

Data Sheet for Precision Potentiometer

Multiturn Wirewound Potentiometer

Series 46HDS



The potentiometers of the series 46HDS are used as multiturn sensors with outstanding linearity and resolution for measuring ranges from 3 to 20 turns.

- Multiturn 3..20 turns
- Optional limit switch (CW, CCW)
- Optional back shaft
- Power rating up to 10 W
- Optional tandem version

The optionally integrable limit switches can be factory-configured within the electrically effective angle of rotation or within the signal plateau.

| Electrical Data | 3-turn | 5-turn | 10-turn | 15-turn | 20-turn |
|--|---|----------------|----------------|----------------|----------------|
| Effective electrical angle of rotation 1.) | 1080° ±5° | 1800° ±5° | 3600° ±5° | 5400° ±5° | 7200° ±5° |
| Total resistance 1.) | 0,01..100 kOhm | 0,02..100 kOhm | 0,05..200 kOhm | 0,05..200 kOhm | 0,05..500 kOhm |
| Resistance tolerance | ±3% (±1%) | | | | |
| Independent linearity (best straight line) 1.) | ±0,3% (±0,2%) | | ±0,3% (±0,1%) | | |
| Theoretical resolution 1.) | Depends on resistance value (see table below) | | | | |
| Backlash (Hysteresis) 1.) | ≤ 2° | | | | |
| Rotational noise (ENR) 1.) (Method C) | 100 Ohm | | | | |
| Max. / recommended wiper current 1.) | 35 mA / 2 µA | | | | |
| Power rating @ 70°C (0W @ 105°C) | 2 W | 2,5 W | 5 W | 7,5 W | 10 W |
| Insulation Voltage 1.) | 1000 VAC, 1min | | | | |
| Insulation Resistance 1.) | 100 MOhm @ 1000 VDC | | | | |

| Mechanical Data, Environmental Conditions, Miscellaneous | 3-turn | 5-turn | 10-turn | 15-turn | 20-turn |
|--|----------------------|------------------|------------------|------------|------------|
| Mechanical angle of rotation | 1080° +10° | 1800° +10° | 3600° +10° | 5400° +10° | 7200° +10° |
| Lifetime (90% el. eff. angle half sine) 2.) | 0,6 Mio. rotations | 1 Mio. rotations | 2 Mio. rotations | | |
| Max. operational speed | 40 rev. / min. | | | | |
| Bearing | Ball bearing | | | | |
| Operational torque @ ambient temperature 1.) 2.) | 10 Nmm | | | | |
| End stop torque 1.) 2.) | 90 Ncm | | | | |
| Operating temperature range | -20..+105°C | | | | |
| Storage temperature range | -55..+105°C | | | | |
| Protection grade (IEC 60529) | IP40 | | | | |
| Vibration (IEC 68-2-6, Test Fc) | 15g 10..2000Hz x 12h | | | | |
| Shock (IEC 68-2-27, Test Ea) | 49g @ 11 ms x 18 | | | | |
| Housing diameter | 46 mm | | | | |
| Housing depth | 43,5 mm | | 61,5 mm | 80 mm | 100 mm |
| Shaft diameter | 6 mm | | | | |
| Shaft type | Solid shaft | | | | |

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|--|---|--------|-----------|-----------|-----------|
| Max. radial load | ≤1 N | | | | |
| Max. axial load | ≤1 N | | | | |
| Connection type | Soldering lugs / pin (with option limit switch) | | | | |
| Connection position | Axial | | | | |
| Sensor mounting | Servo flange | | | | |
| Mass | ca. 100 g | | ca. 130 g | ca. 160 g | ca. 190 g |
| Fastening parts included in delivery | 3 x servo clamps SFN1 | | | | |
| Material shaft | Stainless steel | | | | |
| Material housing | Aluminium | | | | |

1.) According IEC 60393

2.) Determined by climatic conditions according to IEC 68-1, para. 5.3.1 without load collectives

Please note: Max. permissible supply voltage <75 VDC respectively <50 VAC in addition the max. power rating must be observed

| Number of wire turns / resolution | | | | | | | | | | |
|-----------------------------------|-----|---|---|---|-----|-----|------|------|------|------|
| Resistance value Ohm | 0,5 | 1 | 2 | 5 | 10 | 20 | 50 | 100 | 200 | 500 |
| Number of wire turns (46HDS-3) | * | * | * | * | 556 | 690 | 950 | 1190 | 1515 | 2080 |
| Number of wire turns (46HDS-5) | * | * | * | * | * | 925 | 1275 | 1650 | 2080 | 2860 |
| Number of wire turns (46HDS-10) | * | * | * | * | * | * | 2000 | 2500 | 3180 | 4350 |
| Number of wire turns (46HDS-15) | * | * | * | * | * | * | 2530 | 3220 | 4160 | 5710 |
| Number of wire turns (46HDS-20) | * | * | * | * | * | * | 3030 | 3920 | 5120 | 7140 |

| Number of wire turns / resolution | | | | | | | | | | |
|-----------------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Resistance value Ohm | 1k | 2k | 5k | 10k | 20k | 50k | 100k | 200k | 500k | |
| Number of wire turns (46HDS-3) | 2550 | 2330 | 3225 | 4080 | 5130 | 6890 | 8330 | - | - | |
| Number of wire turns (46HDS-5) | 3450 | 3230 | 4170 | 5720 | 7410 | 11000 | 12500 | - | - | |
| Number of wire turns (46HDS-10) | 5400 | 6850 | 6600 | 8550 | 10850 | 14900 | 18850 | 24390 | - | |
| Number of wire turns (46HDS-15) | 7410 | 9510 | 8800 | 11300 | 14500 | 20000 | 25600 | 32250 | - | |
| Number of wire turns (46HDS-20) | 9300 | 11900 | 14100 | 13150 | 16950 | 23250 | 30790 | 38200 | 55550 | |

Resolution in degree E.g. R5k 5-turn = $1800^\circ / 4170 = 0,432^\circ$ per winding resistive wire

*marked potentiometers have a single-wire design. These potentiometers have an almost infinite resolution and are available on request for serial production

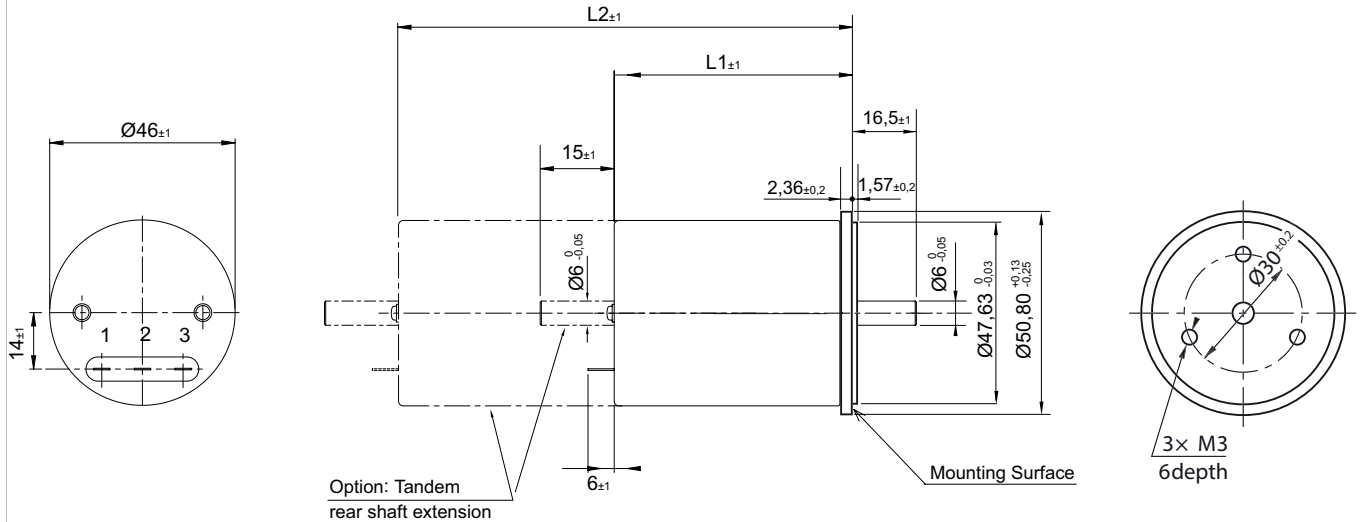
Data Sheet for Precision Potentiometer



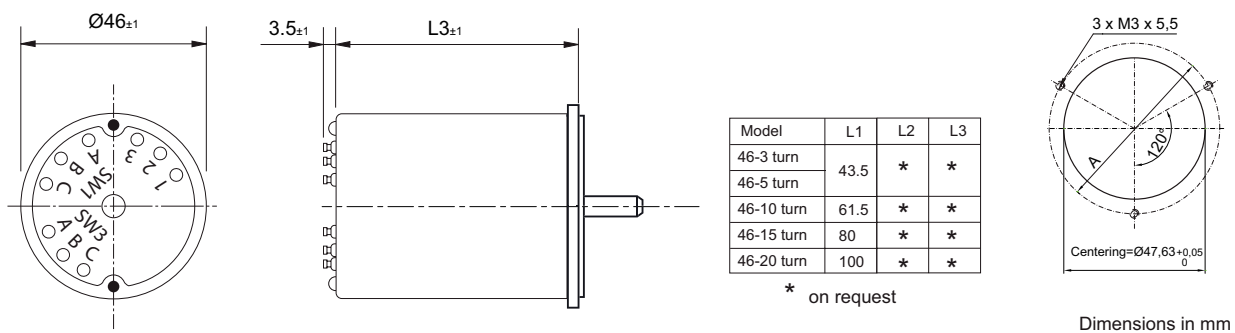
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Series 46HDS

Drawing

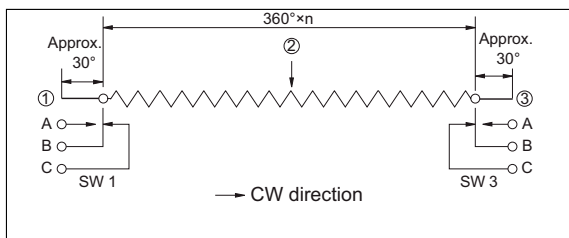


Version with limit switch



Circumscription (standard)

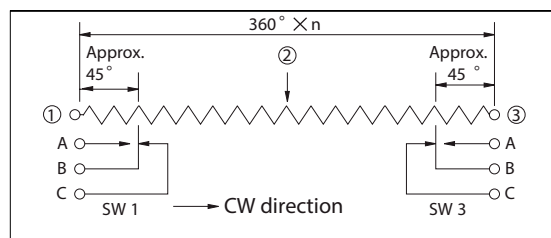
Limit-Switch is activated outside effective electrical angle ($360^\circ \times n$).



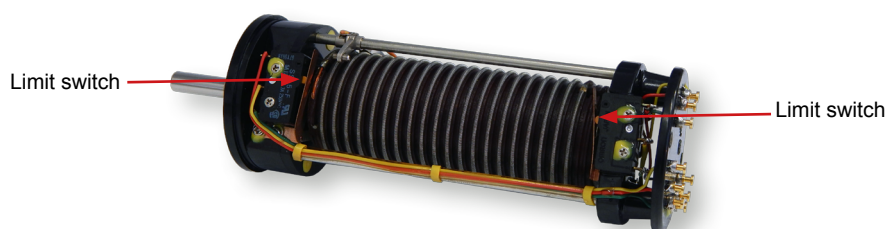
Rating of Limit-Switch is 5 A, 50 VAC

Inscription Type (option)

Limit-Switch is activated within effective electrical rotating angle ($360^\circ \times n$).



Limit switch



On Request: Special machining on shaft

Slot



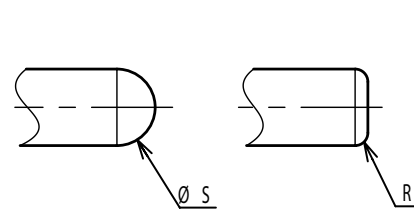
Groove



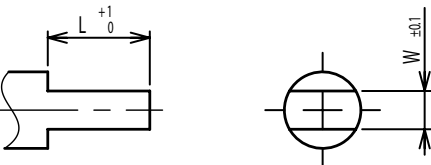
Flat



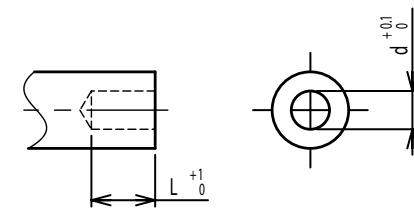
Round top



Double side flat



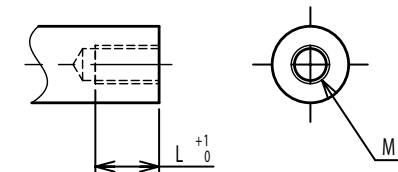
Counterbore hole



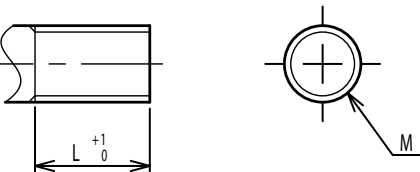
Step



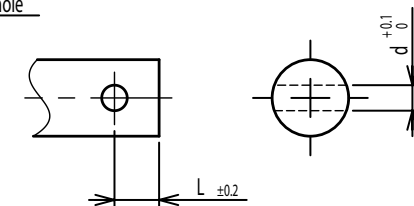
Counterbore screw hole



Screw Thread



Pin hole



Knurled(Parallel)



Screw thread inside hole

