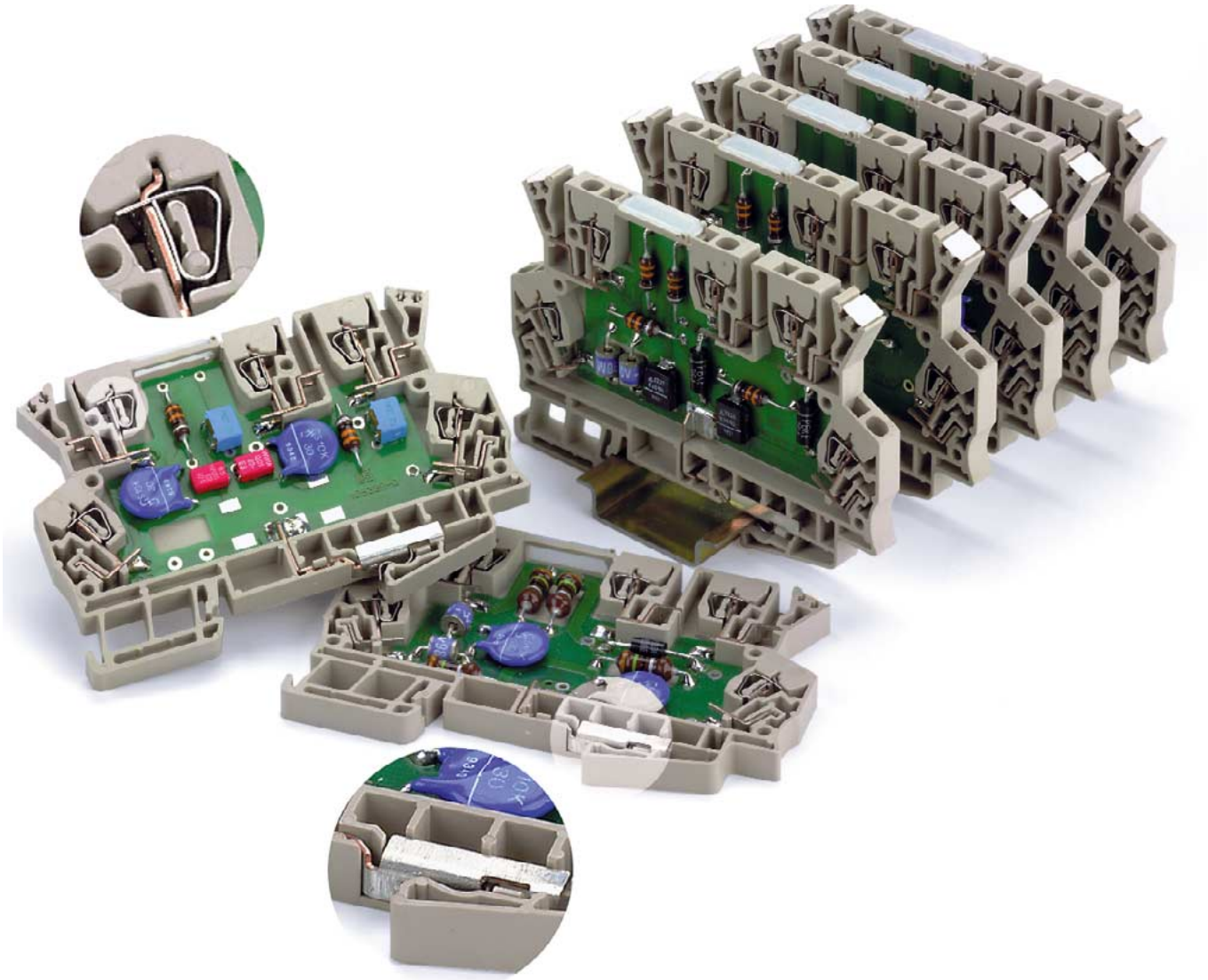


Overvoltage Protection

The electronic equipping of electrical installations is becoming increasingly complex. PLC controls and PC applications are replacing hard-wired relay technology. Interferences from overvoltage or switching actions that enter installations cause failures or damage to the installation components. Appropriate overvoltage protection measures can largely eliminate this damage.

Protection elements

Gas-filled overvoltage arresters (gas-filled arrester), voltage dependent resistors (varistors) and voltage dependent diodes (suppressor diodes) are used as voltage limiters.

• Gas discharge tubes
Gas discharge tubes are composed of a metal-plated aluminium-oxide tube or glass as an isolating body, which is connected, vacuum-tight, with two or three electrodes made from a special alloy. The gas discharger, filled with a noble gas, discharges the overvoltage-loaded energy to earth and returns to a high resistant state, once the overvoltage has faded, to connection voltages (<100V) and short-circuit currents <0.1A. A back-up fuse is necessary. Gas discharge tubes are used that are not tritium doted.
The rated data of the gas discharges are contained in the catalogue in accordance with CCITT (volume IX, K, 12)

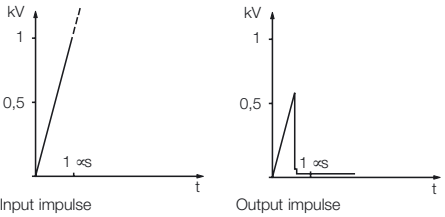
DC pull-in voltage
This value is determined with a du/dt of approx. 100 V/s (statistical behaviour). The tolerance is as much as +/- 20%.

Impulse sparkover voltage
This value is determined with a du/dt of approx. 1000 kV/µs (dynamic behaviour). Typical values are <800V.

Discharge current
Two procedures are presented, DIN VDE 0432 Part 2, IEC 68 and CCITT.
CCITT: 10 loads (8/20 µs) at intervals of 3 min, or acc. to VDE; 5 loads (8/20 µs) at intervals of 30 sec.

Typical values are 10, 20 kA.

DIN IEC 68 lists the mechanical / climatic conditions. In accordance with this standard, mechanical conditions such as vibration, shock and climatic conditions of the gas dischargers are tested, for example, Part 2.3 humid heat over a period of 21 days, 40 °C, 93% relative humidity. Operating temperature range:
–40 C...+90 °C.
The capacity of the earth is typically several pF.

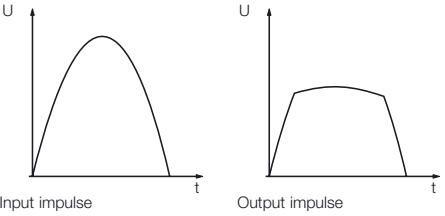


• Varistors

These voltage dependent resistors are made of zinc oxide. The varistor is offered in different designs. Varistors in disc design are primarily preferred. A false current of a few µA flows through the varistor if it is subjected to the max. permitted voltage.
Varistors are tested by the manufacturer according to DIN IEC 68 and according to the quality control system CECC 42000 (DIN 45923).

DIN IEC 68 lists the mechanical / climatic conditions. In accordance with this standard, mechanical conditions such as vibration, shock and climatic conditions of the varistor, for example, Part 2.3 humid heat over a period of 21 days, 40 °C, 93% relative humidity. Operating temperature range: –40 °C...+85 °C.
Storage temperature up to +125 °C.

CECC 42000 lists, e.g. the dielectric strength (>2.5 kV), impulse current derating (8/20µs), insulation resistance > 1 GOhm and the typical response time of < 25 ns.



Varistors used in standard mains impedances should be of the type S14 and S20. S14 can be fused with max. 10A, the S20 with max. 16A.
Energy uptake (2 ms) of the varistor is between 0.3 J to 200 J, depending on design.
The capacity of the varistor is design-dependent and is between 0.1 and 37 nF at 1kHz.

Varistor Approvals

- Underwriters Laboratories, Inc. (UL)
- UL 1414 Across-the-line components: File E77005 (N) Types S05 /S07 / S10/S14/S20, at voltage levels K130 to K 300
- UL 1449 Transient voltage suppressors: File E77005 (M): All disc types which are built primarily into DKU, EGU, LPU, RSU.
- Canadian Standards Association (CSA)
- Class 2221 01 Accessories and Parts for Electronic Products

  All disc types with a voltage of > 115 V; for use as across-the-line transient protectors: File LR 63185
- Schweizerischer Elektrotechnischer Verein SEV

  Protection Class I, IP00, Test conditions CECC 42200; Test report 90.1 02484.01 of 17.7.91 for S05/S07/S10/S14/S20.

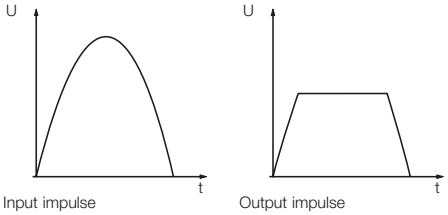
• Suppression diodes

Suppression diodes work on a similar principle to conventional zener diodes, they are though many times faster. The response times are in the range of several ps to 5 ns. The energy absorbtion (1ms) of the suppresor diodes is, depending on the type, 0.3 J to 1.5 J.

The capacity of the diodes is typically between 9500...360 pF at 1 MHz.
The supressor diodes can convert max. 1500 W for 1 ms to heat, depending on type. If the diode is overloaded, the P-N-interface short circuits. If energy continues to be fed, the P-N interface is destroyed.

These diodes can be used as protective circuits to protect coils, or can also be used in combination with gas arrestors or varistors.
Supressor diodes are available as unidirectional and bidirectional diodes. Weidmüller often uses unidirectional diodes for 24 VDC overvoltage protection modules.

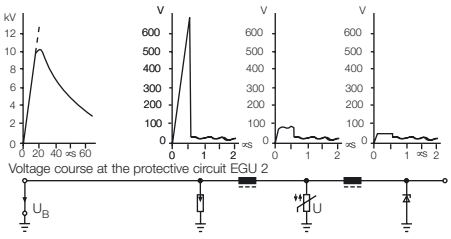
Here the voltage in the non-conducting direction is typically 29V and 0.7 V in the conducting direction.



Areas of application for overvoltage protection in measuring and control circuits

Combination circuitry

By employing a combination of the aforementioned components, close overvoltage protection modules can be provided to meet individual requirements. When a voltage pulse strikes the input of this unit, the gas discharge tube ignites and discharges the high current. The residual impulse is dampened by connected inductors, and subsequently absorbed by a varistor or suppression diode and limited. If the gas discharge tube does not ignite (i. e., slower increase in voltage), the impulse will be processed only by the varistor or the suppression diode.
The sequence of the components results in increased sensitivity in the direction of the output. An interference voltage with the standard rise time of 1 kV/µs and a peak value of 10 kV at the input will be limited to approximately 600 – 700 V by the gas discharge tube.



The second stage of the varistor, which is coupled via an inductor to the first, limits this value to about 90 V. The voltage impulse is further limited by the suppression diode to about 35 V at the output. The subsequently connected electronics need only absorb a voltage impulse of about 1.5 x U_B.

Overvoltage surges on measurement and control signals, data or power supply cables can cause considerable operational disruption. Failures of electronics or of complete systems can cause serious damage to property and even personal injury. Overvoltages arise from, among other things, atmospheric discharges and switching operations and are relevant in the following areas:

- Telemetry Control systems
- Signal systems
- Data processing equipment
- Process control terminals
- Instrumentation and control technology
- Meteorological stations

These systems must be protected against overvoltages.

The necessity of providing overvoltage protection is illustrated in the following examples:

- In measuring and control stations, all sensor and actuator cables from the field and the sensors themselves must be protected against overvoltage.
- Power stations, water tapping systems or sewage treatment plants must be protected not only against direct lightning strikes, but also against the effects of remote strikes. The sheer size of these plants and the extensive electronic systems they incorporate make overvoltage protection a necessity.
- In traffic control systems, such as lock and signal systems overvoltage protection units are essential for safety.
- Frequency converter controlled machines modulate system voltage with high-frequency interference and also affect other electronic units.

- Power supply and data lines of computers and their peripheral equipment must be protected to ensure safe operation.

Overvoltage Protection

Introduction:
Overvoltage protection in terminal format:
Miniconditioner

Installation of Units

To achieve a protection concept for an installation, all wires must be protected by overvoltage protection products.

PU overvoltage protection (PU C and PU B) is used to protect low-voltage consumers

installation and electronic devices against overvoltages resulting from atmospheric discharges (storm) or far more often switching operations (transient) in the mains. Powerful impulses are weakened by the PU module. These weakened impulses can still lead to interferences in process control circuits.

In this case three stage overvoltage protection terminals with gas dischargers, varistor and suppression diodes (TAZ) together with inductance decouplers are used.

Gas dischargers are over voltage protection terminals that work with a spark gap. An arc is ignited between the electrodes when an overvoltage occurs; the spark gap changes abruptly from being in the highly resistive range to being in the low resistive range.

Varistors are used for medium to high power ratings. The metal oxide varistors reduce the resistance when the voltage is too high. The varistor can become low resistant within 25 ns, thereby discharging the overvoltage.

Suppresor diodes function in a similar manner to zener diodes. They have a higher impulse load capacity. The response times are in the ps range.

Combination circuits

Combining the afore-mentioned components, creates the highly efficient overvoltage protective terminal MCZ OP. High currents can be discharged via the discharge tubes.

The varistors and suppressor diodes absorb the residual voltages. Decoupling is achieved via the integrated inductors.

The energy is discharged via the TS contact. A tension clamp terminal point for the PE connection is available.

Mounting rail contact

Mounting rail contact is achieved automatically when mounting the modules.

In order to discharge energy up to 10 kA (8/20us) via the MCZ terminal, the mounting rail must be earthed. EMC regulations require that the mounting rail be screwed to an earthed mounting plate. In addition, it is possible to create the PE contact via the tension clamp terminal of the MCZ OVP.

Application

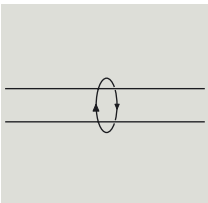
The MCZ OVP overvoltage protection module in terminal format for current loops has a quick switching suppression diode (10-100 ps) in the output. This diode clamps the voltage within the loop when overvoltages occur. This protects sensors and actuators from damage. The MCZ OVP has a tension clamp connections for fast wiring of the MSR terminals.

Energy is discharged via the contact to the mounting rail. The contact is made automatically when the terminal is mounted onto the rail.

Installation of overvoltage protection units

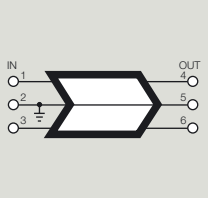
The sensitive overvoltage protections modules are to be installed in immediate proximity to the device to be protected. The protective earth of the device to be protected must be connected to the overvoltage protection module.

- The earth wire to be installed should have a cross-section between 2.5 to 4.0 mm2.
- The connections must be kept as short as possible.
- Avoid connecting several earth wires in series.
- The earthing installations should be designed to comply with VDE 0100, VDE 0185, VDE 0800 and the telecommunications construction regulations FBO 14 of the German Telekom.



Installation of cables

Signal cables should be routed in the installation via the shortest possible path to the overvoltage protection units, and further to the electronics. Parallel routing with other cables is to be avoided, as is the assembly with protected and unprotected cables (attention is made to cable routes and cable ducts!). If parallel routing cannot be avoided, a minimum spacing of 0.5 metres should be maintained.



Module marking

The overvoltage protection modules are marked either with an arrow or the word “IN”. The arrow points to the protected side of the module, i. e., an overvoltage is suppressed in the direction the arrow is pointing (see combination circuit).

Installation of overvoltage protection in general

Installation of overvoltage protection in electrical facilities

An external and internal lightning protection system according to DIN VDE 0185 Part 1, 2 and 3; Part 100, IEC 1024-1: 1990 is recommended. The following describes the external lightning protection system (air terminations, down facility, etc.) and also the internal lightning protection system (potential compensation, planning, etc.). The external lightning protection system is to be planned, installed and tested by lightning-protection construction companies. The internal lightning protection system is concerned with the connection of all electrical metal components.
DIN VDE 0100 §18, protection of the overhead power network, is also applicable in this case. A network protection system should be placed in these systems at intervals of a maximum of 1 km. According to the draft version of DIN VDE 0675 Part 6, a voltage limitation of up to 6 kV is permitted. Further protection modules (PUC 3, three/four phase power overvoltage protection) can be installed in the supply (distribution).

Here, according to the draft version of DIN VDE 0675 Part 6, a voltage limitation of up to 4 kV is permitted.

The power overvoltage protection PU can then limit the incoming interference voltages to approx. 1.3 kV. This voltage is then so low that it causes no damage to the installation. This power voltage protection system is grouped in Class C according to DIN VDE 0675 (Draft). The selection and installation of electrical equipment, grounding, protective wire, potential compensation cables is described in DIN VDE 0100 Part 540. This DIN VDE also describes the selection and installation of the main potential compensation cables (DIN VDE 0100 Part 410) and the potential compensation rail according to DIN VDE 0618 Part 1.
The DIN VDE 0100 Part 443 (IEC 64 (CO) 168) refers to lightning areas.

It is subdivided according to AQ3:

Direct lightning effects, up to AQ1: negligible lightning effects.

Use of Overvoltage Protection

Products that are connected to the power supply must be designed according to DIN VDE 0110 Part 1, Part 2 and DIN VDE 0160. DIN VDE 0110 covers the insulation coordination for electrical equipment in low-voltage installations. This DIN VDE covers the overvoltage classes and the protection facilities as well as the rating of clearance and creepage distances.

VDE 50178 covers the use of electrical equipment in electrical power installations. Here it is stated that the equipment must have a basic resistance towards overvoltages. If this cannot be achieved, then it is pecified that overvoltage limitation must be used to reduce overvoltages. The following overvoltage protection devices are for this purpose.

Electromagnetic compatibility

Devices, systems and facilities must be tested to ensure they fulfil the requirements of the protection objectives of electromagnetic compatibility.
One test is the interference strength test according to EN 61000-4-5; (IEC 801-5), ENV 50142. The installation types are categorised in the standard. In order to achieve a “well protected area” according to EN 61000-4-5, an approximate protection must be installed, e.g. gas-filled arresters, varistors, and fine protection from a combination of gas-filled arresters, varistors and suppressor diodes. These can be chosen according to the block diagram in the following chapter.

The VDE 0113 Part 1 requires that interference signals from electrical equipment of machines must be below a spe-cific permissible level. To achieve this, ca-pacitors, chokes, diodes, Zener diodes, varistors or a combination of these can be installed. Overvoltage protection systems are also used in special applications, for example. in the installation of electrical facilities in power stations. This is described in KTA 2206 “Design of nuclear power stations for protection against lightning strikes. In addition to potential compensation, overvoltage protection of electronic systems is required. This also applies to DIN VDE 0800 Part 1, Part 2 and DIN VDE 0845 Part 1. These VDEs are applicable to telecommunications technology and affect the installation of the facility, grounding and the potential compensation in telecommunications technology.

The DIN VDE 0845 Part 1 is valid for the measures and protection of telecommunication installations from the effects of lightning, static charging, and overvoltages from electrical power installations.

Housings

The individual components to be built in are either in terminal design, component housings or locking socket (RS80) on a PCB. Further information, please refer to page 280, where the clampable wire cross-sections are specified.

Passive components, coils, LEDs, fuses and resistors

In the main, rod-core coils made from ferrite and current compensating coils with inductors from 15 µH...4 mH for coil currents of 6 A...50 mA are used.
It is important that the current is not exceeded. This prevents that the maximum magnetisation (saturation) of the coil core and the coil power loss are not exceeded. A times 20 switch-on current that flows through the coil is hereby permissible. Afterwards the coil must be allowed to cool down.

The selection of the LED colour is made according to EN 60204.
Green LEDs indicate the presence of a voltage supply, yellow LEDs indicate the switching status of the relays.

As a rule, 5 x 20 mm G miniature fuses are used according to DIN VDE 0820 Part 22 (EN 60127-2).

Classification is made according to small and large breaking capacities as well as between quick-blow and slow-blow breaking capacities. The corresponding rated data such as max. power loss, rated voltage, etc. can be taken from the standard.

The flame retardant, fully-insulated wire resistors used are surge-proof and fulfil the requirements of DIN 44061, 44062, 45921 P. 107 and 49521 P. 1014.

Technical data of the resistors:

- loading capacity 0.6 W
- max. surface temperature 155 °C
- U_{max} (1 min) 300 V_{eff}
- thermal impedance 140 K/W
- temperature coefficient ±25 x 10^{-6}/K

Marking Material Dekafix and WS10

The graphic symbols used for printing of Dekafix systems comply with DIN 40900. The plastic material is made of polyamide. The temperature limit for polyamide is according to DIN VDE 0304 Part 21
T = 100 °C

The flammability is classified at level V 2, according to UL-94.The material is halogen-free and is wipe resistant according to IEC 947-7-1 Item 5.1.

Overvoltage Protection

Criteria for selecting Weidmüller overvoltage protection units in measuring and control circuits

1.

- Determine maximum operating voltage of the equipment to be protected

2.

- Determine maximum operating current of the equipment to be protected

3.

- Select circuit configuration
- Binary signals
- Current loops
- Symmetric loads
- Power supplies
- Serial data transmission
- Limit frequency, baud rate

Standards and regulations

DIN VDE 0100
Installation of electrical power installations with a rated voltage up to 1000 V.

DIN VDE 0110 P.1
Insulation coordination for electrical equipment within low-voltage systems; basic specification.

DIN VDE 0100 P.410
Installation of electrical power installations with a rated voltage up to 1000 V. Protection measures; protection from shock currents.

DIN VDE 0100 P.443
Installation of electrical power installations with a rated voltage up to 1000 V. Protection from overvoltages caused by atmospheric conditions. Identical to IEC64 (CO) 168.

DIN VDE 0100 P.540
Installation of electrical power installations with a rated voltage up to 1000 V. The selection and installation of electrical equipment, grounding, protective wire, potential compensation cables.

VDE 0113 P.1 (DIN EN 60204 P.1)
Machine safety; electrical equipment of machines; part 1: general requirements.

EN 50178
Electronic equipment to be used in electrical power installations.

DIN VDE 0185 P.1, P.2
Lightning protection systems, installation of special systems.
(IEC 1024-1:1990)
Lightning protection for buildings.

DIN VDE 0185 P.1
Lightning protection systems,
General installation information.
DIN VDE 0185 P.2
Lightning protection systems,
Installation of special systems.
DIN VDE 0185 P.100
Lightning protection for buildings, basic principles (prENV 61024-1).

VDE 0303 P.1
Process for determination of comparative and test value for tracking of insulated materials in moist conditions.

DIN VDE 0304 P.21
Determination of thermal stability for electro-insulated materials; part 1: general procedure to determine the thermal endurance properties, the temperature index and the thermal endurance profile.

DIN VDE 0611 P.1
Low-voltage switchgear and controlgear, part 7: auxiliary equipment,

(EN 60947-7-1)

Main section 1 - terminal blocks for connecting copper wires.

DIN VDE 0432 P.1
High-voltage testing technology.
(IEC 60-1)

DIN VDE 0675 P.6 (Draft)
Overvoltage arrester for use in alternating supply networks between 100 V and 1000 V.

DIN VDE 0800 P.1
Telecommunications technology; general terms, requirements and tests for the safety of systems and devices.

DIN VDE 0800 P.2
Telecommunications technology, grounding and potential compensation.

DIN VDE 0820 P.22 (EN 60127-2)
Miniature fuses; part 2,
G miniature fuses.

DIN VDE 0845 P.1
DIN 17845
Protection of telecommunication systems from the effects of lightning, static charging and overvoltages from electrical power installations.

DIN VDE 0878 P.240
Electromagnetic compatibility for installations in information processing and telecommunications technology.

UL-94
Tests of flammability of plastic materials for parts in devices and appliances.

UL-1414
Across-The-line, Antenna-Coupling and Line-By-Pass Capacitors for Radio and Television-Type Appliances.

UL-1449
Transient Voltage Surge Suppressors.

DIN IEC 68
Outline for environmental test procedures.

DIN 41651 P.1
Two-part connectors for printed boards for connection of flat cables to round wires; indirect plugging, pitch 2.54 mm; joint features, dimensions of types A and B.

DIN 41651 P.2
Two-part connectors for printed boards for connection of flat cables to round wires; indirect plugging, pitch 2.54 mm; gauges, nominal values and tests.

DIN 45921 P.107
Harmonised system of quality assessment for electronic components; construction type specifications:

non wire-wound permanent resistors for low loading capacity, metal-coated resistors for increased requirements (CECC 40101-017).

DIN 45923
Harmonised system of quality assessment for components (varistors)
(CECC 4200).

DIN VDE 0820 P.22
Miniature fuses; part 12, G miniature fuses.

(EN 60127-2)
EN 61000-4-5; Electromagnetic compatibility (EMC) (IEC 801-5); ENV 50142

testing and measurement procedures; testing for interference immunity from interference voltages.

DIN EN 60099-1 (VDE 0675 Part 1: 2000-08) overvoltage surge arresters - Part 1: Overvoltage surge arresters with non-linear resistances for alternating current systems (IEC 60099-1: 19991 + A11999); German Version EN 60099-1: 1994 + A1:1999
The standard applies to overvoltage arresters, designed for repeated responses, to limit overvoltages in alternating current systems and for interruption of flowing currents.
It applies in particular to overvoltage surge voltage protectors that consist of a single or multiple spark gap connected in series with a single or a number of non-linear resistances.

Requirements for power systems
Overvoltage protection for 230 / 400 V circuits

Arresters for 230 / 400 V circuits fall into 4 categories, 3 of which are in the Weidmüller range

Class B arresters

Arresters installed for the purpose of mastering direct lightning strikes by means of equipotential bonding. These arrestors are tested with a simulated lightning test current I_{imp} of waveform 10/350 µs.

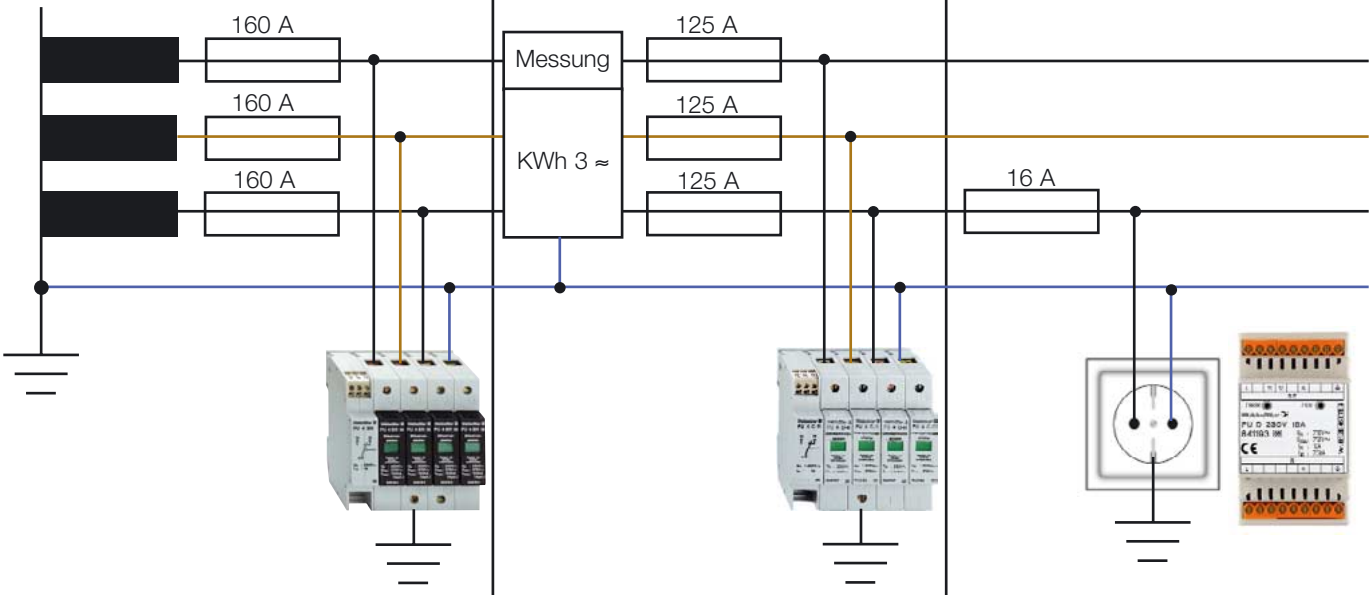
Class C arresters

Arresters installed for overvoltage protection in permenant installations, i.e., distribution.
These arresters are tested with a nominal discharge current I_{sn} of waveform 8/20 µs.

Class D arresters

Arresters installed for overvoltage protection in permenant or portable installations, in particular for socket outlets or before consumer devices

Circuit diagram



Arresters according to draft VDE 0675 T. 6
B
10 / 350 µs

The Insulation coordination to VDE 0110 is **6 kV** for the 230/400 V Net.
The overvoltage category to DIN VDE 0110 has to be not lower than **Class IV.**

The B-Surge arrester is useful for lightning protection and is necessary if lightning rods are installed.

Arresters according to draft VDE 0675 T. 6
C
8 / 20 µs

The Insulation coordination to VDE 0110 is **4 kV** for the 230/400 V Net.
The overvoltage category to DIN VDE 0110 has to be not lower than **Class III.**

C-arresters discharge energy coupled in the mains cable to earth.
They are installed in switchgear cabinets.

Arresters according to draft VDE 0675 T. 6
D
1.2 / 50 µs

The Insulation coordination to VDE 0110 is **2.5/1.5 kV** for the 230/400 V Net.
The overvoltage category to DIN VDE 0110 has to be not lower than **Class II.**

D-arresters discharge energy coupled in the mains cable to earth.
They are installed in switchgear cabinets and sub-distributor boards.


PUI TSG+
CLASS I/B
OK
PUI TSG
CLASS I/B
OK
PUI TSG
CLASS I/B
OK

Overvoltage Protection

Lightning stroke current arresters with spark gap for equipotential bonding in lightning protection

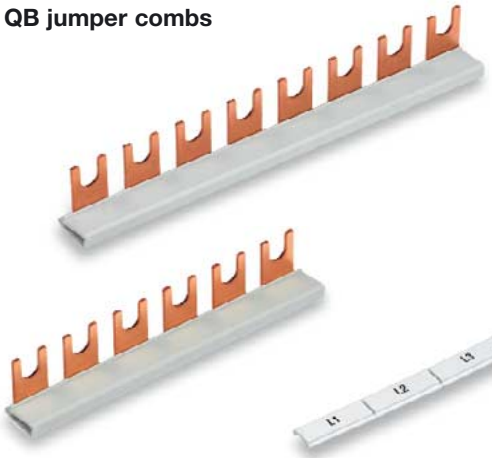
Overvoltage protection class I (B-arrester)

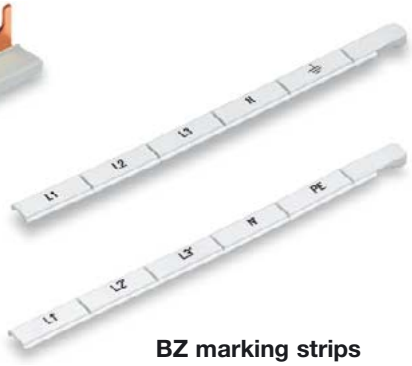
Lightning stroke current arresters are used for equipotential bonding at interface junctions 0 to 1 (according to IEC 1312-1) in lightning protection systems in accordance with the requirements of **class B** (DIN VDE 0675 Part 6 (Draft 11.89)/A1: 3/96) and **class I** according to IEC 61643-1 (2.98).

Several lightning stroke current arresters are combined for overvoltage protection in the system configurations TN, TT and IT.

When lightning strikes, the triggered-type spark gaps create the necessary equipotential bonding between the building's lightning protection system and the earthing system of the power supply. The use of spark gaps fulfils the requirements of the VDEW guidelines (1 edition 1998) concerning the verification of class B overvoltage protection facilities.

QB jumper combs





BZ marking strips

Electrical connections for building installations

The class 1 lightning-stroke current arrester PU1TSG 35kA is connected between the outer wires (L1, L2, L3). The PU1TSG 50kA creates the N-PE spark gap. The wires should be kept as short as possible.

The triggered-type and non-blowout PU1TSG can be mounted onto a TS 35 mounting rail in the swichgear cabinet or snapped onto a distribution board.

The maximum permitted operationg voltage Uc is 260 V AC. It is not necessary to decouple the connected class II (C) arresters, because triggered-type spark gaps with low pull-in voltages are used.

Please observe the notes on installation.

Electrical connections for industrial installations

The class I lightning-stroke current arrester PU1TSG+ 50kA/330 V or 440 V are connected between the outer wires (L1, L2, L3). The PU1TSG 50kA creates the N-PE spark gap. The wires should be kept as short as possible.

The triggered-type and blowout PU1TSG+ 50kA can be mounted onto a TS 35 mounting rail in the swichgear cabinet or snapped onto a distribution board. A safety clearance of at least 10 cm to potential carrying parts must be maintained, because emissions are created when the spark gaps are operated.

The maximum permitted operationg voltage Uc 330 or 440 V AC. It is not necessary to decouple the connected class II (C) arresters for 470 V AC, because triggered-type spark gaps with low pull-in voltages are used

Please observe the notes on installation.

Functions check, maintenance and approvals

The PU1TSG and PU1TSG+ overvoltage protection modules can be checked visually. A functions indicator, which lights up at 120 V AC, can indicate the failure of the system voltage as well as the failure of the triggering electronics. Checks should be made more often in periods when thunderstorms are prevalent.

The triggered-type spark gap achieves a very low protection level of under 1.5 kV together with high discharge currents. The PU1TSG arrester must be fused up to a maximum of 125 AgL, depending on the wire cross-section. The PU1TSG+ must be fused up to a maximum of 250 AgL.

The connection is rated for the following cross-sections:

solid core: 10 ... 35 mm^2
stranded: 10 ... 25 mm^2

The operating range is –40 °C ... +85 °C.

The PU B lightning stroke currents have UL and KEMA approvals. This guarantees their suitability for use worldwide.

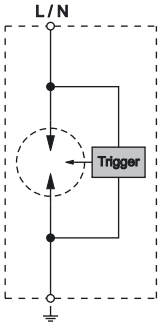
PU 1 TSG

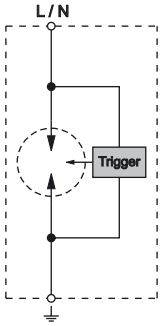
35 kA / 0.9 kV

PU 1 TSG

50 kA / 1.5 kV

Circuit diagram





Ordering data	Type	Cat. No.	Type	Cat. No.
	PU 1 TSG 35 kA / 0.9 kV	**8561260000**	PU 1 TSG 50 kA / 1.5 kV	**8561230000**

Rated data		
Voltage, Un per circuit	230 Vac	230 Vac
Voltage, Uc per circuit	260 Vac	260 Vac
Requirement category	I (B-arrester)	I (B-arrester)
Lightning test voltage limp. (10/350µs)	35 kA at load17.5As	50 kA at load 25 As
Specific energy, per circuit	305 kJ/W	625 kJ/Ohm
Short-circuit current extinguishing when without back-up fuse	3000 A / 50 Hz	500 A / 50 Hz
Short-circuit withstand max. back-up fuse	25 kA_{eff}	–
Leakage current I_{PE}	≤ 2.5 mA	≤ 0.1µA
Response time, ta, type	≤ 1µs	≤ 1µs
Back-up fuse max.	125 A gL	125 A gL
Protection level Up	<0.9 kV	< 1.5 kV
Optical function display	yes	no
Design	Insta IP20 / 90 x 18 x 66 mm	Insta IP20 / 90 x 18 x 66 mm
Colour	grey	grey
Temperature	-25 °C…+85 °C	-25 °C…+85 °C
Connection according to IEC 947-7-1		
Solid	10…35 mm^2	10…35 mm^2
Flexible	10…25 mm^2	10…25 mm^2

Accessories		
Cross-connection QB single 18-4	**8619440000**	**8619440000**
Cross-connection QB single 18-6	**8619450000**	**8619450000**
Designation		
BZ18 L1, L2, L3, N, PE	**8619460000**	**8619460000**
BZ18 PE, PE, PE, PE, PE	**8619470000**	**8619470000**
Approvals	UL, KEMA	UL, KEMA

Overvoltage Protection

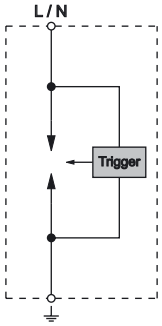
PU 1 TSG+

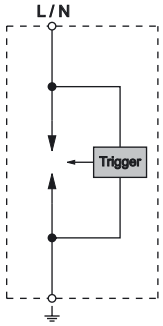
50 kA / 0.9 kV

PU 1 TSG+

50 kA / 1.5 kV

Circuit diagram





Ordering data	Type	Cat. No.	Type	Cat. No.
	PU 1 TSG+ 50 kA / 0.9 kV	**8561220000**	PU 1 TSG+ 50 kA / 1.5 kV	**8561250000**

Rated data		
Voltage, Un per circuit	330 Vac	440 Vac
Voltage, Uc per circuit	330 Vac	440 Vac
Requirement category	I (B-arrester)	I (B-arrester)
Lightning test voltage limp. (10/350µs)	50 kA at load 25 As	50 kA at load 25 As
Specific energy , per circuit	625 kJ/Ohm	625 kJ/Ohm
Short-circuit current extinguishing at ohne back-up fuse	50 kA / 50 Hz	50 kA / 50 Hz
Short-circuit withstand at max. back-up fuse	25 kA_{eff}	25 kA_{eff}
Leakage current I_{PE}	≤ 2.5 mA	≤ 2.5 mA
Response time, ta, typ	≤ 100 ns	≤ 100 ns
Back-up fuse max.	250 A gL	250 A gL
Protection level Up	< 0.9 kV	< 1.5 kV
Optical function display	yes	yes
Design	Insta IP20 / 151 x 36 x 81 mm	Insta IP20 / 151 x 36 x 81 mm
Colour	black	black
Temperature	-25 °C…+85 °C	-25 °C…+85 °C
Connection according to IEC 947-7-1		
Solid	10…35 mm^2	10…35 mm^2
Flexible	10…25 mm^2	10…25 mm^2

Accessories		
Cross-connection QB single row 18-4	**8619440000**	**8619440000**
Cross-connection QB single row 18-6	**8619450000**	**8619450000**
Designation		
BZ18 L1, L2, L3, N, PE	**8619460000**	**8619460000**
BZ18 PE, PE, PE, PE, PE	**8619470000**	**8619470000**
Approvals	UL, KEMA	UL, KEMA

VDE 0675, Part 6, Class B
Overvoltages due to lightning strikes

Lightning stroke current arresters for equipotential lightning protection

The PU B is designed for equipotential bonding in lightning protection systems, in accordance with DIN VDE 0185, Part 1 (11.82). The PU B is a class B lightning stroke current arrester in accordannce with DIN VDE 0675 (Draft 11/89) and DIN EN 60099 Part 1 (8/00), ENV 61024-1 (1/95) and IEC 1312-1 (2/95). The integrated varistors ensure the equipotential bonding between the building's lightning protection system and the the power supply system when lightning strikes.

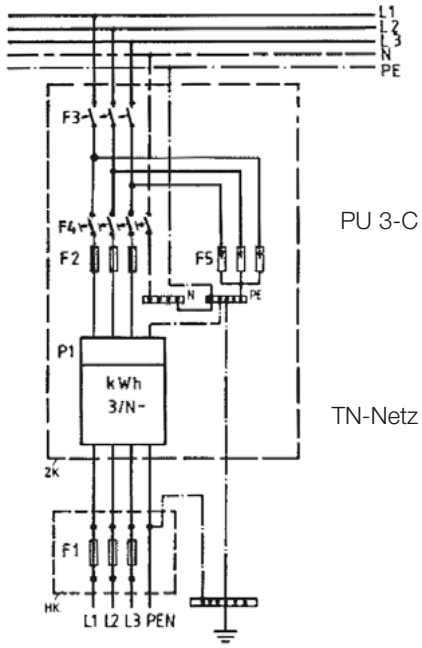
The electrical connection

The PU B lightning-stroke current arrester should be installed by an electrical tradesman between the outer wires (L1, L2, L3) and the earth connection of the consumer installation, keeping the cables as short as possible. The PU B can be mounted onto TS 35 mounting rails in the switchgear cabinet or in distribution boards.

Functional check / Maintenance

PU B overvoltage protectors should be visibly checked, in particular, during thunderstorms. PU Bs are equipped with pluggable varistor housings. An arrester disconnector thermally protects the varistor so that the status window will change color from green to red when protection is no longer given. The arrester can be replaced by an electrician without having to disconnect the wiring. The upper part of the varistors are coded according to voltage, which means that only a correct PU B type varistor can be used as a replacement. The varistors ensure a low protective level < 2 kV with high discharge currents. The arrester is to be fused against short-circuits depending on wire cross-sections. The use of varistors ensures that no emissions occur at the place of installation due to overvoltages.

Overvoltage Protection



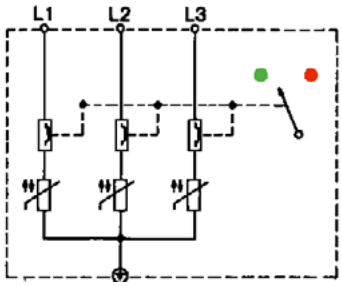
PU 3-C

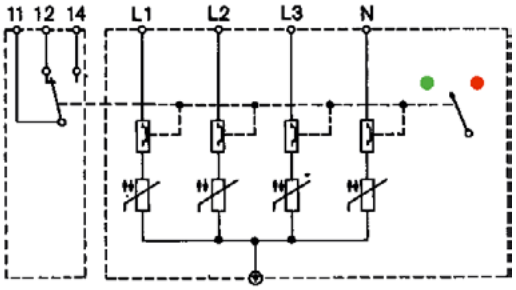
TN-Netz

PU 3 B

PU 4 B-R

Circuit diagram





VDE rated data	PU3 B	PU4 B
Rated voltage*; ac	230 V	230 V
Max. permissible operation voltage	275 V ac	275 V ac
Test current of the compl. arrester (8/20µs)	75 kA	100 kA
Charge Q	7 As	10 As
Specific energy	250 KJ/Ohm	500 KJ/Ohm
Lightning test voltage 10/350µs based on lightning current parameter acc. to ENV 61024-1 (1/95) and IEC 1312-1 (2/95)		
Peak current	20 kA	25 kA
Charge Q	10 As	12.5 As
Specific energy	100 KJ/Ohm	160 KJ/Ohm
Residual voltage typ. at		
Leakage current 40 kA (8/20µs)	< 1.5 kV	< 1.5 kV
Leakage current 7kA (10/350µs)	< 2 kV	< 2 kV
Response time of the varistor	< 25 ns	< 25 ns
Short-circuit withstand 25 kA		
Back-up fuse ≤	160 A gL	160 A gL
Connection cross-section:	6…10 mm^2 solid	
according to IEC 947-7-1	16…25 mm^2 stranded	
	10…25 mm^2 flexible	
Colour of the upper relay of the varistor	black; PA6.6 VO	black; PA6.6 VO
Operating temperature range	- 40°C...+60°C	- 40°C...+60°C
Approvals	UL	UL

Ordering data	Dimensions	Cat. No.	Dimensions	Cat. No.
PU 3 B, 230 / 400 V	53.4 x 55	**8381890000**		
PU 3 BR, 230 / 400 V with remote signalling	71.2 x 55	**8381900000**		
PU 4 B, 230 / 400 V			71.2 x 55	**8147020000**
PU 4 BR, 230 / 400 V with remote signalling			89 x 55	**8291640000**
PU 0 B, replacement module for PU x B		**8381880000**		**8381880000**
Accessories				
Housing, can be sealed	GPS 360x254x112	**1785490000**	GPS 360x254x112	**1785490000**

* other nominal voltages on request

Overvoltage Protection

VDE 0675, part 6, class C
Protection against
overvoltages

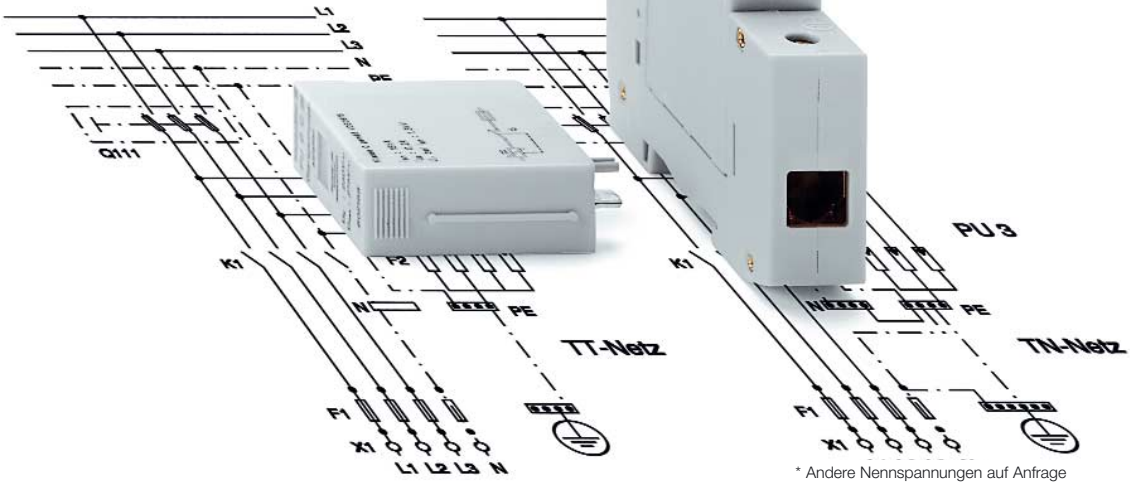
The PU C overvoltage protector protects low-voltage consumer installations and electronic devices against overvoltages, such as those that result from atmospheric discharges (thunderstorm) or switching operations.
The PU-C fulfils the requirements of DIN VDE 0675, Part 6, Class C 11/89, Draft, and DIN VDE 0675. Part 6, A2, 10/96 and ÖVE SN 60 Part 4 and Parts 1 and 4, and the DIN EN 60099 - 1 (8/00)

The electrical connection

The PU overvoltage protection should be installed between the exterior wires (L1, L2, L3) or the neutral wire (N) and the earth wire of the consumer installation, keeping the cables as short as possible. The parallel routing of unprotected cables (for example, the wire to the meter) and protected cables, (for example, power supply cables) must be avoided.

Functional check / maintenance

The window is green when the unit is in operation. If the window of an arrester is red, the arrester must be replaced by a qualified tradesman. Individual arresters are pluggable and coded according to voltage. The replacement arrester must correspond to the nominal voltage of the installation. The cross-section of the earthing wire must be at least 10 mm^2.
The back-up fuse for the PU modules is to be chosen depending on the cross-section of the wire and the type of routing. Maximum 125 A is permitted.



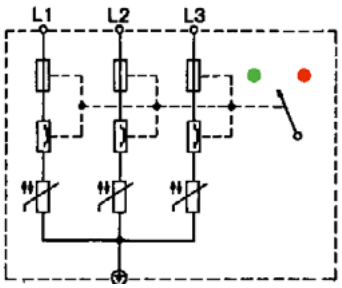
* Andere Nennspannungen auf Anfrage

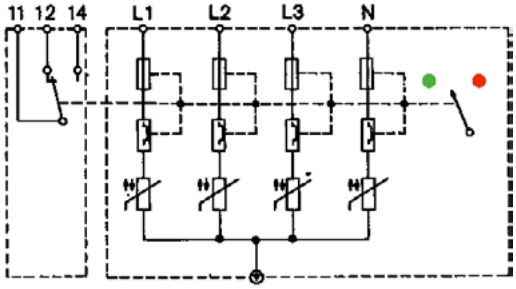
Overvoltage Protection

PU 3 C

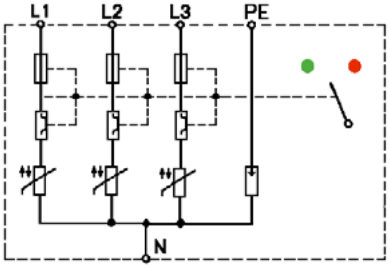
PU 4 C-R

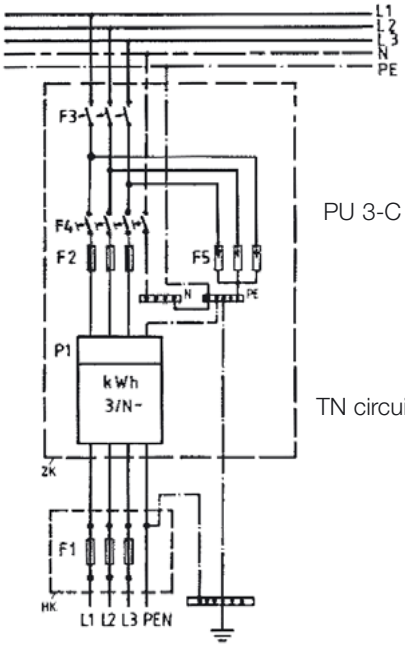
Circuit diagram





Arrester to DIN VDE 0542 /A1 with spark gap schematic circuit diagram for PU 4C TT





PU 3-C

TN circuit

Installation

VDE rated data		**PU xC**			**PU 4C TT**
Rated voltage		230 V~	115 V~	470 V~	230 V~
Max. permissible operation voltage		275 V~	130 V~	500 V~	275 V~
Service requiremental class to VDE 0675, Part 6, draft 11/89		**C**	**C**	**C**	**C**
Nominal leakage current of the upper part		15 kA	15 kA	15 kA	20 kA (Spark gap)
Limit leakage current of the upper part		40 kA	40 kA	40 kA	
Residual voltage of the upper part isn = 15 kA		1.3 kV	0.6 kV	2.2 kV	
Limit leakage current for each	1-channel block isg (8/20)	40 kA	40 kA	40 kA	
	2-channel block isg (8/20)	75 kA	75 kA	75 kA	
	3-channel block isg (8/20)	100 kA	100 kA	100 kA	
	4-channel block isg (8/20)	100 kA	100 kA	100 kA	
Response time		<25 ns	<25 ns	<25 ns	<1 µs
Short-circuit withstand 25 kA with max. back-up fuse		≤125 A gL	≤125 A gL	≤125 A gL	≤125 A gL
Connection cross-section:	f 6 mm² with AEH	6...- 25mm²	6...- 25mm²	6...- 25mm²	
	acc. to IEC 974-7-1	6…10 mm² solid			
		16…25mm² stranded			
		10…25mm² flexible			
Assembly		TS 35	TS 35	TS 35	
Colour		grey	grey	grey	orange
Approvals		UL/ÖVE	UL	UL	
Dimensions, typ.	1-channel block compl.	17.8 x 55 mm			
	2-channel block compl.	35.5 x 55 mm			
	3-channel block compl.	53.4 x 55 mm			
	4-channel block compl.	71.2 x 55 mm			

Ordering data		Cat. No.			
PU 1 C		**8102610000**	**8215820000**	**8291700000**	
PU 2 C		**8098170000**	**8291650000**	**8291710000**	
PU 3 C	for TN-C circuits	**8021490000**	**8291660000**	**8451050000**	
PU 3 C-R	for TN-C circuits w. remote signalling	**8021510000**	**8291680000**	**8451060000**	
PU 4 C	for TT circuits	**8021500000**	**8291670000**	**8291720000**	
PU 4 C-R	for TT circuits w. remote signalling	**8021520000**	**8291690000**	**8451070000**	
PU 0 C	repl. module for PUC and PUCR	**8339510000**	**8432430000**	**8451080000**	
PU 0/S-E	monitoring module PU 1...4	**8021530000**			
PU 4 C TT	for TT- circuits				**8416370000**

Accessories		
Housing, can be sealed	GPS 360x254x112	**1785490000**

Overvoltage Protection

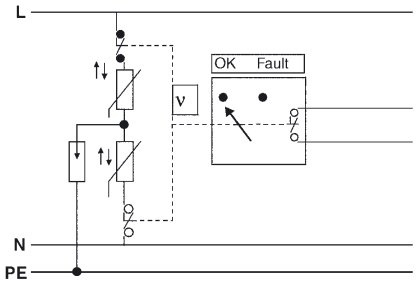
PU D

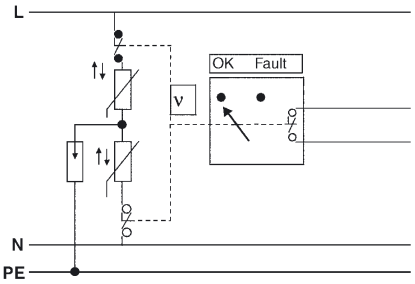
230 V / 16 A

PU D

115 V / 16 A

Circuit diagram





Ordering data	Type	Cat. No.	Type	Cat. No.
	PU D 230V 16A	**8411930000**	PU D 115V 16A	**8472100000**

Rated data		
Input		
Input voltage	230 Vac ±10%	115 Vac ±10%
Input current	16 A	16 A
Leakage current max.	7 kA	7 kA
Leakage current nenn.	2.5 kA	2.5 kA
Response time symmetric / asymmetric	< 150 ns	< 150 ns
Output		
Interference voltage output at 1 kV / µs		
between L - N	< 550 V	< 550 V
between N - PE or L - PE	< 850 V	< 850 V
Standards		
VDE 0675 Part 6 (11/89)	Class; D	Class ; D
Overvoltage category	II	II
Pollution severity	2	2
Leakage current with Un to PE	< 1 µA	< 1 µA
Monitoring contact		
Switching contact (NC) Uac max / I max	250 V / 2 A	250 V / 2 A
Temperature data	Application class IEC 68	Application class IEC 68
Operating temperature	–25 °C…+55 °C	–25 °C…+55 °C
- rowed without space	–25 °C…+55 °C	–25 °C…+55 °C
Storage temperature	–40 °C…+60 °C	–40 °C…+60 °C
Max. humidity	95%, without condensation	95%, without condensation
General data		
Housing	DIN 43880	DIN 43880
Dimensions W x H x D mm	52.5 x 56 x 45	52.5 x 56 x 45
Protection class	IP 20	IP 20
Weight	approx. 250 g	approx. 250 g
Mounts onto	TS 35	TS 35
Connection via screw terminal	System LP	System LP
Terminal range	0.13 ... 4 mm^2	0.13 ... 4 mm^2
“e” solid	0.5 ... 4 mm^2	0.5 ... 4 mm^2
“f” flexible	0.5 ... 2.5 mm^2	0.5 ... 2.5 mm^2
“f” flexible with ferrule	0.5 ... 2.5 mm^2	0.5 ... 2.5 mm^2

Overvoltage Protection

PU 3 D

230 V / 400 Vac

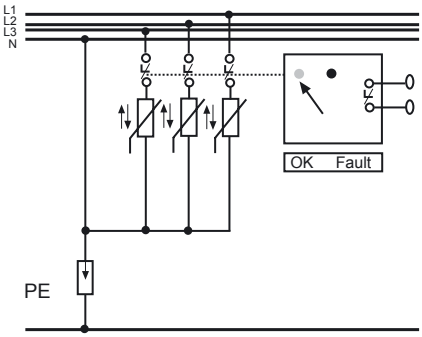
PU DS

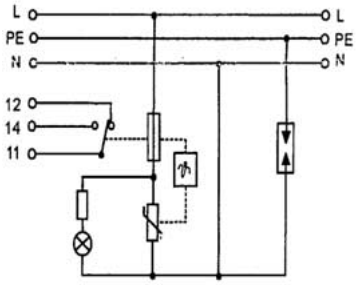
230 V 16 A

Function

The PU 3 D fulfils the requirements of DIN VDE 0675 (Draft). The varistors are temperature controlled. The ageing of varistors caused by transients allow the current to increase, this in turn results in high temperatures. In this case, the varistors are automatically separated from the supply voltage. This being indicated by a red glow lamp. Three green glow lamps signalize the three phase power. A monitoring contact (NC contact) processes the group error messages.

Circuit diagram





Ordering data	Type	Cat. No.	Type	Cat. No.
	PU 3 D 230 V/400 V 16 A	**8509130000**	PU DS 230 V 16 A	**8523740000**

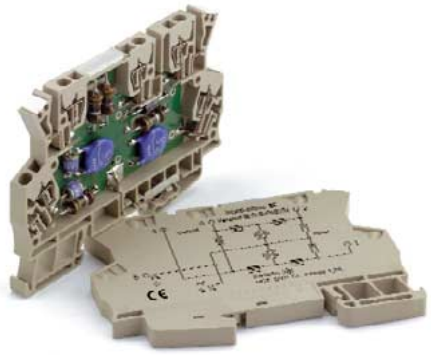
Rated data		
Input		
Input voltage	230V/400Vac ±10%	230Vac ±10%
Input current	16 A	16 A in total
Leakage current max.	18 kA in total	5 kA in total 6.5 kA
Leakage current nenn.	2.5 kA in total 6.5 kA	2.5 kA
Response time symmetric / asymmetric	< 150 ns	< 150 ns
Output		
Interference voltage at 1 kV / µs		
between L - L; L - N	< 550 V	< 600 V
between N - PE or L - PE	< 850 V	< 1500 V
Standards		
VDE 0675 Part 6 (11/89)	Class : D	Class: D
Overvoltage category	III	III
Pollution severity	2	2
Leakage current with Un to PE	< 1 µA	< 1 µA
Monitoring contact		
Switching contact (NC) Uac max / I max	250 V / 2 A	250 V/2 A
Temperature data	Application class IEC 68	Application class IEC 68
Operating temperature	–25 °C…+55 °C	–25 °C…+55 °C
- rowed without space	–25 °C…+55 °C	–25 °C…+55 °C
Storage temperature	–40 °C…+60 °C	–40 °C…+60 °C
Max. humidity	95%, without condensation	95%, without condensation
General data		
Housing	(Insta housing) DIN 43880	(Insta housing) DIN 43880
Dimensions W x H x D mm	52.5 x 56 x 45	18 x 56 x 45
Protection class	IP 20	IP 20
Weight	approx.150 . 400 g	approx.150 g
Mounts onto	TS 35	TS 35
Connection via screw terminal	System LP	System LP
Terminal range	0.13 ... 4 mm^2	0.13 ...4 mm^2
“e” solid	0.5 ... 4 mm^2	0.5 ...4 mm^2
“f” flexible	0.5 ... 2.5 mm^2	0.5 ... 2.5 mm^2
“f” flexible with ferrule	0.5 ... 2.5 mm^2	0.5 ... 2.5 mm^2

Overvoltage Protection

MCZ OVP

24 Vdc 0.5 A
24 Vdc 1.25 A
24 Vac 0.5 A
24 Vac 1.25 A

Slim overvoltage protection terminals with additional PE contacts to the mounting rail



MCZ OVP

for current loops
0(4)...20 mA

MCZ OVP

for current loops
0(4)...20 mA

MCZ OVP

for symmetric loads
z.B. ±24V

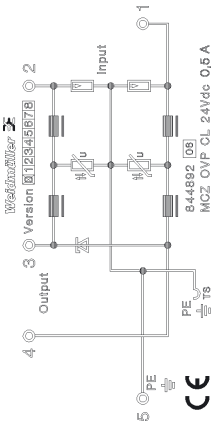
MCZ OVP

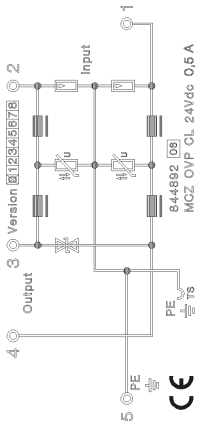
for current loops
0(4)...20 mA

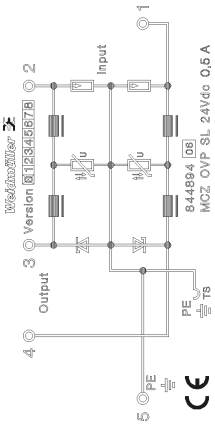
MCZ OVP

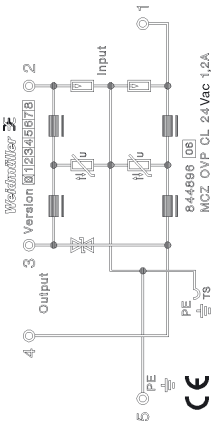
for symmetric loads
z.B. ±24V

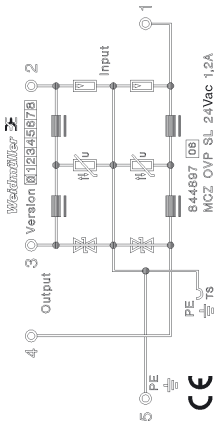
Circuit diagrams











Technical data					
Rated voltage	**24 Vdc**	**24 Vac**	**24 Vdc**	**24 Vac / 34 Vdc**	**24 Vac**
Max. operating voltage	28 Vdc	37 Vac / 34 Vdc	28 Vdc	28Vac	28Vac
Max. operating current	**0.5 A**	**0.5 A**	**0.5 A**	**1.25 A**	**1.25 A**
Through resistance					
1.4 and 2.5	2.5 Ω	2.5 Ω	2.5 Ω		
1.3 and 2.4				1.0 Ω	1.0 Ω
Inductance of four-pole network	75 µH	75 µH	75 µH	35 µH	35 µH
Capacitance of four-pole network	1.5 nF	1.5 nF	1.5 nF	1.5 nF	1.5 nF
Limit frequency at 50 Ohm/					
-3dB at Rl= 240 Ohm	500 kHz / 240 Ω	500 kHz / 240 Ω	500 kHz / 240 Ω	500 kHz / 240 Ω	500 kHz / 240 Ω
Gas discharger	90 V 10 kA	90 V 10 kA	90 V 10 kA	90V 10 kA	90V 10 kA
Varistor voltage	30 V	30 V	30 V	30 V	30 V
Suppressor diodes	33 V	34 V	33V	33 V	33V
Pull-in voltage					
of the gas discharger	<600 V	<600 V	<600 V	<600 V	<600 V
Max. leakage current					
at Un and max. Tu from					
terminals 1/3 o. 2/3 a. 1/2	max 10 µA	max 15 µA	max 10 µA		
terminals 1/5 o. 2/5 a. 1/2				max 10µA	max 10µA
Interference voltage at output					
3/4 at 1000V/µs					
at input, typ:	40 V	45 V	40 V	40 V	40 V
Interference voltage at output					
3/4 at 8/20 µs					
and 2.5 kA at input:	max 65 V	max 70 V	max 65 V	max 65 V	max 65 V
Dimensions LxWxH (mm)	91 x 6 x 63.2	91 x 6 x 63.2	91 x 6 x 63.2	91 x 12 x 63.2	91 x 12 x 63.2
Details see page 278					

Ordering data					
Type	MCZ OVP CL 24 Vdc 0.5 A	MCZ OVP CL 24 Vac 0.5 A	MCZ OVP SL 24 Vdc 0.5 A	MCZ OVP CL 24 Vac 1.25 A	MCZ OVP SL 24 Vac 1.25 A
Cat. No.	**8448920000**	**8472880000**	**8448940000**	**8448960000**	**8448970000**
Qty.	10 pieces	10 pieces	10 pieces	10 pieces	10 pieces

* A fuse equivalent to the rated current of the MCZ OVP must be installed.

Overvoltage Protection

MCZ OVP
24 V ac/dc 16A

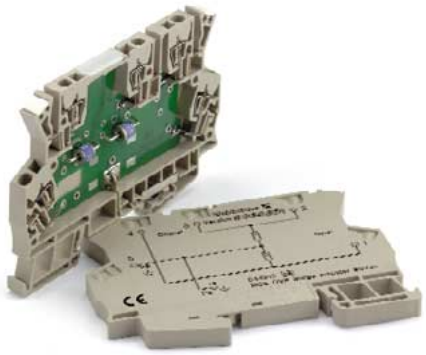
Slim overvoltage protection terminals with additional PE contacts to the mounting rail

MCZ OVP
with gas discharger

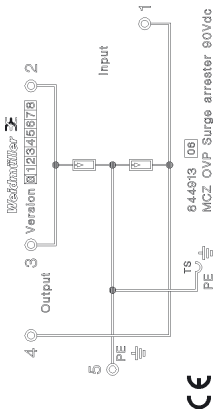
MCZ OVP
with varistor

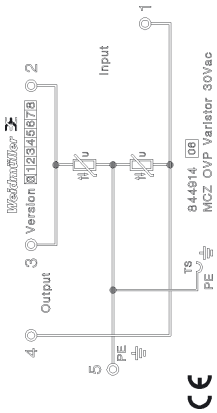
MCZ OVP
with suppression diode
Unipolar

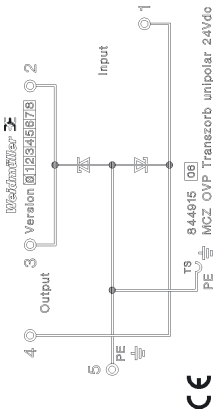
MCZ OVP
with suppression diode
Bipolar

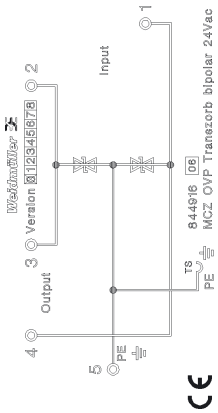


Circuit diagrams









Technical data				
Rated voltage	**24 Vuc**	**24 Vuc**	**24 Vdc**	**24 Vac/dc**
Max. operating voltage	90 Vdc	30 Vac / 38 Vdc	30 Vdc	30 Vdc / 27 Vac
Max. operating current	**16 A**	**16 A**	**16 A**	**16 A**
Through resistance 1.3 and 2.4	0.2 Ω	0.2 Ω	0.2 Ω	0.2 Ω
Inductance of four-pole network 1/2	-	-	-	-
Capacitance of four-pole network 1/2	<1.5 pF	2700 pF	<1 nF	<1 nF
Limit frequency at 50 Ohm/ -3dB at Rl= 240 Ohm			-	-
Gas discharger	90 V 10 kA	-	-	-
Varistor voltage	-	30 V	-	-
Suppressor diodes	-	-	30.8 V	30.8 V
Sparkover voltage of surge arrester	< 600 V	-	-	-
Max. leakage current at Un and max. Tu from terminal 1/5 or 2/5 and 1/2	max 10 µA	max 20 µA	max 10 µA	max 10 µA
Interference voltage at output 3/4 with 1000V/µs at input, typ:	typ 700 V	45 V	55 V	55 V
Interference voltage at output 3/4 with 8/20 µs and 2.5 kA at input:	max 800 V	max 55 V	max 65 V	max 65 V
Dimensions LxWxH (mm)	91 x 12 x 63.2	91 x 12 x 63.2	91 x 12 x 63.2	91 x 12 x 63.2
Details see page 257				

Ordering data				
Type	**MCZ OVP Gas dschrg. 90V**	**MCZ OVP Varistor 30 V**	**MCZ OVP TAZ unipolar 24V**	**MCZ OVP TAZ bipolar 24V**
Cat. No.	**8449130000**	**8449140000**	**8449150000**	**8449160000**
Qty.	10 pieces	10 pieces	10 pieces	10 pieces

* A fuse equivalent to the rated current of the MCZ OVP must be installed.

Overvoltage Protection

MCZ OVP

48 Vuc 0.5 A

48 Vuc 1.25 A

Slim overvoltage protection terminals with additional PE contacts to the mounting rail

MCZ OVP

for current loops

0.5 A

MCZ OVP

for symmetric loads

0.5 A

MCZ OVP

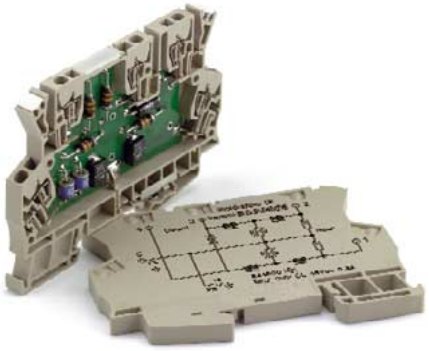
for current loops

1.25 A

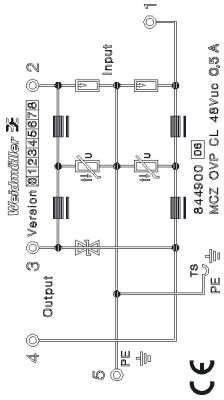
MCZ OVP

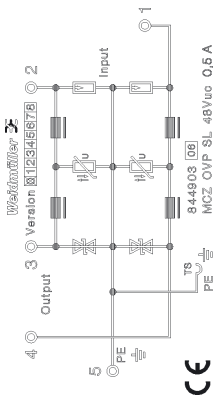
for symmetric loads

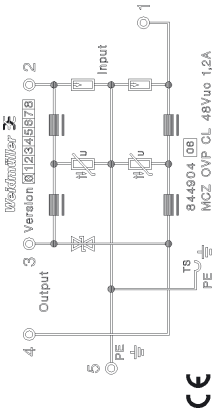
1.25 A

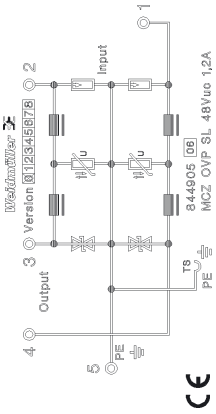


Circuit diagrams









Technical data				
Rated voltage	**48 Vac**	**48 Vac**	**48 Vac**	**48 Vac**
Max. operating voltage	53 Vac	53 Vac	53 Vac	53 Vac
Max. operating current	**0.5 A**	**0.5 A**	**1.25 A**	**1.25 A**
Through resistance				
1.4 and 2.5	2.5 Ω	2.5 Ω		
1.3 and 2.4			1 Ω	1 Ω
Inductance of four-pole network 1/2	75 µH	75 µH	35 µH	35 µH
Capacitance of four-pole network 1/2	1.5 nF	1.5 nF	1.5 nF	1.5 nF
Limit frequency at				
50 Ohm/ -3dB at Rl= 240 Ohm	500 kHz / 240 Ω	500 kHz / 240 Ω	500 kHz / 240 Ω	500 kHz / 240 Ω
Gas discharger	90 V 10 kA	90 V 10 kA	90V 10 kA	90V 10 kA
Varistor voltage	60 Vac	60 Vac	60 Vac	60 Vac
Suppressor diodes	55 Vac	55 Vac	55 Vac	55 Vac
Sparkover voltage of surge arrester	< 600 V	< 600 V	< 600 V	< 600 V
Max. leakage current at Un and max. Tu				
from terminal 1/3 or 2/3 and 1/2	max 10 µA	max 10 µA		
from terminal 1/5 or 2/3 and 1/2			max 10µA	max 10µA
Interference voltage at output 3/4				
with 1000V/µs at input, typ:	82 V	82 V	82 V	82 V
Interference voltage at output 3/4				
with 8/20 µs and 2.5 kA at input:	max 150 V	max 150 V	max 150 V	max 150 V
Dimensions LxWxH (mm)	91 x 6 x 63.2	91 x 6 x 63.2	91 x 12 x 63.2	91 x 12 x 63.2
Details see page 257				

Ordering data				
Type	MCZ OVP CL 48Vuc 0.5 A	MCZ OVP SL 48Vuc 0.5 A	**MCZ OVP CL 48Vuc 1.25A**	**MCZ OVP SL 48Vuc 1.25A**
Cat. No.	**8449000000**	**8449030000**	**8449040000**	**8449050000**
Qty.	10 pieces	10 pieces	10 pieces	10 pieces

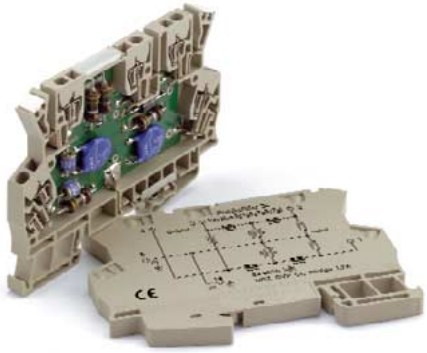
* A fuse equivalent to the rated current of the MCZ OVP must be installed.

Overvoltage Protection

MCZ OVP
115 V uc 1.25 A

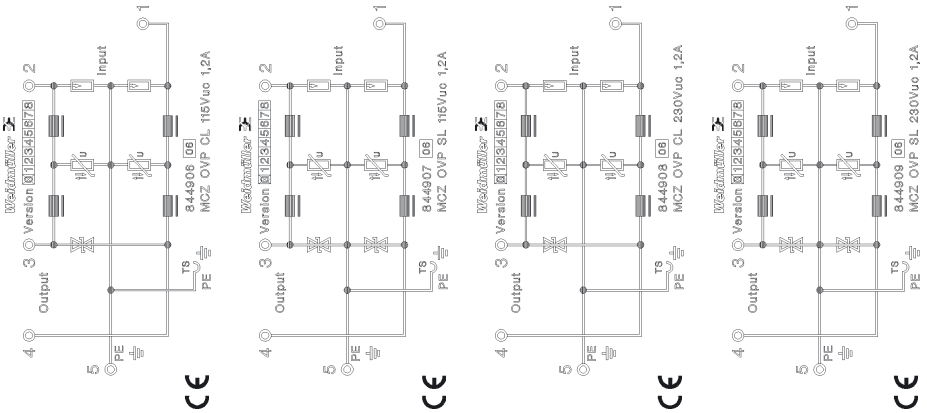
MCZ OVP
230 V uc 1.25 A

Slim overvoltage protection terminals with additional PE contacts to the mounting rail



MCZ OVP	MCZ OVP	MCZ OVP	MCZ OVP
for current loops	for symmetric loads	for current loops	for symmetric loads
115 V	115 V	230 V	230 V

Circuit diagrams



Technical data					
Rated voltage		**115 Vac**	**115 Vac**	**230 Vac**	**230 Vac**
Max. operating voltage		127 Vac	127 Vac	250 V ac / 320 V dc	250 V ac / 320 V dc
Max. operating current		**1.25 A**	**1.25 A**	**1.25 A**	**1.25 A**
Through resistance					
1.4 and 2.5		1 Ω	1 Ω		
1.3 and 2.4				1 Ω	1 Ω
Inductance of four-pole network 1/2		35 µH	35 µH	35 µH	35 µH
Capacitance of four-pole network 1/2		1.5 nF	1.5 nF	1.5 nF	1.5 nF
Limit frequency at					
50 Ohm/ -3dB at Rl= 240 Ohm		500 kHz / 240 Ω	500 kHz / 240 Ω	500 kHz / 240 Ω	500 kHz / 240 Ω
Gas discharger		90 V 10 kA	90 V 10 kA	90V 10 kA	90V 10 kA
Varistor voltage		150 Vac	150 Vac	275 Vac	275 Vac
Suppressor diodes		130 Vac	130 Vac	265 Vac	265 Vac
Sparkover voltage of surge arrester		< 600 V	< 600 V	< 600 V	< 600 V
Max. leakage current at Un and max. Tu					
from terminal 1/3 or 2/3 and 1/2		max 10 µA	max 10 µA		
from terminal 1/3 or 2/3 and 1/2				max 10µA	max 10µA
Interference voltage at output 3/4					
with 1000V/µs at input, typ:	220 V	220 V		420 V	420 V
Interference voltage at output 3/4					
with 8/20 µs and 2.5 kA at input:		max 360 V	max 360 V	max 710 V	max 710 V
Dimensions LxWxH (mm)		91 x 6 x 63.2	91 x 6 x 63.2	91 x 12 x 63.2	91 x 12 x 63.2
Details see page 257					

Ordering data					
Type		MCZ OVP CL 115 Vuc 1.25 A	MCZ OVP SL 115 Vuc 1.25 A	MCZ OVP CL 230 Vuc 1.25 A	MCZ OVP SL 230 Vuc 1.25A
Cat. No.		**8449060000**	**8449070000**	**8449080000**	**8449090000**
Qty.		10 pieces	10 pieces	10 pieces	10 pieces

* A fuse equivalent to the rated current of the MCZ OVP must be installed.

MCZ OVP

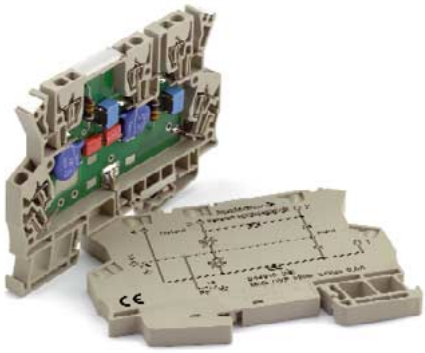
Filter 24 Vuc 0.5 A

Slim overvoltage protection terminals with additional PE contacts to the mounting rail

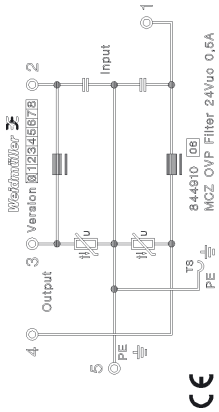
MCZ OVP

Filter for signal cables

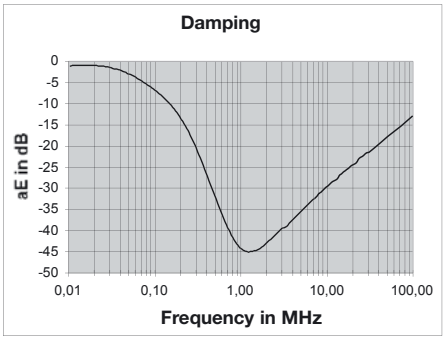
24 V 0.5A



Circuit diagrams



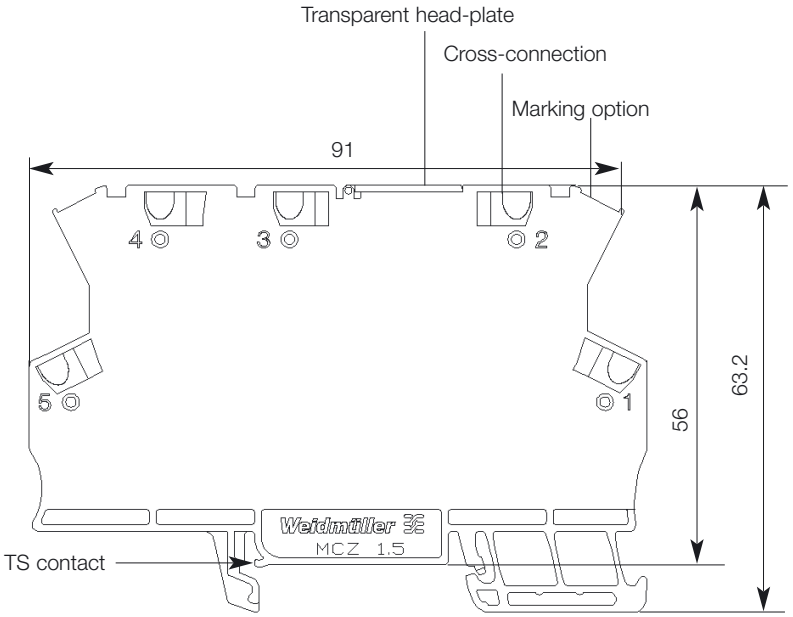
Technical data		
Rated voltage	**24 Vac**	
Max. operating voltage	26.4 Vac	
Max. operating current	**0.5 A**	
Capacitance of four-pole network 1/2	15 nF	
Limit frequency at 50 Ohm/ -3dB at Rl= 240 Ohm, typ.	35 kHz / 50 Ω	
Dimensions LxWxH (mm)	91 x 12 x 63.2	
Details see page 257		



Ordering data		
Type	MCZ OVP Filter 0.5 A	
Cat. No.	**8449100000**	
Qty.	10 pieces	

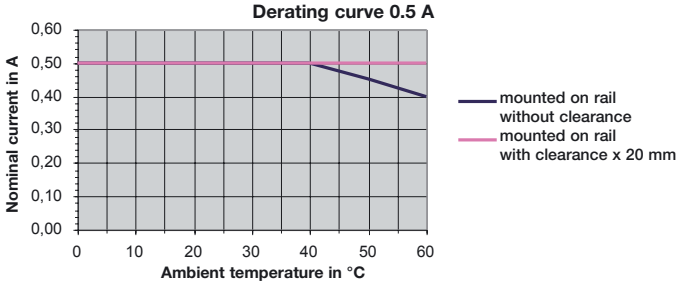
Overvoltage Protection

MCZ ovp
Dimensions and accessories

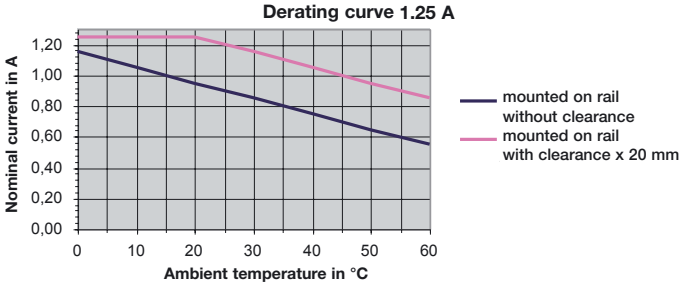


End plate	Type	Cat. No.
	AP MCZ 1.5	**8389030000**
	Frame	**2224240000**
Cross-connection		
	ZQV 4 2-pole	**1608950000**
	ZQV 4 3-pole	**1608960000**
	ZQV 4 4-pole	**1608970000**
	ZQV 4 5-pole	**1608980000**
	ZQV 4 6-pole	**1608990000**
	ZQV 4 7-pole	**1609000000**
	ZQV 4 9-pole	**1609020000**
	ZQV 4 10-pole	**1609030000**
Protective conductor terminals		
W- series	WPE 2.5	**1010000000**
	WPE 4	**1010100000**
	WPE 6	**1010200000**
	WPE 10	**1010300000**
Z - series	ZPE 2.5	**1608640000**
	ZPE 4	**1632080000**
	ZPE 6	**1608670000**

Derating curve 0.5 A

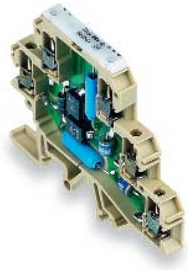


Derating curve 1.25 A

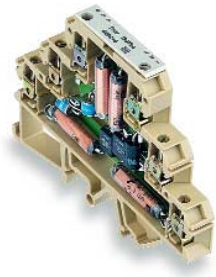


DKU
with combination circuitry

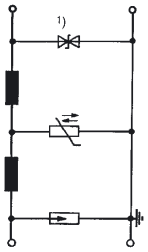
DK 5 U
for current loops in MSR circuits

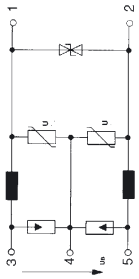


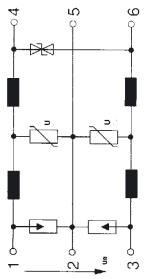
DK 6 U
for current loops in supply systems



Circuit diagram







Ordering data	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	DKU, 24 V–/32	**8015800000**	DKU, 48 V0/32	**8019280000**	DK 5 U 24 Vdc	**8238340000**	DK 6 U 120 V0	**8262480000**
	DKU, 24 V–/35	**8015810000**	DKU, 48 V0/35	**8019290000**				

VDE rated data				
Rated voltage	24 V–	48 V0	24 V–	120 V0
Max. operating voltage (U_B)	28 V–	75 V–/54 V~	28 V–	130 V~/170 V–
Through resistance, typ.	3 Ω	3 Ω	< 3 Ω (per circuit)	< 0.7 Ω (per circuit)
Max. operating current	0.3 A	0.3 A	0.3 A	1 A
Limit frequency (– 3 dB/load resistance)*	500 kHz/240 Ω	1 MHz/480 Ω	400 kHz/240 Ω	22 kHz/120 Ω
Leakage current, max. (8/20 µs)	5 kA	5 kA	5 kA	5 kA
DC sparkover voltage of the gas discharger	90 V	230 V	90 V	230 V
Impulse sparkover voltage (1 kV/µs) of the gas discharger, typ.	700 V	700 V	typ. 600 V	typ. 600 V
Interference voltage output side, at input 1 kV/µs, typ.	35 V	82 V	typ. 30 V	typ. 220 V
Storage temperature	–25 °C…+85 °C	–25 °C…+85 °C	–25 °C…+85 °C	–25 °C…+85 °C
Operating temperature	–25 °C…+60 °C	–25 °C…+60 °C	–25 °C…+60 °C	–25 °C…+60 °C
Overall width	6 mm	6 mm	6 mm	8 mm

Ordering data	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	DKU, 115 V0/32	**8019300000**	DKU, 230 V0/32	**8019320000**	DK 5 U 48 V0	**8262470000**	DK 6 U 230 V0	**8263760000**
	DKU, 115 V0/35	**8019310000**	DKU, 230 V0/35	**8019330000**				

VDE rated data				
Rated voltage	115 V0	230 V0	48 V0	230 V0
Max. operating voltage (U_B)	170 V–/122 V~	320 V–/240 V~	54 V~/75 V–	240 V~/320 V–
Through resistance, typ.	3 Ω	3 Ω	< 3 Ω (per circuit)	< 0.7 Ω (per circuit)
Max. operating current	0.3 A	0.3 A	0.3 A	1 A
Limit frequency (– 3 dB/load resistance)*	1 MHz	1 MHz/2.2 kΩ	400 kHz/240 Ω	22 kHz/120 Ω
Leakage current, max. (8/20 µs)	5 kA	20 kA	5 kA	5 kA
DC spark overvoltage of the gas discharger	230 V	600 V	230 V	600 V
Impulse sparkover voltage (1 kV/µs) of the gas discharger, typ.	700 V	700 V	typ. 600 V	typ. 700 V
Interference voltage output side, at input 1 kV/µs, typ.	180 V	400 V	typ. 82 V	typ. 450 V
Storage temperature	–25 °C…+85 °C	–25 °C…+85 °C	–25 °C…+85 °C	–25 °C…+85 °C
Operating temperature	–25 °C…+60 °C	–25 °C…+60 °C	–25 °C…+60 °C	–25 °C…+60 °C
Overall width	6 mm	12 mm	6 mm	8 mm
Details see page 278				

Accessories	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
End plate	AP	**0687560000**	AP	**0687560000**	AP	**8268870000**	AP	**8324560000**

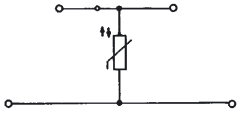
* Source impedance 50 Ω

A fuse equivalent to the rated current of the DK 5/6 U must be installed, e.g. ASK 1 (Cat.-No. **0474360000**), Fuse 5 x 20 0.1 A (F) (Cat.-No. **0430300000**), 5 x 20 (F) (**0430700000**).

Notes

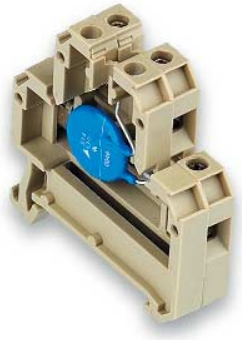
Overvoltage Protection in Terminal Design

with varistor in terminal design

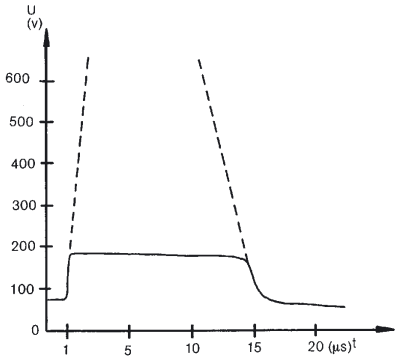


Varistors

Metal-oxide varistors are used as varistors. These are approved for the maximum sinusoidal operating AC voltage indicated on the component. Any voltage exceeding the indicated voltage is safely discharged.
Varistors can be used for medium to large ratings.



DK 4 U S 20 K 130



Rated data DK 4U

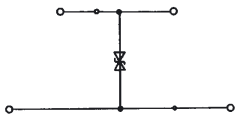
Type	Max. operating voltage at varistor U_{eff} V	U– V	Max. energy and impulse current at an impulse on 8/20 µs Energy J	Impulse A	Max. energy and impulse current at 10000 impulses after 8/20 µs Energy J	Impulse A	Max. varistor voltage at 10 A Leak. current V	Max. varistor voltage at 1 mA V	Capacity pF	Cat. No. TS 32	TS 35
S 14	**11**	14	1.6	1000	0.07	75	36	18	18000	**on request**	**9401400000**
	14	18	2.0	1000	0.08	75	42	22	15000	**9401010000**	**on request**
	17	22	2.7	1000	0.11	75	52	27	10000	**9401020000**	**on request**
	20	26	3.3	1000	0.13	75	65	33	7500	**9401030000**	**9401430000**
	25	31	3.7	1000	0.15	75	75	39	6500	**9401040000**	**9401440000**
Preferred types 24 V	**30**	38	4.4	1000	0.17	75	90	47	5500	**9401050000**	**9401450000**
	35	45	5.2	1000	0.23	75	110	56	4500	**on request**	**on request**
	40	56	6.8	1000	0.27	75	125	68	3300	**9401070000**	**9401470000**
	50	65	27.0	4500	0.6	150	135	82	2900	**9401080000**	**9401480000**
Preferred types 48 V	**60**	85	30.0	4500	0.7	150	155	100	2400	**9401090000**	**9401490000**
	75	100	38.0	4500	0.8	150	185	120	1900	**9401100000**	**9401500000**
	95	125	45.0	4500	1.0	150	230	150	1500	**on request**	**on request**
Preferred types 115 V	**130**	170	55.0	4500	1.3	150	315	205	1000	**9401120000**	**9401520000**
	140	180	60.0	4500	1.5	150	330	220	1000	**on request**	**on request**
	150	200	65.0	4500	1.5	150	350	240	900	**on request**	**9401540000**
	175	225	68.0	4500	1.6	150	420	270	750	**on request**	**on request**
	230	300	85.0	4500	2.1	150	560	360	550	**on request**	**9401560000**
	250	320	92.0	4500	2.4	150	610	390	500	**on request**	**9401570000**
Preferred types 230 V	**275**	350	00.0	6500	2.5	190	660	430	450	**9401180000**	**9401580000**
	300	385	10.0	6500	2.6	190	740	470	400	**9401190000**	**9401590000**
S 20	**11**	14	3.0	2000	0.12	125	32	18	37000	**On request**	**On request**
	14	18	4.0	2000	0.15	125	38	22	30000	**On request**	**On request**
	17	22	5.6	2000	0.19	125	48	27	22000	**On request**	**9401620000**
	20	26	6.6	2000	0.24	125	60	33	17000	**On request**	**9401630000**
	25	31	7.8	2000	0.28	125	70	39	15000	**9401240000**	**9401640000**
Preferred types 24 V	**30**	38	9.0	2000	0.35	125	85	47	13000	**9401250000**	**9401650000**
	35	45	10.8	2000	0.40	125	100	56	11000	**On request**	**On request**
	40	56	14.0	2000	0.48	125	120	68	7000	**9401270000**	**On request**
	50	65	36.0	6500	0.5	190	120	82	5500	**On request**	**9401680000**
Preferred types 48 V	**60**	85	45.0	6500	0.7	190	150	100	4800	**On request**	**9401690000**
	75	100	55.0	6500	0.8	190	180	120	3800	**On request**	**On request**
	95	125	65.0	6500	1.0	190	220	150	3000	**On request**	**On request**
Preferred types 115 V	**130**	170	80.0	6500	1.4	190	300	205	2000	**9401320000**	**9401720000**
	140	180	90.0	6500	1.5	190	320	220	2000	**9401330000**	**9401730000**
	150	200	95.0	6500	1.6	190	340	240	1800	**On request**	**9401740000**
	175	225	10.0	6500	1.8	190	390	270	1600	**On request**	**On request**
	230	300	30.0	6500	2.4	190	550	360	1200	**9401360000**	**9401760000**
	250	320	40.0	6500	2.7	190	600	390	1000	**9401370000**	**9401770000**
Preferred types 230 V	**275**	350	50.0	8000	2.9	300	640	430	900	**9401380000**	**9401780000**
	300	385	60.0	8000	3.0	300	700	470	900	**On request**	**9401790000**

Overall width 12 mm, dimensions see page 278

Overvoltage Protection

DK 4 U

with Gas discharger
or suppression diode



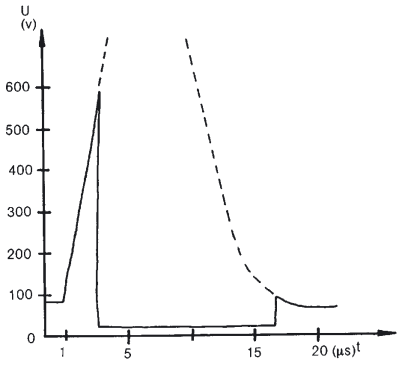
Gas discharge tube

The so-called gas discharge tube consists of two electrodes spaced a defined distance apart, enclosed in a small glass or ceramic tube. Between the electrodes is an inert gas at a defined pressure. A voltage surge which has a rise time of 1 kV/µs and reaches a peak of 10 kV can be limited to 600…700 V. The gas filled space changes from high resistance to low resistance. This process depends on the surge of the overvoltage and the rated DC pull-in voltage.
The rated DC pull-in voltage is printed on the side of the gas discharge tube. Once the gas is ignited a typical arcing voltage of 10 to 30 V is produced across the component. The ionisation of the gas causes the discharger to become low resistive. allowing a high follow current to flow. Suitable measures must be taken to limit the follow current, for example, by fusing.

Suppression diodes

Suppression diodes work on a similar principle to conventional zener diodes. If the indicated breakdown voltage is exceeded, the diode conducts.
Compared to zener diodes, suppression diodes have a higher current carrying capacity and faster response times in the ps range.

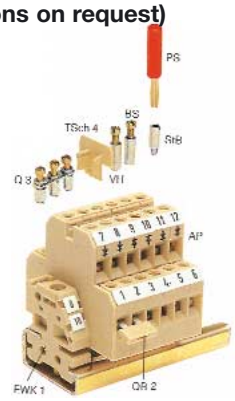
DK 4 U gas discharger 5 kA, 90 V



Rated data DK 4U

Type		Rated DC sparkover voltage V	Tolerance %	Impulse sparkover voltage at 1 kV/µs V	Maximum rated voltage U_{eff} V	U– V	Capacity pF	Cat. No. TS 32	TS 35
2.5 kA (8/20 µs)	Preferred types 24 V	**90**–	±25	< 600	35	50	≈1	**9400000000**	**On request**
		150–	±15	< 600	60	90	≈1	**On request**	**94001100000**
	Preferred types 48 V	**230**–	±20	< 650	95	135	≈1	**94000200000**	**94001200000**
5 kA (8/20 µs)		**350**–	±20	< 700	145	210	≈1	**On request**	**On request**
	Preferred types 24 V	**90**–	±25	< 600	35	50	≈2	**94002000000**	**94003000000**
	Preferred types 48 V	**150**–	±15	< 600	60	90	≈2		**On request**
20 kA (8/20 µs)									
	Preferred types 24 V	**90**–	±25	< 600	35	50	≈2	**94004000000**	**94005000000**
		150–	±15	< 600	60	90	≈2	**94004100000**	**94005100000**
	Preferred types 48 V	**230**–	±15	< 650	95	135	≈2	**94004200000**	**On request**
	Preferred types 115 V	**470**–	±15	<1000	200	280	≈2	**94004400000**	**94005400000**
	Preferred types 230 V	**600**–	±15	<1000	255	360	≈2	**94004500000**	**94005500000**
DK 4 U with suppression diode		**20**–	±10	< 60	–	28	≈3000	**80169500000**	**80169600000**
		480	±10	< 146	53	74	≈1400	**80169700000**	**80169800000**
		1150	±10	< 300	135	178	≈700	**80169900000**	**80170000000**
		2300	±10	< 700	320	240	≈400	**80170100000**	**80170200000**
WDK 2.5 V with supression diode		**24**0	±10	< 60	33 V	28 V	≈3000		**81327600000**
		24–	±10	< 60		30 V	≈3000		**82691200000**

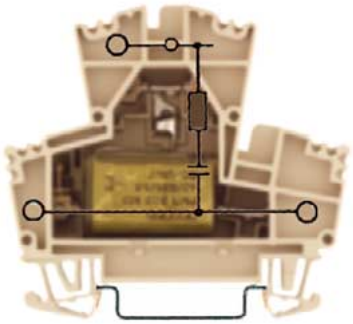
with electronic components (other versions on request)



DK 4 RC

Arc suppression circuit for contacters and solenoid valves (AC)

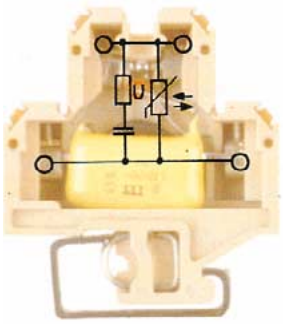
Suppressor module for opto-coupler inputs



DK 4 RC-VRS

Arc suppression circuit

for contacters and solenoid valves (AC)



Dimensions DK 4/WDK 2.5				
Terminal width (+ fitting tolerance 0.2)		18 mm		18 mm
Insulation stripping length		9 mm		9 mm
Connection data				
Screw connection, flexible	DK 4	0.5…4 mm^2		0.5…4 mm^2
Screw connection, flexible	WDK 2.5	–		–
Wire cross-section	DK 4	AWG 22…12		AWG 22…12
Wire cross-section	WDK 2.5	–		–
VDE rated data				
Voltage		250 V~/300 V–		24 V~
Diode current		–		–
Diode reverse voltage				–
Current of through busbar		10 A		10 A
Approvals				
Operating temperature range				
Diode		–		–
Resistance		220 Ω		47 Ω
Capacitor		0.22 µF		0.22 µF
Varistor	(max. operating voltage)	–		S 14
Gas discharger	(rated DC spark over voltage)	–		50 V
max. leakage current	(standard wave 8/20 µs)	–		–
Ordering data				
Type		DK 4 RC		DK 4 RC-VRS
Cat. No.	for TS 32	**0692160000**		**9401860000**
Type		DK 4 RC/35		DK 4 RC-VRS/35
Cat. No.	for TS 35	**0053160000**		**9402260000**
Type		WDK 2.5 RC		
Cat. No.	for TS 35	**8065910000**		

Accessories		Type	Cat. No.	Qty.	Type	Cat. No.	Qty.
Mounting rail (2 m lengths)		TS 32	**0122800000**	–	TS 32	**0122800000**	–
		TS 35	**0383400000**	–	TS 35	**0383400000**	–
End bracket (thickness mm)		EWK 1 (8.5)	**0206160000**	50	EWK 1 (8.5)	**0206160000**	50
		EW 35 (8.5)	**0383560000**	50	EW 35 (8.5)	**0383560000**	50
End plate (thickness mm)		AP PA (1.5)	**0359260000**	20	AP PA (1.5)	**0359260000**	20
Small partition		TSch 4	**0363360000**	100	TSch 4	**0363360000**	100
Socket for test plug		StB 8.5	**0215700000**	50	StB 8.5	**0215700000**	50
Test plug (pin diameter)		PS (ø 2.3)	**0180400000**	20	PS (ø 2.3)	**0180400000**	20
Cross-connection (pre-assembled)							
	3-pole						
	4-pole	Q 4	**0336600000**	50	Q 4	**0336600000**	50
	10-pole	Q 10	**0368600000**	20	Q 10	**0368600000**	20
Cover plate							
Fixing screw (plastic)		BSK M 2.5 x 18	**0303300000**	100	BSK M 2.5 x 18	**0303300000**	100
Cross-connection bridge	2-pole	QB 2[1])	**0482700000**	100	QB 2[1])	**0482700000**	100
	3-pole	QB 3[1])	**0482800000**	50	QB 3[1])	**0482800000**	50
	4-pole	QB 4[1])	**0482900000**	50	QB 4[1])	**0482900000**	50
	75-pole	QB 75 blank	**0526400000**	10	QB 75 blank	**0526400000**	10
Insulation profile		IP	**0526700000**	–	IP	**0526700000**	–
		StB 8.5	**0215700000**	50			

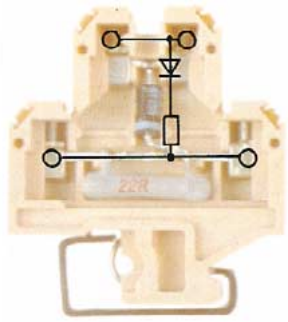
[1]) When using QB: wire connection max. 2.5 mm^2

Feed-through Terminals

DK 4 RD

Arc suppression circuit

for contacters and solenoid valves (AC)



12 mm	
9 mm	
0.5…4 mm²	
–	
AWG 22…12	
–	
3 A	
1300 V	
10 A	
BY 255	
22 Ohm (4 W)	
–	
–	
–	
–	
DK 4 RD	
0150260000	
DK 4 RD/35	
0059160000	

Type	Cat. No.	Qty.
TS 32	**0122800000**	–
TS 35	**0383400000**	–
EWK 1 (8.5)	**0206160000**	50
EW 35 (8.5)	**0383560000**	50
AP PA (1.5)	**0359260000**	20
TSch 4	**0363360000**	100
StB 8.5	**0215700000**	50
PS (ø 2.3)	**0180400000**	20
Q 3	**0336500000**	50
Q 4	**0336600000**	50
Q 10	**0368600000**	20
AD 4 (4 terminals)	**0303400000**	50
BSK M 2.5 x 18	**0303300000**	100
QB 2[1])	**0482700000**	100
QB 3[1])	**0482800000**	50
QB 4[1])	**0482900000**	50
QB 75 blank	**0526400000**	10
IP	**0526700000**	–

for retrofitting electronic components

WPO 4

Dimensions		
Width/length/height (mm)	with TS 32	–
Width/length/height (mm)	with TS 35x7.5	6/60/47
Insulation stripping length/clamping screw		9 mm/M 3
Rated data		
Rated voltage/current/cross-section		250 V/32 A/4 mm²
Rated impulse voltage VDE 0110/1.89/pollution severity		4 kV/3
Further technical data		
Tightening torque range	Nm	0.5...1.0
Torque setting with DMS2 electric screwdriver		2
Clampable wires		
„e“ solid HO7V-U	mm²	0.5…4
„m“ stranded HO7V-R	mm²	1.5…4
„f“ flexible HO7V-K	mm²	0.5…4
„f“ flexible HO7V-K and AEH DIN 46228/1	mm²	0.5…4
„f“ flexible HO7V-K and AEH with plastic collar	mm²	0.5…4
Gauge pin to 947-1	Size	A 3
Continuous current rating of terminal for wire size		32 A/4 mm²
Wire diameter of electrical components	mm	0.8...1.0 mm
UL/CSA rated data		
Voltage/current/wire size	UL	
	CSA	

Ordering data	Type	Cat. No.	Qty.
	Wemid	**1036000000**	50

Intermediate frame

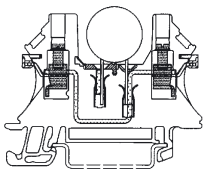
Type	Cat. No.	Qty.
ZR	**1071100000**	20

Thickness 1.5 mm

Busbar

SSch 7.3x1.2 **1071200000** 1 m

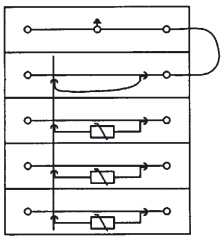
Varistors		
for 24 V	S14k30	**4127830000**
for 230 V	S14k275	**4011070000**
Gas discharger		
for 90 V	90 V 20 kA	**4233030000**
for 600 V	600 V 20 kA	**4140810000**



WOP 4 with a plug in varistor

Weidmüller varistor terminals have been designed to allow the retrofitting of electronics components, e. g., varistors, diodes, gas discharge tubes, etc. These electronic terminals no longer have to be configured prior to installation to subsequently be delivered with soldered components which can no longer be distinguished. The significant advantages of this new design are:

- Cost saving:
- Components can be changed quickly on site
- Service is limited to visual inspection
- Clarity:
- Components are easy to distinguish
- Flexibility:
- Components can immediately be adapted to changed conditions



Overvoltages in a three-phase supply discharged to earth via WPE with the aid of varistors and a gas discharge tube.

Marking tags	**Print**	
	Consecutive horizontal	FW 6 **046866....**
	Consecutive vertical	FS 6 **047356....**

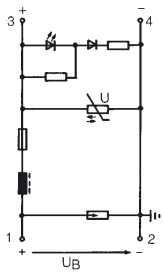
EGU 1 50 mA

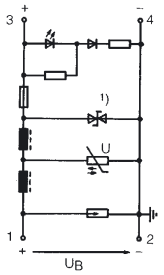
e. g. for binary signals

EGU 2 50 mA

e. g. for binary signals

Circuit diagram





Ordering data	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	EGU 1, 24 V0	**0243960000**	EGU 1, 48 V0	**0244460000**	EGU 2, 24 V0	**0223060000**	EGU 2, 48 V0	**0226560000**
Technical data								
Rated voltage	24 V0		48 V0		24 V–		48 V0	
Max. operating voltage (U_B)	38 V–/30 V~		85 V–/60 V~		28 V–		88 V–/55 V~	
Through resistance	28 Ω		28 Ω		50 Ω		50 Ω	
Max. operating current	50 mA		50 mA		50 mA		50 mA	
Fuse	F 63 mA		F 63 mA		F 63 mA		F 63 mA	
Limit frequency (– 3 dB/load resistance)*	20 kHz/500 Ω		40 kHz/1 kΩ		10 kHz/500 Ω		20 kHz/1 kΩ	
Leakage current, max. (8/20 µs)	5 kA		5 kA		5 kA		5 kA	
DC sparkover voltage of the gas discharger	90 V		230 V		90 V		230 V	
Impulse sparkover voltage (1 kV/µs) of the gas discharger, typ.	700 V		700 V		700 V		700 V	
Interference voltage output side, with input 1 kV/µs, typ.	55 V		130 V		35 V		82 V	
Storage temperature	–25 °C…+85 °C		–25 °C…+85 °C		–25 °C…+85 °C		–25 °C…+85 °C	
Operating temperature	–25 °C…+60 °C		–25 °C…+60 °C		–25 °C…+60 °C		–25 °C…+60 °C	

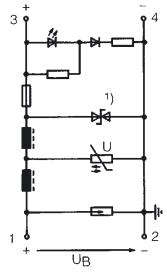
Ordering data	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	EGU 1, 115 V0	**0240560000**	EGU 1, 230 V0	**0245060000**	EGU 2, 115 V0	**0226660000**	EGU 2, 230 V0	**0223260000**
Technical data								
Rated voltage	115 V0		230 V0		115 V0		230 V0	
Max. operating voltage (U_B)	170 V–/130 V~		320 V–/250 V~		170 V–/130 V~		320 V–/250 V~	
Through resistance	28 Ω		28 Ω		30 Ω		30 Ω	
Max. operating current	50 mA		50 mA		50 mA		50 mA	
Fuse	F 63 mA		F 63 mA		F 63 mA		F 63 mA	
Limit frequency (– 3 dB/load resistance)*	88 kHz/2.2 kΩ		150 kHz/4.5 kΩ		88 kHz/2.2 kΩ		150 kHz/4.5 kΩ	
Leakage current, max. (8/20 µs)	5 kA		20 kA		5 kA		20 kA	
DC sparkover voltage of the gas discharger	230 V		600 V		230 V		600 V	
Impulse sparkover voltage (1 kV/µs) of the gas discharger, typ.	700 V		700 V		700 V		700 V	
Interference voltage output side, with input 1 kV/µs, typ.	180 V		300 V		200 V		350 V	
Storage temperature	–25 °C…+85 °C		–25 °C…+85 °C		–25 °C…+85 °C		–25 °C…+85 °C	
Operating temperature	–25 °C…+60 °C		–25 °C…+60 °C		–25 °C…+60 °C		–25 °C…+60 °C	
Accessories								
Accessories, dimensions and connection data see	Page 279		Page 279		Page 279		Page 279	

* Source impedance 50 Ω

Fine Overvoltage Protection

EGU 2 1.5 A

e. g. for power supply

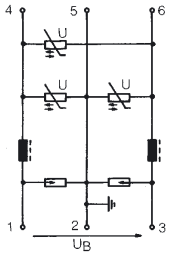


Type	Cat. No.
EGU 2, 24 V0	**9310830000**
24 V–	
31 V–	
0.2 Ω	
1.5 A	
1.6 A	
500 kHz/16 Ω	
5 kA	
90 V	
700 V	
33 V	
–25 °C…+85 °C	
–25 °C…+40 °C	
Page 279	

Type	Cat. No.
EGU 2, 115 V0	**9311520000**
115 V0	
170 V–/130 V~	
0.2 Ω	
1.5 A	
1.6 A	
1.5 MHz/70 Ω	
5 kA	
230 V	
700 V	
180 V	
–25 °C…+85 °C	
–25 °C…+60 °C	
Page 279	

EGU 3 50 mA

e. g. for current loops



Type	Cat. No.
EGU 3, 24 V0	**0250560000**
24 V0	
38 V–/30 V~	
18 Ω	
50 mA	
–	
10 kHz/500 Ω	
5 kA	
90 V	
700 V	
55 V	
–25 °C…+85 °C	
–25 °C…+60 °C	
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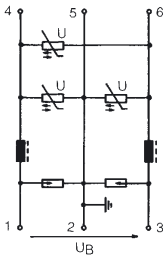
Type	Cat. No.
EGU 3, 115 V0	**0250760000**
115 V0	
170 V–/130 V~	
18 Ω	
50 mA	
–	
44 kHz/2.2 kΩ	
5 kA	
230 V	
700 V	
180 V	
–25 °C…+85 °C	
–25 °C…+60 °C	
Page 279	

Type	Cat. No.
EGU 3, 48 V0	**0250660000**
48 V0	
85 V–/60 V~	
18 Ω	
50mA	
–	
20 kHz/1 kΩ	
5 kA	
230 V	
700 V	
130 V	
–25 °C…+85 °C	
–25 °C…+60 °C	
Page 279	

Type	Cat. No.
EGU 3, 230 V0	**0250860000**
230 V0	
320 V–/250 V~	
18 Ω	
50 mA	
–	
75 kHz/4.5 kΩ	
20 kA	
600 V	
700 V	
300 V	
–25 °C…+85 °C	
–25 °C…+60 °C	
Page 279	

EGU 3 1.5 A

e. g. for power supply



Type	Cat. No.
EGU 3, 24 V0	**1186760000**
24 V0	
38 V–/30 V~	
0.1 Ω	
1.5 A	
–	
300 kHz/16 Ω	
5 kA	
90 V	
700 V	
85 V	
–25 °C…+85 °C	
–25 °C…+60 °C	
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Type	Cat. No.
EGU 3, 115 V0	**1186860000**
115 V0	
170 V–/130 V~	
0.1 Ω	
1.5 A	
–	
550 kHz/70 Ω	
5 kA	
230 V	
700 V	
320 V	
–25 °C…+85 °C	
–25 °C…+60 °C	
Page 279	

Type	Cat. No.
EGU 3, 48 V0	**1186960000**
48 V0	
82 V–/58 V~	
0.1 Ω	
1.5 A	
–	
400 kHz/32 Ω	
5 kA	
230 V	
700 V	
145 V	
–25 °C…+85 °C	
–25 °C…+60 °C	
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Type	Cat. No.
EGU 3, 230 V0	**1187060000**
230 V0	
315 V–/240 V~	
0.1 Ω	
1.5 A	
–	
800 kHz/150 Ω	
20 kA	
600 V	
700 V	
580 V	
–25 °C…+85 °C	
–25 °C…+60 °C	
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[1]) 24 V DC model with unipolar Transzorp diode

Fine Overvoltage Protection

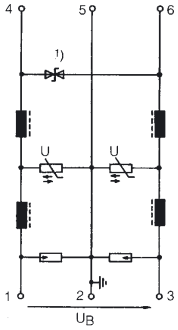
EGU 4 0.1 A

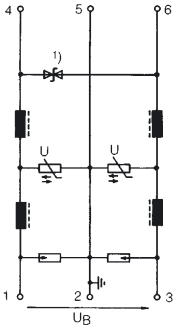
e. g. for current loops

EGU 4 1.5 A

e. g. for power supply

Circuit diagram





Ordering data	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	EGU 4, 24 V0	**0459460000**	EGU 4, 48 V0	**0461860000**	EGU 4, 24 V0	**1170960000**	EGU 4, 48 V0	**1171060000**
Technical data								
Rated voltage	24 V–		48 V0		24 V0		48 V0	
Max. operating voltage (U_B)	28 V–		88 V–/55 V~		34 V–/26.5 V~		75 V–/53 V~	
Through resistance	22 Ω		22 Ω		0.1 Ω		0.1 Ω	
Max. operating current	100 mA		100 mA		1.5 A		1.5 A	
Limit frequency (– 3 dB/load resistance)*	5 kHz/240 Ω		10 kHz/480 Ω		250 kHz/16 Ω		500 kHz/32 Ω	
Leakage current, max. (8/20 µs)	5 kA		5 kA		5 kA		5 kA	
DC sparkover voltage of the gas discharger	90 V		230 V		90 V		230 V	
Impulse sparkover voltage (1 kV/µs) of the gas discharger, typ.	700 V		700 V		700 V		700 V	
Interference voltage output side, with intput 1 kV/µs, typ.	33 V		82 V		42 V		83 V	
Storage temperature	–25 °C…+85 °C		–25 °C…+85 °C		–25 °C…+85 °C		–25 °C…+85 °C	
Operating temperature	–25 °C…+60 °C		–25 °C…+60 °C		–25 °C…+50 °C		–25 °C…+50 °C	

Ordering data	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	EGU 4, 115 V0	**0461960000**	EGU 4, 230 V0	**0462060000**	EGU 4, 115 V0	**1171160000**	EGU 4, 230 V0	**1171260000**
Technical data								
Rated voltage	115 V0		230 V0		115 V0		230 V0	
Max. operating voltage (U_B)	170 V–/130 V~		320 V–/250 V~		170 V–/122 V~		300 V–/250 V~	
Through resistance	22 Ω		22 Ω		0.1 Ω		0.1 Ω	
Max. operating current	100 mA		100 mA		1.5 A		1.5 A	
Limit frequency (– 3 dB/load resistance)*	20 kHz/1.2 kΩ		40 kHz/2.2 kΩ		800 kHz/70 kΩ		1 MHz/150 kΩ	
Leakage current, max. (8/20 µs)	5 kA		20 kA		5 kA		20 kA	
DC sparkover voltage of the gas discharger	230 V		600 V		230 V		600 V	
Impulse sparkover voltage (1 kV/µs) of the gas discharger, typ.	700 V		700 V		700 V		700 V	
Interference voltage output side, with intput 1 kV/µs, typ.	200 V		350 V		190 V		400 V	
Storage temperature	–25 °C…+85 °C		–25 °C…+85 °C		–25 °C…+85 °C		–25 °C…+85 °C	
Operating temperature	–25 °C…+60 °C		–25 °C…+60 °C		–25 °C…+50 °C		–25 °C…+50 °C	

Accessories				
Accessories, dimensions and connection data see	Page 279	Page 279	Page 279	Page 279

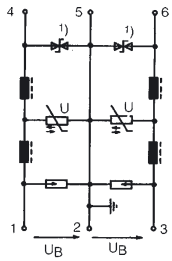
* Source impedance 50 Ω

1) 24 V DC model with unipolar Transzorp diode

Fine Overvoltage Protection

EGU 4 0.1 A

e. g. for symmetric loads



Type	Cat. No.
EGU 4, 24 V0	**1170560000**
24 V–	
31 V–	
12 Ω	
100 mA	
10 kHz/240 Ω	
5 kA	
90 V	
700 V	
33 V	
–25 °C…+85 °C	
–25 °C…+50 °C	
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Type	Cat. No.
EGU 4, 48 V0	**1170660000**
48 V0	
75 V–/54 V~	
12 Ω	
100 mA	
20 kHz/480 Ω	
5 kA	
230 V	
700 V	
82 V	
–25 °C…+85 °C	
–25 °C…+50 °C	
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Type	Cat. No.
EGU 4, 115 V0	**1170760000**
115 V0	
170 V–/130 V~	
12 Ω	
100 mA	
40 kHz/1.2 kΩ	
5 kA	
230 V	
700 V	
230 V	
–25 °C…+85 °C	
–25 °C…+50 °C	
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Type	Cat. No.
EGU 4, 230 V0	**1170860000**
230 V0	
320 V–/250 V~	
12 Ω	
100 mA	
80 kHz/2.2 kΩ	
20 kA	
600 V	
700 V	
420 V	
–25 °C…+85 °C	
–25 °C…+50 °C	
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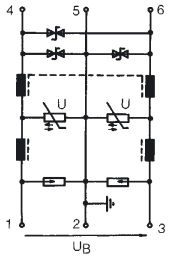
RS U 6 A

e. g. for power supply



Type	Cat. No.
RS U, 24 V0	**1171361001**
24 V0	
34 V–/26.5 V~	
0.08 Ω	
6 A	
8 kHz/4 Ω	
20 kA	
90 V	
700 V	
40 V	
–25 °C…+85 °C	
–25 °C…+40 °C	
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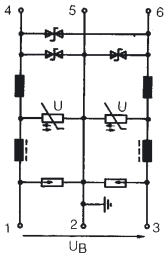
Type	Cat. No.
RS U, 48 V0	**1171461001**
48 V0	
77 V–/54 V~	
0.08 Ω	
6 A	
10 kHz/8 Ω	
20 kA	
230 V	
700 V	
80 V	
–25 °C…+85 °C	
–25 °C…+40 °C	
Page 279	

Type	Cat. No.
RS U, 115 V0	**1171561001**
115 V0	
170 V–/130 V~	
0.08 Ω	
6 A	
30 kHz/20 Ω	
20 kA	
230 V	
700 V	
200 V	
–25 °C…+70 °C	
–25 °C…+40 °C	
Page 279	

Type	Cat. No.
RS U, 230 V0	**1171661001**
230 V0	
320 V–/250 V~	
0.08 Ω	
6 A	
90 kHz/40 Ω	
20 kA	
600 V	
700 V	
420 V	
–25 °C…+70 °C	
–25 °C…+40 °C	
Page 279	

RS U 10 A

e. g. for power supply



Type	Cat. No.
RS U, 24 V0	**8104201001**
24 V0	
34 V–/26 V~	
0.04 Ω	
10 A	
–	
20 kA	
90 V	
700 V	
45 V	
–25 °C…+85 °C	
–25 °C…+40 °C	
Page 279	

Type	Cat. No.
RS U, 115 V0	**8104221001**
115 V0	
170 V–/130 V~	
0.04 Ω	
10 A	
–	
20 kA	
230 V	
700 V	
220 V	
–25 °C…+70 °C	
–25 °C…+40 °C	
Page 279	

Type	Cat. No.
RS U, 48 V0	**8025371001**
48 V0	
77 V–/54 V~	
0.04 Ω	
10 A	
–	
20 kA	
90 V	
700 V	
85 V	
–25 °C…+85 °C	
–25 °C…+40 °C	
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Type	Cat. No.
RS U, 230 V0	**8093281001**
230 V0	
230 V–/250 V~	
0.04 Ω	
10 A	
–	
20 kA	
600 V	
700 V	
450 V	
–25 °C…+70 °C	
–25 °C…+40 °C	
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[1]) 24 V DC model with unipolar Transzorp diode

pluggable

LPU 4 0.1 A

e. g. for current loops

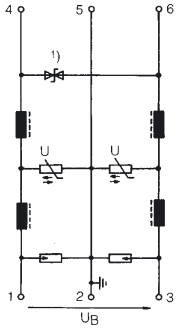
SEG/U

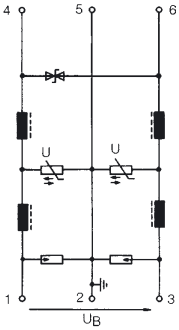
LPU 1.5 A

e. g. for current loops

SEG/U

Circuit diagram





Ordering data	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	LPU, 24 V0	**8008300000**	LPU, 48 V0	**8008330000**	LPU, 24 V0	**8008430000**	LPU, 48 V0	**8008440000**

Technical data				
Rated voltage	24 V–	48 V0	24 V0	48 V0
Max. operating voltage (U_B)	29 V–	74 V–/53 V~	34 V–/27 V~	74 V–/53 V~
Through resistance	12.5 Ω	12.5 Ω	0.15 Ω	0.15 Ω
Max. operating current	0.1 A	0.1 A	1.5 A	1.5 A
Limit frequency (– 3 dB/load resistance)*	7.5 kHz/240 Ω	9 kHz/480 Ω	150 kHz/16 Ω	300 kHz/32 Ω
Leakage current, max. (8/20 µs)	5 kA	5 kA	5 kA	5 kA
DC sparkover voltage of the gas discharger	90 V	230 V	90 V	230 V
Impulse sparkover voltage (1 kV/µs) of the gas discharger, typ.	700 V	700 V	700 V	700 V
Interference voltage output side, with intput 1 kV/µs, typ.	34 V	82 V	42 V	82 V
Storage temperature	–25 °C…+85 °C	–25 °C…+85 °C	–25 °C…+85 °C	–25 °C…+85 °C
Operating temperature	–25 °C…+60 °C	–25 °C…+60 °C	–25 °C…+50 °C	–25 °C…+50 °C
Weight				

Ordering data	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	LPU, 115 V0	**8008350000**	LPU, 230 V0	**8008380000**	LPU, 115 V0	**8008450000**	LPU, 230 V0	**8008460000**

Technical data				
Rated voltage	115 V0	230 V0	115 V0	230 V0
Max. operating voltage (U_B)	170 V–/125 V~	320 V–/240 V~	170 V–/125 V~	320 V–/240 V~
Through resistance	12.5 Ω	12.5 Ω	0.15 Ω	0.15 Ω
Max. operating current	0.1 A	0.1 A	1.5 A	1.5 A
Limit frequency (– 3 dB/load resistance)*	9 kHz/1.1 kΩ	40 kHz/2.2 kΩ	600 kHz/70 kΩ	1 MHz/150 kΩ
Leakage current, max. (8/20 µs)	5 kA	20 kA	5 kA	20 kA
DC sparkover voltage of the gas discharger	230 V	600 V	230 V	600 V
Impulse sparkover voltage (1 kV/µs) of the gas discharger, typ.	700 V	700 V	700 V	700 V
Interference voltage output side, with intput 1 kV/µs, typ.	180 V	400 V	180 V	400 V
Storage temperature	–25 °C…+85 °C	–25 °C…+85 °C	–25 °C…+85 °C	–25 °C…+85 °C
Operating temperature	–25 °C…+60 °C	–25 °C…+60 °C	–25 °C…+50 °C	–25 °C…+50 °C

Accessories	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
Housing	SEG/U	**8007871001**	SEG/U	**8007871001**	SEG/U	**8007871001**	SEG/U	**8007871001**

Details see page 280

* Source impedance 50 Ω

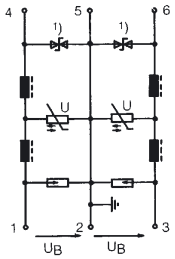
1) 24 V DC model with unipolar Transzorp diode

Fine Overvoltage Protection

LPU 0.1 A

e. g. for symmetric loads

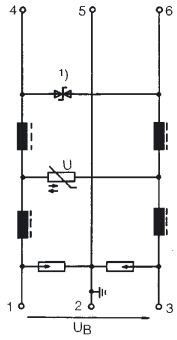
SEG/U



LPU 0.1 A

e. g. unearthed signal lines

SEG/U



TGU

Test case for LPU overvoltage protection

LPU test case:
The built-in protective elements in the LPU, such as gas-filled surge arresters, varistors and diodes, are tested for rated data and permissible tolerance ranges, and the reactors for continuity. The test results can be protocoled via two-coloured LEDs or a built-in printer. The test case runs a self-test when turned on. Electrical testing of the LPU occurs automatically after plugging in the LPU overvoltage protector.

Type	Cat. No.
LPU, 24 V0	**8008230000**

24 V–
29 V–
12.5 Ω
0.1 A
7.5 kHz/240 Ω
5 kA
90 V
700 V
35 V
–25 °C…+85 °C
–25 °C…+60 °C

Type	Cat. No.
LPU, 48 V0	**8008250000**

48 V0
74 V–/53 V~
12.5 Ω
0.1 A
17 kHz/480 Ω
5 kA
230 V
700 V
83 V
–25 °C…+85 °C
–25 °C…+60 °C

Type	Cat. No.
LPU, 24 V0	**8008390000**

24 V–
29 V–
12.5 Ω
0.1 A
7.5 kHz/240 Ω
5 kA
90 V
700 V
35 V
–25 °C…+85 °C
–25 °C…+60 °C

Type	Cat. No.
LPU, 48 V0	**8008400000**

48 V0
74 V–/53 V~
12.5 Ω
0.1 A
9 kHz/480 Ω
5 kA
230 V
700 V
82 V
–25 °C…+85 °C
–25 °C…+60 °C

Type	Cat. No.
TGU	**on request**

230/115 V~
0…40 °C
10 kg

Type	Cat. No.
LPU, 115 V0	**8008260000**

115 V0
170 V–/125 V~
12.5 Ω
0.1 A
40 kHz/1.1 kΩ
5 kA
230 V
700 V
180 V
–25 °C…+85 °C
–25 °C…+60 °C

Type	Cat. No.
LPU, 230 V0	**8008280000**

230 V0
320 V–/240 V~
12.5 Ω
0.1 A
80 kHz/2.2 kΩ
20 kA
600 V
700 V
400 V
–25 °C…+85 °C
–25 °C…+60 °C

Type	Cat. No.
LPU, 115 V0	**8008410000**

115 V0
170 V–/125 V~
12.5 Ω
0.1 A
20 kHz/1.1 kΩ
5 kA
230 V
700 V
180 V
–25 °C…+85 °C
–25 °C…+60 °C

Type	Cat. No.
LPU, 230 V0	**8008420000**

230 V0
320 V–/240 V~
12.5 Ω
0.1 A
40 kHz/2.2 kΩ
20 kA
600 V
700 V
400 V
–25 °C…+85 °C
–25 °C…+60 °C

Type	Cat. No.
SEG/U	**8007871001**

Type	Cat. No.
SEG/U	**8007871001**

Type	Cat. No.
SEG/U	**8007871001**

Type	Cat. No.
SEG/U	**8007871001**

1) 24 V DC model with unipolar Transzorp diode

Overvoltage Protection for Data Lines

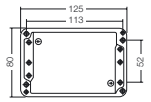
LPU RS 485

for data interfaces
to RS 485 or RS 422

RS 485

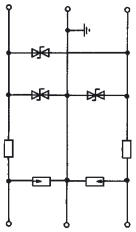
for modulink

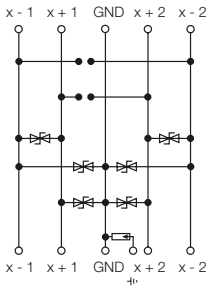
Circuit diagram/function



approx. 25 mm PG cable gland

optional soldering jumper for T branch





VDE rated data		
Rated voltage	± 6 V	±12 V
Through resistance	0.1 Ω	negligably small
Max. operating voltage (U_B)	± 12 V	±12 V
Max. operating current	1.5 A	–
Max. frequency	–	–
Limit frequency (–3 dB/load resistance)	–	–
Leakage current, max. (8/20 µs)	0.5 kA	10 kA
DC sparkover voltage of the gas discharger	90 V	90 V
Impulse sparkover voltage (1 kV/µs) of the gas discharger	–	–
Interference voltage output side, with intput 1 kV/µs	≤ 18 V	≤18 V
Baud rate	≤ 9600 Bd	≤ 6 MB
Response time	≤ 5 ns	≤5 ns
Storage temperature	–25 °C…+85 °C	–25 °C…+85 °C
Operating temperature	–25 °C…+60 °C	–25 °C…+60 °C

Ordering data	Type	Cat. No.	Type	Cat. No.
	LPU RS 485	**9454930000**	RS 485	**8008501001**
Accessories	SEG-U	**8007871001**		

Fine Overvoltage Protection For Data Lines

EGU 4, RS 232

for RS 232 interfaces

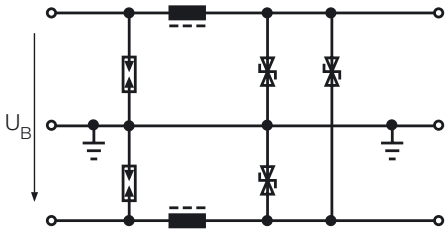
ZS-RS 232

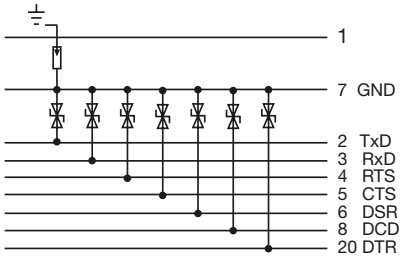
RS 232 interface adapter

Circuit diagram/function

Two stage close overvoltage protection, two data lines, R x D, T x D are protected against earth. The fine overvoltage protection modules mount onto TS 35 or TS 32 mounting rails. The module can be fit on any vertical or horizontal surface by replacing the locking foot with a mounting plate.

The ZS-RS 232 adapter is used for fine overvoltage protection between RS 232 interfaces and programmable controllers. These highly sensitive systems are particularly susceptible to interference. This protection module can be used with a maximum cable length of 15 metres.



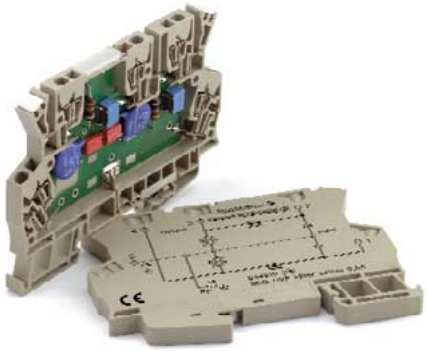


VDE rated data		
Rated voltage	12…14.5 V	±12 V
Through resistance	1.3 Ω	
Max. opearting voltage (U_B)	50 V	15 V
Max. opearting current	0.05 A	0.1 A
Max. frequency		14 kHz/600 Ω
Limit frequency (–3 dB/load resistance)	300 kHz/600 Ω	30 kHz/1.2 kΩ
Leakage current, max. (8/20 µs)	5 kA	
DC sparkover voltage of the gas discharger	90 V	10 kA
Impulse sparkover voltage (1 kV/µs) of the gas discharger	700 V	700 V
Interference voltage output side,	20 V	≤ 20 V
with intput 1 kV/µs		
Baud rate	9600 Bd	≤ 19200 Bd
Ressponse time	≤ 5 ns	≤ 5 ns
Storage temperature	–25 °C…+85 °C	–25 °C…+85 °C
Operating temperature	–25 °C…+60 °C	–25 °C…+60 °C
Dimensions	–	63 x 54 x 16 mm

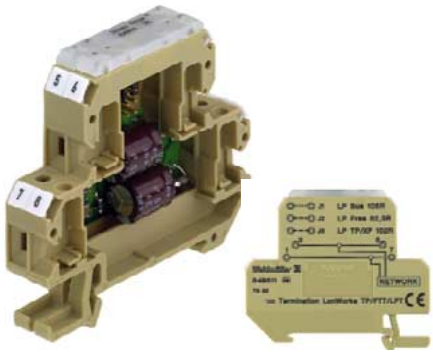
Ordering data	Type	Cat. No.	Type	Cat. No.
	EGU 4, RS 232	**1170460000**	ZS-RS 232/B-S*	**8570500000**
	MPL (mounting plate)	**0158560000**	ZS-RS 232/S-B*	**8570510000**
			***ZS-RS 232/B-S:**	
			Cable side 25-pole Sub-D socket → unprotected	
			***ZS-RS 232/S-B:**	
			Cable side 25-pole Sub-D plug → unprotected	

Overvoltage Protection for LonWorks®

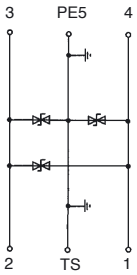
MCZ ovp LON
LPT / FTT / TP 78

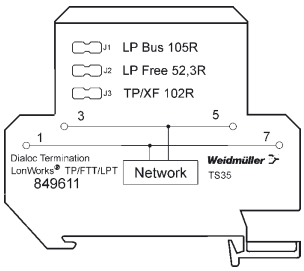


LON Termination
LPT / FTT / TP 78



Circuit diagram





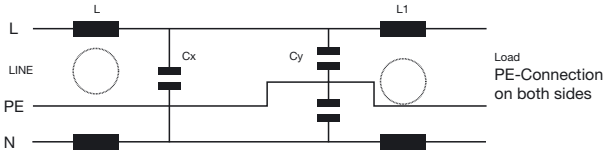
Ordering data	Type	Cat. No.	Type	Cat. No.
	MCZ ovp LON	**8473470000**	Dialoc Term	**8496110000**

Technical data		
Rated voltage	± 12V	± 12V
Through resistance 2/3 and 1/4	< 0.5Ω	< 0.5Ω
Damping, typ.	< 5 db	< 5 db

Overvoltage Protection

Mains filter in the WAVEBOX

	WAVEFILTER 250V 1A	WAVEFILTER 250V 3A	WAVEFILTER 250V 6A	WAVEFILTER 250V 10A
				
Circuit diagram				



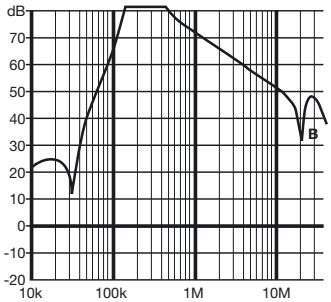
Ordering data	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	Wavefilter		Wavefilter		Wavefilter		Wavefilter	
	250V 1A	**8614790000**	250V 3A	**8614780000**	250V 6A	**8614800000**	250V 10A	**8614770000**

Technical data				
Mains voltage	250 V 50/60Hz	250 V 50/60Hz	250 V 50/60Hz	250 V 50/60Hz
Rated current	1 A	3 A	6 A	10 A
Capacity	Cx 1*33 nF Cy 2*2.2 nF	Cx 1*33 nF Cy 2*2.2 nF	Cx 1*33 nF Cy 2*2.2 nF	Cx 1*33 nF Cy 2*2.2 nF
Inductor L and L1	10 mH	2 mH	0.8 mH	0.8 mH
Leakage current	190 µA	190 µA	190 µA	190 µA
Test voltage PN-PE	2000 Vac	2000 Vac	2000 Vac	2000 Vac
Test voltage P-N	1700 Vdc	1700 Vdc	1700 Vdc	1700 Vdc
Temperature range	-20 °C…+40 °C	-20 °C…+40 °C	-20 °C…+40 °C	-20 °C…+40 °C
Dimensions in mm	72 x 93 x 22.5	72 x 93 x 22.5	93 x 113 x 22.5	93 x 113 x 22.5

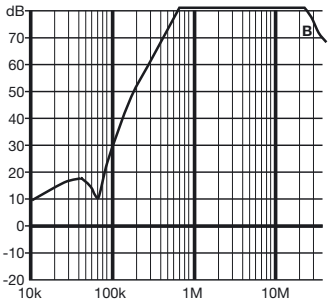
Insertion loss

Measurement according to CISPR 17 B = 50Ω/50Ω asymm.

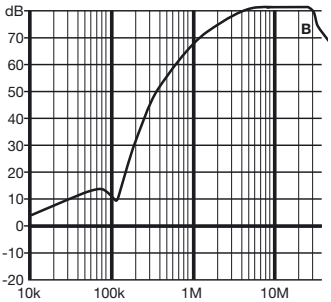
1 A WAVEFILTER



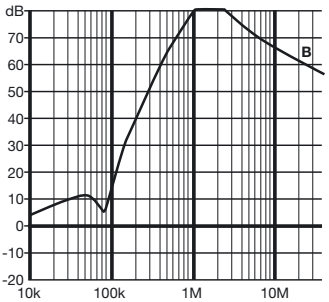
3 A WAVEFILTER



6 A WAVEFILTER



10 A WAVEFILTER



Technical rules for flammable liquids

TRbF

Extract from TRbF 100

Requirements:

1. Buildings containing above-ground installations (subject to special permission) for the storage, filling or transportation of flammable liquids, as well as outdoor tanks above and below ground which are not enclosed on all sides by soil, brickwork or concrete or several of these materials, must be protected by the provision of suitable apparatus against ignition hazards and lightning (for example, in accordance with DIN VDE 0185 Parts 1 and 2).
2. Section 1 also applies to outdoor tanks above ground, which are used for the storage of flammable liquids of the danger classes A I, A II or B in one area.
3. For intrinsically safe circuits, which are used, for example, for operating instrumentation and control systems, whose cables are routed into the tank, applicable are independent of Sections 1 and 2 and over and above.

– for outdoor tanks below ground*),

– for tanks in buildings susceptible to lightning strikes due to the cable routing (also remote lightning strikes*).

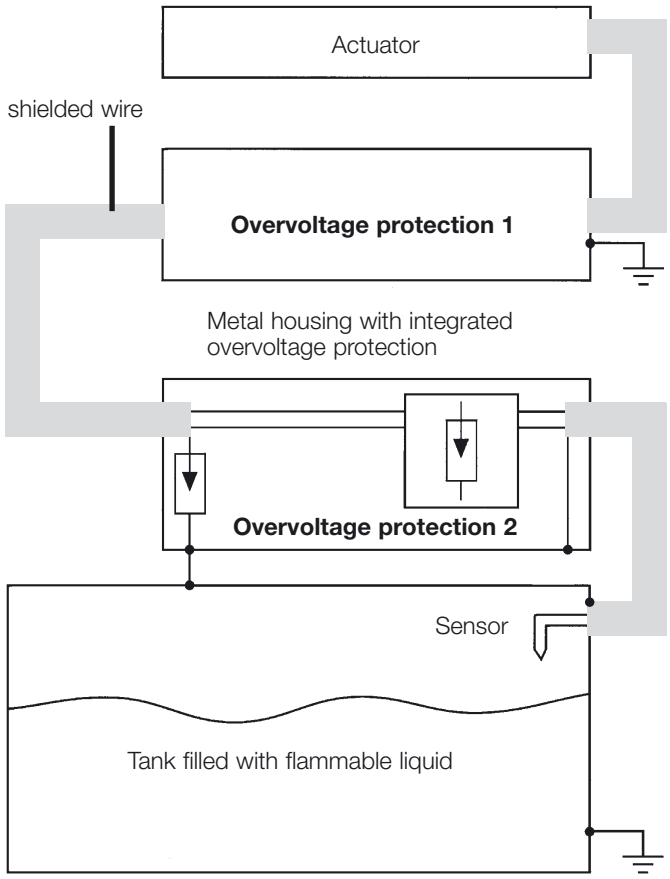
the demands resulting thereof:

1. An overvoltage apparatus in a metal housing (for example, terminal box, housing for integrated measuring transducer or similar) must be assembled before the wire is inserted into the tank. The metal housing containing the overvoltage protection apparatus is to be fixed,securely and electrically conductive, immediately to the wall or shielding of the tank in such a manner as to ensure equipotential bonding.
2. A suitable cable/suitable wire** is to be used for the supply wire from the instrument board to the metal housing with the overvoltage protection apparatus; a cable/a suitable wire with metal sheath, shielding or a suitable cable/a suitabler wire in a metal conduit is to be used from the overvoltage protection apparatus to the storage tank. The metal sheath, shielding or the conduit must be be connected to the equipotential bonding (earth).The test voltage Ueff between the wires and the metal sheath, shielding or conduit of the cable/wire from the metal housing with the overvoltage protection apparatus to the storage tank must be at least 1500 V.
3. The cable/wire between the metal housing with the overvoltage protection apparatus and the entry into the storage tank should be laid so as to ensure that a lightning strike is improbable.

*) These requirements apply, for example, to level meters or similar measuring devices which are installed in outdoor tanks below ground and from which a cable is routed below ground into a building (e.g. petrol station buildings).

**) In accordance with harmonization documents 21 and 22 CENELEC

Overvoltage Protection for Intrinsically Safe Circuits



Weidmüller offers a complete solution for this application!

- Metal enclosure with BASEEFA approval EEx e II T6
- Overvoltage protection with PTB approval EEx ia IIB/IIC T4/T6
- Metal enclosure complete with glands and overvoltage protection according to your requirements.

The point **Overvoltage protection 1** is securely earthed!

The overvoltage protection units
LPU 800843 24 VAC/DC 1.5 A or
LPU 800844 48 VAC/DC 1.5 A
are used for this purpose.

This is a plug-in protection unit for use in the SEG-U housing. It can also be fitted in the terminal design:
DKU 801580
DKU 801581 24 VDC 0.1 or
DKU 801928
DKU 801929 48 VAC/DC 0.1 A

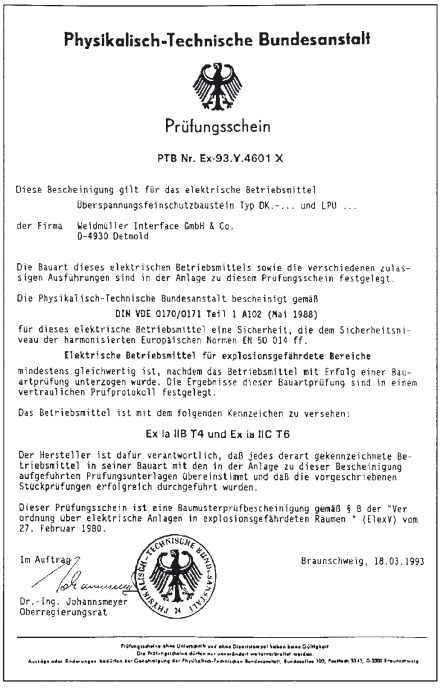
The point **Overvoltage protection 2** is earthed floating - via a gas discharge tube!

Earthing takes place via a gas discharge tube with 470 V from cable to earth (type DK4U 940044 and DK4U 940045).

Overvoltage protection can be installed between the cables, for example:
LPU 822524 24 VDC 0.1 A
LPU 822525 48 VDC 0.1 A or
overvoltage protection in terminal design:
DK4U 940040
DK4U 940050.

According to TRbF, overvoltage protection 2 must be assembled in a metal housing prior to inserting the cable into the tank. The housings STB 1 and NEXT 26/26/16 are used for this purpose.

These housings are approved for hazardous areas use by BASEEFA EEx e II T6. The housings must be conductively connected to the tank.



Physikalisch-Technische Bundesanstalt

Prüfungsschein

PTB Nr. Ex-93.Y.4601 X

Diese Bescheinigung gilt für das elektrische Betriebsmittel
Überspannungsfeinschutzbaustein Typ DK.-... und LPU ...
der Firma Weidmüller Interface GmbH & Co.
D-4930 Detmold

Die Bauart dieses elektrischen Betriebsmittels sowie die verschiedenen zulassigen Ausführungen sind in der Anlage zu diesem Prüfungsschein festgelegt.

Die Physikalisch-Technische Bundesanstalt bescheinigt gemäß
DIN VDE 0170/0171 Teil 1 A102 (Mai 1988)
für dieses elektrische Betriebsmittel eine Sicherheit, die dem Sicherheitsniveau der harmonisierten Europäischen Normen EN 50 014 ff.
Elektrische Betriebsmittel für explosionsgefährdete Bereiche
mindestens gleichwertig ist, nachdem das Betriebsmittel mit Erfolg einer Bauartprüfung unterzogen wurde. Die Ergebnisse dieser Bauartprüfung sind in einem vertraulichen Prüfprotokoll festgelegt.

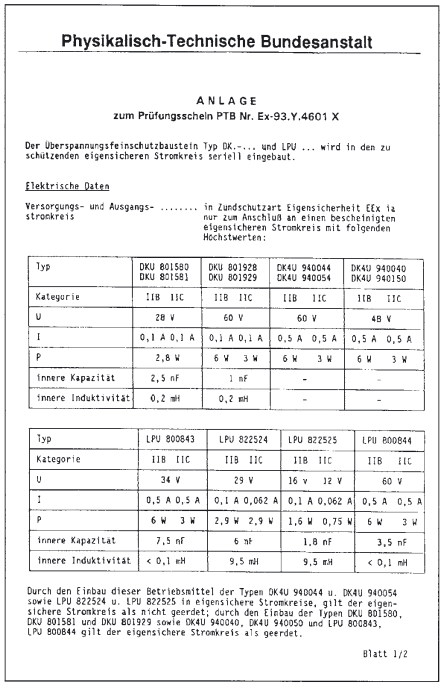
Das Betriebsmittel ist mit dem folgenden Kennzeichen zu versehen:
Ex ia IIB T4 und Ex ia IIC T6

Der Hersteller ist dafür verantwortlich, daß jedes derart gekennzeichnete Betriebsmittel in seiner Bauart mit den in der Anlage zu dieser Bescheinigung aufgeführten Prüfungsunterlagen übereinstimmt und daß die vorgeschriebenen Stückprüfungen erfolgreich durchgeführt wurden.

Dieser Prüfungsschein ist eine Baumusterprüfbescheinigung gemäß § 8 der "Verordnung über elektrische Anlagen in explosionsgefährdeten Räumen " (ElexV) vom 27. Februar 1980.

Im Auftrag
Dr.-Ing. Johannsmeyer
Oberregierungsrat

Braunschweig, 18.03.1993



Physikalisch-Technische Bundesanstalt

ANLAGE
zum Prüfungsschein PTB Nr. Ex-93.Y.4601 X

Der Überspannungsfeinschutzbaustein Typ DK.-... und LPU ... wird in den zu schützenden eigensicheren Stromkreis seriell eingebaut.

Elektrische Daten

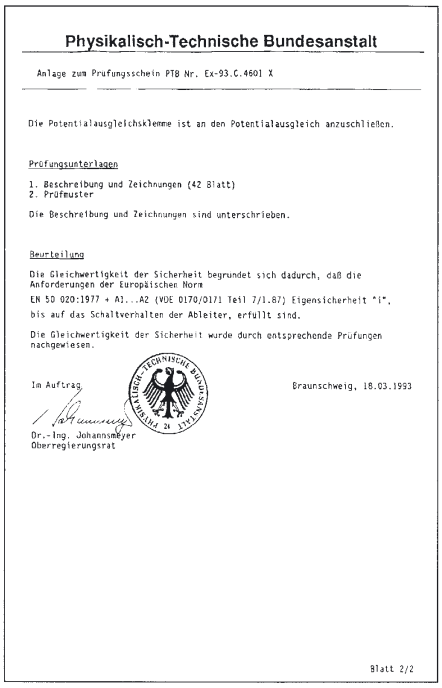
Versorgungs- und Ausgangs- ..... in Zundschutzart Eigensicherheit EEx ia stromkreis nur zum Anschluß an einen bescheinigten eigensicheren Stromkreis mit folgenden Höchstwerten:

Typ	DKU 801580 DKU 801581	DKU 801928 DKU 801929	DK4U 940044 DK4U 940054	DK4U 940040 DK4U 940150
Kategorie	IIB IIC	IIB IIC	IIB IIC	IIB IIC
U	28 V	60 V	60 V	48 V
I	0,1 A 0,1 A	0,1 A 0,1 A	0,5 A 0,5 A	0,5 A 0,5 A
P	2,8 W	6 W 3 W	6 W 3 W	6 W 3 W
innere Kapazität	2,5 nF	1 nF	-	-
innere Induktivität	0,2 mH	0,2 mH	-	-

Typ	LPU 800843	LPU 822524	LPU 822525	LPU 800844
Kategorie	IIB IIC	IIB IIC	IIB IIC	IIB IIC
U	34 V	29 V	16 V 12 V	60 V
I	0,5 A 0,5 A	0,1 A 0,062 A	0,1 A 0,062 A	0,5 A 0,5 A
P	6 W 3 W	2,9 W 2,9 W	1,6 W 0,75 W	6 W 3 W
innere Kapazität	7,5 nF	6 nF	1,8 nF	3,5 nF
innere Induktivität	< 0,1 mH	9,5 mH	9,5 mH	< 0,1 mH

Durch den Einbau dieser Betriebsmittel der Typen DK4U 940044 u. DK4U 940054 sowie LPU 822524 u. LPU 822525 in eigensichere Stromkreise, gilt der eigensichere Stromkreis als nicht geerdet; durch den Einbau der Typen DKU 801580, DKU 801581 und DKU 801929 sowie DK4U 940040, DK4U 940050 und LPU 800843, LPU 800844 gilt der eigensichere Stromkreis als geerdet.

Blatt 1/2



Physikalisch-Technische Bundesanstalt

Anlage zum Prüfungsschein PTB Nr. Ex-93.C.4601 X

Die Potentialausgleichsklemme ist an den Potentialausgleich anzuschließen.

Prüfungsunterlagen

1. Beschreibung und Zeichnungen (42 Blatt)
2. Prüfmuster

Die Beschreibung und Zeichnungen sind unterschrieben.

Beurteilung

Die Gleichwertigkeit der Sicherheit begründet sich dadurch, daß die Anforderungen der Europäischen Norm
EN 50 020:1977 + A1...A2 (VDE 0170/0171 Teil 7/1.87) Eigensicherheit "i", bis auf das Schaltverhalten der Ableiter, erfüllt sind.

Die Gleichwertigkeit der Sicherheit wurde durch entsprechende Prüfungen nachgewiesen.

Im Auftrag
Dr.-Ing. Johannsmeyer
Oberregierungsrat

Braunschweig, 18.03.1993

Blatt 2/2

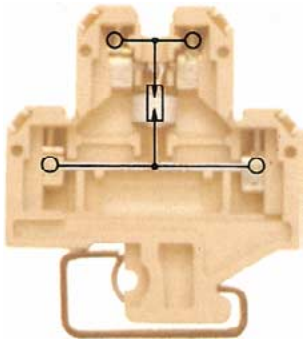
Overvoltage Protection for Intrinsically Safe Circuits

Overvoltage protection 1

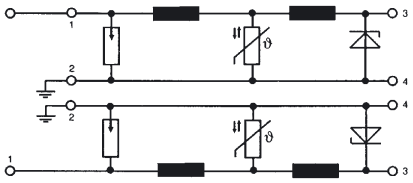
in 6-mm wide
terminal design

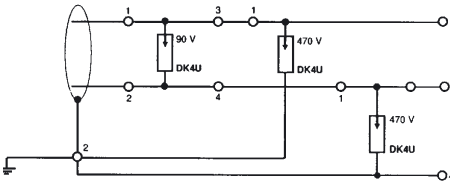
Overvoltage protection 2

in 12-mm wide terminal design
with individual components



Circuit diagram





Technical data				
Rated voltage U1.2	**24 Vdc**	**48 Vac/dc**		
Max. permissible voltage U1.2	**28 Vdc**	**75 Vdc/54 Vac**	**56 Vdc/40 Vac**	**± 283 Vdc/200 Vac**
Through resistance 1.3	3.5 Ω	3.5 Ω	≤ 0.1 Ω	≤ 0.1 Ω
Inductance of four-pole network LI ≤	**170 µH**	**170 µH**	**0 mH**	**0 mH**
Capacitance of four-pole network CI ≤	**2.5 nF**	**1.0 nF**	**0 µF**	**0 µF**
Source impedance frequency response	(… at R_i = 240 Ω)	(… at R_i = 480 Ω)		
at 50 Ω/-3 db at R_i = … Ω	500 kHz	1000 kHz		
Max. rated current per path	**0.1 A**	**0.1 A**	**10 A**	**10 A**
ΔTü at 0.1 A and 60 °C ambient temperature	18 K	11 K	typ. 15 K	typ. 15 K
Gas arrester type	90 V 2.5 kA	230 V 2.5 kA	90 V 20 kA	470 V 20 kA
Varistor type	S07 K30	S07 K60		
Suppression diode type	ZP 1033 A 0.6 kW	P 6 KE 82 CP 0.6 kW		
Inductor	2 x 70 µH 0.1 A	2 x 70 µH 0.1 A		
Rated AC discharge current	–	–	25 A	25 A
Terminal material	PA 66	PA 66	PA 66	PA 66
Sparkover voltage of surge arrester				
at 1000 V/µs at input	typ. 700 V	typ. 700 V	typ. 650 V	typ. 1100 V
Interference voltage at output				
at 1000 V/µs at input	typ. 33 V	typ. 82 V		
Interference voltage at output				
at 8/20 µs and 5 kA at input	max. 38 V	max. 100 V		
Max. leakage current at U_n and max. T_u				
from terminal 1 to 2 (PA)	10 µA	10 µA	0 µA	0 µA
Protection class	Safe from finger-touch acc. to DIN VDE 0106 Part 100	Safe from finger-touch acc. to DIN VDE 0106 Part 100	Safe from finger-touch acc. to DIN VDE 0106 Part 100	Safe from finger-touch acc. to DIN VDE 0106 Part 100
Storage temperature	- 25 … + 85 °C	- 25 … + 85 °C	- 25 … + 85 °C	- 25 … + 85 °C
Operating temperature	- 25 … + 60 °C	- 25 … + 50 °C	- 25 … + 60 °C	- 25 … + 60 °C
Clamping point	Self-locking screw	Self-locking screw	Self-locking screw	Self-locking screw
Solid	0.5 … 4 mm^2	0.5 … 4 mm^2	0.5 … 4 mm^2	0.5 … 4 mm^2
Flexible	0.5 … 4 mm^2	0.5 … 4 mm^2	0.5 … 4 mm^2	0.5 … 4 mm^2
Approvals	**Ex ia IIC/IIB T6/T4 PTB No. Ex-93.Y.4601 X**	**Ex ia IIC/IIB T6/T4 PTB No. Ex-93.Y.4601 X**	**Ex ia IIC/IIB T6/T4 PTB No. Ex-93.Y.4601 X**	**Ex ia IIC/IIB T6/T4 PTB No. Ex-93.Y.4601 X**

Ordering data	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	DKU 24 Vdc **0.1 A TS 32**	**8015800000**	DKU 48 Vac/dc **0.1 A TS 32**	**8019280000**	DK4U 48 Vdc **TS 32**	**9400400000***	DK4U 110 Vdc **TS 32**	**9400440000***
	DKU 24 Vdc **0.1 A TS 35**	**8015810000**	DKU 48 Vac/dc **0.1 A TS 35**	**8019290000**	DK4U 48 Vdc **TS 32**	**9400500000***	DK4U 110 Vdc **TS 35**	**9400540000***

Accessories				
STB and NEXT component housing	see housing catalogue	see housing catalogue	see housing catalogue	see housing catalogue

Details see page 278

Overvoltage Protection for Intrinsically Safe Circuits

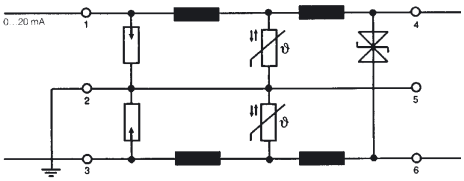
Overvoltage protection 1

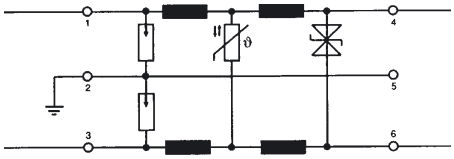
for 20 mm wide
SEG/U housing

Overvoltage protection 2

for 20 mm wide
SEG/U housing

Circuit diagram





Technical data				
Rated voltage U1.3	**24 Vac/dc**	**48 Vac/dc**	**24 Vac/dc**	**48 Vac/dc**
Rated voltage U1.2 and U2.3	**24 Vac/dc**	**48 Vac/dc**	**%**	**%**
Max. permissible voltage $U_{1.3}$	34 Vdc/27 Vac	74 Vdc/53 Vac	29 Vdc	74 Vdc/53 Vac
Max. permissible voltage $U_{1.2}$ and $U_{2.3}$	31 Vdc/25 Vac	81 Vdc/59 Vac	200 Vac/283 Vdc	200 Vac/283 Vdc
Through resistance 1, 4 and 2, 6	0.15 Ω	0.15 Ω	13 Ω	13 Ω
Inductance of four-pole network Ll ≤	**75 µH**	**75 µH**	**9.5 mH**	**9.5 mH**
Capacitance of four-pole network Cl ≤	**7.5 nF**	**3.5 nF**	**6.0 nF**	**1.8 µF**
Source impedance frequency response	(… at R_i = 16 Ω)	(… at Ri = 32 Ω)	(… at R_i = 240 Ω)	(… at R_i = 480 Ω)
at 50 Ω/-3 db at R_i = … Ω	150 kHz	300 kHz	4.5 kHz	9 kHz
Max. rated current per path	**1.5 A**	**1.5 A**	**0.1 A**	**0.1 A**
$\Delta T_{ü}$ at 1.5 A_{eff} and				
50 °C ambient temperature	32 K	32 K		
60 °C ambient temperature			25 K	25 K
Gas arrester type	2 x 90 V 5 kA	230 V 5 kA	2 x 470 V 5 kA	2 x 470 V 5 kA
Varistor type	2 x S10 K25	2 x S10 K60	S10 K25	S10 K60
Suppression diode type	CP 2039 A 1.5 kW	P 6 KE 82 CA 0.6 kW	ZP 1033 A 0.6 kW	P 6 KE 82 CA 0.6 kW
Inductor	4 x 15 µH 1.5 A	4 x 15 µH 1.5 A	4 x 2 mH 0.1 A	4 x 2 mH 0.1 A
Location cover material	PA 66	PA 66	PA 66	PA 66
Sparkover voltage of surge arrester				
at 1000 V/µs at input	typ. 700 V	typ. 700 V	typ. 800 V	typ. 800 V
Interference voltage at output 4, 6				
at 1000 V/µs at input	typ. 39 V	typ. 82 V	typ. 33 V	typ. 82 V
Interference voltage at output 4, 6				
at 8/20 µs and 5 kA at input	max. 65 V	max. 115 V	max. 38 V	max. 90 V
Max. leakage current at Un and max. Tu				
from terminal 1, 3 to 2 (PA)	10 µA	10 µA	0 µA	0 µA
…from terminals 1 to 3			15 µA	15 µA
Protection class	Safe from finger-touch acc.	Safe from finger-touch acc.	Safe from finger-touch acc.	Safe from finger-touch acc.
	to DIN VDE 0106 Part 100	to DIN VDE 0106 Part 100	to DIN VDE 0106 Part 100	to DIN VDE 0106 Part 100
Storage temperature	- 25 … + 85 °C	- 25 … + 85 °C	- 25 … + 85 °C	- 25 … + 85 °C
Operating temperature	- 25 … + 50 °C	- 25 … + 50 °C	- 25 … + 60 °C	- 25 … + 60 °C
Clamping point	Self-locking screw	Self-locking screw	Self-locking screw	Self-locking screw
Solid	0.5 … 4 mm^2	0.5 … 4 mm^2	0.5 … 4 mm^2	0.5 … 4 mm^2
Flexible	0.5 … 4 mm^2	0.5 … 4 mm^2	0.5 … 4 mm^2	0.5 … 4 mm^2
Approvals	**Ex ia IIC/IIB T6/T4 PTB No. Ex-93.Y.4601 X**	**Ex ia IIC/IIB T6/T4 PTB No. Ex-93.Y.4601 X**	**Ex ia IIC/IIB T6/T4 PTB No. Ex-93.Y.4601 X**	**Ex ia IIC/IIB T6/T4 PTB No. Ex-93.Y.4601 X**

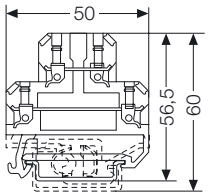
Ordering data								
	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
	LPU 24 V ac/dc	**8008430000**	LPU 48 V ac/dc	**8008440000**	LPU 24 V dc	**8225240000**	LPU 48 V ac/dc	**8225250000**
	1.5 A current loops		1.5 A current loops		0.1 A unearthed		0.1 A unearthed	

Accessories			
STB and NEXT component housing	see housing catalogue		see housing catalogue
Housing	**SEG/U**	**8007871001**	**SEG/U**	**8007871001**
Screw terminals	LP system		LP system
Solid	0.5 … 4 mm^2		0.5 … 4 mm^2
Flexible	0.5 … 2.5 mm^2		0.5 … 2.5 mm^2

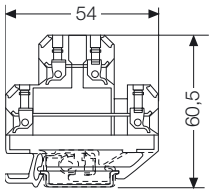
Details see page 280

Housing dimensions
DKU
EGU
RSU

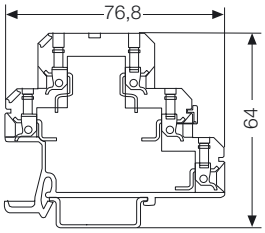
DK 4 U
Varistor
Gas discharge tube



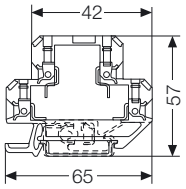
DK 4 U
with suppression diodes



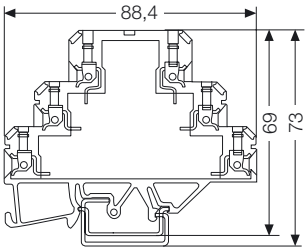
DK 5 U



DKU
with combination unit



DK 6 U



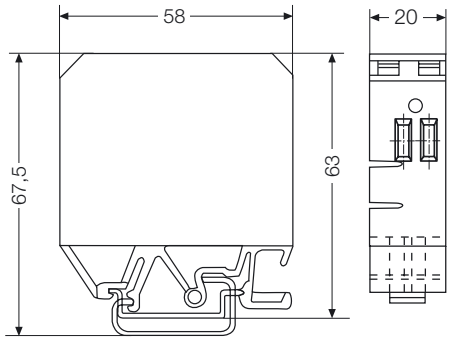
Technical data	DK 4 U		DK 5 U	DK 6 U	DK 4 U	DKU	
	24 V/48 V/115 V	230 V				24 V/48 V/115 V	230 V
Terminal width (+ fitting tolerance 0.2 mm)	6 mm	12 mm	6 mm	8 mm	6 mm	6 mm	12 mm
Insulation stripping length	9 mm						
Screw connection, solid	0.5…4 mm²						
Screw connection, flexible	0.5…4 mm²						
Connection cross-section	AWG 20…12						

Accessories	Type	Cat. No.	Type	Cat. No.
Mounting rail	TS 32	**0122800000**	TS 32	**0122800000**
	TS 35 x 7.5	**0383400000**	TS 35 x 7.5	**0383400000**
	TS 35 x 15	**0498000000**	TS 35 x 15	**0498000000**
End bracket	EWK 2 (TS 32)	**0199360000**	EWK 2 (TS 32)	**0199360000**
	EWK 35 (TS 35)	**0199360000**	EWK 35 (TS 35)	**0199360000**
End plate	AP (for **DK 4 U**)	**0359260000**	AP (for **DK 4 U**)	**0687560000**
	AP (for **DK 5 U**)	**4036780000**	AP (for **DKU**)	**0687560000**
	AP (for **DK 6 U**)	**4042030000**		
Marking material*	**dekafix 5**		**dekafix 5**	

* Special prospect available on request

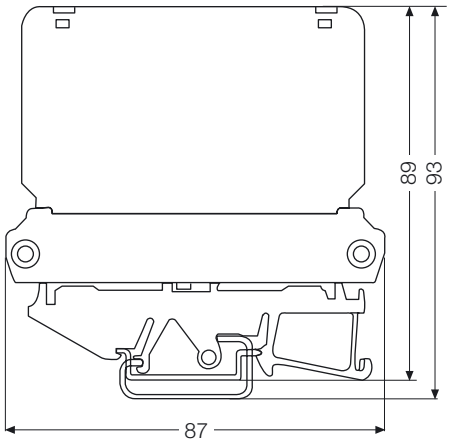
Fine Overvoltage Protection

EGU 1/EGU 2

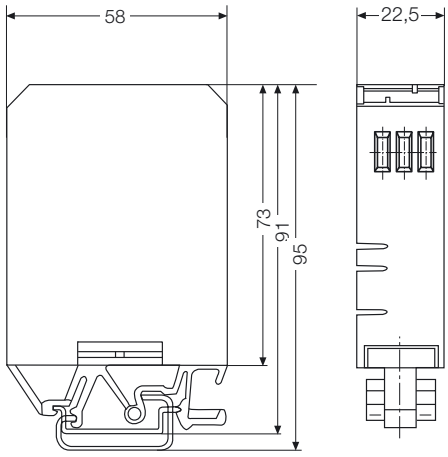


RSU, 6 A

10 A



EGU 3, EGU 4



EGU 1 / EGU 2
20 mm
12 mm
0.5…6 mm2
0.5…4 mm2
AWG 20…12

Type	Cat. No.
TS 32	**0122800000**
TS 35 x 7.5	**0383400000**
TS 35 x 15	**0498000000**
EWK 2 (TS 32)	**0199360000**
EWK 35 (TS 35)	**0199360000**
dekafix 5	

RSU, 6 A	10 A
81 mm	81 mm
7 mm	7 mm
0.5…4 mm²	0.5…4 mm²
0.5…2.5 mm²	0.5…2.5 mm²
AWG 26…14	AWG 26…14

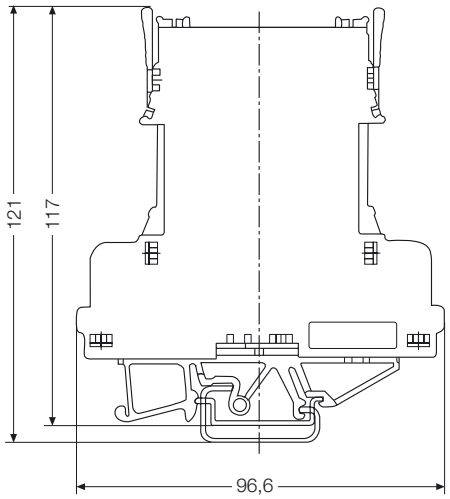
Type	Cat. No.
TS 32	**0122800000**
TS 35 x 7.5	**0383400000**
TS 35 x 15	**0498000000**
EWK 2 (TS 32)	**0199360000**
EWK 35 (TS 35)	**0199360000**
dekafix 5	

EGU 3 / EGU 4
22.5 mm
7 mm
0.5…4 mm²
0.5…2.5 mm²
AWG 22…12

Type	Cat. No.
TS 32	**0122800000**
TS 35 x 7.5	**0383400000**
TS 35 x 15	**0498000000**
EWK 2 (TS 32)	**0199360000**
EWK 35 (TS 35)	**0199360000**
dekafix 5	

SEG-U/LPU
EGF

SEG-U/LPU



Technical data	
Terminal width (+ fitting tolerance 0.2 mm)	20 mm
Insulation stripping length	7 mm
Screw connection, solid	0.5…4 mm²
Screw connection, flexible	0.5…2.5 mm²
Connection cross-section	AWG 26…14

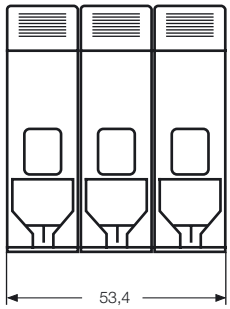
Accessories	Type	Cat. No.
Mounting rail	TS 32	**0122800000**
	TS 35 x 7.5	**0383400000**
	TS 35 x 15	**0498000000**
End bracket	EWK 2 (TS 32)	**0199360000**
	EWK 35 (TS 35)	**0199360000**
Marking material*	**dekafix 5**	

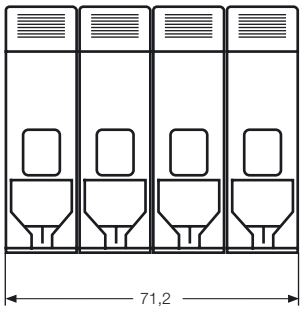
* Special catalogue available on request

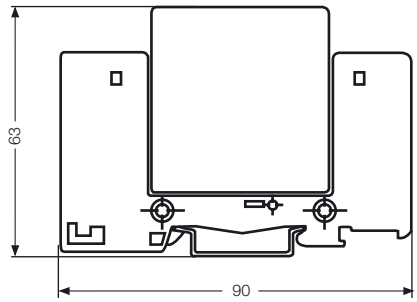
Notes

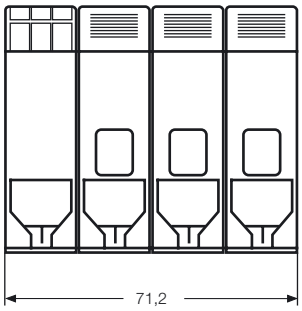
Overvoltage Protection for PU Power Supply

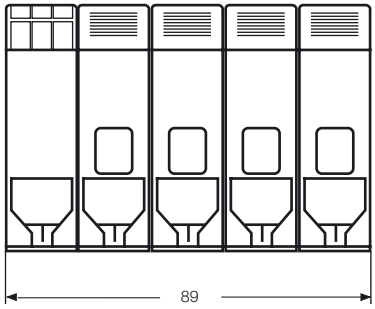
	PU 3 C/B	PU4 C/B	PU 3 C/B-R	PU 4 C/B-R











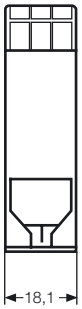
Technical data		
Overall width	53.4 mm/71.2 mm	71.2 mm/89.0 mm
Overall depth	55 mm	55 mm
Connection data/power side		
Screw connection, solid	6…25 mm	6…25 mm
Screw connection, flexible	10…25 mm	10…25 mm
Connection data relay/opto-coupler side		
Screw connection, solid	–	0.5…2.5 mm²
Screw connection, flexible	–	0.5…1.5 mm²

Accessories	Type	Cat. No.	Type	Cat. No.
Mounting rail	TS 35 x 7.5	**0383400000**	TS 35 x 7.5	**0383400000**
	TS 35 x 15	**0498000000**	TS 35 x 15	**0498000000**
End bracket	EWK 35 (TS 35)	**0199360000**	EWK 35 (TS 35)	**0199360000**

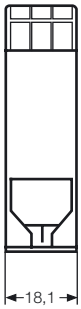
Overvoltage Protection for PU Power Supply

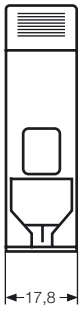
PU-O/S-E

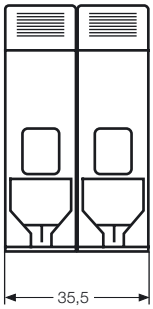
Transmitter

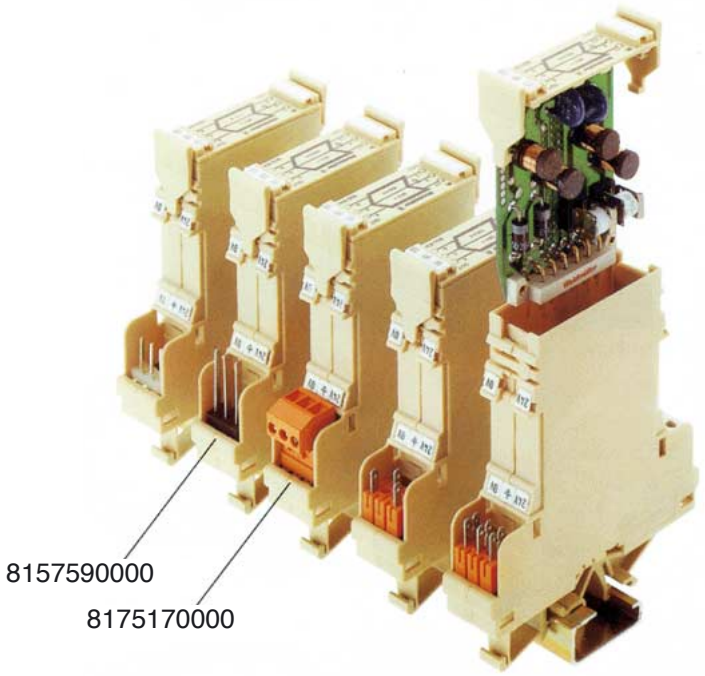


Receiver









18.1 mm	
55 mm	
–	
–	
0.5…2.5 mm²	
0.5…1.5 mm²	

Type	Cat. No.
TS 35 x 7.5	**0383400000**
TS 35 x 15	**0498000000**
EWK 35 (TS 35)	**0199360000**

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