

**WARREN
RUPP®**

IDEX
FLUID & METERING

SERVICE AND OPERATING MANUAL

RUPPTECH®

Stroke Counter/Batch Control

A General Overview of this Control System

This control functions in two modes of operation:

- stroke counter mode
- batch controller mode

The two modes can be operated together or alone.

The control receives a signal from the diaphragm pump for each pump stroke. It accomplishes this through a **RuppTech® Pulse Output Interface** mounted on the pump.

RuppTech® Pulse Output Interface - (available ONLY from Warren Rupp, Inc.)

The Pulse Output Interface mounts on the pump and provides electrical signals to operate the Control. This creates an electrical interface between the control and the air-powered pump.

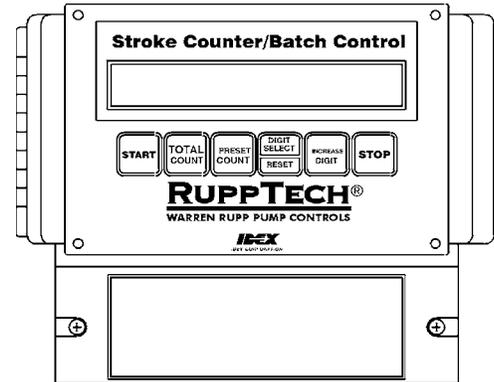
Each pump stroke generates a signal through a proximity switch (PNP) on either end of the air valve. As the air valve reciprocates back and forth during pump operation, targets on either end of the sleeve and spool set trigger their respective proximity switches. Each trigger signals the control to register one count on the stroke counter / batch control unit. This method provides a positive signal for every pump stroke.

The Pulse Output Interface are designed for easy field installation. The interfaces are also available factory-installed on new pumps. Pulse Output Interfaces can be purchased separately from the control unit for those applications where a process controller is already present in a system. This provides a direct interface with the pump and the customer's system.

Stroke Counter Mode

In this mode, the control keeps a running tally of the total number of strokes of the pump. The control saves this total until the accumulated count is reset from the control's keyboard, or the counter exceeds the 10-digit capacity of the display. The count can be pump strokes (one for every stroke), or a measure of volume (i.e. gallons, liters, pounds) to indicate total volume pumped. The stroke count could also be used to indicate how long the pump has run. This is helpful for preventative maintenance schedules, or to account for the volumes of fluid being transported or consumed. The stroke counter function is cumulative, even if the pump is turned off and on by some means other than the control. Any time the pump is running and the control is powered, it will store the total count for future reference.

To view the totalized count, push and hold the Total Count button on the control keyboard. (To extend the life of the LED display, the count does not display continuously.) Refer to the Programming Instructions in this manual to set the scale per stroke or reset the count.



249-006-000 • 100-120/240VAC • 50/60 hertz

NEMA 12 Enclosure

Height 6.1" (15.5cm)

Width 6.54" (16.6cm)

Depth 3.46" (8.8cm)

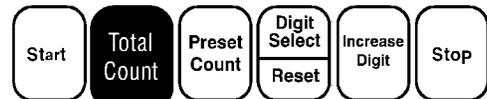
10-digit LED display

4 push buttons for setup

10A relay output for solenoid valve

2 proximity sensor inputs

2 remote on/off switch inputs



Press and hold to view Total Count.

Batch Controller Mode

In this mode, the Control can be programmed to transfer a fixed volume of product. A Preset Count is programmed into one of the ten program storage areas (P0-P9). This tells the pump how much product will be transferred (one “batch”) each time the Control is activated. There is a START switch and a STOP switch mounted on the front of the Control for this purpose. There is also an internal connection for remote START and STOP switches that a customer may want to install.

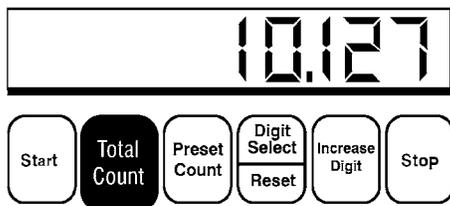
NOTE: Use a momentary contact switch when using a remote start/stop control.

In the batch control mode, the Total Count function remains active. At the end of a shift (several programmed “batches”) the customer can reference the total stroke count or transferred volume of fluid handled during the time period. All other basic functions remain active (Scale Factor, Reset Total Count), as well as advanced functions (i.e. Preset Count, multiple program storage, Reset Preset Count) which are explained later in this manual.

The Batch Controller Mode also uses the Pulse Output Interface to receive a count from the pump. It requires an electric solenoid valve (available from Warren Rupp) in the air line to the pump. This valve is a normally closed, 3-way, AC voltage (standard control) unit, and is purchased separately. The solenoid starts and stops the pump through the control. The pump is stopped by turning off the air supply to the pump, after it has transferred a batch, volume or count programmed into the control. The pump is restarted by turning on the air supply to the pump.

In this Mode of operation the pump will start pumping when it receives a signal from the control. This opens the valve in the air line. The signal can be activated from the control mounted switch or from a remote signal. The pump will stop automatically once the Preset Count has been reached. The pump can also be stopped mid-operation, using the control mounted STOP switch or from a remote STOP signal. When restarted, the pump will continue the operation from the point of interruption.

If power to the control is lost during operation, the pump will stop. When power is restored, the control resets to the P0 program. The pump will not continue operation without receiving a START signal. This function is to prevent accidents or product spillage. Before re-starting the unit, be certain to select the program which was interrupted. When the pump has completed a cycle, the Preset Count display will flash until it is activated again. When reactivated, the display will reset and restart the count from the Preset Count selected. If the count is stopped mid-cycle from the STOP switch, the display will not flash.



When viewing the PRESET COUNT, a flashing LED display means the pump was stopped after COMPLETING the programmed cycle.

If the STOP button is used to stop the operation mid-cycle, the display will not flash. When reactivated, the pump will continue the cycle from the point of interruption.

Programming for Accuracy:

Batch Control Mode

Published pump performance is the starting point for programming the batch controller. But your actual system performance must be verified, to achieve the expected 1 to 3% accuracy. This is accomplished through initial test runs and measurement. On the following page you will find an example showing the recommended sequence for verifying your system's actual performance.

Programming for Accuracy

To preset accurate batch programs, it is important to know actual system performance. Gather this information by measuring output volumes generated by test runs of the systems, using published pump performance as a starting program. Careful measurement will tell you how much volume your system is actually discharging on every stroke. You can then adjust the program accordingly. Here is an example.

EXAMPLE OF USE:

A product is blended based on incoming orders. Two ingredients are mixed in a ratio of 3 to 1, creating the final product.

Order volumes are typically 50, 500, 1000, 1500 and 2000 gallons. Two pumps transfer the ingredients to a mixing area for "batching".

Pump #1 in this example is the transfer pump for the main element. Its control has Preset Counts set as follows:

Pump #1 Preset Counts:..... PO - 37.5 gallons P1 - 375 gallons
..... P2 - 750 gallons P3 - 1125 gallons.
..... P4 - 1500 gallons
Stroke Scale Valve:..... 0.34 gallons per stroke

The control's Stroke Scale Value is set at the displacement per stroke of the 1½-inch pump to which it is connected, .34 gallons.

Pump #2 in this example is the transfer pump for the second element. Its control has Preset Counts set as follows, based on the 3 to 1 mixing ratio:

Pump #2 Preset Counts:..... PO - 12.5 gallons P1 - 125 gallons
..... P2 - 250 gallons P3 - 375 gallons
..... P4 - 500 gallons
Stroke Scale Valve:..... 0.09 gallons per stroke

Pump #2's control has the Stroke Scale Value set at the displacement per stroke of the 1 -inch pump to which it is connected, .09 gallons.

Though each pump requires its own control unit, both controls can be tied together with one remote Start/Stop switch running both units.

WHERE TO FIND PUBLISHED PUMP PERFORMANCE

Published pump performance is found on the data sheet issued for model pump. Displacement is shown to the right of the performance curve.

If you do not have the appropriate data sheet, contact your local Warren Rupp or Marathon distributor for a copy. Or you can contact the Factory Literature Department at the number shown below.

To receive the correct sheet, be sure to verify the pump model and type, which is shown on the pump nameplate.

TESTING THE SYSTEM

Since each control gets one pulse or signal from its pump for each stroke, the volumes referenced in the example should be set for the closest total volume available.

For example:

Pump #1.....P1 - 375 gallons @
.....0.34 gal. per stroke
.....= 1102.94 strokes

Adjusting for 1103 strokes would deliver 375.02 gallons, assuming 100% efficiency from pump and system. Realistic expectations of a well-designed and implemented system fall in the range of 1% to 3%.

Based on data obtained from the system, it becomes evident where the system will perform from an accuracy and efficiency standpoint. This will indicate adjustments to be made.

For example:

Testing showed in the example system that Pump #1 delivered 363.93 gallons, within the 3% range of accuracy. Since the Stroke Scale Value was set at .34 gallons per stroke, 1103 strokes actually produced .329 gallons per stroke.

Formula is:

Flow ÷ Strokes = Gallons per Stroke
363.93 ÷ 1103 = 0.329 gal./stroke

This test indicates the system should be reset to produce a total flow closer to the batch target of 375 gallons.

Formula is:

Batch Target ÷ Gal. per Stroke = # Strokes
375 ÷ 0.329 = 1139.81
Rounded to 1140 strokes

The controller cannot count a fractional stroke, so the number of strokes is rounded to the nearest whole number, 1140. This gets closer to the target batch size of 375 gallons, actually producing 375.06 gallons.

The same type of testing, calculation and adjustment would be applied to all pumps in a system. Each pump's performance will be effected by the application and system in total.

Panel Button Functions

BUTTON.....	FUNCTION(S)
Total Count.....	Display the total or accumulated count.
Digit Select/Reset	Resets the count displayed (Preset or Total).
Preset Count	Displays the batch size.
Press and hold: Total Count then press: Increase Digit Moves decimal point.	
Press at the same time and hold: Total Count + Preset Count then press: Digit Select Selects digit for programming Stroke Scale Valve. Selected digit will flash.	
then press: Increase Digit To program valve to the selected (flashing) digit.	
Increase Digit	Increases value of selected (flashing) digit. --ALSO-- Selects storage register for program storage. (P0-P9)

Programming & Set-up Functions (with pump stopped)

Setting the Multiplier or Stroke Scale Value

Each input signal from the Pulse Output Interface mounted on the pump registers one count into the control. The value of this count must be determined at the initial set-up for display purposes. For example, to count only pump strokes, the Stroke Scale Value would be set at 1 (one). One pulse would equal one stroke.

To set the Stroke Scale Value, simultaneously press the Total Count and Preset Count buttons in and hold. Then use the Increase Digit button to enter the value assigned to the flashing digit. To program, the digit to the far right of the display should be flashing. If it is not flashing, press the Digit Select button until the digit to be programmed begins to flash. The decimal point should be to the far right.

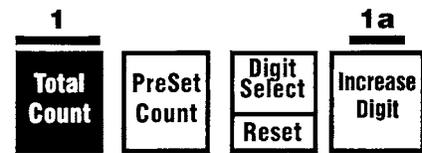
Moving the Decimal Point for Fractional Volumes

If the value you wish to use is a fractional volume, such as displacement per pump stroke, the decimal point must be moved into the proper location BEFORE a Stroke Scale Value is entered.

While pressing the Total Count button, press and release the Increase Digit button until decimal point is in position. As the Increase Digit button is pressed and released, the decimal point location will move from right to left on the display. Press and release Increase Digit, until the decimal point is in the desired position.

Once the decimal point is positioned, set the Stroke Scale Value. These instructions appear in the previous section. Also, please refer to the programming and testing procedures outlined earlier in this manual for detailed instructions. The section is entitled, Programming for Accuracy.

PROGRAMMING QUICK REFERENCE



Setting the Decimal Point

1. Press and hold Total Count.
 - a. Repeatedly press and release Increase Digit to move decimal point from right to left.



Setting the Multiplier or Stroke Scale

1. Press and hold: Total Count + Preset Count.
 - a. Press and release Digit Select until digit flashes.
 - b. Press Increase Digit to program the flashing digit.

Selecting & Storing a Preset Count

To initially store or change a Preset Count value, select one of the ten program storage locations (P0 through P9). Press and hold the Increase Digit button to display the current register location. The display will show P0 through P9 for these locations. Press and release the Increase Digit button to sequence through to the location which will store the new Preset Count value, Release the Increase Digit button.

After selecting the program storage location, press and hold the Preset Count button until the following sequence is completed. Press the Reset button to reset the display to a zero value. The digit position available for setting will flash. Press and release the Increase Digit button to change the digit to the required value. Repeat the process using the Digit Select button until each digit location is set as required.

Resetting the Total Count

Press and hold in the Total Count button. Press and release the Digit Select/Reset button. The display will reset to zero.

Resetting the Preset Count

Press and hold in the Preset Count button. Press and release the Digit Select/Reset button. The display will reset to zero. To reprogram, refer to the procedures outlined in Selecting & Storing a Preset Count.

Functions (with the pump running)

START Button - NOTE: Use a momentary contact switch when using a remote start/stop control.

This button is used only when the control is utilized as a Batch Controller. In this mode of operation, the control is used with an electric solenoid air valve, which controls the air supply to the pump. Pressing this button starts the pump. The control has an internal connection for utilizing an external or remote START button.

STOP Button - NOTE: Use a momentary contact switch when using a remote start/stop control.

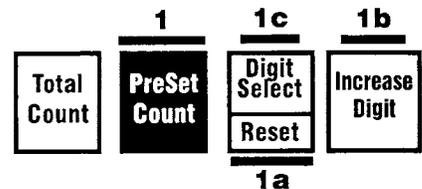
This button is only used when the control is utilized as a Batch Controller. Pressing this button stops the pump. The unit can be restarted by pressing the START button. The control has an internal connection for utilizing an external or remote STOP button. When a Preset Count has been stopped before completion, the display valve will not flash. This is to show the count has been stopped. When the pump stops after completing a Preset Count, the display panel will flash.

PROGRAMMING QUICK REFERENCE



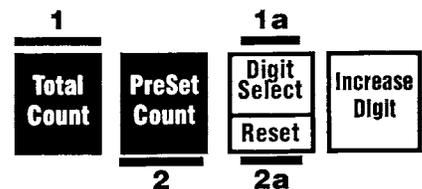
Selecting a Program Storage Area

1. Press and release Increase Digit to sequence through program storage areas (P0 through P9).
2. When the desired storage area appears, proceed with programming and storage.



Programming & Storing a Preset Count

1. Press and hold Preset Count
 - a. Press Reset to reset the display to zero.
 - b. Press and release Increase Digit to change the flashing digit.
 - c. Press Digit Select until each digit is set.



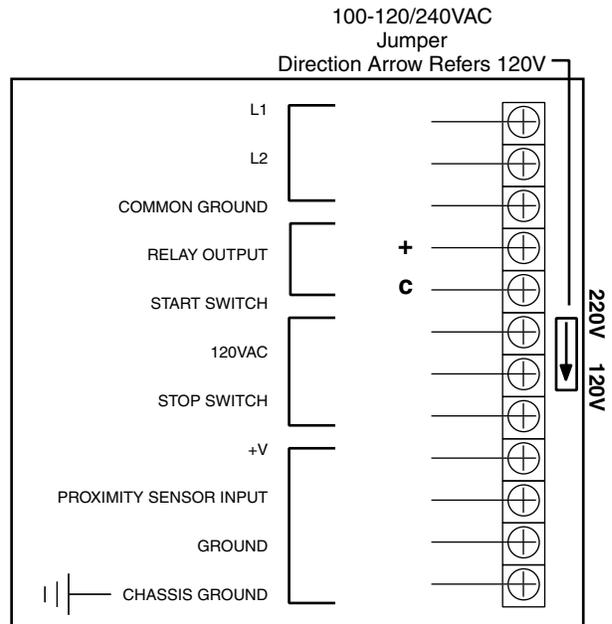
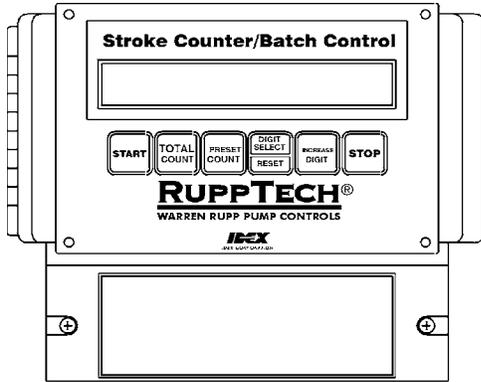
Resetting the Total Count

1. Press Total Count.
 - a. Press and release Reset.

Resetting the Preset Count.

2. Press and hold Preset Count.
 - a. Press and release Digit Select/Reset.

Wiring Diagram



IMPORTANT!

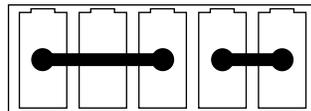
If installing other RuppTech components, such as the Pulse Output Kit or Solenoid Kit, please refer to the separate service pages supplied with the items.

Wiring Diagram 249-006-000

This device is factory set for 90-130VAC, 50/60Hz.
For 200-230VAC, 50/60Hz, remove and rotate the jumper plug as show below.

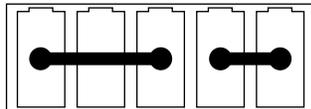
CAUTION!!! REMOVE POWER BEFORE SETTING!!!

Factory Set
90-130VAC



ARROW →

Optional
220VAC



← ARROW

Replace fuse with Type 3AG/250V, .5A, or equal, Fast Blow ONLY.

Wiring Diagram

Connecting the control box to other system components.



IMPORTANT!

If installing other RuppTech components, such as the Pulse Output Kit or Solenoid Kit, please refer to the separate service pages supplied with the items.

