M939 SERIES ANTI-LOCK BRAKE SYSTEM MAINTENANCE SUSTAINMENT TRAINING

Student Handout ABS-MT-SH

“Saving Lives Through Technology”

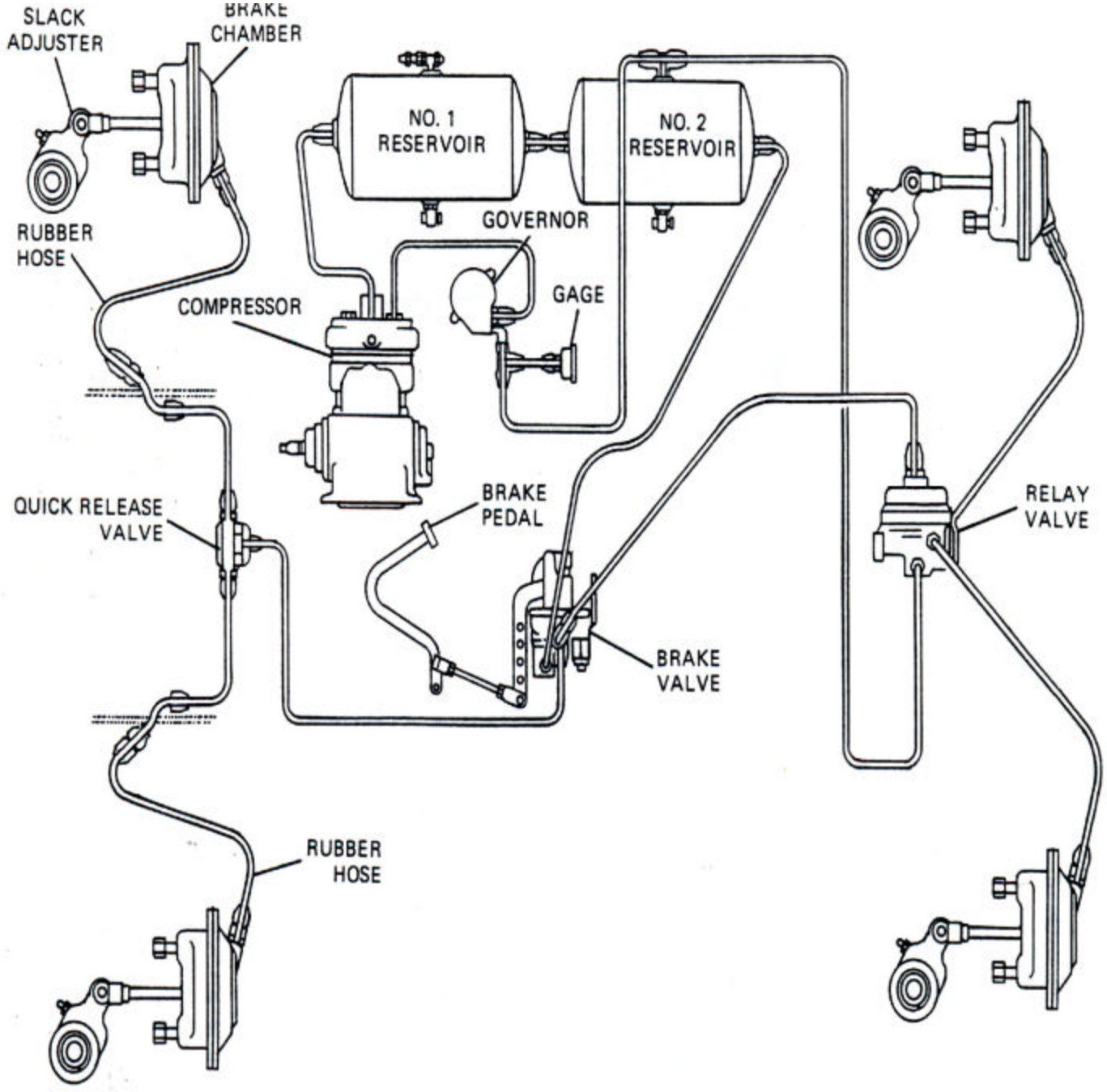


Figure 34-31. Typical Airbrake System.

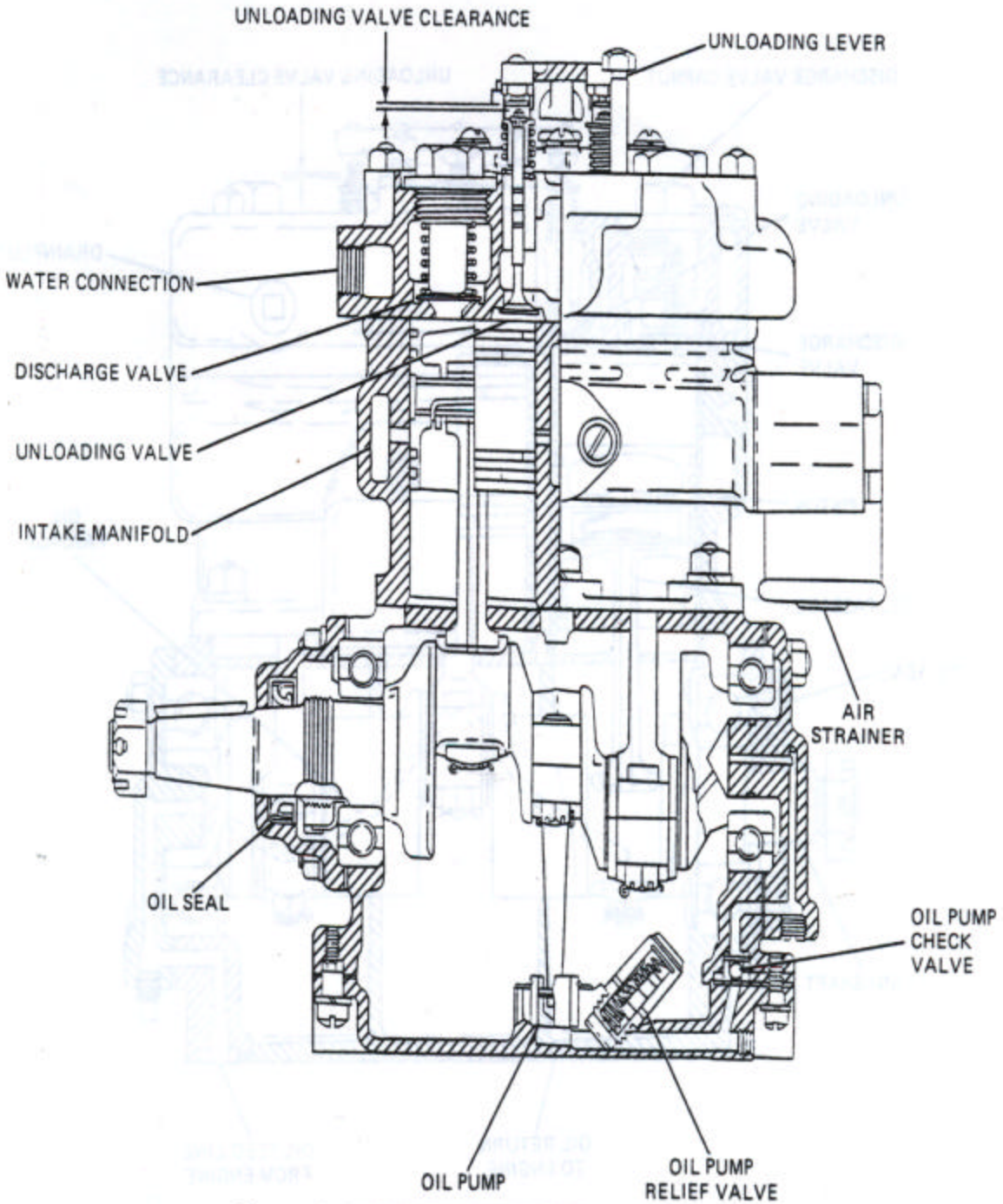
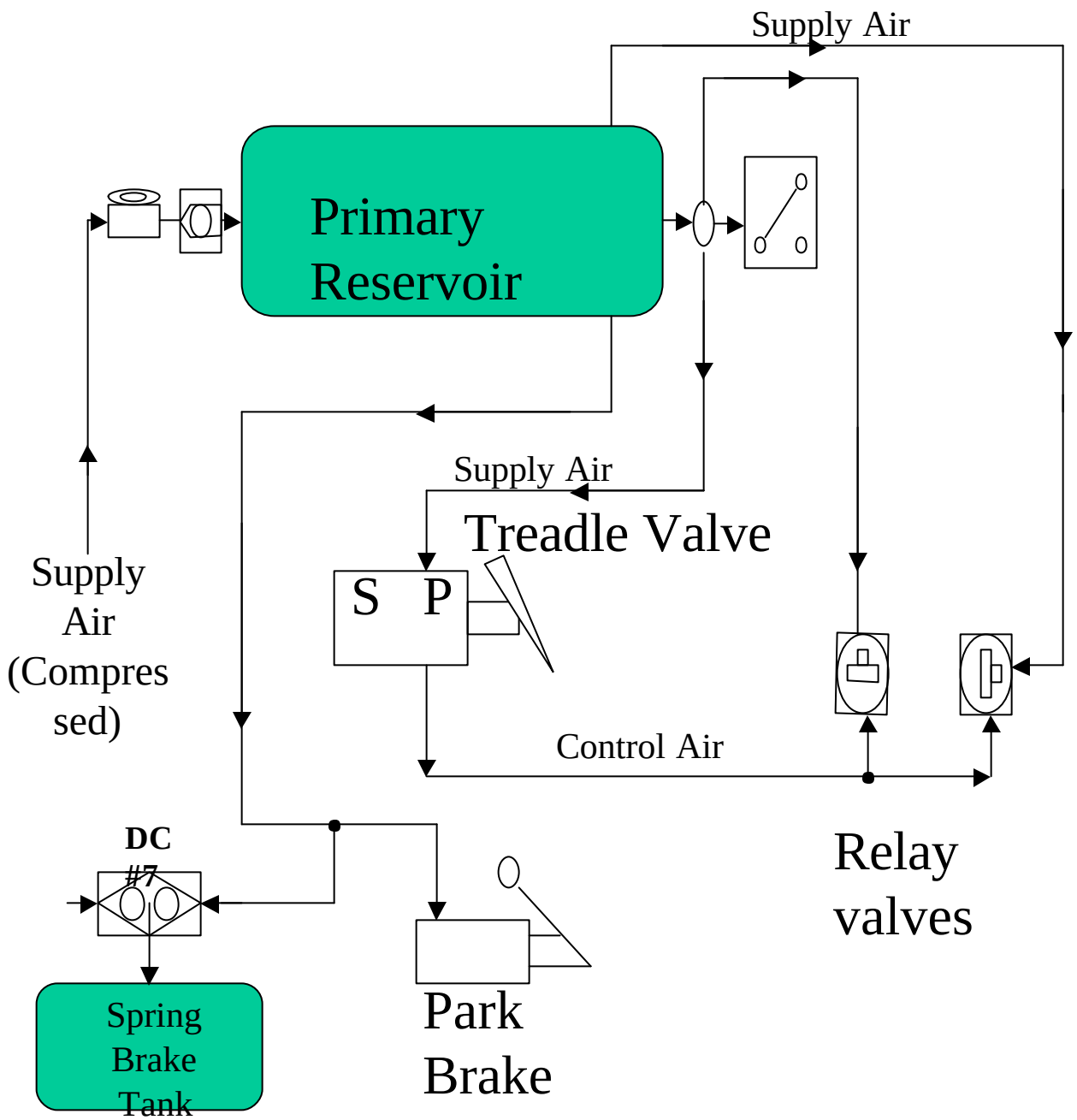


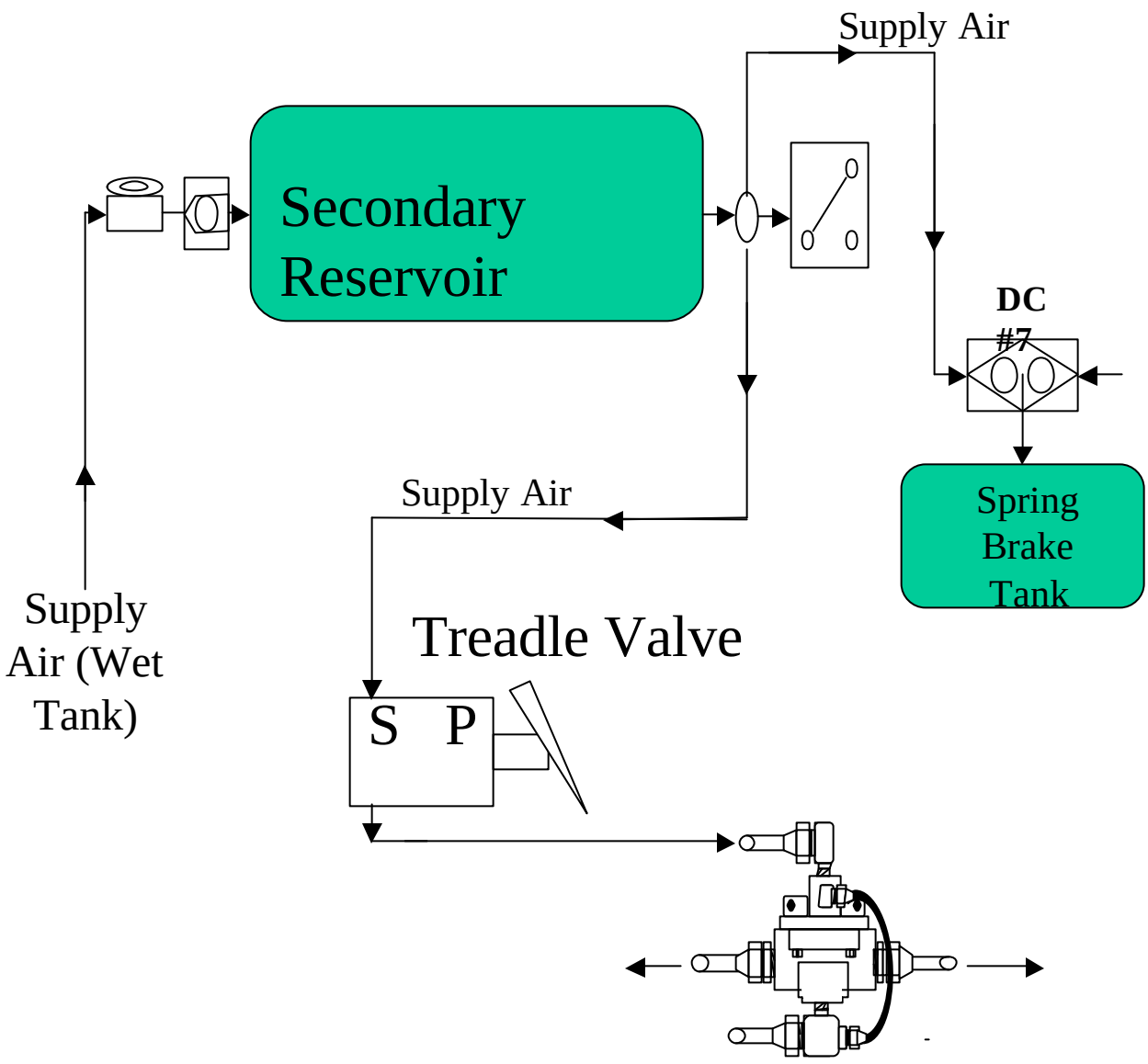
Figure 34-32. Typical Air Compressor, Two-Cylinder.

Primary Air Circuit



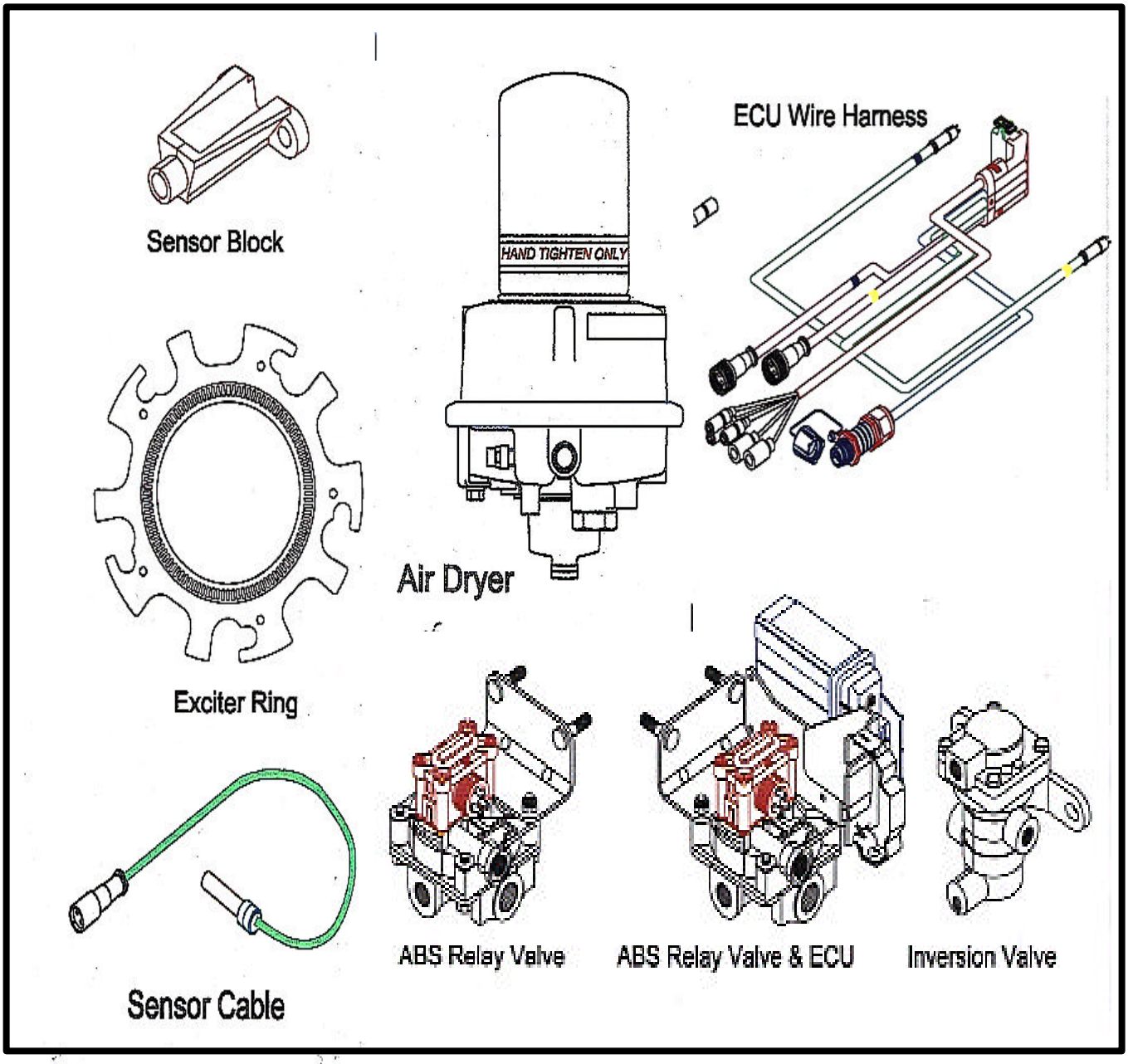
SLIDE ABS-01B

Secondary Air Circuit

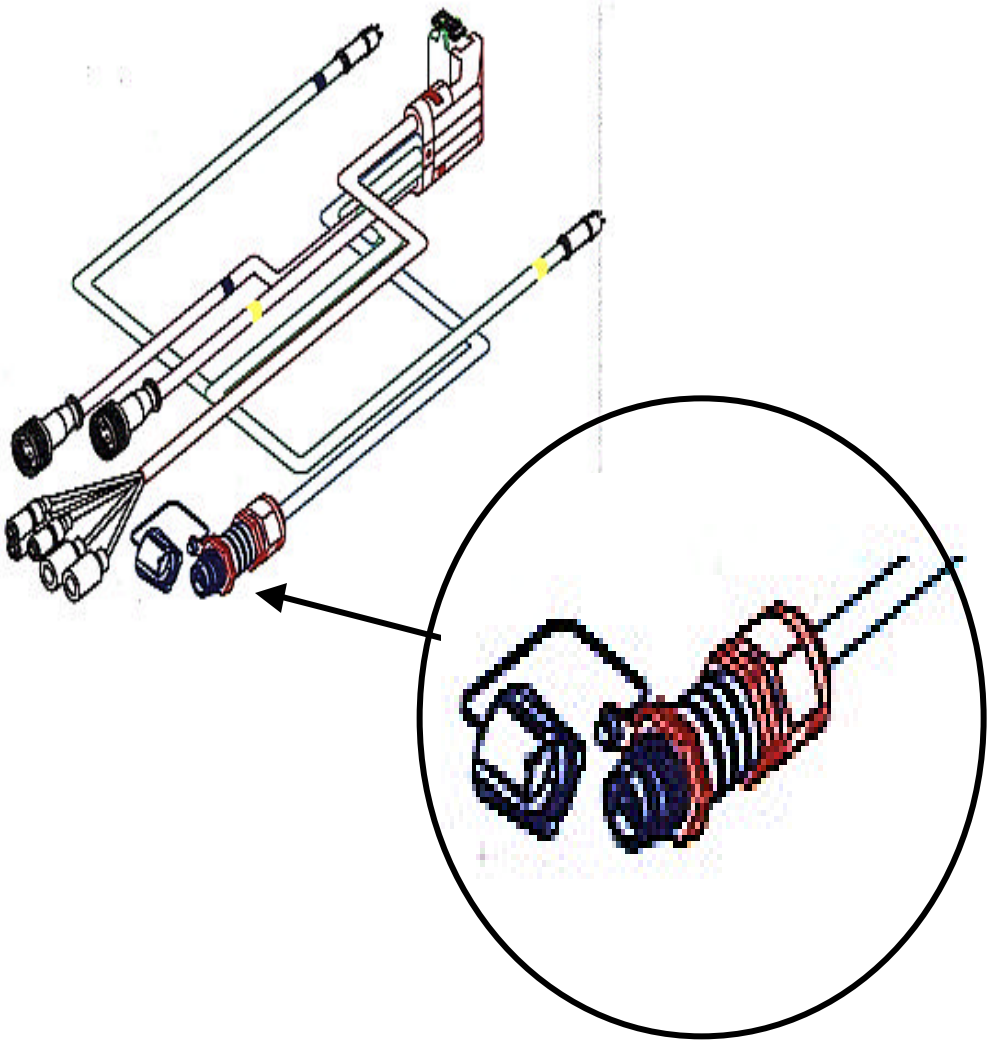


Definition of Air Brake Circuits

1. SUPPLY CIRCUIT: This circuit consists of air supplied by compressed means and stored in reservoirs.
2. CONTROL CIRCUIT: This circuit consists of compressed air directed towards a components usually activating or controlling valves or relays.
3. DELIVERY CIRCUIT: This circuit consists of compressed air released to activate a component converting pneumatic force to mechanical force.
4. EXHAUST CIRCUIT: This circuit consists of compressed residual air released -- after brakes have been released.



ABS Major Components



Wire Harness/Loom (Inset: Diagnostic Connector)

System Configuration-Post MWO

❑ COMPONENTS ADDED

- Air Dryer (Bendix): Applied to all vehicles. Dryers on A2 models are replaced.
- Inversion Valve
- Limiting Valve (LQ2)
- Relay Valves
- Double check Valve (#7)
- Toner Rings
- Sensors
- Wire Loom
- ABS Warning Light

System Configuration-Post MWO

❑ PLUMBING

- Rear axles are re-plumbed to allow for split coefficient braking. Braking left-to-right versus axle-to-axle
- Inversion Valve Integrated into air system and mounted in Step Box
- Limiting Valve (LQ2) is plumbed with existing hardware
- Relay Valves are plumbed to operate with one control line.
- Double check Valve (#6) Relocated in vicinity of Inversion Valve
- Cross “T” plumbed in location where DC #1 was moved (now DC#6)
- Double Check Valve (#7) added to System. Mounted on inlet of Spring Brake Tank
- Air line mounted from governor “unload” port to air dryer for purging dryer.
- 250psi relief valve added to high temp line for supply air to air dryer

Overview of ABS Component Data

Wheel End:

- Torque sensors to 110-145 ft lbs
- Air gap adjusted by pushing sensors until fully seated (sensor shoulder seated flush with bracket housing).
- Torque toner rings to 110 – 130 in. lbs (Basic & A1 Models).

Air Dryer:

- Torque to 30 – 45 ft. lbs

Relay valves:

- Torque to 30 – 45 ft. lbs

Limiting Valve (LQ2):

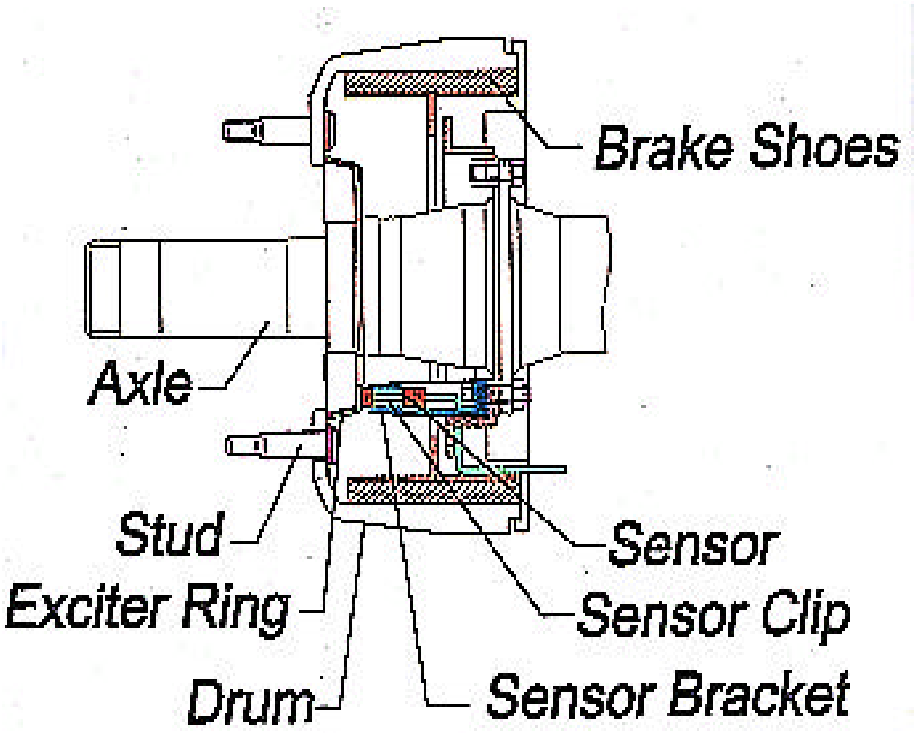
- Limits the amount of delivery air (67%) to front brake chambers.

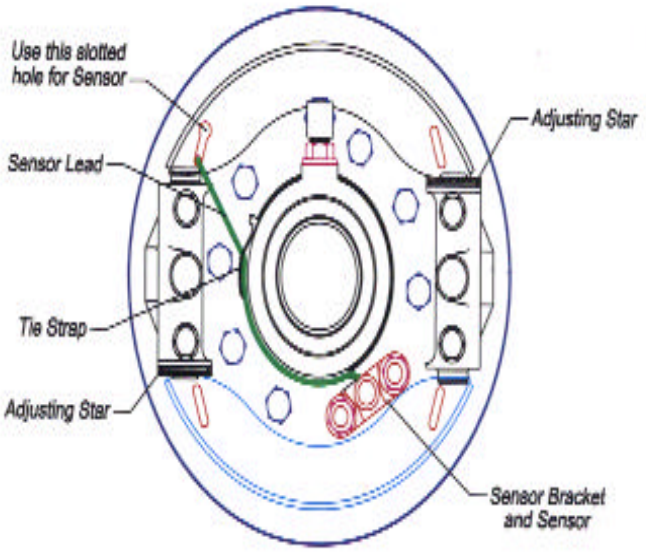
Electrical Systems (ABS):

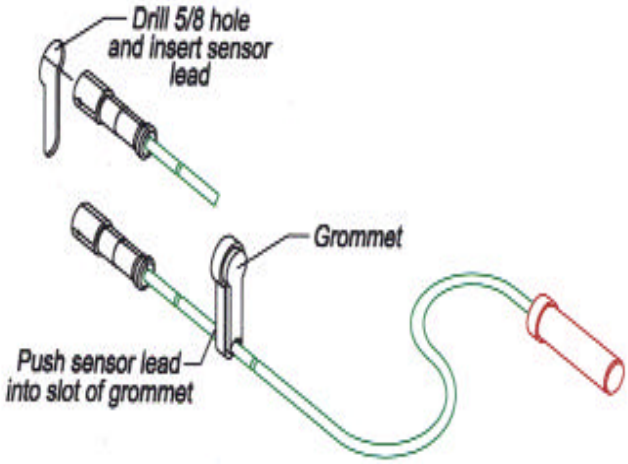
- Powered by vehicle electrical system. Operating range of 21 – 32 vdc
- 28 pin connector at ECU. -- Nine (9) not used.
- Diagnostic Connector Assembly (DCA).
- Protective fuses. 15 amp protects main power circuit. 3 amp protects ABS light assembly

ABS Component Familiarization

- **SENSORS**- Located on rear axles. Mounted using a bracket to the axle spider plate.
- **TONER/ EXCITER RINGS**- Mounted on inside face of brake drums.
- **Relay Valves w/Modulators-** Mounted in place of OEM relay valves. Located between both rear axle assemblies.
- **Electronic Control Unit (ECU)-** Mounted on forward Relay Valve between rear axle assemblies.
- **Inversion Valve-** Mounted on panel inside Driver's Step Box below cab door.
- **Double Check valve #7-** Mounted to inlet of Spring Brake Tank.
- **LQ2 valve-** Mounted in same location of existing front proportioning valve or QR Valve. No required additional plumbing.
- **ABS Warning Light-** Located on Driver's Instrument Panel.
- **In-line protective Fuses-** 15 amp located under driver's dashboard (left of steering column). 3 amp located under driver's dash board (right of steering column).
- **Air Dryer Assembly-** Mounted on cross member forward of intermediate axle. (M936 Wrecker is mounted on exterior frame rail (Curb-side)

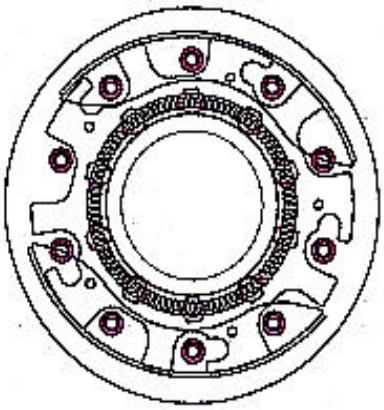


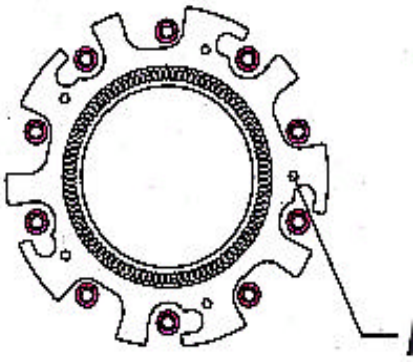




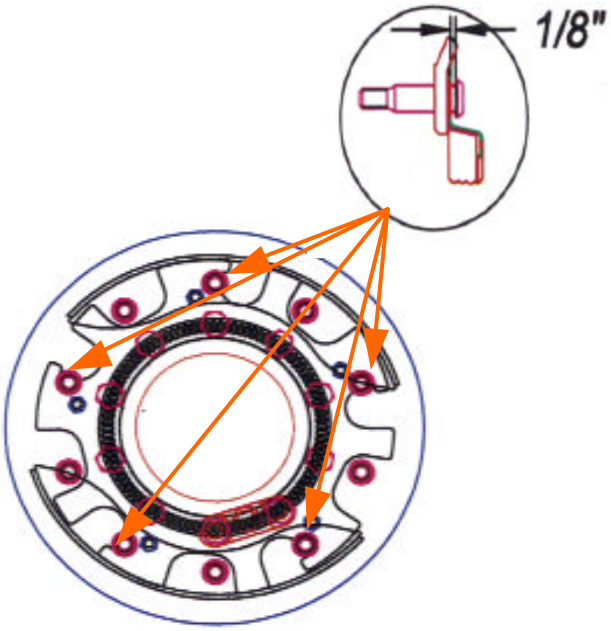
Wheel End Installation

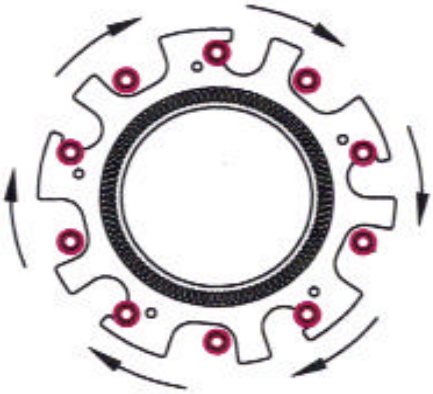
M939 FOV Basic/A1 Models





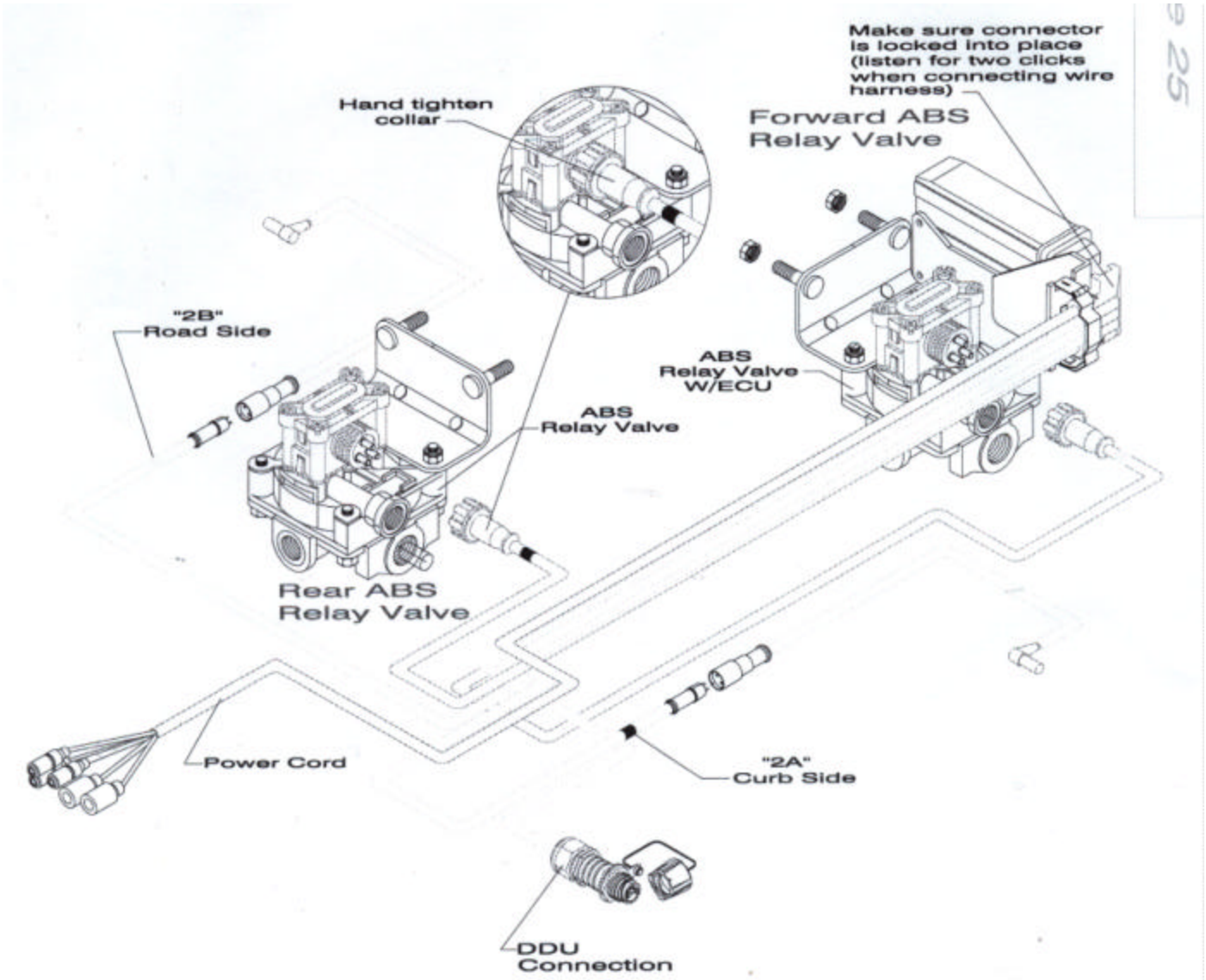
Exciter Ring





Exciter Ring

M939 FOV A2 Models



Legend

Sensor
DDU Cable
Power Cable
Modulating Cable

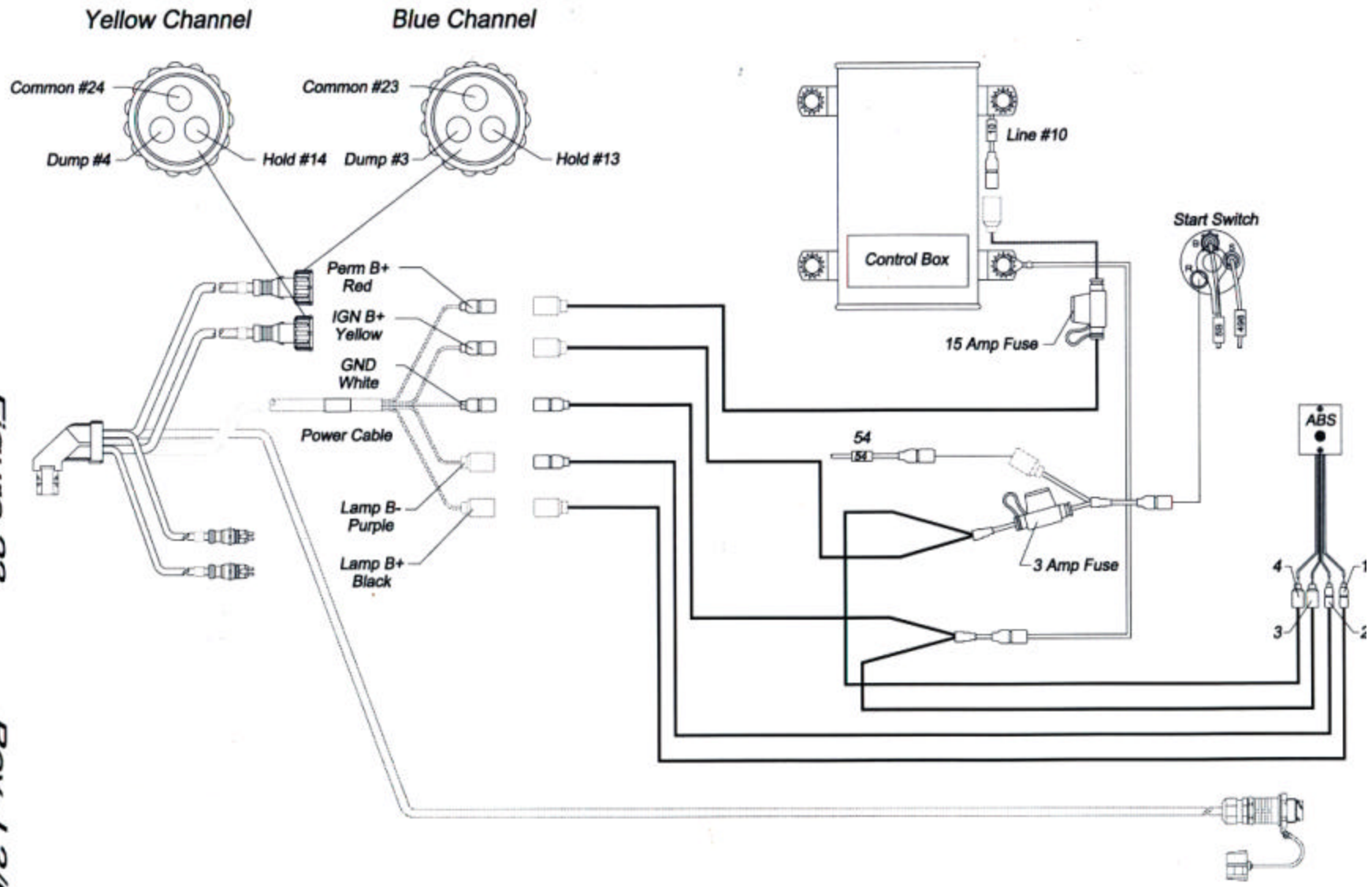
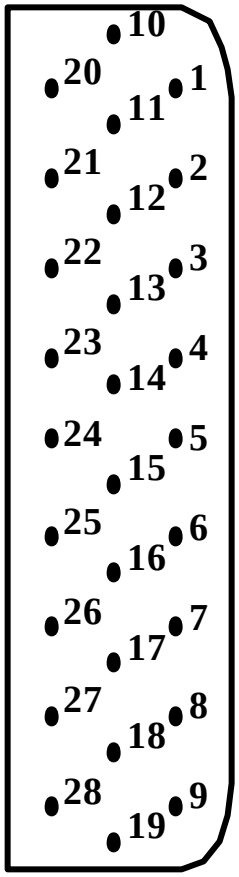


Figure 23

Rev J 2/00

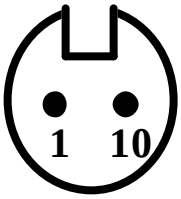
M939 ABS Loom Connector Pin Relationships

Loom Connector

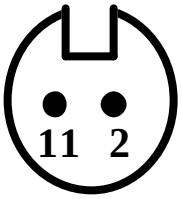


1. Sensor 2A Low
2. Sensor 2B HI
3. Blue Sol Dump
4. Yellow Sol Dump
5. Not Used
6. Ignition Switch B+
7. B+ Perm
8. Diagnostic Input
9. DDU B+
10. Sensor 2A HI
11. Sensor 2B Low
12. Not Used
13. Blue Sol Hold
14. Yellow Sol Hold
15. Not Used
16. Not Used
17. Lamp +
18. DDU B -
19. Diagnostic Output
20. Not Used
21. Not Used
22. Not Used
23. Blue Sol Common
24. Yellow Sol Comm
25. Not Used
26. Lamp –
27. B – Ground
28. Not Used

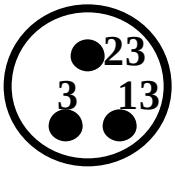
Sensor 2A Connector



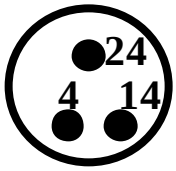
Sensor 2B Connector

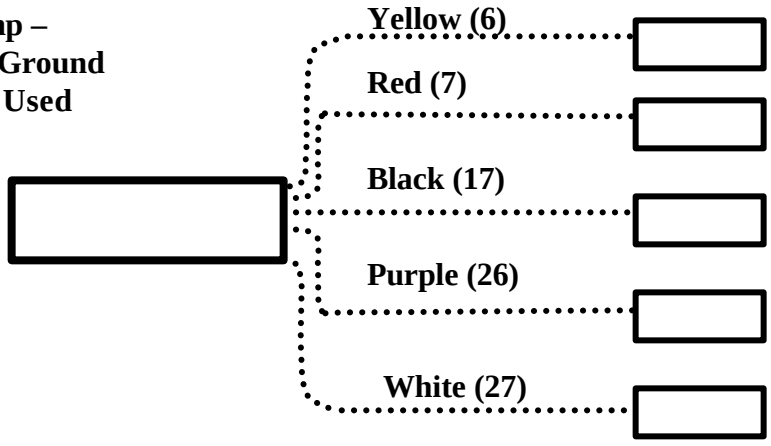


Front Relay Blue Solenoid



Rear Relay Yellow Solenoid





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