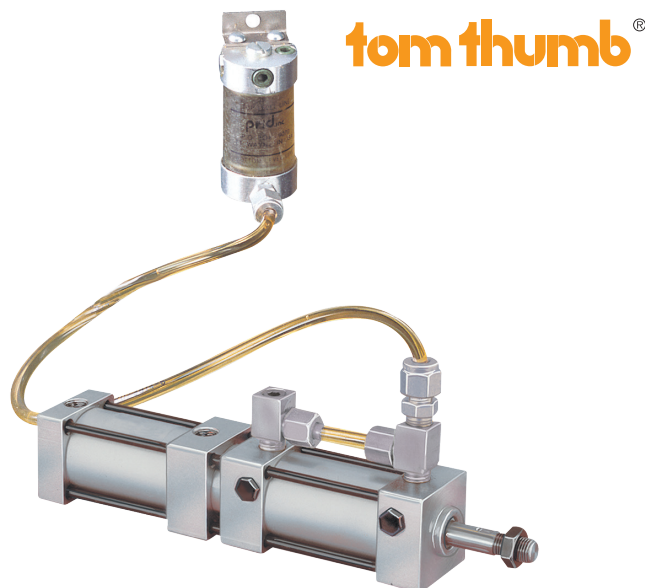


TD

3/4", 1", 1-1/8", 1-3/8" Bore

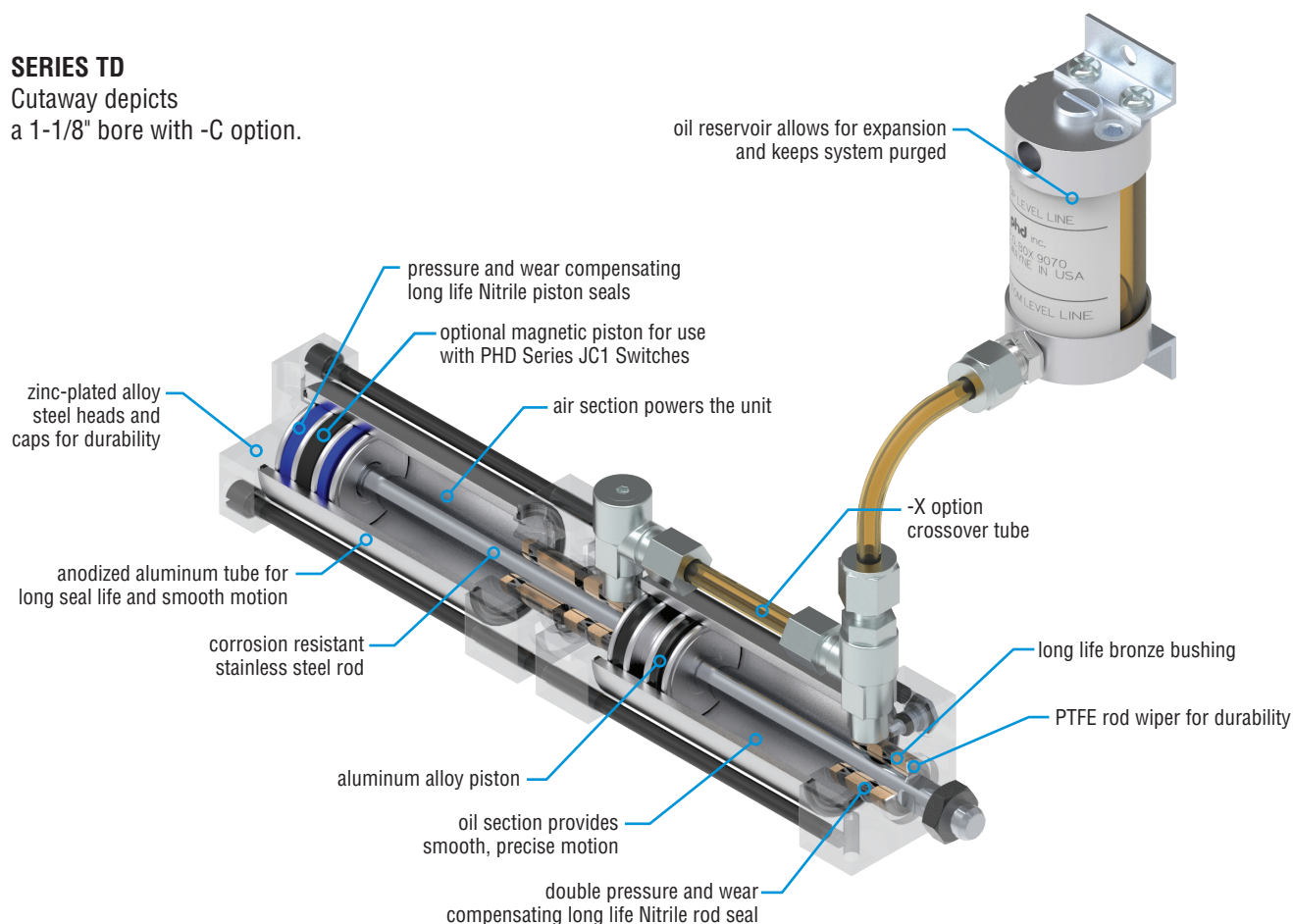
Major Benefits

- Precise speed control and smooth operation at low velocities with -C option
- Long life design for low maintenance
- NFPA repairable for extended life providing long term savings
- Wide range of options for easy application and reduced design time
- Wide range of mounting styles for easy installation



SERIES TD

Cutaway depicts a 1-1/8" bore with -C option.



ORDERING DATA: Series TD Cylinders - 3/4", 1", 1-1/8", 1-3/8" Bore

TO ORDER SPECIFY:
Series, Mounting Style,
Bore Size, Stroke, and Options.

CYLINDER SERIES
TD - 150 psi air

BORE SIZE
3/4" BORE
1/4" Rod Dia.
1/4-28 Thread

1" BORE
5/16" Rod Dia.
5/16-24 Thread

1-1/8" BORE
3/8" Rod Dia.
3/8-24 Thread

1-3/8" BORE
1/2" Rod Dia.
3/8-24 Thread



Options may affect unit length. See dimensional pages and option information details.

OPTIONS

E - Magnetic Piston for Series JC1 radial sensing switches
M - Magnetic Piston for Series JC1 reed and teachable switches
V - Fluoroelastomer Seals

TD

F

1-1/8

x

3

-

X

-

M

MOUNTING STYLE

F - Foot Mount, c'bored thru holes
B - Bottom Mount, tapped holes in head and cap
R - Rod Mount, tapped holes on front face of head
T - Thread Mount, threaded snout on head (shipped with mounting nut)
RF - Rod End Flange
CF - Cap End Flange
*L - Mount, Threaded snout and pilot diameter on head (shipped with mounting nut)
*P - Pivot Mount, pivot on cap
**K - Clevis Mount, clevis on cap

*Available on 3/4", 1", and 1-1/8" bore only
**Available on 1-3/8" bore only

STANDARD STROKE LENGTHS

3/4" BORE SIZE
1/4" to 6"
1" and 1-1/8" BORE SIZES
1/4" to 9"
in 1/4" increments
1-3/8" BORE SIZE
1/2" to 12"
in 1/2" increments

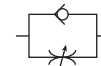
For longer strokes, consult PHD.

TANDEM OPTION

X - Crossover Tube must be specified to receive the unit with Crossover Tube and Fittings filled with oil for use as Air/Oil Tandem (crossover tube only)
C - Includes -X above with the reservoir plumbed to the head end. For use as Air/Oil crossover with reservoir

Standard Feature

PORT CONTROL®



**BUILT-IN METER OUT
FLOW CONTROL VALVE**

SERIES JC1xDx MAGNETIC SWITCHES

PART NO.	DESCRIPTION
JC1RDU-5	PNP or NPN DC Reed, 5 meter cable
JC1RDU-K	PNP or NPN DC Reed, Quick Connect
JC1ADU-K	AC Reed, Quick Connect (M12)
JC1HDP-5	PNP (Source), Radial Sensing, 5 meter cable
JC1HDP-K	PNP (Source), Radial Sensing, Quick Connect
JC1HDN-5	NPN (Sink), Radial Sensing, 5 meter cable
JC1HDN-K	NPN (Sink), Radial Sensing, Quick Connect

NOTE: Switches must be ordered separately.

CORDSETS FOR SERIES JC1xDx SWITCHES

PART NO.	DESCRIPTION
63549-02	M8, 3 pin, Straight Female Connector, 2 meter cable
63549-05	M8, 3 pin, Straight Female Connector, 5 meter cable
81284-1-010	M12, 4 pin, Straight Female Connector, 2 meter cable

NOTE: Cordsets are ordered separately.

SERIES JC1ST TWO POSITION TEACHABLE MAGNETIC SWITCHES

PART NO.	DESCRIPTION
JC1STP-2	PNP (Source), Solid State, 12-30 VDC, 2 meter cable
JC1STP-K	PNP (Source), Solid State, 12-30 VDC, Quick Connect

NOTE: Switches must be ordered separately.

CORDSET FOR SERIES JC1ST SWITCHES

PART NO.	DESCRIPTION
81284-1-001	M8, 4 pin, Straight Female Connector, 5 meter cable

NOTE: Cordsets are ordered separately.

SWITCH MOUNTING BRACKET

CYLINDER SIZE	BRACKET NO.	DESCRIPTION
3/4	92100	Mounts Series JC1 Switch to Tie Rod
1		
1-1/8		
1-3/8	92101	

NOTE: Brackets are ordered separately.



SPECIFICATIONS	SERIES TD
OPERATING PRESSURE STANDARD WITH -X OR -C	20 to 150 psi air 30 to 150 psi air
RESERVOIR PRESSURE	20 psi recommended
OPERATING TEMPERATURE	-20° to +180°F [-29° to +82°C]
STROKE TOLERANCE	±0.032
LUBRICATION	Permanently lubricated
TANDEM FLUID	SAE 32 weight oil (viscosity at 100°F is 158. SSU at 250° is 45.1)
MAINTENANCE	Field repairable

CYLINDER FORCE TABLE

SERIES	CYLINDER BORE	ROD DIAMETER	ROD DIRECTION	EFFECTIVE AREA FORCE		AIR CONSUMPTION at 80 psi CUBIC ft/in OF STROKE		DISPLACEMENT gal/in OF STROKE
				WITH -C OR -X	W/OUT -C OR -X	WITH -C OR -X	W/OUT -C OR -X	
				lb/psi	lb/psi			
TD	3/4	1/4	EXTEND	0.442	0.835	0.0016	0.0030	0.0019
			RETRACT	0.393	0.786	0.0014	0.0028	0.0017
	1	5/16	EXTEND	0.785	1.494	0.0029	0.0055	0.0034
			RETRACT	0.709	1.418	0.0026	0.0052	0.0031
	1-1/8	3/8	EXTEND	0.994	1.877	0.0037	0.0069	0.0043
			RETRACT	0.883	1.766	0.0032	0.0064	0.0038
	1-3/8	1/2	EXTEND	1.485	2.774	0.0055	0.0103	0.0064
			RETRACT	1.289	2.578	0.0048	0.0096	0.0056

MAXIMUM ALLOWABLE EXTEND STROKE

SERIES	ROD DIAMETER	CYLINDER FORCE (lb)							
		100	200	500	1000	1500	2000	3000	5000
3/4", 1", 1-1/8" TD	1/4	12"	9"	6"	—	—	—	—	—
	5/16	18"	13"	8"	—	—	—	—	—
	3/8	26"	18"	12"	—	—	—	—	—
1-3/8" TD	1/2	48"	34"	21"	—	—	—	—	—

MAXIMUM AIR/OIL TANDEM CYLINDER VELOCITY (in/sec)

PRESSURE (psi)		BORE			
		3/4"	1"	1-1/8"	1-3/8"
40	EXTEND	0.68	2.26	2.66	3.07
	RETRACT	1.00	2.26	2.30	2.60
60	EXTEND	1.26	3.07	3.33	4.13
	RETRACT	1.50	3.00	3.24	3.52
80	EXTEND	1.71	3.42	4.28	4.80
	RETRACT	2.00	3.42	3.87	4.44
100	EXTEND	2.06	4.28	5.00	5.21
	RETRACT	2.44	4.44	4.61	4.80

Minimum recommended velocity for all bore sizes at pressures from 40 to 150 psi is 0.133 in/sec.

Field Maintenance Videos on filling and bleeding Air/Oil Tandem Actuators are available. Contact your local PHD distributor or call our toll free number: 1-800-624-8511. Or go online to www.phdinc.com to view working cutaways and applications.

CYLINDER FORCE CALCULATIONS

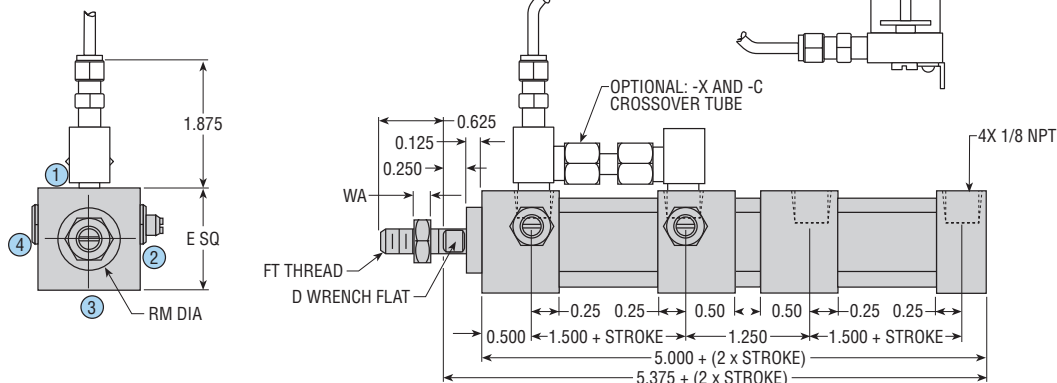
Imperial
F = P x A

F = Cylinder Force lbs
P = Operating Pressure psi
A = Effective Area in²
(Extend or Retract)

DIMENSIONS: Series TD Cylinders - 3/4", 1", 1-1/8" Bore

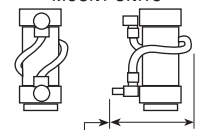
SERIES TD BASIC CYLINDER

For -C reservoir dimensions and operation notes, see next page (1-3/8").



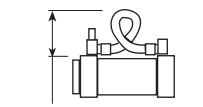
TUBE CROSSOVER VIEW

FOR NON F OR B MOUNT UNITS



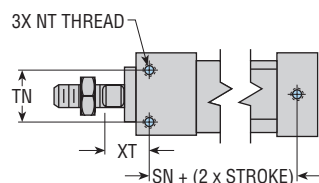
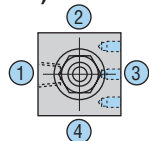
TUBE COIL DIAMETER APPROXIMATELY 9" SEE NOTE 1*

F & B MOUNT UNITS

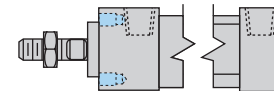
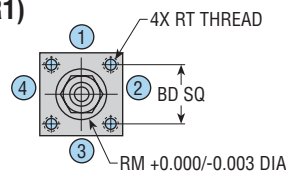


TUBE COIL DIAMETER APPROXIMATELY 9" SEE NOTE 1*

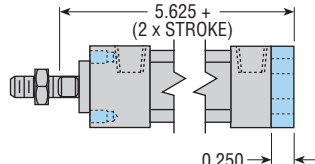
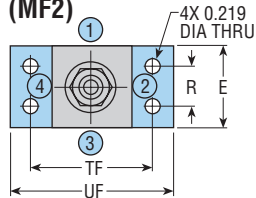
B (MS9)



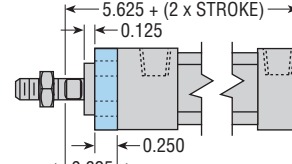
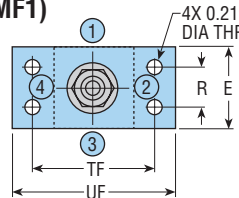
R (MR1)



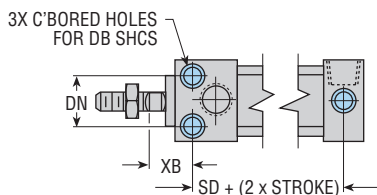
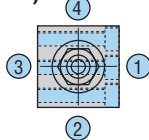
CF (MF2)



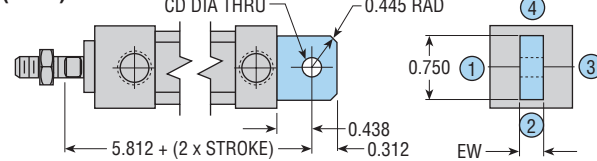
RF (MF1)



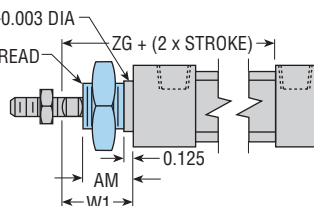
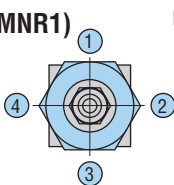
F (MS8)



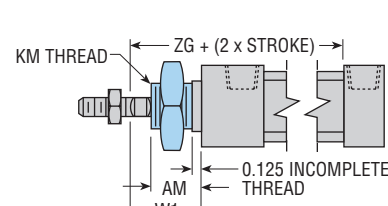
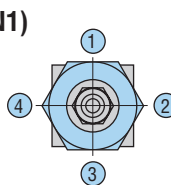
P (MP3)



L (MNR1)



T (MN1)



All standard rod ends have four wrench flats (two wrench flats with "I" option).

BORE SIZE	LETTER DIMENSION															
	AM	BD	CD	D	DB	DN	E	EW	FT	KM	NT	R	RM	RM1	RT	SD
3/4	0.625	0.750	0.250	3/16	#8	0.625	1.000	0.250	1/4-28	5/8-18	8-32 x 0.18 DP	0.500	0.625	0.687	8-32 x 0.25 DP	4.562
1	0.625	1.000	0.375	1/4	#10	0.875	1.375	0.375	5/16-24	3/4-16	10-32 x 0.25 DP	0.875	0.750	0.812	8-32 x 0.25 DP	4.500
1-1/8	0.875	1.125	0.375	5/16	#10	1.000	1.500	0.375	3/8-24	1-14	10-32 x 0.25 DP	1.000	0.750	1.062	10-32 x 0.25 DP	4.500

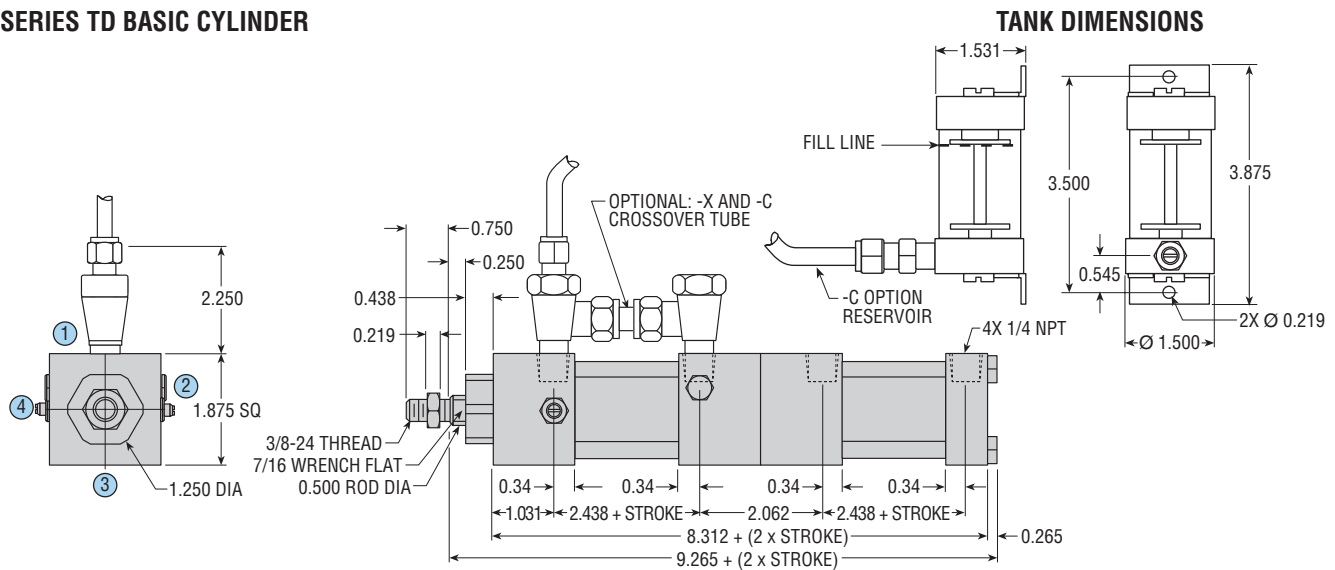
BORE SIZE	LETTER DIMENSION					
	UF	WA	W1	XB	XT	ZG
3/4	2.000	0.156	0.875	0.562	0.562	5.875
1	2.375	0.188	0.875	0.625	0.625	5.875
1-1/8	2.500	0.219	1.125	0.625	0.625	6.125

PORT POSITIONS: INDICATED BY CIRCLED NUMBERS

NOTE: *FOR -X AND -C OPTIONS WITH STROKES OF 0.250 in OR LESS, THE CROSSOVER TUBE WILL BE COILED AROUND CYLINDERS FOR ALL NON B OR F MOUNTING UNITS. F & B MOUNTING UNITS WILL HAVE TUBE COILED ABOVE CYLINDER DUE TO DISTANCE BETWEEN FITTINGS. SEE DETAIL ABOVE.

All dimensions are reference only unless specifically tolerated.

SERIES TD BASIC CYLINDER



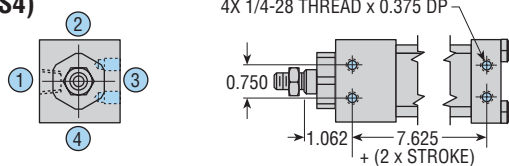
-C Option Air/Oil Tandem Mounting and Operation Notes:

1. Mount reservoir vertically above hydraulic section. Excess tubing may be coiled or cut off. Shortening of tubing should be done in a fashion as to keep oil loss to a minimum. Tubing and crossover below cut must be kept full of oil at all times.

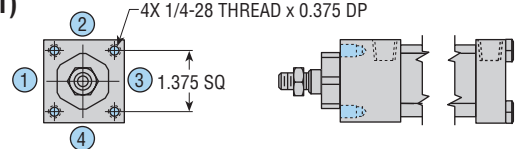
2. A constant air supply of 20 psi to be on inlet port of reservoir during operation. Use of E-stop or other applications with pressure lost to reservoir may cause rod seal seepage. PHD recommends use of check valve in circuit on reservoir port.

3. Oil level in reservoir should be kept at level indicated on label of tube.

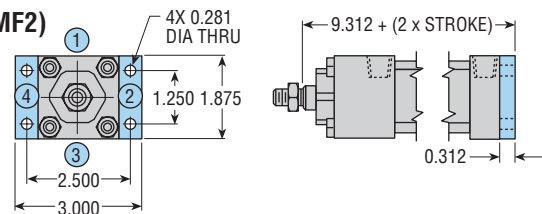
B (MS4)



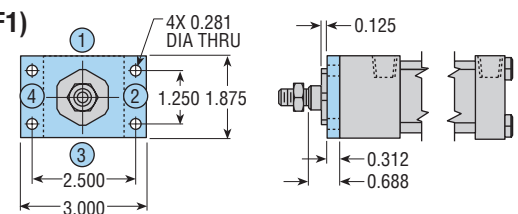
R (MR1)



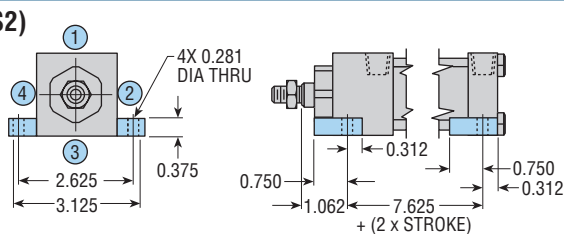
CF (MF2)



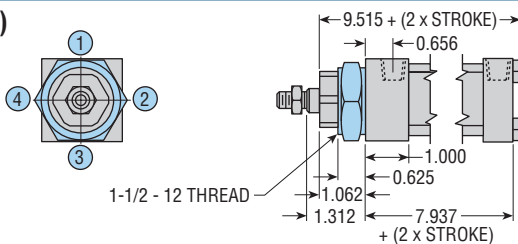
RF (MF1)



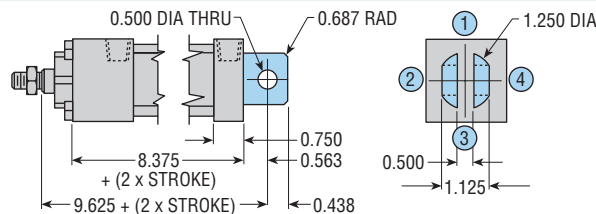
F (MS2)



T (MN1)



K (MP1)



All standard rod ends have four wrench flats (two wrench flats with "I" option).

PORT POSITIONS: INDICATED BY CIRCLED NUMBERS

All dimensions are reference only unless specifically tolerated.

E

MAGNETIC PISTON FOR SERIES JC1 RADIAL SENSING SWITCHES

PHD Cylinders can include a magnetic band (-E) on the piston to trigger external radial sensing solid state switches. These switches enable Tom Thumb® air or hydraulic cylinders to connect with different logic systems and work with the switches listed below.

See Series JC1 Switches at phdinc.com for more information.

M

MAGNETIC PISTON FOR SERIES JC1 REED & TEACHABLE SWITCHES

A magnetic band (-M) on the piston triggers externally mounted PHD Reed Switches and Two Position Teachable Switches. Reed switches use a physical element to close the circuit, whereas solid-state switches utilize magnetoresistive principles.

The Teachable Switch enables two programmable positions with one device – no fine tuning needed. Simply align the switch, position the actuator, and program the two positions.

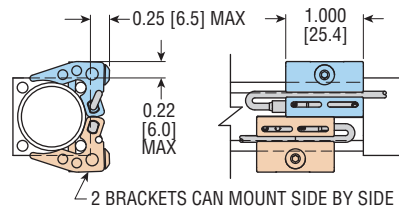
SERIES JC1 MAGNETIC SWITCHES AND CORDSETS

MAGNET OPTION	SENSING TYPE	OUTPUT / VOLTAGE	CABLE	SWITCH PART NO.	CORDSETS	
					2 METER	5 METER
-E [Radial]	Solid State	NPN / DC	5 m, 3 Conductor	JC1HDN-5	—	—
			.3 m, M8 3-Pin	JC1HDN-K	63549-02	63549-05
		PNP / DC	5 m, 3 Conductor	JC1HDP-5	—	—
			.3 m, M8 3-Pin	JC1HDP-K	63549-02	63549-05
-M [Axial]	Reed	PNP or NPN / AC	.3 m, M12 4-Pin	JC1ADU-K	81284-1-010	—
		PNP or NPN / DC	5 m, 3 Conductor	JC1RDU-5	—	—
			.3 m, M8 3-Pin	JC1RDU-K	63549-02	63549-05
	Solid State	PNP / DC Two Position Teachable	2 m, 4 Conductor	JC1STP-2	—	—
			2 m, M8 4-Pin	JC1STP-K	—	81284-1-001

SWITCH MOUNTING BRACKET

CYLINDER SIZE	BRACKET NO.
3/4	92100
1	
1-1/8	
1-3/8	92101

NOTE: Brackets are ordered separately.



V

FLUOROELASTOMER SEALS

Fluoroelastomer seals are available to achieve seal compatibility with certain fluids. Seal compatibility should be checked with the fluid manufacturer for proper application. Consult PHD for high temperature use.

C

RESERVOIR ASSEMBLY PLUMBED Air/Oil Tandem models only (Series TD)

See previous page for dimensions.

Available on Series TD tandem models only. The reservoir assembly is plumbed to the unit and is bled of air for easy installation. (Includes -X option).

- 1) Mount reservoir vertically above hydraulic section. Extra tubing may be coiled or cut off. Shorten tubing in a manner that minimizes oil loss. Tubing and crossover should be kept full at all times.
- 2) Keep a constant 20 psi on inlet port of reservoir during operation.
- 3) Oil level in reservoir should be kept at levels indicated on tube label.

X

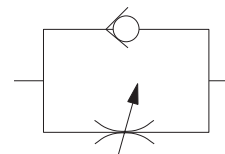
CROSSOVER TUBE Air/Oil Tandem models only (Series TD)

Available on Series TD tandem models only. These tandem models provide the smooth control of hydraulics with the simplicity of pneumatics. The -X option must be specified to receive the air/oil tandem units filled with oil and bled of air. (It is recommended that these units be used with reservoir and 20 psi oil pressure.)

STANDARD PORT CONTROL®

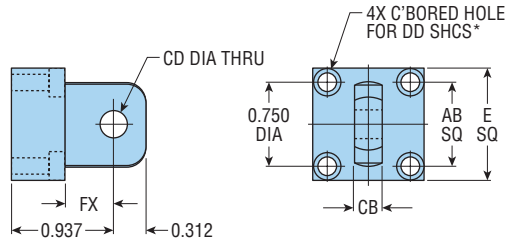
The exclusive PHD Port Control®, based on the “meter-out” principle, features an adjustable needle and a separate ball check. Both are built into the cylinder end cap and are used to control the speed of the cylinder over its entire stroke.

The self-locking needle has micrometer threads and is adjustable under pressure. It determines the orifice size which controls the exhaust volume. The separate ball check is closed while fluid is exhausting from the cylinder, but opens to permit full flow of incoming fluids. The PHD Port Control® provides the optimum in speed control for small bore cylinders. It saves space and eliminates the cost of installation and fittings for external flow control valves.



All dimensions are reference only unless specifically tolerated.

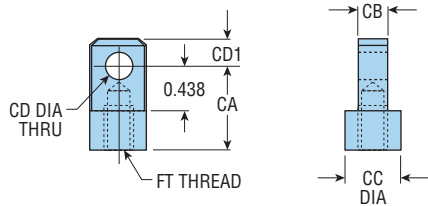
EYE BRACKET KIT



BORE SIZE	PART NO.	LETTER DIMENSION					
		AB	CB	CD	DD*	E	FX
3/4	1077-01	0.750	0.248	0.250	#6	1.000	0.577
1 & 1-1/8	1077-03	1.000	0.373	0.375	#10	1.375	0.437

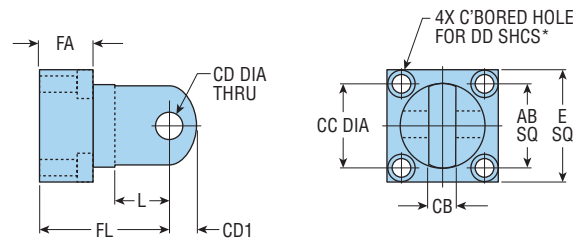
*For 3/4 bore thru hole only.

ROD EYE KIT



BORE SIZE	PART NO.	LETTER DIMENSION					
		CA	CB	CC	CD	CD1	FT
3/4	1075-01	0.750	0.248	0.500	0.250	0.250	1/4-28 x 0.375 DP
1	1075-04	0.875	0.373	0.750	0.375	0.375	5/16-24 x 0.375 DP
1-1/8	1075-05	0.875	0.373	0.750	0.375	0.375	3/8-24 x 0.312 DP

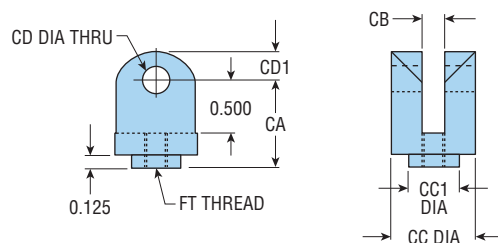
CLEVIS BRACKET KIT - PIN INCLUDED



BORE SIZE	PART NO.	LETTER DIMENSION									
		AB	CB	CC	CD	CD1	DD*	E	FA	FL	L
3/4	12901	0.750	0.254	0.750	0.250	0.250	#6	1.000	0.360	1.187	0.500
1 & 1-1/8	12903	1.000	0.379	0.875	0.375	0.375	#10	1.375	0.500	1.250	0.531

*For 3/4 bore thru hole only.

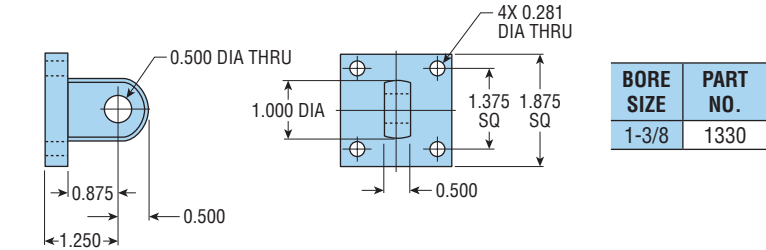
ROD CLEVIS KIT - PIN INCLUDED



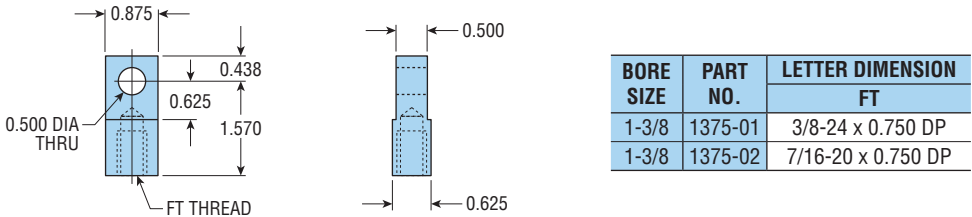
BORE SIZE	PART NO.	LETTER DIMENSION					
		CA	CB	CC	CC1	CD	CD1
3/4	12904	0.812	0.254	0.750	0.437	0.250	0.250
1	12906	0.875	0.379	0.875	0.562	0.375	0.375
1-1/8	12908	0.875	0.379	0.875	0.562	0.375	0.375

All dimensions are reference only unless specifically tolerated.

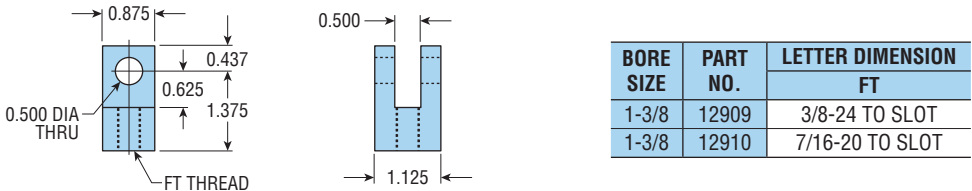
EYE BRACKET KIT



ROD EYE KIT



ROD CLEVIS KIT - PIN INCLUDED



All dimensions are reference only unless specifically toleranced.