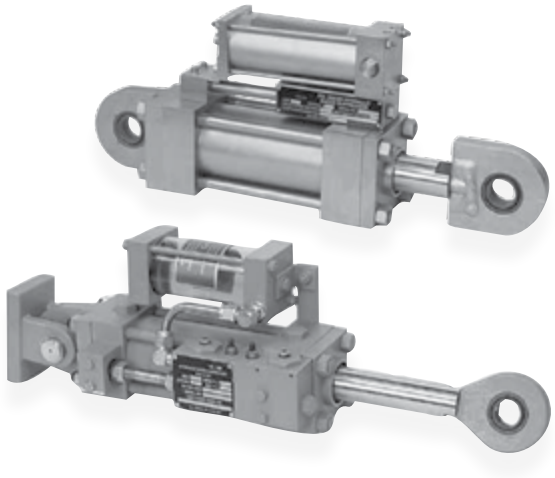
ASC Engineered Solutions

# ☐Fig. 200, ☐Fig. C–200 Hydraulic Snubber (Corrosion Resistant)
# ☐Fig. 201, ☐Fig. C–201 Hydraulic Snubber with Extenstion Piece (Corrosion Resistant)



**Size Range:** Seven standard sizes with cylinder bores of 1½" to 8" and with normal load ratings from 3,000 pounds to 128,000 pounds. All are available with 5", 10", 15", or 20" strokes except the 1½" size which is offered with 5" and 10" strokes only. Snubbers are available with integral or remote reservoirs.

**Finish:** Fig. 200/201 painted with semi gloss primer. Fig. C–200/C–201 corrosion resistant; painted with carbo zinc.

**Service:** For use on piping systems or equipment when unrestrained thermal movement must be allowed, but which must be restrained during impulsive or cyclic disturbance. The unit is not effective against low amplitude, high frequency movement. Use with standard settings to prevent destructive response to earthquakes, flow transients or wind load. Special settings are available to absorb the continuous thrust resulting from safety valve blow–off or pipe rupture.

**Standard Settings:** The standard settings are:
Locking (activation) velocity 8 +/– 2 in/min. Bleed rate (post activation) at normal rated load 4 +/– 1 in/min. (Special settings are available).

The valves are calibrated at the factory within the tolerances indicated at room temperature. Locking velocity and bleed rate will vary with temperature. Testing has indicated that there is little effect of these changes on dynamic operation.

**Features:**

- **Choice of valve type**
- ☐ Adjustable – permits field adjustments
- ☐ Temperature compensating – minimizes the effects of temperature on lockup and bleed
- **Choice of reservoir type**
- ☐ Transparent – continuous operation at 200° F with brief transients to 250° F
- ☐ Metal or pressurized metal – allows brief transients to 340° F
- ☐ Pressurized – eliminates the concern of reservoir orientation relative to valve and cylinder – minimizes internal contamination
- ☐ Remote

- Factory calibrated valves.
- Rapid, positive valve closure.
- Special design minimizes the “lost motion” which results from the shifting and seating of piston seals.
- Unlocked resisting force is less than 1% of rated load.
- Stable, non–flammable, long life hydraulic fluid made highly visible for ease of inspection.
- Self–aligning bushings permit ± 5° misalignment or angular motion.
- Bushings are coated with a dry lubricant.
- Choice of coating (paint, primer, carbo zinc, epoxy, plating or other)

**Loads** (Lbs)

| Cylinder Size (in) | Max Load* |
|---|---|
| 1½ (5" stroke) | 3,000 |
| 1½ (10" stroke) | 1,250 |
| 2½ (5", 10", 15" stroke) | 12,500 |
| 2½ (20" stroke) | 10,500 |
| 3¼ | 21,000 |
| 4 | 32,000 |
| 5 | 50,000 |
| 6 | 72,000 |
| 8 | 128,000 |

*Loads must not be applied outside a 10° included angle cone of action to the pipe clamp axis without special authorization.

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| Project: | ☐ Approved |
| Address: | ☐ Approved as noted |
| Contractor: | ☐ Not approved |
| Engineer: | Remarks: |
| Submittal Date: | |
| Notes 1: | |
| Notes 2: | |

# Fig. 200, Fig. 201 Hydraulic Snubbers

**Upgrade Kits:** Kits are available to upgrade existing snubbers with temperature compensating valves and/or pressurized reservoir.

**How to Size:**

1. **Cylinder size:** Use table on submittal page 1 to select cylinder bore size large enough to restrain expected load.
2. **Stroke:** Define expected movement of the pivot joining the suppressor with the equipment to be protected (cold to hot plus any abnormal movements). Determine maximum and minimum distances between this curve and the fixed pivot pin of the snubber. The minimum recommended stroke is 20% greater than the difference between these lengths.

   **Note:** If erected position at the snubber's location on the equipment is outside of the range of normal cold-to-hot movement (e.g. cold pull of pipe), the snubber should not be installed until after the equipment is in its cold position.This eliminates the need of providing for the extra travel in the snubber's stroke. For 2½" through 8" snubbers, standard strokes are 5", 10", 15", and 20". For the 1½" snubber, 5" and 10" are the only standard strokes.
3. **Installed Piston Setting:** As indicated previously, the snubber should be installed at its cold piston position if possible. From the installed position, take extension (outward movement) of the piston rod as positive (+) and retraction as negative (–).
4. **Installed Piston Position =**

$$\left( \frac{\text{Stroke} - (\text{Algebraic Sum of Movements})}{2} \right)$$

   To aid in measuring the piston position, we have shown a dimension, "Z". This dimension represents the distance between the cylinder head and the end of the rod when the rod is fully retracted. Whenever specifying the position at which the piston rod is to be set, the total dimension from the cylinder head to the end of the rod should be given.

   Thus, Piston Setting = Piston Position + Z.
5. **Assembly Length:** Determine the installed "C" dimension by adding the installed piston position (not setting) to C minimum. Lay in take out dimensions E and/or B, and find required pin-to-pin snubber length. If a pin-to-pin length adjustment is desired, use Fig. 201. Calculate the required "W" dimension by subtracting (C installed + F) from the required pin-to-pin length. If this is less than W minimum, only a Fig. 200 can be used, and one of the attachments will have to be moved or shimmed to suit. If a Fig. 200 is to be used, make sure that the required pin-to-pin length is at least as great as (C installed + B). If neither a Fig. 200 nor a Fig. 201 can be accommodated, and the installation cannot be modified, consult your ASC Engineered Solutions™ representative about designing a special or modified unit.

**Ordering:**

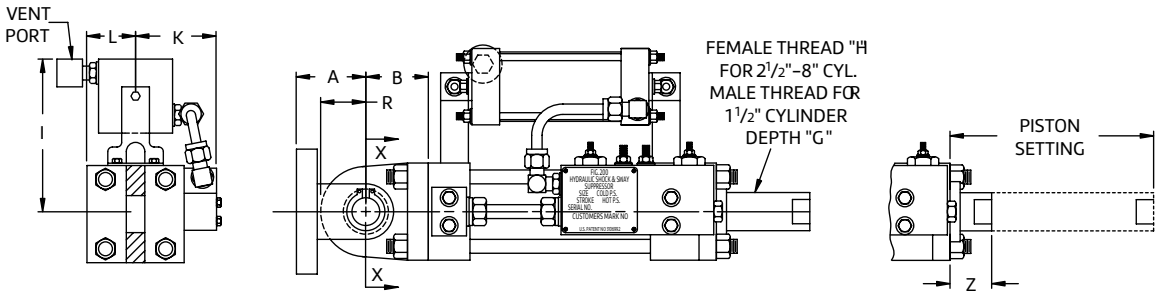
**Ordering: Specify part number as follows:**

| XXX | X | XX | X | X | X | X | |
|---|---|---|---|---|---|---|---|
| | | | | | | | Reservoir Orientation<br>O= Does not apply for Pressurized or Remote<br>U= Rod Up<br>D= Rod Down or Horizontal |
| | | | | | | | Reservoir Type<br>L= Transparent (Polycarbonate)<br>M= Metal (Limited Applications)<br>P= Pressurized<br>R= Remote |
| | | | | | | | Valve Type<br>A= Adjustable<br>T= Temperature Compensating |
| | | | | | | | Option (0,1,2, or 3),<br>See Option Table Below |
| | | | | | | | Stroke (5, 10, 15, 20) |
| | | | | | | | Cylinder Size:<br>1 (1½ Cyl.)<br>2 (2½ Cyl.)<br>3 (3¼ Cyl.)<br>4 (4 Cyl.)<br>5 (5 Cyl.)<br>6 (6 Cyl.)<br>8 (8 Cyl.) |
| | | | | | | | Figure No. (200 or 201),<br>Also Specify:<br>W Dimension when Specifying Fig. 201, Pipe Clamp Size when Specifying Option 3<br>Surface Coating<br>Cold and Hot Piston Settings. |

**Fig. 200 & Fig. 201 Options**

| Option | Consists of... |
|---|---|
| 0 | Fig. 200: Basic unit (snubber) with pivot mount and one rear bracket. |
| | Fig. 201: Basic unit with extension piece and one rear bracket. |
| 1 | Option 0 plus cylinder eye |
| 2 | Option 0 plus cylinder eye and additional rear bracket. |
| 3 | Option 0 plus cylinder eye and pipe clamp. |

# Hydraulic Snubbers (cont.)
## Fig. 200, Fig. 201




SECTION X–X

FIG. 200 (OPTION 0)

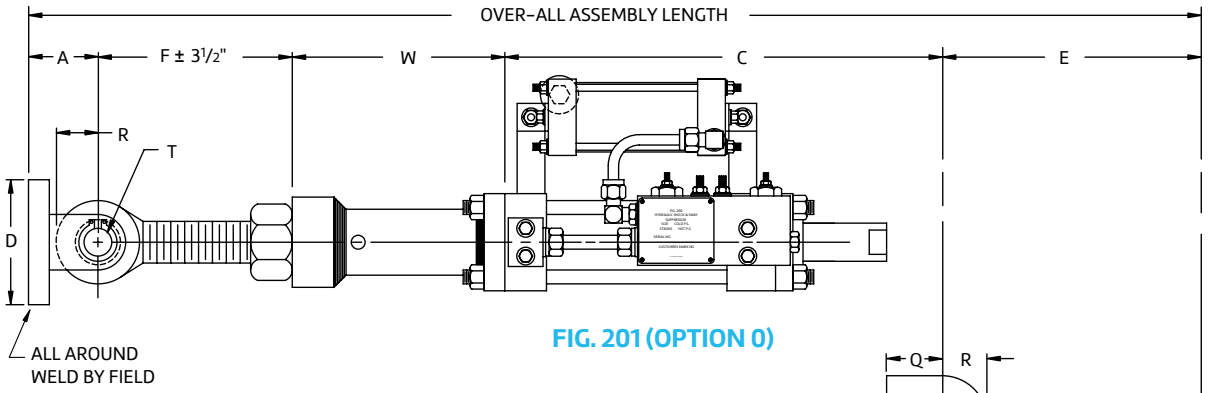
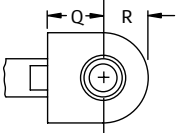
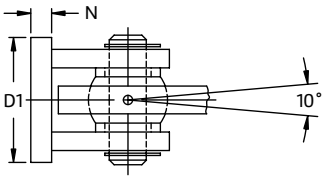


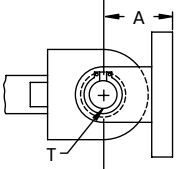

FIG. 201 (OPTION 0)



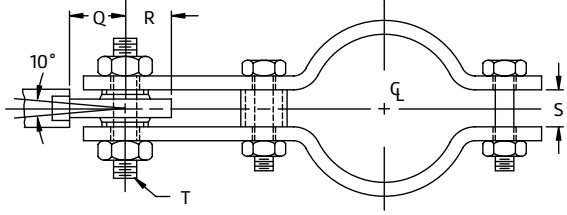

OPTION 1




**NOTE:**
CYLINDER EYE
MAY BE ROTATED
TO ANY POSITION




OPTION 2




OPTION 3

# Hydraulic Snubbers (cont.)
## Fig. 200, Fig. 201

**Fig. 200, 201: Dimensions** (in) • **Weight** (Lbs)

| Cylinder | | Fig. 200 Wt. | A | B | C | | | D | D1 | F | G | H | I | | | K | L | N | Q | R | S | T | W | | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bore | Stroke | | | | Min | Mid | Max | | | | | | Metal Res. | Trans. Res. | Press Res. | | | | | | | | Min | Max | |
| 1½ | 5 | 45 | 2½ | 1⅝ | 13⅛ | 15⅝ | 18⅛ | 2 | 2⅜ | 6 | ¾ | ⅝–18 | 5⁹⁄₁₆ | 4¹³⁄₁₆ | 4¾ | 2¾ | 2¼ | ⅝ | 2⅛ | 1⅛ | 1 | ¾ | 9½ | 75⅝ | ⅝ |
| | 10 | 49 | | | 18⅛ | 23⅛ | 28⅛ | | | | | | | | | | | | | | | | | 65⅝ | |
| 2½ | 5 | 75 | 2½ | 2¼ | 13⅜ | 15⅞ | 18⅜ | 2 | 2⅞ | 7³⁄₁₆ | ⅞ | ⅞–14 | 6¼ | 5⅛ | 5¾ | 3¼ | 1¾ | ¾ | 2 | 1⅝ | 1⅜ | 1 | 10⅜ | 94⁹⁄₁₆ | 1 |
| | 10 | 81 | | | 18⅜ | 23⅜ | 28⅜ | | | | | | | | | | | | | | | | | 84⁹⁄₁₆ | |
| | 15 | 87 | | | 23⅜ | 30⅞ | 38⅜ | | | | | | | | | | | | | | | | | 74⁹⁄₁₆ | |
| | 20 | 93 | | | 28⅜ | 38⅜ | 48⅜ | | | | | | | | | | | | | | | | | 64⁹⁄₁₆ | |
| 3¼ | 5 | 121 | 3 | 3 | 14⅞ | 17⅜ | 19⅞ | 3 | 3³⁄₁₆ | 7¹⁵⁄₁₆ | 1⅛ | 1⅛–12 | 6⅞ | 5¾ | 6¾ | 3¾ | 2¼ | ¾ | 2½ | 2¹⁄₁₆ | 1¹¹⁄₁₆ | 1¼ | 10½ | 92 | 1⅛ |
| | 10 | 132 | | | 19⅞ | 24⅞ | 29⅞ | | | | | | | | | | | | | | | | | 82 | |
| | 15 | 146 | | | 24⅞ | 32⅜ | 39⅞ | | | | | | | | | | | | | | | | | 72 | |
| | 20 | 156 | | | 29⅞ | 39⅞ | 49⅞ | | | | | | | | | | | | | | | | | 62 | |
| 4 | 5 | 177 | 4 | 3¾ | 16⅛ | 18⅝ | 21⅛ | 6⅛ | 4¼ | 9⁵⁄₁₆ | 1½ | 1½–12 | 7⅛ | 6 | 7¹³⁄₁₆ | 4 | 2½ | 1¼ | 3⅜ | 2½ | 2 | 1½ | 11½ | 89⁹⁄₁₆ | 1⅛ |
| | 10 | 189 | | | 21⅛ | 26⅛ | 31⅛ | | | | | | | | | | | | | | | | | 79⁹⁄₁₆ | |
| | 15 | 206 | | | 26⅛ | 33⅝ | 41⅛ | | | | | | | | | | | | | | | | | 69⁹⁄₁₆ | |
| | 20 | 223 | | | 31⅛ | 41⅛ | 51⅛ | | | | | | | | | | | | | | | | | 59⁹⁄₁₆ | |
| 5 | 5 | 235 | 5 | 4½ | 18 | 20½ | 23 | 7⅞ | 5⅜ | 10³⁄₁₆ | 1⅞ | 1⅞–12 | 8½ | 7 | 9⁵⁄₁₆ | 4¾ | 3¼ | 1¾ | 4 | 3¹⁄₁₆ | 2⅜ | 1¾ | 12 | 86¹³⁄₁₆ | 1⅞ |
| | 10 | 256 | | | 23 | 28 | 33 | | | | | | | | | | | | | | | | | 76¹³⁄₁₆ | |
| | 15 | 277 | | | 28 | 35½ | 43 | | | | | | | | | | | | | | | | | 66¹³⁄₁₆ | |
| | 20 | 298 | | | 33 | 43 | 53 | | | | | | | | | | | | | | | | | 56¹³⁄₁₆ | |
| 6 | 5 | 292 | 5¾ | 5½ | 19¾ | 22¼ | 24¾ | 9⅛ | 6¼ | 11⁵⁄₁₆ | 2¼ | 2¼–12 | 9¹⁄₁₆ | 7⅝ | 10¹⁵⁄₁₆ | 5¼ | 3⅞ | 2 | 4⅝ | 3½ | 2¾ | 2 | 13⅜ | 83¹⁵⁄₁₆ | 1¾ |
| | 10 | 320 | | | 24¾ | 29¾ | 34¾ | | | | | | | | | | | | | | | | | 73¹⁵⁄₁₆ | |
| | 15 | 348 | | | 29¾ | 37¼ | 44¾ | | | | | | | | | | | | | | | | | 63¹⁵⁄₁₆ | |
| | 20 | 375 | | | 34¾ | 44¾ | 54¾ | | | | | | | | | | | | | | | | | 53¹⁵⁄₁₆ | |
| 8 | 5 | 515 | 7¼ | 6 | 23½ | 26 | 28½ | 14 | 8¾ | 14½ | 4 | 3–12 | 12½ | N/A | 13⅛ | 8½ | 4⅞ | 2¼ | 6¾ | 4¾ | – | 2½ | 14½ | 75½ | 2¼ |
| | 10 | 575 | | | 28½ | 33½ | 38½ | | | | | | | | | | | | | | | | | 65½ | |
| | 15 | 640 | | | 33½ | 41 | 48½ | | | | | | | | | | | | | | | | | 55½ | |
| | 20 | 705 | | | 38½ | 48½ | 58½ | | | | | | | | | | | | | | | | | 45½ | |

# Hydraulic Snubbers
## Fig. 200, Fig. 201

### Fig. 200, 201 Dimensions (in)

| Pipe Size** | E–Take Out 650˚F (Max.) | | | | | | E Dimension 1075˚F* (Max.) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cylinder Bore | | | | | | Cylinder Bore | | | | | |
| | 1½ | 2½ | 3¼ | 4 | 5 | 6 | 1½ | 2½ | 3¼ | 4 | 5 | 6 |
| 2 | 6 | 6⅜ | – | – | – | – | 9⅜ | 9⅜ | – | – | – | – |
| 2½ | 7 | 7 | – | – | – | – | 9⅜ | 9⅜ | – | – | – | – |
| 3 | 7 | 7 | – | – | – | – | 9⅜ | 9⅜ | – | – | – | – |
| 3½ | 7 | 7 | – | – | – | – | 9⅜ | 9⅜ | 9⅜ | – | – | – |
| 4 | 7¼ | 7¼ | – | – | – | – | 9⅝ | 9⅝ | 9⅝ | – | – | – |
| 5 | 7¾ | 7¾ | 9⅛ | 10 | – | – | 10¼ | 10¼ | 10¼ | 10⅜ | – | – |
| 6 | 8⅜ | 8⅜ | 10 | 10 | 11⅞ | – | 10¾ | 10¾ | 10¾ | 11⅛ | 12 | – |
| 8 | 9⅜ | 9⅜ | 11¼ | 11¼ | 12⅝ | – | 11¾ | 11¾ | 11¾ | 12⅜ | 13⅜ | – |
| 10 | 10½ | 10½ | 12¾ | 12¾ | 14¼ | – | 12¾ | 12¾ | 12¾ | 13⅝ | 14¾ | – |
| 12 | 11⅞ | 11⅞ | 13⅞ | 13⅞ | 15⅜ | – | – | 13¾ | 13¾ | 14¾ | 15⅞ | – |
| 14 | 12⅝ | 12⅝ | 14½ | 14½ | 16 | – | – | 14⅜ | 14⅜ | 15⅜ | 17¼ | 17¼ |
| 16 | 13⅝ | 13⅝ | 15¼ | 15¼ | 17⅛ | – | – | 15⅜ | 15⅜ | 16⅞ | 18⅜ | 18½ |
| 18 | 14⅝ | 14⅝ | 16⅜ | 16⅜ | 18¼ | – | – | 16⅜ | 16½ | 18 | 19½ | 19⅝ |
| 20 | 15¾ | 15¾ | 17¾ | 17¾ | 19¼ | 19¼ | – | 17⅜ | 17½ | 19⅜ | 20⅜ | 20⅞ |
| 24 | 18⅛ | 18⅛ | 19⅞ | 19⅞ | 21¾ | 21¾ | – | 19⅜ | 20⅜ | 21½ | 22½ | 23 |
| 30 | 21¼ | 21¼ | 23 | 23 | 25 | 25 | – | 22⅜ | 23½ | 24½ | 26⅜ | 26⅜ |
| 36 | 24 | 24 | 26½ | 26½ | 28⅛ | 28⅛ | – | 25⅜ | 26⅝ | 27½ | 29⅝ | 30 |

* Please specify temperature when ordering.
**Intermediate sizes between 20 and 36 are available and will have the takeout and stock size of the next larger size.
**Note:** Carbon steel clamps can accomodate up to 4" insulation. Alloy can accomodate 6½".
High temperature clamps will be made from alloy steel. Stainless steel available upon request. For other special design requirements, please contact your ASC Engineered Solutions™ sales representative.