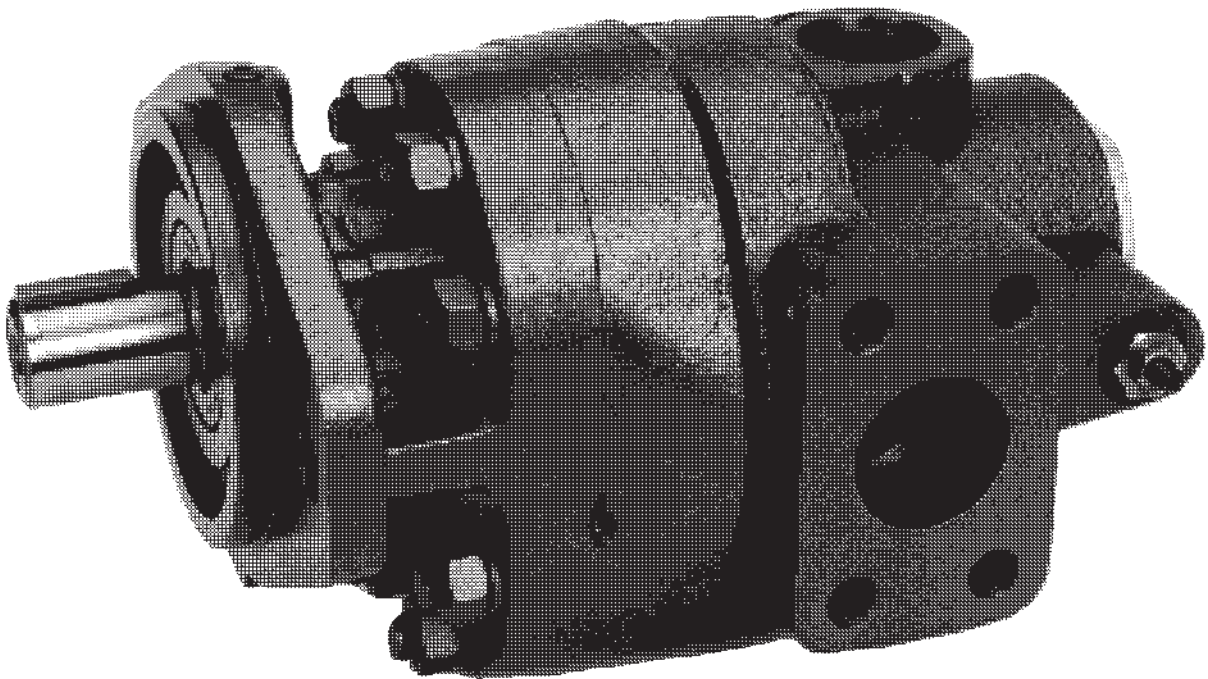




# LOAD SENSE GEAR PUMP SERIES A



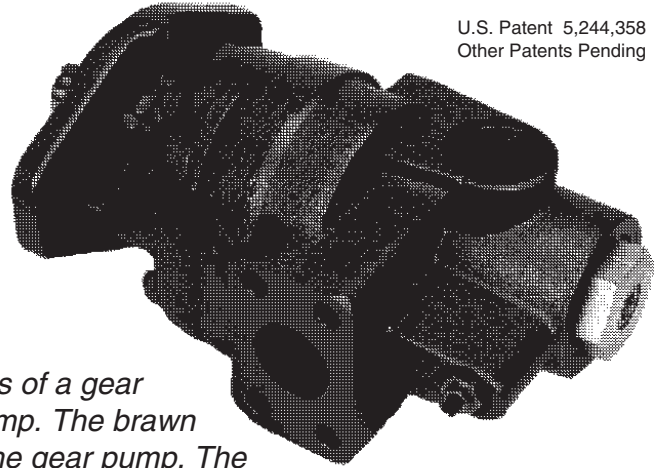
U.S. Patent 5,244,358  
Other Patents Pending

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Drive Products, Inc., Toronto, Exclusive Agents for Canada

## PRODUCT DESCRIPTION

***Now you can have both brains and brawn with the newest and most innovative product in several years for the truck equipment market. The product is the Muncie Load Sense Variable Discharge Gear Pump.***

*You can have all the simplicities and advantages of a gear pump with the efficiency features of a piston pump. The brawn is the hardworking / long life characteristics of the gear pump. The brain is the dual stage modulating element which provides a 15 PSI standby bypass pressure for oil being unloaded back to the tank. Then when your system demands flow the signal is sent thru the load sense line from the directional valve into the element which now shuts down the bypass and sends the desired amount of flow and pressure downstream to the valve bank.*



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## SPECIFICATIONS

Muncie Power Products can provide you with the right product for the job because we offer 10 sizes ranging from 6 GPM to 23 GPM at 1000 RPM. With pressures up to 4000 PSI and RPM's to 3600 we can meet all your application needs. A built in relief valve provides total system protection. Easily adjusted to the application requirements.

## CONSTRUCTION

Pump construction consists of all cast iron housings with solid one piece shafts with extra long journals for excellent bearing support. This equalizes the load distribution for less shaft deflection which ultimately means minimum wear and maximum life. Teflon impregnated sleeve type bearings provide the ultimate in both load and life.

Pressure balanced wearplates with high pressure metering notches provide product that's both high in volumetric efficiencies and extremely quiet during operation.

## ADVANTAGES OVER PISTON PUMPS

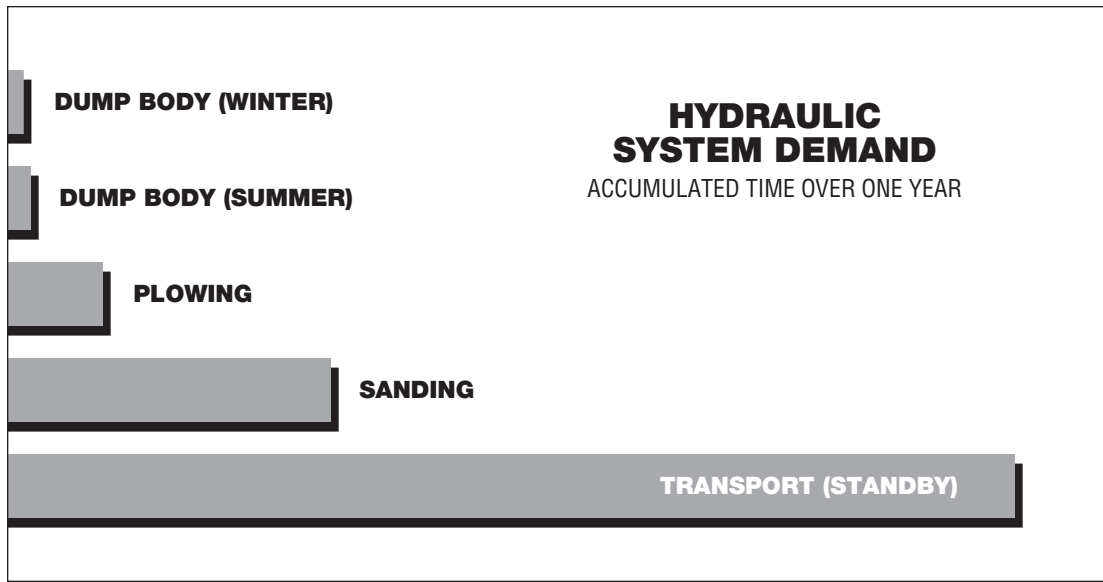
- Lower Initial Investment Cost.
- Low Standby (Unloaded) Condition For Better Horsepower And Fuel Conservation.
- Fewer Working Components For Fewer Potential Problems.
- Serviceable By Personnel Familiar With Gear Pumps—No Special Training.
- Higher Tolerance Of Contamination.
- Improved Noise Levels.
- Works Over A Broader Range Of Temperature Conditions And Oil Viscosities.
- Tolerant To Poor Or Borderline Inlet Feed Conditions.
- Can Activate At Any Speed With No Concern For A Catastrophic Failure.



## SYSTEM ADVANTAGES

Not all equipment uses its hydraulic system 100% of the time in metered flow conditions, and does not take full advantage of the piston pump's variable displacement feature. In fact, vehicles running over the road or in a transport mode to a job site can quickly consume any horsepower (ie: fuel savings) that was originally

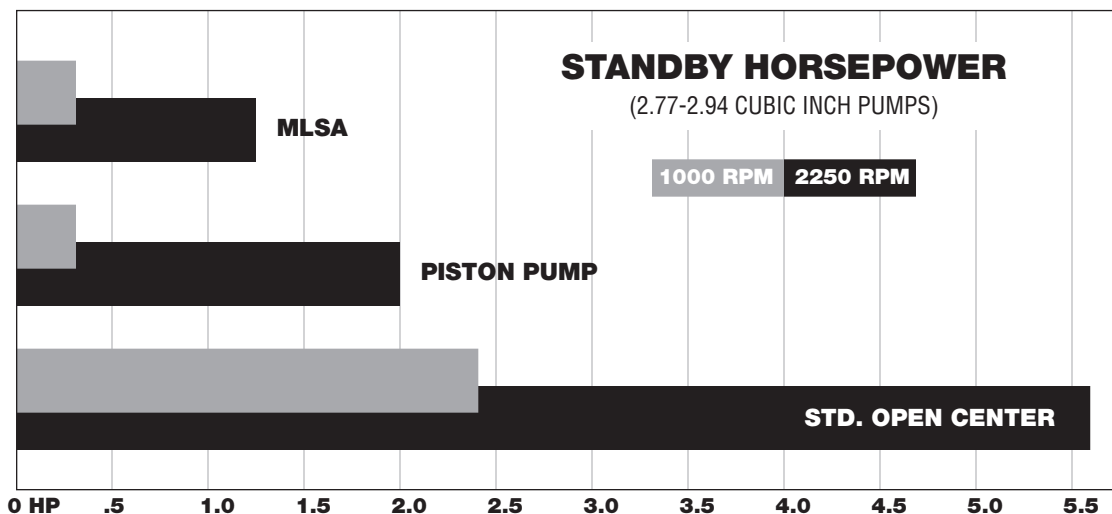
intended with the pump. For example, snow and ice removal equipment is designed to combat a few months of severe weather conditions but spends the bulk of its time running on the highway with no hydraulic requirements until a few minutes of work is needed at the job or dump site.



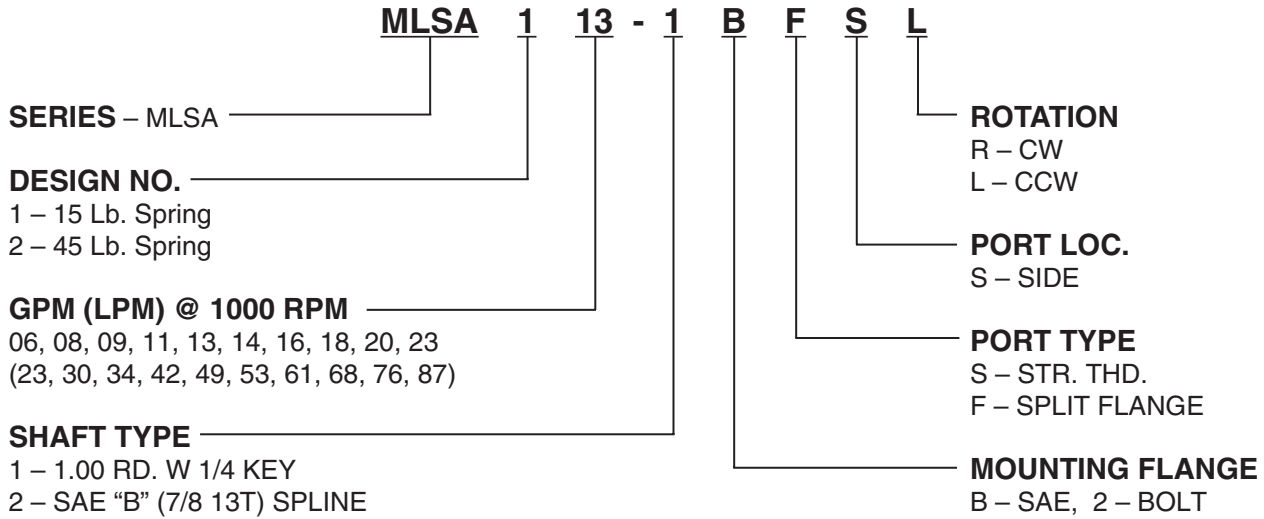
System operation and total horsepower conservation is achieved in the two known operating conditions of running and standby.

In the running condition the load sense modulating element monitors the discharge flow and only delivers the amount of flow to the system required to maintain a 200 PSI pressure differential between the pump and system load demand.

In the standby mode the full oil flow is unloaded and returned directly back to the reservoir at 15 PSI or less plus return line backpressure. The horsepower requirement here is considerably less than the piston pump which is producing 1-2 GPM lube oil flow at 200-300 PSI!



## MODEL NUMBER CONSTRUCTION



## PUMP SPECIFICATIONS

MODEL GPM (LPM)	DISPL CU IN (CC)	MAX RPM	MAX PSI (BAR)	MIN RPM	INLET VACUUM	INLET PORT	OUTLET PORT
06 (23)	1.41 (23)	3600	4000 (275)	1000	5 IN HG (.17BAR)	1 1/4 STR. THD.	1 STR. THD.
08 (30)	1.79 (29)	3400	4000 (275)	800	5 IN HG (.17BAR)	1 1/4 STR. THD.	1 STR. THD.
09 (34)	2.18 (36)	3200	4000 (275)	600	5 IN HG (.17BAR)	1 1/4 STR. THD.	1 STR. THD.
11 (42)	2.60 (43)	3000	4000 (275)	600	5 IN HG (.17BAR)	1 1/4 STR. THD.	1 STR. THD.
13 (49)	2.94 (48)	2800	4000 (275)	600	5 IN HG (.17BAR)	1 1/2 SPL FLANGE	1 SPL FLANGE
14 (53)	3.33 (55)	2700	3600 (248)	600	5 IN HG (.17BAR)	1 1/2 SPL FLANGE	1 SPL FLANGE
16 (61)	3.77 (62)	2500	3200 (221)	600	5 IN HG (.17BAR)	1 1/2 SPL FLANGE	1 SPL FLANGE
18 (68)	4.13 (68)	2500	3000 (207)	600	5 IN HG (.17BAR)	1 1/2 SPL FLANGE	1 SPL FLANGE
20 (76)	4.71 (77)	2500	2800 (193)	600	5 IN HG (.17BAR)	1 1/2 SPL FLANGE	1 SPL FLANGE
23 (87)	5.30 (87)	2300	2500 (172)	600	5 IN HG (.17BAR)	1 1/2 SPL FLANGE	1 SPL FLANGE

Note: Maximum oil temperature is 200° F (93° C). Maximum unload is 4000 RPM.  
 Bypass port is 1 Str.Thd. Load sense port is 1/4 Str.Thd.

## PUMP OUTLET

FLOW RATE AT 3000 PSI (207 BAR), MEASURED IN GPM (LPM)

MODEL	600	1000	1500	2000	2500	3000
06 (23)	—	3.75 (14)	7.50 (28)	10.75 (41)	13.75 (52)	17.00 (64)
08 (30)	—	6.00 (23)	10.00 (38)	13.75 (52)	17.50 (66)	21.75 (82)
09 (34)	3.75 (14)	7.50 (28)	12.50 (47)	17.00 (64)	21.50 (81)	26.25 (99)
11 (42)	4.90 (19)	9.00 (34)	15.00 (57)	20.62 (78)	26.25 (99)	31.87 (121)
13 (49)	5.06 (19)	10.62 (40)	17.50 (66)	23.12 (88)	30.00 (114)	—
14 (53)	6.25 (24)	12.50 (47)	18.81 (71)	26.31 (100)	33.75 (128)	—
16 (61)	7.50 (28)	13.75 (52)	22.50 (85)	30.00 (114)	38.75 (147)	—
18 (68)	8.75 (33)	15.06 (57)	25.00 (95)	33.75 (128)	42.50 (161)	—
20 (76)*	10.00 (38)	17.50 (66)	28.00 (106)	39.00 (148)	49.00 (185)	—
23 (87)*	12.00 (45)	20.00 (76)	32.50 (123)	43.75 (166)	—	—

\* Test data at 2500 and 2250 PSI respectively.



# OIL RECOMMENDATIONS

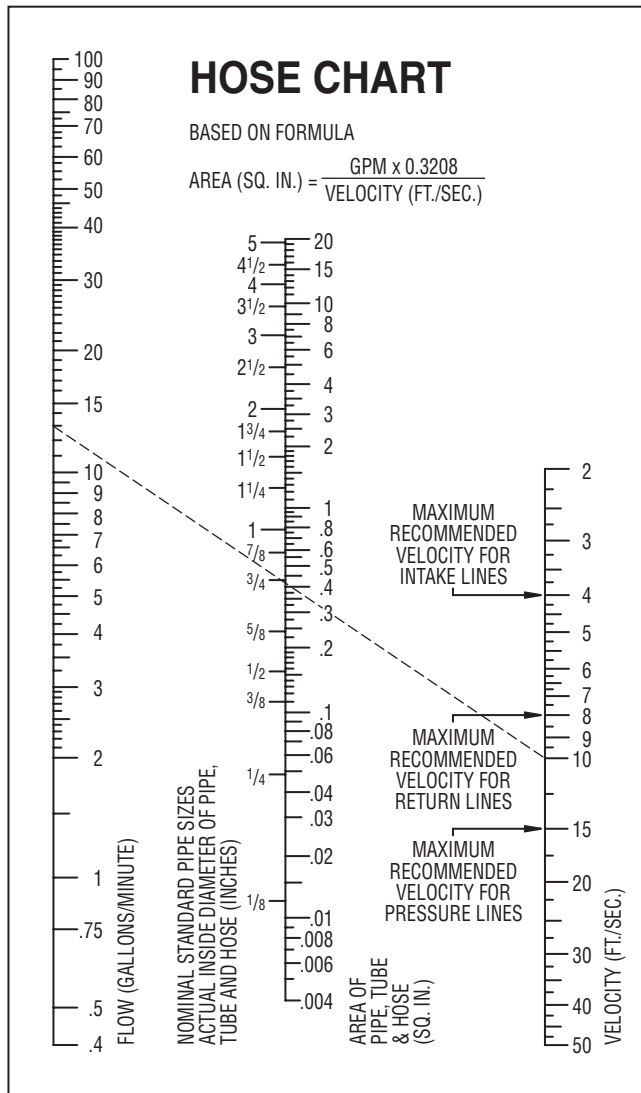
Muncie does not promote specific manufacturers' brands of oil. Specifications below are guidelines and the oil manufacturer should be consulted for your exact application needs.

- Viscosity (ASTM D-88-56) — @ 100° F.-173/187 SSU  
(Ref. 210° F. - Approx. 45 SSU min)
- Viscosity Index (ASTM D-567-53) — 100 Optimum
- Gravity °API (ASTM D-287-64) — 29.0 Minimum
- Flash Point (ASTM D-92-57) — 400° F. Minimum
- Fire Point (ASTM D-92-57) — 430° F. Minimum (Ref.)
- Pour Point (ASTM D-97-57) — 15° F. Maximum

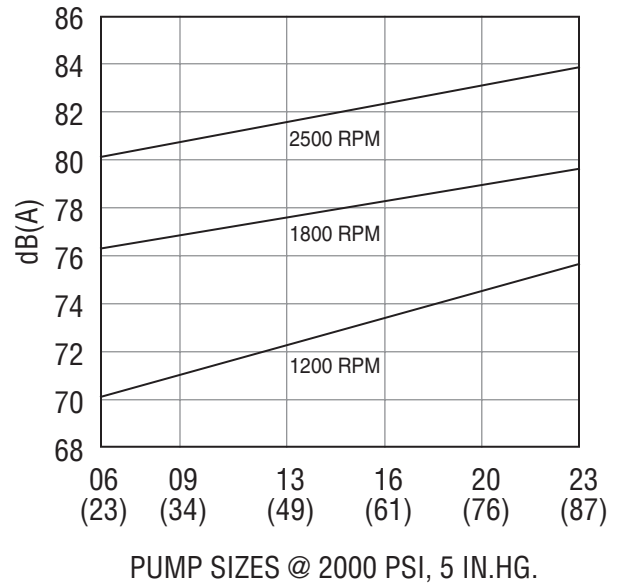
- Foam Resistance (ASTM D-892, Test. Seq. II)
- Viscosity at Startup (7500° SSU Maximum)
- Rust Resistance (ASTM D-665-60) — No Rust
- Corrosion Resistance (ASTM D-130-65) — Class. 1
- Oxidation Stability (ASTM D-943) — 1500 Hours Min.
- Aniline Point (ASTM D-611-64) — 180–220° F.
- Anti-Wear Additive — .06% Zinc Minimum

Note: Cold weather operation requires special oil considerations. Viscosity should not exceed 7500 SSU at lowest startup temperature. Continuous operation should range between 60–1000 SSU for all temperature ranges.

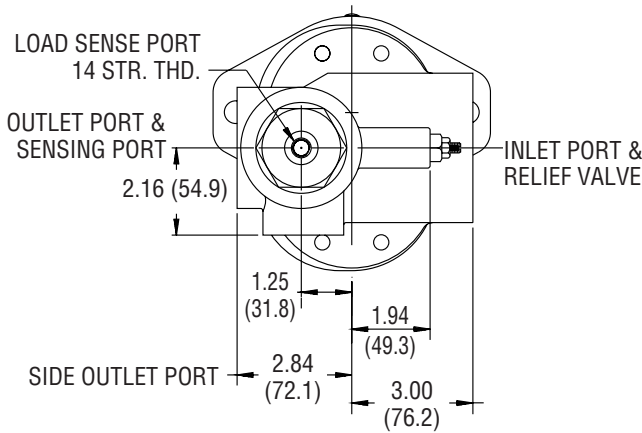
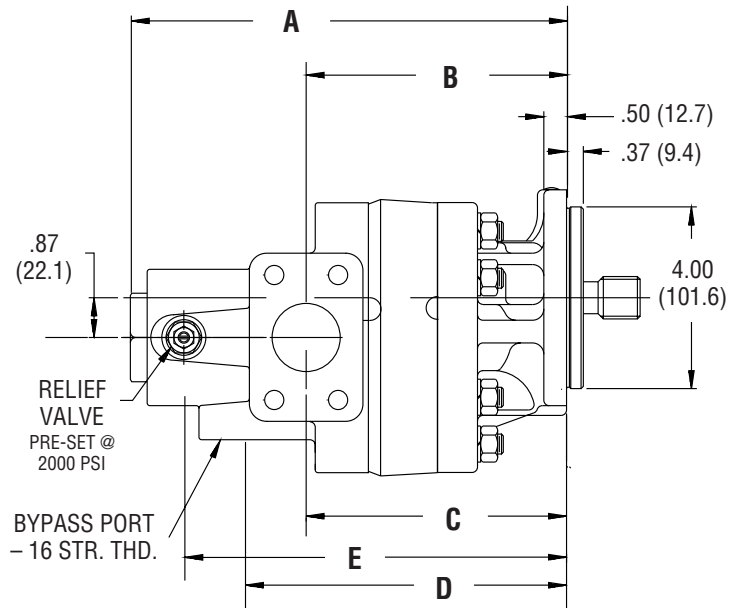
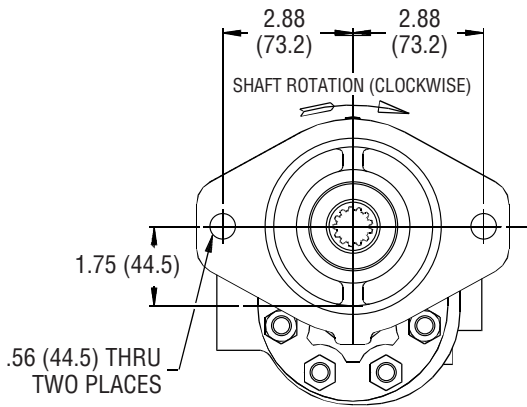
## FLOW CAPACITIES



## NOISE LEVEL



# INSTALLATION DIMENSIONS



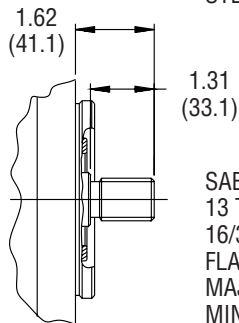
MODEL	A (IN)	B (IN)	C (IN)	D (IN)	E (IN)	WT (LB)
06	9.03	4.63	4.85	6.20	7.55	34.5
08	9.21	4.81	5.03	6.38	7.73	35.0
09	9.39	4.99	5.21	6.56	7.91	35.1
11	9.58	5.18	5.40	6.75	8.10	36.5
13	9.74	5.34	5.56	6.91	8.26	37.0
14	9.91	5.51	5.73	7.08	8.43	37.6
16	10.11	5.71	5.93	7.28	8.63	38.0
18	10.28	5.88	6.10	7.45	8.80	39.0
20	10.55	6.15	6.37	7.72	9.07	40.0
23	10.82	6.42	6.64	7.99	9.34	41.8

MODEL	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)	WT (KG)
06	229.4	117.6	123.2	157.5	191.8	15.6
08	233.9	122.2	127.8	162.1	196.3	15.9
09	238.5	126.7	132.3	166.6	200.9	15.9
11	243.3	131.6	137.2	171.5	205.7	16.6
13	247.4	135.6	141.2	175.5	209.8	16.8
14	251.7	140.0	145.5	179.8	214.1	17.1
16	256.8	145.0	150.6	184.9	219.2	17.2
18	261.1	149.4	154.9	189.2	223.5	17.7
20	254.0	156.2	161.8	196.1	230.4	18.1
23	274.8	163.1	168.7	202.9	237.2	19.0

## SHAFT OPTIONS

### SHAFT TYPE #2

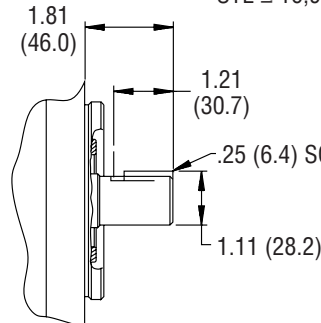
7/8 - 13T (SAE "B")  
STL ≤ 16,500



SAE INVOLUTE SPLINE  
13 TEETH, 7/8 DIA.  
16/32 PITCH  
FLAT ROOT SIDE FIT  
MAJ. DIA. .853-.858  
MIN. DIA. .7335 MAX.

### SHAFT TYPE #1

1.00 (25.4) RND 1/4 (6.4) KEY  
STL ≤ 16,900



**Shaft Torque Limitations** The pump input shaft can withstand torques up to the designed shaft torque limitation (STL). This figure is based on multiplying the pump cu. in. displacement x the pump pressure (IE:  $D \times P \leq STL$ ).



# TROUBLESHOOTING GUIDE for HYDRAULICS

Hydraulic analysis and proper repair require the use of a vacuum gauge and pressure gauge for testing.

Possible Pump Trouble	Cause	Cure
<b>Cavitation: noisy pump</b> <b>Use vacuum gauge to isolate problem</b>	Low oil supply. Pump sucking air thru shaft seal.  Heavy oil / cold oil / wrong oil. Dirty suction strainer. Air leak in junction line. Suction line too small. Relief valve bypassing.  Restriction in suction line.	Fill to proper level. Check by squirting oil around seal. Replace if faulty. Change to proper oil. Clean and replace. Remove and repair. Increase size. Check downstream system for overpressure condition. Readjust R.V. if needed. Remove and replace.
<b>Pump takes too long to respond or fails to respond</b>	Low oil supply. No sensing signal. Insufficient relief valve pressure. Modulating element. Pump worn or damaged.	Fill to proper level. Check downstream valve. Use gauge to reset pressure. Clean, inspect, reinstall. Repair or replace.
<b>Oil Heating Up</b>	Contamination in relief valve. Oil too light. Dirty oil. Oil level too low. Reservoir capacity too small. Insufficient relief valve pressure or pressure too high. Pump slippage	Remove. Drain and refill with proper oil. Drain, flush, refill with clean oil. Fill to proper level. Install oil cooler. Use gauge to reset pressure.  Repair or replace.
<b>Oil Foaming</b>	Air leaking into suction line from tank to pump. Wrong kind of oil. Oil level too low. Improper tank or reservoir baffle. Return line above oil level.	Tighten all connections.  Drain & refill w/non-foaming oil. Fill to proper level. Baffle correctly. Install below oil level.
<b>Actuator Slips</b>	Contamination damages, control valve and allows check valve to leak. Cylinder or piston packing defective. Valve is cracked. Spool not centering.  Incorrect oil. Load check stuck.	Clean out the system.  Repair or replace. Replace. Clean contaminants from valve or replace. Replace with correct oil. Open.





## PUMP WARRANTY

THE MUNCIE CAST IRON PUMP SERIES "MLSA" IS WARRANTED AGAINST ANY DEFECT IN MATERIAL AND WORKMANSHIP WHICH EXISTED AT THE TIME OF SALE BY MUNCIE, ACCORDING TO THE FOLLOWING PROVISIONS, SUBJECT TO THE REQUIREMENTS THAT THE PUMP MUST BE USED ONLY IN ACCORDANCE WITH CATALOGUE AND PACKAGE INSTRUCTIONS, AND THE WARRANTY CARD MUST BE FILLED OUT AND RETURNED TO MUNCIE WITHIN TEN DAYS AFTER THE PUMP IS INSTALLED.

THE PUMP IS WARRANTED FOR A PERIOD OF ONE YEAR FROM THE DATE OF INSTALLATION. IF DURING THE WARRANTY PERIOD THE PUMP FAILS TO OPERATE TO MUNCIE'S SPECIFICATIONS DUE TO A DEFECT IN ANY PART IN MATERIAL OR WORKMANSHIP THAT EXISTED AT THE TIME OF SALE BY MUNCIE, THE DEFECTIVE PART WILL BE REPAIRED OR REPLACED, AT MUNCIE'S ELECTION, AT NO CHARGE, IF THE DEFECTIVE PART IS RETURNED TO MUNCIE WITH TRANSPORTATION PREPAID.

**WARNING.** THE ABOVE WARRANTY SHALL TERMINATE IF ANY ALTERATIONS OR REPAIRS ARE MADE TO THE PUMP OTHER THAN AT A SERVICE CENTER OWNED BY MUNCIE, OR IF THE PUMP IS USED ON ANY EQUIPMENT OTHER THAN THE EQUIPMENT UPON WHICH IT IS FIRST INSTALLED.

AS TO ANY CAST IRON PUMP SERIES "MLSA" WHICH IS REBUILT AND RETESTED AT A SERVICE CENTER OWNED BY MUNCIE, THE PERIOD OF THE ABOVE WARRANTY IS EXTENDED FOR A PERIOD OF ONE ADDITIONAL YEAR FROM THE RETEST DATE.

**THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER OBLIGATIONS AND LIABILITIES, INCLUDING NEGLIGENCE AND ALL WARRANTIES OF MERCHANTABILITY AND SUITABILITY, EXPRESSED OR IMPLIED AND STATE MUNCIE'S ENTIRE AND EXCLUSIVE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR ANY CLAIM OF DAMAGES IN CONNECTION WITH THE SALE, REPAIR OR REPLACEMENT OF THE ABOVE GOODS, THEIR DESIGN, INSTALLATION OR OPERATION. MUNCIE WILL IN NO EVENT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, AND OUR LIABILITY UNDER NO CIRCUMSTANCES WILL EXCEED THE CONTRACT PRICE FOR THE GOODS FOR WHICH LIABILITY IS CLAIMED.**

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