

A RUTHMAN COMPANY

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

# Molten Metal Pumps

## Installation, Operation & Maintenance Manual

MAINTENANCE • INSTALLATION • OPERATIONS

Installation Manual

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# **PUMP SAFETY TIPS**

## **SAFETY APPAREL**

- Insulated work gloves when handling hot bearings or using bearing heater
- Heavy work gloves when handling parts that have sharp edges, especially impellers
- Safety glasses (with side shields) to protect eyes, especially in machine shop areas
- Steel-toed shoes to protect feet when handling parts, heavy tools, etc.
- Any other equipment needed to protect against hazardous/toxic fluids

## **COUPLING GUARDS**

- Never operate a pump without coupling guards properly installed

## **FLANGED CONNECTIONS**

- Never force piping to make connection with a pump
- Use only fasteners of proper size and material
- Ensure there are no missing fasteners
- Beware of corroded or loose fasteners

## **OPERATION**

- Do not operate below minimum rated flow, or with suction/discharge valves closed
- Do not open vent or drain valves, or remove plugs while the system is pressurized

## **MAINTENANCE SAFETY**

- Always lockout power
- Ensure pump is isolated from the system and pressure is relieved before disassembling pump, removing plugs, or disconnecting piping
- Use proper lifting and supporting equipment to prevent serious injury
- Observe proper decontamination procedures
- Know and follow company safety regulations
- Never apply heat to remove impeller

# **FOREWORD**

The design, craftsmanship, and materials used in Gusher pumps provides for optimum performance and long, trouble-free service. As with any mechanical device, proper use and periodic maintenance will enhance the performance and life of your pump. This manual is provided as a guideline for proper installation, operation and maintenance. THIS MANUAL MUST BE READ AND UNDERSTOOD BEFORE INSTALLING AND OPERATING ANY PUMP.

GUSHER PUMPS INC. SHALL NOT BE LIABLE FOR PHYSICAL INJURY, DAMAGE OR DELAYS CAUSED BY A FAILURE TO OBSERVE THE INSTRUCTIONS FOR INSTALLATION, OPERATION, AND MAINTENANCE CONTAINED IN THIS MANUAL.

## **WARRANTY**

Gusher Pumps, Inc. will replace or repair, within one year of shipment from our plant, any pump in our judgment that has failed due to defects in materials or workmanship, provided the pump has been properly installed and maintained and has not been subject to abuse. These pumps must return to Gusher Pumps, Inc. with complete history of service for inspection and warranty consideration. Gusher Pumps, Inc. does not accept the responsibility for transportation to and from our plant. Furthermore, we do not assume any responsibility for consequential damage or loss of production.

WARRANTY IS ONLY VALID WHEN GENUINE GUSHER PARTS ARE USED.

Supervision by an authorized Gusher representative is recommended to ensure proper installation.

Additional manuals can be obtained by contacting your local Gusher representative or by calling (606) 824-5001.

# **PRECAUTIONS**

## **!Warning!**

**Personal injury will result if procedures outlined in this manual are not followed.**

- **NEVER** apply heat to remove impeller. It may explode due to trapped liquid.
- **NEVER** use heat to disassemble pump. Explosion could occur due to trapped liquid.
- **NEVER** operate pump without coupling guard correctly installed.
- **NEVER** operate pump beyond the rated conditions to which the pump was sold.
- **NEVER** start pump without proper prime (sufficient liquid in pump casing).
- **NEVER** operate pump below recommended minimum flow or when dry.
- **ALWAYS** lock out power to the motor before performing pump maintenance.
- **NEVER** operate pump without safety devices installed.
- **NEVER** operate pump with discharge valve closed.
- **NEVER** operate pump with suction valve closed.
- **DO NOT** change conditions of service without approval of an authorized Gusher representative.

# NAMEPLATE INFORMATION

On the casing of every Gusher pump is a nameplate that provides information about the pump's hydraulic characteristics. This information will be used when ordering spare or replacement parts for your pump.

**Gusher**

LOW VOLTAGE HIGH VOLTAGE

TO REV. NOT INTERCHANGE 00 1 00

MODEL

SERIAL  HP

VOLTS

AMP.  PH. **3**

R.P.M.  CY.

REF  IMP.

GPM  TDH IN FT.

## RECEIVING and INSPECTION

Gusher Pumps, Inc. has taken great care in preparing your pump for shipment, however, due to circumstances beyond our control, your shipment may be received damaged. Therefore, we strongly recommend that you take a few minutes to check your pump upon receipt. Check for cracked, bent, severely misaligned (minor misalignments almost always occur during shipment), or even missing parts. If any such damage has occurred, you must report it to the delivering carrier and Gusher Pumps, Inc. immediately.

We also recommend that you check the model number, horsepower, current characteristics, g.p.m., and ft. head of pump received to ensure that you have received the pump you ordered for your specific operating conditions. If you should find some discrepancy, report it to Gusher at once.

If your pump is not going to be installed within six months, several precautions must be taken;

1. Preservative treatment of bearings and machined surfaces is required.
2. Remove packing on pumps with packed stuffing box, the stuffing box and shaft sleeve must be oil lubricated to also protect against moisture.
3. Units equipped with mechanical seals must also be oil lubricated with an oil can through the NPT port while rotating the shaft by hand.
4. Pump suction and discharge ports must be covered to prevent foreign material from getting into the pump and causing damage when pump is started at a later date.
5. Pump must be stored in a dry location.
6. Rotate pump shaft several times every other month.

# **OPERATION & MAINTENANCE**

## **• OPERATION**

Before starting the pump the reservoir should be filled to the minimum level so as to completely submerge the bottom pump impeller housing in the liquid which assures priming of the pump.

Upon initial start up we recommend that you check and maintain the minimum liquid level in your reservoir, it is also advisable to check your piping for leaks at this time. We also recommend that you check and record the pump discharge pressure, line voltage and amperage being drawn by the motor and operating temperature of the bearings.

Temperature should be checked with a pyrometer, do not check by touch. Temperatures that are hot to the touch are often well within the maximum operating temperature of 225° F.

If a problem develops check the trouble shooting list on page 10. If you are unable to solve your problem please feel free to contact the factory.

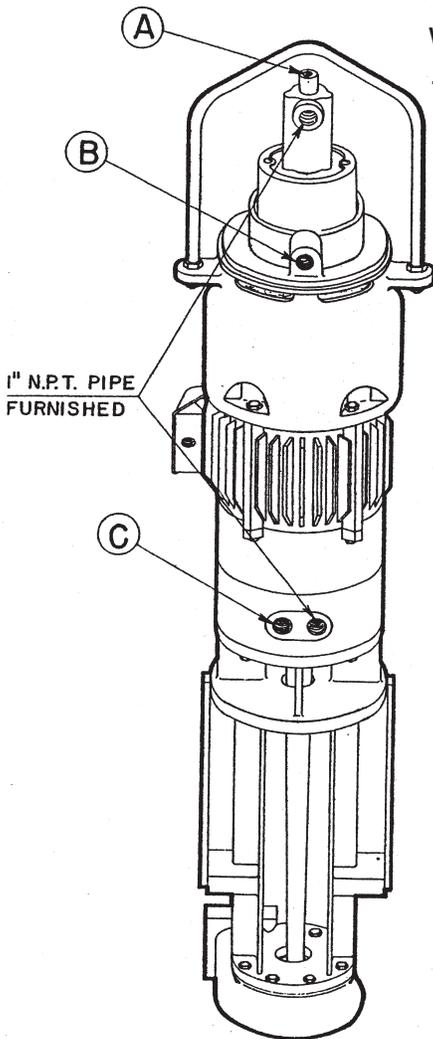
## **• MAINTENANCE**

Normally after proper installation and under normal operating conditions (8 hours daily duty in clean liquid with SG of 1) the pump requires very little attention.

Before shipment all Gusher pumps have been tested and greased at the plant, therefore lubrication is not necessary for approximately six to eight months. Remember, when lubricating ball bearings that too much grease will cause bearings to run hot, so grease bearings sparingly when it is necessary. We recommend the use of Chevron SRI #2 grease.

Because of the vast range of operating conditions it is difficult to recommend one set schedule for periodic maintenance. The more severe the application the more attention the pump will require. When a pump operates in a high temperature application (over 150°F) it is recommended to grease the ball bearings sparingly once a month (approx. 1 gram). In hostile environments where abrasives are present the pump may need to be inspected for wear quarterly. This should include inspection of the impellers, bushings and seals.

# WATER COOLING INSTRUCTIONS FOR **GUSHER**<sup>®</sup> 15028XE & XEB MOLTEN METAL PUMPS.



## (A) 1/4" N.P.T. WATER INLET

CONNECT WATER SUPPLY FOR COOLING AT THIS POINT **ONLY**. 3 TO 5 G.P.M. SHOULD PROVIDE ADEQUATE CIRCULATION FOR COOLING. CONTROL FLOW BY USE OF VALVE IN WATER SUPPLY LINE **ONLY**. DO NOT CONTROL FLOW OF WATER OUTLET BY USE OF VALVE IN OUTLET PIPING. (C)

## (B) 1" SAFETY DRAIN

THE PURPOSE OF THE SAFETY DRAIN IS TO PIPE AWAY ANY POSSIBLE LEAKAGE FROM SEAL OR PACKING WITHIN COOLING SYSTEM.

IT IS IMPORTANT THAT THIS OUTLET BE PIPED SEPARATELY TO DRAIN.

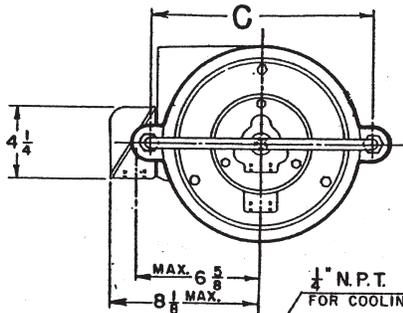
## (C) 1" N.P.T. WATER OUTLET

THE WATER OUTLET CARRIES ALL THE WATER WITHIN THE CIRCULATING COOLING SYSTEM. THIS OUTLET SHOULD BE PIPED SEPARATELY TO DRAIN.

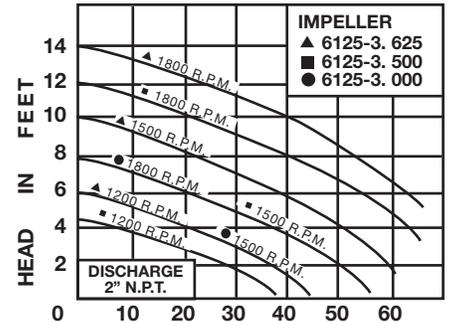
CAUTION: DO NOT USE ANY VALVES IN PIPING FROM OUTLET TO DRAIN.

{ WATER CIRCULATION SHOULD CONTINUE BEFORE AND AFTER CYCLE OF OPERATION OR UNTIL PUMP PARTS HAVE COOLED TO A TEMPERATURE OF 200° F. THIS APPLIES TO BOTH PORTABLE AND PERMANENT INSTALLATIONS.

IF THE ABOVE INSTRUCTIONS ARE FOLLOWED, SATISFACTORY RESULTS SHOULD BE OBTAINED. UNLESS THESE INSTRUCTIONS ARE COMPLIED WITH, THE MANUFACTURER IS NOT RESPONSABLE FOR PUMP WARRANTY.



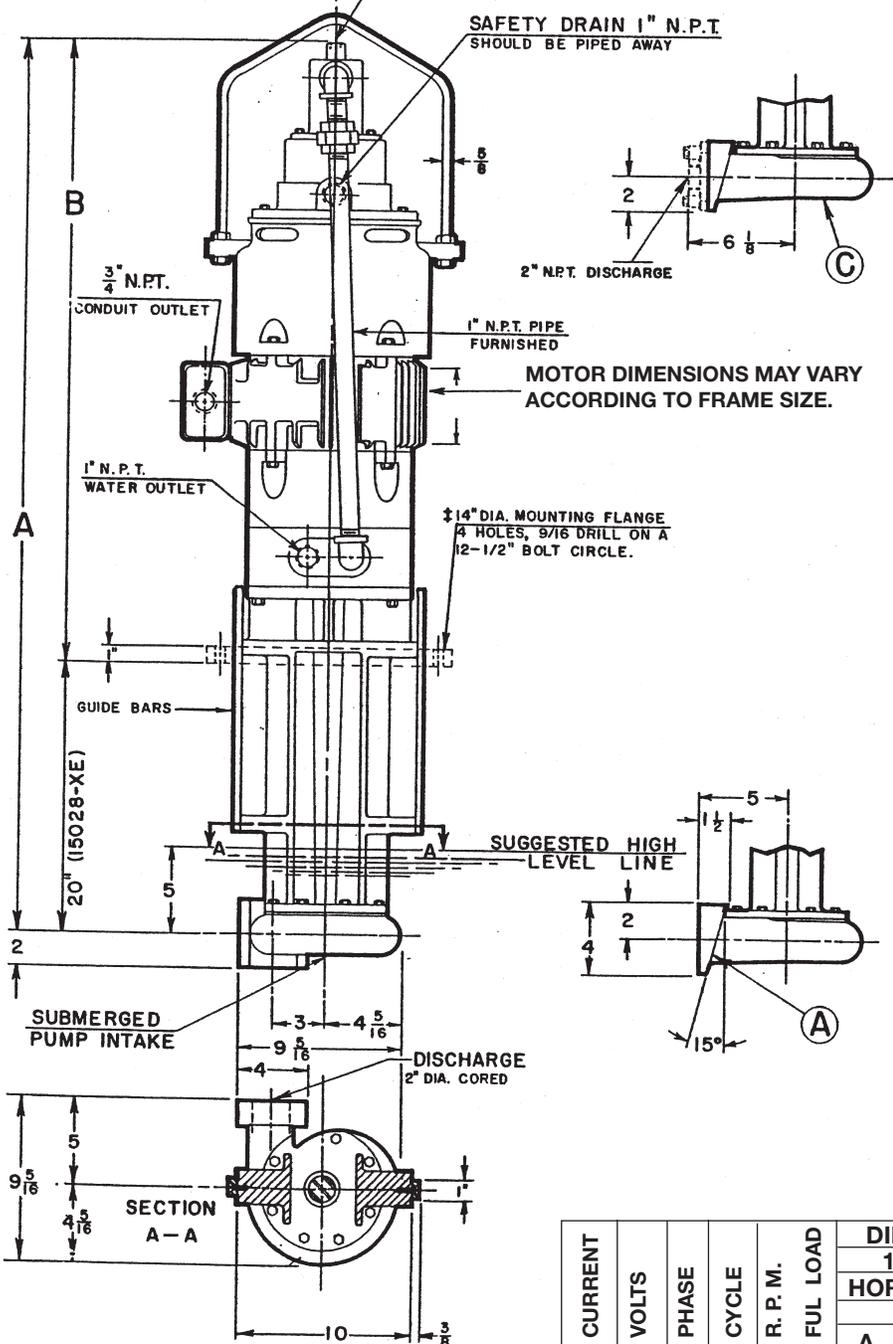
FEATURES  
 BALL BEARING T.E.F.C. MOTOR,  
 ● WATER COOLED SHAFT, BALL BEARINGS AND MOTOR, QUICK MAKE-AND-BREAK SELF-LOCKING WEDGE, DISCHARGE CONNECTIONS, HANDLES MATERIALS UP TO 1200° FAHRENHEIT.



GALLONS PER MINUTE — TIN AT 850°F. HEAD AND G.P.M. MEASURED AT DISCHARGE. TO APPROXIMATE CAPACITY IN POUNDS AND FOR DIFFERENT WEIGHT MATERIALS. ⊙

HORSE POWER RECOMMENDATION CHART FOR DIFFERENT WEIGHT MATERIALS

R.P.M.	H.P.	POUNDS PER GALLON		
		IMPELLER NUMBER		
		6125-3.000	6125-3.500	6125-3.625
1725	7 1/2	—	—	81 to 120
1140	—	—	—	—



MODEL  
**GUSHER® 15028-XE**

MOLTEN METAL PUMP, FOR MOLTEN LEAD, BABBIT, SOLDERS, TIN AND ALLOYS AT TEMPERATURES UP TO 1200° F. FOR SPELTER OR ZINC, RECOMMENDED TEMPERATURE 875° F.

WHEN ORDERING SPECIFY:

- MODEL 15028-E OR 15028-XE (IF MOUNTING FLANGE IS DESIRED ADD SUFFIX "MF" TO MODEL DESIRED (15028-EMF OR 15028-XEMF).
- DISCHARGE CONFIGURATIONS:  
 (A) MACHINED WEDGE,  
 (B) DISCHARGE FLANGE,
- IMPELLER NUMBER.
- MOTOR HORSE POWER AND
- CURRENT CHARACTERISTICS.

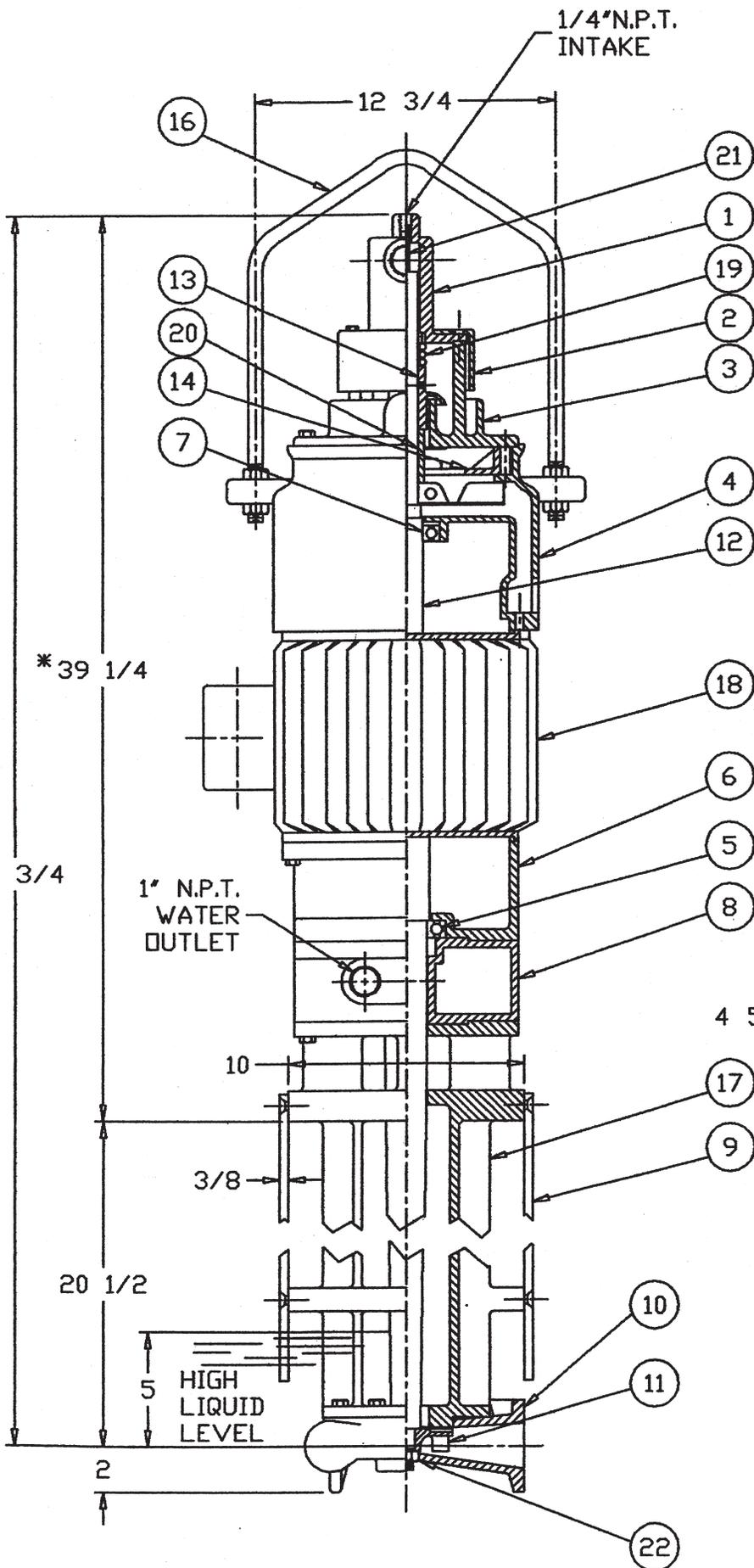
STANDARD MATERIALS:

STAINLESS STEEL SHAFT,  
 CAST IRON HOUSING,  
 CARBON STEEL SCREWS.

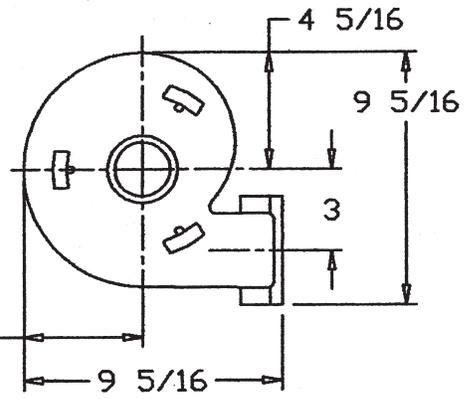
NOTE: OTHER MATERIALS AVAILABLE, QUOTATION UPON REQUEST.

● SEE PAGE 7  
 † WHEN MOUNTING FLANGE DESIRED, GUIDE BARS ARE REMOVED.  
 \* SEE PAGE 92 OR

CURRENT	VOLTS	PHASE	CYCLE	R. P. M.	FUL LOAD	DIMENSION		
						15028-XF		
						HORSEPOWER		
						7 1/2		
						A	B	C
A.C.	220 440 OR 550	2 OR 3	60	1140				
			50	950				
			60	1725	*	*		12 3/4
			50	1425				



- 1 SEAL GLAND
- 2 PACKING GLAND COVER
- 3 SEAL HEAD SUPPORT
- 4 UPPER ENDBELL
- 5 #209 BEARING
- 6 LOWER ENDBELL
- 7 #207 BEARING
- 8 LARGE WATER JACKET
- 9 GUILD BARS
- 10 IMPELLER HOUSING
- 11 IMPELLER
- 12 SHAFT
- 13 SLINGER
- 14 BAFFLE
- 16 LIFT LOOP
- 17 STEM
- 18 MOTOR
- 19 MECHANICAL SEAL
- 20 SEAL COLLAR
- 21 .25" BRASS TUBE
- 22 IMP. RETAINING NUT



BOTTOM VIEW OF HOUSING

\* VARIES WITH MOTOR MANUFACTURER

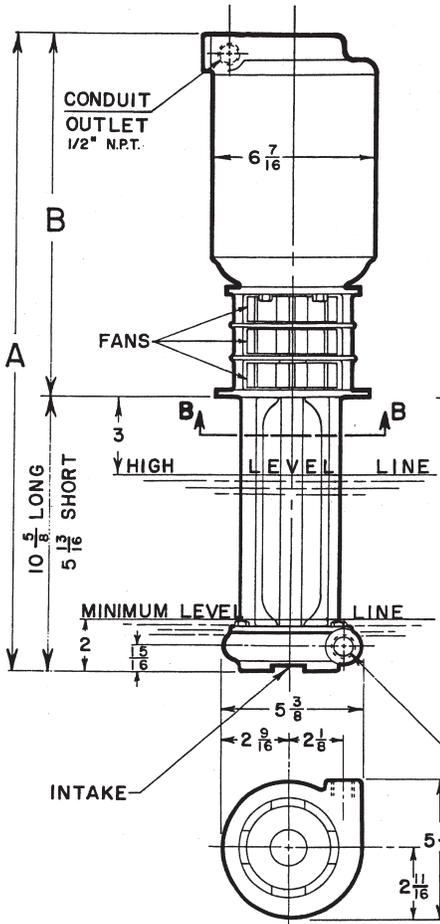
<b>CAN NOT READ THIS</b>	<b>GUSHER PUMPS</b> DIVISION OF RUTHMAN PUMP AND ENGINEERING, INC. RUTHMAN DRIVE-DRY RIDGE, KENTUCKY 41035		
	TITLE 15028-XE 7.5HP 3 PH 1750RPM		
DRAWN BY DINSER	SCALE	MATERIAL	WEIGHT
DATE 8/5/98	REV: 0.1	AK971022-1	

**MODEL 9075-M**

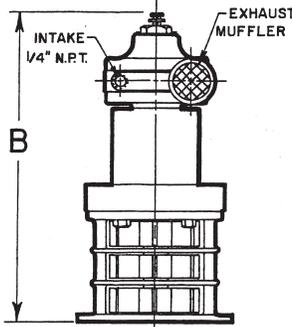
**9075M-AM**

**9075M-BD**

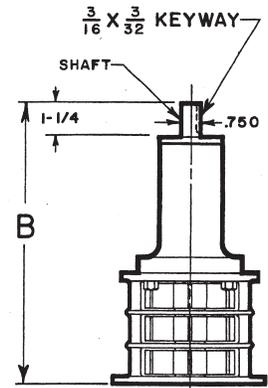
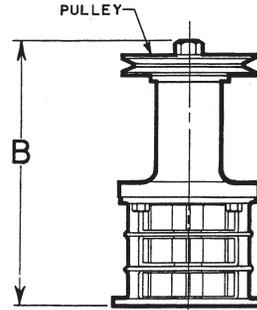
**9075M-PD**



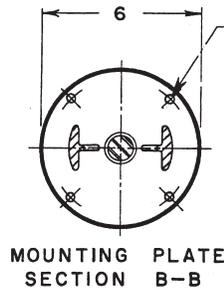
AVAILABLE WITH 4 - AM AIR MOTOR



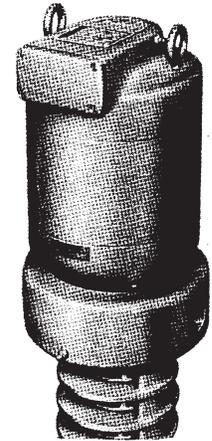
AVAILABLE WITH 5" OR 7" PITCH DIAMETER PULLEY A SIZE V-BELT.



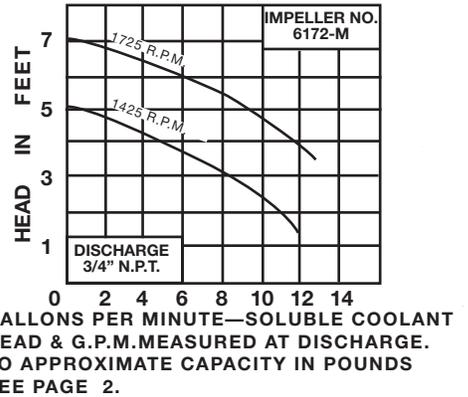
4 HOLES,  $\frac{17}{64}$  DRILL,  $5 \frac{1}{2}$ " B. C.



MODELS 9075-M, 9075-MAM, 9075-MBD and 9075-MPD are without water jacket which allows handling of liquids up to 700 F. Models 9075-MW, 9075-MWAM, 9075-MWBD and 9075-MWPD are equipped with a water jacket (as shown in photo) these models will handle liquids up to 800 F.



VOLTS	CYCLE	PHASE	R. P. M.	MODEL	DIMENSION IN INCHES									
					HORSE POWER OF MOTOR									
					A (long)			A (short)			B			
1/4	1/2	3/4	1/4	1/2	3/4	1/4	1/2	3/4	1/4	1/2	3/4			
230 460	60	3	1725	9075-M WITH ELECTRIC MOTOR	23 1/4	24 5/8	24 7/16	18 7/16	19 13/16	19 5/8	12 5/8	14	13 19/16	
230 460	60	3	1140	9075-MAM	23 1/4	24 1/8	—	18 7/16	19 5/16	—	12 5/8	13 1/2	—	
NOTE: WHEN WATER JACKET IS NEEDED FOR HIGHER TEMPERATURES, ADD 3-1/2" TO A AND B DIMENSIONS.					9075-MAM	23 3/8			18 9/16			12 3/4		
					9075-MBD	21 5/16			16 1/2			10 11/16		
					9075-MPD	21 9/16			16 3/4			10 15/16		



NOTE: 208/ 230/ 460 VOLT 60 CYCLES — 220 / 380 VOLTS 50 CYCLE — 575 VOLTS 60 CYCLE SAME DIMENSIONS AS 230/ 460 VOLTS 60 CYCLE. EXCEPT SINGLE PHASE. (OTHER CURRENT CHARACTERISTICS AVAILABLE).

● MUST BE T. E. F. C.

R.P.M	H.P.	POUNDS PER GALLON	
IMPELLER NUMBER 6172-M			
1725	1/4	1	UP TO 30
1140		1	UP TO 60
1725	1/2	31	UP TO 80
1140		61	UP TO 120
1725	3/4	81	UP TO 120

SEE TABLE ON PAGE 2 FOR DIFFERENT WEIGHT MATERIALS.

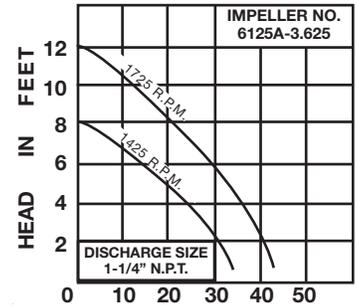
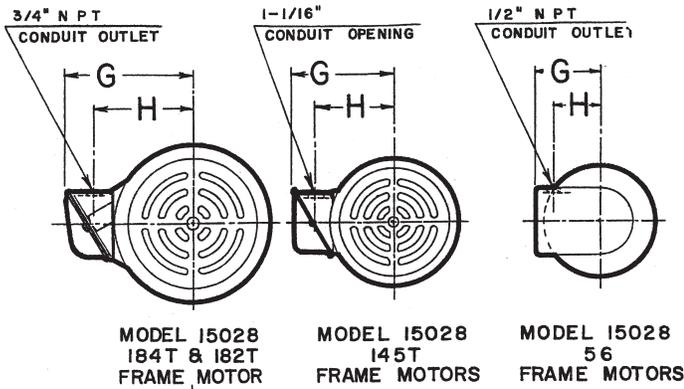
**STANDARD MATERIAL:**  
STAINLESS STEEL SHAFT,  
CAST IRON HOUSING,  
CARBON STEEL SCREWS.

**NOTE:**  
OTHER MATERIALS  
AVAILABLE, QUOTATION  
UPON REQUEST.

MODEL **GUSHER® 9075 — M**  
MOLTEN METAL AND HOT LIQUIDS PUMP

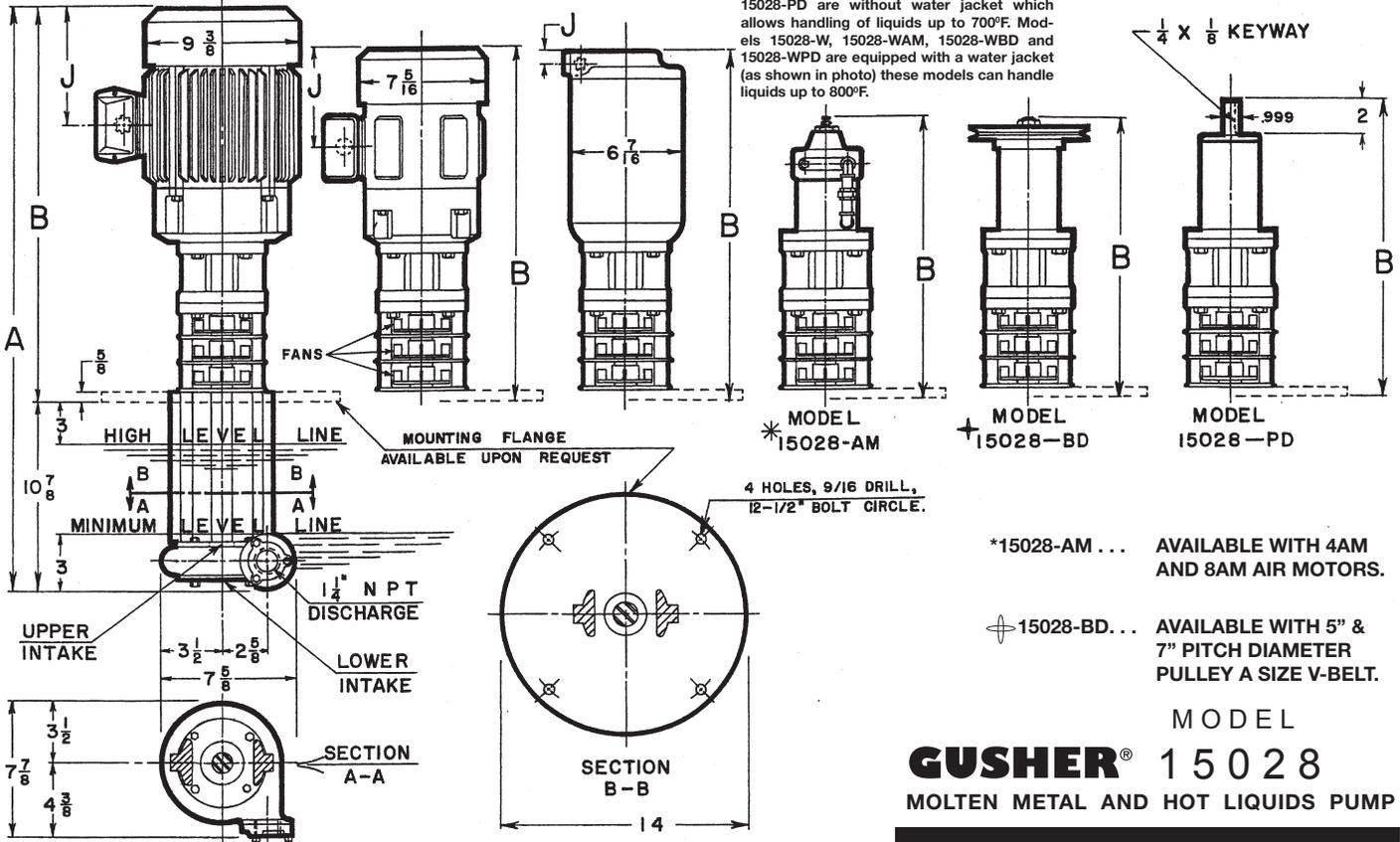
WHEN ORDERING SPECIFY:

- MODEL 9075-M, 9075-MAM, 9075-MBD, 9075-MPD, 9075-MW, 9075-MWAM, 9075-MWBD, OR 9075-MWPD (SHORT OR LONG)
- IMPELLER NUMBER,
- MOTOR HORSE POWER AND
- CURRENT CHARACTERISTICS.



GALLONS PER MINUTE — SOLUBLE COOLANT. HEAD & GPM MEASURE AT DISCHARGE. TO APPROXIMATE CAPACITY IN POUNDS SEE PAGE 2.

Models 15028, 15028-AM, 15028-BD and 15028-PD are without water jacket which allows handling of liquids up to 700°F. Models 15028-W, 15028-WAM, 15028-WBD and 15028-WPD are equipped with a water jacket (as shown in photo) these models can handle liquids up to 800°F.



- \*15028-AM... AVAILABLE WITH 4AM AND 8AM AIR MOTORS.
- †15028-BD... AVAILABLE WITH 5\"/>

## MODEL GUSHER® 15028

MOLTEN METAL AND HOT LIQUIDS PUMP

HORSE POWER RECOMMENDED FOR DIFFERENT WEIGHT MATERIALS					
POUNDS PER GALLON OF MATERIAL PUMPED	1 to 20	21 to 40	41 to 50	51 to 80	81 to 120
H.P. RECOMMENDED FOR 1725 R. P. M.	3/4	1-1/2	2	3	5

SEE TABLE ON PAGE 2 FOR DIFFERENT WEIGHT MATERIALS.

HORSE POWER	FRAME	VOLTS	R.P.M.	CYCLE	PHASE	DIMENSIONS					OTHER MEANS OF DRIVING PUMP		
						A	B	G	H	J	A	B	
3/4	5 6	230 460	1725	6 0	3	29 <sup>1</sup> / <sub>2</sub>	18 <sup>5</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>16</sub>	2 <sup>5</sup> / <sub>8</sub>	11 <sup>1</sup> / <sub>16</sub>	AIR MOTOR 15028-AM, 4 AM AIR MOTOR	27 <sup>15</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>16</sub>
1 1/2 & 2	145T					32 <sup>7</sup> / <sub>16</sub>	2 <sup>19</sup> / <sub>16</sub>	5 <sup>3</sup> / <sub>4</sub>	4 <sup>9</sup> / <sub>16</sub>	6 <sup>1</sup> / <sub>4</sub>	8 AM AIR MOTOR	33 <sup>10</sup> / <sub>16</sub>	23 <sup>1</sup> / <sub>16</sub>
3	182T					32 <sup>15</sup> / <sub>16</sub>	22 <sup>1</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>4</sub>	5 <sup>3</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	BELT DRIVE 15028-BD	27 <sup>1</sup> / <sub>4</sub>	16 <sup>3</sup> / <sub>8</sub>
5	184T					33 <sup>15</sup> / <sub>16</sub>	23 <sup>1</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>4</sub>	5 <sup>3</sup> / <sub>4</sub>	7 <sup>5</sup> / <sub>16</sub>	PLAIN DRIVE 15028-PD	28 <sup>1</sup> / <sub>16</sub>	17 <sup>3</sup> / <sub>16</sub>

▲ ALL "B" DIMENSIONS GO TO BOTTOM OF MOUNTING FLANGE.  
 ■ PUMPS WITH WATER JACKET HAVE THE SAME DIMENSIONS.

NOTE: 208/ 220/440 VOLTS 50/60 CYCLES — 220/380 VOLTS 50 CYCLES — 550 VOLTS 50/60 CYCLES SAME DIMENSIONS AS 2230/460 VOLTS 60 CYCLES. EXCEPT SINGLE PHASE. OTHER CURRENT CHARACTERISTICS AVAILABLE.

### WHEN ORDERING SPECIFY:

- MODEL 15028, 15028-AM, 15028-BD, 15028-PD, 15028-W, 15028-WAM, 15028-WBD OR 15028-WPD (WHEN MOUNTING FLANGE IS DESIRED ADD SUFFIX "MF" TO MODEL DESIRED (15028-MF, 15028-WMF ECT.).
- IMPELLER NUMBER,
- MOTOR HORSE POWER AND
- CURRENT CHARACTERISTICS.

### STANDARD MATERIALS:

STAINLESS STEEL SHAFT,  
 CAST IRON HOUSING,  
 CARBON STEEL SCREWS.

NOTE: OTHER MATERIALS AVAILABLE, QUOTATION UPON REQUEST.

# TROUBLE SHOOTING

## No liquid delivered

- Pump not primed
- Speed too low \*
- Discharge head too high
- Suction line or suction strainer is clogged
- Impeller completely clogged
- Wrong direction of rotation.
- Too much clearance between impeller and intake flange.

## Not enough water delivered

- Air leaks in suction or stuffing boxes
- Speed too low \*
- Discharge head higher than anticipated
- Too much clearance between impeller and intake flange
- Impeller partially clogged
- Not enough suction head for hot water
- Mechanical defects:
  - Wear ring is worn
  - Impeller damaged
- Impeller diameter is too small
- Foot valve is too small
- Foot valve or suction opening not submerged deep enough

## Vibration

- Bent shaft
- Pipe strain
- Impeller clogged
- Coupling alignment off

## Not enough pressure

- Speed too low \*
- Air in water
- Mechanical defects:
  - Wear ring is worn
  - Impeller damaged
- Impeller diameter too small

## Pump works for a while then loses suction

- Leaky suction line
- Water seal plugged
- Impeller clogged
- Air or gasses in liquid

## Pump takes too much power

- Speed too high \*
- Head lower than rating, pumps too much water
- Specific gravity or viscosity too high
- Mechanical defects:
  - Shaft bent
  - Power frame in bind
  - Wear ring is worn
- Impeller diameter too large
- Pump delivering too many gallons

\* When directly connected to electric motors, check for full voltage across all electrical leads



A RUTHMAN COMPANY

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

## GUSHER PUMPS LOCATIONS

### Williamstown Headquarters

115 Industrial Road  
Williamstown, KY 41097

**Phone:** 859.824.5001

**Fax:** 859.824.3011

**Email:** [Info@Gusher.com](mailto:Info@Gusher.com)

### Dry Ridge Manufacturing

22 Ruthman Drive  
Dry Ridge, KY 41035

**Phone:** 859.824.5001

**Fax:** 859.824.3011

**Email:** [Info@Gusher.com](mailto:Info@Gusher.com)

### Dry Ridge Training Facility

3565 Dixie Highway  
Dry Ridge, KY 41035

**Phone:** 859.824.5001

**Email:** [Info@Gusher.com](mailto:Info@Gusher.com)

### New Castle Sales & Service

403 North Ninth Street  
New Castle, IN 47362

**Phone:** 765.529.5624

**Fax:** 765.521.0008

**Email:** [GusherNC@Gusher.com](mailto:GusherNC@Gusher.com)

### Gusher Pumps, Shanghai

655 Caosheng Rd, Jiading District  
Shanghai, China 201808

**Phone:** +86 (021) 55151993

**Email:** [Flomo@Gusher.com](mailto:Flomo@Gusher.com)

## Ruthman Companies: A family-owned business supplying pumps for over 100 years



Ruthman Companies was co-founded in 1912 by brothers Alois and Edward Ruthman as the "Ruthman Machinery Company." Based in Cincinnati, the company serviced the steamboats that traveled the Ohio River.

In 1924, Alois conceived the first sealless centrifugal pump, coining the term 'coolant pump.' The brothers named this new pump "Gusher," giving birth to what is now Ruthman Companies' flagship brand, Gusher Pumps.

Alois' son Thomas R. Ruthman joined the family business in 1949, growing the business globally through organic growth and the acquisition of complementary technologies. In the early 1990's, Alois' grandson, Thomas G. Ruthman, became the third generation of Ruthmans in the pump business. Over the years, Ruthman Companies has expanded its product line from the original centrifugal coolant pumps to include valves, vertical turbine pumps, positive displacement pumps, gear pumps, and other specialized pump equipment, while upholding its reputation as a leader in the custom engineering of pumps for the most challenging applications.

## RUTHMAN COMPANIES MANUFACTURING DIVISIONS

### BSM Pump Corp.

180 Frenchtown Road  
North Kingstown, RI 02852

**Phone:** 401.471.6350

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