

### FEATURES

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

### MECHANICAL SPECIFICATIONS

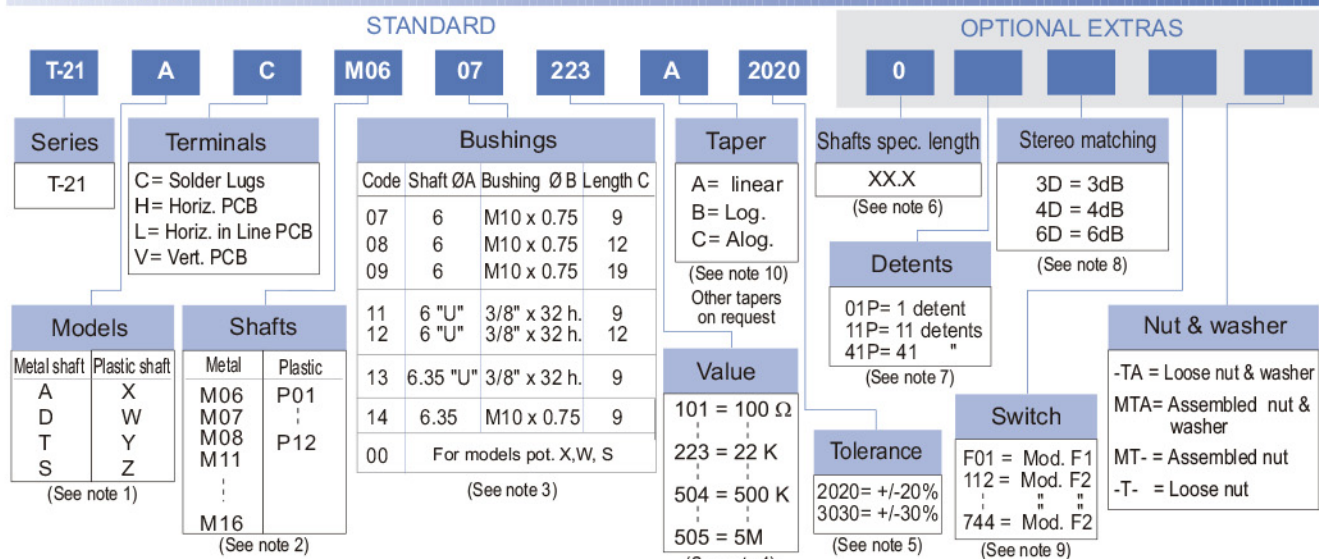
- Mechanical rotation angle: 310° ± 5°
- Electrical rotation angle: 290° ± 20°
- Torque: 0.5 to 1.5 Ncm. (0.7 to 2.1 in-oz)
- Stop torque: > 80 Ncm. (> 112 in-oz)

\* Others upon request.  
 \*\* Up to 85°C depending on application.

### 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\*:  
 $100\Omega \leq R_n \leq 1\text{M}$  ..... ± 20%  
 $1\text{M}\Omega < R_n \leq 5\text{M}$  ..... ± 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\*: ≤ 0.5%  $R_n$  (5Ω min)
- Equivalent Noise Resistance: ≤ 3%  $R_n$  (3Ω min.)
- Operating temperature\*\*: -25°C + 70°C (-13°F + 158°F)

### 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:  $\overbrace{10}^{\text{Number of zeros}} \overbrace{1}^{\text{2 first digits of the value}} = 100\Omega$
  - In models "D" and "T" with different values, order under special drawing number.
- Tolerance (special), upon request. Example: +7% Code: 07 05 -5% (negative tolerance above, positive tolerance below)
- 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 T-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

T-21 A C + DRAWING NUMBER (Max. 16 digits)

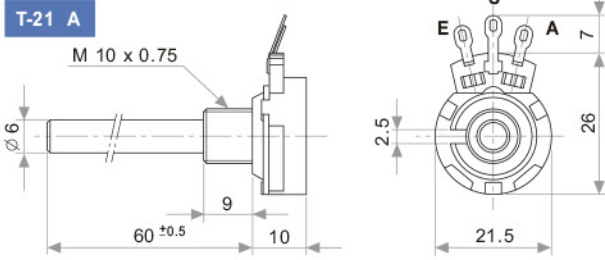
This way of ordering should be used for options which are not included in the "How to order" standard and optional extras.

## STANDARD OPTIONS

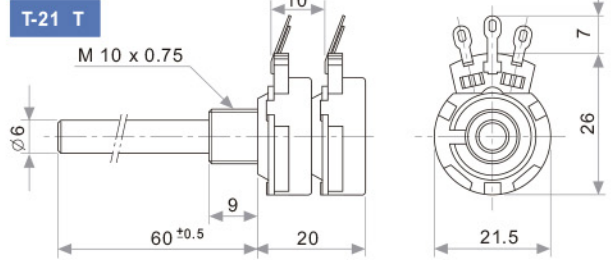
Shaft length .....0 standard  
 Detents .....Without  
 Stereo matching .....Only for model "T" and upon request  
 Switch .....No switch  
 Nut & washer .....Without nut and washer

## MODELS WITH METALIC SHAFTS

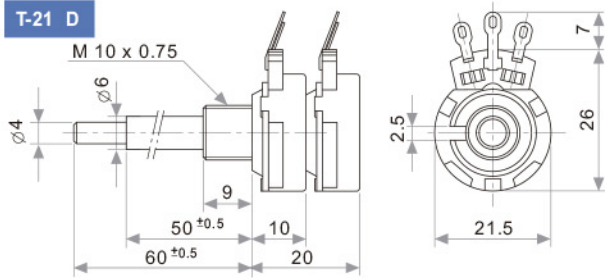
**T-21 A**



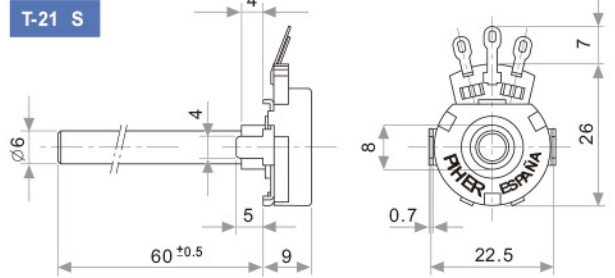
**T-21 T**



**T-21 D**



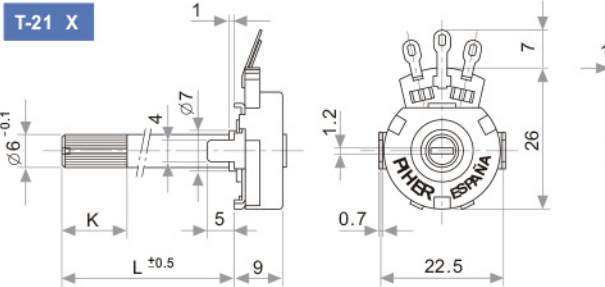
**T-21 S**



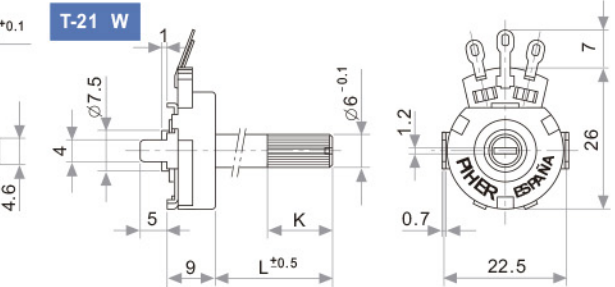
A = Initial  
 S = Wiper  
 E = Final

## MODELS WITH PLASTIC SHAFTS

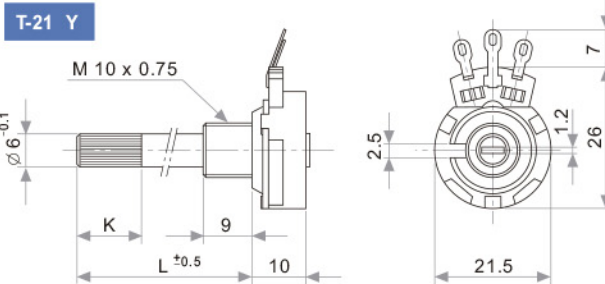
**T-21 X**



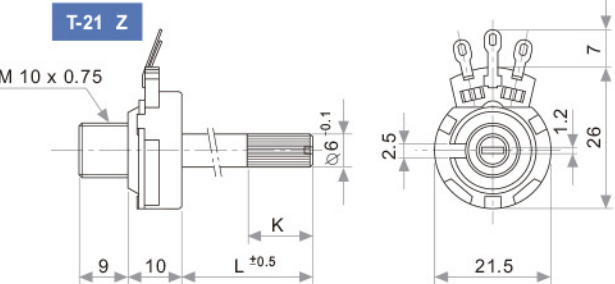
**T-21 W**



**T-21 Y**

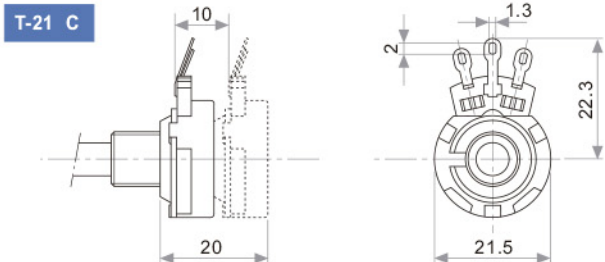


**T-21 Z**

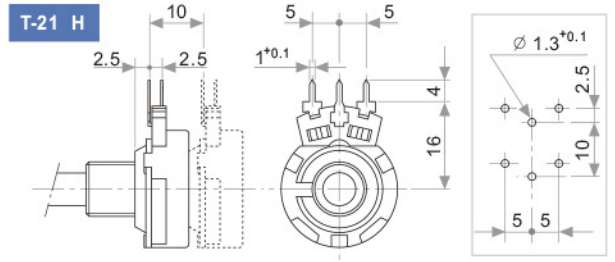


## TERMINALS

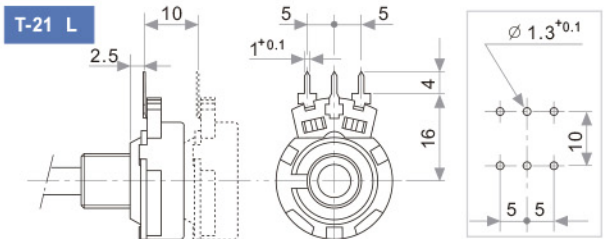
**T-21 C**



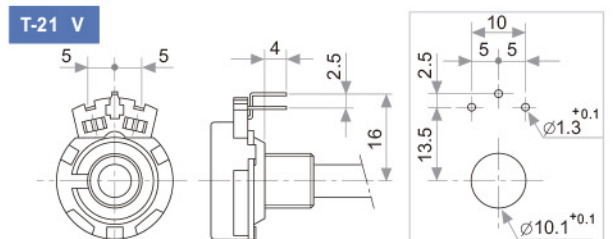
**T-21 H**



**T-21 L**



**T-21 V**



## PLASTIC SHAFTS

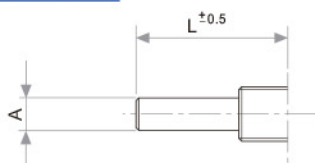
T-21 X/Y without Switch			
Knurling length	T-21 X	T-21 Y	CODE
K = 0	L = 2	/	P01
K = 6	L = 10	/	P02
K = 12	L = 16	L = 15	P03
K = 12	L = 26	L = 25	P04
K = 12	L = 36	L = 35	P05
K = 35	L = 46	L = 45	P06

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

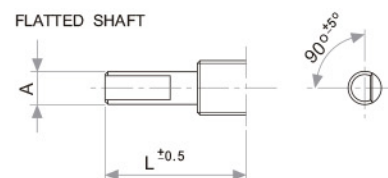
## METALIC SHAFTS

### PLAIN SHAFT

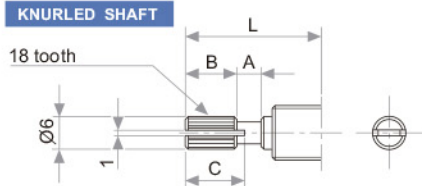


A	L	CODE
4	40	M04
6	60	M06
6.35	60	M07
4/6	50/60	M08

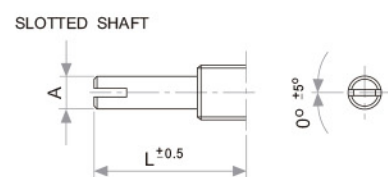
### UNDER DRAWING



### KNURLED SHAFT

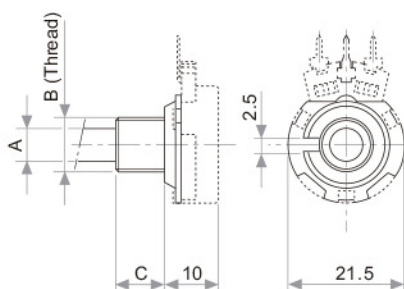


L	A	B	C	CODE
15	2	6	7	M11
20	2	10	11	M12
25	4	12	14	M13
30	4	12	14	M14
35	4	12	14	M15
40	4	12	14	M16



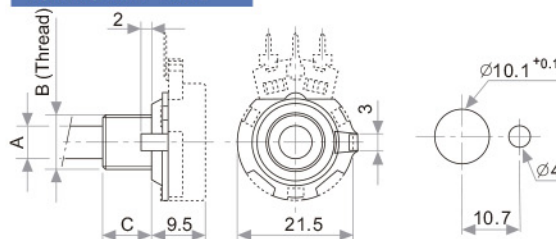
## BUSHINGS

### STANDARD



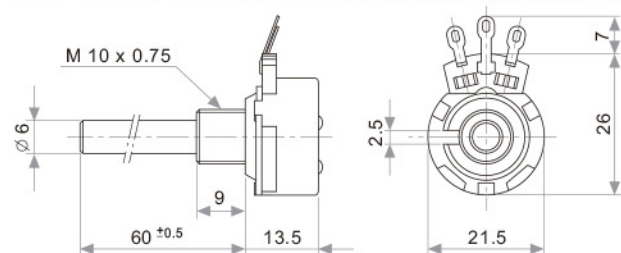
CODE	A	B	C
07	6	M10 x 0.75	9
08	6	M10 x 0.75	12
09	6	M10 x 0.75	19
14	6.35	M10 x 0.75	9

### NON ROTARY PAWL

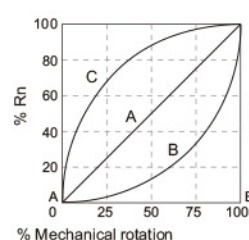


CODE	A	B	C
11	6	3/8" x 32 h.	9
12	6	3/8" x 32 h.	12
13	6.35	3/8" x 32 h.	9

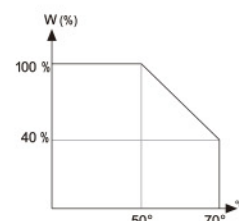
## DETENTS



## TAPERS



## POWER RATING CURVE



## TESTS

TESTS	TYPICAL VARIATIONS
ELECTRICAL LIFE	1.000 h. 50°C; 0.25 W
MECHANICAL LIFE* :	25.000 (10-15 CPM)
TEMPERATURE COEFFICIENT	-25°C; +70°C
THERMAL CYCLING	16 h. @ 85°C; 2h. @ -25°C
DAMP HEAT	500 h. 40°C 95% HR
VIBRATION (for each plane X,Y,Z)	2 h. @ 10 Hz - 55 Hz.

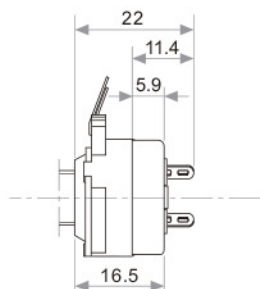
NOTE: Out of range values may not comply these results.

(\*) only applicable to values  $\geq 1K$ . For lower values please consult.

## PACKAGING

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

## SWITCH F1

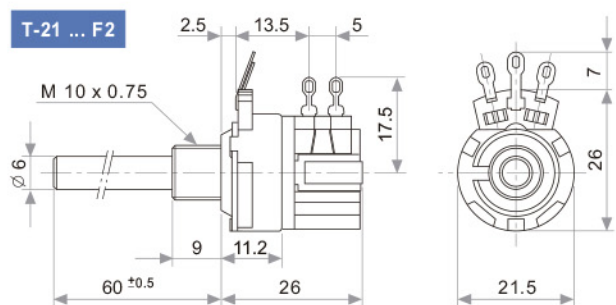


MECHANICAL & ELECTRICAL SPECIFICATIONS	F 1
OPERATING ANGLE	50° ±5°
OPERATING TORQUE	3-7 Ncm (4.2-9.8 in-oz)
MAXIMUM AXIAL CHARGE	80 N; 17 pounds
NOMINAL CURRENT	1A; 250 VAC
CONTACT RESISTANCE	≤ 25mΩ
TEST VOLTAGE (DIELECTRIC STRENGTH)	2000 V (50 Hz)

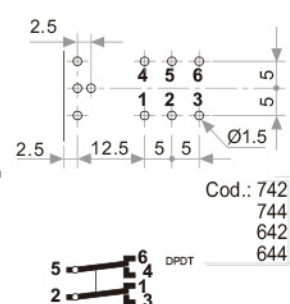
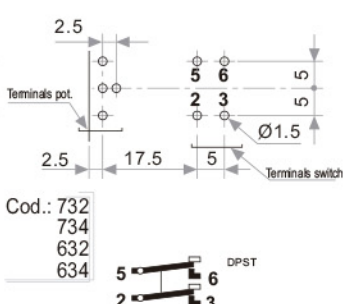
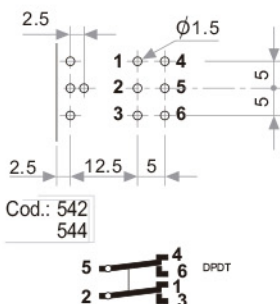
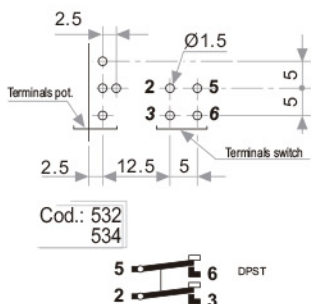
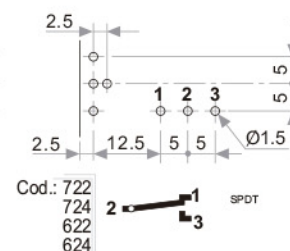
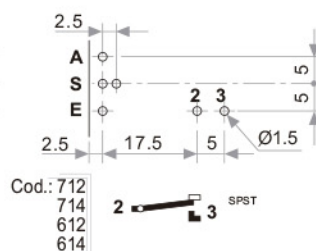
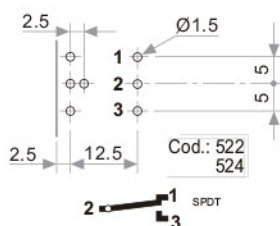
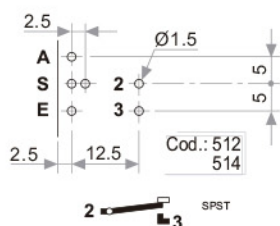
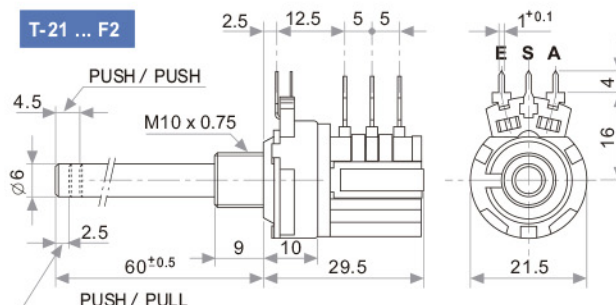
## SWITCH F2

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 27oz)
MECHANICAL LIFE	10.000 cycles
STOP TORQUE	> 100 Ncm. (142 oz/in)

### ROTARY



### PUSH



# I-21 HOW TO ORDER (only switch)

**STANDARD**

**1-21**

Series

I-21
------

(See note 1)

**2**

Code	Switch model	Circuits
1	1	1
2	2	1
3	1	2
4	2	2

**3**

Code	Switch model	Terminals
1	rotary switch	Solder lugs
2	push/ push switch	Solder lugs
3	push/ pull switch	Solder lugs
5	rotary switch	PCB
6	push/ push switch	PCB
7	push/ pull switch	PCB

**4**

Code	Current	Voltage
2	2 A	250 V
4	4 A	250 V

**M06**

Shafts

M04; L= 40
M06; L= 60

(See note 2)

**OPTIONAL**

**0**

Shaft spec. length

XX.X
------

(See note 3)

Nut & washer

- TA = Loose nut & washer
- MTA = Assembled nut & washer
- MT - = Assembled nut
- T - = Loose nut

**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

I-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.

## STANDARD OPTIONS

Shaft length ..... See note 2

Nut & washer ..... Without nut and washer

**ROTARY**

**PUSH**

## NUT & WASHER

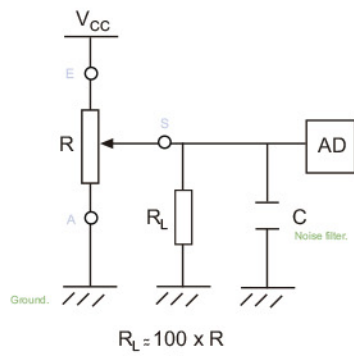
## PACKAGING

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

-84-

PIHER

Piher potentiometer's recommended connection circuit for a position sensor or control application. (voltage divider circuit electronic design).



**Disclaimer**

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