A/D-Converter DISOBOX® Plus

- **Local weighing electronics IP66**
- **One measuring channel per load cell**
- **Can monitor individual load cells**
- **Electronic corner adjustment**
- **Digital transmission of measured values**
- **Fieldbus connection**
- **All components can be replaced without requiring or reverification recalibration**
- **Can be combined optimally with Schenck Process weighing electronics, legal-for-trade PC programs or standard PLCs**

Application

The Schenck Process DISOBOX Plus is a multi-channel, on-site analog-digital converter unit.

The output signal of each load cell connected is digitized separately.

This allows the measuring voltage of each individual load cell to be accessed at any time – for many applications an invaluable ad-vantage:

- in commissioning (analysis of dead weight distribution, electronic corner adjustment)
- in operation (analysis of the load distribution on the scales,
  load cell monitoring)
- and in case of a fault (rapid identification of the components affected)

The digital transmission through a standard fieldbus system is fast, fail-safe and easy to project.

These features make the DISOBOX Plus an ideal data recording and control unit for weighing systems – in combination either with Schenck Process DISOMAT® series weighing terminals, or with PC-based weighing systems or PLC controllers.

Typical applications are:

- Road weighbridges
- Bin weighers
- Security relevant
- overload control systems
- as per EN ISO 13849

However, the integrated scales functions also enable the device to be operated as a multi-channel scale indicator for, for example, a series of simple bin weighers.

Equipment

The DISOBOX Plus has up to 8 measuring channels (model-dependent). One load cell can be connected to each channel. The fact that each individual signal can be accessed individually allows each load point to be calibrated separately (electronic corner adjustment) without requiring the box to be opened, without plugging, soldering, …

Each channel has its own high-resolution analog/digital converter (not a multiplexer). This makes the DISOBOX Plus also suitable for measuring and controlling fast sequences – e.g. of feeds.

The integrated I/O signals allow direct control of time-critical signals such as an overload shutdown by bypassing the connected control systems.

The individual load cell signals can also be accessed separately during operation, in order to e.g. monitor the sensors or, in case of a fault, to localize quickly the source of the fault.

Integrated diagnostics functions in the DISOBOX Plus allow automatic monitoring of the load cell ze-ro-point and the load distribution on the scales.

Individual measuring channels can be bundled to-gether to form a maximum of eight independent groups. Each group corresponds to a complete, legal-for-trade scales, with:

- Filtering of the weight values
- Status determination (idle, ...)
- Tare memory
- Zeroing
- Multi-range / multi-interval function (3 ranges)
- Zero tracking
- ...

Communication

All measured values (channel values and scales weights) can be transmitted on to higher-level sys-tems through the serial interface.

The optional cards available allow adaptation to all standard industry communication systems. Available at this point in time are:

- PROFIBUS DP-V0, data width 256 Byte, max. data transfer rate 12 MBaud
- DeviceNet

The Modbus-RTU protocol can be connected via the in-ternal serial interfaces directly.

The following protocols are supported by the permanently installed Ethernet interface

- Modbus-TCP
- UDP
- EtherNet/IP (optional)

The Ethernet interface can also be used to configure the device.

Key advantages of communication via Ethernet are the ability to use existing network infrastructures, the high data transfer rate and parallel access of multiple partners to a device (e.g. to make a diagnosis during normal sys-tem operation). (External access via internet can of course be restricted as desired or disabled completely by introducing the appropriate privileges).

The DISOBOX Plus serial interfaces are not reserved forcommunication with the plant control system. Other peripheral devices can also be connected, such as:

- Serial I/O expansion
- Second display or large display
- Printer

Inputs/Outputs

The DISOBOX Plus inputs and outputs (6 inputs/ 6 outputs, 24 VDC) also allow direct, local process control, in the form of overload messages, feed contacts or release signals.

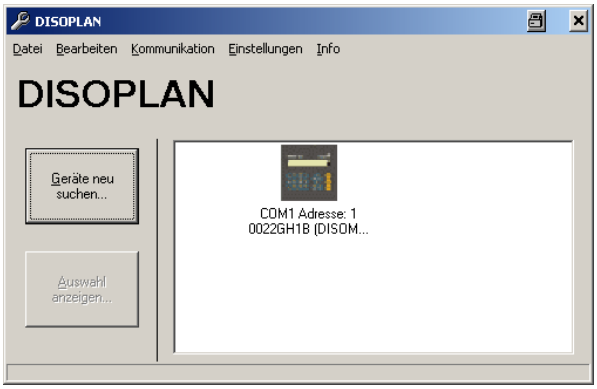
Configuration/Calibration

Used in combination with Schenck Process systems (DISOMAT, PC programs, DISOVIEW X), configuration and calibration are usually performed using the connected master. The configuration program DISOPLAN® is used for comprehensive configurations or if the DISOBOX is used in conjunction with third-party systems. It allows access to all parameters for the complete calibration and can indicate weight values if required.

Furthermore, the complete status of a DISOBOX Plus can be read out (backup) and loaded (restore) into a similar device or a replacement if necessary.

DISOPLAN runs on the platforms Windows 7, 8 and 10. It communicates with the DISOBOXes either:

- Point-to-point
- Via an RS485 bus
- Via Ethernet



Legal-for-Trade Verification

The DISOBOX Plus has EU certification as a legal-for-trade weighing system, both as an A/D converter in combination with a DISOMAT Tersus or the Schenck Process PC software DISOVIEW X or as a stand-alone scales, for instance in combination with a suitable display and operating console.

The certification allows that in case of a fault the complete active electronics can be replaced without the need for adjustment or a re-calibration – all adjustment and calibration parameters are stored in a non-volatile memory in the passive part of the sys-tem. Together with the DISOPLAN backup/restore function, this allows downtimes to be avoided effectively.

The system's sealing concept, with no jumpers, normally allows it to keep the DISOBOX always closed. Parameterization and adjustments are made through the serial interface, the legal-for-trade protection is performed by a change counter for the relevant parameter. This removes the risk dirt or moisture entering the electronics during maintenance or calibration.

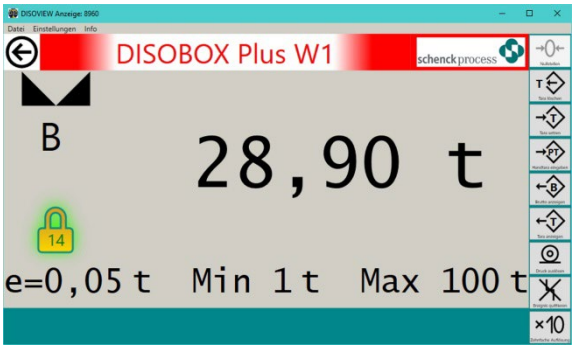
DISOVIEW X

Many data-intensive weighing applications, such as road weighbridges or batching systems, today use a PC as a high-performance and comfortable opera-tor guidance – usually in combination with conven-tional weighing electronics to implement the legal-for-trade display and the data storage.

The combination of DISOBOX Plus with the legal-for-trade scales program DISOVIEW X opens up a range of new possibilities.

- The DISOBOX is located on-site at the scales
- Data is transmitted digitally to the PC interference-free
- There are no additional devices next to the PC to cause interference
- DISOVIEW X displays the legal-for-trade, comfortable and flexible scales directly on the PC monitor
- The DISOVIEW X application interface allows simple access from the operator program to the data and the scales functions

DISOVIEW X can display any number of legal-for-trade scales.



Accessories

The DISOBOX Plus is powered by a nominal 24 VDC (permissible range 18 - 36 V). This power will often be available on-site.

However, up to three DISOBOXes can be supplied by the VNT 21000 supplementary power supply unit. The VNT 21000 can also convert a serial RS232 interface (PC COM) to RS485. This allows a DISOBOX to be located at a distance of 300 m away.

There is also a scales simulator to test the hardware and the process flow, the VWZ 21000, with which up to 8 load cells can be simulated individually.

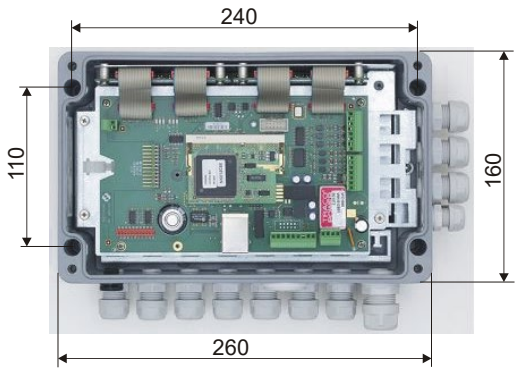
DISOBOX Plus units with integrated overvoltage protection for the load cell connections as an optional extra are also available.

Non-Standard Applications

In addition to the weighing applications already de-scribed, the DISOBOX can also provide solutions to tasks that cannot be solved using conventional weighing electronics.

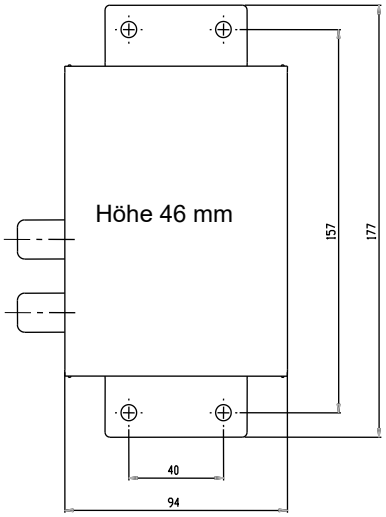
- If one does without the individual load cell monitoring option, a group of load cells can be attached to each measuring channel instead (attention must be paid to the overall impedance).

- In this case, a DISOBOX Plus can measure the weight of up to eight scales (e.g. surge hoppers) and transmit the data to a control system.
- The fact that each measuring channel can be configured individually means that the DISOBOX Plus al-lows scales to be constructed with load cells of differing rated capacities or sensitivities, e.g. for systems with greatly differing loads at the individual points of support.
- This feature allows, for example, the repair of systems with load cells that are no longer available. In-stead of having to completely re-equip the scales with new sensors, now the defective load cell can simply be replaced (any restrictions that may apply due to the permissible combination of load cells used must be considered in legal-for-trade systems).
  The DISOBOX Plus is installed in the place of the previous junction box. In many cases even the old measurement cable for serial data transmission can be retained. This can turn a necessary repair into an attractive upgrade.
- Plastic housing



Height: 90 mm mounting material supplied

- Stainless steel housing: 300 x 200 x 121 mm (L x W x H), fastened with 4 clips, hole distance 330 x 144 mm, max. bolt diameter 10 mm
- Power supply unit VNT 21000



schenck process

Technical Data

Date	Value
Processor	ARM-9 high-performance controller
RAM	32 MB
Flash	8 MB
EEPROM	16 kB
Clock	Real-time clock, 2 weeks back-up time
Display	None
Keyboard	None
On-site housing	Plastic, plastic cable screw connections, protection class IP66, impact-resistance 7 Joule.
Optional	Stainless steel 1.4301, brass screw connections
	Aluminum brass screw connections
No. of measuring channels	4 to 8, model dependant
Load cell power supply	5 VAC
Load cell impedance per channel	44 … 4000 Ω
Total impedance	>44 Ω
Input signal per channel	0 … 19 mV
Scan rate	132/s per measuring channel
Connections	4- or 6-wires
Scales	max. 8, the measuring channels can be freely assigned to the scales
Minimal signal voltage	0.5 µV/d * √n n: number of measuring channels per scales
Number of digits in legal-for-trade operation	N ≤10000 d
Multi-range-/ Multi-interval scales	3 ranges, with each N ≤8,000 d $E_{max.}$ / $d_{min.}$ ≤15,000 d
Linearity error	<0,05 ‰
Zero point stability, Tk_o	<0.6 µV / 10 K <0.03 ‰ / 10 K with referenceto the max. input voltage
Range error, Tk_c	<0,03 ‰ / 10 K
Combined error F_{comb}	<0,08 ‰ / 10 K
Supply voltage	24 VDC (18 … 36 V)
Power requirement	max. 5 W
Temperature range	Service temperature: -30 °C to +60 °C (legal for trade: -30 °C to +50 °C) Storage temperature: -30 °C to +60 °C
Electro-magnetic environment	E2 (OIML D11)
Binary outputs	6 x 24 VDC isolated, max. 100 mA 2 x 3 each with common root
Inputs	6 x 24 VDC isolated, with common root
Serial port	S1: RS485-2-wire DC isolated S2: RS485-2-wire DC coupled S3: RS232 DC coupled 9,600 … 115,000 Baud
Ethernet interface	Full-duplex 100 MBaud
USB interface	1 x USB 2.0 Host
Fieldbus protocol	Modbus, Modbus-TCP
Optional	PROFIBUS PROFINET I/O DeviceNet EtherNet/IP

Equipment Supplied	Type	Material-Nr.
Basic Units		
DISOBOX base unit, A/D converter unit with 8 measuring channels	VME 21080	V081000.B01
DISOBOX base unit, A/D converter unit with 4 measuring channels	VME 21040	V081001.B01
DISOBOX, A/D converter unit with 8 measuring channels for ATEX category 2D aluminum housing	VME 21080-2D	V081102.B01
DISOBOX basic unit, A/D converter unit with 8 measuring channels and overvoltage protection for the load cell connections	VME 21081	V081003.B01
DISOBOX basic unit, A/D converter unit with 4 measuring channels and overvoltage protection for the load cell connections	VME 21041	V081004.B01
DISOBOX basic unit, A/D converter unit with 8 measuring channels, stainless steel housing	VME 21084	V081005.B01
DISOBOX basic unit, A/D converter unit with 4 measuring channels, stainless steel housing	VME 21044	V081006.B01
DISOBOX basic unit, A/D converter unit with 4 measuring channels, temperature monitoring stainless steel housing	VME 21046	V081002.B01
Bus Cards		
Optional PROFIBUS, mounted and wired	VPB 28020	V081904.B01
Optional PROFINET, mounted and wired	VPN 28020	V535496.B01
Optional DeviceNet, mounted and wired	VCB 28020	V081906.B01
Optional interface expansion, mounted and wired	VSS 28020	V081905.B01
Analog I/O		
Analog Input	VAI 20100	V078800.B01
Analog Output 0 - 20 mA, max. 11 V	VAO 20100	V078801.B01
Analog Output 0 - 10 V, max. 50 mA	VAO 20101	V078802.B01
Accessories		
Power supply unit/ serial adapter IP20	VNT 21000	V028209.B01
Load cell simulator, 8 channel	VWZ 21000	V081029.B01
DISOPLAN	VPL 20430	V029764.B01
Grounding angle for fitting the PEL connections of the load cells		V035403.B01

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