

Potentiometers

for use with indicating measuring instruments in metering and control engineering

General

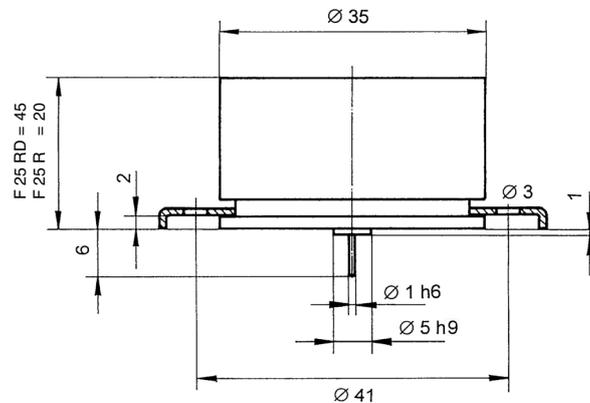
Potentiometers are wire-wrapped rotation resistances of an extremely low torque.

They essentially comprise:

- a resistance wire-wrapped around a ring and
- a slider coupled with the pointer shaft of the measuring instrument via a coupling system.

To reach the required low torque, the contact pressure of the slider to the winding must be as low as possible, but must not affect the functional safety.

This is why noble metal alloys of high resistance against corrosion and of smallest temperature coefficients are used for the slider and the winding. All other parts of the potentiometer are also made of corrosion proof materials.



Operation

The principle of the potentiometer is that of a no-load voltage divider.

Conditional upon the pointer position of the measuring instrument, the resistance between the beginning of the winding and the slider will change and so will the partial voltage to be tapped between these two connection points. To keep a falsification of the measuring signal as low as possible, it will be expedient to use a high-impedance measuring unit in relation to the measuring resistance.

The pointer position is transmitted by a coupling fork at the potentiometer and a motion pin at the instrument pointer (for dial surface mounting type F 25 Z ...), or a coupling lever (for mounting on the back of the measuring instrument type F 25 R).

Application

The difference between potentiometers and limit value switches is that the former supply a permanent signal proportional to the measuring value of the measuring instrument. This signal may be used for indication, registration, monitoring, regulation, control and long distance monitoring.

In programme control units, we find potentiometers as transmitters and actuators for servo systems. They allow for conversion of mechanical values such as length or angles into proportional voltage values. Our potentiometers are chiefly used with pressure gauges and thermometers, hygrometers, programme control units, wind direction indicators and weather-vanes.

The required resistance value depends upon the indicating measuring instrument (e.g. moving coil instrument, digital display unit) and the transmission distance.

Available models

Potentiometers are available in two models of different set-up:

1. As potentiometers type F 25 R for rear mounting.

These potentiometers can be fastened to the rear side of the measuring instrument. The pointer position is transmitted via a coupling fork fastened to the shaft of the potentiometer. The counterpart of the coupling (coupling lever) is mounted to the pointer shaft of the measuring instrument which is passed through to the rear side of the instrument.

2. As potentiometers for front fitting types F 25 Z 100 and F 25 Z 160.

These potentiometers may be mounted **on** the dial, or **below** the dial of the measuring instrument. The pointer position is transmitted via a coupling fork fastened to the potentiometer, and a motion pin at the instrument pointer.

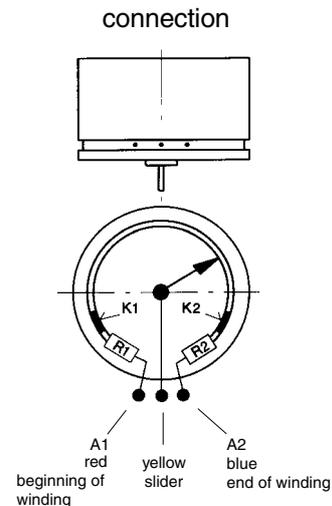
Special features of the two models F 25 REB and F 25 ZEB

These models will be supplied with 1 or 2 dropping resistors upon request. For different dropping resistors, kindly indicate the resistances as follows:

Dropping resistor R1 Ω
 Dropping resistor R2 Ω
 Total resistance (A1-A2) Ω

Option:

Angle of short circuit distance K1 $^{\circ}$
 Angle of short circuit distance K2 $^{\circ}$
 Angle from stop to stop $^{\circ}$



Mechanical data

Housing _____ aluminium
 Shaft _____ stainless steel \varnothing 1 mm
 Bearing _____ jewel bearing
 Resistor element _____ noble metal winding
 Slider tap _____ noble metal, multiple
 Housing type of protection _____ IP 60 (IEC 529)
 Angle of rotation, mechanical 290 $^{\circ}$ + 5 $^{\circ}$
 Angle of rotation, electrical _____ 290 $^{\circ}$ (REB and ZEB 270 $^{\circ}$)
 Rotating speed _____ max. 1 r/sec.
 Torque _____ 0.002 to 0.003 Ncm
 Service life _____ 50 x 10 6 slider travel (360 $^{\circ}$)

Electrical data

Resistance values, standard according to schedule
 Resistance values, max. _____ 50 k Ω
 Resistance tolerance _____ \pm 3 % resp. \pm 1 % for REB and ZEB
 Lowest starting resistance _____ 0.1 % of total resistance
 Linearity tolerance _____ \pm 0.3 %
 Insulation resistance _____ 20 M Ω
 Test voltage _____ 500 V, 50 Hz
 Operating voltage _____ 50 V max.
 Total load _____ 1.5 Watt at 80 $^{\circ}$ C max.
 Slider load capacity _____ 1 mA max.
 Temperature range _____ - 50 $^{\circ}$ C to + 100 $^{\circ}$ C
 Temperatur coefficient _____ 20 ppm/ $^{\circ}$ C

Power consumption
 $P_V = f(\text{ambient temperature } T_U)$

