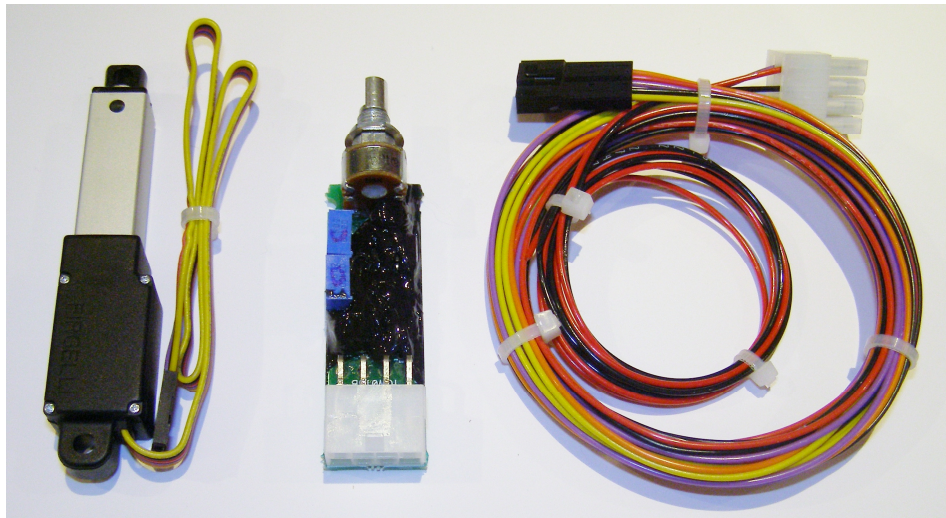


Control Valve Servo Kit CVS-12v-kit

The CVS-12v kit is a system for controlling valves and dampers such as those used to select cabin heat or ventilation or control air flow through oil coolers or radiators. The CVS kit includes an instrument panel mounted controller, a 30 mm travel linear actuator servo and a pre-made 5 foot wiring harness.

The controller provides fully proportional operation of the linear actuator servo, allowing the motion of the attached valve or damper to be selected at any position from fully opened to fully closed. Additionally, the CVS system may be coupled to an optional butterfly valve (3" or 4" available) for controlling the flow of cooling air through an oil cooler assembly.



Linear actuator servo, panel mounted controller, 5 foot wiring harness

CVS must be installed using the current aircraft standards and practices as shown in AC 43.13-2A/1B. The installer/builder is solely responsible for determining the suitability of the installation and use of this product.

Installation Instructions:

- 1) Select an appropriate location in the aircraft for the CVS panel mounted controller, ensure there is adequate clearance available behind the controller for the wiring harness and that the circuit board does not come into contact with other metallic objects or devices.
- 2) Drill a mounting hole and an anti-rotation hole per the drawing in figure 1.

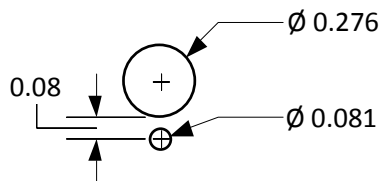


Figure 1.

- 3) Attach the white, 8 pin wiring harness connector to the pcb and then install the potentiometer shaft thru the mounting hole and add the washer and nut. Rotate the pcb until the indexing tab on the potentiometer aligns with the anti-rotation hole, then tighten the pot shaft nut.
- 4) Strain relieve the wiring harness within 6" of the white 8 pin connector. It is important that the wiring harness is not pulling on the controller circuit board. Use a cable tie and mounting plate to secure the wiring harness to the aircraft.

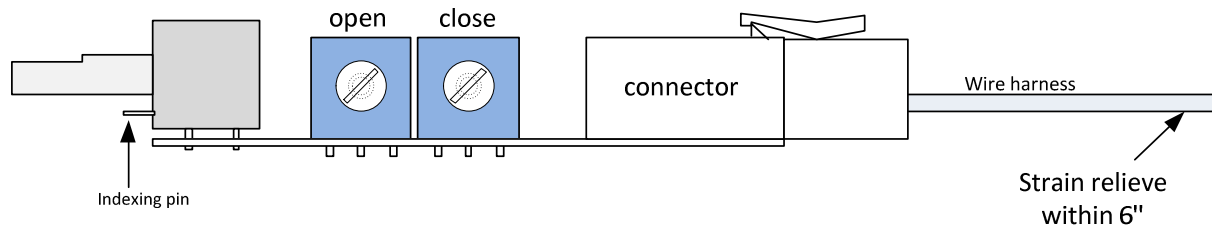


Figure 2.

(Note: Open and close pots correspond to actuator motion when wire harness colors are aligned, if you use reverse polarity connection, open and closed pots are reversed)

- 5) Mount the linear actuator servo using the hardware provided. NOTE: it may be helpful to temporarily connect the wiring harness to the actuator and apply 12 volts to the controller to evaluate the full travel available from the linear actuator. You must ensure that the travel required to get full motion of the device you are controlling is available, this can be strongly influence by the mounting location of the actuator and any control arms on the device. Also note, you can always limit the travel after installation by utilizing the two blue trimmer potentiometers on the side of the controller, however you cannot cause addition travel beyond the fixed length of the linear actuator arm.

When connecting the black 5 pin connector at the linear actuator you can select the direction the actuator travels with respect to the control knob rotation on the controller circuit board by simply flipping the connector body over. This connector is non-polarized and will mate properly in either direction.

See figures 3, 4, and 5 for examples of mounting the linear actuator. Figure 3 shows the linear actuator used in conjunction with our 4" butterfly valve for controlling oil temperature on a Van's RV-10 system. Figure 4 and 5 shows the linear actuator being used to control a cabin heat flapper valve on an RV-10. Example dimensions are shown in the figures for locating the C shaped mounting bracket.

Start the mounting process by attaching the servo to the control arm of heater valve or oil cooler butterfly valve using the provided hardware. Follow this by temporarily mounting the C shaped bracket to the other end of the servo. Hold the servo in the approximate installation location and check the mounting location of the C shaped bracket. Confirm the mounting location by operating the servo over its full travel, ensure the valve can move thru the required range of motion. When satisfied with the motion of the servo, drill a hole for the C shaped bracket and securely bolt in place. Attach the servo and recheck the full range of motion.

If necessary the travel of the servo can be reduced using the two blue trimmer potentiometers on the side of the controller.

IMPORTANT NOTES on adjusting the full travel of the servo:

- a) Make very small adjustments of the trimmer potentiometers, after each adjustment run the servo all the way to the opposite end of travel then back to end being adjusted.
- b) Each trimmer is dedicated to adjusting one end of the travel, however, it does have some influence on the opposite end therefore it is important to make small adjustments and always check the opposite end after each adjustment.

c) During the trimming process avoid running the servo to the absolute end of travel. Ensure that the active travel area commanded by the control knob leaves about 1/32" or more of actuator shaft unused at each end.

d) If during the trimming process you need to get back to the factory shipped settings, turn both trim pots fully counter- clockwise, then back them off about 1/16" at the pointer end of the pot.

6) After completing the travel adjustments route the wiring harness and properly fasten the wires to the airframe using cable ties. Connect the wiring harness to the linear actuator and strain relieve the wires. Add a piece of heat-shrink tubing over the black connector to lock it in place.

7) Connect the two power leads from 8 pin connector to aircraft power and ground.

Connect the red + to aircraft power via a 2 amp fuse or circuit breaker. Connect the black - flying lead to aircraft ground.

For service or if you have questions, please contact us.

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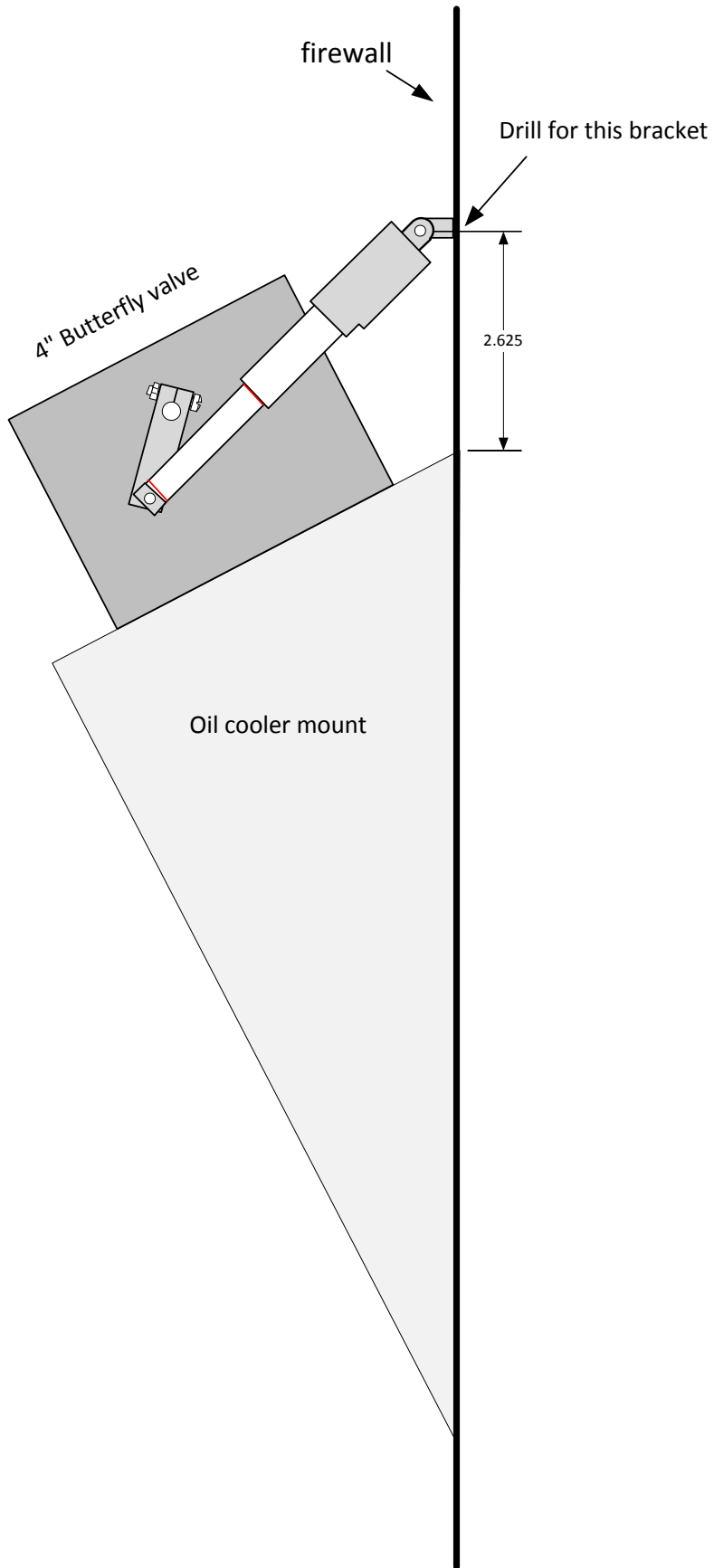


Figure 3. RV-10 oil cooler assembly with CVS system

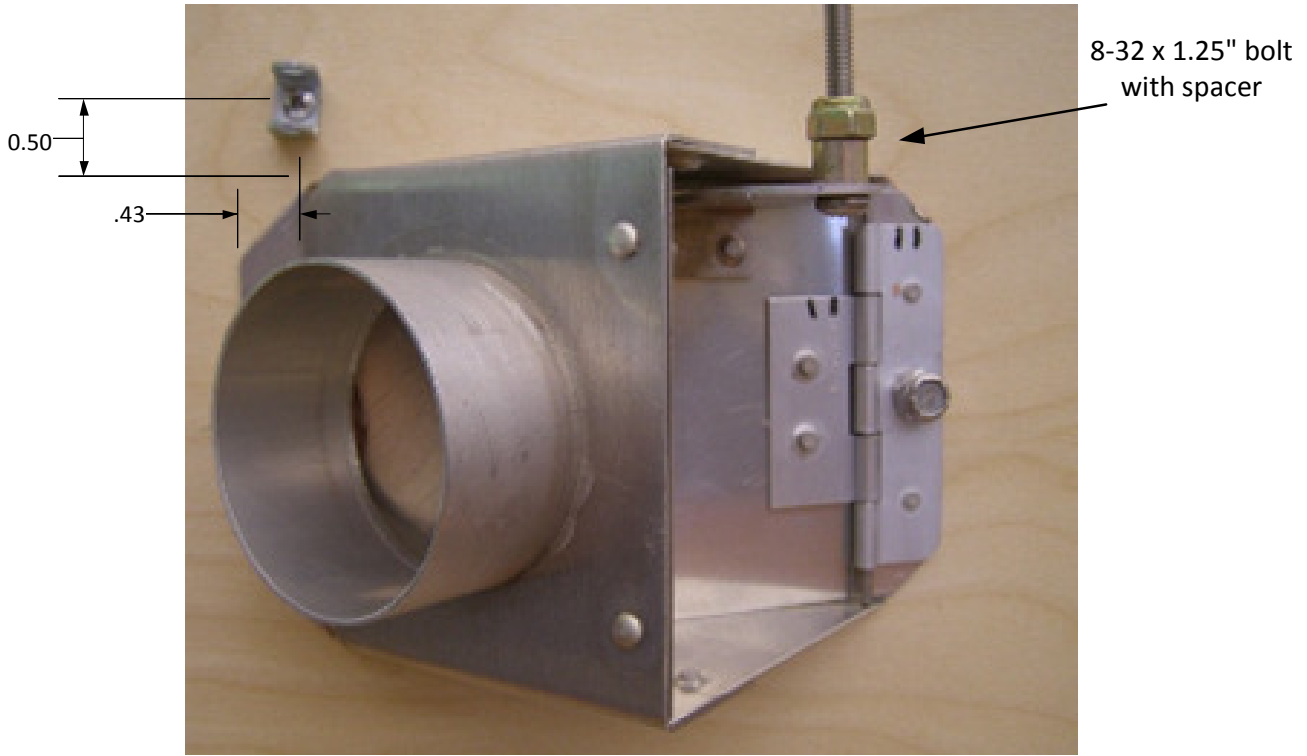


Figure 4. Mount C bracket, install 8-32 x 1.25 bolt with spacer

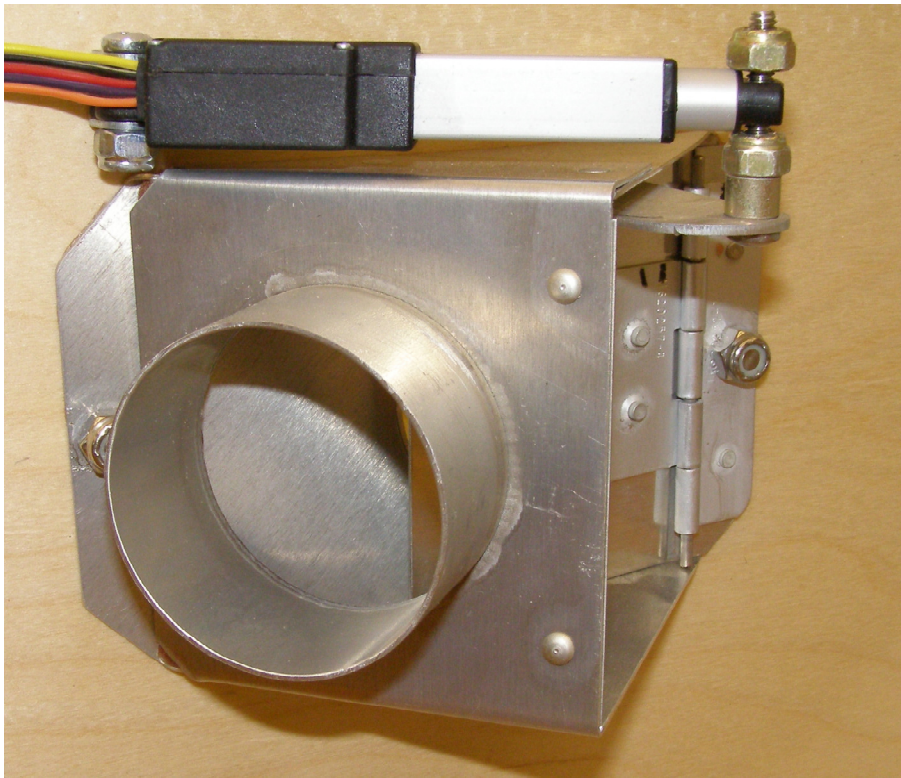


Figure 5. Servo mounted in C bracket

SPECIFICATIONS:

Input Voltage:	10-15 volts DC
Input Current	0.5 amp
Servo	30 mm max travel
Max drive force	2.5 lbs.
Max holding force	10 lbs.
Temp range	-30 C to +70 C
Weight	servo: 1.1 oz. Controller: 1.0 oz.

TCW Technologies, LLC.

During the first 12 months from the date of purchase and subject to the conditions hereinafter set forth, TCW Technologies, LLC. (TCW) will repair or replace to the original user or consumer any portion of your new TCW product which proves defective due to defective materials or workmanship of TCW. Contact TCW Technologies for warranty service. TCW shall have and possess the sole right and option to determine whether to repair or replace defective equipment, parts or components. Damage due to equipment, environment or conditions beyond the control of TCW Technologies are NOT COVERED BY THIS WARRANTY.

LABOR, COSTS: TCW shall IN NO EVENT be responsible or liable for the cost of field labor or other charges incurred by any customer in removing and/or reaffixing any TCW product, part or component thereof.

THIS WARRANTY WILL NOT APPLY: (a) to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions provided; (b) to failures resulting from abuse, accident, or negligence; (c) to normal maintenance services and the parts used in connection with such service; (d) to units which are not installed in accordance good trade practices; or (e) to unit used for purposes other than for what it was designed and manufactured.

RETURN OR REPLACED COMPONENTS: any item to be replaced under this Warranty must be returned to TCW Technologies in Emmaus, PA, or such place as TCW may designate, freight prepaid.

PRODUCT IMPROVEMENTS: TCW reserves the right to change or improve its products or any portions thereof without being obligated to provide such a change or improvement for units sold and /or shipped prior to such change or improvement.

WARRANTY EXCLUSIONS: as to any specific TCW product, after the expiration of the time period of the warranty applicable thereto as set forth above. THERE WILL BE NO WARRANTIES, INCLUDING ANY IMPLIED WARRANTIES OR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. No warranties or representations at any time made by any representative of TCW shall vary or expand the provisions hereof.

LIABILITY LIMITATION: IN NO EVENT SHALL TCW OR ITS AFFILIATES BE LIABLE OR RESPONSIBLE FOR CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES RESULTING FROM OR RELATED IN ANY MANNER TO ANY TCW PRODUCT OR PARTS THEREOF. THE SUITABILITY OF USE OF THE TCW TECHNOLOGIES, LLC. PRODUCT IS TO BE DETERMINED BY THE AIRCRAFT BUILDER.

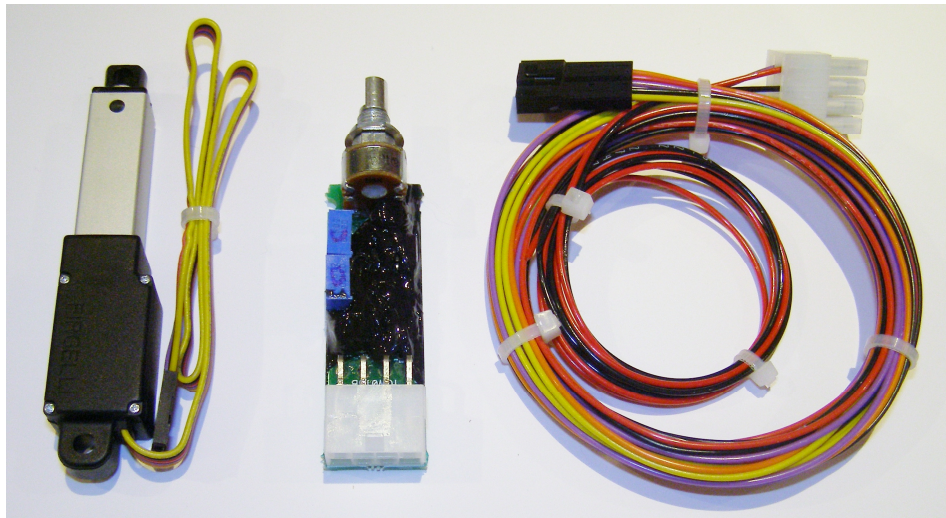
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Linear actuator servo, panel mounted controller, 5 foot wiring harness

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- 2) Drill a mounting hole and an anti-rotation hole per the drawing in figure 1.

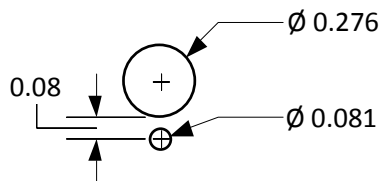


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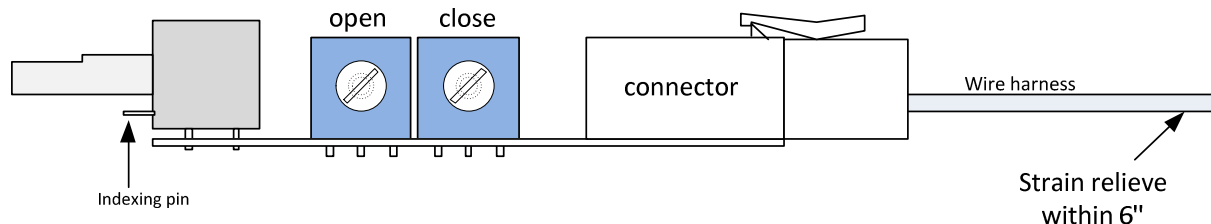


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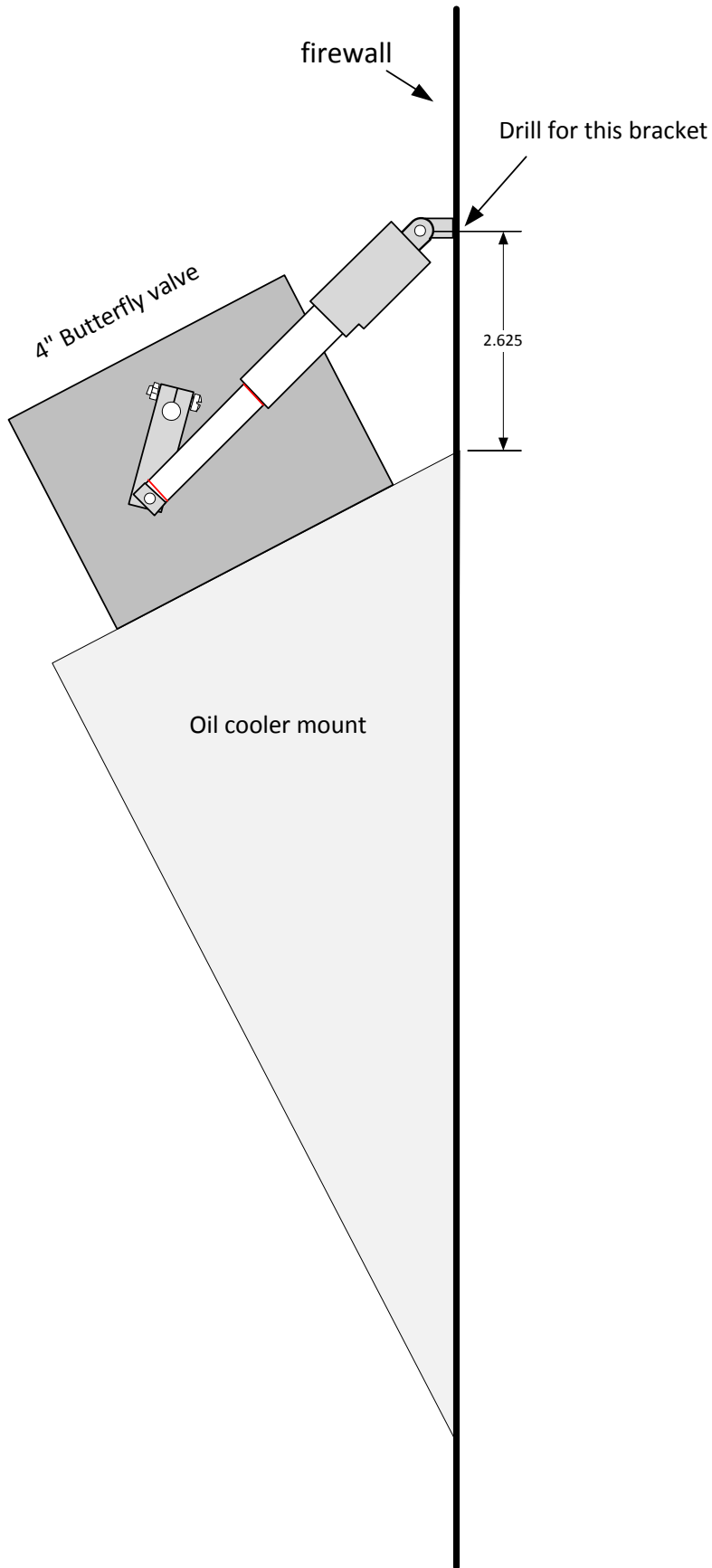


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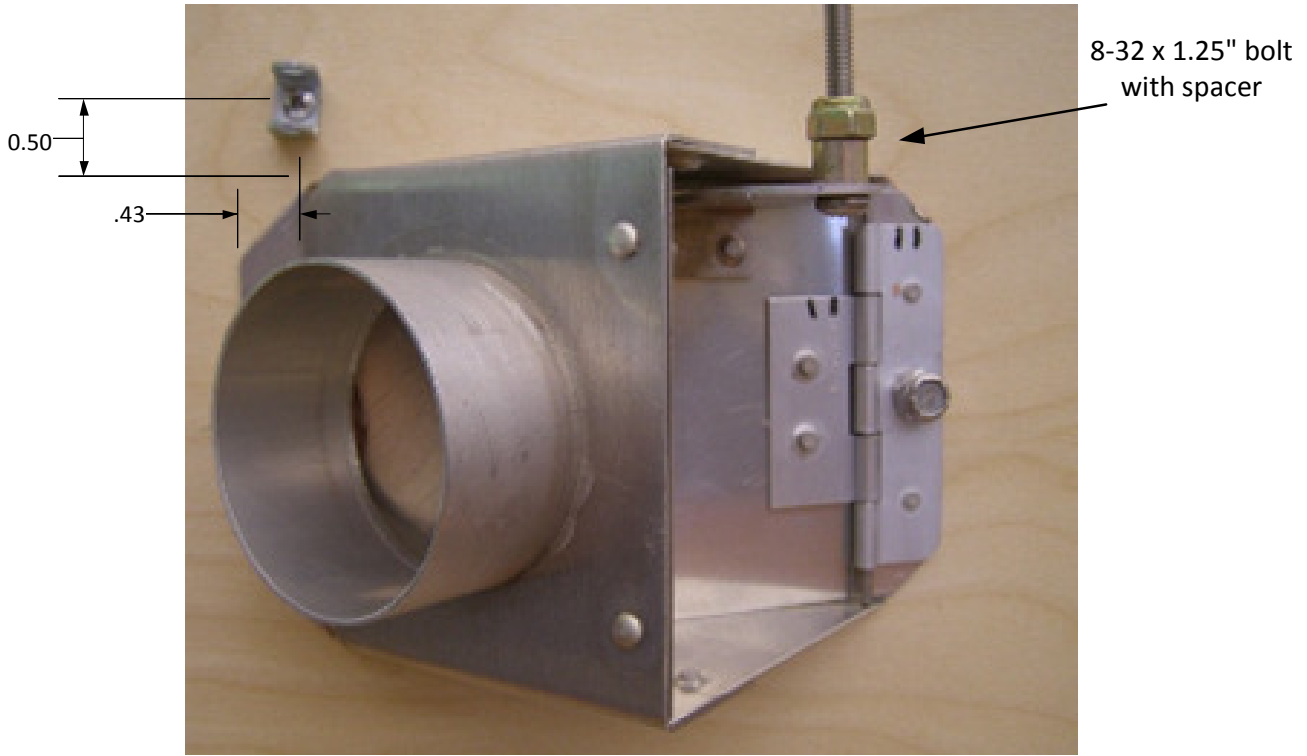


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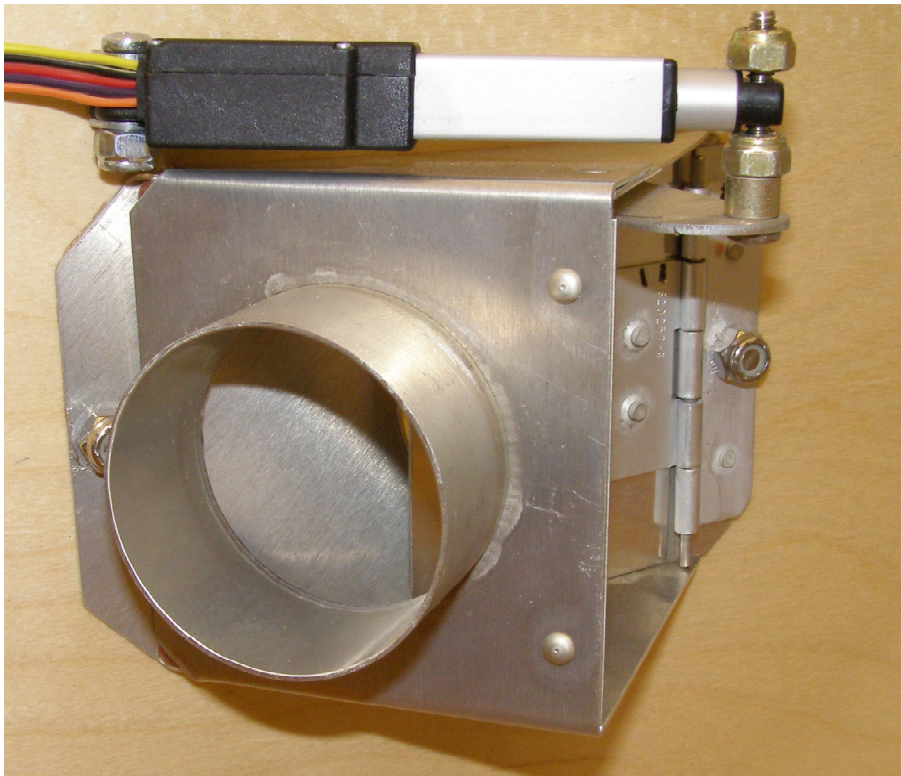


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