

KEEP THIS DOCUMENT WITH THE PRODUCT UNTIL IT REACHES THE END USER.

The Passive - R4 device (PR4) is intended for installation on a standard 2 inch transfer hose so that the hose will then comply with the DOT 49CFR173.315 standard for passive shutdown devices required on certain MC 330 & 331 transports.

CAUTION: The installed Passive R4 device is designed for proper operation with the Main Housing end of the hose assembly connected to the product source which typically is the transport. Product must flow from the Main Housing (large) end of the hose assembly toward the Outlet Housing (small) end of the hose. Failure to observe this rule will result in seriously reduced flow rates and improper operation of the passive device in an emergency which could result in serious injury or death.

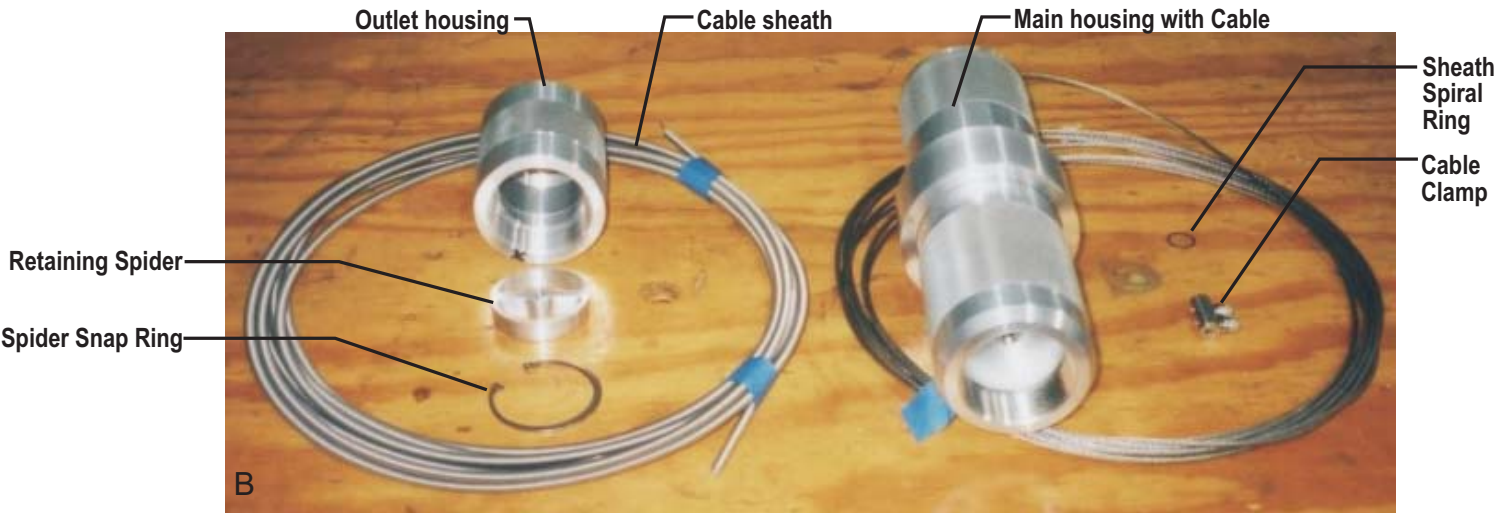
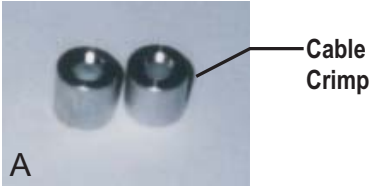
INSTALLATION OF PR4

To prepare for installation of the PR4 kit you should do the following:

1. Make sure that the hose to be used in the installation is properly marked, has been pressure tested and is in overall good physical condition.

2. Inspect the PR4 kit to verify that it contains the following pieces as shown in A and B:

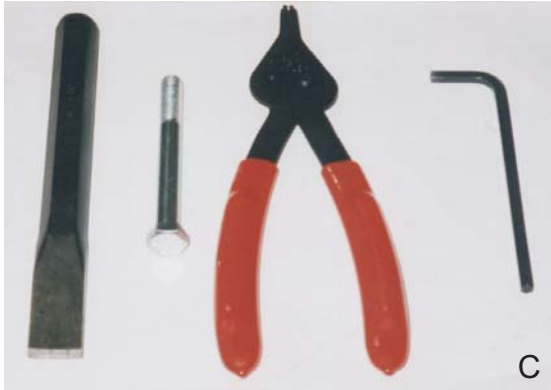
- | | |
|---------------------------------|--------------------------|
| Qty 1 - main housing with cable | Qty 1 - retaining spider |
| Qty 1 - cable sheath | Qty 2 - cable crimps |
| Qty 1 - outlet housing | Qty 1 - spider snap ring |
| Qty 2 - sheath spiral rings | Qty 1 - cable clamp |



3. Make sure you have the following tools as shown in C:

- *Cold chisel
- *3/8 x 16 bolt at least 4 inches long
- *3/16" Allen wrench
- *Snap ring pliers (.070 tip - internal)
- Medium sized hammer of any type
- Felt tip marker or paint stick of any type

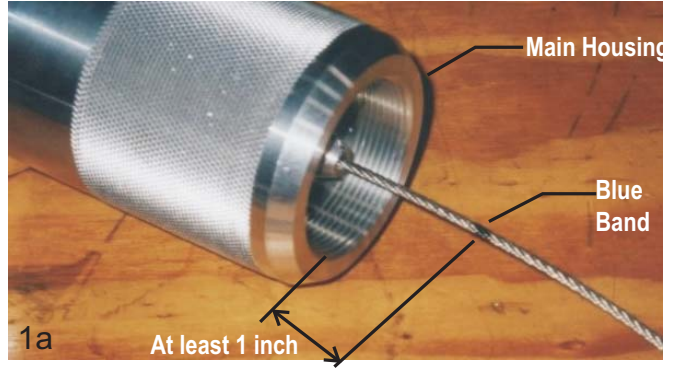
*Tools available with Installation Tool Kit PR4-0022.



To install the PR4 device on a 2 inch transfer hose, perform the following steps in the indicated sequence:

STEP 1:

The product is shipped with its internal trigger mechanism (located inside the Main Housing) in a position that will facilitate assembly of the device. Check for the proper trigger position by observing the location of a blue band located on the cable attached to the Main Housing. The blue band should be at least one inch from the face of the Main Housing as shown in 1a. If not, correct the condition as explained in section B (last page) and then proceed to step 2.

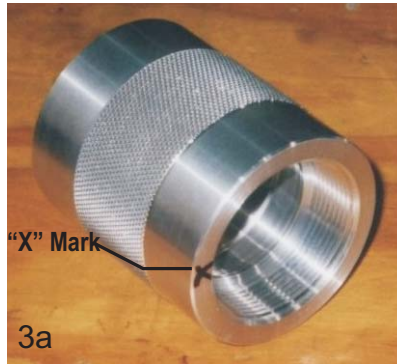


STEP 2:

Remove any hammer unions or valves from both ends of the hose such that there is a male 2 inch NPT connection on both hose ends and no other devices or fittings are installed on the hose. The only exception would be a short nipple to convert from a female hose end connector to the required male connector at both ends. The overall length of the hose in this condition cannot exceed 24 feet. Kits for longer hoses can be obtained on special factory order.

STEP 3:

Assemble the Outlet Housing to one end of the hose. Make sure to properly tape and/or dope the threads for proper sealing and ease of later disassembly if required. The Outlet Housing is marked with a black "X" on one end as shown in 3a and that end should be installed to the hose. Make up wrench tight.



STEP 4:

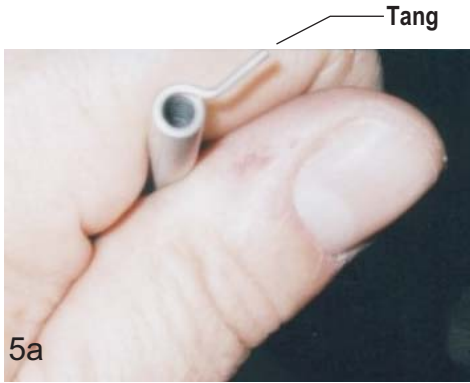
Lay the hose out straight as shown in 4a and measure from one bare hose end NPT as shown in 4b to the end of the assembled Outlet Housing as shown in 4c. Write down this measurement which we will call length "Y".



To install the PR4 device on a 2 inch transfer hose, perform the following steps in the indicated sequence (cont'd):

STEP 5:

Lay the Cable Sheath on the floor straight and measure length "Y" from the "tang" end of the sheath as shown in 5a and mark the Cable Sheath with an easily visible mark at the "Y" length as shown in 5b.



STEP 6:

Place the marked spot on the Sheath on a vise anvil or similar steel block as shown in 6a and cut it using a cold chisel and a hammer as shown in 6b.



NOTE: The cut sheath of length "Y" must contain the end with the tang.



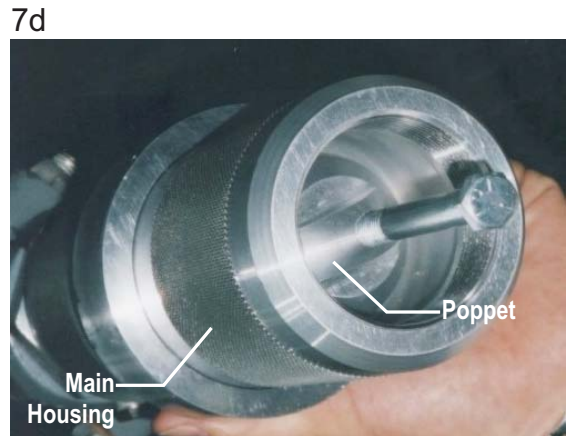
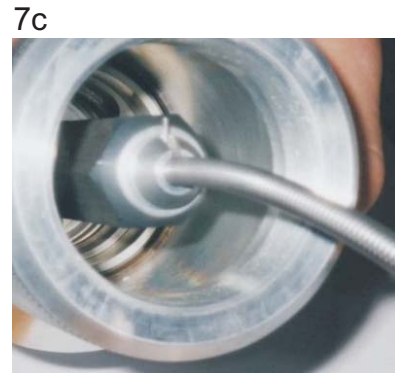
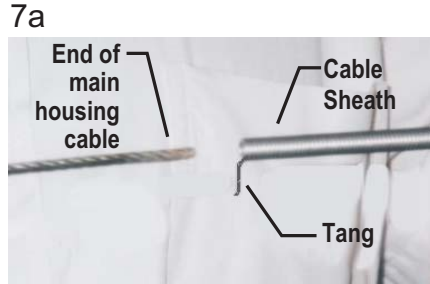
To install the PR4 device on a 2 inch transfer hose, perform the following steps in the indicated sequence (cont'd):

STEP 7:

Uncoil the cable attached to the Main Housing and thread the "tang" end of the Cable Sheath over the end of the cable as shown in 7a until the tang approaches the sheath housing as shown in 7b. Note the slot in the sheath housing which will receive the tang from the sheath. Engage the tang into the slot as shown in 7c. Thread the 3/8-16 bolt into the end of the poppet inside the Main Housing as shown in 7d. Now place the Main Housing into a vise with the 3/8-16 bolt resting on the vise below the jaws as shown in 7e. Tighten the vise against the Main Housing just sufficient to hold it in a vertical position but do not over tighten. **Important:** Mounting the Main Housing in a vise with the bolt head resting on the vise will insure that the downward motion of installing the Sheath Spiral Ring in the next step will not allow the Trigger to shift into the wrong position.

Slide one of the Sheath Spiral Rings (the second one is a spare) over the end of the cable and sheath as shown in 7f. Slide it over the entire length of the cable and sheath until it reaches the Main Housing Cone with the tang in the slot as shown in 7g and install the spiral ring as shown. If using your thumb nail is too hard, use the blades of two screw drivers to press the ring over the cone into the locking groove on the sheath housing.

After installation of the ring, pull gently up on the sheath as shown in 7h to make sure the spiral ring is in the groove and the tang is locked in place.



To install the PR4 device on a 2 inch transfer hose, perform the following steps in the indicated sequence (cont'd):

STEP 8:

Tape the bare end of the cable as shown in 8a so that the cable/sheath can be inserted through the hose. Make sure the loop is not greater than 1.5 inches wide so the end will pass freely through the hose end.



8a

STEP 9:

With the hose stretched out straight, thread the cable through the hose end opposite the Outlet Housing as shown in 9a. until it comes out the Outlet Housing end as shown in 9b. Then tape or dope the hose end at the Main Housing as shown in 9c and thread the Main Housing to the hose end by hand to prevent cross threading as shown in 9d and then make up wrench tight.

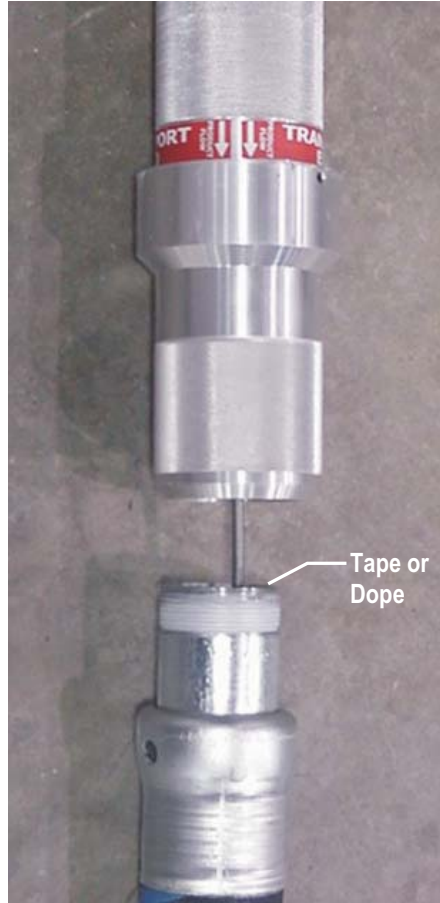


9a

9b



9c



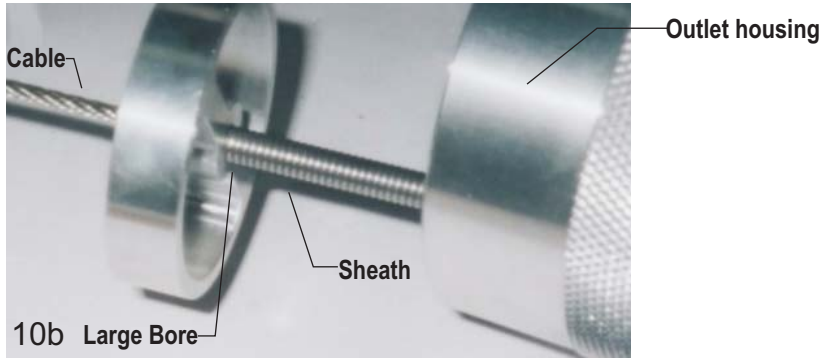
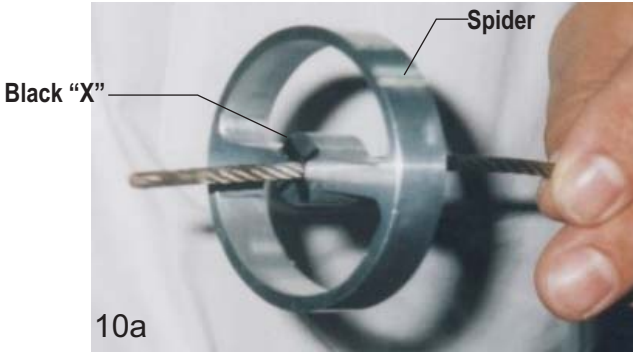
9d



To install the PR4 device on a 2 inch transfer hose, perform the following steps in the indicated sequence (cont'd):

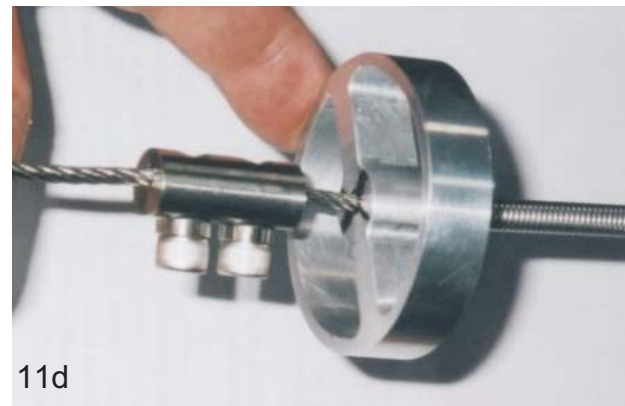
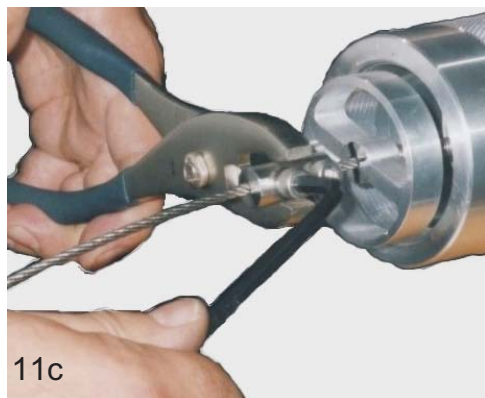
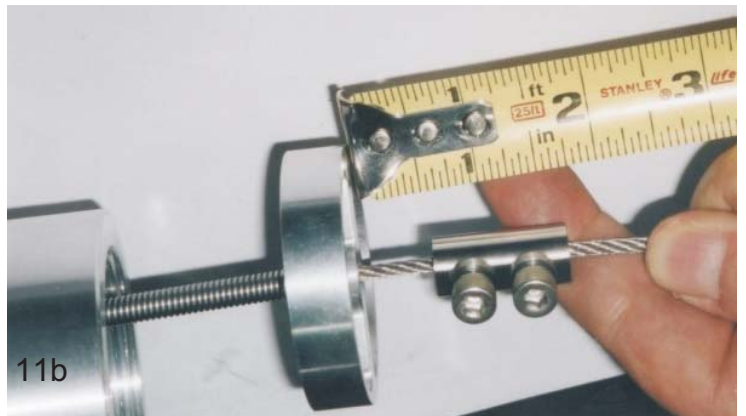
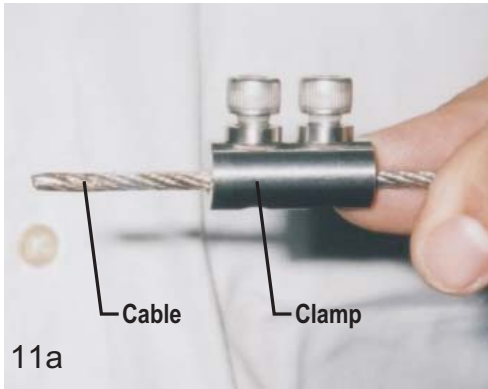
STEP 10:

Pull the cable at the outlet housing end of the hose gently until the sheath can be seen at the Outlet Housing opening. Form the hose into a "U" shape so that the cable sheath will protrude from the Outlet Housing end of the hose. Slide the Retaining Spider over the cable end as shown in 10a leaving the side with the black "X" mark out as shown. Slide the spider over the cable until the end of the sheath slides into the large bore on the spider as shown in 10b.



STEP 11:

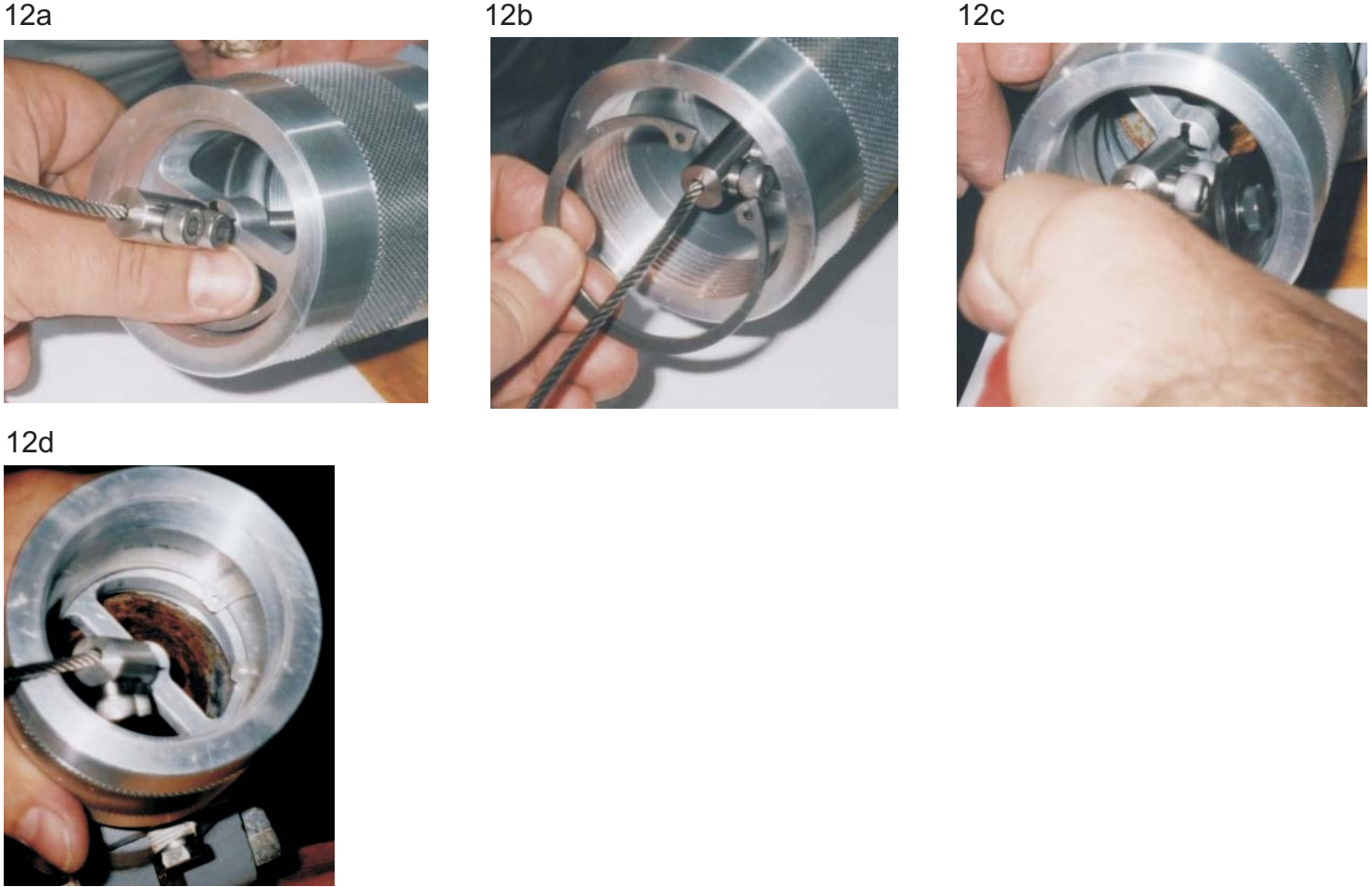
Slide the Cable Clamp over the cable end as shown in 11a. While keeping the cable sheath engaged in the spider bore, measure out approximately 1/2 inch from the face of the spider as shown in 11b and snug up the cable clamp screws by hand to hold them in place. Then hold the clamp with pliers as shown in 11c and tighten the cable clamp screws tightly using the 3/16" Allen wrench until the screw heads bottom out against the washers on the clamp. The length of the capscrews is controlled to grip the cable tightly yet not deform the cable to prevent reuse or moving the clamp if necessary. When completed, the end should look like 11d.



To install the PR4 device on a 2 inch transfer hose, perform the following steps in the indicated sequence (cont'd):

STEP 12:

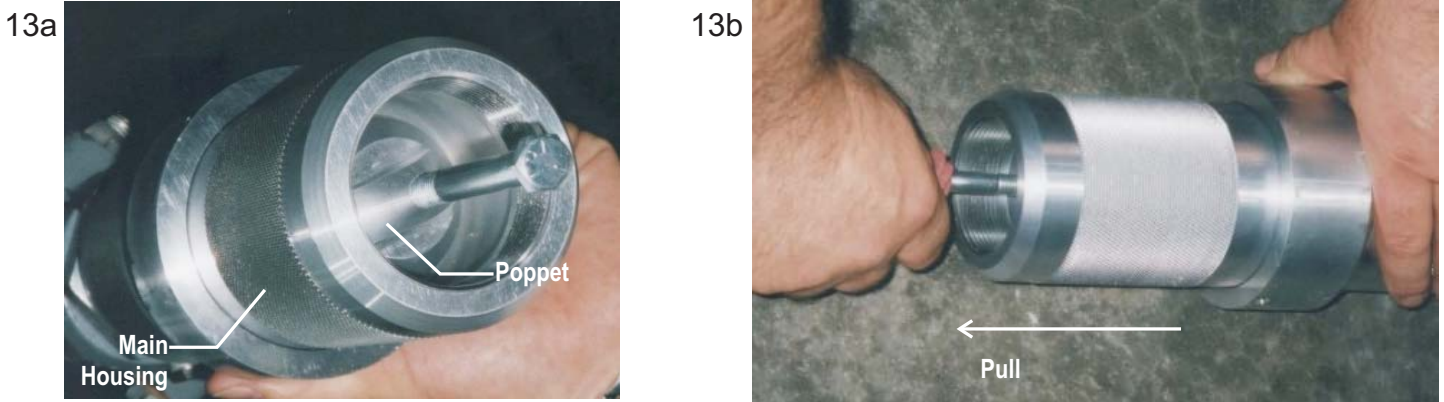
Push the spider assembly into the Outlet Housing bore as shown in 12a. Then using the snap ring shown in 12b and the snap ring pliers shown in 12c, engage the snap ring into the snap ring groove in the bore of the Outlet Housing. The completed assembly should look like 12d.



At this point the unit is assembled. We will now test it for proper operation and then trim the excess cable from the end.

STEP 13:

Straighten out the hose and thread a 3/8 x 16 bolt into the end of the poppet inside the Main Housing as shown in 13a. Pull on the bolt with a rag covered hand as shown in 13b and you should hear a “click” and the poppet should stay open after pulling it about 3/4 inch. If it is properly cocked, the 1/2 inch of slack between the spider and the cable clamp at the outlet housing end of the hose as shown in 11D should be gone and the clamp should be pulled tight against the spider. Also you will be able to “blow” through the hose, if the poppet is open.



At this point the unit is assembled. We will now test it for proper operation and then trim the excess cable from the end (cont'd):

STEP 13 (cont'd):

If the poppet does not stay open, remove the spider from the Outlet Housing bore, loosen the cable clamp and move it 1/4 inch farther away from the spider. That is, the space should now be 3/4 inch between the spider and the clamp as shown in 11d. Repeat step 13 until the poppet stays cocked although more than one adjustment would indicate something else has gone wrong.

Then curl the hose into a tight double loop as though the hose was to be transported in a pickup truck bed as shown in 13c. If the poppet stays open (the clamp stays tight to the spider and you can blow through the hose) you are done with the adjustments. If curling the hose caused the poppet to trip shut, remove the spider from the Outlet Housing bore, loosen the cable clamp and move it 1/4 inch farther away from the spider. That is, the space should now be 3/4 inch between the spider and the clamp as shown in 11d. Repeat step 13 until the poppet stays cocked although more than one adjustment would indicate something else has gone wrong.

The final test is to trip the device by hand. Straighten out the hose and with a rag covered hand as shown in 13d. A pull of about 2 inches on the cable as shown in 13e. will cause the device to trip to the closed position. The pull must be straight in line with the hose and will require about 40 pounds of pull force to trip the unit.

13c



13d



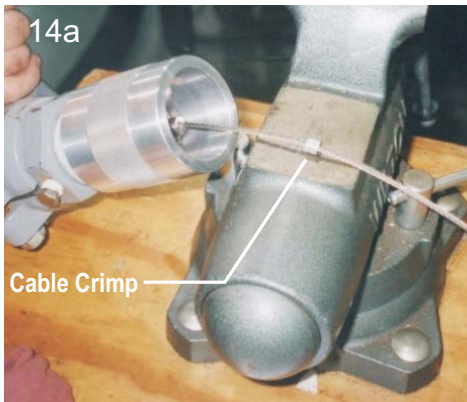
13e



STEP 14:

Locate one of the two cable crimps (one is a spare) and slide it over the end of the cable as shown in 14a. Smash the crimp about 2 inches from the end of the Outlet Housing as shown in 14b. and cut off the excess cable as shown in 14c. This is done to prevent fraying of the cable end while preserving some excess cable for uses if the device is transferred to another hose in the future.

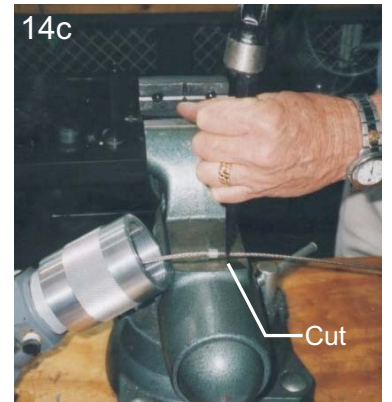
14a



14b



14c



STEP 15:

Apply tape or dope to the hammer unions as shown in 15a. and install wrench tight as shown in 15b. on both ends of the hose to complete the installation.

15a



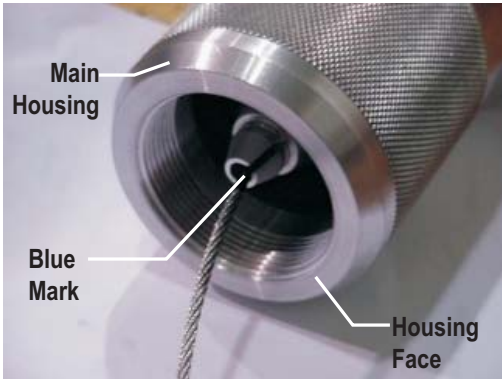
15b



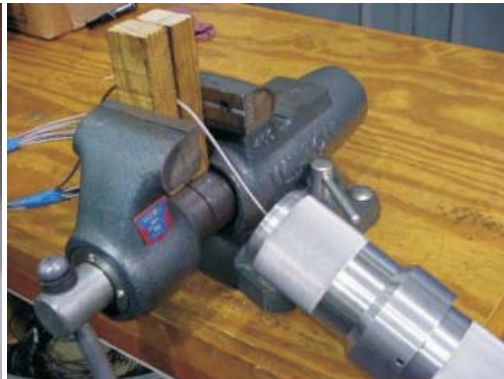
SECTION B: Placing the Main Housing trigger in proper position for assembly of the unit to the hose.

1. The position of the trigger in the Main Housing must be corrected prior to assembly IF the blue mark on the cable is in the position shown in B1.
2. Grip the cable between two wooden blocks as shown in B2. The blocks should be tightened firmly on the cable but not so tight as to crush the cable.
3. Thread a 3/8 x 16 bolt into the poppet of the housing as shown in 13a and with a rag on your hand, pull on the entire assembly as shown in B3 with about 20 pounds of force.
4. While continuing to pull on the bolt, with one hand, push on the housing with the other hand as shown in B4 until you feel the mechanism release. Keep the pull on the bolt.
5. Continue pulling on the bolt (about 2 inches) as shown in B5 until the unit “clicks” into position. Release the pull on the bolt.
6. At this point the blue mark on the cable should be at least 1 inch out from the face of the Main Housing as shown in B6. Release the cable from the wood blocks and proceed to STEP 2.

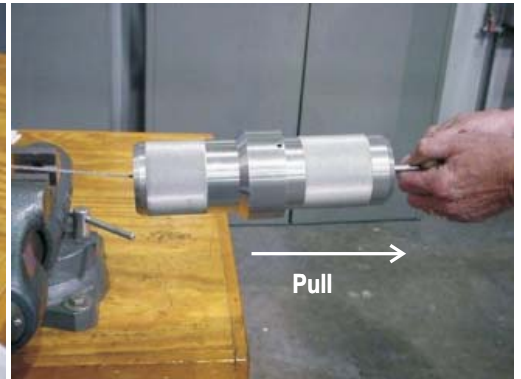
B1



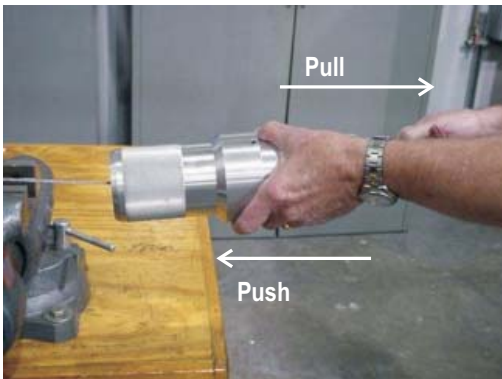
B2



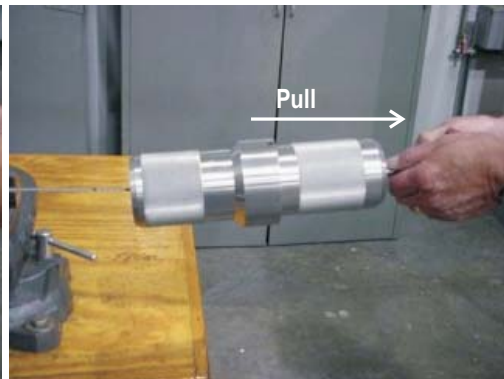
B3



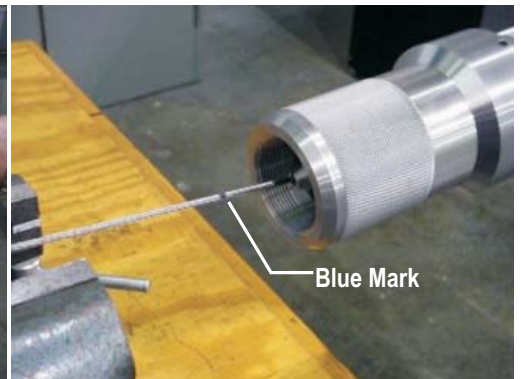
B4



B5



B6



OPERATION OF PR4

Proper Connection to Product Supply Source

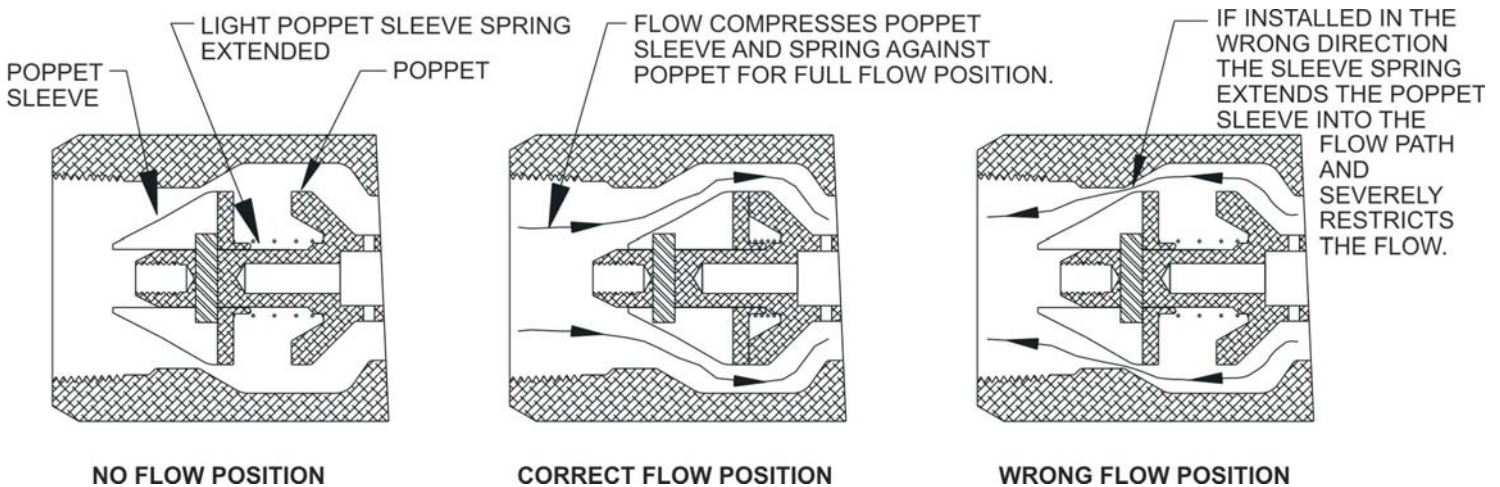
Refer to picture C1 A & B below for proper connection of hose to the transport.

The inlet side of the PR4 device has a decal with Flow Arrows that shows the direction of flow and has the words Transport End, to insure that the proper end of the hose is connected to the transport.



Consequences of Improper Connection

Refer to drawing below for explanation of the flow patterns when the hose is installed properly or improperly. It is important to always connect the Inlet Side of the PR4 to the transport when off loading product. If you attempt to flow product through the hose in the wrong direction, the Poppet Sleeve severely restricts but does not stop the flow completely, and will result in a very long product transfer time. Warning: Be advised that if the hose is mounted in the incorrect flow direction that the unit WILL NOT provide the designed protection against a complete failure of the transfer hose and WILL NOT stop the flow of product from the transport in the event of a hose failure.



If Unit Trips Without Hose Failure

Caution: If you can audibly hear the pump deadheading and you are correctly connected, the unit has probably tripped into a closed position, see figures B and C on page 12. This situation can be easily corrected by just re-cocking as described in Step 13 and pictures 13a and 13b of the Installation Instructions.

MAINTENANCE OF PR4

The PR4 is a very low maintenance device, that if assembled to the hose properly, will give many years of trouble free operation.

TRANSFERRING UNIT TO A NEW HOSE:

At some point in time it will be necessary to transfer the PR4 to a new hose. At that time a PR4-0021 Transfer Kit may be required. Instructions for making a transfer to a new hose will be furnished with that kit.

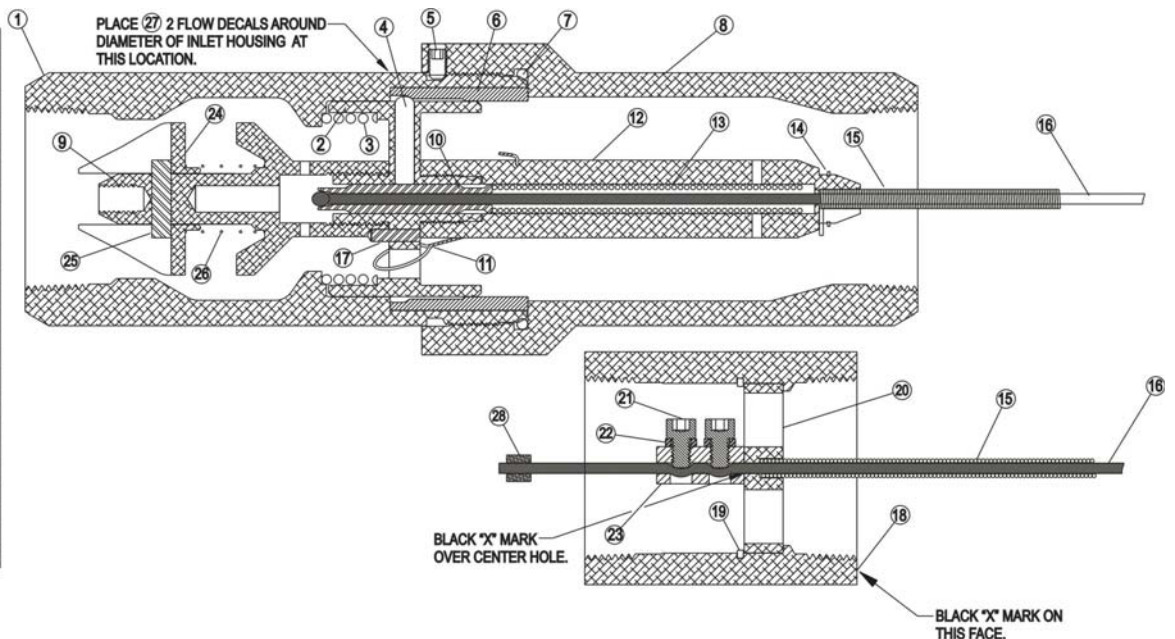
YEARLY TESTING OF UNIT FOR PROPER OPERATION:

One of the main features of the PR4 Passive Shutdown device is that it can be tested at any time to insure that it will work properly if the need ever arises. It is suggested that once a year, or as desired, that the Trigger mechanism be tripped which will allow the Poppet to close, and verify that the mechanism is in good working order.

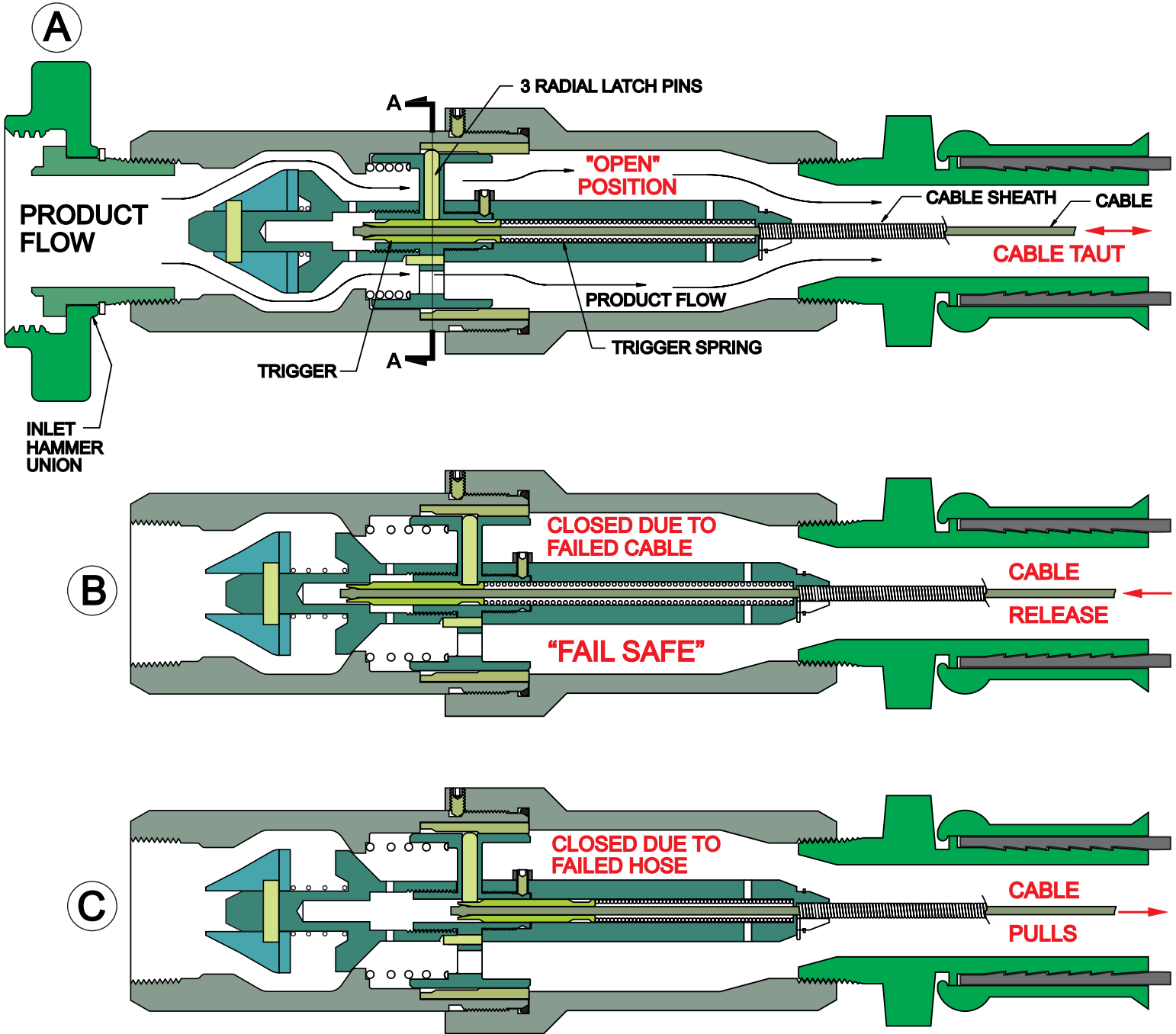
Procedure for tripping and resetting the Trigger mechanism:

- A. Lay the hose out straight on a flat surface.
- B. Remove the Hammer Unions from both ends of the hose.
- C. Using a pair of Vice Grips or similar pliers, clamp onto the Cable Clamp inside the Outlet Housing, and pull in a straight line with a force of approximately 40 pounds.
Note: It will require that the person pulling on the Cable Clamp be sitting on the flat surface with their foot pressing back on the end of the Outlet Housing to accomplish this step. This pulling action will cause the Trigger to trip and allow the Poppet, inside the Inlet Housing, on the opposite end of the hose to close.
- D. After visually checking to insure that the Poppet has closed, re-cock the Trigger by using the 3/8-16 x 4" Long bolt installed into the end of the Poppet. A pull of approximately 20 pounds will be required.
- E. Re-tape and/or dope the 2" npt threads on the hose and replace the Hammer Unions on both ends. The hose is once again ready for product transfer.

24	1	POPPET SLEEVE
23	1	CABLE CLAMP
22	2	WASHER
21	2	1/4-NC20 X 3/8 (SS) SOC. HD. CAP SCREW
20	1	SPIDER
19	1	N500-218 (SS) WALDES TRUARC RETAINING RING
18	1	OUTLET HOUSING
17	1	5/32" X 5/8 LG. (SS) DOWEL PIN
16	1	CABLE
15	1	SHEATH
14	2	WS-62-502 (SS) SPIROL RING (1 SPARE)
13	1	TRIGGER SPRING
12	1	SPRING CARRIER
11	1	SAFETY TIE WIRE 300 SERIES SS
10	1	TRIGGER
9	1	POPPET
8	1	HOSE ADAPTOR HOUSING
7	1	2-235 PARKER N674-70 O-RING
6	1	TRIGGER SLEEVE
5	1	1/4"-20NC X 3/8 (SS) SOC. SET SCREW
4	3	TRIGGER PIN
3	1	POPPET SPRING
2	1	POPPET CARRIER
1	1	INLET HOUSING
NO. QTY.		DESCRIPTION



OPERATION MODES



DOT CERTIFICATION FOR PR4 PASSIVE SHUTDOWN

(B) Description of the Propane Cargo Tank Unloading System

The propane cargo tank unloading system consists of a closed process containing liquid and gaseous propane. The process consists of the following components:

Components for primary containment:

- (1) A 4-inch flanged internal valve attached to the bottom of a cargo tank
- (2) A 4-inch product transfer pump with 2-inch threaded outlet (Corken Model Z4200 Pump or equivalent) with a differential relief valve setting not to exceed 100 psig.
- (3) A 2-inch full port ball (isolation) valve with a flow coefficient of 165 or larger.
- (4) A 2-inch male threaded pipe to 3 ¼-inch male ACME adapter
- (5) A 2-inch Class 3000 threaded coupling
- (6) A 2-inch male threaded pipe to 2-inch crimped ID hose adapter
- (7) A 2-inch OD transfer hose 20-feet long or less

Components for emergency shutoff system:

- (1) A 2" transfer hose no longer than 20 feet with 2" NPT male hose ends.
- (2) (1) 2" Passive R-4 Adapter (PR4) for Transport end of Hose.
- (3) (1) 2" Passive Cable Set Adapter for Delivery end of Hose
- (4) (1) 1/8" Stainless Cable cut to length of hose plus adapters
- (5) (1) 0.140" Stainless Steel Sheathing for cable

(C) Theory of Operation

This is a mechanical device that is set in the normally open position and closes when the internal cable inside the transport hose is pulled by means of complete hose separation. The Passive-R4 (PR4) Adapter has an internal poppet that is set in the normally open position when initially installed onto the transport hose. The internal cable is then adjusted to be taut at the opposite end of the transport hose with the 2" Passive Cable Set Adapter.

If the hose is completely separated by an external force this will result in putting the internal cable in tension, thereby causing a small external load on the cable and result in closing the poppet on the Passive PR4 adapter and closing the flow of product.

(D) Certification

C-CAM and ATECH Engineering has reviewed the technical information and equipment specifications for the Passive R-4 (PR4) device. In addition, the said parties have witnessed the system's performance in actual testing, while connected to a transport unit, to ensure that the system meets the requirements of Title 49 CFR 173.315 (n)(2). Based on testing and review of the system it is concluded that the system, if installed properly, meets the requirements of 49 CFR 173.315 (n)(2).

As a Design Certifying Engineer registered with the U.S. Department of Transportation, I certify the above true and correct.

Signed:

Edward D. Mansell

DOT Certification ID #CT8680

Date:

4/1/02

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