

TRANSPORTATION PUMPS



MP PUMPS, INC.

DICTIONARY AND CONVERSION TABLE

Flooded Suction The liquid source is higher than the pump and flows to the pump by gravity. Flooded suction is preferred for centrifugal pump installations.

Flow The liquid volume capacity of a pump measured in gallons-per-minute (gpm) or gallons-per-hour (gph).

Head A measure of pressure expressed in feet. This indicates the height of a column of water being lifted by the pump (neglecting friction losses in the piping). To convert head to pressure in pounds-per-square-inch (psi), divide head by 2.31.

Lift (Suction lift) Occurs when the liquid source is lower than the pump. The pumping action creates a partial vacuum and atmospheric pressure forces liquid up to the pump. The theoretical limit of suction lift is 34 feet for water, but in practical applications it is 25 feet, or less, depending on the pump style and elevation above sea level.

Pressure The force exerted on the system (pipe, tank, etc.) by the liquid within, measured in pounds-per-square-inch (psi). To convert pressure to head, in feet, multiply by 2.31 then divide by Specific Gravity.

Prime The liquid required to begin pumping action.

Seal A device mounted in the pump housing and/or on the pump shaft to prevent liquid leakage from the pump.

SEAL TYPES

• **Lip** A flexible ring (usually rubber or similar material) with the inner edge held closely against the rotating shaft by a spring.

• **Mechanical** A two-part seal with one rotating part and one stationary. Touching surfaces on the parts are highly polished and provide excellent sealing capability and life. The surfaces can be damaged by dirt or grit in the liquid.

Packing Rings of flexible material (foil, graphite or kevlar) held in the pump body gland or stuffing box by a packing nut. Permits adjustable sealing with minimal maintenance.

Specific Gravity The ratio of the weight of a given volume of liquid to the same volume of pure water (unless stated otherwise). Power requirements increase for liquids with specific gravities greater than 1.0.

Sump A well or pit that collects liquid below floor level. Sometimes refers to the waste sump or oil reservoir.

Here is a conversion guide you may want to keep handy.

Conversion Factors

Flow

Lbs of water/hr x .002	= gal min
Gal/min x 500	= lbs of water/hr
Lbs of fluid/hr x .002	= gal min
Specific gravity x .002	= gal min
Liters/min x .264	= gal/min (US)
Gpm x 3.785	= liters/min
Cu meters/hr x 4.4	= gal/min (US)
Gal/min x .227	= cu meters/hr
Kg of water/min x .264	= gal/min (US)
Gal/min x 3.8	= Kg of water/min

Pressure

Ft of water x .433	= psi
Psi x 2.31	= ft of water
Inches Hg x .491	= psi
Inches Hg x 1.133	= ft of water
ATM x 14.7	= mm Hg
ATM x 33.9	= ft of water
Kg/sq cm x 14.22	= psi
Meters of water x 1.42	= psi
ATM x 760	= mm Hg
mm Hg x .039	= inches Hg
Bar x 14.5	= psi
Newton/meter ² x 1	= Pascal
Psi x 6.9	= kPa (Kilopascal)
kPa x .145	= psi

Volume

Lbs of water x .119	= gal
Gal (Brit) x 1.2	= gal (US)
Gal x 128	= fluid ounces
Cubic ft x 7.48	= gal
Cubic in x .00433	= gal
Gal x 3.785	= liters
Liters x .264	= gal
Cubic meters x 264.2	= gal
Cubic meters x 1,000	= liters
Liters x 1,000	= cubic centimeters
Cubic centimeters x .0338	= fluid ounces
Fluid ounces x 29.57	= cubic centimeters

Length

Mils x .001	= inches
Meters x 3.281	= feet
Centimeters x .394	= inches
Millimeters x .0394	= inches
Microns x .0000394	= inches

Mass

Gal of water x 8.336	= lbs
Cubic foot of water x 62.4	= lbs
Ounces x .0625	= lbs
Kilograms x 2.2	= lbs
Lbs x .454	= Kilo
Metric ton x 2205	= lbs

Metric prefixes

Mega	= 1,000,000
Kilo	= 1,000
Hecto	= 100
Deca	= 10
Deci	= .1
Centi	= .01
Milli	= .001
Micro	= .000001

Transportation Pumps

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MP PUMPS

Committed To Excellence...



OUR HISTORY

MP Pumps was organized in Detroit in 1942, shortly after America's entry into World War II. Our first pumps were used in landing craft and other amphibious vehicles where quality and reliability were absolutely essential.

After the war, we continued to grow along with our reputation for superior design, engineering and manufacturing of centrifugal pumps for a wide variety of applications. In 1984, MP Pumps built and occupied a 100,000-square-foot facility in Fraser, Michigan. The facility houses all of our manufacturing and engineering operations as well as our administrative and marketing staffs.

Nearly 20,000 square feet of our Fraser headquarters is devoted to parts warehousing. We stock over 10,000 different parts to ensure prompt delivery of replacement parts to MP Pumps' customers worldwide.

OUR FUTURE

MP Pumps remains committed to designing and developing innovative products to meet the fluid handling requirements of both current and emerging markets. To maintain our role as a leader in the design and manufacture of centrifugal pumps, we will continue to invest in the best equipment and people.



RESEARCH & DEVELOPMENT

A strong research and development program is fundamental to innovation. A highly trained and experienced research staff is backed by a fully equipped laboratory for conducting rigorous performance and endurance testing.

Development projects range from endurance testing of new seal materials to performance testing of custom housing geometries. Prototypes are frequently subjected to elevated



Test Lab Dynamometers With AC And DC Controllers

Exceeding customer expectations ... that's what we're all about at MP Pumps. Whether you use one of our many standard centrifugal pumps or have us design a new one to meet your specific requirements, our only goal is your complete satisfaction.

Greg Peabody, President

ambient conditions to simulate actual operating environments and gain more reliable data.

Laboratory facilities include dynamometers ranging from 3 to 125 horsepower, two test cells for measuring impeller radial and thrust loads and provision for testing self-priming pumps up to 25 feet of static lift.

ENGINEERING

Solid modeling design software for manufacturing techniques and fast prototype capability gives MP Pumps' Engineering Department the ability to move rapidly from initial concept to first production.



Typical CAD Workstation With Solid Modeling

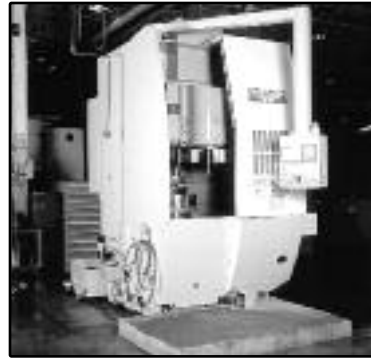
Our application design expertise encompasses a broad range of markets, among them:

- **Industrial**
- **Transportation**
- **Agriculture**
- **Marine**

Similarly, our engineers are accustomed to working with a wide range of materials. Commonly used materials include bronze, ductile iron, aluminum, cast iron and stainless steel.

MANUFACTURING

Speed, uniformity and consistent high quality translates into customer satisfaction.



Vertical CNC Machining Center

Computer numerical control (CNC) machining centers on the factory floor are linked to a central server for rapid loading of machine programs.

This direct interface speeds set-up, which, in turn, boosts productivity.

Automated machining also improves precision in milling, boring, facing, drilling and other critical operations. Greater accuracy and repeatability means consistent high quality — your next MP pump will perform as well as your last.

QUALITY CONTROL

At MP Pumps, quality is designed into every component and every pump we build. From concept, through development and on into production, our focus is to provide durable and reliable products that satisfy every customer requirement.

- **American Bureau of Shipping (ABS) Certification for select models.**
- **ISO 9001 certification assures our**



Computer Controlled Coordinate Measuring System (CMM)

customers that all products are manufactured with an uncompromised commitment to quality, and that's something every employee at MP Pumps, Inc. takes personally.

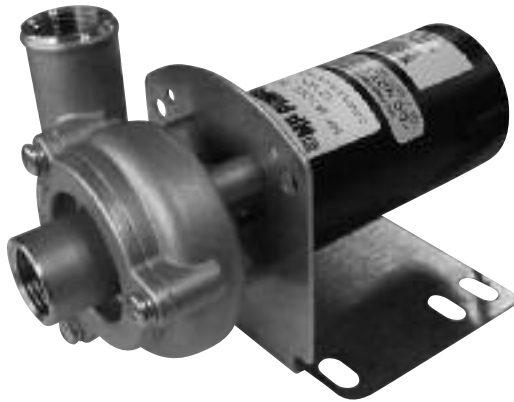
... Driven To Innovate

FRX Series

FRACTIONAL HP CENTRIFUGAL PUMP FEATURES

- CLOSE COUPLED TO ELECTRIC MOTORS
- 316 SS CONSTRUCTION
FRX 50-R POLYPHENYLENE HOUSING AND COVER
- FLOWS: 8-25 GPM
- PRESSURES: 9 TO 30 FEET HEAD
- IMPELLER: 316 STAINLESS STEEL
- MECHANICAL SEALS: CARBON/CERAMIC/VITON
- MOTOR OPTIONS: 12VDC AND 24VDC
HYDRAULIC: FRX75, FRX75 SP

MODEL	Suction	Discharge
FRX 50	1/2" NPT/1" HOSE	1/2" NPT/1" HOSE
FRX 50-R	1" HOSE	1" HOSE
FRX 75	3/4" NPT	3/4" NPT



FRX 50



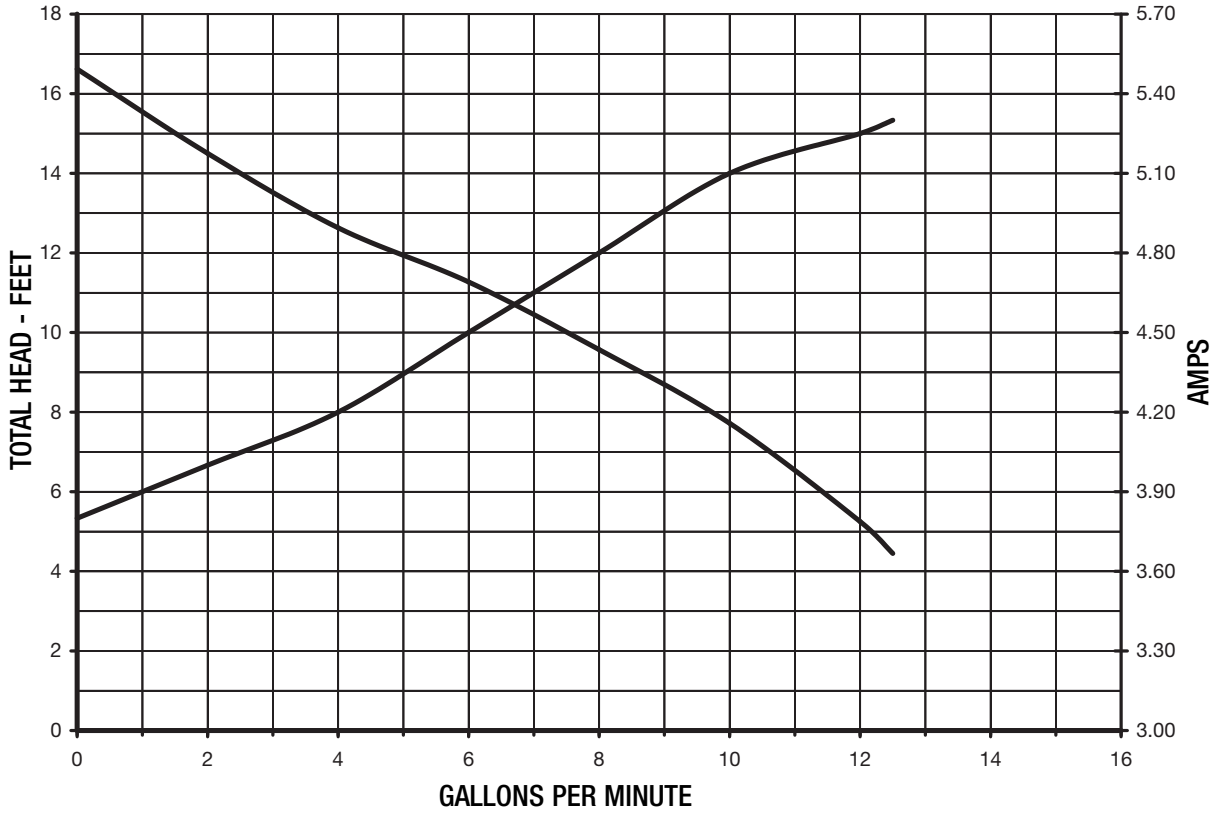
FRX 50-R



FRX 75

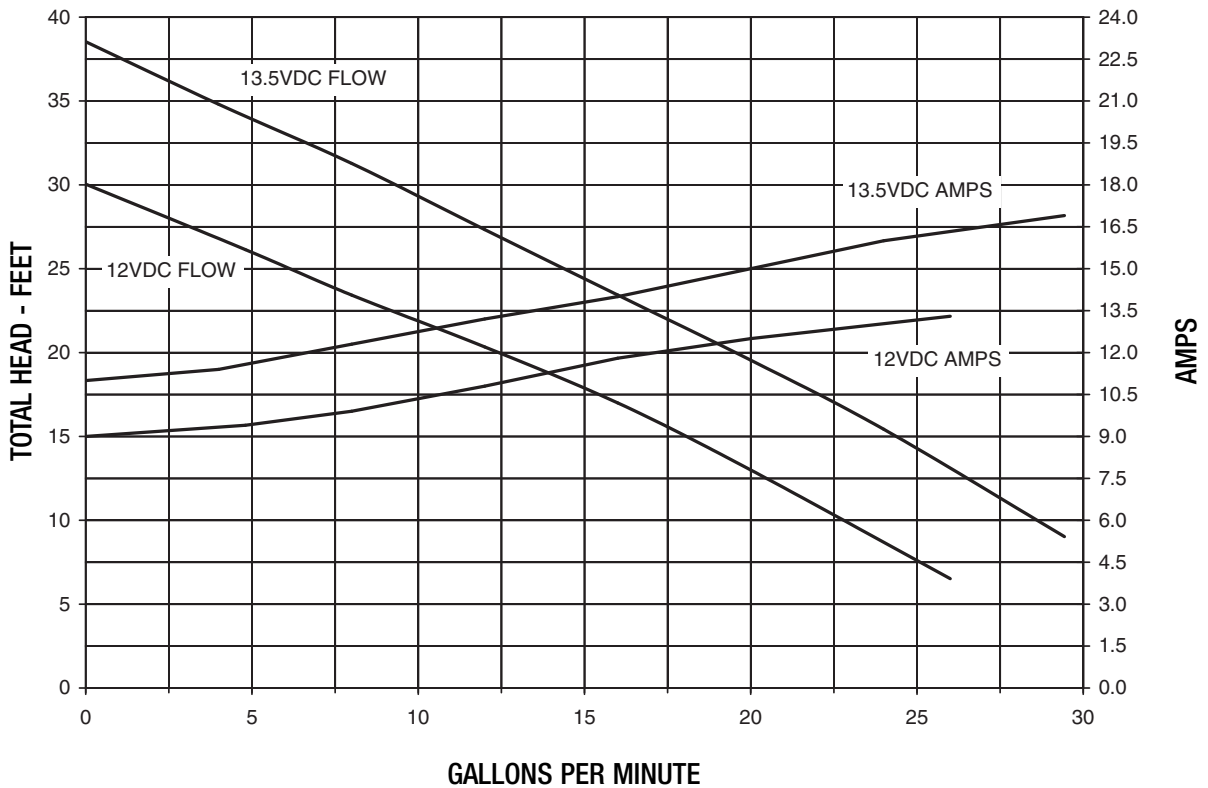
FRX 50 & FRX 50-R Performance Curves

**12V DC MOTOR
FOR 24 V DC MOTOR
DIVIDE AMPS BY TWO**

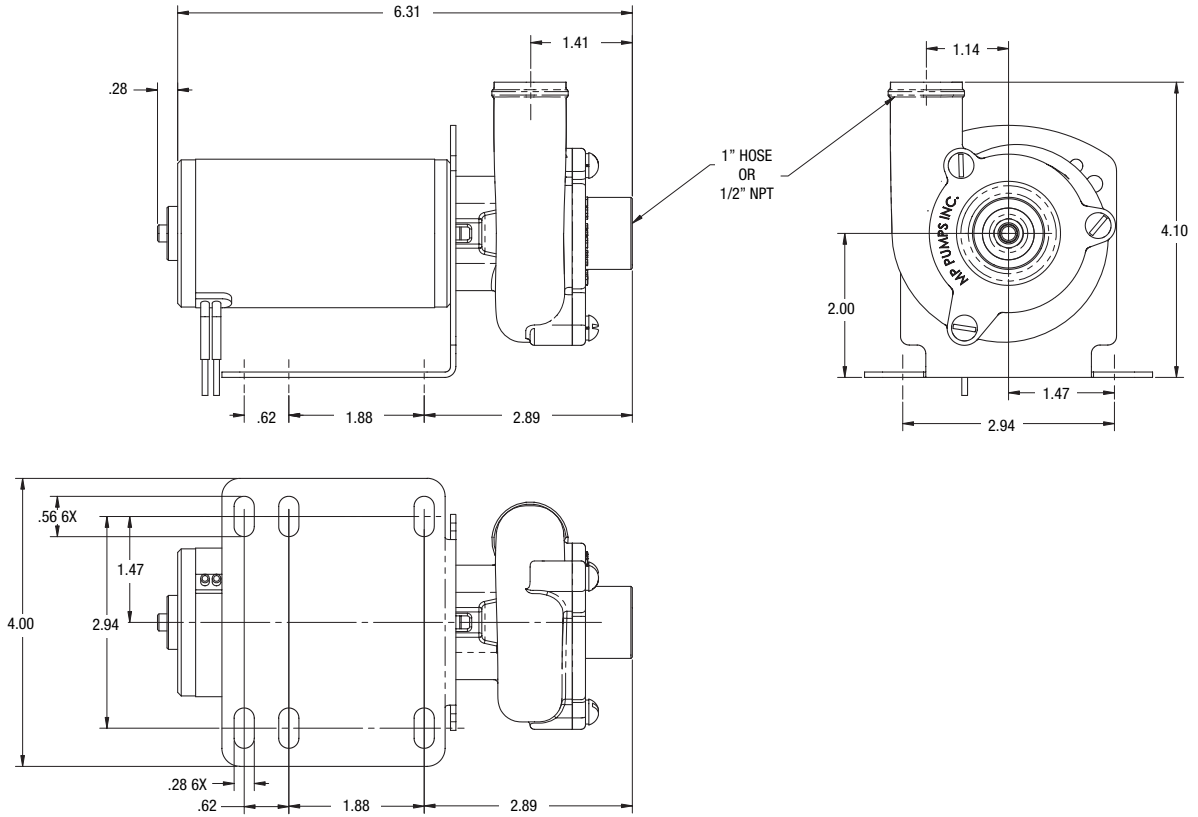


FRX 75 12 or 24V Performance Curves

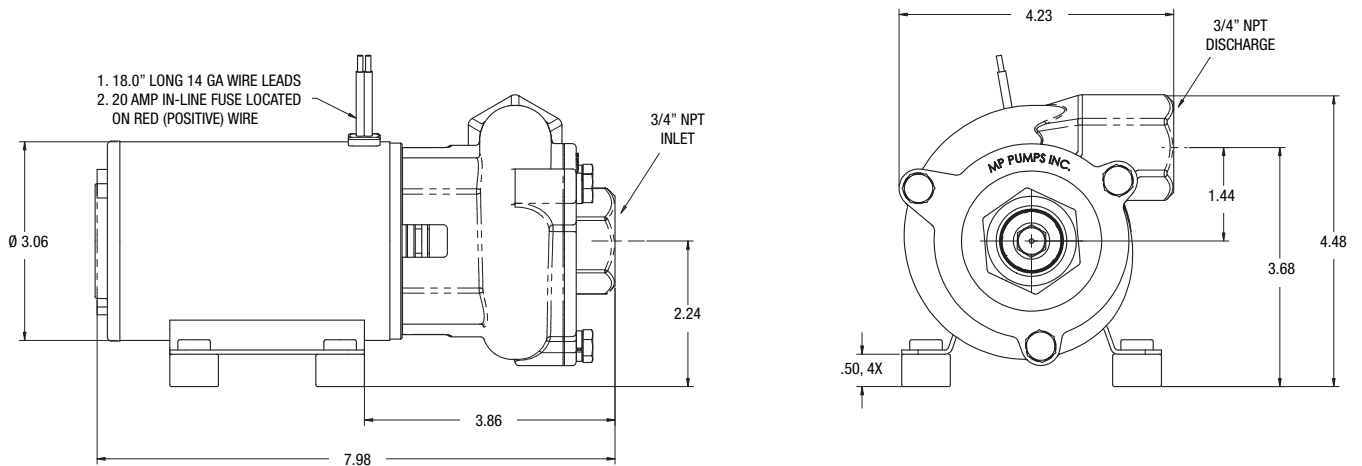
**12V DC MOTOR
FOR 24 V DC MOTOR
DIVIDE AMPS BY TWO**



FRX 50 & FRX 50-R Dimensions



FRX 75 12 or 24V Dimensions



BRONZE PUMP

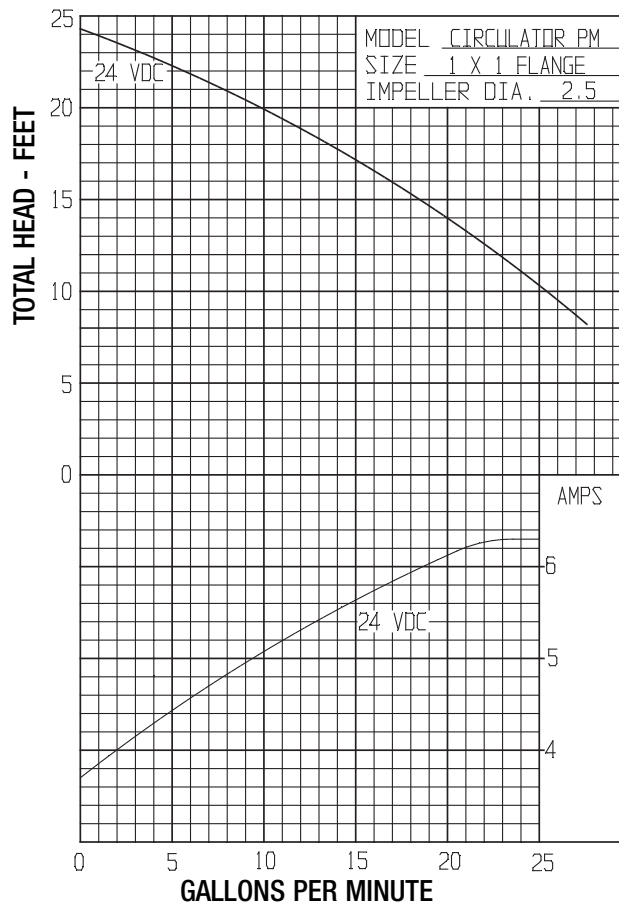
BRONZE PUMP FEATURES

- BRUSHLESS AND PERMANENT MAGNET MOTORS AVAILABLE.
- BRUSH LIFE: TO 10,000 HOURS
- IMPELLER: NICKEL STEEL
- MECHANICAL SEALS: CARBON / SILICON, SILICON / SILICON, AND CARBON / CERAMIC.
- MOTOR OPTIONS: 12VDC AND 24VDC.
- PORT OPTIONS: TWO BOLT FLANGED
- ADJUSTABLE REMOVABLE BASE

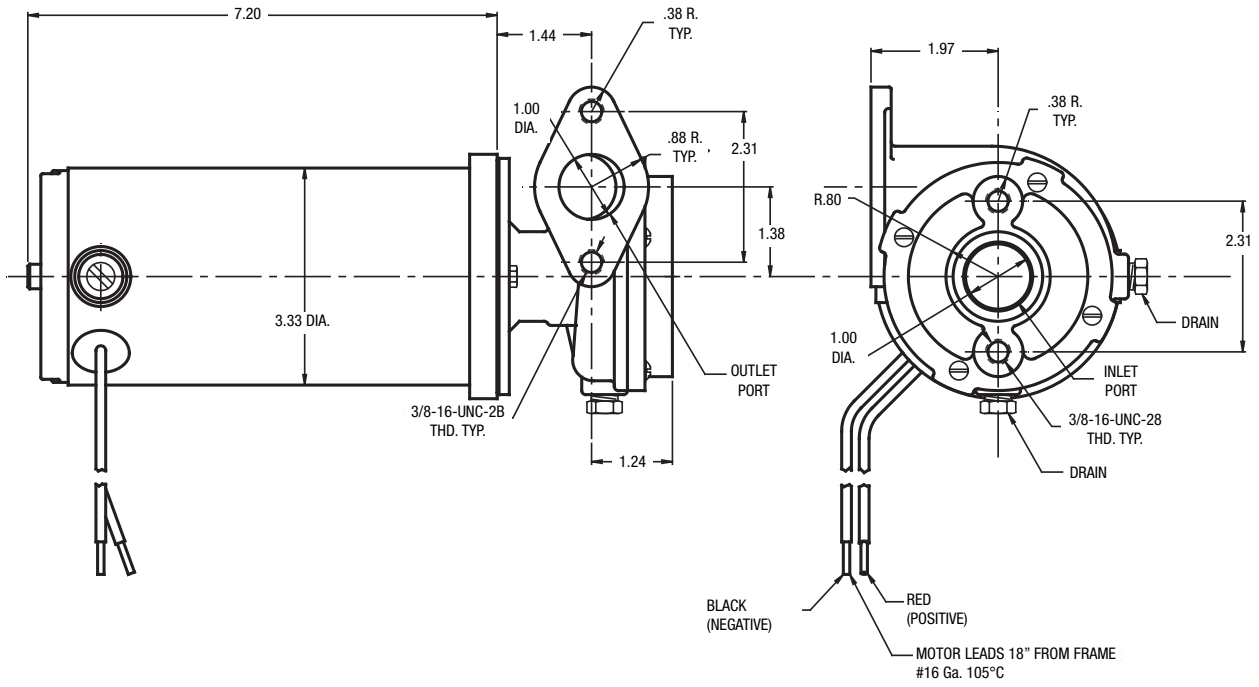


BRONZE

BRONZE Pump Performance Curves



Bronze



ALUMINUM PUMP

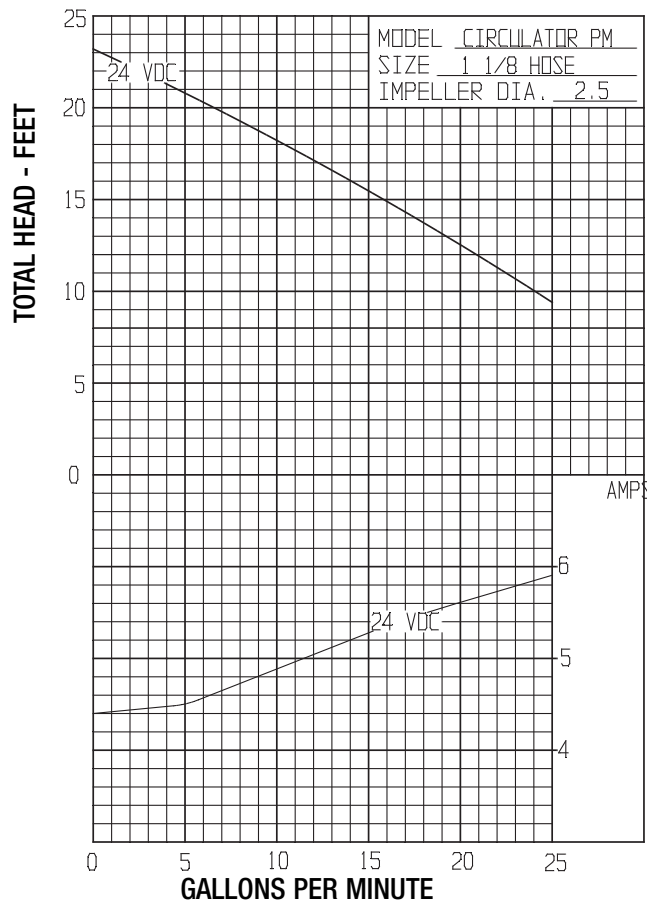
ALUMINUM PUMP FEATURES

- PERMANENT MAGNET AND BRUSHLESS MODELS.
- GASKET: O-RING
- IMPELLER: STAINLESS STEEL, NICKEL STEEL
- MECHANICAL SEALS: CARBON / SILICON, SILICON / SILICON, AND CARBON / CERAMIC.
- MOTOR OPTIONS: 12VDC AND 24VDC
- PORTS: 1 1/8" O.D. HOSE
- RIGID BASE WITH VIBRATION GROMMETS

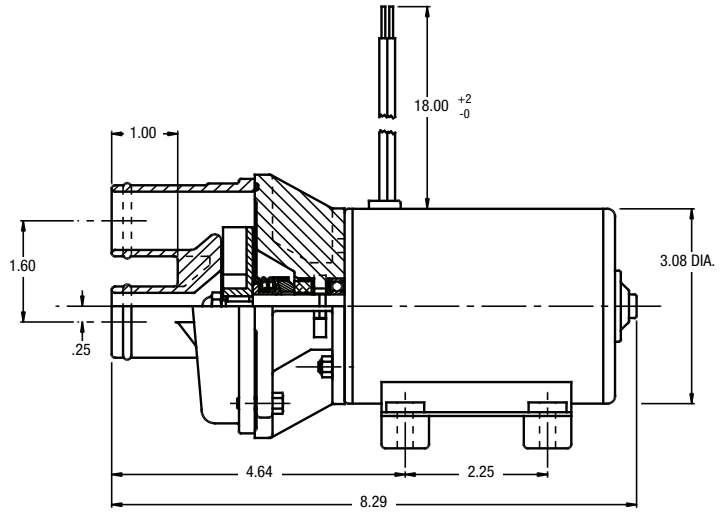
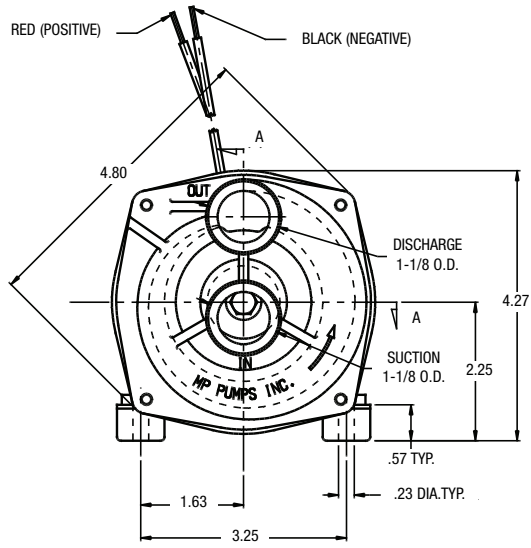


ALUMINUM

ALUMINUM Pump Performance Curves



Aluminum



MAG DRIVE PUMP

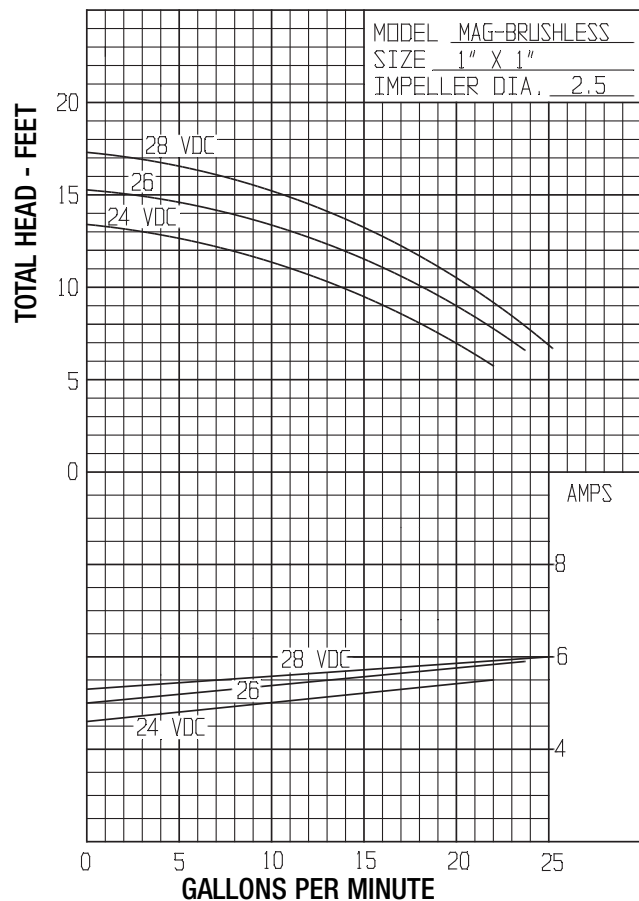
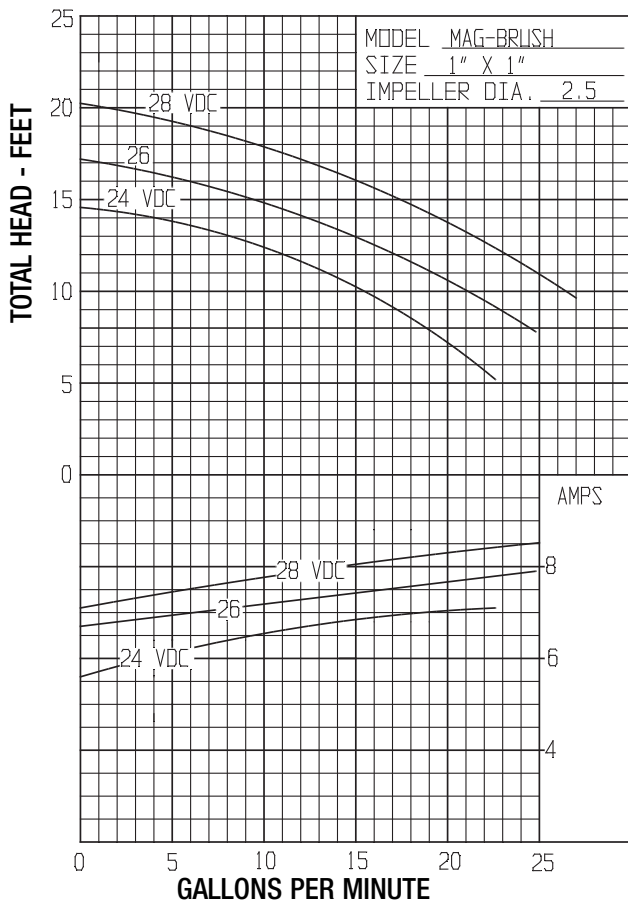
MAG DRIVE PUMP FEATURES

- BRUSHLESS AND BRUSH MOTORS
- HOUSING SEAL: BUNA N O-RING
- HOUSING AND ADAPTOR: 356T-6 ALUMINUM
- IMPELLER: STAINLESS STEEL
- MOTOR OPTIONS: 12VDC AND 24VDC.
- MOTOR THERMALLY PROTECTED FOR OVERLOAD OR OVERTEMPERATURE WITH AUTOMATIC RESET.
- ENCLOSURE IS SPLASH RESISTANT.
- SEALED CONTROL ELECTRONICS.
- ADJUSTABLE REMOVABLE BASE

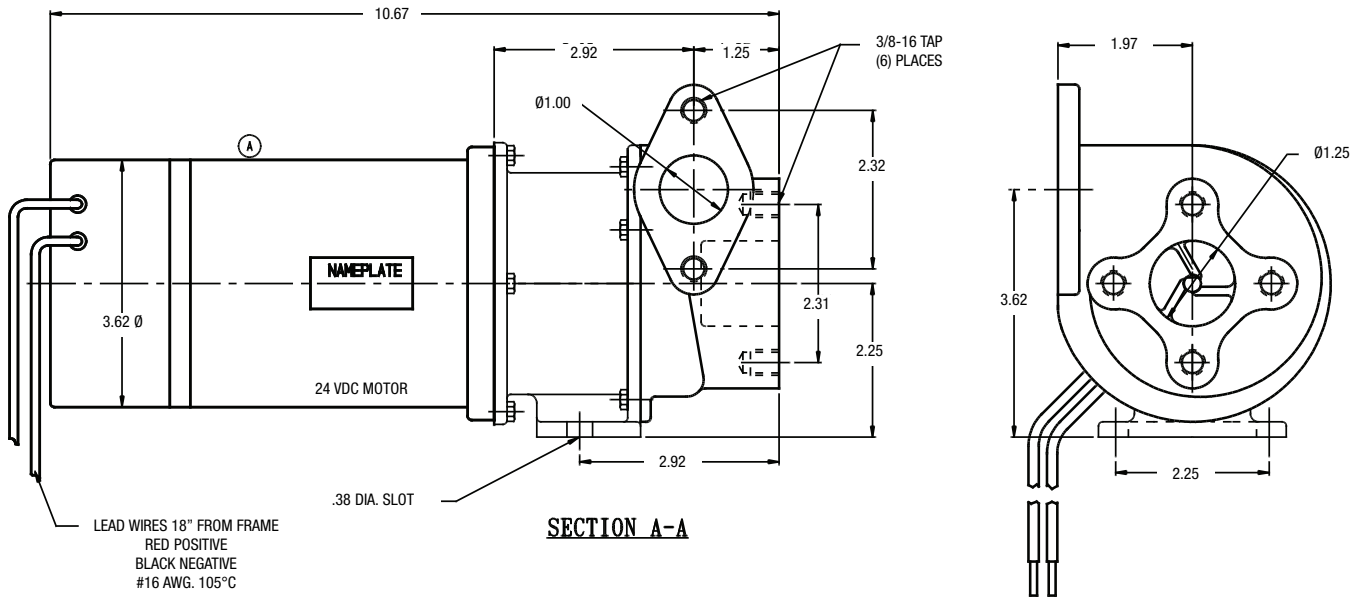


MAG DRIVE

MAG DRIVE Pump Performance Curves



Mag Drive



SBC PUMP

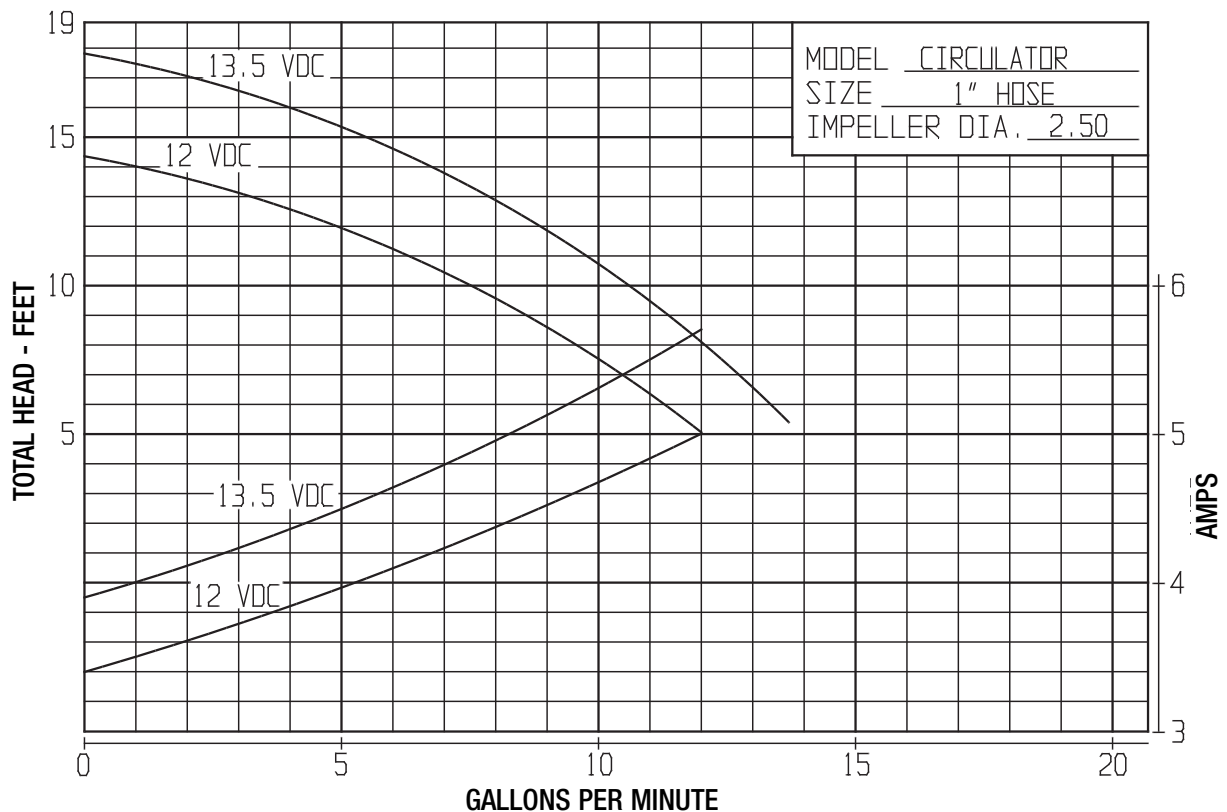
SBC PUMP FEATURES

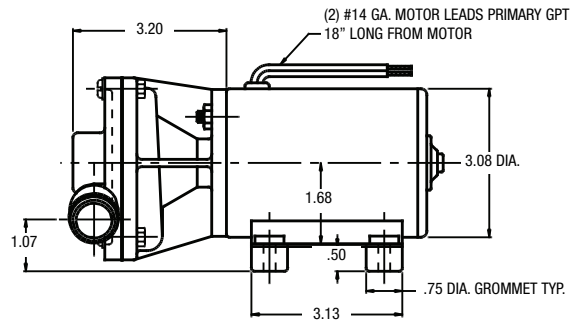
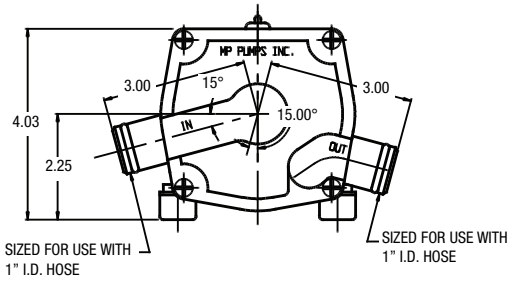
- ALUMINUM ALLOY CONSTRUCTION
- IMPELLER: NICKEL STEEL
- MECHANICAL SEALS: CARBON / CERAMIC / BUNA N
- PORTS: 1" I.D. HOSE
- MOTOR OPTIONS: 12VDC AND 24VDC
- RIGID BASE WITH VIBRATION GROMMETS



SBC

SBC Pump Performance Curves





SCHOOL BUS PUMP

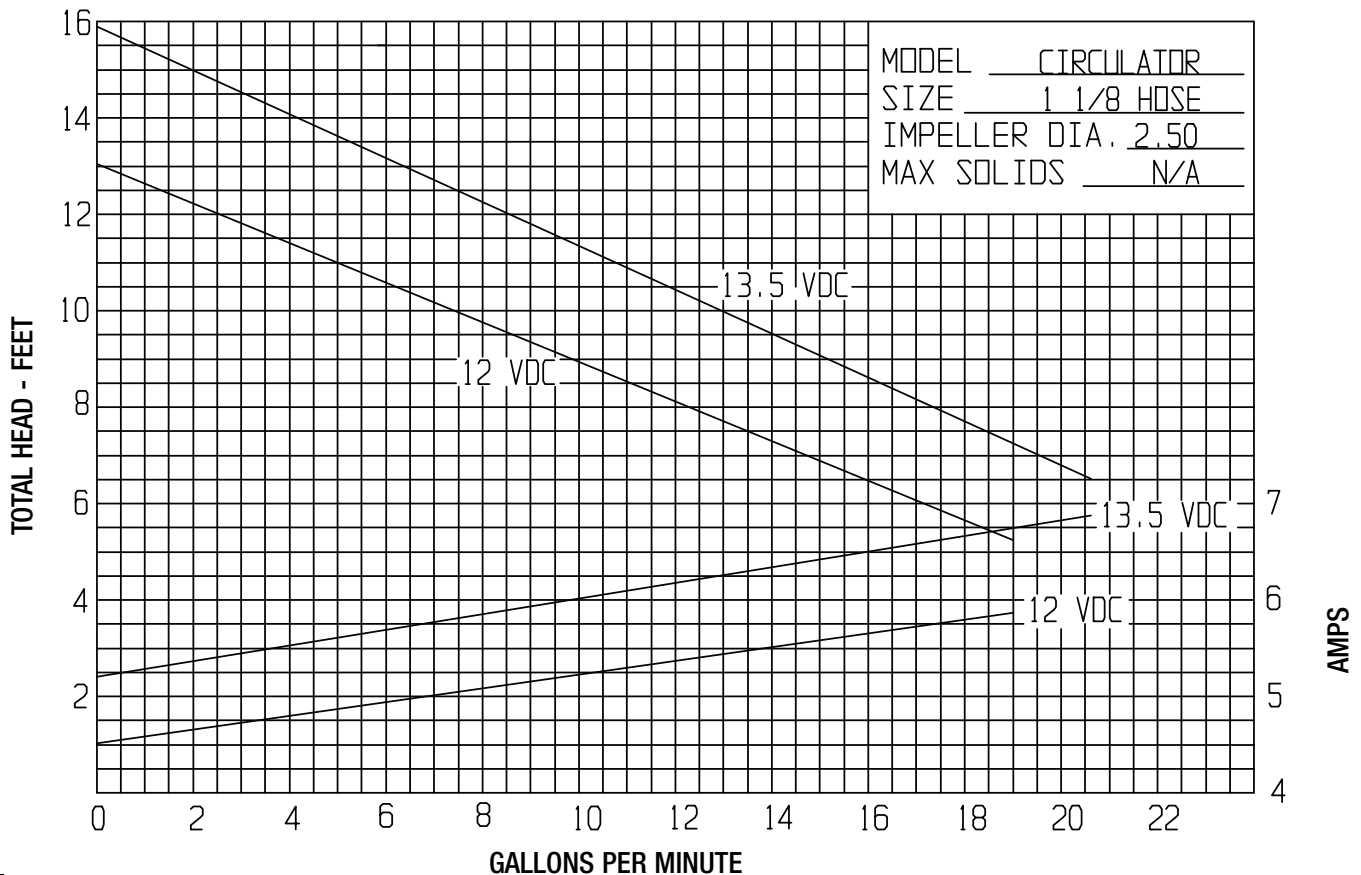
SCHOOL BUS PUMP FEATURES

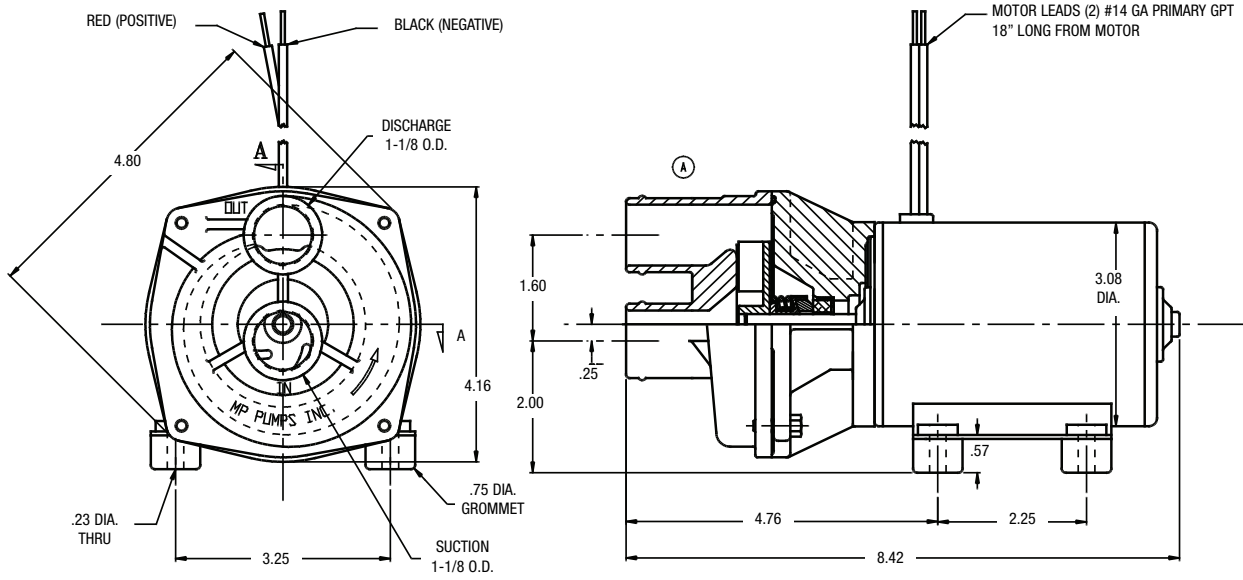
- PERMANENT MAGNET AND BRUSHLESS MODELS.
- GASKET: O-RING
- MECHANICAL SEALS: CARBON / SILICON, SILICON / SILICON, AND CARBON / CERAMIC.
- IMPELLER: STAINLESS STEEL, NICKEL STEEL
- MOTOR OPTIONS: 12VDC AND 24VDC
- PORTS: 1 1/8" O.D. HOSE
- RIGID BASE WITH VIBRATION GROMMETS



SCHOOL BUS

School Bus Pump Performance Curves





Customer Support Worldwide

IT'S SIMPLE TO CONTACT MP PUMPS FOR INFORMATION



MP Pumps Operates In A Global Marketplace.

We are keenly aware of the need to provide prompt delivery of our products to customers worldwide and have in place an international network of distributors to meet this need.

“It is the policy of MP Pumps to satisfy customers by consistently supplying them with products that fully meet their requirements. Customer Satisfaction Today, Tomorrow, Always.”

— Mission Statement

Our computerized inventory control system tracks the more than 10,000 parts we stock in our 20,000-square-foot parts warehouse. We also maintain E-mail capability and a site on the worldwide web to speed communication between us, our distributor network and our customers.

800-563-8006

(Outside the U.S., 586-293-8240)

FAX: 586-293-8469

www.mppumps.com

MP PUMPS, INC. LIMITED WARRANTY FOR NEW PUMPS MANUFACTURED BY MP PUMPS

A. PRODUCTS WARRANTED

MP PUMPS, Inc., a Michigan Company ("MP PUMPS") subject to the limitations contained below, will at its option, repair or replace, without charge for parts or labor only, any part of a new pump manufactured by MP PUMPS (an "MP Pump") which is found, upon examination by MP PUMPS' factory in Fraser, Michigan, to be DEFECTIVE IN MATERIAL AND/OR WORKMANSHIP if received by such factory for such examination within twelve months from the date of sale to the original consumer purchaser.

B. PRODUCTS AND ITEMS NOT WARRANTED

1. Alterations or Modifications of MP Pump
All obligations under this warranty shall be terminated if the new MP Pump is altered or modified in any way.
2. Accidents, Normal Maintenance, Failure To Follow MP PUMPS' Instruction Bulletin.
3. Any MP Pump which is not completely and properly decontaminated prior to return to MP PUMPS.
4. Any MP Pump returned without an identification of the material pumped by your MP Pump on the "Return Goods Authorization Form."

This warranty covers only parts of a new MP Pump which are found upon examination to be defective in material or workmanship as delivered to the original consumer purchaser. This warranty does not cover defects caused by depreciation or damage caused by normal wear, accidents, improper maintenance, improper use or abuse of the product, failure to follow the instructions contained in an Instruction Bulletin for the operation of the pump and parts. The cost of normal maintenance and replacement of service items which are not defective, shall be paid for by the original consumer purchaser. This warranty is VOID if an MP Pump is not decontaminated prior to return to MP PUMPS or if the material pumped is not identified as provided below.

C. SECURING WARRANTY SERVICE

Warranty service can be arranged by contacting MP PUMPS, Inc., c/o Service Manager, 34800 Bennett Drive, Fraser, Michigan 48026. Warranty service can only be performed by MP PUMPS at its factory in Fraser, Michigan. At the time of requesting warranty service, evidence must be presented of the date of sale to the original consumer purchaser. MP PUMPS, at its option, will supply you with a "Return Goods Authorization Form" ("RGA") or will prepare an RGA on your behalf and provide you with an RGA reference number. The product pumped must be identified on the RGA. All parts returned to MP PUMPS for any reason must be completely and properly decontaminated prior to delivery to MP PUMPS. If the product pumped requires a Material Safety Data Sheet ("MSDS"), reference to this fact must be indicated under "Application Information" on the RGA form which must be returned with the part(s) or if an RGA was completed on your behalf you must provide your RGA reference number. A copy of the MSDS must also be included with the returned RGA forms or with your RGA reference number. New or unused parts need not be decontaminated. This fact must be indicated under "Application Information" on the RGA form which must be returned with the part(s). The original consumer purchaser shall pay any charges for making service calls and/or for transporting the product to and from the place where the inspection and/or warranty work is performed. The part submitted for inspection and/or warranty work will be returned to the sender at the sender's expense or scrapped at MP PUMPS. No credits will be issued. The original consumer purchaser shall be responsible for any damage or loss incurred in connection with the transportation of the MP Pump and/or of part or parts of the MP Pump submitted for inspection and/or warranty work.

D. NO ADDITIONAL WARRANTIES OR REPRESENTATIONS

The foregoing EXPRESS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS WARRANTIES. Neither MP PUMPS nor any of its affiliates make any warranties, representations or promises, written or verbal, as to the quality of the MP PUMP or its parts other than those set forth herein.

ANY IMPLIED WARRANTIES (INCLUDING, BUT NOT LIMITED TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE) TO THE EXTENT EITHER APPLIES TO A PART OF AN MP PUMP SHALL BE LIMITED IN DURATION TO THE PERIODS OF THE EXPRESS WARRANTIES AS DEFINED IN PARAGRAPH A. Some States do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

E. LIMITATION OF DAMAGES

IN NO EVENT WILL MP PUMPS BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES AND/OR EXPENSES. Some States do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may have other legal rights which vary from State to State.

F. NO DISTRIBUTOR/DEALER WARRANTY

MP PUMPS neither assumes nor authorizes any other person, natural or corporate, to assume for MP PUMPS any other obligations or liabilities in connection with or with respect to any part or parts of an MP Pump. The seller, dealer or distributor of a part or parts of an MP Pump has no authority to make any representations or promises on behalf of MP PUMPS or to modify the terms or limitations of this warranty in any way. The seller, dealer or distributor makes no warranty of his own on any item warranted by MP PUMPS and makes no warranty on other items, unless such seller or dealer delivers to the purchaser a separate written warranty document in which the seller or the dealer individually and specifically on its own behalf, warrants the terms of items.



MP PUMPS, INC.

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