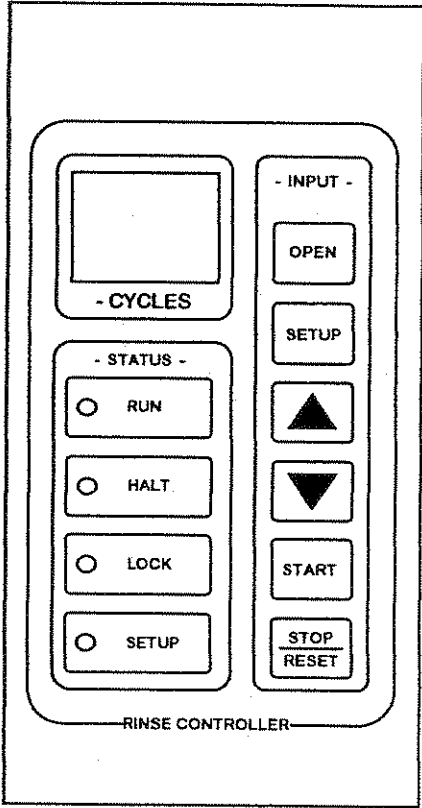


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# PROMAC MODEL 976D RINSE CONTROLLER

## PROMAC MODEL 976D RINSE CONTROLLER



### OVERVIEW

The Model 976D is a microprocessor-based Rinse Controller. It is a self-contained unit that is capable of implementing several different dump rinsing techniques. It contains all of the necessary pneumatics to directly operate a standard system. Both single door and double door configurations are available.

Four standard programs are incorporated in the system. The program to be run is selected by the setup procedure (discussed in a later section) and will operate under time, liquid level, resistivity, or combinations thereof. This allows flexibility for mating the device to the system requirements.

The solenoids are internal to the device and are powered by the internal system power supply. The user need only provide the appropriate voltage (24 or 120 VAC) to the power terminals and the pneumatic hookups to the color coded tubing to allow the system to function. Additional features,

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such as liquid level, resistivity, interlocks, and remote Start/Stop may be wired into the terminal block as desired.

There is a two digit display on the face. During the run mode it displays the remaining cycles. During the setup mode the display will indicate a combination of alpha numeric characters to aid the user in correctly setting up the system.

## DISPLAYS

Four discrete LED's are provided to indicate the current system status. They are labeled RUN, HALT, LOCKOUT, and SETUP:

- |                |  |
|----------------|--|
| <u>RUN</u>     | Indicates that the system is in the RUN mode and implementing the selected program. The display will indicate the number of cycles remaining.  |
| <u>HALT</u>    | Indicates the system has been temporarily stopped.   |
| <u>LOCKOUT</u> | Indicates that a switch closure has occurred on one of the two interlock circuits. This will terminate the Dump Rinser cycle prematurely and stop the system regardless of the current conditions. |
| <u>SETUP</u>   | Indicates that the system is in the SETUP mode. In this mode, the system parameters are selected.  |

## KEYPAD

The six keys marked START, STOP/RESET, SETUP, OPEN, UP (▲) and DOWN (▼) are used to operate and program the unit. The following is a listing of each of the keys and their functions:

- |                   |   |
|-------------------|---|
| <u>START</u>      | This key is used to activate the Dump Rinser. It will start the system if it is reset, or it will continue if the system has been placed in HALT (see STOP/RESET).  |
| <u>STOP/RESET</u> | This is a multifunction key. Its function varies with the current system mode.<br><br><u>RUN MODE:</u> If the system is in the RUN mode, but has not completed all of the cycles, depressing STOP/RESET will place the system in the HALT condition. This simply stops the program and holds it until restarted by the START key or Reset as described below.<br><br><u>HALT MODE:</u> If the system has been placed in the HALT mode by a single depression of the STOP/RESET key, depressing the key again will reset the system.<br><br><u>SETUP MODE:</u> If the system is in the SETUP mode, depressing the key will cause the system to return to the RESET state in preparation for a new cycle run. |
| <u>SETUP</u>      | This key is used to put the system into the SETUP mode and advance through the parameters.  |

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Depressing the key once will place the unit in the SETUP mode. (NOTE: If the access code protection is selected, an additional step is required. See Access Code). Depressing the key after entering the SETUP mode will allow the user to scroll through the setup parameters (see SETUP).

UP

In the SETUP mode, depressing the UP will cause the display to advance. Depressing the key once and releasing will allow the accurate setting of the least significant digit. Holding the key down will activate the automatic, rapid incrementing of the display.

DOWN

In the SETUP mode, depressing the DOWN will cause the display to decrease. Depressing the key once and releasing will allow the accurate setting of the least significant digit. Holding the key down will activate the automatic, rapid decrementing of the display.

OPEN

This key is used to manually dump the tank. When it is depressed, the appropriate solenoid is activated and the tank is dumped. The door is closed by depressing the RESET key.

## SETUP

The controller may be configured to implement various dump rinsing techniques. The SETUP mode allows the user to both adjust and program the unit. The following is a listing of the Code Prompts that will appear in the display when in the SETUP mode. The codes will alternately flash with the selected value to indicate to the user the parameter that is currently being viewed or set.

<u>CODE</u>	<u>DESCRIPTION</u>
CY	Number of Cycles
RC	Number of Reclaimed Cycles (double door only)
FP	Fill Period (Time Programs only)
DP	Drain Period
DD	Dump Delay
SD	Start Delay
AD	Auto Dump Period
N2	Bubbler
AC	Access Code
PC	Period Count
PN	Period Number
RP	Reclaim Placement (double door only)

<u>CODE</u>	<u>SETTING RANGE</u>
CY	0 to 99 Cycles
RC	0 to 99 Cycles
FP	0 to 99 Seconds
DP	0 to 99 Seconds
DD	0 to 99 Seconds
SD	0 to 99 Seconds
AD	0 to 99 Minutes

N2	Y - Yes/N - No
AC	0 to 99
PC	L = Long (min.), S = Short (sec.)
PN	0 to 3
RP	F = First, L = Last

All of the codes do not appear on every unit. If the item does not apply it is automatically removed from the stack. For example, FP is only used with Programs 0 and 1. Thus, when PN is selected as 2 or 3, the FP setting disappears from the stack.

The PC selection will determine whether the Fill Period (FP) and Start Delay (SD) are counted in minutes and seconds. If it is set to 'L' (Long), it will count in minutes. If it is set to 'S' (Short), it will count in seconds.

The RP selection will determine the placement of the Reclaim Cycles in a Double Door unit. If the parameter is set to 'F,' the Reclaim Door will be open for the first RC cycles. If the parameter is set to last 'L,' the Reclaim Door will be closed for the first 'CY-RC' cycles and open for the last RC cycles.

To exit the SETUP mode, the RESET key is depressed. When exiting, the unit automatically enters a SAVE mode. This causes the parameters to be written into the EEPROM memory. This is a permanent (10 year minimum life) memory that does not require battery backup.

## OPERATION

The Dump Rinser functions are directly controlled by the setup parameters and the program selected. All of the programs use a DUMP period. This is the amount of time that the Dump Door is open. The technique used to determine when the tank is full varies between the programs

Programs 0 to 1 use a Timed Fill. In this case the FP (Fill Period) parameter is set to a specific number of minutes or seconds. The program will then activate the fill valve for that period of time and then proceed into the DUMP cycle. (NOTE: The fill solenoid remains on throughout the complete run.)

When using Programs 2 and 3, a liquid level signal is used to terminate the FILL cycle. In these programs, the unit will go into the FILL cycle and remain in FILL until a closure occurs on the liquid level input.

A Resistivity override may be used with either the Time Fill or Liquid Level Fill program. Programs 1 and 3 are special versions of the Time and Liquid Level routines just described, with the additional feature that the Resistivity input is examined at the end of each fill period. If there is a closure on the resistivity input at this time, the system stops the cycle and indicates to the operator that rinsing is complete.

<u>PROGRAM NUMBER</u>	<u>FUNCTION</u>
0	Timed Fill
1	Timed Fill with Resistivity Override
2	Liquid Level Fill
3	Liquid Level Fill with Resistivity Override

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With any of the programs, the N2 option may be selected. When N2 is selected the N2 bubbler solenoid will be activated during the entire cycle run.

There are two programmable delays that may affect the system operation. In the SETUP mode, the DUMP delay may be used to add a fixed amount of time to the end of the fill period. The system would operate as described above except that the dump would not be immediately initiated, but would be delayed by a preset number of seconds.

Additionally, a delay may be inserted via SD (Start Delay) function. When the START key is first depressed, the controller will enter the RUN mode, but the RUN LED will flash to indicate that there is a start delay being counted down. Once the delay has been completed, the RUN LED will go fully on and the system will proceed to operate as previously described.

If a time other than 00 is programmed into the AD (Automatic Dump) parameter, an internal timer will automatically accumulate the time that has elapsed since the last run. If this time accumulates to the programmed number of minutes, the unit will automatically perform one dump cycle.

In some cases it may be desirable to restrict access to the Setup mode. Thus, an access code system is incorporated. If the AC (Access Code) is set to 00, the function is eliminated and the system operates as previously described.

The Access Code is simply any number from 1 to 99 as programmed into the system by the customer's authorized personnel. Once this code is entered into the EEPROM, any attempt to enter the SET mode will cause CD to appear in the data display. The UP and DOWN keys are then used to enter the Access Code. Once the proper code has been selected, the user simply depresses the SET key once again to gain entry into the SETUP stack. Any other entry, the wrong code number, or no action for 30 seconds will return the unit to the normal mode.

## **SPECIFICATIONS**

### **PROMAC MODEL 976DA RINSE CONTROLLER**

<b>RANGE</b>	0 - 99 Cycles
<b>RESOLUTION</b>	1 Cycle
<b>DISPLAY</b>	Two 0.56 Inch High, Seven Segment LED Uniplanar Numerals. Four Discrete LEDs (Red, Green, Amber)
<b>ANNUNCIATOR</b>	Audio Tone, ~ 2500 HZ
<b>SETUP MEMORY</b>	EEPROM, All Parameters
<b>MEMORY RETENTION</b>	10 Years w/o Power
<b>OPERATING RANGE</b>	0 to 50 Degrees C.
<b>STORAGE RANGE</b>	-40 to 60 Degrees C.
<b>CONSTRUCTION</b>	Enclosure - Kydex Face - Lexan, Back Printed

<b>SIZE</b>	8.25 x 3 x 5.25 inches (H x W x D) 210 x 76 x 133 mm.
<b>WEIGHT</b>	< 4 Lbs. (1.8 Kg.)
<b>CONNECTION</b>	Pneumatic - Rear, Tubing, 1/16" ID, PVC, Color Coded with 1/16 - 3/32 Barbed Fitting Electrical - Rear, Screw-Type, 3/8 inch centers
<b>OUTPUT</b>	Pneumatic Solenoid, Internal, 100 PSIG Max. Done - Transistor, Open Collector, 100 MA, 12VDC.
<b>POWER</b>	10 VA, 120 VAC $\pm$ 10%, 50/60 HZ

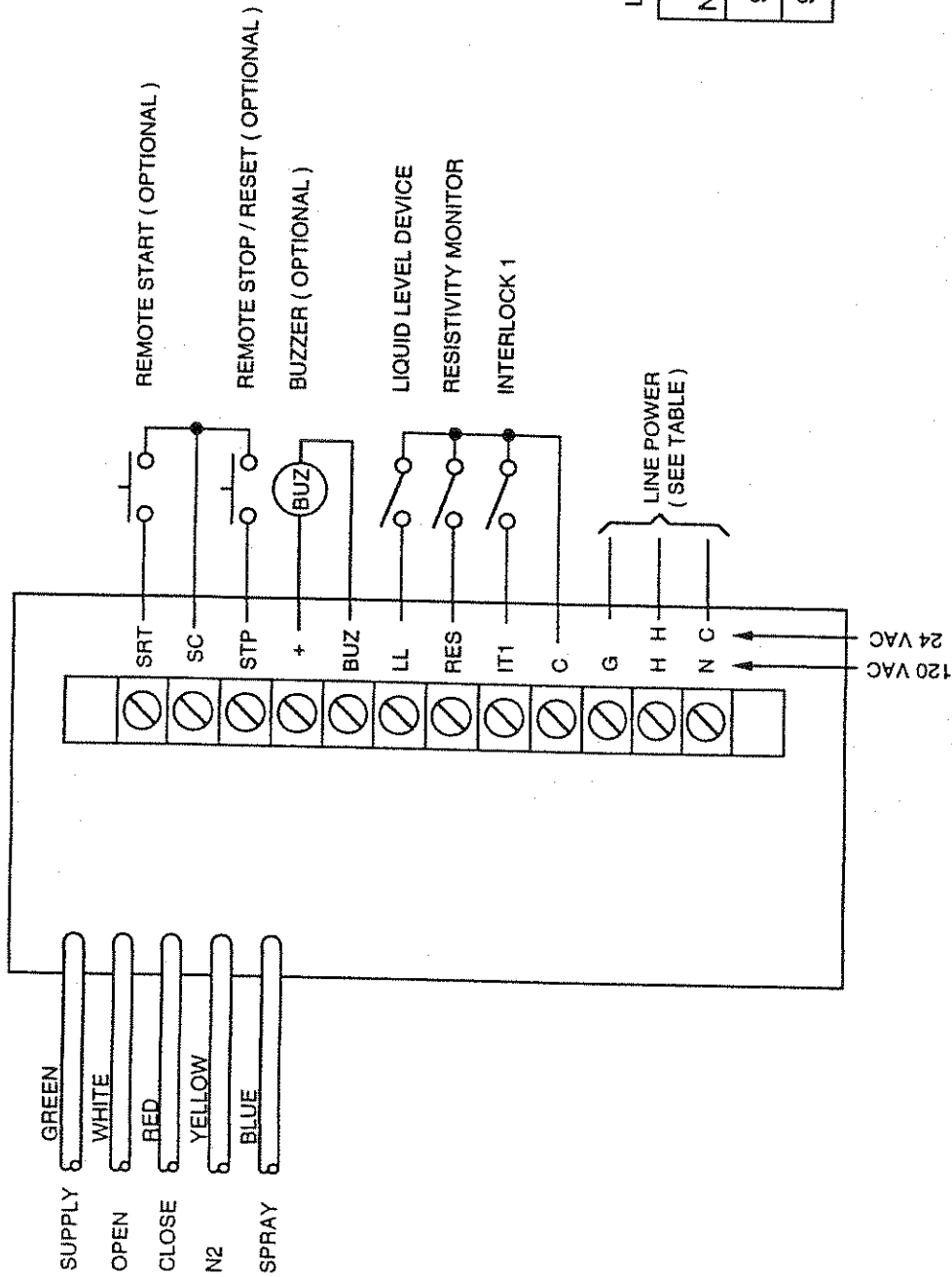
### PROMAC MODEL 976DB RINSE CONTROLLER

<b>RANGE</b>	0 - 99 Cycles
<b>RESOLUTION</b>	1 Cycle
<b>DISPLAY</b>	Two 0.56 Inch High, Seven Segment LED Uniplanar Numerals. Four Discrete LEDs (Red, Green, Amber)
<b>ANNUNCIATOR</b>	Audio Tone, ~ 2500 HZ
<b>SETUP MEMORY</b>	EEPROM, All Parameters
<b>MEMORY RETENTION</b>	10 Years w/o Power
<b>OPERATING RANGE</b>	0 to 50 Degrees C.
<b>STORAGE RANGE</b>	-40 to 60 Degrees C.
<b>CONSTRUCTION</b>	Enclosure - Kydex Face - Lexan, Back Printed
<b>SIZE</b>	8.25 x 3 x 5.25 inches (H x W x D) 210 x 76 x 133 mm.
<b>WEIGHT</b>	< 4 Lbs. (1.8 Kg.)
<b>CONNECTION</b>	Pneumatic - Rear, Tubing, 1/16" ID, PVC, Color Coded with 1/16 - 3/32 Barbed Fitting Electrical - Rear, Screw-Type, 3/8 inch centers
<b>OUTPUT</b>	Pneumatic Solenoid, Internal, 100 PSIG Max. Done - Transistor, Open Collector, 100 MA, 12VDC.

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POWER

10 VA, 24 VAC  $\pm$  10%, 50/60 HZ



LINE POWER TABLE

MODEL NUMBER	VOLTAGE
976DA	120 VAC
976DB	24 VAC

NOTE : + TERMINAL RATED 12 - 20 VDC UNREGULATED (100 mA)

**PROMAC**  
SEMICONDUCTOR PRODUCTS, INC.

DIGITAL DUMP RINSE CONTROLLER

TYPE: \_\_\_\_\_

MODEL #: 976DS DRAWN: TLF SHEET: 1 OF 1

DRAWING #: 976DS-01-ES DATE: 9/20/94