

**MASTER**

**JOCKEY PUMP CONTROLLER  
INSTRUCTION MANUAL**

**SERIAL NO.**

**MODEL NO.**

**PMC**



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# Model PMC

## PUMP MOTOR CONTROLLER

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## MODEL PMC

### PUMP MOTOR CONTROLLER

General: The Model PMC is a fusible combination motor starter with a built in pressure switch for use with pump motors such as make-up pumps, booster pump, or 'jockey' pumps which are used with automatic sprinkler systems. Some units are supplied with a circuit breaker in lieu of the fusible disconnect (switch and fuse block).

### INSTALLATION INSTRUCTIONS

Mounting: The PMC enclosure must be mounted in the vertical position, and in an area free from dripping and spraying water.

Safety Precaution: Before any electrical work is done on the PMC make sure the disconnect switch and the control switch are in the off position.

Power Supply: Use branch circuit protection on the incoming line (mains). Check the motor and PMC nameplates to verify they match the incoming line voltage, frequency and current requirements.

Wiring: All motor circuit conductors should be sized according to the National Electric Code article 430, part B. Insulation for these conductors should be chosen so it will not be affected by the surrounding environment. The input power wiring is connected to the fusible disconnect, and the output motor wiring is connected to the motor starter. Protect internal components from drilling chips and debris.

Plumbing: The brass pressure sense line should be connected to the 1/2 inch NPT female brass bulkhead fitting provided on the bottom of the cabinet. (Note: for fire pump systems, the sense line runs from between the system side of the make-up pump check valve and the pump side of the control valve to the bulkhead fitting on the PMC. See NFPA standard for Fire Pumps (NFPA-20 fig. A-7-5.2.1 for details).

Protection: When Option 3 is provided fuses are furnished according to the National Electric Code (NFPA-70) table 430-148 (Single Phase) and 430-152 (Three Phase) which is based on the full load motor current. If not specified, the full load current is taken from a standard motor current table for Design "B", 1.15 service factor, 40% rise, 60 Hz (50 HZ for 380 Vac or 220 Vac Controllers), A.C. Squirrel Cage Induction 2 Pole or 4 Pole motors. The table is applied to the voltage and horsepower applicable.

The Overload Relay is furnished and set according to the motor Service Factor Amps which is based on the full load motor current times its maximum Service Factor. Both fuse sizes and overload (Trip) settings are shown on M.C.S. drawing SK-0844, included in standard units, or separate label for others.

## Model PMC - continued

Start-up: After the mounting, wiring, and plumbing are completed, and the system is ready to be pressurized, initiate the following:

1. Adjust the pressure switch to the desired turn-on and turn-off settings.
2. Close and latch the door (Operation of the disconnect switch is interlocked with the door).
3. Set the disconnect switch to the "on" position.
4. Momentarily turn the selector switch to manual position while watching the direction of the motor rotation. If correction is necessary, open (turn off) the disconnect switch and interchange two of the motor leads. Repeat the last two steps.
5. Turn the selector switch to the "auto" position to put the pump in service.

### SEQUENCE OF OPERATION

General: The PMC controls a make-up pump-motor combination to maintain the pressure in a system within a selected range. This is accomplished with an adjustable pressure switch which has independently adjustable turn-on and turn-off setting. Refer to the wiring or schematic diagram for details.

Power Wiring: The input lines (mains) connect to the top of the Disconnect Switch DS or Circuit Breaker CB. Power flows through the short circuit protection motor Line (Mains) Fuses LF, or Circuit Breaker CB, and then to the Motor Starter, which is horsepower rated. The Motor Starter consists of Motor Contactor MC and Overload Relay OLR. When the Motor Contactor Coil M is energized, Motor Contactor contacts close to feed power through the Overload Relay to its output terminals where the motor is connected.

Overload Relay: The Overload Relay furnished in the motor starter provide protection from excessive currents. The overload relay has been sized and set to trip open when the motor exceeds 125% of the Full Load Current (FLA) multiplied by the rated Service Factor (SF). Trip times vary depending on the magnitude of the current overload, the number of previous starts, the ambient temperature of the controller, and the size of the overload element. Briefly, the Overload Relay is sized to allow initial starting currents while protecting the motor from excessive long starting currents or excessive running currents. (See Installation Instructions - Protection for proper sizing).

Manual Control: Control power wiring is tapped off the incoming power on the load (down-stream) side of the Line Fuses or Circuit Breaker. It is routed to the three position (Auto-Off-Manual) selector switch.

In the OFF position, the Motor Contactor coil is de-energized to prevent the motor from running.

In the manual position, the Pressure Switch contacts are bypassed so the contactor coil is continuously energized by the selector switch. The Overload Relay contacts also override the manual position to again protect the motor.

**CAUTION:** *Use care when using the MANUAL (MAN) position of the control switch to avoid causing system Over Pressure. Use extra caution with positive displacement, regenerative or other pumps capable of generating high output pressures until or unless the presents and status of a pressure relief valve is determined.*

## Model PMC - continued

Automatic (Pressure) Control: In the AUTO position, control power is routed to the Pressure Switch PS. The Pressure Switch is normally closed (closes on falling pressure). When the pressure is below the Turn-On setting of the Pressure Switch, its contacts close to energize the Motor Contactor coil to start the motor.

In the event of excessive motor current or sustained locked rotor contacts, the thermal element of the Overload Relay will open pilot Contacts OLC to de-energize the Motor Contactor Coil to open the Motor Contactor contacts and de-energize the motor. After the motor and Overload Relay cool down, the Overload Relay is manually reset to re-enable the controller and motor.

Option "1" - Control Transformer: When Option "1" is supplied, control power is supplied by a Control Power Transformer (CPT). Its primary is supplied by two control line fuses F2 and F3. The secondary output of the transformer is protected by secondary fuse F1. When used, control power is 115 Vac (110 - 120 Vac) rather than line voltage. The motor contactor coil and any other relay coils are rated at 110 Vac to 120 Vac in this case.

Option "2" - Minimum Run Timer: This option is used to prevent excessively frequent pump starting. The option consists of the Minimum Run Time Delay Relay TM. It is equipped with a Timer head TMD as well as instantaneous contacts TMA. The timer head is equipped with an adjustment dial. The standard range of adjustment is zero to 180 seconds.

Auto Position - When the Pressure Switch PS closes, the Motor Contactor M and Minimum Run Timer TM coils are energized. Timer Contacts TMA close to seal in (latch) to by-pass the Pressure Switch contacts to maintain the motor run signal, regardless of the state Pressure Switch contacts. The electric motor will run for the duration of the pre-set time setting of the Minimum Run Timer. After the Timer set delay time, contacts TMD open to open the latch path around the Pressure Switch contacts PS. If the Pressure Switch PS contacts are already open, Motor Contactor M is de-energized to stop the motor, and Timer Relay coil TM is de-energized to re-set it for the next starting cycle. If the Pressure Switch contacts are still closed, the Motor Contactor remains energized to keep the motor running until the Pressure Switch contacts open. This will also reset the Minimum Run timer for the next Pressure Switch motor run signal.

BThe Minimum Run Timer does not operate with the selector switch in the MANUAL position.

**CAUTION:** See previous Manual control system Over Pressure Caution note.

Option "3" - Line (Mains) Fuses: The fuses furnished for Option "3" in the disconnect switch provide protection from short circuit or high current faults. (See Installation Instructions - Protection, for proper sizing).

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Model PMC - continued

MODEL PMC

REPLACEMENT PARTS LIST

<u>Symbol</u>	<u>Part No.</u>	<u>Description</u>	<u>Notes</u>
DS	302400	Disconnect Switch, 600 Vac, 30/40 Amp (Internal Switch only)	
DS	302401	Disconnect Switch, 600 Vac, 60/80 Amp (Internal Switch only)	
DS	302402	Disconnect Switch, 600 Vac, 100 Amp (Internal Switch only)	
---	400939	Disconnect Switch Handle Operator only, (30 thru 100 Amp)	
---	400681	Auto-Off-Manual Selector Switch	
PS	400130	Pressure Switch (Mercoid No. DA-31-1-R.9) 10-300 P.S.I.	
TM	613056	Minimum Run Time Delay Relay/Timer Head Ass'y, 120 Vac	
TM	613050	Minimum Run Time Delay Relay/Timer Head Ass'y, 208 Vac	(1)
TM	613051	Minimum Run Time Delay Relay/Timer Head Ass'y, 230 Vac	(1)
TM	613052	Minimum Run Time Delay Relay/Timer Head Ass'y, 380 Vac	(1)
TM	613053	Minimum Run Time Delay Relay/Timer Head Ass'y, 460 Vac	(1)
---	303150	Control Power Transformer, 50 VA, 208/380/416 Vac (S/S 400739)	
---	303156	Control Power Transformer, 50 VA, 230/460/575 Vac (S/S 400244)	
LF	302360	Fuse Holder, 3 Pole, 250 Volt, 30 Amp	
LF	302361	Fuse Holder, 3 Pole, 250 Volt, 60 Amp	
LF	302362	Fuse Holder, 3 Pole, 600 Volt, 30 Amp	
LF	302363	Fuse Holder, 3 Pole, 600 Volt, 60 Amp	
F1,F2	303471	Fuse Holder, 1 pole, 250 Vac, 30 Amp (Opt.1)	
F3	400574	Fuse Holder, 1 pole, 250 Vac, 30 Amp (Opt.1)	
F3	207719	Fuse, 250 Vac, 0.4 Amp Slo-Blo, for 50 VA C.P.T's (Opt.1)	
F3	207727	Fuse, 250 Vac, 1.6 Amp Slo-Blo, for 200 VA C.P.T's (Opt.1)	

Notes:

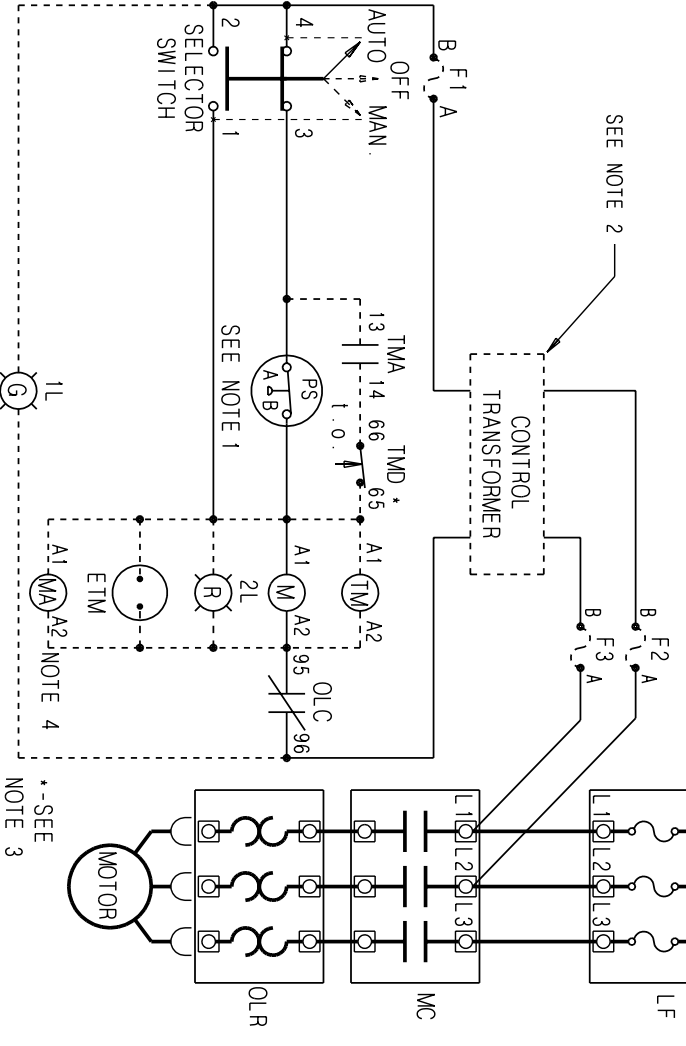
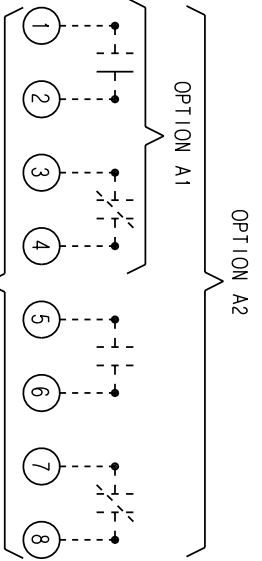
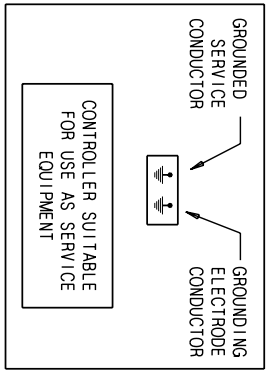
- 1) Line voltage Motor Contactor coils are used only when Option "1" is Not provided.
- 2) One or more renewal parts such as fuses, heaters, contacts, and etc. may be obtained from local electrical distributor(s).

**IMPORTANT:** When ordering replacement parts, be sure to specify the complete MODEL NUMBER and SERIAL NUMBER of controller in which they are to be used.

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REV.	DESCRIPTION
B	ADDED 'MA' COIL
C	EDITORIAL CHANGES
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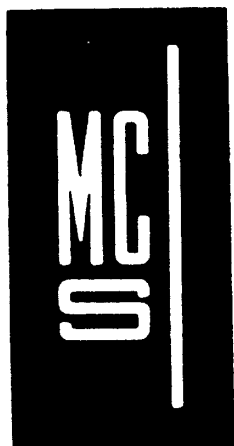


SYMBOL	DESCRIPTION
DS	DISCONNECT SWITCH
S1	SUITABLE AS SERVICE EQUIPMENT
MC	MOTOR CONTACTOR CONTACTS
OLR	OVERLOAD RELAY
PS	PRESSURE SWITCH
M	MOTOR CONTACTOR COIL
MA	AUX. MOTOR RUN RELAY (NOTE 4)
ETM	RUN TIME METER
LF	LINE FUSES
OLC	OVERLOAD CONTACTS
1L	POWER ON LAMP (OPTION L2)
2L	PUMP RUNNING LAMP (OPTION L1)
F1	PRIMARY CONTROL CKT. FUSE
F2.3	SECONDARY CONTROL CKT. FUSES
TMA	MIN. RUN TIMER INST. CONTACT
TM	MINIMUM RUN TIMER RELAY
TMD	MIN. RUN TIMER TIME CONTACT
---	FIELD WIRING
---	DENOTES OPTIONAL EQUIPMENT

- NOTES:
- PRESSURE SWITCH CLOSURES ON FALLING PRESSURE.
  - SUPPLIED WITH OPTION 1, FOR XFMR. PRIMARY, SEE LABEL ON WINDING.
  - CONTACT OPENS WHEN TIMER TIMES OUT SET TIMER TO 1 MIN. FOR EA. 10 HP OR FRACTION THEREOF. MAX. SETTING-3 MIN. (180 SEC.)
  - "MA" SUPPLIED WITH OPTION A1 & A2 WHEN OPTION 2 IS NOT PROVIDED.

WIRING DIAGRAM SERIES PMC CONTROLLER FOR 3Ø PUMP MOTOR	
<b>MASTER CONTROL SYSTEMS, INC.</b> LAKE BLUFF, ILLINOIS U.S.A.	
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