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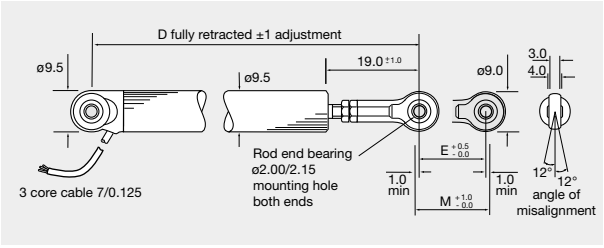
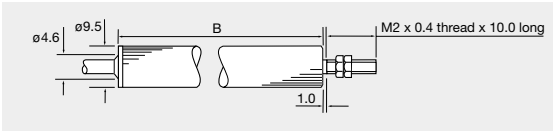
DIMENSIONS AND MOUNTING OPTIONS

SELF ALIGNING BEARING MOUNTING

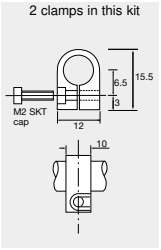


PLAIN BODY MOUNTING

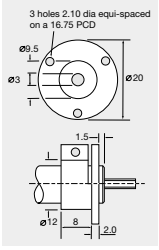


Note: Drawings not to scale

MOUNTING OPTIONS



Body clamp
SA200841

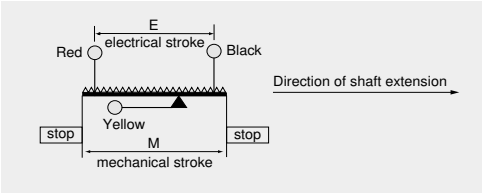


Flange mounting
SA200842

Electrical stroke E	**mm**	***10***	***20***	***30***	***40***	***50***	***75***	***100***
Mechanical stroke M	**mm**	***12.5***	***22.5***	***32.5***	***42.5***	***52.5***	***77.5***	***102.5***
Body length B	**mm**	45.5	55.5	65.5	75.5	85.5	110.5	135.5
Between centres D		70	80	90	100	110	135	160
Weight approximate								
(Mounting option R)	**g**	11	13	14.5	16	17.5	21.5	25.5

ELECTRICAL CONNECTIONS

3 core cable: PUR sheathed 0.3m long with PTFE insulated 7/0.125 cores.



SLS 130

The SLS 130 range is designed to provide performance benefits within a compact, lightweight package in stroke lengths from 25 to 200mm.

With a choice of mounting options and accessories, this sensor is ideally suited to a wide range of industrial applications and is extensively used within the motorsport industry.

PERFORMANCE

Electrical stroke E	**mm**	***25***	***50***	***75***	***100***	***125***	***150***	***175***	***200***
Resistance ±10%	**kΩ**	1	2	3	4	5	6	7	8
Independent linearity									
guaranteed	**±%**	0.25	0.25	0.15	0.15	0.15	0.15	0.15	0.15
typical	**±%**	0.15	0.15	0.15	0.10	0.10	0.07	0.07	0.07
Power dissipation at 20°C	**W**	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Applied voltage maximum	**Vdc**	22	44	67	74	74	74	74	74

Electrical output		Minimum of 0.5% to 99.5% applied volts
Resolution		Virtually infinite
Hysteresis (repeatability)		Less than 0.01mm
Operational temperature	**°C**	–30 to +100
Output smoothness		To MIL-R-39023 grade C 0.1%
Insulation resistance		Greater than 100MΩ at 500V d.c.
Operating mode		Voltage divider only - see Circuit Recommendations on page 2
Wiper circuit impedance		Minimum of 100 x track resistance or 0.5MΩ (whichever is greater)
Operating force maximum		
sealed	**gf**	500 in horizontal plane
unsealed	**gf**	250 in horizontal plane
Life at 250mm per second		Typically greater than 100 million operations (50 x 10^6 cycles) at 25mm stroke length
Dither life		200 million operations (100 x 10^6 cycles) at ±0.5mm, 60Hz
Sealing		IP50 standard - IP66 see options
Shaft seal life		20 million operations (10 x 10^6 cycles) - replaceable
Shaft velocity maximum	**m/s**	10

OPTIONS

Compact shaft	Compact shaft will reduce dimension D by 25mm
Integral shaft seal - IP 66	Designed to accept integral shaft seal to give IP66 rating
Extended cable length	10m output cable can be specified
Mounting	Body clamp, flange or quick release balljoint mounting kits can be supplied
Protective sleeve kit	For all stroke lengths - self aligning bearings only
Spring loaded shaft kit	For stroke lengths 25 to 150mm only

AVAILABILITY

All options can be supplied within five days from the factory.

ORDERING CODES

SLS 130/...../...../...../...../.....

Electrical stroke
Resistance
Shaft L = long, C = compact
Cable 1 = 1m, 10 = 10m
Sealing 50 = IP50, 66 = IP66

Accessories (order separately)

Mounting kits
- Body clamp kit - SA200264
- Flange kit - SA200266
- Quick release balljoint (Heim) - SA200337

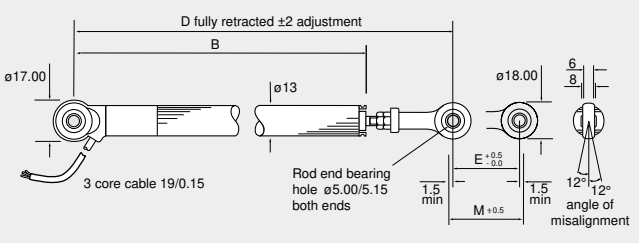
Protective sleeve kit - SA201152/MK†

Spring loaded shaft kit - SA200265/stroke
(For use with option L/50 units only)

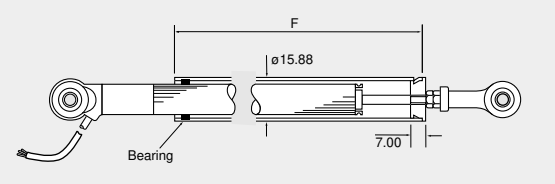
† Check with Penny & Giles for correct part number to match stroke and shaft combination

DIMENSIONS AND MOUNTING OPTIONS

SELF ALIGNING BEARING MOUNTING

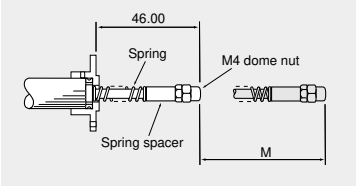


PROTECTIVE SLEEVE OPTION - SA201152/MK



Note: Drawings not to scale

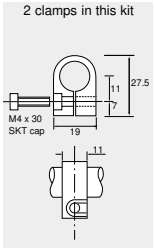
SPRING RETURN OPTION



SA200265/stroke

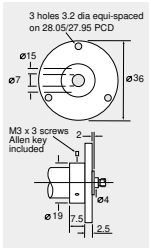
(25 to 150mm stroke lengths only)

MOUNTING OPTIONS



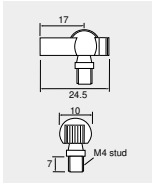
Body clamp

SA200264



Flange mounting

SA200266



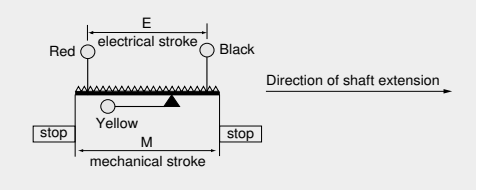
Quick release ball joint

SA200337

Electrical stroke E	**mm**	***25***	***50***	***75***	***100***	***125***	***150***	***175***	***200***
Mechanical stroke M	**mm**	***29***	***54***	***79***	***104***	***129***	***154***	***179***	***204***
Body length B	**mm**	110.5	135.5	160.5	185.5	210.5	235.5	260.5	285.5
Between centres D									
standard sensor (L)	**mm**	173.6	198.6	223.6	248.6	273.6	298.6	323.6	348.6
compact shaft sensor (C)	**mm**	148.6	173.6	198.6	223.6	248.6	273.6	298.6	323.6
Sleeve length F									
standard sensor (L)	**mm**	98	123	148	173	198	223	248	273
compact shaft sensor (C)	**mm**	73	98	123	148	173	198	223	248
Weight approximate									
standard sensor (L)	**g**	64	71	78	85	92	99	106	113
compact shaft sensor (C)	**g**	60	67	74	81	88	95	102	109

ELECTRICAL CONNECTIONS

3 core cable: PUR sheathed 1m long with ETFE insulated 19/0.15 cores.



SLS 190

The SLS 190 range is designed to provide maximum performance benefits within a compact package in stroke lengths from 25 to 350mm.

With a choice of mounting options and accessories, this sensor is ideally suited to a wide range of general purpose industrial applications, for medium stroke linear position sensing.

PERFORMANCE

Electrical stroke E	**mm**	***25***	***50***	***75***	***100***	***125***	***150***	***175***	***200***	***225***	***250***	***275***	***300***	***325***	***350***
Resistance ±10%	**kΩ**	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Independent linearity															
guaranteed	**±%**	0.25	0.25	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
typical	**±%**	0.15	0.15	0.15	0.10	0.10	0.07	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05
Power dissipation at 20°C	**W**	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
Applied voltage maximum	**Vdc**	22	44	67	74	74	74	74	74	74	74	74	74	74	74

Electrical output		Minimum of 0.5% to 99.5% applied volts
Resolution		Virtually infinite
Hysteresis (repeatability)		Less than 0.01mm
Operational temperature	**°C**	–30 to +100
Output smoothness		To MIL-R-39023 grade C 0.1%
Insulation resistance		Greater than 100MΩ at 500V d.c.
Operating mode		Voltage divider only - see Circuit Recommendations on page 2
Wiper circuit impedance		Minimum of 100 x track resistance or 0.5MΩ (whichever is greater)
Operating force maximum		
sealed	**gf**	500 in horizontal plane
unsealed	**gf**	250 in horizontal plane
Life at 250mm per second		Typically greater than 100 million operations (50 x 10^6 cycles) at 25mm stroke length
Dither life		200 million operations (100 x 10^6 cycles) at ±0.5mm, 60Hz
Sealing		IP50 standard - IP66 see options
Shaft seal life		20 million operations (10 x 10^6 cycles) - replaceable
Shaft velocity maximum	**m/s**	10

OPTIONS

Compact shaft	Compact shaft will reduce dimension D by 25mm
Integral shaft seal - IP 66	Designed to accept integral shaft seal to give IP66 rating
Extended cable length	10m output cable can be specified
Mounting	Body clamp or flange mounting kits can be supplied
Protective sleeve kit	For all stroke lengths - self aligning bearings only

AVAILABILITY

All options can be supplied within five days from the factory.

ORDERING CODES

SLS 190/...../...../...../...../.....

Electrical stroke
Resistance
Shaft L = long, C = compact
Cable 1 = 1m, 10 = 10m
Sealing 50 = IP50, 66 = IP66

Accessories (order separately)

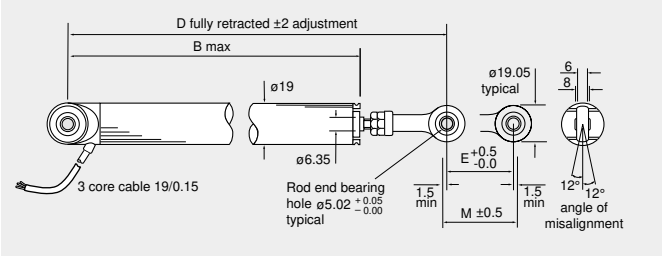
Mounting kits
- Body clamp kit - SA59019
- Flange kit - SA59020

Protective sleeve kit - SA201148/MK†

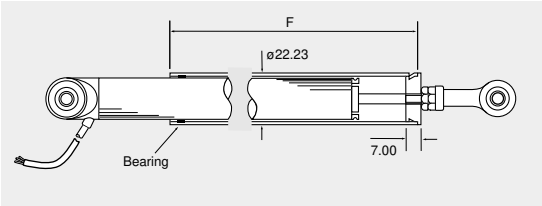
† Check with Penny & Giles for correct part number to match stroke and shaft combination

DIMENSIONS AND MOUNTING OPTIONS

SELF ALIGNING BEARING MOUNTING

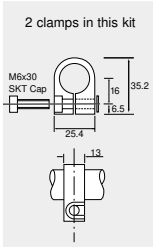


PROTECTIVE SLEEVE OPTION - SA201148/MK

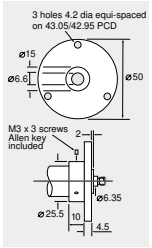


Note: Drawings not to scale

MOUNTING OPTIONS



Body clamp
SA59019

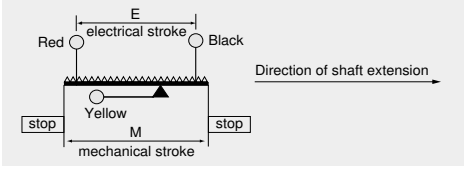


Flange mounting
SA59020

Electrical stroke E	**mm**	***25***	***50***	***75***	***100***	***125***	***150***	***175***	***200***	***225***	***250***	***275***	***300***	***325***	***350***
Mechanical stroke M	**mm**	***29***	***54***	***79***	***104***	***129***	***154***	***179***	***204***	***229***	***254***	***279***	***304***	***329***	***354***
Body length B	**mm**	110.5	135.5	160.5	210.5	235.5	260.5	285.5	310.5	333.5	360.5	385.5	435.5	460.5	485.5
Between centres D															
standard sensor (L)	**mm**	173.6	198.6	223.6	273.6	298.6	323.6	348.6	373.6	398.6	423.6	448.6	498.6	523.6	548.6
compact shaft sensor (C)	**mm**	148.6	173.6	198.6	248.6	273.6	298.6	323.6	348.6	373.6	398.6	423.6	473.6	498.6	523.6
Sleeve length F															
standard sensor (L)	**mm**	98	123	148	198	223	248	273	296	323	348	373	423	448	473
compact shaft sensor (C)	**mm**	73	98	123	173	198	223	248	273	296	323	348	398	423	448
Weight approximate															
standard sensor (L)	**g**	109	126	144	161	179	196	214	231	249	266	284	301	319	336
compact shaft sensor (C)	**g**	103	120	138	155	173	190	208	225	246	260	278	295	316	330

ELECTRICAL CONNECTIONS

3 core cable: PUR sheathed 1m long with ETFE insulated 19/0.15 cores.



SLS 220

SLS 220 linear displacement sensors have a 10mm or 20mm stroke range with a spring loaded operation and a mounting flange to allow easy installation. Contained within a high strength Nylatron® housing, this provides good chemical resistance and low weight. The internal potentiometer assembly is protected to IP66. Suited to OEM and process monitoring applications, this new sensor replaces Penny+Giles HLP 220 model.

PERFORMANCE

Electrical stroke E	**mm**	***10***	***20***
Resistance	**kΩ**	0.4 ±15%	0.8 ±10%
Independent linearity	**±%**	0.5	0.35
Power dissipation at 20°C	**W**	0.2	0.4
Applied voltage maximum	**Vdc**	8.9	17.9
Resolution		Virtually infinite	
Hysteresis (repeatability)		Less than 0.01mm	
Operational temperature	**°C**	–30 to +100	
Output smoothness		To MIL-R-39023 grade C 0.1%	
Insulation resistance		Greater than 100MΩ at 500V d.c.	
Operating mode		Voltage divider only - see Circuit Recommendations on page 2	
Wiper circuit impedance		Minimum of 100 x track resistance or 0.5MΩ (whichever is greater)	
Operating force maximum	**kgf**	4.0	
Life at 250mm per second		Typically greater than 20 million operations (10 x 10^6 cycles)	
Sealing		Internally sealed to IP66 (spring loaded plunger is unsealed, so care must be taken when selecting for environments which have a risk of particle contamination)	
Shaft velocity maximum	**m/s**	2.5	

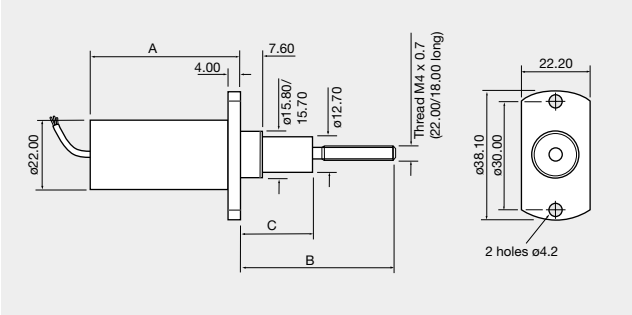
AVAILABILITY & ORDERING CODES

Supplied from stock or within five days from the factory

SLS 220/...../.....

Electrical stroke — Resistance

DIMENSIONS



Note: Drawings not to scale

Electrical stroke E	**mm**	***10***	***20***
Mechanical stroke M	**mm**	***12.5***	***22.5***
Body length A	**mm**	44.4	54.4
Shaft extended - B	**mm**	43	53
Shaft extended - C	**mm**	20	30
Weight approximate	**g**	45	50

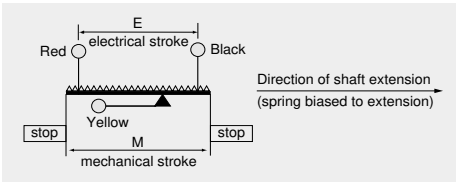
Note: Nominal shaft position is fully extended (spring loaded)

MATERIALS

Body	Nylatron® MC901 (blue)
Shaft	Stainless steel

ELECTRICAL CONNECTIONS

3 core cable: PUR sheathed 0.3m long with PTFE insulated 7/0.125 cores.



SLS 320

The SLS 320 range is designed to provide maximum performance benefits within a body diameter of 32mm, with stroke lengths from 250 to 1600mm.

With a choice of mounting options and accessories, this sensor is ideally suited to a wide range of heavier duty industrial applications, for medium to long stroke linear position sensing.

PERFORMANCE

Electrical stroke E	**mm**	***250***	***300***	***350***	***400***	***450***	***500***	***550***	***600***	***650***	***700***	***750***	***800***	***850***	***900***
Resistance ±10%	**kΩ**	10	12	14	16	18	20	22	24	26	28	30	32	34	36
Power dissipation at 20°C	**W**	5.0	6.0	7.0	8.0	9.0	10	11	12	13	14	15	16	17	18

Electrical stroke E	**mm**	***950***	***1000***	***1050***	***1100***	***1150***	***1200***	***1250***	***1300***	***1350***	***1400***	***1450***	***1500***	***1550***	***1600***
Resistance ±10%	**kΩ**	38	40	42	44	46	48	50	52	54	56	58	60	62	64
Power dissipation at 20°C	**W**	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Independent linearity		
guaranteed	**±%**	0.15
typical	**±%**	0.05
Applied voltage - maximum	**Vdc**	74
Electrical output		Minimum of 0.5% to 99.5% applied volts
Resolution		Virtually infinite
Hysteresis (repeatability)	**mm**	Less than 0.01
Operational temperature	**°C**	–30 to +100
Output smoothness		To MIL-R-39023 grade C 0.1%
Insulation resistance		Greater than 100MΩ at 500V d.c.
Operating mode		Voltage divider only - see Circuit Recommendations on page 2
Wiper circuit impedance		Minimum of 100 x track resistance or 0.5MΩ (whichever is greater)
Operating force - maximum		
sealed	**gf**	2000 in horizontal plane (break-out force 5000gf)
unsealed	**gf**	1500 in horizontal plane (break-out force 2000gf)
Life at 250mm per second		Typically in excess of 100 million operations (50 x 10^6 cycles) at 25mm stroke length
Dither life		200 million operations (100 x 10^6 cycles) at ±0.5mm, 60Hz
Sealing		IP50 standard - IP66 see options
Shaft seal life		20 million operations (10 x 10^6 cycles) - replaceable
Shaft velocity - maximum	**m/s**	10

OPTIONS

Compact shaft	Compact shaft will reduce dimension D by 50mm
Integral shaft seal - IP 66	Designed to accept integral shaft seal to give IP66 rating
Cabled socket	1m or 10m cabled socket assemblies available
Mounting	Body clamp or flange mounting kits can be supplied
Protective sleeve kit	For all stroke lengths - self aligning bearings only

AVAILABILITY

Up to 1100mm stroke - All configurations can be supplied within five days from the factory
1150 to 1600mm stroke - All configurations can be supplied within ten days from the factory

ORDERING CODES

SLS 320/...../..... K/...../...../.....

Electrical stroke
Resistance
Shaft L = long, C = compact
Cabled socket 00 = None, 01 = 1m, 10 = 10m
Sealing 50 = IP50, 66 = IP66

Accessories (order separately)

Mounting kits
- Body clamp kit - SA59661
- Flange kit - SA59660

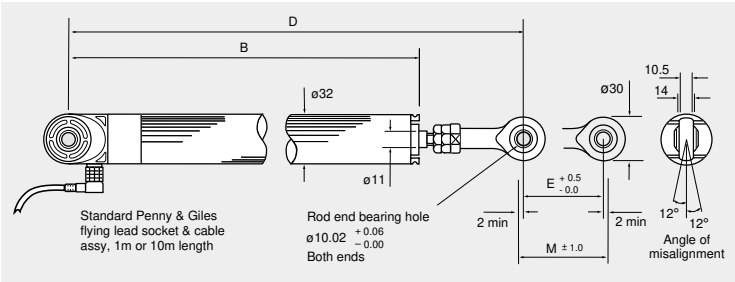
Protective sleeve kit - SA200991/MK†

† Check with Penny & Glies for correct part number to match stroke and shaft combination

DIMENSIONS AND MOUNTING OPTIONS

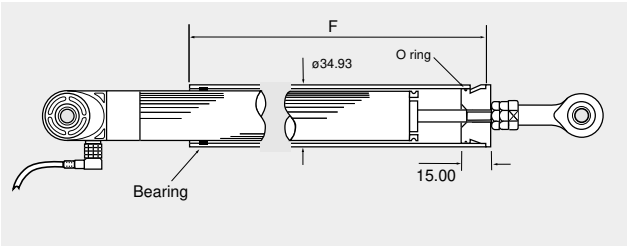
Mounting recommendations:
For units 1150 to 1600mm stroke, we recommend the use of body clamp or flange mounting kits to support the sensor when horizontally mounted. Alternatively, use the protective sleeve kit with the self aligning bearing mountings to provide increased rigidity.

SELF ALIGNING BEARING MOUNTING

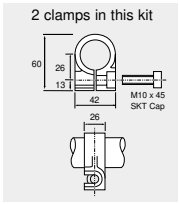


Note: Drawings not to scale

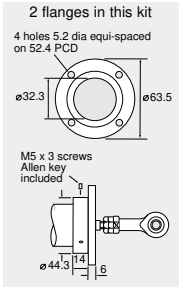
PROTECTIVE SLEEVE OPTION - SA200991/MK



MOUNTING OPTIONS



Body clamp
SA59661



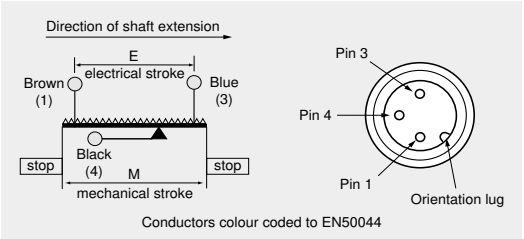
SA59660
Flange mounting

Electrical stroke E	**mm**	***250***	***300***	***350***	***400***	***450***	***500***	***550***	***600***	***650***	***700***	***750***	***800***	***850***	***900***
Mechanical stroke M	**mm**	***255***	***305***	***355***	***405***	***455***	***505***	***555***	***605***	***655***	***705***	***755***	***805***	***855***	***905***
Body length B	**mm**	366	416	466	516	601	651	701	751	801	851	901	986	1036	1086
Between centres D															
standard sensor (L)	**mm**	480	530	580	630	710	760	810	860	910	960	1010	1095	1145	1195
compact shaft sensor (C)	**mm**	430	480	530	580	660	710	760	810	860	910	960	1045	1095	1145
Sleeve length F															
standard sensor (L)	**mm**	370	420	470	520	605	655	705	755	805	855	905	990	1040	1090
compact shaft sensor (C)	**mm**	320	370	420	470	555	605	655	705	755	805	855	940	990	1040
Weight approximate (no sleeve)															
standard sensor (L)	**g**	590	673	756	839	922	1005	1088	1171	1254	1337	1420	1503	1586	1669
compact shaft sensor (C)	**g**	555	638	721	804	887	970	1053	1136	1219	1302	1385	1468	1551	1634

Electrical stroke E	**mm**	***950***	***1000***	***1050***	***1100***	***1150***	***1200***	***1250***	***1300***	***1350***	***1400***	***1450***	***1500***	***1550***	***1600***
Mechanical stroke M	**mm**	***955***	***1005***	***1055***	***1105***	***1155***	***1205***	***1255***	***1305***	***1355***	***1405***	***1455***	***1505***	***1555***	***1605***
Body length B	**mm**	1136	1186	1236	1286	1371	1421	1471	1521	1571	1621	1671	1721	1771	1821
Between centres D															
standard sensor (L)	**mm**	1245	1295	1345	1395	1480	1530	1580	1630	1680	1730	1780	1830	1880	1930
compact shaft sensor (C)	**mm**	1195	1245	1295	1345	1430	1480	1530	1580	1630	1680	1730	1780	1830	1880
Sleeve length F															
standard sensor (L)	**mm**	1140	1190	1240	1290	1375	1425	1475	1525	1575	1625	1675	1725	1775	1825
compact shaft sensor (C)	**mm**	1090	1140	1190	1240	1325	1375	1425	1475	1525	1575	1625	1675	1725	1775
Weight approximate (no sleeve)															
standard sensor (L)	**g**	1752	1835	1918	2000	2095	2190	2285	2380	2475	2570	2665	2760	2855	2950
compact shaft sensor (C)	**g**	1717	1800	1883	1965	2060	2155	2250	2345	2440	2535	2630	2725	2820	2915

ELECTRICAL CONNECTIONS

Right angled, cabled socket
E series M12 to IEC 60947-5-2 PUR jacket.
Conforms to DIN/VDE 0660 part 208A2



Cabled Socket
1 metre long No. x61-169-001
(Hirschmann No. 933 316-021/1m)
10 metres long No. x61-169-010
(Hirschmann No. 933 316-021/10m)

Specialised Designs

We have considerable experience in solving specific application problems by developing our standard designs to suit individual requirements. Custom-designed solutions are also provided where standard equipment does not fully meet our customer's needs.

ICS 100 In-Cylinder Sensors

Suitable for actuator strokes up to 1100mm

A range of In-Cylinder linear position sensors designed for integration into hydraulic and pneumatic actuators where the sensor is fitted inside the pressurised environment. Using the proven benefits of Hybrid Track Technology and including a number of unique design features, the ICS100 range is ideally suited to high volume OEM actuator manufacturers, where design engineers can specify an affordable alternative for applications where non-contacting technologies may prove too expensive.

Ask for our **ICS100 In-Cylinder Sensors** brochure for full details and designers guide. It can also be downloaded from our website at www.pennyandgiles.com

SLS 320 for heavy duty-cycle dynamic applications

A number of specialist applications have demanded an enhanced operating life beyond that capable of the standard SLS320 sealed linear sensor. To meet this requirement, we have developed an oil-filled version of the SLS320, which provides optimum lubrication for the track and sliding mechanism for increased operating life.

Typically the sensors are mounted parallel to actuators fitted to hydraulic motion bases operating leisure ride cabins at amusement parks around the world. Typically the motion bases run a three minute cycle time for up to 12 hours per day. This sensor is ideally suited to similar applications subjected to heavy duty dynamic movements.

SPECIFICATION SUMMARY

Refer to page 12 and 13 for full performance specification and dimensions

Electrical stroke E	**mm**	250 to 1100mm only
Sealing		IP66
Shaft seal life		20 million operations (10×10^6) - replaceable
Shaft velocity - maximum	**m/s**	10

OPTIONS

Compact shaft	Compact shaft will reduce dimension D (page 13) by 50mm
Cabled socket	1m or 10m cabled socket assemblies available
Mounting	Self aligning rod ends standard. Body clamp and flange kits available
Protective sleeve	For 250 to 1100mm stroke lengths - self aligning bearings only.

AVAILABILITY

Can be supplied within five days from the factory

ORDERING CODES

D45566/...../..... K/...../ 66 /.....

- Electrical stroke
- Resistance
- Shaft L = long, C = compact
- Cabled socket 00 = None, 01 = 1m, 10 = 10m

Accessories (order separately)

Mounting kits
- Body clamp kit - SA59661
- Flange kit - SA59660

Protective sleeve kit - SA200991/MK

Clamp sleeve (to allow SLS 320 to replace Penny & Giles HLP 350 in existing installations) - P200863 (2 per sensor)

Special SLS 190

This specially developed SLS 190 variant offers the same mounting dimensions as earlier HLP190 models, but incorporates additional shaft sealing not previously available. M5 steel rod end bearings are fitted, which has become a standard requirement in US NASCAR data acquisition systems. An optional LEMO connector can also be supplied fitted to the cable if required. These potentiometers are ideally suited for retrofit in existing suspension and throttle position applications and will provide high performance and reliability under extreme operating conditions.

PERFORMANCE

Electrical stroke E	**mm**	***25***	***50***	***75***	***100***	***125***	***150***	***200***	***250***
Resistance ±10%	**kΩ**	1	2	3	4	5	6	8	10
Independent linearity	**±%**	0.25	0.25	0.15	0.15	0.15	0.15	0.15	0.15
Power dissipation at 20°C	**W**	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0
Applied voltage maximum	**Vdc**	22	44	67	74	74	74	74	74
Electrical output		Minimum of 0.5% to 99.5% applied volts							
Resolution		Virtually infinite							
Hysteresis (repeatability)	**mm**	Less than 0.01							
Operational temperature	**°C**	–30 to +100							
Output smoothness		To MIL-R-39023 grade C 0.1%							
Insulation resistance		Greater than 100MΩ at 500V d.c.							
Operating mode		Voltage divider only - see Circuit Recommendation on page 2							
Wiper circuit impedance		Minimum of 100 x track resistance or 0.5MΩ (whichever is greater)							
Operating force maximum	**gf**	500 in horizontal plane							
Life at 250mm per second		Typically greater than 100 million operations (50 x 10^6 cycles) at 25mm stroke length							
Dither life		200 million operations (100 x 10^6 cycles) at ±0.5mm, 60Hz							
Shaft seal life		20 million operations (10 x 10^6 cycles) - replaceable							
Shaft velocity maximum	**m/s**	10							

OPTIONS

Connector — Can be supplied with LEMO PHGOB304 CYMD42Z connector and sleeve GMAOB035DG

AVAILABILITY

Please consult our sales office for details

ORDERING CODES

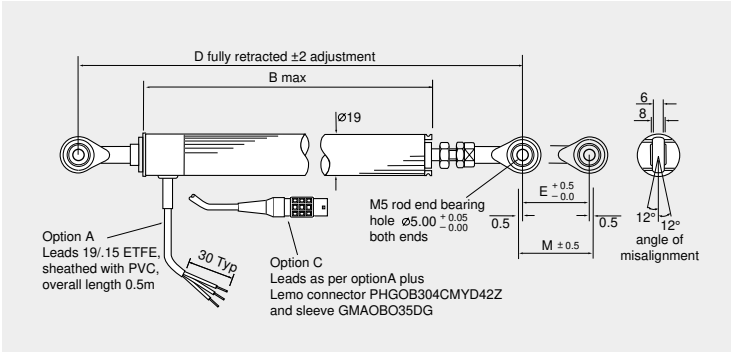
D45190/...../.....

Electrical stroke

A - no connector
C - with connector

DIMENSIONS

All dimensions shown in mm



Note: Drawings not to scale

Electrical stroke E	**mm**	***25***	***50***	***75***	***100***	***125***	***150***	***200***	***250***
Mechanical stroke M	**mm**	***29***	***54***	***79***	***104***	***129***	***154***	***204***	***254***
Body length B	**mm**	107.0	132.0	157.0	207.0	232.0	257.0	307.0	357.0
Between centres D	**mm**	173.6	198.6	223.6	273.6	298.6	323.6	373.6	423.6
Weight approximate	**gm**	105	130	145	175	190	205	230	260

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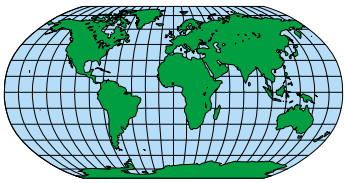
Contact Worldwide



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