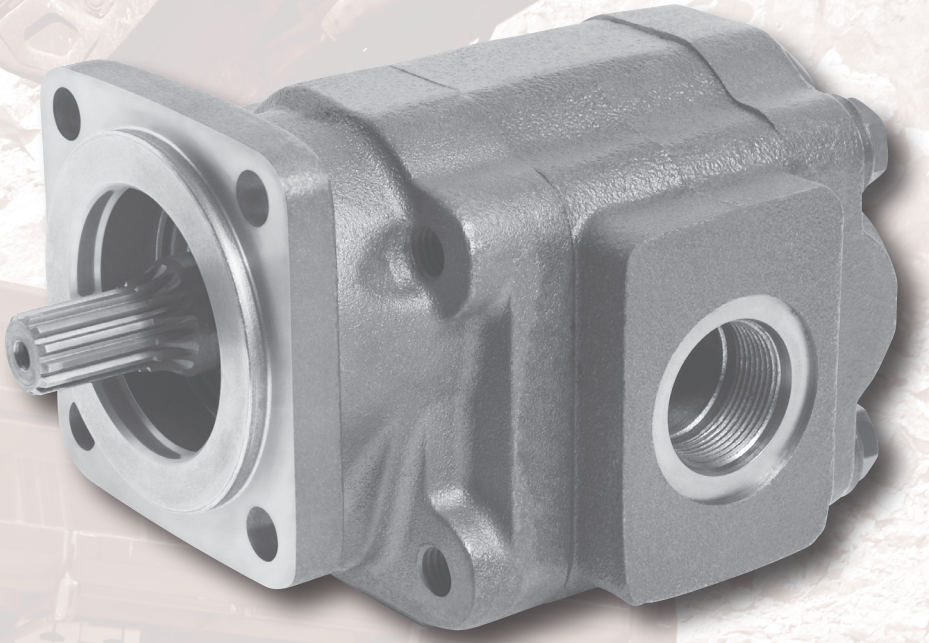
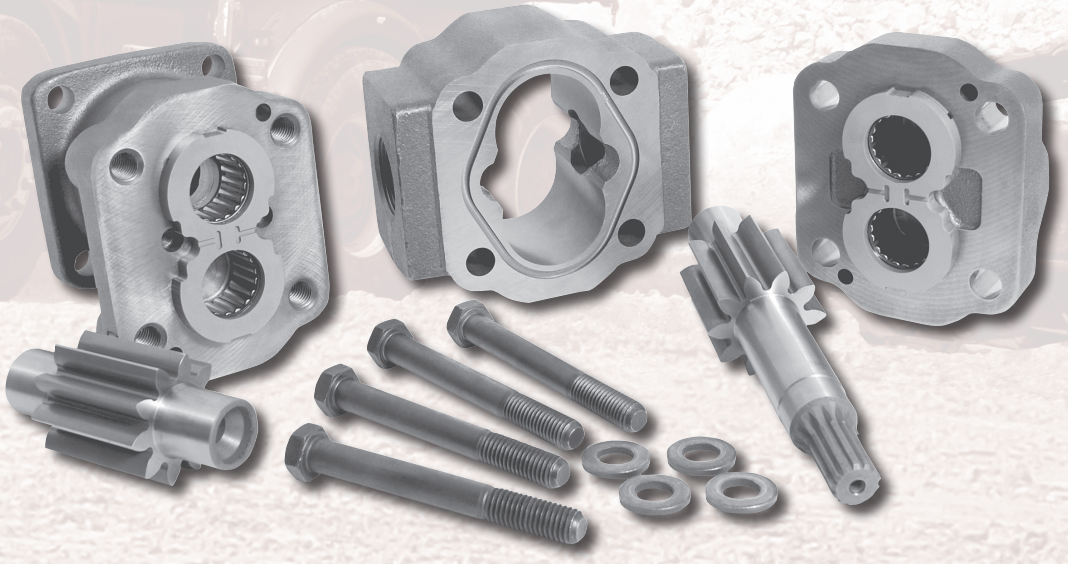
MUNCIE®

Z SERIES

Hydraulic Pump/Motor Product Group
Roller Bearing Design

Z22 TECHNICAL SPECIFICATIONS



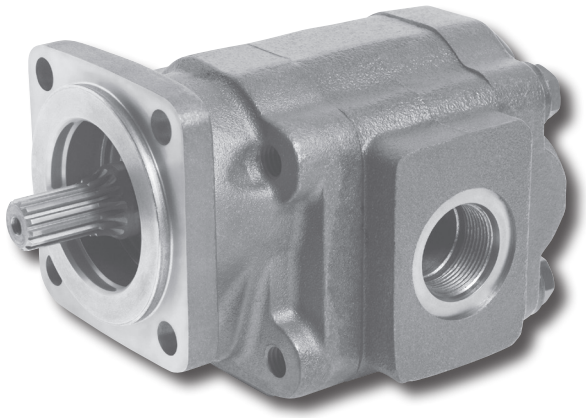


Replacement parts for industry common pump/motor series. Assemblies are built to match your replacement or to meet new installation requirements.

Z22 TECHNICAL SPECIFICATIONS

Muncie Power Product's "Z" series gear pump/motor assemblies are custom built to your replacement or new installation requirements. The Z22 Series offers numerous shaft, flange and port arrangement options to fit a wide variety of application needs. Rigid one-piece drive shafts and pressure balancing wear plates provide top efficiency, while high strength cast iron housings provide durability for the toughest environment. Two-piece "Continental" drive shafts are available for select applications.

Muncie Power Products has served the mobile application industry for over 75 years. We strive to provide the highest quality products and support. Call today and let us give you the power to your hydraulic system.



Flows up to 66 GPM, Pressures up to 3,000 PSI, Speeds to 2,400 RPM, Roller Bearing Design

APPLICATIONS

Construction • Mining • Forestry • Truck • Agriculture • Marine • Material Handling

SPECIFICATION	GEAR WIDTH								
	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50
Housing Width, in	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25
Displacement, in^3 (cc)	1.28 (20.9)	1.91 (31.3)	2.55 (41.8)	3.19 (52.2)	3.83 (62.7)	4.46 (73.1)	5.10 (83.6)	5.74 (94.0)	6.38 (104.5)
GPMt (LPM) @ 1000 RPM	5.5 (20.9)	8.3 (31.3)	11.0 (41.8)	13.8 (52.2)	16.6 (62.7)	19.3 (73.1)	22.1 (83.6)	24.8 (94.0)	27.6 (104.5)
Min. RPM	900	900	900	900	900	900	900	900	900
Max. RPM	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
Max. Pres., PSI (BAR)	3,000 (207)	3,000 (207)	3,000 (207)	3,000 (207)	3,000 (207)	3,000 (207)	2,500 (172)	2,500 (172)	2,500 (172)
Approx. Wt., lbs. (Kg) - Single Unit	34 (16)	35.5 (16.5)	37 (17)	38.5 (17.5)	40 (18)	41.5 (19)	43 (19.5)	48.5 (22)	50 (22.5)
Approx. Wt., lbs. (Kg) - Multiple Unit*	28 (13)	29.5 (13.5)	31 (14)	32.5 (15)	34 (15.5)	35.5 (16)	37 (17)	42.5 (19)	44 (20)
Motor Data: Motor torque and HP values shown below are based on 1,000 RPM per 1,000 PSI, no efficiency values are in the calculations for GPMt. Maximum pressure ratings are the same as above.									
Motor Input, GPMt (LPM) @ 1,000 RPM	5.5 (20.9)	8.3 (31.3)	11.0 (41.8)	13.8 (52.2)	16.6 (62.7)	19.3 (73.1)	22.1 (83.6)	24.8 (94.0)	27.6 (104.5)
Motor Output Torq, in-lbs @ 1,000 RPM	202.2	305.2	404.5	507.4	610.4	709.7	812.6	911.9	1,014.9
Motor Output HP @ 1,000 PSI	3.2	4.8	6.4	8.1	9.7	11.3	12.9	14.5	16.1
Motor Min. RPM	900	900	900	900	900	900	900	900	900
Motor Max. RPM	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400

*Add specified weight per each additional single section

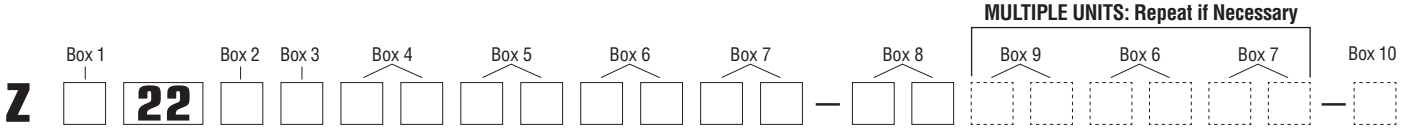
PRODUCT FEATURES

- 9 pump sizes available with flows between 5.5-27.6 GPM (20.9-104.5 LPM) @ 1,000 RPM
- High grade cast iron construction for durability and high performance product requirements
- Up to 3,000 PSI (207 BAR) capability for extreme conditions
- High speed, heavy duty roller bearing design can withstand sever applications and provide long product life
- Standard or Metric porting options are available in numerous configurations
- Multiple shaft and flange options available to fit your application needs

SERIES DESCRIPTION

Z22: Larger pump sizes and greater flows when compared to the Z10 & Z16 series units make the Z22 series a top choice for heavy duty truck applications. The Z22 is a great performer for waste and refuse equipment or can be used in several other industries and applications. Doweled construction is standard in the Z22 series which provides greater structural integrity to achieve higher pressure capabilities compared to similar non-doweled units. The Z22 series is similar to Parker's P51 and Permco's P5100.

Z22 MODEL NUMBER CONSTRUCTION



BOX 1	PUMP/MOTOR
CODE	DESCRIPTION
P	Pump
M	Motor

BOX 2	UNIT CONFIGURATION
CODE	DESCRIPTION
A	Single Unit
B	Tandem Unit
C	Single or Tandem w/ 2-piece shaft (OB bearing required)

BOX 3	UNIT TYPE & ROTATION
CODE	DESCRIPTION
1	Pump, CW, w/o OB Bearing
2	Pump, CCW, w/o OB Bearing
4	Pump, CW, w/ OB Bearing
5	Pump, CCW, w/ OB Bearing
8	Motor, Bi-rotational, w/ OB Bearing, ¼" NPT drain
9	Motor, Bi-rotational, w/o OB Bearing, ¼" NPT drain

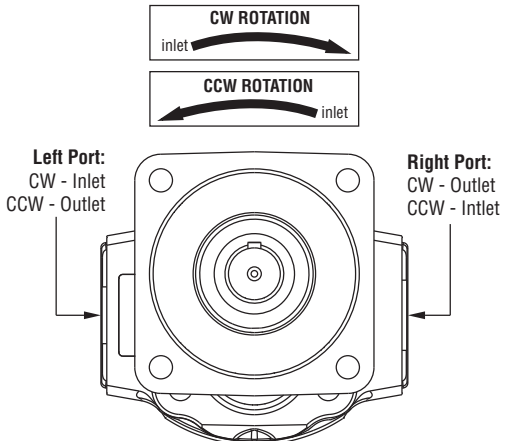
BOX 4	FRONT COVER FLANGE TYPE
CODE	DESCRIPTION
00	4 Bolt Pad Mount
42	SAE "B" 4-Bolt, 4" Pilot Diameter
46	SAE "B" 2/4-Bolt, 4" Pilot Diameter
78	SAE "C" 4-Bolt, 5" Pilot Diameter
96	SAE "B" 2/4-Bolt, Short (OB bearing N/A), 4" Pilot Dia.
97	SAE "B" 2-Bolt, 4" Pilot Diameter
98	SAE "C" 2-Bolt, 5" Pilot Diameter

BOX 5	REAR COVER (REAR PORTS)				
PORTING			CODE		
TYPE	LEFT	RIGHT	SINGLE	TANDEM	EXT. STUDS
Blank	-	-	BE	BI	BY
SAE	0.75	-	CE	CI	CY
	-	0.75	DE	DI	DY
	0.75	0.75	FE	FI	FY

Note: 0.75" Rear Cover ports are rated to 2500PSI Max.

DETERMINING ROTATION

To determine rotation of a unit, position unit with shaft facing you, "belly" down (see image below). A clockwise unit will flow left (inlet) to right (outlet). A counter-clockwise unit will flow from right (inlet) to left (outlet).



Z22 MODEL NUMBER CONSTRUCTION

BOX 6 GEAR HOUSING - PORTING

					Z22 SERIES						
HOUSING CODE (REF. BOX 7)					10	12	15	17	20	22	25
GEAR WIDTH					1.00	1.25	1.50	1.75	2.00	2.25	2.50
DISPLACEMENT (CIR)					2.55	3.19	3.83	4.46	5.1	5.74	6.38
MAX PSI					3,000	3,000	3,000	3,000	2,500	2,500	2,500
PORTING			CODE								
TYPE	IN	OUT	CW	CCW							
No Ports	-	-	AB	AB	X	X	X	X	X	X	X
SAE Ports	0.75	-	EC	ED	X[1]	X[1]		X			
	-	0.75	ED	EC				X			
	0.75	0.75	EF	EF			X[2]	X			
	1.00	0.75	EJ	EG				X			
	1.25	0.75	EK	EH			X[1,2]	X[1]			
	1.00	-	AC	AD	X[1]	X[1]	X[1]	X[1]	X		
	-	1.00	AD	AC					X		
	1.00	1.00	AF	AF					X	X	X
	1.25	1.00	AJ	AG					X[1]		
	1.50	1.00	AK	AH					X[1]		X
	1.25	-	AA	AO			X[1]	X[1]		X	X
	-	1.25	AO	AA						X	X
	1.25	1.25	AL	AL						X	X
	1.50	1.25	AP	AM						X[1]	X[1]
	1.50	-	AE	AU					X[1]	X[1]	X
	-	1.50	AU	AE							X
	1.50	1.50	AR	AR							X
Split Flange Ports	0.75	-	UC	UD	X[2]	X					
	-	0.75	UD	UC	X[2]	X					
	0.75	0.75	UF	UF	X[2]	X	X				
	1.00	0.75	UJ	UG	X[1,2]	X[1]	X[1]				
	1.25	0.75	UK	UH		X[1]	X[1]	X[1]			
	1.00	-	OC	OD		X[1]	X[2]	X	X		
	-	1.00	OD	OC			X[2]	X	X		
	1.00	1.00	OF	OF			X[2]	X	X	X	X
	1.25	1.00	OJ	OG			X[1,2]	X[1]	X[1]		
	1.50	1.00	OK	OH			X[1,2]	X[1]	X[1]	X	
	1.25	-	OA	OB		X[1]	X[1]				
	1.25	1.25	OL	OL					X	X	X
	1.50	1.25	OP	OM					X[1]	X	X
	1.50	-	OE	OU			X[1]	X[1]	X[1]		
	1.50	1.50	OR	OR						X	X
	2.00	-	XB	ZB					X[1]		
	2.00	1.25	OQ	ON					X[1]	X[1]	X[1]
	2.00	1.50	OV	OS						X[1]	X[1]

Notes: *1 INLET port is low pressure only*
2 PRESSURE port MAX = 2500 PSI

– Shaded cells represent Bi-rotational (motor) capabilities
– "X" represents port availability per housing code (gear width)

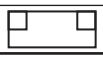
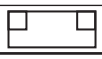
Z22 MODEL NUMBER CONSTRUCTION

BOX 7	GEAR WIDTH (HOUSING CODE)			
CODE	GEAR WIDTH	IN^3/REV	CM^3/REV	MAX PRESSURE
05	0.50	1.28	20.9	3,000 PSI (207 Bar)
07	0.75	1.91	31.3	3,000 PSI (207 Bar)
10	1.00	2.55	41.8	3,000 PSI (207 Bar)
12	1.25	3.19	52.2	3,000 PSI (207 Bar)
15	1.50	3.83	62.7	3,000 PSI (207 Bar)
17	1.75	4.46	73.1	3,000 PSI (207 Bar)
20	2.00	5.10	83.6	2,500 PSI (172 Bar)
22	2.25	5.74	94.0	2,500 PSI (172 Bar)
25	2.50	6.38	104.5	2,500 PSI (172 Bar)

BOX 8	SHAFT TYPE
CODE	DESCRIPTION
07	SAE “C” 1.25" 14T Spline
11	SAE “C” Keyed Shaft 1.25" Dia, 0.313" Key
25	SAE “B” 0.88" 13T Spline
43	SAE “BB” Keyed, 1.0" Dia, 0.25" Key
53	SAE “C” 1.25" Short 14T Spline**
65	SAE “B” Short 0.88" 13T Spline**
98	SAE “BB” 1.0" 15T Spline**

** Not available as two-piece shaft style

BOX 9	BEARING CARRIER - MOTOR ONLY (IF NECESSARY)			
PORTING	BI-ROT. CONFIG.*	IN	OUT	BI-ROT. CODE
NO PORTS		-	-	B
SAE PORTS		1.00	1.00	CC
		1.25	1.25	BB
		1.50	1.50	FF
SPLIT FLANGE PORTS		1.00	1.00	LL
		1.25	1.25	MM
		1.50	1.50	NN

BOX 9	BEARING CARRIER - PUMP ONLY (IF NECESSARY)					
PORTING	CW CONFIG*	CCW CONFIG*	IN	OUT	CW CODE	CCW CODE
COMMON INLET PASSAGE			-	-	C	D
			-	-	A+	U+
SAE PORTS			1.00	-	CB	BC
			1.25	-	DB	BD
			1.50	-	FB	BF
			-	0.75	PJ	JP
			1.00	0.75	CJ	JC
			1.25	0.75	DJ	JD
			1.50	0.75	FJ	JF
			1.25	1.00	DK	KD
			1.50	1.00	FK	KF
			1.00	0.75	CR	RC
			1.25	0.75	DR	RD
			1.50	0.75	FR	RF
			1.25	1.00	DS	SD
			1.50	1.00	FS	SF
			-	1.00	HZ	ZH
			1.00	0.75	KJ	JK
SPLIT FLANGE PORTS			1.00	-	LB	BL
			1.25	-	MB	BM
			1.50	-	NB	BN
			-	0.75	BR	RB
			1.00	0.75	LR	RL
			1.25	0.75	MR	RM
			1.50	0.75	NR	RN
			1.25	1.00	MS	SM
			1.50	1.00	NS	SN
			1.00	0.75	LX	XL
			1.25	0.75	MX	XM
			1.25	1.00	MZ	ZM
			1.50	1.00	NZ	ZN
			1.00	0.75	SR	RS

+ Used when only one adjacent gear housing has an inlet port.

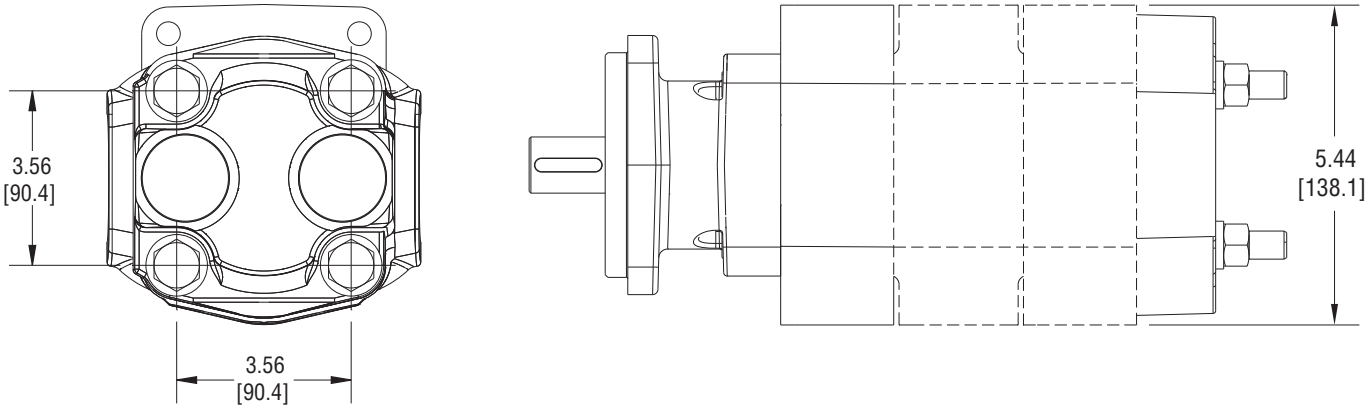
BOX 10	CONNECTING SHAFT (MULTIPLE UNITS ONLY)
CODE	DESCRIPTION
1	Connecting Shaft

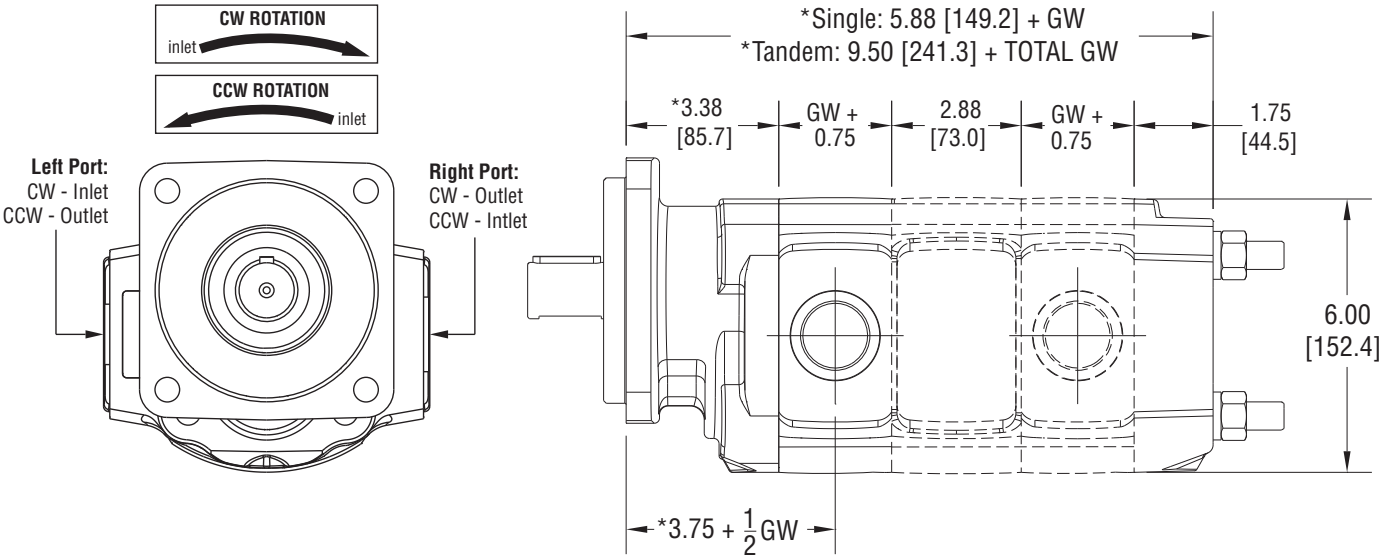
Bearing Carrier View Orientation

REAR SECTION

FRONT SECTION

Z22 PUMP/MOTOR DIMENSIONS (REF. ONLY)





Dimensional Notes

** Dimension shown includes standard front cover. For "Short" style front cover subtract 1.00 [25.4].*
- GW = Gear Width
- Dashed lines represent tandem addition, delete for single unit.
- Z22 Bolt Diameter: ⅞"-11UNC
- Thrust Plate Thickness: 0.375"each (2 required per gear housing)
- Doweled construction is standard
- Bearing carrier width will vary depending on port type (multiple units only)

GENERAL INFORMATION

"Z" Product General Information *(Applies to all series unless noted)*

OIL RECOMMENDATIONS

Muncie Power Products does not promote specific manufacturer's brands of oil, but does recommend the use of quality petroleum based hydraulic fluids. Different climate temperatures require that the oil viscosity be appropriate for the operating conditions. Consult the oil manufacturer for your exact application needs. (Note: NEVER dilute the hydraulic fluid for cold weather operation with, including but not limited to, diesel fuel, kerosene, etc.)

- Oil Viscosity: 60-1,000 SSU (10.5-216 cST) for continuous operation. Viscosity should not exceed 7,500 SSU (1,600 cST) MAX at startup.
- Special Fluids: Biodegradable and water-glycol type fluids are ok for use with bushing design ONLY, NOT roller bearing type products.

INLET / OUTLET CONDITION

- Maximum inlet vacuum should not exceed 5 in.Hg. across all operating RPM's and temperature conditions.
- An undersized inlet port size could have maximum RPM limitations.
- An oversized outlet port size could have maximum pressure limitations.

OPERATING TEMPERATURES

Proper control of the system operating temperature is critical for long product life and the protection of all other hydraulic components as well.

- Optimum operating temperatures: 100-140°F (37.8-60°C)
- MAX Continuous temperature: 180°F (82°C)
- MAX Intermittent temperature: 200°F (93°C)

HOSE SIZING

Hydraulic hose must be properly sized based on the oil velocity in feet per second (FPS) and of the appropriate type (SAE rating) for the specified rate of flow and pressure. The following are hose recommendations for common applications; hose requirements may differ for non-standard applications.

- Inlet hose: 2-4 FPS, SAE 100R4 type
- Pressure hose: 7-15 FPS, SAE 100R2 type
- Return hose: 4-8 FPS, SAE 100R1 type

FILTRATION

Proper filtration is vital to the life of any hydraulic system, as it helps protect hydraulic components from foreign objects which may have entered the system.

- **Return Line Filters:** Return filters are always recommended with a minimum 10 micron rating. Some applications require better filtration with an absolute rating and possibly 3 or 6 micron media.
- **Pressure Filters:** Pressure filter are not typically required for gear pump applications, but they are available if desired.
- **Suction Strainers:** Suction strainers are very useful in catching large objects. Strainers should never be sized smaller than 100 mesh (149 micron), and should always include a 3 PSI (0.2 BAR) bypass.

STARTUP OF A NEW OR RE-BUILT PUMP

Before startup of a new or re-built pump, the installer should always do the following:

- Properly install the pump and all other necessary components
- Fill the pump ports with clean oil
- Back off the main relief valve, or have complete confidence that it is set correctly
- Connect all lines for proper operation
- Engage the pump and allow to run under a no load condition at engine idle for 2 minutes
- If ok, increase engine to normal operating RPM and allow to run for another 2 minutes
- If no problems are detected, reset (if needed) the main relief valve to its proper setting with engine at operating RPM.
- Bushing pumps require a "Power & Flush" startup procedure
- Bushing motors must be broken in before installation

SHAFT TORQUE LIMITATION

The pump input shaft can withstand torques up to the designed shaft torque limitation (STL). This figure is based on multiplying the pump cubic inch displacement x the pump pressure (ie: D x P ≤ STL). Tandem pumps are two pumps with individual calculated STL's added together not to exceed limitation figures.

Z22 Series (Ref. 51)		
Shaft Style	**Integral Shaft & Gear**	**Two Piece Style**
SAE "B" Spline, ⅞ 13T	15641	15641
SAE "BB" Spline, 1" 15T	24103	21795
SAE "BB" Key, 1.00" dia.	14359	14359
SAE "C" Spline, 1 ¼" 14T	33077	21795
SAE "C" Key 1.25" dia.	27949	21795
Connecting Shaft	--	21795

ONE-YEAR PUMP/MOTOR WARRANTY

The Muncie Cast Iron Pump/Motor "Z Product Group" is warranted against any defect in material and workmanship which existed at the time of sale by Muncie Power Products, according to the following provisions, subject to the requirements that the pump/motor must be used only in accordance with catalog and package instructions.

The pump/motor is warranted for a period of one year from the date of installation. If during the warranty period the pump/motor 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 Power Products, the defective part will be repaired or replaced, at Muncie's election, at no charge, if the defective part is returned to Muncie with the transportation prepaid.

WARNING: The above warranty shall terminate if any alterations or repairs are made to the pump/motor 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 OF 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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