



Automotive
Energy & Power Analysis
Aerospace & Defense
Transportation
General Test & Measurement

DEWE-302x

Technical reference manual



Test & Measurement Solutions



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Thank you!

Thank you very much for your investment in DEWETRON's unique data acquisition systems. These are top-quality instruments which are designed to provide you years of reliable service. This guide has been prepared to help you get the most from your investment, starting from the day you take it out of the box, and extending for years into the future.

This guide includes important startup notes, as well as safety notes and information about keeping your DEWETRON system in good working condition over time.

We strongly suggest that you read this entire manual, especially the safety and care sections, as well as to avoid damaging your DEWETRON system.

What is the DEWE-302x?

This product is used for measuring of different physical and/or electrical sizes (depending on model or configuration). The connection is depending on model or configuration and takes place via safety banana plugs, BNC connectors ($\pm 50V$ max.), D-SUB connectors ($\pm 50V$ max.), thermocouple connectors ($\pm 50V$ max.), BINDER® connectors ($\pm 50V$ max.), SMB connectors ($\pm 50V$ max.), μ dot connectors ($\pm 50V$ max.), LEMO® connectors or RJ-45 connectors.

Preface

Notes

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Training

DEWETRON offers training at various offices around the world several times each year. DEWETRON headquarters in Austria have a very large and professional conference and seminar center, where training classes are conducted on a regular basis starting with sensors and signal conditioning, A/D technology and software operation. For more information about training services, please visit:
<http://www.dewetron.com/support/training>

Dewetron Inc. in the USA also has a dedicated training facility connected to its headquarters, located in Rhode Island. For more information about training services in the US, please visit:
<http://www.dewamerica.com/support/training>

Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your DEWETRON data acquisition system is delivered, it is calibrated at our DEWETRON headquarter. Each of this system is delivered with a certificate of compliance with our published specifications. Detailed calibration reports from our calibration system are available for purchase with each order. We retain them for at least one year, so calibration reports can be purchased for up to one year after your system was delivered.

Support

DEWETRON has a team of people ready to assist you if you have any questions or any technical difficulties regarding the system. For any support please contact your local distributor first or DEWETRON directly.

For Asia and Europe, please contact:

DEWETRON Ges.m.b.H.
Parkring 4
A-8074 Graz-Grambach
AUSTRIA
Tel.: +43 316 3070
Fax: +43 316 307090
Email: support@dewetron.com
Web: <http://www.dewetron.com>

The telephone hotline is available
Monday to Friday between
08:00 and 17:00 CET (GMT +1:00)

For the Americas, please contact:

DEWETRON, Inc.
10 High Street, Suite K
Wakefield, RI 02879
U.S.A.
Tel.: +1 401 284 3750
Toll-free: +1 877 431 5166
Fax: +1 401 284 3755
Email: support@dewamerica.com
Web: <http://www.dewamerica.com>

The telephone hotline is available
Monday to Friday between
08:00 and 17:00 GST (GMT -5:00)

Service/repairs

The Team of DEWETRON also performs any kinds of repairs to your system to assure a safe and proper operation in future. For information regarding service and repairs please contact your local distributor first or DEWETRON directly.

Notice

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Warranty Information

A copy of the specific warranty terms applicable to your DEWETRON product and replacement parts can be obtained from your local sales and service office.

Restricted Rights Legend

Use austrian law for duplication or disclosure.

DEWETRON GesmbH
Parkring 4
A-8074 Graz-Grambach / Austria

Printing History

Please refer to the page bottom for printing version.

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Safety instructions

Safety symbols in the manual



Indicates hazardous voltages.

WARNING *Calls attention to a procedure, practice, or condition that could cause bodily injury or death.*

CAUTION *Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.*

WARNINGS

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. DEWETRON Elektronische Messgeraete Ges.m.b.H. assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as option and will not be shipped as standard parts.



*For safety reasons max. 50 V may be applied to the BNC input-connectors!
Refer to the regulation of maximum allowable touch potential.*

Safety instructions

Your safety is our primary concern! Please be safe!

General safety and hazard warnings for all DEWETRON systems

- Use this system under the terms of the specifications only to avoid any possible danger.
- Maintenance will be executed by qualified staff only.
- During the use of the system, it might be possible to access another parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advices for using the system.
- With this product, only use the power cable delivered or defined for the host country.
- DO NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.
- The system is grounded via a protective conductor in the power supply cord. To avoid electric shocks, the protective conductor has to be connected with the ground of the power network. Before connecting the input or output connectors of the system, make sure that there is a proper grounding to guarantee potential free usage. For countries, in which there is no proper grounding, please refer to your local legally safety regulations for safety use.

DC systems: Every DC system has a grounding connected to the chassis (yellow/green safety banana plug).

- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please carefully read the corresponding specifications in the product manual.
- The inputs are not, unless otherwise noted (CATx identification), for connecting to the main circuit of category II, III and IV.
- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.
- DO NOT use the system if equipment covers or shields are removed.
- If you assume the system is damaged, get it examined by authorised personnel only.
- Any use in wet rooms, outdoors or in adverse environmental condition is not allowed!
Adverse environmental conditions are:
 - Moisture or high humidity
 - Dust, flammable gases, fumes or dissolver
 - Thunderstorm or thunderstorm conditions (except assembly PNA)
 - Electrostatic fields, et cetera.
- The measurement category can be adjusted depending on module configuration.
- Any direct voltage output is protected with a fuse against short cut and reverse-polarity, but is NOT galvanically isolated (except it is explicit marked on the system).
- The system must be connected and operated to an earthed wall socket at the AC mains power supply only (except for DC systems).
- Any other use than described above may damage your system and is attended with dangers like shortcut, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened (except for changing DAQ, DAQP, PAD modules).

Safety instructions

- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore, if
 - the system is damaged obviously or causes strange noises.
 - the system does not work anymore.
 - the system has been exposed to long storage in adverse environmental.
 - the system has been exposed to heavy shipment strain.
 - DO NOT touch any exposed connectors or components if they are live wired. The use of metal bare wires is not allowed. There is a risk of short cut and fire hazard!
 - Warranty void if damages caused by disregarding this manual. For consequential damages NO liability will be assumed!
 - Warranty void if damages to property or persons caused by improper use or disregarding the safety instructions.
 - Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE). Exception: changing modules like DAQ, DAQP or PAD.
 - The assembly of the system is equivalent to protection class I. For power supply, only the correct power socket of the public power supply must be used, except the system is DC powered.
 - Be careful with voltages >25 VAC or >35 VDC! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
 - The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not covered!
 - Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.
 - Prevent using metal bare wires! Risk of short cut and fire hazard!
 - DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy overvoltage). An advanced range of application under certain conditions is allowed with therefore designed products only. For details please refer to the specifications.
 - Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.
 - DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
 - Avoid operation in the immediate vicinity of:
 - high magnetic or electromagnetic fields
 - transmitting antennas or high-frequency generators
- For exact values please refer to enclosed specifications.
- Use measurement leads or measurement accessories aligned to the specification of the system only. Fire hazard in case of overload!
 - Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatise the system unpowered to room temperature.
 - Do not disassemble the system! There is a high risk of getting a perilous electric shock. Capacitors still might be charged, even the system has been removed from the power supply.
 - The electrical installations and equipments in industrial facilities must be observed by the security regulations and insurance institutions.

Safety instructions

- The use of the measuring system in schools and other training facilities must be observed by skilled personnel.
- The measuring systems are not designed for use at humans and animals.
- Please contact a professional if you have doubts about the method of operation, safety or the connection of the system.
- Please be careful with the product. Shocks, hits and dropping it from already lower level may damage your system. For exact values please refer to enclosed specifications.
- Please also consider the detailed technical reference manual as well as the security advices of the connected systems.

This product has left the factory in safety-related flawless and proper condition.

In order to maintain this condition and guarantee safety use, the user has to consider the security advices and warnings in this manual.

EN 61326-3-1:2008

IEC 61326-1 applies to this part of IEC 61326 but is limited to systems and equipment for industrial applications intended to perform safety functions as defined in IEC 61508 with SIL 1-3.

The electromagnetic environments encompassed by this product family standard are industrial, both indoor and outdoor, as described for industrial locations in IEC 61000-6-2 or defined in 3.7 of IEC 61326-1. Equipment and systems intended for use in other electromagnetic environments, for example, in the process industry or in environments with potentially explosive atmospheres, are excluded from the scope of this product family standard, IEC 61326-3-1.

Devices and systems according to IEC 61508 or IEC 61511 which are considered as “operationally well-tried”, are excluded from the scope of IEC 61326-3-1.

Fire-alarm and safety-alarm systems, intended for protection of buildings, are excluded from the scope of IEC 61326-3-1.

CAUTION

- ☐ The system BIOS is protected by password. Any change in the BIOS may cause a system crash. When the system is booting, do not press ESC-button on keyboard. This may clear the BIOS settings and cause system faults.
- ☐ Any change in the file structure as deleting or adding files or directories might cause a system crash.
- ☐ Before installing software updates contact DEWETRON or your local distributor. Use only software packages which are released by DEWETRON. Further informations are also available in the internet (<http://www.dewetron.com>).
- ☐ After power off the system wait at least 10 seconds before switching the system on again. Otherwise the system may not boot correct. This prolongs also the life of all system components.

Windows updates and antivirus/security software

Before installing Windows software updates consult with DEWETRON for compatibility guidance. Please also keep in mind that the use of any antivirus or other security software may slow down your system and may cause data loss.

Problematic network stacks

Often intrusive IT software or network processes can interfere with the primary function of the DEWETRON system: to record data. Therefore we recommend strongly against the installation of IT/MIS software and running their processes on any DEWETRON data acquisition system, and cannot guarantee the performance of our systems if they are so configured.



Environmental Considerations

Information about the environmental impact of the product.

Product End-of-Life Handling

Observe the following guidelines when recycling a DEWETRON system:



System and Components Recycling

Production of these components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at its end of life! Please recycle this product in an appropriate way to avoid an unnecessary pollution of the environment and to keep natural resources.

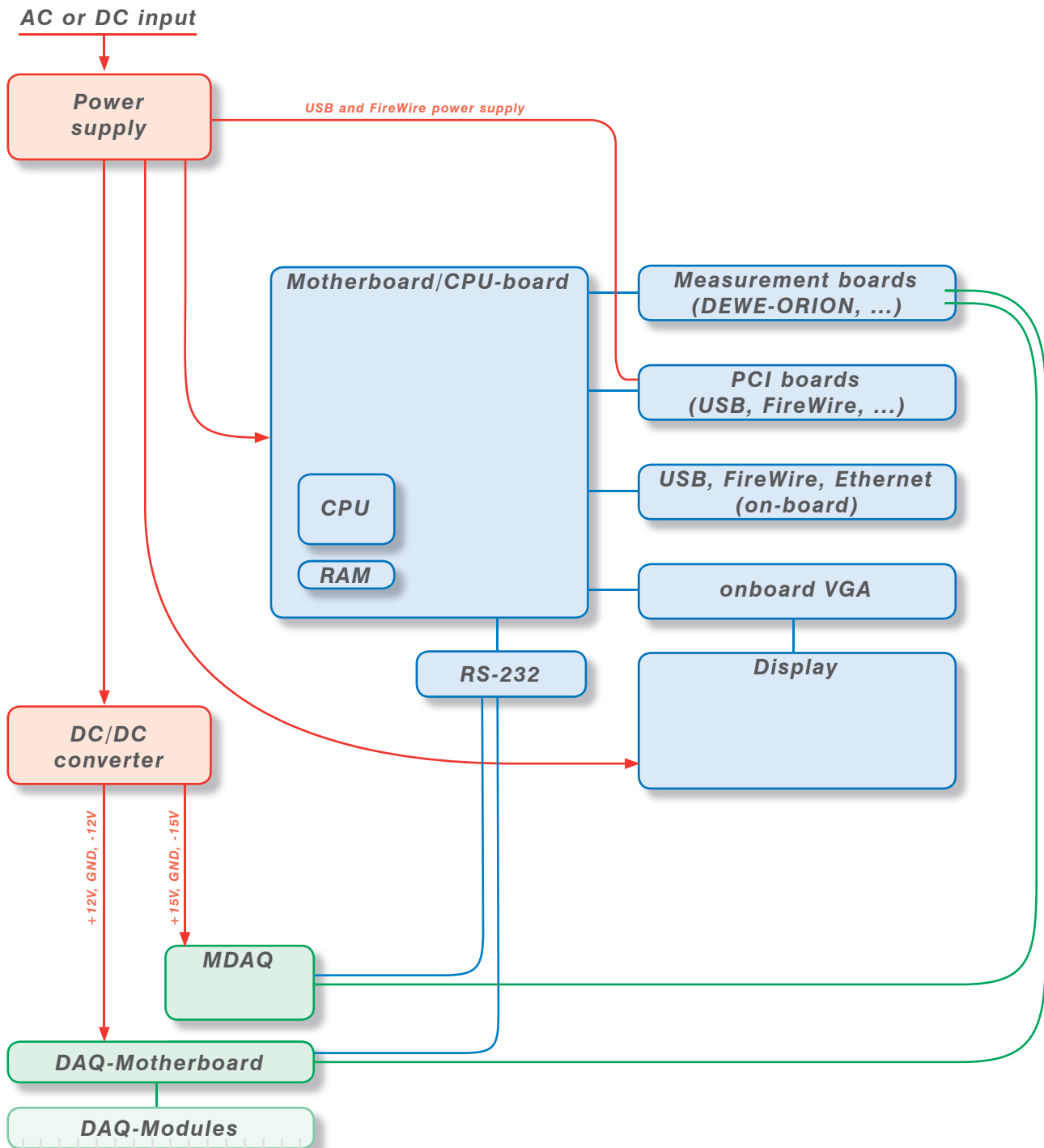
This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further informations about recycling on the DEWETRON web site www.dewetron.com

Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment, and is outside the scope of the 2002/95/EC RoHS Directive. This product is known to contain lead.

Signal processing

Blockdiagram of the internal signal processing



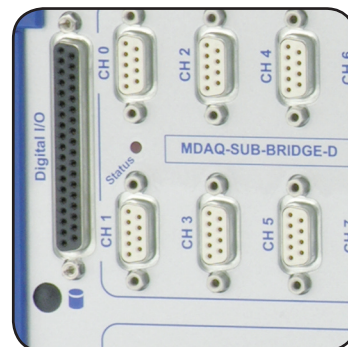
First steps

1



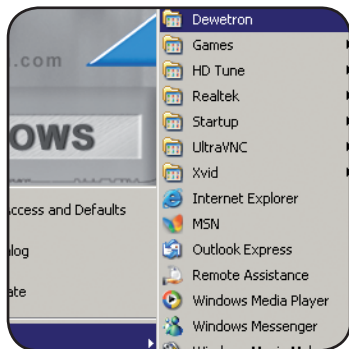
Power-on your system.

2



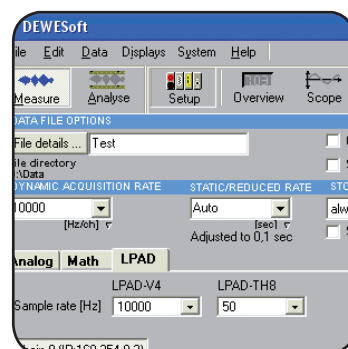
Connect your sensors to the system.

3



Run DEWESoft usually via "Start" > "Programs" > "Dewetron" > "DEWESoft x.x" > "DEWESoft x.x"

4



Start recording your data!

First steps

Notes

DEWE-302x series all-in-one instrument

- Portable data acquisition system
- 8 slots for DEWE DAQ/PAD modules (DEWE-3020)
- Up to 16 MDAQ channels (DEWE-3021)
- Up to 3 PCI Slots for A/D and other cards (1394, ARINC...)
- 15.4" TFT wide-screen display with touch-screen
- Fully battery powered (option)

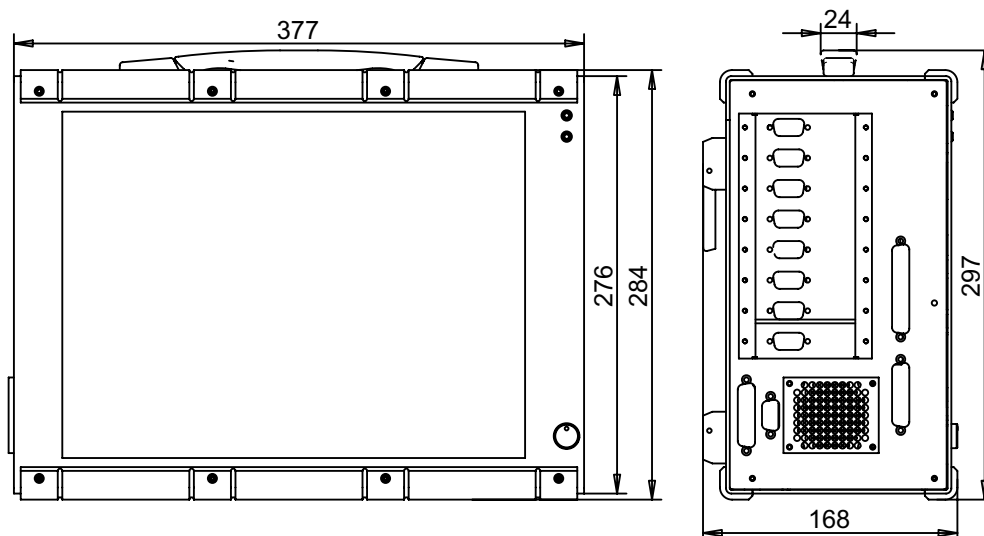


System specifications

DEWE-302x															
DEWE-3020 signal conditioning amplifiers:	8 slots for any DAQP/PAD modules														
DEWE-3021 signal conditioning amplifiers:															
	MDAQ-DIRECT	MDAQ-SUB-V-200	MDAQ-SUB-ACC-x	MDAQ-SUB-ACC-A-x	MDAQ-SUB-BRIDGE	MDAQ-SUB-STG		MDAQ-BASE-5	MDAQ-BASE-10	MDAQ-FILT-5-BU	MDAQ-FILT-5-BE	MDAQ-FILT-5-BU-S1	MDAQ-FILT-10	MDAQ-FILT-10-S1	MDAQ-AAF4-5-BU
Channel 0 to 7	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐
Channel 8 to 15		☐	☐	☐	☐	☐				☐	☐	☐		☐	☐
Standard power supply: option 3020-DC-UPS option 3020-PS-BAT	☐ 100 to 240 V _{AC} 300 W AC power supply (P1S-6300V-B2) ☐ 10 to 32 V _{DC} 160 W DC power supply (NET-202 + accu) ☐ 18 to 24 V _{DC} 320 W DC power supply (XP-04 with DC-123)														
Operating temperature:	0 °C to +50 °C														
Operating temperature with 3020-PS-BAT option:	0 °C to +50 °C when discharging batteries 0 °C to +45 °C when charging batteries														
Storage temperature:	-20 °C to +60°C														
Humidity (operating):	10 % to 80 %, non condensing 5 % to 95 %, rel. humidity														
Vibration test* EN 60068-2-6 (exceeds MIL-STD 810F 514.5 procedure I)	Shape Frequency range Acceleration Sweep rate Duration Test in 3 directions								Sine 10 - 150 Hz 2 g 1 oct./min. 20 Cycles						
Vibration test* EN 60721-3-2 Class 2M2	Shape Frequency range Power spectral density Duration								Random 10 - 200 Hz 1 m/s² / Hz from 10 – 200 Hz 30 Minutes per axis						
Shocktests* EN 60068-2-27 (Exceeds MIL-STD 810F 516.5 procedure I)	Shape Acceleration amplitude Duration Test in 3 axis, 3 shocks in each axis and direction								Half-sine 15 g 11 ms						
Dimensions: (W x D x H):	377 x 284 x 168 mm (14.8 x 11.2 x 6.6 in.)														
Weight:	typ. 9 kg (19.8 lbs), depending on configuration														
*) tested with SSD disc															

Main System

Dimensions*



* Dimensions in mm
(1 inch = 25.4 mm)

Main System

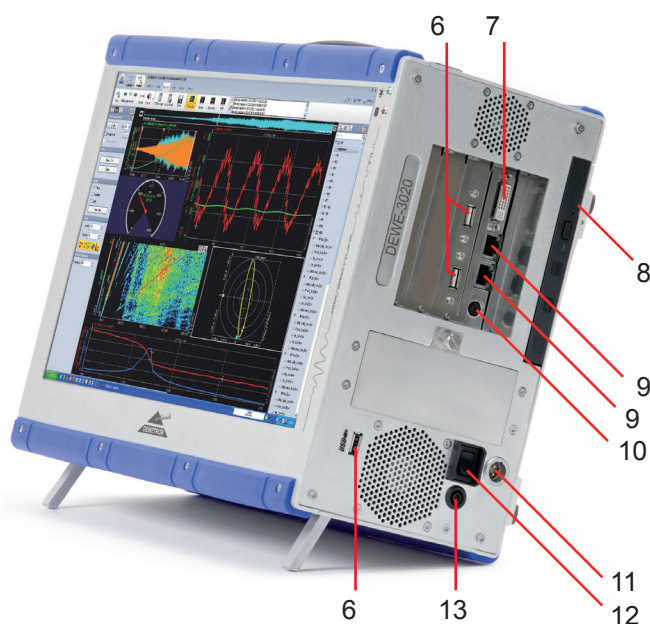
DEWE-302x at a glance

Typical DEWE-3020 front view



- 1 Built in 15.4 " touch TFT display
- 2 **Digital I/O connector**
- 3 **Expansion interface connector**
- 4 Optional RS-232 interface connector
- 5 **EPAD connector**
- 6 USB interface connector
- 7 DVI connector
- 8 DVD R/W drive
- 9 Ethernet LAN connector
- 10 PS/2 mouse / keyboard connector
- 11 **Power supply input connector**
- 12 Power-on switch
- 13 Ground connector

Typical DEWE-302x side view



Typical DEWE-3021 front view

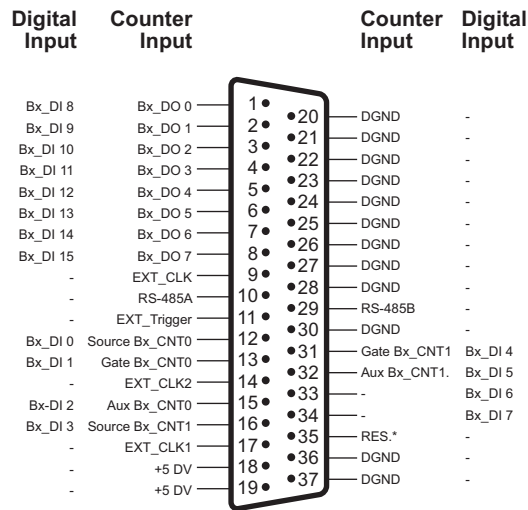


Note: The location of the connectors might vary from system to system and depends on configuration

Main System

2 Digital I/O connector

This connector supports digital input and output lines of the built-in DEWE-ORION series board. If this board does not support digital I/O's, the connector is not available.

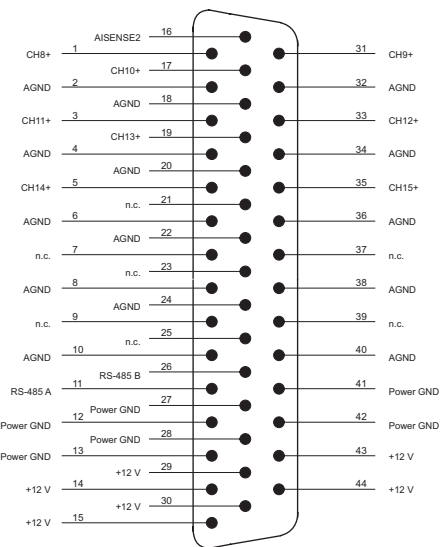


Note: Only available for standard systems using ORION-xxxx cards!

37-pin SUB-D connector

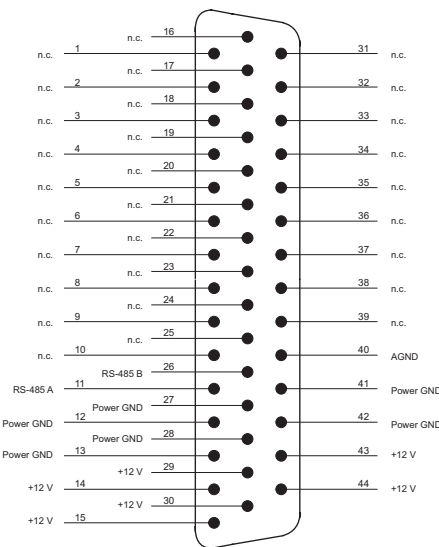
3 Expansion interface connector

These connectors support analog input channel 8 to 15 of the built-in A/D board (ORION-16xx series), power supply of the external 8 channel RACK (option DEWE-30-8-EXP) and a RS-485 communication port for all systems.



ORION card with 16 analog inputs (ORION-16xx-xxx)

44-pin female SUB-D connector

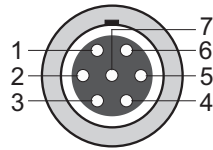


ORION card with 8 analog inputs (ORION-08xx-xxx)

44-pin female SUB-D connector

Optional counter inputs (in conjunction with DEWE-ORION-xxxx boards)

- 1: Source Bx_CNT(n)
- 2: Aux_Bx_CNT(n)
- 3: Gate Bx_CNT(n)
- 4: Power GND
- 5: +5 V (max. 500 mA)
- 6: +12 V (max. 500 mA)
- 7: Signal GND
- n .. channels 0 to 1 of counter board



7-pin female LEMO connector
EGG.1B.307

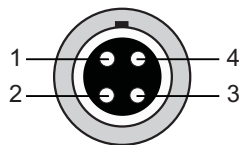
Mating connector:
LEMO FGG.1B.307.CLAD52Z
(for cable diameter 4.1 to 5.0 mm)
LEMO FGG.1B.307.CLAD62Z
(for cable diameter 5.1 to 6.0 mm)
Cable to open end, 5 m long:
CTR-CBL-05

4 Optional RS-232 interface connector (COM)

The RS-232 interface connector meets standard RS-232 pin assignment.

5 EPAD connector

To connect DEWETRON EPAD modules to the system.



Lemo EGG.1B.304

Pin assignment

- 1: RS-485 A
- 2: RS-485 B
- 3: +12 V
- 4: GND

Shield is connected on housing

Mating connector: LEMO FGG.1B.304.CLAD52Z (for cable diameter 4.1 to 5.0 mm)
LEMO FGG.1B.304.CLAD62Z (for cable diameter 5.1 to 6.0 mm)

6 USB interface connectors (Universal Serial Bus)

The USB interface connectors meets standard USB pin assignment.

7 DVI interface connectors

The DVI interface connectors meets standard DVI pin assignment.

9 Ethernet connector

The DEWE-302x system supports 10/100/1000 BaseT Ethernet with standard RJ45 connector.

10 PS/2 mouse / keyboard connector

The mouse / keyboard connector could be used to connect a keyboard or an external PS/2 mouse. The connector meets standard PS/2 pin assignment.

11 Power supply input connector

For details see chapter 'power supply'.

12 Power-on switch

The power-on switch has to be used to switch on the system.

13 Ground connector

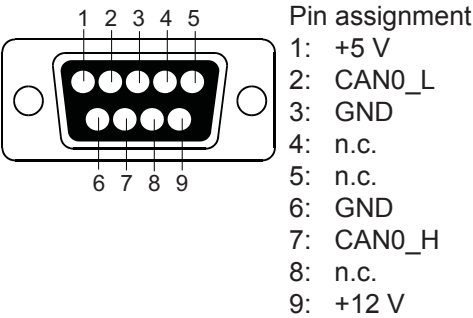
For some kind of measurements, it's necessary to give the system an additional ground connection.

Main System

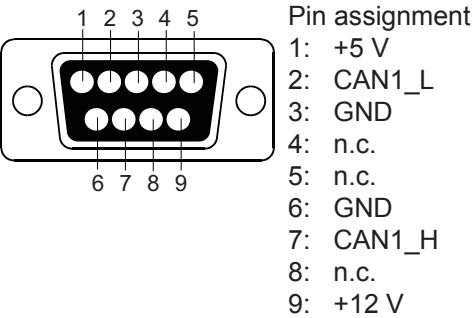
CAN connector (optional)

This connector supports the CAN signals of the built-in A/D board. If this board does not support CAN signals, the connector is not available.

CAN 0:



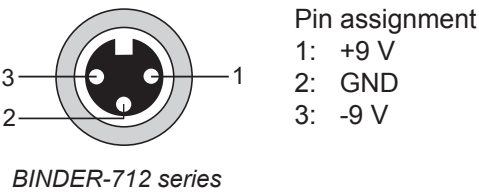
CAN 1:



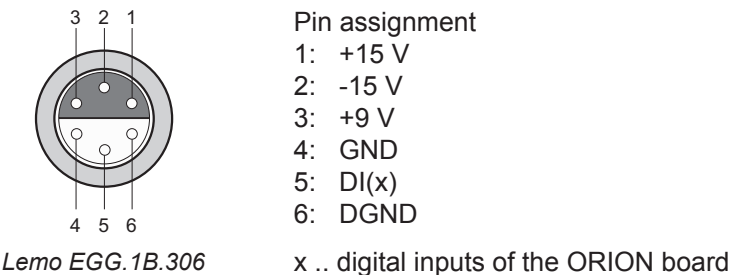
Optional connectors for current power probe supply

This option supports either a 3-pin BINDER series or a 6-pin male/female LEMO connector for connecting current clamps.

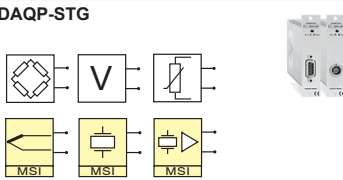
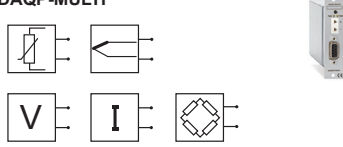
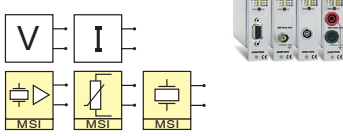
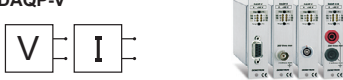
3-pin Binder series connector



or 6-pin male/female LEMO connector



DAQ series overview

Module		Input type	Ranges	TEDS	Bandwidth (BW), Filters (LP = lowpass, HP = highpass)	Isolation (ISO), Overvoltage protection (OP)
Universal measurement						
DAQP-STG 		Strain gauge, bridge sensors	± 0.1 to ± 1000 mV/V (@ 5 VDC _{exc})	✓	BW: 300 kHz LP: 10 Hz to 300 kHz	ISO: 350 V _{DC} OP: ± 50 V _{DC}
		Piezoresistive bridge	± 0.5 to 10000 mV/mA (@ 1 mA _{exc})			
		Voltage	± 500 μ V to ± 10 V			
		Resistance	25 m Ω to 100 k Ω			
		Pt100, Pt200, Pt500, Pt1000, Pt2000	-200° C to 850° C			
		IEPE® via MSI-BR-ACC	± 2.5 to ± 10000 mV			
		Thermocouple via MSI-BR-TH-x	full range of TC type			
		Charge via MSI-BR-CH-50	up to 50000 pC			
		Voltage via MSI-BR-V-200	up to ± 200 V			
DAQP-MULTI 		Thermoresistors	Pt100, Pt200, Pt500, Pt1000 and Pt2000, free programmable range	✓	BW: 3 kHz LP: 3, 10, 30, 100, 300, 1000 Hz	ISO: 1 kV _{RMS}
		Thermocouple	Type K, J, T, R, S, N, E, B, L, C, U free programmable range			
		Resistance	1 Ohm to 1 MOhm			
		Piezoresistive bridge	13 ranges (± 0.5 to 5000 mV/mA)			
		Voltage	10 ranges from ± 5 mV to ± 5 V			
		Current (with external shunt)	depending on external shunt			
High voltage measurement						
DAQP-HV 		High voltage	± 20 to ± 1400 V	-	BW: 300 kHz LP: 10 Hz to 300 kHz	ISO: 1.8 kV _{RMS}
DAQP-HV-S3 		High voltage	± 20 to ± 1400 V	-	BW: 700 kHz LP: 10 Hz to 700 kHz	ISO: 1.8 kV _{RMS}
DAQP-DMM 		High voltage	± 10 to ± 1000 V	-	BW: 20/30 kHz LP: 10 Hz to 30 kHz	ISO: 1.5 kV _{RMS}
Voltage & current measurement						
DAQP-LV 		Voltage	± 10 mV to ± 50 V	✓	BW: 300 kHz LP: 10 Hz to 300 kHz	ISO: up to 1 kV _{RMS} OP: 350 V _{DC}
		Current with external shunt	20 mA / 5 A			
		IEPE® via MSI-V-ACC	± 10 mV to 10 V			
		Pt100, Pt200, Pt500, Pt1000, Pt2000 and resistance via MSI-V-RTD	-200° C to 1000° C and 0 to 6.5 kOhm			
		Charge via MSI-V-CH-50	up to 50000 pC			
DAQP-V 		Voltage	10 mV to 50 V	-	BW: 50 kHz LP: 10 Hz to 50 kHz	ISO: up to 1 kV _{RMS} OP: ± 500 V _{DC}
		Current with external shunt	20 mA / 5 A			
DAQN-AIN 		Voltage	± 10 V (1:1 input)	-	-	OP: < ± 500 V (jumper selectable)

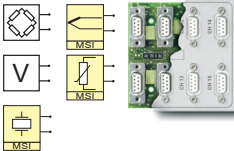
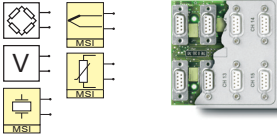
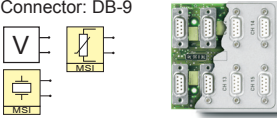
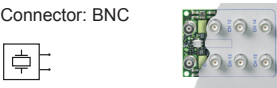
Main System

Module		Input type	Ranges	TEDS	Bandwidth (BW), Filters (LP = lowpass, HP = highpass)	Isolation (ISO), Overvoltage protection (OP)
Current measurement						
DAQP-LA-SC		Current <i>Note:</i> 5 A _{RMS} continuous	0.1 A to 30 A peak max. 5 A _{RMS} contin. current	-	BW: 300 kHz LP: 10 Hz to 300 kHz	ISO: 1.4 kV _{RMS}
DAQP-LA-B		Current <i>Note:</i> typ. 20 mA application	2 mA to 600 mA	-	BW: 300 kHz LP: 10 Hz to 300 kHz	ISO: 1.4 kV _{RMS}
Bridge / strain gauge and carrier frequency amplifier						
DAQP-CFB		AC bridge, strain gauge <i>Note:</i> 5 kHz sine wave excitation	Bridge: 0.1 to 1000 mV/V	-	BW: DC to 2.3 kHz LP: 10 Hz to 1 kHz	OP: ±10 V _{DC}
		Inductive sensors, LVDT	Inductive: 5 to 1000 mV/V			
DAQP-BRIDGE-A		Strain gauge, bridge sensors	±1 to ±50 mV/V (@ 5 VDC)	-	BW: 20 kHz LP: 10 Hz to 20 kHz	ISO: 350 V _{DC} OP: ±10 V _{DC}
		Potentiometric sensors	200 Ω to 10 kΩ			
DAQP-BRIDGE-B		Strain gauge, bridge sensors	±0.1 to ±100 mV/V (@ 5 VDC)	✓ ¹⁾	BW: 200 kHz LP: 10 Hz to 200 kHz	OP: ±10 V _{DC}
		Potentiometric sensors	200 Ω to 10 kΩ			
Charge / IEPE® measurement						
DAQP-ACC-A		IEPE® sensors	±50 mV to ±5 V	-	BW: 0.5 Hz to 300 kHz LP: 1 to 300 kHz HP: 0.5 Hz and 5 Hz	-
DAQP-CHARGE-A		Charge sensors IEPE® sensors <i>Note:</i> selectable integration and double integration	Charge: 5 to 50000 pC IEPE®: ±5 mV to 5 V	-	BW: 0.1 Hz to 50 kHz LP: 100 Hz to 50 kHz HP: 0.1 Hz to 10 Hz	-
DAQP-CHARGE-B		Charge sensors <i>Note:</i> selectable time constant for static sensors	±100 to ±1 000 000 pC	-	BW: DC to 100 kHz LP: 10 Hz to 100 kHz HP: DC, 0.001 Hz to 0.5 Hz	ISO: 350 V _{DC}
Temperature measurement						
DAQP-THERM		Thermocouple <i>Note:</i> internal CJC and linearisation	Type K, J, T, R, S, N, E, B, L, C and U selectable free programmable range	-	BW: 3 kHz LP: 3, 10, 30, 100, 300, 1000 Hz	ISO: 1 kV _{RMS}
Frequency measurement						
DAQP-FREQ-A		Frequency	100 Hz to 200 kHz	-	BW: according to range Output response: 1.5 ms 30 ms 500 ms	ISO: 350 V _{DC}
Voltage output module						
DAQN-V-OUT		Voltage output	1:1 output module with isolation Input voltage: ±10 V Output voltage: ±10 V	-	BW: 400 Hz	ISO: 240 V _{DC}

¹⁾ TEDS support for DAQP-BRIDGE-B revision 2 only

¹⁾ TEDS support for DAQP-BRIDGE-B revision 2 only

MDAQ series amplifiers overview

SUB Modules for MDAQ-BASE-x						
Module	# CH	Input type	Ranges	TEDS	Bandwidth (BW), Highpass filters (HP)	Excitation
MDAQ-SUB-STG-D Connector: DB-9 	8	Strain-gage (Full-, half and quarter-bridge, incl. shunt calibration) for strain gage application	14 ranges from ± 0.5 to 1000 mV/V (@ 5 V _{DC} excitation)	✓	BW: 30 kHz	0 to 12 V _{DC}
		Voltage up to ± 10 V	15 ranges from ± 2.5 mV to ± 10 V			
		ICP via MSI-BR-ACC	7 ranges from ± 0.25 mV to ± 10 V			
		Voltage up to 200 V via MSI-BR-V-200	6 ranges from ± 10 to ± 200 V			
		Thermocouple via MSI-BR-TH-x	full range of TC type			
		Pt100, Pt200, Pt500, Pt1000, Pt2000 and resistance via MSI-BR-RTD	-200 °C to 1000 °C and 0 to 6.5 kOhm			
MDAQ-SUB-BRIDGE-D Connector: DB-9 	8	Strain-gage (Full-, and half bridge) for strain gage sensors	14 ranges from ± 0.5 to 1000 mV/V (@ 5 V _{DC} excitation)	✓	BW: 30 kHz HP: 0.16 Hz	+15 V _{DC} and 0 to 12 V _{DC}
		Voltage up to ± 10 V	15 ranges from ± 2.5 mV to ± 10 V			
		ICP, via MSI-BR-ACC	7 ranges from ± 0.25 mV to ± 10 V			
		Voltage up to 200 V via MSI-BR-V-200	6 ranges from ± 10 to ± 200 V			
		Thermocouple via MSI-BR-TH-x	full range of TC type			
		Pt100, Pt200, Pt500, Pt1000, Pt2000 and resistance via MSI-BR-RTD	-200 °C to 1000 °C and 0 to 6.5 kOhm			
MDAQ-SUB-V-200-D Connector: DB-9 	8	Voltage up to ± 200 V	13 ranges from ± 0.125 to ± 200 V	✓	BW: 300 kHz	+15 V _{DC} and 0 to 12 V _{DC}
		ICP, via MSI-V-ACC	7 ranges from ± 0.25 mV to ± 10 V			
		Pt100, Pt200, Pt500, Pt1000, Pt2000 and resistance via MSI-V-RTD	-200 °C to 1000 °C and 0 to 6.5 kOhm			
		Note: for safety reasons, max. 120 V _{DC} or 50 V _{AC} are allowed at this connector				
MDAQ-SUB-V-200-BNC Connector: BNC 	8	Voltage up to ± 200 V	13 ranges from ± 0.125 to ± 200 V	-	BW: 300 kHz	-
		Note: for safety reasons, max. 120 V _{DC} or 50 V _{AC} are allowed at this connector				
MDAQ-SUB-ACC-BNC Connector: BNC 	8	ICP® or voltage up to ± 10 V	8 ranges from ± 125 mV to ± 10 V	✓	BW: 300 kHz HP: 3.4 Hz	4 / 8 mA
		Single-ended or differential input and one highpass filter 3.4 Hz highpass filter for noise and shock response measurement MDAQ-SUB-ACC-BNC-S1				
		0, 16 Hz for structural and modal analysis, human body vibration measurement (rest same as MDAQ-SUB-ACC-BNC)				
MDAQ-SUB-ACC-A-BNC Connector: BNC 	8	ICP® or voltage up to ± 10 V	8 ranges from ± 125 mV to ± 10 V	✓	BW: 300 kHz HP: 0.16 Hz, 3.4 Hz	4 / 8 mA
		Single-ended input and two HP filters 0.16 Hz for structural and modal analysis, human body vibration measurement 3.4 Hz for noise and shock response measurement				
MDAQ-SUB-ACC-A-MD Connector: Microdot 	8	ICP® or voltage up to ± 10 V	8 ranges from ± 125 mV to ± 10 V	✓	BW: 300 kHz HP: 0.16 Hz, 3.4 Hz	4 / 8 mA
		Single-ended input, two HP filters and sensor failure detection 0.16 Hz for structural and modal analysis, human body vibration measurement 3.4 Hz for noise and shock response measurement				
		Option: test signal input for all channels				



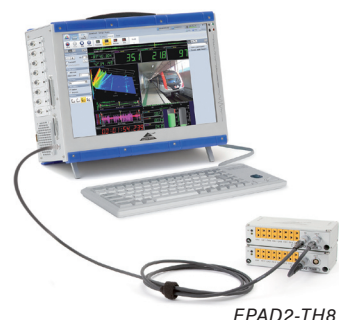
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MSI-V-CH-50

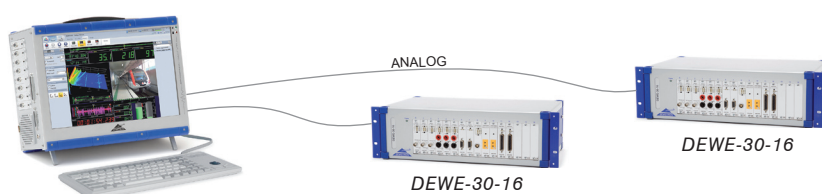
Channel Expansion

Signal conditioning for slow signals is added by connecting EPAD2 series modules to the systems via EPAD interface.

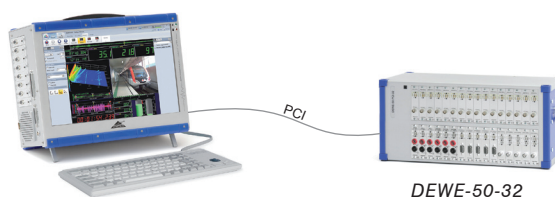


For expanding the number of dynamic channels there are some choices:

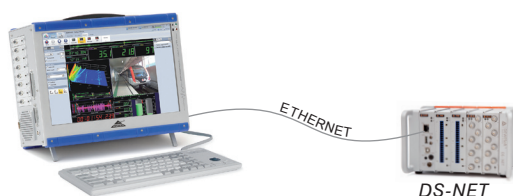
Analog cable: Additional A/D boards are installed into the basic instrument and external signal conditioning, e.g. DAQ modules in a DEWE-30 chassis, is connected by means of an analog signal cable.



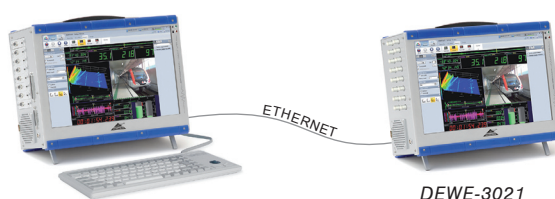
PCI expansion: A PCI-HOST card is installed into the basic instrument and external signal conditioning, e.g. DAQ modules in a DEWE-50 chassis, is connected by means of a PCI cable.



DS-NET: To expand the system with low/medium speed channels a DS-NET unit is connected to the basic instrument via Ethernet.



DEWE-NET: Several instruments are connected via Ethernet. Each unit requires an ORION-SYNC option. For short distances a sync cable is used if the units are far from each other a sync interface like IRIG-CLOCK or GPS-CLOCK is used.

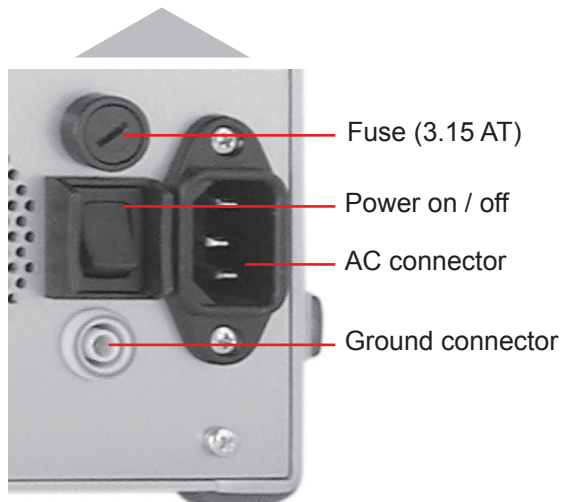


Main System

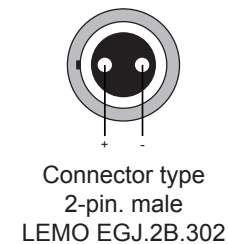
Power supply

Standard AC power supply

300 W AC power supply	P1S-6300V-B2
Input:	
Input range:	100 to 240 V _{AC} , active PFC
Input frequency:	47 .. 63 Hz
Input current:	4.5 A @ 115 V / 2 A @ 230 V
Output:	
Output power:	300 W total
Output voltages:	+12 V1 (max. 8 A) +12 V2 (max. 16 A) +5 V (max 18 A) +3.3 V (max 17 A) -12 V (max. 0.3 A) +5 V _{sb} (max. 2.5 A)
Protection:	
Short circuit protection:	+3.3 V, +5 V, +12 V, switch off / -12 V, +5 V _{sb} , auto recovery
Overload protection:	110 .. 160 %, switch off
Overvoltage protection:	+3.3 V (+3.6 .. +4.3 V), +5 V (+5.6 .. +6.5 V), +12 V (+13.2 .. +15 V)



Power supply pin assignment:



DC power supply (option 3020-UPS-DC)

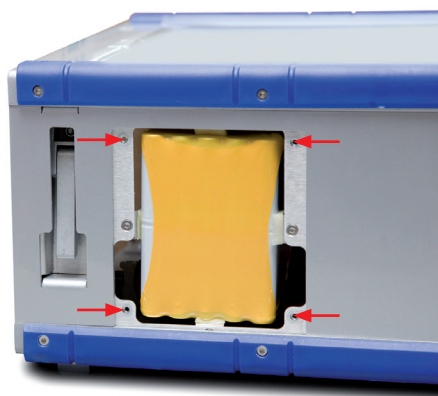
DC Power supply	NET-202 DC + Accu
Input:	
Input range:	10 to 32 V _{DC}
Max. input current:	startup peak up to 25 A
Input power:	160 W
Input voltage priority:	1. DC voltage 2. Accu
External AC power supply:	90 to 260 V _{AC} (DEWE-POW-24-350 included as standard accessory)
Battery type:	NiCd, 24 V _{DC} , 600 mAh
Output:	
Output power:	160 W
Output voltages:	+5 V (max. 20 A) -5 V (max. 0.3 A) +12 V (max. 5 A) -12 V (max. 0.4 A)
Power LED:	
dim green:	DC connected to system, system powered off
bright green:	DC connected to system, system powered on
orange:	system powered on, working via accu
red:	starts 30 sec. before accu is getting low together with beep signal

Battery exchange with option 3020-UPS-DC

The following part is only valid for systems with option 3020-UPS-DC installed:

WARNING Battery exchange has to be done by qualified persons only!

Power down system and disconnect from power supply. Remove four screws from bottom of the DEWE-3020 system to get access to the battery. Exchange battery and close battery compartment again with the four screws.

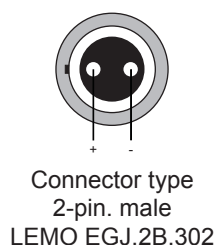


WARNING Do not touch any internal wiring except of the battery connection cable!

Internal battery power supply: option DEWE-3020-PS-BAT

320 W DC power supply with XP-04 battery management	
Input:	
Input range:	18 to 24 V _{DC} (nom. 18 V _{DC})
Input frequency:	DC
Max. input current:	12 A
External AC power supply:	90 to 260 V _{AC} (DEWE-POW-24-350 included as standard accessory)
Output:	
Output power:	320 W with XP-04 battery management (with DCDC-123)
Output voltages:	+3.3 V (max. 10 A) +5 V (max. 10 A) +12 V (max. 12 A)

Power supply pin assignment:



If option 3020-PS-BAT is installed, there are 2 slots for hot-swappable smart batteries available in the system. Standard shipment includes 2 smart batteries, more can be ordered additionally (option BAT-95WH).

Optional cables:

C7502: LEMO 2B jack to LEMO 2B plug, 2 m. (used for connecting DEWE-3020 to DEWE-POW-24-350 or to DEWE-DCDC-24-350-ISO)

C8502: LEMO 2B jack to banana plugs, 2 m.

Note: If the system is powered by batteries, please take care that there are 2 batteries installed!

Main System

External DC/DC power supply, option DEWE-DCDC-24-300-ISO (recommended option if system is configured with 3020 PS-BAT power supply)

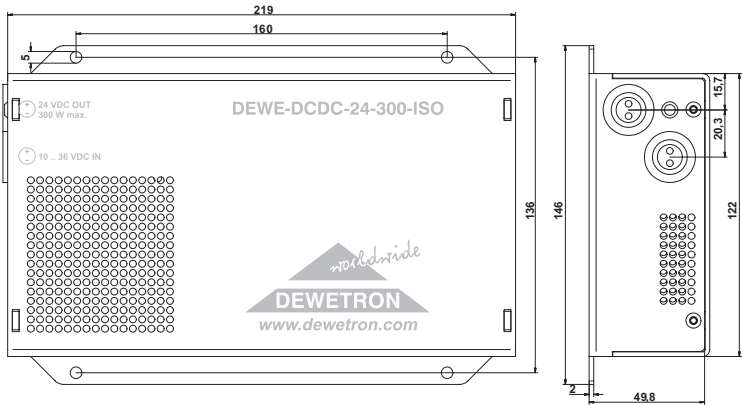
DC/DC power supply	DEWE-DCDC-24-300-ISO
Input:	
Input voltage:	10 to 36 V _{DC} (the input is protected against wrong polarity)
Max. input current:	36 A @ 10 V _{DC} input voltage (15 A @ 24 V _{DC})
Input connector:	2-pin LEMO connector male, type: EGJ.2B.302
Output:	
Output voltages:	24 V
Output power:	300 W
Output current:	12.5 A
Output connector:	2-pin LEMO connector female, type: EGG.2B.302
Operating temperature:	-20 °C to 60 °C
Derating above 45 °C:	8 Watt/°C
Isolation voltage:	500 V _{DC}
Status LED:	Green LED indicates an output voltage > 21 V _{DC}
Dimensions: (W x D x H):	approx. 219 x 122 x 50 mm (8.6 x 4.8 x 2 in.)
Weight:	1.3 kg (2.9 lbs)
Power on sequence:	
First: Connect the system and the DEWE-DCDC-24-300 followed by the power supply connection.	

As an option the DEWE-3020 is shipped with the DEWE-DCDC-24-300-ISO. This power supply serves galvanic isolated voltage with a wide input range from 10 to 36 V_{DC}. The output voltage is fixed with 24 V_{DC} with a maximum output power of 300 W.

Depending on the configuration, the DEWE-3020 takes usually not more than 150 W. The typical power consumption is just around 70 W. However, if the batteries are empty the input current can go up to 12 Ampere which is an equivalent power consumption of 280 Watt! If the unit is supplied from a typical board supply of 12 V it needs an input current of 28 A!

If this high power is not available in the board supply please operate the DEWE-3020 without or with charged batteries.

Dimensions*



* Dimensions in mm
(1 inch = 25.4 mm)

Input connector



Lemo EGJ.2B.302

Pin assignment
1: 10 .. 36 V_{DC} input
2: GND

Output connector



Lemo EGG.2B.302

Pin assignment
1: 24 V_{DC} output
2: GND

Optional cables: C8502 LEMO 2B jack to banana plugs, 2 m.

Smart battery packs



Smart battery packs are equipped with an integrated circuit which stores information (such as manufacturer, serial number, production date etc.) and monitors the current battery status in terms of discharge rate, predicted remaining capacity, temperature, voltage etc. The battery packs, supplied with every battery powered DEWETRON system, are even capable of displaying their charge state without a separate device. With the push of a button, a LED display on the battery pack shows the current charge state in 25% steps. An intelligent battery controller, integrated in our DEWETRON systems, takes care of the charging and discharging process in order to ensure maximum battery performance and life time.

Battery exchange with option 3020-PS-BAT

Loosen the screw on the right side of your DEWE-302x and remove/replace the batteries. The batteries are hot-swappable.



Main System

External battery charger (optional)

External battery charger CH5000A/E/U	
Power supply:	
Input voltage:	90 to 260 VAC, 24V
Input current:	2.5 A
Mains Cord:	CH5000E - 220 V European 2-pin connector with ground recess
Dimensions (WxDxH):	180 mm x 92 mm x 58 mm
Weight:	ca. 250 g
Mating connector:	5-blade standard battery connector

From time to time, due to the aging process of the batteries, it is necessary to recalibrate the battery in order to retain the accuracy and reliability of the fuel gauge. This can be achieved with an external battery charger (BAT-CHARGER) which is optionally available. Another advantage of the BAT-CHARGER is that additional batteries can be recharged without being in the measurement unit. This allows the measurement unit to run non-stop without being connected to the power net, thanks to the hot-swap capability of the battery packs.

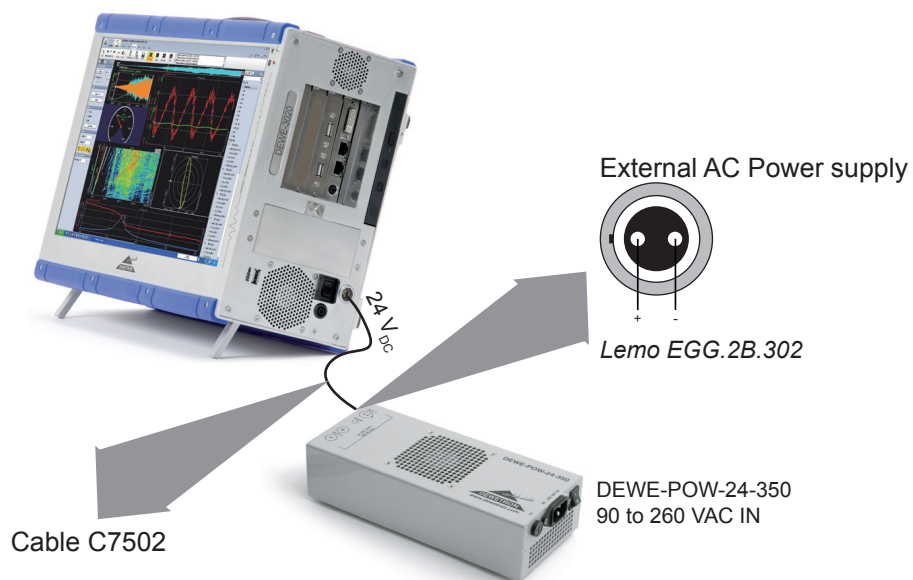


External AC/DC power supply (standard accessory included with option 3020-PS-BAT and option 3020-DC-UPS)

AC/DC power supply	DEWE-POW-24-350
Input:	
Input voltage:	90 to 264 V _{AC} / 127 to 370 V _{DC} universal input
Input frequency:	47 to 63 Hz
Input current (typ.):	2 A @ 230 V _{AC} / 4 A @ 115 V _{AC}
Inrush current (typ.):	44 A @ 230 V _{AC} / 22 A @ 115 V _{AC}
Leakage current:	<2 mA @ 240 V _{AC}
P.F.C. (typ.):	0.95 @ 230 V _{AC} / 0.98 @ 115 V _{AC}
Output:	
Output voltage:	24 V
Min. load:	0 A
Rated load (free / fan):	12.5 A / 14.6 A
Output tolerance:	±2 %
Ripple & Noise (max.):	150 mV
Efficiency (typ.):	88 %
Output connector:	Banana jacks and LEMO EGG.2B.302
Protection:	
Overload:	105 % to 130 % constant current limiting, auto recovery
Over voltage:	26.7 to 32.4 V; Hiccup mode, auto recovery after fault has been removed
Over temperature:	> 80°C ±5°C detect on heat sink of power transistor Shutdown, auto recovery after temp. has fallen
Short circuit:	Yes
Setup time:	<2000ms @ 230V _{AC} / 4000ms @ 115V _{AC}
Rise time:	<100ms @ 230 V _{AC} / 100ms @ 115 V _{AC}
Holdup time:	16ms @ 230 V _{AC} / 16ms @ 115 V _{AC}
Withstand voltage:	I/P-O/P:3 KV _{AC} , I/P-FG:1.5 KV _{AC} , O/P-FG:0.5 KV _{AC} / 1 minute
Isolation resistance:	I/P-O/P, I/P-FG, O/P-FG: 500 V _{DC} / 100 MOhm
Switching frequency:	100 kHz
Temperature:	
Operating:	-10 to 65°C
Derating:	45 to 60°C: 2 %/°C (3.5 & 5 V: 40 to 65°C: 2 %/°C)
Storage:	-40 to 85°C
Humidity:	
Operating:	20 to 90 % RH
Storage:	10 to 95 % RH (non condensing)
M.T.B.F.:	> 106 K hours (according to MIL-HDBK-217F at 25°C environment)
Safety:	Approved: UL 60950-1 / TÜV EN60950-1
EMC:	
EMI	EN55022 Class B / EN61000-3-2,3
EMS	EN61000-4-2,3,4,5,6,8,11 / ENV50204
Dimensions (W x D x H):	248 x 106 x 62 mm (9.8 x 4.2 x 2.4 in.)
Weight:	1.7 kg (3.7 lbs)

Main System

DEWE-302x with option 3020-PS-BAT or option 3020-DC-UPS and external AC power supply



DEWESoft™

DEWESoft™ Software Turns our Hardware into a Powerful Data Acquisition System



Our award-winning data acquisition package is second to none when it comes to both pure recording power and ease of use. Normally it is a difficult balancing act to provide lots of capability and performance, without making the user interface cumbersome and hard to learn. But with careful and innovative design, we have done exactly that!

The software can act as a simple multi-meter or recorder as well as a sophisticated combustion analyzer or power analyzer. Or anything in between these extremes, like a FFT analyzer, transient recorder, etc.

Over 10 years DEWESoft™ evolved into a great data acquisition software and is Nr.1 in synchronous acquisition of vastly different signals like analog, digital, CAN, GPS, PCM, counter, video, etc. In 2010 with the release of version 7, DEWESoft™ takes a big step toward become a very powerful data analysis tool for a wide range of test & measurement applications. Since many years you can utilize math channels in the measure mode for online calculations. Starting with version 7.0, captured data can be re-calculated in the analyze mode using the large suite of calculation (math) functions available in the measure mode. This eliminates the CPU performance limitations and thus provides unlimited offline calculation power.

Example: Performing a 10th order notch filter on 128 channels being sampled at 200 kS/s each. This is not possible online. But in analyze mode it's easy. Simply record the data and then filter it afterwards (math functions are non-destructive, i.e., they do not affect the raw channels).

Another important new feature is the sequencer which provides a way to automate test procedures.

Key Features of DEWETRON systems running DEWESoft™

- Fast and easy setup
- Perfect sync of vastly different signals like analog, digital, counter, CAN, XCP, GPS, Video, ARINC, 1553, etc.
- Powerful online data processing, MATH functions, filters, statistics, reference curves
- Attractive online display of all kind of data, creation of displays is a matter of seconds
- Analog, digital or CAN data output; powerful function generator, alarms, CAN messages
- Build test procedures in a form of workflow diagram by means of sequencer
- Fast data analysis, reload GByte files in seconds
- Post processing, large suite of calculation (math) functions

Hardware Support

DEWESoft™ supports DEWETRON hardware cards as well as some third-party cards, like Spectrum cards for transient recording. Multiple cards of the same family are supported for high channel counts.

There is also a huge range of DEWETRON signal conditioners which are all perfectly implemented into the software.

Besides the analog inputs DEWESoft™ supports the digital I/Os, counters and CAN interfaces of DEWETRON hardware.

To acquire video streams in sync with the analog data there is a selection of DEWE-CAM cameras.

Further bus systems like PCM telemetry, XCP, ARINC, 1553, etc. are supported, too. DEWETRON offers the appropriate hardware for all of these.

For position and speed measurements there is a choice of high performance DEWE-VGPS sensors. Or use low-cost sensor which is NMEA compatible for simple position plotting and mapping applications.

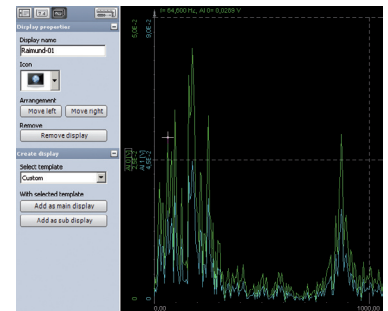


3D Graph

In the properties panel there is a function that allows you to edit the properties of the selected display, and to create new displays, and rearrange them. You can rename any display, and select a different icon for it. Of course you can add sub-displays to any main display.

Display Screens

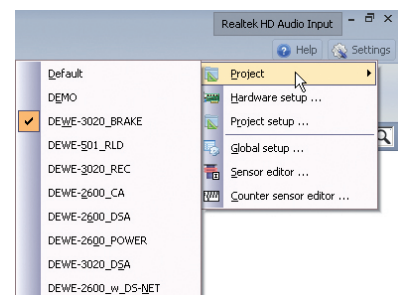
One of the most powerful and yet easy to use aspect of DEWESoft™ is the creation of displays. Of course a few standard displays like Recorders, Oscilloscope, FFT, Meters, Bars, 2D and 3D graphs, etc. are built-in for you. But this is only the beginning. You simply can create custom displays according to the needs of specific test.



Project Setup

The project files setup the measurement instruments in seconds including complete hardware setup, measurement configuration, and sensor calibration.

Since DEWESoft version 7 you can create "Projects" at the hardware setup screen level, where each project contains all of the settings for any hardware that you own. You can have an unlimited number of hardware setups, which you can freely name and edit. When you start DEWESoft 7, it will automatically load the last hardware setup that you used, of course ... but if you have changed the hardware, you can simply choose a different project from the "Settings" menu, and a completely different hardware setup will be loaded.

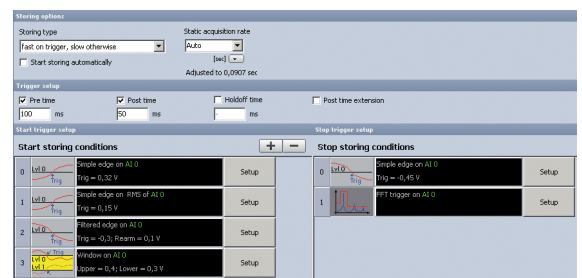


Even when using the same hardware, projects allows using different folders for setup, data and exported files. So you can create John and George projects for different users and work without interfering or you can create e.g. Road-Load and DSA projects for different tasks.

Recording

You can control recording as simple as pressing the START, STORE and STOP buttons. But there are also versatile trigger options to e.g. only store data if a trigger event occurs or to store at a slow rate usually but store at a fast rate at a trigger event with definable pre- and post times.

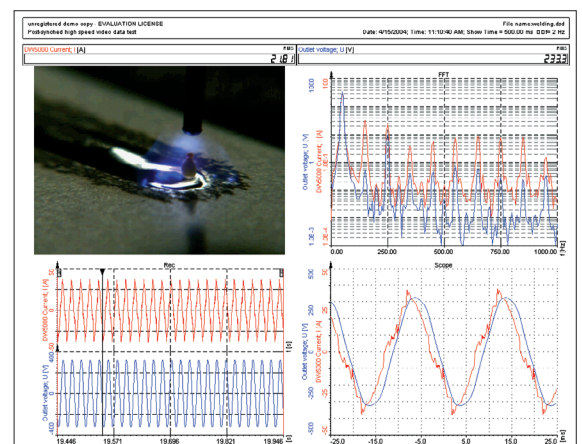
There is a large suite of calculation (math) functions which can be applied to any channels.



Analyze – Replay, Re-calculate, Export

In Analyze mode you can replay any captured data file, zoom in, make cursor measurements, print reports and export the data to a wide variety of formats, like Flexpro, Excel, Matlab, Diadem and many more.

Since version 7 all the powerful math functions such as math formulas, filtering, statistics, power analysis, frequency response function, order tracking, torsional vibration, engine combustion analysis, sound analysis, human vibration analysis, and others can also be applied off-line to captured data. So you can simply store the raw data and do all the processing off-line, on any computer, anywhere. This allows you to work with the data as you were at the test bench or on the proving ground.



Notes

A/D & D/A Conversion

A/D Conversion

Please find information about the A/D conversion in the attached DEWE-ORION series manual.
The latest version of the manual can be downloaded from:

<http://download.dewetron.com/dl/components/adboards>

Informations regarding different manufacturer's see the corresponding D/A card manual.

A/D & D/A Conversion

Notes

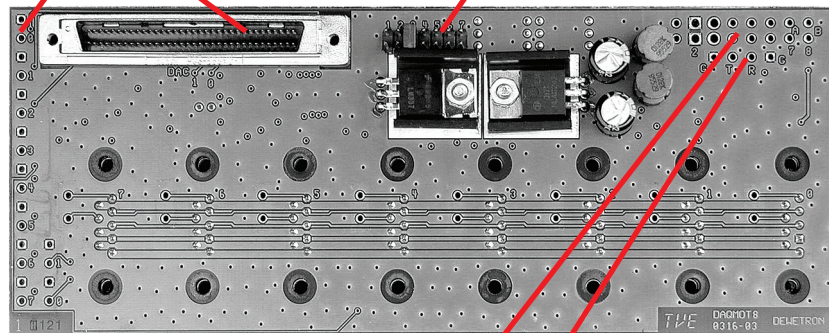
8 slot DEWE-MOTHERBOARD

I/O connectors

Ixx: Analog input xx (leads to
DAQ-module pin 1 in slot xx)
Oxx: Analog output xx (leads to
DAQ-module pin 7 in slot xx)
G: GND (reference for A/D card)
68-pin high-density sub-D connector

Baud rate for onboard RS-232/485 converter

1	115000
2	57600
3	38400
4	19200
5	9600
6	4800
7	2400



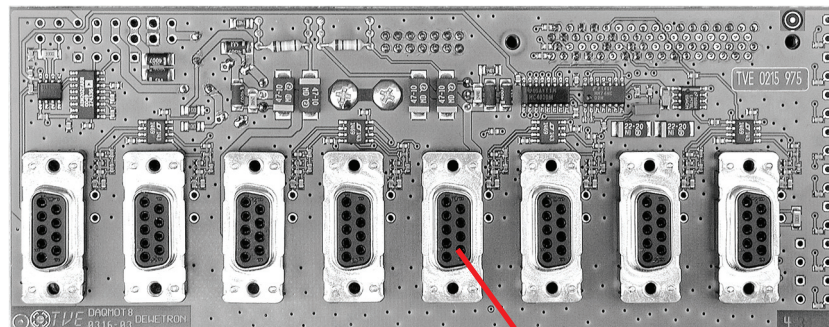
Rear view

Supply voltages, RS-485 connection

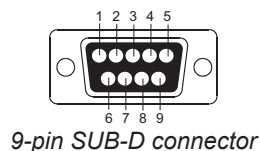
- 1 +12 V (supply voltage)
- 2 GND (system ground)
- 3 GND (referenced ground)
- 4 -12 V (supply voltage)
- 5 +Vcc (sensor supply, normally +12 V, leads to DAQ-module pin 6)
- 6 -Vcc (normally not connected, leads to DAQ-module pin 8)
- 7 A (RS-485)
- 8 B (RS-485)

RS-232 connection

- G GND
T Transmit
R Receive
G GND



Front view (connectors for DAQ-modules)



9-pin SUB-D connector

Interface pin assignment:

- 1 Module input (± 5 V)
- 2 RS-485 (A)
- 3 RS-485 (B)
- 4 GND
- 5 +9 V power supply
- 6 +12 V power / sensor supply
- 7 Module output (from A/D board)
- 8 reserved
- 9 -9 V power supply

The 8 slot DEWE-MOTHERBOARD receives the ± 12 V_{DC} power supply via a DC/DC converter from the internal power supply.

Internal Wiring

Notes

CE-Certificate of conformity



Manufacturer:

DEWETRON Elektronische Messgeraete Ges.m.b.H.

Address:

**Parkring 4
A-8074 Graz-Grambach Austria**

Tel.: +43 316 3070 0

Fax: +43 316 3070 90

e-mail: sales@dewetron.com

<http://www.dewetron.com>

Name of product:

DEWE-302X

Kind of product:

Data acquisition instrument

The product meets the regulations of the following EC-directives:

73/23/EEC

"Directive on the approximation of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits amended by the directive 93/68/EEC"

89/336/EEC

"Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility amended by the directives 91/263/EEC, 92/31/EEC, 93/68/EEC and 93/97/EEC"

The accordance is proved by the observance of the following standards:

L V E M C	Safety	IEC/EN 61010-1:1992/93 IEC/EN 61010-2-031	IEC 61010-1:1992/300 V CATIII Pol. D. 2 IEC 1010-2-031
	Emissions	EN 61000-6-4	EN 55011 Class B
	Immunity	EN 61000-6-2	Group standard

Graz, April 28, 2010

Place / Date of the CE-marking

Dipl.-Ing. Roland Jeutter / Managing director

Notes
