



# ED-582 Ethernet to 4 x RTD Configuring the RTD Inputs

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Technical Director

The ED-582 is a compact format 4x RTD input to Ethernet temperature sensing device that fits on a DIN rail

There are 6 colour removable terminal blocks each with 5 screw terminals on a 3mm pitch.



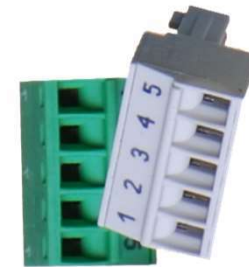
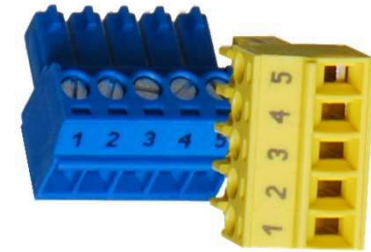
Removable Screw Terminal Blocks

Every Pin is numbered

Each 5 Pin Set of Terminal is colour coded to prevent wiring errors.

## Wiring Made Easy

Why Make Wiring Hard?



The Black terminal is the power input terminal and like the other terminal blocks is removable and numbered.

The Power Input is +5VDC to +30VDC, there is on board regulation.

Two separate sets of power supply input terminals are provided, one to +VA and -V and the other to +VB and -V. This provides redundancy; the second power supply automatically takes over in the event of a failure of the first one.

If only one power supply is connected then the negative must be connected to one of the -V pairs. The positive can be connected to either the +VA or +VB pins. Power LED will light green when correctly connected.

Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
-V	+VA	+VB	-V	Func Earth



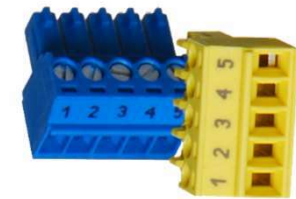
The Four RTD inputs are completely equivalent to each other, each of them may take any mix of 2 wire, 3 wire or 4 wire RTDs.


The Yellow Terminal Block is RTD0

The Orange Terminal Block is RTD1

The Green Terminal Block is RTD2

The Blue Terminal Block is RTD3

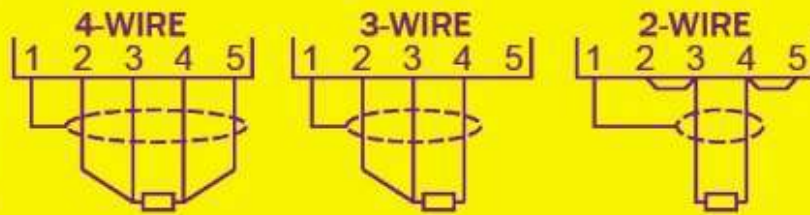


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**ED-582 Industrial Ethernet to RTD In**

Yellow	RTD Input 0
Orange	RTD Input 1
Green	RTD Input 2
Blue	RTD Input 3

**4-WIRE** **3-WIRE** **2-WIRE**



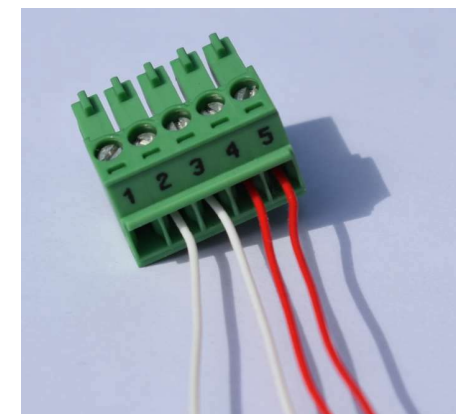

A typical 4 Wire RTD has 2 White and 2 Red wires.

Wire the two White wires one in Terminal Pin 2 and the other into Terminal Pin 3.

Wire the two Red wires into Terminal Pin 4 and Terminal Pin 5.

Some RTDs also have an earth sheath wire, if this is the case wire it into Pin 1.

This is a ceramic 4 wire Pt-100 385.

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**ED-582 Industrial Ethernet to RTD In**

Yellow	RTD Input 0
Orange	RTD Input 1
Green	RTD Input 2
Blue	RTD Input 3

**4-WIRE**

**3-WIRE**

**2-WIRE**

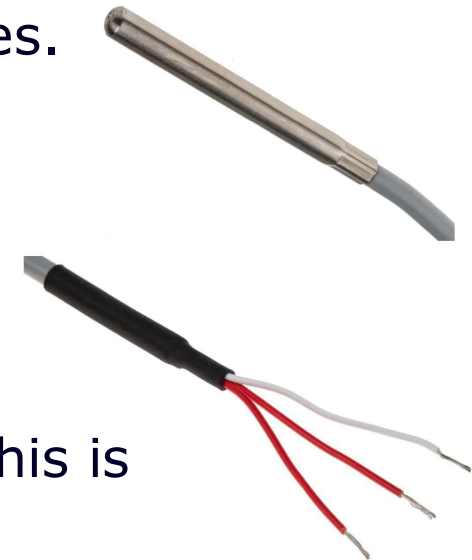
Many 3 Wire RTDs have 1 White and 2 Red wires.


Wire the two Red wires into Terminal Pin 2 and Terminal Pin 3

Wire the single White wire into Terminal Pin 4.

Some RTDs also have an earth sheath wire, if this is the case wire it into Pin 1.

This is a high temperature stainless steel probe 3 wire Pt-100-385.

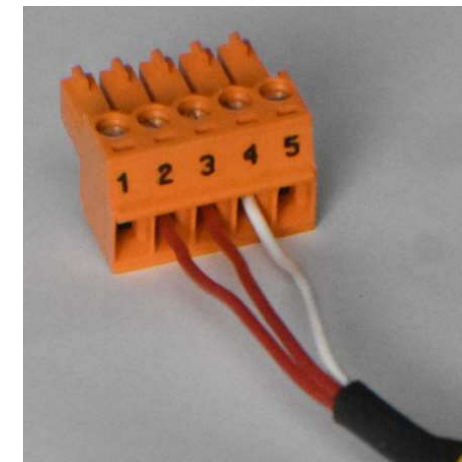
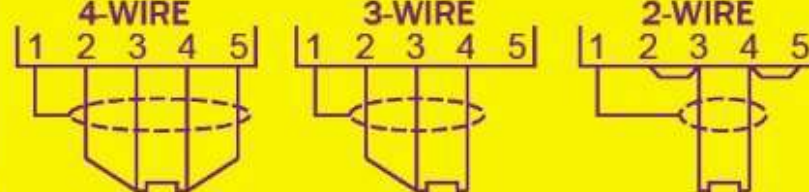


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**ED-582 Industrial Ethernet to RTD In**

Yellow	RTD Input 0
Orange	RTD Input 1
Green	RTD Input 2
Blue	RTD Input 3

4-WIRE 3-WIRE 2-WIRE



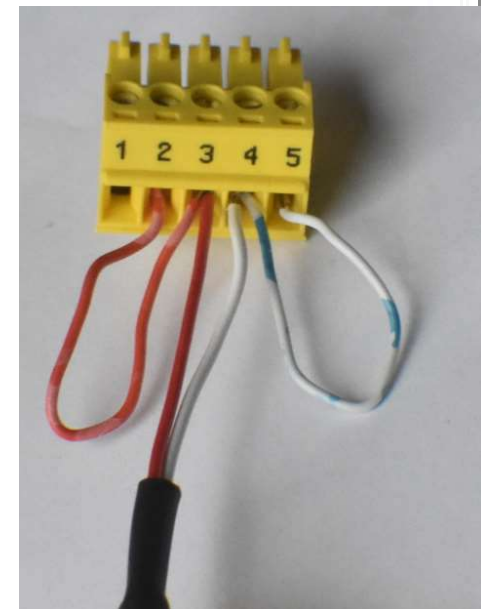

Many 2 Wire RTDs have 1 White and 1 Red wire.

Wire the Red wire into Terminal Pin 3 with a shorting link into Terminal Pin 2

Wire the White wire into Terminal Pin 4 with a shorting link to Terminal Pin 5

Some RTDs also have an earth sheath wire, if this is the case wire it into Pin 1.

This is a stainless steel probe 2 wire Pt-1000-385

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**ED-582 Industrial Ethernet to RTD In**

Yellow	RTD Input 0
Orange	RTD Input 1
Green	RTD Input 2
Blue	RTD Input 3

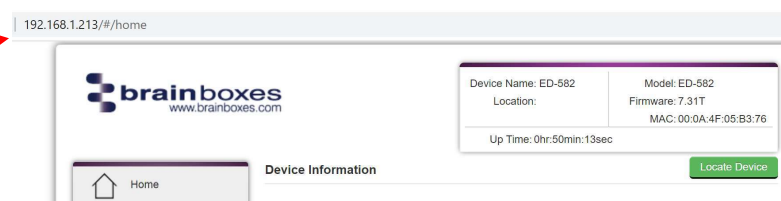
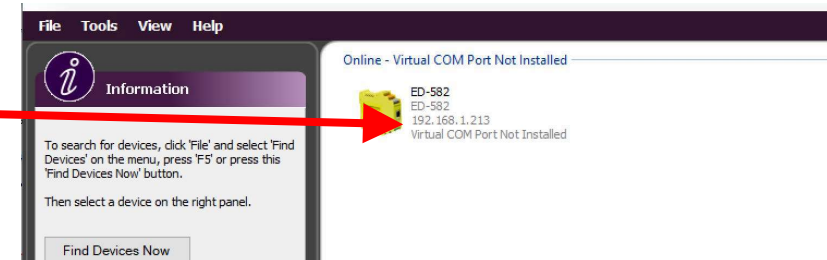
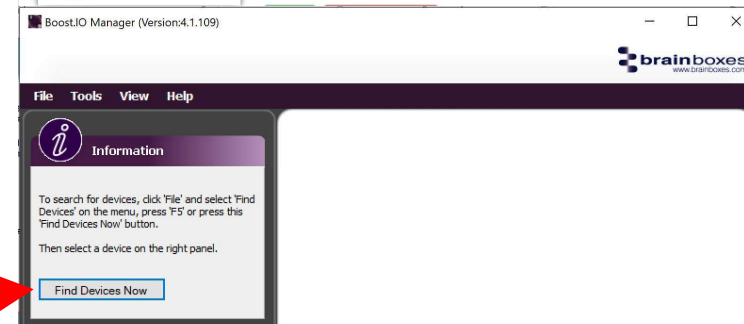
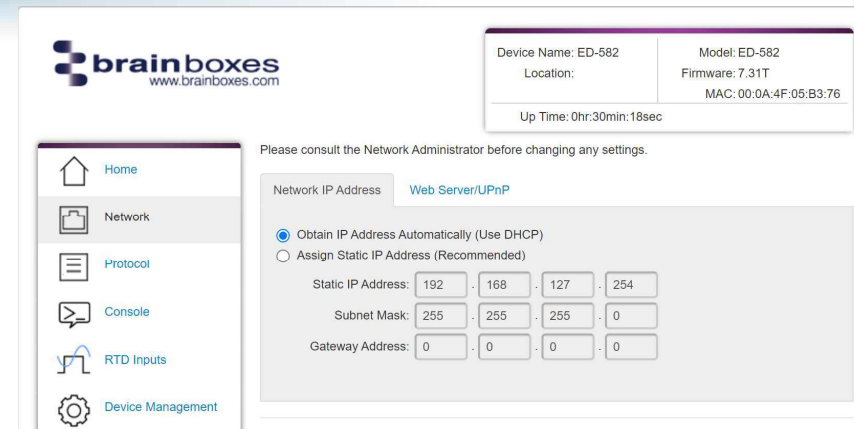
**4-WIRE**

**3-WIRE**

**2-WIRE**



- The web page is the recommended method of configuring the ED-582
- The ED-582 is set to obtain an IP address from a DHCP server on its Ethernet network,
- If it fails to get this DHCP server IP address within 60 seconds it will fallback to 192.168.127.254
- Determine the ED-582 IP address by launching Boost.IO
- Here the ED-582's IP address is 192.168.1.213
- Access the web pages via your preferred web browser using the ED-582's IP address



By Default

All 4 RTDs are Enabled

Each is set as a Pt100-385 connected in 4 wire mode.

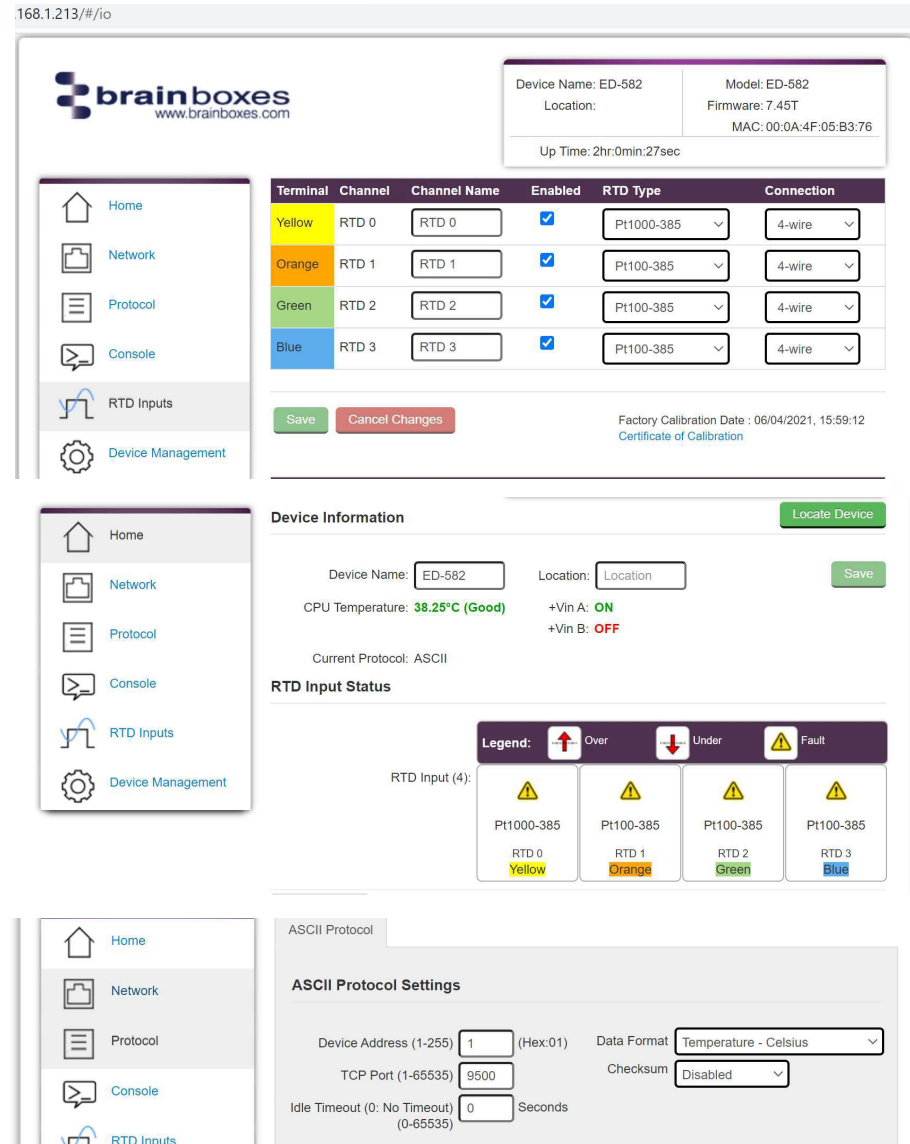
This is shown on the RTD Inputs web page.

When no RTDs are actually connected the Over value symbol is shown on the Home web page.

The Data Format may be displayed as Temperature or as the RTD Resistance in Ohms  $\Omega$

Temperature may be one of  $^{\circ}\text{C}$ ,  $^{\circ}\text{F}$ , K.  
The default Data Format is Celsius  $^{\circ}\text{C}$   
This is shown on the Protocol page

168.1.213/#/io



The screenshot displays the web interface for the ED-582 device. It includes a navigation menu on the left with options: Home, Network, Protocol, Console, RTD Inputs, and Device Management. The main content area is divided into several sections:

- RTD Inputs:** A table showing the configuration for four RTD channels. All are enabled and set to Pt100-385 in 4-wire mode.
- Device Information:** Shows device name (ED-582), location, CPU temperature (38.25°C), and current protocol (ASCII).
- RTD Input Status:** A visual status bar for the four RTD inputs, showing 'Over' (yellow) for RTD 0, 'Under' (orange) for RTD 1, 'Good' (green) for RTD 2, and 'Good' (blue) for RTD 3.
- ASCII Protocol Settings:** Shows settings for the ASCII protocol, including device address (1), TCP port (9500), data format (Temperature - Celsius), and checksum (Disabled).

Terminal	Channel	Channel Name	Enabled	RTD Type	Connection
Yellow	RTD 0	RTD 0	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Orange	RTD 1	RTD 1	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Green	RTD 2	RTD 2	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Blue	RTD 3	RTD 3	<input checked="" type="checkbox"/>	Pt100-385	4-wire

Device Name: ED-582 | Model: ED-582  
Location: | Firmware: 7.45T  
MAC: 00:0A:4F:05:B3:76  
Up Time: 2hr:0min:27sec

Factory Calibration Date : 06/04/2021, 15:59:12  
Certificate of Calibration

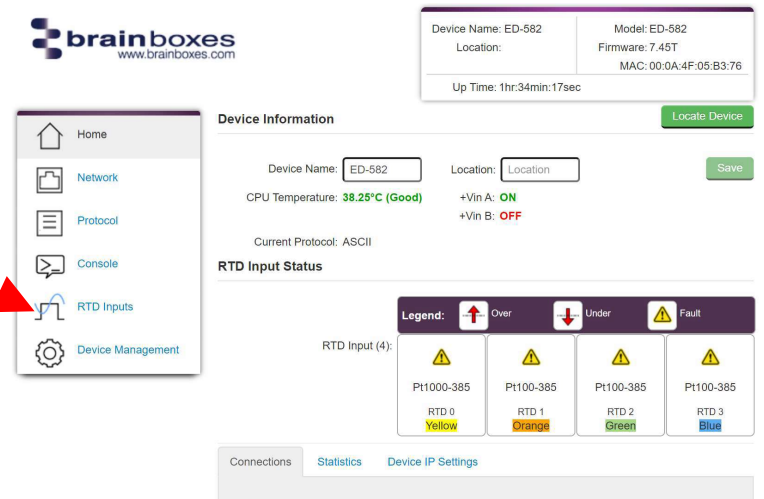
Device Information: CPU Temperature: 38.25°C (Good) | +Vin A: ON | +Vin B: OFF

RTD Input Status Legend: Over (Yellow), Under (Orange), Fault (Yellow triangle), Good (Green/Blue)

ASCII Protocol Settings: Device Address: 1 (Hex:01) | Data Format: Temperature - Celsius | TCP Port: 9500 | Checksum: Disabled | Idle Timeout: 0 Seconds

# Configuring the ED-582: RTD Options

- From the Home page Select RTD Inputs
- For each channel with an RTD Connected Ensure that Channel is Enabled
- Optionally Enter a Name or location for the RTD in the Channel Name Text Field. This Field will act as a reminder of where the RTD is placed e.g. Exhaust Flue or the device that it is having its temperature measured e.g. Freezer-1



Device Name: ED-582    Model: ED-582  
Location:    Firmware: 7.45T  
Up Time: 1hr:34min:17sec    MAC: 00:0A:4F:05:B3:76

Device Information    [Locate Device](#)

Device Name: ED-582    Location: Location    [Save](#)

CPU Temperature: 38.25°C (Good)    +Vin A: ON  
+Vin B: OFF

Current Protocol: ASCII

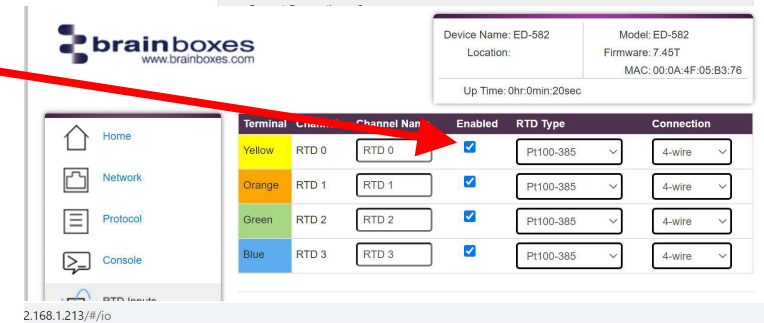
RTD Input Status

Legend: Over Under Fault

RTD Input (4):

Pt1000-385 RTD 0 Yellow	Pt100-385 RTD 1 Orange	Pt100-385 RTD 2 Green	Pt100-385 RTD 3 Blue
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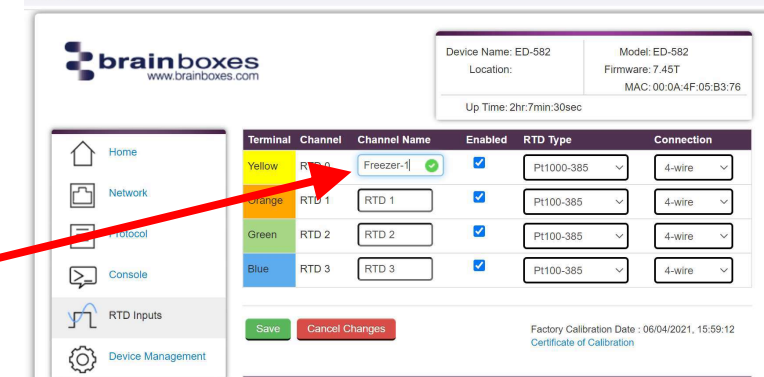
Connections    [Statistics](#)    [Device IP Settings](#)



Device Name: ED-582    Model: ED-582  
Location:    Firmware: 7.45T  
Up Time: 0hr:0min:20sec    MAC: 00:0A:4F:05:B3:76

Terminal	Channel	Channel Name	Enabled	RTD Type	Connection
Yellow	RTD 0	RTD 0	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Orange	RTD 1	RTD 1	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Green	RTD 2	RTD 2	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Blue	RTD 3	RTD 3	<input checked="" type="checkbox"/>	Pt100-385	4-wire

2.168.1.213/#/io



Device Name: ED-582    Model: ED-582  
Location:    Firmware: 7.45T  
Up Time: 2hr:7min:30sec    MAC: 00:0A:4F:05:B3:76

Terminal	Channel	Channel Name	Enabled	RTD Type	Connection
Yellow	RTD 0	Freezer-1	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Orange	RTD 1	RTD 1	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Green	RTD 2	RTD 2	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Blue	RTD 3	RTD 3	<input checked="" type="checkbox"/>	Pt100-385	4-wire

[Save](#)    [Cancel Changes](#)

Factory Calibration Date : 06/04/2021, 15:59:12  
Certificate of Calibration

# Configuring the ED-582:RTD Options

Select the RTD type from the drop down Menu

In this case it is a Pt1000-385

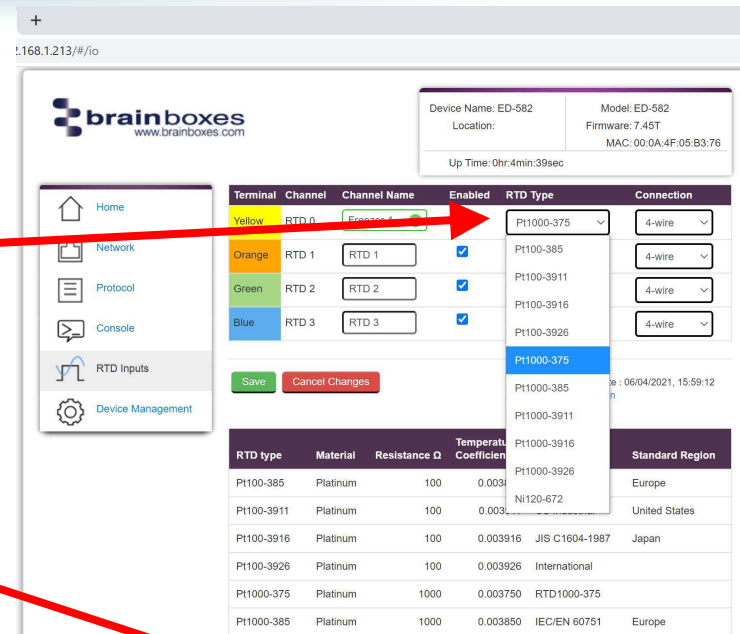
Select the Number of Connection Wires that the RTD has.

In this case it is a 2 wire connection

Connect the RTD to the ED-582 by wiring it into the coloured terminal block.

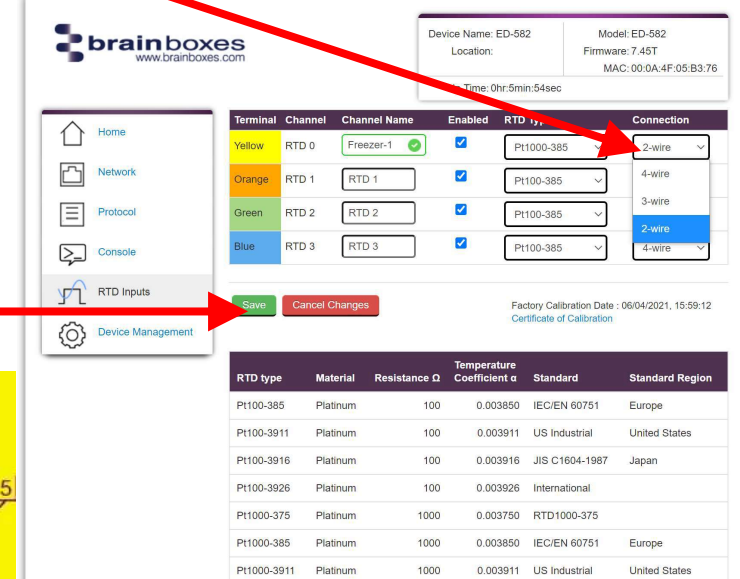
Remember 2 wire RTDs require shorting jumpers across pins 2-3 and pins 4-5.

Remember to Save your Changes



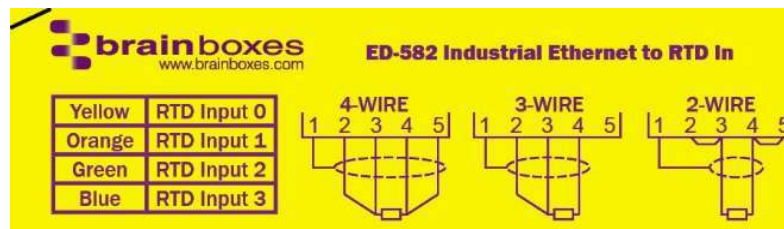
Terminal	Channel	Channel Name	Enabled	RTD Type	Connection
Yellow	RTD 0	Freezer-1	<input checked="" type="checkbox"/>	Pt1000-375	4-wire
Orange	RTD 1	RTD 1	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Green	RTD 2	RTD 2	<input checked="" type="checkbox"/>	Pt100-3911	4-wire
Blue	RTD 3	RTD 3	<input checked="" type="checkbox"/>	Pt100-3916	4-wire

RTD type	Material	Resistance $\Omega$	Temperature Coefficient	Standard	Standard Region
Pt100-385	Platinum	100	0.0031		Europe
Pt100-3911	Platinum	100	0.0031		United States
Pt100-3916	Platinum	100	0.003916	JIS C1604-1987	Japan
Pt100-3926	Platinum	100	0.003926	International	
Pt1000-375	Platinum	1000	0.003750	RTD1000-375	
Pt1000-385	Platinum	1000	0.003850	IEC/EN 60751	Europe



Terminal	Channel	Channel Name	Enabled	RTD Type	Connection
Yellow	RTD 0	Freezer-1	<input checked="" type="checkbox"/>	Pt1000-385	2-wire
Orange	RTD 1	RTD 1	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Green	RTD 2	RTD 2	<input checked="" type="checkbox"/>	Pt100-385	3-wire
Blue	RTD 3	RTD 3	<input checked="" type="checkbox"/>	Pt100-385	4-wire

RTD type	Material	Resistance $\Omega$	Temperature Coefficient $\alpha$	Standard	Standard Region
Pt100-385	Platinum	100	0.003850	IEC/EN 60751	Europe
Pt100-3911	Platinum	100	0.003911	US Industrial	United States
Pt100-3916	Platinum	100	0.003916	JIS C1604-1987	Japan
Pt100-3926	Platinum	100	0.003926	International	
Pt1000-375	Platinum	1000	0.003750	RTD1000-375	
Pt1000-385	Platinum	1000	0.003850	IEC/EN 60751	Europe
Pt1000-3911	Platinum	1000	0.003911	US Industrial	United States









# Viewing The Temperature in °F

- When the Data Format is set to Temperature - Fahrenheit on the Protocol web page
- Then the Home page displays measurement from each Enabled RTD as a Temperature in °F
- The RTD readings can be accessed programmatically using the #01 Ascii command via a TCP socket connection, via a Virtual COM port connection or directly typing the #01 command in the window on the Console web page

The screenshot displays the Brainboxes web interface for device management. It is divided into three main sections:

- Protocol Settings:** Shows 'ASCII Protocol Settings' with fields for Device Address (1-255) set to 1, TCP Port (1-65535) set to 9500, and Idle Timeout (0-65535) set to 0. The 'Data Format' dropdown is set to 'Temperature - Fahrenheit', and 'Checksum' is 'Disabled'.
- Device Information:** Shows 'Device Name: ED-582', 'Location: Location', and 'CPU Temperature: 38.35°C (Good)'. It also indicates '+Vin A: ON' and '+Vin B: OFF'. The 'Current Protocol' is 'ASCII'.
- RTD Input Status:** Displays 'RTD Input (4):' with a legend for 'Over' (red up arrow), 'Under' (red down arrow), and 'Fault' (yellow triangle). Three RTD inputs are shown:
  - Pt1000-385 Freezer-1 RTD 0: -003.86 F (Yellow)
  - Pt1000-385 Hot Water RTD 1: +118.11 F (Orange)
  - Pt1000-385 Ambient RTD 2: +065.14 F (Green)

At the bottom, the 'Terminal Console' shows the ASCII Command Console with the following output:

```
ASCII Command Console
> #01
>-019.63+084.61+018.15
> #01
>-003.83+117.45+065.10
>
```



- When the Data Format is set to Temperature - Kelvin on the Protocol web page
- Then the Home page displays measurement from each Enabled RTD as a Temperature in K
- The RTD readings can be accessed programmatically using the #01 Ascii command via a TCP socket connection, via a Virtual COM port connection or directly typing the #01 command in the window on the Console web page

The screenshot displays the Brainboxes web interface for device ED-582. The top navigation bar includes Home, Network, Protocol, Console, RTD Inputs, and Device Management. The main content area is divided into several sections:

- Protocol Settings:** Shows ASCII Protocol Settings with fields for Device Address (1-255), TCP Port (1-65535), Idle Timeout (0-65535) Seconds, Data Format (set to Temperature - Kelvin), and Checksum (Disabled).
- Device Information:** Displays Device Name (ED-582), Location, CPU Temperature (39.13°C Good), and Vin status (ON/OFF).
- RTD Input Status:** Shows RTD Input (4) with a legend for Over, Under, and Fault. Three RTD inputs are listed: Pt1000-385 Freezer-1 RTD 0 (Yellow), Pt100-385 Hot Water RTD 1 (Orange), and Pt100-385 Ambient RTD 2 (Green).
- Terminal Console:** A terminal window showing the ASCII Command Console with the #01 command entered, resulting in RTD temperature readings in Kelvin: +253.32+919.18+291.58.

Red arrows indicate the flow of information: from the Protocol Settings page to the Home page, and from the RTD Input Status page to the Terminal Console page.



168.1.213/#/home



Device Name: ED-582	Model: ED-582
Location:	Firmware: 7.45T
MAC: 00:0A:4F:05:B3:76	
Up Time: 0hr:1min:34sec	

Locate Device

### Device Information

Device Name:  Location:

Save

CPU Temperature: **39.4°C (Good)** +Vin A: **ON**  
+Vin B: **OFF**







Current Protocol: ASCII

### RTD Input Status

Legend:  Over  Under  Fault

RTD Input (4):

<b>-019.64°C</b>	<b>+043.37°C</b>	<b>+018.34°C</b>
Pt1000-385 Freezer-1 RTD 0	Pt100-385 Hot Water RTD 1	Pt100-385 Ambient RTD 2
<b>Yellow</b>	<b>Orange</b>	<b>Green</b>

-  Home
-  Network
-  Protocol
-  Console
-  RTD Inputs
-  Device Management

Connections [Statistics](#) [Device IP Settings](#)

Current Connections: 0

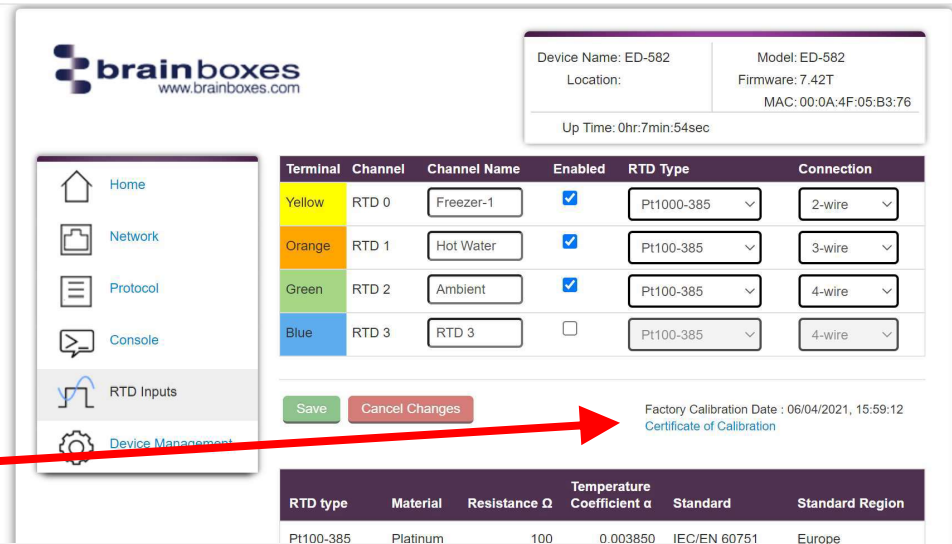
Connected Devices:

IP Address	Protocol	Duration

# Viewing The Calibration Certificate

Every ED-582 has been calibrated before it leaves our factory to ensure that readings are as accurate as possible.

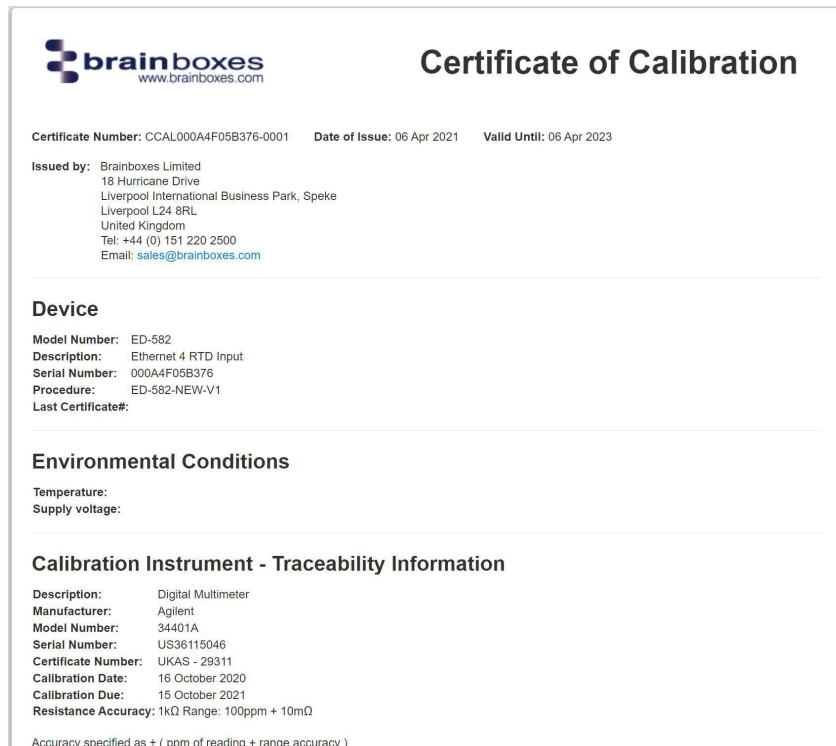
View the calibration certificate from the RTD input web page by clicking on 'Certificate of Calibration'



The screenshot shows the Brainboxes web interface. On the left is a navigation menu with 'RTD Inputs' selected. The main area displays a table of RTD inputs:

Terminal	Channel	Channel Name	Enabled	RTD Type	Connection
Yellow	RTD 0	Freezer-1	<input checked="" type="checkbox"/>	Pt1000-385	2-wire
Orange	RTD 1	Hot Water	<input checked="" type="checkbox"/>	Pt100-385	3-wire
Green	RTD 2	Ambient	<input checked="" type="checkbox"/>	Pt100-385	4-wire
Blue	RTD 3	RTD 3	<input type="checkbox"/>	Pt100-385	4-wire

Below the table are 'Save' and 'Cancel Changes' buttons. A red arrow points from the 'Certificate of Calibration' link in the text to the 'Certificate of Calibration' link in the interface. The link text is: 'Factory Calibration Date : 06/04/2021, 15:59:12 Certificate of Calibration'.



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## Certificate of Calibration

Certificate Number: CCAL000A4F05B376-0001    Date of Issue: 06 Apr 2021    Valid Until: 06 Apr 2023

**Issued by:** Brainboxes Limited  
18 Hurricane Drive  
Liverpool International Business Park, Speke  
Liverpool L24 8RL  
United Kingdom  
Tel: +44 (0) 151 220 2500  
Email: sales@brainboxes.com

**Device**

Model Number: ED-582  
Description: Ethernet 4 RTD Input  
Serial Number: 000A4F05B376  
Procedure: ED-582-NEW-V1  
Last Certificate#:

**Environmental Conditions**

Temperature:  
Supply voltage:

**Calibration Instrument - Traceability Information**

Description: Digital Multimeter  
Manufacturer: Agilent  
Model Number: 34401A  
Serial Number: US36115046  
Certificate Number: UKAS - 29311  
Calibration Date: 16 October 2020  
Calibration Due: 15 October 2021  
Resistance Accuracy: 1kΩ Range: 100ppm + 10mΩ

Accuracy specified as ± ( ppm of reading + range accuracy )

### Calibration Information

The device was calibrated against laboratory standards whose values are traceable to recognised National Standards. The reported uncertainty values are based on a standard uncertainty multiplied by a coverage factor of 2.0, providing a confidence of approximately 95%.

### Test Results - Resistance Calibration

PASS criterion: uncertainty < 0.0 Ω

DMM Reading (Ω)	DUT Reading (Ω)	Rsense (Ω)	Uncertainty (Ω)	Result
997.51	997.64	999.87	0.22	PASS

### Test Results - Resistance Linearity

PASS criterion: Uncertainty of DUT resistance is less than 0.1Ω for 4-wire mode and 0.5Ω for 3-wire mode.

#### 4-wire configuration mode:

RTD Type	DMM (Ω)	DUT (Ω)	Difference (Ω)	Uncertainty (Ω)	Result
Pt-100	314.896	314.91	-0.014	0.084	PASS
Pt-1000	3158.864	3159.1	-0.236	0.691	PASS
Ni-120	373.071	373.08	-0.009	0.095	PASS

#### 3-wire configuration mode:

RTD Type	DMM (Ω)	DUT (Ω)	Difference (Ω)	Uncertainty (Ω)	Result
Pt-100	314.896	314.754	0.143	0.165	PASS
Pt-1000	3158.864	3158.944	-0.08	0.657	PASS
Ni-120	373.071	372.924	0.147	0.175	PASS



RTD Fault are indicated on the Home page. Often it is easiest to determine the cause of a fault by viewing the Resistance Value that the ED-582 is measuring on the terminals. Select Data Format as RTD Resistance on the protocol page.

RTD Short. Here we can see that the ED-582 is reading a resistance of  $0.00\Omega$ . This means that there is a short circuit in the wires connected to the ED-582 terminal block

RTD Open Circuit: here we can see that the E-582 is reading a very high resistance over 1Mega  $\Omega$ . Probably the RTD is not connected or the cable has a break in it.

A resistance that is rapidly changing indicates the wrong RTD wire type has been selected.

Up time: 001.4min.42sec

Device Information Locate De

Device Name: ED-582 Location: Location

CPU Temperature: 38.29°C (Good) +Vin A: ON +Vin B: OFF

Current Protocol: ASCII

RTD Input Status

Legend: ↑ Over ↓ Under ⚠ Fault

RTD Input (4)

⚠	+042.45°C	+018.58°C
Pt1000-385 Freezer-1 RTD 0 Yellow	Pt100-385 Hot Water RTD 1 Orange	Pt100-385 Ambient RTD 2 Green

RTD Input (4):

↑ Over	↓ Under	⚠ Fault
+000.00Ω	+921.76Ω	+107.21Ω
Pt1000-385 Freezer-1 RTD 0 Yellow	Pt100-385 Hot Water RTD 1 Orange	Pt100-385 Ambient RTD 2 Green

RTD Input (4):

↑ Over	↓ Under	⚠ Fault
+1168184.2Ω	+114.33Ω	+107.21Ω
Pt1000-385 Freezer-1 RTD 0 Yellow	Pt100-385 Hot Water RTD 1 Orange	Pt100-385 Ambient RTD 2 Green