



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

## **DEWE-510 (AC powered version)**

*Technical reference manual*



ISO9001

Re-inventing Data Acquisition



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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-510?**

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.) or LEMO® connectors.

# Preface

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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](mailto: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)

## 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.

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](mailto: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)

# 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

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## Safety symbols in the manual

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*Indicates hazardous voltages.*

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**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.*

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**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.*

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# Safety instructions

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**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

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- 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.

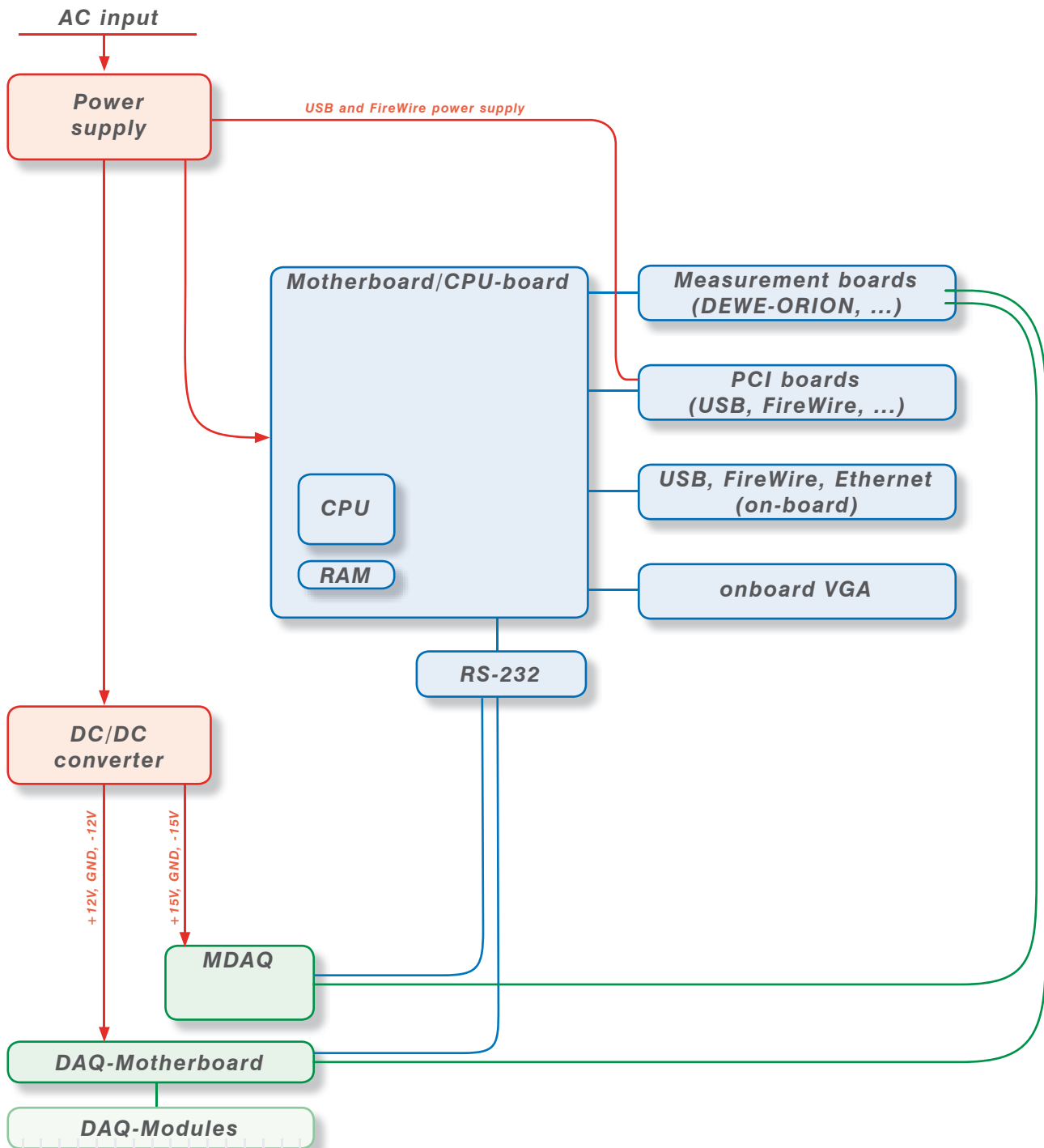
This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further informations about recycling on the DEWETRON web site [www.dewetron.com](http://www.dewetron.com)

## **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



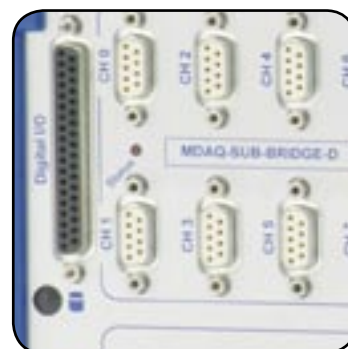
## First steps

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-510 AC Powered Instrument

- Portable data acquisition system
- 3 PCI slots for up to 3 DEWETRON ORION-series cards
- Up to 16 internal slots for DEWE-DAQ/PAD modules
- Optional counter- / encoder inputs
- A/D converter specs see appendix A

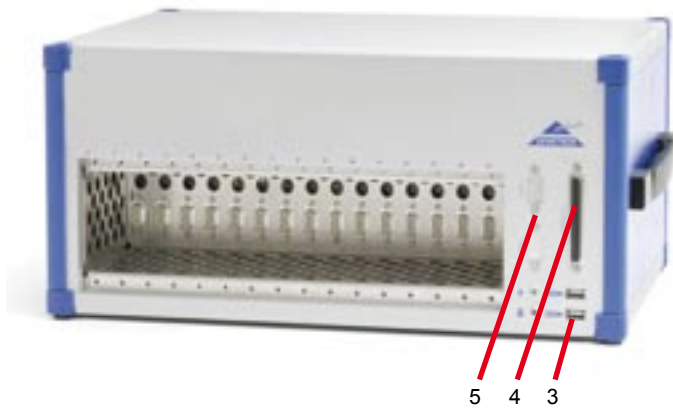


## System specifications

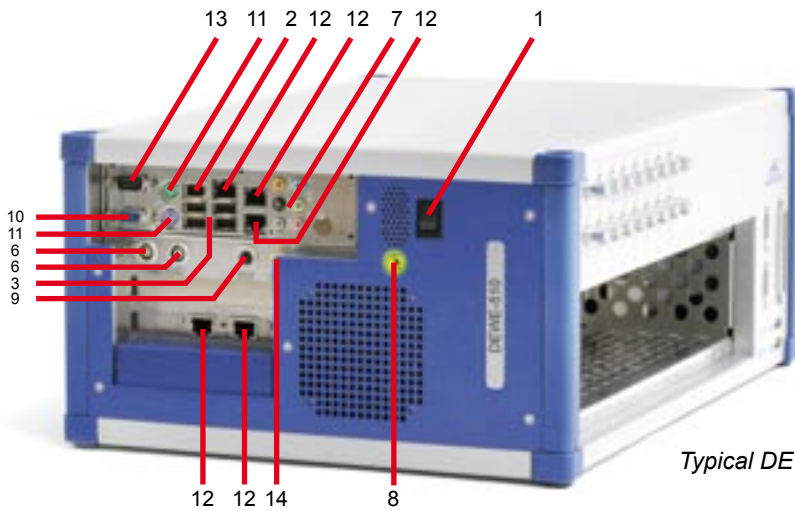
	DEWE-510	
Power supply	100 to 240 VAC (auto selecting) FSP400-60PFN/PLN (400 W) for details see next pages	
Operating temperature	-10 °C to +50 °C	
Storage temperature	-20 °C to +60 °C	
Humidity (operating)	10 % to 80 %, non condensing 5 % to 95 %, rel. humidity	
Vibration test EN 60068-2-6	Shape	Sine
	Frequency range	10 - 150 Hz
	Acceleration	2 g
	Sweep rate	1 oct./min.
	Duration	20 Cycles
	Test in 3 directions	
Vibration test EN 60721-3-2 Class 2M2	Shape	Random
	Frequency range	10 - 200 Hz
	Power spectral density	1 m/s <sup>2</sup> / Hz from 10 – 200 Hz
	Duration	30 Minutes per axis
Shocktests EN 60068-2-27	Shape	Half-sine
	Acceleration amplitude	15 g
	Duration	11 ms
	Test in 3 axis, 3 shocks in each axis and direction	
Dimensions (W x D x H)	DEWE-510: 438.5 x 308 x 180.5 mm (17.3 x 12.1 x 7.1 in.)	
Weight	typ. 6 to 10 kg (13.2 to 22 lbs), depending on configuration	

# Main System

## Connectors



Typical DEWE-510 front view



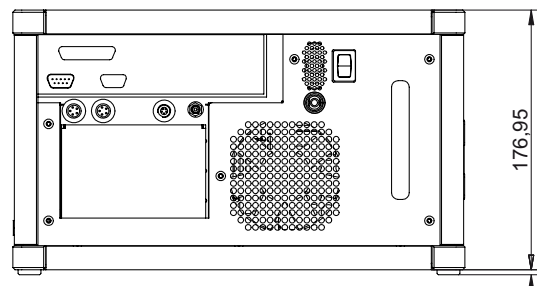
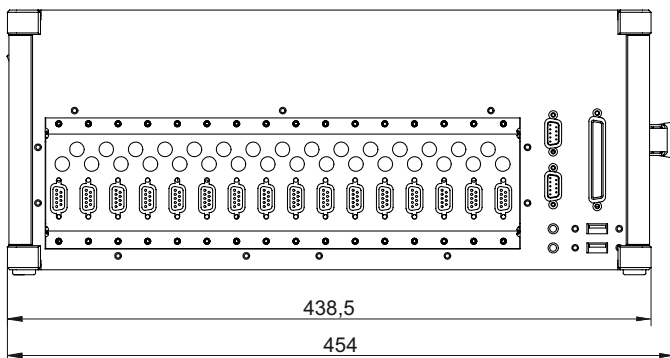
Typical DEWE-510 side view

Connector overview:

- 1 Power-on button
- 2 IEEE1394 interface connector
- 3 USB interface connectors
- 4 Digital I/O connector
- 5 CAN interface
- 6 Power supply for accessories (12 V<sub>DC</sub> / 1.8 A) Lemo FGG1B-302
- 7 Audio interface
- 8 Ground connector
- 9 EPAD interface
- 10 VGA connector
- 11 PS/2 connector
- 12 Ethernet LAN connector
- 13 RS-232 interface connector
- 14 WLAN connector

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

## Dimensions\*



\* Dimensions in mm  
(1 inch = 25.4 mm)

## Internal AC power supply

400 W AC power supply		FSP400-60PFN/PLN	
Input:			
Input range:	100 to 240 V <sub>AC</sub> (auto selecting)		
Input frequency:	50 to 60 Hz		
Max. input current:	10 A (115 V <sub>AC</sub> ) or 5 A (230 V <sub>AC</sub> )		
Output:			
Output power:	400 W (max. 235 W @ +3.3 V and +5 V)		
Output voltages:	+3.3 V (max. 28 A)		
	+5 V (max. 40 A)	-5 V (max 0.3 A)	
	+5 Vsb (max. 2 A)		
	+12 V (max. 15 A)	-12 V (max. 0.8 A)	

## 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.

## USB interface connectors (Universal Serial Bus)

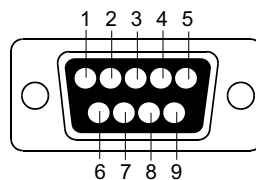
The USB interface connectors meets standard USB pin assignment.

## RS-232 interface connector (COM1)

The RS-232 interface connector (male) is located on the rear side of the DEWE-510. It is configured as standard RS-232 interface COM 1 and can be used for mouse or other peripheral units.



9-pin SUB-D connector (male)



Schematic

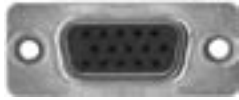
### Pin assignment

- 1: DCD (Data Carrier Detector)
- 2: RD (Received Data)
- 3: TD (Transmitted Data)
- 4: DTR (Data Terminal Ready)
- 5: GND (Ground)
- 6: DSR (Data Set Ready)
- 7: RTS (Request To Send)
- 8: CTS (Clear To Send)
- 9: RI (Ring Indicator)

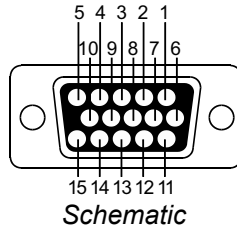
# Main System

## VGA connector

The VGA connector offers the possibility to connect a CRT or other standard VGA displays to the system.



15-pin mini-SUB-D connector (male)



Schematic

### Pin assignment

- 1: Red video
- 2: Green video / Sync on green
- 3: Blue video
- 4: -
- 5: -
- 6: Red video ground
- 7: Green video ground
- 8: Blue video ground
- 9: -
- 10: Ground
- 11: Ground
- 12: Data line
- 13: H-Sync / HV-Sync
- 14: V-Sync
- 15: Clock line

Some systems have a DVI connector instead or additionally to the VGA.



15-pin mini-SUB-D connector (male)



Schematic

### Pin assignment

- |                         |                           |                          |                    |
|-------------------------|---------------------------|--------------------------|--------------------|
| 1: TDMS-data 2-         | 9: TDMS-data 1-           | 17: TDMS-data 0-         | C1: Analog: red    |
| 2: TDMS-data 2+         | 10: TDMS-data 1+          | 18: TDMS-data 0+         | C2: Analog: green  |
| 3: Shield TDMS-data 2,4 | 11: Shield TDMS-Daten 1,3 | 19: Shield TDMS-data 0,5 | C3: Analog: blue   |
| 4: TDMS-data 4-         | 12: TDMS-data 3-          | 20: TDMS-data 5-         | C4: Analog: H-Sync |
| 5: TDMS-data 4+         | 13: TDMS-data 3+          | 21: TDMS-data 5+         | C5: Analog: ground |
| 6: DDC clock            | 14: +5 volt               | 22: Shield TDMS-Takt     |                    |
| 7: DDC data             | 15: Ground for +5 volt    | 23: TDMS-clock+          |                    |
| 8: Analog: V-Sync       | 16: Hotplug-Detect        | 24: TDMS-clock -         |                    |

## Ethernet connector

The DEWE-510 system supports 10/100/1000 BaseT Ethernet with standard RJ45 connector.

## WLAN connector

The DEWE-510 system supports 802.11b and 802.11g standards for Wireless LAN with max. speed of 54 MBit/s.

## Power-on button

The power-on button has to be used to switch on the system. To shut down the system exit windows and press the power-on button for more than 3 seconds.

## Digital I/O connector

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

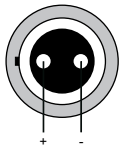
The pin assignment is depending on the used A/D board - details are available in appendix B.

## Ground connector

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

## Power supply for accessories

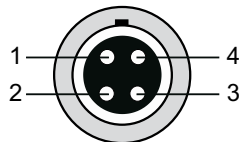
To supply your accessories with 12 V<sub>DC</sub>. Fused with an 1.8 A self-healing fuse.



Lemo EGG.1B.302

## EPAD connector

To connect DEWETRON EPAD modules to the system.



4-pin. LEMO  
connector (female)

### 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)



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

# Main System

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**Notes**

## **A/D Wandler**

Nähere Informationen zu der A/D Wandlung finden Sie in der beigefügten DEWE-ORION Beschreibung.  
Die aktuellste Version finden Sie auf:

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

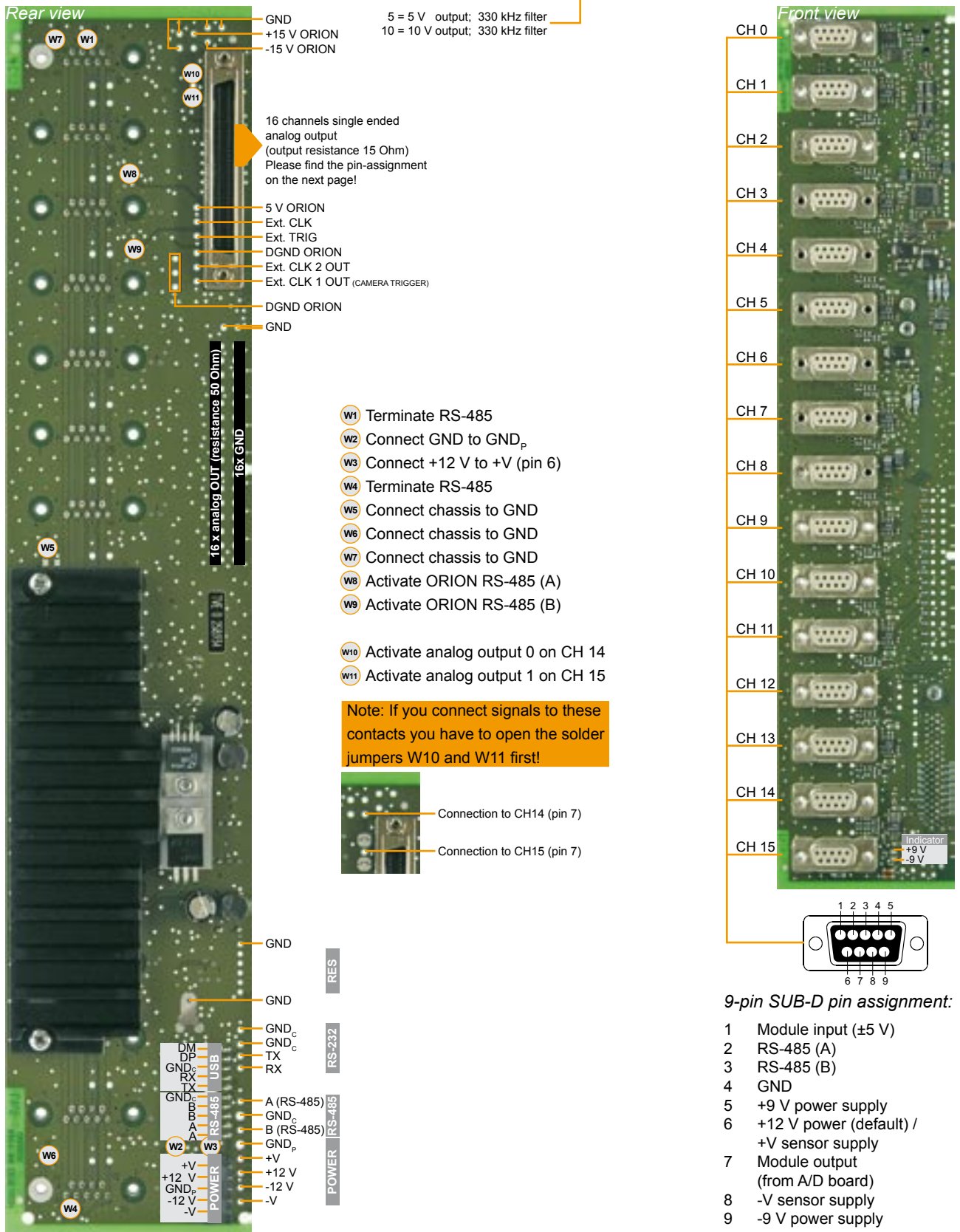
Informationen bezüglich anderer Hersteller entnehmen Sie bitte der entsprechenden A/D Wandler Beschreibung.

# A/D & D/A Wandler

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Notizen

## 16 slot DEWE-MOTHERBOARD DAQ-MOTH-16-DE-x

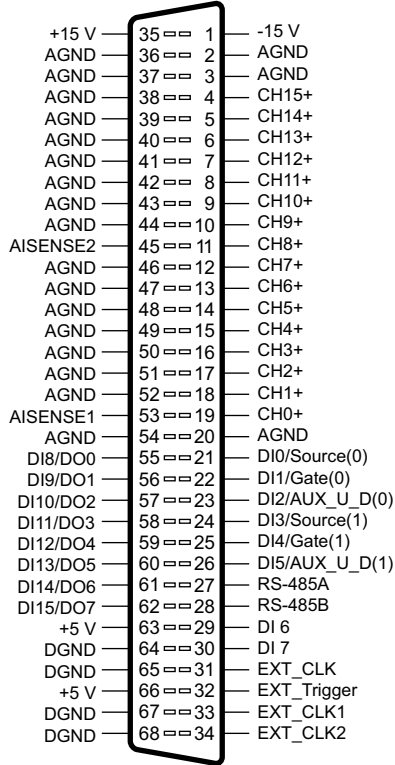


The 16 slot DEWE-MOTHERBOARD receives the  $\pm 12$  V<sub>DC</sub> power supply via a DC/DC converter from the internal power supply.

# Internal Wiring

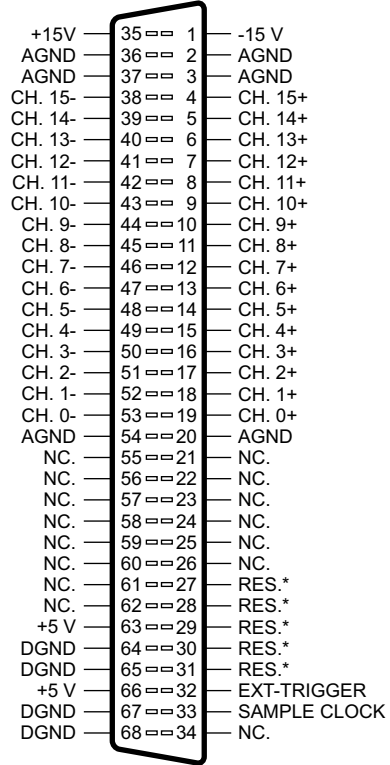
## Analog output connector pin-assignment

Connector for DEWE-ORION-1616 cards



68-pin high density connector

Connector for DEWE-ORION-1624 cards



\* DONT CONNECT

68-pin high density connector

# 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-510 AC**

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:

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

**Graz, October 14, 2008**

Place / Date of the CE-marking

Dipl.-Ing. Roland Jeutter / Managing director

# Notes

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