

Application for RTD-Box TR1200 (RS485)

7XV5662-6AD10

This document describes the measurement of 12 temperatures in a 7SJ62x via the RTD-Box TR1200 at an RS485-Bus.

The RTD-Box TR1200 has 12 sensor inputs and can in this way measure 12 temperatures via Pt 100-elements.

2 and 3 conductor Pt 100 are supported. In the case of 2 conductor operation, the measured line resistance can be compensated with an applicable setting.

All settings are done with 3 keys on the front cover. Input can be blocked with a code.

The measured value output to the protection device is done with the bus cable 7XV5103-7AAxx via a RS485-Bus.

Note: SIPROTEC 4 protection devices can process up to 12 measured values.

Up to now, 2 RTD-Boxes TR600 were required. The RTD-Box TR1200 can now replace up to 2 RTD-Boxes TR600 for temperature measurement.

Note: The TR1200 does not supply its own alarm messages or contacts.

The alarm levels must be set and displayed for each input in the protection device, and output via contacts or transferred to a central control system.

Note: This application guide is only meant as an additional user information, and assumes knowledge of the general information for operation of the products as well as their basic functions as described in the applicable manuals.

Measurement of up to 12 temperature measured values

From a RTD-Box TR1200 up to 12 temperature measured values can be input into and processed by a protection device via an "RS485-Bus". Larger distances should be covered with an FO converter and optical interface.

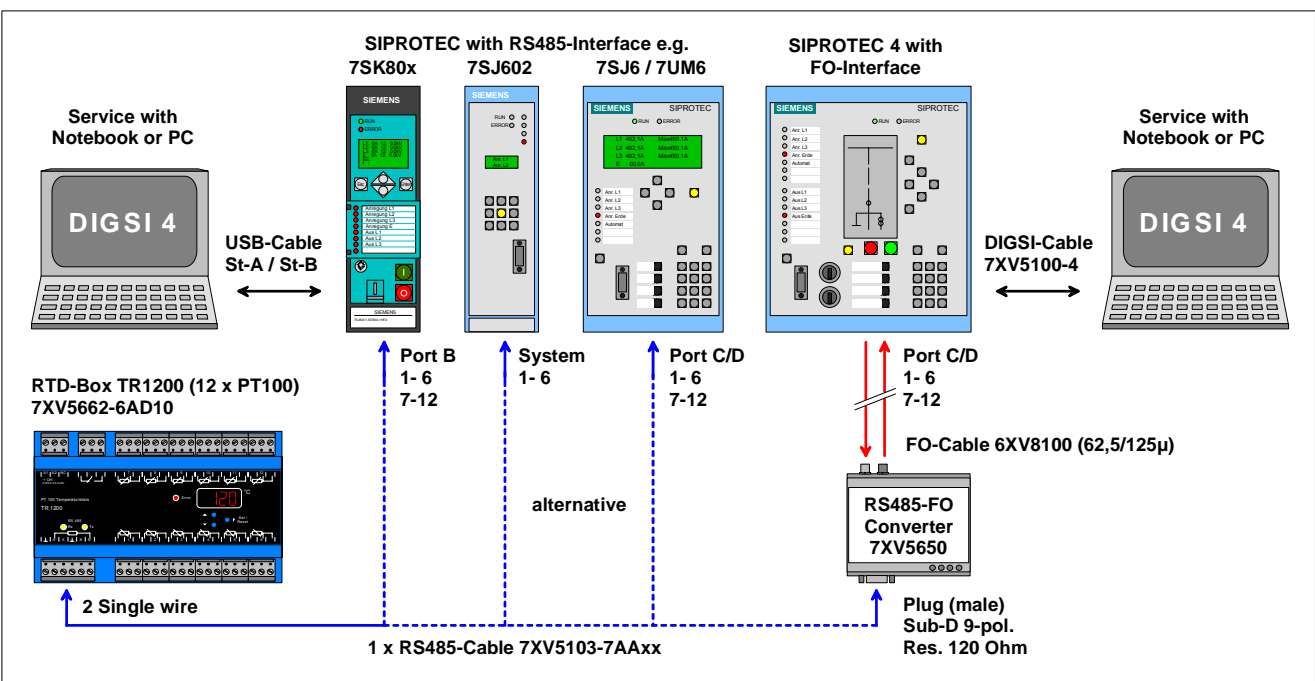
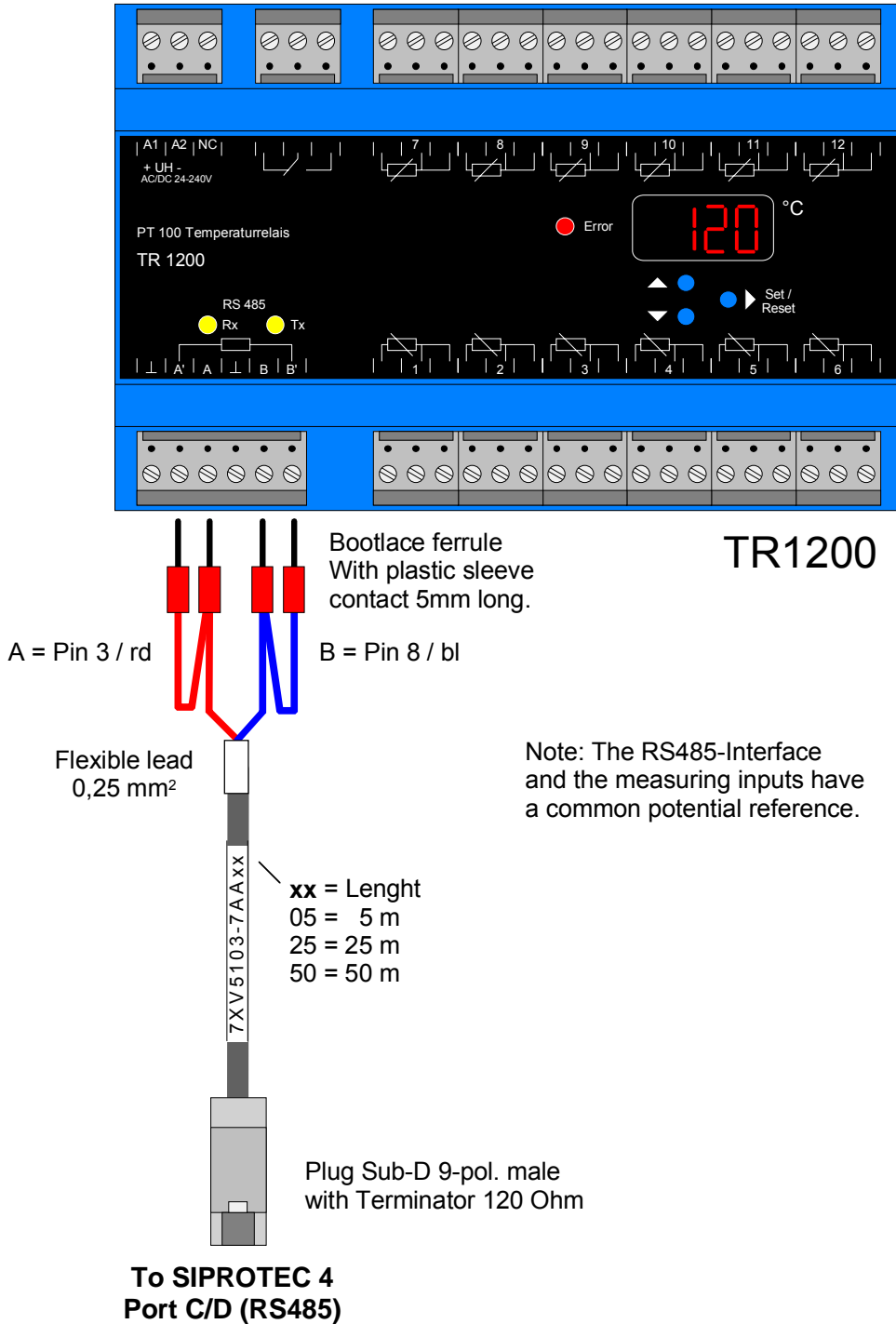


Figure 1: TR1200 with various protection devices and operation PC with DIGSI 4

Connection of the RTD-box 7XV5662-6AD10 with connection cable 7XV5103-7AAXx to Protection devices SIPROTEC 4 (RS485)



The two short cable ends (rd + bl) are connected to A (rd) and B (bl) of the RTD-box. By bridging of the terminals A - A' and B - B' the termination resistances are activated.

The two long cable ends (rd + bl) are connected to A' (rd) and B' (bl) to activated the bus termination.

Setting the devices

The protection device **7SK80** is set with DIGSI 4 on a Notebook via the USB front interface. A USB cable with plug type A to plug type B is used.

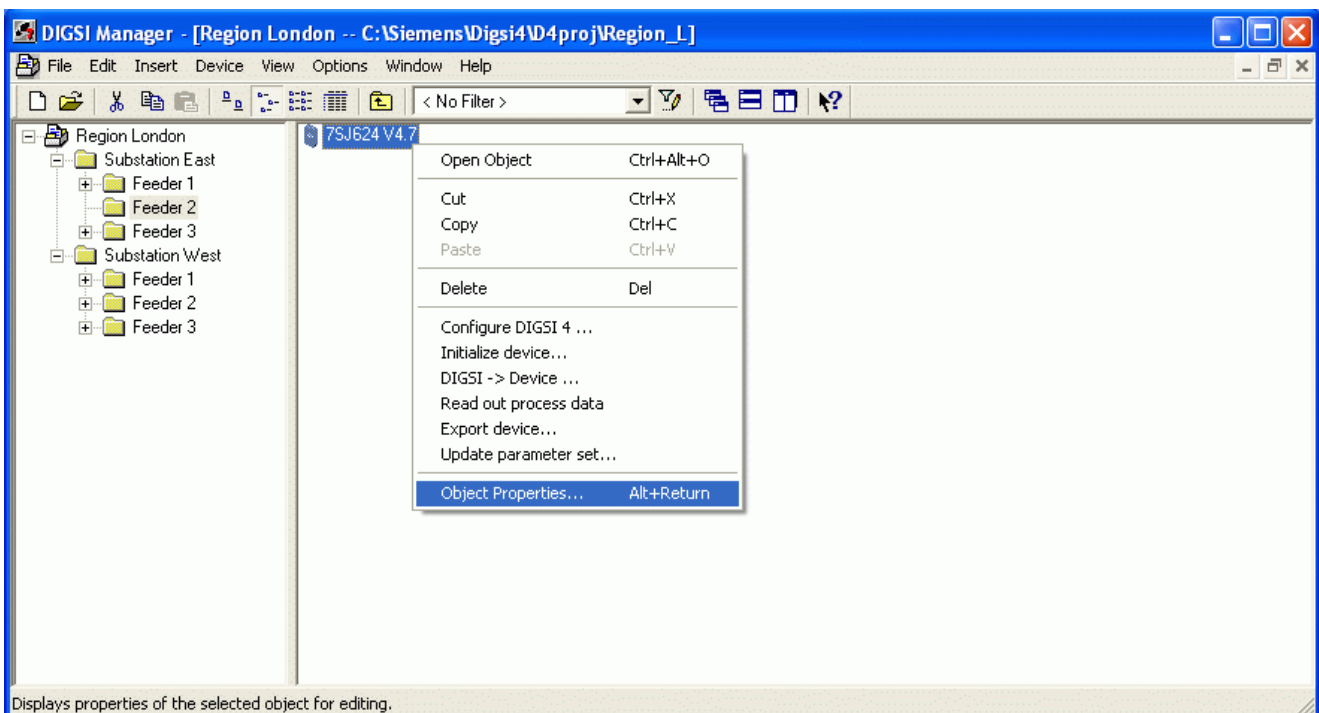
The **SIPROTEC 4 protection devices** (here e.g. 7SJ62) are set with the "DIGSI-cable" 7XV5100-4/BB via the serial front interface.

The **RTD-Box TR1200** is set with 3 keys. The navigation is done via the setting tree and the relevant settings are displayed in the display.

Setting the protection device 7SJ62 with DIGSI 4

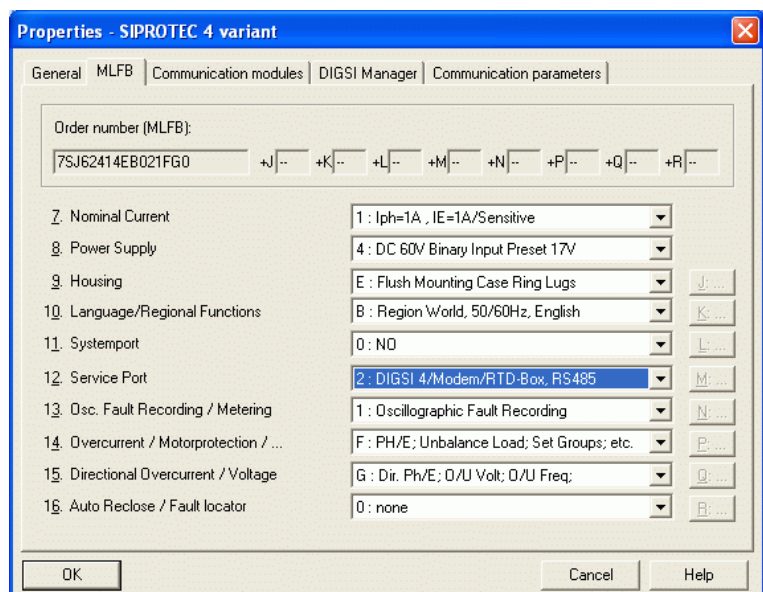
A notebook is connected with the "DIGSI-cable" 7XV5100-4/BB via the RS232-interface with the front interface of the protection device. The protection device is configured in DIGSI 4 with a corresponding MLFB and (if not yet done) initialised.

The RTD-Box is connected to the RS485 Service-interface „Port C“.



If the "Service Port" (Port C) has already been configured in the factory with "MLFB", this can be checked under "Properties", "MLFB"

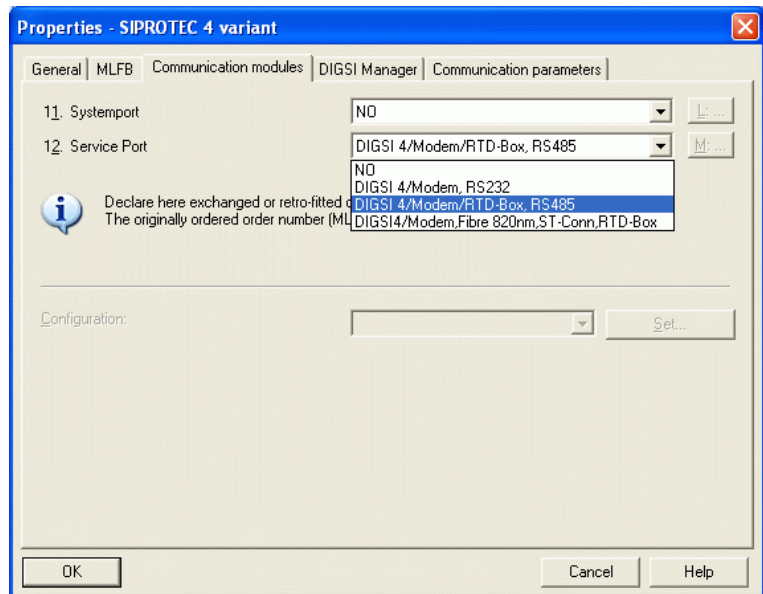
Save with "OK"



If the interface module was retro-fitted it must first be configured under **“Properties“**, **“Communication modules“**.

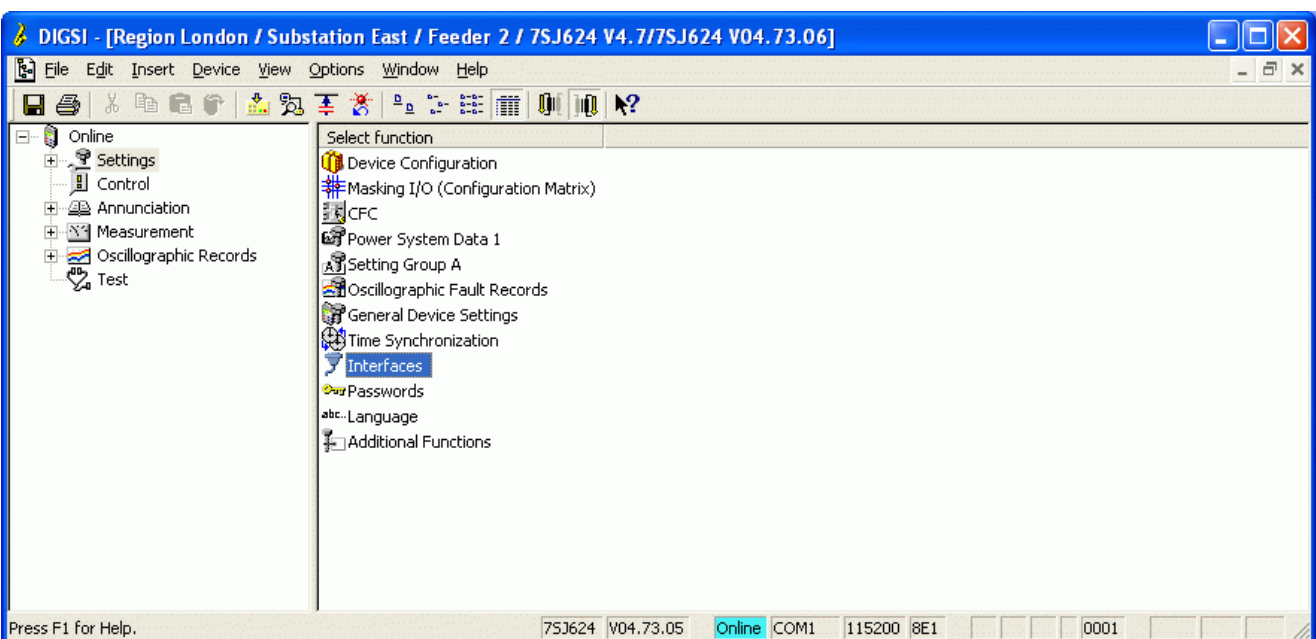
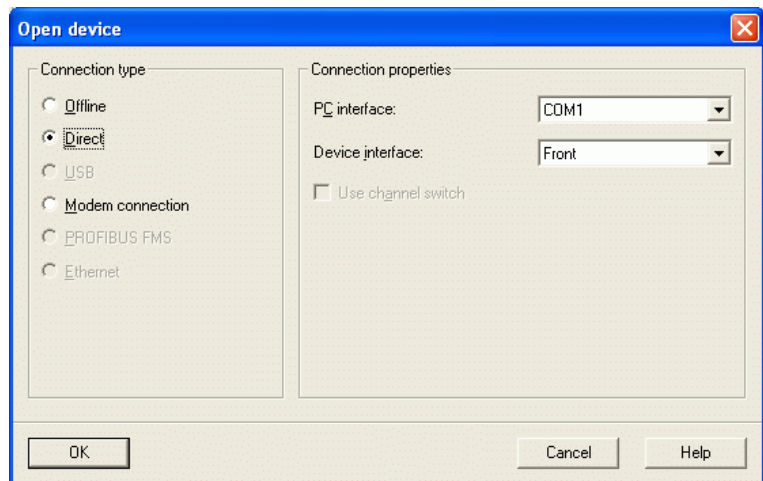
Thereafter again **„Initialize device...“**.

Save with **„OK“**



Open dialog with the protection device in DIGSI 4 using the connection type **“Direct“** via the **“PC-interface“** **“COM1“** and the **“Device interface“** **“Front“**.

Continue with **“OK“**



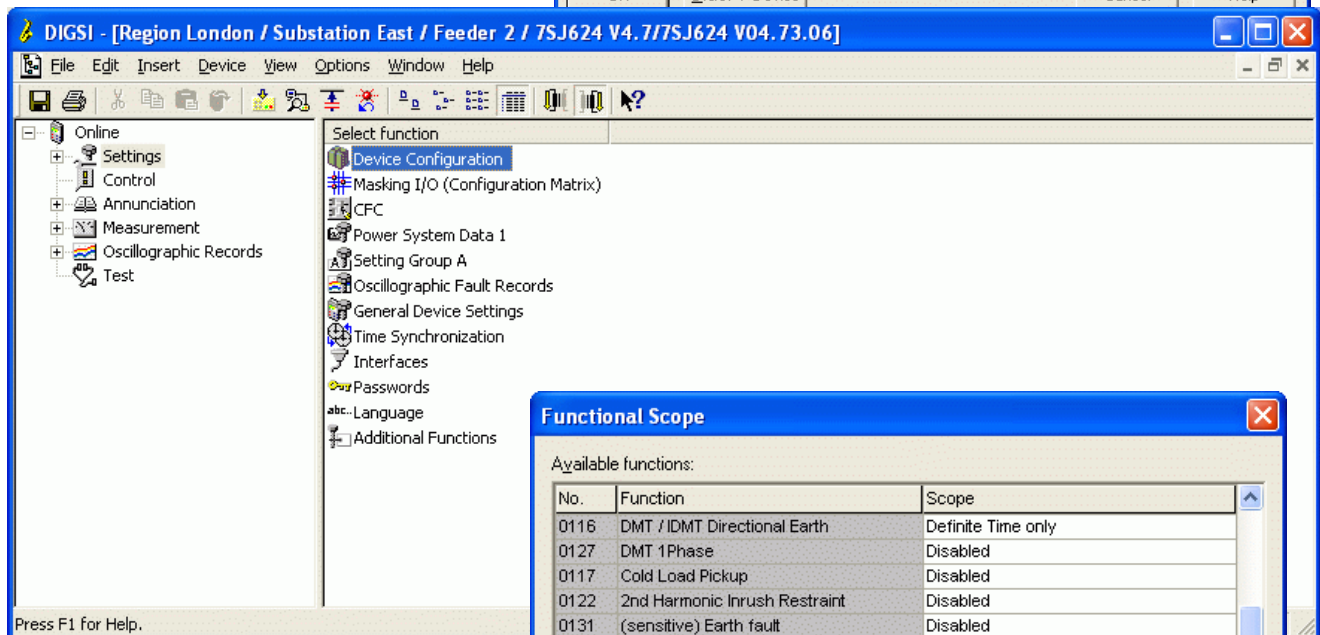
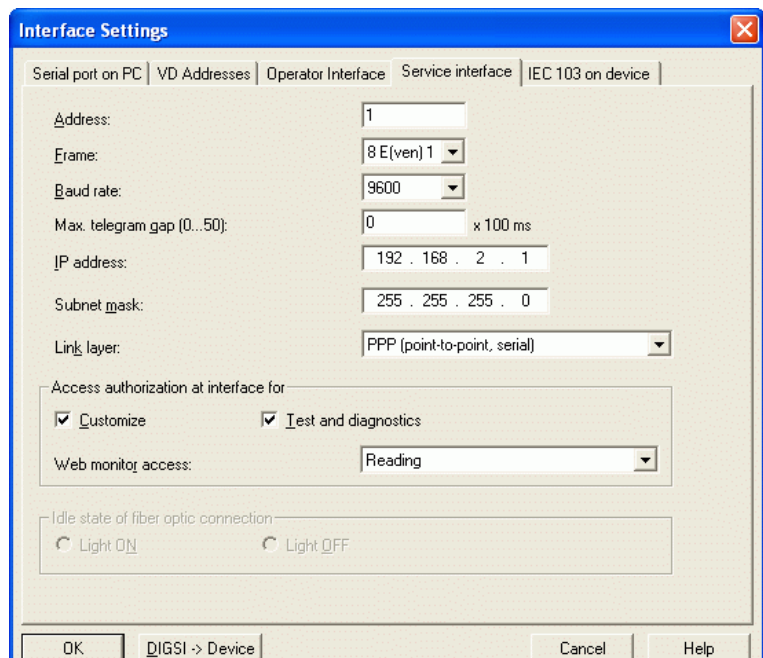
Under **“Settings“** select the function **“Interfaces“**.

Under “Interface Settings“ the setting of the “Service interface“ is done.

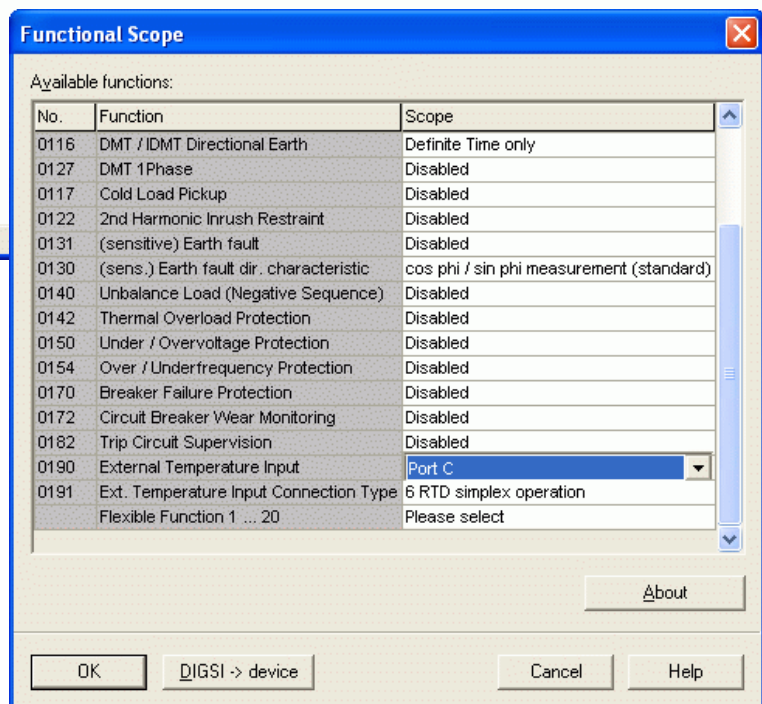
Address: 1
Frame: 8 E(ven) 1
Baudrate: 9600

All other settings are not relevant and can remain in their pre-set state.

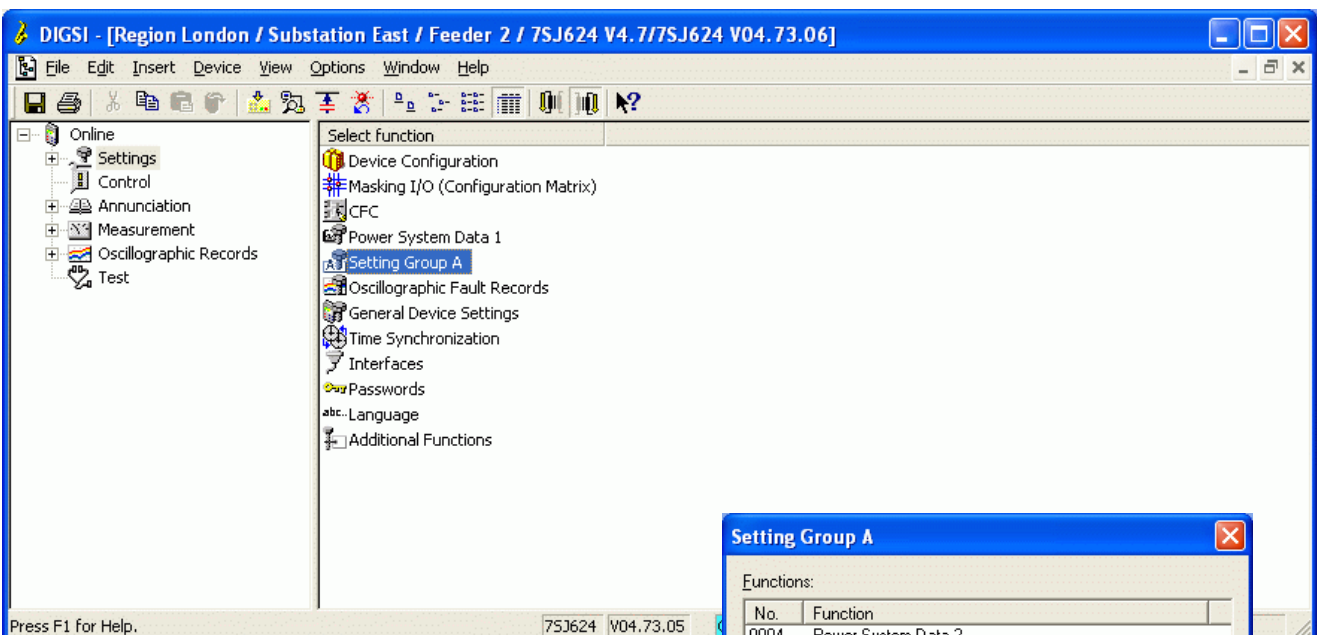
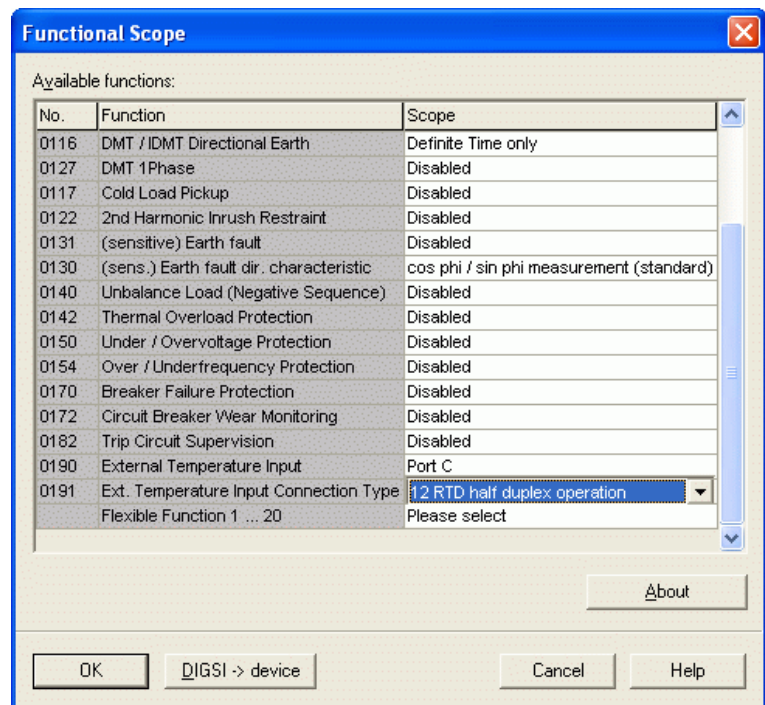
Data transfer at the service interface is always done automatically if a RTD-Box is used, at 9600 Baud and 8E1.
These settings must also be selected in the RTD-Box.



In “Functional Scope“ in the “Function“ „External Temperature Input“ select “Port C“ service interface.



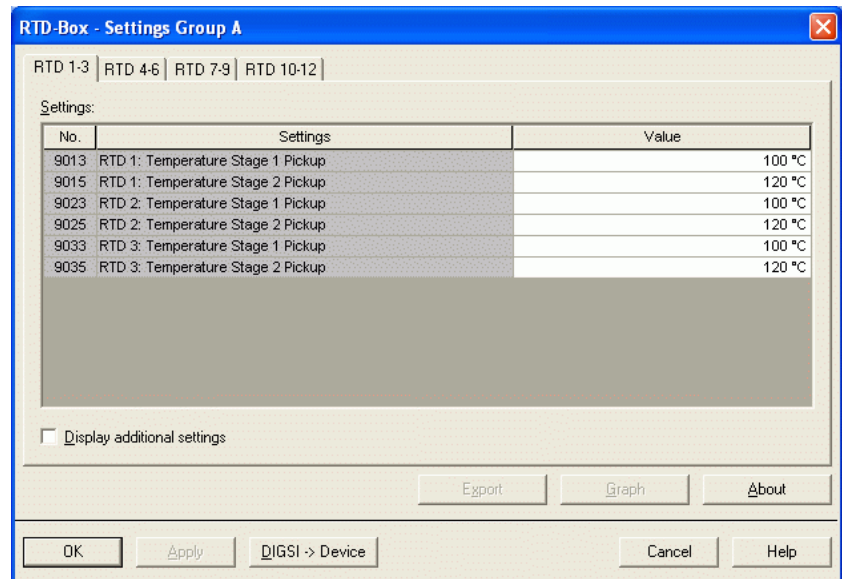
In “Functional Scope“ „12 RTD half duplex operation“ is selected under the function “Ext. Temperature Input Connection Type“.



Under “Setting Group A“ customisation of the “RTD-Box“ is done with “Customize...“.

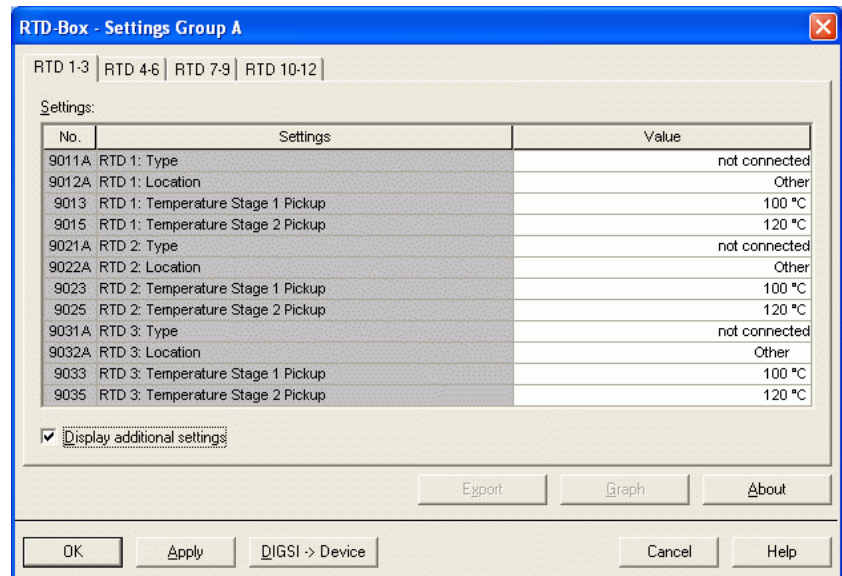
The next step is to configure all required measurement inputs. 4 setting pages with 3 measurement inputs each are offered for configuration.

In the following example only the first measuring input is configured. The same procedure must be used for the others.



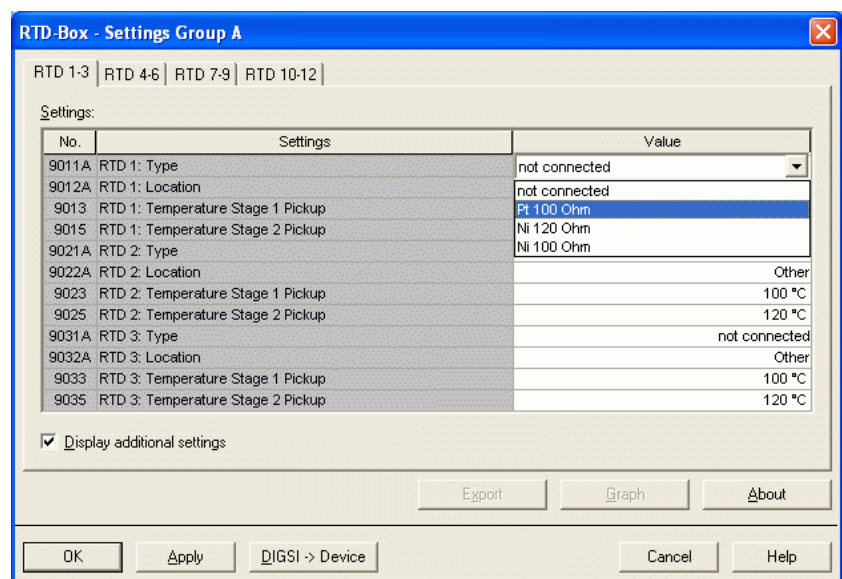
In the initial menu only the pick-up values of the temperature stages are displayed.

Put a check in „Display additional settings“ to make all settings visible.



In the window „RTD 1-3“ the settings for the first three measuring inputs can now be done.

Initially for „RTD 1“ the „Type“ of the Thermo element is selected to „Pt 100 Ohm“



In this menu a **“Location“** can be selected for the measured value **„RTD 1“**

No.	Settings	Value
9011A	RTD 1: Type	Pt 100 Ohm
9012A	RTD 1: Location	Other
9013	RTD 1: Temperature Stage 1 Pickup	Oil
9015	RTD 1: Temperature Stage 2 Pickup	Ambient
9021A	RTD 2: Type	Winding
9022A	RTD 2: Location	Bearing
9023	RTD 2: Temperature Stage 1 Pickup	Other
9025	RTD 2: Temperature Stage 2 Pickup	120 °C
9031A	RTD 3: Type	not connected
9032A	RTD 3: Location	Other
9033	RTD 3: Temperature Stage 1 Pickup	100 °C
9035	RTD 3: Temperature Stage 2 Pickup	120 °C

Under **“Temperature Stage 1 / 2 Pickup”** two pickup thresholds for alarm or trip can be set for the measured value **“RTD 1“**

No.	Settings	Value
9011A	RTD 1: Type	Pt 100 Ohm
9012A	RTD 1: Location	Ambient
9013	RTD 1: Temperature Stage 1 Pickup	30 °C
9015	RTD 1: Temperature Stage 2 Pickup	40 °C
9021A	RTD 2: Type	not connected
9022A	RTD 2: Location	Other
9023	RTD 2: Temperature Stage 1 Pickup	100 °C
9025	RTD 2: Temperature Stage 2 Pickup	120 °C
9031A	RTD 3: Type	not connected
9032A	RTD 3: Location	Other
9033	RTD 3: Temperature Stage 1 Pickup	100 °C
9035	RTD 3: Temperature Stage 2 Pickup	120 °C

When all measuring inputs have been configured, the settings are sent to the protection device with the key **„DIGSI -> Device“**.

The procedure is concluded by entry of the password and **“OK“**.

Note: Also save the settings to **“File“**.

The screenshot shows the DIGSI software interface. The main window displays a tree view on the left with the following structure:

- Online
 - Settings
 - Control
 - Annunciation
 - Measurement
 - Primary Values
 - Secondary Values
 - Percent Values
 - Others
 - RTD-Box Measuring Values (highlighted)
 - User Defined
 - Energy
 - Set Points (Measured Values)
 - Oscillographic Records
 - Test

The main display area shows the date and time: 15.06.2009 11:16:00.146.

A smaller window titled 'RTD-Box Measuring Values - 28.05.2009 - Region Ansbach / Verteil...' is overlaid, showing a table of measured values:

Nummer	Messwert	Wert
01068	Temperature of RTD 1	24 °C
01069	Temperature of RTD 2	212 °C
01070	Temperature of RTD 3	47 °C
01071	Temperature of RTD 4	72 °C
01072	Temperature of RTD 5	63 °C
01073	Temperature of RTD 6	69 °C
01074	Temperature of RTD 7	24 °C
01075	Temperature of RTD 8	80 °C
01076	Temperature of RTD 9	----
01077	Temperature of RTD10	----
01078	Temperature of RTD11	----
01079	Temperature of RTD12	----

The measured values can be output in DIGSI under **“Measurement“ – „Others“ – “RTD-Box Measurement Values“**.

In the display of the protection device, the measured values are output under **“Measurement“– “RTD-Box“**.

Processing of the measured values by protection functions

Alarms and measured values of the Thermo function can be transferred to a superordinate control system or may also be transferred between devices via “IEC 61850 GOOSE“

Configuration of the RTD-Box TR1200

In the following, the connection of the sensors and the configuration of the TR 1200 for processing in SIPROTEC devices is described. The difference here is the mode of connection of the RTD-Box.

6 RTD Simplex (1x TR 1200 works like 1x TR 600) = Factory setting

The TR 1200 transmits the data from Sensors 1...6 cyclically every 3 s under device address 0.

- Connect Sensors 1...6.
- Configure Sensors 1...6 in menu item **SEn** depending on the connection. (configure Sensors that are not connected as „nc“).
- Configure Sensors 7...12 in menu item **SEn** as „nc“ (Factory setting).
- Set device address in menu item **bUS** → **Adr** to „0“ (Factory setting).
- Set Baudrate in menu item **bUS** → **bdr** to „96“ (Factory setting).
- Set Data in menu item **bUS** → **PAr** to „EuE“ (Factory setting).

6 RTD half duplex (1x TR 1200 works like 1x TR 600)

The TR 1200 transmits the data from Sensors 1...6 on request with device address 1 or 2.

- Connect Sensors 1...6.
- Configure Sensors 1...6 in menu item **SEn** depending on the connection. (configure Sensors that are not connected as „nc“).
- Configure Sensors 7...12 in menu item **SEn** as „nc“ (Factory setting).
- Set device address in menu item **bUS** → **Adr** to „1“.
- Set Baudrate in menu item **bUS** → **bdr** to „96“ (Factory setting).
- Set Data in menu item **bUS** → **PAr** to „EuE“ (Factory setting).

12 RTD halb duplex (1x TR 1200 works like 2x TR 600)

The TR 1200 transmits the data from Sensors 1...6 on request with device address 1 and the data from Sensors 7...12 on request with device address 2.

- Connect Sensors 1...12.
- Configure Sensors 1...12 in menu item **SEn** depending on the connection. (configure Sensors that are not connected as „nc“).
- Set device address in menu item **bUS** → **Adr** to „1“.
- Set Baudrate in menu item **bUS** → **bdr** to „96“ (Factory setting).
- Set Data in menu item **bUS** → **PAr** to „EuE“ (Factory setting).

Note for SIPROTEC-protection devices:

The data transfer at the service interface always takes place automatically at 9600 Baud with the data format 8E1 when a RTD-Box is used.

Installation as well as safety instructions and detailed setting notes for the devices may be found in the corresponding manuals for each device.

Good luck!