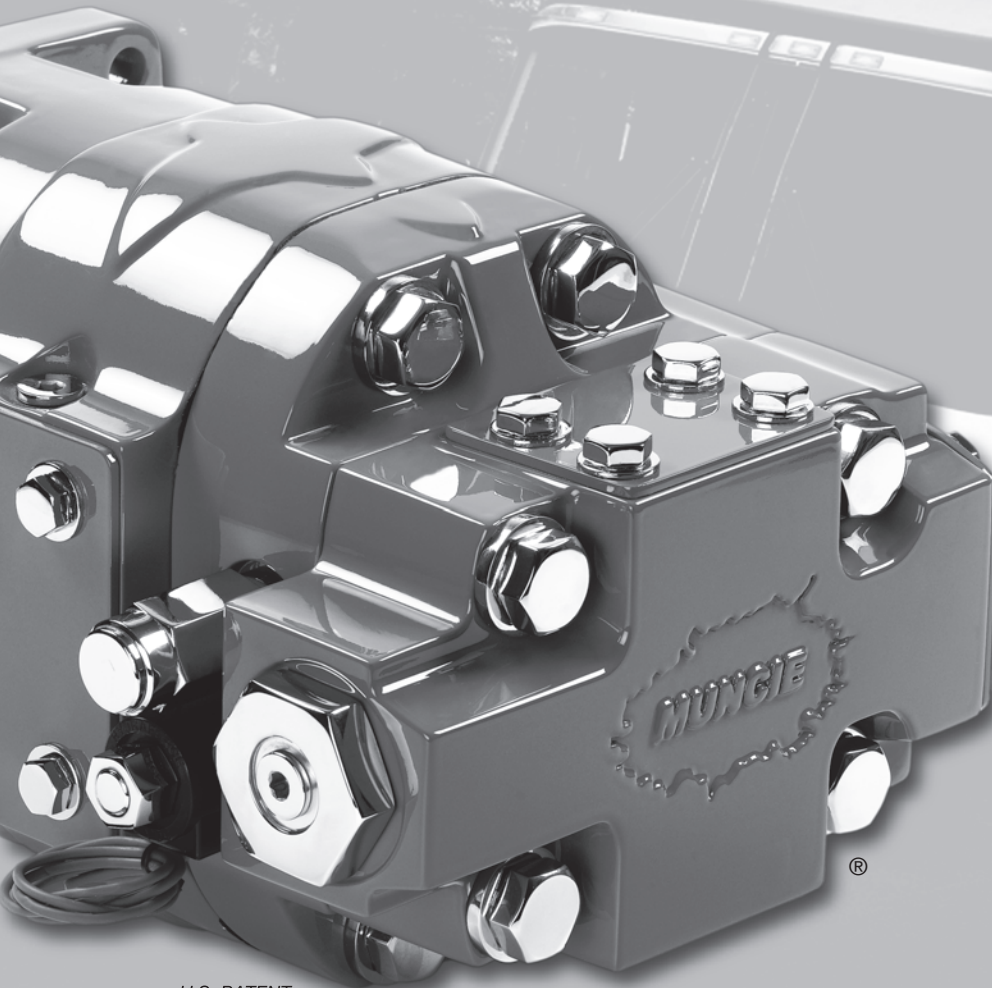




LIVE PAK

MLS SERIES M PUMP SYSTEM



U.S. PATENT
5,515,879

Proven innovative product design addresses equipment performance, productivity and increases fuel savings.
In today's world where time and performance is money the MLS Live Pak System can save you a bundle.

"On Demand Power at the Flip of a Switch"

MLS LIVE PAK PUMP SYSTEM

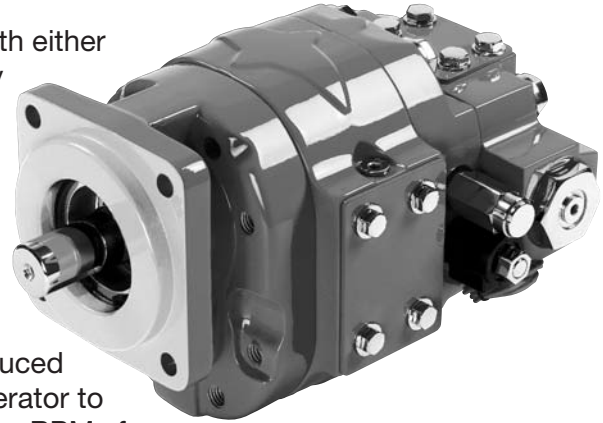
ON DEMAND POWER AT THE FLIP OF A SWITCH

MLS Live Pak is ideally suited for fleets running all routes with either rear loaders, side loaders, or front loaders. Packer efficiency is maximized by allowing the system to operate without electronic or hydraulic overspeed controls, flow controls, or dry valves. All of this is accomplished without fear of hydraulic system saturation and heat buildup resulting from overspeed conditions.

Complete control of your hydraulic system at the flip of a switch allows you to only run the system when you need it.

No more guess work, allowing you to conserve fuel with reduced HP requirements while unloaded. The system allows the operator to pack on the run without interruption even at maximum engine RPMs for increased packer efficiency and improved route times both resulting in increased fuel savings.

The user friendly system never shuts down due to overspeed or excess flow. Subsequently, no containers are dumped on top of the cab and there's no waiting for the blade to complete its cycle because the hydraulics are never interrupted.*



SYSTEM FEATURES

- Improved fuel conservation due to low horsepower draw with the pump unloaded.
- Reduced route times for increased productivity and increased profits.
- Eliminates electrical* and hydraulic overspeed protection devices that shut down the system, robbing control, productivity, and efficiency while reducing engine speed to reset the system.
- No electrical connections to the alternator.*
- Low unload pressures for minimal system heat generation in the standby mode.
- Tamper resistant to prevent operator abuse.
- External bypass for less heat generation and inlet flow turbulence.
- Continuous oil circulation provides faster winter warm-ups.
- Improved contamination control due to continuous oil filtration.
- No dry valve cavitation or bleed valves to worry about.
- One component design, no special valve sections required.
- Standard gear pump technology requires no special service training.
- No pneumatic connections, air valves, or air filters required.

*See the "SPD-1001A" product on page 3

PUMP OPERATION AND SELECTION

The pump uses a dual modulating element design to establish a low unload condition of approximately 20 PSI (1 BAR) while returning oil back to the reservoir. Once activated, the low unload condition shuts down and the element varies the flow up to the preset flow limit. The element compensates to maintain set discharge flow no matter what the pressure requirements.

Because the equipment will typically be operating at higher engine RPMs, smaller pumps can now be used. The flow limiter is set for the system's desired flow but sized so the bypass flow is no higher than 50% of the desired control flow:

Example:

Flow required40 GPM (151 LPM)

Flow57 GPM (216 LPM)

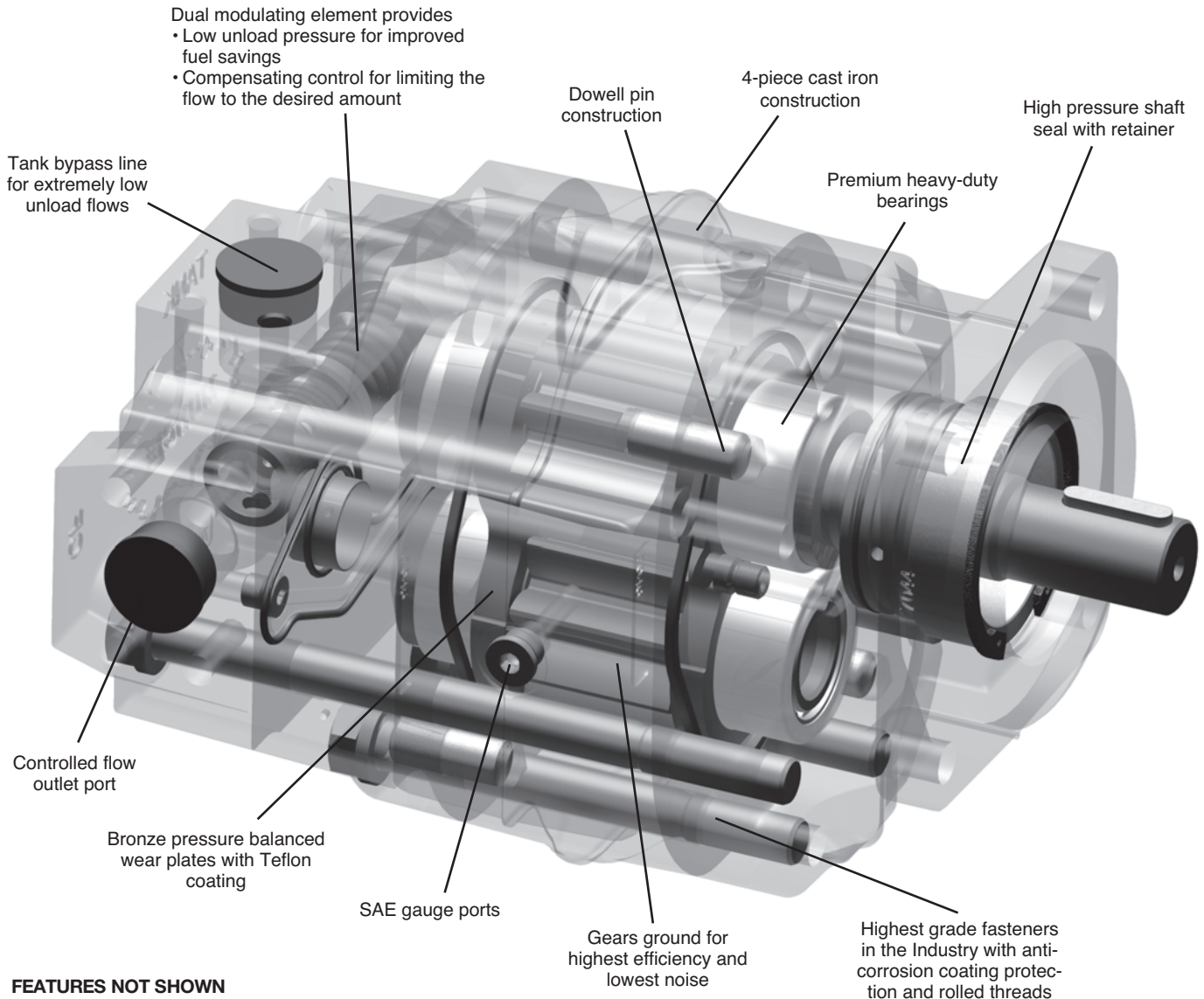
From 31 GPM (117 LPM) Pump operating at 2000 RPM

Bypass flow17 GPM (64 LPM)

Subsequently a 40 GPM (151 LPM) flow limiter will be used. (See page 4)



MLSM PUMP CONSTRUCTION



FEATURES NOT SHOWN

- On/Off electrical activation
- Numerous flow limiter choices
- Tamper resistant preset pump safety relief valve



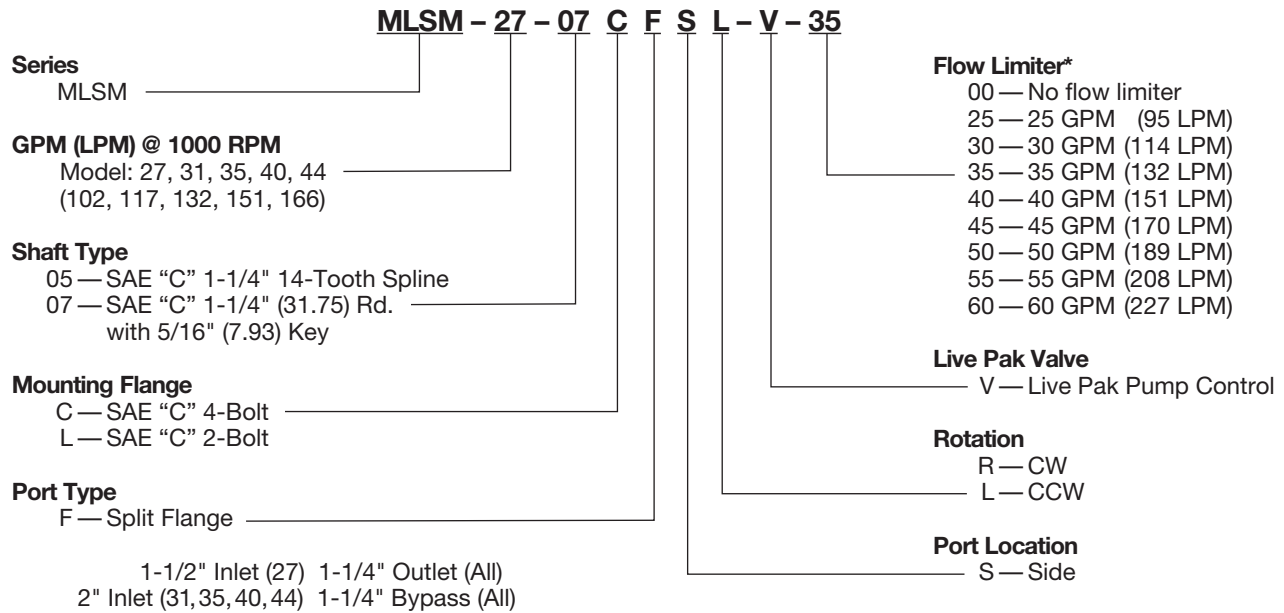
- Activate By:
- Engine Speed
 - or
 - Vehicle Speed (MPH)

SPD-1001A SAFETY PROTECTION DEVICE

If desired to complete the optimum level of fuel savings, an optional safety protection device “SPD-1001A” provides automatic disengagement during transport mode in between container pickups, thus assuring the hydraulics are being unloaded when not required. The device is fully programmable by maintenance personnel for the best operating conditions within their fleet. Some interruptions of the hydraulic system could occur until the driver is “Trained” to stay within the desired operating limits.



MODEL NUMBER CONSTRUCTION



*For higher flows call for assistance.

PUMP SPECIFICATIONS

MODEL NUMBER	DISPL CU IN (CC)	MAX RPM	UNLOAD RPM	MIN RPM	MAX PSI (BAR)	MAX INLET VACUUM	APP. WT. LBS (KG)
MLSM*27	6.10 (102)	2500	3000	800	3000 (207)	5 IN HG (.17 BAR)	103 (46.7)
MLSM*31	7.11 (117)	2500	3000	800	3000 (207)	5 IN HG (.17 BAR)	106 (48.0)
MLSM*35	8.20 (132)	2400	2500	800	2750 (190)	5 IN HG (.17 BAR)	108 (49.0)
MLSM*40	9.27 (151)	2300	2500	800	2750 (190)	5 IN HG (.17 BAR)	111 (50.3)
MLSM*44	10.25 (166)	2200	2500	800	2500 (170)	5 IN HG (.17 BAR)	113 (51.2)

Notes: Maximum temperature is 200°F (93°C). Non-adjustable pump safety relief valve.

PUMP OUTPUT

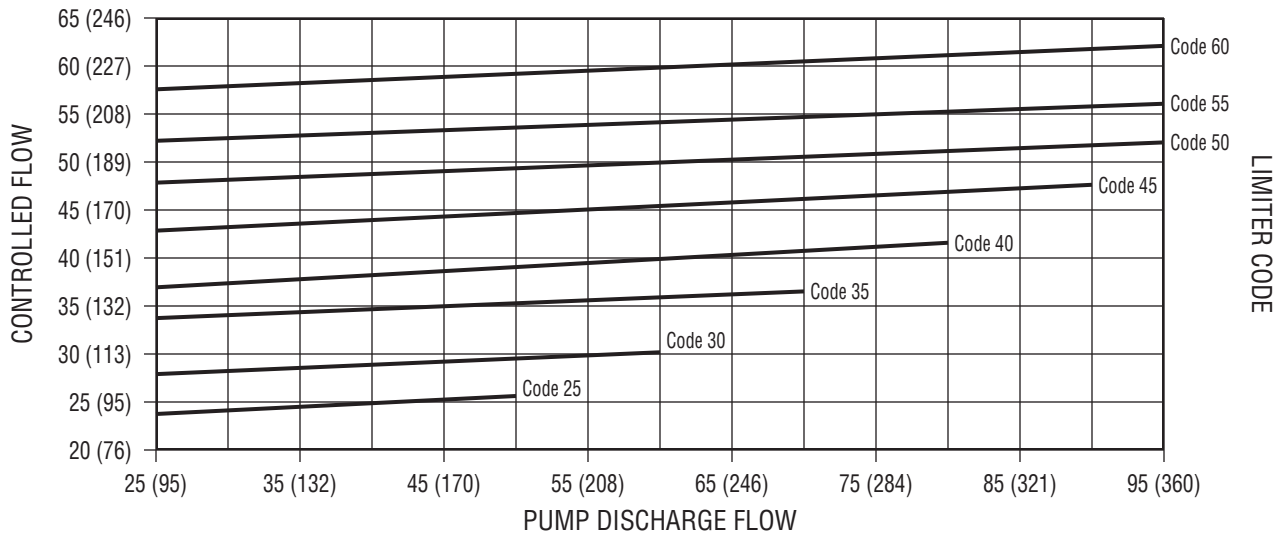
FLOW RATE AT 2500 PSI (172 BAR), MEASURED IN GPM (LPM)

MODEL	800 RPM	1000 RPM	1500 RPM	2000 RPM	2400 RPM
MLSM*27	17.9 (67.7)	22.4 (87.7)	35.6 (134.7)	48.8 (184.7)	59.6 (225.6)
MLSM*31	21.1 (79.8)	26.4 (99.9)	41.8 (158.2)	57.2 (216.5)	69.4 (262.7)
MLSM*35	24.3 (91.9)	30.4 (115.0)	48.0 (181.7)	61.0 (230.9)	79.2 (299.7)
MLSM*40	27.7 (104.8)	34.7 (131.3)	54.2 (205.1)	73.7 (278.9)	89.8 (339.9)
MLSM*44	31.2 (118.1)	39.0 (147.6)	60.4 (228.6)	83.2 (314.9)	100.4 (380.0)



FLOW LIMITER CONTROL RANGE

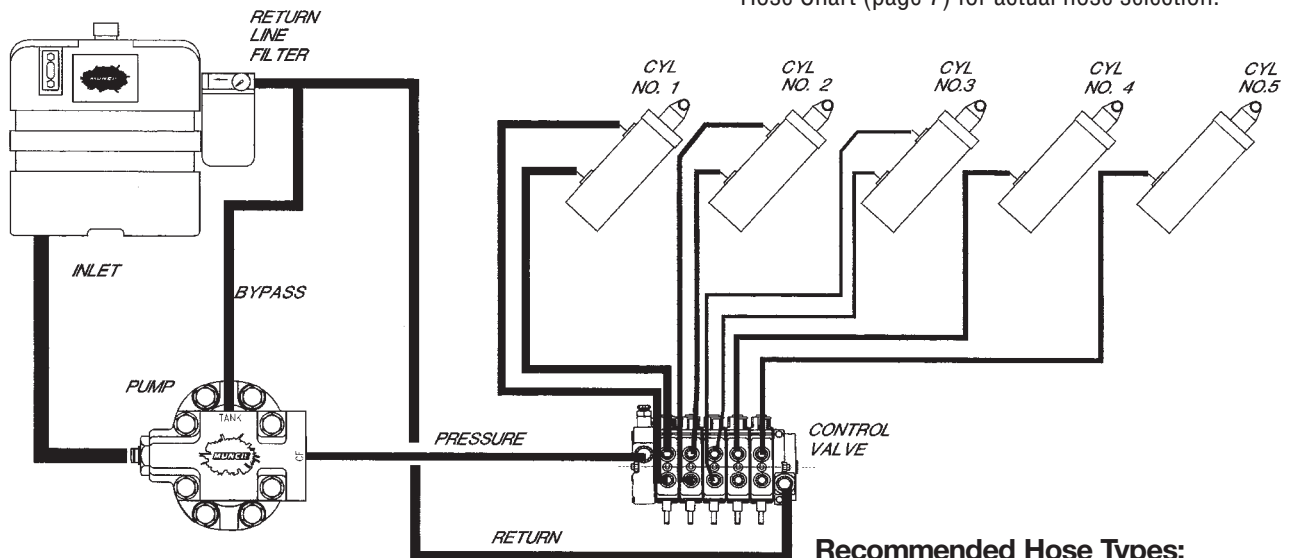
FLOW RATE AT 500 PSI (35 BAR), MEASURED IN GPM (LPM)



Notes: All test data at 100 SUS oil, 120°F. Actual results and performance can vary depending on oil viscosity, temperature, test equipment used, component tolerance, and operating RPM range.

TYPICAL PLUMBING DIAGRAM

Note: Circuit shown is generic and for reference only. Internal sense passage and drain.



Hose sizes will be affected by flow requirements and should be sized for the following fluid velocities.

- Inlet Line4 Ft. Sec.
- Pressure Line.....15 Ft. Sec.
- Return Line8 Ft. Sec.

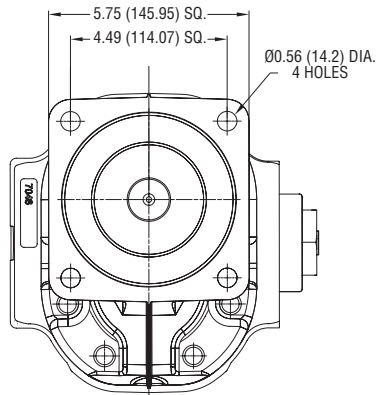
Reference hose manufacturing catalog or Muncie Hose Chart (page 7) for actual hose selection.

Recommended Hose Types:

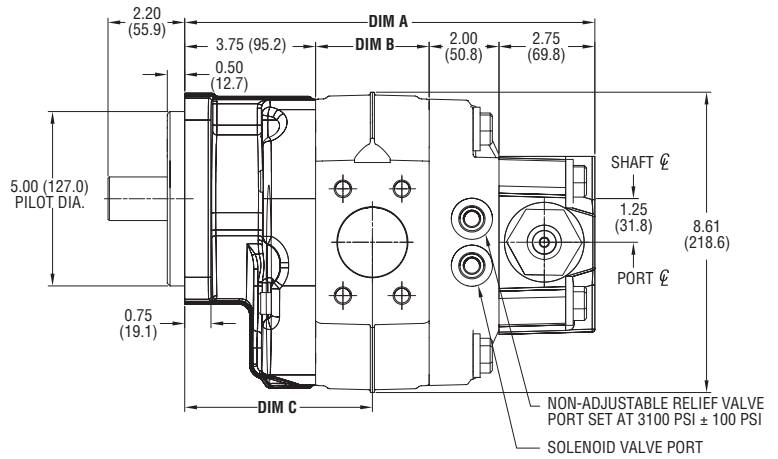
- A. SAE 100R4Inlet Line
- B. SAE 100R2 or higher..Pressure Line
- C. SAE 100R1Return/Bypass Line
- D. SAE 100R2 or higher..Application Line
- E. SAE 100R2 or higher..Application Line



INSTALLATION DIMENSIONS INCHES (MM)



C FLANGE
SAE "C" 4 BOLT
CCW ROTATION

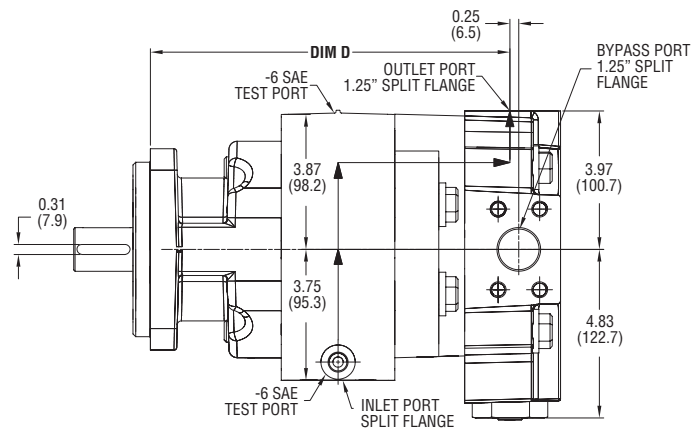


PORT SIZES

MODEL	INLET	OUTLET	BYPASS	TEST PORTS
27	1.50 S.F.	1.25 S.F.	1.25 S.F.	-6 O.D.T.
31,35,40,44	2.00 S.F.	1.25 S.F.	1.25 S.F.	-6 O.D.T.

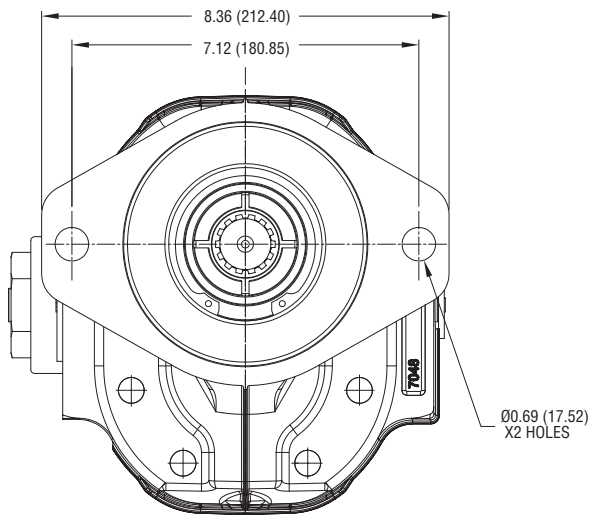
INCHES (MM)

MODEL	A	B	C	D
27	11.00 (279.4)	2.50 (63.5)	5.00 (127.0)	9.58 (242.8)
31	11.25 (285.8)	2.75 (69.9)	5.12 (130.0)	9.80 (248.9)
35	11.50 (292.1)	3.00 (76.2)	5.25 (133.3)	10.06 (255.5)
40	11.75 (298.5)	3.25 (82.6)	5.38 (136.6)	10.32 (262.1)
44	12.00 (304.8)	3.50 (88.9)	5.50 (139.7)	10.56 (268.2)



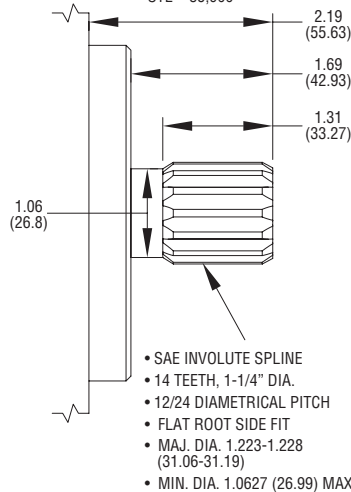
FLANGE OPTIONS

L FLANGE
SAE "C" 2 BOLT
CW ROTATION

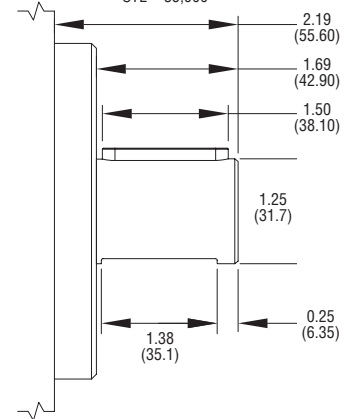


SHAFT OPTIONS

05 SHAFT TYPE
1-1/4" - 14T (SAE C)
STL ≤ 35,900



07 SHAFT TYPE
1-1/4" - RND. (1/4" KEY)
STL ≤ 35,900



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 by the pump pressure in PSI (IE: $D \times P \leq STL$).

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 (40°C)—173/187 SSU (37 CS)
 [Ref. 210°F (100°C) – Approx. 45 SSU (5.9 CS) Minimum]
 Viscosity Index (ASTM D-567-53) — 100°F (82°C) Optimum
 Gravity °API (ASTM D-287-64) — 29°F (-2°C) Minimum
 Flash Point (ASTM D-92-57) — 400°F (204°C) Minimum
 Fire Point (ASTM D-92-57) — 430°F (221°C) Minimum (Ref.)
 Pour Point (ASTM D-97-57) — 15°F (-10°C) Maximum

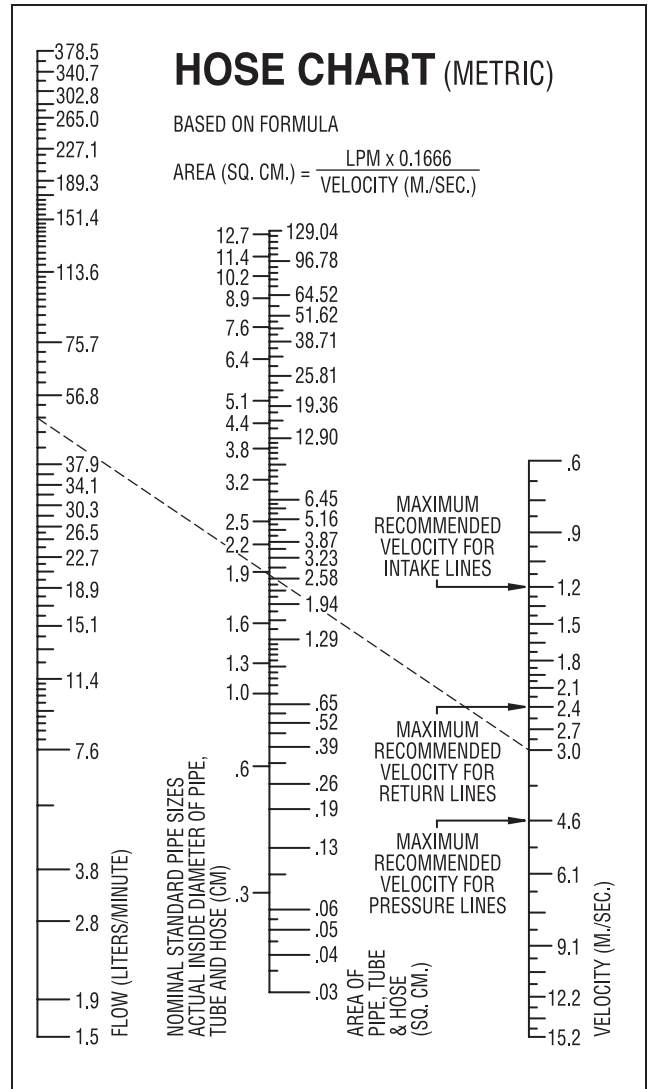
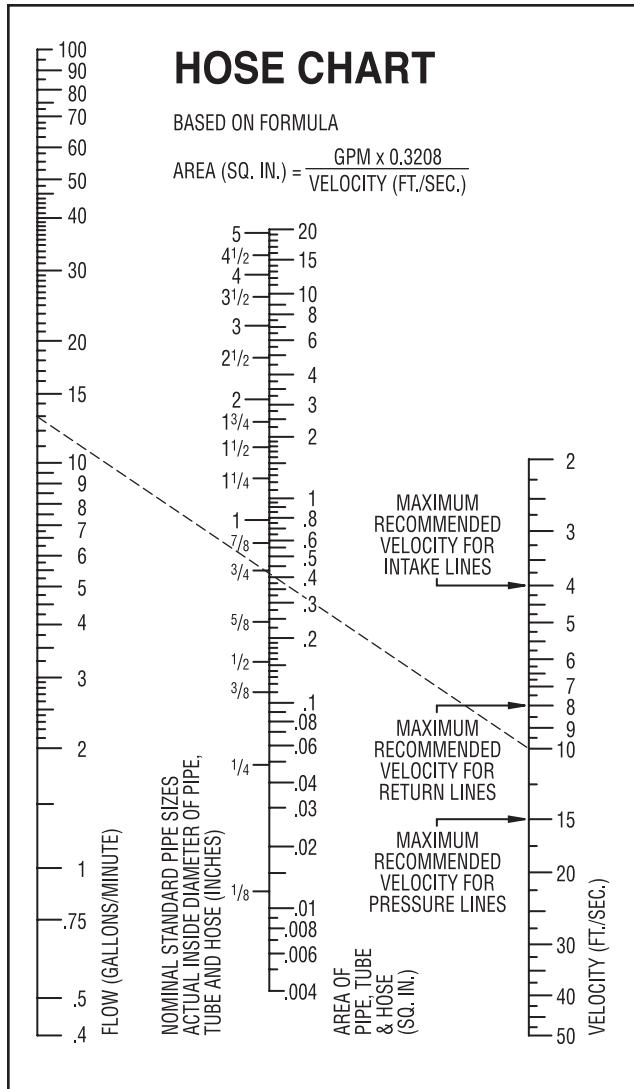
Foam Resistance (ASTM D-892, Test. Seq. II)
 Viscosity at Startup [7500 SSU (1620 CS) Maximum]
 Rust Resistance (ASTM D-665-60) — No Rust
 Corrosion Resistance (ASTM D-130-65) — Class. 1
 Oxidation Stability (ASTM D-943) — 1500 Hours Min.
 Aniline Point (ASTM D-611-64) — 180–220°F (82–104°C)
 Anti-Wear Additive — .06% Zinc Minimum

NOTE: Cold weather operation requires special oil considerations. Viscosity should not exceed 7500 SSU (1620 CS) at lowest startup temperature. Continuous operation should range between 60–1000 SSU (10.5–216 CS) for all temperature ranges.

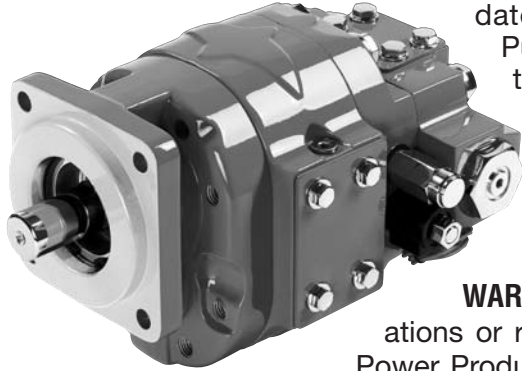
Never use diesel fuel or kerosene to thin the oil.

FLOW CAPACITIES

FOR PIPE, TUBE AND HOSE AT RECOMMENDED FLOW CAPACITIES



PUMP WARRANTY



The Muncie Cast Iron Pump Series "MLSM" 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.

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 pre-paid.

WARNING: The above warranty shall terminate if any alterations or repairs are made to the Pump other than at Muncie Power Products, or if the Pump is used on any equipment other than the equipment upon which it is first installed.

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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