



Basic-PSA
Mechanical Shock Arrestors

**Corporate/Manufacturing
Facility**

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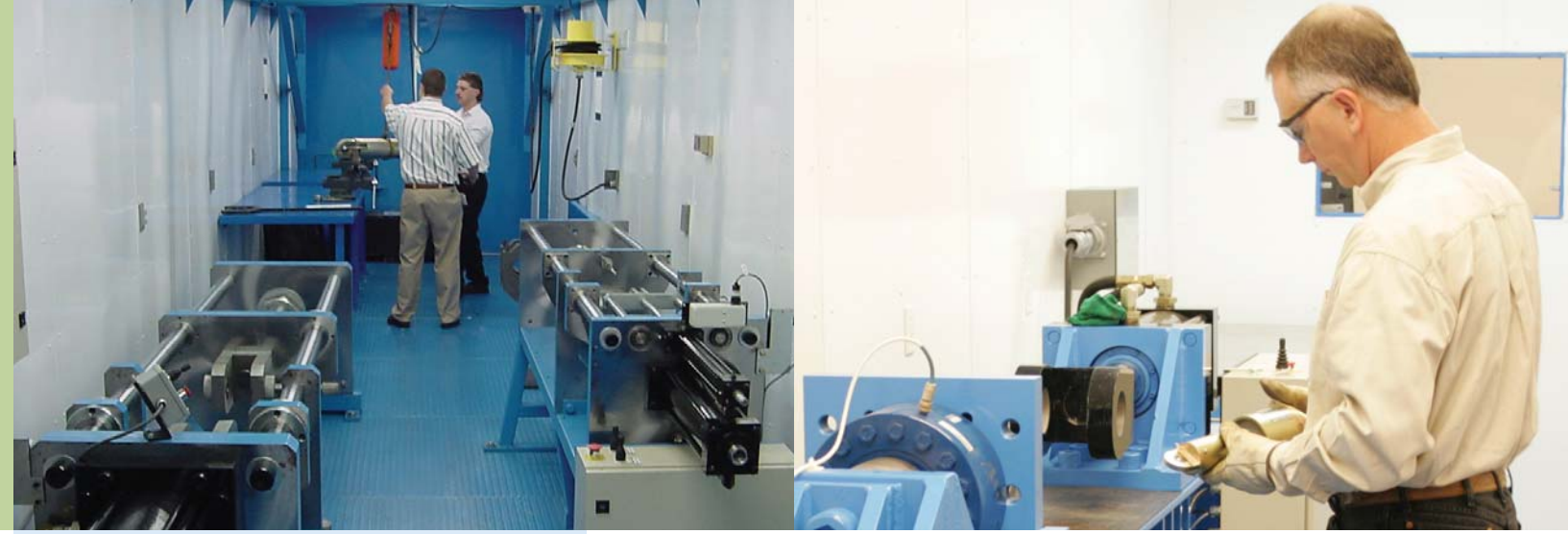
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Basic-PSA, Inc. was founded in 1996 when Mr. Jack Matlock purchased the PSA Mechanical Shock Arrestor Division from Pacific Scientific in Yorba Linda, California and relocated it to Johnstown, Pennsylvania. Basic-PSA, Inc. is now owned and operated by an Employee Stock Ownership Plan (ESOP). The ESOP has allowed each individual employee to be part of the company growth and success.

The PSA Mechanical Snubber was designed to protect piping systems and other associated components such as valves, pumps, and steam generators from abnormal movement resulting from water hammer, plant transients, earthquakes, etc.



The PSA Mechanical Snubber controls unwanted movement by becoming a load carrying member between the piping and structure the instant a force sufficient to cause abnormal movement is initiated. The potentially damaging motion is arrested before it has a chance to develop. However, for normal thermal motion movement, the PSA Mechanical Snubber telescopes freely in either direction through its full operating stroke.

Basic-PSA, Inc. remains focused on complete customer satisfaction. Distributed both domestically and abroad, Basic-PSA's Mechanical Snubbers and Snubber Related Services are a standard within the Power Industry. The PSA Mechanical Snubber has a 40 Year Service Life when operated within its design conditions, and is manufactured to meet ASME Section III, and 10CFR50 Appendix B.

In addition to the PSA Mechanical Snubbers, Basic-PSA, Inc. supplies all the necessary PSA hardware for installation such as forward brackets, rear brackets, transition tube kits, clevis, load pins, load studs, bolts, pipe clamps, etc.

In support of the PSA Mechanical Snubber Product Line, Basic-PSA, Inc. also manufactures a complete line of the former Basic-Engineers, Inc. (BE) Pipe Supports and Restraint Systems. This includes products such as hydraulic snubbers, pipe hangers, variable springs, constant supports, rigid struts, etc.

As the “Original Equipment Manufacturer” of the PSA Mechanical Snubber, Basic-PSA, Inc. leads the Power Industry in supporting Snubber Service Programs. The Basic-PSA Service Group is well known throughout the Industry for Mechanical and Hydraulic Snubber Support. Basic-PSA, Inc. staffs a complete group of factory trained, certified technicians to successfully meet the requirements of your Snubber Program.

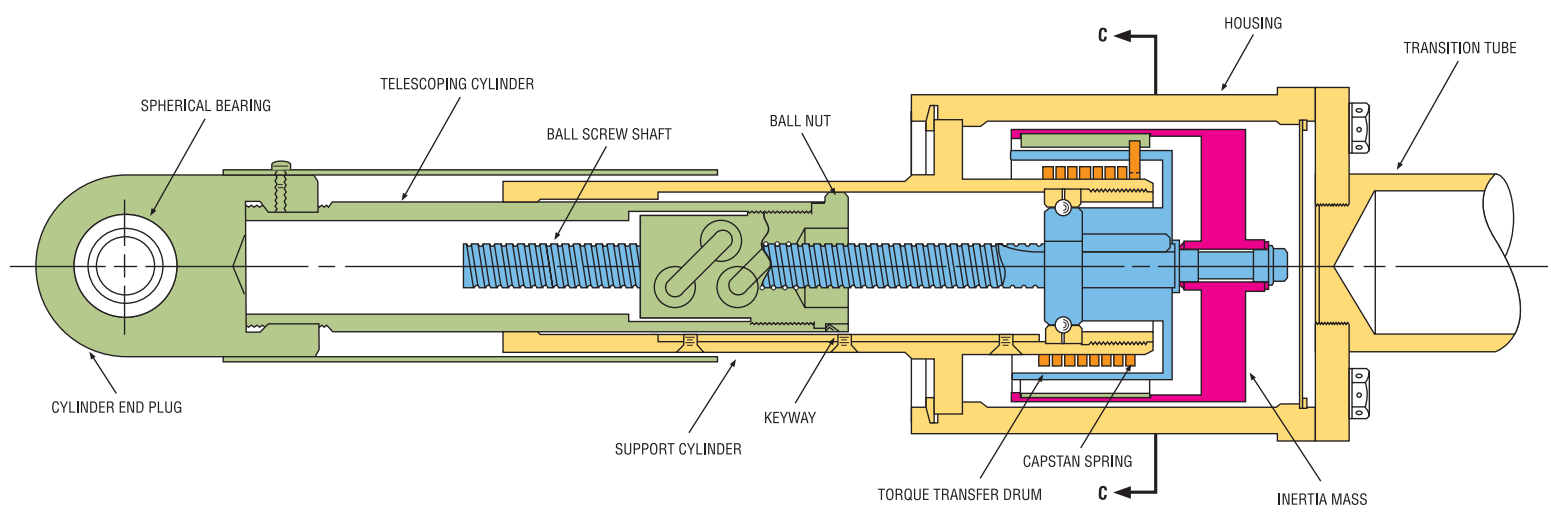
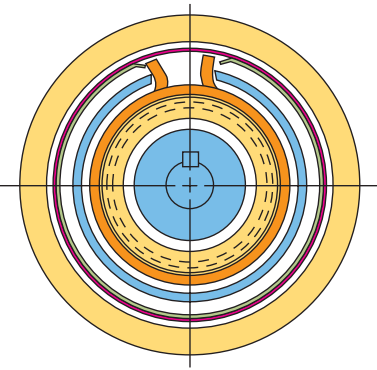
Basic-PSA can supply Turn-Key in-service inspection (ISI) programs to support your Snubber Program including:

- Functional Testing Equipment & Testing Services for Large & Small Bore Snubbers
- Work Procedures
- Mechanical & Hydraulic Snubber Refurbishment
- On-Site Temporary Snubber & Snubber Spare Parts Inventory
- Long Term Service Contracts
- Competitive Service Rates
- Snubber Engineering Support
- VT 3 Level II Inspections
- Remote Camera Inspection
- Experienced Snubber Removal and Reinstallation
- Quality Control Personnel
- Snubber and Snubber Parts Discounts
- Turnkey Snubber Program Operations

Snubbers are Basic-PSA's business. Basic-PSA's reputation for supporting Snubber Programs, both domestically and abroad, is highly respected. As a company that manufactures and provides snubber products and snubber related services around the world, we challenge anyone to do it better than Basic-PSA, Inc.



Operation of the PSA Mechanical Snubber



The Basic-PSA, Inc. Mechanical Shock Arrestor operates on the principle of limiting the acceleration of any pipe movement to a threshold level of .02 g's. This is the maximum acceleration that the arrestor will permit the piping to see. Should a disturbance attempt to accelerate the pipe in either direction, a braking force will be applied within the arrestor of whatever magnitude required to limit the acceleration to a value less than .02 g's. At the same time, thermal expansion, being a gradual movement, is not restricted. A particular feature of the arrestor is that at no time does it lock and thereby become a rigid strut. Should a sudden acceleration occur and sustain continuously in one direction, the arrestor will apply whatever force is necessary to limit the pipe movement to its preset threshold value. The arrestor's performance is independent of the amount of force being applied.

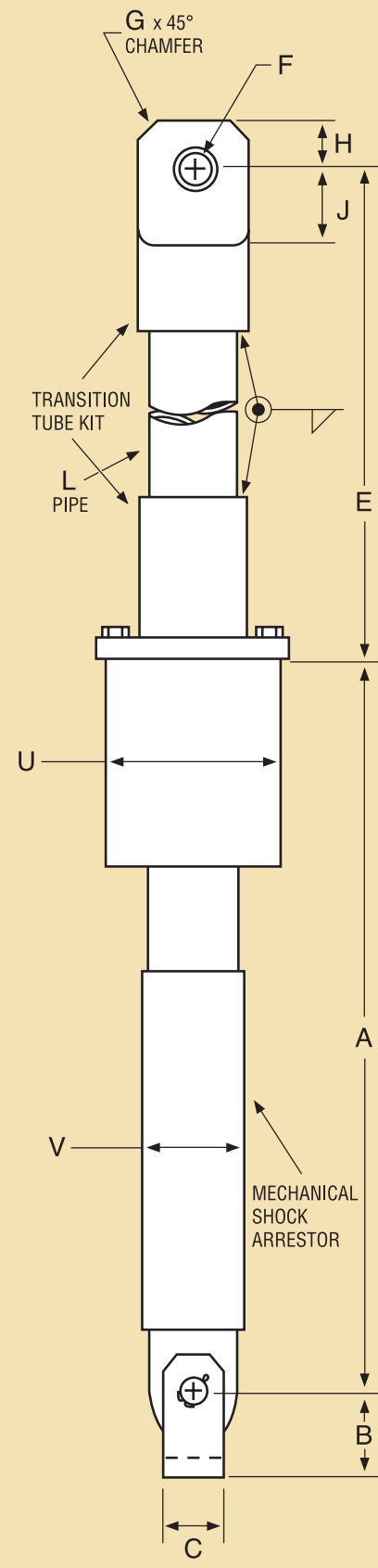
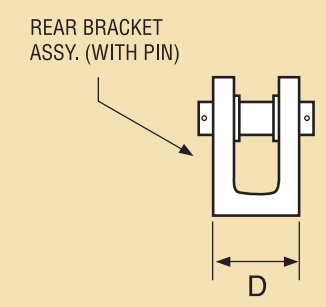
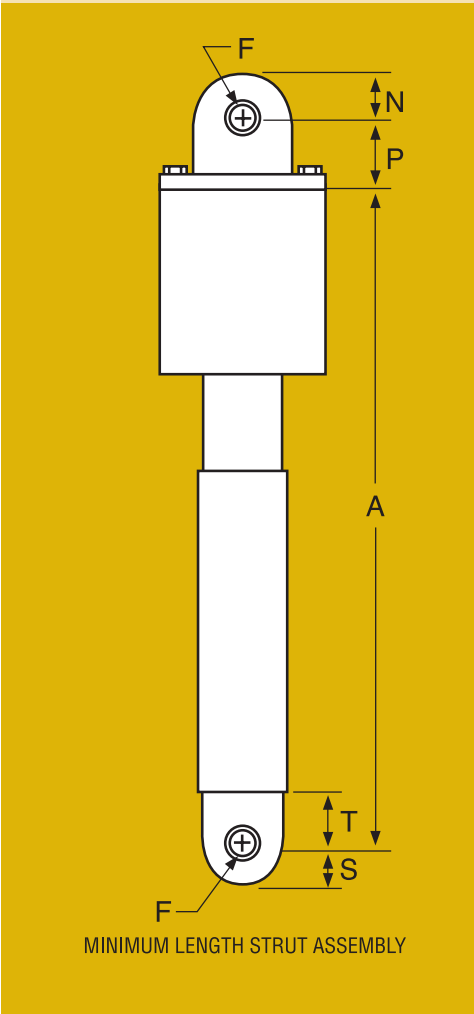
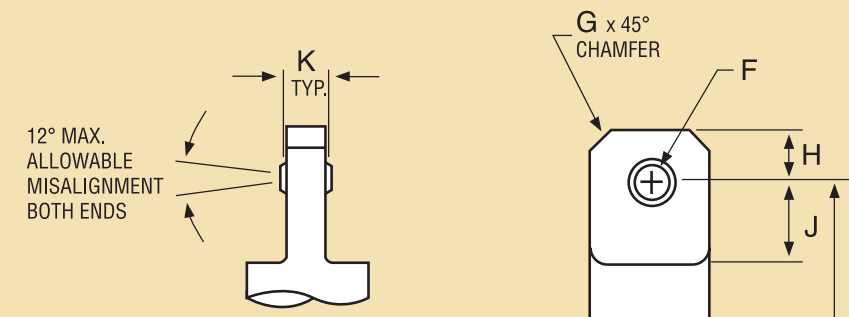
The principle of operation can best be seen in the cross section view above. Two structural telescoping members, colored green and yellow, are connected between the pipe and the fixed structure. Within these telescoping tubes is a ball screw and nut which serve to convert the linear telescoping motion, which would occur during a seismic disturbance or thermal changes, to rotational motion of the blue ball screw and drum assembly. This rotational motion is coupled to an inertia mass colored red. The coupling consists of a resilient capstan spring colored orange.

When a disturbance occurs that exceeds the threshold "g" level (.02 g's), the ball screw and drum attempt to angularly

accelerate the inertia mass. The inertial resistance of the mass causes the resilient capstan spring to tighten around a hardened mandrel which is part of the yellow structural tube. In this manner, a restraining force is applied against rotation of the ball screw, and, in turn, linear telescoping of the green and yellow members.

The design of the unit is completely symmetrical, and the same capstan spring will apply this braking action in both tension and compression loading, which in turn means clockwise or counterclockwise angular acceleration. Therefore, the braking characteristics of the unit in tension and compression are identical.

It can also be noted that when the sudden force is applied, the resisting force is applied by the inertia mass. The inertia mass is mounted to turn freely, and therefore the moment the acceleration drops below the threshold value, it no longer applies a braking force. In addition, the capstan spring is always urging the inertia mass back to an unbraked condition. The net effect is a design which continuously throttles or brakes to limit and control the acceleration. During thermal compensation, the gradual linear movement is far below the threshold acceleration setting; therefore, the inertia mass will rotate without tightening the capstan brake. Should this thermal movement be uneven or jerky as might occur because of a hanger or skid sticking, the unit might momentarily brake, while permitting the pipe movement.

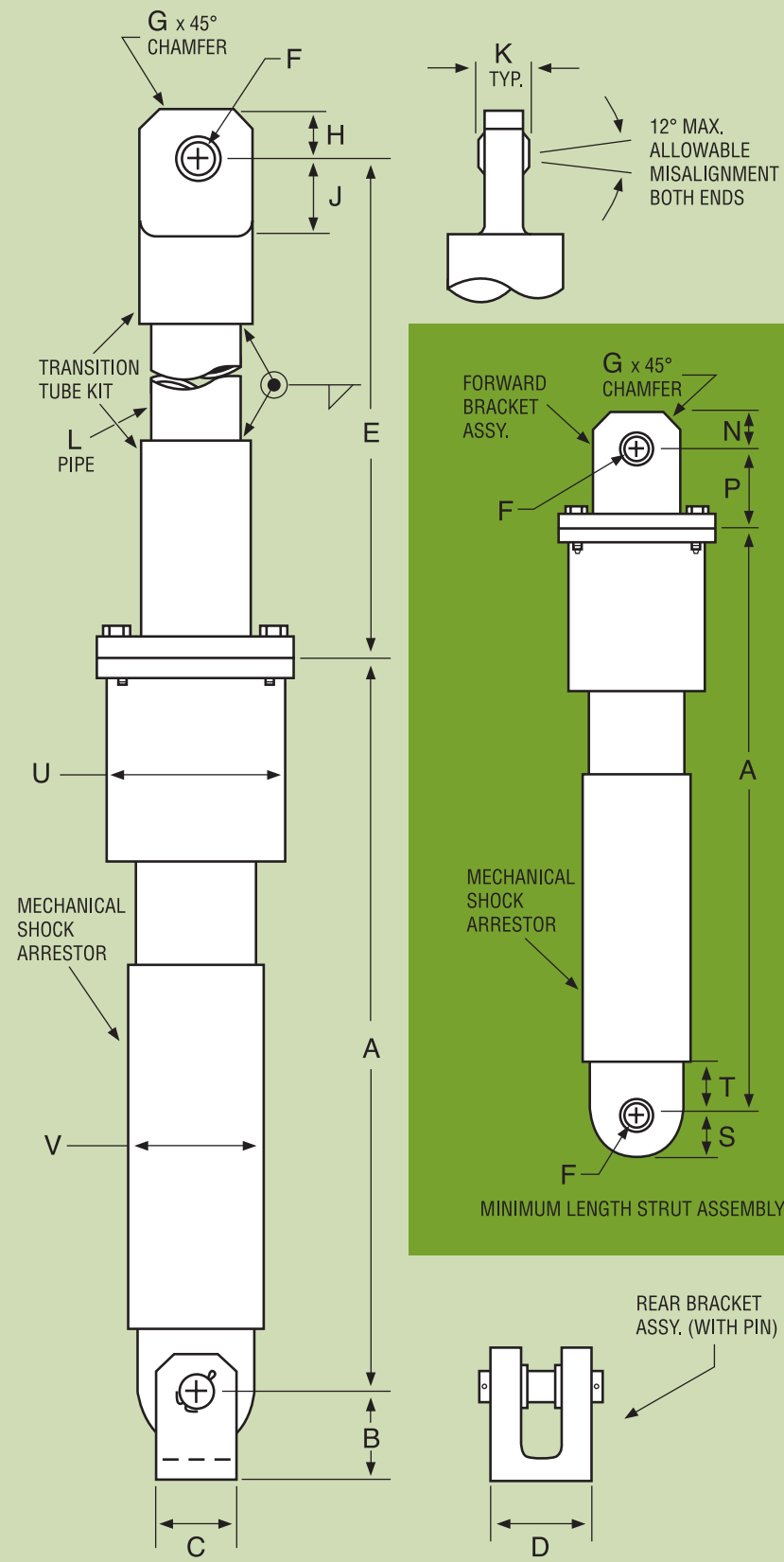


MODEL	PSA 1/4	PSA 1/2
Travel	4.0 102	2.5 64
Weight-Shock Arrestor only	3.6 1.63	3.3 1.50
A Length-fully retracted	9.0 229	7.5 191
B	1.375 34.93	1.375 34.93
C	1.00 25.4	1.00 25.4
D	1.16 29.5	1.16 29.5
E Minimum	5.38 136.6	5.38 136.6
F Dia +.0000 -.0005	.3750 9.525	.3750 9.525
G	.18 4.6	.18 4.6
H	.75 19.0	.75 19.0
J	1.12 28.4	1.12 28.4
K	.406 10.31	.406 10.31
L Customer supplied	3/4 inch Sched. 40 min	3/4 inch Sched. 40 min
N	.70 17.8	.70 17.8
P	1.10 27.9	1.10 27.9
S	.52 13.2	.52 13.2
T	.74 18.8	.74 18.8
U Dia	2.25 57.2	2.25 57.2
V Dia	1.25 31.8	1.25 31.8

MODEL	LOAD
PSA 1/4	350 156
PSA 1/2	650 289

- Dimensions given in blue are in pounds and inches. Dimensions given in red are in millimeters and dekanewtons.
 - Special Fittings and Configurations are available on special request.
- Level A & B Loads in accordance with Section III, Subsection NF, of the ASME Boiler and Pressure Vessel Code.





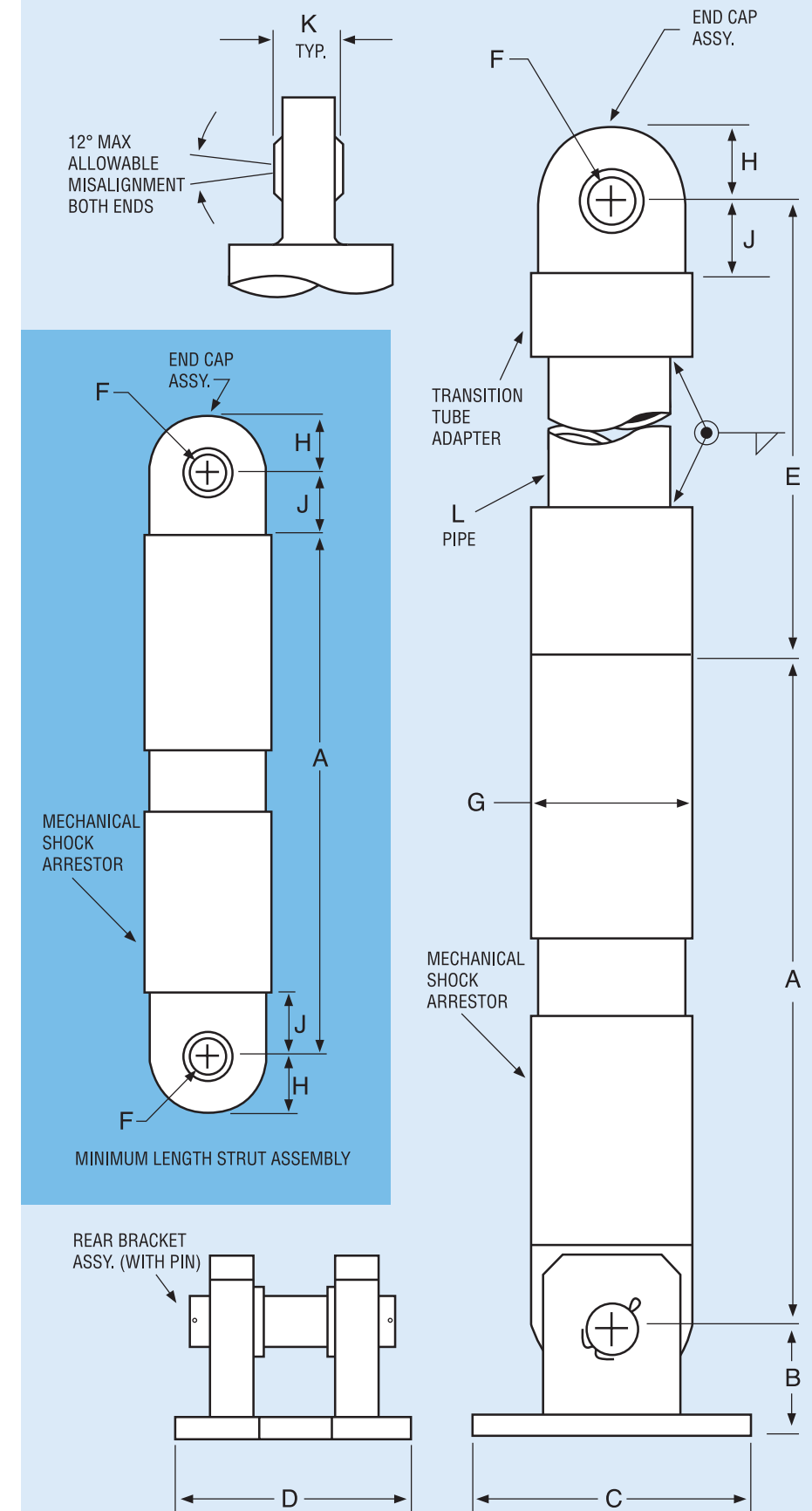
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MODEL	PSA 1	PSA 3	PSA 10
Travel	4.0 102	5.0 127	6.0 152
Weight—Shock Arrestor only	10.2 4.63	25.6 11.61	46.7 21.18
A Length—fully retracted	11.0 279	14.5 368	17.1 434
B	1.750 44.45	2.250 57.15	2.750 69.85
C	1.50 38.1	2.25 57.2	3.06 77.7
D	1.56 39.6	2.23 56.6	2.72 69.1
E Minimum	6.38 162.1	7.75 196.8	8.00 203.2
F Dia +.0000 -.0005	.5000 12.700	.7500 19.050	1.0000 25.400
G	.18 4.6	.50 12.7	1.00 25.4
H	.88 22.4	1.25 31.8	1.69 42.9
J	1.12 28.4	1.35 34.3	1.62 41.1
K	.500 12.70	.750 19.05	1.000 25.40
L Customer supplied	1 inch Sched. 80 min	1 1/2 inch Sched. 40 min	2 inch Sched. 80 min
N	1.00 25.4	1.25 31.8	1.50 38.1
P	1.51 38.4	2.00 50.8	2.40 61.0
S	.99 25.1	1.35 34.3	1.65 41.9
T	.98 24.9	1.35 34.3	1.63 41.4
U Dia	3.50 88.9	4.63 117.6	5.75 146.1
V Dia	2.12 53.8	2.87 72.9	3.25 82.6

MODEL	LOAD
PSA 1	1500 667
PSA 3	6000 2669
PSA 10	15000 6672

MODEL	PSA 35	PSA 100
Travel	6.0 152	6.0 152
Weight—Shock Arrestor only	140 64	265 120
A Length—fully retracted	24.0 610	29.0 737
B	4.800 121.92	6.280 159.51
C	12.00 304.8	20.00 508.0
D	7.00 177.8	10.00 254.0
E Minimum	13.00 330.2	14.50 368.3
F Dia +.000 -.001	1.500 38.10	2.500 63.50
G Dia	6.00 152.4	7.62 193.5
H	2.79 70.9	3.45 87.6
J	3.1 79	3.8 97
K	1.687 42.85	2.062 52.37
L Customer supplied	4 inch Sched. XXS min	5 inch Sched. XXS min

MODEL	LOAD
PSA 35	50000 22241
PSA 100	120000 53379



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