MONITOR FOUR

INSTALLATION MANUAL

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SECTION I - INSTALLATION

WARNING: In installation and use of this product, comply with the National Electrical Codes, Federal, State and local codes and/or any other applicable safety codes. In addition, turn off power and take other necessary precautions during installations, service and repair to prevent personal injury and any equipment damage.

CAUTION: This equipment is not suitable for use with intrinsically safe devices.

A. MOUNTING

WARNING: Do not install the interconnection box or control console in a volatile, combustible or explosive atmosphere. The environment must be free from severe vibrations, extreme temperatures.

- The console should be installed where the operator has full view of the pumps being controlled.
- Adequent protection should be arranged to prevent unauthorized or accidental operation of the console controls.
- The console must be shielded from direct sunlight to prevent excessive internal heating.
- The interconnection box location should allow easy access to the AUTOMATIC-MANUAL switches.

B. GENERAL WIRING

WARNING: This equipment is to be installed in accordance with the National Electric Code (NFPA 70) and the Flammable and Combustible Liquid Code (NFPA 30)

Refer to wiring diagram for typical installations. This equipment is intended for monitoring self service type dispensing devices containing equipment suitable for that purpose. The wiring diagrams typify installation circuits for dispensers containing:

1. Computer electric reset actuator
2. Pulse transmitter with appropriate rating
3. Junction box of sufficient volume (see Table 1)
4. Pump motor (when applicable)
5. Solenoid valve (when applicable)

TABLE 1 - SIZE OF DISPENSER JUNCTION BOXES

Size of Conductor AWG (mm ^{2})	Free space within box for each Conductor cubic inches (cm ^{3})	
	Box with Hubs	Box without Hubs
16 or smaller (1.3)	1.3 (21.3)	1.5 (24.6)
14 (2.1)	1.8 (29.5)	2.0 (32.8)
12 (3.3)	2.0 (32.8)	2.25 (36.9)
10 (5.3)	2.2 (36.1)	2.5 (41.0)
8 (8.3)	2.7 (44.2)	3.0 (49.2)

Note: A conductor passing through the box and each conductor terminating in the box is counted as one conductor. No unplugged openings are permitted.

Conductor sizes for motor loads must be appropriately rated, (e.g. ½ h.p. motor load requires No. 14 AWG conductor for 100 foot wiring runs). Check local codes to insure that your application meets all requirements. Wire the interconnection box and power relay box (if applicable)to the dispensers according to the wiring diagrams which have been provided. All wires should be checked for line-to-line or line-to-ground faults. All seal offs should be properly potted with sealing compound. Power connections can be made using conveniently located sub-breaker panel. The 115 VAC line to the interconnection box must be maintained at all times. Therefore this circuit breaker should be independent of pump or lighting circuits disconnect switches or line contractors.

Power relays used in the system should have ¾ h.p. double pole contacts with 115 VAC coils. Power relays for self contained dispensers are included in the interconnection box upon request.

SECTION II - POST INSTALLATION CHECK

A. GENERAL

The purpose of this check is to allow the installation contractor to test the system for proper operation. Before activating the system, the electrician should recheck all connections to the interconnection boxes, relays, pumps, pump junction boxes, pulsers and any other related electrical devices. The round cable (MB 102) can be installed between the console and interconnection box. The interconnection box is shipped with the AUTOMATIC-MANUAL switches in the MANUAL position and should be left in that position until further system checkout to prevent possible damage to the interconnection box in the event of incorrect wiring.

WARNING: Hazardous voltages are present in the interconnection box. Take precautions to prevent personal injury.

B. OPERATION CHECK

The following test procedures will determine if the system is working properly.

1. Make sure all pump handles are in the OFF position.
2. Turn on pump circuit breakers. No pumps should start. If any start, recheck relays and associated circuitry.
3. Turn on interconnection box circuit breakers with the console emergency switch in the EMERGENCY position. Again no pumps should start. The console should display a system initialization number and should respond to the keyboard.
4. Please the console emergency switch in the OPERATE position. At this time 110 VAC will be present on all of the A terminals in the interconnection box. Therefore any shorts to neutral or earth on the A lines will trip the interconnection box circuit breaker.
5. Individually check out each pump by placing the pump handle in the ON position and dispensing some product to ensure the proper operation of the reset motor, solenoid valve, suction or submersible pump, etc.
6. Place the AUTOMATIC-MANUAL switches in the AUTOMATIC position. All pump handles should be in the OFF position.
7. Place the pump handle in the ON position. The appropriate AUTHORIZE REQUEST lamp on the console should come on and an audible pulsating tone will be present. Press the appropriate pump position button on the console and depress the RESET PUMP button. The PUMP READY lamp should come on and 110 VAC will be present on the A terminal in the interconnection box for that pump. The pump should reset as before. Dispense some product and place the pump handle in the OFF position. While dispensing product the appropriate PUMPING lamp on the console will flash. This lamp will cease flashing after the pump is turned off and will remain on. The console dollar reading should match that of the pump. This procedure should be repeated for all the valid hoses. Refer to the Monitor Four Operators Manual for further console operational information.
8. As a final safety check, place all pump handles in the ON position and via the console, reset all pumps. Next place the console emergency switch in the EMERGENCY position. Ensure that this action cuts the power to all the pumps. A failure to do so indicates a wiring fault which should be rectified.

IMPORTANT: 110 VAC must be continually supplied to the interconnection box. Failure to do so will result in a constant drainage of the battery. Deactivation of the pump control circuits in the interconnection box should be accomplished simply by placing the console emergency switch in the EMERGENCY position. If AC power to the interconnection box must be turned off for servicing, refer to system power down procedure in the operators manual.

SECTION III - THEORY OF OPERATION

A basic understanding of the pump control circuits in the interconnection box is a great asset in troubleshooting both pump and Kraus equipment related problems. The following table should provide a full understanding of the relay operation in the Kraus interconnection box.

ACTION	RESULT
Customer places pump handle in the ON position.	Path to neutral through reset motor causes relay K2 to energize. Contacts of K2 place 14V on the AR terminal which causes the appropriate AUTHORIZE REQUEST lamp to light and the audible tone to sound in the console.
Operator depresses appropriate pump position button and then depresses the RESET PUMP button.	Appropriate PUMP READY lamp lights and relay K3 energizes. Contacts of K3 place 115 VAC on "A" terminal, therefore K2 de-energizes and AUTHORIZE REQUEST lamp goes out. K3 also puts 115 VAC on "B" terminal for submersible pump pre-start applications.
Reset motor resets pump display and closes associated motor switches	115 VAC on "A" terminal is returned on "C" terminal via motor switches in pump. Relay K1 energizes because of this voltage and its contacts place 14V on the "C1" terminal to the console and 115 VAC on the "B" terminal.
Customer dispenses product.	Pulses are presented on the impulser line. After one cent (one pulse) is dispenser appropriate PUMPING lamp starts flashing.
Customer places pump handle in OFF position	Relay K1 de-energizes. 14V is removed from C1 terminal. PUMPING lamp stays on. Relay K3 de-energizes thus 115 VAC is removed from the "A" terminal.

SECTION IV - TROUBLESHOOTING GUIDE

The section dealing with theory of operation should be read and fully understood before any attempt at troubleshooting is made. In general most problems which affect the general operation of the control console can be attributed to the console.

Note: It is extremely important that the round power cable (MB 102) be unplugged from the console when replacing any circuit boards or assemblies and the POWER DOWN/STANDBY switch placed in the POWER DOWN position on units equipped with a standby battery.

FAILURE INDICATION	PROBABLE CAUSES	CORRECTION ACTION
1. Pump operates properly but no money registers on console. Other pumps register properly.	Defective impulser and/or wiring in pump. Defective relay K1 in (1C). Defective cable (MB 102). Defective Monitor frame board.	Check out impulser and replace if necessary. Replace relay 1K. Replace. Replace.
2. PUMP READY lamp can't be turned on with either the RESET PUMP or PUMP ON buttons but operates normally.	Defective PUMP READY lamp on keyboard.	Replace keyboard.
3. Same as (2) but pump will not operate.	Defective Monitor frame board.	Replace.
4. PUMP READY lamp can be turned on but pump will not operate because 115 VAC is not present on "A" terminal in 1C box.	Faulty cable (MB 102). Faulty relay K3. Blown connection under relay board.	Replace. Replace. Check for continuity between pin 5 or 6 on relay socket K3 and the "A" terminal. Repair if blown. Check for continuity between pin 9 or 10 of relay socket K3 and the "X" terminal. Repair if blown.
5. AUTHORIZE REQUEST lamp will not light and no audible tone (1 pump only)	Faulty relay K2. Faulty cable MB 102.	Replace relay. Replace cable.
6. Same as (5) but audible tone is present.	Defective AUTHORIZE REQUEST lamp.	Replace keyboard
7. Segment(s) missing or added to all digits on console display.	Defective display. Defective Monitor frame.	Replace with spare. Replace with spare.
8. Display fails to change when a particular pump button is depressed or console fails to respond to action of depressing a particular button.	Faulty button on keyboard. Monitor frame board malfunction.	Replace keyboard with spare. Replace with spare.
9. Improper system initialization number.	Defective IC cable (MB 102). Defective Monitor frame board.	Replace cable. Replace board.