DEWETRON

POWER ANALYZER

0.03% Measurement Error

10 MS /s/ch

16 Power Phases

DEWE2-PA7
DEWE3-PA8

THE MEASURABLE DIFFERENCE.

MIXED SIGNAL POWER ANALYZER

HIGH-PERFORMANCE POWER ANALYSIS & GAPLESS RECORDING OF ANY SIGNAL

0.03% Measurement Error

10 MS /s/ch

16 Power Phases

Continuous Waveform Recording

2 TB Storage Capacity

MIXED-SIGNAL RECORDER

Our Power Analyzers are also mixed-signal recorders, which means you only need ONE system for all inputs:

> Modular and mixed signal inputs
> Isolated high voltage & current inputs
> High-performance auxiliary inputs (e.g. torque, speed, vibration)
> CAN interface with input and output
> EtherCAT and XCP, SCPI over Ethernet
> High number of mid-speed inputs for low dynamic signals (e.g. temperature)
> PTP, GPS, IRIG synchronization
> Counter

MULTI-POWER ANALYZER

A DEWETRON Power Analyzer is the solution for the analysis of several motors, converters or complete drive trains simultaneously. Up to 16 different power phases and the calculation capability of power parameters even for polyphase motors (up to 9 phases) turns the Power Analyzer into a multi-power analyzer.

EXCHANGEABLE CONFIGURATION

The input configuration is adaptable by the user at any time.
If your application is changing, you can easily adapt the input configuration to the new requirements by simply changing the sub-modules for very little money.

SIMPLE CALIBRATION

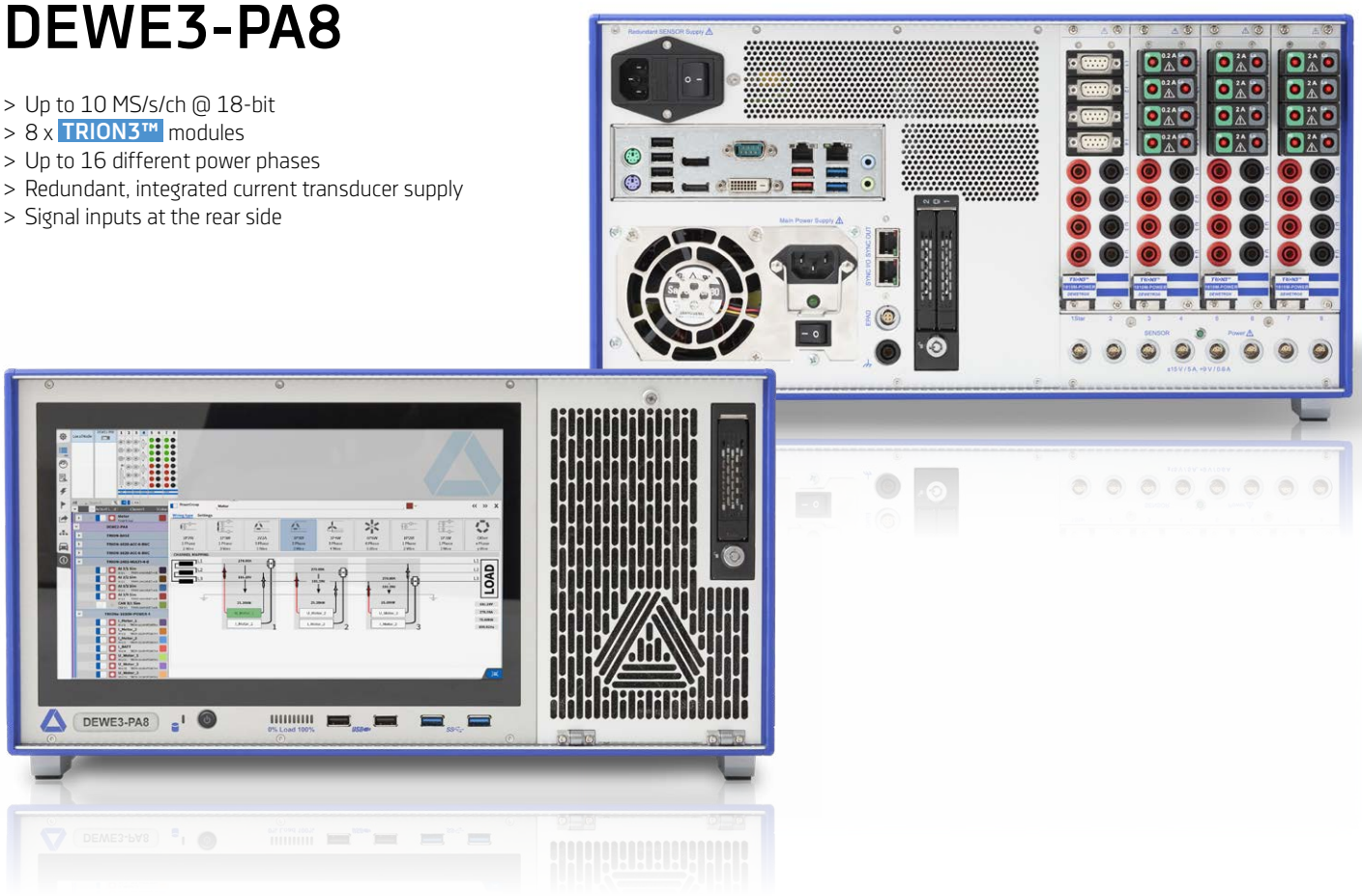
The power modules and the flexible sub-modules hold their own calibration data. For new calibration, you only have to send the module instead of the entire system.

ISO 17025 CALIBRATION

Our Power Analyzers are optionally supplied with an EN ISO/IEC17025 certification. Calibration and adjustment are done in the accredited calibration laboratory at the DEWETRON headquarters in Graz/ Austria.

DEWE3-PA8

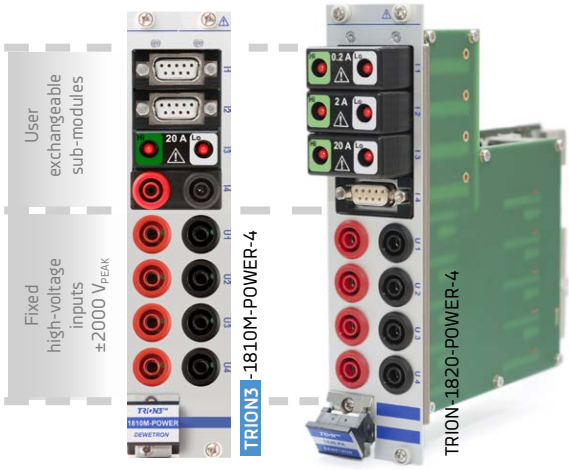
> Up to 10 MS/s/ch @ 18-bit
> 8 x TRION3™ modules
> Up to 16 different power phases
> Redundant, integrated current transducer supply
> Signal inputs at the rear side



DEWE2-PA7

> Up to 2 MS/s/ch @ 18-bit
> 7 x TRION™ modules
> Up to 12 different power phases
> Integrated current transducer supply
> Signal inputs at the front

POWER MODULES



TRION3-1810M-POWER-4
TRION-1820-POWER-4

Choose between two types of power modules with 8 input channels, each with 18-bit resolution.

Because of the unique modularity, 4 channels can be equipped with different user-exchangeable sub-modules for direct current or voltage measurement. So almost any kind of voltage or current sensor can be connected to a DEWETRON Power Analyzer.

The other 4 channels are fixed high-voltage inputs with ±2000 V_{PEAK}.

The modules offer a different sampling rate:

> TRION3-1810M-POWER-4
  10 MS/s/ch
> TRION-1820-POWER-4
  2 MS/s/ch

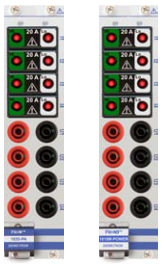
SUB-MODULES

> User-exchangeable at any time
> Automatically detected
> Calibration data directly stored inside

Examples for user exchangeable sub-modules

		RANGE	SAFETY	BANDWIDTH	CONNECTOR	USER EXCHANGEABLE	SUB-MODULE
USER EXCHANGEABLE SUB-MODULES FOR CURRENT MEASUREMENT (DIRECTLY & SENSORS)							
CURRENT	**20 A module**	20 A ($\pm 40\ A_{PEAK}$)	CAT II 600 V, unfused	300 kHz	Safety banana (male)	Yes	
CURRENT	**2 A module**	2 A ($\pm 4\ A_{PEAK}$)					
CURRENT	**1 A module**	1 A ($\pm 2\ A_{PEAK}$)					
CURRENT	**0.2 A module**	0.2 A ($\pm 0.4\ A_{PEAK}$)					
VOLTAGE	**1 V module**	1 V ($\pm 2\ V_{PEAK}$)	Not isolated. Depending on connected clamp	5 MHz	DSUB-9 socket	Yes	
VOLTAGE	**5 V module**	5 V ($\pm 10\ V_{PEAK}$)		5 MHz	DSUB-9 socket		
VOLTAGE	**Clamp input module**	5 V ($\pm 10\ V_{PEAK}$)		150 kHz	DSUB-9 socket		
USER EXCHANGEABLE SUB-MODULES FOR VOLTAGE INPUT							
	600 V module	600 V ($\pm 1500\ V_{PEAK}$)	CAT II 600 V, isolated	300 kHz	Safety banana	Yes	
	5 V module	5 V ($\pm 10\ V_{PEAK}$)		300 kHz	Safety banana		
FIXED HIGH-VOLTAGE INPUTS							
	Voltage input U1, U2, U3, U4	1000 V ($\pm 2000\ V_{PEAK}$)	CAT IV 600 V / CAT III 1000 V	5 MHz	Safety banana	No	

ACCURACY SPECIFICATIONS



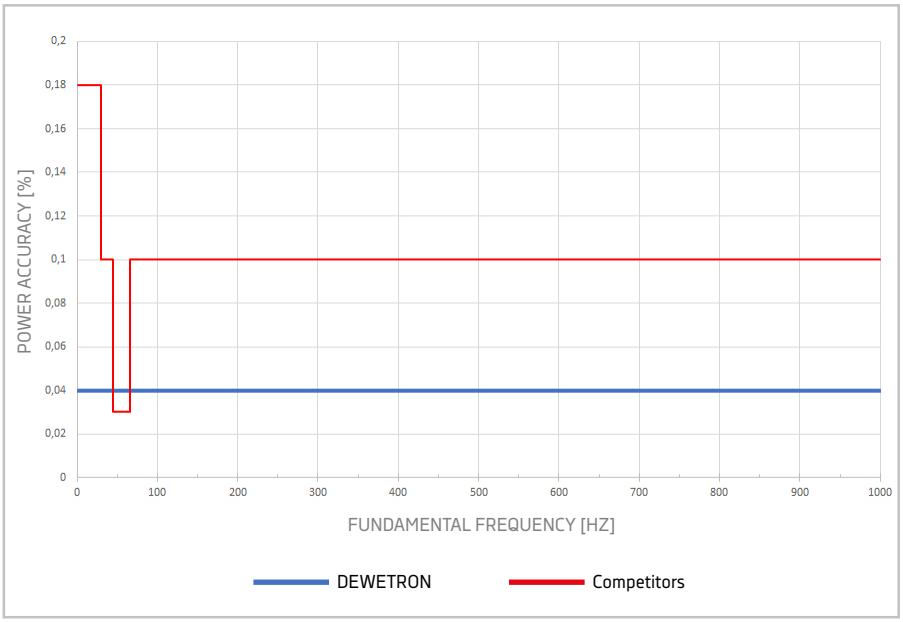
	TRION3-1810M-POWER-4 TRION-1820-POWER-4
VOLTAGE INPUT SPECIFICATIONS [1]	
Range	1000 V (±2000 V_{PEAK})
Accuracy DC	±0.02 % of reading, ±0.02 % of range
Accuracy 0.5 Hz - 1 kHz	±0.03 % of reading (no range error)
Accuracy 1 kHz - 5 kHz	±0.15 % of reading (no range error)
Accuracy 5 kHz - 10 kHz	±0.35 % of reading (no range error)
Accuracy 10 kHz - 50 kHz	±0.6 % of reading (no range error)
Accuracy 50 kHz - 300 kHz	(± 0.02 % *f in kHz) of reading (no range error)
CURRENT INPUT SPECIFICATIONS [1]	
Range	0.2 A (±0.4 A_{PEAK}) / 1 A (±2 A_{PEAK}) / 2 A (±4 A_{PEAK}) / 20 A (±40 A_{PEAK})
Accuracy DC	±0.02 % of reading, ±80 µA [2]
Accuracy 0.5 Hz - 10 kHz	±0.03 % of reading (no range error)
Accuracy 10 kHz - 30 kHz	±0.1 % of reading (no range error)
Accuracy 30 kHz - 200 kHz	(±0.015 % *f in kHz) of reading (no range error)
Accuracy 200 kHz - 300 kHz	(± 0.01 % *f in kHz) of reading (no range error)
POWER INPUT SPECIFICATIONS (50/60 HZ, PF=1)	
Accuracy DC	±0.03 % of reading, ±0.03 % of range
Accuracy 0.5 Hz - 1 kHz	±0.04 % of reading (no range error)
Accuracy 1 kHz - 5 kHz	±0.15 % of reading (no range error)
Accuracy 5 kHz - 10 kHz	±0.35 % of reading (no range error)
Accuracy 10 kHz - 50 kHz	(± 0.5 % + 0.05 % *f in kHz) of reading (no range error)
FUNDAMENTAL FREQUENCY	
Range	0.2 Hz – 200 kHz (>1 MS/s: 0.5 Hz – 200 kHz)
Accuracy	±0.01 % of reading, ±1 mHz

[1] For detailed specifications, please refer to TRION-1820-POWER-4 datasheet or TRION3-1810M-POWER-4 datasheet
[2] For 1 A sub-module (TRION-POWER-SUB-CUR-1A-1B)

HIGH DYNAMIC RANGE

DEWETRON's power modules provide fast acquisition rates up to 10 MS/s and 18-bit A/D conversion as well as the best linearity of the signal conditioning. In addition, the power modules offer the highest dynamic performance in the whole input range – up to 1000 V (2000 V_{PEAK}) and 20 A (40 A_{PEAK}) with the highest possible accuracy for all your dynamic applications.

The power accuracy of the DEWE2-PA7 and DEWE3-PA8 is stunning. Compared to other Power Analyzers available on the market, DEWETRON offers a constant power accuracy of 0.04 % from 1 Hz to 1000 Hz fundamental frequency. This is the key requirement for testbed applications to achieve high precision results over a wide frequency range.



OXYGEN MEASUREMENT SOFTWARE

OXYGEN Measurement Software seamlessly integrates data being transmitted through multiple, totally synchronized signals into calculations for power analysis.

> Analysis of 1-9 phase power systems (1P2W, 2V2A, 3P3W, 3P4W, 6P6W, ...)
> Several power systems are logically summarized into power groups
> Gapless cycle-by-cycle calculation, no blind spots

MULTIPLE FREELY DEFINABLE SCREENS

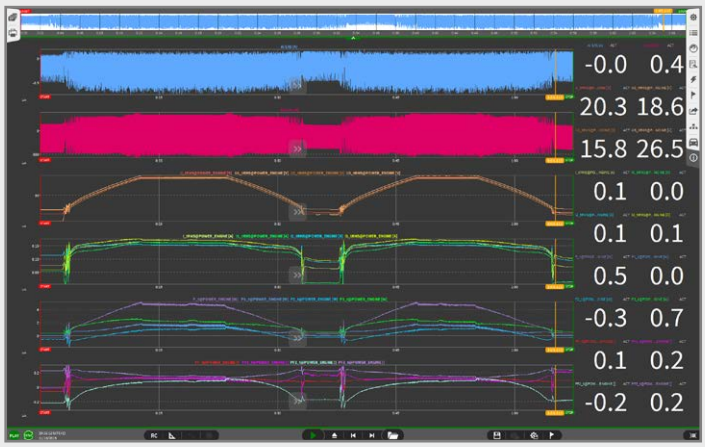
Using a DEWETRON Power Analyzer, you can freely define differnt screens and easily select between views compatible to traditional Power Analyzers or design your own preferred views by drag and drop (with the finger our a mouse/touchpad).
It is easy to create multiple different views within one setup and select the one of actual interest by a single click.

Navigation through the acquired data – including the raw data stored at up to 10 MS/s – is fast and easy. All screens update synchronously, no matter if harmonics, the exact waveform of voltage and current, a special FFT or anything else is of special interest.

RAW DATA & WAVEFORM RECORDING

Waveform data, mixed signals and power analysis?
A DEWETRON Power Analyzer combines them all.

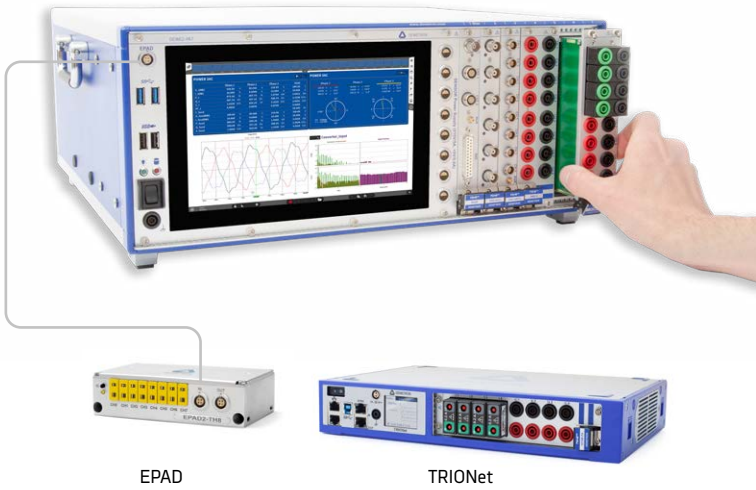
Reliable gapless raw data recording of any analog or digital signal and high performance power calculation of several power groups simultaneously.



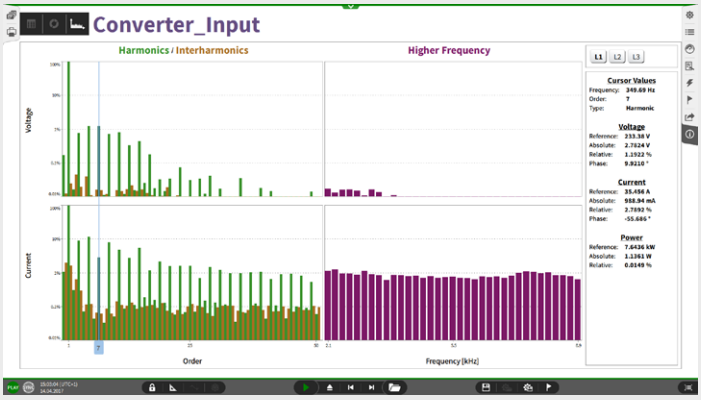
MODULARITY & EXPANDABILITY

Do you need more input channels? No problem, the Power Analyzers can be extended in many ways. Just add another TRION™ or TRION3™ module, if there is a free slot. Data is automatically synchronized across all channels.

If you need more input channels, you can easily expand the Power Analyzer with a TRIONet for a higher channel count or add static inputs by using CPAD or EPAD modules.



EPAD TRIONet



COMPLIANCE TO INDUSTRY STANDARDS

Analysis of harmonics, interharmonics, and higher frequencies as well as voltage fluctuations and flicker emissions are done according to industry standard.
> IEC 61000-4-7
> IEC 61000-4-15
> IEC 61400-21

DEWETRON provides CAT IV - the highest safety class on the market for Power Analyzers.

INTEGRATED TRANSDUCER SUPPLY

The Power Analyzers provide integrated (redundant) power supply for 8 current transducers. The integrated transducer power supply enables the engineer to relinquish an additional supply box and connect the transducers directly to the Power Analyzer.

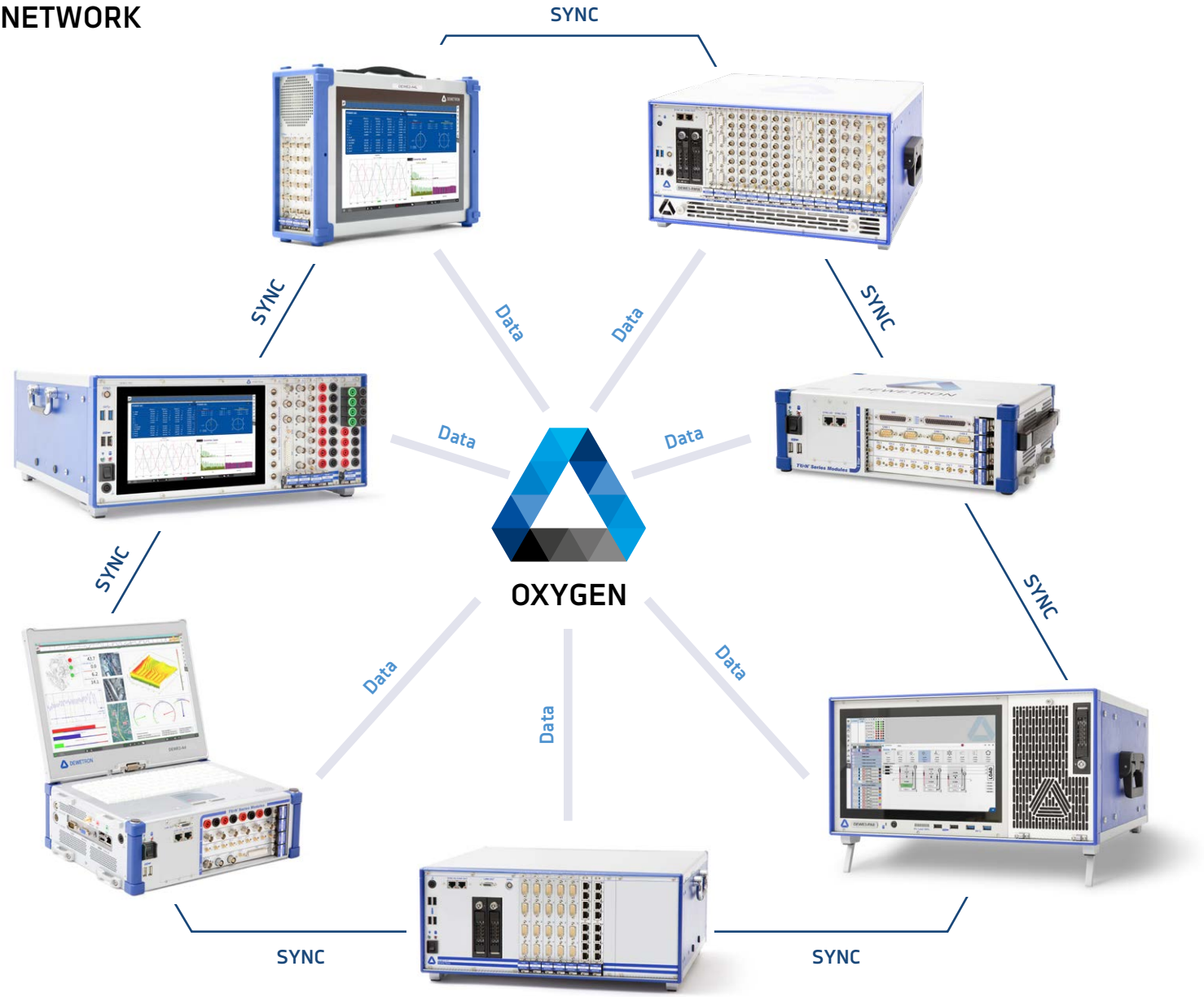
Sensors requiring ±15V or +9 V supply voltage can be powered directly. Therefore, sensors like zero-flux transducers do not need an extra power supply.

OXYGEN-NET FOR DISTRIBUTED MEASUREMENTS

Many applications require more than one measurement device, sometimes even at different locations. OXYGEN-Net makes it possible to sum up all devices to one virtual measurement device. You only need a reliable network connection, and you can simply claim all available nodes and operate it from the main device.

> Create one big virtual device with several remote nodes (measurement cloud)
> No complicated settings needed, simply claim and remove nodes with one click
> Remote and local data storage possible for redundancy
> Works with absolute time synchronization as well as with TRION-SYNC-BUS

DISTRIBUTED NETWORK



TESTBED INTEGRATION

Smart interface technology makes it easy to integrate a Power Analyzer into automation systems and testbed environments while it is guaranteeing reliable data transmission, easy to use remote control and remote configuration through TCP/IP based protocols in compliance with standardized protocols (e.g. ASAM) and file formats.

INTERFACES

DEWETRON provides various options for integration of the measurement device into a testbed or any other third-party environment. This enables the usage of nearly any host as data sink and control instance.

		SCPI	XCP	ETHERCAT	DATA STREAM	ETHERNET RECEIVER	CAN/CAN-FD
	Physical layer	Ethernet	Ethernet	TRION EtherCAT	Ethernet	Ethernet	TRION-CAN / Vector CAN-FD
OUTPUT	**Typical speed**	<= 100 S/s <= 10 kS/s (ELOG)	<= 10 kS/s	<= 500 S/s	10 kS/s - 2 MS/s	No	<= 100 S/s
OUTPUT	**Number of channels**	> 100	< 20	<= 100	> 100	No	> 20
OUTPUT	**Provides timestamp**	Yes	Implicit	Yes	Yes	No	No
INPUT	**Typical speed**	No input signals				100 S/s - 1 kS/s	< 1 kS/s
INPUT	**Number of channels**					> 100	> 100
INPUT	**Sync to timestamp**					Yes	Receive timestamp
CONTROL	**Start/Stop recording**	Yes	Yes	Yes	No	No	No
CONTROL	**Save/Restore setup**	Yes	No	Partly	No	No	No
CONTROL	**Modify file name**	Yes	No	No	No	No	No
CONTROL	**Trigger**	No	No	No	No	Yes	Yes
	Comment	Generic interface for almost every application	Interfacing CANape or INCA	Automation fieldbus compatible interface	Performance interface for RAW streaming	Receiver for UDP packets	Automotive fieldbus interface

APPLICATION EXAMPLES

RENEWABLE ENERGY

Renewable power plants, especially solar power plants and wind power plants, are becoming more and more common all over the world and help us to ensure a power supply with green energy.

DEWETRON's modular Power Analyzers are the ideal solution for DC and AC measurements for renewable energy power plants and furthermore are able to capture environmental parameters like irradiance, wind, pressure or temperature simultaneously and synchronized. For distributed measurements over several grid connection points and renewable energy power plants, DEWETRON offers synchronized (e.g: by GPS) distributed solutions to analyze the behavior during an eclipse or passing clouds.

E-MOBILITY

HDR-inputs (high dynamic range) for precise measurements from low voltage up to 2000 V as well as current up to 2000 A enables the user to analyze the dynamic drivetrain behavior. Beginning with load jumps and moving start-up and braking, the whole spectrum of power analysis is possible, because of our 0.03 % reading error (NO range error) until 1 kHz of fundamental frequency. DEWETRON Power Analyzers are the professional solution for R&D as well as test and certification during real-time drive testing.

Synchronous acquisition of all input channels, high accuracy power calculation for several motors (DC and AC) and the possibility to capture environmental parameters are just a few benefits of the DEWETRON Power Analyzer. With the modular product concept a single DEWETRON solution is able to precisely capture electrical parameters, mechanical parameters, and environmental parameters absolutely synchronously, without any additional devices.

ELECTRICAL POWER GENERATION

In answer to the need for monitoring power parameters (such as active, reactive, apparent power, THD, ...) for maintenance and testing in power plants (generator, turbines, transformers,...), we provide modular and flexible solutions for long term monitoring and precise power analysis with the needed safety category (CAT IV 600V / CAT III 1000V).

The DEWETRON solution combines the functionality of a Power Analyzer and a data logger. The combination of electrical and mechanical values conjunct in one device allows you the synchronization of measured and calculated values.

CURRENT TRANSDUCERS

The integrated transducer power supply enables the engineer to relinquish an additional supply box and connect the transducers directly to the Power Analyzer. Sensors with ±15 V or +9 V are compatible.



	Direct input TRION-POWER			Zero-flux through hole						Clamps			Flexible	
DC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
AC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Diameter [mm]	-	-	-	26	26	30	30	38.2	70	20	20	50	85	210
Range [A_{RMS}]	0.2	1	20	60	200	400	700	1000	2000	200	500	1000	4200	42000
Accuracy area [%]	< 0.05			< 0.05						< 0.5			< 2.0	
Bandwidth [kHz]	300			800	1000	300	100	440	140	500	200	20	600	
Name	TRION-POWER-SUB-CUR-x			PA-IT-x				PA-IN-x		SE-CUR-CLAMP-x			SE-CUR-LFR-x	
Supply required	No			Yes, provided by DEWE2-PA7 and DEWE3-PA8										
Sub-module recommendation	-			SUB-CUR-02A			SUB-CUR-1A or SUB-dLV-1V with shunt adapter (for highest bandwidth)			SUB-dLV-5V for high bandwidth or SUB-dLV (clamp input for medium bandwidth		SUB-dLV (clamp input)	SUB-dLV-5V for high bandwidth or SUB-dLV (clamp input) for medium bandwidth	
Application	Accurate measurements low current, where current path can be openend.			Accurate measurements high current, where current path can be opened. Typically efficiency tests, R&D, ...						Measurements high current, where current path can not be opened. Typically e-mobility			High AC current measurements where current path can not be openend. Typ. steel industry, melting oven, ...	

SPECIFICATIONS

	DEWE2-PA7	DEWE3-PA8
Slots for TRION™/TRION3™ modules	7 TRION™	8 TRION™ / TRION3™
Number of power phases	Up to 12	Up to 16
Sampling rate	Up to 2 MS/s	Up to 10 MS/s
Signal input location	Front	Rear
High-speed channel expansion	Add TRIONet or OXYGEN-NET	
Low-speed channel expansion 100 Hz	CPAD3 via TRION-CAN	
Quasi-static channel expansion	EPAD2 or CPAD2 via TRION-CAN	
Data storage	1 TB Solid State Disk dedicated for data storage	
Optional data storage	1 TB hard disk dedicated for data storage 120 GB SSD for operating system and application software	(SSD-PCIe-1T-2T) Upgrade from 1 TB to 2 TB industrial grade, PCIe attached Solid State Disk
Gap free storing rate	Typ. 90 MB/s	Typ. 1 GB/s
Display	9" multi-touch wide-screen	11.6" multi-touch wide-screen, full HD
POWER SUPPLY		
Input voltage (max.)	90 to 264 V_{AC}	
Sensor power supply	Supply sockets for 8 current transducers (±15 V / +9 V)	
Integrated current transducer supply	Yes	Yes, with redundant supply
POWER BASIC FEATURES		
Voltage and current RMS/AVG/PP/PHI	Cycle-by-Cycle, total and fundamental	
Active/reactive/apparent power	Cycle-by-Cycle, total and fundamental	
Voltage and current unbalance	Cycle-by-Cycle, fundamental	
Energy	Total and fundamental / sum, positive and negative	
POWER ADVANCED FEATURES		
Voltage and current harmonics	Up to 1000th, 2 to 9 kHz and 8 to 150 kHz, 10/12 period, IEC61000-4-7, 3 grouping types	
Voltage fluctuations	120 V / 230 V 50 Hz / 60 Hz, IEC61000-4-15	
Flicker emission	IEC61400-21	
Mechanical power	Power, speed, torque, efficiency (with motor option)	
DIMENSIONS		
Dimensions (W x D x H) without handle/feet	441 x 427 x 177 mm (17.4 x 16.8 x 7 in.) (4 u plus 1 u for cooling in cabinet required)	441 x 435 x 222 mm (17.4 x 17.1 x 8.7 in.) (5 u)
Weight without modules	Typ. 13 kg (28.6 lb.)	Typ. 14 kg (30.9 lb.)

DEWETRON

DEWETRON GmbH, Headquarters
Parkring 4, 8074 Grambach, Austria
Phone: +43 316 3070
Fax: +43 316 3070 90
E-Mail: info@dewetron.com
Web: www.dewetron.com

ABOUT DEWETRON

DEWETRON is an Austrian manufacturer of precision Test & Measurement systems designed to help our customers make the world more predictable, efficient and safe. Our strengths lie in customized solutions that are immediately ready for use while also being quickly adaptable to the changing needs of the test environment and sophisticated technology of the Energy, Automotive, Transportation and Aerospace industries.
More than 30 years of experience and innovation have awarded DEWETRON the trust and respect of the global market.

There are more than 25,000 DEWETRON measurement systems and over 400,000 measurement channels in use in well-known companies worldwide. Choosing DEWETRON means, having a partner by your side who accompanies you every step of the way.
DEWETRON employs over 120 people in 25 countries and is part of the TKH Group, a global corporation, that specializes in the development and supply of innovative solutions worldwide. DEWETRON quality is certified in compliance with ISO9001, ISO14001 and ISO17025.