



MINIMATIC® CYLINDER



Clippard offers more types of miniature pneumatic cylinders for the designer's convenience, including: spring return, spring extend, air retract, double-acting and double rod models. From sub-miniature ($5/32$ " bore) to heavy duty ($1\ 1/8$ " bore), the extensive Clippard line provides a wide selection of bore sizes to suit any application requirement. An even wider range of strokes are available in the complete Clippard line of miniature cylinders, in stroke sizes ranging from $1/4$ " to 20".



FEATURES

- Buna-N "U"-cup rod seals for smooth leakproof operation
- Buna-N "U"-cup piston seals for full power, low friction and trouble-free performance
- Rods are threaded and bonded to piston
- The original miniature pneumatic cylinder
- 100% tested
- Pneumatic & hydraulic performance
- Sturdy, compact and long life
- Temperature range: 30° F to 180° F

The Clippard line offers numerous choices in the mounting of Clippard Minimatic® cylinders. The cylinders are provided in several types of mounting styles including plain end, stud mount, block

mount, and clevis mount (male and female). In addition, a complementary line of mounting hardware, including brackets, male and female clevises and Clippard's Minimatic® super structures are available for almost any application.



Clippard cylinders are of original design, pioneered by the world's most experienced manufacturer of miniature pneumatic equipment. They are of the finest OEM quality, fully tested for outstanding performance and long life. Special steps in manufacture insure the high quality of Clippard cylinders. These include: ground, polished and roller burnished rods to protect seals and provide smooth action; tube I.D. precision through "ballizing"

with carbide precision balls; high precision screw machine parts manufacture, based on concentric design that lends itself to close tolerance machining. The reputation Clippard has earned in the field is a result of our policy to test every cylinder (100%) we manufacture.

Every Cylinder is 100% tested

Cylinder Tubes:

Machined from heavy wall, cold-drawn brass tubing; ballized internally for precise size, fine finish and low seal friction; 1 1/8" bore: hard coat aluminum

Piston Rods:

Except where otherwise specified, all rods are stainless steel, ground, polished and roller burnished for long seal life, low friction and smooth action

Pistons:

Brass in all models except aluminum in 7/8" bore single acting series

Springs:

Stainless steel for long life and resistance to corrosion

Seals:

Buna-N compound, impervious to a wide range of hydraulic fluids, liquids, and gases; rod seals replaceable on models where applicable; piston seals replaceable only on threaded construction models

Bumpers:

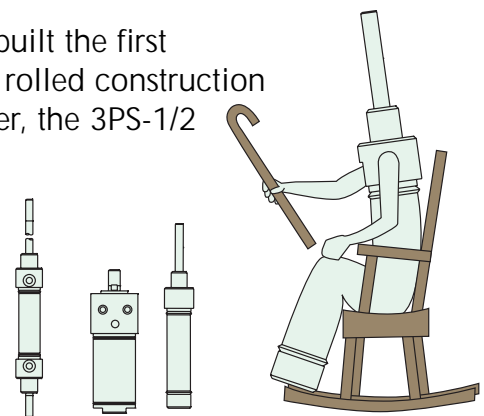
Resilient bumpers of Buna-N or polyurethane absorb shock, increase life and reduce noise level

Finish:

All external brass parts are "bright-dipped" to resist corrosion and preserve finished appearance; 1 1/8" bore: hard coated aluminum with black oxide steel heads

Did you know...

Clippard built the first miniature rolled construction air cylinder, the 3PS-1/2 in 1949.





MINIMATIC® CYLINDER

Minimatic® Cylinders	pg.	Engineering Data			Design Features							Remarks
		Medium	Force Factor	Rec. Max. Working Pres.	Piston Seals	Rod Seals	Rod Dia.	Rod End	Ports Tapped	Construction		
5/32" Bore Spring Return	89	Air	0.02	150 psig	U-Cup		0.062"	Plain	#10-32 #3-56	Rolled or Welded	45° Tapered rod end on SM-2 Spring force extend- 2 oz. Spring force compressed- 5 oz.	
1/4" Bore 6.35 mm Spring Return	89	Air	0.05	125 psig	U-Cup		0.135"	Thd.	#10-32	Rolled	Spring force extend- 6 oz. Spring force compressed-10 oz.	
3/8" Bore Spring Return	90	Air	0.10	125 psig	U-Cup		3/16"	Plain	#10-32	RF Silver Soldered	Model 3PS-1/2 is rolled construction with non-rotating thd. brass rod, others; non-thd. stainless steel Spring force extend- 12 oz. Spring force compressed- 30 oz.	
3/8" Bore Double Acting	91	Air & Hyd.	0.10	125 psig-Air	U-Cup	Vee Ring	1/8"	Plain	#10-32	RF Silver Soldered		
3/8" Bore Spring Extend Air Retract	90	Air	0.10	125 psig	U-Cup		1/8"	Thd.	#10-32	RF Silver Soldered	Min. of 14 psig to retract Spring force extend- 12 oz. Spring force compressed- 30 oz.	
9/16" Bore Spring Return	92	Air	0.22	125 psig	U-Cup		3/16"	Plain	#10-32	RF Silver Soldered	9PS-3/4 & 9SS-3/4 have non- rotating, thd., stainless steel rods, others; non-thd., stainless steel Spring force extend- 1.6 oz. Spring force compressed- 3.7 oz.	
9/16" Bore Double Acting	92	Air & Hyd.	0.22	125 psig-Air	U-Cup	Vee Ring	3/16"	Plain	#10-32	RF Silver Soldered		
9/16" Bore Spring Extend Air Retract	92	Air	0.22	250 psig	U-Cup	Vee Ring	1/4"	Thd.	#10-32	Threaded	Min. of 19 psig to retract Spring force extend- 2 lb. Spring force compressed- 4 lb.	
9/16" Bore Heavy Duty Spring Return	94	Air	0.20	250 psig	U-Cup		1/4"	Thd.	1/16" NPT	Threaded	Spring force extend- 2 lb. Spring force compressed- 4 lb.	
9/16" Bore Heavy Duty Double Acting	95 **	Air & Hyd.	0.20 Hyd.	250 psig-Air 1000 psig-Hyd.*	T- Ring	Vee Ring	1/4"	Thd.	1/16" NPT	Threaded		
7/8" Bore Spring Return	96	Air	0.60	250 psig	U-Cup		1/4"	Thd.	1/8" NPT	Threaded	Sintered bronze rod bushing Spring force extend- 7 lb. Spring force compressed- 12 lb.	
7/8" Bore Double Acting	97 **	Air & Hyd.	0.60	250 psig-Air 1000 psig-Hyd.*	T- Ring	Vee Ring	1/4"	Thd.	1/8" NPT	Threaded	Sintered bronze rod bushing	
7/8" Bore Spring Extend Air Retract	96	Air	0.60	250 psig	U-Cup	Vee Ring	1/4"	Thd.	1/8" NPT	Threaded	Min. of 23 psig to retract Spring force extend- 7 lb. Spring force compressed- 12 lb.	
1-1/8" Bore Double Acting	99 **	Air	1.0	250 psig	U-Cup	Vee Ring	3/8"	Thd.	1/8" NPT	Threaded	Sintered bronze rod bushing Low friction - 2 psig to operate	
1-1/8" Bore Spring Return	98	Air	1.0	250 psig	U-Cup		3/8"	Thd.	1/8" NPT	Threaded	Spring force extend- 8 lb. Spring force compressed- 12 lb.	

Quick Cylinder Computations:

Cylinder Force = Force Factor x Pressure

Displacement = Force Factor x Stroke

(Force factor given in table above equals effective piston area)

**NOTE: Double rods also available in these models.

Temperature: 30° F to +230° F

*Consult factory for hydraulic applications

SUB-MINIATURE MINIMATIC® CYLINDER

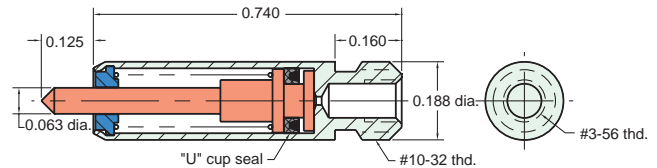


SM-2

Single Acting

Bore: 5/32"
Mount: Rear Thread
Type: Spring Return

Available Stroke Lengths: 1/4
Materials: Stainless steel body, piston & rod, Buna-N U-cup, Beryllium copper spring



SM-3-□

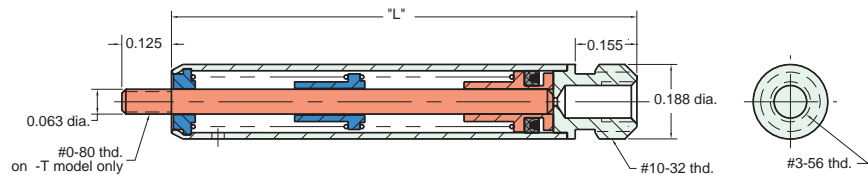
Single Acting

Bore: 5/32"
Mount: Rear Thread
Type: Spring Return

Model	SM-3-2	SM-3-3	SM-3-4
Stroke	1/2"	3/4"	1"
Length "L"	1.171	1.593	2

Materials: Stainless steel tube and rod, brass piston, Buna-N U-cup

To order: Add stroke length to the end of the part number



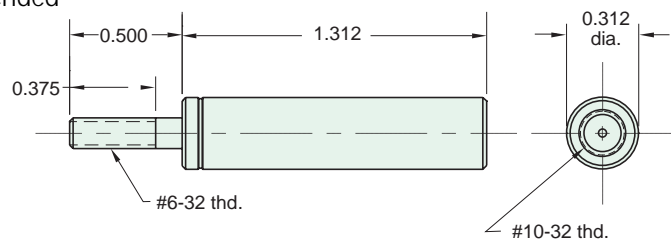
SM-6

Single Acting

Bore: 1/4"
Mount: Body*
Type: Spring Return

Available Stroke Lengths: 3/8"
Materials: Brass body, Buna-N U-cup, stainless steel piston & rod

*Super structure recommended



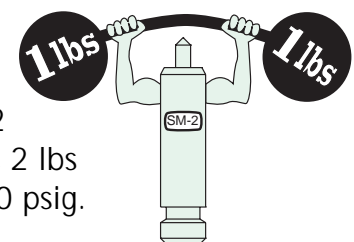
Nut included, but not shown on drawing



Super structure 12327 pictured here is recommended for mounting the SM-6 cylinder. For more information see page 105.

Did you know...

The tiny SM-2 cylinder gives 2 lbs of force at 100 psig.



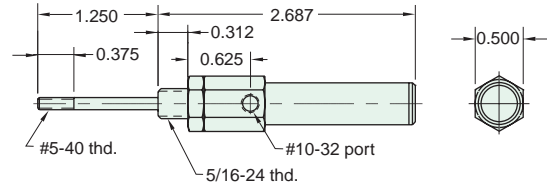


3/8" BORE BRASS MINIMATIC® CYLINDER

3SS-AR-1/2

Mount: Stud **Available Stroke Lengths:** 1/2"
Type: Single Acting
 Spring Extended

Add **-N** to the end of the part number for a non-threaded rod



Rod nut included, but not shown on drawing

3PS-1/2

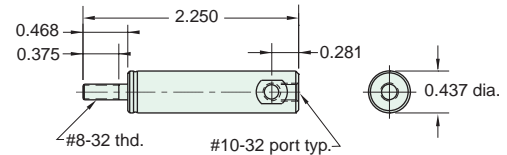
Mount: Body* **Available Stroke Lengths:** 1/2"
Type: Single Acting
 Spring Return **Ports:** End or Side

Brass Rod - non-rotating

Add **-N** to the end of the part number for a non-threaded rod

*Super Structure recommended

First Cylinder - 1949



Rod nut included, but not shown on drawing

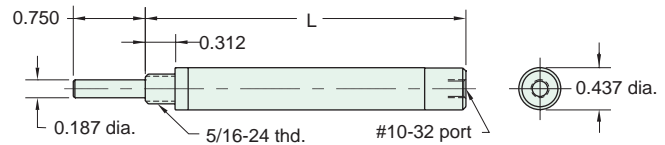
3SS-□

Mount: Stud **Stroke**
Type: Single Acting **Length "L"**
 Spring Return

1/2"	1"	2"	3"
2.093	3.343	5.218	7.093

To order: Add stroke length to the end of the part number

Add **-T** to the end of the part number after stroke for a #10-32 x 1/2" rod thread



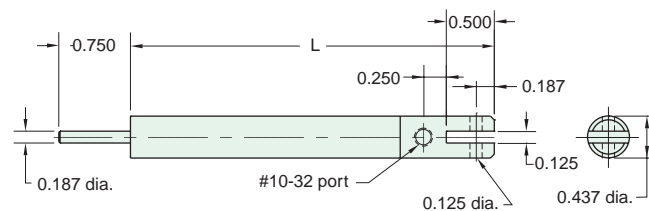
3CS-□

Mount: Clevis **Stroke**
Type: Single Acting **Length "L"**
 Spring Return

1/2"	1"	2"	3"
2.468	3.406	5.281	7.156

To order: Add stroke length to the end of the part number

Add **-T** to the end of the part number after stroke for a #10-32 x 1/2" rod thread



3/8" BORE BRASS MINIMATIC® CYLINDER

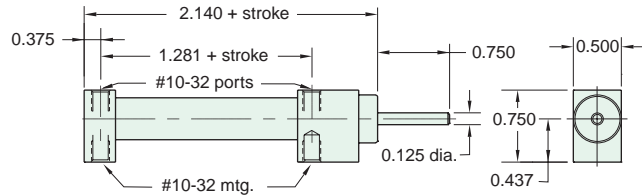


3BDS-□

Mount: Block **Available Stroke Lengths:** 1", 2", 3", 4", 5", 6"
Type: Double Acting

To order: Add stroke length to the end of the part number

Add -T to the end of the part number after stroke for a #5-40 x 1/2" rod thread

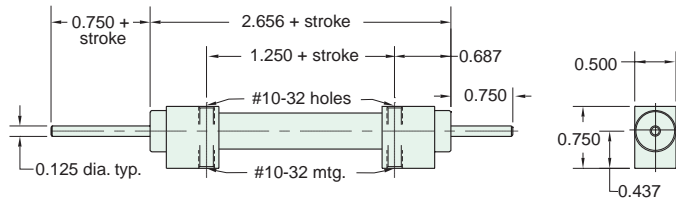


3BDD-□

Mount: Block **Available Stroke Lengths:** 1", 2", 3", 4"
Type: Double Acting
 Double Rod

To order: Add stroke length to the end of the part number

Add -T to the end of the part number after stroke for a #5-40 x 1/2" rod thread

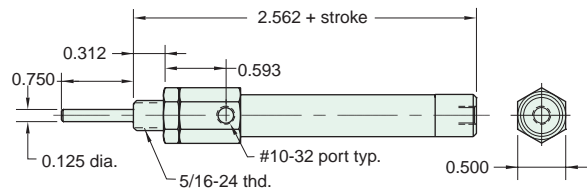


3SD-□

Mount: Stud **Available Stroke Lengths:** 1", 2", 3", 4"
Type: Double Acting

To order: Add stroke length to the end of the part number

Add -T to the end of the part number after stroke for a #5-40 x 1/2" rod thread



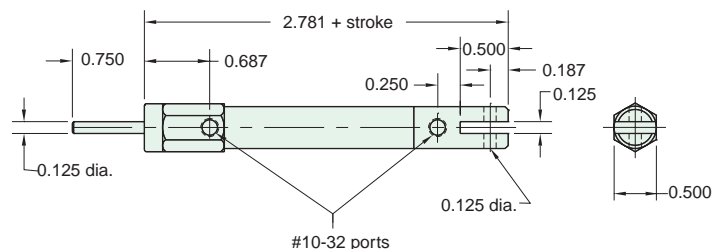
Nut included, but not shown on drawing

3CD-□

Mount: Clevis **Available Stroke Lengths:** 1", 2", 3", 4"
Type: Double Acting

To order: Add stroke length to the end of the part number

Add -T to the end of the part number after stroke for a #5-40 x 1/2" rod thread



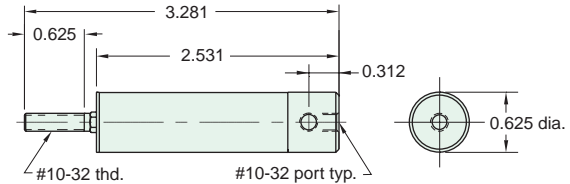


9/16" BORE BRASS MINIMATIC® CYLINDER

9PS-3/4

Mount: Body* **Available Stroke Lengths:** 3/4"
Type: Single Acting Spring Return Non-Rotating Shaft

Add **-N** to the end of the part number for a non-threaded rod
 *Super Structure recommended



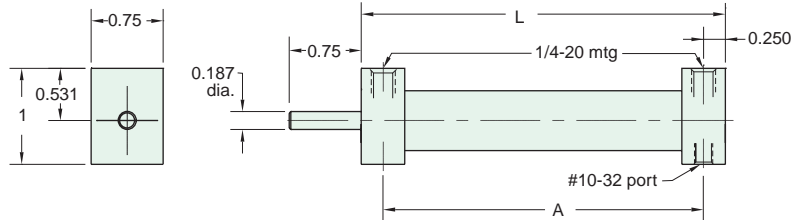
Rod nut included, but not shown on drawing

9BS-□

Mount: Block **Stroke** 3/4" | 1 1/2" | 2 1/4" | 3"
Type: Single Acting Spring Return **Length "L"** 2.750 | 4.218 | 5.593 | 6.937
"A" 2.312 | 3.750 | 5.125 | 6.500

To order: Add stroke length to the end of the part number

Add **-T** to the end of the part number after stroke for a #10-32 x 1/2" rod thread

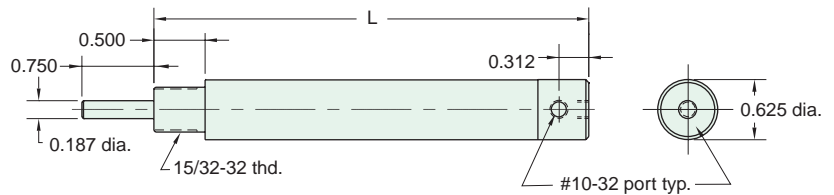


9SS-□

Mount: Stud **Stroke** 3/4" | 1 1/2" | 2 1/4" | 3"
Type: Single Acting Spring Return **Length "L"** 3.031 | 4.531 | 5.875 | 7.250

To order: Add stroke length to the end of the part number

Add **-T** to the end of the part number after stroke for a #10-32 x 1/2" rod thread



Rod nut included, but not shown on drawing

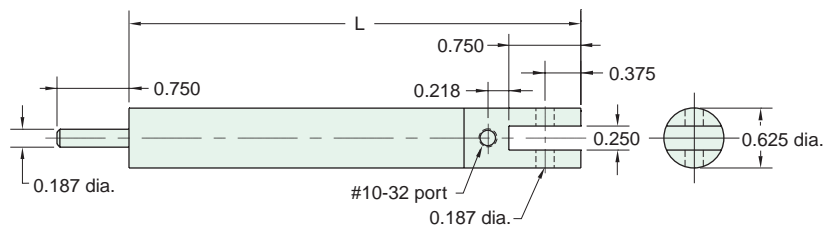
Note: On 3/4" stroke rod is hexagonal stainless steel (non-rotating) and threaded #10-32 x 5/8

9CS-□

Mount: Clevis **Stroke** 3/4" | 1 1/2" | 2 1/4" | 3"
Type: Single Acting Spring Return **Length "L"** 3.343 | 4.687 | 6.062 | 7.406

To order: Add stroke length to the end of the part number

Add **-T** to the end of the part number after stroke for a #10-32 x 1/2" rod thread



9/16" BORE BRASS MINIMATIC® CYLINDER

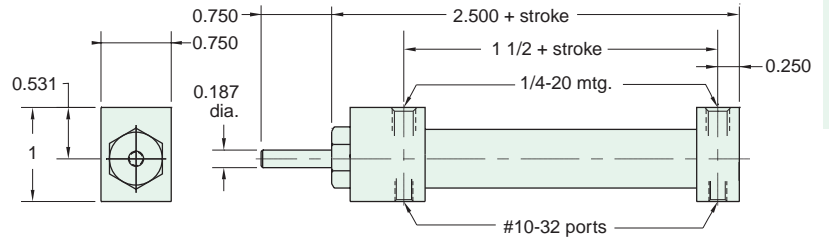


9BDS-□

Mount: Block **Available Stroke Lengths:** 1", 2", 3", 4", 5", 6"
Type: Double Acting

To order: Add stroke length to the end of the part number

Add -T to the end of the part number after stroke for a #10-32 x 1/2" rod thread

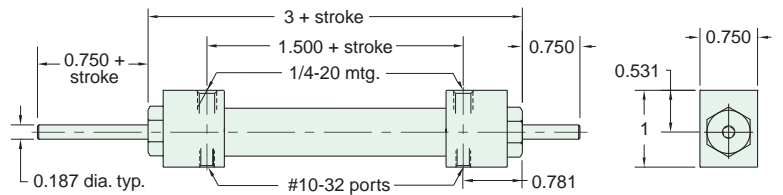


9BDD-□

Mount: Block **Available Stroke Lengths:** 1", 2", 3", 4", 5", 6"
Type: Double Acting
 Double Rod

To order: Add stroke length to the end of the part number

Add -T to the end of the part number after stroke for a #10-32 x 1/2" rod thread

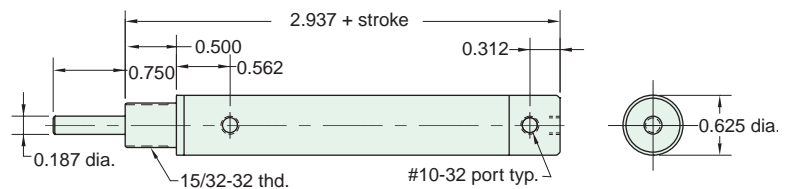


9SD-□

Mount: Stud **Available Stroke Lengths:** 1", 2", 3", 4", 5", 6"
Type: Double Acting

To order: Add stroke length to the end of the part number

Add -T to the end of the part number after stroke for a #10-32 x 1/2" rod thread



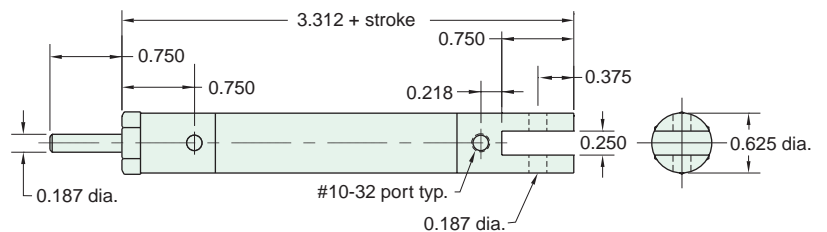
Nut included, but not shown on drawing

9CD-□

Mount: Clevis **Available Stroke Lengths:** 1", 2", 3", 4", 5", 6"
Type: Double Acting

To order: Add stroke length to the end of the part number

Add -T to the end of the part number after stroke for a #10-32 x 1/2" rod thread





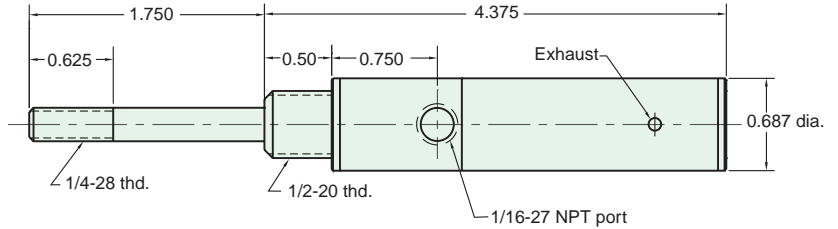
9/16" BORE BRASS HEAVY DUTY CYLINDER

9SS-AR-1

Mount: Stud
Type: Single Acting
 Spring Extended

Available Stroke Lengths: 1"

Add **-N** to the end of the part number for a non-threaded rod



Nut included, but not shown on drawing

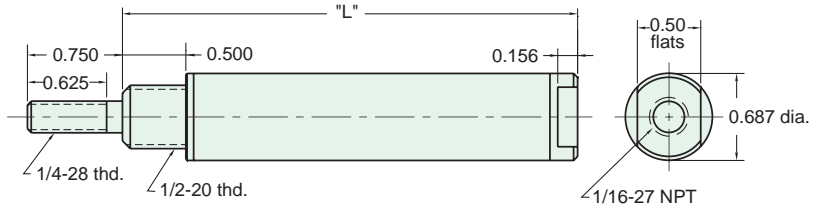
H9S-□S

Mount: Stud
Type: Single Acting
 Spring Return

Stroke Length "L"	1"	2"	3"
	3.593	5.250	6.906

To order: Indicate stroke in box □

Add **-N** to the end of the part number for a non-threaded rod



Nut included, but not shown on drawing

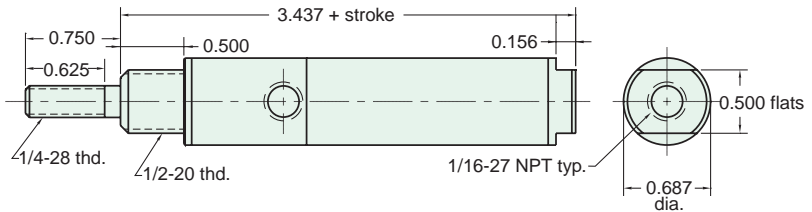
H9S-□D

Mount: Stud
Type: Double Acting

Available Stroke Lengths: 1", 2", 3", 4", 5", 6"

To order: Indicate stroke in box □

Add **-N** to the end of the part number for a non-threaded rod



Nut included, but not shown on drawing

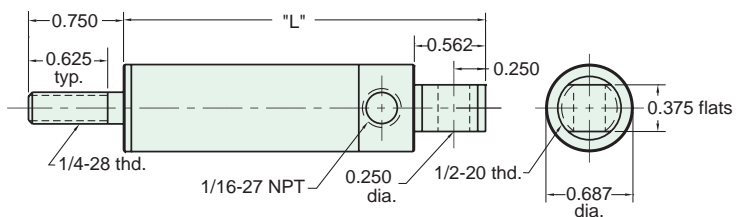
H9C-□S

Mount: Clevis
Type: Single Acting
 Spring Return

Stroke Length "L"	1"	2"	3"
	3.875	5.531	7.187

To order: Indicate stroke in box □

Add **-N** to the end of the part number for a non-threaded rod



Nut included, but not shown on drawing

9/16" BORE BRASS HEAVY DUTY CYLINDER



Consult factory for hydraulic applications

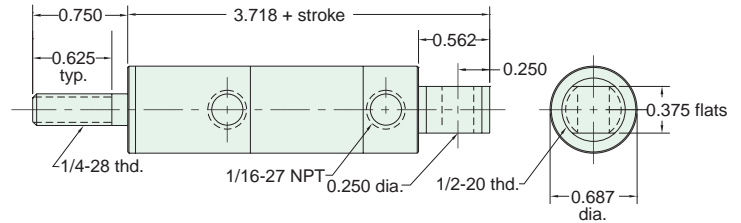
Note: Maximum recommended hydraulic working pressure for heavy duty cylinders is 1000 psig.

H9C-□D

Mount: Clevis **Available Stroke Lengths:** 1", 2", 3", 4", 5", 6"
Type: Double Acting

To order: Indicate stroke in box □

Add **-N** to the end of the part number for a non-threaded rod



Nuts included, but not shown on drawing

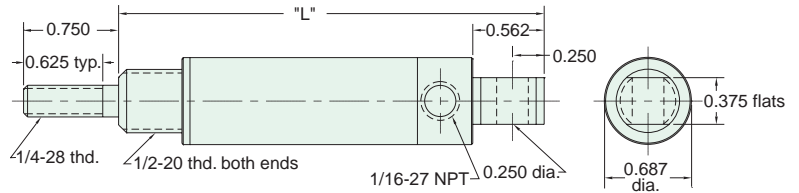
H9U-□S

Mount: Universal
Type: Single Acting
 Spring Return

Stroke Length "L"	1"	2"	3"
	4.375"	6.031"	7.687"

To order: Indicate stroke in box □

Add **-N** to the end of the part number for a non-threaded rod



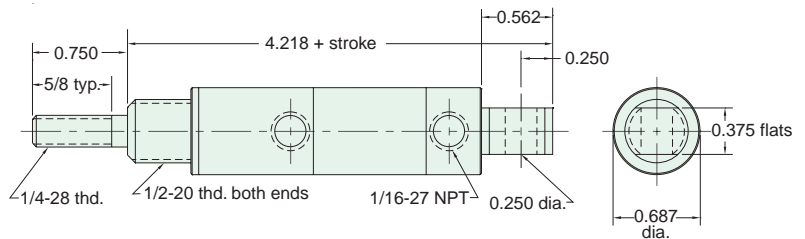
Nuts included, but not shown on drawing

H9U-□D

Mount: Universal **Available Stroke Lengths:** 1", 2", 3", 4", 5", 6"
Type: Double Acting

To order: Indicate stroke in box □

Add **-N** to the end of the part number for a non-threaded rod



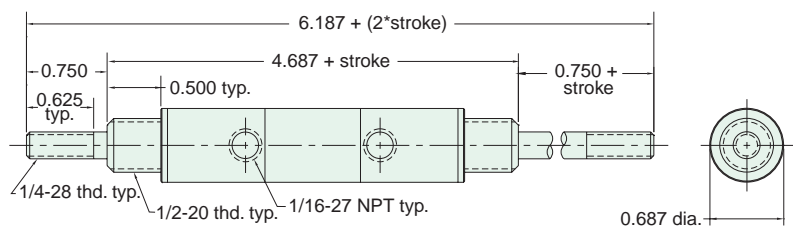
Nuts included, but not shown on drawing

H9D-□D

Mount: Stud **Available Stroke Lengths:** 1", 2", 3", 4", 5", 6"
Type: Double Acting
 Double Rod

To order: Indicate stroke in box □

Add **-N** to the end of the part number for a non-threaded rod



Nuts included, but not shown on drawing



7/8" BORE BRASS HEAVY DUTY CYLINDER

Consult factory for hydraulic applications

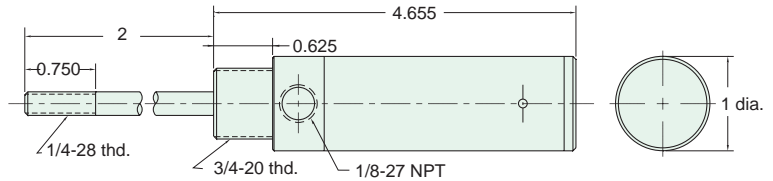
7SS-AR-1

Mount: Stud

Available Stroke Lengths: 1"

Type: Single Acting
Spring Extended

Add **-N** to the end of the port for a non-threaded rod



Nut included, but not shown on drawing

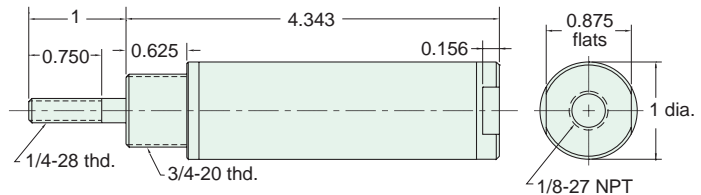
7SS-1

Mount: Stud

Available Stroke Lengths: 1"

Type: Single Acting
Spring Return

Add **-N** to the end of the port for a non-threaded rod



Nut included, but not shown on drawing

7SD-□

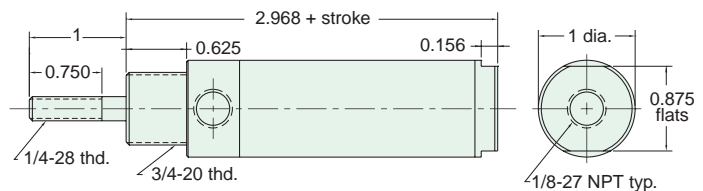
Mount: Stud

Available Stroke Lengths: 1", 2", 3", 5", 7", 9"

Type: Double Acting

To order: Add stroke length to the end of the part number

Add **-N** to the end of the port for a non-threaded rod



Nut included, but not shown on drawing

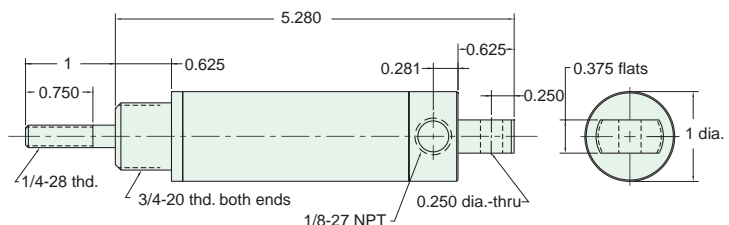
7S-1

Mount: Universal

Available Stroke Lengths: 1"

Type: Single Acting
Spring Return

Add **-N** to the end of the port for a non-threaded rod



Nuts included, but not shown on drawing

7/8" BORE BRASS HEAVY DUTY CYLINDER



Consult factory for hydraulic applications

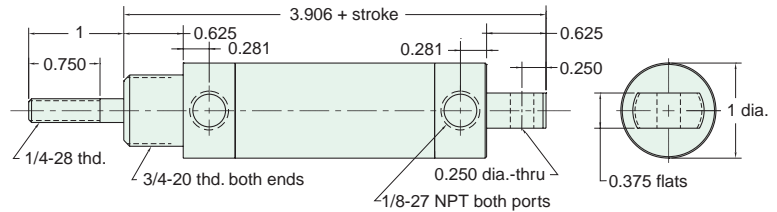
Note: Maximum recommended hydraulic working pressure for heavy duty cylinders is 1000 psig.

7D-

Mount: Universal **Available Stroke Lengths:** 1", 2", 3", 5", 7", 9"
Type: Double Acting

To order: Add stroke length to the end of the part number

Add **-N** to the end of the part number for a non-threaded rod



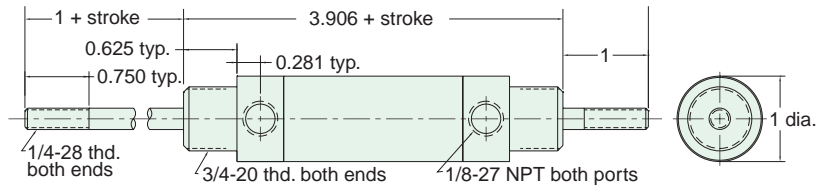
Nut included, but not shown on drawing

7DD-

Mount: Universal **Available Stroke Lengths:** 1", 2", 3", 5", 7", 9"
Type: Double Acting
 Double Rod

To order: Add stroke length to the end of the part number

Add **-N** to the end of the part number for a non-threaded rod



Nut included, but not shown on drawing

Did you know...

Leonard Clippard made the prototype cylinder piston seals by punching leather disks from his kids old shoe tongues.

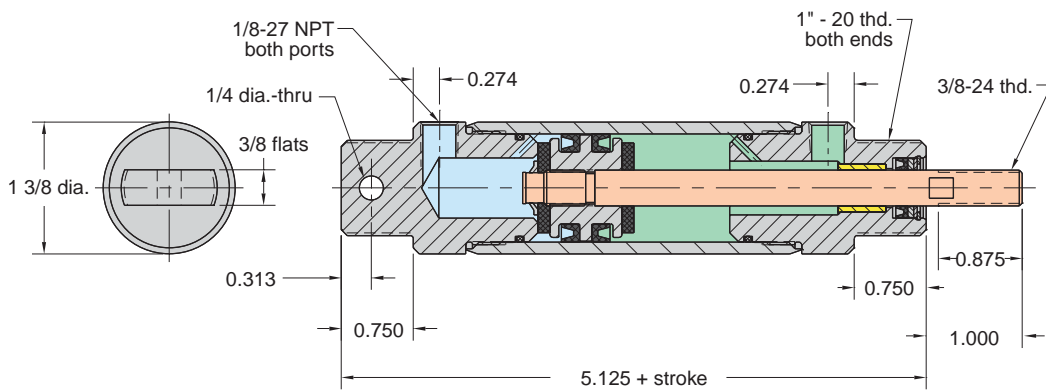




1 1/8" BORE HEAVY DUTY ALUMINUM CYLINDER

Features

- Very low breakaway force - allows for a consistent stroke speed (no sudden jumps)
- Hard-anodized aluminum body - attractive, yet durable
- Force factor of 1 - 100 psig input provides 100 lbs. output force
- Available in many stroke lengths (even up to 8 ft. in special quantities!)
- Brass piston, stainless steel rod



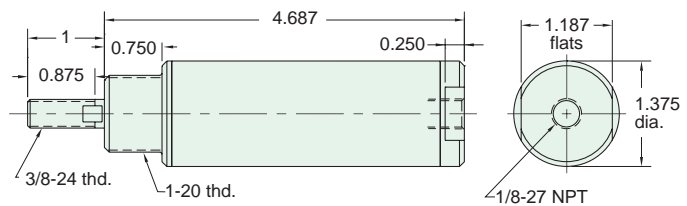
18SS-1

Mount: Stud

Available Stroke Lengths: 1"

Type: Single Acting
Spring Return

Add **-N** to the end of the part number for a non-threaded rod



Nut included, but not shown on drawing

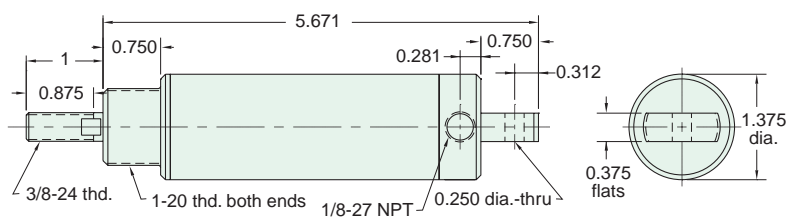
18S-1

Mount: Universal

Available Stroke Lengths: 1"

Type: Single Acting
Spring Return

Add **-N** to the end of the part number for a non-threaded rod



Nuts included, but not shown on drawing

1 1/8" BORE HEAVY DUTY ALUMINUM CYLINDER



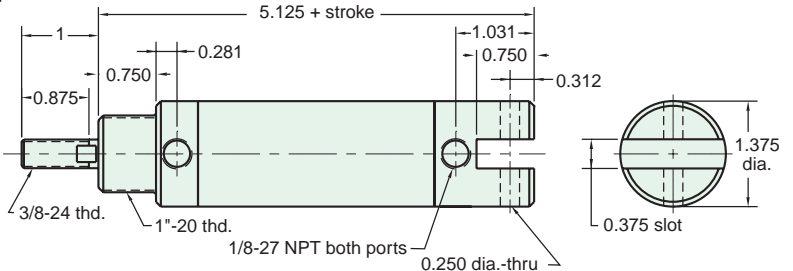
18CSD-□

Mount: Clevis
Type: Double Acting

Available Stroke Lengths: 1", 2", 3", 4", 5", 6", 7", 8", 9", 10", 12", 14", 16", 18", 20"

To order: Add stroke length to the end of the part number

Add **-N** to the end of the part number for a non-threaded rod



Nut included, but not shown on drawing

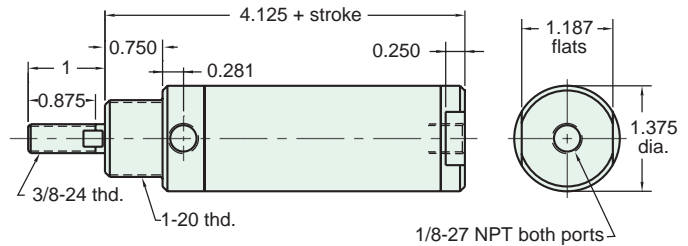
18SD-□

Mount: Stud
Type: Double Acting

Available Stroke Lengths: 1", 2", 3", 4", 5", 6", 7", 8", 9", 10", 12", 14", 16", 18", 20"

To order: Add stroke length to the end of the part number

Add **-N** to the end of the part number for a non-threaded rod



Nut included, but not shown on drawing

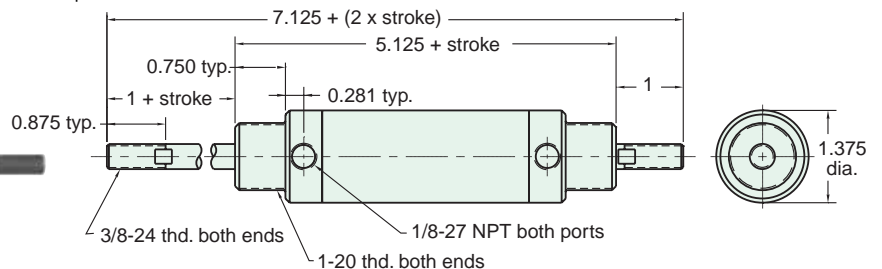
18DD-□

Mount: Stud
Type: Double Acting
Double Rod

Available Stroke Lengths: 1", 2", 3", 6"

To order: Add stroke length to the end of the part number

Add **-N** to the end of the part number for a non-threaded rod



Nuts included, but not shown on drawing

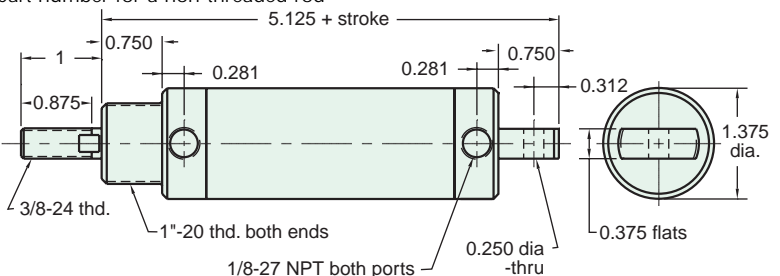
18D-□

Mount: Universal
Type: Double Acting

Available Stroke Lengths: 1", 2", 3", 4", 5", 6", 7", 8", 9", 10", 12", 14", 16", 18", 20"

To order: Add stroke length to the end of the part number

Add **-N** to the end of the part number for a non-threaded rod



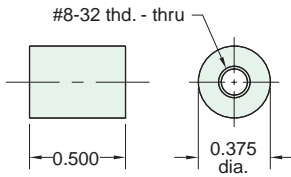
Nuts included, but not shown on drawing



3/8" BORE MOUNTING BRACKETS

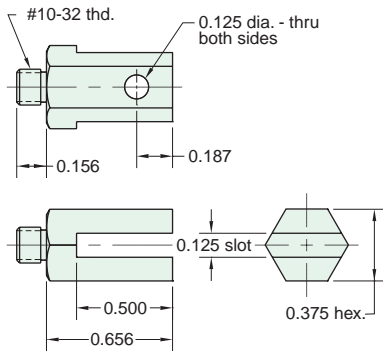
11767

Ceramic Insulator
Use with cylinder having #8-32 threaded shaft to insulate cylinder from heat or electricity



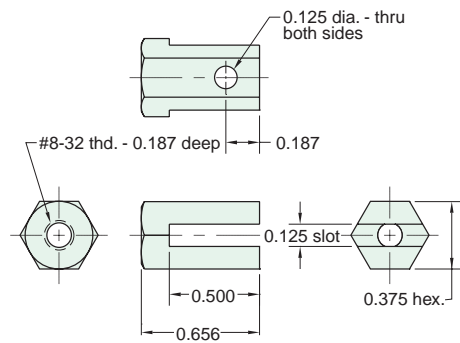
11996

Male Clevis
Mounts in rear of cylinder tapped #10-32



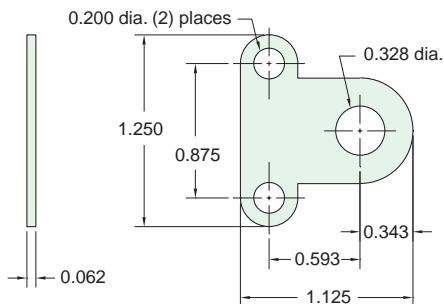
11997

Female Clevis
Use with cylinder having #8-32 threaded shaft



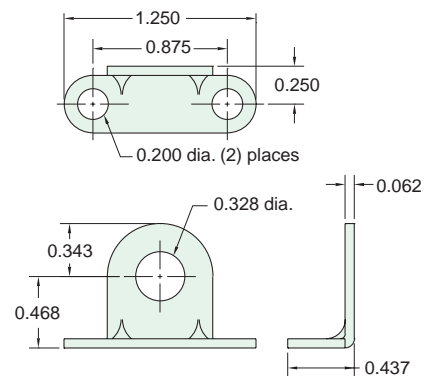
11917-2

Mounting Bracket (flat)



11918-2

Mounting Bracket (angled)



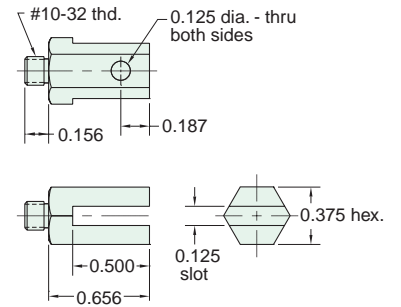
9/16" BORE MOUNTING BRACKETS



11996

Male Clevis

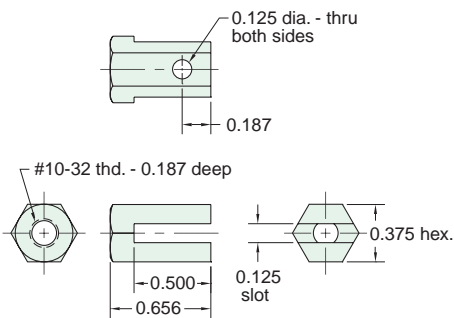
Mounts in rear of cylinder tapped #10-32



15009

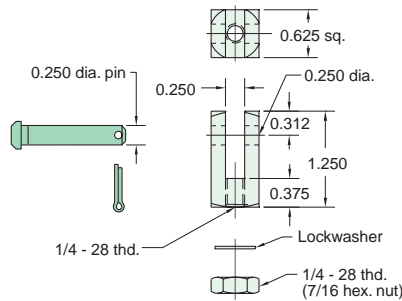
Female Clevis

For use with cylinders having #10-32 threaded shaft



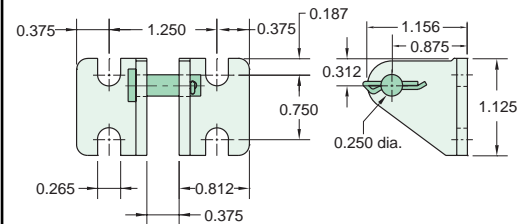
15015

Rod Clevis Assembly



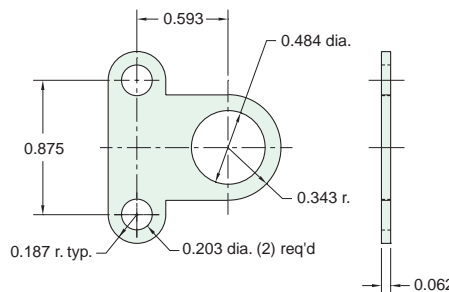
CB-1795

Clevis Bracket
Material: steel, bright zinc plated



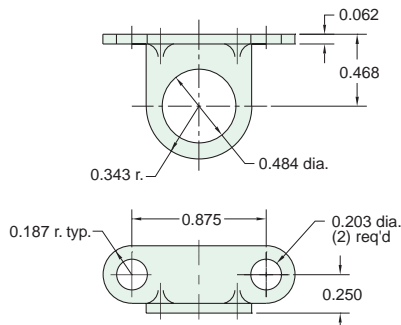
11917-1

Mounting Bracket (flat)



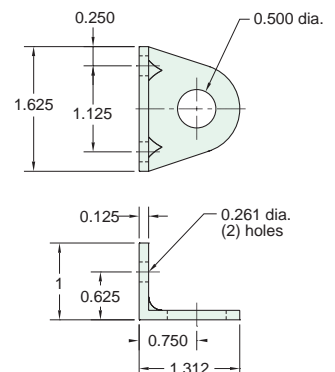
11918-1

Mounting Bracket (angled)



15018-2

Mounting Bracket (angled)

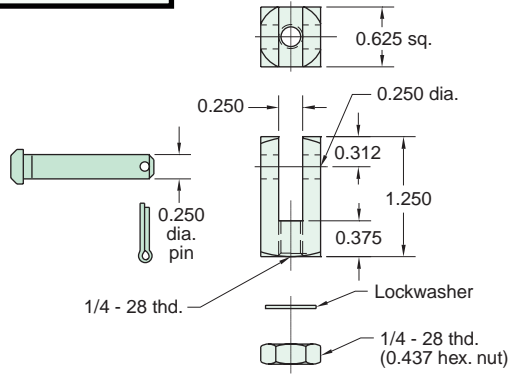




7/8" BORE MOUNTING BRACKETS

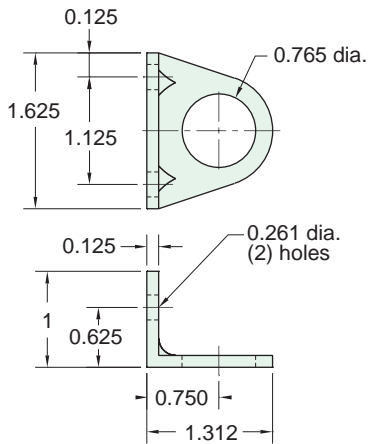
15015

Rod Clevis Assembly



15018-1

Foot Mounting Bracket

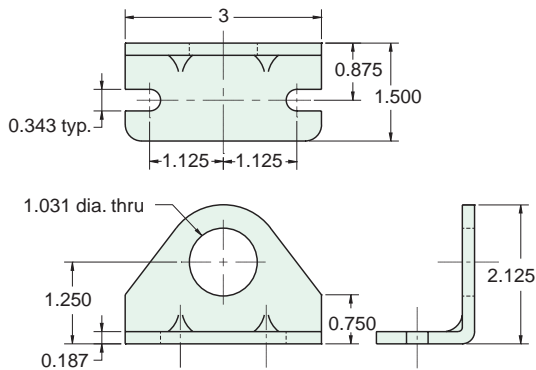


1 1/8" BORE MOUNTING BRACKETS



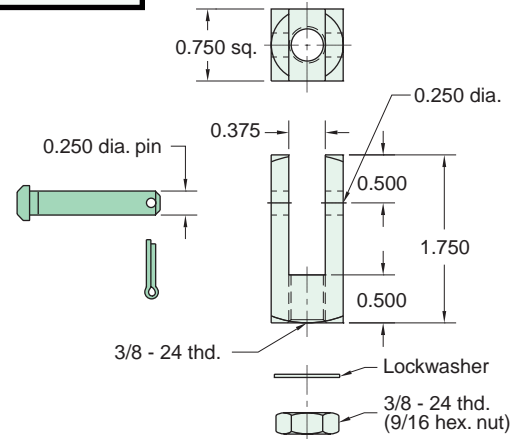
FB-2891

Foot Mounting Bracket



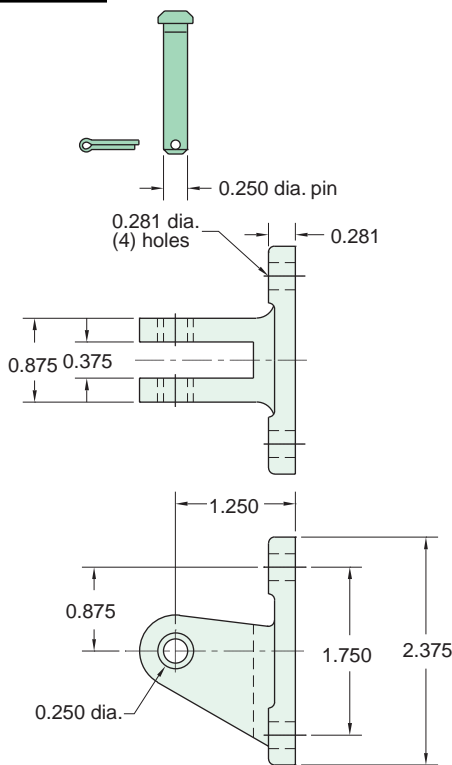
12346

Rod Clevis Assembly



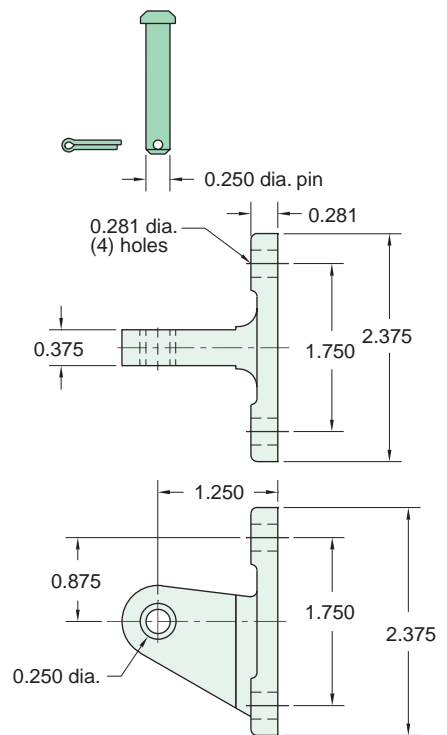
12456

Female Clevis Mounting Bracket



12458

Male Clevis Mounting Bracket



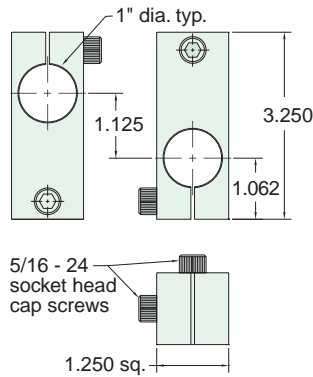


SUPER STRUCTURE

Here's a building block concept to speed construction of small equipment, fixtures, jigs and tooling. Machined steel blocks adapt to any position on the column and base. Offset extensions are provided through use of fixture and block mounting shafts of various lengths. Use of proper size brass slotted adapter permits mounting small bore cylinders or other parts. Column base is drilled for mounting. The Super Structure is extremely solid and secure, yet fully adjustable.

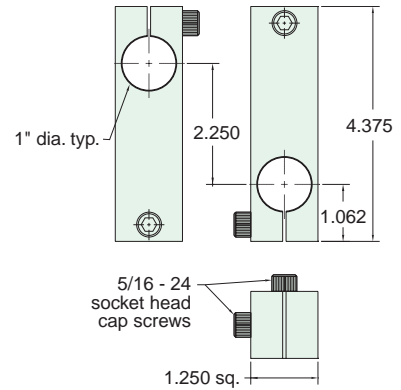
12361

Perpendicular mounting block
(black oxide finished steel)



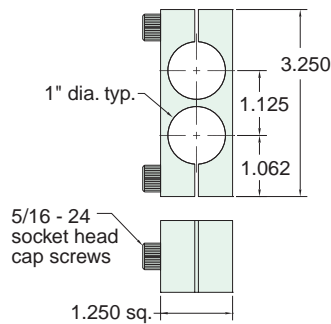
12362

Perpendicular mounting block
(black oxide finished steel)



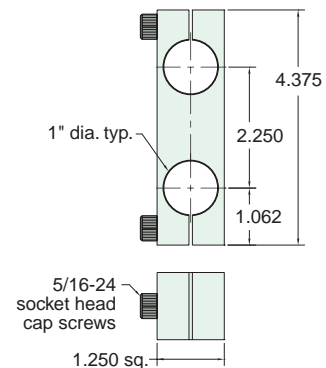
12363

Inline mounting block
(black oxide finished steel)



12364

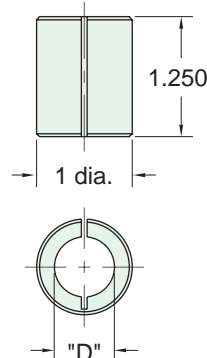
Inline mounting block
(black oxide finished steel)



12365-□

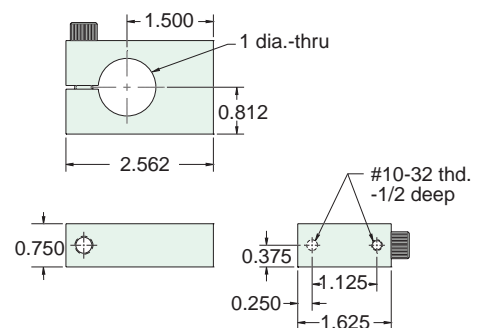
Part #	12365-1	12365-2	12365-3
"D" dia.	0.437	0.625	0.687

Slotted adapters (brass)



12369

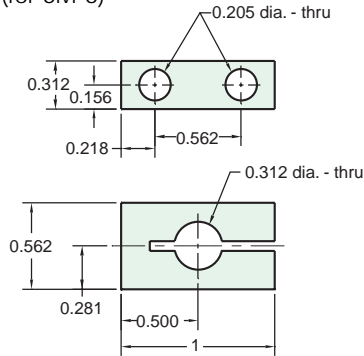
Bracket mounting adapter block



12327



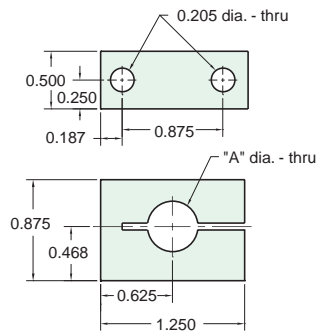
Cylinder mounting squeeze block
(for SM-6)



12326-□



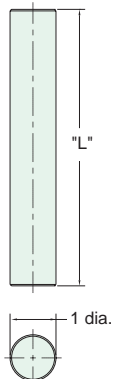
Cylinder mounting squeeze blocks
(for 3/8" & 9/16" standard bore)



Part #	"A"	
12326-1	5/8"	(for 9/16" stand. bore cylinder)
12326-2	7/16"	(for 3/8" stand. bore cylinder)

12366-□

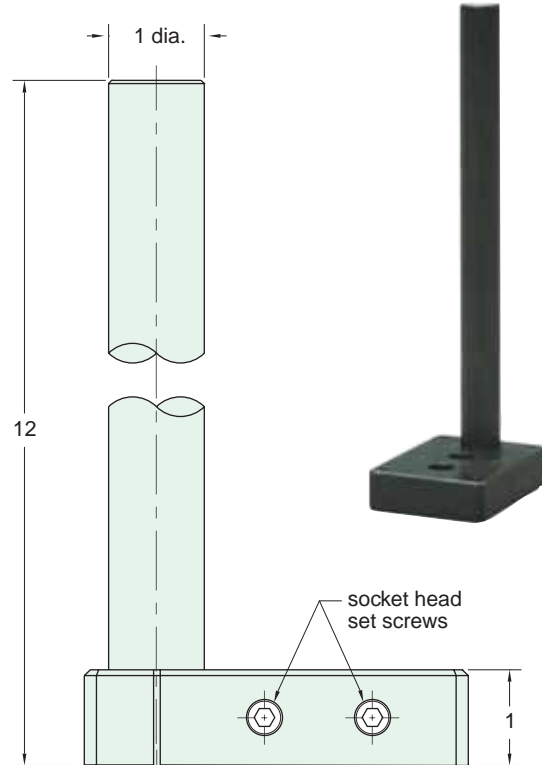
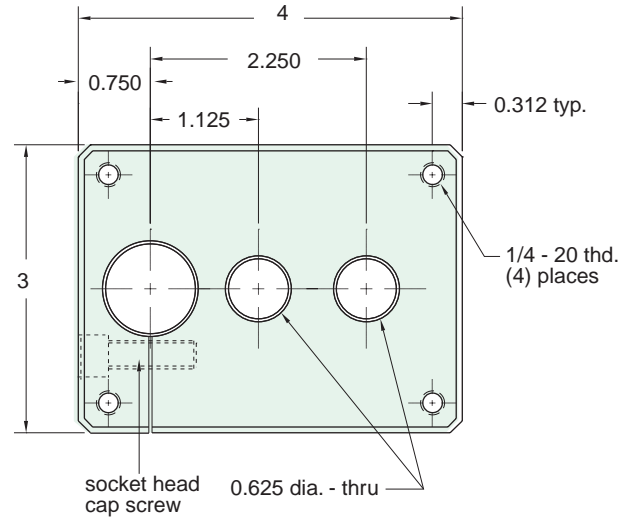
Fixture and bracket mounting shafts
(black oxide finished steel)



Part #	"L"
12366-4	4"
12366-6	6"
12366-8	8"
12366-10	10"
12366-12	12"
12366-14	14"
12366-16	16"
12366-18	18"
12366-20	20"

CMB

Column and mounting base
(black oxide finished steel)





Miniature Swing-In Automated Arbor Press

