GOULDS PUMPS

Depco Home

Installation, Operation and Maintenance Instructions

Model SMVT

Owner Information

Model Number: _____

Serial Number: _____

Dealer: _____

Date of Purchase: _____

Date of Delivery: _____

Table of Contents

Goulds Pumps

ITT Industries

Safety

These pumps have been designed for safe and reliable operation when properly used and maintained in accordance with instructions contained in this manual. A pump is a pressure containing device with rotating parts that can be hazardous. Operators and maintenance personnel must realize this and follow safety measures. Goulds Pumps shall not be liable for physical injury, death, damage or delays caused by a failure to observe the instructions in this manual.

This manual is intended to assist in the installation and operation of this unit and must be kept with the pump. Thoroughly review all instructions and warnings prior to performing any work on this pump.

Definitions

Throughout this manual the words **WARNING, CAUTION** and **NOTICE** are used to indicate procedures or situations which require special operator attention:

TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN MANUAL AND ON PUMP.

THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP.

This is a **SAFETY ALERT SYMBOL.** When you see this symbol on the pump or in the manual, look for one of the following signal words and be alert to the potential for personal injury or property damage.

⚠ DANGER Warns of hazards that **WILL** cause serious personal injury, death or major property damage.

⚠ WARNING Warns of hazards that **CAN** cause serious personal injury, death or major property damage.

⚠ CAUTION Warns of hazards that **CAN** cause personal injury or property damage.

NOTICE: INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

MAINTAIN ALL SAFETY DECALS.

General Precautions

Safety Apparel:

- Wear insulated work gloves when handling hot bearings or using bearing heater.
- Heavy work gloves when handling parts with sharp edges, especially impellers.
- Safety glasses (with side shields) for eye protection, especially in machine shop areas.
- Steel-toed shoes for foot protection when handling parts, heavy tools, etc.
- Other personal protective equipment to protect against hazardous/toxic fluid

Maintenance Safety:

- Always lock out power to the motor before performing pump maintenance.
- Be sure the unit is properly grounded per instructions in the motor manual and per applicable electrical code
- Ensure pump is isolated from system and pressure is relieved before disassembling pump, removing plugs, or disconnecting piping.
- Use proper lifting and supporting equipment to prevent serious injury.
- Know and follow company safety regulations.

Description and Optional Pump Styles

The model SMVT embraces a line of industrial, commercial and residential vertical multistage, mechanical equipped inline booster pumps.

MODEL NOMENCLATURE

3 SM A 1 J 2 C 1 V A

Impeller Diam.
A Maximum diam. B Trim
C Trim D Trim
E Trim F Special Trim

Options
V = Vertical Mount
H = Horizontal Mount

Seal
1 = Standard Crane Type 2B Seal

Stages
A = 1, B = 2, C = 3, D = 4, E = 5, F = 6, G = 7, H = 8, J = 9, K = 10, L = 11, M = 12

Driver
1 = 1PH ODP, 2 = 3PH ODP, 3 = 3PH 575V ODP, 4 = 1PH TEFC, 5 = 3PH TEFC, 6 = 575V TEFC,

HP
A = 3 HP, B = 5 HP, C =7.5 HP, D = 10 HP, E = 15 HP, F = 20 HP, G = 25 HP, H = 30 HP, J = 40 HP, K = 50 HP, L = 60 HP

Hz/RPM
1 = 60 HZ, 3600 RPM, 2 = 50 HZ 2900 RP

Material
A = CI/BF, B = 316SS, C = High Temp.

Product Line
SM = SMVT

Flow
1 = 150GPM, 2 = 200GPM,
3 = 300GPM, 4 = 500GPM, 5 = 600GPM

Installation

- Provided adequate space and ventilation around unit for service and for motor cooling.
- Protect the pump and piping from freezing temperature.
- The unit must be securely affixed to a leveled concrete or metal base foundation, adequate to absorb vibration and provide permanent, rigid support for the pump and motor assembly. The pump base mounting dimensions are shown in Figure 1.

NOTICE: DO NOT DRAW PIPING INTO PLACE BY FORCING THE PUMP SUCTION OR DISCHARGE CONNECTION.

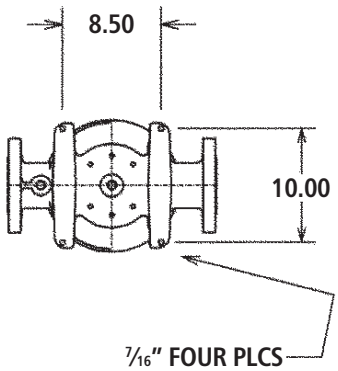


Figure 1

Piping

- Discharge and suction piping should be no smaller than the respective opening size provided by the pump and should be as short as possible to avoid unnecessary fittings to minimize friction loss.

NOTICE: PIPING MUST BE INDEPENDENTLY SUPPORTED AND NOT PLACE ANY PIPING LOAD ON THE PUMP.

- If suction pipe is larger than the pump suction, an eccentric pipe reducer, **WITH THE STRAIGHT SIDE UP**, must be installed at the pump suction.
- If the pump is installed below the liquid source, install a full flow isolation valve in the suction piping for inspection or maintenance.

NOTICE: DO NOT USE THE ISOLATION VALVE TO THROTTLE PUMP. THIS MAY CAUSE LOSS OF PRIME, EXCESSIVE TEMPERATURES RISE, DAMAGE TO PUMP AND VOID WARRANTY.

- If pump is installed above the liquid source, the following **MUST** be provided:
  - To avoid air pockets, no part of the suction piping should be above the pump suction.
  - On any horizontal piping sections, slope piping upward from liquid source.
  - All suction pipe joints **MUST** be airtight.
  - Use a foot valve for priming, or for holding prime during intermittent duty.
- The suction strainer or suction bell **MUST** be at least 3 times the suction pipe diameter.
- Insure that the size and minimum liquid submergence, over the suction inlet, is sufficient to prevent air from entering suction through a suction vortex. See typical intake piping arrangement Figure 2 through 5.
- Install a discharge check valve, suitable to handle the rated amount of flow and the liquids, to prevent back flow.
- Install an appropriately sized gate valve, **AFTER** the discharge valve, to regulate the pump capacity, for pump inspection and maintenance.
- When a pipe increaser is required, install between the check valve and the pump discharge.

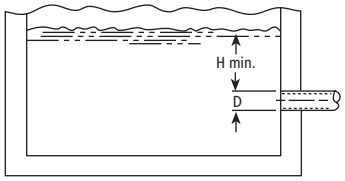


Figure 2

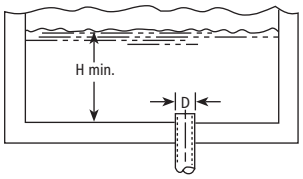


Figure 3

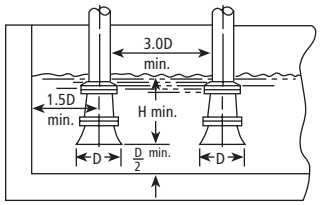


Figure 4

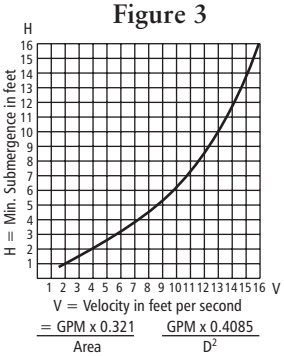


Figure 5

Install Motor to Pump and Impeller Position

- Remove the eyebolts and nut from the top flange of the motor adapter and the 2 coupling guard halves.
- Insure that the impeller position shim is properly positioned between the coupling and the seal gland.
- Loosen the 4 socket head screws on the motor end of the coupling enough to provide an adequate opening in the coupling to receive the motor shaft.
- With an adequately sized crane, carefully lower the motor assembly onto the motor adapter on top of the pump and to allow the motor shaft to engage into the coupling..
- Secure the 4 motor. See **"ENGINEERING DATA"** Section of this manual for the proper torque value.
- Tightening the 4 socket head screws on the coupling. See **"ENGINEERING DATA"** Section of this manual for the proper torque value.
- Remove the impeller position shim and retain for future use.
- Install the 2 coupling guard halves.

Wiring and Grounding

⚠ Install, ground and wire according to local and National Electrical Code requirements.

⚠ Install an all leg disconnect switch near the pump.

⚠ Disconnect and lockout electrical power before installing or servicing pump.

⚠ Electrical supply **MUST** match pumps name plate specifications. Incorrect voltage can cause fire, damage to the motor and voids warranty.

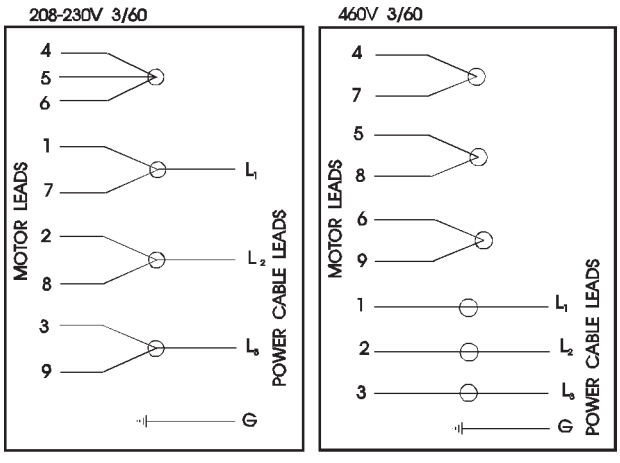
⚠ Motors equipped with automatic thermal protectors open the motor's electrical circuit when an overload exists. This can cause the pump to start unexpectedly and without warning.

- Use only stranded copper wire to motor and ground. Wire size **MUST** limit the maximum voltage drop to 10% of the motor nameplate voltage, at the motor terminals. Excessive voltage drop will affect performance and void motor warranty. The ground wire must be at least as large as the wires to the motor. Wires should be color coded for ease of maintenance.
- The three phase motors require all leg protection with properly sized magnetic starters and thermal overloads.

⚠ WARNING **PERMANENTLY GROUND THE PUMP, MOTOR AND CONTROLS PER NEC OR LOCAL CODES BEFORE CONNECTING TO ELECTRICAL POWER. FAILURE TO DO SO CAN CAUSE SHOCK, BURNS OR DEATH.**

- Connect the electrical leads to the motor, as follows:
  - Single Phase Motors – Connect the BLACK wire to the BLACK motor wire. Connect the WHITE wire to the WHITE motor wire. Connect the GREEN wire to the GREEN motor wire.
- Three Phase Motors – See Figure 6

NOTICE: UNIT ROTATION IS COUNTERCLOCKWISE WHEN VIEWED FROM MOTOR END. INCORRECT ROTATION MAY CAUSE DAMAGE TO THE PUMP AND VOIDS WARRANTY.



THREE PHASE MOTOR WIRING DIAGRAM

Figure 6

- Check pump rotation by observing the motor fan or the coupling THROUGH the coupling guard. **DO NOT** confuse with the flow arrows casted on the pump body. The rotation arrow is casted on the coupling. For three phase motors only – If rotation is incorrect, have a qualified electrician interchange any two of the three power cable leads.

Priming

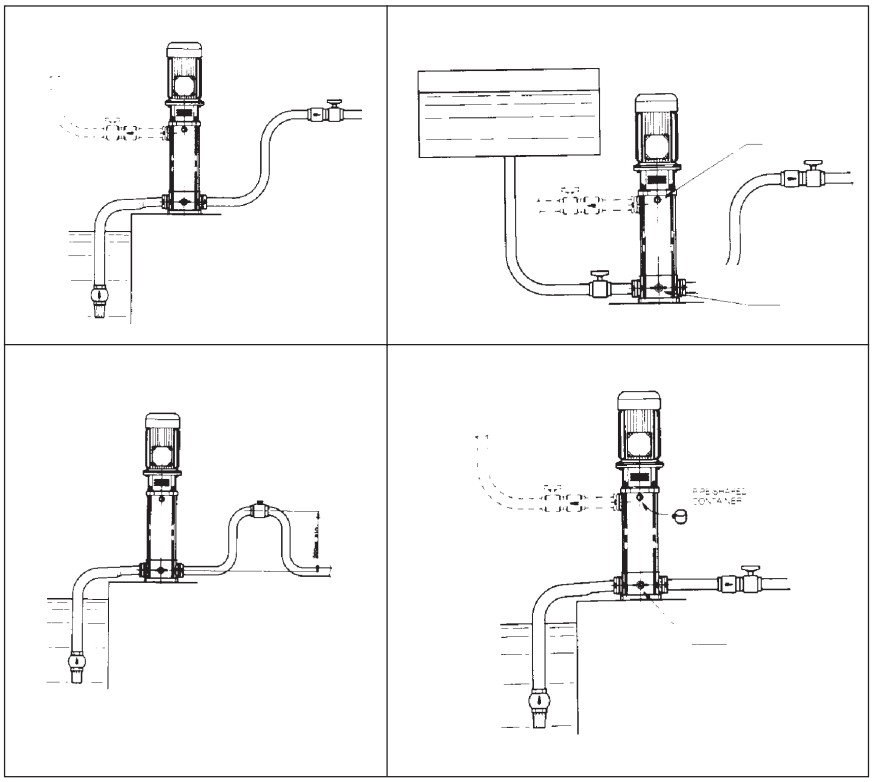
For installation with the liquid level above the pump:

- Close the discharge valve.
- Remove the vent plug and the drain plug on the discharge side.
- Open the suction valve until liquid flows out of the vent plug opening.
- Re-install the vent plug and drain plug. Open the discharge valve.

For installation with liquid level below pump:

- Install fool valve at suction end.
- Remove the vent plug and loose drain plug on the discharge side. With the provided vented funnel, completely fill the casing with liquid.
- Re-install the vent plug and tighten the drain plug.
- Open the suction valve.

Typical Plumbing and Installation



NOTE: Discharge loop must be high enough to keep liquid in the bottom stages during shut-down.

Operation

⚠WARNING

Hazardous machinery can cause personal injury or death.

DO NOT OPERATE UNIT WITHOUT SAFETY GUARD IN PLACE. TO DO SO CAN CAUSE SEVERE PERSONAL INJURY.

NOTICE: PUMP MUST BE COMPLETELY PRIMED BEFORE OPERATION.

⚠WARNING

Extreme heat can cause personal injury or property damage.

DO NOT OPERATE PUMP AT OR NEAR ZERO FLOW. TO DO SO CAN CAUSE EXTREME HEAT, DAMAGE TO THE PUMP, INJURY OR PROPERTY DAMAGE.

- After stabilizing the system at normal operating conditions, check piping for correct alignment. If necessary, adjust pipe supports.

⚠WARNING
Hazardous machinery

MOTOR THERMAL PROTECTORS CAN START THE MOTOR UNEXPECTEDLY AND WITHOUT WARNING, CAUSING SEVERE PERSONAL INJURY.

- See the **"ENGINEERING DATA"** section in this manual for the recommended maximum pump starts per hour.

Maintenance

⚠WARNING
Hazardous voltage

DISCONNECT AND LOCKOUT ELECTRICAL POWER BEFORE ATTEMPING ANY MAINTENANCE. FAILURE TO DO SO CAN CAUSE SHOCK, BURNS OR DEATH.

- Unit motor requires regular lubrication maintenance.

MOTOR LUBRICATION

Recommended Motor Bearing Lubrication Intervals

Interval	Service Environment
1 – 2 Years	Light Duty in Clean Atmosphere
1 Year	8 – 16 hours/day – Clean, Dry Atmosphere
6 Months	12 – 24 hours/day – Moisture Present
3 Months	12 – 24 hours/day – Dirty, High Moisture

- When lubricants are operated at elevated temperatures, the lubrication frequency should be increased.
- **DO NOT** intermix grease bases (lithium, sodium. etc.). Completely purge old grease if changing grease base.
- Over greasing can cause excessive bearing temperatures, lubricant and bearing failure.

Mechanical Seal Replacement

1. Close all necessary suction and discharge valves.
2. Drain the liquid from the pump by removing the lower drain plugs and the upper vent plug.
3. Remove the coupling guards.
4. Dis-assemble the coupling by removing 6 socket head screws. Remove the dowel pin on the pump shaft.
5. Loose the set screws on the seal collar. Remove four hex head capscrews on the gland.
6. Carefully lift the seal assembly from the seal housing by sliding it up the pump shaft. Discard the entire seal assembly.
7. Clean the pump shaft, seal housing and the mounting surface on the seal housing.
8. Lubricate the inside of the new mechanical seal assembly and the pump shaft with STP or Dow Corning #4 grease. Be sure there is an o-ring at the back of gland flange.
9. To install a new mechanical seal assembly, carefully slide it down on the pump shaft until the gland contact the mounting surface on the seal housing.
10. Install the hex capscrews to the seal housing.
11. Install the dowel pin on the pump shaft. Assemble the shaft coupling as indicated on Figure 7. Tighten the two socket head screws on the pump end of the coupling. Do not tighten those on the motor end at this point
12. Insert the provided position shim (in the accessory bag) between the shaft coupling and seal gland. This will lift the shaft/impeller to the running position.
13. Tighten the four socket head screws on the motor end of the coupling.
14. Remove the position shim.
15. Tighten the set screws on the gland.
16. Re-install the coupling guard.

Item	Quantity	Description
A	2	Coupling half
B	6	Socket head capscrew
C	6	Lockwasher
D	1	Dowel pin

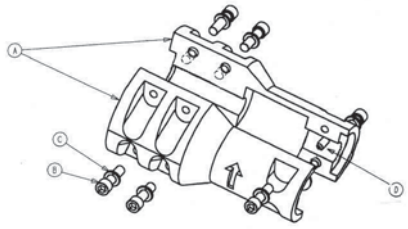


Figure 7

Motor Replacement

1. Remove the coupling guards.
2. Insert the provided position shim (in the accessory bag) between the shaft coupling and seal gland
3. Remove the four hex cap screws joint the motor and the motor adapter.
4. Loose the 4 socket head screws on the motor end of the coupling.
5. With an adequately sized crane, carefully remove the motor.
6. With as adequately sized crane, carefully lower the new motor on to the motor adapter. Be careful not to damage the motor shaft when it silde into the coupling.
7. Tighten the socket head screws on the motor end of the shaft coupling. Remove the position shim.
8. Re-install the coupling guard.

Troubleshooting Guide

⚠WARNING
Hazardous voltage

DISCONNECT AND LOCKOUT ELECTRICAL POWER BEFORE ATTEMPING ANY MAINTENANCE. FAILURE TO DO SO CAN CAUSE SHOCK, BURNS OR DEATH.

SYMPTOM

MOTOR NOT RUNNING
See Probable cause - 1 through 5

LITTLE OR NO LIQUID DELIVERED BY PUMP
See Probable cause – 6 through 12

POWER CONSUMPTION TOO HIGH
See Probable cause – 3, 12, 13, 15

EXCESSIVE NOISE AND VIBRATION
See Probable cause – 3, 6 – 8, 10, 12, 13, 16

PROBABLE CAUSES

1. Motor thermal protector tripped.
2. Open circuit breaker or blown fuse
3. Impellers binding
4. Motor improperly wired
5. Defective motor
6. Pump is not primed, air or gas in liquid
7. Discharge, suction plugged or valve closed
8. Incorrect rotation (three phase only)
9. Low voltage or phase loss
10. Impellers worn or plugged
11. System head too high
12. NPSHA too low – excessive suction lift or losses
13. Discharge head too low – excessive flow rate
14. Fluid viscosity, specific gravity too high
15. Worn bearing
16. Pump, motor or piping loose

Engineering Data

Maximum working pressure:
175 psi for the following pump models:

1SM – 1 to 5 stages

2SM – 1 to 3 stages

3SM – 1 to 3 stages

4SM – 1 to 3 stages

5SM – 1 to 5 stages

6SM – 1 to 4 stages

Maximum working pressure:
400 psi for the stages higher than indicated above.

Maximum liquid temperature:
150°F for the taperlock impeller construction.

250°F for the keyed impeller construction,

ELECTRIC DATA

HP	Motor Frame	RPM	Voltage	Phase	Hz	Start/Hour
3	182TC	3500	115/230	1	60	20
	182TC		230/460	3		240
5	182TC	3500	230	1	60	20
	184TC		230/460	3		165
7.5	184TC	3500	230	1	60	20
	213TC		230/460	3		150
10	213TC	3500	230/460	1	60	20
	215TC			3		135
15	215TC	3500	230/460	3	60	12
20	254TC	3500	230/460	3	60	180
	256TC					75
25	256TC	3500	230/460	3	60	135
	284TSC					30
30	284TSC	3500	230/460	3	60	60
	286TSC					30
40	286TSC	3500	230/460	3	60	45
	324TSC					30
50	324TSC	3500	230/460	3	60	45
	326TSC					25
60	326TSC	3500	230/460	3	60	30
	364TSC					25

TORQUE VALUES

Motor bolts:

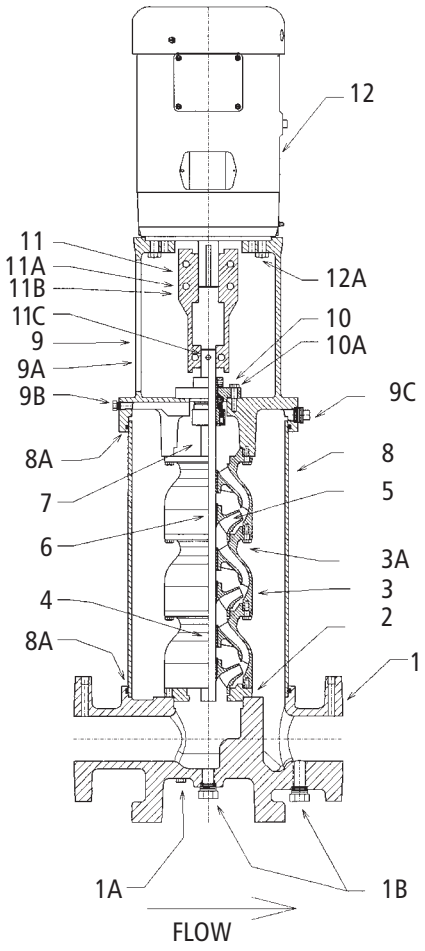
For 3, 5, and 7.5 hp motors: 20 lbs-ft.

For 10 to 40 hp motors: 45 lbs-ft

For 50 and 60 hp motors: 70 lbs-ft

Coupling bolts: 28 lbs-ft

Sectional Assembly Drawing



Item No.	Description
1	Pump body
1A	Capscrew – body
1B	Pipe plug – drain
2	Suction cover
3	Intermediate bowl
3A	Capscrews – bowl
4	Bearing
5	Impeller
6	Taperlock
7	Pump shaft
8	Casing
9	Motor adapter
9A	Coupling guard
9B	Plug – bypass
9C	Plug – prime
10	Mechanical seal
10A	Capscrew, seal
11	Shaft coupling
11A	Capscrew – coupling
11B	Lockwashers
11C	Dowel pin
12	NEMA vertical motor
12A	Motor bolts

WARRANTY

WARRANTY – Company warrants title to the product(s) and, except as noted with respect to items not of Company's manufacturer, also warrants the product(s) on date of shipment to Purchaser, to be of the kind and quality described herein, and free of defects in workmanship and material. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANT-ABILITY AND FITNESS, AND CONSTITUTES THE ONLY WARRANTY OF COMPANY WITH RESPECT TO THE PRODUCT(S).

If within one year from date of initial operation, but not more than 18 months from date of shipment by Company of any item of product(s), Purchaser discovers that such item was not as warranted above and promptly notifies Company in writing thereof, Company shall remedy such nonconformance by, at Company's option, adjustment or repair or replacement of the item and any affected part of the product(s). Purchaser shall assume all responsibility and expense for removal, reinstallation, and freight in connection with the foregoing remedies. The same obligations and conditions shall extend to replacement parts furnished by Company hereunder. Company shall have the right of disposal of parts replaced by it. Purchaser agrees to notify Company, in writing, of any apparent defects in design, material or workmanship, prior to performing any corrective action back-chargeable to the Company. Purchaser shall provide a detailed estimate for approval by the Company.

ANY SEPARATE LISTED ITEM OF THE PRODUCT(S) WHICH IS NOT MANUFACTURED BY THE COMPANY IS NOT WARRANTED BY COMPANY and shall be covered only by the express warranty, if any, of the manufacturer thereof.

THIS STATES THE PURCHASER'S EXCLUSIVE REMEDY AGAINST THE COMPANY AND ITS SUPPLIERS RELATING TO THE PRODUCT(S), WHETHER IN CONTRACT OR IN TORT OR UNDER ANY OTHER LEGAL THEORY, AND WHETHER ARISING OUT OF WARRANTIES, REPRESENTATIONS, INSTRUCTIONS, INSTALLATIONS OR DEFECTS FROM ANY CAUSE.

Company and its suppliers shall have no obligation as to any products which has been improperly stored or handled, or which has not been operated or maintained according to instructions in Company or supplier furnished manuals.

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