

SM-13 series – Compact Linear Potentiometers

- **Rugged Construction**
- **Compact Design**
- **Sealed to IP67**
- **Long Life**
- **Excellent Linearity**
- **Regulated Output Options**



The SM-13 series of linear potentiometers are designed to withstand the harsh environments of motorsport, testing and industrial applications. Using proven 'Conductive Plastic' technology, the sensors offer high performance and reliability at operational temperatures up to +150°C

The rugged, yet compact 13mm diameter SM-13 is available with stroke lengths up to 200mm, flange mount, a choice of potentiometer and regulated analogue outputs, sealing up to IP67.

Specifications

Electrical (Potentiometer Output)

| | |
|---------------------------|---------------------------------|
| Technology | Conductive plastic |
| Max. Supply Voltage | 40VDC |
| Resolution | Essentially infinite |
| Recommended Wiper Current | <10µA |
| Output Signal | Potentiometer (voltage divider) |
| Repeatability | ≤0.01mm |
| Independent Linearity | ≤0.5% |

Electrical (Regulated Outputs)

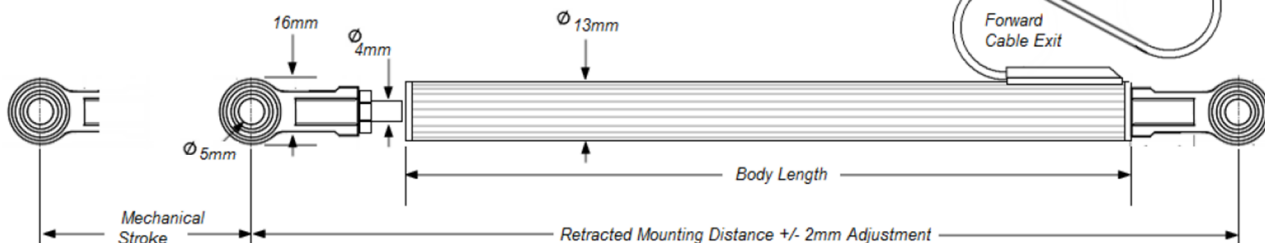
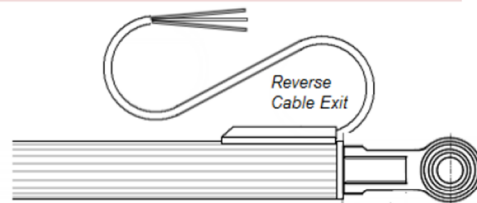
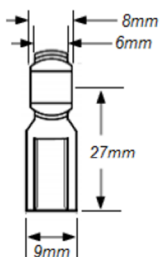
| | |
|-----------------------------|---|
| Technology | Conductive plastic with 'on board' signal conditioning |
| Supply Voltage | 6-30VDC (4-20mA, 0-5V output) ; 11-30VDC (0-10V output) |
| Resolution | Essentially infinite |
| Reverse Polarity Protection | Yes |
| Output Signal | 4-20mA ; 0-5VDC ; 0-10VDC regulated output options |
| Repeatability | ≤0.01mm |
| Independent Linearity | ≤0.5% |

Mechanical

| | |
|------------------------------|---|
| Operating Temperature | -40°C - +150°C (Potentiometer output) ; -30°C - +125°C (4-20mA, 0-5V, 0-10V output) |
| Stroke lengths | 25mm – 200mm |
| Operational Speed | 10m/s max |
| Electrical & Mechanical Life | >25 million operations (depending on installation and environmental conditions) |
| Housing Material | Aluminium |
| Shaft Material | Stainless steel |
| Sealing | IP54 (felt) ; IP65 (2 x Viton O ring) ; IP67 (PTFE U spring, Viton O ring) |

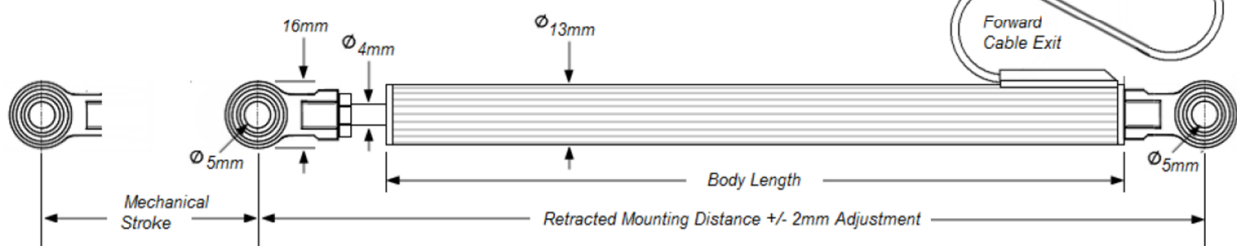
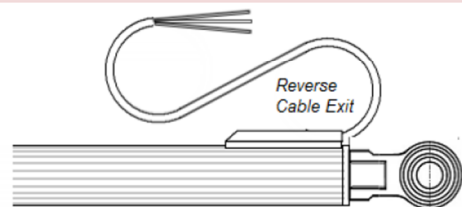
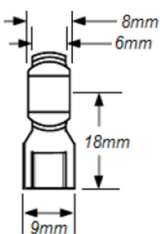
SM-13M-

| | | | | | | | | |
|----------------------------------|---|-----|-----|-----|-----|-----|------|------|
| Electrical Stroke (mm) | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| Retracted Mounting Distance (mm) | 173 | 198 | 223 | 248 | 273 | 298 | 323 | 348 |
| Min. Mechanical Stroke (mm) | 27 | 52 | 77 | 102 | 127 | 152 | 177 | 202 |
| Body Length (mm) | 107 | 132 | 157 | 182 | 207 | 232 | 257 | 282 |
| Approx. Weight Without Cable (g) | 53 | 58 | 63 | 68 | 73 | 78 | 83 | 88 |
| Resistance (K Ω +/-20%) | 1.7 | 3.4 | 5 | 6.7 | 8.4 | 10 | 11.7 | 13.4 |
| Mechanical Fixing | Standard Rod End Bearings - \varnothing 5mm | | | | | | | |



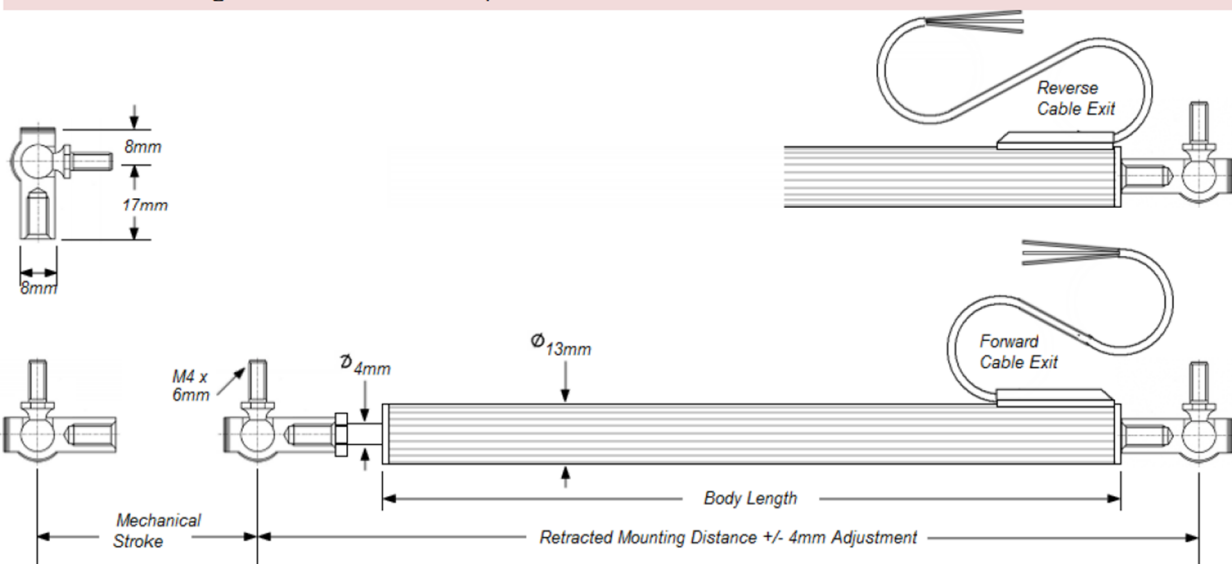
SM-13C-

| | | | | | | |
|----------------------------------|--|-----|-----|-----|-----|-----|
| Electrical Stroke (mm) | 25 | 50 | 75 | 100 | 125 | 150 |
| Retracted Mounting Distance (mm) | 142 | 167 | 192 | 217 | 242 | 267 |
| Min. Mechanical Stroke (mm) | 27 | 52 | 77 | 102 | 127 | 152 |
| Body Length (mm) | 97 | 122 | 147 | 172 | 197 | 222 |
| Approx. Weight Without Cable (g) | 43 | 48 | 53 | 58 | 63 | 68 |
| Resistance (K Ω +/-20%) | 1.7 | 3.4 | 5 | 6.7 | 8.4 | 10 |
| Mechanical Fixing | Compact Rod End Bearings - \varnothing 5mm | | | | | |



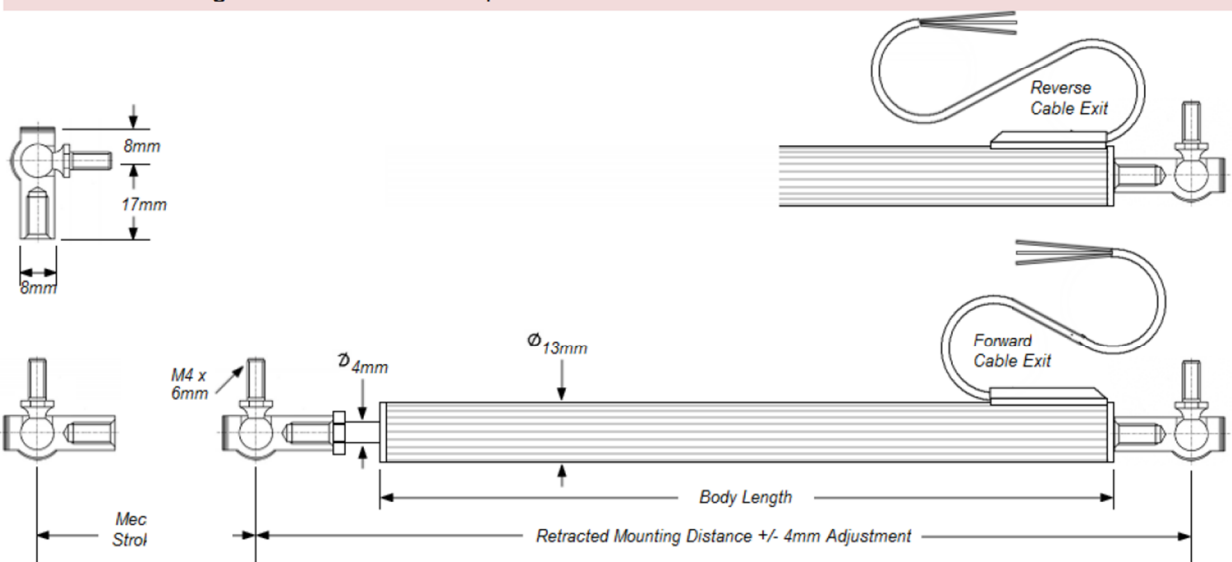
SM-13MP-

| | | | | | | | | |
|-----------------------------------|---------------------|-----|-----|-----|-----|-----|------|------|
| Electrical Stroke (mm) | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| Retracted Mounting Distance (mm) | 153 | 178 | 203 | 228 | 253 | 278 | 303 | 328 |
| Min. Mechanical Stroke (mm) | 27 | 52 | 77 | 102 | 127 | 152 | 177 | 202 |
| Body Length (mm) | 107 | 132 | 157 | 182 | 207 | 232 | 257 | 282 |
| Approx. Weight Without Cable (g) | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 |
| Resistance (K Ω \pm 20%) | 1.7 | 3.4 | 5 | 6.7 | 8.4 | 10 | 11.7 | 13.4 |
| Mechanical Fixing | Pop Joints M4 x 6mm | | | | | | | |



SM-13CP-

| | | | | | | |
|-----------------------------------|---------------------|-----|-----|-----|-----|-----|
| Electrical Stroke (mm) | 25 | 50 | 75 | 100 | 125 | 150 |
| Retracted Mounting Distance (mm) | 140 | 165 | 190 | 215 | 253 | 240 |
| Min. Mechanical Stroke (mm) | 27 | 52 | 77 | 102 | 127 | 152 |
| Body Length (mm) | 97 | 122 | 147 | 172 | 197 | 222 |
| Approx. Weight Without Cable (g) | 40 | 45 | 50 | 55 | 60 | 65 |
| Resistance (K Ω \pm 20%) | 1.7 | 3.4 | 5 | 6.7 | 8.4 | 10 |
| Mechanical Fixing | Pop Joints M4 x 6mm | | | | | |



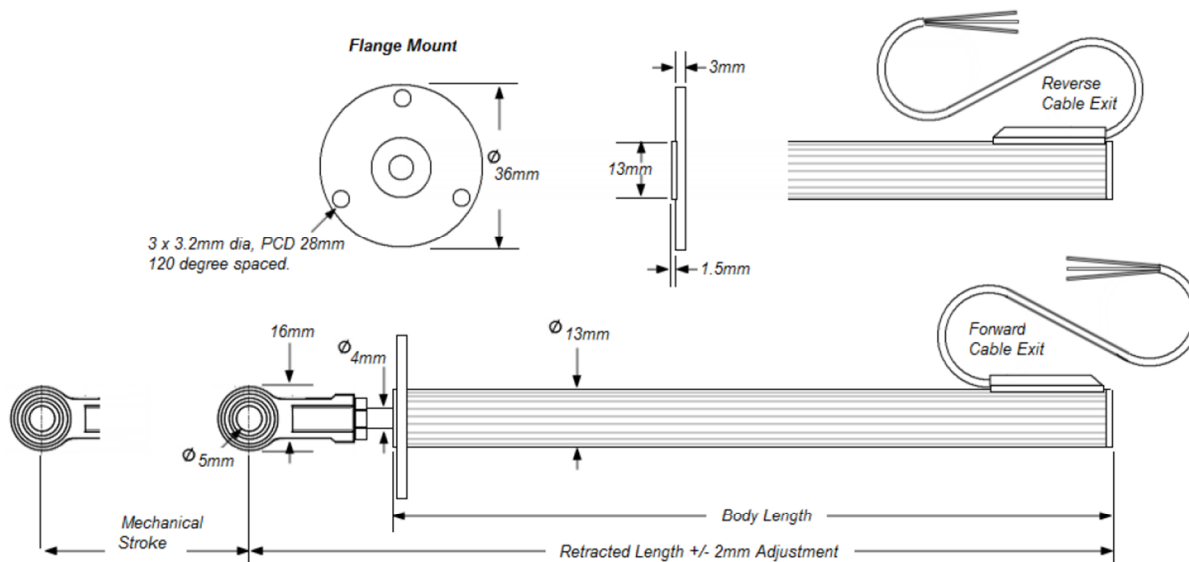
Flange Mount

Compatible with 13M, 13C, 13MP & 13CP – Refer to model for specifications, except below:

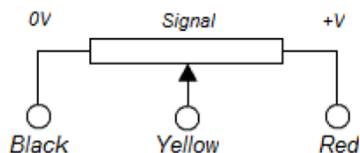
Rod End Bearing (13M, 13C) or Pop Joint (13MP, 13CP) is removed from the rear of the sensor

Retracted Length (mm) = Retracted Mounting Distance -27mm (13M) , -18mm (13C) , -17mm (13MP, 13CP)

Body Length (mm) = +2.5mm to all models



Electrical Connection (Potentiometer output)



| Wiring | +Ve Supply | 0V Supply (GND) | Signal |
|----------------------|------------|-----------------|-------------------------------|
| Single Output | RED | BLACK | YELLOW |
| Dual Output (option) | BROWN | BLUE | WHITE (Green wire = Not Used) |

Output Signal Output signal may be reversed by swapping connections to the Red & Black and Brown & Blue wires. DO NOT connect +Ve supply to the Yellow or White wires, as this will cause damage to the sensor element.

Electrical Connection (0-5VDC ; 0-10VDC output)

| Wiring | +Ve Supply | 0V Supply (GND) | Signal |
|---------------|------------|-----------------|--------|
| Single Output | RED | BLACK | YELLOW |

Electrical Connection (4-20mA output) 2 wire

| Wiring | +Ve Supply | 0V Supply (GND) | Signal |
|---------------|------------|-----------------|--------------------------|
| Single Output | RED | BLACK | (Yellow wire = Not Used) |

Electrical Cable

| | |
|--------------|-----------------------------------|
| Cable Type | Raychem 55A, 26AWG, FDR 25 sleeve |
| Cable Length | Approximately 500mm |

Ordering Information

Please use the chart below to construct your product code...

Sample Product Code: SM – 13M – 150 – 67 – F – 000

| | |
|---|--------|
| Series | SM- 13 |
| Mounting | |
| M = Standard - Rod End Bearings | |
| C = Compact - Rod End Bearings | |
| MP = Standard - Pop Joints | |
| CP = Compact - Pop Joints | |
| Stroke Length | |
| Insert required length in mm | |
| 25 , 50 , 75 , 100 , 125 , 150 , 175* , 200* *13M, 13MP only | |
| Seal Rating | |
| 54 = IP54 | |
| 65 = IP65 | |
| 67 = IP67 | |
| Cable Exit Direction | |
| F = Forward facing cable exit | |
| R = Reverse facing cable exit | |
| Options (compatible options may be selected, separated by – between codes) | |
| 000 = No options selected | |
| FL = Flange Mount | |
| Dual = Dual output (6 wire) | |
| SLV = Protective sleeve (refer to accessories below) | |
| 420 = 4-20mA regulated output (single output only) | |
| V05 = 0-5VDC regulated output (single output only) | |
| V10 = 0-10VDC regulated output (single output only) | |
| Lxxxx = Cable length in mm (500mm cable supplied as standard) | |

Accessories



Protective Sleeve SLV For use with all models except **Flange Mount**

Material

Carbon fibre, Peek Ø16mm