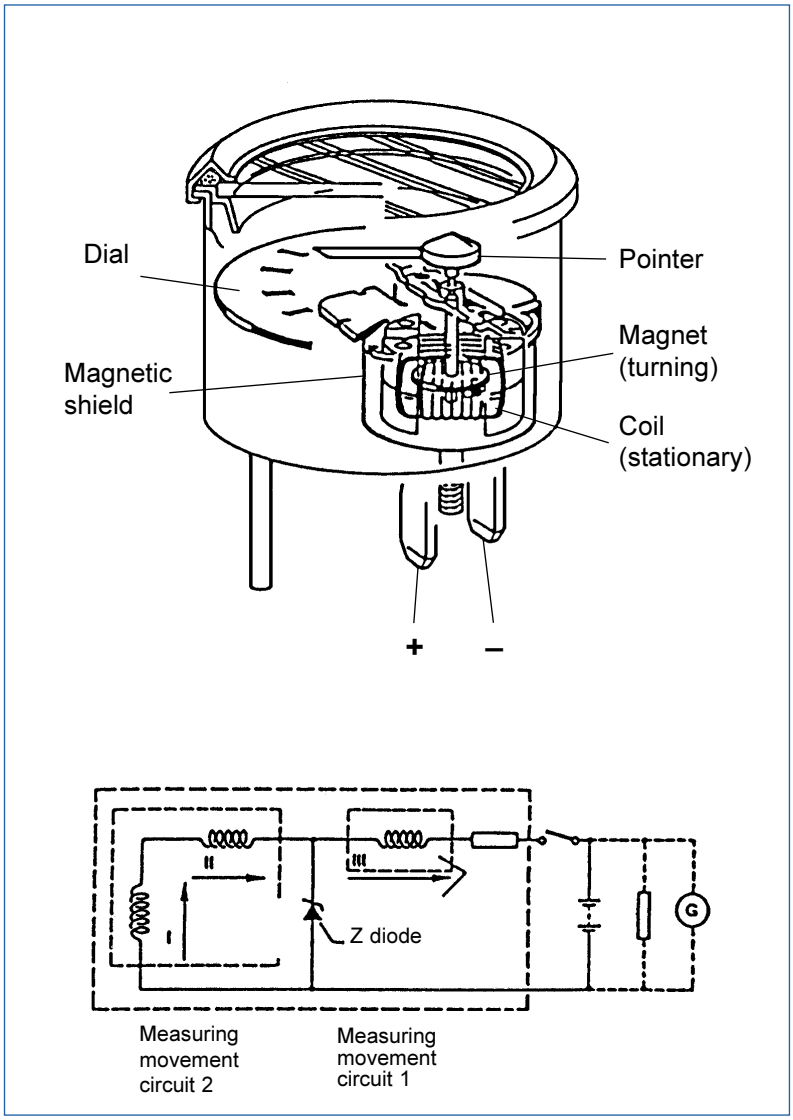
10. Voltmeter (dia. 52 mm)

10.1 General Informations

Designation of function
Movement: System Ke (90°)
(Turning magnet movement for ratio indication, maximum pointer travel 90°)

The voltmeter is connected to the plus and minus (ground) polarity for voltage display. A turning magnet ratio measuring movement is used. The dial is graduated according to the movement characteristic. The voltage range to be ignored, below 8 V or 18 V, is electronically suppressed by a Z diode. The limitation of the dial to a range of 8 - 16 V or 18 - 32 V (instead of 0 - 16 V or 0 - 32 V for the same pointer deflection) gives a better resolution of the reading.



The turning magnet ratio measuring movement comprises three stationary coils wound at 90° against each other, and a rotating permanent magnet disk with an axle and a pointer in these coils.

The three coils constitute two measuring circuit branches, coil III constituting branch 1; branch 2 consists of coil II with opposite sense of winding and coil I wound vertical to coil II.

No current passes the Z diode between voltage 0 and Z voltage, the current distribution in all three coils is unchanged, and thus the resulting magnetic field remains unchanged.

A partial current passes the Z diode when the voltage rises above the minimum value indicated on the dial. Now the currents in both circuit branches are not equal any more. The strength of the magnetic field in measuring circuit 1 containing coil III increases with the measured voltage, whereas it remains constant in measuring circuit 2 with coilsi and II. The turning magnet carrying the pointer follows the direction of the field resulting from measuring circuits 1 and 2, thereby indicating the measured voltage.

A magnetic shield prevents effects of external magnetic fields.

The voltmeter measuring range is adapted to various on-board voltages by selection of adequate dropping resistor and Z diode values.

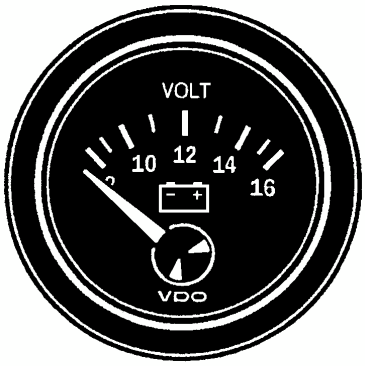
10. Voltmeter (dia. 52 mm)

10.2 Technical Data

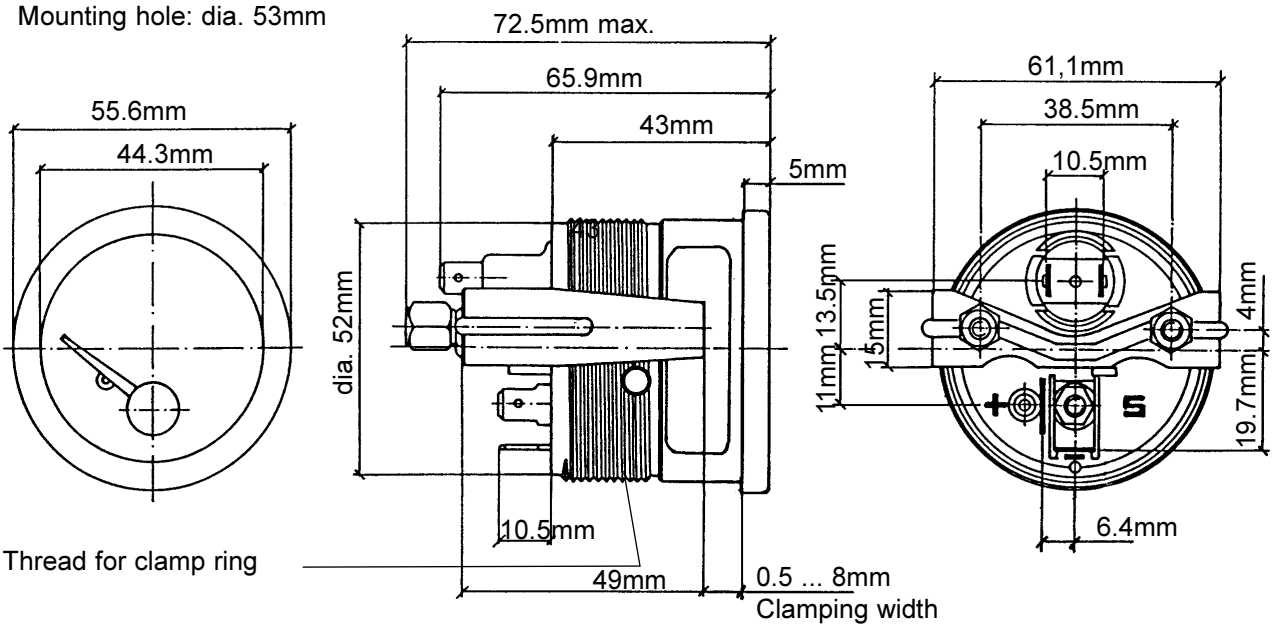
Operating voltage:	8 ... 16 V or 18 ... 32 V
Movement:	System Ke (90°)
Current consumption:	67 mA = 16 V (without illumination) 63 mA = 32 V (without illumination)
Operating temp.:	– 30°C ... + 85°C
Storage temperature:	– 40°C ... + 90°C
Illumination:	1 light bulb 14 V, 3.4 W or 24 V, 3 W, 2 coloured caps, green and red (only at 12 V)
Protection:	IP64 DIN 40050 from the front reverse-polarity protection
Vibration resistance:	max. 1g eff., 25 ... 2000 Hz, duration 8 h, f: 1 octave/min.
Nominal position:	NL 0 to NL 90, DIN 16257

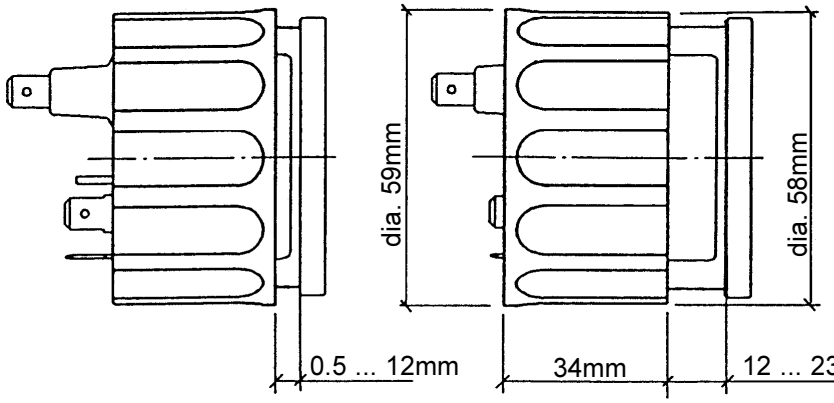
VDO cockpit vision

dia. 52 mm Backlight



Example: voltmeter
operating voltage 8 ... 16 V





Pin assignment:
Pin +: + 12 V or + 24 V, terminal 15
Pin –: Ground, terminal 31
Pin S: not assigned

10. Voltmeter (dia. 52 mm)

10.2 Technical Data

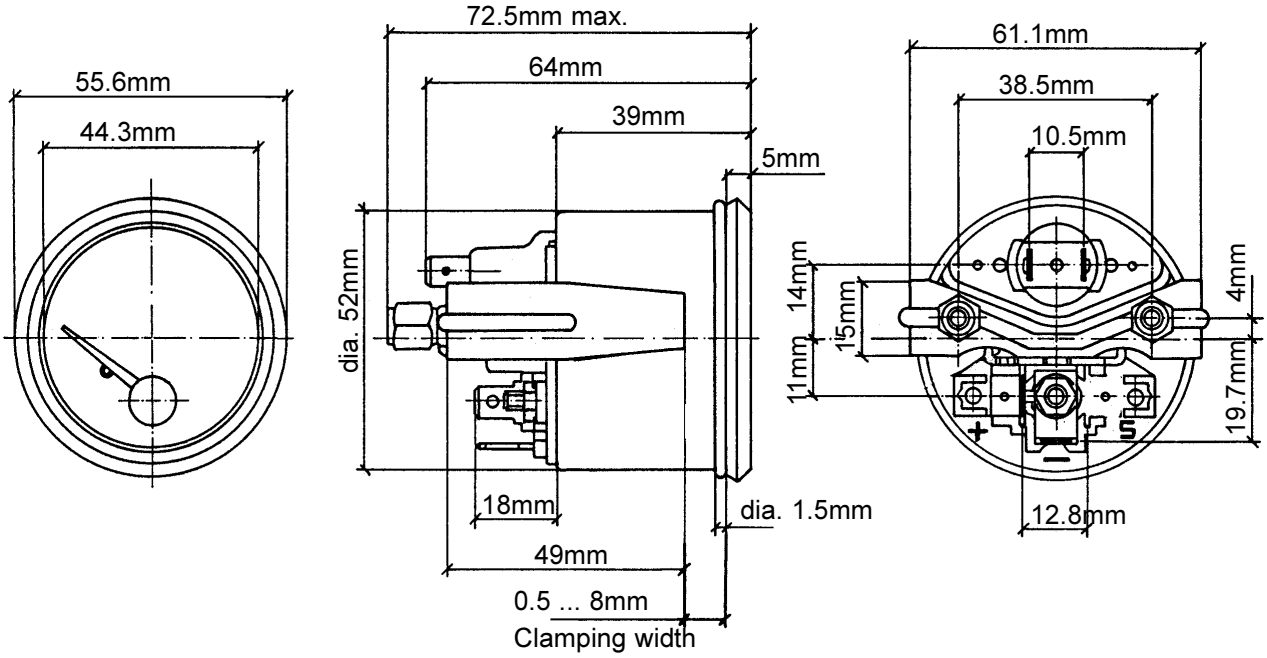
Operating voltage:	8 ... 16 V or 18 ... 32 V
Movement:	System Ke (90°)
Current consumption:	67 mA = 16 V (without illumination) 63 mA = 32 V (without illumination)
Operating temp.:	– 30°C ... + 85°C
Storage temperature:	– 40°C ... + 90°C
Illumination:	1 light bulb 14 V, 3.4 W or 24 V, 3 W
Protection:	IP64 DIN 40050 from the front reverse-polarity protection
Vibration resistance:	max. 1g eff., 25 ... 2000 Hz, duration 8 h, f: 1 octave/min.
Nominal position:	NL 0 to NL 90, DIN 16257

VDO cockpit international

dia. 52 mm Floodlight

Example: voltmeter
operating voltage 18 ... 32 V

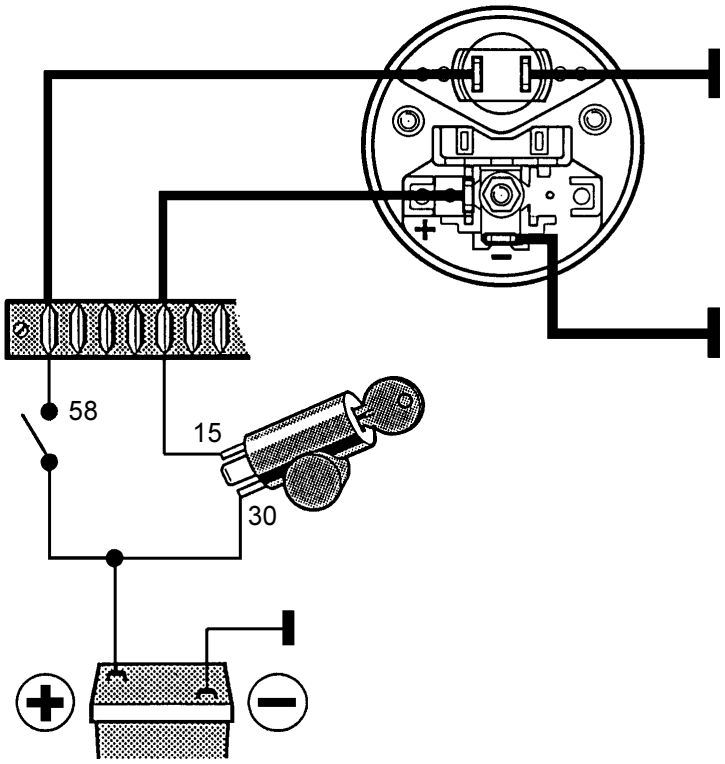
Mounting hole: dia. 53mm



Pin assignment:
Pin +: + 12 V or + 24 V, terminal 15
Pin –: Ground, terminal 31
Pin S: not assigned

10. Voltmeter (dia. 52 mm)

10.3 Wiring Diagram



10. Voltmeter (dia. 52 mm)

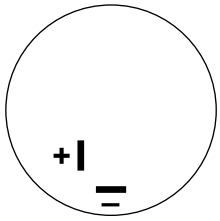
10.4 Testing Instructions

Test accessories

1x power supply

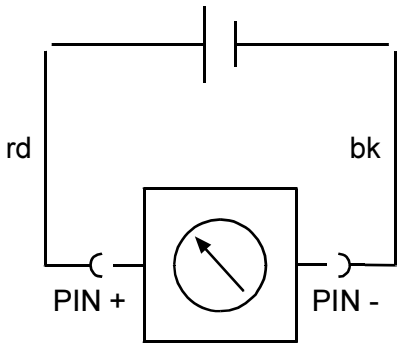
1x test cable No. 3 } contained in test cables kit
1x measuring cable } X12-019-101-001

Pin allocation



Pin + + 12V or + 24V
Pin – Ground

Test circuit diagram



Test method description

Test of the movement

Connect the instrument according to the test circuit diagram, using test cable 3.

The following tables shows the permissible Volt indication tolerances in angular degrees.

Indication (V)	8	9	10	11	12	13	14	15	16
Deflection (°∠)	0	7.1	16.8	29.4	44.1	58.6	70.8	80.6	87.6
Tolerance (V)	± 0.85		± 0.6		± 0.5		± 0.5		± 0.75

Indication (V)	18	20	22	24	25	26	28	30	32
Deflection (°∠)	0	8.1	19	33.6	42.1	50.4	66.4	78.8	88
Tolerance (V)	± 0.85		± 0.6		± 0.5		± 0.5		± 0.75

10. Voltmeter (dia. 52 mm)

10.5 Instruments Survey

VDO cockpit vision (Backlight) dia. 52 mm **Part No. 332-010-. . .**

Dial		Special feature	Part No.
Range	Imprint		
8 ... 16 V	VOLT − +	Clamp ring 12 V	**001K**
8 ... 16 V	VOLT − +	Stud bolts 12 V	**003K**

Part No. 332-020-. . .

Dial		Special feature	Part No.
Range	Imprint		
18 ... 32 V	VOLT − +	Clamp ring, 24 V without colour caps	**001C**

VDO cockpit international (Floodlight) dia. 52 mm **Part No. 332-030-. . .**

Dial		Special feature	Part No.
Range	Imprint		
8 ... 16 V	Colour fields (red and green) − +	12 V	**001C** **001G**

Part No. 332-040-. . .

Dial		Special feature	Part No.
Range	Imprint		
18 ... 32 V	Colour fields (red and green) − +	24 V	**001C** **001G**