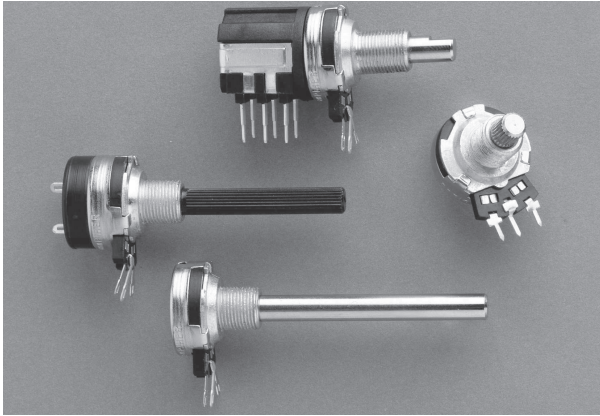




EN: This Datasheet/Document is presented by the manufacturer.

Please visit our website for pricing and availability at www.hestore.hu.



MECHANICAL SPECIFICATIONS

- Mechanical rotation angle: $310^\circ \pm 5^\circ$
- Electrical rotation angle: $290^\circ \pm 20^\circ$
- Torque: 0.5 to 1.5 Ncm.
(0.7 to 2.1 in-oz)
- Stop torque: > 80 Ncm. (> 112 in-oz)

FEATURES

- Carbon resistive element.
- High mechanical endurance.
- Upon request:
 - Detents
 - Stereo matching
 - Switch
 - Nut & washer

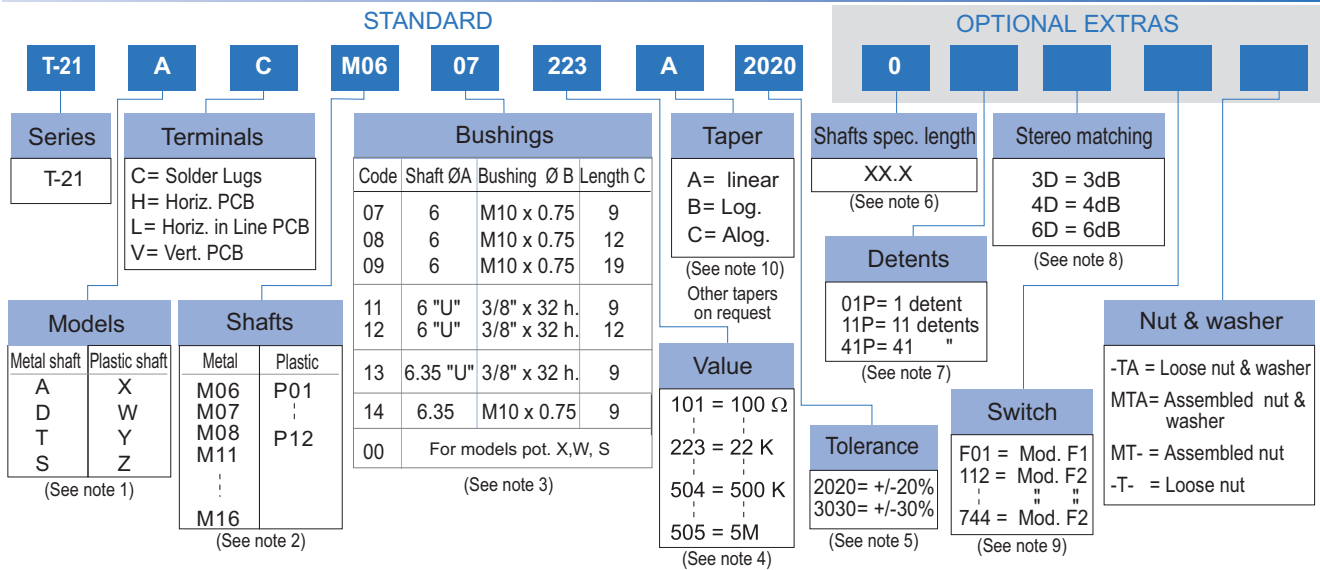
ELECTRICAL SPECIFICATIONS

- Range of values (*)
 $100\Omega \leq R_n \leq 5\text{ M}$ (Decad. 1.0 - 2.0 - 2.2 - 2.5 - 4.7 - 5.0)
- Tolerance (*): $100\Omega \leq R_n \leq 1\text{M}$ $\pm 20\%$
 $1\text{M}\Omega < R_n \leq 5\text{M}$ $\pm 30\%$
- Max. Voltage: 250 VDC (lin) 150 VDC (no lin)
- Nominal Power 50°C (122°F) (see power rating curve)
0.25 W (lin) 0.12 W (no lin)
- Taper (*) (Log. & Alog. only $R_n > 1\text{K}$) Lin ; Log; Alog.
- Residual resistance(*): $\leq 0.5\% R_n$ (5 Ω min)
- Equivalent Noise Resistance: $\leq 3\% R_n$ (3 Ω min.)
- Operating temperature**: $-25^\circ\text{C} + 70^\circ\text{C}$ ($-13^\circ\text{F} + 158^\circ\text{F}$)

* Others upon request

** Up to 85°C depending on application

HOW TO ORDER



NOTES:

- MODELS : Models D y T are not available with "V" terminals.
- SHAFTS: The codes indicate diameter and length. M08: Code for the double potentiometer.
- BUSHINGS ; The codes types 11, 12 and 13 have an antirotation lug (at 90°CW). Plastic shaft and double model are only available with Ø6 bushing.
- VALUE:
 - Code: $\frac{10}{1} = 100\Omega$
 - Number of zeros
 - 2 first digits of the value.
 - In models "D" and "T" with different values, order under special drawing number.
- Tolerance (special), upon request. Example: $\frac{07}{05}$ negative tolerance positive tolerance
- Shafts special length:
 - Only for special length and plain shafts (not knurled). Example: Shaft Ø6 L= 24.5
 - Flatted and slotted shafts, etc. will need drawing.
 - Shaft M08 (T-21D) with other length, order under special drawing number.
 - Recommendation : Shaft L > 60 bushing C = 19
- DETENTS : - Not available in models with plastic shaft X, W, Y, Z.
- Detents and switch are not compatible.
- Stereo matching: Only available in tandem models and upon request.
- SWITCHES : Two types of switches are offered: F1 and F2.
 - F1 = The code is "F01"
 - Plastic shafts are only available if they are code P10, P11 or P12
 - F2 = (Only with metal shaft) Indicate the corresponding I-21 switch code.
- Switch option not available with antilog taper.

NOTE: The information contained here should be used for reference purposes only.

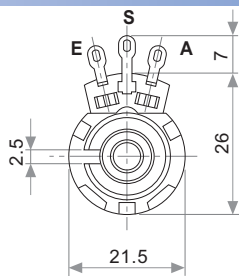
HOW TO ORDER CUSTOM DRAWING

STANDARD OPTIONS

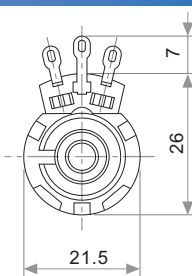
This way of ordering should be used for options which are not included in the "How to order" standard and optional extras.

Shaft length	0 standard
Detents	Without
Stereo matching	Only for model "T" and upon request
Switch	No switch
Nut & washer	Without nut and washer

MODELS WITH METALIC SHAFTS



Technical drawing of the T-21 T terminal block. The drawing shows a side view and a top view. The side view includes dimensions: a total length of 60 ± 0.5 mm, a mounting tab width of 9 mm, a base width of 20 mm, a hole diameter of $\varnothing 6$ mm, and a screw thread of M 10 x 0.75. The top view shows a circular base with a diameter of 21.5 mm, a mounting height of 26 mm, and a screw height of 7 mm.



A = Initial
S = Wiper
E = Final

T-21 D

M 10 x 0.75

Ø6

Ø4

9

50 $\pm$ 0.5

10

20

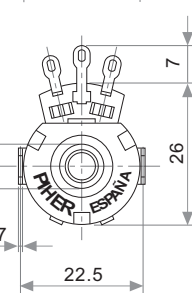
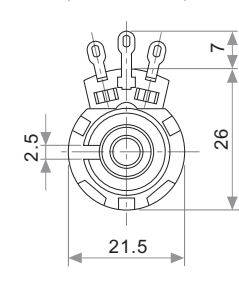
60 $\pm$ 0.5

2.5

21.5

7

26



MODELS WITH PLASTIC SHAFTS

Technical drawing of the T-21 X valve, showing side and front views with dimensions.

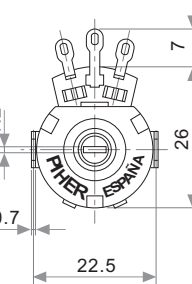
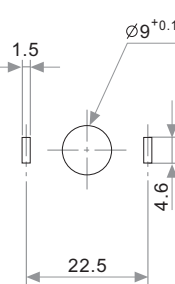
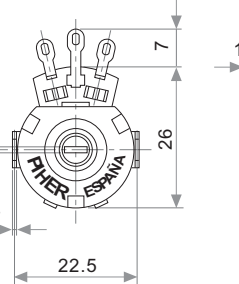
Side View Dimensions:

- Threaded section diameter: $\varnothing 6_{-0.1}$
- Section length: K
- Section length: $L \pm 0.5$
- Section length: 9
- Section length: 5
- Section length: 4
- Section length: $\varnothing 7$
- Section length: 1

Front View Dimensions:

- Overall width: 22.5
- Overall height: 26
- Height from base to top of handle: 7
- Height from base to top of handle (alternative): 1.2
- Height from base to top of handle (alternative): 0.7

The front view also shows the text "FITER ESPANA" on the valve body.



T-21 Y

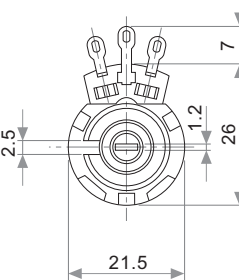
Technical drawing of the T-21 Y connector, showing side and front views with dimensions.

Side View Dimensions:

- Thread: M 10 x 0.75
- Flange thickness: 6 (with ± 0.1 tolerance)
- Flange diameter: $\varnothing 6$
- Distance from flange to mounting hole center: K
- Distance from mounting hole center to connector body: 9
- Distance from mounting hole center to connector body (with ± 0.5 tolerance): L
- Connector body length: 10

Front View Dimensions:

- Distance between mounting holes: 2.5
- Distance from mounting hole center to connector body: 1.2
- Connector body diameter: 26
- Distance from mounting hole center to connector body (with ± 0.5 tolerance): 21.5



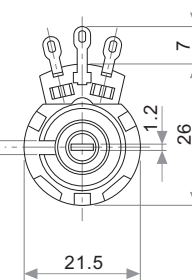
Technical drawing of the T-21 Z valve, showing side and top views with dimensions.

Side View Dimensions:

- Thread: $M 10 \times 0.75$
- Flange thickness: 9
- Body length: 10
- Valve stem length: $L \pm 0.5$
- Valve stem diameter: $\varnothing 6 \pm 0.1$
- Valve stem length from flange: K

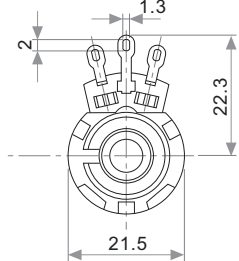
Top View Dimensions:

- Valve body diameter: 21.5
- Valve body thickness: 2.5
- Valve body diameter at mounting holes: 1.2
- Valve body diameter at mounting holes (outer): 26
- Valve body diameter at mounting holes (inner): 7



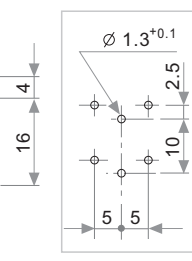
TERMINALS

Technical drawing of the T-21 C valve. The side view on the left shows a valve with a handle and a body. Dimensions include a 10 mm height for the handle assembly and a 20 mm width for the main body. The top view on the right shows a circular valve with three ports. Dimensions include a 1.3 mm port diameter, a 2 mm port height, a 22.3 mm overall height, and a 21.5 mm overall width.



Technical drawing of the T-21 H connector. The drawing includes three views: a side view, a top view, and a detail view of the contact area. Dimensions are provided in millimeters.

- Side View:** Shows the profile of the connector. Dimensions include a total width of 10 mm, a mounting tab width of 2.5 mm, and a central contact width of 2.5 mm.
- Top View:** Shows the circular base of the connector. Dimensions include a central contact diameter of $1^{+0.1}$ mm, a contact pitch of 5 mm, a contact width of 5 mm, a contact height of 4 mm, and a total base diameter of 16 mm.
- Detail View:** Shows the contact area with a diameter of $\varnothing 1.3^{+0.1}$ mm. The contact is positioned at a distance of 2.5 mm from the edge of the contact area, and the contact height is 10 mm. The contact area is 5 mm wide and 5 mm high.



T-21 L

Technical drawing of the T-21 L valve. The drawing includes a side view on the left and a top view on the right. Dimensions are provided in millimeters.

Side View Dimensions:

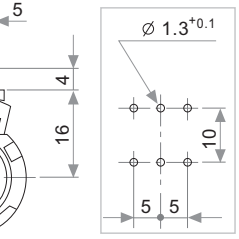
- Overall width: 10
- Flange thickness: 2.5

Top View Dimensions:

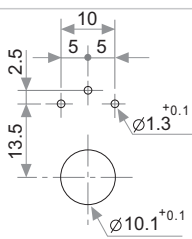
- Distance between mounting holes: 5
- Mounting hole diameter: $\varnothing 1^{+0.1}$
- Distance from center to mounting hole: 5
- Flange thickness: 4
- Overall height: 16

Mounting Pattern:

- Mounting holes are arranged in a 3x3 grid.
- Distance between mounting holes: 5
- Distance from center to mounting hole: 5
- Mounting hole diameter: $\varnothing 1.3^{+0.1}$



Technical drawing of the T-21 V connector showing three views: front, side, and top. The front view shows a circular base with a central pin and two side pins, with dimensions 5 and 5. The side view shows the profile of the connector with dimensions 4, 2.5, and 16. The top view shows the circular base with dimensions 10, 5, 5, 2.5, 13.5, and a hole diameter of $\varnothing 10.1^{+0.1}$.



PLASTIC SHAFTS

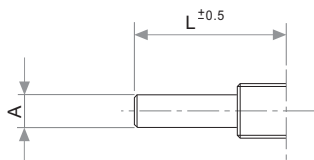
T-21 X/Y without Switch			
Knurling length	T-21 X	T-21 Y	CODE
K = 0	L = 2	/	P01
K = 6	L = 10	/	P02
K = 12	L = 16	L = 15	P03
K = 12	L = 26	L = 25	P04
K = 12	L = 36	L = 35	P05
K = 35	L = 46	L = 45	P06

T-21Y w/Sw F01		
Knurling length	T-21 Y	CODE
K = 5	L = 16	P10
K = 14.6	L = 25	P11
K = 35	L = 46	P12

T-21 W/Z without Switch			
Knurling length	T-21 W	T-21 Z	CODE
K = 12	L = 26	L = 26	P07
K = 12	L = 36	L = 36	P08
K = 12	L = 46	L = 46	P09

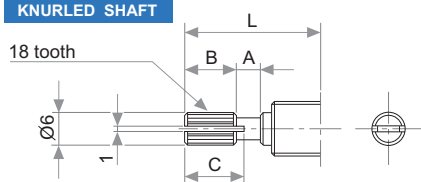
METALIC SHAFTS

PLAIN SHAFT



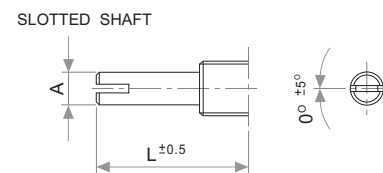
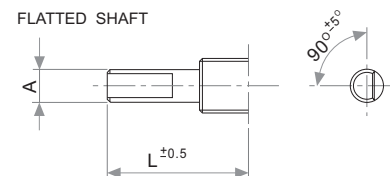
A	L	CODE
4	40	M04
6	60	M06
6.35	60	M07
4/6	50/60	M08

KNURLED SHAFT



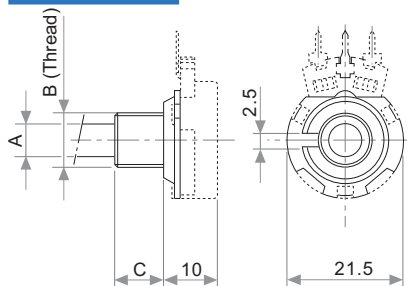
L	A	B	C	CODE
15	2	6	7	M11
20	2	10	11	M12
25	4	12	14	M13
30	4	12	14	M14
35	4	12	14	M15
40	4	12	14	M16

UNDER DRAWING



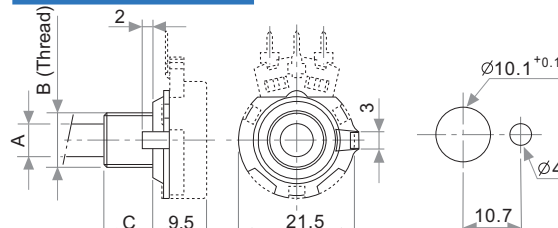
BUSHINGS

STANDARD



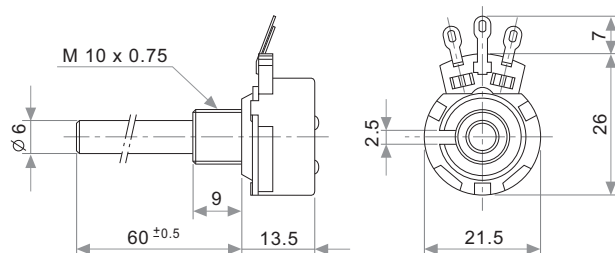
CODE	A	B	C
07	6	M10 x 0.75	9
08	6	M10 x 0.75	12
09	6	M10 x 0.75	19
14	6.35	M10 x 0.75	9

NON ROTARY PAWL

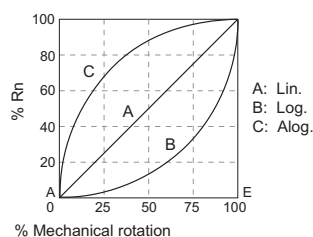


CODE	A	B	C
11	6	3/8" x 32 h.	9
12	6	3/8" x 32 h.	12
13	6.35	3/8" x 32 h.	9

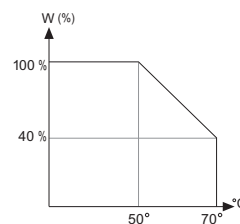
DETENTS



TAPERS



POWER RATING CURVE



TESTS

TYPICAL VARIATIONS

ELECTRICAL LIFE	1.000 h. 50°C; 0.25 W	±5 %
MECHANICAL LIFE* :	25.000 (10-15 CPM)	±3 % (Rn < 1 M)
TEMPERATURE COEFFICIENT	-25°C; +70°C	±300 ppm (Rn < 100 K)
THERMAL CYCLING	16 h. @ 85°C; 2h. @ -25°C	±2.5 %
DAMP HEAT	500 h. 40°C 95% HR	±5 %
VIBRATION (for each plane X,Y,Z)	2 h. @ 10 Hz – 55 Hz.	±2 %

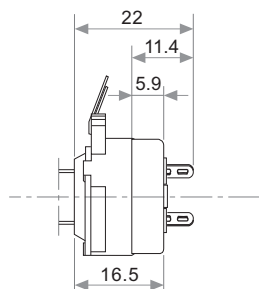
NOTE: Out of range values may not comply these results.

(*) only applicable to values ≥1K. For lower values please consult.

PACKAGING

Boxes of 150 / 200 pieces (160 x 110 x 85 mm.)

SWITCH F1

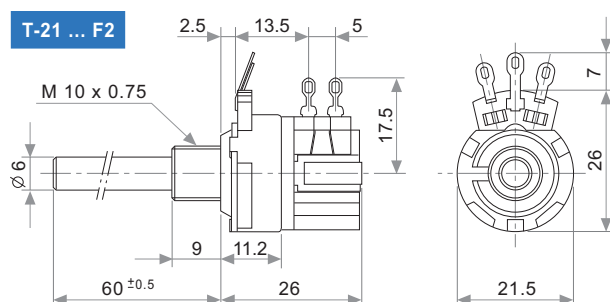


MECHANICAL & ELECTRICAL SPECIFICATIONS	F 1
OPERATING ANGLE	50° ±5°
OPERATING TORQUE	3-7 Ncm (4.2-9.8 in-oz)
MAXIMUM AXIAL CHARGE	80 N; 17 pounds
NOMINAL CURRENT	1A; 250 VAC
CONTACT RESISTANCE	≤ 25mΩ
TEST VOLTAGE (DIELECTRIC STRENGTH)	2000 V (50 Hz)

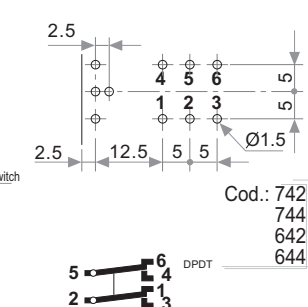
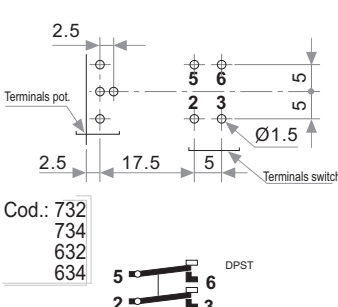
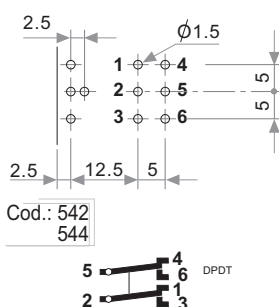
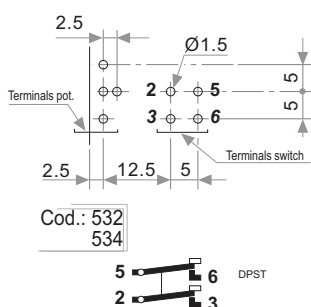
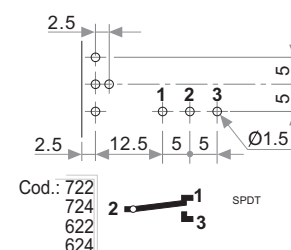
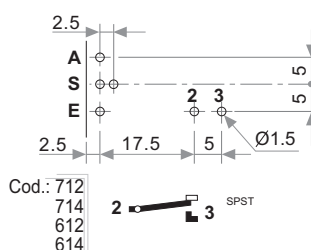
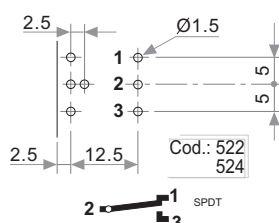
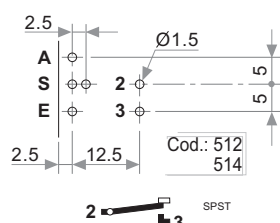
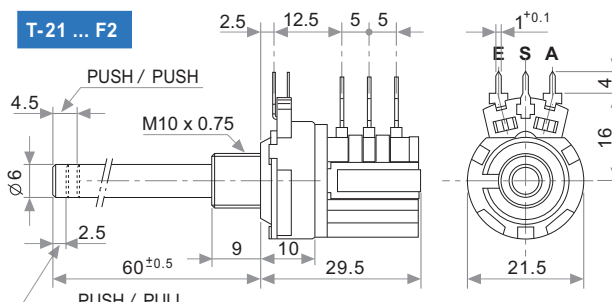
SWITCH F2

ELECTRICAL SPECIFICATIONS	F 2
SWITCH RATING	2 or 4A; 250 VAC
CONTACT RESISTANCE	≤ 25 mΩ
DIELECTRIC STRENGTH	2000 V
INSULATION RESISTANCE	100 MΩ
MECHANICAL SPECIFICATIONS	F 2
OPERATING ANGLE (ROTARY)	35° ± 5°
PUSH / PUSH OPERATING TRAVEL	4 mm.
PUSH / PULL OPERATING TRAVEL	2.5 mm.
OPERATING TORQUE (ROTARY)	2 to 9 Ncm. (2.8 to 12.7 oz/in)
OPERATING FORCE (Push/Push ; Push/Pull)	4 to 7 N (14 to 27 oz)
MECHANICAL LIFE	10.000 cycles
STOP TORQUE	> 100 Ncm. (142 oz/in)

ROTARY



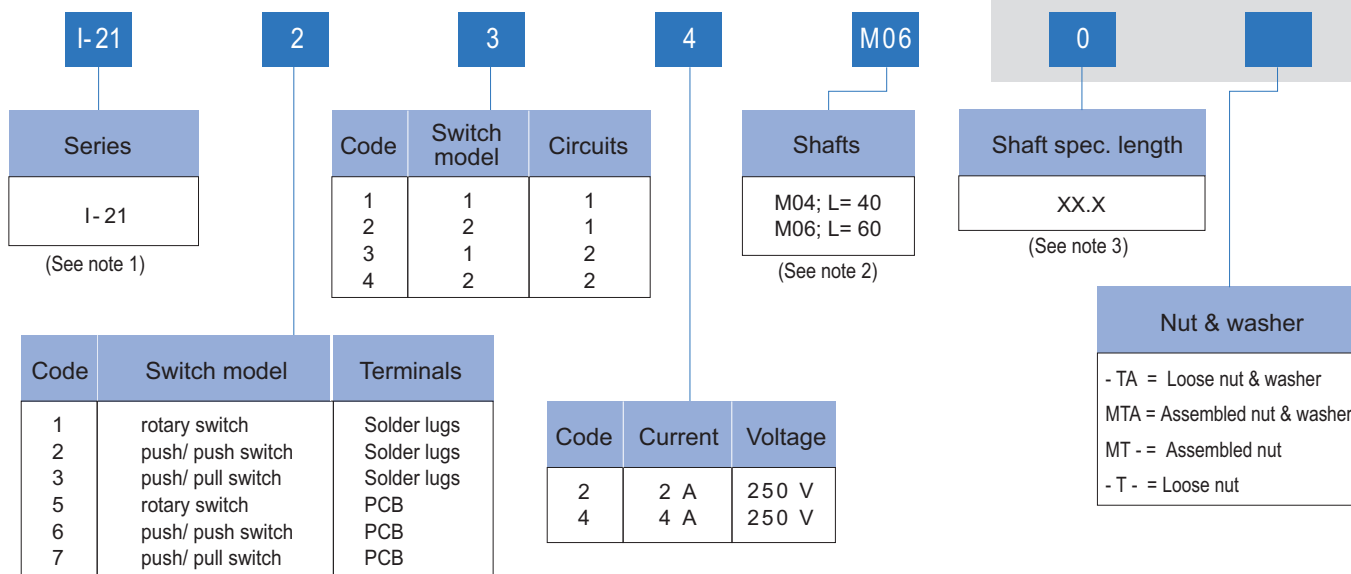
PUSH



I-21 HOW TO ORDER (only switch)

STANDARD

OPTIONAL



NOTES:

- (1) When only the switch is ordered (without potentiometer), it will be called "I -21" followed by the respective code.
- (2) The shaft and bushing for "I -21" is:

COD.	A	B	L
M06	6	M10 x 0.75	60

- (3) Only for special length and plain shaft (not knurled).
Example: E: Ø6 L= 24.5 M06 24.5 → special length
Flatted and slotted shafts, etc. will need drawing.

HOW TO ORDER CUSTOM DRAWING

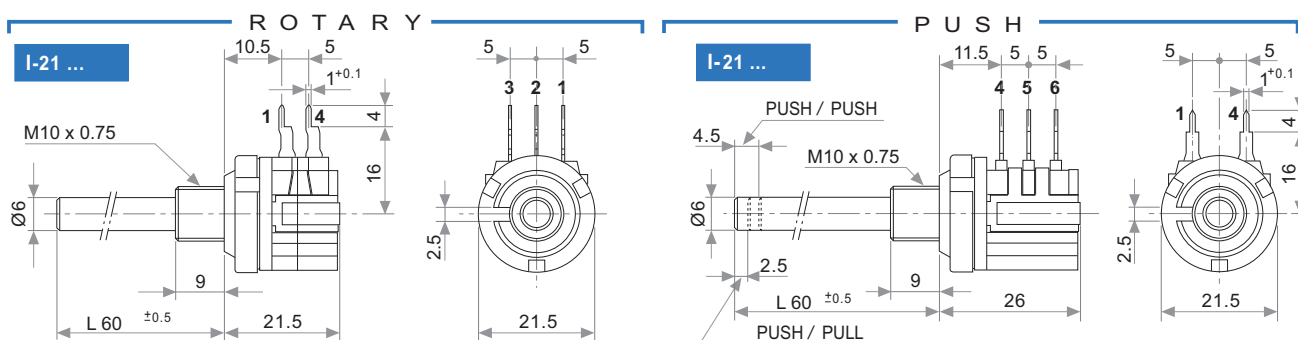
STANDARD OPTIONS

| -21 + DRAWING NUMBER (Max. 16 digits)

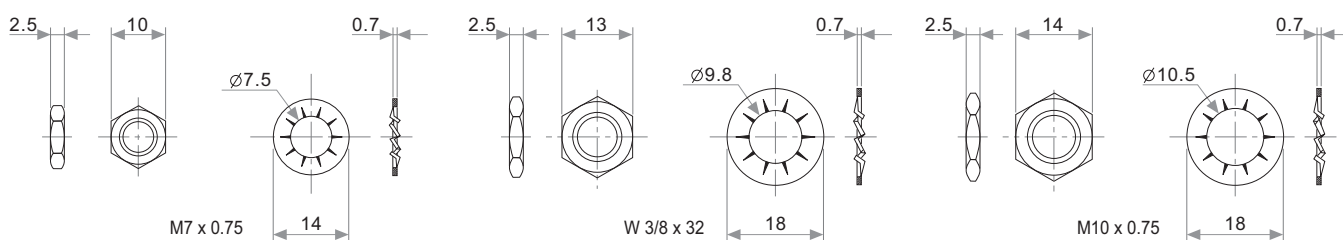
This way of ordering should be used for options which are not included in the "How to order" standard and optional extras.

Shaft length See note 2

Nut & washer Without nut
and washer



NUT & WASHER



PACKAGING

Boxes of 100 pieces (160 x 110 x 85 mm.).

Disclaimer

The product information in this catalogue is for reference purposes. Please consult for the most up to date and accurate design information.

Piher Sensors & Controls S.A., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Piher"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product described herein.

Piher disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Piher's terms and conditions of sale, including but not limited to the warranty expressed therein, which apply to these products.

No licence, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Piher.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Piher products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Piher for any damages arising or resulting from such use or sale. Please contact authorised Piher personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.

Information contained in and/or attached to this catalogue may be subject to export control regulations of the European Community, USA, or other countries. Each recipient of this document is responsible to ensure that usage and/or transfer of any information contained in this document complies with all relevant export control regulations. If you are in any doubt about the export control restrictions that apply to this information, please contact the sender immediately. For any Piher International Corp. Exports, Note: All products / technologies are EAR99 Classified commodities. Exports from the United States are in accordance with the Export Administration Regulations. Diversion contrary to US law is prohibited.



v100714