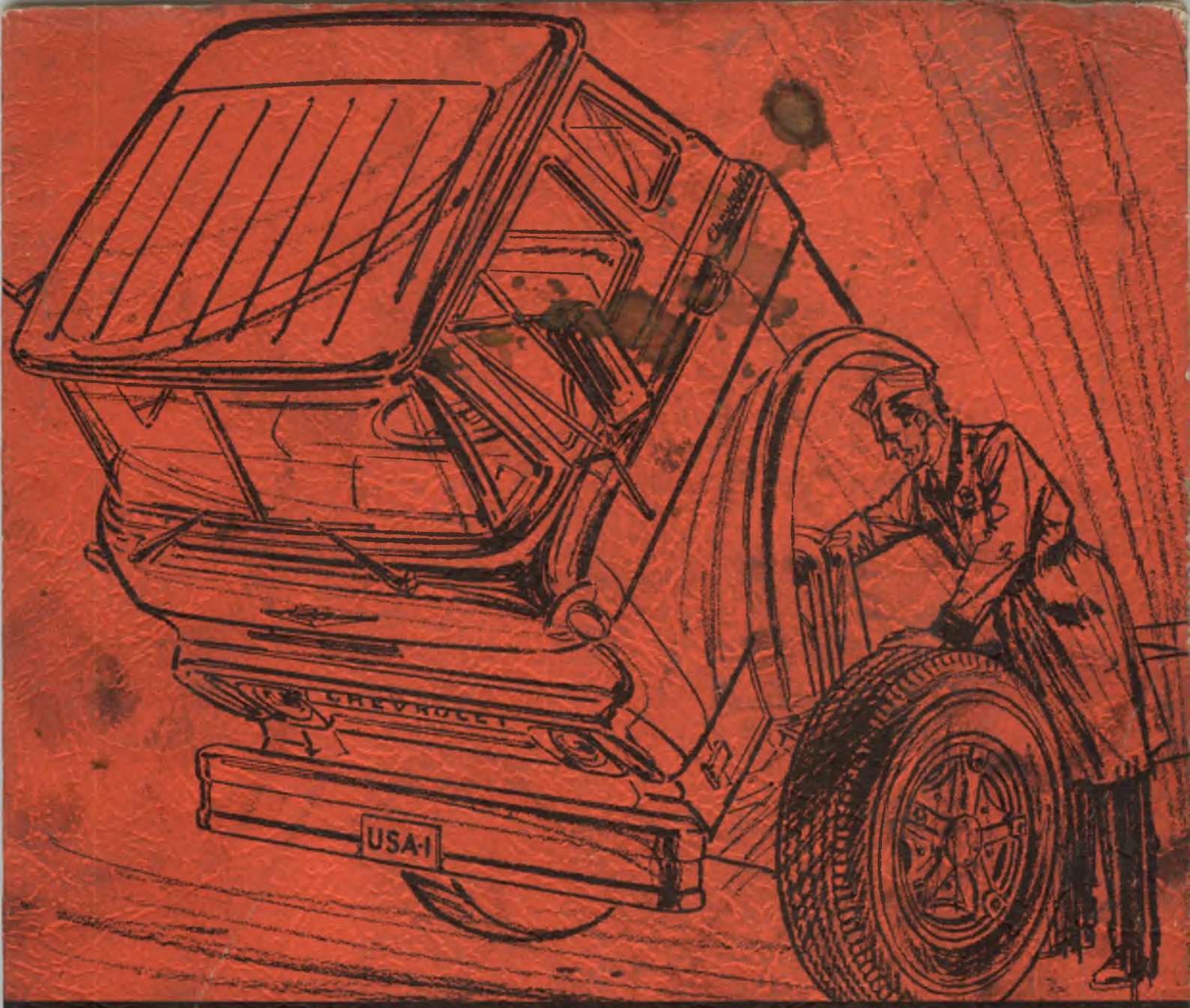


HEAVY DUTY TRUCK SUPPLEMENT

SERVICE MANU

CHEVROLET

LUBRICATION DATA
(CHART ON OPPOSITE PAGE)

Item No.	Item	Remarks	Symbol	Miles(c)
1	Brake Camshaft (d)	1 fitting each (apply sparingly)	MPG	6,000
2	Brake Cam Roller Pins (d)	Apply	E	20,000
3	Front Wheel Bearings (f)	Hand pack or use lubricator	MPG	20,000(a)
4	Steering Knuckles	2 fittings each side	MPG	6,000
5	Steering Tie Rod Ends	1 fitting each end	MPG	6,000
6	Clutch Release Bearing	Cup or fitting (apply sparingly)	S27	6,000
7	Spring Slip Pads	Apply each end	MPG	6,000
8	Transmission (Fuller)	To level of filler plug	GO	6,000
		Drain and refill	GO	12,000
8	Transmission (Spicer)	To level of filler plug	ES	6,000
		Drain and refill	ES	12,000
9	Blower Air Cleaner	See instructions (See SEC. 6M)	-	--
10	Tilt Cab Hydraulic System	To level of filler plug	S23	6,000
11	Propeller Shaft U-Joints	1 fitting each joint	MPG	6,000
12	Rear Wheel Bearings (g)	Hand pack or use lubricator	MPG	20,000(a)
13	Rear Axle	To level of filler plug	MPO	6,000
		Drain and refill	MPO	24,000(b)
14	Propeller Shaft Slip Joint	1 fitting each joint	MPG	6,000
15	Speedometer Adapter Cable (d)	1 fitting	MPG	6,000
16	Battery Terminals	Keep coated	S3	6,000
17	Transmission Shift Rod U-Joint	1 fitting each joint	MPG	6,000
18	Clutch Release Cross Shaft	1 fitting each end	MPG	6,000
19	Power Steering Cylinder Ends (d)	2 fittings	MPG	6,000
20	Steering Drag Link	1 fitting each end	MPG	6,000
21	Clutch Linkage (e)	3 fittings	MPG	6,000
22	Steering Gear Housing	To level of filler plug	SG	6,000
23	Steering Column U-Joints	1 fitting each joint	MPG	6,000
24	Steering Column Slip Joint	1 fitting	MPG	6,000
25	Accelerator Cross Shaft	1 fitting	MPG	6,000
26	Power Steering Reservoir (d)	To oil level mark	S32	6,000
27	Speedometer Drive Adapter (d)	1 fitting	MPG	6,000

(a) Or once a year, whichever occurs first.
(b) Or every six months, whichever occurs first.
(c) When "MPG" (Multi-Purpose Grease) is specified, lubricate every 6,000 miles or 60 days, whichever occurs first.
(d) If used.
(e) Front idler lever grease fitting is accessible through opening in front bumper. Rear idler lever grease fitting is accessible at transmission. Clutch pedal grease fitting through splash shield opening. (Loosen screw, then move access cover to expose grease fitting.)
(f) Optional oil lubricated front wheel bearings use "GO" type oil.
(g) No periodic servicing with oil lubricated bearings (Stemco seals).

AIR OPERATED WINDSHIELD WIPERS

DUAL WIPER CONTROL VALVES

All model vehicles with air operated windshield wipers are equipped with dual control valves as shown in schematic (fig. 5).

The control knob at left operates left wiper and control knob at right operates right wiper.

To operate wipers, turn wiper control knobs counterclockwise toward run position. Variable speed air powered wiper motors will operate wipers. To stop wipers, turn knobs clockwise to park position. If blades do not park properly momentarily, turn knob or knobs clockwise against spring tension beyond park position. Blades will park.

NOTE: Speed of the wiper motors is controlled by the control valves.

To check control valve, connect air supply line to "IN" port and turn control on. If air flows from the "RUN" port only the control is operating properly. If air flows from the "PARK" port as well as the "RUN" port, the rubber slide valve is defective, and the control valve can be serviced as described in 1970 Heavy Duty Truck Service Manual ST135-70, Section 1A, page 1-21.

NOTE: When using Valve Service Kit, assemble new pre-greased valve to backing plate and place valve cavity in correct position to receive control stem. Lubricate with Silicone Grease Type GE-SS-4067 or DC-4.

IMPORTANT: Be sure to replace old slide valve (fig. 6) with new valve of the same thickness.

WIPER MOTOR AIR LINES

(Refer to Figure 7)

Air lines for models covered in this supplement are of nylon type lines with brass fittings. Nylon ferrule design or metal ball sleeve design is available for service.

WIPER BLADE REPLACEMENT

(Refer to Figure 8)

1. Hold fillister head screw with screwdriver and remove lock nut. Remove screw which is threaded into wiper arm and remove blade. Reverse procedure to install.

IMPORTANT: Turning the fillister head block attaching screw too far into the wiper arm will bend the blade arm and cause blade to bind and wipe erratically.

NOTE: Curved windshield wiper blade is designed to accept a refill insert for service replacement.

AIR OPERATED WIPER MOTOR SERVICING (CONV. CAB MODELS)

If inspection indicates a faulty wiper motor unit, the unit can be readily removed from vehicle, disassembled and repaired. For repair information see "Troubleshooting and Repair of Wiper System" later in this section.

WIPER MOTOR REPLACEMENT

Removal

1. Disconnect lines at motor.
2. Remove the four motor mounting plate-to-cowl bolts and nuts.
3. Move motor forward from cowl, then through cowl opening, disconnect transmission link from motor crank arm. The link attached to the right motor is retained with two small nut assemblies. The left motor is connected to link with a spring clip and flat washer. Remove wiper motor.

Installation

NOTE: Before installing motor, remove any old sealing compound from around motor mounting surfaces, then apply bead of new compound to surfaces. Install motor in the reverse sequence of the "Removal" procedure.

TRANSMISSION AND LINKAGE REPLACEMENT

NOTE: Access to transmissions and linkage can be obtained from under dash panel at left side and by removing ash tray panel at the right side. The linkage connection at the motor crank arms is

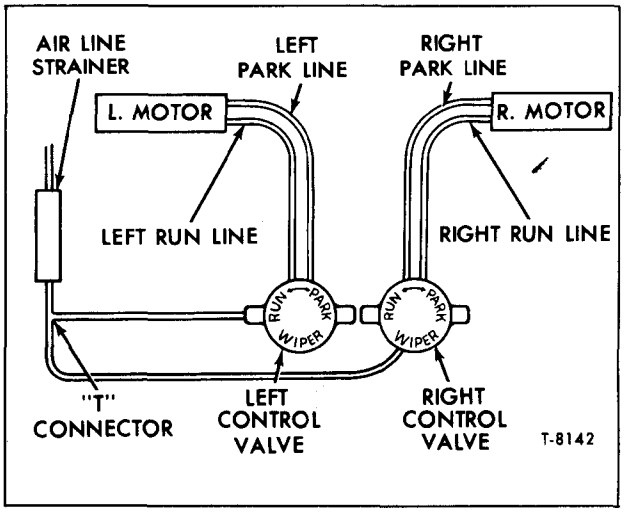
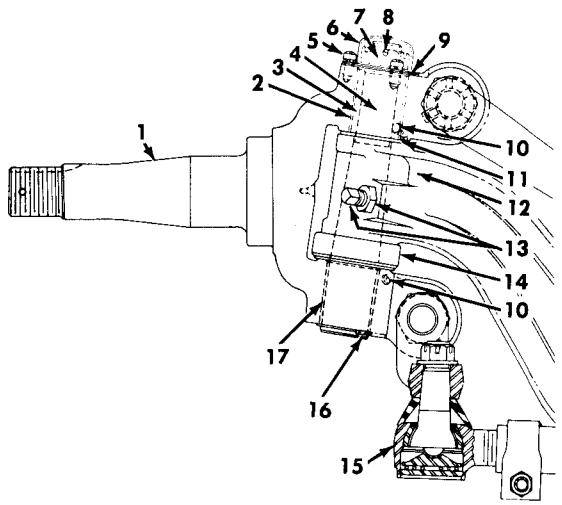


Figure 5—Dual Wiper Control Valve Schematic



1 Steering Knuckle Spindle
2 Steering Knuckle Bushing (Upper)
3 Kingpin Bushing
4 Kingpin
5 Cap Screw
6 Dust Cap
7 Kingpin Nut
8 Cotter Pin
9 Gasket
10 Lube Fitting
11 Washer or Shims
12 Axle Center
13 Stop Bolt and Lock Nut
14 Thrust Bearing
15 Tie Rod End Assy.
16 Retaining Ring
17 Steering Knuckle Bushing (Lower)

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Figure 4—Steering Knuckle (F160 Axle)

FRONT AXLE (F161)

REMOVAL

1. Safely support axle, then remove hubs and bearings as directed under "FRONT HUBS AND BEARINGS" (SEC. 3D).

2. Remove tie rod from one or both steering arms.

3. Remove three screws and washers which attach kingpin dust cap to top of steering knuckle. Remove cap and cap gasket.

4. At bottom of kingpin, remove lock ring and expansion plug. If plug cannot be readily removed, it will come out later when kingpin is driven from knuckle.

5. Using a suitable drift, drive out the two draw keys by placing drift against small end of each key.

NOTE: Keys were originally installed from opposite sides of center.

6. With axle components properly supported, drive the kingpin downward using a brass driving bar or drift.

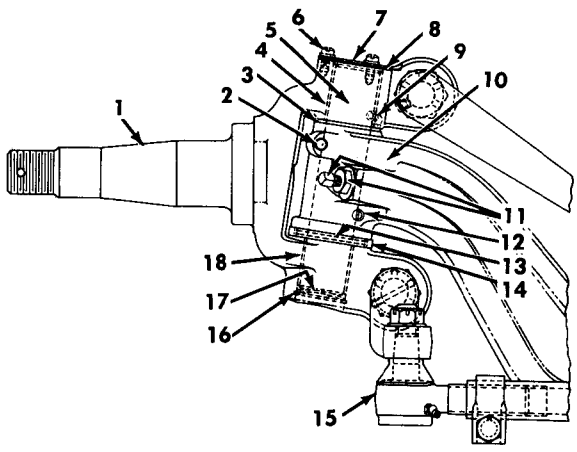
7. Remove knuckle, thrust bearing and spacing shim(s).

STEERING KNUCKLE INSTALLATION

1. Make sure that kingpin hole in axle center is clean and dry, then position and support knuckle on the axle center.

2. Slide the thrust bearing races and seal between axle center and knuckle lower yoke.

3. Place a jack under the knuckle and raise knuckle so that all clearance is taken up at thrust bearing.



1 Steering Knuckle
2 Upper Draw Key (Short)
3 Spacing Washers
4 Steering Knuckle Bushing (Upper)
5 Kingpin
6 Kingpin cap screw
7 Kingpin Cap
8 Gasket
9 Lube Fitting
10 Axle Center
11 Stop Bolt and Lock Nut
12 Lower Draw Key (Long)
13 Thrust Bearing
14 Seal
15 Tie Rod End Assembly
16 Retainer
17 Expansion Plug
18 Steering Knuckle Bushing (Lower)

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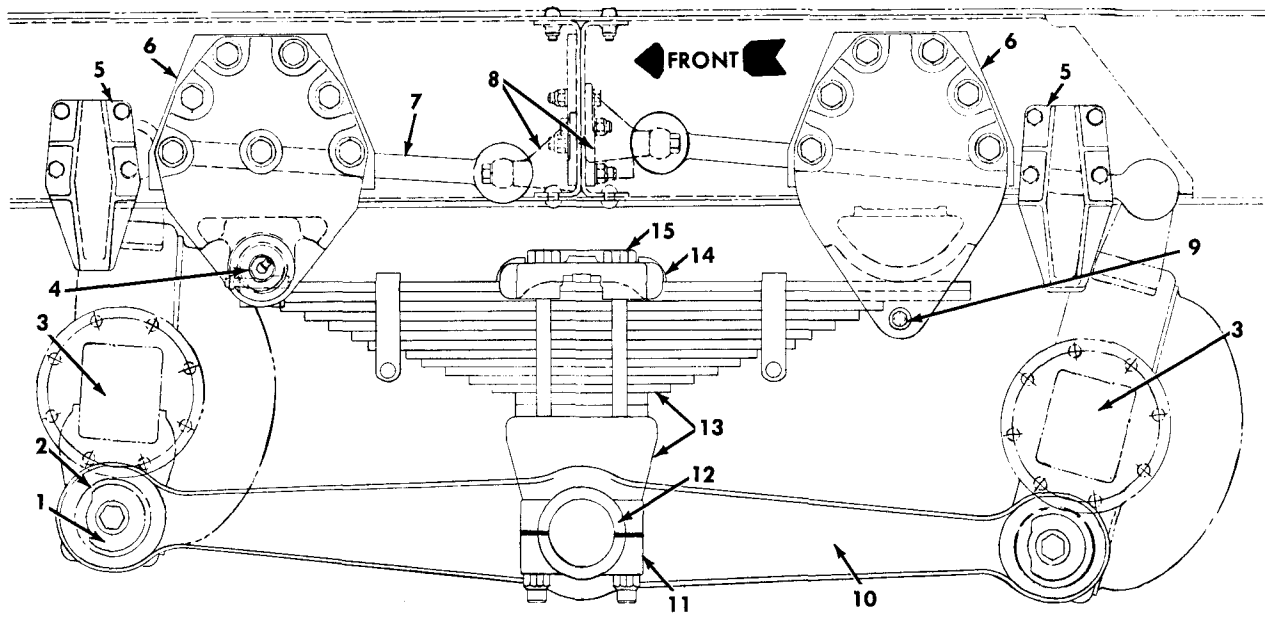
Figure 5—Steering Knuckle (F161 Axle)

SECTION 4B
Rear Springs and Suspension

All information pertaining to "REAR SPRINGS AND SUSPENSION" (SEC. 4B) as described in 1970 Heavy Duty Truck Service Manual ST135-70, is applicable to models covered by this supplement with addition of the following updated illustrations, specifications, and torque charts.



1 Beam End Adapter
2 Beam End Bushing
3 Rear Axle
4 Spring Eye Pin
5 Axle Bumper
6 Frame Bracket
7 Torque Rod
8 Torque Rod Frame Bracket
9 Rebound Bolt
10 Equalizer Beam
11 Saddle Cup
12 Beam Center Bushing
13 Spring and Saddle Assembly
14 Top Pad
15 Saddle Bolts

Figure 1—Tandem Rear Suspension (Hendrickson RT) (Typical)

1 Beam Center Bushing
2 Spring Saddle
3 Spring Assembly
4 Spring Saddle Top Pad
5 Top Pad to Spring Saddle Bolts
6 Lock Nut
7 Setscrew
8 Equalizing Beam
9 Cross Tube
10 Spring Saddle Cap
11 Stud
12 Thrust Washer
13 Bushing

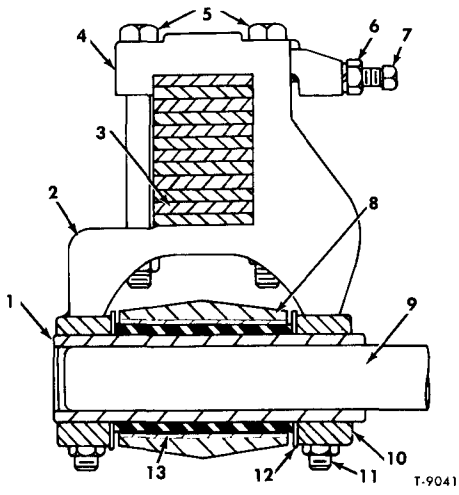


Figure 2—Section Through Spring, Saddle, and Beam (Hendrickson RT)

SECTION 5

Brakes

All information in 1970 Heavy Duty Truck Service Manual ST135-70 BRAKES (SEC. 5) also applies to vehicles covered by this supplement except as specifically stated in the following procedures:

SECTION 5A

Hydraulic Brakes

BRAKE SYSTEM MAINTENANCE

Refer to 1970 Heavy Duty Truck Service Manual ST135-70, page 5-1 under above heading. The statement in Step 1 — "At least once a year, drain and flush entire brake system and refill with new fluid" no longer applies.

Flushing system and replacing fluid is necessary only when it is known or suspected that system has become contaminated with dirt, water, wrong type fluid, etc.

CLEANING AND FLUSHING BRAKE PARTS AND SYSTEM

Under the headings of "Bleeding Brakes," "Master Cylinder Overhaul," and "Wheel Cylinder Repair" in 1970 Heavy Duty Truck Service Manual ST135-70 instructions are given to wash or clean parts with DENATURED ALCOHOL.

Latest instructions specifically state "DO NOT USE ALCOHOL" for flushing hydraulic brake systems or for washing parts with internal passages in which fluid could be trapped. The only approved fluid for such cleaning or flushing operations is new brake fluid. Parts without internal passages may be cleaned with alcohol but must be completely dried and coated with brake fluid before assembly.

CAUTION: DO NOT use kerosene, gasoline, or other unapproved solvents for cleaning or flushing hydraulic brake systems or parts.

BRAKE PEDAL PUSH ROD ADJUSTMENT

IMPORTANT: If any doubt exists relative to push rod adjustment, remember it is better to have push rod too short than for it to be too long.

"H" AND "J" MODELS

1. Loosen lock nut on brake pedal push rod and shorten push rod until brake pedal is completely clear of brake pedal bumper stop.
2. Place a 0.040-inch shim between brake pedal and brake pedal bumper stop.
3. With master cylinder properly installed on fire wall and master cylinder piston in rearmost position against retaining ring, adjust push rod length until push rod contacts master cylinder piston.
4. Hold push rod firmly and tighten lock nut.
5. Check operation of brakes.

TILT CAB MODELS

1. Set emergency brake or block wheels.
2. Tilt cab (see instructions).
3. To adjust, loosen adjusting nut and turn rod in or out of rod end as necessary. Adjust so that there is 1/8" free play movement of brake pedal at pad before end of push rod contacts piston.
4. Tighten adjusting nut.
5. Check operation of brakes.

MASTER CYLINDER REPLACEMENT

CONVENTIONAL MODELS

Removal

1. Place a suitable container under master cylinder to catch fluid when hydraulic line is disconnected. DO NOT RE-USE THIS FLUID.
2. Disconnect hydraulic line from outlet.
3. Remove two bolts and lock washers attaching master cylinder to fire wall (nuts are welded to inner side) and remove master cylinder assembly.

Installation

1. Place master cylinder in position on fire wall. Make certain push rod is aligned properly and

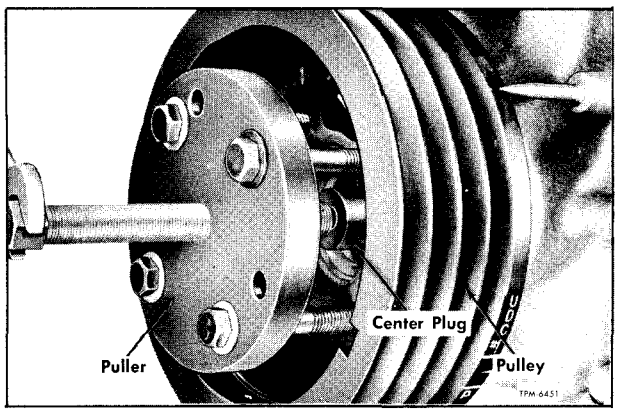


Figure 3—Crankshaft Pulley Removal (Typical)

2. Use impact wrench or block the crankshaft to prevent turning and use suitable socket wrench and handle to loosen bolt which secures pulley hub to crankshaft.

3. Remove bolt and thick washer, then assemble special puller and center plug in manner shown in figure 3. Turn puller screw to remove pulley hub or damper from crankshaft. A tapered cone (fig. 4) is used in addition to retainer washer on engines having a crankshaft damper assembly, or Tilt cab models with crankshaft pulley hub.

4. Remove key from keyway in crankshaft.

INSTALLING PULLEY HUB
OR DAMPER ASSEMBLY

1. Clean seal area on crankshaft pulley hub or damper hub thoroughly and apply engine oil on surface contacted by oil seal.

2. On 637 engine check position of O-ring seal (1, fig. 5) which should be located approximately ¼" from slinger (2, fig. 5) so it will roll into counterbore in hub as damper is installed.

IMPORTANT: On 637 engines, lubricate O-ring with engine oil.

3. Align keyway in pulley with key in crankshaft, then start pulley or hub onto front end of crankshaft. Assemble special installer typically shown in figure 5, and turn nut with wrench to force pulley firmly into place on crankshaft.

4. Remove installer, then referring to figure 4, locate cone (if used) at hub, and install retaining washer and bolt. Tighten retaining bolt to "Specifications" at end of this section.

5. Mount crankshaft pulley on pulley hub or damper.

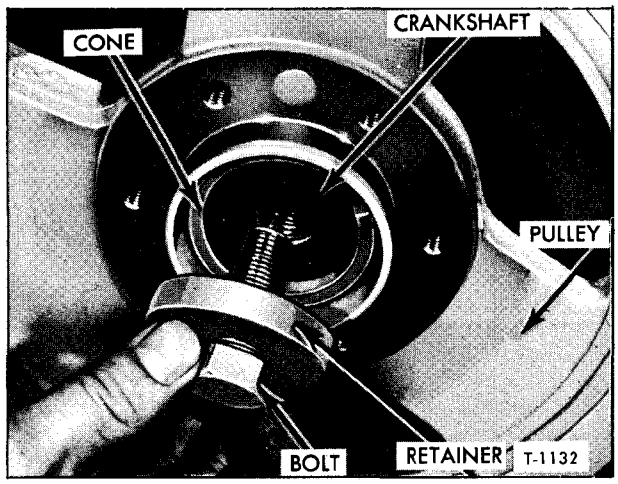


Figure 4—Crankshaft Damper Retaining Parts (Typical)

ENGINE OIL PAN REPLACEMENT (V8 ENGINE)

(Key Numbers in Text Refer to Figure 6)

OIL PAN REMOVAL

1. Clean all dirt and accumulated material from oil pan attaching bolts and drain plug.

2. Drain oil from oil pan.

3. Remove lower oil pan bolts (14), then remove lower pan (1) and gasket (12).

4. Loosen upper and lower oil inlet tube nuts (7) see inset in figure 6.

5. Remove two bolts, nuts, and washers (5) attaching oil pump suction screen bracket (8) to upper pan (2).

6. Remove lower oil inlet tube nut (7), remove float assembly (9) and suction screen bracket (8).

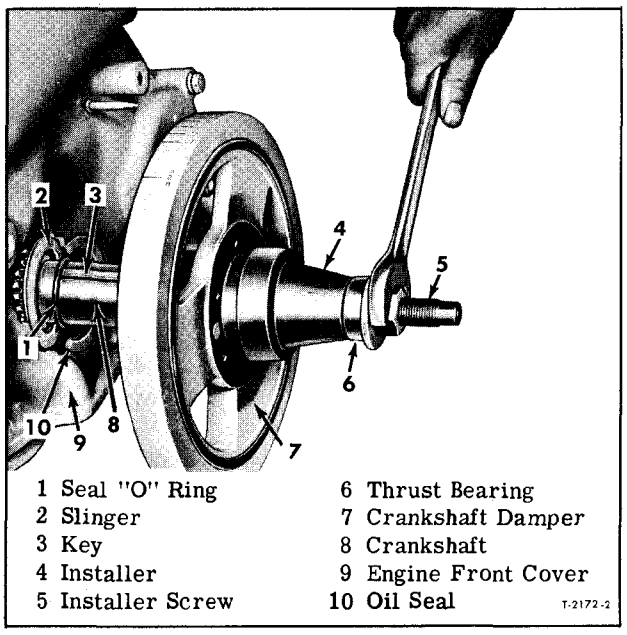


Figure 5—Installing Damper on Crankshaft with Special Tool Set

Lock adjusting screw with lock nut when idle speed is approximately 15 rpm below desired setting.

BUFFER SCREW ADJUSTMENT

With the idle speed set, the buffer screw may be adjusted as follows:

1. With the engine running at normal operating temperature, turn the buffer screw in so that it contacts the differential lever as lightly as possible and still eliminates the engine roll.

NOTE: Do not increase the engine idle speed more than 15 rpm with the buffer screw.

2. Buffer screw can be checked for proper adjustment by accelerating engine and de-accelerating. When engine comes to idle from de-acceleration it should roll one to two times and level off to smooth idle.

NOTE: If engine rolls or surges more than three times, the buffer screw needs to be adjusted in slightly.

If engine does not roll one to two times, the buffer screw is adjusted in too far.

3. With buffer screw properly adjusted, hold the buffer screw and tighten the lock nut and recheck.

4. Recheck the maximum no-load speed. If it has increased more than 25 rpm, back off the buffer screw until the increase is less than 25 rpm.

5. After the governor tune-up has been completed, install the variable low speed adjuster coupling and spring housing. Center the adjusting coupling before securing the housing assembly to the governor housing with two lock washers and bolts. Install the flexible shaft and manual control assembly.

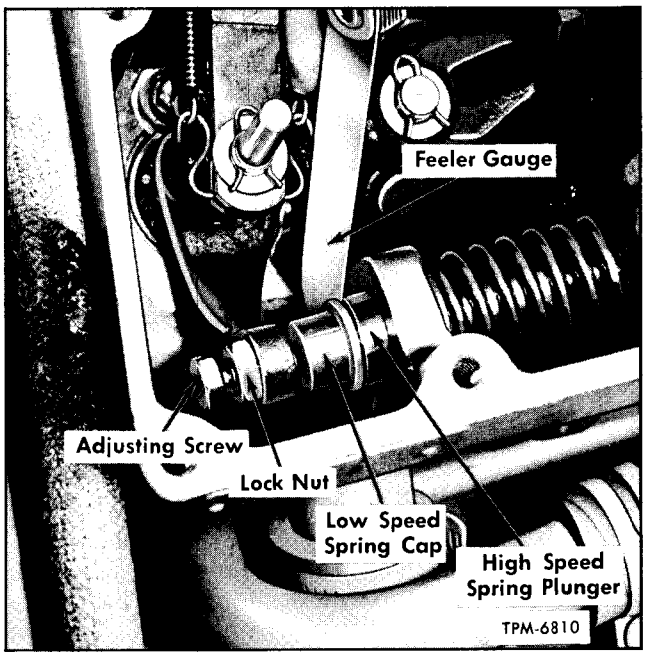


Figure 4—Low Speed Spring Gap Adjustment (Typical)

TORQUE REQUIREMENT FOR INJECTOR RACK CONTROL LEVER SCREWS (53 AND 71 DIESEL ENGINES)

Overtightening of the injector rack control lever screws can cause damage to the injector control tube.

The recommended torque for these screws is 24 to 36 in.-lbs. which can be obtained generally using a screwdriver with a one-inch diameter handle and turning it with one hand. Using a torque wrench with a screwdriver adapter, for final adjustment, eliminates the touch or feel by hand that is helpful in making uniform rack settings, important to good engine performance.

Overtightening of these screws can result if a larger screwdriver is used and both hands are applied to tighten the screws. Tests show that the screws start to cut into the control tube when torque exceeds 40 inch-pounds.

TORQUE WRENCH SPECIFICATIONS

Cylinder head bolts and nuts torque on pages 6C-15, 6C-25 and 6C-48 in ST135-70 Service Manual should be 175 to 185 foot-pounds instead of 190 to 200 foot-pounds.

INJECTOR VALVE OPENING PRESSURE

Injector valve opening pressure on pages 6C-8 and 6C-25 in Service Manual ST135-70 should read 2300 and 3300 psi instead of 2000 to 3200 psi.

ENGINE REPLACEMENT-HH AND JH MODELS

V8 DIESEL ENGINE REMOVAL

The procedure on page 6C-27 of Service Manual ST135-70 will apply with the addition of the following information:

It is not necessary to raise the cab if a dolly, to support and move engine forward before lifting the engine, is available. Also, in some instances it may not be necessary to remove the front cross members.

AIR BOX PRESSURE TEST
(Refer to Figure 19)

Proper air box pressure is required to maintain sufficient air for combustion and scavenging of the burned gases.

To check the air box pressure connect a manometer to the air box drain tube. (fig. 19).

Check the readings obtained at various speeds with the specifications in the chart.

AIR BOX PRESSURE (Min. in Inches of Mercury) Max. Exhaust Back Pressure (Full Load)				
	SPEED (RPM)			
Engine	1200	1800	2100	2600
6V-53				8.4
6-71	3.2	7.6	10.1	
V-71	2.3	6.4	8.2	
(Zero Exhaust Back Pressure)				
6V-53				5.2
6-71	1.7	4.3	6.0	
V-71	1.1	3.8	5.0	

Lack of power or black or grey exhaust smoke are also indications of low air box pressure.

If less than minimum air box pressure is indicated, some restriction is causing high air intake vacuum, and it may be caused by:

1. Emergency shut-off door adjusted wrong.
2. Restricted or damaged air cleaners.
3. Worn or damaged blower due to improper adjustment.
4. Leaking end plate gaskets.
5. Clogged blower air inlet screen.

If excessive air box pressure is indicated, there is a restriction in cylinder liner ports or the exhaust system.

AIR INTAKE RESTRICTION
(Refer to Figure 20)

Excessive restriction of the air inlet will affect the flow of air to the cylinders and result in poor combustion and lack of power. Consequently, the restriction must be kept as low as possible considering the size and capacity of the air cleaner. An obstruction in the air inlet system or dirty or damaged air cleaners will result in a high blower inlet restriction. The air inlet restriction may be checked with a water manometer connected to a fitting in the air intake housing.

On some models a drilled hole is provided for this connection (fig. 20). On models where a drilled hole is not provided, it is necessary to remove the blower air intake assembly and drill and tap a hole

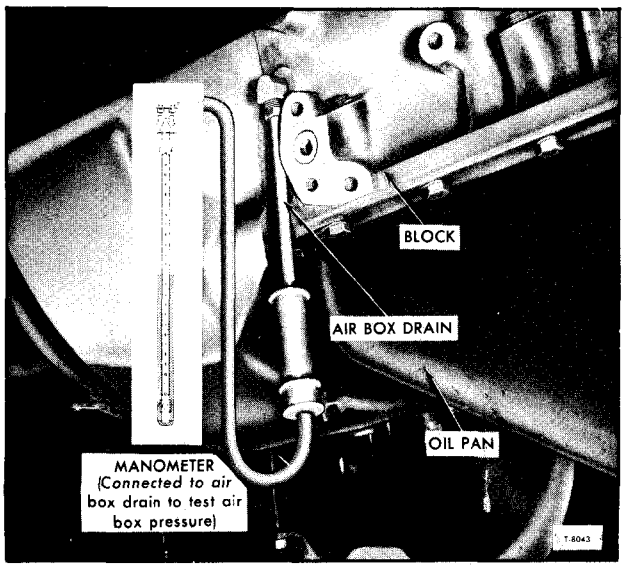


Figure 19—Air Box Pressure Check (Typical)

(11/32" drill and 1/8" pipe thread tap). The hole sgould be located at point above emergency stop.

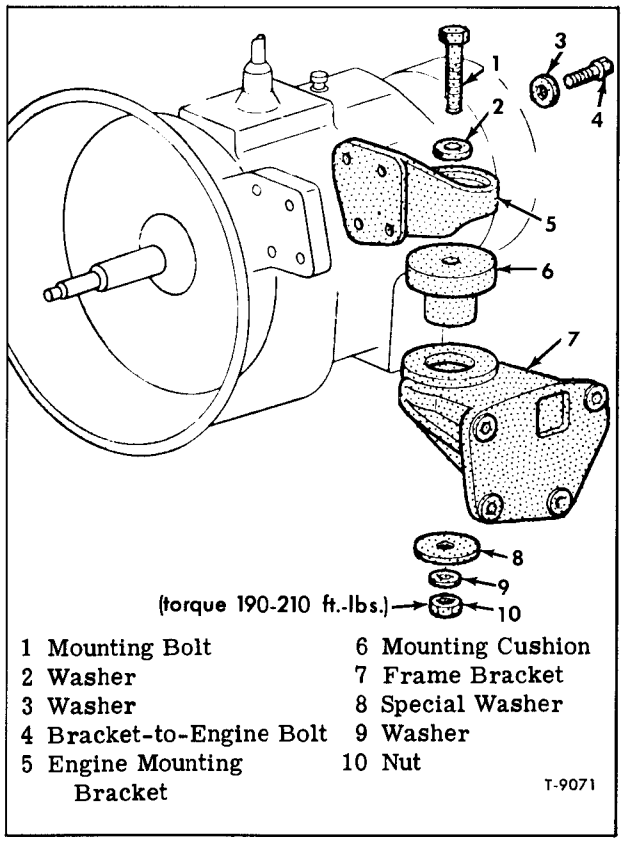
The air intake restriction should be checked at a specific engine speed. Then, the air cleaner and ducting should be removed from the air inlet housing and the engine again operated at the same speed while noting the manometer reading.

The difference between the two readings, with the air cleaner and ducting and without the air cleaner and ducting, is the actual restriction caused by the air cleaner and ducting.

Check the normal air intake vacuum at various speeds (at no-load) and compare the results with the following chart:

AIR INTAKE RESTRICTIONS (In Inches of Water) Max. With Dirty Air Cleaner (Oil Bath or Dry)				
	SPEED (RPM)			
Engine	1200	1800	2100	2600
6V-53				24.5
6-71	12.4	25.0	25.0	
V-71	12.4	25.0	25.0	
Max. With Clean Air Cleaner (Oil Bath or Dry) With Precleaner				
6V-53				14.7
6-71	8.7	13.4	15.9	
V-71	8.7	13.4	15.9	
Max. With Clean Air Cleaner (Dry) No Precleaner				
6V-53				9.2
6-71	5.2	9.1	11.5	
V-71	5.2	9.1	11.5	

ENGINE MOUNTINGS



1 Mounting Bolt
2 Washer
3 Washer
4 Bracket-to-Engine Bolt
5 Engine Mounting Bracket
6 Mounting Cushion
7 Frame Bracket
8 Special Washer
9 Washer
10 Nut

Figure 12—Rear Center Bond Mount

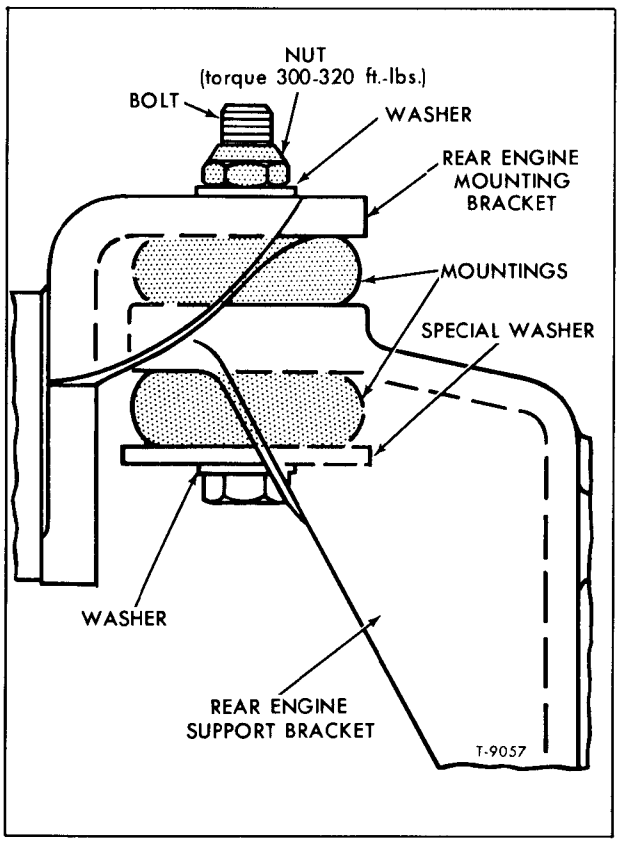


Figure 13—Rear Elasto Mount

MOUNTING BOLTS, BRACKET BOLTS, AND NUT TORQUES

BOLT OR NUT SIZE	GM 280-M BOLT FT.-LBS.	BOLT HEAD IDENTIFICATION	GM 300-M BOLT FT.-LBS.	BOLT HEAD IDENTIFICATION	NUT TORQUE FT.-LBS.
1/4" - 20-28	8-10		10-15		5-8
5/16" - 18-24	20-25		25-30		8-12
3/8" - 16-24	25-30		35-45		15-20
7/16" - 14-20	40-50		70-80		25-30
1/2" - 13-16	55-65 *		85-105		40-50
9/16" - 12-18	60-70 **		90-110		50-60
5/8" - 11-18	130-140 ***		170-180		70-80
3/4" - 10-16	180-200		300-320		110-130
7/8" - 9-14	240-270		400-430		210-230
1" - 8-14	325-380		700-730		320-350

* 40 - 50
** 55 - 65 Torque for aluminum casting.
*** 60 - 70

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SECTION 6M

Engine Fuel System

This group is divided into four sections as shown in Index below:

Subject	Page No.
Air Cleaners	95
Gasoline Engines	95
53 and 71 Series Diesel Engines	103
Cummins Diesel Engine	107

Air Cleaners
(ALL ENGINES)

All information in Service Manual ST135-70 pertaining to "AIR CLEANERS," pages 6M-1 through 6M-6 is applicable to models covered by this supplement with the addition of the following:

Air cleaner should be inspected and serviced at intervals specified in Emission Control Systems booklet. Air cleaners should be serviced whenever dirt becomes visible in element or oil. Under adverse conditions or extensive operation on dusty or sandy roads unit should be cleaned every day. Air cleaners on vehicles operating in dust storm areas should be cleaned immediately after such storm occurs.

GASOLINE ENGINES

CAUTION: In addition to its function of filtering air drawn into the engine through the carburetor, the air cleaner also acts as a flame arrester in the event the engine backfires. Because backfiring may cause fire in the engine compartment the air cleaner should be installed at all times unless temporary removal is necessary during repair or maintenance of the vehicle.

DIESEL ENGINES

AIR CLEANER SERVICE INSTRUCTIONS (Fig. 1)

Some FH and DH Models use the vee-type element air cleaner as shown in figure 1.

Measuring the restriction of the air cleaner element is the only way to tell if it needs to be serviced. Restriction can be measured with a water manometer, vacuum gauge, or with a permanently installed indicator as shown in figure 1, and is measured at governed engine speed. When restriction is higher than 25 inches of water the element should be cleaned or replaced.

To replace element, stop engine, tilt cab, remove 6 nuts and washers, and remove cover. Remove retention bracket and vee-type element.

IMPORTANT: When cleaning or handling be careful to prevent element from being punched or damaged, which would allow foreign material to enter engine.

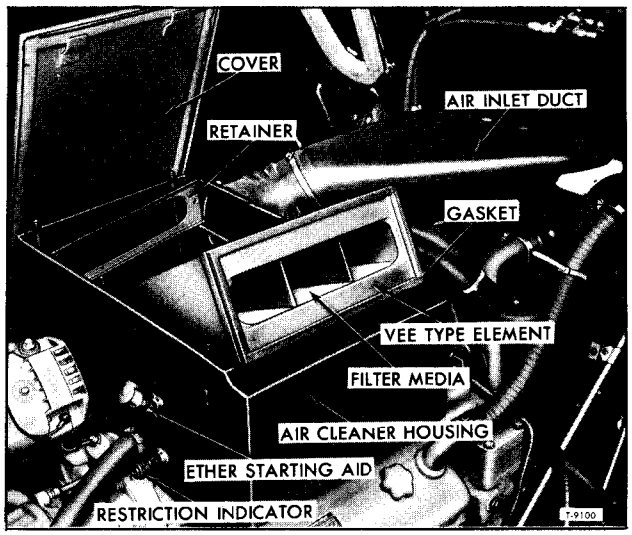


Figure 1—Air Cleaner (Some DH and FH Models)

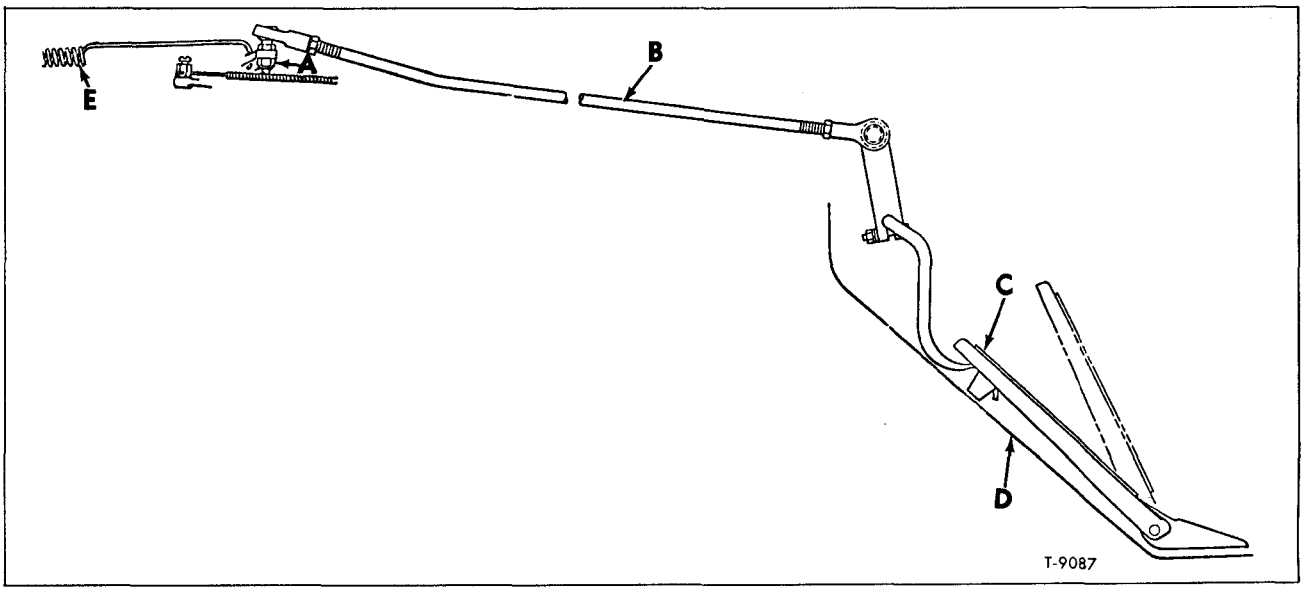


Figure 4—Accelerator Linkage (MH Models)

1. With the cab in the driving position, loosen bracket assembly "A" attaching bolts, then slide bracket to obtain 1/8-inch clearance between lever "B" and roller "C." Torque attaching bolts to 5 to 8 foot-pounds.

2. Rotate lever assembly "B" to full throttle position and adjust stop "D" to contact accelerator. Tighten stop bolts "E."

V12—71 EMERGENCY STOP LINKAGE ADJUSTMENT (FIG. 6)

NOTE: Emergency stop adjustment is the same as on other series 71 Diesel engines and is described in ST135-70 Service Manual, page 6M-22.

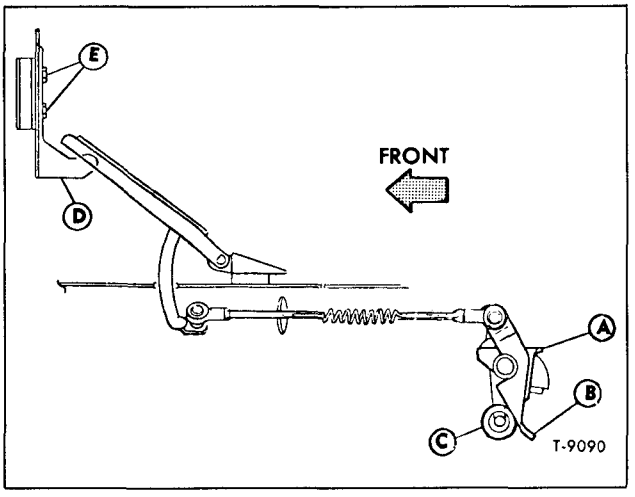


Figure 5—Aluminum Tilt Cab Linkage (Typical)

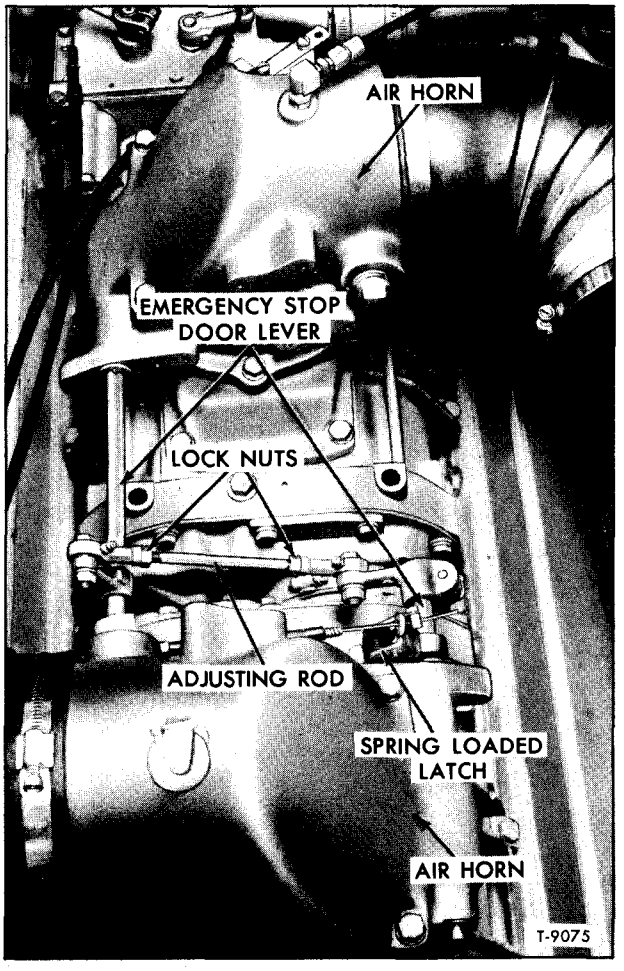
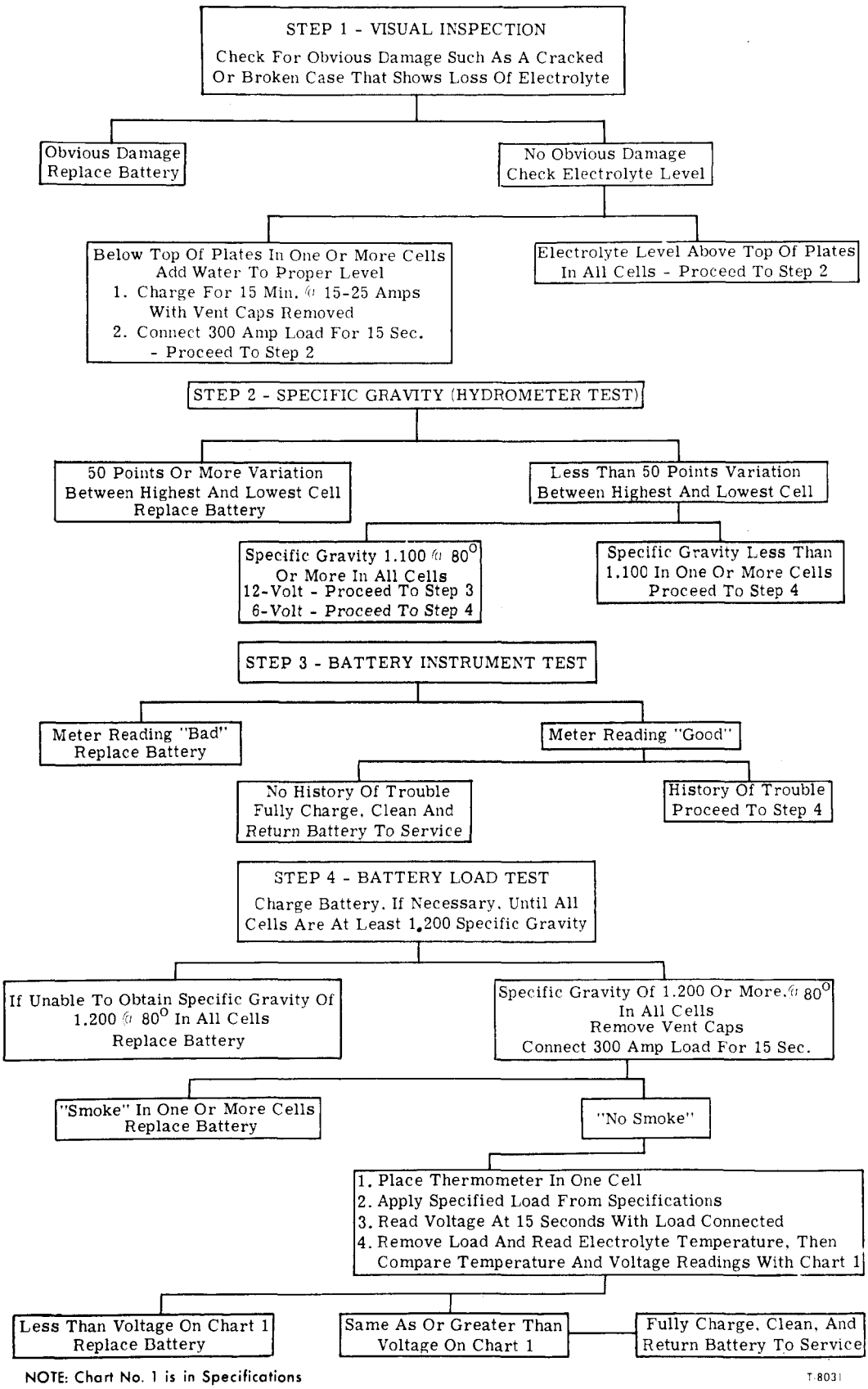


Figure 6—12V-71 Emergency Stop Linkage

BATTERY TEST PROCEDURE



NOTE: Chart No. 1 is in Specifications

T-8031

A. C. GENERATING SYSTEM (NON-INTEGRAL TYPE)

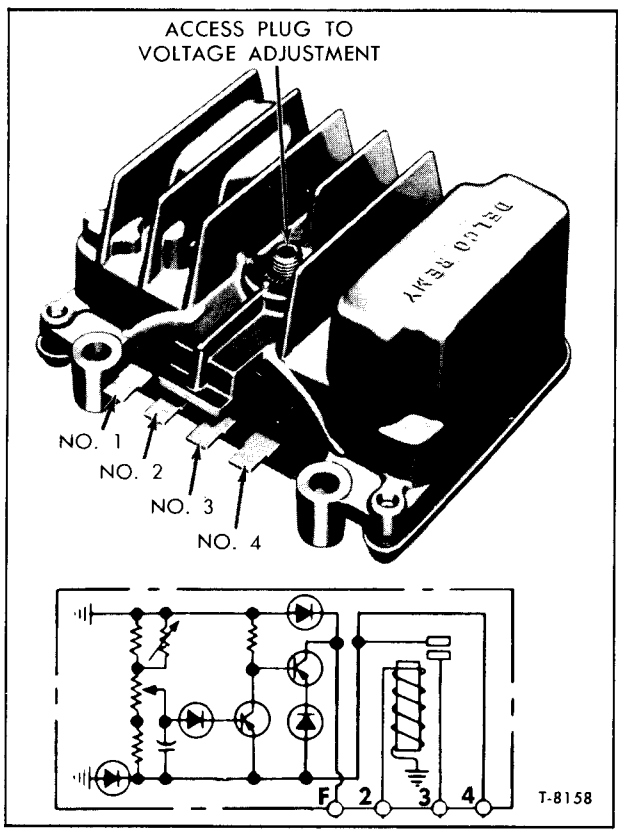


Figure 8—Transistorized Type Regulator (Model 1116374 or 1116378) (Typical)

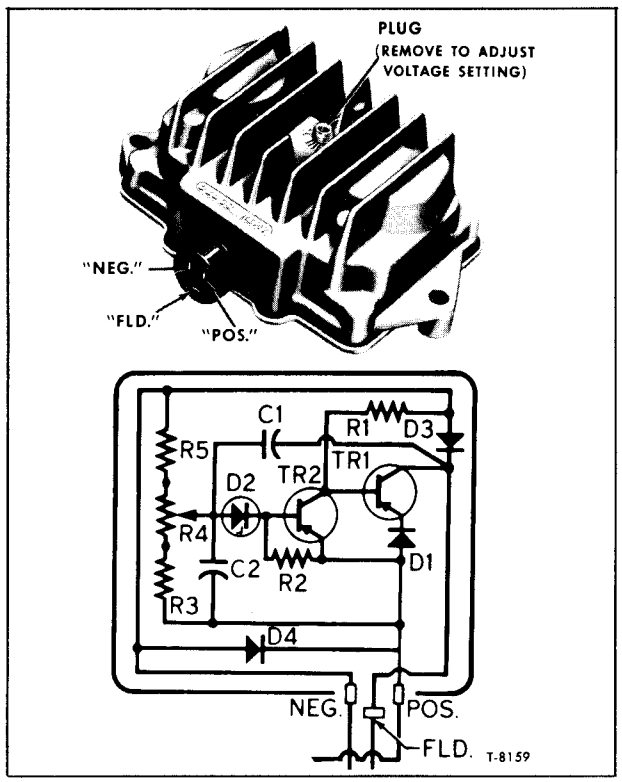


Figure 9—Full Transistor Type Regulator (Model 9000590) (Typical)

tension brush spring holds each brush in contact with the slip ring.

Although generators vary with respect to current output and type of voltage regulation, the operating principles in each system are similar.

The generator is driven from the engine and converts mechanical energy to electrical power. Six rectifier diodes, mounted in the slip ring end frame and heat sink assembly, are connected to the stator windings. These diodes act to change generator "A.C." voltages to a "D.C." voltage which appears at the output "BAT." terminal on the generator.

The regulator controls generator voltage output by varying current flow in field windings in generator rotor assembly. No current regulating device is required in regulator used with the "A.C." generator since the generator has inherent current regulation as long as the voltage is controlled. A cut-out relay is not required with the A.C. generating system as the diodes will not conduct an electrical current in reverse direction; i.e., from battery to ground through the generator.

On 42-, and 61-amp generating systems, voltage is controlled by a vibrating point type regulator (fig. 7). On 62-amp generating systems (except with 1117756 or 1117781 generator), voltage is controlled by a transistorized type regulator (fig. 8). On 62-amp generating systems equipped with the 1117756 or 1117781 generator, voltage is controlled by a full transistor type regulator (fig. 9).

The two-unit double contact regulator assembly (fig. 7) consists of a double contact voltage regulator unit and a field relay unit. The voltage regulator unit uses an upper and lower set of contact points to limit the generator voltage output to a pre-set value.

NOTE: On steel tilt cab models, the field relay unit is used to control the indicator lamp circuit. The relay unit allows the indicator lamp to light (as a bulb check) with the control switch in "IGN" position and engine not running. When the engine is started and the generator begins to charge, the indicator light goes out, indicating that the system is operating normally.

The transistorized type regulator (fig. 8), is an assembly composed principally of transistors, diodes, resistors, a capacitor, and a thermistor to form a completely static voltage regulating unit in combination with a conventional vibrating type field relay.

The transistor is an electrical device which limits the generator voltage to a pre-set value by controlling the generator field current. The diodes,

adjuster one notch counterclockwise, then check for an improved battery condition after a service period of reasonable length.

c. If the regulator cannot be adjusted to a value within the specified range, repair or replace the regulator.

REGULATOR CIRCUIT TEST (WITH 9000590 REGULATOR)

IMPORTANT: Observe the following test procedures in order listed. Improper connections and procedures may instantly damage the equipment.

NOTE: Test adapter (J-21600) may be used to facilitate making test connections at the regulator.

FIELD RELAY CHECK

1. Connect a voltmeter to test adapter as shown in View A, figure 17.

2. Make sure ignition or control switch is in "OFF" position.

3. Observe voltmeter reading.

a. If voltmeter indicates battery voltage, the field relay contacts are stuck closed and the relay must be replaced.

b. If voltmeter reads zero, proceed to Step 4.

4. Connect a jumper lead between field relay No. 1 terminal and No. 3 terminal. Slide test prods into connector body to make connections.

5. Turn ignition or control switch on.

a. If voltmeter reads battery voltage, proceed to "Field Circuit Check" later in this section.

b. If voltmeter reads zero, check for excessive resistance or an open circuit between battery and "BAT" terminal on generator, between battery and No. 3 relay terminal, between No. 1 terminal on relay and "POS" terminal on regulator, or between "NEG" terminal on regulator and ground.

FIELD CIRCUIT CHECK

1. Connect a voltmeter to test adapter (J-21600) as shown in View B, figure 17.

2. Turn ignition or control switch on.

3. If voltmeter reads 1 or 2 volts less than battery voltage, proceed to "Generator Output Check."

4. If voltmeter reads zero, the regulator is defective and must be repaired or replaced.

NOTE: Since the regulator defect may have been caused by a defective generator field, check the field as follows before installing a new regulator.

a. Turn ignition or control switch off and disconnect negative battery cable from battery. Disconnect test adapter from the regulator.

b. Connect an ammeter to the adapter as shown in View C, figure 17.

c. If ohmmeter reads high, there is an open, or excessive resistance in the field winding or in wiring between regulator "FLD" terminal and generator "F1" terminal.

d. If ohmmeter reads low, the winding is shorted or grounded.

NOTE: Since the reading is taken through the adapter, leads, brushes, and slip rings, the ohmmeter reading on a good field winding will be slightly higher than the specified value. This is because the specified value is for an ohmmeter reading directly across the slip rings.

e. Disconnect ohmmeter and connect negative battery cable to the battery.

5. If the voltmeter reads battery voltage, the regulator is shorted and must be replaced or repaired, or the generator field winding is open or grounded.

a. To check the field winding, follow procedures listed in a. through e. under Step 4 above.

b. To check the regulator, connect a voltmeter as shown in View A, figure 17, then start engine and operate at moderate speed. If voltage is uncontrolled and increases with speed to values above the specified setting range, replace or repair the regulator.

GENERATOR OUTPUT CHECK

NOTE: Check generator for specified output as follows:

1. Connect an ammeter in circuit at output "BAT" terminal on the generator.

2. Connect a voltmeter to the adapter as shown in View A, figure 17.

3. Turn on ignition or control switch.

4. Operate generator at specified speed and check for rated output as listed in "Specifications" at end of this section. Load battery with a carbon pile or vehicle accessories (if needed) to obtain rated output. If generator does not produce rated output, repair or replace the generator.

NOTE: After generator is installed on the vehicle, connect an ammeter in circuit at output "BAT" terminal of the generator and check for excessive resistance as follows:

EXCESSIVE RESISTANCE CHECK

NOTE: Excessive resistance in the sensing circuit consisting of leads from No. 1 and No. 3 terminals on the field relay and leads from "NEG" or "POS" terminals on the regulator can cause an overcharged battery. If trouble is *not* battery overcharge, refer to "Voltage Setting Adjustment" later in this section, otherwise proceed as follows:

1. Connect a voltmeter as shown in View D, Part 1 and Part 2 in figure 17.

2. Remove jumper lead from field relay unit, then connect a jumper lead from battery to No. 2 terminal on the relay. Disconnect lead after 60 seconds to prevent overheating.

A. C. GENERATING SYSTEM (NON-INTEGRAL TYPE)

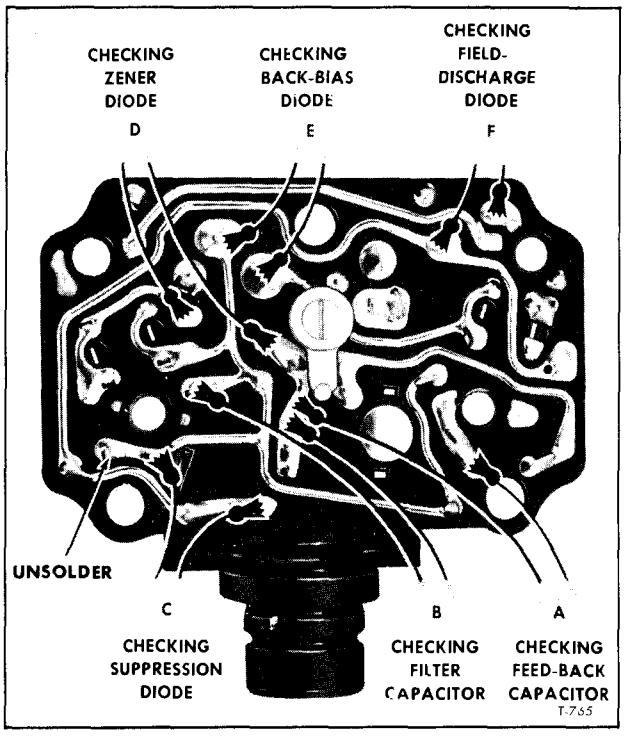


Figure 36—Checking Regulator Circuits

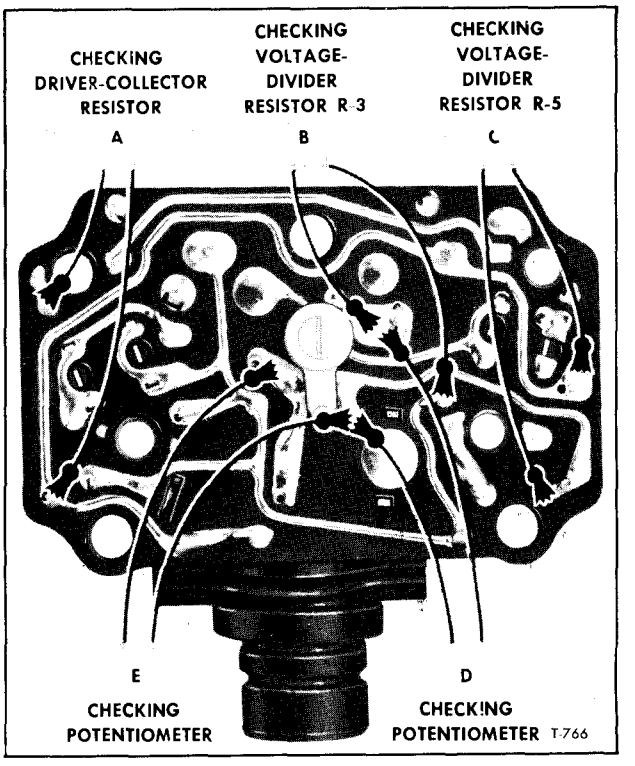


Figure 37—Checking Regulator Circuits

ZENER DIODE (D2),
(PART D, Fig. 36)

Replace the diode if both readings are zero, or if both readings are infinite.

BACK-BIAS DIODE (D1),
(PART E, Fig. 36)

Replace the diode if both readings are zero, if both readings are infinite or identical.

FIELD-DISCHARGE DIODE (D3),
(PART F, Fig. 36)

Replace the diode if both readings are zero, if both readings are infinite, or if both are identical.

DRIVER-COLLECTOR RESISTOR
(PART A, Fig. 37)

If both readings are infinite, the resistor is open.

VOLTAGE-DIVIDER RESISTOR (R3),
(PART B, Fig. 37)

If one reading is infinite or nearly infinite, or if both readings are infinite or nearly infinite, the resistor is open.

VOLTAGE DIVIDER RESISTOR (R5),
(PART C, Fig. 37)

If one reading is infinite or nearly infinite, or if both readings are infinite or nearly infinite, the resistor is open.

POTENTIOMETER
(PARTS D AND E, Fig. 37)

If one reading is infinite or nearly infinite in Part D, the potentiometer is open. If both readings are infinite in Part E, the potentiometer is open.

NOTE: When installing a new potentiometer, mount on panel board and turn the potentiometer adjustment to the middle position. Then, after all tests have been completed and the unit has been assembled as shown in figure 34, connect the regulator to a generator and adjust the potentiometer to 14 volts. With the adjustment lever in a vertical position (fig. 34) use a soldering iron to melt the adjusting lever into the potentiometer.

EMITTER-BASE RESISTOR
(OHMMETER CHECK NOT ILLUSTRATED)

Since the resistor has been unsoldered from the panel board at one end, merely connect an ohmmeter across the resistor - an infinite reading indicates an open. Replace if defective.

DRIVER AND POWER TRANSISTORS
(Refer to Fig. 29)

If both readings in Step 1 are zero, or if both readings are very low and identical, the transistor is shorted. Similarly, if both readings in Step 2, or in Step 3, are zero or very low and identical, the transistor is shorted.

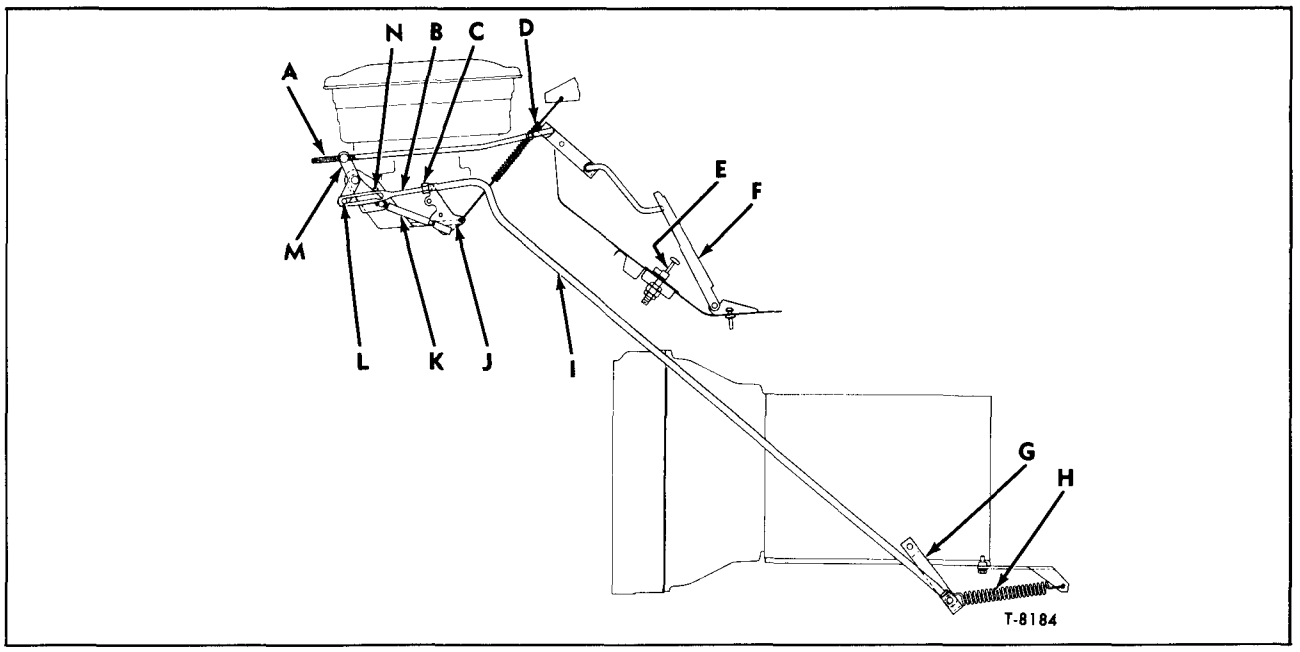


Figure 7—TV Linkage (HM, JM80)

loosening nut (F), then reposition slotted-rod (E) as required. Tighten nut (F) against shoulder of rod (L).

b. To lower shift point, lengthen rod (L) in the same manner as the preceding step.

TV Linkage Adjustment — Gasoline Engine Models, Except RM80 and HM80

IMPORTANT: Be sure engine idle (525 rpm with MT Series transmission) and governed speed are properly adjusted before proceeding. Refer to ENGINE FUEL SYSTEM (SEC. 6M) of the Heavy Duty Truck Service Manual ST135-70 for adjustments. Note the key letters in the following text refers to figures 7 and 8.

1. Apply parking brake and block vehicle's driving wheels.

2. To facilitate installation of TV Linkage Adjustment Gauge (J-23739) disconnect manual range selector linkage at transmission.

3. Disconnect TV rod (I) from TV lever (G). Also, disconnect TV lever return spring (H) from TV lever.

4. Disconnect link assembly (K) from lever (M).

5. With carburetor throttle lever (J) at IDLE position and lever assembly (M) held against stop pin (N), adjust the length of link assembly (K) so that it freely enters lever (M).

6. Disconnect rod (A) from lever assembly (M) and also disconnect throttle return spring (D).

7. Depress accelerator pedal (F) until detent button (E) is compressed (THRU-DETENT). Ample clearance must exist between the pedal and floor to assure complete movement of the TV linkage to the THRU-DETENT position. If necessary, adjustment of the detent button (E) is accomplished by relocating the two jam nuts located on the detent button assembly.

8. With accelerator pedal just touching detent button (E) hold the throttle lever (J) in full throttle position and adjust length of rod assembly (A) for free-entry into lever (M). Connect rod (A) to lever (M).

9. Connect throttle return spring (D).

10. Install gauge (J-23739) as shown in figure 3. Note gauge is installed on manual selector nut.

11. Hold TV lever (G) full counterclockwise against the transmission internal stop. Align the "STOP" line on gauge with forward edge of TV lever. If necessary, reposition gauge on manual selector nut to obtain alignment. Use a mirror if unable to view directly.

12. Move TV lever (G) full clockwise as shown in figure 4. TV lever should be aligned with "THRU-DETENT" line. This step is a check to be sure no internal condition exists in the transmission that would prevent full movement of the TV lever.

NOTE: All MT Series transmissions covered by this supplement are of the Long Stroke design and TV lever travel must be the same as shown in figure 4. Correct any internal transmission condition, if necessary, before proceeding.

13. Reconnect TV rod (I) to transmission TV lever (G).

14. With engine "OFF" and accelerator pedal at "IDLE" position, the forward edge of TV lever should be aligned with the "IDLE" line on gauge as

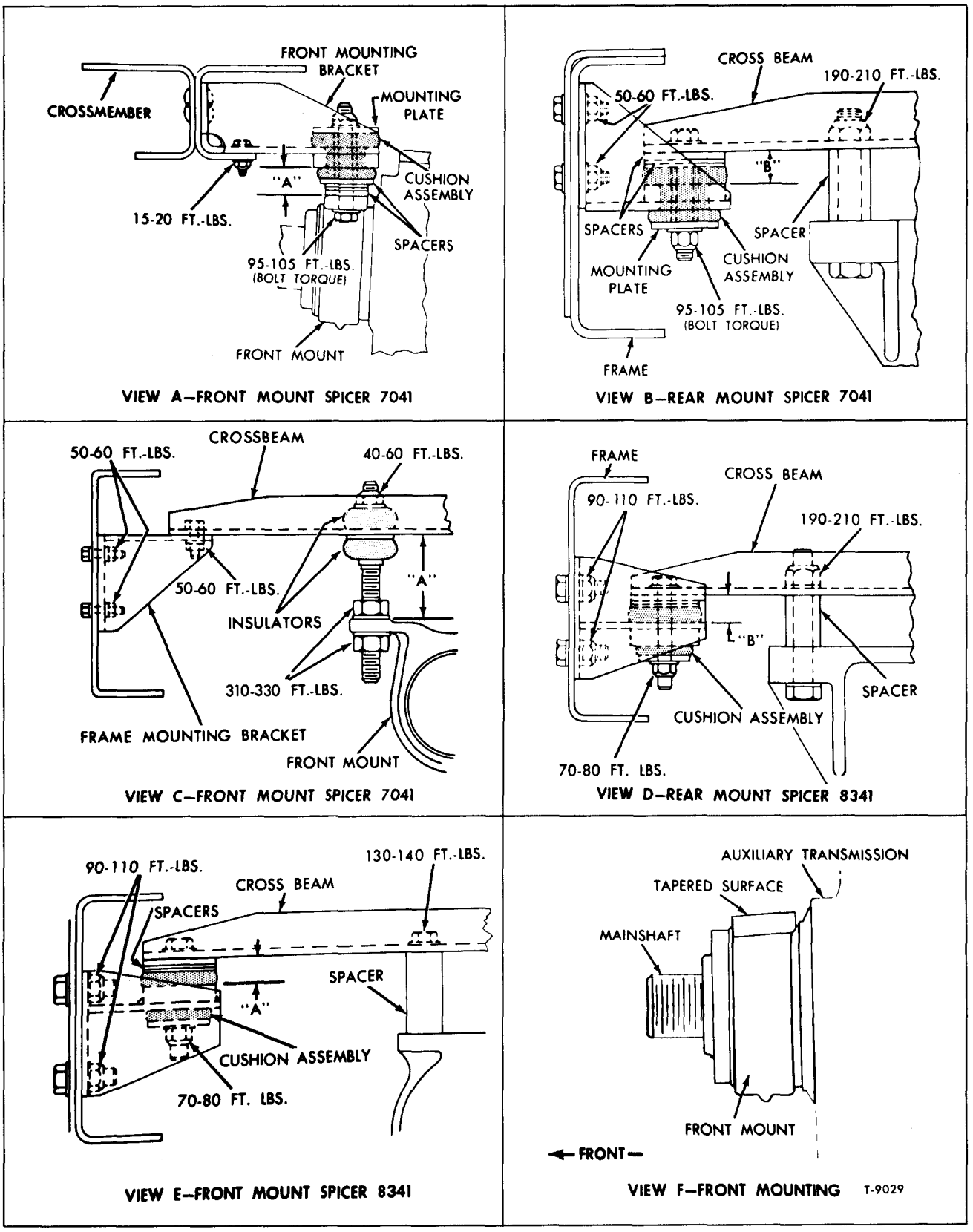


Figure 1—Auxiliary Transmission Mountings

SECTION 8B

Exhaust System

All information in Section 8B of the 1970 Heavy Duty Truck Service Manual ST135-70, starting on page 8-9 is applicable to models covered by this supplement. The following information has been added:

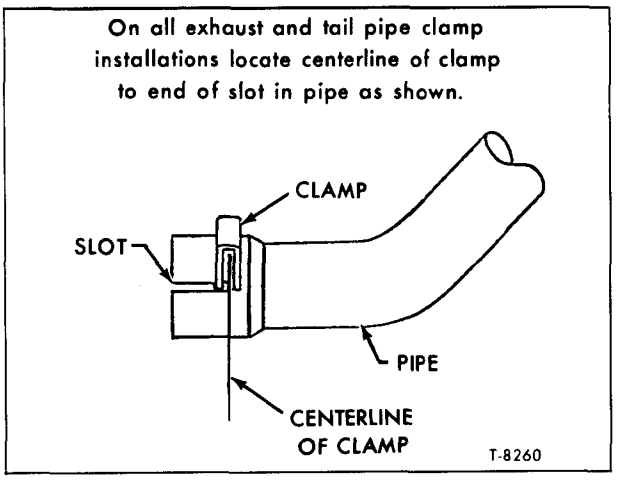


Figure 1—Exhaust Pipe Clamp Installation

EXHAUST SYSTEM ALIGNMENT

During installation of a new exhaust pipe, muffler or tail pipe, care should be taken to properly position components in relation to each other. Particular care should be given to the installation of the exhaust pipe and crossover pipe assembly on "V" engines equipped with single exhaust system.

On all joints except exhaust manifold, apply sealer (GM 9985020) or equivalent, to prevent possible leaks.

Incorrectly assembled parts of exhaust system are frequently the cause of annoying noises and rattles due to improper clearances. Therefore, leave all clamp U-bolts and muffler strap bolts loose temporarily until the entire system has been inspected to determine if there is adequate clearance between exhaust components and frame members. The weight of the exhaust system should be properly distributed on all supporting brackets and hangers. If the load is not properly balanced, reposition pipes at connecting joints to relieve any concentrated loads. After adjusting hangers, aligning pipes, and repositioning muffler, check entire system for adequate clearance and then tighten all clamps, working from front to rear. Start engine and inspect all connections for leakage.

NOTE: When installing exhaust pipe to manifold, always use new packing and nuts. Be sure to clean manifold stud threads with a wire brush before installing new nuts.

The exhaust pipe clamps must be installed over slots in exhaust pipes as shown in figure 1.

NOTE

Exhaust system performance complaints such as excessive back pressure or a malfunctioning gasoline engine exhaust control valve are usually noticeable by their effect on engine performance.

SPECIFICATIONS (CONT.)

POWER STEERING GEAR APPLICATION CHART

TRUCK SERIES	GEAR MODEL	RATIO
HM-JM80, HV-JV70	553-D V-82	28.14 to 1
RM80	568-D V-74	30.51 to 1
TV70	553-D V-94	28.14 to 1
TM-WM80, WV70	553-D V-90	28.14 to 1
HM80	553-D V-86	28.14 to 1
HC-HE-HH-HI-HN-JC-JE-JH-JI-JN-MH 90	553-D V-82	28.14 to 1
DC-DH-DI-DN-FC-FH-FI-FN 90	554-D V-5	28.14 to 1

POWER STEERING POWER CYLINDER

TRUCK SERIES	TYPE OF MOUNTING	RETRACTED LENGTH	EXTENDED LENGTH	STROKE
Conventional Cab Models with F-070; F-090; F-120; F-160 Front Axle	Side	16.680″	25.740″	9 1/16″
Series R-80 with F-090 Front Axle	Axle	17.936″	26.996″	9 1/16″
Series T 70/80				
With F-070 Front Axle	Axle	16.680″	25.740″	9 1/16″
F-090; F-120 Front Axle	Axle	19.806″	30.866″	11 1/16″
Series T/W-70/80/90, D/F90				
With F-090 Front Axle	Axle	17.936″	26.996″	9 1/16″
F-120, F-160 Front Axle	Axle	19.806″	30.866″	11 1/16″

POWER STEERING HYDRAULIC PUMP MODEL APPLICATION CHART

TRUCK SERIES	PUMP MODEL	TYPE PUMP
HM-JM80	235 P 125	VANE
HV-JV70	235 P 36	VANE
RM80	235 P 49	VANE
TV70	235 P 19	VANE
TM-WM80	235 P 48	VANE
WV70	235 P 141	VANE
HM80	235 P 43	VANE
HC-HN-JN-JC90	235 P 137	VANE
HE-JE90	235 P 48	VANE
HH-JH90	VTM 27-60-45-10-MJ-L-1-12	VANE
HI-JI90	235 P 46	VANE
MH90	VTM 27-50-30-10-MJ-L-1-12	VANE
TE90	14-150 100-16	SLIPPER
DC-DH-DN-FC-FH-FN90	235 P 137	VANE
DI-FI90	235 P 132	VANE

drive axles should equal the sum of the circumferences of the 4 tires on the rear of the tandem axles. This precaution is necessary to prevent excessive wear from slippage. If there is a third differential between these two drive axles, disregard this recommendation. Likewise it is to be disregarded for semi-trailer tandem tires because these are on free-rolling wheels.

SYNTHETIC TUBES AND FLAPS

TUBES CHAFED OR PINCHED BY FABRIC BREAKS

Tubes may fail as a result of being chafed or pinched by fabric breaks inside the tire. The direction and shape of the tube injuries have rather closely followed the pattern of the fabric breaks. A tire does not necessarily go flat immediately when a fabric break occurs on the inside of the tire because it may take some time for the injury to chafe completely through the tube.

TUBES DAMAGED BY MISMOUNTED FLAPS

The tube may become chafed by a fold at the edge of the flap. In mounting tires requiring flaps, it is essential that the flaps be properly centered between beads to prevent folds or wrinkles. Flaps which have once become twisted, creased, or folded over at edges, should not be used again.

TUBES AND CASINGS DAMAGED BY FOREIGN MATERIALS IN CASINGS

Any foreign material between the casing and tube will cause a chafing action. In time, one or both will become badly damaged and fail. The result of grit, pebbles, or other hard substances which become embedded in the tube wall, will chafe tube and finally cause failure.

TUBES STRETCHED AND CREASED

When a tube is larger than the inside of the casing it has become stretched and can become creased. Creasing can also happen to a new tube of proper size when incorrectly mounted. If the crease occurs in the flexing area of the tire, the resulting additional thickness of the tube where folded causes a hinging action which cuts the tube and frequently damages the fabric - resulting in a costly failure.

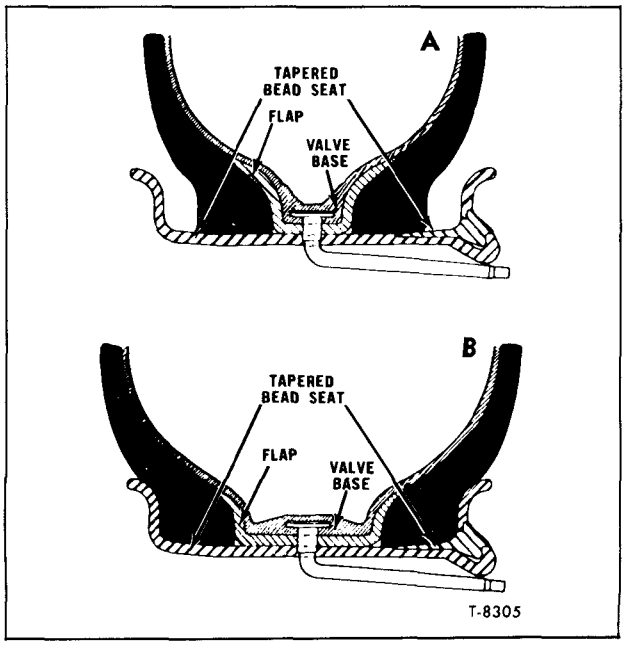


Figure 14—Improper Tube Inflation

CREASES CAUSED BY REMOUNTING USED TUBES

Tubes usually undergo some stretch or growth in service. This is particularly true of truck tubes because of the high temperatures which develop. When a used tube is remounted in a new, or nearly new tire, a folded condition will usually result, and eventually will cause both tube and tire to fail.

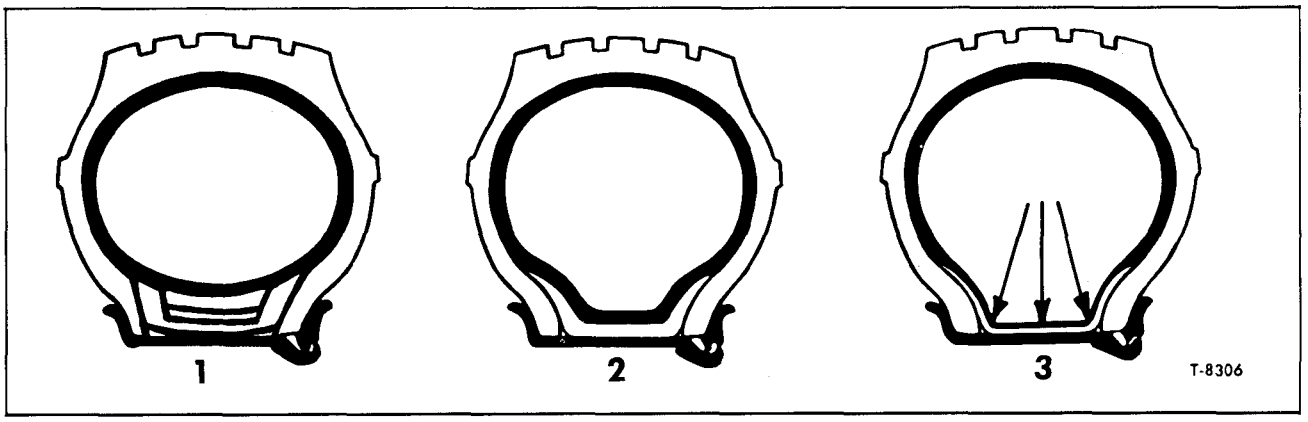


Figure 15—Proper Tube Inflation

SPECIFICATIONS

WHEEL NUT TORQUE

CAST TYPE WHEELS
Tighten nuts as directed in text to:
Front . . . . . 190-210 foot-pounds
Rear . . . . . 190-210 foot-pounds

BUDD TYPE (DISC) WHEELS
Tighten nuts as directed in text to:
Front . . . . . 500-550 foot-pounds
Rear (Inner and Outer Nuts) . . . . . 500-550 foot-pounds*
Aluminum Wheels and/or Hubs . . . . . 450-500 foot-pounds*

CORPORATION TYPE (DISC) WHEELS
Tighten nuts as directed in text to:
Front . . . . . 300-400 foot-pounds
Rear . . . . . 300-400 foot-pounds

* Loosen outer nuts, tighten inner nuts, then tighten outer nuts.

TIRES FOR TRUCKS IN HIGHWAY SERVICE LOAD AND INFLATION TABLE

Tire and Rim Association Standard Tire Loads At Various Inflation Pressures.

TIRES USED AS SINGLES

TIRE IDENTIFICATION		TIRE LOAD LIMITS AT VARIOUS INFLATION PRESSURES										
SIZE	LOAD RANGE	50	55	60	65	70	75	80	85	90	95	100
8.25-20	E	2800	3010	3190	3370	3560	3730	3890	4050			
8.25-20	F	2800	3010	3190	3370	3560	3730	3890	4050	4210	4350	4500
9.00-15	F		2950	3150	3330	3500	3660	3830	3980	4140	4290	
9.00-18	E		3320	3530	3730	3920	4120	4300				
9.00-20	E		3560	3770	4000	4210	4410	4610				
9.00-20	F		3560	3770	4000	4210	4410	4610	4790	4970	5150	
10.00-15	F			3580	3780	3980	4170	4370	4540			
10.00-15	G			3580	3780	3980	4170	4370	4540	4710	4880	5050
10.00-20	F			4290	4530	4770	4990	5220	5430			
10.00-20	G			4290	4530	4770	4990	5220	5430	5640	5840	6040
10.00-22	F			4560	4820	5070	5310	5550	5780			
10.00-22	G			4560	4820	5070	5310	5550	5780	6000	6210	6430
11.00-20	F			4670	4940	5200	5450	5690	5920			
11.00-20	G			4670	4940	5200	5450	5690	5920	6140	6370	6590
11.00-22	F			4960	5240	5520	5790	6040	6290			
11.00-22	G			4960	5240	5520	5790	6040	6290	6530	6770	7000
11.00-24	F			5270	5570	5860	6140	6420	6680			
12.00-20	G				5620	5920	6200	6480	6740	7000		
12.00-24	G				6330	6660	6980	7280	7580	7880		

NOTE: Underlined Figures Indicate Maximum Recommended Load.

R. H. CHASSIS JUNCTION BLOCK (STEEL TILT CAB MODELS) (SYMBOL ⬡) (CONT'D.)

Terminal No.	Circuit	Wire Size	Color Code
7	ELECTRIC TWO-SPEED AXLE		
	From Line Connector From Axle Shift Switch "LO"	14	Blk.
	To Speedometer Adapter	16	Blk.
	ALLISON TRANSMISSION OIL TEMPERATURE SWITCH		
	From Bolted Connection From Control Switch "G1"	16	Blk.
	To Transmission Oil Temperature Switch	16	Blk.
8	L.H. DIRECTIONAL LAMP (TRAILER)		
	From Spliced Connection From 8-Way Connector From Directional and Hazard Warning Switch	14	Yell.
	To 6-Post Junction #2 Junction	12	Yell.
9	R.H. DIRECTIONAL LAMP (TRAILER)		
	From Spliced Connection From 8-Way Connector From Directional and Hazard Warning Switch	14	Dk. Grn.
	To 6-Post Junction Block #3 Junction	12	Dk. Grn.
10	HOT ENGINE SWITCH		
	From Engine Alarm Buzzer	18	Dk. Grn.-Wht.Str.
	To Hot Engine Switch	16	Blk.
11	LOW OIL SWITCH - ENGINE ALARM		
	From Engine Alarm Buzzer	18	Blk.-Yell.Str.
	To Low Oil Switch	16	Blk.
12	BACK-UP LAMP		
	From 20-Amp. Stop & Back-up Lamp Fuse on Fuse Block	14	Orn.
	From 4-Way Connector From Allison Transmission Control "REV"	16	Blk.
	To Back-up Lamp Switch	16	Blk.
	To Emergency Park Brake Stop Light Switch	14	Blk.

TRAILER WIRING HARNESS TO TRAILER CABLE 6-TERMINAL POST JUNCTION BLOCK (STEEL TILT CAB MODELS) (SYMBOL ◯)

Terminal No.	Circuit	Wire Size	Color Code
1	TAIL LAMPS - TRAILER		
	From L.H. Junction Block #1 Junction	12	Brn.
	To 6-Wire Semi-Trailer Plug	14	Brn.
	To 7-Wire Semi-Trailer Plug	12	Brn.
2	L.H. DIRECTIONAL LAMP - TRAILER		
	From R.H. Junction Block #8 Junction	12	Yell.
	To 6-Wire Semi-Trailer Plug	14	Yell.
	To 7-Wire Semi-Trailer Plug	12	Yell.
3	R.H. DIRECTIONAL LAMP - TRAILER		
	From R.H. Junction Block #9 Junction	12	Dk. Grn.
	To 6-Wire Semi-Trailer Plug	14	Grn.
	To 7-Wire Semi-Trailer Plug	12	Grn.
4	STOP LAMPS - TRAILER		
	From L.H. Junction Block #4 Junction	12	Red
	To 6-Wire Semi-Trailer Plug	14	Red
	To 7-Wire Semi-Trailer Plug	12	Red
5	TRAILER I.C.C. MARKER LIGHTS		
	From R.H. Junction Block #5 Junction	12	Blk.
	To 6-Wire Semi-Trailer Plug	14	Blk.
	To 7-Wire Semi-Trailer Plug	12	Blk.
6	SPARE		
	From R.H. Junction Block #6 Junction	12	Dk. Blue
	To 7-Wire Semi-Trailer Plug	12	Blue

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A forward junction panel shown in figure 4 is located at left of driver and a rear junction panel shown in figure 5 is located at right rear of vehicle.

A 6-terminal post junction block is located on the rear junction panel and a 16-terminal post junction panel is located on the front electrical equipment and circuit breaker panel.

Terminal numbers on the junction panel correspond to numbers shown on wiring diagrams and in the tabulations which follow. The tabulations list each terminal number, the circuit it carries, and the size, color, and pattern of the wire which connects to each terminal.

AUXILIARY LAMPS (ALL WEATHER)

Auxiliary all weather lamps, available as optional equipment on some vehicles, are used to provide increased illumination. The lamps, which are mounted at lower front of vehicle are controlled by a toggle-type switch mounted on the light switch and heater control panel. Refer to "Light Bulb Data" at end of this section for sealed-beam unit type and trade number.

PARKING LIGHTS

Parking lights (when used) are an integral part of the directional light assembly. The parking lights are illuminated when the main light switch knob is pulled out to the first detent position. The parking light circuit is protected by an automatic reset type circuit breaker built into the main light switch.

BULB REPLACEMENT

NOTE: Refer to "Light Bulb Data" at end of this section for bulb size and type.

Remove screws which attach directional lamp lens to housing, then remove the lens. Press inward on bulb and turn counterclockwise to release from socket. Press new bulb into socket and turn clockwise to secure. Replace gasket if damaged, then position lens on lamp housing and attach with screws.

CAB FRONT MARKER AND IDENTIFICATION LIGHTS

Front marker and identification lights are mounted across front top of cab. On conventional cab and Series 70 through 90 tilt cab models, the light circuit is energized by a separate marker lamp switch fed from the main light switch when light switch is in "ON" position. On Series 90 tilt cab models, the light circuit is energized by a separate marker lamp switch fed from the 20-amp No. 5 circuit breaker in the console compartment.

Bulbs are accessible for replacement after removing screws which attach lamp lens to housing, then removing the lens.

DIRECTIONAL AND HAZARD WARNING LIGHTS

Information applicable to "Directional Signal Lights" and the "Hazard Warning System" remains the same as covered under "Lighting System" pages 12-29 and 12-30 in CHASSIS ELECTRICAL AND INSTRUMENTS (SEC. 12) in Service Manual ST135-70 except as follows:

NOTE: When checking electrical circuits, refer to applicable wiring diagram in "Wiring Diagrams" in (SEC. 12) of Service Manual ST135-70 for wiring arrangement.

On Series HC/HH/JC/JH90 and Series 90 tilt cab models, an arrow at either side of the telltale cluster flashes when the left or right signal light is illuminated. When turn is completed, the switch must be returned to the neutral "OFF" position to cancel the lights.

On Series HC/HH/JC/JH90 and Series 90 tilt cab models, the hazard warning switch lever is located on the directional signal switch housing below the turn signal lever. Pull hazard warning switch lever out to activate the system. To cancel or "turn-off" the lights, move directional signal switch lever up or down. The hazard warning signal lever is spring-loaded and will cancel the hazard warning lights when released by movement of the directional signal switch lever.

If switch becomes inoperative, check for a blown fuse, defective circuit breaker, or a weak flasher. If this fails to correct the condition, replace the hazard warning or directional signal switch.

DIRECTIONAL SIGNAL CONTROL ASSEMBLY (EXCEPT ALUMINUM TILT CAB MODELS)

Information applicable to the directional signal control assembly remains the same as covered on pages 12-32 and 12-33 in CHASSIS ELECTRICAL and INSTRUMENTS (SEC. 12) in Service Manual ST135-70, except the directional signal wiring harness connector used on conventional cab models has been revised to conform with the wiring harness connector used on series 70-90 tilt cab models.