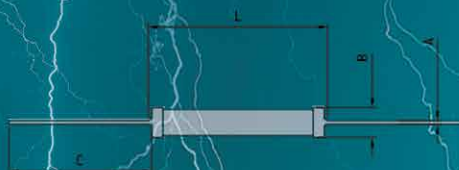
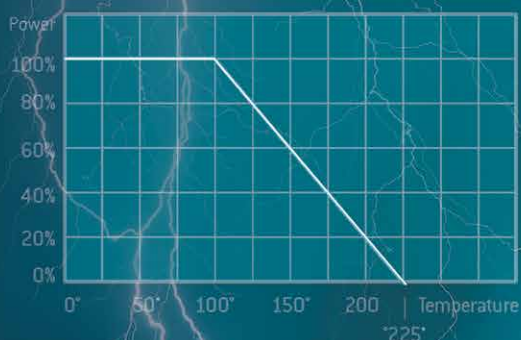


HIGH VOLTAGE RESISTORS

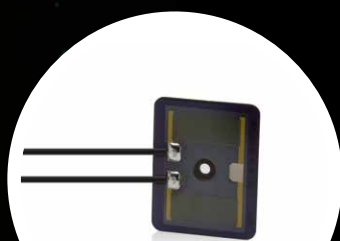
PRECISION – PULSE – POWER



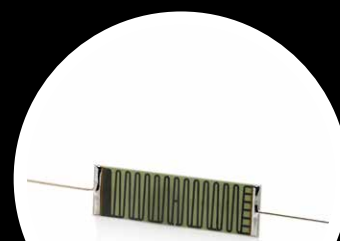
▶ HVR 969



▶ POC 400



▶ PLR/PLR-T0



▶ HVR 967

LEADING IN SENSORS

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Fair partnership and customer-specific solutions.

We appreciate your interest in our metallux high voltage resistors and high voltage dividers. Metallux products stand for excellent know-how, extreme precision, innovation, outstanding quality and the highest level of reliability. For our customers, we serve as both an innovator and a consultant. Our company's highly-qualified consultation expertise ensures that our customers receive the best possible added value.

By integrating quality management in all areas according to ISO 9001:2015, we ensure that each of our high-quality products offers outstanding reliability. We are committed to providing personalized, individual consultation and building trust-based, long-term relationships with our customers. The metallux high voltage resistors and dividers are manufactured in state-of-the-art production processes. In particular, the high long-term stability and precision of these products make them stand out. All high voltage products can be tailored to the needs of our customers. For your individual solutions, you can always count on the creativity of our development team.

Don't hesitate to contact us. We'll be glad to provide consultation.

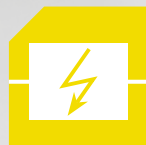
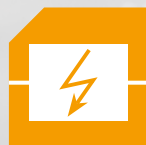
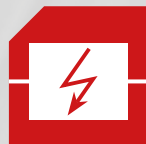
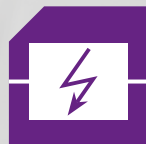
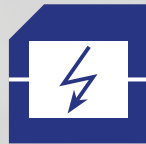
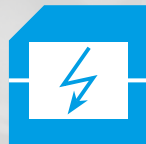
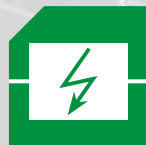
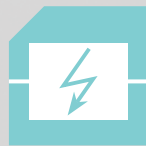


▶ ANDREAS OBERASCHER
Chairman of the board / CEO

▶ METALLUX AG – founded in 1986 and for years now a leading manufacturer of sensors, membrane sensors, resistors, pressure sensors and industrial joysticks in thick-film technology.



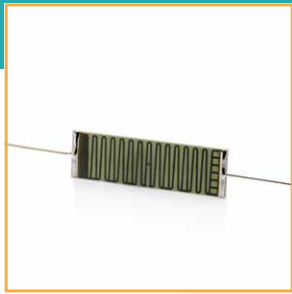
▶ Whether standard resistors or custom solutions: Our high voltage resistors are employed in numerous fields, such as solar and medical technology, transformer equipment and much more

**HVR**High voltage resistors
Type series 967, 968, 969**HPR**High voltage precision resistors
Type series 967, 968, 969**HVI**High voltage pulse resistors
Type series 967, 968, 969**HVD**High voltage dividers
Type series 967, 968, 969**NW**Resistor networks
Type series 967**HVS**High voltage SMD resistors
Type series 967**POC**High voltage potentiometers
Type series 400**PLR**Power resistors
Type series 100, 200, 300, 900New from Metallux
Applications

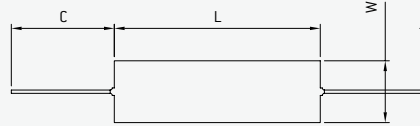
HIGH VOLTAGE RESISTORS HVR 967



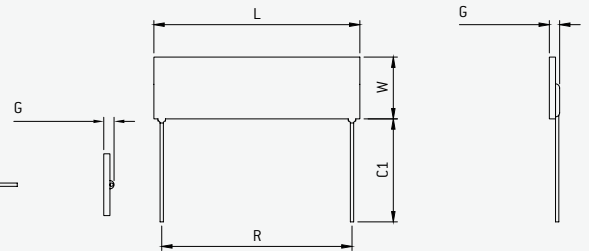
With their variety of designs, thick-film high voltage resistors offer ideal possibilities for mastering measuring, controlling and regulating processes in high voltage applications. Whether for high voltage pulses or for registering constant high voltages – with our HVR basic program we offer the ideal solution for all applications in high voltage engineering, high voltage network components, medical technology, electrostatics, the automotive industry and traffic engineering.



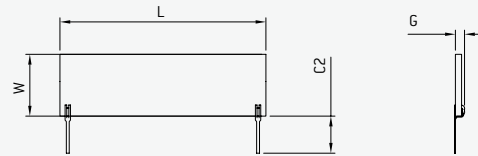
Axial wire connection



Radial wire connection



Optional contact PIN



- Flat designs
- Pulse-proof
- Low inductance

GENERAL TECHNICAL SPECIFICATIONS

| | |
|--|--|
| Resistance values, standard | 5 K, 10 K, 100 K, 1 M, 5 M, 10 M, 25 M, 50 M, 100 M, 1 G, 2 G, 5 G |
| Tolerance | 1 % (0.5 % – 20 %)* |
| Temperature coefficient | 100 ppm/°C (25 ppm/°C – 200 ppm/°C)* |
| Voltage coefficient | <2 ppm/V |
| Insulation resistance | >10,000 MΩ (500 V 25° C 75 % relative humidity) |
| Dielectric strength of the insulation | >1,000 V (25° C 75 % relative humidity) ΔR/R 0.25 % max. |
| Thermal shock | ΔR/R 0.25 % max. |
| Overload capacity | 1.5 x P[nom], 5 sec. (not 1.5 x V[max]) |
| Moisture resistance | ΔR/R 0.25 % |
| Long-term stability | ΔR/R 0.25 % max. |
| Temperature range (operation / storage) | -55° C – +175° C (-55° C – +100° C) |
| Cover | Epoxy-based varnishes (glass, silicone-based encasing) |
| Connection type | Tinned copper wire Cu vz Ø 0.8 mm, axial or radial |

Depending on ambient conditions, the characteristics of resistors can change. We recommend a suitability test under operational conditions. Specifications are subject to change without notice.

* Other values upon request.

| TYPE SELECTION | | | | | | | |
|----------------|--------------|------------|-----------|-----------|-----------|-----------|-----------|
| TYPES | TCR (ppm/°C) | 0.50 % | 1 % | 2 % | 5 % | 10 % | 20 % |
| 967.3.25 | 25 | 5 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G |
| 1 W | 50 | 5 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G |
| 8 kV [air] | 100 | 5 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G |
| 12 kV [oil] | 200 | 5 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G |
| 967.3.38 | 25 | 4 K-500 M | 4 K-3 G | 4 K-3 G | 4 K-3 G | 4 K-3 G | 4 K-3 G |
| 1.5 W | 50 | 4 K-500 M | 4 K-3 G | 4 K-3 G | 4 K-3 G | 4 K-3 G | 4 K-3 G |
| 10 kV [air] | 100 | 4 K-500 M | 4 K-3 G | 4 K-3 G | 4 K-3 G | 4 K-3 G | 4 K-3 G |
| 15 kV [oil] | 200 | 4 K-500 M | 4 K-3 G | 4 K-3 G | 4 K-3 G | 4 K-3 G | 4 K-3 G |
| 967.5.13 | 25 | 3 K-500 M | 2 K-1 G | 2 K-1 G | 2 K-1 G | 2 K-1 G | 2 K-1 G |
| 1.0 W | 50 | 3 K-500 M | 2 K-1 G | 2 K-1 G | 2 K-1 G | 2 K-1 G | 2 K-1 G |
| 5 kV [air] | 100 | 3 K-500 M | 2 K-1 G | 2 K-1 G | 2 K-1 G | 2 K-1 G | 2 K-1 G |
| 7.5 kV [oil] | 200 | 3 K-500 M | 2 K-1 G | 2 K-1 G | 2 K-1 G | 2 K-1 G | 2 K-1 G |
| 967.7.51 | 25 | 10 K-400 M | 5 K-5 G | 5 K-5 G | 5 K-5 G | 5 K-5 G | 5 K-5 G |
| 2 W | 50 | 10 K-400 M | 5 K-5 G | 5 K-5 G | 5 K-5 G | 5 K-5 G | 5 K-5 G |
| 20 kV [air] | 100 | 10 K-400 M | 5 K-5 G | 5 K-5 G | 5 K-5 G | 5 K-5 G | 5 K-5 G |
| 30 kV [oil] | 200 | 10 K-400 M | 5 K-5 G | 5 K-5 G | 5 K-5 G | 5 K-5 G | 5 K-5 G |
| 967.8.26 | 25 | 10 K-1 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G |
| 2 W | 50 | 10 K-1 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G |
| 10 kV [air] | 100 | 10 K-1 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G |
| 15 kV [oil] | 200 | 10 K-1 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G |
| 967.13.38 | 25 | 10 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 3 W | 50 | 10 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 15 kV [air] | 100 | 10 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 30 kV [oil] | 200 | 10 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 967.15.30 | 25 | 10 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 3 W | 50 | 10 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 15 kV [air] | 100 | 10 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 30 kV [oil] | 200 | 10 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 967.15.51 | 25 | 20 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 4.5 W | 50 | 20 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 30 kV [air] | 100 | 20 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 45 kV [oil] | 200 | 20 K-1 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G | 10 K-5 G |
| 967.15.76 | 25 | 10 K-5 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G |
| 5.5 W | 50 | 10 K-5 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G |
| 35 kV [air] | 100 | 10 K-5 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G |
| 52 kV [oil] | 200 | 10 K-5 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G |
| 967.25.90 | 25 | 20 K-5 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G |
| 10 W | 50 | 20 K-5 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G |
| 45 kV [air] | 100 | 20 K-5 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G |
| 67 kV [oil] | 200 | 20 K-5 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G | 20 K-10 G |

Other resistance values and temperature coefficients upon request.

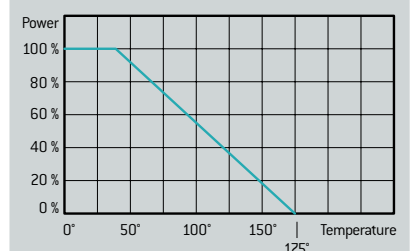
| DIMENSIONS | | | | | | | |
|------------|-------------|-----------|-----------|-------------|--------------------|-------------|------------|
| TYPES | W [width] | C1 | G | L [length] | R [raster spacing] | Unit | Weight [g] |
| 967.3.25 | 3.8 (0.2) | 36 (1.42) | 2.5 (0.1) | 25.4 (1.0) | 22.9 (0.9) | mm (inches) | 0.70 |
| 967.3.38 | 3.8 (0.15) | 36 (1.42) | 2.5 (0.1) | 38.0 (1.5) | 35.7 (1.41) | mm (inches) | 0.52 |
| 967.5.13 | 5.0 (0.2) | 36 (1.42) | 2.5 (0.1) | 12.7 (0.5) | 10.2 (0.4) | mm (inches) | 0.54 |
| 967.7.51 | 7.0 (0.3) | 36 (1.42) | 2.5 (0.1) | 51.9 (2.04) | 48.0 (1.89) | mm (inches) | 1.60 |
| 967.8.26 | 8.0 (0.31) | 36 (1.42) | 2.5 (0.1) | 25.4 (1.0) | 22.5 (0.89) | mm (inches) | 0.93 |
| 967.13.38 | 13.0 (0.51) | 36 (1.42) | 2.5 (0.1) | 38.5 (1.52) | 36.0 (1.42) | mm (inches) | 2.20 |
| 967.15.30 | 15.0 (0.59) | 36 (1.42) | 2.5 (0.1) | 30.0 (1.18) | 22.1 (0.87) | mm (inches) | 2.00 |
| 967.15.51 | 15.0 (0.59) | 36 (1.42) | 2.5 (0.1) | 50.8 (2.0) | 48.3 (1.9) | mm (inches) | 3.42 |
| 967.15.76 | 15.5 (0.61) | 36 (1.42) | 2.5 (0.1) | 76.2 (3.0) | 73.20 (2.88) | mm (inches) | 5.10 |
| 967.25.90 | 25.4 (1.0) | 36 (1.42) | 2.5 (0.1) | 88.9 (3.45) | 85.6 (3.37) | mm (inches) | 10.0 |

Optional contact PIN - C2: 9 (0.35)

| SAMPLE ORDER | | | | | |
|-------------------|--------------------|------------------------------|-----------------------|---------------|------------------------------|
| HVR 967.3.38 Type | A Connections | B Cover | 100M Resistance value | 1 % Tolerance | TC25 Temperature coefficient |
| | A = axial* | G = glass | R = Ω | 0.5 % | 25 ppm/°C |
| | R = radial* | B = operation in air* | K = KΩ | 1.0 %* | 50 ppm/°C |
| | P = PIN | D = operation in oil | M = MΩ | 2.0 % | 100 ppm/°C* |
| | | U = encasing | G = GΩ | 5.0 % | 200 ppm/°C |
| | | | | 10.0 % | |
| | | | | 20.0 % | |

* standard

DERATING CURVE



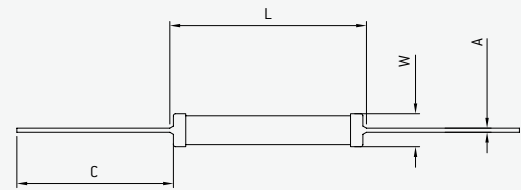
HIGH VOLTAGE RESISTORS HVR 968



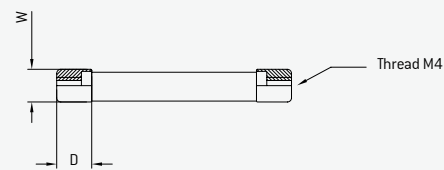
Thick-film high voltage resistors of this type series have been designed specifically for demanding applications. Heavy-duty and with high dielectric strength, these offer the ideal qualities for mastering measuring, controlling and regulating processes. Whether for high voltage pulses or for registering constant high voltages – with our HVR basic program we offer the ideal solution for all applications in X-ray technology, high voltage measuring technology and energy transmission systems.



- Round designs
- Pulse-proof
- Low inductance



Alternatively threaded end caps



GENERAL TECHNICAL SPECIFICATIONS

| | |
|--|--|
| Resistance values, standard | 10 K, 100 K, 1 M, 5 M, 10 M, 25 M, 50 M, 100 M, 1 G, 2 G, 5 G* |
| Tolerance | 1 % [0.5 % – 20 %]* |
| Temperature coefficient | 100 ppm/°C [25 ppm/°C – 200 ppm/°C]* |
| Voltage coefficient | <2 ppm/V |
| Insulation resistance | 10,000 MΩ [500 V 25° C 75 % relative humidity] |
| Dielectric strength of the insulation | >1,000 V [25° C 75 % relative humidity] ΔR/R 0.25 % max. |
| Thermal shock | ΔR/R 0.25 % max. |
| Overload capacity | 1.5 x P[nom], 5 sec. (not 1.5 x V[max]) |
| Moisture resistance | ΔR/R 0.25 % |
| Long-term stability | ΔR/R 0.25 % max. |
| Temperature range (operation / storage) | -55° C – +175° C [-55° C – +100° C] |
| Cover | Epoxy-based varnishes [glass, silicone-based encasing] |
| Connection type | Brass caps, wired, optionally with inner thread M4 |

Depending on ambient conditions, the characteristics of resistors can change. We recommend a suitability test under operational conditions.

* Other values upon request.

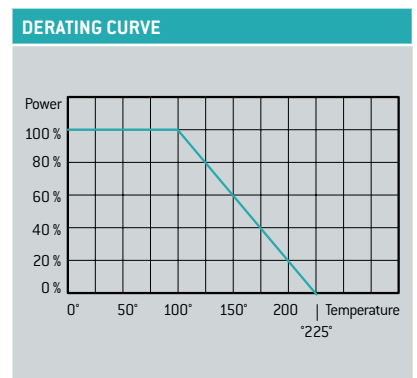
| TYPE SELECTION | | | | | | | |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| TYPES | TOLERANCE | | | | | | |
| | TCR (ppm/° C) | 0.50 % | 1 % | 2 % | 5 % | 10 % | 20 % |
| 968.2 3.8 W 9 kV (air) 13.5 kV (oil) | 25 | 60 K – 500 M | 60 K – 500 M | 60 K – 500 M | 60 K – 500 M | 60 K – 500 M | 60 K – 500 M |
| | 50 | 9 K – 1 G | 9 K – 1 G | 9 K – 1 G | 9 K – 1 G | 9 K – 1 G | 9 K – 1 G |
| | 100 | 9 K – 1 G | 9 K – 1 G | 9 K – 1 G | 9 K – 1 G | 9 K – 1 G | 9 K – 1 G |
| | 200 | 9 K – 10 G | 9 K – 10 G | 9 K – 10 G | 9 K – 10 G | 9 K – 10 G | 9 K – 10 G |
| 968.3 5 W 12 kV (air) 18 kV (oil) | 25 | 80 K – 750 M | 80 K – 750 M | 80 K – 750 M | 80 K – 750 M | 80 K – 750 M | 80 K – 750 M |
| | 50 | 6 K – 1.5 G | 6 K – 1.5 G | 6 K – 1.5 G | 6 K – 1.5 G | 6 K – 1.5 G | 6 K – 1.5 G |
| | 100 | 6 K – 1.5 G | 6 K – 1.5 G | 6 K – 1.5 G | 6 K – 1.5 G | 6 K – 1.5 G | 6 K – 1.5 G |
| | 200 | 6 K – 15 G | 6 K – 15 G | 6 K – 15 G | 6 K – 15 G | 6 K – 15 G | 6 K – 15 G |
| 968.4 6 W 14 kV (air) 21 kV (oil) | 25 | 80 K – 750 M | 80 K – 750 M | 80 K – 750 M | 80 K – 750 M | 80 K – 750 M | 80 K – 750 M |
| | 50 | 10 K – 1.5 G | 10 K – 1.5 G | 10 K – 1.5 G | 10 K – 1.5 G | 10 K – 1.5 G | 10 K – 1.5 G |
| | 100 | 10 K – 1.5 G | 10 K – 1.5 G | 10 K – 1.5 G | 10 K – 1.5 G | 10 K – 1.5 G | 10 K – 1.5 G |
| | 200 | 10 K – 15 G | 10 K – 15 G | 10 K – 15 G | 10 K – 15 G | 10 K – 15 G | 10 K – 15 G |
| 968.5 7.5 W 18 kV (air) 27 kV (oil) | 25 | 120 K – 1 G | 120 K – 1 G | 120 K – 1 G | 120 K – 1 G | 120 K – 1 G | 120 K – 1 G |
| | 50 | 10 K – 2 G | 10 K – 2 G | 10 K – 2 G | 10 K – 2 G | 10 K – 2 G | 10 K – 2 G |
| | 100 | 10 K – 2 G | 10 K – 2 G | 10 K – 2 G | 10 K – 2 G | 10 K – 2 G | 10 K – 2 G |
| | 200 | 10 K – 20 G | 10 K – 20 G | 10 K – 20 G | 10 K – 20 G | 10 K – 20 G | 10 K – 20 G |
| 968.7 10 W 24 kV (air) 36 kV (oil) | 25 | 180 K – 1.5 G | 180 K – 1.5 G | 180 K – 1.5 G | 180 K – 1.5 G | 180 K – 1.5 G | 180 K – 1.5 G |
| | 50 | 20 K – 3 G | 20 K – 3 G | 20 K – 3 G | 20 K – 3 G | 20 K – 3 G | 20 K – 3 G |
| | 100 | 20 K – 3 G | 20 K – 3 G | 20 K – 3 G | 20 K – 3 G | 20 K – 3 G | 20 K – 3 G |
| | 200 | 20 K – 30 G | 20 K – 30 G | 20 K – 30 G | 20 K – 30 G | 20 K – 30 G | 20 K – 30 G |
| 968.10 12 W 36 kV (air) 54 kV (oil) | 25 | 240 K – 2 G | 240 K – 2 G | 240 K – 2 G | 240 K – 2 G | 240 K – 2 G | 240 K – 2 G |
| | 50 | 30 K – 3 G | 30 K – 3 G | 30 K – 3 G | 30 K – 3 G | 30 K – 3 G | 30 K – 3 G |
| | 100 | 30 K – 3 G | 30 K – 3 G | 30 K – 3 G | 30 K – 3 G | 30 K – 3 G | 30 K – 3 G |
| | 200 | 30 K – 30 G | 30 K – 30 G | 30 K – 30 G | 30 K – 30 G | 30 K – 30 G | 30 K – 30 G |
| 968.12 15 W 42 kV (air) 63 kV (oil) | 25 | 300 K – 2 G | 300 K – 2 G | 300 K – 2 G | 300 K – 2 G | 300 K – 2 G | 300 K – 2 G |
| | 50 | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G |
| | 100 | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G |
| | 200 | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G | 35 K – 3 G |
| 968.15 17 W 54 kV (air) 81 kV (oil) | 25 | 350 K – 2 G | 350 K – 2 G | 350 K – 2 G | 350 K – 2 G | 350 K – 2 G | 350 K – 2 G |
| | 50 | 50 K – 3 G | 50 K – 3 G | 50 K – 3 G | 50 K – 3 G | 50 K – 3 G | 50 K – 3 G |
| | 100 | 50 K – 6 G | 50 K – 6 G | 50 K – 6 G | 50 K – 6 G | 50 K – 6 G | 50 K – 6 G |
| | 200 | 50 K – 30 G | 50 K – 30 G | 50 K – 30 G | 50 K – 30 G | 50 K – 30 G | 50 K – 30 G |

Other resistance values and temperature coefficients upon request.

| DIMENSIONS | | | | | | | |
|------------|------------|------------|-------------|------------|--------------|-------------|------------|
| TYPES | A | B [Ø] | C | D | L [length] | Unit | Weight [g] |
| 968.2 | 0.8 (0.03) | 8.0 (0.31) | 37.0 (1.46) | 8.5 (0.33) | 27.0 (1.06) | mm (inches) | 4.17 |
| 968.3 | 0.8 (0.03) | 8.0 (0.31) | 37.0 (1.46) | 8.5 (0.33) | 37.0 (1.46) | mm (inches) | 5.89 |
| 968.4 | 0.8 (0.03) | 8.0 (0.31) | 37.0 (1.46) | 8.5 (0.33) | 47.0 (1.85) | mm (inches) | 7.65 |
| 968.5 | 0.8 (0.03) | 8.0 (0.31) | 37.0 (1.46) | 8.5 (0.33) | 52.0 (2.05) | mm (inches) | 8.50 |
| 968.7 | 0.8 (0.03) | 8.0 (0.31) | 37.0 (1.46) | 8.5 (0.33) | 78.0 (3.07) | mm (inches) | 12.75 |
| 968.10 | 0.8 (0.03) | 8.0 (0.31) | 37.0 (1.46) | 8.5 (0.33) | 102.0 (4.06) | mm (inches) | 17.34 |
| 968.12 | 0.8 (0.03) | 8.0 (0.31) | 37.0 (1.46) | 8.5 (0.33) | 123.0 (4.84) | mm (inches) | 20.50 |
| 968.15 | 0.8 (0.03) | 8.0 (0.31) | 37.0 (1.46) | 8.5 (0.33) | 153.0 (6.02) | mm (inches) | 25.67 |

Length tolerance: max. -2 mm/+2 mm Models with brass caps: L_{total} = L + 10 mm, Weight: +2.15 g per resistor

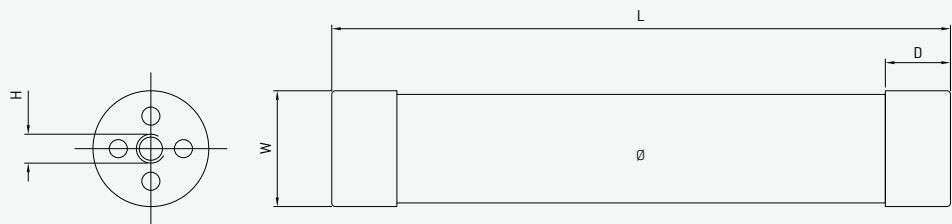
| SAMPLE ORDER | | ATTENTION: PLEASE USE THE FOLLOWING ORDER SPECIFICATIONS. | | | |
|----------------|------------------|---|-----------------------|---------------|------------------------------|
| HVR 968.5 Type | A Connections | B Cover | 100M Resistance value | 1 % Tolerance | TC25 Temperature coefficient |
| | A = wire, axial* | G = glass | R = Ω | 0.5 % | 25 ppm/° C |
| | C = caps | B = operation in air* | K = KΩ | 1.0 %* | 50 ppm/° C |
| | | D = operation in oil | M = MΩ | 2.0 % | 100 ppm/° C* |
| | | U = encasing | G = GΩ | 5.0 % | 200 ppm/° C |
| | | | | 10.0 % | |
| | | | | 20.0 % | |
| | | | | | * standard |



HIGH VOLTAGE RESISTORS HVR 969



Thick-film high voltage resistors of this type series are especially well-suited for measuring and testing tasks under very high voltages or for use as protective resistors. Whether for high voltage pulses or for registering constant high voltages – with our HVR basic program we offer the ideal solution for all applications in high voltage engineering, energy transmission, insulation testing and traffic engineering.



- Round designs
- Pulse-proof
- Low inductance

GENERAL TECHNICAL SPECIFICATIONS

| | |
|--|--|
| Resistance values, standard | 10 K, 100 K, 1 M, 5 M, 10 M, 25 M, 50 M, 100 M, 1 G, 2 G, 5 G* |
| Tolerance | 1 % [0.5 % – 20 %]* |
| Temperature coefficient | 100 ppm/°C [25 ppm/°C – 200 ppm/°C]* |
| Voltage coefficient | <2 ppm/V |
| Insulation resistance | 10,000 MΩ [500 V 25° C 75 % relative humidity] |
| Dielectric strength of the insulation | >1,000 V [25° C 75 % relative humidity] ΔR/R 0.25 % max. |
| Thermal shock | ΔR/R 0.25 % max. |
| Overload capacity | 1.5 x P[nom], 5 sec. [not 1.5 x V[max]] |
| Moisture resistance | ΔR/R 0.25 % max. |
| Long-term stability | ΔR/R 0.25 % max. |
| Temperature range (operation / storage) | -55° C – +175° C [-55° C – +100° C] |
| Cover | Epoxy-based varnishes [glass, silicone-based encasing] |
| Connection type | Brass caps with inner thread M4 / M8 |

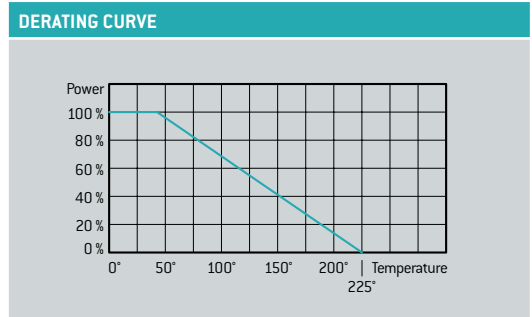
Depending on ambient conditions, the characteristics of resistors can change. We recommend a suitability test under operational conditions.

* Other values upon request.

| TYPE SELECTION | | | | | | | |
|--|------------------------|--|--|--|--|--|--|
| TYPES | TCR (ppm/° C) | 0.50 % | 1 % | 2 % | 5 % | 10 % | 20 % |
| 969.11 11 W 24 kV [air] 32 kV [oil] | 25 50 100 200 | 50 K – 500 M 10 K – 1 G 10 K – 1 G 10 K – 5 G | 50 K – 500 M 10 K – 1 G 10 K – 1 G 10 K – 5 G | 50 K – 500 M 10 K – 1 G 10 K – 1 G 10 K – 5 G | 50 K – 500 M 10 K – 1 G 10 K – 1 G 10 K – 5 G | 50 K – 500 M 10 K – 1 G 10 K – 1 G 10 K – 5 G | 50 K – 500 M 10 K – 1 G 10 K – 1 G 10 K – 5 G |
| 969.23 23 W 48 kV [air] 72 kV [oil] | 25 50 100 200 | 100 K – 1 G 10 K – 1 G 10 K – 1 G 10 K – 10 G | 100 K – 1 G 10 K – 1 G 10 K – 1 G 10 K – 10 G | 100 K – 1 G 10 K – 1 G 10 K – 1 G 10 K – 10 G | 100 K – 1 G 10 K – 1 G 10 K – 1 G 10 K – 10 G | 100 K – 1 G 10 K – 1 G 10 K – 1 G 10 K – 10 G | 100 K – 1 G 10 K – 1 G 10 K – 1 G 10 K – 10 G |
| 969.54 54 W 48 kV [air] 72 kV [oil] | 25 50 100 200 | 100 K – 1 G 15 K – 1 G 15 K – 1 G 15 K – 10 G | 100 K – 1 G 15 K – 1 G 15 K – 1 G 15 K – 10 G | 100 K – 1 G 15 K – 1 G 15 K – 1 G 15 K – 10 G | 100 K – 1 G 15 K – 1 G 15 K – 1 G 15 K – 10 G | 100 K – 1 G 15 K – 1 G 15 K – 1 G 15 K – 10 G | 100 K – 1 G 15 K – 1 G 15 K – 1 G 15 K – 10 G |
| 969.71 71 W 64 kV [air] 96 kV [oil] | 25 50 100 200 | 100 K – 1.5 G 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 100 K – 1.5 G 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 100 K – 1.5 G 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 100 K – 1.5 G 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 100 K – 1.5 G 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 100 K – 1.5 G 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G |
| 969.105 105 W 96 kV [air] 148 kV [oil] | 25 50 100 200 | 100 K – 2 G 35 K – 2 G 35 K – 2 G 35 K – 25 G | 100 K – 2 G 35 K – 2 G 35 K – 2 G 35 K – 25 G | 100 K – 2 G 35 K – 2 G 35 K – 2 G 35 K – 25 G | 100 K – 2 G 35 K – 2 G 35 K – 2 G 35 K – 25 G | 100 K – 2 G 35 K – 2 G 35 K – 2 G 35 K – 25 G | 100 K – 2 G 35 K – 2 G 35 K – 2 G 35 K – 25 G |

| DIMENSIONS | | | | | | | |
|----------------|-------------|-------------|-----------|----|-------------------|-------------|------------|
| TYPES | ∅ | W | D | H | L [length] | Unit | Weight [g] |
| 969.11 | 13.0 [0.51] | 14.5 [0.57] | 10 [0.39] | M4 | 81.0 [3.19] | mm (inches) | 36 |
| 969.23 | 13.0 [0.51] | 14.5 [0.57] | 10 [0.39] | M4 | 156.0 [6.14] | mm (inches) | 64 |
| 969.54 | 30.5 [1.2] | 31.1 [1.22] | 18 [0.71] | M8 | 160.0 +1/-2 [6.3] | mm (inches) | 274 |
| 969.71 | 30.5 [1.2] | 31.1 [1.22] | 18 [0.71] | M8 | 209.0 ±2 [8.23] | mm (inches) | 338 |
| 969.105 | 30.5 [1.2] | 31.1 [1.22] | 18 [0.71] | M8 | 309.0 ±3 [12.17] | mm (inches) | 485 |

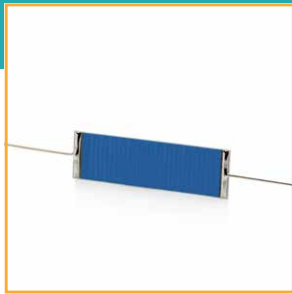
| SAMPLE ORDER | | | | |
|-----------------|-----------------------------|-----------------------|---------------|------------------------------|
| HVR 969.23 Type | B Cover | 100M Resistance value | 1 % Tolerance | TC25 Temperature coefficient |
| | G = glass | R = Ω | 0.5 % | 25 ppm/° C |
| | B = operation in air | K = KΩ | 1.0 % | 50 ppm/° C |
| | D = operation in oil | M = MΩ | 2.0 % | 100 ppm/° C |
| | U = encasing | G = GΩ | 5.0 % | 200 ppm/° C |
| | | | 10.0 % | |
| | | | 20.0 % | |



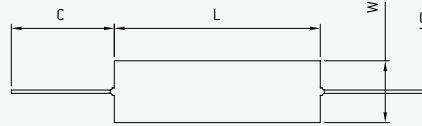
HIGH VOLTAGE PRECISION RESISTORS HPR 967



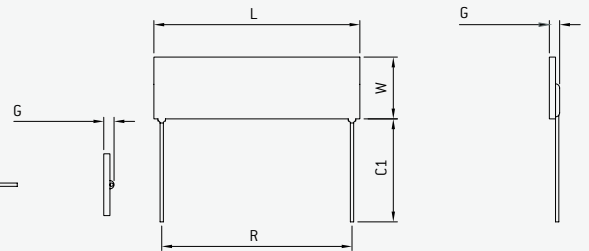
High voltage precision resistors were developed specifically for high value measuring tasks. The design provides outstanding features for implementation in devices with extremely high precision and reliable function. HPR high voltage resistors are suitable for all applications in high voltage measuring technology, in mass spectrometers, in high voltage network components and in medical technology.



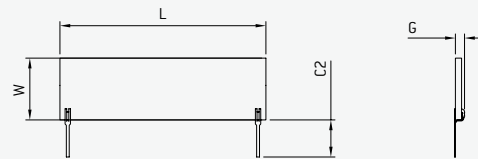
Axial wire connection



Radial wire connection



Optional contact PIN



- Flat designs
- Outstanding stability
- Very low inductance
- Minimal drift

GENERAL TECHNICAL SPECIFICATIONS

| | |
|--|--|
| Tolerance | 0.1 % – 20 %* |
| Temperature coefficient | 15 ppm/°C – 200 ppm/°C* |
| Voltage coefficient | 0.08 ppm/V – 0.75 ppm/V (depending on size and layout) |
| Insulation resistance | 10,000 MΩ (500 V 25° C 75 % relative humidity) |
| Dielectric strength of the insulation | >1,000 V (25° C 75 % relative humidity) ΔR/R 0.25 % max. |
| Thermal shock | ΔR/R 0.25 % max. |
| Overload capacity | 1.5 x P[nom], 5 sec. (not 1.5 x V[max]) |
| Moisture resistance | ΔR/R 0.25 % max. |
| Long-term stability | ΔR/R 0.25 % max. |
| Temperature range (operation / storage) | -55° C – +175° C (-55° C – +100° C) |
| Cover | Epoxy-based varnishes (glass, silicone-based encasing) |
| Connection type | Tinned copper wire Cu vz Ø 0.8 mm, axial or radial |

Depending on ambient conditions, the characteristics of resistors can change. We recommend a suitability test under operational conditions.

* Other values upon request.

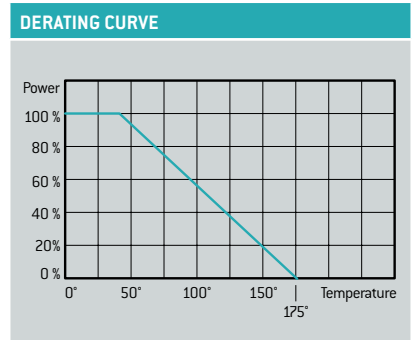
| TYPE SELECTION | | | | | | | | | |
|--|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| TYPES | TCR (PPM/° C) | 0.1 % | 0.25 % | 0.5 % | 1 % | 2 % | 5 % | 10 % | 20 % |
| 967.3.25 0.7 W 8 KV (AIR) 12 KV (OIL) | 15/25 | 5 K-2 G | 2 K-2 G | 5 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G |
| | 50 | 5 K-2 G | 2 K-2 G | 5 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G |
| | 100 | 5 K-2 G | 2 K-2 G | 5 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G |
| | 200 | 5 K-2 G | 2 K-2 G | 5 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G | 2 K-2 G |
| 967.3.38 1.0 W 10 KV (AIR) 15 KV (OIL) | 15/25 | 6 K-500 M | 6 K-3 G | 6 K-500 M | 6 K-3 G | 6 K-3 G | 6 K-3 G | 6 K-3 G | 6 K-3 G |
| | 50 | 6 K-500 M | 6 K-3 G | 6 K-500 M | 6 K-3 G | 6 K-3 G | 6 K-3 G | 6 K-3 G | 6 K-3 G |
| | 100 | 6 K-500 M | 6 K-3 G | 6 K-500 M | 6 K-3 G | 6 K-3 G | 6 K-3 G | 6 K-3 G | 6 K-3 G |
| | 200 | 6 K-500 M | 6 K-3 G | 6 K-500 M | 6 K-3 G | 6 K-3 G | 6 K-3 G | 6 K-3 G | 6 K-3 G |
| 967.5.13 0.7 W 5 KV (AIR) 7.5 KV (OIL) | 15/25 | 4 K-500 M | 4 K-1 G | 4 K-500 M | 4 K-1 G | 4 K-1 G | 4 K-1 G | 4 K-1 G | 4 K-1 G |
| | 50 | 4 K-500 M | 4 K-1 G | 4 K-500 M | 4 K-1 G | 4 K-1 G | 4 K-1 G | 4 K-1 G | 4 K-1 G |
| | 100 | 4 K-500 M | 4 K-1 G | 4 K-500 M | 4 K-1 G | 4 K-1 G | 4 K-1 G | 4 K-1 G | 4 K-1 G |
| | 200 | 4 K-500 M | 4 K-1 G | 4 K-500 M | 4 K-1 G | 4 K-1 G | 4 K-1 G | 4 K-1 G | 4 K-1 G |
| 967.8.26 1.4 W 10 KV (AIR) 15 KV (OIL) | 15/25 | 10 K-1 G | 5 K-2 G | 10 K-1 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G |
| | 50 | 10 K-1 G | 5 K-2 G | 10 K-1 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G |
| | 100 | 10 K-1 G | 5 K-2 G | 10 K-1 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G |
| | 200 | 10 K-1 G | 5 K-2 G | 10 K-1 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G | 5 K-2 G |
| 967.13.38 2.0 W 15 KV (AIR) 22 KV (OIL) | 15/25 | 15 K-1 G | 15 K-5 G | 15 K-1 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G |
| | 50 | 15 K-1 G | 15 K-5 G | 15 K-1 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G |
| | 100 | 15 K-1 G | 15 K-5 G | 15 K-1 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G |
| | 200 | 15 K-1 G | 15 K-5 G | 15 K-1 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G |
| 967.15.30 2.0 W 15 KV (AIR) 22 KV (OIL) | 15/25 | 15 K-1 G | 15 K-5 G | 15 K-1 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G |
| | 50 | 15 K-1 G | 15 K-5 G | 15 K-1 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G |
| | 100 | 15 K-1 G | 15 K-5 G | 15 K-1 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G |
| | 200 | 15 K-1 G | 15 K-5 G | 15 K-1 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G | 15 K-5 G |
| 967.15.51 3.0 W 30 KV (AIR) 45 KV (OIL) | 15/25 | 30 K-1 G | 30 K-5 G | 30 K-1 G | 30 K-5 G | 30 K-5 G | 30 K-5 G | 30 K-5 G | 30 K-5 G |
| | 50 | 30 K-1 G | 30 K-5 G | 30 K-1 G | 30 K-5 G | 30 K-5 G | 30 K-5 G | 30 K-5 G | 30 K-5 G |
| | 100 | 30 K-1 G | 30 K-5 G | 30 K-1 G | 30 K-5 G | 30 K-5 G | 30 K-5 G | 30 K-5 G | 30 K-5 G |
| | 200 | 30 K-1 G | 30 K-5 G | 30 K-1 G | 30 K-5 G | 30 K-5 G | 30 K-5 G | 30 K-5 G | 30 K-5 G |
| 967.25.90 8.0 W 45 KV (AIR) 70 KV (OIL) | 15/25 | 50 K-5 G | 50 K-10 G | 50 K-5 G | 50 K-10 G | 50 K-10 G | 50 K-10 G | 50 K-10 G | 50 K-10 G |
| | 50 | 50 K-5 G | 50 K-10 G | 50 K-5 G | 50 K-10 G | 50 K-10 G | 50 K-10 G | 50 K-10 G | 50 K-10 G |
| | 100 | 50 K-5 G | 50 K-10 G | 50 K-5 G | 50 K-10 G | 50 K-10 G | 50 K-10 G | 50 K-10 G | 50 K-10 G |
| | 200 | 50 K-5 G | 50 K-10 G | 50 K-5 G | 50 K-10 G | 50 K-10 G | 50 K-10 G | 50 K-10 G | 50 K-10 G |

Other resistance values upon request.

| DIMENSIONS | | | | | | | |
|------------|-------------|-----------|-----------|-------------|--------------------|-------------|------------|
| TYPES | W [width] | C1 | G | L [length] | R [raster spacing] | Unit | Weight [g] |
| 967.3.25 | 3.8 [0.2] | 36 [1.42] | 2.5 [0.1] | 25.4 [1.0] | 22.9 [0.9] | mm [inches] | 0.70 |
| 967.3.38 | 3.8 [0.15] | 36 [1.42] | 2.5 [0.1] | 38.0 [1.5] | 35.7 [1.41] | mm [inches] | 0.52 |
| 967.5.13 | 5.0 [0.2] | 36 [1.42] | 2.5 [0.1] | 12.7 [0.5] | 10.2 [0.4] | mm [inches] | 0.54 |
| 967.8.26 | 8.0 [0.31] | 36 [1.42] | 2.5 [0.1] | 25.4 [1.0] | 22.5 [0.89] | mm [inches] | 0.93 |
| 967.13.38 | 13.0 [0.51] | 36 [1.42] | 2.5 [0.1] | 38.5 [1.52] | 36.0 [1.42] | mm [inches] | 2.20 |
| 967.15.30 | 15.0 [0.59] | 36 [1.42] | 2.5 [0.1] | 30.0 [1.18] | 22.1 [0.87] | mm [inches] | 2.00 |
| 967.15.51 | 15.0 [0.59] | 36 [1.42] | 2.5 [0.1] | 50.8 [2.0] | 48.3 [1.9] | mm [inches] | 3.42 |
| 967.25.90 | 25.4 [1.0] | 36 [1.42] | 2.5 [0.1] | 88.9 [3.54] | 85.6 [3.37] | mm [inches] | 10.00 |

Contact PIN radial - C2: 9 [0.35]

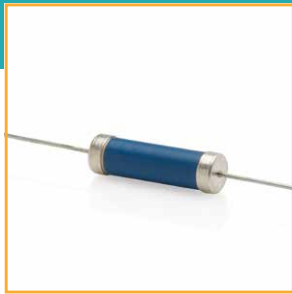
| SAMPLE ORDER | | | | | |
|-------------------|---------------|----------------------|-----------------------|---------------|------------------------------|
| HPR 967.3.38 Type | A Connections | B Cover | 100M Resistance value | 1 % Tolerance | TC25 Temperature coefficient |
| | A = axial | G = glass | R = Ω | 0.5 % | 15 ppm/° C |
| | R = radial | B = operation in air | K = KΩ | 1.0 % | 25 ppm/° C |
| | P = PIN | D = operation in oil | M = MΩ | 2.0 % | 50 ppm/° C |
| | | U = encasing | G = GΩ | 5.0 % | 100 ppm/° C |
| | | | | 10.0 % | |
| | | | | 20.0 % | |



HIGH VOLTAGE PRECISION RESISTORS HPR 968



These high voltage precision resistors are in a league of their own when it comes to mastering the demanding measuring tasks involved in switching and regulating processes. The high long-term stability makes this type series particularly well-suited for applications in industrial and medical X-ray technology as well as for all test processes.



- Outstanding stability
- Very low inductance
- Minimal drift

GENERAL TECHNICAL SPECIFICATIONS

| | |
|--------------------------------|---|
| Tolerance | 0.1 % – 20 %* |
| Temperature coefficient | 15 ppm/°C – 200 ppm/°C* |
| Voltage coefficient | 0.08 ppm/V – 0.75 ppm/V (depending on size and layout) |

Product drawing and dimensions, refer to pages 6/7.
General technical specifications, refer also to type series HVR 968.

* Other values upon request.

SAMPLE ORDERS

| HPR 968.5 Type | A Connections | B Cover | 100M Resistance value | 0.1 % Tolerance | TC25 Temperature coefficient |
|----------------|-----------------|----------------------|-----------------------|-----------------|------------------------------|
| | A = wire, axial | G = glass | R = Ω | 0.1 % | 15 ppm/°C |
| | C = caps | B = operation in air | K = KΩ | 0.25 % | 25 ppm/°C |
| | | D = operation in oil | M = MΩ | 0.5 % | 50 ppm/°C |
| | | U = encasing | G = GΩ | 1.0 % | 100 ppm/°C |
| | | | | 2.0 % | 200 ppm/°C |
| | | | | 5.0 % | |
| | | | | 10.0 % | |
| | | | | 20.0 % | |

TYPE SELECTION

| TYPES | TCR (ppm/°C) | TOLERANCE | | | | | | | | |
|---|---------------------------|---|---|---|---|---|---|---|---|---|
| | | 0.1 % | 0.25 % | 0.50 % | 1 % | 2 % | 5 % | 10 % | 20 % | |
| 968.2 2.6 W 9 kV [air] 15 kV [oil] | 15/25 50 100 200 | 60 K – 500 M 15 K – 1 G 15 K – 1 G 15 K – 10 G | 60 K – 500 M 15 K – 1 G 15 K – 1 G 15 K – 10 G | 60 K – 500 M 15 K – 1 G 15 K – 1 G 15 K – 10 G | 60 K – 500 M 15 K – 1 G 15 K – 1 G 15 K – 10 G | 60 K – 500 M 15 K – 1 G 15 K – 1 G 15 K – 10 G | 60 K – 500 M 15 K – 1 G 15 K – 1 G 15 K – 10 G | 60 K – 500 M 15 K – 1 G 15 K – 1 G 15 K – 10 G | 60 K – 500 M 15 K – 1 G 15 K – 1 G 15 K – 10 G | 60 K – 500 M 15 K – 1 G 15 K – 1 G 15 K – 10 G |
| 968.3 3.0 W 12 kV [air] 22 kV [oil] | 15/25 50 100 200 | 80 K – 750 M 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 80 K – 750 M 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 80 K – 750 M 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 80 K – 750 M 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 80 K – 750 M 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 80 K – 750 M 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 80 K – 750 M 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 80 K – 750 M 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G | 80 K – 750 M 25 K – 1.5 G 25 K – 1.5 G 25 K – 15 G |
| 968.5 5.0 W 18 kV [air] 30 kV [oil] | 15/25 50 100 200 | 120 K – 1 G 40 K – 2 G 40 K – 2 G 40 K – 20 G | 120 K – 1 G 40 K – 2 G 40 K – 2 G 40 K – 20 G | 120 K – 1 G 40 K – 2 G 40 K – 2 G 40 K – 20 G | 120 K – 1 G 40 K – 2 G 40 K – 2 G 40 K – 20 G | 120 K – 1 G 40 K – 2 G 40 K – 2 G 40 K – 20 G | 120 K – 1 G 40 K – 2 G 40 K – 2 G 40 K – 20 G | 120 K – 1 G 40 K – 2 G 40 K – 2 G 40 K – 20 G | 120 K – 1 G 40 K – 2 G 40 K – 2 G 40 K – 20 G | 120 K – 1 G 40 K – 2 G 40 K – 2 G 40 K – 20 G |
| 968.7 6.5 W 24 kV [air] 48 kV [oil] | 15/25 50 100 200 | 180 K – 1.5 G 45 K – 3 G 45 K – 3 G 45 K – 30 G | 180 K – 1.5 G 45 K – 3 G 45 K – 3 G 45 K – 30 G | 180 K – 1.5 G 45 K – 3 G 45 K – 3 G 45 K – 30 G | 180 K – 1.5 G 45 K – 3 G 45 K – 3 G 45 K – 30 G | 180 K – 1.5 G 45 K – 3 G 45 K – 3 G 45 K – 30 G | 180 K – 1.5 G 45 K – 3 G 45 K – 3 G 45 K – 30 G | 180 K – 1.5 G 45 K – 3 G 45 K – 3 G 45 K – 30 G | 180 K – 1.5 G 45 K – 3 G 45 K – 3 G 45 K – 30 G | 180 K – 1.5 G 45 K – 3 G 45 K – 3 G 45 K – 30 G |
| 968.10 8.0 W 36 kV [air] 54 kV [oil] | 15/25 50 100 200 | 240 K – 2 G 60 K – 3 G 60 K – 3 G 60 K – 30 G | 240 K – 2 G 60 K – 3 G 60 K – 3 G 60 K – 30 G | 240 K – 2 G 60 K – 3 G 60 K – 3 G 60 K – 30 G | 240 K – 2 G 60 K – 3 G 60 K – 3 G 60 K – 30 G | 240 K – 2 G 60 K – 3 G 60 K – 3 G 60 K – 30 G | 240 K – 2 G 60 K – 3 G 60 K – 3 G 60 K – 30 G | 240 K – 2 G 60 K – 3 G 60 K – 3 G 60 K – 30 G | 240 K – 2 G 60 K – 3 G 60 K – 3 G 60 K – 30 G | 240 K – 2 G 60 K – 3 G 60 K – 3 G 60 K – 30 G |
| 968.12 10.0 W 42 kV [air] 63 kV [oil] | 15/25 50 100 200 | 300 K – 2 G 75 K – 3 G 75 K – 5 G 75 K – 30 G | 300 K – 2 G 75 K – 3 G 75 K – 5 G 75 K – 30 G | 300 K – 2 G 75 K – 3 G 75 K – 5 G 75 K – 30 G | 300 K – 2 G 75 K – 3 G 75 K – 5 G 75 K – 30 G | 300 K – 2 G 75 K – 3 G 75 K – 5 G 75 K – 30 G | 300 K – 2 G 75 K – 3 G 75 K – 5 G 75 K – 30 G | 300 K – 2 G 75 K – 3 G 75 K – 5 G 75 K – 30 G | 300 K – 2 G 75 K – 3 G 75 K – 5 G 75 K – 30 G | 300 K – 2 G 75 K – 3 G 75 K – 5 G 75 K – 30 G |
| 968.15 12.0 W 54 kV [air] 81 kV [oil] | 15/25 50 100 200 | 350 K – 2 G 85 K – 3 G 85 K – 6 G 85 K – 30 G | 350 K – 2 G 85 K – 3 G 85 K – 6 G 85 K – 30 G | 350 K – 2 G 85 K – 3 G 85 K – 6 G 85 K – 30 G | 350 K – 2 G 85 K – 3 G 85 K – 6 G 85 K – 30 G | 350 K – 2 G 85 K – 3 G 85 K – 6 G 85 K – 30 G | 350 K – 2 G 85 K – 3 G 85 K – 6 G 85 K – 30 G | 350 K – 2 G 85 K – 3 G 85 K – 6 G 85 K – 30 G | 350 K – 2 G 85 K – 3 G 85 K – 6 G 85 K – 30 G | 350 K – 2 G 85 K – 3 G 85 K – 6 G 85 K – 30 G |

Depending on ambient conditions, the characteristics of resistors can change. We recommend a suitability test under operational conditions.

Length tolerance: max. -2 mm/+2 mm

Other resistance values and temperature coefficients upon request.

HIGH VOLTAGE PRECISION RESISTORS HPR 969



This series of high voltage precision resistors was developed to simultaneously handle high voltages while providing excellent stability. The reliability and precision in recording measurement values are just two of the outstanding features of this type series. At the same time, the resistors also offer high load capacity, making them particularly well-suited for applications in energy transmission, electrostatics and as protective resistors in electric drives.

- High load capacity
- Good stability
- Very low inductance



| SAMPLE ORDERS | | | | |
|-----------------|----------------------|-----------------------|-----------------|------------------------------|
| HPR 969.54 Type | B Cover | 100M Resistance value | 0.1 % Tolerance | TC25 Temperature coefficient |
| | G = glass | R = Ω | 0.1 % | 15 ppm/° C |
| | B = operation in air | K = KΩ | 0.25 % | 25 ppm/° C |
| | D = operation in oil | M = MΩ | 0.5 % | 50 ppm/° C |
| | U = encasing | G = GΩ | 1.0 % | 100 ppm/° C |
| | | | 2.0 % | 200 ppm/° C |
| | | | 5.0 % | |
| | | | 10.0 % | |
| | | | 20.0 % | |

| GENERAL TECHNICAL SPECIFICATIONS | |
|---|---|
| Tolerance | 0.1 % – 20 %* |
| Temperature coefficient | 15 ppm/° C – 200 ppm/° C* |
| Voltage coefficient | 0.08 ppm/V – 0.75 ppm/V (depending on size and layout) |
| Product drawing and dimensions, refer to pages 8/9. General technical specifications, refer also to type series HVR 969. | |
| * Other values upon request. | |

| TYPE SELECTION | | | | | | | | | |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| TYPES | TCR (ppm/° C) | 0.1 % | 0.25 % | 0.50 % | 1 % | 2 % | 5 % | 10 % | 20 % |
| 969.11 | 15/25 | 50 K – 500 M | 50 K – 500 M | 50 K – 500 M | 50 K – 500 M | 50 K – 500 M | 50 K – 500 M | 50 K – 500 M | 50 K – 500 M |
| 11 W | 50 | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G |
| 24 kV [air] | 100 | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G | 20 K – 1 G |
| 32 kV [oil] | 200 | 20 K – 5 G | 20 K – 5 G | 20 K – 5 G | 20 K – 5 G | 20 K – 5 G | 20 K – 5 G | 20 K – 5 G | 20 K – 5 G |
| 969.23 | 15/25 | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G |
| 23 W | 50 | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G |
| 48 kV [air] | 100 | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G | 50 K – 1 G |
| 72 kV [oil] | 200 | 50 K – 10 G | 50 K – 10 G | 50 K – 10 G | 50 K – 10 G | 50 K – 10 G | 50 K – 10 G | 50 K – 10 G | 50 K – 10 G |
| 969.54 | 15/25 | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G | 100 K – 1 G |
| 54 W | 50 | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G |
| 48 kV [air] | 100 | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G | 74 K – 1 G |
| 72 kV [oil] | 200 | 74 K – 10 G | 74 K – 10 G | 74 K – 10 G | 74 K – 10 G | 74 K – 10 G | 74 K – 10 G | 74 K – 10 G | 74 K – 10 G |
| 969.71 | 15/25 | 100 K – 1.5 G | 100 K – 1.5 G | 100 K – 1.5 G | 100 K – 1.5 G | 100 K – 1.5 G | 100 K – 1.5 G | 100 K – 1.5 G | 100 K – 1.5 G |
| 71 W | 50 | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G |
| 64 kV [air] | 100 | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G | 150 K – 1.5 G |
| 96 kV [oil] | 200 | 150 K – 15 G | 150 K – 15 G | 150 K – 15 G | 150 K – 15 G | 150 K – 15 G | 150 K – 15 G | 150 K – 15 G | 150 K – 15 G |
| 969.105 | 15/25 | 100 K – 2 G | 100 K – 2 G | 100 K – 2 G | 100 K – 2 G | 100 K – 2 G | 100 K – 2 G | 100 K – 2 G | 100 K – 2 G |
| 105 W | 50 | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G |
| 96 kV [air] | 100 | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G | 200 K – 2 G |
| 148 kV [oil] | 200 | 200 K – 25 G | 200 K – 25 G | 200 K – 25 G | 200 K – 25 G | 200 K – 25 G | 200 K – 25 G | 200 K – 25 G | 200 K – 25 G |

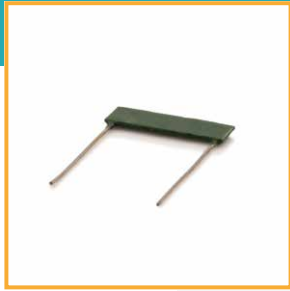
Length tolerance: max. -3 mm/+3 mm

Other resistance values and temperature coefficients upon request.

HIGH VOLTAGE PULSE RESISTORS HVI 967 / 968 / 969



The generously-dimensioned design of the high voltage pulse resistors promotes energy distribution, providing an ideal solution for pulse applications. Whether for single pulses or pulse sequences – for all applications in high voltage engineering, high voltage protection systems and high voltage network components HVI pulse resistors are the right choice.



- Flat designs
- High pulse stability
- Very low inductance

Technical drawing and specifications:
refer to type series HVR 967, HVR 968 and HVR 969.

GENERAL TECHNICAL SPECIFICATIONS

| | |
|--|--|
| Tolerance | From 5 %* |
| Temperature coefficient | 100 ppm/° C* |
| Insulation resistance | >10,000 MΩ (500 V 25° C 75 % relative humidity) |
| Dielectric strength of the insulation | >1,000 V (25° C 75 % relative humidity) ΔR/R 0.25 % max. |
| Thermal shock | ΔR/R 0.25 % max. |
| Overload capacity | 1.5 x P[nom], 5 sec. (not 1.5 x V[max]) |
| Moisture resistance | ΔR/R 0.25 % max. |
| Long-term stability | ΔR/R 0.25 % max. |
| Temperature range (operation / storage) | -55° C – +175° C (-55° C – +100° C) |
| Cover | Epoxy-based varnishes (glass, silicone-based encasing) |
| Connection type | Tinned copper wire Cu vz Ø 0.8 mm, axial or radial, brass caps with inner thread M4 / M8 |

Depending on ambient conditions, the characteristics of resistors can change. We recommend a suitability test under operational conditions.

* Other values upon request.

| TYPE SELECTION HVI 967 | | | | |
|--|------------------------------|--------------|--------------|--------------|
| TYPES | TOLERANCE | | | |
| | TCR (ppm/° C) | 5 % | 10 % | 20 % |
| 967.5.13 1 W 5 kV (air) 7.5 kV (oil) | 100 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| 967.15.51 4.5 W 30 kV (air) 45 kV (oil) | 100 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| 967.28.38 7 W 10 kV (air) 15 kV (oil) | 100 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| TYPE SELECTION HVID 967 – PRINTED ON BOTH SIDES | | | | |
| 967.6.9 0.5 W 3 kV (air) 5 kV (oil) | 100 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| | Dimension: 9.0 mm x 5.5 mm | | | |
| 967.6.11 0.5 W 5 kV (air) 7.5 kV (oil) | 100 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| | Dimension: 11.0 mm x 5.5 mm | | | |
| 967.6.13 0.8 W 5 kV (air) 7.5 kV (oil) | 100 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| | Dimension: 13.0 mm x 5.5 mm | | | |
| 967.8.21 1.0 W 10 kV (air) 15 kV (oil) | 100 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| | Dimension: 21.0 mm x 8.0 mm | | | |
| 967.11.21 1.5 W 10 kV 15 kV (oil) | 100 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| | Dimension: 21.0 mm x 10.5 mm | | | |
| 967.11.26 2.0 W 10 kV 15 kV (oil) | 100 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| | Dimension: 24.0 mm x 10.5 mm | | | |
| Other resistance values and temperature coefficients upon request. | | | | |

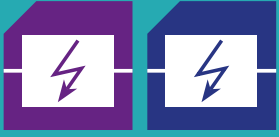
| TYPE SELECTION HVI 968 | | | | |
|---|---------------|---------------|---------------|---------------|
| TYPES | TOLERANCE | | | |
| | TCR (ppm/° C) | 5 % | 10 % | 20 % |
| 968.3 5 W 12 kV (air) 18 kV (oil) | 100 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| 968.5 7.5 W 18 kV (air) 27 kV (oil) | 100 | 80 R – 500 K | 80 R – 500 K | 80 R – 500 K |
| 968.10 12 W 36 kV (air) 54 kV (oil) | 100 | 100 R – 500 K | 100 R – 500 K | 100 R – 500 K |
| TYPE SELECTION HVI 969 | | | | |
| 969.11 11 W 24 kV (air) 32 kV (oil) | 25 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| | 50 | | | |
| | 100 | | | |
| | 200 | | | |
| 969.54 54 W 48 kV (air) 72 kV (oil) | 25 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| | 50 | | | |
| | 100 | | | |
| | 200 | | | |
| 969.71 71 W 64 kV (air) 96 kV (oil) | 25 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| | 50 | | | |
| | 100 | | | |
| | 200 | | | |
| 969.105 105 W 96 kV (air) 144 kV (oil) | 25 | 50 R – 500 K | 50 R – 500 K | 50 R – 500 K |
| | 50 | | | |
| | 100 | | | |
| | 200 | | | |
| Other resistance values and temperature coefficients upon request, cover with glass: Tolerance ± 20 %. | | | | |

| SAMPLE ORDER | | | | | |
|----------------------|------------------|----------------------|--------------------------|-------------------|---------------------------------|
| HVI 967.5.13 Type | A Connections | B Cover | 150R Resistance value | 10 % Tolerance | TC25 Temperature coefficient |
| | A = axial | G = glass | R = Ω | 5.0 % | 50 ppm/° C |
| | R = radial | B = operation in air | K = KΩ | 10.0 % | 100 ppm/° C |
| | | D = operation in oil | M = MΩ | 20.0 % | 200 ppm/° C |
| | | U = encasing | | | |

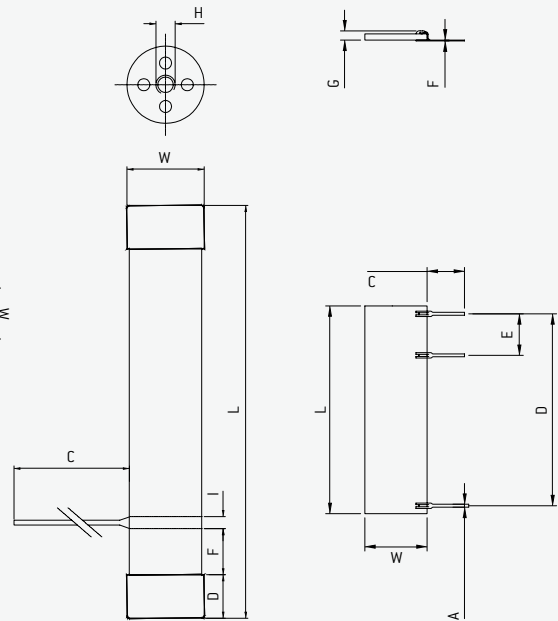
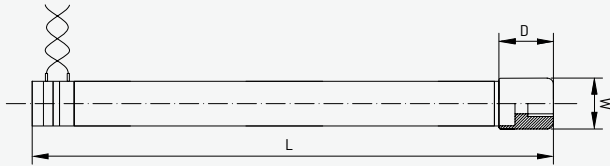
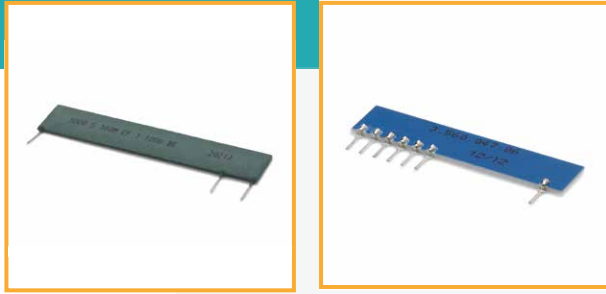
| | | | | | |
|-------------------|------------------|----------------------|--------------------------|------------------|---------------------------------|
| HVI 968.5 Type | C Connections | B Cover | 100M Resistance value | 1 % Tolerance | TC25 Temperature coefficient |
| | A = axial | G = glass | R = Ω | 5.0 % | 50 ppm/° C |
| | C = caps | B = operation in air | K = KΩ | 10.0 % | 100 ppm/° C |
| | | D = operation in oil | M = MΩ | 20.0 % | 200 ppm/° C |
| | | U = encasing | | | |

| | | | | | |
|--------------------|--|----------------------|--------------------------|------------------|---------------------------------|
| HVI 969.23 Type | | B Cover | 100M Resistance value | 1 % Tolerance | TC25 Temperature coefficient |
| | | G = glass | R = Ω | 5.0 % | 50 ppm/° C |
| | | B = operation in air | K = KΩ | 10.0 % | 100 ppm/° C |
| | | D = operation in oil | M = MΩ | 20.0 % | 200 ppm/° C |
| | | U = encasing | | | |

HIGH VOLTAGE DIVIDERS HVD AND RESISTOR NETWORKS NW



High voltage dividers and networks are precision resistors that are ideally suited for precise measuring and dividing of voltages thanks to a multitude of combination possibilities. Metallux high voltage dividers are available as a representative selection of various types. **Networks** are based on special application-oriented requirements. Please contact us – we will be glad to provide consultation.



- Very good ratio stability
- Low tolerances
- Minimal drift

GENERAL TECHNICAL SPECIFICATIONS

| | |
|--|--|
| Tolerance, absolute | From 0.5 %* |
| Tolerance, ratio | From 0.1 %* |
| Temperature coefficient, ratio | From 25 ppm/°C* |
| Voltage coefficient, ratio | From 15 ppm/V* |
| Insulation resistance | >10,000 MΩ (500 V 25° C 75 % relative humidity) |
| Dielectric strength of the insulation | >1,000 V (25° C 75 % relative humidity) ΔR/R 0.25 % max. |
| Thermal shock | ΔR/R 0.25 % max. |
| Moisture resistance | ΔR/R 0.25 % max. |
| Long-term stability | ΔR/R 0.25 % max. |
| Temperature range (operation / storage) | -55° C – +175° C (-55° C – +100° C) |
| Cover | Epoxy-based varnishes (glass, silicone-based encasing) |
| Connection type | Tinned copper wire Cu vz Ø 0.8 mm, axial or radial; Brass caps with inner thread M4 or M8 |

Depending on ambient conditions, the characteristics of resistors can change. We recommend a suitability test under operational conditions.

* Other values upon request.

| TYPE SELECTION | | | | | | | | |
|--|---|--|--|--|--|--|--|--|
| TYPES | TOLERANCE RATIO / ABS. * | | | | | | | |
| | TCR ratio/abs. (ppm/°C)* | Division ratio | 0.1 % / from 0.5 % | 0.25 % / from 1 % | 0.5 % / from 1 % | 1 % / from 2 % | 2 % / from 5 % | 5 % / from 10 % |
| HVD 967.8.26 (formerly: 1000.2) 0.5 W 8/12 kV (air/oil) | 15 / 25 25 / 50 50 / 100 100 / 200 | 1:500 – 1:1,000 1:500 – 1:2,000 1:500 – 1:2,000 1:500 – 1:2,000 | 1.5 M – 100 K 1.5 M – 150 K 1.5 M – 150 K 1.5 M – 150 K | 1.5 M – 100 K 1.5 M – 150 K 1.5 M – 150 K 1.5 M – 150 K | 1.5 M – 100 K 1.5 M – 150 K 1.5 M – 150 K 1.5 M – 150 K | 1.5 M – 100 K 1.5 M – 150 K 1.5 M – 150 K 1.5 M – 150 K | 1.5 M – 100 K 1.5 M – 150 K 1.5 M – 150 K 1.5 M – 150 K | 1.5 M – 100 K 1.5 M – 150 K 1.5 M – 150 K 1.5 M – 150 K |
| 967.13.38 (formerly: 1000.3) 1.2 W 15/22 kV (air/oil) | 15 / 25 25 / 50 50 / 100 100 / 200 | 1:500 – 1:5,000 1:500 – 1:10,000 1:500 – 1:10,000 1:500 – 1:10,000 | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M |
| 967.15.30 1 W 15 kV (air) 22 kV (oil) | 15 / 25 25 / 50 50 / 100 100 / 200 | 1:500 – 1:5,000 1:500 – 1:10,000 1:500 – 1:10,000 1:500 – 1:10,000 | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M | 5 M – 300 M 5 M – 500 M 5 M – 500 M 5 M – 500 M |
| 967.15.51 (formerly: 1000.4) 1.8 W 24/46 kV (air/oil) | 15 / 25 25 / 50 50 / 100 100 / 200 | 1:500 – 1:5,000 1:500 – 1:10,000 1:500 – 1:10,000 1:500 – 1:10,000 | 10 M – 500 M 10 M – 1 G 10 M – 1.5 G 10 M – 1.5 G | 10 M – 500 M 10 M – 1 G 10 M – 1.5 G 10 M – 1.5 G | 10 M – 500 M 10 M – 1 G 10 M – 1.5 G 10 M – 1.5 G | 10 M – 500 M 10 M – 1 G 10 M – 1.5 G 10 M – 1.5 G | 10 M – 500 M 10 M – 1 G 10 M – 1.5 G 10 M – 1.5 G | 10 M – 500 M 10 M – 1 G 10 M – 1.5 G 10 M – 1.5 G |
| 967.15.77 (formerly: 1000.5) 2.4 W 32/49 kV (air/oil) | 15 / 25 25 / 50 50 / 100 100 / 200 | 1:500 – 1:5,000 1:500 – 1:10,000 1:500 – 1:10,000 1:500 – 1:10,000 | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G |
| 968.5 3 W 15 kV (air) 22 kV (oil) | 15 / 25 25 / 50 50 / 100 100 / 200 | 1:500 – 1:5,000 1:100 – 1:10,000 1:100 – 1:10,000 1:100 – 1:10,000 | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G |
| 968.7 6 W 20 kV (air) 30 kV (oil) | 15 / 25 25 / 50 50 / 100 100 / 200 | 1:500 – 1:5,000 1:100 – 1:10,000 1:100 – 1:10,000 1:100 – 1:10,000 | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G | 15 M – 1 G 15 M – 1 G 15 M – 2 G 15 M – 2 G |
| 969.23 (formerly: 2000.23) 10 W 45/60 kV (air/oil) | 15 / 25 25 / 50 50 / 100 100 / 200 | 1:100 – 1:10,000 1:100 – 1:20,000 1:100 – 1:20,000 1:100 – 1:20,000 | 20 M – 500 M 20 M – 2 G 20 M – 3 G 20 M – 3 G | 20 M – 500 M 20 M – 2 G 20 M – 3 G 20 M – 3 G | 20 M – 500 M 20 M – 2 G 20 M – 3 G 20 M – 3 G | 20 M – 500 M 20 M – 2 G 20 M – 3 G 20 M – 3 G | 20 M – 500 M 20 M – 2 G 20 M – 3 G 20 M – 3 G | 20 M – 500 M 20 M – 2 G 20 M – 3 G 20 M – 3 G |
| 969.105 (formerly: 2000.105) 50 W 90/120 kV (air/oil) | 15 / 25 25 / 50 50 / 100 100 / 200 | 1:100 – 1:10,000 1:100 – 1:20,000 1:100 – 1:20,000 1:100 – 1:20,000 | 20 M – 1 G 20 M – 2 G 20 M – 3 G 20 M – 3 G | 20 M – 1 G 20 M – 2 G 20 M – 3 G 20 M – 3 G | 20 M – 1 G 20 M – 2 G 20 M – 3 G 20 M – 3 G | 20 M – 1 G 20 M – 2 G 20 M – 3 G 20 M – 3 G | 20 M – 1 G 20 M – 2 G 20 M – 3 G 20 M – 3 G | 20 M – 1 G 20 M – 2 G 20 M – 3 G 20 M – 3 G |

* Other values upon request.

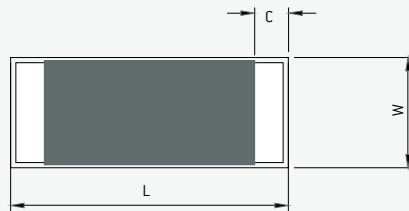
| DIMENSIONS | | | | | | | | | |
|------------|------------|-------------|-------------|-------------|-------------|-------------|------------|-----------|-------------|
| TYPES | A | W = width | L = length | C | D | E | F | G | Unit |
| 967.8.26 | 0.6 (0.02) | 8.0 (0.31) | 25.4 (1.0) | 9.1 (0.36) | 22.9 (0.9) | 5.08 (0.2) | 0.3 (0.01) | 2.5 (0.1) | mm (inches) |
| 967.13.38 | 0.6 (0.02) | 13.0 (0.51) | 38.5 (1.52) | 9.1 (0.36) | 35.6 (1.4) | 7.6 (0.3) | 0.3 (0.01) | 2.5 (0.1) | mm (inches) |
| 967.15.30 | 0.8 (0.02) | 15.0 (0.59) | 30.0 (1.18) | 36.0 (1.42) | 22.86 (0.9) | 5.08 (0.2) | | 2.5 (0.1) | mm (inches) |
| 967.15.51 | 0.6 (0.02) | 15.0 (0.59) | 50.8 (2.0) | 9.1 (0.36) | 48.3 (1.9) | 10.16 (0.4) | 0.3 (0.01) | 2.5 (0.1) | mm (inches) |
| 967.15.77 | 0.6 (0.02) | 15.5 (0.61) | 77.5 (3.05) | 9.1 (0.36) | 73.4 (2.89) | 10.2 (0.4) | 0.3 (0.01) | 2.5 (0.1) | mm (inches) |
| TYPES | | L = length | B = Ø | C | D | E | H | I | Unit |
| 968.5 | | 52.0 (2.05) | 8.0 (0.31) | | 8.5 (0.35) | | M4 | | mm (inches) |
| 968.7 | | 78.0 (3.07) | 8.0 (0.31) | | 8.5 (0.35) | | M4 | | mm (inches) |
| 969.23 | | 156 (6.14) | 13 (0.51) | | 10 (0.39) | 6.5 (0.26) | M6 | | mm (inches) |
| 969.105 | | 308 (12.13) | 30 (1.18) | | 10 (0.39) | 21 (0.83) | M8 | | mm (inches) |

| SAMPLE ORDERS | | | | | |
|---------------|----------------------|--|--|--|---|
| Type | D Cover | 33 M 100 M 1 G Resistance value | 1:5,000 1:1,000 1:10,000 Division ratio | 0.25 % / 0.5 % 1.0 % / 2.0 % 5.0 % / 10.0 % Tol. abs. / Tol. ratio. | TC50 / TC100 TC25 / 15 TC15 / TC25 TCabs. / TCratio. |
| | U = encasing | R = Ω | | 0.1 % / 0.5 % | 15 ppm/°C / 25 ppm/°C |
| | B = operation in air | K = KΩ | | 0.25 % / 1.0 % | 25 ppm/°C / 50 ppm/°C |
| | D = operation in oil | M = MΩ | | 0.5 % / 1.0 % | 50 ppm/°C / 100 ppm/°C |
| | G = glass | G = GΩ | | 1.0 % / 2.0 % | 100 ppm/°C / 200 ppm/°C |
| | | | | 2.0 % / 5.0 % | |
| | | | | 5.0 % / 10.0 % | |
| | | | | 10.0 % / 20.0 % | |

HIGH VOLTAGE SMD RESISTORS HVS 967



As a variant of the reliable HVR967 type series, high voltage SMD resistors present an interesting addition to the classic standard SMD chip resistors.



- Pulse-proof
- Low inductance
- SMD assembly



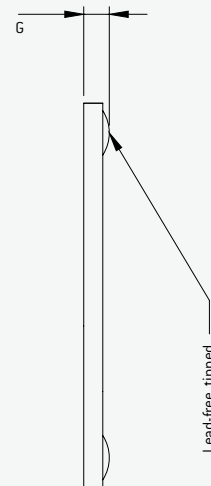
SAMPLE ORDER

| HVS 967.3.38 Type | B Cover | 100M Resistance value | 1 % Tolerance | TC25 Temperature coefficient |
|----------------------|----------------------|--------------------------|------------------|------------------------------------|
| | G = glass | R = Ω | 0.5 % | 25 ppm/°C |
| | B = operation in air | K = KΩ | 1 % | 50 ppm/°C |
| | D = operation in oil | M = MΩ | 2 % | 100 ppm/°C |
| | | G = GΩ | 5 % | 200 ppm/°C |
| | | | 10 % | |
| | | | 20 % | |

TYPE SELECTION HVS 967

| TYPES | TOLERANCE | | | | | | |
|--|----------------|----------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | TCR (ppm/°C) | 0.50 % | 1 % | 2 % | 5 % | 10 % | 20 % |
| 967.3.25 1 W 8 kV (air) 12 kV (oil) | 25 / 50 100 | 5 K - 2 G 5 K - 2 G | 2 K - 2 G 2 K - 2 G | 2 K - 2 G 2 K - 2 G | 2 K - 2 G 2 K - 2 G | 2 K - 2 G 2 K - 2 G | 2 K - 2 G 2 K - 2 G |
| 967.5.13 1 W 5 kV (air) 7.5 kV (oil) | 25 / 50 100 | 4 K - 500 M 4 K - 500 M | 4 K - 3 G 4 K - 3 G | 4 K - 3 G 4 K - 3 G | 4 K - 3 G 4 K - 3 G | 4 K - 3 G 4 K - 3 G | 4 K - 3 G 4 K - 3 G |
| 967.6.12 1 W 5 kV (air) 7.5 kV (oil) | 25 / 50 100 | 4 K - 500 M 4 K - 500 M | 4 K - 3 G 4 K - 3 G | 4 K - 3 G 4 K - 3 G | 4 K - 3 G 4 K - 3 G | 4 K - 3 G 4 K - 3 G | 4 K - 3 G 4 K - 3 G |
| 967.6.25 1.5 W 10 kV (air) 15 kV (oil) | 25 / 50 100 | 3 K - 500 M 3 K - 500 M | 2 K - 1 G 2 K - 1 G | 2 K - 1 G 2 K - 1 G | 2 K - 1 G 2 K - 1 G | 2 K - 1 G 2 K - 1 G | 2 K - 1 G 2 K - 1 G |
| 967.8.26 1.5 W 10 kV (air) 15 kV (oil) | 25 / 50 100 | 3 K - 500 M 3 K - 500 M | 2 K - 1 G 2 K - 1 G | 2 K - 1 G 2 K - 1 G | 2 K - 1 G 2 K - 1 G | 2 K - 1 G 2 K - 1 G | 2 K - 1 G 2 K - 1 G |

Other resistance values and temperature coefficients upon request.



GENERAL TECHNICAL SPECIFICATIONS

| | |
|--|--|
| Tolerance | 0.5 % - 20 %* |
| Temperature coefficient | 25 ppm/°C - 200 ppm/°C* |
| Insulation resistance | 10,000 MΩ (500 V 25° C 75 % relative humidity) |
| Dielectric strength of the insulation | >1,000 V (25° C 75 % relative humidity) ΔR/R 0.25 % max. |
| Thermal shock | ΔR/R 0.25 % max. |
| Temperature range (operation/storage) | -55° C - +175° C (-55° C - +100° C) |

Cover Epoxy-based varnish

Connection type Solder pads, tinned

Depending on ambient conditions, the characteristics of resistors can change. We recommend a suitability test under operational conditions.
* Other values upon request.

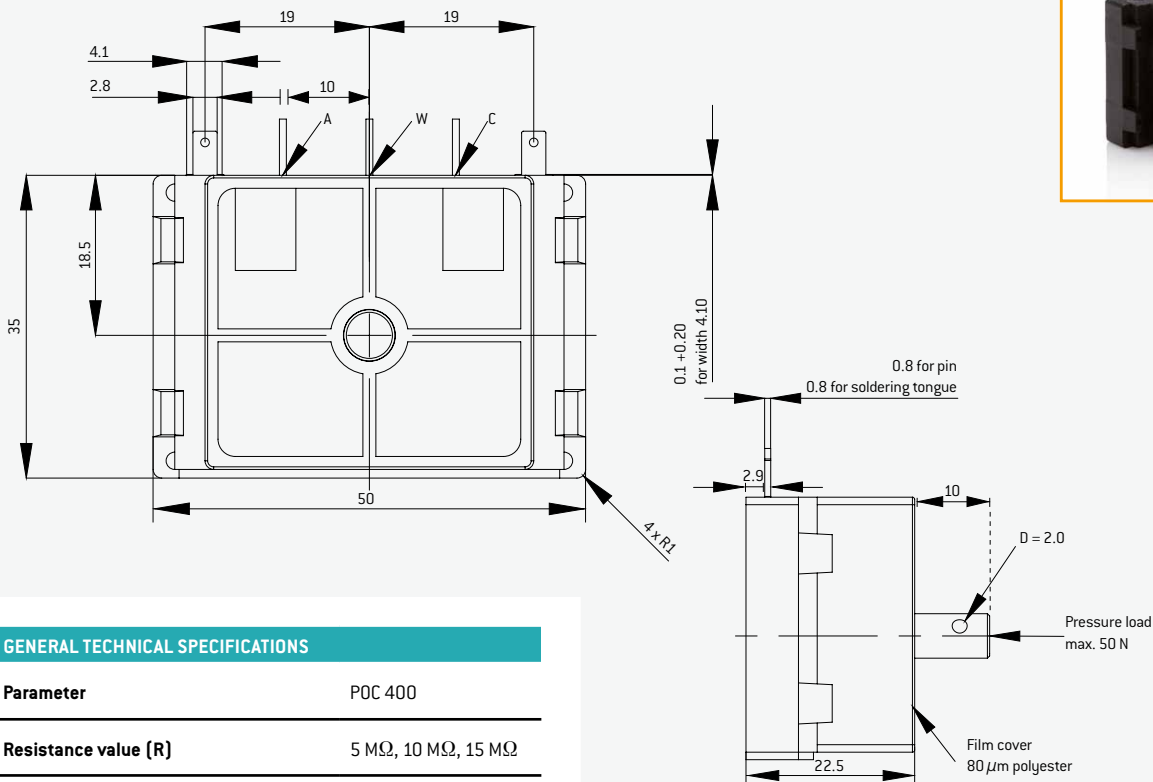
DIMENSIONS

| TYPES | W [width] | C | G | L [length] | Unit |
|-----------------|-------------|-------------|-------------|------------|-------------|
| 967.3.25 | 3.8 (0.2) | 1.55 (0.06) | 0.63 (0.02) | 25.4 (1.0) | mm (inches) |
| 967.5.13 | 5.0 (0.2) | 1.55 (0.06) | 0.63 (0.02) | 12.7 (0.5) | mm (inches) |
| 967.6.12 | 6.35 (0.25) | 1.55 (0.06) | 0.63 (0.02) | 12.7 (0.5) | mm (inches) |
| 967.6.25 | 6.35 (0.25) | 1.55 (0.06) | 0.63 (0.02) | 25.4 (1.0) | mm (inches) |
| 967.8.26 | 8.0 (0.31) | 1.55 (0.06) | 0.63 (0.02) | 25.4 (1.0) | mm (inches) |

HIGH VOLTAGE POTENTIOMETERS POC 400



The POC 400 high voltage potentiometer is based on a ceramic substrate, embedded in plastic encasing with excellent insulating properties. Carefully selected high-quality materials, paired with decades of experience in the development and production of linear and rotary sensors, are the guarantee for a long service life without any function loss.



GENERAL TECHNICAL SPECIFICATIONS

| Parameter | POC 400 |
|---|---------------------|
| Resistance value (R) | 5 MΩ, 10 MΩ, 15 MΩ |
| Tolerance | ± 10 % |
| Linearity | ± 4 % |
| Max. operational voltage (V) | 2.5 kV |
| Insulation voltage | >2.5 kV |
| Temperature coefficient absolute (TCabs.) | 50 ppm/K |
| Temperature coefficient ratio (TCratio) | 50 ppm/K at R = 1:1 |
| Temperature range | -20° C – +70° C |
| Contact resistance (Rc) | <15 KΩ at 15 MΩ |
| Rotary angle | 305 ± 5° |
| Degree of protection | IP 60 |

Depending on ambient conditions, the characteristics of resistors can change. We recommend a suitability test under operational conditions.

* Other values upon request.

- Adjustable high voltage up to 2.5 kV
- Suitable for implementation in high voltage measurement and power units, spectrometers, electrical precipitators and much more.
- Simple contacting and mounting

SAMPLE ORDERS

| POC 400 Type | 100 M Resistance value |
|--------------|------------------------|
|--------------|------------------------|

NOTES ON APPLICATION

For safety reasons related to dielectric strength under high voltage, the following connector pin assignment should be observed:

PIN A: Voltage in+

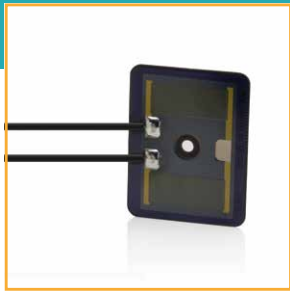
PIN B: Out 5 – 95 %

PIN C: Gnd or voltage in-

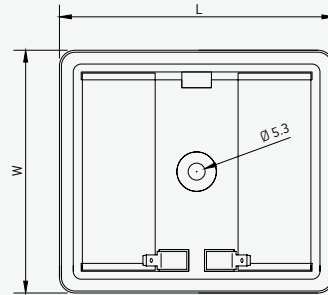
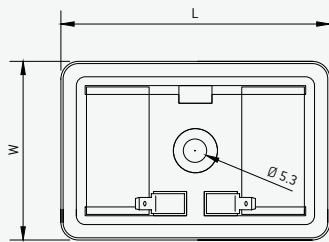
POWER RESISTORS PLR 100, 180, 200, 300, 900



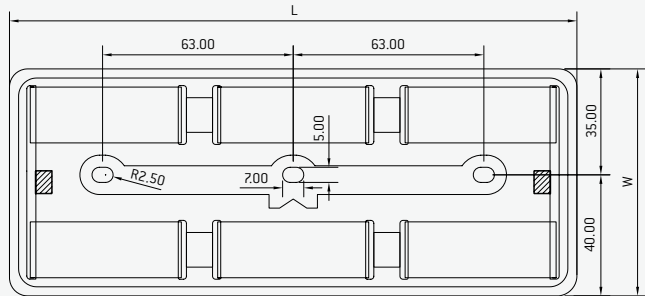
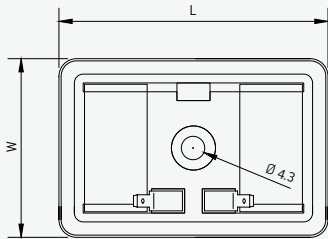
The space-saving design of power resistors made using thick-film technology on steel substrates makes it possible to achieve high capacity, even in the narrowest spaces. Special features including extremely low inductance and high resistance values open new perspectives in power electronics. Variable resistance values, in addition to standard dimensions, freely selectable geometries upon request, as well as universal connection variants, optimally round out the product family of Metallux power resistors.



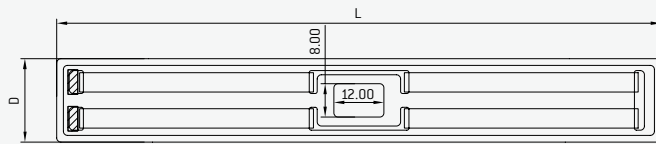
Standard types:



Optional types:



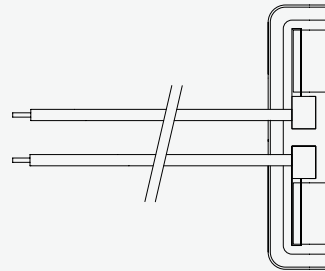
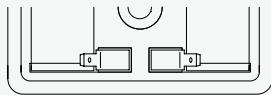
PLR 900.188.75



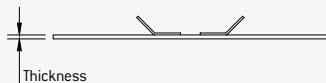
PLR 180.145.20

- Low inductive
- Space-saving
- High-performance

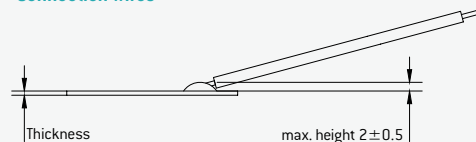
Connection variants:



Plug-in terminals



Connection wires



| GENERAL TECHNICAL SPECIFICATIONS | |
|---|---|
| Resistance values, standard | [E12] 10 Ω, 22 Ω, 47 Ω, 68 Ω, 100 Ω, 220 Ω, 470 Ω, 680 Ω* |
| Tolerance | ≥ ± 10 %* |
| Temperature coefficient | 150 ppm/° C |
| Max. operational voltage | 1,000 VDC |
| Dielectric strength of the insulation | 2.5 KVDC, 60 sec. at 50 Hz |
| Stability (max. ΔR/R) | ± 20 % |
| Inductance | < 6 μH |
| Temperature range (operation / storage) | -50° C – +200° C / -40° C – +105° C |
| Tightening torque (fastening screws) | 3 Nm |
| Cover* | Glass |
| Protection rating | IP00 |
| Connection type | Wires, solder lug, plug-in terminals |

Depending on ambient conditions, the characteristics of resistors can change.
We recommend a suitability test under operational conditions.

* Other values upon request.

| TYPES | | | | |
|----------------|---------------|-----------------------|------------|------------|
| | Nominal power | Resistance values [Ω] | Attachment | Weight [g] |
| Standard types | | | | |
| 100.61.41 | 100 | 5 – 500 | M5 | 20 |
| 200.70.51 | 200 | 5 – 500 | M5 | 28 |
| 300.70.61 | 300 | 5 – 500 | M5 | 34 |
| Optional types | | | | |
| 100.55.43 | 100 | 5 – 500 | M4 | 19 |
| 180.145.20 | 200 | 5 – 500 | without | 23 |
| 900.188.75 | 900 | 5 – 500 | 3 x M5 | 110 |

| DIMENSIONS | | | | |
|----------------|--------------|-------------|------------|-------------|
| | Length | Width | Thickness | Unit |
| Standard types | | | | |
| 100.61.41 | 61.0 (2.40) | 41.0 (1.61) | 1.0 (0.04) | mm (inches) |
| 200.70.51 | 69.5 (2.74) | 51.5 (2.03) | 1.0 (0.04) | mm (inches) |
| 300.70.61 | 69.5 (2.74) | 61.0 (2.40) | 1.0 (0.04) | mm (inches) |
| Optional types | | | | |
| 100.55.43 | 55.0 (2.17) | 43.0 (1.69) | 1.0 (0.04) | mm (inches) |
| 180.145.20 | 145.0 (5.71) | 20.0 (0.79) | 1.0 (0.04) | mm (inches) |
| 900.188.75 | 188.0 (7.40) | 75.0 (2.95) | 1.0 (0.04) | mm (inches) |

| SAMPLE ORDERS | | | |
|---------------|------------------|-----------|---|
| Type | Resistance value | Tolerance | Connection variants |
| PLR 100.61.41 | 100 R | 10 % | |
| | | | K = 100 mm wires, PVC, UL1015, AWG20, blk |
| | | | L = solder terminal |
| | | | S = Plug-in terminal |

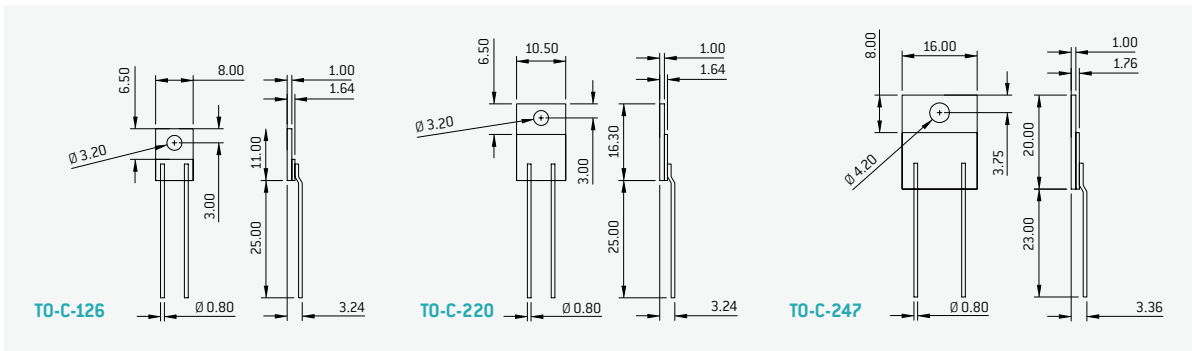
NEW BY METALLUX: POWER AND PULSE RESISTORS



The type series PLR-T0 with three additional performance classes will augment the established Metallux range of performance film resistors. The familiar design with new material pairings offers even more capacity and dielectric strength in the narrowest spaces.

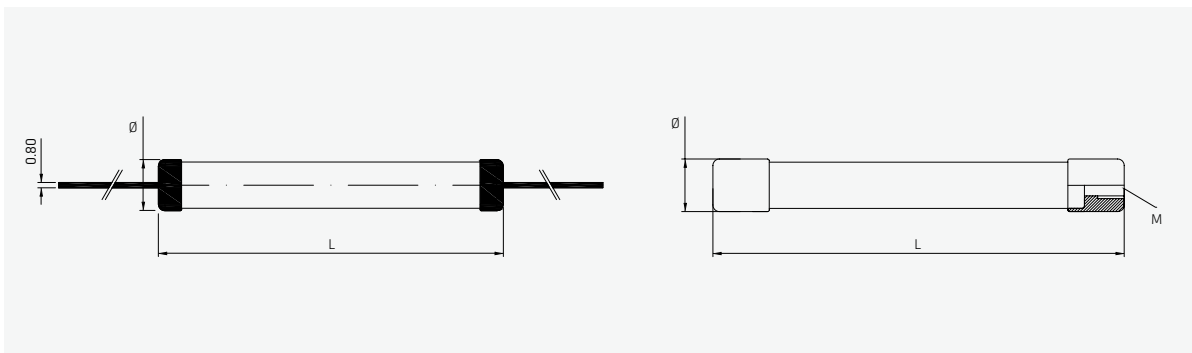
In the new type series PCR particularly low impedance high voltage pulse resistors are available. The resistance value and pulse energy from three different diameters and variable lengths can be combined.

| POWER RESISTORS OF THE TYPE SERIES T0 | | | | | |
|---------------------------------------|--------------------------|-----------------------|--------------------|-------------------|-----------|
| Model | Max. operational voltage | Power without cooling | Power with cooling | Resistance values | Tolerance |
| T0-126 | 300 V | 2 W | 30 W | 1R0 – 10 K | 5 %, 10 % |
| T0-220 | 300 V | 3.5 W | 60 W | 1R0 – 10 K | 5 %, 10 % |
| T0-247 | 300 V | 6 W | 120 W | 1R0 – 10 K | 5 %, 10 % |



| PULSE RESISTORS OF THE TYPE SERIES PCR | | | | |
|--|---|-------------------|--|--|
| Model | Nominal power at $\Delta T = 400 \text{ K}$ | Resistance values | Max. permitted voltage, operation in air | Pulse energy [1 sec. at $\Delta T 200 \text{ K}$] |
| PCR 8 | 1 – 5 W | OR3 – 1 R | 10 kV | 3 KJ |
| PCR 13 | 5 – 50 W | OR3 – 1R5 | 35 kV | 5 KJ |
| PCR 30 | 50 – 200 W | OR3 – OR5 | 60 kV | 35 KJ |

| Model | L [mm] | \varnothing [mm] | M |
|--------|--------|--------------------|----|
| PCR 8 | To 120 | 8.5 | M4 |
| PCR 13 | To 220 | 14.5 | M4 |
| PCR 30 | To 230 | 31.8 | M5 |



APPLICATIONS



The variety of the Metallux thick-film resistors makes it possible to use these components in many applications. The spectrum ranges from highly accurate precision resistors with long term stability to types with an extremely high pulse load capacity.



High voltage cascades in transducers for HVDC (high voltage direct current transmission) systems

Voltage sensors for monitoring and stabilising power supplies



High voltage resistors as sensors for stable, high-precision imaging in medical and industrial X-ray systems



Power and high voltage resistors in cable, measurement and testing technology for detecting and locating insulation errors; testing insulation materials and defining fuses in circuits



Charging and discharging resistors for capacitors



Electrostatic paint finishing system

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System Certification
to ISO 9001:2015