DSI-ADAPTERS

DEWESoft®

TECHNICAL REFERENCE MANUAL

DSI ADAPTERS V23-1

1. Table of contents

2. About this document

This is the users' manual for DSI Adapters available for SIRIUS DAQ system, KRYPTON DAQ modules, IOLITE DAQ and Control System, MINITAURs or DEWE-43 DAQ module.

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.

2.2. Online versions

2.2.1. Device Technical Reference Manual

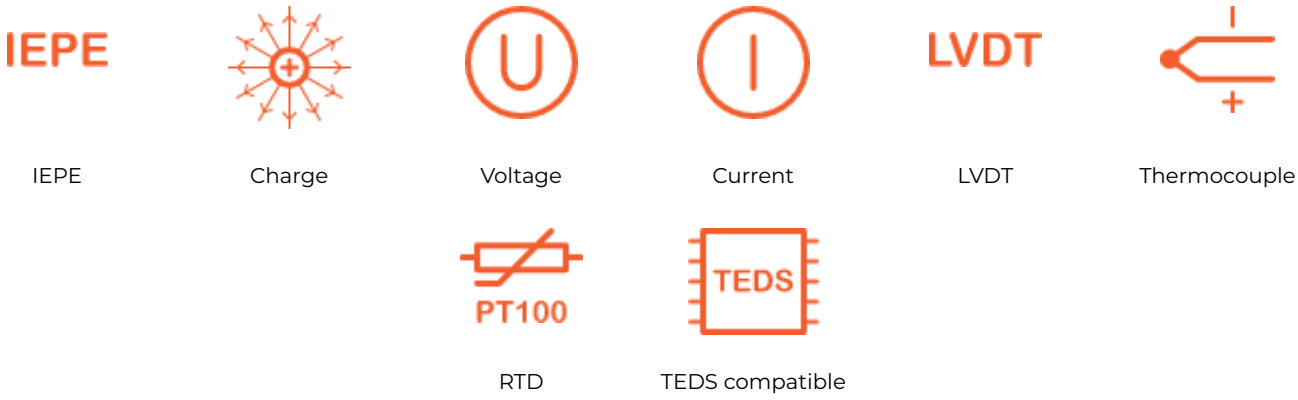
The most recent version of this manual can be downloaded from our homepage:
https://download.dewesoft.com/list/manuals-brochures/hardware-manuals
In the *Hardware Manuals* section click the download link for the *Device® technical reference manual*.

2.2.2. DEWESoft® User Manual

The DEWESoft® User Manual document provides basics and additional information and examples for working with DEWESoft® and certain parts of the program.
The latest version of the DEWESoft® tutorials can be found here:
https://download.dewesoft.com/list/manuals-brochures/software-manuals
In the Software Manuals section click the download link of the DEWESoft X User Manual entry.

2.3. DSI Adapters Overview

DSI adapters are TEDS IEEE 1451.4 equipped sensor adapters that turn any of our DSUB9 universal analog input amplifiers into direct IEPE, charge, thermocouple, shunt, voltage, LVDT or RTD input...



IEPE | Charge | Voltage | Current | LVDT | Thermocouple

RTD | TEDS compatible

2.3.1. Features of DSI adapters:

- EXTEND ANALOG INPUTS: DSI adapters are compatible with any Dewesoft amplifier with a DSUB-9 analog input, independent of the product family. They will fit SIRIUS DAQ system, KRYPTON DAQ modules, IOLITE DAQ and Control System, MINITAURs or DEWE-43 DAQ instrument.
- PLUG-AND-PLAY WITH TEDS: All DSI adapters have a TEDS chip built-in for automatic sensor detection and plug-and-play setup. Just connect the sensor to the DSI adapter and DSI adapter

to one of our DSUB-9 analog inputs and everything from scaling, units, calibration data, etc. will be configured automatically.

- COMPACT AND RUGGED: All electronics are built into small and rugged DSUB-9 aluminum housing with screw connectors to firmly screw adapters to the analog input channel.

Hint
When isolation is required, you must use the DSI-adapters on isolated DewesoftX® devices: e.g. Siriusi modules.

All DSI-adapters are the size of a DSUB-9 housing, which contains the electronics as well as the sensor connector. The miniature electronics of each DSI sensor also contain a TEDS chip in which the identification, calibration and configuration data of the DSI are stored. TEDS data are read automatically by the DewesoftX® software and are immediately applied to the channel setup.

Hint
When using DSI® adapters, DewesoftX® can read the TEDS information of the adapter and also the TEDS information of any sensors that are connected to the adapter (the old MSI adapters could not read the TEDS of the connected sensor).

*The Bridge Completion Adapters are available in a separate technical reference manual.

2.4. DSI: General Specifications

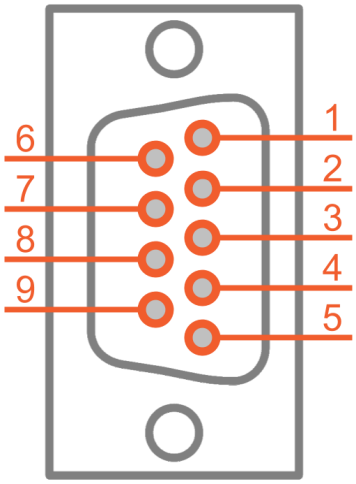
Connectors	
DAQ interface connector	DB9 Male
Sensor connector	See individual adapter specification
Environmental	
Operating Temperature	-10 to 60 °C
Storage Temperature	-40 to 85 °C
Humidity	5 to 95 % RH non-condensing at 50 °C
IP rating	IP50
RFI susceptibility	±0.5 % span error at 400 MHz, 5 W, 3 m
Shock & Vibration	Vibration sweep sinus (EN 60068-2-6:2008) Vibration random (EN 60721-3-2: 1997 - Class 2M2) Shock (EN 60068-2-27:2009) MIL-STD-810D

2.4.1. Calibration

The DSI-adapters are calibrated at 23 °C ± 3 °C and meet their specifications when leaving the factory. The time interval for calibration depends on environmental conditions. A two year calibration interval is recommended.

Important
Total measurement accuracy depends on the adapter accuracy and host amplifier accuracy!

2.4.2. DSI: Pin-out



DSI connector: pin-out (DSUB-9 male)

Pin	Name	Description
1	Exc +	Excitation +
2	In+	Input +
3	Sns-	Sense -
4	GND	Ground
5	N.C.	Not connected
6	Sns+	Sense +
7	In-	Input -
8	Exc-	Excitation -
9	TEDS	TEDS

2.4.3. Environmental

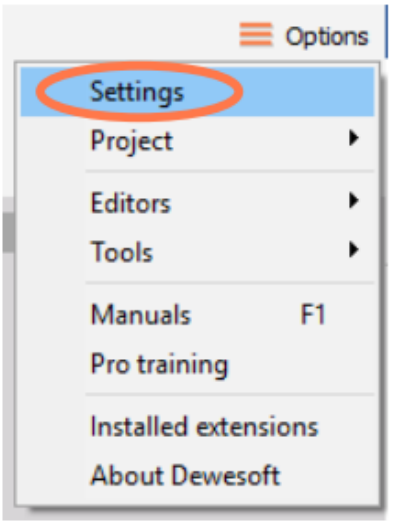
Warning

All DSI® specifications within this manual are valid at 25 °C.
All DSI-adapters are produced according to ISO 9001 and ISO 14001.

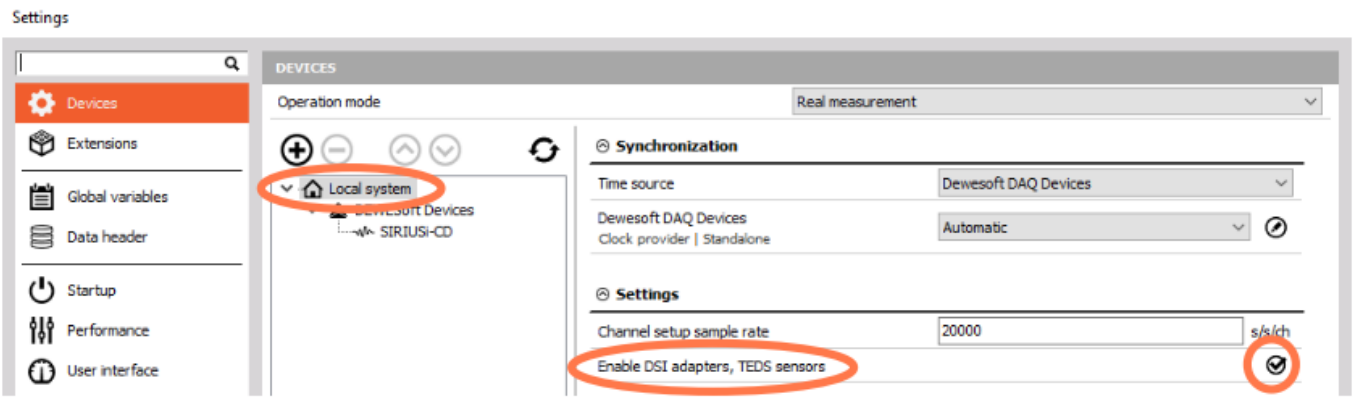
2.4.4. DSI adapters / TEDS sensor support

Since there is an inbuilt TEDS device in the adapter itself and if ☑ DSI adapters/TEDS sensors under hardware setup are selected, adapter will be recognised and proper EXC. Voltage will be set automatically.

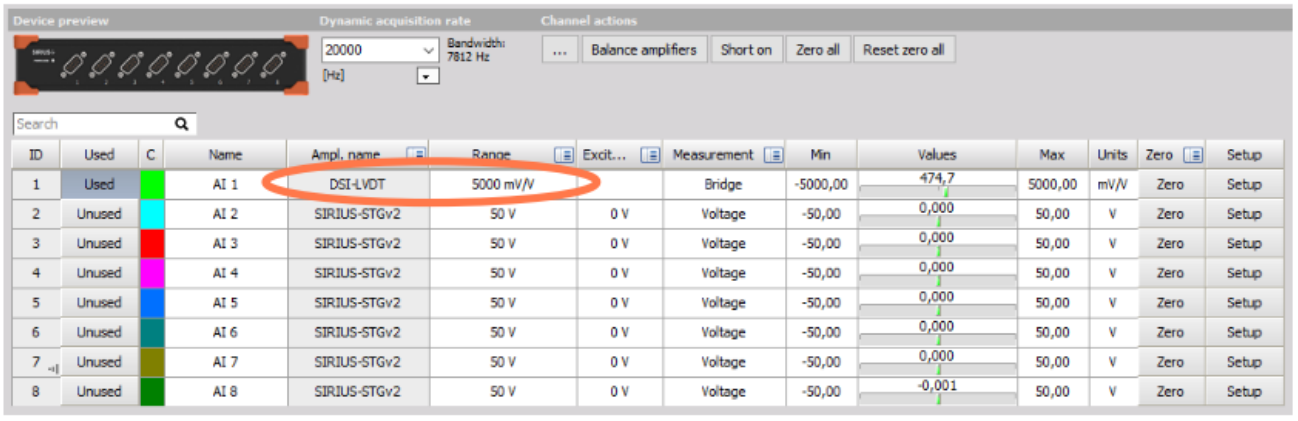
Please check if you are using the latest software where LVDT Adapter is supported.



Options - Settings



DSI adapters/TEDS sensors checkbox

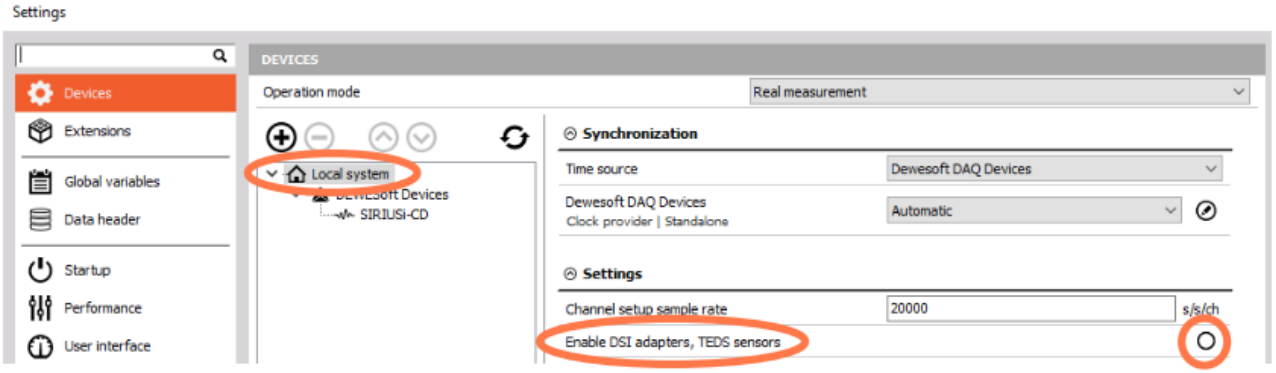


ID	Used	C	Name	Ampl. name	Range	Excit...	Measurement	Min	Values	Max	Units	Zero	Setup
1	Used		AI 1	DSI-LVDT	5000 mV/V		Bridge	-5000,00	474,7	5000,00	mV/V	Zero	Setup
2	Unused		AI 2	SIRIUS-STGv2	50 V	0 V	Voltage	-50,00	0,000	50,00	V	Zero	Setup
3	Unused		AI 3	SIRIUS-STGv2	50 V	0 V	Voltage	-50,00	0,000	50,00	V	Zero	Setup
4	Unused		AI 4	SIRIUS-STGv2	50 V	0 V	Voltage	-50,00	0,000	50,00	V	Zero	Setup
5	Unused		AI 5	SIRIUS-STGv2	50 V	0 V	Voltage	-50,00	0,000	50,00	V	Zero	Setup
6	Unused		AI 6	SIRIUS-STGv2	50 V	0 V	Voltage	-50,00	0,000	50,00	V	Zero	Setup
7	Unused		AI 7	SIRIUS-STGv2	50 V	0 V	Voltage	-50,00	0,000	50,00	V	Zero	Setup
8	Unused		AI 8	SIRIUS-STGv2	50 V	0 V	Voltage	-50,00	-0,001	50,00	V	Zero	Setup

DSI-LVDT adapter is recognized and set automatically

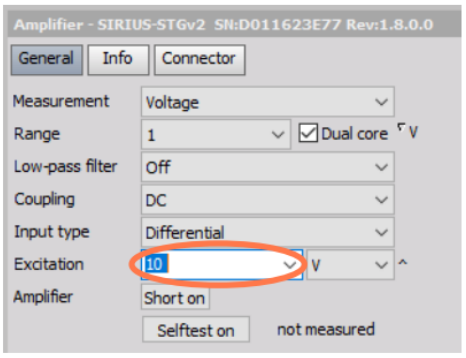
2.4.4.1. Manual operation

If DSI adapters/TEDS sensors are left unchecked under hardware setup then sensor supply and range has to be set manually.



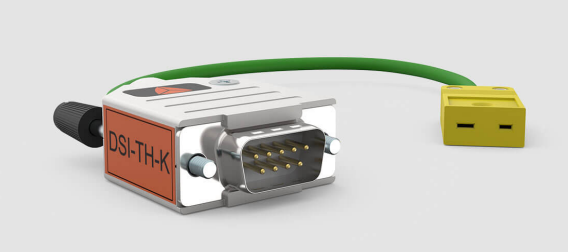
DSI adapters/TEDS sensors checkbox is left unchecked

Under Channel setup for channel N, set Excitation voltage from 10V to 15V maximum according to Electrical Specifications.

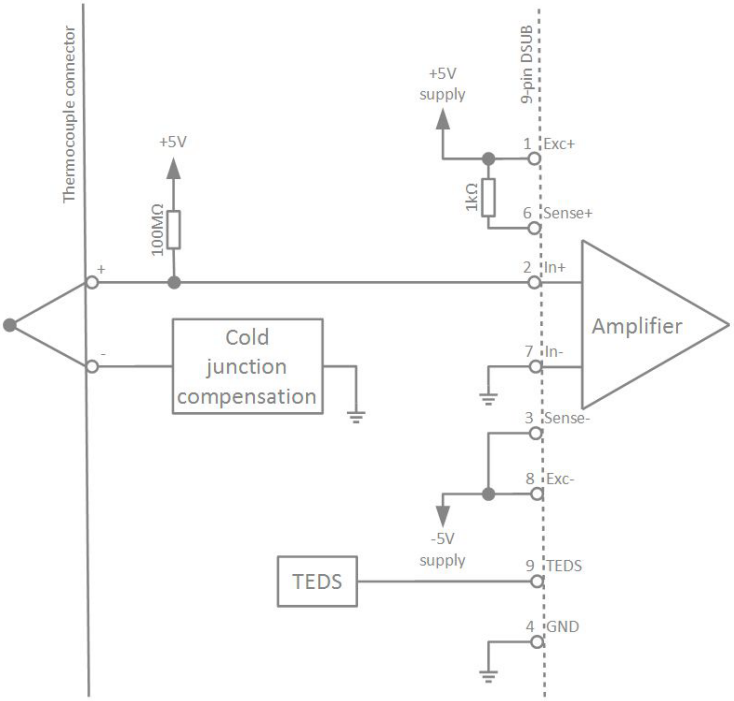


Excitation voltage setting

2.5. DSI-TH-x



DSI-TH-K



Basic circuit design of DSI-TH-x

The DSI-TH-x allows thermocouple temperature measurement with Dewesoft devices. The common thermocouple types K, J, T and E are supported. For high temperature applications also type C is supported. A high precision cold junction compensation is included in the adapter. The non-linearity of the thermocouple is compensated for in software.

A TEDS chip provides automatic adapter identification by software and the calibration data. In operation with the isolated SIRIUSi modules you will get a fully isolated thermocouple amplifier.

Note
In operation with the differential SIRIUS® modules (or Krypton® / DEWE-43, IOLITE) only isolated thermocouples should be used, because the thermocouple input is single-ended.

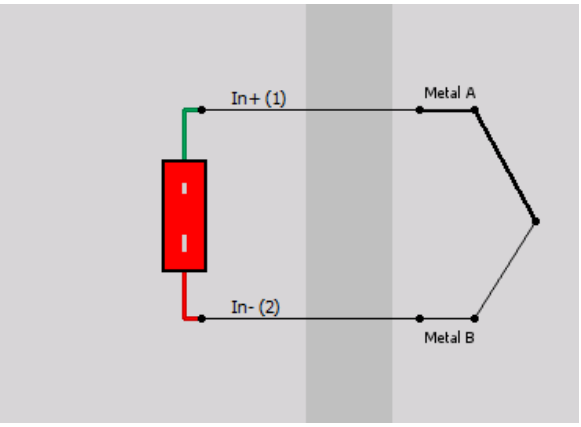
2.5.1. DSI-TH-x Specifications

General specifications	
Sensor connector	Mini thermocouple, female
Thermocouple Types	DSI-TH-K: Type K DSI-TH-J: Type J DSI-TH-T: Type T DSI-TH-C: Type C DSI-TH-E: Type E
Cold junction compensation	Integrated
CJC accuracy	1.0 °C
Input impedance	> 10 MΩ
BIAS current	50 nA
Open TC detection	✓
Linearisation	Through software according to the sensor type
TEDS	For adapter identification and calibration data

Measurement hardware		SIRIUSi LVv2 SIRIUSi HD STGS SIRIUSi STGv2	KRYPTONi STG SIRIUSi XHS-LV IOLITE STG	SIRIUSi STGMv3 MINITAURs	DEWE-43A SIRIUSi HD-LV	SIRIUSi HS-LVv2	SIRIUSi HS-STG	SIRIUSi MULTI
DSI-TH-K for thermocouple type K (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
-270 to 1370 °C	-250 to -200 °C	±3.2 [±18.2] °C	±11.3 [±21.3] °C	±4.9 [±18.2] °C	±9.9 [±18.2] °C	±2.2 [±21.3] °C	±2.2 [±9.7] °C	±4.9 [±34.9] °C
	-200 to -100 °C	±1.8 [±7.4] °C	±4.8 [±8.6] °C	±2.4 [±7.4] °C	±4.3 [±7.4] °C	±1.4 [±8.6] °C	±1.4 [±4.2] °C	±2.4 [±13.6] °C
	-100 to 0 °C	±1.4 [±4.3] °C	±3.0 [±4.9] °C	±1.7 [±4.3] °C	±2.7 [±4.3] °C	±1.2 [±4.9] °C	±1.2 [±2.6] °C	±1.7 [±7.5] °C
	0 to 200 °C	±1.3 [±3.5] °C	±2.5 [±4.0] °C	±1.5 [±3.5] °C	±2.3 [±3.5] °C	±1.1 [±4.0] °C	±1.1 [±2.3] °C	±1.5 [±6.0] °C
	200 to 1000 °C	±1.8 [±4.1] °C	±2.9 [±4.4] °C	±2.0 [±4.1] °C	±2.8 [±4.1] °C	±1.4 [±4.4] °C	±1.4 [±2.6] °C	±2.0 [±6.7] °C
	1000 to 1370 °C	±2.0 [±4.6] °C	±3.2 [±4.9] °C	±2.3 [±4.6] °C	±3.2 [±4.6] °C	±1.6 [±4.9] °C	±1.6 [±2.9] °C	±2.3 [±7.5] °C
DSI-TH-J for thermocouple type J (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
-200 to 1200 °C	-200 to -100 °C	±1.6 [±5.5] °C	±3.7 [±6.3] °C	±2.0 [±5.5] °C	±3.3 [±5.5] °C	±1.3 [±6.3] °C	±1.3 [±3.3] °C	±2.0 [±9.8] °C
	-100 to 0 °C	±1.3 [±3.4] °C	±2.5 [±3.9] °C	±1.5 [±3.4] °C	±2.3 [±3.4] °C	±1.2 [±3.9] °C	±1.2 [±2.2] °C	±1.5 [±5.8] °C
	0 to 500 °C	±1.4 [±3.0] °C	±2.2 [±3.3] °C	±1.6 [±3.0] °C	±2.1 [±3.0] °C	±1.2 [±3.3] °C	±1.2 [±2.0] °C	±1.6 [±4.8] °C
	500 to 1000 °C	±1.7 [±3.2] °C	±2.3 [±3.3] °C	±1.8 [±3.2] °C	±2.3 [±3.2] °C	±1.4 [±3.3] °C	±1.4 [±2.1] °C	±1.8 [±4.9] °C
	1000 to 1200 °C	±1.8 [±3.4] °C	±2.4 [±3.5] °C	±2.0 [±3.4] °C	±2.5 [±3.4] °C	±1.5 [±3.5] °C	±1.5 [±2.2] °C	±2.0 [±5.1] °C

DSI-TH-T for thermocouple type T (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
-270 to 400 °C	-250 to -200 °C	±2.7 [±14.7] °C	±9.2 [±17.2] °C	±4.1 [±14.7] °C	±8.1 [±14.7] °C	±1.9 [±17.2] °C	±1.9 [±7.9] °C	±4.1 [±28.1] °C
	-200 to -100 °C	±1.8 [±7.3] °C	±4.8 [±8.4] °C	±2.4 [±7.3] °C	±4.2 [±7.3] °C	±1.4 [±8.4] °C	±1.4 [±4.2] °C	±2.4 [±13.4] °C
	-100 to 0 °C	±1.4 [±4.5] °C	±3.1 [±5.2] °C	±1.7 [±4.5] °C	±2.8 [±4.5] °C	±1.2 [±5.2] °C	±1.2 [±2.8] °C	±1.7 [±8.0] °C
	0 to 200 °C	±1.3 [±3.6] °C	±2.5 [±4.1] °C	±1.5 [±3.6] °C	±2.3 [±3.6] °C	±1.1 [±4.1] °C	±1.1 [±2.3] °C	±1.5 [±6.1] °C
	200 to 400 °C	±1.3 [±3.0] °C	±2.2 [±3.3] °C	±1.5 [±3.0] °C	±2.0 [±3.0] °C	±1.1 [±3.3] °C	±1.1 [±2.0] °C	±1.5 [±4.8] °C
DSI-TH-E for thermocouple type E (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
-270 to 1000 °C	-250 to -200 °C	±2.3 [±10.2] °C	±6.5 [±11.8] °C	±3.2 [±10.2] °C	±5.8 [±10.2] °C	±1.7 [±11.8] °C	±1.7 [±5.6] °C	±3.2 [±19.0] °C
	-200 to -100 °C	±1.5 [±5.0] °C	±3.4 [±5.6] °C	±1.9 [±5.0] °C	±3.1 [±5.0] °C	±1.3 [±5.6] °C	±1.3 [±3.0] °C	±1.9 [±8.7] °C
	-100 to 0 °C	±1.3 [±3.2] °C	±2.3 [±3.6] °C	±1.5 [±3.2] °C	±2.1 [±3.2] °C	±1.1 [±3.6] °C	±1.1 [±2.1] °C	±1.5 [±5.4] °C
	0 to 500 °C	±1.3 [±2.4] °C	±1.9 [±2.6] °C	±1.4 [±2.4] °C	±1.8 [±2.4] °C	±1.2 [±2.6] °C	±1.2 [±1.7] °C	±1.4 [±3.7] °C
	500 to 1000 °C	±1.6 [±2.8] °C	±2.1 [±2.9] °C	±1.8 [±2.8] °C	±2.2 [±2.8] °C	±1.4 [±2.9] °C	±1.4 [±2.0] °C	±1.8 [±4.2] °C
DSI-TH-C for thermocouple type C (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
0 to 2320 °C	0 to 500 °C	±1.7 [±8.4] °C	±5.4 [±9.9] °C	±2.5 [±8.4] °C	±4.7 [±8.4] °C	±1.4 [±9.9] °C	±1.4 [±4.7] °C	±2.5 [±15.8] °C
	500 to 1000 °C	±2.0 [±6.7] °C	±4.4 [±7.6] °C	±2.5 [±6.7] °C	±4.1 [±6.7] °C	±1.5 [±7.6] °C	±1.5 [±3.9] °C	±2.5 [±12.0] °C
	1000 to 1500 °C	±2.4 [±8.0] °C	±5.2 [±9.0] °C	±3.0 [±8.0] °C	±4.9 [±8.0] °C	±1.8 [±9.0] °C	±1.8 [±4.6] °C	±3.0 [±14.3] °C
	1500 to 2000 °C	±3.0 [±10.0] °C	±6.4 [±11.1] °C	±3.8 [±10.0] °C	±6.1 [±10.0] °C	±2.1 [±11.1] °C	±2.1 [±5.6] °C	±3.8 [±17.8] °C
	2000 to 2320 °C	±4.1 [±13.7] °C	±8.6 [±15.1] °C	±5.1 [±13.7] °C	±8.4 [±13.7] °C	±2.7 [±15.1] °C	±2.7 [±7.6] °C	±5.1 [±24.5] °C
1) Typical accuracy... when you balance the offset on the amplifier; Maximum accuracy ... when the amplifier is not balanced								

2.5.2. DSI-TH Input Connection



2.6. DSI-TH-UNI

DSI-TH-UNI adapter has universal thermocouple input allowing it to connect practically any type of thermocouple
(K, J, T, R, S, N, E, B, C).

DSI-TH-UNI has integrated cold junction compensation with CJC accuracy of 0.5 °C.

Universal thermocouple DSI adapter comes in an attractive compact chassis mounted directly on the host amplifier without any additional cable.

Host amplifier configuration and calibration coefficients can be read via TEDS.

DSI-TH-UNI

Note
In operation with the differential SIRIUS® modules (or Krypton® / DEWE-43, IOLITE) only isolated thermocouples should be used, because the thermocouple input is single-ended.

2.6.1. DSI-TH-UNI Specifications

General specifications	
Sensor connector	Mini thermocouple, female
Thermocouple Types	K, J, T, R, S, N, E, B, C
Cold junction compensation	Integrated
CJC accuracy	0.5 °C
Input impedance	> 10 MΩ
BIAS current	50 nA
Bandwidth	up to 150 Hz (limited by bandwidth of host amplifier)
Open TC detection	✓
Linearisation	Through software according to the sensor type
TEDS	For adapter identification and calibration data
Dimensions	52 x 31 x 15 mm (61 x 31 x 15 mm with screws)
Weight	40 g

	Measurement hardware	SIRIUSi LVv2 SIRIUSi HD STGS SIRIUSi STGv2 SIRIUSi STGS	KRYPTONi STG SIRIUSi XHS-LV IOLITE STG	SIRIUSi STGMv3 MINITAURs	DEWE-43A SIRIUSi HD-LV	SIRIUSi HS-LVv2	SIRIUSi HS-STG	SIRIUSi MULTI
DSI-TH- for thermocouple type K (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
-270 to 1370 °C	-250 to -200 °C	±2.7 [±17.7] °C	±10.8 [±20.8] °C	±4.4 [±17.7] °C	±9.4 [±17.7] °C	±1.7 [±20.8] °C	±1.7 [±9.2] °C	±4.4 [±34.4] °C
	-200 to -100 °C	±1.3 [±6.9] °C	±4.3 [±8.1] °C	±1.9 [±6.9] °C	±3.8 [±6.9] °C	±0.9 [±8.1] °C	±0.9 [±3.7] °C	±1.9 [±13.1] °C
	-100 to 0 °C	±0.9 [±3.8] °C	±2.5 [±4.4] °C	±1.2 [±3.8] °C	±2.2 [±3.8] °C	±0.7 [±4.4] °C	±0.7 [±2.1] °C	±1.2 [±7.0] °C
	0 to 200 °C	±0.8 [±3.0] °C	±2.0 [±3.5] °C	±1.0 [±3.0] °C	±1.8 [±3.0] °C	±0.6 [±3.5] °C	±0.6 [±1.8] °C	±1.0 [±5.5] °C
	200 to 1000 °C	±1.3 [±3.6] °C	±2.4 [±3.9] °C	±1.5 [±3.6] °C	±2.3 [±3.6] °C	±0.9 [±3.9] °C	±0.9 [±2.1] °C	±1.5 [±6.2] °C
	1000 to 1370 °C	±1.5 [±4.1] °C	±2.7 [±4.4] °C	±1.8 [±4.1] °C	±2.7 [±4.1] °C	±1.1 [±4.4] °C	±1.1 [±2.4] °C	±1.8 [±7.0] °C
DSI-TH- for thermocouple type J (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
-200 to 1200 °C	-200 to -100 °C	±1.1 [±5.0] °C	±3.2 [±5.8] °C	±1.5 [±5.0] °C	±2.8 [±5.0] °C	±0.8 [±5.8] °C	±0.8 [±2.8] °C	±1.5 [±9.3] °C
	-100 to 0 °C	±0.8 [±2.9] °C	±2.0 [±3.4] °C	±1.0 [±2.9] °C	±1.8 [±2.9] °C	±0.7 [±3.4] °C	±0.7 [±1.7] °C	±1.0 [±5.3] °C
	0 to 500 °C	±0.9 [±2.5] °C	±1.7 [±2.8] °C	±1.1 [±2.5] °C	±1.6 [±2.5] °C	±0.7 [±2.8] °C	±0.7 [±1.5] °C	±1.1 [±4.3] °C

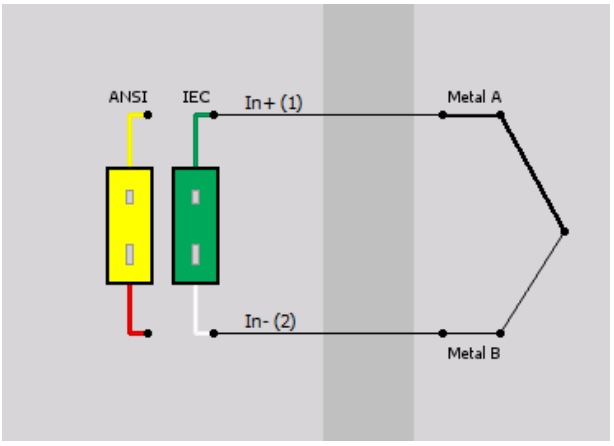
	500 to 1000 °C	±1.2 [±2.7] °C	±1.8 [±2.8] °C	±1.3 [±2.7] °C	±1.8 [±2.7] °C	±0.9 [±2.8] °C	±0.9 [±1.6] °C	±1.3 [±4.4] °C
	1000 to 1200 °C	±1.3 [±2.9] °C	±1.9 [±3.0] °C	±1.5 [±2.9] °C	±2.0 [±2.9] °C	±1.0 [±3.0] °C	±1.0 [±1.7] °C	±1.5 [±4.6] °C
DSI-TH- for thermocouple type T (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
	-250 to -200 °C	±2.2 [±14.2] °C	±8.7 [±16.7] °C	±3.6 [±14.2] °C	±7.6 [±14.2] °C	±1.4 [±16.7] °C	±1.4 [±7.4] °C	±3.6 [±27.6] °C
	-200 to -100 °C	±1.3 [±6.8] °C	±4.3 [±7.9] °C	±1.9 [±6.8] °C	±3.7 [±6.8] °C	±0.9 [±7.9] °C	±0.9 [±3.7] °C	±1.9 [±12.9] °C
	-100 to 0 °C	±0.9 [±4.0] °C	±2.6 [±4.7] °C	±1.2 [±4.0] °C	±2.3 [±4.0] °C	±0.7 [±4.7] °C	±0.7 [±2.3] °C	±1.2 [±7.5] °C
	0 to 200 °C	±0.8 [±3.1] °C	±2.0 [±3.6] °C	±1.0 [±3.1] °C	±1.8 [±3.1] °C	±0.6 [±3.6] °C	±0.6 [±1.8] °C	±1.0 [±5.6] °C
-270 to 400 °C	200 to 400 °C	±0.8 [±2.5] °C	±1.7 [±2.8] °C	±1.0 [±2.5] °C	±1.5 [±2.5] °C	±0.6 [±2.8] °C	±0.6 [±1.5] °C	±1.0 [±4.3] °C
DSI-TH- for thermocouple type R (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
	0 to 100 °C	±2.4 [±19.0] °C	±11.6 [±22.7] °C	±4.2 [±19.0] °C	±9.8 [±19.0] °C	±1.4 [±22.7] °C	±1.4 [±9.8] °C	±4.2 [±37.5] °C
	100 to 200 °C	±1.9 [±13.7] °C	±8.4 [±16.3] °C	±3.2 [±13.7] °C	±7.1 [±13.7] °C	±1.2 [±16.3] °C	±1.2 [±7.1] °C	±3.2 [±26.9] °C
	200 to 500 °C	±1.7 [±11.8] °C	±7.3 [±14.0] °C	±2.8 [±11.8] °C	±6.2 [±11.8] °C	±1.1 [±14.0] °C	±1.1 [±6.2] °C	±2.8 [±23.1] °C
	500 to 1000 °C	±1.6 [±9.9] °C	±6.1 [±11.6] °C	±2.5 [±9.9] °C	±5.3 [±9.9] °C	±1.1 [±11.6] °C	±1.1 [±5.2] °C	±2.5 [±19.1] °C
	1000 to 1500 °C	±1.7 [±8.5] °C	±5.3 [±9.8] °C	±2.4 [±8.5] °C	±4.7 [±8.5] °C	±1.1 [±9.8] °C	±1.1 [±4.5] °C	±2.4 [±16.0] °C
-50 to 1768 °C	1500 to 1768 °C	±2.0 [±8.7] °C	±5.4 [±9.9] °C	±2.7 [±8.7] °C	±5.0 [±8.7] °C	±1.3 [±9.9] °C	±1.3 [±4.7] °C	±2.7 [±16.2] °C
DSI-TH- for thermocouple type S (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
	0 to 100 °C	±2.3 [±18.7] °C	±11.4 [±22.3] °C	±4.1 [±18.7] °C	±9.6 [±18.7] °C	±1.4 [±22.3] °C	±1.4 [±9.6] °C	±4.1 [±36.9] °C
	100 to 200 °C	±1.9 [±14.1] °C	±8.6 [±16.7] °C	±3.2 [±14.1] °C	±7.3 [±14.1] °C	±1.2 [±16.7] °C	±1.2 [±7.3] °C	±3.2 [±27.6] °C
	200 to 500 °C	±1.8 [±12.3] °C	±7.6 [±14.7] °C	±2.9 [±12.3] °C	±6.5 [±12.3] °C	±1.1 [±14.7] °C	±1.1 [±6.4] °C	±2.9 [±24.1] °C
	500 to 1000 °C	±1.7 [±10.8] °C	±6.7 [±12.7] °C	±2.7 [±10.8] °C	±5.8 [±10.8] °C	±1.1 [±12.7] °C	±1.1 [±5.7] °C	±2.7 [±20.9] °C
	1000 to 1500 °C	±1.9 [±9.4] °C	±5.8 [±10.8] °C	±2.7 [±9.4] °C	±5.2 [±9.4] °C	±1.3 [±10.8] °C	±1.3 [±5.0] °C	±2.7 [±17.6] °C
-50 to 1768 °C	1500 to 1768 °C	±2.2 [±10.1] °C	±6.2 [±11.5] °C	±3.0 [±10.1] °C	±5.7 [±10.1] °C	±1.4 [±11.5] °C	±1.4 [±5.4] °C	±3.0 [±18.8] °C
DSI-TH- for thermocouple type N (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						

	-250 to -200 °C	±3.9 [±28.9] °C	±17.5 [±34.2] °C	±6.7 [±28.9] °C	±15.0 [±28.9] °C	±2.2 [±34.2] °C	±2.2 [±14.7] °C	±6.7 [±56.7] °C
	-200 to -100 °C	±1.6 [±10.1] °C	±6.3 [±11.9] °C	±2.6 [±10.1] °C	±5.4 [±10.1] °C	±1.1 [±11.9] °C	±1.1 [±5.3] °C	±2.6 [±19.6] °C
	-100 to 0 °C	±1.0 [±5.2] °C	±3.3 [±6.1] °C	±1.5 [±5.2] °C	±2.9 [±5.2] °C	±0.8 [±6.1] °C	±0.8 [±2.9] °C	±1.5 [±9.9] °C
	0 to 500 °C	±0.9 [±4.3] °C	±2.8 [±5.1] °C	±1.3 [±4.3] °C	±2.4 [±4.3] °C	±0.7 [±5.1] °C	±0.7 [±2.4] °C	±1.3 [±8.2] °C
	500 to 1000 °C	±1.2 [±3.5] °C	±2.3 [±3.8] °C	±1.4 [±3.5] °C	±2.2 [±3.5] °C	±0.9 [±3.8] °C	±0.9 [±2.0] °C	±1.4 [±6.0] °C
-270 to 1300 °C	1000 to 1300 °C	±1.4 [±3.9] °C	±2.5 [±4.2] °C	±1.7 [±3.9] °C	±2.5 [±3.9] °C	±1.0 [±4.2] °C	±1.0 [±2.3] °C	±1.7 [±6.6] °C
DSI-TH- for thermocouple type E (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
	-250 to -200 °C	±1.8 [±9.7] °C	±6.0 [±11.3] °C	±2.7 [±9.7] °C	±5.3 [±9.7] °C	±1.2 [±11.3] °C	±1.2 [±5.1] °C	±2.7 [±18.5] °C
	-200 to -100 °C	±1.0 [±4.5] °C	±2.9 [±5.1] °C	±1.4 [±4.5] °C	±2.6 [±4.5] °C	±0.8 [±5.1] °C	±0.8 [±2.5] °C	±1.4 [±8.2] °C
	-100 to 0 °C	±0.8 [±2.7] °C	±1.8 [±3.1] °C	±1.0 [±2.7] °C	±1.6 [±2.7] °C	±0.6 [±3.1] °C	±0.6 [±1.6] °C	±1.0 [±4.9] °C
	0 to 500 °C	±0.8 [±1.9] °C	±1.4 [±2.1] °C	±0.9 [±1.9] °C	±1.3 [±1.9] °C	±0.7 [±2.1] °C	±0.7 [±1.2] °C	±0.9 [±3.2] °C
-270 to 1000 °C	500 to 1000 °C	±1.1 [±2.3] °C	±1.6 [±2.4] °C	±1.3 [±2.3] °C	±1.7 [±2.3] °C	±0.9 [±2.4] °C	±0.9 [±1.5] °C	±1.3 [±3.7] °C
DSI-TH- for thermocouple type B (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
	200 to 500 °C	±5.3 [±48.2] °C	±29.1 [±57.7] °C	±10.1 [±48.2] °C	±24.4 [±48.2] °C	±2.9 [±57.7] °C	±2.9 [±24.3] °C	±10.1 [±95.8] °C
	500 to 1000 °C	±2.6 [±20.2] °C	±12.3 [±24.1] °C	±4.5 [±20.2] °C	±10.4 [±20.2] °C	±1.6 [±24.1] °C	±1.6 [±10.4] °C	±4.5 [±39.8] °C
	1000 to 1500 °C	±1.8 [±11.6] °C	±7.2 [±13.7] °C	±2.9 [±11.6] °C	±6.2 [±11.6] °C	±1.2 [±13.7] °C	±1.2 [±6.1] °C	±2.9 [±22.5] °C
	1500 to 1700 °C	±1.8 [±9.6] °C	±5.9 [±11.1] °C	±2.7 [±9.6] °C	±5.2 [±9.6] °C	±1.2 [±11.1] °C	±1.2 [±5.1] °C	±2.7 [±18.2] °C
0 to 1820 °C	1700 to 1820 °C	±2.0 [±9.8] °C	±6.1 [±11.3] °C	±2.8 [±9.8] °C	±5.4 [±9.8] °C	±1.3 [±11.3] °C	±1.3 [±5.2] °C	±2.8 [±18.5] °C
DSI-TH- for thermocouple type C (DIN EN 60584-1)								
Input Range	**Actual reading**	**Typical accuracy [maximum accuracy] (see 1)**						
	0 to 500 °C	±1.2 [±7.9] °C	±4.9 [±9.4] °C	±2.0 [±7.9] °C	±4.2 [±7.9] °C	±0.9 [±9.4] °C	±0.9 [±4.2] °C	±2.0 [±15.3] °C
	500 to 1000 °C	±1.5 [±6.2] °C	±3.9 [±7.1] °C	±2.0 [±6.2] °C	±3.6 [±6.2] °C	±1.0 [±7.1] °C	±1.0 [±3.4] °C	±2.0 [±11.5] °C
	1000 to 1500 °C	±1.9 [±7.5] °C	±4.7 [±8.5] °C	±2.5 [±7.5] °C	±4.4 [±7.5] °C	±1.3 [±8.5] °C	±1.3 [±4.1] °C	±2.5 [±13.8] °C
	1500 to 2000 °C	±2.5 [±9.5] °C	±5.9 [±10.6] °C	±3.3 [±9.5] °C	±5.6 [±9.5] °C	±1.6 [±10.6] °C	±1.6 [±5.1] °C	±3.3 [±17.3] °C
0 to 2320 °C								

	2000 to 2320 °C	±3.6 [±13.2] °C	±8.1 [±14.6] °C	±4.6 [±13.2] °C	±7.9 [±13.2] °C	±2.2 [±14.6] °C	±2.2 [±7.1] °C	±4.6 [±24.0] °C

1) Typical accuracy... when you balance the offset on the amplifier; Maximum accuracy ... when the amplifier is not balanced

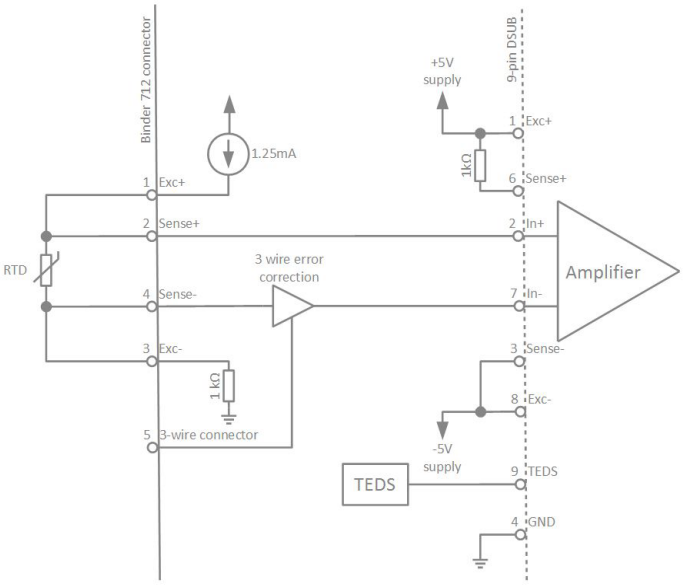
2.6.2. DSI-TH-UNI Input Connection



Wiring diagram for K-type thermocouple

2.7. DSI-RTD/ DSI-RTD-L1S4-TNC

DSI-RTD



Basic circuit design of DSI-RTD

Note
There is also DSI-RTD-L1S4-TNC available with Lemo L1S4 input connector available.

2.7.1. DSI-RTD Specifications

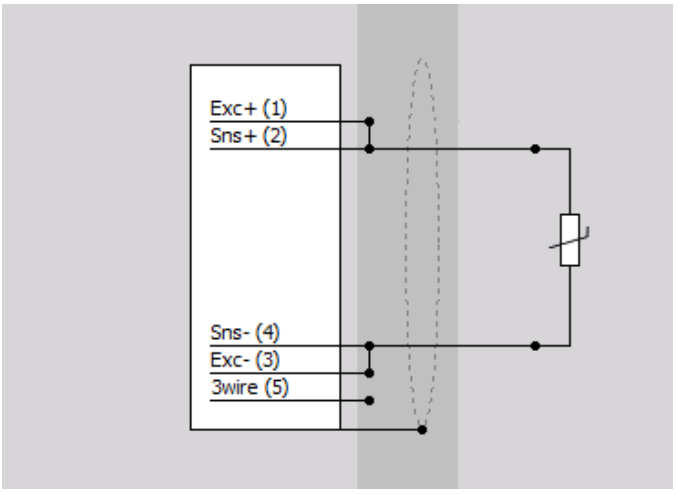
Inputs specifications	
Sensor connector	5-pin BINDER connector series 712 09 0416 00 05 M9 socket, mates with 99 0413 00 05 M9 cable plug
Supported sensors	Resistance: Pt100, Pt200, Pt500, Pt1000, Pt2000
Temperature range	-200 °C to 850 °C
Input offset	50 µV
Constant current	1.25 mA
Constant current accuracy	±0.02 % from calibrated value
Constant current drift	22 ppm/ °C
Linearisation	Through software according to sensor type
Connection types	2-, 3- or 4-wire
Bandwidth (-3 dB)	10 kHz (limited by bandwidth of host amplifier)
Input configuration	Isolated (max. 350 VDC) when using with isolated SIRIUSi modules, else differential
Typ. noise: 100 Hz bandwidth	0.03 °C
Input configuration	Isolated (max. 350 VDC) when using with isolated SIRIUSi modules, else differential
Amplifier settings	Automatically selected by software - Measurement: Voltage - Range: ±0.1 V to ±10 V - Excitation: 10 V

DSI-RTD Accuracy:

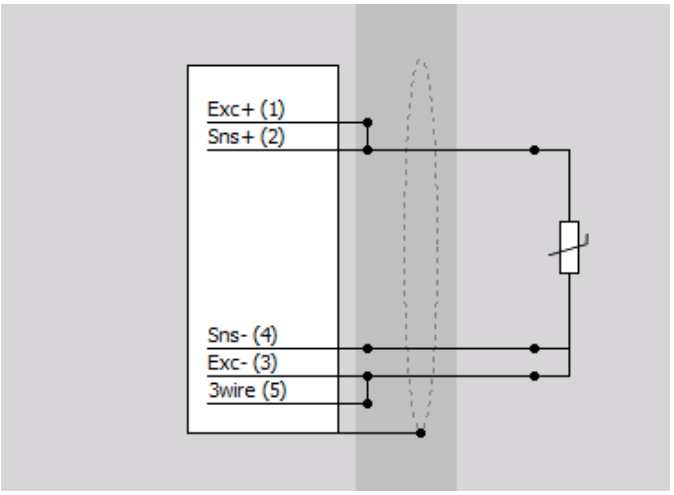
Host amplifier			SIRIUSx LVv2 / STGv2 / HS-LV / HS-STG DEWE-43A MINITAURs	SIRIUSx STGMv2 / HD-LV / HD-STG KRYPTON STG	SIRIUSx Multi / STGM
Resistance Range		80 Ω	±0.05 % of reading ±120 mΩ	±0.05 % of reading ±120 mΩ	±0.05 % of reading ±200 mΩ
		800 Ω	±0.05 % of reading ±200 mΩ	±0.05 % of reading ±200 mΩ	±0.05 % of reading ±840 mΩ
		6 kΩ	±0.05 % of reading ±840 mΩ	±0.05 % of reading ±1500 mΩ	±0.05 % of reading ±8 Ω
DIN	**Sensor**	**Range**	**Temperature**		
EN 60751	Pt100	-200 to 850°C	±0.1 % of reading ±0.69 °C	±0.1 % of reading ±0.69 °C	±0.1 % of reading ±2.5 °C
EN 60751	Pt200	-200 to 850°C	±0.1 % of reading ±0.44 °C	±0.1 % of reading ±0.44 °C	±0.1 % of reading ±1.2 °C
EN 60751	Pt500	-200 to 850°C	±0.1 % of reading ±0.61 °C	±0.1 % of reading ±1 °C	±0.1 % of reading ±4 °C
		-200 to 150°C	±0.1 % of reading ±0.28 °C	±0.1 % of reading ±0.28 °C	±0.1 % of reading ±1.2 °C
EN 60751	Pt1000	-200 to 850°C	±0.1 % of reading ±0.39 °C	±0.1 % of reading ±0.8 °C	±0.1 % of reading ±3 °C
EN 60751	Pt2000	-200 to 550°C	±0.1 % of reading ±0.29 °C	±0.1 % of reading ±0.5 °C	±0.1 % of reading ±1.5 °C

2.7.2. DSI-RTD Input Connection

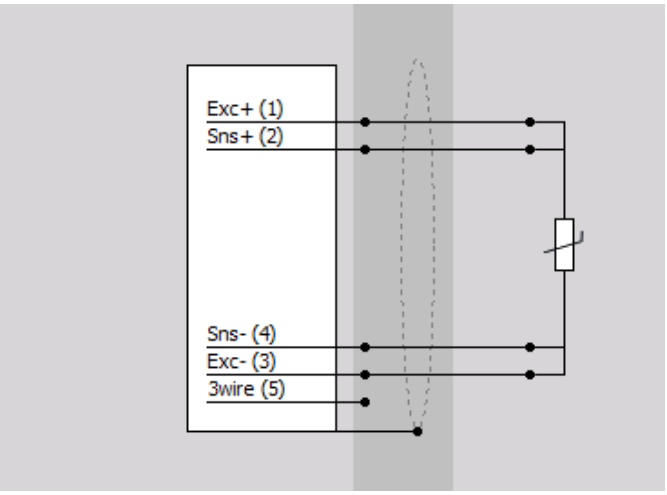
2-wire sensor connection



3-wire sensor connection



4-wire sensor connection



2.7.3. DSI-RTD Binder connector pinout

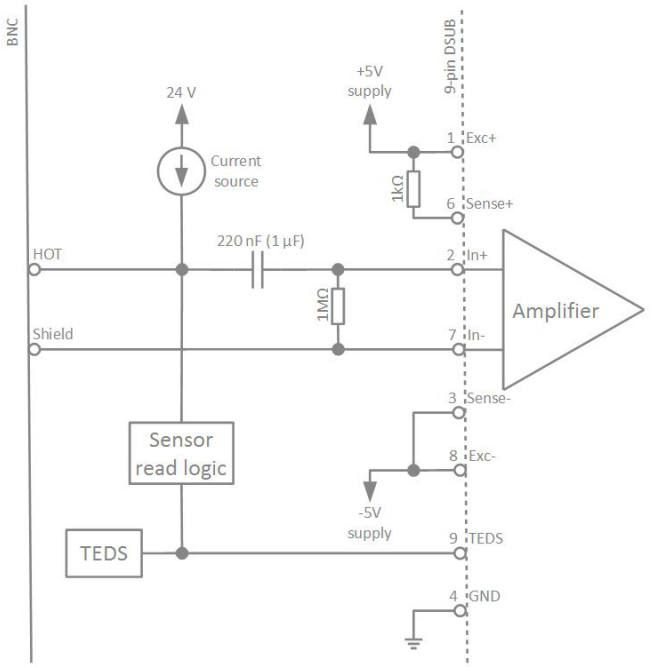
Binder 5-pin (female)

Pin	Name	Description
1	Exc+	Excitation+
2	Sns+	Sense+
3	Exc-	Excitation-
4	Sns-	Sense-
5	3-wire	3-wire connection

2.8. DSI-ACC / DSIw-ACC

The DSI-ACC is designed to operate with IEPE sensors and IEPE compatible sensors (e.g. ICP®). The adapter provides a constant current source and high pass filter. Depending on the application, different excitation levels and high pass filters are available. There is also a waterproof (DSIw-ACC) available for IEPE sensors.

DIS-ACC



Basic circuit design of DSI-ACC

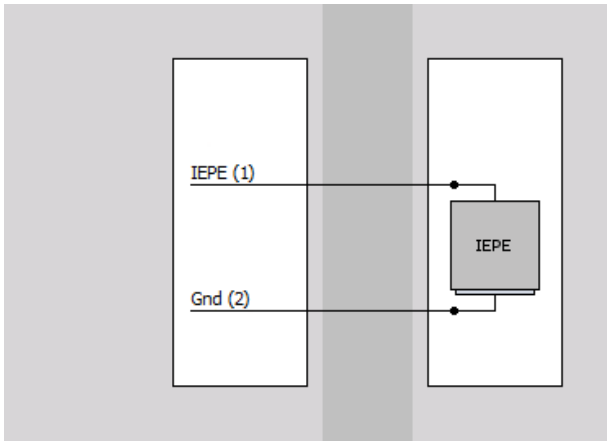
Important

In operation with the isolated SIRIUSi modules you will get a fully isolated amplifier. In operation with differential modules (SIRIUS®, Krypton™, DEWE-43, IOLITE) the input configuration is single-ended.

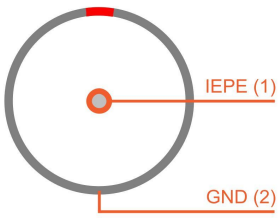
2.8.1. DSI-ACC / DSIw-ACC Specifications

Inputs specifications				
Sensor connector	BNC			
Supported sensors	IEPE / ICP			
Amplifier settings	Automatically selected by software - Measurement: Voltage - Range: ±0.1 V to ±10 V - Excitation: 10 V			
	DSI-ACC	**DSI-ACC-0.16Hz**	**DSI-ACC-20mA**	**DSI-ACC-0.16Hz-20mA**
Sensor excitation	4 mA ±10 %	4 mA ±10 %	20 mA ±15 %	20 mA ±15 %
Compliance voltage	> 22 Volt	> 22 Volt	> 20 Volt	> 20 Volt
Accuracy 30 Hz to 30 kHz	0.3 %	0.07 %	0.3 %	0.07 %
High pass filter	0.8 Hz	0.16 Hz	0.8 Hz	0.16 Hz
Power consumption	300 mW	300 mW	800 mW	800 mW
Supported Amplifiers (exceptions)	-	-	Only on: SIRIUS LV/LV+, STG/STG+, HS-LV/HS-LV+, HS-STG/HS-STG+	Only on: SIRIUS LV/LV+, STG/STG+, HS-LV/HS-LV+, HS-STG/HS-STG+
Gain drift	50 ppm/°C			
Max. input offset	12 mV			
Input impedance	1 MΩ			
Supply voltage	±5 V (±1 %)			
Input configuration	Isolated (max. 350 VDC) when using with isolated SIRIUSi modules, else single ended			
Bandwidth	up to 500 kHz (limited by bandwidth of host amplifier)			
Low-pass filter	10 Hz to 100 kHz (depending on host amplifier)			
Ranges	100 mV, 1000 mV, 10000 mV (SIRIUS-HS series offers more ranges)			
Typical SNR @ 30 kHz bandwidth				
10000 mV	up to 125 dB (limited by the SNR of the host amplifier)			
1000 mV	up to 110 dB (limited by the SNR of the host amplifier)			

2.8.2. DSI-ACC / DSIw-ACC Input Connection



2.8.3. DSI-ACC / DSIw-ACC connector pinout



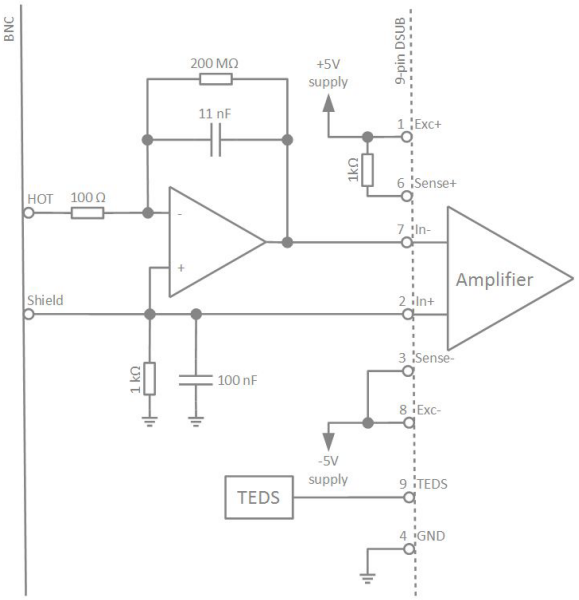
ACC connector: pin-out (BNC)

Pin	Description
1	IEPE
2	Gnd

2.9. DSI-CHG-50

The DSI-CHG adapter can be used for charge sensors up to 50,000 pC with Dewesoft devices.

DSI-CHG-50



Basic circuit design of DSI-CHG-50

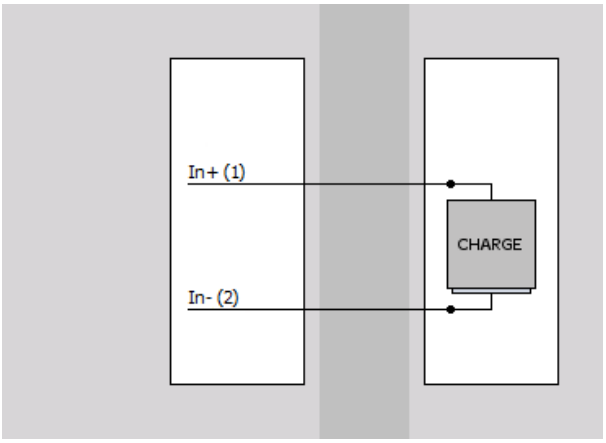
Important

In operation with the isolated SIRIUSi modules you will get a fully isolated charge amplifier. In operation with differential modules (SIRIUS®, Krypton®, DEWE-43, IOLITE) the input configuration is single-ended.

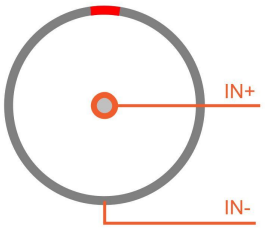
2.9.1. DSI-CHG-50 Specifications

Inputs specifications	
Sensor connector	BNC
Supported sensors	Charge sensors
Accuracy	0.5 %
Gain drift	100 ppm/°C
Supply voltage	±5 V (±1 %)
Power consumption	max. 100 mW
Input configuration	Isolated (max. 350 VDC) when using with isolated SIRIUSi modules, else single-ended
Bandwidth	0.07 Hz up to 300 kHz (limited by bandwidth of host amplifier)
Low-pass filter	10 Hz to 100 kHz (depending on host amplifier)
Range	1,000 / 10,000 / 50,000 pC (SIRIUS-HS series offers more ranges)
Typ. SNR @ 30 kHz bandwidth	up to 125 dB (limited by the SNR of the host amplifier)
Max. offset	20 pC (compensated in DEWESoft® by software filter)
High-pass filter	0.07 Hz, 1 Hz, 10 Hz
Amplifier settings	Automatically selected by software - Measurement: Voltage - Range: ±0.1 to ±10 V - Excitation: 10 V

2.9.2. DSI-CHG-50 Input Connection



2.9.3. DSI-CHG-50 connector pinout



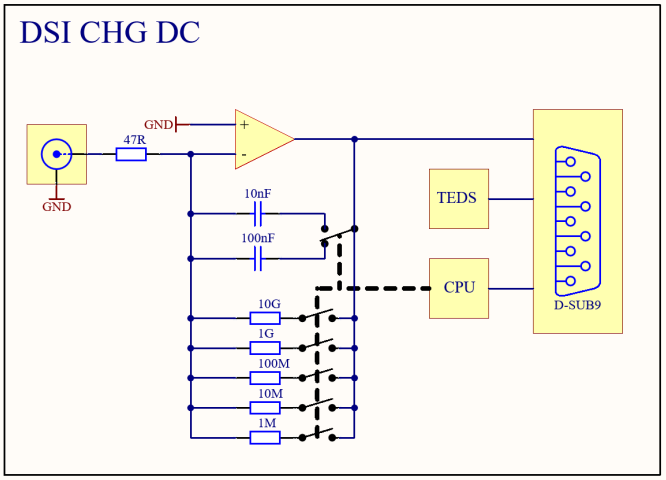
DSI-CHG-50 connector: pin-out (BNC)

Pin	Description
1	In+
2	In-

2.10. DSI-CHG-DC

The DSI-CHG-DC adapter can be used for charge sensors up to 50,000 pC with Dewesoft devices.

DSI-CHG-DC

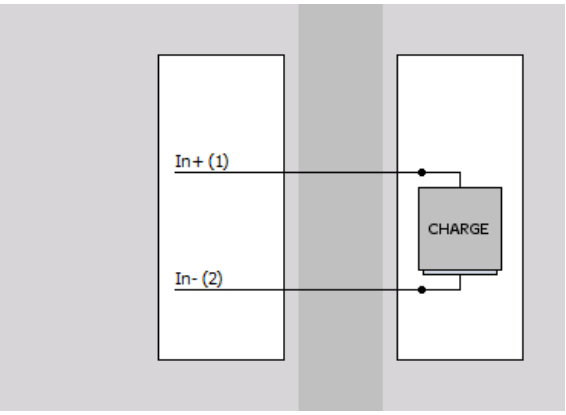


Important
If the adapter is not recognized on some amplifiers (SIRIUS-STG), set Excitation to more than 0 V.

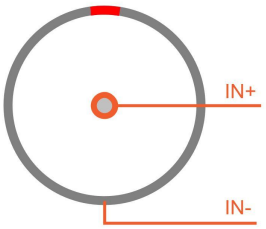
2.10.1. DSI-CHG-DC Specifications

Inputs specifications	
Sensor connector	BNC
Supported sensors	Charge sensors
Supply voltage	12 V to 15 V (±1 %)
Power consumption	Max. 0.8 W
Input configuration	Isolated (max. 350 VDC) when using with isolated SIRIUSi modules, else single-ended
Bandwidth	20 kHz (500000 pC range) to 200 kHz (50000 pC) Bandwidth may be limited on amplifiers with < 500 mW Exc. power supply
Range	500000 pC 50000 pC 10000 pC 1000 pC
High-pass filter	500000 pC range: - DC (filter off) - 0.14 mHz (time constant > 1000 s) - 1.4 mHz (time constant > 100 s) - 14 mHz (time constant > 10 s) - 0.14 Hz (time constant > 1 s) 50000 pC / 10000 pC / 1000 pC range: - DC (filter off) - 1.4 mHz (time constant > 100 s) - 14 mHz (time constant > 10 s) - 0.14 Hz (time constant > 1 s) - 1.4 Hz (time constant > 0.1 s)
DC drift	500000 pC range: typ. < 0.1 pC/s (max. < 1 pC/s) 50000 pC / 10000 pC / 1000 pC range: typ. < 0.05 pC/s (max. < 0.5 pC/s)
Supported Amplifiers	SIRIUS LV/LV+, MULTI, STGM/STGM+, STG/STG+, HD-LV, HD-STGS, HS-LV/HS-LV+, HS-STG/HS-STG+ KRYPTON-6xSTG IOLITE-6xSTG *Other amplifiers support pending
Amplifier settings	Automatically selected by software: - Measurement: Voltage - Range: ±0.1 V to ±10 V - Excitation: 12 V / 15 V

2.10.2. DSI-CHG-DC Input Connection



2.10.3. DSI-CHG-DC connector pinout



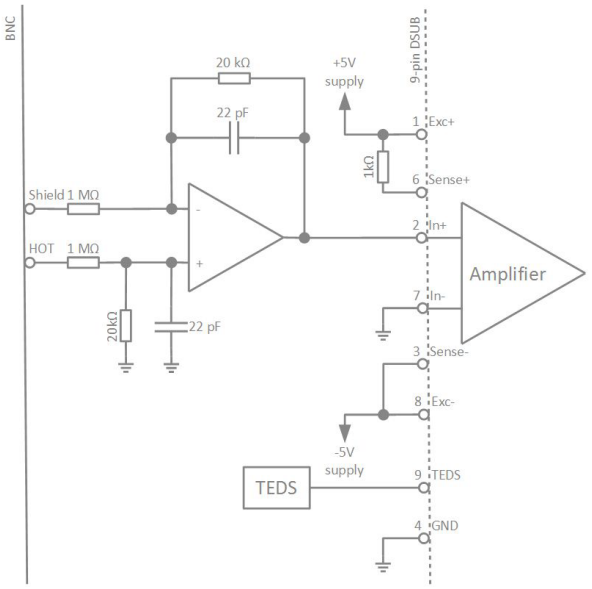
DSI-CHG-DC connector: pin-out (BNC)

Pin	Description
1	In+
2	In-

2.11. DSI-V-200

This adapter consists of an active voltage divider (50:1), which allows an input range up to ±200 V. The picture below shows the basic configuration of the amplifier circuit.

DSI-V-200



Basic circuit design of DSI-V-200

Important

In operation with the isolated SIRIUSi modules you will get a fully isolated amplifier. In operation with differential modules (SIRIUS®, Krypton®, DEWE-43, IOLITE) the input configuration is differential.

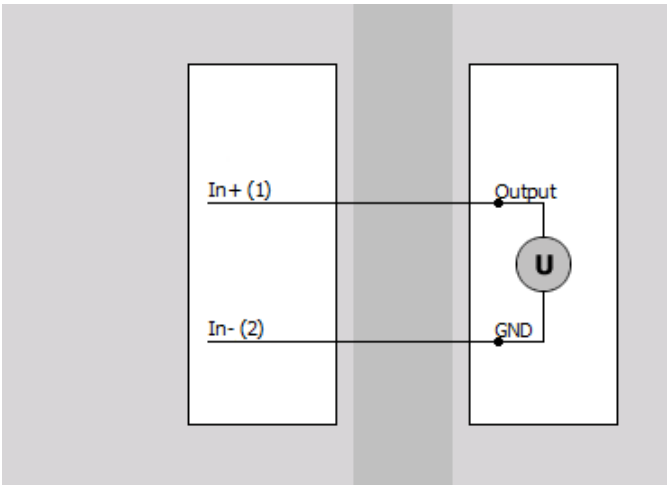
2.11.1. DSI-V-200 Specifications

Inputs specifications	
Sensor connector	BNC
Ranges	±200 V, ±50 V, ±5 V, ±0.5 V (SIRIUS-HS series offers more ranges)
DC Accuracy	±0.06 % of reading ±0.02 % of range ±5 mV
Bandwidth (-3 dB)	300 kHz (limited by bandwidth of host amplifier)
Low-pass filter	10 Hz to 100 kHz (depending on host amplifier)
Common mode voltage range	±200 V
Input overvoltage protection	±250 V
Input impedance In+	1 MΩ
Input impedance In-	1 MΩ
Gain drift	Typical 15 ppm/K (max. 30 ppm/K)
Input offset drift	Typical 10 µV/K (max. 25 µV/K)
Input attenuation	50 ±0.5 % (uncalibrated)
Input configuration	Isolated (max. 350 VDC) when using with isolated SIRIUSi modules, else differential
Typical SNR @ 30 kHz BW	98 dB @ 200 V range 98 dB @ 40 V range 79 dB @ 4 V range
Host: Isolated amplifier	160 dB DC, 110 dB @ 1 kHz
Host: Differential amplifier	100 dB @ 100 Hz, 60 dB @ 10 kHz
Amplifier settings	Automatically selected by software - Measurement: Voltage - Range: ±0.1 V to ±10 V - Excitation: 10 V

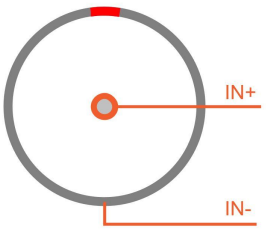
Warning

For safety reasons maximum 50 V may be applied to the BNC input-connectors! Refer to the regulation of maximum allowable touch potential.

2.11.2. DSI-V-200 Input Connection



2.11.3. DSI-V-200 connector pinout



DSI-V-200 connector: pin-out (BNC)

Pin	Description
1	In+
2	In-

2.12. DSI-20mA/DSIw-20mA

The DSI-20mA and DSIw-20mA adapters allow current measurement of up to 20mA. It uses a 50 Ω shunt resistor with 0.01 % accuracy and 0.2 ppm/K temperature drift (0.05 ppm/K in temperature range 0 °C to 60 °C). This is a product made for sensing current from industrial sensors with 4-20 mA output. DSIw-20mA is a waterproof adapter suited for mounting on a SIRIUSwe or KRYPTON STG.

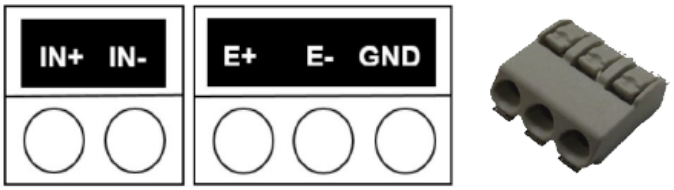
DSI-20mA

DSIw-20mA

2.12.1. DSI-20mA/DSIw-20mA Specifications

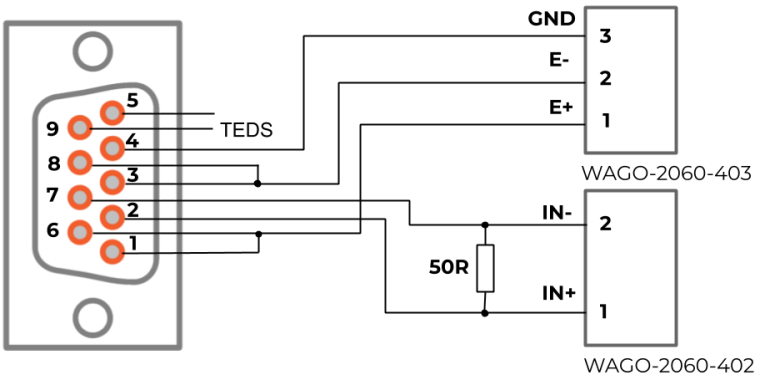
Inputs specifications	DSI-20mA	DSIw-20mA
Input connector type	SMD terminal block with push-buttons (Direct wire: 0.2 ... 0.75 mm² / 24 ... 18 AWG)	Waterproof DSUB9 female connector
Input range	20 mA	
Shunt Resistor	50 Ω, Metal Foil	
Input accuracy	Calibrated to ±0.01 %, calibration in TEDS (uncalibrated ±0.05 %)	
Temperature Coefficient	±0.05 ppm/°C typical (0 °C to +60 °C) ±0.2 ppm/°C typical (-55 °C to +125 °C)	
Power Rating	250 mW (do NOT exceed maximum rating!)	
TEDS	1024-bit, 1-Wire EEPROM	
Environmental rating	IP20	IP67

2.12.2. DSI-20mA Output connector pinout



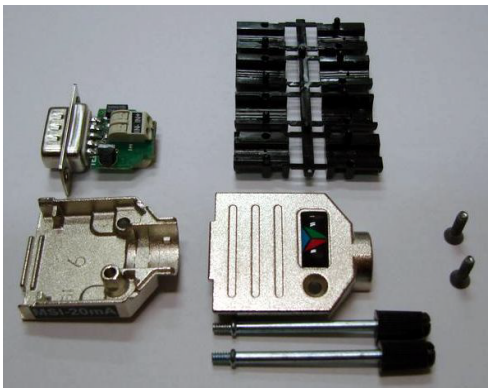
Surface Mount Terminal Strips with Push-Buttons

Pin	Description
E+	Excitation +
E-	Excitation -
GND	AGND
IN+	IN+
IN-	IN-

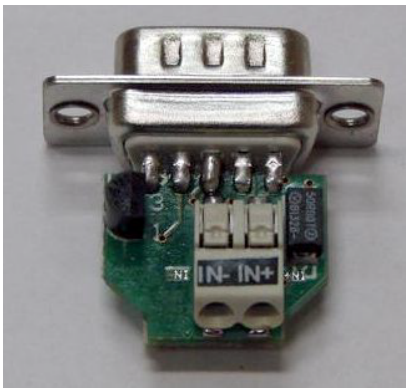


DSI-20mA Input Connection

2.12.3. DSI-20mA Assembly



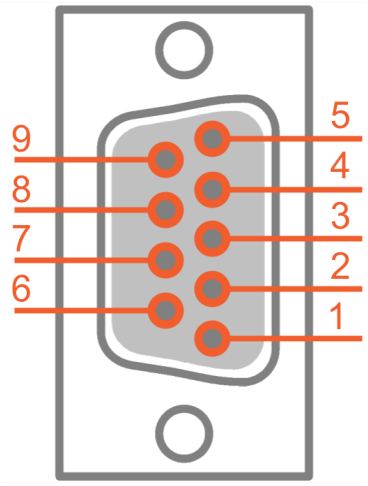
Bundle content



Top

Bottom

2.12.4. DSIw-20mA Output connector pinout

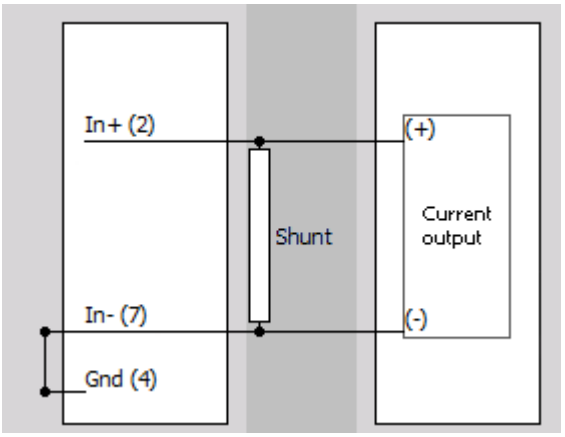


STG connector: pin-out (DSUB-9 female)

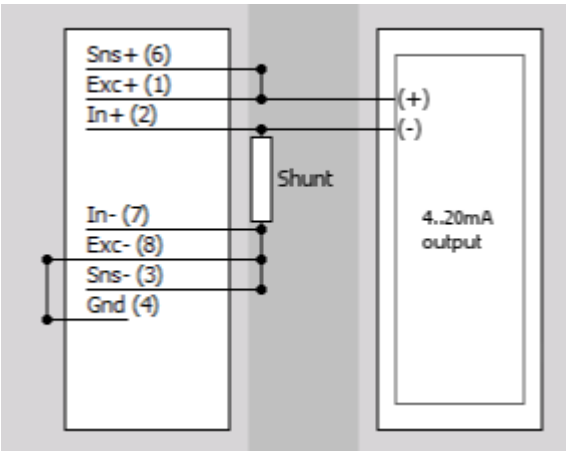
Pin	Name	Description
1	Exc +	Excitation +
2	In+	Input +
3	Sns-	Sense -
4	GND	Ground
5	N.C.	Not connected
6	Sns+	Sense +
7	In-	Input -
8	Exc-	Excitation -
9	TEDS	TEDS

2.12.5. DSI-20mA Connection diagrams

External direct shunt

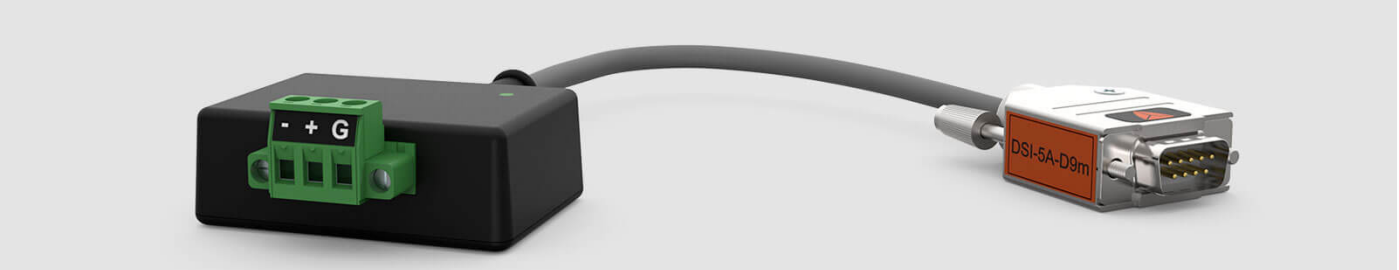


External loop powered shunt



2.13. DSI-5A

The DSI-5A allows current measurement of up to 5A.



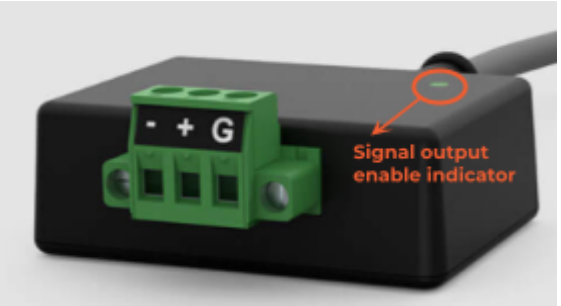
DSI-5A-D9m

2.13.1. DSI-5A v2 specifications

Inputs specifications	DSI-5A v2
Input connector type	MSTB 2,5/ 3-STF-5,08 Phoenix Contact, mates with MSTB 2,5/ 3-GF-5,08
Connector info	2.5 mm² Nominal cross section
Nominal current	5 A (DC or AC RMS continuous)
Pulse load	1 s @ 15 A, 5 s @ 0 A
Shunt Resistor	10 mΩ
Input accuracy	Calibrated to ±0.1 %, calibration in TEDS
Temperature Coefficient	±15 ppm/°C max (-55 °C to +125 °C)
Voltage rating	300 V DC or AC RMS
TEDS	1024-bit, 1-Wire EEPROM
Physical	
Dimensions	57 x 39 x 20 mm
Cable	200 mm
Weight	100 g

Important
Isolated voltage input amplifiers are recommended for connecting shunt resistor adapters.

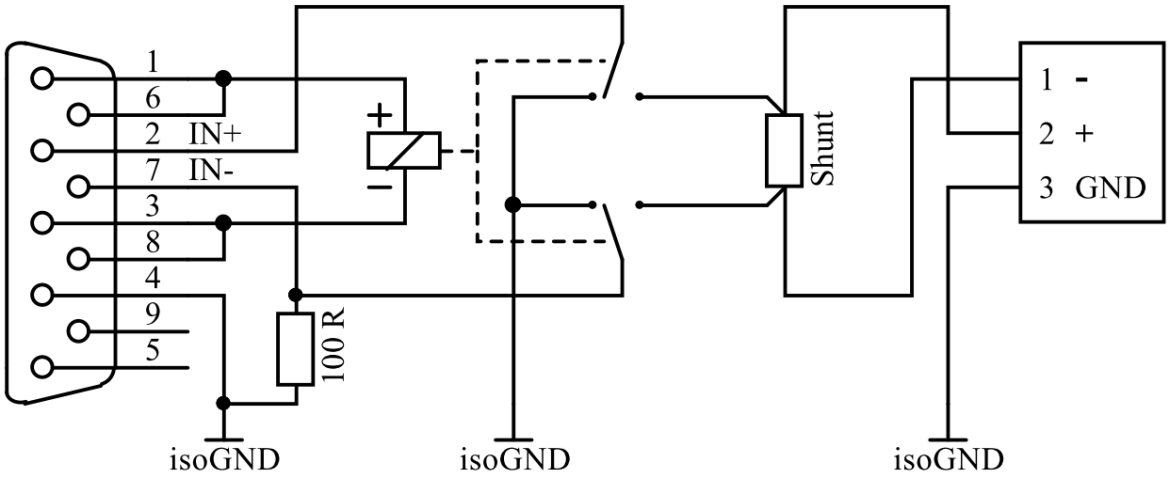
2.13.2. DSI-5A input connection



DSI-5A input connector

Pin	Name	Description
1	-	Current Input -
2	+	Current Input +
3	G	Analog Ground

2.13.3. DSI-5A output connector



2.14. DSI-LVDT

LVDTs (Linear Variable Differential Transformers) are linear position sensors. They are used to measure linear displacement and position over relatively short distances.

DSI-LVDT

2.14.1. Electrical specifications

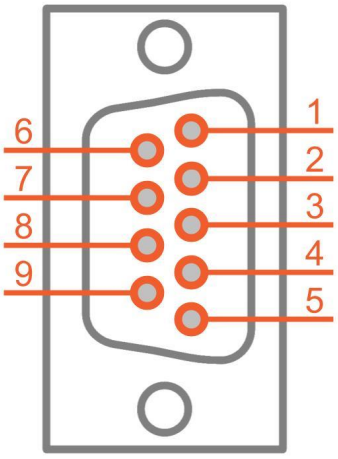
The DSI LVDT adapter is powered by EXC voltage. The LVDT adapter is compatible with SIRIUS(i) (variable EXC), DEWE-43A type instrument (fixed +/-5V EXC) and KRYPTON STG and IOLITE STG amplifiers.

General specifications	
Sensor connector	**DB9 Female**
Power supply Exc. Voltage	10 V – 15 V, from EXC+ to EXC- outputs
Power supply Exc. Current	44 mA, from EXC+ to EXC- outputs (see 1)
Output voltage	1.00 V = 500 mV/V (see 2)
Output bandwidth	1 kHz
Gain error	1 % of Full Scale
Output TCR	55 ppm/K of Full Scale
Sensor VTR = S x d, Sensitivity	2000 mV/V maximum
Sensor supported type	Differential LVDR or RVDT, Inductive Half-Bridge LVDT
Sensor Exc. voltage	2.88 Vrms (differential) (see 3)
Sensor Exc. frequency	Selectable 4.02 kHz / 9.60 kHz typical; 2.5% error
Phase compensation	-50° to +85° @ 4kHz; -75° to +70° @ 10kHz
TEDS	1024-bit, 1-Wire EEPROM (see 4)

1) Absolute maximum rating, specified for SIRIUSi
2) For sensor VTR (Voltage Transfer Ratio) = 1000 mV/V
3) Sinusoidal, 50dB THD typical, not possible to sync from adapter to adapter
4) Only one device per TEDS line is supported. Can be set to internal (adapter) or external (sensor)

2.14.2. LVDT connectors

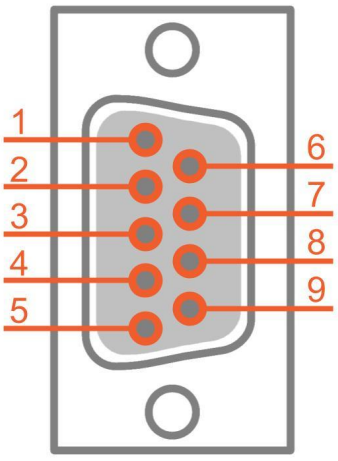
2.14.2.1. DSUB Input connector pinout



9 pin DSUB male

Pin	Name	I/O	Description
1	PS+	I, Power	Power Supply +
2	Out+	O, Signal	Adapter Output (Single ended) +
3	PSEn-	I, Signal	Power Supply Enable -
4	AGND	I	Analog Ground
5	NC	I/O	Reserved / Not Connected
6	PSEn+	I, Signal	Power Supply Enable +
7	Out-	O, Signal	Adapter Output (Ground) -
8	PS-	I, Power	Power Supply -
9	TEDS	I/O, Signal	TEDS

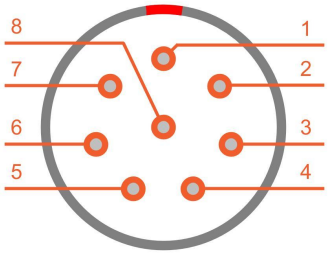
2.14.2.2. DSUB Output connector pinout



9 pin DSUB female

Pin	Name	I/O	Description
1	Exc+	O, Power	Sensor supply, excitation +
2	In+	I, Signal	Sensor Output +
3	Sns-	I, Signal	Sense -
4	AGND	I	Analog Ground
5	NC	I/O	Reserved / Not Connected
6	Sns+	I, Signal	Sense +
7	In-	I, Signal	Sensor Output -
8	Exc-	O, Power	Sensor supply, excitation -
9	NC	I/O	Reserved / Not Connected

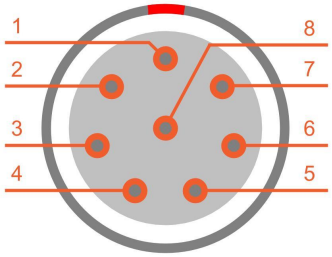
2.14.2.3. LEMO Input connector pinout



8 pin LEMO 2B.308 male

Pin	Name	I/O	Description
1	PS+	I, Power	Power Supply +
2	Out-	O, Signal	Adapter Output (Ground) -
3	Out+	O, Signal	Adapter Output (Single ended) +
4	PS-	I, Power	Power Supply -
5	MGND	I	Mechanical Ground, chassis
6	TEDS	I/O, Signal	TEDS
7	AGND	I	Analog Ground
8	NC	I/O	Reserved / Not Connected

2.14.2.4. LEMO Output connector pinout



8 pin LEMO 2B.308 female

Pin	Name	I/O	Description
1	Exc+	O, Power	Sensor supply, excitation +
2	In-	I, Signal	Sensor Output -
3	In+	I, Signal	Sensor Output +
4	Exc-	O, Power	Sensor supply, excitation -
5	MGND	I	Mechanical Ground, chassis
6	NC	I/O, Signal	Reserved / Not Connected
7	AGND	I	Analog Ground
8	NC	I/O	Reserved / Not Connected

2.14.3. Output bandwidth - Magnitude and Phase response

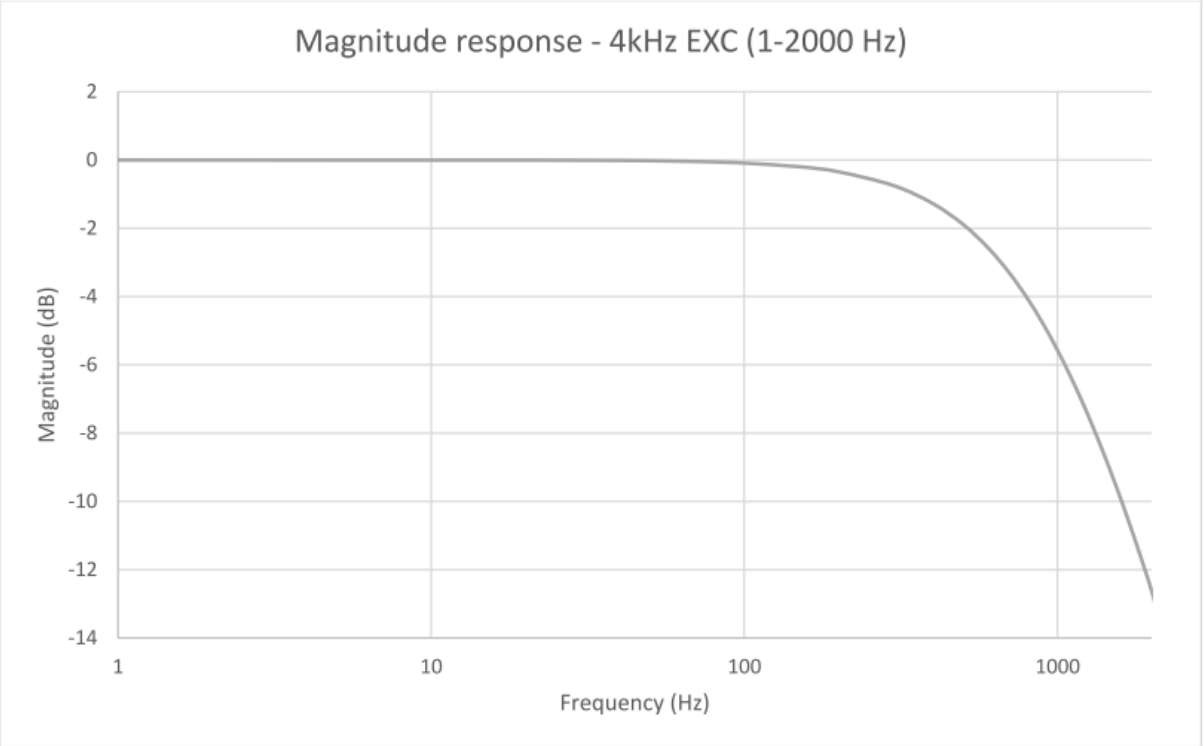


Image 1: Typical magnitude response for 4kHz EXC

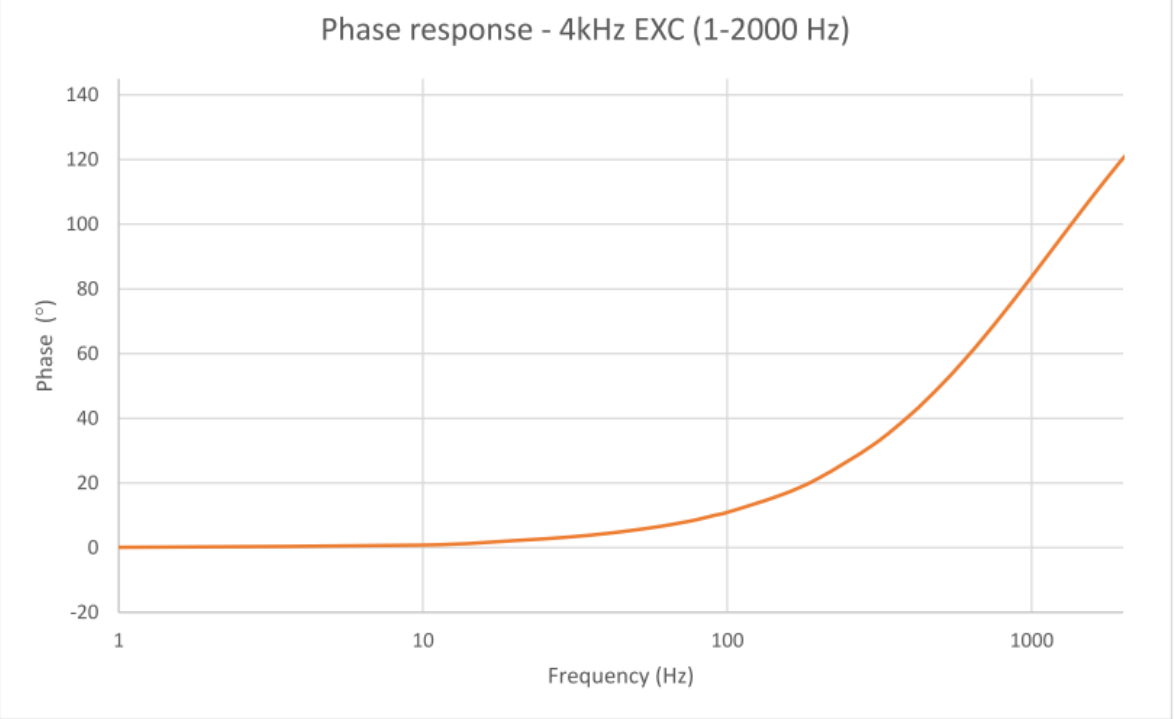


Image 2: Typical phase response for 4kHz EXC

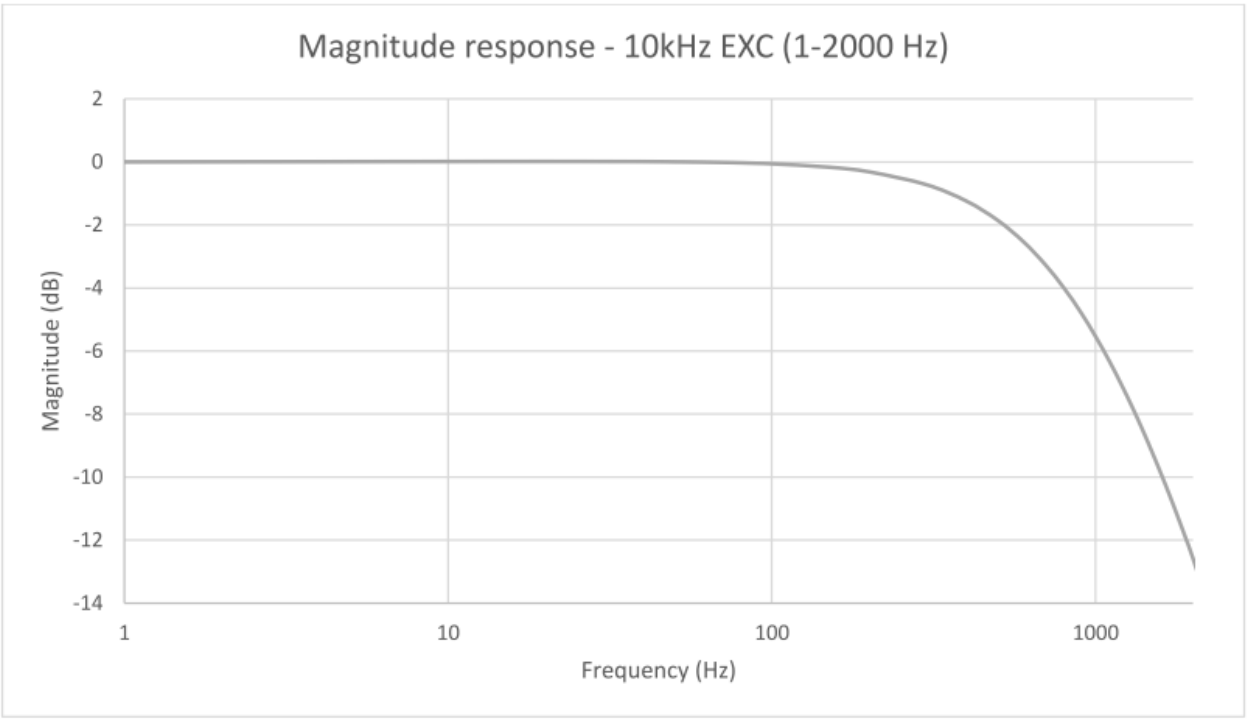


Image 3: Typical magnitude response for 10kHz EXC

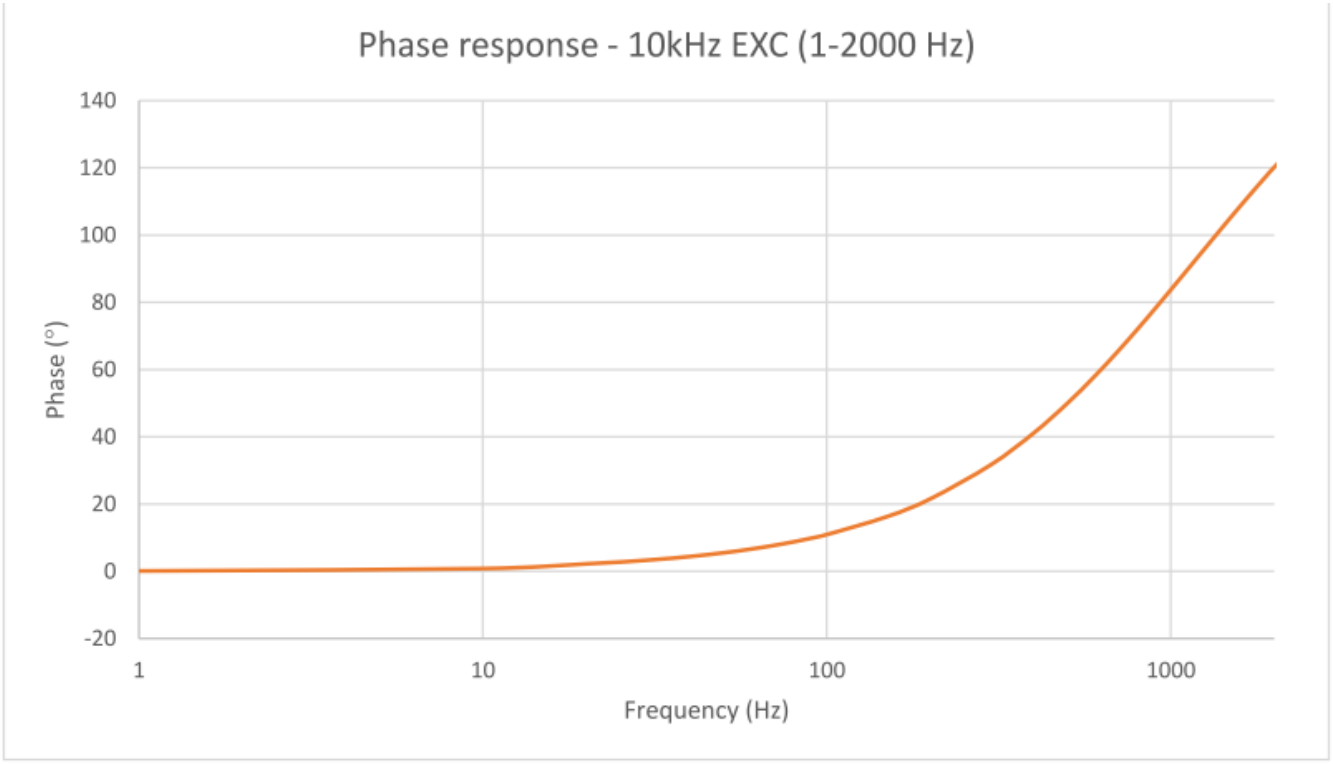


Image 4: Typical phase response for 10kHz EXC

2.14.4. Theory of operation

DSI LVDT Adapter uses a unique ratiometric architecture to eliminate several of the disadvantages associated with traditional approaches to LVDT interfacing. The benefits of this new circuit are: minimal adjustments are required; temperature stability is improved; and transducer interchangeability is improved.

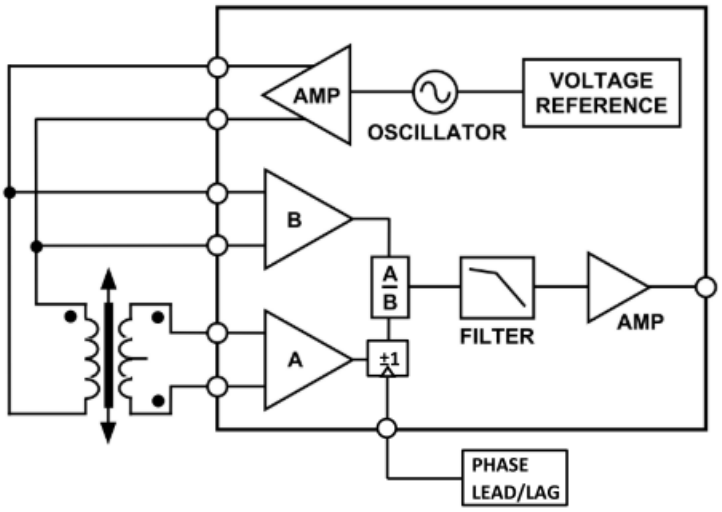


Image 5: Functional block diagram

LVDT adapter SENSE inputs are connected as B-Inputs and adapters IN are connected as A-Inputs. Phase Lead / Lag circuit will compensate for the difference of the sensor output in reference to Exc. and Sense inputs.

Output signal level will depend on the phase difference between sensor output and Sense inputs.

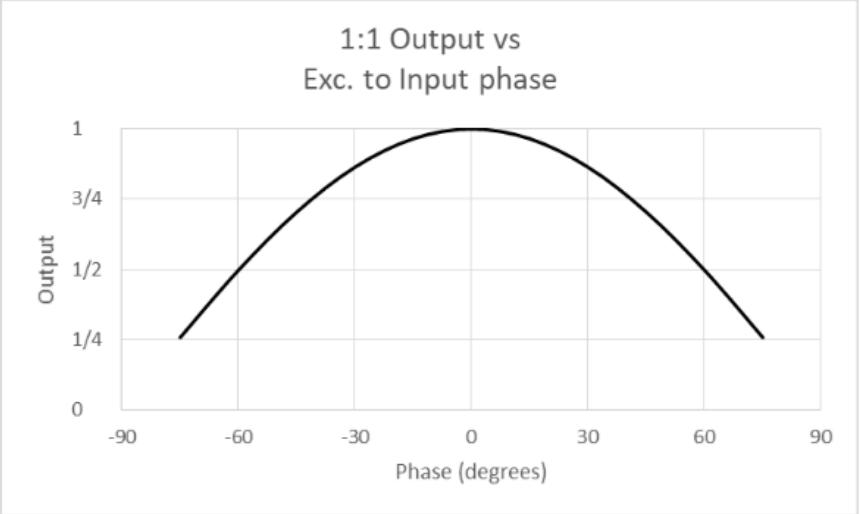


Image 6: LVDT adapter output sensitivity to input signal phase lead/lag , 1:1 sensor

Two examples are shown for sensors with sensitivity = 0,5. Output signal level is 1/2 of the Exc. Signal. Sensor output phase lag is 45°. LVDT adapter output is ≈0,35 (≈1Vexc · sensitivity · 0,70) according to Image 2.

When phase compensation matches phase lead / lag of sensor output LVDT adapter output will be at its maximum = 0,5 (=1Vexc · sensitivity · 1,00).

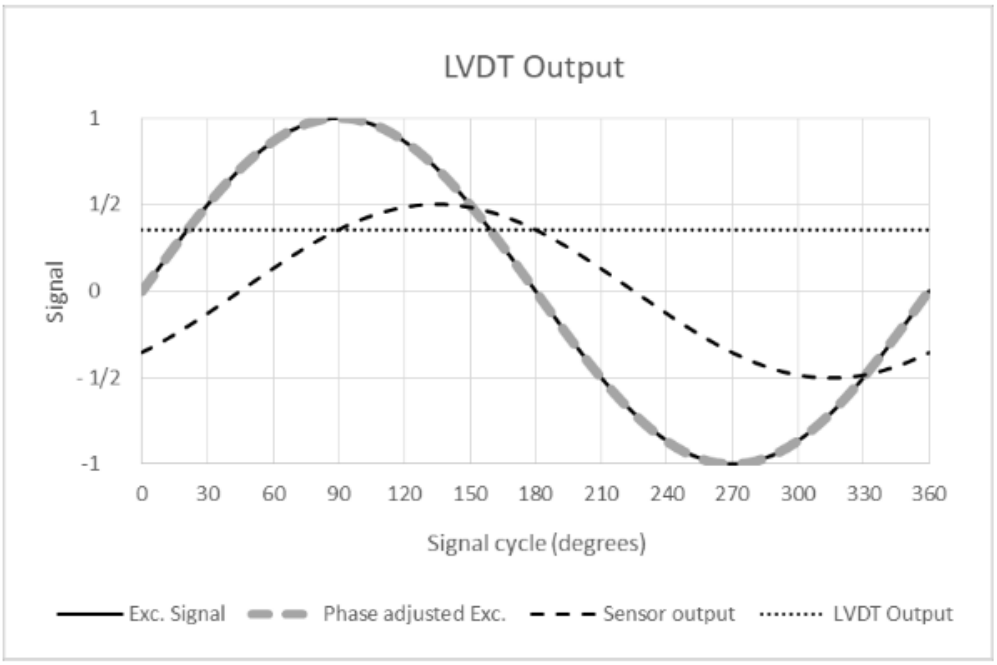


Image 7: Example: 45° sensor output , no compensation

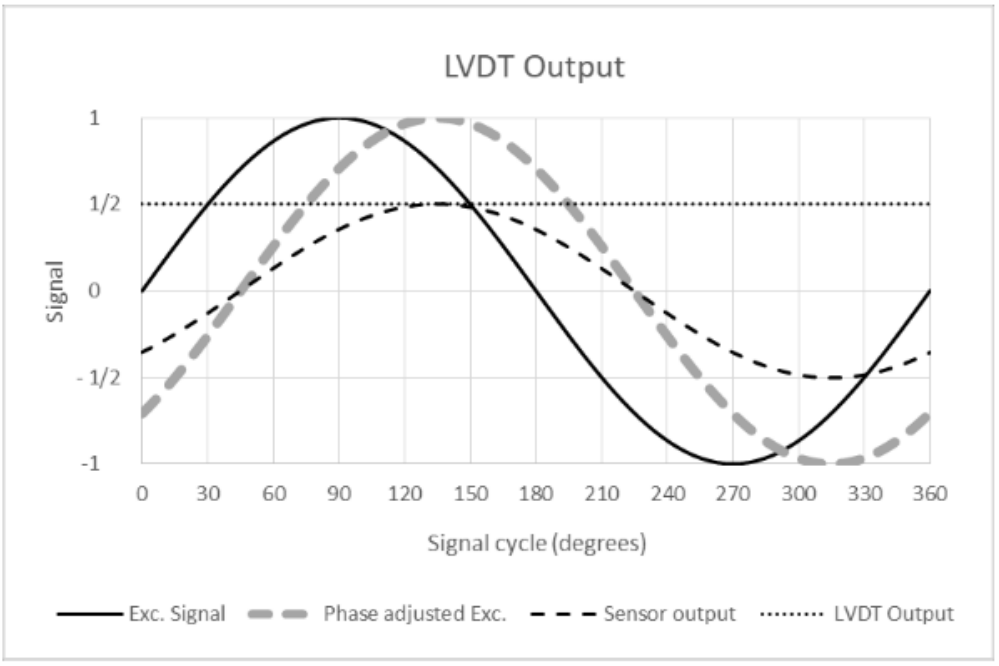


Image 8: Example: 45° sensor output, 45° compensation

2.14.5. Operation

Connect the LVDT Adapter to your SIRIUS or DEWE-43 channel and connect to SENSOR input your sensor probe.

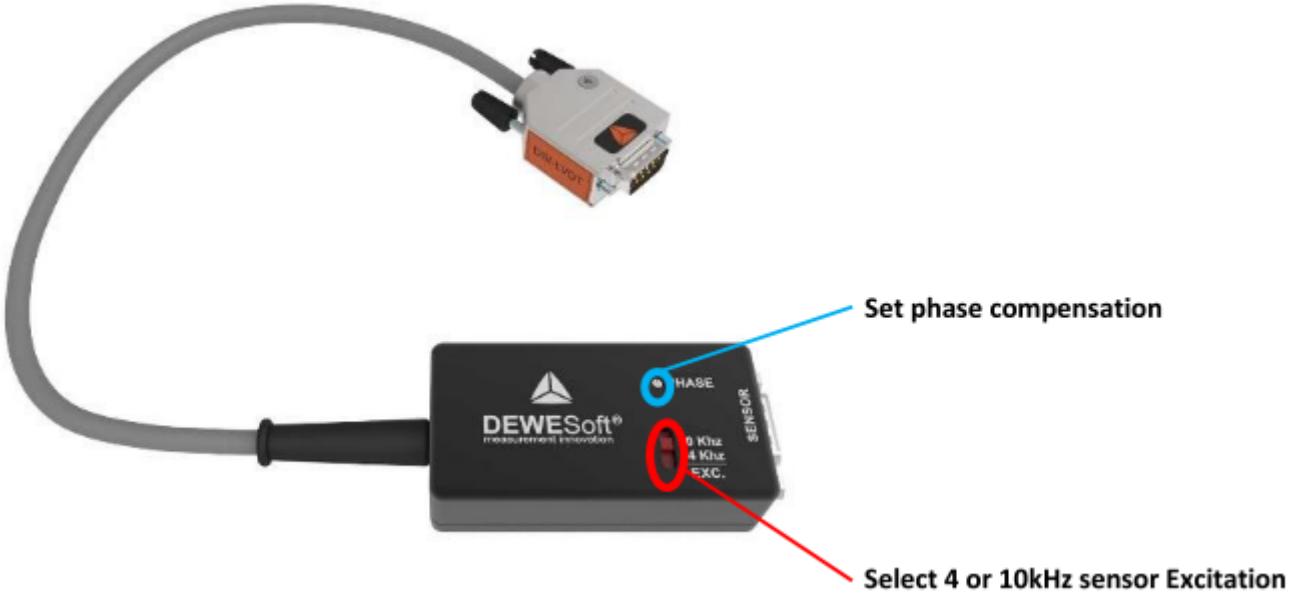


Image 13: Adapter setting, frequency, phase

Depending on the sensor used, select the excitation frequency of the adapter as close as possible to frequency in sensors specifications.

With phase compensation adjust the measured output to maximum output value.

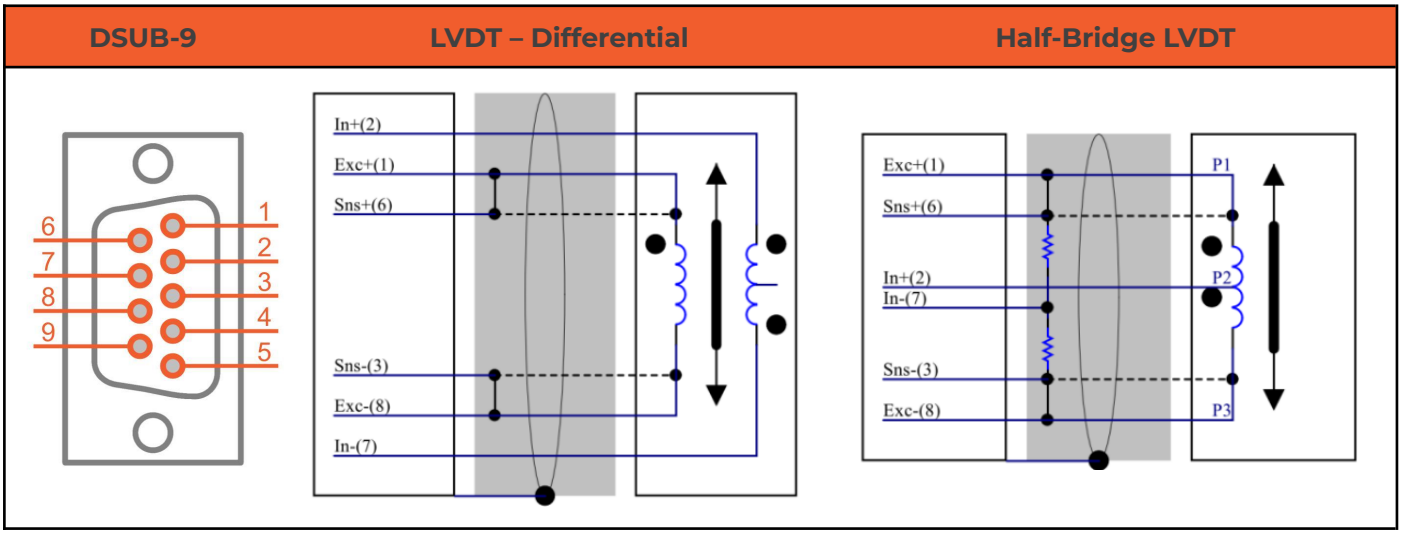
2.14.5.1. Phase adjustment procedure

Please ensure that the pin pairs Exc/Sns are connected with each other (6-wire-connection).

Phase adjustment steps:

1. Manually set the sensor to e.g. 3/4 of the measurement range, e.g. if you have a displacement sensor with 50mm range, fix it at position 35mm.
2. In the Dewesoft Analog in → Channel setup → check the signal. Adjust the phase with the screw on the DSI-LVDT (blue circle in picture) until the signal is maximized.
3. Then do the calibration (e.g. 2-point-calibration directly in the channel setup)

2.14.5.2. Connections



Hint

6-wire connection only shown. 4-wire also possible, connect Sns and Exc signals on the adapter side of the connector.

Important

Input - (pin7) shall be connected to half bridge completion resistor divider assembled with discrete resistors with the following recommended specifications: Resistance 1kΩ, Tolerance 0.1%, Temperature coefficient 15ppm, Power 0,125W. This connection is preferred over the previous connection IN- to GND (so called “noisy GND”).

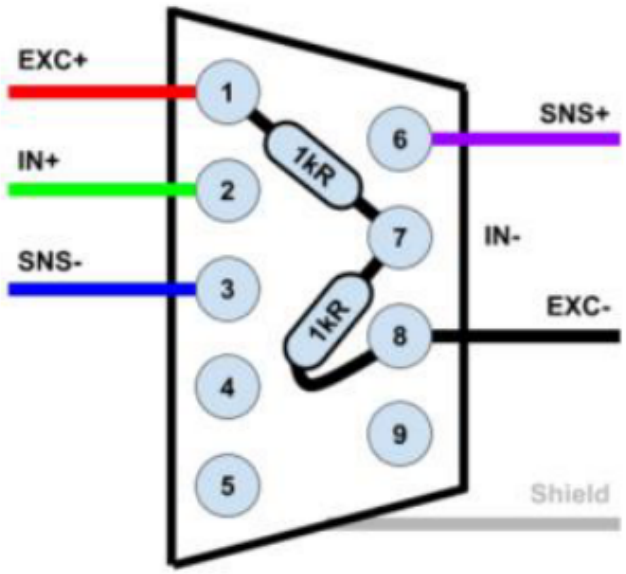


Image 14: Solder side of the DB9 male, HB divider resistors

2.15. DS-16xLVDTr

DS-16xLVDTr uses a unique ratiometric architecture to eliminate several of the disadvantages associated with traditional approaches to LVDT interfacing. DS-16xLVDTr combines 16 channels of DSI-LVDT adapters in a 19”-rack housing with 1U height.

Main advantage of the new design is a synchronous excitation signal provided from the external function generator to a BNC front connector (IN connector). When using multiple DS-LVDTr devices the EXC signal can be daisy-chained from the BNC OUT connector to the BNC IN connector on the other device.

Additionally, there are 16 DSUB-9M (male) connectors on the front panel of DS-16xLVDTr for the connection to the Dewesoft host amplifier. Each connector is a trimmer used for phase adjustment.

On the back panel are 16 DSUB-9F (female) connectors for the sensor connection. DS-16xLVDTr supports measurements with full-bridge and half-bridge LVDT sensor types.

DS-16xLVDTr

2.15.1. General specifications

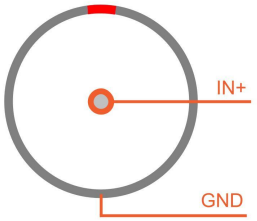
Parameter	Description
Power supply Exc. Voltage	10V – 15V, from EXC+ to EXC- outputs (SIRIUS STGv2 = 15V supply)
Power consumption per channel	320mW (15V supply, no load) 800mW (15V supply, 100R load on 3Vrms)
Output voltage max.	500mV for 1000mV/V HB LVDT
Output bandwidth	1kHz (-6dB, 90deg phase)
Gain error	1% of Full Scale
Output TCR	55ppm/K of Full Scale
Sensor supported type	Full Bridge / Half-Bridge LVDT impedance min. 120R.
SYNC Input Voltage	500mVrms typical recommended 1700mVrms max recommended
Sensor Exc. voltage	3Vrms max (15V supply) set on SYNC Inputs: 1.76 * Sync Input (Vrms) @ 4kHz 1.70 * Sync Input (Vrms) @ 10kHz
Sensor Exc. frequency	4kHz to 10kHz typical, set on SYNC Inputs
Phase compensation	-50° to +85° @ 4kHz -75° to +70° @ 10kHz
TEDS	1024-Bit, 1-Wire EEPROM
Operating temperature	-20°C to +50°C
Ingress protection	IP20
Humidity	5% to 85% RH non condensing @ 50°C
Dimensions	444 x 221 x 44 mm (W x D x H)
Weight	2300g

For more detailed information about the DS-16xLVDTr please check the DS-16xLVDTr-manual on our web page.

2.15.2. LVDTr connectors

2.15.2.1. SYNC inputs

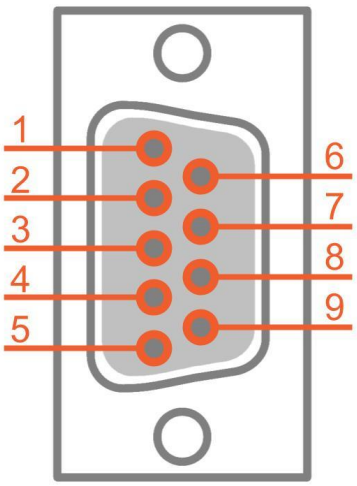
2x BNC SYNC input connectors



BNC SYNC input pinout

Parameter	Description	Comment
Input connectors	2 x BNC	Parallel, Not isolated
Coupling	AC - High pass	-3dB @ 16Hz (1st order)
Input impedance	1MR	
Overvoltage Protection / ESD	36V	Bidirectional TVS
Overcurrent Protection	2.4mA typical	Resettable
Input Bandwidth	4kHz 10kHz 20kHz	Att: 0% 17deg phase relative to input Att: <2% 45deg phase relative to input -3dB @ 20kHz (2nd order)

2.15.2.2. Input connector pinout



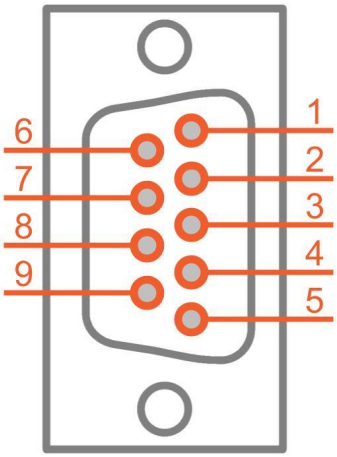
9 pin DSUB female

Pin	Name	I/O	Description
1	Exc+	O, Power	Sensor supply, excitation +
2	In+	I, Signal	Sensor Output +
3	Sns-	I, Signal	Sense -
4	AGND	I	Analog Ground
5	Reser.	I/O	Reserved / Not Connected
6	Sns+	I, Signal	Sense +
7	In-	I, Signal	Sensor Output - [1.]
8	Exc-	O, Power	Sensor supply, excitation -
9	Reser.	I/O	Reserved / Not Connected

Important

1. Optional **internal** HB completion: Do not connect Sensor Output-. Pin-7 internally terminated as Half-Bridge. Must specify when ordered!

2.15.2.3. Output connector pinout



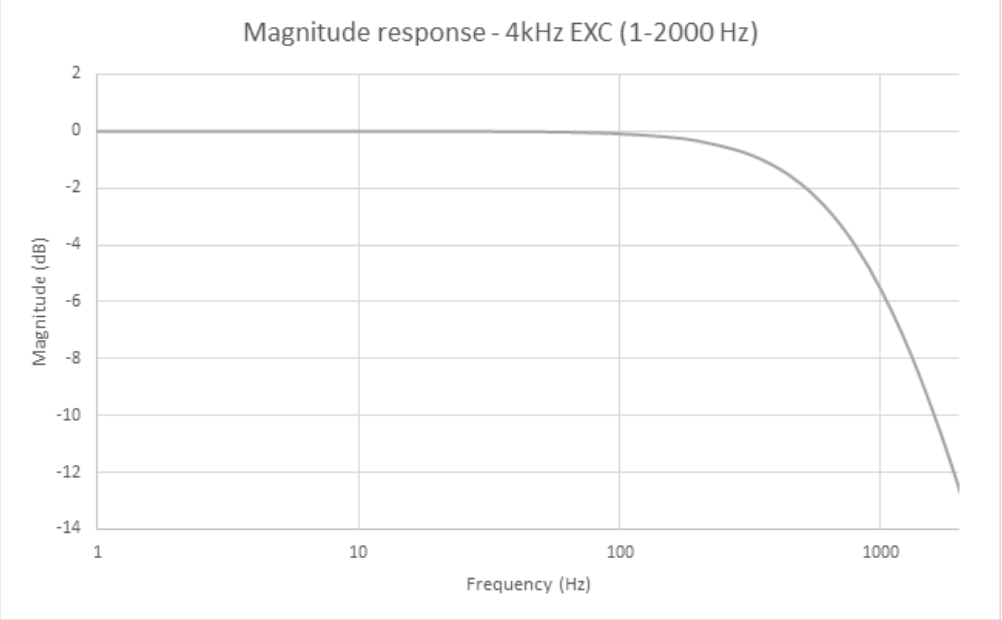
9 pin DSUB male

Pin	Name	I/O	Description
1	PS+	I, Power	Power Supply +
2	Out+	O, Signal	Adapter Output (Single ended) +
3	PSEn-	I, Signal	Power Supply (sns) -
4	AGND	I	Analog Ground
5	Reser.	I/O	Reserved / Not Connected
6	PSEn+	I, Signal	Power Supply (sns) +
7	Out-	O, Signal	Adapter Output (Ground) -
8	PS-	I, Power	Power Supply -
9	TEDS	I/O, Signal	TEDS

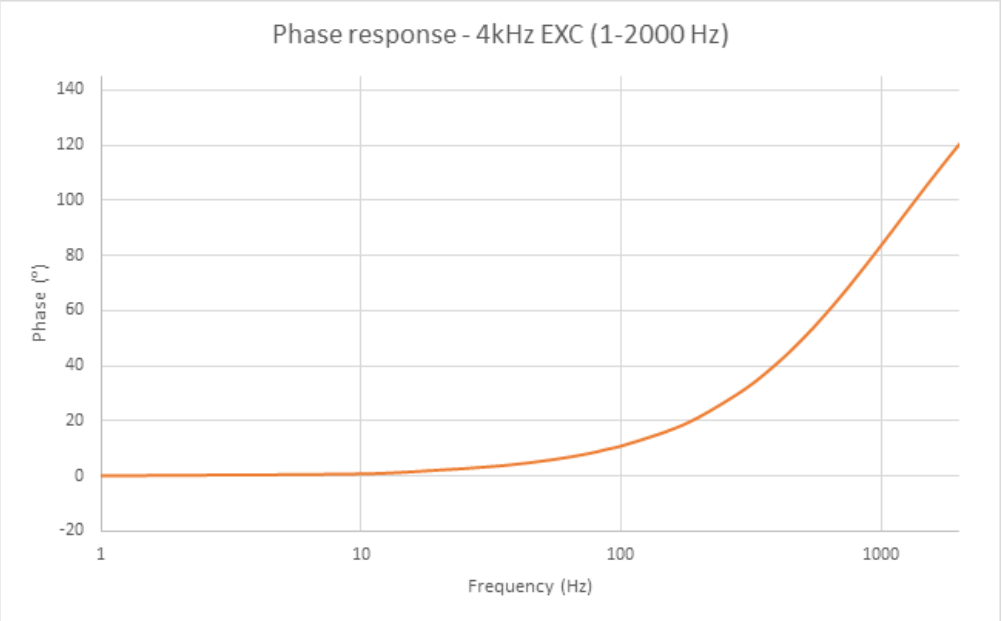
2.15.2.4. Typical connection to DEWESoft amplifier w. DSUB-9 connector

Use shielded DSUB9-male to DSUB9-female extension cable.

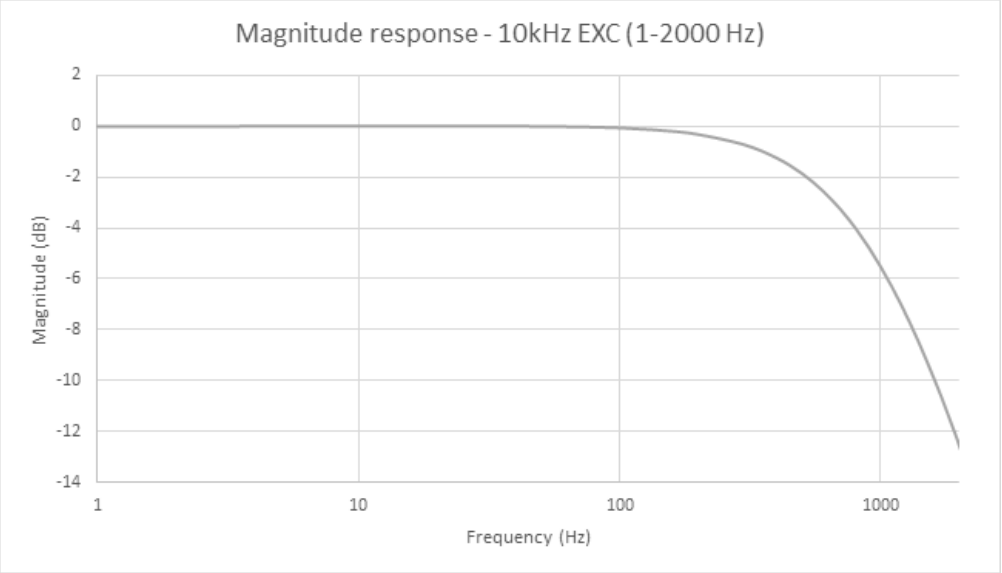
2.15.3. Output bandwidth - Magnitude and Phase Response



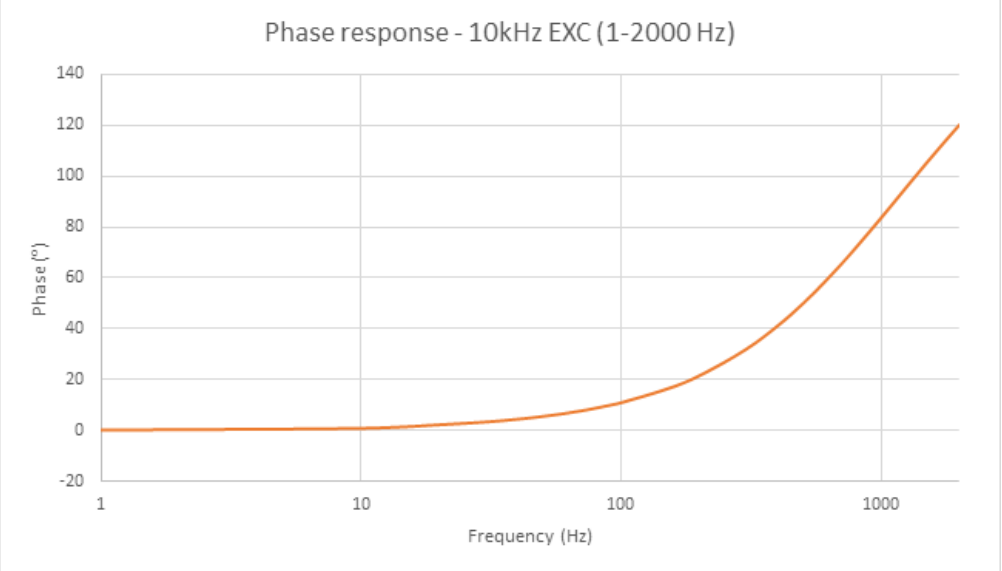
Typical magnitude response for 4kHz EXC



Typical phase response for 4kHz EXC

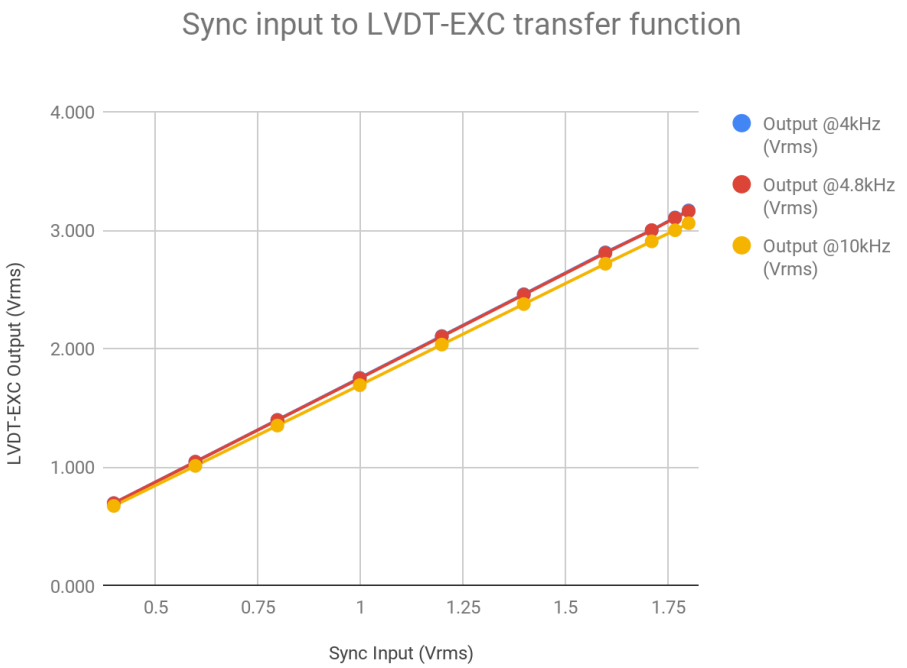


Typical magnitude response for 10kHz EXC



Typical phase response for 10kHz EXC

2.15.4. Sync input to LVDT-EXC transfer function



Transfer function:

	Output @4kHz (Vrms)	Output @4.8kHz (Vrms)	Output @10kHz (Vrms)
Transfer-K	1.76	1.76	1.7

*LVDT-EXC Output (Vrms)= Transfer-K * Sync Input (Vrms)*

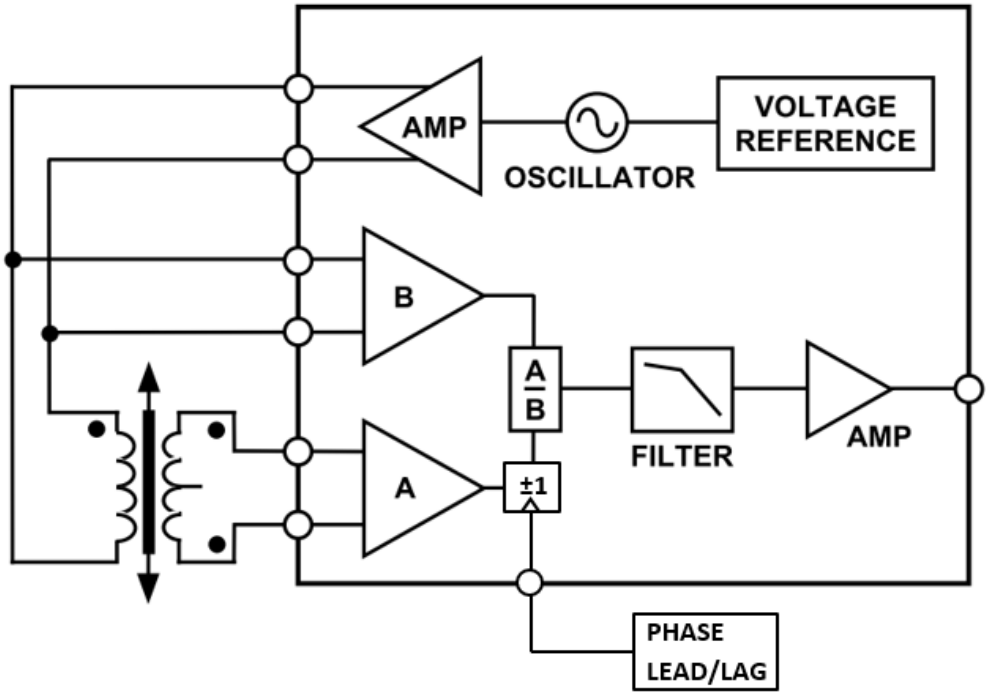
Best overall Noise floor results were observed at Sync input between 400mVrms and 600mVrms.

Proposed best Sync input voltage setting: 500mVrms.

Calculated LVDT-EXC voltage: **880mVrms.**

2.15.5. Theory of operation

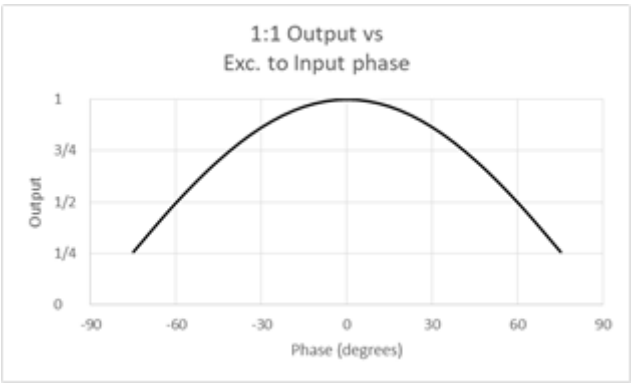
DSI - LVDT Adapter uses a unique ratiometric architecture to eliminate several of the disadvantages associated with traditional approaches to LVDT interfacing. The benefits of this new circuit are: minimal adjustments are required; temperature stability is improved; and transducer interchangeability is improved.



Functional block diagram

LVDT adapter SENSE inputs are connected as B-Inputs and adapters IN are connected as A-Inputs. Phase Lead / Lag circuit will compensate for the difference of the sensor output in reference to Exc. and Sense inputs.

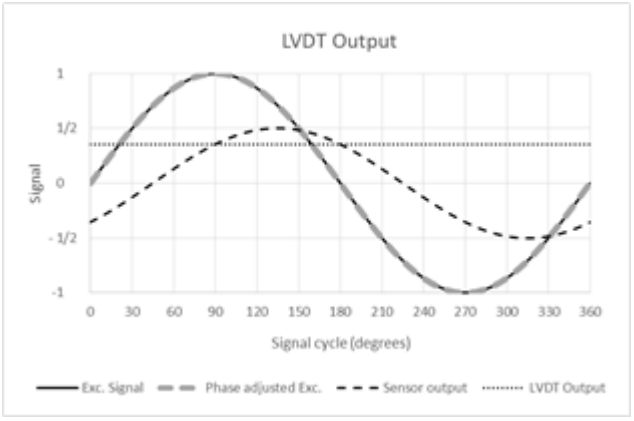
Output signal level will depend on the phase difference between the sensor output and Sense inputs.



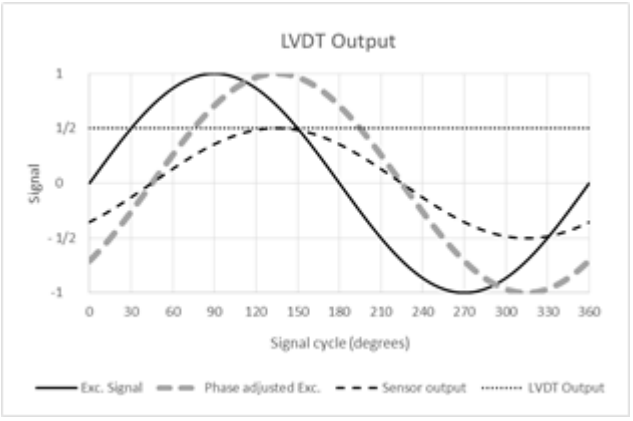
LVDT adapter output sensitivity to input signal phase lead/lag, 1:1 sensor

Two examples are shown for sensors with sensitivity = 0,5. Output signal level is of the Exc. Signal. Sensor output phase lag is 45⁰. LVDT adapter output is ≈0,35 (≈1Vexc · sensitivity · 0,70).

When phase compensation matches phase lead / lag of sensor output LVDT adapter output will be at its maximum = 0,5 (=1Vexc · sensitivity · 1,00).



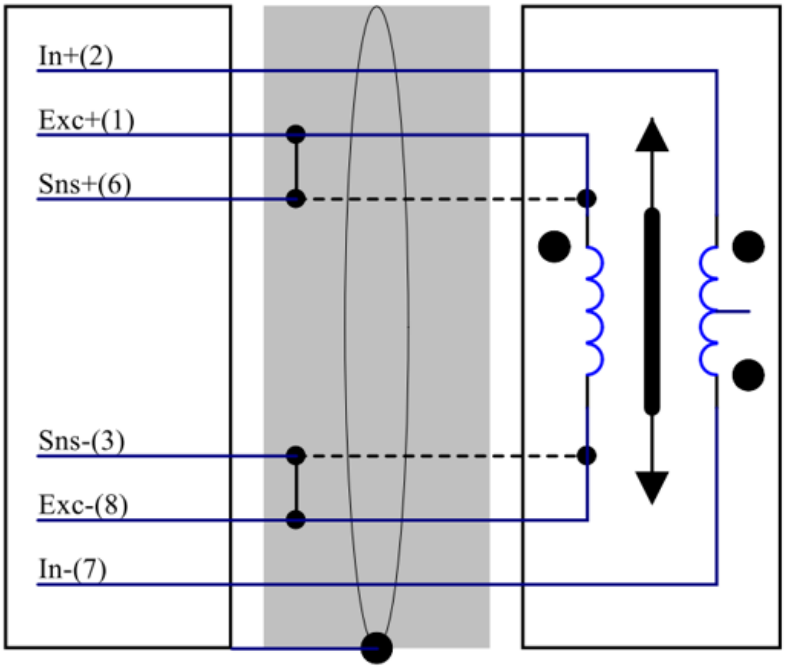
Example: 45⁰ sensor output, no compensation



Example: 45⁰ sensor output, 45⁰ compensation

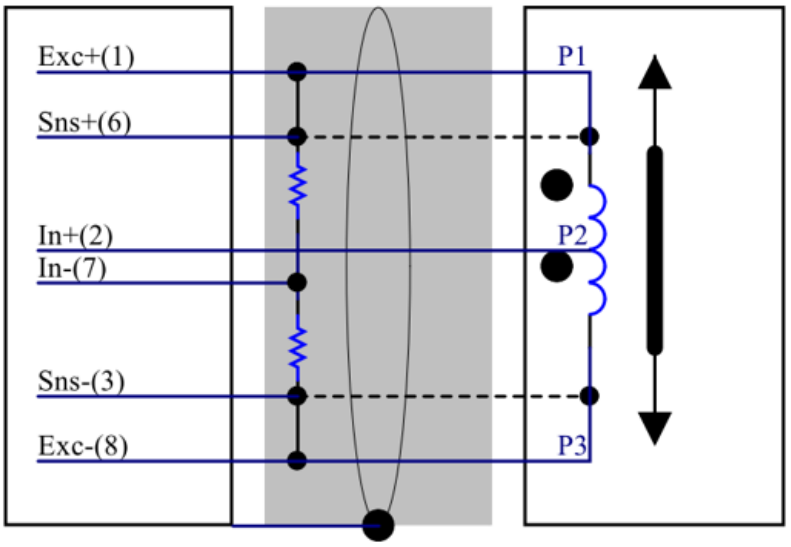
2.15.6. Connections

2.15.6.1. Typical Full Bridge sensor connection

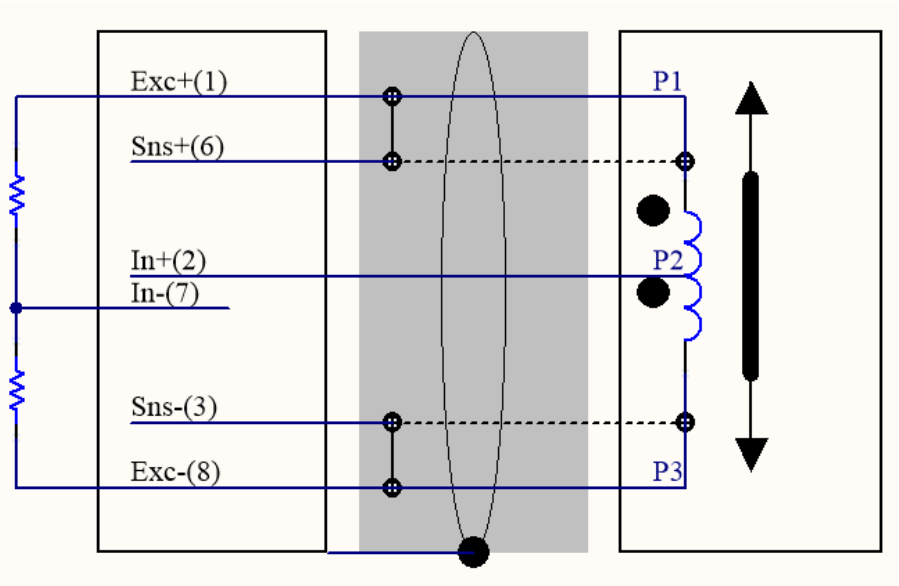


6-wire connection only shown. 4-wire also possible, connect Sns and Exc signals on the adapter side of the connector.

2.15.6.2. Typical Half Bridge sensor connection



External Half Bridge completion

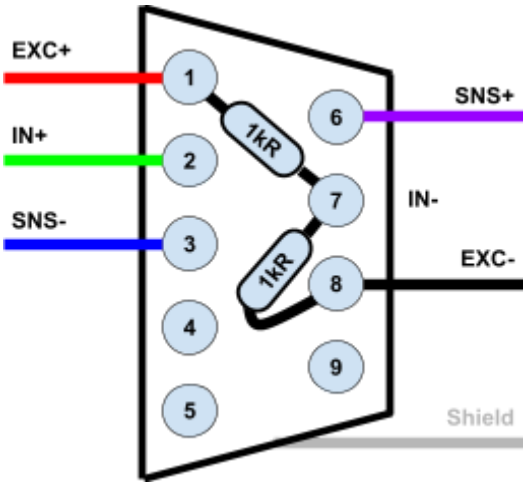


Optional internal Half Bridge completion

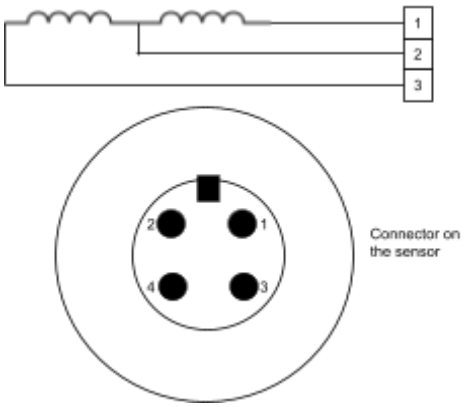
Input - (pin7) shall be connected to half bridge completion resistor divider assembled with discrete resistors with the following recommended specifications:

- Resistance 1kΩ,
- Tolerance 0.1%,
- Temperature coefficient 15ppm,
- Power 0,125W.

This connection is preferred over the previous connection IN- to GND (so called “noisy GND”).



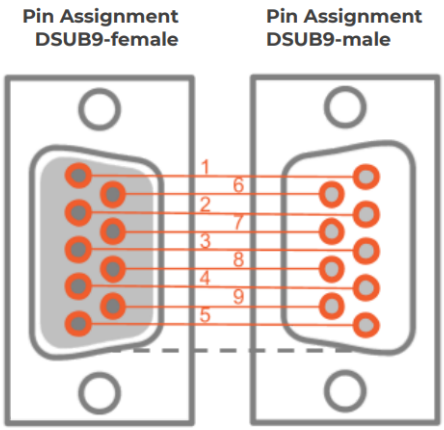
External Half Bridge completion, DSUB9 solder side view



Example sensor pinout

2.15.6.3. Typical connection to DEWESoft amplifier w. DSUB-9 connector

Use shielded DSUB9-male to DSUB9-female extension cable.



3. Warranty information

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

Note:
Dewesoft d.o.o. shall not be liable for any errors contained in this document. Dewesoft MAKES NO WARRANTIES OF ANY KIND WITH REGARD TO THIS DOCUMENT, WHETHER EXPRESS OR IMPLIED. DEWESOFT SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Dewesoft shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory, in connection with the furnishing of this document or the use of the information in this document.

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.

3.1. 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.

3.2. 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
Email: Support@dewesoft.com
The telephone hotline is available Monday to Friday from 07:00 to 16:00 CET (GMT +1:00)

3.3. 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.

3.4. Restricted Rights

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

3.5. Printing History

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

3.6. Copyright

3.7. 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.

4. Safety instructions

Your safety is our primary concern! Please be safe!

4.1. 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.

4.2. 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.

4.2.1. Environmental Considerations

Information about the environmental impact of the product.

4.2.2. Product End-of-Life Handling

Observe the following guidelines when recycling a Dewesoft system:

4.2.3. 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.

4.2.4. 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!

- Lithium ion batteries are classified as not hazardous when used according to the recommendations of the manufacturer described in Battery Safety Data Sheet, which is available for download from this link.
- 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.

4.3. Documentation version history

Version	Date	Notes
V23-1	3.10.2023	-Initial version; same content as in Accessories manual that was discontinued and DSI-LVDT and DS-16xLVDTr