

# Universal Remote Ethernet

## XM-210 ETH





# Introduction

Thank you for choosing our XM-210 ETH. To ensure its proper and efficient usage, it is important to read this user manual thoroughly to understand how to operate the XM-210 ETH, before operating it.

## About this Manual

- 1 - This manual should be delivered to the end user of the XM-210 ETH;
- 2 - The contents of this manual are subject to change without notice;
- 3 - All rights reserved. No part of this manual may be reproduced in any form without the written consent from DLG;
- 4 - The specifications contained herein are limited to standard models and do not cover customized versions;
- 5 - All precautions were taken on preparing this manual, in order to guarantee the quality of its information.

## CAUTION!

The instrument described in this technical user manual is a device suitable for application in a specialized technical area. DLG supplied products are submitted to a strict quality control process. However, electronic industrial control equipment may cause damage to machinery or processes in the event of any failure or improper operations and may even endanger human lives. The user is responsible for settling and selecting values of the parameters of the instrument. The manufacturer warns of the risk of incidents with injuries to both people and goods, resulting from the incorrect use of the equipment.

# Contents

|  |           |
|--|-----------|
| <b>INTRODUCTION .....</b>                                | <b>3</b>  |
| <b>CONTENTS .....</b>                                    | <b>4</b>  |
| <b>PRESENTATION .....</b>                                | <b>5</b>  |
| <b>TYPICAL APPLICATIONS .....</b>                        | <b>6</b>  |
| <b>TECHNICAL SPECIFICATIONS .....</b>                    | <b>7</b>  |
| Input characteristics .....                              | 7         |
| General characteristics .....                            | 8         |
| LEDs .....   | 8         |
| <b>DIMENSIONS .....</b>                                  | <b>9</b>  |
| <b>MECHANICAL INSTALLATION .....</b>                     | <b>10</b> |
| <b>ELECTRICAL INSTALLATION .....</b>                     | <b>11</b> |
| Power supply .....                                       | 12        |
| Digital inputs .....                                     | 12        |
| Relay outputs and alarms .....                           | 12        |
| Pt100 input .....  | 14        |
| Thermocouple input .....                                 | 14        |
| Current input .....                                      | 14        |
| Voltage input .....                                      | 15        |
| Logic level input .....                                  | 15        |
| Frequency input .....                                    | 15        |
| Modbus RTU communications .....                          | 16        |
| <b>OPERATION .....</b>                                   | <b>17</b> |
| Starting the XM-210 ETH .....                            | 17        |
| HTTP server (webserver) .....                            | 18        |
| Communication settings .....                             | 19        |
| Ethernet switch .....                                    | 21        |
| Reset .....  | 22        |
| SNMP .....   | 23        |
| Modbus table .....                                       | 24        |
| Modbus register details .....                            | 30        |
| <b>RECOMMENDATIONS .....</b>                             | <b>32</b> |
| <b>ETHERNET CABLE AND CONNECTORS SPECIFICATION .....</b> | <b>32</b> |
| <b>WARRANTY .....</b>                                    | <b>33</b> |
| <b>COPYRIGHT NOTE .....</b>                              | <b>34</b> |
| <b>REFERENCES .....</b>                                  | <b>34</b> |
| <b>NOTES .....</b>                                       | <b>35</b> |

## Presentation

The Universal Remote Ethernet XM-210 ETH is designed to promote versatility and robustness in industrial plants.

With its processing core based in the ARM® technology, the XM-210 ETH offers speed and accessibility to field variables through the Modbus TCP protocol over Ethernet and also through the Modbus RTU protocol over the RS-485 physical interface, thus enabling the acquisition of 16 inputs from several kind of signals such as thermocouples, RTD resistive sensors, current, tension, frequency and logical levels.



The available inputs and product features are described below:

- Thermocouples type J, K, T, R, S, E, N, B (ITS-90) with cold junction compensation
- RTD type Pt100 (two or three wires)
- Current 0-20 mA and 4-20 mA
- Voltage 0 – 75 mV, 0 – 5 V or 0 – 10 V
- Logic level maximum amplitude 12 Vdc
- Frequency up to 10 kHz with 4 simultaneous channels with 0.3 V to 50 V sensibility
- Two digital inputs isolated up to 30 Vdc for alarm acknowledgment
- Two alarm levels per channel, configurable (high, low, or differential) with hysteresis and delay of 1 to 10 seconds
- Two relay outputs for alarm status
- Fully detachable (plug-in type) connection to the terminal block
- Integrated Ethernet switch

The XM-210 ETH is configured by the universal DLG configuration tool DLG Tools.

## Typical Applications

The Universal Remote Ethernet XM-210 ETH is designed to several types of industrial applications, enabling the concentration of distributed field data. The XM-210 ETH applications demonstrate high optimization in remote field data acquisition, which were previously delegated to controllers, increasing the process scalability and decreasing costs.

The 16 inputs of the XM-210 ETH acquire reliable data for SCADA systems.

## Technical Specifications

### Input characteristics

| Type                       | Parameter     | Min   | Max  | Comments       | Unit |    |
|----------------------------|---------------|-------|--|----------------|------|----|
| <b>Input signal</b>        | Current       | 0     | 20   | Burnout in 3.5 | mA   |    |
|                            | Voltage       | 0     | 10   |                | Vdc  |    |
|                            | Logic level   | 0     | 12   |                |      |    |
|                            | Thermocouple  |       | 600  | 1820           | B    | °C |
|                            |               |       | -180                                       | 1000           | E    |    |
|                            |               |       | -210                                       | 1200           | J    |    |
|                            |               |       | -260                                       | 1370           | K    |    |
|                            |               |       | -260                                       | 1300           | N    |    |
|                            |               |       | -50  | 1760           | R    |    |
|                            |               |       | -50  | 1800           | S    |    |
|                            | -260          | 400   | T  |                |      |    |
| Cold junction comp.        | -10           | +60   | Operating range                            |                |      |    |
| Pt100                      | -200          | 850   | Two or three wires<br>Burnout in V, G or I |                |      |    |
| Frequency                  | 0.0004        | 10    | 0.3 to 50 Vdc sensibility                  | kHz            |      |    |
| <b>Input impedance</b>     | Current       | 49    |  |                | Ω    |    |
|                            | Voltage       | 5     |  |                | MΩ   |    |
|                            | Thermocouple  | 5     |  |                |      |    |
|                            | Pt100         | 5     |  |                |      |    |
|                            | Frequency     | 150   | @10Vp 10KHz                                |                | KΩ   |    |
| <b>A/D precision</b>       | Current       | 0-20  | ± 1  |                | uA   |    |
|                            |               | 4-20  | ± 1  |                |      |    |
|                            | Voltage       | 0-75  | ± 0.003                                    |                | mV   |    |
|                            |               | 0-5   | ± 0.25                                     |                |      |    |
|                            |               | 0-10  | ± 0.5                                      |                |      |    |
|                            | Thermocouple  | ± 0.1 |  |                | %    |    |
| Pt100                      | Pt            | ± 0.1 |  |                |      |    |
| Cold junction comp.        | ± 0.5         |       |  | °C             |      |    |
| <b>Linearization</b>       | Thermocouple  | 0.1   |  |                | °C   |    |
|                            | Pt100         | 0.2   |  |                |      |    |
| <b>Frequency precision</b> | 0.02 @10000Hz |       |  | %              |      |    |

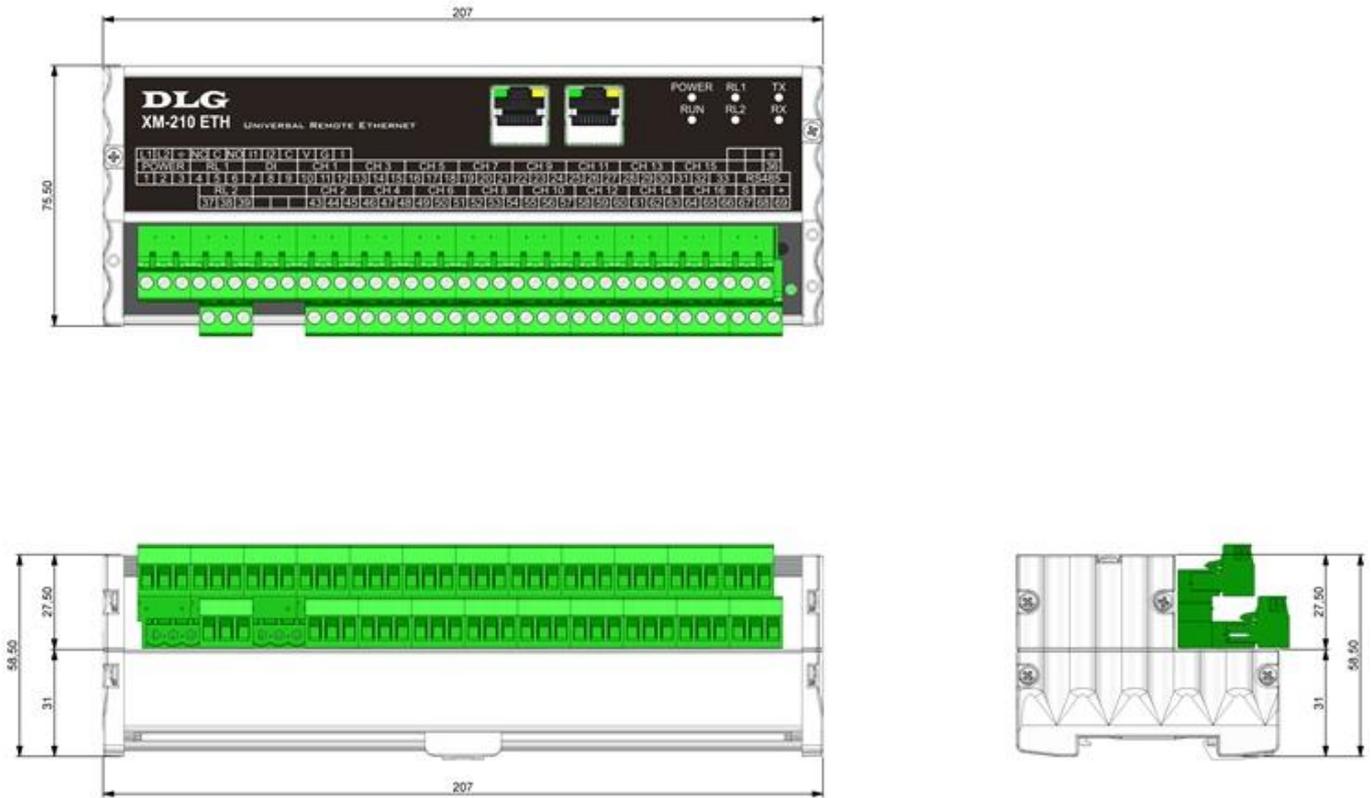
## General characteristics

| Type                         | Comments  |
|------------------------------|---|
| <b>CPU</b>                   | ARM7TDMI, 32 bits   |
| <b>Alarms</b>                | Two relay outputs: RL1 and RL2 SPDT max. 3 A / 220 Vac  |
| <b>Communications</b>        | Ethernet 10/100 Mbps full duplex, two isolated RJ45 connectors, integrated Ethernet switch, up to 10 simultaneous Modbus TCP connections<br><br>RS-485, isolated and with transient protection filter, Modbus RTU with even or odd parity, 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bps |
| <b>Operating temperature</b> | -10 °C to 60 °C   |
| <b>Thermal stability</b>     | ±0.005% / °C span @ 25°C  |
| <b>Relative humidity</b>     | Up to 90%   |
| <b>IP protection</b>         | IP-50 (DIN EN 60529 VDE 0470)   |
| <b>Input voltage</b>         | <b>AC Version:</b> Full-range 90 ~ 265 Vac @ 60 Hz<br><b>DC Version:</b> 18 ~ 30 Vdc  |
| <b>Current consumption</b>   | 200 mA  |
| <b>Construction</b>          | Aluminum and side panels in PA 6.6-FR (flame resistant polyamide)   |
| <b>Placement</b>             | DIN35 rail (DIN EN 60715 TH35)  |
| <b>Electrical connection</b> | Cable up to 2.5mm <sup>2</sup> with “plug-in” type removable connectors   |
| <b>Approx. Weight</b>        | 0.5 kg  |
| <b>Dimensions</b>            | 59 x 208 x 75 mm. (height x width x depth)  |

## LEDs

| LED           | Behavior  |
|---------------|---|
| RJ45 (green)  | Ethernet link established   |
| RJ45 (green)  | Ethernet data transmission / reception                                      |
| POWER (green) | Equipment energized   |
| RUN (green)   | Lit under normal operation, blinking when TCP/IP settings are being changed |
| RL1 (green)   | Relay 1 activated   |
| RL2 (green)   | Relay 2 activated   |
| TX (orange)   | RS-485 data transmission  |
| RX (green)    | RS-485 data reception   |

## Dimensions



Dimensioning for assembling (millimeters)

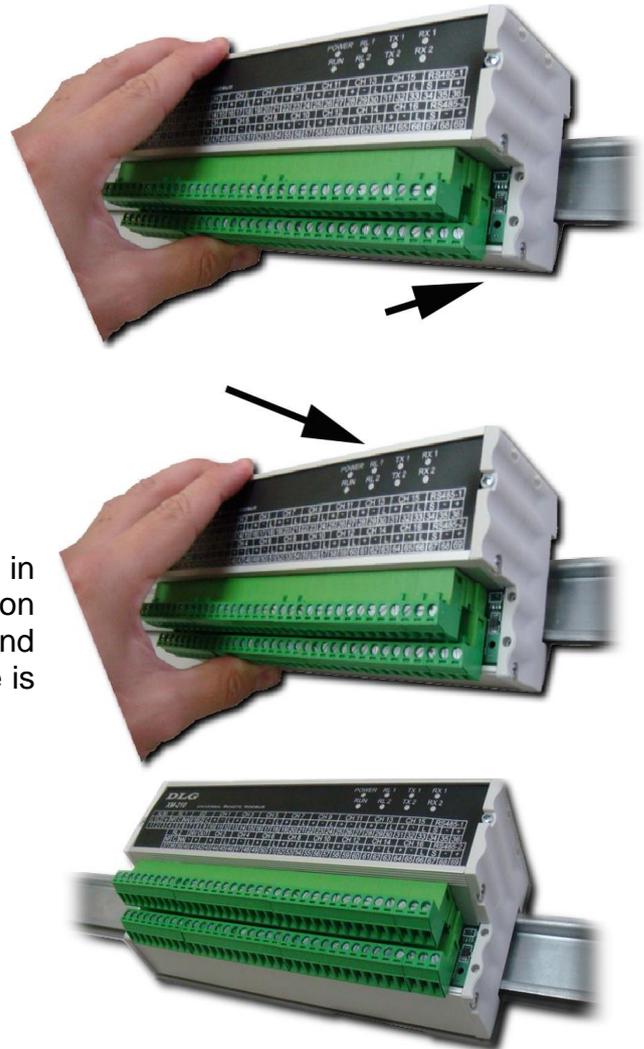
## Mechanical installation

The installation of the Universal Remote Ethernet XM-210 ETH requires the use of an appropriate screwdriver so the mechanical parts are not damaged. A “terminal” type 1/8” screwdriver is recommended. The following steps details the installation.

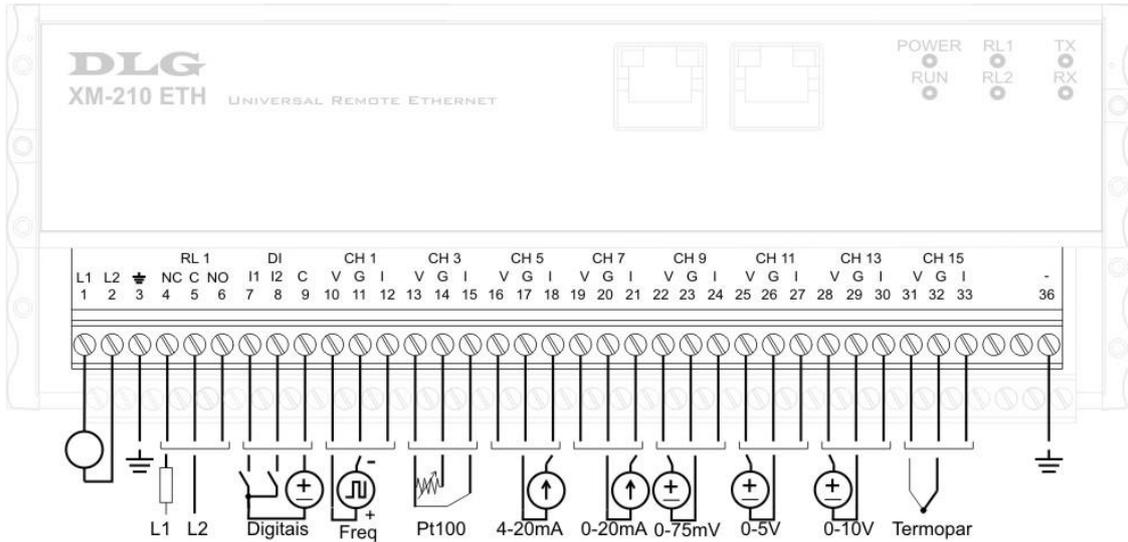
1. Place the bottom of the XM-210 ETH in the DIN 35mm rail.

2. Press the top part of the XM-210 ETH until hearing a click. To remove the XM-210 ETH, just apply the opposite force, i.e., force the XM-210 ETH up and pull it out.

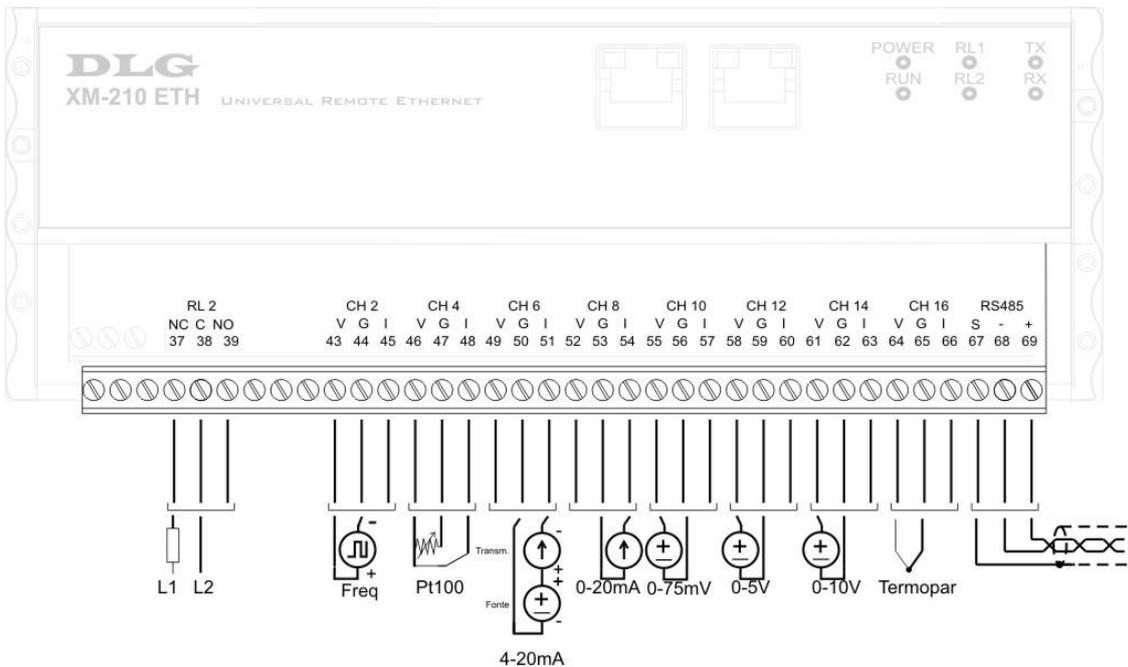
3. The XM-210 ETH is designed to be installed in regular DIN 35 mm rails and after the installation the equipment must remain securely fastened and must not present any slack within the rail. If there is any slack, the rail is possibly not standard.



## Electrical installation



**Top terminal**

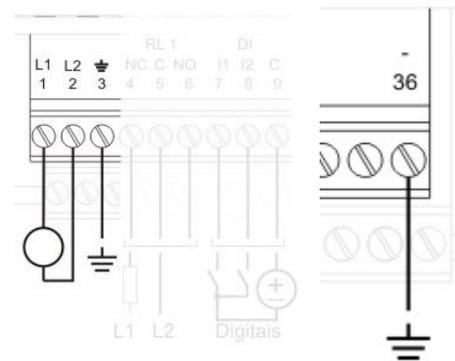


**Bottom terminal**

**Attention:** all cables must be “crimped” with eyelet type terminals for cables up to 1.5 mm<sup>2</sup> unless otherwise stated. The XM-210 ETH input type selection is done entirely through the DLG Tools software and there are no configuration jumpers. It is recommended to use woven shielded cables and the woven grounding should be mostly done around the field instruments at just one point.

## Power supply

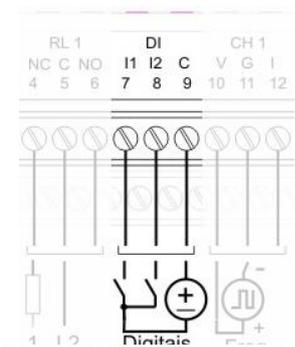
The XM-210 ETH AC must be powered through terminals 1 and 2 with voltage ranging from 90 to 260 Vac. The XM-210 ETH DC must be powered through terminals 1 and 2 with voltage from 18 to 30 Vdc. Terminals 3 and 36 are used to ground the “mass” to the panel and it is recommended to use 1,5 mm<sup>2</sup> cables for the phases and 2,5 mm<sup>2</sup> for grounding. The electric scheme is described in the picture.



**Note:** There is no polarity on power terminals 1 and 2 for the XM-210 ETH DC, i.e., the positive can be connected to terminal 1 and negative to terminal 2 or positive to terminal 2 and negative to terminal 1.

## Digital inputs

The digital inputs are used for alarm status and recognition. Input I1 and I2 are photo-coupled, with sensibility from 10 to 30 Vdc, common for both inputs, NPN driven. Digital input I1 is used to reset or recognize RL1 an RL2 alarm conditions and digital input I2 is used as a status flag for general use. The electric scheme is described in the picture where terminals 7 and 8 are the NPN inputs and terminal 9 is the positive source common.



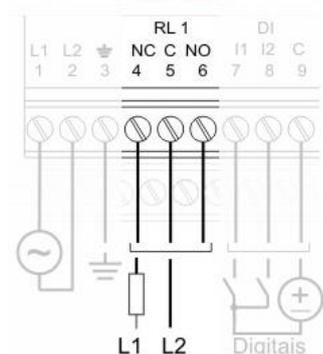
Digital inputs can be read through Modbus register 40020.

## Relay outputs and alarms

The relay outputs are used to physically indicate alarmed conditions preset for each input. The outputs can only be reseted through the digital inputs or Modbus registers.

The electric scheme is described in the picture, where the common contact is connected to terminals 5 and 38, the normally open contacts are connected to terminals 6 and 39 and the normally closed contacts are connected to terminals 4 and 37.

The relay outputs can be read and written through Modbus register



40022.

The XM-210 ETH has two independent alarms for each channel.

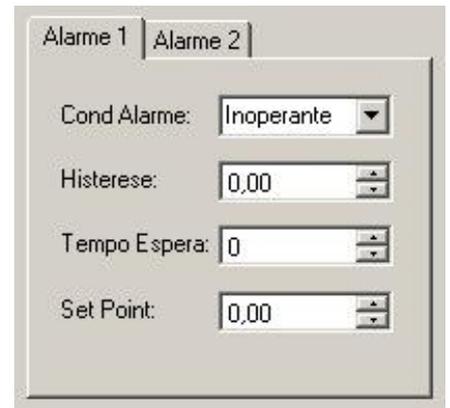
Each alarm can operate under four conditions: inoperative, low value, high value and differential.

Inoperative: no alarm condition.

Low value: the alarm is active when the input value is lower than the setpoint.

High value: the alarm is active when the input value is greater than the setpoint.

Differential: differential mode is defined by the setpoint and hysteresis. The setpoint defines the center reference point and the hysteresis increases the reference range. If the input signal lies outside the reference range, the alarm becomes active. For instance, to define a reference range from 400 to 600, define the setpoint as 500 and the hysteresis as 100. When the input signal is lower than 400 or greater than 600 the alarm triggers.



The hysteresis is relative to the delay between the activation or deactivation of a condition. In the XM-210 ETH the operation mode can change based on the selected alarm condition.

With the low value alarm condition selected, the alarm activates when the input value is lower than the setpoint and deactivates when the input value is greater than the setpoint plus the hysteresis.

With the high value alarm condition selected, the alarm activates when the input value is greater than the setpoint and deactivates when the input value is lower than the setpoint minus the hysteresis.

The waiting time defines how many seconds the output waits to be activated.

**Note:**

For improved security when using output relays in burn-out conditions, when there is disruption of the Pt100 cable (see Pt100 input), it is recommended to configure the relay output wait time to more than five seconds. This condition is important to avoid operational failures, for instance, turbine “trips” or any other system that relies on error free states, taking into consideration that the burn-out is an error condition in the process.

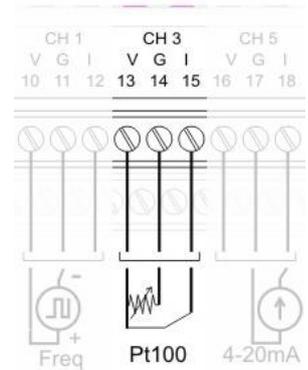
## Pt100 input

The Pt100 inputs are linearized according to ITS-90. With a current source circuit and cable compensation the XM-210 ETH eliminates the line charging effect, and with resistive sensors measurement it stands as a precise temperature measurement system. The sensor measurement terminals are signal (G) and common (V and I) for channels CH1 up to CH16 and the cable compensation measurement is done in the I terminals referenced to G.

If the Pt100 cables are not connected or are open, a burn-out signal will be represented by an indication of -200°C in the respective channel.

The XM-210 ETH detects the missing sensor and disables the alarm conditions associated with the open channel.

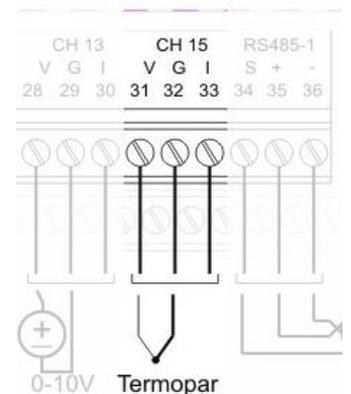
**Note:** User should pay attention to the correct connection of the sensor (signal → G and common → V and I), otherwise indication of the temperature will fail. Incorrect connection may interfere on the other channels.



## Thermocouple input

The thermocouple inputs are linearized according to ITS-90. With a cold junction compensation circuit, the XM-210 ETH takes into account the Seebeck effect in cable connections, standing as a precise system for high temperature or high differentials measurements. The sensor measurement terminals are positive (V) and negative (G) for channels CH1 up to CH16. Terminal (I) is not used in this configuration.

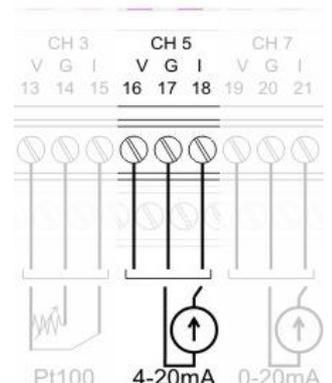
**Note:** The universal remote doesn't have burnout detection for voltage input, which means that, to avoid floating signal (**when sensor is disconnected**), the user should configure that channel as "Sem Entrada" (disabled) or to make a short-circuit between terminals V and G, to keep the input on 0 (zero).



## Current input

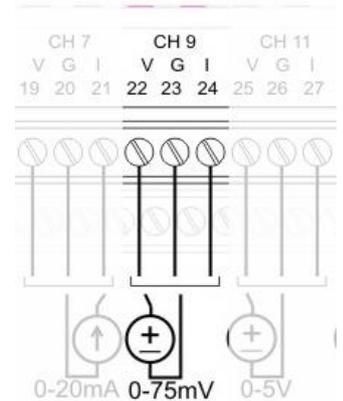
The XM-210 ETH has two current input configurations: 0 – 20 mA and 4 – 20 mA. The scheme for both configurations is described in the Picture, where the positive of the current loop is connected to the line terminal (I) and the negative to the (G) terminal for channels CH1 up to CH16. The positive terminal (V) is not used in this configuration.

Note: the burn-out is represented when the 4-20 mA signal is lower than 3.5 mA.



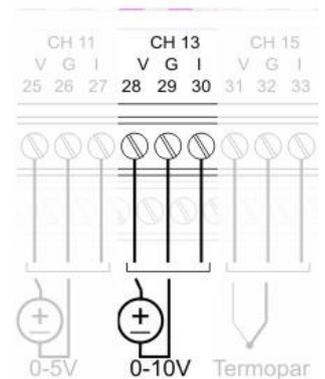
## Voltage input

The XM-210 ETH has three voltage input configurations: 0 – 75 mV, 0 – 5 V and 0 – 10 V. The scheme for the configurations is described in the Picture, where the positive is connected to the (V) terminal and the negative to the (G) terminal for channels CH1 up to CH16. The line terminal (I) is not used in this configuration.



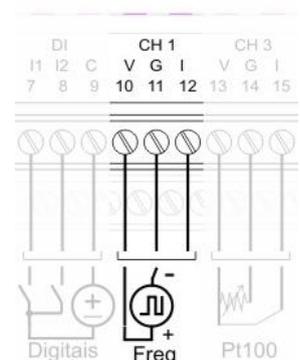
## Logic level input

The XM-210 ETH has logic level inputs with 0 to 12 Vdc sensibility. The 0 to 3 Vdc range corresponds to logic level 0 while the 5 to 12 Vdc range corresponds to logic level 1. The scheme is described in the Picture, where the positive is connected to the (V) terminal and the negative to the (G) terminal for channels CH1 up to CH16. The line terminal (I) is not used in this configuration.



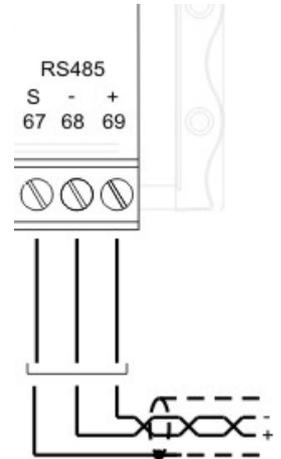
## Frequency input

The XM-210 ETH has frequency inputs with 0.3 to 50 Vdc sensibility and 0.3 Hz to 10 kHz reading. The scheme is described in the Picture, where the positive is connected to the (V) terminal and the negative to the (G) terminal for channels CH1 up to CH4. The line terminal (I) is not used in this configuration.



## **Modbus RTU communications**

The picture describes the connection scheme for the RS-485 channel, where the positive (+) is connected to terminal 69 and the negative (-) to terminal 68. Terminal 67 must be connected to the cable shield.



## Operation

### Starting the XM-210 ETH

The Universal Remote Ethernet XM-210 ETH is designed to apply the advantages in the distribution and collection of field variables with Modbus protocol compatibility. The XM-210 ETH parameterization comprises the following steps:

**Communications:**

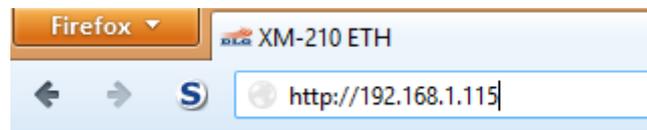
- IP, network mask and default gateway settings for the Ethernet interface.
- Address, baud rate and parity settings for the RS-485 interface.

**Configuration:**

- Sensor type selection.
- Offset setting for each sensor.
- Maximum and minimum engineering unit scales and decimal point.
- Alarm condition: low, high or differential.
- Alarm hysteresis setting.
- Alarm setpoint setting.
- Alarm activation wait time.

## HTTP server (webserver)

The XM-210 ETH is equipped with a webserver that allows channel monitoring and changing communications settings. The webserver is accessed using a web browser (Firefox, Chrome, IE, Safari) via the URL *http://<equipment IP address>*



The *Monitoring* page displays the input values in the 16 channels, alarm status, relay status, digital inputs and internal temperature.

| <b>Configurações</b> | <b>Endereço Modbus</b> | <b>Valor</b> | <b>Descrição</b>                   |
|----------------------|------------------------|--------------|------------------------------------|
| <b>Monitoração</b>   | 40001                  | 30           | Canal 1                            |
|                      | 40002                  | 0            | Canal 2                            |
|                      | 40003                  | 0            | Canal 3                            |
|                      | 40004                  | 0            | Canal 4                            |
|                      | 40005                  | -200.0       | Canal 5                            |
|                      | 40006                  | -200.0       | Canal 6                            |
|                      | 40007                  | -200.0       | Canal 7                            |
|                      | 40008                  | -200.0       | Canal 8                            |
|                      | 40009                  | -200.0       | Canal 9                            |
|                      | 40010                  | -200.0       | Canal 10                           |
|                      | 40011                  | -200.0       | Canal 11                           |
|                      | 40012                  | -200.0       | Canal 12                           |
|                      | 40013                  | 0            | Canal 13                           |
|                      | 40014                  | -200.0       | Canal 14                           |
|                      | 40015                  | -200.0       | Canal 15                           |
|                      | 40016                  | -200.0       | Canal 16                           |
|                      | 40017                  | 1            | Status do alarme 1 (canal 1 ao 16) |
|                      | 40018                  | 1            | Status do alarme 2 (canal 1 ao 16) |
|                      | 40019                  | 3            | Status dos relés 1 e 2             |
|                      | 40020                  | 0            | Status das entradas digitais 1 e 2 |
|                      | 40021                  | 30.5         | Temperatura ambiente               |

a página para atualizar os valores.

## Communication settings

The XM-210 ETH communication interfaces settings have the following factory defaults:

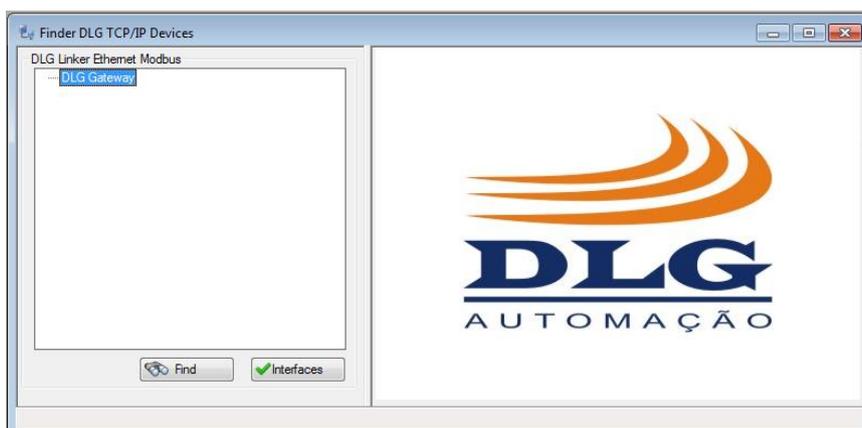
### Ethernet interface

- IP: 192.168.1.100
- Network mask: 255.255.255.0
- Default gateway: 192.168.1.1

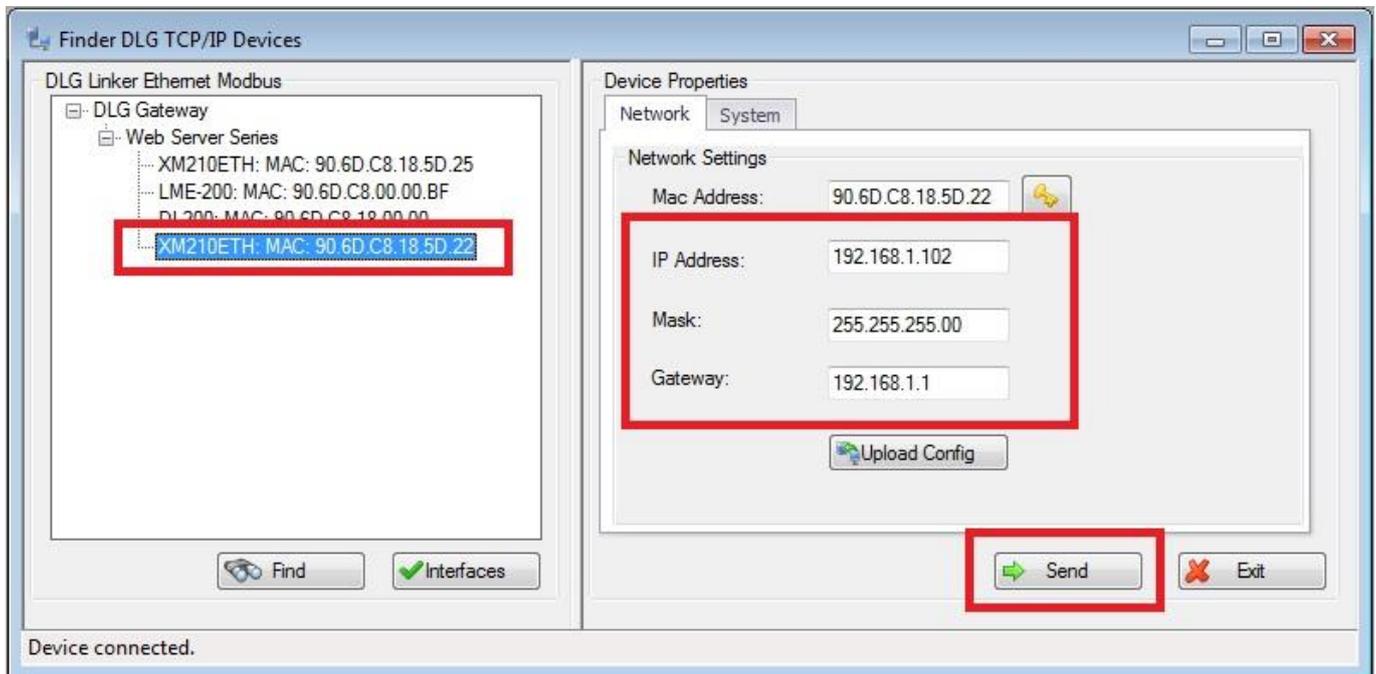
### RS-485 interface

- Address: 1
- Baud rate: 19200 bps
- Parity: no parity

The Ethernet interface settings can be changed via the DLG Tools software, by selecting the option Ferramentas -> Gateway or the Gateway icon  in the toolbar.



Click the “Find” button and wait while DLG Tools find the equipments accessible in the network.



Select the XM-210 ETH which is to have its communication parameters changed. After changing the parameters, click the “Send” button. The RUN LED of the XM-210 ETH immediately starts to blink, until the parameters are effectively changed, when the RUN LED stops blinking.

It is also possible to change the Ethernet settings via the webserver, through the *Configuration* page.

## Configurações

### TCP/IP

|                               |  |
|-------------------------------|--|
| <b>Endereço físico (MAC):</b> | 90:6D:C8:18:5D:22  |
| <b>Endereço IP:</b>           | <input style="width: 150px;" type="text" value="192.168.1.115"/> |
| <b>Máscara de sub-rede:</b>   | <input style="width: 150px;" type="text" value="255.255.255.0"/> |
| <b>Gateway padrão:</b>        | <input style="width: 150px;" type="text" value="192.168.1.1"/>   |

The “Send” button sends the new settings to the equipment. The RUN LED of the XM-210 ETH blinks until the parameter changing is finished.

The RS-485 settings can also be changed via the webserver.

## RS-485

|                          |                                       |
|--------------------------|---------------------------------------|
| ID:                      | <input type="text" value="1"/>        |
| Baud rate:               | <input type="text" value="19200"/>    |
| Paridade:                | <input type="text" value="Even"/>     |
| Atraso na Resposta (ms): | <input type="text" value="13"/>       |
|                          | <input type="button" value="Enviar"/> |

The RS-485 port settings are immediately changed when the “Send” button is clicked.

## Ethernet switch

The two Ethernet interfaces comprise a switch. It is possible to connect several XM-210 ETH in a topology known as “daisy chain”, where the equipments are directly interconnected, in a different way as the “star” topology, where the equipments are connected to a central switch.

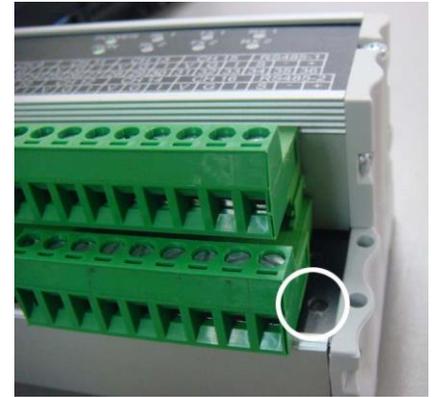
It is by no means mandatory to use both interfaces, as the equipment operates normally when just one interface is used. The interfaces are functionally identical, giving the user freedom to choose which one will be used.

## Reset

The reset mode is useful to restore the TCP/IP settings to its factory default values. The equipment can be reset by pressing the “RST ID” button, located in the lower right section, as shown in the picture.

After pressing the reset button, the RUN LED starts blinking, indicating that the TCP/IP settings are being restored. When the LED stops blinking, the equipment is restored to the factory defaults:

- IP: 192.168.1.100
- Mask: 255.255.255.0
- Gateway: 192.168.1.1



**Note:** neither the RS-485 interface settings nor the channel input type settings are changed by the reset mode.

## SNMP

The XM-210 ETH supplies management and diagnostic data through SNMP (Simple Network Management Protocol). The table below details important features regarding the protocol support.

|   |  |
|---|--|
| Version                                 | V1                                     |
| Community                               | public                                 |
| Available services                      | GetRequest, SetRequest, GetNextRequest |
| Maximum number of variables per request | 1                                      |

The available management and diagnostic data supplied by the XM-210 ETH are standardized according to RFC 1213 [1].

## Modbus table

| Address | Mnemonic | Description  |
|---------|----------|--|
| 40001   | EAI1     | Channel 1 – analog input   |
| 40002   | EAI2     | Channel 2 – analog input   |
| 40003   | EAI3     | Channel 3 – analog input   |
| 40004   | EAI4     | Channel 4 – analog input   |
| 40005   | EAI5     | Channel 5 – analog input   |
| 40006   | EAI6     | Channel 6 – analog input   |
| 40007   | EAI7     | Channel 7 – analog input   |
| 40008   | EAI8     | Channel 8 – analog input   |
| 40009   | EAI9     | Channel 9 – analog input   |
| 40010   | EAI10    | Channel 10 – analog input  |
| 40011   | EAI11    | Channel 11 – analog input  |
| 40012   | EAI12    | Channel 12 – analog input  |
| 40013   | EAI13    | Channel 13 – analog input  |
| 40014   | EAI14    | Channel 14 – analog input  |
| 40015   | EAI15    | Channel 15 – analog input  |
| 40016   | EAI16    | Channel 16 – analog input  |
| 40017   | MSA1     | Alarm 1 status, channels 1-16  |
| 40018   | MSA2     | Alarm 2 status, channels 1-16  |
| 40019   | SR01     | Relay 1 and 2 status   |
| 40020   | STDIV    | Digital input 1 and 2 status and memory error                                    |
| 40021   | TAMB     | Room temperature   |
| 40022   | R101     | Relay deactivation 1=relay 1, 2=relay 2<br>Relay activation 4=relay 1, 8=relay 2 |
| 40023   | ID       | Equipment Modbus RTU address   |
| 40024   | RES      | Reserved   |
| 40025   | RES      | Reserved   |
| 40026   | RES      | Reserved   |
| 40027   | BR1      | RS-485 port baud rate  |
| 40028   | PAR1     | RS-485 port parity   |
| 40029   | DR1      | RS-485 port response delay   |
| 40030   | TS01     | Sensor type channel 1  |
| 40031   | TS02     | Sensor type channel 2  |
| 40032   | TS03     | Sensor type channel 3  |
| 40033   | TS04     | Sensor type channel 4  |
| 40034   | TS05     | Sensor type channel 5  |
| 40035   | TS06     | Sensor type channel 6  |
| 40036   | TS07     | Sensor type channel 7  |

|       |      |                                 |
|-------|------|---------------------------------|
| 40037 | TS08 | Sensor type channel 8           |
| 40038 | TS09 | Sensor type channel 9           |
| 40039 | TS10 | Sensor type channel 10          |
| 40040 | TS11 | Sensor type channel 11          |
| 40041 | TS12 | Sensor type channel 12          |
| 40042 | TS13 | Sensor type channel 13          |
| 40043 | TS14 | Sensor type channel 14          |
| 40044 | TS15 | Sensor type channel 15          |
| 40045 | TS16 | Sensor type channel 16          |
| 40046 | OF01 | Channel 1 offset                |
| 40047 | OF02 | Channel 2 offset                |
| 40048 | OF03 | Channel 3 offset                |
| 40049 | OF04 | Channel 4 offset                |
| 40050 | OF05 | Channel 5 offset                |
| 40051 | OF06 | Channel 6 offset                |
| 40052 | OF07 | Channel 7 offset                |
| 40053 | OF08 | Channel 8 offset                |
| 40054 | OF09 | Channel 9 offset                |
| 40055 | OF10 | Channel 10 offset               |
| 40056 | OF11 | Channel 11 offset               |
| 40057 | OF12 | Channel 12 offset               |
| 40058 | OF13 | Channel 13 offset               |
| 40059 | OF14 | Channel 14 offset               |
| 40060 | OF15 | Channel 15 offset               |
| 40061 | OF16 | Channel 16 offset               |
| 40062 | IH01 | Max engineering unit channel 1  |
| 40063 | IH02 | Max engineering unit channel 2  |
| 40064 | IH03 | Max engineering unit channel 3  |
| 40065 | IH04 | Max engineering unit channel 4  |
| 40066 | IH05 | Max engineering unit channel 5  |
| 40067 | IH06 | Max engineering unit channel 6  |
| 40068 | IH07 | Max engineering unit channel 7  |
| 40069 | IH08 | Max engineering unit channel 8  |
| 40070 | IH09 | Max engineering unit channel 9  |
| 40071 | IH10 | Max engineering unit channel 10 |
| 40072 | IH11 | Max engineering unit channel 11 |
| 40073 | IH12 | Max engineering unit channel 12 |
| 40074 | IH13 | Max engineering unit channel 13 |
| 40075 | IH14 | Max engineering unit channel 14 |
| 40076 | IH15 | Max engineering unit channel 15 |
| 40077 | IH16 | Max engineering unit channel 16 |
| 40078 | IL01 | Min engineering unit channel 1  |
| 40079 | IL02 | Min engineering unit channel 2  |
| 40080 | IL03 | Min engineering unit channel 3  |

|       |      |                                 |
|-------|------|---------------------------------|
| 40081 | IL04 | Min engineering unit channel 4  |
| 40082 | IL05 | Min engineering unit channel 5  |
| 40083 | IL06 | Min engineering unit channel 6  |
| 40084 | IL07 | Min engineering unit channel 7  |
| 40085 | IL08 | Min engineering unit channel 8  |
| 40086 | IL09 | Min engineering unit channel 9  |
| 40087 | IL10 | Min engineering unit channel 10 |
| 40088 | IL11 | Min engineering unit channel 11 |
| 40089 | IL12 | Min engineering unit channel 12 |
| 40090 | IL13 | Min engineering unit channel 13 |
| 40091 | IL14 | Min engineering unit channel 14 |
| 40092 | IL15 | Min engineering unit channel 15 |
| 40093 | IL16 | Min engineering unit channel 16 |
| 40094 | PD01 | Decimal point channel 1         |
| 40095 | PD02 | Decimal point channel 2         |
| 40096 | PD03 | Decimal point channel 3         |
| 40097 | PD04 | Decimal point channel 4         |
| 40098 | PD05 | Decimal point channel 5         |
| 40099 | PD06 | Decimal point channel 6         |
| 40100 | PD07 | Decimal point channel 7         |
| 40101 | PD08 | Decimal point channel 8         |
| 40102 | PD09 | Decimal point channel 9         |
| 40103 | PD10 | Decimal point channel 10        |
| 40104 | PD11 | Decimal point channel 11        |
| 40105 | PD12 | Decimal point channel 12        |
| 40106 | PD13 | Decimal point channel 13        |
| 40107 | PD14 | Decimal point channel 14        |
| 40108 | PD15 | Decimal point channel 15        |
| 40109 | PD16 | Decimal point channel 16        |
| 40110 | H101 | Alarm 1 hysteresis channel 1    |
| 40111 | H102 | Alarm 1 hysteresis channel 2    |
| 40112 | H103 | Alarm 1 hysteresis channel 3    |
| 40113 | H104 | Alarm 1 hysteresis channel 4    |
| 40114 | H105 | Alarm 1 hysteresis channel 5    |
| 40115 | H106 | Alarm 1 hysteresis channel 6    |
| 40116 | H107 | Alarm 1 hysteresis channel 7    |
| 40117 | H108 | Alarm 1 hysteresis channel 8    |
| 40118 | H109 | Alarm 1 hysteresis channel 9    |
| 40119 | H110 | Alarm 1 hysteresis channel 10   |
| 40120 | H111 | Alarm 1 hysteresis channel 11   |
| 40121 | H112 | Alarm 1 hysteresis channel 12   |
| 40122 | H113 | Alarm 1 hysteresis channel 13   |
| 40123 | H114 | Alarm 1 hysteresis channel 14   |
| 40124 | H115 | Alarm 1 hysteresis channel 15   |

|       |      |                               |
|-------|------|-------------------------------|
| 40125 | H116 | Alarm 1 hysteresis channel 16 |
| 40126 | H201 | Alarm 2 hysteresis channel 1  |
| 40127 | H202 | Alarm 2 hysteresis channel 2  |
| 40128 | H203 | Alarm 2 hysteresis channel 3  |
| 40129 | H204 | Alarm 2 hysteresis channel 4  |
| 40130 | H205 | Alarm 2 hysteresis channel 5  |
| 40131 | H206 | Alarm 2 hysteresis channel 6  |
| 40132 | H207 | Alarm 2 hysteresis channel 7  |
| 40133 | H208 | Alarm 2 hysteresis channel 8  |
| 40134 | H209 | Alarm 2 hysteresis channel 9  |
| 40135 | H210 | Alarm 2 hysteresis channel 10 |
| 40136 | H211 | Alarm 2 hysteresis channel 11 |
| 40137 | H212 | Alarm 2 hysteresis channel 12 |
| 40138 | H213 | Alarm 2 hysteresis channel 13 |
| 40139 | H214 | Alarm 2 hysteresis channel 14 |
| 40140 | H215 | Alarm 2 hysteresis channel 15 |
| 40141 | H216 | Alarm 2 hysteresis channel 16 |
| 40142 | C101 | Alarm 1 conditions channel 1  |
| 40143 | C102 | Alarm 1 conditions channel 2  |
| 40144 | C103 | Alarm 1 conditions channel 3  |
| 40145 | C104 | Alarm 1 conditions channel 4  |
| 40146 | C105 | Alarm 1 conditions channel 5  |
| 40147 | C106 | Alarm 1 conditions channel 6  |
| 40148 | C107 | Alarm 1 conditions channel 7  |
| 40149 | C108 | Alarm 1 conditions channel 8  |
| 40150 | C109 | Alarm 1 conditions channel 9  |
| 40151 | C110 | Alarm 1 conditions channel 10 |
| 40152 | C111 | Alarm 1 conditions channel 11 |
| 40153 | C112 | Alarm 1 conditions channel 12 |
| 40154 | C113 | Alarm 1 conditions channel 13 |
| 40155 | C114 | Alarm 1 conditions channel 14 |
| 40156 | C115 | Alarm 1 conditions channel 15 |
| 40157 | C116 | Alarm 1 conditions channel 16 |
| 40158 | C201 | Alarm 2 conditions channel 1  |
| 40159 | C202 | Alarm 2 conditions channel 2  |
| 40160 | C203 | Alarm 2 conditions channel 3  |
| 40161 | C204 | Alarm 2 conditions channel 4  |
| 40162 | C205 | Alarm 2 conditions channel 5  |
| 40163 | C206 | Alarm 2 conditions channel 6  |
| 40164 | C207 | Alarm 2 conditions channel 7  |
| 40165 | C208 | Alarm 2 conditions channel 8  |
| 40166 | C209 | Alarm 2 conditions channel 9  |
| 40167 | C210 | Alarm 2 conditions channel 10 |
| 40168 | C211 | Alarm 2 conditions channel 11 |

|       |      |                               |
|-------|------|-------------------------------|
| 40169 | C212 | Alarm 2 conditions channel 12 |
| 40170 | C213 | Alarm 2 conditions channel 13 |
| 40171 | C214 | Alarm 2 conditions channel 14 |
| 40172 | C215 | Alarm 2 conditions channel 15 |
| 40173 | C216 | Alarm 2 conditions channel 16 |
| 40174 | T101 | Alarm 1 wait time channel 1   |
| 40175 | T102 | Alarm 1 wait time channel 2   |
| 40176 | T103 | Alarm 1 wait time channel 3   |
| 40177 | T104 | Alarm 1 wait time channel 4   |
| 40178 | T105 | Alarm 1 wait time channel 5   |
| 40179 | T106 | Alarm 1 wait time channel 6   |
| 40180 | T107 | Alarm 1 wait time channel 7   |
| 40181 | T108 | Alarm 1 wait time channel 8   |
| 40182 | T109 | Alarm 1 wait time channel 9   |
| 40183 | T110 | Alarm 1 wait time channel 10  |
| 40184 | T111 | Alarm 1 wait time channel 11  |
| 40185 | T112 | Alarm 1 wait time channel 12  |
| 40186 | T113 | Alarm 1 wait time channel 13  |
| 40187 | T114 | Alarm 1 wait time channel 14  |
| 40188 | T115 | Alarm 1 wait time channel 15  |
| 40189 | T116 | Alarm 1 wait time channel 16  |
| 40190 | T201 | Alarm 2 wait time channel 1   |
| 40191 | T202 | Alarm 2 wait time channel 2   |
| 40192 | T203 | Alarm 2 wait time channel 3   |
| 40193 | T204 | Alarm 2 wait time channel 4   |
| 40194 | T205 | Alarm 2 wait time channel 5   |
| 40195 | T206 | Alarm 2 wait time channel 6   |
| 40196 | T207 | Alarm 2 wait time channel 7   |
| 40197 | T208 | Alarm 2 wait time channel 8   |
| 40198 | T209 | Alarm 2 wait time channel 9   |
| 40199 | T210 | Alarm 2 wait time channel 10  |
| 40200 | T211 | Alarm 2 wait time channel 11  |
| 40201 | T212 | Alarm 2 wait time channel 12  |
| 40202 | T213 | Alarm 2 wait time channel 13  |
| 40203 | T214 | Alarm 2 wait time channel 14  |
| 40204 | T215 | Alarm 2 wait time channel 15  |
| 40205 | T216 | Alarm 2 wait time channel 16  |
| 40206 | S101 | Alarm 1 setpoint channel 1    |
| 40207 | S102 | Alarm 1 setpoint channel 2    |
| 40208 | S103 | Alarm 1 setpoint channel 3    |
| 40209 | S104 | Alarm 1 setpoint channel 4    |
| 40210 | S105 | Alarm 1 setpoint channel 5    |
| 40211 | S106 | Alarm 1 setpoint channel 6    |
| 40212 | S107 | Alarm 1 setpoint channel 7    |

|       |       |                                       |
|-------|-------|---------------------------------------|
| 40213 | S108  | Alarm 1 setpoint channel 8            |
| 40214 | S109  | Alarm 1 setpoint channel 9            |
| 40215 | S110  | Alarm 1 setpoint channel 10           |
| 40216 | S111  | Alarm 1 setpoint channel 11           |
| 40217 | S112  | Alarm 1 setpoint channel 12           |
| 40218 | S113  | Alarm 1 setpoint channel 13           |
| 40219 | S114  | Alarm 1 setpoint channel 14           |
| 40220 | S115  | Alarm 1 setpoint channel 15           |
| 40221 | S116  | Alarm 1 setpoint channel 16           |
| 40222 | S201  | Alarm 2 setpoint channel 1            |
| 40223 | S202  | Alarm 2 setpoint channel 2            |
| 40224 | S203  | Alarm 2 setpoint channel 3            |
| 40225 | S204  | Alarm 2 setpoint channel 4            |
| 40226 | S205  | Alarm 2 setpoint channel 5            |
| 40227 | S206  | Alarm 2 setpoint channel 6            |
| 40228 | S207  | Alarm 2 setpoint channel 7            |
| 40229 | S208  | Alarm 2 setpoint channel 8            |
| 40230 | S209  | Alarm 2 setpoint channel 9            |
| 40231 | S210  | Alarm 2 setpoint channel 10           |
| 40232 | S211  | Alarm 2 setpoint channel 11           |
| 40233 | S212  | Alarm 2 setpoint channel 12           |
| 40234 | S213  | Alarm 2 setpoint channel 13           |
| 40235 | S214  | Alarm 2 setpoint channel 14           |
| 40236 | S215  | Alarm 2 setpoint channel 15           |
| 40237 | S216  | Alarm 2 setpoint channel 16           |
| 40238 | MA11  | Alarm 1 relay 1 mask                  |
| 40239 | MA12  | Alarm 1 relay 2 mask                  |
| 40240 | MA21  | Alarm 2 relay 1 mask                  |
| 40241 | MA22  | Alarm 2 relay 2 mask                  |
| 40242 | FREQ1 | Max frequency for eng. unit channel 1 |
| 40243 | FREQ2 | Max frequency for eng. unit channel 2 |
| 40244 | FREQ3 | Max frequency for eng. unit channel 3 |
| 40245 | FREQ4 | Max frequency for eng. unit channel 4 |

## Modbus register details

| Status – 40020 |   |
|----------------|---|
| Bit            | Function  |
| 0              | Digital input 1                                       |
| 1              | Digital input 2                                       |
| 2              | Error reading calibration memory (0 = OK; 1= Failure) |

| Baud Rate – 40027 |        |
|-------------------|--------|
| Value             | Rate   |
| 0                 | 1200   |
| 1                 | 2400   |
| 2                 | 4800   |
| 3                 | 9600   |
| 4                 | 19200  |
| 5                 | 38400  |
| 6                 | 57600  |
| 7                 | 115200 |

| Parity – 40028 |        |
|----------------|--------|
| Value          | Parity |
| 0              | EVEN   |
| 1              | ODD    |
| 2              | NONE   |

| Response delay – 40029             |           |      |
|------------------------------------|-----------|------|
| Max value                          | Min value | Step |
| 100                                | 0         | 1 ms |
| Minimum delays for each baud rate: |           |      |
| 1200: 6                            | 19200:2   |      |
| 2400: 4                            | 38400:2   |      |
| 4800: 3                            | 57600:2   |      |
| 9600: 2                            | 115200: 2 |      |

| Alarm conditions 40142 ~ 40158 |              |
|--------------------------------|--------------|
| Index                          | Condition    |
| 0                              | Low          |
| 1                              | High         |
| 2                              | Differential |
| 3                              | Inoperative  |

| Relay reset ~ 40022 |           |                    |
|---------------------|-----------|--------------------|
| Value               | Index     | Action             |
| 1                   | 0000 0001 | Deactivate relay 1 |
| 2                   | 0000 0010 | Deactivate relay 2 |
| 3                   | 0000 0100 | Activate relay 1   |
| 4                   | 0000 1000 | Activate relay 2   |

| Sensor type 40030 ~ 40045 |       |
|---------------------------|-------|
| Type                      | Value |
| J                         | 0     |
| K                         | 1     |
| T                         | 2     |
| R                         | 3     |
| S                         | 4     |
| E                         | 5     |
| N                         | 6     |
| B                         | 7     |
| Pt100                     | 8     |
| 0 – 20 mA                 | 9     |
| 4 – 20 mA                 | 10    |
| 0 – 75 mV                 | 11    |
| 0 – 5 V                   | 12    |
| 0 – 10 V                  | 13    |
| Logic                     | 14    |
| No input                  | 15    |
| Frequency                 | 16    |

## Recommendations

It is recommended to only use appropriate tools for the XM-210 ETH installation and maintenance.

|   |   |  |
|---|---|--|
| <p>It is necessary to use a “terminal” type screwdriver for terminal connection or 1/8 with 3 mm maximum diameter, as it is the ideal format and will not damage the connection aperture.</p> |  <p>Inappropriate screwdriver</p> |  <p>Recommended screwdriver</p> |
| <p>It is recommended to crimp all the wires that will be connected to the XM-210 ETH with a pre-isolated “needle” type or “eyelet” terminal for cables of 0.5 ~ 1.5 mm<sup>2</sup>.</p>       | <p>Needle terminal</p>          | <p>Eyelet terminal</p>         |

## Ethernet cable and connectors specification

In order to minimize electromagnetic interference effects, it is recommended to use Ethernet cables and connectors with the following specifications:

|                |   |
|----------------|---|
| Cable          | Twisted pair, four pairs, 24 AWG, 5e category, shielded (F/UTP), maximum length of meters |
| RJ45 connector | Male, shielded  |

## Warranty

The manufacturer assures to equipment owners, identified by the purchase invoice, 1 (one) year warranty as follows:

1. The warranty period begins with the invoice issuing.
2. Within the warranty period, the labor and parts for repairing normal use damage are free.
3. For repairs, send the equipment along with the shipping invoices to our factory in Sertãozinho. DLG's address is available at the of this user manual.
4. The owner is responsible for transportation costs and risks.
5. Warranty will be automatically voided if changes are made to the equipment by non-authorized personnel, defects caused by mechanical shock, exposure to conditions unfit for use or tampering with the product.
6. DLG disclaims any charge related to unauthorized repairing or replacements due to failures caused by agents external to the equipment, the improper use of them and as a result of unforeseeable circumstances or major forces.
7. DLG ensures full operation of the equipment described herein.

## Copyright note

This product makes use of the open source software components:

|          |  |
|----------|--|
| FreeRTOS | <a href="http://www.freertos.org">www.freertos.org</a>                                 |
| lwIP     | Copyright (c) 2001-2004 Swedish Institute of Computer Science.<br>All rights reserved. |

## References

[1] RFC 1213 – Management Information Base for Network Management of TCP/IP-based internets: MIB-II (<http://www.ietf.org/rfc/rfc1213.txt>)

# Notes



|   |   |   |
|---|---|---|
| <p><b>DLG</b> Automação Industrial Ltda.<br/>Rua José Batista Soares, 53<br/>Distrito Industrial – 14176-119<br/>Sertãozinho – São Paulo – Brasil<br/>Fone: +55 (16) 3513-7400<br/><a href="http://www.dlg.com.br">www.dlg.com.br</a></p> | <p>MAN-EN-DE-XM210ETH-<br/>01.00_16</p> | <p>UNIVERSAL REMOTE ETHERNET<br/>XM-210 ETH</p> |
| <p>DLG reserves the right to update this manual without notice in order to keep it updated with potential product developments.</p>   |   |   |