

### ROCKER ARM SHAFT

	DIESEL
Shaft Diameter	
Standard	0.743-0.742
Minimum	0.740

### SLEEVES [www.ForMenWhoGrow.com](http://www.ForMenWhoGrow.com)

Type	Wet
Material	Cast iron
Brinell Hardness	212-277
Bore	
Standard	3.8750-3.8765
Maximum (Measured At Top Of Ring Travel)	3.8775
Out-Of-Round	
Maximum	0.002
Taper	
Maximum	0.004
Overall Length	7-7/16
Projection Above Crankcase (For Gasket Crush)	0.001-0.004
Crankcase Sleeve Lower Bore	4.281-4.282
Crankcase Sleeve Upper Bore	4.370-4.380
Crankcase Sleeve Counterbore	4.562-4.563
Sleeve Counterbore Depth In Crankcase	0.250-0.248
Sleeve Flange Thickness	0.251-0.252
Sleeve Outer Diameter	
Upper Flange	4.5600-4.5585
Packing Ring Lands	4.2790-4.2775
Sleeve Upper Flange Clearance In Crankcase	0.002-0.0045

### TIMING GEARS

Type	Helical gears
Material	Steel forging
Back Lash	
Idler Gear To Crankshaft Gear	0.004-0.006
Maximum For Wear	0.007
Camshaft Gear To Crankshaft Gear	0.004-0.006
Maximum For Wear	0.007

### VALVES [www.ForMenWhoGrow.com](http://www.ForMenWhoGrow.com)

Material	
Intake	Silcrome #1
Exhaust	EMS-10
Valve Arrangement (Front To Rear)	I-E-I-E-I-E-I-E-I-E-I-E
Valve Length Overall — Intake & Exhaust	6-13/16
Valve Stem Runout - Maximum	0.002
Valve Stem Diameter	
Intake	
Standard	0.3725-0.3720
Minimum	0.3690
Exhaust	
Standard	0.3720-0.3715
Minimum	0.3680

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Wooster, OH 44691-9293

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## VALVES (Continued)

	DIESEL
Valve Running Clearance In Guides	
Intake	
Standard	0.003-0.0015
Maximum	0.005
Exhaust	
Standard	0.0035-0.002
Maximum	0.0065
Valve Face Angle	
Intake	29-1/2°
Exhaust	45-1/2°
Valve Head Diameter	
Intake	1-23/32
Exhaust	1-1/2
Valve Timing	
Intake Opens	15° BTDC
Intake Closes	35° ABDC
Exhaust Opens	35° BBDC
Exhaust Closes	15° ATDC
Valve Lift	
Intake	0.416
Exhaust	0.406
Valve Port Diameter	Refer to Cylinder Head Specifications
Maximum Valve Face Runout	0.001
Maximum Valve Seat Runout	0.002
Valve Margin - Minimum	1/64
Valve Clearance (Cold)	
Intake	0.014
Exhaust	0.024

## VALVE GUIDES

[www.ForMenWhoGrow.com](http://www.ForMenWhoGrow.com)

Type	Straight
Material	Cast iron alloy, Brinell hardness 269-302
Valve Guide Bore	
Spiral Groove End	0.373-0.374
Plain End	0.3745-0.3757
O. D.	0.6260-0.6255
Length	3-1/2
Valve Guide Height Above Counterbore Of Cylinder Head	7/8

## VALVE SPRINGS

Material	Spring steel
Part Number	
Intake & Exhaust	106 573-A
Free Length	2.562
Compressed Length	
Valve Closed	1.906 at 59 lbs ± 4 lbs
Valve Open	1.506 at 95 lbs ± 4 lbs

## VALVE LIFTERS [www.ForMenWhoGrow.com](http://www.ForMenWhoGrow.com)

	DIESEL
Type	Mushroom
Diameter	
Standard	0.6245-0.6240
Minimum	0.619
Maximum Allowable Out-Of-Round	0.0003
Lifter Guide Bore	
Standard	0.625-0.626
Maximum	0.631
Running Clearance	0.0005-0.002

## TORQUE WRENCH VALUES IN FOOT POUNDS (OILED)

Cylinder Head Cap Screws	
Numbers 1 thru 6 on Tightening Diagram	150
Numbers 7 thru 14 on Tightening Diagram	133
Main Bearing Cap Screws	129-133
Connecting Rod Cap Screws	46-50
Manifold Nuts	25-27
Rocker Arm Shaft Bracket Nuts	25-27
Flywheel Cap Screws	67-69
Damper Cap Screws	31-34
Pulley Cap Screw	75-85

## FUEL SYSTEM INJECTOR NOZZLES

Opening Pressure	
New (Or Used Nozzle With New Spring)	2800
Used Nozzle Spring	2600
Spray Orifices (Number)	Four
Orifice Diameter	0.011
Valve Lift Adjusting Screw	1/2 turn open
Return Oil Leakage	5-8 drops per 30 seconds @ 1500 psi after first drop falls
Torque Values	
Pressure Adjusting Screw Locknut	70-75 in. lbs.
Hold-down Screw	20 ft. lbs.

## FUEL INJECTION PUMP (ROOSA MASTER)

Roosa Number	DBGFC 633-11DH
Governor	
Idle Speed	650
High No-Load Speed	2640
Rated Speed	2400
Timing (Static)	4° BTDC
Distributor Rotor Diameter	0.920 nominal
Drive Shaft Tang Width	0.3105-0.3095

**FUEL INJECTION PUMP (ROOSA MASTER) (Continued)**

DIESEL

Drive Shaft Bushing	0.8755-0.8765
Governor Control Arm Fork Wear	0.003 maximum wear. Fork tip to back side when new: 0.216-0.226
Plunger Diameter	0.330-0.3299
Basic Cam Dimension	1.900
Rotation	Clockwise from drive end
Torque Values	
Delivery Valve Retainer Screw	85-90 inch pounds
Head Locking Screw	15 foot pounds
Cam Advance Screw	33 foot pounds
Head Locating Screw	25 foot pounds
End Plate Screws	25-30 inch pounds

**TEST SPECIFICATIONS** [www.ForMenWhoGrow.com](http://www.ForMenWhoGrow.com)

NOTE: All speeds are in engine rpm.

**TEST STAND**

- |                            |                        |
|----------------------------|------------------------|
| 1. Injection Lines         | 3/32" I.D. by 20" long |
| 2. Test Oil Temperature    | 110-115° F.            |
| 3. Nozzles                 | 12SD12                 |
| 4. Nozzle Opening Pressure | 2500 psi               |
| 5. Calibrating Oil         | Roosa Master           |

**PUMP OPERATING SPEED**

Half Engine Speed

**PUMP ACCESSORIES**

Delivery valve, speed advance, by-pass system

**PUMP SETTINGS**

- |  |                  |
|--|------------------|
| 1. Roller To Roller Dimension  | 1.965 ± 0.0005   |
| 2. Governor Linkage Gap (Use Roosa Gage No. 13389)   | 0.125" to 0.165" |
| 3. Operate Pump At 1000 RPM (Wide Open Throttle) For 10 Minutes To Bring To Operating Temperature And Clear Air From System. |                  |
| 4. Check For Minimum 18" HG Transfer Pump Lift At 400 RPM With By Pass Hose Pinched.   |                  |
| 5. Adjust Transfer Pump Pressure (Wide Open Throttle)  |                  |
| 6. Check For Minimum Cranking Speed Delivery (See Step 14)   |                  |
| 7. Auto Advance  | Speed Responsive |
| a. Advance Movement 7°   |                  |
| RPM  | Cam Movement     |
| b. 900-1100  | Set 3°           |
| c. 2000-2200   | Finish           |

	RPM ± 10	MM3 PER STROKE	MAX. VAR. BET. CYL.	TRANS. PUMP PRESS-PSI 73-75
8. Check Point	2400			
9. Check Point	1000	58-61	3	
10. Set Torque Screw	2400	57-60	5	
11. High Idle (Wide Open Throttle)	2640	12-15	5	
12. Recheck Point	1400	60-63	5	
13. Low Idle	675	9-12		
14. Minimum Cranking Speed Delivery	100	33		7 Min.

## HYDRAULIC SYSTEM

	<u>DEPTH STOP DRAFT CONTROL</u>	<u>HYDRA -LECTRIC DRAFT CONTROL</u>	<u>DEPTH STOP REMOTE CONTROL</u>
Hydraulic Pump			
Capacity @ 2400 RPM	16.7 gpm	16.7 gpm	20.4 gpm
Capacity Available To System W/Flow Divider	11.7 gpm	11.7 gpm	15.4 gpm
Pressure Relief Valve Setting	2050 psi	2050 psi	2100 psi
Flow Divider			
Capacity	5 gpm	5 gpm	5 gpm
Relief Valve Setting	1500 psi	1500 psi	1500 psi
Internal Cylinder			
Diameter	4 inches	4 inches	
Length of Piston Stroke	6 inches	6 inches	
Capacity @ Rocker Shaft	8600 ft. lbs.	8600 ft. lbs.	
Lifting Time @ 2400 RPM	1.8 sec.	1.8 sec.	
Safety Valve Setting	2300-2500 psi	2300-2500 psi	
Control Valve			
Detent Relief Pressure			1800-2000 psi
Thermal Relief Pressure	4400-5100 psi	4400-5100 psi	4500 psi ± 300 psi
Remote Cylinders			
Diameter	3-1/2 inches	3 or 4 inches	3-1/2 inches
Length Of Stroke	8 inches	8 inches	8 inches
Recommended Lifting Capacity	16150 lbs.	11600 or 21000 lbs.	16150 lbs.
Extension Time @ 2400 RPM	1.6 sec.	1.3 or 2.3 sec.	1.3 sec.
Torque Values			
Oil Filter Body	150 ft. lbs. min.	150 ft. lbs. min.	150 ft. lbs. min.
Breather Cap Nut	Tighten until sheet metal cap begins to yield		
Pump Cover Cap Screws	65-70 ft. lbs.	65-70 ft. lbs.	65-70 ft. lbs.
Pump-To-Housing, Line Flange-To-Pump, Line Flange-To-Housing And Inlet			
Manifold-To-Pump Cap Screws	26-28 ft. lbs.	26-28 ft. lbs.	26-28 ft. lbs.
Control Valve Cap Screws			30-35 ft. lbs.
Control Valve Detent Retainer			5-8 ft. lbs.
Cylinder Head Cap Screws			25-30 ft. lbs.
Head-To-Barrel Cap Screws (3" Cyl. Only)		65-72 ft. lbs.	
Piston Rod Lock Nut	150-180 ft. lbs.	150-180 ft. lbs.	300-330 ft. lbs.
Internal Cylinder Safety Valve Seat	75-90 ft. lbs.	75-90 ft. lbs.	
Main Housing Cone Head Cap Screws	135-150 ft. lbs.	135-150 ft. lbs.	

## POWER TAKE-OFF, TRANSMISSION, HYDRA-POWER, CLUTCH, AXLES AND POWER STEERING

Refer to 1850-1950 Tractor Shop Manual.

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## HYDRA-POWER DRIVE

Output Shaft Bearing Adjustment  
Output Shaft Nut Torque

DIESEL  
15-20 in. lb. preload including oil seal drag  
200 foot pounds

## HYDRAULIC SYSTEM [www.ForMenWhoGrow.com](http://www.ForMenWhoGrow.com)

	<u>DEPTH STOP DRAFT CONTROL</u>	<u>HYDRA -LECTRIC DRAFT CONTROL</u>	<u>DEPTH STOP REMOTE CONTROL</u>
<b>Hydraulic Pump</b>			
Capacity @ 2400 RPM	16.7 gpm	16.7 gpm	20.4 gpm
Capacity Available To System W/Flow Divider	11.7 gpm	11.7 gpm	15.4 gpm
Pressure Relief Valve Setting	2050 psi	2050 psi	2100 psi
<b>Flow Divider</b>			
Capacity	5 gpm	5 gpm	5 gpm
Relief Valve Setting	1500 psi	1500 psi	1500 psi
<b>Internal Cylinder</b>			
Diameter	4 inches	4 inches	
Length of Piston Stroke	6 inches	6 inches	
Capacity @ Rocker Shaft	8600 ft. lbs.	8600 ft. lbs.	
Lifting Time @ 2400 RPM	1.8 sec	1.8 sec	
Safety Valve Setting	2300-2500 psi	2300-2500 psi	
<b>Control Valve</b>			
Detent Relief Pressure			1800-2000 psi
Thermal Relief Pressure	4400-5100 psi	4400-5100 psi	4500 psi ± 300 psi
<b>Remote Cylinders</b>			
Diameter	3-1/2 inches	3 or 4 inches	3-1/2 inches
Length of Stroke	8 inches	8 inches	8 inches
Recommended Lifting Capacity	16150 lbs.	11600 or 21000 lbs.	16150 lbs.
Extension Time @ 2400 RPM	1.6 sec	1.3 or 2.3 sec	1.3 sec
<b>Torque Values</b>			
Oil Filter Body	_____ 150 ft. lbs. minimum _____		
Breather Cap Nut	_____ Tighten until sheet metal cap begins to yield _____		
Pump Cover Cap Screws	_____ 65-70 ft. lbs. _____		
Pump-To-Housing, Line Flange-To-Pump and Housing, and Inlet Manifold Cap Screws	26-28 ft. lbs.	26-28 ft. lbs.	26-28 ft. lbs.
Control Valve Cap Screws			30-35 ft. lbs.
Control Valve Detent Retainer			5-8 ft. lbs.
Cylinder Head Cap Screws			25-30 ft. lbs.
Head-to-barrel Cap Screws(3" Cyl. Only)		65-72 ft. lbs.	
Piston Rod Lock Nut	150-180 ft. lbs.	150-180 ft. lbs.	300-330 ft. lbs.
Internal Cylinder Safety Valve Seat	75-90 ft. lbs.	75-90 ft. lbs.	
Main Housing Cone Head Cap Screws	135-150 ft. lbs.	135-150 ft. lbs.	

## REAR AXLES [www.ForMenWhoGrow.com](http://www.ForMenWhoGrow.com)

Rear Axle Bearing Preload (including Oil Seal Drag)

3-3/8" Diameter Axle

10-12 ft. lbs.

3-7/8" Diameter Axle

13-15 ft. lbs.

Pull At Teeth Of Bull Gear For Correct Preload Adjustment(Including Oil Seal Drag)

9-12 lbs.

## POWER STEERING AND ENGINE CLUTCH

Refer To 1850 Tractor Shop Manual