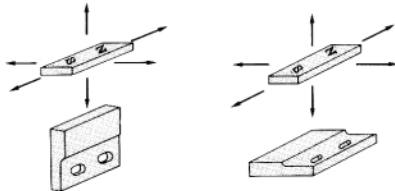


Reed Switch Type Proximity Sensors

Magnet Actuation

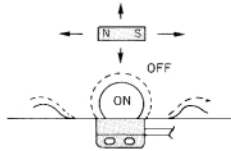
Inexpensive proximity sensor with internal reed switch, that is turned on and off by change of magnetic field strength (vertical, horizontal or longitudinal movement of magnet).



▼Contact Form

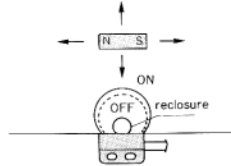
N.O. Contact (Normally Open)

Contact which is normally open. It will be closed when magnetic field is applied.



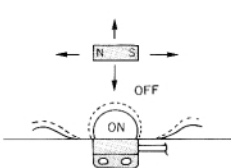
N.C. Contact (Normally Closed)

Contact which is normally closed. It will be opened when magnetic field is applied.



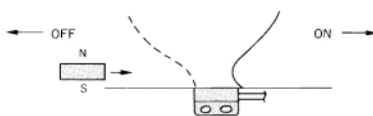
Transfer Contact (Form "C")

Common contact (wiper) will transfer from N.C. to N.O. contact when magnetic field is applied.

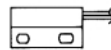


Latching Contact

After being opened or closed by application of magnetic field, the contact will be held in this position (latched) even after removal of the magnetic field. Application of a magnetic field with reversed polarity will unlatch the contact.



Miniature



General purpose



Connector terminated



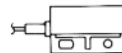
Low cost



Long life



Ultra miniature



Waterproof



PCB mount



High power



Waterproof



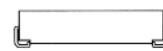
PCB mount



For lamp loads



Threaded package



Surface mount package



Detection of door position



Multiple reed switches

Contact Form	Part Number
--------------	-------------

N O	PS-500
N C	PS-510
Transfer	PS-520
Latching	DS-M2

N O	PS-3150
N O	PS-3529
N C	PS-3251

N O	PS-3670
N C	PS-3980

N O	PS-3170
-----	---------

N O	PS-3870
-----	---------

N O	PS-0048
-----	---------

N O	PS-4122
N C	PS-4221

N O	PS-5171
-----	---------

N O	PS-6132
N C	PS-6231
Transfer	PS-6341
N O (Mercury)	PS-6503

N O	PS-0016
-----	---------

N C•N O	PS-0018
---------	---------

N C•N O	PS-0024
---------	---------

N O	PS-0021
-----	---------

N O	MJS-2234
-----	----------

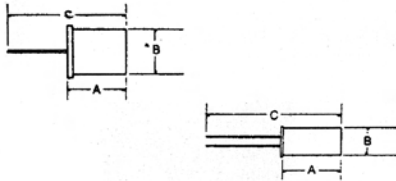
N O	PS-1522
-----	---------

N O	PSP-05
-----	--------

11

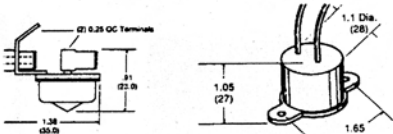
CONTROLS & SENSORS

METAL TILT SWITCHES General Purpose



PART No.	FIG.	A Inch (mm)	B Inch (mm)	C (mm)	MAX. DIFF. ANGLE	RATINGS (AMPS)						FEATURES
						AC			DC			
						30V	120V	240V	30V	120V	240V	
CM 100-0	1	.38 (9.7)	.32 (8.1)	.82 (20.8)	10°	2	1	.75	.7	.5	.2	Low Cost Stock Item
CM 1300-0	1			.88 (22.3)	10°	1	.5	.3	.5	.2	.1	Low Cost
CM 1323-0	2	.4 (10.2)	.19 (4.7)	.76 (19)	10°	.5	.25	.2	.5	.2	.1	Stock Item (2) Electrodes
CM 1320-0	2			1.075 (27)	10°	.5	.25	.2	.5	.2	.1	Stock Item (2) Electrodes

TIP-OVER SWITCHES



FEATURES:

These switches operate when tilted in any direction from their normally vertical position. Normally open (tilt to close) and normally closed (tilt to open) are available.

PART No.	TERMINAL STYLE	CONTACT	OPERATE ANGLE	RATINGS (AMPS)					
				AC			DC		
CM 1535-75	Two .25" Male QC Terminals With Nylon Bushing for Mounting	N.C.	35° + - 10°	30	12.5	7	15	8	5
CM 1535-70	Epoxy Seated Plastic Housing Mount on Horizontal Surface	N.C.	35° + - 10°	30	12.5	7	15	8	5
CM 1445-0	Single Electrode	N.O.	45° + - 10°	2	1	-	0.7	0.5	-
CM 1490-0		N.C.	45° + - 15°	2	1	-	0.7	0.5	-

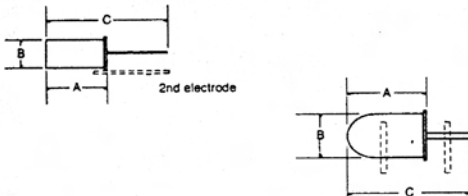


N.C.
TILT TO OPEN
CM 1490-0



N.O.
TILT TO CLOSE
CM 1445-0

NON-MERCURY TILT SWITCHES



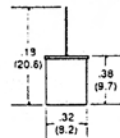
PART No.	FIG.	A B C Inch (mm)			MAX. DIFF. ANGLE	RATINGS (AMPS)	FEATURES
CW 1300-0	1	.40	.19	.88	15°	60V AC/DC max. 3 VA max. 0.25 Amp max. 30 Ohm max. resistance	Single Electrode
CW 1300-1	1	(10)	(4.7)	(22)		2nd Electrode on case	
CW 1600-0	2	.22	.14	0.34	15°	60V max. 30 VA max. 0.25 Amp max.	Miniature 30 ohm max.
CW 1600-1	2	(5.6)	(3.5)	(8.7)			

MOTION/VIBRATION SENSORS

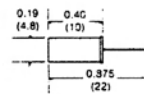
Designed for applications having the need to sense when the system is at rest or in motion.

FOR USE IN:

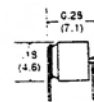
- Smart Appliances** - Turns off power when not in use.
- Portable Devices** - Conserves battery power.
- Anti-Theft** - Sounds alarm if unit is moved by unauthorised person.
- Man-Down Alarm** - Detects if the user has not moved within a set time period.



CM4400-0
Mercury Contact
Always OFF when at rest



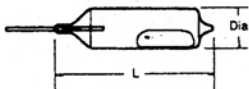
CW1300-0*
Non-Mercury Contact
May be ON or OFF when at rest



CM1800-1
Mercury Contact
May be ON or OFF when at rest

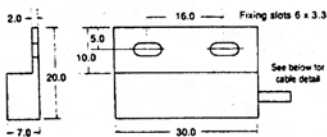
Movement causes intermittent contact

GLASS TILT SWITCHES

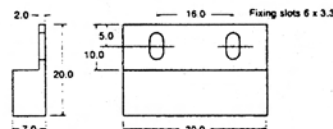


PART No.	L DIA		MAX. DIFF. ANGLE	RATINGS (AMPS)						FEATURES	Mount Clips
	Inch (mm)			AC			DC				
CB 17-0	1.38 (35)		10°	6	3	2	4	2	1	Low Cost Standard	
CB 17-1	1.5 (38)		10°	6	3	2	4	2	1	7" Flex Lead Wire	
CB 51-0	1.0 (25.4)	.32 (8.1)	2°	3	1	.5	2	.5	.1	Low Angle	3BH
CB 51-1	1.2 (30.5)		2°	3	1	.5	2	.5	.1	7" Flex Lead Wire	
CA 20-0	.5 (3.9)	.155 (3.9)	10°	.25	.1	.05	.15			Smallest Switch	

Magnetic Proximity Switches



PSA 100/30 PSA 240/30
PSB 175/30 PSC 175/30

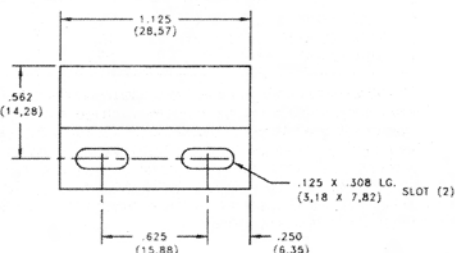
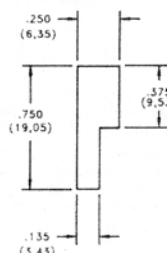
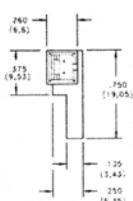
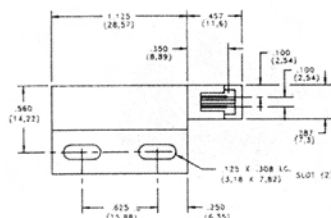
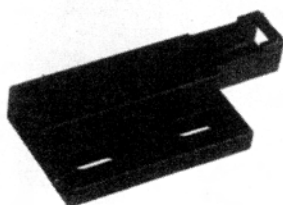


PSM
MAGNET

PART No.	FORM	CONTACT RATING - MAX.			
		VA	VOLTS	AMP	
PSA 100/30	1A	5	100	0.25	
PSA 240/30	1A	10	240	0.50	
PSC 175/30	1C	5	175	0.25	
PSM		MAGNET			

SENSOR 59105 series

ACTUATOR 57105



U.L. File# E61760 (N) ±0.010 (0.25) Tolerance

AVAILABLE CONTACTS

	Form A SPST-NO		Form A - H.V. (2) SPST-NO		Form C SPDT-CO		Form B SPST-NC	
Sensor Number	59065-010	59085-010	59065-020	59105-020	59065-030	59065-040	59065-040	59085-040
	59070-010		59070-020		59070-030		59070-040	
	59105-010		—		59085-030		59105-040	

ELECTRICAL CHARACTERISTICS

Contact Rating (1)		Watts. Maximum	10	5	10	5	5	10
Voltage	Switching	Vdc. Maximum	200	175	300	175	175	200
	Breakdown	Vdc. Minimum	250	200	450	200	200	250
Current	Switching	Amps. Maximum	.500	.250	.500	.250	.250	.500
Resistance	Contact Initial	Ohms. Maximum	200	200	200	200	200	200

OPERATING CHARACTERISTICS

Operate Time	ms. typical	.6	.7	.6	.7	.7	.6
Shock Without False Operation	G's Max., 11ms 1/2 sine wave	100	50	100	50	50	100
Operating Temperature	Degrees Celsius	-40 to +105		-20 to +105		-40 to +105	

LOAD/LIFE CHARACTERISTICS (millions of operations)

Load Operations	5Vdc, 10ma	100	50	5Vdc, 10ma	100	5Vdc, 10ma	50	5Vdc, 10ma	50	100
	24Vdc, 250ma	2	.5	24Vdc, 250ma	50	24Vdc, 250ma	.5	24Vdc, 250ma	.5	2

MUST OPERATE AND RELEASE DISTANCES

Sensor Type	Actuator	Actuating Position	Must Operate	Must Release	Must Operate	Must Release	Must Operate	Must Release	Must Operate	Must Release
59065 series	57065-000	A	59065-010	59065-020	59065-030	59065-040				
			.150/(3.81)	.800/(20.32)	.150/(3.81)	.800/(20.32)	.150/(3.81)	.800/(20.32)	.150/(3.81)	.800/(20.32)
59070 series	57070-000	A	59070-010	59070-020	59070-030	59070-040				
			.150/(3.81)	.800/(20.32)	.150/(3.81)	.800/(20.32)	.150/(3.81)	.800/(20.32)	.150/(3.81)	.800/(20.32)
59085 series	—	B	59085-010	—	59085-030	59085-040				
			.100/(2.54)	.250/(6.35)	.100/(2.54)	.250/(6.35)	.100/(2.54)	.250/(6.35)	.100/(2.54)	.250/(6.35)
59105 series	57105-000	C	59105-010	59105-020	—	59105-040				
			.150/(3.81)	.800/(20.32)	.150/(3.81)	.800/(20.32)			.150/(3.81)	.800/(20.32)

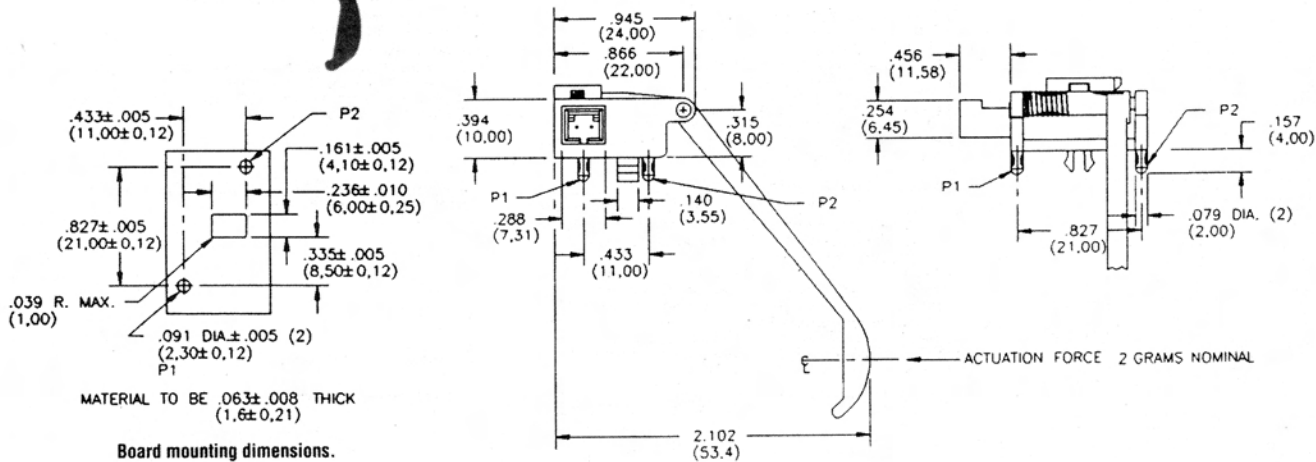
(1) Product of switching voltage and current must not exceed wattage rating.

(2) Form A -H.V. represents high voltage.

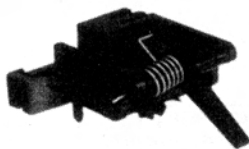
SENSOR
59200-020



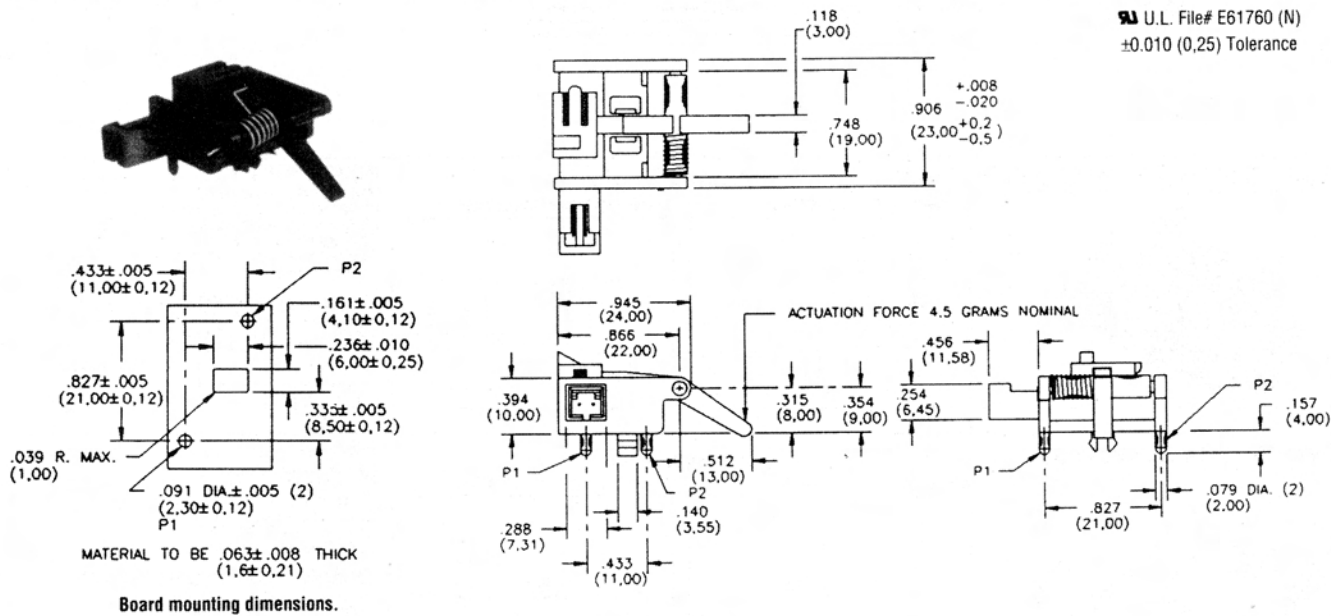
U.L. File# E61760 (N)
±0.010 (0,25) Tolerance



59210-020



U.L. File# E61760 (N)
±0.010 (0,25) Tolerance



Products for tomorrow...



Description

Magnetically operated Reed Sensors in flat form with mounting holes for screw fastening

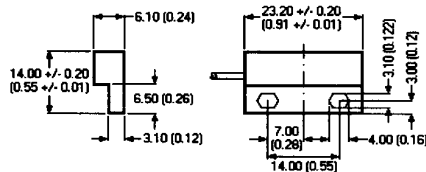
Applications

Position and limit switch
Door and window contact
Level sensor

Features

Choice of switches, termination options, & cable lengths
5 ranges of switch sensitivity

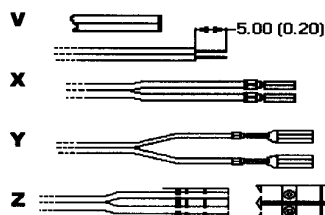
Dimensions



Tolerance +/- 0.10 mm (0.004 in)

Termination

The standard termination is a 2-wire flat cable with a cross section of 2x0.14mm².
The standard cable length is 500 mm, other lengths can be supplied on request. The required length must be stated in the part number.
The cable end can be supplied with the following connection styles:



Standard flat cable straight cut only
Standard flat cable with 5 mm (0.2 in) individual crimped terminals 1 mm (0.04 in) diameter
Individual spade terminals 2.8 x 0.8 mm (0.11 x 0.03 in)
PCB edge connector "MASCON" with 2.54 mm (0.1 in) spacing

Ordering Information

MK4	XXXX	X -	XXX	X
Series	Contact Type	Magnetic Sensitivity	Cable Length (mm)	Termination (VW/X/Y/Z)
	1A71			
	1A84	(AT)		
	1C90	B 10 - 15 (71 only)	500 standard	
		C 15 - 20		
		D 20 - 25		
		E 25 - 30		

All data at 20 °C

All data at 20 °C			Contact type Contact form			Contact 71			Contact 84			Contact 90			Units
						Standard			High Dielectric			Standard Form C			
						Form 1A			Form 1A			Form 1C			
Parameter	Conditions	Sym.	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max				
Contact Operation															
Must operate condition	Steady state field (ranges available)		10		30	15		30	15		30	AT			
Must release condition	Steady state field (ranges available)		3		30	3		30	3		30	AT			
Contact Ratings															
Rated Power	DC/peak AC Resistive	W			10			10			3	Watts			
Switching Voltage	DC/peak AC Resistive	V			180*			250			175	Volts			
Switching Current	DC/peak AC Resistive	A			0.5			0.5			0.25	Amps			
Carry Current	DC/peak AC Resistive	A			1.5**			1.5			1.2	Amps			
Static Contact Res.	50mV @ 10mA @ nom. volt.	CR			150			150			150	mΩ			
Dynamic Contact Res.	0.5 V @ 50mA, 100 Hz and after 1.5 ms @ nom. volt.	DCR			200			200			na	mΩ			
Dielectric Strength	Across contact		250			700			200			DCV			
Capacitance	Across switch			0.2			0.2			0.3		pf			
Operating time	Including bounce	Top			500			700		700	1000	μs			
Release time	No coil suppression	Trel			50			50			2000	μs			
Insulation Resistance	Across switch	IR	10 ¹⁰	10 ¹²		10 ¹⁰	10 ¹¹		10 ⁹	10 ¹¹		Ω			
Contact material				Ru			Rh			Rh					
Environmental Ratings															
Operating temperature		To	-20		85	-20		85	-20		85	°C			
Storage temperature		Ta	-35		85	-35		85	-35		85	°C			
Shock	At 11 ms +/- 1ms; 1/2 sine wave	S			150			50			50	Gs			
Vibration	10 Hz to 2000 Hz	G			10			35			30	Gs			

* Range D and E: 200 V

** Range D and E: 1.75 A

Products for tomorrow...



11

C
O
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Description

Magnetically operated Reed
Sensors for direct pcb mounting

Features

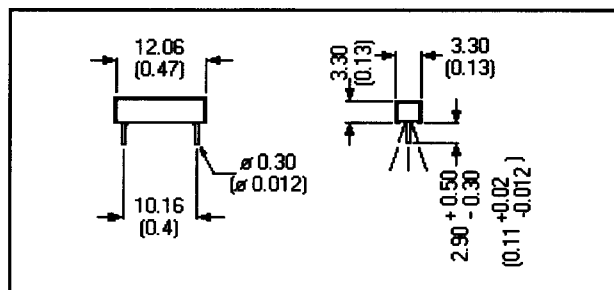
Magnetic pull-in/drop-out sensitivity
is divided into various AT ranges
2.54 mm (1 in) pcb pin to pin on center
distance, available with different distances

Applications

Telecommunications
Domestic appliances
Limit switch for low-power signals
Lifts/elevators

Ordering Information

MK6 - 4 X
Series Magnetic Sensitivity



Tolerance +/- 1.0 mm (0.004 in)
Other sizes available

All data at 20° C		Contact type		Contact 84			Units
		Contact form		Standard			
				Form 1A			
Parameter	Conditions	Sym.	Min	Typ	Max		
Contact Operation							
Must operate condition	Steady state field (ranges available)						AT
Must release condition	Steady state field (ranges available)						AT
Contact Ratings							
Rated Power	DC/peak AC Resistive	W			1		Watts
Switching Voltage	DC/peak AC Resistive	V			100		Volts
Switching Current	DC/peak AC Resistive	A			0.5		Amps
Carry Current	DC/peak AC Resistive	A			0.5		Amps
Static Contact Res.	50 mV @ 10mA @ nom. volt.	CR			150		mΩ
Dynamic Contact Res.	0.5 V @ 50mA, 100 Hz and after 1.5 ms @ nom. volt.	DCR			200		mΩ
Dielectric Strength	Across contact		250				DCV
Capacitance	Across switch			0.2			pf
Operating time	Including bounce	Top			500		μs
Release time	No coil suppression	Trel			50		μs
Insulation Resistance	Across switch	IR	10 ¹⁰	10 ¹²			Ω
Contact material				Ru			
Environmental Ratings							
Operating temperature		To	-20		85		°C
Storage temperature		Ta	-35		85		°C
Shock	At 11 ms +/- 1 ms; 1/2 sine wave	S			150		Gs
Vibration	10 Hz to 2000 Hz	G			10		Gs

Products for tomorrow...



Description

Magnetically operated proximity sensors for SMT mounting

Applications

A no energy consuming sensor
 Telecommunications applications
 In microphones as switching element
 Sensing flip in cellular phones
 Level sensing
 Proximity sensing

Features

Lead design 1:

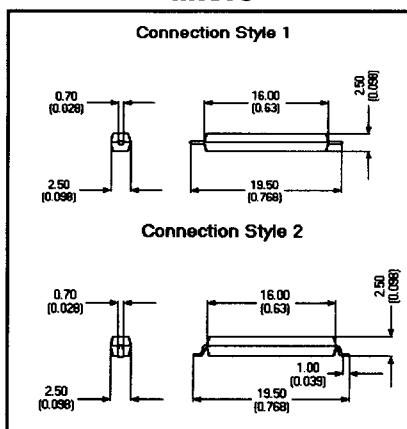
Flat, straight leads for PCB slot mounting

Lead design 2:

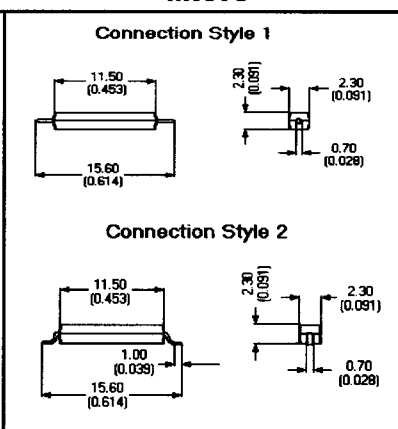
Flat, bent SMT leads for SMT mounting
 Sensors delivered in commercial tapes according to IEC 286/part 3 and can be mounted automatically
 Magnetic pull-in sensitivity is divided into several classes in 5 AT steps
 MK15, 16 have simple internal structure, small dimensions, and low cost

Tolerance ± 0.10 mm (0.004 in)

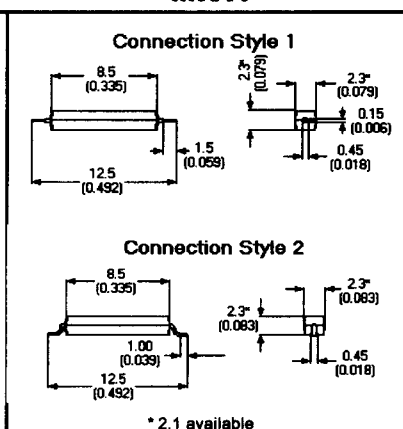
MK15



MK16

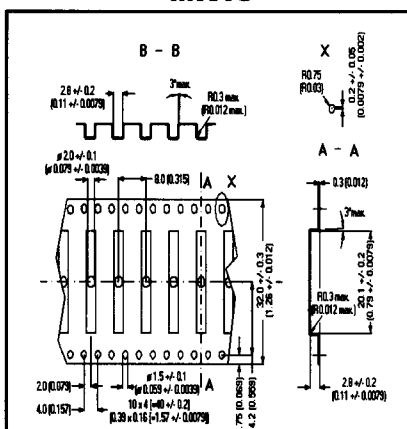


MK17

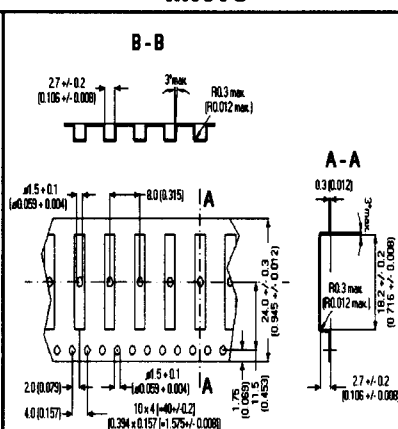


Tape, Reel, and Packaging

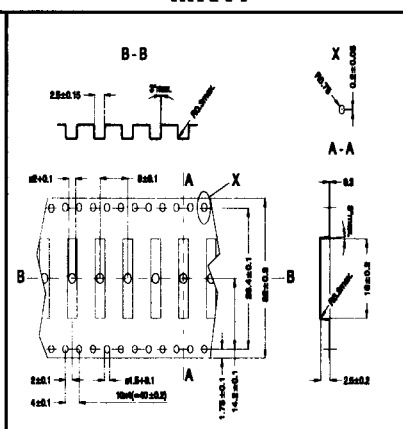
MK15



MK16



MK17



Products for tomorrow...

11

CONTROLS & SENSORS



All data at 20 °C

 Contact type
 Contact form

All data at 20 °C		Contact type Contact form	Contact 71 (MK15)			Contact 87 (MK16)			Contact 39 (MK17)			Units
			Standard			Standard			Standard			
			Form A			Form A			Form A			
Parameter	Conditions	Sym.	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Contact Operation												
Must operate condition	Steady state field (ranges available)	AT	10		30	10		30	10		30	AT
Must release condition	Steady state field (ranges available)	AT	3		30	3		30	3		30	AT
Contact Ratings												
Rated Power	DC/peak AC Resistive	W			10			1			10	Watts
Switching Voltage	DC/peak AC Resistive	V			180*			24			100	Volts
Switching Current	DC/peak AC Resistive	A			0.5			0.1			0.5	Amps
Carry Current	DC/peak AC Resistive	A			1.5**			0.3			1	Amps
Static Contact Res.	50mV @ 10mA @ nom. volt.	CR			150			150			150	mΩ
Dynamic Contact Res.	0.5 V @ 50 mA, 100 Hz and after 1.5 ms @ nom. volt.	DCR			200			200			200	mΩ
Dielectric Strength	Across contact											DCV
Capacitance	Across switch											pf
Operating time	Including bounce	Top			500			500			400	μs
Release time	No coil suppression	Trel			50			50			50	μs
Insulation Resistance	Across switch	IR	10 ¹⁰	10 ¹²		10 ¹⁰	10 ¹²		10 ¹⁰	10 ¹²		Ω
Contact material				Ru			Rh			Rh		
Environmental Ratings												
Operating temperature		To	-20		130	-20		130	-20		70	°C
Storage temperature		Ta	-35		130	-35		130	-20		70	°C
Shock	At 11 ms +/- 1ms; 1/2 sine wave	S			50			50			50	Gs
Vibration	10 Hz to 2000 Hz	G			10			10			10	Gs

* Range D and E: 200 V

** Range D and E: 1.75 A

Ordering Information

XXXX-	X-	X
Series	Magnetic	Lead Design
	Sensitivity	
MK15	(AT)	
MK16	B 10 - 15	Style 1 - 1
MK17	C 15 - 20	Style 2 - 2
	D 20 - 25	
	E 25 - 30	

Products for tomorrow...



LS03 Series

MK2 Series

MK 2/0 -2/1

MK2 Series

MK 2/2 - 2/3

Magnetic bridging Sensors for security applications

Unique magnetic circuit
only a simple piece of
iron is required to
activate switching
position
Standard cable is a 4
wire round core 4x
0.14mm²





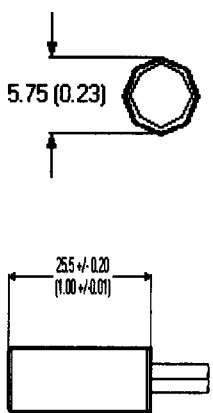
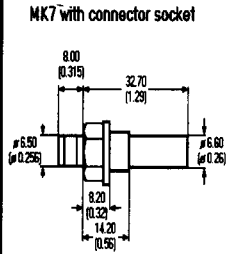
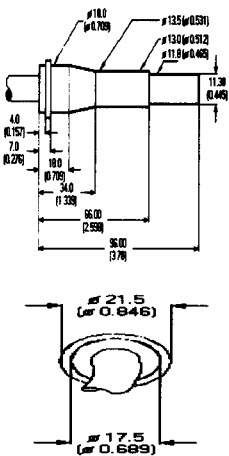
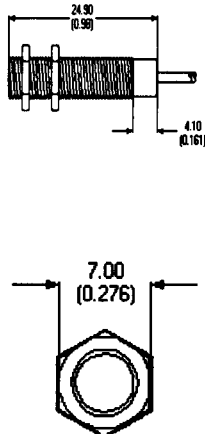
Door & window control
Opening recognition control
Fastening bolt control
Fire protection doors

1A, 1B
-20 / 85
-35 / 85
500 -700
100 - 1000
3 - 10

Products for tomorrow.

11

CONTROLS & SENSORS

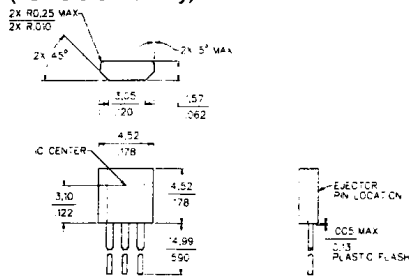
				
	MK3 Series Cylindrical magnetically operated Reed Sensors	MK7 Series Magnetically operated Reed Sensors in cylindrical form with M8 thread	MK8 Series Oil-resistant Reed Sensor with intrinsically safe approval	MK11 Series Magnetically operated Reed Sensors with screw thread enclosure
DIMENSIONS Tolerance 0.10 mm (0.004 in) except as noted		 MK7 with connector socket Version with cable available		
FEATURES	Series offers a selection of two-part magnetically operated reed proximity switches Five ranges of switch sensitivity are offered Ideal for ring type magnet on end-on actuation	Series offers a selection of two-part magnetically operated reed proximity switches Five ranges of switch sensitivity are offered	Magnetically actuated Oil resistant cable Six ranges of switch sensitivity are offered, allowing a wide range of sensor-magnet distances for customer applications	Non-corrosive stainless steel housing for exact adjusting Magnetic pull-in sensitivity is divided in several AT classes at 5 AT steps each Different types of switches, connections, and cable lengths available
APPLICATIONS	Position and limit switch Door and window contact for security systems Level sensor	Position and limit switch Level sensor Position sensor	Position and limit switch Impulse or revolution sensing Petro industry Cold resistant	Position and limit switch End position sensing Machinery safety and control
SPECS	Contact style 1A, 1B, 1C Operating temp (°C) -20 / 85 Storage temp (°C) -35 / 85 Operating time (µs) 500 - 2000 Release time (µs) 100 - 1000 Rated power (Watts) 3 - 10 Avail. operate range (AT) 5 - 30	Contact style 1A, 1B, 1C Operating temp (°C) -20 / 85 Storage temp (°C) -35 / 85 Operating time (µs) 500 - 1000 Release time (µs) 100 - 1000 Rated power (Watts) 3 - 12 Avail. operate range (AT) 5 - 30	Contact style 1A Operating temp (°C) -40 / 130 Storage temp (°C) -40 / 130 Operating time (µs) 500 - 2500 Release time (µs) 100 - 200 Rated power (Watts) 30 - 60 Avail. operate range (AT) 10 - 70	Contact style 1A Operating temp (°C) -20 / 85 Storage temp (°C) -35 / 85 Operating time (µs) 500 Release time (µs) 100 Rated power (Watts) 5 - 15 Avail. operate range (AT) 5 - 30

Magnetic Sensors Digital Output

2SSP



MOUNTING DIMENSIONS (For reference only)



OPERATION

2SSP Series position sensors have 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. Though this signal is identical to our digital Hall effect sensors, it can be achieved by magnetoresistive sensors at much greater sensor-to-magnet distances. For example, the 2SSP sensing distance is approximately one inch, when operated by a MICRO SWITCH 101MG3 magnet.

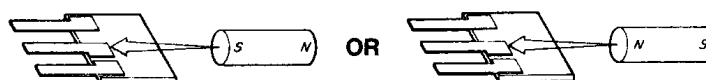
FEATURES

- Low gauss operation can extend sensing distance to one inch or more, depending on magnet size
- Digital current sinking output
- Omnipolar – can be operated with either North or South magnetic pole
- Operating speed: 0 to over 100 kHz
- Small size: .18 x .18 inch
- 3-pin, in-line PC board terminals on .100-inch mounting centers
- Operating temperature range: -20° to 85°C (-4° to 185°F)
- Parallel magnetic field operation

2SSP ORDER GUIDE

Catalog Listing	Supply Voltage (VDC)	Supply Current (mA)	Output Voltage (V)	Output Current (mA)	Magnetic Gauss @ 25°C Typ.		
					Op.	Rel.	Dif.
2SSP	6 to 24	13.5	.40 max.	20mA	15	11	4

OPERATING MODE

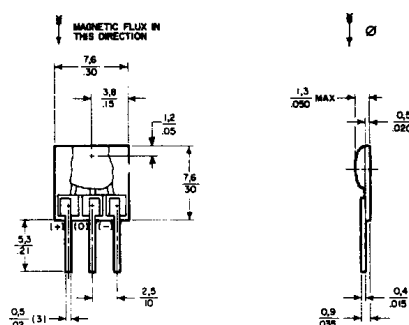


Magnetic Sensors Digital Output

SS2 Series



MOUNTING DIMENSIONS (For reference only)



OPERATION

SS2 Series position sensors have magnetoresistive material integrated on silicon and protected by an epoxy overcoat. The integrated circuit provides a digital output in response to very low magnetic fields. Though this signal is identical to our digital Hall effect sensors, it can be achieved by magnetoresistive sensors at much greater sensor-to-magnet distances. For example, the SS2 sensing distance is approximately one inch, when operated by a MICRO SWITCH 101MG3 magnet.

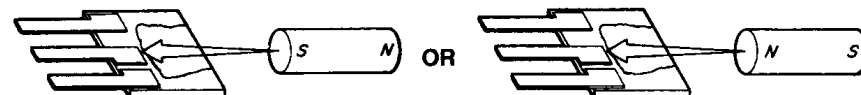
FEATURES

- Low gauss operation can extend sensing distance to one inch or more, depending on magnet size
- Digital current sinking output
- Omnipolar—can be operated with either North or South magnetic pole
- Operating speed: 0 to over 100 kHz
- Small size: .3 x .3 inch (with epoxy chip protection)
- 3-pin, in-line PC board terminals on .100-inch mounting centers
- Operating temperature range: -20° to 85°C (-4° to 185°F)
- Parallel magnetic field operation

SS2 SERIES ORDER GUIDE

Catalog Listing	Supply Voltage (VDC)	Supply Current (mA)	Output Voltage (V)	Output Current (mA)	Magnetic Gauss @ 25°C Typ.		
					Op.	Rel.	Dif.
SS21PE	4.5 to 5.5	10	.40	20	15	11	4
SS22PE	6 to 24	13.5	.40	20	15	11	4

OPERATING MODE



Magnetic Sensors Digital Output

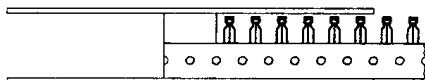
SS400 Series™

11

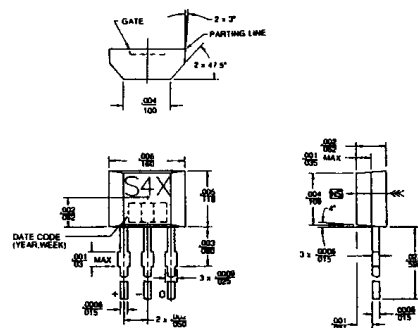
CONTROLS & SENSORS



TAPE AND REEL



MOUNTING DIMENSIONS (For reference only)



SS400 Series position sensors have a thermally balanced integrated circuit over full temperature range. The negative compensation slope is optimized to match the negative temperature coefficient of lower cost magnets. Bipolar, latching and unipolar magnetics are available.

Band gap regulation provides extremely stable operation over 3.8 to 24 VDC supply voltage range. SS400 sensors are capable of continuous 20 mA sinking output, and may be cycled as high as 50 mA maximum.

FEATURES

- 3.8-24 VDC supply voltage
- Digital current sinking output
- 3 pin in-line PCB terminals
- Quad-Hall design virtually eliminates mechanical stress effects
- Temperature compensated magnetics
- Operate/release points can be customized
- High output current capability – 50 mA absolute maximum
- Operate/release points symmetrical around zero gauss (bipolar/latch)
- Operating temperature range of – 55 to + 150°C (– 67 to + 302°F)

SS400 SERIES ORDER GUIDE

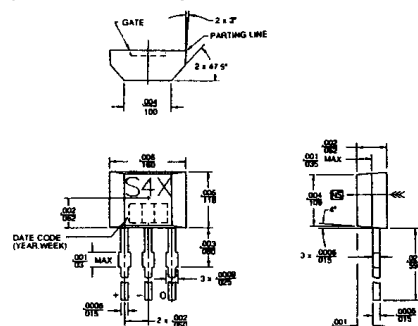
Catalog Listing	Magnetic Type	Supply Current (max.)	Output Voltage (max.)	Output Current (max.)	Magnetic Gauss @ 25°C Max.		
					Op.	Rel.	Dif.
SS411A	Bipolar	10 mA	.40 V	20 mA	60	–60	15
SS413A	Bipolar	10 mA	.40 V	20 mA	140	–140	20
SS441A	Unipolar	10 mA	.40 V	20 mA	115	20	20
SS443A	Unipolar	10 mA	.40 V	20 mA	180	75	25
SS449A	Unipolar	10 mA	.40 V	20 mA	380	245	30
SS461A	Latching	10 mA	.40 V	20 mA	85	–85	50
SS466A	Latching	10 mA	.40 V	20 mA	180	–180	200

Magnetic Sensors Digital Output, Bipolar

SS40 Series



MOUNTING DIMENSIONS (For reference only)



FEATURES

- 4.5 to 24 VDC supply voltage
- Small size (.160" x .118")
- Reverse power polarity protection
- Current sinking output
- Sensitive magnetic characteristics
- Operating speed from 0 to over 100 kHz
- Operating temperature range: –55° to 150°C

SS40 SERIES ORDER GUIDE

Catalog Listing	Magnetic Type	Supply Current (max.)	Output Voltage (max.)	Output Current (max.)	Magnetic Gauss @ 25°C Typ.		
					Op.	Rel.	Dif.
SS41	Bipolar	8.7 mA	0.40 mA	20 mA	40	–40	80
SS46	Latching	8.7 mA	0.40 mA	10 mA	100	–100	200

Magnetic Sensors Analog Output

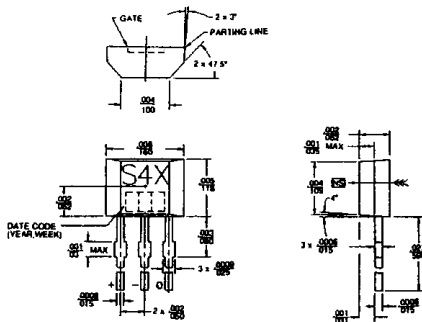
SS49/SS19 Series



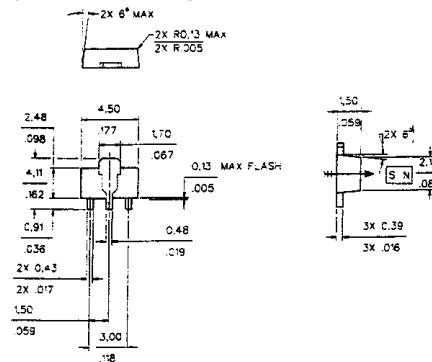
FEATURES

- 4 to 10 VDC supply voltage
- High output current sourcing capability – 10 mA continuous, 20 mA max.
- Ratiometric output
- Low supply current – 4 mA typ., for battery operation
- Very small, industry accepted packages
- Available on tape and reel for automated assembly
- Responds to North or South pole
- Linear output voltage over wide magnetic flux range

MOUNTING DIMENSIONS (For reference only)



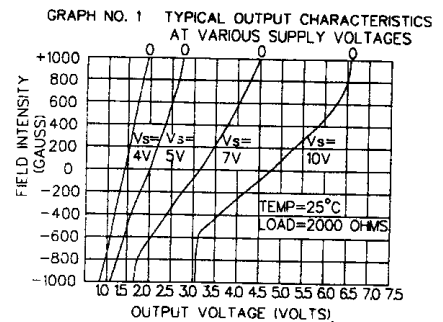
MOUNTING DIMENSIONS (For reference only)



TYPICAL LINEAR OUTPUT CHARACTERISTICS*

Graph #1

This graph displays the relationship between supply voltage and the combined effects of a change in sensitivity (gain) and null voltage output at room temperature. The sensitivity variation is represented by a change in the slope of the curve. The null voltage shifts the entire curve.

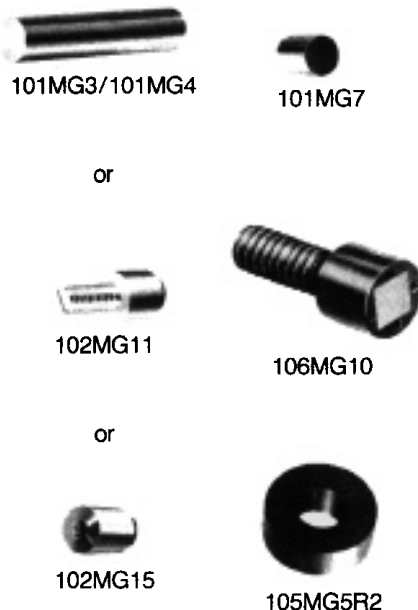


SS49/SS19 SERIES ORDER GUIDE

Catalog Listing	Supply Voltage	Supply Current	Output Voltage @ 0 gauss	Magnetic Characteristics Output	Gauss Range
SS49/SS19	4 to 10 VDC	4 mA typ.	1.75 to 2.25 V	0.60 to 1.25 mV/gauss	-400 and +400

Magnets

MG Series



MICRO SWITCH does not manufacture magnets. However, we do supply bar and ring magnets for operating our Hall effect sensors. The most common form of magnet used to operate a Hall effect sensor is the bar magnet. The magnet should provide at least 10% flux overdrive above "Max. Operate", when at minimum distance from the sensing surface.

Ring magnets are magnetized on the outside diameter with both North and South poles. Each pole pair (N and S) produces one pulse with standard Hall devices.

MG ORDER GUIDE – Bar Magnets

Catalog Listing	Length	Outside Diameter
101MG3	6,3/0.25	31,7/1.25
101MG2L1*	3,2/0.125	9,5/0.375
101MG7*	6,3/0.25	6,3/0.25
102MG11*	7,9/0.31	17,0/0.67
102MG15*	7,9/0.31	12,2/.48
103MG5**	2,0/.078	2,0/.078
106MG10*	10,2/0.40	23,6/0.93

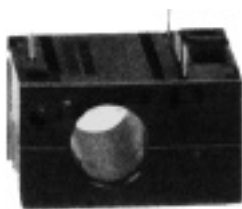
* Bulk packaging in 100 unit lots — ADD-BP to catalog listing.

** 125 pieces per tube. Poles not marked.

MG ORDER GUIDE – Ring Magnets

Catalog Listing	# Pole Pairs	Outside Diameter
105MG5R2	2	15,9/0.625
105MG5R4	4	15,9/0.625

CS Series



Each MICRO SWITCH CS series digital current sensor provides a logic level output that changes from approximately V_{cc} to 0.4 volts when the sensed current exceeds the operate point. Each digital sensor will operate on AC or DC current, but the output will turn off at every zero crossing when sensing AC current.

- Digital output
- AC or DC current sensing
- Through-hole design
- Fast response time, 100 μ sec
- Output voltage isolation from input
- Minimum energy dissipation
- Maximum current limited only by conductor size
- Accurate, low cost sensing
- Operating temperature range — 25 to 85°C

Catalog Listing	Operate Current @ 25° C (Amp-Turns)			Operate Current (Amp-Turns)	Release Current (Amp-Turns (Min.))	Supply Volt (Volts DC)	Output Volts	Output Current (mA) Sinking
	Min.	Nom.	Max.					
CSDA1BA	0.32	0.50	0.88	.25 to 1.0	0.08	6 to 16	0.4	20mA
CSDA1AA	0.32	0.50	0.88	.25 to 1.0	0.08	6 to 16	0.4	20mA

CS Series



- Linear output
- AC or DC current sensing
- Through-hole design
- Fast response time, 100 μ sec
- 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
- VCC/2 offset voltage

Catalog Listing	Supply Volt. (Volts DC)	Supply Current (mZ max.)	Sensed Current (Amps Peak)	Sensitivity mV/NI		Offset Shift (%/°C)
				Nominal	± TOL	
CSLA1CD	8 to 16	19	57	49.6	5.8	± .05
CSLA1CE	8 to 16	19	75	39.4	4.4	± .05
CSLA1DE	8 to 16	19	75	39.1	4.8	± .05
CSLA2CD	6 to 12	20	72	32.7	3.0	± .02
CSLA2CE	6 to 12	20	92	26.1	2.1	± .02
CSLA2DG	6 to 12	20	150	16.2	1.1	± .02
CSLA2DJ	6 to 12	20	225	8.7	0.6	± .020

CS Series



4.8 X 0.5
QUICK DISCONNECT

SENSITIVITY ADJUST

OFFSET ADJUST

3.8
15

0.5
19

22.4
88

35.6
140

53.3
2 30

68.6
2 20

7.6
30

55.9
2 20

C-O

- $V_{cc}/2$ offset voltage
- 8 μ sec response time
- $\pm .03\%/^{\circ}\text{C}$ offset shift

Catalog Listings	Max. Sensed Current (Amps-Peak)	Adjustable Operating Range @ Vcc = 12 VDC*			
		Min. Sens. (mV/NI)	Oper. Range (Amps)	Max. Sens. (mV/NI)	Oper. Range (Amps)
CSLB1AD	57	53	0-57	90	0-33
CSLB1AF	100	30	0-100	55	0-55

* For best results, choose a sensor to operate toward its maximum operate range. Increased amplification occurs when adjusting toward a minimum operate range; noise is also amplified.

CS Series



- Adjustable operating range
- Industrial standard 1 to 5 VDC or 4 to 20 mA output
- Regulated power supply accepts 10.5 to 24 VDC input
- AC or DC current sensing
- Through-hole design
- Fast response time, 150 msec
- Output voltage isolation from input
- Minimum energy dissipation
- Sensors available with adjustable performance feature
- Built-in temperature compensation
- Operating temperature range: -25° to 85°C (-13° to 185°F)
- Accurate, low-cost sensing
- 4mA offset current

Catalog Listing	Supply Current (mA max.)	Max. Sensed Current* (Amps-Peak)	Adjustable Operating Range			
			Min. Sens. (μA/NI)	Oper. Range (Amps)	Max. Sens. (μA/NI)	Oper. Range (Amps)
CSLF5HD	30	18	869.6	18	2666.7	6
CSLF5HE	30	92	173.9	92	533.33	30

* Optimum accuracy is obtained when operating the sensor at maximum sensed current.

Pressure Sensors Unamplified Gage Pressure

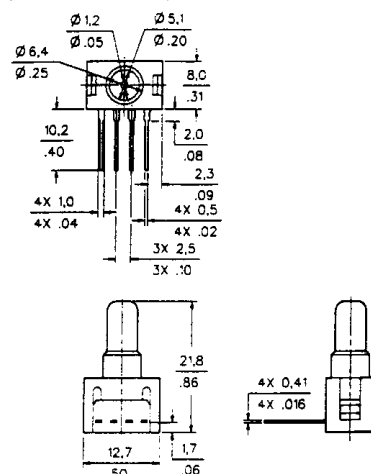
20PC Series;

11

CONTROLS & SENSORS



TYPICAL DIMENSIONS
(For reference only)



FEATURES

- Lowest priced sensor with temperature compensation and calibration
- Choice of termination for gage sensors
- Calibrated Null and F.S.O.
- Temperature compensated for F.S.O. over 0 to 50°C
- Provides interchangeability
- 10-16 VDC excitation
- $\pm 1.0\%$ F.S.O. linearity
- Compensated temperature range: 0 to 50°C

26PC SERIES ORDER GUIDE

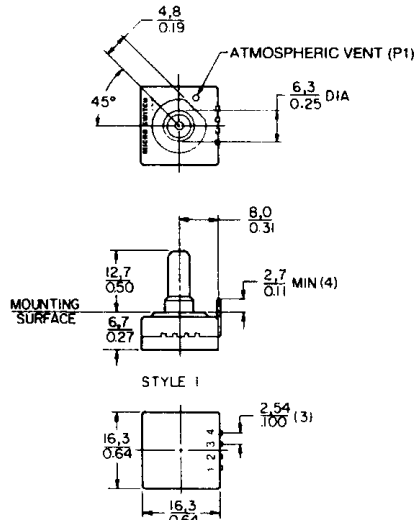
Catalog Listing	Pressure Range psi	Full Scale Output F.S.O., mV Typ.	Null Offset mV Typ.	Sensitivity mV/psi Typ.	Overpressure psi Max.
26PCBFA2G	5.0	50	0	10	20
26PCCFA2G	15	100	0	6.67	45
26PCDFA2G	30	100	0	3.33	60

Pressure Sensors Unamplified Gage

130PC Series



TYPICAL DIMENSIONS
(For reference only)



FEATURES

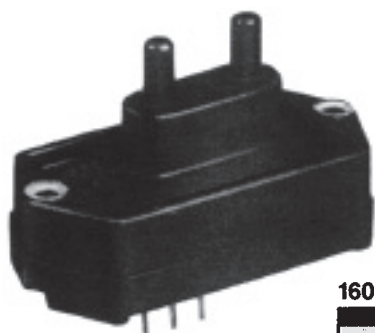
- Miniature package
- Can be used to measure with vacuum or positive pressure
- Absolute and gage sensors available
- Calibrated Null and F.S.O.
- Temperature compensated for F.S.O. over 0 to 50°C
- Provides interchangeability
- Lowest cost 1, 100 and 150 psi calibrated and temperature compensated sensor
- 10-16 VDC excitation
- Compensated temperature range: 0 to 50°C
- Typical null offset ± 0 mV

136PC SERIES ORDER GUIDE

Catalog Listing	Pressure Range psi	Full Scale Output F.S.O. Typ.	Sensitivity mV/psi Typ.	Overpressure psi Max.	Linearity, %F.S.O. P2 > P1 Max.
136PC15A1	0-15	100	6.67	45	± 1.00
136PC15A1L	0-15 (L)	40	2.67	60	± 0.50
136PC15A1L	0-30 (0-15L)	79	2.63	60	± 0.75
136PC01G1	0-1	20	20	20	± 1.00
136PC100G2	0-100	100	1.00	150	± 0.40
136PC150G2	0-150	60	0.40	225	± 0.40

Pressure Sensors Low Pressure Amplified, Differential

160PC Series



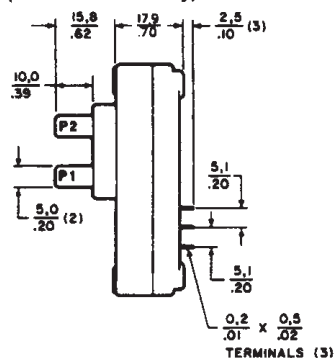
FEATURES

- Low pressure measurement
- PCB terminals on opposite side from the ports
- Optional color coded leadwires, 12 in., 24 gauge
- Fully signal conditioned
- 6-16 VDC excitation
- 8 to 20 mA supply current
- 5 Volt full scale output
- -18 to 63°C compensated temperature range

160PC SERIES ORDER GUIDE, DIFFERENTIAL TYPE

Catalog Listing	Pressure Range "H ₂ O	Null & Sensitivity Shift 25 to 5° 25 to 45°C Max.	Sensitivity V/"H ₂ O	Over-ressure psi Max.	Linearity, %F.S.O. P2 > P1 B.F.S.L. Max.	Repeatability & Hysteresis %F.S.O. Typ.
162PC01D	0-27.68	---	0.18	5	± 2.00	± 0.15
163PC01D36	± 5	± 1.00	0.50	5	± 2.00	± 0.25
164PC01D37	0-10	± 1.00	0.50	5	± 2.00	± 0.25
164PC01D76	0-5	± 1.25	1.00	5	± 2.00	± 0.25

TYPICAL DIMENSIONS (For reference only)



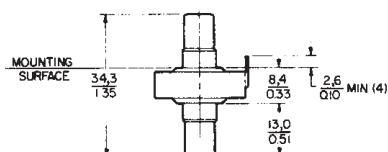
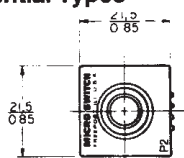
Pressure Sensors Unamplified Low Pressure Gage & Differential

170PC Series



MOUNTING DIMENSIONS (For reference only)

Differential Types



FEATURES

- Miniature package
- Low pressure measurement
- Calibrated Null and F.S.O.
- Temperature compensated for F.S.O. over 0 to 50°C
- Provides interchangeability
- 10-12 VDC excitation
- ± 2 mV null offset
- 0 to 50°C compensated temperature range

174PC SERIES ORDER GUIDE

Catalog Listing	Pressure Range "H ₂ O	Full Scale Output F.S.O., mV Typ.	Sensitivity mV/"H ₂ O Typ.	Overpressure "H ₂ O Max.	Linearity, %F.S.O. P2 > P1 Max.
176PC07HG2	0-7	28	4.00	140	± 3.00
176PC07HD2	0-7	28	4.00	140	± 3.00
176PC14HG2	0-14	35	2.50	140	± 3.00
176PC14HD2	0-14	35	2.50	140	± 3.00
176PC28HG2	0-28	42	1.50	140	± 3.00
176PC28HD2	0-28	42	1.50	140	± 3.00

Pressure Sensors

Miniature, Differential, Gage, Amplified

180PC Series

11

CONTROLS & SENSORS



Terminal Mount

Housing Mount

FEATURES

- Miniature plastic package
- Terminal and housing mount styles
- PCB termination
- Fully signal conditioned
- 8 VDC excitation, typ.
- $1V \pm .05V$ null offset
- 5V full scale output
- 0 to 50°C compensated temperature range

185PC SERIES ORDER GUIDE, DIFFERENTIAL TYPE, P2 > P1

Catalog Listing	Pressure Range psi	Overpressure psi Max.	Linearity, P2 > P1 Max.	% F.S.O. P2 < P1 Max.
185PC05DT	0-5	20	± 2.00	± 1.00
185PC15DT	0-15	45	± 2.00	± 1.00
185PC30DT	0-30	60	± 1.50	± 0.75

186PC SERIES ORDER GUIDE, BI-DIRECTIONAL TYPE, P2-P1

Catalog Listing	Pressure Range psi	Overpressure psi Max.	Linearity, P2 > P1 Max.	% F.S.O. P2 < P1 Max.
186PC03DT	± 2.5	20	± 2.00	± 1.00
186PC05DT	± 5.0	20	± 2.00	± 1.00
186PC15DT	± 15	45	± 2.00	± 1.00

HOW TO ORDER

Catalog listings in the order guide are shown with mounting version T (terminal mount). To order version H (housing mount), change the "T" to "H".

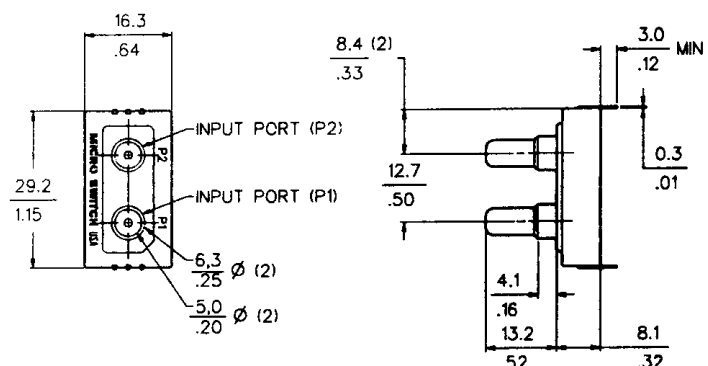
Example: 184PC05GT converted to a housing mount version becomes 184PC05GH.

TYPICAL DIMENSIONS

(for reference only)

Terminal Mount

(Differential "D" or Absolute "A" Housing)



At Relay Specialties.
Customers are our most important asset.

AWM3000 Series



Figure 1 is a technical drawing of a mechanical part, likely a bracket or support, showing dimensions in inches. The part has a base with a central slot and two side flanges. Dimensions include overall width (12.0), overall height (30.5), and various internal features like a central slot (2.5 wide, 1.0 deep) and side flanges (1.0 wide, 0.04 thick).

- Laser trimmed for interchangeability
- Flow sensing up to 1.0 LPM
- 5 VDC output @ laser trim point
- 1 VDC null voltage
- 8 to 15 VDC excitation
- 3m sec. response time
- -25 to 85°C temperature range
- Ratiometric output voltage

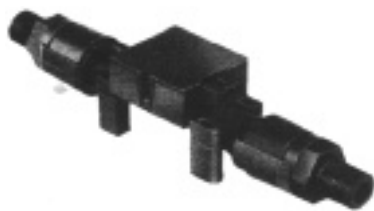
Dust contamination is possible in some airflow applications, but can be minimized. Dust particles in the airstream flow past the chip parallel to its surface. In addition, the microstructure is kept clean by a thermophoretic effect, which impels the micrometer-sized dust particles away from the structure. In an accelerated operating life test, with less than 50 sccm flow, a lifetime equivalent to over 20 years in a typical industrial air environment was achieved with no degradation of sensor response.

Two Wheatstone bridges control airflow measurement – one provides closed loop heater control, the other contains the twin sensing elements. The heater circuitry, operational amplifier, and precision thick-film resistors are located on the ceramic substrate. Ambient temperature is sensed by a similar heatsunk resistor on the chip.

Clogging due to dust adherence to chip edges and channel surfaces can be substantially eliminated through the use of a simple filter. The optimum filtering action is obtained with a low impedance filter in series with the small cross-section and high flow impedance of the channel. This permits a large accumulation of dust in the filter without significant change in the combined impedance. Where filtering is desired, a disposable five-micron filter may be used upstream of the flow sensor.

Catalog Listing	Flow Range	Null Voltage Shift – 25 to 85°C	Output Voltage Shift 25 to – 25°C 25 to 85°C	Repeatability & Hysteresis
AWM3200V	+ 60 sccm, (± 20 scc.)/ + 2.0 " H ₂ O	± 100 mV	+ 24.00% F.S.O. – 7.0% F.S.O.	± 0.50% F.S.O. max.
AWM3100V	+ 200 sccm/ + 2.0 " H ₂ O	± 50 mV	+ 6.0% F.S.O. – 24.0% F.S.O.	± 0.50% F.S.O. max.
AWM3300V	+ 1000 sccm/ + 1.3 ± 1 " H ₂ O	± 50 mV	+ 6.5% F.S.O. – 9.0% F.S.O. type	± 1% F.S.O. typ.

AWM5000 Series



- Variety of flow connections possible
- Venturi design
- Remote mount
- Active laser trimmed to CO₂, N₂ or argon calibration
- 8 to 15 VDC excitation
- Linear output, 1 to 5 VDC
- -20 to 70°C temperature range
- Null output, 1 VDC

AWM5000 Series Microbridge Mass Airflow Sensors feature a venturi type flow housing. They measure flow as high as 20 standard liters per minute (SLPM) while inducing a maximum pressure drop of 2.25" H₂O. The microbridge chip is in direct contact with the flow stream, greatly reducing error possibilities due to orifice or bypass channel clogging.

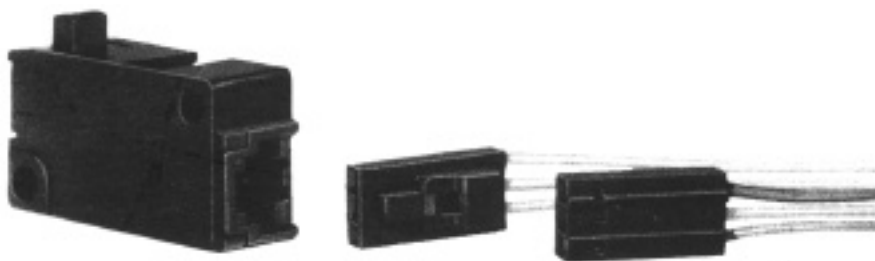
Catalog Listing	Flow Range
AWM5101VA	5 SLPM, Argon calibration
AWM5101VC	5 SLPM, CO ₂ calibration
AWM5101VN	5 SLPM, N ₂ calibration
AWM5102VA	10 SLPM, Argon calibration
AWM5102VC	10 SLPM, CO ₂ calibration
AWM5102VN	10 SLPM, N ₂ calibration
AWM5103VA	15 SLPM, Argon calibration
AWM5103VC	15 SLPM, CO ₂ calibration
AWM5103VN	15 SLPM, N ₂ calibration
AWM5104VA	20 SLPM, Argon calibration
AWM5104VC	20 SLPM, CO ₂ calibration
AWM5104VN	20 SLPM, N ₂ calibration

Hall Effect Switches Mechanically Operated

VX Series

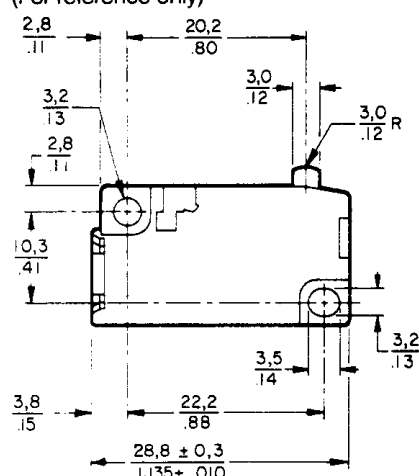
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CONTROLS & SENSORS



TYPICAL DIMENSIONS

(For reference only)



FEATURES

- Hall effect sensor operated by magnet in plunger
- Low force operation
- 4.5 to 24 VDC supply voltage
- -40°C to +70°C operating temperature
- Direct interface to solid state circuits
- Reverse voltage protection
- Digital current sinking, normally high or normally low output (10 mA)
- Wide variety of actuators . . . uses all standard MICRO SWITCH V3 levers*
- Industry standard mounting holes
- No external terminals . . . uses standard keyed and locking plug-in connectors

Termination

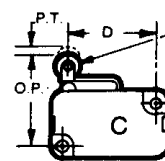
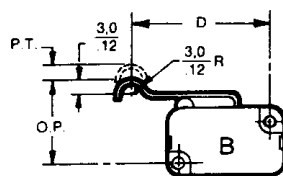
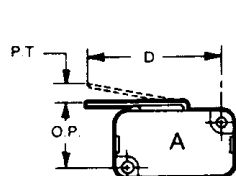
Terminal pins accept connectors (not furnished).

1. AMP 102241-1
MICRO SWITCH part number:
VX1A — connector & receptacle unassembled.
VX1A-01 — connector & receptacle pre-assembled with 5.4", 24 gauge lead wires.

VX SERIES ORDER GUIDE

Catalog Listing		Operating Force Ounces	Max. Free Position	Operating Point	Overtravel (Min.)	Differential Travel (Max.)
Normally High	Normally Low					
VX10	VX11	.35 \pm .18 -.14	.645	.580 \pm .02	.040	.014
VX80	VX81	3.0 \pm .88				

Actuating lever examples.



4.8/19 DIA X 4.8/19 WIDE
OIL BRONZE ROLLER
(CONCENTRICITY 0.13/.005 TIR)

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