DEWETRON – WE SET STANDARDS

DEWETRON is the market-leading producer of universal test and measurement systems. DEWETRON’s great strengths are in supplying complete systems that are immediately ready for use while also being quickly customizable to the unique needs of the test environment.

DEWETRON was established in 1989 as a purveyor of PC components and measuring instruments. At that time the market for PC based measuring systems was just emerging and being identified as a promising segment with great potential for growth.

In response to the potential, DEWETRON expanded into producing its own measurement systems and measurement software. As the test and measurement market evolved so did DEWETRON. Introducing the concept of “modular logic”, the modular approach to test and measurement combines application specific systems with customer specific requirements to create a high level of quality in a short time. Customization was a part of DEWETRON’s philosophy long before it became an industry standard.

For 25 years DEWETRON has set new standards for test and measurement systems. Today, customers from more than 25 countries worldwide rely on our products for precision measurement recording and analysis. DEWETRON is certified in accordance with ISO 9001:2008 and ISO 14001:2009. Environmental and quality management is more than just a statutory obligation for us – it is an integral part of all our business processes. We continually strive to combine innovation and business success with strict quality standards and rigorous quality processes. It is for this reason that we are recognized as a reliable partner.

DEWETRON has more than 25 years of expertise in measurement engineering and technology. The PC-based systems are suitable for mobile use, modular in design and can therefore be extended as desired. DEWETRON systems are compatible with all common sensors available on the market. Together with our powerful measurement amplifiers, DEWETRON systems will guarantee you accurate, immediate results from your test series.
DEWETRON CUSTOMERS

There are more than 20,000 DEWETRON measuring systems and over 300,000 measuring channels in use in well known companies worldwide:

AIRBUS, AUDI, BOEING, BOMBARDIER, BRIDGESTONE, BMW, CONTINENTAL, DEUTSCHE BAHN, ELECTRO SUISSE, EADS, FERRARI, FIAT, FORD, FRAUNHOFER INSTITUTE, GOODYEAR, HARLEY DAVIDSON, HYUNDAI, HELICOPTER INSTITUTE CHINA, IVECO, JOHNSON & JOHNSON, KENNEDY SPACE CENTER, LUFTHANSA, MAGNA STEYR, MAN, MERCEDES BENZ, METRO MADRID, NEW YORK SUBWAY, NISSAN, NASA, NOKIA, OMV, PANASONIC, PIRELLI, PORSCHE, RENAULT, ROLLS ROYCE, SIEMENS, SHANGHAI GM, TOYOTA, UNIVERSITY OF VIENNA, US AIR FORCE EDWARDS FLIGHT TEST CENTER, US NAVY, VOLVO, VW, VOEST, YAMAHA AND MANY MORE.

PROJECT PLANNING AND CONSULTING

DEWETRON systems provide the complete technical solution to test and measurement projects and DEWETRON employees provide a wide range of project planning and data management expertise. As your project partner we are always available to answer questions related to initial project planning, post implementation data management and technical support whenever you need it.

QUALITY

Total Quality Management starts with an understanding of what is important to ensure the success of our customers. Our commitment to quality begins with defined technical specifications and continues through product development, delivery and on to the support and service of our products. DEWETRON is ISO 9001:2008 and ISO 1401:2009 certified. Environmental and Quality Management are more than compliance, they are an integral part of our operation. All DEWETRON products are tested at our Environmental Test Facility in Graz, Austria before being delivered.

WORLDWIDE SUPPORT

In the world of test and measurement, testing time is often short so there is no room for downtime. Knowing this, DEWETRON provides prompt, efficient technical support worldwide. With 150 employees working in over 25 countries technical and sales support is always available and has been for more than 25 years. Our support success is measured by over 20,000 DEWETRON systems and 300,000 measurement channels in continuous use in the worldwide Automotive, Aerospace, Energy & Power Analysis, and Transportation markets.

CALIBRATION

DEWETRON maintains two high tech calibration labs: one at the worldwide headquarters in Austria and the other one at the DEWETRON USA headquarters in Rhode Island. Both calibration labs employ the Fluke 5500 series calibrator and the Agilent 3458 multimeter. METCAL calibration software automates nearly every process for precision calibration. Additionally to the standard calibration, we offer accredited calibration according to EN ISO/IEC 17025.
DEWETRON is a leading global supplier in the field of power measurement. This position is largely shaped by five essential strengths which ensures our customers receive only state-of-the-art products.

**CUSTOMIZED**

We go the extra mile!
We provide solutions, which simply fit the bill.
Our manifold technologies and modular systems allow us to customize your measurement system to your requirements enabling you to maintain a competitive edge.

**MODULAR**

A DEWETRON measurement system is modular in design, which means that components are easily exchanged, customizing the system for additional measurements whenever and wherever necessary. Use one system and adapt it to many different tasks in your work environment. This kind of flexibility guarantees sustainability and investment security.

**COMPETENT**

Your challenge is our challenge!
DEWETRON is the preferred contact for measurement engineering in several industries. Our strength lies in customizing solutions with the unique DEWETRON technology. More than 25 years of experience, market knowledge as well as continuous research and development have led to the singular DEWETRON expertise.

**COMMITTED**

Partnership at eye level.
The perfect solution for customer’s sophisticated requirements requires a partnership in order to achieve a mutual understanding of technical specifications that ensures the success of our customers’ tests. Choosing DEWETRON means having a partner by your side who accompanies you every step of your way.

**APPROVED**

Our customers’ accomplishments are our best reference.
DEWETRON quality is certified in compliance with ISO9001/ISO14001. More than 25 years of experience, innovation and collaboration have awarded DEWETRON the trust and respect of the global market.
# TABLE OF CONTENTS

DEWETRON - We set standards ............................................ 2  
Our strengths for your success ............................................... 4  
Many tasks with one measurement technology .......................... 6  

**SOLUTION EXAMPLES** .................................................. 8  
Combustion analysis ............................................................. 9  
Advanced Driver Assistance Systems ................................... 13  
Functional safety testing ..................................................... 19  
Road load data ..................................................................... 23  
Ride and handling ............................................................... 27  
E-mobility ............................................................................... 31  

**ADDITIONAL HARDWARE** ............................................. 35  
Accessories ............................................................................ 35  
CPAD3/CPAD2/EPAD2 modules............................................ 36  
TRION™ modules .................................................................. 37  

**SOFTWARE** ................................................................. 38  
OXYGEN ................................................................................ 38  
Power Analysis .................................................................... 39  
LabView™ ........................................................................... 41  
Why DEWETRON? ................................................................ 42  
Solutions in other industries .................................................. 43
DEWETRON offers a flexible measurement system and in combination with the gyro system ADMA from GeneSys and the robot system from Stähle, tests with high precision are performed. Because of the hardware synchronization all relevant parameters are already calculated and displayed during the measurement.

**YOUR BENEFITS**

- Data from all vehicles is recorded fully synchronized
- All relevant parameters are calculated and displayed during the measurement
- Online check of the data quality
- Master manages the measurement and the configuration of the slave – so the driver can concentrate on his task
- Online data transfer of selected channels from slave to master
- Measurement data is redundantly stored on each measurement unit and can be transferred after the measurement

**USER EXCHANGEABLE MODULES**

All TRION™ amplifier modules can be changed within a few seconds. Modules with different sampling speeds and resolution can be used in one chassis. Use isolated and differential inputs at the same time.
ONE MEASUREMENT TECHNOLOGY

ANALOG INPUTS
Voltage, current, strain, acceleration, temperature, force, pressure, ...

VIDEO
Web cam, thermo cam, high-speed cam, ...

GPS
Basic positioning, relative positions to other objects, precise velocities, ...

DRIVING ROBOTS

MEASUREMENT STEERING WHEEL

BUS DATA
CAN-bus, FlexRay, ...

WHEEL PULSE
Wheel speed, force, ...

CCP/XCP
Data from ECUs
DEWETRON internal combustion analyzers are suitable for mobile applications, such as real-time drive testing and also for test-bed applications. The systems support time and angle based measurement, and also provide various interfaces for testbed automation and control.

**YOUR BENEFITS**

> In-vehicle and testbed application
> Direct pressure and angle sensor connection
> Engine calibration
> Cold start testing
> CAN input and output, various testbed links
> Time and angle based measurement
SYNCHRONOUS INPUT SIGNALS

Isolated charge amplifiers and bridge amplifiers with constant current supply features, are used for high-pressure sensors and for the absolute pressure sensors of inlet and exhaust. With the freedom to swap amplifiers as needed, almost any signal like torque, current, acceleration and temperature, etc. can be measured. Voltage inputs include the start of injection, end of injection and ignition, and any other additional signal captured in time or angle domains. The isolated voltage and current inputs can be used to calculate electrical power.

SOFTWARE

Software provides easy to use user interface with preconfigured analysis screens. All major parameters are calculated online and can be corrected and recalculated in the Analyze mode.

- MEP values
- Heat release, IS, ISO, SOC, EOC
- Min. max pressure and pos.
- Thermodynamic zero correction
- Various average possibilities of pressure (running, overall, ...)
- Knocking
- Statistical values
- CA noise

CA noise calculation is provided for time and angle based measurement. The open architecture allows the user to integrate an engine specific transfer filter.

- User definable calculations

In case additional results or special calculations, like custom volume, are required, the open architecture provides the possibility to adapt the configuration.

FILE EXPORT

Data can be exported into various file formats (txt, ifl, xls ...).
TESTBED INTERFACE

Testbed interface, via RS232 or TCP/IP is provided to link the analyzer to a testbed for automated measurements. An open AK-protocol, or native interfaces for AVL PUMA Open, and DT2 is supported. In addition, calculated results can be also transferred via CAN-out. Results can be recorded from mapping tools for immediate feedback.

CRANKANGLE CPU

Included Crankangle CPU, is able to handle of various crank marker disc signals which provide CDM- and TRIG-signals. If more angle resolution is required, the Crankangle CPU will do the interpolation up to 0.1 deg. Pickup sensors, for the native CDM signals, like 60-2, can be directly connected. The isolated input can handle voltages from 0.5 V up to 60 V. The Crankangle CPU will do gap filling and interpolation.

SUITABLE FOR COLD START

At cold start tests the combustion analyzer runs and records signals before the piston makes the first move, recording the complete start process for further investigation.
ADDITIONAL MEASUREMENTS AND ANALYSES

The system is not limited to CA measurement only. The hardware and software architecture provides for various other measurements such as recorder, FFT analyzer, scope, power measurement and long term measurement.

> Recorder
> FFT analyzer
> Order tracking
> Rotational and torsional vibration
> Transient recorder
> Electrical power (after frequency converter)

CONFIGURATION EXAMPLES

<table>
<thead>
<tr>
<th></th>
<th>DEWE-2600-CA2-PROF</th>
<th>DEWE-800-CA2-PROF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input channels</td>
<td>8, 16 (expandable to 32, 64)</td>
<td>8, 16 (expandable to 32, 64)</td>
</tr>
<tr>
<td>Optional low speed temperature and voltage inputs (5 Hz) voltage</td>
<td>64 (in groups of 8)</td>
<td>64 (in groups of 8)</td>
</tr>
<tr>
<td>Amplitude resolution</td>
<td>16 bit</td>
<td>16 bit</td>
</tr>
<tr>
<td>Sampling rate</td>
<td>1 MHz (optional up to 5 MHz)</td>
<td>1 MHz (optional up to 5 MHz)</td>
</tr>
<tr>
<td>Input range</td>
<td>±10 V</td>
<td>±10 V</td>
</tr>
<tr>
<td>Charge inputs</td>
<td>Variable 1 to 16 depending on amplifier configuration (DAQP-CHARGE-B)</td>
<td>Variable 1 to 16 depending on amplifier configuration (DAQP-CHARGE-B)</td>
</tr>
<tr>
<td>Charge input range</td>
<td>10 to 10000 pC</td>
<td>10 to 10000 pC</td>
</tr>
<tr>
<td>Drift compensation</td>
<td>AC coupling</td>
<td>AC coupling</td>
</tr>
<tr>
<td>CAN input</td>
<td>Input and output up to 1 Mb/s</td>
<td>Input and output up to 1 Mb/s</td>
</tr>
<tr>
<td>FlexRay and XCP</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Storage memory</td>
<td>1 TB</td>
<td>1 TB</td>
</tr>
<tr>
<td>Digital input channels</td>
<td>8 if digital out is used, 16 TTL</td>
<td>-</td>
</tr>
<tr>
<td>Digital outputs</td>
<td>8 TTL</td>
<td>8 TTL</td>
</tr>
<tr>
<td>Crank angle inputs</td>
<td>TTL based CDM and TRG (BNC)</td>
<td>TTL based CDM and TRG (BNC)</td>
</tr>
<tr>
<td></td>
<td>TTL based encoder (A, B, Z on multicore connector)</td>
<td>TTL based encoder (A, B, Z on multicore connector)</td>
</tr>
<tr>
<td></td>
<td>CA input for native pickup sensors like 60-2 (BNC)</td>
<td>CA input for native pickup sensors like 60-2 (BNC)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 to +50 °C</td>
<td>0 to +50 °C</td>
</tr>
<tr>
<td>Power supply</td>
<td>100 to 240 VAC input (50/60 Hz) 120 W max.</td>
<td>100 to 240 VAC input (50/60 Hz) 120 W max.</td>
</tr>
<tr>
<td></td>
<td>9 to 36 VDC, battery powered up to 2 h</td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>417 x 246 x 303 mm (16.4 x 9.6 x 11.9 in.)</td>
<td>437 x 443 x 181 mm (17.2 x 17.4 x 7.1 in.)</td>
</tr>
<tr>
<td>Weight without batteries</td>
<td>Typ. 14 kg (31 lb.)</td>
<td>Typ. 12 kg (26.4 lb.)</td>
</tr>
</tbody>
</table>

Please find current specifications in the latest price list
DEWETRON provides the ideal solution for developing and benchmarking ADAS (Advanced Driver Assistance Systems).

All data between one or more vehicles stays fully synchronized, can be used in online calculations and visualized in a live, 3D display. Based on precision measurement of position and movement with GPS based IMUs (Inertial Measurement Units), this system features position accuracy down to the centimeter range.

**YOUR BENEFITS**

- All ADAS tests can be done using the same hardware
- Perfect synchronization of all signal sources from two or more cars or moving objects
- Easy mounting, setup, alignment and calibration
- Online data transfer to master system
- Highly accurate, combined GPS & Gyro data
- Reproducible tests
- Online calculation of relative distance, speed, acceleration, etc.
GPS POSITION AND VELOCITIES

RELATIVE POSITION TO OTHER OBJECTS

ROLL, PITCH, YAW

DRIVING ROBOTS

ACOUSTIC SIGNALS

LIGHT BARRIER

MEASUREMENT STEERING WHEEL

CAN/FLEXRAY BUS DATA

CCP/XCP DATA FROM ECU

VIDEO DATA

WHEEL PULSE SENSOR

WHEEL VECTOR SENSOR

WHEEL FORCE SENSOR

TIRE TEMPERATURE

BRAKE PRESSURE

ACCELERATION

TEMPERATURE

STRAIN GAGES

ADVANTAGES

WITH DEWETRON’S ADAS TEST SYSTEMS

> Online calculation of relative distance and velocity to multiple objects like lines, curves, cones and vehicles
> Data from all vehicles is recorded fully synchronized
> Online check of the data quality
> Master manages the measurement and the configuration of the slave – so the driver can concentrate on his task
> Online data transfer of selected channels from slave to master
> Measurement data is redundantly stored on each measurement unit and can be transferred after the measurement
**ADAS CONFIGURATION**

The master unit collects all synchronized data from the master vehicle and the slave unit via WLAN.

The measurement systems are synchronized and send the data to the master measurement unit.

**GYRO DATA**

The ADAS system uses the GeneSys inertial measurement system ADMA (Automotive Dynamic Motion Analyzer) for six degree of freedom motion analysis in combination with high performance GPS position measurement. This combination avoids the drawbacks of each system – the drift of the gyro platform and outages and jumps in GPS position. Kalman filters are used for optimizing the measured result.

**2 CM POSITION ACCURACY WITH RTK (REAL TIME KINEMATICS)**

This technology improves the position accuracy. With the known position of the base receiver, errors in the GPS signal transmission can be calculated. The data from the DGPS corrections are transmitted via WLAN to a mobile GPS receiver for an online correction of the position data.

- Elimination of GPS outages
- Suppression of jumps in GPS position
- Residual accuracy is better than Inertial Measurement Unit or GPS accuracy on its own
- Position data with high dynamic and bandwidth
- Highly accurate motion states of a vehicle with low setup time
- All motion states in body-fixed, levelled and NED coordinates
- All motion states in 3D (t, a, v, p, dφ/dt, φ) via CAN or RS-232 or Ethernet
**HIGH ACCURACY**

ADAS requires precision accuracy of the measured parameters. This is achieved using the latest technology of data acquisition, inertial measurement, GPS technology and test methodology.

**SYNC-CLOCK™ TECHNOLOGY**

To achieve the required accuracy, we implemented a high precision system clock. All data channels, analog and digital signals, CAN information or video are synchronized.

**ADAS APPLICATIONS**

All ADAS tests can be conducted using the same hardware. DEWETRON offers a flexible measurement system which in combination with the gyro system ADMA from GeneSys and the robot system from Stähle, performs high precision tests. With the hardware synchronization all relevant parameters are already calculated and displayed during the measurement.
ADAPTIVE CRUISE CONTROL (ACC)

One of the challenges when testing the longitudinal control system is synchronized timing because ACC is measuring the relative position and velocity between two or more vehicles. The most important feature for capturing high-quality measurement data is the perfect synchronization of all signal sources.

MEASUREMENT SIGNALS

> Relative distance between the vehicles
> Absolute and relative velocity
> Longitudinal acceleration
> Longitudinal deceleration
> Moment of acoustic, optic and/or haptic warning
> Lateral deviation

FORWARD COLLISION WARNING (FCW)

The primary purpose of FCW tests is to measure the time between when the driver is warned of an imminent crash, and the acoustic/haptic warning.

Before being approved for the US market, vehicle manufacturers who offer FCW must test their system in compliance with the FCW Confirmation Test defined by the National Highway Traffic Safety Administration. The DEWETRON systems for FCW tests are fully compliant to the NHTSA requirements and specifications.

MEASUREMENT SIGNALS

> Position/trajectory of both vehicles
> Speed of both vehicles
> Yaw-rate of both vehicles
> Deceleration of POVs
> Acoustic/Optical warning signal
> Request of warning signal

AUTONOMOUS EMERGENCY BRAKE (AEB)

AEB tests, especially the Euro NCAP test, require measurements relative to a virtual vehicle target (balloon car) that does not carry measurement equipment due to the possibility of high impact collisions.

Therefore, the software must accurately calculate the position of the vehicle target.

Driving robotics are needed to control the longitudinal and lateral movement of the vehicles during testing. DEWETRON’s capability of synchronously acquiring input signals from all sources is essential for the accuracy and the comparability of the data.

COMPLETE MEASUREMENT SOLUTION

DEWETRON teamed up with other experts in the automotive testing industry to provide a complete measurement solution for AEB tests:

> GeneSys Elektronik G.m.b.H., specialist in gyroscopic and GPS based sensors
> Stähle G.m.b.H, manufacturer of high-end robotic systems
> Technical University of Dresden/Germany, faculty of transportation science & technology as experienced insider in vehicle testing

LANE SUPPORT

For tests of lateral control systems such as lane departure warning or lane keeping assistant (LDW/LKA), the measurement system calculates the relative position, angle and velocity between the vehicle and stationary objects, such as lines, curbs or traffic signs. The acquisition of synchronized video data is important for such tests.

MEASUREMENT SIGNALS

> Distance to side, middle line or road edge
> Steering angle, moment and velocity
> Lateral acceleration
> Yaw rate
> Moment of acoustic, optic and/or haptic warning
> Driver view (video)
### CONFIGURATION EXAMPLES

<table>
<thead>
<tr>
<th></th>
<th>DEWE2-M4 (with ADAS configuration)</th>
<th>DEWE2-M13s (with ADAS configuration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input channels</td>
<td>2 free slots for TRION™ series modules</td>
<td>11 free slots for TRION™ series modules</td>
</tr>
<tr>
<td>Digital channels</td>
<td>8 DIO and 2 CTR or 8 DI</td>
<td></td>
</tr>
<tr>
<td>Channel expansion</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>CAN interfaces</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Video</td>
<td></td>
<td>DEWE-CAM-GIGE-120 or USB</td>
</tr>
<tr>
<td>Display</td>
<td></td>
<td>External MOB-DISP-x</td>
</tr>
<tr>
<td>Power supply</td>
<td>11 to 32 VDC, rated (max. 10 to 36 VDC) isolated; external AC power supply adapter included</td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>317 x 252 x 108 mm 12.5 x 9.9 x 4.3 in.</td>
<td>441 x 230 x 177 mm 17.4 x 9.1 x 7 in.</td>
</tr>
<tr>
<td>Weight</td>
<td>Typ. 3.9 kg (8.6 lb)</td>
<td>Typ. 13 kg (28.6 lb.)</td>
</tr>
<tr>
<td>Additionally required sensor</td>
<td>GeneSys ADMA INS/Gyro system</td>
<td></td>
</tr>
</tbody>
</table>

TRION™ series modules are available for almost all kinds of sensors.

### SENSORS & ACCESSORIES

- Seat mounting kit from Stähle
- ADMA-G-PRO+
- DEWE-CAM-GIGE-120
The international standard ISO 26262 addresses such questions by defining requirements, processes and methods to mitigate the effects of systematic faults and random hardware faults in the automotive field. Together with the leading European car manufacturers DEWETRON has developed a unique measurement system that tests active safety systems.

What happens in the case of a malfunction of a safety relevant system such as ESP or active steering?

**YOUR BENEFITS**

- Quick system installation and setup
- CAN, FlexRay and XCP support
- Ready-to-print report generator
**TEST PROCEDURE**

Any functional safety test consists of two phases: constant phase (pre-trigger) and dynamic phase (post-trigger). The simulation of a sensor error triggers the measurement and separates the pre-trigger phase (constant phase) from the post-trigger phase (dynamic phase).

In the constant phase, the vehicle is driving in a steady state under constant conditions (e.g., constant speed, lateral acceleration, curve radius) in order to get reproducible test results.

01 CONFIGURATION PHASE  
02 ARM MEASUREMENT  
03 CONSTANT PHASE  
04 TRIGGER  
05 DYNAMIC PHASE  
06 STOP STORING  
07 ANALYZE PHASE

**HIGH-PRECISION SENSORS**

Functional safety measurements for active-safety systems are based on precise measurement of rotation, acceleration, and position in all three axes. DEWETRON therefore relies on one of the best motion sensors on the market: the GeneSys ADMA.

The GeneSys ADMA is a 6 DOF motion sensor which combines rotational data (from high-accuracy fiber-optic gyros), acceleration data (from servo-type accelerometers) and position data (from a RTK-enabled GPS receiver) in one compact unit and combines the raw sensor data in a fast Kalman-filter to achieve the best possible accuracy.

**KEY FEATURES**

> Rotation (drift < 1°/h)  
> Acceleration accuracy of 1mg  
> Position down to 0,02m  
> L1/L2 GPS receiver capable of receiving RTK correction data from base station  
> Up to 1000 Hz output rate  
> Synchronization to DEWETRON measurement systems

**SYNCHRONOUS INPUT SIGNALS**

- GPS POSITION AND VELOCITIES  
- DISTANCE TO LINE/CURVE/TRAJECTORY  
- GYRO DATA  
- MEASUREMENT STEERING WHEEL  
- WHEEL SPEEDS  
- CAN/FLEXRAY BUS DATA  
- CCP/XCP DATA FROM ECU
Sensor Error Simulation

In most cases power to the measurement system and the sensors is supplied by the vehicle battery. This can be problematic however, because the power management of modern vehicles might suddenly cut the supply if a high-priority system (like active-safety systems) requires more battery power. The ECU unit might need a reset – turning the engine off and on again – after an error trigger or system malfunction, or you need a gas refill but don’t want to turn off the engine because the measurement should not be stopped.

These short power outages can be cumbersome if you need to get your test-cycles done within a limited time. To resolve these issues, the DEWE2 systems can be upgraded with an internal buffer battery to bridge supply outages of up to 10 minutes.

The scarcity of available energy in modern vehicles make it necessary to be independent from the vehicle power network. DEWETRON offers a fully battery powered solution with hot-swappable batteries for such applications.

**TOUGH & RELIABLE**

The industry-approved PXI standard and the new internal construction of the DEWE2 series makes them our most rugged measurement system so far. Tested for shock up to 30g and vibration up to 20 m/s² as well as an operating temperature range of -20°C to +50°C (-4°F to +122°F) the DEWE2 systems are constructed for testing under harsh conditions.

**XCP/CCP AND FLEXRAY SUPPORT**

The DEWE2 systems also support the XCP protocol which allows you to record the ECU internal status during your tests and measurements. The upcoming FlexRay bus is supported.

**INTERNAL BUFFER BATTERY & INDEPENDENT POWER SUPPLY**

In most cases power to the measurement system and the sensors is supplied by the vehicle battery. This can be problematic however, because the power management of modern vehicles might suddenly cut the supply if a high-priority system (like active-safety systems) requires more battery power. The ECU unit might need a reset – turning the engine off and on again – after an error trigger or system malfunction, or you need a gas refill but don’t want to turn off the engine because the measurement should not be stopped.

These short power outages can be cumbersome if you need to get your test-cycles done within a limited time. To resolve these issues, the DEWE2 systems can be upgraded with an internal buffer battery to bridge supply outages of up to 10 minutes.

The scarcity of available energy in modern vehicles make it necessary to be independent from the vehicle power network. DEWETRON offers a fully battery powered solution with hot-swappable batteries for such applications.
## Configuration Examples

<table>
<thead>
<tr>
<th>Feature</th>
<th>DEWE2-M4-FS (with Functional Safety configuration)</th>
<th>DEWE2-A4-FS (with Functional Safety configuration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input channels</td>
<td>2 free slots for TRION™ series modules</td>
<td></td>
</tr>
<tr>
<td>Digital channels</td>
<td>8 DIO and 2 CTR or 8 DI</td>
<td></td>
</tr>
<tr>
<td>Channel expansion</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>CAN interfaces</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Video</td>
<td>DEWE-CAM-GIGE-120 or USB</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>External MOB-DISP-x</td>
<td>Internal 13&quot; display</td>
</tr>
<tr>
<td>Power supply</td>
<td>11 to 32 V&lt;sub&gt;c&lt;/sub&gt; rated (max. 10 to 36 V&lt;sub&gt;c&lt;/sub&gt;) isolated; external AC power supply adapter included</td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>318 x 253 x 108 mm (12.5 x 10 x 4.3 in.)</td>
<td>318 x 253 x 128 mm (12.5 x 10 x 5 in.)</td>
</tr>
<tr>
<td>Weight</td>
<td>Typ. 3.9 kg (8.6 lb)</td>
<td>Typ. 5.9 kg (13 lb.)</td>
</tr>
<tr>
<td>Additionally required sensor</td>
<td>GeneSys ADMA INS/Gyro system</td>
<td></td>
</tr>
</tbody>
</table>

TRION™ and MDAQ series modules are available for almost all kinds of sensors

## Sensors & Accessories

- **MOB-DISP-12**
  - External display

- **ADMA-MOUNT-KIT**

- **DE-POWERBOX-11**
  - Power distribution box
The DEWETRON RLD system is used for durability measurements during real test drives or on testbeds – for a whole vehicle or specific components.

The measured data can be exported for replay on a testbed to simulate all forces and vibrations in the laboratory. As an option, DEWETRON RLD systems can be equipped with a real-time analog output for testbed integration.

**YOUR BENEFITS**

- High channel count (16 to 1000 channels)
- 24 bit aliasing free sampling
- Multiple inputs (voltage, acceleration, strain, etc.)
- Support for Kistler RoaDyn® measurement wheels
- Export to different file formats (supports RPC III)
- Battery powered, portable system for in-vehicle use
- Real-time analog output (ORION only)
DEWETRON systems offer a rugged and portable design for in-vehicle use and fulfill the requirement for high channel counts. The devices cover a wide range of input types such as voltage, strain, temperature, counters, GPS, Video, CAN and OBD II.

For testbed simulation the acquired data is exported to an RPC III file format.

### Dual Use

**Real Time Analog Output for Test Rig Application**

Dual-use allows the DEWETRON RLD system to also be used on the testbed. The same road test environment is measured on the testbed. Additionally, the system provides real-time conditioned and filtered (typ. ±10 V) analog output signals from each input signal.

### Synchronous Input Signals

- **GPS Position and Velocities**
- **Accelerations and Rotational Rates**
- **Roll, Pitch, Yaw**
- **Temperatures**
- **Strain Gauges**
- **Pressure Sensors**
- **Wheel Vector Sensors**
- **Wheel Force Transducers**
- **Height Sensors**
- **Measurement Steering Wheel**
- **CAN/FlexRay Bus Data**
- **Video Data**

### The Primary Features

**For Road Load Data Measurement Systems Are:**

- Simultaneous and aliasing free recording
- High channel count
- Connectivity for a broad range of sensors - including a flexible power supply for sensors
- Sensor database, TEDS functionality
- Shunt calibration
- Amplifier and sensor balance
- Offline instrument setup
- Online overload detection and failure detection for e.g. damaged sensors
- Various trigger options
- Powerful online mathematics
- Fast and efficient data analysis
- Traceability of the measurement results
- Compact and rugged hardware design
- CAN .dbc import
- J1939 decoding
- RPC III export
REMOTE CONTROL

The NET option provides for the communication between different DEWETRON instruments. Each unit can be configured as stand alone, as master or as slave. It is also possible to use any PC to remotely control a measurement unit.

For road load data measurement the NET option is used to combine several instruments and to increase the total number of measurement channels.

OFFLINE SETUP

Using your office PC, you can standardize and simplify the set-up procedure of a DEWETRON measurement system. Together with the sensor database, the setup can be performed independent from the measurement hardware. This feature allows you to use a central setup database. A standard office PC using our software can export XML based file format with all this setup information. Simply loading this file on a DEWETRON measurement system adjusts all settings for this setup which is required for the measurement. The set-up time of the whole system can be significantly reduced and this also avoids user errors.

ANALYZE MODE: REPLAY, EXPORT, SHARE DATA

You can replay any captured data file, zoom in with the recorder graph cursors, make measurements, print in full color to any printer, and export the data to a wide variety of formats compatible with today’s popular analysis software packages, like FlexPro®, Matlab, Excel, DIAdem, UNV, Famos, Nsoft, Text and many more.

You can even export the whole measurement view to an AVI video file from your recorded data to create “moving documentation”.

NO LICENSE is needed to use the software in the ANALYZE mode, so you can install the software on all your computers, or even distribute it to your customers, so they can view to the results. In this way, all of your colleagues and customers can replay your data files and execute all of the functions that you can.

AMPLIFIER BALANCE

Amplifier balancing is integrated within the amplifier module – the input is shorted and the offset of the amplifier is checked automatically. This feature is a quick check of the amplifier and allows for the measurement of absolute output from a strain gage.

AMPLIFIER BALANCING - FOR ALL AMPLIFIERS AT A TIME:

- Automated amplifier balancing
- Check of the amplifier offset
- Quick overview of adjust value
- Absolute strain gage measurement

SENSOR BALANCE

Sensor balancing allows a quick zero adjustment of all sensors. In static conditions the offset of the amplifiers are adjusted, to compensate the offset of the strain gage.

SENSOR BALANCING - FOR ALL SENSORS AT A TIME:

- Automated sensor balancing
- Quick overview of adjust value
- Easy to detect fatigue of material

SHUNT CALIBRATION

Shunt calibration is a very useful feature to quick check the measurement chain of bridge amplifiers.

EXPORT FORMATS

The export dialog allows selecting different export files for:

- RPC III
- FlexPro
- ComTrade
- MS Excel
- WAV
- Diadem
- ATI
- Matlab
- SDF
- UNV
- CAN
- Famos
- AVI
- Nsoft
- Clipboard
- Text
- Google Earth
- And many more
## CONFIGURATION EXAMPLES

<table>
<thead>
<tr>
<th></th>
<th>DEWE2-M4</th>
<th>DEWE2-M13s</th>
<th>DEWE2-A13</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analog input channels</strong></td>
<td>2 free slots for TRION™ series modules</td>
<td>11 free slots for TRION™ series modules</td>
<td></td>
</tr>
<tr>
<td><strong>Digital channels</strong></td>
<td>8 DIo and 2 CTR or 8 DI</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Channel expansion</strong></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CAN interfaces</strong></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Video</strong></td>
<td>DEWE-CAM-GIGE-120 or USB</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>External MOB-DISP-x</td>
<td>17” (1920 x 1080)</td>
<td></td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>11 to 32 V&lt;sub&gt;dc&lt;/sub&gt; (max. 10 to 36 V&lt;sub&gt;dc&lt;/sub&gt;) isolated; incl. external AC power supply</td>
<td>100 to 240 V&lt;sub&gt;ac&lt;/sub&gt; (max. 90 to 264 V&lt;sub&gt;ac&lt;/sub&gt;)</td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions (W x D x H)</strong></td>
<td>318 x 253 x 108 mm 12.5 x 10 x 4.3 in.</td>
<td>441 x 230 x 177 mm 17.4 x 9.1 x 7 in.</td>
<td>450 x 246 x 303 mm 17.7 x 9.7 x 11.9 in.</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Typ. 3.8 kg (8.6 lb)</td>
<td>Typ. 13.0 kg (28.6 lb)</td>
<td>Typ. 15.0 kg (33 lb)</td>
</tr>
</tbody>
</table>

TRION™ series modules are available for almost all kinds of sensors.

---

### SENSORS & ACCESSORIES

- **DE-POWERBOX-11**  
  Power distribution box
- **TRION-VGPS**  
  with antenna
- **4 slots for hot-swapable batteries**  
  (option DW2-PS-BAT)
DEWETRON systems offer a rugged and portable design for in-vehicle use and fulfill the requirements of a high channel count for vehicle dynamics.

The system covers a wide range of input types such as voltage, strain, temperature and also for GPS, Video, CAN and OBD II. In addition to the application of Ride and Handling testing, the systems are engineered to be expanded with additional hardware and software features.

Your Benefits

> Synchronized multichannel data acquisition without phase errors
> Guaranteed compatibility with the whole system
> Compact & rugged equipment for in-vehicle use
> Multisensor inputs (voltage, acceleration, strain, etc.)
> Aliasing free sampling and flexible filtering capabilities
> Real-time mathematics
> Support for Kistler RoaDyn® measurement wheels
> Export to different file formats
RIDE AND HANDLING SENSOR INSTALLATION

Depending on the measurement goal, many different sensors are required for different tests. With a DEWETRON Ride and Handling system you can use all established sensors available on the market.

The following table shows recommended sensor equipment for each test and the physical parameters of the primary measurement systems. Synchronous and aliasing-free acquisition of the physical channels is guaranteed and all mathematical processing for additional channels can be done online.

<table>
<thead>
<tr>
<th>Test</th>
<th>Measurement Wheel</th>
<th>Wheel Vector Sensor</th>
<th>Measurement Steering Wheel</th>
<th>Height Level Sensor</th>
<th>Inertial Platform</th>
<th>GPS/GPS</th>
<th>Wheel Temperature</th>
<th>Brake Pressure</th>
<th>Brake Temperature</th>
<th>Synchronous Data Acquisition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake Test</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ISO LANCE CHANGE TEST (ISO 3888-1)</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>VDA-EVASION TEST (ISO 3888-2)</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>STATIONARY CIRCLE TEST (DIN ISO 4138)</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>BRAKING FROM STATIONARY CIRCLE TEST (ISO 7975)</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>LOAD CHANGE FROM STATIONARY CIRCLE (ISO 9816)</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>FISHHOOK TEST (NCAP)</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>VEHICLE TRANSFER FUNCTION</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>ROAD LOAD DATA</td>
<td>●</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

○ = optional  ● = standard
SENSOR DATABASE AND TEDS

A comprehensive list of sensors and all their parameters, including scaling, units and calibration date information is just a click away in the sensor database.

- Linear scaling and offset
- Non linear scaling
- Polynomial scaling
- Calibration table

If necessary, it’s possible to zero the sensor or even to renew the calibration parameters. This guarantees the reproducibility, traceability and quality of your measurement results.

To make the sensor setup even more automated, our signal conditioning modules support TEDS (Transducer Electronic Datasheet), which is the new ‘smart sensor interface’. It is a table of parameters [manufacturer ID, model number, serial number, version, and many more] that identifies the transducer.

RIDE AND HANDLING APPLICATION

Cars and trucks are designed on computers, and built by robots under computer control. But there is no substitute for testing the car with a human being, under a wide variety of road conditions and environments. That’s where ride handling tests start. Most vehicle manufacturers have their own test track or proving grounds, where they can put their prototypes to the test. What everyday people consider ‘subjective criteria’ like how a car ‘feels’ under certain conditions must be precisely quantified and then tested over and over again within an optimization loop, on every vehicle.

DEWETRON measurement systems support standardized tests, guaranteeing reproducible and comparable results which are important for a globalized comparison of test results. During the testing process, efficient setup time and simple system handling are key to efficient measurement. Our unique software and compact units with rugged construction make DEWETRON products popular for ride and handling, drivability, vehicle dynamics, and related applications.

TYPICAL TESTS FOR RIDE AND HANDLING

- Stationary circle test (DIN ISO 4138)
- ISO Lane Change Test (ISO 3888-1/2)
- Braking from stationary circle test (ISO 7975)
- VDA-evasion test according to ISO 3888-2
- Load change from stationary circle test according to ISO 9816
- Steering angle step and sinus test according to ISO 7401, 13674-1,-2 (with steering robot)
- Fishhook Test (NCAP)
- FMVSS-126 (Sine with Dwell)

MULTISENSOR INPUT

Each channel of a multisensor input supports different sensor types via MSI (Modular Smart Input) modules. These interfaces are automatically detected and configured by the software.

- Thermocouple
- PT100, PT1000, etc.
- Voltage
- Acceleration
### CONFIGURATION EXAMPLES

<table>
<thead>
<tr>
<th></th>
<th>DEWE2-M4</th>
<th>DEWE2-M7s</th>
<th>DEWE2-A13</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(with Ride and Handling configuration)</td>
<td>(with Ride and Handling configuration)</td>
<td>(with Ride and Handling configuration)</td>
</tr>
<tr>
<td>Analog input channels</td>
<td>2 free slots for opt. TRION™ series modules</td>
<td>5 free slots for opt. TRION™ series modules</td>
<td>11 free slots for opt. TRION™ series modules</td>
</tr>
<tr>
<td>Digital channels</td>
<td>8 DIo and 2 CTR or 8 DI</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Channel expansion</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>CAN interfaces</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Video</td>
<td></td>
<td>DEWE-CAM-GIGE-120 or USB</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td></td>
<td>External MOD-DISP-x</td>
<td>17&quot; (1920 x 1080)</td>
</tr>
<tr>
<td>Power supply</td>
<td>11 to 32 V&lt;sub&gt;dc&lt;/sub&gt; (max. 10 to 36 V&lt;sub&gt;dc&lt;/sub&gt;) isolated; incl. external AC power supply</td>
<td>100 to 240 V&lt;sub&gt;dc&lt;/sub&gt; (max. 90 to 264 V&lt;sub&gt;dc&lt;/sub&gt;)</td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>318 x 253 x 108 mm 12.5 x 10 x 4.3 in.</td>
<td>258 x 230 x 137 mm 10.2 x 9.1 x 7 in.</td>
<td>450 x 246 x 303 mm 17.7 x 9.7 x 11.9 in.</td>
</tr>
<tr>
<td>Weight</td>
<td>Typ. 3.8 kg (8.6 lb)</td>
<td>Typ. 4.9 kg (10.8 lb)</td>
<td>Typ. 15.0 kg (33 lb)</td>
</tr>
</tbody>
</table>

*TRION™ series modules are available for almost all kinds of sensors

---

### SENSORS & ACCESSORIES

- **CAM-SPLIT-BOX**
- **DEWE-POWERBOX-11**
  Power distribution box
- **ADMA-G-PRO+**
Battery powered vehicles are becoming more and more common on our roads and in our lives. DEWETRON is your competent partner to analyze, test and verify e-bikes, e-scooters and other electric vehicles during real drive tests.

YOUR BENEFITS

- Portable and flexible battery powered Power Analyzer
- Precision and synchronous calculation of several power groups
- Determination of efficiency and losses during real drive and charging
- Recording of dynamic processes
- Synchronous sampling up to 10 MS/s/ch
- High-speed isolated amplifiers
- Additional data: pressure, temperature, vibration, strain, CAN-bus data and GPS

E-MOBILITY
There is the need for high performance and accurate measurement solutions to determine the efficiency of electrical motors and to perform measurements and analysis according to national and international standards. DEWETRON’s Power Analyzers are multichannel solutions for your motor tests. 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 system is able to capture electrical parameters, mechanical parameters, and environmental parameters absolutely synchronously, and precisely without any additional devices.

Active power, reactive and apparent power, power factor, mechanical power, losses and efficiency, dynamical car parameters, speed, torque, rotation speed and many more.
RESULTS

> Online power calculation for two 3-phase power groups
> DC power calculation for battery power, air-conditioner and heater
> Efficiency calculation for drive train during real drive cycles
> Calculation of mechanical power
> Capture of distance, up and downhill drive
> Analysis of efficiency, PF and losses
> Analysis of temperature influence

OXYGEN WITH POWER OPTION

Our measurement software OXYGEN with Power option seamlessly integrates data being transmitted through multiple, totally synchronized signals into calculations for power analysis. A DEWETRON system with OXYGEN + Power option can do much more than any other power analyzer. One DEWETRON system is capable of both Multi Power Analysis and Mixed Signal Analysis. OXYGEN + Power option turns a DEWETRON system into a Mixed Signal Power Analyzer capable of analyzing system behavior, static and dynamic efficiency and losses on electric drives, engines, power converters and power electronics.

KEY FEATURES OF OXYGEN

> Simple power group creation by ticking the desired channels
> Several power groups with different frequencies and variable sync sources
> 1-7 phases for each power group
> Preview table in details setup
> Dedicated power instrument with overview table, vector scope and harmonics
> Total and fundamental values of voltage, current and power
> Fundamental frequency support from 0.2 Hz to 1500 Hz or DC
> Gapless calculation for reliable results
> Update rate down to 10 ms

POWER INSTRUMENTS

It’s a Multi Power Analyzer! You can simply “drag’n drop” power analyzer instruments to the screen and arrange them to your needs. The table tab provides an excellent overview of all important values, like frequency, true RMS, fundamental and total aggregated values. Additionally, the vector scope and harmonic tab complete the view of power analysis.
### CONFIGURATION EXAMPLES

<table>
<thead>
<tr>
<th>DEWE2-A4</th>
<th>DEWE-2500-PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input channels</td>
<td>2 free slots for TRION™ series modules</td>
</tr>
<tr>
<td>Digital channels</td>
<td>8 DIQ and 2 CTR or 8 DI</td>
</tr>
<tr>
<td>Channel expansion</td>
<td>Yes</td>
</tr>
<tr>
<td>CAN interfaces</td>
<td>4</td>
</tr>
<tr>
<td>Video</td>
<td>DEWE-CAM-GIGE-120 or USB</td>
</tr>
<tr>
<td>Display</td>
<td>13&quot; display (1280 x 800)</td>
</tr>
<tr>
<td>Power supply</td>
<td>11 to 32 VDC, rated (max. 10 to 36 VDC) isolated; external AC power supply adapter included</td>
</tr>
<tr>
<td>Optional 18 to 24 VDC (external AC power supply included)</td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>318 x 253 x 128 mm (12.5 x 10 x 5 in.)</td>
</tr>
<tr>
<td>Weight</td>
<td>Typ. 5.9 kg (13 lb.)</td>
</tr>
</tbody>
</table>

TRION™ and DAQP series modules are available for almost all kinds of sensors.

### SENSORS & ACCESSORIES

- **PNA-CLAMP-150-DC**
  - Current clamps
- **PM-CM-400**
  - Current transducers
- **BAT-CHARGER-4**
  - Desktop battery charger for 4 batteries
ACCESSORIES

CAMERAS
FireWire and Ethernet cameras; Split-box for supplying and connecting Ethernet cameras

MOBILE DISPLAY
External multi-touch display for mobile applications

CARRYING CASES
Carrying cases and transportation systems are available for all systems

POWER SUPPLY SOLUTIONS
Power supplies, battery and distribution boxes

CAR SEAT MOUNTING KITS
Car seat mounting kits for our mobile systems

CURRENT TRANSUDUCERS
Several solutions for current measurement from simple shunts to current clamps and high-precision zero flux transducers

SYNCHRONIZED TIME BASE GENERATOR
The DEWE-CLOCK is a synchronized time base generator (absolute time) capable of using either GPS or IRIG as time source

GPS SENSORS
GPS based speed and displacement sensor

ENCODER
Encoders for combustion analysis and torsional and rotational vibration applications
### CPAD3 MODULES

- 100 Hz sampling rate
- High isolation 1500 V
- ADC per channel

<table>
<thead>
<tr>
<th>MODULE</th>
<th>INPUT TYPE</th>
<th>INPUT RANGES</th>
<th>ISOLATION</th>
<th>SPECIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPAD3-TH8-x</td>
<td>Dedicated modules for type J, K, T</td>
<td>According thermocouple type</td>
<td>1500 Vdc (channel to channel and channel to BUS, power and chassis)</td>
<td>Overvoltage protection: 15 Vdc</td>
</tr>
<tr>
<td>CPAD3-V8</td>
<td>8 isolated voltage input channels</td>
<td>Physical input range: ±50 V</td>
<td>1500 Vdc (channel to channel and channel to BUS, power and chassis)</td>
<td>Overvoltage protection: 350 Vdc</td>
</tr>
</tbody>
</table>

### EPAD2/CPAD2 MODULES

- Extremely rugged and flexible mounting
- 24 bit A/D converter per channel, 12 Hz sampling rate
- Channel to channel/system isolation

<table>
<thead>
<tr>
<th>MODULE OVERVIEW</th>
<th>INPUT TYPE</th>
<th>INPUT RANGES</th>
<th>ISOLATION</th>
<th>SPECIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPAD2/CPAD2-TH8-x</td>
<td>Dedicated modules for type J, K, T</td>
<td>According thermocouple type</td>
<td>350 Vdc (channel to channel and channel to BUS, power and chassis)</td>
<td>Overvoltage protection: 15 Vdc</td>
</tr>
<tr>
<td>EPAD2/CPAD2-V8</td>
<td>8 isolated voltage input channels</td>
<td>Physical input range: ±50 V</td>
<td>350 Vdc (channel to channel and channel to BUS, power and chassis)</td>
<td>Overvoltage protection: 350 Vdc</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Software selectable: ±100 mV, ±500 mV, ±1 V, ±2.5 V, ±5 V, ±10 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPAD2/CPAD2-RTD8</td>
<td>8 isolated Resistance Temperature Detector channels</td>
<td>Resistor: 0 to 9999.99 Ω RTD: PT100(385), PT200 (385), PT500(385), PT1000 (385), PT2000(385), PT100 (3961)</td>
<td>350 Vdc (channel to channel and channel to BUS, power and chassis)</td>
<td>Overvoltage protection: 15 Vdc</td>
</tr>
<tr>
<td>EPAD2/CPAD2-LA8</td>
<td>8 isolated current inputs</td>
<td>0 to 20 mA, ±20 mA, ±30 mA</td>
<td>350 Vdc (channel to channel and channel to BUS, power and chassis)</td>
<td>Overcurrent protection: 70 mA cont.</td>
</tr>
<tr>
<td>EPAD2-USB</td>
<td>USB-interface module for EPAD2</td>
<td>n/a</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODULE</th>
<th>OUTPUT TYPE</th>
<th>OUTPUT RANGES</th>
<th>ISOLATION</th>
<th>SPECIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPAD2-AO4</td>
<td>4 voltage or current output channels</td>
<td>±10 V, ±5 V, 0 to 5 V, 0 to 10 V, 0 to 20 mA, 4 to 20 mA</td>
<td>350 Vdc (channel to BUS, power and chassis)</td>
<td>-</td>
</tr>
</tbody>
</table>
TRION™ MODULES

> User exchangeable modules for signal conditioning
> Simultaneous sampling for DEWE2 product series
> Separate ADC on each channel

### Analog Modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Channels</th>
<th>Sample Rate per Channel</th>
<th>Resolution</th>
<th>Isolation</th>
<th>Connector Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRION-2402-Multi</td>
<td>4 or 8</td>
<td>204.8 ks/s</td>
<td>24 bit</td>
<td>yes</td>
<td>Dsub, Lemo 0B</td>
</tr>
<tr>
<td>TRION-1620-ACC</td>
<td>6</td>
<td>2 MS/s</td>
<td>16 bit</td>
<td>yes</td>
<td>BNC</td>
</tr>
<tr>
<td>TRION-1620-LV</td>
<td>6</td>
<td>2 MS/s</td>
<td>16 bit</td>
<td>yes</td>
<td>BNC, Lemo 1B</td>
</tr>
<tr>
<td>TRION-2402-V</td>
<td>4 or 8</td>
<td>204.8 ks/s</td>
<td>24 bit</td>
<td>-</td>
<td>Safety banana sockets</td>
</tr>
<tr>
<td>TRION-1603-LV</td>
<td>6</td>
<td>250 ks/s</td>
<td>16 bit</td>
<td>yes</td>
<td>BNC, Lemo 1B</td>
</tr>
<tr>
<td>TRION-2402-dSTG</td>
<td>6 or 8</td>
<td>204.8 ks/s</td>
<td>24 bit</td>
<td>-</td>
<td>RJ-45, Dsub, Lemo 1B, Lemo 0B</td>
</tr>
<tr>
<td>TRION-2402-dACC</td>
<td>6 or 8</td>
<td>204.8 ks/s</td>
<td>24 bit</td>
<td>-</td>
<td>SMB, BNC</td>
</tr>
</tbody>
</table>

### Multi-Function Modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Channels</th>
<th>Sample Rate per Channel</th>
<th>Resolution</th>
<th>Isolation</th>
<th>Connector Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRION-1802-dLV</td>
<td>16 or 32</td>
<td>200 kS/s / 100 kS/s</td>
<td>18 bit</td>
<td>-</td>
<td>Dsub</td>
</tr>
<tr>
<td>TRION-1600-dLV</td>
<td>16 or 32</td>
<td>20 kS/s</td>
<td>16 bit</td>
<td>-</td>
<td>Dsub</td>
</tr>
</tbody>
</table>

### Digital Modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Channels</th>
<th>Sample Rate per Channel</th>
<th>Resolution</th>
<th>Isolation</th>
<th>Connector Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRION-CNT</td>
<td>6 to 18</td>
<td>800 kS/s</td>
<td>80 MHz</td>
<td>yes</td>
<td>DI, CNT</td>
</tr>
<tr>
<td>TRION-DI-48</td>
<td>48</td>
<td>2 MS/s</td>
<td>-</td>
<td>yes</td>
<td>DI</td>
</tr>
<tr>
<td>TRION-BASE</td>
<td>1 to 8</td>
<td>2 MS/s</td>
<td>80 MHz</td>
<td>-</td>
<td>DIO, CNT, SYNC, AUX</td>
</tr>
<tr>
<td>TRION-VGPS</td>
<td>1 GPS</td>
<td>0.01 km/h &lt; 10 cm</td>
<td>-</td>
<td>GPS antenna, IRIG In / Out, DIO, CNT, SYNC, AUX</td>
<td></td>
</tr>
<tr>
<td>TRION-TIMING</td>
<td>1 to 8</td>
<td>2 MS/s</td>
<td>-</td>
<td>GPS antenna, IRIG In / Out, DIO, CNT, SYNC, AUX</td>
<td></td>
</tr>
</tbody>
</table>

### Dedicated Modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Channels</th>
<th>Sample Rate per Channel</th>
<th>Resolution</th>
<th>Isolation</th>
<th>Connector Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRION-CAN</td>
<td>2 or 4</td>
<td>-</td>
<td>-</td>
<td>yes</td>
<td>Dsub</td>
</tr>
<tr>
<td>TRION-FLEXRAY</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Dsub</td>
</tr>
<tr>
<td>TRION-A429 / TRION-M1553 / TRION-MA4</td>
<td>4 to 30</td>
<td>1 to 4</td>
<td>-</td>
<td>-</td>
<td>SCSI-3</td>
</tr>
<tr>
<td>TRION-1628-AO-2</td>
<td>Update rate max. 2.8 MS/s</td>
<td>1 MS/s</td>
<td>16 bit</td>
<td>-</td>
<td>BNC</td>
</tr>
<tr>
<td>TRION-1820-POWER</td>
<td>8 (4 U / 4 I)</td>
<td>2 MS/s</td>
<td>≥ 18 bit</td>
<td>yes</td>
<td>Safety banana, Dsub</td>
</tr>
</tbody>
</table>

---

**ANALOG MODULES**

**DIGITAL MODULES**

**DEDICATED MODULES**
OXYGEN

DATA ACQUISITION & ANALYSIS SOFTWARE

Measure, store, view and analyze your measurement data with maximum efficiency. The 64-bit technology and unique multi-touch user interface will inspire you.

EFFICIENCY & PERFORMANCE

> Easy-to-use and intuitive
> Efficient workflow that minimizes the time between set-up and reporting
> High performance through 64-bit technology

MULTI-TOUCH & MOUSE

Get the best of two worlds: Efficient setup using the mouse and keyboard in the office or pure multi-touch operation in the field.

ANALYZE WHILE RECORDING

DejaView allows you to view and analyze all data from the start of the test, while data is still being recorded - an especially useful feature for long term testing.

Live View: Live data is still visible at the same time on a different recorder, on the same or on a different screen.

MULTIPLE MEASUREMENT SCREENS

Organize your instruments on multiple screens for a good overview and immediate analysis.

Look back in time and analyze with DejaView while data is still recorded and displayed in Live View.
LOGGING & RECORDING

Freely define your measurement screen(s), up to hundreds of channels. Keep track on all your data by using multiple measuring screens. Use trigger functions to immediately capture any anomaly in the data. Record any input over a long time:

- Voltage, current
- Temperature
- Pressure
- Acceleration
- Strain gauge
- And many more

VIEWING & ANALYZING

Multiple precision measurement systems and analysis functions increase the value of your measurements:

- Scope
- FFT
- Statistic functions
- Logic-, trigonometric functions
- E-Power calculation (efficiency measurement)
- XY chart
- And many more

ADVANCED APPLICATIONS

Use GPS/IRIG to synchronize your distributed measurement systems (e.g. in two different trains):

- IRIG/GPS
- DI/DO
- Counter
- Video (USB and GigE)
- CAN
- And many more

INDIVIDUAL REPORTING

There are plenty of options how to easily create your test reports. Stay within OXYGEN to print reports directly. Use your common office software tools (e.g. Excel) or export to common 3rd party analysis software, like MATLAB. Popular analysis platforms, like FlexPro and FAMOS, open OXYGEN files directly.
POWER ANALYSIS
WITH OXYGEN

POWER CALCULATION FEATURE OF SOFTWARE OXYGEN

OXYGEN with Power option seamlessly integrates data being transmitted through multiple, totally synchronized signals into calculations for power analysis.

MULTI POWER ANALYZER

OXYGEN with Power option turns your DEWETRON system into a MIXED SIGNAL POWER ANALYZER for the simultaneous calculation of several power groups with up to 7 phases. Power instruments can be easily arranged using drag & drop pre-defined schematics and state-of-the-art multi-touch technology. All important values for your analysis are clearly displayed and in the right form.

HARMONIC ANALYSIS

Harmonic analysis at its best! We include all relevant harmonic/interharmonic and higher frequency parts in one chart. OXYGEN with Power option makes it easy to keep the focus on what you are interested in. The simultaneous display of voltage and current makes it easy to analyze the behavior of electrical motors, drives and other electrical components.

TESTBED INTEGRATION

OXYGEN’s smart interface technology makes it easy to integrate a MIXED SIGNAL POWER ANALYZER into automation systems and test bed environments. Smart interface technology guarantees reliable data transmission, easy to use remote control/configuration by using TCP/IP based protocols in compliance with standardized (e.g. ASAM) protocols and file formats.

FEATURES OF POWER ANALYSIS SOFTWARE

> Simple power group creation
> Predefined schematics for 1 to 7 phase power groups
> Several power groups with different frequencies and variable sync sources
> Dedicated power instrument with overview table, vector scope and harmonics
> Calculation of flicker and flicker emission
> Total and fundamental values of voltage, current and power
> Fundamental frequency support from 0.2 Hz to 1500 Hz or DC
> Gapless calculation
> Update rate down to 10 ms
LABVIEW™ LIBRARY

FOR GRAPHICAL PROGRAMMING

LabVIEW™ is a visual programming platform that allows engineers and scientists the flexibility to build programs specific to unique data acquisition requirements and measurement systems. It offers unprecedented integration with existing legacy software, IP, and hardware while capitalizing on the latest computing technologies. LabVIEW™ provides tools to resolve the challenges of today and tomorrow. LabVIEW™ software is ideal for any measurement or control system. Integrating all the tools that engineers and scientists need to build a wide range of applications in dramatically less time. LabVIEW™ is a development environment for problem solving, accelerated productivity, and continuous innovation. Through the DEWETRON website, we offer a comprehensive LabVIEW™ driver library that supports all DEWETRON systems and components.

LINUX SUPPORT

DEWETRON TRION™ modules can run in a Linux environment (CentOS, Ubuntu and compatible distributions). Like all LabVIEW™ code, the DEWETRON LabVIEW™ libraries are platform independent and can be used with Linux as well.

SAMPLE VIRTUAL INSTRUMENTS

To expedite the development process you use the ready-to-use functions and example programs.

LOW LEVEL VIRTUAL INSTRUMENTS

Using low level VIs you can create your own project from scratch. Use VIs to access every single feature of the multifunction ADC board, including, but not limited to sample rate, input ranges, AI channels, digital I/O, counter, onboard RS-485 interface, and CAN bus interface.

DEWETRON CONNECTOR

The DEWETRON Connector is an abstraction layer for the DEWETRON hardware. Use the ready to use GUI for configuring all DEWETRON inputs and skip programming at the board level. Programming on the Connector level is as easy as calling functions like init, start, read, stop and quit. This saves valuable development time and minimizes the risk of programming errors.
WHY DEWETRON?

**SYNC-CLOCK™ TECHNOLOGY**

The quality of synchronized measurement is guaranteed by SYNC-CLOCK™ technology. With SYNC-CLOCK technology, analog, digital, GPS, counter, CAN-bus, ARINC and video as well as major sensor systems like Kistler RoaDyn® 2000 wheel or the GeneSys ADMA INS/GPS system are recorded synchronously during measurement.

**COUNTER**

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.

**HIGHEST PRECISION**

TRION™ series modules easily integrate with all similar products on the market.

**SCALABLE AND MODULAR**

Expand from a few channels to many and connect many systems without compromising the simultaneous data sampling of all channels.

**USER EXCHANGEABLE MODULES**

TRION™ amplifier modules can be changed in seconds. Modules with different sampling speed and resolution can be used in one chassis. Use isolated and differential inputs at the same time.

**GLOBAL SUPPORT**

Our engineers are in 25 countries around the world to support you with their knowledge and expertise. We offer maintenance, upgrades, ISO certified system calibrations and also customer training!
SOLUTIONS

YOUR MEASUREMENT APPLICATION ON OUR PRODUCTS

INDUSTRIAL
MIXED SIGNAL RECORDER, DYNAMIC SIGNAL ANALYZER, BALANCING, STROBE CAM, ORDER TRACKING, MODAL ANALYSIS, TORSIONAL & ROTATIONAL VIBRATION, TRANSIENT RECORDER, DISTRIBUTED SYSTEMS, AND MANY MORE

AUTOMOTIVE
COMBUSTION ANALYSIS, HYBRID TESTING, MEASURING BATTERIES, FUNCTIONAL SAFETY, ROAD LOAD DATA, BASIC BRAKE TEST, VEHICLE DYNAMICS, ADAPTIVE CRUISE CONTROL, TORSIONAL & ROTATIONAL VIBRATION, E-MOBILITY, RACE CAR, AND MANY MORE

AEROSPACE
FLIGHT TEST, ENGINE TEST, WIND TUNNEL TEST, MAINTENANCE, COMPONENT TEST, SYSTEM INTEGRATION LAB, NOISE AND VIBRATION, TACTICAL OR LAND VEHICLE, STRUCTURAL TEST, PCM TELEMETRY, MODAL TEST, AND MANY MORE

ENERGY & POWER ANALYSIS
POWER ANALYSIS, 3 TO 7-PHASE SYSTEMS, TEST BENCH, SOLAR INVERTERS, REAL DRIVE TEST, E-MOBILITY, FREQUENCY CONVERTER, POWER QUALITY ANALYSIS, MONITORING, GRID COMPATIBILITY, POWER CONVERTER TEST, AND MANY MORE

TRANSPORTATION
NOISE ORIGIN, CURRENT COLLECTOR TEST ON TRAINS, POWER SUPPLY OF RAILWAY SYSTEMS, BATTERY MEASUREMENT, TORSIONAL & ROTATIONAL VIBRATION, DISTRIBUTED MEASUREMENTS, MIXED SIGNAL RECORDING, AND MANY MORE
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 25 years of experience and innovation have awarded DEWETRON the trust and respect of the global market. There are more than 20,000 DEWETRON measurement systems and over 300,000 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 150 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 and ISO14001.