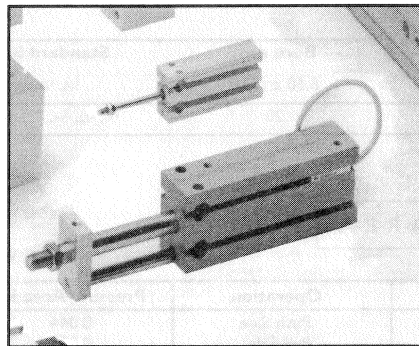
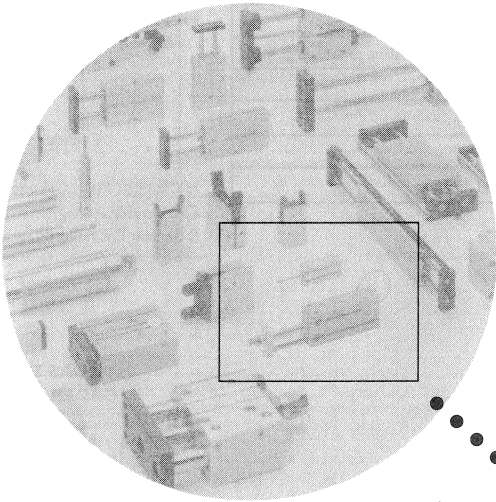
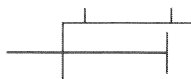


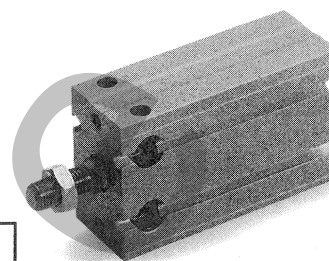
High Multi Cylinders





HYMDAS STANDARD, DOUBLE ACTING SPECIFICATIONS

Bore mm (inches)	6 (0.236)	10 (0.394)	16 (0.630)	20 (0.787)
Operation	Double Acting			
Operating Pressure Range psi	21~100	14~100	12~100	
Operating Temperature Range F° (C°)	32~140 (0~60)			
Operating Speed Range in/s	2~19.5			
Cushion	Rubber Bumper			
Lubrication	Not required, but if used, specify turbine oil type 1 (ISO VG32 or equivalent, or lithium grease)			
Filtration	40 micron			
Ports	10-32 UNC			
Sensors	Piston-mounted magnet is standard.			
Major Materials	Anodized aluminum, stainless steel, brass, nitrile.			



HYMDAS, HIGH MULTI SERIES CYLINDER ORDER CODES

HYMDAS 16 x 2

Cylinder Bore x Stroke

HYM: High Multi Cylinder
DA: Double Acting
S: Sensor Cylinder (Magnet Standard)

HYMDAS WEIGHT VS STROKE

Strokes in Bore	1/4	1/2	3/4	1	1 1/4	1 1/2	2
6 mm	0.8(25)	1(31)	1.1(34)	1.2(37)	1.3(40)	—	—
10 mm	1.1(34)	1.35(42)	1.5(46)	1.6(50)	1.7(54)	—	—
16 mm	2.3(73)	2.7(85)	2.9(91)	3.1(97)	3.3(103)	—	—
20 mm	4.9(154)	5.8(180)	6.2(193)	6.6(206)	7.0(219)	7.9(245)	8.7(271)

Weight: ounces (grams)

HYMDAS (STANDARD DOUBLE ACTING) STANDARD STROKES

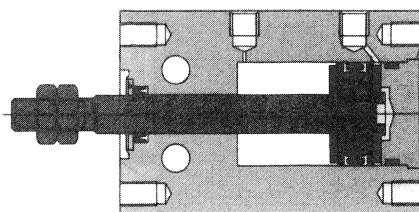
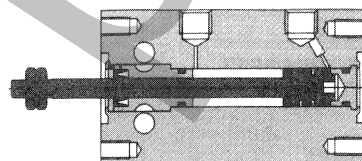
Operation	Bore mm	Standard Strokes inch
Double Acting	6, 10 and 16	1/4, 1/2, 3/4, 1, 1 1/4
Double Acting	20	1/4, 1/2, 3/4, 1, 1 1/4, 1 1/2, 1 3/4, 2

PISTON AREA

Bore Size	Operation	Pressure Area in²	Piston Rod Size mm
6 mm	Push Side	0.044	3
	Pull Side	0.033	
10 mm	Push Side	0.122	5
	Pull Side	0.091	
16 mm	Push Side	0.311	6
	Pull Side	0.267	
20 mm	Push Side	0.487	10
	Pull Side	0.364	

Ø 6

Ø 10 • Ø 16



HYMDAS SENSOR ORDER CODES

ZE 102 A - HP

Lead Wire Length

A: 1000mm (39.37 inches)
B: 3000mm (118.11 inches)

Sensor Switch Type

ZE135: 2 wires, horizontal lead, solid state with LED (PNP, sourcing)
10 ~ 28VDC

ZE155: 3 wires, horizontal lead, solid state with LED (NPN, sinking)
4.5 ~ 28VDC

ZE235: 2 wires, vertical lead, solid state with LED (PNP, sourcing)
10 ~ 28VDC

ZE255: 3 wires, vertical lead, solid state with LED (NPN, sinking)
4.5 ~ 28VDC

ZE101: 2 wires, horizontal lead, reed switch without LED
5 ~ 28VDC, 85 ~ 115VAC

ZE102: 2 wires, horizontal lead, reed switch with LED
10 ~ 28VDC, 85 ~ 115VAC

ZE201: 2 wires, vertical lead, reed switch without LED
5 ~ 28VDC, 85 ~ 115VAC

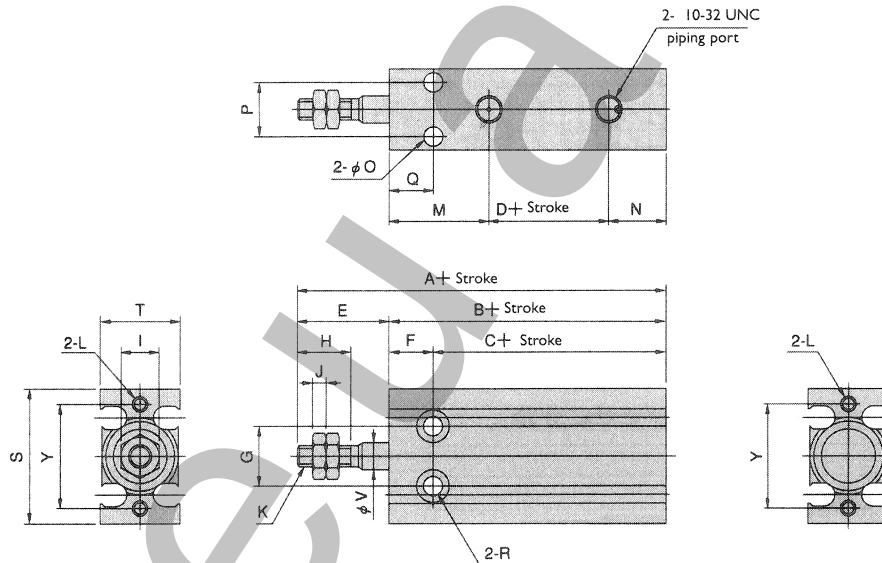
ZE202: 2 wires, vertical lead, reed switch with LED
10 ~ 28VDC, 85 ~ 115VAC

Ø 6 • Ø 10 • Ø 16

Bore Codes	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
6	48 (1.89)	33 (1.299)	26 (1.024)	7 (0.276)	15 (0.591)	7 (0.276)	11 (0.433)	7 (0.276)	5.5 (0.217)	1.8 (0.071)	4-40 UNC	4-40 UNC depth 0.20 in	15.5 (0.61)	10.5 (0.413)	3.4 (0.134)
10	53 (2.087)	36 (1.417)	28 (1.102)	7.5 (0.295)	17 (0.669)	8 (0.315)	11 (0.433)	10 (0.394)	7 (0.276)	2.4 (0.094)	8-32 UNC	4-40 UNC depth 0.20 in	18 (0.709)	10.5 (0.413)	3.4 (0.134)
16	58 (2.283)	40 (1.575)	31 (1.22)	8 (0.315)	18 (0.709)	9 (0.354)	14 (0.551)	12 (0.472)	8 (0.315)	3.2 (0.126)	10-32 UNC	8-32 UNC depth 0.24 in	20 (0.787)	12 (0.472)	4.5 (0.177)

Bore Codes	P	Q	R	S	T	V	Y
6	8 (0.315)	7 (0.276)	ø3.4 Hole with counter bore ø6, to a depth of 5	24 (0.945)	13 (0.512)	3 (0.118)	19
10	10 (0.394)	8 (0.315)	ø3.4 Hole with counter bore ø6, to a depth of 5	25 (0.984)	15 (0.591)	5 (0.197)	19
16	12 (0.472)	9 (0.354)	ø4.5 Hole with counter bore ø7.6, to a depth of 6.5	33 (1.299)	20 (0.787)	6 (0.236)	25

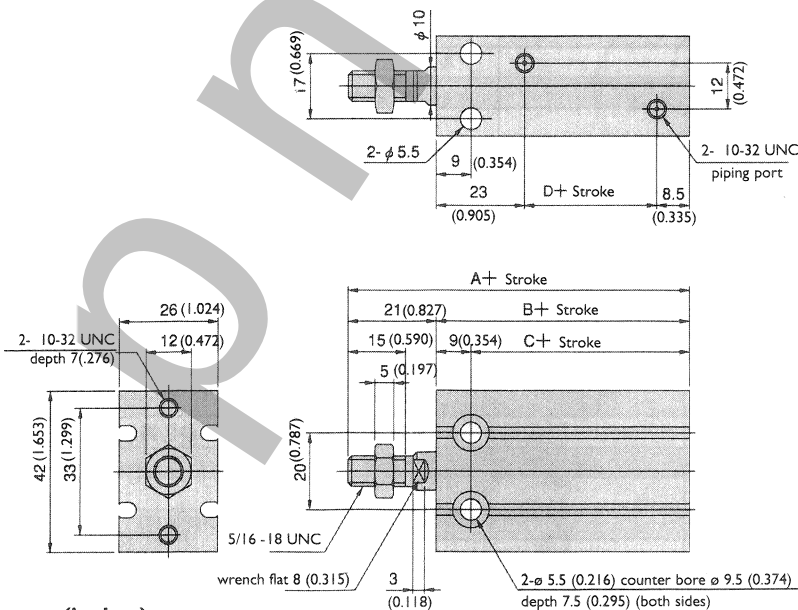
mm (inches)



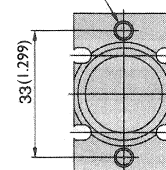
Ø 20

Bore Codes	A	B	C	D
20	71 (2.795)	50 (1.969)	41 (1.614)	18.5 (0.728)

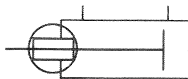
mm (inches)



2- 10-32 UNC, depth 7 (0.276)

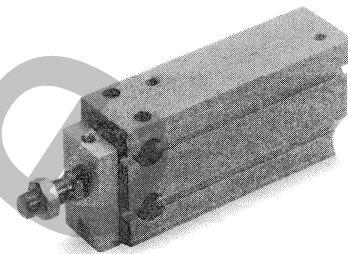


mm (inches)



HYMDALS NON-ROTATING, DOUBLE ACTING SPECIFICATIONS

Bore mm (inches)	6 (0.236)	10 (0.394)	16 (0.630)	20 (0.787)
Operation	Double Acting			
Operating Pressure Range psi	29~100	21~100	14.5~100	
Operating Temperature Range F° (C°)	32~140 (0~60)			
Operating Speed Range in/s	2~19.5			
Cushion	Rubber Bumper			
Lubrication	Not required, but if used, specify turbine oil type I (ISO VG32 or equivalent, or lithium grease).			
Filtration	40 micron			
Ports	10-32 UNC			
Sensors	Piston-mounted magnet is standard.			
Non-Rotating Accuracy	±0.8°			±0.5°
Major Materials	Anodized aluminum, stainless steel, brass, nitrile.			



HYMDALS, HIGH MULTI SERIES CYLINDER ORDER CODES

HYMDALS 16 x 1

Cylinder Bore x Stroke

HYM: High Multi Cylinder
DAL: Double Acting, Non-Rotating Cylinder
S: Sensor Cylinder (Magnet Standard)

HYMDALS WEIGHT VS STROKE

Strokes in Bore	1/4	1/2	3/4	1	1 1/4	1 1/2	2
6 mm	1(31)	1.2(37)	1.3(40)	1.4(43)	1.5(46)	—	—
10 mm	1.35(42)	1.6(50)	1.7(54)	1.9(58)	2.0(62)	—	—
16 mm	2.7(85)	3.1(97)	3.3(103)	3.5(109)	3.7(115)	—	—
20 mm	5.8(182)	6.7(208)	7.1(221)	7.5(234)	7.9(247)	8.8(273)	9.6(299)

Weight: ounces (grams)

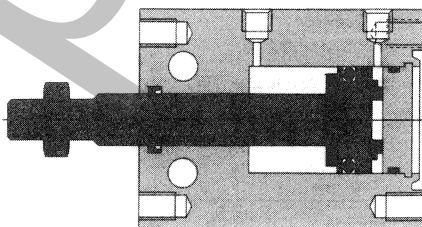
HYMDALS (NON-ROTATING) STANDARD STROKES

Operation	Bore mm	Standard Strokes inch
Double Acting	6, 10 and 16	1/4, 1/2, 3/4, 1, 1 1/4
Double Acting	20	1/4, 1/2, 3/4, 1, 1 1/4, 1 1/2, 1 3/4, 2

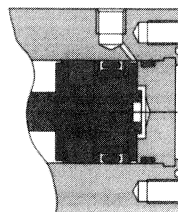
PISTON AREA

Bore Size	Operation	Pressure Area in ²	Piston Rod Size mm
6 mm	Push Side Pull Side	0.044 0.033	3
10 mm	Push Side Pull Side	0.122 0.091	5
16 mm	Push Side Pull Side	0.311 0.267	6
20 mm	Push Side Pull Side	0.487 0.364	10

Ø 2.0



Sensor Cylinder



HYMDALS SENSOR ORDER CODES

ZE 102 A - HP

Lead Wire Length

A: 1000mm (39.37 inches)
B: 3000mm (118.11 inches)

Sensor Switch Type

ZE135: 2 wires, horizontal lead, solid state with LED (PNP, sourcing)
10 ~ 28VDC

ZE155: 3 wires, horizontal lead, solid state with LED (NPN, sinking)
4.5 ~ 28VDC

ZE235: 2 wires, vertical lead, solid state with LED (PNP, sourcing)
10 ~ 28VDC

ZE255: 3 wires, vertical lead, solid state with LED (NPN, sinking)
4.5 ~ 28VDC

ZE101: 2 wires, horizontal lead, reed switch without LED
5 ~ 28VDC, 85 ~ 115VAC

ZE102: 2 wires, horizontal lead, reed switch with LED
10 ~ 28VDC, 85 ~ 115VAC

ZE201: 2 wires, vertical lead, reed switch without LED
5 ~ 28VDC, 85 ~ 115VAC

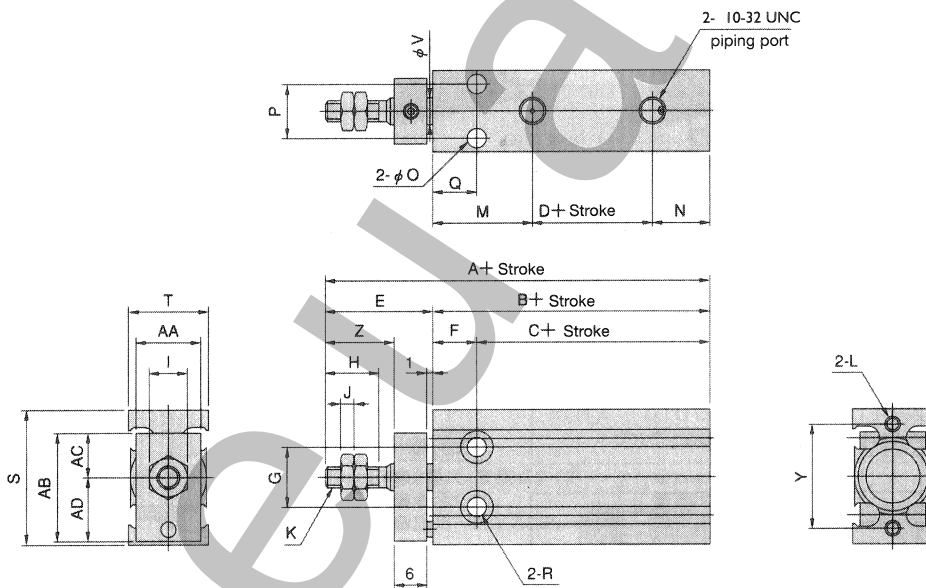
ZE202: 2 wires, vertical lead, reed switch with LED
10 ~ 28VDC, 85 ~ 115VAC

Ø 6 • Ø 10 • Ø 16

Bore Codes	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
6	48 (1.89)	33 (1.299)	26 (1.024)	7 (0.276)	15 (0.591)	7 (0.276)	11 (0.433)	7 (0.276)	5.5 (0.217)	1.8 (0.071)	4-40 UNC	4-40 UNC depth 0.20 in	15.5 (0.61)	10.5 (0.413)	3.4 (0.134)
10	58 (2.283)	36 (1.417)	28 (1.102)	7.5 (0.295)	22 (0.866)	8 (0.315)	11 (0.433)	10 (0.394)	7 (0.276)	2.4 (0.094)	8-32 UNC	4-40 UNC depth 0.20 in	18 (0.709)	10.5 (0.413)	3.4 (0.134)
16	63 (2.48)	40 (1.575)	31 (1.22)	8 (0.315)	23 (0.906)	9 (0.354)	14 (0.551)	12 (0.472)	8 (0.315)	3.2 (0.126)	10-32 UNC	8-32 UNC depth 0.24 in	20 (0.787)	12 (0.472)	4.5 (0.177)

Bore Codes	P	Q	R	S	T	V	Y	Z	AA	AB	AC	AD
6	8 (0.315)	7 (0.276)	Ø3.4 Hole with counter bore Ø6, to a depth of 5	24 (0.945)	13 (0.512)	3 (0.118)	19 (0.748)	8 (0.315)	12 (0.472)	20 (0.787)	8.5 (0.335)	11.5 (0.453)
10	10 (0.394)	8 (0.315)	Ø3.4 Hole with counter bore Ø6, to a depth of 5	25 (0.984)	15 (0.591)	5 (0.197)	19 (0.748)	15 (0.591)	12 (0.472)	20 (0.787)	8 (0.315)	12 (0.472)
16	12 (0.472)	9 (0.354)	Ø4.5 Hole with counter bore Ø7.6, to a depth of 6.5	33 (1.299)	20 (0.787)	6 (0.236)	25 (0.984)	16 (0.63)	15 (0.591)	25 (0.984)	9.5 (0.374)	15.5 (0.61)

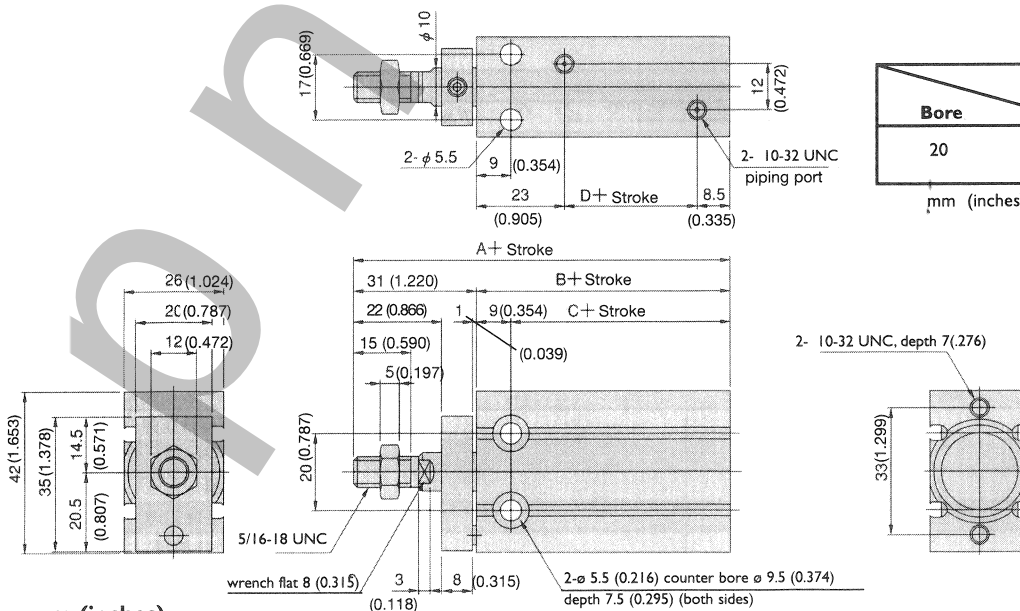
mm (inches)



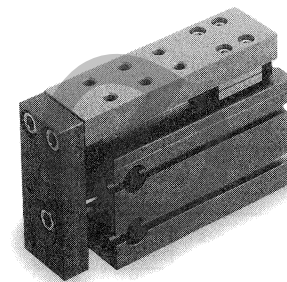
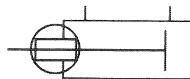
Ø 20

Bore Codes	A	B	C	D
20	81 (3.189)	50 (1.969)	41 (1.614)	18.5 (0.728)

mm (inches)



mm (inches)



HYMDAGS DOUBLE ACTING WITH GUIDE SPECIFICATIONS

Bore mm (inches)	6 (0.236)	10 (0.394)	16 (0.630)	20 (0.787)
Operation	Double Acting			
Operating Pressure Range psi	29~100	21~100	14~100	
Operating Temperature Range F°(C°)	32~140 (0~60)			
Operating Speed Range in/s	3.9~19.5	1.9~19.5		
Cushion	Rubber Bumper			
Lubrication	Not required, but if used, specify turbine oil type 1 (ISO VG32 or equivalent, or lithium grease)			
Filtration	40 micron			
Ports	10-32 UNC			
Sensors	Piston-mounted magnet is standard.			
Allowable Moment Pitch lb•in	3.452		4.514	9.027
Allowable Moment Roll lb•in	5.133		9.027	18.409
Allowable Moment Yaw lb•in	4.160		4.514	9.027
Major Materials	Anodized aluminum, stainless steel, brass, nitrile.			

HYMDAGS, HIGH MULTI SERIES CYLINDER ORDER CODES

HYMDAGS 16 x 2-L

-L: Piping Base Optional

Cylinder Bore x Stroke

HYM: High Multi Cylinder

DAG: Double Acting Cylinder with Guide

S: Sensor Cylinder (Magnet Standard)

HYMDAGS WEIGHT VS STROKE

Actuator only

Strokes in Bore	1/2	3/4	1 1/4	1 1/2	2	2 3/8
6 mm	1.6(50)	1.9(59)	2.2(68)	2.5(77)	2.8(86)	3.0(95)
10 mm	2.1(66)	2.5(77)	2.8(88)	3.2(99)	3.5(110)	3.9(121)
16 mm	4.5(140)	5.1(158)	5.6(176)	6.2(194)	6.8(212)	7.4(230)
20 mm	8.8(273)	9.9(387)	11.0(341)	12.0(375)	13.1(409)	14.2(443)

Weight: ounces (grams)

Actuator and piping base

Strokes in Bore	1/2	3/4	1 1/4	1 1/2	2	2 3/8
6 mm	2.4(76)	2.9(90)	3.3(104)	3.8(118)	4.2(132)	4.7(146)
10 mm	3.0(94)	3.5(109)	4.0(125)	4.5(140)	5.0(155)	5.5(171)
16 mm	6.0(186)	6.8(211)	7.5(235)	8.3(260)	9.1(284)	9.9(309)
20 mm	11.1(345)	12.4(387)	13.8(429)	15.1(471)	16.5(513)	17.8(555)

Weight: ounces (grams)

HYMDAGS (DOUBLE ACTING WITH GUIDE AND PIPING BASE) STANDARD STROKES

Operation	Bore mm	Standard Strokes inch
Double Acting	6, 10, 16 and 20	1/2, 3/4, 1 1/4, 1 1/2, 2, 2 3/8

PISTON AREA

Bore Size	Operation	Pressure Area in²	Piston Rod Size mm
6 mm	Push Side	0.044	3
	Pull Side	0.033	
10 mm	Push Side	0.122	5
	Pull Side	0.091	
16 mm	Push Side	0.311	6
	Pull Side	0.267	
20 mm	Push Side	0.487	10
	Pull Side	0.364	

HYMDAGS SENSOR ORDER CODES

ZE 102 A - HP

Lead Wire Length

A: 1000mm (39.37 inches)

B: 3000mm (118.11 inches)

Sensor Switch Type

ZE135: 2 wires, horizontal lead, solid state with LED (PNP, sourcing)
10 ~ 28VDC

ZE155: 3 wires, horizontal lead, solid state with LED (NPN, sinking)
4.5 ~ 28VDC

ZE235: 2 wires, vertical lead, solid state with LED (PNP, sourcing)
10 ~ 28VDC

ZE255: 3 wires, vertical lead, solid state with LED (NPN, sinking)
4.5 ~ 28VDC

ZE101: 2 wires, horizontal lead, reed switch without LED
5 ~ 28VDC, 85 ~ 115VAC

ZE102: 2 wires, horizontal lead, reed switch with LED
10 ~ 28VDC, 85 ~ 115VAC

ZE201: 2 wires, vertical lead, reed switch without LED
5 ~ 28VDC, 85 ~ 115VAC

ZE202: 2 wires, vertical lead, reed switch with LED
10 ~ 28VDC, 85 ~ 115VAC

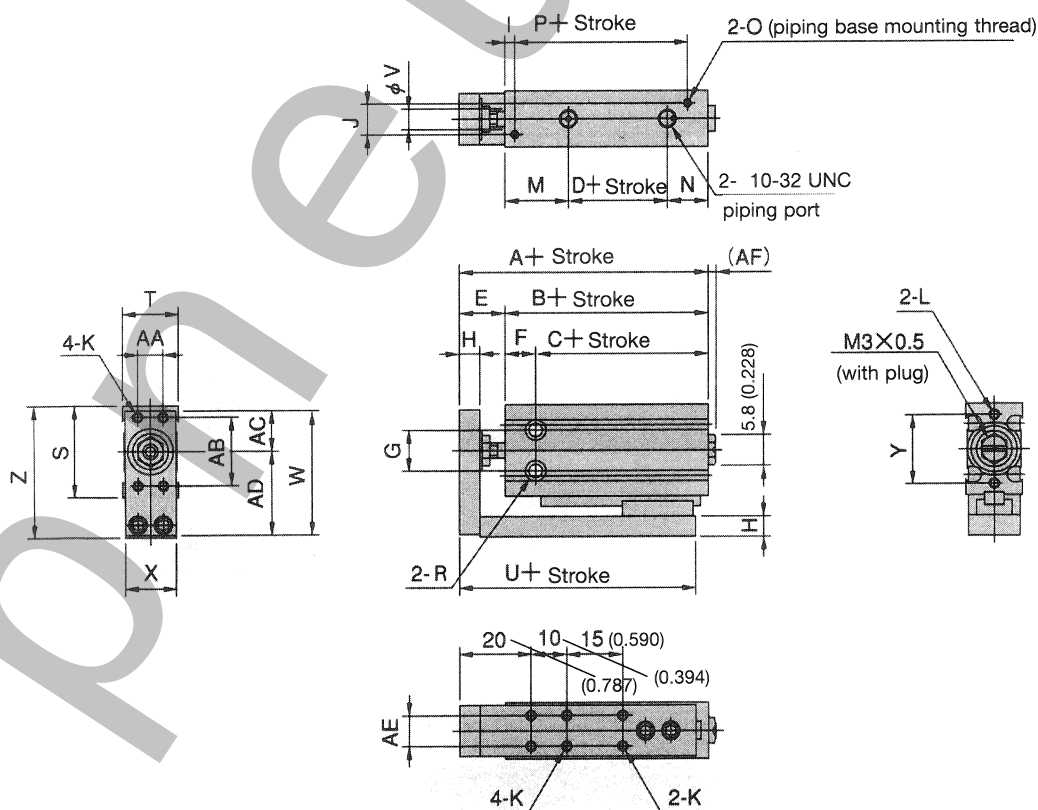
Ø 6 • Ø 10 • Ø 16

Bore	Codes	A	B	C	D	E	F	G	H	I	J	K	L	M	N
6		44 (1.732)	33 (1.299)	26 (1.024)	7 (0.276)	11 (0.433)	7 (0.276)	11 (0.433)	5 (0.197)	2.5 (0.098)	8 (0.315)	4-40 UNC	4-40 UNC depth 0.20 in	15.5 (0.61)	10.5 (0.413)
10		49 (1.929)	36 (1.417)	28 (1.102)	7.5 (0.295)	13 (0.512)	8 (0.315)	11 (0.433)	6 (0.236)	3 (0.118)	8 (0.315)	4-40 UNC	4-40 UNC depth 0.20 in	18 (0.709)	10.5 (0.413)
16		54 (2.126)	40 (1.575)	31 (1.22)	8 (0.315)	14 (0.551)	9 (0.354)	14 (0.551)	8 (0.315)	5 (0.197)	12 (0.472)	8-32 UNC	8-32 UNC depth 0.24 in	20 (0.787)	12 (0.472)

Bore	Codes	O	P	R	S	T	U	V	W	X	Y	Z
6		4-40 UNC	25.5 (1.004)	Ø 3.4 Hole with counter bore Ø 6, to a depth of 5	24 (0.945)	13 (0.512)	41 (1.614)	3 (0.118)	32 (1.26)	12 (0.472)	19 (0.748)	34.5 (1.358)
10		4-40 UNC	28 (1.102)	Ø 3.4 Hole with counter bore Ø 6, to a depth of 5	25 (0.984)	15 (0.591)	46 (1.811)	5 (0.197)	35 (1.378)	14 (0.551)	19 (0.748)	36.5 (1.437)
16		8-32 UNC	30 (1.181)	Ø 4.5 Hole with counter bore Ø 7.6, to a depth of 6.5	33 (1.299)	20 (0.787)	52 (2.047)	6 (0.236)	46 (1.811)	19 (0.748)	25 (0.984)	48 (1.89)

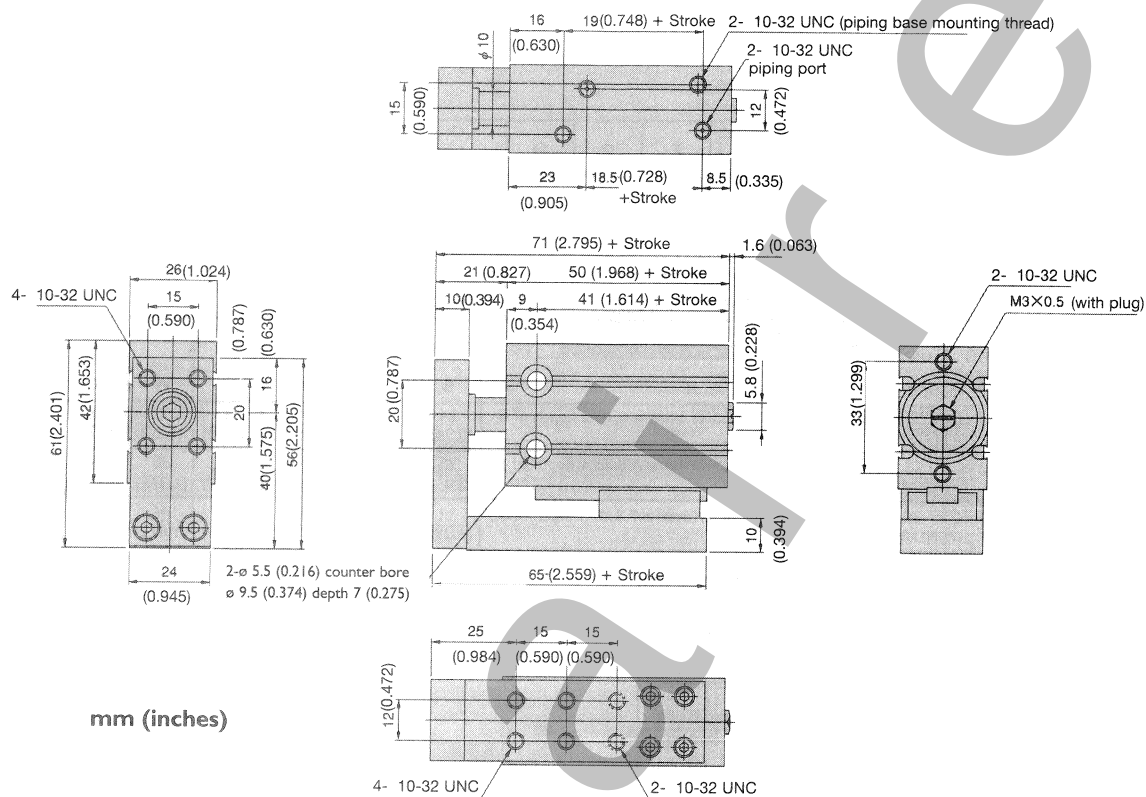
Bore	Codes	AA	AB	AC	AD	AE	AF
6		6 (0.236)	14 (0.551)	9.5 (0.374)	22.5 (0.886)	6 (0.236)	3.6 (0.142)
10		7 (0.276)	16 (0.63)	11 (0.433)	24 (0.945)	8 (0.315)	2.4 (0.094)
16		10 (0.394)	20 (0.787)	14.5 (0.571)	31.5 (1.24)	10 (0.394)	2.4 (0.094)

mm (inches)



mm (inches)

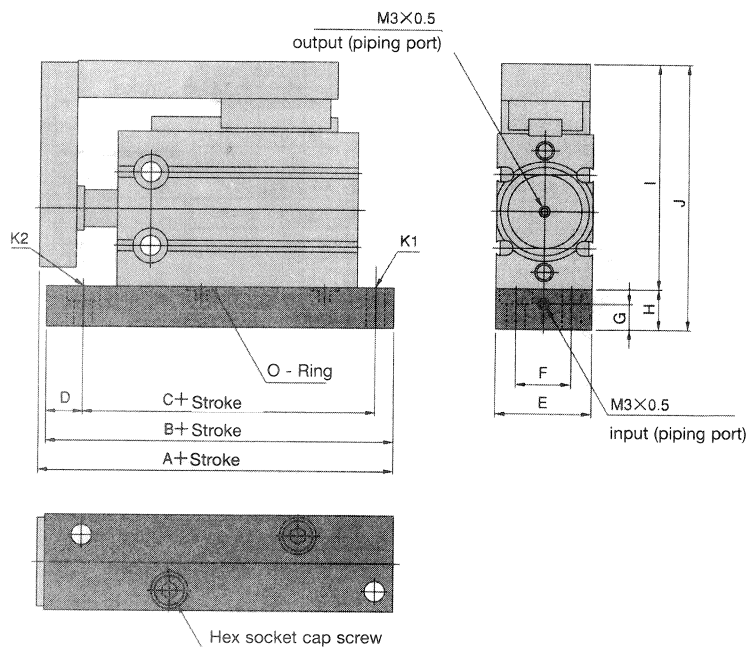
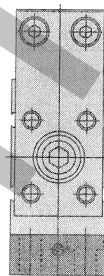
Ø 20



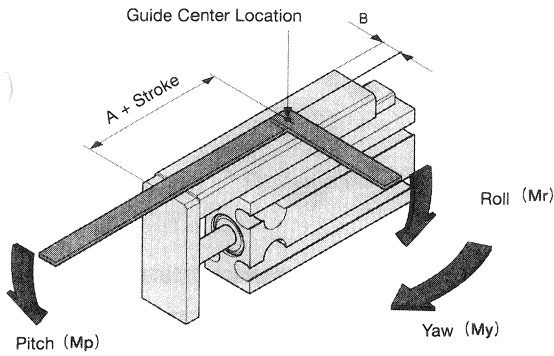
L-PIPING BASE

Bore mm \ Codes	A	B	C	D	E	F	G	H	I	J	K1	K2
6	51 (2.008)	49 (1.929)	41 (1.614)	5 (0.197)	15 (0.591)	9 (0.354)	6 (0.236)	10.5 (0.413)	34.5 (1.358)	45 (1.772)	ø3.4	ø3.4 Hole with counter bore ø6, to a depth of 2.5
10	56 (2.205)	52 (2.047)	44 (1.732)	5 (0.197)	15 (0.591)	9 (0.354)	6 (0.236)	10.5 (0.413)	36.5 (1.437)	47 (1.85)	ø3.4	ø3.4 Hole with counter bore ø6, to a depth of 2.5
16	63 (2.48)	61 (2.402)	51 (2.008)	6 (0.236)	21 (0.827)	12 (0.472)	7 (0.276)	11 (0.433)	48 (1.89)	59 (2.323)	ø4.5	ø4.5 Hole with counter bore ø7.5, to a depth of 4.4
20	81 (3.189)	79 (3.11)	64 (2.52)	10 (0.394)	26 (1.024)	15 (0.591)	7 (0.276)	11 (0.433)	61 (2.402)	72 (2.835)	ø5.5	ø5.5 hole with counter bore ø9.5, to a depth of 5.4

mm (inches)



Cylinder Bore	Bolts	Mounting Torque lb•in
6 • 10	M3 x 0.5	9.55
16	M4 x 0.7	21.68
20	M5 x 0.8	45.13



All measurements are taken from the Guide Center Location.

MAXIMUM BENDING MOMENTS

Bending Moments		lb•in	
Bore mm	Mp (Pitch)	Mr (Roll)	My (Yaw)
6	3.45	5.13	4.16
10	3.45	5.13	4.16
16	4.51	9.03	4.51
20	9.03	18.41	9.03

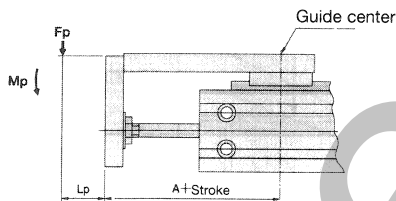
Caution: If HYMDAGS cylinders are used in excess of maximum bending moments, the guides will weaken and lose accuracy, shortening the life of the cylinder.

MOMENTS FROM GUIDE CENTER LOCATION DISTANCE COMPENSATION

Bore mm	A	B
6	30 (1.18)	6 (0.24)
10	35 (1.38)	7 (0.27)
16	39 (1.53)	9.5 (0.37)
20	49 (1.93)	12 (0.47)

mm (inches)

ALLOWABLE LOADS F_p , F_y , F_r CALCULATION FORMULA



PITCH MOMENT: F_p (lbs)

$$F_p = \frac{M_p}{L_p + (A + \text{stroke})}$$

L_p : Distance between the plate and the load (inches)
 $A + \text{Stroke}$: Distance between the plate and the center of the guide (inches)
 Stroke: Cylinder stroke (inches)

Example:

Pitch Moment (F_p)

A 16 mm bore, $\frac{3}{4}$ inch stroke HYMDAGS has $\frac{1}{2}$ lb force applied to the top of the guide. The distance L_p is 1 inch. Is this within the allowable Pitch bending moment specifications for this actuator?

Solution:

$$F_p = \frac{M_p}{L_p + (A + \text{stroke})}$$

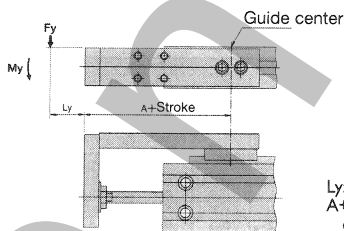
$$M_p = (F_p) (L_p + A + \text{stroke})$$

$$M_p = (.5 \text{ lb}) (1 \text{ in} + 1.53 \text{ in} + .75 \text{ in})$$

$$M_p = (.5 \text{ lb}) (3.28 \text{ in})$$

$$M_p = 1.64 \text{ lb} \cdot \text{in}$$

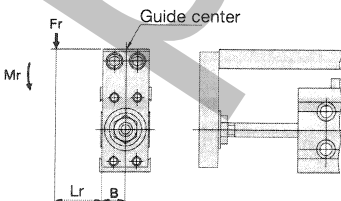
Comparing the calculated M_p value to the maximum M_p value, $1.64 \text{ lb} \cdot \text{in} \leq 4.51 \text{ lb} \cdot \text{in}$, therefore in this application, F_p is an acceptable force on the actuator.



YAW MOMENT: F_y (lbs)

$$F_y = \frac{M_y}{L_y + (A + \text{stroke})}$$

L_y : Distance between the plate and the load (inches)
 $A + \text{Stroke}$: Distance between the plate and the center of the guide (inches)
 Stroke: Cylinder stroke (inches)

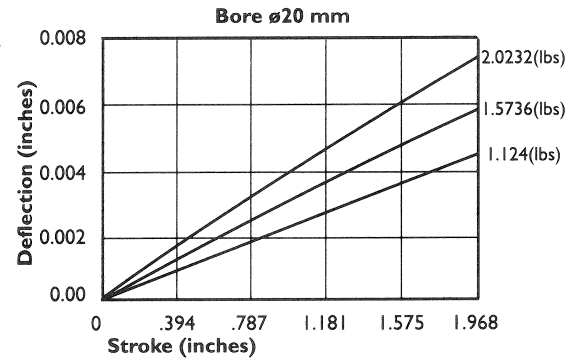
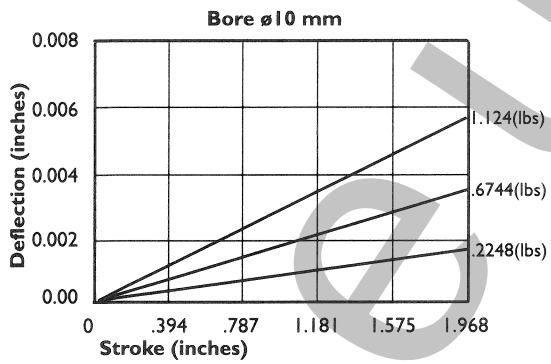
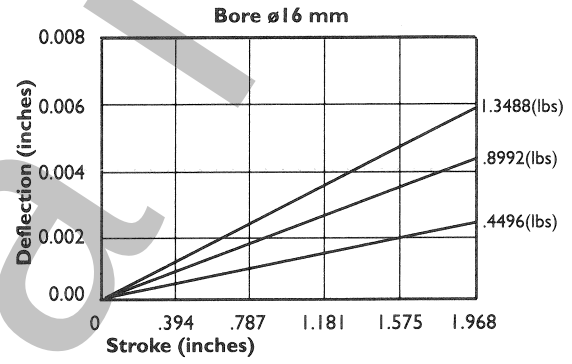
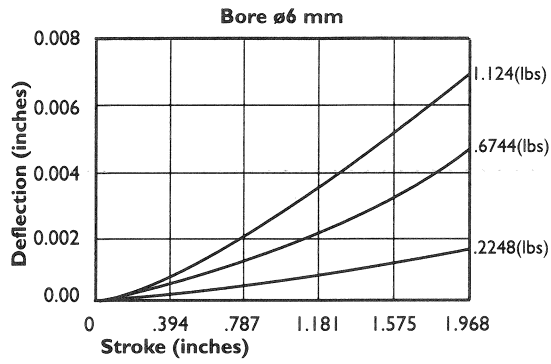
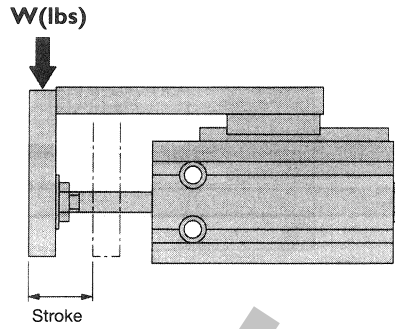


ROLL MOMENT: F_r (lbs)

$$F_r = \frac{M_r}{L_r + B}$$

L_r : Distance between the plate and the load (inches)
 B : Distance to the center of the guide (inches)

DEFLECTION



SOLID STATE TYPE

Item	Model	ZE135	ZE155	ZE235	ZE255
Sensor Type		DC 2-wire type, PNP (sourcing)	DC 3-wire type, NPN (sinking)	DC 2-wire type, PNP (sourcing)	DC 3-wire type, NPN (sinking)
Lead Wire Direction		Horizontal		Vertical	
Power Supply Voltage		—	DC 4.5~28V	—	DC 4.5~28V
Load Voltage		DC 10~28V	DC 4.5~28V	DC 10~28V	DC 4.5~28V
Load Current		4~20 mA (at 25°C, 10 mA at 60°C)	50 mA MAX.	4~20 mA (at 25°C, 10 mA at 60°C)	50 mA MAX.
ON Current Consumption		—	10 mA MAX. (DC 24V)	—	10 mA MAX. (DC 24V)
Internal Voltage Drop ^{note 1}		4.5V MAX.	0.5V MAX. (<10V at 20 mA)	4.5V MAX.	0.5V MAX. (<10V at 20 mA)
Leakage Current		1 mA MAX. (DC 24V, 25°C)	50 µA MAX. (DC 24V)	1 mA MAX. (DC 24V, 25°C)	50 µA MAX. (DC 24V)
Delay Time		1 ms MAX.			
Insulation Resistance		100 MΩ MIN.			
Dielectric Strength		AC500V (50/60Hz) 1 min. (between case and lead wire)			
Shock Resistance		30.0G			
Vibration Resistance		9.0G Total amplitude 1.5 mm, 10~55Hz			
Environmental Protection		IP67 IEC standard (JIS C0920)			
Indicator Lamp		ON : Red LED			
Lead Wire ^{note 2}		(2x0.15 mm ²) Brown/Blue X ℓ	(3x0.15 mm ²) Brown/Blue/Black X ℓ	(2x0.15 mm ²) Brown/Blue X ℓ	(3x0.15 mm ²) Brown/Blue/Black X ℓ
Temperature Range F° (C°)		32~140 (0~60)			
Storage Temperature F° (C°)		14~158 (-10~70)			
Weight ounces		.48 (for lead wire length A : 1000mm), 1.13 (for lead wire length B : 3000mm)			

Notes:

1. Internal voltage drop depends on load current.
2. Lead wire length A : 1000mm, B : 3000mm. All are PCCV insulated cable.

REED SWITCH TYPE

Item	Model	ZE101	ZE102	ZE201	ZE202
Sensor Type		DC 2-wire type			
Lead Wire Direction		Horizontal		Vertical	
Load Voltage		DC 5~28V	AC 85~115V(r.m.s.)	DC 10~28V	AC 85~115V(r.m.s.)
Load Current		40 mA MAX.	20 mA MAX.	5~40 mA	5~20 mA
Internal Voltage Drop ^{note 1}		10 mV MAX. (at load current DC40mA)	3.0V MAX.	10 mV MAX. (at load current DC40mA)	3.0V MAX.
Leakage Current		0 mA			
Delay Time		1 ms MAX.			
Insulation Resistance		100 MΩ MIN.			
Dielectric Strength		AC500V (50/60Hz) 1 min. (between case and lead wire)			
Shock Resistance		294m/s ² (30.0G) (non repeated shock)			
Vibration Resistance		88.3m/s ² (9.0G) Total amplitude 1.5mm, 10~55Hz, Resonance frequency 2750±250Hz			
Environmental Protection		IP67 IEC standard (JIS C0920)			
Indicator Lamp		None	ON : Red LED	None	ON : Red LED
Lead Wire ^{note 2}		PVC insulated cable (2x0.15 mm ²) Brown/Blue X ℓ			
Temperature Range F° (C°)		32~140 (0~60)			
Storage Temperature F° (C°)		14~158 (-10~70)			
Sensor Switch Protection		Required			
Weight ounces		.48 (for lead wire length A : 1000mm), 1.13 (for lead wire length B : 3000mm)			

Notes:

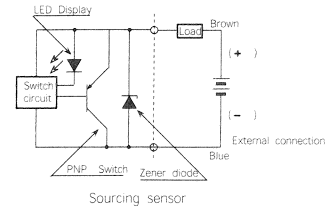
1. Internal voltage drop depends on load current.
2. Lead wire length A : 1000mm, B : 3000mm.

CIRCUITRY

SOLID STATE TYPE

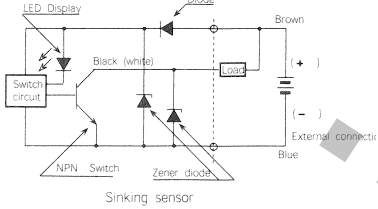
2-WIRE TYPE

ZE 135, ZE 235



3-WIRE TYPE

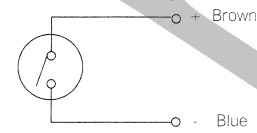
ZE 155, ZE 255



REED SWITCH TYPE

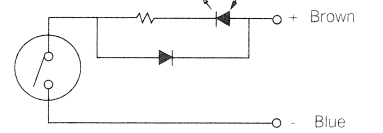
WITHOUT INDICATOR

ZE 101, ZE 201



WITH INDICATOR

ZE 102, ZE 202

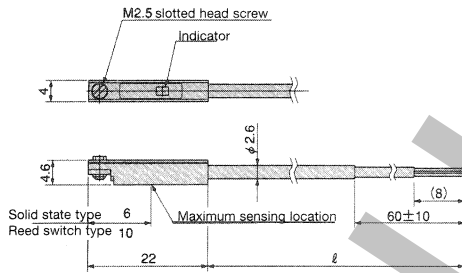


DIMENSIONS OF SENSOR SWITCH

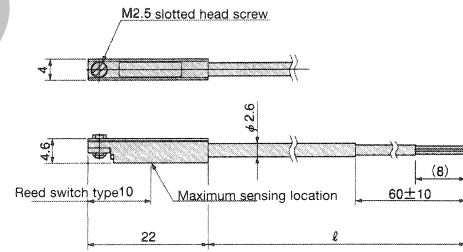
(UNIT: MM)

HORIZONTAL LEAD WIRE

WITH INDICATOR

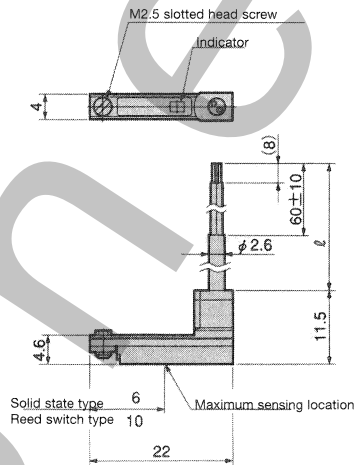


WITHOUT INDICATOR

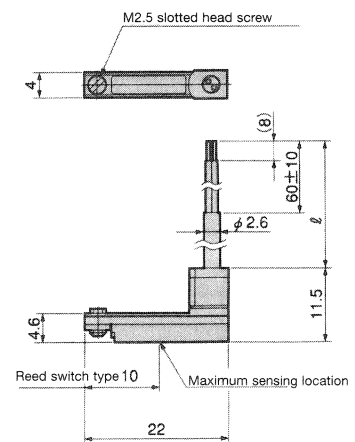


VERTICAL LEAD WIRE

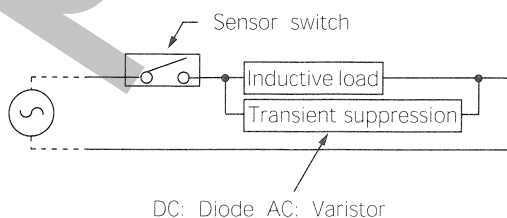
WITH INDICATOR



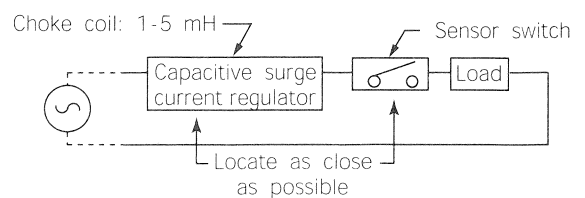
WITHOUT INDICATOR



USE WITH INDUCTIVE LOADS (MAGNETIC RELAYS, ETC.)



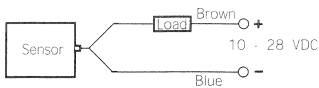
USE WITH LONG LEAD WIRES (10M) BETWEEN SENSOR SWITCH AND LOAD



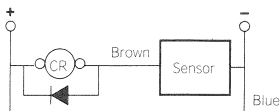
CONNECTING PROCEDURES FOR SOLID STATE SENSOR SWITCHES

3 - WIRE TYPE

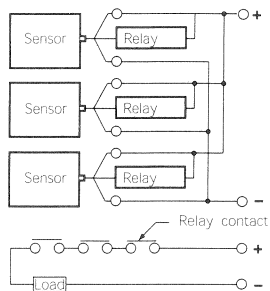
BASIC CONNECTION



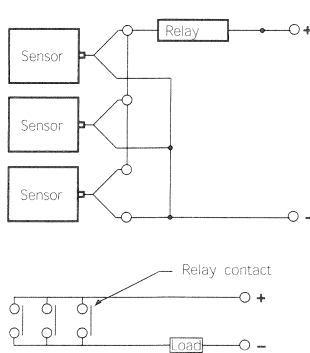
CONNECTION TO RELAY



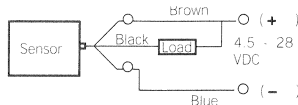
AND CONNECTION



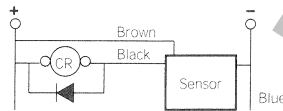
OR CONNECTION



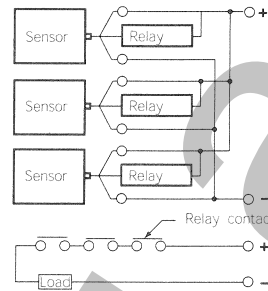
BASIC CONNECTION



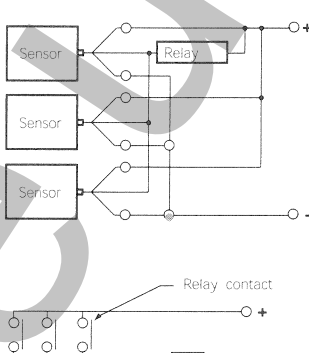
CONNECTION TO RELAY



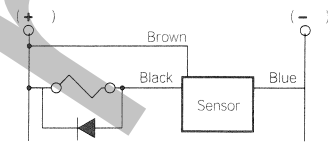
AND CONNECTION



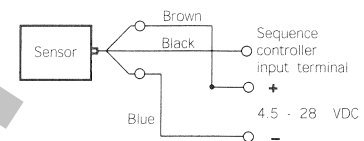
OR CONNECTION



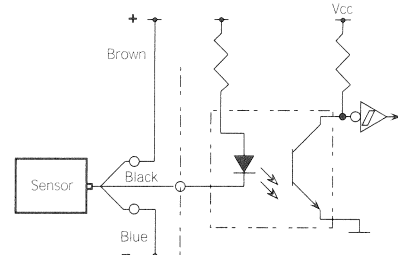
CONNECTION TO SOLENOID



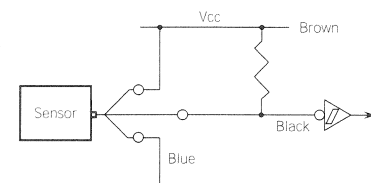
CONNECTION TO SEQUENCER



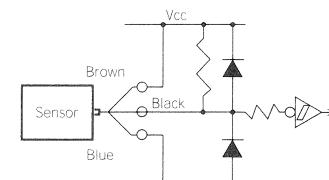
CONNECTION TO TTL



DIRECT CONNECTION



C-MOS CONNECTION



Notes:

1. Follow wire color code for proper connection; otherwise switch will malfunction or may be damaged.
2. Solid state 2-wire type sensor switches should not be connected to TTL or C-MOS.
3. Use of a surge protection diode is recommended for inductive loads such as relays.
4. For OR Connection, it is possible to directly connect outputs of sensor switches (for example, two brown wires). But the amount of leakage current will increase proportionally

by the number of sensor switches. Therefore, be cautious against load return failure.

5. Avoid using sensor switches in places where other strong magnetic forces are present or near large current such as power lines (switches are actuated by magnetism).
6. Use care with lead wires. Do not pull or bend lead wires excessively.
7. Do not use sensor switches in areas where chemically active agents or gases are present.
8. Consult us before using sensor switches in oily or wet surroundings.

CAUTION

Compressed air is powerful and may be dangerous. Before attempting to remove a component from air line or system, always disconnect the supply air and thoroughly exhaust the line or system. Never attempt to construct, operate or service anything using compressed air unless you have been properly trained to do so. Failure to heed this warning could result in SERIOUS, EVEN FATAL PERSONAL INJURY.

PLUMBING

Before connecting fittings and tubing, eliminate any foreign material that may have become lodged within. Be sure that valve and actuator ports are free of debris such as packaging material. If you use a sealant, make sure that it does not get inside of the components as it may cause them to malfunction.