CLARK EQUIPMENT INDUSTRIAL TRUCK DIVISION CLARK EQUIPMENT

OPERATORS MANUAL

CH60, CH70, CH80

CHY60, CHY70, CHY80

CF60, CF70, CF80

CFY60, CFY70, CFY80

2nd REVISION

BOOK NO. O-131-1

CLARK EQUIPMENT COMPANY

PUBLISHED BY

TECHNICAL SERVICE DEPARTMENT,
BATTLE CREEK, MICHIGAN, U.S.A.

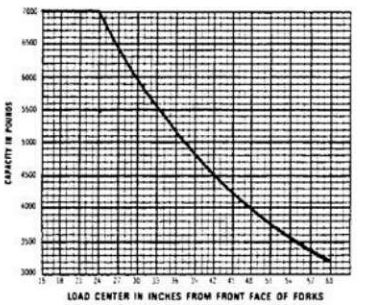
INDUSTRIAL TRUCK DIVISION

S P E C I F I C A T I O N S

CLARKLIFT® DIMENSIONAL SPECIFICATIONS

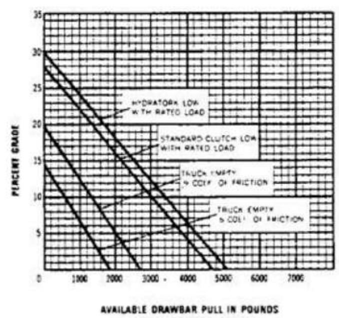
C-70 CF-70

CAPACITY CHART



RATED CAPACITIES SHOWN ABOVE ARE COMPUTED WITH UPRIGHTS IN VERTICAL POSITION
THEY APPLY ONLY ON MAXIMUM FORK HEIGHTS UP TO AND INCLUDING 154"

GRADE & DRAWBAR PULL CHART



EMPTY TRUCK GRADES ARE WITH EITHER TRANSMISSION.

UPRIGHT DIMENSIONAL TABLE

Max. Fork Ht. Std. Hi-Lo	Max. Fork Ht. TSU	Over-all Height Lowered	Free Lift Std.	Free Lift Hi-Lo	Free Lift TSU
75	—	59	19½	35¾	—
81	—	62	19½	38¾	—
87	—	65	19½	41¾	—
93	126	68	19½	44¾	17½
* 99	135	71	19½	47¾	17½
105	*144	74	19½	50¾	17½
111	153	77	19½	53¾	17½
117	162	80	19½	56¾	17½
*123	171	83	19½	59¾	17½
129	*180	86	19½	62¾	17½
135	189	89	19½	65¾	15½
141	198	** 92	19½	68¾	17½
*147	207	** 95	17½	71¾	15½
153	*216	** 99	19½	75¾	17½
159	225	**102	19½	78¾	15½
165	234	**106	19½	82¾	17½
*171	243	**109	19½	85¾	15½
177	—	112	17½	88¾	—
183	—	116	19½	92¾	—
189	—	119	19½	95¾	—
195	—	123	19½	99¾	—
201	—	126	19½	102¾	—

*Preferred standard heights.

**Add 1" for triple stage upright.

For overall height raised add 24¼" to maximum fork height.

ENGINEERING SPECIFICATIONS

MODEL C(F) 70 Weight .... 10,480 lbs. standard

WEIGHT DISTRIBUTION AND CAPACITY Percent on drive wheels, truck empty: 38%
Rated capacity .... 7,000 lbs. at 24" load center
Alternate ratings .... 5,900 lbs. at 30" load center
5,150 lbs. at 36" load center
(See capacity chart for other ratings)

DIMENSIONS AND UNDERCLEARANCES *Dimensions*
Length (to face of forks) .... 96⅛"
Wheelbase .... 58"
Width (drive tires) .... 44"
Tread (drive) ...... 35"
Tread (steer) .... 35½"
Turning radius .. 87½"
Basic aisle for right angle stacking (add load length) .... 102⅞"
Underclearances
Upright .... 3⁷⁄₁₆"
Drive axle .... 5⅛"
Steer axle .... 3¾"
Center of frame .. 5⅛"
Counterweight .... 4"

SPEEDS AND GRADES Travel speeds with rated load C 70 CF 70
10.5 mph 10.7 mph
Gradeability with rated load ... 29.5% 27.5%

	STANDARD Loaded	STANDARD Empty	HI-LO Loaded	HI-LO Empty
Lift speed	71	78	65	72
Lowering speed	60	80	60	65

ENGINE Industrial Continental Red Seal, 6 cylinder, L-head, equipped with stellite-faced valves; seats, positive valve rotators. Connecting rods, main bearings, cam shaft and timing gears are pressure lubricated by submerged gear type pump. Mechanical governor controls engine speed accurately without choking off power. Updraft carburetor.
Model F-209
Bore .... 3⁵⁄₁₆"
Stroke .... 4⅜"
Displacement — cubic inches 209
Crankcase capacity — quarts 5
Governed rpm with rated load 2250
Horsepower at governed rpm 65
Max. torque — lb. ft. 157
Fuel tank capacity — gals. 10.5
Note: LP Gas adaptation optional at extra cost.

ENGINE FILTERS Three types. (1) Fuel filter in metallic bowl. (2) One quart oil filter with automotive-type replaceable cartridge. (3) Dry type in-take air filter that uses a replaceable pleated paper cartridge with minute 5-micron openings.

ELECTRICAL SYSTEM 12-volt, 60 amp-hour battery. 25 amp. low cut-in generator charges at idle. Other features include enclosed electric starter motor with positive engagement and electrical cut-out; weather-shielded key starting switch; dust-proof distributor; electric horn. Multiple-disconnect plug to instrument panel simplifies servicing.

INSTRUMENTS Direct reading engine hour meter, ammeter, engine-oil pressure, fuel and temperature gauges, all mounted in cowl for easy reading.

DRIVE AXLE AND TRANSMISSION Integral assembly with 3-point mounting including engine, torque converter, transmission, spiral bevel pinion and ring gear, differential and full floating drive axle assembly. Axle housing, not drive shaft, carries weight of truck. Final gear reduction is made through fully enclosed pinion and ring gear at drive wheels.

HYDRATORK® DRIVE, STANDARD 2-speed power shifted transmission has torque converter which multiplies engine torque without shock on drive shaft and gears. Transmission oil is cooled thru cooler in bottom radiator tank and is a filtered system with replaceable type cartridge. The forward and reverse gears and high and low range gears are in constant mesh. Direction selector lever for left-hand finger-tip control on steering column.

HYDRAULIC INCHING In close quarters the "free pedal" portion of either the left or right foot inching-brake pedal, hydraulically actuates inching valve permitting power to be gradually disengaged from drive wheels, even when engine is running at top speed for fast lifting.

FRICTION CLUTCH TRANSMISSION, OPTIONAL "Quick Change" 12" diameter single disc, dry plate clutch capacity of 300 lb. ft. of torque, controlled by low effort automotive type pedal. Two shift levers mounted on the steering column control the 3-speed synchronized transmission in either direction.

INDUSTRIAL TRUCK DIVISION

SPECIFICATIONS

DISTRIBUTOR (All FOUR and SIX Cylinder Engines)

N O T E

Distributors are equipped with either Standard or Heavy Duty Points. Heavy Duty Points are thicker (have more contact material) than Standard Points.

Heavy Duty Points - All FOUR Cylinder Engines
Set Dwell Angle at.....31° - 34°

Heavy Duty Points - All SIX Cylinder Engines
Set Dwell Angle at.....22° - 26°

Heavy Duty Points

When connecting leads, terminals must be back to back (flat sides together). Push into slot between insulator and spring. (DO NOT push lever spring.) Then push other terminal in place between first terminal and insulator. See following illustration.

WHEN CONNECTING LEADS, THE TERMINALS MUST BE BACK TO BACK (flat sides together).....

- FOUR (4) CYLINDER ENGINES, ONLY -

Point Opening (in.)	Dwell Angle (deg.)	Centrifugal Advance							
		START		INTERMEDIATE		INTERMEDIATE		MAXIMUM	
		Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.
.022*	31-34	600	1-5	800	6-10	1600	11-15	2200	15-19
.021**	31-34	600	1-5	800	6-10	1600	11-15	2200	15-19

- SIX (6) CYLINDER ENGINES, ONLY -

Point Opening (in.)	Dwell Angle (deg.)	Centrifugal Advance							
		START		INTERMEDIATE		INTERMEDIATE		MAXIMUM	
		Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.	Eng.rpm.	Eng.adv.
.020*	28-32	600	1-5	800	6-10	1600	11-15	2200	15-19
.021**	22-26	600	1-5	800	6-10	1600	11-15	2200	15-19

N O T E

Time engine with timing light and tachometer at 400 engine RPM or below to the above specifications. The initial advance RPM range is 430 - 580. Distributor advance at 600 engine RPM should be 1° to 5°. Distributor rotation (as viewed from cap end) is counterclockwise.

When checking Distributor on a test stand, the above specifications are 1/2 that shown.

*..... Four (4) or Six (6) Cylinder Engine STANDARD Points.
**..... Four (4) or Six (6) Cylinder Engine HEAVY DUTY Points.

Plate 6418. Ignition Switch

STARTING

Place all transmission control levers in neutral position. Pull out on choke button and turn ignition switch key. The starter is engaged when the key is turned to start position.

CAUTION

DO NOT ENGAGE THE STARTER LONGER THAN 15 SECONDS WITHOUT A MINUTE OR SO INTERVAL BETWEEN TRIALS.

If the engine becomes overchoked or flooded; push choke button in, depress accelerator pedal fully and engage starter. If all necessary equipment is in correct working order, the engine will start.

After engine has started, make certain that the oil pressure indicator registers adequate pressure. If an abnormal reading is indicated, stop engine and correct the difficulty.

NOTE

RUN ENGINE A FEW MINUTES TO WARM OIL, BEFORE PUTTING MACHINE TO WORK ESPECIALLY IN COLD OPERATING CONDITIONS.

TO OPERATE MACHINE

1. Place transmission levers in neutral position and start engine.

2. Release hand brake and depress clutch pedal. Position shift levers for desired speed and direction.

3. Release clutch pedal slowly and at the same time accelerate as required.

4. Travel with the forks only high enough to clear any floor obstructions.

CAUTION

DO NOT ALLOW FOOT TO REST ON CLUTCH PEDAL WHILE DRIVING FROM POINT TO POINT. RIDING THE CLUTCH PEDAL WILL CAUSE SLIPPAGE OF THE DRIVEN DISC RESULTING IN UNNECESSARY WEAR OR DAMAGE TO THE CLUTCH COMPONENTS.

TO STOP MACHINE

Remove foot from accelerator pedal and depress clutch and brake pedal. If machine is to be parked, place transmission control levers in neutral position, apply hand brake and shut off engine.

CAUTION

IF THE ENGINE HAS BEEN OPERATING AT OR NEAR FULL LOAD, IT SHOULD BE ALLOWED TO RUN AT FAST IDLE (600 to 800 R.P.M.) FOR ONE OR TWO MINUTES AFTER LOAD IS REMOVED BEFORE BEING STOPPED. THIS ALLOWS INTERNAL ENGINE TEMPERATURES TO EQUALIZE.

Engine Crankcase

Before attempting to start the engine...make sure the crankcase has sufficient oil.

N O T E

The oil filler pipe is located on the right side of the engine.

The oil level dipstick is also located on the right side of the engine.

Fill the crankcase reservoir through the filler pipe... check oil for proper level as indicated on the crankcase dipstick.

C A U T I O N

NEVER PERMIT OIL LEVEL TO FALL BELOW THE LOW LEVEL MARK ON THE CRANKCASE DIPSTICK.

Do not overfill the crankcase..too much oil will bring the level high enough for the connecting rods to dip, thus causing excessive quantities of oil to be thrown to the cylinder walls resulting in oil consumption, smoking, excessive carbon deposits and fouled spark plugs.

N O T E

On L.P. Gas machines...use a non-detergent oil during break-in periods.

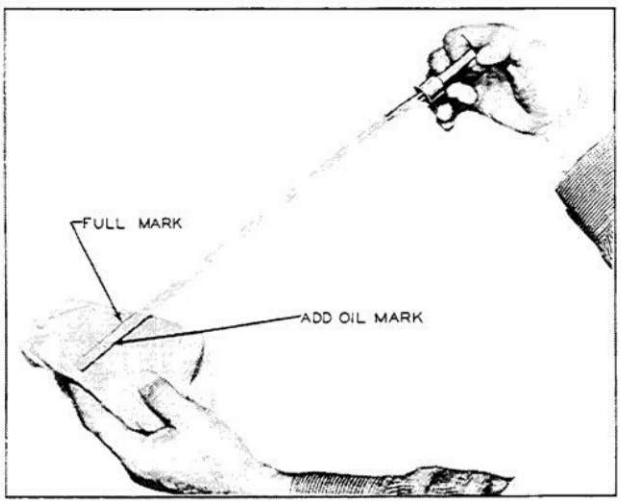


Plate 3145. Check Crankcase with Dipstick

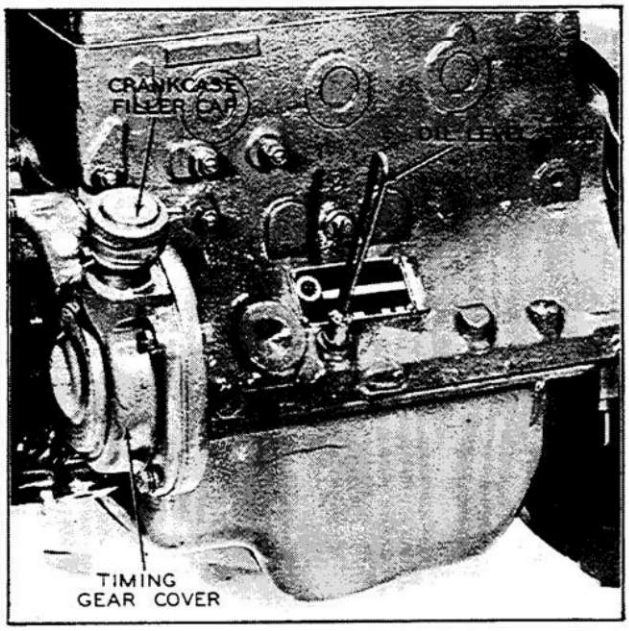


Plate 6629. Crankcase...location of Fill Cap and Oil Level Dipstick.

LUBRICATING OIL RECOMMENDATIONS

Crankcase Capacity..Refer to Specifications

SERVICE "MS"

S.A.E.	10W	0 deg	to	32 deg F.
S.A.E.	20W	32 deg	to	75 deg F.
S.A.E.	30	above	75	deg F.

Low Temperature Operation

Multi-viscosity oil should be used only where starting conditions make it necessary. The oil supplier should assume full responsibility for satisfactory performance of the multi-viscosity oil at both low and normal engine operating temperatures.

Service Conditions

Oil performance will reflect engine load, temperature, fuel quality, atmospheric dirt, moisture and maintenance. Where oil performance problems arise or are anticipated...the oil supplier should be consulted. When extended drain periods are contemplated, his analysis or that of a reputable laboratory should determine the suitability of oil for further service.

N O T E

Refer to Diesel engine manual for machines so equipped.

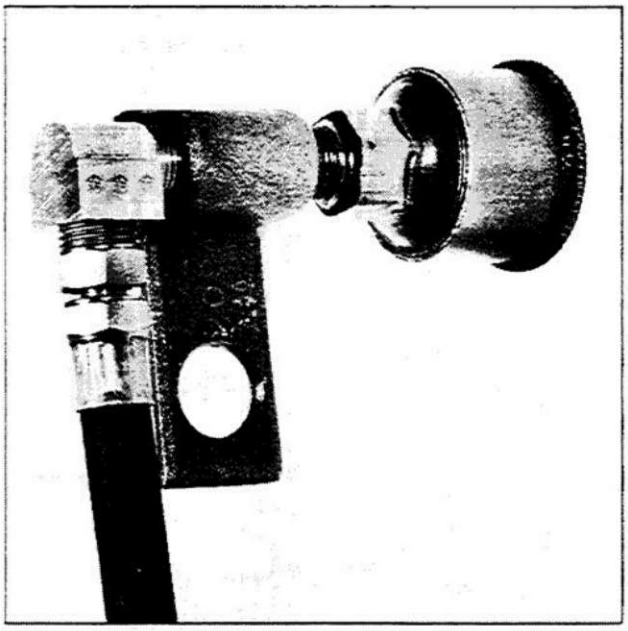


Plate 7398. Clutch Release Bearing Grease Cup

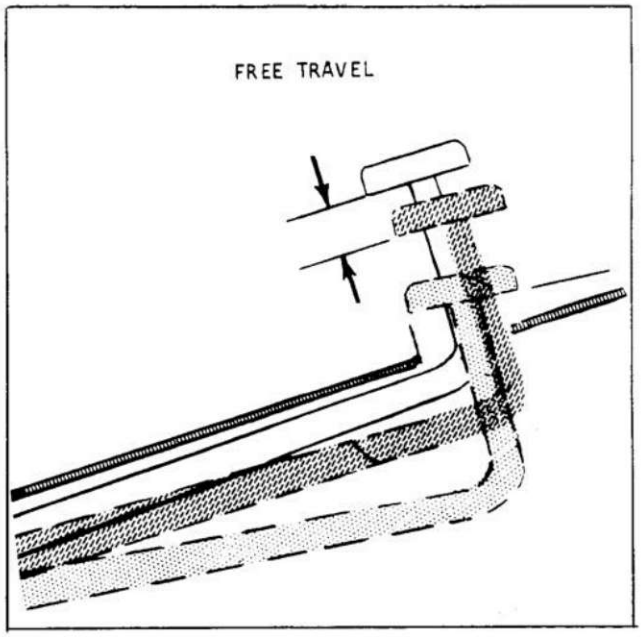


Plate 7048. Clutch Pedal Free Travel Check

CLUTCH RELEASE BEARING LUBRICATION:

Rotate cup one complete turn every 8 operating hours.

Keep grease cup filled with clutch release bearing high temperature grease. Use NLGI #2 (Amolith grease EP #2 or its equivalent)

CLUTCH PEDAL FREE TRAVEL. Depress clutch pedal from the top position to a point where it meets resistance. This free travel should be approximately 5/8 to 1" inches from top pedal position.

LIFT AND TILT CYLINDERS

Check for drift, leakage at packings, damage and security of mountings (Anchor Pivot Pins, Flanges and Mounting Rings).

LIFT CHAINS

The lift chains are mounted to the chain anchors on the lift carriage and at the chain anchor rods near the lift cylinder piston head.

If it becomes necessary to adjust the lift chains place a capacity load on forks (or device if used) and adjust chains so center line of lower carriage roller is at least 1/2" above the bottom end of the innerslide channel. It is important that the chain adjustment be made with a capacity load. In this manner you will allow for chain stretch.

W A R N I N G

KEEP CLEAR OF LOAD DURING ADJUSTMENT TO AVOID INJURY IF ANY MALFUNCTION SHOULD OCCUR AND CAUSE LOAD TO FALL.

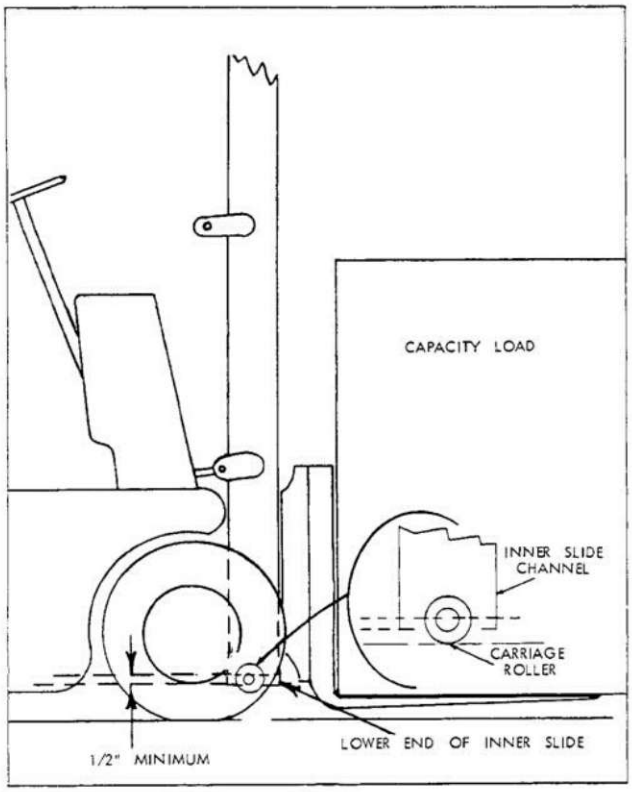


Plate 6884. Lift Chain Adjustment (Place Maximum Load On Forks)

LUBRICATE MACHINE

C A U T I O N

WHEN LUBRICATING THE TRUCK, MAKE A VISUAL INSPECTION OF ALL HYDRAULIC LINES, FITTINGS AND ALL ELECTRICAL WIRING. LUBRICATE ALL MISCELLANEOUS LINKAGE WITH S.A.E. NUMBER 20 OIL.

HYDRAULIC CONTROL VALVE AND LINES

Inspect for damage, leakage and security of mounting.

LIFT BRACKET

Inspect for damage, bent forks etc.

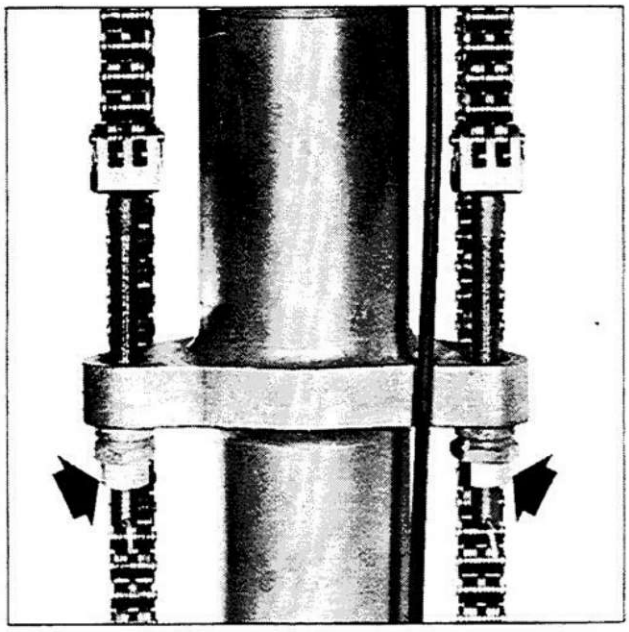


Plate 6634. Lift Chain Adjustment (Chain Anchor Rods)

HYDRAULIC SUMP TANK AND SUMP OIL FILTER

C A U T I O N

THE HYDRAULIC SYSTEM MUST BE KEPT CLEAN. IT MAY BE NECESSARY TO DRAIN, CLEAN AND REFILL THE SUMP TANK MORE OFTEN UNDER ADVERSE CONDITIONS. THIS IS BEST DETERMINED BY CHECKING CONDITION OF THE HYDRAULIC FLUID FOR EVIDENCE OF DIRT, SLUDGE OR ANY FOREIGN MATTER AT PERIODIC INTERVALS.

1. Lower upright. Shut engine off.

2. Place a large container underneath the sump tank which is located at the right side of machine.

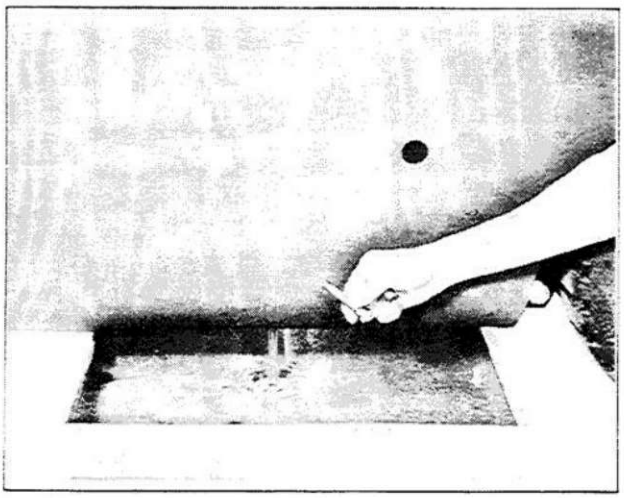


Plate 5359. Draining Sump Tank

3. Remove sump tank drain plug, located at bottom of tank, and allow the fluid to drain. Replace drain plug.

C A U T I O N

DO NOT START ENGINE WHILE SUMP TANK IS EMPTY AS DAMAGE TO THE HYDRAULIC PUMP WILL RESULT.

4. Remove Filter and Clean Sump Tank:

a. Disconnect hose and remove filter retainer bolts.

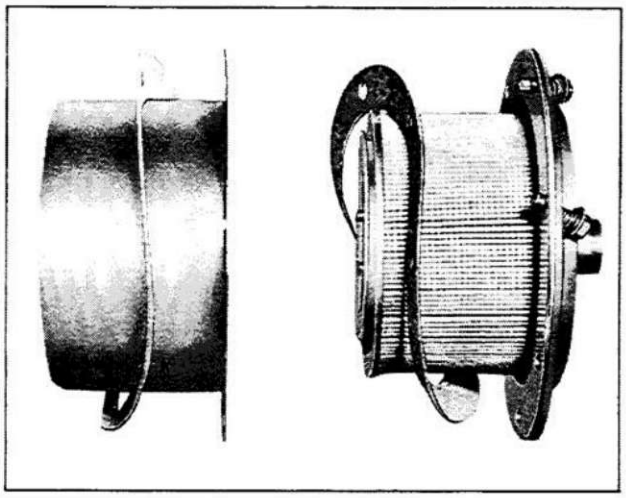


Plate 5274. Sump Tank Oil Filter Components

b. Pull filter assembly out of sump tank.

c. Remove any remaining gasket material from mounting flange.

d. Before installing a new filter and gasket, be sure sump tank is absolutely clean. Flush sump tank with two quarts of clean hydraulic oil.

N O T E

THE FILTER ATTACHING BOLTS SHOULD BE TIGHTENED TO 40 to 50 INCH POUNDS. IF THIS TORQUE IS EXCEEDED, DISTORTION MAY OCCUR, CAUSING LEAKAGE.

f. Install hose and tighten hose connections.

5. Fill sump tank with MS 68 Hydraulic fluid until level reaches the bottom of the fill pipe.

C A U T I O N

START ENGINE AND OPERATE HYDRAULIC CONTROL LEVERS SEVERAL TIMES, CHECK OIL FILTER FOR LEAKS, RECHECK OIL LEVEL AND FILL TO BOTTOM OF FILL PIPE IF NECESSARY.

7. COMPRESSION TEST

a. Test battery for full charge (specific gravity 1.280 temperature of 24°C (75° F). If battery is not fully charged, replace with fully charged battery.

b. Start engine and allow it to warm up until normal operating temperature is reached.

c. Turn off ignition.

d. Remove spark plug cables from spark plugs and remove spark plugs from cylinder head. Examine spark plugs for carbon deposits, defective insulation and general serviceability. All carbon or lead deposits must be removed from the insulation shell and electrodes. This can be done on a sand blast cleaner. Carbon deposits should be removed from the plug threads with a stiff brush. After cleaning, inspect plugs carefully for cracked or broken insulator, badly pitted electrodes or other signs of failure.

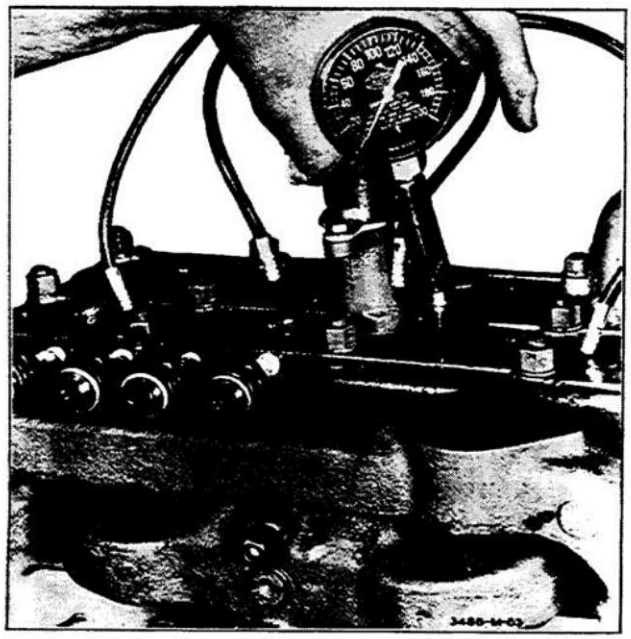


Plate 3486. Compression Test

e. With all plugs removed, install compression gauge in front spark plug port. Operate starting motor until maximum reading on gauge is obtained, see Plate 3486. Record gauge reading. Repeat this operation on each remaining cylinder.

f. If readings are reasonably high (110 to 120) pounds and the readings do not vary more than about 10 pounds between cylinders, compression may be considered normal. Excessively low readings or readings that vary more than 10 pounds between cylinders indicate internal trouble to be corrected after further examination and testing.

g. Set the spark plug gap as specified, by bending side electrode only. The gap should be checked with a wire feeler gauge rather than a flat type gauge as it is better suited for this purpose.

h. Spark Plug Specifications:

Standard Type	-	.025" Gap
Resistor Type	-	.035" Gap

i. Replace spark plugs using new gaskets. Always replace spark plug gasket whenever a spark plug is removed from the engine. Before installing plugs, be sure that the spark plug seat in the cylinder head is clean and free from obstructions. The spark plug should be screwed into cylinder head (using a socket of proper size) sufficiently tight to fully compress the gasket. This is most important as a large percentage of troubles due to overheated spark plugs are caused by plugs being too loose in the cylinder head. Conversely, excessive tightening may change the gap between the electrodes or crack the insulator.

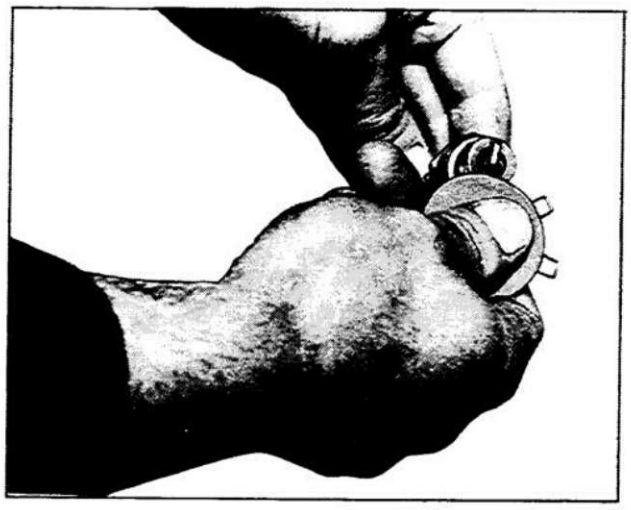


Plate 3278. Check Spark Plug Gap

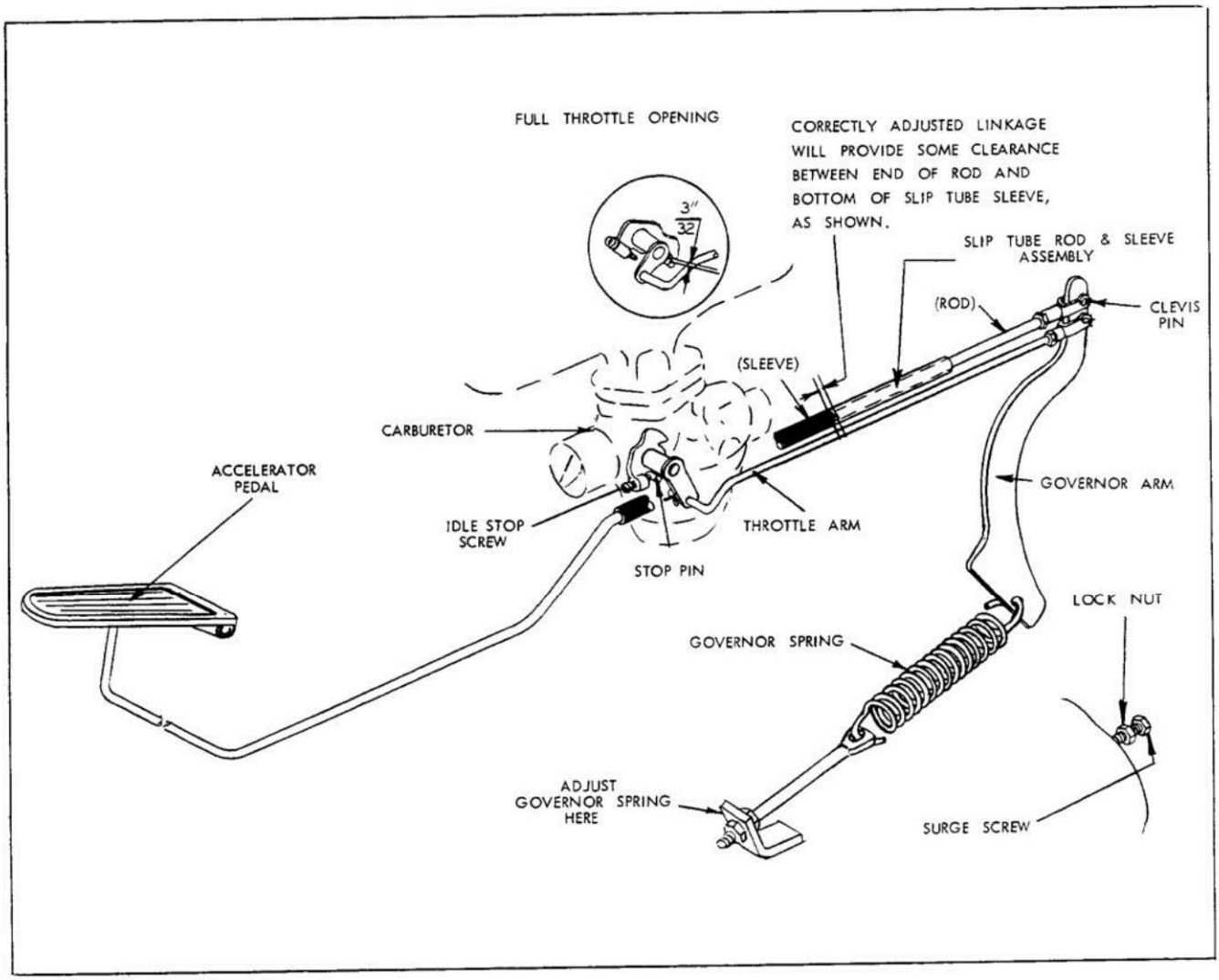


Plate 6660. Governor Adjustment

11. GOVERNOR ADJUSTMENT

With timing set on top dead center, and the carburetor properly adjusted to idle at 500 R.P.M., proceed with the following:

A. Loosen Governor Surge Screw Jam Nut and back Surge Screw out.

B. Disconnect Slip Tube Rod from Governor Arm by removing Clevis Pin.

N O T E

REMOVE CLEVIS PIN --- DO NOT LOOSEN CLEVIS JAM NUT.

C. Pull rod from Slip Tube Sleeve and thoroughly clean rod and sleeve. Lubricate rod with Graphite Grease after cleaning.

N O T E

THE SLIP TUBE ROD AND SLEEVE ASSEMBLY CANNOT FUNCTION PROPERLY IF IT IS BINDING, THEREFORE, THE ASSEMBLY MUST BE CLEAN AND PROPERLY LUBRICATED TO CORRECTLY ADJUST THE GOVERNOR.

D. With the Slip Tube and Sleeve Assembly disconnected, the Governor Arm will move forward. Check the Carburetor Throttle Opening. There should be 3/32 inch clearance between the Full Throttle Opening Stop and Stop Pin on the carburetor.

If adjustment is necessary, adjust the Throttle Rod between carburetor and

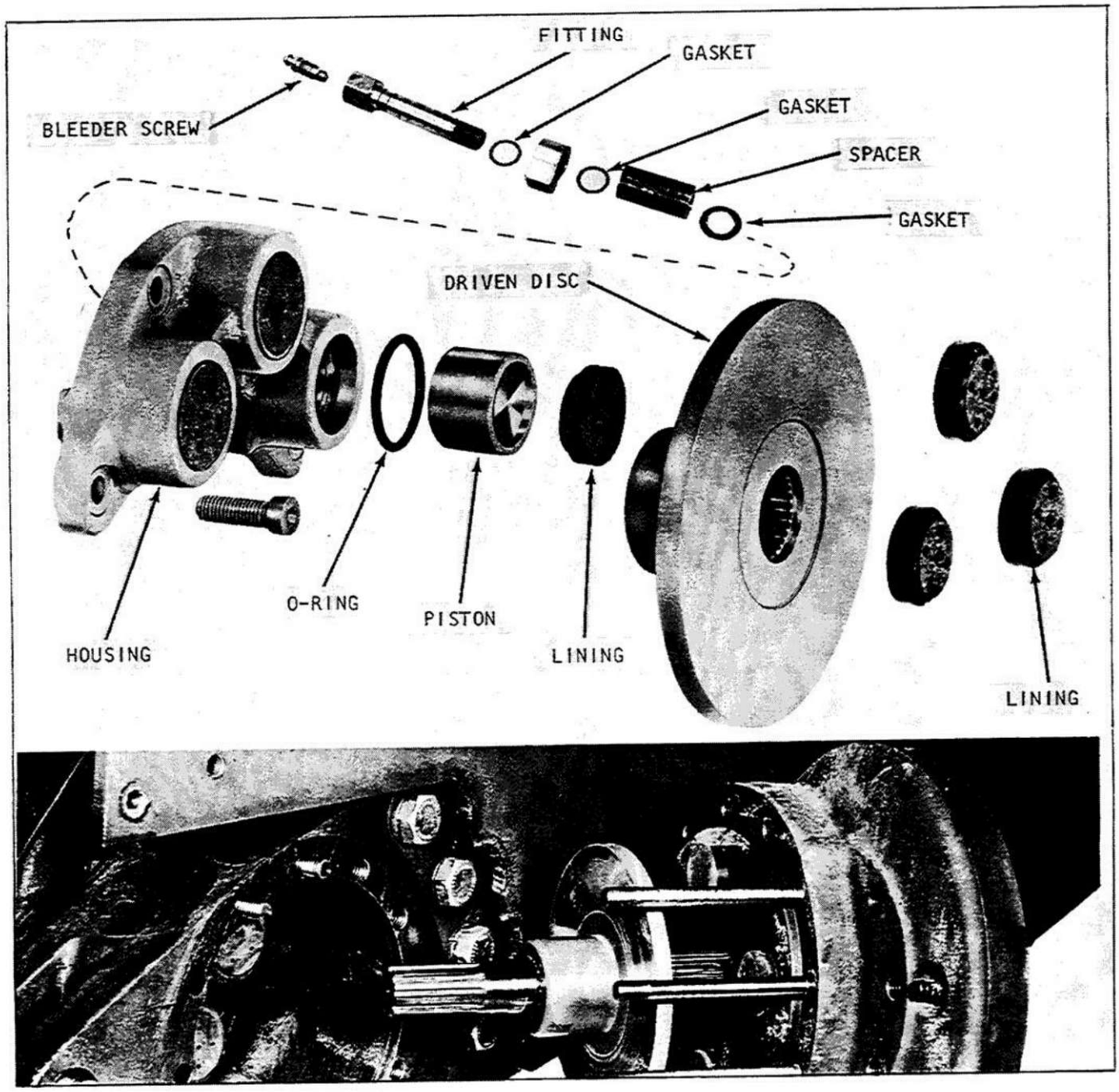


Plate 7567. Typical Service Wheel Brake Assembly

DESCRIPTION

When depressing the brake pedal hydraulic pressure is applied to the brakes, the pistons move out clamping the rotating disc between the pistons and anvil linings producing the braking action. When hydraulic brake pressure is released the clamping action is removed and the disc is again free to rotate.

If it is found that the brake effectiveness has gradually dropped to a noticeable degree (and the system has been properly bled and pedal free travel is adjusted correctly) the linings are worn beyond their designed limits. If lining wear has reached this point, the replacement of linings is necessary. Report to designated person in authority.

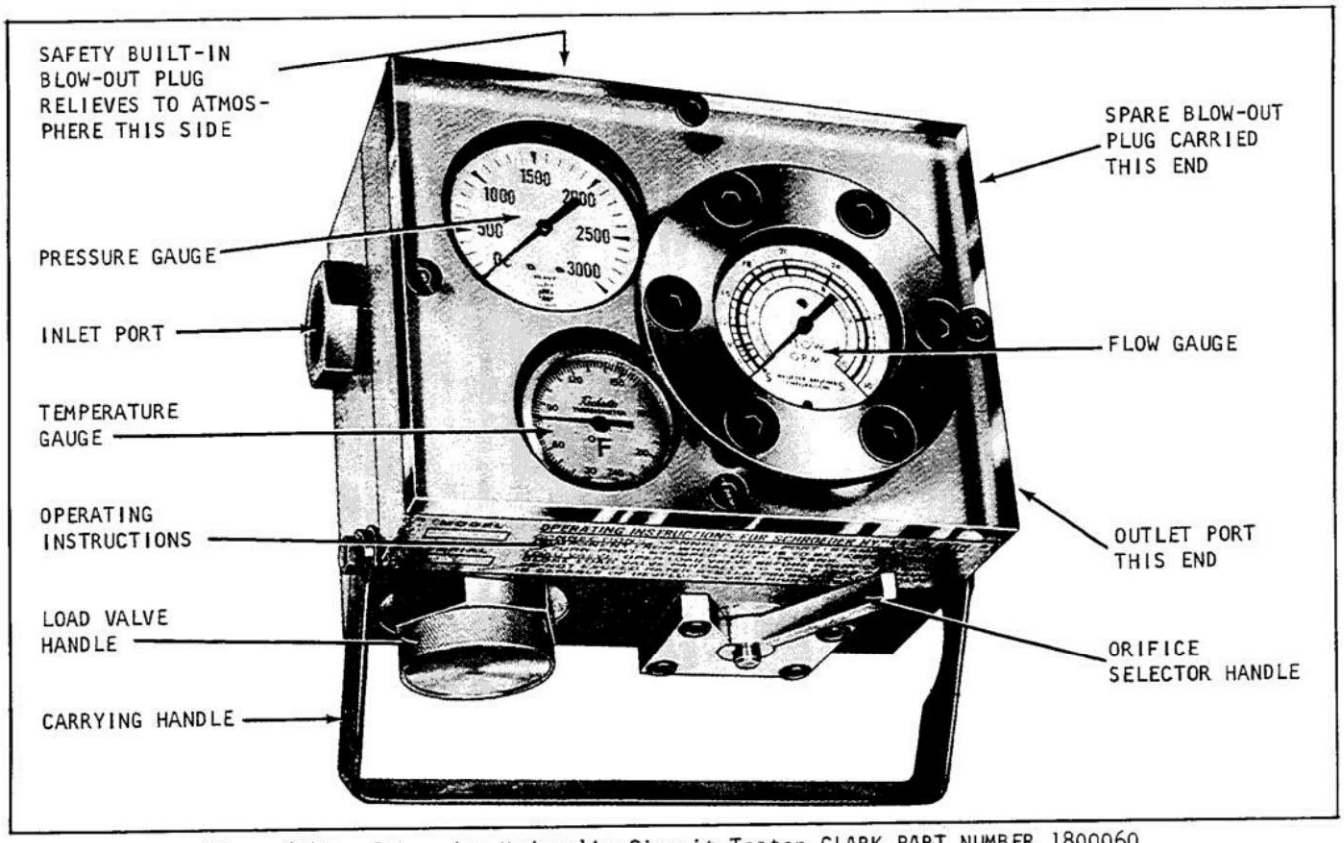


Plate 6747. Schroeder Hydraulic Circuit Tester CLARK PART NUMBER 1800060

PRESSURE GAUGE

Reads directly in pounds per square inch (PSI).

TEMPERATURE GAUGE

Reads directly in degrees Fahrenheit and indicates the temperature of the oil passing through the instrument.

FLOW GAUGE

Reads two scales in gallons per minute.

0 - 30 gallons
9 - 30 gallons

Read the scale that corresponds with the orifice selector position.

Turn orifice selector to the left (counter-clockwise) to read 10 gallon scale.

Turn orifice selector to the right (clockwise) to read 30 gallon scale.

You may switch from one scale to the other, while operating machine. Always start on 30 gallon scale.

LOAD VALVE

The load valve is a flow restrictor or shut off valve. Turning the valve to the right throttles flow through the Hydra-Sleuth, thus the operator may load a hydraulic pump or circuit to the desired test pressure, simulating work.

SAFETY PLUG

Located opposite the load valve this plug protects the Hydra-Sleuth and the tested system from pressures in excess of 3200 PSI. When pressure becomes higher the plug will rupture and dump oil to atmosphere.

HYDRAULIC FLUID

Unless marked to the contrary, the unit is for use with petroleum, hydraulic fluids.

HOW TO CONNECT THE PORTABLE TESTER

Using a 1/2" hose or larger, connect tester INLET PORT to the flow to be tested. Connect the tester outlet port to reservoir fill port, or system return line.

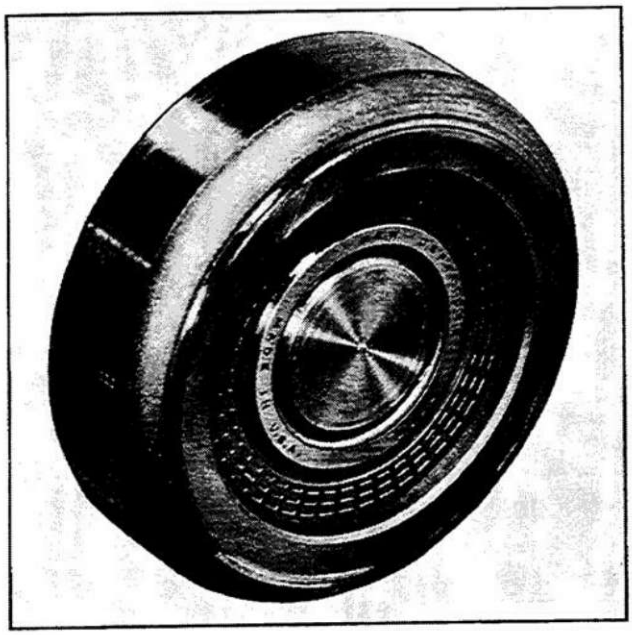


Plate 6323. Upright Roller

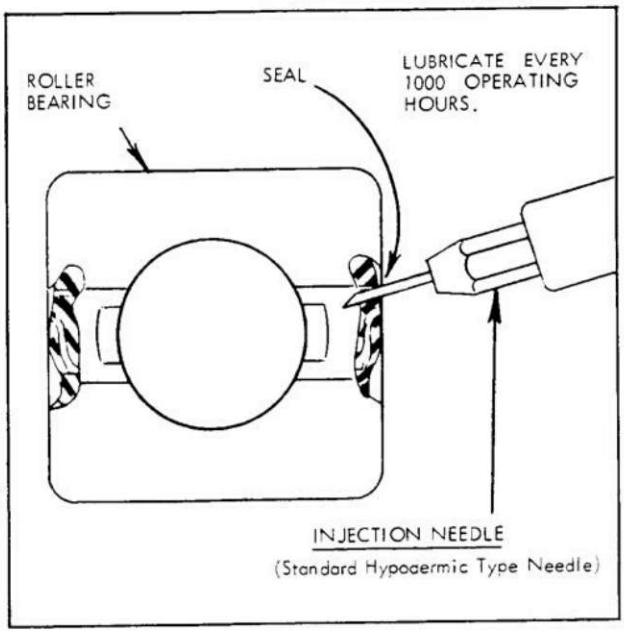


Plate 6328. Roller Bearing Lubrication

UPRIGHT AND CARRIAGE ROLLER LUBRICATION

The manufacturer does not recommend removing a bearing seal for periodic lubrication.

Bearings are generally provided with four openings (on the bearings front face, between the waffle pattern) for lubrication with an Injection Needle.

This needle is a standard hypodermic type needle and can be purchased in drug stores, refer to Plate 6328.

A good light petroleum base oil should be used.

CLUTCH

TROUBLE	PROBABLE CAUSE	REMEDY
Clutch slips.	Improper pedal adjustment.	Adjust pedal free travel.
	Release linkage binding.	Free-up and lubricate linkage.
	Clutch facings burned or worn, torn loose from plate, or oil soaked.	Report to designated individual in authority.
	Weak pressure spring.	Report to designated individual in authority.
	Sticking pressure plate.	Report to designated individual in authority.
	Weak or broken retractor springs.	Replace. Report to designated individual in authority.
	Damaged pilot or clutch release bearing.	Replace. Report to designated individual in authority.
Clutch grabs or chatters.	Control linkage binding.	Free-up and lubricate linkage.
	Loose engine mounting.	Tighten engine mounts.
	Facings burned, worn, or loose on driven plate; driven plate crimped, flattened out, worn, or binding on splined shaft.	Report to designated individual in authority.
	Pressure plate or clutch adaptor face scored or rough; pressure plate broken.	Report to designated individual in authority.
	Excessive looseness in power train.	Report to designated individual in authority.
	Oil on facings, or excessively worn disc surfaces.	Report to designated individual in authority.
	Sticking pressure plate.	Report to designated individual in authority.
Clutch drags.	Excess pedal free play.	Adjust pedal free play.
	Driven plate warped, facings torn or loose.	Report to designated individual in authority.
	Pressure plate warped or binds, improper clutch lever adjustment.	Report to designated individual in authority.
Clutch rattles.	Clutch pedal return spring broken or disconnected.	Replace or connect spring.