DEWE2

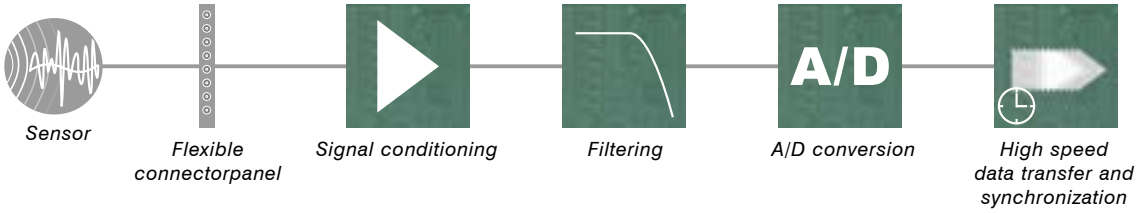
SYNC-CLOCK™ inside

Modular Data Acquisition Systems

TRION™ Series Modules

System Architecture

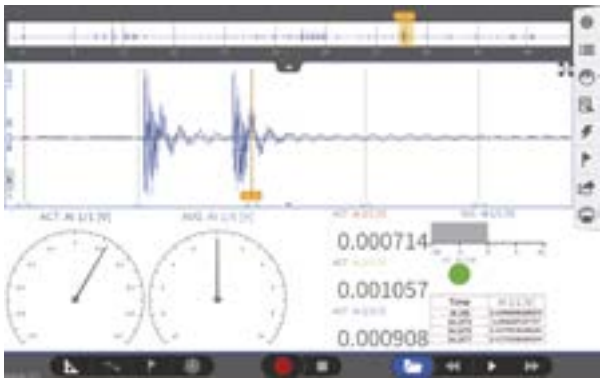
Data Acquisition Module



User exchangeable TRION™ modules

- Binary / counter / timer modules
- Bus interface modules
- Analog signal conditioning modules
- Timing / sync modules

Housing and Storage + Controlling and Analysis



Wide range of housings

- *DEWE2-A series*
  All-in-one
- *DEWE2-M series*
  Mainframes
- *DEWE2-F series*
  Front-ends

One software for all

- *Easy-to-use*
- *Full hardware control*
- *Powerful online or offline data processing*
- *Attractive online displays*
- *Fast data analysis*
- *Post processing and/or export to many file formats*
- *Simple reports*

A-series

All-in-one instruments

Most compact, includes powerful i7 computer, brilliant display and keyboard, touchpad.

Most convenient for all mobile applications like inspecting facilities, rotating machines, test stands, power generators, electrical machines, buildings, vehicles, aircrafts, trains, and anything else.

M-series

Mainframes

Like the A-series but without display; keyboard and pointing device are included loose.

Very popular for applications where the instrument is installed in a poorly visible place for the user (e.g. in a car the instrument is often installed in the leg area of the passenger seat but the driver needs to see the screen) or laboratory applications and test rigs.

F-series

Front-ends

F-series units don´t have a built-in computer but supply measurement data over a robust high-speed PCI Express bus. Multiple units can be daisy-chained.

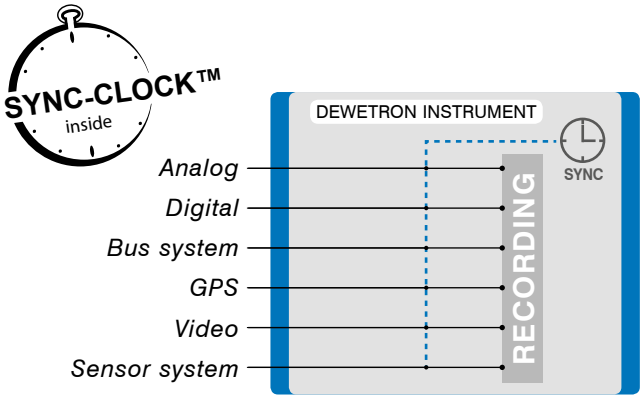
One popular application is to use F-series devices with an external computer.

The second use of F-series devices is to expand A or M series instruments.

SYNC-CLOCK™ technology

DEWETRONs unique SYNC-CLOCK™ technology ensures synchronized recording of

- *Analog signals like acceleration, temperature, strain, pressure, force, voltage, etc.*
- *Digital signals like static, counters, encoders*
- *Bus systems like CAN-bus, FlexRay™, XCP*
- *GPS*
- *Video cameras (hardware synchronized)*
- *Major sensor systems like Kistler RoaDyn® 2000 wheel force transducers or GeneSys ADMA INS/GPS system*



Your advantage:

SYNC-CLOCK™ enables ***reduction of editing and analysis times by up to 50 %.***

At the same time, the quality of the analysis results can be improved by a factor of 5 – 10.

User exchangeable modules

Enjoy maximum flexibility

- *Mix any TRION™ modules to perfectly match your sensor setup*
- *Use isolated inputs and differential inputs at the same time*
- *Use modules of different sampling speed and resolution in one chassis*
- *Add modules at any time; analog, digital, CAN, time code, sync, etc.*
- *Reconfigure your DEWE2 system in minutes by changing TRION™ modules*
- *Rugged PXI-compatible interface for high reliability*

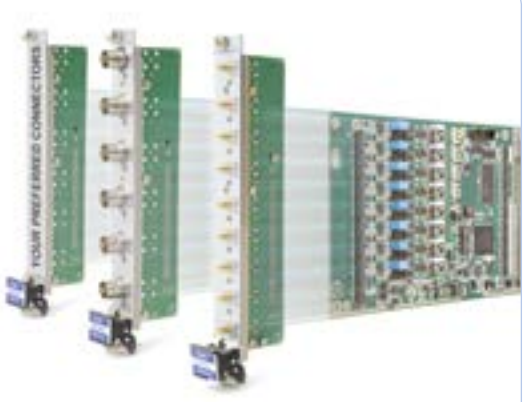
Your advantage:

Enables optimal utilization of your DEWE2 instrument

Secures your investment

Input connectors to match your sensors

- *All TRION™ modules have a factory-exchangeable connector panel*
- *Some types of TRION™ modules are already available with different input connectors*
- *Customized connector panels can be offered to match your sensors*



Your advantage:

Your sensors can keep their cables and can still be used with existing systems

Safes a lot of money when the quantity of sensors is high

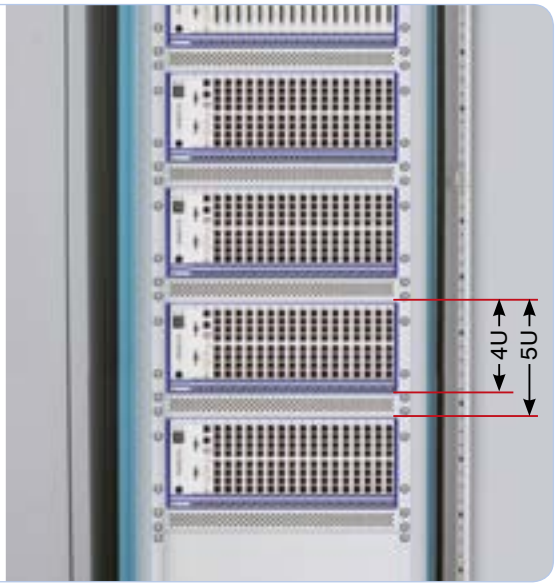
High channel density

- The basic consideration for DEWE2 chassis is a height of 4 U (~177 mm or ~7 in.)
- TRION™ modules are made for optimal utilization of that space
- The size of input connectors limits the channel count per module
- A single 4 U chassis can hold up to 144 analog inputs
- Systems are scalable from six to thousands of channels

Your advantage:

The small size and the low weight of portable systems enable simple and cheap transportation

In high channel-count applications more than 1000 channels can be fitted into a single 19” cabinet



Self test and calibration port

- Most TRION™ modules offer self-test functionality
- A calibration port is available for efficient calibration of high channel-count systems
- Sensors don't need to be disconnected during calibration

Your advantage:

Confidence in measurement results, robust high-quality data are ensured

Significant time savings at calibration of high channel-count systems

Advanced counter

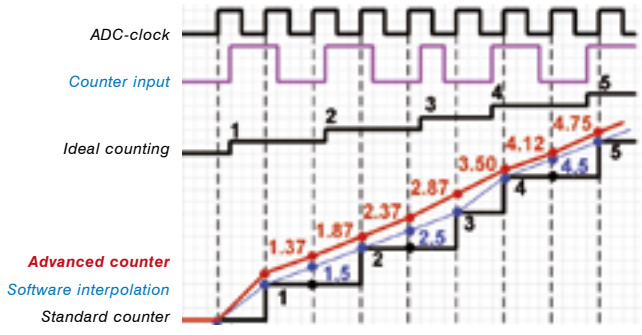
- Perfectly synchronized to analog and all other inputs
- Accepts any signal wave form, trigger level from 0 to 50 V
- 3 modes: event counting, waveform timing and sensor input

Counter/encoder inputs of TRION™ modules are phase synchronized. Refering to the diagram, you can see that a standard counter is always a sample behind. With software interpolation you can get closer, but only DEWETRONs advanced technology is both, fully phase AND amplitude corrected.

Your advantage:

Efficiency: no sensor output-signal adaption required, single cable connection including power supply

Reduction of analysis time due to synchronized recording



Demand for greater accuracy?

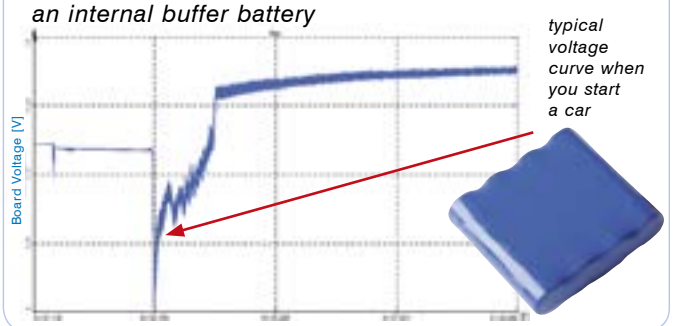
Highest precision ever

TRION™ series modules easily take it on with all similar products on the market

Voltage drops disturb your measurement?

Internal buffer battery

Supply voltage drops up to 10 minutes are bridged by an internal buffer battery



Have had enough of ground loops?

Isolated power supply

Maximum safety

No interference between instrument and test object

Need more battery time?

Fully battery powered

Hot-swappable batteries for continuous operation without an external power source for hours.

What's most valuable?

Your data

We protect your critical data by using reliable, industrial solid state disks only (no consumer SSD!)

Safety of classified data?

Removable hard disk / SSD

The perfect way to protect your data, and also to work easily within classified data environments.

Concerned about vibrations?

High shock and vibration rating

DEWE2 instruments are tested for high shock and vibration resistance according international standards

Respectful of system restore?

Recovery inside

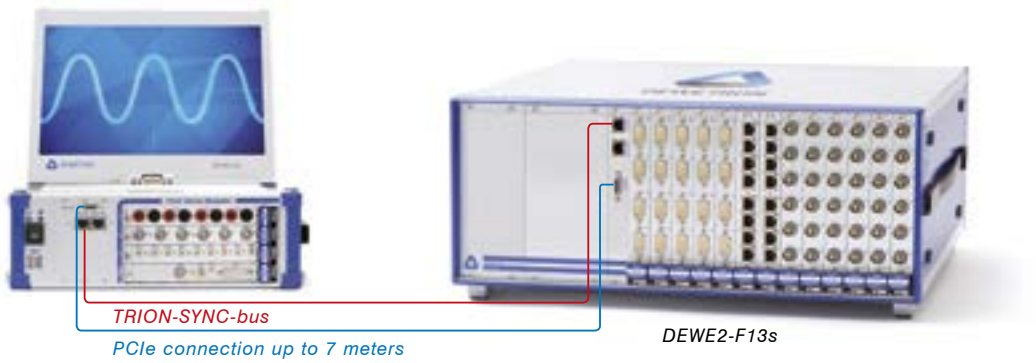
An internal dedicated SATA SSD drive stores the factory settings at time of shipment. Total recovery is possible quickly, everywhere at any time and without any external media

SYNC it all!

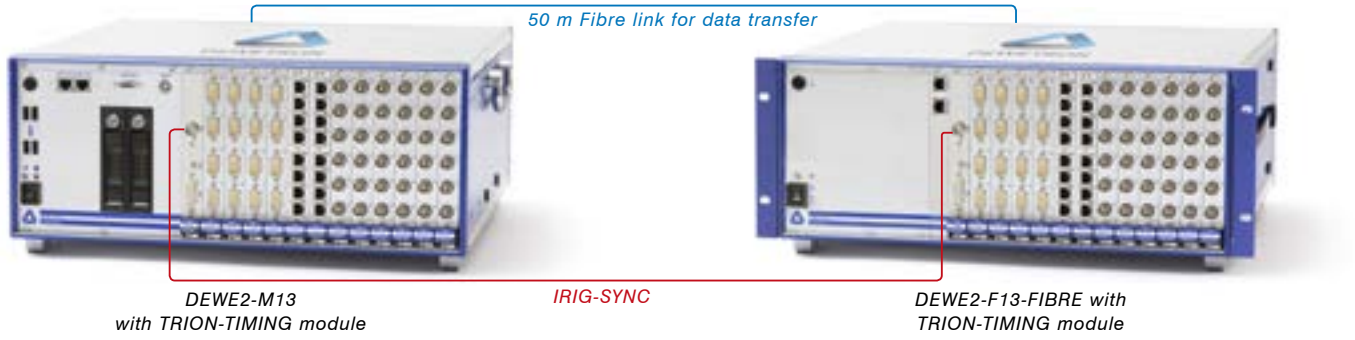
To create high channel count systems or for distributed measurements DEWE2 instruments support multiple synchronization options. A special feature is the perfectly hardware synchronized video acquisition since also for data analysis the slogan "a picture is worth a thousand words" is true.

Channel expansion

All DEWE2 instruments (except DEWE2-M4s) come with PCIe and two SYNC interfaces installed.
Example: DEWE2-A4 expanded with DEWE2-F13s (no optional order item required)



Example: DEWE2-M13 expanded with DEWE2-F13-FIBRE via fibre-cable for long distance

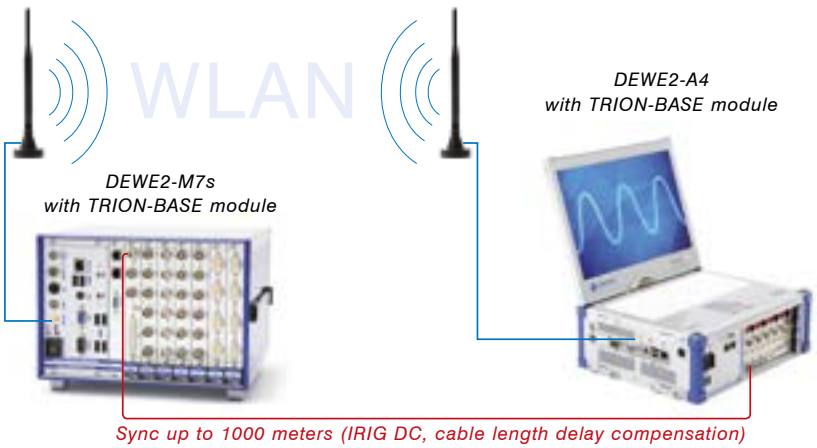


Synchronization of multiple DEWE2 systems

Sync via TRION™ modules or TRION-SYNC-BUS

Example:

Two instruments synchronized via TRION-BASE modules (multiple units possible)

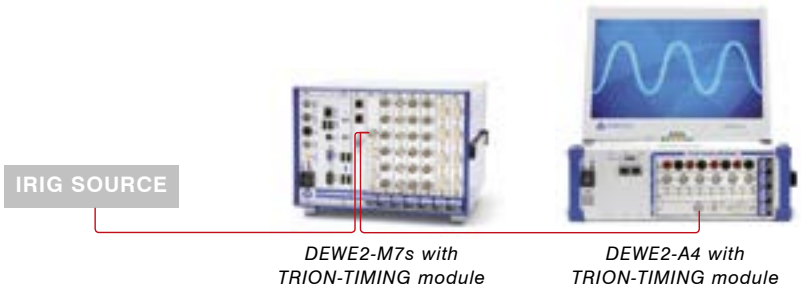


Synchronization to GPS or IRIG time-code

There are 2 ways how to synchronize DEWE2 instruments very accurately to absolute time. Both, GPS time and IRIG time, enable execution of synchronized distributed measurements over unlimited distances. Each instrument (or array of instruments) must be connected to the time-code via a TRION-TIMING module.

IRIG

Two instruments synchronized to absolute IRIG time



GPS

Two instruments synchronized via GPS

VIDEO-SYNC

Hardware synchronized video of up to 200 frames per second (camera clocked by DEWE2 instrument): accurate per sample, no delay

Software synchronized low-cost video (USB or PAL/NTSC cameras): optimized low latency, known delay of USB camera can be compensated

High speed video up to 500 000 frames per second: online sync for Photron cameras, post-sync for any high-speed .avi file.

DEWE2 All-In-One Instruments



	DEWE2-A4	DEWE2-A7	DEWE2-A13
Slots for TRION™ acquisition modules	4	7	13
Dynamic channel expansion	DEWE2 F-Series chassis or Ethernet		
Quasi-static channel expansion	EPAD2 CPAD2 via TRION-CAN	EPAD2 CPAD2 via TRION-CAN	EPAD2 CPAD2 via TRION-CAN
Data storage [1]			
Technology	Removable Solid State Disk	Hard disk	Hard disk
Capacity	120 GB (up to 480 GB)	1 TB	1 TB
Typ. duration of recording (16 ch. / 10 kS/s/ch. / 16 bit)	1 day	35 days	35 days
Gap free storing rate [2]	Typ. 90 MB/s	Typ. 90 MB/s	Typ. 90 MB/s
Main system [1]			
Display	13“ (1280 x 800)	17“ (1920 x 1080) FULL HD	17“ (1920 x 1080) FULL HD
Processor	Intel® Core™ i7	Intel® Core™ i7	Intel® Core™ i7
Power supply			
Input voltage: rated (max.)	10 to 36 V_{DC} isolated incl. external AC power supply	90 to 264 V_{AC}	90 to 264 V_{AC}
Optional	Add internal buffer battery for ~ 10 min. operation and/or DW2-UPS-250-DC (ext. battery pack)	Battery powered, 4 battery slots [3], 3 batt. for ~2 hours operation included, incl. external AC power supply,optional external DC power supply	Battery powered, 4 battery slots [3], 3 batt. for ~2 hours operation included, incl. external AC power supply,optional external DC power supply
Environmental			
Operating temperature	0 to +50 °C, down to -20 °C with prewarmed unit	0 to +50 °C, down to -20 °C with prewarmed unit	0 to +50 °C, down to -20 °C with prewarmed unit
Storage temperature	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C
Humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	10 to 90 % non cond., 5 to 95 % rel. humidity
Max. Altitude	2000 m (6560 ft)	2000 m (6560 ft)	2000 m (6560 ft)
Sine vibration (EN 60068-2-6)	20 m/s²	20 m/s²	20 m/s²
Shock (EN 60028-2-27)	30 g	15 g	15 g
Random vibration (EN 60721-3-2)	Class 2M3	Class 2M2	Class 2M2
Dimensions			
Dimensions (W x D x H) (without handle)	318 x 253 x 128 mm (12.5 x 10 x 5 in.)	450 x 246 x 303 mm (17.7 x 9.7 x 11.9 in.)	450 x 246 x 303 mm (17.7 x 9.7 x 11.9 in.)
Weight without TRION™ modules	Typ. 5.9 kg (13 lb.)	Typ. 14 kg (31 lb.)	Typ. 15 kg (33 lb.)

[1] Please find current specifications in the latest price list
[2] Depending on configuration (performance is different if e.g. Video data is involved and 2 or more files are written in parallel)
[3] Weight of one battery: 660 g (1.45 lb.)

DEWE2-A4 with Removable Solid State Disk

DEWE2-A7

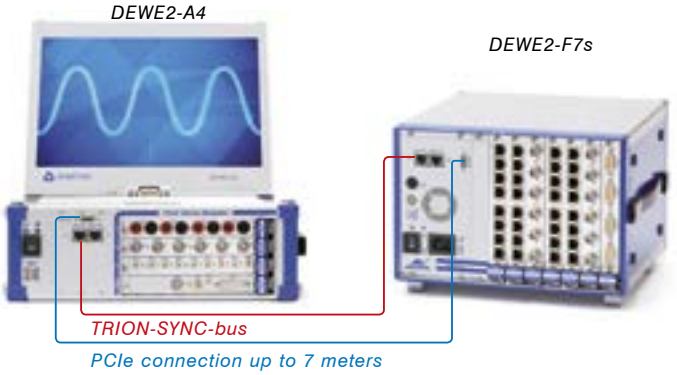
DEWE2-A13

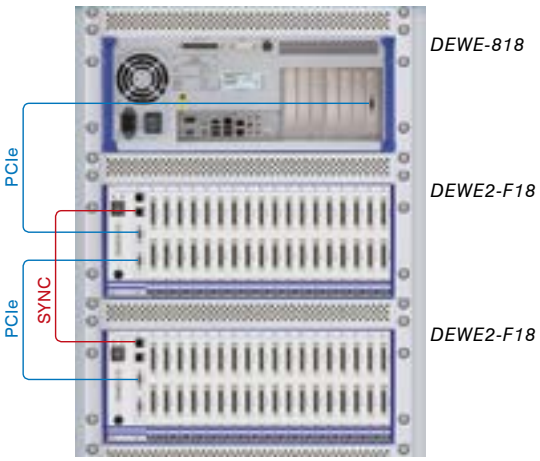
DW2-UPS-250-DC
The hot-swappable batteries guarantee continuous operation without an external power source.

DEWE2 Front-ends

	DEWE2-F4s	DEWE2-F7s	DEWE2-F13s	DEWE2-F18
Slots for TRION™ acquisition modules	4	7	13	18
Main system [1]				
Main frame bandwidth	90 MB/sec	90 MB/sec	90 MB/sec	90 MB/sec
Upstream interface (to host)	PCI Express X1	PCI Express X1	PCI Express X1	PCI Express X1
Downstream interface	-	optional	optional	PCI Express X1
Host PC interface	Express card 34, 1 m cable (optional 3 m or 7 m) optional PCI Express X1 card			
Power supply standard: rated (max.)	90 to 264 V_{AC}	90 to 264 V_{AC}	90 to 264 V_{AC}	90 to 264 V_{AC}
Optional power supply: rated (max.)	11 to 32 V_{DC} (10 to 36 V_{DC}) isolated, optional with buffer battery for ~ 10 min.	11 to 32 V_{DC} (10 to 36 V_{DC}) isolated, optional with buffer battery for ~ 10 min.	Redundant AC power supply	Redundant AC power supply
Dimensions (W x D x H)	177 x 230 x 177mm (4 u) (7 x 9.1 x 7 in.) without feet	258 x 230 x 177 mm (4 u) (10.2 x 9.1 x 7 in.) without feet	441 x 230 x 177 mm (4 u) (17.4 x 9.1 x 7 in.) without feet	441 x 427 x 177 mm (4 u) (17.4 x 16.8 x 7 in.) without feet
Weight	Typ. 3.9 kg (8.6 lb.)	Typ. 4.9 kg (10.8 lb.)	Typ. 8 kg (17.6 lb.)	typ. 12.0 kg (26.4 lb.)
Environmental specifications				
Operating temperature	0 to +50 °C, down to -20 °C with prewarmed unit	0 to +50 °C, down to -20 °C with prewarmed unit	0 to +50 °C, down to -20 °C with prewarmed unit	0 to +50 °C, down to -20 °C with prewarmed unit
Storage temperature	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C
Humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	10 to 90 % non cond., 5 to 95 % rel. humidity
Max. altitude	2000 m (6560 ft)	2000 m (6560 ft)	2000 m (6560 ft)	2000 m (6560 ft)
Sine vibration (EN 60068-2-6)	20 m/s²	20 m/s²	20 m/s²	20 m/s²
Shock (EN 60028-2-27)	30 g	30 g	15 g	15 g
Random vibration (EN 60721-3-2)	Class 2M3	Class 2M3	Class 2M2	Class 2M2

[1] Please find current specifications in the latest price list





DEWE2 Mainframes



	DEWE2-M4	DEWE2-M4s	DEWE2-M7s
Slots for TRION™ acquisition modules	4	4	7
Dynamic channel expansion	DEWE2 F-Series chassis or Ethernet		
Quasi-static channel expansion	EPAD2 CPAD2 via TRION-CAN	EPAD2 CPAD2 via TRION-CAN	EPAD2 CPAD2 via TRION-CAN
Data storage [1]			
Technology	Removable Solid State Disk	Solid State Disk	Solid State Disk
Capacity	120 GB (up to 480 GB)	120 GB (up to 480 GB)	120 GB (up to 480 GB)
Typ. duration of recording (16 ch. / 10 kS/s/ch. / 16 bit)	4 days	4 days	4 days
Gap free storing rate [2]	Typ. 90 MB/s	Typ. 90 MB/s	Typ. 90 MB/s
Main system [1]			
Display	no display MOB-DISP-12-A recommended	no display MOB-DISP-12-A recommended	no display MOB-DISP-12-A recommended
Processor	Intel® Core™ i7	Intel® Core™ i7	Intel® Core™ i7
Power supply			
Standard: rated (max.)	10 to 36 V_{DC} isolated; incl. external AC power supply	10 to 36 V_{DC} isolated; incl. external AC power supply	10 to 36 V_{DC} isolated; incl. external AC power supply
Optional	add internal buffer battery for ~ 10 min. operation and/or DW2-UPS-250-DC (ext. battery pack)	add internal buffer battery for ~ 10 min. operation	add internal buffer battery for ~ 10 min. operation
Environmental			
Operating temperature	0 to +50 °C, down to -20 °C with prewarmed unit	0 to +50 °C, down to -20 °C with prewarmed unit	0 to +50 °C, down to -20 °C with prewarmed unit
Storage temperature	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C
Humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	10 to 90 % non cond., 5 to 95 % rel. humidity
Max. Altitude	2000 m (6560 ft)	2000 m (6560 ft)	2000 m (6560 ft)
Sine vibration (EN 60068-2-6)	20 m/s²	20 m/s²	20 m/s²
Shock (EN 60028-2-27)	30 g	30 g	30 g
Random vibration (EN 60721-3-2)	Class 2M3	Class 2M3	Class 2M3
Dimensions			
Dimensions (W x D x H) (without handle)	318 x 253 x 108 mm (12.5 x 10 x 4.3 in.)	177 x 230 x 177 mm (4 u) (7 x .9.1 x 7 in.) without feet	258 x 230 x 177 mm (4 u) (10.2 x 9.1 x 7 in.) without feet
Weight without TRION™ modules	Typ. 3.9 kg (8.6 lb.)	Typ. 3.9 kg (8.6 lb.)	Typ. 4.9 kg (10.8 lb.)

[1] Please find current specifications in the latest price list
[2] Depending on configuration (performance is different if e.g. Video data are involved and 2 or more files are written in parallel)
[3] Weight of one battery: 440 g (1 lb.)

The hot-swappable batteries guarantee continuous operation without external power source

DEWE2-M13



DEWE2-M13s	DEWE2-M13	DEWE2-M18
13	13	18
DEWE2 F-Series chassis or Ethernet		
EPAD2 CPAD2 via TRION-CAN	EPAD2 CPAD2 via TRION-CAN	CPAD2 via TRION-CAN
Solid State Disk	Hard disk (plus two 3,5“ bays)	Solid State Disk
120 GB (up to 480 GB)	1 TB	120 GB (up to 480 GB)
4 days	35 days	
Typ. 90 MB/s	Typ. 80 MB/s	Typ. 90 MB/s
no display MOB-DISP-12-A recommended	no display	no display
Intel® Core™ i7	Intel® Core™ i7	Intel® Core™ i5
10 to 36 V_{DC} isolated; incl. external AC power supply	90 to 264 V_{AC}	90 to 264 V_{AC}
add internal buffer battery for ~ 5 min. operation	Redundant AC power supply	-
Battery powered, 4 battery slots [3], 3 batt. for ~2 hours operation included, incl. external AC power supply, optional external DC power supply		
0 to +50 °C, down to -20 °C with prewarmed unit	0 to +50 °C, down to -20 °C with prewarmed unit	0 to +45 °C
-20 to +70 °C	-20 to +70 °C	-20 to +70 °C
10 to 90 % non cond., 5 to 95 % rel. humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	10 to 90 % non cond., 5 to 95 % rel. humidity
2000 m (6560 ft)	2000 m (6560 ft)	2000 m (6560 ft)
20 m/s²	20 m/s²	20 m/s²
30 g	15 g	15 g
Class 2M3	Class 2M2	Class 2M2
441 x 230 x 177 mm (4 u plus 1 u for cooling in cabinet required) (17.4 x 9.1 x 7 in.) without feet	441 x 427 x 177 mm (4 u plus 1 u for cooling in cabinet required) (17.4 x 16.8 x 7 in.) without feet	441 x 427 x 177 mm (4 u plus 1 u for cooling in cabinet required) (17.4 x 16.8 x 7 in.) without feet
Typ. 13.0 kg (28.6 lb.)	Typ. 13.0 kg (28.6 lb.)	Typ. 15.0 kg (28.6 lb.)

DEWE2-M13-MK
19“ mounting kit for the DEWE2-M13 series, 4U

MOB-DISP-12-A
Very rugged external display

DEWE2-A4 / M4

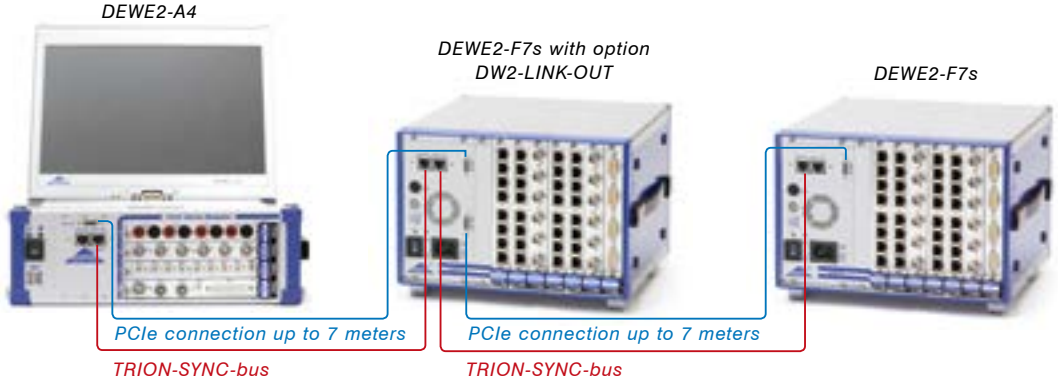
- *4 slots for TRION™ series modules*
- *Isolated wide range DC power supply*
- *Optional internal buffer battery for ~10 minutes*
- *Fully battery-powered by stackable battery pack*
- *Removable solid state disk*
- *Powerful Intel® Core™ i7 processor*

	DEWE2-A4	DEWE2-M4
Slots for TRION™ modules	4	
Dynamic channel expansion	DEWE2 F-Series chassis or Ethernet	
Quasi-static channel expansion	EPAD2 CPAD2 via TRION-CAN	
Main system [1]		
Data storage	removable 120 GB Solid State Disk optional up to 480 GB	
Gap free storing rate	Typ. 90 MB/s[2]	
Power supply standard: rated (max.)	10 to 36 V_{DC} isolated; external AC power supply adapter included	
Power supply optional	add internal buffer battery for ~10 minutes	
Display	13" TFT display, 1280 x 800	no display
Processor	Intel® Core™ i7	
RAM	4 GB	
Ethernet	1x 1 Gbit Ethernet optional 2 additional 1 Gbit Ethernet (replaces WLAN and Audio)	
Wireless LAN	1 antenna, 802.11n standard	
USB interfaces	4	
RS-232 interface	1	
Keyboard/pointing device	keyboard (84 keys) and touchpad integrated	external keyboard and mouse included
Operating system	Microsoft® WINDOWS® 7	
Dimensions (W x D x H)	317 x 252 x 128 mm (12.5 x 9.9 x 5 in.)	317 x 252 x 108 mm (12.5 x 9.9 x 4.3 in.)
Weight without TRION™ modules	Typ. 5.9 kg (13 lb.)	Typ. 3.9 kg (8.6 lb.)
Power consumption without modules	Typ. 75 W	Typ. 60 W
Environmental specifications		
Operating temperature	0 to +50 °C, down to -20 °C with prewarmed unit	
Storage temperature	-20 to +70 °C	
Humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	
Max. Altitude	2000 m (6560 ft)	
Sine vibration (EN 60068-2-6)	Acceleration 20 m/s², Freq. 10 Hz - 150 Hz, Sweep 1 oct/min, 20 cycles	
Shock (EN 60028-2-27)	Acceleration 30 g, duration 11ms, pulse form half sine, 3 pumps/direction, 6 directions	
Random vibration (EN 60721-3-2)	Class 2M3 (spectral acceleration density 3 m²/s³, frequency range 10 Hz-200 Hz, duration 30 min/direction)	

[1] Please find current specifications in the latest price list
[2] Depends on the system configuration

Channel Expansion

DEWE2-A4 with two channel expansion chassis DEWE2-F7s



SYSTEM OPTIONS	
DW2-PS-DC-BUFFER	Internal battery for a DEWE2 system. Bridges outages of the supply voltage up to approx. 5 - 10 minutes
DW2-LAN-2	Adds two additional 1 GBit LAN interfaces. Replaces the WLAN and AUDIO interfaces
FLEXRAY-INT-1	Adds one FLEXRAY interface. Changes removable SSD to fixed installed SSD.
DW2-CBL-SYNC-03	DEWE2 SYNC-cable with RJ45 plugs, 3 m
DW2-CBL-SYNC-07	DEWE2 SYNC-cable with RJ45 plugs, 7 m
UPGRADES	
SSD-120-240	Upgrade of 120 GB flash disk to 240 GB flash disk
SSD-120-480	Upgrade of 120 GB flash disk to 480 GB flash disk

DW2-LAN-2 option

FLEXRAY-INT-1 *option*

DW2-PS-DC-BUFFER *option*
Bridges supply voltage outages

SSD-120-240/480
Flash disk upgrade

ACCESSORIES	
POW-CBL-3B302F-B-2	DC power supply cable Lemo FGJ.3B.302 to two male 4 mm banana plugs, 2 m
DW2-UPS-250-DC	External 250 W UPS and multi-battery charger with isolated 11 to 32 V_{DC} (max.) input range. 3 slots for BAT-89WH batteries, 3 batteries included, cable set included. Longer cables for flexibe use of DW2-UPS-250-DC optionally available. Mechanically compatible with DEWE2-A4 / DEWE2-M4.
BAT-89WH	Lithium-Ion battery, 14.4 V, 95 Wh, max. 8 A
BAT-CHARGER-1	Desktop battery charger for 1 battery, incl. external AC adaptor
BAT-CHARGER-4	Desktop battery charger for 4 batteries, incl. external AC adaptor
DEWE-CAM-GIGE-SPLIT BOX	Box for connecting up to four DEWE-CAM-GIGE-120 cameras to a DEWETRON system
DE-POWERBOX-12	Power distribution box with 12 connectors for DC power with voltage meter Input via 5 m connection cable 2x 10 mm² with 50 A fuse, terminated with 2 ring tongues, 2nd input for a buffer battery (from customer) to achieve UPS function

DW2-UPS-250-DC, stackable
250 W UPS with 3 slots for batteries

BAT-CHARGER-1

DEWE-CAM-GIGE-SPLIT BOX

DE-POWERBOX-12
DC Power distribution box

MOB-DISP-12
External display

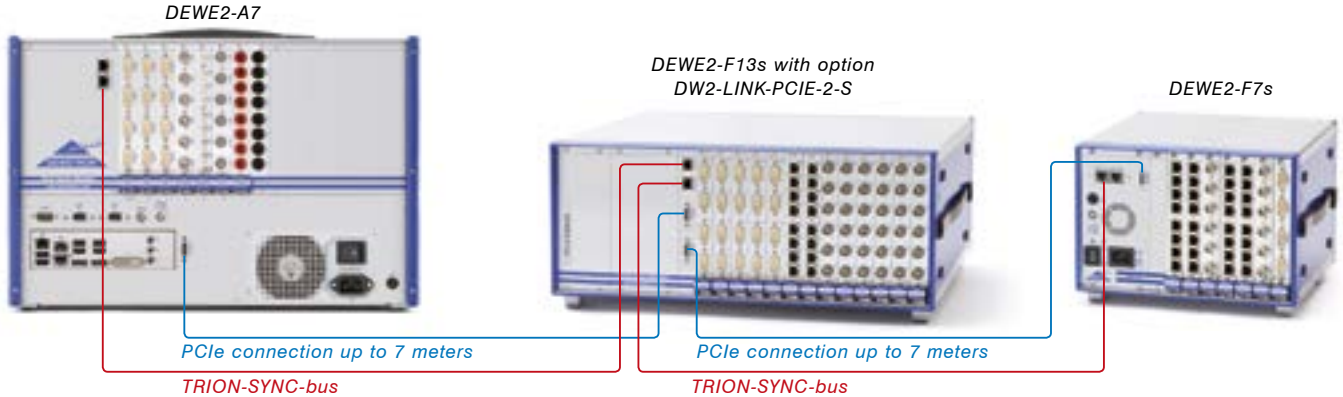
DEWE2-A7 / A13

- *7 / 13 slots for TRION™ series modules*
- *Powerful Intel® Core™ i7 processor*
- *Brilliant 17" full-HD display*
- *Optional fully battery powered*

	DEWE2-A7	DEWE2-A13
Slots for TRION™ modules	7	13
Dynamic channel expansion	DEWE2 F-Series chassis or Ethernet	
Quasi-static channel expansion	EPAD2 CPAD2 via TRION-CAN	
Main system [1]		
Data storage	1 TB	
Gap free storing rate	Typ. 90 MB/s[2]	
Power supply standard: rated (max.)	90 to 264 V_{AC}	
Power supply optional	Battery powered, 4 battery slots [3], 3 batt. for ~2 hours operation included, incl. external AC power supply, optional external DC power supply	
Display	17" TFT display, 1920 x 1080	
Processor	Intel® Core™ i7	
RAM	4 GB	
Ethernet	2 x 1 Gbit Ethernet	
USB interfaces	7	
RS-232 interface	1	
Keyboard/pointing device	84 keys keyboard and touchpad integrated	
Operating system	Microsoft® WINDOWS® 7	
Dimensions (W x D x H)	450 x 246 x 303 mm (17.7 x 9,7 x 11.9 in.)	450 x 246 x 303 mm (17.7 x 9,7 x 11.9 in.)
Weight without TRION™ modules	Typ. 14 kg (31 lb.)	Typ. 15 kg (33 lb.)
Power consumption without modules	Typ. 120 W	Typ. 120 W
Environmental specifications		
Operating temperature	0 to +50 °C, down to -20 °C with prewarmed unit	
Storage temperature	-20 to +70 °C	
Humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	
Max. Altitude	2000 m (6560 ft)	
Sine vibration (EN 60068-2-6)	Acceleration 20 m/s², Freq. 10 Hz - 150 Hz, Sweep 1 oct/min, 20 cycles	
Shock (EN 60028-2-27)	Acceleration 15 g, duration 11ms, pulse form half sine, 3 pumps/direction, 6 directions	
Random vibration (EN 60721-3-2)	Class 2M2 (spectral acceleration density 1 m²/s³, frequency range 10 Hz-200 Hz, duration 30 min/direction)	

[1] Please find current specifications in the latest price list
[2] Depends on the system configuration
[3] Weight of one battery: 440 g (1 lb.)

Channel Expansion



SYSTEM OPTIONS	
DW2-A13-PS-BAT	Upgrade of DEWE2-A7/A13 instruments to battery power supply with UPS function 18 to 24 V_{DC} (max.) non-isolated input, incl. external AC adaptor 4 slots for hot-swappable batteries, 3 batteries for appr. 2 hours operation included
DW2-CBL-SYNC-03	DEWE2 SYNC-cable with RJ45 plugs, 3 m
DW2-CBL-SYNC-07	DEWE2 SYNC-cable with RJ45 plugs, 7 m
UPGRADES	
HDD-1000-SSD-120	Upgrade to 120 GB flash disk (replaces 1 TB harddisk), no moving parts, max. data throughput 40 MB/s
HDD-1000-SSD-240	Upgrade to 240 GB flash disk (replaces 1 TB harddisk), no moving parts, max. data throughput 40 MB/s
HDD-1000-SSD-480	Upgrade to 480 GB flash disk (replaces 1 TB harddisk), no moving parts, max. data throughput 40 MB/s

DEWE2-A7

DEWE2-A13

DEWE2-A13 with
DW2-A13-PS-BAT option

ACCESSORIES	
DW2-A13-CC	Shipping/carrying case for the DEWE2-A7 or DEWE2-A13 mainframe. Common-carrier rated, internal custom foam cut-out, high impact construction. Hasps for attaching padlocks, pull-out handle and wheels for easy transport
DEWE-DCDC-24-300-ISO	External power supply, input voltage 10 to 36 V_{DC} (max.), output 24 V_{DC} 300 W
BAT-89WH	Lithium-Ion battery, 14.4 V, 95 Wh, max. 8 A
BAT-CHARGER-1	Desktop battery charger for 1 battery, incl. external AC adaptor
BAT-CHARGER-4	Desktop battery charger for 4 batteries, incl. external AC adaptor

Carrying bag

DEWE-DCDC-24-300-ISO

BAT-CHARGER-1

BAT-CHARGER-4

DW2-A13-CC
Shipping/carrying case

DEWE2-M4s / M7s / M13s

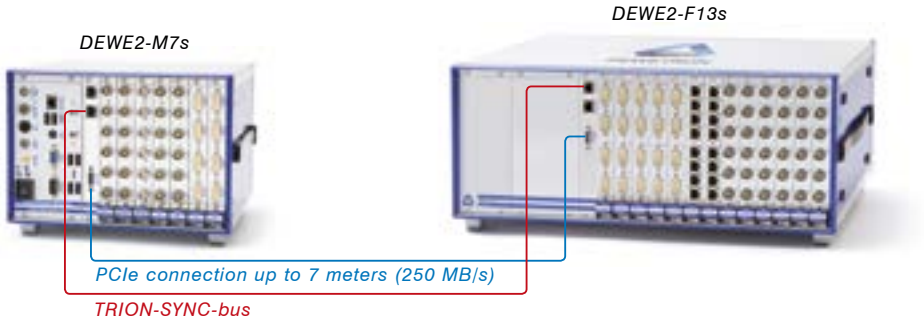
- *4/7/13 slots for TRION™ series modules*
- *All connections at the front*
- *Isolated wide range DC power supply*
- *Optional internal buffer battery for ~10 minutes*
- *Powerful Intel® Core™ i7 processor*



	DEWE2-M4s	DEWE2-M7s	DEWE2-M13s
Slots for TRION™ modules	4	7	13
Dynamic channel expansion	Ethernet	DEWE2 F-Series chassis or Ethernet	
Quasi-static channel expansion	EPAD2 CPAD2 via TRION-CAN		
Main system [1]			
Data storage	120 GB solid state disk, optional up to 480 GB		
Gap free storing rate	Typ. 90 MB/s[2]		
Power supply: rated (max.)	isolated 10 to 36 V_{DC}, external AC power supply adapter included optional internal UPS battery for ~5 minutes		
Display	no display, MOB-DISP-12-A recommended		
Processor	Intel® Core™ i7		
RAM	4 GB		
Ethernet	1x 1 Gbit Ethernet optional 2 additional 1 Gbit Ethernet (replaces WLAN and Audio)		
Wireless LAN	1 antenna, 802.11n standard		
USB interfaces	6	6	4
RS-232 interface	1		
FireWire® interface	optional (replaces WLAN and Audio)		
Keyboard/pointing device	Keyboard and mouse included		
Operating system	Microsoft® WINDOWS® 7		
Dimensions (W x D x H) without feet	177 x 230 x 177 mm (4 u) (7 x 9.1 x 7 in.)	258 x 230 x 177 mm (4 u) (10.2 x 9.1 x 7 in.)	441 x 230 x 177 mm (4 u plus 1 u for cooling in cabinet) (17.4 x 9.1 x 7 in.) without feet
Weight	Typ. 3.9 kg (8.6 lb.)	Typ. 4.9 kg (10.8 lb.)	Typ. 13 kg (28.6 lb.)
Power consumption without modules	Typ. 60 W	Typ. 60 W	Typ. 60 W
Environmental specifications			
Operating temperature	0 to +50 °C, down to -20 °C with prewarmed unit		
Storage temperature	-20 to +70 °C		
Humidity	10 to 90 % non cond., 5 to 95 % rel. humidity		
Max. Altitude	2000 m (6560 ft)		
Sine vibration (EN 60068-2-6)	Acceleration 20 m/s², Freq. 10 Hz - 150 Hz, Sweep 1 oct/min, 20 cycles		
Shock (EN 60028-2-27)	Acceleration 30 g, duration 11ms, pulse form half sine, 3 pumps/direction, 6 directions		
Random vibration (EN 60721-3-2)	Class 2M3 (spectral acceleration density 3 m²/s³, frequency range 10 Hz-200 Hz, duration 30 min/direction)		

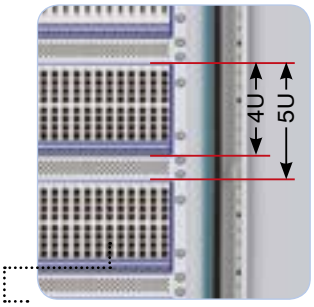
[1] Please find current specifications in the latest price list
[2] Depends on the system configuration

Channel Expansion

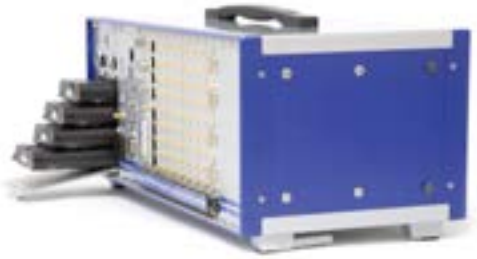


SYSTEM OPTIONS				
	M4s	M7s	M13s	
DW2-PS-DC-BUFFER	✓	✓	✓	Adds an internal battery and bridges outages of the supply voltage up to approx. 5 - 10 minutes No status information is supplied.
DW2-LAN-2	✓	✓	✓	Adds two additional 1 GBit LAN interfaces. Replaces the WLAN and AUDIO interfaces
DW2-CBL-SYNC-03		✓	✓	DEWE2 SYNC-cable with RJ45 plugs, 3 m
DW2-CBL-SYNC-07		✓	✓	DEWE2 SYNC-cable with RJ45 plugs, 7 m
DW2-PS-BAT			✓	Upgrade of DEWE2-M13s instruments to battery power supply with UPS function 18 to 24 V_{DC} (max.) non-isolated input, incl. external AC adaptor 4 slots for hot-swappable batteries, 3 batteries for appr. 2 hours operation included
UPGRADES				
SSD-120-240				Upgrade of 120 GB flash disk to 240 GB flash disk
SSD-120-480				Upgrade of 120 GB flash disk to 480 GB flash disk

DW2-LAN-2
DEWE2-M4s with 2x
1 Gbit Ethernet option



M13s installed into a 19" cabinet
5 u required (4 u = system + 1 u = cooling)



DW2-PS-BAT
DEWE2-M13s with batteries

ACCESSORIES	
DW2-CBL-POW-B-2	2 male banana plugs to DC power supply input of DEWE2 system. Applicable to DEWE2-A4, DEWE2-M4, DEWE2-M4s, DEWE2-M7s and DEWE2-F4s / -F7s with option DW2-PS-DC
DW2-UPS-250-DC	External 250 W UPS and multi-battery charger with isolated 11 to 32 V_{DC} (max.) input range. 3 slots for BAT-89WH batteries, 3 batteries included, cable set included. Longer cables for flexibe use of DW2-UPS-250-DC optionally available
POW-CBL-3B302F-B-2	DC power supply cable (terminated with Lemo FGJ.2B.303) to two male 4mm banana plugs, 2m
DEWE-UPS-300-DC	External 300 W UPS and multi-battery charger with isolated 10 to 36 V_{DC} (max.) input range for powering systems with wide range DC input, output of DEWE-UPS-300-DC is 12 .. 16 V_{DC} when running from batteries and 24 V_{DC} when powered from DC, 4 slots for BAT-95WH batteries, 2 batteries included
BAT-89WH	Lithium-Ion battery, 14.4 V, 89 Wh, max. 8 A
BAT-CHARGER-1	Desktop battery charger for 1 battery, incl. external AC adaptor
BAT-CHARGER-4	Desktop battery charger for 4 batteries, incl. external AC adaptor
DE-POWERBOX-12	Power distribution box with 12 connectors for DC power with voltage meter Input via 5 m connection cable 2x 10 mm² with 50 A fuse, terminated with 2 ring tongues, 2nd input for a buffer battery (from customer) to achieve UPS function Outputs: 1x Lemo EGG.3B.302 socket, 1 pair of high-current banana sockets, 2 cigarette lighter sockets, 2x Lemo EGG.2B.302 sockets, 2x Lemo EGG.1B.302 sockets, 4 pairs of banana sockets

DW2-UPS-250-DC,
250 W UPS with 3 slots for batteries

BAT-CHARGER-1

BAT-CHARGER-4

DE-POWERBOX-12
DC Power distribution box

MOB-DISP-12
External display

DEWE2-M13 / M18

- *13/18 slots for TRION™ series modules*
- *Free PCI slots inside (DEWE2-M13 only)*
- *One internal hard disk and 2 bays for removable disks (DEWE2-M13 only)*
- *19" rack-mountable or benchtop use*

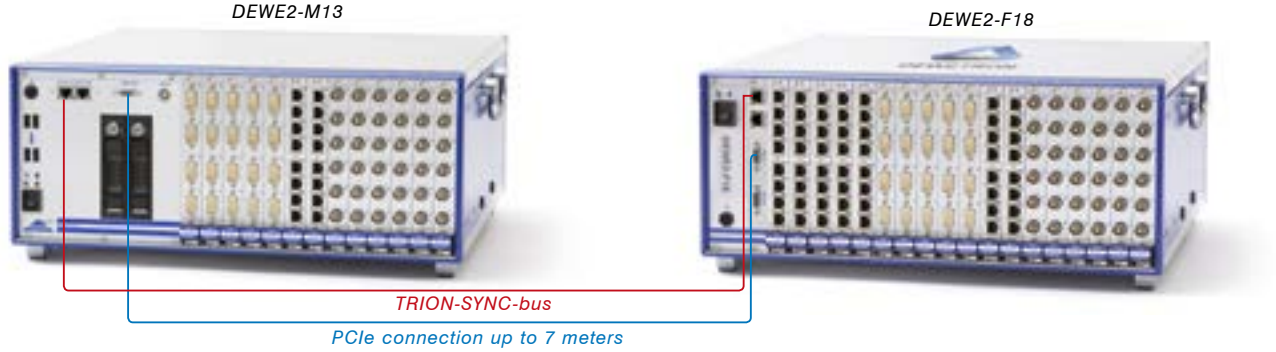
	DEWE2-M13	DEWE2-M18
Slots for TRION™ modules	13	18
Dynamic channel expansion	DEWE2 F-Series chassis or Ethernet	Ethernet
Quasi-static channel expansion	EPAD2 CPAD2 via TRION-CAN	CPAD2 via TRION-CAN
Main system [1]		
Free slots (PCI, PCIe)	2 PCI, 1 PCIe x4, 1 PCIe x16	-
Data storage	1 TB hard disk 2 free 3.5" bays for further hard disks	120 GB solid state disk, optional up to 480 GB
Gap free storing rate	Typ. 80 MB/s[2]	Typ. 90 MB/s[2]
Power supply: rated (max.)	90 to 264 V_{AC}	90 to 264 V_{AC}
Display	no display	no display
Processor	Intel® Core™ i7	Intel® Core™ i5
RAM	4 GB	4 GB
Ethernet	2x 1 Gbit Ethernet	1 Gbit Ethernet
USB interfaces	8	2
FireWire® interface	optional	-
Keyboard/pointing device	external keyboard with touchpad	external keyboard with touchpad
Operating system	Microsoft® WINDOWS® 7	Microsoft® WINDOWS® 7
Dimensions (W x D x H) without feet	441 x 427 x 177 mm (4 u plus 1 u for cooling in cabinet required) (17.4 x 16.8 x 7 in.)	441 x 427 x 177 mm (4 u plus 1 u for cooling in cabinet required) (17.4 x 16.8 x 7 in.)
Weight	Typ. 13.0 kg (28.6 lb.)	Typ. 13.0 kg (28.6 lb.)
Power consumption without modules	Typ. 100 W	Typ. 100 W
Environmental specifications		
Operating temperature	0 to +50 °C, down to -20 °C with prewarmed unit	0 to +45 °C
Storage temperature	-20 to +70 °C	-20 to +70 °C
Humidity	10 to 90 % non cond., 5 to 95 % rel. humidity	10 to 90 % non cond., 5 to 95 % rel. humidity
Max. Altitude	2000 m (6560 ft)	2000 m (6560 ft)
Sine vibration (EN 60068-2-6)	Acceleration 20 m/s², Freq. 10 Hz - 150 Hz, Sweep 1 oct/min, 20 cycles	Acceleration 20 m/s², Freq. 10 Hz - 150 Hz, Sweep 1 oct/min, 20 cycles
Shock (EN 60028-2-27)	Acceleration 15 g, pulse length 11ms, pulse form half sine, 3 moves/direction, 6 directions	Acceleration 15 g, pulse length 11ms, pulse form half sine, 3 moves/direction, 6 directions
Random vibration (EN 60721-3-2)	Class 2M2 (spectral acceleration density 1 m²/s³, Frequency range 10 Hz-200 Hz, duration 30 min/ direction)	Class 2M2 (spectral acceleration density 1 m²/s³, Frequency range 10 Hz-200 Hz, duration 30 min/ direction)

[1] Please find current specifications in the latest price list
[2] Depends on the system configuration

Channel Expansion

DEWE2-M13

DEWE2-F18

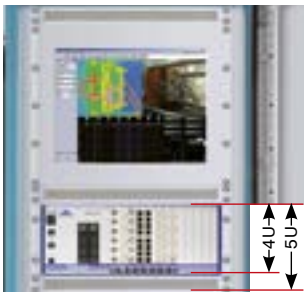


SYSTEM OPTIONS	
DW2-PS-AC-RED	Redundant 115 / 230 V_{AC} power supply for a DEWE2 system Applicable to DEWE2-M13, DEWE2-F13s and DEWE2-F18
DW2-M13-MK	19“ mounting kit for the DEWE2-M13, 4U
UPGRADES for DEWE2-M13	
HDD-1000-SSD-120	Upgrade to 120 GB flash disk (replaces 1 TB harddisk), no moving parts, max. data throughput 40 MB/s
HDD-1000-SSD-240	Upgrade to 240 GB flash disk (replaces 1 TB harddisk), no moving parts, max. data throughput 40 MB/s
HDD-1000-SSD-480	Upgrade to 480 GB flash disk (replaces 1 TB harddisk), no moving parts, max. data throughput 40 MB/s
DW2-M13-BAY35-SATA	3.5“ SATA removable drive bay for 2.5“ harddisk or 2.5“ flash disk
HDD-SATA-750-2.5	750 GB SATA harddisk 2.5“

DEWE2-M13 with
DW2-PS-AC-RED option

DEWE2-M13 with typical
PCI slot configuration

DEWE2-M13 with 2x option
DW2-M13-BAY35-SATA



DEWE2-M13 and
DEWE-TFT19-RM
Rack-mounting 19“ display
5 u required
(4 u = system + 1 u = cooling)

ACCESSORIES	
DEWE-TFT24-DT	24“ desktop TFT monitor with resolution of 1920 x 1200
DEWE-TFT19-RM	Rack-mounting 9U industrial grade 19“ display with resolution of 1280 x 1024

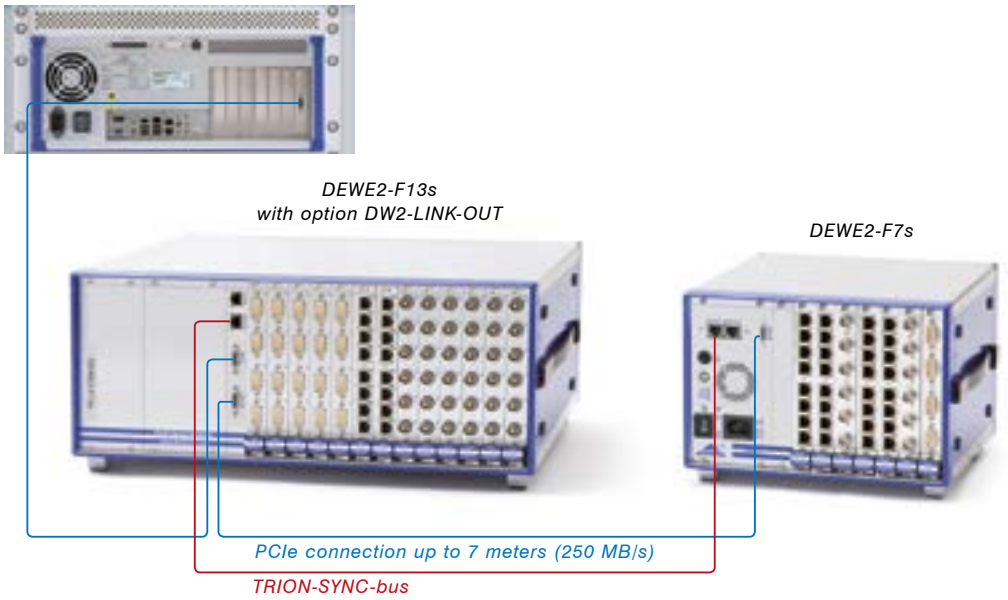
DEWE2-F4s / F7s / F13s / F13-FIBRE

- *4 / 7 / 13 slots for TRION™ series modules*
- *PCI Express data link*
- *120 MB/s data transfer rate*

	DEWE2-F4s	DEWE2-F7s	DEWE2-F13s	DEWE2-F13-FIBRE
Slots for TRION™ modules	4	7	13	13
Quasi-static channel expansion	CPAD via TRION-CAN (no EPAD)			
Main system [1]				
Main frame bandwidth	90 MB/sec			
Upstream interface (to host)	PCI Express X1, 250 MB/s			
Power supply: rated (max.)	90 to 264 V_{AC}			
Dimensions (W x D x H) without feet	177 x 230 x 177mm (4 u) (7 x 9.1 x 7 in.)	258 x 230 x 177 mm (4 u) (10.2 x 9.1 x 7 in.)	441 x 230 x 177 mm (4 u plus 1 u for cooling in cabinet required) (17.4 x 9.1 x 7 in.)	441 x 427 x 177 mm (4 u plus 1 u for cooling in cabinet required) (17.4 x 16.8 x 7 in.)
Weight	Typ. 3.9 kg (8.6 lb.)	Typ. 4.9 kg (10.8 lb.)	Typ. 8 kg (17.6 lb.)	Typ. 12 kg (26.4 lb.)
Power consumption without mod.	Typ. 25 W	Typ. 25 W	Typ. 25 W	Typ. 25 W
Environmental specifications				
Operating temperature	0 to +50 °C, down to -20 °C with prewarmed unit			
Storage temperature	-20 to +70 °C			
Humidity	10 to 90 % non cond., 5 to 95 % rel. humidity			
Max. Altitude	2000 m (6560 ft)			
Sine vibration (EN 60068-2-6)	Acceleration 20 m/s², Freq. 10 Hz - 150 Hz, Sweep 1 oct/min, 20 cycles			
Shock (EN 60028-2-27)	Acceleration 30 g, duration 11 ms, pulse form half sine, 3 pumps/direction, 6 directions		Acceleration 15 g, duration 11 ms, pulse form half sine, 3 pumps/direction, 6 directions	
Random vibration (EN 60721-3-2)	Class 2M3 (spectral acceleration density 3 m²/s³, frequency range 10 Hz-200 Hz, duration 30 min/direction)		Class 2M2 (spectral acceleration density 1 m²/s³, Frequency range 10 Hz-200 Hz, duration 30 min/direction)	

[1] Please find current specifications in the latest price list

Channel Expansion



SYSTEM OPTIONS					
	F4s	F7s	F13s	F13-FIBRE	
DW2-PS-DC-150	✓	✓			Isolated power supply 10 to 36 V_{DC} (max.), 150 W, 2 m Power supply cable to cigarette lighter Including external 115 / 230 V_{AC} adaptor
DW2-PS-DC-240			✓		Isolated power supply 10 to 36 V_{DC} (max.), 240 W, 2 m Power supply cable to cigarette lighter Including external 115 / 230 V_{AC} adaptor
DW2-PS-AC-RED			✓	✓	Redundant 115 / 230 V_{AC} power supply
DW2-PS-BAT			✓		Upgrade of DEWE2-F13s instruments to battery power supply with UPS function 18 to 24 V_{DC} (max.) non-isolated input, incl. external AC adaptor 4 slots for hot-swappable batteries, 3 batteries for appr. 2 hours operation included
DW2-F13s-MK			✓	✓	19“ mounting kit for the DEWE2-F13s, 4U
DW2-LINK-OUT		✓	✓	✓	Extended interfaces to enable daisy-chaining. 2 PCIe 1X interfaces and 2 SYNC interfaces. Please order synchronization cable DW2-CBL-SYNC-xx separately!
DW2-CBL-SYNC-03		✓	✓	✓	DEWE2 SYNC-cable with RJ45 plugs, 3 m
DW2-CBL-SYNC-07		✓	✓	✓	DEWE2 SYNC-cable with RJ45 plugs, 7 m

UPGRADES	
LINK-HOST-UP-EX34-PCIE	Changes the standard ExpressCard-34 to a PCI Express 1X host card
LINK-HOST-PCIE	Additional PCI Express 1X host card, needs a free PCI Express slot in host unit
LINK-HOST-EX34	Additional ExpressCard-34 host card, for laptop with ExpressCard-34 slot

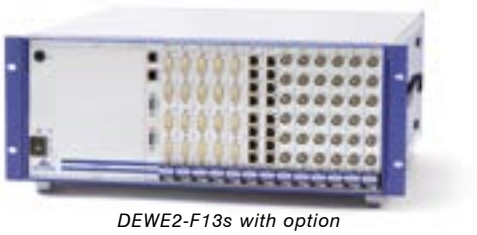
DEWE2-F7s with option DW2-LINK-OUT

DEWE2-F13s with option DW2-LINK-OUT

DEWE2-F13s with option DW2-PS-AC-RED

LINK-HOST-EX34
ExpressCard-34 host card

LINK-HOST-PCIE
ExpressCard-34 host card



DEWE2-F13s with option DW2-F13x-MK

ACCESSORIES	
DW2-CBL-POW-B-2	2 male banana plugs to DC power supply input of DEWE2 system. Applicable to DEWE2-A4, DEWE2-M4, DEWE2-M4s, DEWE2-M7s and DEWE2-F4s / -F7s with option DW2-PS-DC
DW2-UPS-250-DC	External 250 W UPS and multi-battery charger with isolated 11 to 32 V_{DC} (max.) input range. 3 slots for BAT-89WH batteries, 3 batteries included, cable set included. Longer cables for flexibe use of DW2-UPS-250-DC optionally available
POW-CBL-3B302F-B-2	DC power supply cable (terminated with Lemo FGJ.2B.303) to two male 4mm banana plugs, 2m
BAT-89WH	Lithium-Ion battery, 14.4 V, 95 Wh, max. 8 A
DEWE-UPS-300-DC	External 300 W UPS and multi-battery charger with isolated 10 to 36 V_{DC} (max.) input range for powering systems with wide range DC input, output of DEWE-UPS-300-DC is 12 to 16 V_{DC} when running from batteries and 24 V_{DC} when powered from DC, 4 slots for BAT-95WH batteries, 2 batteries included
BAT-CHARGER-1	Desktop battery charger for 1 battery, incl. external AC adaptor
BAT-CHARGER-4	Desktop battery charger for 4 batteries, incl. external AC adaptor
DE-POWERBOX-12	Power distribution box with 12 connectors for DC power with voltage meter Input via 5 m connection cable 2x 10 mm² with 50 A fuse, terminated with 2 ring tongues, 2nd input for a buffer battery (from customer) to achieve UPS function Outputs: 1x Lemo EGG.3B.302 socket, 1 pair of high-current banana sockets, 2 cigarette lighter sockets, 2x Lemo EGG.2B.302 sockets, 2x Lemo EGG.1B.302 sockets, 4 pairs of banana sockets

BAT-CHARGER-1

BAT-CHARGER-4

DW2-UPS-250-DC,
250 W UPS with 3 slots for batteries

DEWE-UPS-300-DC
300 W UPS with 4 slots for batteries

DEWE2-F18

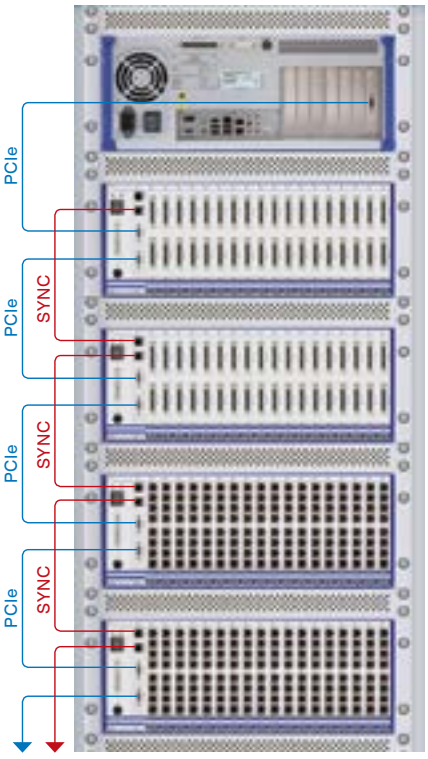
- *18 slots for TRION™ series modules*
- *PCI Express data link*
- *120 MB/s data transfer rate*
- *19" rack-mountable or benchtop use*

	DEWE2-F18
Slots for TRION™ modules	18
Quasi-static channel expansion	CPAD via TRION-CAN (no EPAD)
Main system [1]	
Main frame bandwidth	120 MB/sec
Upstream interface (to host)	PCI Express X1, 250 MB/s
Downstream interface	PCI Express X1, 250 MB/s
Power supply: rated (max.)	90 to 264 V_{AC}
Dimensions (W x D x H) without feet	441 x 427 x 177 mm (4 u plus 1 u for cooling in cabinet required) (17.4 x 16.8 x 7 in.)
Weight	Typ. 12.0 kg (26.4 lb.)
Power consumption without modules	Typ. 25 W
Environmental specifications	
Operating temperature	0 to +50 °C, down to -20 °C with prewarmed unit
Storage temperature	-20 to +70 °C
Humidity	10 to 90 % non cond., 5 to 95 % rel. humidity
Max. Altitude	2000 m (6560 ft)
Sine vibration (EN 60068-2-6)	Acceleration 20 m/s², Freq. 10 Hz - 150 Hz, Sweep 1 oct/min, 20 cycles
Shock (EN 60028-2-27)	Acceleration 15 g, pulse length 11ms, pulse form half sine, 3 moves/direction, 6 directions
Random vibration (EN 60721-3-2)	Class 2M2 (spectral acceleration density 1 m²/s³, Frequency range 10 Hz-200 Hz, duration 30 min/direction)

[1] Please find current specifications in the latest price list

SYSTEM OPTIONS	
DW2-PS-AC-RED	Redundant 115 / 230 VAC power supply for a DEWE2 system
DW2-F18-MK	19“ mounting kit for the DEWE2-F18, 4U
DW2-CBL-SYNC-03	DEWE2 SYNC-cable with RJ45 plugs, 3 m
DW2-CBL-SYNC-07	DEWE2 SYNC-cable with RJ45 plugs, 7 m
LINK-HOST-UP-EX34-PCIE	Changes the standard ExpressCard-34 to a PCI Express 1X host card

Channel Expansion



TRION™ Series Modules
Overview

ANALOG Modules	Channels	Sample rate per channel	Resolution	Isolation	Connector Type
TRION-2402-MULTI	4 or 8	204.8 kS/s	24 bit	yes	DSUB, LEMO 0B
TRION-1620-ACC	6	2 MS/s 1 MS/s	16 bit 24 bit	yes	BNC, LEMO 1B
TRION-1620-LV	6	2 MS/s 1 MS/s	16 bit 24 bit	yes	BNC, LEMO 1B
TRION-2402-V	4 or 8	204.8 kS/s	24 bit	yes	Safety banana sockets
TRION-1603-LV	6	250 kS/s	16 bit	yes	BNC, LEMO 1B
TRION-2402-dSTG	6 to 8	204.8 kS/s	24 bit	no	RJ-45, DSUB, LEMO 1B, LEMO 0B
TRION-2402-dACC	6 to 8	204.8 kS/s	24 bit	no	SMB, BNC

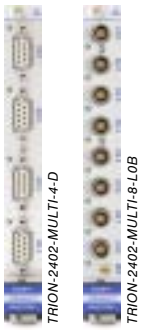
Voltage (1000 V) | Current (shunt needed) | Bridge | IEPE | RTD | Potentiometer | Advanced counter inputs

DIGITAL Modules	Channels	Sample rate per channel	Resolution	Isolation	Connector Type
TRION-CNT-6-L1B	6 to 18	800 kS/s	80 MHz	yes	DI, CNT
TRION-DI-48	48	2 MS/s	80 MHz	yes	DI
TRION-BASE	1 to 8	2 MS/s	80 MHz	-	DI, DIO, CNT, SYNC, AUX
TRION-TIMING	1 to 8	2 MS/s	80 MHz	-	GPS antenna, IRIG In / Out, DIO, CNT, SYNC, AUX

DEDICATED Modules	Channels	Sample rate per channel	Resolution	Isolation	Connector Type
TRION-CAN	2 or 4	n/a	n/a	yes	DSUB
TRION-FLEXRAY	1	n/a	n/a	-	DSUB
TRION-VGPS	1 CNT 8 DIO	2 MS/s	0.01 km/h < 10 cm	-	GPS antenna, IRIG In / Out, DIO, CNT, SYNC, AUX
TRION-A429	4, 8, 16 or 30	-	n/a	-	SCSI-3
TRION-M1553	1,2 or 4	-	n/a	-	SCSI-3
TRION-MA4	9, 10, 12 or 13	-	n/a	-	SCSI-3
TRION-1628-AO-2	Update rate max. 2.8 MS/s	2	16 bit	-	BNC

TRION-2402-MULTI Universal analog input module

- *Sampling:* *24-bit; 204.8 kS/s per channel*
- *Input:* *Voltage, bridge, resistance, RTD and IEPE*
- *Isolation:* *350 V_{DC}*
- *CAN:* *High-speed CAN2.0 port*



TRION-2402-MULTI specifications		
Input channels	TRION-2402-MULTI-4-D TRION-2402-MULTI-8-L0B	4 channels SUB-D connector (CH1 can be used as CAN port) 8 channels 0B LEMO connector (CH1 can be used as CAN port)
ADC		
Resolution	24 bit	
Sampling rate	1 kS/s to 204.8 kS/s per channel	
Isolation[1)]	Channel to channel	350 V_{DC}[1)]
	Channel to chassis	350 V_{DC}[1)]
Input ranges		
Voltage	±5 mV to ±100 V[1)] freely programmable	
IEPE®	±100 mV to ±10 V freely programmable	
Bridge	1 to 1000 mV/V	
Resistance	10, 30, 100, 300 Ω, 1, 3, 10, 30 kΩ	
Voltage input 1 year accuracy	±0.02 % of reading ± 0.02 % of range ±20 µV	
Gain drift	typical 10 ppm/°C max. 20 ppm/°C	
Offset drift	typical 0.3 µV/°C+ 10 ppm of range, max 2 µV/°C + 20 ppm of range/°C	
Linearity	typical 0.01 %	
Input impedance	0 to 10 V range	100 MΩ
	10 to 100 V range	2 MΩ
Input bias current	< 5 nA	
Input configuration	Single ended or differential (programmable)	
Input coupling	DC / AC (high pass filter 0.16 Hz)	
Common mode voltage	±200 V_{DC}	
Over voltage protection	0 to 10 V range	50 V continuous, 100 V for 60 seconds
	10 to 100 V range	250 V
Excitation voltage range	0 to 24 V_{DC}	
Resolution	1 mV	
1 year Accuracy	±0.03 % ±1.5 mV	
Drift	±10 ppm/K ±50 µV/K	
Current limit	0.1 to 10 V: 60 mA	
	10 to 15 V: 40 mA	
	>15 V: 30 mA	
Protection	Continuous short	
Excitation current	0.1 to 60 mA_{DC} (programmable, 16 bit DAC)	
Resolution	1 uA	
1 year Accuracy	0.1 to 5 mA: 0.05 % ±2 µA	>5 to 60 mA: 2% ±5 µA
Drift	15 ppm/°C	
Compliance voltage	0.1 to 20 mA: 24 V	
	>20 mA: 10 V	
Output impedance	>10 MΩ	
Supported sensors	4- 6-wire full bridge	
	3- 5-wire ½ bridge with internal completion (software programmable)	
	3- or 4-wire ¼ bridge with internal resistor for 120 Ω and 350 Ω (software programmable)	
	4-wire full bridge with constant current excitation (piezoresistive bridge sensors)	
	Potentiometer	
	Resistance	
	Resistance temperature detection: Pt100, Pt200, Pt300, Pt500, Pt1000, Pt2000 (2-, 3-, 4-wire)	
	IEPE®	

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Bridge resistance	80 Ω to 10 kΩ @ ≤ 5 V_{DC} excitation			
Completion resistor accuracy	0.05 % ±15 ppm/K			
Automatic bridge balance	±400 % of range			
Typical SNR Range	10 mV	100 mV	1V	10 V
100 S/s ≤ fs ≤ 1 kS/s	82 dB	101 dB	111 dB	112 dB
10 kS/s < fs ≤ 102.4 kS/s	72 dB	92 dB	104 dB	107 dB
102.4 kS/s < f ≤ 200 kS/s	69 dB	80 dB	81 dB	81 dB
Spurious free dynamic range	10 mV	100 mV	1 V	10 V
100 S/s ≤ fs ≤ 1 kS/s	108 dB	128 dB	141 dB	141 dB
10 kS/s < fs ≤ 102.4 kS/s	103 dB	123 dB	134 dB	136 dB
102.4 kS/s < f ≤ 200 kS/s	99 dB	120 dB[2] / 106 dB	133 dB[2] / 106 dB	135 dB[2] / 106 dB
Typical CMRR	90 dB @ 1 kHz	80 dB @ 10 kHz		
Self test (self calibration)	Each channel is able to perform a complex self test by using internal high precision references			
Low pass filter (-3 dB, digital)	10 Hz to 40 % of sample rate freely programmable			
Characteristic	Bessel or Butterworth			
Filter order	2nd, 4th, 6th, 8th			
Analog anti aliasing filter	2nd order Bessel,			
Sample rate > 10 kS/s	250 kHz (-3 dB), 150 kHz (-1 dB)			
Bandwidth (-3 dB digital filter)				
1 kS/s ≤ fs ≤ 51.2 kS/s	0.494 fs			
51.2 kS/s < fs ≤ 102.4 kS/s0.49	0.49 fs			
102.4 kS/s < fs ≤ 204.8 kS/s	0.38 fs			
Channel to channel phase mismatch	<60 nsec between channels using the same range			
CAN specification	CAN 2.0			
CAN Physical Layer	High Speed			
CAN Termination	Programmable: high impedance or 120 Ω			
CAN bus protection	±36 V			
Input connector	9-pin LEMO EPG.0B.309, 9-pin SUB-D connector			
REF connector	SMB			
Environmental specifications				
Operating temperature	(0 to +45 °C (32 to 113 °F)			
Storage temperature	-20 to +70 °C (-4 to 158 °F)			
Humidity	10 to 90 % non cond., 5 to 95 % rel. humidity			

[1] for safety reasons it is not allowed to apply more than 47.2 V_{PEAK} or 70 V_{DC}
[2] below 0.22 * fs

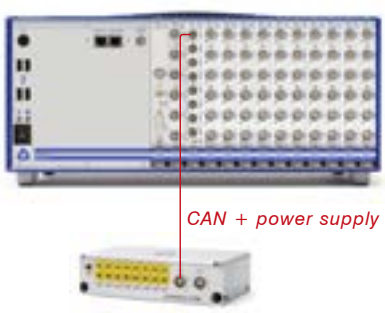
Cables for TRION-2402-MULTI modules

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-L0B9-OE-05-00	Lemo 0B.309	open end	5 m	TRION-2402-MULTI-8-L0B
TRION-CBL-L0B9-OE-01-00	Lemo 0B.309	open end	1 m	TRION-2402-MULTI-8-L0B
TRION-CBL-L0B9-D9-0.5-01	Lemo 0B.309	DSUB-9 socket (DAQP-STG/MDAQ-STG compatible), MSI copatible	0,5 m	TRION-2402-MULTI-8-L0B
TRION-CBL-L0B9-CAN-0.5	Lemo 0B.309	D-SUB-9 plug for CAN	0,5 m	TRION-2402-MULTI-8-L0B
TRION-CBL-L0B9-CPAD-01-00	Lemo 0B.309	For the connection to one CPAD-series module (CAN & power supply for ONE module)	1 m	TRION-2402-MULTI-8-L0B
TRION-CBL-L0B9-CPAD-01-01	Lemo 0B.309	Additional Lemo FGG.1B.304 plug (EPAD) for CPAD-module power supply	1 m	TRION-2402-MULTI-8-L0B
TRION-CBL-L0B9-BNC-0.5-01	Lemo 0B.309	BNC (for IEPE sensors)	0,5 m	TRION-2402-MULTI-8-L0B
TRION-CBL-L0B9-BNC-0.5-02	Lemo 0B.309	BNC (for voltage signals)	0,5 m	TRION-2402-MULTI-8-L0B

Connecting CPAD modules to TRION-2402-MULTI module(s)

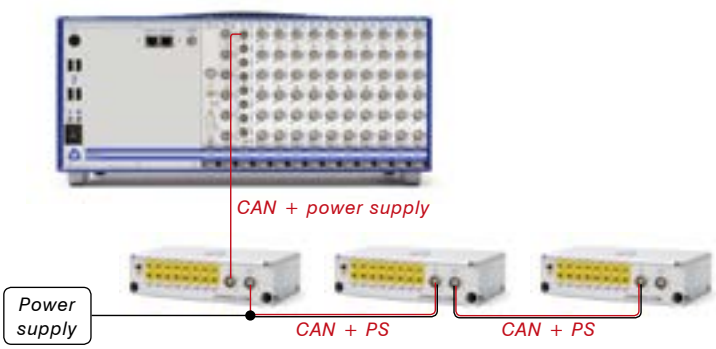
1 x CPAD @ 1 x TRION-2402-MULTI

One single CPAD series module can be directly connected to channel 1 of the TRION-2402-MULTI module.



Multiple CPADs @ 1 x TRION-2402-MULTI

If more CPADs are used, an additional external power supply with a split cable is needed.



TRION-2402-dACC — Differential multi-function input module

- *Sampling:* 24 bit; 204.8 kS/s per channel
- *Input types:* Voltage measurement from ±30 mV to ±70 V_{DC} (46.7 V_{RMS} AC)
  IEPE
  Resistance
  Current (using external shunt)
- *Additional feature:* AUX socket

TRION-dACC specifications				
Input channels	8 using SMB sockets (TRION-2402-dACC-8-SMB)			
	6 using BNC sockets (TRION-2402-dACC-6-BNC)			
AUX socket (SMB version)	Selectable: Camera trigger, external trigger, CAL-port			
Sampling rate	204.8 kS/s per channel			
Resolution	24 bit			
Rated input voltage (max.)	70 V_{DC} (46.7 V_{RMS})			
Input ranges				
Voltage	±30, ±100, ±300 mV, ±1, ±3 V, ±10 V, ±30 V, ±100 V			
IEPE®	±100, 300 mV, 1 V, 3 V, 10 V			
Resistance	10, 30, 100, 300 Ω, 1, 3, 10, 30, 100, 300, 1000 kΩ			
Current	Depending on external Shunt			
Voltage input accuracy	±0.02 % of reading ± 0.02 % of range ±200 µV			
Gain drift	typical 10 ppm/°C max. 20 ppm/°C			
Offset drift	typical 0.3 µV/°C + 10 ppm of range, max 15 µV/°C + 20 ppm of range/°C			
linearity	typical 0.01 %			
Input impedance				
Range <= 10 V	10 MΩ			
Range > 10 V	2 MΩ			
Input bias current	< 1 nA			
Input configuration	Single ended or differential (programmable)			
Input coupling	DC, AC (0.16 Hz, 0.5 Hz, 3.4 Hz, 10 Hz)			
Sensor fault detection for IEPE®	short circuit and open sensor detection with LED indication			
Excitation current	0.1 to 24 mA_{DC} (programmable, 16 Bit DAC, 2 Ranges)			
Accuracy	0.05% ±2 µA			
Drift	15 ppm/°C			
Compliance voltage	23 V			
Output impedance	>10 MΩ			
Supported sensors	IEPE® (up to 24 mA excitation)			
	Resistance			
	Resistance Temperature Detection: Pt100, Pt200, Pt500, Pt1000, Pt2000			
Counter Channels	2 Counter channels, linked to analog input Channel 1 and Channel 2			
Counter modes	Event counting; Periode; Frequency; Pulsewidth; Dutycycle			
Trigger Level	Trigger and retrigger level freely programmable within analog input range			
Counter input bandwidth	1 MHz			
Typical SNR Range	100 mV	1 V	10 V	100 V
100 S/s ≤ fs ≤ 1 kS/s	97 dB	111 dB	112 dB	112 dB
10 kS/s < fs ≤ 102.4 kS/s	87 dB	104 dB	107 dB	104 dB
102.4 kS/s < f ≤ 200 kS/s	80 dB	81 dB	81 dB	81 dB
Spurious free dynamic range range	10 mV	100 mV	1 V	10 V
100 S/s ≤ fs ≤ 1 kS/s	124 dB	139 dB	140 dB	139 dB
10 kS/s < fs ≤ 102.4 kS/s	118 dB	134 dB	134 dB	134 dB
102.4 kS/s < f ≤ 200 kS/s	116 dB[1] / 110 dB	131 dB[1] / 112 dB	132 dB[1] / 110 dB	131 dB[1] / 112 dB
Typical CMRR ≤10V Range	100 dB @ 50 Hz	100 dB @ 1 kHz		
>10 to 200 V Range	90 dB @ 50 Hz	70 dB @ 1 KHz		
Analog anti aliasing filter	2nd order Bessel, automatically set by sample rate			
Sample rate ≤ 1kS/s	2.5 kHz (-3 dB), 1.5 kHz (-1 dB)			
Sample rate ≤ 10kS/s	25 kHz (-3 dB), 15 kHz (-1 dB)			
Sample rate > 10kS/s	250 kHz (-3 dB), 150 kHz (-1 dB)			
Bandwidth (-3 dB digital filter)				
1 kS/s ≤ fs ≤ 51.2 kS/s	0.494 fs			
51.2 kS/s < fs ≤ 102.4 kS/s0.49	0.49 fs			
102.4 kS/s < fs ≤ 204.8 kS/s	0.38 fs			
Crosstalk fin 1 kHz [10 kHz]	120 dB [105 dB]			
Channel to channel phase mismatch	<60 nsec between channels using the same range			
Common mode voltage	±200 V_{DC} (input range > 10 V), ±12 V_{DC} (input range ≤ 10 V)			

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[1] *For safety reasons maximum allowed voltage: 70 V_{DC} (46.7 V_{RMS} AC)*

Over voltage protection	200 V peak input to GND
Supported TEDS chips	DS2406, DS2430A, DS2431, DS2432, DS2433
Power consumption[2)]	
Voltage mode; no excitation	6 W
IEPE® mode 4 mA	6.5 W
IEPE® mode 16 mA	9.5 W
IEPE® mode 24 mA	11.4 W
Weight	Appr. 210 g (SMB version), appr.270 g (BNC version)

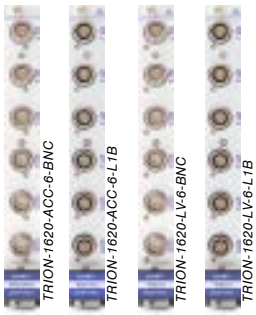
[1)] below 0.22 fs
[2)] Consider maximum power supply of your DEWE2 chassis.

Cables for TRION-2402-dACC modules

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-SMOE-05-00	SMB	open end	5 m	TRION-x-dACC-x-SMB
TRION-CBL-SMBN-01-00	SMB	BNC cable socket	1 m	TRION-x-dACC-x-SMB

TRION-1620-ACC /-LV Isolated voltage / IEPE input module

- *Sampling:* *2 MS/s per channel at 16-bit*
  24 bit in oversampling mode
- *Input:* *Voltage ±5 mV to ± 100 V*[1)]
  IEPE ±5 mV to ±5 V, excitation 4 or 8 mA
  Current 10 mA to 100 mA[4)]
- *Isolation:* *1.5 kV*



TRION-1620-series specifications										
Input channels	TRION-1620-LV-6-BNC TRION-1620-ACC-6-BNC TRION-1620-LV-6-L1B TRION-1620-ACC-6-L1B	6 channels BNC; voltage input 6 channels BNC; voltage input; IEPE®; 1 counter 6 channels 1B LEMO; voltage input; 1 to 28 V sensor supply; TEDS 6 channels 1B LEMO; voltage input; IEPE®; 1 counter; sensor supply; TEDS								
Sampling Rate / Resolution										
High speed mode	>1 to 2 MS/s, 16-bit									
Over Sampling mode	100 S/s to 1MS/s, 24-bit									
Data Transfer	16-bit / 24-bit									
ADC type	SAR (Successive Approximation Register)									
Data rate DMA transfer	6 analog channels: max 24 MB/s; 1 x counter: max. 16 MB/s									
Input ranges Voltage IEPE® Current[4)]	±5, ±10, ±20, ±50, ±100, ±200, ±500 mV, ±1 V, ±2 V, ±5 V, ±10 V, ±20 V, ±50 V, ±100 V[1)], ±5, ±10, ±20, ±50, ±100, ±200, ±500 mV, ±1 V, ±2 V, ±5 V, ±10 V, ±20 V, ±50 V 10, 20, 50, 100 mA									
Input noise (5 mV range)	0 to 10 Hz : 1.5 μV_{PP} Noise density: 6.4 nV/SQRT(Hz)									
Input impedance	1 MΩ shunted by 18 pF									
Current input	Internal 10 Ω shunt; max. 100 mA protected with resettable fuse									
Input bias current	<1 nA									
Input coupling	DC; AC: 0.16Hz[2)]									
Accuracy[3)] Voltage	DC to 1 kHz ±0.02 % of reading ± 0.02 % of range ±20 µV >1 kHz to 5 kHz ±0.2 % of reading ± 0.02 % of range ±20 µV >5 kHz to 10 kHz ±0.5 % of reading ± 0.02 % of range ±20 µV >10 kHz to 100 kHz ±1.00 % of reading ± 0.02 % of range ±20 µV									
Current[4)]	DC to 1 kHz ±0.1 % of reading ± 0.02 % of range ±10 µA >1 kHz to 5 kHz ±0.2 % of reading ± 0.02 % of range ±10 µA >5 kHz to 10 kHz ±0.5 % of reading ± 0.02 % of range ±10 µA >10 kHz to 100 kHz ±1.00 % of reading ± 0.02 % of range ±10 µA									
Gain drift	typical 10 ppm/°C max. 20 ppm/°C									
Offset drift	typical 0.3 µV/°C + 10 ppm of range, max 15 µV/°C + 20 ppm of range/°C									
Linearity	typical 0.01 %									
Input configuration Isolation impedance Isolation voltage	Isolated Isolation resistance >1 GΩ; Isolation capacitance typically 15 pF 1500 V									
IEPE® excitation[2)]	4 mA, 8 mA ±10 % @ 1 % ±1 mV accuracy @ 24V compliance voltage									
Voltage excitation[4)]	1 to 28 V @ 1 % ±1 mV accuracy freely programmable (max. 100 mA, max. 1 W)									
Signal-to-noise ratio, Spurious free SNR, Effective number of Bits		20 mV range			2 V range			100 V range		
		SNR	SFDR	ENOB	SNR	SFDR	ENOB	SNR	SFDR	ENOB
Sample rate		[dB]	[dB]	[Bit]	[dB]	[dB]	[Bit]	[dB]	[dB]	[Bit]
0.1 kS/s		104	125	17.0	130	155	21.3	130	155	21.3
1 kS/s		97	125	15.8	123	150	20.1	122	145	20.0
10 kS/s		91	122	14.8	111	150	18.1	112	135	18.3
100 kS/s		82	116	13.3	106	142	17.3	105	130	17.1
200 kS/s		78.7	116	12.8	103.7	142	16.9	102	125	16.7
500 kS/s		74	114	12.0	99.5	140	16.2	98	121	16.0
1000 kS/s		71	87	11.5	93.2	130	15.2	93	116	15.2
2000 kS/s		56	56	9.0	88	88	14.3	88	88	14.3
Typical CMRR	≤2 V range	>140 dB @ 50 Hz >120 dB @ 1 kHz								
	>2 V range	>90 dB @ 50 Hz >60 dB @ 1 kHz								
Low pass Filter (-3 dB, digital)		10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 600 kHz								
Characterisic		Bessel or Butterworth								
Filter order		2nd , 4th, 6th, 8th								
Analog antialiasing filter	2nd order Bessel, automatically selected									
Bandwidth (-3 dB, deacivated digital filter)	1 MHz 2nd order Bessel filter									
Crosstalk fin 1 kHz [10 kHz]	≤2 V Range: 120 dB [105 dB]									
Channel to channel phase mismatch	typically <10 nsec when using the same input range; <60 nsec for using different ranges.									

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Board to board phase mismatch	<30 nsec
Over voltage protection	±300 V_{DC}
Counter	1 x counter channel linked to analog channel #1; trigger level 70 % of actual analog input range
Counter modes	Event counting, period, frequency, pulse width, duty cycle
Counter input bandwidth	1 MHz to 10 kHz depending on analog filter of CH1
ESD protection	IEC61000-4-2: ±8 kV air discharge, ±4 kV contact discharge
Supported TEDS chips (LEMO only)	DS2406, DS2430A, DS2431, DS2432, DS2433
Power consumption	Voltage mode: 6 W; IEPE® mode: 7.5 W

[1] For safety reasons maximum allowed voltage: 70 V_{DC} (46.7 V_{RMS} AC)
[2] TRION-1620-ACC only
[3] 1 year accuracy 23 °C ±5 °C
[4] TRION-1620-LV-6-L1B only

Cables for TRION-1620-ACC /-LV modules

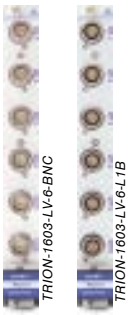
TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-L1B8-OE-05-00	LEMO 1B.308	open end	5 m	TRION-x-LV-6-L1B
TRION-CBL-L1B8-BNC-0.5-00	LEMO 1B.308	BNC cable socket	0.5 m	TRION-x-LV-6-L1B

Mating connector

Connector				
	Connector	Termination	Length	TRION modules
LEMO-FGG.1B.308.CLAD52Z	LEMO 1B.308	mating connector, for cable diameter 4.2 to 5.2 mm	-	TRION-x-LV-6-L1B
LEMO-FGG.1B.308.CLAD62Z	LEMO 1B.308	mating connector, for cable diameter 5.2 to 6.2 mm	-	TRION-x-LV-6-L1B
LEMO-FGG.1B.308.CLAD72Z	LEMO 1B.308	mating connector, for cable diameter 6.2 to 7.2 mm	-	TRION-x-LV-6-L1B

TRION-1603-LV — Isolated voltage input module

- **Resolution:** 16 bit 250 kS/s per channel
- **Input:** Voltage ±5 mV to ± 100 V[1)]; Current 10 mA to 100 mA[2)]
- **Isolation:** 1.5 kV



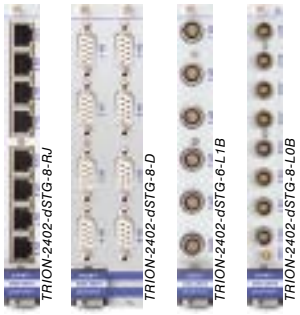
TRION-1603-LV series specifications										
Input channels		TRION-1603-LV-6-BNC: 6 channels BNC; voltage input TRION-1603-LV-6-L1B: 6 channels LEMO; voltage input; 5/12 V sensor supply; TEDS								
Sampling Rate / Resolution		100 S/s to 250 kS/s 16-bit								
Data Transfer		16-bit								
ADC type		SAR (Successive Approximation Register)								
Data rate DMA transfer		6 analog channels: max 3 MB/s								
Input ranges	Voltage	±5, ±10, ±20, ±50, ±100, ±200, ±500 mV, ±1 V, ±2 V, ±5 V, ±10 V, ±20 V, ±50 V, ±100 V[1)]								
	Current[2)]	10, 20, 50, 100 mA								
Input noise (5 mV range)		0 to 10 Hz : 1.5 μV_{PP} Noise density: 6.4 nV/SQRT(Hz)								
Input impedance		1 MΩ shunted by 18 pF								
Input bias current		<1 nA								
Input coupling		DC								
Accuracy[3)]	Voltage	DC to 1kHz ±0.02 % of reading ± 0.02 % of range ±20 µV >1 kHz to 5 kHz ±0.2 % of reading ± 0.02 % of range ±20 µV >5 kHz to 10 kHz ±0.5 % of reading ± 0.02 % of range ±20 µV								
	Current[2)]	DC to 1kHz ±0.1 % of reading ± 0.02 % of range ±10 µA >1 kHz to 5 kHz ±0.2 % of reading ± 0.02 % of range ±10 µA >5 kHz to 10 kHz ±0.5 % of reading ± 0.02 % of range ±10 µA								
Gain drift		typical 10 ppm/°C max. 20 ppm/°C								
Offset drift		typical 0.3 µV/°C + 10 ppm of range, max 15 µV/°C + 20 ppm of range/°C								
Linearity		typical 0.01 %								
Sensor excitation[2)]		1 to 28 V @ 1 % ±1 mV accuracy freely programmable (max. 100 mA, max 1 W)								
Input configuration		Isolated								
Isolation impedance		Isolation resistance >1 GΩ; Isolation capacitance typically 15 pF								
Current input		Internal 10 Ω shunt; max. 100 mA protected with resettable fuse								
Isolation voltage		1500 V with TRION-1603-LV-6-BNC 800 V with TRION-1603-LV-6-L1B								
Signal-to-noise ratio, spurious free SNR, Effective number of Bits		20 mV range			2 V range			100 V range		
	Sample rate	SNR [dB]	SFDR [dB]	ENOB [Bit]	SNR [dB]	SFDR [dB]	ENOB [Bit]	SNR [dB]	SFDR [dB]	ENOB [Bit]
	1 kS/s	93	120	15.2	93	120	15.2	93	120	15.2
	10 kS/s	90	120	14.7	93	120	15.2	93	120	15.2
	100 kS/s	80	116	13.0	93	120	15.2	93	120	15.2
	250 kS/s	74	100	12.0	93	120	15.2	93	120	15.2
Typical CMRR	≤2 V range	>140 dB @ 50 Hz >120 dB @ 1 kHz								
	>2 V range	>90 dB @ 50 Hz >60 dB @ 1 kHz								
Low pass Filter (-3 dB, digital)		10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz								
Characterisic		Bessel or Butterworth								
Filter order		2nd, 4th, 6th, 8th								
Analog antialiasing filter		2nd order Bessel, automatically selected								
Bandwidth (-3 dB, deactivated digital filter)		100 kHz 2nd order Bessel filter								
Crosstalk fin 1 kHz [10 kHz]		≤2 V Range: 120 dB [105 dB]								
Channel to channel phase mismatch		typically <60 nsec when using the same input range; <200 nsec for using different ranges.								
Board to board phase mismatch		<30 nsec								
Over voltage protection		±300 V_{DC}								
ESD protection		IEC61000-4-2: ±8 kV air discharge, ±4 kV contact discharge								
Supported TEDS chips[2)]		DS2406, DS2430A, DS2431, DS2432, DS2433								
Power consumption		6 W								

[1)] For safety reasons maximum allowed voltage: 70 V_{DC} (46.7 V_{RMS} AC)
[2)] TRION-1603-LV-6-L1B only
[3)] 1 year accuracy 23 °C ±5 °C

Mating Connector				
	Connector	Termination	Length	TRION modules
LEMO-FGG.1B.308.CLAD52Z	LEMO 1B.308	mating connector, for cable diameter 4.2 to 5.2 mm	-	TRION-x-LV-6-L1B
LEMO-FGG.1B.308.CLAD62Z	LEMO 1B.308	mating connector, for cable diameter 5.2 to 6.2 mm	-	TRION-x-LV-6-L1B
LEMO-FGG.1B.308.CLAD72Z	LEMO 1B.308	mating connector, for cable diameter 6.2 to 7.2 mm	-	TRION-x-LV-6-L1B

TRION-2402-dSTG Differential universal input module

- *Sampling:* *24 bit; 204.8 kS/s per channel*
- *Input types:* *Voltage up to ±10 V*
  Strain gauge, bridge sensor, piezoresistive bridge
  IEPE
  RTD; Pt100 to Pt2000
  Resistance, potentiometer



TRION-dSTG specifications				
Input channels	8 using RJ-45 sockets (TRION-2402-dSTG-8-RJ) 8 using DSUB 9 sockets (TRION-2402-dSTG-8-D, double-wide slotpanel) 6 using LEMO 1B sockets (TRION-2402-dSTG-6-L1B) 8 using LEMO 0B sockets (TRION-2402-dSTG-8-L0B)			
Sampling rate	204.8 kS/s per channel			
Resolution	24 bit			
Input ranges				
Voltage	±10, 30, 100, 300 mV, 1 V, 3 V, 10 V			
Bridge	1, 3, 10, 30, 100, 300, 1000 mV/V or mV/mA			
IEPE	±100, 300 mV, 1V, 3V, 10V			
Resistance	10, 30, 100, 300 Ω, 1, 3, 10, 30 kΩ			
Current	Depending on external Shunt			
Voltage input accuracy	±0.02 % of reading ± 0.02 % of range ±20 µV			
Gain drift	typical 10 ppm/°C max. 20 ppm/°C			
Offset drift	typical 0.3 µV/°C + 10 ppm of range, max 2 µV/°C + 20 ppm of range/°C			
linearity	typical 0.01 %			
Input impedance	100 MΩ			
Input bias current	< 1 nA			
Input configuration	Single ended or differential (programmable)			
Input coupling	DC, AC (0.16 Hz, 0.5 Hz, 3.4 Hz, 10 Hz); max. DC voltage when AC coupled: 50 V			
Excitation voltage	0 to 13.5 V_{DC} (programmable, 1 mV steps), 100 mA max. current, max 8 W per module			
Accuracy	±0.03 % ±1 mV			
Drift	±10 ppm/K ±50 µV/K			
Current limit	100 mA			
Protection	Continuous short to ground			
Excitation current	0.2 to 20 mA_{DC} (programmable, 1 µA steps)			
Accuracy	0.05% ±2 µA			
Drift	15 ppm/°C			
Compliance voltage	10 V			
Output impedance	>10 MΩ			
IEPE Excitation	4 mA ±10 %			
Compliance voltage	22 V			
Supported sensors	4- or 6-wire full bridge 3- or 5-wire ½ bridge with internal completion (software programmable) 3- or 4-wire ¼ bridge with internal resistor for 120 and 350 Ω (software programmable) 4-wire full bridge with constant current excitation (piezoresistive bridge sensors) Potentiometric; Resistance Resistance Temperature Detection: Pt100, Pt200, Pt500, Pt1000, Pt2000 (software linearization functionality depending on measurement software) IEPE (fixed 4 mA excitation)			
Bridge resistance	80 Ω to 10 kΩ @ ≤ 5 V_{DC} excitation			
Shunt calibration	Two internal shunt resistors 50 kΩ and 100 kΩ			
Shunt and completion resistor accuracy	0.05 % ±15 ppm/K			
Automatic bridge balance	±250 % of Range			
Typical SNR Range	10 mV	100 mV	1 V	10 V
100 S/s ≤ fs ≤ 1 kS/s	82 dB	101 dB	111 dB	112 dB
10 kS/s < fs ≤ 102.4 kS/s	72 dB	92 dB	104 dB	107 dB
102.4 kS/s < f ≤ 200 kS/s	69 dB	80 dB	81 dB	81 dB
Spurious free dynamic range	10 mV	100 mV	1 V	10 V
100 S/s ≤ fs ≤ 1 kS/s	108 dB	128 dB	141 dB	141 dB
10 kS/s < fs ≤ 102.4 kS/s	103 dB	123 dB	134 dB	136 dB
102.4 kS/s < f ≤ 200 kS/s	99 dB	120 dB[1] / 106 dB	133 dB[1] / 106 dB	135 dB[1] / 106 dB
Typical CMRR	90 dB @ 1 KHz	80 dB @ 10 KHz		
Analog anti aliasing filter	2nd order Bessel, automatically set by sample rate			
Sample rate ≤ 1k S/s	2.5 kHz (-3 dB), 1.5 kHz (-1 dB)			
Sample rate ≤ 10 kS/s	25 kHz (-3 dB), 15 kHz (-1 dB)			
Sample rate > 10kS/s	250 kHz (-3 dB), 150 kHz (-1 dB)			
Bandwidth (-3 dB digital filter)				
1 kS/s ≤ fs ≤ 51.2 kS/s	0.494 fs			
51.2 kS/s < fs ≤ 102.4 kS/s	0.49 fs			
102.4 kS/s < fs ≤ 204.8 kS/s	0.38 fs			
Crosstalk fin 1 kHz [10 kHz]	120 dB [105 dB]			

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Channel to channel phase mismatch	<60 nsec between channels using the same range
Common mode voltage	±10 V_{DC}
Over voltage protection	±50 V_{DC}
Supported TEDS chips	DS2406, DS2430A, DS2431, DS2432, DS2433
Typical power consumption[2)]	Typ 10 W + excitation power
Voltage mode; no excitation	7 W
IEPE mode	7 W
350 Ω full bridge (5 V / 10 V)	7 W / 9.5 W
120 Ω quarter bridge 5 V excitation	8 W
Bridge mode without connected sensor	11.5 W[3)]
Weight	Appr. 200 g (RJ45 version), appr. 250 g (LEMO version)

Cables for TRION-2402-dSTG modules

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-RJ-OE-05-00	RJ45	open end	5 m	TRION-x-dSTG-x-RJ
TRION-CBL-RJ-D9-01-00	RJ45	DSUB-9 socket (DAQP-STG/MDAQ-STG compatible)	1 m	TRION-x-dSTG-x-RJ
TRION-CBL-RJ-BNC-01-00	RJ45	BNC	1 m	TRION-x-dSTG-x-RJ
TRION-CBL-L0B9-OE-05-00	LEMO 0B.309	open end	5 m	TRION-x-dSTG-x-L0B
TRION-CBL-L0B9-OE-01-00	LEMO 0B.309	open end	1 m	TRION-x-dSTG-x-L0B
TRION-CBL-L0B9-D9-0.5-00	LEMO 0B.309	DSUB-9 socket (DAQP-STG/MDAQ-STG compatible)	0.5 m	TRION-x-dSTG-x-L0B
TRION-CBL-L1B8-OE-05-00	LEMO 1B.308	open end	5 m	TRION-x-dSTG-x-L1B
TRION-CBL-L1B8-D9-0.5-00	LEMO 1B.308	DSUB-9 socket (DAQP-STG/MDAQ-STG compatible)	0.5 m	TRION-x-dSTG-x-L1B

TRION-CBL-RJD9-01-00

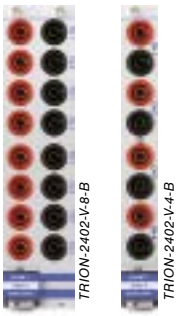
TRION-CBL-RJBN-01-00

Mating connector

Connector				
	Connector	Termination	Length	TRION modules
LEMO-FGG.1B.308.CLAD52Z	LEMO 1B.308	mating connector, for cable diameter 4.2 to 5.2 mm	-	TRION-x-dSTG-x-LEMO
LEMO-FGG.1B.308.CLAD62Z	LEMO 1B.308	mating connector, for cable diameter 5.2 to 6.2 mm	-	TRION-x-dSTG-x-LEMO
LEMO-FGG.1B.308.CLAD72Z	LEMO 1B.308	mating connector, for cable diameter 6.2 to 7.2 mm	-	TRION-x-dSTG-x-LEMO

TRION-2402-V — Isolated wide range voltage module

- *Sampling:* 24 bit; 204.8 kS/s per channel
- *Input types:* Voltage ±300 mV to ±1000[2] V_{DC}; Current
- *Isolation:* 4 kV



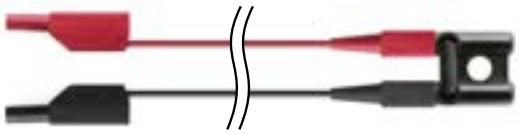
TRION-2402-V specifications					
Input channels		4 (TRION-2402-V-4-B)			
		8 (TRION-2402-V-8-B)			
Sampling rate		204.8 kS/s per channel			
Resolution		24 bit			
Input ranges					
Voltage		±0.3 V, ±1 V, ±3 V, ±10 V, ±30 V, ±100 V, ±400 V and ±1000 V[2]			
Current		Depending on external Shunt; e.g. 20 mA, 1 A, 5 A			
Voltage input accuracy		Signal frequency	Accuracy		
	Range > 10 V	DC to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	±0.02 % of reading ±0.02 % of range ±3 mV ±0.3 % of reading ±0.02 % of range ±3 mV ±1 % of reading ±0.02 % of range ±3 mV		
	Range ≤ 10 V	DC to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	±0.02 % of reading ±0.02 % of range ±200 µV ±0.3 % of reading ±0.02 % of range ±200 µV ±1 % of reading ±0.02 % of range ±200 µV		
Offset drift	Range > 10 V	typical 10 µV/°C + 10 ppm of range, max 500 µV/°C + 20 ppm of range/°C			
	Range ≤ 10 V	typical 0.3 µV/°C + 10 ppm of range, max 15 µV/°C + 20 ppm of range/°C			
Gain drift		typical 10 ppm/°C max. 20 ppm/°C			
Linearity		typical 0.01 %			
Input impedance	Range > 10 V	10 MΩ			
	Range ≤ 10 V	5 MΩ			
Input bias current		< 100 pA			
Input coupling		DC			
Input configuration		Isolated			
Typical SNR	Range	1 V	10 V	100 V	1000 V [2]
	100 S/s ≤ fs ≤ 1 kS/s	113 dB	115 dB	113 dB	115 dB
	10 kS/s < fs ≤ 102.4 kS/s	106 dB	109 dB	106 dB	109 dB
	102.4 kS/s < f ≤ 200 kS/s	81 dB	81 dB	81 dB	81 dB
Spurious free dynamic range	Range	1 V	10 V	100 V	1000 V
	100 S/s ≤ fs ≤ 1 kS/s	139 dB	140 dB	139 dB	140 dB
	10 kS/s < fs ≤ 102.4 kS/s	134 dB	134 dB	134 dB	134 dB
	102.4 kS/s < f ≤ 200 kS/s	132 dB[1] / 110 dB	131 dB[1] / 112 dB	132 dB[1] / 110 dB	131 dB[1] / 112 dB
Typical CMRR	≤10 V Range	100 dB @ 50 Hz	100 dB @ 1 kHz	100 dB @ 1 kHz	
	>10 V Range	90 dB @ 50 Hz	60 dB @ 1 kHz	60 dB @ 1 kHz	
Low pass Filter (in DEWESoft 7™, digital)		10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz (-3 dB), Off			
Characteristic		Bessel or Butterworth			
Filter order		2nd , 4th, 6th, 8th			
Analog anti aliasing filter		2nd order Bessel, automatically set by sample rate			
Sample rate ≤ 1 kS/s		2.5 kHz (-3 dB), 1.5 kHz (-1 dB)			
Sample rate ≤ 10 kS/s		25 kHz (-3 dB), 15 kHz (-1 dB)			
Sample rate > 10 kS/s		250 kHz (-3 dB), 150 kHz (-1 dB)			
Bandwidth (-3 dB digital filter)					
1 kS/s ≤ fs ≤ 51.2 kS/s		0.494 fs			
51.2 kS/s < fs ≤ 102.4 kS/s		0.49 fs			
102.4 kS/s < fs ≤ 204.8 kS/s		0.38 fs			
Typ. crosstalk fin 1 kHz [10 kHz]		110 dB [95 dB]			
Channel to channel phase mismatch		<60 nsec beween channels using the same range			
Measurement category		CAT II 300 V			
Isolation voltage		4 kV			
Non-destructive voltage Range ≤ 10 V Range > 10 V		 ±1000 V_{DC} ±2000 V_{DC}			
Typcial power consumption TRION-2402-V-8 TRION-2402-V-4		 8.3 W 4.5 W			
Connector		4 mm safety banana sockets			
Weight		Appr. 270 g (4 ch version), appr. 400 g (8 ch version)			

[1] below 0.22 fs
[2] Unit meets IEC/EN 61010-1:2010 and IEC/EN 61010-2-30:2010 up to input voltage 300 V

Shunts for TRION™ voltage input modules

Shunts	
SE-CUR-SHUNT-01	20 mA shunt adaptor (50 Ohm, ±0.1 %, 1 W); Fitting into 4 mm banana jacks with 19 mm distance Not compatible with TRION-x-V-4-B
SE-CUR-SHUNT-01-UNI	20 mA shunt adaptor (50 Ohm, ±0.1 %, 1 W); Fitting into 4 mm banana jacks - also for TRION-x-V-4-B
SE-CUR-SHUNT-04	5 A shunt box (100 mOhm, ±0.1%, <10 ppm); Current input via 2 safety banana jacks, output 2x 0.3 m cable with banana plugs
SE-CUR-SHUNT-05	5 A shunt box (100 mOhm, ±0.1%, <10 ppm); Current input via 2 safety banana jacks, output via 2 safety banana jacks
SE-CUR-SHUNT-06	20 A shunt box (0.5 mOhm, ±0.1% <±30 ppm/K); Current input via 2 safety banana jacks, output via 2 safety banana jacks

SE-CUR-SHUNT-01
(not compatible with TRION-x-V-4 modules)



SE-CUR-SHUNT-01-UNI
(50 cm cable length)

SE-CUR-SHUNT-04

SE-CUR-SHUNT-05

SE-CUR-SHUNT-06

TRION-BASE — Counter, DIO and synchronization module

- *Counter channels:* 2 advanced counters
- *Digital I/O:* 8 DIO and 8 DI
- *Synchronization:* IRIG code B, DC I/O
- *Additional features:* 1 AUX socket (by default set to camera trigger)

TRION-BASE specifications	
Digital I/O specifications	
Number of channels	8 DIO + 8 DI
Compatibility (Input)	CMOS/TTL
Compatibility (Output)	TTL, 20 mA
Overvoltage protection	±30 V permanent, 50 V peak (for 100 msec)
Sensor power supply (module total)	5 V (600 mA) and 12 V (600 mA)
Connector	SUB-D-25 socket
SUBD-25 SYNC OUT specifications	
Functionality	Acquistion clock and trigger output (can be used to sync two systems/enclosures)
Compatibility (Input)	LVTTL
Compatibility (Output)	LVTTL, 10 mA
Overvoltage protection	±20 V
Connector	On same SUB-D-25 socket as Digital I/O
Counter specifications	
Number of channels	2 advanced counters or 6 digital inputs
Counter modes	
Event counting	Basic event counting, gated counting, up/down counting and encoder mode (X1, X2 and X4)
Waveform timing	Period, frequency, pulse width duty cycle and edge separation
Sensor modes	Encoder (angle and linear)
Compatibility (Input)	CMOS/TTL
Counter resolution	32-bit
Counter time base	80 MHz
Time base accuracy	typ. 10 ppm (defined by the back plane)
Maximum input frequency	10 MHz
Overvoltage protection	±30 V permanent, 50 V peak (100 msec)
Sensor power supply (module total)	5 V (600 mA) and 12 V (600 mA)
Connector	LEMO 1B.307
AUX specifications	
Functionality	Camera trigger, trigger input/output, acquisition clock and programmable clock output
Compatibility (Input)	LVTTL
Compatibility (Output)	LVTTL, 10 mA
Overvoltage protection	±20 V
Connector	SMB socket
Timing specifications	
Input sources	IRIG code B, DC
Output signals	IRIG code B, DC
Input specification	
Compatibility (DC code)	DC Level Shift TTL / CMOS Compatible
Impedance	20 kΩ
Output specification	
Compatibility (DC code)	TTL, 20 mA
Adjustment range	±150 ppm
Clock acc. IRIG locked	without drift
Clock acc. IRIG unlocked	< 1 ppm
Isolation voltage	350 V_{DC}
Connector	BNC socket
General specifications	
Power consumption	5 W
Temperature Range	0 - 50 °C
Weight	Appr. 240 g

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-L1B7-OE-05-00	LEMO 1B.307	open end	5 m	TRION-BASE, TRION-CNT-6-L1B
TRION-CBL-CAMTRG-03-00	SMB	To synchronize a DEWE-CAM-FW-70 via an AUX socket of TRION modules	3 m	TRION-BASE, TRION-TIMING

TRION-TIMING — Timing and synchronization module

- *Timing input:* GPS, PPS or IRIG code A or B; AC, DC
- *Timing output:* Isolated IRIG output
- *GPS position:* 1 Hz update rate (requires GPS antenna)
- *Additional features:* 8x DIO, 1x counter, 1x AUX

TRION-TIMING specifications		
IRIG input specifications		
Supported codes		IRIG code A or B; AC or DC
Compatibility (AC code)		0.5 Vp-p to 10 Vp-p
Ratio (AC)		3:1 ±10 %
Compatibility (DC code)		DC Level Shift TTL / CMOS compatible
Impedance		20 kΩ
IRIG output specifications		
Supported codes		IRIG code B, DC
Compatibility (DC code)		TTL, 20 mA
Adjustment range		±150 ppm
Clock accuracy IRIG locked		without drift
Clock accuracy IRIG unlocked		<1 ppm (opt. 5 ppb)
Max. cable length (IRIG)		1000 m, cable length delay compensation available
Isolation voltage		350 V_{DC}
Connector		BNC socket
GPS specifications		
General		12 channel, L1 frequency receiver
PPS accuracy		100 ns
Refreshrate		1 Hz
Position accuracy		Horizontal CEP
Autonomous		3.0 m
Differential		1.0 m
Trigger accuracy		1 µsec
Clock accuracy locked		without drift
Clock accuracy unlocked		<10 ppm
Input Connector GPS		SMA for GPS antenna, BNC for IRIG I/O
Digital I/O specifications		
Number of channels		8
Compatibility (input)		CMOS/TTL
Compatibility (output)		TTL, 20 mA
Overvoltage protection		±30 V
Connector		SUB-D-15 socket
Counter specifications		
Number of channels		1 advanced counter or 3 digital inputs
Counter modes	Event counting	Basic event counting, gated counting, up/down counting and encoder mode (X1, X2 and X4)
	Waveform timing	Period, frequency, pulse width, duty cycle and edge separation
	Sensor modes	Encoder (angle and linear), gear tooth with/without zero, gear tooth with missing/double teeth
Input signal compatibility		CMOS/TTL
Counter resolution		32-bit
Counter time base		80 MHz
Time base accuracy		typ. 10 ppm (defined by the backplane)
Maximum input frequency		10 MHz
Overvoltage protection		±30 V permanent, 50 V peak (for 100 msec)
Sensor power supply		5 V (600 mA) and 12 V (600 mA)
Connector		On same SUB-D-15 socket as Digital I/O
AUX specifications		
Functionality		Camera trigger, trigger input/output, acquisition clock and programmable clock output
Compatibility (input)		LVTTL
Compatibility (output)		LVTTL, 10 mA
Overvoltage protection		±20 V
Connector		SMB socket
General specifications		
Power consumption		5 W
Temperature Range		0 to 50 °C
Weight		Appr. 240 g

Cables for TRION-TIMING modules

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-CAMTRG-03-00	SMB	To synchronize a DEWE-CAM-FW-70 via an AUX socket of TRION modules	3 m	TRION-BASE, TRION-TIMING TRION-VGPS-x

Options for TRION-TIMING modules

Options	
GPS-ANT-1	GPS antenna for TRION-TIMING or DEWE-CLOCK, for fixed installation
GPS-ANT-2	GPS antenna for TRION-TIMING or DEWE-CLOCK, for mobile applications

GPS-ANT-1
GPS antenna for fixed installations

GPS-ANT-2
GPS antenna for mobile installations

TRION-VGPS-20 /-100 Position, speed and displacement module

- *20/100 Hz GPS receiver*
- *Supports differential GPS (SBAS) as a standard*
- *Optional GLONASS capability*
- *High accuracy speed and displacement measurement*
- *Additional features: GPS or IRIG timing, 8x DIOs, 1x CTR, 1x AUX*
- *Isolation: 350 V_{DC}*


GPS antenna


TRION-VGPS-20

TRION-VGPS-20 /-100		
Position, speed and displacement specifications		
Speed		
Accuracy		0.1 km/h ±0.05 % of range[1]
Min to max		0.1 km/h to 500 km/h
Resolution		0.01 km/h
Refresh rate		5 to 20 Hz
Absolute position		
Accuracy		<40 cm CEP[2]
Refresh rate		TRION-VGPS-20: 1 to 20 Hz TRION-VGPS-100: 1 to 100 Hz
Resolution		<10 cm
Latency time		<2 ms using DEWESoft™
Displacement		
Accuracy		20 cm/km[3]
Refresh rate		1 to 20 Hz (refresh rates for speed & displacement up to 50 Hz) TRION-VGPS-100: 1 to 100 Hz
Connectors		SMA connector for GPS antenna, Lemo EGG.1B.304 for VGPS display
IRIG timing specifications		
Input sources		IRIG code A or B; AM, DC or TTL
Output signals		IRIG code B, DC
Input specification	Compatibility (AM code)	0.5 Vp-p to 10 Vp-p
	Ratio (AM code)	3:1 ±10 %
	Compatibility (DC code)	DC level shift TTL / CMOS compatible
	Compatibility (TTL Code)	TTL
	Impedance	20 kΩ
Output specification		
Compatibility (DC code)		TTL, 20 mA
Adjustment range		±150 ppm
Clock accuracy IRIG locked		without drift
Clock accuracy IRIG unlocked		<1 ppm (opt. 5 ppb)
Max. cable length (IRIG)		1000 m, cable length delay compensation available
Isolation voltage		350 V_{DC}
Connector		BNC socket
GPS timing specifications		
Input		GPS antenna
Trigger accuracy		100 ns
Clock acc. GPS locked		without drift
Clock acc. GPS unlocked		<1 ppm
Digital I/O specifications		
Number of channels		8
Compatibility (input)		CMOS/TTL
Compatibility (output)		TTL, 20 mA
Overvoltage protection		±30 V
Connector		SUB-D-15 socket
Counter specifications		
Number of channels		1 advanced counter or 3 digital inputs
Counter modes	Event counting	Basic event counting, gated counting, up/down counting and encoder mode (X1, X2 and X4)
	Waveform timing	Period, frequency, pulse width, duty cycle and edge separation
	Sensor modes	Encoder (angle and linear), gear tooth with/without zero, gear tooth with missing/double teeth
Input signal compatibility		CMOS/TTL
Counter resolution		32-bit
Counter time base		80 MHz
Time base accuracy		typ. 10 ppm (defined by the backplane)
Maximum input frequency		10 MHz
Overvoltage protection		±30 V permanent, 50 V peak (for 100 msec)
Sensor power supply		5 V (600 mA) and 12 V (600 mA)
Connector		On same SU B-D-15 socket as Digital I/O

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AUX specifications	
Functionality	Camera trigger, trigger input/output, acquisition clock and programmable clock output
Compatibility (input)	LVTTL
Compatibility (output)	LVTTL, 10 mA
Overvoltage protection	±20 V
Connector	SMB socket
General specifications	
Power consumption	5 W (without sensor supply)
Temperature Range	0 to 50 °C
Weight	Appr. 240 g

[1] *Acquiring more than 6 satellites, averaged over 3 values*
[2] *Acquiring more than 6 satellites, driving at constant speed*
[3] *Circular Error Probable*
- *40 cm differential operation using local base station*
- *90 cm differential operation using BEACON*
- *40 cm differential operation using local base station*
- *1.8 m differential operation using SBAS*
- *3 m autonomous operation*

Options for TRION-VGPS-20 /-100 modules

Options	
VGPS-OPT-GLONASS	Upgrade to add GLONASS tracking capability; includes receiver upgrade and changes the standard GPS antenna to a combined GPS/GLONASS antenna
VGPS-DISP	Bright, small, rugged LCD display with 2 m cable to VGPS sensor
CAL-VGPS-DATASTREAM	ISO 9001 compliant calibration report of a VGPS sensor; velocity and heading at different calibration points; includes only the serial datastream output

Cables for TRION-VGPS-20 /-100 modules

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-CAMTRG-03-00	SMB	To synchronize a DEWE-CAM-FW-70 via an AUX socket of TRION modules	3 m	TRION-BASE, TRION-TIMING, TRION-VPGS-x

TRION-CNT-6-L1B Isolated Advanced counter module

- *Sampling* — *80 MHz time base*
  204.8 kS/s per channel
- *Input types* — *Event, waveform timing and sensor mode*
  Programmable threshold and AC/DC coupling for ideal signal adaption

TRION-CNT specifications	
Input channels	6 advanced counters or 18 digital inputs
Counter modes	
Event counting	Basic event counting, gated counting, up/down counting and encoder mode (X1, X2 and X4)
Waveform timing	Period, frequency, pulse width duty cycle and edge separation
Sensor modes	Encoder (angle and linear)
Input signal characteristic	
Rated input voltage (max.)	70 V_{DC} (46.7 V_{PEAK})
Compatibility	Adjustable trigger levels
Configuration	Isolation (±500 V_{DC}) for each input channel
Input coupling	DC and AC (1Hz) AC for input A only
Input impedance (ground referenced)	1 MΩ / 5 pF
Sampling rate	204.8 kS/s per channel
Bandwidth (-3dB)	5 MHz
Trigger adjustment range	0 to 50 V
Trigger resolution	12 mV
Trigger level accuracy	±20 mV ±1% of threshold/retrigger level
Overvoltage protection	±100 V continuous
Max. DC level @AC coupling	±50 V continuous
Counter resolution	32-bit
Counter time base	80 MHz
Time base accuracy	typ. 10 ppm (defined by the backplane)
Sensor power supply (per module)	5 V (600 mA) and 12 V (600 mA), not isolated
Typical power consumption	5 W (without sensor supply)
Connector	6x LEMO 1B.307 sockets
Weight	Appr. 240 g

Cables for TRION-CNT modules

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-L7OE-05-00	LEMO 1B.307	open end	5 m	TRION-BASE, TRION-CNT-6-L1B

Mating connector

Connector				
	Connector	Termination	Length	TRION modules
LEMO-FGG.1B.307.CLAD42Z	LEMO 1B.307	mating connector, for cable diameter 3.1 to 4.2 mm	-	TRION-CNT-6-L1B
LEMO-FGG.1B.307.CLAD52Z	LEMO 1B.307	mating connector, for cable diameter 4.2 to 5.2 mm	-	TRION-CNT-6-L1B
LEMO-FGG.1B.307.CLAD62Z	LEMO 1B.307	mating connector, for cable diameter 5.2 to 6.2 mm	-	TRION-CNT-6-L1B
LEMO-FGG.1B.307.CLAD72Z	LEMO 1B.307	mating connector, for cable diameter 6.2 to 7.2 mm	-	TRION-CNT-6-L1B

TRION-DI-48 — Isolated digital input module

- *Number of channels:* 48 isolated digital inputs (TRION-DI-48)
- *Sampling:* 204.8 kS/s per channel

TRION-DI-48 specifications	
Input channels	48 isolated digital inputs (TRION-DI-48)
Input modes	digital input (discrete)
Sampling rate	2 MS/s
Input signal characteristic	
Compatibility	CMOS
Configuration	Isolated input
Input low level	U_{IN} < 1.8 V
Input high level	U_{IN} > 3.2 V
Input high current @ 5 V UIN	< 3.5 mA
Input high current @ 30 V UIN	< 7 mA
Propagation delay	< 160 nsec
Bandwidth	3 MHz
Overvoltage protection	35 V continuous (65 V peak)
Isolation voltage (channel to channel)	100 V
Isolation voltage (input to output)	250 V
Sensor power supply (per module)	5 V (600 mA), not isolated
Input connector	2 x 50 pin mini centronics sockets (Harting 60 11 050 5740)
Typical power consumption	5 W
Weight	Appr.190 g

Options for TRION-DI modules

Options				
	Connector	Termination	Length	TRION modules
TRION-CB24-B	Mini-Centronics	24 channel break-out box with 4 mm banana jacks 1 m cable, terminated with 50-pin mini-centronics plug (two boxes needed for all 48 inputs)	1 m	TRION-DI-48
TRION-CB24-SC	Centronics	24 channel screw-terminal block, unshielded 1 m cable, terminated with 50-pin mini-centronics plug For TRION-DI-48 (two blocks needed for all 48 inputs)	1 m	TRION-DI-48

TRION-CB24-B

TRION-CB24-SC

TRION-CAN

Isolated high speed CAN interface

- *Input types*

High speed, (low speed and single wire with optional converter)
Listen only and programmable termination
Direct interface to CPAD2 module series

TRION-CAN specifications	
Input channels	2 with DSUB 9 connector (TRION-CAN-2-D)
	4 with DSUB 9 connector (TRION-CAN-4-D)
Specification	CAN 2.0B
Physical layer	High speed, (low speed and single wire with optional converter)
Listen only mode	Supported
Termination	Programmable: high impedance or 120 Ω
Galvanic isolation	500 V_{DC}
Bus pin fault protection	±36 V
ESD protection	12 kV (HBM)
CAN Transceiver	SNHVD235
Sensor power supply (per module)	5 V (600 mA) and 12 V (600 mA)
Typical power consumption without sensor/CPAD supply	5 W
Connector	SUB-D-9 plug
Weight	Appr. 190 g

Options

Options		
ADAP-CAN-LS-HS	DSUB-9	DSUB-9, Adaptor from low-speed CAN to high-speed CAN
ADAP-LIN-CAN	DSUB-9	DSUB-9, Isolated LIN to CAN adaptor. Requests data from LIN as a LIN-master and outputs the data to CAN

ADAP-CAN-LS-HS

ADAP-LIN-CAN

Cables for TRION-CAN modules

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-D9-OE-05-00	DSUB-9	open end	5 m	TRION-CAN-x-D





TRION-A429 / M1553 / MA4

- *ARINC 429 module with up to 30 interfaces*
- *MIL-STD-1553 modules with up to 4 dual redundant channels*
- *Mixed modules with 8 ARINC and up to 5 dual redundant MIL-STD-1553 channels*


TRION-A429

Specifications	
Ports TRION-A429 TRION-M1553 TRION-MA4	 4, 8, 16 or 30 ARINC 429 1 to 4 MIL-STD-1553 8 x ARINC 429 + 1 to 5 MIL-STD-1553
Resolution	8 bit, 1 uSec A/D signal capture on first two RX channels
Programmable interface	Fully programmable label/word encoding and decoding Word length, Start/Sync/Stop bits, MSB/LSB, RX/TX bit (baud) rates, parity, bit encoding types
Memory	One Mbyte of memory per 16 channel bank for TX/TX buffering
Power consumption	4CH@4.5W, 8CH@5.0W, 16CH@6.0W, 30CH@7.0W
Connector	SCSI 3 connector, cable provided
Temperature range	0 to +50°C
Weight	Appr. 120 g

Model overview

TRION Module	ARINC channels	1553 channels
TRION-A429 modules		
A429-4-T	4 (shared Tx/Rx)	-
A429-8-T	8 (shared Tx/Rx)	-
A429-16-T	16 (8 shared Tx/Rx and 8 Rx)	-
A429-30-T	30 (16 shared Tx/Rx and 14 Rx)	-
TRION-M1553 modules		
M1553-1D-T	-	1 dual redundant, dual function
M1553-2D-T	-	2 dual redundant, dual function
M1553-4D-T	-	4 dual redundant, dual function
M1553-1F-T	-	1 dual redundant, full function
M1553-2F-T	-	2 dual redundant, full function
M1553-4F-T	-	4 dual redundant, full function
TRION-MA4 modules		
MA4-1D8-T	8 (4 shared Tx/Rx and 4 Rx)	1 dual redundant, dual function
MA4-2D8-T	8 (4 shared Tx/Rx and 4 Rx)	2 dual redundant, dual function
MA4-4D8-T	8 (4 shared Tx/Rx and 4 Rx)	4 dual redundant, dual function
MA4-5D8-T	8 (4 shared Tx/Rx and 4 Rx)	5 dual redundant, dual function
MA4-1F8-T	8 (4 shared Tx/Rx and 4 Rx)	1 dual redundant, full function
MA4-2F8-T	8 (4 shared Tx/Rx and 4 Rx)	2 dual redundant, full function
MA4-4F8-T	8 (4 shared Tx/Rx and 4 Rx)	4 dual redundant, full function
MA4-5F8-T	8 (4 shared Tx/Rx and 4 Rx)	5 dual redundant, full function

TRION-1628-AO-2 Analog output module

- *2 channel TRION™ analog output module, based on NI PXI-6251*
- *voltage range max. ±10 V*
- *16 bit resolution*
- *Update rate max. 2.8 MS/s*

TRION-1628-AO-2	
Analog output channels	2
DAC resolution	16 bits
Output range	±10 V, ±5 V
DNL	±1 LSB
Monotonicity	16 bit guaranteed
Accuracy	
Residual gain error	75 ppm of reading @ ±10 V 85 ppm of reading @ ±5 V
Gain temperature coefficient	17 ppm/°C @ ±10 V 8 ppm/°C @ ±5V
Reference temperature coefficient	1
Residual offset error	40 ppm of range
Offset temperature coefficient	2 ppm of range/°C
INL error	64 ppm of range
Absolute accuracy @ full scale 1	2.08 mV @ ±10 V 1.045 mV @ ±5 V
Maximum update rate	
1 channel	2.86 MS/s
2 channels	1.00 MS/s
Timing accuracy	50 ppm of sample rate
Timing resolution	50 ns
Output coupling	DC
Output impedance	0.2 Ω
Output current drive	±5 mA
Overdrive protection	±25 V
Overdrive current	20 mA
Power-on state	±5 mV2
Power-on glitch	1.5 V peak for 1.5 s
Output FIFO size	8,191 samples shared among channels used
Settling time, full scale step 15 ppm (1 LSB)	2 µs
Slew rate	20 V/µs

DEWETRON GmbH • Parkring 4 • 8074 Grambach • AUSTRIA • Tel: 0043 316 30700 • Fax: 0043 316 3070 90 • info@dewetron.com

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