

# "DRY-STOP" MAC-METER MODEL S-1

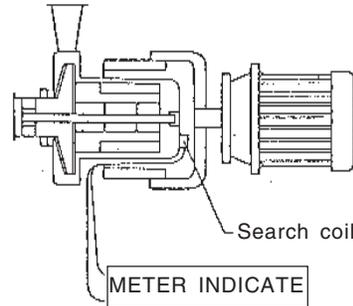
## GENERAL

"DRY-STOP" MAC-METER is a highly reliable contactless meter relay of photoelectric method using an LED as the light source.

It is designed to protect the SERIES "KK" pump from dry run and is capable of remote watch to indicate wearing conditions of a mouthing and bearings.

## PRINCIPLE OF OPERATION

When the "KK" pump is normally running, axial thrust carries the impeller toward the suction port, when a dry run condition occurs, the impeller moves backward toward the motor.



These variations are detected as current signals by an impeller position search coil installed out of the liquid, therefore, the meter's relay is operated and shuts the motor off immediately.

## SPECIFICATIONS

Maximum signal current	2001A
Power supply	100/110VAC, 200/220VAC, 50/60Hz
Contact capacity	100/110VAC - 1A, 200/220 VAC - 0.5A.

## INSTALLATION TO PANEL

Tighten 4 nuts to secure meter to panel. Overtightening can damage the meter case.

## WIRING

### 1. Preparation

A push button switch and an electromagnetic contactor (4 contacts) are required for wiring.

Connect power source terminals, relay terminals, and signal terminals, as described on circuit diagram.

### 2. Power source terminal

AC 100/110 V, or 200/220 V and ACO, 50/60 Hz.

Be careful not to connect 200 volt source to 100 volt terminal.

### 3. Relay terminal

Use terminal contacts 2 - 3.

Connect the relay circuit across terminals 2 - 3 of H symbol, do not use L symbol.

2 terminal is common contact, 2 - 3 is normally ON, and 2 - 1 is normally OFF.

When the meter needle is over the dry run pointer, 2 - 3 is OFF and 2 - 1 is ON.

### NOTE:

Relay circuit is a reversible, not a self holding circuit.

Therefore, a starter with H-O-A switch is necessary for automatic circuit operation.

### CAUTION:

In automatic mode, pump/motor will restart automatically.

### 4. Signal terminal

There are three terminals AM<sup>+</sup>, B, BM<sup>-</sup>:

a) For Pump Model PM 250 - PM 801

Connect signal cords to terminals B and BM<sup>-</sup>.

b) For Pump Model PM 1000

Connect signal cords to terminals AM<sup>+</sup> and BM<sup>-</sup>.

### NOTE:

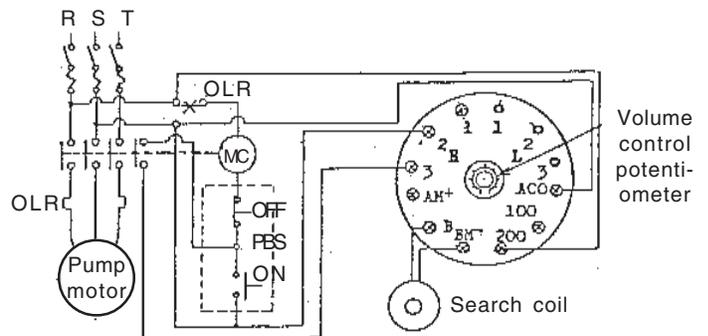
Signal cords of the outdated Model PM 800 and PM 801 are a four wire system.

When "DRY-STOP" MAC METER is used with these pumps, connect only two signal cords which are marked with A, A seals.

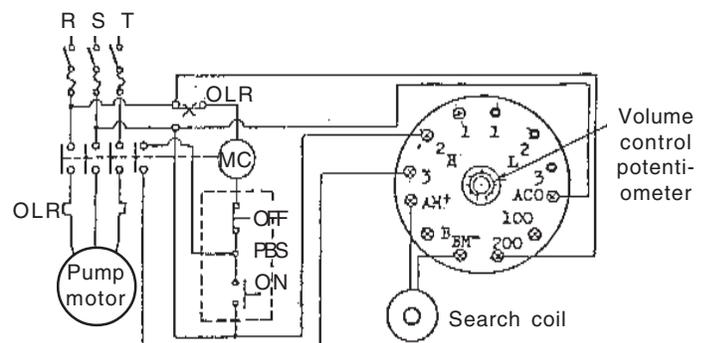
## STANDARD CIRCUIT DIAGRAM

### For PM250 - PM801

OLR: Overload relay  
MC: Electro-magnetic contactor's coil  
PBS: Push button switch

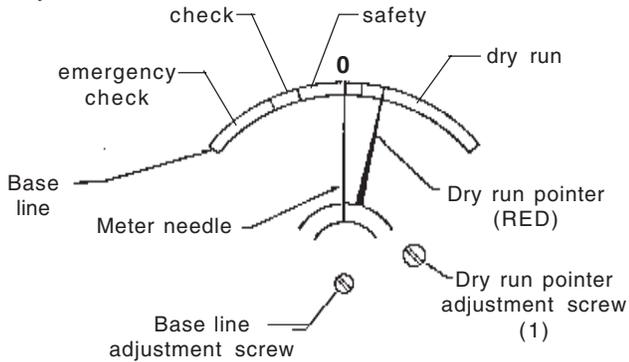


### For PM1000



## PREPARATION

Confirm base line position of the meter. If it has slipped off, adjust base line position. Base line adjust screw should be turned gently.



## PUMP STARTING, METER ADJUSTING

1. Test run the Series "KK" pump according to Operation and Service Guide supplied for pump.
2. Turn adjustment screw (1) to the right (clockwise) and move the red pointer (Dry run pointer) to the right hand side of the meter.
3. Turn the volume control potentiometer in the center on the back side of the meter and set the meter needle on the zero point.

4. Turn the adjustment screw of the red pointer to move it from the right side to the left side. When it passes under the needle, make sure it turns off the "KK" pump. Return it to the former position by turning the red pointer adjustment screw.
5. Start the "KK" pump again.
6. Turn the red pointer adjustment screw and set it to sit closely ( $3/16"$  to  $1/4"$  to the right side of the zero point. (Right hand side on the orange zone)
7. **MOMENTARILY** shut off the suction valve to check the movement of the meter needle and then open it again.
8. Shut off the discharge valve to check the movement of the meter needle and open it again.
9. The meter needle settles with normal running after 30 minutes to one hour. Then turn the volume control and set the meter needle on the zero point again.

### NOTE:

Reset the meter needle again on the zero point after 2 or 3 weeks running, because the meter needle falls gradually to the left side due to creep of the rear casing with continuous load.

10. When the operating conditions are changed, make corrections to meter needle. (i.e. Temperature, head . . .)

## TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSE	CORRECTION
MOTOR STOP (Needle past the red pointer)	Dry run, air leak or air pocket.	Prime again or purge air.
	Severe cavitation.	Check the system and re-evaluate the application and NPSH <sub>a</sub> .
	Damage of parts.	Replace parts.
	Suction is clogged with foreign materials.	Remove all foreign materials.
NEEDLE FALLS IN THE CHECK RANGE	Wear of mouthring.	Check and replace the mouthring and bearings.
	Change in the operating conditions.	Make correction to the set of the meter needle.
NEEDLE STOPS AT BASE LINE	Bad connection, broken wire in the signal cords.	Check wiring. Check the resistance of the signal cords. (Normal is 150 to 200 ohms.)
	Meter failure.	Replace "DRY-STOP" Mac-Meter.
	Unusual noise or vibration (with broken signal cords).	Disassemble and check immediately.
NEEDLE RUN UNUSUAL (In no current) Needle does not indicate the base line.	Bad connection of the signal cords.	Check signal cords.

### CAUTION:

Do not place a stronger magnetic field near the METER or SIGNAL CORD.  
Do not touch the volume control, if there is no trouble.