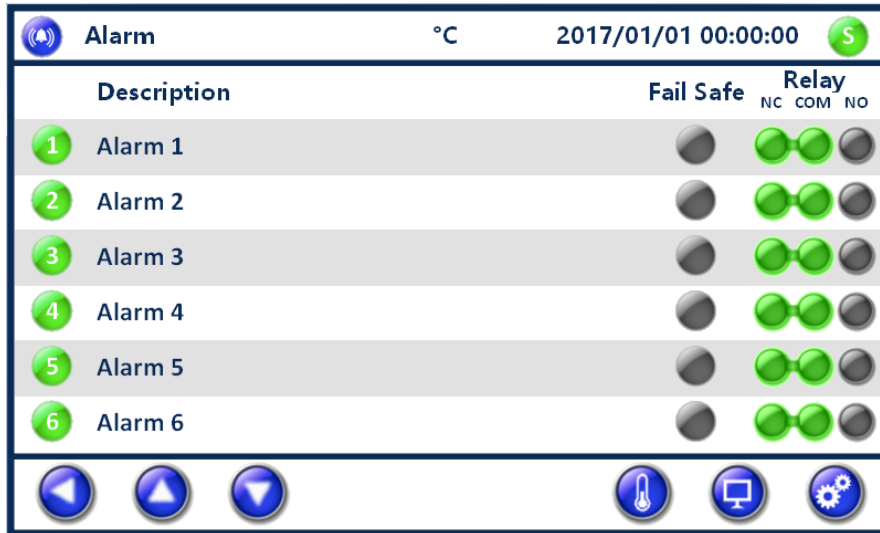


18 Channel display with 16 relays

## 7.2 Alarm



This page displays the current status of each relay: Use the up and down control buttons to scroll to other alarm numbers , Operation status , Condition met or not, Description, Fail Safe status and a graphic representation of the physical position of the relay.



Information provided

- Left column icons provide Relay Number, Relay Mode and Relay State

Alarm 1	Not Enabled	Enabled & Normal	Enabled & Triggered
Relay mode & state			

- Under **Description** appears the user-defined name of the Alarm.
- Fail safe Icons provide the mode of operation.

Fail Safe	Not Enabled	Enabled
Mode state		

- Under **Relay** the icons show the physical position of the relay, to allow for easy understanding of the relay status.

Mode	Power Off			Normal			Triggered			Exerciser		
Normal	NC	COM	NO	NC	COM	NO	NC	COM	NO	NC	COM	NO
Fail Safe	NC	COM	NO	NC	COM	NO	NC	COM	NO	NC	COM	NO



### 7.3 Statistics



This page displays the temperature statistics gathered on each channel. The following information is also stored in the EasyGrid Mega Logger storage location:

Statistic	°C		2017/01/01 00:00:00		S
	Minimum		Maximum		Average
1	-40.0	2017/01/01 00:00:0	225.0	2017/01/01 00:00:0	0.0
2	-39.0	2017/01/01 00:00:0	224.0	2017/01/01 00:00:0	0.1
3	-38.0	2017/01/01 00:00:0	223.0	2017/01/01 00:00:0	0.2
4	-37.0	2017/01/01 00:00:0	222.0	2017/01/01 00:00:0	0.3
5	-36.0	2017/01/01 00:00:0	221.0	2017/01/01 00:00:0	0.4
6	-35.0	2017/01/01 00:00:0	220.0	2017/01/01 00:00:0	0.5

Information provided

- Left column icons provide Sensor Channel Number, Channel Mode and Channel State

Channel 1	Not Enabled	Enabled & Normal	Enabled & In Failure
Channel mode & state			

- Under **Minimum** appears the minimum measured value for each channel with the date and time it was recorded.
- Under **Maximum** appears the maximum measured value for each channel with the date and time it was recorded.
- Under **Average** appears the average of all measured values since the last Statistics reset.

## 7.4 Analog



This page displays the Analog output parameters, it provides detailed information on the user-defined values as well as all the resulting values:

Analog		°C		2017/01/01 00:00:00		
	Min °T (4mA)	Max °T (20mA)	°T / mA	0°T mA	I (mA)	Temp
1	-40.0	325.0	22.81	5.75	7.93	25.0
2	-40.0	325.0	22.81	5.75	7.94	26.0
3	-40.0	325.0	22.81	5.75	7.95	27.0
4	-40.0	325.0	22.81	5.75	7.96	28.0
5	-40.0	325.0	22.81	5.75	7.97	29.0
6	-40.0	325.0	22.81	5.75	7.98	30.0

Information provided

- Left column icons provide Sensor Channel Number, Channel Mode and Channel State

Channel 1	Not Enabled	Enabled & Normal	Enabled & In Failure
Channel mode & state			

- Under **Min °T (4mA)** appears the user-defined temperature value to which the minimum range of the analog output (4mA) corresponds. -40 °C is the minimum definable value.
- Under **Max °T (20mA)** appears the user-defined temperature value to which the maximum range of the analog output (20mA) corresponds. 225 °C is the maximum definable value.
- Under **°T/mA** appears the resulting number of degrees of temperature which corresponds to 1 mA, based on the user-defined minimum and maximum temperature values.
- Under **0°T mA** appears the resulting mA value corresponding to 0° of temperature, based on the user-defined minimum and maximum temperature values.
- Under **I (mA)** appears the value in mA corresponding to the live measured temperature. This mA value will be the one generated on the corresponding analog output terminal of the monitor.
- Under **Temp** appears the live measured temperature value.

## 7.5 Information



This page displays the factory set FISO Device information, the user-defined Transformer information, as well as the 3 internal memory storage locations of the EasyGrid monitor.

Information		°C	2017/01/01 00:00:00	S
<b>Device</b>		<b>Transformer</b>		
Model	Serial	Name		
E-GRID-18	17NR0124	N/A		
Firmware	HTML	Type		
5.0.0.0	3.0.0.0	N/A		
# Channels	# Alarms	Description		
18	16	N/A		
System Temp	System Status	System Relay	NC	COM
25.0	0	Fail Safe	<input type="radio"/>	<input checked="" type="radio"/>
<b>Mega Logger</b>		<b>Event Logger</b>		
45312 / 60416	1.80 GB / 7.20 GB	12288 / 24576		

Information found in the **Device** section corresponds to the firmware and hardware characteristics of this specific EasyGrid monitor/controller. Anytime servicing of the device is required, the information located here should be noted and supplied to your FISO contact.

Information found in the **Transformer** section will have been defined by the end-user of the monitor/controller. It allows for information specific to the transformer, location or other to be recorded in the monitor for reference purposes.

Information found in the **Logger** section provides feedback on the level of usage of the 3 different internal memory storage locations of the EasyGrid monitor, the configurable Mega Logger, the removable SD Card and the fixed Event Logger.

## 7.6 Diagnostic



This page displays the FISO system diagnostic values for each channel. It is important to check the Light and Signal levels during the installation of the system.

Diagnostic		°C	2017/01/01 00:00:00	
	Temp		Light %	Signal %
1	25.0		10.0	100.0
2	26.0		15.0	95.0
3	27.0		20.0	90.0
4	28.0		25.0	85.0
5	29.0		30.0	80.0
6	30.0		35.0	75.0

Information provided

- Left column icons provide Sensor Channel Number, Channel Mode and Channel State




Channel 1	Not Enabled	Enabled & Normal	Enabled & in Failure
Channel mode & state			

- Under **Temp** appears the live measured temperature value
- Under **Light %**, the icons provide Light diagnostic state

Light %	Excellent	Good	Fail
Light % state			
Light % range	< 40	< = 80	> 80

- Under **Light %**, the Light % value provides the level at which the system eliminates the channel
  - The “Light %” is related to the required power applied to the light source to generate an accurate temperature measurement from a sensor. A high value of light % could indicate one of the following problems:
    - Contaminated or Dirty connection
    - Over bent cable along the sensor cable routing
    - Broken Sensor or Extension Cable
    - Damaged Sensor Tip

- Under **Signal %**, the icons provide Signal diagnostic state

Signal %	Excellent	Good	Fail
Signal % state			
Signal % range	> 80	= > 40	< 40

- Under **Signal %**, the Signal % value provides the level of quality of the processed light
  - The “Signal %” is related to the quality of the signal required to make an accurate reading from a sensor. A low value of the signal % could indicate one of the following problems:
    - Contaminated or Dirty connection
    - Over bent cable along the sensor cable routing
    - Broken Sensor or Extension Cable
    - Damaged Sensor Tip

## 8 Nortech Client Software

The Nortech Client software can be used to configure the EasyGrid system and retrieve the data stored in the internal memory of the unit as well as from the SD memory card. It is possible to communicate directly through the USB interface of the EasyGrid unit from your office PC.

The main functions are:

- ▲ Configuring and controlling the EasyGrid unit.
- ▲ Real-time viewing of all EasyGrid unit's measurements, statistics and settings.
- ▲ Retrieving and viewing the logged data from Mega Logger and Event Logger and the SD card.

The minimum system requirements are:

- ▲ Intel® Pentium® 4 or compatible processor at speed above 1 GHz
- ▲ Microsoft Windows® XP, Vista or 7
- ▲ Monitor resolution at 800 × 600
- ▲ At least 512 MB of RAM and 100 MB of available hard disk space
- ▲ Media readers and/or drives
- ▲ A mouse or similar pointing device.
- ▲ USB interface.

### 8.1 Getting Started

#### 8.1.1 Installing the Program

To install the software for the first time on the computer:

- ▲ Place the removable storage device provided with the Nortech Unit on the media readers and/or drives. If auto run does not start, open Windows Explorer to view the removable storage device's content and double-click on **setup.exe**.
- ▲ The Install Shield Wizard will automatically start.
- ▲ Click **Next** to proceed with the installation.
- ▲ When the installation is over, click **Finish** to exit the Wizard.

#### Accessing the Program

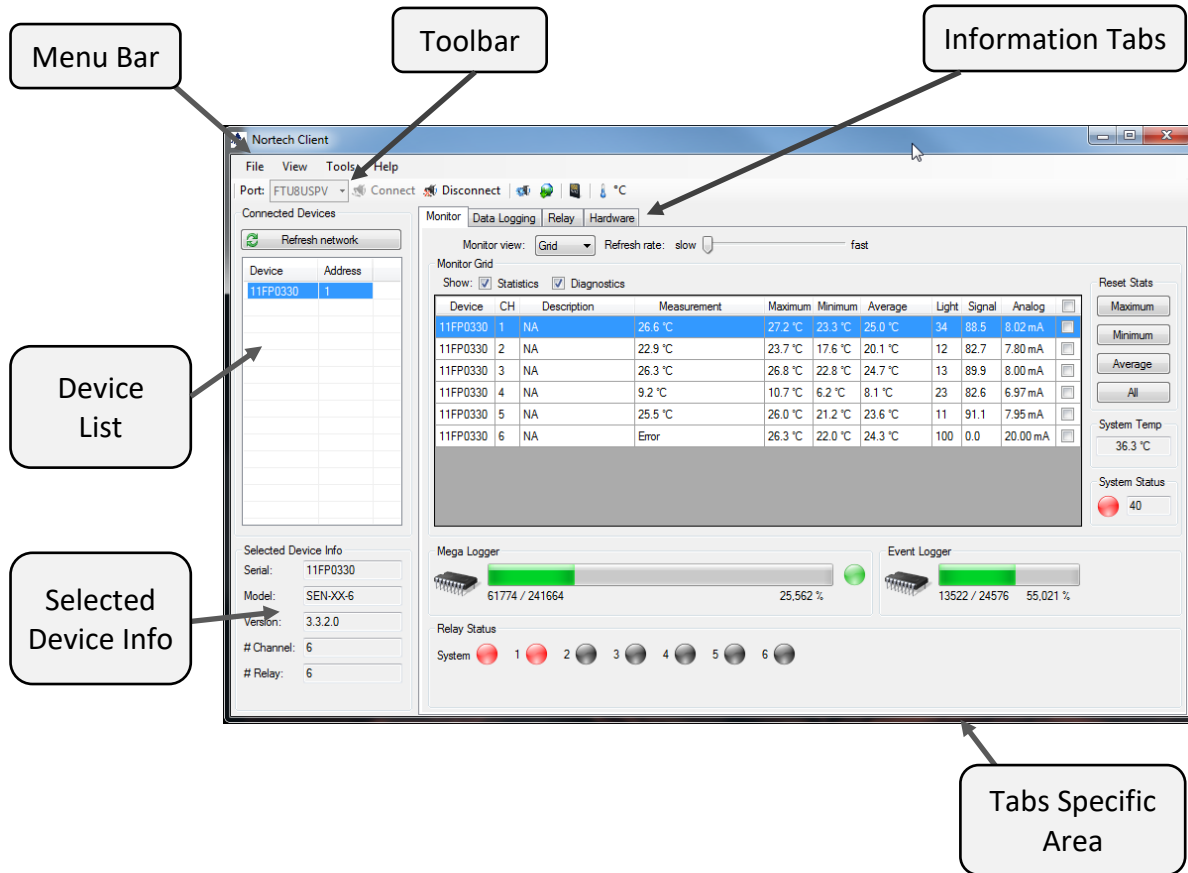
The program should be in the installed program list, under **FISO Technologies**.

To execute the program, select the program from the program list. The complete access menu is

**Start ► All programs ► FISO Technologies ► Nortech Client ► Nortech Client.**

## 8.2 Main Window

**FOR DETAILED INFORMATION, CONSULT:  
MAN-00083 Nortech Client Software User's Manual**



The **Menu Bar** and **Toolbar** give quick access to serial port connection, network configuration, firmware update, and view options.

The **Device List** shows the detected units on the network. This list can be refreshed with the Refresh network button.

The **Selected Device Information** section presents detailed information about the instrument that is highlighted in the device list.

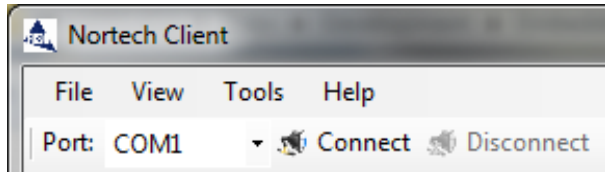
The **Information Tabs** controls the right side of the window. These tabs organize and provide all the information available for the selected EasyGrid unit.

## 8.3 Connecting to the EasyGrid

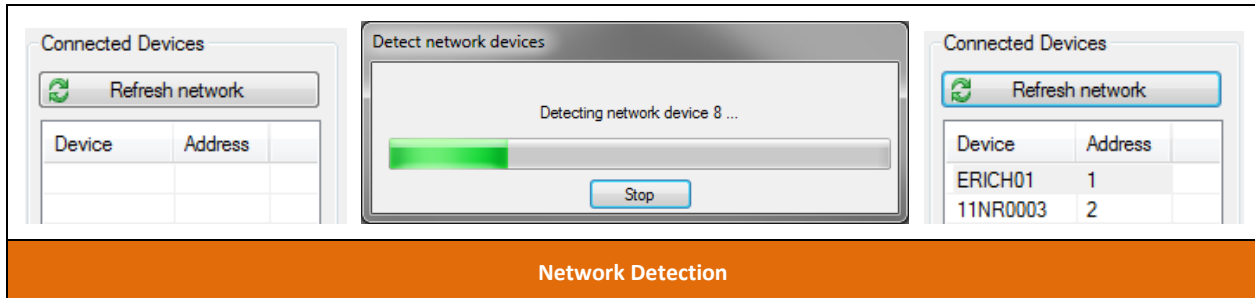
1. Unlock both screws and open the maintenance door, connect a USB cable to the USB port.
2. Connect the other end of the USB cable to the PC.

On the first connection, Windows might need to download and install the FTDI USB driver which is available on windows update. To install the driver manually, browse the software installation CD and launch **CDM20814\_Setup.exe** located in the **Driver** folder, or download the driver online from FTDI website, vcp driver: <http://www.ftdichip.com/Drivers/VCP.htm>.

3. Device serial number should appear in the port list, select the **USB port** that was created after you have connected the unit to one of your PC USB ports.



4. Click **Connect** to establish communication.
5. Once connected, a list of devices is displayed on the left of the main window. To refresh network detection, click **Refresh network**. This will scan the network to detect all devices. Network scan can be stop anytime when connected units have been detected.



**! IMPORTANT**

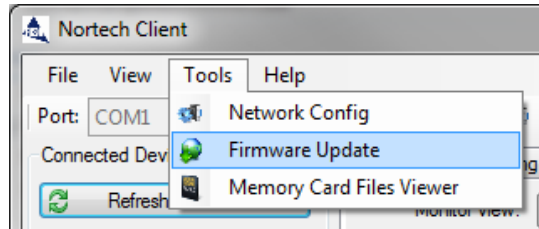
If your device list is **empty or not reflecting** the connected device, press on the **Refresh Network** button before reporting a problem.

To close the connection, use the **Disconnect** button in the toolbar



## 8.4 Firmware Update

With the appropriate firmware file, the EasyGrid unit can be updated using the Nortech Client application. To open the firmware update window, select the Firmware Update button in the toolbar or in the Tools menu.

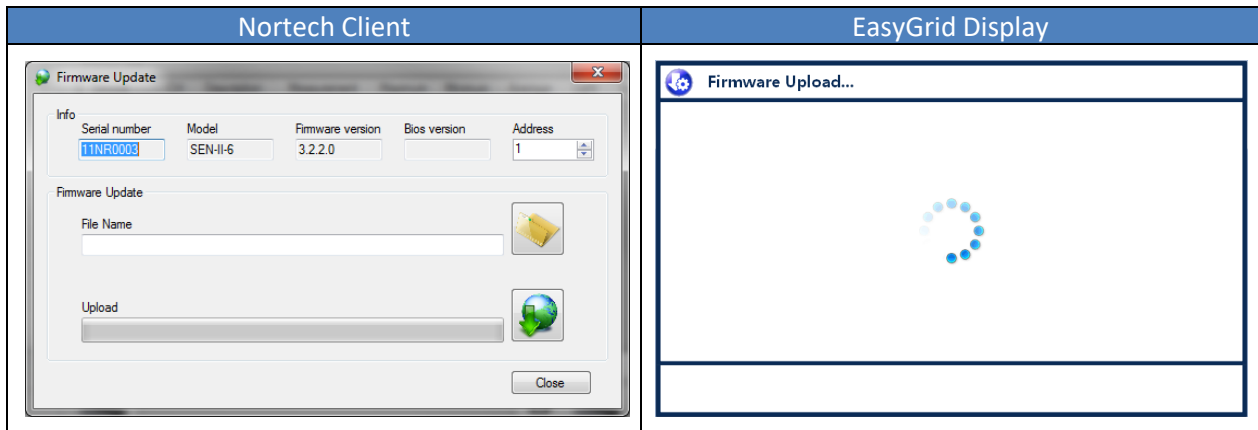


**CAUTION**

*Be sure to have a valid firmware file provided to you by FISO. Otherwise, the unit could be damaged and require factory repair.*

To update the firmware follow this procedure:

1. Click on the “Select firmware file” button and browse the firmware file (.he3) location.
2. Click on the “Upload firmware” button.
3. Watch progression and wait for completion message.
4. Unit reboots and new firmware version is displayed



If a problem occurred while uploading firmware (bad communication, bad firmware file, power lost, etc.), the unit might end up with a corrupted firmware. The software is for firmware update, so you can upload it again.

When soft sector is corrupted, the unit will not boot up normally. It will stay in the firmware update mode (blank blue screen). The red system status led on the front panel also indicates a corrupted soft sector (firmware).

The unit might need to be rebooted for the firmware upload to work properly. Be sure you have the right EasyGrid Firmware file selected and try uploading it again.

# 9 Resetting to Factory Defaults

## 9.1 Resetting to Factory Defaults

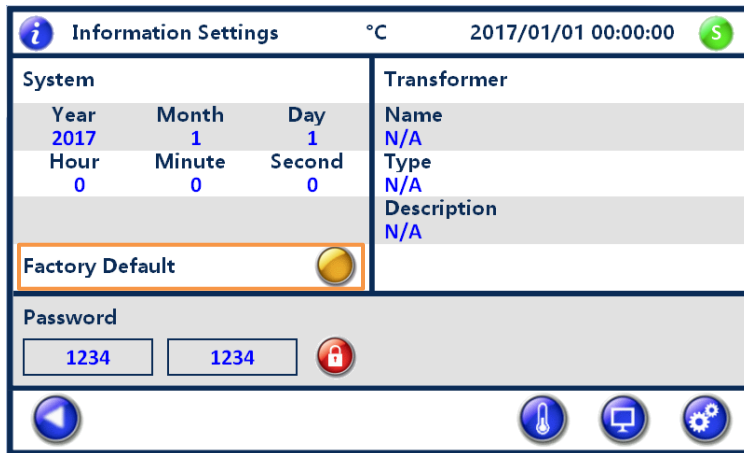
If a persistence operation problem is not solved, a reset to factory defaults might need to be performed to regain full operation of the EasyGrid monitor.

Refer to the “Firmware Settings” “Information Settings” screen of Section 6 of this manual for the Reset to Factory Default function.



**Important**

*If you press the RESET to factory settings button, you will lose all configurations you have made to the instrument.*



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# 10 FISO Contact Information

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## 10.1 FISO Service Center

If your product requires servicing, contact the authorized service center nearest to you.

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](mailto:support@FISO.com)

# 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

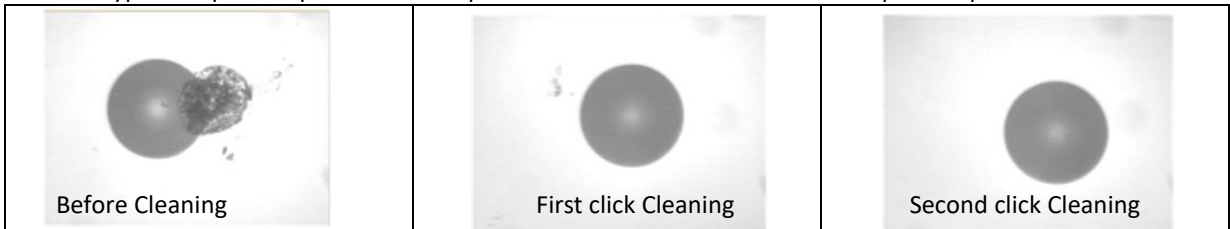
The EasyClean is easy to use, but you need to be careful not to do the following:

- 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.

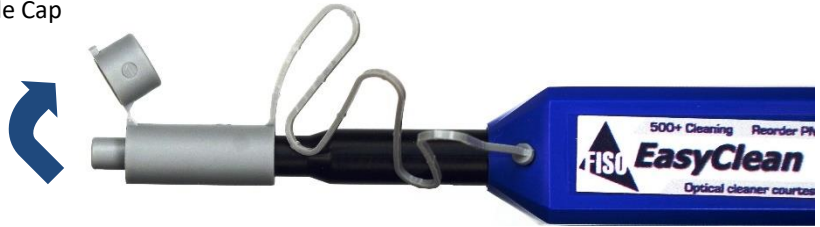
	View of Indicator	View of the Nozzle end	
Full	Cloth (White)	Tip (Black) Cloth (White)	
Little	Cloth (White) Red	Tip (Black) Cloth (White)	
Empty	Red	Tip (Black) No Cloth (Black)	

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

