DISOBOX Plus
A/D conversion unit

- **On-site evaluation electronics IP66**
- **Up to 8 measuring channels with individual monitoring**
- **Electronic corner balancing**
- **Digital transmission of measured values**
- **Fieldbus connection**

Application

The DISOBOX Plus is a multi-channel on-site analogue-to-digital conversion unit.
The output signal of each load cell connected is digitized separately. This ensures access to the measurement voltage of each cell at all times – an advantage that's invaluable in many applications:

- During commissioning (analysis of the dead load distribution, electronic corner adjustment)
- During operation (analysis of the load distribution on the scale, monitoring of the load cells)
- In case of a fault (quick identification of the affected component)

Digital signal transmission via standard fieldbus systems is fast, interference-resistant, and easy to design.
With these features, the DISOBOX Plus is ideally suited as a data acquisition and control unit for weighing systems – both in combination with the evaluation devices of the DISOMAT family and with PC-based weighing systems or PLC controllers.

Typical applications include:

- Road weighbridges
- Hopper scales
- Safety-relevant overload shut-offs in accordance with EN ISO 13849

The integrated weighing functions also allow the device to operate as a multi-channel weighing indicator, for example, for a series of simple container scales.

Equipment

The DISOBOX Plus has up to 8 measurement channels (depending on the model). One load cell can be connected to each channel.
Access to the individual signals allows for the precise adjustment of each load point (electronic corner adjustment) without the need to open the box, plug in, solder, and so on.
Each channel has its own high-resolution analog/digital converter (not a multiplexer). This makes the DISOBOX Plus ideal for measuring and controlling fast processes, such as feeding.

The integrated I/O signals enable direct control of time-critical signals, such as an overload shut-off, bypassing connected control systems.
Even during operation, the individual load cell signals are always available, for example, to monitor the sensors or, in the event of a fault, to quickly narrow down the cause of the issue.
Integrated diagnostic functions in the DISOBOX Plus allow for automatic checking of the load cell zero point and the load distribution on the scale.
The measurement channels can be grouped individually into up to 8 independent groups. Each group corresponds to a complete, legally approved scale, featuring:

- Filtering of the weight values
- Status determination (standstill and other conditions)
- Tare memory
- Zero-setting
- Multi-range/multi-division function (3 ranges)
- Zero tracking

Communication

All measured values (channel values and scales weights) can be transmitted on to higher-level systems 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 of 256 bytes, with a maximum data rate of 12 MBaud
- DeviceNet

The Modbus-RTU protocol can be directly connected via the internal serial interfaces.
The integrated Ethernet interface also supports the following protocols:

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

The Ethernet interface can also be used to configure the device. Key advantages of Ethernet communication include leveraging existing network infrastructures, high transmission speeds, and simultaneous access by multiple partners to a single device (e.g., diagnostics alongside normal system operation). External access, such as via the internet, can of course be restricted or completely blocked by assigning appropriate privileges.

The serial interfaces of the DISOBOX Plus are not exclusively reserved for communication with the system controller. Additional peripheral devices can also be connected, such as:

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

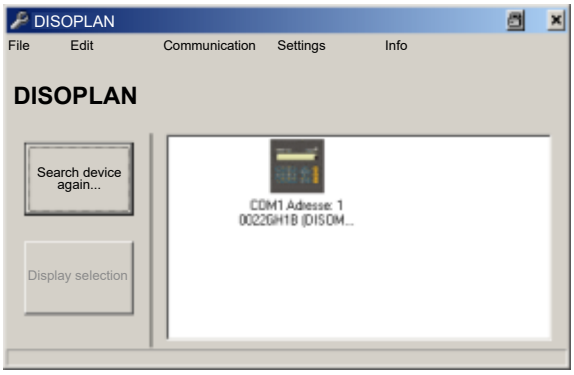
Inputs/Outputs

The inputs and outputs of the DISOBOX Plus (6 inputs / 6 outputs, 24 VDC) also enable direct, local process control, such as overload notifications, dosing contacts, or release signals.

Configuration/adjustment

In combination with systems from the manufacturer (DISOMAT, PC software DISOVIEW X), configuration and adjustment are typically performed via the connected master. For more extensive configurations or when used with third-party systems, the DISOPLAN configuration program is used. It allows access to all parameters for the complete calibration and can indicate weight values if required.
Additionally, the complete status of a DISOBOX Plus can be read (backup) and transferred to an identical or replacement device (restore) if necessary.
DISOPLAN runs on Windows versions 7, 8, and 10 and can communicate with the DISOBOX as follows:

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



Legal-for-Trade Verification

The DISOBOX Plus is EU-certified as a legal-for-trade weighing system, either as an A/D converter module in combination with a DISOMAT Tersus or the PC software DISOVIEW X, or as a standalone scale paired with an appropriate display and control device.

This certification allows the complete active electronics to be replaced in the event of a fault without requiring a new calibration or re-verification. All configuration and calibration parameters are stored in a non-volatile memory in the passive system component. Together with the backup/restore function in DISOPLAN, this effectively reduces downtime.

The system's lead seal without jumper connections generally allows the DISOBOX to remain closed. Parameterization and adjustments are made through the serial interface, the legal-for-trade protection is performed by a change counter for the relevant parameters. This eliminates the risk of damage to the electronics from dirt or moisture during maintenance or adjustment.

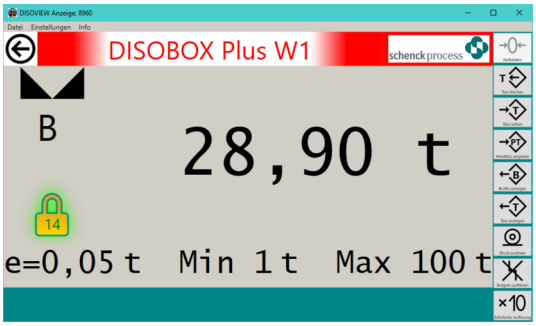
DISOVIEW X

Many data-intensive weighing applications, such as road vehicle scales or batch control systems, now use PCs for efficient and user-friendly operation, often in combination with conventional weighing electronics that handle legal-for-trade display and data storage.

The combination of DISOBOX Plus with the legal-for-trade weighing program DISOVIEW X offers new possibilities:

- The DISOBOX Plus is installed locally at the scale.
- Data transmission to the PC is digital and interference-free.
- No additional devices interfere with the PC.
- DISOVIEW X provides a legal-for-trade, user-friendly, and flexible scale display directly on the PC screen.
- DISOVIEW X's application interface allows easy access to the scale's data and functions from user programs.

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



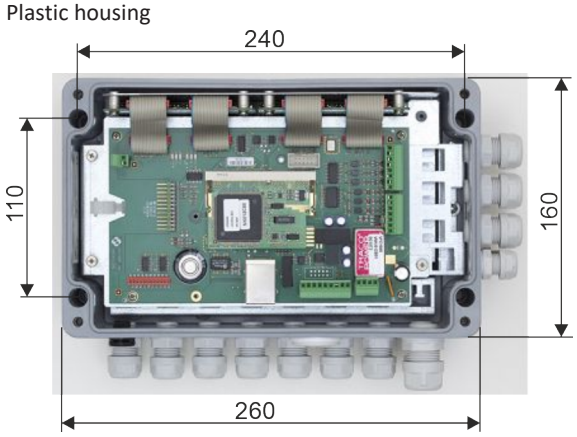
Accessories

The DISOBOX Plus is powered by a nominal 24 VDC (operating range 18–36 V). This power will often be available on-site. Optionally, up to three DISOBOX units can be powered by the additional power supply unit VNT 21000. The VNT 21000 also enables the conversion of an RS232 serial interface (PC-COM) to RS485, allowing distances of up to 300 meters to the DISOBOX. For hardware and process testing, the VWZ 21000 scale simulator is available, capable of individually simulating up to 8 load cells. Optional DISOBOX Plus units with integrated surge protection for the load cell connections are also available.

Non-Standard Applications

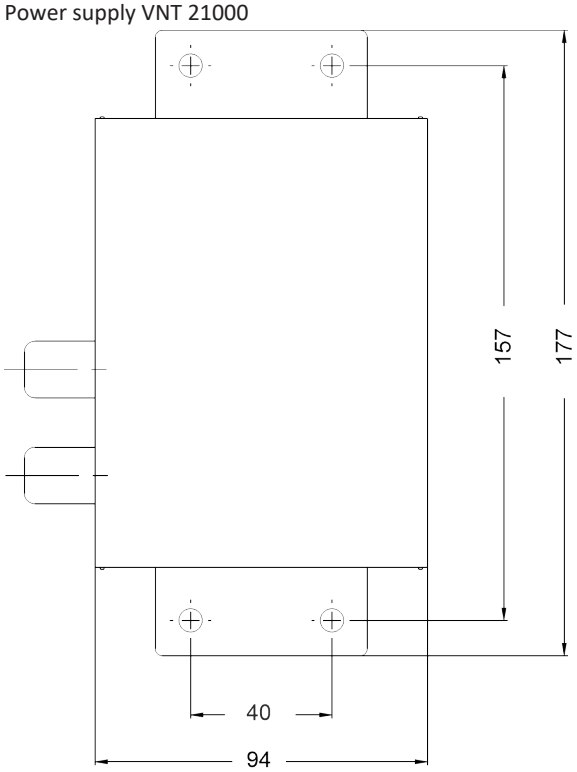
In addition to the weighing applications already described, the DISOBOX can also provide solutions to tasks that cannot be solved using conventional weighing electronics.

- If the function of individual load cell monitoring is not required, a group of load cells can be connected to each measurement channel (considering the total impedance).
- In this case, a single DISOBOX Plus can capture the weight of up to 8 scales (e.g., pre-containers) and transmit it to a controller.
- Through the individual configuration of each measurement channel, the DISOBOX Plus enables the construction of scales using load cells with different nominal loads or sensitivities. This is particularly useful for systems where individual bearing points are subject to significantly different loads.
- This feature allows, for example, the repair of systems with load cells that are no longer working. Instead of retrofitting the entire scale with new sensors as before, the defective cell can now simply be replaced.
  Note: In legal-for-trade systems, restrictions on the permitted combination of load cells may need to be observed.
  The DISOBOX Plus replaces the previous junction box, and in many cases, the old measurement cable can even be reused for serial transmission. This can turn a necessary repair into an attractive upgrade.
- Plastic housing



Height: 90 mm, Attachment material included

- Stainless steel housing: 300 x 200 x 121 mm (L x W x H), mounted via 4 brackets, hole spacing 330 x 144 mm, maximum screw diameter 10 mm
- Power supply VNT 21000



Height 46 mm

Technical Data

Description	Value
Processor	ARM-9 high-performance controller
RAM	32 MB
Flash	8 MB
EEPROM	16 kB
Clock	Real-time clock, back-up time 2 weeks
Display	-
Keyboard	-
On-site housing	Plastic, protection class IP66, plastic cable glands, impact resistance of 7 joules
On-site housing optional	Stainless steel 1.4301, brass screw connections Aluminium, brass screw connections
No. of measuring channels	4 … 8, type-dependent
Load cell 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-wire
Scales	Max. 8, the measuring channels can be freely assigned to the scales
Minimal signal voltage	0.5 µV/d * √n n: the number of the measuring channels per scales
Number of digits in legal-for-trade operation	N ≤ 10000 d
Multi-range / multi-interval scales	3 ranges, each N ≤ 8000 d; $E_{max.}/d_{min.}$ ≤ 15000 d
Linearity error	< 0.05 ‰
Zeropoint stability, Tk_0	< 0.6 µV/10 K < 0.03 ‰/10 K with respect to the maximum 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	Operating temperature: -30 °C … +60 °C (capable for legal-for-trade:-30 °C … +50 °C)
	Storage temperature: -30 °C … +60 °C
Electromagnetic ambient conditions	E2 (OIML D11)
Binary outputs	6 x 24 V galv. free, max. 100 mA 2 x 3 each with common root
Inputs	6 x 24 V isolated, with common root
Serial interface	S1: RS485-2-wire galv. free S2: RS485-2-wire galv. connected S3: RS232 DC coupled 9600 … 115000 Baud
Ethernet interface	Full duplex 100 MBaud
USB interface	1 x USB 2.0 Host
Fieldbus protocol	Modbus, Modbus-TCP

Description	Value
Optional:	PROFIBUS, PROFINET I/O, DeviceNet, EtherNet/IP

Delivery items

Delivery items	Type	Material no.
Basic Units		
Basic unit DISOBOX, A/D-conversion unit with 8 measuring channels	VME 21080	V081000.B01
Basic unit DISOBOX, A/D-conversion unit with 4 measuring channels	VME 21040	V081001.B01
Basic unit DISOBOX, A/D-conversion unit with 8 measuring channels for ATEX category 2D aluminum housing	VME 21080-2D	V081102.B01
Basic unit DISOBOX, A/D conversion unit with 8 measuring channels and over-voltage protection for the load cell connections	VME 21081	V081003.B01
A/D conversion unit with 4 measuring channels and overvoltage protection for the load cell connections	VME 21041	V081004.B01
A/D-conversion unit with 8 measuring channels, stainless steel housing	VME 21084	V081005.B01
A/D-conversion unit with 4 measuring channels, stainless steel housing	VME 21044	V081006.B01
Basic unit DISOBOX, A/D-conversion unit with 4 measuring channels, temperat-ure monitoring, stainless steel housing	VME 21046	V081002.B01
Bus Cards		
Option PROFIBUS, mounted and wired	VPB 28020	V081904.B01
Option PROFINET, mounted and wired	VPN 28020	V535496.B01
Optional DeviceNet, mounted and wired	VCB 28020	V081906.B01
Optional interface extension, mounted and wired	VSS 28020	V081905.B01
Analogue I/O		
Analogue input module	VAI 20100	V078800.B01
Analogue output 0 … 20 mA, max. 11 V	VAO 20100	V078801.B01
Analogue 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 bracket for connecting the PAL terminals from the load cells	–	V035403.B01