ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Veeder-Root 7935 PDC-1* at our website: ***Click HERE***

SECTION 6.0 CALIBRATION OF COUNTING AND RATE FEATURES

All Series 7935 counting and rate functions are based upon receiving pulses at Input A and/or Input B terminals.

Display of count and rate data in engineering units appropriate to an application requires that input pulses be factored (multiplied or divided by a constant). This method of calibration allows display in feet, gallons, yards, pounds, or any other engineering unit proportional to input pulses.

6.1 SCALING FACTORS

Figure 6-1 illustrates the location of the six calibration (scaling) factors provided. Factor assignments are as follows:

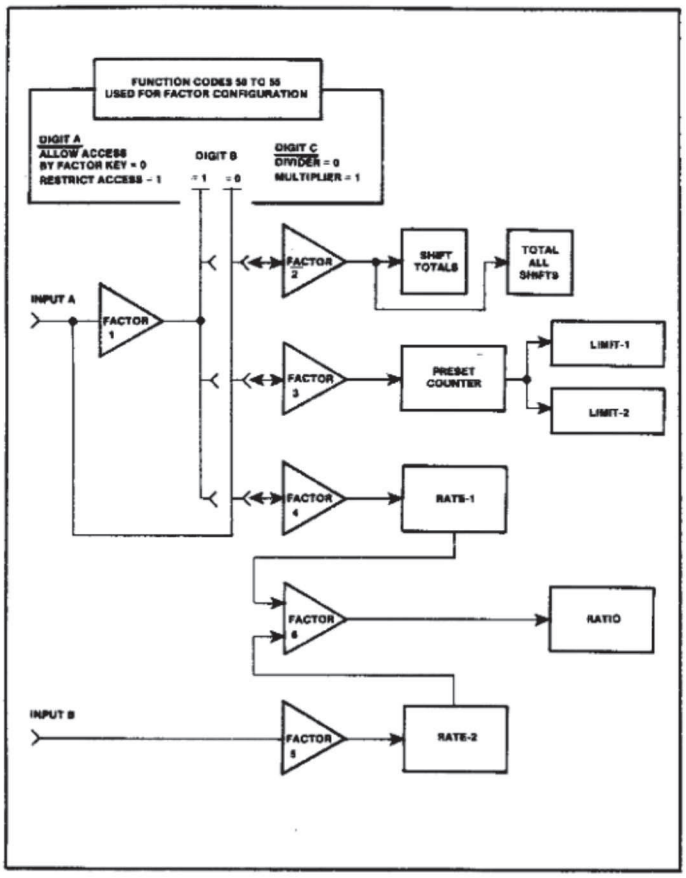


Figure 6-1.

Calibrated Function	Factor Number	Input Signal
Universal Factor	1	*
Shift Totals	2	Input A
Preset Count	3	Input A
Rate-1	4	Input A
Rate-2	5	Input B
Ratio	6	Rate-1 and Rate-2

*The universal factor may be used as a pre-factor in series with any (or all) of the other factors.

Review the function of the six scaling factors in reference to Figure 6-1.

a. Factor 1 is the UNIVERSAL FACTOR. It may be selectively assigned to perform as a pre-factor ahead of Factors 2, 3, 4 and/or 5. If unassigned, the universal factor has no effect.

b. Factor 2 calibrates the five-shift and accumulative totalizer functions. The signal is received from Input A.

c. Factor 3 calibrates the preset counter function. The signal is received from Input A.

d. Factor 4 calibrates the Rate-1 function. The signal is received from Input A.

e. Factor 5 calibrates the Rate-2 function. The signal is received from Input B.

f. Factor 6 calibrates the ratio function. Input is received from Rate-1 and Rate-2.

6.2 FUNCTION CODES

Each factor has a corresponding function code used to customize operations.

Feature	Factor	Function Code
Universal Factor	F1	50
Shift Count	F2	51
Preset Count	F3	52
Rate-A	F4	53
Rate-B	F5	54
Ratio	F6	55

a. Factors are accessed in the operating mode.

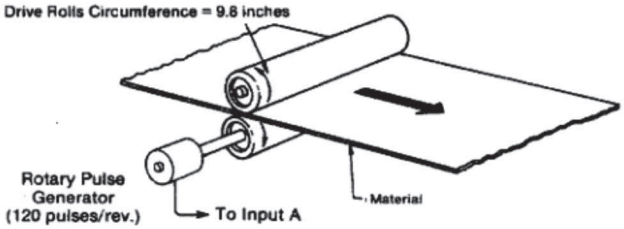
b. Function codes are accessed in the setup mode. For instructions on accessing the setup mode, refer to Section 5.0, Setup Mode Programming.

6.3 CALIBRATION

Determine the application requirements regarding calibration of each of the counting or rate functions described in the previous section. Temporarily disregard the Universal Factor and Factor 6 (ratio).

a. Determine the number of pulses per measured unit that will be displayed on each counting or rate function. Refer to the example in Figure 6-2.

Example: You want to monitor shift totals in yards, preset count in inches and Rate-1 in feet per minute from an Input A signal.



FUNCTION DISPLAY	DESIRED CALIBRATION	PULSES PER UNIT
Shift Totals	yards	$\frac{36}{9.8} \times 120 = 440.82$ pulses/yard
Preset Count	inches	$\frac{120}{9.8} = 12.24$ pulses/inch
Rate-1	feet/minute	$\frac{12}{9.8} \times 120 = 146.94$ pulses/foot

Figure 6-2.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

6.4 DETERMINING THE FACTOR VALUES FOR EACH DISPLAYED FUNCTION

The factors may be selected to perform as dividers (divide by 1 to 999,999) or multipliers (multiply by X.XXXXX). The choice of using multipliers or dividers is based on which is more convenient and **if pulses per unit has a decimal, in which case multipliers should be used.**

a. When the factor is a multiplier, calculate:

$$\text{Factor} = \frac{R^*}{\text{pulses/unit}}$$

b. When the factor is a divider, calculate

$$\text{Factor} = \frac{\text{pulses/unit}}{R^*}$$

*R = 1 for unit resolution; R = 10 for 1/10 unit resolution.

Example: What factor provides calibration in yards and tenths at 32.67 pulses/yard? Since pulses/yard has a decimal content, determine the factor as a multiplier:

$$\text{Factor} = \frac{R}{\text{pulses/unit}} = \frac{10}{32.67} = 0.30609$$

Example: At 1,176 pulses/inch, what factor provides calibration in whole inches? Since pulses/inch is a whole number, either division or multiplication can be used:

Division:

$$\text{Factor} = \frac{\text{pulses/unit}}{R} = \frac{1{,}176}{1} = 1{,}176$$

Multiplication:

$$\text{Factor} = \frac{R}{\text{pulses/unit}} = \frac{1}{1{,}176} = 0.00085$$

c. Determine the values for Factors 2 through 5 and record them. These values will be used for entry in subsequent steps. For example:

Factor 2 = ×0.30609
Factor 3 = ÷2637
Factor 4 = ÷1
Factor 5 = ×0.16290

d. Factor 1 and Factor 6 should initially be assumed as a value of ×1.

6.5 SCALING FACTOR INTERPRETATION CODES

a. Access the setup mode and enter the following preliminary values for function codes 50 to 55, the scaling factor interpretation codes:

PRELIMINARY FUNCTION CODES

Code	Digit A	Digit B	Digit C
50	0	0	1
51	0	0	*
52	0	0	*
53	0	0	*
54	0	0	*
55	0	0	1

* If the factor is a multiplier, Digit C = 1; if the factor is a divider, Digit C = 0.

Note the values you entered in Codes 50 to 55 for use later in final calibration.

b. While still in the setup mode, enter Function Codes 60 to 63 for decimal point placement for whole units (no decimal point) or for 1/10 units.

DECIMAL POINT POSITION

Code	Function	Digit A	Digit B	Digit C
60	Shift Totals	0	0	*
61	Preset Count	0	0	*
62	Rate-A	0	0	*
63	Rate-B	0	0	*

* No decimal point = 0; decimal point (tenths) = 1.

Note: Be sure to position the decimal points to correspond with calibration factor values developed in Section 6.4. If the constant "R" used in the calculations is 1, decimal points are not required. If "R" is 10, program the decimal point at the tenths position.

c. While still in the setup mode, enter Function Code 64 to select the ratio feature's decimal point position (if ratio feature is used).

1. Enter 000 for a decimal point at the tenths position.
2. Enter 001 for a decimal point at the hundredths position.

d. Exit the setup mode (press the RESET key).

e. While in the operating mode, enter the desired multiplier or divider factors that were determined in Section 6.4 as follows:

PRESS [FACTOR]

Confirm that F1 (Factor 1) is shown in the function display. The data display should show the existing value of F1.

IMPORTANT: REVIEW WHETHER THE PRELIMINARY VALUE FOR FUNCTION CODE 50 WAS SELECTED TO MAKE FACTOR 1 A MULTIPLIER OR DIVIDER. IF THE FACTOR WAS SELECTED AS A DIVISOR, A DECIMAL POINT SHOULD NOT BE PRESENT IN THE DATA DISPLAY. IF THE FACTOR WAS SELECTED AS A MULTIPLIER, A DECIMAL POINT (X.XXXXX) SHOULD BE DISPLAYED.

REVIEW

If a decimal point is not present in the factor value (whole number), the factor is a divider.

If the decimal point is present in the factor value, the factor is a multiplier (multiply by X.XXXXX).

f. If Factor 1 does not appear when the FACTOR key is pressed or the factor's mathematical assignment (multiply or divide) is not correct as indicated by the decimal point, check the preliminary function code value (refer to Section 6.5).

g. Using the CLEAR, numerical, and ENTER keys, enter the desired factor value. Dividers must be entered as whole numbers and multipliers must be entered around the fixed decimal point (X.XXXXX).

h. Using the FACTOR key, repeat steps e through h to access Factors 2 through 5. Make corrections to Function Codes 51 to 54 if necessary.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

6.6 FINAL VALUES FOR FUNCTION CODES 50 TO 55

The previous steps in this section have accomplished the following:

- Determined the necessary values for scaling factors F1 through F5 as multipliers or dividers.
- Entered a preliminary value in Function Codes 50 through 55 to select factors as multipliers or dividers.
- Positioned decimal points for displayed functions.
- Entered scaling factor values in Factors F1 to F6.

6.6.1 Ratio Feature Factor Value

The ratio feature's factor (F1) is set to a value of 1 for most applications.

a. In the operating mode, enter a value of 1.00000 in Factor 6.

b. In the setup mode, enter Function Code 55 with a value of 101.

6.6.2 Considerations

The 7935 is now calibrated for use. However, it may be desirable to proceed to the following steps if:

1. The Universal Factor (F1) is to be used.
2. Some or all of Factors F2 to F6 are to be inhibited; i.e., not accessible by the FACTOR key in normal operation.

Otherwise, proceed to Section 6.8, Preparation for Installation.

6.7 USING THE UNIVERSAL FACTOR AND/OR INHIBITING FACTORS F2 TO F6

Perform the following procedure to use the Universal Factor and/or to inhibit Factors F2 to F6:

a. Note the following codes for subsequent entry.

   1. If the Universal Factor is to be used as a multiplier, Code 50 = 001.
   2. If the Universal Factor is to be used as a divider, Code 50 = 000.

b. Use the following table to determine final function code values for Codes 51 to 54. Note these for subsequent entry.

FUNCTION CODES 51 to 54

Digit	Function	0 =	1 =
A	Inhibit	no	yes
B	Universal Factor	no	yes
C	Mathematics	divides*	multiply*

* Use the initial value of Digit C that was determined in Section 6.5, Scaling Factor Determination Codes.

Example: A Function Code 51 (affecting Factor 2) was assigned an initial value of 001. The final configuration requires that Factor 2 be used with the Universal Factor and also be inhibited. Therefore, the final value of Function Code 51 would be Digit A = 1 (inhibit), Digit B = 1 (Universal Factor applied), and Digit C = 1 (same as initial value).

IMPORTANT: FACTOR REGISTERS MUST BE ENTERED WITH MULTIPLIER or DIVIDER VALUES BEFORE USING THE INHIBIT CODE. FACTORS WILL NOT BE ACCESSIBLE FOR CHANGE ONCE THE INHIBIT CODE IS ENTERED. IF A FACTOR VALUE REQUIRES FREQUENT CHANGE, IT IS RECOMMENDED THAT THE INHIBIT CODE NOT BE USED.

c. If it becomes necessary to change or observe an inhibited factor, access the setup mode and reenter the corresponding function code value with Digit A as zero (101 becomes 001).

d. Access the setup mode and enter the values determined in Section 6.7 for Function Codes 50 to 54.

6.8 PREPARATION FOR INSTALLATION

a. While in the operating mode, enter the value of Factor F1 (Universal Factor), if used.

b. Recheck all factor values and Function Code 50 to 55 entries for correct content. If necessary, revise. Record the final values for future reference on the programming worksheet provided with this manual.

c. Turn off A.C. power supply. Remove all temporary wiring.

d. Proceed to Section 7.0, Installation and Wiring.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

SECTION 7.0 INSTALLATION AND WIRING

WARNING: IN INSTALLATION AND USE OF THIS PRODUCT, COMPLY WITH THE NATIONAL ELECTRICAL CODE; FEDERAL, STATE AND LOCAL CODES, AND ANY OTHER APPLICABLE SAFETY CODES. IN ADDITION, TURN OFF POWER AND TAKE OTHER NECESSARY PRECAUTIONS DURING INSTALLATION, SERVICE AND REPAIR TO PREVENT PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

CAUTION: THE OPERATING MODE OF THIS PRODUCT IS PRIMARILY DEPENDENT ON CUSTOM PROGRAMMING WHICH IS THE RESPONSIBILITY OF THE INSTALLER. BEFORE PLACING THE PRODUCT INTO SERVICE INITIALLY, OR AFTER REPAIR, IT IS NECESSARY TO PERFORM THE PROGRAMMING PROCEDURES AS DESCRIBED IN THIS MANUAL.

WARNING: IF INSTALLATION IS TO BE IN A VOLATILE, COMBUSTIBLE OR EXPLOSIVE ATMOSPHERE, THIS PRODUCT MUST BE HOUSED IN AN APPROPRIATE ENCLOSURE AS REQUIRED FOR USE IN SUCH ATMOSPHERE BY NATIONAL ELECTRICAL CODE AND ANY LOCAL APPLICABLE STANDARDS.

7.1 MOUNTING

The Series 7935 is designed to be panel mounted in an environment suitable for electronic equipment. Air immediately surrounding the unit must be within the unit's specified operating temperature.

7.1.1 Panel Preparation. A cutout must be provided per dimensions in Figure 2-1, Dimensions.

a. Three inches minimum, unobstructed clearance around all sides of the unit is required behind the panel to allow mounting and wiring operations.

7.1.2 Installation. Before proceeding with mounting, locate the supplied gasket, four mounting clamps and four mounting screws.

a. Install the mounting screws in the mounting clamps per Figure 7-1, Mounting Assembly.

b. Slide the gasket over the rear of the unit's body and position against the flange.

c. Place the unit in the panel cutout. Check the gasket for proper location.

d. Snap the four mounting clamp assemblies in the cavities provided by inserting the large tab of the clamp toward the front of the 7935 and then pressing inward (see Figure 7-1, Mounting Assembly).

e. Tighten the four mounting screws. The unit must be firm in the panel mount and the gasket must be compressed. DO NOT OVERTIGHTEN.

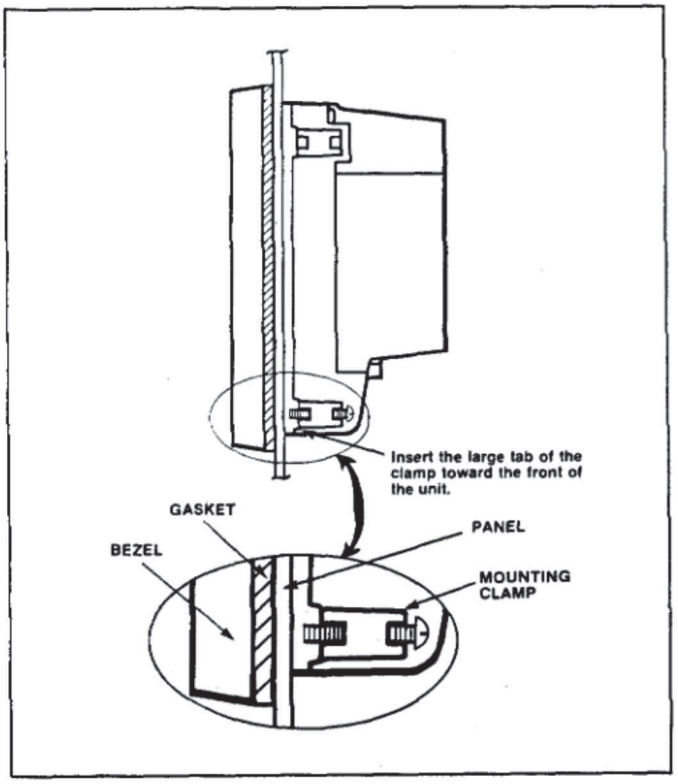


Figure 7-1. Mounting Assembly

7.2 GENERAL WIRING

All signal, control and power wiring is connected to the Series 7935 via the screw-connection blocks provided. The connection blocks are detachable for ease of installation or removal. Terminal positions are numbered 1 through 61 (see Figure 7-2, Rear Connections). Some positions may not be used on some models.

a. Insert the 4 position connection block in the socket containing terminal numbers 1 through 4.

b. Insert the 9 position connection block in the socket containing terminal numbers 5 through 13.

c. Insert the remaining 8 position connection blocks only in connector sockets that are populated with pins.

d. Use the stick-on "number" labels provided to identify connection block terminal numbers. Be sure to match numbers as positioned on the unit's main label (see Figure 7-2, Rear Connections).

CAUTION: TIGHTEN SCREW-CONNECTION BLOCKS TO 5 IN./LBS. TORQUE.

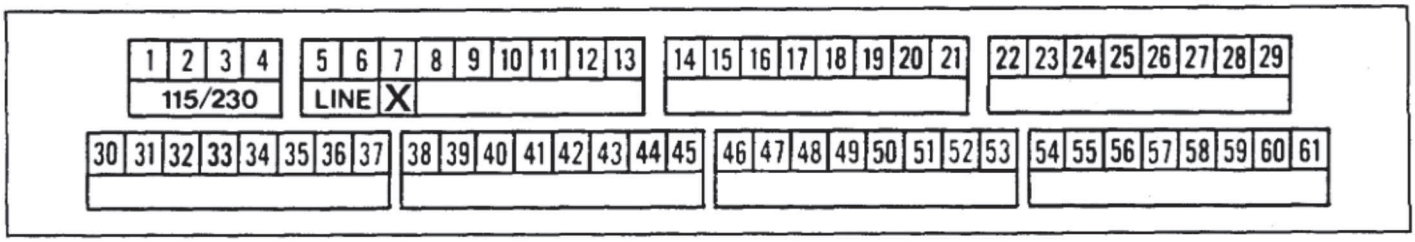


Figure 7-2. Rear Connections

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

7.2.1 Wiring Practice. The Series 7935 uses state-of-the-art MOS/LSI circuitry which characteristically has high immunity to the effects of electrical interference. Proper electrical wiring further reduces the probability of electrical interference. The following precautions should be observed:

1. Do not run input count signal or command lines in the same conduit as power or control lines from relays, motor starters, etc.
2. Use two-conductor shielded wire for count signal and command inputs. The shield should be connected at the counter end to "Common".
3. **DO NOT** connect controller to "Earth Ground".
4. Mount the controller as far as possible away from motor starters, SCR circuits, large relays, etc.
5. When connecting terminals, "solder-tin" the ends of all stranded wires.

Note: Do not allow the controller to support the weight of cables, harnesses, etc. All interconnection wiring must be supported elsewhere.

7.2.2 Summary of Terminal Connections

Function	Terminal Number	Reference
AC Line Select	1, 2, 3, 4	7.3.1
AC Line Power	5,6	7.3.2
Input A	30	7.4
Input B	31	7.4
Remote Reset	32	7.5.1
Run/Stop	33	7.5.3
Direction	34	7.5.4
Security	35	7.5.5
Fault Input #1	46	7.5.2
Fault Input #2	48	7.5.2
Fault Input #3	50	7.5.2
Fault Input #4	52	7.5.2
Fault Input #5	54	7.5.2
Fault Input #6	56	7.5.2
Fault Input #7	58	7.5.2
Relay Output #1, NO	8	7.6
Relay Output #1, COM	9	7.6
Relay Output #1, NC	10	7.6
Relay Output #2, NO	11	7.6
Relay Output #2, COM	12	7.6
Relay Output #2, NC	13	7.6
Transistor Out #1	16	7.6
Transistor Out #2	17	7.6
+15 V dc Sensor Supply	14	7.4
Signal Common	15, 21, 36, 37 42, 45, 47, 49 51, 53, 55, 57 59, 61	

7.3 AC POWER WIRING

7.3.1 Voltage Selection. Wire the 4 position terminal block to match available AC line voltage (terminals 1 through 4).

a. Use short lengths of insulated 18-gauge stranded wire.

b. For 115 volts, wire per Figure 7-3, 115 VAC Wiring.

c. For 230 volts, wire per Figure 7-4, 230 VAC Wiring.

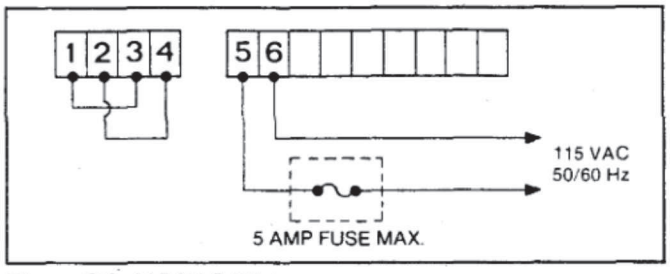


Figure 7-3. 115 VAC Wiring

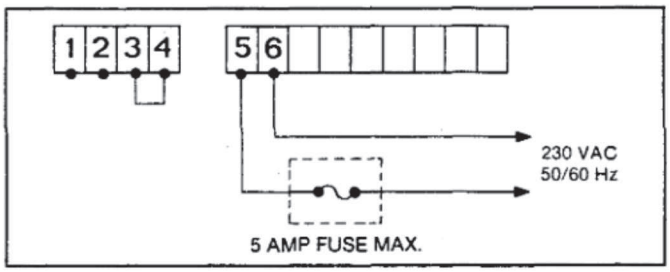


Figure 7-4. 230 VAC Wiring

7.3.2 Power Line. Wire the 9 position terminal block, terminals 5 and 6, per Figure 7-3, 115 VAC Wiring, or Figure 7-4, 230 VAC Wiring.

a. Do not apply power.

b. Be sure voltage that will be applied is correct for the selection made in 7.3.1, Voltage Selection.

7.4 COUNT INPUT WIRING

Use shielded wire. If a sensor device without shielded wire is used, terminate to shielded wire within 12 inches of the sensor.

Note: The following applies to count input A and, if used, count input B.

a. For count input received from contact closure, see Figure 7-5, Connection of Contact Input to Input A and/or B.

b. For count input received from a photosensor or proximity switch, see Figure 7-6, Three-Wire Sensor Connection to Input A and/or B, or Figure 7-7, Connection of a Two-Piece Photoelectronic Sensor to Input A and/or B.

c. For count input received from a rotary pulse generator, see Figure 7-8, Connection of a Series 7132 Rotary Pulse Generator and Cable to Input A and/or B.

d. A sensor power supply output (+15 VDC) is provided (terminal 14). Do not exceed current load per the specifications in Section 2.0.

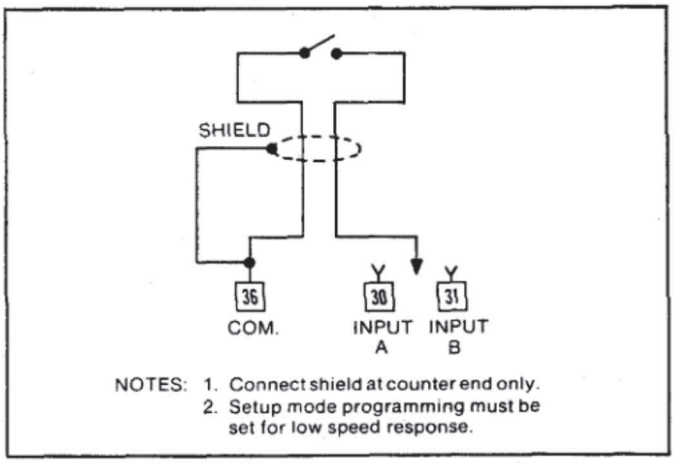


Figure 7-5. Connection of Contact Input to Input A and/or Input B

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

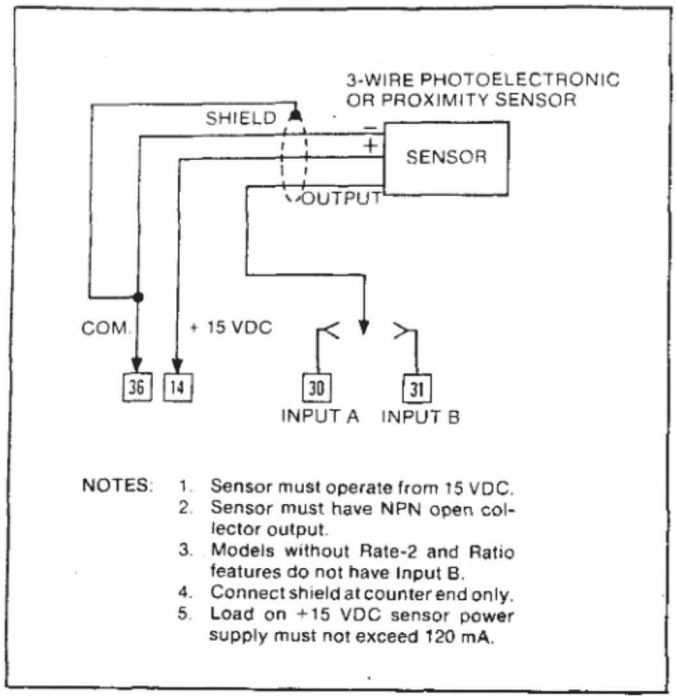


Figure 7-6. Three-Wire Sensor Connection to Input A and/or Input B

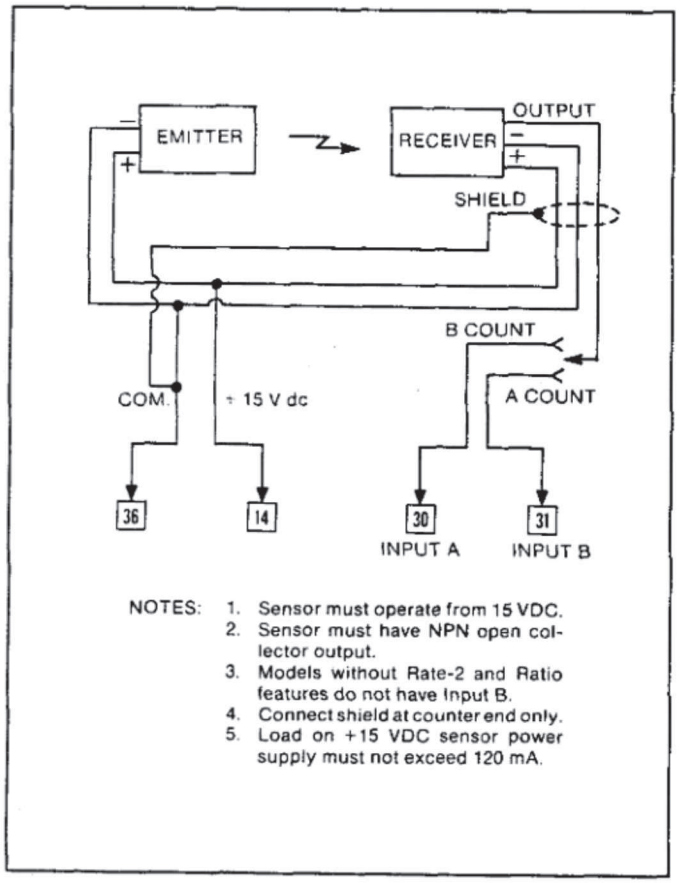


Figure 7-7. Connection of a Two-Piece Photoelectronic Sensor to Input A and/or B.

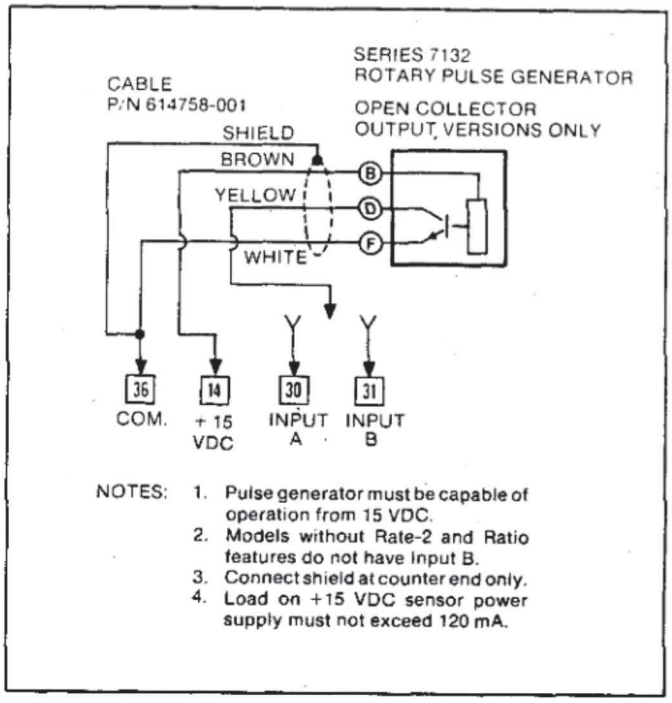


Figure 7-8. Connection of a Series 7132 Rotary Pulse Generator and Cable to Input A and/or Input B.

7.5 COMMAND INPUT WIRING

Use shielded wire. If a sensor device without shielded wire is used, terminate to shielded wire within 12 inches of the sensor.

7.5.1 Remote Reset. The 7935's preset counter feature may be reset from a remote contact or sensor. Use shielded wire.

a. Wire the remote reset per Figure 7-9, Command Input Wiring (Typical).

b. The contact must be free of external voltage (isolated contact).

7.5.2 Fault Detection Inputs. The Series 7935 provides seven status inputs to count and time reasons for stopped or faulty production. Sensors or contacts may be connected to the fault inputs. Shielded wire should be used.

a. Wire per Figure 7-9, Command Input Wiring (Typical).

b. Provision is made in the unit's setup mode for directing "on" or "off" status of input to be recorded as a fault.

c. Input must be sustained in the fault condition for the full duration of the fault.

d. The contact must be free of external voltage (isolated contact).

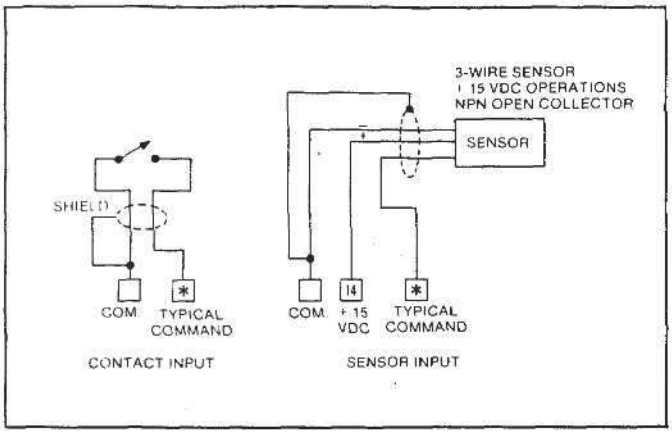
7.5.3 Run/Stop Input. This is a status command input used to verify if the machine or process is in a running or stopped condition. Wire to an isolated contact that is closed when equipment is running and open when equipment is stopped.

a. Wire per Figure 7-9, Command Input Wiring (Typical).

b. The contact must be free of external voltage (isolated contact).

c. Use shielded wire.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



*COMMAND TERMINALS

Function	Number	Common Terminals (any may be used)
Remote Reset	32	15, 55
Run/Stop	33	21, 57
Direction	34	36, 59
Fault-1	46	37, 61
Fault-2	48	42
Fault-3	50	45
Fault-4	52	47
Fault-5	54	49
Fault-6	56	51
Fault-7	58	53

Figure 7-9. Command Input Wiring (Typical)

7.5.4 Direction Reverse Command. This command provides reverse counting direction of the preset counter and shift totals functions. This connection is not required for unidirectional applications. Use shielded wire.

a. Wire the direction reverse command (terminal 34) per Figure 7-9, Command Input Wiring (Typical).

b. The contact must be free of external voltage (isolated contact).

c. Closed contact status commands reverse direction.

7.5.5 Security Input. This is for use only when the external switch-operated security method is used.

DO NOT CONNECT WHEN THE DIGITAL SECURITY CODE METHOD IS USED. IF CONNECTION IS MADE, CUSTOM SECURITY CODE WILL BE LOST (DEFAULT TO FACTORY SET CODE). REFER TO SECTION 5.0, SETUP MODE PROGRAMMING.

a. Wire per Figure 7-10, Security Switch Connection.

b. Use shielded wire.

c. Security is in effect when the contact is closed.

d. The contact must be free of external voltage (isolated contact).

7.6 CONTROL OUTPUT WIRING

The Series 7935 contains two control output channels which are associated with its preset counter function. Each channel provides a Form-C (SPDT) relay and an NPN open collector transistor. **Do not exceed ratings of relay or transistor per the specifications in Section 2.0.**

7.6.1 Relay Connection. Use the wiring appropriate to load and applicable standards.

a. Wire in reference to Figure 7-11, Control Output Connections.

7.6.2 Transistor Connection.

a. Wire in reference to Figure 7-11, Control Output Connections.

b. Inductive loads should be provided with an external suppression device.

c. Setup mode provides choice of normally on or normally off operation.

7.7 DATA COMMUNICATIONS WIRING

If the RS-422 Communications feature is to be applied, refer to the separate manual (P/N 576013-222) for wiring and programming information.

If this feature is **not to be used**, it is recommended that the jumper connection shown in Figure 7-12 be made.

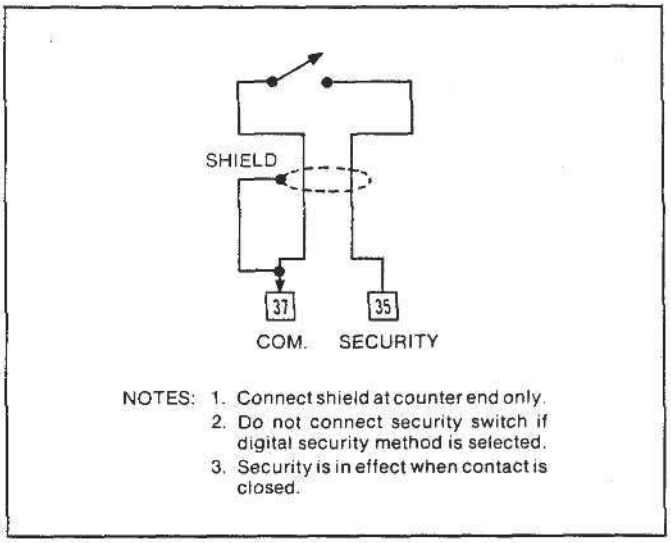


Figure 7-10. Security Switch Connection

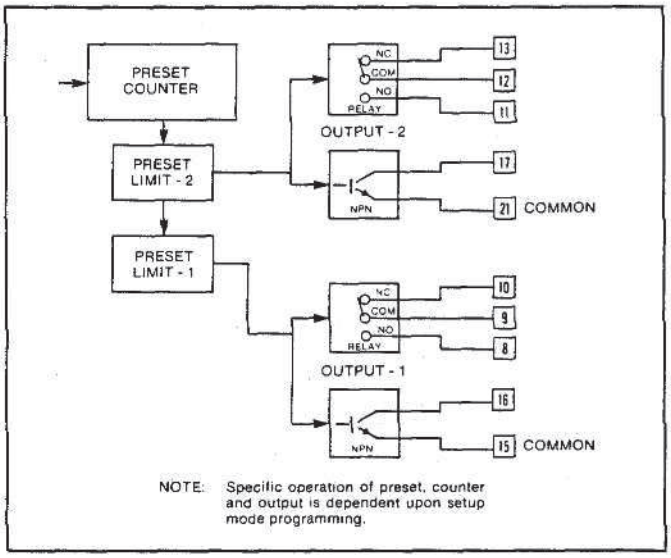


Figure 7-11. Control Output Connections

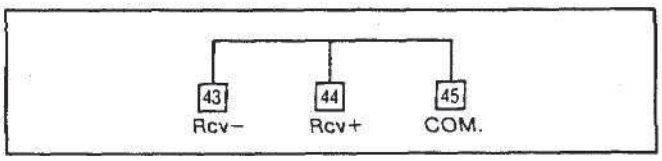


Figure 7-12 Jumper Connection Wiring.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.0 OPERATION

CAUTION: BEFORE PLACING THE EQUIPMENT INTO SERVICE, PERFORM THE SYSTEM START-UP TEST PER SECTION 8.9, SYSTEM START-UP TEST.

The 7935's touch panel and LED display provide access to current and stored production data and programming functions. This information can be changed or displayed by pressing the corresponding touch keys and observing the LED display.

The LED display is divided into two sections. One section is labeled FUNCTION and the other section is labeled DATA.

The FUNCTION display identifies which data register and/or shift information is currently being displayed. It also indicates security status and entry of the setup mode. (The setup mode is used by the installer to configure the 7935 to an application. Entry of the setup mode is restricted by security.) A list of FUNCTION characters and their designations is shown in Table 8-1.

The DATA display indicates values of count, time rate, efficiency or programming information.

CAUTION: USE FINGER PRESSURE ONLY TO PRESS THE FRONT PANEL KEYS. DO NOT USE ANY OBJECT OR TOOL THAT MAY CREASE, INDENT OR PUNCTURE THE SURFACE OF THE FRONT PANEL. PERMANENT DAMAGE AND OPERATING FAILURE OF THIS PRODUCT MAY RESULT.

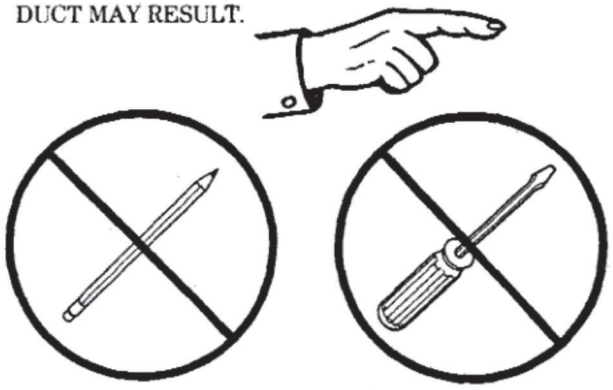


Table 8-1. Displayed Characters (x = any digit 0 through 9)

Function Display	Description
xC	Shift Count
xd	Shift Downtime
xE	Shift Efficiency or Event
Fx	Factor x
FC	Function Code
Lx	Limit x
PC	Preset Count
rx	Rate x
rr	Ratio
xU	Shift Uptime
oC	Accumulative Total
.	Security Disabled

8.1 HOME DISPLAY FEATURE

The 7935 has the capability of automatically returning the display to a selected data register 1 to 15 seconds after viewing an alternate register. The operation of this feature is dependent upon setup mode programming.

8.2 SECURITY

There are two methods of security provided with the 7935 that may be used to restrict or limit touch panel access to the following functions or registers:

Preset Limits Change
Scaling Factors Change
Shift Changes
Reset Operation
Setup Mode Access

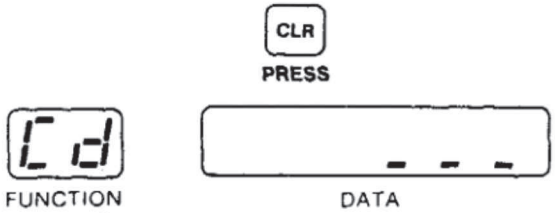
The first method allows access by entering a three-digit security code into the 7935 via the touch panel. The second method allows access via the security terminals on the back of the unit. The security terminals may be connected to an external key switch for use by authorized persons. Note that options concerning security are selected in the setup mode.

Securable functions and registers will be noted throughout this section of the manual.

8.2.1 Unlocking security when the digital code method is used:

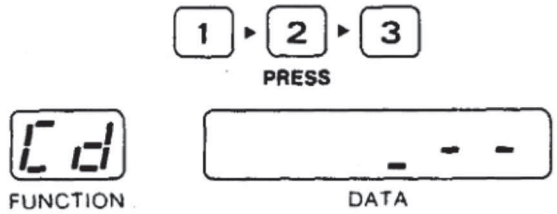
a. The display should be in "HOME" position.

b. Press the CLR key.



c. Press your security code number.

Example:

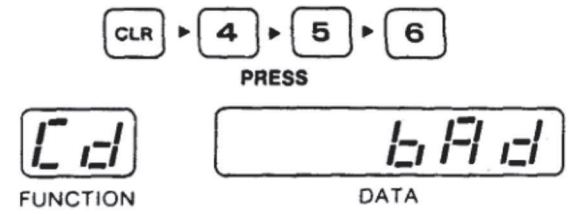


Note: The bars in the display change levels to indicate keypad depressions. The actual number is not displayed to avoid observation by unauthorized persons.

d. Observe that the decimal point in the function display illuminates at the completion of the security code number entry. The unit automatically returns to locked security (the decimal point goes out) after ten seconds without keyboard activity.

e. Incorrect security code (i.e., 4 5 6).

Example:



Note: The display indicates "BAD" to signify rejection of an incorrect code. Try again.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

If the correct code is entered, a decimal point illuminates in the FUNCTION display indicating that security is deactivated. Security reactivates if no touch keys are pressed within ten seconds.

8.2.2 Unlocking security when the key-switch method is used:

a. Turn key-switch to unlock position.

b. NOTE that function display decimal point is illuminated (indicating unlocked security).

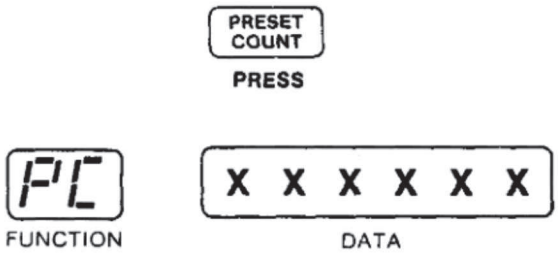
c. Return switch to locked position after task is accomplished.

8.3 PRESET COUNTER FEATURE

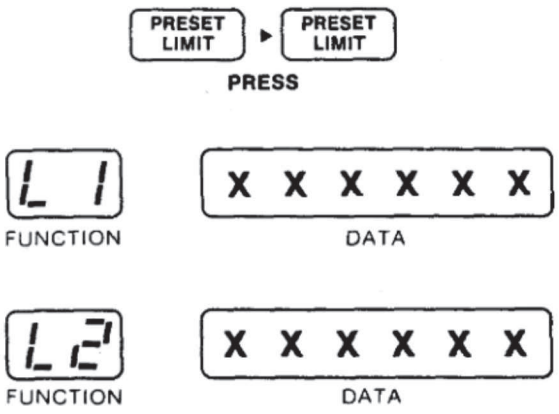
The preset count register operates in conjunction with the preset limits and displays the number of impulses received at the Count A input. The value of that number can be scaled to engineering units via input scaling factors.

Preset limits 1 and 2 are predetermined process values that correspond to relay and transistor outputs 1 and 2. Whenever the count value in the preset count register is equal to a preset limit, the output for that limit actuates. The counting direction of this feature is dependent upon set-up mode programming.

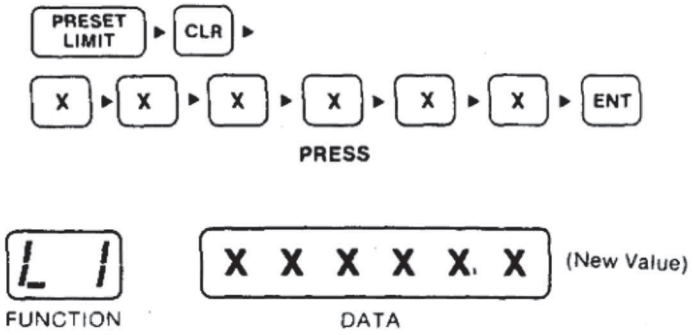
8.3.1 Displaying the Preset Count



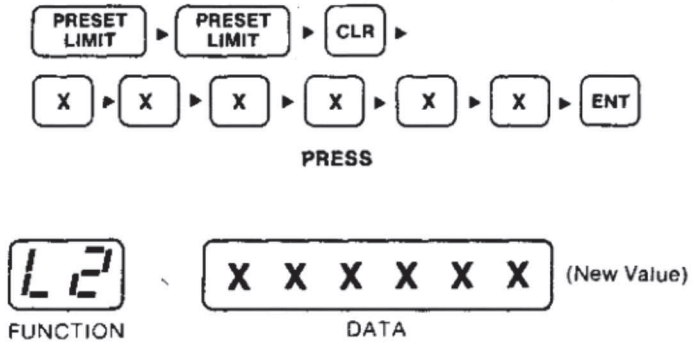
8.3.2 Displaying Preset Limits 1 and 2



8.3.3 Changing Preset Limit 1*

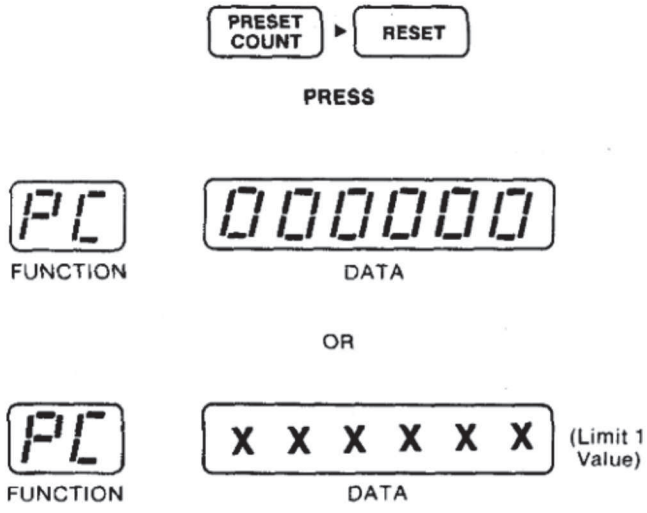


8.3.4 Changing Preset Limit 2*



*Registers and functions may be restricted by security.

8.3.5 Resetting the Preset Count*

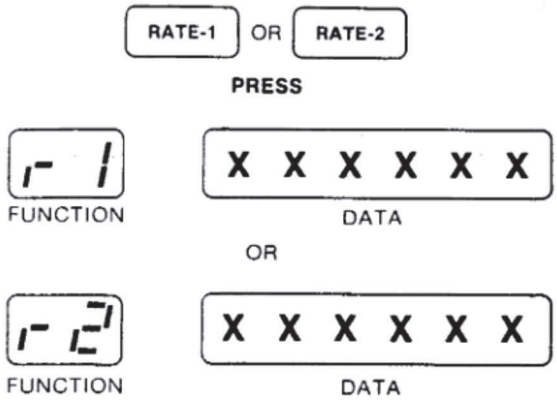


*This function may be restricted by security.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.3.6 Rate-1 and Rate-2

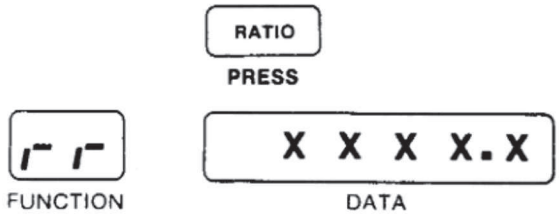
Rate-1 and Rate-2 registers display the rate of impulses received at the Count A and B inputs. The numeric value of the rates can be scaled to engineering units by the input scaling factors. The rate registers can also be programmed via the setup mode to display counts per minute or counts per hour. To display Rate-1 or Rate-2:



Note: A blank display indicates no pulses have been input to the unit.

8.3.7 Ratio

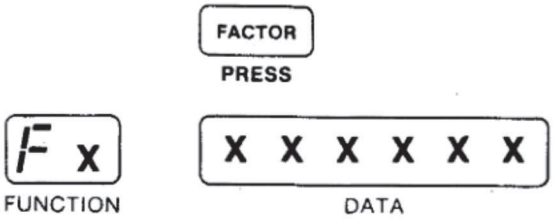
A ratio of rates 1 and 2 can be displayed. Different arithmetic ratio functions are selectable via setup mode programming. To display the ratio of the rates:



8.4 FACTORS

Factors are used for scaling count impulses into engineering units. They may be selected to operate as input multipliers or dividers via setup mode programming. The setup mode also controls displaying of the factors. Any or all of the factors can be inhibited from access. If all of the factors are inhibited, the 7935 returns the display to the home position when the FACTOR key is pressed. If touch panel access is authorized, follow the next steps.

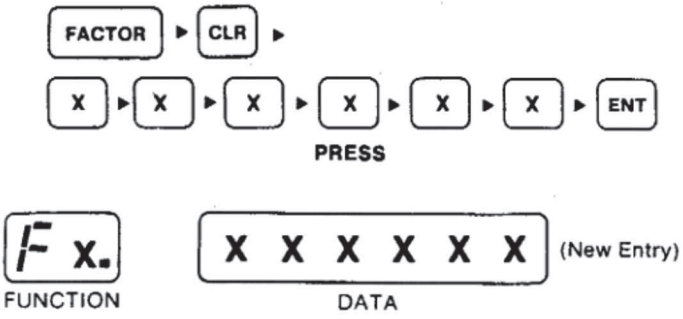
8.4.1 Displaying Factors:



Repeated pressing of the FACTOR key displays the values of up to six factors and then returns the display to the home position.

Note: If a decimal point is displayed, the factor is a multiplier. If no decimal point, the factor is a divider.

8.4.2 Changing the Values of Factors



Note: These registers are restricted by security.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.5 DISPLAYING SHIFT-RELATED DATA

Display of shift totals and change of current shift, time, or efficiency can only be obtained by first pressing **SHIFT** to access the shift prompt:



* = current shift number

The shift prompt indicates that shift-related data can be read by pressing the appropriate key. At this point the current shift may be changed (by pressing **ENTER**) or shift efficiency, totals, or time can be displayed.

To exit the shift mode, press **SHIFT** again. The display returns to the "HOME" position.

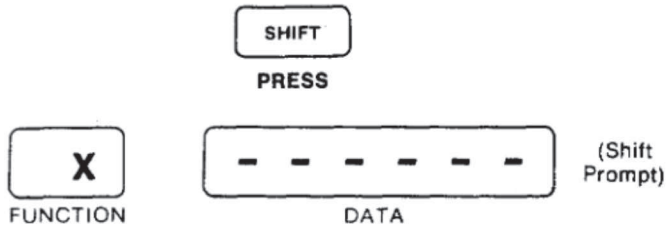
8.5.1 Shift Time, Total and Efficiency

TIME: The 7935 will display shift running time or shift downtime. This choice is made during setup mode programming. Repeated pressing of the TIME key displays time registers for all other shifts.

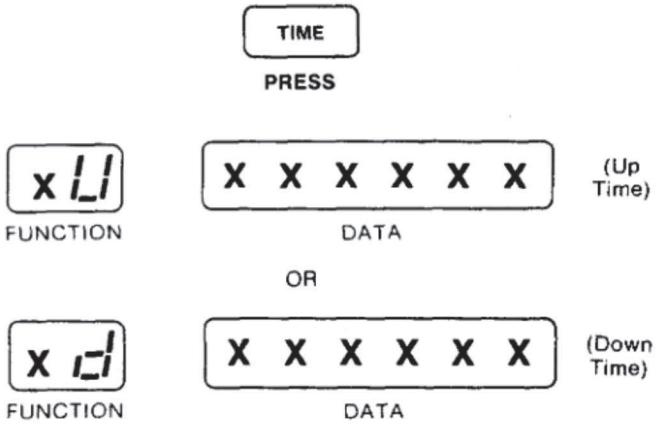
TOTAL: Repeated pressing of the TOTAL key displays count totals for all shifts. Accumulated count totals are designated by a *0* in the function display.

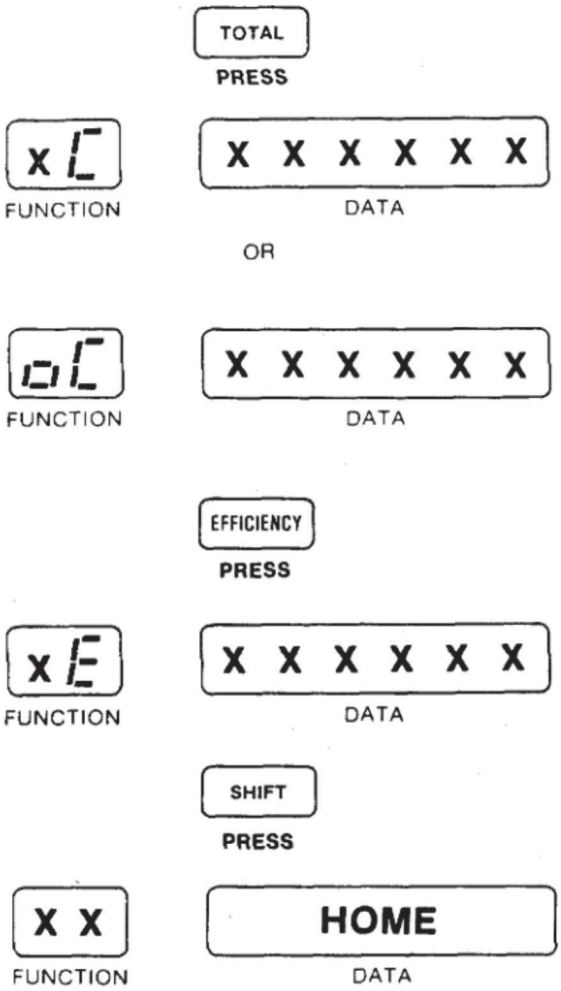
EFFICIENCY: Repeated pressing of the EFFICIENCY key displays operating efficiency for all other shifts.

To display time, total and efficiency:

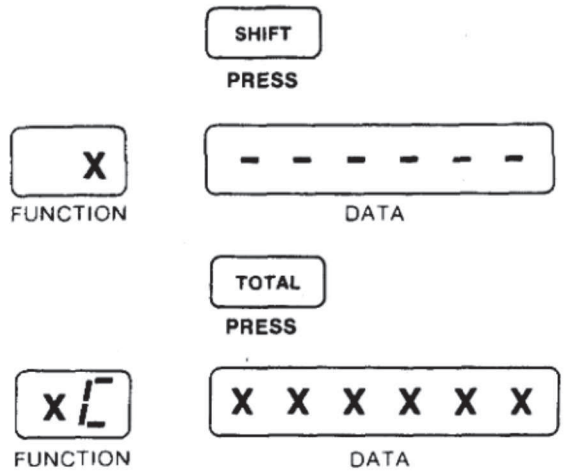


The "**X**" in the function display indicates the number of current shifts.

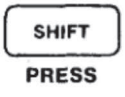




Note: It is not necessary to display the time, total or efficiency registers in the order shown above. They may also be displayed individually as in the following example displaying shift total:



To return to the home display:

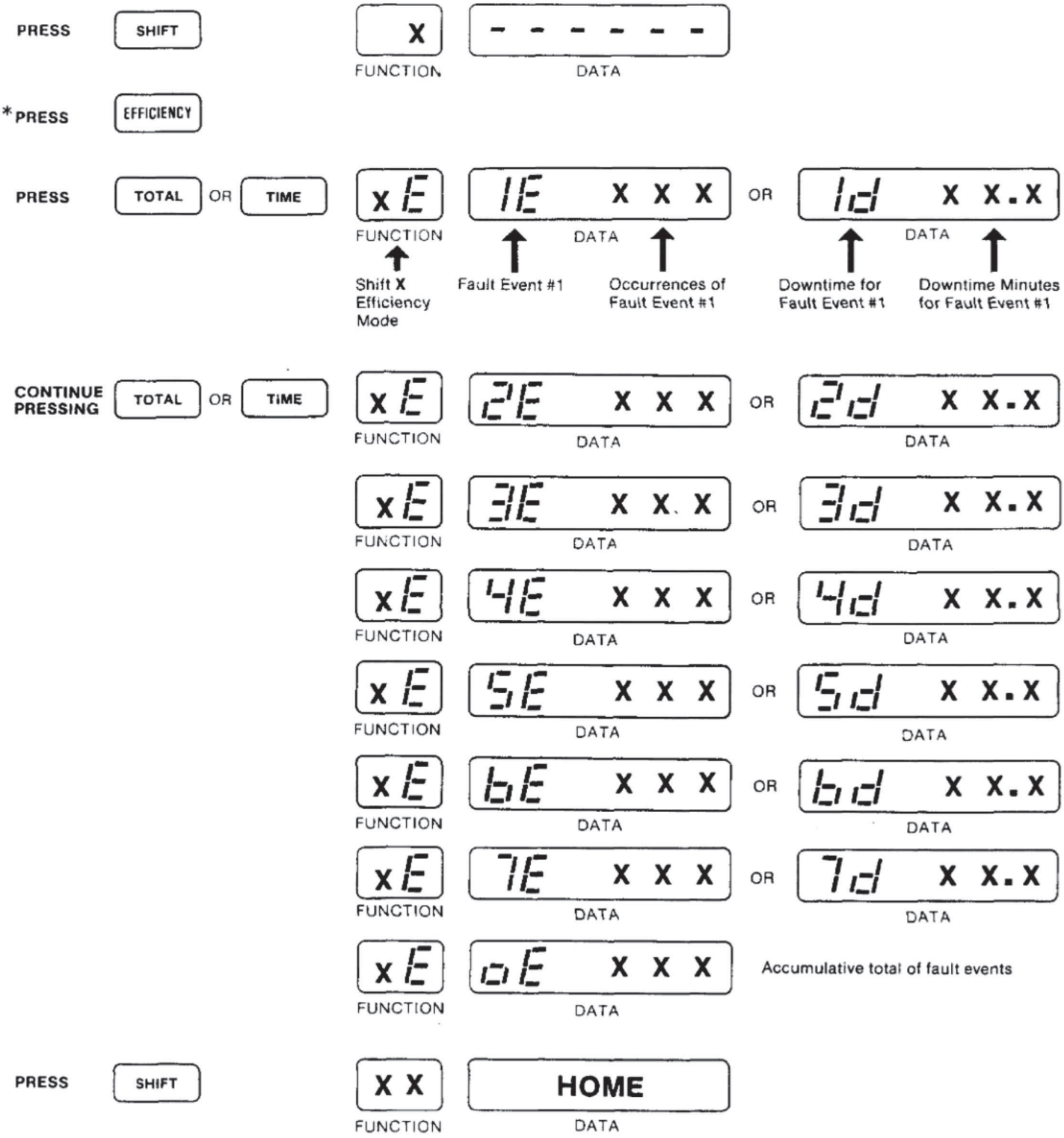


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.6 FAULT REASON ANALYSIS FEATURE (FRA)

The 7935 is capable of displaying downtime by event and the occurrences of each event via its fault analysis feature. Seven fault inputs, which can be actuated by sensors or switches, correspond to individual total and time registers. The total registers display occurrences, and the time registers accumulate downtime when their respective inputs are active. This feature is accessed by first displaying shift efficiency, then using the totals and time keys to display the seven FRA registers.

8.6.1 Displaying Fault Event and Time Registers



Note: The SHIFT key may be pressed at any time to terminate the display of downtime-by-event data.
*Repeated pressing of the EFFICIENCY key at this point accesses downtime-by-event data for the remaining shifts.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.6.2 Reset of the FRA Feature

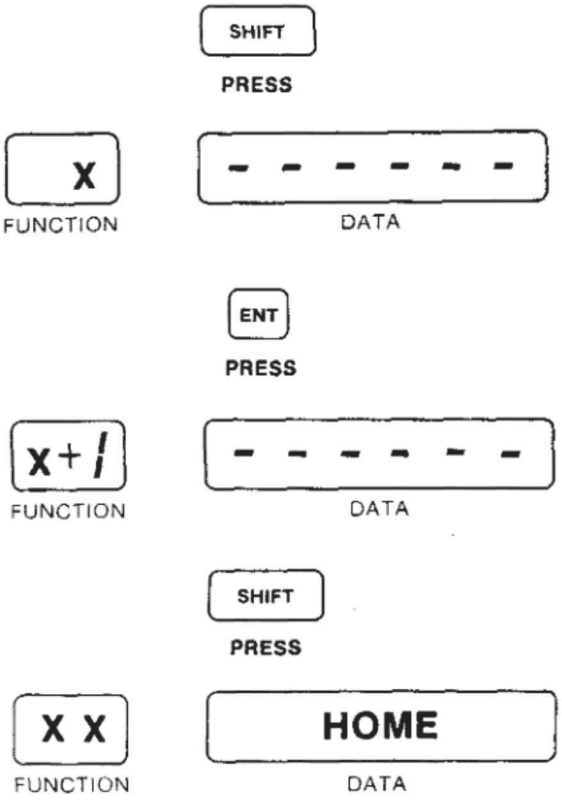
Since all FRA time and event count information is interrelated for a given shift, reset of any register will clean **all** registers for that shift.

Reset is accomplished by unlocking security, displaying the register, and pressing "RESET".

Note: In some applications of the FRA features, it may be desirable to also reset the efficiency feature for the specific shift

8.6.3 Changing the Current Shift*

In order to track production data by shift, it is necessary to perform the following steps at the beginning or end of each shift. Upon doing so, the 7935 starts accumulating data and displaying the number of the new shift.



*This function may be restricted by security.

8.7 RESETTING TIME, TOTAL AND EFFICIENCY REGISTERS*

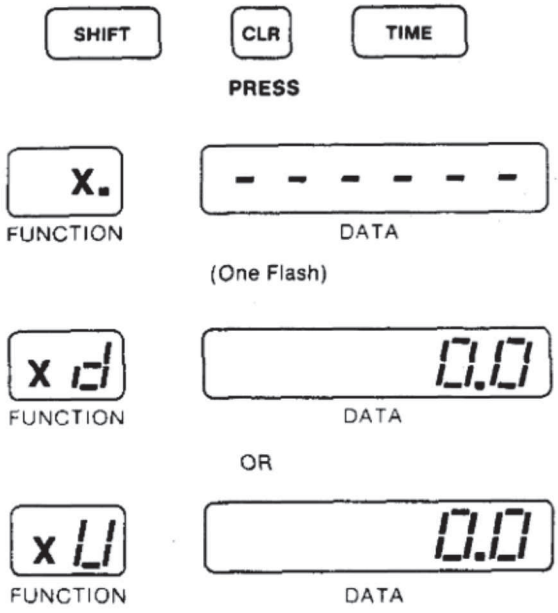
Time, total and efficiency registers may be reset individually by displaying the desired register and pressing the RESET key.

*This function may be restricted by security.

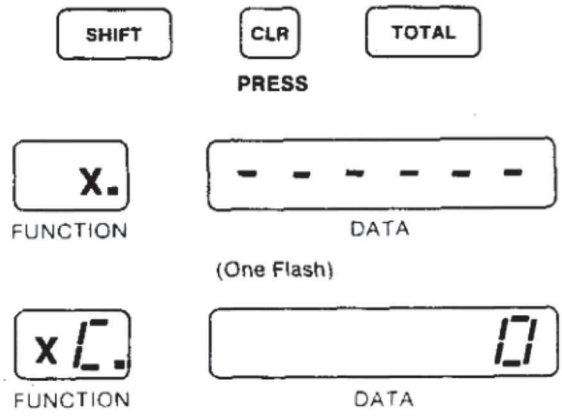
8.8 MASTER CLEAR FUNCTIONS

For convenience, the above-mentioned registers may be reset by group for all shifts using the master clear function shown below. Note that security must be deactivated to reset any shift data register.

8.8.1 Resetting Shift Time

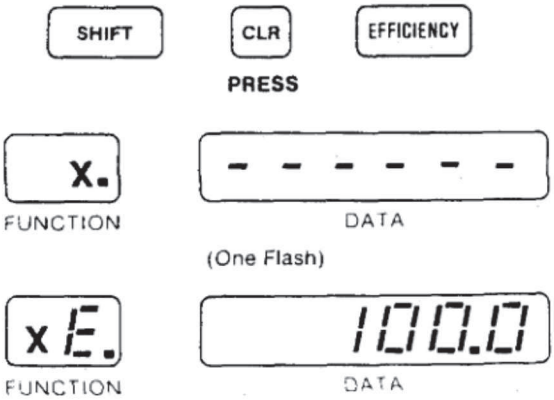


8.8.2 Resetting Shift Totals



Note: Accumulative totals (oC) must be reset by pressing the RESET key.

8.8.3 Resetting Efficiency Registers



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.9 SYSTEM START-UP TEST

CAUTION: THE OPERATING MODE OF THIS PRODUCT IS PRIMARILY DEPENDENT ON CUSTOM PROGRAMMING WHICH IS THE RESPONSIBILITY OF THE INSTALLER. BEFORE PLACING THE PRODUCT INTO SERVICE INITIALLY, OR AFTER REPAIR, IT IS NECESSARY TO PERFORM THE PROGRAMMING PROCEDURES AS DESCRIBED IN THIS MANUAL.

Upon installation of this product, it is advisable to confirm proper operation of the program configuration and all input sensors and devices. This should be done before wiring any of the 7935's control outputs to process machinery and to avoid unpredictable operation. The following procedure is a suggested method of system start-up. The troubleshooting guide in Section 9, Troubleshooting and Diagnostics, may also be a helpful reference.

1. Install the preprogrammed unit (leaving the output relays and transistors disconnected) and apply AC power.
2. **IMPORTANT:** PERFORM **ALL** MASTER CLEAR FUNCTIONS AS DESCRIBED IN SECTION 8.8.
3. Check the operation of the fault input devices by noting the current values in the downtime event registers. Actuate each of the devices once and recheck the values. An additional fault should be recorded for each event register.
4. Check the time register for status of the run/stop input. Downtime should be accumulating when the input is not active.
5. Count input devices and wiring may be checked by pressing the RATE 1 and/or RATE 2 keys while actuating the respective device. Preset count operation may be verified by entering the two preset limit values and observing the display and monitoring the operations of the control outputs while actuating Input A.
6. Confirm proper operation of the process to be controlled by the preset counter. Connect the 7935's output relays and/or transistors to the process. Proceed with caution during test runs.
7. Upon the start of production, reset all time, total and efficiency registers to their initial state. The 7935 will begin tracking production data.
8. Record all process program information and retain for reference. Use the 7935 programming worksheet provided with this manual.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

9.0 TROUBLESHOOTING AND DIAGNOSTICS

Establish regular intervals for inspection. Periods should be based on operating time and environmental conditions. Inspect:

1. Security of unit on mounting surface.
2. All leads and connectors. No looseness, chafing or wear is acceptable.
3. Proper operation of all control functions.

WARNING: DISCONNECT ALL 7935 CONTROL OUTPUTS FROM PROCESS EQUIPMENT BEFORE PERFORMING THE FOLLOWING TESTS.

9.1 TESTING THE FRONT PANEL KEYBOARD

1. Enter the setup mode and press: [9] ▶ [8]
2. Press the keys in the sequence shown in the following table and observe the resulting display:

Key	Display	Key	Display
ENT	1	TIME	547
0	2	6	507
CLR	3	5	517
RESET	4	4	537
FACTOR	5	PRESET LIMIT	437
		RATE 2	637
		TOTAL	667
		9	067
SHIFT	6	8	167
3	0	7	267
2	20	PRESET COUNT	367
1	40	RATE 1	767
RATIO	540	EFFICIENCY	777

Note: The keyboard test terminates in five seconds if a key is not pressed.

9.2 TESTING THE DISPLAY

1. Enter the setup mode and press: [9] ▶ [9]

   The unit displays some numbers that pertain to its internal software.
2. Press any key. All display segments and decimal points should illuminate.
3. Pressing any other key returns the unit to the setup mode.

9.3 REPAIR

NO attempt to repair the unit should be made by the user. The compact design of the unit, made possible by the use of integrated circuits and other solid state devices, makes special knowledge and unique test equipment essential if serious damage to the electronic circuits is to be avoided. We, therefore, recommend that the unit be returned to the factory for repair or adjustment.

9.4 DIAGNOSTICS

Before returning the unit for repair, it may be helpful to refer to the following table for analysis of common user correctable problems:

PROBLEM	POSSIBLE REASON/SOLUTION
Display Does Not Illuminate	1. Check external in-line fuse 2. Confirm that the proper AC voltage is applied to the proper terminals. Refer to Section 7.3.2. 3. Confirm proper wiring of voltage select terminals 1 through 4.
Unit Does Not Count Properly or Does Not Count At All	1. Confirm proper values of factors and that Limit 1 is set to a nonzero value. 2. Check sensor wiring and alignment.
Efficiency Reading is Improper or Will Not Reset to 100%	1. Confirm proper programming of the Stop Reason inputs. Refer to codes 70 through 76 in Section 4.2. 2. Check for the proper wiring of the run/stop and fault reason inputs. Check for proper operation of the input device. Refer to Sections 7.5.2 and 7.5.3
Outputs Do Not Actuate	1. Check limit values and output hold time selection Codes 20 and 21 (refer to Section 4.2). Also check preset count operation code 12. 2. Check wiring of relay and/or transistor outputs. Refer to Sections 7.6.1 and 7.6.2
Cannot Display Shift Time, Count or Efficiency	1. Press "Shift" key to obtain Shift-Prompt.
Cannot Change Current Shift	1. Press "Shift" key to obtain Shift-Prompt. 2. Set-up is for Security Protection. Unlock Security.
Cannot Display Rate, Ratio or Preset Count	1. Press "Shift" key after reading shift-related data.
Cannot Access Data from Specific Shift(s)	1. Set-up mode program does not include the shift(s). Reprogram.
Unit Will Not Accept Digital Security Code	1. Use Correct Code. 2. Press "CLR" before entering code. 3. Set-up mode security programming incorrect.
Key-Lock Security Method Does Not Operate	1. Check wiring to key switch. 2. Set-up mode security program incorrect.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

9.5 SHIPMENT

If the unit must be returned to a Veeder-Root authorized electronic service center or factory for repair, perform the following steps:

1. Explain, in writing, the nature of the problem as accurately as possible. List the person(s) to be contacted in the event communication is required.
2. Place the letter along with the unit in its original packing material and container or suitable substitutes.
3. Place in an overwrap box. Address to the nearest authorized electronic service center or:

Service Department
VEEDER-ROOT LTD.
Kilspindie Road
Dundee DD2 3QJ
SCOTLAND
Tel: 44-382-84161
Telex: 76146

Service Department
VEEDER-ROOT
COMPANY
125 Powder Forest Drive
P.O. Box 2003
Simsbury, CT 06070-2003
Tel: (203) 651-2700
Telex: 277844 VROOT UR
Fax: (203) 651-2750

Service Department
VEEDER-ROOT
(Australia) PTY LTD.
82 Herald Street
Cheltenham, Victoria 3192
AUSTRALIA
Tel: 61 (3) 584-3800
Telex: 32572

Service Department
VEEDER-ROOT
OF CANADA LTD.
26 Fieldway Road
Toronto, Ontario M8Z 3L2
CANADA
Tel: (416) 239-3094
Telex: 06-217708

4. All shipments must be prepaid.

SECTION 10.0 DAMAGE CLAIMS, WARRANTY AND CONDITIONS

10.1 DAMAGE CLAIMS

A. Thoroughly examine the enclosure as soon as it is received. If damaged, write on the face of the freight bill a complete and detailed description of the damage. Have the carrier's agent sign the description.

Note: Insist that the carrier's agent verify the inspection and sign the description.

B. Immediately notify the delivering carrier of damage or loss. This notification may be given either in person or by telephone. Written confirmation must be mailed within 48 hours. Railroads and motor carriers are understandably reluctant to make adjustments for damaged merchandise unless inspected and reported promptly.

C. Risk of loss of, or damage to merchandise remains with the Buyer. It is the Buyer's responsibility to file a claim with the carrier involved.

D. Immediately advise your Veeder-Root representative, distributor, or the factory so that we may assist you.

10.2. WARRANTY AND CONDITIONS

A. WARRANTY. We warrant that this product shall be free from defects in material and workmanship for a period of one year from the date of shipment thereof or the product's total rated life, whichever first occurs. Within the warranty period we shall repair or replace such products which are returned to us with shipping charges prepaid and which are determined by us to be defective. This warranty will not apply to any product which has been subjected to misuse, negligence, or accident; or misapplied; or used in violation of product manuals, instructions, or warnings; or modified or repaired by unauthorized persons; or improperly installed.

B. INSPECTION. You shall inspect the product promptly after receipt and shall notify us at our Simsbury office, in writing, of any claims, including claims of breach of warranty, within thirty days after you discover or should have discovered the facts upon which the claim is based. Your failure to give written notice of a claim within the time period shall be deemed to be a waiver of such claim.

C. LIMITATION OF REMEDY AND WARRANTY. The provisions of Paragraph A are our sole obligation and exclude all other remedies or warranties, express or implied, including warranties of MERCHANTABILITY and FITNESS FOR A PARTICULAR PURPOSE, whether or not purposes or specifications are described herein. We further disclaim any responsibility whatsoever to you or to any other person for injury to person or damage to or loss of property or value caused by any product which has been subjected to misuse, negligence, or accident; or misapplied; or used in violation of product manuals, instructions, or warnings; or modified or repaired by unauthorized persons; or improperly installed.

D. LIMITATION OF DAMAGES. Under no circumstances shall we be liable for any incidental, consequential or special damages, losses or expenses arising from this contract or its performance or in connection with the use of, or inability to use, our product for any purpose whatsoever.

E. LIMITATION OF ACTIONS. No action regardless of form arising out of this contract may be commenced more than one year after the cause of action has accrued, except an action for nonpayment.

F. COLLATERAL PROMISES. There are no representations, warranties, or conditions express or implied, statutory or otherwise except those herein contained, and no agreements or waivers collateral hereto shall be binding on either party unless in writing and signed by you and accepted by us at our Simsbury office.

G. INTERPRETATION. Rights and liabilities arising out of any contract with us shall be determined under the Uniform Commercial Code as enacted in Connecticut.

Warranty revised April 1, 1989

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

7935 PRODUCTION DATA CONTROL
PROGRAMMING WORKSHEET

MACHINE # _____ 7935 FORM NO. _____ 7935 SERIAL NO. _____

PROGRAMMER _____ DATE _____

Preset Limit 1	Preset Limit 2
Factor 1	Factor 4
Factor 2	Factor 5
Factor 3	Factor 6
FC 00	FC 52
FC 01	FC 53
FC 10	FC 54
FC 11	FC 55
FC 12	FC 60
FC 13	FC 61
FC 14	FC 62
FC 15	FC 63
FC 16	FC 64
FC 17	FC 70
FC 18	FC 71
FC 19	FC 72
FC 20	FC 73
FC 21	FC 74
FC 50	FC 75
FC 51	FC 76
Displayed Units (yards, fpm, rpm, etc.): Record the actual calibration engineering units in the blocks to the right.	**Efficiency —** %
	Total
	Time — minutes
	Rate-1
	Rate-2
	Ratio — /
	Preset Count

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

VEEDER-ROOT
Digital Products

125 Powder Forest Drive, Post Office Box 2003, Simsbury, CT 06070-2003 TEL: (203) 651-2700, FAX (203) 651-2750

AUSTRALIA Cheltenham Victoria • BRAZIL Sao Paulo • CANADA Toronto Montreal Vancouver
FRANCE Rungis • SCOTLAND Dundee • WEST GERMANY Neunausen Filder

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP