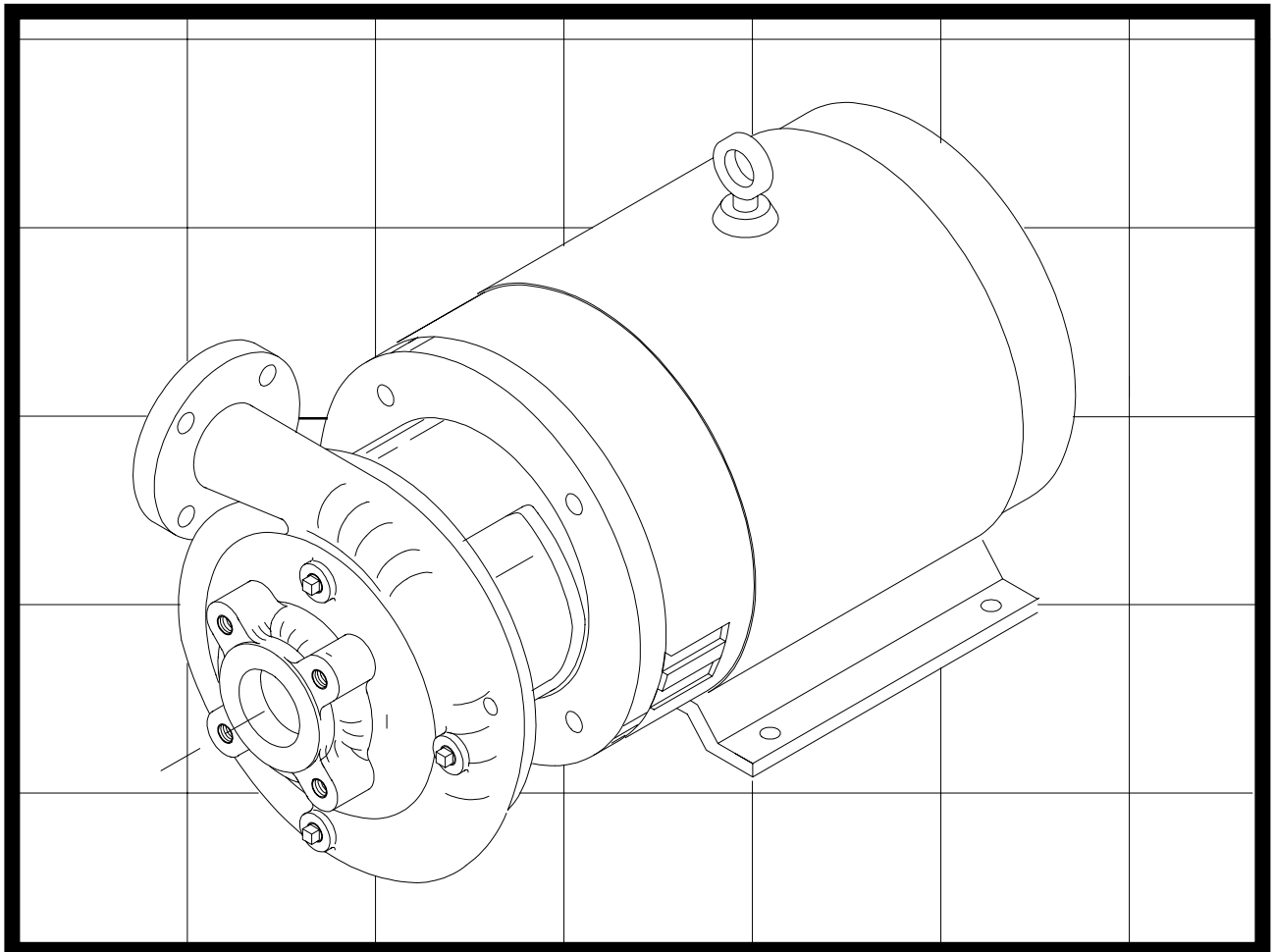


# OPERATION AND MAINTENANCE MANUAL

## EP SERIES CLOSE COUPLED ELECTRIC PUMPS





# MONARCH INDUSTRIES

## Total Quality Principles

1. **The definition of Quality is conformance to requirements.**
2. **The way to achieve Quality is prevention not correction. Do it right the first time.**
3. **Quality and the cost of poor quality are measurable.**
4. **Total Quality is a never ending process of continuous improvement.**
5. **Total Quality is everyone's job, and Total Quality affects all aspects of a job.**
6. **Total Quality means meeting or exceeding the expectations of all our customers, internal and external.**
7. **We will encourage all employees to become actively involved in Total Quality** by providing training and an environment for continuous improvement. We encourage people to experiment and innovate without fear of failure or retribution.

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**A. W. Janke**  
**President.**

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## 1. SAFETY INSTRUCTIONS

- The **SAFETY ALERT** symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



- The **SAFETY ALERT SYMBOL** identifies important safety messages in the manual and on the product. When you see this symbol be alert to the possibility of personal injury or death. Follow the instructions in the safety message. **Note the use of the signal words CAUTION, WARNING and DANGER with safety messages.** These words are used in the following situations.

**CAUTION** Unsafe practices which could result in personal injury if proper practices are not adhered to, or a reminder of good safety practices.

**WARNING** A specific hazard or unsafe practice which could result in severe personal injury or death if proper precautions are not taken.

**DANGER** An immediate and specific hazard which will result in severe personal injury or death if the proper precautions are not taken.



# CAUTION

**SAFETY DECALS MUST BE ON THE PRODUCT AT ALL TIMES. IF THIS DECAL IS NOT CLEARLY LEGIBLE ON THE ELECTRIC MOTOR, REORDER FROM YOUR MONARCH DEALER UNDER CODE # 233874**



# CAUTION

- REVIEW INSTRUCTIONS BEFORE OPERATING.
- ELECTRICAL INSTALLATIONS MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL CODES AND ORDINANCES.



# WARNING

## RISK OF ELECTRIC SHOCK

- HAVE AN ELECTRICIAN PROVIDE ELECTRICAL POWER TO THE MOTOR.
- ENSURE LEAD AND GROUND WIRES ARE PROPERLY WATERPROOFED AND SECURELY CONNECTED.
- ENSURE MOTOR IS PROPERLY GROUNDED. REFER TO "ELECTRICAL CONNECTION" SECTION IN OPERATION AND MAINTENANCE MANUAL.
- MOTOR MUST BE GUARDED TO REDUCE ELECTRIC SHOCK HAZARD.
- ALWAYS DISCONNECT POWER BEFORE SERVICING.
- KEEP OPERATING AREA AS DRY AS POSSIBLE.

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## 2. SYSTEM DESIGN

- The selection of the correct pump for the application and the design of the suction and discharge piping should be done by a qualified pump professional based on sound hydraulic design practices. The Monarch Technical Manual is a useful reference guide for system design. Consult your Monarch dealer for assistance. The electric motor must be selected in accordance with local electrical codes, specific application requirements and the available power supply. When designing the system the following design parameters must be determined and should be recorded below for future reference.
- Actual values should be recorded at startup.

	Design Values		Actual Values	
- Dynamic Suction Lift (Gauge reading at inlet)	_____	FT.	_____	FT. (Vacuum or pressure)
- Total Dynamic Discharge Head (Gauge reading at discharge)	_____	FT.	_____	FT. (Pressure)
- Electric Motor Current	_____	Amps.	_____	Amps.

### 3. MOTOR MOUNTING

- The electric motor must be anchored to a structural steel base using bolts which fit the holes in the motor base snugly. Use all the holes provided in the motor base.
- The base should be securely anchored to a concrete floor or similar structure.

### 4. ELECTRICAL CONNECTION



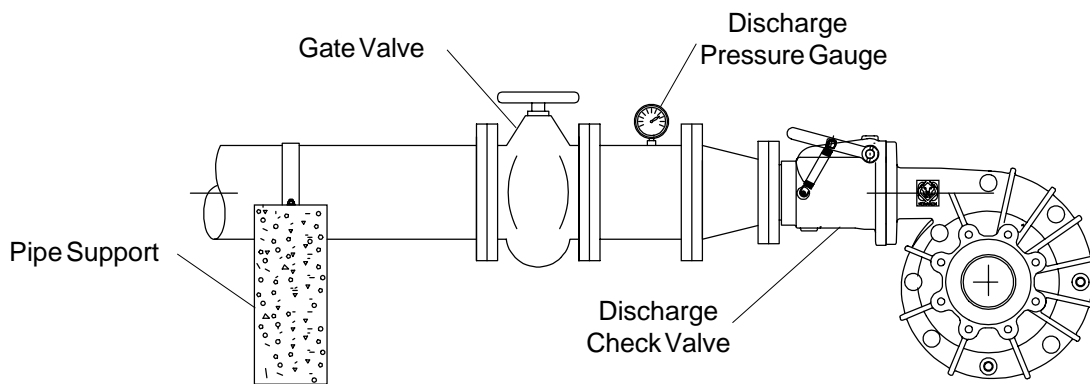
**WARNING -HAVE A QUALIFIED ELECTRICIAN CONNECT THE MOTOR. DO NOT ATTEMPT TO DO IT YOURSELF.**

- The motor must be installed in accordance with all applicable Electrical codes. It is important to size wiring so that the motor will receive full rated voltage under full load operation.

### 5. DISCHARGE PIPING

- Discharge piping should be sized according to the system design. It is important to include a discharge check valve in the system to protect the pump against “water hammer”. Water hammer can occur if air pockets form in the discharge piping and release suddenly causing pressure spikes which could be harmful to the pump.
- When using double mechanical seals a flush line should be connected to the seal box. This line should be connected to a clean water supply with a pressure above the shutoff pressure of the pump.

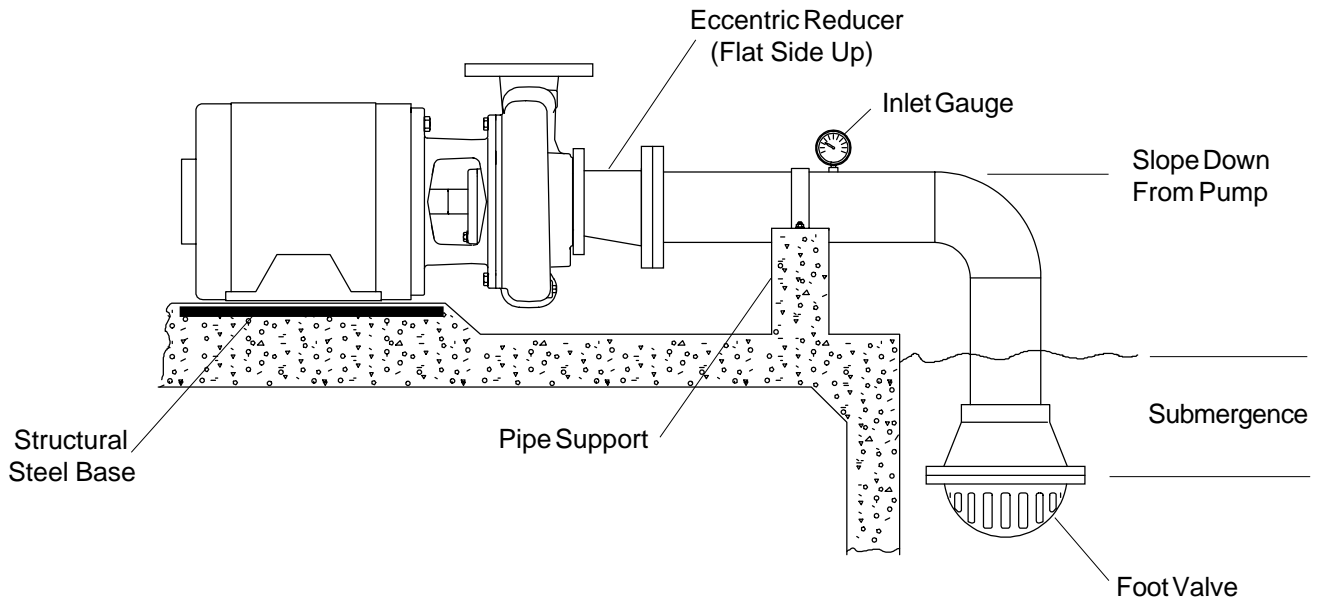
#### RECOMMENDED DISCHARGE PIPING



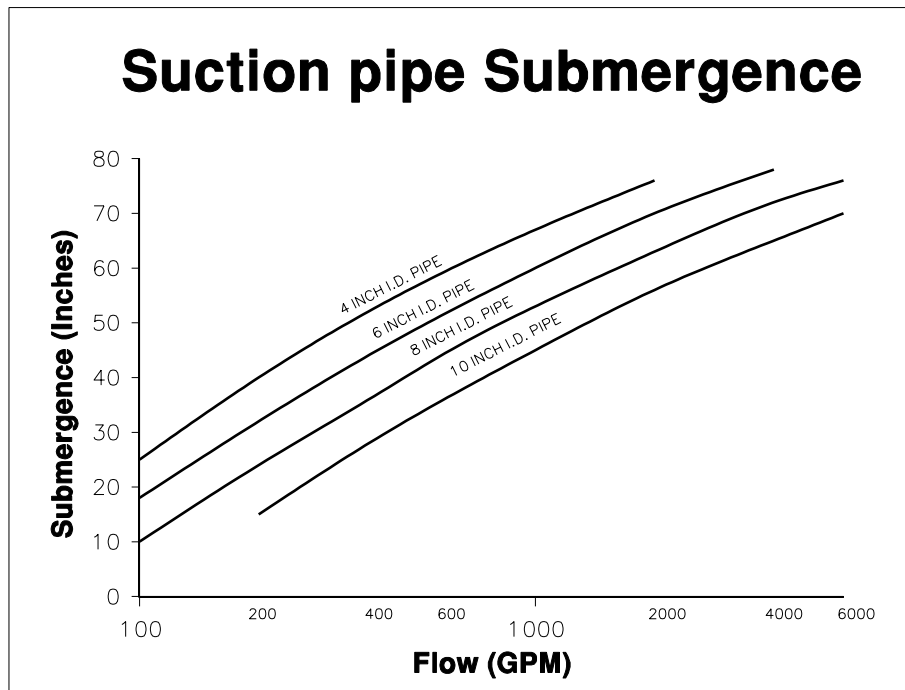
## 6. SUCTION PIPING

- Suction piping must be sized such that the suction at the pump inlet does not exceed the net positive suction head (NPSH) available. As indicated in the illustration care must be taken to ensure that the inlet piping does not have any high spots which could trap air and cause the pump to lose prime.

### RECOMMENDED SUCTION PIPING



- Proper pipe submergence is required to prevent vortexing at the inlet. The following chart indicates submergence required.



## 7. STARTUP CHECKLIST

Once the installation is complete the following startup procedure should be followed.

1. Close the discharge gate valve.
2. Prime the system until the pump casing is full.
3. Replace the priming plug and tighten.
4. Check pump rotation. (Clockwise viewed from Drive End)



**WARNING - IF ROTATION IS INCORRECT HAVE A QUALIFIED ELECTRICIAN CORRECT IT. DO NOT ATTEMPT TO CORRECT IT YOURSELF.**

5. If the pump has a packing, adjust the gland until it leaks 10-12 drops per minute.
6. Start the pump. If it does not prime immediately turn it off and re-prime. Running the pump without prime will damage the seal.
7. Open the discharge gate valve.



**WARNING - DO NOT RUN THE PUMP FOR MORE THAN ONE MINUTE WITH THE DISCHARGE GATE VALVE CLOSED. CONTINUED RUNNING WILL CAUSE DANGEROUS PRESSURE BUILDUP.**

8. Check the system for leaks.
9. Take actual readings of suction pressure, discharge pressure, and motor current and record on page 2.
10. Re-tighten the packing to achieve 10-12 drops per minute while operating. (Pumps without rear wear rings only.)
11. Monitor the operation of the unit until the electric motor has reached operating temperature.

## 8. OPERATION

Once your Monarch pump has been properly installed it should give many years of trouble free service. The following procedures will assist in keeping the system operating properly.

- Before shutting down the pump close the discharge gate valve. This will assist in maintaining prime and ensure that no water hammer occurs after the pump is shut down.
- On units with double mechanical seals ensure that the seal casing flush valve is open before starting the pump.
- Always restart the pump with the discharge gate valve closed. If the discharge pressure does not build up immediately shut down the pump and re-prime.
- If the system becomes noisy check for air leaks in the system or increased suction lift. If these conditions do exist they must be corrected immediately as they will cause serious damage to the pump.
- The system should be maintained according to the following section.

## 9.MAINTENANCE

### SINGLE MECHANICAL SEALS

- Standard carbon-ni-resist seals do not require maintenance. They operate on a water lubrication principle and should last many years in clean water. If they do leak, however, they are not repairable and must be replaced.

Optional Tungsten carbide seals can be relapped if they become worn. Contact your Monarch Dealer for this service.

### DOUBLE MECHANICAL SEALS

- These seals do not require routine maintenance but must be drained to avoid frost damage. (see Winterization.)

### PACKING

- Packing must be tightened periodically to compensate for wear.
- Gland leakage with the pump primed but not operating should be 10-12 drops per minute.  
**Note: On pumps with rear wear rings leakage will normally reduce in operation. Loose packing on these pumps will allow air into the pump and may cause damage or loss of performance. On pumps without rear wear rings leakage will normally increase during operation.**
- If tightening the packing will not control the leakage one additional packing ring may be added. If this is not successful the gland must be re-packed.

## ELECTRIC MOTOR LUBRICATION

Monarch pumps are equipped with ball bearing motors and do not require lubrication on initial installation. The following re-lubrication schedule should be used for pumps running continuously.

HP Range	Lubrication Interval	Grease Type
Up to 40	6 Months	Medium Polyurea
50 to 150	3 Months	Bearing Grease

- If motor is equipped with grease fittings apply 1 to 2 strokes on motors up to NEMA 215 frame size, 2 to 3 strokes on NEMA 254 to 365. Use 3 to 4 strokes on NEMA 404 and larger. On motors having grease drains remove drain plugs and run pump for 20 minutes, then replace plugs.
- On motors equipped with slotted head grease screws, remove screws and insert 2 to 3 inches of grease string in each hole on motors up to NEMA 215 frame size and 3 to 5 inches for larger motors.

### **CAUTION - Lubricate Motors Stopped. Remove and replace drain plugs with motor stopped.**



not mix petroleum grease and silicone grease. Keep grease clean.

- For motors which are operated seasonally lubricate at the beginning of each season of use.

## WINTERIZING

If the system will be exposed to freezing temperatures the following steps must be taken.

- Drain the pump casing. On pumps with double volutes ensure that both halves of the volute are drained.
- Drain the seal box on pumps with double mechanical seals.
- Grease the stuffing box on pumps with packings.
- Drain the suction piping on pumps with foot valves (if possible the suction piping should be removed from the water).
- Drain any other low spots in the system.

## 10. TROUBLE SHOOTING GUIDE

Problem	Cause	Solution
1. Will not prime	<ul style="list-style-type: none"> <li>-Seal damaged.</li> <li>-Packing loose.</li> <li>-Airleak in suction.</li> <li>-Inlet blocked.</li> <li>-Suction lift too great.</li>   <li>-Impeller drive key failure.</li> </ul>	<ul style="list-style-type: none"> <li>-Replace seal.</li> <li>-Tighten or repack.</li> <li>-Check and repair.</li> <li>-Check and clean.</li> <li>-Raise water level or lower pump.</li> <li>-Repair or replace damaged parts.</li> </ul>
2. Flow or pressure too low	<ul style="list-style-type: none"> <li>-Seal damaged.</li> <li>-Packing loose.</li> <li>-Air leak in suction.</li> <li>-Inlet partially blocked.</li> <li>-Impeller partially blocked.</li> <li>-Impeller worn or damaged.</li> <li>-Required head flow has changed.</li> </ul>	<ul style="list-style-type: none"> <li>-Replace seal.</li> <li>-Tighten or repack.</li> <li>-Check and repair.</li> <li>-Check and clean.</li> <li>-Check and clean.</li>   <li>-Replace impeller or wear ring</li> <li>-Re-evaluate system design.</li> </ul>
3. Motor over amps (Trips breakers)	<ul style="list-style-type: none"> <li>-Low voltage.</li> <li>-Packing too tight.</li> <li>-Motor bearing seized.</li> <li>-Motor electrical fault.</li> <li>-Required TDH has dropped.</li> </ul>	<ul style="list-style-type: none"> <li>-Increase line size</li> <li>-Loosen packing.</li> <li>-Replace bearings.</li> <li>-Repair motor.</li> <li>-Trim impeller or throttle discharge</li> </ul>
4. Pump vibrates or is noisy	<ul style="list-style-type: none"> <li>-Seal damaged.</li> <li>-Packing loose.</li> <li>-Airleak in suction piping.</li> <li>-Inlet partially blocked.</li> <li>-Impeller partially blocked.</li> <li>-Worn or damaged impeller.</li> <li>-Worn motor bearings.</li> <li>-Suction lift too great.</li> </ul>	<ul style="list-style-type: none"> <li>-Replace seal.</li> <li>-Tighten or repack.</li> <li>-Check and repair.</li>   <li>-Check and clean.</li> <li>-Check and clean.</li>   <li>-Replace impeller.</li>   <li>-Replace bearings.</li> <li>-Raise water level or lower pump.</li> </ul>
5. Pump will not start	<ul style="list-style-type: none"> <li>-No power.</li> <li>-Motor failure.</li> <li>-Seized impeller/wear ring.</li> <li>-Packing too tight.</li> </ul>	<ul style="list-style-type: none"> <li>-Contact electrician.</li> <li>-Repair motor.</li> <li>-Replace impeller/wear ring.</li> <li>-Loosen packing.</li> </ul>

## CONDITIONS OF SALE AND WARRANTY:

All sales made by Monarch are subject to these conditions unless otherwise agreed in writing with a duly authorized officer of Monarch. In all cases of conflict between these conditions and the requirements of the purchase order, these conditions shall prevail.

(1) **SALES POLICY:** Nothing herein shall be construed as abridging the right of Monarch to sell directly or indirectly to: (a) Federal and State Governments or Agencies thereof, or to Agencies employing Federal or State Government aid; (b) Purchasers who buy Monarch's products for sale as integral or assembled parts of their products; (c) Firms operating on a national scale; (d) Any other class of purchaser to whom Monarch may from time to time, elect to sell.

(2) **PRICES:** All prices are F.O.B. our warehouses, freight allowance as specified on Distributor Net Price Lists. The suggested list prices and discount schedules are established by Monarch and are intended to act as a guide for our distributors. All prices and discount schedules previously quoted by Monarch, are herewith cancelled. Unless otherwise stated in writing, prices are subject to change without notice and will be applied as in effect at time of shipment.

(3) **TERMS:** Unless otherwise agreed upon in writing by an officer of Monarch, all invoices become due and payable net 30 days following the date of invoice. Interest at the maximum legal rate will be charged on all overdue accounts. Minimum net charge per invoice is \$25.00

(4) **CANCELLATION AND CHANGES:** No orders or sales may be cancelled or changed without the consent of Monarch. At Monarch's option cancelled/changed orders are subject to payment of cancellation charges equal to all costs incurred by Monarch up to the date of cancellation/change.

(5) **DELAYED DELIVERIES:** Monarch shall not be liable for any delay of merchandise for any cause whatsoever.

(6) **CLAIMS:** All goods shall be deemed delivered to purchaser at the time they are placed in the hands of carrier and consigned to purchaser: loss, damage or destruction of any said merchandise is assumed by purchaser. No claims may be made for shortages unless made in writing within ten days from receipt of merchandise.

(7) **RETURN OF GOODS:** Written permission from Monarch must be obtained before returning any merchan-

dise. All transportation charges must be borne by the purchaser. Credit for returned goods will be based on the original price paid, less 15 %. Special parts or custom-built items cannot be returned for credit.

(8) **LIMITATION OF LIABILITY:** Monarch's liability on any claim of any kind, including negligence, for any loss or damage arising out of, connected with, or resulting from contract, or the performance or breach thereof, or the design, manufacture, sale, delivery, resale, installation, technical direction of installation, inspection, repair, operation or use of any equipment covered by or furnished under contract shall in no case exceed the price paid by the purchaser for the equipment. Monarch also disclaims all liability, whether in contract, tort, warranty, or otherwise, to any party other than purchaser.

(9) All Price Lists, Catalogues and other material shall remain the property of Monarch and are subject to return on demand. The Suggested List Prices are established by Monarch and are intended to act as a guide. All shipping weights shown are approximate.

### LIMITED MONARCH WARRANTY

For two years from date of purchase, Monarch will replace or repair for the original purchaser, free of charge, any part or parts, found upon examination by any Monarch Authorized Service Depot or by the Monarch factory, to be defective in material or workmanship or both. Equipment and accessories not manufactured by Monarch are warranted only to the extent of the original manufacturer's warranty. All transportation charges on parts submitted for replacement or repair under this warranty must be borne by the purchaser. **For warranty service contact your nearest Monarch Authorized Service Depot.**

THERE IS NO OTHER EXPRESS WARRANTY. IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO ONE YEAR FROM PURCHASE AND TO THE EXTENT PERMITTED BY LAW. LIABILITY FOR CONSEQUENTIAL DAMAGES UNDER ANY AND ALL WARRANTIES ARE EXCLUDED TO THE EXTENT EXCLUSION IS PERMITTED BY LAW.

This warranty is an addition to any statutory warranty.