



DEWE2

Modular Data Acquisition Systems



TRION™

Series Modules

NEW
DEWE2

Dedicated Instruments

Instruments

Front-ends

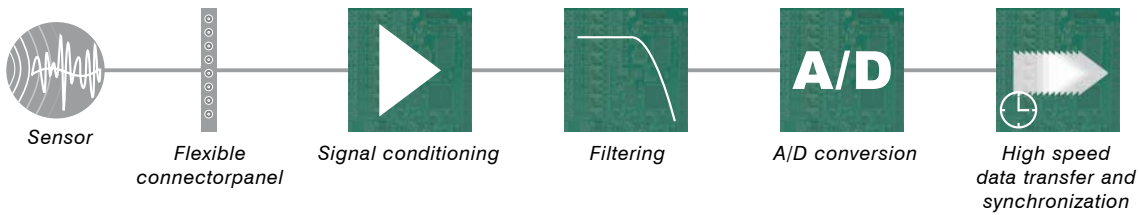
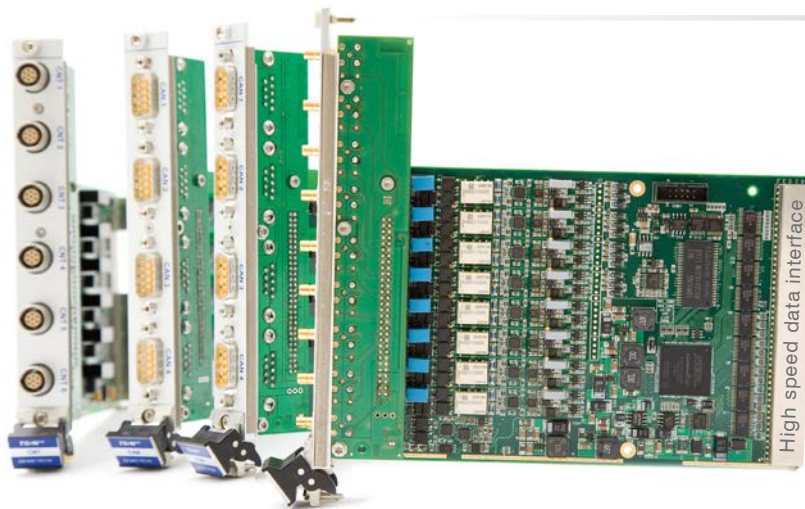
Signal Conditioning

Components

Software

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.

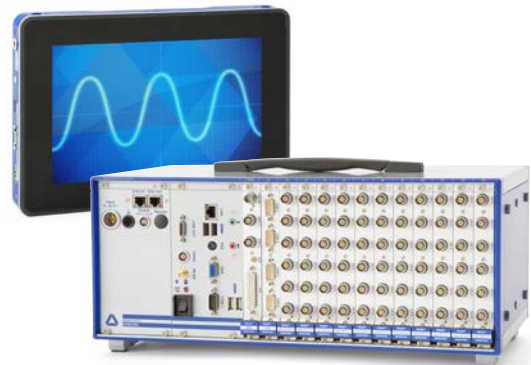


M-series

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.

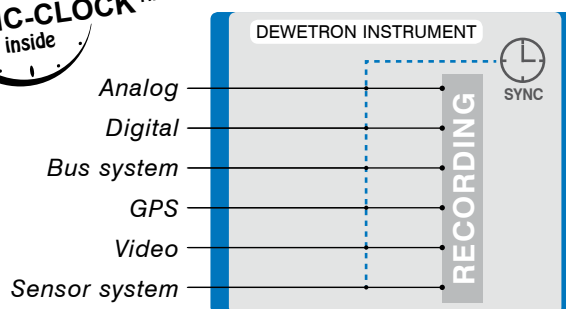
The second use of F-series devices is to expand A or M series instruments.



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

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

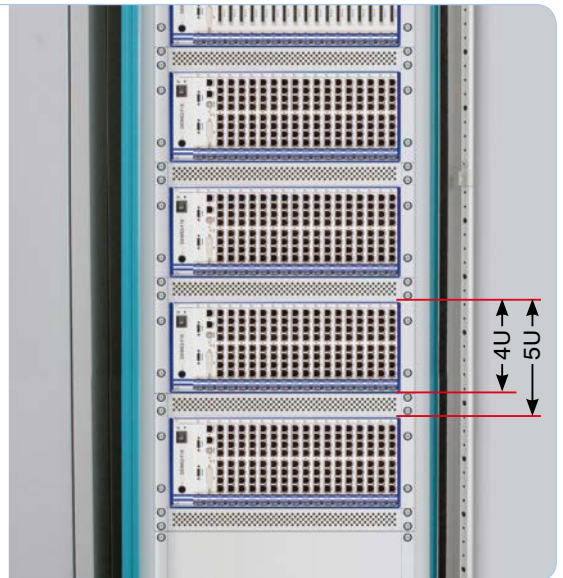


High channel density

- 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



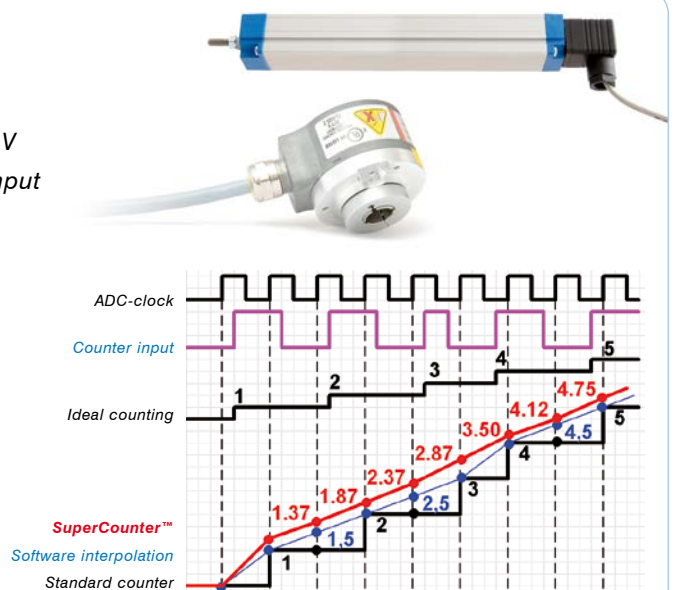
SuperCounter™

- 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. Referring to the diagram, you can see that a standard counter is always a sample behind. With software interpolation you can get closer, but only DEWETRON's 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

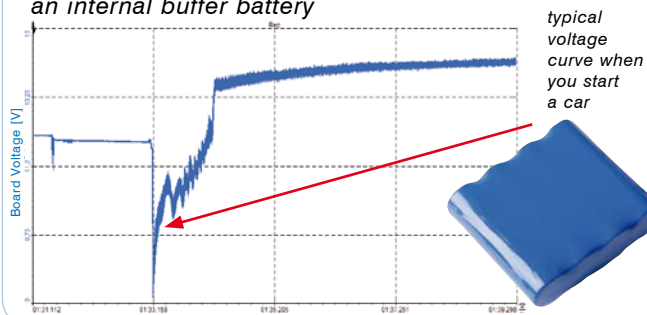
TRION™ series modules easily take it on with all similar products on the market



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



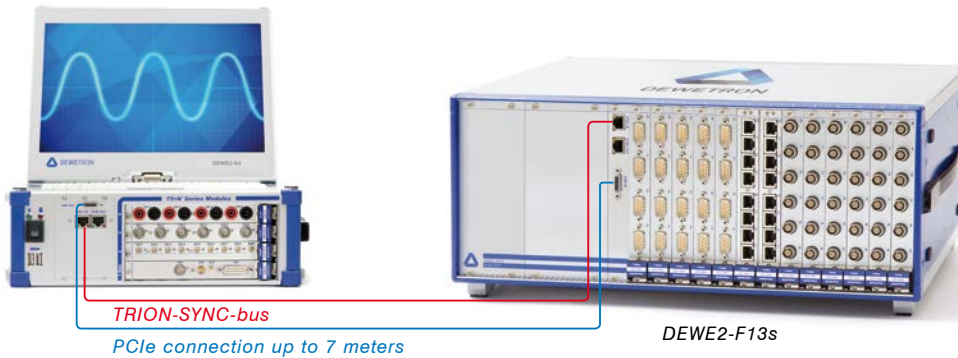
SYNC it all!

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.

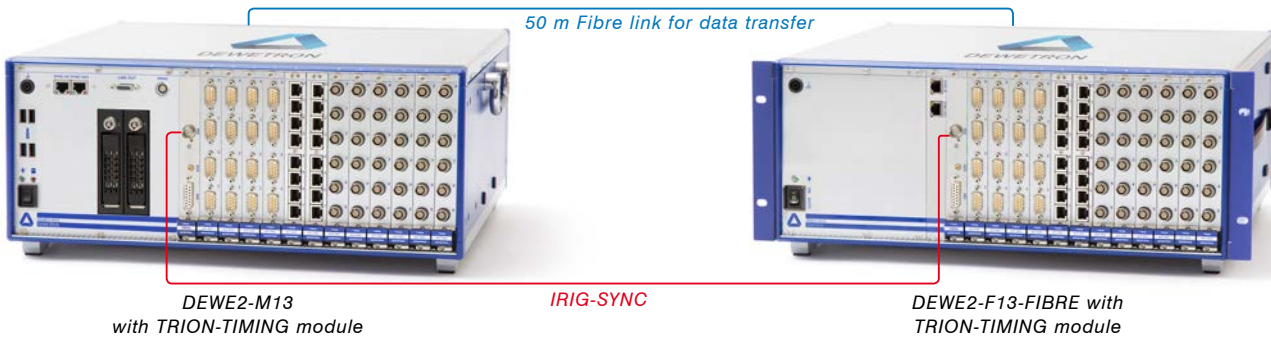


Channel expansion

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

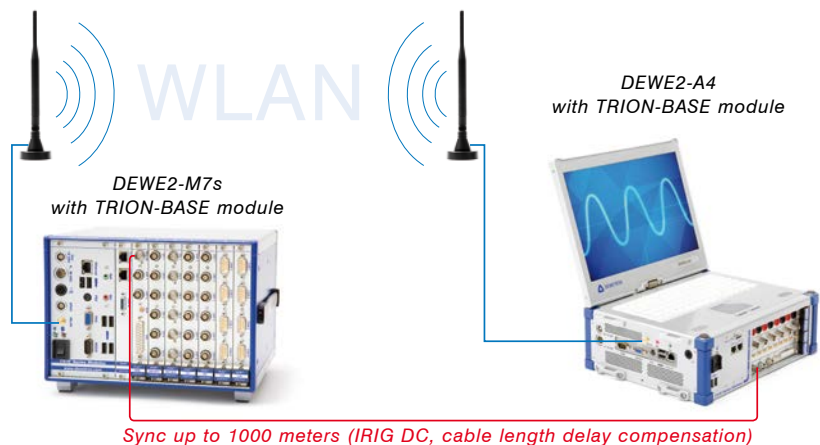


Synchronization of multiple DEWE2 systems

Sync via TRION™ modules or TRION-SYNC-BUS

Example:

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

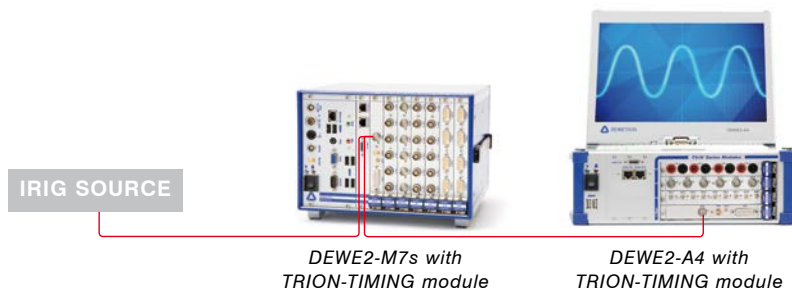


Synchronization to GPS or IRIG time-code

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.

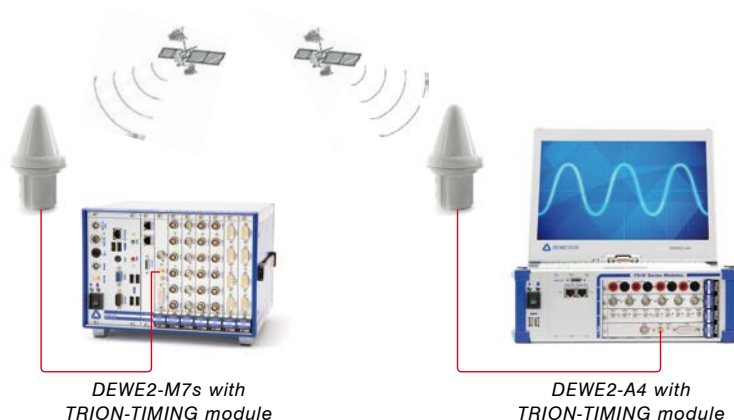
IRIG

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-A4 with option TRION-BASE module



DEWE-CAM-GIGE-120



Gigabit ethernet interface (up to 100 m cable length)

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-150-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/s ²	20 m/s ²	20 m/s ²
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



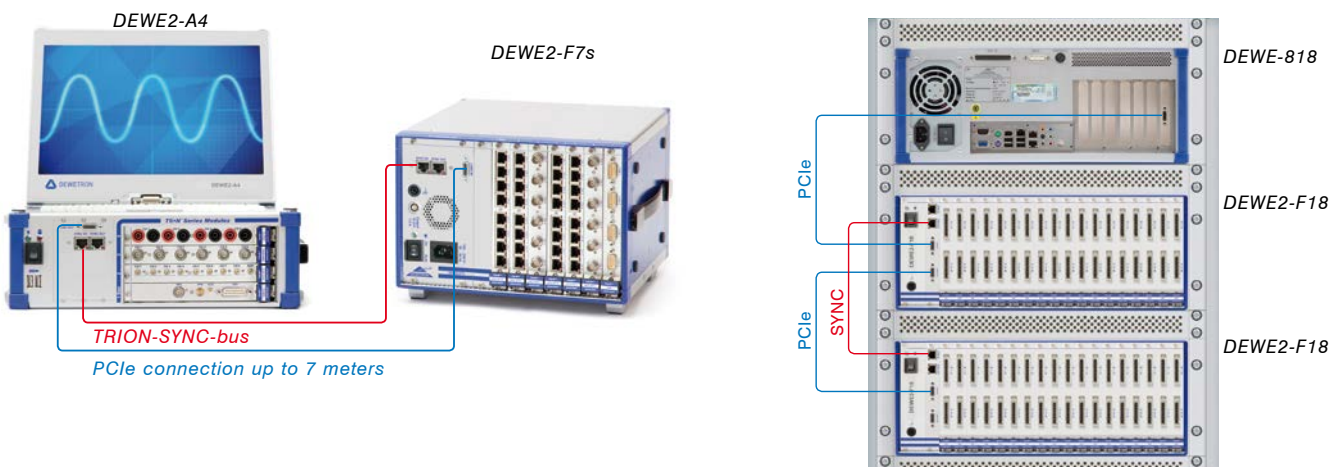
DW2-UPS-150-DC
The hot-swappable
batteries guarantee
continuous operation with-
out an external power source.

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	120 MB/sec	120 MB/sec	120 MB/sec	120 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/s ²	20 m/s ²	20 m/s ²	20 m/s ²
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

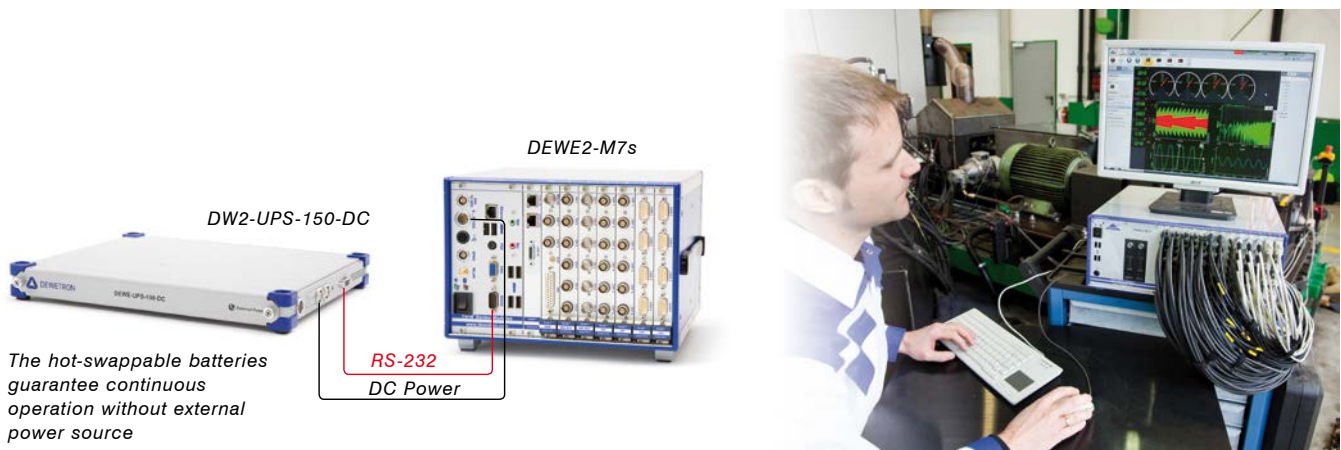


	DEWE2-M4	DEWE2-M4s	DEWE2-M7s
Slots for TRION™ acquisition modules	4	4	7
Dynamic channel expansion	DEWE2 F-Series chassis or Ethernet		
Quasi-static channel expansion	EPAD2 CPAD2 via TRION-CAN	EPAD2 CPAD2 via TRION-CAN	EPAD2 CPAD2 via TRION-CAN
Data storage ¹⁾			
Technology	Removable Solid State Disk	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-150-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/s ²	20 m/s ²	20 m/s ²
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 .91 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

RS-232
DC Power

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 120 GB (up to 480 GB)	Hard disk (plus two 3.5" bays) 1 TB	Solid State Disk 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 Battery powered, 4 battery slots ³⁾ , 3 batt. for ~2 hours operation included, incl. external AC power supply, optional external DC power supply	Redundant AC 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/s ²	20 m/s ²	20 m/s ²
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

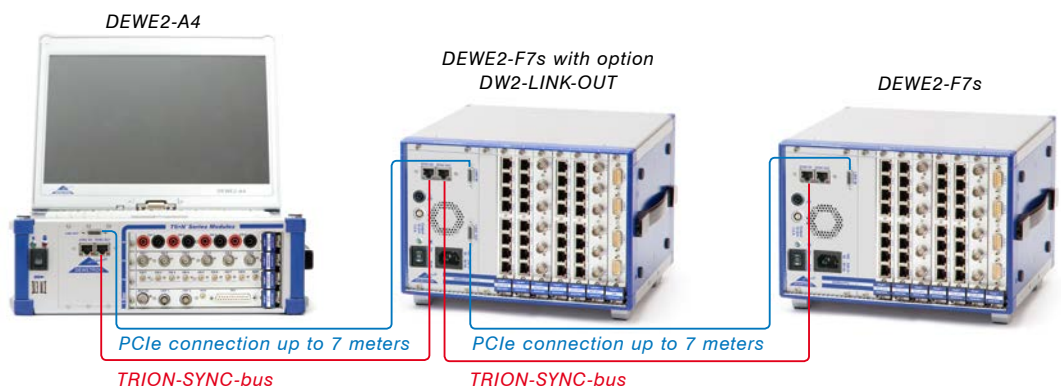
- 4 slots for TRION™ series modules
- Isolated wide range DC power supply
- Optional internal buffer battery for ~10 minutes
- Fully battery-powered by stackable battery pack
- Removable solid state disk
- Powerful Intel® Core™ i7 processor



	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/s ² , 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 m ² /s ³ , 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	
DW2-CBL-POW-B-2	Power supply cable 2 m to two male banana plugs
DW2-UPS-150-DC	External 130 W UPS and multi-battery charger with 10 to 36 V _{DC} (max.) input range 2 slots for BAT-95WH batteries, 2 batteries included Mechanically compatible with DEWE2-A4 / DEWE2-M4, cable set included
BAT-95WH	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 mm ² with 50 A fuse, terminated with 2 ring tongues, 2nd input for a buffer battery (from customer) to achieve UPS function



DW2-UPS-150-DC, stackable
130 W UPS with 2 slots for batteries



BAT-CHARGER-1



DEWE-CAM-GIGE-SPLIT BOX



DE-POWERBOX-12
DC Power distribution box



MOB-DISP-12
External display

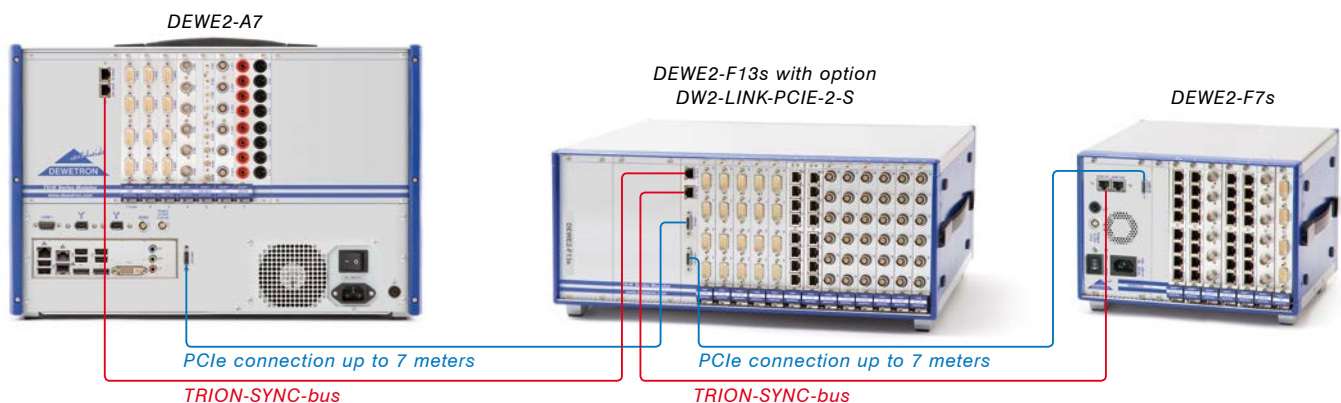
DEWE2-A7 / A13

- 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/s ² , 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 m ² /s ³ , 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-95WH	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

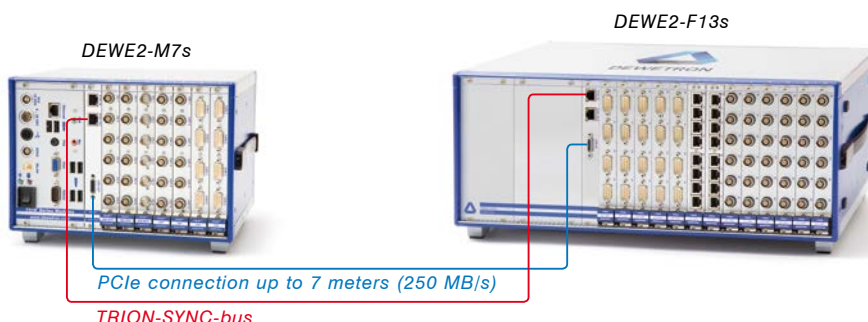
DEWE2-M4s / M7s / M13s

- 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/s ² , 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 m ² /s ³ , 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			

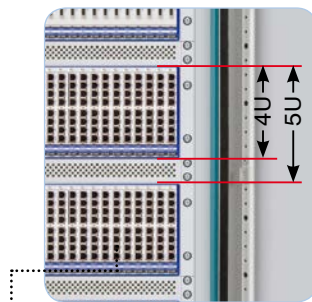
Channel Expansion



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-150-DC	External 130 W UPS and multi-battery charger with isolated 10 to 36 V _{DC} (max.) input range. 2 slots for BAT-95WH batteries, 2 batteries included, cable set included. Longer cables for flexibe use of DW2-UPS-150-DC optionally available
DW2-UPS-150-DC-CBL-2	2 m RS-232 cable and DC power cable (terminated with Lemo FGJ.2B.303)
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-95WH	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
DE-POWERBOX-12	Power distribution box with 12 connectors for DC power with voltage meter Input via 5 m connection cable 2x 10 mm ² 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-150-DC,
130 W UPS with 2 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/s ² , Freq. 10 Hz - 150 Hz, Sweep 1 oct/min, 20 cycles	Acceleration 20 m/s ² , 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 m ² /s ³ , Frequency range 10 Hz-200 Hz, duration 30 min/ direction)	Class 2M2 (spectral acceleration density 1 m ² /s ³ , 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	
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"



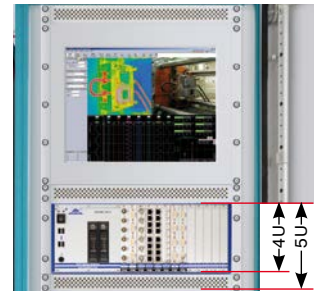
DEWE2-M13 with DW2-PS-AC-RED option



DEWE2-M13 with typical PCI slot configuration

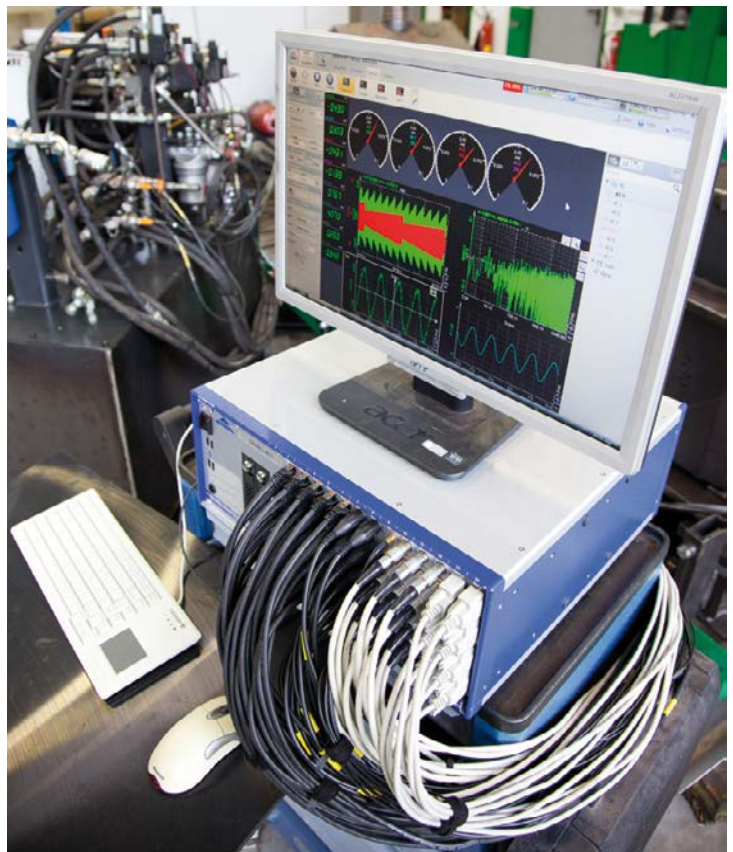


DEWE2-M13 with 2x option DW2-M13-BAY35-SATA



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

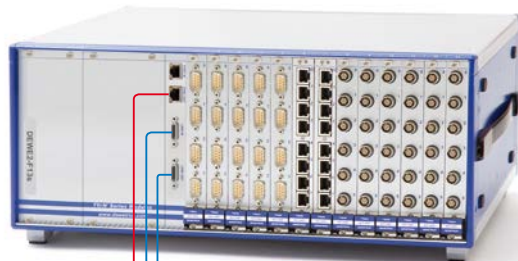


	DEWE2-F4s	DEWE2-F7s	DEWE2-F13s	DEWE2-F13-FIBRE
Slots for TRION™ modules	4	7	13	13
Quasi-static channel expansion	CPAD via TRION-CAN (no EPAD)			
Main system ¹⁾				
Main frame bandwidth	120 MB/sec			
Upstream interface (to host)	PCI Express X1, 250 MB/s			
Power supply: rated (max.)	90 to 264 V _{AC}			
Dimensions (W x D x H) without feet	177 x 230 x 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 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/s ² , 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 m ² /s ³ , frequency range 10 Hz-200 Hz, duration 30 min/direction)		Class 2M2 (spectral acceleration density 1 m ² /s ³ , frequency range 10 Hz-200 Hz, duration 30 min/direction)	
¹⁾ Please find current specifications in the latest price list				

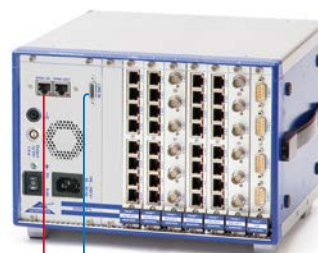
Channel Expansion



DEWE2-F13s
with option DW2-LINK-OUT



DEWE2-F7s



PCIe connection up to 7 meters (250 MB/s)

TRION-SYNC-bus

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-150-DC	External 130 W UPS and multi-battery charger with isolated 10 to 36 V _{DC} (max.) input range. 2 slots for BAT-95WH batteries, 2 batteries included, cable set included. Longer cables for flexibe use of DW2-UPS-150-DC optionally available
DW2-UPS-150-DC-CBL-2	2 m RS-232 cable and DC power cable (terminated with Lemo FGJ.2B.303)
BAT-95WH	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 mm ² 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-150-DC, 130 W UPS with 2 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

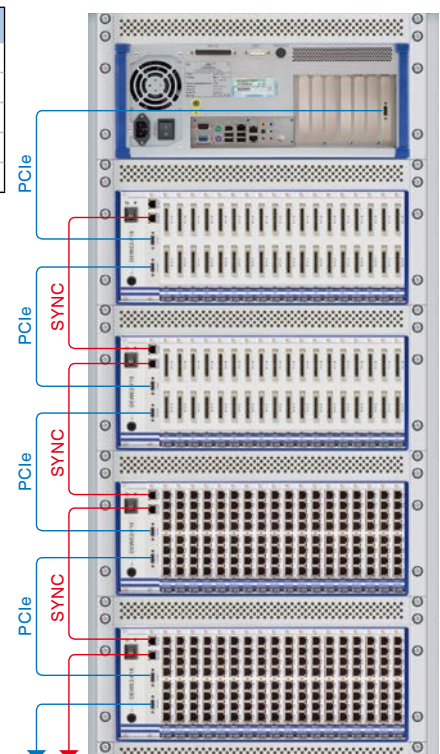


DEWE2-F18	
Slots for TRION™ modules	18
Quasi-static channel expansion	CPAD via TRION-CAN (no EPAD)
Main system ¹⁾	
Main frame bandwidth	120 MB/sec
Upstream interface (to host)	PCI Express X1, 250 MB/s
Downstream interface	PCI Express X1, 250 MB/s
Power supply: rated (max.)	90 to 264 V _{AC}
Dimensions (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/s ² , 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 m ² /s ³ , 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



NEW

DEWE2

Dedicated Instruments



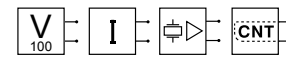
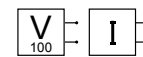
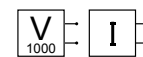


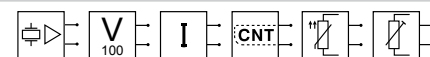
Instruments








Front-ends


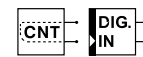


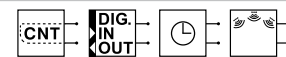
Signal Conditioning




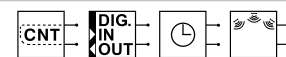




Components

Software

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
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

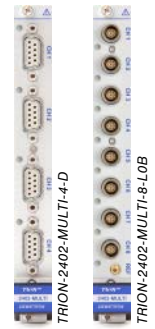
 Voltage (1000 V)
  Current (shunt needed)
  Bridge
  IEPE
  RTD
  Potentiometer
  SuperCounter™ inputs

DIGITAL Modules 		Channels	Sample rate per channel	Resolution	Isolation	Connector Type
TRION-CNT		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 4 channels SUB-D connector (CH1 can be used as CAN port) TRION-2402-MULTI-8-LOB 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	±0.05 % 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
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 10 to 100 V range 250 V
Excitation voltage range	0 to 24 V _{DC} (programmable)
Resolution	1 mV
1 year accuracy	±0.05 % ±1 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 range	0.1 to 60 mA _{DC} (programmable, 16 bit DAC)
Resolution	1 μA
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- 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 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

▶ continued on next page ...

Bridge resistance	80 Ω to 10 kΩ @ $\leq 5 V_{DC}$ 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 $\leq f_s \leq 1$ kS/s	82 dB	101 dB	111 dB	112 dB
	10 kS/s $< f_s \leq 102.4$ kS/s	72 dB	92 dB	104 dB	107 dB
	102.4 kS/s $< f \leq 200$ 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 $\leq f_s \leq 1$ kS/s	108 dB	128 dB	141 dB	141 dB
	10 kS/s $< f_s \leq 102.4$ kS/s	103 dB	123 dB	134 dB	136 dB
	102.4 kS/s $< f \leq 200$ 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 $\leq f_s \leq 51.2$ kS/s	0.494 fs			
	51.2 kS/s $< f_s \leq 102.4$ kS/s	0.49 fs			
	102.4 kS/s $< f_s \leq 204.8$ kS/s	0.38 fs			
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

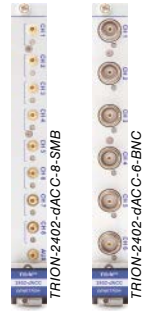
TRION-2402-dACC

- **Sampling:**
- **Input types:**

- **Additional feature:**

Differential multi-function input module

24 bit; 204.8 kS/s per channel
 Voltage measurement from ± 30 mV to ± 70 V_{DC} (46.7 V_{RMS} AC)
 IEPE
 Resistance
 Current (using external shunt)
 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 only)	Selectable: Camera trigger, external trigger, CAL-port				
Sampling rate	204.8 kS/s per channel				
Resolution	24 bit				
Input ranges					
Voltage	$\pm 30, \pm 100, \pm 300$ mV, $\pm 1, \pm 3$ V, ± 10 V, ± 30 V, ± 100 V ¹⁾				
IEPE	$\pm 100, 300$ mV, 1 V, 3 V, 10 V				
Resistance	10, 30, 100, 300 Ω , 1, 3, 10, 30, 100, 300, 1000 k Ω				
Current	Depending on external Shunt				
Voltage input accuracy	± 0.02 % of reading ± 0.02 % of range ± 200 μ V				
Gain drift	typical 10 ppm/ $^{\circ}$ C max. 20 ppm/ $^{\circ}$ C				
Offset drift	typical 0.3 μ V/ $^{\circ}$ C + 10 ppm of range, max 15 μ V/ $^{\circ}$ C + 20 ppm of range				
linearity	typical 0.01 %				
Input impedance	10 M Ω				
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 μ A				
Drift	15 ppm/ $^{\circ}$ C				
Compliance voltage	23 V				
Output impedance	>10 M Ω				
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; Periodic; Frequency; Pulsewidth; Duty-cycle				
Trigger Level	Trigger and retrigger level freely programmable within analog input range				
Typical SNR	Range	100 mV	1 V	10 V	100 V
100 S/s \leq fs \leq 1 kS/s		97 dB	111 dB	112 dB	112 dB
10 kS/s < fs \leq 102.4 kS/s		87 dB	104 dB	107 dB	104 dB
102.4 kS/s < fs \leq 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 \leq fs \leq 1 kS/s		124 dB	139 dB	140 dB	139 dB
10 kS/s < fs \leq 102.4 kS/s		118 dB	134 dB	134 dB	134 dB
102.4 kS/s < fs \leq 200 kS/s		116 dB* / 110 dB	131 dB* / 112 dB	132 dB* / 110 dB	131 dB* / 112 dB
Typical CMRR	≤ 10 V Range	100 dB @ 50 Hz	100 dB @ 1 kHz		
>10 to 200 V Range		90 dB @ 50 Hz	70 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, Off				
Characteristic	Bessel or Butterworth				
Filter order	2 nd , 4 th , 6 th , 8 th				
Analog anti aliasing filter	2 nd order Bessel, automatically set by sample rate				
Sample rate \leq 1kS/s	2.5 kHz (-3 dB), 1.5 kHz (-1 dB)				
Sample rate \leq 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 \leq fs \leq 51.2 kS/s	0.494 fs				
51.2 kS/s < fs \leq 102.4 kS/s	0.49 fs				
102.4 kS/s < fs \leq 204.8 kS/s	0.38 fs				
Crosstalk fin 1 kHz [10 kHz]	120 dB [105 dB]				
Inter channel phase mismatch	0.02° * fin (kHz) + 0.08°				
Common mode voltage ¹⁾	± 200 V _{DC} (input range > 10 V), ± 12 V _{DC} (input range \leq 10 V)				

→ continued on next page ...

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	Typ 10 W + excitation power
Connectors	TRION-2402-dACC-8-SMB: 8x SMB sockets for inputs, 1 SMB socket for AUX TRION-2402-dACC-6-BNC: 6x BNC sockets
Weight	Appr. 210 g (SMB version), appr.270 g (BNC version)
* below 0.22 fs	

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



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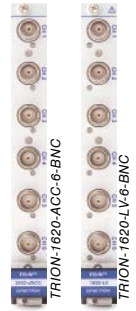
Signal Conditioning

Components

Software

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

- **Resolution:** 16 bit 2 MS/s per channel
24 bit 1 MS/s per channel
- **Input:** Voltage ±5 mV to ±100 V¹⁾
IEPE ±5 mV to ±5 V, excitation 4 or 8 mA
- **Isolation:** 1.5 kV



TRION-1620-series specifications									
Input channels	TRION-1620-LV-6-BNC TRION-1620-ACC-6-BNC Coming soon TRION-1620-LV-6-LEMO		6 channels BNC; voltage input 6 channels BNC; voltage input; IEPE®; 1 counter 6 channels LEMO; voltage input; 5/12 V 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	±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							
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; AC: 0.16Hz ²⁾								
Accuracy ³⁾	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 >10 kHz to 100 kHz ±1.00 % 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 15 μV/°C + 20 ppm of range								
Linearity	typical 0.01 %								
Input configuration	Isolated								
Isolation impedance	Isolation resistance >1 GΩ; Isolation capacitance typically 15 pF								
Isolation voltage	1500 V								
IEPE® excitation ²⁾	4 mA, 8 mA ±10 % @ 24V compliance voltage								
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								
Characteristic	Bessel or Butterworth								
Filter order	2 nd , 4 th , 6 th , 8 th								
Analog antialiasing filter	2 nd order Bessel, automatically selected								
Bandwidth (-3 dB, deactivated digital filter)	1 MHz 2 nd 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; <30 nsec for using different ranges.								
Board to board phase mismatch	<30 nsec								
Over voltage protection	±300 V _{DC}								
Counter ²⁾	1 x counter channel linked to analog channel #1; trigger level 70 % of actual analog input range								
Counter modes ²⁾	Event counting, period, frequency, pulse width, duty cycle								
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

TRION-1603-LV

Isolated voltage input module

- **Resolution:** 16 bit 250 kS/s per channel
- **Input:** Voltage ±5 mV to ± 100 V¹⁾
- **Isolation:** 1.5 kV



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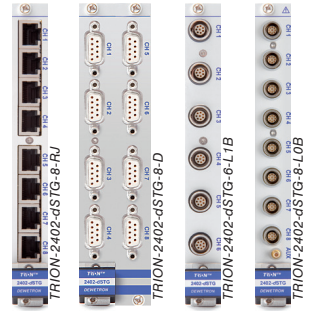
TRION-1603-LV series specifications										
Input channels	Coming soon		TRION-1603-LV-6-BNC		6 channels BNC; voltage input					
			TRION-1603-LV-6-LEMO		6 channels LEMO; voltage input; 5/12 V sensor supply; TEDS					
Sampling Rate / Resolution	100 S/s to 250 kS/s		16-bit							
Data Transfer	16-bit									
ADC type	SAR (Successive Approximation Register)									
Data rate DMA transfer	6 analog channels: max 3 MB/s									
Input ranges	±5, ±10, ±20, ±50, ±100, ±200, ±500 mV, ±1 V, ±2 V, ±5 V, ±10 V, ±20 V, ±50 V, ±100 V ¹⁾									
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 ²⁾	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							
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									
Linearity	typical 0.01 %									
Input configuration	Isolated									
Isolation impedance	Isolation resistance >1 GΩ; Isolation capacitance typically 15 pF									
Isolation voltage	1500 V									
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]	
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									
Characteristic	Bessel or Butterworth									
Filter order	2 nd , 4 th , 6 th , 8 th									
Analog antialiasing filter	2 nd order Bessel, automatically selected									
Bandwidth (-3 dB, deactivated digital filter)	100 kHz 2 nd 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; <30 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 (LEMO only)	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⁾ 1 year accuracy 23 °C ±5 °C

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) 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	$\pm 10, 30, 100, 300$ mV, 1 V, 3 V, 10 V																				
Bridge	1, 3, 10, 30, 100, 300, 1000 mV/V or mV/mA																				
IEPE	$\pm 100, 300$ mV, 1V, 3V, 10V																				
Resistance	10, 30, 100, 300 Ω , 1, 3, 10, 30 k Ω																				
Current	Depending on external Shunt																				
Voltage input accuracy	± 0.02 % of reading ± 0.02 % of range ± 20 μ V																				
Gain drift	typical 10 ppm/ $^{\circ}$ C max. 20 ppm/ $^{\circ}$ C																				
Offset drift	typical 0.3 μ V/ $^{\circ}$ C+ 10 ppm of range, max 2 μ V/ $^{\circ}$ C + 20 ppm of range																				
linearity	typical 0.01 %																				
Input impedance	100 M Ω																				
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 μ V/K																				
Current limit	100 mA																				
Protection	Continuous short to ground																				
Excitation current	0.2 to 25 mA _{DC} (programmable, 1 mV steps)																				
Accuracy	0.05% ± 2 μ A																				
Drift	15 ppm/ $^{\circ}$ C																				
Compliance voltage	10 V																				
Output impedance	>10 M Ω																				
IEPE Excitation	4 mA ± 10 %																				
Compliance voltage	22 V																				
Supported sensors	4- or 6-wire full bridge 3- or 5-wire $\frac{1}{2}$ bridge with internal completion (software programmable) 3- or 4-wire $\frac{1}{4}$ 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) IEPE (fixed 4 mA excitation)																				
Bridge resistance	80 Ω to 10 k Ω @ ≤ 5 V _{DC} excitation																				
Shunt calibration	Two internal shunt resistors 50 k Ω and 100 k Ω																				
Shunt and completion resistor accuracy	0.05 % ± 15 ppm/K																				
Automatic bridge balance	± 250 % of Range																				
Typical SNR	<table border="1"> <thead> <tr> <th>Range</th> <th>10 mV</th> <th>100 mV</th> <th>1 V</th> <th>10 V</th> </tr> </thead> <tbody> <tr> <td>100 S/s \leq fs \leq 1 kS/s</td> <td>82 dB</td> <td>101 dB</td> <td>111 dB</td> <td>112 dB</td> </tr> <tr> <td>10 kS/s < fs \leq 102.4 kS/s</td> <td>72 dB</td> <td>92 dB</td> <td>104 dB</td> <td>107 dB</td> </tr> <tr> <td>102.4 kS/s < f \leq 200 kS/s</td> <td>69 dB</td> <td>80 dB</td> <td>81 dB</td> <td>81 dB</td> </tr> </tbody> </table>	Range	10 mV	100 mV	1 V	10 V	100 S/s \leq fs \leq 1 kS/s	82 dB	101 dB	111 dB	112 dB	10 kS/s < fs \leq 102.4 kS/s	72 dB	92 dB	104 dB	107 dB	102.4 kS/s < f \leq 200 kS/s	69 dB	80 dB	81 dB	81 dB
Range	10 mV	100 mV	1 V	10 V																	
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102.4 kS/s < f \leq 200 kS/s	69 dB	80 dB	81 dB	81 dB																	
Spurious free dynamic range	<table border="1"> <thead> <tr> <th>Range</th> <th>10 mV</th> <th>100 mV</th> <th>1 V</th> <th>10 V</th> </tr> </thead> <tbody> <tr> <td>100 S/s \leq fs \leq 1 kS/s</td> <td>108 dB</td> <td>128 dB</td> <td>141 dB</td> <td>141 dB</td> </tr> <tr> <td>10 kS/s < fs \leq 102.4 kS/s</td> <td>103 dB</td> <td>123 dB</td> <td>134 dB</td> <td>136 dB</td> </tr> <tr> <td>102.4 kS/s < f \leq 200 kS/s</td> <td>99 dB</td> <td>120 dB* / 106 dB</td> <td>133 dB* / 106 dB</td> <td>135 dB* / 106 dB</td> </tr> </tbody> </table>	Range	10 mV	100 mV	1 V	10 V	100 S/s \leq fs \leq 1 kS/s	108 dB	128 dB	141 dB	141 dB	10 kS/s < fs \leq 102.4 kS/s	103 dB	123 dB	134 dB	136 dB	102.4 kS/s < f \leq 200 kS/s	99 dB	120 dB* / 106 dB	133 dB* / 106 dB	135 dB* / 106 dB
Range	10 mV	100 mV	1 V	10 V																	
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102.4 kS/s < f \leq 200 kS/s	99 dB	120 dB* / 106 dB	133 dB* / 106 dB	135 dB* / 106 dB																	
Typical CMRR	90 dB @ 1 KHz 80 dB @ 10 KHz																				
Analog anti aliasing filter	2 nd order Bessel, automatically set by sample rate																				
Sample rate \leq 1k S/s	2.5 kHz (-3 dB), 1.5 kHz (-1 dB)																				
Sample rate \leq 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 \leq fs \leq 51.2 kS/s	0.494 fs																				
51.2 kS/s < fs \leq 102.4 kS/s	0.49 fs																				
102.4 kS/s < fs \leq 204.8 kS/s	0.38 fs																				
Crosstalk fin 1 kHz [10 kHz]	120 dB [105 dB]																				
Inter channel phase mismatch	0.02° * fin (kHz) + 0.08°																				

continued on next page ...

Common mode voltage	$\pm 10 V_{DC}$
Over voltage protection	$\pm 50 V_{DC}$
Supported TEDS chips	DS2406, DS2430A, DS2431, DS2432, DS2433
Power consumption	Typ 10 W + excitation power
Connector	TRION-2402-dSTG-8-RJ: 8x RJ-45 sockets TRION-2402-dSTG-6-L1B: 6x Lemo EGG.1B.308 sockets TRION-2402-dSTG-8-D: 8x SUB-D-9 socket
Weight	Appr. 200 g (RJ45 version), appr. 250 g (LEMO version)
* below 0.22 fs	

Cables for TRION-2402-dSTG modules

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-RJOE-05-00	RJ45	open end	5 m	TRION-x-dSTG-x-RJ
TRION-CBL-RJD9-01-00	RJ45	DSUB-9 socket (DAQP-STG/MDAQ-STG compatible)	1 m	TRION-x-dSTG-x-RJ
TRION-CBL-RJBN-01-00	RJ45	BNC	1 m	TRION-x-dSTG-x-RJ
TRION-CBL-L8OE-05-00	LEMO 1B.308	open end	5 m	TRION-x-dSTG-x-LEMO
TRION-CBL-L8D9-01-00	LEMO 1B.308	DSUB-9 socket (DAQP-STG/MDAQ-STG compatible)	1 m	TRION-x-dSTG-x-LEMO



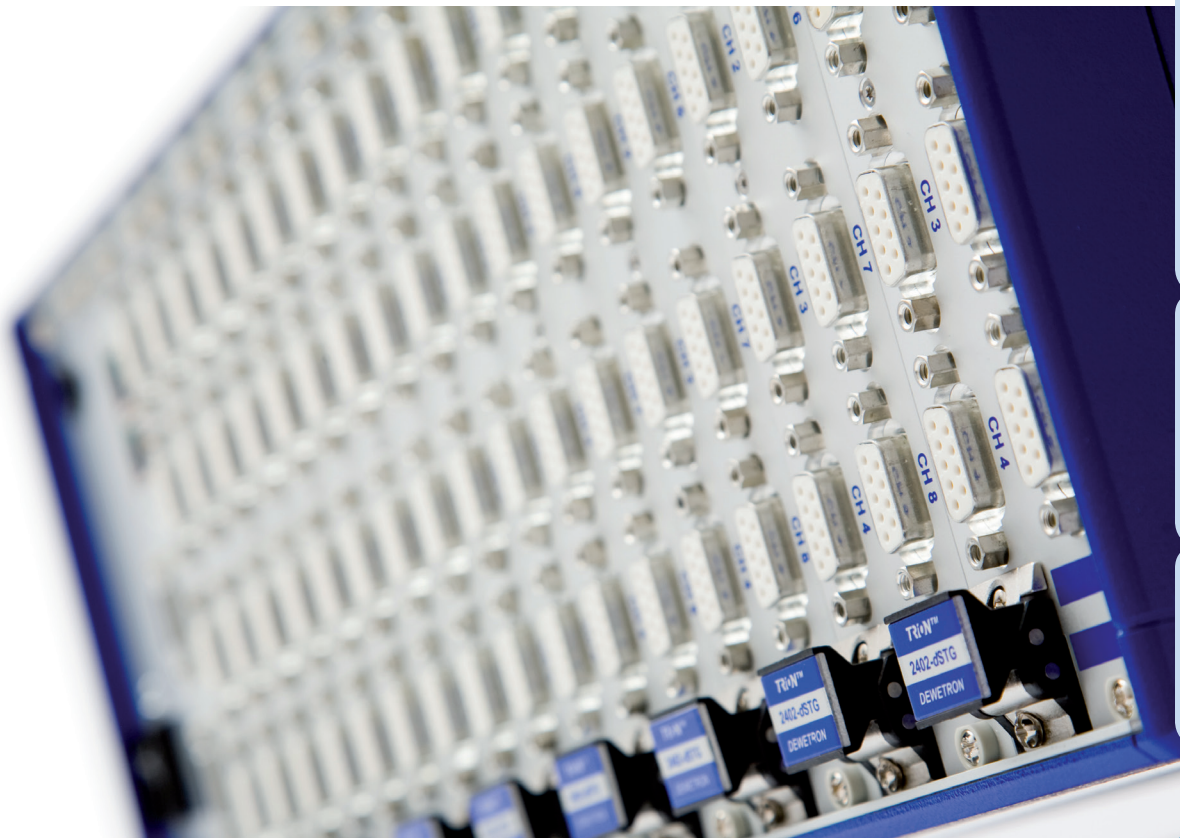
TRION-CBL-RJD9-01-00



TRION-CBL-RJBN-01-00

Mating connector

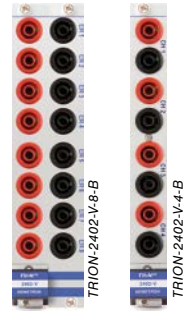
Connector				
	Connector	Termination	Length	TRION modules
LEMO-FGG.1B.308.CLAD52Z	LEMO 1B.308	mating connector, for cable diameter 4.1 to 5.0 mm	-	TRION-x-dSTG-x-LEMO



TRION-2402-V

Isolated wide range voltage module

- **Sampling:** 24 bit; 204.8 kS/s per channel
- **Input types:** Voltage ± 300 mV to $\pm 1000^{(2)}$ 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	± 0.02 % of reading ± 0.02 % of range ± 3 mV			
	>1 kHz to 5 kHz	± 0.3 % of reading ± 0.02 % of range ± 3 mV			
	>5 kHz to 10 kHz	± 1 % of reading ± 0.02 % of range ± 3 mV			
Range ≤ 10 V	DC to 1 kHz	± 0.02 % of reading ± 0.02 % of range ± 200 μ V			
	>1 kHz to 5 kHz	± 0.3 % of reading ± 0.02 % of range ± 200 μ V			
	>5 kHz to 10 kHz	± 1 % of reading ± 0.02 % of range ± 200 μ V			
Offset drift	Range > 10 V	typical 10 μ V/°C + 10 ppm of range, max 500 μ V/°C + 20 ppm of range			
	Range ≤ 10 V	typical 0.3 μ V/°C + 10 ppm of range, max 15 μ V/°C + 20 ppm of range			
Gain drift	typical 10 ppm/°C max. 20 ppm/°C				
Linearity	typical 0.01 %				
Input impedance	Range > 10 V	10 M Ω			
	Range ≤ 10 V	5 M Ω			
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 \leq fs \leq 1 kS/s	113 dB	115 dB	113 dB	115 dB
	10 kS/s < fs \leq 102.4 kS/s	106 dB	109 dB	106 dB	109 dB
	102.4 kS/s < f \leq 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 \leq fs \leq 1 kS/s	139 dB	140 dB	139 dB	140 dB
	10 kS/s < fs \leq 102.4 kS/s	134 dB	134 dB	134 dB	134 dB
	102.4 kS/s < f \leq 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		
	>10 V Range	90 dB @ 50 Hz	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 \leq 1 kS/s	2.5 kHz (-3 dB), 1.5 kHz (-1 dB)				
Sample rate \leq 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 \leq fs \leq 51.2 kS/s	0.494 fs				
51.2 kS/s < fs \leq 102.4 kS/s	0.49 fs				
102.4 kS/s < fs \leq 204.8 kS/s	0.38 fs				
Crosstalk fin 1 kHz [10 kHz]	110 dB [95 dB]				
Inter channel phase mismatch	0.02° ⁽¹⁾ fin (kHz) + 0.08°				
Measurement category	CAT II 300 V				
Isolation voltage	4 kV				
Non-destructive voltage					
Range ≤ 10 V	± 1000 V _{DC}				
Range > 10 V	± 2000 V _{DC}				
Power consumption	Typ 6 W for 4 channels (10 W for 8 channels)				
Connector	4 mm safety banana sockets				
Weight	Appr. 270 g (4 ch version), appr. 400 g (8 ch version)				

¹⁾ below 0.22 fs

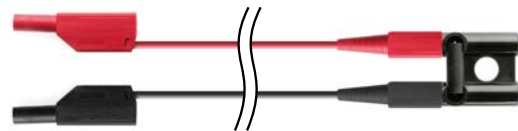
²⁾ Unit meets IEC/EN 61010-1:2010 and IEC/EN 61010-2-30:2010 up to input voltage 300 V

Shunts for TRION™ voltage input modules

Shunts	
DAQ-SHUNT1	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
DAQ-SHUNT1-UNI	20 mA shunt adaptor (50 Ohm, ±0.1 %, 1 W); Fitting into 4 mm banana jacks - also for TRION-x-V-4-B
DAQ-SHUNT4	5 A shunt box (100 mOhm, ±0.1%, <10ppm); Current input via 2 safety banana jacks, output 2x 0.3 m cable with banana plugs
DAQ-SHUNT5	5 A shunt box (100 mOhm, ±0.1%, <10ppm); Current input via 2 safety banana jacks, output via 2 safety banana jacks



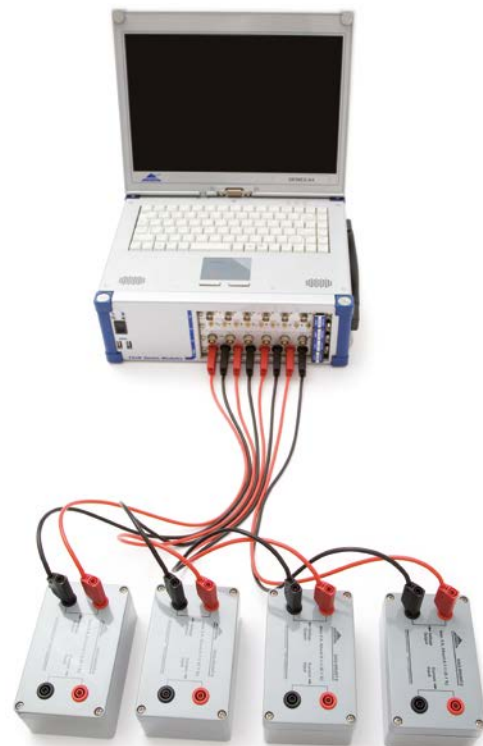
DAQ-SHUNT1
(not compatible with TRION-x-V-4 modules)



DAQ-SHUNT1-UNI
(50 cm cable length)



DAQ-SHUNT4



DAQ-SHUNT5

TRION-BASE

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

Counter, DIO and synchronization module



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
Sync I/O specifications	
Functionality	Acquisition clock and trigger output (can be used to sync two systems/enclosures)
Compatibility (Input)	LVTTTL
Compatibility (Output)	LVTTTL, 10 mA
Overvoltage protection	±20 V
Connector	On same SUB-D-25 socket as Digital I/O
Counter specifications	
Number of channels	2 SuperCounters™ 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), Gear tooth with/without zero, gear tooth with missing/double teeth
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	2x LEMO EGG.1B.307 sockets
AUX specifications	
Functionality	Camera trigger, trigger input/output, acquisition clock and programmable clock output
Compatibility (Input)	LVTTTL
Compatibility (Output)	LVTTTL, 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 Watt (without sensor supply)
Temperature Range	0 - 50 °C
Weight	Appr. 240 g

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
TRION-CBL-CAMTRG-04-00	SMB	To synchronize a DEWE-CAM-FW-70 via an AUX socket of TRION modules	4 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

NEW
DEWE2

Dedicated Instruments

Instruments

Front-ends

Signal Conditioning

Components

Software

TRION-TIMING specifications		
IRIG input specifications		
Supported codes:	IRIG code A or B; AC or DC	
Compatibility (AC code):	0.5 V _{p-p} to 10 V _{p-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 SuperCounter™ 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)	LVTTTL	
Compatibility (output)	LVTTTL, 10 mA	
Overvoltage protection	±20 V	
Connector	SMB socket	
General specifications		
Power consumption	5 W (without sensor supply)	
Temperature Range	0 - 50 °C	
Weight	Appr. 240 g	

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-CAMTRG-04-00	SMB	To synchronize a DEWE-CAM-FW-70 via an AUX socket of TRION modules	4 m	TRION-BASE, TRION-TIMING

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
- High accuracy speed and displacement measurement
- Additional features: GPS or IRIG timing, 8x DIOs, 1x CTR, 1x AUX



GPS antenna



TRION-VGPS-20 /-100		
Position, speed and displacement specifications		
Speed		
Accuracy	0.1 km/h \pm 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 \pm 10 %
	Compatibility (DC code)	DC level shift TTL / CMOS compatible
	Compatibility (TTL Code)	TTL
	Impedance	20 k Ω
Output specification		
Compatibility (DC code)	TTL, 20 mA	
Adjustment range	\pm 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	

→ continued on next page ...

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 SuperCounter™ 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)	LVTTTL	
Compatibility (output)	LVTTTL, 10 mA	
Overvoltage protection	±20 V	
Connector	SMB socket	
General specifications		
Power consumption	5 W (without sensor supply)	
Temperature Range	0 - 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

TRION-CNT

- Sampling
- Input types

Isolated SuperCounter™ module

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



TRION-CNT specifications	
Input channels	6 SuperCounters™ 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), gear tooth with/without zero, gear tooth with missing/double teeth
Input signal characteristic	
Rated input voltage (max.)	70 V _{DC} (43.7 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 M Ω / 5 pF
Bandwidth (-3dB)	5 MHz
Trigger adjustment range	0 to 50 V
Trigger resolution	12 mV
Trigger level accuracy	± 20 mV $\pm 1\%$ 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)
Maximum input frequency	10 MHz
Sensor power supply (per module)	5 V (600 mA) and 12 V (600 mA), not isolated
Power consumption	Typ. 5 W + excitation power
Connector	6x LEMO EGG.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.CLAD52Z	LEMO 1B.307	mating connector, for cable diameter 4.1 to 5.0 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)
Input signal characteristic	
Compatibility	CMOS
Configuration	Isolated input
Input low level	$U_{IN} < 1.8 \text{ V}$
Input high level	$U_{IN} > 3.2 \text{ V}$
Input high current @ 5 V U_{IN}	< 3.5 mA
Input high current @ 30 V U_{IN}	< 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
Power consumption	Typ. 5 W + excitation power
Connector	2 x 50 pin mini centronics sockets (Harting 60 11 050 5740)
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



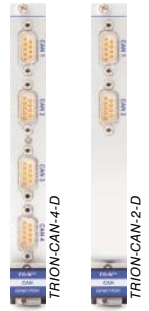
TRION-CB24-SC

TRION-CAN

■ **Input types**

Isolated high speed CAN interface

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 100 Ω
Galvanic isolation	500 V _{DC}
Bus pin fault protection	±36 V
CAN Transceiver	SNHVD235
Sensor power supply (per module)	5 V (600 mA) and 12 V (600 mA)
Power consumption	Typ. 5 W + excitation power
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



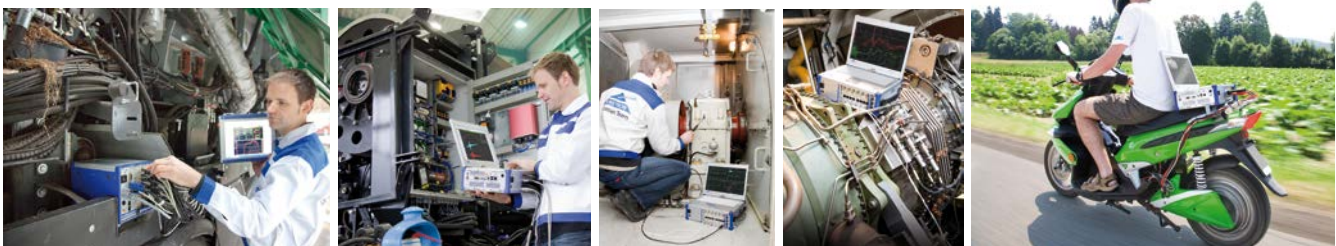
ADAP-CAN-LS-HS



ADAP-LIN-CAN

Cables for TRION-CAN modules

TRION cables				
	Connector	Termination	Length	TRION modules
TRION-CBL-D9OE-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



Specifications	
Ports	
TRION-A429	4, 8, 16 or 30 ARINC 429
TRION-M1553	1 to 4 MIL-STD-1553
TRION-MA4	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 @ ± 5 V
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 μ V @ ± 10 V 1.045 μ V @ ± 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 mV ²
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 μ s
Slew rate	20 V/ μ s