

ZAM - SERVIS s. r. o.

KŘIŠŤANOVA 1116/14, 702 00 OSTRAVA 2

USER MANUAL

Continuous conveyor scale

KPV-01

Documentation No.: 206 31

This User Manual contains:

Instructions for assembly, installation, putting into operation, usage, operation, setting, maintenance and service, disassembly, disposal, and technical conditions

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User Manual

This user manual contains instructions for assembly, installation, putting into operation, usage, operation, setting, maintenance and service, disassembly, disposal, and technical conditions.

All workers carrying out installation, putting into operation, operation, maintenance and service must be familiarized in a demonstrable way with these instructions for operation. Keep this manual for further reference.

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Use

The KPV-01 continuous conveyor scale is used to measure the performance of a conveyor belt (weight flow) and to calculate total weight. The performance of a conveyor belt is usually measured in t/h or kg/s. KPV-01 is designed for the measuring of weight of loose and lump materials such as coal, coke, gravel,.... The scale and the evaluation unit are designed for heavy duty operation and for areas of methane explosion hazard SNM 1 and 2.

Description and function

The measuring system of the continuous conveyor scale consists of the MSI weighing stand with a roller whose construction is adapted to the conveyor belt, and the BW100 evaluation unit with KPV-01 flameproof enclosure. The weighing stand contains G4-TBSP strain gauges which sense the longitudinal load of the conveyor belt m_l [kg/m]. Another input is the belt speed v [m/s], which is usually set as a constant, but it can also be measured. From these two values, the performance of the conveyor belt (or the weight flow) Q_m [kg/s, t/h] is calculated by the evaluation unit.

$$Q_m [kg / s] = m_l [kg / m] \cdot v [m / s]$$

The evaluation unit can display the performance of the conveyor belt [kg/s, t/h], the belt speed [m/s], the total weight counter (internal totalizer 1 and 2) [t, kg], or the longitudinal load of the belt [kg/m]. The evaluation unit can be programmed so that it switches the output (external totalizer 2) if the total weight of the material passing reaches a certain level. This output will switch an output relay, whose contact is conducted to the Ex e terminal block. The unit is factory set so that the relay will switch a short 0.3s pulse after each ten tonnes. It is possible to set 1:1 switching ratio by changing the function of KA2 relay.

The KPV-01 electrical and electronic devices are located in an Ex d flameproof enclosure with IP54 protection; there are also Ex ib converters to intrinsically safe levels. The enclosure cover can be ordered with a sight hole for the display or without a sight hole (standard). The terminal part is of secured Ex e design. It contains 15 screwless WAGO terminals, 3 M20 plastic bushings and one M40

bushing. There are two 21mm holes which serve for the connection of protected cables to the strain gauges, or they may be equipped with M20 bushings. The G4-TBSP strain-gauge sensors of the MSI weighing stand are simple devices according to ČSN EN 50020.

The power supply of the KPV-01 is led from the Ex e terminals through the switch and fuses to the transformer, which provides galvanic separation from the supply voltage. From the transformer, the evaluation unit, the totalizer relay, and the intrinsically safe converter for the sensing of the conveyor operation switch are fed. The evaluation unit provides the power supply of the strain gauges via the intrinsically safe converters. The signal from the strain gauges goes back to the evaluation unit again via the intrinsically safe converters. All intrinsically safe inputs and outputs can be led in one cable.

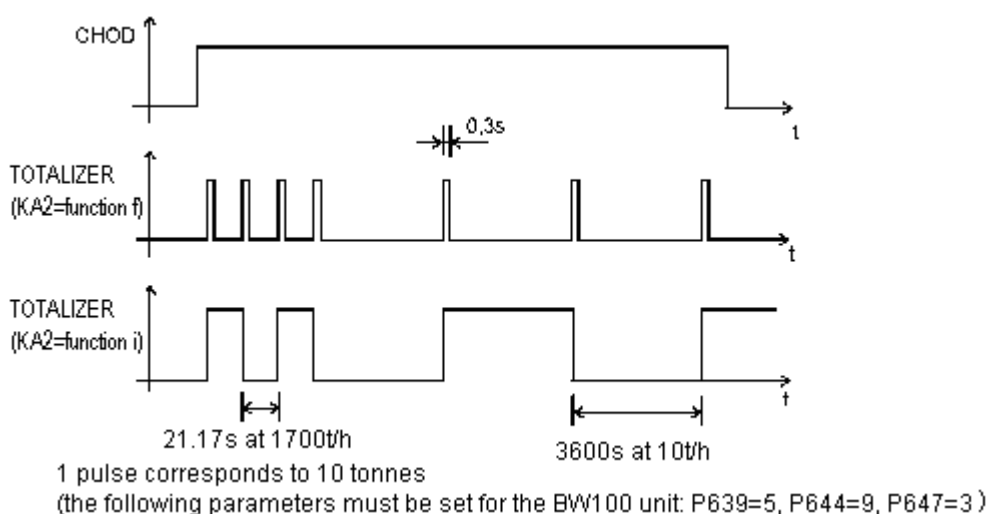
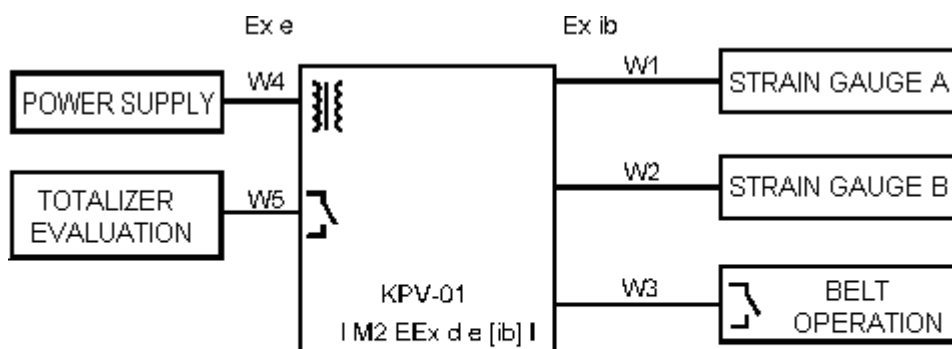


Fig.1: Block diagram and function of the totalizer

Installation and assembly

1. Mount the KPV-01 near the weighing stand so that shocks and mechanical strain are minimized. Unused bushings must be replaced with original fillings.
2. The installation of the station in explosion-hazard areas must comply with this user manual, local operating instructions, ČSN EN 50 014, ČSN EN 50 018, ČSN EN 50 020 ed.3, ČSN EN 60 079-0, ČSN EN 60 079-1 and other valid standards and regulations.
3. The KPV-01 is fastened to a fixed base in the vertical position, using four M8 screws. To comply with electric shock safety requirements according to ČSN 332000-4-41, the cover of the station must be earthed by connecting it to the main equipotential bonding. Use the screw-in terminal

on the side of the flameproof enclosure to connect the earth conductor and the equipotential bonding conductor.

4. Connect the 230V/50Hz supply voltage to Ex e terminals 1,2,3 and the totalizer output to Ex e terminals 4,5 via the M20 and/or M40 bushing. The cable diameter in the M20 bushing can be 6-13mm. The cable diameter in the M40 bushing can be 17-28mm. The cross section of the connecting wires can be 0.5-4mm².

5. The KPV-01 can be connected only to the MSI weighing stand with G4-TBSP strain gauges. Connect the protected strain gauge cables to Ex ib terminals 7-13 through the 21mm holes. Connect the operation switch to Ex ib terminals 14,15 via the M20 bushing. The cable diameter in the M20 bushing can be 6-13mm. The cross section of the connecting wires can be 0.5-2.5mm². Each strain gauge as well as the operation switch must have a separate cable.

6. The bushings must be properly fastened so that they grip and seal the cables sufficiently. It must be ensured during the installation and use that the cables are released from strain. No conductor ends may be placed loosely. There must be a tracking distance and clearance of at least 50mm between intrinsically safe terminals and terminals which are not intrinsically safe. After the assembly is finished, all parts of the cover must be properly fixed and sealed. Take particular care when handling the covers so that the internal components are not damaged.

7. When closing the device, clean the contact surfaces from dust and apply some lubricant grease (Mogul K3) on them. The contact surfaces which form an explosion-proof joint must be always free of any surface treatment, intact, and spread with lubricant grease. Under each screw of the explosion-proof enclosure there must be a spring washer. The M10 screws on the cover must be fastened using the specified torque of 8-10 Nm and the M5 screws using 1-2 Nm torque.

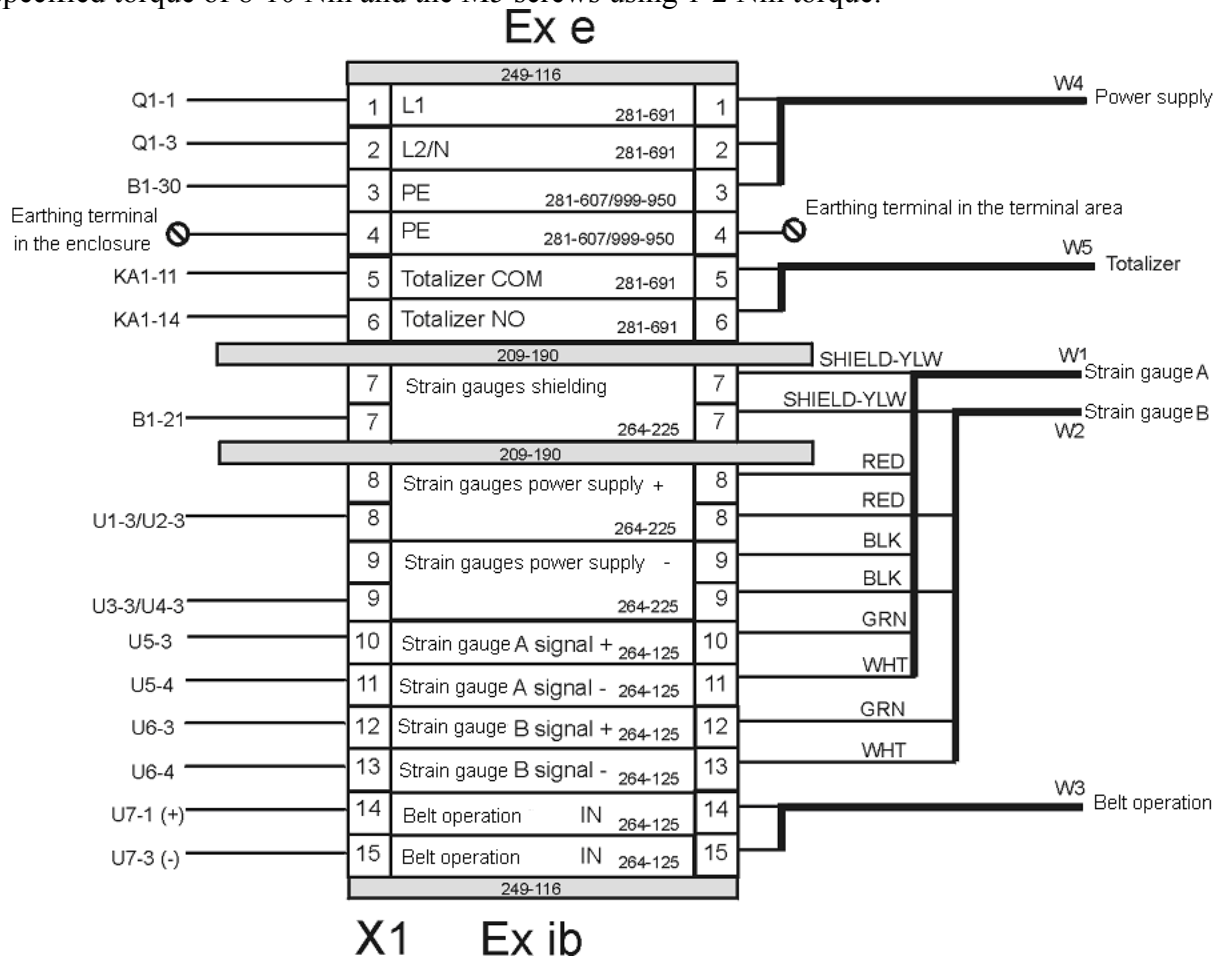


Fig.2: Terminal block X1

Operating instructions

Except for the power supply, the KPV-01 is an unattended device. The operation of the continuous conveyor scale depends on the given application. The installation, calibration, adjustment, and operation of the scale must be done according to the operation manual of the Siemens Milltronics BW100 unit and the user manual of the MSI weighing stand.

Maintenance

- Remove dust and impurities from the surface with a dry cloth or a brush; further cleaning of the surface should be carried out with a cloth dampened in water containing common detergents or spirit-based cleansers. Check the state of the enclosure and the sealing of the case. If some dust or dampness gets inside the case, clean and dry the device. Lubricate the device once or twice every 2 years using Mogul K3 (or a lubricant of similar composition). Before applying new grease, remove the old layer with a cloth. Keep the contact surfaces of the individual parts clean and intact.

Service and spare parts

All repairs and spare parts are provided for by the manufacturer, except for the replacement of the following fuses:

F1,F2 T160mA / 250V, glass fuses 5x20mm

Delivery, transport and storage

- KPV-01 continuous conveyor scale
 - without a sight hole (standard)
 - with a sight hole for the display (per order)
- The delivery includes
 - This User Manual
 - Appendix 1: Operation manual for the Siemens Milltronics BW100 unit.
 - Declaration of conformity.
 - Certificate of quality and completeness of the product.
 - The product.
- The parts are delivered unpacked.
- During transporting all parts it is necessary to minimize possible shocks and impacts. Storage in dry areas at a temperature of 0 to 40°C in one layer is required.

Fire safety, ecology, disposal, recycling

- Do not expose to open flame; combustion results in the formation of harmful substances.
- When correctly used during operation it does not cause any harm to its surroundings and environment.
- After the service life expires, return the product to the manufacturer for disposal. The address is available in this document.



- Electrical and electronic equipment must not be disposed of as common municipal waste. The product must be handed over to a relevant collecting point for proper processing, regeneration and recycling of electrical and electronic equipment.
- More detailed information about collecting points and recycling of this product may be required from local authorities, your local municipal waste disposal company, or your retail agent.

Manufacturer and service organization

ZAM-SERVIS s.r.o. Křišťanova 1116/14, 702 00 Ostrava-Přívoz
tel: 596 135 422 e-mail: zam@zam.cz

Related standards, regulations, documents

LVD:

- ČSN 33 2000-4-41 Electrotechnical regulations – Electrical devices – Part 4: Safety – Chapter 41: Protection against electric shock
- ČSN 33 0010 Electrotechnical regulations. Electrical devices. Division and terms
- ČSN EN 60529 Protection levels (protection - IP code)
- ČSN EN 60 439-1 Low voltage switchboards. Part 1: Type tested and partially type tested switchboards

EMC:

- ČSN EN 60 439-1 Low voltage switchboards. Part 1: Type tested and partially type tested switchboards

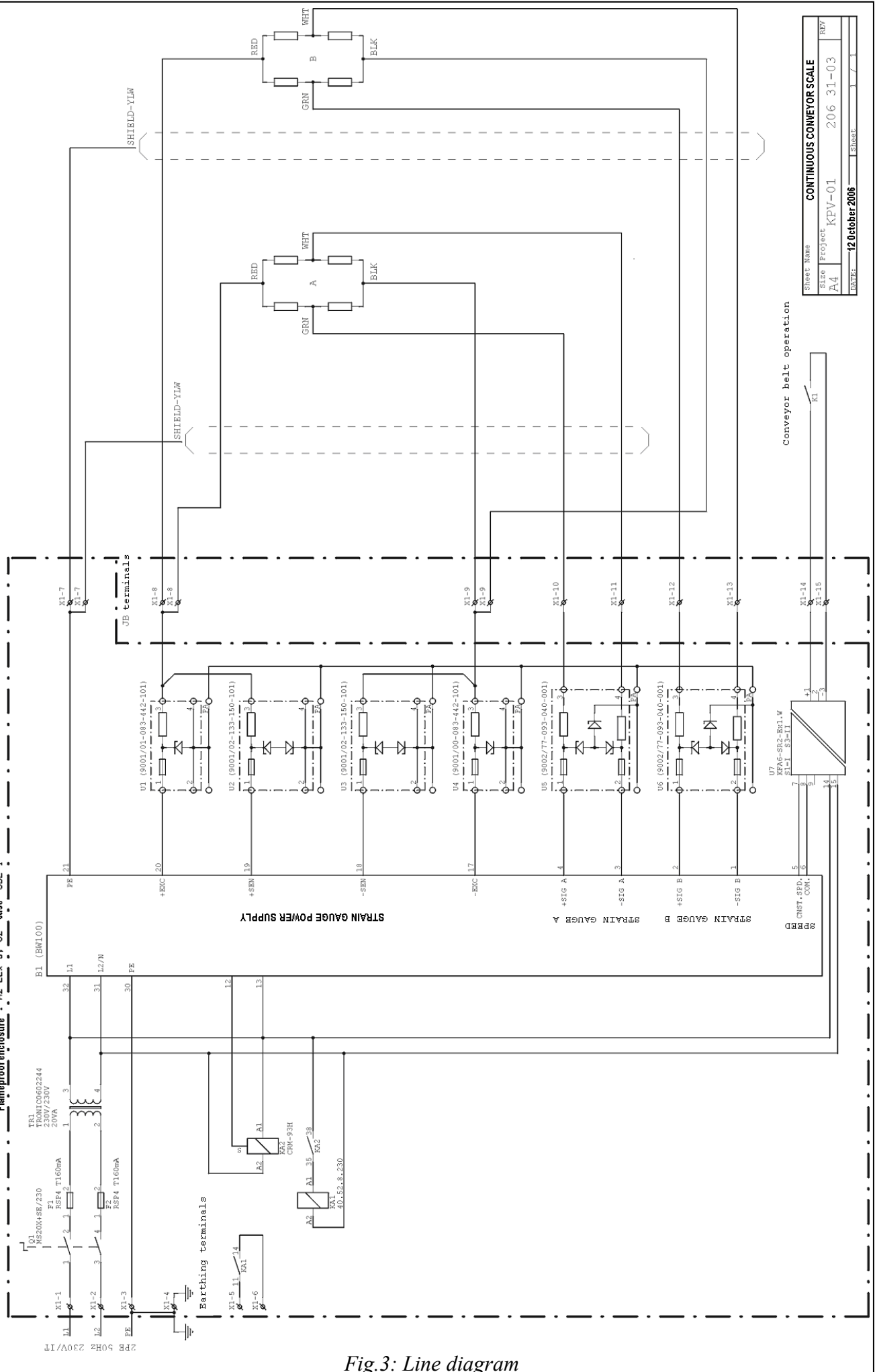
ATEX:

- ČSN EN 50014 Explosion-proof electric devices – General requirements
- ČSN EN 50018 Explosion-proof electric devices – Flameproof enclosure "d"
- ČSN EN 50020 ed.3 Explosion-proof electric devices – Intrinsic safety "i"
- ČSN EN 60079-0 Electrical devices for explosive gas atmosphere – Part 0: General requirements
- ČSN EN 60079-1 Electrical devices for explosive gas atmosphere – Part 1: Flameproof enclosure "d"
- ČSN EN 1127-1 Explosive environments – Prevention and explosion protection – Part 1: Basic terms and methodology
- ČSN EN 1127-2 Explosive environments - Prevention and explosion protection – Part 2: Basic conception and methodology for mines

Technical parameters

Rated supply voltage, terminals 1,2	230VAC, 50Hz, TN-S or IT system
Rated power input	20VA
Rated fuse current	0.16A
Max. switched voltage of the totalizer, terminals 4,5	250VAC / 45VDC
Max. switched current	5A
Max. switched power	100VA / 100W
Min. switched voltage	10V
Min. switched current	10mA
Cross-section of connected wires, terminals 1-6	0.5mm ² to 4mm ²
Cross-section of connected wires, terminals 7-15	0.5mm ² to 2.5mm ²
Cable diameter in the M20 bushing	6 to 13mm
Cable diameter in the M40 bushing	17 to 28mm
Distance tensiometer from evaluation electronics	100m
Temperature range	0 to 40 °C
Relative humidity	max 95%, no condensation
Protection	IP 54
Dimensions (sight hole design)	380x510x205mm
Weight	40kg
Explosion protection	I M2 EEx d e [ib] I
Intrinsically safe parameters	
U1, U4 converter	U1 terminals: X1-8
U1 = 9001/01-083-442-101	U4 terminals: X1-9
U4 = 9001/00-083-442-101	U _o = 8.3V
	I _o = 442mA
	P _o = 917.2mW
	L _o = 0.5mH
	C _o = 73μF
U2, U3 converter	U2 terminals: X1-8
9001/02-133-150-101	U3 terminals: X1-9
	U _o = 13.3V
	I _o = 150mA
	P _o = 498.8mW
	L _o = 7mH
	C _o = 5.6μF
U5, U6 converter	U5 terminals: X1-10, X1-11
9002/77-093-040-001	U6 terminals: X1-12, X1-13
	U _o = 9.3V
	I _o = 40mA
	P _o = 0.09mW
	L _o = 87mH
	C _o = 31μF
U7 converter	U7 terminals: X1-14, X1-15
KFA6-SR2-Ex1.W	U _o = 10.6V
	I _o = 19.1mA
	P _o = 51mW
	L _o = 390mH
	C _o = 16.2μF

Flameproof enclosure I M2 EEx d, UZ case SDE 1



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Size	Project	REV
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DATE:	12 October 2006	Sheet

Fig.3: Line diagram

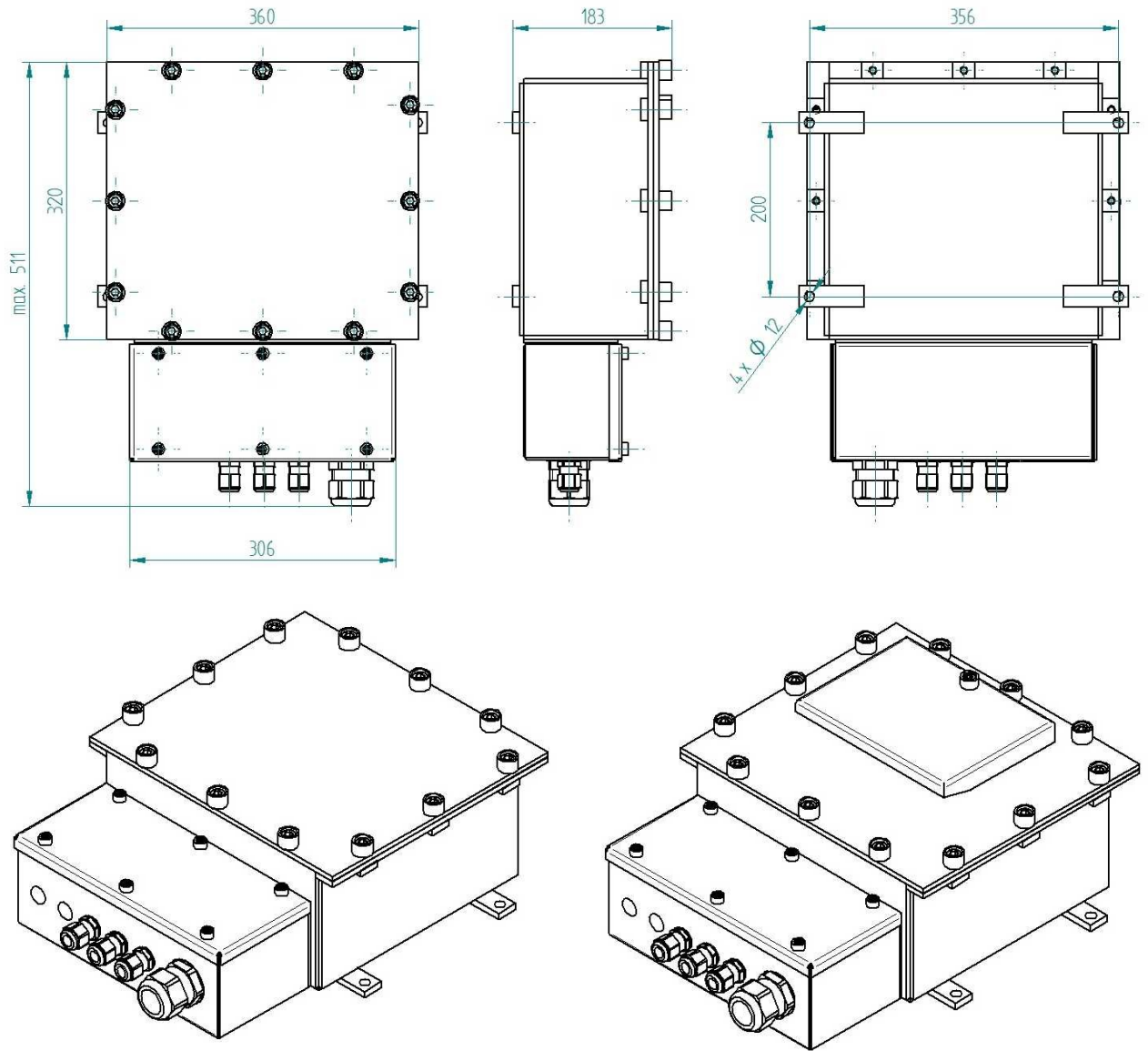


Fig.4: Mechanical dimensions (cover without a sight hole-standard; with a sight hole for the display)

Fig.5: The inside of the device