
SOFTWARE USER MANUAL

DS-CAL V24-1
NZD 10.3



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2. About this document

2.1. Legend

The following symbols and formats will be used throughout the document.



Important

It gives you important information about the subject.
Please read carefully!



Hint

It gives you a hint or provides additional information about a subject.



Example

Gives you an example of a specific subject.

3. Introduction

The DS-CAL test board is a calibration device and DSCalibrator is the software used for calibration and testing of Dewesoft UUT. The calibration system consists of:

- A computer or PC (running DSCalibrator software)
- Multifunction calibrator
- Digital multimeter
- DS-CAL test board
- UUT
- Proper set of cables according to the UUT

In order for a correct operation of your calibration system the procedures described in this manual must be followed. If you should encounter any problems during the installation and use please feel free to contact our support team.

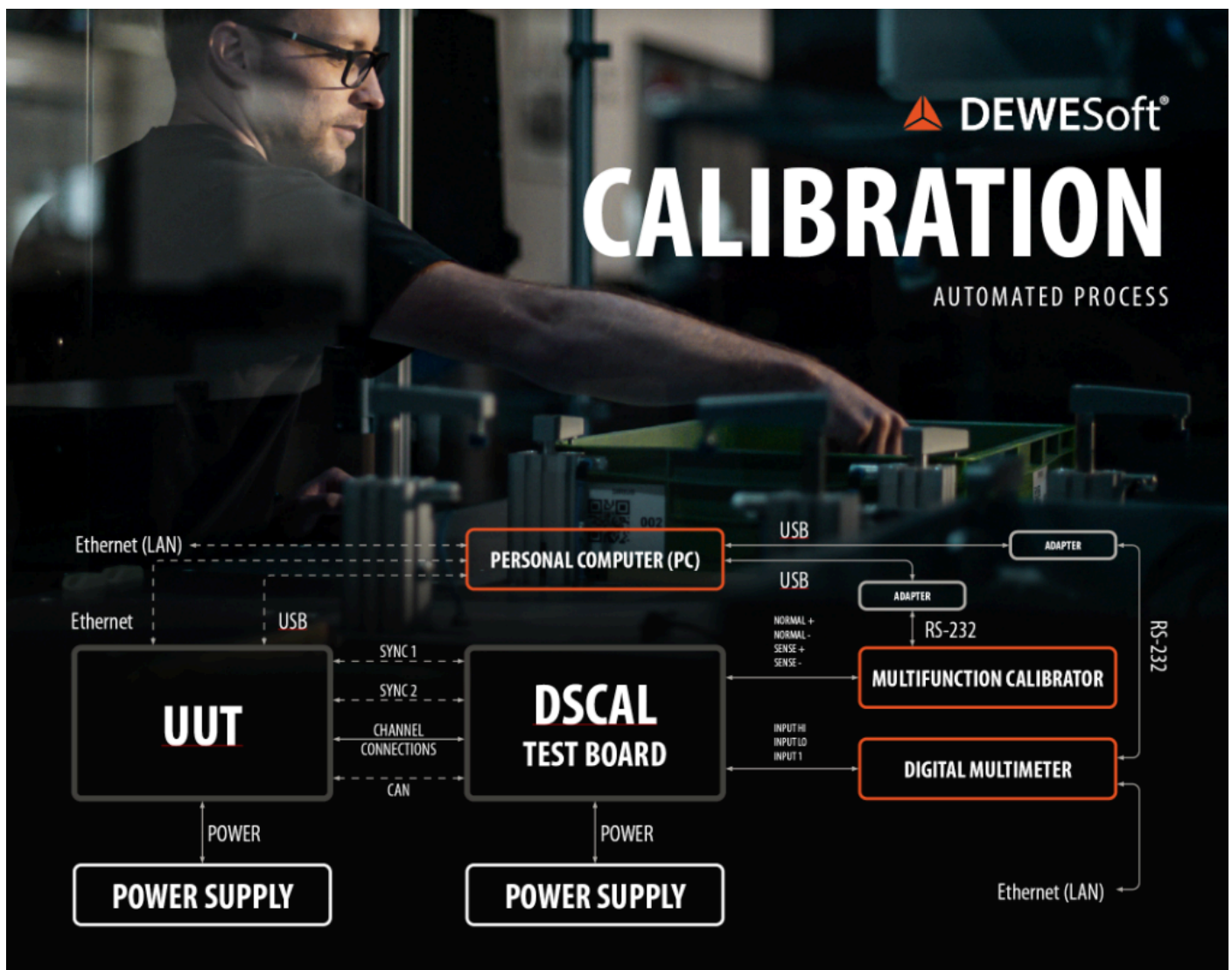


Image: Block diagram of the calibration system

3.1. Calibration system equipment support



Important

Please read this chapter carefully! It contains important information about calibration system equipment support and usage.

3.1.1. Multifunction calibrator support



Important

Multifunction calibrator **MUST be calibrated 1 per year in accredited laboratory** in order to assure correct measurements. Check if the calibration laboratory, who will perform calibration, is accredited. After calibration check that the calibration laboratory included their accreditation number on the certificate!



Important

All specifications apply for the temperature and time period indicated. For temperatures outside of **tcal Δ** (tcal is the ambient temperature when the Multifunction calibrator was calibrated), the temperature coefficient as stated in the General Specifications must be applied.

The specifications also assume the **calibrator is zeroed every "n" days or hours** or whenever the ambient temperature changes. **See additional specifications for your device!**

If the specifications are not followed, the accuracy can drift out of specifications!



Example

Zero FLUKE 5502E

All specifications apply for the temperature and time period indicated. For temperatures outside of **tcal ±5 °C** (tcal is the ambient temperature when the 5502E was calibrated), the temperature coefficient as stated in the General Specifications must be applied.

The specifications also assume the **Calibrator is zeroed every seven days or whenever the ambient temperature changes more than 5 °C**. The tightest ohms specifications are maintained with zero calibration every 12 hours within ±1 °C of use. Also see additional specifications later in this chapter for information on extended specifications for ac voltage and current.



Image: Zero Calibration bridge Fluke 5502E

The following multifunction calibrator models are supported:

- Fluke 5502A
- Fluke 5502E
- Fluke 5522A
- Fluke 5700A
- Fluke 5720A
- Fluke 5730A
- Fluke 5540A

Feature	FLUKE 55XX series	FLUKE 57XX series
Thermocouple calibration Krypton 8xTH/16xTH/8xTH-HS IOLite 8xTH/8xTH-HS DSI-TH-K/T/J/B/C/E	Supported	NOT POSSIBLE*
Extended filter tests on Sirius HS/XHS modules	NOT POSSIBLE**	Supported
Current clamp calibration	Supported	NOT POSSIBLE***
Current /calibration Krypton 3xSTG/6xSTG/8xLA/1xSTG IOLite 6xSTG	Supported	NOT POSSIBLE****
Krypton-RTD, IOLITEi-8xRTD, IOLITEi-8xRTD-HS	***Fluke 5500A NOT supported	

* Thermocouple output is not available by the multifunction calibrator.

** Extended frequency range for AC voltage is not supported by the multifunction calibrator.

*** Supported AC / DC current output capabilities are too low.

**** Fluke 57xx series uses additional terminal posts for DC current which are not possible to connect to the DS-CAL test board.

3.1.2. Digital multimeter support



Important

Digital Multimeter **MUST be calibrated 1 per year in accredited laboratory** in order to assure correct measurements. Check if the calibration laboratory, who will perform calibration, is accredited. After calibration check that the calibration laboratory included their accreditation number on the certificate!

The following digital multimeter models are supported:

- Keysight 34465A
- Agilent 34410A
- Agilent 34401A









3.2. Basic principle

The multifunction calibrator is used for generating signals which are measured by the Dewesoft UUT. The DSCalibrator software (in cooperation with Dewesoft) records these measurements and also makes adjustments to the calibration factors stored in the UUT. The DS-CAL test board is used for distributing the signals to and from the UUT and is controlled by the DSCalibrator software over the CAN or USB interface. The digital multimeter is used for measuring output voltage or current (for example the excitation voltage)

3.3. Scope of supply

3.3.1. DS-CAL-BOX

Qty	Type	Usage	Picture
1x	DS-CAL-BOX	DS-CAL test board.	
1x	DC Power supply 60W 12V including power cord	Power supply for DS-CAL test board.	
1x	USB-A to USB-B-mini cable, 1.8m	Used for connecting DS-CAL test board to the PC.	
1x	Installation USB stick	Contains the software, drivers, and manuals.	
2x	USB-to-serial converter including RS232 cable, 1m (D9f-D9f-1M-RS232)	Used for connecting the PC, multifunction calibrator, and the digital multimeter together.	
1x	CAN Y-cable, 1.2m (D9F-2D9F-1.2m)	Used for connecting the CAN port(s) between UUT and the DS-CAL test board.	
1x	PPS cable, 2m (L1B4M-BNC-2m)	Used for a precise PPS time source signal. Connects to the DS-CAL test board.	

2x	Sync cable, 3m (L00B4m-L00B4m-3m)	Used for connecting the Sync ports between the UUT and the DS-CAL test board.	
1x	Banana cable, 2m (CABLE-GND) with crocodile clip	Used for connecting GND between the UUT and the DS-CAL test board.	
12x	Safety test lead 4mm, red with gold-plated contacts, 1m	4x used for multifunction calibrator and digital multimeter connection with the DS-CAL test board.	
11x	Safety test lead 4mm, black with gold-plated contacts, 1m	3x used for multifunction calibrator and digital multimeter connection with the DS-CAL test board.	
8x	BNC-to-BNC cable, 0.5m	Used for connecting BNC UUT inputs and DS-CAL test board.	
8x	BNC-to-BNC cable, 1.2m	Used for connecting BNC UUT analog outputs and DS-CAL test board.	
8x	MULTI cable, 0.4m (D15m-D15m-0.4m)	Used for connecting MULTI UUT inputs and DS-CAL test board.	
8x	DSUB9 cable, 0.4m (D9m-D9m-0.4m)	Used for connecting all DSUB9 UUT inputs and DS-CAL test board.	
8x	Counter cable, 0.4m (L1B7m-L1B7m-0.4m)	Used for connecting UUT counter inputs and DS-CAL test board.	

3.4. Optional accessory packages

3.4.1. CHG-CAL-ADAPTER

Accessory package CHG-CAL-ADAPTER is required for calibration of SIRIUS-CHG and SIRIUS-HS-CHG modules and for DSI-CHG-50 adapters:



Image: CHG-CAL adapter accessory package

3.4.2. KRYPTON-TH-CAL-SET

Accessory package KRYPTON-TH-CAL-SET is required for calibration of Krypton 8xTH / 16xTH, IOLITEi-8xTH, 8xTH-HS and IOLITEir-8xTH, 8xTH-HS.

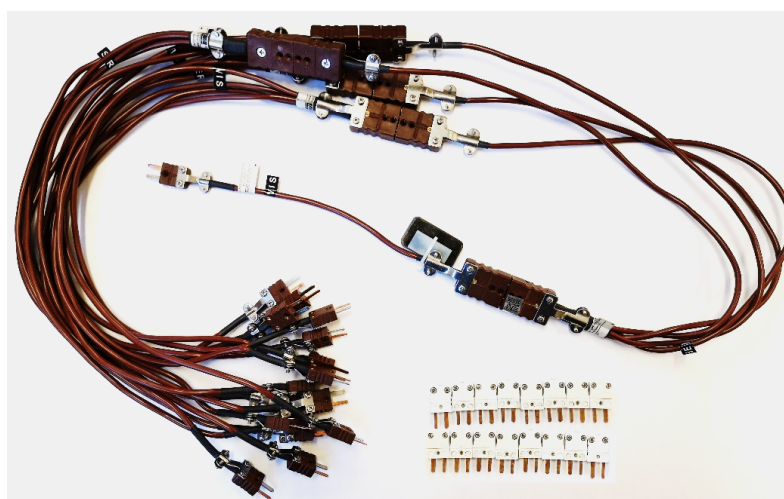


Image: TH-CAL-SET

3.4.3. IOLITE-CAL-SET

Cable bundle for calibrating every IOLITE module.

The set includes:

- 8x BNC-T2B2m
- 8x D15m-L0B6m
- 2x 4xBNC-T2B9m
- 8x T2B9f-D9m
- 2x D37m-4xD9f
- 1x TH-CAL-SET
- 8x D15m-T2B4m
- 2x 4xBNC-T2B12m
- 1x 4xBNC-T2B8m

3.4.4. DSI-CAL-SET

Accessory package DSI-CAL-SET is required for calibration of DSI adapters:



Image: Content of DSI-CAL-SET package

3.4.5. DSI-5A-CAL-CABLE

Accessory package DSI-5A-CAL-CABLE is required for calibration of DSI-5A adapters:

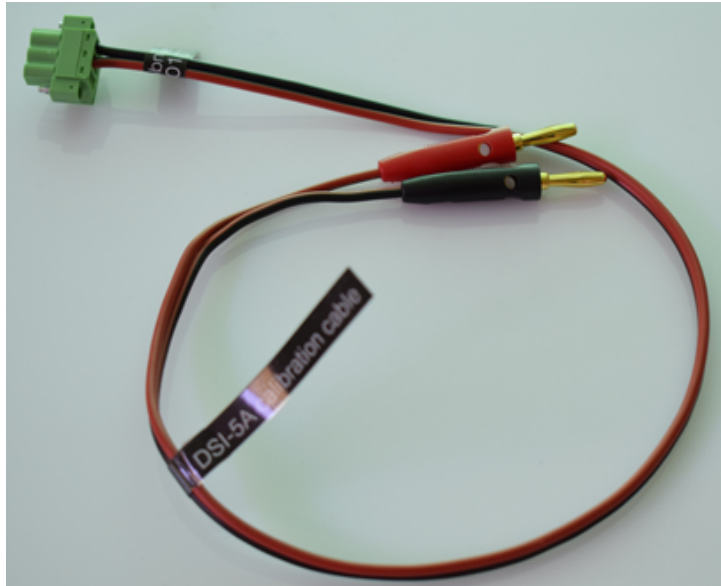


Image: DSI-5A-CAL-CABLE accessory package

3.4.6. 100nF-CAP-STD

Accessory package 100nF-CAP-STD is required for the calibration of DSI-CHG-DC adapters.



Image: 100nF-CAP-STD accessory package



Important

100nF-CAP-STD must be ISO calibrated.

3.4.7. DS-TOOL-CAL-DOCK

The DS-TOOL-CAL-DOCK is a calibration docking station compatible with DEWE-43, SIRIUS, IOLITE and KRYPTON devices in modular or slice variants.

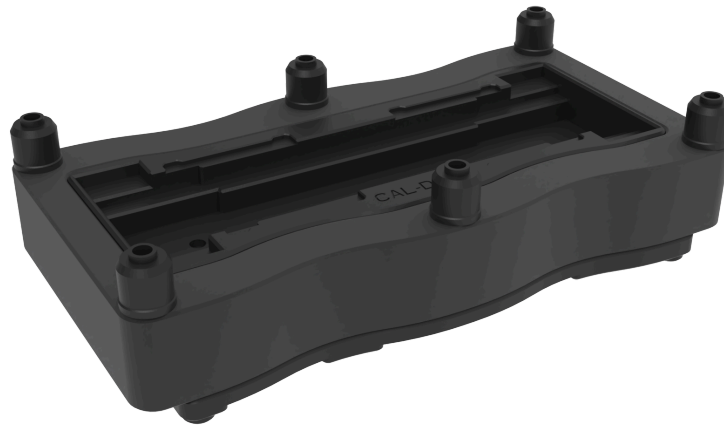


Image: Calibration docking station DS-TOOL-CAL-DOCK

3.4.8. DS-CAL-BOX-DB

Accessory package DS-CAL-BOX-DB is required for the calibration of the “+DB” devices (example SIRIUSi-8xSTG+-DB) which have 8 counters (24 DI on DSUB37m, 8 DO on DSUB24f). Accessory package include DS-CAL-BOX-DB, D37f-D37f-0.8m-CAL-CABLE and D25m-D25m-0.8m-CAL-CABLE.



Image: DS-CAL-BOX-DB



Hint

First you connect cables D37f-D37f-0.8m-CAL-CABLE and D25m-D25m-0.8m-CAL-CABLE between the DS-CAL-BOX-DB and Sirius device. After that you connect Counter cables (L1B7m-L1B7m-0.4m) between DS-CAL-BOX-DB and DS-CAL-BOX.

3.5. Optional temperature and humidity probe

For monitoring temperature and humidity in your laboratory, you can use standard temperature and humidity probe type HC2A-S from manufacturer ROTRONIC.

To be able to connect the probe to your PC you need a USB converter type AC3001 which is also manufactured by ROTRONIC.



Image: ROTRONIC probe and USB converter



Hint

Software is used for reading the data from the probe and sending it directly to the DSCalibrator software, which can be downloaded directly from a Dewesoft website. Software is named *Environment server*.



Hint

We recommend using a different PC for monitoring environmental conditions. In case this is not possible, you must pay attention to selecting the correct COM port in DSCalibrator.



Important

Keep environmental conditions in the Calibration lab.

Temperature: $23\text{ °C} \pm 3\text{ °C}$

Humidity: $45\% \pm 33\%$

4. Calibration system equipment configuration

As the next step, configure the calibration system equipment for use by the DSCalibrator. Here are two setups for the digital multimeter as well as two setups for the multifunction calibrator configuration described. Select the correct combination of these two according to your existing equipment and follow all the steps provided by the setup.

4.1. Digital multimeter setup

Power on your multimeter and first of all choose between front or rear side cable connection to the DS-CAL test board. Switching between the front or rear side plugs is done by pressing the white button next to the navigation buttons.

4.1.1. Agilent 34410A

DSCalibrator communicates with Agilent 34410A multimeter via ethernet (LAN) connection. Plug in a LAN cable and start configuring the multimeter.

Enter the **Utility menu** (Shift + Data Log) → Select **Remote I/O** → Enter → **I/O Port** → Select **LAN** → Enter → **Enable LAN?** → Select **Yes** → Enter → Select **Modify** → Enter → **Reset LAN?** → Select **No** → Enter.

The following settings must be set:

- DHCP → Off
- Auto IP → Off
- IP address (example) → 192.168.10.206
- Subnet mask (example) → 255.255.255.0
- Default gateway → 0.0.0.0
- DNS server → 0.0.0.0
- Host name → (leave blank)
- LAN services → Enable all
- Web Password → Disable



Hint

You should enable DHCP if it is guaranteed that the IP address provided by DHCP won't change automatically. Otherwise use an unoccupied static IP address as shown by the example above.

4.1.2. Agilent 34401A

DSCalibrator communicates with Agilent 34401A multimeter via serial port (RS 232) connection. Plug in a serial port cable along with the USB-to-RS232 converter and start configuring the multimeter.

Enter the **Setting menu** (Shift + <) → Select **E: I/O menu** → Enter.

The following settings must be set:

- Interface → RS232
- Baud Rate → 9600
- Parity → EVEN 7 BITS

- Language → SCPI

4.2. Multifunction calibrator setup

Power on your multifunction calibrator and let it warm up prior to usage according to the provided User's manual of your multifunction calibrator.

4.2.1. FLUKE 57XX setup

The example below is based on FLUKE 5720A but should apply in similar ways on the FLUKE 57XX series of multifunction calibrators.

DSCalibrator communicates with FLUKE 5720A multifunction calibrator via a serial port (RS 232) connection. Plug in a serial port cable along with the USB-to-RS232 converter and start configuring the multifunction calibrator. For this specific calibrator you will require an additional DSUB25-to-DSUB9 serial port adapter:



Image: DSUB25-to-DSUB9 serial port adapter

Go to **Setup Menus → Instmt Setup → Remote Port Setup → Remote Port.**

- Select **RS 232**
- **Remote lang** → Select **Normal**

Go to **RS 232 Port Setup** where the following settings must be set:

- 8 data bits
- 1 stop bit
- Stall → *S/*Q
- Parity → None
- 9600 baud
- Wait → Off
- EOL → CRLF
- Remote I/F → Terminal

Save the configuration by exiting the menus:

Done Setting Port → Done Setting Port → Done Setting Up → Done Setup.

4.2.2. FLUKE 55XX setup

The example below is based on FLUKE 5502E but should apply in similar ways on the FLUKE 55XX series of multifunction calibrators.

Go to **Setup** → **Instmt Setup** → **Remote setup**.

- **Host** → **serial**

Go to Host setup where the following settings must be set:

- 8 data bits
- 1 stop bit
- Stall → Xon/off
- Parity → None
- 9600 baud
- Remote I/F → Term
- EOL → CRLF

Save the configuration by exiting the menus:

(Prev Menu) → (Prev Menu) → (Prev Menu) → **Store changes?** → Select **Yes** → (Prev Menu).

4.3. ROTRONIC HC2A-S temperature and humidity probe setup

HC2A probe uses the RO-ASCII communication protocol, this is the standard (default) communication protocol used by all AirChip 3000 devices.

Before you start to measure with a new HC2A sensor, you need to download the ROTRONIC HW5 software and configure the sensor to send data to the com port automatically. Follow the next steps:

1. Install ROTRONIC HW5 software and connect an HC2A probe to the USB port of the PC
2. Run the software and click on "Start HW5".
3. When a message "Add new device to tree?" appears click on button Yes
4. In the left sidebar menu select and open "HC2A" -> Device Manager -> Tools -> Communication Protocol
5. Select Protocol Type RO-ASCII
6. Select a option "Unsolicited mode (send data automatically)"
7. Click OK, close the software, unplug and plug the sensor back in a USB port (very important step)



Hint

Download link for ROTRONIC HW5 software: [HW5 PC-Software](#)



Hint

Software used for reading the data from a probe and sending them directly to the DSCalibrator software can be downloaded directly from a Dewesoft website. Software is named Environment server.

5. Connecting the calibration system together

The next step after setting up the multifunction calibrator and digital multimeter is to establish all connections of the complete calibration system.



Caution To avoid damage, first apply the DC power to the DS-CAL test board and then start connecting all the cables and doing system wiring. Disconnecting should be done in the opposite way (unplugging the DS-CAL test board at last). It is also recommended to use a separate power supply for the DS-CAL test board.

5.1. Digital multimeter

Connect as shown by the picture and described by table below.



Image: Front panel connections on multifunction calibrator

Multimeter	DS-CAL test board
Input HI	Multimeter HI
Input LO	Multimeter LO
Input I	Multimeter I

5.2. Multifunction calibrator



Warning

During the calibration procedure voltage up to 1000 V can appear on the output of the used multifunction calibrator! Use only the 4 mm safety test leads with touch protection and follow strictly the safety instructions provided by the manual!

Connect as shown by the pictures and described by table below.

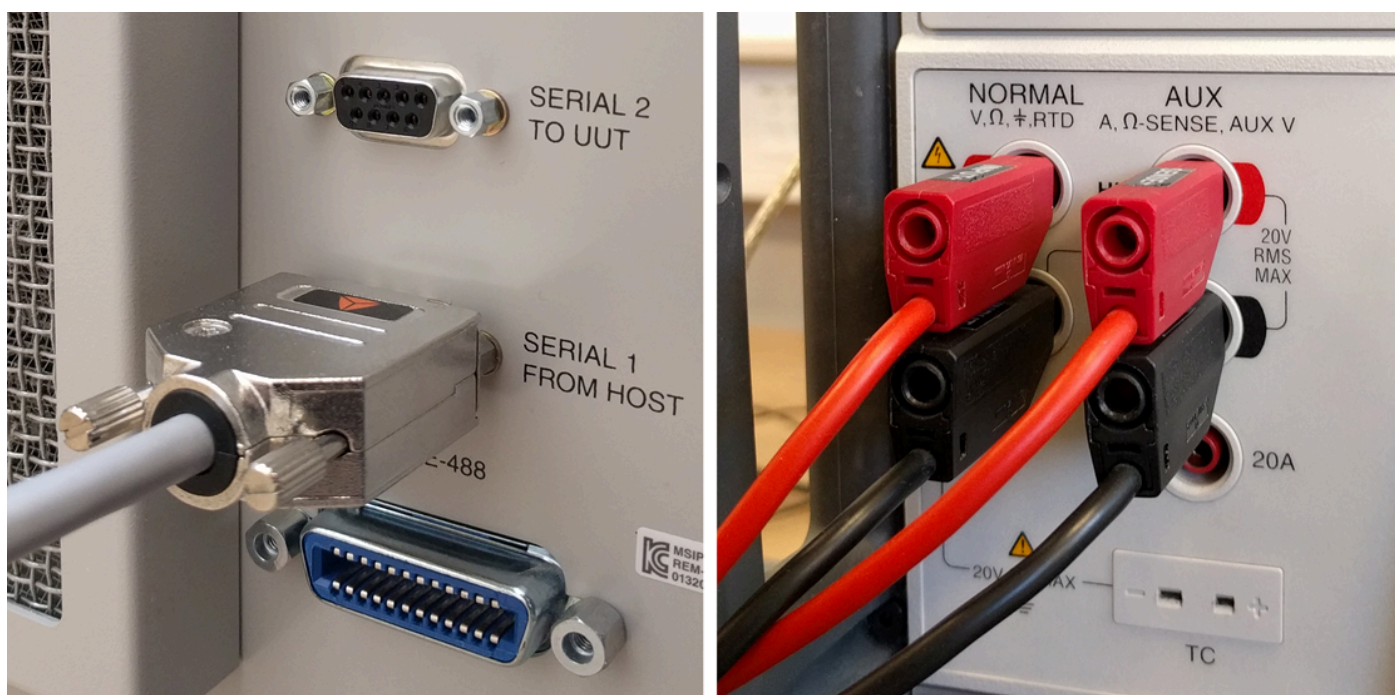


Image: Serial connection (left) and front panel connections (right) on multifunction calibrator

Multifunction calibrator	DS-CAL test board
Output HI	Calibrator IN +
Output LO	Calibrator IN -
Sense HI	Calibrator SENSE +
Sense LO	Calibrator SENSE -



Hint

In case that **Fluke 5540A** calibrator is used in the calibration process, then you will have to change the connection of the CAL-BOX to Fluke (in case of devices which also have **current ranges** -e.g. IOLITEr-6xSTG) during calibration procedure.. DSCalibrator will display additional "warning messages", during calibration of those devices, to inform you that you have to change connection. Below is a step by step guide on how to do that.

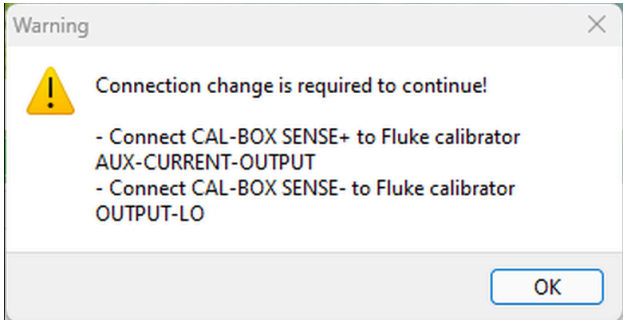
1



5540A calibrator - normal connection	DS-CAL test board
Output (VZ) HI	Calibrator IN +
Output LO	Calibrator IN -
Sense (VZ) HI	Calibrator SENSE +
Sense LO	Calibrator SENSE -

Normal front panel connections on multifunction calibrator - Fluke 5540A.

2



DSCalibrator displays warning message - info that you have to change connections from CAL-BOX to Fluke

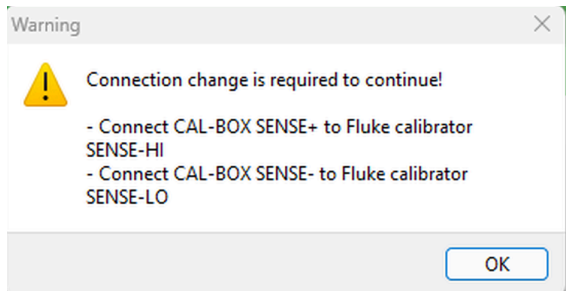
3



5540A calibrator - current connection	DS-CAL test board
Output (VZ) HI	Not connected!
Output LO	Calibrator SENSE -
Output VI AUX	Calibrator SENSE +
Sense (VZ) HI	Not connected!
Sense LO	Not connected!

Connect CAL-BOX to Fluke according to the picture and table above. In case that you do not connect accordingly, the calibration procedure of the current device ranges will fail.

4



When the current “part” of calibration is done, DSCalibrator displays a warning message - info that you have to change connections from CAL-BOX to Fluke back to normal.

5



5540A calibrator - normal connection	DS-CAL test board
Output (VZ) HI	Calibrator IN +
Output LO	Calibrator IN -
Sense (VZ) HI	Calibrator SENSE +
Sense LO	Calibrator SENSE -

Normal front panel connections on multifunction calibrator - Fluke 5540A.

5.3. DS-CAL test board

The following connections should be done to the DS-CAL test board as described by the picture and table below. DS-CAL test board connections:

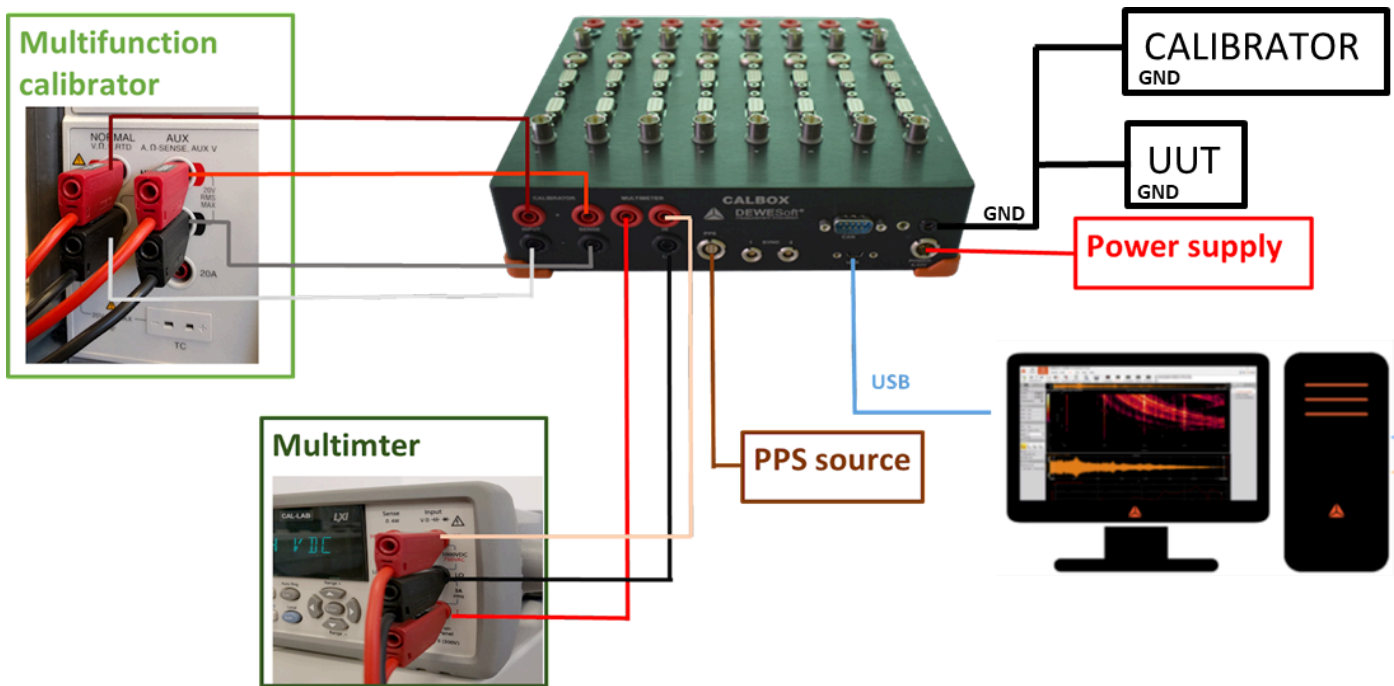


Image: DS-CAL test board back connectors

Depending on different Dewesoft UUT connections, see chapters Sirius USB, DEWE-43, Krypton, and DSI adapters.

DS-CAL test board	Connection description
Calibrator INPUT +, -	Connects to the INPUT connectors of the multifunction calibrator.
Calibrator SENSE +, -	Connects to the SENSE connectors of the multifunction calibrator.
Multimeter HI, LO, and I	Connects to the digital multimeter.
PPS*	Optional PPS signal input from a precise external time source.
Sync 1, 2	Connects to the SIRIUS and DEWE-43 UUT. See chapters Sirius USB and DEWE-43.

CAN	Connects to the SIRIUS and DEWE-43 UUT. See chapters Sirius USB and DEWE-43.
USB**	Connects to the PC.
GND	Connects to the UUT and to Calibrator.
Power	Power supply provided for the DS-CAL test board.

* If available by the DS-CAL test board (see chapters DS-CAL1 v3 test board).

** If available by the DS-CAL test board (see chapters DS-CAL2 test board).



Hint

TUSB 3410 device driver may be required for the PC to recognize the calibration box.



Important

It is not possible to perform adjustment and calibration of frequency accuracy of the UUTs' motherboard if PPS signal is not available. Disable the "Frequency test" checkbox in the DSCalibrator settings if PPS signal is not available to avoid errors during calibration. Disabling tests is discouraged, however it is the only option if PPS signal is not available.



Important

If DS-GPS-CLOCK is used as a PPS source, please make sure that it is not connected via USB to the same PC on which you are running DSCalibrator software and performing calibration. Motherboard calibration tests can fail in this case, even though the UUT is working perfectly.

5.3.1. DS-CAL1 v1 test board

This DS-CAL test board was the first version of the test board available. It is missing a PPS input connector and it does not support USB.

If used with the Dewesoft UUT without the CAN port, see chapters Dewesoft UUT without CAN port.

5.3.2. DS-CAL1 v3 test board

DS-CAL1 v3 test board features the PPS input connector for precise external time source provided by the PPS signal.

PPS signal must be connected only if it is required to check also the accuracy of the internal oscillator on the UUT. Additionally, the "Frequency test" checkbox has to be enabled in the settings of DSCalibrator software (see chapters External devices).

If used with the Dewesoft UUT without the CAN port, see chapters Dewesoft UUT without CAN port.

5.3.3. DS-CAL2 test board

DS-CAL2 test board also features the PPS as well as a USB connector.

USB is used for control by the DSCalibrator instead of the CAN port.
It still can be used via CAN port if defined as DS-CAL1 v3 test board in settings of DSCalibrator software (see chapter External devices).

6. Software and driver installation

6.1. Installation of the USB-to-serial adapter driver

On the flash drive you will find a folder named \Extras\Driver\UC232A. Open it and run UC232A_Windows_Setup.exe and follow the installation instructions. Once the installation is finished proceed to the next step.

6.2. Installation of DSCalibrator software

The self-extract installer DSCalibrator_Installer.exe contains the DSCalibrator software and is intended to be installed on the PC which will be used for adjustment and calibration of Dewesoft instruments.

- Startup your PC and login with an administrator account.
- Run the self-extract installer "DSCalibrator_Installer.exe" to install the software to C:\DSCalibrator.
- After the installation is finished carefully follow the next chapter about DSCalibrator software configuration.



Hint

The software versions of DSCalibrator from version 5.0 and onward do not require an installed Microsoft Excel anymore!



Hint

In case that you see text in red "*Dewesoft is not installed*" when you installed and first time run DSCalibrator, then you need to uninstall DSCalibrator and first install the latest version of Dewesoft and again install DSCalibrator.



Important

Calibration PC overview, basic specifications should be:

- **CPU:** Preferred Intel i7/i5/(minimum i3) or AMD processor,
- **Internal memory:** Preferred 16/8/(minimum 4) GB,
- **OS:** Windows 10/11 preferred, minimum Windows 7/8 (we still support Windows 7/8, however those are EOL by Microsoft),
- **Network:** Two network cards preferred, one integrated + one PCIE addon card (integrated is used for the internet, addon card is used for EtherCAT chain - for Krypton and IOLite calibration).
- Other specifications (like GPU) are not relevant.

6.3. Download and run Environment server software

To automatically read the temperature and humidity from the probe and transfer them to the DSCalibrator, you need additional software. Download *Environment server.exe* file from a Dewesoft website and run it.

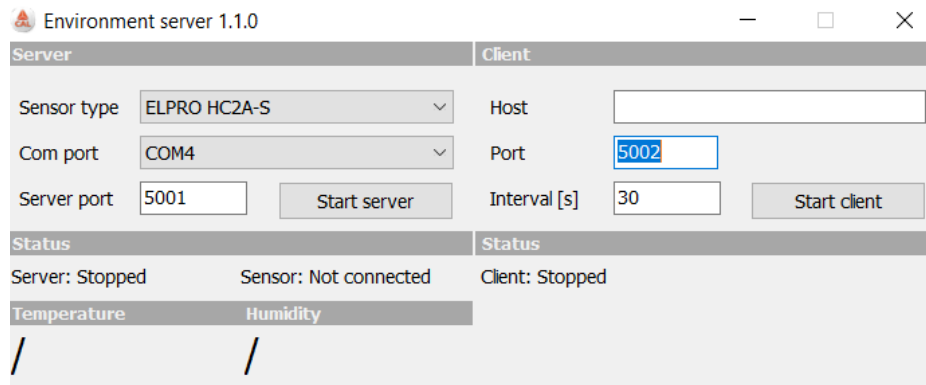


Image: Environment server software

When you run the software for the first time you need to select:

- Sensor type: “ELPRO HC2A-S”
- Com port: “port of your connected probe”

After all the settings are set the process of collecting data from a probe can be started with a click on the button “Start server”. If everything is working as it should, temperature and humidity data appear in the bottom section of the window.

To enable the option of transferring the environmental conditions to the calibration software look at chapter 7.5. Environment.



Hint

Environment server software supports only the HC2A-S probe from manufacturer ROTRONIC.



Hint

Environment server software is just optional. You can perform calibration without it, but it saves you some time because it automatically reads the temperature and relative humidity from the probe.

7. Configuring the DSCalibrator software

Run the DSCalibrator software by double-clicking on the DSCalibrator desktop shortcut. When the DSCalibrator software opens you will immediately see the window “Log-in to database”. Enter your Username, which is the same as you use to access the Dewesoft ERP system or your Dewesoft account on the website and the password, which is also the same as for Dewesoft account or ERP account and click the “OK” button. After that, you are Logged in to the DSCalibrator software under your name. Now open the menu File → Settings to configure your connected calibration system equipment. After you review and adjust the settings according to the following chapters make sure to press the OK button to confirm changes to the settings.

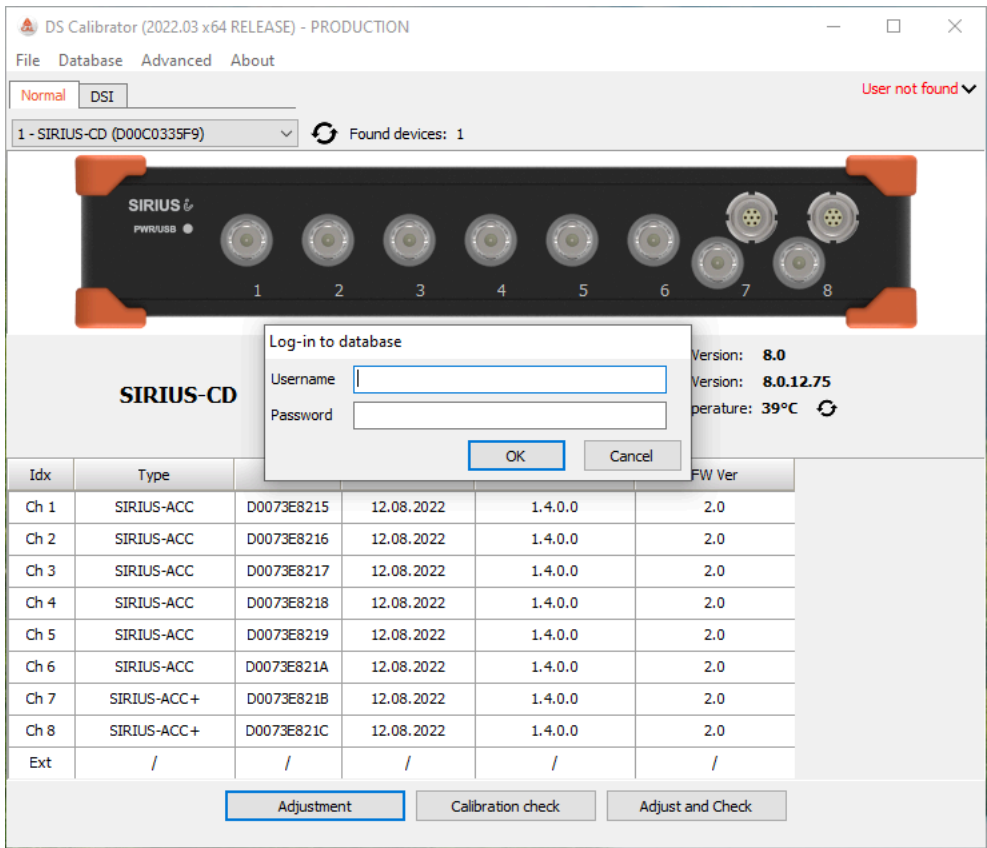


Image: Log-in to database window

7.1. General settings

- Enter the location of the calibration operator; this information will be shown on the generated calibration reports.
- Internal calibration is used only in HQ and is not relevant for other locations.
- Optionally an “As Found” or “As Left” comment can be enabled. You can choose which one will be included in the report after the calibration is finished.
- By enabling custom serial numbers the calibration reports will include your own serial numbers defined before calibration.
- You can also enable sound playback when the calibration reports are finished.

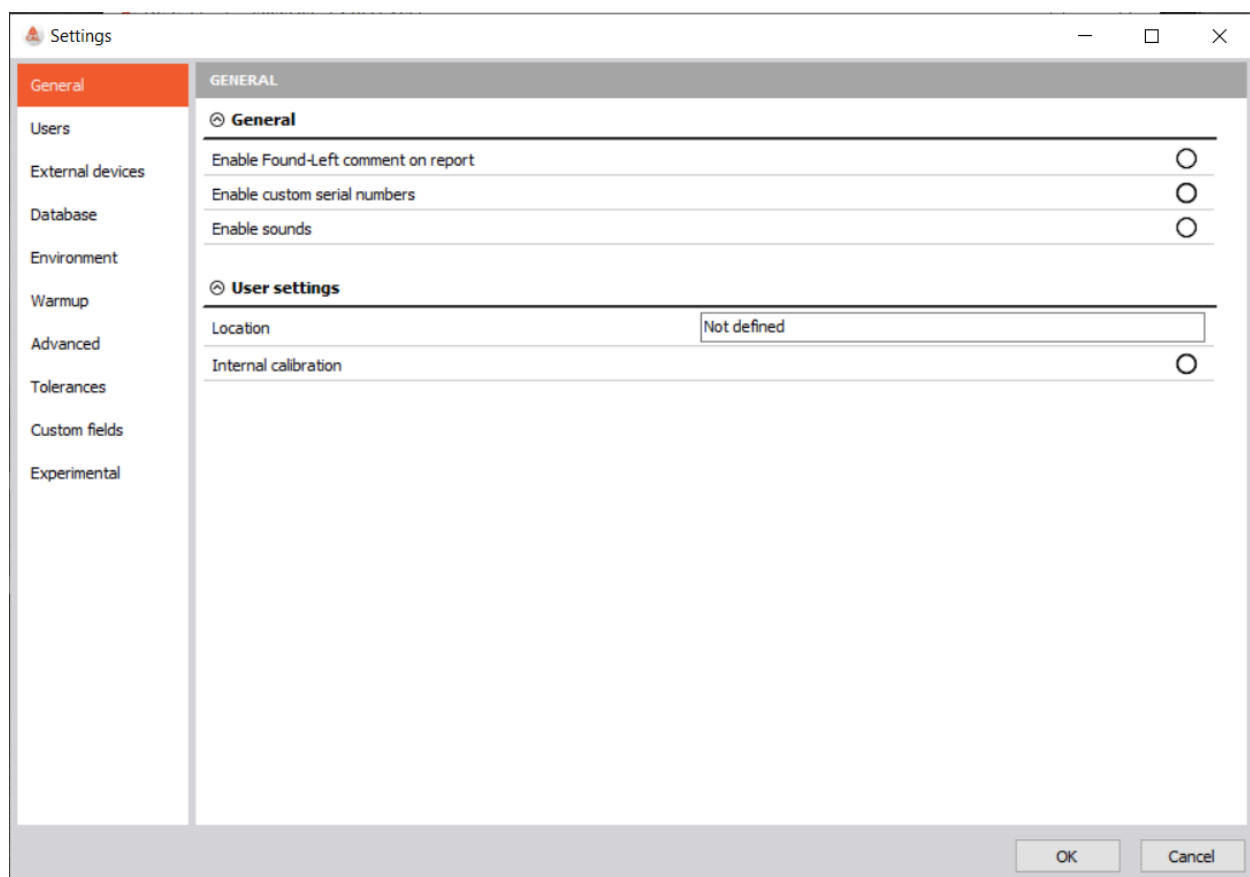


Image: General settings tab of the DSCalibrator

7.2. Users

- User is now automatically added to the drop-down menu, selected and shown (if not, you have to select it from the drop-down menu) under “Users”
- “Username” is automatically entered
- “Display name” is automatically entered and will be shown on the generated calibration certificates.
- As an option, your name and an image of your signature can be embedded at the end of the generated PDF calibration certificates; supported image file types are PNG and JPG
- “Upload calibration reports to global database” is selected as default.
- If you click, under “Get User data from database” on the button “Get data” and enter your password, a window with your information will appear.

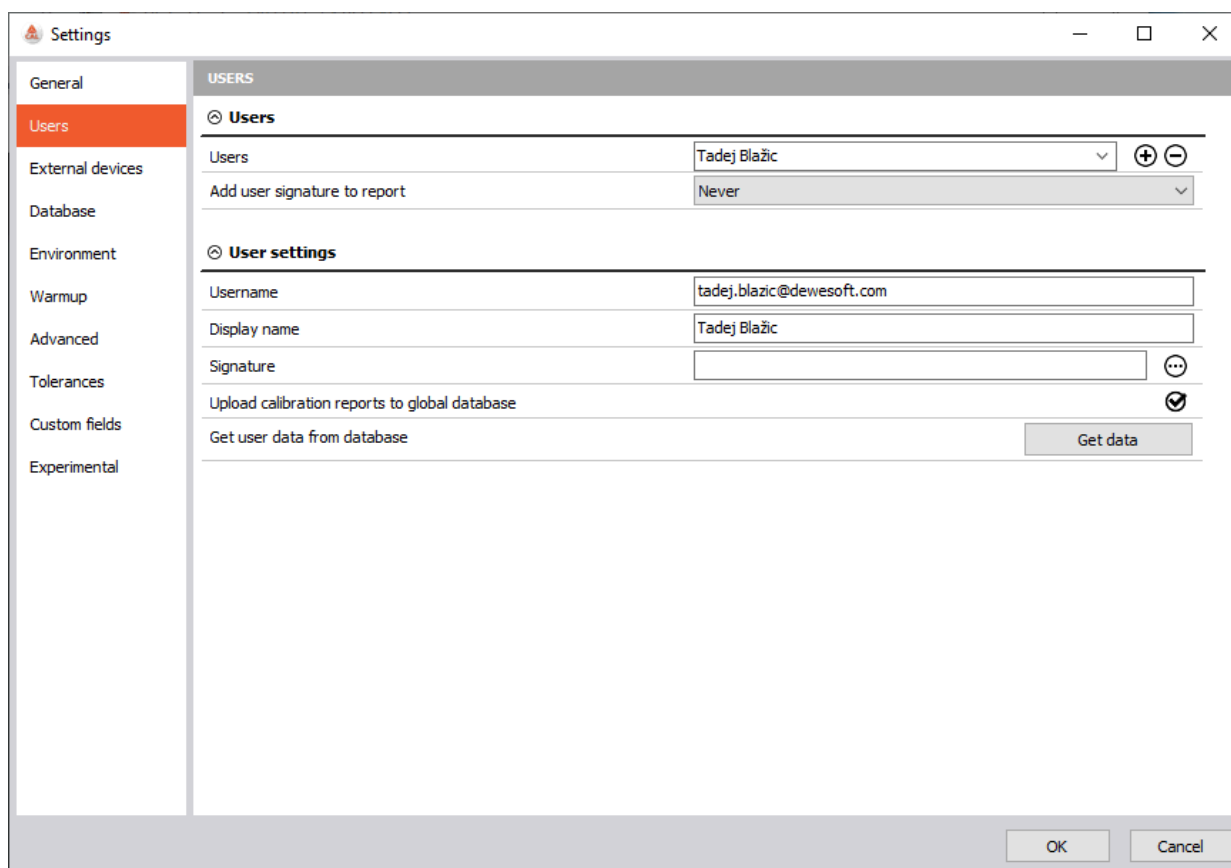


Image: Users tab of the DS-Calibrator



Warning

In case you do not have all the needed permissions for the calibration, contact our support team (Support@dewesoft.com) or directly our calibration team (calibration@dewesoft.com).

7.3. External devices

Signal generator section:

- Set the multifunction calibrator type to Fluke.
- Select the correct COM port where it is connected. (only available COM ports will be shown). The easiest way to choose the correct COM port from the USB to RS232 converter is to look for ports that are available while the other devices are unplugged. Then start plugging in the devices one by one and simultaneously check for available COM ports. The COM port that is new in the drop-down menu is the right one.
- The Certificate no. and Due date can be found on the calibration certificate of your multifunction calibrator and will be shown on the generated calibration certificates.

Multimeter section:

- Make a selection of the digital multimeter model.
- If you are using a 34401A digital multimeter:
 - Select the correct COM port where it is connected.
 - Enter the serial number of the digital multimeter; this needs to be done manually.
- If you are using a 34410A / 34465A digital multimeter, you need to type in the IP address that was configured as a part of the 4.1.1 Agilent 34410A
- The Certificate no. and Due date can be found on the calibration certificate of your digital multimeter and will be shown on the generated calibration certificates.

Due date warning section:

- When the due date of one or more external devices approaches, you will be warned before starting the calibration procedure. Here you can set how many days before the expiration date a warning will be issued.

Dewesoft section:

- Here the right path is already chosen, so do not make any changes unless you have manually changed the folder structure.
- Dewesoft is normally running in the background during calibration, which you can change if you check the "Visible" option.

Calibration board section:

- Select DS-CAL 1 (v1) if you have a DS-CAL test board without a PPS connector (see chapters DS-CAL1 v1 test board)
- In this case the serial number of the DS-CAL test board has to be entered manually.
- Select DS-CAL 1 (v3) if you have a DS-CAL test board with PPS connector (see chapters DS-CAL1 v3 test board)
- Select DS-CAL 2 if you have a DS-CAL test board with USB connector (see chapters DS-CAL2 test board)
- Enable the "Frequency test" checkbox only if a precise PPS signal from an external time source is connected to the PPS connector on the DS-CAL test board. If you do not have a precise PPS signal, disable (uncheck) "Frequency test" otherwise will "motherboard" test on devices fail.

Settings

General

Users

External devices

Database

Environment

Warmup

Advanced

Tolerances

Custom fields

Experimental

EXTERNAL DEVICES

Standard

Signal generator

Com portCOM1

Due date30. 12. 1899

Certificate number/

Multimeter

Type34401A

Due date30. 12. 1899

Certificate number/

Serial number

Com portCOM1

Calibration box

TypeDS-CAL 2

Enable frequency test (PPS signal needed)☒

Com portCOM1

Function generator

Used☒

Due date30. 12. 1899

Certificate number/

IP address

Dewesoft

Visible☐

Folder path typeDefault

Filename..\Dewesoft\Dewesoft.exe

Relative path☒

Due date warning

Days remaining to due date21

OK

Cancel

Image: External devices tab of the DS-Calibrator

7.4. Database

Local database section:

- Select the path where the calibration data (XML files) will be stored.
- By checking “Generate PDF Reports” PDF calibration certificates will be automatically generated at the end of the calibration procedure.
- By checking “Generate Excel reports” Excel calibration certificates will be automatically generated at the end of the calibration procedure.
- By checking “Enabling the suffix” the calibration report will have a “fail” or “pass” suffix added to the end of the file name representing the fail or pass status of device calibration.
- If the “Generate calibration procedure overview report and then run” is checked then the program chosen in the text box below will be run after the calibration procedure is finished.

Global database section:

- By checking “Enable uploading reports to global database” calibration data will be automatically uploaded to the Dewesoft server.

Overview report section:

- By changing “Certificate number format” you can define a custom format for the certificate number of the generated overview report. The format can be defined with the following variables: %filePrefix, %SystemSN, %yy, %yyyy, %mm and %dd, %counter.
- To define the file prefix as part of the certificate number simply change the “File prefix”.

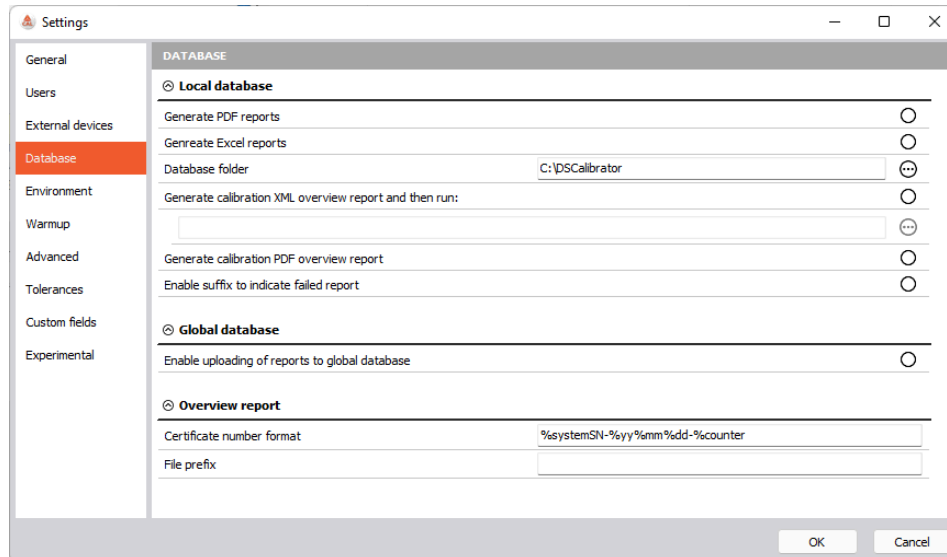


Image: Database tab of the DSCalibrator

7.5. Environment

- By checking the “Enable environment server” you enable the environment server which is used to automatically read the temperature and relative humidity from the probes.
- Enter IP address of the PC, on which is running the Environment server, to section “Host” to automatically read the temperature and humidity.

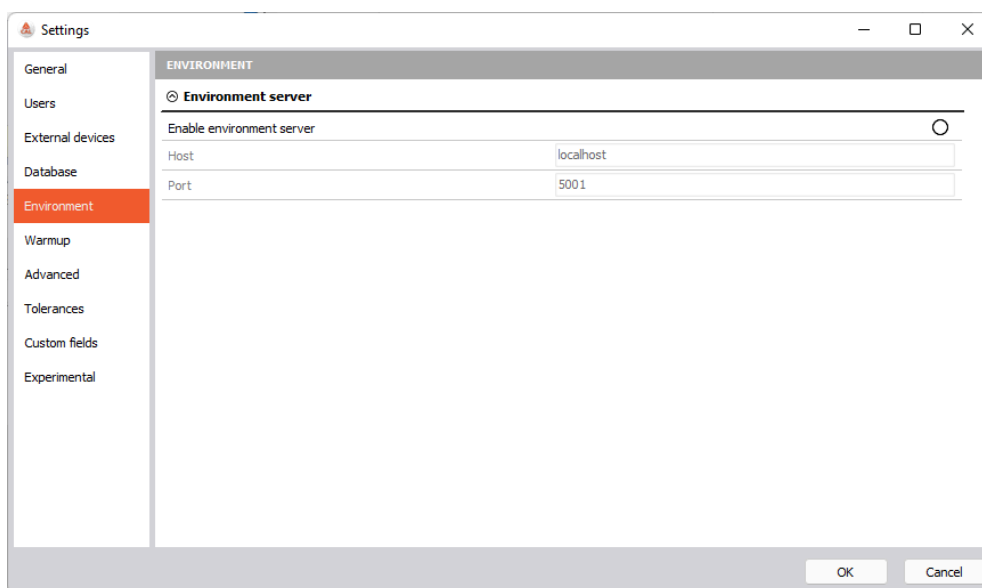


Image: Environment tab of the DSCalibrator

7.6. Warmup

- By checking the “Enable instrument warmup” you enable the device to warm-up, before the calibration process starts. You can define a time limit and a temperature limit.

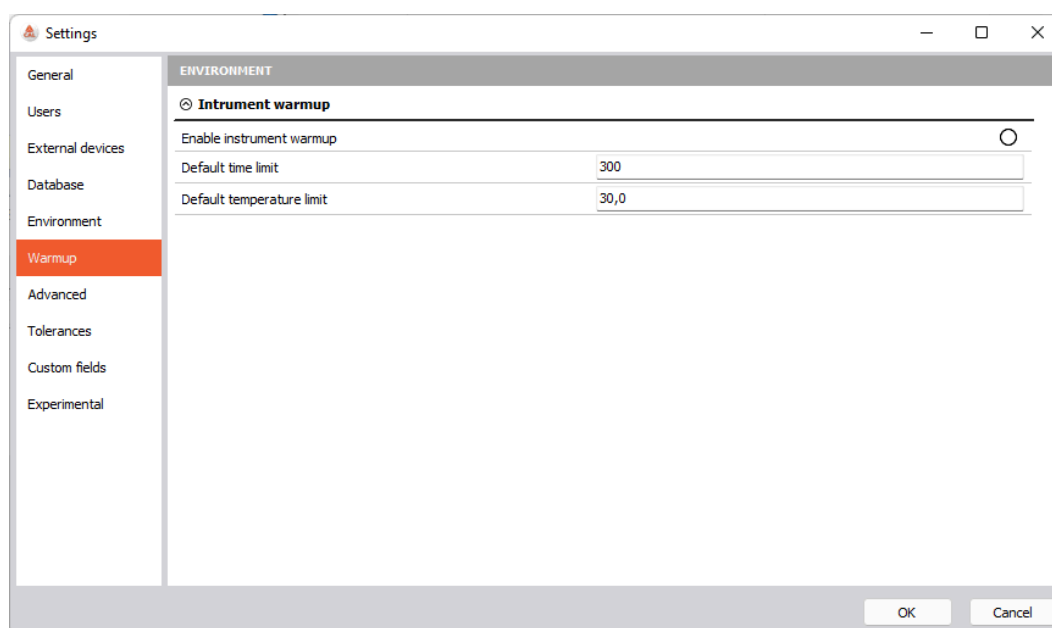


Image: Warmup tab of the DSCalibrator

7.7. Advanced

- In the advanced tab you can select and enable special tests.

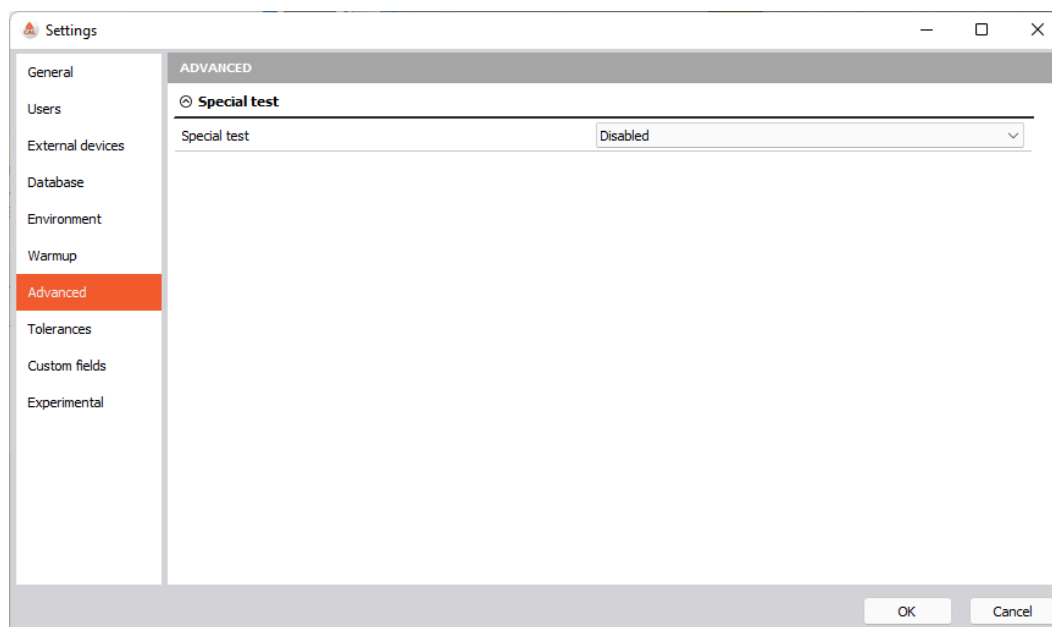


Image: Advanced tab of the DS-Calibrator

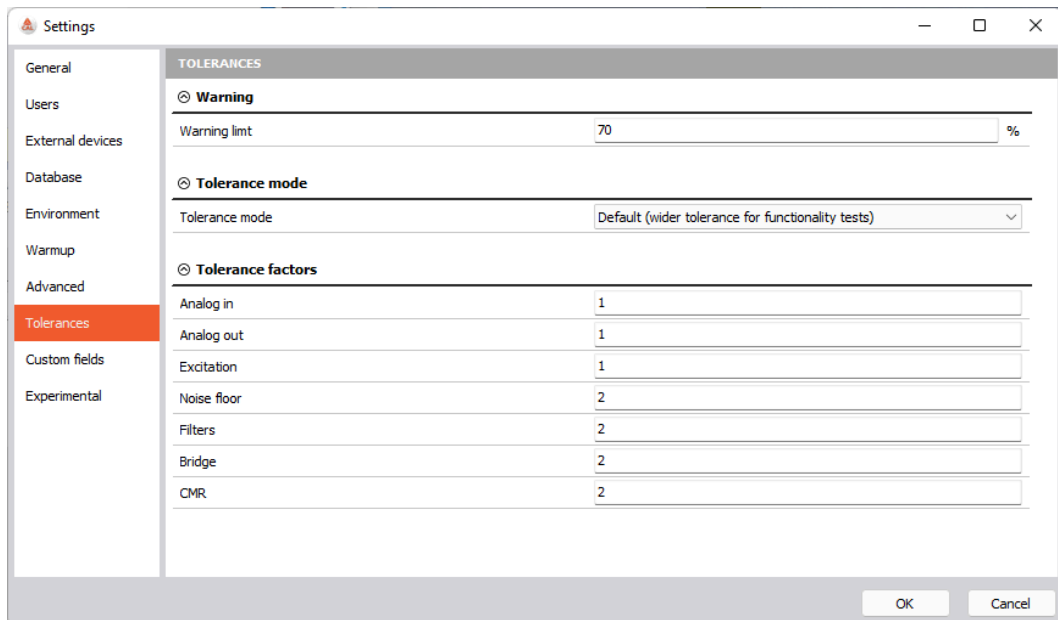
7.8. Tolerance

- The warning limit defines the maximum allowable deviation of the measured value. By default, it is set to 70 % which means if a channel has an error higher than 70 % of the allowed specification the channel will be marked in the overview in the color yellow during the calibration process. This function is used for defining if an adjustment is necessary or not.
- Leave the Tolerance mode at the default setting of “Default”; this means that the error calculation is done based on the specified accuracy of the system. The setting “Production tolerances” is used internally for functionality tests and has very tight limits.



Hint

The warning limit is very useful to diagnose if an adjustment should be done; the default value of 70 % was determined by experience and makes sure that the unit will not be out of tolerance until the next calibration after a year.



The screenshot shows the 'Settings' window of the DS-Calibrator software, specifically the 'TOLERANCES' tab. The left sidebar contains a list of settings categories: General, Users, External devices, Database, Environment, Warmup, Advanced, Tolerances (highlighted in orange), Custom fields, and Experimental. The main area of the window is divided into three sections: 'Warning', 'Tolerance mode', and 'Tolerance factors'. The 'Warning' section has a 'Warning limit' input field set to '70' with a '%' symbol to its right. The 'Tolerance mode' section has a 'Tolerance mode' dropdown menu set to 'Default (wider tolerance for functionality tests)'. The 'Tolerance factors' section contains a table with seven rows, each with a label and a corresponding input field:

Tolerance factors	
Analog in	1
Analog out	1
Excitation	1
Noise floor	2
Filters	2
Bridge	2
CMR	2

At the bottom right of the window are 'OK' and 'Cancel' buttons.

Image: Tolerance tab of the DSCalibrator

7.9. Custom fields

- You can define a custom logo (for example your company logo) in the first line which will be shown on the generated PDF calibration certificates; supported image file types are PNG and JPG.
- Additionally, you can add one or more custom fields which will also show up on the calibration certificates.
- “Predefined” type will show up as a fixed text on a calibration certificate. A fixed text must be entered here in the field “Value”.
- “Before Calibration” and “After Calibration” types which you can define before or after calibration procedure, respectively.

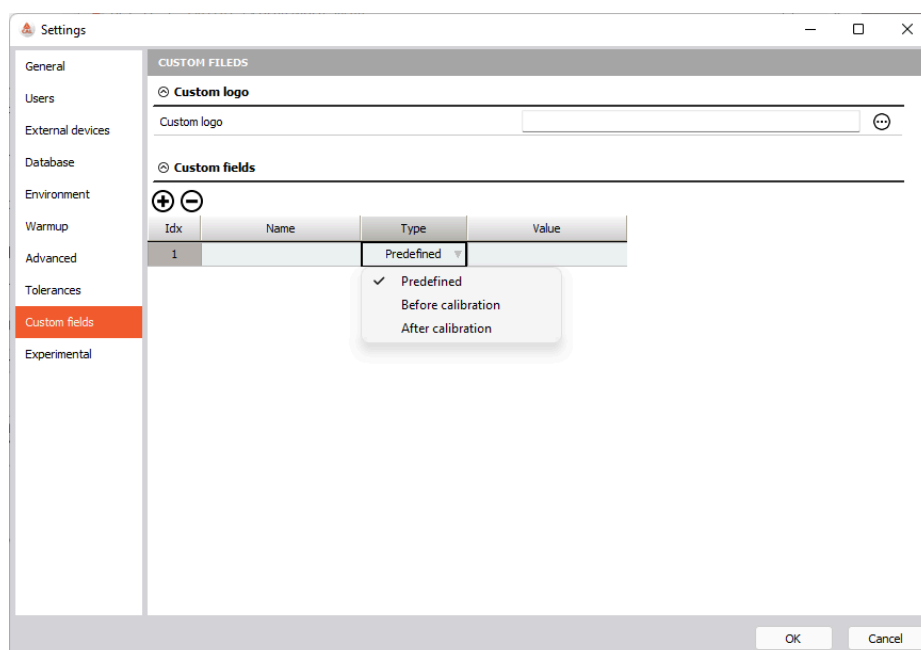


Image: Custom fields tab of the DSCalibrator

7.10. Experimental

- In the experimental tab, you can enable experimental features.



Caution

These experimental features may change, break or disappear at any time. We make absolutely no guarantees about what may happen if you turn one of these features on.

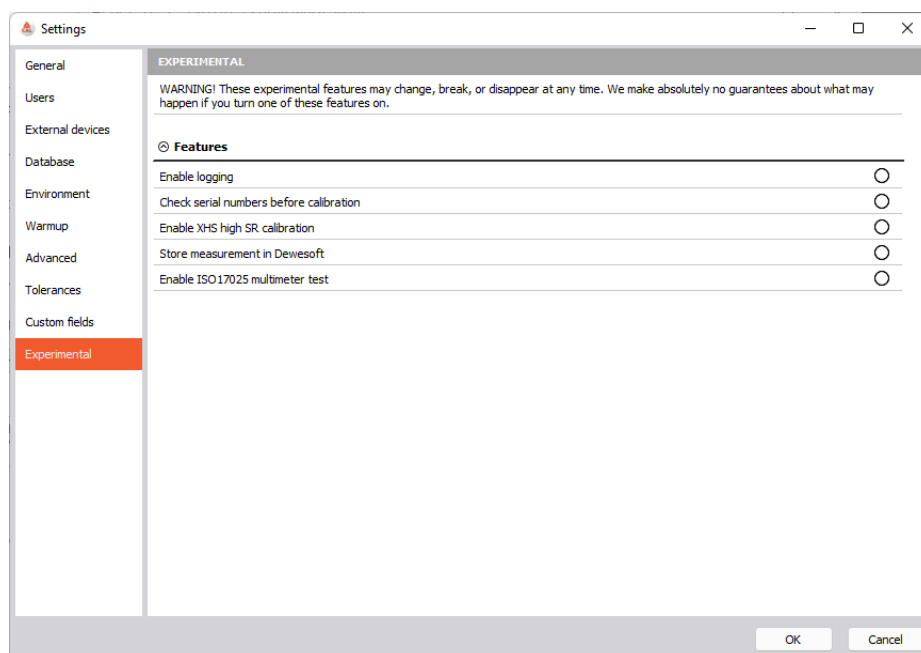


Image: Custom fields tab of the DSCalibrator

8. Using the DSCalibrator software

You should now see the screen as displayed below, showing general information about the connected Dewesoft UUT. Here it is possible to check the firmware version, the internal temperature, and the serial numbers of the installed modules.

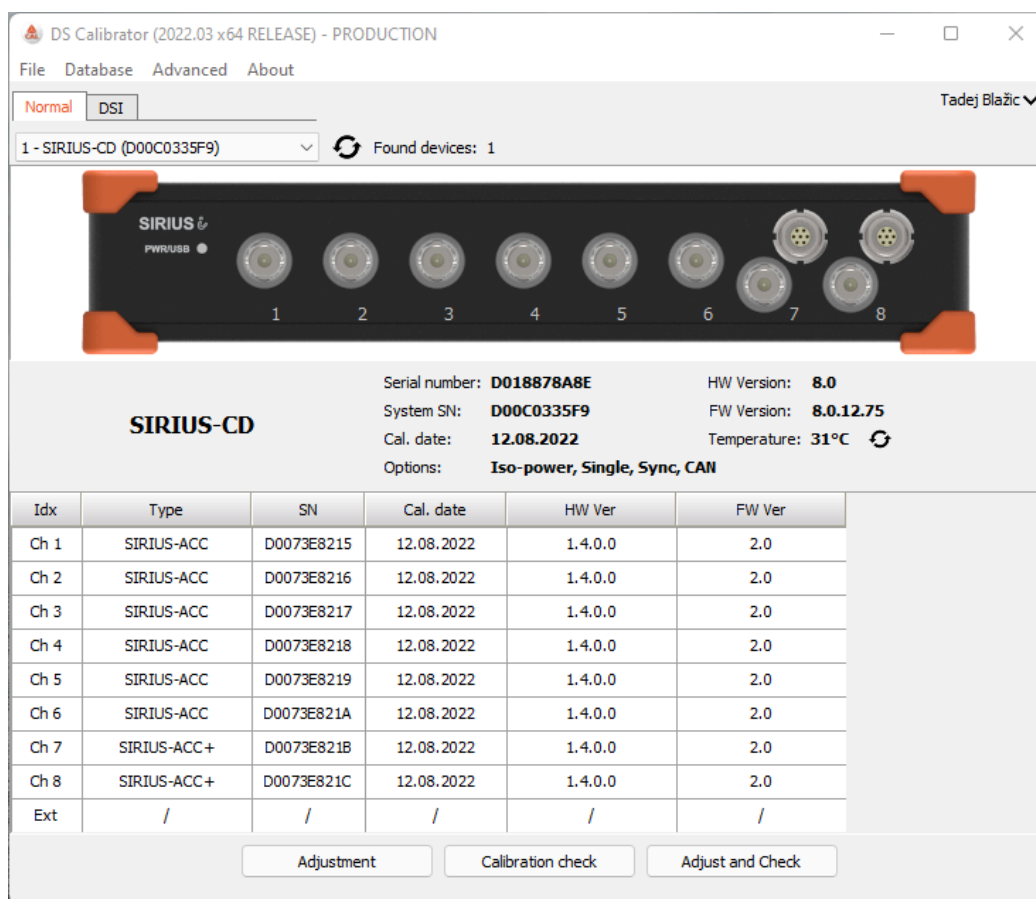


Image: DSCalibrator software overview

There are 3 possible options:

- Adjustment
- Calibration check
- Adjust and Check

8.1. Adjustment

After clicking on the Adjustment button a window will appear as shown below.

Here it is necessary to adjust the following settings before starting an adjustment procedure:

- Selection of Test groups is performed automatically. Changes to the selection for an adjustment procedure should be made only if there is a good reason to do so (see chapter Omission of tests).
- Select the modules that you want to make an adjustment on.
- Enter the environmental conditions (ambient temperature and humidity).
- The user (operator) that will perform an adjustment procedure is automatically selected and can not be changed (DSCalibrator software automatically selects the user who is logged in).
- Check “Disable report generation” if you want to perform the adjustment procedure without documenting it at the end of the adjustment procedure. The PDF calibration certificate for the adjustment procedure is never generated anyway.

When ready, press Start to begin with an adjustment procedure.

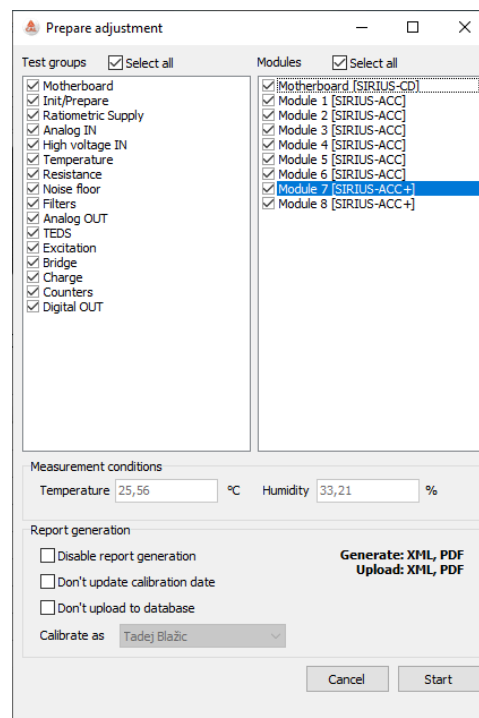


Image: Prepare adjustment procedure window



Caution

After pressing “Start” the UUT will be immediately adjusted and the existing calibration factors will be overwritten. If it is necessary to document also the actual state of calibration (“as found” state) a calibration check must be made before an adjustment!



Hint

If UUT is a Sirius HD UUT, for modules consider selecting the Motherboard and modules 1-4 in the first pass, and select modules 5-8 in the second pass. Connect appropriately all the channels according to the chapter Sirius modules.

8.2. Calibration check

After clicking on the Calibration check button a window will appear as shown below. Here it is necessary to adjust the following settings before starting a check procedure:

- Selection of Test groups is performed automatically. Changes to selection for calibration check procedure can be made if this is desired by the user (see chapter Omission of tests).
- Select the modules that you want to make a calibration check on.
- Enter the environmental conditions (ambient temperature and humidity).
- The user (operator) that will perform a calibration check is automatically selected and can not be changed.
- Check “Disable report generation” if you want to perform the calibration check procedure without documenting it at the end of the calibration procedure.

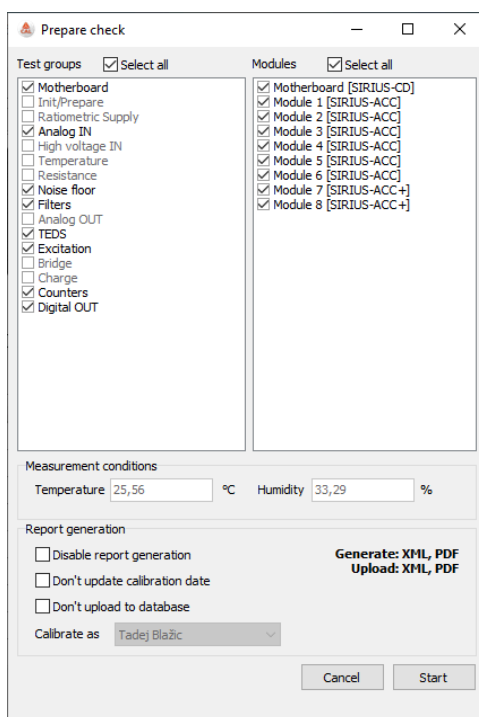


Image: Prepare check procedure window

When ready, press Start to begin with the check procedure.

8.3. Adjust and Check

Pressing the Adjust and Check button will automatically start an adjustment and immediately afterwards a calibration check of the UUT will be performed. Refer to the above-mentioned description for the detailed settings of both procedures.

8.4. Calibration procedure

A window similar to shown below will be displayed during the calibration procedure.

- A function/channel currently being performed is marked with black color (for example Excitation for channel 6 in the image below).
- A channel which was already checked and passed the limits is highlighted in green.
- A function/channel which was already checked passed the limits but exceeds the warning limit (see chapter Tolerance) is highlighted in yellow. Additionally, the whole function group will be marked yellow. You can see a detailed description of the deviation by pressing the “Details” button.
- A function/channel which was already checked but is not within the accuracy limits is highlighted in red. Additionally, the whole function group will be marked red.

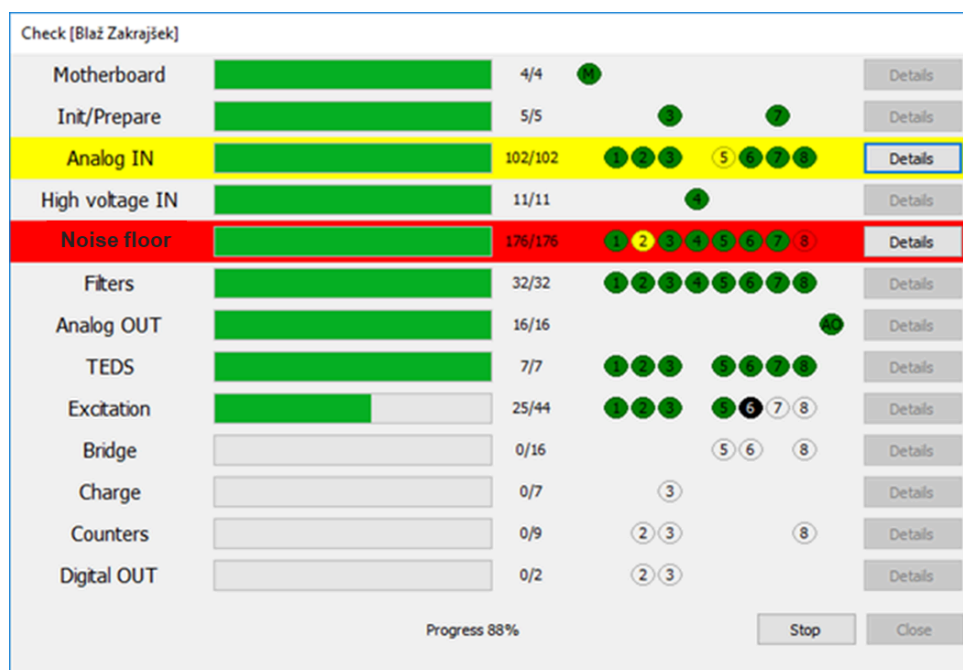


Image: Calibration check procedure in progress



Hint

An adjustment will only affect the accuracy of the Analog IN, analog OUT, and Excitation. It can not fix failed Noise floor, Filters, TEDS, Counters, and Bridge tests.

8.5. Special considerations


8.5.1. Omission of tests

Special considerations are required when omitting calibration procedure tests automatically provided by the DSCalibrator software.

UUT	Result
SIRIUS-CHG SIRIUS-HS-CHG DSI-CHG-50	Any or all of Analog IN, Noise floor, Filters, TEDS, and Charge tests fail on adjustment/calibration procedure when Init/Prepare tests are omitted.
KRYPTON 8xTH/16xTH	Analog IN tests fail on adjustment/calibration procedure when SNR tests are omitted.

8.5.2. Different module grounding setting

DSCalibrator software will notify if groups of modules require different grounding settings by issuing a warning before starting a calibration procedure similar to as shown below.



Important

Reported groups of modules must be calibrated separately! Additionally, only connections to the modules being calibrated must be made to the DS-CAL test board and all others disconnected!

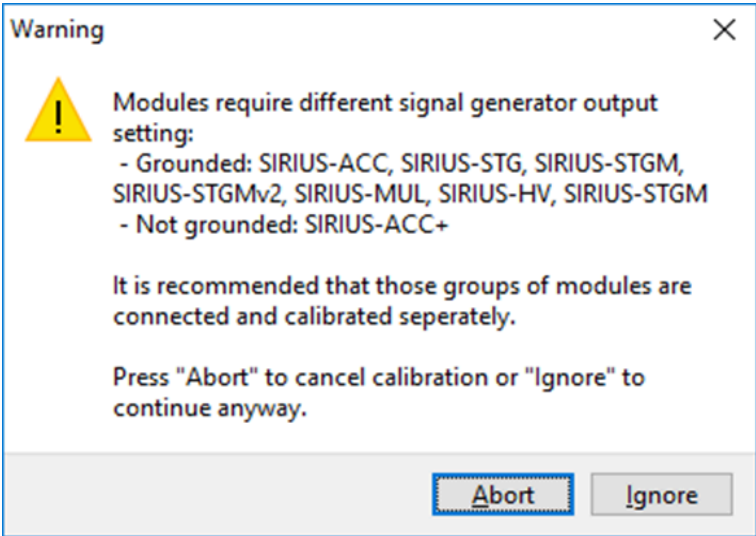


Image: Warning issued by DSCalibrator when different module grounding setting is required

8.5.3. Dewesoft UUT without CAN port

This following applies only if you use an **older version of the DS-CAL test board** and you have a **Dewesoft UUT without CAN port!**

An additional DS-CAN2 instrument must be connected to the PC performing calibration procedure along with the UUT if any of the following DS-CAL test board versions is used:

- DS-CAL1 v1
- DS-CAL1 v3

Please see chapter DS-CAL test board, to distinguish between different DS-CAL test board versions. DS-CAN must be connected to the calibration system along with the Dewesoft UUT according to the Table:

DS-CAN2	Connection description
Power	Not connected.
USB	Connects to the PC performing calibration procedure.
CAN1	Connects to the CAN1 connector of the CAN Y-cable and the other end to the DS-CAL test board.
CAN2	Connects to the CAN2 connector of the CAN Y-cable.

8.6. Custom serial number

DSCalibrator enables you to define your own serial numbers for your devices. These serial numbers will be seen on the calibration reports and in the DSCalibrator. To define custom serial numbers go to File and open the “Custom serial numbers editor...”

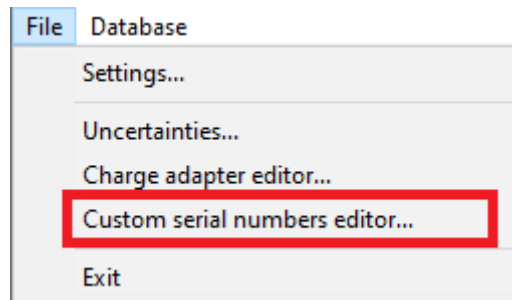


Image: Open Custom serial numbers editor

A new window will appear:

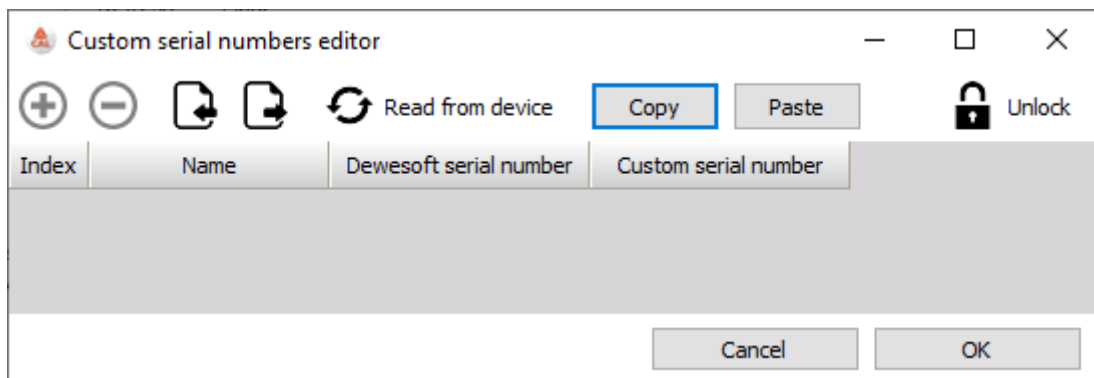


Image: Custom serial numbers editor

By unlocking the form you are able to add new custom serial numbers. You can add or remove elements by clicking the “+” and “-” buttons. You can also import and export serial numbers from an XML file or simply Copy and Paste them to this form. The serial numbers can also be read directly from the system currently connected to the DSCalibrator and then define a new custom serial number for these devices.

8.7. Overview report

To create an overview report for a system of devices click on the Database button and choose “Create overview PDF report...”

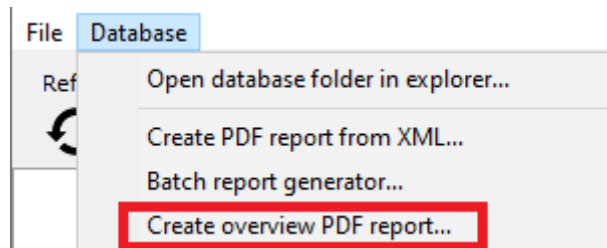


Image: Open Create overview PDF report

A new window will appear:

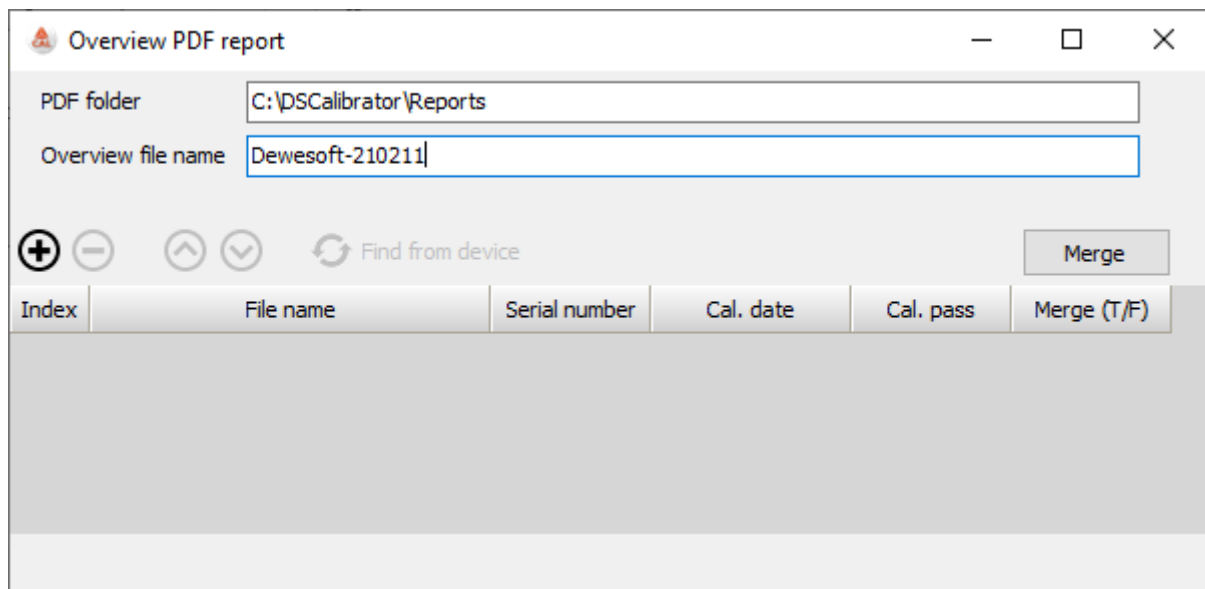


Image: Overview PDF report

To generate an overview report add XML reports to the list. You can add the reports by clicking the “+” button and choosing a file from a folder on your computer or by clicking the “Find from device” button, this will check your local database and add the latest found report to the list. After a report is added to the list you can see a quick overview of its status (serial number of the device, calibration date, and information whether calibration passed or failed). For each report in the list, you can also choose whatever you want it to be included in the overview report.

Before merging the reports in the list you can specify the location of where you want to save the report or change the name of the file, note that the name of the file is also the certificate number of the report.

After clicking the Merge file a new overview report will be generated in the specified location on your computer.

8.8. Manual upload of calibration reports to the database

DSCalibrator enables you to manually upload calibration reports to the database. This feature is useful in case that connection to ethernet (LAN) is not possible at the time of calibration (we recommend that the PC which is used for calibration is always connected to ethernet).

To manually upload calibration reports you first need to collect all .xml reports of all calibrated modules. You can find all .xml files on the PC on which calibration was performed. After that follow the next steps:

1. Open DSCalibrator and Log-in.
2. Click on “Database” → “Create PDF report from XML”

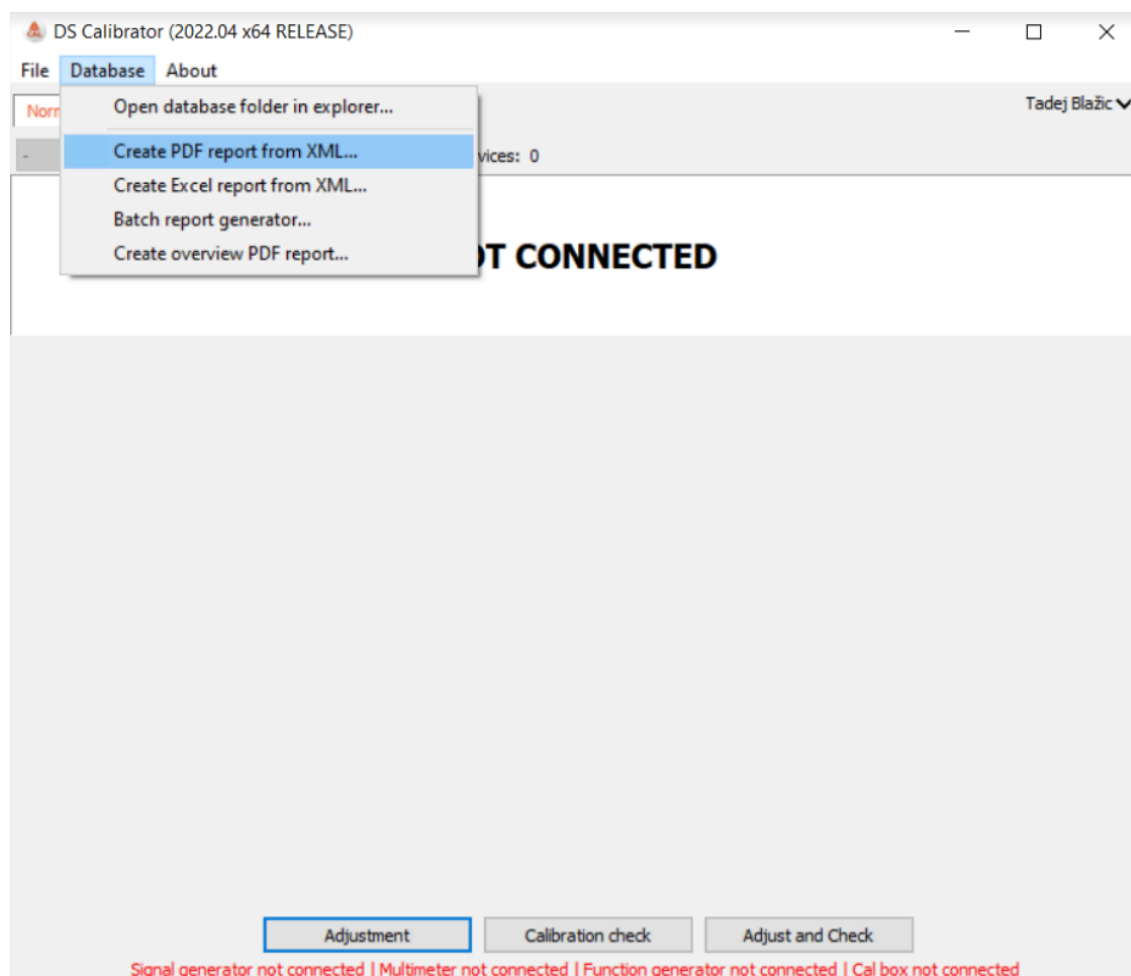


Image : DSCalibrator - database

3. Select .xml files (from which you would like to create PDF report and upload them to database) and click "Open"

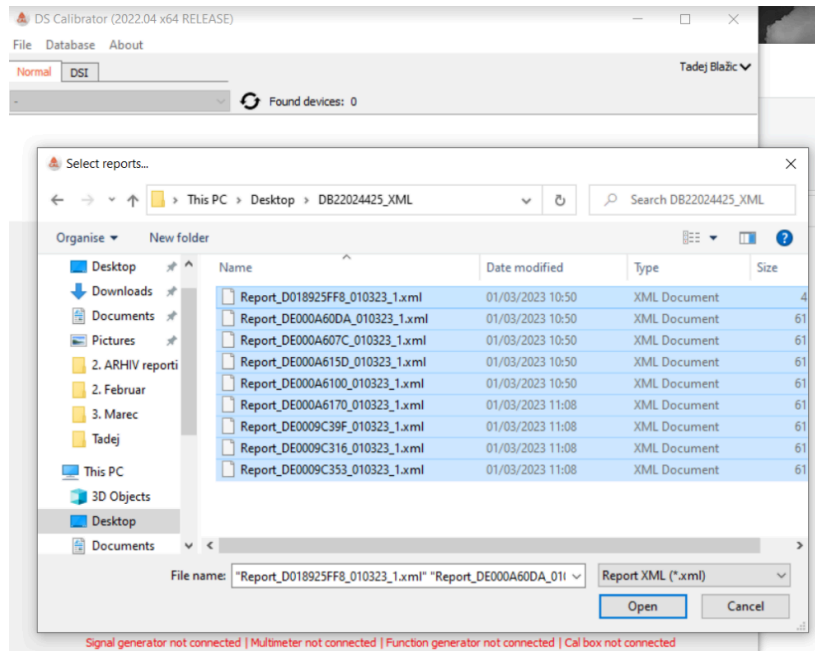


Image: Selecting .xml files

4. Click on "yes" and wait to DSC upload reports to database

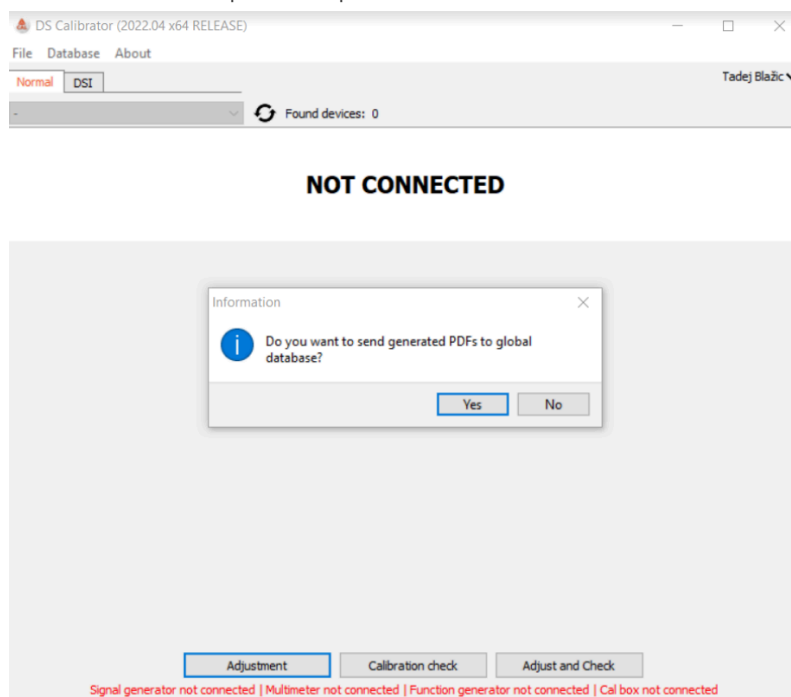


Image: Uploading reports to database

5. Back you receive information that report generation is done

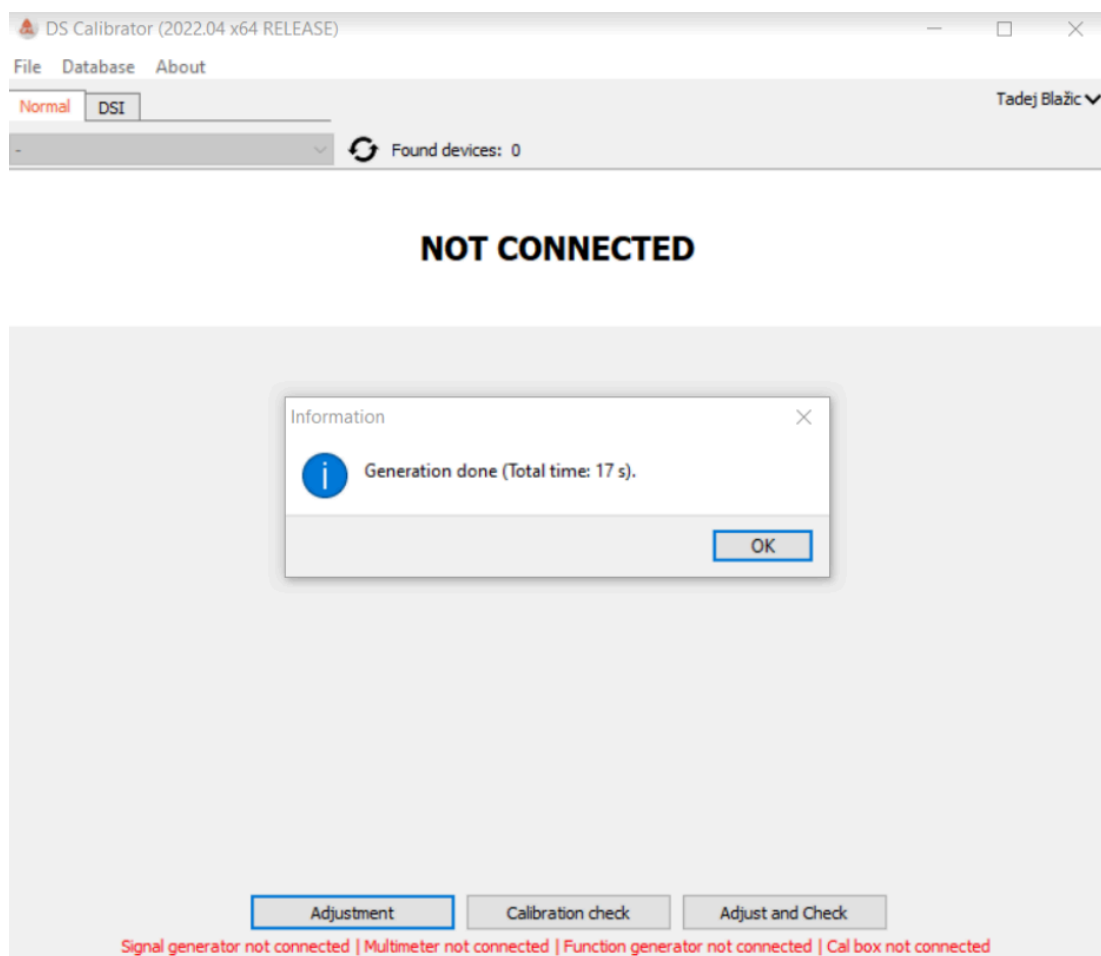


Image: Generation done

9. Connecting the Sirius UUT

Dewesoft UUTs connect to the calibration system in many different ways according to the different Dewesoft products. The most common types are described in the following chapters.



Important

Before the calibration, make sure that device is heated up to its working temperature. The Proposal is to run the UUT for at least 2h, before the start of the calibration.



Important

When making connections please pay close attention to the channel order on the DS-CAL test board and UUT and connect appropriately. Additionally, make sure that all connections to the connectors of UUT are made unless otherwise specified!

9.1. Sirius USB

Connect the Sirius USB UUT as described in the table below. Picture of Sirius USB UUT for reference:

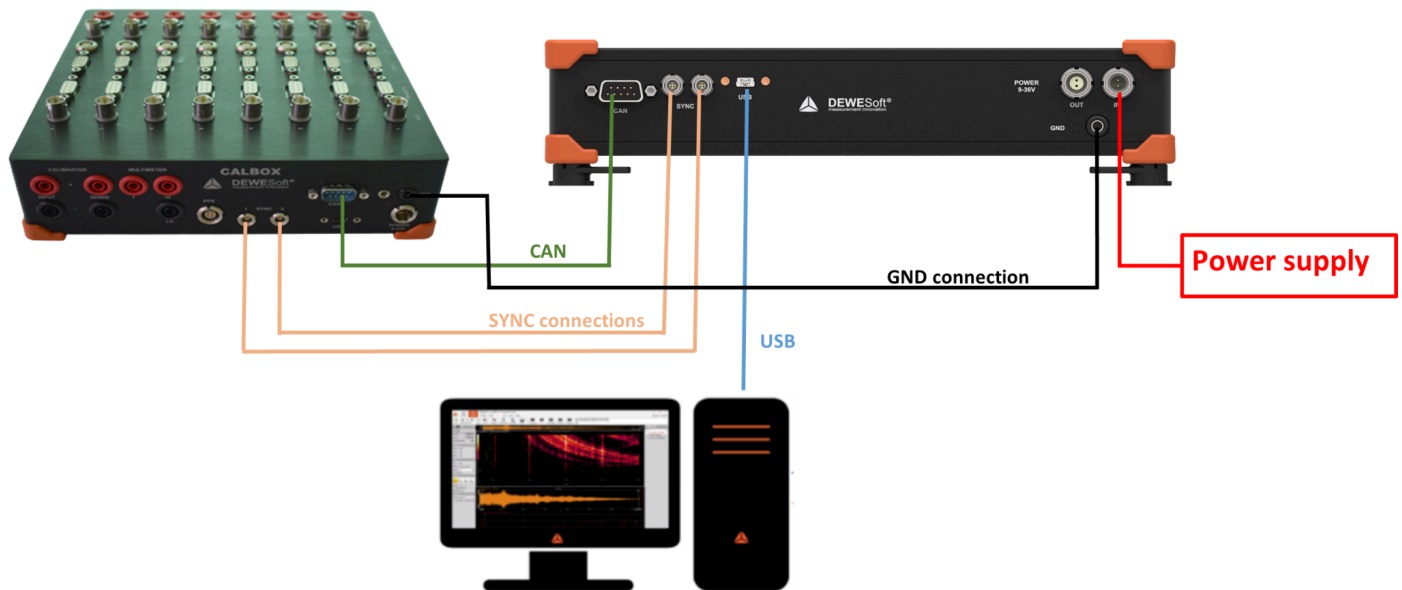


Image: Sirius USB UUT connections

Sirius USB UUT requires the CAN cable, two Sync cables, a USB cable, a power cable, and a banana plug cable for grounding to be connected. Please note that only the CAN1 connector of the CAN Y-cable connects to the Sirius USB UUT. There is no distinction between the two Sync connectors.

Sirius USB UUT	Connection
POWER IN	Connects to the dedicated power supply.
POWER OUT	Not connected.
GND	Connects to the GND connector of the DS-CAL test board.
USB	Connects to the PC.
SYNC (1, 2)	Connects to the SYNC (1, 2) connector of the DS-CAL test board.
CAN	Connects to the CAN connector of the DS-CAL test board. NOTE: Only the CAN1 connector of the CAN Y-cable connects the UUT.

The next step is to connect all the modules of the Sirius USB UUT. See chapter Sirius modules.

9.2. Sirius EtherCAT

Connect the Sirius EtherCAT UUT as described in the table below. Picture of Sirius EtherCAT UUT for reference:

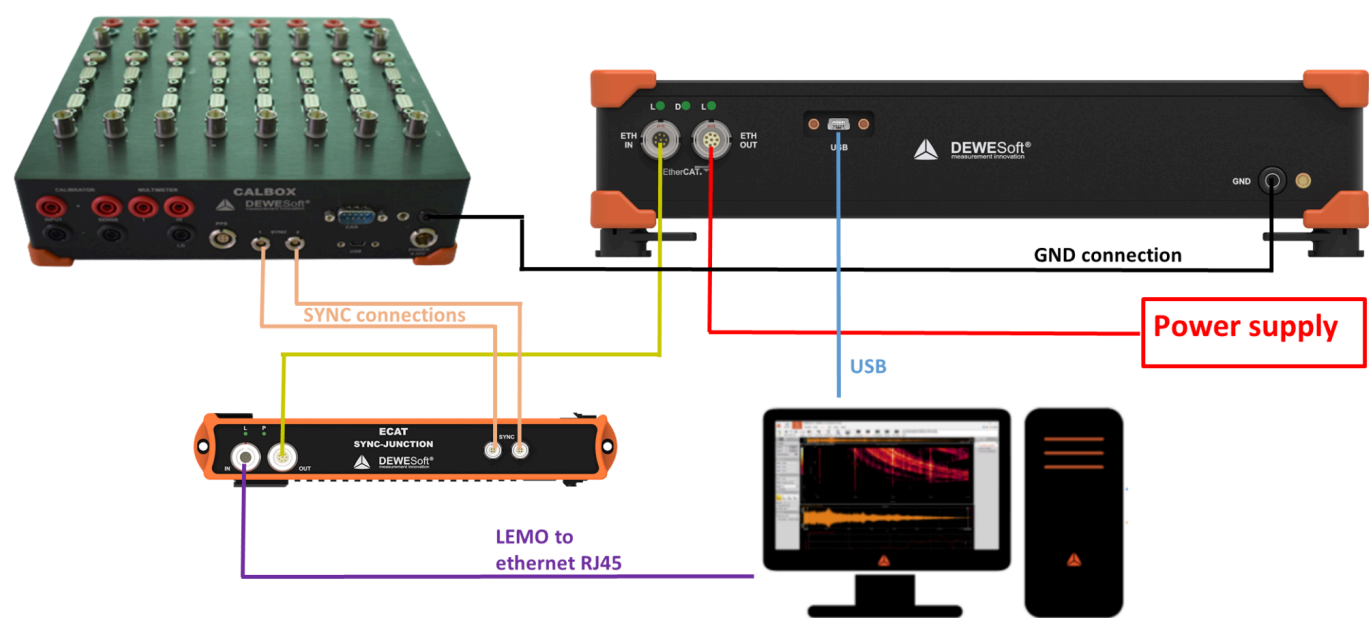


Image: Sirius EtherCAT UUT connection

Sirius EtherCAT UUT requires the 8-pin LEMO power cable, a USB cable, and a banana plug cable for grounding to be connected. Sirius EtherCAT UUT must be connected to the PC via USB cable, it is not possible to perform calibration procedure via EtherCAT connection!

Sirius EtherCAT UUT	Connection
ETH IN	Connects to the SYNC-JUNCTION “out”
ETH OUT	Connects to the dedicated power supply.
USB	Connects to the PC.
GND	Connects to the GND connector of the DS-CAL test board.



Important

For the Sirius EtherCAT UUT please consult the Sirius Technical Reference Manual for information about ways of connecting power and data connection and usage of proper cables! Cables for connecting the Sirius EtherCAT UUT are not included in the DS-CAL-BOX package, see chapter DS-CAL-BOX.



Important

If you are using the DS-CAL1 v1 or DS-CAL1 v3 test board, you must use and connect DS-CAN2 along with the UUT (see chapter Dewesoft UUT without CAN port)!



Hint

First connect the PS and USB to the UUT. When UUT is recognized by DSCalibrator, connect SYNC-JUNCTION to UUT and click on refresh the button in the DSCalibrator.

The next step is to connect all the modules of the Sirius EtherCAT UUT. See chapter Sirius modules.

9.3. Sirius Mini

Connect the Sirius Mini UUT as described in the table below. Picture of Sirius Mini UUT for reference:

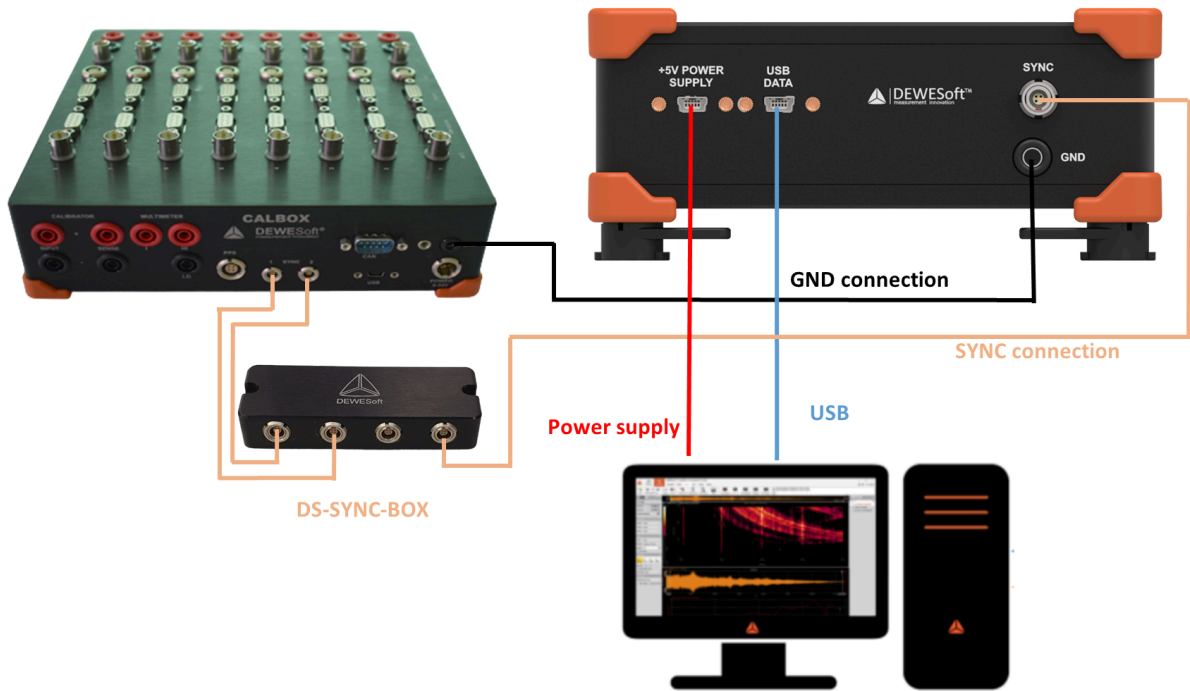


Image: Sirius Mini UUT connections

Sirius Mini UUT requires two USB cables, a SYNC connector, and a banana plug cable for grounding connection.

Sirius Mini UUT	Connection
+5V Power supply	Connects to the PC. NOTE: Only USB power is used via this connector.
USB Data	Connects to the PC. NOTE: Only a USB connection to the Sirius Mini UUT is established via this connector.
SYNC	Connects to the DS-SYNC-BOX and then to the both SYNC connectors of the DS-CAL test board
GND	Connects to the GND connector of the DS-CAL test board.



Important

If you are using the DS-CAL1 v1 or DS-CAL1 v3 test board, you must use and connect DS-CAN2 along with the UUT (see chapter Dewesoft UUT without CAN port)!



Important

Before the calibration, run the SIRIUSi Mini for at least 2h. It has to be heated up to working temperature.

9.3.1. SIRIUSm-3xACC-1xACC+

ACC modules connect to the DS-CAL test board via a BNC-to-BNC cable to the appropriate **ACC (BNC connector) channel** of the DS-CAL test board.

ACC+ module must also have the counter connector connected to the appropriate **counter (CNT connector) channel** on the DS-CAL test board.

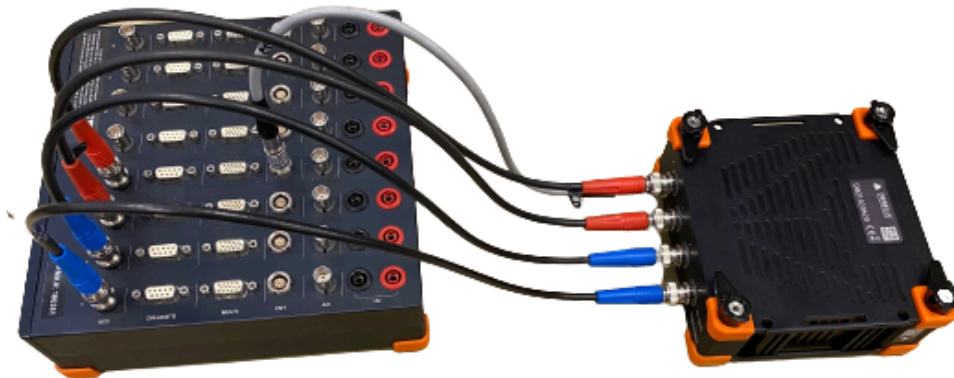


Image: Example of connecting Siriusm-3xACC-1xACC+ to DS CAL test board

9.3.2. SIRIUSm-4xACC

ACC modules connect to the DS-CAL test board via a BNC-to-BNC cable to the appropriate **ACC (BNC connector) channel** of the DS-CAL test board.

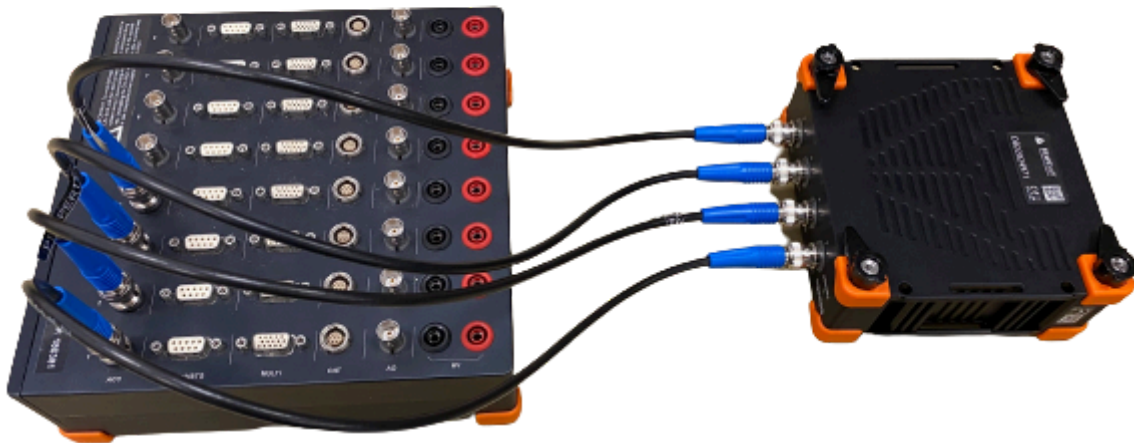


Image: Example of connecting Siriusm-4xACC to DS CAL test board

9.4. Sirius modules



Important

Unless otherwise noted, channel 1 on the UUT connects to channel 1 on the DS-CAL test board and so on for up to all eight UUT channels, respectively.



Important

Sirius HD UUT only: Due to the doubled amount of channels two calibration passes are required. At first pass connect UUT channels 1 to 8 to the DS-CAL test board's channels 1 to 8, respectively. Continue with a second pass by connecting UUT channels 9 to 16 to the DS-CAL test board's channels 1 to 8, respectively. You will be notified during the calibration procedure by the DSCalibrator software which channels should be connected when.

9.4.1. Sirius ACC and HS-ACC

ACC and HS-ACC modules connect to the DS-CAL test board via a BNC-to-BNC cable to the appropriate **ACC (BNC connector) channel** of the DS-CAL test board.

ACC+ and HS-ACC+ modules must also have the counter connector connected to the appropriate **counter (CNT connector) channel** on the DS-CAL test board.



Important

ACC+ and HS-ACC+ modules must be calibrated separately because of the required different grounding settings due to the connected counter channel (see chapter Different module grounding setting).

Example of connecting 8xACC Sirius modules to DS-CAL test board:

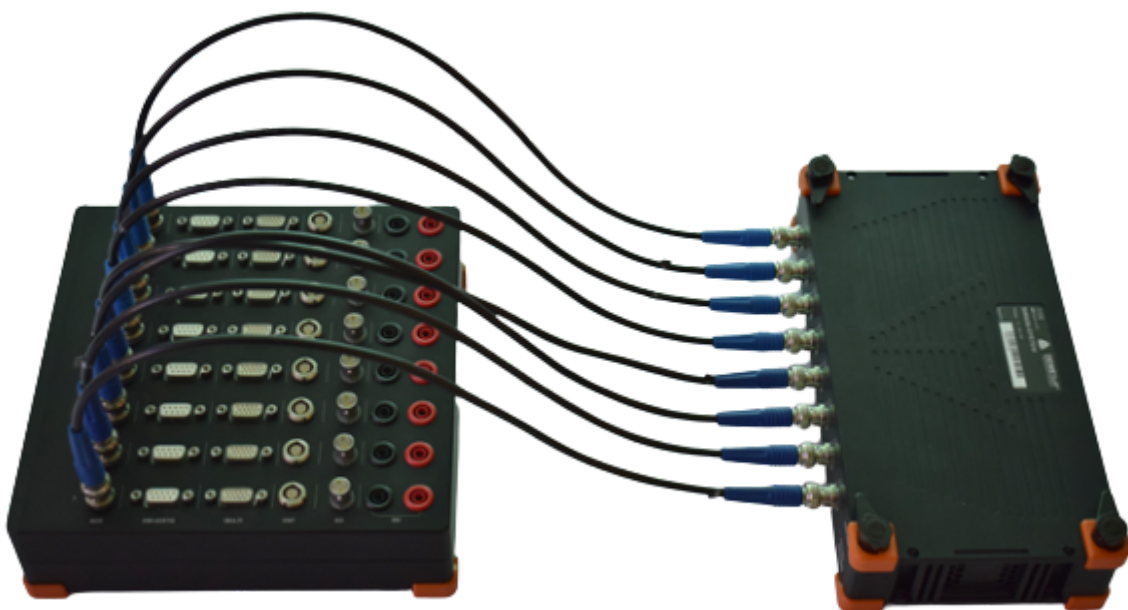


Image: Example of connecting 8xACC Sirius modules to DS-CAL test board

9.4.2. Sirius CHG and HS-CHG



Important

For the calibration of Sirius CHG or HS-CHG an accessory package CHG CAL ADAPTER is required (see chapter CHG-CAL-ADAPTER)!

CHG and HS-CHG modules connect to the DS-CAL test board via a BNC-to-BNC cable to the **CHG-CAL adapter's BNC connector**. CHG-CAL adapter plugs into the appropriate **MULTI (DSUB15 connector) channel** on the DS-CAL test board.

Example of connecting 4xCHG Sirius modules to DS-CAL test board:

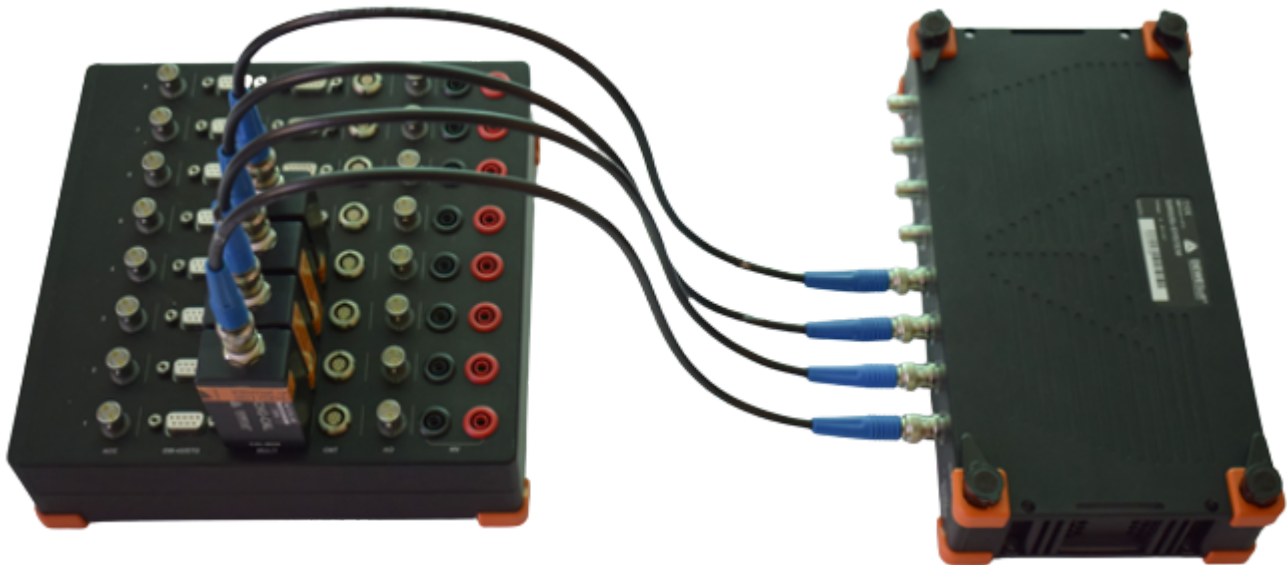


Image: Example of connecting 4xCHG Sirius modules to DS-CAL test board

The principle of connecting to the CHG-CAL adapter applies also for other available module front connectors (for example CHG-TNC). CHG+ and HS-CHG+ modules must also have the counter connector connected to the appropriate **counter (CNT connector) channel** on the DS-CAL test board.



Hint

If omitting calibration tests for these modules, see chapter Omission of tests.

9.4.3. Sirius HV and HS-HV

HV and HS-HV modules connect to the DS-CAL test board via the banana cables to the appropriate **HV (BANANA connector) channel** of the DS-CAL test board.



Warning

Only HV and HS-HV modules should be connected to the DS-CAL test board's HV connectors, unless otherwise noted! During the calibration procedure voltage up to 1000 V can appear on the output of the used multifunction calibrator! Use only the 4 mm safety test leads with touch protection and follow strictly the safety instructions provided by the manual!

Example of connecting 4xHS-HV Sirius modules to DS-CAL test board:



Image: Example of connecting 4xHS-HV Sirius modules to DS-CAL test board



Hint

For calibration of HV and HS-HV modules consider also the usage of a proper multifunction calibrator model for filter tests. See table in chapter Multifunction calibrator support.

9.4.4. Sirius LV and HS-LV



Caution NEVER connect the LV or HS-LV module to the HV connector on the DS-CAL test board! If Sirius UUT contains mixed modules (for example a combination of LV and HV modules with banana fronts) make sure NOT to connect the LV or HS-LV modules to the HV connector on the DS-CAL test board as this will incur permanent damage to the LV or HS-LV module! Always connect LV or HS-LV modules according to the Table below.

LV and HS-LV modules connect to the DS-CAL test board:

Module (Connector)	DS-CAL test board channel (Connector)
LV (DSUB9), HS-LV (DSUB9)	DEWE-43/STG (DSUB9)
LV (BNC), HS-LV (BNC)	ACC (BNC)
LV (BANANA), HS-LV (BANANA)	ACC (BNC via BANANA-to-BNC adapter)

Example of connecting 4xHS-LV Sirius modules with Banana fronts to the DS-CAL test board:

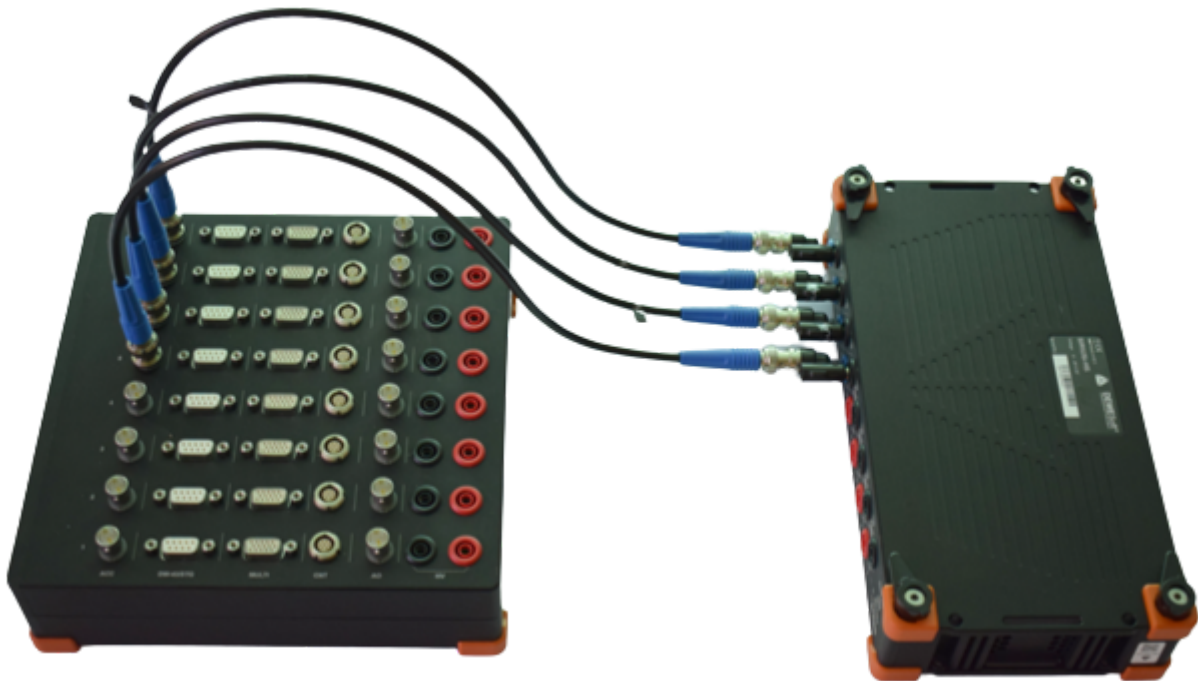


Image: Example of connecting 4xHS LV Sirius modules with Banana fronts to the DS CAL test board

LV+ and HS-LV+ modules must also have the counter connector connected to the appropriate counter (CNT connector) channel on the DS-CAL test board.

9.4.5. Sirius MULTI

MULTI modules connect to the DS-CAL test board via a DSUB15-to-DSUB15 cable to the appropriate **MULTI (DSUB15 connector) channel** of the DS-CAL test board.



Caution

In case, that Sirius device with MULTI channels also has AO channels on the back of the device, make sure that the AO channels are disconnected from CAL-BOX in time of MULTI channels calibration. In this case you have to calibrate MULTI channels separately and AO channels on the back separately, otherwise calibration fails.

9.4.6. Sirius STG and STGM

STG and STGM modules connect to the DS-CAL test board via a DSUB9-to-DSUB9 cable to the appropriate **DEWE-43/STG (DSUB9 connector) channel** of the DS-CAL test board.

The principle of connecting to the appropriate **DEWE-43/STG (DSUB9 connector) channel** on the DS-CAL test board channel applies also for other available module front connectors (for example STG L2B7f, STG L2B10f, STGM L2B8f, STGM L2B16f, and others).

STG+ and STGM+ modules must also have the counter connector connected to the appropriate **counter (CNT connector) channel** on the DS-CAL test board.

Example of connecting the 8xHS-STG Sirius modules to the DS-CAL test board:

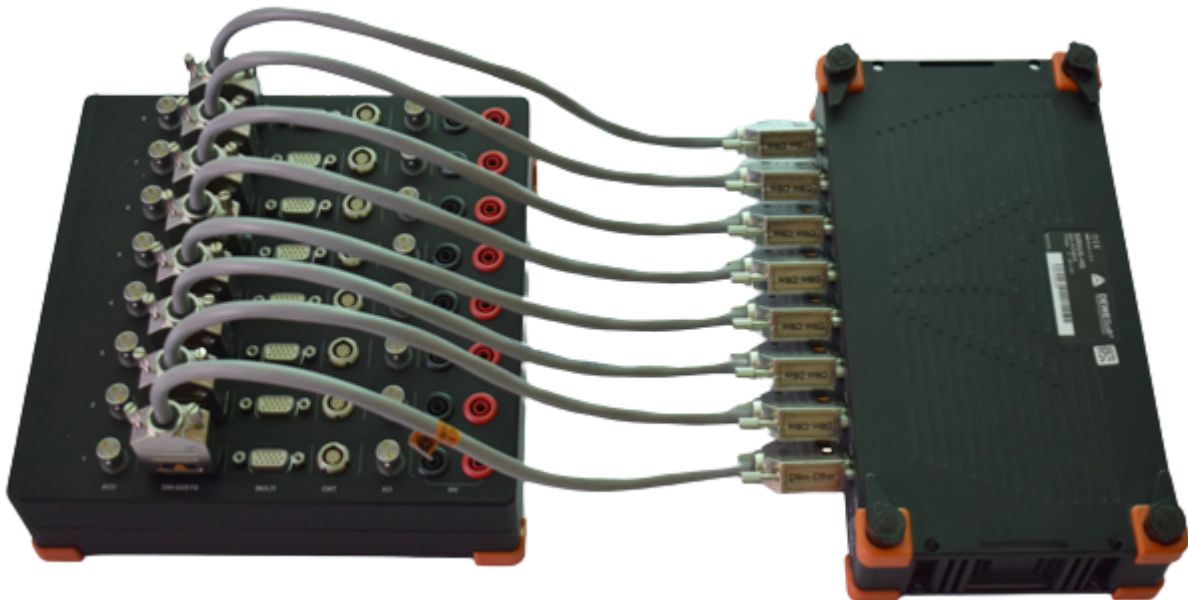


Image: Example of connecting 8xHS-STG Sirius modules to the DS-CAL test board

9.4.7. Sirius HD-ACC

HD-ACC connect to the DS-CAL test board via a BNC-to-BNC cable to the appropriate **ACC (BNC connector) channel** of the DS-CAL test board:

Module (Connector)	DS-CAL test board channel (Connector)
HD-ACC (BNC), channels 1-8	ACC (BNC), channels 1-8
HD-ACC (BNC), channels 9-16	ACC (BNC), channels 1-8

Example of connecting the first half of 8xHD-ACC Sirius modules to the DS-CAL test board:

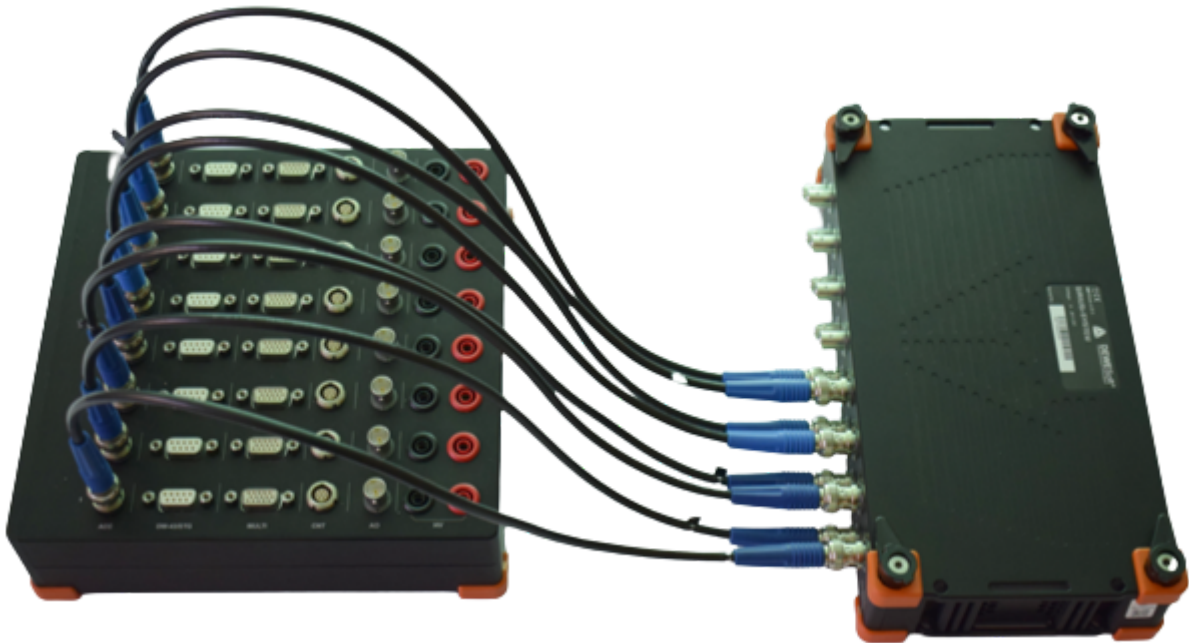


Image: Example of connecting the first half of 8xHD-ACC Sirius modules to the DS-CAL test board

9.4.8. Sirius HD-LV

LV and HS-LV modules connect to the DS-CAL test board:

Module (Connector)	DS-CAL test board channel (Connector)
HD-LV (DSUB9), channels 1-8	DEWE-43/STG (DSUB9), channels 1-8
HD-LV (DSUB9), channels 9-16	DEWE-43/STG (DSUB9), channels 1-8
HD-LV (BNC), channels 1-8	ACC (BNC), channels 1-8
HD-LV (BNC), channels 9-16	ACC (BNC), channels 1-8

Example of connecting the second half of 8xHD-LV Sirius modules to the DS-CAL test board:

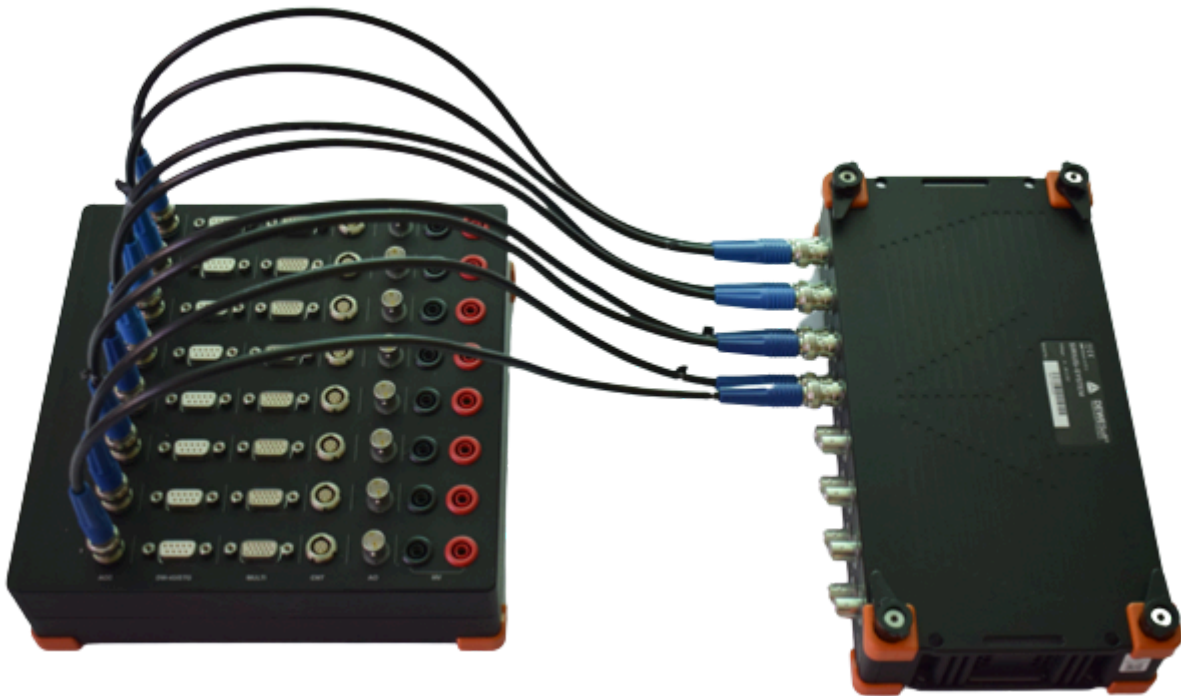


Image: Example of connecting the second half of 8xHD LV Sirius modules to the DS CAL test board

9.4.9. Sirius HD-STGS and SIRIUS-HD-16xSTGS-L1B10f

HD-STGS modules connect to the DS-CAL test board:

Module (Connector)	DS-CAL test board channel (Connector)
HD-STGS (DSUB9), channels 1-8	DEWE-43/STG (DSUB9), channels 1-8
HD-STGS (DSUB9), channels 9-16	DEWE-43/STG (DSUB9), channels 1-8
HD-STGS (DSUB15), channels 1-8	MULTI (DSUB15), channels 1-8
HD-STGS (DSUB15), channels 9-16	MULTI (DSUB15), channels 1-8

The principle of connecting to the appropriate connector on the DS-CAL test board channel applies also for other available module front connectors not listed in the table above.

Example of connecting the first half of 8xHD-STGS Sirius modules to the DS-CAL test board:

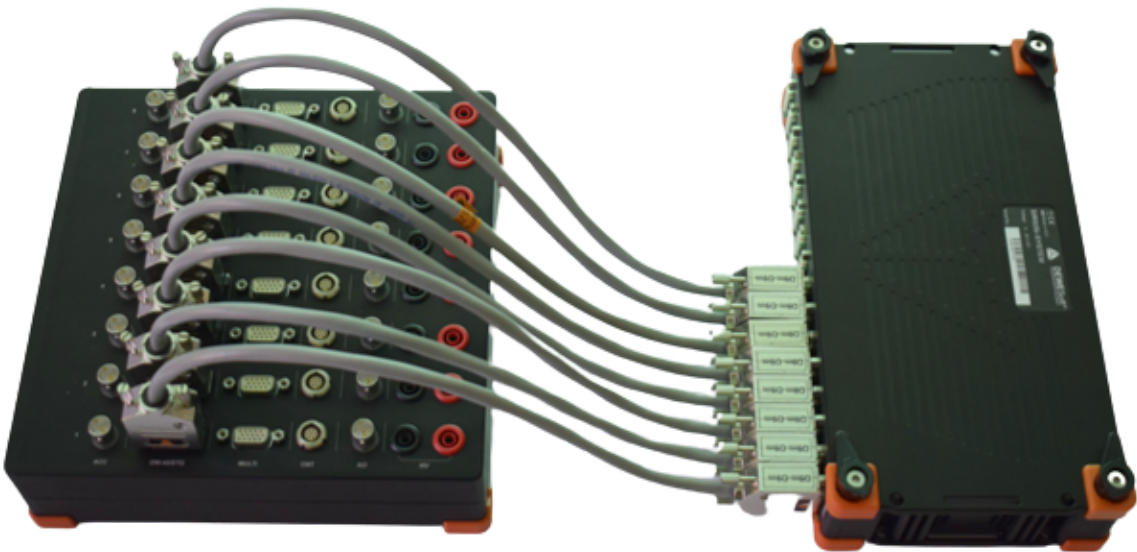


Image: Example of connecting the first half of 8xHD STGS Sirius modules to the DS CAL test board



Important

For the calibration of SIRIUS-HD-16xSTGS-L1B10f UUT special (L1B10m-D9M) cables are required! Contact our support team for more information.

9.4.10. Sirius AO

The AO module connects to the DS-CAL test board via a BNC-to-BNC cable to the appropriate **AO (BNC connector) channel** of the DS-CAL test board. All eight channels must be connected and calibrated at once.

Example of connecting the Sirius AO module to the DS-CAL test board:

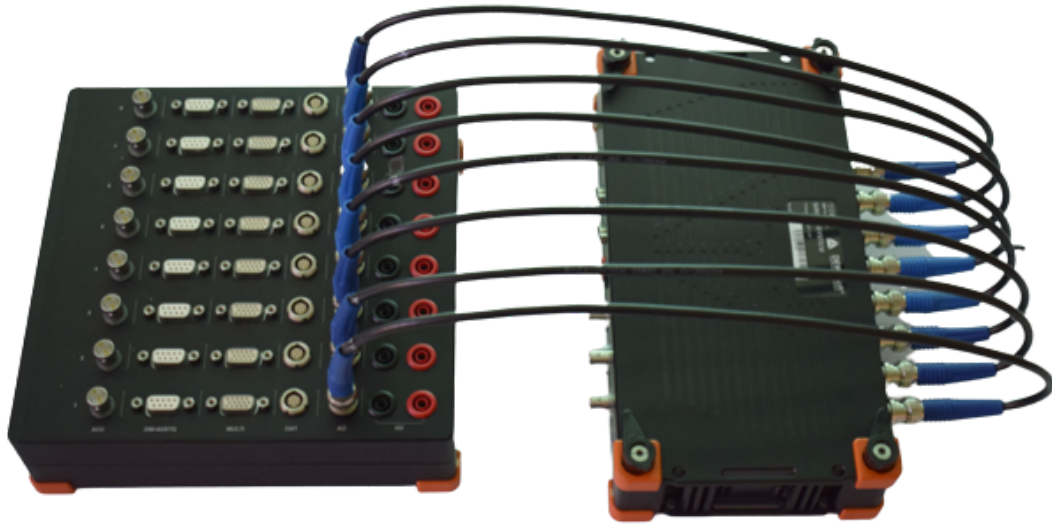


Image: Example of connecting the Sirius AO module to the DS-CAL test board

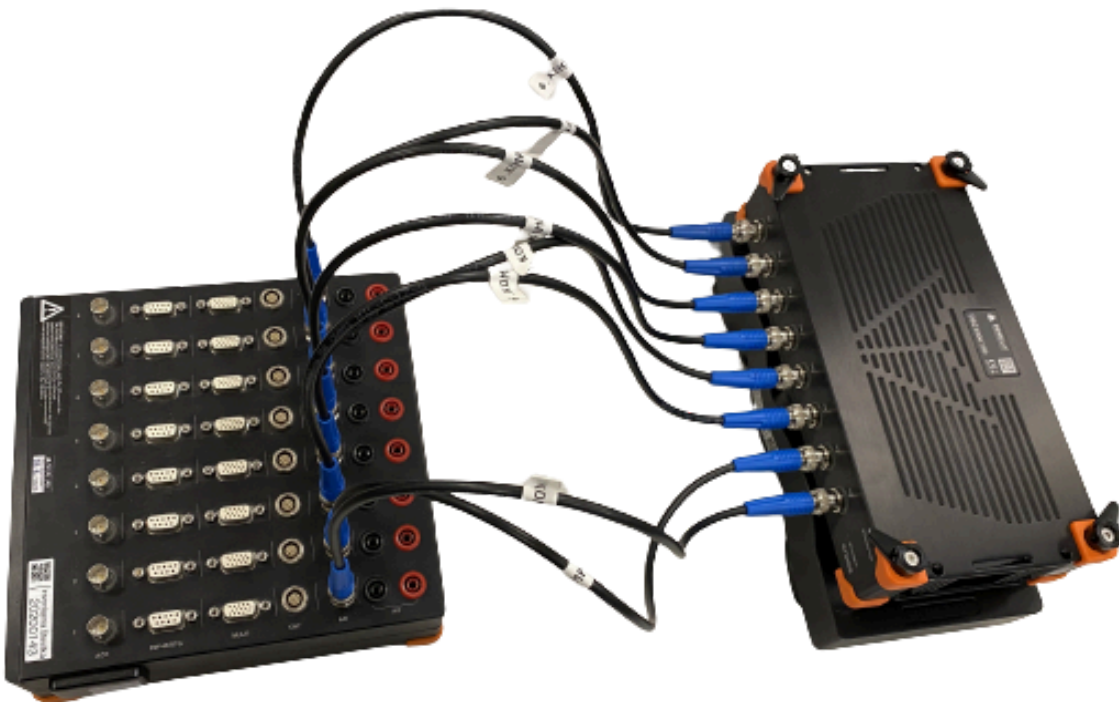


Image: Example of connecting the SIRIUS-8xAO to the DS-CAL test board

9.5. SIRIUSiwe

Connect the SIRIUSiwe UUT as shown on the image and as described by the Table below.

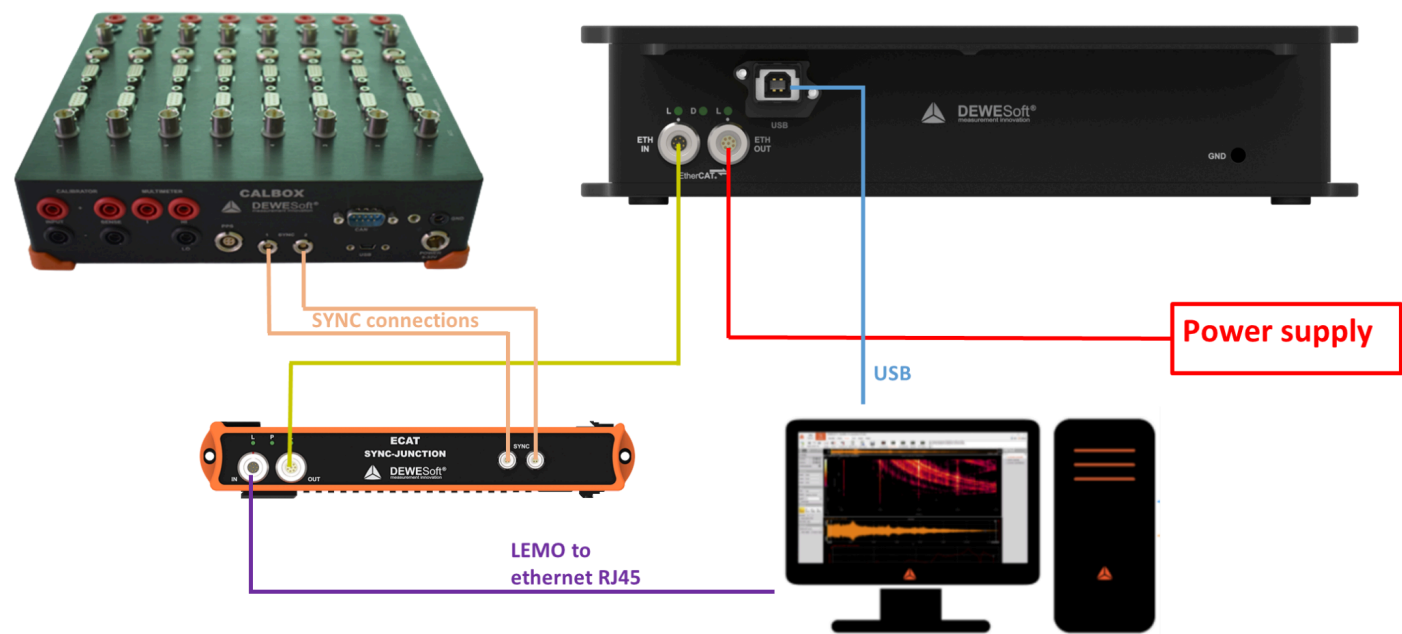


Image: SIRIUSiwe UUT connections

SIRIUSWe	Connection
ETH IN	Connects to the SYNC-JUNCTION "OUT" connector.
ETH OUT	Connects to the dedicated power supply.
USB	Connects to the PC.



Important
Before the calibration, run the SIRIUSiwe for at least 2h. It has to be heated up to working temperature.

9.5.1. SIRIUSiwe-6xSTGM-2xSTGM+

STGM modules connect to the DS-CAL test board via a DSUB9-to-DSUB9 cable to the appropriate DEWE-43/STG (DSUB9 connector) channel of the DS-CAL test board. STGM+ modules must also have the counter connector connected to the appropriate counter (CNT connector) channel on the DS-CAL test board.



Important

Before the calibration, run the Sirius UUT for at least 2h. It has to be heated up to working temperature.

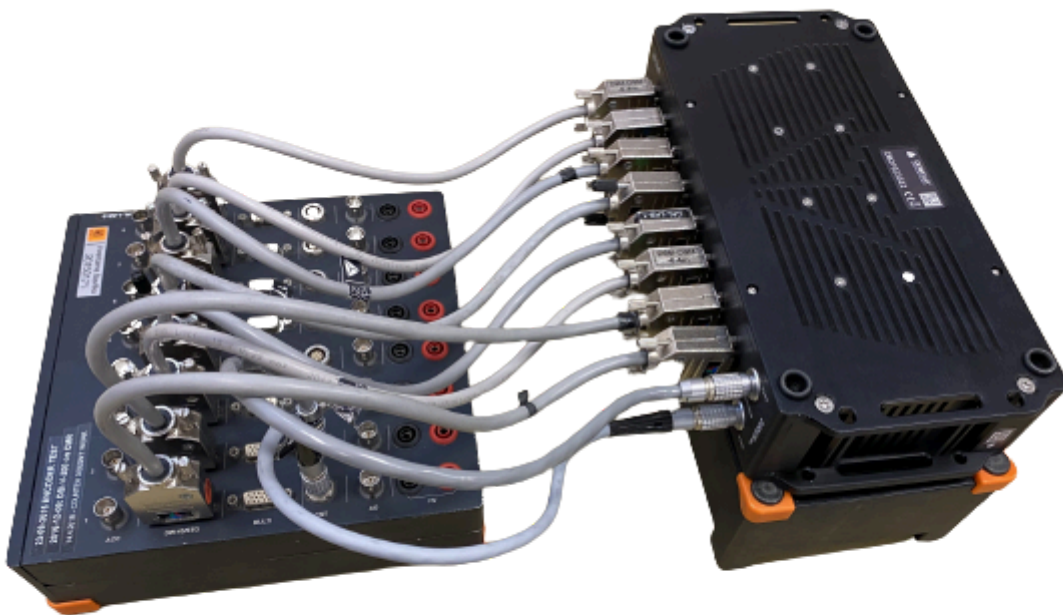


Image: Example of connecting 6xSTGM-2xSTGM+ modules to the DS-CAL test board

9.6. MINITAURs

MINITAURs is a special device, it has 8 x analog and 8 x advanced counter inputs, basically it is like Sirius 8x STG-M+, with the difference that it has integrated CPU with removable SSD.

Due to the integrated CPU, the calibration process is a little different from the normal Sirius 8x STG-M+.



Image: MINITAURs

To calibrate this UUT, the following options are available:

1. The best option is to have a replacement disk with all the installed and necessary software, which is needed for the calibration and swapping the disk for the time of the calibration.
2. Similar alternative is to download and install the DSCalibrator software on the device and perform the calibration process on the device itself. We do not recommend this option, because this process requires installation of additional software and drivers on the inserted disk, which the owner of the MINITAURs may not desire (the same applies for the SBOX instruments).
3. Another alternative is to send MINITAURs to the Dewesoft HQ, where the UUT is disassembled (the computer part is separated from the UUT). The calibration is performed on the UUT independently from the computer. In this case no installation of software and drivers is required.

How to connect MINITAURs to the CAL-BOX is presented on the picture and table below:

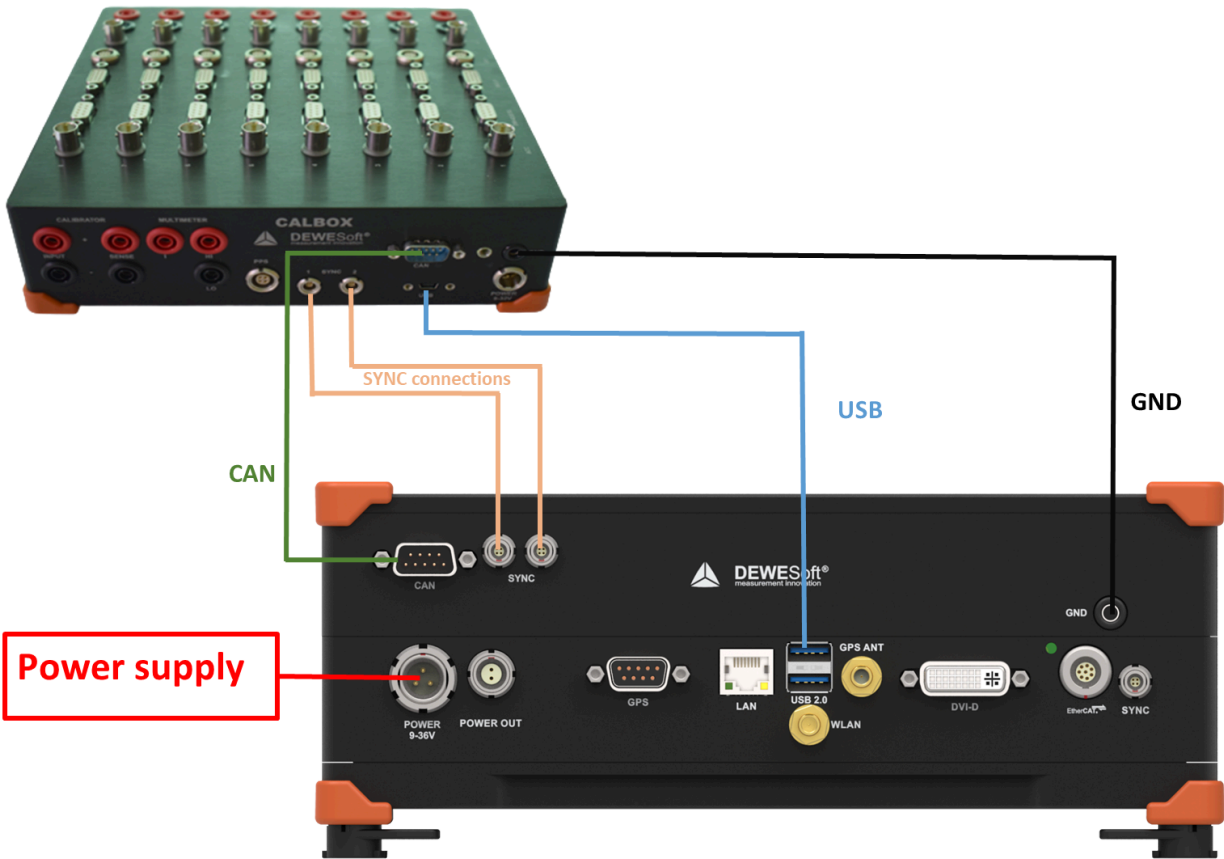


Image: MINITAURs UUT connections

MINITAURs	Connection
POWER	Connects to the dedicated power supply.
Slice SYNC (1, 2)	Connects to the SYNC (1, 2) connector of the DS-CAL test board.
USB	Connects to the CAL-BOX and Multifunction calibrator.
GND	Connects to the GND connector of the DS-CAL test board.
CAN1	Connects to the DS-CAL test board via a CAN1 connector of the CAN Y-cable.



Important

Before calibration all the external devices (multifunction calibrator, multimeter and DS-CAL test board) must be connected to the MINITAURs and have all the necessary software and drivers installed before calibration can be performed.



Hint

Additional accessories are needed (computer screen, keyboard and mouse) to be able to perform calibration.



Image: Example of connecting STGM+ modules to the DS-CAL test board

9.7. Sirius-HS and Siriusi-HS

Connect the Sirius-HS and Siriusi-HS UUT as described in the table below. Picture of Sirius USB UUT for reference:

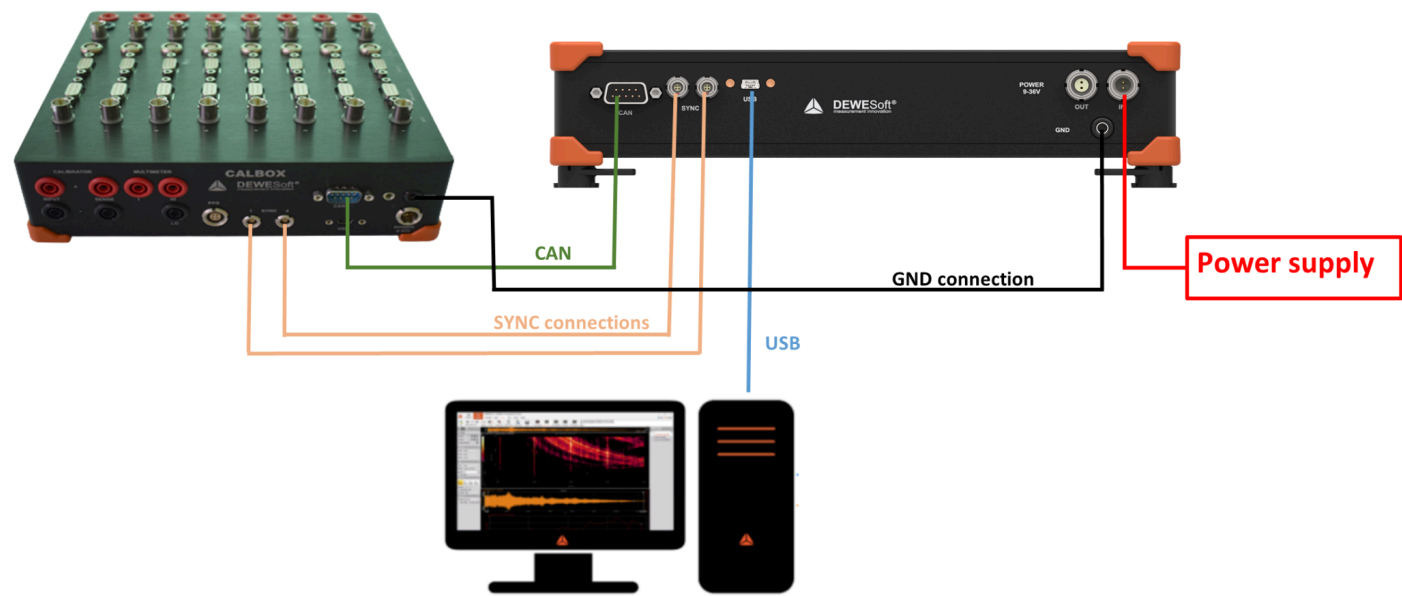


Image: Sirius-HS and Siriusi-HS UUT connections

Sirius-HS and Siriusi-HS devices require the CAN cable, two Sync cables, a USB cable, a power cable, and a banana plug cable for grounding to be connected. Please note that only the CAN1 connector of the CAN Y-cable connects to the Sirius USB UUT. There is no distinction between the two Sync connectors.

Sirius/i-HS UUT	Connection
POWER IN	Connects to the dedicated power supply.
POWER OUT	Not connected.
GND	Connects to the GND connector of the DS-CAL test board.
USB	Connects to the PC.
SYNC (1, 2)	Connects to the SYNC (1, 2) connector of the DS-CAL test board.

CAN

Connects to the CAN connector of the DS-CAL test board.

NOTE: Only the CAN1 connector of the CAN Y-cable connects the UUT.



Important

Sirius High Speed devices with HV, LV or STG modules must be calibrated on FLUKE 57XX series. Calibration is possible with 55XX series, but extended filter tests will not be done (the whole functionality of the UUT will not be tested)!!



Important

Sirius high speed devices with ACC modules can be calibrated on FLUKE 57XX or 55XX series. The whole functionality of UUT can be tested also on FLUKE 55XX series.



Hint

Sirius high speed modules connect to the DS-CAL-box the same way as the Sirius USB or Sirius EtherCAT modules.

The next step is to connect all the modules of the Sirius-HS to CAL-BOX. See chapter Sirius modules.

9.8. Siriusi-XHS

Connect the Siriusi-XHS UUT as described in the table below. Picture of Siriusi-XHS UUT for reference:

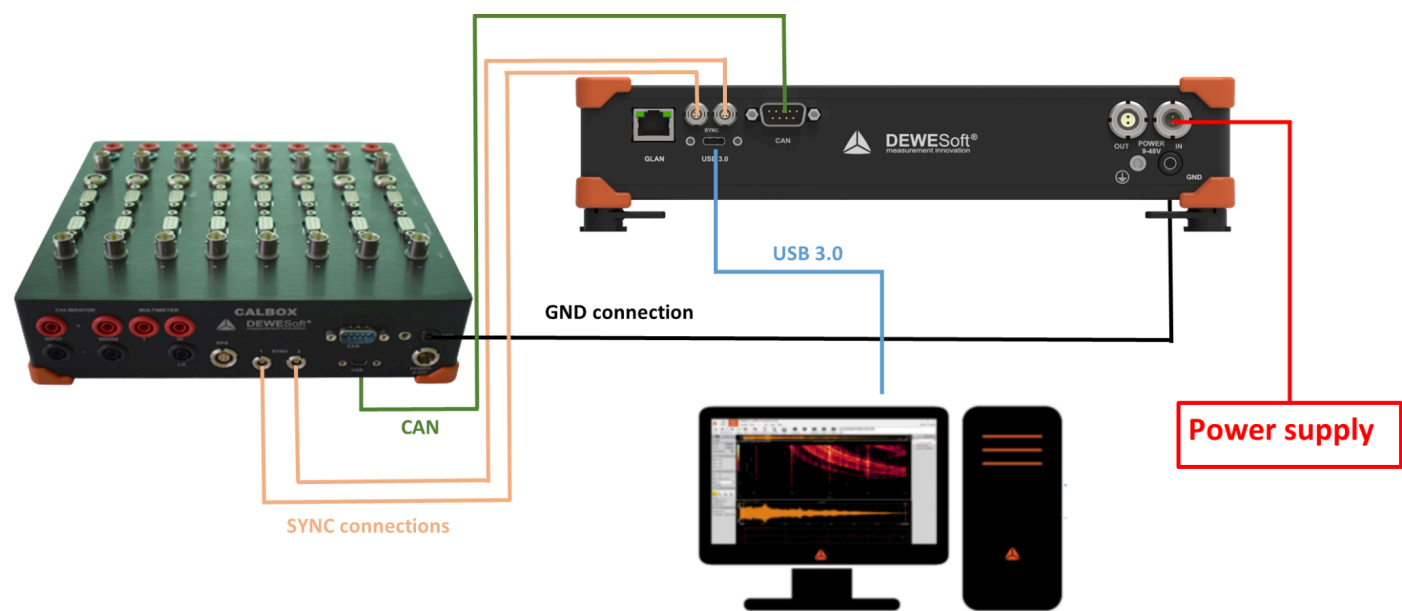


Image: Siriusi-XHS

Siriusi-XHS UUT	Connection
POWER IN	Connects to the dedicated power supply.
POWER OUT	Not connected.
GND	Connects to the GND connector of the DS-CAL test board.
USB	Connects to the PC.
SYNC (1, 2)	Connects to the SYNC (1, 2) connector of the DS-CAL test board.
CAN	Connects to the CAN connector of the DS-CAL test board. NOTE: Only the CAN1 connector of the CAN Y-cable connects the UUT.
GLAN	Not connected.



Important

Sirius Extra High Speed devices must be calibrated on FLUKE 57XX series. Calibration is possible with 55XX series, but extended filter tests will not be done (the whole functionality of the UUT will not be tested)!!



Important


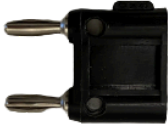

Before the calibration, make sure that device is heated up to its working temperature. The Proposal is to run the UUT for at least 1h-2h, before the start of the calibration



Hint

Before calibration it is not necessary to connect CAN and SYNC connections. Motherboard tests are not supported yet, therefore after calibration the report for motherboard is not created and motherboard calibration date is not updated.

Some XHS modules require terminators during calibration procedure. Table below shows which modules require terminators and which terminators you have to use.

XHS module type	Terminator
LV (DSUB9 type of connector)	D9M-BNC adapter + BNC terminator 
LV (BANANA type of connector)	Shorting bar 
LV (BNC type of connector)	BNC terminator 

The next step is to connect all the modules of the Sirius-XHS to CAL-BOX. See chapter Sirius modules.

10. DEWE-43



Caution

Before connecting DEWE-43 UUT to the DS-CAL test board, make sure that the DS CAL test board has a power supply connected! If not, permanent damage might incur to the DS CAL test board.

Connect the DEWE-43 UUT as shown on the picture and as described by the table below. DEWE-43 UUT connects to the calibration system in a very similar manner as the Sirius UUT but is mentioned here due to its different looks and two CAN interfaces. DEWE-43 UUT requires the CAN Y cable, two Sync cables, a USB cable, a power cable, and a banana plug cable for grounding to be connected. Please note that both CAN1 and CAN2 connectors of the CAN Y cable connect to the DEWE-43 UUT. There is no distinction between the two Sync connectors.

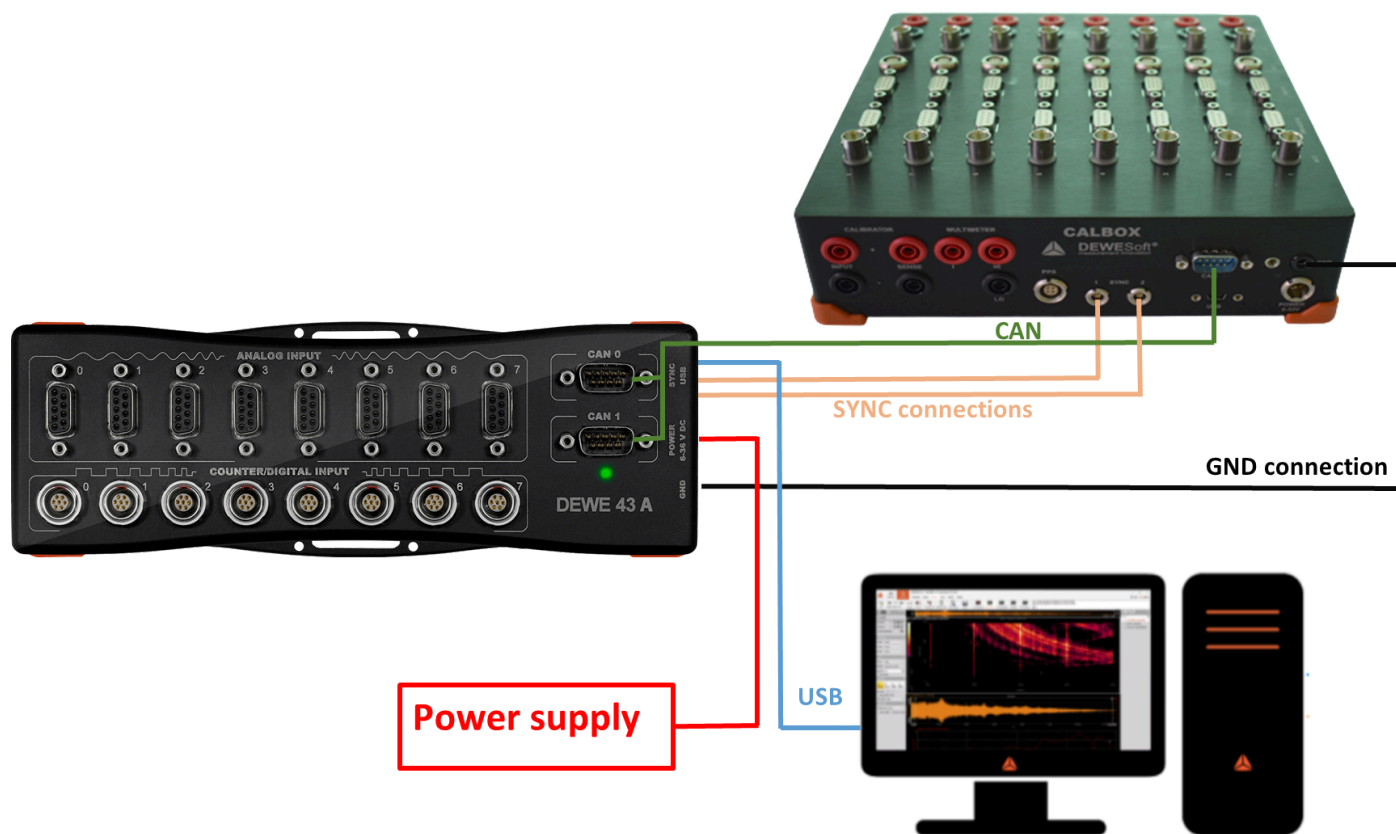


Image: DEWE-43 UUT connections



Image: Example of connecting DEWE-43 to the DS-CAL test board

DEWE-43	Connection
POWER IN	Connects to the dedicated power supply.
SYNC (1, 2)	Connects to the SYNC (1, 2) connector of the DS-CAL test board.
USB	Connects to the PC.
GND	Connects to the GND connector of the DS-CAL test board.
CAN1	Connects to the DS-CAL test board via a CAN1 connector of the CAN Y-cable.
CAN2	Connects to the DS-CAL test board via a CAN2 connector of the CAN Y-cable.
AI (DSUB9), channels 1-8	Connects to the appropriate DS-CAL test board's DEWE-43/STG (DSUB9 connector) channels.
CNT (LEMO7), channels 1-8	Connects to the appropriate DS-CAL test board's counter (CNT connector) channels.

11. Krypton

11.1 Krypton Modular multi



Important

For connecting the Krypton UUT to the PC via a network connection a dedicated network device must be used! It is not allowed to connect via a network switch, hub or a router! Therefore, a PC with two network devices is required if at least one network device is used to connect the PC to the internet (or intranet).



Important

If you are using the DS-CAL1 v1 or DS-CAL1 v3 test board, you must use and connect DS-CAN2 along with the UUT (see chapter Dewesoft UUT without CAN port)!



Important

Unless otherwise noted, the channel 1 on the UUT connects to the channel 1 on the DS-CAL test board and so on for up to all eight UUT channels, respectively.

Krypton UUT requires a power cable (8-pin LEMO) and a network connection to the PC connected. Connect the Krypton UUT:

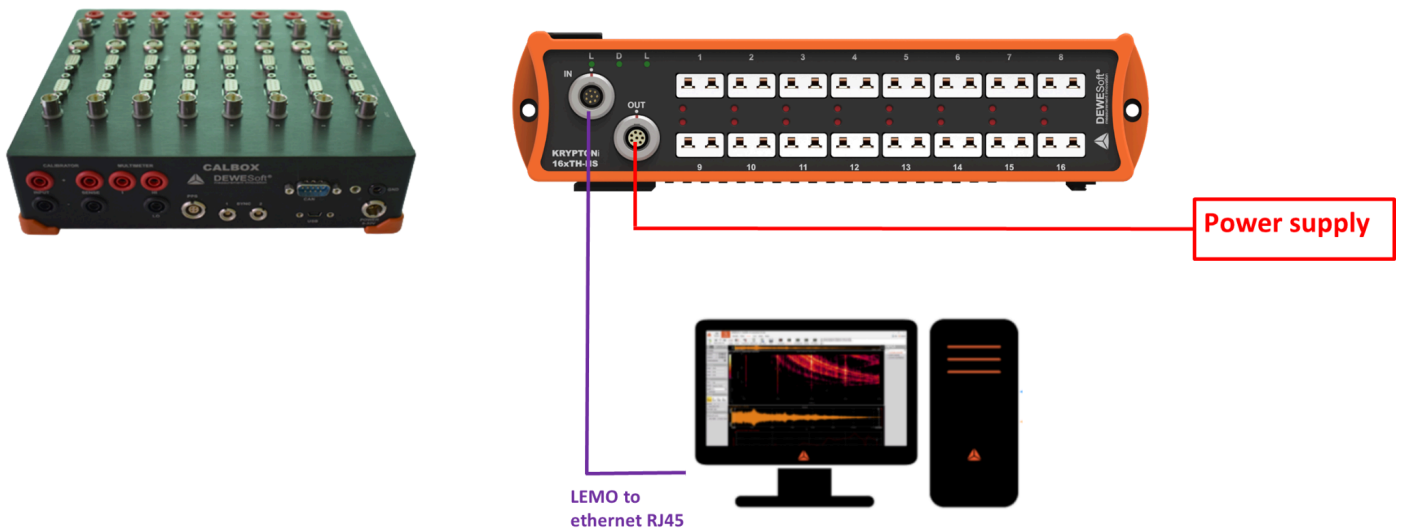


Image: KRYPTONI-16xTH-HS UUT connections

Krypton UUT	Connection
IN	Ethernet connection to the PC.
OUT	Power supply for the UUT.

The next step is to connect all the channels of the Krypton UUT, which is described in the following chapters.



Important

For the Krypton UUT please consult the Krypton Technical Reference Manual for information about ways of connecting power and data connection and usage of proper cables! Cables for connecting the Krypton UUT are not included in the DS-CAL-BOX package, see chapter DS-CAL-BOX.

11.1.1. Krypton 8xTH, 16xTH



Important

For the calibration of Krypton 8xTH / 16xTH UUT an accessory package KRYPTON-TH-CAL-SET is required (see chapter KRYPTON-TH-CAL-SET)! Consider also the usage of a supported multifunction calibrator (see chapter Multifunction calibrator support)!

Krypton TH channels connect **directly to the multifunction calibrator** using a 1-to-8 or 1-to-16 male-to-male splitter **T-type thermocouple cable**. Thermocouple cables need to be of hi-precision type. All channels must be connected and calibrated at once.



Hint

Because of the nature of thermocouple cables having a temperature dependent voltage drop, shorting of thermocouple input channels is required at one point during calibration. Use the provided white thermocouple terminators. You will be informed by the DSCalibrator software during the calibration procedure when shorting is required.

Example of connecting the Krypton 8xTH channels:

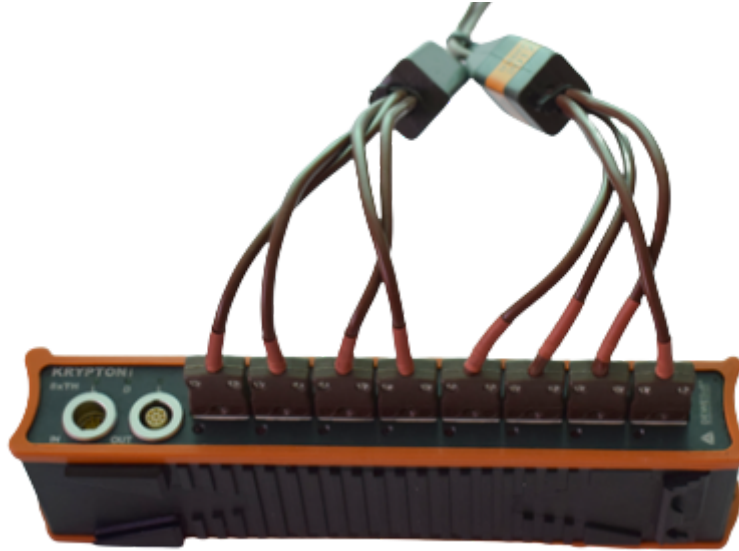


Image: Example of connecting the Krypton 8xTH channels using T-type thermocouple cable

11.1.2. Krypton 4xLV, 8xLV

Krypton LV channels connect to the DS-CAL test board via a BNC-to-BNC cable to the appropriate **ACC (BNC connector) channel** of the DS-CAL test board. All channels must be connected and calibrated at once.

Example of connecting the Krypton 4xLV channels to the DS-CAL test board:

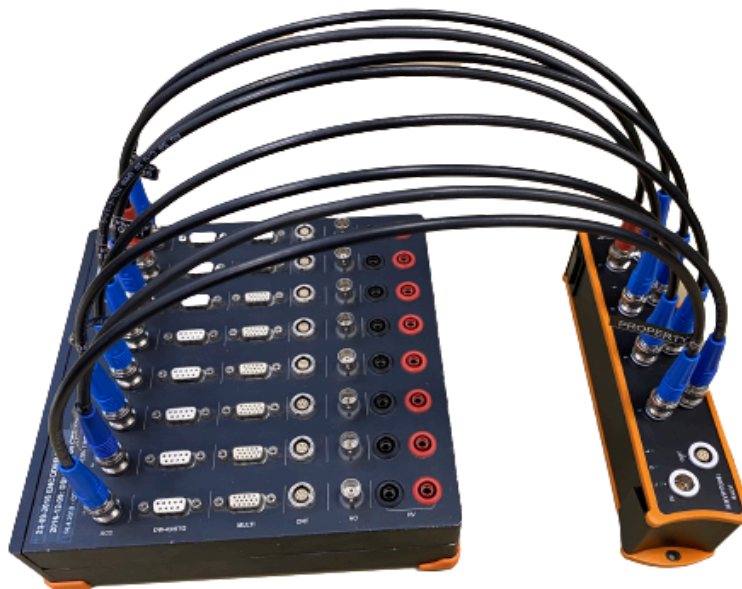


Image: Example of connecting the Krypton 4xLV channels to the DS-CAL test board

11.1.3. Krypton-3 x STG, Krypton-6xSTG

Krypton STG channels connect to the DS-CAL test board via a DSUB9-to-DSBU9 cable to the appropriate **DEWE-43/STG (DSUB9 connector) channel** of the DS-CAL test board. All channels must be connected and calibrated at once.

Example of connecting the Krypton 3xSTG channels to the DS-CAL test board:



Image: Example of connecting the Krypton 3xSTG channels to the DS-CAL test board

11.1.4. Krypton RTD



Important

For the calibration of Krypton RTD UUT special cables are required! Contact our support team for more information.

Krypton RTD channels connect to the DS-CAL test board via an L0B6m-to-DSUB15 cable to the appropriate **MULTI (DSUB15 connector) channel** of the DS-CAL test board. All channels must be connected and calibrated at once.

Example of connecting the Krypton 8xRTD channels to the DS-CAL test board:

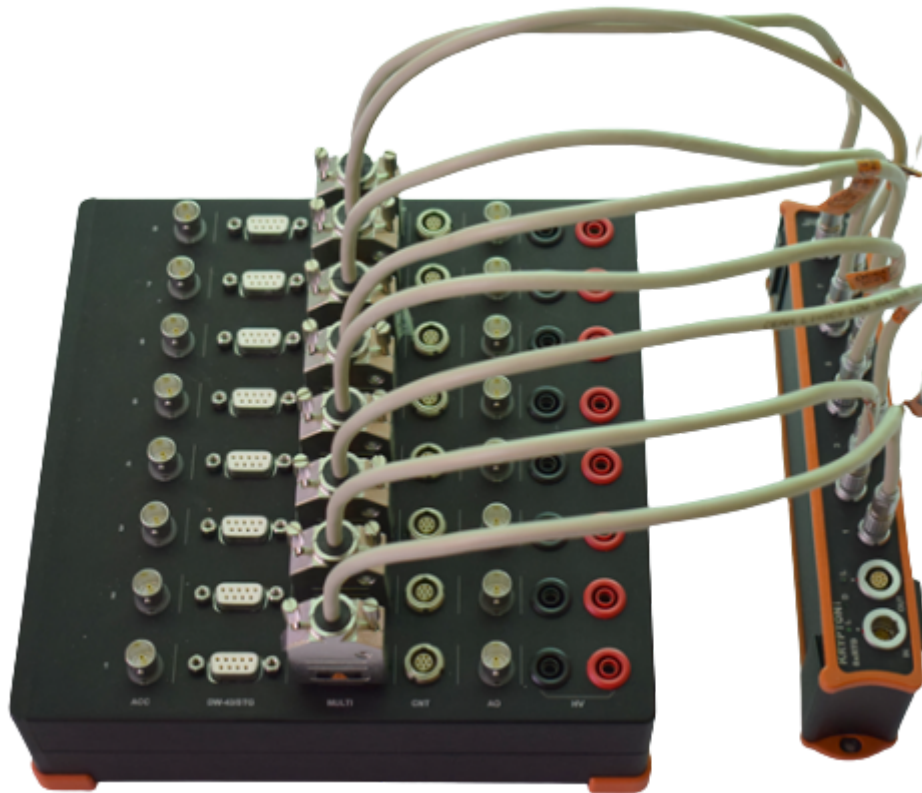


Image: Example of connecting the Krypton 8xRTD channels to the DS-CAL test board

11.1.5. Krypton 4xACC, 8xACC

Krypton ACC channels connect to the DS-CAL test board via a BNC-to-BNC cable to the appropriate **ACC (BNC connector) channel** of the DS-CAL test board. All channels must be connected and calibrated at once. During noise floor tests it is necessary to disconnect the cables and connect the 50 Ω terminators (and then back).



Hint

You will be informed by the DSCalibrator software during the calibration procedure when 50 Ω terminators are required.

Example of connecting the Krypton 4xACC channels to the DS-CAL test board:

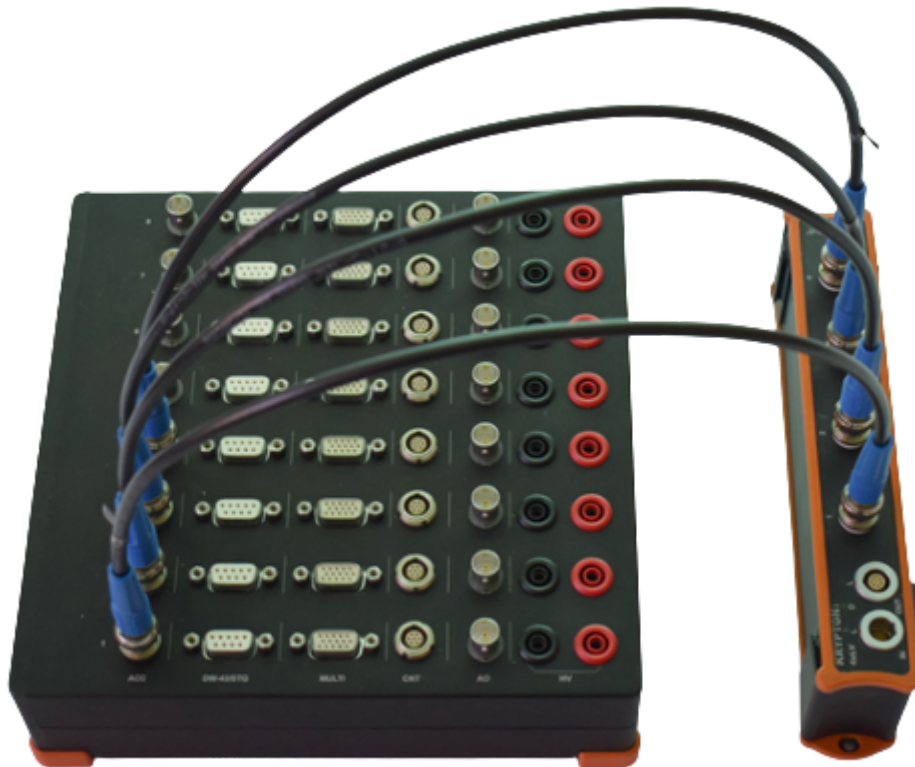


Image: Example of connecting the Krypton 4xACC channels to the DS-CAL test board

11.2. Krypton Modular one



Important

For connecting the Krypton UUT to the PC via a network connection a dedicated network device must be used! It is not allowed to connect it via a network switch, hub or a router! Therefore, a PC with two network devices is required if at least one network device is used to connect the PC to the internet (or intranet).

Krypton UUT requires a power cable (8-pin LEMO) and a network connection to the PC connected. Connect the Krypton UUT as described by the table below.

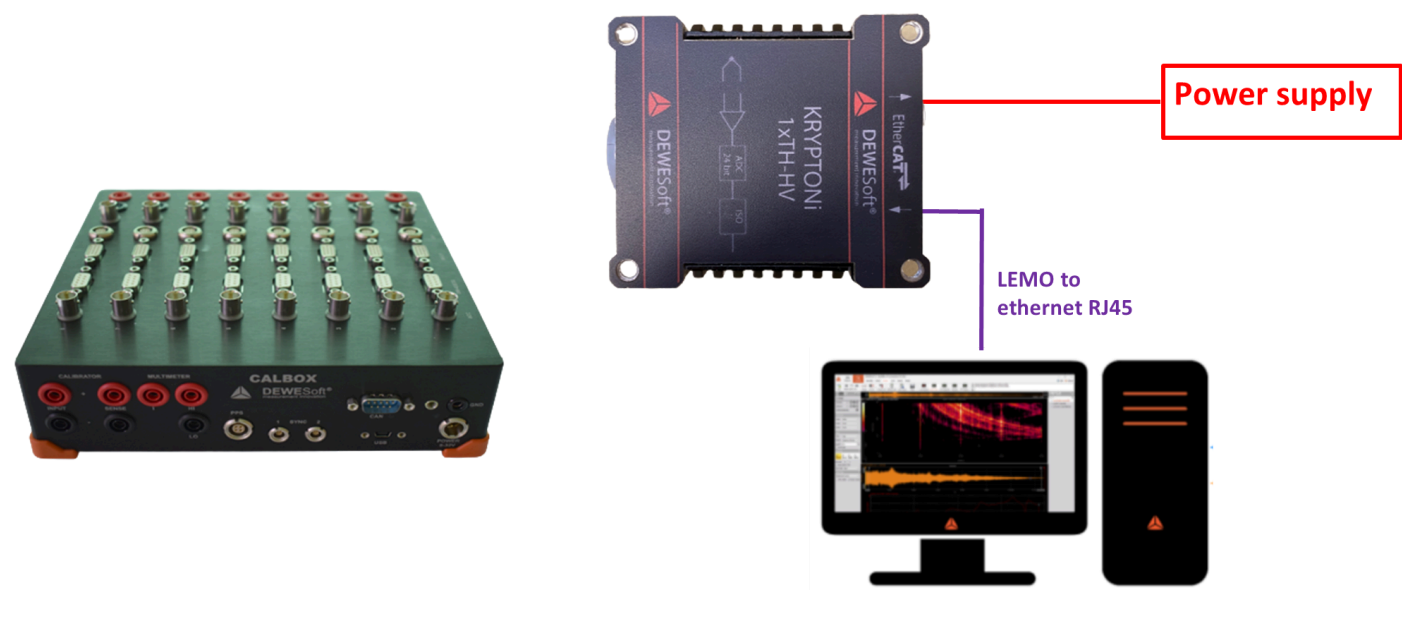


Image: KRYPTON 1xTH-HV connections

Krypton UUT	Connection
IN	Ethernet connection to the PC.
OUT	Power supply for the UUT.

11.2.3. Krypton 1xTH-HV

The Krypton TH-HV channel connects **directly to the multifunction calibrator** using a KRYPTON TH-HV-CAL-CABLE.

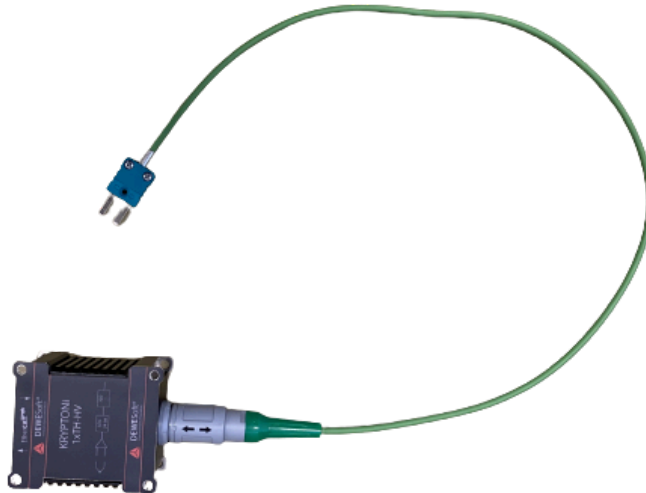


Image: Example of connecting the KRYPTONI-1xTH-HV channel

11.2.4. Kryptoni 1xLV

The Kryptoni 1xLV channel connects to the appropriate **ACC (BNC connector) channel** on the DS-CAL test board.



Image: Example of connecting the Kryptoni 1xLV

12. IOLITE

12.1. IOLITE R12, R8, LX-R8, R8r

Important



For connecting the IOLITE UUT to the PC via a network connection a dedicated network device must be used! It is not allowed to connect it via a network switch, hub or a router! Therefore, a PC with two network devices is required if at least one network device is used to connect the PC to the internet (or intranet).

Hint



If you want to calibrate only modules and not the IOLITE gate, then it is not necessary to connect SYNC 1 and 2 to the DS-CAL test board.

Caution



Be careful when removing IOLite slices from the frame. Before removing the slice, turn off the power source or unplug the device from the power supply. The same applies for inserting the slices back in.

Connect the IOLITE R12 UUT as described by the Table and Image below.

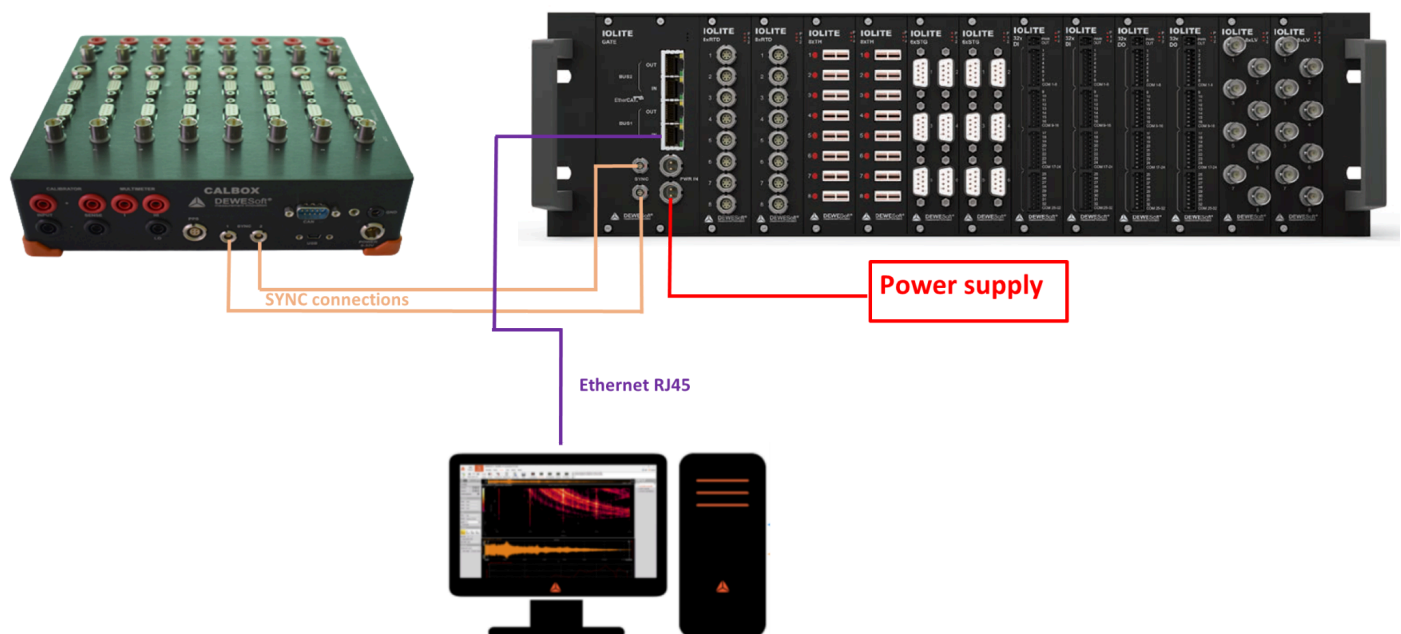


Image: IOLITE R12 UUT connections

IOLITE R12 requires two Sync cables, a power cable and an Ethernet cable.

IOLITE R12	Connection
POWER IN	Connects to the dedicated power supply.
SYNC (1, 2)	Connects to the SYNC (1, 2) connector of the DS-CAL test board.
EtherCAT BUS1 IN	Ethernet connection to the PC.
EtherCAT BUS1 OUT	Not connected.
EtherCAT BUS2 IN	Not connected.
EtherCAT BUS2 OUT	Not connected.

Connect the IOLITE R8 UUT as described by the Table and image below.



Image: IOLITE R8 UUT connections

IOLITE R8	Connection
POWER IN	Connects to the dedicated power supply.
SYNC (1, 2)	Connects to the SYNC (1, 2) connector of the DS-CAL test board.
EtherCAT IN	Connection to the PC.
EtherCAT OUT	Not connected.
ETH1	Not connected.
ETH2	Not connected.



Hint

IOLite LX-R8 and R8r connections are the same as for the IOLITE R8.

12.1.1. IOLITEir-8xTH and 8xTH-HS



Important

For the calibration of IOLITEir-8xTH and 8xTH-HS an accessory package KRYPTON-TH-CAL-SET is required (see chapter KRYPTON-TH-CAL-SET)! Consider also a usage of a supported multifunction calibrator (see chapter Multifunction calibrator support)!

IOLITE TH channels connect **directly to the multifunction calibrator** using a 1-to-8 male-to-male splitter **T-type thermocouple cable**. Thermocouple cables need to be of hi-precision type. All channels must be connected and calibrated at once.



Hint

Because of the nature of thermocouple cables having a temperature dependent voltage drop, shorting of thermocouple input channels is required during calibration. Use the provided white thermocouple terminators. You will be informed by the DSCalibrator software during the calibration procedure when shorting is required.

12.1.2. IOLITEr-4xCNT

IOLITE counter connectors connect to the appropriate **counter (CNT connector) channel** on the DS-CAL test board.

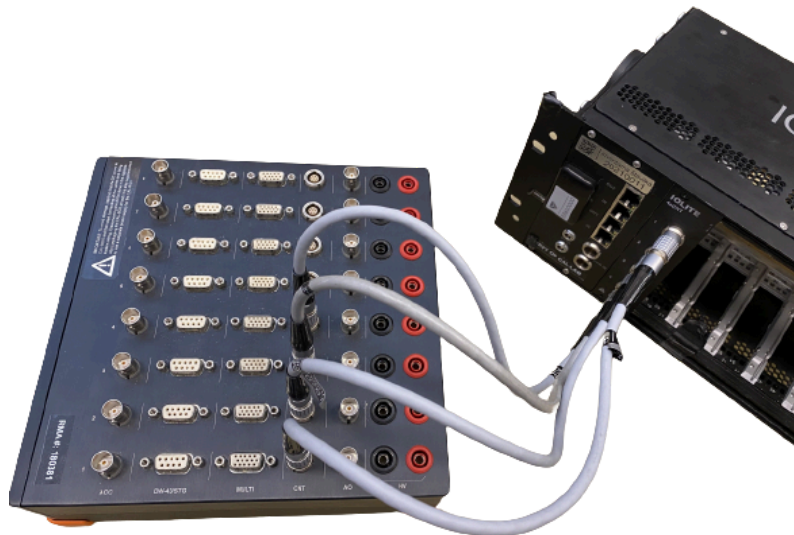


Image: Example of connecting the IOLITEr-4xCNT to the DS-CAL test board

12.1.3. IOLITEr-8xSTGS

IOLITE STGS channels connect to the DS-CAL test board via a T2B9f -to-D9m cable to the appropriate **STG (DSUB9 connector) channel** of the DS-CAL test board. All channels must be connected and calibrated at once.

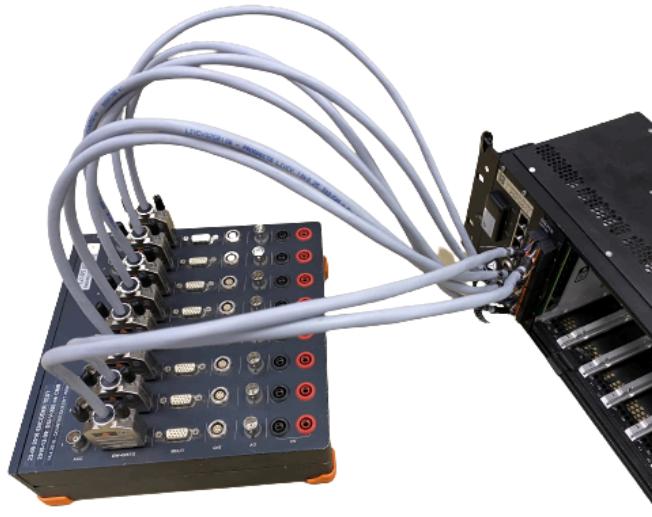


Image: Example of connecting the IOLITEr-8xSTGS to the DS-CAL test board

12.1.4. IOLITEr-6xSTG

IOLITE STG channels connect to the DS-CAL test board via a DSUB9-to-DSBU9 cable to the appropriate **STG (DSUB9 connector) channel** of the DS-CAL test board. All channels must be connected and calibrated at once.

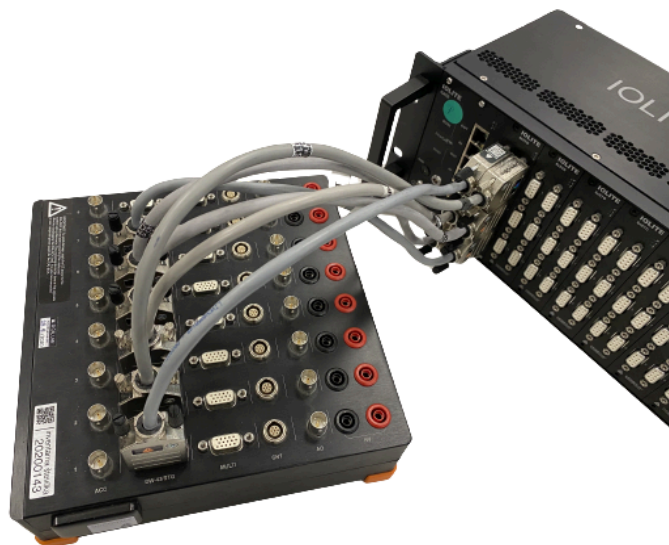


Image: Example of connecting the IOLITEr-6xSTG to the DS-CAL test board

12.2. IOLite multi-channel



Important

Before connecting power cable to IOLite multi-channel, remove included “POWER-IN/POWER-OUT” connectors. These connectors are included so it is possible to use customers’ own power supply cable.



Important

For connecting the IOLite multi-channel UUT to the PC via a network connection a dedicated network device must be used! It is not allowed to connect it via a network switch, hub or a router! Therefore, a PC with two network devices is required if at least one network device is used to connect the PC to the internet (or intranet).

Connect the IOLite multi-channel UUT as described by the Table below. IOLite multi-channel requires a special 2-pin power cable.

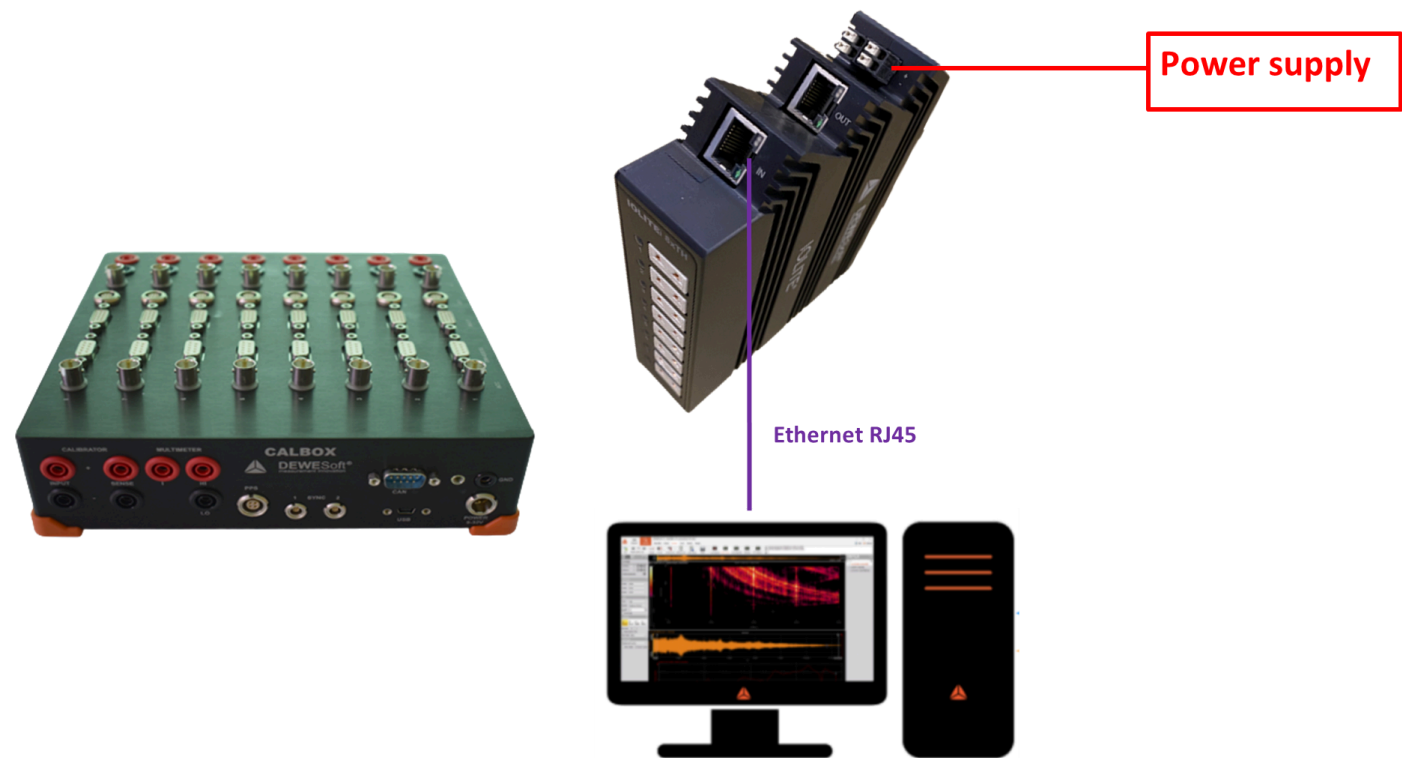


Image: IOLITE multi UUT connections

IOLITE	Connection
POWER OUT	Not connected.
POWER IN	Connects to the dedicated power supply.
ECAT OUT	Not connected.

ECAT IN

Ethernet connection to the PC.

12.2.1. IOLITEi-8xRTD and IOLITEi-8xRTD-T2A4f

IOLITEi RTD channels connect to the DS-CAL test board via a L0B6m-to-DSBU15 cable to the appropriate **MULTI (DSUB15 connector) channel** of the DS-CAL test board. All channels must be connected and calibrated at once.

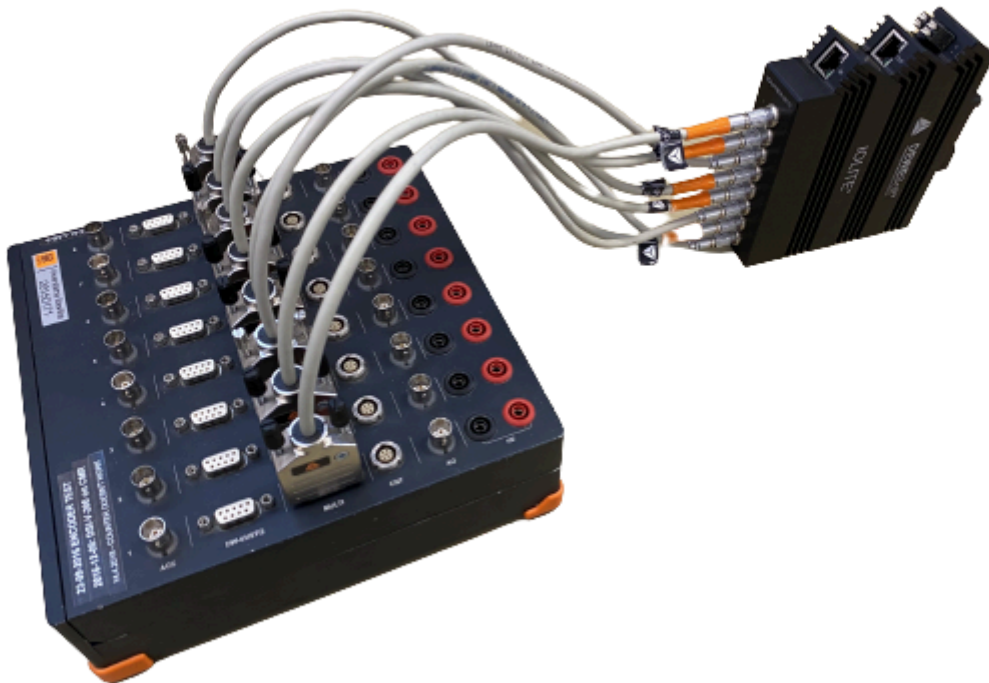


Image: Example of connecting the IOLITEi-8xRTD to the DS-CAL test board



Important

For the calibration of IOLITEi-8xRTD-T2A4f UUT special (*D15M-TBLOCK4-CAL-CABLE*) cables are required! Contact our support team for more information.

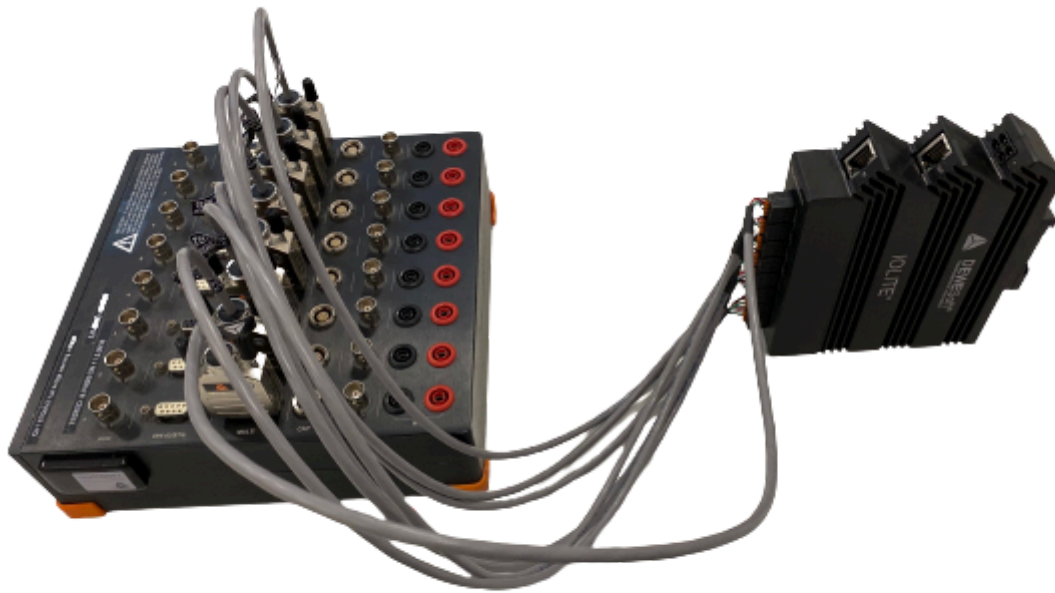


Image: Example of connecting the IOLITEi-8xRTD-T2A4f to the DS-CAL test board

12.2.2. IOLITEi-8xTH and 8xTH-HS



Important

For the calibration of IOLITEi-8xTH and 8xTH-HS an accessory package KRYPTON-TH-CAL-SET is required (see chapter KRYPTON-TH-CAL-SET)!

Consider also a usage of a supported multifunction calibrator (see chapter Multifunction calibrator support)!

IOLITE TH channels connect **directly to the multifunction calibrator** using a 1-to-8 male-to-male splitter **T-type thermocouple cable**. Thermocouple cables need to be of hi-precision type. All channels must be connected and calibrated at once.



Hint

Because of the nature of thermocouple cables having a temperature dependent voltage drop, shorting of thermocouple input channels is required during calibration. Use the provided white thermocouple terminators. You will be informed by the DSCalibrator software during the calibration procedure when shorting is required.



Image: Example of connecting the IOLITEi-8xTH

12.2.3. IOLITE-6xSTG

IOLITE STG channels connect to the DS-CAL test board via a DSUB9-to-DSBU9 cable to the appropriate **STG (DSUB9 connector) channel** of the DS-CAL test board. All channels must be connected and calibrated at once.

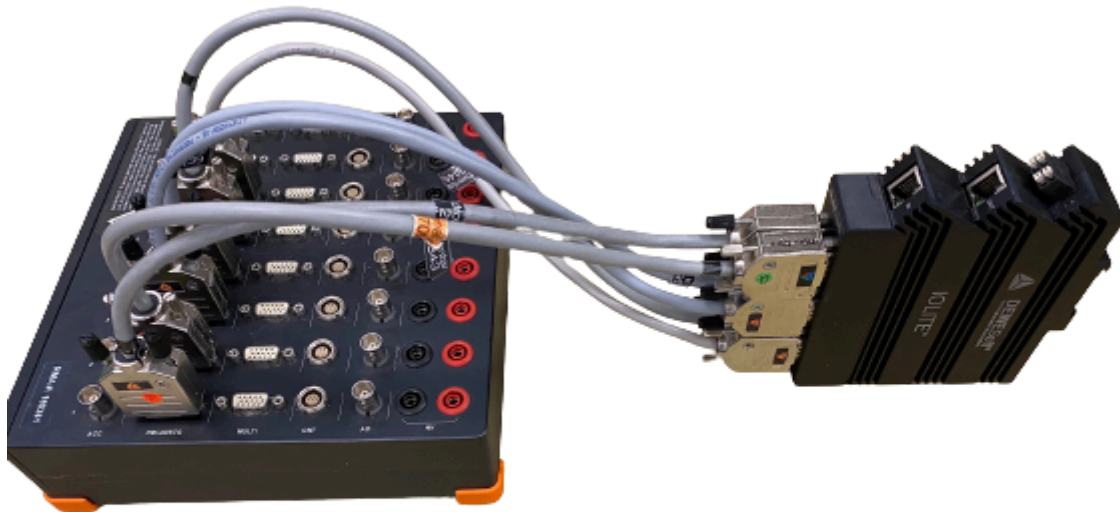


Image: Example of connecting the IOLITEir 6xSTG channels to the DS-CAL test board

12.2.4. IOLITEi-8xLA-T2A2f

IOLITE LA channels with T2A2f type of connector connect to the DS-CAL test board via BNC-to-T2B2m cable to appropriate ACC (BNC connector) channel of the DS-CAL test board. All channels must be connected and calibrated at once.

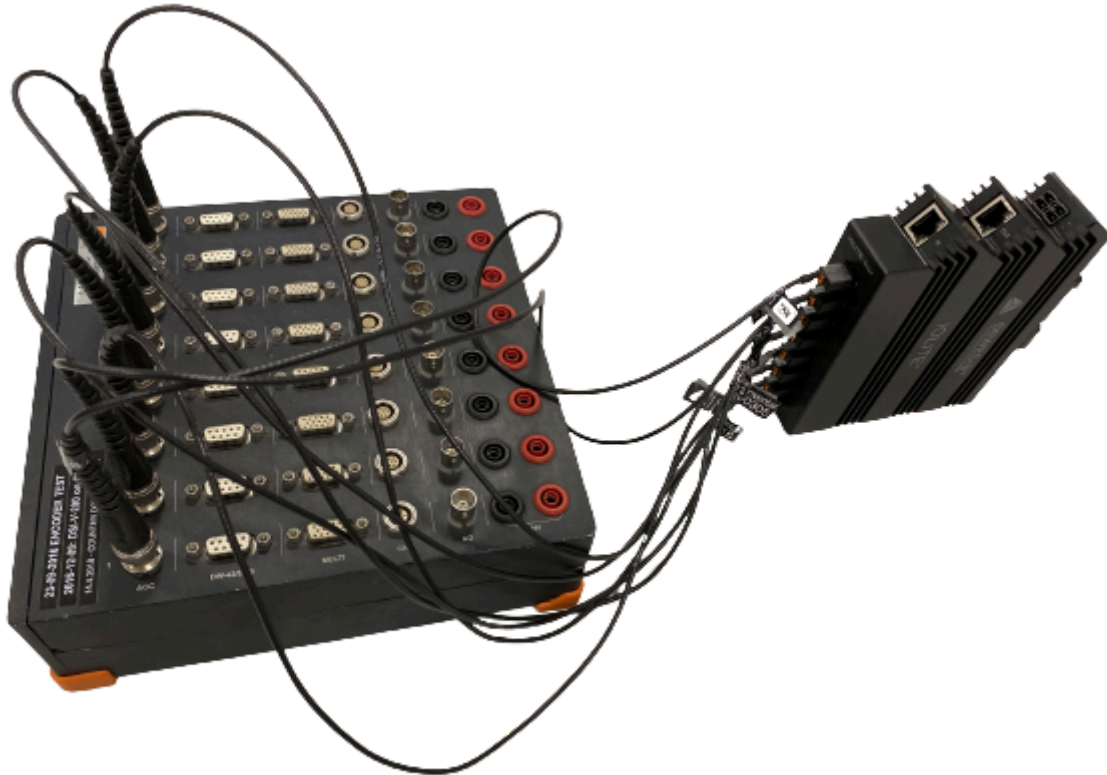


Image: Example of connecting the IOLITEi-8xLA-T2A2f channels to the DS-CAL test board



Hint

For the calibration of IOLITEi devices with T2A2f type of connector special BNC-to-T2B2m cables are required! Please look at chapter [3.4.3. IOLITE-CAL-SET](#).

13. DSI adapters



Important

For the calibration of DSI adapter UUT an accessory package DSI CAL SET is required (see chapter DSI-CAL-SET)!



Important

An isolated SIRIUS instrument is also required (SIRIUSi 8xSTG is preferred), however, Sirius HS and HD, Krypton, and Sirius XHS devices are not supported for calibration of DSI adapters.

Start by connecting the DSI CAL ADAPTER and DSI EXC BNC together via BNC-to-BNC cable as shown below. Connect also a SIRIUS instrument (see chapter Sirius USB, respectively) but without connecting any modules to the DS CAL test board.



Image: DSI connection cable

Steps to connect the DSI adapter UUT are as follows:

- DSI CAL ADAPTER connects to one of eight **module (DSUB9 connector) channels** on SIRIUS.
- The other end of the cable with DSI EXC BNC adapter connects to the appropriate DS-CAL test board's **DEWE-43/STG (DSUB9 connector) channel**.
- On top of the DSI, CAL ADAPTER connects a DSI adapter UUT.
- The connection between the DSI adapter UUT and the DS-CAL test board depends on the type of the DSI adapter UUT. DSI adapter UUT input connects according to the following chapters.

To calibrate a DSI adapter UUT select the DSI tab in the DSCalibrator software:

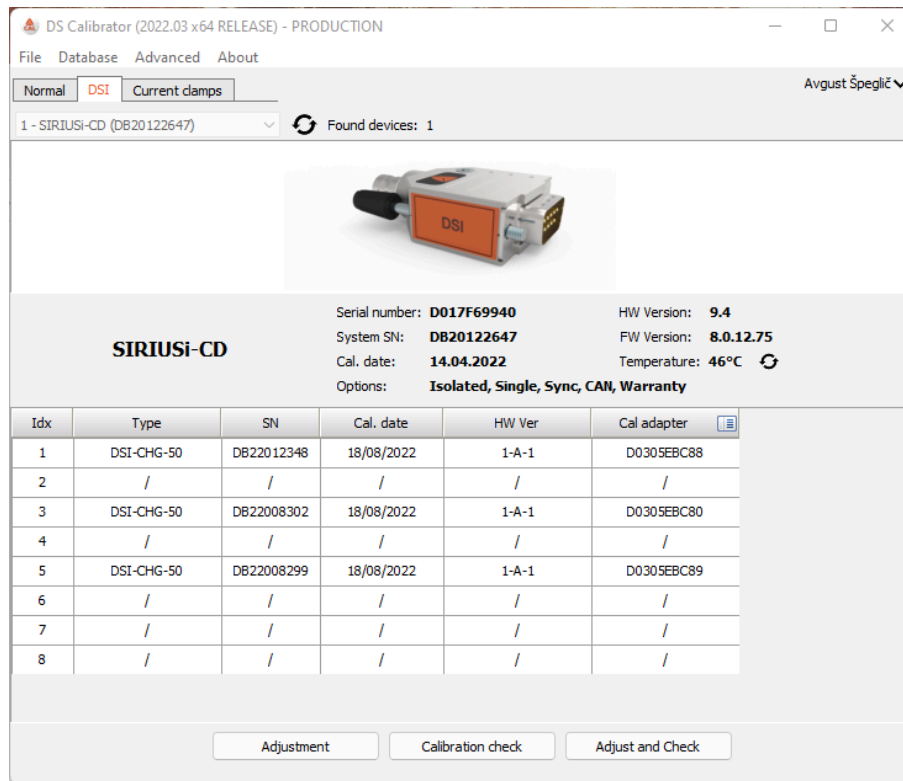


Image: DSCalibrator software overview in DSI mode

Connected DSI adapter UUTs are detected when mode is changed to DSI. Clicking on the Refresh button re-detects and re-reads the information about the connected DSI adapter UUTs.

Calibration of some DSI adapters requires a predefined charge adapter. Defining the properties (such as serial number, certificate number, and capacitor value) of these charge adapters is done in the Charge adapters editor accessible by clicking the File button. Click the Unlock button and add the charge adapter and its properties.

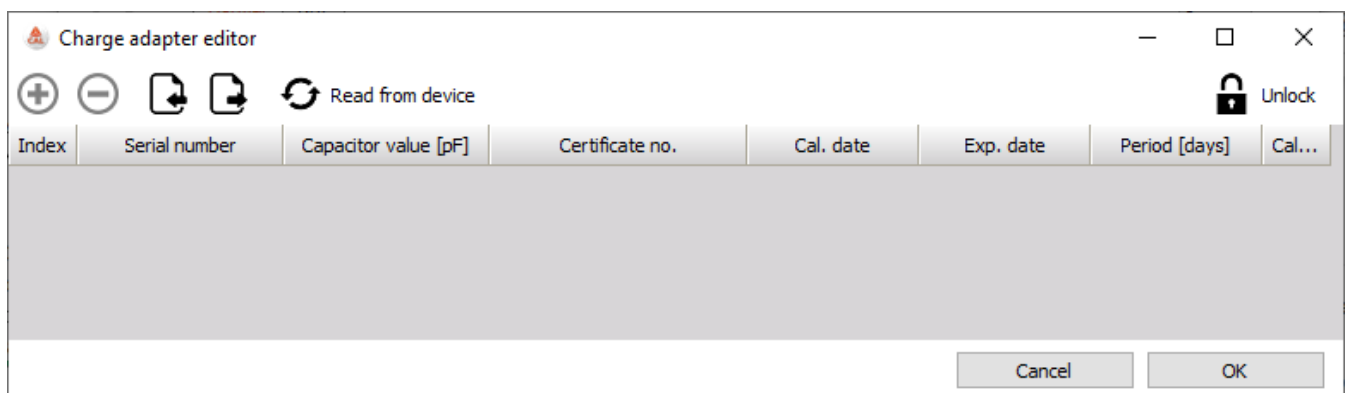


Image: Charge adapters editor

The list of defined charge adapters is accessible in the DSI adapters grid in the Cal adapter column.

13.1. DSI-ACC, DSI-ACC-0.16Hz, DSI-ACC-20mA

DSI-ACC, DSI-ACC-0.16Hz, and DSI-ACC-20mA connect to the DS-CAL test board via a BNC-to-BNC cable to the appropriate **ACC (BNC connector) channel** of the DS-CAL test board.

Example of connecting the 4xDSI-ACC to the DS-CAL test board:

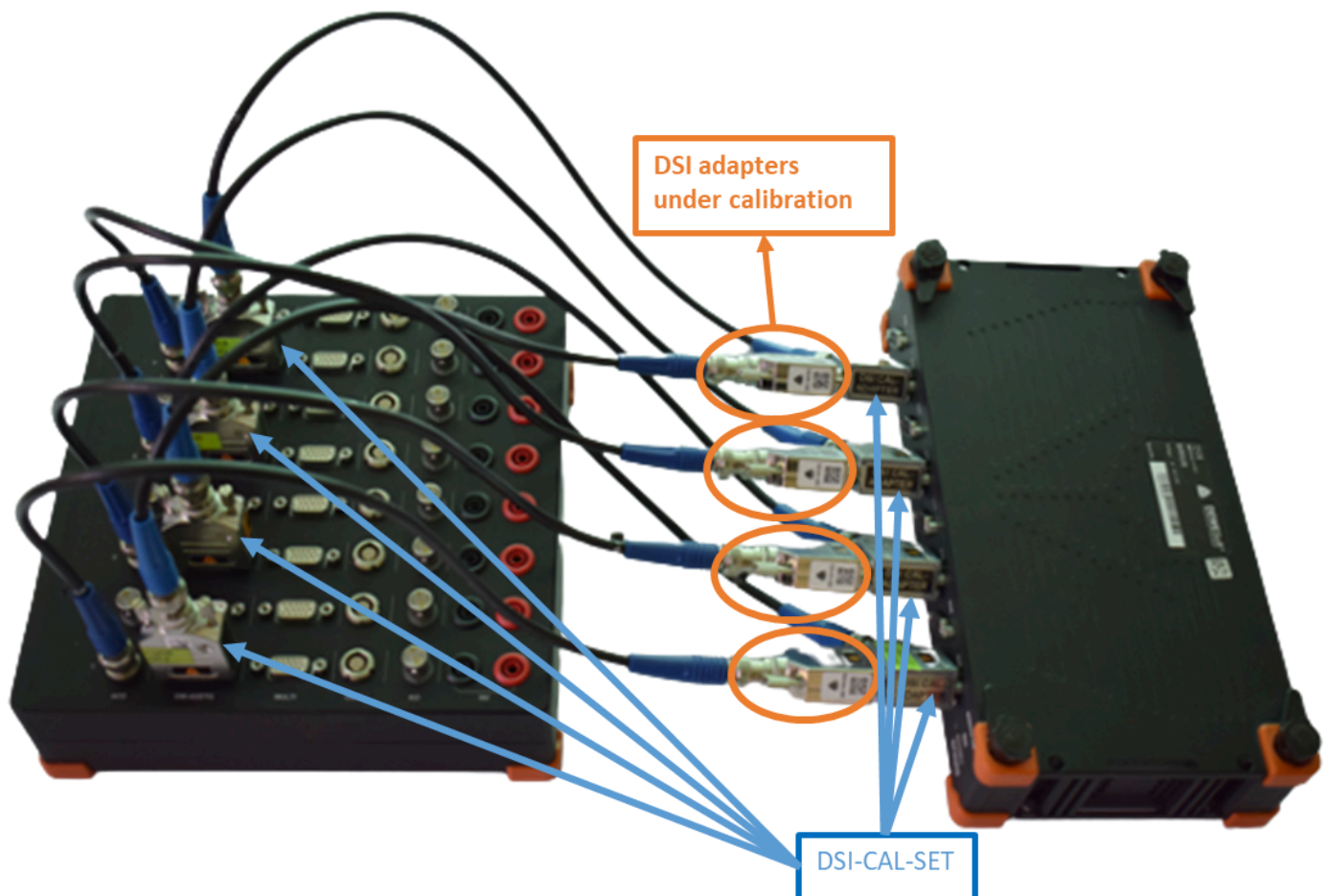


Image: Example of connecting the 4xDSI-ACC to the DS CAL test board



Important

Calibration procedure will fail if you use Agilent 34401A DMM (also a warning window appears before start). Use any other supported DMM for DSI-ACC calibration.

13.2. DSI-V-200

DSI-V-200 connects to the DS-CAL test board via a BNC-to-BNC cable and a Banana-to-BNC adapter to the appropriate HV (BANANA connector) channel of the DS-CAL test board.



Important

Do not calibrate more than four DSI-V-200 adapters at once!
This is a limitation due to the input impedance of the DSI-V-200 adapters.

Example of connecting the DSI-V-200 to the DS-CAL test board:

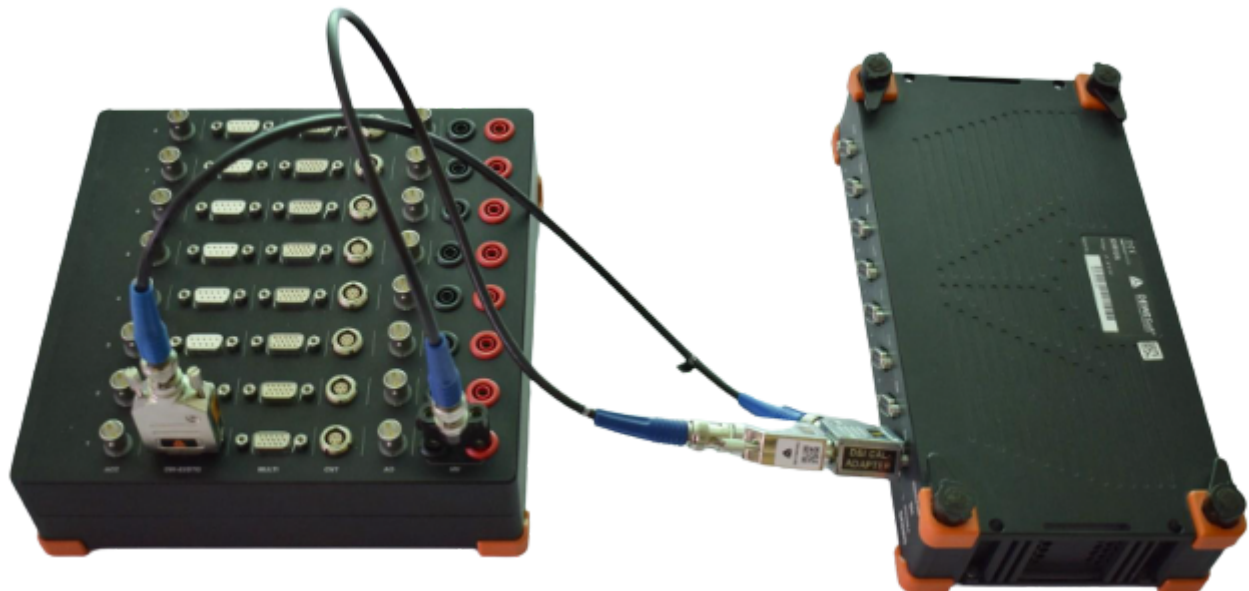


Image: Example of connecting the DSI-V-200 to the DS-CAL test board

13.3. DSI-CHG-50, DSI-CHG-100 and DSI-CHG-DC



Important

For the calibration of DSI-CHG-50 and DSI-CHG-100 adapter UUT an accessory package CHG CAL ADAPTER is required (see chapter CHG-CAL-ADAPTER)!
The calibration of DSI-CHG-DC requires a 100 nF ISO calibrated capacitor.



Important

For the calibration of DSI-CHG-DC adapter UUT a 100 nF ISO calibrated capacitor is required.

DSI-CHG-50 and DSI-CHG-100 connects to the CHG-CAL adapter via a BNC-to-BNC cable and the CHG-CAL adapter connects to the appropriate MULTI (DSUB15 connector) channel of the DS-CAL test board.

DSI-CHG-DC connects to the 100 nF capacitor via a BNC-to-BNC cable and the 100 nF capacitor connects to the appropriate ACC (BNC connector) channel of the DS-CAL test board.

Example of connecting the DSI-CHG-50 to the DS-CAL test board:

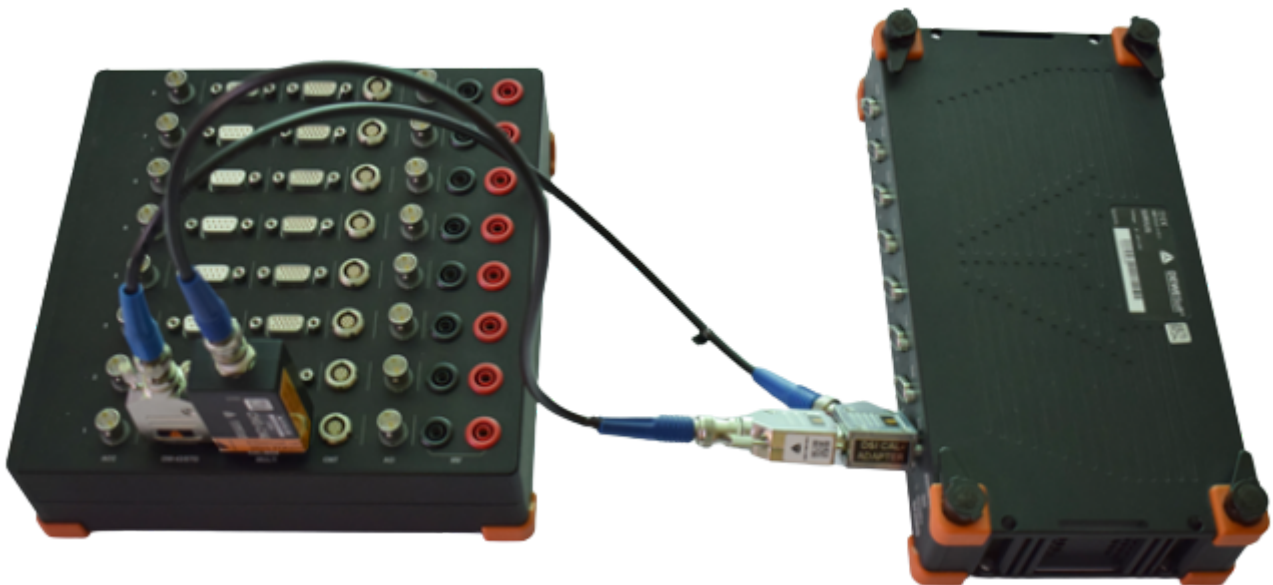


Image: Example of connecting the DSI-CHG-50 to the DS-CAL test board

13.4. DSI-TH-K, DSI-TH-T, DSI-TH-J, DSI-TH-C, DSI-TH-B and DSI-TH-E



Important

For the calibration of DSI-TH adapter UUT a proper thermocouple cable type is required (for example DSI-TH-K uses K-type thermocouple cable)! Consider also a usage of a supported multifunction calibrator (see chapter Multifunction calibrator support)!



Hint

Thermocouple cable colors can vary around the world.

DSI-TH connects **directly to the multifunction calibrator** using a 1-on-1 **thermocouple cable** of the **appropriate type** according to the table below. Thermocouple cables need to be of hi-precision type.

Example of connecting the DSI-TH-K:

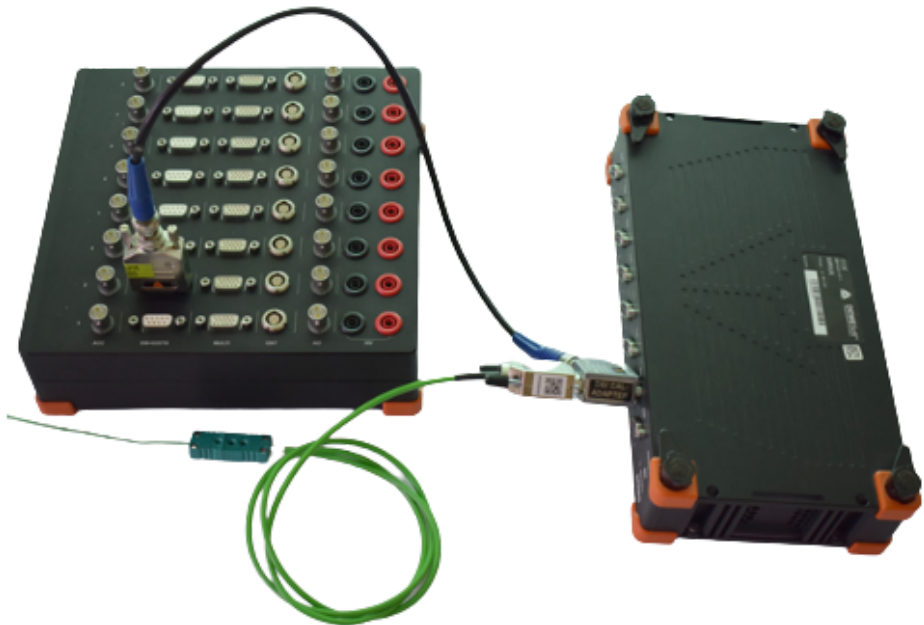


Image: Example of connecting the DSI-TH-K

DSI adapter UUT	Connection (cable color according to standard IEC 60584-3)
DSI-TH-K	Connects using a K-type thermocouple cable (green).
DSI-TH-T	Connects using a T-type thermocouple cable (brown).
DSI-TH-J	Connects using a J-type thermocouple cable (black).
DSI-TH-C	Connects using a C-type thermocouple cable (red).
DSI-TH-B	Connects using a B-type thermocouple cable (gray).
DSI-TH-E	Connects using an E-type thermocouple cable (purple).

13.5. DSI-RTD



Important

For the calibration of DSI RTD adapter UUT special DSI-RTD-CAL-CABLE is required! Contact our support team for more information.



Hint

On DSI-RTD-CAL-CABLE you can find marks of how to connect it to Fluke calibrator.

DSI-RTD connects directly to the multifunction calibrator using a Binder-to-4xBanana cable. Due to a usage of a special cable, only one adapter can be calibrated at once!

An example of connecting the DSI-RTD:

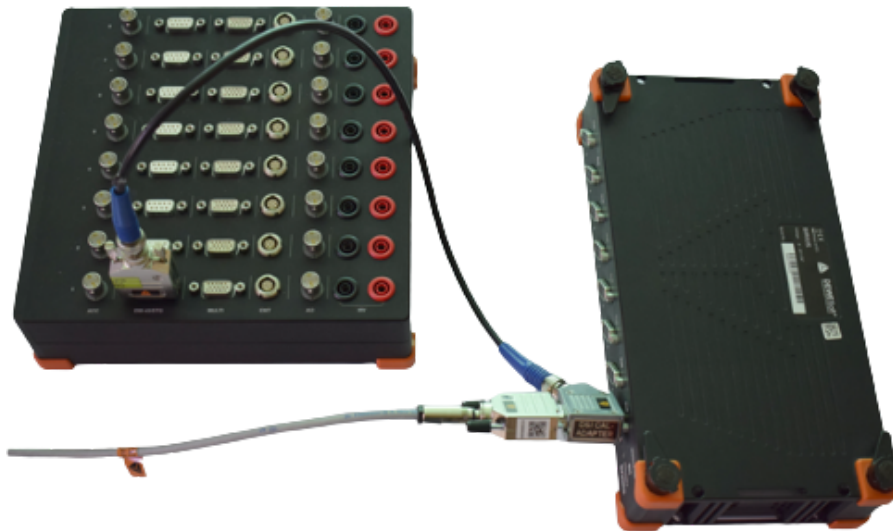


Image: Example of connecting the DSI-RTD

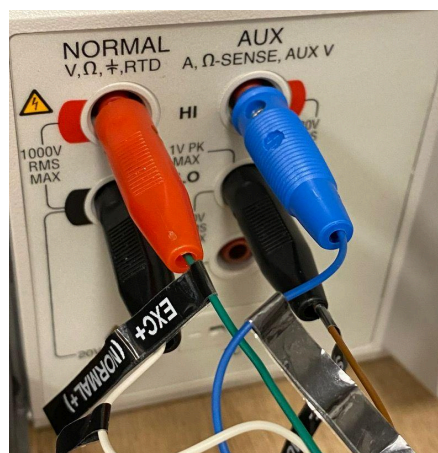


Image: Example of connecting the DSI-RTD-CAL-CABLE to Fluke

13.6. DSI-5A



Important

For the calibration of DSI 5A adapter UUT an accessory package DSI-5A-CAL-CABLE is required (see chapter DSI-5A-CAL-CABLE)!

DSI-5A connects **directly to the multifunction calibrator** using a DSI-5A-CAL-CABLE cable. Due to a usage of a special cable, only one adapter can be calibrated at once!

DSI-5A-CAL-CABLE's banana connectors connect as shown below and an example of connecting the DSI-5A follows.



Image: Example of connecting DSI-5A-CAL-CABLE to the FLUKE 5502E multifunction calibrator

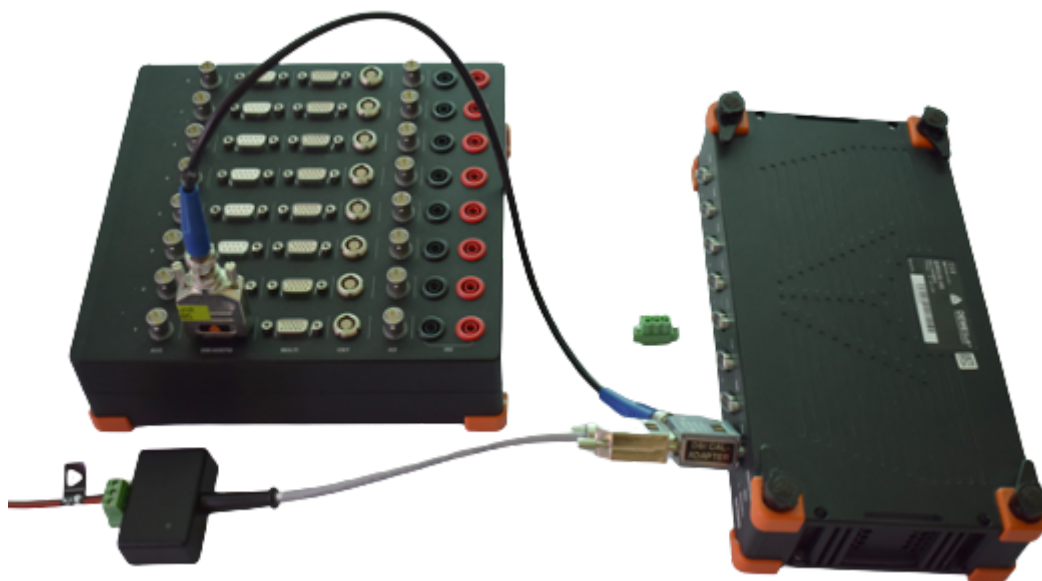


Image: Example of connecting the DSI-5A



Hint

The DSli-10A and DSli-20A adaptors have to be connected with Banana-to-Banana connectors to the Fluke instrument. The DSI-20mA has spring connectors right on the PCB, so they are shipped to the customer disassembled (so the connection can be made according to the customers' wishes). Regardless of the connector used, it is necessary to connect the DSI-20mA adapter to the ACC channels on the CAL-BOX.

13.7. DSI-CHG-CAL



Important

For the calibration of DSI-CHG-CAL adapter an ISO calibrated 1nF capacitor is required. The capacitor properties need to be defined in the Charge adapter editor.

To define capacitor properties, open DS Calibrator and go to File → Charge adapter editor. When the new window appears you first need to click on “Unlock” and then click on “+” to add capacitor. Enter capacitor serial number, value (from ISO calibration report - measured), certificate nr., Calibration date, and Exp. date fulfills automatically. After you successfully defined the capacitor, you click on “Lock” and “OK”.

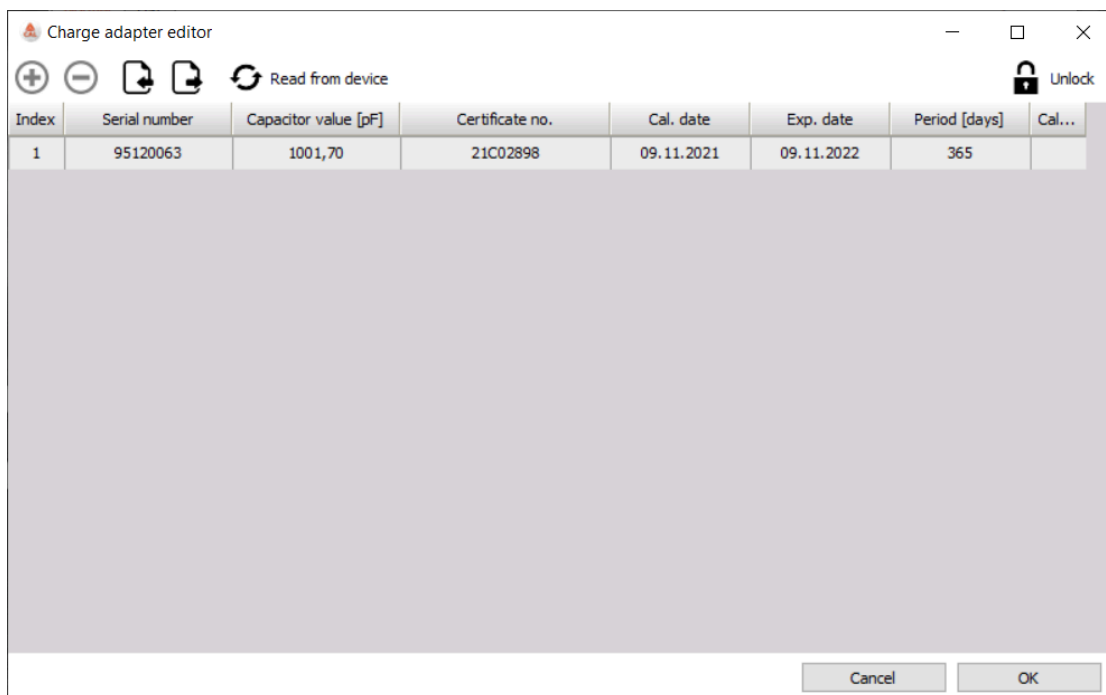


Image: Charge adapter editor with defined 1nF capacitor

The DSI-CHG-CAL adapter connects to the appropriate MULTI (DSUB15 connector) channel and the capacitor connects to the appropriate ACC channel of the DS-CAL test board. The DSI-CHG-CAL adapter then connects to the CHG module on chosen instrument via a BNC-to-BNC cable, during the calibration a window will appear asking to connect the BNC-to-BNC cable from DSI-CHG-CAL adapter to the capacitor.

In order to read the data from the DSI-CHG-CAL adapter you must change the mode of the DS-CAL test board. To do that right click on the DSI adapters grid and select “Charge adapter calibration” from the menu. Before starting the calibration procedure choose the correct capacitor from the drop down menu in the DSI adapters grid in the “Cal adapter” column. Note that only one CHG-CAL adapter can be calibrated at once.



Image: Example of connecting the DSI-CHG-CAL adapter to the DS CAL test board

When you finish with calibration you need to upload DSI-CHG-CAL adapters to the Charge adapter editor, so they are automatically read next time when they are used for calibration of SIRIUS-CHG and SIRIUS-HS-CHG modules and for DSI-CHG-50 adapters.

To upload DSI-CHG-CAL adapters you need to first open the Charge adapter editor and then click on “Read from device”. After that, DSI-CHG-CAL adapters which are currently connected to the CAL box CHG module as shown in the picture above, appear in the Charge adapter editor.

14. Appendix A: Connectors of the DS-CAL test board

14.1. CAN connector

Pin	Name	Description
1	+5V_CAN1	CAN1: +5V input
2	CAN_LOW	CAN data low
3	DGND	Digital ground
4	+12V_CAN2	CAN2: +12V input
5	+5V_CAN2	CAN2: +5V input
6	DGND	Digital ground
7	CAN_HIGH	CAN data high
8	RES	Reserved
9	+12V_CAN1	CAN1: +12V input

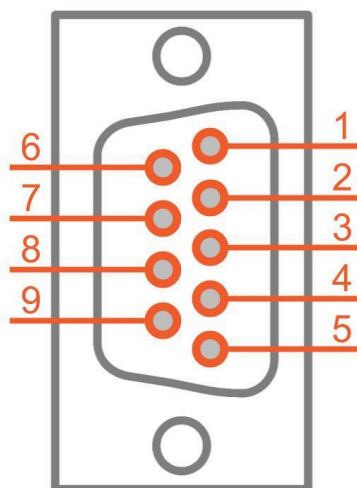


Image: CAN connector pinout

14.2. Sync connector

Type of installed connector is **Lemo EEG.00.304.CLL (female)**. Note that there is no distinction between the two connectors on the DS-CAL test board.

Pin	Name	Description
1	CLK	Clock
2	TRIG	Trigger
3	PPS	PPS
4	DGND	Digital ground

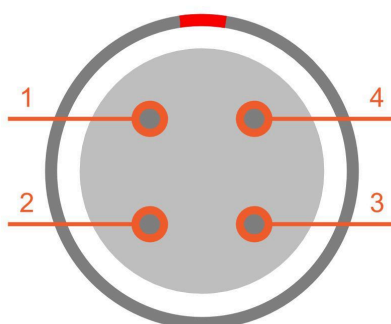


Image: Sync connector pinout

14.3. PPS connector

Type of installed connector is Lemo ECG.1B.304 (female).

Pin	Name	Description
1	+5V	+5V output
2	NC	Not connected
3	PPS	PPS input
4	GND	Ground

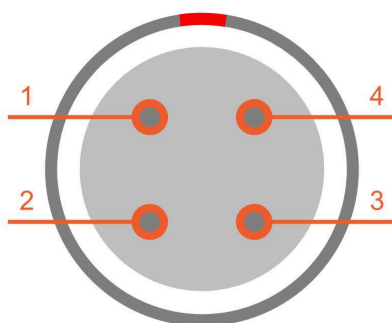


Image: PPS connector pinout

14.4. Power supply connector

Type of installed connector is **Lemo EGJ.1B.302.CLA (male)**.

For the DS-CAL test board an unregulated power supply of 9 to 32 V DC is required.

Pin	Name	Description
1	+	Power supply +
2	-	Power supply -

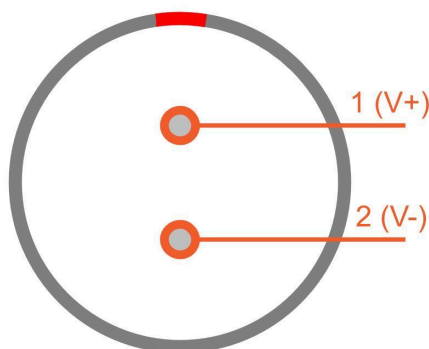


Image: Power connector pinout

14.5. GND connector

For a correct adjustment and calibration check the ground (GND) of the UUT must be connected to the DS-CAL test board with the supplied banana plug cable.

15. Appendix B: Glossary and abbreviations

dB

The decibel (dB) is a logarithmic unit that indicates the ratio of a physical quantity (usually power or intensity) relative to a specified or implied reference level. A ratio in decibels is ten times the logarithm to base 10 of the ratio of two power quantities.

Dewesoft

Dewesoft refers to the company. DEWESoft™ refers to the software suite for data acquisition, data processing, data analysis and much more. See www.dewesoft.com.

DMM

Refers to the digital multimeter (for example the Agilent 34410A).

Dynamic Range

Dynamic Range is the ratio of a specified full scale input range to the minimum detectable value (peak spurious signal). The value for dynamic range is expressed in decibels (dB).

GND

The electrical ground (or earth).

Microsoft®

Microsoft® Corporation is a public multinational corporation headquartered in Redmond, Washington, USA, that develops, manufactures, licenses, and supports a wide range of products and services predominantly related to computing through its various product divisions.

DEWESoft™ is a Windows® based application and thus a Windows® operating system must be installed on the measurement PC where DEWESoft™ is installed. See www.microsoft.com.

OS

An operating system (OS) is a set of system software running on a device that manages the system hardware. This may refer to the operating system of a PC (Windows is required for DEWESoft™) or to the operating system of the SIRIUS system.

PPS

A pulse per second (PPS) is an electrical signal that has a width of less than one second and a sharply rising or abruptly falling edge that accurately repeats once per second. PPS signals are output by radio beacons, frequency standards, other types of precision oscillators and some GPS receivers.

PC

A personal computer. SIRIUS systems are typically connected to a personal computer which runs DEWESoft™ to fetch the measurement data.

SNR

Signal to Noise Ratio (SNR) is the ratio of the RMS value of the full scale input range to the total RMS noise measured with the inputs shorted together. The value for SNR is expressed in decibels (dB).

USB

Universal Serial Bus is a specification to establish communication between devices and a host controller (usually PCs). SIRIUS systems use a USB connection to connect to a PC.

UUT

“Unit Under Test” refers to the (measurement) device which is intended to be adjusted or calibrated.

Windows®

A PC operating system by Microsoft®. DEWESoft™ works on Windows® 7, Windows® 8 and Windows® 10. Windows® is a registered trademark of Microsoft Corporation in the United States and other countries.

16. Warranty information

Notice

The information contained in this document is subject to change without notice.

Note:

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The copy of the specific warranty terms applicable to your Dewesoft product and replacement parts can be obtained from your local sales and service office. To find a local dealer for your country, please visit <https://dewesoft.com/support/distributors>.

16.1. Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your Dewesoft data acquisition system is delivered, it is calibrated. Detailed calibration reports for your Dewesoft system can be requested. We retain them for at least one year, after system delivery.

16.2. Support

Dewesoft has a team of people ready to assist you if you have any questions or any technical difficulties regarding the system. For any support please contact your local distributor first or Dewesoft directly.

Dewesoft d.o.o.
Gabrsko 11a
1420 Trbovlje Slovenia

Europe Tel.: +386 356 25 300

Web: <http://www.dewesoft.com>

Support Email: Support@dewesoft.com

The telephone hotline is available Monday to Friday from 07:00 to 16:00 CET (GMT +1:00)

Calibration team Email: calibration@dewesoft.com

16.3. Service/repair

The team of Dewesoft also performs any kinds of repairs to your system to assure a safe and proper operation in the future. For information regarding service and repairs please contact your local distributor first or Dewesoft directly on <https://dewesoft.com/support/rma-service>.

16.4. Restricted Rights

Use Slovenian law for duplication or disclosure. Dewesoft d.o.o. Gabrsko 11a, 1420 Trbovlje, Slovenia / Europe.

16.5. Printing History

Version 2.0.0, Revision 217 Released 2015 Last changed: 23. July 2018 at 16:54.

16.6. Copyright

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16.7. Trademarks

We take pride in our products and we take care that all key products and technologies are registered as trademarks all over the world. The Dewesoft name is a registered trademark. Product families (KRYPTON, SIRIUS, DSI, DS-NET) and technologies (DualCoreADC, SuperCounter, GrandView) are registered trademarks as well. When used as the logo or as part of any graphic material, the registered trademark sign is used as a part of the logo. When used in text representing the company, product or technology name, the ® sign is not used. The Dewesoft triangle logo is a registered trademark but the ® sign is not used in the visual representation of the triangle logo.

17. Safety instructions

Your safety is our primary concern! Please be safe!

17.1. Safety symbols in the manual



Warning

Calls attention to a procedure, practice, or condition that could cause the body injury or death



Caution

Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

17.2. General Safety Instructions



Warning

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Dewesoft d.o.o. assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as an option and will not be shipped as standard parts.

17.2.1. Environmental Considerations

Information about the environmental impact of the product.

17.2.2. Product End-of-Life Handling

Observe the following guidelines when recycling a Dewesoft system:

17.2.3. System and Components Recycling

Production of these components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at its end of life! Please recycle this product in an appropriate way to avoid unnecessary pollution of the environment and to keep natural resources.



This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further information about recycling on the Dewesoft web site www.dewesoft.com

Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment and is outside the scope of the 2002/95/EC RoHS Directive. However, we take care of our environment and the product is lead-free.

17.2.4. General safety and hazard warnings for all Dewesoft systems

Safety of the operator and the unit depend on following these rules.

- Use this system under the terms of the specifications only to avoid any possible danger.
- Read your manual before operating the system.
- Observe local laws when using the instrument.
- DO NOT touch internal wiring!
- DO NOT use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- You may not connect higher voltages than rated to any connectors.
- The power cable and connector serve as Power-Breaker. The cable must not exceed 3 meters, the disconnect function must be possible without tools.
- Maintenance must be executed by qualified staff only.
- During the use of the system, it might be possible to access other parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advice for using the system.
- With this product, only use the power cable delivered or defined for the host country.
- DO NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.
- Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), a non-interruptible safety earth ground must be provided from the mains power source to the product input wiring terminals.
- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please read the corresponding specifications in the product manual carefully.
- The inputs must not, unless otherwise noted (CATx identification), be connected to the main circuit of category II, III and IV.
- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.
- DO NOT use the system if equipment covers or shields are removed.
- If you assume the system is damaged, get it examined by authorized personnel only.
- Adverse environmental conditions are Moisture or high humidity Dust, flammable gases, fumes or dissolver Thunderstorm or thunderstorm conditions (except assembly PNA) Electrostatic fields, etc.
- The measurement category can be adjusted depending on module configuration.
- Any other use than described above may damage your system and is attended with dangers like short-circuiting, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until the safe operation can be verified by service-trained personnel. If necessary, return the product to Dewesoft sales and service office for service and repair to ensure that safety features are maintained.
- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore if the system is damaged obviously or causes strange

noises. The system does not work anymore. The system has been exposed to long storage in adverse environments. The system has been exposed to heavy shipment strain.

- Warranty void if damages caused by disregarding this manual. For consequential damages, NO liability will be assumed!
- Warranty void if damage to property or persons caused by improper use or disregarding the safety instructions.
- Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE).
- Be careful with voltages >25 VAC or >35 VDC! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
- The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not be covered!
- Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.
- Prevent using metal bare wires! Risk of short circuit and fire hazard!
- DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy over-voltage). An advanced range of application under certain conditions is allowed with therefore designed products only. For details please refer to the specifications.
- Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.
- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Avoid operation in the immediate vicinity of high magnetic or electromagnetic fields, transmitting antennas or high-frequency generators, for exact values please refer to enclosed specifications.
- Use measurement leads or measurement accessories aligned with the specification of the system only. Fire hazard in case of overload!
- Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatise the system unpowered to room temperature.
- Do not disassemble the system! There is a high risk of getting a perilous electric shock. Capacitors still might be charged, even if the system has been removed from the power supply.
- The electrical installations and equipment in industrial facilities must be observed by the security regulations and insurance institutions.
- The use of the measuring system in schools and other training facilities must be observed by skilled personnel.
- The measuring systems are not designed for use in humans and animals.
- Please contact a professional if you have doubts about the method of operation, safety or the connection of the system.
- Please be careful with the product. Shocks, hits and dropping it from already- lower level may damage your system.
- Please also consider the detailed technical reference manual as well as the security advice of the connected systems.
- This product has left the factory in safety-related flawlessness and in proper condition. In order to maintain this condition and guarantee safety use, the user has to consider the security advice and warnings in this manual.

EN 61326-3-1:2008

IEC 61326-1 applies to this part of IEC 61326 but is limited to systems and equipment for industrial applications intended to perform safety functions as defined in IEC 61508 with SIL 1-3.

The electromagnetic environments encompassed by this product family standard are industrial, both indoor and outdoor, as described for industrial locations in IEC 61000-6-2 or defined in 3.7 of IEC 61326-1.

Equipment and systems intended for use in other electromagnetic environments, for example, in the process industry or in environments with potentially explosive atmospheres, are excluded from the scope of this product family standard, IEC 61326-3-1.

Devices and systems according to IEC 61508 or IEC 61511 which are considered as “operationally well-tried”, are excluded from the scope of IEC 61326-3-1.

Fire-alarm and safety-alarm systems, intended for the protection of buildings, are excluded from the scope of IEC 61326-3-1.

18. Documentation version history

Version	Date		Notes (person who made change)	Approved by:
1.0.0	13.05.2014	✓	Initial revision	/
1.0.1	02.07.2014	✓	Added Manual in Scope of delivery, change length of GND cable to 2m, changed min. Excel Version to 2010, remove blank page 23	/
1.1	14.07.2015	✓	New Logo, Software Version changed to DSCalibrator5, supported Fluke calibrators mentioned, corrected PPS connector type gender, Power On Sequence added, Calibration procedure details added	/
2.0	25.10.2017	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	Full document rewrite Updated document template Added 3.1. Calibration system equipment support Updated 3.3. Scope of supply Added 3.4. Optional accessory packages Updated 4. Calibration system equipment configuration Updated 5. Connecting the calibration system together Updated 7. Configuring the DSCalibrator software Added 7.2. Users Updated 8. Using the DSCalibrator software Added 8.5. Special considerations Added 9. Connecting the UUT Updated Appendix A: Connectors of the DS-CAL test board Updated Appendix B: Glossary and abbreviations	/
V20-1	30.9.2020		New template	/
V21-1	05.03.2021	✓ ✓ ✓ ✓ ✓	Updated 7. Configuring the DSCalibrator software Added 8.6 Custom serial numbers Added 8.7 Overview report Added 9.7.7 DSI-CHG-CAL Updated 3.1.1. Multifunction calibrator support	/
V22-1	04.01.2022	✓ ✓ ✓	Updated 9.7: DSI adapters Fix various spelling mistakes Fix and remove references to images and pictures	/
V22-2	04.07.2022	✓ ✓ ✓ ✓ ✓ ✓	Added IOLITE-CAL-SET Updated 3.1.1. Multifunction calibrator support Updated 3.1.2. Digital multimeter support Added pictures in 3.3.1. DS-CAL-BOX Updated 3.4.2. KRYPTON-TH-CAL-SET Replaced image 5.3. DS-CAL test board	/

- ☑ Replaced image 9.1. Sirius USB
 - ☑ Updated 9.2. Sirius EtherCAT
 - ☑ Updated 9.3. Sirius Mini
 - ☑ Added chapter 9.3.1. SIRIUSm-3xACC-1xACC+
 - ☑ Added chapter 9.3.2. SIRIUSm-4xACC
 - ☑ Replaced image 9.4.1. Sirius ACC and HS-ACC
 - ☑ Replaced image 9.4.2. Sirius CHG and HS-CHG
 - ☑ Replaced image 9.4.3. Sirius HV and HS-HV
 - ☑ Replaced image 9.4.4. Sirius LV and HS-LV
 - ☑ Replaced image 9.4.6. Sirius STG and STGM
 - ☑ Replaced image 9.4.7. Sirius HD-ACC
 - ☑ Replaced image 9.4.8. Sirius HD-LV
 - ☑ Replaced image 9.4.9. Sirius HD-STGS
 - ☑ Replaced image 9.4.10. Sirius AO
 - ☑ Added chapter 9.5. SIRIUSiwe and chapter 9.7. MINITAURs
 - ☑ Added image in chapter 9.8. Krypton
 - ☑ Replaced image 9.8.1. Krypton 8xTH, 16xTH
 - ☑ Replaced image 9.8.2. Krypton 4xLV, 8xLV
 - ☑ Updated chapter 9.8.3. Krypton-3 x STG, Krypton-6xSTG and replaced image.
 - ☑ Replaced image 9.8.4. Krypton RTD
 - ☑ Replaced image 9.8.5. Krypton 4xACC, 8xACC
 - ☑ Added chapter 9.9. Krypton Modular one
 - ☑ Added chapter 9.9.1. Krypton 1 x AO
 - ☑ Added chapter 9.9.2. Krypton 1 x CNT
 - ☑ Added chapter 9.9.3. KRYPTONi-1xTH-HV
 - ☑ Added chapter 9.10 IOLITE R12, R8, LX-R8, R8r
 - ☑ Added chapter 9.10.1 IOLITEir-8xTH and 8xTH-HS
 - ☑ Added chapter 9.10.2 IOLITEr-4xCNT
 - ☑ Added chapter 9.10.3 IOLITEr-8xSTG
 - ☑ Added chapter 9.11 IOLITE multi
 - ☑ Added chapter 9.11.1 IOLITEi-8xRTD
 - ☑ Added chapter 9.11.2 IOLITEi-8xTH and IOLITEi-8xTH-HS
 - ☑ Added chapter 9.11.3 IOLITE-6xSTG
 - ☑ Replaced image 9.12.1. DSI-ACC, DSI-ACC-0.16Hz, DSI-ACC-20mA
 - ☑ Replaced image 9.12.2. DSI-V-200
 - ☑ Replaced image 9.12.3. DSI-CHG-50
 - ☑ Updated chapter 9.12.4. DSI-TH-K, DSI-TH-T, DSI-TH-J, DSI-TH-C
 - ☑ Replaced image 9.12.5. DSI-RTD
 - ☑ Replaced image 9.12.6. DSI-5A
 - ☑ Added Image 9.12.7. DSI-CHG-CAL
 - ☑ Added chapter 9.5.1. SIRIUSiwe-6xSTGM-2xSTGM+
 - ☑ Added chapter 7.5.Environment
 - ☑ Added chapter 7.6. Warmup
 - ☑ Added chapter 7.7. Advanced
 - ☑ Added chapter 7.10. Experimental
- (Tadej Blažic)

V22-3	17.08.2022	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Updated chapter and added image 7. Configuring the DSCalibrator Replaced image 7.1. General settings Updated chapter and replaced image 7.2. Users Updated chapter 7.4. Database Replaced image 8. Using the DSCalibrator software Updated chapter and replaced image 8.1. Adjustment Updated chapter and replaced Image 8.2. Calibration check Added chapter 3.4.6. 100nF-CAP-STD Added chapter 3.4.7. DS-TOOL-CAL-DOCK Added chapter 3.4.8. DS-CAL-BOX-DB Updated chapter 9.10.3. IOLITEr-8xSTGS Updated chapter 12.2. Support Replaced image 9.12. DSI adapters (Tadej Blažič)	/
V22-4	19.10.2022	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Added chapter 3.5. Optional: temperature and humidity probe Added chapter 4.2. ROTRONIC HC2A-S temperature and humidity probe setup Added chapter 6.3. Download and run Environment server software Added chapter 7.5. Environment Replaced image 9.7. MINITAURs Updated chapter 10.2. Sync connector Added Image 9.12.5. DSI-RTD (Tadej Blažič)	/
V23-1	03.04.2023	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Renamed chapters between chapter 9 and 18. Added chapter 12.2.4. IOLITEi-8xLA-T2A2f Updated chapter 6.2. Installation of DSCalibrator Software (added basic specifications for calibration PC) Updated chapter 3.1.1. Multifunction calibrator support Updated chapter 3.1.2. Digital multimeter support Updated chapter 9.3. Sirius Mini Updated chapter 7.3. External devices Updated chapter 13.4. DSI-TH-K, DSI-TH-T, DSI-TH-J, DSI-TH-C, DSI-TH-B and DSI-TH-E Updated chapter 9.2. Sirius EtherCAT Updated chapter 3.5. Optional temperature and humidity probe Added chapter 11.2.4. Kryptoni 1xLV Updated chapter 12.2.1. IOLITEi-8xRTD and IOLITEi-8xRTD-T2A4f and added image Updated chapter 9.4.9. Sirius HD-STGS and SIRIUS-HD-16xSTGS-L1B10f Added chapter 9.7. Sirius-HS and Siriusi-HS Updated chapter 12.1. IOLite R12, R8, LX-R8, R8r Added chapter 9.8. Siriusi-XHS Added chapter 8.8. Manual upload of calibration reports to the Database (Tadej Blažič)	/

V23-2	13.11.2023	<input checked="" type="checkbox"/> Updated chapter 3.1.1. Multifunction calibrator support <input checked="" type="checkbox"/> Updated chapter 18. Documentation version history <input checked="" type="checkbox"/> Replaced image in chapter 3. Introduction <input checked="" type="checkbox"/> Replaced image and updated chapter 13.1. DSI-ACC, DSI-ACC-0.16Hz, DSI-ACC-20mA <input checked="" type="checkbox"/> Replaced image in chapter 5.3. DS-CAL test board <input checked="" type="checkbox"/> Added chapter 12.1.4. IOLITEr-6xSTG <input checked="" type="checkbox"/> Added image in chapter 9.4.10. Sirius AO <input checked="" type="checkbox"/> Updated chapter 13.3. DSI-CHG-50, DSI-CHG-100 and DSI-CHG-DC (Tadej Blažic)	Uroš Kašca
V24-1	13.03.2024	<input checked="" type="checkbox"/> Updated chapter 9.4.5. Sirius MULTI <input checked="" type="checkbox"/> Updated chapter 5.2. Multifunction calibrator and added images. <input checked="" type="checkbox"/> Deleted image numbers (Tadej Blažic)	Uroš Kašca