EMD MAINTENANCE INSTRUCTION

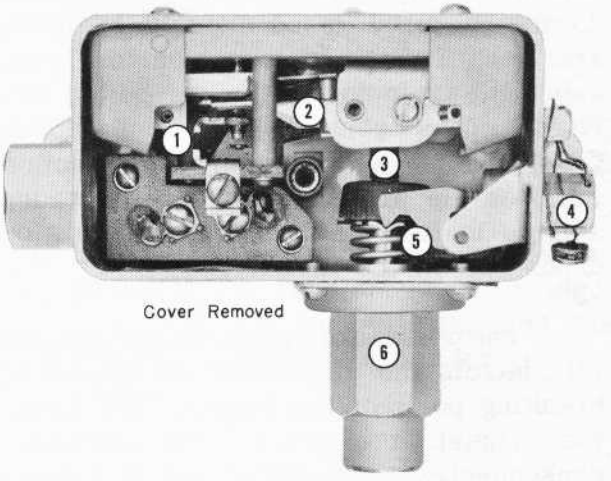
HIGH LUBE OIL SUCTION SWITCHES 8259356, 8212816 AND 8082941

DESCRIPTION

The engine lubricating and piston cooling oil pumps require a constant volume of oil in order to maintain the correct pressure in the engine system. Due to the importance of adequate lubrication and piston cooling it is essential that there is a constant supply of oil to the suction of these pumps.

The major factor affecting the supply of oil to the pumps, other than lack of oil, is the condition of the suction strainers. If they are neglected and allowed to become dirty, the supply of oil will be insufficient and the engine must be protected. Such protection is the function of the high lube oil suction switches of the type illustrated in Fig. 1. Similar protection is offered by a high suction device that is an integral part of electro-hydraulic and pneumatic-hydraulic governors used on engines for locomotive and drilling rig service.

Either the switch or the governor high suction device (depending on installation) is connected to a common suction of the combined lubricating and piston cooling oil pumps, and is actuated by the vacuum created by these pumps. If the pump suction should create a vacuum of about 18" Hg (mercury), the device employed will initiate protective action to cause one or more of the following: give visible or audible alarm, or shut down the engine. It is suggested that the wiring diagram for the particular installation be checked for such circuit information.



1. Differential Adjustment
2. Contact Assembly
3. Lever Actuating Arm
4. Range Setting Screw
5. Range Spring
6. Bellows Assembly

Fig. 1 - High Suction Switch 8212816

OPERATION

Shown in Fig. 2 is a schematic diagram of high suction switch 8212816 with principal parts named, which are typical of these switches.

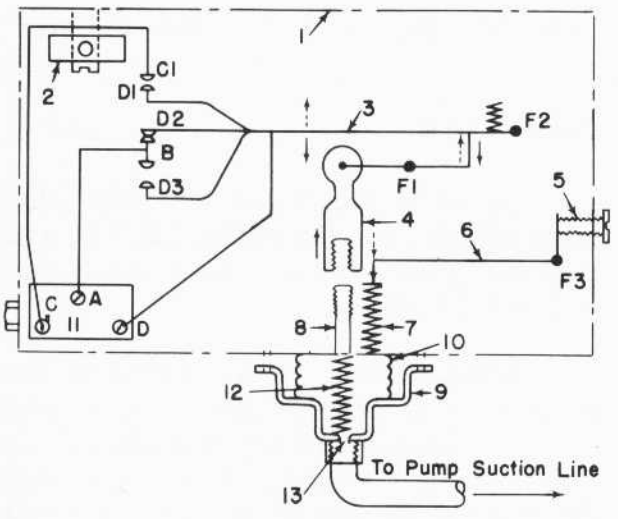
Bellows stud (8) is screwed into lever arm (4) only so far as to permit some compression of the metallic bellows (10) and the bellows spring (12), when the bellows portion (9) is attached to the case. The upward force at lever arm (4) causes contact lever (3) to move downward due to the connecting lever acting through fulcrum points F1 and F2. This causes contacts D2 and B to make contact. Compression of range spring (7) by range

*THIS BULLETIN IS COMPLETELY REVISED AND SUPERSEDES M.I. 1529.

adjustment screw (5) acting through lever (6) counteracts bellows spring upward pressure.

Range adjustment screw (5) causes sufficient tension on spring (7) so that if lube oil pump suction reaches 18" Hg this tension plus atmospheric pressure on top the bellows overcomes the original bellows spring upward force. This causes downward force to be exerted on lever arm (4). Downward movement on lever arm (4), as indicated by the dotted arrows, opens contact D2-B and closes C1-D1 and D3-B contacts. This action initiates the protective circuits to cause alarms to function or the engine to stop depending on the installation.

The position of the permanent magnet (2) controls the differential or downward breaking point of the switch. The lower the magnet, the greater its influence, consequently, differential or difference between "make" and "break" of the contacts is lessened. Changing the "range" or operating point by screw adjustment (5) for normal adjustment does not alter the differential. The permanent magnet, also provides for quick "make" and "break" of the contacts and prevents excessive arcing.



1. Case
2. Permanent Magnet And Differential Adjustment
3. Movable Contact Lever
4. Lever Arm
5. Range Adjustment Screw
6. Lever
7. Range Spring
8. Bellows Stud
9. Bellows Portion
10. Metallic Bellows
11. Terminal Board
12. Bellows Spring
13. Orifice

Contacts - B, C1, D1, D2, D3

Fig. 2 - Schematic Operating Diagram High Suction Switch 8212816

MAINTENANCE

At intervals specified in the Scheduled Maintenance Program, Maintenance Instruction 1704, the high suction protective devices should be checked for proper operation, and reset if necessary.

In order to check the operation of these high suction protective devices it will be necessary to have an apparatus capable of creating and sustaining a vacuum of at least 18" Hg. The apparatus shown in Fig. 4 has proved suitable and can be constructed from parts generally available locally.

The following procedure is recommended for checking and setting high suction switches 8259356, 8212816 and 8082941.

These switches are identical in operation and adjustments but differ in contact arrangement and construction. Switch 8259356 is currently being used having replaced switch 8082941 in all applications.

Checking and setting these switches may be done by referring to Fig. 3 and using the following method:

1. Switch may be left on the product or removed for testing. If removed, it should be tested in its normal position with the suction connection at the bottom since the vacuum for operation will be affected by switch position.
2. Using a suitable adapter, connect the vacuum apparatus to the switch.
3. Observe movable contact lever position, Fig. 3. The normal position is down when vacuum is less than 18" Hg.

4. Slowly pump up suction and note that movable contact lever snaps upward at 18" Hg vacuum. If adjustment is needed, turn the range adjusting screw clockwise to lower the pickup value or counterclockwise to raise pickup value.

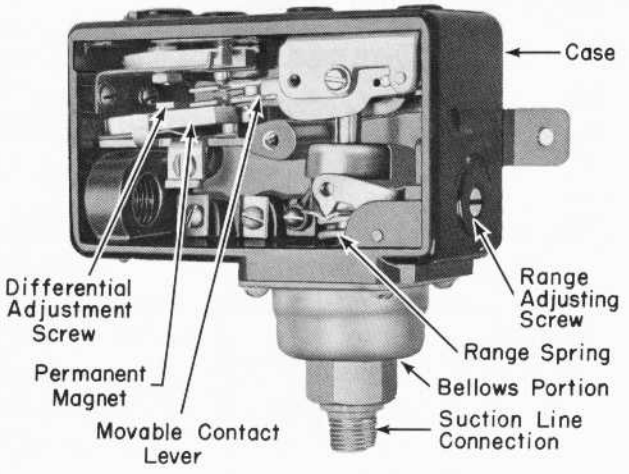


Fig. 3 - High Suction Switch 8082941

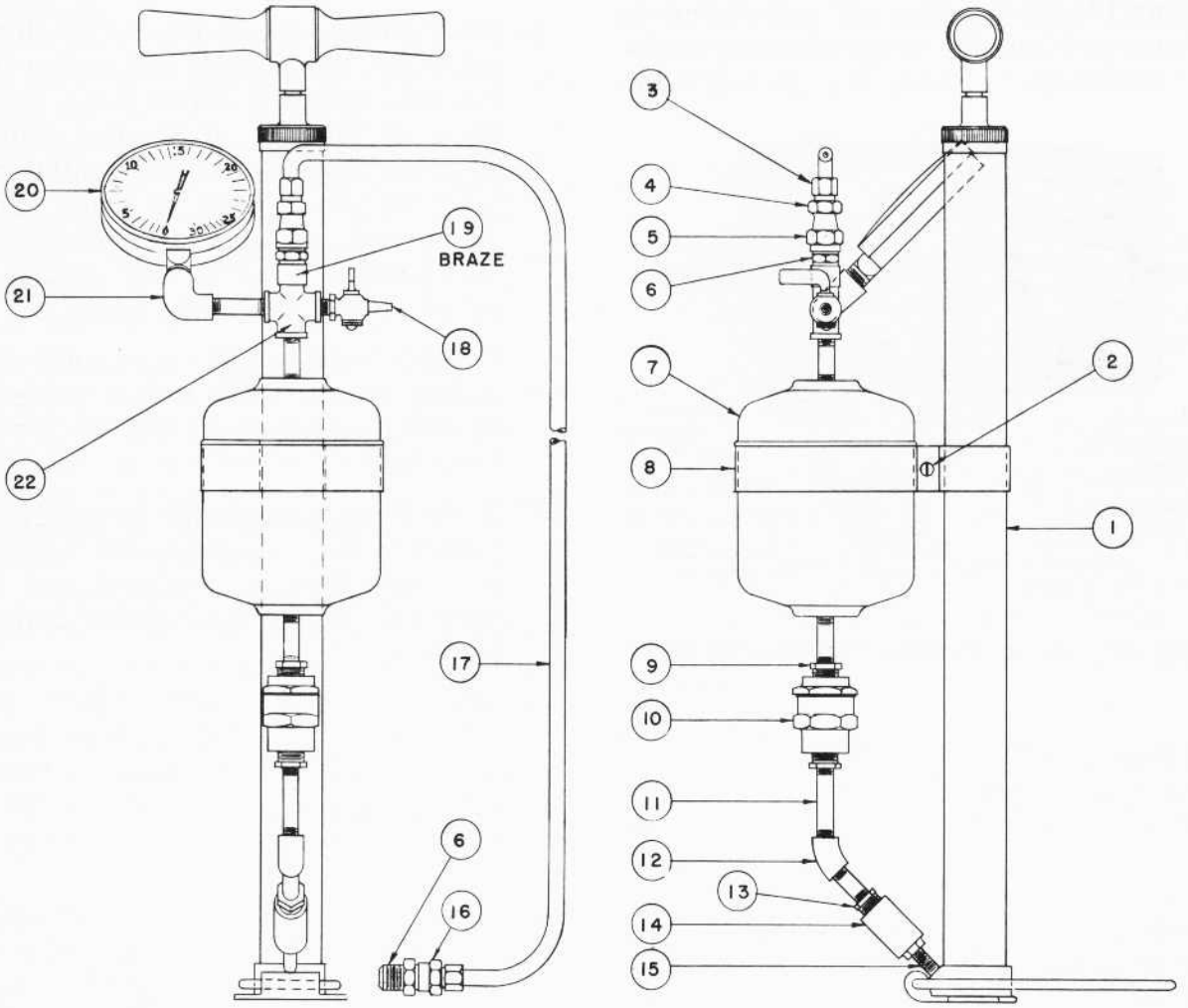
5. After pickup, check dropout by slowly releasing the vacuum and noting that movable switch contacts move downward at 13" Hg. If dropout adjustment is needed, the differential adjustment screw may be used. Such adjustment is generally necessary only after a considerable change in range setting has been made.

6. Repeat checking and adjustment procedure above until switch picks up at 18" Hg and drops out at 13" Hg vacuum.

7. If the switch cannot be properly adjusted to the recommended settings, it should then be replaced and the defective switch returned for remanufacture.

NOTE: REVERSE AIR PUMP LEATHER

OPTIONAL: STEEL TUBING CAN BE USED INSTEAD OF NIPPLES AND CONNECTIONS



Item	Qty.	Description
1	1	Auto Tire Pump - Std.
2	1	Rd. Hd. Mach. Screw & Nut
3	1	Nut & Hose Insert
4	1	Nut
5	1	Flared Tube Nut - 5/8"-18 Am. Nat. Thread
6	2	Flared Tube Connector - 5/8"-18 Am. Nat. Thread
7	1	Vacuum Tank - 4" I.D. × 6" lg. - To Suit or From Auto Oil Filter
8	1	Tank Strap - #15 Ga. - 1-1/8" Width - Made In One Piece
9	2	Bushing - 3/8" × 1/8"
10	1	Automotive Vacuum Brake Check Valve - Bendix or B & K or Equal

Item	Qty.	Description
11	5	Nipple - 1/8" Pipe - Lengths to Suit
12	1	45° Elbow - For 1/8" Pipe
13	1	Bushing - 1/4" × 1/8"
14	1	Coupling - 1/4"
15	1	Stud - 5/16"-24 N.F. × 1" lg. - 5/32" Hole Drilled Through
16	1	Hose Connector - 1/4" Female P.T. × 3/16" I.D.
17	1	Hose - 3/8" O.D. × 4 ft. lg.
18	1	Air Cock - 1/8" - BR.
19	1	Coupling - 1/4" - BR. - Braze to Item 22
20	1	Vacuum Gauge - 0 to 30"
21	1	90° Street Elbow - 1/4" × 1/8" - M.I.
22	1	Cross - 1/8" - BR. - See Assembly

Fig. 4 - High Suction Protective Device Testing And Setting Apparatus