

Kit Potentiometer Rotational Analog Displacement Sensor



FEATURES

- Conductive plastic potentiometer technology, infinite resolution
- Analog or digital output
- Low height
- High flexibility of wires
- Applicable standards: NFC 93255, MIL R39023

QUICK REFERENCE DATA

Sensor type	ROTATIONAL, conductive plastic
Output type	Output by wires
Market appliance	Industrial, avionics
Dimensions	16 mm, 18 mm, 22 mm, 23 mm, 27 mm, 40 mm, 55 mm, 60 mm, 85 mm

ELECTRICAL SPECIFICATIONS FOR KITPR016, KITPR018 (H22), KITPR022 (PR22)

PARAMETER	KITPR016		KITPR018 (H22)								KITPR022 (PR22)	
	60°	88°	95°	200°	287° 30'	340°	340°	340°	340°	350°	130°	340°
Total electrical travel	60°	88°	95°	200°	287° 30'	340°	340°	340°	340°	350°	130°	340°
Useful electrical travel	20°	74°	95°	197°	230°	337°	340°	340°	348°	120°	340°	
Linearity	± 0.5 %	± 0.5 %	± 0.5 %	± 0.5 %	± 0.25 %	± 0.1 %	± 0.25 %	± 0.5 %	± 0.1 %	± 0.25 %	± 1 %	
Operating voltage	± 10 V ± 0.02 V											
Gradient	-	-	-	-	-	-	-	-	-	-	-	-
Total resistance range (R _n)	4.7 kΩ	4.7 kΩ	4.7 kΩ	470 Ω	2 kΩ	4.7 kΩ	2.2 kΩ	10 kΩ	10 kΩ	5 kΩ	4.7 kΩ	
Tolerance on R _n	± 20 %	± 10 %	± 20 %	± 10 %	± 12.5 %	± 10 %	± 12.5 %	± 10 %	± 20 %	± 10 %	± 10 %	
Output smoothness	≤ 0.1 %											
Power rating	0.1 W at 80 °C	0.2 W at 80 °C	-	-	0.75 W at 85 °C	-	0.75 W at 85 °C	-	-	-	-	-
Temperature coefficient	-300 ppm/°C ± 300 ppm/°C											
Wiper current	≤ 1 mA											
Recommended load impedance	≥ 1000 R _n											
Insulation resistance	≥ 1 GΩ at 100 V _{DC}				≥ 10 GΩ at 500 V _{DC}							
Dielectric strength	-		750 V _{RMS} , 50 Hz, 1 min									

ELECTRICAL SPECIFICATIONS FOR KITPR023 (H27), KITPR027 (PR27), KITPR040, KITPR055, KITPR060, KITPR085

PARAMETER	KITPR023 (H27)	KITPR027 (PR27)	KITPR040	KITPR055	KITPR060	KITPR085		
Total electrical travel	120°	124°	330°	345°	100° ± 2°	140°	356°	25°
Useful electrical travel	90°	120°	180°	300°	90°	124°	345°	16°
Linearity	± 0.5 %	± 1 %	± 0.3 %	± 1 %	± 0.1 %	± 0.2 %	± 0.2 %	± 0.08 %
Operating voltage	-	-	-	-	± 10 V ± 0.02 V	-	5 V _{DC} ± 0.1 V _{DC}	± 10 V ± 0.02 V
Gradient	-	-	-	-	0.2 V/° ± 0.2 %	-	-	0.8 V/° ± 0.1 %
Total resistance range (R _n)	2.2 kΩ	5 kΩ	4.7 kΩ	10 kΩ	6.2 kΩ	10 kΩ	2.5 kΩ	
Tolerance on R _n	-	± 10 %	± 10 %	± 10 %	± 10 %	± 10 %	± 20 %	
Output smoothness	≤ 0.1 %			≤ 0.12 %		≤ 0.1 %		
Power rating	1.25 W at 70 °C	1.25 W at 70 °C	0.6 W at 70 °C	-	0.275 W at 85 °C	-		
Temperature coefficient	-300 ppm/°C ± 300 ppm/°C							
Wiper current	≤ 1 mA							
Recommended load impedance	≥ 1000 R _n							
Insulation resistance	≥ 10 GΩ at 500 V _{DC}				≥ 60 MΩ at 200 V _{DC}	≥ 1 GΩ at 500 V _{DC}	≥ 10 GΩ at 500 V _{DC}	
Dielectric strength	750 V _{RMS} , 50 Hz, 1 min	500 V _{RMS} , 50 Hz, 1 min	-	-	500 V _{RMS} , 50 Hz, 1 min	-		



MECHANICAL SPECIFICATIONS FOR KITPR016, KITPR018 (H22), KITPR022 (PR22)						
PARAMETER	KITPR016	KITPR018 (H22)	KITPR022 (PR22)			
			TET = 130°	TET = 340°		
Mechanical travel	-	-	360°			
Backlash	< 3'	-	-			
Repeatability	-	-	-			
Running and starting torque	≤ 2 cN.cm	≤ 3 cN.cm	≤ 10 cN.cm			
Weight	0.7 g ± 0.1 g	4.2 g ± 0.5 g	≤ 10 g	-		

MECHANICAL SPECIFICATIONS FOR KITPR023 (H27), KITPR027 (PR27), KITPR040, KITPR055, KITPR060, KITPR085						
PARAMETER	KITPR023 (H27)	KITPR027 (PR27)	KITPR040	KITPR055	KITPR060	KITPR085
Mechanical travel	-	360°	110° max.	130°	360°	-
Backlash	≤ 0.05°	-	< 0.02°	± 0.03°	-	< 1.2°
Repeatability	-	-	< 0.01°	-	-	-
Running and starting torque	≤ 12 cN.cm	-	≤ 5.65 cN.cm	≤ 0.5 mN.m	-	< 1.2 mN.m
Weight	≤ 15 g	-	12 g ± 1 g	-	< 70 g	75 g ± 5 g

PERFORMANCE FOR KITPR016, KITPR018 (H22), KITPR022 (PR22)			
PARAMETER	KITPR016	KITPR018 (H22)	KITPR022 (PR22)
Operating temperature range	-46 °C to +71 °C	-55 °C to +125 °C	-40 °C to +85 °C
Storage temperature range	-46 °C to +71 °C	-55 °C to +125 °C	-40 °C to +85 °C
Rotation humidity (max.)	55 % ± 20 %	5 % to 95 %	-
Thermal deviation at U/2 over operational temperature range	-	-	-

Note

- Nothing stated herein shall be construed as a guarantee of quality or durability

PERFORMANCE FOR KITPR023 (H27), KITPR027 (PR27), KITPR040, KITPR055, KITPR060, KITPR085							
PARAMETER	KITPR023 (H27)		KITPR027 (PR27)	KITPR040	KITPR055	KITPR060	KITPR085
	TET = 120°	TET = 124°					
Operating temperature range	-55 °C to +90 °C	-54 °C to +71 °C	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +100 °C	-55 °C to +110 °C	-43 °C to +90 °C
Storage temperature range	-55 °C to +125 °C	-64 °C to +90 °C	-40 °C to +85 °C	-46 °C to +71 °C	-40 °C to +100 °C	-65 °C to +120 °C	-55 °C to +90 °C
Rotation humidity (max.)	-		-	5 % to 95 %	-	-	5 % to 95 %
Thermal deviation at U/2 over operational temperature range	-			≤ 0.04 %	-		

Note

- Nothing stated herein shall be construed as a guarantee of quality or durability

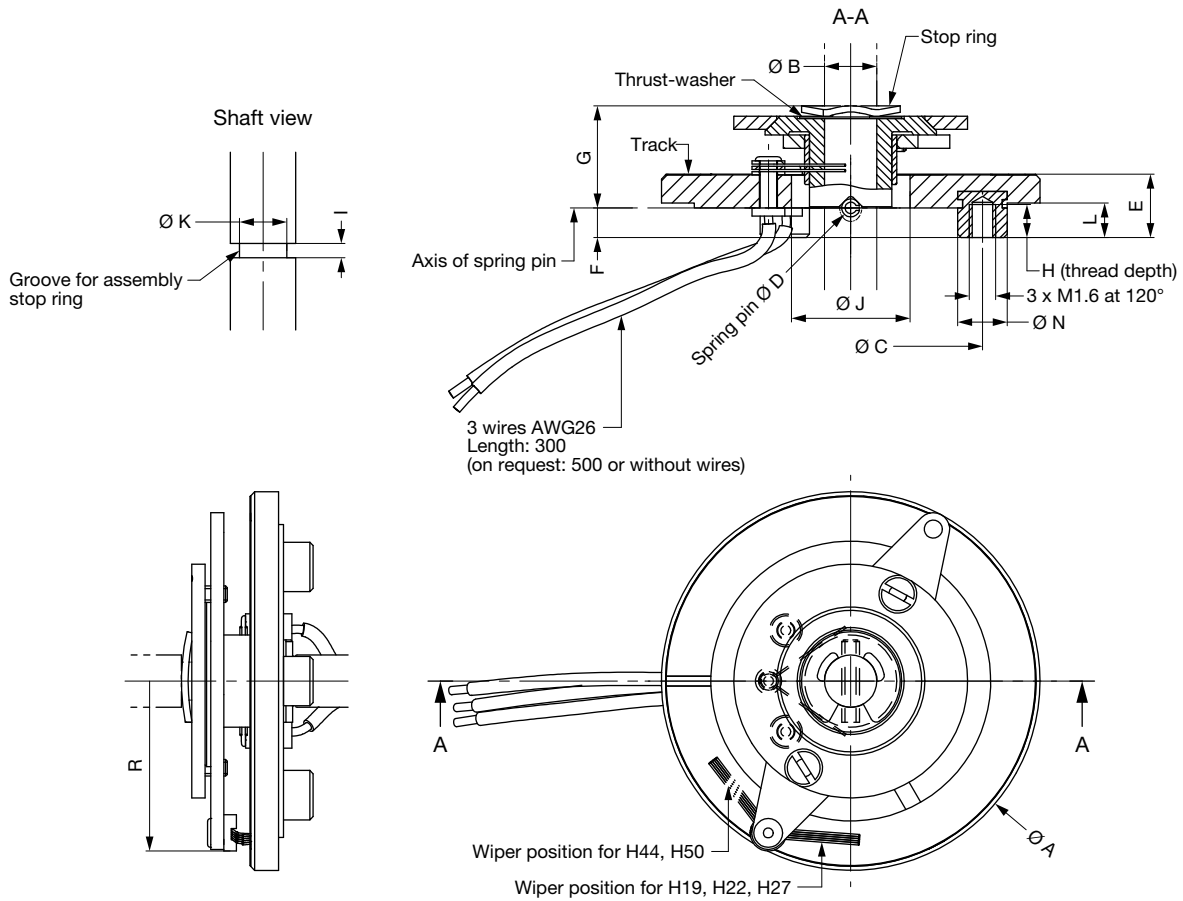


SAP PART NUMBERING GUIDELINES							
MODEL	TYPE	SIZE	FUNCTION	VALUE	LINEARITY	PACKAGING	3 DIGITS
KITP	R = rotational	016	1	472 = 4K7	B = 0.5 %	B = box (1 piece)	To consult Vishay for dedicated 3 digits
		018		103 = 10K	D = 0.1 %		
				202 = 2K0	C = 0.25 %		
				222 = 2K2			
				471 = 470	B = 0.5 %		
				472 = 4K7			
				103 = 10K			
		022		472 = 4K7	A = 1 %		
				502 = 5K0	C = 0.25 %		
		023		502 = 5K0	A = 1 %		
				222 = 2K2	B = 0.5 %		
		027		472 = 4K7	A = 1 %		
					P = 0.3 %		
		040		103 = 10K	D = 0.1 %		
		055		622 = 6K2	L = 0.2 %		
		060	103 = 10K				
085	252 = 2K5	U	1				

Note

- See “Electrical Specifications” for the angle

DIMENSIONS in millimeters

KITPR018 (H22), KITPR023 (H27), KITPR035 (H44)


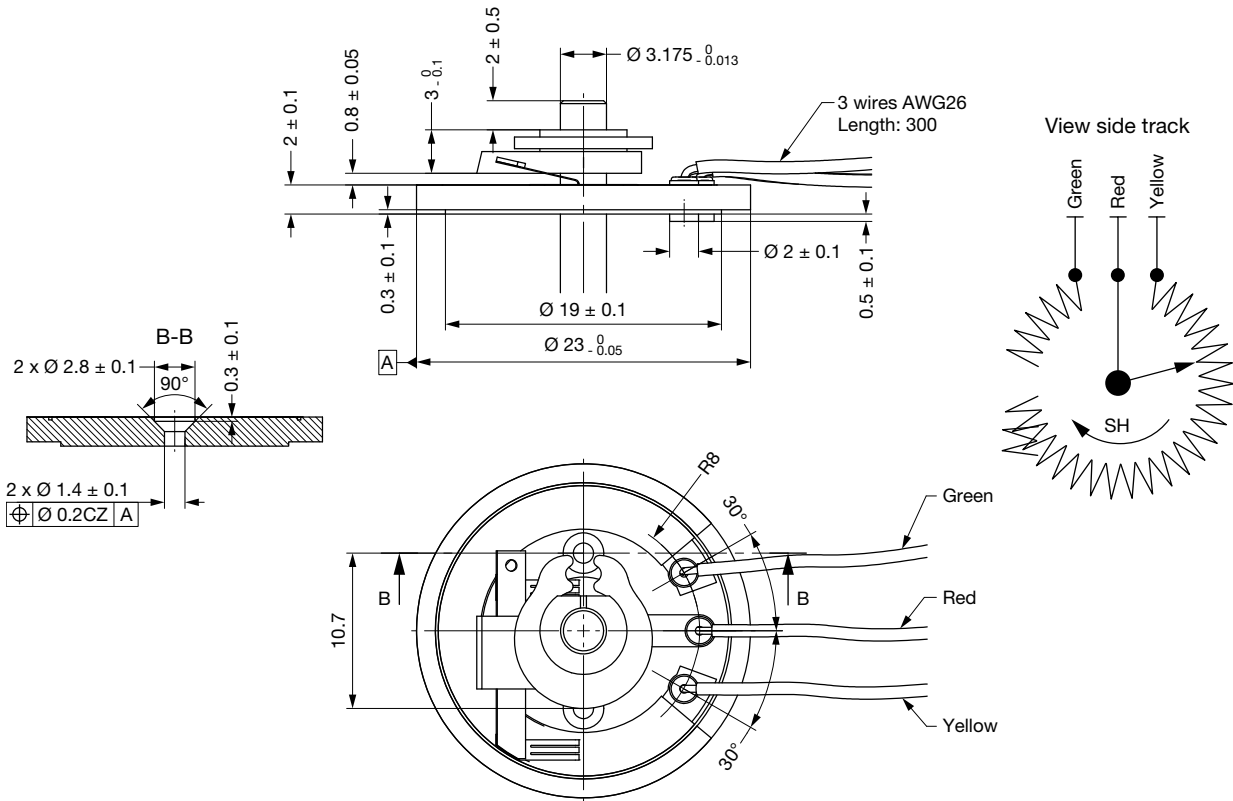
DIMENSION	TYPE			ON REQUEST	
	KITPR018 (H22)	KITPR023 (H27)	KITPR035 (H44)	KITPR015 (H19)	KITPR042 (H50)
A (0 / -0.05)	18	23	35	15	42
B (+0.012 / 0)	3.175	3.175	6.35	3.175	6.35
C ± 0.1	12	16	28	11.5	34
D ± 0.1	1	1	1.5	1	1.5
E ± 0.2	3.8	3.8	5.8	5	6.8
F ± 0.1	1.8	1.8	2.9	4.1	4.3
G (+0.1 / 0)	6.2	6.2	8.6	6.2	8.6
H _{min.}	2	2	3.5	2.5	3.5
l	0.7 (+0.05 / 0)	0.7 (+0.05 / 0)	1.05 (+0.07 / 0)	0.7 (+0.05 / 0)	1.05 (+0.07 / 0)
J ± 0.05	7.2	7.2	11.2	5.7	13.2
K (+0.05 / 0)	2.3	2.3	4.8	2.3	4.8
L _{max.}	2.2	2.2	3.2	3.2	3.2
N _{max.}	3	3 ⁽¹⁾	4.1	3	3.9
R _{max.}	9.2	11.7	17.9	7.7	20.8

Note

- On request: Ø 2.5 with 3 x M1.2

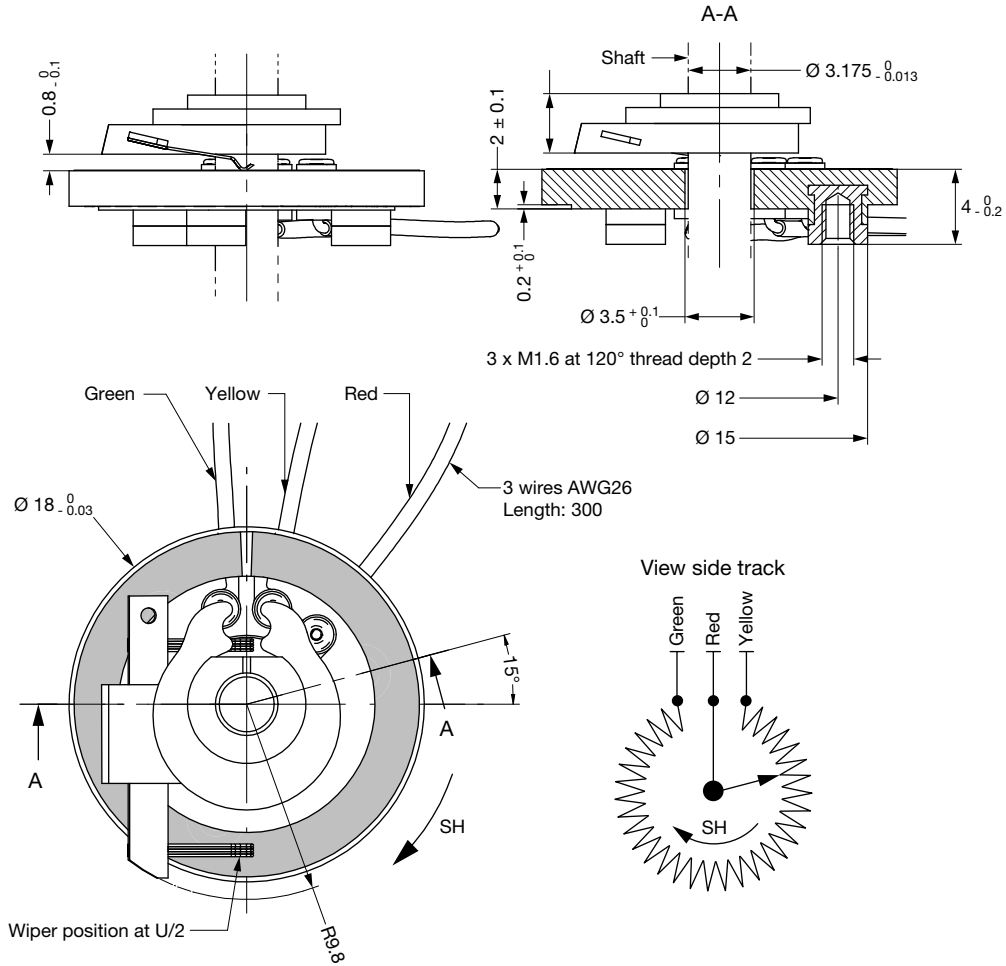
DIMENSIONS in millimeters

DESIGN ON REQUEST FOR KITPR023



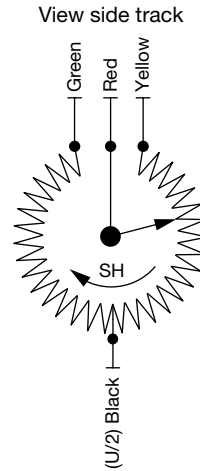
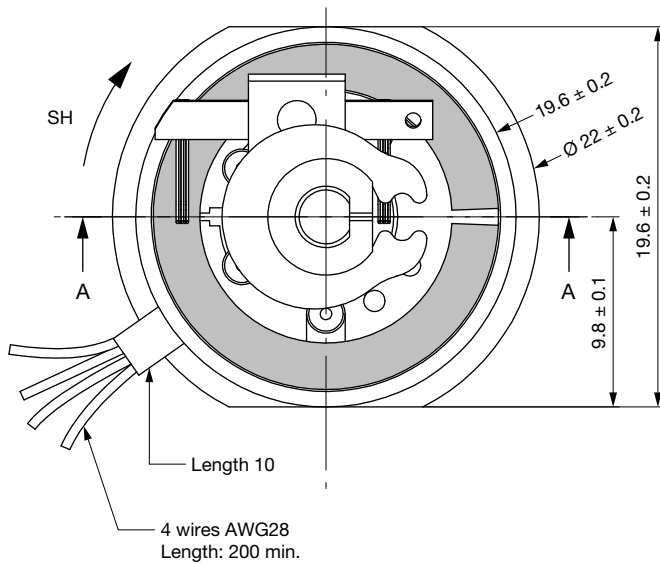
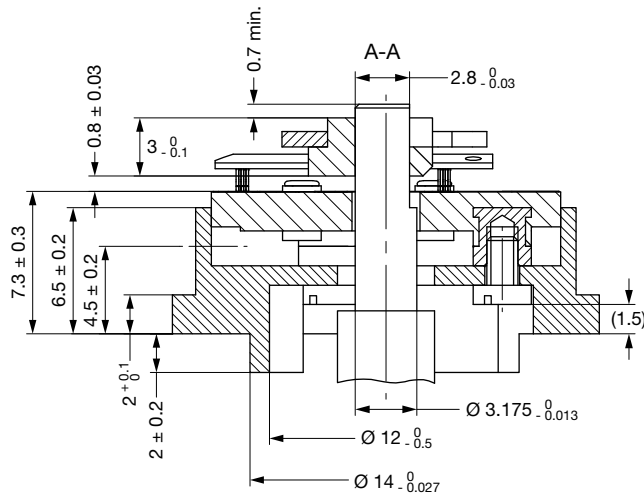
DIMENSIONS in millimeters

KITPR022



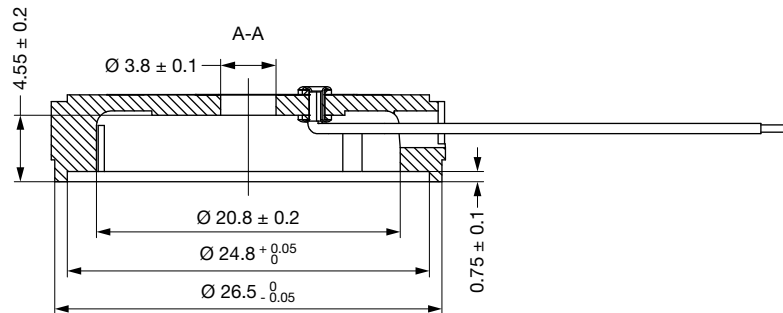
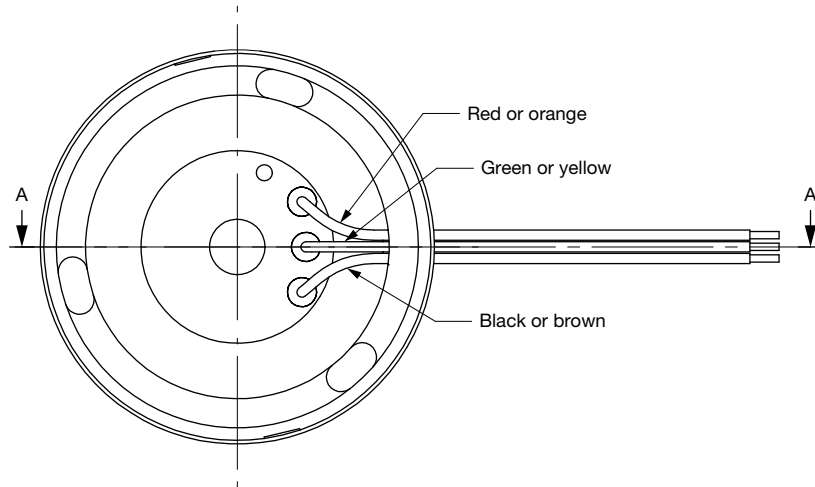
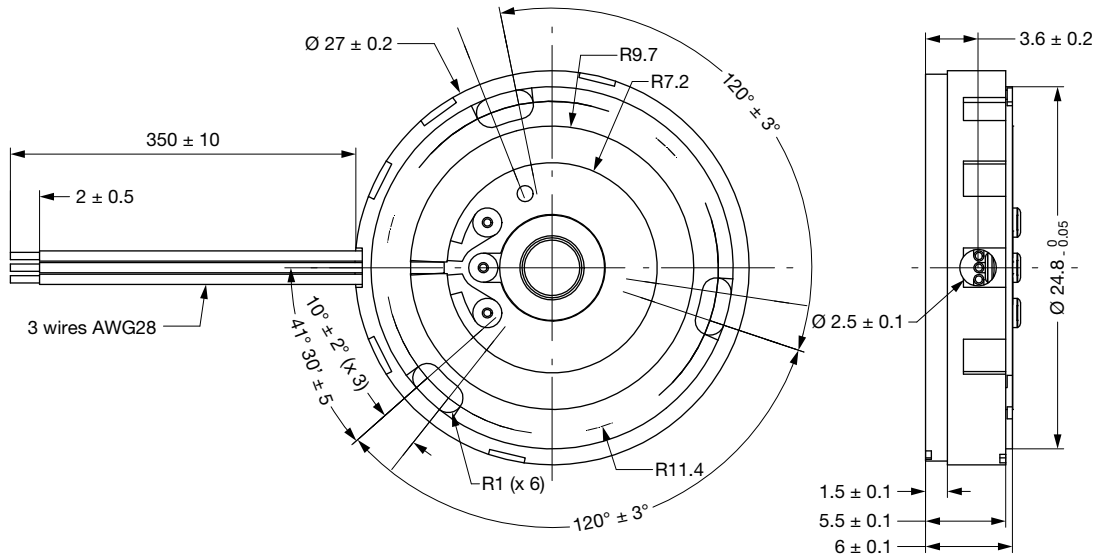
DIMENSIONS in millimeters

DESIGN ON REQUEST FOR KITPR022



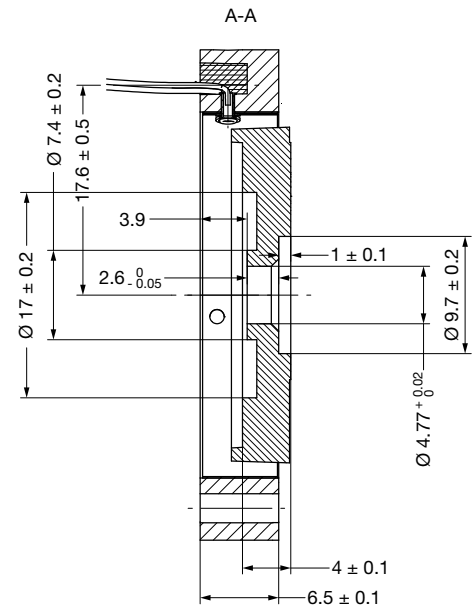
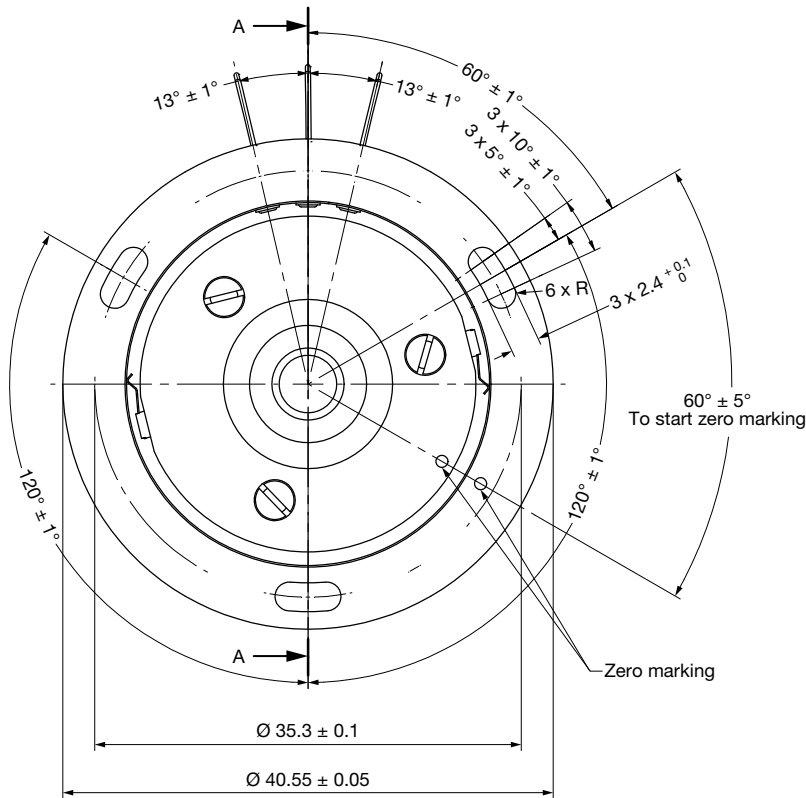
DIMENSIONS in millimeters

KITPR027



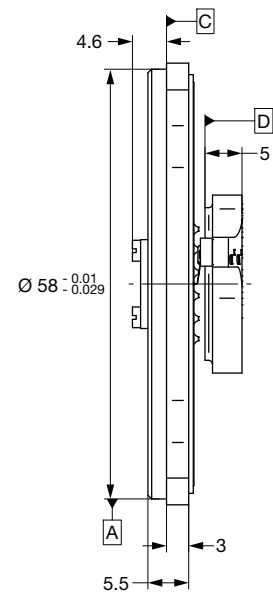
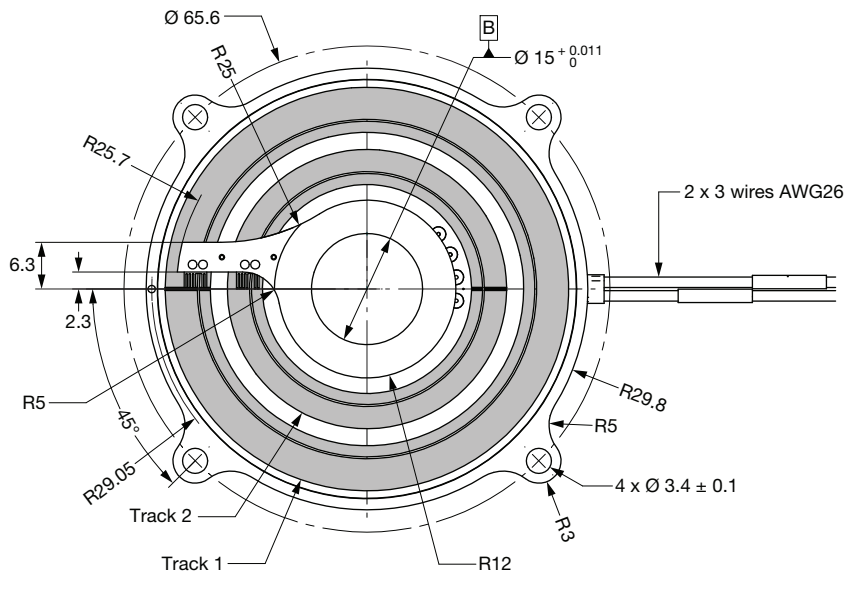
DIMENSIONS in millimeters

KITPR040 (Analog Output)

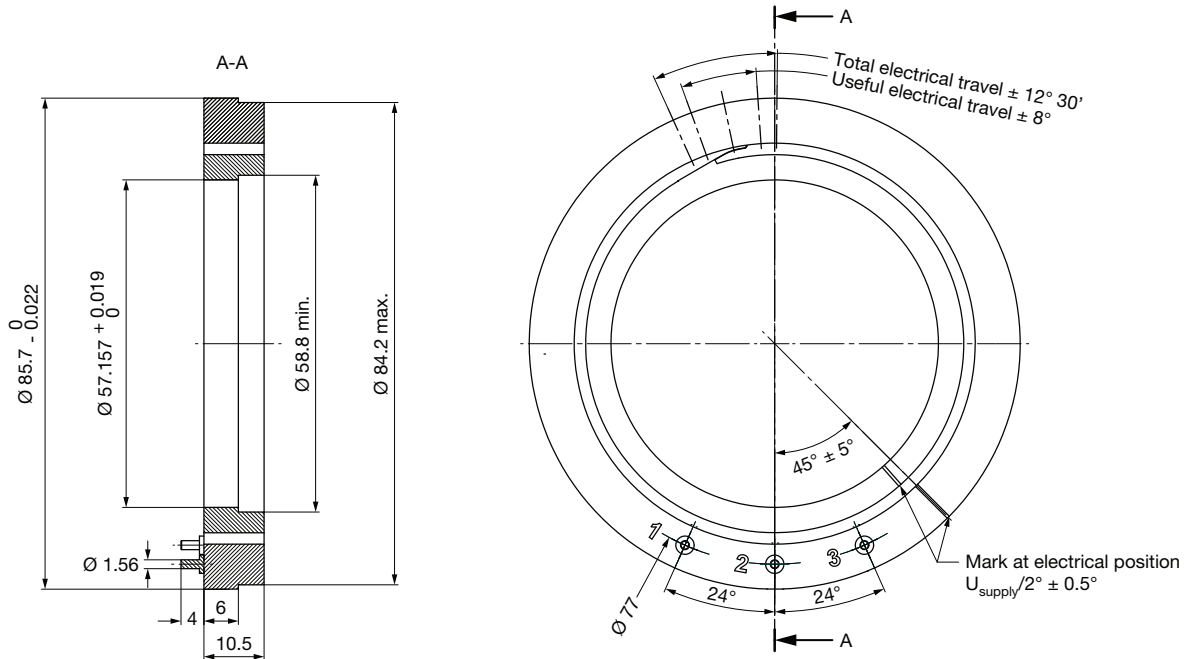


Wires length: 500

KITPR060 (Redundant Functions)

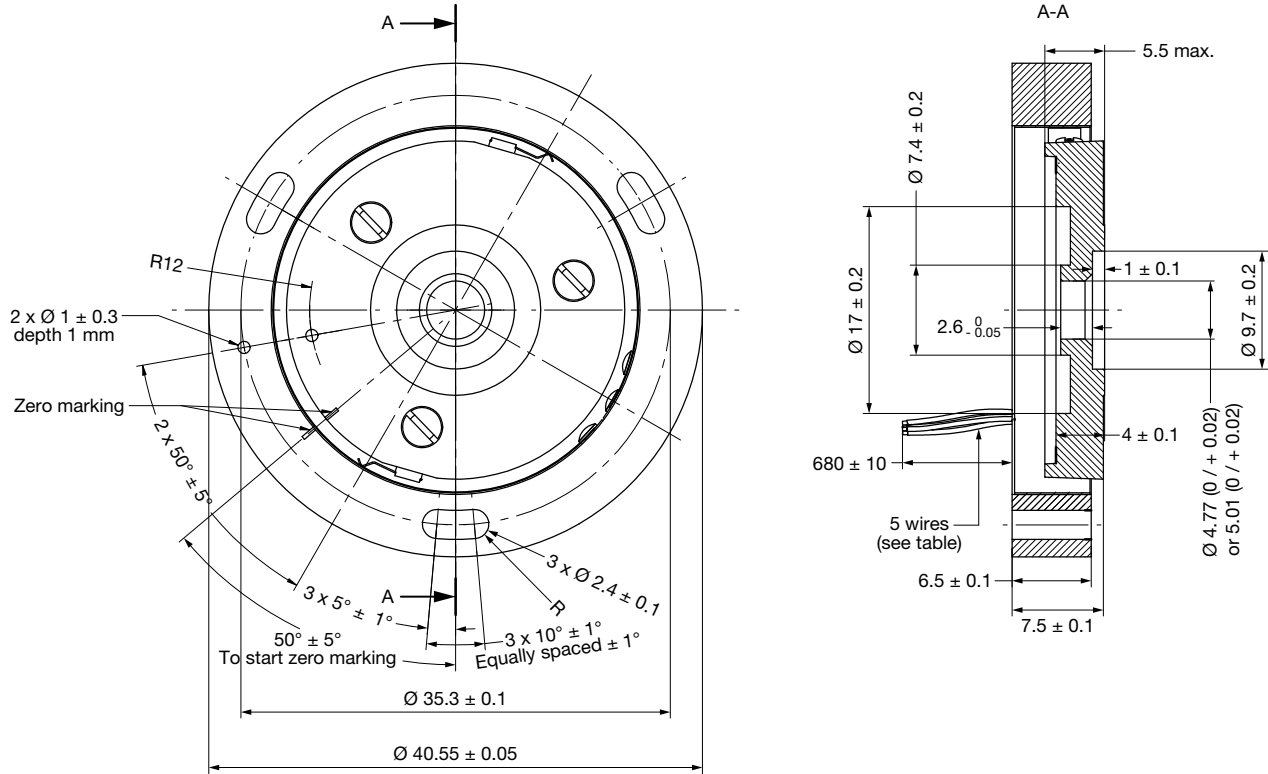


DIMENSIONS in millimeters

KITPR085 (Analog Output)

OPTIONS (on request)

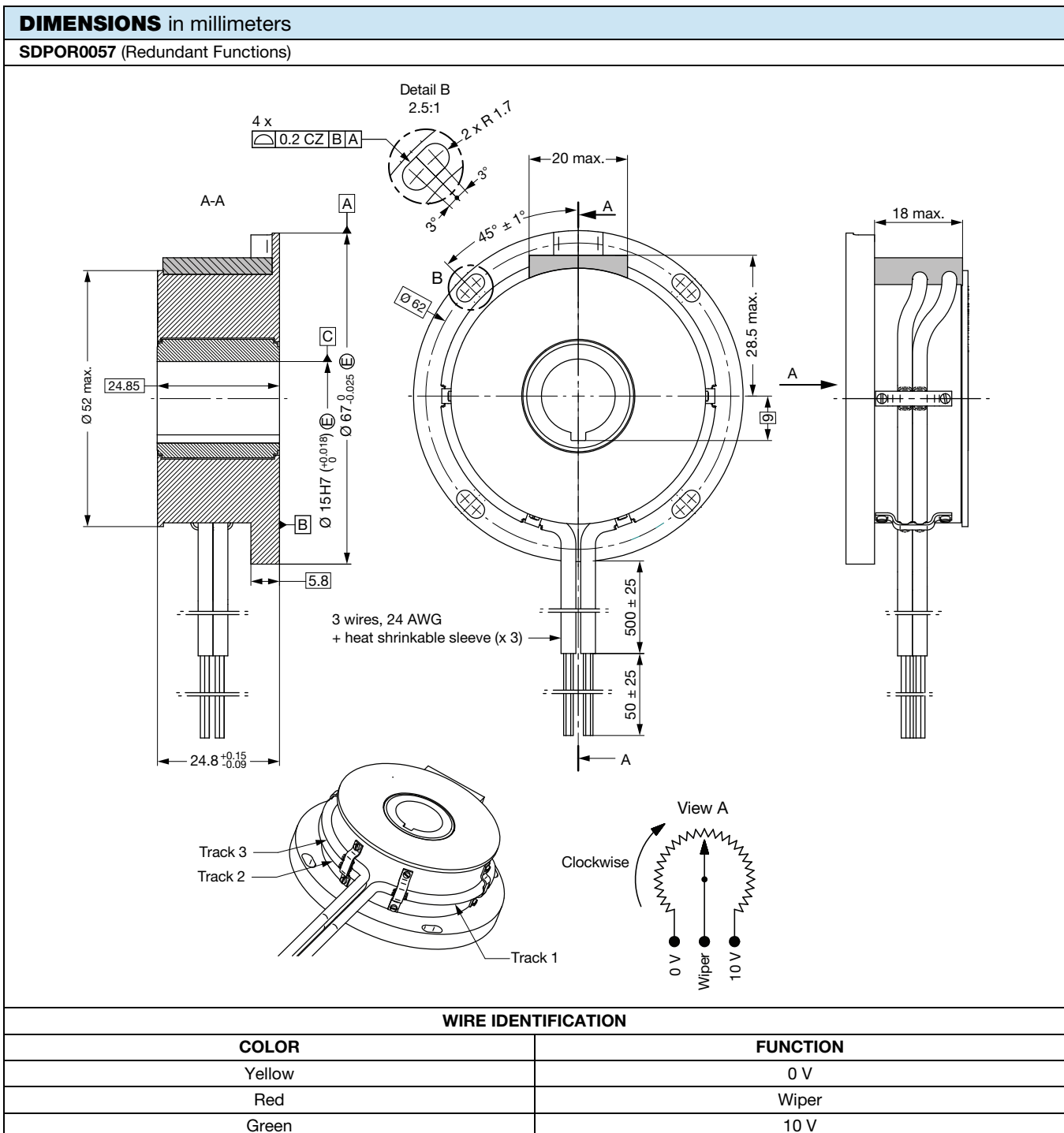
- Other ohmic values (R_n): consult us for all values between 470Ω and $10 \text{ k}\Omega$, and out of this range also
- Other tolerances on R_n
- Other linearities
- Other theoretical electrical travels
- Other dimensions
- Middle tap: KITPR022 $U/2 \pm 1^\circ$
- KITPR040: digital output SPI
 - Operating voltage: $5 \text{ V} \pm 5 \%$
 - With absolute linearity $\pm 0.1^\circ$ max. within $\pm 39.9^\circ$
 - $\pm 0.2^\circ$ max. from -45° to -40°
 - $\pm 0.2^\circ$ max. from $+40^\circ$ to $+45^\circ$
 - Thermal deviation at $U/2$ over operational temperature range $\leq 0.05^\circ$
 - Gradient at $\pm 45^\circ$: $655.36 \text{ bits}/^\circ$
 - Weight: $12.5 \text{ g} \pm 1.5 \text{ g}$
 - Power dissipation: 150 mW min.
 - Current supply: 12 mA max.
- The active resistive track could be also mounted at the outer diameter to use the potentiometer with an outer wiper. All dimensions are feasible (to consult us)

DIMENSIONS in millimeters

KITPR040 (Digital Output)


NAME	COLOR MARK ON WIRE	FUNCTION
P5VA	Red	Voltage supply high (+5 V)
AGND	Black	Voltage supply low (GROUND)
DCLK	White	CLOCK
OUT	None	Data output line
CSN	Yellow	Convert start not

- SDPOR0057: redundant functions
 - Functions quantity: 3
 - Theoretical electrical travel (TET): 300°
 - Useful electrical travel (UET): ± 145°
 - Ohmic value 5 kΩ ± 20 %
 - Independent linearity: ± 0.25 %
 - Mechanical travel: 300°





Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.