OPERATIVE MANUAL

ETHD

ETH1S

Revision	1.1
Last update	24/09/2014

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Table of contents

1 Introduction

Device name	Functions
ETHD	Allows the following conversions: - RS232 ↔ ETHERNET - RS485 ↔ ETHERNET - RS232 ↔ RS485 - MODBUS TCP↔ETHERNET - Allows to share the archives between 2 3590E/EGT-AF03
ETH1S	Allows the following conversions: - RS485 ↔ ETHERNET - MODBUS TCP↔ETHERNET

2 Identification of the device on the network

The SETH module uses the UPnP (Universal Plug and Play) technology, which allows to use a device when it connects at the network. This means that, when they are connected at the network, the ETHD devices should automatically appear on the Windows Network Resources , where it will also shows the IP address associated from the DHCP server (or the configured fixed address).

The default address is **192.168.16.205**.

To establish a communication with a computer or any other device connected at the network it is necessary that the module belongs to the same class of network (in our case the network should have the addresses of this type **192.168.16.xxx)**, otherwise you must assign to the ETHD module an IP address that belongs to the class of the network or the device which you want to connect. The steps required to perform these operations via computer are:

- Assign to the PC a static IP address that belongs to the class of the module (**192.168.16.xxx**).
- Connect the module to the computer through an ethernet cable.
- Enter the home page of module, by typing in a browser the address **192.168.16.205**, and assign a free IP address that belongs to the class of network where the module will be used.

3 Parameters configuration trough web browser

3.1   Status and configuration (Home)

By making double-click on the SETH-DIN module (listed on the Network Resources), or digit the IP address on the address bar of your browser(see below example, as default will be 192.168.16.205),
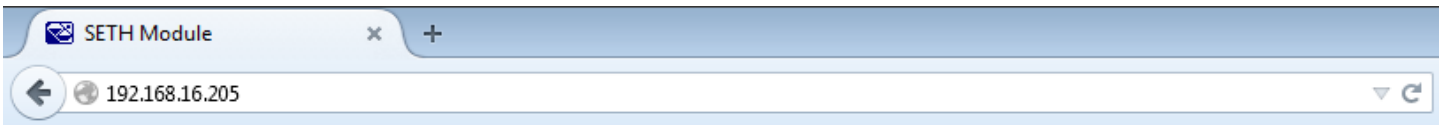
the *home* of the module will appear on the default browser, which will shows the status and the configuration of the module.

ETHD Module

DINI ARGEO
Scales - Weighing systems
Visit us at: www.diniargeo.com

Status & Configuration

Home

General Settings

Port 0 (RS232) Settings

Port 1 (RS485) Settings

Password Setting

Name:	*ETHD: Serial 2 Ethernet*
Firmware Revision:	**02.02.00.0064D**
IP Address:	192.168.16.205
MAC Address:	00-1e-c0-ac-8b-48
Serial Port 1 Option Switch:	2-wire
Operating Mode:	**Serial Bridge**

Current port settings:

	Port 0 (RS232)	Port 1 (RS485)
Baud Rate:	9600 bits/second	9600 bits/second
Data Size:	8 bits/character	8 bits/character
Parity:	None	None
Stop Bits:	1bit(s)	1bit(s)
Flow Control:	None	None
Physical I/F:	LAN	LAN
Protocol:	TCP	TCP
Local UDP Port Number:	3001	3002
Remote UDP Port Number:	3001	3002
UDP Trigger Char:	10 decimal ASCII	10 decimal ASCII
UDP Trigger Idle Timeout:	100 ms	100 ms
UDP Remote IP Address:	0.0.0.0	0.0.0.0
Local TCP Port Number:	23	26
TCP Timeout:	0 s	0 s
Modbus Mode:	RTU	RTU

3.2   Setting of the protection password

It's possible to protect the device configuration (from writing and reading) through a password. Choose the *Password Setting* option from the menu, type two times the desired password and click on **Submit!**, it will be permanently memorized on the module. If the two boxes are empty, the protection password will be disabled.

After which, to access at the *home page*, it will necessary to insert the correct password and click on **Enter**:

Password Setting

Password: [   ]
Re-enter: [   ]
   [Submit!]

If the inserted password is wrong, the same page will appear.

4 General settings

By selecting the general settings option, the *Miscellaneous Settings* page will be displayed and then you can change the IP address of the module, the subnet mask and the default gateway.

Miscellaneous Settings

Home

General Settings

Port 0 (RS232) Settings

Port 1 (RS485) Settings

Password Setting

Name:	ETHD: Serial 2 Ethernet
Firmware Revision:	02.02.00.0064D
IP Address:	192.168.16.205
MAC Address:	00-1e-c0-ac-8b-48

Reboot

IP Address Selection

Address Type:	Static IP
Static IP Address:	192 . 168 . 16 . 205
Subnet Mask:	255 . 255 . 255 . 0
Default Gateway:	0 . 0 . 0 . 0

Save and Reboot

General Configuration Settings

Module Name:	ETHD: Serial 2 Ethernet
UPnP port number:	6432
Web Server Port Number:	80
Operating Mode:	Serial Bridge

Save and Reboot

Restore Factory Defaults

Restore all options to their factory default:	

Restore Defaults and Reboot

You can also change the name of the module, the UPnP port number, the web server port number and the operating mode; or restore defaults parameter and reboot.
The possible value of Operating Mode are:

- Serial to ethernet
- Serial bridge
- Port0: SNet Adapter - Port1: Serial To Ethernet
- Modbus TCP

To change the operating mode is necessary to click on save and reboot and wait a few second to allow the device to reboot, then refresh the page.

4.1   Serial to Ethernet

This mode translates the WLAN or LAN information into serial signals RS232 or RS485. This mode will set both serial ports to 9600,n,8,1 with no flow control and TCP local ports to 23 and 26.

4.2   Serial Bridge

This mode creates a bridge between the RS232 and the RS485, in this case every packets received via WLAN or LAN is ignored by the module. This mode will set both serial ports to 9600,n,8,1 with no flow control.

4.3   Port0: SNet Adapter - Port1: Serial To Ethernet

This mode is used for making a network between two or more instruments. This mode will set both serial ports to 115200,n,8,1 with no flow control, UDP local/remote ports to 3001 on Serial Port 0, TCP local ports to 26 on Serial Port 1.

Plus, after a refresh of the page, will appear SETH-NET Service where is possible to monitor the current status of the connection and the statistics.

4.4   Modbus TCP

This mode is used to transmit Modbus data via LAN. This mode will set both serial ports to 9600,n,8,2 with no flow control, Modbus-RTU on both serial ports and TCP local ports to 502 and 503. The function mode MODBUS TCP requires a network connection that uses the TCP / IP protocols. In order to establish a communication using the Modbus protocol is sufficient connect the module on RS232/485 to a tool that supports the Modbus RTU or Modbus ASCII.

5 Port Settings

In the first column are displayed the parameter to set, in the second the current setting of the parameter and in the third the editable values. Every time you change some parameter check if *Make these settings permanent* is set and click on *Save* or the changes will be lost.

In the first paragraph is possible to set the serial port parameter.

Serial Settings

	Current	Updated
Baud Rate:	9600 bits/second	9600 ▾ bits/S
Data Size:	8 bits/character	8 ▾ bits/character
Parity:	None	None ▾
Stop Bits:	1 bit(s)	1 ▾ bit(s)
Flow Control:	None	None ▾

Save   ☑ Make these settings permanent.

In the second the LAN setting such as the protocol of transmission and the medium, the *Physical I/F* is editable only if *WIFI Function* is set on *enabled* (see chapter *WIFI Settings*).

LAN Settings

	Current	Updated
Physical I/F:	LAN	LAN ▾
Protocol:	UDP	UDP ▾

Save   ☑ Make these settings permanent.

In the third the UDP settings editable only if UDP is set in the protocol field of *LAN Settings*.

UDP

	Current	Updated
Local UDP Port Number:	3001	3001
Remote UDP Port Number:	3001	3001
UDP Trigger Char:	10 decimal ASCII code	10 char (0 for no trigger char)
UDP Trigger Idle Timeout:	100 milliseconds	100 milliseconds (0 for no timeout)
UDP Remote IP Address:	0.0.0.0	0 . 0 . 0 . 0

Save   ☑ Make these settings permanent.

And in the fourth the TCP settings editable only if TCP is set in the protocol field of *LAN Settings*. The *TCP Timeout* is editable only if the *Physical I/F* is set on LAN.

TCP

	Current	Updated
Local TCP Port Number:	23	23
TCP Timeout:	0 seconds	0 seconds (0 for no timeout)
Modbus Mode:	RTU	RTU ▾

Save   ☑ Make these settings permanent.

5.1   Tunnelling mode

The tunneling mode allows to use the ethernet protocol to overcome the limits of the serial communication by creating a virtual connection. This mode works only using the UDP protocol and two modules.

This can be done in the *Port Settings* page by inserting in the *Remote UDP Port Number* field the *Local UDP Port Number* of the other module and in *UDP Remote IP Address* the IP address of the other module, repeat the same procedure for the other module. To disable the tunneling mode over the relative ports set 0.0.0.0 in the UDP Remote Address field.

Example: Tunnelling mode between two ports of two modules

	ETHD 1	ETHD 2
IP	192.168.16.205	192.168.16.206
Local UDP Port Number	3001	3002
Remote UDP Port Number	3002	3001
UDP Remote Address	192.168.16.206	192.168.16.205

Don't change the others UDP parameters.

5.2   Double tunnelling mode

The double tunnelling mode works like the single tunnelling mode but it can manage two virtual connection between the same port of each module (Port 0←→Port 0 Port 1←→Port 1). It is not possible to create a virtual connection between two different ports. To disable the tunneling mode set 0.0.0.0 in the UDP Remote Address field.

Example: Double tunnelling mode

	ETHD 1	ETHD 2
IP	192.168.16.205	192.168.16.206
Port 0		
Local UDP Port Number	3001	3002
Remote UDP Port Number	3002	3001
UDP Remote Address	192.168.16.206	192.168.16.205
Port 1		
Local UDP Port Number	3003	3004
Remote UDP Port Number	3004	3003
UDP Remote Address	192.168.16.206	192.168.16.205

Don't change the others UDP parameters.

5.3   Broadcast mode

It is possible set the function mode **BROADCAST** on module.

This configuration allows to have a module (**MASTER**) that sends the data to N modules setted on the same UDP port, it is necessary set "255.255.255.255" as broadcast address on MASTER.

6 WIFI Settings

This page is accessible only if a WIFITD module is installed otherwise the option will not be displayed.

WiFi Settings

Home		
	Firmware Revision:	4.7.1
General Settings	IP Address:	0.0.0.0
	MAC Address:	00:00:00:00:00:00

Network Settings

Port 0 (RS232) Settings

Port 1 (RS485) Settings

	WiFi Function:	Disabled ▾
WiFi Settings	SSID:	DiniNet
	Network Mode:	Infrastructure ▾
Password Setting	Ad Hoc Mode:	Joiner ▾

Security Settings

Security Type:	Open ▾
Security Key:	

IP Settings

Address Type:	Static IP ▾
Static IP Address:	192 . 168 . 16 . 207
Subnet Mask:	255 . 255 . 255 . 0

Save and Reboot

The MAC address is 0.0.0.0 until the *WiFi Function* is disabled and the *IP Address* is 0.0.0.0 until the module isn't connected to a WIFI network.

To connect to a WIFI network is needed to set the correct SSID of the network.

If the network is protected by a password it is necessary to set the right *Security Type* and the relative *Security Key*.

The last step is to set the type of the *Address Type*, if is set on DHCP the DHCP server in the network will assign a free IP to the module otherwise if is set on Static IP you have to assign a free IP in the same class of the network and the correct subnet mask.

7 Main Technical Specification

Power supply   + 5 Vdc (AMP)

                                      +24Vdc (WIRE TERMINAL)

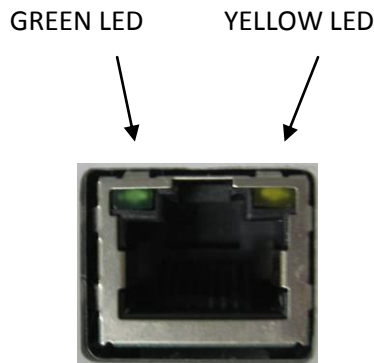Max consumption   200 mA, 5W at 24Vdc.

Operating temperature   -10°C + 50°C

Interface Characteristics

Protocols   TCP, UDP, DHCP, SNMP, SSL 3.0/TLS 1.0, HTTP, SMTP, ICMP, IGMP,

CONNECTION   Through RJ45 standard connector.

WEB INTERFACE   10/100 Base-T.

SPEED COMMUNICATION   10-100Mbps.

Available conversions

RS232 ↔ ETHERNET

RS485 ↔ ETHERNET

RS232 ↔ RS485

LED meaning:

GREEN LED   YELLOW LED

	GREEN	**YELLOW**
SOME CONSECUTIVE BLINKINGS	At the start-up, indicates that the module is ON. When the module is on indicates the presence of serial activities.	
OFF	Network cable not connected	
FIXED	Device connected at the network	-
BLINKING		Presence of network activity.

8 Connections

8.1   ETHD Connections

POWER SUPPLY

+Vdc	+ 12Vdc÷24Vdc
GND	GND

SERIALS

RS232

TXD	TX
RXD	RX
GND	GND

RS485

ARX+	A(+)
BRX-	B(-)

AMP

1	TX
2	RX
3	Not used
4	**+**5 Vdc
5	Not used
6	GND
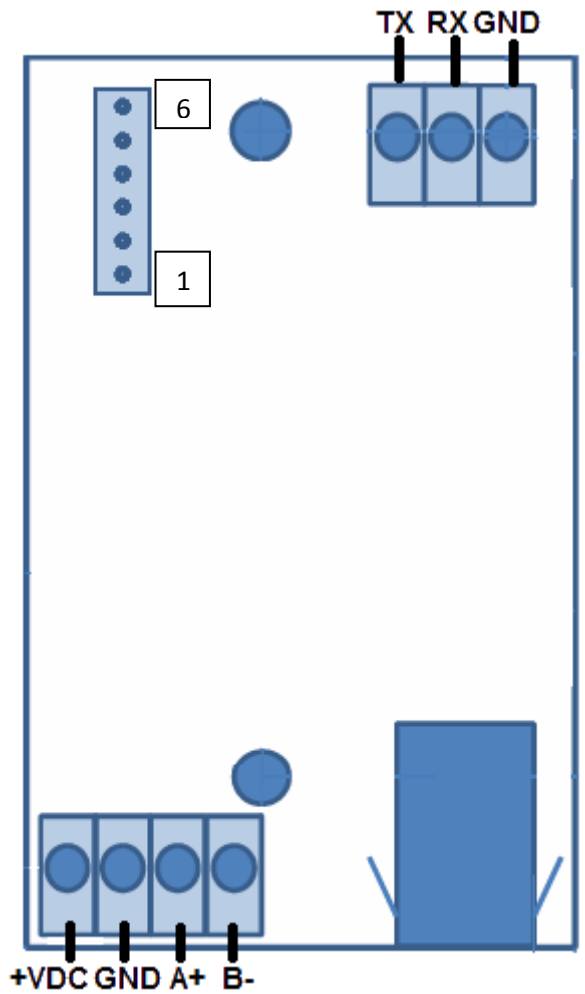
ATTENTION! The ETH AMP cable are not compatible with ETHD AMP cable.
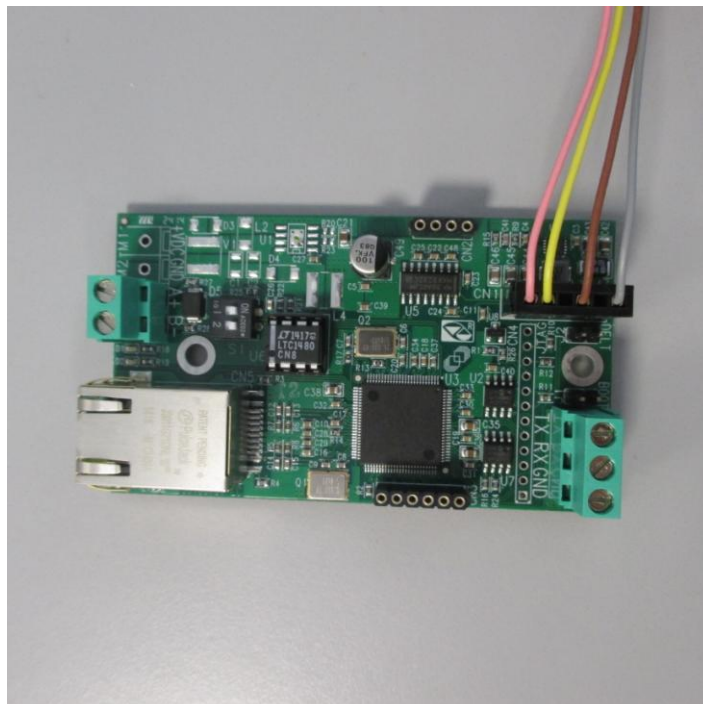
8.2   ETH1S Connections

POWER SUPPLY

+Vdc	+ 12Vdc÷24Vdc
GND	GND

RS485 (RJ45)

1	Not used
2	Not used
3	Not used
4	A(+)
5	B(-)
6	Not used
8	Not used
9	Not used
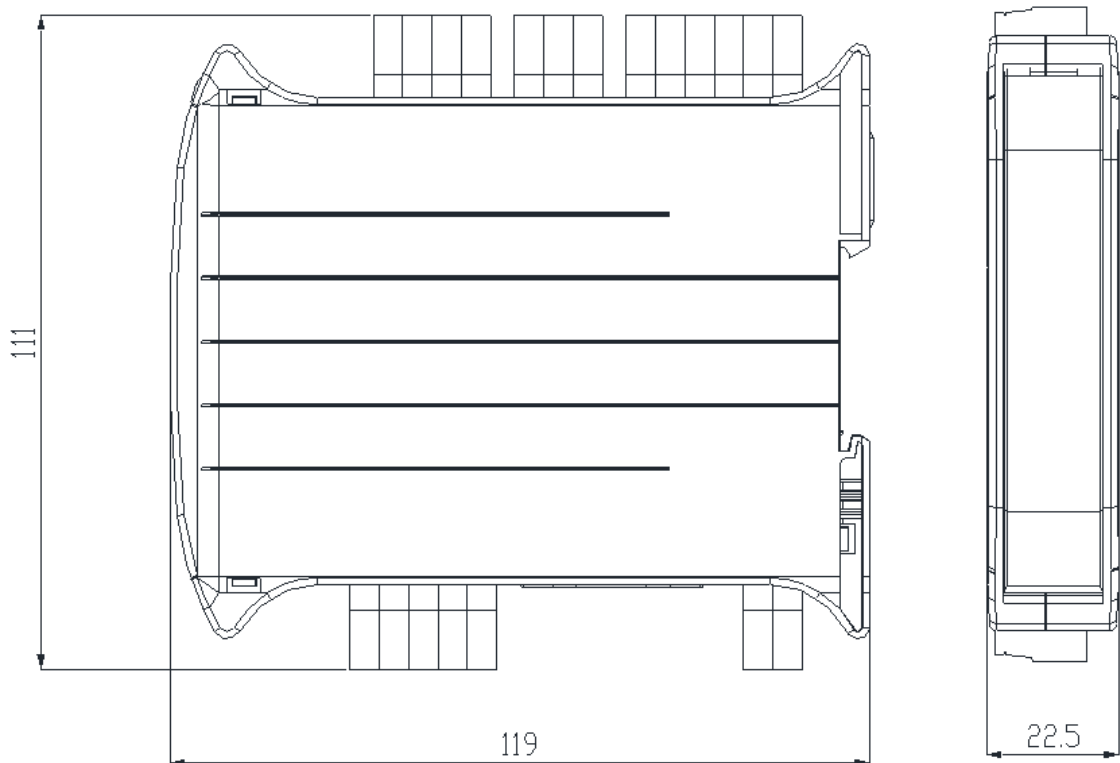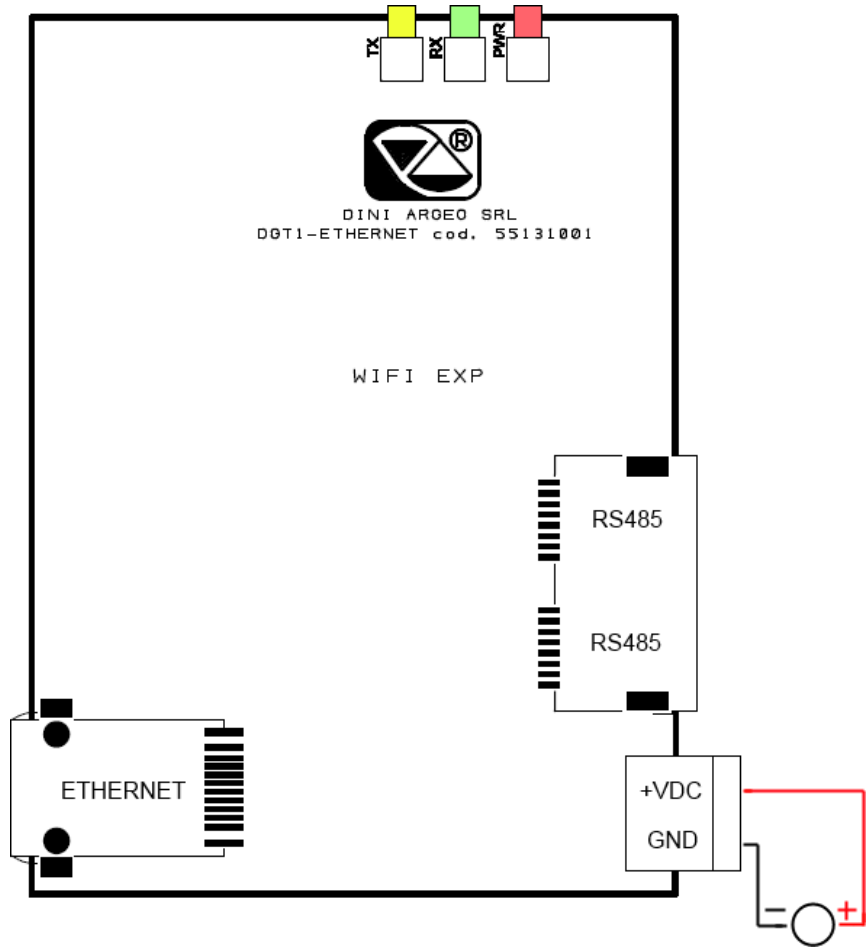
8.2.1 RS485 connection

Below is the RS485 connection of the module

TERMINAL		
(A+)	TX+/RX+	Signal +
(B-)	TX-/RX-	Signal -

On the same RS485 line it's possible to connect up to 32 devices.
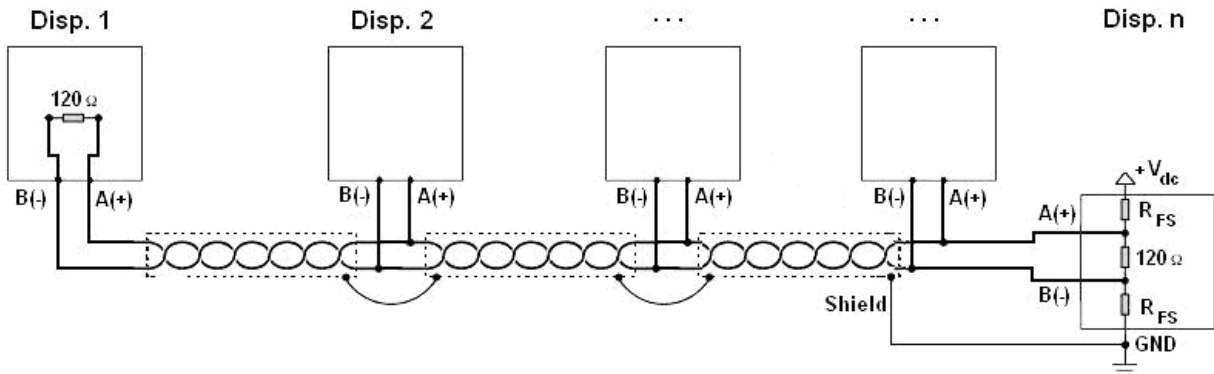

Figure 1. Electrical diagram of RS485 connection

- Use a STP (Shielded Twisted Pair) cable in order to make the connection (twisted and shielded pair/s with single shielding for each pair through aluminum band and total shielding through external sheathing).
- The maximum reachable length from the line with the use of the appropriate cable for RS 485 connections, the twisted 2x24 AWG duplex cable, shielded with external sheathing + aluminium band, is of about 1200 meters.
- With very long cables, the cable capacity (normally near 50pF/m) starts being a dominant factor in the power consumption and increases with the increase of speed.
- This implies that the maximum distance cannot be covered with the maximum possible speed. For an approximate value, one can consult the following table:

Baud rate	Total capacity of the cable (pF)
1200	400000
2400	200000
4800	100000
9600	50000
19200	25000
38400	12000
57600	8000
115200	4000

As a general rule, if one has any doubts, it is always preferable to choose the cable with a greater section.

- Verify that the grounding satisfies the requirements of section 1.2. Especially, all the digital masses, as well as the analogue masses, and the power circuits, must be connected to the grounding bar and this last one must be connected to the grounding pole.
- The shielding can be connected into a single point of the entire network (as shown in Figure 1) or both its ends, however it's important that all the masses have the same potential, in order to avoid the forming of current rings.
- On the RS485 network normally one connects 2 termination resistances equal to the characteristic impedance of the cable (typically 120 Ω, see Figure 1), ONLY on the 2 devices which are at the 2 ends of the ring connection (for example indicator and last device). The terminal resistance is not supplied with the ports of the indicator.
- The difference of potential between the A(+) and B(-) terminals in rest conditions (for example with instrument in set-up phase), must be of at least 0,2 V.
- To create a resistive divider which maintains this difference of potential also when all the transmitters are disabled, inert in the RS485 port of the indicator where there are the termination resistances, the polarisation or fail-safe resistances (R_{FS} in Figure 1). The value of these resistances is between 390 Ω and 2,2 kΩ.

  NOTE: in particular, the value of each of these resistances must be greater than the value calculable through the formula:

  $$R_{FS} = \frac{R_{eq}}{2} \times \left(\frac{V_{dc}}{0,2} - 1 \right)$$

  in which:
  V_{dc} is the power supply voltage of the line
  R_{eq} is the overall resistance to the A(+) a B(-) heads, supplied by the parallel of the 2 termination resistances and all the input resistances of the devices connected to the bus.

  FOR EXAMPLE:
  Presuming that a connection has 120 Ω as termination resistance and 32 connected devices, each having an input impedance of 12 kΩ. The V_{dc} power supply is 5 V.
  One calculates R_{eq}, equal to about 52 Ω, and R_{FS} which must be at least equal to 624 Ω.
- The connection between the indicator and the digital load cells is made with RS485 protocol in the COM3 configured as Auxiliary port. The indicator can be connected with up to 16 digital load cells.
- It's possible to connect the indicator to digital load cells with 485 4-wire protocol through 422/232 converter. In this case one is required to connect the double TX of RS422 cable to TX+ and TX- converter's pins and the double RX of RS422 cable to RX+ and RX- converter's pins

- In case of connection with non Dini Argeo devices, there may be different ways of line marking: generally one presumes that the A/B indication corresponds to the +/- and HI/LO markings, but this is not always true. Therefore, if the device does not function, one should try inverting the connections even if everything seems to be correct.
- For the correct functioning of the digital load cells, one should, in any case respect all the rules given in the relative specific manuals.

8.2.2 PC connection

MODULE	9 pin Collector	Color
TX	2	Pink
RX	3	Yellow
GND	5	Grey

9 Reset Of The Module

To reset the module and return at initial settings is necessary do the following operations:

- switch off the indicator;

- open the indicator so as to be able to close the jumper DFLF;

- close the jumper DFLT;

- switch on the indicator;

- now the 2 LEDs on the module (red and green) blink repeatedly;

- to complete the reset open the jumper and restart the instrument.