

# Data Sheet for Linear Sensors

## Potentiometric Linear Transducer (Conductive Plastic)

## Series RC20

### With Mounting Brackets



RC20  
Design M  
IP60

RC20  
Design M  
IP67

### With Ball Joints



RC20  
Design G  
IP60

RC20  
Design G  
IP67

The RC20 displacement sensors are used in applications where a single push rod is recommended from 10 to 300 mm. Three designs cover a wide range of applications.

- Linear potentiometer (conductive plastic) with almost infinite resolution
- Measuring lengths from 10 mm to 300 mm
- Long life span (100 million movements)
- In IP60 with cable and IP67 with connector

The ball joint version compensates movements transversely to the push rod, so that non-linear movements can also be coupled easily and without stress. G and M versions are available with IP67 protection and are suitable for use in harsh environments, such as those often found in mobile machinery.

### With Flange



RC20  
Design F  
IP60

Electrical Data	RC20-10	RC20-25	RC20-50	RC20-75	RC20-100	RC20-125	RC20-150	RC20-175	RC20-200	RC20-250	RC20-300
Effective electrical travel (mm +1/-0) 1.)	10	25	50	75	100	125	150	175	200	250	300
Total electrical travel (mm +1/-0) 1.)	11 ±1	26 ±1	51 ±1	76 ±1	101 ±1	126 ±1	151 ±1	176 ±1	201 ±1	251 ±1	301 ±1
Total resistance 1.)	1 kOhm	1 kOhm	2 kOhm	3 kOhm	4 kOhm	5 kOhm	6 kOhm	7 kOhm	8 kOhm	10 kOhm	12 kOhm
Resistance tolerance	±20%										
Independent linearity (best straight line) 1.)	±0.5 %	±0.2 %	±0.1 %			±0.05%					
Theoretical resolution 1.)	Almost infinite										
Repeatability 1.)	≤ 0.01 mm										
Max. / recommended wiper current 1.)	1 mA (@40 °C, 1 min in case of failure) / < 1 µA										
Power rating @40 °C (0 W @120 °C)	≤0.3W	≤0.8W	≤1.6W	≤2.6W	≤ 8 W						
Isolation voltage 1.)	< 100 µA @500 VAC, 1bar, 2s										
Isolation resistance 1.)	100 MOhm @500 VDC, 1bar, 2s										

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Series RC20

Mechanical Data, Environmental Conditions,	RC20-10	RC20-25	RC20-50	RC20-75	RC20-100	RC20-125	RC20-150	RC20-175	RC20-200	RC20-250	RC20-300
Mechanical stroke 1.)	10 +5	25 +5	50 +5	75 +5	100 +5	125 +5	150 +5	175 +5	200 +5	250 +5	300 +5
Lifetime (90 % effective electrical travel) 2.)	> 25 million meters or 100 million movements (the smaller value applies)										
Max. operational speed	< 10 m/s for IP60 / ≤ 3..5 m/s for IP67										
Operational force @ RT 1.) 2.)	< 0.5 N for IP60 / < 20 N for IP67										
Operational temperature	-30 °C up to +100 °C										
Storage temperature	-50 °C up to +120 °C										
Protection grade (IEC60529)	IP60 / IP67										
Vibration (IEC 68-2-6, Test Fc)	20 g (5..2000 Hz, 0.75 mm, 12h)										
Shock (IEC 68-2-27, Test Ea)	50 g, halfsine, 11 ms (18x)										
Housing length <b>design M in IP60</b> (±1 mm)	-	83.5	108.5	133.5	158.5	183.5	208.5	233.5	258.5	308.5	358.5
Housing length <b>design M in IP67</b> (±1 mm)	-	106.5	131.5	156.5	181.5	206.5	231.5	256.5	281.5	331.5	381.5
Housing length <b>design G in IP60</b> (±1 mm)	-	110	135	160	185	210	235	260	285	335	385
Housing length <b>design G in IP67</b> (±1 mm)	113.5	128.5	153.5	178.5	203.5	228.5	253.5	278.5	303.5	353.5	403.5
Housing length <b>design F in IP60</b> (±1 mm)	-	83.5	108.5	133.5	158.5	183.5	208.5	233.5	258.5	308.5	358.5
Mounting parts (included in delivery)	Design M: 2 x mounting brackets / design G: 2 x ball joints										
Material housing	Aluminium, Nylon 66 G 25 IP60 / Aluminium IP67										
Material push rod	Stainless steel										
Connection type	IP60 types with round cable 1 m for designs M, G, F IP67 types with connector for design M: 4-pole M12 / design G: 3-pole M8										

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

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Series RC20

## Order Code

Description	Selection: <b>standard=black/bold</b> , possible <i>options=grey/italic</i>						
<b>Series:</b>	<b>RC20</b>						
<b>Effective electrical travel:</b>							
<i>Option 10 mm (only design G in IP67 with connector)</i>	<i>10</i>				<i>R1K</i>		<i>L0,5%</i>
<b>25 mm</b>	<b>25</b>				<b>R1K</b>		<b>L0,2%</b>
<b>50 mm</b>	<b>50</b>				<b>R2K</b>		<b>L0,1%</b>
<b>75 mm</b>	<b>75</b>				<b>R3K</b>		<b>L0,1%</b>
<b>100 mm</b>	<b>100</b>				<b>R4K</b>		<b>L0,1%</b>
<b>125 mm</b>	<b>125</b>				<b>R5K</b>		<b>L0,05%</b>
<b>150 mm</b>	<b>150</b>				<b>R6K</b>		<b>L0,05%</b>
<b>175 mm</b>	<b>175</b>				<b>R7K</b>		<b>L0,05%</b>
<b>200 mm</b>	<b>200</b>				<b>R8K</b>		<b>L0,05%</b>
<b>250 mm</b>	<b>250</b>				<b>R10K</b>		<b>L0,05%</b>
<b>300 mm</b>	<b>300</b>				<b>R12K</b>		<b>L0,05%</b>
<b>Construction:</b>							
<b>Mounting Brackets</b>				<b>M</b>			
<b>Ball Joints</b>				<b>G</b>			
<b>Flange (only in IP60 with cable)</b>				<b>F</b>			
<b>Electrical connection:</b>							
<b>Round cable 1 m (IP60 version, design M,G,F)</b>					-		
<i>Option cable length in m (IP60 version)</i>					<i>Kxx</i>		
<b>Connector (IP67 version, design M,G)</b>					<b>S</b>		
<b>Design M: 4-pol. M12</b>							
<b>Design G: 3-pol. M8</b>							
<b>Total resistance depends on electrical travel</b> (e.g. R3K means 3 kOhm)						<b>see above</b>	
<b>Resistance tolerance:</b> <b>±20%</b>							<b>W20%</b>
<b>Independent linearity depends on electrical travel</b> (e.g. L0,2 means ±0.2%)							<b>see above</b>
<b>Protection class:</b>							
<b>IP60 for design M, G, F with cable</b>							-
<b>IP67 for design M, G with connector</b>							<b>IP67</b>

### Accessory (not included in delivery):

Construction M: Mating connector (STEM12) #125301: M12 thread, 4-pole, IP67, straight, shielded (STE M12 4POL IP67 G S)  
 Construction G: Mating connector with cable (STKM8) #125303: M8 thread, 3-pole, IP67, straight, not shielded, 2 m (STK M8 3POL IP67 G NS 2M AWG22)

More connectors with and without cable on request. Take a look at data sheet STEM12 for connector without cable or STKM12 for connector with cable.

### For higher quantities or on-going demand, additional options are available as described below on request

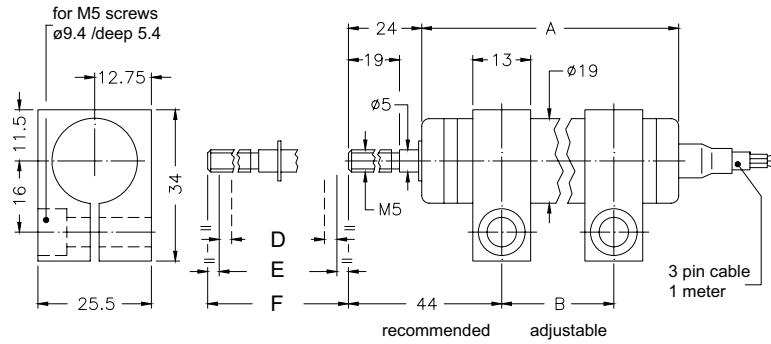
For example:

- Assembled leads and cables with / without connector
- Probe, special axis length and much more

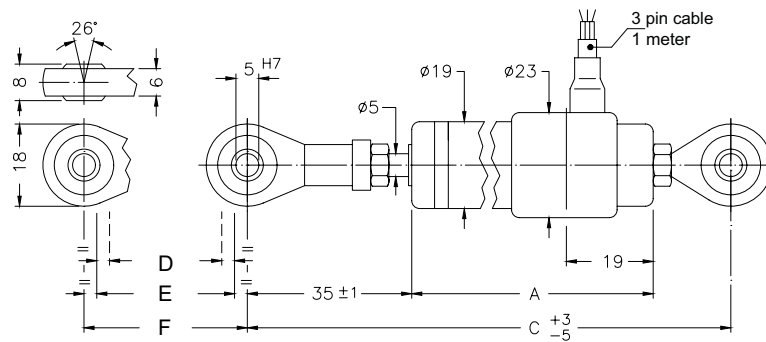
Note: When calibrating the linear transducer, be careful to set the stroke so that the output does not drop below 1 % or rise beyond 99 % of the supply voltage.

### Drawing RC20 - IP60

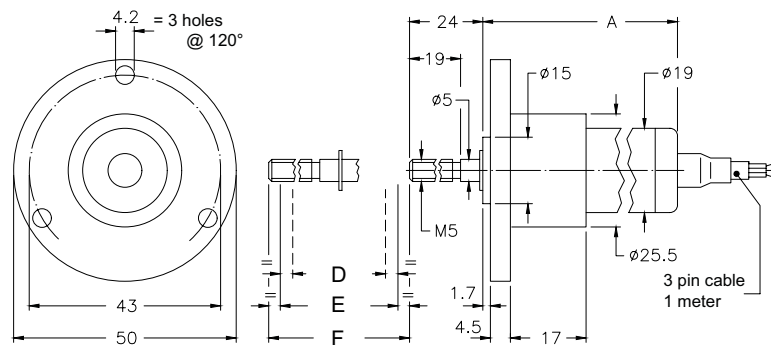
#### Construction M - Mounting Brackets



#### Construction G - Ball Joints



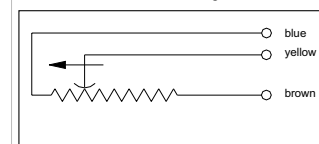
#### Construction F - Flange



Dimensions in mm

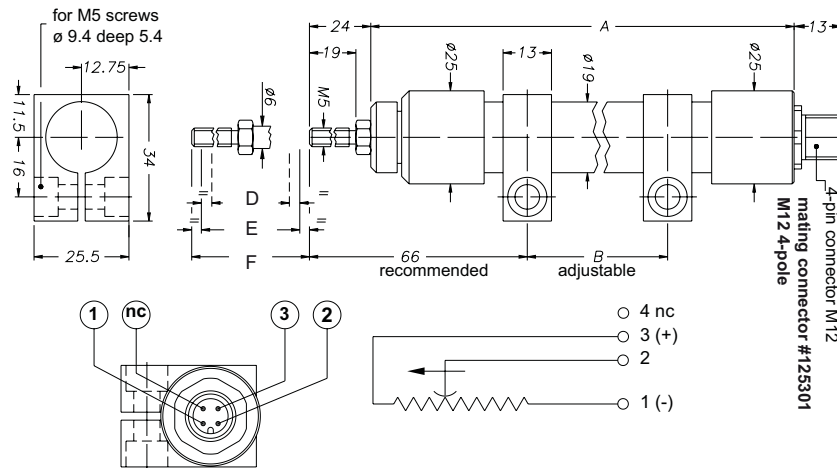
Dimensions	RC20-25	RC20-50	RC20-75	RC20-100	RC20-125	RC20-150	RC20-175	RC20-200	RC20-250	RC20-300
A [mm] construction M	83.5	108.5	133.5	158.5	183.5	208.5	233.5	258.5	308.5	358.5
A [mm] construction G	110	135	160	185	210	235	260	285	335	385
A [mm] construction F	83.5	108.5	133.5	158.5	183.5	208.5	233.5	258.5	308.5	358.5
B [mm] mounting brackets	47	72	97	122	147	172	197	222	272	322
C [mm] ball joints	163	188	213	238	263	288	313	338	388	438
D [+1-0 mm] effective el. travel	25	50	75	100	125	150	175	200	250	300
E [±1 mm] total el. travel	26	51	76	101	126	151	176	201	251	301
F [+5 mm] mech. travel	25	50	75	100	125	150	175	200	250	300

Connection diagram

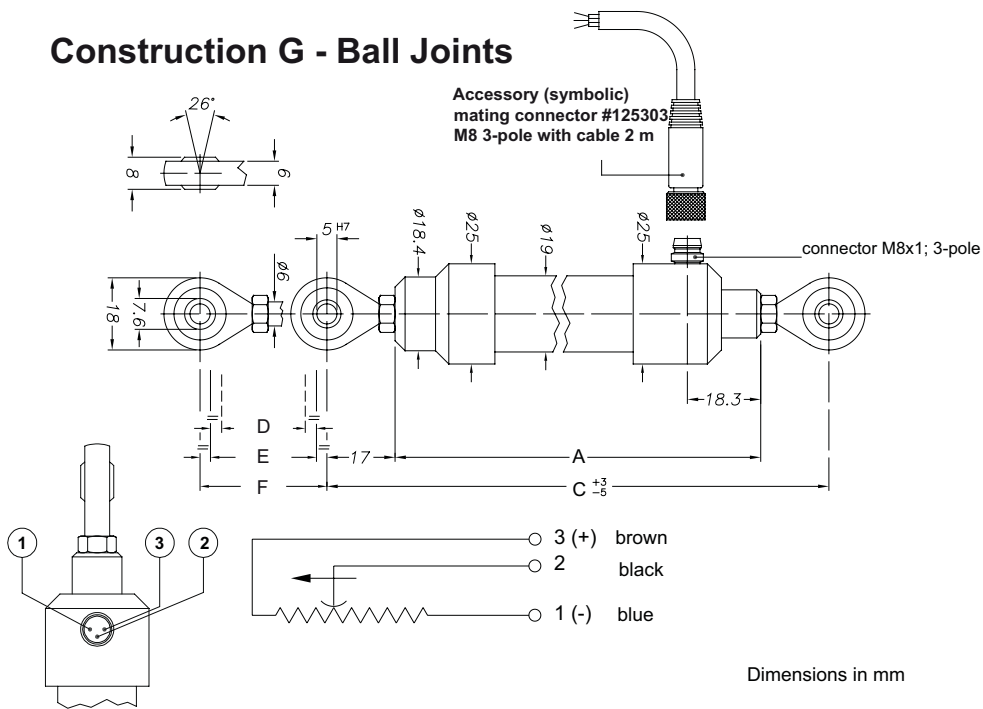


### Drawing RC20 - IP67

### Construction M - Mounting Brackets



### Construction G - Ball Joints



Dimensions	RC20-10	RC20-25	RC20-50	RC20-75	RC20-100	RC20-125	RC20-150	RC20-175	RC20-200	RC20-250	RC20-300
A [ $\pm 1$ mm] construction M	-	106.5	131.5	156.5	181.5	206.5	231.5	256.5	281.5	331.5	381.5
A [ $\pm 1$ mm] construction G	113.5	128.5	153.5	178.5	203.5	228.5	253.5	278.5	303.5	353.5	403.5
B [mm] construction M	-	21	46	71	96	121	146	171	196	246	296
C [mm] construction G	148	163	188	213	238	263	288	313	338	388	438
D [+1/-0 mm] effective el. travel	10*	25	50	75	100	125	150	175	200	250	300
E [ $\pm 1$ mm] total el. travel	11*	26	51	76	101	126	151	176	201	251	301
F [+5 mm] total mech. travel	15*	30	55	80	105	130	155	180	205	255	305

\*only for construction G