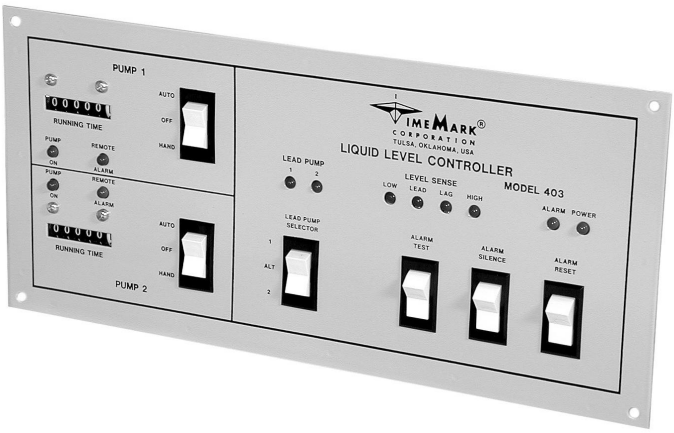
MODEL 403

Liquid Level Controller



- **Dual run-time meters**
- **Selectable lead/lag or automatic alternation**
- **Four sensing levels**
- **Alarm outputs**
- **Hand-off-auto controls**

DESCRIPTION

The **Model 403 Liquid Level Controller** provides central control of duplex pumping systems. The Model 403 includes pump alternating, visual run-time meters, hand-off-auto (HOA) controls and alarm outputs.

Four level-sense inputs interface with float switches, pressure switches, or other level sensing devices which can provide a contact closure.

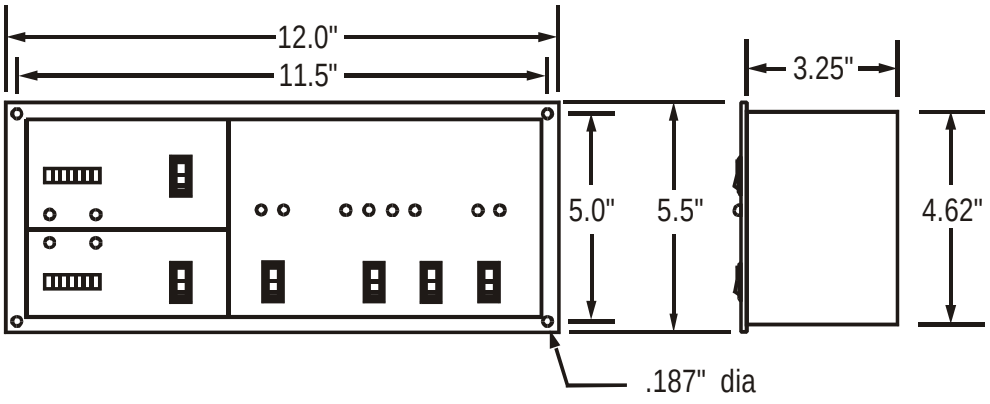
A SPST, normally-closed internal power-fail contact opens when AC power 120 VAC is connected to the controller, and closes if power is lost or removed. Connections for external remote alarm contacts, which must remain closed for normal operation (or jumpered if not required), are supplied for each pump.

If either circuit opens, the corresponding pump will be locked out until the problem is corrected and the 'Alarm reset' switch is pressed.

SPECIFICATIONS

MODEL	403
Input voltage	105-130 VAC
Input frequency	60 Hz
Power consumption	10 Watts max.
Contacts	SPST relay
Contact rating	10A at 240 VAC resistive
Float Switch Potential	12 VDC at 1 mA
Transient protection	2500 V for 10 msec
Operating temperature	- 40º to +140º F
Display	to 99,999.9 non-resettable
Humidity tolerance	0-97% without condensation
Expected relay life	Mechanical: 10 million operations Electrical: 100,000 operations at rated load
Case material	20 gauge Steel
Termination	Removable terminal strip
Weight	4.9 lbs

DIMENSIONS



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MODEL 403 Liquid Level Controller

READ ALL INSTRUCTIONS BEFORE INSTALLING, OPERATING OR SERVICING THIS DEVICE.
KEEP THIS DATA SHEET FOR FUTURE REFERENCE.

GENERAL SAFETY

POTENTIALLY HAZARDOUS VOLTAGES ARE PRESENT AT THE TERMINALS OF THE MODEL 403.
ALL ELECTRICAL POWER SHOULD BE REMOVED WHEN CONNECTING OR DISCONNECTING WIRING.
DO NOT EXCEED THE OUTPUT OR INPUT RATINGS, AS STATED IN THE SPECIFICATIONS.
PROTECT THE UNIT WITH PROPERLY RATED FUSES.
DO NOT INSTALL IN DAMP OR MOIST AREAS.

THIS DEVICE SHOULD BE INSTALLED AND SERVICED BY QUALIFIED PERSONNEL.

Installation Instructions

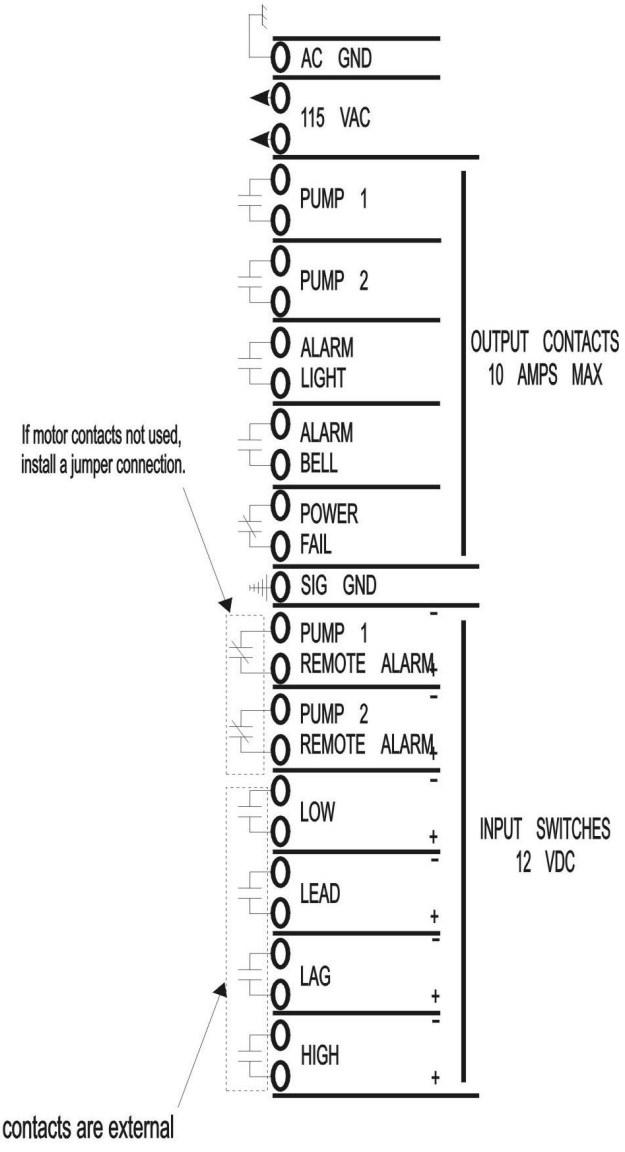
INSTALLATION

Mount the controller in a suitable enclosure. Unplug the terminal connectors from the controller.

Referring to the terminal block decal on the controller and the illustration on this page, make the following connections.

1. Connect a chassis ground to the terminals marked AC GND.
2. Connect 115 VAC operating power to the terminals marked 115 VAC.
3. Connect the LOW float switch to the LOW terminals. Polarity is not critical.
4. Repeat step 3 for LEAD, LAG and HIGH terminals.
5. The SIGNAL GROUND connection is a common between the controller, (Model 403), and a Liquid Level Sensor, (Model 404), no connection is necessary if the sensor is not used.
6. The PUMP 1 & 2 REMOTE ALARM terminals should be connected to normally closed (NC) alarm contacts in the motors. If none exist it is still necessary to install a jumper connection between Pump 1 REMOTE ALARM terminals & PUMP 2 REMOTE ALARM terminals.
7. The POWER FAIL, ALARM BELL, & ALARM LIGHT are not required for proper operation, but are provided for your convenience. If used, connect an audible / visual alarm across the terminals. The POWER FAIL contact is open while power is applied and closes on loss of power. Connect audible and visual alarms across the ALARM BELL and ALARM Light terminals respectively. These contacts are normally open and will close on a fault (high or remote alarm) condition.
8. Connect the PUMP 1 and the PUMP 2 contacts to the appropriate motor control circuits. These contacts start and stop the pump motors during operation.

Set the HOA (Hand-off-Auto) switches and the LEAD PUMP selector switch as required. Apply operating power. Test alarm LEDs and bells by pressing the ALARM TEST switch.

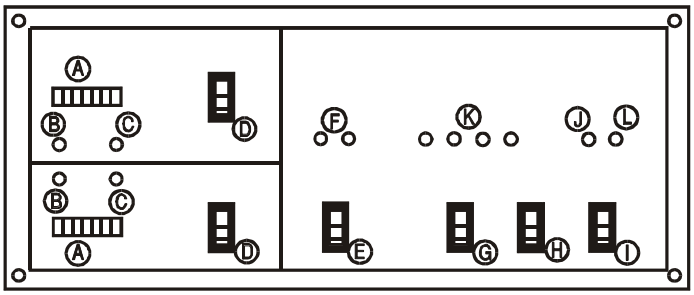


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MODEL 403 Liquid Level Controller

Model 403 Panel



Panel Layout

A. Pump running time meter to 99,999.9 hours, non-resettable.
B. Indicator LED's illuminate when pumps are running.
C. Indicator LED's illuminate when pump is stopped because the remote alarm circuit is open.
D. Hand-off-Auto switch to manually or automatically control the pumps.
E. Lead pump selector switch alternates lead pump selection or a fixed lead pump operation of pump 1 or 2.
F. Indicator LED's show which pump is the lead pump for the next pumping cycle.
G. Momentary switch tests remote alarm bell, light, and illuminates alarm light J.
H. Momentary switch silences alarm bell until problem is corrected.
I. Momentary switch resets all alarm indicators to return to normal operation.
J. Alarm light stays lit until alarm reset switch is pressed.
K. Indicator LED's show which level switches are closed.
L. Indicator LED illuminates when primary power is applied.

OPERATION

The Liquid Level controller can be used in either pump-down applications (with sump pumps) or in pump-up applications (to fill water tanks or reservoirs). The type of application is determined by the type of level switch used, normally-open or normally-closed.

In typical application, as shown on page 4, pumps are used to remove water from wet well when the water level activates the float switches. Activating the first switch (LOW) prepares the controller for operation. No pump is started. The second level switch (LEAD) starts the first pump.

Which pump actually starts is determined by the LEAD PUMP selector switch. The third switch (LAG) starts the second pump running. The final level switch (HIGH) illuminates the alarm indicator and closes the alarm bell and alarm light outputs.

As the level switches are opened (in reverse order) all operating pumps remain on until the LOW switch is opened. All pumps are then turned off and the internal alternator is triggered. On the next operating cycle the next pump depending which was on before either 1 or 2 will become the lead pump.

If the HIGH level is triggered an alarm light and alarm bell circuit are activated, plus an LED on the controller illuminates to warn of the problem.

Should this occur, an 'Alarm Silence' switch on the controller breaks the alarm bell contacts, but leaves the LED alarm indicator on.

When the alarm condition is corrected, an alarm reset switch returns the controller to its normal operating mode.

TROUBLESHOOTING

Problem: Remote alarm LEDs will not extinguish
Causes: 1. Remote alarm inputs not jumpered closed
2. Motor circuit to close jumpers is open
Solutions: 1. Install jumpers
2. Close circuit

Problem: Remote alarm LED's come on for no apparent reason and inputs are jumpered closed.
Causes: Externally generated noise. Noise can be generated from faulty circuit breakers, contacts and motors. It can also be induced from the source being too close to the controller with little or no shielding.
Solutions: Replace faulty components; install noise suppression devices; shield wiring.

Note: This device is not a field repairable unit. Should the unit not operate properly during installation or testing, insure that all electrical, ground, and physical connections are correct. Verify that the proper voltage is applied and check all fuses. Check all motor control circuits, and insure that, if the REMOTE ALARM contacts are not used, they are jumpered. If everything is correct and the device still fails to operate, contact the factory. Should the controller fail during use, contact the factory for instructions on returning the device for repair.

WARRANTY

The **Model 403 Liquid Level Controller** is warranted to be free from defects in materials and workmanship for one year. Should this device fail to operate, we will repair or replace it for one year from the date of purchase. Contact the Time Mark Sales department, Monday through Friday; 8 a.m. to 5 p.m., CST, for further details.

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MODEL 403 Liquid Level Controller

TYPICAL APPLICATIONS

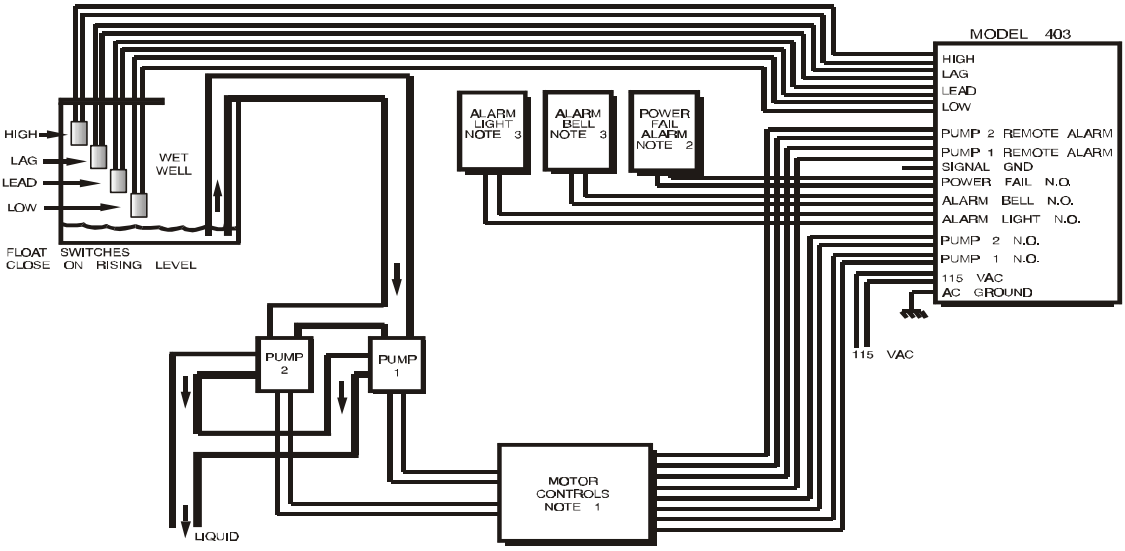


Fig. 1
Model 403 to float switches

Note:

1. Remote alarm contacts are normally closed contacts located at the motor controllers. Jumper closed if not used.
2. Power fail contacts close on power failure.
3. Alarm Bell and Alarm Light contacts close on alarm condition.

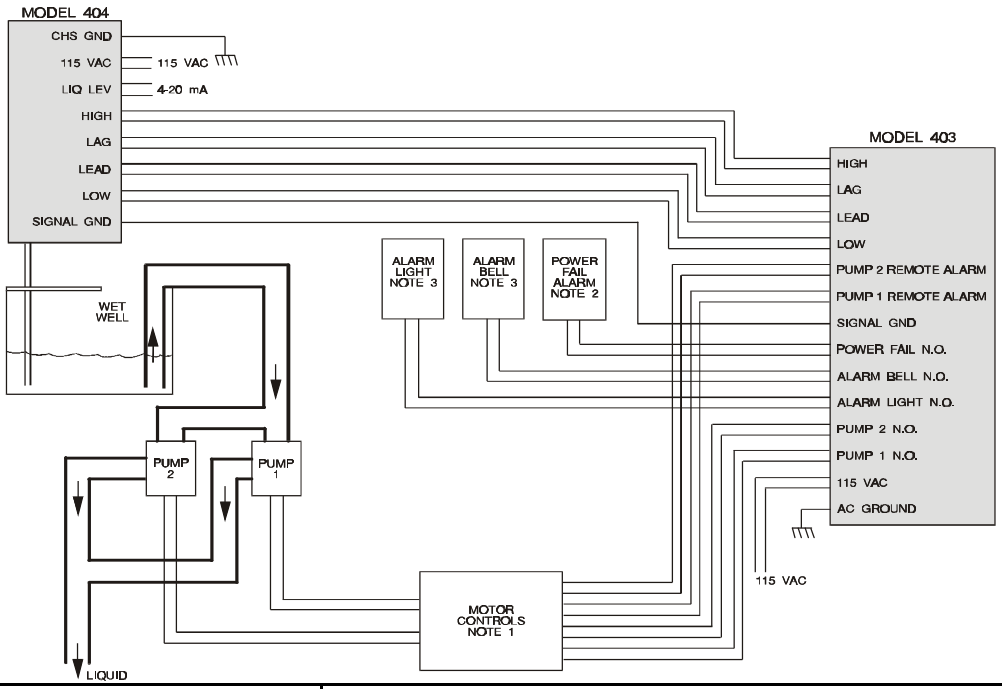


Fig. 2
Model 403 to Model 404

Note:

1. Remote alarm contacts are normally closed contacts located at the motor controllers. Jumper closed if not used.
2. Power fail contacts close on power failure.
3. Alarm Bell and Alarm Light contacts close on alarm condition.

Fig. 3
Model 403 to Model 4042
PUMP DOWN
APPLICATION

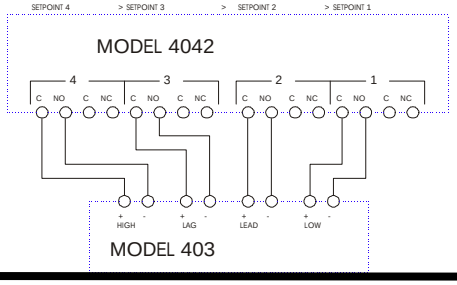
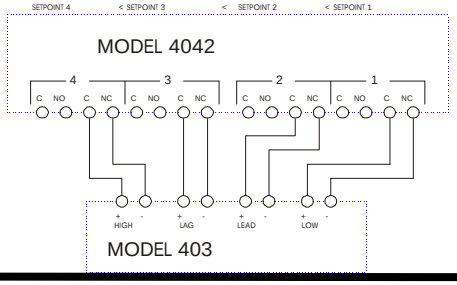


Fig. 4
Model 403 to Model 4042
PUMP UP
APPLICATION



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