TCE-8000 PROGRAMMING GUIDE

Coriolis TCM Series

Rev. 2.2

TRICOR
Coriolis Technology

www.tricorflow.com

This guide contains instructions on how to reconfigure the TCE-8000 Coriolis transmitter using its integral keyboard and display. There are two packaging configurations of the TCE-8000 transmitter: field mount (cast aluminum housing) and panel mount (plastic housing). These programming instructions apply to both. The TRICOR TCE-8000 transmitter's keyboard and display consists of:

- an LCD graphic display
- two LEDs labeled "OK" and "ERR"
- four pushbutton keys labeled "P," "Reset," "Display," and "Info"

Normal Operation

When the TRICOR flow meter is operating properly, "OK" flashes green. With the factory defaults, the display indicates FLOW RATE on the upper line and BATCH TOTAL on the lower line. When viewing this display, press the "Reset" key to reset the BATCH TOTAL to zero. Press the "Display" key to view the DENSITY on the upper line and TEMPERATURE on the lower line of the display. Press the "Display" key to toggle back to the FLOW RATE and BATCH TOTAL display. You can reconfigure the normal operation displays to show data other than the factory defaults (see DISPLAY programming).

Abnormal Operation

When the LED labeled "ERR" flashes red, the internal diagnostics of the transmitter is sensing that there may be a measurement error occurring. Press the "Info" key to view the problem and to see additional parameters that are important to the operation of the unit. Note: Press the "Info" key during normal operation to view these additional parameters. The display that appears is similar to the following:

SA: 140	FRE: 142.74
SB: 140	TOT: 1007.69
DR: 5.51	ZP: -0.02
PT: 1071.2	RS485: 01

These parameters are important when discussing operational problems with a TRICOR service technician and they correspond to the following data:

- SA is the amplitude of Sensor A in millivolts
- SB is the amplitude of Sensor B in millivolts
- DR is the sensor DRive current in milliamps
- PT is the resistance indicated by the Platinum Temperature probe in Ohms
- FRE is the vibrating tube FREquency in Hz
- TOT is the internal TOTalizer value
- ZP is the captured Zero Point calibration in microseconds
- RS485 is the address of the RS485 communication port

ZERO OFFSET procedure

Note: ON NEW INSTALLATIONS, A ZERO POINT CALIBRATION MUST BE PERFORMED TO ENSURE ACCURATE METERING.

- Shut off the flow and block in the flow line with a downstream valve to ensure that the flow rate is truly zero.
- Press and hold the "P" key until the following screen appears:

```
      MAIN MENU
     ZERO OFFSET
 UP     DOWN    EXIT
```
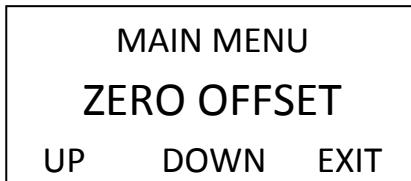
- Press the "P" key again and the following screen appears

```
 *ENTER USER_CODE*
        220 6
   LEFT   UP   EXIT
```
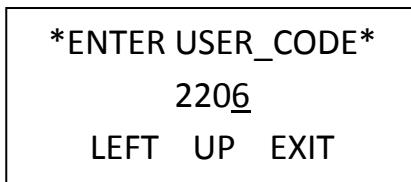
- Press the "UP" softkey to change 2206 to 2207, then press the "P" key. The following screens appear:

```
 *     USERCODE     *
        OKAY
```

```
    START OFFSET
     PROCEDURE
 SLOW    FAST    EXIT
```
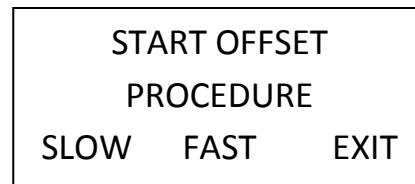
- Press the "SLOW" softkey for long averaging (about 30 seconds) or the "FAST" key for short averaging (about 10 seconds) to initiate zero point calibration. Caution: Do not flow through the sensor while the following screens are displayed:

```
      MAKE ZERO

 OLD ZERO:   x.xxx   uS
 NEW ZERO:           uS
```

```
 *END OF ZERO POINT*
 PRESS INFO TO RETURN
 OLD ZERO:   x.xxx   uS
 NEW ZERO:   v.vvv   uS
```
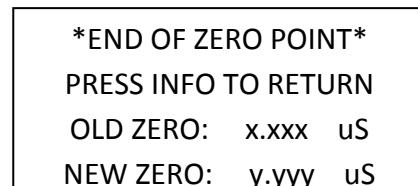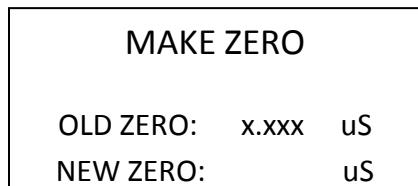
- The zero point calibration is complete. Press the INFO key to return to the ZERO OFFSET display.
- Press EXIT softkey to return to the RATE and BATCH TOTAL display.

REPROGRAMMING OPERATION

FLOW DISP reprogramming

To enter the function that allows you to reconfigure the transmitter display of flow, total, density and temperature, perform the following steps:

- Press and hold the "P" key until the following screen appears:

```
MAIN MENU
ZERO OFFSET
UP    DOWN    EXIT
```
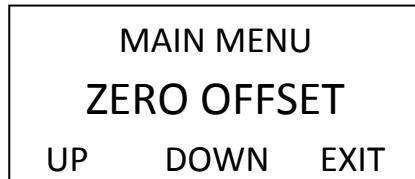
- Press the "DOWN" key and the following screen will appear:

```
MAIN MENU
DISPLAY
UP    DOWN    EXIT
```

- Press the "P" key and the following screen will appear:

```
SELECT PROG-POINT
FLOW DISP
UP    DOWN    EXIT
```
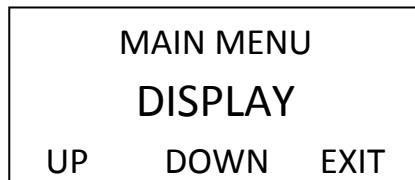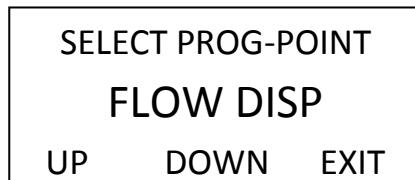
- Press the "P" key to access the flow rate parameter(s) that can be changed under the FLOW DISP submenu.

Displayed Parameter   Description

FLOW UNITS	select unit of measure for flow rate display
FLOW DP	select decimal point location in flow rate display
DISP FILTER	define filter value used to smooth flow rate display

FLOW UNITS programming

With FLOW UNITS displayed, press the "P" key to bring up the current flow rate units. Press the "UP" or "DOWN" softkey to select the desired unit of measure. If the METER MODE selected in SETUP is MASS METER the list consists of the following:

Mass Flow Rate Units

FLOW-UNITS	Description
G/S	Grams/second
KG/S	Kilograms/second
LB/S	Pounds/second

OZ/S	Ounces/second
T/S	Metric tons/second
ST/S	Stones/second
G/M	Grams/minute
KG/M	Kilograms/minute
LB/M	Pounds/minute
OZ/M	Ounces/minute
T/M	Metric tons/minute
ST/M	Stones/minute
G/H	Grams/hour
KG/H	Kilograms/hour
LB/H	Pounds/hour
OZ/H	Ounces/hour
T/H	Metric tons/hour
ST/H	Stones/hour
G/D	Grams/day
KG/D	Kilograms/day
LB/D	Pounds/day
OZ/D	Ounces/day
T/D	Metric tons/day
ST/D	Stones/day

If the METER MODE selected in SETUP is VOLUME METER the list consists of the following:

Volumetric Flow Rate Units

Flow Rate Unit	Description
CC/S	Cubic centimeters/second
L/S	Liters/second
UGAL/S	US gallons/second
LOZ/S	Fluid ounces/second
EGAL/S	English gallons/second
BBL/S	English barrels/second
CC/M	Cubic centimeters/minute
L/M	Liters/minute
UGAL/M	US gallons/minute
LOZ/M	Fluid ounces/minute
EGAL/M	English gallons/minute
BBL/M	English barrels/minute
CC/H	Cubic centimeters/hour
L/H	Liters/hour
UGAL/H	US gallons/hour
LOZ/H	Fluid ounces/hour
EGAL/H	English gallons/hour
BBL/H	English barrels/hour
CC/D	Cubic centimeters/day
L/D	Liters/day
UGAL/D	US gallons/day
LOZ/D	Fluid ounces/day
EGAL/D	English gallons/day
BBL/D	English barrels/day

With the desired flow rate unit displayed, press the "P" key; the display returns to FLOW UNITS. Note: To compute volume flow, the device divides the measured mass by the measured density.

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FLOW DP programming

When FLOW DP displays, press the "P" key to bring up the current position of the flow rate decimal point position. Press the "LEFT" softkey to select the desired position of the flow rate decimal point, then press the "P" key; the display returns to FLOW DP.

DISP FILTER programming

With DISP FILTER displayed, press the "P" key to bring up the current time constant (in seconds) for the flow rate display. Press the "RIGHT" and "UP" softkeys to define the time constant between the limits of 0 and 99.9 seconds. Press the "P" key; the display returns to DISP FILTER. Note: The larger the time constant used in the DISP FILTER, the steadier the rate display; however, it will take longer to reach final value when a change in the flow rate is made. The factory default is 1.0 second for moderate filtering.

TOTAL DISP reprogramming

TOTAL DISP is below FLOW DISP is the DISPLAY submenu. Follow the steps above to get to FLOW DISP then press the "DOWN" key to bring up TOTAL DISP.

- Press the "P" key to access the totalizer parameters that can be changed under the TOTAL DISP submenu.

Displayed Parameter   Description

TOTAL UNITS	select unit of measure for BATCH TOTAL display
TOTAL DP	select decimal point location in BATCH TOTAL display

TOTAL UNITS programming

With TOTAL UNITS displayed, press the "P" key to bring up the current totalizer units. Press the "Up" or "Down" softkey to select the desired unit of measure. If the METER MODE selected in SETUP is MASS METER the list consists of the following:

TOTAL UNITS	Description
GRAMS	Grams
KILO	Kilograms
POUNDS	Pounds mass
OUNCES	Ounces mass
TONS	Metric tons
STONES	Stones

If the METER MODE selected in SETUP is VOLUME METER the list consists of the following:

TOTAL UNITS	Description
CC	CubicCentimeters
LITER	Liters
US-GAL	US Gallons
L-OUNC	Liquid Ounces
UK-GAL	UK Gallons
UK-BBL	UK Barrels

With the desired totalizer unit displayed, press the "P" key; the display returns to TOTAL UNITS.

TOTAL DP programming

When TOTAL DP displays, press the "P" key to bring up the current position of the totalizer decimal point. Press the "LEFT" softkey to select the desired position of the flow rate decimal point, then press the "P" key; the display returns to TOTAL DP.

DENS DISP programming

DENS DISP is below TOTAL DISP in the DISPLAY submenu. Follow the steps above to get to FLOW DISP then press the "DOWN" key twice to bring up DENS DISP.

- Press the "P" key to access the DENS UNITS submenu.

DENS UNITS programming

With DENS UNITS displayed, press the "P" key to bring up the current density unit of measure. Press the "Up" or "Down" softkey to select the desired unit of measure from the list below:

DENS-UNIT	Description
G/CC	Grams/Cubic centimeter
G/L	Grams/Liter
KG/L	Kilograms/Liter
LB/FT3	Pounds/Cubic foot
LB/GAL	Pounds/US Gallon
BRIX	Degrees Brix

With the desired density unit displays, press the "P" key; the display returns to DENS UNITS.

TEMP DISP programming

TEMP DISP is below DENS DISP in the DISPLAY submenu. Follow the steps above to get to FLOW DISP then press the "DOWN" key three times to bring up TEMP DISP.

- Press the "P" key to access the TEMP UNITS submenu.

TEMP UNITS programming

With TEMP UNITS displayed, press the "P" key to bring up the current temperature unit of measure. Press the "Up" or "Down" softkey to select the desired unit of measure from the list below:

TEMP UNIT	Description
°C	Celsius Degrees
°F	Fahrenheit Degrees
Kelvin	Kelvin Degrees

When the desired temperature unit displays, press the "P" key; the display returns to TEMP UNITS.

DISP MODE

With normal operating factory defaults, display 1 is set to show RATE on the upper line and BATCH TOTAL on the lower line. Default display 2 is set to show DENSITY on the upper line and TEMPERATURE on the lower line. Use the "Display" key to toggle between display 1 and display 2 during normal flowmeter operation. Display 1 and display 2 can be customized to have a single line/single parameter displayed in a larger font. Also, the double line display can be reconfigured to show different parameters of interest.

DISP MODE is below TEMP DISP in the DISPLAY submenu. With DISP MODE displayed, press the "P" key to begin configuring display 1 or display 2. Select from the list below:

MODE	Description
DISPLAY 1	Select Display 1
DISPLAY 2	Select Display 2

- Select the desired display (1 or 2) and press the "P" key. The current configuration of the display will appear. Press the "P" key to change it or the "EXIT" key for no change.

- Press the "P" key to display the current line mode:

SELECT LINE MODE
DUAL LINE
SINGLE LINE

- Select the desired line mode and press the "P" key. Then select the parameter from the list below:

SELECT LINE 1
RATE
BATCH TOTAL
DENS.
TEMP.
GRAND TOTAL
F-OUT
CURR-1

- Press the "P" key and repeat this procedure for LINE 2 if 2-LINES was previously selected. Press the "P" key to return to DISPLAY 1. Press "DOWN" to display DISPLAY 2 and repeat the above procedure.
- Press "EXIT" to return to DISPLAY 2. Press "DOWN" to display the following selection:

DISPLAY	Description
BACKLIGHT	Select to turn on/off the display backlight
TIME MODE	Select to FIXED or ALTERNATE display

- Select BACKLIGHT and press the "P" key to display the following selection:

BACKLIGHT SETTINGS:
ON
OFF

- Select ON or OFF softkey then press the "P" key to return to BACKLIGHT.
- Press the "DOWN" softkey to display TIME MODE.and press the "P" key to display the following selection:

TIME MODE SETTINGS:	FUNCTION
FIXED	Display stays on Display 1 or Display 2. Toggle using "Display" key.
ALTERNATE	Display toggles between Display 1 and Display 2 every 5 seconds

- Press "P" key then "EXIT" softkey to leave the programming mode.

SETUP REPROGRAMMING

SETUP is below ZERO OFFSET and DISPLAY in the main menu structure. From the normal display, press the "P" key then press the "DOWN" softkey twice until SETUP is displayed then press the "P" key and the following screen will be displayed:

```
*ENTER USER_CODE*

       2206
```
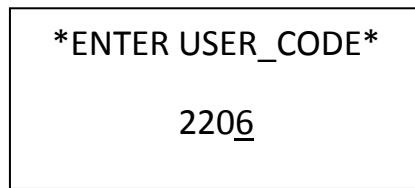
- Press the "UP" softkey to display user code of 2207 then press the "P" key to access the SETUP MENU. There are several submenus in the SETUP MENU, they are:

PARAMETER	Allows setup of various metering parameters.
FILTER	Allows programming of FLOW and DENSITY filters.
IN/OUTPUTS	Allows programming of the various I/O terminal functions.
DATA CONFIGURATION	Allows saving and restoring of the configuration memory.
RESET TOTAL	Allows zeroing of the grand total and batch total.

PARAMETER programming

- When PARAMETER is displayed press the "P" key to access the PARAMETER submenu which contains the following parameters:

METER MODE	Allows selection of MASS METER or VOLUME METER

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CUTOFF	Set the value of a low flow cutoff as a percent of the full scale rating of the flow sensor.
STEP RESP.	Set the value of the step response as a percent of the full scale flow rating of the sensor.
RESET KEY	Activate (ON) or deactivate (OFF) the "Reset" for the displayed BATCH TOTAL.
FLOW-DIREC	Define the flow direction through the sensor as either FORWARD (in the same direction of the arrow on the flow sensor) or REVERSE (in the opposite direction of the arrow on the flow sensor).
K-FACTOR	Default K-FACTOR (also known as meter factor) is 1.000. Adjusting this value proportionally will alter the meter output flow function by that proportion.
FAULT TIME	The time in seconds after a fault is detected before it is declared as an error.
LANGUAGE	Select the language used on the display.

METER MODE programming

The METER MODE submenu allow selection of MASS METER when the application requires mass units of measure for both flow rate and flow totals or VOLUME METER when the application requires volume units of measure for both flow rate and flow totals. When VOLUME METER is selected the volume is determined by dividing the measured mass by the measured density.

CUTOFF programming

CUTOFF is a low flow cutoff. Because the meter at zero flow has a live zero, that is, there is some residual amount of noise being measured at zero flow, there will be some small amount of flow noise being displayed when the flow is actually zero. To avoid this problem which can cause confusion, a cutoff must be in place so that any detected flow noise below this cutoff is displayed as zero flow rate and the totalizer is stable and not counting. Ideally, the cutoff should be as low as possible to assure that the least amount of flow is missed when true flow starts up or shuts off. CUTOFF is programmed as a percentage of the maximum flow rate for the meter and can be set to a minimum of 0.1% (or higher if necessary). For example, the TCM28K meter is rated at a maximum flow rate of 28000 kilograms per hour. Therefore, a CUTOFF setting of 0.1% would mean that any flow below 0.001 x 28000 = 28 kilograms per hour would not be registered. The amount of CUTOFF needed for stable zero indication may be installation dependent. Enter the lowest value of CUTOFF to obtain a stable zero flow reading.

STEP REPONSE programming

STEP RESPONSE works in conjunction with the FLOW FILTER in that, if a rapid change in flow rate above the amount specified in the STEP RESPONSE occurs, the filter is temporarily cancelled and the meter output goes rapidly to the new flow rate value.

In a few applications, it is desirable to have a very stable flow rate displayed when flow is constant thereby dictating a longer time constant in the FLOW FILTER (e.g. greater than 4 seconds). However, in this case if STEP RESPONSE is not employed and the actual flow rate makes a rapid step, the meter

outputs will be slow to respond to it.

In most cases it is more desirable to keep the FLOW FILTER at a low value (e.g. 1 second or less) and accept a little variation in the flow rate display by deactivating the STEP RESPONSE entirely. The default value for STEP RESPONSE is therefore deactivated. It is recommended that TRICOR customer support be consulted before STEP RESPONSE is activated and employed.

RESET KEY programming

The "Reset" key on the display can be programmed to either ON or OFF. When programmed to be ON, the displayed BATCH TOTAL can be reset to zero by pressing this key at any time. If it is undesirable to have a local reset then change RESET KEY to OFF. Note that the CONTROL INPUT line can be programmed for a remote BATCH TOTAL reset.

FLOW DIRECTION programming

The TRICOR meter is bidirectional. That is, the sensor is fully symmetrical and can be installed in the flow line in either orientation independent of the ⟶ FLOW ⟶symbol on the label. The arrow indicates the direction of FORWARD flow in the software configuration. If the sensor is installed in the opposite orientation simply change FLOW DIRECTION to REVERSE in order to show positive numbers in both the FLOW RATE and BATCH TOTAL.

Note that flow in the opposite direction will indicate negative values of FLOW RATE and the BATCH TOTAL will decrement rather than increment. If the BATCH TOTAL decrements down to zero and continues on down, it will show negative numbers in the BATCH TOTAL.

K-FACTOR programming

The meter calibration can be changed in one of two ways. The first is to change the "factory calibration factor" known as METER VARIABLE which is accessed under the SERVICE menu. A more convenient recalibration method is to modify the K-FACTOR (while preserving the factory calibration factor). The default K-FACTOR is 1.00000. Increasing the K-FACTOR will increase the meter output. Conversely, decreasing the K-FACTOR will decrease the meter output.

EXAMPLE: A field recalibration is performed using a calibrated weight scale. The meter registers 105.62 pounds and the weight scale registers 105.51 pounds. The meter is high by 0.104%. Recalculate the K-FACTOR as follows:

(old K-FACTOR) X (scale ÷ meter) = new K-FACTOR

(1.00000) x (105.51 ÷ 105.62) = 0.99896. Change the K-FACTOR to 0.99896 to improve the meter accuracy.

FAULT TIME programming

Should an error be detected by the meter electronics it may be desirable to delay the declaration of it in order to not disrupt the operation of the meter, especially if the error is short lived such as an air bubble passing through the meter causing a temporary reduction in amplitude of the Coriolis sensors. The default is 2.7000 seconds delay and should suffice for most applications but can be increased or reduced as needed.

LANGUAGE programming

The default language on the display is ENGLISH but can be changed to others as they become available.

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FILTER programming

When FILTER is displayed press the "P" key to access either the FLOW FILTER or the DENSITY FILTER by pressing the UP or DOWN key. Enter the "time constant" for the filter selected. The time constant is defined as the time in seconds that is required to reach 63% of the final value after a step change in the actual flow or density. The filter used is a software representation of a classical single pole RC filter used in analog electronics.

IN/OUTPUTS programming

- When IN/OUTPUTS is displayed press the "P" key to access the IN/OUTPUTS submenu which contains the following I/O terminals:

FREQ OUT	Scaling of flow pulses on f-out (terminals #5 to 8)
CTRL OUT	Definition of the function of digital control output (terminals #6 to 8).
ANALOG OUT	Scaling of analog 1 output (terminals #1 to 2) Scaling of analog 2 output (terminals #3 to 4)
CTRL IN	Definition of the function of digital control input (terminals #7 to 8).
INTERFACE	Definition of communications interface used

FREQ-OUT programming

With FREQ-OUT displayed, press the "P" key to bring up the current function of the f-out output of the transmitter. Press the "Up" or "Down" key to select the desired function from the list below:

FREQ-OUT	Description
FREQUENCY	f-out produces a frequency that is proportional to the flow rate. Frequencies up to 10,000 Hz can be produced in the FREQUENCY mode of operation. Note: Because this mode outputs a frequency proportional to flow rate, totalizing these pulses may result in a slight discrepancy from the TOTAL display.
TOTAL COUNT	f-out produces pulses that are based on the internal totalizer. In the TOTAL COUNT mode, a change in state from low to high, or high to low occurs when the internal totalizer increases by a set amount of mass (or volume). Totalizing these pulses results in an accurate representation of the TOTAL display. The maximum output in this mode is about 15 pulses per second.

FREQUENCY programming

After selecting FREQUENCY mode of operation, press the "P" key to view and/or set the additional scaling parameter required for the frequency mode of operation. In each of the following screens set the numerical value using the "RIGHT" and "UP" keys, then "P" to advance to the next parameter.

FULL SCALE FLOW	Flow rate in the FLOW-UNITS selected that correspond to the frequency selected in the next screen, FULL SCALE FREQUENCY.
FULL SCALE FREQUENCY	Frequency corresponding to the flow rate entered in the previous screen, FULL SCALE FLOW.

Example 1: The application is expected to reach a full scale flow rate of 600 pounds per minute. The display totalizer is set to display BATCH TOTAL to 0.001 pound resolution and it is desired to have the external pulse counter have the same resolution, 1 pulse per 0.001 pound. The FULL SCALE FREQUENCY is entered in Hz which is equivalent to pulses per second but the flow rate is expressed in pounds per minute. Perform the following calculation.

600 pounds / minute ÷ 60 seconds per minute = 10 pounds per second

10 pounds per second ÷ 0.001 pulses / pound = 10000 pulses per pound = 10000 Hz

Therefore:

FULL SCALE FLOW = 600.00 lbs/min

FULL SCALE FREQUENCY = 10000 Hz

Example 2: The application is expected to reach a full scale flow rate of 36000 pounds per hour. The display totalizer is set to display BATCH TOTAL to 0.01 pound resolution and it is desired to have the external pulse counter have the same resolution, 1 pulse per 0.01 pound. The FULL SCALE FREQUENCY is entered in Hz which is equivalent to pulses per second but the flow rate is expressed in pounds per hour. Perform the following calculation.

36000 pounds /hour ÷3600 seconds per hour = 10 pounds per second

10 pounds per second ÷ 0.01 pulses / pound = 1000 pulses per pound = 1000 Hz

Therefore:

FULL SCALE FLOW = 36000.0 lbs/hr

FULL SCALE FREQUENCY = 1000 Hz

TOTAL COUNT programming

After selecting the TOTAL COUNT mode of operation, press the "P" key to view and/or set the SELECT VALUE in total units to the value for each output pulse. To ensure that the TOTAL COUNT output does not exceed the maximum frequency of 15 Hz, the SELECT VALUE must be checked against the maximum flow rate expected or a delay of the pulses out could result.

Press the "P" key to return to FREQ-OUT display.

Example : The application is expected to reach a full scale flow rate of 600 pounds per minute. The TOTAL COUNT mode of operation is selected to produce a low frequency pulse output. One pulse per 0.1 pound is to be sent to an external PLC device. SELECT VALUE is set to 0.1000 POUNDS. Perform the following calculation to verify that at the maximum flow rate of 600 pounds per minute the pulse output will not exceed 15 Hz.

600 pounds per minute ÷ 60 seconds/minute = 10 pounds per second

10 pounds per second ÷ 0.1 pounds per pulse = 100 pulses per second = 100 Hz

This exceeds the maximum frequency of 15 Hz which is a limitation of the TOTAL COUNT functionality and, therefore, will not work properly. The SELECT VALUE could be increased to 1.0 pounds per pulse in order to reduce the maximum frequency to 10 Hz which does not exceed the 15 Hz limit.

CNTL OUT programming

When CNTL OUT is displayed press the "P" key to select the function of the Control Output terminal #6 with respect to #8.

FAULT	Control output goes from low to high when a fault is declared.
FREQ OUT DIR	If the application requires bi-directional flow through the meter the Control Output can be set to indicate the direction of flow through the meter so that the frequency output can be qualified to be FORWARD FLOW (Control Output low) or REVERSE FLOW (Control Output high).
BATCH	The Control Output can be used to control a batch control valve.

If BATCH is selected the Control Input terminal must previously have been programmed to RESET BATCH as a start switch for the batch control function. Additionally, two more parameters must be programmed:

BATCH VALUE	Enter the preset amount of the batch to be delivered each start cycle.
SELECT OUTPUT LEVEL	ACTIVE LOW (a low signal when not flowing) ACTIVE HIGH (a high signal when not flowing)

Press the "P" key to return to CNTL OUT display.

ANALOG OUT programming

ANALOG 1 (or ANALOG 2) programming

With ANALOG 1 (or ANALOG 2) displayed, press the "P" key to view and/or set the additional scaling parameter required for each milliamp output.

SELECT OUTPUT MODE	FLOW DENSITY TEMPERATURE BATCH COUNT
VALUE AT 4 mA	The value of the process variable selected at 4 mA.
VALUE AT 20 mA	The value of the process variable selected at 20 mA

The milliamp outputs can be freely programmed to set 4 mA at one value and 20 mA at another value for the measured variable selected.

Press the "P" key to return to ANALOG 1 (or ANALOG 2) display.

CNTL IN programming

When CNTL IN is displayed press the "P" key to select the function of the Control Input terminal #7 with respect to #8.

EXT. ZERO	Initiate a ZERO OFFSET procedure using an external high signal into terminal 7
RESET BATCH	Reset the BATCH TOTAL from an external high signal into terminal 7 and/or start a batch using the Control Output programmed to BATCH.

Press the "P" key to return to CNTL IN display.

INTERFACE programming

When INTERFACE is displayed press the "P" key to select the function of the digital communication interface that will be serviced by the software configuration from the interface submenu below:

RS485	Communicate over the RS485 terminals 20, 21, and 22 using the TRICOR protocol. If RS485 is selected an additional screen to set the node address will be displayed. The default node address is 01.
HART	Communicate over ANALOG 2 terminals using the HART protocol
FF	Communicate over the Foundation Fieldbus terminals 30 and 31 using the Foundation Fieldbus protocol

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Press the "P" key to return to the INTERFACE display.

DATA CONFIGURATION programming

When DATA CONFIGURATION is displayed the EEPROM memory can be accessed to either SAVE DATA as currently configured to EEPROM memory or RECALL DATA from the EEPROM memory.

SAVE DATA programming

With SAVE DATA displayed, you can save all new configuration settings in the non-volatile EEPROM memory. If you made changes but have not saved them, a warning message appears during startup for about 10 seconds as follows:

```
***... WARNING...***
THERE IS NO RAM BACKUP
LOOK INTO YOUR MANUAL
PRESS ENT TO CONTINUE
```
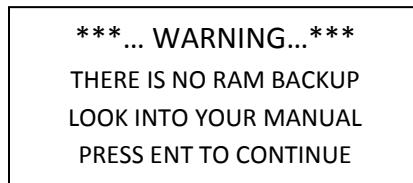
To initiate a SAVE DATA operation, press the "P" key and the following screen will appear:

```
       READY TO SAVE DATA


     START            EXIT
```

Press "START" and the following screens will appear:

```
   MEMORY              READY
   ACCESS
```

RECALL DATA programming

With RECALL DATA displayed, you can delete any changes that have been made to revert to the settings the last time SAVE DATA was performed. To initiate a RESTORE DATA operation, press the "P" key and the following screen will appear:

```
       RESTORE BACKUP DATA


     START            EXIT
```

  Press the "START" softkey and the following screens will appear:

```
   MEMORY              READY
   ACCESS
```

I/O – TEST programming

With I/O TEST displayed, you can drive the Frequency, Analog 1 and 2, or Control Outputs to fixed levels to test your receiving device(s). You can also test the level of the Control Input being received. The I/O TEST submenu is as follows:

FREQ OUT	Produce a fixed frequency (terminals #5 to 8).
CTRL OUT	Produce a low or high level (terminals #6 to 8).
ANALOG OUT	Produce a fixed current level on Analog 1 (terminals #1 to 2) or Analog 2 (terminals #3 to 4)
CTRL IN	Read back the status of the Control Input on terminals #7 to 8

FREQ OUT programming

With FREQ OUT selected, press the "P" key to ENTER FREQUENZ [HZ]. Valid entries are 1 to 9999 Hz. Press the "P" key and the frequency that was displayed will be output while the display reads as follows:

```
CHANGE VALUE


      YES      EXIT
```

Press "YES" to enter a different frequency or "EXIT" to stop the test.

CTRL OUT programming

With CTRL OUT selected, press the "P" key. When SELECT OUTPUT LEVEL is displayed select either HIGH or LOW.

Press "EXIT" to return to CTRL OUT

ANALOG OUT programming

With ANALOG OUT displayed press the "P" key. OUTPUT 1 or OUTPUT 2 can be selected using the "UP" or "DOWN" softkey.

With OUTPUT n selected, press the "P" key to ENTER CURRENT n [mA]. Valid entries are 1 to 22 mA. Press the "P" key and the current that was displayed will be output while the display reads as follows:

```
CHANGE VALUE


      YES      EXIT
```

Press "YES" to enter a different current or "EXIT" to stop the test. Press "EXIT" again to display I/O - TEST. Press "EXIT" again to return to the normal display.

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