DEWESoft®

TEST ENGINEERS CATALOG

7 YEAR WARRANTY

DEWESoft®

CONTENTS

Our company was built by test engineers. Before we started Dewesoft, we worked in a variety of fields. We didn't know each other yet, but we shared remarkably similar experiences.

Like you, we faced measuring challenges every day. Each new product or product revision needed to be tested. But TIME and MONEY were never luxuries that we could afford: our bosses demanded that our testing be done accurately, but on a tight schedule with little room for errors or do-overs. So, with each measurement challenge, we looked at the test instruments that we had in our lab and figured out how to use them to their maximum advantage.

It wasn't always easy.

There were mechanical issues, like when the best instrument for the job would not physically fit where it needed to go. Or it wasn't rugged enough. Or it ran only from AC power, but that was not possible to provide. You get the idea.

There were electrical noise problems, like when the only suitable instrument that we owned didn't have enough common-mode rejection or isolation, leading to noisy signals being recorded. Or when signal levels varied so greatly during the test that we had to feed the input into two different channels with different gain settings... then we had to manually try to sync and combine the channels later to analyze the data.

But, like you, we did the best we could with what we had. That's what test engineers do, after all. We figure it out, right?

When we came together to create Dewesoft data acquisition instruments, we had a clear picture of what they needed to do. Based on our years of facing measurement challenges, we each had an image of our "dream instrument" in our heads. When we compared these dreams, it was remarkable how similar they were.

We imagined a line of instruments that were small, lightweight, and extremely robust, with great shock and vibe specifications, so that we could put them just about anywhere and they would survive. We imagined instruments with wide dynamic range and ISOLATED inputs, to avoid over-modulated or noisy signals. We imagined instruments that ran from DC or AC power, and even battery power, when no external power was available. We imagined being able to use one instrument to record different kinds of signals, all synchronized together. Even video

cameras, CAN bus, and more ... all recorded with dynamic and static data at the same time. Impossible? We didn't think so.

We imagined that these instruments all shared the same software and that it was easy to use, even looking at it for the first time.

Then we talked to engineers and technicians like you, and got your ideas. We still do this, by the way, because you have the best ideas in the world. After all, you know what you need. You know what works and what doesn't.

We imagined what we wanted. We added your ideas. We worked very hard to build it. That was at the beginning, and two decades later nothing has changed. That's Dewesoft. If you do data acquisition, we can help.

IF YOU DO DATA ACQUISITION - WE CAN HELP

◭ HOW THIS CATALOG WORKS?

Our CNC machines are always busy making our rugged housings

Revolutionary DewesoftX software. Top-notch system setup, data visualization, analysis, and report generation.

There's no substitute for simply doing things the right way.

In the following pages, we will show you how each of our three major DAQ system platforms can help you to measure the major signals and sensors that you encounter in your job as a test engineer (voltage, current, temperature, strain, shock, vibration, and more). The goal of this catalog is that you will be able to see which Dewesoft DAQ systems line is the perfect one for the kinds of applications and measuring challenges that you face every day.

At the heart of every Dewesoft DAQ system is excellent signal conditioning. Without this, you can't make accurate measurements. Next, high-performance ADCs are used to convert analog signals to digital ones, so that they can be visualized and even analyzed in real-time, and recorded to disk.

The next element is great housing. We make just about everything from aluminum blocks that are precisely milled and shaped via CNC to create the most rugged and yet lightweight chassis possible.

We also offer a variety of sensors that we have precisely paired with our amplifiers and measuring systems.

And then there's software. Award-winning DewesoftX makes the whole process from set-up to measurement to report generation easier than you ever thought was possible. Since 2001 we've received awards and accolades for our graphical displays and user interface. We're not bragging when we say that DewesoftX is the best, most flexible data acquisition software on the market.

DewesoftX software is included with all of our products at no additional cost, and updates are free forever. There are no licensing or maintenance fees.

Over the next few pages, we will show you our three major DAQ series: SIRIUS, KRYPTON, and IOLITE, and how they compare and contrast. This should give you an idea of which one might be the best fit for you. Then we will review each of the major signal types that are measured today, with some technical background... then we will show you how each of our three product lines addresses them. We will cover the major signal types that our customers need to acquire, starting with voltage, then temperature, current and moving onward to strain, pressure, sound and vibration, and more.

For each of these signal types, we will show you how each of our recording platforms can handle this signal. In nearly every case there is more than one way.

We hope you keep this catalog on your desk for a long time as a useful reference.
The next page provides a short tour of a typical table, in this case, the VOLTAGE table for some of our SIRIUS modules:

HOW THIS CATALOG WORKS? ◭

The key measurand of this table will be listed at the top of each page.

The product series and model within

A brief description, photo, or both

The specific module / amplifier, per column

Key specifications, followed by the range of analog signal and sensor types

The gold row with bold text is the key measurand on this page (voltage, in this example).

The silver column means that this module is specifically made for this measurand.

The light orange field means that this module natively supports this measurand, whether it is dedicated to it or not. A checkmark ✓ indicates that no explanation is needed. Otherwise, some text will appear in this field to provide specifics.

Dark orange field indicates that this module can handle the measurand via one of our DSI adapters or another adapter (e.g., external shunt or sensor). Text will be bold if this is the key measurand of this page.

⊗ means that this module cannot support this measurand, regardless of background color.

We have included a handy reference at the bottom of each table, as a reminder for you.

TEST ENGINEERS CATALOG

VOLTAGE MEASUREMENT SIRIUS®

SIRIUS DUAL CORE

DualCoreADC® technology: dual 24-bit delta-sigma ADC's with anti-aliasing filtering.
160 dB of dynamic range. 200 kS/s sample rate.
8 channel modules.

	HV	LV	ACC	CHG	MULTI	
Connectors	BANANA	DB9, BNC, BANANA	BNC, TNC	BNC, TNC	DSUB-15, L2B16f	DB9,
Channels per slice	8	8	8	8	8	
Data rate / channel	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	
Resolution	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-
Bandwidth	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	
Voltage ranges	±1200 V, ±50 V	±200 V, ±10 V, ±1 V, ±100 mV	±10 V, ±500 mV	±10 V, ±500 mV	±10 V, ±1 V, ±100 mV, ±50 mV	± ±100
Input coupling	DC	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.1 Hz, 1 Hz	DC, AC 0.1 Hz, 1 Hz, 10 Hz, 100 Hz	DC	D (3
Sensor excitation	⊗	2 to 30 V bipolar, 0 to 24 V unipolar, max. 0.2 A / 2 W	(IEPE) 2, 4, 8, 12, 16, 20 mA	(IEPE) 4, 8, 12 mA	0 to 12 V max. 44 mA	0 to 2 0 to 6
Bridge connection	⊗	Full	⊗	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire	Full, ½, 3-
Programmable shunt	⊗	⊗	⊗	⊗	59.88 kΩ	59.88 k
IEPE input	⊗	DSI-ACC	✓	✓	DSI-ACC	
±200 Volt input	✓	✓	⊗	⊗	DSI-V200	
Resistance	⊗	⊗	⊗	⊗	⊗	
Temperature (PTx)	⊗	DSI-RTD	⊗	⊗	DSI-RTD	
Thermocouple	⊗	DSI-THx	⊗	⊗	DSI-THx	
Potentiometer	⊗	⊗	⊗	⊗	✓	
LVDT	⊗	DSI-LVDT	⊗	⊗	DSI-LVDT	
Charge	⊗	DSI-CHGx	⊗	100 k, 10 k pC	DSI-CHGx	
Current	⊗	ext. shunt, DSI-xxA, current sensor	⊗	external shunt, current sensor	ext. shunt, DSI-xxA, current sensor	ext. s cu
TEDS	⊗	⊗	✓	✓	✓	
Isolation voltage	CATII 1000 V	1000 V	1000 V	1000 V	1000 V	

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

IN THESE TABLES:

Modules whose primary function is to measure the measurement type sh
Modules that natively support the signal/sensor type in that row are colo
Modules that support the signal/sensor type via DSI series (or other) ada

16

◭ DAQ SYSTEMS - SIRIUS®

MODULAR. ISOLATED. HIGH PERFORMANCE.

SIRIUS® is our flagship series of data acquisition systems. At the heart of every SIRIUS system are the "slices" - multichannel modules that contain up to 8 (or 16 high density) isolated inputs, which can be all the same or a variety of input types. SIRIUS systems are available in a wide variety of form factors, including:

SIRIUS® MODULAR
Rugged slices with 8 or 16 measurement modules. This solution is very flexible because you can use each slice independently or combine multiple slices for a single measurement. The slices connect back to your computer running Dewesoft X software. Available in Dual-CoreADC®, HD, HS, and XHS modules.

SIRIUS® INSTRUMENTS
Portable and rugged all-in-one solutions including S-BOX computer, display and optional hot-swappable battery power, with 1, 2, 4, or 8 measurement slices. Up to 128 analog channels per instrument. Including DewesoftX software. Accepts all DualCoreADC®, HD, and HS modules.

SIRIUS® RACK
19" rack-mounting solution for up to 3 measurement slices (up to 48 analog channels) with integrated, easy to upgrade computer and DewesoftX software. Optional display is available. Accepts all DualCoreADC®, HD, and HS modules.

DAQ SYSTEMS - SIRIUS®

SIRIUS DualCoreADC

The classic SIRIUS platform is based on our breakthrough DualCoreADC® technology. We solved the problem of selecting the wrong range by using two ADCs in parallel: one set to a high range and another set to a lower one. The best output is chosen in real-time. The result? Incredible dynamic range up to 160 dB. With its 24-bit delta-sigma ADCs, 8-channel Sirius DualCoreADC modules are ideal for sound and vibration and a huge array of applications.

- Highest dyamic range
- 8 channels per slice
- Two 24-bit delta-sigma ADCs/channel
- Great for thousands of applications

SIRIUS HD (HIGH DENSITY)

When you need as many channels as you can get, SIRIUS HD modules provide 16 of them in the same size package. A single 24-bit delta-sigma ADC is used for each channel. Channels are isolated in pairs, so they are isolated from all other channels in the module. HD amplifiers are available for strain gage, universal inputs, low voltage, and IEPE accelerometers. Also includes EtherCAT interface, just like the SIRIUS DualCoreADC platform.

- Highest channel count
- 16 channels per slice
- One 24-bit delta-sigma ADC/channel)
- For high channel count applications

SIRIUS HS (HIGH SPEED)

There are two reasons to opt for the HS platform: first, you might need more bandwidth than DualCoreADC and HD provide. With 1 MS/s sampling on all channels, HS provides 500 kHz bandwidth. Second, if you are working primarily with impulse signals like spikes and square waves, the 16-bit SAR ADCs used by SIRIUS HS are resistant to hysteresis (over-shoot). HS amplifiers are available for strain, high/low voltage, charge, and IEPE.

- 1 MS/s sample rate
- 8 channels per slice
- One 16-bit SAR ADCs/channel)
- Great for impulse signals, square waves

SIRIUS XHS (EXTRA HIGH SPEED)

HybridADC technology combines all the advantages of the DualCoreADC and HS to create a true breakthrough platform. Yes, you can have great dynamic range and 24-bit resolution all the way to 1 MS/s, but you can keep turning up the speed - all the way to 15 MS/s with 16-bit resolution and 5 MHz bandwidth! You can set each channel independently, any way that you want. Includes more new features like PTP_V2 synchronization, USB 3.0, and more.

- 15 MS/s sample rate
- 8 channels per slice
- Switchable 16/24-bit resolution
- Our overall most powerful platform

SIRIUS SBOX
Rugged Computer Platforms

Of course, you can use your computer to connect to one or more SIRIUS modular slices, but for a more robust solution, we offer the SBOX. This is a powerful PC built into a rugged aluminum SIRIUS-like chassis. With Intel® Core™ processor and removable SSD drive. Includes EtherCAT®, USB 3.0, USB 2.0 and SIRIUS sync ports. In addition to the standard SBOX we also offer:

- SBOXwe – IP67 rated WATERPROOF version, made to get wet! Waterproof SIRIUS slices are also available.
- SBOXfe – IP50 rated FANLESS version, ideal for testing in dust-heavy environments.

SBOX easily attaches to your SIRIUS module(s) using built-in clips. Or you can run it mechanically disconnected, at your option.

VIDEO CAMERAS
DS-CAM models

You can connect our DS-CAM synchronizable GigE cameras to your Dewesoft DAQ system and add video to your recordings. DS-CAMs offer high-speed video with up to 333 fps at full HD, or up to 600 fps at lower resolutions. They have onboard, real-time JPEG compression for streaming directly to the computer's hard drive. Up to eight cameras can be used at the same time.

- DS-CAM-88 – 88 fps @ 640x480 / 289 fps @ 160x120
- DS-CAM-120 – 120 fps @ 640x480
- DS-CAM-175 – 68 fps @ 1456x1088 / 178 fps @ 640x480
- DS-CAM-320 – 266 fps @ 728x544 / 328 fps @ 640x480
- DS-CAM-600 – 334 fps @ 2048x1080 / 600 fps @ 800x600

DS-CAM sychronizable video camera.

⚠ RUGGED DAQ SYSTEMS - KRYPTON®

RUGGED. MADE FOR HARSH ENVIRONMENTS

Typical DAQ systems are not made for high shock & vibration, or sub-freezing environments. But have a solution for you: KRYPTON, our ULTRA RUGGED and distributable DAQ series. You can distribute them close to the sensors, even in the worst environments. Not only can they survive in -40 to +85 °C environments, they can operate perfectly and make great measurements. They are interconnected via a single cable, with up to 100 meters (328 ft.) between devices. This one cable provides power, synchronization, and sends the data back to your computer, or one of our ruggedized KRYPTON CPU computers (-40 to 70 °C operating environment). KRYPTONs are built to IP67 standards: they're dust-proof, waterproof, and 100 g shock and vibration resistant.

KRYPTON CPU ALSO AVAILABLE

KRYPTON modules can be connected to your computer, where the included DewesoftX software can be installed to complete the system. But what if you need a computer that can also survive in harsh environments? For these applications, we offer the KRYPTON CPU. Besides being designed from the ground up to work with KRYPTON modules, this Quad-Core computer is fully IP67 waterproof, dustproof, and can withstand shocks up to 100 g. It operates from -40° to 70 °C, and has all the interfaces you need.

AND FOR THE ULTIMATE IN MODULARITY...

Tiny KRYPTON 1 modules distribute your measurements down to a single channel! You simply can't get more modular than that. Place your KRYPTON 1 module right next to the sensor, even in terrible environments like on a running engine, in water, at -40 °C/F ... or in high shock and vibration areas.

RUGGED DAQ SYSTEMS - KRYPTON®

KRYPTON MULTI

Multi-channel KRYPTON modules are available for voltage, current, strain, thermocouples, RTDs, IEPE sensors and digital I/O. And by adding our DSI adapters to several of these modules, we can add charge sensors and ±200 V inputs to the list, too. Krypton's legendary interconnectivity takes full advantage of the EtherCAT interface. You can locate your KRYPTON modules where you need them, easily daisy-chaining from module to module.

- 3, 4, 6, 8, and 16 channel modules.
- Modules/adapters for every sensor
- 24-bit delta-sigma 20 kS/s sampling
- EtherCAT interconnectivity

KRYPTON ONE

2019 NASA TECH BRIEFS Product of the Year Award Winner KRYPTON ONE analog modules are small enough for you to hold in the palm of your hand, but they offer the same high performance as their multi-channel brothers and sisters. We offer KRYPTON ONE modules for voltage, current, strain, IEPE, thermocouple, RTD – as well as digital IO modules and a digital counter module that handles encoders, tacho, and RPM sensors.

- Ultimate modularity
- Analog modules for every sensor
- 24-bit delta-sigma 40 kS/s sampling
- EtherCAT interconnectivity

KRYPTON CPU
Rugged Computer Module

If you need a computer with the same environmental specifications as our KRYPTON modules, we've got you covered. KRYPTON CPU is a powerful PC built into a rugged aluminum chassis. Everything is sealed inside, and the outside is built with shock absorbers. With Intel® Core™ processor and removable SSD drive. Includes EtherCAT®, 3 x USB 2.0m GLAN and DVI-D video port.

- -40 to 70°C operating range (-40 °F to 158 °F)
- Sealed to IP67 – waterproof, dustproof
- Internal SSD
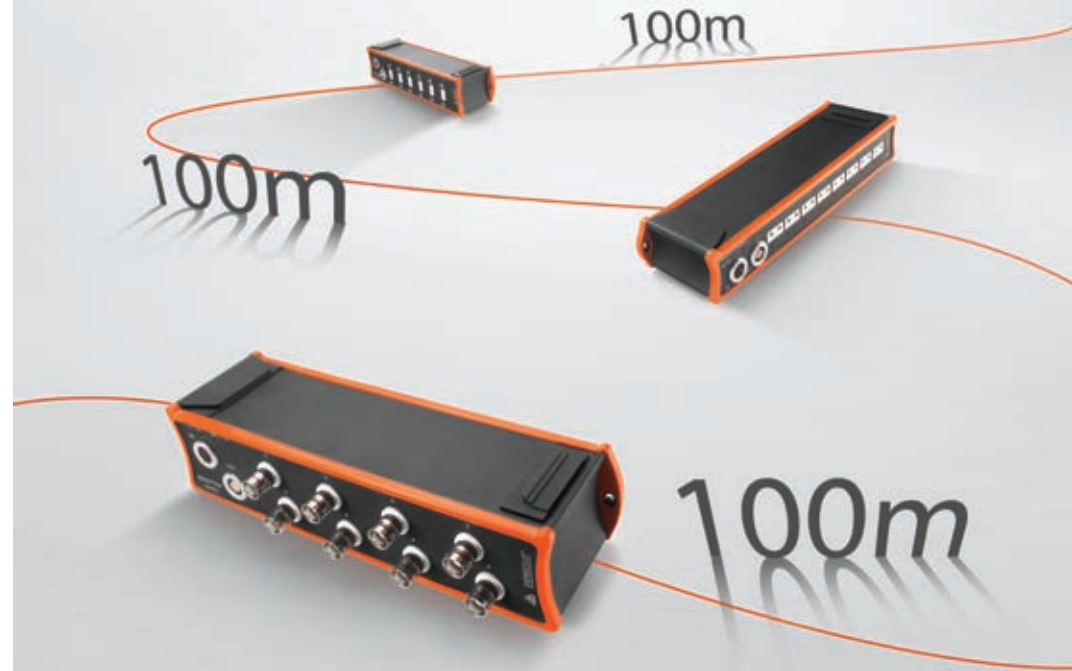- 100 g shock rating
- Weighs only 1 kg (2.2 lbs.)

KRYPTON CPU

KRYPTON CPU stacked on top of several multi modules

ETHERCAT CONNECTIVITY

KRYPTON data acquisition systems use a 100 Mbit datalink based on EtherCAT® technology. This fast data bus allows many KRYPTON units to be daisy-chained in a single measurement chain. At the end of the chain, an RJ45 cable connects to the Ethernet port of ordinary Windows® computers, or to the more robust 8-pin LEMO connector one of our ruggedized computers, such as KRYPTON CPU, SBOX, R2DB, R4 or R8.

EtherCAT brings another big advantage – zero configuration. KRYPTON devices do not require any complex IP setup; simply daisy-chain them along with a PC, and DewesoftX software will recognize and automatically set up everything on the DAQ network. That's convenience.

A single cable carries data, power, and synchronization. Each cable can be up to 100 meters (328 feet) from module-to-module to from module to the PC.

KRYPTON DAQ modules can also be combined and synchronized with our fast USB DAQ devices like SIRIUS, MINITAURs, and DEWE-43A. An EtherCAT Sync Junction provides a clock source for synchronization. External timing sources like GPS or IRIG can also be connected to sync the system to absolute time.

◮ DAQ & CONTROL SYSTEMS - IOLITE®

REAL-TIME CONTROL AND DATA ACQUISITION COMBINED

In industrial data acquisition, it is often required to have a control system, like a PLC (Programmable Logic Controller). PLCs have the ability to record data, but not very fast. So a separate data acquisition system must be used for dynamic data. The problem has always been that these two worlds were separate and hard to connect. Dewesoft IOLITE is the missing link between control and faster data acquisition.

IOLITE features great signal conditioning amplifiers that provide excellent signal quality and sample rates up to 20 kHz (IOLITE One samples up to 40 kHz). For control, IOLITE uses two EtherCAT® buses in parallel. The EtherCAT primary bus is used for full-speed buffered data acquisition to a computer. The EtherCAT secondary bus is mainly used for real-time data to any 3rd party control system.

IOLITE® R8 AND R8R

SIRIUS style chassis with up to eight slots, dual EtherCAT® interfaces, and redundant power supplies.

IOLITE® LX-R8

IOLITE® R12

19" RACK version with up to twelve slots, dual EtherCAT® interface, and redundant power supply.

DAQ & CONTROL SYSTEMS - IOLITE®

IOLITE R8 AND R12

The original IOLITE platform is the ideal combination of DAQ and real-time control. The primary EtherCAT bus is used for full-speed buffered data acquisition to a computer hard-drive. The secondary bus is used for a real-time low-latency data feed to any third-party EtherCAT-based control system. The rack-mounting R12 chassis holds up to 12 multi-channel IOLITE modules. The R8 chassis is field portable, with slots for 8 multi-channel modules.

- Dual redundant EtherCAT busses
- Redundant power supply
- Complete line of signal conditioning
- 20 kHz rate on dynamic channels

IOLITE LX

IOLITE LX is an embedded data acquisition system based on a low-power ARM processor with a Linux-based open architecture. IOLITE LX can act as a stand-alone data logger, real-time control system, and signal conditioning front-end, all at the same time. It includes dual EtherCAT interfaces and 8 slots for multi-channel modules. The onboard Dewesoft RT real-time operating system runs everything flawlessly.

- Stand-alone and remote operation
- Embedded ARM processor & LINUX OS
- 8 slots for multi-channel modules
- 20 kHz rate on dynamic channels

IOLITE DISTRIBUTED

There are multichannel IOLITE modules that are designed for DIN rail mounting, as well as single-channel IOLITE modules that you can mount anywhere - and everywhere. These modules represent the ultimate modularity. IOLITE DISTRIBUTED devices are standard EtherCAT slave devices that are compatible with any EtherCAT master controller. With DewesoftX software, retransmit functionality ensures that no samples can be lost during measurement.

- Distributable like never before
- Multi- and single-channel modules
- DIN rail mounting
- Ideal for Machine Condition Monitoring

SIRIUS RT (R8, R4, AND R2)

SIRIUS RT DAQ systems can perform high-speed buffered data acquisition and feed real-time data to any third-party EtherCAT master, like Beckoff, MTS FlexTest, Syclone Clemessy, Labview, and others. They use our standard SIRIUS modules (DualCore, HD and HS series), for up to 128 analog channels, plus up to 16 counter/encoder or 192 digital input channels. This is the merger of high-end DAQ with real-time control via Dual Mode EtherCAT interfaces.

- Highest dynamic range modules
- Up to 128 analog channels
- Dual Mode EtherCAT interfaces
- 2, 4, and 8 slot models available

Until IOLITE, the worlds of data acquisition and control were completely disconnected.

PLC systems were made for real-time processes, and lacked high-performance data acquisition. DAQ systems were made for performance but without any real-time control capabilities.

Today, IOLITE combines the worlds of real-time control and high-performance data acquisition in one elegant EtherCAT-based system. It is absolutely unique on the market.

INTEGRATION WITH TEST BENCH REAL-TIME CONTROLLERS

Traditionally you need to purchase and configure additional control system I/O's to bring data from analog sensors and data acquisition systems to the test bench controllers. But with SIRIUS RT systems this is done faster, cheaper, and also much more accurately.

SIRIUS RT systems feed data to the test bench controller in real-time over one cable via EtherCAT. This completely removes the need for traditional control system I/Os, bulky analog cabling, and overly complex configurations.

▲ HANDHELD DAQ SYSTEM - DEWE-43A

We would be remiss not to include the trusty DEWE-43A in this catalog. This handheld DAQ system features 8 universal analog inputs which can be used directly for low voltages and full-bridge measurement. DSI series adapters allow each input to handle IEPE and charge accelerometers, thermocouples, RTDs, and more.

Each analog channel has a SuperCounter®, which can be used with encoders, gear tooth and tacho sensors. In addition, the system includes two isolated CAN bus interfaces. Simply connect the DEWE-43A to your Win-

dows® computer via USB, install DewesoftX software, and you're ready to get to work. The system is powered by a wide-ranging 9 to 36 VDC power, so it can be used in cars, trucks, airplanes – you name it. It also includes an external AC/DC adapter, similar to one provided with a notebook computer, so that you can power it from worldwide AC, too.

Built-in SYNC ports allow you to sync multiple units together, as well as to synchronize this unit with other Dewesoft instruments like SIRIUS, KRYPTON, and more.
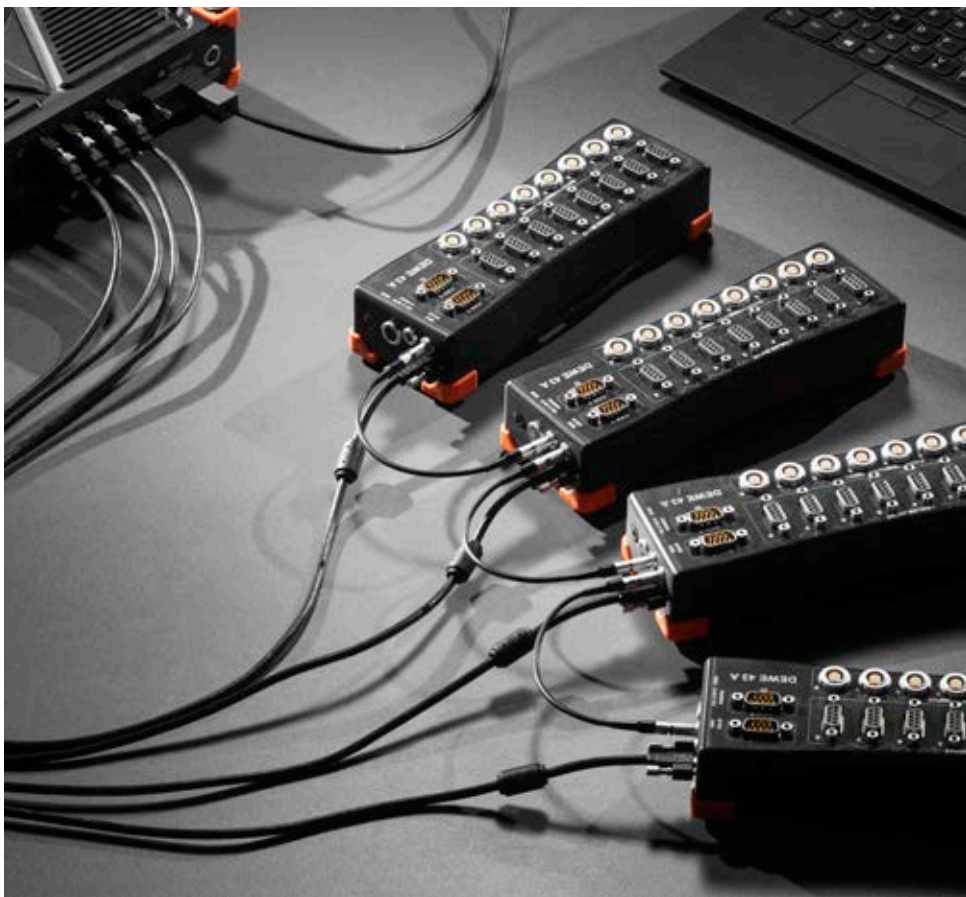
KEY DEWE-43A FACTS

- Each analog input is based on a 24-bit sigma-delta ADC with anti-aliasing filtering and up to 200 kS/s sample rate.
- All channels (analog, digital, and CAN) are synchronized with each other < 1 μs
- The power supply and CAN bus interfaces are galvanically isolated, eliminating ground loops
- Includes two high-speed CAN 2.0b interfaces with 1 Mbit/sec data throughput.
- Both CAN interfaces offer additional support for CCP, OBDII, J1939, and CAN output.
- Includes DewesoftX, the best overall DAQ software in the world
- The DEWE-43A won the Product of the Year award from NASA Tech Briefs magazine

Highly portable DAQ system

	DEWE-43A
ANALOG INPUTS	
Analog Connectors	DB9, female
#ch per system	8
Data rate / channel	200 kS/s (max)
Resolution	24-bit
Bandwidth	70 kHz
Voltage ranges	±10 V, ±1 V, ±100 mV, ±10 mV
Input type	Voltage and full bridge, selectable
Sensor excitation	±5 V ±0.1 % bridge sensor supply, 70 mA max.
Bridge connection	Full bridge
DSI compatibility	All DSI adapters are supported, including: IEPE, CHGx, THx, LVDT, V200, xxA
Bridge completion	1/4 and 1/2 bridge completion adapters available
Input protection	Differential with ±70V over-voltage protection
COUNTERS	
Counter inputs	8 counters/24 digital input, fully synchronized with analog inputs
Counter modes	Counting, waveform timing, encoder, tacho, geartooth sensor
Counter connectors	LEMO 7-pin connector
Input protection	±30 V continuous
CAN BUS	
Number of CAN bus ports	2
CAN type	CAN 2.0B, up to 1 MBit/sec
CAN applications	CCP, OBDII, J1939, CAN output
CAN connectors	DB9, male
Input protection	Galvanic isolation
GENERAL	
Power input	9 to 36 VDC, isolated External worldwide AC/DC adapter included
Interface to computer	USB 2.0. USB cable with locking connector included
Operating temperature	-20 °C to 60 °C (-4°F to 140°F)
Dimensions	225 x 80 x 45 mm (8.86 x 3.15 x 1.77 in.)
Weight	0.72 kg (1.59 lbs.)

DAQ SYSTEM - MINITAURs ◢

MINITAURs

Highly portable DAQ system
Includes built-in computer, SSD, and more

MINITAURs	
ANALOG INPUTS	
Analog Connectors	DB9, female
#ch per system	8
Data rate / channel	200 kS/s (max)
Resolution	24-bit Dual Core™ inputs
Bandwidth	70 kHz
Voltage ranges	±10 V, ±1 V, ±100 mV, ±10 mV
Input type	Voltage and bridge, selectable
Sensor excitation	0 to 12V programmable, 44 mA max.
DSI compatibility	All DSI adapters are supported, including: IEPE, CHGx, THx, LVDT, V200, xxA
Bridge modes	Full, ½, ¼ bridge @ 120, 350 Ω, (3-wire)
Internal shunt resistor	100 kΩ, bipolar to exc+ or exc-
Input protection	Differential with ±50V continuous protection
COUNTERS	
Counter inputs	8 counters/24 digital input, fully synchronized with analog inputs
Counter modes	Counting, waveform timing, encoder, tacho, geartooth sensor
Counter connectors	LEMO 7-pin connector
Input protection	±25 V continuous
CAN BUS	
Number of CAN bus ports	One port, DB9 connector, male
CAN type	CAN 2.0B, up to 1 MBit/sec
CAN applications	CCP, OBDII, J1939, CAN output
GENERAL	
Built-in computer	Intel® Core™ i3, 2x 2.1 GHz base, 4 threads
Computer RAM	4 GB (up to 16 GB optional)
Computer Storage	250 GB removable SATA SSD
Power input	9 to 36 VDC, isolated ; External worldwide AC/DC adapter included
Interfaces	DVI-D, 4x USB 3.0, 2x USB 2.0, 2x GLAN, WLAN, EtherCAT® 100 Mbps Full Duplex, 2x SYNC
Operating temperature	-10 °C to 50 °C (-14 °F to 122 °F)
Dimensions	266 x 139 x 109 mm (10.47 x 5.47 x 4.29 in.)
Weight	3.0 kg (6.61 lbs.)

The all-in-one MINITAURs packs DAQ power and a computer into one compact chassis. It's similar to the DEWE-43A shown on the opposite page, except that we upgraded the analog inputs to our DualCore ADCs, and added a powerful Intel Core i3 CPU computer, a removable solid-state hard drive, WiFi, two LAN ports, four USB 3.0 and two USB 2.0 ports, an EtherCAT master port, and an optional 10 Hz or 100 Hz GPS receiver. We offer rugged displays for automotive and field applications, or you can plug in an regular display when you're back at the office.

Each analog channel has a SuperCounter®, which can be used with encoders, gear tooth and tacho sensors. In addition, the system includes an isolated high-speed CAN BUS interface.

A display is not needed for operation. You can start the logging and remove the display – or control it remotely via DS-NET software via LAN or WiFi.

The operating system, DewesoftX, and your data are stored on the removable 250 GB SATA drive. This drive can be upgraded to a 1 TB drive if you need more space.

KEY MINITAURs FACTS

- Each of the eight analog inputs can be used for bridge measurements or voltage inputs
- Inputs feature our DualCore® 24-bit sigma-delta ADCs with anti-aliasing filtering and sample rates up to 200 kS/s per channel
- Each of the eight counter inputs can alternatively be used as three digital inputs
- Includes a high-speed CAN bus interface that supports CAN 2.0 protocol, CCP, OBDII, J1939, and CAN output messages
- All channels (analog, digital, and CAN) are synchronized with each other < 1 µs
- The power supply and CAN bus interfaces are galvanically isolated, eliminating ground loops
- Includes DewesoftX, the best overall DAQ software in the world

You can connect an office type display using the DVI-D interface on the back, or one of our rugged DS-DISP models for mobile and fieldwork applications.

⚠ MEASURING VOLTAGE

Voltage is one of the most often recorded signals. It takes several basic forms: alternating current (AC) and direct current (DC). In addition, you sometimes need to measure very tiny voltages, i.e., in the microvolt range – or up to the thousands of volts. A voltage pre-amplifier with multiple input ranges is needed to convert these widely different signal levels to a normalized output that can be digitized. Sometimes a tiny voltage is riding on top of a large DC offset, which is yet another challenge that many measuring systems have trouble with.

KEY CHALLENGES AND SOLUTIONS

SIGNAL OVERLOAD / OVERMODULATION

When signal levels are higher than expected, they get "clipped" by any ADC, resulting in wrong measurements. This means you have to do the test all over again. Dewesoft's unique DualCoreADC® technology prevents this problem. How? Each channel has two ADC's that measure the input signal at two different gains. If a signal goes out of bounds, the lower gain version is switched in automatically in real-time.

DualCoreADC® TECHNOLOGY

It achieves more than 130 dB signal-to-noise ratio and more than 160 dB dynamic range. This is 20 times better than 24-bit systems and with 20 times less noise.

COMMON-MODE PROBLEMS

"Noise" on the signals is one of the most common problems in data acquisition. There are a variety of causes, including proximity to other devices that are generating electromagnetic fields, wiring problems, and more.

Dewesoft's isolated inputs are the best overall solution to noise and interference of the signal. We provide high galvanic channel-to-channel and channel-to-ground isolation, including the sensor excitation and other lines as well, so that noise has no way into the signal chain. High isolation also means that you can measure high voltage potentials or common-mode voltages, where a smaller signal is "riding" on top of a large DC offset. Non-isolated differential inputs are also a good approach, but their common-mode voltage is lower than a galvanically isolated input.
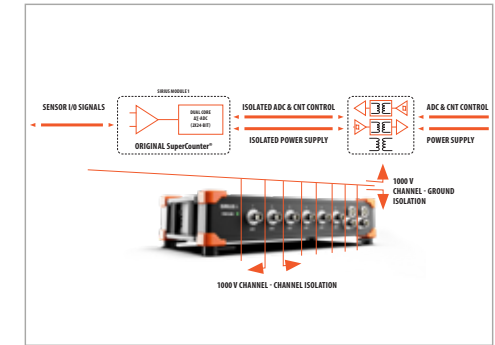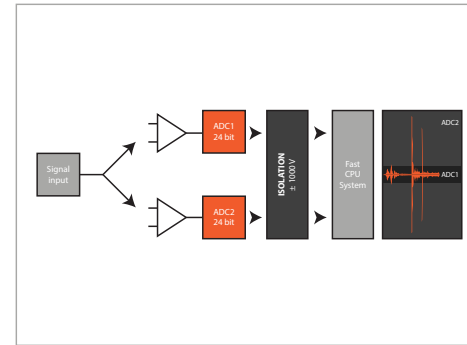
ALIASING

Let's say your voltage is a 10 kHz sine wave, but you only take one sample from it every second. Obviously, the resulting recording is going to be completely wrong. Between each sample that you take, 10,000 sine waves will have gone by. The resulting signal will look like a waveshape, but it will be a false, or "alias" of the actual signal. It is dangerous because you get something that looks like a signal, but of course, it's wrong. The most important thing to know is that it's impossible to remove aliasing once it has been recorded. It must be prevented from happening before the digitizing process. How? Either by sampling much faster than the signal will ever go (which is often nei-

ther practical nor possible) or with anti-aliasing filtering at the input.

Dewesoft's powerful ADC technology with on-board, automatic anti-aliasing filtering is the best way to prevent aliasing.

MEASURING VOLTAGE

VOLTAGE TYPES

There are several different types of voltages such as peak, peak-to-peak, average, RMS, and AC or DC voltage. See the difference between them in the graphic below.

The average voltage is, as the name already states, the average value for a certain period. For pure sinusoidal signals, the average will be zero.

The RMS (root-mean-square) voltage is the square root of the arithmetic mean of the squared function values that define the continuous waveform. It is the most commonly used

value to define the AC voltage at a certain point and produces the same energy as the DC voltage at an ohmic load.

The peak voltage describes the highest voltage in a period. In the datasheet specifications, the peak voltage or the DC voltage of an input is given which means the same. To calculate the RMS value for sine waves, the peak value has to be divided by the square root of 2.

The peak-to-peak ratio shows the amplitude of positive and negative peaks in a period.

The Crest Factor is the peak amplitude divided by the RMS value of the waveform.
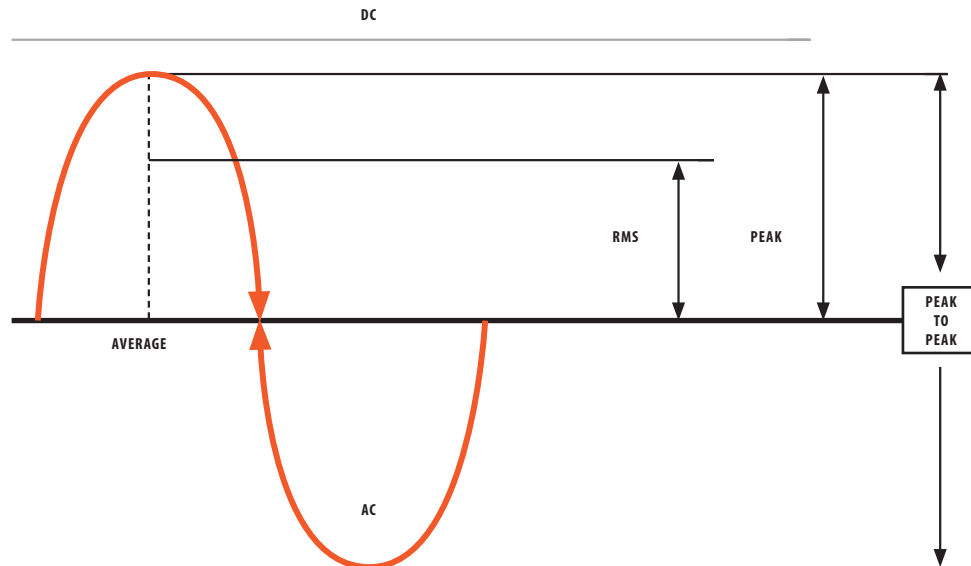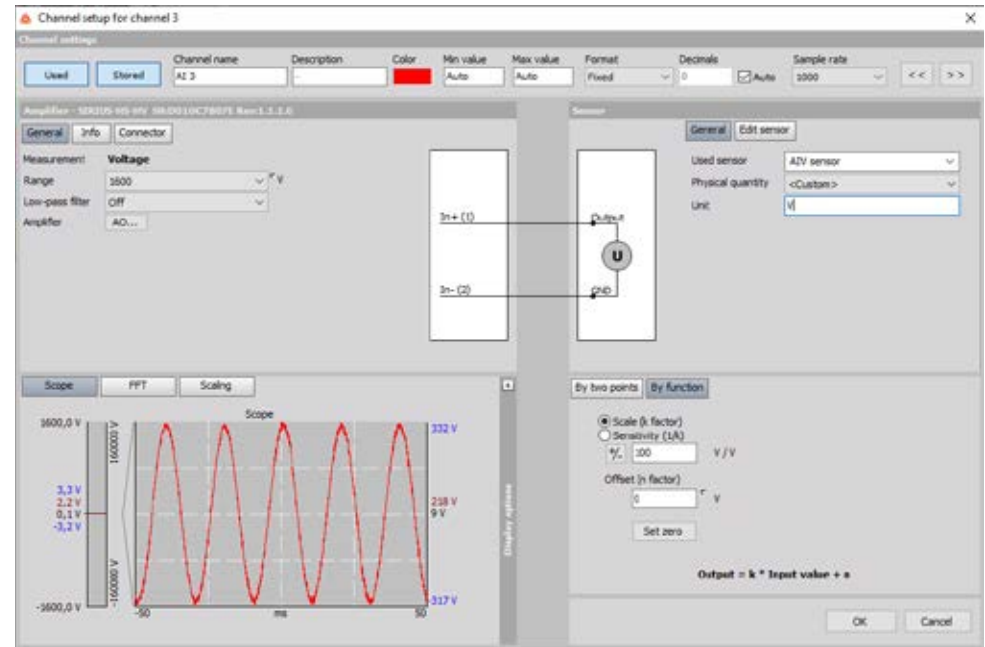
ABOVE: TYPICAL SETUP OF A HIGH VOLTAGE AMP IN DEWESOFTX SOFTWARE, USING A SIRIUS HV AMPLIFIER. THE TOP PART OF THE SCREEN HAS THE SENSOR/RANGE SETUP.

The bottom left of the above screenshot shows the signal in real-time - you see that the RMS and peak-to-peak values of the sine wave. We're using a 100:1 potentiometric transducer (labeled "AIV sensor" in the top right), so a scale of 100 is entered on the bottom right

side of the screen - so our ±1600 V range is in effect a ±16,000 V range. The scaling factor is applied automatically, and you will see the actual measured voltage level everywhere in the software.

But everything is flexible in DewesoftX software. So let's say that you accidentally typed in a wrong scaling value for your external high-voltage transducer of potentiometric transformer – you can correct it, even after recording!

⚠ MEASURING POWER

THE DEWESOFT POWER ANALYZER

We combined our SIRIUS DAQ systems with DewesoftX software to create the perfect solution for power measurement. Our innovative DAQ instruments for power analysis and power quality provide 0.03% accuracy for high voltage and AC/DC current measurement. Dewesoft Power Analyzers feature power quality, measuring parameters according to IEC 61000-4-30 Class A.

Dewesoft power and power quality analyzers can be used for any power-based test and measurement application. Flexible, robust, and highly accurate DAQ hardware with easy-to-use DAQ software form innovative power and power quality analysis never experienced before.

The Dewesoft Power Analyzer is not only the smallest in the world, but it's also the most powerful one. The flexible hardware platform combined with powerful software features gives unique testing possibilities for any kind of electrical measurement.

Our instruments are much more than just standard power meters. A wide range of extra supported inputs for temperature, vibration, strain, load sensors, as well as support for digital interfaces like counters, encoders, CAN, CAN FD, GPS/GNSS, Inertial Navigation, and video offer a perfect data recording and analysis solution for electric and hybrid vehicle testing, batteries, and other electrical components. All of this data, regardless of its source or rate, is fully synchronized.
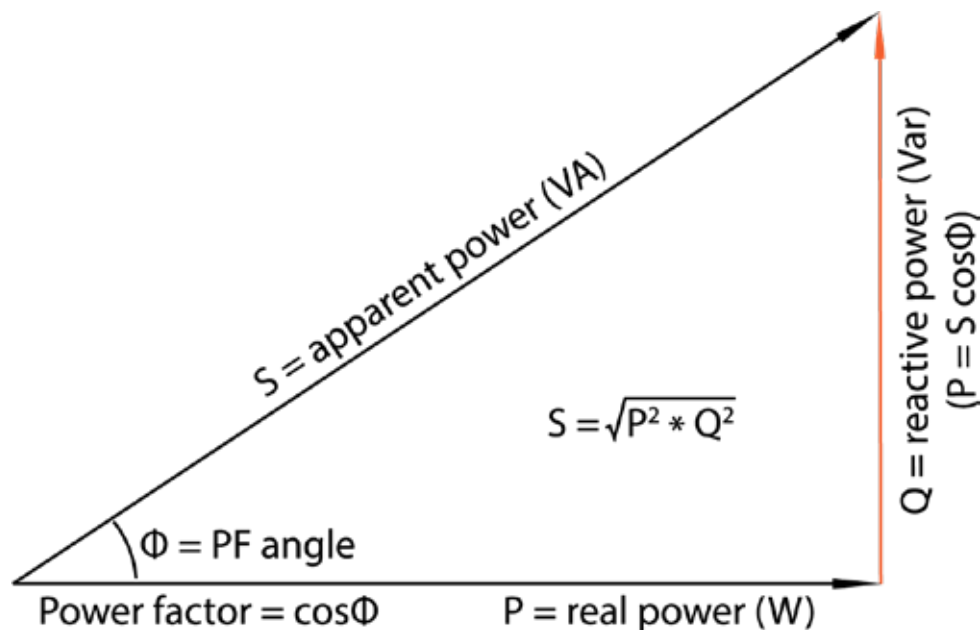
THREE TYPES OF POWER

There are three types of power in alternating current (AC) electrical systems to be measured. These are:

- Active power (P)
- Reactive power (Q)
- Apparent power (S)

The power triangle is a handy tool to illustrate the relationship between the types of power - see graphic bottom left.

Active power (P) also known as "real power" or "active power" is the useful power that is used within the AC circuit.

Reactive power (Q) is not used but is transported between the source such as a power station and the load, it is mainly used to transport the active power through the electrical system.

Apparent power (S) is the vector sum of active and reactive power in an AC power system.

The Power factor (PF or cos phi or φ) is an indication of the amount of active power that is present in the transmission line compared to the apparent power that combines both the active and reactive power. In other words, it is the factor by which the useful power in the transmission line is less than the maximum power theoretically possible. Reductions in the theoretically ideal power factor are caused by the voltage and current being out of phase. PF is therefore the ratio between active and apparent power and can take on values between 1 and -1.

If you'd like to learn more about this topic, please visit:
https://dewesoft.com/daq/what-is-power-analysis

WHAT IS POWER ANALYSIS?

Power is the rate of doing work, i.e., the amount of energy consumed per unit of time. The power of an electrical system is the multiplication of the voltage with the current, integrated over and then divided through the periodic time. To calculate the power of an electrical system the periodic time - the reciprocal of the frequency - must be known." Power analysis" is simply the method by which power is tested and studied, typically using a power analyzer.

WHAT IS A POWER ANALYZER?

A power analyzer is an instrument that measures and quantifies the rate of power flow in electrical systems. Power flow is expressed in Joules/second (J/s) or kilowatt-per-hour (kW/h). Electrical power is the rate per unit of time that electrical energy is transferred between two points in an electrical system.

$$S = \text{apparent power (VA)}$$
$$S = \sqrt{P^2 * Q^2}$$
$$Q = \text{reactive power (Var)} \quad (P = S \cos\Phi)$$
$$\Phi = \text{PF angle}$$
$$\text{Power factor} = \cos\Phi$$
$$P = \text{real power (W)}$$

MEASURING POWER

APPLICATIONS IN POWER MEASUREMENT

POWER ANALYSIS
FOR ALL KINDS OF ELECTRICAL MEASUREMENTS
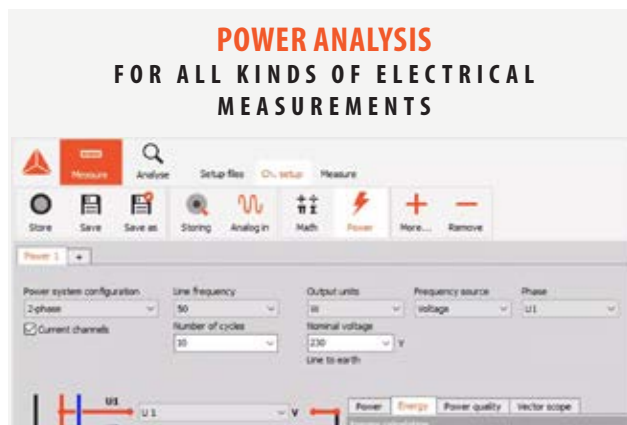
Dewesoft power analyzers calculate more than 100 power parameters such as P, Q, S, PF, cos phi, and many others. They provide full raw data recording capabilities, oscilloscope, FFT, harmonics, and more. All these calculations can be done online or after recording.

- Direct input and acquisition of high voltage signals ±2000 V, 1600 V DC/CAT II 1000 V/CAT III 600 V with high galvanic channel-to-channel isolation.
- SIRIUS XHS amplifiers provide up to 15 MS/s sampling rate and 5 MHz bandwidth per channel.

Learn more:
https://dewesoft.com/applications/power-and-energy/power-analyzer

POWER QUALITY
ACCORDING TO INTERNATIONAL STANDARDS

Dewesoft power quality analyzers measure all power quality parameters according to IEC 61000-4-30 Class A. You can measure up to the 150th harmonics plus interharmonics. Raw data storing, behavior at faults, calculation of additional parameters, etc.

- All measurements are performed according to IEC-61000-4-7 standards.
- Fast visual displays for FFT, Harmonic FFT, Waterfall FFT in addition to scope, recorder, digital, and meters.
- Flicker according to IEC-61400-4-15 and IEC-61400-21.

Learn more:
https://dewesoft.com/applications/power-and-energy/power-quality-analyzer

E-MOBILITY TESTER
FOR ELECTRIC VEHICLE TESTING
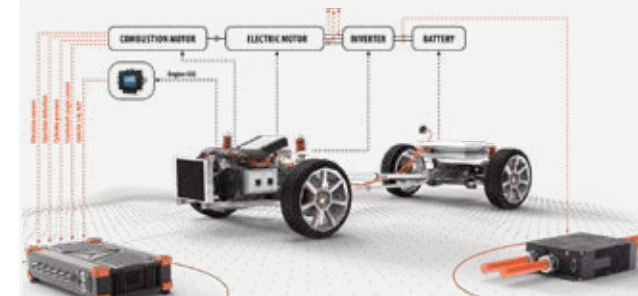
Dewesoft e-mobility testers are made for electric and hybrid vehicle testing in the development, validation, and production phase. They perform electric motor and inverter testing, battery and battery charge testing, combustion analysis, hydrogen engine testing, and more.

- Calculate more than 100 power parameters like P, Q, S, PF, cos phi φ, and many others
- Also measure CAN, XCP, FlexRay, video or GPS – fully synchronized with the voltage, current, and other sensor data

Learn more:
https://dewesoft.com/applications/power-and-energy/e-mobility

VOLTAGE MEASUREMENT - SIRIUS®

SIRIUS DUAL CORE

DualCoreADC® technology: dual 24-bit delta-sigma ADC's with anti-aliasing filtering. 160 dB of dynamic range. 200 kS/s sample rate. 8 channel modules.

	HV	LV	ACC	CHG	MULTI	UNI	STG	STGMw
Connectors	BANANA	DB9, BNC, BANANA	BNC, TNC	BNC, TNC	DSUB-15, L2B16f	DB9, L2B10f	DB9, L2B7f, L2B10f	DB9, L2B7f, L2B10f
Channels per slice	8	8	8	8	8	8	8	8
Data rate / channel	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s
Resolution	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore
Bandwidth	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz
Voltage ranges	±1200 V, ±50 V	±200 V, ±10 V, ±1 V, ±100 mV	±10 V, ±500 mV	±10 V, ±500 mV	±10 V, ±1 V, ±100 mV, ±50 mV	±100 V, ±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±1 V, ±100 mV, ±50 mV	±10 V, ±1 V, ±100 mV, ±50 mV
Input coupling	DC	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.1 Hz, 1 Hz	DC, AC 0.1 Hz, 1 Hz, 10 Hz, 100 Hz	DC	DC, AC 0.3 Hz, 0.16 Hz (1, 3, 5, 10, 20 Hz SW)	DC, AC 1 Hz (3, 10 Hz SW)	DC
Sensor excitation	⊗	2 to 30 V bipolar, 0 to 24 V unipolar, max. 0.2 A / 2 W	(IEPE) 2, 4, 8, 12, 16, 20 mA	(IEPE) 4, 8, 12 mA	0 to 12 V max. 44 mA	0 to 20 V max. 0.8 W, 0 to 60 mA max. 0.5 W. IEPE 2 to 20 mA	0 to 20 V max. 0.8 W, 0 to 60 mA max 0.5 W	0 to 15 V max. 44 mA
Bridge connection	⊗	Full	⊗	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire, 4-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire, 4-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire
Programmable shunt	⊗	⊗	⊗	⊗	59.88 kΩ	59.88 kΩ 175 kΩ bipolar	59.88 kΩ, 175 kΩ bipolar	100 kΩ bipolar
IEPE input	⊗	DSI-ACC	✓	✓	DSI-ACC	✓	DSI-ACC	DSI-ACC
±200 Volt input	✓	✓	⊗	⊗	DSI-V200	DSI-V200	DSI-V200	DSI-V200
Resistance	⊗	⊗	⊗	⊗	⊗	✓	✓	⊗
Temperature (PTx)	⊗	DSI-RTD	⊗	⊗	DSI-RTD	✓	DSI-RTD	DSI-RTD
Thermocouple	⊗	DSI-THx	⊗	⊗	DSI-THx	DSI-THx	DSI-THx	DSI-THx
Potentiometer	⊗	⊗	⊗	⊗	✓	✓	✓	✓
LVDT	⊗	DSI-LVDT	⊗	⊗	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT
Charge	⊗	DSI-CHGx	⊗	100000, 10000 pC	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx
Current	⊗	ext. shunt, DSI-xxA, current sensor	⊗	external shunt, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor
TEDS	⊗	⊗	✓	✓	✓	✓	✓	✓
Isolation voltage	CATII 1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

IN THESE TABLES:

Modules whose primary function is to measure the measurement type shown at the top of the page are shaded in grey.
Modules that natively support the signal/sensor type in that row are colored in light orange.
Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

VOLTAGE MEASUREMENT - SIRIUS®

SIRUS HD
HIGH DENSITY

High density modules with 200 kS/s sample rate.
Ideal for high channel count applications.
16 channel modules.

SIRUS HS
HIGH SPEED

1 MS/s 16-bit SAR technology.
Alias-free filtering, ideal for transient recording.
8 channel modules.

SIRUS XHS
EXTRA HIGH SPEED

Our fastest and most advanced DAQ system.
15 MS/s sample rate and 5 MHz bandwidth.
8 channel modules.

HD-LV	HD-ACC	HD-STGS	HS-HV	HS-LV	HS-ACC	HS-CHG	HS-STG	XHS-HV	XHS-LV	XHS-ACC
DB9, BNC	BNC	DB9, L1B10f	BANANA	DB9, BNC, BANANA	BNC	BNC, TNC	DSUB-9	BANANA	DB9, BNC	BNC
16	16	16	8	8	8	8	8	8	8	8
200 kS/s	200 kS/s	200 kS/s	1 MS/s	1 MS/s	1 MS/s	1 MS/s	1 MS/s	15 MS/s	15 MS/s	15 MS/s
24-bit	24-bit	24-bit	16-bit	16-bit	16-bit	16-bit	16-bit	Up to 1 MS/s: 24 bit >1 MS/s: 16 bit	Up to 1 MS/s: 24 bit >1 MS/s: 16 bit	Up to 1 MS/s: 24 bit >1 MS/s: 16 bit
70 kHz	70 kHz	70 kHz	2 MHz	1 MHz	500 kHz	500 kHz	1 MHz	5 MHz	5 MHz	5 MHz
±100 V, ±10 V, ±1 V, ±100 mV	±10 V, ±5 V, ±1 V, ±200 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±1600 V to ±20 V	±100 V to ±50 mV	±10 V to ±100 mV	±10 V to ±100 mV	±50 V to ±20 mV	±2000 V to ±200 V	±100 V to ±50 mV	±10 V to ±200 V
DC	DC, AC 0.1 Hz, 1 Hz	DC	DC	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.1 Hz, 1 Hz, 10 Hz, 100 Hz	DC, AC 1 Hz (3, 10 Hz SW)	DC	DC, AC 1 Hz	DC, AC 0.1 Hz, AC 1 Hz
Bipolar 2 to 30 V, Unipolar 0 to 24, max. 0.2 A / 2 W	(IEPE) 4,8,12 mA	0 to 12 V max. 44 mA	⊗	2 to 30 V bipolar, 0 to 24 V unipolar, max. 0.2 A / 2 W	(IEPE) 4 mA, 8 mA	(IEPE) 4 mA, 8 mA, 12 mA	0 to 20 V max. 0.8 W, 0 to 60 mA max 0.5 W	⊗	Bipolar 2.5 to 30 V, Unipolar 2 to 24 V, max. 0.2 A / 2 W	(IEPE) 2, 4, 8, 12, 16, 20 mA
Full	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	⊗	Full	⊗	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3- & 4-wire	⊗	Full	⊗
⊗	⊗	100 kΩ	⊗	⊗	⊗	⊗	59.88 kΩ, 175 kΩ bipolar	⊗	⊗	⊗
DSI-ACC	✓	DSI-ACC	⊗	DSI-ACC	⊗	⊗	DSI-ACC	⊗	DSI-ACC	✓
⊗	⊗	DSI-V200	✓	⊗	⊗	⊗	DSI-V200	✓	DSI-V200	⊗
⊗	⊗	⊗	⊗	⊗	⊗	⊗	✓	⊗	⊗	⊗
DSI-RTD	⊗	DSI-RTD	⊗	DSI-RTD	⊗	⊗	✓	⊗	DSI-RTD	⊗
DSI-THx	⊗	DSI-THx	⊗	DSI-THx	⊗	⊗	DSI-THx	⊗	DSI-THx	⊗
⊗	⊗	✓	⊗	⊗	⊗	⊗	✓	⊗	⊗	⊗
DSI-LVDT	⊗	DSI-LVDT	⊗	DSI-LVDT	⊗	⊗	DSI-LVDT	⊗	DSI-LVDT	⊗
DSI-CHGx	⊗	DSI-CHGx	⊗	DSI-CHGx	⊗	1000 to 100000 pC	DSI-CHGx	⊗	DSI-CHGx	⊗
ext. shunt, DSI-xxA, current sensor	ext. shunt, current sensor	ext. shunt, DSI-xxA, current sensor	⊗	ext. shunt, DSI-xxA, current sensor	ext. shunt, current sensor	ext. shunt, current sensor	ext. shunt, DSI-xxA, current sensor	⊗	ext. shunt, DSI-xxA, current sensor	ext. shunt, current sensor
✓	✓	✓	⊗	✓	✓	✓	✓	⊗	✓	✓
500 V in pairs	500 V in pairs	500 V in pairs	CATII 1000 V	1000 V	1000 V	1000 V	1000 V	CATII 1000 V	1000 V	1000 V

THE MOST VERSATILE AND FLEXIBLE SIGNAL CONDITIONERS IN THE WORLD

Dewesoft modules are carefully engineered to handle a particular signal type. But that doesn't mean that they can't also be used for other signals, too. How?
The secret is our DSI series adapters. DSI adapters plug into a wide variety of modules, allowing them to handle just about every signal type you can think of.
See the table above for DSI adapter compatibility with various Dewesoft modules.

◢ VOLTAGE MEASUREMENT - KRYPTON®

KRYPTON MULTI

Multi-channel ruggedized modules for harsh environment testing applications.

KRYPTON 1

Single channel ruggedized modules for harsh environment testing applications.

	LV	STG	ACC	TH-HS	TH	RTD	HV	LV	ACC	STG	TH-HV
Connectors	BNC	DB9, L2B10f	BNC	Thermocouple	Thermocouple	L0B6f	Banana jack	BNC	BNC	DB9	K-type Thermocouple LEMO REDEL
#ch per module	4, 8	3, 6	4, 8	8	8	8	1	1	1	1	1
Data rate / channel	20 kS/s	20 kS/s	20 kS/s	10 kS/s	100 S/s	100 S/s	40 kS/s	40 kS/s	40 kS/s	40 kS/s	100 S/s
Resolution	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit
Bandwidth	0.49 fs	0.49 fs	0.49 fs	0.49*fs (max. 930 Hz)	--	--	0.49 fs	0.49 fs	0.49 fs	0.49 fs	0.49 fs
Voltage ranges	±50 V	±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±5 V, ±1 V, ±200 mV	±1 V, ±100 mV	±1 V, ±100 mV	±1 V, ±100 mV	±1000V	±50 V, ±10 V, ±1 V, ±100 mV	±50 V, ±10 V, ±1 V, ±100 mV	±50 V, ±10 V, ±1 V, ±100 mV	±1 V, ±100 mV
Input coupling	DC	DC	DC, AC 0.1 Hz, 1 Hz	DC	DC	DC	DC	DC, AC 1 Hz	DC, AC 0.1 Hz, 1 Hz	DC, AC 1 Hz	DC
Sensor excitation	⊗	0 to 15 V max. 0.4 W/ch (45 mA limit)	(IEPE) 4 mA, 8 mA	⊗	⊗	⊗	⊗	⊗	(IEPE) 4 mA, 8 mA	Unipolar 0 to 24 V, Bipolar 0 to 12 V	⊗
Bridge connection	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3 wire	⊗	⊗	⊗	⊗	⊗	⊗	⊗	Full, ½ and ¼ bridge strain, 3-wire	⊗
Programable shunt	⊗	100 kΩ	⊗	⊗	⊗	⊗	⊗	⊗	⊗	100 kΩ	⊗
IEPE input	⊗	DSI-ACC	✓	⊗	⊗	⊗	⊗	⊗	⊗	DSI-ACC	⊗
±200 Volt input	⊗	**DSI-V200**	⊗	⊗	⊗	⊗	⊗	⊗	⊗	**DSI-V200**	⊗
Resistance	⊗	⊗	⊗	⊗	⊗	10 kΩ	⊗	⊗	⊗	⊗	⊗
Temperature (PTx)	⊗	DSI-RTD	⊗	⊗	⊗	PT100, 200, 500, 1000, 2000	⊗	⊗	⊗	DSI-RTD	⊗
Thermocouple	⊗	DSI-THx	⊗	K, J, T, R, S, N, E, C, B	K, J, T, R, S, N, E, C, B	⊗	⊗	⊗	⊗	DSI-THx	⊗
Potentiometer	⊗	✓	⊗	⊗	⊗	⊗	⊗	⊗	⊗	✓	⊗
LVDT	⊗	DSI-LVDT	⊗	⊗	⊗	⊗	⊗	⊗	⊗	DSI-LVDT	⊗
Charge	⊗	DSI-CHGx	⊗	⊗	⊗	⊗	⊗	⊗	⊗	DSI-CHGx	⊗
Current	⊗	ext. shunt, DSI-xxA, current sensor	ext. shunt, current sensor	⊗	⊗	⊗	⊗	⊗	⊗	ext. shunt, DSI-xxA, current sensor	⊗
TEDS	⊗	✓	✓	⊗	⊗	⊗	⊗	⊗	⊗	✓	⊗
Isolation voltage	1000 V	Differential	Differential	1000 V	1000 V	1000 V	CAT III 600 V CAT II 1000 V	125 Vrms Isolation CH, GND	125 Vrms Isolation CH, GND	125 Vrms Isolation CH, GND	CAT III 600 V CAT II 1000 V

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

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VOLTAGE MEASUREMENT - KRYPTON®

IOLITE MULTI

Multi-channel IOLITE modules for DAQ and real-time control applications.

IOLITE SINGLE

Single channel IOLITE modules for DAQ and real-time control applications.

|	LV	LV	STG	TH-HS	TH	RTD	ACC	STG
Connectors	BNC, screw terminal	Terminal block	DSUB9	Thermocouple	Thermocouple	L0B6f, Terminal block	BNC	DSUB9
#ch per module	8	16	6	8	8	8	1	1
Data rate / channel	20 kS/sec	20 kS/sec	20 kS/s	10 kS/s	100 S/s	100 S/s	40 kS/s	40 kS/s
Resolution	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit
Bandwidth	0.49*fs	0.433*fs	0.49*fs	--	--	--	0.49*fs	0.49*fs
Voltage ranges	**±100 V, ±10 V (±10 V, ±1 V on request)**	**±200 V, ±10 V (±20 V, ±1 V on request)**	**±50 V, ±10 V, ±1 V, ±100 mV**	**±1 V, ±100 mV**	**±1 V, ±100 mV**	**±1 V, ±100 mV**	**±10 V, ±5 V, ±1 V, ±200 mV**	**±50 V, ±10 V, ±1 V, ±100 mV**
Input coupling	DC	DC	DC, AC 1 Hz	DC	DC	DC	DC, AC 0.1 Hz, 1 Hz	DC, AC 1 Hz
Sensor excitation	⊗	⊗	Bipolar 0 to 12 V, Unipolar 0 to 24 V Current 0 to 44 mA (max. 0.55 W/ch)	⊗	⊗	⊗	(IEPE) 4 mA, 8 mA	Unipolar 0 to 24 V, Bipolar 0 to 12 V
Bridge connection	⊗	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire	⊗	⊗	⊗	⊗	Full, ½ and ¼ bridge strain, 3-wire
Programmable shunt	⊗	⊗	100 kΩ	⊗	⊗	⊗	⊗	100 kΩ
IEPE input	⊗	⊗	DSI-ACC	⊗	⊗	⊗	✓	DSI-ACC
±200 Volt input	⊗	⊗	**DSI-V200**	⊗	⊗	⊗	⊗	**DSI-V200**
Temperature (PTx)	⊗	⊗	DSI-RTD	⊗	⊗	PT100, 200, 500, 1000, 2000	⊗	DSI-RTD
Thermocouple	⊗	⊗	DSI-THx	K, J, T, R, S, N, E, C, U, B	K, J, T, R, S, N, E, C, U, B	⊗	⊗	DSI-THx
Resistance	⊗	⊗	✓	⊗	⊗	1 kΩ, 10 kΩ	⊗	⊗
Potentiometer	⊗	⊗	✓	⊗	⊗	⊗	⊗	⊗
LVDT	⊗	⊗	DSI-LVDT	⊗	⊗	⊗	⊗	DSI-LVDT
Charge	⊗	⊗	DSI-CHGx	⊗	⊗	⊗	⊗	DSI-CHGx
Current	⊗	⊗	20 mA (internal shunt), DSI-xxA, current sensor	⊗	⊗	⊗	⊗	✓
TEDS	⊗	⊗	✓	⊗	⊗	⊗	✓	✓
Isolation voltage	450 V	250 V	Differential	1000 V	1000 V	1000 V	125 Vrms Isolation CH, GND	125 Vrms Isolation CH, GND

Left: IOLITE multi-channel modules provide a great price/performance ratio for the most demanding applicaitons in DAQ and real-time control. They are available for all IOLITE chassis.

Right: IOLITE single-channel modules provide the ultimate in modularity. Place them where you need them, and easily daisy-chain them up to 100 meters (328 ft.) apart!

⚠ MEASURING CURRENT
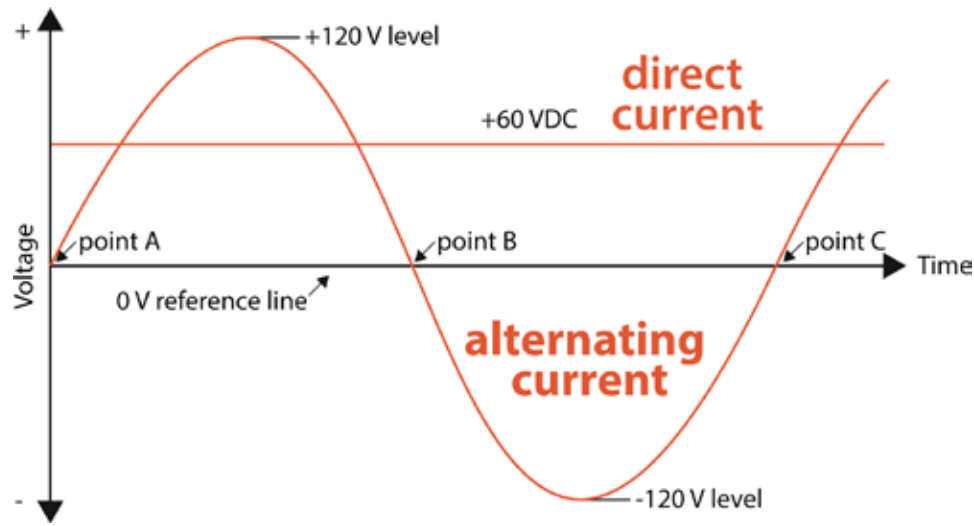
CURRENT TYPES

Like voltage, current can be alternating current (AC) or direct current (DC). Electrical current is the intensity, or rate of flow of an electric charge. Just as with making voltage measurements, we sometimes need to measure very tiny currents, i.e., in the microamp range, while other times we may need to measure very high currents into the thousands of amperes.

WHAT IS ELECTRICAL CURRENT?

Current is the intensity or rate of flow of an electric charge. In DC systems, the current flows in one direction, aka "unidirectionally." Common sources of DC current include batteries and solar cells. In AC systems the current reverses directions at a given frequency. In our businesses and homes, we have AC power based on either 50 or 60 Hz (depending on your country). This alternating current is typically sinusoidal (in the shape of a sine wave). The International System of Units (SI) term for

current is Ampere, commonly abbreviated to the word "amps" and written with the symbol A.

Current is also often written with the letter I. This goes back to the French phrase intensité de courant ("current intensity"). Both A and I are acceptable abbreviations for current. AC current and DC current are often abbreviated as AAC and ADC, respectively.

One ampere equals one coulomb of electrical charge moving past a given place in one second (one coulomb contains roughly 6.242 × 1018 electrons).

A current always produces a magnetic field. The stronger the current, the stronger the field. By measuring this field using various techniques: Hall Effect, Induction, or magnetic flux, we can measure the electron flow (current) in an electric circuit.

OPEN LOOP VS. CLOSED LOOP CURRENT SENSORS

You may hear about the open-loop and closed-loop current sensors. What are the differences?

Open-loop current sensors are less expensive than closed-loop varieties such as zero flux current sensors. They consist of a Hall effect sensor mounted in the gap of a magnetic core. The output from the Hall effect sensor is amplified and measures the field created by the current without making any contact with it. This provides galvanic isolation between the circuit and the sensor.

Some open-loop current sensors have compensation electronics that help to offset the drift caused by changes in ambient temperature. Compared to closed-loop sensors, open-loop sensors are smaller and less expensive. They have low power requirements and can be used for measuring both AC and DC currents. At the same time, they are not as accurate as their closed-loop cousins: they are subject to saturation and provide inferior temperature compensation and noise immunity.

With open-loop sensors, drift caused by temperature, or any non-linearities in the sensor will cause an error. On the other hand, closed-loop sensors employ a coil that is actively driven by creating a magnetic field that opposes the current conductor's field. This is the "closed-loop" that provides enhanced accuracy and saturation performance.
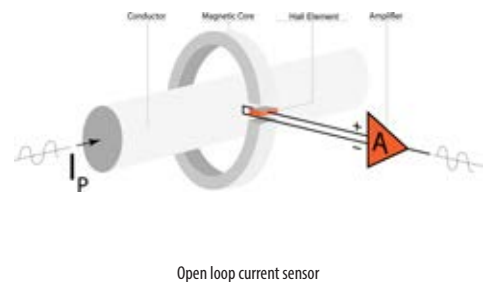
Open-loop sensor applications:
- Battery-powered circuits
- Drive applications where torque accuracy need not be high
- Fan and pump current measurement
- Welding machines
- Battery management systems
- Variable speed drives
- Uninterruptible power supply applications

Closed-loop current sensor applications:
- Variable speed drives (when accuracy and linearity are paramount)
- Servo controls
- Overcurrent protection
- Ground fault detectors
- AC and DC industrial drives
- Robot control
- Energy measurement applications

So which is better? This depends entirely on the application. The lower cost, size, and power requirements make open-loop current sensors very popular. This is offset somewhat by the fact that their susceptibility to saturation means that they must be over-sized in some applications in order to avoid this problem.

Closed-loop current sensors are the clear favorite in applications that require the best possible accuracy and resistance to saturation, or which are used in environments with wide temperature extremes or electrical noise.

Open loop current sensor

Closed loop current sensor
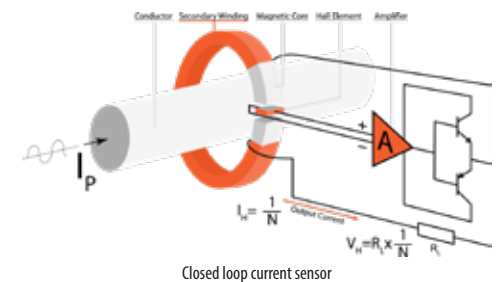
CURRENT MEASUREMENT

THERE'S STRENGTH IN NUMBERS

To handle this wide range of possibilities, Dewesoft offers a variety of current transducers and adapters that provide a voltage output (or current) compatible with many of the signal conditioners from the SIRIUS, IOLITE and KRYPTON product lines.

Because current creates a magnetic field, there are Hall Effect and other sensors that allow us to measure this field and thereby measure the current. It is also possible to connect a shunt resistor within the circuit itself and directly measure the current, as in the classic ammeter and current shunt.

Dewesoft systems support open and closed loop current sensors, zero flux, AC and AC/DC current clamps, Rogowski coils, shunts, and DC-CT® sensors. We also offer DSI series adapters that allow you to connect 20 mA or up to 20 A sources to a wide range of our low-voltage and sensor-specific signal conditioners across all Dewesoft product lines.

TRANSDUCER / SENSOR TYPES

A variety of sensors and transducers are available for measuring current, each adapted to the measuring environment as well as the current range that is intended to be measured. For example, the requirements for measuring microamps (µA) are greatly different from those required to measure thousands of amps. Here's a high-level overview of the main types available today:

DIRECT CURRENT MEASUREMENT

The most common way to measure current is to connect a shunt resistor in series with the circuit. An ammeter or ammeter shunt is really nothing more than a highly accurate resistor.

When we place a precision resistor across a circuit, a voltage drop will occur across it. The shunt sensor's output is measured by the data acquisition system, which applies Ohm's law to determine the amperage flowing through the circuit.

Because the measuring range is limited by the resistor value, direct connection to the electrical conductors of a circuit is widely used in low current applications, but rarely in high current applications, where indirect measuring sensors like current clamps and flex coils are far more prevalent.

Some Dewesoft signal conditioners have a built-in shunt for measuring small currents. For example, the IOLITE STG has a 50 Ω shunt that allows direct 2 or 20 mA measurements.

INDIRECT CURRENT MEASUREMENT

For higher current and non-contact measurement there is a range of sensors available, including Hall effect, CTs, coils, and more. The table above provides a useful cross-reference of these and their typical applications. Whether it's milliamps or thousands of amps, Dewesoft has a sensor and signal conditioner combination that can handle it. We will cover the current sensors that we offer immediately following the current tables on the next pages.

	Shunt	Hall Effect	CT	Rogowski	Zero Flux
Connection type	Direct	Indirect	Indirect	Indirect	Indirect
Current	AC and DC	AC and DC	AC	AC	AC and DC
Accuracy	High	Medium	Medium	Low	High
Range	Low	Medium	High	Medium	High
Drift	Low	Medium	Medium	High	Low
Isolation	⊗*	✓	✓	✓	✓

* Shunts are not inherently isolated, but if the amplifier that they are connected to is isolated, then the shunt is also isolated.

DSI CURRENT ADAPTERS

If your Dewesoft DAQ system was not purchased with current input modules, you may be able to add this capability to your system using DSI adapters. DSI adapters are compatible with most LV, STG, STGM and MULTI modules across all Dewesoft product lines (requires DB9 connector version of the module).

Here are the DSI adapters available for current measurement:

DSI-20mA	50 Ω shunt with 0.01% accuracy for 20 mA measurements.
DSIw-20mA	50 Ω shunt with 0.01% accuracy for 20 mA measurements (waterproof). Environmentally sealed, superior temperature stability.
DSI-5A	10 mΩ shunt with 0.1% accuracy for 5 A measurements and superior temperature stability.
DSIi-10A	ISOLATED 10 A full scale shunt with 0.5% accuracy with banana connector inputs
DSIi-20A	ISOLATED 20 A full scale shunt with 0.5% accuracy with banana connector inputs

But we're always developing according to your needs, so please check with us if there's a DSI adapter that you need.

▲ CURRENT MEASUREMENT - SIRIUS®

SIRIUS DUAL CORE

DualCoreADC® technology: dual 24-bit delta-sigma ADC's with anti-aliasing filtering.
160 dB of dynamic range. 200 kS/s sample rate.
8 channel modules.

SIRIUS HD HIGH DENSITY

High density modules with 200 kS/s sample rate.
Ideal for high channel count applications.
16 channel modules.

	LV	ACC	CHG	MULTI	UNI	STG	STGM	HD-LV	HD-ACC	HD-STGS
Connectors	DB9, BNC, BANANA	BNC, TNC	BNC, TNC	DSUB-15, L2B16f	DB9, L2B10f	DSUB-9, L2B7f, L2B10f	DSUB-9, L2B7f, L2B10f	DB9, BNC	BNC	DSUB-9, L1B10f
Channels per slice	8	8	8	8	8	8	8	16	16	16
Data rate / channel	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s
Resolution	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit DualCore	24-bit	24-bit	24-bit
Bandwidth	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz
Voltage ranges	±200 V, ±10 V, ±1 V, ±100 mV	±10 V, ±500 mV	±10 V, ±500 mV	±10 V, ±1 V, ±100 mV, ±50 mV	±100 V, ±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±1 V, ±100 mV, ±50 mV	±10 V, ±1 V, ±100 mV, ±50 mV	±100 V, ±10 V, ±1 V, ±100 mV	±10 V, ±5 V, ±1 V, ±200 mV	±10 V, ±1 V, ±100 mV, ±10 mV
Input coupling	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.1 Hz, 1 Hz	DC, AC 0.1 Hz, 1 Hz, 10 Hz, 100 Hz	DC	DC, AC 0.3 Hz, 0.16 Hz (1, 3, 5, 10, 20 Hz SW)	DC, AC 1 Hz (3, 10 Hz SW)	DC	DC	DC, AC 0.1 Hz, 1 Hz	DC
Sensor excitation	Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A / 2 W)	(IEPE) 2, 4, 8, 12, 16 and 20 mA	IEPE 4, 8, 12 mA	0 to 12 V (max. 44 mA)	0 to 20 V max. 0.8 W, 0 to 60 mA max. 0.5 W. IEPE 2 to 20 mA	0 to 20 V max. 0.8 W, 0 to 60 mA (max 0.5 W)	0 to 15 V (max. 44 mA)	Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A / 2 W)	(IEPE) 4, 8 and 12 mA	0 to 12 V (max. 44 mA)
Bridge connection	Full	⊗	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire, 4-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3- and 4-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	Full	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire
Programmable shunt	⊗	⊗	⊗	59.88 kΩ	59.88 kΩ 175 kΩ bipolar	59.88 kΩ, 175 kΩ bipolar	100 kΩ bipolar	⊗	⊗	100 kΩ
IEPE input	DSI-ACC	✓	✓	DSI-ACC	✓	DSI-ACC	DSI-ACC	DSI-ACC	✓	DSI-ACC
±200 Volt input	✓	⊗	⊗	DSI-V200	DSI-V200	DSI-V200	DSI-V200	⊗	⊗	DSI-V200
Resistance	⊗	⊗	⊗	⊗	✓	✓	⊗	⊗	⊗	⊗
Temperature (PTx)	DSI-RTD	⊗	⊗	DSI-RTD	✓	DSI-RTD	DSI-RTD	DSI-RTD	⊗	DSI-RTD
Thermocouple	DSI-THx	⊗	⊗	DSI-THx	DSI-THx	DSI-THx	DSI-THx	DSI-THx	⊗	DSI-THx
Potentiometer	⊗	⊗	⊗	✓	✓	✓	✓	⊗	⊗	✓
LVDT	DSI-LVDT	⊗	⊗	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	⊗	DSI-LVDT
Charge	DSI-CHGx	⊗	100 k, 10 k pC	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	⊗	DSI-CHGx
Current	**ext. shunt, DSI adapters, current sensors**	**ext. shunt, DSI adapters, current sensors**	**ext. shunt, DSI adapters, current sensors**	**ext. shunt, DSI adapters, current sensors**	**ext. shunt, DSI adapters, current sensors**	**ext. shunt, DSI adapters, current sensors**	**ext. shunt, DSI adapters, current sensors**	**ext. shunt, DSI adapters, current sensors**	**ext. shunt, current sensors**	**ext. shunt, DSI adapters, current sensors**
TEDS	⊗	✓	✓	✓	✓	✓	✓	✓	✓	✓
Isolation voltage	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	500 V in pairs	500 V in pairs	500 V in pairs

CURRENT MEASUREMENT - SIRIUS®

SIRIUS HS HIGH SPEED

1 MS/s 16-bit SAR technology.
Alias-free filtering, ideal for transient recording.
8 channel modules.

SIRIUS XHS EXTRA HIGH SPEED

Our fastest, most advanced DAQ system.
15 MS/s SR, 5 MHz bandwidth.
8 channel modules.

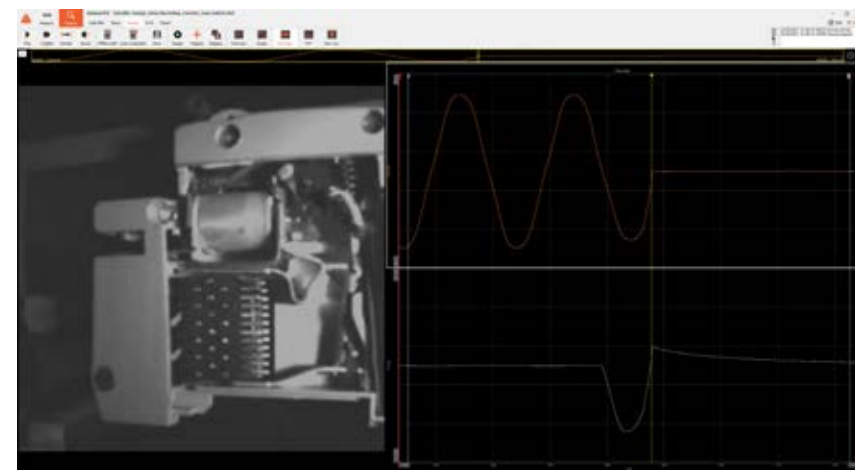| HS-LV	HS-ACC	HS-CHG	HS-STG	XHS-LV	XHS-ACC
DB9, BNC, BANANA	BNC	BNC, TNC	DSUB-9	DB9, BNC	BNC
8	8	8	8	8	8
1 MS/s	1 MS/s	1 MS/s	1 MS/s	15 MS/s	15 MS/s
16-bit	16-bit	16-bit	16-bit	Up to 1 MS/s: 24 bit >1 MS/s: 16 bit	Up to 1 MS/s: 24 bit >1 MS/s: 16 bit
1 MHz	500 kHz	500 kHz	1 MHz	5 MHz	5 MHz
±100 V to ±50 mV	±10 V to ±100 mV	±10 V to ±100 mV	±50 V to ±20 mV	±100 V to ±50 mV	±10 V to ±200 V
DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.1 Hz, 1 Hz, 10 Hz, 100 Hz	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 1 Hz	DC, AC 0.1 Hz, AC 1 Hz
Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A / 2 W)	(IEPE) 4 and 8 mA	(IEPE) 4, 8 and 12 mA	0 to 20 V max. 0.8 W, 0 to 60 mA (max 0.5 W)	Bipolar 2.5 to 30, Unipolar 2 to 24 V, (max. 0.2 A / 2 W)	(IEPE) 2, 4, 8, 12, 16 and 20 mA
Full	⊗	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-, 4-wire	Full	⊗
⊗	⊗	⊗	59.88 kΩ, 175 kΩ bipolar	⊗	⊗
DSI-ACC	⊗	⊗	DSI-ACC	DSI-ACC	✓
⊗	⊗	⊗	DSI-V200	DSI-V200	⊗
⊗	⊗	⊗	✓	⊗	⊗
DSI-RTD	⊗	⊗	✓	DSI-RTD	⊗
DSI-THx	⊗	⊗	DSI-THx	DSI-THx	⊗
⊗	⊗	⊗	✓	⊗	⊗
DSI-LVDT	⊗	⊗	DSI-LVDT	DSI-LVDT	⊗
DSI-CHGx	⊗	1 k to 100 k pC	DSI-CHGx	DSI-CHGx	⊗
ext. shunt, DSI adapters, current sensors	ext. shunt, current sensors	ext. shunt, current sensors	ext. shunt, DSI adapters, current sensors	ext. shunt, DSI adapters, current sensors	ext. shunt, current sensors
✓	✓	✓	✓	✓	✓
1000 V	1000 V	1000 V	1000 V	1000 V	1000 V

A WORLD OF CHOICES

Although there is no SIRIUS module specifically dedicated to measuring current, you can see from the table on these pages that you can measure current with virtually every one of our modules. This can be done in every case by using an external shunt, and in many cases by using one of our DSI adapters made for current measurement up to 20A. And of course, you can always use an external current sensor. An overview of the clamps, coils and transformers that we offer is presented on upcoming pages.

RELEVANT SI UNITS

The SI unit of Current is:

Ampere (symbol A)

IN THIS TABLE:

Modules whose primary function is to measure the measurement type shown at the top of the page are shaded in grey.
Modules that natively support the signal/sensor type in that row are colored in light orange.
Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

▲ CURRENT MEASUREMENT - KRYPTON®

KRYPTON MULTI

Multi-channel ruggedized modules for harsh environment testing applications.

KRYPTON 1

Single channel ruggedized modules for harsh environment testing applications.

	LA	STG	ACC	STG	ACC
Connectors	BNC	DB9, L2B10f	BNC	DB9	BNC
#ch per module	8	3 or 6	4 or 8	1	1
Data rate / channel	20 kS/s	20 kS/s	20 kS/s	40 kS/s	40 kS/s
Resolution	24-bit	24-bit	24-bit	24-bit	24-bit
Bandwidth	0.49 fs	0.49 fs	0.49 fs	0.49 fs	0.49 fs
Voltage ranges	--	±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±5 V, ±1 V, ±200 mV	±50 V, ±10 V, ±1 V, ±100 mV	±50 V, ±10 V, ±1 V, ±100 mV
Input coupling	DC	DC	DC, AC 0.1 Hz, 1 Hz	DC, AC 1 Hz	DC, AC 0.1 Hz, 1 Hz
Sensor excitation	⊗	0 to 15 V max. 0.4 W/ch (45 mA limit)	(IEPE) 4 mA, 8 mA	Unipolar 0 to 24 V, Bipolar 0 to 12 V	(IEPE) 4 mA, 8 mA
Bridge connection	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	⊗	Full bridge strain, ½ bridge strain, ¼ bridge strain, 3-wire	⊗
Programmable shunt	⊗	100 kΩ	⊗	100 kΩ	⊗
IEPE input	⊗	DSI-ACC	✓	DSI-ACC	⊗
±200 V input	⊗	DSI-V200	⊗	DSI-V200	⊗
Resistance	⊗	⊗	⊗	±20 mA, ±2 mA	⊗
Temperature (PTx)	⊗	DSI-RTD	⊗	DSI-RTD	⊗
Thermocouple	⊗	DSI-THx	⊗	DSI-THx	⊗
Potentionmeter	⊗	✓	⊗	⊗	⊗
LVDT	⊗	DSI-LVDT	⊗	DSI-LVDT	⊗
Charge	⊗	DSI-CHG	⊗	DSI-CHG	⊗
Current	**±20 mA**	**ext. shunt, DSI-xxA, current sensor**	**ext.shunt, current sensor**	**DSI-xxA, current sensor**	**ext. shunt, current sensor**
TEDS	⊗	✓	✓	✓	⊗
Isolation voltage	1000 V	Differential	Differential	125 Vrms Isolation CH, GND	125 Vrms Isolation CH, GND

THE MODULES ARE RUGGED, BUT WHAT ABOUT THE PC?

You don't have to worry about your KRYPTON modules surviving in harsh environments: they're going to be just fine. Of course, they need a computer to run DewesoftX DAQ software and to store the data. Sometimes the computer can be kept away from the harsh environment, but what if it can't be?

What would happen to your office computer if it was sprayed with water, or subjected to heavy dust or smoke? How would it handle bone-rattling shock and vibration? What if the ambient temperature rose to 70 °C (158 ° F)? Or dropped to -40 °? Office computers are simply not designed for those kinds of environmental extremes.

That's why we made the KRYPTON CPU. Besides being designed from the ground up to work with KRYPTON modules, this Quad-Core computer is fully IP67 waterproof, dustproof, and can withstand shocks up to 100 g. It operates from -40 ° to 70 ° C (158 ° F), and has all the interfaces you need.

CURRENT MEASUREMENT - IOLITE®

IOLITE MULTI

Multi-channel IOLITE modules for DAQ and real-time control applications.

IOLITE ONE

Single channel IOLITE modules for DAQ and real-time control applications.

	8xLA	6xSTG	1xSTG
Connectors	BNC, screw terminal	DB9	DB9
#ch per module	8	6	1
Data rate / channel	20 kS/sec	20 kS/sec	40 kS/sec
Resolution	24-bit	24-bit	24-bit
Bandwidth	0.49*fs	0.49*fs	0.49*fs
Voltage ranges	⊗	±50 V, ±10 V, ±1 V, ±100 mV	±50 V, ±10 V, ±1 V, ±100 mV
Input coupling	DC	DC, AC 1 Hz	DC, AC 1 Hz
Sensor excitation	⊗	Bipolar 0 to 12 V, Unipolar 0 to 24 V, Current 0 to 44 mA, (max. 0.55 W/ch)	Unipolar 0 to 24 V, Bipolar 0 to 12 V
Bridge connection	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	Full bridge strain, ½ bridge strain, ¼ bridge strain, 3-wire
Programmable shunt	⊗	100 kΩ	100 kΩ
IEPE input	⊗	DSI-ACC	DSI-ACC
Resistance	⊗	✓	⊗
±200 V input	⊗	DSI-V200	DSI-V200
Temperature (PTx)	⊗	DSI-RTD	DSI-RTD
Thermocouple	⊗	DSI-THx	DSI-THx
Potentiometer	⊗	✓	⊗
LVDT	⊗	DSI-LVDT	DSI-LVDT
Charge	⊗	DSI-CHGx	DSI-CHGx
Current	**±20 mA, ±2 mA**	**±20 mA, (Also accepts DSI-xxA)**	**±20 mA**
TEDS	⊗	✓	✓
Isolation voltage	450V	Differential	125 Vrms channel to ground isolation

IN THESE TABLES:

Modules whose primary function is to measure the measurement type shown at the top of the page are shaded in grey.
Modules that natively support the signal/sensor type in that row are colored in light orange.
Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

⚠ MEASURING CURRENT

CURRENT IS AN OFTEN-RECORDED SIGNAL

Like voltage, current can be alternating current (AC) or direct current (DC). And again like the voltage, you sometimes need to measure very tiny currents, i.e., in the microamp range – and all the way into the thousands of amperes. To handle this wide range of possibilities Dewesoft offers a variety of current transducers and sensors, which we combine with one of our voltage preamplifiers. This duo seamlessly converts these widely different signal levels to a normalized output that can be digitized. Sometimes a tiny current modulation is riding on top of a large DC offset, another challenge with which many measuring systems have trouble.

SMALL CURRENTS

DSI adapters can be plugged into a wide range of Dewesoft amplifiers, across virtually the entire product range. For current measurement we offer:
- DSI-20mA measures up to 20 mA
- DSIw-20mA water-proof version
- DSI-5A measures up to 5 A
- DSIi-10A measures up to 10 A, with 4kVp isolation
- DSIi-20A measures up to 20 A, with 4k Vp isolation

FLUXGATE TECHNOLOGY DC CLAMPS

A fluxgate current sensor is similar to a Hall effect current sensor, except that it uses a magnetic coil instead of a Hall effect system. The higher accuracy that results makes these sensors ideally suited for industrial, aerospace and other applications that require high accuracy measurements. Dewesoft offers several fluxgate current clamps which have been paired with our SIRIUS systems, including mating and power cables.
- The DS-CLAMP-200DC measures up to 200 ADC or ACrms
- The DS-CLAMP-500DCS measures up to 500 ADC or ACrms

Both of the clamps above need to be powered by the SIRIUSi-PWR-MCTS2.
- The DS-CLAMP-500DC measures up to 500 ADC or ACrms
- The DS-CLAMP-1000DC measures up to 1000 ADC or ACrms

Both of the clamps above need to be powered by the SIRIUSi-PWR-MCTS2 or SIRIUSir-PWR-MCTS2. See the table for details about compatibility and specifications.

DSI ADAPTERS

DSI-20MA
measures currents up to 20 mA

DSIW-20MA
is a waterproof version of the DSI-20mA

DEWESOFT CURRENT SENSORS ◢

HALL EFFECT TECHNOLOGY DC CLAMPS

DC Current Clamps
Hall effect current sensors offer the convenience of requiring very little power, so they can be powered directly from a SIRIUS preamp with a DSUB connector. No additional power supply is needed. They are not as accurate as fluxgate clamps, but they offer a much wider measuring range.

- DS-CLAMP-150DC measures up to 200 ADC or 150 A ACrms
- DS-CLAMP-150DCS measures up to 290 ADC or 150 A ACrms
- Both sensors can be connected directly to a Sirius® LV or Sirius® HS-LV amplifier with DSUB connector.
- DS-CLAMP-1800DC measures up to 1800 ADC or ACrms

These clamps can be connected directly to virtually all DEWESoft amplifiers that provide sensor power and voltage input.

IRON CORE TECHNOLOGY AC CLAMPS

AC Current Clamps
Iron Core AC current sensors offer the convenience of requiring very little power, so they can be powered directly from a SIRIUS preamp ith a DSUB connector. No additional power supply is needed. They are made specifically for AC current measurements. They have bandwidths from 2 Hz to 10 kHz (2 Hz to 5 kHz for the DS-CLAMP-5AC).

- DS-CLAMP-5AC measures up to 5 A ACrms
- DS-CLAMP-15AC measures up to 15 A ACrms
- DS-CLAMP-200AC measures up to 200 A ACrms
- DS-CLAMP-1000AC measures up to 1000 A ACrms

These clamps can be connected directly to virtually all DEWESoft amplifiers that provide sensor power and voltage input.

More specifications:
https://dewesoft.com/products/interfaces-and-sensors/current-clamps-and-transducers/tech-specs

THE DSII-10 AND -20
allow you to measure currents up to 10 and 20 A, with 4 kVp isolation

▲ DEWESOFT CURRENT SENSORS

ROGOWSKI TECHNOLOGY AC CURRENT SENSORS

FLEX CURRENT SENSORS WITH ROGOWSKI TECHNOLOGY

FLEX sensors have the advantage of going around large cable bundles, bus bars, and irregularly shaped conductors in a way that regular clamps cannot.

They're made for AC measurements, and their low inductance means that they can respond to fast-changing currents. Their lack of an iron core makes them highly linear, even when subjected to very large currents. They provide excellent performance when measuring harmonic content. A small integrator and power circuit is needed and is built into each DS-FLEX sensor.

The number in their model name like 300, 3000 or 30,000 refers to the maximum amperage that they can read. The final number refers to the length of the "rope" in cm. So for example, the DS-FLEX-3000-80 can read up to 3000 AAC, and has a "rope" length of 80 cm (31 inches).

These clamps can be connected directly to all DEWESoft® amplifiers with DSUB9 connectors (e.g. SIRIUS-LV) that provide sensor power.

More specifications:
https://dewesoft.com/products/interfaces-and-sensors/current-clamps-and-transducers/tech-specs

- The **DS-FLEX-300-17-HS** measures up to 300 A
  Length: 17 cm (6.7 in.)
- The **DS-FLEX-3000-80** has selectable ranges of 3, 30, 300 and 3000 A ACrms
  Length: 80 cm (31 in.)
- The **DS-FLEX-30000-120** has selectable ranges of 30, 300, 3000 and 30000 A ACrms
  Length: 120 cm (47.2 in.)
- The **DS-FLEX-3000-35** has selectable ranges of 3, 30, 300 and 3000 A ACrms
  Length: 35 cm (13.7 in.)

DEWESOFT CURRENT SENSORS

IT-700-S

IT-200-S

IT-1000-S

ZERO FLUX CURRENT TRANSDUCERS

ISOLATED, HIGH ACCURACY CURRENT SENSORS

Our Zero Flux current transducers measure current with galvanic isolation. They reduce the high voltage currents to a much lower level which can be easily read by any measurement system. They have two windings that are operated in saturation to measure the DC current: one winding for the AC current and an additional winding for compensation.

This kind of current measurement is very precise because of the zero flux compensation.

Why?

Normally, a magnetic core retains a residual magnetic flux, which ruins the accuracy of the measurement. In zero flux transducers, however, this parasitic flux is compensated. Zero flux transducers are ideal for high AC/DC accuracy and/or high bandwidth (up to 1 MHz). They are very linear and have a low phase and offset error.

They may not be so handy for making simpler measurements that don't require as much accuracy or bandwidth. For those applications, the current sensors on the previous pages are recommended.

- The **IT-60-S** has a 60 A primary current range, 2000 Vrms isolation
- The **IT-200-S** has a 200 A primary current range, 2000 Vrms isolation
- The **IT-400-S** has a 400 A primary current range, 2000 Vrms isolation
- The **IT-700-S** has a 700 A primary current range, 1600 Vrms isolation
- The **IT-1000-S** has a 1000 A primary cur-

rent range, 400 Vrms isolation
- The **IN-1000-S** has a 1000 A primary current range, 1000 Vrms isolation
- The **IN-2000-S** has a 2000 A primary current range, 1000 Vrms isolation

Dewesoft Zero Flux sensors must be operated with the SIRIUSi-PWR-MCTS2 or SIRIU-Sir-PWR-MCTS2 power units, otherwise they can be damaged.

More specifications:
https://dewesoft.com/products/interfaces-and-sensors/current-clamps-and-transducers/tech-specs

⚠ SIRIUS XHS-PWR - DC-CT CURRENT TECHNOLOGY

DC-CT TECHNOLOGY EXPLAINED

UNPRECEDENTED ACCURACY IN CURRENT MEASUREMENT

DC-CT® technology represents an innovative breakthrough in the isolated measurement of DC and AC currents. Within a magnetic core, magnetic flux can only be measured if it is non-constant, i.e., changing or alternating. Since a DC current generates a constant magnetic flux the innovative principle redistributes this flux among two or more paths periodically in a single core.

If we observe this magnetic flux from only one path, it appears to be alternating and is therefore easily measured by a simple winding whose output is proportional to the current. The DC-CT breakthrough is based on a zero-flux gapless core with a compensation winding. A current-controlled variable reluctance (CCVR) creates a self-closed magnetic loop.

This vital component is made of an "infinity" winding, embedded into a gap-less core, retaining all of the good properties of high permeability materials.

DC-CT is, therefore, energy-efficient, of compact size, low noise, and cost-effective. This innovation is used in the standalone current sensor DC-CT-1000A shown here, and inside the SIRIUS XHS-PWR described on the next page.

DC-CT-1000A

The DC-CT 1000A current transducer is used for current measurements in the widest sense of the world. The device offers a wide measurement range, high bandwidth, excellent linearity, very high accuracy, very low temperature drift and lower power consumption as compared to the other zero-flux type current transducers. Lower power consumption also enables a more compact form factor.

This transducer is used in all types of current measurement applications in areas where precise, high-bandwidth, and low angular shift sensor is needed. This includes all types of e-mobility measurements from measuring quiescent DC currents, to analyzing higher harmonics of the PWM switching frequency which can extend into the MHz range. Power quality measurements of renewable energy sources, battery storage systems measurements, other high-power applications such as railway systems, and power transmission and distribution grids.

	DC-CT-1000A
Compatible amplifiers	SIRIUS LV / HS-LV / XHS-LV, SIRIUS STG / HS-STG, SIRIUS STGM, DEWE-43A
Primary current range DC/RMS sinus	1000 A
Conversion ratio	1 : 1680
Overload ability short time (100 ms)	2000 Apk
Max. burden resistor (100 % of Ip)	1 Ω
Output ratio	595.2381 mA at 1000 A
Bandwidth (0.5dB)	200 kHz
Angular accuracy	-0.0094° * f (kHz) + 0.054°
Inner diameter	22 mm (0.866 in.)
Size	50 x 70 x 30 mm
Supply voltage (±5 %)	±15 V
Operating temperature	+10 °C to +50 °C
Dewesoft shunt	1 Ω
PWR-MCTS2 needed	Yes
Linearity	<100 ppm
Max. offset including hysteresis	100 mA

Due to the single gapless core design, the sensitivity of the sensor is very high. The sensor has high immunity to external magnetic fields and has small power consumption as compared to other designs.

High permeability core and high-speed regulation loop enable high-frequency bandwidth. Besides its high bandwidth, it provides angular accuracy. This is especially important in power analysis because it determines the ratio between active and reactive power.
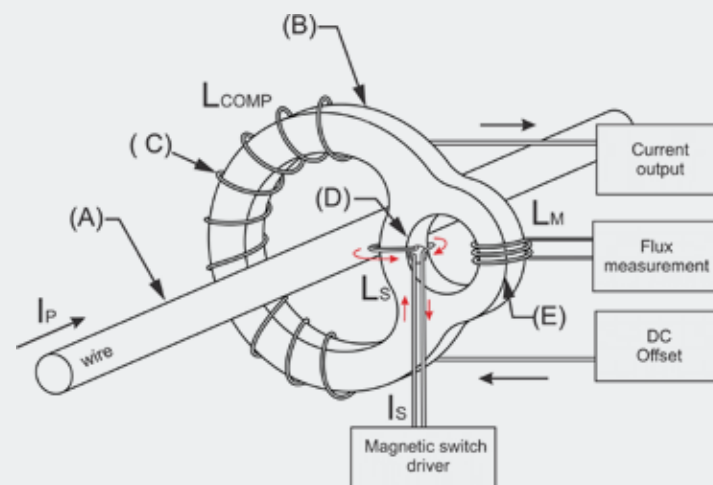
SIRIUS XHS-PWR - DC-CT CURRENT TECHNOLOGY

THE SIRIUS XHS-PWR

ADDRESSING AUTOMOTIVE MEGATRENDS

Vehicle electrification and autonomous driving vehicles are the major megatrends in the field of automotive vehicles today. The intelligent management and smart distribution of in-vehicle electric power is becoming more and more important every day.

The precise measurement and prediction of energy consumption in the vehicle are needed for both development and vehicle operation. The development of efficient and EMC emissionless electric components like e-motors, inverters, chargers, and power management is in full swing and steadily increasing.

SIRIUS XHS-PWR can directly measure voltage up to 2000 V peak (with CAT II 1000 V safety), with up to 5 MHz bandwidth. It is designed to be installed on the vehicle's power lines. Its IP67 design and construction allow it to work in harsh environments, like real drive testing. SIRIUS XHS-PWR incorporates the patented DC-CT® Platiše flux current transducer technology described on the previous page. It represents the latest current sensing technology with ranges up to 2000 A, wide bandwidth, and the ultimate in current sensing performance. Excellent linearity, precision, accuracy, immunity to external magnetic fields, low offsets, extremely low-temperature drift are achieved at low power operation.

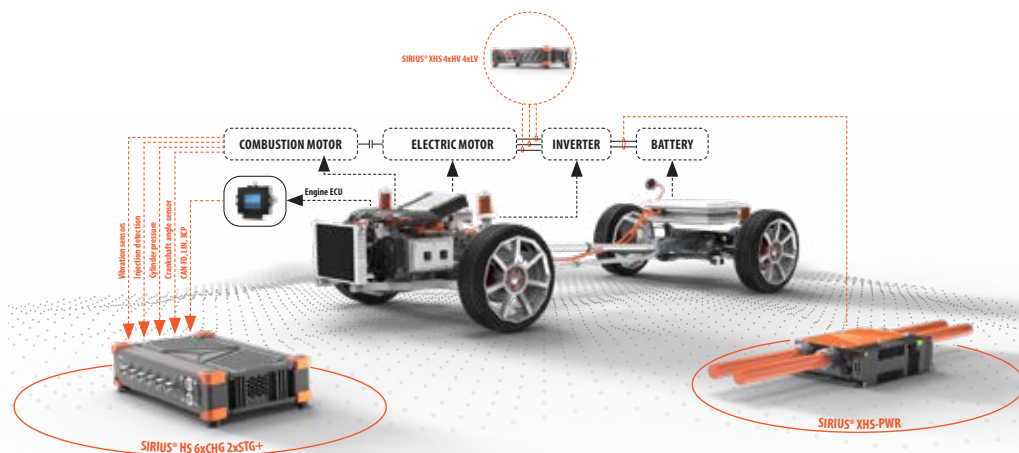### TWO SAMPLING MODES TO CHOOSE FROM

The on-board HybridADC data acquisition system provides a high bandwidth mode with 15 MS/s sampling and 5 MHz bandwidth, perfect for transient and power analysis. Or you can choose a high dynamic mode with 2 MS/s sampling and 24-bit resolution with brick wall anti-aliasing filtering.

You can take advantage of today's interfaces, such as USB 3.0 (Type C), XCP, and OPC/UA on PoE Gigabit Ethernet. PTPv2 can be used for precise time synchronization.

SIRIUS XHS-PWR is a unique combination of high bandwidth HybridADC analog-to-digital converters, high accuracy/high bandwidth voltage signal conditioners, high accuracy/high bandwidth DC-CT current transducers – all packed into compact and rugged chassis with excellent environmental specifications. Seamless integration with DewesoftX software makes XHS-PWR easy to set up and operate. Multiple systems can be connected via a 6-port network switch (DS-6xLAN-L1B), providing PTPv2 synchronization.

SIRIUS-XHS-PWR APPLICATIONS

- Powertrain efficiency – both on the test bench and in-vehicle verification. Compare input electrical power with mechanical output power
- Real-drive testing – standardized driving cycles including WLTP, NEDC, WMTC
- Total power consumption – multiple systems can be used in one vehicle
- Transient analysis – 5 MHz bandwidth captures transients, and allows EMI effects analysis

	1xHV-1xDCCT-1000A	1xHV-1xDCCT-500A	1xHV-1xDCCT-250A
Input types	1 x voltage, 1 x current (single phase)		
Voltage input			
Voltage ranges	±2000 V, ±1000 V, ±400 V, ±200 V		
ADC type	Hybrid ADC - 24-bit alias free up to 2 MS/s, 16-bit up to 15 MS/s		
Sample rate	15 MS/s/ch, simultaneous (max.)		
Filtering	AAF 1 MHz (6th order)		
Analog bandwidth	5 MHz (-3 dB)		
Current input			
Current ranges	±2000 A, ±1000 A, ±400 A, ±200 A	±1000 A, ±500 A, ±200 A, ±100 A	±500 A, ±250 A, ±100 A, ±50 A
Primary/secondary ratio	1 : 1680		
Cable size (single core)	95 mm² / 70 mm²	50 mm² / 35 mm²	6 mm²
Rated DC current	292 A / 245 A	198 A / 158 A	54 A
Rated AC current	206 A / 173 A	140 A / 111 A	38 A
General			
Power supply	9 - 60 VDC, PWR + DATA + SYNC (Lemo 1T 8-pin)		
Power consumption	Typ. 13 W (max. 23 W)	Typ. 13 W (max. 21 W)	Typ. 13 W (max. 21 W)
Environmental	Operating temperature: -20 to 70 °C, Sealed to IP67		
Shock & vibration	EN 60068-2-6:2008 Environmental testing – Part 2-6: Tests - Test Fc: Vibration (sinusoidal) EN 60068-2-27:2009 Environmental testing – Part 2-27: Tests - Test Ea and guidance: Shock		
Interfaces	GbE (XCP, OPC UA) incl. IEEE1588v2 synchronization (PTP), CAN 2.0 (DSUB9),		
Dimensions	245 x 151 x 63 mm		
Weight	4.4 kg (9.70 lbs.) (max. 7 kg)	4.4 kg (9.70 lbs.) (max. 7 kg)	2.3 kg (5.07 lbs.)

SIRIUS® XHS 4xHV 4xLV

COMBUSTION MOTOR — ELECTRIC MOTOR — INVERTER — BATTERY

Engine ECU

SIRIUS® HS 6xCHG 2xSTG+

SIRIUS® XHS-PWR

⚠ MEASURING TEMPERATURE

Did you know that temperature is the MOST often recorded physical measurement in the world? Temperature is critical for the correct operation of everything from the human body to an automobile engine, and everything in between. There are several sensors used for this, and we support them all. Let's have a look at each one and the challenges each present – and how we address them.

KEY TEMPERATURE MEASUREMENT SENSORS: THE THERMOCOUPLE

The most popular temperature sensor overall due to its relatively low cost and reliability is the thermocouple. Thermocouples are based on the Seebeck effect: when wires made of dissimilar metals are in contact with each other at each end and are subjected to changes in temperature, they create a small voltage potential. Pairing different kinds of metals give us a variety of measuring ranges.

These are called "types." A very popular one is Type K, which pairs chromel and alumel, resulting in a wide measuring range of -200 °C to +1350 °C (-330 °F to +2460 °F). Other popular types are J, T, E, R, S, B, N, and C.

The output from a thermocouple must be linearized by the measuring system. It must also be referenced using Cold Junction Compensation (CJC). The "hot junction" is the measuring end of the thermocouple, and the other end is the cold junction, where the reference is typically located.

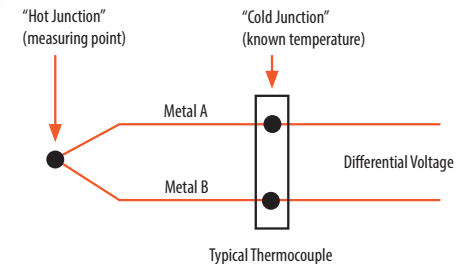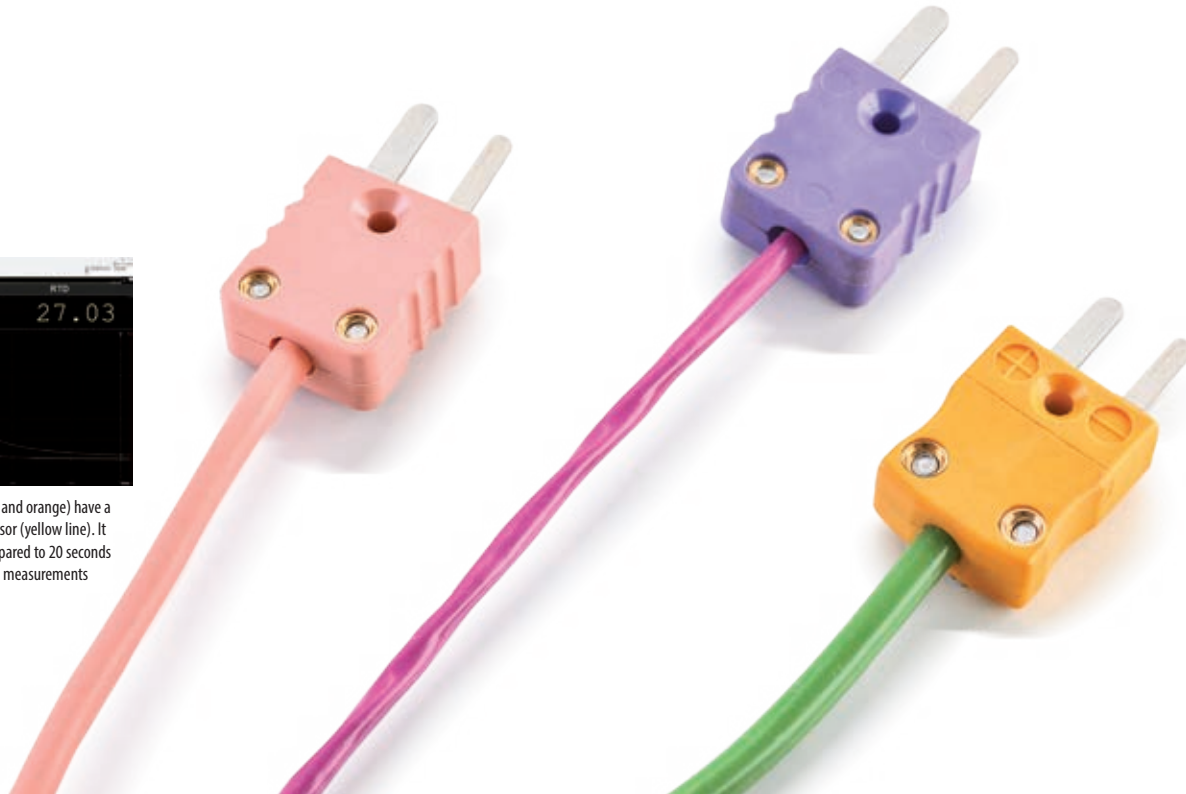## THERMOCOUPLE MEASURING CHALLENGES AND SOLUTIONS

Due to the very small microvolt and millivolt output of these sensors, electrical noise and interference can occur when the measuring system is not isolated. Dewesoft modules tackle this head-on with powerful isolation. There is no better way to reject common-mode voltages that get into the signal chain than with galvanic isolation.

Another way to reduce noise is to place the measuring system as close to the sensor as possible. Avoiding long signal lines is a proven strategy for maximizing signal fidelity and reducing costs. Look at our KRYPTON and IOLITE modular instruments for single-channel thermocouple modules that you can place anywhere.

The reference should be located as close to the CJC as possible. The CJC assembly should be protected from ambient temperature changes. We use a separate reference chip for each channel in our CJCs, which are milled from a solid block of aluminum, and precisely assembled to achieve the best possible reference.
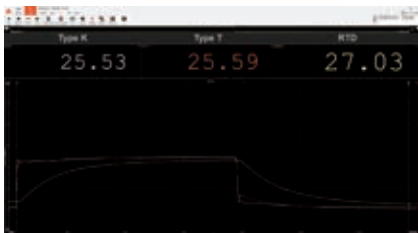
This test shows that thermocouple sensors (white and orange) have a quicker stabilization period than a typical RTD sensor (yellow line). It only takes them about 6 seconds to stabilize, compared to 20 seconds for the RTD. However, after stabilization, the RTD's measurements will be more accurate.


"Hot Junction" (measuring point)

"Cold Junction" (known temperature)

Metal A

Metal B

Differential Voltage

Typical Thermocouple

MEASURING TEMPERATURE ◮

KEY TEMPERATURE MEASUREMENT SENSORS: THE RTD

Compared to the thermocouple, the RTD (Resistance Temperature Detector) is generally more linear and drift-free within its measuring range. However, due to their platinum content and more complex construction, they are more expensive than thermocouples. You will typically find RTDs used in applications such as pharmaceuticals, where precise temperature measurements must be made over extended periods. However, they don't range much above 600 °C, so thermocouples are a better choice for high-temperature applications.
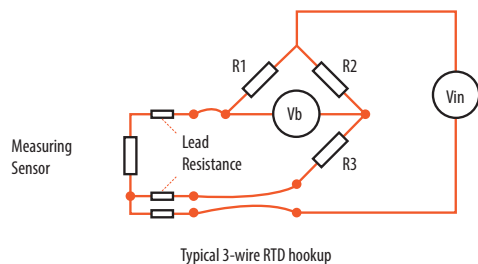
Unlike self-powered thermocouples, RTDs must be powered by the measuring system. The RTD measures temperature via electrical resistance which changes in a highly linear fashion to temperature. Although at its core an RTD is a 2-wire sensor, the addition of one or even two more wires (3- and 4-wire hookups) provides better compensation against self-heating and lead wire resistance and is therefore recommended. Dewesoft RTD signal conditioners provide 2-, 3-, and 4 wire hook-up possibilities.

The PT100 ("PT" = platinum and "100" = 100 Ω at 0 °C) and PT1000 are the most popular variants of the RTD. However, Dewesoft systems also support Pt200, Pt500 and Pt2000 sensors.

RTD MEASURING CHALLENGES AND SOLUTIONS

Although the hook-up of an RTD is more complex than that of a thermocouple, RTD modules and DSI-RTD adapters make it easy and convenient to connect your sensors to any Dewesoft DAQ system.

Noise is always a consideration for any sensor with small output, but our high isolation inputs are the best prevention imaginable. Another way to reduce noise is to place the measuring system as close to the sensor as possible. Avoiding long signal lines is a proven strategy for maximizing signal fidelity and reducing costs. Look at our KRYPTON ONE and IOLITE ONE series for the ultimate in modularity. MULTI channel modules can be located virtually anywhere, too!

KEY TEMPERATURE MEASUREMENT SENSORS: THE THERMISTOR

A thermistor is a small semiconductor made of metal oxides that have been pressed into a small bead, disk, wafer, or another shape, and sintered at high temperatures. Lastly, they are coated with epoxy or glass. You can pass a current through a thermistor to read the voltage across it and determine its temperature. They're fast, but not linear, have a limited range, are relatively fragile, and are not often used in DAQ measurement applications. We support them, however, with any of our modules that support a half-bridge configuration.

Typical 3-wire RTD hookup

▲ TEMPERATURE MEASUREMENT - SIRIUS®

SIRIUS TEMPERATURE MEASUREMENT

When measuring temperature with SIRIUS systems, we use our popular DSI adapters to plug into a variety of our highest performing modules, including:

- STG, STGM, MULTI, LV
- HD-STGS and HD-LV
- HS-STG and HS-LV
- XHS-LV

The spec table on the facing page shows the DSI modules that are compatible with SIRIUS. Simply plug the DSI-TH or DSI-RTD into the module's DB9 connector (required), and check

the hardware setup screen in DewesoftX software, and you're ready to go.

TEDS PLUG-AND-PLAY
All DSI adapters have a TEDS chip built-in for automatic sensor detection and plug-and-play setup. When you plug in the DSI adapter everything from scaling, units, calibration data, etc. is read from the adapter and is configured inside DewesoftX software automatically.

SMALL, RUGGED, AND SELF-CONTAINED
DSI-TH adapters for thermocouple types J, K, T, and C (and more) sensors have color-coded mini blade type thermocouple connectors and a short cable.

The DSI-TH-UNI has a mini thermocouple con-

nector and supports all popular thermocouple types (K, J, T, R, S, N, E, B, C).

DSI-RTD adapters have a standard DB9 connector and are compatible with Pt100, Pt200, Pt500, Pt1000, and Pt2000 RTD sensors.

DSI-TH-K adapter
(Also available for types J, T and C)

DSI-TH-UNI adapter
Universal, supports types
K, J, T, R, S, N, E, B, C

DSI-RTD adapter

TEMPERATURE MEASUREMENT - SIRIUS®

SIRIUS DUAL CORE

DualCoreADC® technology: dual 24-bit delta-sigma ADC's with anti-aliasing filtering. 160 dB of dynamic range. 200 kS/s sample rate. 8 channel modules.

SIRUS HD HIGH DENSITY

High density modules, 200 kS/s sample rate. Ideal for high channel count applications. 16 channel modules.

SIRUS HS HIGH SPEED

1 MS/s 16-bit SAR technology. Alias-free, ideal for transient recording. 8 channel modules.

SIRUS XHS EXTRA HIGH SPEED

Our fastest DAQ system 15 MS/s.

	STG	STGM	UNI	MULTI	LV	HD-STGS	HD-LV	HS-LV	HS-STG	XHS-LV
Connectors	DB9, L2B7f, L2B10f	DB9, L2B7f, L2B10f	DB9, L2B10f	DSUB-15, L2B16f	DB9, BNC, BANANA	DB9, L1B10f	DB9, BNC	DB9, BNC, BANANA	DB9	DB9
Channels per slice	8	8	8	8	8	16	16	8	8	8
Data rate / channel	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	1 MS/s	1 MS/s	15 MS/s
Resolution	24-bit Dual Core	24-bit Dual Core	24-bit DualCore	24-bit Dual Core	24-bit Dual Core	24-bit	24-bit	16-bit	16-bit	Up to 1 MS/s: 24 bit >1 MS/s: 16 bit
Bandwidth	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	1 MHz	1 MHz	5 MHz
Voltage ranges	±50 V, ±10 V, ±1 V, ±100 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±100 V, ±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±1 V, ±100 mV, ±50 mV	±200 V, ±20 V, ±10 V, ±1 V, ±100 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±100 V, ±10 V, ±1 V, ±100 mV	±100 V to ±50 mV	±50 V to ±20 mV	±100 V to ±50 mV
Input coupling	DC, AC 1 Hz (3, 10 Hz SW)	DC	DC, AC 0.3 Hz, 0.16 Hz (1, 3, 5, 10, 20 Hz SW)	DC	DC, AC 1 Hz (3, 10 Hz SW)	DC	DC	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 1 Hz
Sensor excitation	0 to 20 V max. 0.8W, 0 to 60mA max 0.5W	0 to 15 V (max. 44 mA)	0 to 20 V max. 0.8 W, 0 to 60 mA max. 0.5 W. IEPE 2 to 20 mA	0 to 12 V (max. 44 mA)	Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A / 2 W)	0 - 12 V (max. 44 mA)	Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A/2 W)	Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A/2 W)	0 to 20 V max. 0.8W, 0 to 60 mA (max 0.5 W)	Bipolar 2.5 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A/2 W)
Bridge connection	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3- or 4-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3- or 4-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire, 4-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3- or 4-wire	Full	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3- or 4-wire	Full	Full	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3- or 4-wire	Full
Programmable shunt	59.88 kΩ, 175kΩ bipolar	100 kΩ bipolar	59.88 kΩ 175 kΩ bipolar	59.88 kΩ bipolar	⊗	100 kΩ	⊗	⊗	59.88 kΩ, 175 kΩ bipolar	⊗
IEPE input	DSI-ACC	DSI-ACC	✓	DSI-ACC	DSI-ACC	DSI-ACC	DSI-ACC	DSI-ACC	DSI-ACC	DSI-ACC
Resistance	✓	⊗	DSI-V200	⊗	⊗	⊗	⊗	⊗	✓	⊗
±200V input	DSI-V200	DSI-V200	✓	DSI-V200	DSI-V200	DSI-V200	DSI-V200	DSI-V200	DSI-V200	DSI-V200
Temperature (PTx)	✓	**DSI-RTD**	✓	**DSI-RTD**	**DSI-RTD**	**DSI-RTD**	**DSI-RTD**	**DSI-RTD**	✓	**DSI-RTD**
Thermocouple	**DSI-THx**	**DSI-THx**	DSI-THx	**DSI-THx**	**DSI-THx**	**DSI-THx**	**DSI-THx**	**DSI-THx**	**DSI-THx**	**DSI-THx**
Potentiometer	✓	✓	✓	✓	⊗	✓	⊗	⊗	✓	⊗
LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT
Charge	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx
Current	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI adapters, current sensors	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor
TEDS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Isolation voltage	1000 V	1000 V	1000 V	1000 V	1000 V	500 V in pairs	500 V in pairs	1000 V	1000 V	1000 V

IN THIS TABLE:

Modules whose primary function is to measure the measurement type shown at the top of the page are shaded in grey.
Modules that natively support the signal/sensor type in that row are colored in light orange.
Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

▲ TEMPERATURE MEASUREMENT - KRYPTON

The KRYPTON-1xTH-HV is a single channel isolated thermocouple input module

The KRYPTON-8xTH is an 8 channel isolated thermocouple input module

KRYPTON MULTI
Ruggedized modules with up to 8 channels per module.
Handles harsh environments, extreme temperatures and high shock

KRYPTON SINGLE
Single channel ruggedized KRYPTON modules,
for the ultimate in modularity in harsh environments

	TH-HS	TH	RTD	STG	TH-HV	STG
Connectors	Thermocouple	Thermocouple	L0B6f	DB9, L2B10f	K-type thermocouple LEMO REDEL	DB9
#ch per module	8 or 16	8 or 16	8	3 or 6	1	1
Data rate / channel	10 kS/s	100 S/s	100 S/s	20 S/s	100 S/s	40 kS/s
Resolution	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit
Bandwidth	0.49 fs (max. 930 Hz)	--	--	0.49 fs	0.49 fs	0.49 fs
Voltage ranges	±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±1 V, ±100 mV	±1 V, ±100 mV	--	±50 V, ±10 V, ±1 V, ±100 mV
Input coupling	DC	DC	DC	DC	DC	DC, AC 1 Hz
Sensor excitation	⊗	⊗	⊗	0 to 15 V max. 0.4 W/ch (max. 45 mA)	⊗	Unipolar 0 to 24 V, Bipolar 0 to 12 V, 0 to 42 mA (max. 0.4 W/ch)
Bridge connection	⊗	⊗	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3 wire	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3 wire
Programmable shunt	100 kΩ	100 kΩ	⊗	100 kΩ	⊗	100 kΩ
IEPE input	⊗	⊗	⊗	DSI-ACC	⊗	DSI-ACC
Resistance	⊗	⊗	10 kΩ	⊗	⊗	±20 mA, ±2 mA
±200 V input	⊗	⊗	⊗	DSI-V200	⊗	DSI-V200
Temperature (PTx)	⊗	⊗	**PT100, 200, 500, 1000, 2000**	**DSI-RTD**	⊗	**DSI-RTD**
Thermocouple	**K, J, T, R, S, N, E, C, B**	**K, J, T, R, S, N, E, C, B**	⊗	**DSI-THx**	**Thermocouple Type K**	**DSI-THx**
Potentiometer	⊗	⊗	⊗	✓	⊗	⊗
LVDT	⊗	⊗	⊗	DSI-LVDT	⊗	DSI-LVDT
Charge	⊗	⊗	⊗	DSI-CHG	⊗	DSI-CHGx
Current	⊗	⊗	⊗	ext. shunt, DSI-xxA, current sensor	⊗	ext. shunt, DSI-xxA, current sensor
TEDS	⊗	⊗	⊗	✓	⊗	✓
Isolation voltage	1000 V	1000 V	1000 V	Differential	CAT III 600 V CAT II 1000 V	125 Vrms Ch-GND isolation

IN THESE TABLES:
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Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

TEMPERATURE MEASUREMENT - IOLITE ▲

IOLITE MULTI

Multi-channel IOLITE modules
for DAQ and real-time control applications.

IOLITE SINGLE

Single channel IOLITE modules
for DAQ and real-time control applications.

	TH-HS	TH-HS	RTD	STG	STG
Connectors	Thermocouple	Thermocouple	LEMO (L0B6f)	DB9	DB9
#ch per module	8	8	8	6	1
Data rate / channel	10 kS/s	100 S/s	100 S/s	20 kS/s	40 kS/s
Resolution	24-bit	24-bit	24-bit	24-bit	24-bit
Bandwidth	0.49*fs (max. 930 Hz)	0.5 fs	0.5 fs	0.49 fs	0.49 fs
Voltage ranges	±1V, ±100mV	±1V, ±100mV	±1V, ±100mV	±50 V, ±10 V, ±1V, ±100mV	±50 V, ±10 V, ±1V, ±100mV
Input coupling	DC	DC	DC	DC, AC 1 Hz	DC, AC 1 Hz
Excitation	⊗	⊗	⊗	Bipolar 0 to12 V, Unipolar 0 to 24 V, Current 0 to 44 mA, (max. 0.4 W/ch)	Bipolar 0 to 12 V, Unipolar 0 to 24 V
Bridge connection	⊗	⊗	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	Full bridge strain, ½ bridge strain, ¼ bridge strain, 3-wire
Programmable shunt	⊗	⊗	⊗	100 kΩ	100 kΩ
IEPE input	⊗	⊗	⊗	DSI-ACC	DSI-ACC
±200 V input	⊗	⊗	⊗	DSI-V200	DSI-V200
Temperature (PTx)	⊗	⊗	**PT100, 200, 500, 1000, 2000**	**DSI-RTD**	**DSI-RTD**
Thermocouple	**K, J, T, R, S, N, E, C, B**	**K, J, T, R, S, N, E, C, B**	⊗	**DSI-THx**	**DSI-THx**
Resistance	⊗	⊗	1 kΩ, 10 kΩ	✓	⊗
Potentiometer	⊗	⊗	⊗	✓	⊗
LVDT	⊗	⊗	⊗	DSI-LVDT	DSI-LVDT
Charge	⊗	⊗	⊗	DSI-CHGx	DSI-CHGx
Current	⊗	⊗	⊗	20 mA (internal shunt), also DSI-xxA, current sensor	±20 mA, ±2 mA also DSI-xxA, current sensor
TEDS	⊗	⊗	⊗	✓	✓
Isolation voltage	1000 V	1000 V	1000 V	Differential	125 Vrms Isolation

IN THESE TABLES:

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Modules that natively support the signal/sensor type in that row are colored in light orange.
Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

⚠️ MEASURING STRAIN AND PRESSURE

KEY STRAIN MEASUREMENT SENSORS: CHALLENGES AND SOLUTIONS

THE STRAIN GAGE SENSOR

A strain gage (aka "gauge") measures strain through a change in resistance. A metal foil pattern is mounted on a flexible substrate, which also serves to insulate the foil sensor from the object under test. A current is passed through the foil pattern. When the object under test is stressed by bending or twisting it in the axis perpendicular to the foil pattern, this creates a change in resistance which is proportionate to the amount of deflection. When a conductor is stretched, its resistance increases. When compressed, its resistance decreases. This change in resistance can be measured using a Wheatstone bridge. Shown in the diagram at right, a Wheatstone bridge circuit measures an unknown electrical resistance (Rx) as a change of the voltage V. Since the other three resistors have known values we can determine the value of Rx.

When one of the four resistors is being used to make a single axis measurement, this is what is called a "quarter bridge" hook-up. The signal conditioner must provide the three missing sensors, and balance the circuit, deducing the resistance value of the sensor in real-time, and converting that resistance to a useful strain measurement (when no current passes through V, the circuit is balanced). Using two sensors, therefore, is a half-bridge, and measuring with all four sensors is a full-bridge configuration. When the signal conditioner provides the missing resistors needed to com-

plete the circuit, this is referred to as "bridge completion." Dewesoft STG signal conditioners provide this completion, and often allow you to select between 120 Ω and 350 Ω completion resistors.

When you purchase a sensor, the package will typically show the GF or "gage factor." This is a number typically around 2. It is important to know the GF when setting up the sensor in the software. This factor relates to the change in resistance caused by strain over the native resistance of the sensor, divided by the strain itself.

SENSE LINES TO ENSURE ACCURACY

What about temperature and its effect on the accuracy of these measurements? After all, any time we talk about resistance measurements, the temperature is a factor because it can so easily change the measurement, causing wrong readings. Temperature variations at the sensor are caused not only by the ambient temperature (imagine one sensor is in the sun, or mounted right onto a running engine, while another one is not), but also by the current that is powering the Wheatstone bridge itself! The farther the excitation has to travel, the greater it will need to be, resulting in even more sensor self-heating from the excitation current. Because of this phenomenon, Dewesoft STG signal conditioners are designed for the use of SENSE lines to be connected to the corners of the bridge circuit.

Sense lines measure the difference between the excitation at the conditioner and the sensor and allow the conditioner to automatically adjust the circuit, rejecting the error from lead line resistance and temperature changes, and ensuring accurate and stable readings.

### INTERNAL SHUNT FOR CONVENIENT STRAIN GAGE CALIBRATION

A "shunt" is a resistor that is connected across one leg of the Wheatstone bridge circuit, temporarily unbalancing it. This method simulates a given strain, and since the value of the shunt resistor is known (e.g., 59.88 kΩ), it provides a known offset.

The momentary switching in of this shunt cal resistor is often done both at the beginning and at the end of a test so that the measured data can be referenced to it during data analysis. Thus, any baseline shifts which may have occurred across the whole span of a long test can be detected and offset mathematically later on.

Dewesoft STG signal conditioners provide an internal shunt cal resistor, eliminating the need to connect one externally (which also eliminates the need to touch the wiring).
In addition, DewesoftX software allows you to engage the shunt cal with a click of a button. Shunt calibration can be done on a single channel, or multiple channels at once, at your option.
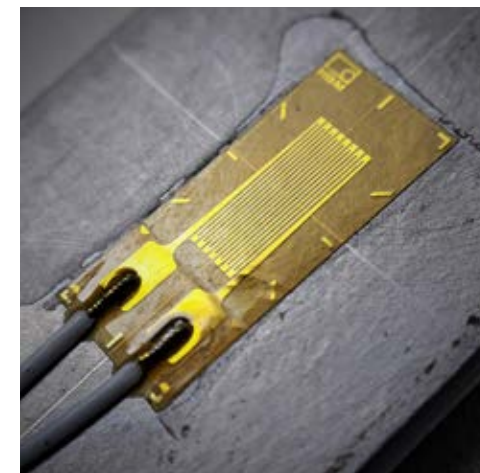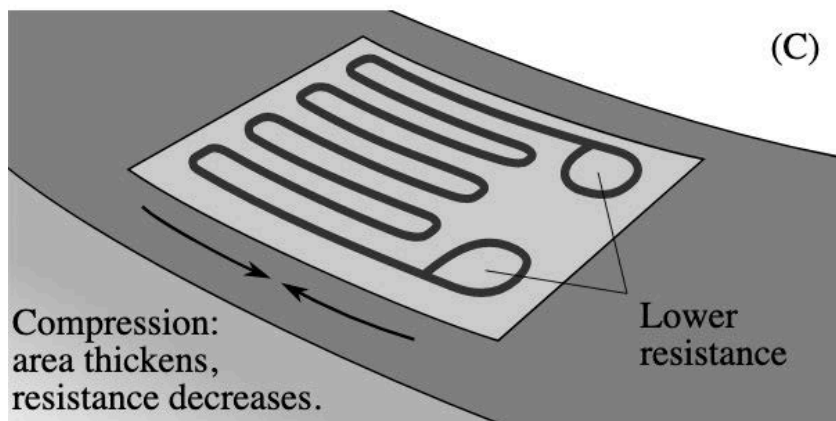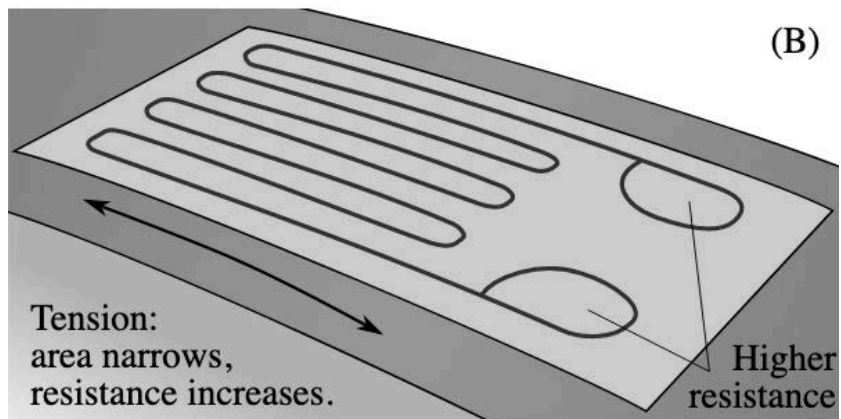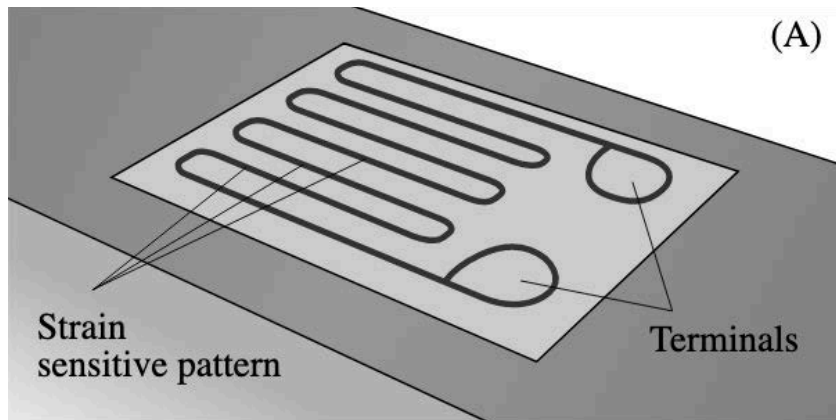

Typical foil strain gage sensor
Image: courtesy of Cristian V. [CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)]
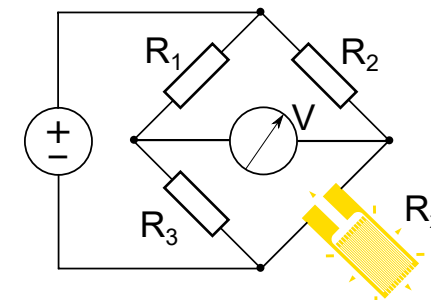
Wheatsone bridge diagram, showing a single strain gage used for measuring in quarter bridge configuration

MEASURING STRAIN AND PRESSURE

(A)
Strain sensitive pattern — Terminals

(B)
Tension: area narrows, resistance increases. — Higher resistance

(C)
Compression: area thickens, resistance decreases. — Lower resistance

Graphic courtesy of Wikimedia commons

MORE USEFUL BACKGROUND INFORMATION

Strain is usually expressed in μm/m (micrometer per meter), also known as "microstrain." You may also see "mV/V," which refers to the output in millivolts per volt of excitation. Speaking of which, please note in the specification tables for our STG and MULTI series amplifiers, that the excitation voltage can be changed independently on each channel. It is recommended first to check the sensor datasheet and use the excitation voltage recommended by the sensor producer. In order to avoid the self-heating phenomenon mentioned earlier, it is considered a best practice to use the lowest excitation voltage possible. However, increasing excitation voltage improves sensitivity.

It's important that the excitation lines be isolated just like the signal lines are, to ensure low noise and optimal signal-to-noise ratio of your recorded data. This is also ensured by the advanced ADC electronics of all Dewesoft hardware in general, and the dual ADC approach of SIRIUS DualCore hardware in particular. And because reducing the length of signal cables is especially important when it comes to strain sensors, the modular nature of all Dewesoft systems is a big advantage.

More Information
https://dewesoft.com/daq/measure-strain-and-pressure

STRAIN GAGE APPLICATIONS

Strain gages are used every day for a wide range of applications, from static to dynamic. For example, they are commonly used inside load cells for measuring weight, in static applications. But they are also used in highly dynamic applications, where their outputs are fluctuating widely according to the deformation of a mechanical object under test. Imagine strain gages mounted all across the body panels of an automobile, which is being driven rapidly across uneven blocks at very high speeds, as just one example. Or, being mounted on a drive shaft spinning at thousand of RPMs and being subjected to tension and torsion as the load changes dynamically. There are countless applications for strain gages, and Dewesoft can help you handle all of them.

Typical compression load cell

RELEVANT SI UNITS

The SI units of Force and Area are Newton (N), and meter squared (m2). Therefore, the SI unit of Stress and Pressure are:

**N/m2
or pascal (Pa):
1 Pa=1 • N/m2**

Because strain is defined as the ratio of the change the length/volume, it has no units.

STRAIN & PRESSURE MEASUREMENT - SIRIUS®

SIRIUS
DUAL CORE

DualCoreADC® technology: dual 24-bit delta-sigma ADC's with anti-aliasing filtering.
160 dB of dynamic range. 200 kS/s sample rate.
8 channel modules.

SIRUS HD
HIGH DENSITY

High density modules with 200 kS/s sample rate.
Ideal for high channel count applications.
16 channel modules.

SIRUS HS
HIGH SPEED

1 MS/s 16-bit SAR technology.
Alias-free filtering, ideal for transient recording.
8 channel modules.

	STG	UNI	MULTI	STGM	LV	HD-STGS	HD-LV	HS-STG	HS-LV
Connectors	DB9, L2B7f, L2B10f	DB9, L2B10f	DB9, L2B7f, L2B10f	DB9, L2B7f, L2B10f	DB9	DB9, L1B10f	DB9	DB9	DB9
Channels per slice	8	8	8	8	8	16	16	8	8
Data rate / channel	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	1 MS/s	1 MS/s
Resolution	24-bit Dual Core	24-bit DualCore	24-bit Dual Core	24-bit Dual Core	24-bit Dual Core	24-bit	24-bit	16-bit	16-bit
Bandwidth	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	1 MHz	5 MHz
Voltage ranges	±50 V, ±10 V, ±1 V, ±100 mV	±100 V, ±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±200 V, ±10 V, ±1 V, ±100 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±100 V, ±10 V, ±1 V, ±100 mV	±50 V to ±20 mV	±100 to ±50 mV
Input coupling	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.3 Hz, 0.16 Hz (1, 3, 5, 10, 20 Hz SW)	DC	DC	DC, AC 1 Hz (3, 10 Hz SW)	DC	DC	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 1 Hz (3, 10 Hz SW)
Sensor excitation	0 to 20 V (max. 0.8W), 0 to 60mA (max 0.5W)	0 to 20 V max. 0.8 W, 0 to 60 mA max. 0.5 W. IEPE 2 to 20 mA	0 to 15 V (max. 44 mA)	0 to 15 V (max. 44 mA)	Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A / 2 W)	0 to 12 V (max. 44 mA)	Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A / 2 W)	0 to 20 V max. 0.8W, 0 to 60 mA max 0.5 W	Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A / 2 W)
Bridge connection	Full, ½, ¼ 350Ω, ¼ 120Ω 3, 4 wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire, 4-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3 wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3 wire	Full bridge	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3 wire	Full	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3, 4 wire	Full
Programmable shunt	59.88 kΩ, 175kΩ bipolar	59.88 kΩ 175 kΩ bipolar	100 kΩ bipolar	100 kΩ bipolar	⊗	100 kΩ	⊗	59.88 kΩ, 175 kΩ bipolar	⊗
IEPE input	DSI-ACC	✓	DSI-ACC	DSI-ACC	DSI-ACC	DSI-ACC	DSI-ACC	DSI-ACC	DSI-ACC
Resistance	✓	DSI-V200	⊗	⊗	⊗	⊗	⊗	✓	⊗
±200 V input	DSI-V200	✓	DSI-V200	DSI-V200	DSI-V200	DSI-V200	DSI-V200	DSI-V200	DSI-V200
Temperature (PTx)	✓	✓	DSI-RTD	DSI-RTD	DSI-RTD	DSI-RTD	DSI-RTD	✓	DSI-RTD
Thermocouple	DSI-THx	DSI-THx	DSI-THx	DSI-THx	DSI-THx	DSI-THx	DSI-THx	DSI-THx	DSI-THx
Potentiometer	✓	✓	✓	✓	⊗	✓	⊗	✓	⊗
LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT
Charge	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx	DSI-CHGx
Current	Ext. shunt, DSI-xxA	ext. shunt, DSI adapters, current sensors	Ext. shunt, DSI-xxA	Ext. shunt, DSI-xxA	Ext. shunt, DSI-xxA	Ext. shunt, DSI-xxA	Ext. shunt, DSI-xxA	Ext. shunt, DSI-xxA	Ext. shunt, DSI-xxA
TEDS	✓	✓	✓	✓	✓	✓	✓	✓	✓
Isolation voltage	1000 V	1000 V	1000 V	1000 V	1000 V	500 V in pairs	500 V in pairs	1000 V	1000 V

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Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter support, with model name	Does not support this measurement

STRAIN & PRESSURE MEASUREMENT - SIRIUS®

SIRIUS XHS
EXTRA HIGH SPEED

Our fastest, most advanced DAQ system. 15 MS/s sample rate and 5 MHz bandwidth. 8 channel modules.

XHS-LV
DB9
8
15 MS/s
24-bit up to 1 MS/s 16-bit > 1 MS/s
±100 to ±50 mV
DC, AC 1 Hz
Bipolar 2.5 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A / 2 W)
Full
⊗
DSI-ACC
⊗
DSI-V200
DSI-RTD
DSI-THx
⊗
DSI-LVDT
DSI-CHGx
Ext. shunt, DSI-xxA
✓
1000 V

The maximum benefit from strain gauge measurements can only be obtained when a DAQ system is operated by a person with complete knowledge of the factors governing the strength and elasticity of materials. This knowledge allows the strain gauges to be located so that measurements provide clear unambiguous information about the structure under test.

The Rosette Math software plug-in is used to determine the angle and max amplitude of strain/stress on a surface. This is used when it is not known which direction of the strain/stress has to be expected.

Without this plug-in, many calculations would have to be done manually in the Math engine. Rosette strain gauges are available combined in one foil (stacked construction), alternatively, you can use three separate strain gauges (planar construction).

STRAIN & PRESSURE MEASUREMENT - KRYPTON®

KRYPTON MULTI

Multi-channel ruggedized modules for harsh environment testing applications.

KRYPTON ONE

Single channel ruggedized modules for harsh environment applications.

	3xSTG and 6xSTG	STG-1
Connectors	DB9, L2B10f	DB9
#ch per module	3 or 6	1
Data rate / channel	20 kS/sec	40 kS/sec
Resolution	24 bit	24 bit
Bandwidth	0.49 fs	0.49 fs
Voltage ranges	±10 V, ±1 V, ±100 mV, ±10 mV	±50 V, ±10 V, ±1 V, ±100 mV
Input coupling	DC, AC 1 Hz	DC, AC 1 Hz
Sensor Excitation	0 - 15 V max. 0.4 W/ch (max. 45 mA)	Freely programmable (16-bit DAC) Unipolar 0 to 24 V, Bipolar 0 to 12 V 0 to 42 mA (max. 0.4 W/ch)
Bridge connection	**Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire**	**Full bridge strain, ½ and ¼ bridge strain, 3-wire)**
Programmable shunt	100 kΩ	100 kΩ
IEPE input	DSI-ACC	DSI-ACC
Resistance	⊗	±20 mA, ±2 mA
±200 V input	DSI-V200	DSI-V200
Temperature (PTx)	DSI-RTD	DSI-RTD
Thermocouple	DSI-THx	DSI-THx
Potentiometer	✓	⊗
LVDT	DSI-LVDT	DSI-LVDT
Charge	DSI-CHGx	DSI-CHGx
Current	ext. shunt or DSI-xxA	ext. shunt or DSI-xxA
TEDS	✓	✓
Isolation voltage	Differential	125 Vrms Ch-GND isolation

KRYPTON ONE series modules provide the ultimate in modularity – right down to a single channel. Place them as close to the signal source as you like. Easily interconnect them using EtherCAT cables. Daisy-chain them together freely up to 100 m (328 ft) apart!

KRYPTON-STG multi-channel modules are available with either 3 or 6 channels each. Designed for the harshest environments, KRYPTON modules can handle temperature extremes like -40 to 85°C (-40 to 185°F). They're IP67 sealed against water, dust, smoke, and other elements. And they're tough, with high shock and vibration tolerances that ordinary DAQ instruments simply cannot match.

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Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

STRAIN & PRESSURE MEASUREMENT - IOLITE®

The IOLITE 8xSTGS is an 8-channel module made specifically for strain gage applications. The IOLITE 6xSTG is a 6 channel isolated strain gage input module. It also accepts DSI modules which adapt it to handle a wide variety of other sensors.

Single-channel IOLITE 1xSTG strain gage module, for the ultimate in modularity. Place them as close to the signal source as you like. Easy to interconnect and daisy-chain using EtherCAT cables, up to 100 m each!

IOLITE MULTI

Multi-channel IOLITE modules for DAQ and real-time control applications.

IOLITE ONE

Single channel IOLITE modules for DAQ and real-time control applications.

	8xSTGS	6xSTG	1xSTG
Connectors	Terminal block, DB9	DB9	DB9
#ch per module	8	6	1
Data rate / channel	20 kS/s	20 kS/s	40 kS/sec
Resolution	24-bit	24-bit	24-bit
Bandwidth	0.433 fs	0.49 fs	0.49 fs
Voltage ranges	±1 V, ±100 mV, ±20 mV	±50 V, ±10 V, ±1 V, ±100 mV	±50 V, ±10 V, ±1 V, ±100 mV
Input coupling	DC	DC, AC 1 Hz	DC, AC 1 Hz
Sensor excitation	Unipolar 1 V, 2 V, 5 V	Bipolar 0 to 12 V, Unipolar 0 to 24 V, Current 0 to 44 mA, (max. 0.55 W/ch)	Bipolar 0 to 12 V , Unipolar 0 to 24 V
Bridge connection	**Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire**	**Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire**	**Full bridge strain, ½ bridge strain, ¼ bridge strain, 3-wire**
Programmable shunt	100 kΩ	100 kΩ	100 kΩ
IEPE input	⊗	DSI-ACC	DSI-ACC
±200 V input	⊗	DSI-V200	DSI-V200
Temperature (PTx)	⊗	DSI-RTD	DSI-RTD
Thermocouple	⊗	DSI-THx	DSI-THx
Resistance	⊗	✓	⊗
Potentiometer	⊗	✓	⊗
LVDT	⊗	DSI-LVDT	DSI-LVDT
Charge	⊗	DSI-CHGx	DSI-CHGx
Current	⊗	20 mA (internal shunt) or DSI-xxA	±20 mA, ±2 mA or DSI-xxA
TEDS	✓ (DB9 only)	✓	✓
Isolation voltage	Differential	Differential	125 Vrms Isolation CH, GND

IN THIS TABLE:

Modules whose primary function is to measure the measurement type shown at the top of the page are shaded in grey.
Modules that natively support the signal/sensor type in that row are colored in light orange.
Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

⚠ MEASURING VIBRATION

Vibration and derived parameters like acceleration, shock, and displacement are extremely important measurands in so many applications. Vibration can be considered to be the oscillation or repetitive motion of an object around an equilibrium position. The equilibrium position is the position the object will attain when the force acting on it is zero. Vibration usually occurs because of the dynamic effects of manufacturing tolerances, clearances, rolling and rubbing contact between machine parts, and out-of-balance forces in rotating and reciprocating members. Small, insignificant vibrations sometimes excite the resonant frequencies of other structural parts and can be amplified into major vibration and noise sources.

KEY VIBRATION SENSOR TYPES

There are many sensor types, and many models within each type from the manufacturers who make them. But we will focus on the main types which are used in the overwhelming number of applications around the world in this section.

THE CHARGE SENSOR
The classic CHARGE sensor is based on a quartz crystal that converts changes in pressure, acceleration, temperature, strain, or force into an electrical charge.

Pros – excellent dynamic characteristics, extremely linear output, able to withstand high-temperature environment (over 500°), require no sensor power. Very high shock amplitude range.

Cons – they require a relatively expensive CHARGE signal conditioner. Cables are susceptible to noise, so lengths must be short. Low-noise cables are expensive. Very limited static measurement capabilities.

Compatibility – Dewesoft CHG modules directly support charge sensors. It is also possible to use MULTI and STG modules with our DSI-CHGx adapters, as long as the dynamic range is sufficient for your application.

THE IEPE SENSOR
If we take a CHARGE sensor and integrate a small amplifier inside it, we get an IEPE, or "Integrated Electronics Piezo-Electric" accelerometer, also known as ICP®, CCLD, IsoTron® or DeltaTron®.

Pros – higher output signal means less noise, longer cables are no problem, etc. Requires a less expensive IEPE signal conditioner in the measurement system. Excellent dynamic response.

Cons – requires mA sensor power. The operating temperature maximum is ~130°C. Not suitable for measuring static signals.

Compatibility – Dewesoft ACC modules directly support IEPE sensors, providing the required constant current excitation. It is also possible to use other modules with DSI-ACC adapters as long as the bandwidth is sufficient for your application.

THE MEMS SENSOR
Since CHARGE and IEPE sensors typically start to measure at 0.3 Hz to 10 Hz, they cannot make static or very low-frequency measurements. The Micro-Electro Mechanical System sensor (MEMS) is a great solution. MEMS sensors are typically used for seismic work, gyro positioning systems, airbag testing, and the like.

Pros – great for static/low-frequency measurements (they can measure down to 0 Hz), can measure static angle.

Cons – limited temperature operating range due to internal electronics, upper bandwidth limited to low kHz range. Amplitude range limited to 400 g.

Compatibility – Some MEMS sensors have a digital output that can be input to your Dewesoft system via USB. Consult with us to find out more.

Of course, compatibility with the 3xMEMS-ACC sensors shown on the next page is guaranteed.

ACCELERATION MEASUREMENT - IOLITE 3XMEMS-ACC ▲

LOW-NOISE TRIAXIAL MEMS ACCELEROMETER AND INCLINOMETER

IOLITEdi 3xMEMS-ACC is a data acquisition device with an embedded triaxial MEMS accelerometer, analog-to-digital conversion, and an EtherCAT interface based on the IOLITEd DAQ device platform.

This sensor is the ideal DAQ sensor for structural health monitoring solutions, such as permanent condition monitoring on structures such as bridges, buildings, antennas, and stadiums. Easily distribute and synchronize multiple sensors over large structures using one cable that can span up to 50m node-to-node. A single cable carries the signal, power, and synchronization.

Analog to digital conversion is done inside the IOLITE 3xMEMS-ACC, eliminating the noise that would be picked up in analog cables running back to the DAQ system.
Measure acceleration in the X, Y, and Z axes. And with the included DewesoftX software, you can easily calculate velocity and displacements as well as static pitch and roll angles from the DC acceleration values.

Even though the IOLITE 3xMEMS-ACC measures acceleration, it can also be used to precisely measure displacement by integrating the acceleration twice and applying appropriate filtering. The task is straightforward thanks to DewesoftX DAQ software.

The "w" version is built into a waterproof aluminum casing with cable glands. It's designed to be mounted outdoors and is fully waterproof. The enclosure automatically vents the air to equalize pressure inside the enclosure to the outside air pressure while it does not allow water to pass into the enclosure. This prolongs the life span of the seal and increases the durability of the enclosure.

More information:
https://dewesoft.com/products/daq-and-control-systems/iolited/iolitedi-3xmems

IOLITEdiw 3xMEMS-ACC waterproof / sealed version for outdoor applications.

IOLITEdi 3xMEMS-ACC for indoor applications.

RELEVANT SI UNITS

Acceleration is derived from the two SI units Meters (distance) and Seconds (time) according to this equation:

$$a = m/s^2$$

It can also be derived from the Force (N) and the mass (kg), if these are known:

$$a = F/kg \quad (a = force/mass)$$

IOLITEdiw 3XMEMS-ACC

3-axis MEMS based sensor.
8 and 40 g versions available.
Laboratory version

IOLITEdiw 3XMEMS-ACC

3-axis MEMS based sensor.
8 and 40 g versions available.
Waterproof version, IP65 for outdoor use.

	3xMEMS-ACC-8g	3xMEMS-ACC-40g	IOLITEdiw-3xMEMS-ACC-8g	IOLITEdiw-3xMEMS-ACC-40g
Measurement ranges	Min: +-2 g Max: +-8 g	Min: +-10 g Max: +-40 g	Min: +-2 g Max: +-8 g	Min: +-10 g Max: +-40 g
-3 dB bandwidth	1000 Hz	1000 Hz	1000 Hz	100 Hz
Sample rate	4 S/s	4 S/s	4 S/s	4 S/s
Dynamic range	96 dB	96 dB	96 dB	96 dB
Noise density (lowest range)	25 µg/√Hz	75 µg/√Hz	25 µg/√Hz	25 µg/√Hz
MEMS inclinometer				
Accuracy and resolution valid in range	±15 °	±15 °	±15 °	-15 °
Accuracy and resolution valid for bandwidth	< 0.1 °	< 0.1 °	< 0.1 °	< 0.1 °
Relative accuracy (23 °C)	0.01 °	0.01 °	0.01 °	0.01 °
Resolution	0.001 °	0.001 °	0.001 °	0.001 °
Dimensions	62 x 70.5 x 22.3 mm 2.44 x 2.78 x 0.88 in)	62 x 70.5 x 22.3 mm (2.44 x 2.78 x 0.88 in.)	83 x 152 x 38.9 mm (3.26 x 5.98 x 1.53 in.)	83 x 152 x 38.9 mm (3.26 x 5.98 x 1.53 in.)
Environmental	IP20	IP20	IP65 (waterproof)	IP65 (waterproof)

▲ MEASURING SOUND

KEY SOUND MEASUREMENT APPLICATIONS

Dewesoft supports a wide variety of applications in the world of sound measurement with turn-key hardware and software solutions. These include:

Sound Level Meter – a Class 1 sound level meter that is designed to meet the requirements of IEC 61672. This standard specifies two levels of performance, Class 1 and Class 2, with Class 1 being effectively more accurate.
Octave Band Analysis – Provides a close approximation of how the human ear responds. Dewesoft's octave band analyzer exactly represents the filter sets defined by the IEC 61260 standards and gives the user live visualization of data, crucial for advanced acoustic analysis. Acoustic weighting filters include A, B, C, D, and Z.

Sound Intensity – A perfect tool for sound intensity level measurement and noise source determination brought to an entirely new level by Dewesoft. Complies with sound intensity-based sound power calculations: the Discrete points method (ISO 9614-1) and the Scanning method (ISO 9614-2).

Sound Power – Fully compliant with relevant sound power standards ISO 3741, ISO 3743-1, ISO 3743-2, ISO 3744, ISO 3745, ISO 6393, ISO 6394, ISO 6395, ISO 6396. All calculated parameters are available both in real-time and offline. Calculates correction factors K1, K2, C1, C2, and C3; supports raw time-domain data storing and offline sound power calculation.

Dewesoft offers easy to use, yet advanced products for acoustics testing. Our systems can accurately measure and characterize the sound and noise emissions of your products. Our one-stop acoustic test solution covers all essential sound measurement applications such as Sound Level, Sound Power, Sound Quality, Sound Intensity, Octave Band Analysis, and Reverberation Time RT60.

All acoustic tests are performed according to international standards and supported by reference and accurate sound and acoustic calibration services. We put in extra effort and care to make you the trusted partner in the acoustic analysis.

Noise and sound have become critical sales factors for many products. Indeed, they are often key product differentiators. Too much or too little noise or the wrong sound profile can affect consumer perception and acceptance of a particular brand.

Moreover, manufacturers must comply with strict noise legislation and labeling requirements, and document the methods used to determine the data. Therefore, when designing product sound and noise emission it is essential to take into account not only objective parameters but also the user's subjective perceptions.

We provide a complete range of very flexible data acquisition systems for sound measurement and recording with compatibility for any microphone or vibration sensor.
Award-winning DewesoftX data acquisition software perfectly contemplates our DAQ hardware and brings simple, usable sound analysis into the hands of every test engineer.

MEASURING SOUND ◢

Sound Quality – Addresses the need to empirically evaluate how sound produced by different kinds of machines is perceived by the human ear. The tool will help you determine how the sound is perceived, tune the sound of your machine, and make it appealing to users. Loudness calculation is done according to ISO 532-1 and ISO 532-2. An integrated solution.

Reverberation Time RT60 – the RT60 reverberation time solution represents an essential tool for obtaining an accurate measurement of reflected sound.
RT60 fully complies with the ISO 354 standard using the integrated response method. Different evaluation ranges for reverberation time estimation are supported (T20, T30, and T60).

And there's more
Even more sound, noise, vibration, and harshness testing applications are outlined on our website. Look to the applications section.

More Information
https://dewesoft.com/applications/acoustics
https://dewesoft.com/applications/nvh-testing

RELEVANT SI UNITS

Because sound is a pressure, it is expressed in the derived SI unit

Pascal (Pa).

It is often expressed in decibels due to the nature of the Pascal scale, and the logarithmic nature of human hearing.

1 dB = 94 Pa

BRAKE NOISE TESTING
ACCORDING TO VDA 303 GUIDELINES

https://dewesoft.com/applications/nvh-testing/brake-noise-testing

CLASS 1 SOUND LEVEL METER
FOR SOUND AND NOISE

https://dewesoft.com/applications/nvh-testing/sound-level-meter

OCTAVE BAND ANALYSIS & ANALYZER

https://dewesoft.com/applications/nvh-testing/octave-band-analysis

SOUND INTENSITY MEASUREMENT

https://dewesoft.com/applications/nvh-testing/sound-intensity

SOUND POWER MEASUREMENT

https://dewesoft.com/applications/nvh-testing/sound-power

SOUND QUALITY
MEASUREMENT & ANALYSIS

https://dewesoft.com/applications/nvh-testing/sound-quality

REVERBERATION TIME
RT60 MEASUREMENT

https://dewesoft.com/applications/nvh-testing/reverberation-time

ORDER ANALYSIS
FOR ROTATING MACHINERY

https://dewesoft.com/applications/nvh-testing/order-analysis

⚠ MEASURING SOUND

Not just for singers - microphones are an important sensor in a wide range of measurement applications.

KEY MICROPHONE SOUND SENSORS: TYPES AND COMPATIBILITY

All microphones convert sound energy into electrical energy, but there are several differ ways of doing the job.

Key questions to ask when choosing a micro phone for your application:
- Externally polarized or pre-polarized
- Free-field, pressure, or random Incidence type
- Dynamic range required
- Frequency range required

The majority of microphones used in applications are either capacitor (electrostatic) aka condenser, or dynamic (electromagnetic) models.

Both types employ a moving diaphragm to capture sound, but use different electrical principles for converting the mechanical energy into an electrical signal.

BASIC MICROPHONE TECHNOLOGIES

Condenser microphones are heavily used in DAQ applications. One plate of a capacitor moves in response to sound pressure. This movement changes the capacitance. Condenser microphones usually need an external power supply (aka polarization voltage) or a small battery to provide a voltage across the capacitor.

Dynamic microphones use a diaphragm that moves a magnet (or a coil) when sound waves move the diaphragm. This movement induces a small current. Dynamic mics don't require power to operate.

MAJOR MICROPHONE TYPES

Free-field microphones are designed to measure the sound pressure as it was before the microphone entered the sound field. Their frequency response is adjusted to compensate for disturbances of the local sound field.

Pressure microphones are used for measuring the actual sound pressure on the surface of the microphone's diaphragm. Pressure microphones are recommended for studies of sound pressures inside closed cavities.

Random incidence microphones (also known as diffuse-field microphones) are used for measuring in sound fields where the sound comes from many directions, like when measuring in a reverberation chamber. These mics are often used for sound pressure level measurements according to ANSI standards.

SOUND MEASUREMENT - SIRIUS®

SIRIUS MIC200 SOUND MEASUREMENT SYSTEM

• CRITICAL SOUND MEASUREMENTS
• HIGH AMPLITUDE ENVIRONMENTS
• HIGH-TEMPERATURE ENVIRONMENTS

Polarize your condenser microphones to measure sound in the most demanding applications with the highest possible stability and accuracy. SIRUS MIC200 is designed for high amplitude measurements with classic 200V externally polarized microphones that offer supreme temporal and temperature stability.

FEATURES

- **High dynamic range:** DualADC technology provides 160 dB dynamic range
- **Fast acquisition:** 200 kS/s sample rate supports high-frequency microphones
- **Multi-brand microphone support:** Industry-standard 7-pin LEMO connector supports every microphone brand
- **TEDS support:** automated setup of TEDS-equipped microphones
- **High channel count:** use as many MIC200s as required for your applications
- Software included: award-winning DewesoftX software is included
- **Dedicated sound solutions:** Class 1 IEC SLM and a complete set of advanced ISO compliant measurements: Sound Power, Sound Intensity, Sound Quality, RT60
- **IEC acoustic calibration services:** IEC 61672, IEC 61260, IEC 60651, IEC 61094-4, etc. with the ability to order everything already calibrated
- **Multifunction and extensible:** Use in conjunction with any other Dewesoft DAQ system and maximize your measurement capabilities – simply add additional sensors and simultaneously capture temperature, vibration, video, strain, etc. while always staying within the same software, with all data perfectly synchronized.

WHY USE EXTERNAL POLARIZATION?

The main advantage of external polarization is freedom in the choice of microphones. It opens access to a broader selection as more models are available, which again gives flexibility in advanced R&D measurements. External polarization is an advantage whenever:

- High temporal stability is required
- High temperatures are expected (e.g., 150 °C / 302° F)
- High amplitudes are expected
- Higher frequencies need to be measured
- High grade of accuracy and lower noise floor is required

SOFTWARE INCLUDED

Award-winning DewesoftX is included with every SIRIUS system. Powerful math and extensive analysis options are built-in, including: octave analysis, FFT, and mathematical analysis with visualization, sequencing, and data export to a wide variety of popular formats.

SIRIUS MIC200

160 dB dynamic range 8-channel polarized microphone DAQ system

Inputs		
Input types	**Voltage (Externally polarized microphones)**	
ADC Type	24-bit delta-sigma dual core with anti-aliasing filter	
Sampling Rate	Simultaneous 200 kS/sec	
Dual Core Ranges (Dual Core)	±10 V (±500 mV)	±500 mV (NA)
Input Accuracy @ 1 kHz	±0.1 % of reading	±0.1 % of reading
Dynamic Range @ 10 kS/s (Dual Core)	-139 dB (-160 dB)	-134 dB (NA)
Typ. Noise floor @ 50 kS/s (Dual Core)	-109 dB (-125 dB)	-100 dB (NA)
Typ. THD @ 200 kS/s (Signal: -1 dBFS @ 1 kHz)	-94 dB	-92 dB
Typ. SFDR @ 200 kS/s (Signal: -1 dBFS @ 1 kHz)	97 dB	93 dB
Typ. CMR @ 50 Hz / 400 Hz / 1 kHz	140 / 133 / 126 dB	140 / 133 / 126 dB
Gain Drift	Typ. 10 ppm/K, max. 40 ppm/K	
Gain Linearity	<0.03 %	
Input Coupling	AC 0.35 Hz (3 Hz, 10 Hz per SW)	
Excitation		
Preamplifier Excitation Voltage	±14 V	
Polarization Voltage	200 V	
Polarization Voltage Accuracy	±0.5 %	
Protection	Continuous short to ground	
Additional Specifications		
Input connector	7-pin LEMO 1B	
TEDS support	Standard (Class 2)	

◭ VIBRATION / SOUND MEASUREMENT - SIRIUS®

Above: SIRIUS ACC input module, ideal for all kinds of IEPE sensors. The green light around the bezel indicates that the sensor is connected and working fine. Note that ACC+ inputs also include a synchronized SuperCounter® / digital input

DSI ADAPTERS
Let's say your SIRIUS system has only low voltage (LV) or strain gage (STG) inputs with DB9 connectors, but you need to connect one or more CHARGE or IEPE sensors. Simply plug in the appropriate DSI adapter, and the problem is solved. And the TEDS interface makes DSI setup automatic in DewesoftX software.

The DSI-CHG allows you to connect CHARGE type sensors to STG, MULTI, and LV modules with DB9 connectors. Sensor connector is BNC.

The DSI-CHG-DC version allows you to measure static charge with a large time constant almost down to DC, with drift lower than 0.1 pC/s.

SIRIUS DUAL CORE

DualCoreADC® technology: dual 24-bit delta-sigma ADC's with anti-aliasing filtering.
160 dB of dynamic range. 200 kS/s sample rate.
8 channel modules.

	ACC	CHG	STG	STGM	UNI	MULTI	LV
Connectors	BNC, TNC	BNC, TNC	DB9, L2B7f, L2B10f	DB9, L2B7f, L2B10f	DB9, L2B10f		DB9, BNC, BANANA
Channels per slice	8	8	8	8	8	8	8
Data rate / channel	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s	200 kS/s
Resolution	24-bit Dual Core	24-bit Dual Core	24-bit Dual Core	24-bit Dual Core	24-bit DualCore	24-bit Dual Core	24-bit Dual Core
Bandwidth	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz	70 kHz
Voltage ranges	±10 V, ±50 mV	±10 V, ±500 mV	±50 V, ±10 V, ±1 V, ±100 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±100 V, ±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±1 V, ±100 mV, ±50 mV	±200 V, ±20 V, ±10 V, ±1 V, ±100 mV
Input coupling	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.1 Hz, 1 Hz, 10 Hz, 100 Hz	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.3 Hz, 0.16 Hz (1, 3, 5, 10, 20 Hz SW)	DC	DC, AC 1 Hz (3, 10 Hz SW)
Sensor excitation	(IEPE) 2,4,8,12,16, 20 mA	(IEPE) 4,8,12 mA	0 to 20 V (max. 0.8W), 0 to 60mA (max 0.5W)	0 to 15 V (max. 44 mA)	0 to 20 V max. 0.8 W, 0 to 60 mA max. 0.5 W. IEPE 2 to 20 mA	0 to 12 V (max. 44 mA)	Bipolar 2 to 0 V, Unipolar 0 to 24 V, (max. 0.2 A/2 W)
Bridge connection	⊗	⊗	Full, ½, ¼ 350Ω, ¼ 120Ω 3-, 4-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire, 4-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	Full
Programmable shunt	⊗	⊗	59.88 kΩ, 175 kΩ bipolar	100 kΩ bipolar	59.88 kΩ 175 kΩ bipolar	59.88 kΩ	⊗
IEPE input	✓	✓	**DSI-ACC**	**DSI-ACC**	✓	**DSI-ACC**	**DSI-ACC**
Resistance	⊗	⊗	✓	⊗	DSI-V200	⊗	⊗
±200 V input	⊗	⊗	DSI-V200	DSI-V200	✓	DSI-V200	DSI-V200
Temperature (PTx)	⊗	⊗	✓	DSI-RTD	✓	DSI-RTD	DSI-RTD
Thermocouple	⊗	⊗	DSI-THx	DSI-THx	DSI-THx	DSI-THx	DSI-THx
Potentiometer	⊗	⊗	✓	✓	✓	✓	⊗
LVDT	⊗	⊗	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT
Charge	⊗	✓ **(100 k, 10 k pC)**	**DSI-CHG**	**DSI-CHG**	DSI-CHGx	**DSI-CHG**	**DSI-CHG**
Current	ext.shunt, current sensor	ext.shunt, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI adapters, current sensors	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor
TEDS	✓	✓	✓	✓	✓	✓	✓
Isolation voltage	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V

DSI-ACC adapters allow you to connect IEPE sensors to STG, MULTI, and LV modules with DB9 connectors. Sensor connector is BNC.

VIBRATION / SOUND MEASUREMENT - SIRIUS®

SIRUS HD
HIGH DENSITY
High-density modules with 200 kS/s sample rate.
Ideal for high channel count applications.
16 channel modules.

SIRUS HS
HIGH SPEED
1 MS/s 16-bit SAR technology.
Alias-free filtering, ideal for transient recording.
8 channel modules.

SIRUS XHS
EXTRA HIGH SPEED
Our fastest, most advanced DAQ system.
15 MS/s sample rate and 5 MHz bandwidth.
8 channel modules.

HD-ACC	HD-STGS	HD-LV	HS-ACC	HS-CHG	HS-STG	HS-LV	XHS-ACC	XHS-LV
BNC	DB9, L1B10f	DB9, BNC	BNC	BNC, TNC	DB9	DB9, BNC, BANANA	BNC	BNC, DB9
16	16	16	8	8	8	8	8	8
200 kS/s	200 kS/s	200 kS/s	1 MS/s	1 MS/s	1 MS/s	1 MS/s	15 MS/s	15 MS/s
24-bit	24-bit	24-bit	16-bit	16-bit	16-bit	16-bit	Up to 1 MS/s: 24-bit > 1 MS/s: 16-bit	Up to 1 MS/s: 24-bit > 1 MS/s: 16-bit
70 kHz	70 kHz	70 kHz	500 kHz	500 kHz, CHG: 200 kHz	1 MHz	1 MHz	5 MHz	5 MHz
±10 V, ±5 V, ±1 V, ±200 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±100 V, ±10 V, ±1 V, ±100 mV	±10 V to ±100 mV	±10 V to ±100 mV	±50 V to ±20 mV	±100 V to ±50 mV	±10 V to ±200 mV	±100 V to ±20 mV
DC, AC 0.1 Hz, 1 Hz (3, 10 Hz SW)	DC	DC	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.1 Hz, 1 Hz, 10 Hz, 100 Hz	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.1 Hz, AC 1 Hz	DC, AC 1 Hz
(IEPE) 4,8,12 mA	0 to 12 V max. 44 mA	Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A/2 W)	(IEPE) 4,8 mA	(IEPE) 4,8,12 mA	0 to 20 V max. 0.8W, 0 to 60 mA max 0.5 W	Bipolar 2 to 30 V, Unipolar 0 to 24 V, (max. 0.2 A/2 W)	IEPE 2 mA, 4 mA, 8 mA, 12 mA, 16 mA, 20 mA	Bipolar 2.5 to 30 V, Unipolar 2 to 24 V, (max. 0.2 A / 2 W)
⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	Full	⊗	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-, 4-wire	Full	⊗	Full
⊗	100 kΩ	⊗	⊗	⊗	59.88 kΩ, 175 kΩ bipolar	⊗	⊗	⊗
✓	**DSI-ACC**	**DSI-ACC**	✓	✓	**DSI-ACC**	**DSI-ACC**	✓	**DSI-ACC**
⊗	⊗	⊗	⊗	⊗	✓	⊗	⊗	⊗
⊗	DSI-V200	DSI-V200	⊗	⊗	DSI-V200	DSI-V200	⊗	DSI-V200
⊗	DSI-RTD	DSI-RTD	⊗	⊗	✓	DSI-RTD	⊗	DSI-RTD
⊗	DSI-THx	DSI-THx	⊗	⊗	DSI-THx	DSI-THx	⊗	DSI-THx
⊗	✓	⊗	⊗	⊗	✓	⊗	⊗	⊗
⊗	DSI-LVDT	DSI-LVDT	⊗	⊗	DSI-LVDT	DSI-LVDT	⊗	DSI-LVDT
⊗	**DSI-CHG**	**DSI-CHG**	⊗	✓ **(100k to 1k pC)**	**DSI-CHG**	**DSI-CHG**	⊗	**DSI-CHGx**
ext.shunt, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext.shunt, current sensor	ext.shunt, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, DSI-xxA, current sensor	ext.shunt, current sensor	ext. shunt, DSI-xxA, current sensor
✓	✓	✓	✓	✓	✓	✓	✓	✓
500 V in pairs	500 V in pairs	500 V in pairs	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

IN THIS TABLE:
Modules whose primary function is to measure the measurement type shown at the top of the page are shaded in grey.
Modules that natively support the signal/sensor type in that row are colored in light orange.
Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

▲ VIBRATION / SOUND MEASUREMENT - KRYPTON®

KRYPTON MULTI

Multi-channel ruggedized modules for harsh environment testing applications.

KRYPTON ONE

Single channel ruggedized modules for harsh environment testing applications.

The KRYPTONi-1xACC is a single channel isolated input module that handles virtually any IEPE sensor, providing selectable 4 or 8 mA of constant current sensor supply.

The KRYPTON-ACC is a 4 or 8 channel isolated module for IEPE sensors. Use the KRYPTON-STG with DSI-CHGx adapters to handle CHARGE sensors. Voltage and STG modules can be used with most CAPACITIVE acceleometers.

	ACC	STG	ACC-1	STG-1
Connectors	BNC	DB9, L2B10f	BNC	DB9
#ch per module	4 or 8	3 or 6	1	1
Data rate / channel	20 kS/sec	20 kS/sec	40 kS/sec	40 kS/sec
Resolution	24-bit	24-bit	24-bit	24-bit
Bandwidth	0.49 fs			
Voltage ranges	±10 V, ±5 V, ±1 V, ±200 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±5 V, ±1 V, ±200 mV	±50 V, ±10 V, ±1 V, ±100 mV
Input coupling	DC, AC 0.1 Hz, 1 Hz	DC, AC 1 Hz	DC, AC 0.1 Hz, 1 Hz	DC, AC 1 Hz
Sensor Excitation	(IEPE) 4 mA, 8 mA	0 to 15 V max. 0.4 W/ch (45 mA limit)	(IEPE) 4 mA, 8 mA	Bipolar: 0 to 12 V, Unipolar: 0 to 24 V (0 to 42 mA, max. 0.4 W/ch)
Bridge connection	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	⊗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire
Programmable shunt	⊗	100 kΩ	⊗	100 kΩ
IEPE input	✓	**DSI-ACC**	✓	**DSI-ACC**
Resistance	⊗	⊗	⊗	±20 mA, ±2 mA
±200 V input	⊗	DSI-ACC	⊗	DSI-ACC
Temperature (PTx)	⊗	DSI-RTD	⊗	DSI-RTD
Thermocouple	⊗	DSI-THx	⊗	DSI-THx
Potentiometer	⊗	✓	⊗	⊗
LVDT	⊗	DSI-LVDT	⊗	DSI-LVDT
Charge	⊗	**DSI-CHGx**	⊗	**DSI-CHGx**
Current	ext. shunt, current sensor	ext. shunt, DSI-xxA, current sensor	ext. shunt, current sensor	DSI-xxA, current sensor
TEDS	✓	✓	✓	✓
Isolation voltage	Differential	Differential	125 Vrms Ch-GND isolation	125 Vrms Ch-GND isolation

IN THIS TABLE:

Modules whose primary function is to measure the measurement type shown at the top of the page are shaded in grey.
Modules that natively support the signal/sensor type in that row are colored in light orange.
Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

VIBRATION / SOUND MEASUREMENT - IOLITE®

IOLITE MULTI

Multi-channel IOLITE modules for DAQ and real-time control applications.

IOLITE SINGLE

Single channel IOLITE modules for DAQ and real-time control applications.

	6xSTG	1xACC	1xSTG
Connectors	DB9	BNC, screw terminal	
#ch per module	6	1	1
Data rate / channel	20 kS/sec	40 kS/s	40 kS/s
Resolution	24-bit	24-bit	24-bit
Bandwidth	$0.49 \times fs$	$0.49 \times fs$	$0.49 \times fs$
Voltage ranges	±50 V, ±10 V, ±1V, ±100mV	±10 V, ±5 V, ±1 V, ±200 mV	±50 V, ±10 V, ±1 V, ±100 mV
Input coupling	DC, AC 1 Hz	DC, AC 0.1 Hz, 1 Hz	DC, AC 1 Hz
Sensor excitation	Bipolar 0 to 12 V, Unipolar 0 to 24 V, Current 0 to 44 mA (max. 0.55 W/ch)	(IEPE) 4 mA, 8 mA	Unipolar 0 to 24 V, Bipolar 0 to 12 V
Bridge connection	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3-wire	⊗	Full bridge strain, ½ bridge strain, ¼ bridge strain, 3-wire
Programmable shunt	100 kΩ	⊗	100 kΩ
IEPE input	DSI-ACC	✓	DSI-ACC
Resistance	✓	⊗	⊗
±200 V input	DSI-V200	⊗	DSI-V200
Temperature (PTx)	DSI-RTD	⊗	DSI-RTD
Thermocouple	DSI-TH	⊗	DSI-TH
Resistance	✓	⊗	⊗
Potentiometer	✓	⊗	⊗
LVDT	DSI-LVDT	⊗	DSI-LVDT
Charge	DSI-CHGx	⊗	DSI-CHGx
Current	20 mA (internal shunt), DSI-xxA	⊗	±20 mA, ±2 mA
TEDS	✓	✓	✓
Isolation voltage	Differential	125 Vrms Isolation CH, GND	125 Vrms Isolation CH, GND

IN THIS TABLE:

Modules whose primary function is to measure the measurement type shown at the top of the page are shaded in grey.
Modules that natively support the signal/sensor type in that row are colored in light orange.
Modules that support the signal/sensor type via DSI series (or other) adapters are colored in dark orange.

This Measurement	✓	DSI-NAME	⊗
The key measurement described in this table	Native support	DSI adapter, or external shunt or sensor	Does not support this measurement

SENSORS ACCELERATION MEASUREMENT

SIRIUS MINI

	SIRIUSm-3xACC-1xACC+
Analog inputs	4
Input type	**IEPE / voltage**
Connectors	BNC
High range / Low range	±10 V / ±500 mV
Sensor excitation	(IEPE) 2, 4, 8, 12, 16 or 20 mA
Compliance voltage	25 V
Sensor indicator	Green BNC LED bezel indicates IEPE sensor fault or disconnection
SuperCounter	One, compatible with counting, waveform timing, encoder, tacho, or gear-tooth sensor
Software	DewesoftX included. Runs on Windows computers. Software updates included for the life of the product.
TEDS	✓
Weight	0.74 kg (1.63 lb.)
Dimensions	146 x 139 x 64 mm (5.75 x 5.47 x 2.52 inches)
Power	5.0 V (+0.25 V, -0.6 V) DC (via USB)

Note: There is also a model SIRIUSm-4xACC model available without the SuperCounter input

SIRIUS MINI

MADE FOR SOUND AND VIBRATION

SIRIUS mini is a 4-channel DAQ system. It's perfect for vibration analysis and acoustic noise measurements. Just plug it into your computer's USB port and install the included DewesoftX software. USB also powers the system. SIRIUS mini is fanless, which means it's completely silent – important in some sound applications.

Each of the four high dynamic analog inputs features dual sigma-delta ADC's with 200 kHz per channel sampling rate. With DualCoreADC® technology SIRIUS DAQ systems achieve more than 130 dB signal-to-noise ratio and more than 160 dB in dynamic range. This is 20 times better than 24-bit DAQ systems and with 20-times less noise.

SIRIUS mini also features a SuperCounter®, which means that you can connect an encoder or tacho sensor. This serves as the basis for order tracking analysis, torsional vibration, and similar applications.

Carved out of a single block of aluminum, the SIRIUS mini is so small and light that you can easily fit it into a laptop bag or backpack.

VIBRATION SENSORS:

For standard measurements or single-axis modal analysis, the I1T-50g-1 and isolated triaxial I3T-50G-1 IEPE cube accelerometer with 50 g range are recommended. The I1AI-500G-1 is a miniature accelerometer intended for the measurement of higher vibration up to 500g. Many accelerometers are equipped with the TEDS smart sensor interface. DewesoftX software automatically detects the sensor and sets the correct scaling.

MODAL IMPACT HAMMER

The IH-441N-1 is a modal hammer with up to 440 N range. Our modal hammer is equipped with a TEDS smart sensor interface. DewesoftX software automatically detects the sensor and sets the correct engineer units and sensor scaling.

INDUSTRIAL ACCELEROMETERS

Case isolated sensors can also be used with non-isolated amplifiers without worrying about ground loops.

The I1TI-50G-2 IEPE sensor is perfect for industrial applications due to its rugged case and connector. The I3TI-50G-1 is a standard triaxial sensor with ranges up to 50 g. The I1TI-500G-1 is a single-axis accelerometer that can measure up to 500 g. The C1T-50g-1 charge accelerometer can be used in high-temperature environments up to 190° C (374°F).

MICROPHONES AND MORE

The facing page also shows the range of microphones offered by Dewesoft, as well as a sound intensity probe.

DEWESOFT ACCELERATION & SOUND SENSORS ▲

	I1T-50G-1	13TI-50G-1	I1TI-50G-2	C1T-100G-1	I1TI-500G-1	I1AI-500G-1	I3T-50G-1
Number of Axes	1	3	1	1	1	1	3
Sensitivity	100 mV/g	100 mV/g	100 mV/g	50 pC/g	10 mV/g	10 mV/g	100 mV/g
Range	50 g	50 g	50 g	100 g	500 g	500 g	50 g
Type	IEPE	IEPE	IEPE	Charge	IEPE	IEPE	IEPE
Frequency Range	±5 % 0.3 to 5000 Hz	±10 % 2 to 5000 Hz	±10 % 2 to 5000 Hz	±8 % up to 5000 Hz	±10 % 1 to 10,000 Hz	±10 % 1.1 to 10,000 Hz	±10 % 0.3 to 10,000 Hz
TEDS	✓	✓	⊗	⊗	✓	✓	✓
Features	Miniature size	Isolated case, triaxial	Isolated case, industrial	High temperature	Isolated case, modal	Ultra miniature	Low noise, triaxial
Dimensions	10.2 x 10.2 x 10.2 mm	15.5 x 15 x 15 mm	17.5 x 42.2 mm	12.7 x 24.4 mm	19.4 x 12.7 x 16.1 mm	9 x 6 mm	12 x 12 x 11 mm
Weight	4.3 g	10 g	44 g	25 g	10 g	2 g	5.6 g
Temperature Range	-51 °C to +85 °C	-51 °C to +85 °C	-51 °C to +121 °C	-51 °C to +191 °C	-40 °C to +85 °C	-51 °C to +121 °C	-51 °C to +82 °C

	46AE - 1/2" CCP Free-field Standard Microphone Set	146AE - 1/2" CCP Free-field Rugged Microphone Set IP67	46BE 1/4" CCP Free-field Standard Microphone Set w/o cable	46DE 1/8" CCP Pressure Standard Microphone Set
Frequency range (±1 dB)	5 - 10 kHz	5 - 10 kHz	10 - 40 kHz	10 - 25 kHz
Frequency range (±2 dB)	3.15 - 20 kHz	3.15 - 20 kHz	4 - 80 kHz	6.5 - 70 kHz
Dynamic range lower limit with GRAS preamplifier	17 dB(A)	18 dB(A)	35 dB(A)	52 dB(A)
Dynamic range upper limit with GRAS CCP preamplifier	138 dB	138 dB	160 dB(A)	174 dB
Set sensitivity @ 250 Hz (±2 dB)	50 mv/Pa	50 mv/Pa	3.6 mV/Pa	/
Set sensitivity @ 250 Hz (±3 dB)	/	/	/	0.8 mV/Pa
IEC 61094-4 Compliance	WS2F	WS2F	WS3F	Manufactured within same tolerances
Temperature range, operational	-30 to 85 °C	-40 to 125 °C	-30 to 85 °C	-30 to 70 °C
Temperature range, storage	-40 to 85 °C	-40 to 85 °C	-40 to 85 °C	-40 to 85 °C
TEDS	✓	✓	✓	✓
Weight	33 g	35 g	8 g	7 g

50GI-R CCP Intensity Probe with Remote Control	
Sound-intensity microphone pair 40GK, phase-matched	0.5" free field
Preamplifiers 26CB	Phase matched
Frequency response and phase-matching	IEC 61043 class 1
Frequency range (±2 dB)	IEC 61043 class 1
Frequency range with 100 mm spacer	30 Hz – 1 kHz
Frequency range with 50 mm spacer	80 Hz – 1.5 kHz
Frequency range: with 25 mm spacer	120 Hz – 5 kHz
Frequency range: with 12 mm spacer	200 Hz – 10 kHz
TEDS	✓
Weight	400 g

⚠ SHAKERS FOR INERTIAL AND MODAL ANALYSIS

Dewesoft offers a full range of modal and inertial shakers with integrated and easy-to-use amplifiers. Our permanent magnet shakers are compact, lightweight, and powerful general-purpose shakers that have a high DUT* capacity despite their small sizes.

APPLICATIONS

Permanent magnet shakers are used for vibration and shock testing, such as:

- Vibration testing of micro parts, assemblies, and electronics
- Modal testing
- Shock testing
- Sensor calibration
- Separation and compacting of powders
- Fatigue and resonance testing
- Velocity transducer or high-speed actuator testing

- Mechanical impedance measurement
- Education and research

ADVANTAGES

- Lightweight, durable, portable, and easy to use
- Adjustable trunnion base provides a high degree of flexibility
- Broad frequency range
- Embedded power amplifier and signal generator for PM-20 and PM-100

MAIN FEATURES

- **Integrated Amplifier:** PM-20, PM-100, MS-20, and MS-100 shakers have integrated amplifiers. Simply plug in a single cable and the shaker is ready to run.
- **Integrated Signal Generator:** Besides having an integrated amplifier, PM-20,

PM-100, MS-20, and MS-100 shakers have an integrated signal generator as well.

You can also generate an analog output signal from the SIRIUS DAQ system, but the shaker's onboard generator allows you to test the shaker system, and to make some simple tests to evaluate the structural behavior.

- **Trunnion and Handles:** All MS and PM shakers have trunnions and handles. These parts allow the shaker to be positioned in any position and orientation.
- **Integrated Screen:** Systems that have an integrated signal generator show the frequency of the generated signal. By visualizing the generated signal frequency it is possible to set the shaker to a selectable frequency from 1 Hz to 15 kHz and

to observe the behavior of the structure under these conditions.

- **Small Amplifier Box:** All inertial shakers use the same amplifier box. This box is also capable of generating sinusoidal signals, and can even be used with third-party shakers. This all-in-one unit can be customized to generate different signals, such as white noise, pink noise, and more.

* DUT means "device under test"

More information:
https://dewesoft.com/products/interfaces-and-sensors/shakers

SHAKERS FOR INERTIAL AND MODAL ANALYSIS

		MODAL SHAKERS		INERTIAL SHAKERS	
		PM-20	**PM-100**	**PM-250**	**PM-440**
Output	Force (sinus)	20 N	100 N	250 N	440 N
	Force (shock)	40 N	200 N	500 N	880 N
	Payload (vertical)	0.8 kg	1.5 kg	2 kg	2.5 kg
	Max. without Cooling	⊗	⊗	125 N	220 N
Frequency Range		0 - 12 kHz	0 - 8 kHz	0 - 5 kHz	0 - 5 kHz
Displacement (PK-PK)		5 mm	10 mm	25 mm	25 mm
Max. Acceleration		30 g	45 g	80 g	80 g
Moving Assembly Mass		⊗	⊗	⊗	⊗
Total Mass		4.25 kg	7.5 kg	11.6 kg	11.8 kg
Cooling	Cooling System	Air Convection	Air Convection	Forced Air	Forced Air
	Cooling Compressor	⊗	⊗	ProAir A4MS-511*	ProAir A4MS-511*
Suspension		Spring	Spring	Spring	Spring
Amplifier type		Integrated in shaker	Integrated in shaker	External amplifier*	External amplifier*
Amplifier dimensions	W x H x D (mm)	⊗	⊗	310x80x275	310x80x275
Connections	Outlet to Amplifier	2 m	2 m	2 m	2 m
	Amplifier to Shaker	X	X	5 m **	5 m **
	Cooling Hose	X	X	5 m ***	5 m ***
Power supply	Max Input Voltage	19 V*	19 V*	100 V - 240 V	100 V - 240 V
	Max. Input Current	4 A	6 A	10 A	10 A
	Max. Peak Current	⊗	⊗	⊗	⊗
Amplifier Spec	Sine Frequency Generator	✓	✓	✓	✓
	Sine FG range	0 Hz - 15 kHz	0 Hz - 15 kHz	0 Hz - 15 kHz	0 Hz - 15 kHz
	Adjustable Gain	✓	✓	✓	✓
	External Signal Input	✓	✓	✓	✓
	External Input Voltage	1 VAC (p-p)	1 VAC (p-p)	10 VAC (p-p)	10 VAC (p-p)
	Input Protection	✓	✓	✓	✓
Dimensions	Height	178 mm	214 mm	278 mm	278 mm
	Depth - Diameter	105 mm	143 mm	156 mm	156 mm
	Width	129 mm	169 mm	186 mm	186 mm
	Table Diameter	33 mm	54 mm	57 mm	57 mm
Included accessories and notes		All models include stingers and stinger adapters, collets, and mounting plates. PM-20 and PM-100 include M4 stainless bolt. PM-250 and PM-440 include BNC to AMP, Signal cable (5m) & M6 stainless bolt Notes: * Included in price, shipped with item. ** Possible extension per request *** No extension due to reduced flow			

⚠ DIGITAL SIGNALS AND COUNTING EVENTS
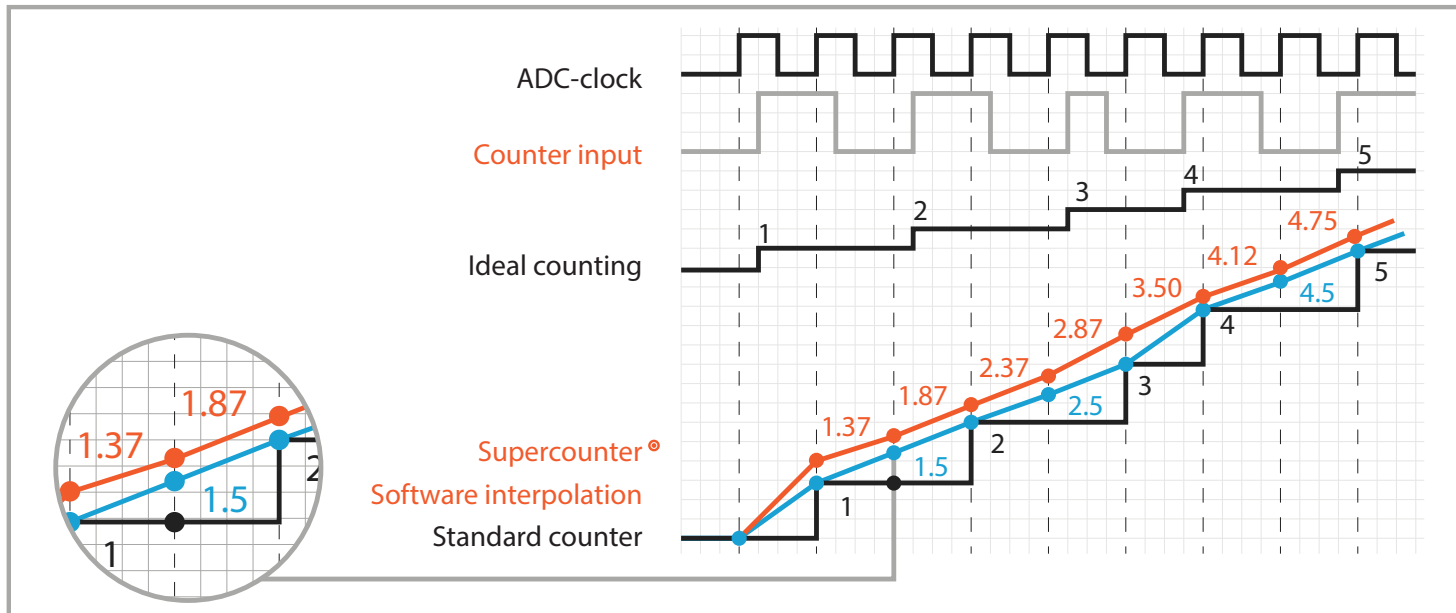
Dewesoft systems offer digital inputs which can be used for recording discrete signals, such as switch closures and other bi-state events. Digital inputs can also be configured to count such events and to derive RPM from pulse trains. And they do it with incredible accuracy, and in perfect sync with the analog signals.

DIGITAL & COUNTER INPUTS: CHALLENGES AND SOLUTIONS

ELIMINATING NOISE AT THE SOURCE

Isolation is every bit as important in the digital realm as it is in the analog realm. Noise riding on top of digital lines can be easily mistaken for real events, and thus miscounted. This is why Dewesoft hardware provides robust isolation on all digital and counter line inputs.

SYNCHRONIZATION WITH ANALOG SIGNALS

Many systems measure the digital lines at the same rate that they measure the analog signals. But this results in measurements falling

between the analog samples, which are typically much slower. Again the result is inaccurate recordings. This is why Dewesoft invented and has patented our unique SYNC CLOCK technology. With this approach, we sample the digital lines much faster than the analog ones and then time-align them together. Our patented SuperCounter™ technology is used in SIRIUS counter/encoder inputs.

Counter inputs can measure RPM and angle when testing rotating machines. Standard counters only provide integer resolution (like 1, 1, 2, 2) and their data is one sample behind the data.

However, SuperCounters can extract floating-point values like 1.37, 1.87, 2.37, and time-align them precisely with the rest of your data. This is done by measuring the exact time of the rising edge of the signal with an additional counter. SuperCounters work on a 102.4 MHz time base, independent from the current sampling rate.

As a result, you can make precise phase measurements, confident that all of your data is precisely aligned on the time axis.

Several SIRIUS modules, like the ACC, are available in a "+" version, which includes a counter input, provided on a LEMO connector right next to the analog input's BNC connector. Each of these inputs can be configured as a counter, or as three discrete digital inputs. They do not take away anything from the analog input, and in fact, greatly increase the recording capability of your SIRIUS system. See the table on the next page for a list of all of the SIRIUS + modules that include a Super-Counter.

This is followed by tables showing the digital input and output capabilities of the KRYPTON and IOLITE product families.

DIGITAL INPUTS AND COUNTERS - SIRIUS®

COUNTER/ENCODER APPLICATIONS

Position and Angular position sensors can be found in a wide range of applications:

- Steering wheel position sensing
- Pedal position sensing
- Throttle position sensing
- Torque sensing
- Process machine monitoring and control (thousands of applications)
- Maintaining absolute position references in CNC machines
- Controlling absolute position in MRI machines
- Position feedback in robotics of all kinds
- Electronics systems, especially for the human interface
- Conveyor belt applications
- Parking sensors

SENSOR COMPATIBILITY

Angle sensors are available in a variety of packages and resolutions, from simple inductive sensors that simply count each time the shaft rotates, to high-resolution encoders that provide hundreds or even thousands of positions around the 360° rotation, and also report the direction of rotation.
SuperCounters are compatible with:

- Proximity sensors
- Rotary encoders
- Linear encoders
- Gear tooth sensors
- Optical sensors

OPERATING MODES

SuperCounter hardware is tightly integrated with DewesoftX DAQ software, providing access to a great selection of capabilities:

- Event counting mode (basic, gated, up/down, basic encoder)
- Sensor mode (encoder, tacho, CDM, 60-2 gear tooth, and more)
- Waveform timing mode (period, pulse-width, duty cycle, etc.)

ONBOARD ANGLE SENSOR DATABASE

DewesoftX has a sensor database for your analog sensors, such as accelerometers, strain gages, current clamps. But did you know that it also contains a similar database for your angle-based/counter/digital inputs? This database makes it easier than ever to set up your encoders, proximity sensors, and more. You can even track sensor calibration data. When it's time to go to work, simply connect the sensor to a counter input and then select it by name in the database, and everything will be configured for you.

SIRIUS
DUAL CORE, HD, HS AND XHS

Counter/digital inputs for SIRIUS platforms

	Counter
Modes	Counting, waveform timing, encoder, tacho, geartooth sensor
Counter timebase	102.4 MHz
Timebase accuracy	Typical: 5 ppm, Max: 20 ppm
Max. bandwidth	10 MHz
Input filter	500 ns, 1 µs, 2 µs, 4 µs, 5 µs and 7.5 µs
Counter resolution	32-bit
Input Compatibility, Level	TTL/CMOS (Low: <0.8 V, High >2 V)
Input termination, impedance	100 kΩ pull-up to +3.3 V
Input protection	±25 V, continuous
Alarm output	Open collector, max. 100 mA / 30 V
Sensor supply	5 V / 100 mA; 12 V / 50 mA
Available on these models	SIRIUS-LV+, SIRIUS-ACC+, SIRIUS-CHG+, SIRIUS-STG+, SIRIUS-STGM+, SIRIUS MINI

PROXIMITY PROBES

RPM SENSOR
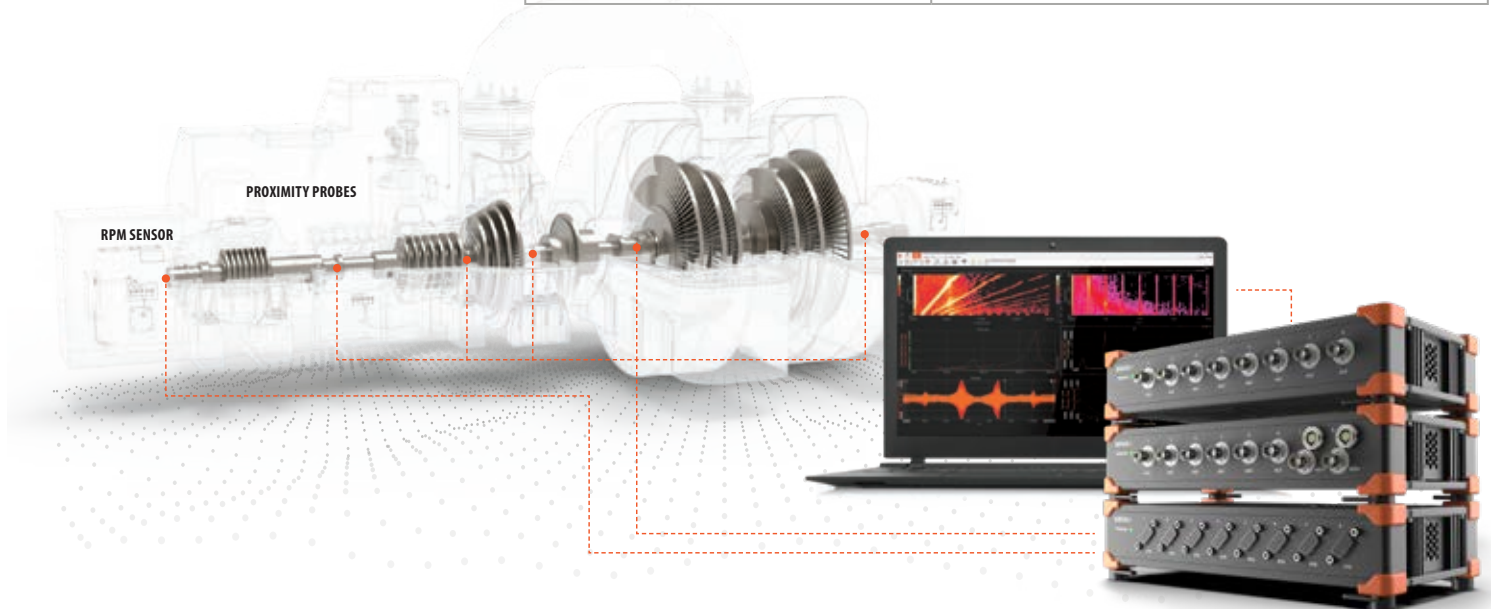
◢ DIGITAL & COUNTER MEASUREMENT - KRYPTON®

KRYPTON

Multi-channel ruggedized modules for harsh environment testing applications.

KRYPTON ONE

Single channel ruggedized modules for harsh environment testing applications.

	16xDI	8xDI-8xDO	16xDO	4xCNT	4xDI	4xDO	CNT
Connector(s)	2 x DB25	2 x DB25	2 x DB25	LEMO T-type 7-pin female	DSUB15HD Male	DSUB15HD Female	LEMO T-type 7-pin female
Input #channels per module	16	8	⊗	4	4	⊗	A, B, Z (can be used for csensors/ encoders, or as 3x digital inputs)
Output #channels per module	⊗	8	16	⊗	⊗	4	⊗
Data rate / channel	DI: 40 kS/s	DI: 40 kS/s DO: Depends on EtherCAT cycle time	Depends on EtherCAT master cycle time	20 kS/s	40 kS/s	Depends on EtherCAT master cycle time	20 kS/s
Resolution	Digital	Digital	Digital	100 MHz timebase 5 ppm, 20 ppm max	Digital	Digital	100 MHz timebase 5 ppm, 20 ppm max
Bandwidth	-	-	-	10 MHz	-	-	10 MHz
Voltage ranges	CMOS compatible	CMOS compatible	CMOS compatible	TTL (Low: <0.8 V, High > 2 V)	Digital (Low: < 1 V, High: > 2 V)	-	TTL (Low: <0.8 V, High > 2 V)
Output type	-	Open collector with 10 kΩ pull-up to +5 V	Open collector with 10 kΩ pull-up to +5 V	-	-	Open collector with 10 kΩ pull-up to +5 V	-
Sensor excitation	5 V @ 300 mA 12 V @ 120 mA Vsupply @ 200 mA	5 V @ 300 mA 12 V @ 120 mA Vsupply @ 200 mA	5 V @ 300 mA 12 V @ 120 mA Vsupply @ 200 mA	5 V /100 mA 12 V / 50 mA	5 V @ 300 mA 12 V @ 120 mA Vsupply @ 200 mA	5 V @ 300 mA 12 V @ 120 mA Vsupply @ 200 mA	5 V @ 100 mA 12 V @ 10 mA
Watchdog function	⊗	-	-	-	⊗	-	⊗
Overvoltage protection	40 V continuous (65 V peak)	40 V continuous (65 V peak)	-	-	30 V Continuous, 65 V peak	-	-
Isolation voltage	250 V channel/ ground and channel/channel	250 V channel/ ground and channel	250 V channel/ ground and channel/channel	Ch to GND isolation	Galvanic isolation CH, GND	Galvanic isolation CH, GND	⊗

The KRYPTON 4xDI module provides four high speed digital input lines

The KRYPTON 4xDO module provides four high speed digital output lines

The KRYPTON 1xCNT module provides an A,B,Z counter input that can be used for RPM, tacho sensors, encoders, etc. Alternatively these inputs can be used as three discrete digital inputs.

The KRYPTON 16xDI module provides 16 high-speed digital input lines.

The KRYPTON 8xDI-8xDO module provides 8 high-speed digital input lines and 8 high-speed digital output lines.

The KRYPTON 16xDO module provides 16 high-speed digital output lines.

BULLET-PROOF DAQ

We machine each KRYPTON module out of a single block of aluminum. Then we carefully install our industrial-grade electronics. Each unit gets sealed against shock, vibration, and temperature extremes with thermally conductive and electrically insulative rubber. As a final touch, we add rubber shock absorbers to the chassis to further protect against shock.

The result is an IP67 waterproof and 100G shockproof DAQ instrument that is rated to work virtually anywhere in the world, with temperature performance of -40°C/F to +85 °C/+185°F. Welcome to KRYPTON!

DIGITAL & COUNTER MEASUREMENT - IOLITE®

The IOLITE R is avaiable in an 8-slot benchtop chassis, and a 12-slot rack-mount chassis

The IOLITE LX chassis has 8 slots and an embedded ARM processor and DewesoftX RT software for stand-alone applications.

IOLITE D (distributed) includes both multi-channel DIN rail mountable modules AND IOLITE single modules for ultimate flexibility.

CHOICE OF PLATFORMS

IOLITE MULTI modules plug into our benchtop and rack-mounting, and DIN rail mountable chassis as shown above.

IOLITE SINGLE are individual modules that do not require a chassis. You can distribute them close to the signal source, or wherever they are needed. A single EtherCAT cable that carries power, data, and sync interconnects them.

IOLITE bridges the worlds of DAQ and control in a way that has never been done before. Finally, great signal conditioning and DAQ performance have been integrated with real-time control.

IOLITE MULTI

Multi channel IOLITE series modules with EtherCAT connection

IOLITE SINGLE

Smallest size IOLITE modules for DAQ and real-time control applications.

	32xDI	8xDI-4xDO	32xDO	4xCNT	4xDI	4xDO
Connector(s)	Terminal block, 2 pole, 4 x 9 pole OMNIMATE SL 2.50 / BLF 2.50/180	Terminal block (3 x 2 pole, 2 x 12 pole, 1 x 8 pole) OMNIMATE SL 2.50 / BLF 2.50/180	Terminal block, 2 pole, 4 x 9 pole OMNIMATE SL 2.50 / BLF 2.50/180	L1B7f	DSUB 15HD (Male)	DSUB 15HD (Female)
Input #channels per module	32	8	⊗	4	4	⊗
Output #channels per module	⊗	4	32	⊗	⊗	4
Data rate / channel	DI: 20 kS/s	DI: 20 kS/s DO: Depends on EtherCAT master cycle time	DO: Depends on EtherCAT master cycle time	20 kS/s	DI: 20 kS/s	DO: Depends on EtherCAT master cycle time
Input voltage ranges	Low level: -1 V ~ +1 V High level: -48 V ~ -3 V, +3 V ~ +48 V	Low level: -1 V ~ +1 V High level: -48 V ~ -3 V, +3 V ~ +48 V	-	Low level: < 0.8 V, High level: > 2 V	Low level: < 1 V High level: >2 V	-
Output type	-	Solid state relay compatible, Maximum sink current: 0.5 A Max. switching: 50 V	Solid state relay compatible, Maximum sink current: 0.5 A Max. switching: 50 V	-	-	Open collector, active internal 5V pull-up Sink: max 50 V @ 2 A (resistive load, unprotected) Source: 5 V @ 40 mA max. (internally limited)
Sensor excitation	Unregulated output, 9 - 48 VDC (max. 2A), via 2-pin PWR OUT connector	Unregulated output, 9 - 48 VDC (max. 2A), via 2-pin PWR OUT connector	Unregulated output, 9 - 48 VDC (max. 2A), via 2-pin PWR OUT connector	5 V @ 100 mA 12 V @ 50 mA	5 V @ 300 mA 12 V @ 100 mA	5 V @ 300 mA 12 V @ 100 mA
Watchdog function	⊗	✓	✓	⊗	⊗	✓
Overvoltage protection	100 V continuous (250 Vpeak)	100 V continuous (250 Vpeak)	-	±25 V, continuous	30 V Continuous, 65 V peak	-
Isolation voltage	1000 V (peak) CH-CH and CH-GND	1000 V (peak) CH-CH and CH-GND	1000 V (peak) CH-GND only		Galvanic isolation CH, GND	Galvanic isolation CH, GND

The **IOLITE 32xDI** module provides 32 high speed digital input lines

The **IOLITE 32xDO** module provides 32 high speed digital output lines

The **IOLITE 8xDI-4DO** module provides eight high speed digital input lines and four high speed digital output lines

The **IOLITE 4xCNT** module provides four counters, each capable of event counting, encoder, period, pulsewidth and duty cycle measurements.

The **IOLITE 4xDI** module provides four high speed digital input lines. This module fits in the palm of your hand.

The **IOLITE 4xDO** module provides four high speed digital output lines. These small modules are easily connected via EtherCAT cables up to 100m (328 ft.) apart.

⬧ DEWESOFT ACCESSORIES

DS-BP BATTERY PACKS

We offer battery packs with two or four batteries for you to choose from. Some of our "all-in-one" SIRIUS models such as SIRIUS R1, R2, R4, and R8 are available with hot-swappable batteries that keep the system running for hours without being connected to power.

In addition, external DS-BP battery packs are available as external options for most of our other products as well. DS-BP2i and DS-BP4i are engineered to work perfectly together with SIRIUS data acquisition systems and SBOX data logger instruments.

A clever click-and-lock mechanism allows you easily to connect the battery pack to SIRIUS modular and/or SBOX systems.

Of course, you can also use DS-BP2i/DS-BP4i battery packs with other systems like KRYPTON, IOLITE, or IOLITE LX – or to power a third-party device that runs from compatible DC power.

Batteries can be hot-swapped, so you can keep your system running indefinitely from battery power if required. Additional batteries and additional chargers can be used to charge batteries off-line.

Even if you're running from wall power, a battery pack serves as a perfect UPS, protecting your tests from interruptions caused by external power loss. Batteries are a great insurance policy.

SIRIUS R2DB with built-in, hot-swappable batteries

DS-BP2i (bottom) connected to a SIRIUS SBOX computer and four stacked 8-channel SIRIUS modules.

DS-BP2 and DS-BP4 external battery packs

DS-DISP MOBILE DISPLAYS

RUGGEDIZED 10" AND 12" MODELS TO CHOOSE FROM

DS-DISP-12 is a 12" LED mobile display built into rugged aluminum chassis for field tests and measurements. It is designed specifically to work with Dewesoft DAQ systems as well as our rugged computers like SBOX, KRYPTON CPU, and any of our systems that need a display. The high quality/high brightness LED display ensures visibility even in outdoor testing conditions and at wide viewing angles. The 9 to 36 VDC powered DS-DISP-12 operates from -20° C to 60° C (-4°C to 140°F), so you can use it in a wide variety of test environments. Everyone is familiar with the intuitive multi-touch operation of today's smartphones. DewesoftX DAQ software and the DS-DISP-12 display support several key multi-touch gestures, improving your workflow.

Mounting accessories are available for attaching the display to windshields and other smooth surfaces.

	DS-DISP-12	DS-DISP-10
Touchscreen	PCAP, Multi-touch	PCAP, Multi-touch
Interface	1x USB 2.0, USB Mini B	1x USB 2.0, USB Mini B
Input	1x VGA, 1x DVI	1x VGA, 1x DVI
Mounting	3x 1/4-20 UNC thread insert on bottom side, VESA mounting compatible on back side	3x 1/4-20 UNC thread insert on top & bottom side
Type	TFT 12.1"	TFT 10.1"
Resolution	WXGA, 1280 x 800 pixels @ 60Hz	WSVGA, 1024 x 600 pixels @ 59 Hz
Luminance	700 cd/m^2	200 cd/m^2 typ.
Contrast ratio	700:1 (typ.)	500:1 (typ.)
Op. temperature	-20 to 60 °C (-4 to 140°F)	-20 to 50 °C (-4 to 122°F)
Power supply	9 to 36 V DC	6 to 36 V DC

DEWESOFT ACCESSORIES

DSI ADAPTERS

Expand the capabilities of your Dewesoft hardware with DSI. Simply plug in a DSI adapter and it is identified by DewesoftX software, and the input settings will be changed automatically to match the input type, engineering units, and more.

	DSI-THx	DSI-TH-UNI	DSI-ACC	DSI-CHG	DSI-CHG-DC	DSI-V200	DSI-RTD	DSI-20mA	DSI-5A	DSIi-10A	DSIi-20A	DSI-LVDT
Sensor(s) supported	Thermocouples 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	Universal thermocouple types K, J, T, R, S, N, E, B, C	Acceleration from IEPE (ICP) sensors	Charge accelerometers 1,000 / 10,000 / 50,000 pC	Charge accelerometers 500,000, 50,000, 10,000, 1,000 pC	Voltage ±200 V, ±50 V, ±5 V, ±0.5 V	RTD sensors Pt100, Pt200, Pt500, Pt1000, Pt2000	Current up to 20 mA	Current up to 5A (DC or AC RMS continuous)	Current up to 10 ADC or 10 ACpeak	Current up to 20 ADC or 20 ACpeak	Differential LVDR or RVDT, Inductive Half-Bridge LVDT
Input connector	T/C mini blade, female	T/C mini blade, female	BNC	BNC	BNC	BNC	5-pin BINDER series 712	SMD terminal block	MSTB 2.5/ 3-STF-5.08	4 mm banana jacks	4 mm banana jacks	DB9, female
Features	Integrated CJC, Open sensor detection	Integrated CJC, Open sensor detection	4 mA sensor power @ 22 VDC	High bandwidth, selectable high-pass filter	Multiple selectable high-pass filters	±250 V over-voltage protection	-200 to 850 °C, 2-, 3- or 4-wire hookups	50 Ω foil shunt, IP20 environmental	10 mΩ shunt, rated to 300 V DC or AC RMS	4 kVp isolation, Safety 600 V CAT III	4 kVp isolation, Safety 600 V CAT III	P/S voltage: 10 to 15 V, P/S current: 44 mA
TEDS *	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

* TEDS is used for DSI adapter identification and calibration data

Learn more about Accessories
https://dewesoft.com/products/accessories

MORE ADD-ONS...

CAN BUS AND CAN FD INTERFACES

Robust, easy to use, DS-CAN interfaces can be connected to your Dewesoft DAQ system or any computer via USB. CAN ports support OBDII, J1939, XCP, and CAN OUT messages. Available with 2, 4, or 8 ports (2-port model shown below). Also available: rugged, KRYPTONi 1xCAN-FD high speed CAN FD module. Connects to most Dewesoft DAQ systems via the EtherCAT interface.

DS-WIFI

DS-WIFI is a powerful Wi-Fi modem for long-range wireless data transfer between and among DAQ systems. It is perfectly suited for testing moving objects, ADAS and other automotive tests, and remote measurement applications.

MOUNTING PLATES

We offer a variety of mounting plates for our products: SIRIUS, SIRIUS mini, SIRIUS R8x, SBOX, KRYPTON, KRYPTON CPU, DS-DISP-12, and more. Some plates are intended for fixed mounting, while others are made for 19" rack enclosures. There are many popular options.

ETHERCAT ACCESSORIES

We offer accessories for the interconnection, power, and synchronization of our EtherCAT DAQ systems, including KRYPTON, IOLITE, and SIRIUS. We make EtherCAT power injectors, SYNC junctions, and repeaters – and they're all sealed to IP67.

▲ DAQ SOFTWARE - DEWESOFTX

IT'S THE BEATING HEART INSIDE EVERY DEWESOFT DAQ SYSTEM

It would require a catalog at least as big as this one to properly describe DewesoftX DAQ software. DewesoftX provides easy hardware setup and control, rich data visualization and displays, high speed and synchronous recording of all your data, and a powerful suite of data review, analysis, post-processing, and data export tools. DewesoftX really does "do it all."

best ideas came from people like you. Our job is to listen to you, and then bring your ideas to life as best we can.

FORGET ABOUT PROGRAMMING
Our core value is to strive for simplicity, usability, and ease of use. Everything in DewesoftX is visual, with a simple drag-and-drop user interface. All changes are visible in real-time. There is no programming required to acquire, visualize, analyze, and store the data from our DAQ systems.

DewesoftX combustion analyzer plug-in, including real-time PV (cylinder pressure/volume) graph

KEY DEWESOFTX FACTS

- Included free with each Dewesoft DAQ instrument
- Updates are included for the life of the product
- All measurement applications are supported by single software package
- Allows multiple Dewesoft DAQ systems to be connected and used in almost limitless combinations
- Offers unlimited view / analyze license seats, free of charge
- Free lifetime software support

BRILLIANT, BEAUTIFUL DISPLAYS
The first thing you notice is the displays. The graphics are crisp and colorful. Then you discover that you can arrange the screens any way that you like, and that you can make more screens if needed – even while the system is recording data! Someone really gave this software some thought.

In fact, many talented engineers have worked on DewesoftX for more than 20 years. But their

DAQ SOFTWARE - DEWESOFTX

BUILT-IN MATHEMATICS

Advanced mathematics built into the software will cover 99% of all of your measurement and analysis needs. For the other 1%, DewesoftX offers several ways to extend and automate the software with your functionality, including plugins, C++ scripting, DCOM, and a built-in sequencer for high-level automation.

GET YOUR DATA OUT

A wide range of analysis functions is built right into the software. For one thing, you can print your data easily, and configure how the data looks with ease. In addition, you can export your data to a huge variety of industry-standard formats for offline processing and report generation.

A LEGEND OF FIRSTS

We were the first to allow a webcam to be synchronized to a DAQ system. We figured out how to time-stamp the video frames to analog and digital data. Then we added synchronized cameras with software-controllable shutters. CAN bus came next. Then ARINC 429, MIL-STD-1553, and PCM data from NASA spacecraft. We never stopped. Today, DewesoftX is the most connectable software in the world. There is virtually no data source that you cannot connect to a Dewesoft DAQ system.

After 20+ years, DewesoftX has won more awards than we can list. But the most important thing is that it continues to make you happy and get your job done, efficiently and well. Nothing else really matters.

FREE SW UPDATES FOR LIFE

DewesoftX comes with every Dewesoft DAQ system at absolutely no cost. We do not ask you to pay for service or update contracts for the software – and we include updates at no cost for the life of your Dewesoft hardware.

Are there options? Yes, we offer software options and plugins for advanced applications and specialized hardware, but you never need to pay for DewesoftX itself, with all of its rich capabilities.
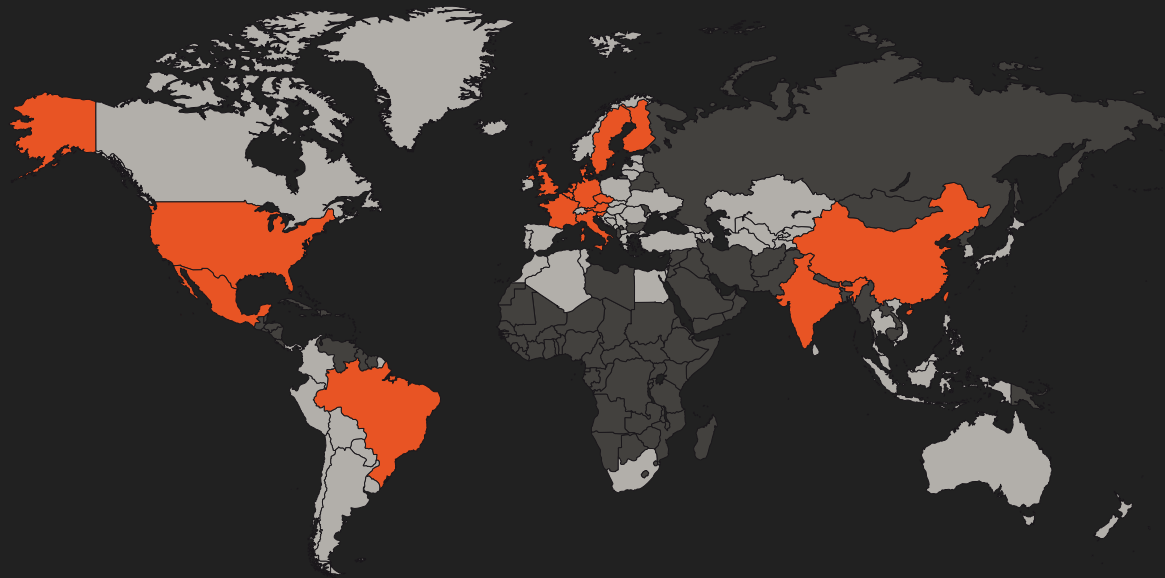
More Information:
https://dewesoft.com/products/daq-software/dewesoft-x

Dewesoft 3D, recorder and rainflow graphs
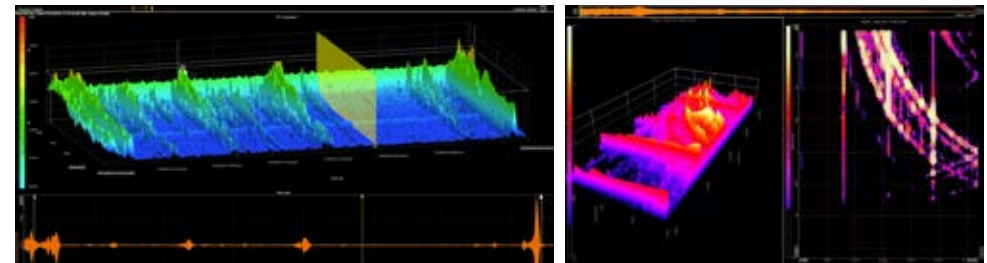
DewesoftX automotive test, example screen. Flexible graphics can be placed anywhere on the screen. Multiple video cameras are synched with the analog data, CAN bus data, and GPS/GNSS data. Everything moves in real-time, as well as during playback.

DEWESOFT® WORLDWIDE: SLOVENIA, Austria, Belgium, Brazil, Czech, China, Denmark, Finland, France, Germany, Hong Kong, India, Italy, Mexico, Singapore, Sweden, UK, USA and PARTNERS IN MORE THAN 50 COUNTRIES

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