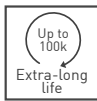


PT-10 / PTC-10

10-mm carbon / cermet through-hole potentiometer

The PT-10 and PTC-10 potentiometers offer control where frequent adjustment is required. The shaftless design allows for employment of different engagement mechanisms, such as a customized shaft, a motor control or a human interface adjustment. This potentiometer can also control variable outputs including frequency, change in motor speed or volume.



KEY FEATURES

- ▶ Excellent performance (up to 3% linearity)
- ▶ Carbon or cermet resistive element
- ▶ Up to 16 mechanical detents for tactile feedback
- ▶ Up to 100.000 life cycles
- ▶ IP54 protection
- ▶ Magazine packaging for automatic insertion available
- ▶ Polyester / Alumina substrate
- ▶ Wiper positioned at initial, 50% or fully clockwise
- ▶ Loose and assembled shaft and knobs
- ▶ Linear, logarithmic and antilogarithmic tapers
- ▶ Self extinguishable plastic (UL 94V-0) available
- ▶ SPDT switch and low torque version available

On request

- ▶ Embossed tape packaging

ELECTRICAL SPECIFICATIONS

| | PT-10 | PTC-10 |
|----------------------------------|---|---|
| Taper ¹ | Lin, Log, Alog | |
| Range of values ¹ | (Decad. 1.0 - 2.0 - 2.2 - 2.5 - 4.7 - 5.0) | |
| Lin | 100Ω ≤ Rn ≤ 5MΩ | |
| Log, Alog | 1KΩ ≤ Rn ≤ 5MΩ | |
| Tolerance ¹ | | |
| 100Ω ≤ Rn ≤ 1MΩ | ± 20% | |
| 1MΩ < Rn ≤ 5MΩ | ± 30% | |
| Max. Voltage | | |
| Lin | 200 VDC | |
| Log, Alog | 100 VDC | |
| Nominal power | 50°C (122°F) | 70°C (158°F) |
| Lin | 0.15 W | 0.33 W |
| Log, Alog | 0.07 W | 0.17 W |
| Residual resistance ¹ | ≤ 0.5% Rn (5Ω min.) | |
| Equivalent noise resistance | ≤ 3% Rn (3Ω min.) | |
| Operating temperature | -25°C to +70°C ² [-13°F to + 158°F] | -40°C to +90°C ³ [-40°F to + 194°F] |

¹ Others available on request; ² Up to 85°C depending on application.; ³ +120°C/+248°F upon request

APPLICATIONS

- ▶ Appliance program selection
- ▶ Thermostat adjustment
- ▶ Timer and control relays
- ▶ Consumer electronics
- ▶ Power tool controls
- ▶ Test and measurement equipment

PT-10 / PTC-10

10-mm carbon / cermet through-hole potentiometer

MECHANICAL SPECIFICATIONS

| | PT-10 | PTC-10 |
|--|---|------------------|
| Mechanical rotation angle ¹ | 235° ± 5° | |
| Electrical rotation angle ¹ | 220° ± 20° | |
| Torque Rotational Stop | 0.4 to 2 Ncm (0.6 to 2.7 in-oz) > 5 Ncm (>7 in-oz) | |
| Push-pull force over the rotor | > 49N | |
| Life ² | Up to 100k cycles | Up to 10k cycles |

¹ Endless rotation available: ST-10; ² Others check availability

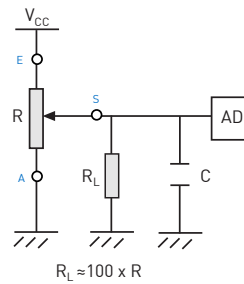
ENVIRONMENTAL TESTING

| | Test method (CEI 393-1) | PT-10 ΔR(%) - Piher typical test results | PTC-10 ΔR(%) - Piher typical test results |
|-------------------------|--|---|--|
| Electrical life | 1.000h at 50°C; 0.15W 1.000h at 70°C; 0.33W | ±5% n/a | n/a ±2% |
| Mechanical life | 1000 cycles at 10 to 15 cpm | ±3 % (Rn < 1M) | ±2% |
| Temperature coefficient | -25°C; +70°C -40°C; +90°C | ±300 ppm/°C (Rn < 100K) n/a | n/a ±100 ppm/°C |
| Thermal cycling | 16h at 85°C and 2h at -25°C 16h at 90°C and 2h at -40°C | ±2.5% n/a | n/a ±2% |
| Damp heat | 500h at 40°C and 95% relative humidity (RH) | ±5% | ±2% |
| Vibration | 2h each plane at 10Hz - 55Hz | ±2% | ±2% |
| Storage | 6 month at 23°C ±2°C and 50% RH | ±2.5% | ±2% |

Out of range values may not comply with these results. Standard test conditions: temperature: 23°C ±2°C and 45% to 70% RH

RECOMMENDED CONNECTIONS

Recommended connection circuit for a position sensor or control application (voltage divider circuit electronic design).



POWER RATING CURVE



PT-10 / PTC-10

10-mm carbon / cermet through-hole potentiometer

HOW TO ORDER

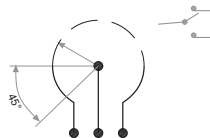
Carbon potentiometer (Example: PT10LH01-101A2020-S)

| | | | | | | | | | | | | | | |
|--|--|---|-----------------------------------|---|---------------------------------------|-----------------------|---|--|--|--------------------------------------|---|---|-----------------------|---|
| PT10 | - | - | - | - | - | - | - | - | - | - | - | - | - | S |
| Series | Rotors¹ | Mounting method² | Ω-Value³ | Taper | Tolerance⁴ | Life | Cut track | Detents | Shaft/Knob | Shaft/Rotor color⁷ | Torque | Flammability⁶ | Wiper position | |
| B G K L M R W inserted shaft X inserted shaft Y inserted knob Z inserted knob | H01 horizontal adjust H04 H05 H07 H02 crimped terminals H10 V05 vertical adjust V10 V11 crimped terminals V13 | 101 = 100Ω 201 = 200Ω ... 504 = 500KΩ 505 = 5MΩ 000 = CM | A = lin. B = log. C = alog. | 0505 = ±5% 0707 = ±7% 1010 = ±10% 2020 = ±20% 3030 = ±30% XXYY = ±XX-YY% | [empty] = 1K cycles E = 10K cycles | [empty] PCI PCF | [empty] PAI PAM PAF P11 P1F P02 ... P16 | [empty] = none 1 = Fig.1 2 = Fig.2 ... 18 = Fig.18 | [empty] AM = yellow AZ = blue BL = white CR = cream GR = grey MA = brown NA = orange NE = black RO = red VE = green VI = violet | [empty] = standard L = ≤ 1 Ncm | [empty] = standard I = non-flammable | [empty] = initial PM = 50% PF = final | | |

Cermet potentiometer (Example: PTC10LH01-101A2020)

| | | | | | | | | | | | | | | |
|--|---|---|-----------------------------------|---|---------------------------------------|---|---------------------------------|--|--|---|-----------------------------------|---------------|---|---|
| PTC10 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Series | Rotors¹ | Mounting method² | Ω-Value³ | Taper | Tolerance⁴ | Life | Detents | Packaging⁵ | Shaft/Knob | Shaft/Rotor color⁷ | Wiper position | Torque | | |
| B G K L M R W inserted shaft X inserted shaft Y inserted knob Z inserted knob | H01 horizontal adjust H04 H05 H02 crimped terminals H10 V05 vertical adjust V10 V11 crimped terminals V13 | 101 = 100Ω 201 = 200Ω ... 504 = 500KΩ 505 = 5MΩ 000 = CM | A = lin. B = log. C = alog. | 0505 = ±5% 0707 = ±7% 1010 = ±10% 2020 = ±20% 3030 = ±30% XXYY = ±XX-YY% | [empty] = 1K cycles E = 10K cycles | [empty] PAI PAM PAF P11 P1F P02 ... P16 | [empty] = bulk T = magazines | [empty] = none 1 = Fig.1 2 = Fig.2 ... 18 = Fig.18 | [empty] AM = yellow AZ = blue BL = white CR = cream GR = grey MA = brown NA = orange NE = black RO = red VE = green VI = violet | [empty] = initial PM = 50% PF = final | [empty] = standard L = ≤ 1 Ncm | | | |

1. Rotors: "Z" adjustment only available on "H"-mounting versions. Rotor "G" only available in purple (shaft/rotor color "VI")
2. Mounting method: "V05", "H07" terminals material: brass.
3. Ω- Value: \overline{XXX} - First two digits of Ω-value 000 = CM = switch SPDT version
 \overline{XXX} - Number of zeros



4. Tolerance: for custom tolerance please check availability: info@piher.net
5. Packaging: available options depend on mounting method, see "available packaging option" below. Embossed tape packaging on request.
6. Non-flammable according to UL 94V-0: housing, rotor and shaft. PTC-10 made of non-flammable material by standard.
7. Without knob or shaft: only the rotor. With knob or shaft: only the knob/shaft.

ORDER CODE EXAMPLES

PT10LH01-103A2020-S

10mm carbon potentiometer with rotor "L" (arrow shape), H01 mounting method (horizontal adjustment), 10K value, linear taper and 20% resistive tolerance.

PTC10WV05-104A1010-9-NE

10mm cermet potentiometer with rotor "W" (pre-inserted shaft), V05 mounting method (vertical adjustment), 100K resistive value, linear taper, 10% resistive tolerance and black shaft.

PT-10 / PTC-10

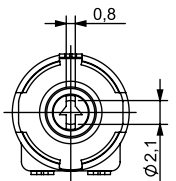
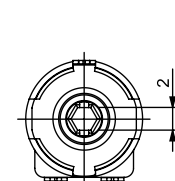
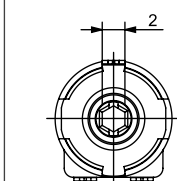
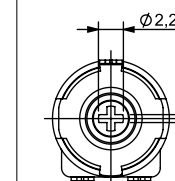
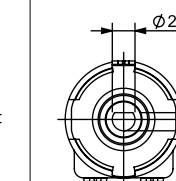
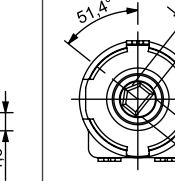
10-mm carbon / cermet through-hole potentiometer

STANDARD CONFIGURATION

| | PT-10 | PTC-10 |
|-------------------|----------------|--------|
| Life | 1.000 cycles | |
| Cut track | no | n/a |
| Detents | none | |
| Packaging | bulk | |
| Shaft/thumb wheel | none | |
| Non-flammability | no | yes |
| Housing color | black | cream |
| Rotor color | white | cream |
| Wiper Position | initial | |
| Torque | 0.4 to 2 Ncm | |
| Linearity | not controlled | |

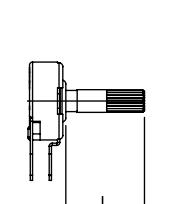
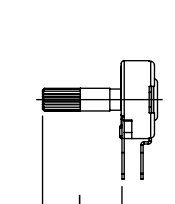
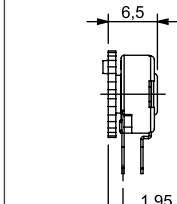
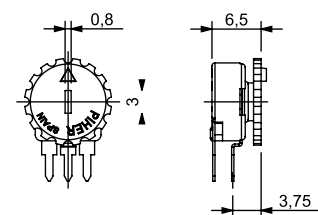
ROTORS

Without shaft or knob

| L Screwdriver | M Hexagonal | G Hexagonal | K Cross slot | R | B |
|---|---|---|---|--|---|
|  |  |  |  |  |  |

With inserted shaft

With inserted knob / thumbwheel

| X Adjustable from collector side | W Adjustable from terminal side | Y Adjustable from terminal side Default knob is Fig. 5 - Ref. 5034 | Z Adjustable from collector side Default knob is Fig. 5 - Ref. 5034 |
|---|---|---|--|
|  |  |  |  |

Default delivery is at initial position. Wipers are shown positioned at 50% for the picture.



Download the STEP file here:
www.pihher.net

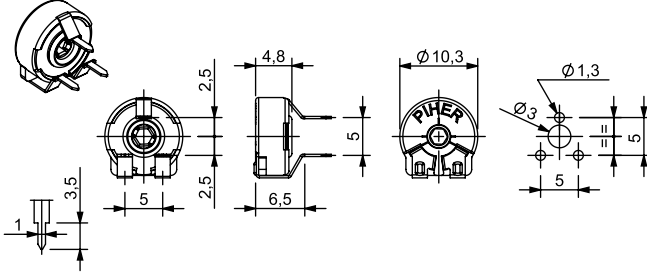
PT-10 / PTC-10

10-mm carbon / cermet through-hole potentiometer

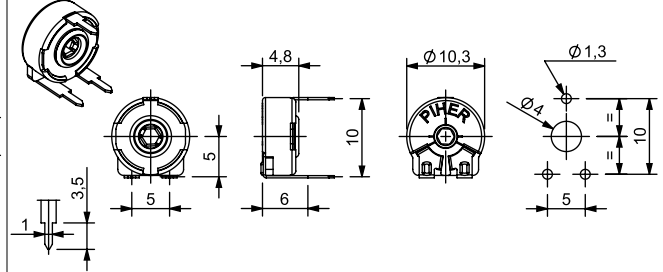
MOUNTING METHOD

Vertical adjust / Horizontal mounting - straight terminals

V05 - 5mm

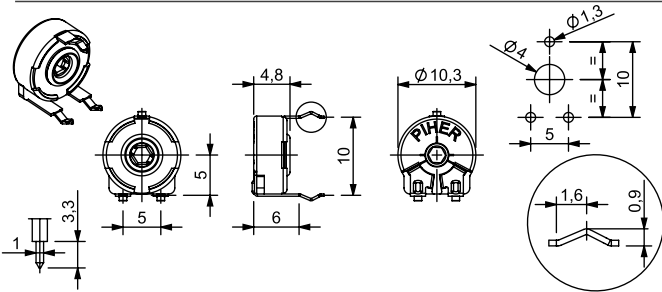


V10 - 10mm



Vertical adjust / Horizontal mounting - crimped terminals

V11 - 10mm

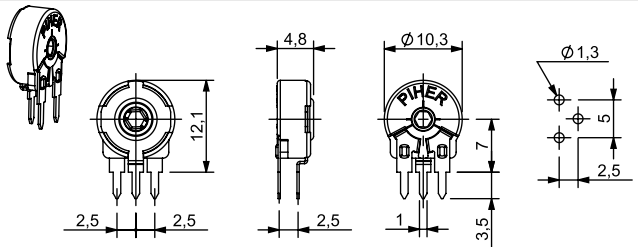


V13 - 10mm

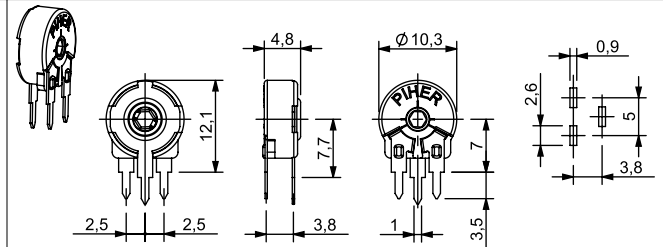


Horizontal adjust / Vertical mounting - straight terminals

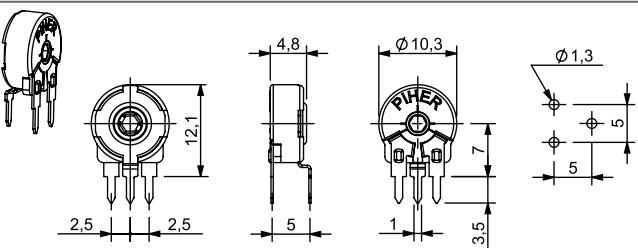
H01 - 2.5mm



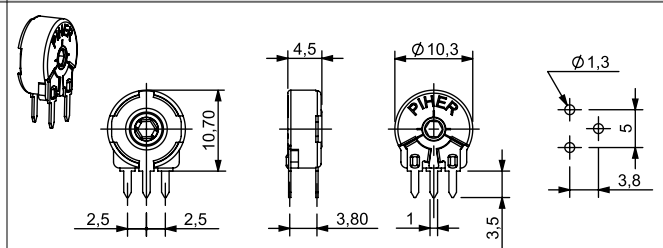
H04 - 3.8mm



H05 - 5mm

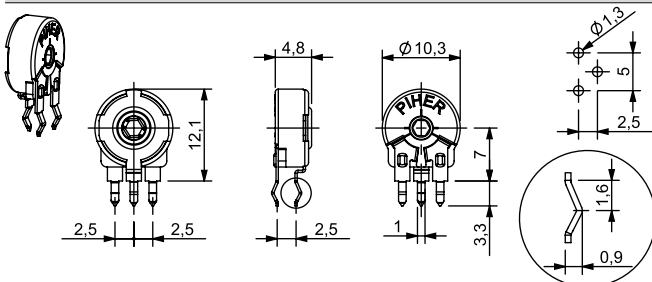


H07 - 3.8mm (only PT-10)



Horizontal adjust / Vertical mounting - crimped terminals

H02 - 2.5mm



H10 - 5mm



PT-10 / PTC-10

10-mm carbon / cermet through-hole potentiometer

STANDARD RESISTANCE-VALUES AND TOLERANCES

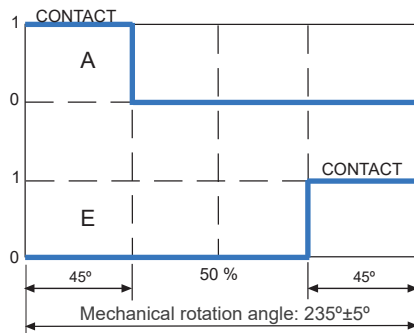
| Resistance Ω | 100 | 200 | 220 | 250 | 470 | 500 | 1K | 2K | 2.2K | 2.5K | 4.7K | 5K | 10K | 20K | 22K | 25K | 47K | 50K | 100K | 200K | 220K | 250K | 470K | 500K | 1M | 2M | 2.5M | 4.7M | 5M |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|-----|-----|------|------|-----|
| Order Code | 101 | 201 | 221 | 251 | 471 | 501 | 102 | 202 | 222 | 252 | 472 | 502 | 103 | 203 | 223 | 253 | 473 | 503 | 104 | 204 | 224 | 254 | 474 | 504 | 105 | 205 | 255 | 475 | 505 |
| Tolerance | 20% | | | | | | | | | | | | | | | | | | | | | | | | 30% | | | | |

SWITCH VERSIONS AVAILABLE WITH OR WITHOUT DETENTS

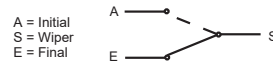
A80 Switch code

Switch standard specification

A80 Switch code



Power rating: 24V / 15mA
 ON position resistance: $\leq 5\Omega$
 Insulation resistance: $\geq 30M\Omega$

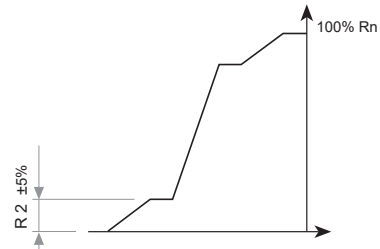
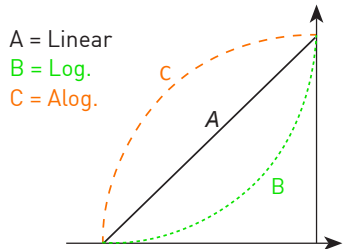


Contact Piher Sensing Systems for ordering information.

TAPERS

Standard

Example: special custom taper



For more information on custom tapers contact Piher Sensing Systems.

CUT TRACKS (OPEN CIRCUIT DESIGN)

PCI

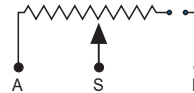
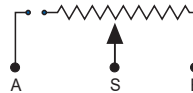
PCF

CCW on-off (A)

Cut track at the beginning of travel.

Cut track at the end of travel.

CW on-off (E)



Other configurations available upon request. Cut Track not available for PTC-10.

PT-10 / PTC-10

10-mm carbon / cermet through-hole potentiometer

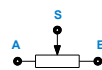
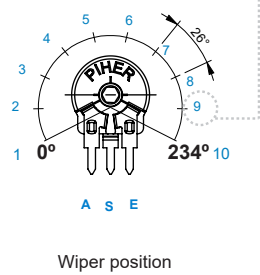
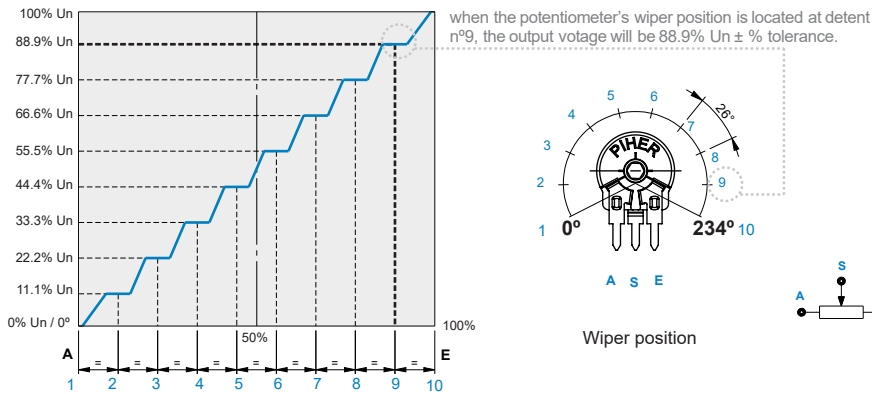
DETENTS

| PAM | P1i | P1F | P02 | P03 | P04 | P05 | P06 |
|--------------------------------------|-----|--------------------------|-----|-----|-----|------------------------------------|-----|
| | | | | | | | |
| P07 | P08 | P09 | P10 | P11 | P12 | P13 | P16 |
| | | | | | | | |
| PAI | | PID | | PFD | | PAF | |
| <p>(wiper positioned at initial)</p> | | <p>A = 26° B = 27.5°</p> | | | | <p>(wiper positioned at final)</p> | |

— Relative detent positions along total mechanical travel

Standard mechanical life is 500 cycles.
 Long life versions are available upon request and have the following characteristics at T^a: Potentiometers with 1 to 3 detents up to 10K cycles; Potentiometers with 4 and more detents up to 5K cycles.
 Please consult Piher Sensing Systems if unique non-overlapping values at each detent position or LOG/ALOG tapers are required.
 Different output voltage values can be matched at each detent position (see next section).
 Detent torque can vary from 1.2 to 2.5 times the standard potentiometer torque.
 For more than 16 detents versions please contact Piher Sensing Systems.

STEPPED OUTPUTS / CONSTANT VALUE ZONES



IMPROVED REPEATABILITY

Constant value zones can be combined with strategically located mechanical detents to provide exact alignment between the electrical output (flat areas) and the mechanical detent position. This provides clear mechanical positions that are not only repeatable, but perfectly aligned electrical outputs at each of the (detent) angles. The detents also prevent output values from changing due to vibration or accidental rotor movements. The result is a higher level of precision in controlling lighting, temperature, motor or other electronic control systems.

Contact Piher Sensing Systems for ordering information.

PT-10 / PTC-10

10-mm carbon / cermet through-hole potentiometer

PACKAGING

Bulk

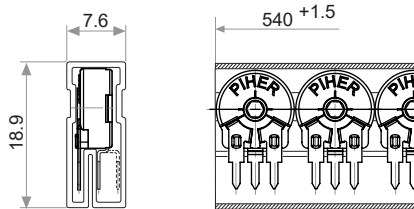


Dimensions (mm): 185x85x80

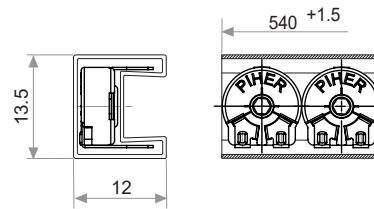
Without shaft: 1000 units per box
 With Thumbweel: 800 units per box
 With shaft: 400 units per box

Magazine for automatic insertion (50 units)

Horizontal adjust



Vertical adjust



AVAILABLE PACKAGING OPTIONS

| Mounting Type | Terminal Style | Mounting Method | Bulk | Magazine |
|-------------------|----------------|-----------------|------|----------|
| Horizontal adjust | Straight | H01 | x | x |
| | | H04 | x | x |
| | | H05 | x | x |
| | | H07 | x | x |
| | Crimped | H02 | x | x |
| | | H10 | x | |
| Vertical adjust | Straight | V05 | x | |
| | | V10 | x | x |
| | Crimped | V11 | x | x |
| | | V13 | x | |

Rotor Type X, W, Y, Z only in bulk packaging. Embossed tape packaging on request.

PT-10 / PTC-10

10-mm carbon / cermet through-hole potentiometer

| SHAFTS, KNOBS AND THUMBWHEELS (TOP VIEW, FOR G AND M ROTOR TYPES) | | | | | |
|---|-------------------------|-------------------------|-------------------------|---|-------------------------|
| Fig. 1 - Ref. 5016 | Fig. 2 - Ref. 5053 | Fig. 3 - Ref. 5012 | Fig. 4 - Ref. 6053 | Fig. 5 - Ref. 5034 | Fig. 6 - Ref. 5035 |
| Fig. 7 - Ref. 5115 | Fig. 8 - Ref.: 5116 | Fig. 9 - Ref 5119 | Fig. 10 - Ref. 5120 | Fig. 12 - Ref. 6052 | Fig. 14 - Ref. 5055 |
| Fig. 15 - Ref. 6008 | Fig. 16 - Ref. 5039 | Fig. 17 - Ref. 5062 | | Upon request: Numbered thumbwheel | |
| Fig. 18 - Ref: 6064 2-gang plastic knob/shaft | | | | Shaft and knobs are delivered unassembled if not specified otherwise in part number code (W, X, Y, Z). The position of assembled knobs Fig 5, 15, 16 can be indicated in part number code: Initial (default), 50% (PM) or Final (PF), others will be delivered at random position by default. Custom specific positions are available for all shafts and knobs on request. Non flammable plastic available, if potentiometer is orderer with non-flammable plastic (UL-94V0), the shaft or knob will be delivered with non-flammable plastic. If you wish to use your own plastic shaft/knob/actuator please contact Piher for advice about compatible materials. | |