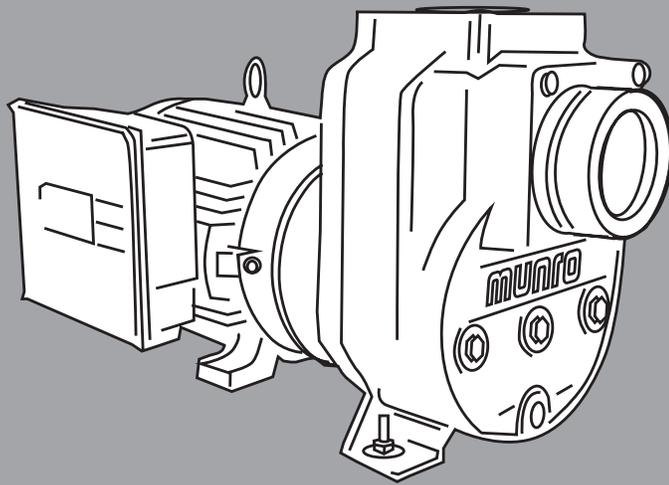


OWNER'S MANUAL

MU SERIES CENTRIFUGAL PUMPS



Installation - Operation - Parts

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munro

READ AND FOLLOW SAFETY INSTRUCTIONS!

 **This is the safety alert symbol.** When you see this symbol on your pump or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

 **DANGER** warns about hazards that **WILL** cause serious personal injury, death or major property damage if ignored.

 **WARNING** warns about hazards that **CAN** cause serious personal injury, death or major property damage if ignored.

 **CAUTION** warns about hazards that **WILL** or **CAN** cause minor personal injury or property damage if ignored.

The label **NOTICE** indicates special instructions which are important but not related to hazards.

MOTOR AND ELECTRICAL:

Carefully read and follow all safety instructions in this manual and on the pump.

WARNING



Hazardous voltage.
Can shock, burn, or
cause death.

Electric pump motors can be hazardous if not properly installed. Call a licensed electrician if unsure of any electrical connection.

GENERAL SAFETY – ELECTRICAL

-  **WARNING** Every time work is to be performed on a pump, the power supply should be terminated at the breaker box.
-  **WARNING** Follow all local electrical and safety codes, including the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).
-  **WARNING** Replace damaged or worn cords immediately.
-  **WARNING** Ground motor before connecting to power supply.
-  **WARNING** Use extreme caution around an operating pump and motor – it may be hot enough to cause serious burns.

GENERAL OPERATION – ELECTRICAL

-  **CAUTION** Before using pump, check your motor nameplate for voltage. Your electric supply voltage and the stamped nameplate voltage must match. Motors stamped 200 volts only or 230 volts only must be used with that voltage only. Motors stamped with two voltages (for example 230/460 volts) may be used with either supply voltage.
-  **CAUTION** Check the connections against the wiring diagram on the motor nameplate and make any changes necessary to agree with your supply voltage.
-  **WARNING** Supply voltage must be within 10%, or nameplate voltage. Incorrect voltage can cause fire or seriously damage motor and voids warranty. When in doubt, call a licensed electrician. High voltage can shock, burn, or cause death.
- Some models are equipped with three phase motors. Three phase motors require magnetic starters.

GENERAL SAFETY – MOTOR

-  **WARNING** Disconnect the main power before handling the unit for ANY REASON.
-  **WARNING** An operating motor can run between 250°F and

- 311°F depending on insulation rating. Never touch a motor without first determining the housing temperature.
- Keep pump motor ventilated to reduce damage due to heat.
-  **DANGER** Motor is not waterproof and should never be submerged into any liquid.
- Motor is designed to work with up to a 15 degree angle of water impact. Do not allow water to spray directly onto motor. External motor protection should be used to eliminate environmental concerns.
- To reduce the risk of electric shock, the motor must be securely and adequately grounded. Refer to National Electric Code (NEC Article 250 – Grounding) for additional information.
- When in doubt, call a licensed electrician. High voltage can shock, burn or cause death.

WIRING CONNECTION:

Refer to the connection diagram located on the nameplate of the motor.

GROUNDING

- Grounding the motor can be achieved by securing the motor to a metal raceway system. Alternately a separate grounding wire connected to bare metal on the motor frame, or to the green grounding screw located inside the motor terminal box, or other suitable means is acceptable. (Refer to NEC Article 250 – Grounding for specifics.)
- Verify motor grounding provision on the nameplate before connecting any wires to the motor.

ROTATION

- When facing the suction tapping, all Munro pumps run in a Counter-Clockwise (CCW) rotation only. Rotation from the motor end perspective is Clockwise (CW) and is marked as such on the motor nameplate.

CHECK MOTOR ROTATION

- Remove the motor end cover to expose the motor shaft.
- If hook-up is correct, the shaft will rotate clockwise.
- If rotation is not clockwise, see motor nameplate for installation information.
- Tampering with, or reversing, the rotation will damage your pump and void the warranty.

MOTOR PROTECTION

- Fuses and circuit breakers are used as a safety device for the wire circuit. They do NOT offer motor protection.
- Consult local or national electric codes for proper fuse protection based on the motor data located on the motor nameplate.

THERMAL OVERLOAD

- Refer to motor nameplate to verify the presence of overload protection.
- Overload protects the motor from high and low voltage irregularities.
- All motors must be thermally protected – either within the motor or externally.
-  **WARNING** The internal overload is usually automatic and resets itself once the temperature has dropped to a safe point.
- Frequent tripping of the overload indicates motor or power problems. Immediate professional attention is recommended.
-  **WARNING** NEVER examine, make wiring changes or touch the motor before disconnecting the electrical supply. Thermal overload protectors automatically reset and can close the electrical circuit without warning.
-  **WARNING** The overload should never be tampered with or removed.

PUMP:

GENERAL SAFETY – PUMP

1. **▲WARNING** An operating pump, with a blocked discharge, will heat the water and pump housing. Allow pumps to cool before handling.
2. High temperature sensors can help protect plastic plumbing from disfiguring and/or expanding.
3. Running a pump without water may cause damage to the seal.

GENERAL OPERATION – PUMP

1. Locate the pump as close to the water source as is practical.
2. Total suction lift (vertical lift plus any friction loss in suction line) should not exceed 15' for optimal performance. Suction lift of 25' is attainable depending on elevation, water temperature, and atmospheric condition. Pump performance is affected when suction lift exceeds 15'.
3. The pump should be set firmly in a level position.
4. Fill the pump case and suction pipe with water to expel as much air as possible prior to start-up. Running a pump dry may cause damage to the seal and void warranty.
5. Pump and pipe must be drained if there is any danger of freezing.

PIPE CONNECTION

1. Plastic or galvanized steel pipe are most commonly used. Support pipe as needed.
2. Keep suction and discharge lines as large as possible. Pipe should not be smaller than the corresponding suction and discharge holes.
3. Avoid excess fittings when possible. Use straight runs when possible.
4. All joints and connections should have pipe-specific sealing compound applied and be completely tightened.
5. Isolation valves or unions on suction and discharge allow for easy pump removal, especially with multi-pump or positive inlet pressure applications.
6. Suction pipe should never have a higher elevation than the pump.

ENGINE DRIVE

1. Check that the engine and pump are free to rotate by turning the engine hand-crank slowly through a complete revolution.

OPERATION:

INITIAL PRIMING

1. Unit must be full of liquid before operating. Never run dry. Running a pump dry may cause damage to the seal and void the warranty.
2. Fill the pump body and suction line completely with water. Never operate the pump without water in the pump case.
3. Normal system start-up will take a few minutes for air to expel from system and water to begin to cycle – depending on suction lift. If no water is flowing after a few minutes, turn the pump off and refer to troubleshooting guide (p.8). Do NOT run pump dry for any period of time.
4. Do not run against a closed discharge for more than a few minutes.

MAINTENANCE – CLEANING

1. Run clear water through the pump if possible after pumping dirty water. Do this for two or three minutes before stopping the engine or motor.

MAINTENANCE – LUBRICATION

1. The seal must be kept lubricated by the liquid being pumped and should never be allowed to run dry.

MAINTENANCE – FREEZING

1. Remove the lower drain plug to drain the pump case when the unit is idle, during freezing weather, or in storage and let it drain completely.
2. Filling the pump with non-toxic Munro Freeze Defeat and replacing the plug, will reduce the oxidation in the case over the winter. Before spring start-up, drain the Munro Freeze Defeat from the case.

RECOMMENDED OPTIONAL EQUIPMENT:

1. Strainer – Use of strainers prevent large debris from entering pump system through suction line.
2. Pressure Gauge – Use of a pressure gauge helps to troubleshoot and identify a pump or system issue.
3. Discharge Valve – Use of a gate or ball valve on the discharge side of a pump allows pump isolation for removal.
4. Foot Valve – Use of a foot valve (or check valve) can aide the priming of a centrifugal pump. If suction lines are kept full, the pump does not have to evacuate the air before pumping water.

ROTARY SEAL ASSEMBLY REPLACEMENT:

▲CAUTION Make certain the power supply is disconnected before attempting to service the unit!

SEAL REMOVAL

1. Remove the pump case from motor bracket.
2. Remove impeller retaining bolt and cone washer (RH threads) then remove impeller.
3. Remove motor bracket and sleeve/seal assembly from motor shaft.
4. Remove the seal from the sleeve – penetrating lubricant may be used to ease removal.
5. Remove ceramic seat and rubber cup from motor bracket.

SEAL INSTALLATION

NOTICE: As sealing faces are matched parts, the shaft seal must be replaced as a complete assembly. Extreme care must be taken to keep seal faces and components perfectly clean during assembly.

NOTICE: Application of a light coat of multi-purpose water-based lubricant to the outer diameter of the rubber seat may make installation easier. Be certain both seal face surfaces are kept clean.

1. Inspect and clean the shaft sleeve – replace if grooves can be felt by running a fingernail along the sleeve.
2. Using a wire brush and power drill, clean up the seat pocket in the motor bracket – install stationary seat into motor bracket and install onto motor.
3. Install the rotating portion of the seal onto the sleeve *Note the carbon seal face should face the inner bevel for o-rings.
4. Install two o-rings on motor shaft – apply light film of waterproof silicone to the o-rings – install shaft sleeve fully over o-rings ensuring not to pinch.
5. Apply a light film of grease to the shaft and key, install impeller, install cone washer, new lock washer and bolt.
6. Install new housing gasket/o-ring and apply a light film of grease.
7. Install housing, verify pump and motor turn free once fully assembled.

PUMP PERFORMANCE

H Series

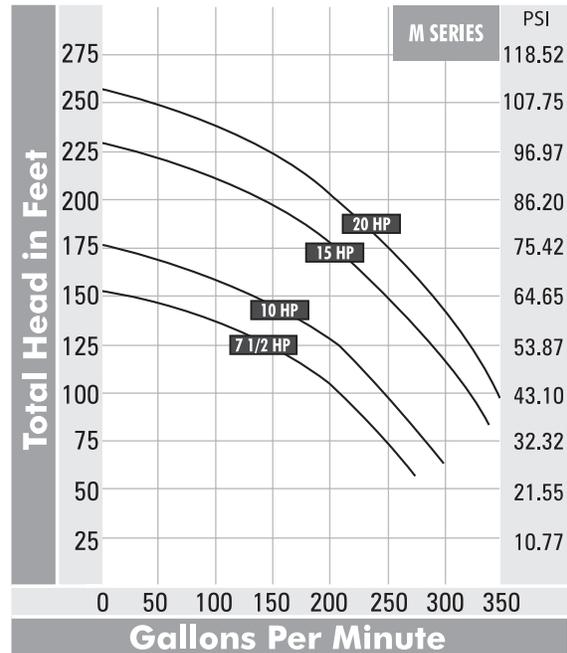
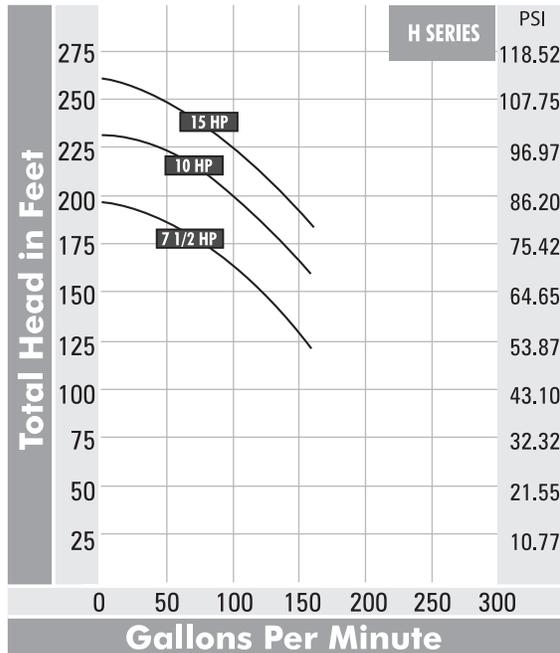
HP	Capacity - U.S. Gallons per Minute Discharge Pressure (PSI) at 5' Suction Lift*						Shut Off Pressure PSI	Model Number
	50	100	150	200	250	300		
7.5	81	70	55				85	MU75HS
7.5	81	70	55				85	MU75HT
10	96	86	71				98	MU10HS
10	96	86	71				98	MU10HT
15	107	97	83				110	MU15HT

M Series

HP	Capacity - U.S. Gallons per Minute Discharge Pressure (PSI) at 5' Suction Lift*						Shut Off Pressure PSI	Model Number
	50	100	150	200	250	300		
7.5	63	60	54	44	32		65	MU75MS
7.5	63	60	54	44	32		65	MU75MT
10	73	67	61	55	43	27	75	MU10MS
10	73	67	61	55	43	27	75	MU10MT
15	95	91	85	75	64	49	98	MU15MT
20	107	102	96	87	75	63	109	MU20MT

*Suction lift varies, depending upon elevation (altitude) and water temperatures. Max lift is 15 feet at 5000' elevation.
Maximum case pressure is 120 psi

PUMP CURVES



PUMP SPECIFICATIONS

Specifications – Pump – H Series

HP	Suction	Discharge	Approx Ship Weight lbs	Max Liquid Temperature	Max Case Pressure psi	Model Number
7.5	3"	3"	225	100°	120	MU75HS
7.5			174			MU75HT
10			229			MU10HS
10			197			MU10HT
15			210			MU15HT

Specifications – Motor – H Series

HP	Phase	Volts	Run Amps	Motor Type	Model Number
7.5	1	208-230/460	30.5-28.2/14.1	TEFC	MU75HS
7.5	3	230/460	17.5/8.76	ODP	MU75HT
10	1	208-230/460	41.8-38.8/19.4	TEFC	MU10HS
10	3	208-230/460	25.7-23.2/11.6	ODP	MU10HT
15	3	230/460	34.0/17.06	ODP	MU15HT

Specifications – Pump – M Series

HP	Suction	Discharge	Approx Ship Weight lbs	Max Liquid Temperature	Max Case Pressure psi	Model Number
7.5	4"	3"	225	100°	120	MU75MS
7.5			174			MU75MT
10			229			MU10MS
10			197			MU10MT
15			210			MU15MT
20			241			MU20MT

Specifications – Motor – M Series

HP	Phase	Volts	Run Amps	Motor Type	Model Number
7.5	1	208-230/460	30.5-28.2/14.1	TEFC	MU75MS
7.5	3	230/460	17.5/8.76	ODP	MU75MT
10	1	208-230/460	41.8-38.8/19.4	TEFC	MU10MS
10	3	208/230/460	25.7-23.2/11.6	ODP	MU10MT
15	3	230/460	34.0/17.0	ODP	MU15MT
20	3	208-230/460	51.3-46.4/23.2	ODP	MU20MT

Motor specifications may change without notice, always verify nameplate information.

HOW TO USE A WIRE SIZE CHART

Starting on the left, find your required voltage and phase rating. Move to the right at the Horsepower (HP) needed and verify the Full Load Amps (FLA) equals or exceeds the listed FLA found on the motor nameplate. Using the distance of the wire run, look to the right for the next HIGHEST number. Once that number is located, follow that column up to the top of the chart. This resulting number is the wire size required to carry that particular voltage/phase and HP for that distance. (All motors are not the same. If the FLA does not meet or exceed the nameplate FLA, use the FLA column to determine what line to use for distance and resulting wire size.)

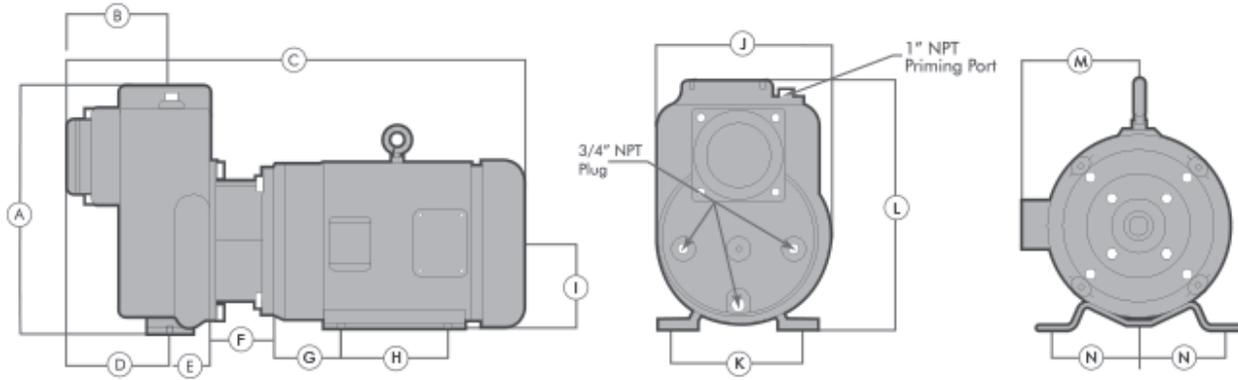
WIRING SIZE CHART

Motor Rating	Circuit Size	Fuse Size	Full Load Amps	Copper Wire Size														
				Volts	HP	KW	12	10	8	6	4	2	0	00	000	0000	250	300
208 (1Ø)	7-1/2	60	50	44	5.59			205	350	555	885	1410	1780	2245	2830	3345		
	10	60	60	55	7.46				270	430	685	1095	1380	1740	2195	2595	3115	
240 (1Ø)	7-1/2	50	45	40	5.59			218	369	588	935	1488	1876	2365	2983	3524		
	10	60	60	50	7.46				286	456	725	1153	1455	1834	2313	2733	3279	

WIRING SIZE CHART (cont.)

Motor Rating		Circuit Size	Fuse Size	Full Load Amps	Copper Wire Size																
Volts	HP				KW	12	10	8	6	4	2	0	00	000	0000	250	300	350	400	500	600
208 (3ø)	7-1/2	30	35	24.2	5.59		202	321	511	811	1293	2058	2594	3270	4124	4872					
	10	40	40	30.2	7.46			251	399	635	1010	1608	2026	2555	3222	3807	4568	5329	6091	7614	
	15	60	60	46.2	11.19				266	423	673	1072	1351	1703	2148	2538	3045	3553	4060	5076	
	20	100	80	59.4	14.91					328	520	829	1046	1318	1663	1964	2357	2750	3143	3929	
240 (3ø)	7-1/2	30	30	22	5.59	268	401	679	1080	1717	2733	3445	4343	5476	6470	7764	9059	10353	12941	15529	
	10	40	35	28	7.46		299	507	806	1282	2041	2573	3243	4090	4832	5799	6766	7731	9666	11598	
	15	50	50	42	11.19			395	629	1001	1593	2008	2531	3192	3771	4526	5280	6035	7543	9052	
	20	70	70	54	14.91				423	672	1070	1349	1701	2145	2535	3042	3549	4056	5070	6084	
480 (3ø)	7-1/2	20	15	11	5.59	678	1079	1612	2728	4339	6899	10978									
	10	20	20	14	7.46	504	802	1199	2029	3227	5131	8165	10292								
	15	30	25	21	11.19		626	936	1583	2519	4004	6373	8032	10127	12770						
	20	40	35	27	14.91			629	1064	1693	2691	4283	5399	6806	8583						

PUMP DIMENSIONS



Single Phase

HP	A	B	C	D	E	F	G	H	I	J	K	L	M	N
7.5	15 1/4"	8 3/4"	26 5/8"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	5 1/2"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"
10	15 1/4"	8 3/4"	27 1/4"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	7"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"

Three Phase

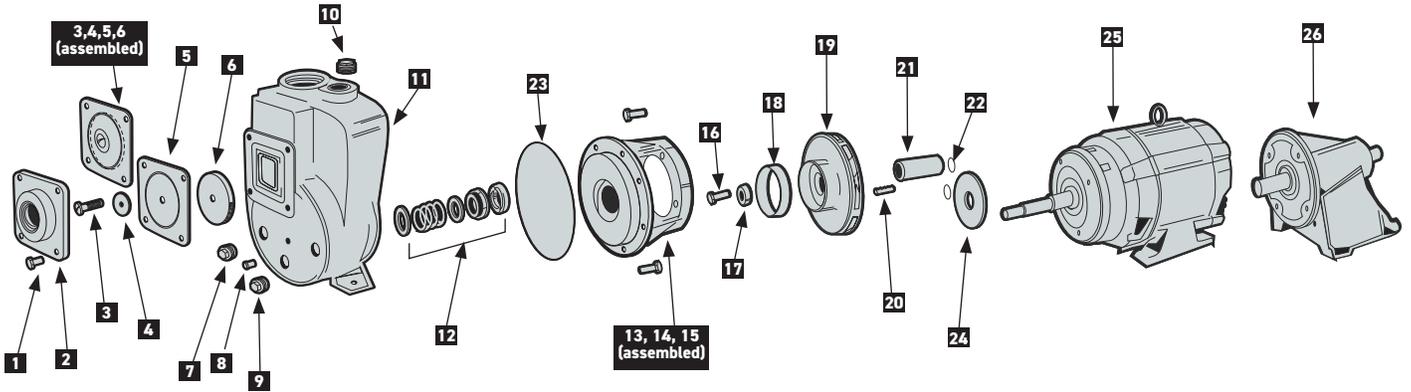
HP	A	B	C	D	E	F	G	H	I	J	K	L	M	N
7.5	15 1/4"	8 3/4"	23 1/2"	6 1/8"	2 3/4"	2 7/8"	2 3/4"	4 1/2"	4 1/2"	10 9/16"	7 15/16"	15 5/32"	8 3/32"	3 3/4"
10	15 1/4"	8 3/4"	25 5/8"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	5 1/2"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"
15	15 1/4"	8 3/4"	27 1/4"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	7"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"
20	15 1/4"	8 3/4"	29 1/2"	6 1/8"	2 3/4"	2 5/8"	4 1/4"	8 1/4"	7"	10 9/16"	7 15/16"	15 5/32"	11"	5"

Three Phase TEFC

HP	A	B	C	D	E	F	G	H	I	J	K	L	M	N
7.5	15 1/4"	8 3/4"	30 13/16"	6 1/8"	2 3/4"	2 7/8"	2 3/4"	4 1/2"	4 1/2"	10 9/16"	7 15/16"	15 5/32"	8 3/32"	3 3/4"
10	15 1/4"	8 3/4"	35 1/4"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	7"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"
15	15 1/4"	8 3/4"	35 1/4"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	7"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"
20	15 1/4"	8 3/4"	42"	6 1/8"	2 3/4"	2 5/8"	4 1/4"	10"	7"	10 9/16"	7 15/16"	15 5/32"	11"	5"

NOTE: Pump dimensions are approximate and may vary.

PARTS BREAKDOWN



H Series

			HORSEPOWER	7.5	7.5	10	10	15
			MODEL NO.	MU75HS	MU75HT	MU10HS	MUTOHT	MU16HT
ITEM	DESCRIPTION	PART NO.						
1	Suction Flange Cap Screw	MUP14129225	4	4	4	4	4	4
2	Suction Flange 3"NPT	MUP16001208	1	1	1	1	1	1
3	Flapper Weight Screw	MUP14140313	1	1	1	1	1	1
4	Flapper Weight Washer	MUP14074009	1	1	1	1	1	1
5	Suction Gasket/Flapper	MUP13009105	1	1	1	1	1	1
6	Flapper Weight	MUP16001406	1	1	1	1	1	1
7	3/4" Drain Plug	MUP31006207	1	1	1	1	1	1
8	1/4" Vacuum Plug	MUP31005911	1	1	1	1	1	1
9	3/4" Accessories Plug	MUP31006207	2	2	2	2	2	2
10	1" Fill Plug	MUP31006307	1	1	1	1	1	1
11	Self Primer Case	MUPH1NI1	1	1	1	1	1	1
12	Mechanical Seal	MUP10036903	1	1	1	1	1	1
13	Bracket/Motor Cap Screw 1ph, 7.5hp	MUP14129423	4	4	4	4	4	4
	Bracket/Motor Cap Screw 1ph, 10-15hp	MUP14178701						
	Bracket/Motor Cap Screw 3ph							
14	Motor Bracket Single Phase, 7.5-10hp	MUP2156909	1	1	1	1	1	1
	Motor Bracket Single Phase 15hp	n/a						
	Motor Bracket Three Phase 7.5hp	MUP2159200						
	Motor Bracket Three Phase 10-15hp	MUP2156909						
15	Bracket/Case Cap Screw	MUP14129225	8	8	8	8	8	8
16	Impeller Bolt	MUP14129647	1	1	1	1	1	1
17	Impeller Washer	MUP14412209	1	1	1	1	1	1
18	Impeller Wear Ring	MUPH1PM7	1	1	1	1	1	1
19	Impeller 7.5hp	MUPH282700	1	1	1	1	1	1
	Impeller 10hp	MUPH282756						
	Impeller 15hp	MUPH287797						
20	Impeller Key, 7.5-15hp	MUP14412407	1	1	1	1	1	1
21	Shaft Sleeve	MUP8287211	1	1	1	1	1	1
22	Sleeve O-Ring	MUP47002209	2	2	2	2	2	2
23	Case/Bracket O-Ring	MUP47017108	1	1	1	1	1	1
24	Deflector	MUP22020408	1	1	1	1	1	1
25	Motor		1	1	1	1	1	1
26	Power Frame		1	1	1	1	1	1

PARTS BREAKDOWN

M Series

		HORSEPOWER	7.5	7.5	10	10	15	20
		MODEL NO.	MU75HS	MU75HT	MU10HS	MU10HT	MU16HT	MU20MT
ITEM	DESCRIPTION	PART NO.						
1	Suction Flange Cap Screw	MUP14129225	4	4	4	4	4	4
2	Suction Flange 4"NPT	MUP16098808	1	1	1	1	1	1
3	Flapper Weight Screw	MUP14140313	1	1	1	1	1	1
4	Flapper Weight Washer	MUP14074009	1	1	1	1	1	1
5	Suction Gasket/Flapper	MUP13037502	1	1	1	1	1	1
6	Flapper Weight	MUP16098907	1	1	1	1	1	1
7	3/4"Drain Plug	MUP31006207	1	1	1	1	1	1
8	1/4" Vacuum Plug	MUP31005911	1	1	1	1	1	1
9	3/4"Accessories Plug	MUP31006207	2	2	2	2	2	2
10	1" Fill Plug	MUP31006307	1	1	1	1	1	1
11	Self Primer Case	MUPH1N12	1	1	1	1	1	1
12	Mechanical Seal, 7.5-15hp	MUP10036903	1	1	1	1	1	1
	Mechanical Seal 20hp	MUP10037002						
13	Bracket/Motor Cap Screw 1ph, 7.5-15hp	MUP14178701	4	4	4	4	4	4
	Bracket/Motor Cap Screw 1ph, 20hp	MUP14389803						
	Bracket/Motor Cap Screw 3ph, 7.5hp	MUP14129423						
	Bracket/Motor Cap Screw 3ph,10-15hp	MUP14179701						
	Bracket/Motor Cap Screw 3ph, 20hp	MUP14389803						
14	Motor Bracket Single Phase, 7.5-15hp	MUP2156909	1	1	1	1	1	1
	Motor Bracket Single Phase 20hp	MUP2137503						
	Motor Bracket Three Phase 7.5-15hp	MUP2159200						
	Motor Bracket Three Phase 10-15hp	MUP2156909						
	Motor Bracket Three Phase 20hp	MUP2137503						
15	Bracket/Case Cap Screw	MUP14129225	8	8	8	8	8	8
16	Impeller Bolt 7.5 -15hp	MUP14129647	1	1	1	1	1	1
	Impeller Bolt 20hp	MUP14073324						
17	Impeller Washer Adpt, 7.5-15hp	MUP14412209	1	1	1	1	1	1
	Impeller Washer Adpt. 20hp	MUP14412308						
18	Impeller Wear Ring	N/A	1	1	1	1	1	1
19	Impeller 7.5hp	MUP5122912	1	1	1	1	1	1
	Impeller 10hp	MUP5123518						
	Impeller 15hp	MUP5123612						
	Impeller 20hp	MUP5191713						
20	Impeller Key, 7.5-15hp	MUP14412407	1	1	1	1	1	1
	Impeller Key, 20hp	MUP14412506						
21	Shaft Sleeve, 7.5-15hp	MUP8287211	1	1	1	1	1	1
	Shaft Sleeve 20hp	MUP8287310						
22	Sleeve O-Ring, 7.5-15hp	MUP47002209	2	2	2	2	2	2
	Sleeve O-Ring, 20hp	MUP13038500						
23	Case/Bracket O-Ring	MUP47017108	1	1	1	1	1	1
24	Deflector, 7.5-15hp	MUP22020408	1	1	1	1	1	1
	Deflector, 20hp	MUP22020507						
25	Motor		1	1	1	1	1	1
26	Power Frame		1	1	1	1	1	1

TROUBLESHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Little or no discharge	<ol style="list-style-type: none"> 1. Casing not initially filled with water to prime pump 2. Total head too high 3. Suction lift too high, or too long 4. Impeller plugged 5. Hole or air leak in suction line 6. Foot valve too small 7. Impeller damaged 8. Foot valve or suction line not submerged deep enough in water 9. Insufficient inlet pressure or suction head 10. Suction piping too small 11. Motor wired incorrectly 12. Casing gasket leaking 13. Suction or discharge line valves closed 	<ol style="list-style-type: none"> 1. Fill pump casing 2. Shorten suction lift and/or change head 3. Lower suction lift, install foot valve and prime or shorten length of suction line 4. Clean impeller 5. Repair or replace suction line, use pipe sealing compound. 6. Match foot valve to piping or install one size larger foot valve 7. Replace impeller 8. Submerge lower in water 9. Increase inlet pressure by adding more water to tank or increasing back pressure 10. Increase to pump inlet size or one size larger 11. Check wiring diagram for correct wiring 12. Replace Gasket 13. Open suction and/or discharge lines
Pump will not deliver water or develop pressure	<ol style="list-style-type: none"> 1. No priming water in casing 2. Mechanical seal is leaking 3. Leak in suction line 4. Discharge line is closed and priming air has no where to go 5. Suction line (or valve) is closed 6. Poor pump performance 7. Foot valve is leaking 8. Suction screen is clogged 	<ol style="list-style-type: none"> 1. Fill pump casing 2. Replace seal (See Rotary Seal Assembly Replacement on p.2) 3. Repair or replace 4. Open discharge line 5. Open suction line or valve 6. Replace worn parts 7. Replace foot valve 8. Clean or replace screen
Loss of suction	<ol style="list-style-type: none"> 1. Air leak in suction line 2. Suction lift is too high 3. Insufficient inlet pressure or suction head in booster system 4. Clogged foot valve or strainer 	<ol style="list-style-type: none"> 1. Repair or replace suction line 2. Lower suction lift, install foot valve and prime 3. Increase inlet pressure by adding more water to tank or increasing back pressure 4. Unclog
Pump vibrates and/or makes excessive noise	<ol style="list-style-type: none"> 1. Mounting plate or foundation not rigid enough 2. Foreign material in pump 3. Impeller damaged 4. Worn motor bearings 5. Suction lift too high 	<ol style="list-style-type: none"> 1. Reinforce 2. Disassemble pump and clean 3. Replace impeller 4. Replace bearings 5. Lower suction lift, install foot valve and prime
Pump will not start or run	<ol style="list-style-type: none"> 1. Improper wiring 2. Blown fuse or open circuit breaker 3. Loose or broken wiring 4. Stone or foreign object lodged in impeller 5. Motor shorted out 6. Thermal overload has opened circuit 	<ol style="list-style-type: none"> 1. Check wiring diagram on motor 2. Replace fuse or close circuit breaker 3. Tighten connections, replace broken wiring 4. Disassemble pump and remove foreign object 5. Replace motor 6. Allow unit to cool, restart after reason for over load has been determined
Pump leaks at shaft	<ol style="list-style-type: none"> 1. Worn mechanical shaft seal 	<ol style="list-style-type: none"> 1. Replace rotary seal (See Rotary Seal Assembly Replacement on p.2)



GOVERNING LAW & LIMITED WARRANTY FOR PUMPS, PUMP CONTROLS, VALVES, FITTINGS AND ACCESSORIES MANUFACTURED BY MUNRO

GOVERNING LAW: It is understood and agreed that these Terms and Conditions of Sale (this "Agreement") shall be interpreted under and pursuant to the laws of the State of Colorado; you agree that any action at law or suit which is related to any contact of sale brought against us shall be filed in a federal or state court located in the State of Colorado.

LIMITED WARRANTY: Munro, Inc. (the "Company") hereby warrants, in accordance with and subject to the provisions herein contained, your unit against defects in materials and workmanship under normal use and service when properly installed, following provided installation instructions for a period of 12 months or 1000 hours of operation (whichever occurs first), from the date of purchase (Continuous-duty rated products are exempt from the 1000 hours of operation stipulation). In the event of a breakdown or failure of your unit or part thereof, within the period of 12 months or 1000 hours of operation, which prevents normal function, and is found to be the result of a defect in materials or workmanship, the Company will repair the breakdown or failure and/or replace any defective part or the whole unit at the Company's discretion. Freight charges will be the customer or ultimate consumer's responsibility.

Further, we warrant to our immediate customer and to the ultimate consumer (the "Customer") that products of our manufacture will be free of defects in material and workmanship under normal use and service, when installed and maintained in accordance with our instructions, for a period of twelve (12) months from date of sale to the ultimate customer or eighteen (18) months from date of shipment to the Munro distributor, whichever occurs first. As used herein, the "Ultimate Consumer" is defined as the purchaser who first uses the product after its initial installation or, in the case of product designed for non-permanent installation, the first owner who used the product. It is our immediate customer's obligation to make known to the Ultimate Consumer the terms and conditions of this warranty. This warranty provides limited specific legal rights, and there may also be other rights, which vary from state to state. As, and to the extent, covered by the federal consumer product warranties Law (the Magnuson-Moss Act, 15 U.S. Code §2301, et seq., (1) the duration of any implied warranties associated with the product by virtue of said law is limited to the same duration as stated herein, to the fullest extent allowed, (2) this warranty is for all purposes a LIMITED WARRANTY, and (3) no claims of any nature whatsoever shall be made against the Company, unless and until the Ultimate Consumer notifies the Company in writing of the defect, and delivers the product and/or defective part(s) Customer paid freight (see Return Policy section, below) to our factory or nearest authorized service facility. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may be limited by such law, to the extent applicable. **THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY AND ALL WARRANTIES WITH RESPECT TO ANY PRODUCT SHALL BE TO REPLACE OR REPAIR AT OUR ELECTION, F.O.B. POINT OF MANUFACTURER OR AUTHORIZED REPAIR FACILITY, SUCH PRODUCTS AND/OR PARTS AS PROVEN DEFECTIVE. THERE SHALL BE NO FURTHER LIABILITY, WHETHER BASED ON WARRANTY, NEGLIGENCE OR OTHERWISE.** Unless expressly stated otherwise, statements as to the nature of performance specifications furnished in addition to the foregoing material and workmanship warranties on product manufactured by the Company, if any, are subject to laboratory tests corrected for field performance. Any additional statements in the nature of performance specifications must be in writing and such writing must be signed by our authorized representative. Due to inaccuracies in field testing, if a conflict arises between the results of field testing conducted by or for user, and laboratory tests corrected for field performance, the latter shall control. Components or accessories supplied by us but manufactured by others are warranted only to the extent of, and are subject to, the terms and conditions of the original manufacturer's warranty.

RECOMMENDATIONS FOR SPECIAL APPLICATIONS OR THOSE RESULTING FROM SYSTEMS ANALYZES AND EVALUATIONS WE CONDUCT WILL BE BASED ON OUR BEST AVAILABLE EXPERIENCE AND PUBLISHED INDUSTRY INFORMATION. SUCH RECOMMENDATIONS DO NOT CONSTITUTE A WARRANTY OF SATISFACTORY PERFORMANCE AND NO SUCH WARRANTY IS GIVEN.

This warranty shall not apply when damage is caused by (a) improper installation, mechanical or electrical, (b) improper power (i.e., voltage, etc.) (c) lightning (d) freezing (e) sand or other abrasive material (f) scale or corrosion build-up due to excessive chemical content. This warranty does not extend to or cover the unit or any part of it which, in the opinion of the Company, has worn by wear and tear, abraded or corroded by fluid pumped or environmental conditions, run in a dry condition, operated at high temperatures or outside the technical specifications of the unit. Mechanical seal failure is not warranted outside of initial start up. Any modification of the original equipment will also void this warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective parts, nor charges incurred by others without our prior written approval.

This warranty is void if our inspection reveals the product was used in a manner inconsistent with normal industry practice and/or our specific recommendations. The purchaser is responsible for communication of all necessary information regarding the intended application and use of the product.

UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, REGARDLESS OF WHETHER SUCH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL AND/OR WORKMANSHIP AND/OR DAMAGE OR DELAYS IN SHIPMENT. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED

WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

No rights extended under this warranty may be assigned to any other person, whether by operation of law or otherwise, without our prior written approval. If any litigation is commenced between the parties hereto for the enforcement of any rights hereunder, the successful party in subject litigation shall be entitled to receive from the unsuccessful party all costs incurred in connection therewith, including a reasonable amount for attorney's fees.

PRICING

All prices provided are guaranteed for only 30 days from the date of written quote, unless otherwise noted. Unless noted, prices do not include applicable taxes or freight costs. Prices are otherwise subject to change without notice. Customer is responsible for payment of all applicable state and local taxes, or for providing a valid sales tax exemption certificate. The Company reserves the right to reject any order.

PAYMENT TERMS

The Company accepts cash, checks, money orders, direct deposit, Visa, MasterCard, Discover and American Express. Credit card payments made on the date of invoice or within 10 business days of invoice date will not incur a fee. Credit card payments made 11 or more business days after the date of invoice will incur a 3% service charge. For Customers with established credit, terms are net, due 30 days following the date of invoice. A finance charge is computed on a periodic rate of 2% per month, which is an annual rate of 24%, on any previous balance not paid within 30 days (minimum service charge of 50¢). Customer agrees to pay all costs of collection and all attorney's fees if the account becomes delinquent and is referred for collection.

FREIGHT & SHIPPING

Freight terms are FOB Munro, Inc. dock, unless otherwise noted. Unless other arrangements are made, The Company will ship to an address provided by Customer, by the most efficient means we find. Shipping and handling charges will be added to invoices. The Company is not liable for any delays in shipping or issues related to arrival times and do not guarantee delivery dates.

RETURN POLICY

- 30-days, new condition – Upon the Company's verification that the product is in new condition, the Company will provide a refund for the price paid less a 15% restocking fee, for all stock items returned in new condition within 30 days of purchase and sent freight prepaid to our factory or nearest authorized service facility. Any returned product that is damaged through misuse, is missing parts, or is in unsellable condition due to Customer tampering will result in the Customer being charged a higher restocking fee based on the condition of the product.
- Custom orders – All custom items are non-refundable. All custom order cancellations must be approved and may be denied or subject to restocking fees and other charges.
- Damaged in shipping – Great care is taken in filling, checking and packing your order. Should your order be damaged or lost in transit, write so on the delivery receipt before signing. If a truck shipment is damaged, please obtain an inspection report from the truck line immediately. The Company will help to resolve the situation to the best of our ability.
- Warranty claim – Please note that products must not be returned to our factory or nearest authorized service facility for warranty consideration without the Munro distributor first contacting Munro to initiate a Return Merchandise Authorization (RMA).
- Freight - Freight charges to inspect a Munro product will be the user's responsibility until warranty eligibility is determined. If product is warranted, Munro will cover all freight costs. Munro's Packaging Guidelines must be adhered to. Lowest cost shipping option must be used. Pre-authorization from Munro is required for expedited shipping.
- For complete warranty procedures and packaging guidelines, please visit: www.munropump.com/Company-Information/Warranty-statements

ENTIRE AGREEMENT

No employee or agent of Munro, Inc. has been authorized to make any promises, representations or warranties binding Munro Inc., or its parent company, Munro Companies, Inc., or its owners or management, other than those contained here or those which have been reduced to writing and signed by an officer of Munro Companies, Inc. Any verbal or written statements made by an employee or agent which are contrary to the provisions of this Agreement shall be deemed mere expressions of opinion and not binding. This Agreement constitutes the entire agreement between Munro, Inc. and the Customer with respect to the purchase of equipment, superseding all other agreements, whether oral or written.

YOUR ACCEPTANCE OF ANY GOODS SUPPLIED BY US, OR ON OUR BEHALF, SHALL, WITHOUT LIMITATION CONSTITUTE ACCEPTANCE OF ALL TERMS, AND CONDITIONS STATED ABOVE.

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