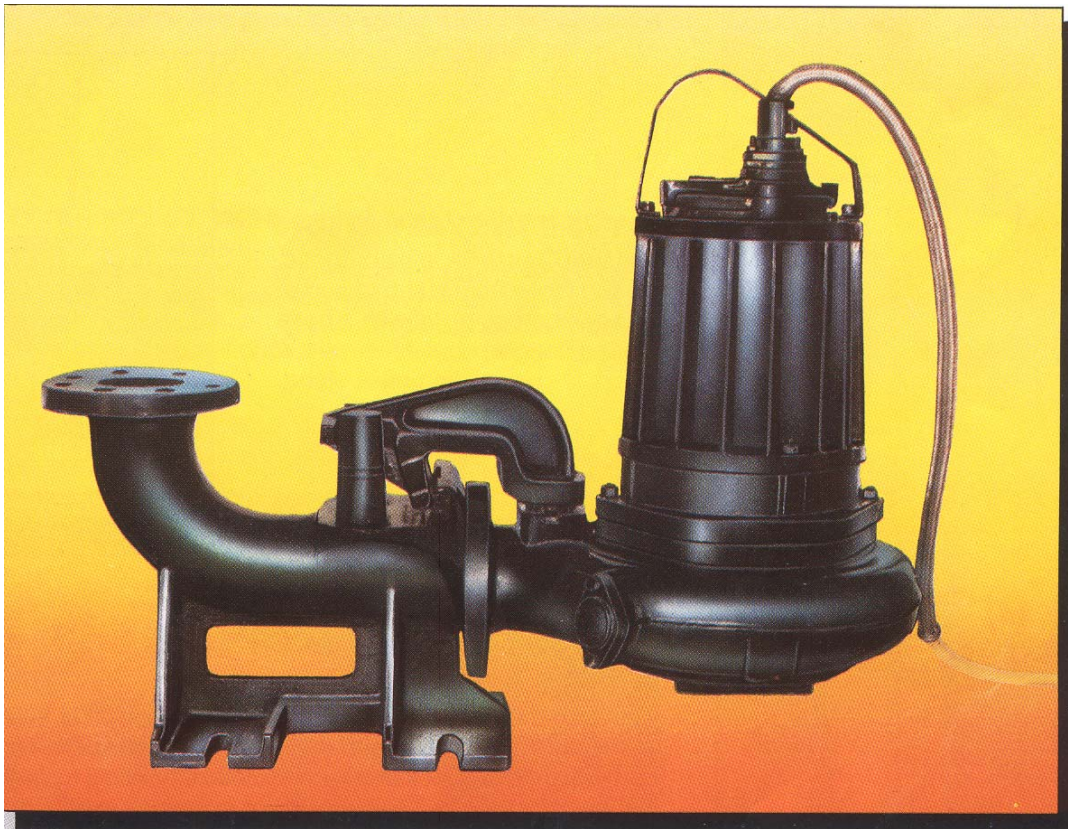




## **MODELS: MS 231 & 232**

**OPERATING INSTRUCTIONS, INSTALLATION & MAINTENANCE  
MANUAL INCLUDING SPARE PARTS LIST**



***Mody Pumps Inc.***

**2166 Zeus Court**

**Bakersfield, CA 93308**

**Tel.: (661) 392-7600 FAX.: (661) 392-7601**

**E-Mail: [sales@modypump.com](mailto:sales@modypump.com)**

**<http://www.modypump.com>**



## LIFE IS PRECIOUS - THINK SAFETY

1. Most accidents can be avoided by using COMMON SENSE.
2. Please read the operation and maintenance instruction manual supplied with the pump. If you did not receive one, please call your local distributor before pump installation.
3. Do not wear loose apparel that may become entangled in the impeller or other moving parts.
4. Always use appropriate safety equipment, such as safety glasses, when working on the pump or piping.
5. Pumps build up heat and pressure during operation-allow time for pumps to cool before handling or servicing.
6. Only qualified service personnel should install, operate and repair pump.
7. Keep clear of suction and discharge openings. DO NOT insert fingers in pump with power connected.
8. Do not pump flammable or hazardous materials (gasoline, acids, alkalis, etc.)
9. Do not block or restrict discharge hose, as it may whip or burst catastrophically under pressure.
10. Make sure lifting handles/hooks are securely fastened each time before lifting.
11. Do not lift pump by the power cord under any circumstances.
12. Do not exceed manufacturer's recommendation for optimum performance, as this could cause the motor/pump to overheat and lead to premature wear or failure.
13. Secure the pump in its operating position so it does not tip over, fall or slide.
14. Keep away from impeller when power is connected.
15. Submersible Pumps are not approved for use in swimming pools, recreational water installations, decorative fountains or any installation where human contact with the pumped fluid is common.
16. Do not operate pump without adequate protection and safety devices in place.
17. Always replace safety devices that have been removed during service or repair.
18. To reduce risk of electrical shock, pump must be properly grounded in accordance with the National Electric Code and all applicable state and local codes and ordinances.
19. To reduce risk of electrical shock, always disconnect the pump from the power source before handling or servicing.
20. Any wiring of pumps should be performed by a qualified electrician.
21. Never operate a pump with a power cord that has frayed or brittle insulation.
22. Cable should be protected at all times to avoid punctures, cuts, and abrasions - inspect frequently.
23. Never handle connected - "hot" power cords with wet hands.
24. Never operate a pump with a plug-in type power cord without a ground fault circuit interrupter, adequate overload and short circuit protection.

**IMPORTANT !!!** Mody Pumps Inc. is not responsible for losses, injury, or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

## GENERAL INFORMATION.

THE "MS" SERIES OF MODY'S SUBMERSIBLE SEWAGE PUMPS ARE PRIMARILY DESIGNED FOR HANDLING SEWAGE, SLUDGE, SLURRIES, WASTEWATER AND LIQUID MANURE. THEY CAN ALSO BE USED FOR HANDLING STORMWATER DRAINAGE WITH HIGH SOLIDS CONTENT.

THE SERVICE LIFE OF A SUBMERSIBLE PUMP PRIMARILY HINGES ON TWO ASPECTS: THE DEPENDABILITY OF THE SEALING SYSTEM AND THE WEAR RESISTANCE OF THE PUMP ITSELF.

THE "MS" SERIES OF PUMPS ARE AVAILABLE WITH A WIDE RANGE OF IMPELLERS TO SUIT PRACTICALLY EVERY PUMPING DUTY WITH HIGH EFFICIENCIES. THE MS 230 SERIES HAS TWO MODELS AS UNDER:

1. MS 231 SINGLE CHANNEL IMPELLER WITH 40MM/1.5" SOLID HANDLING CAPACITY.
2. MS 232 SINGLE CHANNEL IMPELLER WITH 75MM/3" SOLID HANDLING CAPACITY.

THE SINGLE CHANNEL IMPELLERS ARE IN CAST IRON CONSTRUCTION. THE PUMP VOLUTES ARE ALSO IN CAST IRON WITH SMOOTH PROFILED GEOMETRY FOR CLOG FREE OPERATION AND HIGH EFFICIENCIES. ALL VOLUTES ARE FITTED WITH REPLACEABLE WEAR RINGS.

IT IS IN THE INTEREST OF THE USER THAT HE/SHE GO THROUGH THIS MANUAL IN DETAIL PRIOR TO USING THE PUMP.

## TECHNICAL DESCRIPTION.

THE PUMPSET IS IN A MODULAR CONSTRUCTION ENSURING EASY AND SIMPLE SERVICEABILITY. THE MAJOR DESIGN FEATURES ARE AS UNDER:

**A] THERMAL PROTECTION :** SEE UNDER "MOTOR PROTECTION" .

**B] THE MOTOR:** A RUGGED ALUMINUM DIE CAST ROTOR, DYNAMICALLY BALANCED TO GRADE 2.5 ACCURACY OF ISO 942. A STAINLESS STEEL SHAFT RUNNING IN TWO DEEP GROOVE BALL BEARINGS. INSULATION CLASS "F" (155 DEGREES CELSIUS). END WINDINGS DULY EPOXY COATED TO PREVENT DETERIORATION OF INSULATION EVEN IN EXTREMELY HUMID CONDITIONS. WINDING WIRE IS DUAL COATED SUITABLE FOR "H" CLASS INSULATION.

**C] THE SEAL CHAMBER:** THE HEART OF THE "MODY" PUMP. DUAL MECHANICAL SEALS, TUNGSTEN CARBIDE V/S TUNGSTEN CARBIDE SEAL FACES. SECONDARY SEALS OF NITRILE RUBBER AND METAL PARTS IN STAINLESS STEEL, RUNNING IN AN OIL BATH. THE SEALS HAVE BEEN SPECIFICALLY DESIGNED WITH EXTREMELY SHORT WORKING LENGTHS KEEPING IMPELLER OVERHANG TO THE MINIMUM. THIS ENSURES EXTENDED SEAL AND BEARING LIFE.

**D] BEARINGS:** DOUBLE ROW ANGULAR CONTACT LOWER BEARING, WITH SINGLE ROW DEEP GROOVE UPPER BALL BEARING GREASED FOR LIFE WITH A SPECIAL HIGH TEMPERATURE BEARING GREASE REQUIRING NO PERIODIC MAINTENANCE WHATSOEVER.

**E] THE HYDRAULIC ELEMENTS:** SINGLE CHANNEL IMPELLERS WITH LARGE SOLID HANDLING CAPACITY. SMOOTH PROFILED VOLUTES FOR HIGH EFFICIENCIES.

**F] CABLE GLAND ASSEMBLY:** THE PUMP IS SUPPLIED WITH 50' CABLE AS STANDARD. THE CABLE IS AWG #14 SOOW 4 CORE WITH AN OPTION AVAILABLE FOR 6 CORE WHEN THERMAL OVERLOADS ARE REQUIRED AND SEVEN CORES WHEN A SEAL PROBE SENSOR IS NEEDED IN CONJUNCTION WITH ABB AN ABB MONITORING RELAY. (SCHEMATIC ENCLOSED) THE CABLE IS TERMINATED IN THE PUMP AT THE CABLE GLAND. THE GLAND ASSEMBLY SEALS THE CABLE ON THE OUTSIDE SHEATH. A WATER DAM ARRANGEMENT IS ALSO PROVIDED WHICH SEALS THE INDIVIDUAL CORES OF THE CABLE. THIS FEATURE IS UNIQUE AND IS ESSENTIAL TO PREVENT WATER SEEPING THROUGH THE CORES OF THE CABLE INTO THE TERMINAL CHAMBER IN THE EVENT OF A CUT CABLE. THE CABLE IS ALSO SHEATHED FOR THE 1ST ONE METRE LENGTH BY MEANS OF A CABLE GRIP MADE OF STAINLESS STEEL. THIS IS ESSENTIAL TO ENSURE THAT THERE IS NO UNDUE STRAIN ON THE CABLE IF THE PUMP IS PULLED OR

LOWERED INADVERTENTLY BY MEANS OF THE CABLE. COMPLETE DETAILS OF THE CABLE GLAND ASSEMBLY ARE SHOWN IN THE DRAWING.

**G] ELECTRICAL INFORMATION:** MOTORS ARE DESIGNED TO OPERATE ON SINGLE VOLTAGE AND FREQUENCY. MAXIMUM DEVIATION IN VOLTAGE ALLOWED IS  $\pm 6\%$  AND FREQUENCY  $\pm 3\%$ . CHECK NAME PLATE FOR OPERATING VOLTAGE AND FREQUENCY. 230/460V DUAL WIRED MOTORS STANDARD IN NORTH AMERICA.

### **DESIGN PARAMETERS :**

- LOWEST LIQUID LEVEL SHOULD BE 0.2 MTRS (8") ABOVE PUMP CASING.
- THE MAXIMUM SUBMERGENCE RECCOMENDED IS 15 METRES. (50')
- THE SPECIFIC GRAVITY OF THE PUMPED FLUID SHOULD NOT EXCEED 1.1.
- MAXIMUM FLUID TEMPERATURE IS 40 DEG. CELSUIS.
- pH OF THE PUMPED FLUID : 6 - 11

### **INSTALLATION.**

#### **PUMPS ARE AVAIABLE FOR THREE TYPES OF INSTALLATION:**

**P TYPE INSTALLATION:** SEMI PERMANENT/WET. PUMPS ARE LOWERED DOWN GUIDE BARS TO AUTOMATICALLY CONNECT TO DISCHARGE PIPING. PLEASE SEE ILLUSTRATION AT END OF MANUAL FOR DETAIL DIMENSIONS AND INSTALLATION.

**S TYPE INSTALLATION:** PORTABLE/WET. VERSATILE, MULTIPURPOSE, EASY TO INSTALL AND MOVE FROM SUMP TO SUMP. PUMP IS AVAILABLE WITH HOSE/FLANGE TYPE OUTLET CONNECTION AND INDEPENDENT BASE STAND. SEE ILLUSTRATION AT END OF MANUAL.

**D TYPE INSTALLATION:** THIS IS A DRY WELL INSTALLATION OR IN LINE PUMPING SYSTEMS. FLANGED CONNECTION TO FIXED SUCTION AND DELIVERY PIPELINES. SUITABLE FOR HORIZONTAL OR VERTICAL MOUNTING FOR DRY INSTALLATIONS. POWER LIMITATIONS EXIST FOR CERTAIN MODELS AND EXTERNAL COOLING MAY BE NECESSARY. PLEASE CONTACT FACTORY/SALES IF PUMP IS TO BE USED WITH THIS TYPE OF INSTALLATION.

- CHECK THAT THE SITE VOLTAGE CORRESPONDS WITH THAT OF THE PUMP.
- CHECK THAT FUSES ARE INTACT.
- USE SHORTEST POSSIBLE HOSE OF RECOMMENDED DIMENSION. AVOID SHARP BENDS, CREASES AND CONTRACTIONS. FOR P TYPE AND D TYPE INSTALLATIONS ENSURE ALL ACCESSORIES ARE AVAILABLE BEFORE STARTING INSTALLATION.
- NEVER LIFT OR PULL THE PUMP BY MEANS OF THE CABLE. SUSPEND THE PUMP BY A ROPE/CHAIN OR PREFERABLY PLACE IT ON A SOLID BASE. FOR P TYPE INSTALLATIONS THE REQUISITE CHAIN & TACKLE EQUIPMENT MUST BE AVAILABLE. PLEASE READ OUR PUBLICATION REGARDING "P" TYPE INSTALLATION.
- WIRE THE PUMP TO THE MAINS CORRECTLY. ALWAYS USE A STARTER OR A PANEL BOARD. SEE INSTRUCTIONS UNDER "MOTOR PROTECTION" BELOW.
- WHEN THE PUMP IS ENERGIZED IT WILL KICK, WHICH IS OPPOSITE TO THE DIRECTION OF ROTATION OF THE IMPELLER. SHIFT TWO PHASES IN THE POWER CONNECTION IF THE KICK IS IN THE WRONG DIRECTION. THE CORRECT DIRECTION IS INDICATED ON THE PUMP COVER AT THE TOP OF THE PUMP.
- CHECK LEVEL AND CONDITION OF THE OIL AT SERVICE EVERY SIX MONTHS. IF THE OIL IS EMULSIFIED BY WATER THE SEALS MUST BE REMOVED FROM THE ROTOR SHAFT FOR FURTHER ACTION. THE SHAFT SEAL SHOULD BE CHECKED FOR WEAR EVERY 2500 HRS. OF OPERATION. IF SEAL FACES SHOW ANY SIGNS OF WEAR, THEY SHOULD BE REPLACED.

## **HRC FUSE RECOMMENDED**

<b>MAINS VOLTAGE AT SITE</b>	<b>MS 231</b>	<b>MS 232</b>
220 VOLTS, 3 PHASE	20 AMPS	20 AMPS
380 VOLTS, 3 PHASE	10 AMPS	10 AMPS
415 VOLTS, 3 PHASE	10 AMPS	10 AMPS
460 VOLTS, 3 PHASE	10 AMPS	10 AMPS

<b>TROUBLE GUIDE</b>	<b>CAUSE</b>	<b>REMEDY</b>
<b><u>PUMP DOES NOT START</u></b>	1.FUSES BLOWN.	1.REPLACE FUSES
	2.CABLE DAMAGED	2.SHORTEN/REPLACE CABLE
	3.NO POWER.	3.CHECK POWER SUPPLY
	4.BLOCKED IMPELLER.	4.CLEAN BOTTOM PARTS.
	5.STATOR WINDING BURNT.	5.REPLACE STATOR.
<b><u>PUMP STARTS BUT STOPS.</u></b>	1.BLOCKED IMPELLER.	1.CLEAN BOTTOM PARTS.
	2.IMPELLER ROT.WRONG	2.SHIFT TWO PHASE CONN.
	3.CONNECTED FOR WRONG VOLTAGE.	3.CHECK & RECONNECT.
	4.VOLTAGE TOO LOW/HIGH.	4.APPROACH POWER CO.
	5.LIQUID DENSITY HIGH	5.HIGHER HP REQUIRED.
	6.BI-METAL TRIPS.	6.CHECK CURRENT.
<b><u>PUMP GIVES TOO LITTLE WATER.</u></b>	1.IMPELLER ROT.BACKWARD.	1.SHIFT TWO PHASE CONN.
	2.PUMP WORN DOWN.	2.REPLACE IMPELLER.
	3.LONG HOSE AND DIAMETER TOO SMALL.	3.CHECK PRESSURE LOSSES
	4.PRESSURE HEAD TOO HIGH	4.INSTALL BIGGER PUMP.
	5.WEARING RING WORN OUT.	5.REPLACE WEAR RING.

## **MOTOR PROTECTION**

IT IS ESSENTIAL THAT THE PUMP BE USED WITH A STARTER AND PREFERABLY A PANEL BOARD. PANEL BOARDS INCORPORATING ALL PROTECTIVE DEVICES ARE AVAILABLE WITH US. THE FULL LOAD AMPERE RATINGS OF THE TWO MODELS ARE AS PER TABLE BELOW. THE OVERLOAD RELAY IN THE STARTER SHOULD BE CHOSEN ACCORDINGLY AND AMPERES SET AT THE FULL LOAD SETTING FOR THE PARTICULAR MODEL OF THE PUMP. (DETAILS BELOW ARE FOR 230/460 VOLT PUMPS. CHECK FULL LOAD AMPERES FOR DIFFERENT VOLTAGES ON PUMP NAME PLATE)

<b><u>MODEL</u></b>	<b><u>FULL LOAD AMPERES.</u></b>
---------------------	----------------------------------

MS 231	5.0 AMPS @ 460V - 10 AMPS @ 220v
MS 232	5.0 AMPS @ 460V - 10 AMPS @ 220v

## **POWER CABLE OPTIONS**

### **A) FOUR CORE CABLE**

THE PUMP IS SUPPLIED WITH A FOUR CORE CABLE AND THE FUNCTION OF THE SAME IS AS UNDER:

- RED/YELLOW(WHITE)/BLUE(BLACK) ARE THE POWER CORES.
- GREEN CORE IS FOR EARTHING.

### **B) SIX CORE CABLE**

THE PUMP IS SUPPLIED WITH A SIX CORE CABLE AND THE FUNCTION OF THE SAME IS AS UNDER:

- RED/YELLOW(WHITE)/BLUE(BLACK) ARE THE POWER CORES.
- GREEN CORE IS FOR EARTHING.
- ORANGE AND BLUE ARE FOR THERMALS

THREE THERMAL SWITCHES ARE EMBEDDED IN THE MOTOR WINDING OF WHICH TWO ARE CONNECTED IN SERIES. THESE ARE CONNECTED TO THE WHITE CORES OF THE CABLE. THE WHITE CORES OF THE CABLE ARE TO BE CONNECTED IN SERIES WITH THE CONTACTOR COIL OF THE STARTER. THIS IS MOST IMPORTANT.

IN THE EVENT OF OVERHEATING OF THE STATOR WINDING FOR ANY REASON, THE EMBEDDED THERMAL SWITCHES WILL OPEN, CAUSING THE STARTER COIL TO DROP OUT AND ISOLATE THE PUMP UNIT FROM THE MAINS. THESE SWITCHES DO NOT PROVIDE ANY PROTECTION IN THE CASE OF A SHORT CIRCUIT, AND ADEQUATE H.R.C. FUSES SHOULD BE USED FOR SHORT CIRCUIT PROTECTION.

### **C) MODY CAB SEVEN CORE CABLE**

THE PUMP IS SUPPLIED WITH A SEVEN CORE CABLE AND THE FUNCTION OF THE SAME IS AS UNDER:

- RED/WHITE/BLACK ARE THE POWER CORES.
- GREEN CORE IS FOR EARTHING.
- TWO # 16 AWG WHITE CORES ARE FOR THERMALS
- ONE # 16 AWG BLACK CORE IS THE SEAL PROBE SENSOR

THE SEAL PROBE SENSOR NEEDS TO BE WIRED TO AN ABB LLC4 LIQUID LEVEL PROBE SENSOR THAT DETECTS MINUTE AMOUNTS OF FLUID IN THE OIL CHAMBER INSIDE THE CONTROL PANEL. SEE FOLLOWING DIAGRAM.

## **SEAL PROBE SENSOR OPTION**

ALL MODY SEWAGE SUBMERSIBLES (MS RANGE) INCORPORATE A MOISTURE SENSOR IN THE SEAL HOUSING. A PROBE INSULATED FROM THE PUMP BODY IS INSTALLED IN THIS CHAMBER AND IS ENERGIZED USING A 12V SUPPLY FROM A RELAY LIKE THE ABB LLC4.

IN THE EVENT OF LOWER SEAL WEAR THE PUMPED FLUID ENTERS THE SEAL HOUSING CONTAMINATING THE OIL AND CHANGING THE ELECTRICAL RESISTANCE OF THE FLUID. THE RELAY WILL IMMEDIATELY ENERGIZE SENDING A SIGNAL LIKE AN ALARM IF EQUIPPED WHICH SHUTS DOWN OR WARNS THE OPERATOR OF OUTER SEAL WEAR.

DO NOT IN ANY EVENT CONNECT THE THERMAL WIRES AND THE SEAL PROBE WIRE IN SERIES. THE THERMALS AND OUTPUT FROM THE RELAY CAN BE CONNECTED TO A SINGLE COIL IN THE CONTACTOR IN THE EVENT PUMP SHUTOFF IS REQUIRED EITHER FOR OVERHEATING OR SEAL WEAR.

A COMPLETE SCHEMATIC IS ENCLOSED.



# Liquid Level Control LLC4 Series Single Probe



- Single Probe Level Control for Conductive Liquids
- Adjustable or Fixed Sensing up to 250KΩ
- Fill or Drain Operation Available
- 24, 120, or 230 V AC Models are Available
- Isolated AC Voltage on the Probes
- 4 A Resistive SPDT Isolated Contacts

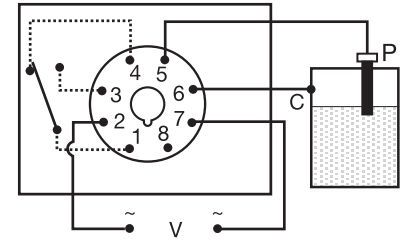
### Description

The LLC4 combines resistance sensing circuitry with solid state timing to provide single probe level maintenance. On adjustable units, the sensitivity adjustment allows accurate level sensing while ignoring foaming agents and floating debris. Transformer isolated 12 V AC is provided at the probe to prevent electrolysis. A trickle current of less than 1 mA determines the presence or absence of liquid between the probe and common. The LLC4 Series can be used with many types of low voltage (resistance changing) transducers to perform other control functions like temperature limit control, photo limit control, condensation sensing, and ice sensing.

### Operation

**Drain (Pump Down Mode):** When the liquid level rises and touches the probe, a fixed time delay begins. This time delay prevents rapid cycling of the output relay and its load. At the end of the time delay, the output relay energizes and remains energized until the liquid level falls below the probe. The output relay then de-energizes and remains de-energized until the liquid again touches the probe.

- Approvals:



Relay contacts are isolated. Dashed lines are internal connections.

Connect common to conductive tank. Additional probe is necessary for non-conductive or insulated tanks.

P = Probe C = Probe Common V = Voltage

**Fill (Pump Up Mode):** When the liquid level falls below the probe, a fixed time delay begins. This time delay prevents rapid cycling of the output relay and its load. At the end of the time delay, the output relay energizes and remains energized until the liquid level rises and touches the probe. The output relay then de-energizes and remains de-energized until the liquid level again falls below the probe.

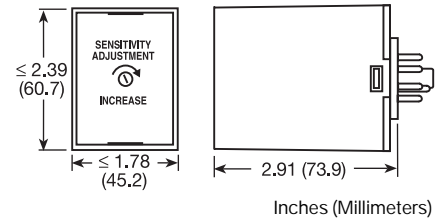
### Ordering Table

LLC4 Series	X Input	X Operation	X Time Delay (Seconds)	X Sense Resistance
	-2 - 24 V AC -4 - 120 V AC -6 - 230 V AC	-A - Drain -B - Fill	-Specify fixed delay (1 ... 60) secs. in 1 s increments	-A - Adjustable -F - Fixed Specify fixed resistance (1 ... 250) in 1K Ω increments

Example P/N: **LLC44A1A** Fixed - **LLC46B5F0**

### Technical Data

Control	
Type	ON/OFF (Single Level) Resistance sensor with built-in time delay to prevent rapid cycling
Sense Voltage	12 V AC at probe terminals
Sense Resistance	Factory fixed or adjustable to 250K Ω
Sense Resistance Tolerance	Adjustable - guaranteed range Factory fixed +/-10%
Input	
Voltage	24, 120, or 230 V AC
Tolerance	24 V AC -15% ... +20% 120 & 230 V AC -20% ... +10%
Frequency	50 ... 60 Hz
Output	
Type	Electromechanical relay
Form	Isolated single pole double throw (SPDT) contacts
Rating	4 A resistive at 240 V AC; 1/10 hp at 240 V AC
Protection	
Surge	IEEE C62.41-1991 Level A
Isolation Voltage	≥ 1500 V RMS between input, output, & probe
Mechanical	
Mounting	Plug-in socket
Termination	8-Pin plug-in
Package	2.91 x 2.39 x 1.78 in. (73.9 x 60.7 x 45.2 mm)
Environmental	
Operating Temperature	-20°C ... +60°C
Storage Temperature	-40°C ... +80°C
Weight	≅ 6 oz (170 g)



### Accessories

 Panel mount kit P/N: BZ1	 Octal 8-pin socket P/N: NDS- 8
 Level probe P/N: LLP-24	 Hold down clips P/N: PSC8
 Electrode with common connection P/N: WCC-1138-3	 Electrode P/N: WCC-1138

See accessory page at the end of this section.



## Liquid Level Control Application Notes

### Dual Probe Level Control

The dual probe input LLC's are designed to maintain the high or low level of a liquid within the containment tank. Figure 3 is an example of a water well reservoir application. Using an LLC2 Series open board design or the LLC5 series 8 pin plug-in (with the 'B' fill logic), we will be able to maintain a precise level within the holding vessel.

As long as the potable water (with a typical resistance of 5K ohms) remains in constant contact with and completes the path between the upper and lower probes, the LLC's output remains de-energized. During usage, the demand pump lowers the water level. When the water level drops below the lower probe, the LLC's output energizes and closes the fill pump control circuit. As the level rises, the pump up circuit will remain closed until the water rises to and touches the upper probe. With the probe depths set accurately, the high level of the tank is maintained and the low level will not drop below the intake of the submersible pump, thus avoiding a loss of prime condition.

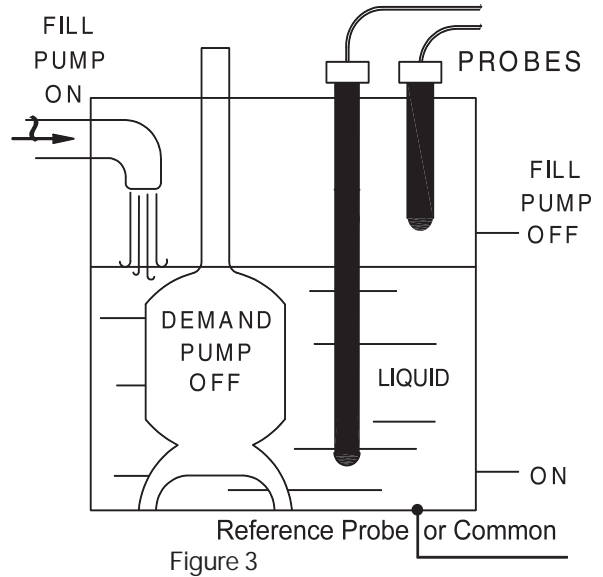


Figure 3

### Seal Leak Detection

Another use for a conductive liquid level control is as a seal leak detector. An electrode is placed in contact with the non-conductive oil within a pump/motor casing. If a leak in a watertight seal occurs, the conductive contaminates introduced into the oil lowers its resistance. The LLC senses this change in resistance. The example in Figure 4A & 4B illustrates a typical sewage pump application. The probe is normally inserted through a watertight seal which isolates the probe from the case (common

connection). A separate wire runs from the pump ground (case) to the LLC common to complete the sensing path. Typical sewage has a resistance of 5K ohms. An LLC setting, of approximately 21K ohms, will allow detection of minute levels of sewage in the oil. This means leaks are detected early. Normally the output of the LLC would then be connected to an alarm to signal a leak has occurred allowing routine maintenance to be scheduled to replace the damaged seal.

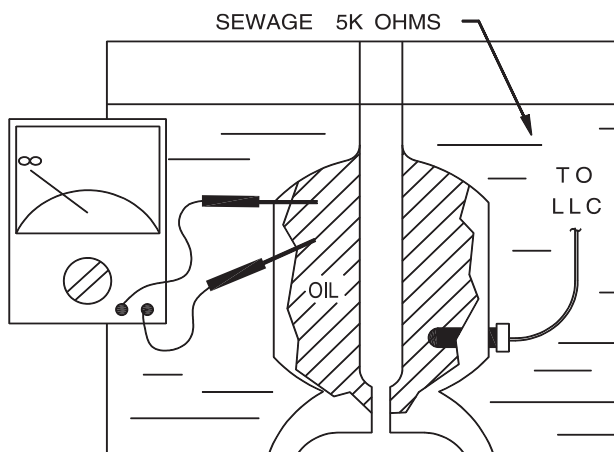


Figure 4A

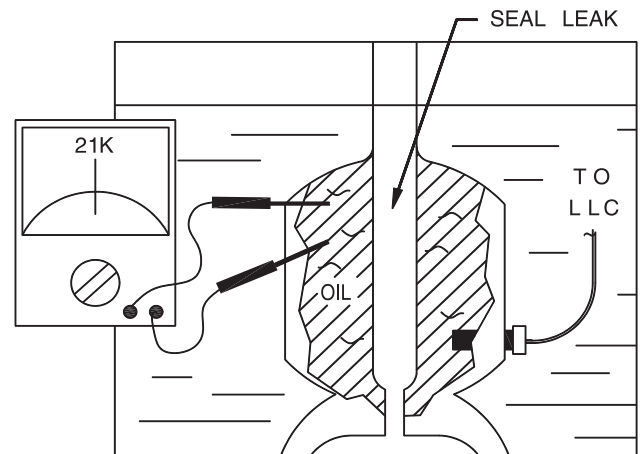


Figure 4B

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## **GENERAL OVERHAUL AND OIL CHECK. (THIS APPLIES TO BOTH MODELS)**

**TO CARRY OUT A GENERAL OVERHAUL, IT IS ESSENTIAL THAT A COMPLETE SET OF TOOLS BE AVAILABLE AS PER TOOL KIT LIST. (LIST IS AVAILABLE AT THE END OF THE MANUAL). IT IS NOT POSSIBLE TO CONDUCT THE OVERHAUL WITHOUT THE REQUISITE TOOLS.**

### **DIS-ASSEMBLY(REFER DRG.NO.MS/853/00 OR MS/854/00 AT END OF MANUAL)**

- IT IS MANDATORY THAT ALL "O" RINGS BE REPLACED WHENEVER A PUMP IS OVERHAULED OR DISMANTLED. UNDER NO CIRCUMSTANCES SHOULD OLD "O" RINGS BE USED, EVEN IF THEY SEEM O.K. BE CAREFUL NOT TO SCRATCH SEALING SURFACES. ALWAYS GREASE NEW "O" RINGS BEFORE INSTALLATION.
- ALWAYS ISOLATE THE UNIT FROM ELECTRICAL POWER BEFORE ATTEMPTING ANY OVERHAUL.
- THE TRANSPORTABLE VERSION IS SUPPLIED WITH A PUMP BASE REMOVE BASE BEFORE ANY FURTHER DIS - ASSEMBLY. THE PERMANENT INSTALLATION VERSION IS SUPPLIED WITH A SLIDING BRACKET FIXED ON THE VOLUTE OF THE PUMP. LAY THE PUMP ON IT'S SIDE ON A BENCH OR OVER TWO SUPPORTS. TURN THE PUMP SO THAT THE OIL HOLE FACES DOWNWARDS. USING AN ALLEN KEY UNSCREW OIL PLUG (18) TO DRAIN OIL FROM THE SEAL CHAMBER. IT IS EASIER TO DRAIN THE OIL IF THE OTHER OIL HOLE CAP SCREW IS ALSO REMOVED. **BE CAREFUL.** IF THE SEAL HAS LEAKED, THE OIL CASING MAY BE UNDER PRESSURE. HOLD A RAG OVER THE OIL PLUG TO PREVENT SPLATTER.
- UNSCREW NUTS (4) AND REMOVE PUMP VOLUTE (21) FROM SEAL HOUSING (17). REMOVE CAP SCREW (26) AND SPRING WASHER (27). REMOVE LOCKING SPACER (25) AND SLIDE IMPELLER OF THE MOTOR SHAFT. IF THE IMPELLER IS SLIGHTLY TIGHT USE A WOODEN MALLETT TO TAP THE SAME OFF THE SHAFT. REMOVE KEY (31) AND KEEP ASIDE CAREFULLY.
- THE LOWER MECHANICAL SEAL IS NOW IN VIEW. REMOVE TRIMMING SPACER (S)(32). USING A NOSE/CIRCLIP PLIER REMOVE CIRCLIP (33). THE MECH. SEAL ASSEMBLY CAN NOW BE REMOVED FROM THE SHAFT BY HAND. BE VERY CAREFUL WITH THE SEALING SURFACES SO THAT THEY DO NOT SUFFER DAMAGE OR GET SCRATCHED IN ANY WAY. LEAVE THE SEAL SEAT IN THE SEAL HOUSING.
- UNSCREW NUTS (4) HOLDING THE SEAL HOUSING AGAINST THE STATOR CASING AND REMOVE SEAL HOUSING. USE A WOODEN MALLETT TO TAP OFF THE SAME. THE UPPER MECH. SEAL IS NOW IN VIEW. REMOVE THE SEAL IN EXACTLY THE SAME MANNER AS THE LOWER MECH. SEAL.
- UNSCREW CAP SCREWS (38) HOLDING THE LOWER BEARING BRACKET (16) AGAINST THE STATOR CASING. THE COMPLETE ROTOR ASSEMBLY WITH LOWER BEARING BRACKET AND LOWER BEARINGS CAN BE PULLED OUT FROM THE STATOR ASSEMBLY. THE LOWER BEARING BRACKET CAN BE REMOVED FROM THE ROTOR BY REMOVING THE BEARING COVER. THE BEARING CAN NOW BE EXAMINED.
- UNSCREW HEX NUT (4) HOLDING THE PUMP COVER (1) AND PRY OUT THE SAME. REMOVE THE WIRE CONNECTORS (49 & 50) TO SEPARATE THE POWER CABLE FROM THE MOTOR LEADS. THE WIRE CONNECTORS CAN BE UNSCREWED COUNTER CLOCKWISE TO RELEASE THE SAME. UNSCREW NUT FOR GROMMET (47) AND REMOVE RUBBER GROMMET (46). REMOVE CAP SCREW (38) AND PRY OUT UPPER BEARING BRACKET(8).
- THE STATOR IS NOW AVAILABLE FOR ELECTRICAL CHECKS, IF ANY ARE REQUIRED. WE RECOMMEND MEASURING LINE TO LINE RESISTANCE BETWEEN THE THREE POWER LEGS, A MEGGING TEST AND IF AVAILABLE A HIGH POT.

## **RE- ASSEMBLY OF THE PUMPSET.**

THE PUMP CAN BE RE- ASSEMBLED BY REVERSING THE ABOVE PROCEDURE. PLEASE HOWEVER NOTE THE FOLLOWING:

- ALWAYS REPLACE ELASTOMER ELEMENTS.
- REPLACE LOCK WASHER DURING RE -ASSEMBLY.
- CAREFULLY READ THE SEAL ASSEMBLY INSTALLATION INSTRUCTIONS PAGE.

## **OIL SPECIFICATIONS**

- A) EXXON UNIVOLT 61
- B) SHELL TELLUS 29.
- C) CHEVRON SUPERLA 10 FDA APPROVED

**PLEASE NOTE THE SEAL CHAMBER CONTAINS APPROX. 2.0 LITRES OF OIL .**

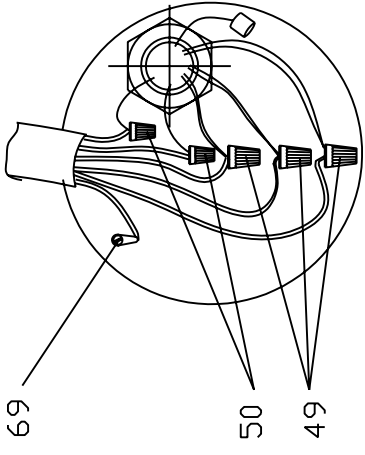
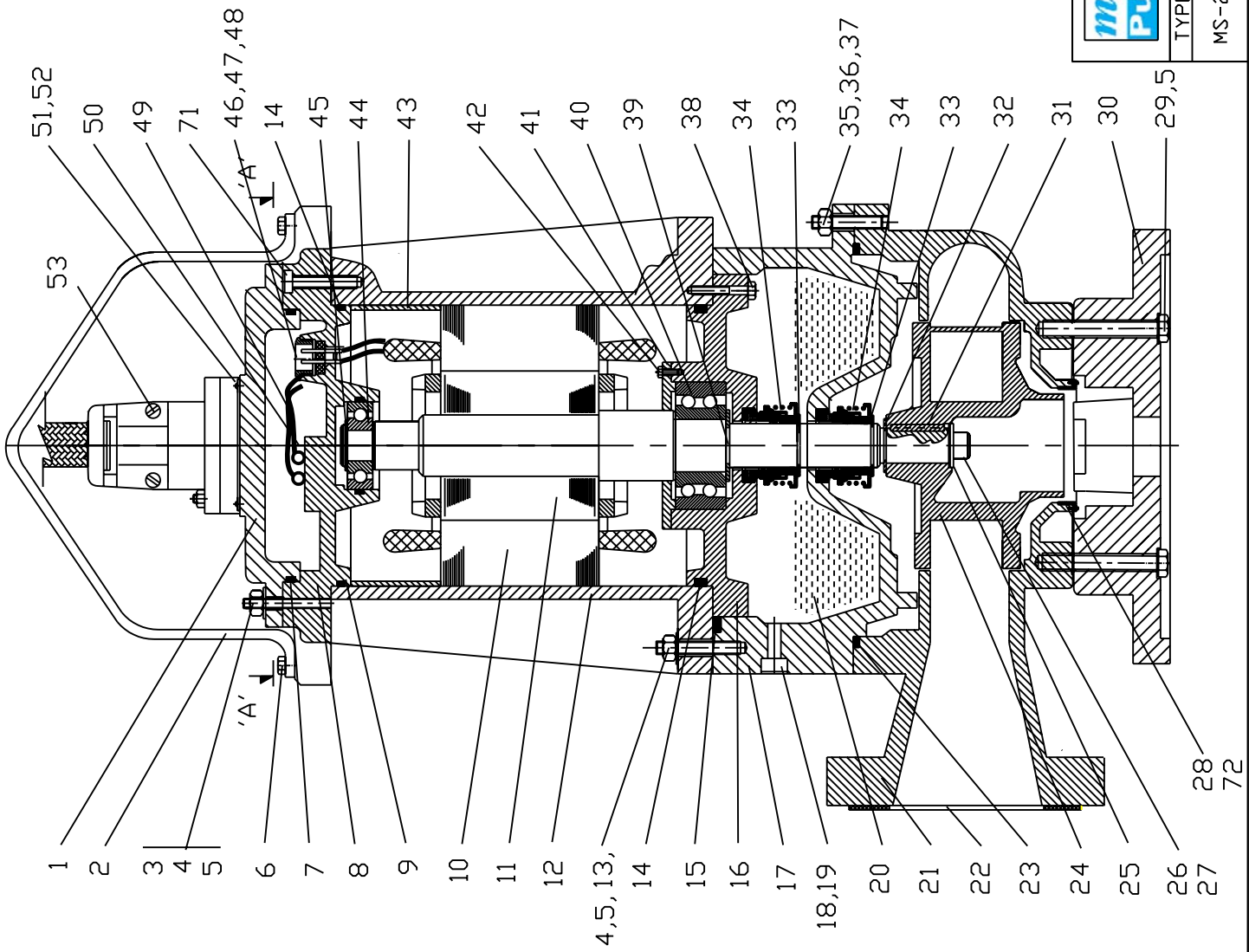
**TOOL KIT DETAILS:**

<b><u>SR. NO.</u></b>	<b><u>TOOL NO.</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>QTY</u></b>
1	T1114	D. E. SPANNER (17*19)	1
2	T1222	RING SPANNER (12*13)	1
3	T1223	RING SPANNER (17*19)	1
4	T2105	ALLEN WRENCH (8MM)	1
5	T3104	SCREW DRIVER (8")	1
6	T4102	BEARING PULLER (4")	1
7	T4104	BEARING PULLER (8")	1
8	T5203	CIRCLIP PLIER (6")	1
9	T9002	SEAL ASSEMBLY MANDREL	1
10	T9506	TEE TYPE ALLEN KEY (8MM)	1

**RECOMMENDED SPARES FOR TWO YEARS OPERATION:**

<b><u>SR. NO.</u></b>	<b><u>PART NO.</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>QTY.</u></b>
1	535-022-00	MECHANICAL SEAL	2
2	535-009-66	"O" RING SET	1
3	260-036-66	CABLE GROMMET	1
4	260-016-66	CABLE LEAD GROMMET	1
5	020-005-07	UPPER BEARING	1
6	020-014-07	LOWER BEARING	1
7	300-092-01	IMPELLER (MS 232)*	1
8	300-106-01	IMPELLER (MS 231)* NEW	1
9	720-006-45	WEAR RING (MS 232)*	1
10	720-013-45	WEAR RING (MS 231)* NEW	1

**\* PLEASE SPECIFY IMPELLER & WEARING RING NO. CORRECTLY DEPENDING ON MODEL OF PUMPSET.**

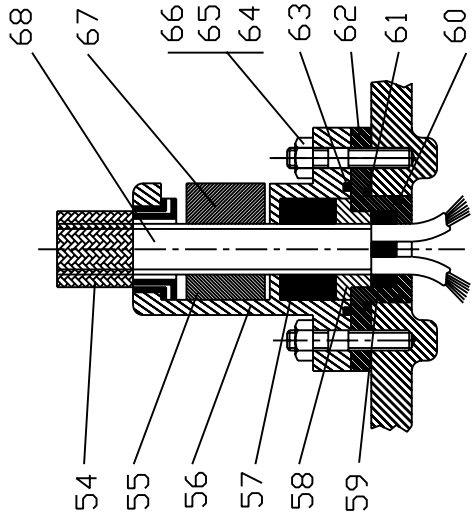


VIEW AT ARROW 'A-A'

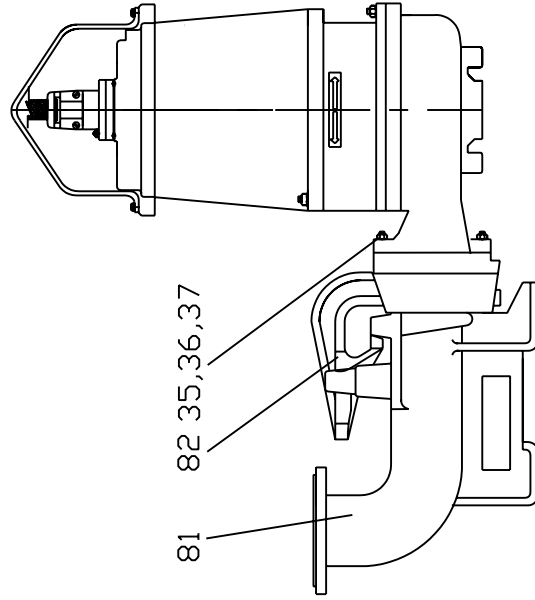


Moddy Pumps Inc.  
 2166 Zeus Court  
 Bakersfield, CA 93308 USA  
 Tel.: 661-392-7600 Fax: 661-392-7601  
 www.moddypump.com

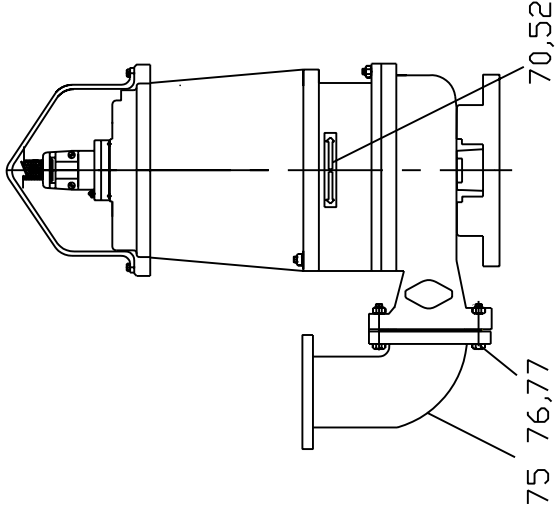
TYPE	TITLE:		NAME	DATE
MS-231	SECTIONAL ASSY. DRG. OF		D.M.GUTAL	2-7-2001
	MODDY SEWAGE PUMP		DRN.	
			CHD.	
			APPD.	
	DRAWING No.	VER.	REV.	
	MS/853/00	1.1	05	



CABLE GLAND ASSY.



PERMANENT INSTALLATION (WT.:145 KG.)



TRANSPORTABLE VERSION (WT.:105 KG.)



Mody Pumps Inc.  
2166 Zeus Court  
Bakersfield, CA 93308 USA  
Tel.: 661-392-7600 Fax: 661-392-7601  
www.modypump.com

TYPE	TITLE:
MS-231	SECTIONAL ASSY. DRG. OF MODY SEWAGE PUMP

DRN.	NAME	DATE
CHD.	D.M.GUTAL	7-7-2001
APPD.		
DRAWING No.	VER	REV
MS/853/00	1.1	05

**PUMP MODEL MS-231      VER - 1.1**

**1/1/2007**

<b>D.NO.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>	<b>QTY</b>
1	105-009-01	PUMP COVER	1
2	270-009-21	HANDLE	1
3	650-024-21	STUD	4
4	370-008-21	HEX NUT	8
5	700-006-21	WASHER	10
6	045-019-21	HEX HD BOLT	2
7	380-026-66	"O" RING	1
8	035-014-01	UPPER BEARING BRACKET	1
9	380013-66	"O" RING	1
10	619-035-00	BARE STATOR	1
11	480-053-00	ROTOR COMPLETE	1
12	625-029-01	STATOR CASING	1
13	650-020-21	STUD	4
14	380-028-66	"O" RING	2
15	380-031-66	"O" RING	1
16	035-037-01	LOWER BEARING BRACKET	1
17	545-013-01	SEAL HOUSING	1
18	520-002-21	OIL PLUG	3
19	380-001-66	"O" RING	3
20	395-005-93	OIL	2L
21	050-025-01	PUMP VOLUTE	1
22	220-020-68	GASKET	1
23	380-056-66	"O" RING	1
24	300-106-01	IMPELLER, 60HZ	1
25	600-045-21	LOCKING SPACER	1
26	045-022-21	HEX HD BOLT	4
27	705-001-21	SPRING WASHER	1
28	720-013-45	WEAR RING	1
29	045-036-21	HEX HD BOLT	4
30	030-029-01	BASE	1
31	320-007-22	KEY	1
32	600-020-21	TRIMMING SPACER	AS REQD
33	080-005-21	CIRCLIP	2
34	535-022-00	MECHANICAL SEAL	2
35	650-025-21	STUD	6
36	370-009-21	HEX NUT	6
37	700-008-21	WASHER	6
38	520-004-21	CAP SCREW	8
39	080-006-08	CIRCLIP	1
40	020-014-07	LOWER BEARING	1
41	037-003-30	BEARING COVER	1
42	045-004-21	HEX HD.BOLT	4
43	600-047-04	SPACER FOR STATOR	1
44	020-005-07	UPPER BEARING	1
45	080-004-08	CIRCLIP	1
46	260-019-66	LEAD GROMMET	1
47	365-010-40	NUT FOR GROMMET	1
48	710-008-21	WASHER FOR LEAD GROMMET	1
49	365-027-00	WIRE NUT CONNECTOR	3

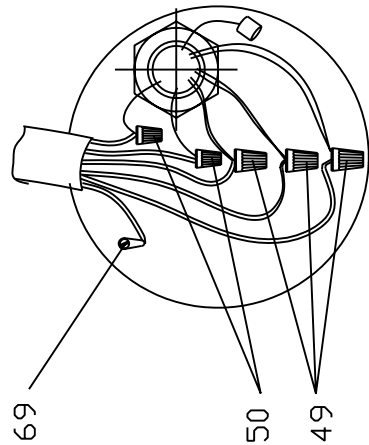
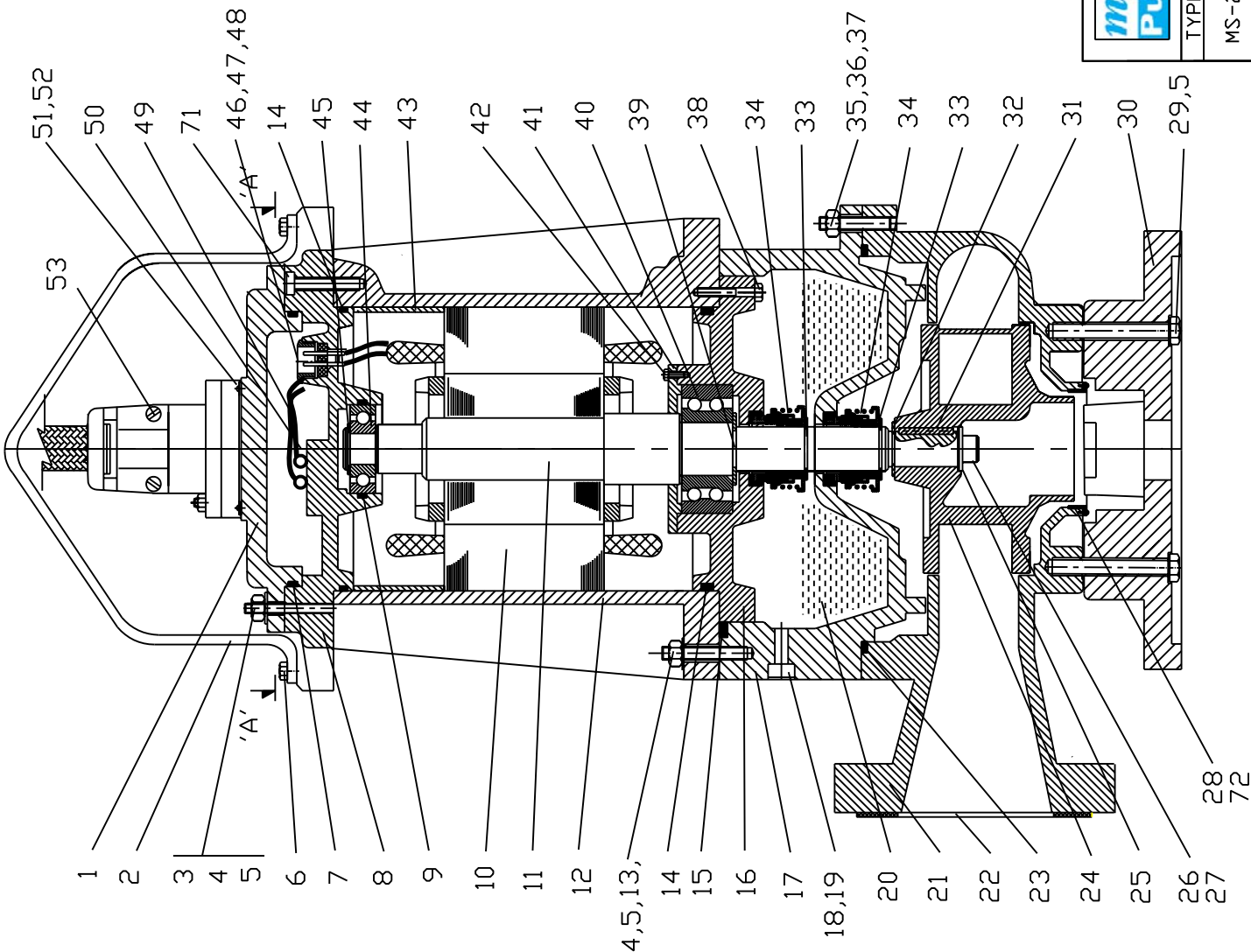


**PUMP MODEL MS-231      VER - 1.1**

<b>D.NO.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>	<b>QTY</b>
50	365-025-00	WIRE NUT CONNECTOR	2
51	350-020-21	NAME PLATE	1
52	465-006-11	RIVET	4
53	525-022-21	PH PAN HD SCREW	2
54	660-093-00	CABLE GRIP (Order with Gland)	1
55	662-002-45	CABLE SUPPORT	1
56	660-093-00	CABLE GLAND (Order with Grip)	1
57a	260-013-66	CABLE GROMMET 4 CORE	1
57b	260-015-66	CABLE GROMMET 6 CORE	1
58	600-018-40	GLAND SPACER	1
59a	260-016-66	CABLE LEAD GROMMET 4 CORE	1
59b	260-038-66	CABLE LEAD GROMMET 6 CORE	1
60	380-010-66	"O" RING	1
61	380-007-66	"O" RING	1
62a	235-005-01	CABLE GLAND BASE 4 CORE	1
62b	235-009-49	CABLE GLAND BASE 6 CORE	1
63	380-005-66	"O" RING	1
64	650-013-21	STUD	2
65	370-006-21	HEX NUT	2
66	700-004-21	WASHER	2
67	085-009-49	CABLE CLAMP	1
68a	065-014-79	CABLE 4 CORE 14/4 SOOW	50'
68b	12-4/16-3	MODYCAB SEVEN CORE CABLE	50'
69	525-007-40	EARTHING SCREW	1
70	430-015-01	CAP FOR VOLUTE	1
71	220-027-66	GASKET	2
72	045-003-21	HEX HD BOLT	3
73	375-009-66	"O" RING SET	1

<b>PORTABLE VERSION</b>			
75	405-070-01	OUTLET 3'	1
76	045-032-21	HEX HD BOLT	2
77	700-009-21	WASHER	2

<b>PERMANENT INSTALLATION</b>			
81a	095-015-01	4" DISCHARGE CONN. ANSI	1
81b	095-013-01	4" DISCHARGE CONN. BS	1
82	095-016-01	SLIDING BRACKET	1
83	095-023-04	UPPER GUIDE BAR HOLDER	1



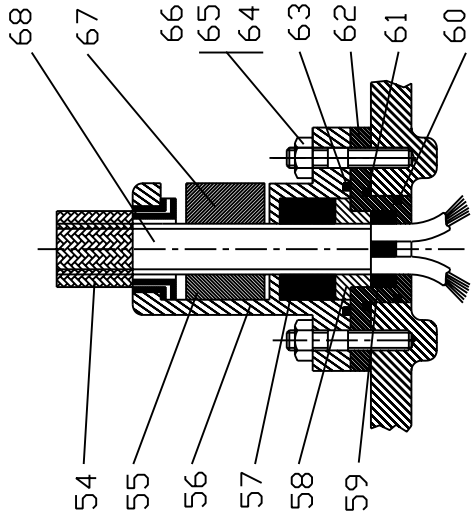
VIEW AT ARROW 'A-A'



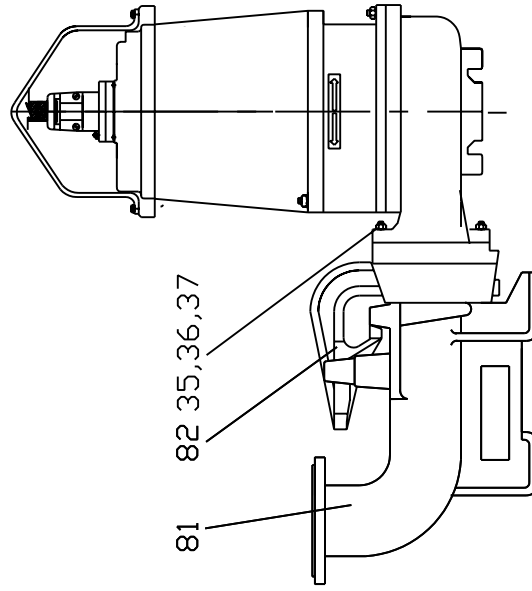
Mody Pumps Inc.  
 2166 Zeus Court  
 Bakersfield, CA 93308 USA  
 Tel.: 661-392-7600 Fax: 661-392-7601  
 www.modypump.com

DRN.	D.M.GUTAL	NAME	DATE
CHD.			2-7-2001
APPD.			

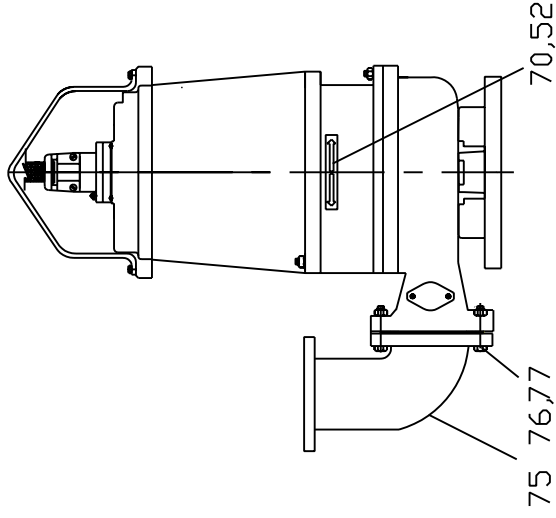
TYPE	TITLE:	DRG. OF	VER.	REV.
MS-232	SECTIONAL ASSY.	SECTIONAL ASSY.	1.0	04
	MODY SEWAGE PUMP	MODY SEWAGE PUMP		




CABLE GLAND ASSY.



PERMANENT INSTALLATION (WT.:164 KG.)



TRANSPORTABLE VERSION (WT.:114 KG.)

		Mody Pumps Inc. 2166 Zeus Court Bakersfield, CA 93308 USA Tel.: 661-392-7600 Fax: 661-392-7601 www.modypump.com		DRN.	NAME	DATE
TYPE		TITLE:		CHD.	D.M.GUTAL	7-7-2001
MS-232		SECTIONAL ASSY. DRG. OF		APPD.		
		MODY SEWAGE PUMP		DRAWING No.	VER.	REV
				MS/854/00	1.0	04

**PUMP MODEL MS-232 VER 1.0**

1/1/2007

<b>D.NO.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>	<b>QTY</b>
1	105-009-01	PUMP COVER	1
2	270-009-21	HANDLE	1
3	650-024-21	STUD	4
4	370-008-21	HEX NUT	8
5	700-006-21	WASHER	10
6	045-019-21	HEX HD BOLT	2
7	380-026-66	"O" RING	1
8	035-014-01	UPPER BEARING BRACKET	1
9	380-013-66	"O" RING	1
10	619-037-00	BARE STATOR	1
11	480-054-00	ROTOR COMPLETE	1
12	625-029-01	STATOR CASING	1
13	650-020-21	STUD	4
14	380-028-66	"O" RING	2
15	380-031-66	"O" RING	1
16	035-037-01	LOWER BEARING BRACKET	1
17	545-013-01	SEAL HOUSING	1
18	520-002-21	OIL PLUG	3
19	380-001-66	"O" RING	3
20	395-005-93	OIL	2L
21	050-014-01	PUMP VOLUTE	1
22	220-020-68	GASKET	1
23	380-056-66	"O" RING	1
24	300-092-01	IMPELLER, 60HZ	1
25	600-045-21	LOCKING SPACER	1
26	520-010-21	CAP SCREW	1
27	705-001-21	SPRING WASHER	1
28	720-006-45	WEAR RING	1
29	045-035-21	HEX HD BOLT	4
30	030-014-01	BASE	1
31	320-007-22	KEY	1
32	600-020-21	TRIMMING SPACER	AS REQD
33	080-005-21	CIRCLIP	2
34	535-022-00	MECHANICAL SEAL	2
35	650-025-21	STUD	6
36	370-009-21	HEX NUT	6
37	700-008-21	WASHER	6
38	520-004-21	CAP SCREW	8
39	080-006-08	CIRCLIP	1
40	020-014-07	LOWER BEARING	1
41	037-003-30	BEARING COVER	1
42	045-004-21	HEX HD.BOLT	4
43	600-047-04	SPACER FOR STATOR	1
44	020-005-07	UPPER BEARING	1
45	080-004-08	CIRCLIP	1
46	260-019-66	LEAD GROMMET	1
47	365-010-40	NUT FOR GROMMET	1
48	710-008-21	WASHER FOR LEAD GROMMET	1
49	365-027-00	WIRE NUT CONNECTOR	3

**PUMP MODEL MS-232 VER 1.0**

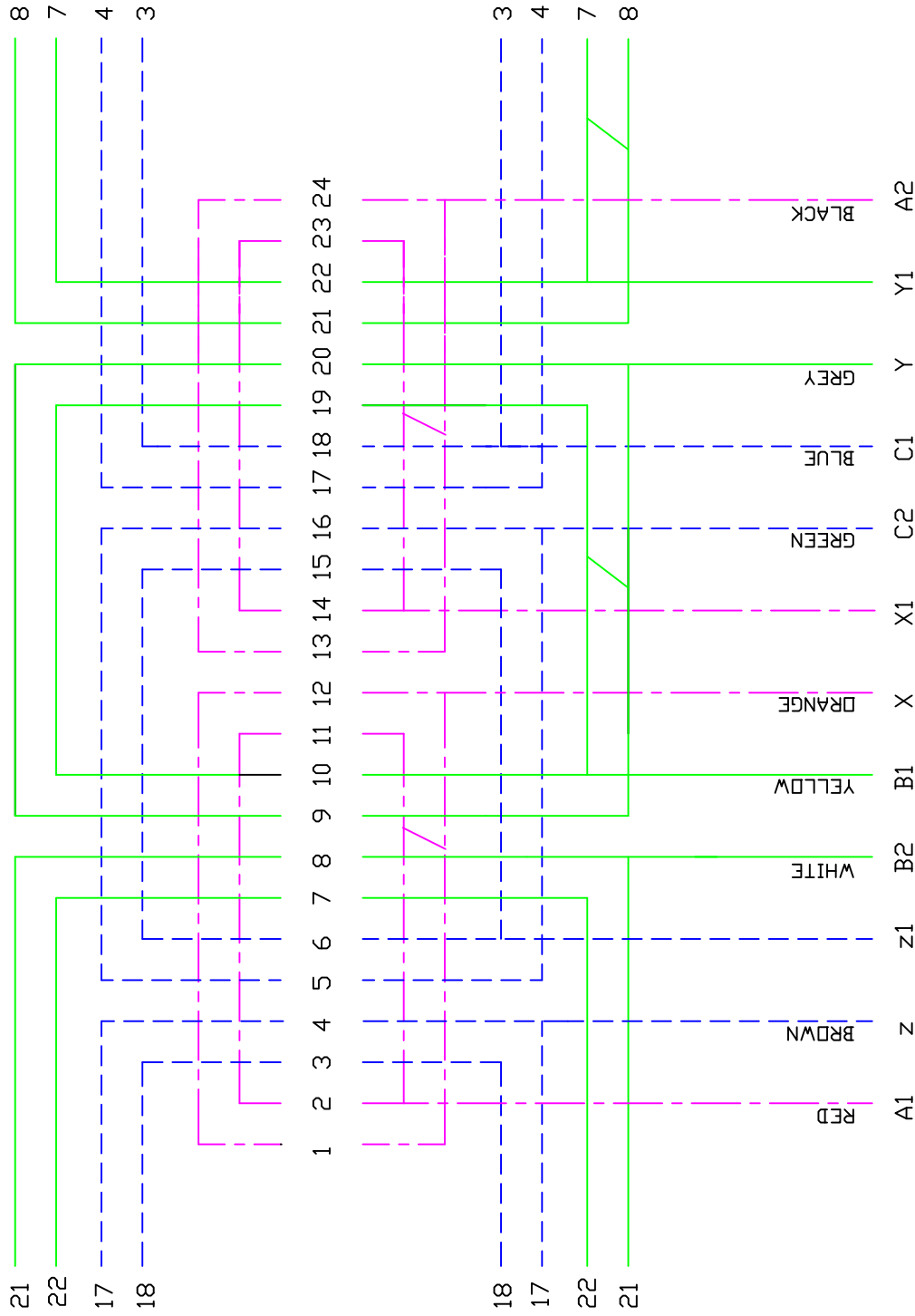
<b>D.NO.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>	<b>QTY</b>
50	365-026-00	WIRE NUT CONNECTOR	2
51	350-020-21	NAME PLATE	1
52	465-006-11	RIVET	4
53	525-022-21	PH.PAN HD.SCREW	2
54	660-093-00	CABLE GRIP (Order with Gland)	1
55	662-002-45	CABLE SUPPORT	1
56	660-093-00	CABLE GLAND (Order with Grip)	1
57a	260-013-66	CABLE GROMMET 4 CORE	1
57b	260-015-66	CABLE GROMMET 6 CORE	1
58	600-018-40	GLAND SPACER	1
59a	260-016-66	CABLE LEAD GROMMET 4 CORE	1
59b	260-038-66	CABLE LEAD GROMMET 6 CORE	1
60	380-010-66	"O" RING	1
61	380-007-66	"O" RING	1
62a	235-005-01	CABLE GLAND BASE 4 CORE	1
62b	235-009-49	CABLE GLAND BASE 6 CORE	1
63	380-005-66	"O" RING	1
64	650-013-21	STUD	2
65	370-006-21	HEX NUT	2
66	700-004-21	WASHER	2
67	085-009-49	CABLE CLAMP	1
68a	065-014-79	CABLE 4 CORE 14/4 S00W	50'
68b	12-4/16-3	MODY CAB 7 CORE CABLE	50'
69	525-007-40	EARTHING SCREW	1
70	430-015-01	CAP FOR VOLUTE	1
71	220-027-66	GASKET	1
72	045-003-21	HEX HD.BOLT	4
73	375-009-66	"O" RING SET	1

	<b>PORTABLE VERSION</b>		
75	405-071-01	OUTLET 4"	1
76	045-032-21	HEX HD.BOLT	2
77	700-009-21	WASHER	2

**PERMANENT INSTALLATION**

81a	095-015-01	4" DISCHARGE CONN. ANSI	1
81b	095-013-01	4" DISCHARGE CONN. BS	1
82	095-016-01	SLIDING BRACKET	1
83	095-023-04	UPPER GUIDE BAR HOLDER	1

# MODY DUAL VOLTAGE, 3Ph-230/460v 9 LEAD WINDING DIAGRAM



### 460 VOLT CONNECTION

- JOIN A2 X - BLACK AND ORANGE
- B2 Y - WHITE AND GREY
- C2 Z - GREEN AND BROWN

POWER TO A1(RED), B1(YELLOW), C1(BLUE)



### 230 VOLT CONNECTION

- SHORT XYZ
- JOIN A1 A2 - RED AND BLACK-POWER
- B1 B2 - YELLOW AND WHITE-POWER
- C1 C2 - BLUE AND GREEN-POWER

POINTS X1 Y1 Z1 ARE PERMANENTLY SHORT CIRCUITED



# *LIMITED WARRANTY*

We warrant to our immediate customer and to the ultimate consumer that products of our manufacture will be free of defects in material and workmanship under normal use and service for the following time periods, when installed and maintained in accordance with our instructions.

PUMPS: One (1) year from date of installation or (18) months from date of shipment, 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 for product designed for non-permanent installation, the first owner who uses the product. It is the purchaser's or any sub-vendor's obligation to make known to the ultimate consumer the terms and conditions of this warranty. This warranty gives you specific legal rights, and there may also be other rights which vary from state to state. In the event the product is covered by the Federal Consumer Product Warranties Law (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, (2) this warranty is a LIMITED WARRANTY, and (3) no claims of any nature whatsoever shall be made against us, until the ultimate consumer, his successor, or assigns, notifies us in writing of the defect, and delivers the product and/or defective part(s) freight prepaid to our facility or nearest authorized service station. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply. **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, FOB POINT OF MANUFACTURE OR AUTHORIZED REPAIR STATION, 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, guarantees in the nature of performance specifications furnished in addition to the foregoing material and workmanship warranties on a product manufactured by *Mody*, if any, are subject to laboratory tests corrected for field performance. Any additional guarantees, 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 by the terms and conditions of the original manufacturer's warranty.

**RECOMMENDATIONS FOR SPECIAL APPLICATIONS OR THOSE RESULTING FROM SYSTEMS ANALYSES 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, (b) improper voltage, (c) lightning, (d) sand or other abrasive materials, (e) scale or corrosion build-up due to excessive chemical content. Any modification of the equipment will also void the warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective parts. Neither will we accept 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 application and use of the product. **UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, WHICH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL, AND/OR WORKMANSHIP AND/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 shall be assigned to any person, whether by operation or otherwise, without our prior written approval.