Manual

Water Vend Controller
Model ESDI 030400

WARNING ! ELECTRICAL SHOCK HAZARD !

AUTHORIZED PERSONNEL ONLY.

EXPOSED 120 VAC ON CIRCUIT BOARD

THE CIRCUIT BOARD HAS MANY EXPOSED AREAS THAT ARE AT 120 VAC. CONTACTING ANY OF THESE AREAS CAN CAUSE BODILY HARM OR DEATH.

DISCONNECT POWER BEFORE SERVICING.

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Water Vend Controller
ESDI Model 030400

1.0 General:

The ESDI Model 030400 is a single product, multiple-purchase, Water Vend Controller for unsupervised water vending machines. It can vend 1, 2, 3, 4, or 5 gallons in a single vend.

It is designed to vend one gallon of water for each credit received from the coin acceptor. It will accumulate up to five credits, and will not vend until the vend switch is pressed. The controller will lock out the coin acceptor after it has received 5 credits. A single digit credit display will indicate the number of gallons to be vended, and will count down the gallons as they are vended.

The controller is available as a single circuit board assembly, or with an enclosure that includes an electromechanical vend counter. The controller's description, features, and specifications are presented in this document.

2.0. Features:

2.1. UV Lamp Monitor:

The controller is constantly monitoring the AC current flowing into the UV lamp ballast. Proper AC current is an indication of a UV lamp that is operating correctly. If the UV lamp fails, the controller will stop vending and go to "Sold Out", and will not accept coins. The Credit display will indicate "U". A manual reset is required to restart the controller.

2.2. Maximum Run Timer:

The controller has a maximum run timer that measures the vending time for each gallon. The maximum run time is set to approx. 45 seconds per gallon. If this time is exceeded, the controller will stop vending, go to "Sold Out", and will not accept coins. The Credit display will indicate "E". A manual reset is required to restart the controller.

2.3. Low Water Monitor:

If a low water condition is detected when the controller is idle, the controller will go to "Sold Out", and will not accept coins. If a low water condition is detected while vending, the controller will complete the vend cycle and then go to "Sold Out". The controller will automatically reset when the low water condition is no longer present.

2.4. Lockout Input:

The lockout input allows an external device to disable the controller. The lockout input can be connected to an external water purity monitor, a low-pressure switch, or any other device supervising the controller operation. A contact closure on this input will allow the controller to operate normally and an open will disable the controller. If this input is not used, place a jumper between Lockout and Common.

If a lockout condition occurs while the controller has credit, or is vending, it will first complete the vend cycle and then go to lockout. If a lockout condition occurs when the controller is idle, it will lockout immediately. When the controller is in lockout, it will go "Sold Out" and will not accept any coins. The credit display will indicate "P" when in lockout. The controller will automatically reset when the lockout condition is no longer present.

3.0. Options (DIP Switch Selectable):

3.1. OP-1: (Reserved for custom option)

3.2. OP-2: ON = Timer, OFF = Meter

3.3. Water Meter Option:

This option allows the user to select between two different types of water meters. When the switch is OFF the controller will interface with a high count, high flow rate water meter such as the GEMS Turbine Flow Sensor, FT-110 Series. When the switch is ON the controller will interface with a low count, low flow water meter, such as the ESDI 941200 Flow Sensor board mounted on a Badger Recordall Disc Meter body.

3.4. UV Flush Cycle:

When this switch is ON, the flush cycle will be enabled. This flush cycle exchanges the water that has been left standing in the UV lamp enclosure

and has become hot. It also refreshes the vending system in general. This water can be recycled back into the product tank, or discharged into the drain. The flush cycle runs for a period of 3 seconds.

The flush cycle will not run if there is credit pending, or while the system is in the process of vending. It also will not run during a Lockout, a Low Water condition, or a UV Lamp failure.

3.4.1. When enabled, the flush cycle will occur as follows:

3.4.1.1. Upon each power-up and manual reset.

3.4.1.2. Upon returning from a Low Water condition.

3.4.1.3. Upon returning from a Lockout condition.

3.4.1.4. Periodically, approximately every 30 minutes after the last vend cycle.

3.4.2. The Flush cycle operates as follows:

3.4.2.1. First the flush valve is turned on.

3.4.2.2. A second later the pump is turned on.

3.4.2.3. The pump runs for a period of 3 seconds then turns off.

3.4.2.4. A second later the flush valve turns off.

During the flush cycle, the controller will go "Sold Out" and will not accept any coins. The credit display will indicate "F" during the flush cycle.

3.5. 4=5 Gallons:

This option allows the user to offer 5 gallons for the price of 4. When this switch is on, the controller will automatically register 5 gallons when 4 credits are entered.

3.6. 5 Gallon Only:

This option allows the user to have a vending machine that vends 5 gallons only. The controller will automatically register 5 gallons when one credit is entered.

3.7. UV Monitor Disable:

When this switch is ON, the on-board UV lamp monitor circuit will be disabled. Monitoring the UV lamp and disabling the vend cycle will be left up to the user.

4.0 Specifications:

4.1.	Coin Acceptor interface:	COINCO 9341-S. MARS 3200-S.
4.2.	Pump Motor interface:	120 VAC, 1 Amp (nominal).
4.3.	Water Meter interface:	GEMS Turbine Flow Sensor, FT-110, P/N 173935 (3800 Pulses per Gallon max) or, AMCO C700 Water Meter, with 200 PPG
4.4.	Vend Accuracy / Repeatability:	± 0.5 %
4.5.	UV Lamp & Ballast Ass'y:	Magnetic type, no internal alarms or relays PURA #UVB1, or equal. 120 VAC, 425 MA (nominal).
4.6.	Power Requirements:	120 VAC, 60/50 Hz, 3 Amps (nominal).
4.7.	Circuit board Size:	6" X 6.7".

5.0. Switches & Indicators:

5.1. Reset Switch:

This miniature pushbutton switch is used to reset the controller. When pressed, the controller will reset and start over, similar to a power-up condition. Vending will stop, all errors will be reset and all credits will be erased.

5.2. One Gallon Calibration DIP Switch:

This 8 bit DIP switch is provided to accurately calibrate a one gallon vend. Multiple gallon purchases will use this calibration for each gallon vended. Press reset each time any switches are changed.

The switch represents an 8 bit binary number. Switch number 1 is the most significant bit and switch number 8 is the least significant bit.

1-Gallon Calibration DIP Sw

Switch No.	**Binary Weight**
Switch Bit 8:	1
Switch Bit 7:	2
Switch Bit 6:	4
Switch Bit 5:	8
Switch Bit 4:	16
Switch Bit 3:	32
Switch Bit 2:	64
Switch Bit 1:	128

A suggested technique for calibrating a one gallon vend:

5.2.1. Start with all switches off. Beginning with switch number 1 and working up from there, vend one gallon of water into a calibrated container.

5.2.2. Find the first single switch that will vend one gallon without overflowing. Leave that switch on. (See Note)

5.2.3. Now continuing with the next switch in sequence, find a switch that can be turned on without overflowing the container. Leave that switch on. (See Note)

5.2.4. Continue until you find the combination of switches that will vend exactly one gallon.

5.2.5. In the future, begin with this setting, and modify it as required.

(Note: Reset the board, using Reset Switch, whenever the calibration switch settings are changed.)

5.3. Vend Indicator:

This LED indicates that the controller is in the process of vending water. It will illuminate RED whenever the pump is running.

5.4. Sold Out Indicator:

This LED will illuminate RED whenever the controller is in the "Sold Out" mode. This can be due to an error, or insufficient water. In this mode, the coin mech will not accept any coins.

5.5. Lockout Indicator:

This LED will illuminate RED whenever the controller is in the "Lockout" mode.

5.6. Flush Indicator:

This LED will illuminate RED whenever the controller is in a Flush cycle.

5.7. UV Good Indicator:

This LED will illuminate GREEN whenever the UV lamp is operating correctly.

5.8. Power Indicator:

This LED will illuminate RED whenever power is applied to the circuit board.

5.9. Credit Display:

The Credit display is a single digit that shows the number of gallons to be vended. It also displays certain error codes, as follows:

Display	" 1 "	=	Vend 1 gallon.
Display	" 2 "	=	Vend 2 gallons.
Display	" 3 "	=	Vend 3 gallons.
Display	" 4 "	=	Vend 4 gallons.
Display	" 5 "	=	Vend 5 gallons.
Display	" 8 "	=	Tests all segments at start up & reset.
Display	" E "	=	Excessive vend time.
Display	" F "	=	Flush cycle in progress.
Display	" L "	=	Low Water.
Display	" P "	=	System is in Lockout mode.
Display	" U "	=	UV Lamp is bad.

6.0. Connectors:

All four terminal blocks are pluggable and can be removed without having to remove the individual wires from the terminal block. The pluggable terminal blocks can be oriented either vertically or at right angles to the circuit board headers.

It is recommended that all interconnect wiring be with UL type 1015, 20 AWG minimum, with the power input being 18 AWG minimum. The terminal blocks will accommodate up to a 16 AWG wire.

6.1. TB1 Inputs:

All inputs are low voltage (+5VDC). Signals are either open, or closed. DO NOT APPLY ANY EXTERNAL VOLTAGES TO ANY OF THESE INPUTS, OR CIRCUIT BOARD MAY BE DAMAGED.

TB1-1	Flow Meter Input (+5VDC)
TB1-2	Flow Meter Input (Signal)
TB1-3	Flow Meter Input (Common
TB1-4	Vend Switch Input (Signal)
TB1-5	Vend Switch Input (Common)
TB1-6	Low Water Switch Input (Signal)
TB1-7	Low Water Switch Input (Common)
TB1-8	Lockout Input (+5VDC)
TB1-9	Lockout Input (Signal)
TB1-10	Lockout Input (Common)

6.2. TB2 Outputs & Power Input:

All output and power inputs are at high voltage (120VAC). Disconnect power before handling this connector. Contacting any of these areas can cause bodily harm or death.

TB2-1	Coin Acceptor (Pin 3)	(Credit Output)	*(Vend Relay)*
TB2-2	Coin Acceptor (Pin 6)	(Coin Blocker Input)	*(Hot Accept)*
TB2-3	Coin Acceptor (Pin 1)	(AC HOT Input)	*(117VAC)*
TB2-4	Coin Acceptor (Pin 2)	(AC NEUT Input)	*(AC Neutral)*
TB2-5	Vend Pump Output & Vend Valve (120VAC Hot)		
TB2-6	Vend Pump Output & Vend Valve (120VAC Neutral)		
TB2-7	Flush Valve Output (120VAC Hot)		
TB2-8	Flush Valve Output (120VAC Neutral)		
TB2-9	AC Power Input (Ground)		
TB2-10	AC Power Input (Ground)		
TB2-11	AC Power Input (120VAC Neutral)		
TB2-12	AC Power Input (120VAC Hot)		

6.3. TB3 UV Power Output:

The UV power output is at high voltage (120VAC). Disconnect power before handling this connector. Contacting any of these areas can cause bodily harm or death.

TB3-1	U.V. Power Output (120VAC Neutral)
TB3-2	U.V. Power Output (120VAC Hot)

6.4. TB4 Vend Counter Output:

The vend counter output is at high voltage (120VAC). Disconnect power before handling this connector. Contacting any of these areas can cause bodily harm or death.

TB4-1	Vend Counter Output (120VAC Hot)
TB4-2	Vend Counter Output (120VAC Neutral)

6.5. "Ready / Deposit Coin" Lamp Output:

A "Ready / Deposit Coin" lamp may be placed on the front of the machine next to the coin acceptor. This lamp will illuminate any time the coin acceptor will accept coins, such as when the machine is not sold out, or is not busy and is ready to vend. The lamp should be a neon type, rated for 125VAC. The lamp is connected between TB2-4 and TB2-2.

7.0. Fuses:

F1	Circuit Board Fuse, ¼ Amp, 120VAC, 3AG Type
F2	Main Controller Fuse, 3 Amp, 120VAC, 3AG Type