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A GMC SPECIFIC TOAD BRAKE SYSTEM

What's commercially available **Surge brake**

Surge brakes work by using the momentum of the toad to push a lever that pulls on a cable. The cable is attached to the toad brake pedal and is used to apply the toad brakes. Surge brakes are proportional.
Example: Readybrake

Deceleration brake

The deceleration brake type uses a pendulum device that makes up a circuit and turns on an air compressor. The air compressor sends air to a pneumatic cylinder that is attached to the toad brake pedal. The air pressure is adjustable via a regulator but always sends the same pressure to the cylinder.
Example: Brake Buddy

Coach applied brake

The coach-applied systems are usually proportional and are somehow tied into the coach brake system. This is called an invasive system in which a hydraulic brake line is cut and fittings are attached, or it cuts into an air brake system. This type of system usually indicates a permanent installation.

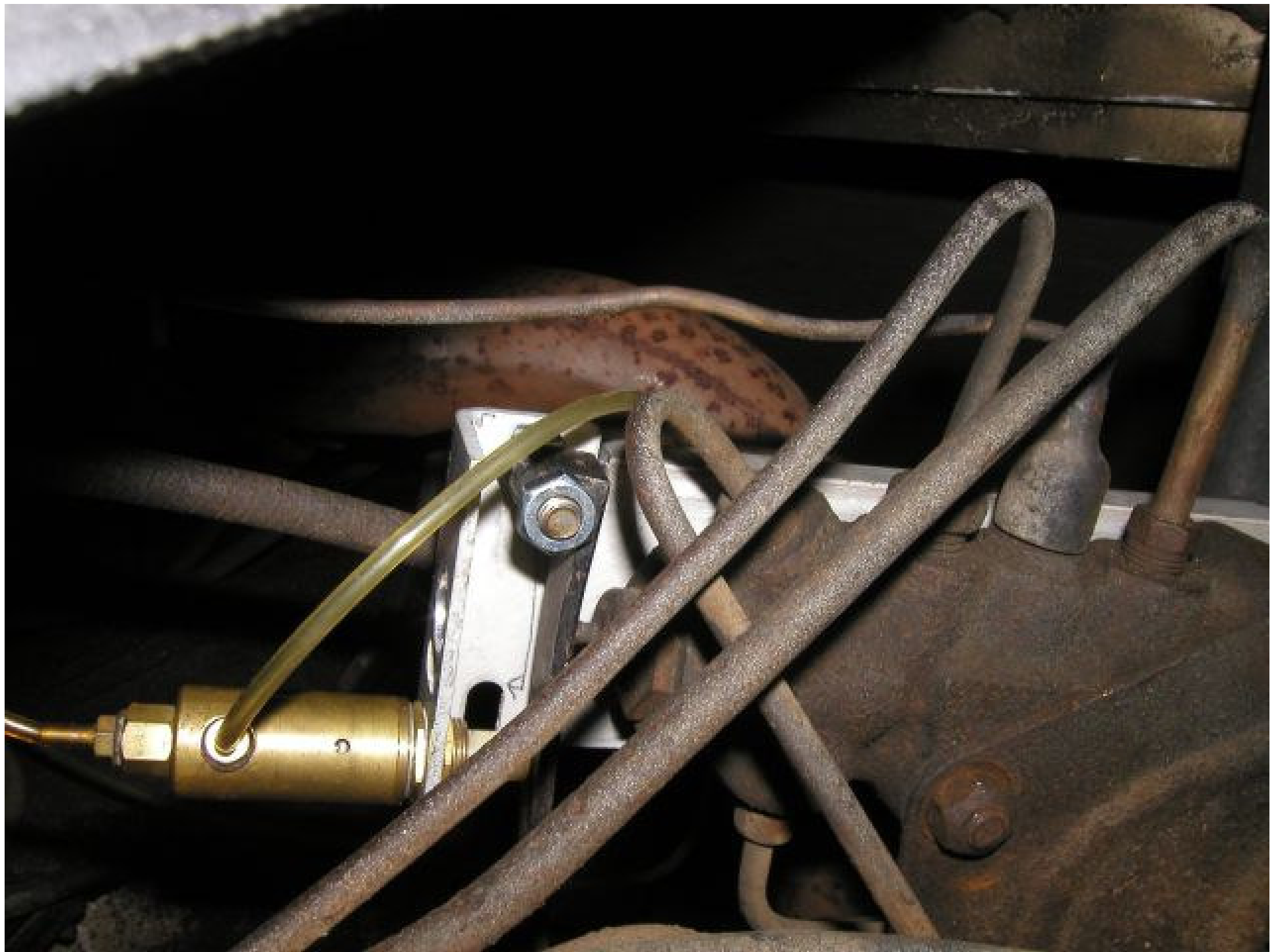
Roadmaster makes a system that senses the pressure in the hydraulic brake line and sends a proportional air signal to an air cylinder in the toad. This air can come from a separate compressor or an onboard one. Example: Brakemaster

The VIP System Function

The VIP system is a **variable independent pressure system**. Controlled by the driver's foot, toad brakes can be applied independently of the coach brakes or in conjunction with the coach brakes. An air pressure regulator, operated by the driver's foot, sends a 0 to 80 PSI air signal via ¼" nylon hose to the toad brake pedal air cylinder. The regulator has about ¼" stroke with about 35 pounds of force to full stroke. The regulator can be mounted on either side of the brake arm, however, I find it is easiest to hit mounted as shown. The coach brakes can be applied using the left foot and the toad brakes with the right foot. An air pressure gauge can be mounted on the dash to measure pressure output to the toad. The reaction time for the toad brakes to apply is about two seconds. The coach/toad combination stops quicker than the coach alone.

The system uses compressed air from the air bag compressor. Cut into the red line, insert a tee and run a line to the block off valve and on to the firewall fitting. Since my compressor is in the rear of the coach, I cut into the red line at the left rear wheel and ran a line forward. The air system must be in top operating condition without leaks, and the coach must be driven in "automatic" in order to keep the air tank pressure up. See item 8 "miscellaneous notes" below for Emery Stora's suggestion for hooking up a dash light to show air compressor cycling.

The total cost for the parts is about \$200.00, so even if you bought a dedicated compressor for the brakes you are way ahead of the commercial units in both cost and function.





WIPER



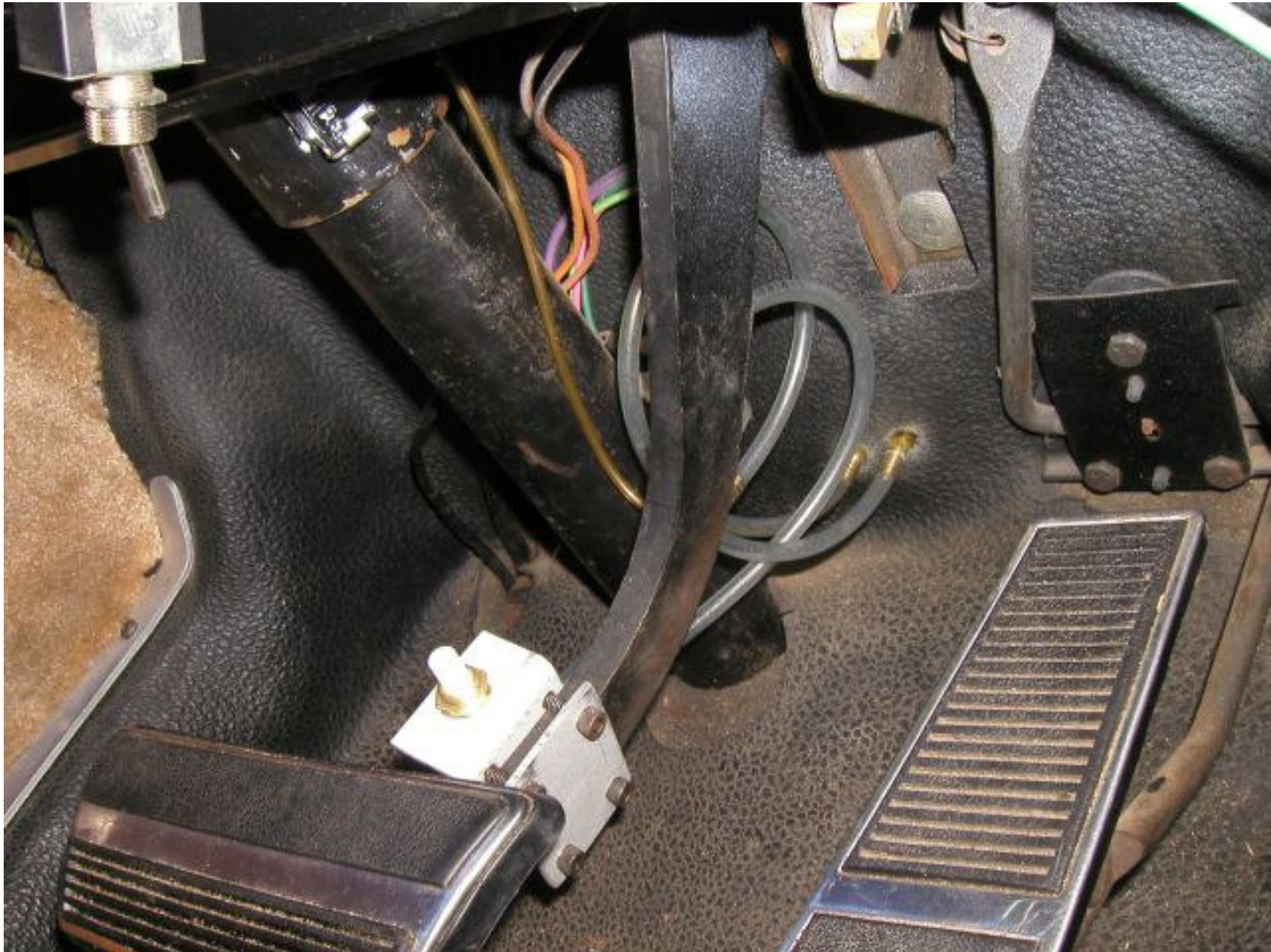
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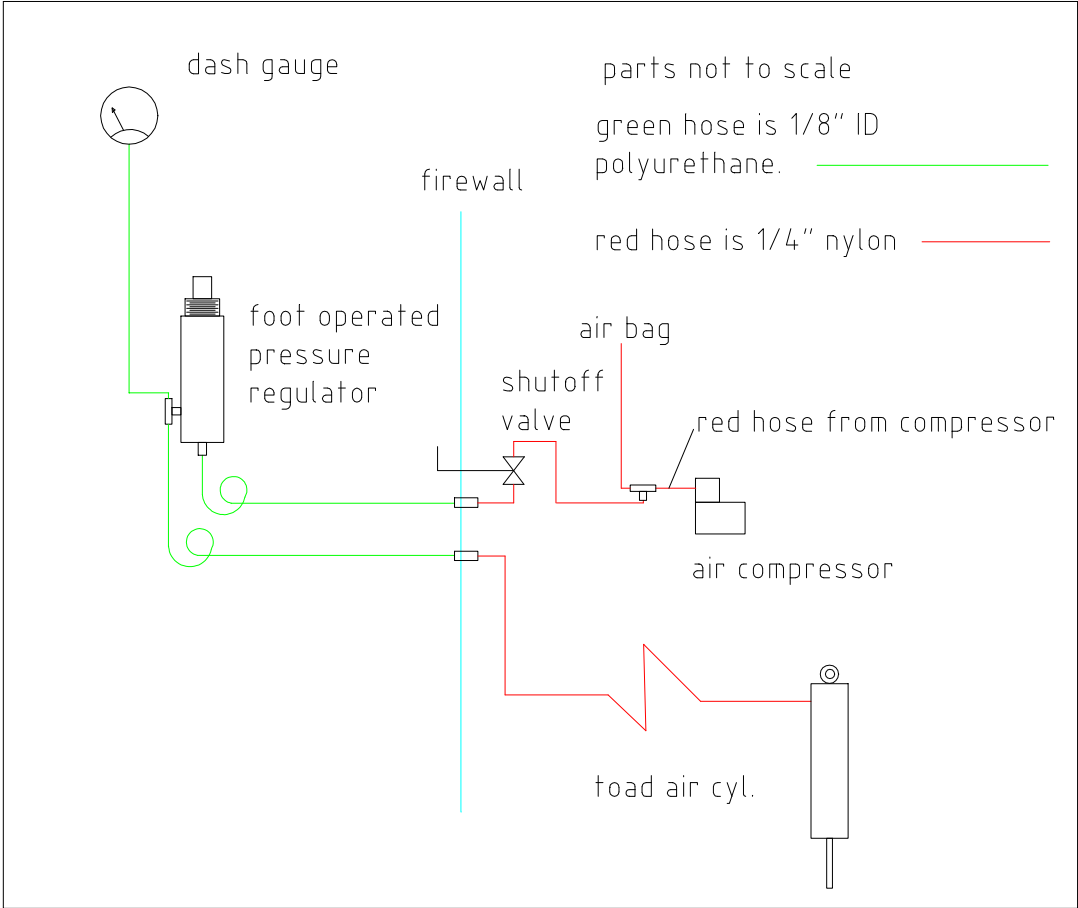
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LOCK

FUEL AUX



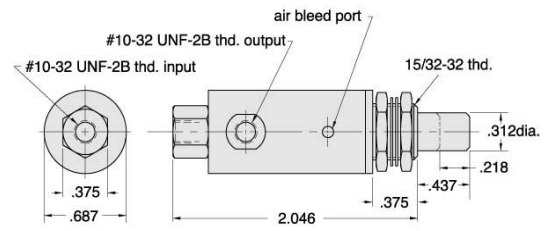




Parts list

MAR-1C pressure regulator. one required \$13.77

http://www.clippard.com/store/display_details.asp?sku=MAR-1C



CT0-4 barb hose fitting 1/8" for input air. one required \$5.41 ea.
http://www.clippard.com/store/display_details.asp?sku=CT0-2-PKG



TT0-404 barb tee fitting for output and gauge. one required \$9.20
http://www.clippard.com/store/display_details.asp?sku=TT0-202-PKG



PQ-BC08P-BLK 1/8" barb by female 1/8" NPT bulkhead fitting
2CP4 push on 1/4" nylon hose fitting by male 1/8" pipe fitting

Two each required \$3.37 ea.; \$.68 ea.

Connects 1/8" ID polyurethane to 1/4" OD nylon hose.

http://www.clippard.com/store/display_details.asp?sku=PQ-BC08P-BLK

http://www.clippard.com/store/display_details.asp?sku=2CP4-BLK

JEV-F2M2 exhaust valve 1/8" NPT. one required \$13.50

http://www.clippard.com/store/display_details.asp?sku=JEV-F2M2#



An exhaust valve can mount on the air cylinder and will vent the cylinder quicker than venting back through the regulator. I find it isn't needed but it is an option.

URH1-0804-BKS-050 1/8" ID polyurethane hose. \$10.28 per 50 feet

http://www.clippard.com/store/byo_tubing/?strSize=URH1-0804&strColor=BKS&strLength=50&sku=URH1-0804-BKS-050

S4N \$1.27 each; one required.

this fitting has a 1/8" barb fitting on one end and 1/8" NPT on the other to connect to a pressure gauge.

http://www.clippard.com/store/display_details.asp?sku=S4N-BLK

Hose clamps aren't needed with the barb fittings on the polyurethane hose.

Calculating toad air cylinder size

This is mostly a guess but decide the maximum effort you want to apply to the toad pedal. The following formula will determine the diameter of the toad air cylinder. This will be 1.5" to 2" diameter.

$E = \pi r^2 P$ or restated to solve for the cylinder diameter:

$$\text{Cylinder diameter} = 2\sqrt{E / \pi P}$$

Where E = pedal effort required in pounds of pressure

P = air pressure available at the regulator output fitting (80 PSI typical)

r = radius of air cylinder

This gives maximum pedal push. If less push is needed, then a small pressure regulator can be added to the red line to lower the input air to the regulator. These are available at Home Depot for \$20.00.

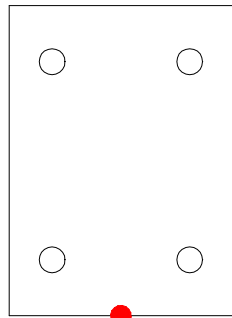
Go to:

<http://www.aircylindersdirect.com/products/nrseries.jsp>

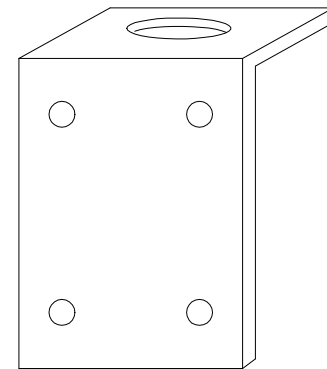
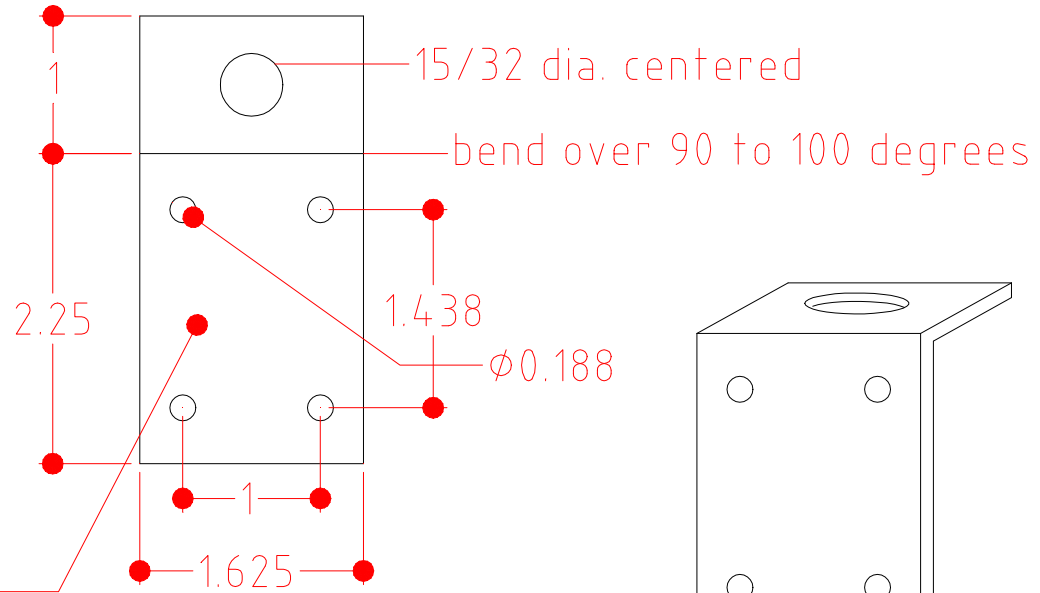
Determine the diameter and length of cylinder you need. An 8" stroke is average. Buy a single acting, spring retracting cylinder. It should be less than \$100.00.

material
.094 alum. plate

bolt together with
10-24 machine
screws 1" long



use same layout





Toad Wiring

Brake wiring diagram

http://www.accessconnect.com/trailer_wiring_diagram.htm

Simple flat 4 wiring for trailers. Shows correct color for wires coming out of the GMC.

<http://www.roadmasterinc.com/pdf/85-1811.pdf>

Download Brakemaster 9000 instructions. Look on page 19 for how to wire toad lights using diodes.

Miscellaneous notes

“How is the best way to install an indicator light for my air compressor?”

Starting in 1976 GMC discontinued the use of the Low Air indicator in the Tell Tale panel. It is the third light bulb from the left, between the Door and the Parking Brake indicators. Duane Simmons has suggested that it be used to tell when the suspension air compressor is on. I just did this and found it quite easy to do.

1. You'll need the special connector that snaps into the plug that connects to the tell tale printed circuit. GM left the bulb there but did not put in the connector. This goes in the blank position in the top of the connector. When this lead is grounded, the Low Air bulb will light up.

2. Run a wire from the back of the dash to the air compressor compartment. Connect the wire behind the dash to the special connector and in the air compressor compartment connect it to one of the two unused screws in the pressure switch. I have a Penn switch. The two existing wires control the compressor motor. The other two screws are the ones to use for the Low Air light.

3. Run another wire from the second unused screw to a good ground.

Now, whenever the compressor comes on the pressure switch will ground the Low Air light and it will light in the dash. This is especially good for anyone who is starting to have a little trouble hearing the compressor when driving down the road (like me).

I have an extra two of the special connectors that are needed. If anyone wants one of them please let me know. First come, first served. They can be found on connectors for some of the Olds, Cadillac and Buick instrument panels in the junkyard.

Emery Stora”

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Since you are running a wire from the compressor anyway, you could just mount a separate light if a special connector isn't available.

If I can be of assistance feel free to write:

Fred Veenschoten

Fredntoni AT cox.net