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Sensors & Transducers



Thermocouples and Probes

Thermocouple Colour Code Changes

THERMOCOUPLE CABLE COLOUR CODING									
THERMOCOUPLE COMBINATION TYPE	EXTENSION CABLE	COMPENSATING CABLE	FORMER COLOUR CODING FOR THERMOCOUPLE EXTENSION & COMPENSATING CABLE						
			INTERNATIONAL COLOUR CODE TO IEC 584-2 (IEC PART 1) (SENSE)	INTERNATIONAL COLOUR CODE TO IEC 584-2 (IEC PART 2) (REF)	ISO 9001 TO IEC 16843	JAPANESE TO JEC 1619-1001	AMERICAN TO ANSI/ASME A59.1	GERMAN TO DIN 42674	FRENCH TO NFC 4224
K	KX		Blue	Green	Red	Blue	Yellow	Green	Purple
	KCA		Green	Blue					
	KCB		Green	Blue	Red	Blue			Brown
T	TX		Brown	Blue	Brown	Blue	Brown	Blue	Yellow
J	JX		Black	Black	Yellow	Black	Blue	Black	Black
N	NX		Pink	Blue	Orange		Orange		
E	EX		Purple	Blue	Brown	Pink	Pink	Black	Orange
R	RCA		Orange	Blue	Green	Black	Green	Black	
	RCB		Orange	Blue	Green	Black	Green	Black	
S	SCA		Orange	Blue	Green	Black	Green	Black	Yellow
	SCB		Orange	Blue	Green	Black	Green	Black	Green

Thermocouples can be manufactured in many styles, from a simple welded junction joining two dissimilar metals with extension leads to mineral insulated sensors with waterproof connecting heads and stainless steel adjustable process fittings. The thermocouples described on the following pages cover many designs and are suitable for a wide range of installations.

The information below is a guide to help select the thermocouple best suited for various applications, along with some definitions.

When connecting thermocouples, in order to maintain an accuracy of any given measuring system, it is imperative that the correct extension or compensating cable is used. A definition of compensating cable and extension cable is given below.

Glossary of Definitions

Thermoelectric (seebeck) effect

The production of an electromotive force (E), due to the difference of temperature between two junctions of different metals or alloys forming part of the same circuit.

Thermocouple

A pair of conductors of dissimilar materials joined at one end and forming part of an arrangement using the thermoelectric effect for temperature measurement.

Measuring junction

That junction which is subjected to the temperature to be measured.

Reference junction

That junction of the thermocouple which is at a known (reference) temperature to which the measuring temperature is compared.

Reference temperature

For the tables of this document, the reference temperature is 0°C.

Thermocouple Type Letter Designations

The following letter designations are established for thermocouple wire combinations as follows:

Letter	Thermocouple	Temp Range °C
T	Copper/copper-nickel	-150 to +350
J	Iron/copper-nickel	0 to +700
K	Nickel-chromium/nickel-aluminium	0 to +1200
N	Nickel-chromium-silicon/nickel-silicon	0 to +1250
S	Platinum 10% rhodium/platinum	0 to +1500
R	Platinum 13% rhodium/platinum	0 to +1600

When identifying noble or base metal thermocouples by their nominal alloy combinations, the positive leg will be listed first.

Extension cables

Extension cables are manufactured from conductors having the same nominal composition as those of the corresponding thermocouple. They are designated by the letter "X" following the designation of the thermocouple, for example "JX".

Compensating cables

Compensating cables are manufactured from conductors having a different composition from the corresponding thermocouple. They are designated by a letter "C" following the designation of the thermocouple, for example "KC". Different alloys may be used for the same thermocouple type. These are distinguished by using additional letters, for example, KCA and KCB.

Tolerance classes for thermocouples

SEN 60584-2 (IEC 584-2), reference junction at 0°C

Types	Tolerance Class 1	Tolerance Class 2
Type T		
Temperature range	-40°C to +125°C	-40°C to +133°C
Tolerance value	±0.5°C	±1°C
Temperature range	125°C to 350°C	133°C to 350°C
Tolerance value	±0.4%	±0.75%
Type J		
Temperature range	-40°C to +375°C	-40°C to +333°C
Tolerance value	±1.5°C	±2.5°C
Temperature range	375°C to 750°C	333°C to 750°C
Tolerance value	±0.4%	±0.75%
Type K, Type N		
Temperature range	-40°C to +375°C	-40°C to +333°C
Tolerance value	±1.5°C	±2.5°C
Temperature range	375°C to 1200°C	333°C to 1200°C
Tolerance value	±0.4%	±0.75%
Type R, Type S		
Temperature range	0°C to 1100°C	0°C to +600°C
Tolerance value	±1°C	±1.5°C
Temperature range	1100°C to 1600°C	600°C to 1600°C
Tolerance value	±(1 + 0.3% of T - 1100)°C	±0.25%

Thermocouple application guide

Immersion depth

The required depth of probe immersion at which no incorrect reading will occur due to insufficient immersion.

Response times

The time in which the probe will attain a proportion of the final medium temperature. Normally quoted as the time taken to achieve a percentage of a step temperature change. The probe construction, i.e. isolated or grounded junction, application and environment will affect response times.

Type T

Copper/Copper-Nickel — 150 to 350°C

Widely used to measure low temperatures, and in applications where moisture is present. May be used in oxidising, or reducing atmospheres.

Type J

Iron/Copper-Nickel — 0 to 700°C

May be used in oxidising atmospheres, limited to below 500°C in sulphurous atmospheres. Iron conductor liable to rust at low temperatures (ice point and below).

Type K

Nickel-Chromium/Nickel-Aluminium — 0 to 1200°C

Widely used thermocouple with a useful measuring range. Not recommended for sulphur bearing atmospheres or reducing atmospheres, but good resistance to oxidising atmosphere.

Type N

Nickel-Chromium-Silicon/Nickel-Silicon — 0 to 1250°C

Very good resistance to oxidising atmospheres, and may be used when good stability at high temperatures is required.

Type R/S

Platinum — 10% Rhodium/Platinum 0 to 1500°C

Platinum — 13% Rhodium/Platinum 0 to 1600°C

Recommended for very high temperature use in oxidising atmospheres. For some applications a secondary ceramic protective sheath is recommended.

The application guide above gives recommendations appertaining to the primary thermocouple wire. When protected by the appropriate outer sheath, some of the limitations given can be overcome.

212223

Thermocouple Installation

- Always observe colour codes and polarity of connection for each type of thermocouple. If the correct lead is used but crossed at both ends, the associated instrument will show an error equal to twice the temperature difference between the thermocouple termination and the instrument ambient.
- Avoid introducing 'different' metals into the cabling, preferably using compensating colour-coded connectors for the greatest accuracy, reliability and convenience of installation.
- To avoid inaccuracies avoid subjecting compensating cable to high temperatures. Extension cable is superior in this aspect.
- Do not form thermo-junctions using compensating cable: only extension cable is valid for this purpose.
- Use screened or braided cable connected to ground in any installation where ac pick-up or relay contact interference is likely. 'Twisted pair' construction is useful in such situations.
- For very long cable runs, ensure that cable resistance can be tolerated by the instrumentation without resulting in measurement errors. Modern electronic instruments usually accept up to 100 Ohms or so. They will usually tolerate higher lead resistance, but some error will result. Refer to relevant instrument specifications for full details.

- (g) Cabling is usually available with many different types of insulation material and outer covering to suit different applications. Choose carefully in consideration of ambient temperature, the presence of moisture of water and the need for abrasion resistance.
- (h) If errors or indicator anomalies occur, be sure to check the thermocouple, the cable, interconnections and the instrument. Many such problems are due to incorrect wiring or instrument calibration error, rather than the sensor.

Interchangeability is facilitated by the use of plug and socket connections. Special connectors are available for this purpose and thermocouple alloys or compensating materials are used for the pins and receptacles to avoid spurious thermal voltages. Such connectors are usually colour coded to indicate the relevant thermocouple type and are available as 'standard' size with round pins or 'miniature' size with flat pins.

Source: LABFACILITY TEMPERATURE HANDBOOK - Order Code 656-069.

229700

Thermocouple - Fine Wire, Welded Tip

Type K or T



- High sensitivity, exposed junction
- Thermocouples to IEC 60584
- 1/0.08mm single wires, 1m length
- PFA insulated wires, class 1
- Rated from -75 to +250°C



Order Multiple = Pack of 5		Price Per Pack			
Description	Mftrs. List No.	Order Code	1+	5+	10+
Type K tails	ZO-PFA-K-1 X 5	859-8240	74.80	67.61	61.98
Type T tails	ZO-PFA-T-1 X 5	859-8258	74.80	67.61	61.98

386285

Welded Tip Thermocouples - Types J, K & T

Fibre Glass Insulated and PTFE Insulated



Fibre glass insulated
PTFE insulated

- 1 metre and 2 metre long welded tip thermocouples
- Choice of insulation: varnish-impregnated fibre glass (suitable for temperatures up to 350°C) or PTFE (suitable up to 250°C) which is chemically inert
- Manufactured to international reference tables BS4937 (Part 3 for type J, Part 4 for Type K, Part 5 for Type T)



Insulation	Type J	Type K	Type T
Fibre Glass Insulated			
Wire diameter	1/0.315mm	1/0.315mm	1/0.315mm
Overall diameter	1.5mm	1.5mm	1.5mm
Temperature range	-50°C to +350°C	-50°C to +350°C	-50°C to +350°C
Positive leg	Iron	Nickel chromium	Iron
Negative leg	Constantan	Nickel aluminium	Constantan
PTFE Insulated		Type K	Type T
Wire diameter	—	1/0.2mm	1/0.2mm
Overall diameter	—	1.3mm	1.3mm
Temperature range	—	-50°C to +250°C	-50°C to +250°C
Positive leg	—	Nickel chromium	Copper
Negative leg	—	Nickel aluminium	Constantan

212204

Mftrs. List No.		Price Each			
Insulation	Order Code	1+	10+	25+	50+
Fibre Glass Insulated					
Type J, 2m	Z3-J-2M (IEC) 706-9212	16.70	15.53	14.53	13.61
Type K, 1m	Z3-K-1M (IEC) 706-9224	11.42	10.62	9.93	9.31
Type K, 2m	Z3-K-2M (IEC) 707-6137	16.83	15.65	14.64	13.72
Type T, 2m	Z3-T-2M (IEC) 707-6149	15.64	14.55	13.61	12.75
PTFE Insulated					
Type K, 1m	Z2-K-1M (IEC) 707-6150	9.17	8.53	7.98	7.48
Type K, 2m	Z2-K-2M (IEC) 707-6162	15.72	14.85	13.90	13.02
Type T, 1m	Z2-T-1M (IEC) 707-6174	8.25	7.67	7.18	6.72
Type T, 2m	Z2-T-2M (IEC) 707-6186	12.48	11.97	11.20	10.49

Probes Types J, K and T



Overall length = 207 (4.5mm dia type), 163 (3mm dia types), Probe length = 125, Probe diameter = 3.0 or 4.5 (type K), 3.0 (types J and T), Bush thread = 1/4"BSPT, Lead length = 1m

- Thermocouple mineral-insulated probes sheathed in stainless steel, intended for temperature measurement and control applications
- Probes have an adjustable brass coupling which may be secured at any position along the length of the body to give the required depth of insertion
- Coupling includes a sealing olive which provides a gas or liquid seal
- Fitted with 1 metre of PVC-sheathed thermocouple cable



Temperature range	Type J	Type K	Type T	Output	Type J	Type K	Type T
	-40°C to +750°C	-40°C to +1100°C	-40°C to +400°C		50µV/°C	40µV/°C	40µV/°C

212237

Probe Dia (mm)	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
Type J 3.0	T/C J 3MM (IEC)	707-7373	79.53	73.96	69.19
Type K 3.0	T/C K 3MM (IEC)	707-7385	90.42	84.09	78.67
Type K 4.5	T/C K 4.5MM (IEC)	707-7397	96.60	90.54	84.69
Type T 3.0	T/C T 3MM (IEC)	707-7403	80.85	75.19	70.34

Magnetic Strip Thermocouple

Type K



Size 50 x 25, Thickness = 1

- Fast response
- Attach to any ferro-magnetic surface
- Easy and quick to position
- Can be transferred to other positions without damage



Type K surface thermocouple using a flexible magnetic strip which can be attached to any ferro-magnetic surface.

The 2m lead is terminated with a miniature thermocouple plug

Temperature range	-50°C to +120°C	Lead	2m PTFE insulated, twisted pair
Mftrs. List Nos:	FMS-2/PLUG (IEC) = 707-7725		

212147

Order Code	1+	10+	25+
707-7725	38.72	34.93	31.03

Copper Disc Thermocouple



- Type K thermocouple junction brazed onto 7mm dia. copper disc
- Supplied with adhesive tape to attach to any clean surface for semi-permanent temperature measurement
- 5 adhesive tapes supplied. Tapes can also be used to secure 1m long flexible PTFE lead
- For use up to 200°C

212322

Mftrs. List No.	Order Code	1+	10+	25+
Z2-K-1M DISC (IEC)	721-8771	23.10	21.48	20.10



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Compliant
Non-compliant
+ Limited stock - RoHS replacement available
RoHS



Pipe Thermocouple - Adjustable Diameter
Type J or K - Up to 350°C



13 - 20mm diameter

- Grounded tip - Fast response
- Rated at 350°C
- Fits pipe diameters from 13mm to 55mm in 4 sizes
- Stainless steel pipe clamp
- Glassfibre stainless steel braided extension lead, 7/0.2mm

386272

Description	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
Type J, 2m lead					
13 to 20mm Dia.	FP-13/20-J-2M	859-7960	50.58	45.86	42.22
22 to 30mm Dia.	FP-22/30-J-2M	859-7979	50.58	45.86	42.22
30 to 45mm Dia.	FP-30/45-J-2M	859-7987	56.02	50.84	46.74
40 to 55mm Dia.	FP-40/55-J-2M	859-7995	56.02	50.84	46.74
Type K, 2m lead					
13 to 20mm Dia.	FP-13/20-K-2M	859-8002	55.79	50.55	46.42
22 to 30mm Dia.	FP-22/30-K-2M	859-8010	57.00	51.53	47.20
30 to 45mm Dia.	FP-30/45-K-2M	859-8029	57.00	51.53	47.20
40 to 55mm Dia.	FP-40/55-K-2M	859-8037	58.88	53.54	49.31

Leaf Thermocouple - Stainless Steel Shim
Type J or K - Up to 350°C



- Grounded tip - Fast response
- Rated at 350°C
- 2m glassfibre stainless steel braided extension cable, 7/0.2mm
- Stainless steel shim, 25mm long x 13mm wide

386275/406061

Description	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
Type J, 2m lead	FL-J-2M	859-7928	34.18	30.99	28.51
Type K, 2m lead	FL-K-2M	859-7936	36.91	33.46	30.82

Thermocouple - Washer Eyelet
Type J or K - Up to 350°C



- Grounded tip - Fast response
- Rated at 350°C
- 2m glassfibre stainless steel braided extension cable, 7/0.2mm
- Washer with 6mm clearance hole

386277/406071

Description	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
Type J, 2m lead	FW-J-2M	859-7944	35.61	32.19	29.52
Type K, 2m lead	FW-K-2M	859-7952	33.46	30.47	28.06

Mineral Insulated
310 Stainless Steel Sheath



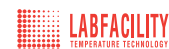
- Mineral Insulated construction
- Flexible for access to awkward locations
- Terminated with 1000mm PFA flat pair cable
- 310 Stainless steel sheath
- Operating temperature -100 to 1100°C

Mineral insulated thermocouples are extremely rugged and able to withstand temperatures up to 1100°C (pot seal max. temp. 200°C). They are available in three thermocouple types J, K, and T. These probes can be bent to enable fitting in awkward locations. They are particularly suitable for industrial applications including high pressure, high vacuum and high vibration. The thermocouple junction is located at the tip of the sensor and is insulated from the sheath.

415594

Probe Size Dia x L (mm)	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
J Type					
1.5 x 150	91-9326-03	101-0213	57.29	52.76	48.89
1.5 x 250	91-9327-03	101-0214	58.46	53.87	49.93
1.5 x 150	91-9328-03	101-0215	57.94	53.38	49.48
3 x 250	91-9329-03	101-0216	59.60	54.91	50.88
6 x 150	91-9330-03	101-0217	73.07	67.31	62.40
6 x 250	91-9331-03	101-0218	77.53	71.41	66.21
K Type					
1.5 x 150	91-9332-03	101-0221	57.29	52.76	48.89
1.5 x 250	91-9333-03	101-0222	58.46	53.87	49.93
3 x 150	91-9334-03	101-0223	57.94	53.38	49.48
3 x 250	91-9335-03	101-0224	59.60	54.91	50.88
6 x 150	91-9336-03	101-0225	73.07	67.31	62.40
6 x 250	91-9337-03	101-0226	77.53	71.41	66.21
T Type					
1.5 x 150	91-9341-03	101-0227	68.78	63.34	58.72
1.5 x 250	91-9342-03	101-0228	69.43	63.96	59.27
1.5 x 150	91-9343-03	101-0229	70.31	64.74	60.02
3 x 250	91-9344-03	101-0230	71.41	65.78	60.97
6 x 150	91-9345-03	101-0231	74.21	68.36	63.34
6 x 250	91-9346-03	101-0233	76.39	70.37	65.23

Industrial Mineral Insulated Probes



Type K



- Type K mineral-insulated stainless steel sheathed probes particularly suitable for industrial applications
- Suitable for applications up to 1100 °C
- Probes can be bent to enable fitting in awkward locations
- High reliability and stability

The thermocouple junction is located at the tip and insulated from the sheath. Smaller diameter thermocouples respond to temperature changes more rapidly than larger diameters, but larger diameters are mechanically stronger. Available in a range of lengths and diameters.

Sheath material	310 stainless steel
Temperature range of probe	-40°C to 1100°C
Pot seal	M8 x 1.0mm thread L=25
Pot temperature	200°C max.
Leads	PTFE insulated 7/0.2 mm, L = 100

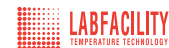
Mftrs List No: KML/probe dia. probe length (IEC)

FOR SUITABLE COMPRESSION GLANDS SEE ORDER CODE 708-8206

222133

Probe Dia. (mm)	Probe L (mm)	Order Code	Price Each		
			1+	10+	25+
0.5	150	721-8898	84.81	78.87	73.78
0.5	250	NEW 424-8170	79.20	73.66	68.90
0.5	500	NEW 424-8181	90.00	84.40	78.95
1	150	707-8110	53.79	50.02	46.80
1	250	707-8122	53.04	51.56	48.23
1	500	707-8134	59.28	57.70	53.97
1.5	150	707-8146	37.95	35.29	33.02
1.5	250	707-8158	39.60	36.83	34.45
1.5	500	707-8160	40.66	37.81	35.38
1.5	1000	707-8171	47.52	44.19	41.34
3	150	707-8183	42.24	39.28	36.75
3	250	707-8195	43.23	40.20	37.61
3	500	707-8201	45.21	42.05	39.33
3	1000	707-8213	56.10	52.17	48.81
6	250	707-8225	67.65	62.91	58.86
6	500	707-8237	74.25	69.05	64.60
Probes with Grounded Junction					
0.5	150	424-8417	64.68	60.15	56.27
0.5	250	424-8429	66.00	61.38	57.42
0.5	500	424-8430	75.90	70.59	66.03

Heavy Duty Thermocouples



Probe L = 150, Dia = 4.76, Lead L = 2mx7/0.2

Mftrs. List No. J-HD-150X(IEC) = 707 9436, K-HD-150X(IEC) = 707 9448

- Low-cost, heavy-duty, stainless steel thermocouples for a variety of applications up to 350°C
- Probes have grounded junctions for fast response
- 2 metre leads of rugged, stainless steel braided, fibreglass



212221

	Order Code	1+	10+	25+
Type J	707-9436	42.06	37.14	33.74
Type K	707-9448	42.06	37.14	33.74

Industrial - Mineral Insulated
310 Stainless Steel Sheath



These industrial style sensors use a mineral insulated thermocouple which is housed in a 6mm diameter, 310 stainless steel, closed end sheath. They are terminated in an aluminium IP 67 connection box which has a terminal block fitted for easy connection.



- Probe diameter 6mm
- Insulated hot junction
- IP 67 Terminal head
- 310 Stainless steel sheath
- Operating temperature -100 to 1100°C

415535

Probe Length	Mftrs. List No.	Order Code	1+	10+	25+
J Type					
150mm	91-9320-03	101-0206	116.27	107.09	99.24
250mm	91-9321-03	101-0208	125.09	115.23	106.80
500mm	91-9322-03	101-0209	143.71	132.35	122.68
K Type					
150mm	91-9323-03	101-0210	116.27	107.09	99.24
250mm	91-9324-03	101-0211	125.09	115.23	106.80
500mm	91-9325-03	101-0212	143.71	132.35	122.68

Industrial Process Probes - Type K



Probes: Dia. = 6, L = 100, 150
Mounting: 1/2" BSPP male thread

Lagging extension:
Dia. = 12.7, L = 75

- Accurate rugged construction
- Terminal head can accommodate DIN form transmitter or DIN terminal blocks
- Sensor is thermocouple type K to IEC 584-3, insulated from sheath
- Suitable for a wide range of industrial applications
- Wide temperature range: -100°C to +1100°C
- All stainless steel below aluminium head
- IP67 rated
- DIN terminal block is made of high temperature green plastic and has 2 terminals

This industrial thermocouple is mounted into the process via 1/2" BSPP male thread below which the probe length is measured. Above the thread hexagon is a stainless steel lagging extension. The sensor has a fitted aluminium terminal head with a captive threaded cover.

FOR SUITABLE THERMOCOUPLE 4 - 20MA TRANSMITTER, SEE ORDER CODE 615-687

222171

Probe Length	Mftrs. List No.	Order Code	1+	5+	10+
100mm	010012TD	725-5603	157.50	146.48	138.60
150mm	010013TD	725-5615	165.38	153.81	145.53
Terminal Block	HT-055	725-5627	16.38	15.25	14.43

Adjustable Bayonet Thermocouple
Types J and K



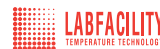
- Adjustable bayonet thermocouples designed primarily for the plastics and packaging industry, but recommended wherever spring loaded contact is required

- Thermocouple junction is housed in a rugged stainless steel tip
- Supplied with 2 metres of stainless steel braided lead fitted with a 170mm spring with adjustable fixing cap
- Separate bayonet adaptor locates via a 1/8" BSP male thread
- Fixing cap of the thermocouple is fitted to the adaptor to ensure secure spring loaded contact
- Suitable for temperatures up to 350°C

212338

Mftrs. List No.	Order Code	1+	10+	25+	50+
Type J J-ABT-2 (IEC)	707-9801	42.64	40.10	38.15	36.29
Type K K-ABT-2 (IEC)	707-9813	50.16	46.65	43.64	40.88
Adaptor	152-239	9.17	8.53	7.98	7.48

Welded Tip Thermocouples with Fitted Plugs



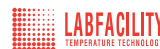
These Welded Tip Thermocouples are available in either PTFE or Glassfibre insulation. Complete with a miniature thermocouple plug fitted, they are ready to use for most types of temperature measurement.

- Available as 1/0.2mm PTFE and 1/0.315mm Glassfibre Insulated construction
- Thermocouple types J, K, & T
- PTFE Insulation rating -75°C to +250°C
- Glassfibre Insulation rating -50°C to +350°C
- Fitted with a miniature thermocouple plug
- PTFE 1M long, glassfibre 2m long

249384

PTFE x 1m	Order Code	1+	10+	25+
Type J	410-0736	13.60	12.64	11.83
Type K	410-0748	14.26	13.57	13.18
Type T	410-0750	13.86	12.89	12.06
Glass fibre x 2m				
Type J	410-0761	20.46	19.03	17.80
Type K	410-0773	20.46	19.03	17.80

Thermocouple - Welded Tip
Types J, K, T & N



Type K, tails



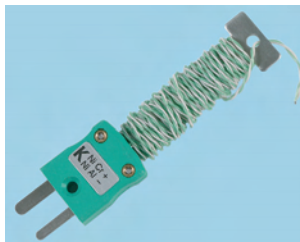
Type K, mini-plug

- Fast response, exposed junction
- Thermocouples to IEC 60584
- 1/0.2mm twin twist wires
- PTFE insulated wires, class 1
- Rated from -75 to +250°C

386293

Order Multiple = Pack of 5		Price Per Pack			
Description	Mftrs. List No.	Order Code	1+	5+	10+
2m twin twist cable					
Type K tails	Z2-K-2 X 5	859-8150	83.65	74.80	67.93
Type T tails	Z2-T-2 X 5	859-8169	61.00	55.24	50.78
Type T tails	Z2-N-2 X 5	859-8177	87.69	78.35	71.15
Type K mini-plug	Z2-K-2-MP X 5	859-8185	66.92	60.87	56.05
Type T mini-plug	Z2-T-2-MP X 5	859-8193	81.64	72.75	65.95
Type N mini-plug	Z2-N-2-MP X 5	859-8207	94.59	85.35	78.09
Type J mini-plug	Z2-J-2-MP X 5	859-8215	83.65	73.95	66.60
1m twin twist cable					
Type K tails	Z2-K-1 X 5	859-8223	46.71	41.83	38.12
Type T tails	Z2-T-1 X 5	859-8231	42.22	38.08	34.83

Thermocouple - Fine Wire
Type K or T - 220°C



- Class 1 PFA insulated wire - High accuracy
- Rated at 220°C continuous (plug), 250°C (PFA)
- 2m wire stored on stainless steel stem with fitted mini-plug
- High sensitivity, fast response

386279

Description	Mftrs. List No.	Order Code	1+	5+	10+
Type K, 2m lead length					
Twin twist, 1/0.2mm	CT-Z2-PFA-K-2	859-8118	43.52	39.58	36.42
Flat pair, 1/0.315mm	CT-Z4-PFA-K-2	859-8126	50.22	45.64	42.02
Type T, 2m lead length					
Twin twist, 1/0.2mm	CT-Z2-PFA-T-2	859-8134	40.17	36.49	33.62
Flat pair, 1/0.315mm	CT-Z4-PFA-T-2	859-8142	46.84	42.61	39.26



Industrial Mineral Insulated Probes

Type K With 1m Lead



Mineral insulated thermocouples are extremely rugged and flexible, able to withstand temperatures up to 1100°C (pot seal max temp 180°C).

The probes can be bent to enable fitting in awkward locations, they are particularly suitable for industrial applications including high pressure, high vacuum, and high vibration.

The thermocouple junction is located at the tip of the sensor and is insulated from the sheath

- Type K mineral insulated thermocouples
- Stainless Steel (316)
- Very Flexible
- Plain pot seal
- 1m PTFE flat pair 7/0.2mm cable
- Duplex types (2 thermocouples in one probe) available

FOR SUITABLE COMPRESSION GLANDS SEE ORDER CODE 708-8206

249373

Probe Dia. (mm)	Probe L (mm)	Order Code	Price Each		
			1+	5+	10+
Standard Thermocouple					
1.5	150	424-8193	47.66	45.27	40.76
1.5	250	424-8200	48.82	46.40	41.74
3	150	424-8211	50.62	48.10	43.28
3	250	424-8223	52.10	49.49	44.54
6	150	424-8235	57.33	54.50	49.05
6	250	424-8247	62.75	59.60	53.61
Duplex Thermocouple					
3	150	424-8259	85.18	80.92	72.83
3	250	424-8260	91.41	86.85	78.15
6	150	424-8272	85.18	80.92	72.83
6	250	424-8284	91.41	86.85	78.15

Industrial Mineral Insulated Probes

Type K With Miniature Plug



Mineral insulated thermocouples are extremely rugged and flexible, able to withstand temperatures up to 1100°C (plug max temp 220°C).

The probes can be bent to enable fitting in awkward locations, they are particularly suitable for industrial applications including high pressure, high vacuum, and high vibration.

The thermocouple junction is located at the tip of the sensor and is insulated from the sheath

- Type K mineral insulated thermocouples
- Stainless Steel (316)
- Very Flexible
- Direct connection to miniature plug

FOR SUITABLE COMPRESSION GLANDS SEE ORDER CODE 708-8206

249378/406072

Probe Dia. (mm)	Probe L (mm)	Order Code	Price Each		
			1+	5+	10+
Standard Thermocouple					
0.5	150	424-8296	81.90	77.81	70.06
0.5	250	424-8302	90.09	85.62	77.05
1.5	150	424-8314	42.75	40.64	36.57
1.5	250	424-8326	43.91	41.71	37.55
3	150	424-8338	43.41	41.23	37.11
3	250	424-8340	44.89	42.65	38.40
Grounded Junction Thermocouple					
0.5	150	424-8442	81.90	77.81	70.06
0.5	250	424-8454	90.09	85.62	77.05

Melt Thermocouple - Bolt Sensor

Type J - Up to 450°C



- Robust construction - Withstands high pressures and temperatures
- Bolt length 76 or 152mm
- Rated 450°C (sensor), 220°C (connector). Insulated junction
- Suitable for wide range of extruders and moulders
- 310 stainless steel: 1/2" UNF 20 thread
- Sheath; immersion depth 5mm, diameter 3mm

386264

Description	Mfrs. List No.	Order Code	Price Each		
			1+	5+	10+
76mm Length	FM-J-U-76-5	859-8061	163.76	148.04	135.70
152mm Length	FM-J-U-152-5	859-8070	197.77	177.59	161.90

Nozzle Thermocouple - Threaded Bolt

Type J or K - Up to 350°C



- Grounded tip - Fast response
- Adjustable insertion
- Not sealed
- Tip shape matches drill angle in blind holes
- M6 x 1mm threaded stainless steel bolt
- Glassfibre stainless steel braided extension lead, 7/0.2mm

386270

Description	Mfrs. List No.	Order Code	Price Each		
			1+	10+	25+
Type J, 2m lead	FN-J-2M	859-8045	47.82	43.39	39.94
Type K, 2m lead	FN-K-2M	859-8053	51.23	46.48	42.77

Handheld Probes - Type K



Fixed Probes



Insertion
Overall L=200
Probe L=105
Dia=3.3
Lead L=2m



Surface, disc
Overall L=195, Probe L=80, Dia=4.7, Lead L=1.5m

Surface, coil
Overall L=220, Probe L=108, Dia=7.9, Lead L=1.5m

Air
Overall L=187, Probe L=74, Dia=4.7, Lead=1.5m

- Hand-held type K thermocouple probes with stainless steel sheath
- Fitted with coiled PVC lead terminated with miniature thermocouple plug

Insertion probe: Tapered tip suitable for general purpose temperature measurement, immersion in liquids and penetration of semi-solids and solids including frozen food, grain etc. Maximum temperature 400°C.

Choice of **surface probes:** **Disc-type** features a spring-loaded thermocouple with copper 4mm diameter disc tip, operates up to 850°C. **Coil type** features a ceramic tip and coiled element for fast response, improved accuracy and maximum temperature of 900°C. Diameter of coiled element is 5.5mm.

Air probes: Thermocouple junction protected by perforated sheath allowing the free passage of gases, for fast response measurement up to 750°C.

212446

Type	Mfrs. List No.	Order Code	Price Each		
			1+	10+	25+
Insertion	Q-K (IEC)	708-1170	106.66	96.11	91.70
Surface, disc	A-K (IEC)	708-1182	82.49	77.12	69.49
Surface, coil	C-K (IEC)	708-1194	92.87	86.59	78.56
Air	L-K (IEC)	708-1200	74.99	66.43	61.08

Handheld Probes - Type K



Exchangeable Probes



Probes:-
Gen. Purpose: Ø=4.8, L=150
Surface: Ø=4.7, L=80
Air/gas: Ø=4, L=90, Insertion: Ø=3.2 L=100,
High temp: Ø=3, L=200

- A range of probes for general purpose, insertion, air/gas, surface, and high temperature measurement
- An economical solution to multi-application temperature measurement
- Universal handle suits range of plug-in probes

The stainless steel probes are terminated directly with miniature thermocouple plugs allowing direct connection to thermocouple instruments and circuits or plugging in to the universal handle.

The universal handle has a miniature socket allowing any plug-in probe to be fitted to form a complete hand-held sensor and also has an extendible coiled lead with miniature plug for connection to instruments.

Probe	Temperature	Features
General purpose	350° C (max)	General purpose probe
Surface	850° C (Max)	Spring loaded copper disc tip
Air/gas	750° C (Max)	Fast response
Insertion	350° C (Max)	Chisel tip
High temperature	1100° C (Max)	Bendable mineral insulation probe
Handle		Nylon, with 1.5cm coiled lead and miniature plug

212331

	Mfrs. List No.	Order Code	Price Each		
			1+	10+	25+
Handle	HH-PL-K (IEC)	708-1595	32.55	--	--
Surface probe	A-PL-K (IEC)	708-1601	62.24	54.78	49.80
General purpose probe	M-PL-K (IEC)	708-1613	39.31	34.59	31.44
Air/gas probe	L-PL-K (IEC)	708-1625	65.52	57.65	52.42
Insertion probe	F2-PL-K (IEC)	708-1637	55.69	49.01	44.54
High temperature probe	E2-PL-K (IEC)	708-1649	72.07	63.41	57.64

Thermocouple Cables

General Data

Thermocouple Extension and Compensation Cable

Extension cable has a temperature v e.m.f. relationship to the appropriate standard over the complete temperature range. It can, therefore, be used for producing a thermocouple junction and for joining thermocouples to their measuring instruments. It is limited in temperature, only by the rating of its insulation.

Compensating cable is of different composition to extension cable but has a similar temperature v e.m.f. relationship over a limited range, and **should only be used for joining thermocouples to their measuring instruments**. It can only be used in a limited ambient temperature, generally not higher than 80°C.

Ordinary copper wires and connectors should never be used to join thermocouples to instruments-substantial errors can result. Use only thermocouples compensating or extension cable and thermocouple connectors.

Guide to wire and Cable Insulation

Insulation Material	Usable Temperature Range	Application Guide
PVC	-10°C to 105°C	Good general-purpose insulation for 'light' environments. Waterproof and very flexible.
PTFE	-75°C to 250/300°C	Resistant to oils, acids, other adverse agents and fluids. Good mechanical strength and flexibility.
Glass-fibre (varnished)	-60°C to 350/400°C	Good temperature range but will not prevent ingress of fluids. Fairly flexible but does not provide good mechanical protection.
Glass-fibre (varnished) stainless steel overbraid	-60°C to 350/400°C	Good resistance to physical disturbance and high temperature (up to 400°C). Will not prevent ingress of fluids.

Single or Multi-Strand?

The choice is mainly determined by the application (e.g. termination considerations and internal diameter of associated sheath). Generally, single-strand wires are used for thermocouple junctions and multi-strand or thicker single-strand for extensions of the thermocouple. The greater the effective conductor diameter, the lower the value of thermocouple loop resistance, an important consideration with long cable runs.

Source: LABFACILITY TEMPERATURE HANDBOOK- Order Code 656-069.

229884

Thermocouple Cables Type J & K

PVC Flat Pair



Un-screened Type J

386260

Description	Mfrs. List No.	Order Code	Price Each		
			1+	10+	+
Unscreened 7/0.2 100m					
Type K	WK-150	859-8460	199.61000	181.49510	--
Type J	WJ-200	859-8479	128.06000	114.73600	--
Screened Extension Cable, 7/0.2					
Type K, 100m	WK-359	859-8487	275.34000	250.33000	--
Type J, 100m	WJ-241	859-8495	219.70000	198.56990	--
Type J, 50m	WJ-241	859-8509	118.32000	107.16950	--
Type J, 10m	WJ-241	859-8517	31.34000	28.08972	--

Extension Cable and Compensating Cable, PVC

Types J, K, T, N, R/S and Vx



Colour coded to BS4937 Part 30:1993.

Extension Cable

Extension cable suitable for thermocouples. The cable is 7/0.2 twin flat with PVC covered conductors with an overall sheath of PVC. The cable is ideally suited for extending thermocouples away from the heat source via the connectors listed below.

Compensating Cable (Type K)

The Vx cable is type K compensating at ambient temperatures up to 80°C.



Mfrs. List No.	WJ-200/10M (IEC)	= 708-2289	WV-100/25M (IEC)	= 708-2370
	WJ-200/50M (IEC)	= 708-2290	WJ-200/10M (IEC)	= 708-2289
	WK-150/10M (IEC)	= 708-2307	WT-009/50M (IEC)	= 708-2368
	WK-150/50M (IEC)	= 708-2319	WV-009/25M (IEC)	= 708-2393
	WN-001/10M (IEC)	= 708-2320	WV-009/100M (IEC)	= 708-2400
	WT-200/50M (IEC)	= 708-2344	WU-100/100M (IEC)	= 708-2423

212432

Extension Cable	Order Code	Price Each			
		1+	5+	+	+
Type J, 7/0.2mm 10m	708-2289	18.78	17.00	--	--
Type J, 7/0.2mm 50m	708-2290	93.03	86.73	--	--
Type K, 7/0.2mm 10m	708-2307	37.87	35.75	--	--
Type K, 7/0.2mm 50m	708-2319	182.25	173.49	--	--
Type N, 7/0.2mm 10m	708-2320	31.30	28.17	--	--
Type T, 7/0.2mm 50m	708-2344	86.94	78.25	--	--
Type T, 13/0.2mm 50m	708-2368	104.32	93.89	--	--
Compensating Cable					
Type Vx (K), 7/0.2mm 25m	708-2370	34.74	31.37	--	--
Type Vx (K), 13/0.2mm 25m	708-2393	52.16	46.95	--	--
Type Vx (K), 13/0.2mm 100m	708-2400	170.40	153.36	--	--
Type RC/SC, 13/0.2mm 100m	708-2423	170.40	153.36	--	--

Extension Cable, PTFE

Types K and T



- Flexible extension cable for types K and T thermocouples
- Comprises pair of PTFE-insulated flexible conductors with overall flat PTFE sheath
- Good chemical resistance

Conductor size	7/0.2mmmm
Approx. overall size	2.4 x 2mm
Maximum continuous temperature	250°C

212332



	Mfrs. List No.	Order Code	Price Each		
			1+	10+	+
Type K, 25m	WK-302/25M (IEC)	708-5904	159.27	143.35	--
Type T, 25m	WT-046/25M (IEC)	708-5916	146.06	131.45	--

Extension Cable, Glass Fibre Insulated

Types J, K and T



- Suitable for high ambient temperature applications
- Each conductor insulated with silicon varnish-impregnated fibre glass
- Overall fibre glass sheath impregnated with silicon varnish

	Type J	Type K
Wire diameter	1/0.315mm	1/0.315mm
Overall diameter	1.5mm	1.5mm
Max continuous temperature	350°C	350°C
Positive conductor	Iron	Nickel chromium
Negative conductor	Constantan	Nickel chromium

212438

	Mfrs. List No.	Order Code	Price Each		
			1+	10+	+
Type J, 10m coil	WJ-032/10M (IEC)	708-5928	26.18	24.20	--
Type K, 10m coil	WK-041/10M (IEC)	708-5930	26.18	24.20	--
Type K, 50m reel	WK-041/50M (IEC)	708-5941	130.23	115.04	--
Type T, 10m coil	WT-056/10M (IEC)	708-5953	26.60	23.48	--

Extension Cable with Stainless Steel Overbraid

Glass Fibre, Types J and K



- Rugged extension cable for types J and K thermocouples
- Excellent mechanical protection
- Flexibility
- High temperature resistance
- Overbraid can be used for electrical screening

Conductor size	7/0.2mmmm
Approx. overall size	1.6 x 2.4mm
Maximum continuous temperature	350°C

Cable comprises one pair of glass fibre insulated flexible conductors, a glass fibre sheath and an overall rugged stainless steel braid.

212333

	Mfrs. List No.	Order Code	Price Each		
			1+	10+	+
Type K 25m	WK-075/25M (IEC)	708-6337	159.96	143.97	--
Type J 25m	WJ-040/25M (IEC)	708-6349	121.71	109.55	--



Screened Extension and Compensating Cable
Types K and Vx



Screened thermocouple cable reducing electromagnetic and electrostatic interference of thermocouple signals. The cable comprises one pair of stranded 7/0.2mm conductors, PVC insulated and twisted together. The pair are screened with mylar/aluminium tape in contact throughout with a copper drain wire. The cable has an overall round PVC sheath, approximate diameter 5mm.

Maximum temperature 105°C (type K) and 80°C (type Vx).

Mftrs. List No. WK-074/10M (IEC) = 708-6131, WK-074/50M (IEC) = 708-6143, WV-029/100M (IEC) = 708-6155

212222

	Order Code	Price Each			
		1+	10+	+	
Extension Cable					
Type K 10m coil	708-6131	48.37	42.74	--	
Type K 50m coil	708-6143	223.11	196.83	--	
Compensating Cable					
Type Vx (K) 100m reel	708-6155	161.88	142.96	--	

Thermocouple wire, PTFE TW-TW



- PTFE insulated, twin-twist construction
- 1/0.2mm diameter conductor
- Thermocouple types J, K, T
- High accuracy Class 1 tolerance
- Insulation rating -75°C to +250°C
- Supplied on 25m reels

231796

Thermocouple Type	Order Code	Price Each			
		1+	10+	+	
Type J x 25M Reel	335-8150	42.59	40.45	--	
Type K x 25M Reel	335-8161	39.31	37.36	--	
Type T x 25M Reel	335-8173	34.07	32.38	--	

Thermocouple Connectors and Accessories

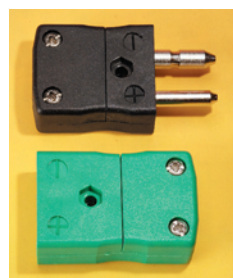
Thermocouple Connectors

General Data

- Designed and manufactured under strict ISO 9000:2000 disciplines
- Full compliance to CENELEC specifications IEC, ANSI, DIN & JIS colour coding
- Contacts made from thermocouple material
- Calibration types J,K,T,E,R,S,N & Cu(B)
- Terminal cable clamping plates
- Polarised terminals guarantee correct polarity
- Compatibility with other makes of connectors
- High accuracy compensated connections

231271

Connectors - Standard Types
J, K, R/S, T and Copper



- A range of standard sized connectors with round pins to suit the thermocouple type being used
- Intended for use in more industrial applications
- All contacts are polarised to ensure correct connection
- Maximum continuous operating temperature 220°C
- Cable clamps available for securing cable to free plugs and sockets
- Colour coded to **BS4937 Part30:1993**

212475

Line Plug	Order Code	Price Each				
		1+	10+	25+	100+	+
Type J	148-823	9.68	9.21	8.70	8.50	--
Type K	708-7925	9.68	9.21	8.70	8.19	--
Type T	NEW 381-0215	9.70	9.69	8.70	8.19	--
Type R	708-7950	9.68	9.21	8.70	8.19	--
Line Socket						
Type J	148-824	8.85	8.41	7.99	7.51	--
Type K	708-7937	8.85	8.41	7.99	7.51	--
Type T	NEW 381-0240	8.85	8.41	7.99	7.51	--
Type R	708-7962	8.85	8.41	7.99	7.51	--
Copper	NEW 381-0252	8.85	8.41	7.99	7.51	--

Connectors, Standard, Quick Wire
Types J and K

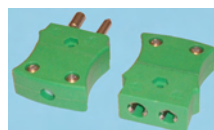


- Physically compatible with alternative standard, round pin connectors
- These quick connect versions allow rapid termination
- Quick, easy 'jab-in' connection just push in wire and tighten screw
- Wide range of wire sizes
- 220°C continuous rating
- IEC colour coded bodies to **BS4937 Part 30:1993**

231221

Mftrs. List No.	Order Code	Price Each				
		1+	10+	25+	50+	+
Quick Wire Plug						
Type J IS-J-MQ	381-0264	9.90	9.21	8.61	8.07	--
Type K IS-K-MQ	381-0276	9.90	9.21	8.61	8.07	--
Quick Wire Socket						
Type J IS-J-FQ	381-0320	10.61	10.19	9.53	8.93	--
Type K IS-K-FQ	381-0331	10.61	10.19	9.53	8.93	--
Accessories						
Cable Clamp FSTC-EXCL	674-084	5.79	5.52	5.17	4.84	--

Thermocouple Connectors
Standard In-Line



A range of standard thermocouple connectors uniquely shaped allowing ease of use. Constructed as a one-piece moulding giving superior strength and quality. The use of thermocouple grade alloys ensures error free connections. Pins are polarised and are marked with positive and negative polarity.

NEW

- Contacts made from thermocouple grade material
- Uniquely shaped for ease of use
- Polarised contacts
- 6mm cable entry
- Maximum temperature = 220°C

415750

Type	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
In-Line Plug - Standard					
J	91-9463-04	101-0263	9.63	9.28	8.56
K	91-9464-04	101-0264	9.63	9.28	8.56
T	91-9465-04	101-0265	9.63	9.28	8.56
Cu	91-9466-04	101-0266	9.63	9.28	8.56
In-Line Socket - Standard					
J	91-9467-04	101-0267	6.80	6.51	6.02
K	91-9468-04	101-0269	6.80	6.51	6.02
T	91-9469-04	101-0271	6.80	6.51	6.02
Cu	91-9470-04	101-0272	6.80	6.51	6.02
Cable Clamp - Standard					
	91-9475-04	101-0277	6.31	6.09	5.63

Thermocouple Connectors
Standard Fascia Sockets



A range of standard fascia sockets for panel mounting, supplied with a metal locking clip. Constructed as a one-piece moulding giving superior strength and quality. The use of thermocouple grade alloys ensures error free connections. All these miniature fascia sockets are compatible with other makes of miniature plugs.

NEW

- Quick and simple installation into panels
- Contacts made from thermocouple grade material
- Polarised contacts to ensure correct connection
- Maximum temperature = 220°C

415751

Type	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
Fascia Socket - Standard					
J	91-9471-04	101-0273	7.32	7.03	6.51
K	91-9472-04	101-0274	7.32	7.03	6.51
T	91-9473-04	101-0275	7.32	7.03	6.51
Cu	91-9474-04	101-0276	7.32	7.03	6.51

Thermocouple Connectors

Standard Sockets with Panel Mount Brackets



The range of miniature sockets for panel mounting. Each socket is supplied with a panel mounting bracket. Constructed as a one-piece moulding giving superior strength and quality. The use of thermocouple grade alloys ensures error free connections.

NEW

- Quick and simple installation into panels
- Contacts made from thermocouple grade material
- Polarised contacts to ensure correct connection
- Maximum temperature = 220°C

415752

Type	Mfrs. List No.	Order Code	1+	10+	25+
Socket, Panel Mount - Standard					
Cu	91-9499-04	101-0288	10.97	10.55	9.73
Cu	91-9500-04	101-0289	10.97	10.55	9.73
Cu	91-9501-04	101-0290	10.97	10.55	9.73

Thermocouple Connectors

Miniature In-Line



A range of miniature thermocouple connectors uniquely shaped allowing ease of use. Constructed as a one-piece moulding giving superior strength and quality. The use of thermocouple grade alloys ensures error free connections. Pins are polarised by size and are marked positive and negative polarity. All these miniature connectors are compatible with other makes of miniature plugs & sockets.

NEW

- Contacts made from thermocouple grade material
- Unique easy to use shape
- Polarised contacts
- 3mm cable entry
- Maximum temperature = 220°C

415664

Type	Mfrs. List No.	Order Code	1+	10+	25+
In-Line Plug - Miniature					
J	91-9450-04	101-0249	4.52	4.36	4.04
K	91-9451-04	101-0250	4.52	4.36	4.04
T	91-9452-04	101-0251	4.52	4.36	4.04
Cu	91-9453-04	101-0252	4.52	4.36	4.04
In-Line Socket - Miniature					
J	91-9454-04	101-0253	5.21	4.98	4.62
K	91-9455-04	101-0254	5.21	4.98	4.62
T	91-9456-04	101-0255	5.21	4.98	4.62
Cu	91-9457-04	101-0257	5.21	4.98	4.62
Cable Clamp - Miniature					
	91-9462-04	101-0262	5.66	5.44	5.01

Thermocouple Connectors

Miniature Sockets with Panel Mount Brackets



The range of miniature sockets for panel mounting. Each socket is supplied with a panel mounting bracket. Constructed as a one-piece moulding giving superior strength and quality. The use of thermocouple grade alloys ensures error free connections.

NEW

- Quick and simple installation into panels
- Contacts made from thermocouple grade material
- Polarised contacts to ensure correct connection
- Maximum temperature = 220°C

415735

Type	Mfrs. List No.	Order Code	1+	10+	25+
Socket, Panel Mount - Miniature					
J	91-9496-04	101-0285	5.66	5.44	5.01
K	91-9497-04	101-0286	5.66	5.44	5.01
T	91-9498-04	101-0287	5.66	5.44	5.01

Product Watch

- FREE to all account holders
- Notification of obsolete, end of line and end of stock items
- Replacement or upgrade recommendations

Advanced warning of obsolete components

Thermocouple Connectors

Miniature Fascia Sockets



A range of miniature fascia sockets for panel mounting, supplied with a metal locking clip. Constructed as a one-piece moulding giving superior strength and quality. The use of thermocouple grade alloys ensures error free connections. All these miniature fascia sockets are compatible with other makes of miniature plugs.

NEW

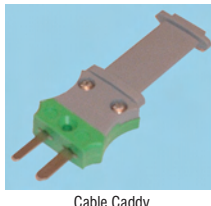
- Quick and simple installation into panels
- Contacts made from thermocouple grade material
- Polarised contacts to ensure correct connection
- Maximum temperature = 220°C

415717

Type	Mfrs. List No.	Order Code	1+	10+	25+
Socket, Facia Miniature					
J	91-9458-04	101-0258	5.86	5.63	5.21
K	91-9459-04	101-0259	5.86	5.63	5.21
T	91-9460-04	101-0260	5.86	5.63	5.21
Cu	91-9461-04	101-0261	5.86	5.63	5.21

Thermocouple Connectors

Accessories



Cable Caddy



Adaptor



Connector Clip

NEW

A miniature thermocouple plug supplied complete with a cable caddy attachment that is uniquely designed for storage of an exposed junction thermocouple. The plug is constructed as a one piece moulding giving superior strength and quality, using thermocouple grade alloys for error free connections. Thermocouple type K contacts are made from thermocouple grade material. All contacts are polarised ensuring correct connection and the plug is provided with a 3mm cable entry.

The miniature clip is designed to secure both a plug and sockets inter-connection under extreme conditions of stress, vibration, etc. It is manufactured from the same material as the thermocouple connectors.

The miniature adaptor converts a miniature thermocouple plug to 2 x banana plugs for use with meters and probes, providing a quick and easy method of connection between thermocouple and instrument.

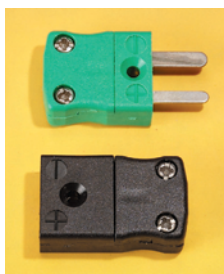
Maximum Temperature - all devices is 220°C

415740

Type	Mfrs. List No.	Order Code	1+	10+	25+
Adaptor	91-9502-04	101-0291	23.27	22.36	20.67
K Type caddy	91-9503-04	101-0292	22.13	21.26	19.66
Clip	91-9504-04	101-0294	6.67	6.41	5.92

Connectors, Miniature

Types, J, K, N, T and Copper



- Range of miniature thermocouple connectors with flat pins having terminal and contact material to suit the thermocouple type
- Uncompensated copper connectors also available (colour white)
- All contacts are polarised to ensure correct connection
- Connectors will accept thermocouple cable up to 3mm diameter
- Maximum operating temperature 220°C
- Cable clamps available for securing cable to free plugs and sockets

212465

	Order Code	1+	10+	25+	100+	+
Line Plug						
Type J	151-128	5.84	5.59	5.46	5.04	--
Type K	708-6362	5.84	5.59	5.46	5.04	--
Type N	708-6430	5.84	5.59	5.46	5.04	--
Type T	708-6404	5.84	5.59	5.46	5.04	--
Copper	721-8874	5.84	5.59	5.46	5.04	--
Line Socket						
Type J	151-127	6.35	6.03	5.97	5.46	--
Type K	708-6350	6.35	6.03	5.97	5.46	--
Type N	708-6428	6.35	6.03	5.97	5.46	--
Type T	708-6398	6.35	6.03	5.97	5.46	--
Copper	721-8862	6.35	6.03	5.97	5.46	--

Sensors & Transducers

41

Compliant
Non-compliant
RoHS
Limited stock - RoHS replacement available

Connectors, Miniature, Quick Wire
Types J and K



- These quick connect versions allow rapid termination
- Quick, easy 'jab-in' connection just push in wire and tighten screw
- Wide range of wire sizes
- 220°C continuous rating
- IEC colour coded bodies to **BS4937 Part 30:1993**

231275

Order Code	Price Each				
	1+	10+	25+	50+	+
Quick Wire Plug					
Type J 381-0380	5.61	5.22	4.88	4.57	--
Type K 381-0392	5.61	5.22	4.88	4.57	--
Type N 381-0409	5.61	5.22	4.88	4.57	--
Type T 381-0410	5.67	5.27	4.93	4.62	--
Copper 381-0422	5.61	5.22	4.88	4.57	--
Quick Wire Socket					
Type J 381-0434	5.61	5.22	4.88	4.57	--
Type K 381-0446	5.61	5.22	4.88	4.57	--
Type N 381-0458	5.61	5.22	4.88	4.57	--
Type T 381-0460	5.61	5.22	4.88	4.57	--
Copper 381-0471	5.61	5.22	4.88	4.57	--

Very High Temperature Plastic Plugs and Sockets
Miniature and Standard Type K



Miniature plug



Miniature socket

- Type identification on white body
- 560°C continuous rating
- Heavy duty ceramic body

386259/406077

Description	Mfrs. List No.	Order Code	Price Each			
			1+	10+	25+	100+
Miniature, Very High Temperature						
Type T	IM-K-M-HTC	859-8428	20.77	18.88	17.41	15.95
Type J	IM-K-F-HTC	859-8436	27.44	24.97	22.98	21.12
Standard, Very High Temperature						
Type K	IS-K-M-HTC	859-8444	32.13	29.23	26.89	24.74
Type K	IS-K-F-HTC	859-8452	28.81	26.17	24.12	22.17

Connectors, Panel, Clip Mount
Types J, K, N, T, R and Copper



- Quick, simple fixing to panel
- Rated for use up to 220°C

Dimensions:
Miniature:- H = 23.30, W = 14.25, D = 21.50
Standard:- H = 38.10, W = 18.50, D = 31.50

231277

Order Code	Price Each				
	1+	10+	25+	100+	+
Miniature					
Type J 151-130	7.34	6.93	6.77	6.39	--
Type K 708-6386	7.34	6.93	6.77	6.39	--
Type N 708-6441	7.34	6.93	6.77	6.39	--
Type T 708-6416	7.34	6.93	6.77	6.39	--
Copper 721-8886	7.34	6.93	6.77	6.39	--
Standard					
Type J 148-825	9.51	9.05	8.57	8.09	--
Type K 708-7949	9.51	9.05	8.57	8.09	--
Type N 381-0483	9.84	9.34	8.89	8.38	--
Type T 381-0495	9.84	9.34	8.89	8.38	--
Type R 708-7974	9.51	9.05	8.57	8.09	--
Copper 381-0501	9.84	9.34	8.89	8.38	--

Thermocouple Connectors



Quick Wire and PCB Mounting Sockets



The range of miniature quick wire thermocouple sockets is uniquely designed to allow ease of connection. The PCB sockets are designed to be mounted directly onto PCB's. Constructed as a one-piece moulding giving superior strength and quality. The use of thermocouple grade alloys ensures error free connections.

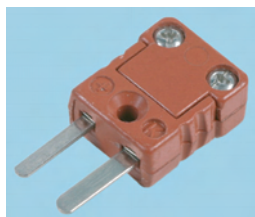


- Contacts made from thermocouple grade material
- Polarised contacts to ensure correct connection
- Maximum temperature = 220°C

415733

Type	Mfrs. List No.	Order Code	1+	10+	25+
Socket, Quick Wire - Miniature					
J	91-9488-04	101-0278	4.78	4.62	4.26
K	91-9489-04	101-0279	4.78	4.62	4.26
T	91-9490-04	101-0280	4.78	4.62	4.26
Cu	91-9491-04	101-0282	4.78	4.62	4.26
Socket, PCB Miniature - Miniature					
K	91-9493-04	101-0283	4.78	4.62	4.26
Cu	91-9495-04	101-0284	4.78	4.62	4.26

High Temperature Plastic Plugs and Sockets
Miniature and Standard Type K



Miniature plug



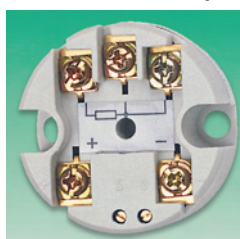
Miniature socket

- Type identification on brown body
- 425°C continuous rating

386258/406074

Description	Mfrs. List No.	Order Code	Price Each			
			1+	10+	25+	100+
Miniature, High Temperature						
Type T	IM-K-M-HTP	859-8380	26.76	24.35	22.43	20.60
Type J	IM-K-F-HTP	859-8398	33.79	30.76	28.32	25.97
Standard, High Temperature						
Type K	IS-K-M-HTP	859-8401	39.32	34.83	31.48	28.42
Type K	IS-K-F-HTP	859-8410	53.32	47.23	42.64	38.47

PT100 or Thermocouple to 4-20mA



- Two transmitters, one PT100 input, one J, K or T thermocouple input (user selectable)
- Both have 4-20mA output
- Din sized for in head installation
- Screw terminals for inputs and outputs
- Corrosion resist plastic case
- 0.2°C accuracy
- Tested to **EN55011, IEC 801-2, 3, 4** for EMC compatibility

H = 23.0, Dia. = 41.8
2 Mounting holes dia. 5.5 @ 33 ctrs.
Centre hole (sensor wire entry) Dia. = 4.0mm

Output	4-20mA loop powered max. 30mA
Loop supply	10 to 30 Vdc reverse polarity protection
Loop resistance	700Ω @ 24V
Loop sensitivity	10µA/volt
Temperature stability	Zero drift typ. 0.02%/°C. Span typ. 0.005%/°C
Ambient temperature	0 to 70°C, (95% humidity, max. non-condensing)

PT100 Version	to DIN 43760 100R @ 0°C (2 or 3 wire)	Thermocouple Versions (J,K, T)	Insulated junction J K or T sensor
Input Accuracy	±0.2°C and +0.2% rdg.		±0.1% FS and cold junction errors
Offset adjustment	range dependant		±100°C, solder link & potentiometer
Gain/adjustment	25°C to 500°C		100 to 1000°C
Impedance			>1MΩ
Burn out	Up scale standard (downscale option)		J=0 to +400°C, K=0 to +1000°C,
Cold junction	Automation 0 to 70°C ±0.2%		T=0 to +400°C
Temperature range	-30°C to +400°C		

Sensor Type	Mfrs. List No.	Order Code	Price Each			
			1+	5+	10+	25+
PT100	SEM104PT100	615-675	102.03	97.77	94.83	90.30
Thermocouple	SEM104TC	615-687	132.00	126.00	118.50	111.93

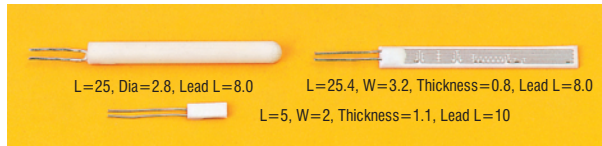
Platinum Resistance Sensors

Platinum Resistance Thermometry

The platinum sensing resistor, Pt100 to IEC 751, is dominant in Europe and in many other parts of the world. Its advantages include chemical stability, relative ease of manufacture, the availability of wire in a highly pure form and excellent reproducibility of its electrical characteristic. The result is a truly interchangeable sensing resistor which is widely commercially available at a reasonable cost.

Source: LABFACILITY TEMPERATURE HANDBOOK - Part No. 656-069

PT100 Elements



- Meets requirements of BS1904 Class B and DIN43760
- Suitable for air and gas temperature measurement
- Cylindrical wire-wound element also particularly suitable for use within protective stainless steel tubular sheath
- Flat element features thick film technology giving particularly good vibration resistance and long term stability
- Flat element is more suited to surface measurements
- Low cost thin-film element is small in size for fast response to temperature changes
- Thin-film element gives good vibration and shock resistance

	Flat (146-884)	Cylindrical (541-102)	Thin-film (721-8850)
Temperature range	-70°C to +600°C	-200°C to +800°C	-50°C to +500°C
Ice point resistance	100±0.12Ω	100±0.12Ω	100±0.12Ω
Fundamental interval (0°C to 100°C)	38.5Ω (nominal)	38.5Ω (nominal)	38.5Ω (nominal)
Self heating	<.005°C/mW	<.003°C/mW	Use <2mA excitation
Thermal response	0.1s	0.4s	0.3s
Stability	±0.05%	±0.05%	±0.06%

Mfrs. List Nos. P100/2528 = 541-102, DM503 (5) = 721-8850
FOR SUITABLE EXTENSION CABLE (SILVER PLATED COPPER CONDUCTOR), SEE ORDER CODE 277-095

	Order Code	1+	10+	25+
Cylindrical element	541-102	31.45	28.82	27.18
Flat element	146-884	34.84	31.91	30.11
			Price Per Pack	
Thin film element (Pack of 5)	721-8850	50.13	47.63	45.11

PT100 Elements with Extension Wires



High quality PT100 sensing resistor of wire-wound construction fitted with extension wires for convenient application.

- PT100 sensing element to IEC 751 Class B
- PTFE insulated stranded tails, 2 or 4 wire configuration
- For use from -60°C to +250°C

725-5731: L=35, Dia.=5, 2 leads L=50 725-5743: L=35, Dia.=5, 4 leads L=450

Mfr. List No.	Order Code	1+	5+	10+	25+
2-wire 010011TD	725-5731	39.31	36.57	34.59	32.63
4-wire 010010TD	725-5743	45.54	42.37	40.07	37.80

Pt100 & Pt1000 Elements Thin Film (100 Ohms)



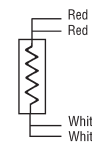
- Pt100 & Pt1000 elements to IEC 751 Class A & B

- Thin Film construction
- Suitable for surface & immersion applications where protected
- Operating temperature -70°C to +600°C
- Vibration resistant

Sensor Type	Pt100 (100 Ohms @ 0°C)	Pt1000 (1000 Ohms @ 0°C)
Construction	Thin film, 10mm tails	Thin film, 10mm tails
Ice point resistance	100 Ω	1000 Ω
Fundamental interval (0°C to 100°C)	38.5 Ω (nominal)	385 Ω (nominal)
Self heating	<0.05°C/mW	<0.5°C/mW
Thermal response	0.1s	0.1s
Stability	±0.05%	±0.05%

Description	Mfrs. List No.	Order Code	1+	5+	10+	25+
Pt100 Elements						
2 x 10mm, Class A	DM-334	859-8525	17.90	15.85	14.29	12.92
2 x 10mm, Class B	DM-333	859-8533	12.27	11.00	10.06	9.15
2 x 2.3mm, Class B	DM-301	859-8541	8.46	7.62	7.00	6.35
Pt1000 Elements						
2 x 10mm, Class A	DM-310	859-8550	15.85	14.32	13.15	12.08
2 x 10mm, Class B	DM-507	774-5655	6.90	--	--	--

PT100 Patch Sensor



- PT100 sensor to BS1904 Class B, mounted on the reverse side of self-adhesive foil
- Rugged sensor encapsulated within a waterproof silicone rubber
- High accuracy PT100 surface temperature measurement
- Good resistance to oils and chemicals

Temperature range -50°C to +150°C Lead 2m PTFE insulated, 4 wire

Mfrs. List No.	Order Code	1+	10+	25+
RTF4-2/NAH	254-678	90.30	83.98	78.56

PT100 Probe



Probe L=117, Dia.=4, Overall length=146, Bush thread= " BSP, Lead L=1m

- Multi-purpose fast response 2-wire platinum resistance probe
- Manufactured from seamless stainless steel tube
- Tube is fitted with a 1/8" BSP compression fitting moveable over its entire length to allow flexibility in siting the probe
- Excellent stability and resistance to vibration and shock
- Sensor meets requirements of BS1904 Class B

Temperature range -70°C to +200°C Thermal response 1.2s typical
Ice point resistance 100±0.1Ω

Order Code	1+	10+	25+
146-885	91.66	82.94	81.79

General Purpose Temperature Sensor Pt 100



A heavy duty, industrial probe with a tough, silicone rubber insulated lead-out.

- Class B, 4 wire
- Stainless steel rigid sheath
- 2 meter, 4 core 7/0.2mm silicone rubber insulated lead
- Operating temperature -50°C to +200°C

Description	Mfrs. List No.	Order Code	1+	5+	10+	25+
6mm Dia. x 50mm length	DRG 010632A	859-8096	104.55	94.72	87.01	77.31
6mm Dia. x 100mm length	DRG 010632B	859-8100	118.55	107.35	98.63	87.62

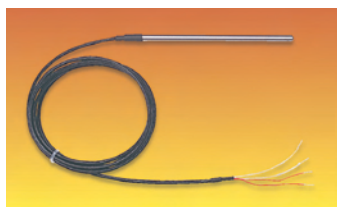
Sensors & Transducers

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Compliant Non-compliant Limited stock - RoHS replacement available



PT100 Probe, PTFE Insulated



A rigid, 6mm diameter, multi-purpose stainless steel probe suitable for temperatures up to 250°C and fitted with a 1 metre PTFE lead.

- Recommended where the superior accuracy of a PT100 sensor over a thermocouple is required
- Suitable for connection to any PT100 instrument - 2,3 or 4 wire

Lead L = 1m

Sensor PT100, 4 wire to **BS1904 (1984) Class B** and **DIN 43760** 100Ω @ 0°C
 Temperature range -50°C to +250°C
 Mfr. List No. PT4 6 x 150 = 560-170, PT4 6 x 250 = 708-8358

FOR SUITABLE COMPRESSION GLAND, ORDER CODE 254-654

222144

Probe Length	Probe Dia.	Order Code	Price Each		
			1+	10+	25+
150mm	6mm	560-170	78.69	73.18	68.46
250mm	6mm	708-8358	93.15	86.98	81.37
150mm	3	410-0670	81.12	77.98	72.95
250mm	3	410-0682	84.72	81.58	76.32

Precision PT100 Probe



- High accuracy 6mm diameter stainless steel PT100 probe
- Ideal for use as temperature reference for comparison calibration of other temperature sensors, and for other high accuracy applications
- Accuracy better than ±0.06°C at 0°C and suitable for use up to 250°C

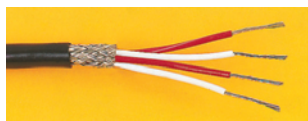
Calibration standard PT100 probe, physically similar to 708-8358 above.

Dimensions Dia = 6, Probe L = 250, Lead L = 2m
 Sensor PT100, 4 wire to **BS1904 (1984)**
 Accuracy Better than ±0.06°C @ 0°C
 Temperature range -50°C to +250°C
 Insertion length 150mm, minimum recommended

212320

Precision PT100 Probe	Mfrs. List No.	Order Code	Price Each		
			1+	5+	10+
	L250	721-8758	196.24	186.48	176.56

Screened Extension Cable - Type PRT



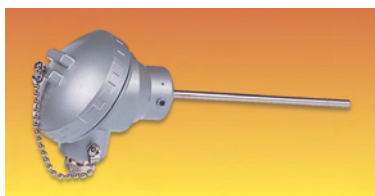
- Suitable for joining 2, 3 or 4-wire PT100 and other PRT sensors to instrumentation
- Colour coded to industry standard **IEC751** (red, red, white, white)
- For use up to 80°C

Flexible 4-wire extension cable comprising 4 PVC-insulated copper conductors size 7/0.2mm, with electrical screen and overall PVC sheath. Nominal O/D=4mm.

212319

PRT cable, 10m coil	Mfrs. List No.	Order Code	Price Each		
			1+	5+	+
	WC-006/10M	721-8734	45.90	43.61	--
PRT cable, 25m coil	WC-006/25M	721-8746	108.89	101.44	--

Industrial Probes with Terminal Head



- Strong 6mm diameter stainless steel stem
- Waterproof aluminium terminal head
- **IP67** protection
- Suitable for connection to any PT100 instrument - 2, 3 or 4 wire



The head of the probe contains a terminal block allowing connection to the measuring instrument via a M20 gland.

Sensor PT100, 4 wire to **BS1904 (1984) Class B** and **DIN 43760** 100Ω @ 0°C
 Temperature head Die cast aluminium, epoxy coated, Screwed lid with retaining chain
IP67 rated
 Temperature range -50°C to +450°C
 Mfr. List Nos. PT4 6 x 150 = 560-157, PT4 6 x 300-KNE = 560-169, PT4 6 x 400 = 708-8449

FOR SUITABLE COMPRESSION GLAND SEE **ORDER CODE 254-654**

222145

Probe Length	Order Code	Price Each		
		1+	5+	10+
150mm	560-157	150.88	143.45	135.92
300mm	560-169	154.04	146.35	138.63
400mm	708-8449	155.93	148.14	140.33

PT100 Sensors Direct Output - Thimble



Direct output "Thimble" type temperature sensor used for measuring air temperature in indoor environments. The product contain a high quality PT100 sensing element. The element is enclosed in an attractive "Thimble" housing for mounting typically on a back-plate, ceiling or wall. Comes complete with 1000mm of flexible, screened cable.



- Resistance type PT100
- Class B, 3 wire
- 1000mm cable length
- Temperature range -10 to 60°C

415804

Type	Mfrs. List No.	Order Code	1+	3+	5+
Thimble	91-9431-03	101-0248	96.02	87.30	80.04

Clean Room Pt100 Assembly



- Wall mounting Pt100 sensor, mounts on standard electrical conduit
- Pt100 to **IEC 751 Class B**
- Suitable for use with any 2, 3 or 4 wire instrument
- Flame retardant vented moulded case

H=85, W=85, D=30

212383

Mfrs. List No.	Order Code	Price Each		
		1+	10+	25+
010014TD	725-5720	82.56	76.78	71.83

Thermal Switches

Bi-Metallic, Auto Reset



Style A H=21 (overall), W=31, D=19 Fixing centres = 24 (holes M3)
 Style B H=16 (overall), W=30, D=17 Fixing centres=24 (hole dia 3.7)

- Automatically re-setting thermal switches with snap action bi-metallic SPST contacts
- Contacts are isolated from the mounting base
- Reset level is specified to within a close tolerance band
- All types are **UL** and **VDE** approved. Style A types also **CSA** approved
- Indication of switch temperature is given on base of switch

Normally closed (opening on temperature rise) and normally open (closing on temperature rise) types are available. All the switches reset when the temperature falls to the reset level. Connection is by ¼" (6.3 x 0.8mm) terminals.

Contact rating (all types) 10A 250V ac, 15A 125Vac (100,000 cycles)
 Body material Phenolic (style A), Thermoplastic (style B)
 Base material Aluminium
 Mounting flange material Stainless steel (style A), aluminium (style B)

Normally Closed Types			
Opening Temp.	Reclosing Temp.	Style	Order Code
15°C ± 3°C	5°C ± 4°C	A	732-400
20°C ± 3°C	10°C ± 3°C	A	732-412
30°C ± 3°C	20°C ± 3°C	A	606-686
40°C ± 3°C	25°C ± 4°C	A	491-445
50°C ± 3°C	35°C ± 4°C	B	100-6842
70°C ± 3°C	55°C ± 4°C	B	100-6843
90°C ± 3°C	70°C ± 4°C	B	100-6844
100°C ± 3°C	85°C ± 4°C	B	100-6845
112°C ± 3°C	97°C ± 4°C	B	100-6846
125°C ± 3°C	110°C ± 4°C	B	100-6847
150°C ± 3°C	135°C ± 4°C	B	100-6849
Normally Open Types			
Closing Temp.	Reopening Temp.	Style	Order Code
30°C ± 4°C	20°C ± 5°C	A	732-424
40°C ± 3°C	25°C ± 4°C	A	491-524
50°C ± 3°C	35°C ± 4°C	A	100-6851
60°C ± 3°C	45°C ± 4°C	A	100-6852
70°C ± 3°C	55°C ± 4°C	A	100-6853
90°C ± 3°C	70°C ± 4°C	A	100-6854

Prices are in Singapore Dollars and exclusive of GST. Due to the volatile nature of certain products, prices are subject to change without notice.

341074

Type	Order Code	Price Each				
		1+	50+	100+	250+	+
Normally Closed Types						
15°C N/C	732-400	7.91	7.06	5.92	4.79	--
20°C N/C	732-412	7.91	7.06	5.92	4.79	--
30°C N/C	606-686	7.91	7.06	6.30	--	--
40°C N/C	491-445	6.46	5.67	4.63	3.78	--
50°C N/C	100-6842	5.61	5.10	3.94	2.99	--
70°C N/C	100-6843	5.61	5.10	3.94	2.99	--
90°C N/C	100-6844	5.61	5.10	3.94	2.99	--
100°C N/C	100-6845	5.61	5.10	3.94	2.99	--
112°C N/C	100-6846	5.61	5.10	3.94	2.99	--
125°C N/C	100-6847	5.61	5.10	3.94	2.99	--
150°C N/C	100-6849	5.61	5.10	3.94	2.99	--
Normally Open Types						
30°C N/O	732-424	6.93	5.98	4.91	3.94	--
40°C N/O	491-524	6.93	5.98	4.91	3.94	--
50°C N/O	100-6851	5.24	4.78	3.74	3.39	--
60°C N/O	100-6852	5.61	5.10	3.94	2.99	--
70°C N/O	100-6853	5.61	5.10	3.94	2.99	--
90°C N/O	100-6854	5.61	5.10	3.94	2.99	--

Bi-Metallic, Auto Reset, High Temperature



- Automatically re-setting thermal switches with snap-action bi-metallic SPST contacts
- Contacts are normally closed, and are isolated from the mounting base
- Range of switching temperatures from 170°C to 250°C
- Approvals:- **UL** Recognised and **CSA** (22N,52N), **VDE0631** (22N), **DIN EN** (52N)
- Indication of switch temperature is given on base of switch

H=21 (overall), W=31, D=19
Fixing centres = 24 (holes M3)

Contact rating (all types) 10A 250V ac, 15A 125Vac (100,000 cycles) (UL/CSA)
Connections 6.3 x 0.8 (1/4") spade terminals

Note: 200°C rated switch available in both materials. Ceramic will withstand a greater degree of temperature overshoot

Opening Temp.	Reclosing Temp.	Body Material	Mftrs List No.	Order Code
170°C ± 5°C	140°C ± 10°C	Ryton	21EN15T044(170/150)	732-436
200°C ± 8°C	160°C ± 10°C	Ryton	22N151044(200/160)	732-448
200°C ± 10°C	160°C ± 10°C	Ceramic	52N12T944(200/160)	732-450
225°C ± 10°C	175°C ± 10°C	Ceramic	52N12T044(225/175)	732-461
250°C ± 10°C	200°C ± 10°C	Ceramic	55H12T944(250/200)	732-473

212351

Type	Body	Order Code	Price Each			
			1+	25+	100+	250+
170°C N/C	Ryton	732-436	7.91	7.06	6.02	5.51
200°C N/C	Ryton	732-448	7.91	7.06	6.02	5.51
200°C N/C	Ceramic	732-450	8.35	7.40	7.02	6.49
225°C N/C	Ceramic	732-461	8.35	7.40	7.02	6.49
250°C N/C	Ceramic	732-473	10.33	9.23	8.73	8.00

Bi-Metallic, Manual Reset



- Snap-action bi-metallic SPST contacts are isolated from the mounting base
- Horizontal tab connections allow easy access to reset pin
- **UL** Recognised and **CSA** approved

The switches are normally closed and open on temperature rise, then remain open until manually reset. Connection is by 6.3 x 0.8 (1/4") spade terminals.

Contact rating (UL, CSA) 10A 250Vac (10,000 cycles), 15A 120Vac (6,000 cycles)
Contact material Silver alloy

Operating Temp.	Mftrs. List No.	Order Code	90°C ± 5°C	05EN1034(90/M)	732-552
40°C ± 4°C	05EN1034(40/M)	732-503	100°C ± 4°C	05EN1034(100/M)	732-564
45°C ± 4°C	05EN1034(45/M)	732-515	115°C ± 5°C	05EN1034(115/M)	732-576
55°C ± 4°C	05N1034(55/M)	732-527	130°C ± 5°C	05EN1034(130/M)	732-588
65°C ± 4°C	05EN1034(65/M)	732-539	150°C ± 5°C	05EN1034(150/M)	732-590
80°C ± 5°C	05EN1034(80/M)	732-540			

212352

Order Code	1+	10+	Price Each		
			25+	100+	+
All Order Codes	9.48	8.88	8.69	7.84	--

Bi-Metallic, Manual Reset



- Snap-action bi-metallic SPST contacts are isolated from mounting base
- Approvals include **VDE**, **DEMKO**, **UTE**, **KEMA** and **EIL**
- **UL** Recognised

The switches are normally closed and open on temperature rise, then remain open until manually reset. Connection is by 1/4" (6.3 x 0.8mm) terminals.

Opening Temp.	Mftrs. List No.	Order Code	Opening Temp.	Mftrs. List No.	Order Code
40°C ± 3°C	R32-C156	732-485	90°C ± 3°C	R32-C180	732-497
45°C ± 3°C	R32-C159	606-698	100°C ± 3°C	R32-C184	254-022
56°C ± 3°C	R32-C166	253-996	112°C ± 3.4°C	R32-C187	606-704
67°C ± 3°C	R32-C171	254-009	132°C ± 4°C	R32-C192	254-034
80°C ± 3°C	R32-C177	254-010	150°C ± 4.5°C	R32-C195	606-716

Contact rating 16A @ 250V Contact material Fine Silver

H=24.5, W=36.2 (across terminals), W=30.4 (across flange),
D=18.2, Fixing centres=23.8 (hole dia. 3.7)

212151

Order Code	Price Each			
	1+	10+	25+	100+
All Order Codes	19.50	17.24	16.38	15.05

Bi-Metallic, TO-220

AIRPAX



- Automatically resetting thermal switches with snap-action bi-metallic SPST contacts
- High temperature epoxy sealed TO-220 package
- Ideal for PC boards, direct mounting on heatsinks etc.
- **UL** recognised, **CSA** certified

H=30 (incl pins), W=10.2, D=4.6, Hole dia=3.6, Pin spacing=5.1

The switches are available as either normally closed (opening on temperature rise) or normally open (closing on temperature rise).

Contact rating 1A @ 120V, 48V dc, (30,000 operations)
20mA (down to 1mA @ 5V dc (100,000 operations))
Contact material Gold plated Silver cross bar

Normally Closed Types		Differential (min.)	Mftrs. List No.	Order Code
Opening Temp. (±5°C)	Reclosing Temp. (min)			
50°C	30°C	4°C	67L050	178-799
70°C	50°C	4°C	67L070	212-829
80°C	55°C	6°C	67L080	178-801
90°C	60°C	6°C	67L090	178-802
100°C	70°C	6°C	67L100	178-803
110°C	80°C	6°C	67L110	279-791

Normally Open Types		Differential (min.)	Mftrs. List No.	Order Code
Closing Temp. (±5°C)	Opening Temp. (min)			
50°C	30°C	4°C	67F050	178-804
70°C	50°C	4°C	67F070	178-805
90°C	60°C	6°C	67F090	178-806
110°C	80°C	6°C	67F110	279-808

Example: A 212-829 thermal switch will open (break contact) on a rising temperature between 65°C and 75°C and will reset (make contact) on a falling temperature no less than 4°C lower than the actual opening temperature and no lower than 50°C.

212179

Order Code	Price Each			
	1+	25+	100+	250+
All Order Codes	12.60	10.24	8.66	7.21

Bi-Metallic, Insulated



Normally closed bi-metal thermal cut-outs fully insulated with an epoxy coating.

- Suitable for over-temperature protection and temperature control in a wide range of electrical and electronic equipment
- Approved to **VDE**, **CSA**, **OVE**, **SEMKO** and **BEAB**
- **UL** Recognised

H=14.0, W=10.0, D=6.0, Lead L=100

Voltage rating 250V ac Temperature tolerance ±5°C
Current rating resistive 2.5A cos φ = 1.0 Contact resistance 40mΩ
inductive 1.6A cos φ = 0.6 Operating temperature -30°C to +180°C
Sealing insulation 160 type = polyolefine (blue)
other types = textile/lacquer (yellow)

Mftrs. List No.	Order Code	Mftrs. List No.	Order Code
T11V 100 05U112L520100	= 152-227,	T11V 110 05U112L520100	= 152-228,
T11V 125 05U112L520100	= 152-229,	T11V 140 05U112L520100	= 152-230,
T11V 150 05U112L529100	= 606-728,	T11V 070 05U112L520100	= 732-606,
T11V 080 05U112L520100	= 732-618,	T11V 160 05U112L531100	= 732-620

212162

Opening Temperature	Order Code	Price Each			
		1+	25+	50+	100+
70°C	732-606	11.66	8.85	7.72	6.43
80°C	732-618	11.66	8.85	7.72	6.43
100°C	152-227	11.66	8.85	7.72	6.43
110°C	152-228	11.66	8.85	7.72	6.43
125°C	152-229	11.66	8.85	7.72	6.43
140°C	152-230	11.66	8.85	7.72	6.43
150°C	606-728	11.66	8.85	7.72	6.43
160°C	732-620	11.66	8.85	7.72	6.43



Thermostats

Capillary, Control and Limit Thermostats



Control Thermostat



Safety Limit Thermostat

Switch body H = 55 (incl. 1/4" tabs), W = 38, D = 34
Spindle L = 19, Dia = 6 with flat
Fixing centres = 4 x M4 on 28 p.c.d.

Output connections:
1 = N.O., 2 = N.C.,
C = COMMON

- Adjustable switching temperature
- Approvals include **VDE, BEAB, IMQ** and **UL** recognised
- Applications include control of boilers, washing equipment, industrial and domestic heating, air conditioning

Control Thermostats

- Changeover (SPDT) contacts enable use for both heating and cooling applications
- Supplied with knob and mounting bezel

Safety Limit Stats

- Available with either SPST or SPDT contacts
- Applications where a maximum safety temperature must not be exceeded

Capillary thermostats operate from a remote liquid-filled sensing bulb through a one metre length of capillary tube. Safety thermostats have a temperature limiter with manual reset and positive cut-off activated if the capillary breaks.

Max head temperature	150°C	Contact rating	15 (2.5)A, 250V ac
Capillary length	1000mm		10A, 380V ac
Temp. rate of charge	1°K/min	Min. capillary bending radius	5mm
Contacts	SPDT, silver	Spindle rotation	270°

Temp. Range	Temp. Differential Δt	Max. Bulb Temp.	Copper Bulb Dia. L	Order Code
-30°C to +35 °C	1.5 ± 0.5°K	65°C	6 x 215	732-631
0°C to +40 °C	2 ± 1°K	65°C	9.5 x 95	732-643
0°C to +90 °C	4 ± 1°K	150°C	6.5 x 95	560-248
0°C to +120 °C	4 ± 1°K	150°C	6.5 x 95	560-250
0°C to +210 °C	9 ± 2°K	270°C	5 x 136	732-655
0°C to +300 °C	10 ± 2°K	350°C	3.5 x 195	732-667

212170/435937

Switching Temp. Range	Order Code	1+	10+	25+	50+
Control Thermostats					
-30°C to +35 °C	732-631	42.60	40.80	39.39	33.60
0°C to +40 °C	732-643	42.60	40.80	39.39	33.60
0°C to +90 °C	560-248	41.59	39.60	37.74	33.60
0°C to +120 °C	560-250	37.18	34.50	32.85	31.53
0°C to +210 °C	732-655	39.99	36.48	33.99	31.32
0°C to +300 °C	732-667	39.99	36.48	33.99	31.32
Safety Limit Thermostats					
+90°C to +110 °C, SPST	732-679	39.75	38.40	36.30	33.75
+90°C to 110 °C, SPDT	732-680	39.75	38.40	36.30	33.75

Cylinder/Pipe



- Rugged moulded plastic unit with curved metal base plate for mounting directly onto cylinders or pipes
- Bi-Metal sensing strip mounted in the centre of the base plate for maximum sensitivity
- Fitted with graduated setting knob and screw compression cable gland.

Supplied with two security straps (220mm and 2m long), a sachet of thermally conductive paste and an instruction leaflet which details installation and typical applications.

H=109, W=50, D=54

Operating voltage	240V, 50Hz	Switching differential	7°C (approx)
Current rating	15A resistive (3.2kW max. load)	Housing	Grey Plastic to IP20, DIN40050
Temperature range	20°C to 90°C		

212245

Order Code	1+	10+	50+	100+
179-872	27.93	25.26	23.85	22.44

Dial Setting and Tamperproof

EBERLE



179-868/179-870
H=71, W=71, D=36

179-869/179-873
H=71, W=71, D=30

A general purpose range of bimetal thermostats suitable for wall or panel mounting.

179-868 and **179-869** have a break on temperature rise single pole contact. They are fitted with accelerator heaters to minimise switching differential and prevent overshoot.

179-870 has a single pole change over contact which can be used to control heating or cooling.

179-873 is an empty housing with terminal block for mounting of sensors.

Supplied with comprehensive installation and instruction leaflet.

Operating voltage	240V, 50Hz
Current rating	179-868 and 179-869: 16A resistive, 4A inductive 179-870: 10A resistive, 4A inductive heating, 5A resistive, 2A inductive cooling
Temperature range	179-868/9=5 to +30° C, 179-870=
Housing	Cream coloured Thermoplastic to IP30, DIN40050
Interface suppression	Complies with VDE0875

Mfrs. List Nos: 3521 = 179-868 3545 = 179-869 6721 = 179-870 007103554000 = 179-873

212236

Order Code	Price Each			
	1+	10+	50+	
Dial adjust with N.O. contact	179-868	24.15	20.25	18.60
Tamperproof adjust with N.O. contact	179-869	37.17	33.51	29.73
Dial adjust with C.O contact	179-870	50.28	44.82	36.06
Housing only	179-873	22.89	17.94	14.67

2455R Series Theromstats

Honeywell



- Open on rising temperature, close on rising temperature
- Standard mounting bracket: B203S
- Horizontal T146 terminals
- Operating temperatures in 10°C steps
- Up to 15A and up to 250V ac
- Silver contact system

NEW

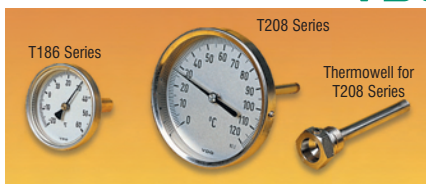
Mfrs. List No.	Open °C ±K	Close °C ±K	Mfrs. List No.	Open °C ±K	Close °C ±K
2455R-100-84	30 3	15 4	2455R-100-89	140 4	115 8
2455R-100-72	40 3	25 6	2455RC-9100-373	150 7	120 8
2455R-100-73	50 3	35 6			
2455R-100-85	60 3	45 6	2455R-100-78	50 3	35 6
2455R-100-74	70 3	55 6	2455R-100-79	60 3	45 6
2455R-100-75	80 3	65 6	2455R-100-92	80 3	65 6
2455R-100-76	90 3	75 6	2455R-100-93	90 3	75 6
2455R-100-77	100 4	80 7	2455R-100-94	100 4	80 7
2455R-100-86	110 4	90 7	2455R-100-95	120 4	100 7
2455R-100-98	120 4	98 6	2455R-100-96	140 4	115 8
2455R-100-88	130 4	110 8			

419439/436284

Mfrs. List No.	Order Code	1+	10+	25+	100+
B203S Mounting Bracket and T146 Terminals					
2455R-100-84	108-2187	4.88	3.91	3.58	3.26
2455R-100-72	108-2189	4.88	3.91	3.58	3.26
2455R-100-73	108-2191	4.88	3.91	3.58	3.26
2455R-100-85	108-2192	4.88	3.91	3.58	3.26
2455R-100-74	108-2193	4.88	3.91	3.58	3.26
2455R-100-75	108-2194	4.88	3.91	3.58	3.26
2455R-100-76	108-2195	4.88	3.91	3.58	3.26
2455R-100-77	108-2196	4.88	3.91	3.58	3.26
2455R-100-86	108-2197	4.88	3.91	3.58	3.26
2455R-100-98	108-2198	4.88	3.91	3.58	3.26
2455R-100-88	108-2199	4.88	3.91	3.58	3.26
2455R-100-89	108-2200	4.88	3.91	3.58	3.26
2455RC-9100-373	108-2201	4.88	3.91	3.58	3.26
2455R-100-78	108-2202	4.88	3.91	3.58	3.26
2455R-100-79	108-2203	4.88	3.91	3.58	3.26
2455R-100-92	108-2204	4.88	3.91	3.58	3.26
2455R-100-93	108-2205	4.88	3.91	3.58	3.26
2455R-100-94	108-2207	4.88	3.91	3.58	3.26
2455R-100-95	108-2208	4.88	3.91	3.58	3.26
2455R-100-96	108-2209	4.88	3.91	3.58	3.26

Temperature Gauges

VDO·IMT



- Low cost series are 63mm diameter with aluminium case
- Heavy duty industrial/process series are 100mm diameter with stainless steel case
- Both ranges utilise 'thermowells' which are permanently inserted into the media being measured

T186 Series - Low cost 63mm diameter, aluminium case, 40mm stem length (including thermowell), 1/2" BSP connection.

Accuracy class	2 to DIN 16203
Case	Aluminium
Window	Acrylic
Pointer and dial	Black on white face
Measuring element	Bimetal coil
Connection	Back central, (supplied with G 1/2" (1/2" BSP) copper alloy, 40mm long 11mm diameter with locking screw)

T208 Series - Heavy duty 100mm diameter, stainless steel case, 100mm stem length (requires 679-318 thermowell with 1/2" BSP connection).

Accuracy class	2 to DIN 16203
Case	Stainless steel 1.4301 (s.s 304)
Window	Flat instrument glass
Pointer and dial	Black on white face
Measuring element	Bimetal coil
Connection	Back central

Thermowell - Suitable for T208 Series gauges (supplied separately).

G1/2" (1/2" BSP) made from stainless steel 1.4571 (s.s.316), 100mm long x 10mm diameter with locking screw.

Relative Humidity (RH)

Range:	0 to 100 % RH
Accuracy:	±3.5 % RH (SHT11 / 71) ±2% RH (SHT15 / 75)
Response time:	≤4 sec.
Reproducibility:	±0.1 % RH
Resolution:	0.03 % RH

Temperature (T)

Range:	-40 to 120 °C
Accuracy:	±0.5 °C @ 25°C
Reproducibility:	±0.1 °C
Resolution:	0.01 °C
Operating temperature	-40°C to 120°C

Electrical Data

Power consumption	Typ. 30 µW (@ 5V, 12-bit, measure every 2 sec.) Typ. 1 µW (@ 2.4V, 8-bit, measure every 2 min.)
Supply voltage range	2.4 to 5.5 V
Input current	0.5 mA
During measurement	≤0.3 µA
In standby	

Type	Mfrs.List No.	Order Code
SMT. Standard	SHT11	391-3065
SMT. High accuracy	SHT15	413-0674
4-pin single-in-line. Standard	SHT71	413-0686
4-pin single-in-line. High accuracy	SHT75	413-0698

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Mfrs. List No.	Order Code	1+	10+	25+	Price Each
SHT11	391-3065	34.11	30.50	-	-
SHT15	413-0674	43.40	38.34	-	36.60
SHT71	413-0686	43.40	38.34	-	36.61
SHT75	413-0698	50.02	44.23	-	42.74
Filter Cap					
SF1	750-0725	6.67	6.38	6.02	

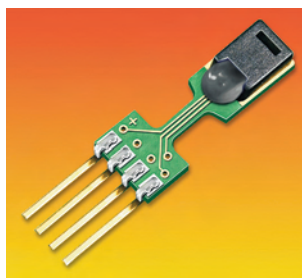
212263

Temperature Range	Mfrs. List No.	Order Code	1+	5+	10+	25+
Low cost, 63mm dia. - T186 Series						
-20°C to +60°C	T186-702001	679-252	21.06	20.23	--	--
0°C to +60°C	T186-706901	679-264	19.86	19.08	18.48	18.37
0°C to +120°C	T186-709001	679-276	19.86	19.08	18.48	17.88
Heavy Duty, 100mm dia. - T208 Series						
-20°C to +60°C	T208-402003	679-288	47.46	45.57	44.13	42.72
0°C to +60°C	T208-406903	679-290	60.87	--	--	--
0°C to +120°C	T208-409003	679-306	53.71	--	--	--
Thermowell for T208						
	T998-404003	679-318	67.15	--	--	--

Humidity and Temperature Sensors

SENSIRION THE SENSOR COMPANY

Humidity and Temperature Sensmitter SHT11/15/71/75



SHT 71/75

- Relative humidity & temperature
- Precise dew point calculation
- Individually calibrated
- Fully interchangeable, no recalibration
- Ultra fast response time
- Excellent long term stability
- Pin-Type Package (pluggable)
- Thermally isolated
- For High-End applications

SHT 71 & 51

H = 3.1, W = 5.08, D = 19.5mm

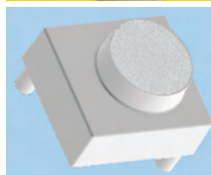


SHT 11/15

- Relative humidity & temperature
- Precise dew point calculation
- Fully calibrated
- Ultra fast response time
- Excellent long term stability
- Fully immersible
- Digital 2-wire interface
- Ultra small size
- Cost-effective

SHT 11 & 15

H = 3.1, W = 5.08, D = 7.62mm



SF1

- Low cost filter solution
- Provides IP67 protection for SHT11 & SHT15
- Facilitates mounting of SHT11 & SHT15
- 99.99% filtration efficiency @ 0.05 m/s air velocity
- Response time of 30s in slow moving air

SF1

H = 8.2, W = 9.38, D = 10.12mm

Humidity and Temperature Sensor Evaluation Kit EK-H2

SENSIRION THE SENSOR COMPANY



Sensirion Supplied with European power supply only

The EK-H2 evaluation kit offers a plug-and-play environment to demonstrate the unique features of all Sensirion humidity and temperature sensors. It can easily be adapted to your specific application and therefore provides an outstanding development and demonstration tool for your future product, enabling fast prototyping.

Including:

- 2 x SHT11, 2 x SHT15 & 2 x SHT7 humidity sensors (incl. connecting cables)
- Serial interface cable (9-pole)
- Power supply 230 VAC/ 9 VDC for board
- Microprocessor and display board ASD11
- Humi Viewer (visualization) software on CD ROM documentation
- Packed in a handy box

For Technical Humidity Sensor Data see Order Codes 391-3065, 413-0674, 413-0686 & 4130698

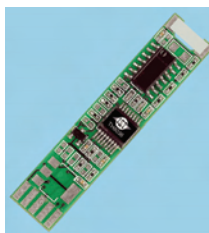
234885

	Order Code	Price Each
Evaluation Kit V2.1	391-3053	1+ 618.75

Analogue humidity module

LinPicco[®] basic series

IST INNOVATIVE SENSOR TECHNOLOGY



- For accurate relative humidity measurement
- Low power consumption, current loop version supplied from current loop
- Temperature-compensated
- Rapid response
- Good linearity
- Drift-stable
- Low hysteresis
- Very small dimensions
- Mechanically robust

NEW

Sensor Type	P14 SMD
Measurement principle:	Capacitive humidity sensor
Specification range:	15...85 % RH
Accuracy:	< 3 %rF @ 23°C
Humidity range	0...99.9 % RH, non condensing
Operating temperature range:	-25...+85 °C
Humidity measurement range:	+85 °C
Current consumption:	< 3 mA
Storage temperature range:	-40...+100 °C @ max. 95 % RH, non condensing
Dimensions:	L=47,0 x W=10,0 x H=2,8 mm
Terminal connectors:	Soldering terminals for VCC, Analog Out , Loop-through of optional temperature sensor

Sensors & Transducers

41

Compliant Non-compliant Limited stock - RoHS replacement available
RoHS

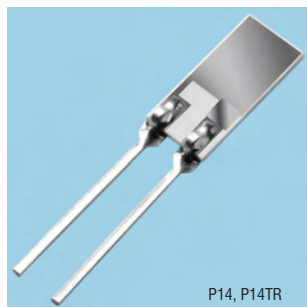
Type	order Code	Output signal 0...100% RH	Input Voltage
LINPICCO (TM) BASIC A01-G	959-6100	0...1V	8...32V=
LINPICCO (TM) BASIC A05-G	959-6119	0...5V	8...32V=
LINPICCO (TM) BASIC A0545-G	959-6127	10...90% Vcc	4.5...5.5V
LINPICCO (TM) BASIC A420-G	959-6135	4...20mA	8...32 V

408198/436281

Type	Order Code	Price Each		
		1+	10+	25+
LINPICCO (TM) BASIC A01-G	959-6100	74.21	65.95	59.34
LINPICCO (TM) BASIC A05-G	959-6119	70.28	62.50	56.21
LINPICCO (TM) BASIC A0545-G	959-6127	66.92	59.47	53.54
LINPICCO (TM) BASIC A420-G	959-6135	81.54	72.49	65.26

Capacitive humidity sensor

Series P14



P14, P14TR



P14Thermo

- Laser-trimmed version available, saving calibration for many applications
- Version with integrated temperature resistance, for dew point determination and for measurements above the dew point by heating.
- Mechanically robust
- Good linearity
- Condensation-resistant
- Alcohol-resistant
- Low hysteresis
- Temperature-shock-resistant
- Resistant to many chemical agents



Measuring principle	capacitive humidity sensor	Hysteresis	< 1,5 %RH
Humidity operating range	0 ... 100% RH (max. DP = 85°C)	Response time	t ₉₃ < 12 sec., 50...0% RH
Temperature range	-30...+150 °C	Frequency range	1...100 kHz
Capacity	150 ± 50pF (@ 30%rF)	Electric strength	< 12 VAC
Loss factor	<0,01	Connectors	SIL
Linearity	< 1,5 %RH (15...90% RH)		

Type	Order Code	Max. Dewpoint-temperature	Temperature	Draft [pF/%RH]	Dimension of Chip (L x B x H) in mm
P14-G	959-6143	85°C	none	0,25	5,00 x 3,81 x 0,38
P14TR-G	959-6160	80°C	none	0,2	5,00 x 3,81 x 0,38
P14 THERMO-G	959-6178	85°C	PT100C	0,25	7,70 x 3,81 x 0,38

408199

Type	Order Code	1+	10+	25+
P14-G	959-6143	50.62	45.99	42.18
P14TR-G	959-6160	102.92	93.55	85.77
P14 THERMO-G	959-6178	87.33	79.39	72.78

Capacitive humidity sensor

MK33 Series



- For use in corrosive applications
- Mechanically robust
- Good linearity
- Condensation-resistant, very high dew point temperature
- Alcohol-resistant
- Low hysteresis
- Temperature-shock-resistant, extreme temperature operating range
- Resistant to many chemical agents



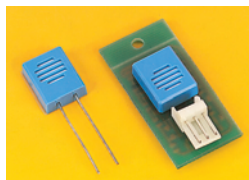
Measuring Principle	Capacitive Polymer Humidity Sensor	Linearity	< 2 %rH (20...90% rH)
Humidity Operating Range	0 ... 100% Relative Humidity	Hysteresis	< 2 %RH
Max. Dewpoint Temp. (100%RH)	+95°C	Response Time t ₉₃	< 10sec., 50...0% RH
Temperature Operating Range	-40...+190°C	Frequency Range	1...100 kHz
Capacity	300 ± 40 pF (bei 30%RH)	Electric Strength	< 12 VAC
Sensitivity	0,45 pF / % RH (20...95 % RH)	Connectors	SIL
Loss Factor	<0,01	Dimension	5,00 x 3,81 x 0,38

408200

Type	Order Code	1+	10+	25+
MK33-G	959-6151	105.01	95.47	87.53

Humidity Sensors

Resistive Sensor and Module, 20-100% RH Range



- Sensor measures up to 100% relative humidity
- Can be used in conditions liable to dew condensation
- Module is temperature compensated
- Module is easy to install and connect.

Sensor: H = 15, W = 12, D = 4.5, Leads = 24, Lead pitch = 5

Module: L = 35, W = 20, H = 75 (above PCB), Mounting hole dia = 3.2

The module incorporates the 732-837 sensor to give a ready-to-use unit. Resistance of the sensor decreases with increasing RH. Output voltage of the module (1.5V to 3.1Vdc) corresponds linearly to RH (25 to 100%)

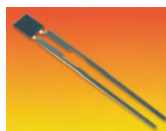
Sensor/Module	Operating humidity range	Operating temperature range	Measurement accuracy	Module Working voltage	Storage temperature	Storage humidity	Measurement range	Current	Output voltage
	10% to 100% RH	0°C to +50°C	±5% RH	5.0 ±0.2Vdc	-40°C to +85°C	0 to 100% RH	25 to 100% RH	2mA max.	1.5 to 3.1 V

Sensor Drive voltage, rated power 1Vac, 0.3mW Measuring frequency 50Hz to 1kHz Impedance (25°C, 50% RH) 60KΩ±30KΩ

212358

	Order Code	Price Each				
		1+	10+	25+	100+	+
Sensor	732-837	10.90	9.14	8.03	7.35	--
Sensor	122-6685	10.90	9.14	8.03	7.35	--
Module	732-849	41.31	34.59	30.37	25.39	--
Module	122-6686	41.31	34.59	30.37	25.39	--

Capacitive Sensor, 0-100% RH Range



- Measures from 0% to 100% relative humidity
- Virtually unaffected by temperature or pressure
- Suitable for use in hostile environments

L = 13, W = 7, D = 2, Leads L = 6, Lead Pitch = 5

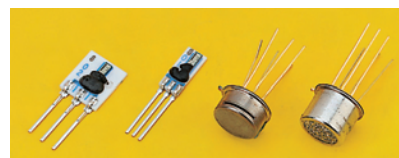
Using a variable capacitance the sensor has extra protection of polymer to make it suitable for use in hostile environments.

Humidity range	0 - 100% RH	0% to 100% RH	-40°C to +120°C
Capacitance 0% RH	240pF ±10%	Linearity	2%
Change in capacitance 0-100% RH	30pF	Operating frequency	10 to 100KHz

212225

Order Code	Price Each			
	1+	25+	100+	250+
332-7838	44.97	40.81	35.82	32.60

Capacitive with Signal Conditioning



(c) TO-39: H=4.6, Dia.=8.3, 6-pin
(d) TO-5: H=6.6, Dia.=8.3, 6-pin

- Linear voltage output response to %RH change
- Laser trimmed interchangeability
- High accuracy
- Fast response
- Stable, low drift performance
- Chemically resistant
- Metal can packages available with options of thermally connected temperature sensor

Capacitive relative humidity sensor with integrated signal conditioning. Sensor consists of a planar capacitor with a second polymer layer for protection against dust, dirt, oils and other hazards. Applications include refrigeration, drying, meteorology and battery powered systems.

Accuracy	±2%RH RH @ 0 to 100% RH non-condensing
Voltage supply	4 to 9V dc, Reference 5V dc
Voltage output (typ.)	0.8 to 3.9V dc @ 25°C
Operating humidity	RH non-condensing
Operating temperature	-40°C to 85°C
Linearity (typ.)	±0.5% RH
Repeatability	±0.5 of span
Hysteresis (max.)	±0.8% RH
Integral sensor	HIH-3602-A: NTC thermistor 100kΩ @ 25°C HIH-3602-C: Platinum RTD 1kΩ @ 0°C

Mfrs. List Nos: HIH-3602-A=723-4650 HIH-3602-C=723-4661 HIH-3602-L=723-4648

212382

Type	Order Code	1+	10+	25+	100+
Slotted TO-39 can	723-4648	114.90	106.60	101.46	--
Filtered TO-5 can with thermistor	723-4650	217.01	206.63	195.76	195.23
Filtered TO-5 can with RTD	723-4661	165.97	156.11	147.87	147.48

Prices are in Singapore Dollars and exclusive of GST. Due to the volatile nature of certain products, prices are subject to change without notice.

Pressure Sensors

General Data

Piezo-Resistive Principle

Many pressure transducers employ the piezo-resistive principle to convert pressure to an electrical signal. The key element is a silicon chip which has been micro-machined to create a diaphragm around which four resistors are diffused in a bridge configuration. The application of pressure to this silicon diaphragm causes the bridge resistors to change their value creating a differential voltage output proportional to the applied pressure.

Open Sensors, Isolated Transducers - Applications

Transducers come in two main forms; open sensors, where the pressure medium comes into contact with the silicon diaphragm and isolated transducers, where the silicon chip is isolated from the media by a stainless steel diaphragm. Most open transducers contain a protective coating over the silicon chip to protect it from humidity and dust are generally recommended for use with air and dry gases.

Typical Open Sensor Applications: medical equipment, pneumatic control, instrumentation, barometry and HVAC. The isolated range of transducers is intended for use with corrosive or non-corrosive liquid or gaseous media compatible with stainless steel, often in rugged or hostile environments.

Typical Isolated Transducer Applications: process control, industrial control water, gas and chemical industries, hydraulics, combustion control and many others. We offer a wide range of pressure transducers to cover the many different applications for these products. These include transducers with and without calibration and temperature compensation, from devices with basic mV output to fully conditioned devices, offering 1-6V and 20mA output and intrinsically safe versions.

Types of Pressure Measurement

This product range covers the three types of pressure measurement: gauge, differential and absolute.

Gauge Pressure: Pressure measured relative to ambient pressure.

Differential Pressure: Pressure measured relative to another pressure.

Absolute Pressure: Pressure measured relative to a vacuum

Pressure Unit Conversion Constants

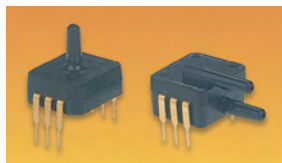
There are many different units used to measure pressure in different industries, and the chart below shows the conversion factor needed to change from one unit to another. These are the most commonly used as per international convention.

	PSI ¹	in. H ₂ O ²	in. Hg ³	k Pascal	millibar	cm. H ₂ O ⁴	mm. Hg ⁵
PSI ¹	1.000	27.680	2.036	6.8947	68.947	70.308	51.715
in. H ₂ O ²	3.6127 10 ²	1.000	7.3554 10 ²	0.2491	2.491	2.5400	1.8683
in. Hg ³	0.4912	13.596	1.000	3.3864	33.864	34.532	25.400
k Pascal	0.14504	4.00147	0.2953	1.000	10.000	10.1973	7.5006
millibar	0.01450	0.40147	0.02953	0.100	1.000	1.01973	0.75006
cm. H ₂ O ⁴	1.42237 10 ²	0.3937	2.8958 10 ²	0.09806	0.9806	1.000	0.7355
mm. Hg ⁵	1.9337 10 ²	0.53525	3.9370 10 ²	0.13332	1.3332	1.3595	1.000

- Note:
1. PSI - pounds per square inch
 2. at 39°F
 3. at 32°F
 4. at 4°C
 5. at 0°C

224668

Basic Sensors - SX Series

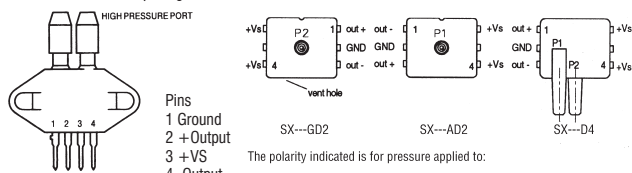


Single Port
SX...AD2/SX...GD2
H = 13.84, W = 13.97
D = 11.94
Pressure Port O/D = 2.6
Pin Spacing = 15.24 x 2.54

Dual Port
SX...DD4
H = 9.65, W = 13.97
D = 11.94
Pressure Port O/D = 2.28
Pin Spacing = 15.24 x 2.54



Sx.N Series
H = 27.2, W = 29.2, D = 10.2
Pressure ports O/D = 4.83
Fixing Centers = 22.9
Pin Spacing = 2.54



Pins
1 Ground
2 +Output
3 +VS
4 -Output

The polarity indicated is for pressure applied to:
SX---GD2 : P2 (backward gage)
SX---AD2 : P1 (forward gage)
SX---DD4 : P2 (backward gage)

- Easy pressure connection using plastic tubing
- DIP package for easy PCB mounting
- Standard differential types can be used for gauge or differential pressure measurements

Pressure sensors featuring only the basic shear stress IC pressure sensor element. The sensors are for use with non-corrosive and non-ionic media, eg. air, dry gases.

Reference conditions	Vs = 5V dc, TA = 25°C	Repeatability	0.5% FS typ
Supply voltage	12V dc max.	Output impedance	4.5Ω
Linearity & hysteresis	0.2% FS typ., 0.5% FS max	Operating temp. range	-40°C to +85°C
Operating Pressure Range	Maximum Pressure	Full Scale Span (typ)	Operating Pressure Range
0 to 1 psig	20Psi	20mV	0 to 30 psig
0 to 5 psig	20Psi	75mV	0 to 100 psig
0 to 15 psia	30Psi	110mV	0 to 150 psid
			Maximum Pressure
			Full Scale Span (typ)
			Operating Pressure Range
			Maximum Pressure
			Full Scale Span (typ)
			Operating Pressure Range
			Maximum Pressure
			Full Scale Span (typ)

212228

Operating Pressure	Mfrs. List No.	Order Code	1+	Price Each 10+	25+
Dip Package					
0 to 15 psia	SX15AD2	674-217	59.96	55.03	50.46
0 to 1 psig	SX01GD2	674-229	60.56	55.58	50.96
0 to 1 psid	SX01DD4	674-230	60.54	55.58	50.96
0 to 5 psig	SX05GD2	674-242	60.56	55.58	50.96
0 to 5 psid	SX05DD4	674-254	60.56	55.58	50.96
0 to 15 psig	SX15GD2	674-266	59.96	55.03	50.46
0 to 15 psid	SX15DD4	674-278	61.94	59.18	52.15
0 to 30 psid	SX30DD4	674-291	60.56	55.58	50.96
0 to 100 psig	SX100GD2	674-308	60.56	55.58	50.96
Standard Package					
0 to 1 psid	SX01DN	414-773	66.18	60.54	56.25
0 to 5 psid	SX05DN	414-785	66.18	60.54	56.25
0 to 15 psid	SX15DN	414-797	66.18	63.53	--
0 to 30 psid	SX30DN	414-803	66.18	60.54	56.25
0 to 100 psid	SX100DN	414-815	66.18	60.54	56.25
0 to 150 psid	SX150DN	414-827	66.18	60.54	56.25

Basic Sensors - SCC Series

Temperature Compensated, Constant Current Drive



- Low cost pressure sensors offering a temperature stable output when driven with a constant current source
- Temperature coefficients for span and resistance effectively cancel each other out between 0°C and 50°C
- For use with non-corrosive and non-ionic media, eg. air, dry gases

The sensors are housed in the same DIP and standard packages as SX series (see above) and have the same pin connections.

Reference conditions	I _S = 1.0mA, T _A = 25°C
Supply current	1.5mA max
Linearity, hysteresis and repeatability	0.25% FS typ, 0.5% FS max
Output impedance	5kΩ typ.
Compensated temp. range	0°C to 50°C
Operating temp. range	-40°C to +85°C

Operating Pressure Range	Maximum Pressure	Full Scale Span
0 to 5 psig	20Psi	25 to 65mV
0 to 15 psia	30Psi	40 to 95mV
0 to 100 psig (g)	150Psi	85 to 225mV

212226

Operating Pressure	Mfrs. List No.	Order Code	1+	Price Each 10+	25+
Dip Package					
0 to 15 psia	SCC15AD2	674-310	46.99	37.38	35.72
0 to 5 psig	SCC05GD2	674-321	46.53	37.01	35.37
0 to 5 psid	SCC05DD4	674-333	46.99	37.38	35.76
Standard Package					
0 to 15 psia	SCC15AN	179-275	60.54	54.33	--
0 to 5 psid (g)	SCC05DN	179-276	60.54	59.81	--
0 to 100 psig (g)	SCC100DN	179-279	60.54	47.97	45.65

Temperature Compensated Sensors Honeywell Sensym

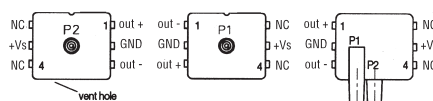
DIP Package — SDX Series

Single Port
SDX A2 Series
SDX G2 Series
H = 15.1, W = 13.97,
D = 11.94
Pressure port O/D = 2.67



Dual Port
SDX D4 Series
H = 9.65, W = 13.97,
D = 11.94
Pressure port O/D = 2.28

Pin Spacing = 15.24x2.54



The polarity indicated is for pressure applied to:
SDX---G2 : P2 (backward gage)
SDX---A2 : P1 (forward gage)
SDX---D4 : P2 (backward gage)

This family of compensated and calibrated sensors is the second generation of Sensym's SCX Series. Incorporating "constraint-wafer" technology the SDX Series provides:-

- Up to 5 times improvement of long term stability and repeatability
- Greater immunity to package stress
- Tight calibration of offset and span
- Temperature compensation of offset and span, giving an accurate and stable output over 0-50°C range
- New DIP package features standard IC dimensions and pin spacing for easy PCB mounting
- For use with non-corrosive, non-ionic media, eg. air and dry gases

Sensors & Transducers

41

Compliant Non-compliant Limited stock - RoHS replacement available
RoHS



Reference conditions	$V_s = 12V, T_A = 25^\circ C$	
Max. supply voltage	$V_s = 20V$	
Linearity & hysteresis	$\pm 0.2\% FS$ typ, $\pm 1\% FS$ max	
Repeatability	$\pm 0.2\% FS$ typ, $\pm 0.5\% FS$ max	
Span shift with temp. (0°C to 50°C)	$\pm 0.4\% FS$ typ, $\pm 2\% FS$ max	
Offset shift with temp. (0°C to 50°C)	$\pm 0.2mV$ typ, $\pm 1mV$ max	
Output impedance	SDX = $4k\Omega$ typ, SDXL = $6k\Omega$ typ.	
Operating temp. range	-40°C to +85°C	
Offset calibration	0 \pm 1mV	
Common mode voltage	1.5V min, 3.0V typ, 5V max	
Operating Pressure	Proof Pressure	Full Scale Span
0 to 5" H ₂ O	5 Psi	25mV
0 to 10" H ₂ O	5 Psi	25mV
0 to 1 psig	20 Psi	18mV
0 to 5 psig	20 Psi	60mV
Operating Pressure	Proof Pressure	Full Scale Span
0 to 15 psig	30 Psi	90mV
0 to 30 psig	60 Psi	90mV
0 to 100 psig	150 Psi	100mV

212227

Operating Pressure	Mfrs. List No.	Order Code	1+	10+	25+
Low Pressure					
0 to 5" H ₂ O	SDX005IND4	434-6063	198.86	157.47	148.27
0 to 10" H ₂ O	SDX010IND4	434-6075	131.70	120.90	111.67
Standard Pressure					
0 to 15 psia	SDX15A2	674-114	74.16	71.65	68.81
0 to 1 psig	SDX01G2	674-126	74.16	72.51	--
0 to 1 psid	SDX01D4	674-138	74.16	71.65	68.81
0 to 5 psig	SDX05G2	674-140	74.15	71.65	68.81
0 to 5 psid	SDX05D4	674-151	73.42	70.94	70.04
0 to 15 psig	SDX15G2	674-163	73.42	70.94	68.13
0 to 15 psid	SDX15D4	674-175	74.16	71.65	68.81
0 to 30 psig	SDX30G2	674-187	77.99	--	--
0 to 30 psid	SDX30D4	674-199	73.42	70.94	68.13
0 to 100 psig	SDX100G2	674-205	74.16	71.65	68.81

Temperature Compensated Sensors - SCX Series



Pins
1 Temp output +
2 VS
3 Output +
4 Ground
5 Output-
6 Temp output-

H=25.4, W=27.9, D=26.2, Pressure ports O/D=4.83, Fixing centres=21.6, Pin spacing=2.54

This low cost range is designed for applications where the user can typically provide fine adjustment of zero and span in external circuitry.

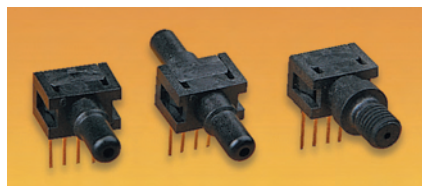
- Very tight offset and full scale calibration
- Guaranteed temperature compensation to max 1% over a 70°C temperature range
- For non-corrosive, non-ionic fluids, eg. dry gases
- Rugged plastic package
- Differential types can be used for gauge or differential pressure measurement

Reference V_s	12V dc
Reference Temp	25°C
Supply voltage, V_s	+30Vdc max.
Linearity & hysteresis	0.1% FS typ, 0.5% FS max (precision) 0.2% FS typ, 1% FS max (low cost)
Repeatability	0.2% FS typ, 0.5% FS max (precision)
Span shift with temp (0°C to 70°C)	0.2% FS typ, 1.0% FS max (precision)
Offset shift with temp (0°C to 70°C)	0.4% FS typ, 2.0% FS max (low cost) $\pm 0.1mV$ typ, $\pm 0.5mV$ max (precision) $\pm 0.2mV$ typ, $\pm 1.0mV$ max (low cost)
Output impedance	$4k\Omega$ typ
Operating temp range	-40°C to +85°C
Offset calibration	0 \pm 0.3mV (precision), 0 \pm 1.0mV max (low cost)

212337

Pressure	Order Code	1+	10+	25+
0 to 15 psia	414-839	97.67	89.33	82.91
0 to 1 psid	414-840	97.67	89.33	82.91
0 to 15 psid	414-852	97.67	89.33	82.91
0 to 15 psia	414-864	125.07	114.95	106.48
0 to 1 psid	414-888	125.07	114.95	106.48
0 to 5 psid	414-890	125.07	114.95	106.48
0 to 15 psid	414-906	125.07	114.95	106.48
0 to 30 psid	414-918	125.07	114.95	107.90
0 to 100 psid	414-920	125.07	114.95	106.48
0 to 150 psid	414-931	125.07	114.95	106.48

Basic Sensors - 24PC Series



Gauge, Absolute: H=8.0 (excl. pins), W=12.7, D=21.8, Pressure port O/D=5.1
 Differential: H=8.0 (excl. pins), W=12.7, D=34.4, Pressure ports O/D =5.1
 High pressure gauge: H=8.0 (excl. pins), W=12.7, D=23.8, Pressure port = 1/4-28UNF, flange dia.=9.14

Connections (2.5 spacing): 1=Vs (+) (notched pin), 2=Output (+), 3 = Ground (-), 4= Output (-)

- Measure vacuum or positive pressures in air, gas or liquids
- High pressure gauge types (100psig and 250psig) have threaded ports

A range of miniature low cost basic sensors. The sensors have wet/wet capability, incorporating a seal either side of the diaphragm, one of which is unique conductive seal offering improved reliability for the product range.

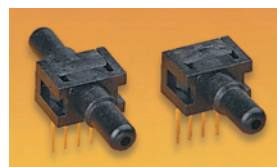
Supply voltage	10V dc (nom.), 12V dc (max.)
Linearity (typ.)	Gauge, differential=0.25% span, 15 psia = 15mV/psia typ, 30 psia = 11mV/psi typ. (see note below)
Repeatability and hysteresis	Gauge, differential = $\pm 0.15\%$, absolute = 0.5%
Input/output resistance	5k Ω
Temperature range	-40°C to +85°C
Media	Wet or dry, compatible with polyetherimide,

Note: Although non-compensated, these sensors exhibit extremely good temperature stability(0.5% of span) when driven by current rather than voltage (1.6 to 2.0mA recommended).

212242/436274

Absolute	Mfrs. List No.	Order Code	1+	10+	25+	50+
2 to 15 psia	24PCCFA6A	723-7753	34.76	--	--	--
2 to 30 psia	24PCDFA6A	723-7765	34.69	--	--	--
Differential						
0 to 0.5 psid	24PCEFA6D	731-626	33.53	32.65	31.51	30.09
0 to 1 psid	24PCFA6D	731-638	33.53	32.65	31.51	30.09
0 to 5 psid	24PCBFA6D	731-640	33.53	32.65	31.51	28.97
0 to 15 psid	24PCCFA6D	731-651	33.53	32.65	31.51	28.97
0 to 30 psid	24PCDFA6D	731-663	33.53	32.65	31.51	28.97
Gauge						
0 to 0.5 psig	24PCEFA6G	731-675	33.53	32.65	31.51	30.09
0 to 1 psig	24PCFA6G	731-687	33.53	32.65	31.51	30.09
0 to 5 psig	24PCBFA6G	731-699	33.53	32.65	31.51	30.09
0 to 15 psig	24PCCFA6G	731-705	33.53	32.65	31.51	30.09
0 to 30 psig	24PCDFA6G	731-717	33.53	32.65	31.51	30.13
0 to 100 psig	24PCFFM6G	731-729	33.53	32.65	31.51	28.97
2 to 15 psia	24PCCFA6A	723-7753	34.76	--	--	--
2 to 30 psia	24PCDFA6A	723-7765	34.69	--	--	--

Temperature Compensated Sensors - 26 PC Series



Differential: H=8.0 (excl. pins), W=12.7, D=34.4, Pressure ports O/D=5.1

Gauge: H=8.0 (excl. pins), W=12.7, D=21.8, Pressure port O/D = 5.1

Connections (2.5 spacing)
1=Vs (+) (notched pin)
3=Ground (-)
2=output (+)
4=output (-)

- Calibrated null and span
- Temperature compensated for span
- Can be used to measure vacuum or positive pressures in air, gas or liquids

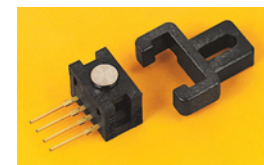
Miniature low cost pressure sensors with compensated outputs. Wet/wet capability of the sensor incorporates a seal either side of the diaphragm, one of which is a unique conductive seal offering improved reliability for the product range.

Supply voltage	10V dc(nom) 16V dc(max)	Input resistance	7.5kR
Null offset	$\pm 1.5mV$	Output resistance	2.5kR
Linearity	0.25% span	Temperature range	-40°C to +85°C (0-50°C compensated)
Sensitivity shift (0-50°C)	$\pm 1.0\%$ span	Media	Wet or dry, compatible with polyetherimide, silicon and
Repeatability and hysteresis	0.2% span		
Response time	1ms (max.)		

212231

Differential	Mfrs. List No.	Order Code	1+	10+	25+	50+
0 to 1 psid	26PCFA6D	731-742	50.00	46.32	45.90	45.44
0 to 5 psid	26PCBFA6D	731-754	50.00	48.01	45.31	44.82
0 to 15 psid	26PCCFA6D	731-766	50.00	48.01	45.31	44.82
0 to 30 psid	26PCDFA6D	731-778	50.00	49.24	--	--
Gauge						
0 to 1 psig	26PCFA6G	731-780	50.00	46.32	45.90	45.44
0 to 5 psig	26PCBFA6G	731-791	50.00	48.01	45.31	44.82
0 to 15 psig	26PCCFA6G	731-808	50.00	48.01	45.31	44.82
0 to 30 psig	26PCDFA6G	731-810	48.66	--	--	--

Force Sensor



- Robust performance characteristics
- Extremely low deflection, typically 30 microns at full scale
- Precise force sensing
- Electrically ratiometric output
- Mounting brackets available separately

Sensor: H=9, W=12.7, D=8 (721-6671), H=3.75, W=14.22, D=5.59 (310-7620)
 Actuator: H=1.3, Dia.=5.08
 Mounting bracket: Slot 5.9 3.3

Piezo-resistive sensing element in Wheatstone bridge circuit. Force is applied through stainless steel plunger directly to sensing element. Applications include load and compression sensing, variable tension control, contact sensing, robotic end effectors, medical.

Supply voltage	10V dc (nom.)	10V dc (nom.)
Force range	1500grams	500grams
Overforce	5500 grams (max.)	4500 grams (max.)
Span	290 to 430mV (360mV typ.)	60mV (at 5V dc)
Response time	1m sec	1m sec
Temperature range	-40°C to +85°C	2°C to +40°C

Mfrs. List Nos: FSG-15N1A=721-6671, PC-15132=721-6683, FSL05N2C=310-7620

	Order Code	1+	5+	10+	25+
Force sensor	721-6671	118.12	--	--	--
Force sensor	310-7620	127.66	118.22	112.00	111.71
Mounting brackets, pack of 5	721-6683	19.76	--	--	--

Micro Pressure Sensor

0 to 4.9kPa



D8M-D82
H = 12 (body), W = 53, D = 53mm



This sensor is specifically designed to detect very small changes in ambient pressure levels. Applications range from medical diagnostics, to white goods, HVAC systems and industrial control. Designed for use in air and similar environments. The D8M-D82 has a range of 0-4.9kPa, and has a pulse count output of 1 pulse/9.84 Pa (1/0.0014 psi)

Supply voltage - V dc	D8MD82
Current Consumption	2.2 to 3.4
Operating Temperature	100mA
	-10 to 60°C

Output Type	Mfrs. List No.	Order Code	1+	5+	10+	25+	+
Digital	D8MD82	100-7620	91.53	81.38	80.56	77.37	--

Pressure Transducers and Transmitters

Transducers, 0.5 - 4.5V Output

Low Profile - HCX Series



H=13, W=35, D=39 (including ports)
Pressure Port O/D=5

- Connections
- 1 Voltage output
 - 2 Internal connection
 - 3 -V_S (GND)
 - 4 Internal connection
 - 5 +V_S
 - 6 Internal connection

- Compensated, calibrated and amplified pressure transducers
- Small low-profile package with in-line pinning for easy PCB mounting
- Internal voltage regulation allows a calibrated output for a supply voltage ranging from 4.8 to 15V
- Suitable for measuring differential gauge and absolute pressures
- Designed for use with non-corrosive, non-ionic media eg. dry air and gases

Supply voltage	4.8V to 15V dc
Output	0.5 to 4.5V
Full scale output (FSO)	4.5V ± 50mV
Operating temperature range	-10°C to +70°C
Linearity and hysteresis (BSL)	0.5% max
Zero pressure output	0.5V ± 50mV
Thermal stability	±5 mBar devices at 50 mBar at 100 mBar at other pressures
	0.2% FSO/°C (0°C TO +50°C) 0.12% FSO/°C (0°C TO +50°C) 0.10% FSO/°C (0°C TO +50°C) 0.05% FSO/°C (0°C TO +50°C)
Long term stability (1 yr)	±0.20% FSO typ.
Proof pressure	5-20 mBar devices at 50/100/350 mBar at 1 Bar and 5 Bar
	350 mBar 1.40 Bar 2 rated pressure

Operating Pressure	Mfrs. List No.	Order Code	1+	10+	25+
0 to +/-5 mBar	HCXPM005D6V	306-9540	210.94	165.50	155.68
0 to 10 mBar	HCXM010D6V	306-9552	210.94	165.50	155.68
0 to +/-10 mBar	HCXPM010D6V	306-9564	208.87	194.73	--
0 to 20 mBar	HCXM020D6V	306-9576	210.94	165.50	155.68
0 to 50 mBar	HCXM050D6V	540-638	160.67	127.26	119.74
0 to 100 mBar	HCXM100D6V	540-640	162.26	127.26	119.21
0 to 350 mBar	HCXM350D6V	540-651	160.67	127.26	119.21
0 to 1 Bar	HCX001D6V	540-663	162.26	127.26	119.74
0 to 5 Bar	HCX005D6V	540-675	162.26	127.26	119.74
0 to 1 Bar absolute	HCX001A6V	540-687	162.26	127.26	119.74

Differential Transducers, 1 - 6V Output

PTE5000 Series



Length=86 (without connector) Dia.=40,
Pressure ports 1/8"BSP female

- Connections
- 1 Brown +V_S
 - 2 White V out
 - 3 Blue Case
 - 4 Black -V_S

- Temperature compensated differential transducer
- Rugged aluminium casing offering environmental protection to IP67
- Applications include flow measurement and filter monitoring in harsh conditions
- Designed for use with non-corrosive, non-ionic, media eg. dry air and gases

Reference conditions	V _S = 15V, T (ambient) = 25°C, R load = 100kΩ common mode pressure = 0 psi		
Output voltage	1 to 6V		
Supply voltage	12 to 32V		
Offset voltage	1V ± 100mV		
Span	5.0V ± 100mV		
Power consumption	60mW (typ.)		
Response time	(10-90%) 0.1ms		
Operating Pressure	Proof Pressure	Mfrs. List No.	Order Code
0 to 1 psid (g)	20 psi	PTE5001D1A	678-508
0 to +/-1 psid (g)	20 psi	PTE5P01D1A	678-510
0 to 5 psid (g)	20 psi	PTE5005D1A	678-521
0 to 15 psid (g)	30 psi	PTE5015D1A	678-533

Operating Pressure	Order Code	1+	10+	25+
0 to 1 psid (g)	678-508	452.09	374.11	--
0 to +/-1 psid (g)	678-510	456.57	357.93	336.61
0 to 5 psid (g)	678-521	456.61	361.51	340.29
0 to 15 psid (g)	678-533	456.57	357.93	336.61

Transducers & Transmitters - PTE2000

Stainless Steel Housing



Connections: PTE...G4A Series
As PTE G1A Series
except Pin 2 - No connection

Connections: PTE...G1A Series
Brown (pin 1) +V_S
White (pin 2) +Vout
White + shield (pin 3)=Case
Yellow (pin 4)=-V_S

L=62.0 (body excl. connector),
Cable L=2m
Dia=31.8 (25.4 across flats), Fitting 3/8" NPT

- Fully temperature compensated and signal conditioned gauge pressure transducer
- Choice of high-level voltage output or a 4 to 20mA to 20mA output
- Rugged stainless steel housing
- Designed for the measurement of hostile media in harsh environments
- Internal voltage regulator allows use of unregulated power sources
- Right-angle plug-in connector gives protection to IP67 and reduces installation and maintenance time

Series	Voltage Output	Current Output
Reference VS	15V	
Operating temperature range	-40°C to +100°C	
Linearity and hysteresis	±0.5% FS max	
Repeatability	0.10% FS typ.	
Shift with temperature		±1.5% FS max. ±2.0% FS typ.
0°C to +70°C		
-40°C to +125°C		
Stability (1 year)		±0.5% FS output typ.
Zero pressure offset	1.0V ± 100mV	4.0mA ± 100µA
Full scale span	5.0V ± 50mV	16.0mA ± 200µA
Full scale output	6V	20.0mA
Supply voltage	12 to 30V dc	12 to 36V dc
Operating Pressure Range	Proof Pressure	Burst Pressure
0 to 5 psig	20	1000 psig
0 to 15 psig	30	1000 psig
0 to 30 psig	60	1000 psig
0 to 100 psig	200	5000 psig
0 to 300 psig	450	5000 psig
	Mfrs. List No.	Order Code
	PTE2005G1A	704-9092
	PTE2030G1A	678-570
	PTE2100G1A	678-582
	PTE2300G1A	678-594
	Mfrs. List No.	Order Code
	PTE2005G4A	704-9109
	PTE2015G4A	678-600
	PTE2030G4A	678-612
	PTE2100G4A	678-624
	PTE2300G4A	678-636

Operating Pressure	Order Code	1+	10+	25+
0 to 5 psig	704-9092	527.33	421.48	--
0 to 30 psig	678-570	522.18	492.71	--
0 to 100 psig	678-582	527.33	417.24	--
0 to 300 psig	678-594	522.18	459.15	--
0 to 5 psig	704-9109	527.33	421.48	--
0 to 15 psig	678-600	527.33	421.48	--
0 to 30 psig	678-612	522.11	409.78	409.20
0 to 100 psig	678-624	527.33	421.48	--
0 to 300 psig	678-636	522.11	409.78	409.20

Sensors & Transducers

41

Compliant
Non-compliant
RoHS
Limited stock - RoHS replacement available



Compact Ceramic Diaphragm Transmitters CTE8000 Series



The CTE8000 series is a compact ceramic diaphragm transmitter, offering a low cost solution for many industrial gases and liquids. This family of sensors offers a choice of electrical outputs and process connections.

L=72 Dia=21.8 Thread=1/8BSP Male

- 0 to -1Bar to 0 to 100 Bar ranges
- For many industrial gases and liquids
- Field interchangeable
- Choice of 0 to 5V or 4 to 20mA outputs

- Gauge pressure sensing
- Rugged stainless steel construction
- Applications include Pneumatic control and instrumentation

Supply Voltage	1 to 5 V 9 to 30 Vdc	4 to 20mA 9 to 30 Vdc
Full Scale Output	5 Vdc (±50mV)	16mA (±0.2mA)
Zero Pressure Output	0 Vdc (±50mV)	4mA (±0.2mA)
Operating Temperature	-40°C to 100°C	
Response Time	10 ms	
Proof Pressure	2 x rated pressure	

249441

Operating Pressure	Mfrs. List No.	Order Code	1+	Price Each 10+	+
Gauge, 4 to 20mA Output					
0 to 1 Bar G	CTE8001GY4	419-7847	285.35	213.16	--
-1 to +1 Bar G	CTE8N01GY4	419-7859	282.52	206.46	--
0 to 2 Bar G	CTE8002GY4	419-7860	282.52	206.46	--
0 to 5 Bar G	CTE8005GY4	419-7872	285.35	213.16	--
0 to 10 Bar G	CTE8010GY4	419-7884	285.35	212.51	--
0 to 25 Bar G	CTE8025GY4	419-7896	282.52	206.46	--
0 to 50 Bar G	CTE8050GY4	419-7902	282.52	206.73	--
0 to 100 Bar G	CTE8100GY4	419-7914	282.52	206.46	--
Gauge, 0 to 5V Output					
0 to 1 Bar G	CTE8001GY7	419-7926	282.52	206.46	--
-1 to +1 Bar G	CTE8N01GY7	419-7938	282.52	206.46	--
0 to 2 Bar G	CTE8002GY7	419-7940	282.52	206.46	--
0 to 5 Bar G	CTE8005GY7	419-7951	282.52	206.46	--
0 to 10 Bar G	CTE8010GY7	419-7963	285.35	213.16	--
0 to 25 Bar G	CTE8025GY7	419-7975	282.52	206.46	--
0 to 50 Bar G	CTE8050GY7	419-7987	282.52	206.46	--
0 to 100 Bar G	CTE8100GY7	419-7999	282.52	206.46	--

Compact Stainless Steel Diaphragm Transmitters - CTE9000 Series



The CTE9000 series is a rugged compact stainless steel diaphragm transmitter, for use with aggressive and corrosive media compatible with SS 303. This family of sensors offers a choice of electrical outputs and process connections.

L=85 Dia=21.8 Thread=1/8BSP Male

- 0 to 0.35 Bar to 0 to 35 Bar ranges
- For all media compatible with 303 Stainless Steel
- Field interchangeable
- Choice of 0 to 5V or 4 to 20mA outputs

- Gauge pressure sensing
- Rugged stainless steel construction
- Applications: Industrial Process control and aggressive or corrosive media

Supply Voltage	1 to 5 V 9 to 32 Vdc	4 to 20mA 9 to 32 Vdc
Full Scale Output	5 Vdc (±50mV)	16mA (±0.2mA)
Zero Pressure Output	0.03 Vdc (0.08V max)	4mA (±0.2mA)
Operating Temperature	-40°C to 100°C	
Response Time	1 ms	
Proof Pressure	2 x rated pressure	

249445

Operating Pressure	Mfrs. List No.	Order Code	1+	Price Each 10+	25+
Gauge, 4 to 20mA Output					
0 to 350 mBar G	CTEM9350GY4	419-8001	377.90	299.37	--
0 to 1 Bar G	CTE9001GY4	419-8013	377.90	297.00	--
0 to 2 Bar G	CTE9002GY4	419-8025	374.16	280.60	273.42
0 to 5 Bar G	CTE9005GY4	419-8037	374.16	280.60	273.42
0 to 10 Bar G	CTE9010GY4	419-8049	377.90	290.62	--
0 to 20 Bar G	CTE9020GY4	419-8050	374.16	280.60	273.42
0 to 35 Bar G	CTE9035GY4	419-8062	377.90	299.37	--
Gauge, 0 to 5V Output					
0 to 350 mBar G	CTEM9350GY7	419-8074	374.16	280.60	273.42
0 to 5 Bar G	CTE9005GY7	419-8104	374.16	280.60	273.42
0 to 10 Bar G	CTE9010GY7	419-8116	377.90	290.62	--
0 to 20 Bar G	CTE9020GY7	419-8128	374.16	280.60	273.42
0 to 35 Bar G	CTE9035GY7	419-8130	377.90	299.37	--

Transducers & Transmitters - BTE6000 Stainless Steel, Flush Diaphragm and High Pressure



High Pressure
H = 35, W = 48, D = 160
(including connector)
Dia. = 27, Thread = 1/2" BSP

Flush
H = 35, W = 48, D = 135
(including connector)
Dia. = 27, Thread = 3/4" BSP

- Pressures up to 350 bar
- Flush mount versions
- Designed for use with any corrosive or non-corrosive media compatible with 303 stainless steel
- 1 to 6V and 4 to 20mA outputs
- Field interchangeable
- Protected against reverse polarity and sealed to IP65
- Suitable for harsh environments
- Flush diaphragm type transducers avoid the problem of particulate build up and minimise dead volume
- Flush diaphragm types are particularly suitable in the food industry and applications using thick liquids and semi-solids

Fully temperature compensated, signal conditioned transducers offering flush mounted stainless steel diaphragms for gauge and absolute pressure and DIN standard 'manometer thread' versions for high pressure.

Supply voltage	1 to 6V Output 12 to 30V dc	4 to 20mA Output 12 to 36V dc
Zero offset	1.0V ± 150mV	4.0mA ± 150µA
Full scale span	5.0V ± 100mV	16.0mA ± 100µA
Operating temperature	-40°C to +100°C	
Linearity and hysteresis	± 0.2% FSO nom.	
Repeatability	± 0.1% FSO nom.	
Thermal stability (0 to +70°C)	0.05% FSO/°C	
Long term stability (1 year)	± 0.2% FSO	
Proof pressure	2 rated pressure	
FSO = Full Scale Output		

Operating Pressure	Mfrs. List No.	Order Code	4 to 20mA Output Mfrs. List No.	Order Code
Flush diaphragm style				
0 to 1 Bar A			BTE6001A4-FL	678-697
0 to ±1 Bar G	BTE6N001G1-FL	678-650	BTE6N001G1-FL	678-703
0 to 5 Bar G	BTE6005G1-FL	678-661	BTE6005G4-FL	678-715
0 to 10 Bar G	BTE6010G1-FL	678-673	BTE6010G4-FL	678-727
0 to 16 Bar G			BTE6016G4-FL	678-739
High pressure style				
0 to 35 Bar A			BTE6035A4.	700-9021
0 to 70 Bar A			BTE6070A4	678-764

212181

Operating Pressure	Order Code	1+	Price Each 10+	25+
0 to ±1 Bar G	678-650	575.82	456.61	443.80
0 to 5 Bar G	678-661	548.35	430.56	403.89
0 to 10 Bar G	678-673	575.82	527.49	--
Flush Diaphragm, 4 to 20mA Output				
0 to 1 Bar A	678-697	581.53	456.61	429.15
0 to ±1 Bar G	678-703	581.53	456.61	428.32
0 to 5 Bar G	678-715	575.82	471.88	--
0 to 10 Bar G	678-727	581.53	456.61	429.15
0 to 16 Bar G	678-739	581.53	456.61	429.15
0 to 350 Bar A	678-752	575.77	452.09	424.08
0 to 35 Bar A	700-9021	581.53	456.61	428.82
0 to 70 Bar A	678-764	575.77	452.09	424.08

Barometric Pressure Transducer



Connections:
1 +V_s H=32 (including ports)
2 GND W=30, D=60
3 V_{out} Fixing centres 52.4mm, 3.5mm dia.

- Transducer covers barometric pressures 800mBar to 1100mBar
- Calibrated and signal conditioned 0 to 5V output
- Applications in barometry, weather stations, absolute pressure compensation in sensitive equipment

The transducer provides a true 0 to 5V output over the barometric pressure range. Internal voltage regulation allows the device to operate from a single rail power supply between 7 and 24V. A potentiometer is provided to adjust for changes in altitude. The transducer is designed for use with non-corrosive, non-ionic media eg. dry air and gases.

Reference conditions	V _s = 8V, T (ambient) = 25°C, R _L = 100KΩ
Supply voltage	7 to 24V dc
Operating pressure	800 to 1100 mBar
Proof pressure	2 Bar
Voltage output (span)	5V± 500mV
Operating temperature	-40°C to +85°C
Compensated range	-10°C to +60°C
Non-linearity and hysteresis	0.1% FSO (max.)
Repeatability	0.2% FSO (typ.)
Temperature shift (-10°C to +60°C)	0.3% FSO/10°C (max)
Response time	1ms (typ.)
Long term stability	0.1% FSO (typ.)

Mfrs. List No. 144SC0811-BARO

212180

Operating Pressure 800 to 1100 mBar	Order Code 540-894	Price Each		
		1+	10+	25+
		362.48	283.73	267.51

Very Low Pressure Differential Transducers
Signal Conditioned – 160PC Series



- High sensitivity pressure transducers enabling pressures as low as 0 to ±2.5" H₂O to be measured
- Transducers are temperature compensated and fully signal conditioned, with calibrated null and FSO

Utilising the latest silicon technology, a higher sensitivity and lower null shift is achievable. Higher sensitivity requires less amplification and improves the signal to noise ratio.

L=59.8, W=30.0, D=33.7 (excl. pins)
Pressure port O/D=5.0
Fixing centres=52.4

Pins:
1. OUT,
2. GND,
3. IN+

Supply voltage 8V dc (nom.), 6V dc (min.), 16V dc (max.)
Supply current 20mA max.
Null offset 1.0 ± 0.05V (162/164PC), 3.50 ± 0.05V (163PC)
Output at full pressure/vacuum 6.0 ± 0.1V (162/164PC), 1.0 ± 0.2V (163PC)
Span 5V
Ratiometric error 7-8V and 8-9V ±0.5% span, 9-12V ± 2.0% span
Repeatability and hysteresis ±0.25% span (162 type ±0.15% span)
Temperature range -40°C to +85°C (-18°C to +63°C compensated)
Media Port 2: wetted compatible with polyester housing, epoxy adhesive, silicon, borosilicate glass and silicon-to-glass bond.

212247

Operating Pressure	Mftrs. List No.	Order Code	1+	5+	10+	25+
0 to 28" H ₂ O	162PC01D.	731-857	337.28	309.94	304.41	261.94
0 to ±5" H ₂ O	163PC01D36.	731-869	269.77	267.12	--	--
0 to 10" H ₂ O	164PC01D37.	731-870	283.14	--	--	--
0 to ±2.5" H ₂ O	163PC01D75	731-882	282.30	--	--	--
0 to 5" H ₂ O	164PC01D76.	731-894	269.77	246.31	225.93	223.18

Miniature Transducers and Transmitters



Stainless Steel — 0-100mV/0-5Vdc/4-20mA Output — 21R Series



- Three output options - 0 to 100mV and 0 to 5V dc transducers, 4 to 20mA transmitters
- 316L stainless steel wetted parts, compatible with most corrosive media
- Good repeatability and linearity, and negligible hysteresis
- Fitted G1 1/4 male port with integral pressure seal
- Supplied with mating mPm micro-connector
- Sealed to **IP65**

Body L = 76 (excl. connector),
Dia = 17. Fitting = G1/4
(1/4" BSP) male port

Precision piezo-resistive silicon sensor available to measure gauge or absolute pressures.

Signal output	0-100mV ±0.1%	0-5V dc ±1%	4-20mA ±1%
Zero balance	±0.1%	1%	1%
Supply	8-28V dc unregulated (4 wire)	8-28V dc (3 wire)	8-28V dc (2 wire)
Non-linearity and hysteresis	0.2% max.	0.5% max.	0.5% max.
Total error band*	2.5% max.	2.5% typ., 4% max.	2.5% typ., 4% max.
Operating temperature	-20°C to +80°C	-20°C to +80°C	-20°C to +80°C
Over-pressure	2 range or 1100 bar, whichever is less		

*Total error band includes hysteresis, zero and span effects, temperature effects and repeatability

212335

Output	Order Codes	Price Each			
		0-100mV	0-5Vdc	4-20mA	
Pressure Range					
0 to 1 Bar G	709-9460	710-0711	433.76	407.23	365.87
0 to 2.5 Bar G	709-8558	710-0723	314.87	299.06	273.61
0 to 10 Bar G	709-8560	710-0735	318.02	302.05	276.35
0 to 25 Bar G	709-9496	710-0747	314.87	299.06	273.61
0 to 100 Bar G	709-9502	710-0759	314.87	299.06	273.61
0 to 250 Bar G	709-8595	710-0760	314.87	299.06	273.61
0 to 400 Bar G	709-9526		314.87	299.06	273.61
0 to 1000 Bar G	709-8613	710-0784	449.82	423.14	400.87
0 to 1 Bar A	709-9540	710-0796	433.76	407.23	365.87
0 to 2.5 Bar A	709-9551		433.76	407.23	365.87

Transducers, 5V Output
Stainless Steel Housing



- Fully signal conditioned and temperature compensated transducers
- Rugged stainless steel housing with stainless steel isolated diaphragm, shielded connector cable
- Male pressure connection has a self-sealing thread
- Typical media include oil, gases, aqueous solutions, hydraulic fluids, alcohol, freon, ammonia, acids and petrol
- Suitable for pressure applications that involve measurement of corrosive media in harsh environments

Connections
Red — Supply Voltage
Brown or white — Signal output
Black — Ground

L=48 (excl cable), Dia=39, Mounting=1/2"hex,
Thread=1/8"-27 NPT, Cable length = 1000

The low pressure devices, up to 50 psi, are absolute devices. The higher pressure devices are sealed gauge, i.e. sealed at atmospheric pressure in manufacture.

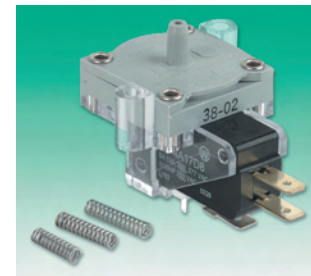
Reference, V _s	9V	-55°C to +125°C	0.02% FSO/°C typ
Output	5V	Zero pressure output	1.0V dc ±0.15V dc max
Span	1V to 6V dc	Stability (1 year)	±1.0% FS output
Supply voltage	9V to 20V dc	Proof pressure	
Operating temp range	-55°C to 105°C	SA15A, SA25A, SA50A	2 rated op pressure
Linearity	<±1% FSO for SA15A, SA25A	SA100S, SA200S	2 rated op pressure
	<±0.5% FSO for others	SA1000S to SA5000S	1.5 rated op pressure
Hysteresis	±0.25% FSO typ	Burst pressure	
Shift with temperature	0°C to +85°C	SA15A, SA25A	20 rated op pressure
	0.01% FSO/°C typ	SA50A, SA100S, SA200S	10 rated op pressure
		SA1000S to SA5000S	5 rated op pressure

212403

Operating Pressure	Mftrs. List No.	Order Code	Price Each	
			1+	10+
0 to 15 psia	SA15A	415-182	693.59	652.43
0 to 25 psia	SA25A	415-194	693.59	652.43
0 to 50 psia	SA50A	415-200	693.59	652.43
0 to 100 psia	SA100S	415-212	552.28	519.50
0 to 200 psia	SA200S	415-224	552.28	519.50
0 to 1000 psia	SA1000S	415-248	546.87	519.50
0 to 3000 psia	SA3000S	415-250	552.28	519.50
0 to 5000 psia	SA5000S	415-261	552.28	519.50

Pressure Switches

Sensitive Pressure Switches



Sensitive, pressure, vacuum and differential pressure measurement switches, housed in a glass filled polyester case.

- Externally adjustable
- Can be mounted in any orientation
- Suits a wide variety of applications
- **UL** and **CSA** recognised

Series 1: Adjustable miniature pressure, vacuum and differential switch for air measurement

Series 2: Gauge pressure only, supplied with 4 colour coded springs, 1 fitted, to cover pressure ranges from 0.07 bar and full setting instructions

	Series 1	Series 2
	Case Material	Glass filled polyester
Electrical	SPST Momentary NO	SPDT (N/O or N/C)
Contact Rating	20 mA, 250 Vac	5 A, 250 Vac
Fluid Medium	Air / Gases	Wide range of Media
Burst Pressure	1.75 Bar	3.1 Bar
Mechanical Life	10 ⁹	10 ⁶
Operating Temperature	-40°C to 120°C	-40°C to 85°C
Contact Material	Phosphor Bronze / 18 ct Gold	Phosphor Bronze / 18 ct Gold
Diaphragm	Polyurethane	Polyurethane
Weight	10g	18g
Mounting	Lugs or pressure stub	Lugs or pressure stub

249526

Pressure Range	Mftrs. List No.	Order Code	Price Each		
			1+	5+	10+
Series 1					
25 to 125 mBar	6101-0021	427-6530	56.13	52.35	49.58
62.5 to 500 mBar	6101-0020	427-6541	56.13	52.35	49.58
0.25 to 1.35 Bar	6101-0019	427-6553	56.13	52.35	49.58
Series 2					
0.025 to 2.75 Bar	6101-0018	427-6565	56.13	52.35	49.58

Miniature Medium Pressure Switches



Miniature pressure switch with all die cast housing and integral 1/8" NPT connection. The switch is designed for moderately high pressure with external vernier adjustment screw. The switch can be mounted in any orientation to suit a wide variety of applications. **UL** and **CSA** recognised. Supplied with 4 colour coded springs, 1 factory fitted, to cover pressure ranges from 0.7 bar to 16 bar and full setting instructions.

Sensors & Transducers

41

Compliant
Non-compliant
RoHS
Limited stock - RoHS replacement available

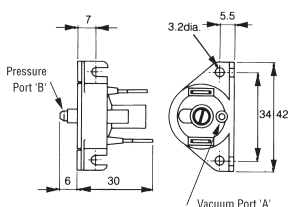


Case Material	Die Cast	Mechanical Life	10 ⁶
Electrical	SPST Momentary (NO or NC)	Operating Temperature	-40°C to 85°C
Contact Rating	5 A, 250 Vac	Diaphragm	Polyurethane
Fluid Medium	Wide range of media	Weight	57g
Burst Pressure	34 Bar		

249528

Pressure Range	Mftrs. List No.	Order Code	Price Each		
			1+	5+	10+
0.7 to 16 Bar	6101-0016	427-6577	54.43	50.75	48.07

Low Pressure 1" - 16" H₂O



herga

- Miniature pneumatic switch for very sensitive pressure, vacuum and differential pressure switching
- Housed in a glass filled nylon 12 surface mounting body with neoprene diaphragm
- Switch can be set for normally open or normally closed operation
- Sensitivity can be adjusted from 1" to 16" H₂O
- Supplied with 1 metre of PVC connecting tube
- Air bleed version has adjustable air bleeds on both sides of the diaphragm

Pressure/Vacuum range	25mm (2") H ₂ O (min), 400mm (16") H ₂ O (max/max. differential)
Pressure, factory setting	50mm (2") H ₂ O (Contact normally open)
Differential between pressure connection	0.34 Bar (5 psi) max.
Body withstand pressure	1.0 Bar (14.7 psi)
Temperature Range	-5°C to +50°C
Switch	SPST-NO/NC
Contact rating	0.5A, 250V ac (resistive)
Dry switching, minimum	5mA, 4V dc
Contact resistance	50mΩ
Pressure connections	4mm dia. spouts

212230/406081

Type	Mftrs. List No.	Order Code	Price Each		
			1+	10+	50+
Standard	6753-00	731-912	68.21	62.84	59.09
Air Bleed	6753-OF	723-0497	68.83	62.84	59.09

Industrial



- Connections
1. Common
 2. N.C., opens on pressure rise
 3. N.O., closes on pressure rise

H=130, W=82, D=38
Fixing centres
(2 holes dia.=4)=45x69, Pressure input= 1/4" BSP brass

- Pressure switching can be set externally
- Switching hysteresis between rising and falling pressure can be preset
- Double insulated GFS nylon housing, sealed to IP65
- Pressure setting can be made tamper-proof by 1.5mm A/F Hex. key
- Approximate pressure setting may be seen through a window in the cover

Industrial pressure switch supplied with 3 colour coded springs to give 3 pressure ranges covering 20 psi to 200 psi, the mid-range spring being supplied ready fitted. Switching is through two separate SPCO V3-style microswitches with 1/4" fast-on spade connections, and cable entry is via M20 tapped conduit hole.

Brass and nitrile rubber are the only materials in contact with the pressure system, making the pressure switch suitable for most commonly used operating fluids, for example in regulating water flow lines or in factory air systems.

Operating pressure ranges (on rising pressure)	Red spring: 20 to 50 psi (1.4 to 3.5 bar) White spring: 40 to 100 psi (2.7 to 6.9 bar) Blue spring: 80 to 200 psi (5.5 to 13.8 bar)
Switching hysteresis	Adjustable 20% to 50% of operating pressure
Switch setting accuracy	±2 psi @ 50 psi rising pressure
Withstand pressure	500 psi
Contact rating	15A 250V ac(resistive)
Operating temperature	-5°C to +70°C

212426

Mftrs. List No.	Order Code	Price Each		
		1+	10+	+
6702-0002	213-317	109.75	101.00	--

Industrial - 0184 Series



L=90 (overall), Dia.=34,
Mounting=27 hex., Thread= G1/4
(1/4" BSP)

- Rugged industrial pressure switches with a wide range of possible setting pressures
- Adjustable switching hysteresis of 10 to 30% between rising and falling pressure
- Switch output by 4A/250VAC changeover contacts
- Connection by industry standard DIN connector
- When used in conjunction with the connector the switch is sealed to IP65
- NBR seal material type suitable for use with hydraulic oil, gasoline, engine oil, heating oil, turpentine and air
- EPDM seal material type suitable for use with water, hydrogen, sea water, acetylene
- Stainless steel body versions suitable for process and chemical industries and pharmaceutical, agricultural applications etc.

Output Rating	4A	Mechanical Life	1000000 operations
Maximum operation	200 operations/min	Temperature range	-30°C to +100°C
Hysteresis	10%	Body Material	Zinc plated steel
Adjustment Range	Tolerance at Room Temp.	Over Pressure	
0.3 to 1.5 Bar	±0.2 bar	100Bar	
1 to 10 Bar	±0.5 to 1.0 bar	300Bar	
10 to 50 Bar	±3.0 bar	300Bar	
10 to 100 Bar	±3.0 to 5.0 bar	300Bar	
50 to 200 Bar	±5.0 bar	600Bar	

212264

Operating Pressure Range	Mftrs. List No.	Order Code	Price Each		
			1+	5+	10+
Zinc Plated Steel Body, NBR Diaphragm					
0.3 to 1.5 Bar	0184-45703-1-003	679-057	110.21	104.71	99.20
1 to 10 Bar	0184-45803-1-042	679-069	110.21	104.71	99.20
10 to 50 Bar	0184-45903-1-009	679-070	110.21	104.71	99.20
10 to 100 Bar	0184-46103-1-012	679-082	110.21	104.71	99.20
50 to 200 Bar	0185-46003-1-003	679-094	120.20	114.18	108.17
Zinc Plated Steel Body, EPDM Diaphragm					
0.3 to 1.5 Bar	0184-457032-003	721-3086	110.21	104.71	99.20
1 to 10 Bar	0184-458032-042	721-3098	110.21	104.71	99.20
10 to 50 Bar	0184-459032-009	721-3104	110.21	104.71	99.20
10 to 100 Bar	0184-461032-012	721-3116	110.21	104.71	99.20
50 to 200 Bar	0185-460032-003	721-3128	110.21	104.71	99.74
Stainless Steel Body, NBR Diaphragm					
0.5 to 5 Bar	0184-457031-SS	721-3037	149.97	142.47	134.99
1 to 10 Bar	0184-458031-SS	721-3049	149.97	142.47	134.99
10 to 50 Bar	0184-459031-SS	721-3050	149.97	142.47	134.99
10 to 100 Bar	0184-461031-SS	721-3062	149.97	142.47	134.99
50 to 200 Bar	0185-460031-SS	721-3074	163.84	155.67	147.46

Load Cells

Shear Beam, Stainless Steel

500-1000 Kg (5-10KN)



- High reliability, IP68 protection
- Stainless steel, fully welded construction
- Heavy-duty, high stiffness sensor
- Industry-standard mounting dimensions

Low profile, heavy-duty shear-beam construction, ideal for heavy industrial applications such as floor scales, overhead scales or hopper weighing. Ultra-high level of protection allows for use in outdoor applications such as tank/vessel weighing or pit scales.

Rated capacity in Kg	500, 1000	kg
Rated capacity in Newtons (N) (approx.)	5000, 10000	N
Output at rated capacity	2V±0.1%	mV/V
Total errors	0.03	% of applied load
Temperature range: Operating	-30 to +80	°C
Temperature range: Compensated	-10 to +40	°C
Safe overload	150	% of rated capacity
Ultimate overload	300	% of rated capacity
Excitation: Recommended	10	V ac or dc
Excitation: Maximum	15	V ac or dc
Input impedance	400± 10	R
Output impedance	350± 3	R
Deflection at rated capacity	<0.4	mm
Cable type	6 Wire, Polyurethane dual floating screen	
Cable length	3mm	m
Threaded mounting holes	M12 x 1.75, 16 deep	1 place (live end only)
Max. dimensions L	148 x 32 x 32	mm

213400

Capacity	Mftrs. List No.	Order Code	Price Each		
			1+	5+	10+
500kg	3510-500M-C2	701-6839	913.50	899.00	--
1000kg	3510-1000-C2	701-6840	913.50	849.55	803.88

Prices are in Singapore Dollars and exclusive of GST. Due to the volatile nature of certain products, prices are subject to change without notice.

Accelerometers

Acceleration/Vibration Sensing



Piezo-Electric Accelerometers

These units have a crystal of piezo-electric material to which is attached a seismic mass. When the crystal is stressed in tension or compression, it generates an electrical charge which is proportional to the acceleration or vibration level it is experiencing. Internal circuitry converts this signal into a voltage or current 4 to 20mA output for data collectors or process control loops. These robust sensors have no moving parts and offer long-term stability and reliability. They have a wide frequency range and signals can be integrated to give velocity and displacement values.

Piezo-Resistive Accelerometers

These models have a seismic mass attached to a cantilever beam. The beam is deflected whilst experiencing 'g' forces and this movement is converted to an electrical signal by resistance changes in a semiconductor sensing unit element. Internal circuitry provides amplification of the signal and temperature compensation. The frequency range of these devices is lower than the piezo-electric models, having the advantage of being able to monitor static or DC acceleration levels.

ACCELEROMETERS - SELECTION TABLE

Vibration Sensitivity	Supply	Mounting Connection	Monitran List No.	Order Code
Industrial - Process Control 4-20mA Loop 0-10mm/sec	10-32V (smoothed)	M8 male 5m armoured cable	MTN/1185CM8	10706-8219
0-25mm/sec0-25mm/sec	10-32V (smoothed)	M8 male 5m armoured cable	MTN/1185CM8	25706-8268
Industrial - AC Output 100mV/g @ ±50g	Compliance voltage 24V dc (nom.) @ 0.5-8.0mA constant current source	¼"28UNFMS 2-pin female connector	MTN/1100	707-7300
Industrial, Hazardous Area - AC Output 100mV/g @ ±50g	As above	¼"28UNFMS 2-pin female connector	MTN/1100I	707-7336
Industrial / Laboratory, Light Weight 100mV/g @ ±10g	As above	Bonding 5m cable with 50W BNC connector	MTN/1800	707-7415
Industrial / Laboratory, Low Frequency 100mV/g @ 5g	10-24V dc @ 7mA	4 holes, 3mm ∅ 5m armoured cable	MTN/7000-5	707-7555
50mV/g @ 50g	10-24V dc @ 7mA	4 holes, 3mm ∅ 5m armoured cable	MTN/7000-50	707-7567

224692

Accelerometers with ac Output With Intrinsic Safety Options



- Robust construction for industrial use
- AC output of 100mV/g
- Uses two-wire constant current drive
- Intrinsically safe version available approved by EECs to category **Ex ia IIC T6**
- Wide operating temperature range -25°C to +140°C
- Mating connector available (not stainless steel)
H (excl connector) = 38, Hex = 25 A/F, Cable L = 5m

Frequency response	2Hz to 8kHz±10%	Transverse sensitivity	Less than 5%
Mounted resonance	10kHz (nom.)	Compliance voltage	24 volts (smoothed)
Measuring range	50g	Integral cable	5m armoured PTFE
Sensitivity	100mV/g ±10% nom. @80Hz	Case material	Stainless Steel
Isolation	Base isolated	Weight	110g (nom.)
Operating temp. range	-25°C to +140°C	Sealing	IP67
Electrical noise	0.3mg max.	Connector	MS 2-pin hermetic
Current range	0.5 to 8mA		

For suitable Zener barrier for intrinsically safe accelerometers, see **Order Code 710-4175**.

224693

Mounting Connector Style	Type	Mfrs. List No.	Order Code	1+	10+	25+
Female Connector		MTN/1100	707-7300	469.35	434.70	418.95
Female Cable		MTN/1100HC	722-3584	469.35	434.70	418.95
Male Cable		MTN/1100HCM8	722-3596	469.35	434.70	418.95
Intrinsic Safety Type						
Female Connector		MTN/1100I	707-7336	661.50	598.50	567.00
Male Cable		MTN/1100IHCM8	722-3602	661.50	598.50	567.00
Mating connector		MS3106A-10SL4S	633-835	20.03	17.67	15.60
Cable clamp		97-3057-1004-1	151-626	17.85	15.73	13.29

Product Watch

- FREE to all account holders
- Notification of obsolete, end of line and end of stock items
- Replacement or upgrade recommendations

Advanced warning of obsolete components

Float Switches

Horizontal



730-786 L=85.5(67.5 into vessel)
372-1061 L=68(39 into vessel)
Float dia = 15.5
Mounting hole dia = 20.6

- Level rise or fall sensing (rotate housing 180)
- Suitable for a wide range of liquids
- Temperature range to 60°C
- Specific Gravity to 0.8
- External fitting
- Rapid push fit
- AMP Econoseal connector option
- Repeatability and reliability due to Reed Switch characteristics
- Interface unit available see order code **730-816**

Typical Sensing Applications

- Windscreen washer bottles
- Recycled water systems
- Condensate level alarm

	730-786	372-1061
Switching voltage	100Vdc, 250Vac	24Vdc,
Switching current	1A	1A
Switching power	15VA	15VA
Min S.G	0.80	0.80
Material	Acetal copolymer (housing), Foamed polypropylene	(Float material)
Temperature Range	-30°C to +60°C	-30°C to +60°C
Sealing Components	EPDM	EPDM
Cable	2 x 22AWG PVC insulated, 0.1m long	AMP Econoseal connector

233624

Description	Mfrs. List No.	Order Code	1+	5+	10+
Float switch 85.5mm	FLCS-01	100-6773	15.28	12.85	8.98
Float switch 68mm	LCS-02..	372-1061 ‡	19.69	16.60	11.62
Connector for above	CA-01..	417-2553 ‡	7.62	7.09	6.62

Horizontal



L=87.9(54.9 into vessel)
Float dia = 17.3
Mounting hole dia = (16.5 internal, 23 external fitting)

- Internal or External fitting
- Specific Gravity to 0.65
- Interface unit available
- Temperature range to 130°C
- Suitable for a wide range of liquids
- Nylon 6.6, Glass Filled Polypropylene or PPS
- Level rise or fall sensing (rotate housing 180)
- International Standards Approvals and recognition (UL, WRC, EN)
- Repeatability and reliability due to Reed Switch characteristics

Typical Sensing Applications

- Vending machines - water level
- Cooling water level - fountain
- Coolant level indication - automotive
- Fuel level - engine
- Boiler heating - element protection
- Oil level - engine

	372-1000	372-1012	372-1024	516-089	372-1036
Switching voltage	100Vdc, 250Vac	100Vdc, 250Vac	100Vdc, 240Vac	120Vdc, 120Vac	100Vdc, 250Vac
Switching current	1A	1A	1A	1A	1A
Switching power	15VA	15VA	15VA	15VA	15VA
Min S.G	0.85	0.65	0.70	0.65	0.65
Material	Nylon 6.6	Polypropylene	PPS	Glass filled polypropylene	Polypropylene
Temperature Range	-30°C to +130°C	-30°C to +110°C	-30°C to +130°C	-30°C to +110°C	-30°C to +110°C
Sealing Components	Nitrile	Silicone	Silicone	Silicone	Silicone
Cable			2 x 18AWG PVC insulated		

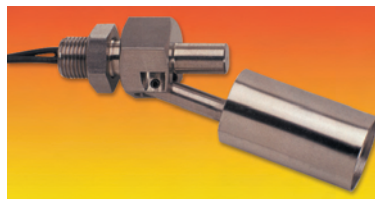
233603

Type	Mfrs. List No.	Order Code	1+	5+	10+
Nylon 6.6	LS303-51N..	372-1000 ‡	20.98	18.40	16.10
Polypropylene	LS403-51..	372-1012 ‡	20.38	17.99	16.51
PPS	LS503-51..	372-1024 ‡	33.52	29.39	25.70
Polypropylene(120V)	FLS801-51	100-6780 ●	22.43	19.94	18.90
Polypropylene(250)	LS803-51..	372-1036 ‡	20.38	17.99	16.51

Horizontal Float - Model SSF211



Internal Fitting



- 304 Grade stainless steel
- Internal mounting
- Compact design
- Temperature range to 120°C
- User configurable N/O or N/C action
- Reversible switch action

L=95, Float dia. = 17

Contact type	NO or NC	Max. switching current	0.5A
Max. switching voltage	300V ac/dc	Max. switching power	50 VA



Min. S.G. of liquid Material	0.80 Stainless steel	Mounting thread	1/8" BSP NPT
Max. temperature	120°C	Lead length	500mm
Mounting Style	Internal	Max. wall thickness	17mm

249053

Mfrs. List No.	Order Code	1+	5+	10+
SSF211X050	424-9100	108.59	97.16	96.58

Horizontal Float - Model SSF212

External Fitting



- 304 Grade stainless steel
- External mounting
- Compact design
- Temperature range to 120°C
- User configurable N/O or N/C action
- Reversible switch action

L = 102, Float dia. = 17

Contact type	NO or NC	Max. temperature	120°C
Max. switching voltage	300V ac/dc	Mounting Style	Internal
Max. switching current	0.5A	Mounting thread	1/2" NPT
Max. switching power	50 VA	Lead length	500mm
Min. S.G. of liquid	0.80	Max. wall thickness	10mm
Material	Stainless steel		

249054

Mfrs. List No.	Order Code	1+	5+	10+
SSF212X050	424-9112	108.59	97.16	96.58

Horizontal Float - Model SSF24

Internal Fitting



- 316 Grade stainless steel
- Internal mounting
- Compact design
- Temperature range to 120°C
- User configurable N/O or N/C action
- Reversible switch action

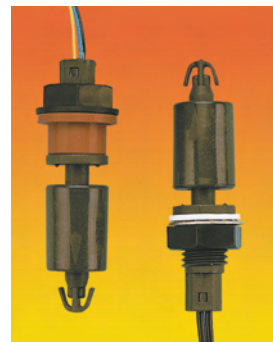
H = 75, L = 55, Float dia. = 28

Contact type	NO or NC	Max. temperature	120°C
Max. switching voltage	300V ac	Mounting Style	Internal
Max. switching current	0.5A	Mounting thread	1/8" BSP
Max. switching power	50 VA	Lead length	350mm
Min. S.G. of liquid	0.80	Max. wall thickness	10mm
Material	316 Grade Stainless steel		

249138

Mfrs. List No.	Order Code	1+	5+	10+
SSF24X035	424-9150	136.58	122.23	121.46

Vertical



- SPST Switching
- Top or bottom entry
- Interface unit available
- Specific Gravity to 0.65
- Internal or External fitting
- Temperature range to 130°C
- Level rise or fall sensing (rotate float 180°)
- Suitable for a wide range of liquids
- Nylon 6.6 or Glass Filled Polypropylene
- International Standards Approvals and recognition (UL, WRC)
- Repeatability and reliability due to Reed Switch characteristics

H=89(58 into vessel)
Float dia = 22.2
Mounting hole dia = (16.5 internal, 23 external fitting)

Typical Sensing Applications

- Deionised water
- Vending machines - Drinking water
- Food processing
- Boiler heating element protection
- Drinking water level - Hot and cold
- Irrigation systems
- Oil level
- Photographic chemicals

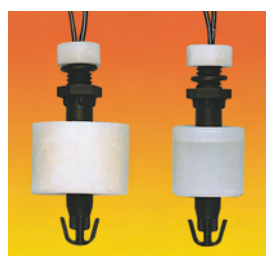
	372-1048	730-749	372-1050
Switching voltage	250Vdc,250Vac	120Vdc,120Vac	250Vdc,250Vac
Switching current	1.0A	1.0A	1.0A
Switching power	15VA	15VA	15VA
Min S.G	0.85	0.65	0.65

Material	372-1048 Nylon 6.6	730-749 Polypropylene	372-1050 Polypropylene
Temperature Range	-30°C to +130°C	-30°C to +110°C	-30°C to +110°C
Sealing Components	Nitrile	Silicone	Silicone
Approvals	UL	UL, WRC	UL, WRC
Cable		2 x 18AWG PVC insulated	

233606

Type	Mfrs. List No.	Order Code	1+	5+	10+
Nitrile (250Vac)	VS303-51N..	372-1048‡	28.82	25.23	22.11
Silicone (120Vac)	FVS801-51	100-6798●	29.26	25.64	22.43
Silicone (250Vac)	VS803-51..	372-1050‡	27.84	24.37	21.35

Vertical



- Level rise or fall sensing (rotate float 180°)
- Suitable for a wide range of liquids
- Temperature range to 70°C
- Specific Gravity to 0.7
- Polypropylene housing
- M8 internal fitting
- Foamed or hollow float (foamed float maintains buoyancy if punctured)
- Top or bottom entry
- Repeatability and reliability due to Reed Switch characteristics
- Interface unit available Order Code 730-816

H=59(45 into vessel), Float dia:730-744=30,
372-1073=22
Mounting hole dia = 8.5, Max wall thickness = 10

Typical Sensing Applications

- Franking equipment
- Oil tanks
- Agricultural equipment
- Condensate level - alarm system

Switching voltage	730-774 100Vdc,250Vac	372-1073 100Vdc,250Vac
Switching current	1A	1A
Switching power	15VA	15VA
Min S.G	0.65	0.65
Material	Polypropylene (housing), Foamed polypropylene (Float material)	Polypropylene (housing), Hollow polypropylene (Float material)
Temperature Range	-30°C to +60°C	-30°C to +70°C
Sealing Components	Silicone	Silicone
Cable	2 x 22AWG PVC insulated, 0.1m long	

233612

Mfrs. List No.	Order Code	1+	25+	100+
FVCS-02	100-6795●	15.40	12.95	9.76
VCS-04..	372-1073‡	16.47	13.86	9.67

Vertical - Stainless Steel



- Level rise or fall sensing (rotate float 180°)
- Suitable for a wide range of liquids
- Temperature range to 120°C
- Specific Gravity to 0.7
- Stainless Steel
- Robust construction
- Internal fitting
- Top or bottom entry
- Repeatability and reliability due to Reed Switch characteristics
- Interface unit available Order Code 730-816

H=78(47 into vessel), Float dia = 28
Mounting hole dia = 16.5, Max wall thickness = 10

Switching voltage	100Vdc,250Vac	Material	Stainless Steel
Switching current	1A	Temperature Range	-30°C to +120°C
Switching power	15VA	Sealing Components	Silicone
Min S.G	0.75	Cable	2 x 18AWG PVC insulated

233601

Mfrs. List No.	Order Code	1+	10+	25+
FVSS-01	100-6801●	113.56	105.62	94.78

Vertical Float - Model SSF22
Internal Fitting



- 316 Grade stainless steel
- Internal mounting to top or bottom
- Compact design
- Temperature range to 120°C
- User configurable N/O or N/C action
- Reversible switch action

Contact type NO or NC
 Max. switching voltage 300V ac
 Max. switching current 0.5A
 Max. switching power 50 VA
 Min. S.G. of liquid 0.80
 Material 316 Grade Stainless steel
 Max. temperature 120°C
 Mounting Style Internal
 Mounting thread 1/8" BSP
 Lead length 350mm
 Max. wall thickness 20mm

H=53, Float dia. =28

249137

Mfrs. List No.	Order Code	1+	5+	10+
SSF22X035	424-9148	94.20	84.30	83.79

Extended Vertical Float



Typical Sensing Applications

- Waste water level
- Cooking oil
- Sump level
- Water level
- Chemical

H=260(224 into vessel), Float dia = 30
 Mounting hole dia = 16.5 internal, 23 external fitting
 Max wall thickness = 10 internal, 4 external fitting

- High and low level sensing
- Suitable for a wide range of liquids
- Temperature range to 130°C
- Specific Gravity to 0.65
- Nylon 6.6 or Brass housing
- M8 internal or external fitting

- Top or bottom entry
- Both switches closed with float down
- Repeatability and reliability due to Reed Switch characteristics
- Interface unit available Order Code **730-816**

	730-762		722-0005	
	High Switch 100Vdc, 70Vac	Low Switch Vdc, 250Vac	High Switch 100Vdc, 70Vac	Low Switch 100Vdc, 250Vac
Switching voltage	100Vdc, 70Vac	15VA	100Vdc, 70Vac	100Vdc, 250Vac
Switching current	0.3 A	A	0.3A	1A
Switching power	3VA	15VA	3VA	15VA
Min S.G.	0.90	0.65	0.65	0.65
Housing Material	Nylon 6.6	Brass	Brass	Brass
Float Material	Nylon 6.6	Polypropylene	Polypropylene	Polypropylene
Temperature Range	°C to +70°C	-30°C to +110°C	-30°C to +110°C	-30°C to +110°C
Sealing Components	Silicone	Silicone	Silicone	Silicone
Cable	3 x 18AWG PVC insulated, 0.5m long			
Cable Colours	Black/White	Black/Yellow	Black/White	Black/Yellow

233615

Type	Mfrs List No.	Order Code	1+	10+	25+
Nylon	FEVS312-51	100-6764	60.64	53.55	49.58
Brass	FEVS722-51..	722-0005	101.05	89.24	85.55

Right Angle



Typical Sensing Applications

- Coolant level indication
- Condensate level alarm
- Vending machines - Drinking water
- Boiler heating element protection
- Drinking water level - (WRC approved for Cold)

H=80 (35 into vessel x 78 long)
 Float dia = 22
 Mounting hole dia = 22.2
 Max wall thickness = 10 internal, 4 external fixing

- Level rise or fall sensing (rotate float 180°)
- Suitable for a wide range of liquids
- Temperature range to 110°C
- Specific Gravity to 0.7
- Glass Filled Polypropylene
- International Standards Approvals and

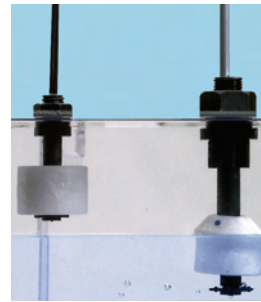
- recognition (UL, EN, WRC)
- Side tank entry
- Internal or External fitting
- Repeatability and reliability due to Reed Switch characteristics
- Interface unit available Order Code **730-816**

	100Vdc, 250Vac	Temperature Range	-30°C to +110°C
Switching voltage	100Vdc, 250Vac	Sealing Components	Silicone
Switching current	1A	Approvals	UL, WRC
Switching power	15VA	Cable	2 x 18AWG PVC insulated
Min S.G.	0.65		
Material	Polypropylene		

233594

Colour	Mfrs. List No.	Order Code	1+	5+	10+
Blue	RS803-51..	372-0998	30.27	26.55	23.22
Black	FRS801-51	100-6791	31.91	27.97	24.48

Reed Level Sensor
Water or Dilute Acid



LS02 - L (overall) = 75, Dia. (float) = 23.5mm



LS03 - L (overall) = 80, Dia. (float) = 17.2mm

Standard liquid level sensors for water applications and dilute acids. The shaft, nut and float are manufactured from black polypropylene, the seal from nitrile rubber. They are terminated by a PVC cable with cross section of 0.14mm² and a length of 500mm. The LS02 has to be mounted vertically; the LS03 version should be mounted horizontally.

Contact Form	1A / 1B
Contact resistance mR (max)	150
Switch power W (max)	10
Switch voltage V dc (max)	200
Switching current A (max)	0.5
Switch carry current A (max)	1
Breakdown voltage V dc	240
Temperature, operating °C	-20 to +90

417823/436283

Mfrs. List No.	Order Code	1+	10+	25+	50+
LS02-1A71-PP-500W	107-9489	27.67	23.05	20.73	15.20
LS02-1B71-PP-500W	107-9490	27.67	23.05	20.73	15.20
LS03-1A71-PP-500W	107-9491	32.94	27.47	24.71	18.13

Horizontal Float - RSF40 Series
Internal Fitting



Compact
 151-643 L=73 (overall), 60 (actuator), Mtg. hole dia=12.7
 151-644 L=70 (overall), 57 (actuator), Mtg. hole dia=16.5
 732-709/607-320 L=88 (overall), 55 (actuator), Mtg. hole dia=16.5
 Max. vessel wall thickness=4
Standard
 146-300 L=116 (overall), 94 (actuator), Mtg hole dia=12.7
 Max vessel wall thickness=6

- Use to indicate either high or low levels
- Choice of materials and sizes for different applications

The units are supplied with normally open contacts, but by inverting the float bobbin the contacts become normally closed.

Liquid level float switches designed to be mounted on the side of a vessel from the inside. Contacts close when the pivoted actuator magnet comes close to the reed switch in the main body. Supplied with fixing nut and sealing ring and 1m of PVC cable.

(607-320 = 0.5m)

151-643: Compact size suitable for use with non-corrosive fluids with temperatures varying up to 100°C.

151-644: Compact size, giving a significantly longer life at sustained temperatures of 80°C to 100°C. It is also compatible with a variety of industrial chemicals.

607-320: Compact size and made from polysulfone which can be used in food grade applications. **UL** recognised.

732-709: Compact size. Material is PPS (polyphenylene sulphide). 120°C max. operating temperature, ideal for applications with continuous exposure to boiling water. Good resistance to wide range of chemicals and to water absorption. **UL** and **WRC** approval.

146-300: Standard size with higher contact rating, suitable for non-corrosive fluids and **WBAS** approved for use with drinking water, suitable for food industry equipment.

Order Code	151-643	151-644	607-320	732-709	146-300
Style	Compact	Compact	Compact	Compact	Standard
Case material	Nylon	Polypropylene	Polysulfone	PPS	Nylon
Mtg. hole dia.	12.7mm	16.5mm	16.5mm	16.5mm	12.7mm
Max. switch current	0.5A	0.5A	1A	1A	2A
Max. switch voltage	250V ac/ 300V dc	440V ac/ 1000V dc	440V ac/ 1000V dc	440V ac/ 1000V dc	250V ac/ 300V dc
Contact rating	15VA	15VA	15VA	25VA	100VA
Min SG of liquid	0.85	0.85	0.85	0.85	0.80
Temperature range °C	-20° to +75°	-20° to +100°	-10° to +85°	-10° to +120°	-20° to +75°
Case colour	Dull Black	Opaque	Shiny Black	Grey	Dull Black



212428

Compact Size	Order Code	Price Each			
		1+	10+	25+	50+
Nylon	151-643	21.50	18.81	17.20	16.12
Polypropylene	151-644	24.93	21.81	19.94	18.70
Polysulfone	607-320	24.43	21.38	19.55	18.32
PPS	732-709	34.28	29.99	27.42	25.71
Standard size	146-300	35.55	32.45	29.67	27.81

Horizontal Float - RSF70 Series



External Fitting



- UK Water Research Council Approved
- UL Recognised
- Rotate 180°, rise or fall to operate

L=88 (overall), 55 (actuator),
Mounting hole dia.=23.0,
Max. wall thickness=4.0, Leads L=0.5m

Horizontal liquid level switches similar to RSF40 (Compact) Series, but incorporating a compression seal to permit fitting from outside the vessel. SPST switch action using reed switch.

	730-609	730-610	732-722
Max. switching voltage	500V ac, 1000V dc	500V ac, 1000V dc	500V ac, 1000V dc
Max. switching current	1A	1A	1A
Max. power	25W	25W	25W
Min. S.G. of liquid	0.85	0.85	0.85
Material	GFS Nylon	GFS Polypropylene	PPS
Temperature range	-20°C to +75°C	-25°C to +100°C	-10°C to +120°C
Case colour	Black	Opaque	Grey

212280

	Mfrs. List No.	Order Code	1+	10+	25+
GFS Nylon	RSF73Y050RM	730-609	29.75	26.03	23.80
GFS Polypropylene	RSF74Y050RM	730-610	31.77	27.80	25.42
PPS	RSF76Y050TV518	732-722	35.87	31.39	28.70

Vertical Float - RSF50 Series



- UL recognition on N/O contact versions
- High 25W rating on N/O versions
- Float reversal, rise or fall to operate (N/O versions)
- Nylon, polypropylene or PPS (polyphenylene sulphide) body
- Normally open or changeover contacts
- PPS type withstands continuous exposure to boiling water
- PPS type gives good chemical and water absorption resistance

H=70 (overall), 44 (inside vessel)
Float dia.=27, Mtg. hole dia.=12.2
Cable L=1m

	730-646	730-658	730-660	730-671	732-710
Contacts	N/O (Form A)	C/O (Form C)	N/O (Form A)	C/O (Form C)	N/O (Form A)
Case material	Nylon	Nylon	Polypropylene	Polypropylene	PPS
Switching current @ 0-30V	0.6A ac	--	0.6A ac	--	0.6A ac
Switching current 120V	0.5A dc	--	0.5A dc	--	0.5A dc
Switching current 240V	0.2A ac	--	0.2A ac	--	0.2A ac
Max. switch current	0.15A dc	--	0.15A dc	--	0.15A dc
Max. switch voltage	0.1A ac	--	0.1A ac	--	0.1A ac
Max. power	--	0.25A	--	0.25A	--
Min. S.G. of liquid	--	48V ac/28V dc	--	48V ac/28V dc	--
Temperature range °C	25VA	3VA	25VA	3VA	25VA
Case colour	0.80	0.80	0.80	0.80	0.80
	-20 to +75	-20 to +75	-20 to +100	-20 to +100	-10 to +120
	Black	Black	Opaque	Opaque	Grey

212278

	Mfrs. List No.	Order Code	1+	10+	25+
Nylon N/O	RSF53Y100RC	730-646	27.63	24.18	22.10
Nylon C/O	RSF53V100MC	730-658	28.88	25.27	23.10
Polypropylene N/O	RSF54Y100RC	730-660	32.47	28.41	25.97
Polypropylene C/O	RSF54V100MC	730-671	30.61	26.78	24.49
PPS N/O	RSF56Y050TB516	732-710	32.70	28.61	26.16

Variable Insertion Depth Vertical Float



- Variable insertion depth float switch is capable of a maximum insertion depth of 450mm
- Insertion depth can be increased by the use of extension tubes, each 306mm long including the connection adaptor
- A maximum of 3 extension tubes can be utilised to achieve a maximum insertion depth of 1350mm
- UL Recognised

The extension tube is fitted by initially removing the cable gland from the float switch and screwing the extension tube to the float switch. The cable gland is then reassembled into the end of the extension tube. The float switch is mounted at the desired level using the clamp supplied.

Temperature range	0°C to +75°C	Min. SG of liquid	0.85
Max. voltage	50V ac/dc	Float material	Polypropylene
Max. current	0.5A ac	Stem material	Polyphenylene sulphide (PPS)
Max. power	10W/VA	Body/extension	PVC, class 7

212273

Mfrs. List No.	Order Code	1+	10+	25+	50+	+	
Switch	RSF64EXS	730-683	85.08	75.22	68.77	64.47	--
Extension	RSF64EXT	730-695	19.32	16.91	15.46	14.49	--

Vertical Float



- Liquid level float switch for vertical mounting, suitable for either high or low level indication
- Suitable for use in fresh and salt water, diesel oil, paraffin and various dilute acid and alkaline solutions

The units are supplied with normally open contacts, but by inverting the float bobbin the contacts become normally closed. Supplied with a 1m PVC cable.

Max. switching current	1A
Max. switching voltage	240V ac, 300V dc
Max. switching power	24VA
Min. S.G. of liquid	0.80
Temperature range	-10°C to +75°C
Case Material	Polypropylene

L=48 (overall), Mtg dia = 3/8",
Float travel = 9.5, Float dia = 25

212229

Order Code	1+	25+	100+	250+
103-846	32.60	28.26	25.01	23.28

Stainless Steel, Vertical Float
Horizontal/Vertical Mounting



Stainless steel liquid level sensors with vertical float, versions available for vertical mount and horizontal mount with right angle stem. Designed to operate in a wide range of environments. SPST switch action.

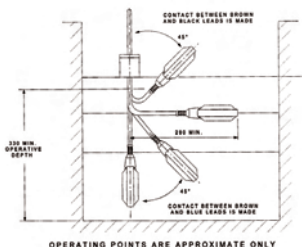
- Internal vessel mounting
- 50W switching capability
- Float reversal, rise or fall to operate
- UL Recognised
- Top or bottom tank mounting
- Silicone sealing washer

Switching Capacity	50W	Min. S.G. of liquid	0.75
Switching Voltage	240V ac/200V dc	Case material	Stainless steel 304
Switching/Carry current	0.5A/1A	Operating pressure	10 Bar
Operating temperature	-10°C to +120°C (intermittant to 200°C)		

212238

Type	Mfrs. List No.	Order Code	1+	5+	10+	25+
Vertical mount	RF3001A/VFS30	730-180	137.53	130.66	115.45	109.70
Horizontal mount	RF3002A/HFS30	730-191	176.51	167.70	150.04	142.47

Level Regulators - Overview of Operation



The sealed float chamber swings vertically about a weight attached to the cable, which causes the contacts to change as the liquid level falls and rises.

234882

Level Regulators - LR01 and LR02
5m, 10m, 20m cable



Float: L = 170, Dia. = 90

- Chemical-resistant HYPALON rubber housing
- Changeover contacts, three core cable
- Simple to install
- Trouble-free operation
- Choice of mercury or non-mercury actuator
- Both contacts open between make and break on mercury types

Sealed float chamber in synthetic rubber housing. Float swings vertically about weight. Contacts change state as liquid level falls or rises.

Contact rating	LR01 = 90V, 6A	LR02 = 250V, 5A
Max. temperature	70°C	
Specific Gravity	0.80 to 1.3	
Max. submerged depth	20 metres	
Actuation	LR01 : Internal mercury level switch LR02 : Internal roller ball and microswitch arrangement	
Position of weight	Fixed, 120mm from float	

WARNING: MERCURY SWITCHES SHOULD NOT BE OPENED

212313

Cable Length	Mfrs. List No.	Order Code	1+	5+	10+	25+
Mercury Regulators						
5m	LR01-L05M	706-2539	114.44	98.37	90.44	82.77
10m	LR01-L10M	706-2540	131.86	113.34	104.20	95.37
20m	LR01-L20M	706-2552	166.70	143.29	131.73	120.57
Non-mercury Regulators						
5m	LR02-L05M	706-3830	114.44	98.37	90.44	82.77
10m	LR02-L10M	706-3842	131.86	113.34	104.20	95.37
20m	LR02-L20M	706-3854	166.70	143.29	131.73	120.57

Level Regulators - LR03, LR06, LR07
PVC, PUR and EPDM cable



Sealed float chamber in plastic housing with PVC cable. The float swings vertically about a weight attached to the cable or the cable attachment point on the side of the vessel, which causes the contacts to change as the liquid level drops or rises.

Float: L=103, W=81 Weight: L=57, Dia.=50

- Change over contacts, three core cable available with:
- LR03, PVC cable for general use
 - LR06, PUR cable for use in DIESEL OIL
 - LR07, WRAS Approved EPDM cable for use in POTABLE WATER

- Easy to install and inexpensive
- Non mercury construction
- Trouble-free operation
- Optional adjustable ballast weight
- Non-mercury level regulator

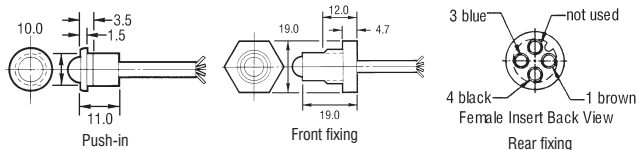
Contact rating	250V, 15A
Max. temperature	70°C
Specific Gravity	0.90 to 1.3
Max. submerged depth	20 metres
Actuation	Internal steel roller ball and microswitch arrangement
Position of weight	Adjustable, 280mm minimum from end of float

212312

Cable Length	Cable Type	Mfrs. List No.	Order Code	1+	5+	10+	25+
5m	PVC	LR03-L05M	706-4263	36.73	31.00	28.48	25.61
10m	PVC	LR03-L10M	706-4275	44.35	37.42	34.43	30.93
5m	PUR	LR06 L05M	388-9841	63.22	53.39	49.11	44.10
10m	PUR	LR06 L10M	388-9853	93.62	79.03	72.76	65.30
20m	PUR	LR06 L20M	388-9865	142.98	123.01	113.18	103.46
5m	EPDM	LR07 L05M	388-9877	70.72	59.69	54.97	49.36
10m	EPDM	LR07 L10M	388-9889	106.66	91.76	84.45	77.19
20m	EPDM	LR07 L20M	388-9890	189.13	162.70	149.72	136.85
Weight LR03/LR06		LR03-W	706-4287	8.25	6.99	6.43	5.73
Weight LR07		LR07-W	390-6541	8.25	6.99	6.43	5.73

Optical Level Switches

Optical Liquid Level Sensor
Solid State



Solid state liquid level sensors incorporate an optoschmitt trigger which provides a digital output that denotes the present or absence of a liquid. The plastic dome contains an LED and the optoschmitt sensor, arranged so that when it is not covered by a liquid, a light path is established between them by total internal reflection.

Three mounting styles are available. The two threaded styles have a stainless steel fixing nut and fluorosilicone rubber gasket supplied, which fix the sensor from on one type and from the rear on the other. The push-in style may be fitted into metal housings or plastic bodies, in some cases an O-ring is recommended to help in the sealing of the finished product.

- Solid state reliability
- Fast response
- Wide temperature range -25°C to +100°C
- Polysulphone body compatible with most industrial liquids
- Suitable for venting machines, food processing and tank level applications

Power Supply	Optoschmitt LED	4.5V dc to 12V dc (5V dc above 85°C) 5V dc, 30 to 40mA (1.1 to 1.4V dc typ)
Output current		200mA max sinking
Mounting thread		-40°C to +125°C
Connections		250mm flying leads

383310/406083

Type	Mfrs. List No.	Order Code	1+	10+	25+	100+
Push-in	LLE105100	868-8303 ▲	67.31	60.71	55.69	48.17
Front fixing	LLE102101	868-8311 ▲	58.36	52.57	48.17	41.70
Rear fixing	LLE103101	868-8320 ▲	58.36	52.57	48.17	46.41

Conductive Level Controllers

Miniature Controller - 61FGPN



- Space saving version of the 61F-GP general purpose conductive level controller
- Suitable for single or two point level control of conductive materials (liquid or solid)

Electrical connections are via a plug-in octal base.

Operating voltage	110V ac or 240V ac (-15%, +10%)
Electrode voltage	8V ac
Output changeover relay	5A @ 240V ac/24V dc
Dielectric strength	1500V ac 50/60Hz
Power consumption	3.2VA max.
Temperature range	-10°C to +55°C

224703

Operating Voltage	Mfrs. List No.	Order Code	1+	+	+
110V ac	61F-GPN2 110AC	177-887	112.90	--	--
240V ac	61F-GPN2 240AC	177-888	112.90	--	--
Surface/DIN	PF083A-E	176-961	7.26	6.90	6.54

Controllers - 61FGP Series



- Plug-in conductive level controllers ideally suited to control top and/or bottom levels of fluids
- For use in conjunction with appropriate electrode assembly

General Purpose Type: Single point or differential level control of all conductive liquids. Also suited for refrigeration as an ice bank controller.

High Sensitivity Type: For liquids having very high specific resistance of the order of 10 5 Ω/cm, such as boiler condensation, distilled water and damp sand.

Operating voltage	110V, 240V 50/60Hz	Dielectric strength	1500V ac
Operating voltage range	85 to 110%	Power consumption	3.2VA max.
Contact rating	5A @ 230V ac	Temperature range	-10°C to +55°C
Insulation resistance	100MW min. @ 500V dc		

Type	Probe Voltage	Operate Resistance	Release Resistance (Max.)
General purpose	8V ac	4kW	15kW
High sensitivity	24V ac	70kW	300kW

224704

Operating Voltage	Mfrs. List No.	Order Code	1+	5+	10+
General Purpose					
110V ac	61FGPN8110VAC	202-198	121.50	115.41	109.35
240V ac	61FGPN8240VAC	202-204	121.50	115.41	109.35
High Sensitivity					
230V ac	61FGPN8H240VAC	202-253	133.83	127.11	120.45
Screw terminal base					
	8PFA1	330-978	17.98	17.05	15.34

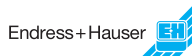
Sensors & Transducers

41

Compliant
Non-compliant
RoHS
Limited stock - RoHS replacement available

Liquid Limit Switches

Liquid Level Switches - LIQUIPHANT FTL260



- Stainless steel forks and housing IP65
- Immune to external vibration and build-up
- 1" BSP parallel thread connections (stainless steel)
- Maintenance-free
- Mounting in any orientation
- LED indication of operating mode and switching mode

Vibration limit switch for liquid level detection in storage tanks, tanks with agitators and piping. Can be used as an alternative to float switches and in applications where build-up, turbulence, liquid flow and gas bubbles are present.

Process media temp. -40°C to +150°C
 Power supply requirement AC version; 19 to 253V 50/60Hz
 DC versions; 10 to 55V, ripple 1.7V max., 0-400Hz
 Connection 4 pole plug connection to DIN 43650-A ISO 4400
 Pressure in tank -1 to 40 Bar
 Density of material 0.7 g/cm³ (min.)
 Dimensions L = 242 (overall), 128 (forks and process connection), Body ∅ = 40, Forks W = 20, Gap = 9

224709

Voltage	Mftrs. List No.	Order Code	Price Each		
			1+	5+	+
19 to 253V ac (2 wire)	FTL260-0010	712-5343	340.42	340.33	--
10 to 55V dc (3 wire)	FTL260-0020	712-5355	340.42	340.33	--

Mass Airflow Sensors

Microbridge

0 - 0.2 l/min to 0 - 1 l/min



- Sensors give signal-conditioned output proportional to the air/gas flow through the device
- Wide range of applications

Connections
 1 Output voltage
 2 +ve supply voltage
 3 Ground

H = 31.5 (excl pins), W = 20.5 (excl ports), D = 15.5 Port O/D = 5.08, Pin spacing = 2.54, Fixing centres = 12.7

Microbridge mass airflow sensors give a signal conditioned output (1V to 5V dc for a 10V dc supply) proportional to the air/gas flow through the device. They are sensitive to flows up to 1 litre/min (0 - 1000 standards cc's/min). The transducers are uni-directional, the air flow going from P1 to P2.

Applications: Air conditioning (variable air volume), medical ventilation/anaesthesia control, gas analysers, gas metering, fume cabinet and process control.

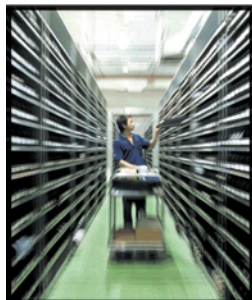
Excitation voltage 10V dc±10mV dc
 Output voltage 5V at full span
 Null voltage 1.00V dc±50mV dc
 Repeatability and hysteresis ±0.5% of reading
 Response time 3ms (max.)
 Operating temperature -25°C to +85°C
 Overpressure 25 psi

	178-887	178-888*	178-889
Operating range	0 to 200 sccm (0 to 0.2 litres/min)	0 to 2" H ₂ O (0 to 0.072 psid)	0 to 1000 sccm (0 to 1 litre/min)
Mftrs. List No.	AWM3100V	AWM3200V	AWM3300V

* 178-888 is configured as a differential pressure transducer

212424

Flow Range	Order Code	Price Each			
		1+	5+	10+	25+
0 to 200 sccm	178-887	217.47	206.59	195.76	195.23
0 to 2" H ₂ O	178-888	222.45	211.35	200.22	199.69
0 to 1000 sccm	178-889	217.47	206.59	195.76	195.23



In stock and ready to despatch, 300,000 products in our Asia, US and Europe warehouses.

300,000 products at your fingertips

Liquid Flow Sensors and Flow Switches

Liquid and Air Flow Switches



- Operates from a small head of liquid
- Maximum pressure 10 Bar @ 20°C
- Low pressure drop
- Vertical mount ±15°
- Suitable for various pipe sizes
- Triac switching (AC)
- Reed Switch switching (DC)
- Suitable for liquid and air

Typical Sensing Applications

- Power shower
- Central heating systems
- Mains water control
- Flow sensing
- Leak detection
- Cooling systems

	730-798	730-804	721-9982	721-9994	372-0986
Switching voltage	250Vac	300Vdc,	250Vac	300Vdc,	100Vdc, 250Vac
Switching current	3A	0.5A	3A	0.5A	1A
Switching power		10VA		10VA	15VA
Material		Noryl	Brass	Brass	Copper
Temperature Range	-30°C to +100°C	-30°C to +85°C	-30°C to +100°C	-30°C to +100°C	-30°C to +80°C
Switch On Flow Rate	1litre/min	1litre/min	1litre/min	1litre/min	0.5litre/min
Fitting	3/4" BSP Male/Female	3/4" BSP Male/Female	22mm compression	22mm compression	15mm pipe

233632

Connection Type	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
3/4" BSP	FS-01	100-6766●	51.00	45.05	41.71
3/4" BSP Male/Female	FS-02	100-6767●	37.17	32.85	30.43
22mm compression	FS-05..	721-9982‡	100.55	91.41	88.48
22mm compression	FS-06..	721-9994‡	90.50	80.73	78.15
15mm pipe	FS-10..	372-0986‡	20.38	18.36	17.51

Liquid Flow Switches

1.5 l/min and 3.5 l/min



- Flow switches in Acetal resin housing, WRC approved for use in potable water systems
- Suitable for use with hot or cold water and alcohol or dilute (including organic) acids up to 5% concentration
- Flow switches can be mounted vertically or horizontally, with the cap upwards

15mm types: L=107, W=56 (standard type), 70 (triac type), Dia.=15, Cable L=250
 22mm types: L=114, W=58 (standard type), 72 (triac type), Dia.=22, Cable L=250

Available 15mm and 22mm diameter for 1.5 litre/min and 3.5 litre/min flows respectively. Triac protected versions are available for switching loads directly, as in powered water systems with relatively high pump turn-on surge currents.

Greater sensitivity is achieved with vertical installation.

Switch point 1.2 to 1.5 litres/min (15mm types), 3.0 to 3.5 litres/min (22mm types)
 Switch off flow (max.) 0.5 litres/min. (15mm types), 1.0 litres/min. (22mm types)
 Operating temperature 85°C (max.)
 Switching voltage 240V rms/dc
 Max. full cycle on state surge 1.0A @ 50Hz (standard types), 10A @ 50Hz (triac types)
 Max. full cycle continuous 1.0A @ 50Hz (standard types), 1.5A @ 50Hz (triac types)
 Max. switching power 15VA (standard types), 240VA (triac types)

212240

	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
1.5 l/min, 15VA	FS15	730-889	34.02	29.77	27.22
3.5 l/min, 15VA	FS22	730-890	36.59	32.02	29.28

Water and Air Flowmeters - 'Loflow'



- Gives accurate indication of low rates of fluid flow
 - Easy wall or panel mounting
- 'Loflow' flowmeters use the principle of variable area flow measurement, utilising the movement of a float inside a calibrated tapered tube. The float is displaced upwards with increasing flow rate until the weight of the float balances the upward force of the fluid. The top of the float then indicates the flow rate on the calibrated scale.

Construction:	Grillon-TR55
Body	ABS 7020
Black body half/ball retainer	PVC
Black panel	10 Bar
Max. working pressure	60°C
Max. working temperature	±2%
Accuracy	±1%
Repeatability	

Media	Inlet Port	Flow Rate	Float Material	Order Code
	BSPT Male	Litres/minute		
Water	1/4"BSPT	0.07-0.55	Stainless Steel	731-158
Water	3/4"BSPT	0.02-2	Acetal	541-266
Water	3/4"BSPT	1.5-10	Stainless Steel	541-278
Water	3/4"BSPT	2-22	Stainless Steel	541-280
Air	1/4" BSPT (male)	1.0-7.5	Acetal	731-092
Air	1/4" BSPT (male)	3-21	Stainless Steel	731-109
Air	3/4"BSPT	5-50	Acetal	731-110
Air	3/4"BSPT	20-135	Acetal	731-122
Air	3/4"BSPT	60-330	Stainless Steel	731-134
Air	3/4"BSPT	60-720	Stainless Steel	731-146



Note: These units must be used in the vertical plane

224716

Flow Range (Litres/min)	List No.	Order Code	Price Each			
			1+	5+	10+	+
Water						
0.07-0.55	LF2055	731-158	135.36	--	--	--
0.02-2	LF.2020	541-266	135.36	--	--	--
1.5-10	LF.211	541-278	135.36	--	--	--
2-22	LF.2220	541-280	135.36	--	--	--
Air						
1.0-7.5	LF3007E	731-092	130.80	--	--	--
3-21	LF3021E	731-109	135.36	--	--	--
5-50	LF3050E	731-110	135.36	--	--	--
20-135	LF3135E	731-122	135.36	--	--	--
60-330	LF3330E	731-134	133.69	127.01	123.17	--
60-720	LF3720E	731-146	135.36	--	--	--

Flow Transducers

Compact, Pulse Output

1 - 25ℓ/min.



'Dataflow Compact' is for monitoring low flows of liquids with an electronic output signal at low cost. Fluid impacts on a twin-vaned turbine which rotates at a speed proportional to the flow rate. The rotation is detected optically and converted to a pulse output signal suitable for display or control of flow rate, totalising or batch control.

Electrical connections, 3 wire	H = 29, W = 52 overall, D = 27
Red = +5V	Connections 3/8" BSP
Green = output signal	Cable L = 300
Blue = 0V	

- Pulse output signal for flows up to 25ℓ/min.
- Lightweight, robust and suitable for most liquids
- Operates in any plane
- Simple to install
- Negligible pressure drop
- Accepts reverse flow
- Low cost flow measurement

Construction	Grilamid - TR55	Shaft retainers	Grilamid - TR55
Body	18% PTFE filled nylon	Max. working pressure	20 Bar
Rotor	Stainless Steel	Pressure drop (max.)	0.1 bar @ 15ℓ/min.
Shaft			
Calibration	752 pulses/litre	Temperature range	+5°C to +70°C
'K' Factor	±2% typ.	Power supply	+5V dc
Accuracy	±1%	Flow range	1 to 25ℓ/min.
Repeatability			

212177

Mftrs. List No.	Order Code	1+	5+	10+	+
DFC.9000	560-121	122.87	119.94	117.37	--

4-20mA or 'Pulse' Output - 'Dataflow'
Flow Rates Up To 150ℓ/min.



H=100, W=42, L=196
Connections: 1" BSP, parallel threads

- 4 to 20mA or pulse output types available
- Works in any plane
- Accepts reverse flow
- Simple to install
- For use with most liquids

Connections	560-108	560-110
	1 +20mA	1 Signal +
	2 +24V	2 +24V
	3 No pin	3 Signal -
	4 0V, 0mA	4 0V GND

'Dataflow' flow transducers are designed to operate with most liquids. The transducer is available with either 4 to 20mA output or pulse output.

The 4 to 20mA output type is factory calibrated to 4 to 100 litres/minute, but this can be easily user recalibrated using the zero and span adjusters on the unit.

The pulse output type is factory calibrated but is not user adjustable. It can be used in conjunction with a totaliser or batch counter.

Construction	Polyester	Calibration
Body	Borasilicate	560-108: 4mA - 0ℓ/min., 20A - 100ℓ/min.
Glass tube	Acetal	560-110: 'K' Factor, Water - 44.25 pulses/litre
Rotor and locator	Nitrile	Oil (viscosity 30cSt) - 51.14 pulses/litre
Seals	Stainless Steel	
Washers and shaft	Stainless Steel	
Rotor tips	Stainless Steel	

Max. working pressure	10Bar oil/water	Temperature range	+5°C to +80°C oil +5°C to +60°C water
Max. flow rate	150ℓ/min.	Accuracy	±2%
Min. flow indication	2ℓ/min. (max. 150ℓ/min.)	Supply	24V dc

Mftrs. List No. DFT.990=560-108, DFT.980=560-110

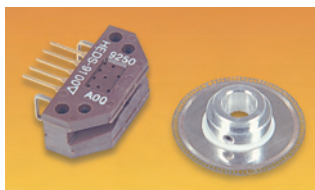
FOR SUITABLE 4 TO 20mA PROCESS INDICATOR, SEE ORDER CODE **108-912** OR **530-050**

222139

Output	Order Code	Price Each		
		1+	5+	10+
4 to 20mA	560-108	934.82	866.00	828.82
Pulse	560-110	857.16	825.14	--

Encoders - Incremental

Encoder Module



The module consists of a lensed LED source and a detector IC enclosed in a small C-shaped plastic package.

The two channel module and code wheel gives two outputs in quadrature, and the three channel module and code wheel also gives an index output.

- High performance low cost optical incremental encoder modules and code wheels
- Module designed to be tolerant to mounting misalignment
- Modules operate from a single 5V supply

Count frequency (guaranteed max.)	100kHz
Code wheel set screw	2.56 (use 0.035" hex wrench)

Encoder	Assembly Tools	
	Centering	Gap Setting
HEDS-9100	329-5977	329-5965
HEDS-9140/9730	329-5977	329-5977
HEDS-9000	389-1331	329-5965
HEDS-9040	389-1331	389-1331

Encoder	PPR	Code Wheel 1/4"	Code Wheel 4/6mm
328-7889	200	418-0082	418-0094
328-7890	256	418-0100 (5/8")	418-0112
415-327	500	280-884	280-896(4mm)
328-8109	500	280-884	280-896(4mm)
280-902	500	280-914	280-926(4mm)
328-7877	1024	389-1367	--
328-7865	200		

212434

Encoder Modules	Resolution (PPR)	Mftrs. List No.	Order Code	Price Each		
				1+	10+	100+
2 ch.	200	HEDS-9100-E00	328-7889	47.08	44.65	--
3 ch.	256	HEDS-9140-F00	328-7890	52.14	49.60	--
2 ch.	2000	HEDS-9000-T00	328-7865	47.08	44.31	41.52
2 ch.	500					
(Flange Mount)						
3 ch.	500	HEDS-9730-A50	328-8109	33.82	31.83	--
3 ch.	1024	HEDS9140-A00	280-902	54.24	46.98	45.46
3 ch.	1024	HEDS-9040#J00	328-7877	52.14	49.64	--
2 ch.	2000	HEDS-9000-T00	328-7865	47.08	44.31	41.52

Sensors & Transducers

41

Compliant
Non-compliant
RoHS
Limited stock - RoHS replacement available

Code Wheels	Resolution (PPR)	Mftrs. List No.	Order Code	1+	10+	100+
	2 ch., 1/4"	200	HEDS-5120-E06	418-0082	33.63	30.27
2 ch., 6mm	200	HEDS-5120-E12	418-0094	33.63	30.27	27.48
3 ch., 515/8" mm	256	HEDS-5140-F04	418-0100	37.77	34.02	30.90
3 ch., 6mm	256	HEDS-5140-F12	418-0112	37.77	34.02	30.90
3 ch., 1/4"	1024	HEDS6140-J06	389-1367	48.70	42.12	--
2 ch., 1/4"	500	HEDS5120-A06	280-884	32.92	25.83	--
2 ch., 4mm	500	HEDS5120-A11	280-896	32.92	25.83	--
3 ch., 1/4"	500	HEDS5140-A06	280-914	36.94	29.04	--
3 ch., 4mm	500	HEDS5140-A11	280-926	36.94	29.04	--
2 ch., 1/4"	2000	HEDM6120-T06	389-1343	45.43	39.00	--
2 ch., 6mm	2000	HEDM6120-T12	389-1355	45.43	39.00	--
Assembly Tools		HEDS-8905	329-5977	13.98	13.17	12.33
		HEDS-8901	329-5965	13.98	13.17	12.51
		HEDS8906	389-1331	22.25	19.62	18.36

360/500 Pulses/Rev



H=41.1, W=30.0, D=18.3
 Mounting: Standard types - 2 screw M2.5 on 19.05 PCD or 3 screw M1.6 on 20.90 PCD
 Types with external mounting ears - Overall W=52.1 with 2 fixing holes for M2.5 screws on 46.0 PCD.

- High reliability
- Quick and easy assembly
- High resolution
- Single 5V supply

A series of two and three channel optical encoders incorporating an HEDS9100/9140 series encoder module and an HEDS5120/5140 series code wheel. The outputs of the two channel version are two square waves in quadrature. The three channel version gives one additional index output pulse per revolution.

The standard encoders (without mounting ears) are available for a 4mm or 1/4" dia shaft and can be mounted to a motor using either the two screw or three screw mounting options on the lid. The encoders with external mounting ears are designed for larger diameter motors and 1/4" dia shafts. The use of an alignment tool or aligning pins is recommended for 2 channel encoders and is essential for 3 channel encoders. Suitable alignment tools and also connecting leads (length 152mm) are available.

212435

Type	Mftrs. List No.	Order Code	1+	10+	100+
Standard - 4mm Shaft Dia.					
2 ch., 500ppr	HEDS5500-A11	415-352	94.11	81.48	75.13
3 ch., 500ppr	HEDS5540-A11	415-376	100.92	87.48	81.14
3 ch., 360ppr	HEDS5540-G11	415-388	100.92	87.48	82.75
2 ch., 500ppr	HEDS-5505-A04	328-7920	80.27	--	--
2 ch., 200ppr	HEDS-5500-E05	328-7919	90.30	89.73	--
Standard - 1/4" Shaft Dia.					
2 ch., 500ppr	HEDS5500-A06	280-938	112.50	99.60	81.75
3 ch., 200ppr	HEDS-5540-E06	328-7932	90.91	85.57	--
3 ch., 500ppr	HEDS5540-A06	280-940	118.68	115.68	99.60
External Mounting Ears - 1/4" Shaft Dia.					
2 ch., 500ppr	HEDS5600-A06	415-390	94.11	82.02	--
2 ch., 360ppr	HEDS5600-G06	415-406	94.11	81.48	77.24
3 ch., 500ppr	HEDS5640-A06	415-418	100.92	87.48	83.74
2 ch., 200ppr	HEDS-5605-E06	328-7944	84.73	--	--
Connecting Leads					
2 ch.	HEDS-8902	415-431	9.15	8.14	--
3 ch.	HEDS-8903	415-443	12.73	9.85	9.03
Alignment Tools					
1/4" shaft dia.	HEDS8910-006	280-951	13.86	--	--
4mm shaft dia.	HEDS8910-011	280-963	14.55	--	--

Panel Mount, 256/360/500 Pulses/Rev



- Encoders operate from a single 5Vdc supply
- Two channel TTL quadrature output to provide resolution and direction information

Optical incremental encoders designed primarily for panel mounting. Connections by colour coded flying leads.

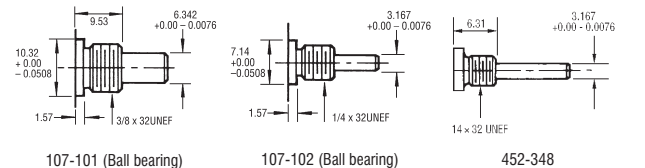
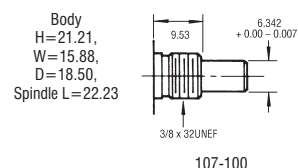
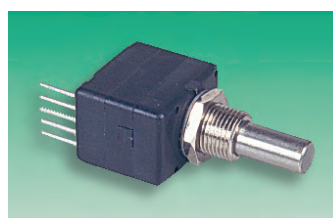
Connections: H=41.1, W=30.0, D=18.3 (body)
 Ch.A=white, Shaft dia.=6.35, L=12.7
 Ch.B=brown, Leads L=150
 VCC=red, Gnd=black

Supply voltage	4.5V - 5.5V
Supply current	17mA typ, 40mA max.
Operating temperature	-20°C to +85°C
Output voltage	2.4V High level min.,

212243/406086

Mftrs. List No.	Order Code	1+	10+	100+
256 ppr	HEDS5701-F00	730-920	120.60	105.06
360 ppr	HEDS5701-G00	730-932	120.60	105.06
500 ppr	HEDS5701-A00	730-944	120.60	105.06

EN Series Rotary Optical Encoder



- Suitable for digital systems where both magnitude and direction of adjustment must be provided
- 2 bit gray code output produced, channel A leads channel B by 90° (clockwise)
- Ideal as a digital panel control or as position sensing devices in applications where long life, high resolution and precise linearity are critical.

Supply voltage	5V dc ±0.25V dc	Connections	1 Ground
Supply current	26mA max		2 NC
Mechanical rotation	Continuous		3 Output A
Resolution			4 +Vcc
(107-100, 107-102, 452-348)	128 pulses per revolution		5 Output B
(107-101)	256 pulses per revolution		
Operating temperature	-40°C to +85°C		

Mftrs. List No.	ENA1J-B28-L00128 = 107-100,	ENS1J-B28-L00256 = 107-101,
	ENA1J-B28-L00128L = 935-8242,	ENT1J-D28-L00128L = 935-8277,
	ENT1J-D28-L00128 = 107-102,	ENC1J-D28-L00128 = 452-348,
	ENS1J-B28-L00256L = 935-8269,	ENC1J-D28-L00128L = 935-8250,

207180

Order Code	Price Each			
	1+	25+	50+	100+
107-100▲±	101.97	79.41	64.86	55.32
935-8242▲±	101.97	79.41	64.86	55.32
107-101▲±	182.58	142.17	116.13	99.02
935-8269▲±	182.58	142.17	116.13	99.02
107-102▲±	156.84	122.13	99.75	85.07
935-8277▲±	156.84	122.13	99.75	85.07
452-348▲±	101.97	79.41	64.86	55.32
935-8250▲±	101.97	79.41	64.86	55.32

120EN Series Rotary Optical Encoder



Ribbon Cable Horizontal PCB Vertical PCB
 Shaft=22 (incl. bush), dia.=6.35
 Mounting bush=3/8" x 32 NEF
 Ribbon cable length=190

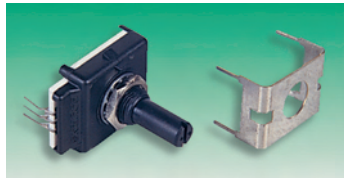
- Manually or motor operated rotary optical encoder
- 2 channel quadrature output, channel A leads channel B by 90° electrically, CCW rotation
- Stainless steel spindle, nickel plated bush
- Ribbon cable, horizontal or vertical PCB mounting versions

Supply voltage	5V dc ±0.25V dc	Maximum rotational speed	300 rpm
Supply current	30mA max.	Rotational life	10 million revolutions
Mechanical rotation	Continuous	Operating temperature	-40°C to +65°C
Resolution	128 pulses per revolution		
Connections		PCB	Pin 1 5V dc
Ribbon cable	Red 5V dc	Pin 2	Output A
	Green Ground	Pin 3	Ground
	Yellow Output A	Pin 4	Output B
	Orange Output B		

207364

Style	Mftrs. List No.	Order Code	Price Each			
			1+	10+	50+	100+
Ribbon cable	120EN-128-CBL	114-4747●	90.20	74.46	59.16	49.68
Horizontal PCB	120EN-128-B66	114-4748●	86.55	71.52	56.82	53.52
Vertical PCB	120EN-128-C24	114-4749●	85.46	70.53	56.07	47.01

EC Series Digital Contacting Encoder



Body D=27.6, W=22.2, H=7.4
Shaft=19.0 (inc bush) x 6.32 dia,
Bush=M9 x 0.75

- Low cost digital contacting encoders, long operating life and high operating temperature characteristics
- 2 bit gray code output is produced, channel A leads channel B by 90° (clockwise)
- Optional snap-on PCB mounting bracket

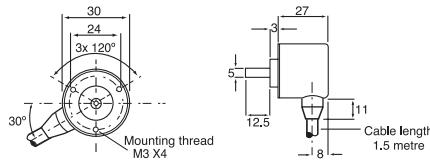
Contact rating	10mA @ 10V, or 0.1W	Maximum operating speed	120 rpm
Voltage rating	350V ac (or limited by power dissipation whichever <)	Rotational life	200000 revs
Dielectric strength	1000V ac	Mechanical rotation	Continuous
		Insulation resistance	>1000MR
		Operating temperature	+1°C to +125°C

Cycles Per Revolution	Detents	Mfrs List No.	Order Code
6	24	ECW0J-B24-AC0006	109-111
24	24	ECW1J-B24-AC0024	120-0080

207187/406088

	Order Code	Price Each			
		1+	25+	50+	100+
Encoder, 6 cycles	109-111	10.05	7.80	6.39	5.40
Encoder, 24 cycles	120-0080	10.05	7.80	6.39	5.40
PCB mounting bracket	219-113	0.84	0.66	0.57	0.56

100 to 1000ppr with Opto-ASIC - RI32-0 Series HENGSTLER
Solid 5mm Dia. Shaft



- Self-test alarm system continuously monitors for disc contamination, disc breakage, over-temperature, under-voltage and excessive LED ageing
- Short circuit and overload protection
- Ingress protected to **IP50**

High quality 30mm diameter incremental miniature encoders. All have 2 channels and marker pulse outputs.

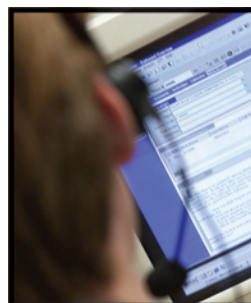
Supply voltage	5V dc or 10 to 30V dc
Max. pulse frequency	5V=300kHz, 10-30V=200kHz
Current consumption	30mA (24V dc), 40mA (5V dc)
Output voltage	5V input high ≥2.5V, low ≤0.5V 10 to 30V input high=supply -3V, low ≤2V
Alarm output	NPN open collector 5mA
Maximum output load	5V supply ±10mA, 10 to 30V supply ±30mA
Maximum shaft loading	Radial 10N, Axial 5N
Absolute max. speed	4000 rpm
Operating temperature	-10°C to 60°C
Storage temperature	-25°C to 85°C
Shock resistance	100g

FOR SUITABLE FLEXIBLE COUPLINGS ORDER CODES 730-981 & 730-993

222178

Push-Pull 5V	Mfrs. List No.	Order Code	Price Each		
			1+	5+	10+
100ppr	RI32-0/100AR.14KB	615-936	270.60	257.07	243.54
360ppr	RI32-0/360AR.14KB	615-948	270.60	257.28	243.54
1000ppr	RI32-0/1000AR.14KB	615-950	270.60	257.07	243.54

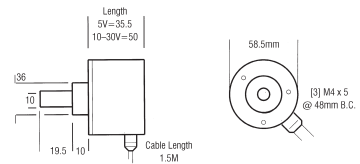
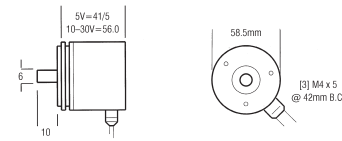
Push-Pull 10-30V	Mfrs. List No.	Order Code	Price Each		
			1+	5+	10+
100ppr	RI32-0/100ER.14KB	615-961	270.60	257.07	243.54
360ppr	RI32-0/360ER.14KB	615-973	270.60	257.07	243.54
1000ppr	RI32-0/1000ER.14KB	615-985	270.60	257.07	243.54



- Fast access to over 300,000 products
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- Technical attribute search
- Quick buy facility
- Instant order confirmation

www.farnell-newarkinone.com.sg

1000 to 5000ppr with Opto-ASIC - RI58-0 Series HENGSTLER
Solid 6mm/10mm Dia. Shaft



- Short circuit and overload protection
- Maximum pulse frequency: TTL 300kHz, push pull 200kHz
- **IP65** protection
- Set of 3 clamping eccentrics included with synchro flange version
- 2 channels, marker pulse and complimentary line driver outputs
- Self-test alarm continuously monitors for disc contamination, disc breakage, over temperature, under voltage, electrical overload and excessive LED ageing. It provides an open collector NPN output if any of these conditions occur
- Available with 5V TTL or 10 to 30V push pull outputs

A range of high quality 58mm diameter incremental encoders with solid 6mm diameter shafts.

Supply voltage	5V dc TTL or 10 to 30V push pull
Current consumption	TTL - 40mA push pull 60mA (10V dc), 30mA (24V dc)
Output voltage	TTL high ≥2.5V, low ≤0.5V push pull high=supply - 3V, low ≤2V
Alarm output	NPN open collector 5mA
Max. output load	±30mA
Max. loadings, 6mm shaft	Radial 110N, axial 60N
Absolute max. speed	10000rpm
Operating temperature	-10°C to +70°C
Storage temperature	-25°C to +85°C
Shock resistance	100g

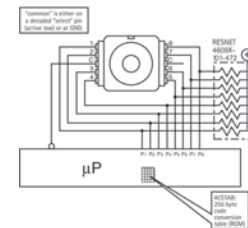
Mfrs. List Nos:	RI58-0/1000AS.41RB = 615-870	RI58-0/1000AK.42RB = 723-4480
	RI58-0/2000AS.41RB = 615-882	RI58-0/2000AK.42RB = 723-4491
	RI58-0/5000AS.41RB = 615-894	RI58-0/5000AK.42RB = 723-4508
	RI58-0/1000ES.41IB = 615-900	RI58-0/1000EK.42IB = 723-4510
	RI58-0/2000ES.41IB = 615-912	RI58-0/2000EK.42IB = 723-4521
	RI58-0/5000ES.41IB = 615-924	RI58-0/5000EK.42IB = 723-4533

222163

	Supply	Order Code	Price Each		
			1+	5+	10+
Solid 6mm Dia. Shaft, Synchro Flange					
1000	5V TTL	615-870	429.00	407.55	386.10
2000	5V TTL	615-882	431.34	409.68	386.22
5000	5V TTL	615-894	390.00	367.50	348.00
1000	10-30V push-pull	615-900	489.00	464.55	440.10
2000	10-30V push-pull	615-912	491.34	464.55	440.22
5000	10-30V push-pull	615-924	624.00	592.80	561.60
Solid 10mm Dia. Shaft, Clamping Flange					
1000	5V TTL	723-4480	429.00	403.44	377.40
2000	5V TTL	723-4491	429.00	403.44	377.40
5000	5V TTL	723-4508	564.00	532.74	498.39
1000	10 - 30V push-pull	723-4510	489.00	460.35	430.65
2000	10 - 30V push-pull	723-4521	489.00	460.35	430.65
5000	10 - 30V push-pull	723-4533	624.00	589.65	551.61

Encoders - Absolute

Absolute Contacting Encoder (ACE)



- 8 bit parallel gray code output at each of 128 rotary positions
- Absolute digital output retains its last position in event of power failure
- Compact size, sturdy construction
- Can be interfaced directly with microprocessor
- Panel or PCB mounting
- Low cost



Output	8 bit gray code	Insulation resistance	>1000M ohm
Positions per revolution	128	Rotational life	50,000 shaft revolutions
Contact rating	10mA 10V or 0.1W	Mechanical angle	Continuous
Dielectric strength	1000V ac (min.)	Operating temperature	-25°C to +125°C
Max. operating speed	120rpm		
Dimensions	L=8.8 (body, above PCB), 19.0 (spindle + bush) Body H=27.9, W=22.2, M9 (bush), 6.32 (spindle) 10 pin DIL, pin spacing=2.54, row spacing=25.4		

230497

Mfrs. List No.	Order Code	1+	25+	50+	100+
EAWOJ-B24-AE0128	700-5258▲‡	19.22	14.97	12.21	10.35

Encoders - Accessories

Flexible Couplings

HENGSTLER



Plastic L=20.5, Dia.=15 Helical L=28, Dia.=19.2 Diaphragm L=22, Dia.=30

Flexible couplings suitable for Hengstler and similar encoders to protect them against excessive mechanical stresses.

Type	Plastic	Helical	Diaphragm
Absolute max. speed	10000rpm	6000rpm	12000rpm
Torque max.	0.2Nm	0.8Nm	0.4Nm
Max. angular misalignment	±2.5 degrees	±4 degrees	±2.5 degrees
Max. shaft misalignment radial/axial	±0.3mm/±0.2mm	±0.25mm/±0.4mm	±0.4mm/±0.4mm
Material	Polyamide 6.6 glass-fibre reinforced	AlCuMgPb, chromed	Polyamide 6.6 glass-fibre reinforced (flange-zinc diecasting)
Compatible Hengstler encoders	RI32 Series (5mm shaft)	RI58-0 Series (6mm shaft)	RI58-0 Series (6mm shaft) RA58-P (10mm shaft)

212244

Type	Hub Diameters	Mfrs. List No.	Order Code	1+	5+	10+
Plastic	5/5mm	3.520.034	730-981	41.19	39.15	37.08
Plastic	5/6mm	3.520.003	730-993	41.19	39.15	37.08
Helical	5/6mm	3.520.035	731-006	66.75	63.42	60.06
Helical	6/6mm	0.070.653	731-018	66.75	63.42	60.06
Diaphragm	5/6mm	3.520.050	731-020	119.94	113.94	107.97
Diaphragm	6/6mm	3.520.081	731-031	117.75	111.87	105.99
Diaphragm	6/10mm	1.076.015	731-043	117.75	111.87	105.99
Diaphragm	10/10mm	1.076.014	731-055	117.75	111.87	105.99

Sensors & Transducers

41

Flexible Couplings

PEPPERL+FUCHS



Helical 6x6 L=35, Dia=16
Helical 10x10 L=50, Dia=26



Precision L=25, Dia=25

	Helical 6x6	Helical 10x10	Precision
Maximum rpm	3000	3000	12000
Nominal torque	0.5Nm	1.5Nm	0.4Nm
Max radial mismatch	1mm	1.5mm	±0.4mm
Max. angle error	5.0°	5.0°	±2.5°
Max. axial mismatch	±1mm	±1mm	±0.4mm
Binding posts	M4	M5	M4
Max. starting torque	120Ncm	120Ncm	80Ncm
Maximum rpm	Nickel-faced spring steel, zinc diecast	Nickel-faced spring steel, zinc diecast	Flange:zinc diecast, Housing:polyamide 6.6
Weight	28g	120g	23g

234119

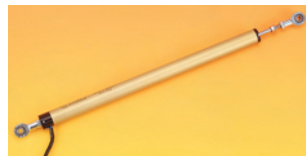
Type	Order Code	1+	5+	10+	25+	+
Helical						
6x6	377-8277	37.80	--	--	--	--
10x10	377-8265	47.85	--	--	--	--
Precision						
6x6	377-8289	90.00	85.50	83.70	83.70	--
6x10	377-8290	107.18	--	--	--	--
10x10	377-8307	104.45	--	--	--	--

Displacement Sensors

Miniature Precision Linear Transducers

VISHAY

34L Series



- Rugged and accurate ideally suited for industrial applications
- High accuracy ±0.1%
- Essentially infinite resolution
- Long life
- Double ball joint shaft terminations

Independent linearity	>±0.1%
Operating temperature range	-55°C to 125°C
Total resistance	10KΩ
Resistance tolerance	±20%
Maximum Power Rating	0.05W/cm@70°C
Dimensions	366-6724 Housing: L=182.8 Ball joint fixing centres =251.6 366-6736 Housing: L=304.8 Ball joint fixing centres =373.6 366-6748 Housing: L=461.2 Ball joint fixing centres =530

233671

Measuring Range	Mfrs. List No.	Order Code	1+	10+	25+
100mm	34L 4D 103 W03263	366-6724	453.60	391.73	359.10
200mm	34L 8D 103 W03263	366-6736	549.11	474.23	434.70
300mm	34L 12D 103 W03263	366-6748	702.95	607.10	556.51

Precision Linear Transducers

VISHAY

115L Series



- Rugged compact and accurate, for use in many industrial applications
- High accuracy +/- 0.05%
- Essentially infinite resolution
- Long life
- Not sensitive to temperature variations
- Moveable mounting brackets
- Ball joint can be ordered separately for greater flexibility

Independent linearity	>±0.1%	Resistance tolerance	±20%
Operating temperature range	-55°C to 125°C	Maximum Power Rating	0.05W/cm@70°C
Total resistance	5KΩ	Dimensions	Housing: L = measuring range + 75 Shaft: L = 25 (retracted)

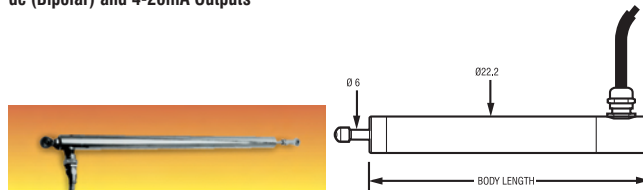
233680

Measuring Range	Mfrs. List No.	Order Code	1+	10+	25+
130mm	115L 5.2E 502 W06017	366-6750	219.49	189.57	173.79
225mm	115L 9E 502 W06017	366-6761	263.94	227.93	208.94
350MM	115L 14E 502 W06017	366-6773	318.31	274.90	252.00
500mm	115L 20E 502 W06017	366-6785	384.65	332.17	304.51
600mm	115L 24E 502 W06017	366-6797	421.75	364.27	333.90
750mm	115L 30E 502 W06017	366-6803	507.31	438.13	401.62
Ball Joint (pair)	320 371	366-6815	20.71	17.86	16.38

Sprung-Loaded LVDTs

dc (Bipolar) and 4-20mA Outputs

MONITRAN



224735

Measuring Range	Mfrs. List No.	Order Code	1+	10+	25+
DC output Type (bipolar)					
+/-25mm	MTN/IE(D)S-25	707-8894	730.80	686.70	639.45
+/-50mm	MTN/IE(D)S-50	707-8912	762.30	718.20	670.95
+/-75mm	MTN/IE(D)S-75	707-8936	822.15	774.90	727.65
DC 4-20mA output Type					
+/-25mm	MTN/IE(I)S-25	707-8900	730.80	686.70	639.45
+/-50mm	MTN/IE(I)S-50	707-8924	762.30	718.20	670.95
+/-75mm	MTN/IE(I)S-75	707-8948	822.15	774.90	727.65

Tilt Sensors

Tilt Sensor



H=23, W=36.5, Dia.=22mm

Contact Form
Rating
Contact Resistance
Operating Humidity
Operating Temperature
Insulation Resistance

Single Pole Single Throw NC
5V dc, 0.1mA to 30V dc, 100mA
300mR
25 to 85% RH
-25°C to 60°C
100 MR Min.



Mfrs. List No.	Order Code	1+	5+	10+	+	+
D7E3	100-7618	10.42	10.09	9.90	--	--

Micro Tilt Sensor

Discriminating Left or Right



H = 3.7, W = 5.5 (body), D = 5.5mm

Angle - Activate
Angle - Reset
Supply Voltage
Current Consumption
Operating Temperature

- Tilt detection over a range of 45 to 75 degrees in right-and-left inclination
- Gull wing surface mount terminals
- Wide operating temperature range: -10 to 60°C

This Hall effect tilt sensor is ideal for PDAs, cell phones and test equipment, digital and video cameras to change aspect ratio automatically; also replaces mercury switches in portable space heaters and game machines such as pinball games.



Mfrs. List No.	Order Code	1+	5+	10+	+	+
D6B2(P)	SMD100-7621	7.19	6.97	6.84	--	--

Precision Electronic Tilt Sensor



H = 25.4, W = 50.8, D = 38.1

- Precision electronic low cost tilt sensor
- Linear, scaleable output with ±1° accuracy
- Auto zeroing feature
- Ideal for integration into sub-systems requiring Digital readout in degrees or radians
- Key applications in Medical, Industrial, Automotive, Aeronautical and Military applications

Angular Range
Resolution
Output Voltage
Response Time

90° (0 ±45)
1°
50mV / Deg
150 ms

Supply Voltage
Operating temperature
Case Material
Cable Length

9 to 24V dc
-10°C to 70°C
ABS
300mm

Mfrs. List No.	Order Code	1+	10+	25+
ETS90XA	422-9125	367.68	359.87	323.87

Insulated Steel



170-853 L=46, Dia=13.5, Lead length=150
170-854 L=60.3, Dia=21.4, Lead length=150

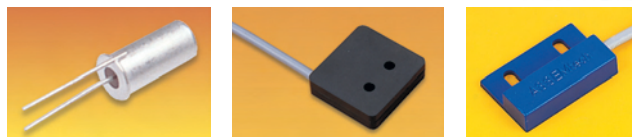
The mercury-to-mercury contacts close when the switch is tilted below horizontal. The switches have silicone rubber leads and are supplied with mounting clips.

Min Tilt from Horiz.	Rating	240V ac	240V dc	Order Code
16°	13AA	8A	10A	170-853
13°	19A	8A	10A	170-854

WARNING: THESE SWITCHES SHOULD NOT BE OPENED AS THEY CONTAIN MERCURY, A TOXIC SUBSTANCE

Contact Rating	Mfrs. List No.	Order Code	1+	25+	100+
13A	S1016.	170-853	28.35	26.15	23.66
19A	S1017.	170-854	32.69	31.18	28.16

Non-Mercury



540-614 L=10.2, Dia.=4.7, Leads L=12, Dia.=0.51, Lead spacing=2.9
730-221 H=25.0, W=27.0, D=7.0, Fixing centres=10.0 (Dia 3.3) Cable L=300
732-825 L=30, W=20, D=7, Cable L=300, Fixing slots=6x3.3, Fixing centres=16.0

- Hermetically sealed tilt switches using non-toxic materials
- 540-614 is designed to meet a wide range of low level switching applications
- 730-221 will switch up to 10VA
- 732-825 has fixing slots for fine adjustment in alignment
- Suitable for safety and security systems, limit, position and level sensing

	540-614	730-221	732-825
Switching voltage	60V ac	240V ac	60V ac
Switching current	0.25A	0.5A	0.25A
Switching power	3VA	10VA	3VA
Contact resistance, (max)	30Ω	150Ω	30Ω
Max. differential angle	15°	90°	16°
Max. 'break' angle above horizontal	10°	45°	10°
Max. 'make' angle below horizontal	10°	45°	10°
Operating temperature	-40°C to +150°C	-20°C to +70°C	-20°C to +70°C

Mfrs. List No.	Order Code	1+	25+	100+	250+	+
CW1300-1	540-614	3.37	2.80	2.33	1.95	--
MTA240	730-221	18.54	15.58	13.58	--	--
TSW30/60	732-825	19.94	16.95	14.58	13.42	--

Tilt/Movement



L=10.2, Dia=4.7, Leads L=16.8, Dia=0.46, Lead spacing=1.27

Switching current
Switching voltage
Switching power

250mA @ 24V ac
24V ac, 24V dc
3R

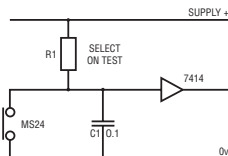
- Miniature mercury switch encapsulated in a nickel plated steel case for PCB mounting
- Senses tilt from horizontal, movement, impact etc.
- Mercury wetted contacts give low contact resistance throughout the life of the switch

WARNING: THIS SWITCH SHOULD NOT BE OPENED AS IT CONTAINS MERCURY, A TOXIC SUBSTANCE

Mfrs. List No.	Order Code	1+	25+	100+	250+	+
CM13R-0.	178-338	6.05	5.07	4.22	3.24	--

Motion Sensors

Vibration/Movement Switch - High Sensitivity Non-mercury



H=9.5, Dia=8.2, Leads L=4.5, Dia=1 Lead spacing=4.7

- Very high sensitivity detection of movement or vibration
- Non-position sensitive, offers a similar level of sensitivity whatever its position
- Long life and high reliability in a wide range of environments
- Ideal for anti-tamper and interference detection

A patented design non-mercury switch in hermetically sealed body with gold contacts. The contacts in their normal mode can be closed or open. When subjected to any small movement or vibration, the contacts will vibrate on and off repeatedly. The output may be damped if less sensitivity is required.

Applications: Movement detection - starting or running of motors, process equipment, detecting unusual levels of movement or vibration, detecting intrusion into control panels and security systems, anti-theft mobile systems in cars, laptop computers.

Switching voltage	24V ac	Contact resistance, initial	2Ω
Switching current	24mA	Operating temperature	-37°C to +100°C
Contact style	change of state	Case material	Steel, Gold Plated

212357

Mfrs. List No.	Order Code	1+	10+	25+	50+	+
MS24	732-795	7.29	6.56	5.98	5.39	--

Shock Sensor, Plastic Case



- Senses mechanical shock, vibration or acceleration
- Output proportional to amount of G subjected to it, typically 40mV/G
- Applications: bank equipment protection, burgular alarms for vehicles, vending machines, shop windows, etc.

Piezoelectric ceramic sensor housed in a plastic case with flying lead connections.

H=4.5, W=34.4, Dia.=24.0
Fixing centres=29.0,
Hole dia=2.2, Lead L=40mm

Sensitivity	40mV/G (typ) @ 25°C	Insulation resistance	30MΩ (min) @ 100V dc
Capacitance	10,000 pF ±30% @ 25°C, 1kHz	Operating temperature	-20°C to +60°C

212455

Mfrs. List No.	Order Code	1+	25+	100+	250+
PKS1-4A10	731-973	6.65	5.73	4.88	4.49

Pyroelectric Infra-Red Detector



- Movement sensor, for example in infra-red intruder alarms
- Sensor incorporates an optical filter to reflect white or visible light
- Improved sensitivity and reduced white noise
- Suitable Fresnel lens arrays also available

Dual element infra-red detectors housed in metal can package.

731-950: H=4.7, Dia=9.1

Detector Sensitivity @ 500°K, 1Hz	4.3mVpp.(typ.)	Supply voltage	2-15V dc
Sensitivity balance	10% max	Viewing angle	45°x45°
White noise level	200mVpp max	Element size	(2.0x1.0mm)x2
Source voltage	0.2-2.5V	Operating temperature	-40°C to +70°C

Mfrs. List No.	PPG10601 = 396-8078	IRA-E700St0=100-6209
	PPG10902 = 396-8080	

212444

	Order Code	1+	10+	25+	100+
Detector	100-6209	8.13	6.87	5.80	5.23
Volumetric lens	396-8078	5.73	5.10	4.41	4.03
Curtain lens	396-8080	5.73	5.10	4.41	4.03

Stopped Motion Monitor - ROTASTOP3



Self-contained



- Self-contained, no moving parts
- Universal voltage, two wire operation
- Simple, low-cost installation
- No contact with moving parts

L=95, Dia.=M18 (overall)

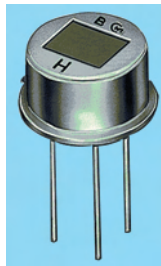
The ROTASTOP SU1MZ is ideal for monitoring chain- or gear-driven machinery such as gearbox drives, screw conveyors etc. but is suitable for almost any application where stoppage detection is needed.

Supply	24 to 240V ac/dc	Target	18mm dia. target for
Ambient temperature	-15°C to +60°C		Maximum range
Operating speed	15 to 3600 ppm	Time delay	4 sec.
Protection	IP65	Start up delay	4 sec.
Output	Normally closed	Cable	2 core, PVC sheathed,
	When running		2m length
Output rating	1.6mA min, 200mA max.	Indication	LED indication of input
	(volt drop 8V)		plused and output energised
Operating distance	8mm ferrous metal	Enclosure	Moulded polycarbonate

212318

Mfrs. List No.	Order Code	1+	Price Each	5+	10+
SU1MZ(A)	705-9220	229.89	218.39	206.92	

Pyroelectric Infrared Sensor



Fresnel Lens

- High sensitivity and excellent Signal to Noise ratio
- High stability, immunity to temperature changes
- Slight movement is detectable
- High immunity to external noise (Vibration, RFI etc.)

This pyroelectric infrared sensor exhibits high sensitivity and reliable performance made possible by ceramic technology and the hybrid IC techniques employed during fabrication.

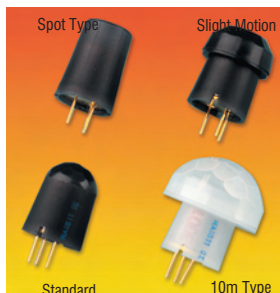
The Fresnel lens is used to decide the detection distance and the detection area (angle) of the sensor.

Supply Voltage	Total Resistance	White Noise	Detection Width (mm)	Operating Temperature	Description	Order Code
2 to 15V	47k to 200kΩ	200mVp-p Max.	4.7±0.1	-40 to 70°C	PIR	508-4921
2 to 15V	47k to 200kΩ	200mVp-p Max.	4.7±0.1	-40 to 70°C	PIR	100-6207
-	-	-	6.6	-25 to 60°C	Fresnel Lens	508-4933
-	-	-	6.6	-25 to 60°C	Fresnel Lens	100-6208

338804

Mfrs. List No.	Description	Order Code	1+	+	+
IRA-E712ST3.	Module	508-4921	5.12	--	--
IRA-E712ST3	Module	100-6207	5.12	--	--
IML-0636.	Fresnel Lens	508-4933	3.56	--	--
IML-0636	Fresnel Lens	100-6208	3.56	--	--

Motion Sensor, PIR - MP Series



- Extremely compact
- Built in amplifier, can be connected directly to a microprocessor
- Dual lens colours available to match equipment
- 4 detection types: Standard, Slight Motion, Spot Type, 10m Type

Voltage	3V dc to 6V dc	Standard	5m 100° Horizontal, 82° Vertical
Output	Vdd -0.5V, 100µA	Slight	2m 91° Horizontal, 91° Vertical
Circuit stability time	7s (typ)	Spot	5m 38° Horizontal, 22° Vertical
Detection Performance		10m	10m 110° Horizontal, 93° Vertical

249101

Lens Colour	Mfrs. List No.	Order Code	1+	Price Each	5+	10+
Standard	Black	AMN11111	416-0253	37.73	35.82	34.27
	White	AMN11112	416-0265	37.73	35.82	33.90
Slight Motion	Black	AMN12111	416-0277	41.55	39.48	37.62
	Spot Type	Black	AMN13111	416-0290	39.20	37.26
White		AMN13112	416-0307	39.20	37.26	35.99
10m Type	Black	AMN14111	416-0319	41.17	39.10	37.90
	White	AMN14112	416-0320	41.17	39.10	37.39

Gear Tooth Sensor



- Accurately senses the movement of ferrous metal targets up to 100kHz
- Reverse polarity protected and EMI resistant

Connections: Black/Brown = +ve
White = 0
Black = -ve

Probe L=31.8, Dia.=17.9, Mounting hole dia.=7.0, Centres=22.0, Leads L=140

Magnetically biased Hall effect device. The sensor contains a specially designed I.C. with discrete capacitor and biased magnet sealed in a probe type package.

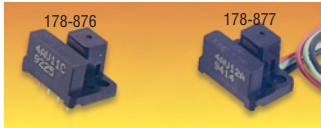
Applications: Machine tool gearboxes, automotive, tachometers, generators, compressors, off road vehicles, flywheels and engine test beds.

Supply voltage	4.5 to 24V dc	Pulsed and reverse	
Supply current	10mA typ., 20mA max.	polarity transients	+60V dc, -40V dc
Output	NPN open collector, 40mA max.	Sensing distance	2.0mm max.
Temperature range	-40°C to +150°C		

212235

Mfrs. List No.	Order Code	1+	5+	10+	25+
IGT101DC	731-900	47.36	44.40	43.39	34.64

Hall Effect Vane Sensors



H=10.9, W=13.2, D=19.1, Slot W=2.5, Slot D=7.4, Fixing centres=14 (dia=2.8)

Hall effect vane sensors include a Hall effect transducer and a magnet, and are operated by passing a ferrous vane through the gap between the two.

The sensor is housed in a miniature and rugged sealed package.

- Useful as limit switch by operating with single large vane
- Useful as tachometer sensor by operating with toothed wheels
- Wide temperature range
- Suitable in dusty or high ambient light environment where an optical sensor would be suitable
- Transient and reverse polarity protection

Supply voltage	4.5 to 26.5V dc	Current output	50mA
Supply current	5 to 18mA	Temperature range	-40°C to +150°C

212443

Termination	Mfrs. List No.	Order Code	1+	10+	25+	100+
PCB	4AV20F	178-876	63.08	58.98	57.68	51.62
Leadwire	4AV16F	178-877	54.13	53.51	50.68	50.58

3000 Series General Purpose VRS Sensors



For general speed sensing applications where the overall size of the sensor is not critical. Best for medium to high speeds or electrically noisy environments with relatively small air gaps.



3010 Series: M16 General Purpose VRS Sensors

Parameter	Value
Output Voltage	40V p-p min.
Coil Resistance	45 to 85Ω
Pole Piece Diameter	2.69mm
Minimum Surface Speed	20 IPS (0.50m/s) Typical.
Operating Temperature	-55 to 120°C
Inductance	25mH Max.
Gear Pitch Range	24 DP (Module 1.06) or Coarser
Max Operating Frequency	50KHz Typical.
Vibration	Meets Mil-Std 202F Method 204D

Thread Length	Weight	Mfrs. List No.	Order Code	1+	10+	25+	50+
35mm (1.4")	70g	3010A	108-2211	145.30	130.79	123.49	113.83
63mm (2.5")	84g	3010S20	108-2212	138.66	124.80	117.90	108.62

3015 Series: M12 General Purpose VRS Sensors

Parameter	Value
Output Voltage	20V p-p min.
Coil Resistance	45 to 65Ω
Pole Piece Diameter	2.36mm
Minimum Surface Speed	20 IPS (0.50m/s) Typical.
Operating Temperature	-40 to 107°C
Inductance	15mH Max.
Gear Pitch Range	26 DP (Module 0.98) or Coarser
Max Operating Frequency	50KHz Typical.
Vibration	Meets Mil-Std 202F Method 204D

Thread Length	Weight	Mfrs. List No.	Order Code	1+	10+	25+	50+
30mm (1.2")	28g	3015S13	108-2213	129.29	116.33	109.89	101.28

3025 Series: M12 High Output VRS Sensors

Parameter	Value
Output Voltage	55V p-p min.
Coil Resistance	275 to 330Ω
Pole Piece Diameter	2.36mm
Minimum Surface Speed	15 IPS (0.38m/s) Typical.
Operating Temperature	-40 to 107°C
Inductance	75mH Max.
Gear Pitch Range	26 DP (Module 0.98) or Coarser
Max Operating Frequency	40KHz Typical.
Vibration	Meets Mil-Std 202F Method 204D

Thread Length	Weight	Mfrs. List No.	Order Code	1+	10+	25+	50+
30mm (1.2")	28g	3025S13	108-2214	129.29	116.33	109.89	101.28

3030 Series: M16 High Output VRS Sensors

Parameter	Value
Output Voltage	190V p-p min.
Coil Resistance	910 to 1200Ω
Pole Piece Diameter	2.69mm
Minimum Surface Speed	10 IPS (0.38m/s) Typical.
Operating Temperature	-55 to 120°C
Inductance	450mH Max.
Gear Pitch Range	24 DP (Module 1.06) or Coarser
Max Operating Frequency	15KHz Typical.
Vibration	Meets Mil-Std 202F Method 204D

Thread Length	Weight	Mfrs. List No.	Order Code	1+	10+	25+	50+
35mm (1.4")	70g	3030A	108-2215	145.73	131.18	123.85	114.16
50mm (2.0")	70g	3030S20	108-2216	138.66	124.80	117.90	108.62

3040 Series: M16 Power Output VRS Sensors

Parameter	Value
Output Voltage	70V p-p min.
Coil Resistance	120 to 162Ω
Pole Piece Diameter	4.75mm
Minimum Surface Speed	15 IPS (0.38m/s) Typical.
Operating Temperature	-55 to 120°C
Inductance	85mH Max.
Gear Pitch Range	12 DP (Module 2.11) or Coarser
Max Operating Frequency	40KHz Typical.
Vibration	Meets Mil-Std 202F Method 204D

Thread Length	Weight	Mfrs. List No.	Order Code	1+	10+	25+	50+
35mm (1.4")	70g	3040A	108-2217	145.73	131.18	123.85	114.16
50mm (2.0")	70g	3040S20	108-2219	138.66	124.80	117.90	108.62

3042 Series: M16 Intrinsically Safe VRS Sensors

Parameter	Value
Output Voltage	30V p-p min.
Coil Resistance	150Ω
Pole Piece Diameter	3.9mm
Minimum Surface Speed	15 IPS (0.38m/s) Typical.
Operating Temperature	-55 to 120°C
Inductance	26mH Max.
Gear Pitch Range	16 DP (Module 1.58) or Coarser
Max Operating Frequency	40KHz Typical.

Thread Length	Weight	Mfrs. List No.	Order Code	1+	10+	25+	50+
35mm (1.4")	70g	3042A	108-2221	317.30	285.56	269.71	248.59

304x Series: M16 High Resolution VRS Sensors

Parameter	Value
Pole Piece Width	0.254mm
Thread*	5/8-18 UNF-2A
Operating Temperature	-55 to 120°C
Gear Pitch Range	36 DP (Module 0.7) or Coarser
Vibration	Meets Mil-Std 202F Method 204D

* For M16x1.5 6g mounting thread versions

Output Voltage	Coil Resistance	Inductance	Min. Surface Speed (Typ.)	Max. Operating Frequency	Mfrs. List No.
80V p-p Min.	45 - 85Ω	25mH Max.	20 IPS	50 KHz	3044A
300V p-p Min.	910 - 1200Ω	450mH Max.	10 IPS	15 KHz	3045A
65V p-p Min.	120 - 162Ω	85mH Max.	15 IPS	40 KHz	3046A

Mfrs. List No.	Order Code	1+	10+	25+	50+
3044A	108-2222	173.07	155.78	147.13	135.59
3045A	108-2223	173.95	156.53	147.84	136.25
3046A	108-2224	173.07	155.78	147.13	135.59

3050 Series: M8 Miniature VRS Sensors

Parameter	Value
Output Voltage	12V p-p min.
Coil Resistance	190Ω
Pole Piece Diameter	1mm
Minimum Surface Speed	30 IPS (0.75m/s) Typical.
Operating Temperature	-40 to 107°C
Inductance	16mH Max.
Gear Pitch Range	36 DP (Module 0.7) or Coarser
Max Operating Frequency	60KHz Typical.
Vibration	Meets Mil-Std 202F Method 204D

Thread Length	Weight	Mfrs. List No.	Order Code	1+	10+	25+	50+
25mm (1.0")	14g	3050S10	108-2225	199.79	179.81	169.81	156.52

Sensors & Transducers

41

Compliant Non-compliant Limited stock - RoHS replacement available
RoHS



3070/3090 Series: Explosive Proof VRS Sensors

Parameter	Value
Output Voltage	60V p-p min.
Coil Resistance	191 to 280Ω
Pole Piece Diameter	4.75mm
Minimum Surface Speed	15 IPS (0.38m/s) Typical.
Operating Temperature	-73 to 93°C
Inductance	115mH Max.
Gear Pitch Range	12 DP (Module 2.11) or Coarser
Max Operating Frequency	40KHz Typical.
Vibration	Meets Mil-Std 202F Method 204D

Thread Length	Weight	Mftrs. List No.	Order Code	1+	10+	25+	50+
45mm (1.8")	294g	3070A	108-2226	458.34	412.51	389.59	359.07
45mm (1.8")	266g	3090A	108-2227	387.83	349.03	329.63	303.83

Ultrasonic Transducers

Ultrasonic Transducer Standard - Open Air Type



The Standard (S) Open Air type transducers consist of a piezo-ceramic disc bender mounted at the node of its fundamental resonant frequency, a quarter wavelength conical metal resonator bonded in the centre of the disc, acting as a rigid piston movement. This special construction provides high sensitivity and Sound Pressure Level (SPL), wider bandwidth, excellent temperature and humidity durability and stable electrical and mechanical characteristics. The S type transducers are suitable for continual driving circuits, such as Doppler motion detectors.

Applications

- Alarm systems
- Liquid level measurement
- Anti-collision devices
- Moving object detectors/counters
- Remote control devices
- Robotics

Centre Freq. (kHz)	SPL (dB)	Sensitivity (dB)	Drive Voltage Max. (rms)	Dimensions H x Dia. (mm)	Mftrs List No.	Order Code
25	112		20	12 x 16.2	250ST160	100-7326
25		-62dB	20	12 x 16.2	250SR160	100-7327
25	112		20	14.2 x 18.2	250ST180	100-7328
25		-62dB	20	14.2 x 18.2	250SR180	100-7329
32.8	115		20	9.6 x 16.2	328ST160	100-7330
32.8		-67dB	20	9.6 x 16.2	328SR160	100-7331
40	120		20	12 x 16.2	400ST160	100-7332
40		-65dB	20	12 x 16.2	400SR160	100-7333
40	120		20	12 x 16.2	400ST16P	100-7337
40		-65dB	20	12 x 16.2	400SR16P	100-7338
40	115		20	12 x 16.2	400ST120	100-7339
40		-67dB	20	12 x 16.2	400SR120	100-7340
40	112		10	6.7 x 9.7	400ST100	100-7341
40		-70dB	10	6.7 x 9.7	400SR100	100-7342
40	112		10	6.7 x 9.7	400ST10B	100-7343
40		-70dB	10	6.7 x 9.7	400SR10B	100-7344

Case Type	Mftrs. List No.	Order Code	1+	25+	100+
Bright Aluminium	250ST160	100-7326	11.43	9.67	8.20
Bright Aluminium	250SR160	100-7327	11.43	9.67	8.20
Bright Aluminium	250ST180	100-7328	11.78	9.96	8.46
Bright Aluminium	250SR180	100-7329	11.78	9.96	8.46
Bright Aluminium	328ST160	100-7330	11.52	9.73	8.27
Bright Aluminium	328SR160	100-7331	11.52	9.73	8.27
Bright Aluminium	400ST160	100-7332	11.00	9.31	7.91
Bright Aluminium	400SR160	100-7333	11.00	9.31	7.91
Plastic	400ST16P	100-7337	9.80	8.30	7.06
Plastic	400SR16P	100-7338	9.80	8.30	7.06
Bright Aluminium	400ST120	100-7339	11.26	9.54	8.10
Bright Aluminium	400SR120	100-7340	11.26	9.54	8.10
Bright Aluminium	400ST100	100-7341	8.63	7.65	6.31
Bright Aluminium	400SR100	100-7342	8.63	7.65	6.31
Black Aluminium	400ST10B	100-7343	8.89	7.88	6.44
Black Aluminium	400SR10B	100-7344	8.89	7.88	6.44

Ultrasonic Transducer Standard - Enclosed Air Type



The Standard Enclosed (E) Type Transducers can be used for outdoor installation, or, because of its special dust-proof construction, can be used in a dusty atmosphere. The transducers consist of a metal housing with integral diaphragm, which operates at resonance on the first harmonic overtone. The backs of the transducers are completely sealed with resin, protecting

from exposure to the environment. Although they are of a watertight construction, it is not recommended that they be used underwater. Due to its free vibration and un-damping characteristics, the (E) type transducers are suitable for continual drive circuits, such as Doppler motion detectors.

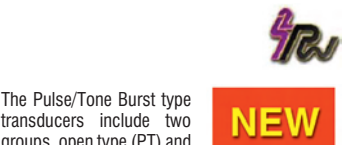
Applications

- Alarm systems
- Liquid level measurement
- Anti-collision devices
- Moving object detection/counters
- Remote control devices
- Robotics

Centre Freq. (kHz)	SPL (dB)	Sensitivity (dB)	Drive Voltage Max. (rms)	Dimensions H x Dia. (mm)	Mftrs List No.	Order Code
32.8	113		20	12 x 25	328ET250	100-7345
32.8		-67dB	20	12 x 25	328ER250	100-7346
40	115		15	12 x 18	400ET180	100-7347
40		-70dB	15	12 x 18	400ER180	100-7349
40	100		15	4.6 x 9.1	400ET080	100-7351
40		-80dB	15	4.6 x 9.1	400ER080	100-7352

Case Type	Mftrs. List No.	Order Code	1+	25+	100+
Bright Aluminium	328ET250	100-7345	21.84	18.46	15.66
Bright Aluminium	328ER250	100-7346	21.84	18.46	15.66
Bright Aluminium	400ET180	100-7347	20.99	17.74	15.04
Bright Aluminium	400ER180	100-7349	20.99	17.74	15.04
Bright Aluminium	400ET080	100-7351	20.21	17.09	14.48
Bright Aluminium	400ER080	100-7352	20.21	17.09	14.48

Ultrasonic Transducer Pulse Transit



The Pulse/Tone Burst type transducers include two groups, open type (PT) and enclosed type (EP). Construction is similar to the standard air types, but an extra mechanical damper is added on the cone surface to minimise vibrations and hence reduce ringing. These types of transducer are specially designed for echo ranging systems with several transducers having asymmetric beam patterns designed specially to minimizing unwanted reflections being picked up from the ground.

- Car reversing aids
- Alarm systems
- Liquid level measurement
- Anti-collision devices
- Moving object detection/counters
- Remote control devices
- Robotics

Centre Freq. (kHz)	SPL (dB)	Sensitivity (dB)	Drive Voltage Max. (rms)	Dimensions H x Dia. (mm)	Mftrs List No.	Order Code
40	117	-65 dB	20	12 x 16.2	400PT160	100-7353
40	115	-68 dB	20	10 x 12.7	400PT120	100-7354
40	108	-75 dB	20	12 x 18	400EP18A	100-7355
40	103	-78 dB	20	9.1 x 14.1	400EP14D	100-7356
40	113	-72 dB	20	12 x 25	400EP250	100-7357
40	105	-72 dB	20	12 x 16.2	400WB160	100-7358
48	100	-80 dB	20	13.6 x	480EP900	100-7359

Type	Mftrs. List No.	Order Code	1+	25+	100+
Bright aluminium	400PT160	100-7353	11.62	9.80	8.33
Bright aluminium	400PT120	100-7354	12.04	10.19	8.66
Black aluminium	400EP18A	100-7355	18.59	15.66	13.31
Black - Asymmetrical beam	400EP14D	100-7356	28.22	23.79	20.21
Bright aluminium	400EP250	100-7357	29.07	24.54	20.83
Aluminium - Wide Beam	400WB160	100-7358	21.48	18.16	15.40
Asymmetrical beam	480EP900	100-7359	40.33	34.05	28.90

Ultrasonic Transducer Mirror Bender



This dual sensor unit houses both transmitter and receiver in a resin housing with 45° acoustic delay mirrors. This delay path offsets the ringing of the transmitter, and theoretically this means that objects can be measured at very close distances. The design combines high sensitivity and sound pressure level with excellent temperature and humidity durability.

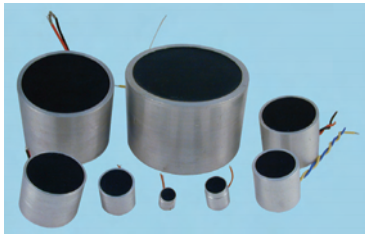
Applications

- Remote control devices
- Robotics
- Intrusion Alarms
- Energy saving equipments

Centre Freq. (kHz)	SPL (dB)	Sensitivity (dB)	Drive Voltage Max. (rms)	Dimensions H x W x D. (mm)	Mftrs List No.	Order Code
50	113	-67 dB	20	32.65 x 30.5 x 31	500MB120	100-7360

Type	Mftrs. List No.	Order Code	1+	25+	100+
Dual Transducer	500MB120	100-7360	28.22	23.79	20.21

Ultrasonic Transducer
High Frequency - Narrow Beam



NEW

These transceiver type transducers operate at higher frequencies than the standard air types and are constructed using a silicon rubber matching technique. Providing narrow beams with little or no side lobes, these transducers are ideal for use as proximity sensors. They have high sensitivity and sound pressure levels.

Applications

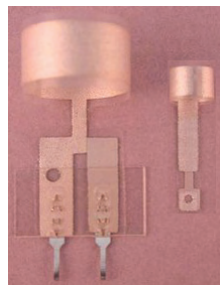
- Proximity detection
- Robotics
- Level control
- Short to long range measurement systems

Centre Freq. (kHz)	SPL (dB)	Sensitivity (dB)	Drive Voltage Max. (rms)	Dimensions H x Dia. (mm)	Mftrs List No.	Order Code
235		-73 dB	50	15 x 13	235AC130	100-7362
80	100	-58 dB	50	25 x 32	080AC350	100-7363
125		-58 dB	20	25 x 25	125SR250	100-7364

415220

Type	Mftrs. List No.	Order Code	1+	25+	100+
Pins, 9.3mm x 1mm	235AC130	100-7362	171.44	142.89	122.49
130mm Leads	080AC350	100-7363	342.98	285.79	245.00
85mm Leads	125SR250	100-7364	244.97	204.15	174.99

Ultrasonic Transducers
Omni-directional



These ultrasonic transmitters are constructed from a 30µm polymer film of polyvinylidene fluoride (PVDF) and offer omni-directional (360°) beam in the horizontal plane, and a ±40° beam in the vertical plane. Two models offer standard 40kHz and a higher 77kHz resonant frequency. The PVDF material offers a versatile solution for tough environmental conditions.

NEW

- Applications
- Alarm/security systems
- Anti-collision devices
- Moving object detection

Centre Freq. (kHz)	SPL (dB)	Resonance Q	Drive Voltage Max. (p-p)	Dimensions H x W x D. (mm)	Mftrs List No.	Order Code
40	95	10	150	22.5 x 11 x 11	400FS080	100-7365
77	69	5	150	16 x 4.9 x 4.9	800FS049	100-7366

415221

Mftrs. List No.	Order Code	1+	25+	100+
400FS080	100-7365	5.70	4.78	4.07
800FS049	100-7366	5.44	4.56	3.87

Ultrasonic Transducers
Electrostatic



NEW

Whilst physically larger than the piezo type ultrasonic transducers, the electrostatic type offer narrower beams, and smaller side lobe beams, enabling accurate detection. They have good sensitivity and sound output, offering very accurate short and long distance measurement. This makes them ideal for deep tank fluid measurement applications. These electrostatic types operate at a centre resonant frequency of 50kHz, and have a relatively flat response over a wide frequency range, and because they are non-resonant, have very low ring-out characteristics.

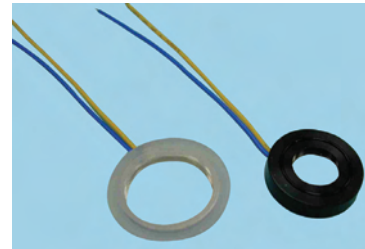
- Distance measurement
- Fluid level monitoring
- Proximity detection

Centre Freq. (kHz)	SPL (dB)	Sensitivity (dB)	Drive Voltage Max. (p-p)	Dimensions H x W x D. (mm)	Mftrs List No.	Order Code
50	116	-63 dB	300	28.6 x 28.6 x 16.2	500ES290	100-7367
50	119	-42 dB	300	H = 8.3, Dia = 42.9	500ES430	100-7368

415222

Mftrs. List No.	Order Code	1+	25+	100+
500ES290	100-7367	32.84	27.73	23.53
500ES430	100-7368	56.70	47.88	40.69

Ultrasonic Transducers
Piezoelectric Atomiser



NEW

The ultrasonic atomizing transducer uses a high Q hard type piezoelectric ceramic element and is ideal for atomizing liquids. A very fine mist, having a particle diameter of only a few microns, can be generated. The process also sterilizes water.

- Piezoelectric ceramic element clad with stainless steel for corrosion resistance
- Fine and consistent particle size of less than 3µm
- High atomizing efficiency >400 cc / hour
- High stability and durability

Applications

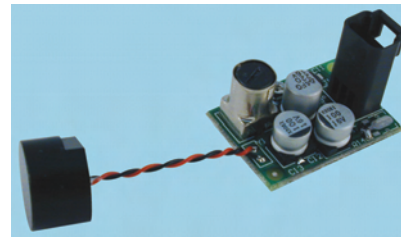
- Humidification in refrigerated food displays and displays
- Humidification in living environments and air conditioning plants
- Inhalation and disinfecting equipment
- Humidification in industrial process control for lubrication and coating
- Nebulisers

Operational Life (Hrs)	Atomising Quality (cc/hr)	Water Level (mm)	Input Power (W)	Resonant Freq. (MHz)	Dimensions H x W x D. (mm)	Mftrs List No.	Order Code
>6000	400	45	30	1.65	H = 5.5, Dia = 30.5	M165D25	100-7369

415223

Mftrs. List No.	Order Code	1+	25+	100+
M165D25	100-7369	29.07	24.54	20.83

Sonar Ranging Module
Ultrasonic Development Kit



NEW

W = 27.5, D = 19mm

Dia. = 3,
L (body) 8mm,
L (lead) = 10mm

Ultrasonic ranging development module The SRM400 Development Kit is an ultrasonic sonar ranging module, designed specially to work with the Prowave PT or EP type transducers. This module provides a short learning curve for the development of car reversing systems, and other distance measurement systems, for design engineers who are not very familiar with analog circuits and/or the operation of ultrasonic transducers. The SRM400 module contains a module board, a 400EP14D enclosed transducer and a detailed electrical schematic.

Ultrasonic Sonar ranging IC This chip consists of an external tunable RC oscillator with a special feature of automatic frequency tracing, which compensates the resonant frequency shift of the transducer due to temperature changes. A fixed gain pre-amplifier can be tailored to compensate for varying transducer sensitivities. The 32 steps time controlled variable gain amplifier slope can be modified by adjusting the frequency of the system clock. The onboard comparator converts the analog signal of the returning echo to a TTL level digital signal for use with an external microprocessor.

- Operating Voltage 6 - 10Vdc
- Broadband output up to 250KHz
- Built-in variable RC oscillator to match transducers with different frequencies
- High gain amplifier - time controlled 32 steps
- Integrated band pass filter to reduce external component count
- Bi-direction I/O pins to simplify control function when transmitting or receiving
- Adjustable system clock

415060

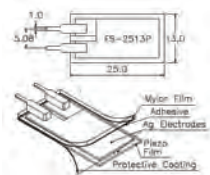
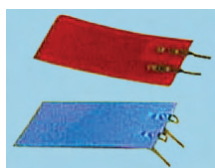
Module	Mftrs. List No.	Order Code	1+	25+	100+
SRM400		100-7370	64.71	53.97	46.22
PW0268		100-7371	9.31	7.84	6.67
Crystal - 40 kHz	S40000	100-7372	2.83	2.41	2.05

Sensors & Transducers

41

Compliant
Non-compliant
RoHS
+ Limited stock - RoHS replacement available

Piezoelectric Film Sensors
Motion / Vibration / Impact



The polymer film of polyvinylidene fluoride (PVF2) provides superior performance to many other piezo crystal or ceramic materials. The strain constant (g value) is 10 - 20 times larger than normal piezo ceramic and is therefore ideal for converting mechanical to electrical energy.

- High mechanical-electrical coefficient
- Low mechanical and acoustic impedance
- High resistance to moisture
- Pliant, flexible, tough and lightweight
- Self generated voltage, non-contact, rustless and free of sparking

Applications

- Vibration and motion sensors
- Coin and impact sensors
- Low weight accelerometer
- Pressure or force sensors
- Keyboards, keypads and touch panels
- Microphone and headset speakers

Voltage Sensitivity	Transverse Sensitivity	Resonant Frequency	Capacitance Sensitivity	Dimensions H x W . (mm)	Mfrs List No.	Order Code
70 mV/ms ⁻²	80	80Hz ±10	1.5nF ±30%	13 x 25	FS-2513P	100-7374

415224

Mfrs. List No.	Order Code	1+	25+	100+
FS-2513P	100-7374	6.54	5.53	4.69

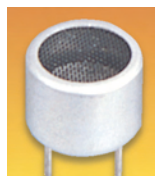
Ultrasonic Transducers



10mm Dia. Type
H=6.6, dia.=9.8
Leads L=8.5,
dia.=0.5
Lead spacing=4.8



10mm Housing Bracket
H=19, W=12,
D=16
Mtg=4.5 dia.



16mm Dia. Type (Open)
H=12, Dia.=16
Leads L=10, Dia.=1.2
Lead spacing=10

Ultrasonic transmitters and high sensitivity receivers designed for sending and receiving ultrasonic sound in the form of continuous or modulated waves through the air at 40KHz.

- Typical applications: remote control, proximity sensors, intruder alarms, motion detectors and data transmission
- Pair of housings are suitable for mounting 10mm dia. transducers. The housing enables the transducer to be aligned in a number of fixed positions relative to its mounting bracket, and is ideal for non-PCB applications

	10mm Dia. Open	16mm Dia. Open
Sensitivity, transmitter	110dB	106dB
Sensitivity, receiver	-70dB	-65dB
Resonant frequency	40±1KHz	40±1KHz
Typical operating distance	5m	5m
Direction angle	30°	30°
Input voltage (max), transmitter	10V rms	20V rms
Capacitance (typ.)	2000pF	1100pF
Operating temperature	-20°C to +60°C	-20°C to +60°C

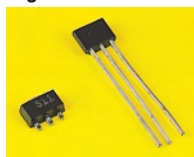
Import Permit may be required in Malaysia

212433

	Order Code	1+	25+	100+
10mm Dia. (Open)				
Transmitter	213-214	9.04	7.91	6.43
Receiver	213-226	9.04	7.91	7.42
Housings (pair)	213-238	5.75	4.98	3.91
16mm Dia. (Open)				
Transmitter	143-736	12.92	11.58	8.97
Transmitter	118-1092	15.40	13.57	10.42
Receiver	143-737	14.87	13.10	9.86
Receiver	118-1093	15.40	13.57	10.42

Magnetic Sensors

Digital Hall Effects Sensors



- Negative temperature coefficient for temperature stability
- High current capability to 50mA
- Quad Hall design to eliminate mechanical stress
- Operating temperature -40°C to +150°C
- SS400 - TO92E Package

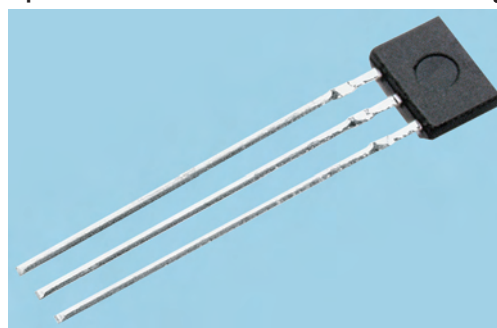
SS400 Series

Description	Mag. Characteristic @ 25°C			Mfrs List No.	Order Code
	Max. Op.	Min. Rel.	Min. Dif.		
Bi-Polar ±60 Gauss	60	-60	15	SS411A	311-1465
Unipolar 115 Gauss@25°C	115	20	20	SS441A	311-1477
Latching Bi-Polar ±115 Gauss	50	85	-85	SS461A	311-1489
Latching Bi-Polar±180 Gauss	180	-180	200	SS466A	311-1490
Unipolar 180 Gauss@25°C	180	75	25	SS443A	311-1507

212423/406092

Description	Package	Order Code	Price Each		
			1+	25+	100+
Bi-Polar ±60 Gauss	TO92E	311-1465	3.52	--	--
Unipolar 115 Gauss@25°C	TO92E	311-1477	3.42	3.26	3.09
Latching Bi-Polar ±115 Gauss	TO92E	311-1489	3.52	--	--
Latching Bi-Polar±180 Gauss	TO92E	311-1490	3.42	3.26	3.09
Unipolar 180 Gauss@25°C	TO92E	311-1507	3.52	--	--

SS40A Bipolar Hall-Effect Sensor



- Miniature construction: 3.0x4.0mm plastic package
- Power consumption of only 5mA Max. @ 4.5V dc for energy efficiency
- Digital current sinking output
- Bipolar magnetics for ring magnet applications
- High output current capability (20mA)
- High speed - operates from 0 KHz to over 100 KHz
- Broad temperature range of -40 to 125°C
- Built-in reverse polarity protection



Package Style	Radial Lead IC	Leakage Current Max.	10 µA
Supply Voltage	4.5 to 24.0V dc	Output Current (Max.)	20mA
Output Type	Sink	Supply Current (Max. @ 25°C)	10mA
Magnetic Actuation Type	Bipolar	Supply Current (Typ. @ 25°C, 24V dc)	6.5mA
Operating Temperature	-40 to 125°C	Response Time	4 µs (Typ.)
Output Voltage	0.4V dc	Operate Point -40°C to 85°C	110G Max.
Operate Point @ 25°C	45 G Typ.	Release Point -40°C to 85°C	-110G Max.
Release Point @ 25°C	-45 G Typ.	Differential (Typ. @ 25°C)	90G

419647

Mfrs. List No.	Order Code	Price Each				
		1+	5+	10+	25+	+
SS40A	108-2268	2.77	2.51	2.15	1.89	--

Magneto-Resistive Digital Sensor



Magneto-resistive material integrated on silicone. Can achieve large sensing distances when used with conventional magnets.

- Low gauss operation (typical op. 15 gauss)
- Digital current sinking
- Omni polar (N & S pole sensing)
- 0-100KHz
- Miniature package
- 3 pin in-line 0.1" centre
- Operating temperature -40°C to +125°C
- Supply voltage 6 to 24V dc

212412

Mfrs. List No.	Order Code	1+	10+	25+	100+
2SS52M	311-1519	4.49	4.43	4.20	4.20

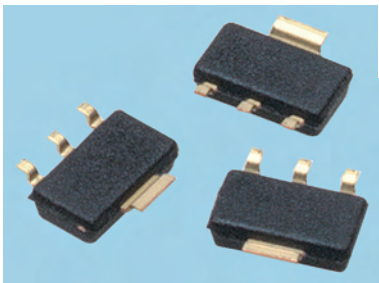
Product Watch

- FREE to all account holders
- Notification of obsolete, end of line and end of stock items
- Replacement or upgrade recommendations

Advanced warning of obsolete components

SS552MT Surface Mount Sensor

Honeywell



NEW

SS552MT is a digital position sensor in an SOT-89 style surface-mount package with omnipolar magnetic action. The sensor has magnetoresistive material integrated on silicon and encapsulated in a plastic package. The integrated circuit provides a digital output in response to very low magnetic fields.

Package Style	Surface Mount
Supply Voltage	3.8 to 30.0V dc
Output Type	Sink
Magnetic Actuation Type	Omnipolar
Operating Temperature	-40 to 150°C
Output Voltage	0.4V dc
Switching Time Rise (10 to 90%)	0.2µs Typ.; 1.5µs Max.
Switching Time Fall (90 to 10%)	0.1µs Typ.; 1.5µs Max.
Output Current (Max.)	20mA
Supply Current (Typ. @ 25°C)	10mA

419608

Mfrs. List No.	Order Code	Price Each				
		1+	5+	10+	25+	+
SS552MT	SMD108-2265	5.24	4.72	4.17	3.65	--

HMC1051Z Magnetic Sensor

Honeywell



NEW

- Miniature surface mount package
- Wide field range of ±6 gauss
- 1.0mV/V/gauss sensitivity
- Low power operation down to 1.8V
- Patented on-chip set/reset and offset straps

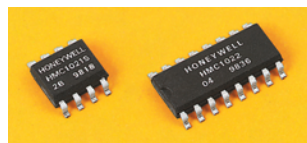
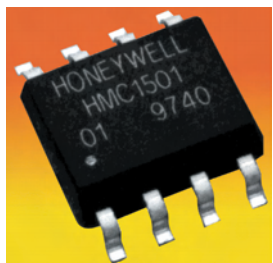
Supply Voltage	1.8 - 20V	Sensitivity	0.8 - 1.2 mV/V/gauss
Resistance	800 - 1500Ω	Noise Density	50nV/sqrt Hz
Operating Temperature	-40 to 125°C	Resolution	120µG
Humidity	85%	Bandwidth	5 MHz
Field Range	-6 to 6G	Disturbing Field	20 G
Linearity Error	±1G - 0.1%FS	Sensitivity Tempco	
	±3G - 0.5%FS	T _A = -40 to 125°C, V _{bridge} = 5V	-300 to -2400 ppm°C
	±6G - 1.8%FS	T _A = -40 to 125°C, I _{bridge} = 5mA	-600 ppm°C Typ.
Hysteresis Error	0.06%FS	Bridge Ohmic Tempco	
Repeatability Error	0.1%FS	V _{bridge} =5V, T _A = -40 to 125°C	2100 - 2900 ppm°C
Bridge Offset	-1.25 to 1.25mV/V	Cross-Axis Effect	±3%FS
		Exposed Field	10000 gauss Max.

419653

Mfrs. List No.	Order Code	Price Each				
		1+	5+	10+	25+	+
HMC1051Z	108-2271	52.24	48.96	45.70	41.18	--

High Sensitivity Magnetic Sensors

Honeywell



Use these high sensitivity Magnetic Sensors to easily obtain accurate compass heading (HMC10xx models) direction, or for precise, non-contact measurement of linear/angular position (HMC15XX models) in many applications. HMC10xx models are ideal for handheld, battery powered appliances such as position intelligent cellular telephone handsets, GPS receivers, short range walkie talkies, or wrist watches. Products excel in compasses embedded in automobile rear view mirrors as well. Detailed applications information describes required signal conditioning electronics.

HMC15xx models are affordable solutions for non-contact valve position measurement in food and beverage applications. The high sensitivity enables use of a small low cost magnet that can be positioned up to 2cm away from sensor.

Ideal solution for rotary position measurement in engine control applications such as measuring engine valve position or accelerator pedal position in electronic throttle control assembly.

Key benefits are:

- Embedded set/reset function nulls out effects of unwanted ambient magnetic fields
- Miniature surface mount package enables automated assembly onto printed circuit boards
- Solid state construction provides high reliability

Key features are:

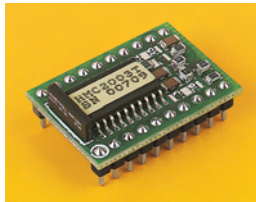
- ±6 Gauss Field Range for HMC10xx
- 80 Gauss Saturation field for HMC15xx
- ±20mV unamplified full scale output
- 0 to 10 MHz frequency response
- -55°C to +125°C operating temperature

232414

Mfrs. List No.	Order Code	Price Each			
		1+	10+	25+	100+
Single axis, 8 pin SOIC	HMC1021S 722-0091	17.24	--	--	--
Single axis, 8 pin SIP	HMC1021Z 722-0108	59.32	53.36	48.51	45.86
Dual axis, 16 pin SOIC	HMC1022 722-0110	59.32	53.36	48.51	45.86
Single axis, 8 pin SOIC	HMC1501 SMD389-0120	45.86	43.56	41.26	--
Dual axis, 8 pin SOIC	HMC1512 SMD389-0132	52.42	49.80	47.19	--
Dual axis, 10 pin MSOP	HMC1052 SMD389-0144	55.69	52.92	50.12	--
Compass -On-Chip, 2 Axis	HMC1051Z 108-2271	52.24	48.96	45.70	41.18

Magnetic Sensor Hybrid - HMC2003

Honeywell



- For use in high precision vehicle control, compass heading detection or medical instrument applications
- High resolution, temperature compensated and amplified voltage outputs
- Operates from single 6 to 15V supply
- Integrated offset coils allow closed loop operation

PCB=27x9, Pin spacing=2.54x15.24

Magnetic hybrid includes 3 magneto-resistive based sensors to sense x, y and z axes, and 3 instrumentation grade amplifiers. 20 pin DIP package.

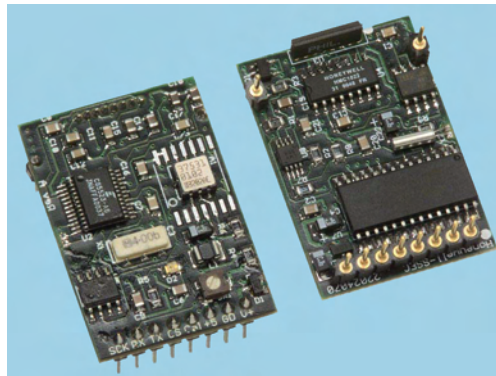
Field range	±2 gauss	Resolution	70 µgauss
Full scale output	4.5V		

212328

Mfrs. List No.	Order Code	Price Each			
		1+	5+	+	+
HMC2003	722-0121	528.38	481.51	--	--

HMR3200/HMR3300 Digital Compass Solutions

Honeywell



Features

- Compact solution on a 1.0" by 1.5" PCB
- Precision compass accuracy
- Tilt-compensated (HMR3300 only)
- 0.5° repeatability
- 8Hz continuous update rate
- Hard-Iron compensation routine
- -40 to 85°C operating temperature range
- UART and SPI communication

Benefits

- Small size and pin interface for daughter/motherboard integration
- ±1° at level heading accuracy, ±0.1° resolution
- Up to ±60° of pitch and roll angles using a MEMS accelerometer (HMR3300)
- Magnetoresistive sensor technology for consistency
- Rapid heading computations for control system applications
- User driven calibration to null stray fields

NEW

Sensors & Transducers

41

Compliant
Non-compliant
RoHS
+ Limited stock - RoHS replacement available



- Consumer and Industrial environment uses
- Intuitive command language

419658

Mfrs. List No.	Order Code	1+	5+	10+	+	+
HMR3200	108-2273	887.93	848.74	818.40	--	--
HMR3300	108-2274	998.93	949.94	920.70	--	--

Digital Magnetometer - HMR2300

Honeywell



- Card level products for industrial applications
- High resolution and direct digital interface
- Embedded microcontroller enables combined error (non-linearity, hysteresis, repeatability and temperature effects) band of 1% FSO over -55°C to +125°C range
- Selectable features include: sampling rate, baud rate and output
- Applications include avionics, marine compassing, process control, vehicle detection, security systems
- Magnetometer supplied with software
- Demo unit includes magnetometer card in enclosure, software, manual and power cable
- Field range ±2 gauss

HMR2300:

H=22, W=38, L=101,
4 Mounting holes F.C.=25.4x92

3-axis magnetometer detects the strength and direction of a magnetic field and communicates the x, y and z outputs directly to a computer.

SEN292/212329

	Mfrs. List No.	Order Code	1+	3+
Demo kit, RS232 output	HMR-R232-DEMO	722-0133	2,354.50	2,236.75
Demo kit, RS485 output	HMR-R485-DEMO	722-0145	2,354.50	2,236.75
Magnetometer, RS232 output	HMR2300-D21-232	722-0157	2,354.47	2,167.50
Magnetometer, RS485 output	HMR2300-D21-485	722-0169	2,354.47	2,150.73
User's manual	ADS14053	722-0170	36.54	34.71
Power cable	HMRPC-001	722-0182	199.35	189.36

Proximity Switches - Magnetic

Reed Sensor

Ferromagnetic Metal Detection



NEW

Products for tomorrow...



These reed proximity switches operate when in the presence of magnetically conductive material unlike standard sensors that require an actuating magnet. Only a simple piece of iron is required to operate this sensor, either from in front of the sensor or from above depending on the version. The connecting cable is round twin core 2 x 0.35 mm² (AWG 22), 500mm long.

H = 10, W = 32.4, D = 16.7mm

Contact Form	Contact Form	1.75
Contact resistance mR (max)	150	Switch carry current A (max)
Switch power W (max)	10	Breakdown voltage V dc
Switch voltage V dc (max)	200	Temperature, operating °C
Switching current A (max)	0.5	-20 to +85

417770

Sensing direction	Mfrs. List No.	Order Code	1+	10+	25+	50+
Front	MK02/0-1A71-500W	107-9473	42.93	35.77	32.19	23.60
Above	MK02/1-1A71-500W	107-9474	42.93	35.77	32.19	23.60

Reed Sensor

Magnet Detection



NEW

Products for tomorrow...



L (body) = 25.5, Dia. = 5.75mm

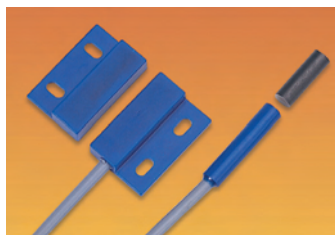
This sensor is a magnetically operated proximity switch housed in a cylindrical case with an interconnecting cable 500mm in length. The sensor is designed to be mounted on a fixed surface with the actuating magnet on the moving surface. Introduction or removal of the magnetic field determines the opening of the reed switch.

Contact Form	Contact Form	150
Contact resistance mR (max)	10	Switch power W (max)
Switch power W (max)	180	Switch voltage V dc (max)
Switch voltage V dc (max)	0.5	Switching current A (max)
Switching current A (max)	1.5	Switch carry current A (max)
Switch carry current A (max)	200	Breakdown voltage V dc
Breakdown voltage V dc	-20 to +85	Temperature, operating °C
Temperature, operating °C		

417773

Mfrs. List No.	Order Code	1+	10+	25+	50+
MK03-1A71B-500W	107-9476	11.75	9.80	8.82	6.48

Reed, Plastic Housing



Rectangular switch: 30x20x7, Fixing centres=16 (slots 6x3.3)
Rectangular actuator: 30x20x7, Fixing centres=16 (slots 6x3.3)
Cylindrical switch: L=28, Dia.=6, Cylindrical actuator: L=19, Dia.=6

- Magnetic proximity switches with hermetically sealed contacts
- Suitable for systems, position sensing, level sensing, security, flow sensing, etc.
- Choice or normally open, normally closed or changeover contacts (Forms A, B or C)
- Rectangular or cylindrical polystyrene housing
- No maintenance required
- Rectangular version has two slotted fixing holes for easy fitting

Switch contacts operate when the magnet actuator moves in close proximity to the switch, 8mm min. for rectangular version and 5mm min. for cylindrical version.

	SPNO	5VA, SPCO, SPNC	20VA, SPCO
Switching current	0.5A max.	0.25A max.	1A max.
Switching voltage	240V ac max.	175V ac max.	150V dc max.
Switching capacity	10VA max.	5VA max.	20VA max.
Operating temperature	-20°C to 70°C	-20°C to 70°C	-20°C to 70°C

Changeover contacts = white-common, green-normally open, brown-normally closed

212213

Switches	Mfrs. List No.	Order Code	1+	25+	100+	250+
Rectangular SPNO	PSA240/30	607-186	11.31	10.08	8.60	8.00
Rectangular SPNC	PSB175/30	721-3440	16.63	14.14	13.24	--
Rectangular SPCO	PSC175/30	607-198	15.34	13.70	11.78	10.84
Rectangular SPCO, 20VA	PSC150/30	732-000	26.78	22.77	19.56	17.99
Cylindrical SPNO	PRA/240/30	607-216	11.47	10.21	8.79	8.10
Cylindrical SPCO	PRC/175/30	607-228	16.29	13.23	11.37	10.49
Magnets						
Rectangular	PSM	607-204	6.49	5.52	4.68	4.26
Cylindrical	PRM	607-230	2.25	1.96	1.69	1.42

Reed Sensor Magnet Detection

NEW



Products for tomorrow...



H = 5.9, W = 23, D = 19.4mm



H = 5.9, W = 23, D = 13.9mm

Contact Form	Contact Form	150
Contact resistance mR (max)	10	Switch power W (max)
Switch power W (max)	180	Switch voltage V dc (max)
Switch voltage V dc (max)	0.5	Switching current A (max)
Switching current A (max)	1.5	Switch carry current A (max)
Switch carry current A (max)	200	Breakdown voltage V dc
Breakdown voltage V dc	-20 to +85	Temperature, operating °C
Temperature, operating °C		

MK04 / MK05 sensors are magnetically operated Reed proximity switches designed for screw mounting. The sensor should be mounted on a fixed surface with the actuating magnet on the moving surface. Introduction or removal of the magnetic field determines the closing and opening of the Reed Switch.

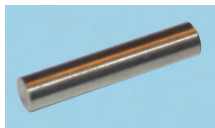
417779

Mfrs. List No.	Order Code	1+	10+	25+	50+
MK04-1A71B-500W	107-9477	13.02	10.84	9.76	7.16
MK05-1A71B-500W	107-9478	9.08	7.55	6.80	4.98

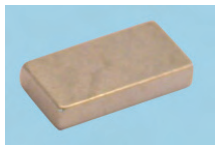
Sensor Magnets



M4



Bar



NdFeB



Products for tomorrow

NEW

AlNiCo bar magnets are suitable for the operation of most Reed Switches and should ideally be the moving part of the sensing application. The selection of the magnet and the sensitivity of the Reed Switch will determine the Pull-In and Drop-Out distances.

SmCo (samarium cobalt) and NdFeB (neodymium iron boron) magnets are made from rare earth materials and have especially good magnetic properties concerning stability and energy product.

Dimensions	H (mm)	W (mm)	D (mm)	Dimensions	H (mm)	W (mm)	D (mm)
Order Code				107-9496	22	5	
107-9492	5.9	23	13.9	107-9497	4	3	
Order Code	L (mm)	Dia. (mm)		107-9498	4	5	
107-9493	27	7.5		107-9500	15	8	
107-9494	12	3		Order Code	H (mm)	W (mm)	D (mm)
107-9495	19	4		107-9501	5	10	1.9

Mfrs. List No.	Order Code	1+	10+	25+	50+
AlNiCo500					
MAGNET M4	107-9492	5.47	4.56	4.10	3.03
ALNIC0500 7.5X27MM	107-9493	4.04	3.35	3.03	2.21
ALNIC0500 3X12MM	107-9494	1.27	1.04	0.94	0.68
ALNIC0500 4X19MM	107-9495	1.63	1.33	1.20	0.88
ALNIC0500 5X22MM	107-9496	4.23	3.52	3.16	2.31
SmCo					
SMCO5 3X4MM	107-9497	1.53	1.27	1.14	0.85
SMCO5 5X4MM	107-9498	2.41	2.02	1.82	1.33
NdFeB					
NDFEB 8X15MM	107-9500	2.80	2.31	2.08	1.53
NDFEB 10X5X1.9MM	107-9501	2.25	1.86	1.69	1.24

Reed, Plastic Housing

Miniature



Switch: 20 x 15 x 7
Actuator: 20 x 15 x 7
Fixing centres=10 (slots 6 x 3.3)

Switch contact operates when the magnet actuator moves in close proximity to the switch, typically 5mm.

Contacts	SPNO (Form A)	Switching distance, min.	5mm
Switching voltage, max.	100V ac	Operating temperature	-5°C to 70°C
Switching current, max.	0.5A	Case material	ABS
Switching capacity, resistive	6VA	Cable length	1m, PVC insulated
Contact resistance, max.	150mΩ		

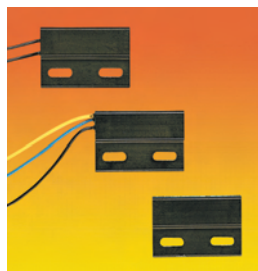
Mfrs. List No.	Order Code	1+	50+	200+
MMPSA 240/100	117-3767	21.03	15.95	12.76
MMPSM	117-3768	10.29	7.94	6.38

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The very latest NEW products

Reed, Plastic Housing

Miniature

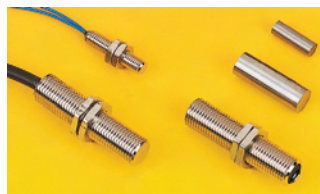


H = 19.5, W = 28.5, D = 6.4
Fixing Centres = 21, (PM102 magnet = 16
Slots 90° against body)

Switch Action	372-0937	372-0949	372-0950
SPST NO	SPST NO	SPST-NO/NC	SPST NO
Switching voltage	100Vdc,250Vac	130Vdc,100Vac	100Vdc,250Vac
Switching current	1.0A	0.3A	1.0A
Switching power	15VA	3VA	15VA
Material	Nylon 6.6	Nylon 6.6	Nylon 6.6
Temperature Range	-30°C to +105°C	-30°C to +105°C	-30°C to +105°C
Approvals			UL
Cable	2 x 24AWG PVC insulated	3 x 24AWG PVC insulated	2 x 20AWG PVC insulated

Type	Mfrs. List No.	Order Code	1+	5+	10+
SPST NO	PS1011	100-6783	8.51	7.34	6.68
SPST NO	PS2011..	372-0950	9.51	8.69	8.35
SPST CO	PS1031..	372-0949	15.15	13.29	11.69
Magnet	PM101	372-0913	7.80	6.36	5.94
Magnet	PM102	372-0925	7.96	6.54	6.09

Reed, Threaded Barrel



730-208: L=28, Ø=M6
732-734: L=50, Ø=M12
732-746: L=90, Ø=M18
607-230: L=19, Ø=M6
732-758: L=30, Ø=M10
732-771: L=40, Ø=M12.5
732-760: L=50, Ø=M12
732-783: L=50, Ø=M18
Cable L=300 (all types)

- Threaded barrel housings for easy fitting and adjustment
- High switching capacity - up to 60VA and 120VA
- Suitable for a wide range of position sensing applications

Barrel size	M6	M12	M18
Contacts	SPNO (form A)	SPNO (form A)	SPNO (form A)
Switching voltage, max.	470Vac	230Vac	1500Vac
Switching current, max.	0.5A	3A	3A
Switching capacity, resistive	10VA max.	60VA max.	120VA max.
Contact resistance, max.	150mΩ	80mΩ	80mΩ
Switching distance, min	5 mm	8 mm	15 mm
Operating temperature		-20°C to 85°C	
Case material	Brass, nickel plated		
Order Code	730-208	732-734	732-746

Switches	Mfrs. List No.	Order Code	1+	25+	100+	250+
M6 threaded	PTA470/30	730-208	36.22	30.84	26.52	24.38
M12 threaded	PTA230/30.	732-734	55.63	47.34	40.70	37.42
M18 threaded	PTA1500/30.	732-746	75.88	64.61	55.53	51.06
Magnets						
6mm dia	PRM	607-230	2.25	1.96	1.69	1.42
12mm dia	PRMM	732-758	8.52	7.38	6.36	5.82
M12 threaded	PTM12	732-760	44.30	40.80	35.55	29.79
18mm dia.	PRNM	732-771	13.23	11.46	9.87	9.06
M18 threaded	PTM18	732-783	56.00	48.57	41.76	38.37

Magnets - High Strength Discs

Miniature, Nickel Plated



- Disc magnets made from strongest permanent magnet material
- Exceptional magnetic strength from small size
- All magnets nickel plated to reduce the onset of corrosion when used under normal conditions
- Suitable for use at temperatures up to 120°C
- Ideal for proximity sensor triggering or biasing where space is a premium

Sensors & Transducers

41

Compliant
Non-compliant
RoHS
Limited stock - RoHS replacement available

Distance (mm) at which magnets measure 1000 gauss	M1219-1=4.1, M1219-2=2.2, M1219-3=1.8, M1219-4=1.2, M1219-5=0.6
Surface flux measurement (gauss)	M1219-1=1500, M1219-2=2500, M1219-3=3200, M1219-4=2500, M1219-5=3500
Magnet material	Neodymium Iron Boron
Grade/Energy density	Grade N30H, max. energy density 30 MGOe (M1219-4 Grade N35H, energy density 35 MGOe)
Operating temperature	120°C max.

Note: M1219-4 has north-seeking pole identified with a dimple

Mfrs. List No.	M1219-1=723-0345, M1219-2=723-0357,	M1219-3=723-0369, M1219-4=723-0370,	M1219-5=723-0382
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212390/406096

Size (mm)	Order Code	Price Each				
		1+	25+	100+	250+	+
Dia.=3, W=1	723-0345	1.50	1.31	1.13	0.95	--
Dia.=3, W=2	723-0357	1.65	1.44	1.24	1.04	--
Dia.=4, W=3	723-0369	1.95	1.70	1.46	1.23	--
Dia.=6, W=2	723-0370	1.50	1.31	1.13	0.95	--
Dia.=10, W=5	723-0382	1.85	1.61	1.38	1.16	--

Reed Sensor
Magnet Detection



L (overall) = 25, Thread = M5 x 0.5mm

The MK11 sensor is a magnetically operated Reed Sensor with screw thread enclosure supplied with a 500mm long interconnect cable. The sensor should be mounted on a fixed surface with the actuating magnet on the moving surface. Introduction or removal of the magnetic field determines the closing and opening of the Reed Switch.

Contact Form	
Contact resistance mR (max)	150
Switch power W (max)	10
Switch voltage V dc (max)	180
Switching current A (max)	0.5
Switch carry current A (max)	1.5
Breakdown voltage V dc	200
Temperature, operating °C	-20 to +85

417800

Pull in Range	Mfrs. List No.	Order Code	Price Each		
			1+	10+	50+
10 to 15 mm	MK11-1A71B-500W	107-9483	20.38	16.99	15.30

Reed, Metal Housing



Switch: 32x15x8
Actuator: 32x15x8
Fixing centres=20,
Fixing hole, 3.3 dia. csk

- Magnetic proximity switch with hermetically sealed contacts
 - Suitable for position, level sensing and security/anti-tamper
 - Contacts closed with magnet present
 - Compact aluminium housing
 - Good protection in harsh environments up to IP65
- Applications:**
- Process control systems
 - Intruder alarm, limit and proximity applications

Switch contact operates when the magnet actuator moves in close proximity to the switch, typically 10mm.

Contacts	SPNO (form A)	Switching distance, min	10 mm
Switching voltage, max.	230Vac	Operating temperature	-20°C to 70°C
Switching current, max.	0.5A	Case material	Aluminium
Switching capacity, resistive	10VA	Cable length	280mm, PVC insulated
Contact resistance, max.	300mΩ		

212401

Mfrs. List No.	Order Code	Price Each		
		1+	50+	200+
CTC 012.	309-4868	13.65	10.24	8.24
CTCM	309-4870	5.68	4.23	3.39

Reed, Metal Housing



Standard switch: 79.5 x 19.3 x 9.8, Standard actuator: 38.1 x 25.4 x 9.8, Miniature switch: 38.3 x 12.7 x 7.7, Miniature actuator: 38.3 x 12.7 x 7.7, Fixing centres=50 (slots 14 x 4.7), Fixing centres=28 (slots 14 x 4.7), Fixing centres=25 (hole dia 3.1), Fixing centres=25 (hole dia 3.1)

- Magnetically operated reed proximity switches encapsulated in pressure die castings with a blue powder coated finish
- Solid construction gives protection in harsh environments, IP64 rating
- Suitable for many applications with resistive loads
- Intruder alarm and limit switch, micro-switch and proximity switch applications
- Normally open or changeover contacts available

Connection is by integral PVC cable, 0.5m for miniature and 0.7m length for standard switches.

Size	Contact Form (earthed*)	Max dc Contact Ratings			Order Code
		V	V.A.	A	
Miniature	SPNO	220	15	0.5	170-838
Miniature	SPCO	175	3	0.25	170-839
Standard	SPNO*	250	100	3	170-842
Standard	SPCO*	250	50	1.5	170-841

Order Code	Used with Order Code	Distance - face to face		Max. (mm)
		Min. (mm)		
170-840	170-838	7		13
	170-839	5		13
	170-842	13		22
170-843	170-841	13		25

212445

Type	Order Code	Price Each		
		1+	10+	25+
Switches				
Miniature SPNO	170-838	21.83	17.80	15.97
Miniature SPCO	170-839	34.56	28.48	25.58
Standard SPNO	170-842	28.79	25.45	24.03
Standard SPCO	170-841	38.71	34.27	32.38
Magnets				
Miniature	170-840	11.17	9.12	8.28
Standard	170-843	11.29	10.20	9.54

Solid State - Hall Effect



L=30, W=20, D=7, Cable L=300
Fixing centres=16,
Fixing slots=6 x 3.3

Connections:
Red=+V, Green=0V, Blue=NPN Output (4.7kΩ to +V), Yellow=PNP Output (4.7kΩ to 0V)

- Bounce-free switching
- High speed operation
- Solid state reliability
- Alignment and monitoring by LED indicator
- Fully encapsulated package
- NPN or PNP normally open output (by wire selection)
- High strength magnet
- Small plastic packages with fixing slots

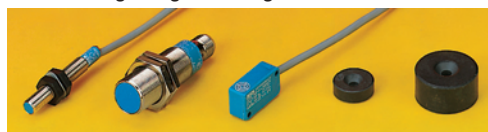
Magnetically activated proximity switch utilising Hall effect technology.

Supply voltage	10 to 20V dc
ON-current	25mA typ.
Output current	250mA max.
Output loading	4.7kΩ approx.
Operating distance	8mm typ.
Operating temperature	-30°C to 70°C
Operating frequency	100kHz max.
Output rise/fall time	2.0µs/2.0µs (max.)

212391

Switch Magnet	Mfrs. List No.	Order Code	Price Each			
			1+	25+	100+	250+
	PSS 25S/30.	723-0400	47.88	40.73	35.03	32.22
	PSSM	723-0412	6.83	5.94	5.10	4.68

Solid State - Long Range Sensing



M8: L=50 (cable type), 59 (plug-in type)
M18: L=50 (cable type), 65 (plug-in type)
Rectangular: H=16, W=10, D=28 (body)
Magnets:
M3.0: Dia.=20, H=6.5, Hole dia.=4.3
M5.0: Dia.=31, H=15, Hole dia.=5.3

- Can be installed flush and non-flush in metal
- Long sensing ranges, even with small size sensors
- Can be used to detect magnets behind surfaces such as wood, plastic or non-ferrous metal
- High switching frequency
- Short circuit and reverse polarity protection
- Barrel sensors in robust metal housings
- Plastic rectangular housing similar to V3 style microswitch
- Prewired 2m cable or plug-in connector options
- LED status indication
- IP67 enclosure rating
- Suitable magnets available, centre drilled and countersunk

Sensing range, axial (using M4.0 magnet)
 In non-magnetisable material M8=60, M18=70, Rectangular=60
 Flush in magnetisable material M8=20, M18=55, Rectangular=20
 Operating voltage 10-30V dc
 Switching output PNP, normally open, 300mA max.
 Case material M8/M18: brass, nickel plated; Rectangular: plastic
 Connection, plug-in M8/Rectangular: M8 screw lock; M18: M12 Barium ferrite

Mfrs. List No. MM08-60APS-ZUO=722-9495, MQ10-60APS-KUO=722-9537, MM08-60APS-ZTO=722-9501, MQ10-60APS-KTO=722-9549, MM18-70APS-ZUO=722-9513, M3.0=722-9550, MM18-70APS-ZCO=722-9525, M5.0=722-9562

FOR SUITABLE SENSOR CONNECTORS SEE **ORDER CODE 532-125**

222167

Proximity Switches	Connection	Order Code	Price Each		
			1+	5+	10+
M8 barrel	Cable	722-9495	112.14	106.53	104.27
M8 barrel	Plug-in	722-9501	115.92	110.12	104.33
M18 barrel	Cable	722-9513	110.88	105.34	99.79
M18 barrel	Plug-in	722-9525	114.66	108.93	103.19
Rectangular	Cable	722-9537	112.14	106.53	100.93
Rectangular	Plug-in	722-9549	115.92	110.12	104.33
Magnets					
Di. = 20, H = 6.5 (drilled)		722-9550	9.98	9.48	9.00
Di. = 31, H = 15 (drilled)		722-9562	17.47	16.59	15.72

Proximity Switches - Capacitive

Low Profile, dc - E2K-F



- For detection of metallic or non-metallic objects
- Flat-pack construction allows a 10mm sensing range in a comparatively small space
- LED operation indicator fitted
- Protection to IP66

H=10.1, W=50 (overall), 34 (face), D=20, Fixing centres=42 (3.5 dia.), Cable L=2m

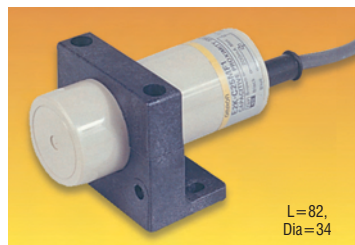
A plastic body capacitive proximity switch. The switch can be mounted directly onto a metal panel, though care should be taken with regard to surrounding metal, since the switch is of non-shielded construction and is side sensitive.

Sensing distance 10mm (max.) Current consumption 10mA max. @ 24V dc
 Operating voltage 10 to 30V dc, 10% ripple (max.) Response frequency 100Hz
 Output NPN open collector, N.O. Temperature range -10°C to +55°C

212192

Mfrs. List No.	Order Code	1+	5+	10+
E2K-F10MC1	530-414	125.65	119.35	113.12

34mm ac and dc - E2K-C Series



- Detects metallic or non-metallic objects without contact
- Sensitivity is adjustable by built-in potentiometer
- Output indication via LED
- Protection IP66
- DC types have UL listing
- Supplied with mounting bracket

Note: When mounting with bracket, provide 20mm (min) between face of detecting head and bracket.

L=82, Dia=34

Sensing distance 3 to 25mm (adjustable) Response frequency
 Output 200mA dc type 70Hz
 Current consumption 1 to 2 mA (ac) 10 to 15mA (dc) ac type 10Hz
 Output mode Normally Open Temperature range -25°C to +70°C

Mfrs. List No. E2K-C25ME1=103-035, E2K-C25MF1=177-872, E2K-C25MY1=103-036

212447

Voltage	Order Code	Price Each		
		1+	5+	10+
10 to 40V dc/NPN	103-035	262.93	249.79	236.63
10 to 40V dc/PNP	177-872	262.93	249.79	236.63
90 to 250V ac	103-036	228.50	217.62	--

M18 dc, M30 ac and dc



L=100 (incl. cable sleeve), Cable L=2m

- M18 and M30 DC sensors available with either NPN or PNP outputs. Normally open or normally closed operation is selectable on the M30 types.
- M30 AC sensors available for either N.O. or N.C. operation.
- Sensitivity is adjustable by built-in potentiometer, and is factory set to 8mm on M18 types and 15mm on M30 types

- Output indication by LED
- Protection to IP67
- Reverse polarity and short-circuit protection on DC sensors
- Transient protection on AC sensors
- UL Recognised and CSA approved

Capacitive proximity switches in cylindrical polyester housings for detecting metallic or non-metallic objects without contact.

Note: Not for flush mounting over unthreaded area near tip - length 12mm (M30), 8mm (M18)

Output ac type 20 to 500mA (thyristor)
 dc type 0 to 200mA (NPN or PNP transistor)
 Supply voltage ac type 20 - 265V ac
 dc type 10 to 40V dc
 Temperature range -25°C to +70°C

Sensing Distance	Thread Size	Output	Response Frequency	Mfrs. List No.	Order Code
2 to 10mm	M18	NPN/N.O.	25Hz	EC1808NPOP	254-447
2 to 10mm	M18	PNP/N.O.	25Hz	EC1808PPOP	673-894
3 to 20mm	M30	NPN/N.O. + N.C.	60Hz	EC3015NAP	177-067
3 to 20mm	M30	PNP/N.O. + N.C.	60Hz	EC3015PNAP	179-319
3 to 20mm	M30	SCR/N.O.	10Hz	EC3015TBOP	175-679
3 to 20mm	M30	SCR/N.C.	10Hz	EC3015TBOP	673-900

212448

Size	Sensing Distance	Output	Order Code	Price Each			
				1+	5+	10+	25+
M18	8mm	NPN	254-447	97.99	93.09	88.28	83.93
M18	8mm	PNP	673-894	97.02	92.17	87.41	83.10
M30	15mm	NPN	177-067	121.12	115.08	109.13	103.75
M30	15mm	PNP	179-319	121.12	115.08	109.13	103.75
M30	15mm	AC/N.O.	175-679	219.58	208.62	197.83	188.09
M30	15mm	AC/N.C.	673-900	219.58	208.62	197.83	188.09

M30 ac/dc, Extended Sensing - 'Tripleshield'

Prewired and M12 Plug-in



L=72.6 (non-flush), 60.6 (flush), Thread=M3

- Outstanding high immunity against ESD, interference and transients, exceeding all industry norm requirements
- Adjustable extended sensing distances to 25mm
- Elevated temperature range -25°C to +80°C
- DC types available NPN or PNP with NO/NC dual output
- AC types have SCR output with programmable NO/NC switching
- DC types have reverse polarity and short-circuit protection
- Senses most materials
- IP67 protection

M30 sensors in thermoplastic polyester housing, triple protected against environmental disturbances, fitted with 2m PUR cable or M12 connector.

Output functions dc types (4-wire): NO/NC, wire selectable
 ac types (2-wire): NO/NC, switch selectable
 Sensing distance Flush=2 to 16mm, Non-flush=4 to 25mm
 Rated operating current (continuous) ≤500mA (ac types), ≤200mA (dc types)
 Operating frequency 25Hz (ac types), 100Hz (dc types)

Operating voltage	Output type	Mounting style	Mfrs. List No.	Order Code	Mfrs. List No.	Order Code
10-40V dc	NPN	Non-flush	EC 30 25 NPAPL	711-3201	EC3025 NPAPL-1	721-2999
10-40V dc	PNP	Non-flush	EC 30 25 PPAPL	711-3213	EC3025 PPAPL-1	721-3001
20-250V ac	Thyristor	Non-flush	EC 30 25 TBAPL	711-3249	EC3025 TBAPL-6	721-3025
10-40V dc	NPN	Flush	EC 30 16 NPAPL	711-3225	EC3016 NPAPL-1	721-2975
10-40V dc	PNP	Flush	EC 30 16 PPAPL	711-3237	EC3016 PPAPL-1	721-2987
20 to 250V ac	Thyristor	Flush	EC 30 16 TPAPL	711-3250	EC3016 TPAPL-6	721-3013

FOR SUITABLE M12 SENSOR CONNECTORS SEE **ORDER CODE 532-617** FOR DC TYPES AND SEE **ORDER CODES 722-1642 & 722-1654** FOR AC TYPES

222156

Voltage	Output	Order Code	Price Each			
			1+	5+	10+	25+
Prewired, Non-flush Mounting						
10 to 40V dc	NPN	711-3201	135.03	128.28	121.62	115.64
10 to 40V dc	PNP	711-3213	135.03	128.28	121.62	115.64
20 to 250V ac	Thyristor	711-3249	179.91	170.91	162.06	154.12
Prewired, Flush Mounting						
10 to 40V dc	NPN	711-3225	151.22	143.64	136.23	129.52
10 to 40V dc	PNP	711-3237	151.22	143.64	136.23	129.52
20 to 250V ac	Thyristor	711-3250	188.63	179.21	169.92	161.59

Sensors & Transducers

41

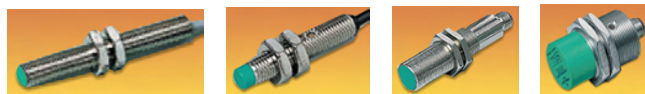
Compliant Non-compliant +
RoHS Limited stock - RoHS replacement available



Voltage	Output	Order Code	Price Each			
			1+	5+	10+	25+
Plug-in, Non-flush Mounting						
10 to 40V dc	NPN	721-2999	152.55	144.91	137.44	130.66
10 to 40V dc	PNP	721-3001	152.55	144.91	137.44	130.66
20 to 250V ac	Thyristor	721-3025	185.16	175.90	166.80	158.60
Plug-in, Flush Mounting						
10 to 40V dc	NPN	721-2975	167.99	159.58	151.33	143.89
10 to 40V dc	PNP	721-2987	169.67	161.18	152.84	145.33
20 to 250V dc	Thyristor	721-3013	191.96	182.35	172.94	164.43

Proximity Switches - Inductive - Pepperl + Fuchs

Prewired and Plug-in, ac and dc 2 and 3 wire



- 3 wire normally open NPN and PNP output options.
- 2 wire normally open AC output options
- Protection Degree IP67
- Yellow LED indicator
- Short circuit/overload protected
- Cable connector versions
- Sensing range 1.5 to 15mm

Temperature range -25° to 70°C

Type	Operating Voltage	Current (mA)	Response Frequency (Hz)
NBB 1.5	10 to 30Vdc	100	1500
NBB2	10 to 30Vdc	200	1500
NBB5	10 to 30Vdc	200	800
NBB10	10 to 30Vdc	200	200
NBN2	10 to 30Vdc	100	1500
NBN4	10 to 30Vdc	200	1200
NBN8	10 to 30Vdc	200	500
NJ...WS	20 to 253Vac	5 to 200	20
NBB,NBN...WS	20 to 253Vac	5 to 200	20

Nomenclature		Nomenclature	
NJ	Inductive, Initiator	E0	NPN normally open
NBB	Inductive, base line,embeddable	E2	PNP normally open
NBN	Inductive, base line,non-embeddable	WS	Normally open ac
1.5	Sensing range mm	V1	M12 connector (cable version 2m PVC no reference)
8	Housing size (8mm diameter)	V3	M8 connector 3 pin
GM	Metal thread		
50	Housing length mm		

Prewired 3 wire dc, 2 wire ac-embeddable and non embeddable							
Sensing Distance mm	Mftrs. List No.	Order Code	1+	10+	25+	50+	+
Embeddable							
1.5	NBB1,5-8GM50-E0	356-5154	100.77	--	--	--	--
1.5	NBB1,5-8GM50-E2	356-5166	87.97	82.02	80.31	75.98	--
2	NBB2-12GM50-E0	356-5178	73.17	68.25	66.81	59.90	--
2	NBB2-12GM50-E2	356-5180	72.45	67.57	66.15	65.09	--
5	NBB5-18GM50-E0	356-5191	79.60	74.21	72.67	71.32	--
5	NBB5-18GM50-E2	356-5208	87.49	--	--	--	--
10	NBB10-30GM50-E0	356-5210	90.50	84.39	82.59	79.98	--
10	NBB10-30GM50-E2	356-5221	88.31	82.37	81.80	--	--
Non-Embeddable							
2	NBN2-8GM50-E0	356-5233	120.16	113.05	110.66	101.15	--
2	NBN2-8GM50-E2	356-5245	121.36	114.18	111.77	102.16	--
4	NBN4-12GM50-E0	356-5257	72.84	--	--	--	--
4	NBN4-12GM50-E2	356-5269	72.45	67.57	66.15	60.83	--
8	NBN8-18GM50-E0	356-5270	87.47	--	--	--	--
8	NBN8-18GM50-E2	356-5282	73.84	69.93	--	--	--
15	NBN15-30GM50-E0	356-5294	99.95	95.98	--	--	--
15	NBN15-30GM50-E2	356-5300	106.86	--	--	--	--
Embeddable, NO AC							
8	NJ2-12GM50-WS	356-5350	162.26	152.65	149.44	136.55	--
5	NBB5-18GM60-WS	356-5361	178.49	167.89	165.12	--	--
5	NBB10-30GM60-WS	356-5373	194.71	183.16	179.31	163.88	--
Non-Embeddable, NO AC							
10	NJ4-12GM50-WS	356-5385	195.35	183.77	179.90	164.43	--
8	NBN8-18GM60-WS	356-5397	215.15	202.40	198.14	181.09	--
15	NBN15-30GM-WS	356-5403	195.35	183.77	179.90	164.43	--

M8 and M12,3 Wire dc, embeddable and non-embeddable							
Sensing Distance (mm)	Mftrs. List No.	Order Code	1+	10+	25+	Price Each	
Non-Embeddable + M12 Connector							
2	NBN2-8GM50-E0-V1	356-5531	123.70	116.39	113.94		
2	NBN2-8GM50-E2-V1	356-5543	120.16	113.05	110.66		
4	NBN4-12GM50-E0-V1	356-5555	72.45	67.57	66.15		
4	NBN4-12GM50-E2-V1	356-5567	78.33	73.04	71.49		
8	NBN8-18GM50-E0-V1	356-5579	78.68	73.40	72.12		
8	NBN8-18GM50-E2-V1	356-5580	80.72	--	--		
15	NBN15-30GM50-E0-V1	356-5592	91.51	85.33	83.54		

Extended Range, Prewired and Plug-in 3 wire dc, Embeddable



- Yellow LED indicator
- Short circuit/overload protected
- Cable connector versions
- Sensing range 1.5 to 15mm
- 3 wire normally open NPN and PNP output options.
- Protection Degree IP67

Temperature range -25° to 70°C
Supply Voltage 10 to 30Vdc
Response Frequency ≥300Hz
Output rating 100mA

Sensing Distance (mm)	Output	Thread	Mftrs. List No.	Order Code	1+	5+	10+	25+
Embeddable-Prewired								
4	NPN	M12	NBB4-12GM50-E0	372-5844	104.19	98.98	96.88	94.35
4	PNP	M12	NBB4-12GM50-E2	372-5856	110.08	104.58	101.70	--
8	NPN	M18	NBB8-18GM50-E0	372-5868	118.99	111.90	106.01	97.74
8	PNP	M18	NBB8-18GM50-E2	372-5870	118.99	112.72	--	--
15	NPN	M30	NBB15-30GM50-E0	372-5881	119.97	--	--	--
15	PNP	M30	NBB15-30GM50-E2	372-5893	102.85	97.68	95.63	90.50
Embeddable-Plug in,M12								
4	NPN	M12	NBB4-12GM50-E0-V1	372-5900	110.31	--	--	--
4	PNP	M12	NBB4-12GM50-E2-V1	372-5911	110.09	103.54	98.09	87.19
8	NPN	M18	NBB8-18GM50-E0-V1	372-5923	111.18	--	--	--
8	PNP	M18	NBB8-18GM50-E2-V1	372-5935	125.64	--	--	--
15	NPN	M30	NBB15-30GM50-E0-V1	372-5947	115.29	109.53	107.19	101.43
15	PNP	M30	NBB15-30GM50-E2-V1	372-5959	115.29	109.53	107.19	101.43

2 Wire dc, Plug-in 2 Wire dc Embeddable and Non Embeddable



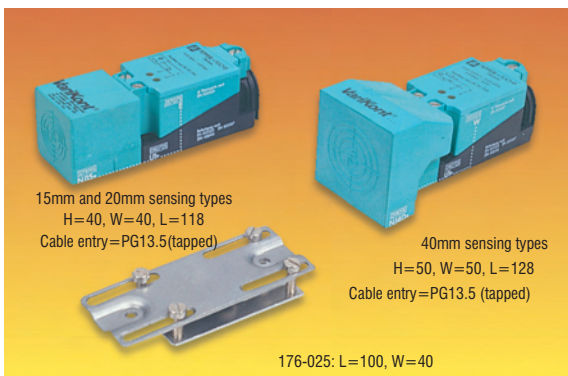
- Low Off-state current -2 wire Inductive sensors
- 2 wire dc NO output with yellow LED operation indicator
- Reverse polarity tolerant
- Fully shielded
- Brass, Nickel plated M12, M18, M30 body
- Protection Degree IP67

Temperature range -25° to 70°C
Supply Voltage 6 to 60Vdc
Response Frequency 700Hz (NBB10), 1000Hz (NBN8), 1500 Hz (NBB5), 2000Hz (NBB2, NBN4)
Output rating 4 to 100mA
Off state current 1mA

Sens- ing Dis- tance (mm)	Thread	Size	Mftrs. List No.	Order Code	1+	10+	25+	50+	+
2 Wired dc, Embeddable-Prewired, 2m									
2	M12		NBB2-12GM40-Z0	356-5312	99.95	94.01	92.04	85.33	--
5	M18		NBB5-18GM40-Z0	356-5324	124.29	116.92	114.47	105.09	--
10	M30		NBB10-30GM40-Z0	372-5728	137.02	131.04	126.63	114.98	--
2 Wired dc, None-Embeddable-Prewired, 2m									
4	M12		NBN4-12GM40-Z0	372-5741	95.44	89.08	84.31	74.99	--
8	M18		NBN8-18GM40-Z0	356-5348	124.29	116.92	114.47	104.64	--

Sens- Thread ing Dis- tance (mm)	Size	Mftrs. List No.	Order Code	1+	10+	25+	50+	+
2 Wire dc, Embeddable-Plug in, M12 4 Pin								
2	M12	NBB2-12GM40-ZO-V1	356-5610	97.35	91.60	89.66	82.35	--
5	M18	NBB5-18GM40-ZO-V1	356-5622	123.06	115.76	113.34	103.60	--
10	M30	NBB10-30GM40-ZO-V1	372-5730	145.84	137.34	132.93	121.28	--
2 Wire dc, Non-Embeddable-Plug in, M12 4 Pin								
4	M12	NBN4-12GM40-ZO-V1	356-5634	96.39	90.69	88.77	81.11	--
8	M30	NBN8-18GM40-ZO-V1	356-5671	123.06	115.76	113.34	103.60	--

5 Position Turret Head Range - 2 Wire ac, 3 Wire dc



- Sensing head may be set in one of 5 positions mutually at right angles
- Main body of unit plugs into base and may therefore be replaced easily
- Key-way pin prevents connection of a dc unit into an ac base
- LED indication of operation and supply (dc versions)
- Connection is to terminals within the base of the unit
- 15mm types are flush mountable
- Conforms to **DIN43694**, **EN50025** and **EN50037**
- All bases now supplied with metric sleeves

Output	ac: NO or NC, dc: NO
Output rating	ac: 500mA 45 to 65Hz (2-wire thyristor) dc: 200mA (3-wire NPN or PNP transistor)
Response frequency	ac: 25Hz, dc: 300Hz
Temperature range	-25°C to +70°C

Inductive proximity switches for detection of metallic objects without physical contact at a distance dependent on the ferrous content within the object. The indicated sensing distances are based upon ferrous material.

The switch mounting bracket is a two part kit to allow easy mounting and setting of the above switches. It gives 30mm lengthwise adjustment.

Mftrs. List Nos:	NJ15+U1+W=176-021	NJ20+U1+E=179-263	NJ40+U1+E=176-024
	NJ15+U1+E=176-022	NJ20+U1+E2=179-264	NJ40+U1+E2=179-265
	NJ15+U1+E2=179-262	NCN20+U1+U=372-5807	NCN40+U1+U=372-5819
	NCB15+U1+U=372-5790	NJ40+U1+W=176-023	MH4-2057=176-025
	NJ20-U1-W=254-435		

Sensing Distance	Voltage	Order Code	1+	5+	10+	25+
15mm	20 to 250V ac	176-021	181.99	--	--	--
15mm	10 to 30V dc/NPN	176-022	125.32	119.64	--	--
15mm	10 to 30V dc/PNP	179-262	125.32	116.53	111.00	--
15mm	20 to 253Vac/dc	372-5790	221.57	--	--	--
20mm	20 to 250V ac	254-435	198.03	--	--	--
20mm	10 to 30V dc/NPN	179-263	126.56	119.64	--	--
20mm	10 to 30V dc/PNP	179-264	125.31	115.38	109.18	103.45
20mm	20 to 253Vac/dc	372-5807	253.42	240.72	235.65	224.46
40mm	20 to 250V ac	176-023	260.91	242.68	229.61	221.43
40mm	10 to 30V dc/NPN	176-024	231.78	215.55	203.96	199.52
40mm	10 to 30V dc/PNP	179-265	234.10	217.71	206.00	198.67
40mm	20 to 253Vac/dc	372-5819	276.26	262.43	256.91	243.09
Switch mounting bracket		176-025	16.94	16.44	15.36	14.61

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The very latest NEW products

Proximity Switches - Inductive - Omron



Miniature, 3-Wire dc - TLW Series



- Side mounted LED indicates output on
- Reverse polarity protected
- Protection to **IP67**
- Prewired with 2m cable
- ABS body ideal for chemical plant and food processing applications

A miniature inductive proximity switch of flat construction and side sensing. Cable entry is perpendicular to the sensing direction.

179-257/8	177-885/6
H=27, W=10, D=5.5	H=30.5, W=18, D=10
fitted with mtg bracket	
Output	Normally Open
Sensing distance	3mm, 5mm
Output rating	3mm 100mA 5mm 50mA at 12V dc, 100mA at 24V dc
Operating voltage	10 to 30V dc, 10% ripple
Operating temperature	-25°C to +70°C
Mftrs. List No:	TL-W3MC1=179-257 TL-W3MB1=179-258
	TL-W5MC1=177-885 TLW5MB12MOMC=177-886

Sensing Distance	Output	Order Code	1+	5+	10+
3mm	NPN	179-257	101.56	92.96	84.70
3mm	PNP	179-258	101.56	92.96	84.70
5mm	NPN	177-885	92.30	84.51	76.95
5mm	PNP	177-886	92.30	84.51	76.95

Prewired Range - 3-Wire dc, 2-Wire ac and dc



E2E Series



M12 shielded M18 unshielded

- Choice of shielded or non-shielded construction
- Non-shielded types offer longer sensing distances
- All dc 3-wire types are protected against reverse polarity connection
- All dc 3-wire types offer overload/short-circuit protection
- 2-wire ac and dc types are particularly suitable for PLC connection
- All types feature LED operation indicator
- DC types are **UL** approved

DIN inductive proximity switches for detection of metallic objects without physical contact at a distance dependent upon ferrous content within object. The indicated sensing distances are based upon ferrous material.

DC 3-wire types include NPN and PNP outputs and shielded or non-shielded construction. Non-shielded types offer longer sensing distances than shielded, but are side sensitive and hence may mutually interfere.

2-wire ac and dc types are particularly suitable for PLC connection, since they will take their supply directly from the PLC and their very low leakage current will not cause the PLC input to turn on when the proximity switches are in the off state.

Supply voltage	3-wire dc to dc 2-wire dc to dc 2-wire ac 24 to 240 ac					
Output	Normally open, NPN or PNP					
Output rating	2-wire dc 100mA, 3-wire dc 200mA, 2-wire ac 200mA					
Sealing	IP67					
Response times dc	1mm 0.1ms, 2mm 1ms, 5/10mm 5ms, ac: 5/10mm 0.10ms					
Operating temperature	-40°C to +85°C (3-wire dc and ac), -25°C to +70°C (2-wire dc)					
Sensing Distance	Thread Size	Thread Length	Overall Length	Output	Mftrs. List No.	Order Code
3-wire dc, shielded						
1mm	M8	26	30	NPN	E2EX1R5E1	170-928
1mm	M8	26	30	PNP	E2EX1R5F1	177-856
2mm	M12	33	38	NPN	E2EX2E1	170-929
2mm	M12	33	38	PNP	E2EX2F1	175-730
5mm	M18	38	43	NPN	E2EX5E1	170-930
5mm	M18	38	43	PNP	E2EX5F1	175-731
10mm	M30	43	48	NPN	E2EX10E1	170-932
10mm	M30	43	48	PNP	E2EX10F1	177-857
3-wire dc, unshielded						
5mm	M12	26	38	NPN	E2EX5ME1	177-858
5mm	M12	26	38	PNP	E2EX5MF1	177-859
10mm	M18	28	43	NPN	E2EX10ME1	177-860
10mm	M18	28	43	PNP	E2EX10MF1	177-861
2-wire dc, shielded						
3mm	M12	33	38	—	E2E-X3D1	177-897
7mm	M18	38	43	—	E2E-X7D1	177-898
10mm	M30	43	48	—	E2E-X10D1	177-899
2-wire ac, shielded						
5mm	M18	38	43	—	E2EX5Y1	170-931
10mm	M30	43	48	—	E2EX10Y1	170-933

212453

Size	Sensing Distance	Output	Order Code	1+	5+	10+
3-wire dc, shielded						
M8	1mm	NPN	170-928	123.99	114.50	104.36
M8	1mm	PNP	177-856	123.99	114.50	104.36
M12	2mm	NPN	170-929	125.76	116.08	105.78
M12	2mm	PNP	175-730	125.76	116.08	105.78
M18	5mm	NPN	170-930	125.76	116.08	105.78
M18	5mm	PNP	175-731	125.76	116.08	105.78
M30	10mm	NPN	170-932	143.27	132.30	120.49
M30	10mm	PNP	177-857	130.56	124.05	117.83
M12	5mm	NPN	177-858	125.76	116.08	105.78
M12	5mm	PNP	177-859	125.76	116.08	105.78
M18	10mm	NPN	177-860	143.27	132.30	120.49
M18	10mm	PNP	177-861	143.27	132.30	120.49
M12	3mm	—	177-897	114.54	105.71	96.33
M18	7mm	—	177-898	134.15	122.82	112.80
M30	10mm	—	177-899	153.13	141.31	128.77
M18	5mm	—	170-931	147.50	—	—
M30	10mm	—	170-933	195.38	180.34	164.34

M12 Plug-In Range - 3 Wire dc
E2E Series



- Cylindrical 3-wire dc inductive proximity switches with IP67 sealed metal body
- Strong metal M12 4-pin plug connection (one pin not used)
- Plug connection reduces installation and maintenance time
- Short circuit and reverse polarity protection
- Red LED operation indicator

Output	Normally open, NPN or PNP	Sealing	IP67
Output rating	200mA	Response frequency	M12=1.5kHz, M18=0.6kHz, M30=0.4kHz
Leakage current	Less than 5µA	Temperature range	-20°C to +70°C
Supply voltage	12 to 24V dc		

Sensing Distance	Thread Size	Thread Length	Overall Length	Output	Mfrs. List No.	Order Code
2mm	M12	33	48	NPN	E2EGX2C1-M1	178-846
2mm	M12	33	48	PNP	E2EGX2B1-M1	178-847
5mm	M18	38	53	NPN	E2EGX5C1-M1	178-848
5mm	M18	38	53	PNP	E2EGX5B1-M1	178-849
10mm	M30	43	48	PNP	E2EGX10B1-M1	178-851

For suitable connector see order code 532010

222181

Size	Sensing Distance	Output	Order Code	1+	5+	10+
M12	2mm	NPN	178-846	93.93	85.96	78.31
M12	2mm	PNP	178-847	93.93	85.96	78.31
M18	5mm	NPN	178-848	93.93	85.96	78.31
M18	5mm	PNP	178-849	97.84	89.52	81.62
M30	10mm	PNP	178-851	108.92	100.55	91.60

Proximity Switches - Inductive

Extended Sensing, Prewired



Short Case, 3 Wire dc



- 3-wire dc inductive proximity switches with extended sensing range
- Multi-direction LED operation indication
- Fully shielded
- Over-load and short-circuit protection

530-293: Thread M8, L=33
530-300: Thread M12, L=33
530-311: Thread M18, L=33.5

Output	Normally Open, PNP	Response frequency	M8=350Hz
Output rating	200mA		M12=300Hz
Supply voltage	12 to 24V dc		M18=60Hz
Voltage limits (incl. ripple)	10 to 38V dc	Temperature range	-25°C to +50°C
Sealing	IP67		

212175

Size	Sensing Distance	Mfrs. List No.	Order Code	1+	5+	10+	25+
M8	2mm	XS1N08PA349	530-293	81.98	77.12	73.04	69.05
M12	3.2mm	XS1N12PA349	530-300	79.89	—	—	—
M18	8mm	XS1N18PA349	530-311	84.70	79.70	75.47	71.77

3 Wire Flush and Non-Flush Mountable



Size	Flush	Non-Flush
M8	1.5mm	2.5mm
M12	2mm	4mm
M18	5mm	8mm
M30	10mm	15mm



- Cylindrical housing sizes M8, M12, M18 and M30
- Sensing distances from 1.5mm to 15mm
- M12 'quick' change connector or 3M fixed PVC cable option
- Short circuit and polarity reversal protected
- LED output indicator
- Double insulated
- IP67 sealing specification

Sensing range with steel square target size of face dia x 1mm thick

231059

Size	Sense Dist.	Order Code NPN	Order Code PNP	1+	5+	10+
Pre-wired N/O						
M8	1.5mm	413-3742	413-3705	62.94	59.69	56.39
M12	2mm	346-1695	346-1701	61.08	52.64	49.71
M18	5mm	346-1713	346-1725	62.94	58.12	54.90
M30	10mm	413-3869	413-3845	71.41	67.19	66.18
Pre-wired N/O (non-flush)						
M8	2mm	413-3766	413-3729	62.94	59.69	56.39
M12	4mm	413-4278	413-3780	61.08	52.64	49.71
M18	8mm	413-3821	413-3961	62.94	58.12	54.90
M30	15mm	346-1816	346-1828	71.41	67.19	66.18
Connector N/O (M12 - 4 pole)						
M8	1.5mm	413-3730	413-3699	62.94	59.69	56.39
M30	10mm	413-3857	413-3833	71.41	67.19	66.18
Connector N/O (non-flush) (M12-4 Pole)						
M8	2mm	413-3754	413-3717	62.94	59.69	56.39
M12	4mm	413-3791	413-3778	61.08	52.64	49.71
M18	8mm	413-3810	413-3808	62.94	58.12	54.90
M30	15mm	—	346-1970	71.41	67.19	66.18

4mm, M5 - Prewired, 3 Wire dc



- Miniature cylindrical sensors
- Stainless steel body
- Short circuit and reverse polarity protection
- LED indication of operation status
- Suitable for flush mounting
- Choice of 4mm diameter unthreaded or M5 threaded

179-266/7 L=27, Dia=4	179-268/9 L=27, Thread=M5		
Output	Normally open, NPN or PNP	Frequency	2000Hz
Output rating	150mA	Sealing	IP67
Operating voltage	10 to 30V dc	Operating temperature	-25°C to +70°C
Sensing distance	0.8mm		
Mfrs. List Nos:	84717100=179-266 84717000=179-267	84717102=179-268 84717002=179-269	

212449

Size	Sensing Distance	Output	Order Code	1+	5+	10+
4mm dia.	0.8mm	NPN	179-266	146.91	139.90	132.10
4mm dia.	0.8mm	PNP	179-267	145.46	138.51	130.79
M5	0.8mm	NPN	179-268	145.46	138.32	130.79
M5	0.8mm	PNP	179-269	145.46	138.32	130.79

V3 Style Miniature - 3-Wire DC

proxistor.



- Precise mounting, easy to fit
- Similar housing to V3 microswitch
- LED operation indicator on side opposite to sensing face
- Designed to be flush mounted
- Ideal replacement to microswitches

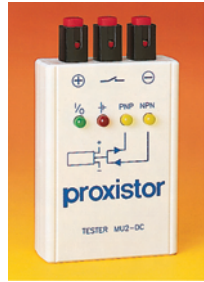
Body H=16, W=10.6, D=28
Fixing centres=10.3x22.2, Cable L=2mm

Supply voltage	5 to 30V dc	Switching frequency	1000Hz max.
Output	Normally Open, 250mA max. load	Temperature range	-30°C to +100°C
Sensing distance	2mm	Protection	IP67
Mfrs. List No:	IPO-002-VSF=721-3633	INO-002-VSF=721-3645	

212300

Sensing Distance	Type	Order Code	1+	5+	10+
2mm	PNP	721-3633	101.50	90.69	78.88
2mm	NPN	721-3645	101.50	90.69	78.88

Proximity Switch Testers



- Suitable for testing 2 and 3 wire proximity switches, including inductive, photo-electric, capacitive and ultra-sonic
- Models available for proximity switches operating from either DC or AC supply
- Ideally suited to 'point of use' testing
- Audio and visual indication
- Supplied and fitted with batteries, ready for use
- AC unit has short-circuit and over-voltage protection

Note: AC tester is suitable for 2-wire units and 3-wire units with negative earth

H=104, W=60, D=29

Indication of proximity switch function NPN or PNP (DC type), normally closed or normally open, light-on or dark-on operation
 Auto-on/off feature Unit is powered only when a proximity switch is connected
 Battery DC=2 9V (PP3), AC=1 9V (PP3)

212302

Type	Mfrs. List No.	Order Code	1+	5+	10+
DC	MU2-DC.	721-3803	105.00	--	--
AC	MU2-AC	723-0394	164.82	--	--

Proximity Switches - Ultrasonic

Compact, Switch Output

Adjustable Switch Point and Time Delay



- User adjustment of delay time
- User adjustment of range 100 to 500 mm
- Housing protected to IP67
- Small compact design
- Easy mounting options:- M4 thru-holes or M18 thread
- Switch status LED
- Detection of small poorly reflecting objects
- Detection unaffected by dust, waterdrops, strong sunlight etc.
- Distance measurement unaffected by target material
- Input protected against power reversal

Body H=46, W=18, D=30, Overall W=40, Cable L=1.5m
 Mounting: Thread=M18, 2x4.1 dia thru-holes, F.C=20

Versatile ultrasonic proximity switch in compact polyamide (glass fibre filled) case for object detection regardless of size, colour and target material.

Operating voltage V_s 12 to 24V
 Scanning range 100 to 500mm
 Switching point Adjustable 100 to 500 mm
 Time delay Adjustable 0.2 to 7 secs
 Resolution ± 1.6 mm typ.
 Detection sensitivity 100% @ $V_s=24V$, 80 to 90% @ $V_s=15V$
 Carrier frequency 175kHz
 Output PNP or NPN open collector 100mA, short-circuit proof
 Operating temperature -15°C to +60°C

212350

Output	Mfrs. List No.	Order Code	1+	5+	10+	25+
PNP	UPX500 PVPS 24	732-801	446.98	402.29	379.95	357.59
NPN	UPX500PVNS 24.	732-813	446.98	402.29	379.95	357.59

M30, Switch Output

With 2 Teachable Switch Points



- One programmable switch output
- Nickel-plated brass IP65 housing
- Tamper-proof programming

The sensor switch points can be set by applying the supply voltage to the teach inputs or programming unit.

UB500, UB2000:L=94, Head dia. =M30, UB4000:L=109, Head dia.=40, UB5000:L=115, Head dia.=74, All types:Thread size M30x1.5

Operating voltage 20 to 30V dc
 Switch outputs 200mA (PNP)
 LED indicators Green=Power on, Red=Fault, Yellow=Switch condition
 Temperature range -25°C to +70°C

Response time 480ms
 Hysteresis $\leq 1\%$ of operating distance
 Reproducibility $\leq 1\%$

222161

Sensing Range (mm)	Mfrs. List No.	Order Code	Price Each		
			1+	5+	10+
60 to 500	UB500-30GM-E5-V15	709-7931	503.31	478.14	456.57
200 to 2000	UB2000-30GM-E5-V15	709-7943	518.90	492.97	467.01
500 to 4000	UB4000-30GM-E2-V15	709-7955	590.81	561.28	531.72
800 to 6000	UB6000-30GM-E2-V15	709-7967	632.67	601.05	569.40
Programming Unit	UB PROG 2	709-7979	165.00	156.75	148.50

Photoswitches - Optical Proximity

Diffuse with Background Suppression, Polarised Reflex SICK
 Miniature Prewired - W4 Series



- Miniature glass-fibre reinforced housing with metal reinforced fixing holes
- Insensitive to external light sources
- LED signal strength indicator
- Diffuse type has adjustment scanning range 4 to 130mm with background suppression
- Polarised reflex type suitable for glossy object detection
- IP67 protection

H=32(body), W=16, D=12, Cable L=2m, Fixing centres=9 (M3)

Sensing distance Diffuse=4 to 130, Reflex=2.8m
 Supply voltage 10 - 30V dc
 Output PNP or NPN transistor, 100mA max.
 Switching mode Diffuse = light switching, Reflex = dark switching
 Switching frequency 1000 per sec.

222168

Output	Mfrs. List No.	Order Code	1+	5+	10+
Diffuse with Background Suppression					
PNP	WT4-2P132	722-9355	250.61	235.75	223.34
NPN	WT4-2N132	722-9367	250.61	235.75	223.34
Polarised Reflex					
PNP	WL4-2F132	722-9379	220.03	203.11	185.09
NPN	WL4-2E132	722-9380	205.63	193.44	183.27

Compact - W160 Series



H=33 W=11 D=23

Sensing Distance Reflex: 0.01 to 6m using PL80A reflector
 Reflex: 0.005 to 4m using P250 reflector
 Diffused: 0 to 900mm
 Supply voltage 10 to 30V dc
 Output PNP, 100mA
 Switching Mode Light / Dark selectable
 Switching Frequency 1000 Hz
 Operating Temperature -25°C to 55°C

249408

	Mfrs. List No.	Order Code	1+	5+	10+
Reflex					
PNP, Cable	WL160-F142	414-7716	226.39	220.72	215.08
PNP, M8 Connector	WL160-F440	414-7728	251.53	245.23	238.96
Diffused					
PNP, Cable	WT160-F182	414-7730	196.28	191.36	186.48
PNP, M8 Connector	WT160-F480	414-7741	243.18	237.13	231.05

Sensors & Transducers

41

Compliant Non-compliant Limited stock - RoHS replacement available
RoHS



Polarised Reflex - W260 Series



H=77.5, W=25, D=63,
Reflector (overall)=60.9 x 50.9

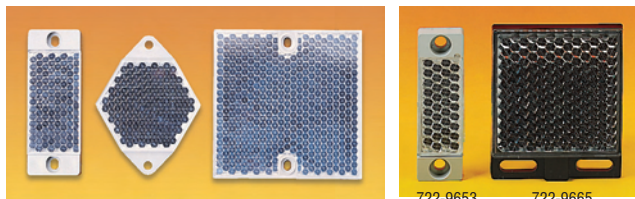
- SPNO relay output
- Light/dark operation (switch selectable)
- Protection to **IP66**
- Mounting bracket and cable gland supplied
- Adjustable sensitivity
- **UL** Recognised and **CSA** approved
- Reflector supplied with reflex types
- Reflex types use polarised red light thereby eliminating risk of malfunction due to shiny surfaces
- Terminal chamber connection with 2-position cable entry gland
- Polarised reflex type available with or without time delays

Sensing distance Diffuse=2m, Diffuse with background suppression=800mm, Polarised reflex = 5m
 Supply voltage 12-240V dc, 24-240V
 Output SPCO Relay 3A @ 240V ac/30V dc
 Power consumption 2VA
 Response time 20ms
 Time delays (timer version) OFF-delay/ON-delay (switch selectable), delay adjustable 0.1-5s

212260

	Mfrs. List No.	Order Code	1+	5+	10+
Diffuse	WT260-S280	723-4594	212.06	199.49	188.97
Diffuse with background suppression	WT260-S260	723-4600	308.77	290.46	275.15
Polarised reflex	WL260-S270	730-282	265.46	249.70	236.57
Polarised reflex with timer	WL260-R270	730-294	294.12	276.66	262.11

Reflectors



Overall dims:	730-427	730-439	730-440	722-9653	722-9665
730-427	H=82, W=30, D=7.2, Fixing centres=71 (Dia. 4.5)	H=78, W=60, D=8, Fixing centres=68 (Dia. 4.8)	H=84, W=84, D=8.5, Fixing centres=71 (Dia. 4.5)	H=60, W=18, D=7.3, Fixing centres=50 (Dia. 4.6)	H=60.9, W=50.9, D=8.5, Fixing centres=30 (Dia. 4.3)

High performance prismatic reflectors.

Mfrs. List No. PL30A = 730-427, PL20A = 722-9653, PL50A = 730-439, P250 = 722-9665, PL80A = 730-440,

212252

	Order Code	1+	5+	10+	25+	+
Rectangular, 82 x 30mm	730-427	25.50	24.27	23.34	--	--
Hexagonal, 78 x 60mm	730-439	26.86	25.53	24.18	23.34	--
Square, 84 x 84mm	730-440	39.27	37.44	35.94	--	--
Rectangular, 60 x 18mm	722-9653	15.94	15.15	14.34	14.28	--
Square, 61 x 51mm	722-9665	17.16	16.32	15.45	15.34	--

M18 Diffuse and Polarised Reflex - S5 Series



Prewired and M12 Plug-In



Thread=M18, Cable L=2m
731-470: L=55
731-481/731-493: L=65 (excl. cable sleeve)
 Reflector supplied with reflex type

- Available AC and DC versions
- Red LED output indication
- M12 connector option (DC types only)
- DC versions have wire selectable NPN/PNP, light-on/dark-on output
- Long range version has sensitivity trimmer and green stability LED
- AC version is multi-voltage 15-264V ac with light-on output
- Plastic housing giving **IP67** protection

Photoswitches suitable for most direct sensing requirements in an industry standard M18 housing.

Sensing distance Diffuse=80mm, Diffuse adjustment=0-350mm, Polarised reflex=3000mm
 Operating temperature -15°C to +55°C

	DC versions	AC version
Power supply	10 to 30V dc	15 to 264V ac, 48 to 62Hz
Output	NPN/PNP selectable	Thyristor + bridge rectifier
Output current	150mA	100mA
Response time	1ms max.	20ms max.

Mfrs. List No. S5-5C10-30 = 731-470, S5-1C8-20 = 731-481, S5-5C35-30 = 731-493, S5-5B3-30 = 721-2586, S5-5C10-32 = 721-2598, S5-5C35-32 = 721-2604, S5-5B3-32+REFLECTOR = 721-2616

222150

Prewired Type	Output	Order Code	Price Each			
			1+	5+	10+	25+
Diffuse	NPN/PNP	731-470	129.00	120.07	112.40	106.77
Diffuse	Thyristor	731-481	143.93	133.98	125.41	119.15
Diffuse, adjustable	NPN/PNP	731-493	179.94	167.48	156.81	148.95
Polarised reflex	NPN/PNP	721-2586	154.47	143.77	134.61	126.98
Plug-In Type						
Diffuse	NPN/PNP	721-2598	148.47	138.21	129.36	122.01
Diffuse, adjustable	NPN/PNP	721-2604	199.41	185.61	173.77	163.88
Polarised reflex	NPN/PNP	721-2616	173.94	161.87	151.57	142.95

M18 Diffuse and Polarised Reflex - 90° Viewing S5 Series



Thread=M18x80 Cable L=2m
 Reflector supplied with reflex type

- Available AC or DC versions
- Red LED output indication
- Plastic housing giving **IP67** protection
- Viewing optics turned through 90°
- DC versions have wire selectable NPN/ PNP, light-on/dark-on output
- AC version is multi-voltage 15-264V ac with light-on output
- Long range DC version has sensitivity trimmer and green stability LED

Sensing distance Diffuse = 80, Diffuse adjustable=0-300, Polarised reflex=1500
 Operating temperature -15°C to +55°C

	DC versions	AC version
Power supply	10 to 30V dc	15 to 264V ac, 48 to 62Hz
Output	NPN/PNP selectable	Thyristor + bridge rectifier
Output current	150mA max.	100mA max.
Response time	1ms max.	20ms max.

Mfrs. List No. S5-5-C10-35 = 179-356, S5-5-C35-35 = 179-358, S5-1-C8-25 = 179-357, S5-5B3-35 = 731-500

212462

Type	Output	Order Code	1+	5+	10+	25+
Diffuse	NPN/PNP	179-356	166.48	154.93	145.05	137.79
Diffuse	Thyristor	179-357	181.40	168.87	158.05	150.17
Diffuse, adjustment	NPN/PNP	179-358	217.26	202.21	189.33	179.85
Polarised reflex	NPN/PNP	731-500	191.47	178.19	166.84	158.47

M18 Diffuse and Reflex - E3F2 Series



ac type: M18 x 80, dc types: M18 x 65
 Reflector supplied with reflex type

- Light-on/dark-on operation is wire selectable (dc types)
- Short-circuit and reverse connection protection (dc types)
- AC type is **UL** Recognised and **CSA** approved
- **IP66** sealing
- LED output indication
- Potentiometer sensitivity adjustment on long range

(300mm) diffuse sensors
 ● Reflector supplied with reflex types

Sensing Distance	Voltage	Output	Order Code	1+	5+	10+
Diffuse	100	ac type		5 - 200mA		
Diffuse adjustable	0 - 300 (400 typ.)	dc type		100mA max, NPN or PNP		
Reflex	2m (2.5m typ.)	Response time				
Temperature range	-25°C to +55°C	ac type		30ms max.		
		dc type		2.5ms max.		

A range of compact cylindrical photoswitches in M18 ABS resin housings.

Mfrs. List No. E3F2-DS10C4N = 478-556, E3F2-DS10B4N = 478-568, E3F2-DS10Z1 = 170-927, E3F2-DS30C4 = 280-768, E3F2-DS30B4 = 280-770, E3F2-R2C4 = 280-781, E3F2-R2B4 = 280-793

212460

Sensing Distance	Voltage	Output	Order Code	1+	5+	10+
Diffuse						
100mm	12 to 30V dc	NPN	478-556	182.08	171.30	162.29
100mm	12 to 30V dc	PNP	478-568	182.08	171.30	162.29
300mm	12 to 30V dc	NPN	280-768	195.87	184.27	174.54
300mm	12 to 30V dc	PNP	280-770	195.87	184.27	174.54
100mm	22 to 264V ac	Thyristor	170-927	196.93	185.25	175.49
Reflex						
2m	12 to 30V dc	NPN	280-781	217.20	204.31	193.54
2m	12 to 30V dc	PNP	280-793	217.20	204.31	193.54
Spare Reflector			177-866	26.46	24.69	22.47

Prices are in Singapore Dollars and exclusive of GST. Due to the volatile nature of certain products, prices are subject to change without notice.

Controllers – E3C Series



- Control amplifiers for E3C series photo-switches
- Up to three photo-switches can be connected to each amplifier to achieve 'AND' or 'OR' operation
- Sensitivity adjustment and LED indication for output and stability

Mfrs. List No. E3C-GF4 = 179-255
 E3C-GE4 = 179-254, PYF14A-E = 176-963,
 H=48, W=48, D=83 H=27.3, W=20.7, D=35.5

Order Code **170-921**
 Supply voltage 100 to 240V ac ± 10% 50/60Hz
 Power consumption 3W max.
 Control output NPN 80mA max. ON/OFF, one shot delay selectable 1 or 10 secs
 Relay SPDT, 1A @240V ac
 Response time NPN 1 or 2ms selectable
 Relay 2ms max.
 Operation mode Light-on/Dark-on selectable
 Mounting style 48 x 48 plug-in, supplied with socket
 Order codes **179-254, 179-255**
 Supply voltage 12 to 24 dc ± 10%
 Current consumption 50mA max.
 Control output 100mA max. (532-370 OFF delay selectable 40ms)
 Response time 1 or 2ms selectable (523-370 1ms)
 Operation mode Light-on/Dark-on selectable
 Mounting style 179-254/5 Plug-in, 523-370 surface in DIN rail

212203

Type	Output	Order Code	1+	5+	10+
DIN48 plug-in	Solid state	179-254	207.96	197.55	187.17
Plug-in	Solid state	179-255	207.96	197.55	195.02
			1+	25+	50+
DIN rail/surface socket for 179-254/5		176-963	10.25	9.73	9.30

Subminiature – Diffuse



EE-SPY, EE-SY Series



EE-SPY 301/401/302/402: H=20, W=26, D=7, F.C.=20
 EE-SY 671/672: H=25, W=25.4, D=7, F.C.=19
 EE-SPY 311/411: H=20, W=26, D=8, F.C.=20

- Built-in amplifier circuitry allows direct switching of PLC and relay outputs
- Applications include robot control, cam timer switching, general position and object detection
- Wide supply voltage range 5 to 24Vdc

Slot width	Output	Load	Supply Voltage	Connector Code	Mfrs. List No.	Order Code
Modulated light, PCB mountable - Horizontal type						
5mm	Light - off	80mA	5-24V dc	3 or 4	EE-SPY301	721-3918
5mm	Light - on	80mA	5-24V dc	3 or 4	EE-SPY401	721-3920
Modulated light, PCB mountable - Vertical type						
5mm	Light - off	80mA	5-24V dc	3 or 4	EE-SPY302	721-3931
5mm	Light - on	80mA	5-24V dc	3 or 4	EE-SPY402	721-3943
Adjustable sensitivity - Horizontal type						
1 to 5mm	Light - off/on	100mA	5-24V dc	1 or 2	EE-SY671	721-3955
Adjustable sensitivity - Vertical type						
1 to 5mm	Light - off/on	100mA	5-24V dc	1 or 2	EE-SY672	721-3967
Convergent beam						
2 to 6mm	Light - off	80mA	5-24V dc	1 or 2	EE-SPY311	721-3979
2 to 6mm	Light - on	80mA	5-24V dc	1 or 2	EE-SPY411	721-3980

Viewing types: Horizontal=top-viewing, Vertical=side-viewing

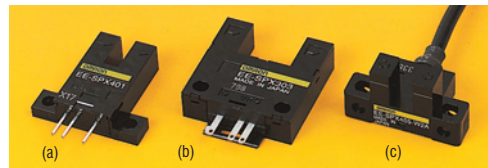
212304

Mfrs. List No.	Order Code	1+	5+	10+	25+	+
EE-SPY301	721-3918	74.69	71.54	69.61	60.51	--
EE-SPY401	721-3920	74.69	71.54	69.61	60.51	--
EE-SPY302	721-3931	74.69	71.54	69.61	60.51	--
EE-SPY402	721-3943	74.69	71.54	69.61	60.51	--
EE-SY671	721-3955	42.21	40.45	39.38	34.18	--
EE-SY672	721-3967	42.21	40.45	39.38	34.18	--
EE-SPY311	721-3979	74.69	71.54	69.61	60.51	--
EE-SPY411	721-3980	74.69	71.54	69.61	60.51	--

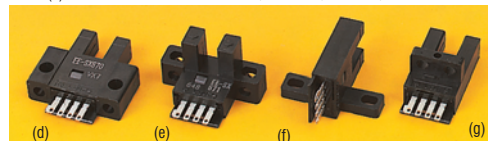
Subminiature - Through-beam (Slotted)



EE-SPX, EE-SX Series



(a) EE-SPX301/401: H=24, W=26, D=7, F.C.=20
 (b) EE-SPX303/403: H=26, W=26, D=7.4, F.C.=19.5
 (c) EE-SPX305/405-W2A: H=15.5, W=27.2, D=15.5, Cable L=1m



(d) EE-SX670: H=22.2, W=25.4, D=7, F.C.=19
 (e) EE-SX671: H=15.5, W=26.2, D=14.5, F.C.=19
 (f) EE-SX672: H=22.2, W=13.4, D=26, F.C.=19
 (g) EE-SX673: H=22.2, W=13.4, D=12.8, F.C.=7

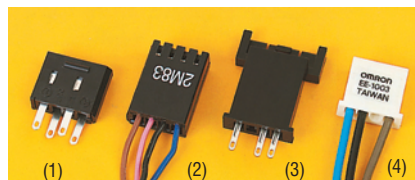
- Built-in amplifier circuitry allows direct switching of PLC and relay outputs
- Applications include robot control, cam timer switching, general position and object detection
- All slotted sensors have light-on indication
- Variety of slot widths, mounting and termination styles
- Mating connectors and connecting leads available

Slot Width	Output	Load	Supply Voltage	Connector Code	Mfrs. List No.	Order Code
Modulated light, PCB mountable						
3.6mm	Light - off	80mA	12 - 24V dc	3 or 4	EE-SPX301	721-3992
3.6mm	Light - on	80mA	12 - 24V dc	3 or 4	EE-SPX401	721-4005
Dust-proof slit, 100mA switching						
5mm	Light - on/off	100mA	12 - 24V dc	1 or 2	EE-SX670	721-4017
5mm	Light - on/off	100mA	12 - 24V dc	1 or 2	EE-SX671	721-4029
5mm	Light - on/off	100mA	12 - 24V dc	1 or 2	EE-SX672	721-4030
5mm	Light - on/off	100mA	12 - 24V dc	1 or 2	EE-SX673	721-4042
Wide slot						
13mm	Light - off	80mA	12 - 24V dc	1 or 2	EE-SPX303	721-4054
13mm	Light - on	80mA	12 - 24V dc	1 or 2	EE-SPX403	721-4066
Modulated light, prewired 1m leads						
5mm	Light - off	80mA	12 - 24V dc	N/A	EE-SPX305-W2A	721-4078
5mm	Light - on	80mA	12 - 24V dc	N/A	EE-SPX405-W2A	721-4080

212306

Mfrs. List No.	Order Code	1+	5+	10+	25+	+
EE-SPX301	721-3992	74.69	71.54	69.61	59.91	--
EE-SPX401	721-4005	74.69	71.54	69.61	59.91	--
EE-SX670	721-4017	37.61	36.04	35.09	30.18	--
EE-SX671	721-4029	37.61	36.04	35.09	30.18	--
EE-SX672	721-4030	37.61	36.04	35.09	30.18	--
EE-SX673	721-4042	37.61	36.04	35.09	30.18	--
EE-SPX303	721-4054	87.35	83.70	81.43	70.12	--
EE-SPX403	721-4066	87.35	83.70	81.43	70.12	--
EE-SPX305-W2A	721-4078	151.59	146.51	142.63	125.09	--
EE-SPX405-W2A	721-4080	151.59	146.51	142.63	125.09	--

Connectors for EE Subminiature Photo-switches



Connectors and connecting leads for Omron EE subminiature photo-switches.



212307

Connector Code	Lead Length	Mfrs. List No.	Order Code	1+	10+	25+
1	—	EE-1001	721-4091	7.21	6.87	6.52
2	2 mtr	EE-1006	721-4108	35.18	33.42	31.68
3	—	EE-1002	721-4110	7.01	6.77	6.36
4	1 mtr	EE-1003	721-4121	25.35	24.12	22.83
Connector with Robot Cord						
		EE 1043G	357-9840	16.49	--	--
Connector for EE-SX67--/EE-SY67--						
		EE 1030E	357-9852	19.52	--	--



'Mini' Side-view and Flat Packages - E3T



Limited Reflective, Diffuse, Reflex, Separate



- Very small size saves installation space
- 'Pin-point' beam (1-2mm) ideal for detecting minute sensing objects
- Minimal influence of background or ambient shiny metal objects
- Limited reflective model ensures precise detection of black sensing objects
- Reflector supplied with reflex types (23x13.7mm)

Power supply 12 to 24V dc ± 10% (ripple 10% max.)
 Control output NPN or PNP open collector, load current: 50mA max. at 24V dc
 Operation mode Limited reflective, diffuse = light-ON; Reflex, separate = dark-ON
 Response time 1ms max. for both operation and release
 Operating temperature -25°C to +55°C
 Enclosure rating IP67

Package	Side-view	Flat pack	Separate
H	20.6	20.8	14.6
W	7	12	7
D	11.2	3.7	9.5

Mfrs. List No.	E3T-SL11 = 721-3748	E3T-SL21 = 721-3750	E3T-FD11 = 721-3761
	E3T-SR22 = 721-3773	E3T-FT12 = 721-3785	E3T-ST12 = 721-3797
	E3T-SL13 = 722-6421	E3T-SL23 = 722-6433	E3T-FD13 = 722-6445
	E3T-SR24 = 722-6457	E3T-FT14 = 722-6469	E3T-ST14 = 722-6470
	E39-R4 = 722-6482		

222158

Sensing Distance	Style	Output	Order Code	Price Each		
				1+	5+	10+
Limited Reflective						
5 to 15mm	Side-view	NPN	721-3748	195.26	183.68	174.01
5 to 15mm	Side-view	PNP	722-6421	195.26	183.68	174.01
5 to 30mm	Side-view	NPN	721-3750	195.26	183.68	174.01
5 to 30mm	Side-view	PNP	722-6433	195.26	183.68	174.01
Diffuse						
5 to 30mm	FLAT	NPN	721-3761	205.18	193.03	182.83
5 to 30mm	FLAT	PNP	722-6445	205.18	193.03	182.83
Reflex						
10 to 200mm	Side-view	NPN	721-3773	228.34	214.83	203.49
10 to 200mm	Side-view	PNP	722-6457	228.34	214.83	203.49
Separate						
500mm	FLAT	NPN	721-3785	271.37	255.28	241.83
500mm	FLAT	PNP	722-6469	258.45	243.12	230.31
1m	Side-view	NPN	721-3797	271.37	255.28	241.83
1m	Side-view	PNP	722-6470	271.37	255.28	241.83
Spare reflector			722-6482	46.11	43.80	41.52

Diffuse, Polarised Reflex, Separate - E3S-A Series



Cable
 Reflex: H=22.3, W=12.4, D=42.3
 Diffuse, separate: H=22.3, W=12.4, D=40

Screw Connector, Diffuse: H=22.3, W=12.4, D=50

- LED indication for output and stability status
- Light-on/dark-on operation is switch selectable
- Small variation in sensitivity between sensors allows quick adjustment of multiple sensors
- Close alignment of optical axis to mounting position (2° max.) permits quick alignment
- Plastic housing protected to IP67
- Connection by 2m lead or M12 screw connector
- Reflector supplied with reflex types

Sensing distance	Diffuse	Polarised reflex	Separate	Current consumption		
				Diffuse	Polarised reflex	Separate
	0 to 200mm	0.1 to 2m	0 to 7m	30mA	30mA	40mA
Supply voltage	10 to 30V dc			Control output (max.) 100mA, 30V dc max.		
Temperature range	-25°C to +55°C			Response time 0.5ms		

Mfrs. List No.	E3S-AR11 = 532-459	E3S-AT11 = 532-472	E3S-AD11 = 532-435
	E3S-AD31 = 532-447 <td>E3S-AD36 = 532-502 <td>E3S-AT31 = 532-484 </td></td>	E3S-AD36 = 532-502 <td>E3S-AT31 = 532-484 </td>	E3S-AT31 = 532-484
	E3S-AR31 = 532-460		

222142

Type	Output	Order Code	Price Each		
2 Metre Lead					
			1+	5+	10+
Diffuse	NPN	532-435	235.74	221.76	210.07
Diffuse	PNP	532-447	235.74	221.76	210.07
Polarised reflex	NPN	532-459	251.71	236.75	224.28
Polarised reflex	PNP	532-460	251.71	236.75	224.28
Separate	NPN	532-472	307.78	289.52	274.27
Separate	PNP	532-484	307.78	289.52	274.27
M12 Screw Connector					
Diffuse	PNP	532-502	275.52	259.15	245.54

Diffuse, Reflex and Separate - E3S Series



103-362, 175-728: H = 21, W = 15, D = 50
103-360: H = 19, W = 15, D = 50
103-361/3/4: H = 23, W = 20, D = 67
 Reflector H = 60, W = 40, D = 7
 Cable L = 2m

- LED indication of output and stability status
- Operation mode selectable by changing power supply polarity
- UL listed
- Diecast housed types protected to IP67
- Plastic housed types protected to IP65
- Reflector supplied with reflex type

Sensing distance	Diffuse	Reflex	Separate	Current consumption	
				Reflex/Diffuse	Separate
	100mm (plastic housed)	2m	2m (plastic housed)	40mA	50mA
	300mm (diecast housed)	5m (diecast housed)	5m (diecast housed)	40mA	50mA
				Load current	PNP types 80mA
					PNP types 100mA
				Response time	1ms
				Separate	1ms
				Temperature range	-25°C to +55°C

Mfrs. List No.	E3S-R2E4 = 103-364	E3S-DS10E4 = 103-362	E3S-DS10B4 = 175-728
	E3S-DS30E4 = 103-363 <td>E3S-2E4 = 103-360 <td>E3S-5E4 = 103-361 </td></td>	E3S-2E4 = 103-360 <td>E3S-5E4 = 103-361 </td>	E3S-5E4 = 103-361
	E39-R1 = 177-866		

212466

Housing	Diffuse Type	Output	Order Code	Price Each			
				1+	5+	10+	
Plastic	NPN	103-362		305.88	287.72	286.02	
			PNP	175-728	305.88	287.72	286.02
				103-363	474.98	446.76	423.30
Diecast	NPN	103-364		446.39	419.86	397.81	
Separate Type	NPN	103-360		413.57	389.02	380.97	
			PNP	103-361	462.67	435.24	412.40
				177-866	26.46	24.69	22.47

Diffused, Retro-reflective, Through beam - E3Z



721388



7213876

- Small powerful sensors, ideal where space is limited
- Powerful optics ensuring reliable sensing where dirt build up is likely
- IP67 allowing the devices to be used in arduous environments
- Light on/ Dark on selectable for target presence or absence operation
- Retro-reflective devices utilise a polarised light source for reliable detection of reflective targets
- Diffuse, Retro-reflective and Through beam operation so that one housing type can be used for a number of common applications, common bracketry

Sensing distance	Supply voltage	Control output	Response time	Operating temperature	Enclosure rating
Retro-reflective	3m				
Thru-beam	15m				
12 to 24V dc ±10%					
0.1A max.					
max.					
-25°C to +55°C					
IP67					

311187

Type	Output	Mfrs. List No.	Order Code	Price Each		
Diffuse						
				1+	5+	10+
Diffuse	NPN	E3Z-D62	414-7601	190.39	180.87	162.79
Diffuse	PNP	E3Z-D82	414-7613	190.39	180.87	162.79
Retro-reflective	NPN	E3Z-R61	414-7625	171.71	163.11	146.79
Retro-reflective	PNP	E3Z-R81	414-7637	171.71	163.11	146.79
Thru-beam	NPN	E3Z-T61	414-7649	222.83	219.85	—
Thru-beam	PNP	E3Z-T81	414-7650	222.83	211.71	190.54
Standard bracket		E39-L104	721-3876	8.83	8.40	7.95
Flat mounting bracket		E39-L43	721-3888	14.48	13.77	13.02
Reflector 59.9 x 40.3mm		E39-R1	177-866	26.46	24.69	22.47
Reflector 59.9 x 80.8mm		E39-R2	310-9239	30.54	29.01	27.48

Diffuse - High Precision Background Suppression **OMRON**

E3S-CL



- High definition sensor, easily adjusted to detect objects at a specific distance, disregarding the background or colour
- Switch selectable operation for NPN or PNP output and dark or light response
- Robust IP67 protected construction resists water, oil and detergent

H=43.7, W=15.4, D=40, Cable L=2m

Setting distance	674-369: 40 to 200mm,	674-370: 50 to 500mm
Detection distance	674-369: 5 to 200mm,	674-370: 5 to 500mm
Repeat accuracy:		
Perpendicular to optical axis	0.5mm max.	
In direction of optical axis	674-369: 1mm max.,	674-370: 10mm max.
Supply voltage	10 to 30V dc	
Control output	100mA (max.) @ 30V dc, NPN/PNP selectable	
Response time	1ms max. for both operation and release	
Sensitivity adjustment	Six turn, adjuster with indicator	

Mfrs. List No. E3S-CL1=674-369, E3S-CL2=674-370

212224

Detection range	Order Code	1+	5+	10+
5mm to 200mm	674-369	529.35	497.95	471.71
5mm to 500mm	674-370	532.72	501.16	474.74

Diffuse with Background Suppression **OMRON**

E3G-L7/R Series - Long Range



- Polarised retro-reflective has a 10m range
- Diffuse scan background suppressed has a 2m range
- Supply voltage either 10-30V dc or 12-240V dc/24-240V ac
- Universal voltage are relay output, with a timer function option
- Transistor output versions are NPN/PNP selectable

- Plug-in connector rotates through 90° offering side or bottom connection
- Universal input versions connect via a terminal connection chamber
- Timer versions can be configured to give a definite output to prevent false trigger
- Removes the need for additional timers or PLC cards
- IP67 protection
- Brackets and reflectors must be ordered separately

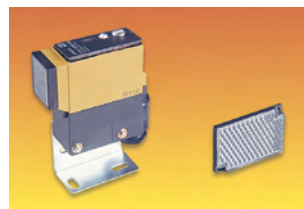
	Retro-Reflective		Background Suppressed	
	E3G-R	E3G-MR/T	E3G-L	E3G-ML/T
Supply voltage	to dc	12 to 240V dc or 24 to 240V ac 50/60Hz	10 to 30V dc	12 to 240V dc or 24 to 240V ac 50/60Hz
Sensing Range		10m	0.2-2m	0.2-2m
Power Consumption	max.	2W max.	50mW max.	2W max.
Control output	NPN/PNP selectable 100mA	SPDT relay 3A@250VAC/30VDC	NPN/PNP selectable 100mA	SPDT relay 3A@250VAC/30VDC
Light/Dark Switching	Yes	Yes	Yes	Yes
Time Delay	N/A	On and Off delay*	N/A	On and Off delay*
Sensitivity Adjustment	Yes, Potentiometer	Yes, Potentiometer	Yes, Potentiometer	Yes, Potentiometer
Response Time	max.	30ms max.	5ms max.	30ms max.
Connection	Pre-wired or M12 Connector	Terminal chamber	Pre-wired or M12 Connector	Terminal chamber
Light Source	Visible Red LED	Visible Red LED	Infra-Red LED	Infra-Red LED

*Timer functions only available on those products with a T post fix

212414

Description	Mfrs. List No.	Order Code	1+	5+	10+
Retro-Reflective					
Universal I/P, Relay O/P	E3G-MR19	310-8752	264.75	249.04	235.94
Universal I/P, Relay O/P, timer	E3G-MR19T	310-8764	264.75	249.04	235.94
Background Suppressed					
Pre-wired, transistor out	E3G-L73	310-8776	281.30	264.60	250.71
Brackets					
For E3G-MR/ML, cable downwards		310-8831	14.48	13.74	13.02
For E3G-MR/ML		310-8843	10.30	9.78	9.27
Reflector					
For E3G-R/MR		310-9239	30.54	29.01	27.48

Polarised Reflex - E3A2 Series **OMRON**



- Reliable detection of shiny objects
 - Available with adjustable ON or OFF delay timer function
 - LED indication of operation and stability status
 - UL Recognised
 - Choice of spare reflectors
- Photoswitch:
H=75, W=26, D=75 (reflector supplied)
Reflectors: 177-866:H=60, W=40, D=7.
177-867:H=65, W=45, D=10

Sensing distance	3m
Supply voltage	12 to 240V dc or 24 to 240V ac
Power consumption	1.5W
Output	SPCO Relay 3A@240Vac instantaneous or SPCO Relay 3A@240Vac 0.1 to 30s delayed
Response time	30ms max.
Temperature range	-10°C to +55°C

Mfrs. List No. E3A2-R3M4-GN1=176-347, E3A2-R3M4D-GN1=176-348

212476

Type	Order Code	1+	5+	10+
Polarised reflex	176-347	357.86	336.64	318.91
Polarised reflex with timer	176-348	402.50	378.63	358.69
Spare reflector	177-866	26.46	24.69	22.47
Alternative reflector	177-867	40.44	37.65	34.32

F20 Series Optical Sensors with Teach-In **SENSOPART**

SENSOPART
www.sensopart.de



- Simple teach-in setting
- Compact housing size
- NO or NC selectable by teach-in
- Manual and dynamic teach-in setting
- Remote teach-in setting
- Key lock function
- Contamination indication
- IP67
- Visible red light
- Short circuit and over voltage protection
- Suitable for connection to M8, 4-way Hirschmann connector, see sensor connectors



Sensing Distance		Termination	4 pin M8 plug plug
Diffuse	300mm	Signal Output	PNP or NPN
Background Suppression	100mm	Operating Voltage	10-30V dc
Retro Reflective	2.5M (500mm clear glass sensing)	Max. Output Current	100mA
Through Beam	4M	Housing Material	ABS
Light Source	660nm visible red, pulsed	Housing Dimensions	32 x 20 x 12mm
Switching Frequency	1kHz		

233449

PNP Output	Mfrs. List No.	Order Code	1+	5+	10+
Diffuse	FT20-R-PSM4	342-1351	171.17	162.60	154.04
Background Suppression	FT20-RH-PSM4	342-1417	216.34	205.54	194.70
Retro Reflective	FR20-R-PSM4	342-1314	182.61	173.50	164.37
Retro Reflective (Clearglass)	FR20-RG-PSM4	342-1338	182.61	173.50	164.37
Through Beam RX	FE20-R-PSM4	342-1430	121.53	115.45	109.37
Through Beam TX	FS20-R-M4	342-1752	104.04	98.82	93.62
NPN Output					
Through Beam RX	FE20-R-NSM4	342-1442	127.26	120.90	114.53
Through Beam TX	FS20-R-M4	342-1752	104.04	98.82	93.62
Bracket	F20 SERIES	342-2069	6.24	5.91	5.46

F50 Series Optical Sensors **SENSOPART**

SENSOPART
www.sensopart.de



Quality range of optical sensors for detection of most targets.



- 50mm x 50mm standard housing
- Precise background suppression sensor
- Precise auto-collimated retro reflective sensor
- High power IR through beam sensor
- Rotating M12, 4 pin plug connector
- NO and NC output
- Contamination indication
- IP67
- Visible red light
- IR 660nm through beam transmitter

- Short circuit and over voltage protection
- Suitable for connection to M12, 4-way Hirschmann connector, see sensor connectors

Sensing Distance	300mm	Signal Output	PNP or NPN
Background Suppression	5.5M	Operating Voltage	10-30V dc
Retro Reflective	15M	Max. Output Current	200mA
Through Beam	15M	Housing Material	ABS
Light Source	660nm visible red, pulsed	Ambient Temp. Range	-20°C to + 60°C
Switching Frequency	1kHz	Housing Dimensions	50 x 50 x 17mm
Termination	4 pin M12 plug plug		

Sensors & Transducers

41

Compliant
Non-compliant
RoHS
Limited stock - RoHS replacement available

233471

PNP Output	Mfrs. List No.	Order Code	Price Each		
			1+	5+	10+
Background Suppression	FT50-RH-PAL4	342-1880	260.25	247.24	234.23
Retro Reflective	FR50-R-PAL4	342-1867	208.06	197.66	187.27
Through Beam TX	FS50-I-L4	342-1922	127.58	121.18	114.82
NPN Output					
Bracket	F50 SERIES	342-2057	14.04	11.70	11.63

F50 Series Laser Optical Sensors, High Speed, High Accuracy



Precise detection of small objects by retro and background suppression principle.

- 50mm x 50mm standard housing
- High accuracy Auto-collimated retro reflective class 2 laser sensor
- High accuracy background suppression class 2 laser sensor
- Rotating M12, 4 pin plug connector
- NO and NC output
- Contamination indication
- IP67
- Visible red Class 2 laser
- Short circuit and over voltage protection
- Suitable connection 4-way Hirschmann connector, see sensor connectors

Sensing Distance	150mm	Signal Output	PNP or NPN
Background Suppression	12M	Operating Voltage	10-30V dc
Retro Reflective	Visible red Class 2 laser	Max. Output Current	200mA
Light Source	2.5kHz	Housing Material	ABS
Switching Frequency	4pin M12 plug plug	Ambient Temp. Range	-20°C to + 45°C
Termination		Housing Dimensions	50 x 50 x 17mm

233465

PNP Output	Mfrs. List No.	Order Code	Price Each		
			1+	5+	10+
Background Suppression	FT50-RLH-PAL4	342-1958	655.20	622.44	589.68
Retro Reflective	FR50-RL-PAL4	342-1934	601.02	570.97	540.92
NPN Output					
Bracket	F50 SERIES	342-2057	14.04	11.70	11.63

Fibre Optic Photoswitches

Fibre Optic Amplifier



212-260 Thread=M6x1

212-271 Threads=M4x0.7



Fibre Optic Leads

Fibre optic leads to plug into fibre optic amplifier above. The diffused type is for direct detection of an object, and the separate (through-beam) type is for light barrier operation. The leads can be cut to the required length with the tool supplied.

L = 80, Thread = M18, Cable L = 2m

Fibre Optic Amplifier Unit

- Sensor for small object detection or when access is difficult using conventional sensor
- Adjustable sensitivity
- Proximity detection (OF18) fibre 22mm
- Through beam detection (OF19) 85cm
- Accepts any 2.2mm diameter fibre optic cable
- LED indication of output status & stability
- Transistor output PNP or NPN (selectable on the cable)
- Dark/Light (selectable on cable)
- Rugged ABS housing with min. IP67 protection

Supply voltage	10 to 30V dc, reverse polarity protected	Temperature range	-15°C to +55°C
Output current	150mA max. with short circuit protection	Light source	Visible red LED
Setting	Trimmer	Connection	2m cable
Response time	1ms max.		

Sensing distance 13mm (diffused), 50mm (separate) Fibre length 1m

Mfrs. List No. S5-5-E1-30=179-361, S5-1-E1-20=179-362, OF18=212-260, OF19=212-271

212479

Supply	Output	Order Code	Price Each		
			1+	5+	10+
Amplifier Units					
10 to 30V dc	NPN or PNP	179-361	179.28	168.53	157.77
Fibre Optic Leads					
Diffused		212-260	71.61	68.36	65.84
Separate		212-271	76.86	72.24	67.65

High Speed - E3X-A, E3X-F, E3X-NVG Series



H=30, W=12, L=59, Cable L=2m

- High resolution and easy setting by means of 8-turn sensitivity adjuster and indicator
- Flashing light shows if light axis is misaligned at the sensor head
- LED indicators show operation and stability status
- Quick lead termination using lock button
- ABS housing with polycarbonate cover, sealing to IP66
- E3X-A types ensure high speed response of 200µs, ideal for a wide variety of applications
- E3X-F types have pulse lighting mechanism enabling very high speed response of 20µs
- E3X-F types ideal for high speed positioning and detection of minute objects
- Adjustable off-delay timer, alarm and external check functions on E3X-F types
- E3X-NVG colour mark sensor ideal for food and packaging industries
- Teaching function on E3X-NVG colour mark sensor is possible with or without object

Supply voltage	E3X-A = 10 to 30V dc; E3X-F, E3X-NVG = 12 to 24V dc +10% ripple
Current consumption	E3X-A = 35mA max.; E3X-F = 40mA max.; E3X-NVG = 50mA max.
Operation mode	Light on/Dark on, switch selectable
Output load	100mA (max.), NPN or PNP
Response time	E3X-A = 200µs max.; E3X-f = 20µs max. (ON)/30µs max. (OFF), E3X-NVG = 500µs max.
Timer function	E3X-F = OFF-delay (0.01s to 0.1s adjustable), switch selectable, E3X-NVG = OFF-delay (fixed 40ms), can be disabled
Light source	E3X-A, E3X-F = red (660nm); E3X-NVG = green (565nm)
Temperature range	-25°C to +55°C
Sensing distance (mm)	E3X-A, Diffuse = 75, Separate = 200
(using Omron fibre leads	E3X-F, Diffuse = 33, Separate = 80
E32-DC200, E32-TC200)	E3X-NVG, Diffuse = 10, Separate = 28

212185

Output	Mfrs. List No.	Order Code	Price Each		
			1+	5+	10+
Standard					
NPN	E3X-A11	532-307	245.38	233.13	220.85
NPN	E3X-A21	321-7310	300.89	285.83	270.81
PNP	E3X-A41	532-319	274.30	--	--
High Speed (20µs)					
NPN	E3X-F21	722-9240	357.97	340.04	322.18
PNP	E3X-F51	722-9252	364.86	346.66	328.39
Colour Mark					
NPN	E3X-NVG21	722-9264	416.02	395.20	374.41
NPN	E3X 1009F	357-9608	169.24	--	--
High speed	E3X 1018E	357-9610	163.31	--	--

Fine Tuning - E3X-NH Series



H=32.5, W=10, D=59
Cable L=2m

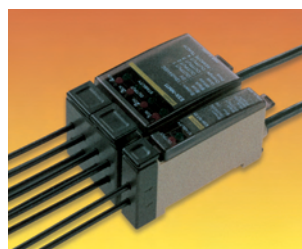
- High precision sensing with manual and auto tuning (teach function)
- Suitable for high precision positioning using fine sensitivity adjustment function
- Manual tuning allows threshold adjustments while sensed objects are moving
- Automatic sensitivity compensation function
- Offers longest sensing distance
- 16 bit resolution
- Mutual interference prevention
- 8-level incident and 13-level threshold indication

Supply voltage	12 to 24V dc ±10%
Light source	Red LED (680nm)
Current consumption	75mA
Output load	50mA max., NPN or PNP versions
Response time	1ms max.
Sensitivity setting	Teaching method
Fine sensitivity adjustment	Automatic or manual fine threshold adjustment
Time function (timer models)	Off-delay timer set to 40ms
Sensing distance	150mm with E32-DC200, 400mm with E32-TC200

212385

Type	Output	Mfrs. List No.	Order Code	Price Each		
				1+	5+	10+
General purpose	NPN	E3X-NH11	722-9148	308.23	292.82	277.42
General purpose	PNP	E3X-NH41	722-9150	308.23	292.82	277.42
Timer function	NPN	E3X-NH21	722-9161	356.90	339.07	321.21
Timer function	PNP	E3X-NH51	722-9173	356.90	339.07	321.21

Touch-to-Teach - Single and Four Channel - E3X-NT/NM



- No-object teaching function
- Single channel and four channel types
- Four channel type saves space and number of cables used
- Four fibre sensors can be wired close together to a four channel amplifier without any mutual interference

Single channel: H=33, W=10, D=59
4 channel: H=33, W=32.2, D=59, Cable L=2m

Supply voltage 12 to 24V dc (ripple 10% max.)
 Control output NPN or PNP versions, 30V dc 100mA max.
 Response time 1ms
 Enclosure rating IP50
 Operating temperature -25°C to +55°C
 Timer functions (see note) Multi-function versions: off-delay timer (fixed 40ms)
 Remote teaching functions Pink & blue (OV) wires are short-circuited when remote input is on
 Pink & blue (OV) wires are not short-circuited when remote input is off
 Response time is 0.5ms max., when remote input is off
 Sensing distance (mm) E3X-NT: Diffuse = 110, Separate = 290
 (using Omron fibre leads E3X-NM: Diffuse = 100, Separate = 270
 E32-DC200, E32-TC200)

Note: It is possible to disable the off-delay timer function by using the switch setting

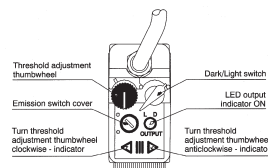
212298

Type	Output	Mftrs. List No.	Order Code	Price Each		
				1+	5+	10+
General purpose	NPN	E3X-NT11	721-3529	397.94	378.06	358.16
General purpose	PNP	E3X-NT41	721-3530	397.94	378.06	358.16
Multi-function	NPN	E3X-NT21	721-3542	327.92	---	---
Multi-function	PNP	E3X-NT51	721-3554	416.02	395.20	374.41
Four channel	NPN	E3X-NM11	721-3566	1,066.15	1,012.85	959.52
Four channel	PNP	E3X-NM41	721-3578	1,066.15	1,012.85	959.52

Contrast Scanners

Contrast Sensor

TL80 Analog



Control Panel

H=63, W=30, D=87
 Shielded cable L=3m

Connections:
 White=NPN/PNP output Brown=10 to 30V dc
 Grey=analogue output Blue=0V

- 10 to 30V dc supply
- Selectable NPN/PNP output
- Dark-on/light-on switching selection
- Simple contrast threshold adjustment
- Selectable red/green LED light source
- Output status indicator LED
- Industry standard IP67 metal housing
- 3 metre cable length

High performance contrast scanner for all print registration and positioning applications.

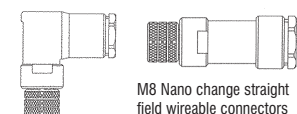
Sensing range 9mm ±2mm Response time 50µs
 Supply voltage 10V to 30V dc Switch frequency 10kHz
 Current consumption 80mA max. Temperature range -10°C to +55°C
 Output NPN/PNP selectable

212232

Mftrs. List No.	Order Code	Price Each		
		1+	5+	+
TL80-011	731-584	699.93	660.86	--

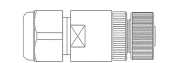
Sensor Connectors

Receptacles - M8 & M12 Threaded



M8 Nano change 90° field wireable connectors

	Order Code	Price Each		
		1+	5+	10+
M8 Nano change straight field wireable connectors				
Socket M8 - 3 pole	346-2183	26.96	25.68	24.52
Socket M8 - 4 pole	346-2195	28.47	27.09	25.84
Plug M8 - 3 pole	346-2201	28.89	27.51	26.26
Plug M8 - 4 pole	346-2213	32.10	30.56	29.18
M8 Nano change 90° field wireable connectors				
Socket M8 - 3 pole	346-2225	26.96	25.68	24.52

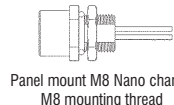


M12 Micro change straight field wireable connectors

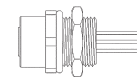


M12 Micro change 90° field wireable connectors

	Order Code	Price Each		
		1+	5+	10+
M12 Micro change straight field wireable connectors				
Socket M12 - PG7 - 4 pole	346-2262	15.41	13.64	13.00
Socket M12 - PG9 - 4 pole	346-2286	16.05	14.25	13.61
Socket M12 - PG7 - 5 pole	346-2274	18.75	16.63	15.89
Socket M12 - PG9 - 5 pole	346-2298	19.36	17.17	16.40
Plug M12 - PG7 - 4 pole	346-2304	15.41	14.25	13.61
Plug M12 - PG9 - 4 pole	346-2328	16.05	14.25	13.61
Plug M12 - PG7 - 5 pole	346-2316	17.56	14.38	13.71
Plug M12 - PG9 - 5 pole	346-2330	18.20	16.21	15.47
M12 change 90° field wireable connectors				
Plug M12 - PG7 - 4 pole	346-2365	15.41	13.64	13.00
Plug M12 - PG7 - 5 pole	346-2377	17.56	15.60	14.89



Panel mount M8 Nano change M8 mounting thread

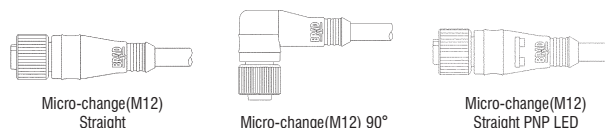
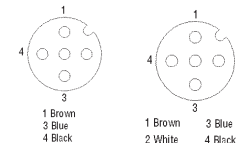
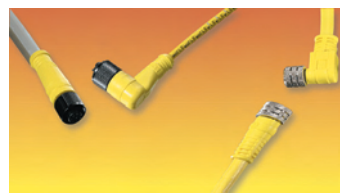


Panel mount M12 Micro change M14 mounting thread

231313

	Order Code	Price Each		
		1+	5+	10+
Panel Mount M8 Nano change M8 mounting thread				
Socket M8 - 300.0 - 3 pole	346-2389	28.89	27.51	26.26
Panel Mount M12 Micro change M14 mounting thread				
Socket M12 - 300.0 - 4 pole	346-2420	22.37	21.30	20.33
Female - 300.0 - 5 pole	346-2432	25.04	23.85	22.76
Plug M12 - 300.0-4pole	346-2444	24.03	22.89	21.86
Plug M12 - 300.0-5pole	346-2456	26.00	24.75	23.63

M12 with Flying Leads Micro-change Connectors



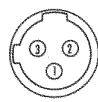
	Order Code	Price Each		
		1+	5+	10+
Micro-change (M12) straight				
2m-3pole -PVC	346-2468	15.30	14.58	13.92
5m-3pole -PVC	346-2493	18.81	17.94	17.13
2m-3pole -PUR	346-2470	17.55	16.68	15.93
2m-3pole -SJTO	540-572	23.46	22.29	21.12
2m-4pole -PVC	346-2523	15.75	15.03	14.34
5m-4pole -PVC	346-2559	19.80	16.05	15.33
2m-4pole -PUR	346-2535	18.09	17.25	16.47
5m-4pole -PUR	346-2560	25.29	20.58	19.65
2m-4pole -SJTO	540-596	26.23	--	--
5m-4pole -SJTO	176-777	42.04	--	--
Micro-change (M12) 90°				
2m-3pole -PVC	346-2584	15.45	14.73	14.06
5m-3pole -PVC	346-2614	19.00	18.12	17.30
2m-3pole -PUR	346-2596	17.73	16.85	16.09
5m-3pole -PUR	346-2626	23.58	22.47	21.45
2m-3pole -SJTO	540-584	23.46	22.29	21.12
2m-4pole -PVC	346-2640	15.75	15.03	14.34
5m-4pole -PVC	346-2675	19.80	16.05	15.33
2m-4pole -PUR	346-2651	18.09	17.25	16.47
5m-4pole -PUR	346-2687	25.29	20.58	19.65
2m-4pole -SJTO	540-602	25.63	24.36	23.06
5m-4pole -SJTO	176-778	39.81	38.92	--
Micro-change (M12) 90° PNP LED				
2m-3pole -PVC	346-2821	21.87	20.58	19.65
2m-3pole -PUR	346-2833	24.57	23.49	22.41
5m-3pole -PUR	346-2869	30.60	29.19	27.87
5m-3pole -SJTO	346-2870	36.36	34.17	32.61
2m-4pole -PVC	346-2882	29.25	27.90	26.61
5m-4pole -PVC	346-2912	32.76	31.20	29.79
2m-4pole -PUR	346-2894	31.56	30.12	28.74
5m-4pole -PUR	346-2924	37.59	35.88	34.26

Sensors & Transducers

41

Compliant
 Non-compliant
 Limited stock - RoHS replacement available

RoHS



1 Green/Yellow
2 Blue
3 Brown

231317

Order Code	1+	5+	10+
Micro-change (M12) S27 straight (AC) 2m - PUR 722-1642	22.86	21.72	20.58
Micro-change (M12) S27 90° (AC) 2m - PUR 722-1654	22.86	21.72	20.58

M8 Range - Cabled, Free and Panel Connectors **HIRSCHMANN**
PVC and PUR Cabled Plugs and Sockets



532-137 532-198 532-216
Cabled Sockets



723-3735 723-3759 723-3760 532-230 723-3772
Free Sockets and Plugs Panel Plug and Socket

Connections: 1=brown (+), 2=white (4-core), not used (3-core), 3=blue (-), 4=black
LED indicators: green=between 1 & 3, yellow=between 4 & 3

- For use with dc proximity switches, photoswitches etc.
- Straight or right-angled connectors
- Screw-lock fixing gives vibration proof interlock with compatible connectors
- Supplied with either PVC or PUR cable
- PUR cable is immune to corrosive fluids or oils, and is more flexible than PVC
- Right-angled connectors available with LED indicators for either NPN or PNP operation
- Panel plugs and sockets are supplied complete with fixing nut
- Panel plugs and sockets have M8x0.5 thread, sealing ring and 500mm leads
- Conform to **DIN/VDE 0660 part 208A2**
- Colour coding of conductors to **EN 50044**
- Protection is **IP67 to DIN 40050**

Rating	4A @60Vdc (types without LEDs) 4A @ 10-30V dc (types with LEDs)
Contact resistance	≤6mR
Temperature range	-40°C to 90°C
Casing and contact bearer	Polyamid 66 to UL94V-2
Contacts	CuZn, nickel plated
Cable cross section	0.75mm ²

Mfrs. List No.	ELKA-KV3308PVC025/2M.=532-125	ELKA 4008V=709-1450
	ELKA-KV4408PVC041/2M.=532-137	ELWIKA 3008V=723-3747
	ELWIKA-KV3308PVC025/2M.=532-149	ELWIKA 4008V=723-3759
	ELWIKA-KV4408PVC025/2M.=532-150	ELST 3008V=723-3760
	ELKA-KV3308PUR025/2M.=532-174	ELST 4008V=709-1461
	ELWIKA-KV3308PUR025/2M.=532-198	ELST 3308RVFM805.=532-228
	ELWIKA-KV3308PS/APUR025/2M.=532-216	ELST 4408RVFM805.=532-230
	ELKA-KV3308PUR025/5M.=723-3711	ELKE 3308VFM805.=723-3772
	ELKA-KV4408PUR025/5M.=723-3723	ELKE 4408VFM805.=723-3784
	ELKA 3008V=723-3735	

212201

Order Code	1+	10+	25+	50+	+
Sockets with 2 metres Cable					
PVC3- way straight 532-125	13.56	11.94	11.33	--	--
PVC4- way straight 532-137	15.06	14.32	--	--	--
PVC3- way r/angle 532-149	13.97	12.30	11.30	--	--
PVC4- way r/angle 532-150	17.07	15.03	14.06	--	--
PUR3- way straight 532-174	15.06	13.24	11.60	11.44	--
PUR3- way r/angle 532-198	15.33	13.48	11.82	11.63	--
PUR3- way r/angle + PNP LEDs 532-216	24.51	21.57	18.88	15.86	--
Sockets with 5 metres Cable					
PUR3- way straight 723-3711	22.63	16.12	15.07	--	--
PUR4- way straight 723-3723	23.36	18.78	--	--	--
Free Sockets, Self-Assembly					
3- way straight 723-3735	16.72	15.83	14.89	9.24	--
4- way straight 709-1450	20.26	17.80	15.62	11.18	--
3- way r/angle 723-3747	15.09	14.25	13.42	8.31	--
4- way r/angle 723-3759	16.30	15.38	14.48	8.99	--
Free plugs, Self-Assembly					
3- way straight 723-3760	19.65	18.57	17.47	10.86	--
4- way straight 709-1461	23.66	20.82	18.25	13.00	--

	Order Code	1+	10+	25+	50+	+
Panel Plugs						
3- way, with nut	532-228	17.54	15.43	13.48	9.28	--
4- way, with nut	532-230	18.74	16.50	14.42	9.95	--
Panel Sockets						
3- way, with nut	723-3772	20.26	19.13	18.00	11.18	--
4- way, with nut	723-3784	22.72	21.43	20.17	12.54	--

M12 Range - Cabled, Free & Panel Connectors **HIRSCHMANN**
PVC and PUR Cabled Plugs and Sockets



532-010 730-737 532-060 723-3929 723-3966
Cabled Sockets and Plugs



723-4028 532-095 532-101 723-4030 723-4065
Free Sockets and Plug



532-113 723-4107
Panel Plug and Socket

Connections: 1=brown (+), 2=white (4-core), not used (3-core), 3=blue (-), 4=black
LED indicators: green=between 1 & 3, yellow=between 4 & 3

- For use with dc proximity switches, photoswitches, pressure transducers, level sensors, limit switches etc.
- Sockets have screw-lock and are supplied with or without cable
- Cable available in black PVC or PUR
- PUR (polyurethane) cable is resistant to corrosive fluids or oils, and is more flexible than PVC
- Straight or right-angled connectors
- Screw-lock fixing gives vibration-proof interlock with compatible connectors
- Right-angled connectors available with LED indicators for either NPN or PNP operation
- Choice of PG7 or PG9 cable-glands on the self-assembly free plugs and sockets
- Free plugs and sockets available with either metal coupling nut or all plastic nut/thread
- Panel plugs and sockets are supplied complete with fixing nut
- Panel plugs and sockets have M12 thread, sealing ring and 200mm leads
- Conform to **DIN/VDE 0660 part 208A2**
- Protection is **IP67 to DIN 40050**
- Colour coding of conductors to **EN50044**

Rating	4A@150Vac/dc(types without LEDs) 4A @ 10-30V dc (types with LEDs)
Contact resistance	≤6mR with cable, ≤3mR without cable
Temperature range	-40°C to 90°C
Casing and contact bearer	Polyamid 66 to UL94V-2
Contacts	CuZn, nickel plated
Cable cross section	0.75mm ²

Mfrs. List No.	ELKA-KV4312 PVC 034/2M.=532-617	ELST-KV5512PUR034/2M.=723-3942
	ELKA-KV4412 PVC034/2M.=532-010	ELWIST-KV3312PUR034/2M.=723-3954
	ELKA-KV5512PVC034/2M.=No Order Code	ELWIST-KV4412PUR034/2M.=723-3966
	ELWIKA-KV4312 PVC034/2M.=532-629	ELWIST-KV5512PUR034/2M.=723-3978
	ELWIKA-KV4412 PVC034/2M.=532-022	ELKA 4012 PG7=532-095
	ELWIKA-KV5512PVC034/2M.=730-737	ELKA 4012K PG7=723-3980
	ELKA-KV4312 PUR034/2M.=532-630	ELKA 5012 PG7=120-7165
	ELKA-KV4412 PUR 034/2M.=532-046	ELWIKA 4012 PG7=532-101
	ELKA-KV 5512PUR034/2M.=723-3838	ELWIKA 4012K PG7=723-4004
	ELWIKA-KV 4312 PUR034/2M.=532-642	ELWIKA 4012PG9=709-1485
	ELWIKA-KV4412 PUR034/2M.=532-058	ELWIKA 5012 PG7=120-7166
	ELWIKA-KV4312 PS/A PUR034/2M.=532-060	ELST 4012 PG7=723-4028
	ELWIKA-KV4312NSCPUR034/2M.=723-3917	ELST 4012K PG7=723-4030
	ELKA-KV4312 PVC 034/5M.=532-678	ELST 4012PG9=709-1473
	ELWIKA-KV4312 PVC 034/5M.=532-680	ELST 5012 PG7=120-7168
	EF123 PUR3X034L0500 50=120-7184	ELWIST 4012 PG7=723-4053
	EF124 PUR4X034L0500 50=120-7185	ELWIST 4012K PG7=723-4065
	ELKA-KV5512PUR034/5M.=No Order Code	ELWIST 5012 PG7=120-7169
	ELWIKA-KV4312PUR034/5M.=723-3887	ELST 412 PG9.=532-113
	ELWIKA-KV4412PUR034/5M.=723-3899	ELST 512 PG9.=723-4089
	ELWIKA-KV5512PUR034/5M.=723-3905	ELKE 412 PG9P.=723-4090
	ELST-KV4412PUR034/2M.=723-3930	ELKE 512 PG9P.=723-4107

Prices are in Singapore Dollars and exclusive of GST. Due to the volatile nature of certain products, prices are subject to change without notice.

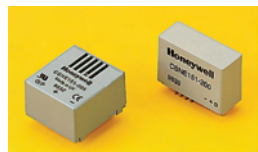
212199

	Order Code	1+	10+	25+	50+
Sockets with 2 metres Cable					
PVC3- way straight	532-617	18.06	15.88	13.91	12.28
PVC4- way straight	532-010	19.39	17.06	14.94	10.07
PVC5- way straight	730-725	23.73	20.88	18.27	17.86
PVC3- way r/angle	532-629	18.06	15.88	13.91	11.53
PVC4- way r/angle	532-022	19.20	16.89	14.79	12.68
PVC5- way r/angle	730-737	23.97	21.09	18.45	16.41
PUR3- way straight	532-630	18.96	16.86	13.80	11.53
PUR4- way straight	532-046	21.42	18.84	16.50	11.29
PUR5- way straight	831-2826	15.72	14.42	13.12	--
PUR34- way r/angle	532-642	18.96	16.86	13.80	11.53
PUR3- way r/angle + PNP LEDs	532-060	28.47	25.05	21.93	14.79
PUR4- way r/angle	532-058	21.42	18.84	16.50	14.10
PUR3- way r/angle + NPN LEDs	723-3917	28.47	25.29	20.70	17.62
Sockets with 5 metres Cable					
PVC3- way straight	532-678	22.20	19.53	17.10	13.76
PVC3- way r/angle	532-680	22.20	19.53	17.10	11.62
PUR3- way straight	120-7184	26.76	19.86	15.07	14.65
PUR4- way straight	120-7185	32.06	23.79	18.10	17.54
PUR5- way straight	723-3875	42.39	30.82	23.39	23.06
PUR3- way r/angle	723-3887	25.32	18.42	13.98	13.29
PUR4- way r/angle	723-3899	28.74	20.91	16.33	--
PUR5- way r/angle	723-3905	41.97	30.51	23.16	23.07
Plugs with 2 metres Cable					
PUR4- way straight	723-3930	20.88	18.54	15.49	--
PUR5- way straight	723-3942	27.78	24.69	20.22	18.00
PUR3- way r/angle	723-3954	19.20	17.07	13.95	12.15
PUR4- way r/angle	723-3966	21.42	19.02	15.57	14.66
PUR5- way r/angle	723-3978	32.80	--	--	--
Free Sockets, Self-Assembly					
4- way straight, PG7, metal	532-095	13.59	11.94	10.46	7.03
4- way straight, PG7, plastic	723-3980	12.78	12.06	11.35	7.07
5- way straight, PG7, metal	120-7165	15.72	15.14	14.26	11.69
4- way r/angle, PG7, metal	532-101	13.59	11.94	10.46	7.03
4- way r/angle, PG7, plastic	723-4004	12.65	11.94	11.24	7.00
4- way r/angle, PG9, metal	709-1485	13.73	12.06	10.56	7.55
5- way r/angle, PG7, metal	120-7166	14.91	14.35	13.51	11.07
Free Plugs, Self-Assembly					
4- way straight, PG7, metal	723-4028	13.73	12.94	12.16	7.55
4- way straight, PG7, plastic	723-4030	12.65	11.94	11.24	7.00
4- way straight, PG9, metal	709-1473	13.73	12.06	10.56	7.55
5- way straight, PG7, metal	120-7168	15.72	15.14	14.26	11.69
4- way r/angle, PG7, metal	723-4053	13.73	12.94	12.16	7.55
4- way r/angle, PG7, plastic	723-4065	12.78	12.06	11.35	7.07
5- way r/angle, PG7, metal	120-7169	14.91	14.35	13.51	11.07
Panel Plugs					
4- way, with nut	532-113	16.77	14.72	12.91	8.76
5- way, with nut	723-4089	21.40	20.19	19.04	11.81
Panel Sockets					
4- way, with nut	723-4090	24.08	21.36	17.50	12.51
5- way, with nut	723-4107	27.72	26.20	24.64	15.30

Current Transducers

Multirange - 25/12/8/6/5A

Honeywell



- Fast response current sensing using Hall effect technology
- Multiple ranges in compact PCB mounting packages
- AC, DC and impulse current measurement
- Improved measurement accuracy at lower currents
- 25A sensor in small-footprint housings
- UL Recognised and CSA approved

723-4727: H=16.8, W=26, D=28
723-4739: H=20.3, W=31.8, D=12.7

Multiple primary connection pins permit a range of currents to be measured, giving a nominal output current that can be used to derive a voltage output.

Mfrs. List No.	CSNE151-005	CSNE151-100
Supply voltage (±5%)	±15V dc	±15V dc
Turns ratio	1-2-3-4-5 : 1000	1-2-3-4 : 1000
Nom. primary current	25/12/8/6/5A	25/12/8/6A
Peak current measurement	36A	90A
Output current	25mA	25mA
Accuracy	±0.5%	±0.5%
Linearity	±0.2%	±0.2%
Response time	<1µs	<200ns

Mfrs. List No. CSNE151-005=723-4727, CSNE151-100=723-4739.

212387

Nominal/Peak Current	Order Code	1+	5+	10+	25+	+
CSNE151-005	723-4727	61.52	58.43	55.38	52.29	--
CSNE151-100	723-4739	61.52	58.43	55.38	52.29	--

0 to 50A, 0 to 100A

Honeywell



H=29.8, W=36.5, D=14.5, Through-hole=13.5x10 Bus-bar fixing centres=25

Supply voltage ±12 to ±5V (±5%) Accuracy ±0.5% of nom. current @ 25°C
Linearity ±0.1% Operating temperature -40°C to +85°C
Response time <500ns

- Closed loop current sensors using Hall effect technology
- AC, DC and impulse current measurement
- Fast response time
- Range of measurement ranges up to 150A peak in small PCB mounted housing
- 50A/90A transducer available with bus-bar for use where the primary current is required on the PCB
- UL Recognised and CSA approved

Nominal Primary Current	Peak Current Range	Turns Ratio	Current Output	Offset Current	Mfrs. List No.
50A	90A	1000	50mA	±0.20mA	CSNP661 (-002)
100A	150A	1000	100mA	±0.20mA	CSNF161

Mfrs. List Nos: CSNP661 = 723-4752 CSNF161 = 723-4788 CSNP661-002 = 723-4764

212386

Nominal/Peak Current DC	Order Code	1+	5+	10+	25+	+
50A/90A	723-4752	57.13	54.24	51.41	48.54	--
50A/90A with bus-bar	723-4764	62.86	59.72	56.57	53.42	--
100A/150A	723-4788	79.15	75.19	71.22	67.25	--

CSLA2CD Linear Current Sensor

Honeywell



NEW

- Linear output
- AC or DC current sensing
- Through-hole design
- Fast response time
- Output voltage isolation from input
- Minimum energy dissipation
- Maximum current limited only by conductor size
- Adjustable performance and built-in temperature compensation assures reliable operation
- Accurate, low cost sensing
- Operating temperature range -25 to 85°C
- PBT polyester housing

Sensor Type	Open Loop Linear
Package Style	PCB Bottom Mount
Supply Voltage	5.4 to 13.2V dc
Sensed Current Range	0 to 72A
Output Type	Voltage
Operating Temperature	-25 to 85°C
Sensitivity	32.7mV N ±3.0 @ 8V dc
Supply Current (Max. @ 25°C)	20mA
Offset Voltage	Vcc/2 ± 2%
Offset Shift	± 0.02
Response Time	3µs
Mounting	PCB on 3 Pins
Pinout Style	3 Pin

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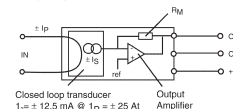
Mfrs. List No.	Order Code	1+	5+	10+	25+	+
CSLA2CD	108-2269	34.60	31.02	27.21	24.38	--

0-8A to 0-25A, LTS Series

LEM



Operation principle



- Development Kit contains three transducers with PCB mounts
- Unique ASIC design
- Improved linearity
- Excellent accuracy
- Extended measuring range
- Unipolar supply
- Voltage output

Output voltage ±IpN 2.5V ± 0.625V Thermal drift if gain TC_{EG} Typically <50ppm

Sensors & Transducers

41

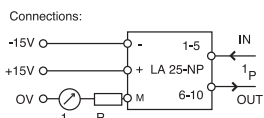
Compliant Non-compliant Limited stock - RoHS replacement available

RoHS

212409

Nominal Peak/Current Range	Power Supply	Mftrs. List No.	Order Code	1+	10+	100+
15/45A	+5V	LTS 15-NP	311-4557	26.21	25.55	22.27
25/80A	+5V	LTS 25-NP	311-4569	26.21	25.55	22.27
25/80A	+5V	LTS 25-NP KIT	310-3535	96.64	87.16	85.56

Multirange 25/12/8/6/5A



H=15.9 (above PCB), W=26, D=29.2

- Based on Hall effect technology
- Allows the electronic measurement of dc and ac pulsed and complex currents with galvanic isolation

By the use of a set of primary connection pins the range of nominal currents capable of being measured on this PCB mounting unit is 25/12/8/6/5A with an output of 25mA in each case to an accuracy of ±0.6%. The 25mA output can then be fed through a measuring resistor in series with the power supply zero to derive a voltage output.

Power Supply	±15V (±5%)	Polarity marking:
Turn ratio	1-2-3-4-5/1000	A positive output current is obtained on terminal M when the primary current flows from terminals 1, 2, 3, 4, 5 to terminals 10, 9, 8, 7, 6.
Linearity	<0.2%	
Bandwidth	DC to 150kHz (-1dB)	
Current consumption	10mA + output current	
Operating temperature	0°C to +70°C	
Isolation	2.5kV rms	

Mftrs. List No.	Order Code	1+	5+	10+	25+	+
LA25-NP	560-182	35.80	34.67	34.24	33.20	--

The **HSX 10-NP/SP3** has the option of selecting Serial or Parallel primary connections by utilising the four 1.3mm fastening & connection pins.
The **HSX 20** range have 8 x 1.3mm primary & connection pins that enable the selection of 1, 2 or 4 primary turns.

- Hall effect measuring principle
- Multi-range current transducer
- Galvanic isolation between primary and secondary
- Isolation test voltage 2.5kV
- Fixed offset and gain
- Only occupies 3.05 cm³ on PCB

Order Code	Primary Current	
	Serial	Parallel
913-5588	10A Nom. 30A Max.	20A Nom. 60A Max.
913-5596	1 20A Nom. 60A Max.	2 10A Nom. 30A Max.
913-5600	1 20A Nom. 60A Max.	2 10A Nom. 30A Max.
913-5618	1 20A Nom. 60A Max.	2 10A Nom. 30A Max.
913-5626	1 50A Nom. 150A Max.	2 25A Nom. 75A Max.
913-5634	1 50A Nom. 150A Max.	2 25A Nom. 75A Max.

Analogue output voltage @ I_p
 Analogue output voltage @ I_p = 0
 Internal Reference - Output voltage, V_{REF}
 Output impedance, R_{out}
 Supply voltage, V_c
 Current consumption, I_c
 Operating temperature range

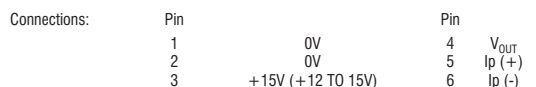
V_{REF} ± (0.625V x I_(Max) / I_(Min))
 V_{REF} ± 0.0125V
 2.5V ± 0.025
 <10 Ω
 +5V ± 5%
 22mA @ V_c = 5V
 -40 to 85°C

Mftrs. List No.	Order Code	1+	5+	+
HXS 10-NP/SP3	913-5588	17.97	16.69	--
HXS 20-NP	913-5596	17.97	16.69	--
HXS 20-NP/SP2	913-5600	18.90	17.58	--
HXS 20-NP/SP2	913-5618	17.01	15.81	--
HXS 50-NP	913-5626	17.97	16.69	--
HXS 50-NP/SP2	913-5634	18.90	17.58	--

0-3A to 0-20A, HX P/SP2Series



- Galvanic isolation between primary and secondary circuit
- Hall effect measuring principle
- Isolation voltage 3000V
- Low power consumption
- Extended measuring range (3 x I_{pn})
- Single Supply from +12V to +15V
- Material according to UL94-V0



Primary Current I _{pn}	Primary Current Measuring Range	Mftrs. List No.	Order Code
3A	± 9A	HX 03-P/SP2	394-3501
5A	± 15A	HX 05-P/SP2	394-3513
10A	± 30A	HX 10-P/SP2	394-3525
15A	± 45A	HX 15-P/SP2	394-3549
20A	± 60A	HX 20-P/SP2	394-3550

Output voltage ±0.625V @ ±I_{pn}, R_L = 2kΩ
 Output impedance >50 Ω
 Supply voltage +12 to +15 V
 Current consumption >20mA

Current Range	Order Code	1+	10+	25+	50+	+
3/9A	394-3501	22.13	21.42	21.19	20.51	--
5/15A	394-3513	22.13	21.42	21.19	20.51	--
10/30A	394-3525	22.13	21.42	21.19	20.51	--
15/45A	394-3549	22.13	21.42	21.19	20.51	--
20/60A	394-3550	22.13	21.42	21.19	20.51	--

5A to 50A, Low Currents

HXS Series



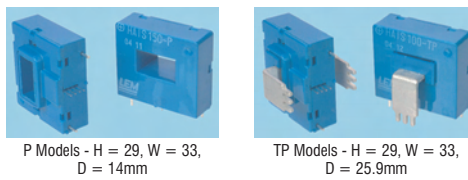
H = 10, W = 16.5, D = 18.5mm

These transducers have been specifically designed for the measurement of a wide range of current types including dc, ac, pulsed, and mixed. The devices have a galvanic isolation between the primary (high power) circuit and the secondary (electronic) circuit.

For the complete HXS range, the fastening & connection of the secondary is by means of four 0.5 x 0.25mm pins.

50A - 400A Rating, 150A - 600A Measuring Ranges

HAS Series



- Galvanic isolation between primary and secondary circuit
- Hall effect measuring principle
- Isolation voltage 2500V
- Low power consumption
- Fixed offset and gain
- Single +5V Power Supply

Primary Current I _{pn}	Primary Current Measuring Range	Mftrs. List No.	Order Code
50A	± 150A	HAS 50-P	913-5693
50A	± 150A	HAS 50-TP	913-5707
100A	± 300A	HAS 100-P	913-5642
100A	± 300A	HAS 100-TP	913-5650
150A	± 450A	HAS 150-P	913-5669
200A	± 600A	HAS 200-P	913-5677
400A	± 600A	HAS 400-P	913-5685

Analogue output voltage @ I_p
 Analogue output voltage @ I_p = 0
 Internal Reference - Output voltage, V_{REF}
 Output impedance, R_{out}
 Supply voltage, V_c
 Current consumption, I_c
 Operating temperature range

V_{REF} ± (0.625V x I_(Max) / I_(Min))
 V_{REF} ± 0.0125V
 2.5V ± 0.025
 <10 Ω
 +5V ± 5%
 22mA @ V_c = 5V
 -40 to 85°C

Mftrs. List No.	Order Code	1+	5+	+
HAS - TP Versions				
HAS 50-TP	913-5707	34.02	31.62	--
HAS 100-TP	913-5650	34.02	31.62	--
HAS - T Versions				
HAS 50-P	913-5693	32.76	30.46	--
HAS 100-P	913-5642	32.76	30.46	--
HAS 150-P	913-5669	32.76	30.46	--
HAS 200-P	913-5677	32.76	30.46	--
HAS 400-P	913-5685	32.76	30.46	--

200A - 800A Rating, 300A - 1200A Measuring Ranges
HTFS Series



H = 16.5, W (Dia.) = 40, D = 46mm

- Galvanic isolation between primary and secondary circuit
- Hall effect measuring principle
- Isolation voltage 2500V
- Low power consumption
- Ratiometric offset
- Single +5V power supply
- Fixing to PCB by either solder pins or 4 x M3 nuts and screws
- 22mm diameter aperture for primary conductor

Primary Current I_{pn}	Primary Current Measuring Range	Mftrs. Type
200A	± 300A	HTFS 200-P
400A	± 600A	HTFS 400-P
800A	± 1200A	HTFS 800-P

Analogue output voltage @ I_p $V_{REF} \pm (0.625V \times I_{(Max)} / I_{(Min)})$
 Analogue output voltage @ $I_p = 0$ $V_{REF} \pm 0.0125V$
 Internal Reference - Output voltage, V_{REF} $2.5V \pm 0.025$
 Output impedance, R_{out} $< 10 \Omega$
 Supply voltage, V_c $+5V \pm 5\%$
 Current consumption, I_c $22mA @ V_c = 5V$
 Operating temperature range -40 to $105^\circ C$

Mftrs. List No.	Order Code	1+	5+	10+	25+
HTFS - P Models with M3 Screw fixing to PCB					
HTFS 200-P	913-5715	33.09	30.74	--	--
HTFS 400-P	913-5731	33.09	30.74	--	--
HTFS 800-P	913-5758	34.98	32.50	--	--
HTFS - P/SP2 Models with Solder Pin fixing to PCB					
HTFS 200-P/SP2	913-5723	35.28	32.78	--	--
HTFS 400-P/SP2	913-5740	35.28	32.78	--	--
HTFS 800-P/SP2	913-5766	37.17	34.55	--	--

0-5A to 0-25A, HY...P Series



H=21, W=35, D=12

- In-line PCB pinouts
- Potted construction for maximum protection
- Minimum footprint design
- Wide choice of current ratings

Pin arrangement
 1 = +15V, 2 = -15V, 3 = V_{OUT}
 4 = 0V, 5 = I_{PIN} , 6 = I_{P-OUT}

Nominal primary current	0-5A, 0-10A, 0-15A, 0-20A, 0-25A	Power supply	±15V
Measuring range	3 nominal primary current	Output voltage	±4V
Accuracy	±1%		

Nominal Primary Current	Mftrs. List No.	Order Code	1+	10+	25+	50+	+
5A	HY5-P	708-3440	30.60	29.62	29.26	28.38	--
10A	HY10-P	708-3452	30.60	29.62	29.26	28.38	--
15A	HY15-P	708-3464	30.60	29.62	29.26	28.38	--
20A	HY20-P	708-3476	29.07	28.16	27.80	26.95	--
25A	HY25-P	708-3488	30.60	29.62	29.26	28.38	--

0-50A, 0-125A, Current Output

708-4122
 H=27.6, W=36.5, D=14.4
 Hole=7x12.7



708-4134
 H=33.6, W=48.4, D=21.4
 Hole=11x17/13

Nominal primary current	50A	125A
Measure range	70A	200A
Power supply	±15V	±15V
Current output	50mA	125mA
Accuracy	±0.65%	±0.6%

- Through-hole primary
- Wide frequency range
- Fast response time

Primary Current	Mftrs. List No.	Order Code	1+	+	+	+
50A	LA55-P	708-4122	33.30	--	--	--
125A	LA125-P	708-4134	60.50	--	--	--

0-100A, LA 100-P/SP13 Series



Primary nominal r.m.s. current	100 A	Supply voltage	±12 to ±15V
Primary current, measuring range	0 to ±160 A	Current consumption	10 mA @ ±15V + I_s
Secondary nominal r.m.s. current	100 mA	Operating temperature	-25°C to 70°C

Current Range	Order Code	1+	5+	10+	25+
0 to 100A	394-3562	41.34	40.00	39.55	38.34

0 to 200A



The current transducers use Hall effect technology. The output is linearly related to the primary current flowing through the centre core. The sensitivity of the transducers may be increased by increasing the number of times that the current carrying conductor

DC Instantaneous Type: An output of 0 to 10V dc corresponds to 0 to 200A primary current (unidirectional), passes through the centre core. Housed in light grey ABS case with screened cable connections

H=107, W=64, D=20, Hole dia=35,
 Fixing centres=91x48, 4.5 dia., Cable L=1.5m

AC Instantaneous Type: A bipolar output of from -10V to +10V corresponds to -200A to +200A ac or dc primary current.

True RMS Types: The output (with choice of 0 to 10V dc or 4 to 20mA dc) corresponds to the true rms value of the primary current independent of its waveform.

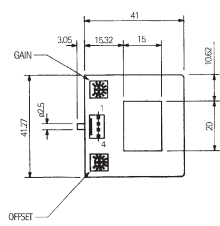
- Accurately measures instantaneous or true rms values of dc, ac or complex waveforms
- Provide electrical isolation from circuit being monitored

Supply voltage	±15V ±0.2V	Voltage withstand	5kV rms at 50Hz/1 min.
Calibration accuracy	±% of range	Operating temp range	0°C to 70°C
Momentary overload	25000 AT	Supply current	25mA (typ)
Small signal freq range	DC to 25kHz		

Mftrs. List No:	HA 200-SU = 107-805	HA 200-SB = 107-807
	HA 200-SRU = 107-809	HA 200-SRI = 107-811

Input	Output	Order Code	1+	5+	10+	25+
0 to 200A dc	0 to 10V dc	107-805	157.11	149.03	141.69	135.04
AC Instantaneous Type						
0 to 200A ac/dc	0 to ±10V	107-807	157.11	149.03	141.69	135.04
True RMS Type						
0 to 200A rms	0 to 10V dc	107-809	231.66	219.71	208.91	199.11
0 to 200A rms	4 to 20mA dc	107-811	231.66	219.71	208.91	199.11

0-50A to 0-400A, HAL Series



- Base-mounted package
- Wide selection of current ratings available
- Instantaneous analogue voltage output
- Compact design
- Low power consumption from auxiliary power supply
- Potted construction for maximum protection
- Output connector facility for ease of connection

Current Rating	Measuring Range	Power Supply	Output Voltage	Mftrs. List No.	Order Code
50A	0 to ±150A	±15V	±4V	HAL50-S/CE	708-4523
100A	0 to ±300A	±15V	±4V	HAL100-S/CE	708-4535
200A	0 to ±600A	±15V	±4V	HAL200-S/CE	708-4547
400A	0 to ±1000A	±15V	±4V	HAL400-S/CE	708-4559

Current Rating	Order Code	1+	10+	50+	+
50A	708-4523	65.52	62.15	59.06	57.43
100A	708-4535	65.52	62.15	59.06	57.47
200A	708-4547	65.52	62.15	59.06	57.47
400A	708-4559	71.48	--	--	--

Current Transducer
DC and AC Primary Input



H = 7, W = 90, D = 25mm

- Large aperture for cable up to 32mm Dia.
- High isolation between primary and secondary circuits
- Easy to mount
- Eliminates insertion loss



NEW

5
WARRANTY
YEARS

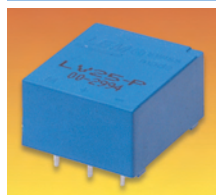
Load Resistance	≥ 10 KΩ	Measurement Bandwidth	DC and 20 to 6000Hz
Supply Voltage	to	Operating Temperature	-40 to 70°C
Current Consumption	30mA	Protection	IP 20
Accuracy	<±1%	Flammability Rating	UL94 V0

These transducers are designed for the measurement of DC and distorted AC waveform current. They have galvanic isolation between the primary (High power) and secondary (Electronic circuit) circuits. There is a choice of 3 output types, 0 - 5V, 0 - 10V and 4 to 20mA.

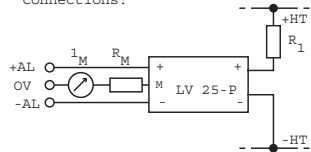
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Primary Current	Mfrs. List No.	Order Code	Price Each		
			1+	10+	25+
5 - 0V dc analogue output signal					
100 A dc/ ac (rms)	DHR 100 C5	100-2687	349.10	327.29	308.02
200 A dc/ ac (rms)	DHR 200 C5	100-2690	349.10	327.29	308.02
300 A dc/ ac (rms)	DHR 300 C5	100-2693	399.13	374.16	352.16
400 A dc/ ac (rms)	DHR 400 C5	100-2696	399.13	374.16	352.16
500 A dc/ ac (rms)	DHR 500 C5	100-2700	399.13	374.16	352.16
600 A dc/ ac (rms)	DHR 600 C5	100-2704	399.13	374.16	352.16
1000 A dc/ ac (rms)	DHR 1000 C5	100-2707	448.80	420.74	396.00
0 - 10V dc analogue output signal					
100 A dc/ ac (rms)	DHR 100 C10	100-2688	349.10	327.29	308.02
200 A dc/ ac (rms)	DHR 200 C10	100-2691	349.10	327.29	308.02
300 A dc/ ac (rms)	DHR 300 C10	100-2694	399.13	374.16	352.16
400 A dc/ ac (rms)	DHR 400 C10	100-2698	399.13	374.16	352.16
500 A dc/ ac (rms)	DHR 500 C10	100-2701	399.13	374.16	352.16
600 A dc/ ac (rms)	DHR 600 C10	100-2705	399.13	374.16	352.16
1000 A dc/ ac (rms)	DHR 1000 C10	100-2708	448.80	420.74	396.00
4 - 20 mA dc analogue output signal					
100 A dc/ ac (rms)	DHR 100 C420	100-2689	349.10	327.29	308.02
200 A dc/ ac (rms)	DHR 200 C420	100-2692	349.10	327.29	308.02
300 A dc/ ac (rms)	DHR 300 C420	100-2695	399.13	374.16	352.16
400 A dc/ ac (rms)	DHR 400 C420	100-2699	399.13	374.16	352.16
500 A dc/ ac (rms)	DHR 500 C420	100-2702	399.13	374.16	352.16
600 A dc/ ac (rms)	DHR 600 C420	100-2706	399.13	374.16	352.16
1000 A dc/ ac (rms)	DHR 1000 C420	100-2709	448.80	420.74	396.00

Voltage Transducer



Connections:



H = 15.9 (above PCB), W = 26, D = 29.2

- Suitable for the electronic measurement of voltages associated with DC, AC and impulse circuits
- Provides galvanic isolation between primary and secondary circuits
- Applications:- AC and DC voltage sensing, including power supplies, UPS, instrumentation, metering and relay systems



5
WARRANTY
YEARS

A PCB mounting voltage transducer based on the Hall effect. The unit provides galvanic isolation between primary and secondary circuits. To enable a voltage to be measured a current proportional to the measured voltage must be collected through an external resistor, selected by the user, in series with the primary circuit of the unit.

Supply voltage	± 15V (±5%)	Polarity markings:	
Input current I _N	10mA (nom.)	A positive output current is obtained	
Analogue output current	25mA (nom.)	at terminal M when a positive charge	
Turns ratio	2500 : 1000	is applied on terminal +HT of the	
Overall accuracy @ 25°C	± 0.6% of I _N	primary circuit	
Isolation	2.5kV rms		
Linearity	<0.2%		
Operating temperature	0°C to +70°C		

230500

Mfrs. List No.	Order Code	Price Each			
		1+	5+	10+	25+
LV25-P	560-194	86.06	81.68	77.55	76.17

Transducers & Buzzers

Electromagnetic Transducers



- Compact transducers which gives a high sound output
- Harmonic content gives a richer sound

H=8.5, Dia=12, FC=6.5-Dia=0.6

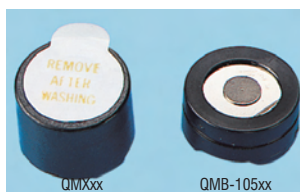
Order Code	119-3537	119-3538	119-3539
Mfrs List No.	QMB-111PN	QMB-111GPN	QMB-111PC
Frequency	2048Hz	2048Hz	2kHz
Rated Voltage (50% duty cycle square wave)	1.5V	1.5V	5V
Current Consumption (Typ)	8.3mA	26mA	31mA
Coil Resistance	140Ω	40Ω	140Ω
Coil Impedance	50Ω	16Ω	50Ω
Sound Output (min @10cm)	80dB	85dB	85dB
Operating Temperature	-20°C to +60°C	-20°C to +60°C	-20°C to +60°C
Weight	2g	2g	2g

Import Permit may be required in Malaysia

212921

Order Code	Price Each				
	1+	10+	25+	50+	+
119-3537	2.02	1.89	1.69	1.63	--
119-3538	2.52	2.43	2.27	1.95	--
119-3539	2.19	2.11	1.95	1.70	--

Electromagnetic Transducers



- QMX range are Compact transducers with removable sealing label to allow washing after dip soldering
- QMB is an ultra thin compact transducer that is NOT washable

Order Code	119-3534	119-3535	119-3540
Mfrs List No.	QMX-05	QMX-12	QMB-105P
Frequency	2400Hz	2400Hz	2048Hz
Rated Voltage (50% duty cycle square wave)	5V	12V	1.5V
Current consumption (Typ)	33mA	28mA	9.1mA
Coil Resistance	47Ω	140Ω	50Ω
Coil Impedance	80Ω	240Ω	140Ω
Sound Output (min @ 10cm)	85dB	85dB	70dB
Operating Temperature	-40°C to +85°C	-40°C to +85°C	-20°C to +60°C
Weight	2g	2g	2g
Dimensions - DiaXxHxPin PitchxDia	12 x 9 x 6.5 x 0.6		12 x 5.4 x 6.5 x 0.6

Import Permit may be required in Malaysia

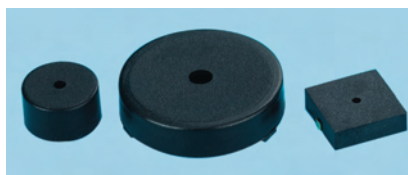
212930

Order Code	Price Each				
	1+	10+	25+	50+	+
119-3534	3.18	3.02	2.80	2.46	--
119-3535	3.54	3.37	3.21	2.74	--
119-3540	2.52	2.43	2.27	1.95	--

Piezo Transducers

EAST

External Driven



- Miniature PCB mounting transducers fully sealed to with-stand wave solder and cleaning processes
- Available in three different styles

	392-1141	392-1153	392-1165
Voltage V _{p-p} max	20	30	20
Current consumption	2.0mA	3.0mA	2.5mA
Capacitance @ 1000Hz	10	20	14
Resonant frequency	4100Hz	3000Hz	4000Hz
Sound pressure level @ 10cm	80dB	90dB	80dB
Max current consumption	2.0mA	3.0mA	2.5mA
Operating Temperature (°C)	-20°C to +70°C	-20°C to +70°C	-20°C to +85°C
Height	7.5	7.5	5.3
Dia/Dimensions	14	29.6	17 x 17
Pin Pitch x pin dia	7.6 x 0.7	15.2 x 1.0	—

234272

Voltage V _{p-p} Max	Order Code	Price Each			
		1+	25+	50+	100+
20V ac	392-1141	1.90	1.61	1.45	1.26
30V ac	392-1153	2.07	1.73	1.54	1.35
20V ac	SMD 392-1165	3.57	3.06	2.68	2.33

Prices are in Singapore Dollars and exclusive of GST. Due to the volatile nature of certain products, prices are subject to change without notice.

Miniature Buzzer 1.5Vdc to 12Vdc



- General purpose
- Continuous tone
- Built in drive circuit

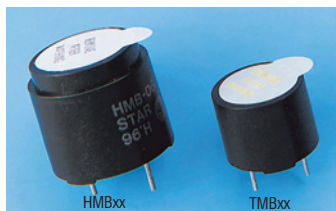
	392-1177	392-1189	392-1190
Rated Voltage V dc	12V dc	12V dc	12V dc
Operating Voltage V dc	3.0 – 20.0V dc	3.0 – 24.0V dc	6.0 – 16.0V dc
Resonant frequency	3100Hz	3500Hz	4000Hz
Sound pressure level @ 10cm	70dB	85dB	82dB
Max current consumption	8.0mA	12mA	8.0mA
Operating Temperature (°C)	-20°C to +70°C	-20°C to +70°C	-20°C to +85°C
Height	5.0	9.8	10.6
Dia/Dimensions	30.0	23.0	14.3 X 14.3
Fixing centres	34.5	27.5	—
Lead length	130	80	—

Import Permit may be required in Malaysia

234271

Voltage (dc)	Order Code	1+	25+	50+	100+	+
12V dc	392-1177	4.56	3.87	3.40	2.96	--
12V dc	392-1189	3.57	3.06	2.68	2.30	--
12V dc	SMD 392-1190	5.61	4.76	4.19	3.62	--

Electromagnetic Audio Indicators - PCB Mounting



- A range of electromagnetic alarms in two case sizes
- Dip solderable and washable - remove sealing label after washing

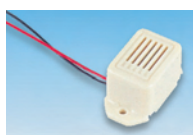
Order Code	119-3526	119-3527	119-3528	119-3529
Mfrs List No.	HMB06	HMB12	TMB05	TMB12
Frequency	2.2kHz	2.2kHz	2.3kHz	2.3kHz
Operating Voltage	4 – 7Vdc	8 – 16Vdc	4 – 6.5Vdc	8 – 16Vdc
Current Consumption (Typ)	27mA	25mA	22mA	15mA
Sound Output (min @10cm)	85dB (@6Vdc)	85dB (@12Vdc)	85dB (@5Vdc)	85dB (@12Vdc)
Operating Temperature	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
Weight (g)	5g	5g	2g	2g
Dimensions (Dia x H x Pitch x pin dia)	16 x 14 x 7.6 x 0.7mm	12 x 9.5 x 7.6 x 0.6mm		

Import Permit may be required in Malaysia

212924

Order Code	1+	10+	25+	50+	+	+
119-3526	5.73	5.48	5.13	4.47	--	--
119-3527	5.73	5.48	5.13	4.47	--	--
119-3528	5.67	5.42	5.07	4.41	--	--
119-3529	5.67	5.42	5.07	4.41	--	--

Mini Buzzers - 6V & 12V



H=15.6, W=33.2, D=15.5
Fixing centres=27.5x2.2 Dia.



H=15.6, W=23.0, D=16.6
2 PCB Pins 1
Dia 7.6 centres.
Pin length=6.0

- Single sound miniature buzzer for use in process control, safety, and industrial applications

Note: The buzzer must be firmly fixed to a rigid base to give optimum performance.

Voltage	6Vdc or 12Vdc	Connections	Red +ve, Black -ve
Current	25mA	Lead length	100mm
Frequency	400Hz ±50	Operating temperature	-40°C to +70°C
Sound level @ 300mm	75dB(A)		

Import Permit may be required in Malaysia

212947

Voltage	Order Code	1+	10+	50+	250+	+
With Leads						
6V	449-064	3.51	3.24	3.15	2.77	--
12V	449-076	3.51	3.24	3.15	2.77	--
PCB Mounting						
6V	449-088	3.48	3.21	2.96	2.65	--
12V	449-090	3.48	3.21	2.96	2.65	--

Piezo Buzzers



119-3652

- General purpose continuous tone piezo buzzers
- Built in drive circuit
- High sound pressure level with a low current consumption

Order Code	119-3651	119-3652	119-3647	119-3649
Mfrs List No.	KPEG222	KPEG232	KPEG228	KPEG238
Resonant Frequency	3.2kHz	3.2kHz	3.4kHz	3.4kHz
Operating Voltage	3-20Vdc	3-20Vdc	3-20Vdc	3-20Vdc
Current consumption (max @12Vdc)	13mA	13mA	15mA	15mA
Sound output (@12Vdc, @ 30cm)	75dB	75dB	80dB	80dB
Operating Temperature	-30°C to +85°C	-30°C to +85°C	-30°C to +85°C	-30°C to +85°C
Weight	5g	5g	1.2g	1.2g
Dimensions (∅ x H)	23.3 x 10.2mm	23.3 x 10.2mm	9 x 24mm	9 x 24mm
Pins (Pitch x Pin ∅)	15 x 0.8mm	17.5 x 0.8mm	15 x 0.8mm	17.5 x 0.8mm

Import Permit may be required in Malaysia

212920

Order Code	1+	10+	25+	50+	+	+
119-3651	5.15	4.78	4.51	3.93	--	--
119-3652	5.07	4.71	4.44	3.87	--	--
119-3647	5.74	5.48	5.17	4.49	--	--
119-3649	5.74	5.48	5.17	4.49	--	--

Piezo Buzzer - Flying Leads



H=14.5m Dia=23.8, FC=29

- General purpose flange mounting piezo ceramic audio indicator
- Loud, clear, penetrating sound
- Wide input voltage range - low current

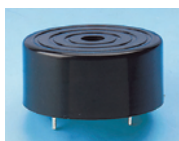
Order Code	119-3670
Mfrs List No.	KPEG-200A
Operating Voltage	3-20Vdc
Current Consumption (max @12V)	8mA
Sound output (min @30cm/12V)	88dB
Oscillating Frequency	3.1kHz
Operating Temperature	-30°C to +85°C
Weight	4.5g

Import Permit may be required in Malaysia

212926

Order Code	1+	10+	25+	50+	+	+
119-3670	6.00	5.70	5.39	4.69	--	--

Piezo Buzzers



- General purpose piezo ceramic audio indicators

Order Code	119-3672	119-3674	119-3675	119-3676
Mfrs List No.	KPEG-272	KPEG-272A	KPEG-276	KPEG-276A
Operating Voltage	3 - 28Vdc	3 - 20Vdc	3 - 28Vdc	3 - 20Vdc
Oscillating Frequency	3.5kHz	3.7kHz	2.7kHz	2.8kHz
Current Consumption (max.)	6mA	10mA	6mA	10mA
Min. Sound output (@ 30cm)	88dB	95dB	79dB	93dB
Operating Temperature	-30°C to +85°C	-30°C to +85°C	-30°C to +85°C	-30°C to +85°C
Weight	7g	7g	7g	7.2g
Dimensions (∅ x H)	31.5 x 14.4mm	31.5 x 14.4mm	31.5 x 14.4mm	32 x 14.7mm
Dimensions (FC x Pin ∅)	17.5 x 1mm	17.5 x 1mm	17.5 x 1mm	17.5 x 1mm

Import Permit may be required in Malaysia

212917

Order Code	1+	10+	25+	50+	+	+
119-3672	5.50	5.23	4.95	4.32	--	--
119-3674	6.46	6.17	5.80	5.04	--	--
119-3675	5.67	5.42	5.07	4.41	--	--
119-3676	6.62	6.30	5.92	5.17	--	--

Piezo Buzzers - 3 Tone Options



- A range of flange or PCB mounting piezo audio indicators
- Choice of tones
- Wide operating voltage range

Sensors & Transducers

41

Compliant
Non-compliant
+ Limited stock - RoHS replacement available
RoHS

Order Code	119-3667	119-3668	119-3669	119-3671
Mfrs List No.	KPEG-350	KPEG-351	KPEG-353	KPEG-500
Oscillating Frequency	2.8kHz	2.8kHz	2.8kHz	2.5kHz
Operating Voltage	3-28Vdc	3-28Vdc	3-28Vdc	5-13Vdc
Current Consumption (max @12Vdc)	7mA	6mA	8mA	60mA
Sound output (min @30cm/12V)	85dB	81dB	81dB	104dB
Tone	Continuous	Fast Pulse (3.5Hz)	Slow Pulse (1.5Hz)	Continuous
Operating Temperature (°C)	-30°C to +85°C		-30°C to +85°C	
Mounting style	Flange	Flange	Flange	PCB
Washable	No	No	No	Yes
Dimensions (diaxhxc)	41.8 x 16 x 50mm		49.1 x 28.9mm	
Leadout length	140mm		N/A	
Weight	14.6g		27.5g	

Import Permit may be required in Malaysia

212925

Order Code	Price Each					
	1+	10+	25+	50+	+	+
119-3667	5.27	5.01	4.73	4.13	--	--
119-3668	8.75	8.35	7.88	6.84	--	--
119-3669	8.75	8.35	7.88	6.84	--	--
119-3671	16.51	15.78	14.87	12.98	--	--

Miniature Buzzer 1.5Vdc to 12Vdc

EAST



- Miniature PCB mounting buzzer fully sealed to with-stand wave solder and cleaning processes
- Available in three different voltages

Pin dia=0.6, Pin spacing=7.6

	392-1098	392-1104	392-1116
Rated voltage	1.5V dc	5.0V dc	12V dc
Operating voltage	1.00-2.0V dc	4.0-6.5V dc	9.0-15.0V dc
Resonant frequency	2300Hz	2300Hz	2300Hz
Sound pressure level @ 10cm	85dB	85dB	85dB
Max current consumption	30mA	30mA	30mA
Operating Temperature (°C)	-20°C to +60°C	-20°C to +60°C	-40°C to +65°C
Height	9.5	9.5	8.0
Diameter	12	12	14.1

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Voltage (dc)	Order Code	Price Each					
		1+	25+	50+	100+	+	+
1.5V dc	392-1098	4.59	4.13	3.65	2.99	--	--
5.0V dc	392-1104	4.59	4.13	3.65	2.99	--	--
12V dc	392-1116	4.59	4.13	3.65	2.99	--	--

Panel Mounting Buzzers



- Bush mounting panel audio indicators
- Continuous and fast pulse or continuous and slow pulse tone option
- Screw and fast on terminations

Dia=36.5, Body H=4, Bush H=19.5
Bush Dia=31.5, Nut Dia=37.8
Panel hole=31.75,
Max panel thickness=12.54

Order Code	119-3639	119-3663
Mfrs List No.	KPEG755	KPEG757B
Operating voltage (V dc)	6-28	6-28
Tone	Continuous	Fast Pulse (3Hz)
Sound Pressure Level, dB (@30cm)	Continuous	Fast Pulse (3Hz)
@ V _{min}	79	75
@ 12V dc	85	80
@ V _{max}	92	87
Operating current (mA)	Continuous	Fast Pulse (3Hz)
@ V _{min}	3	3
@ 12V dc	7	9
@ V _{max}	16	16
Operating Frequency (kHz)	3600Hz	3600Hz

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Order Code	Price Each					
	1+	10+	25+	50+	+	+
119-3639	24.02	23.11	21.84	20.70	--	--
119-3663	22.81	21.83	20.51	17.92	--	--

Panel Mounting Buzzers - Extra Loud



- Bush mounting extra loud panel audio indicators
- Continuous, fast and slow pulse tones available
- DC or AC/DC non polar types available
- Screw and fast on terminations

Dia=42.5, Body H=20, Bush H=13
Bush Dia=27, Nut Dia=38.7

Panel hole=28.57,
Max panel thickness=3.17

Order Code	119-3654	119-3655	119-3656	119-3638	119-3660	119-3662
Mfrs List No.	KPEG-650SA	KPEG-651SA	KPEG-653SA	KPEG650SAN	KPEG-651SAN	KPEG-653SAN
Operating Type	DC Only	DC Only	DC Only	AC/DC	AC/DC	AC/DC
Rated Voltage	6V-28V	6V-28V	6V-28V	4V-28V	6V-28V	6V-28V
Tone	Continuous	Fast Pulse	Slow Pulse	Continuous	Fast Pulse	Slow Pulse
Min Sound Pressure, dB (@30cm)	88	80	80	70	68	67
@ V _{min}	94	87	88	81	74	77
@ 12V dc	98	97	92	87	80	85
@ V _{max}						
Current Consumption (mA)						
@ V _{min}	5	2	4	1	5	4
@ 12V dc	12	9	12	7	10	10
@ V _{max}	22	12	32	18	26	23

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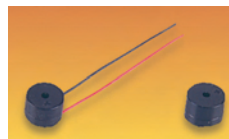
212932

Order Code	Price Each					
	1+	10+	25+	50+	+	+
DC Only Types						
119-3654	14.26	13.70	12.95	12.21	--	--
119-3655	16.01	15.40	14.55	13.83	--	--
119-3656	16.01	15.40	14.55	13.83	--	--
AC/DC Types						
119-3638	24.93	23.99	22.65	21.48	--	--
119-3660	21.74	20.90	19.76	18.81	--	--
119-3662	21.74	20.90	19.76	18.81	--	--

Sub-Miniature Speakers



With flying lead,
H=8.5,
Dia=12.0
Lead length=50



PCB Mounting, H=8.5,
Dia=12.0
PCB mounting=6.5 x 1.0 Dia

- An electromechanical sound element with a good frequency response over the audio range, rendering it suitable for multitone and speech reproduction
- The device uses a fixed coil and a moving, magnetised diaphragm. An audio frequency waveform is required to drive the device

Operating voltage	1 to 5V ac (pk-pk)	Sound output at 100mm	
Current at 1.5 V ac	30mA	at 1.5V ac 2kHz	85dB (A)
Coil impedance at 2kHz	40Ω	Resonant Frequency	2048 Hz
		Operating Temperature (°C)	-20°C to +60°C

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212922

Description	Order Code	Price Each				
		1+	25+	100+	250+	+
Flying lead	119-1945	1.84	1.45	1.35	1.13	--
PCB Mounting	119-1946	1.84	1.45	1.35	1.13	--

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