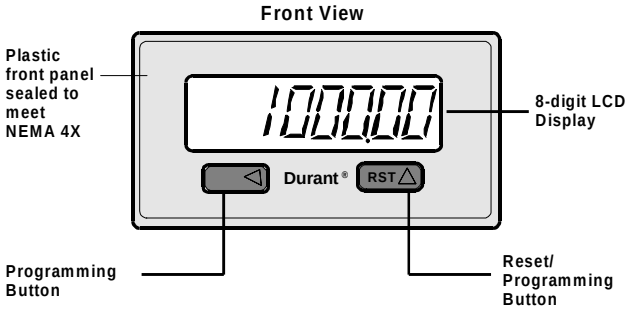
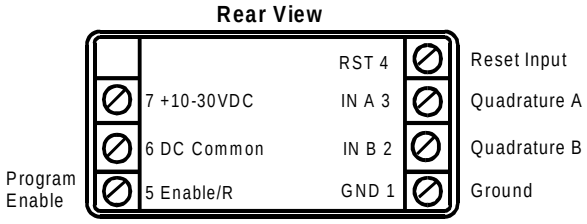
INTRODUCTION

Your 5330X-401/402 is a counter with an eight-digit LCD display. A programmable scaler and decimal point allow for display in any engineering unit.





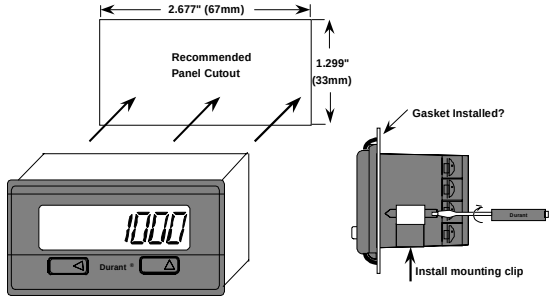
APPLICATIONS

Certain programming and wiring choices must be made to accomplish your application. We recommend the following sequence:

1. Answer the following questions:
   - What type of sensor will be used?
   - To what engineering units should the counter be scaled?
   - How many pulses per item is the sensor providing?
   - Is a decimal point needed on the display?

2. Calculate the scale factor.

MOUNTING



PROGRAM MODE

To enter the program mode, a connection must be made between terminals 1 and 5 (see page 3).

Screens

There are four program-mode screens in the 5330X-401/402. Upon entering the setup mode, the counter will display screen 1. Press and hold the ◁ key while repeatedly pressing the △ key to advance to successive screens.

Programming Screens	
Screen	**Function**
1	Count Scale Factor
2	Count Decimal Point
3	Reset to Offset Value
4	Reset Key Enable / Disable

OPERATION

Add/Subtract Counting

There are two count input terminals on the rear of the totalizer. Count pulses entering Input A (terminal 3) cause the total to decrement (count down). Count pulses entering Input B (terminal 2) cause the total to increment (count up). The totalizer may start counting from zero, when reset, or may start from a user-programmed offset value. The offset value is a positive number and may be up to six digits.

If only one of the count inputs is used, the totalizer becomes an up counter with a range of zero to 99,999,999, or a down counter with a range of zero to -9,999,999. If both inputs are used, the totalizer displays the difference count between the two inputs - counts at Input B are added, counts at Input A are subtracted. In this mode of operation, the totalizer's range is -9,999,999 to 99,999,999. Positive numbers are not indicated with a plus sign(+). Both inputs may occur simultaneously, in which case the displayed total does not change.

Count Inputs

Model 5330X-401 has hi-speed inputs and can accept pulses from solid state, current sourcing sensors at up to 10 kHz per input. The sensor must supply at least +2.0 VDC, but not more than +24VDC to the input. Counts are entered on the positive-going edge of the pulse.

Model 5330X-402 has low speed inputs and can accept pulses from solid state, current sinking sensors or contact closures to ground at up to 20 Hz per input. These inputs are internally pulled up to +3 VDC. The sensor must be capable of sinking current from the input to bring the input voltage down to +0.4 VDC or less. Counts are entered on the negative-going edge of the pulse.

COUNT SCALER

Calculating the Count Scale Factor

The count scale factor is used to convert the incoming count pulses to the desired unit of measure to be displayed (feet, gallons, etc.) or to correct for a known amount of error (wheel wear, viscosity, etc.). This scaler has six digits available with a fixed decimal point.

Count Scaler Range: 0.0001 to 99.9999. (Setting the count scale factor to 0.0000 will allow scaling by 100 in the Courier Series).

Count Scaler (CS) Formula:

$$CS = \frac{DPF}{PPI}$$ where:

DPF is the decimal point factor corresponding to the desired decimal point location.

DISPLAY		DPF	DISPLAY		DPF
XXXXXX	=	1	XXX.XXX	=	1,000
XXXXX.X	=	10	XX.XXXX	=	10,000
XXXX.XX	=	100			

PPI is the number of pulses per item from the sensor.

Example 1: A sensor produces 20 pulses per inch of material travel. Calculate the count scaler required to indicate material used in whole inches (XXXXXX).

$$CS = \frac{1}{20} = 0.05000$$

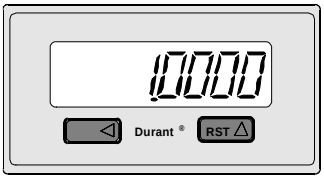
Example 2: An encoder produces 120 pulses per foot. Calculate the count scaler required to indicate material usage in 1/100's of feet (XXXX.XX).

$$CS = \frac{100}{120} = 0.8333$$

(Select the XXXX.XX position on the totalizer decimal point menu).

Programming Count Scale Factor

The first screen in the program mode is used to enter the count scale factor:



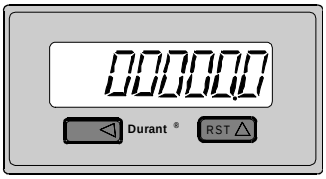
The far right digit will be flashing. Press the RST key until reaching the desired digit value.

Note: Pressing and holding the RST key will cause the numbers to autoscroll.

Next press the ◁ key to move the flashing digit one place to the left. Change this digit to the desired value with the RST key. Repeat this process until all digits are set correctly.

Programming Decimal Point

The second screen is used to enter the decimal point display on the totalizer screen. Press and hold the ◁ key and then press the RST key to move from screen one to screen two.

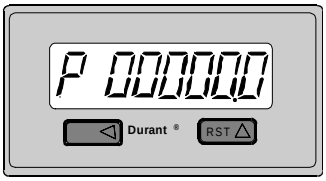


Press the RST key to move the decimal point to the desired position.

Programming Offset Value

Programming an offset value allows the counter to reset to a value other than zero. The offset may be up to six digits. The offset cannot be a negative number.

The third screen in the program mode is used to enter the offset value.



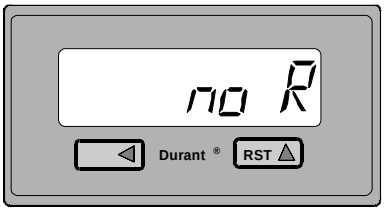
The far right digit will be flashing. Press the RST key until reaching the desired digit value.

Note: Pressing and holding the RST key will cause the numbers to autoscroll.

Next press the ◁ key to move the flashing digit one place to the left. Change this digit to the desired value with the RST key. Repeat this process until all digits are set correctly.

Enabling the Front Panel Reset Key

The fourth screen in the program mode allows the user to enable or disable the front panel reset key.



Press the RST key to choose the option you want.

Note: The reset terminal on the rear panel is still active when the front reset button is disabled.

To exit the program mode, break the connection between terminals 1 and 5.

WIRING RECOMMENDATIONS

Following these suggestions will increase noise immunity and lengthen unit life.

Cable: The connection between the count source and the ratemeter should be made with a two-conductor shielded cable. The shield should be connected to earth ground at one end only. The connecting cable should not be run in conduits with cables switching high inductive loads.

Relay Coil Suppression: If a relay contact is used as a count source, the relay coil should be suppressed. This can be accomplished with an RC network for AC coils or a diode for DC coils. The Durant RC suppressor (38091-400) may be used.

Mounting: The totalizer should not be mounted near a solenoid or other inductive devices. Enough ventilation should be supplied to keep the ratemeter operating within the temperature specifications. Do not mount this unit in a heavy vibration area.

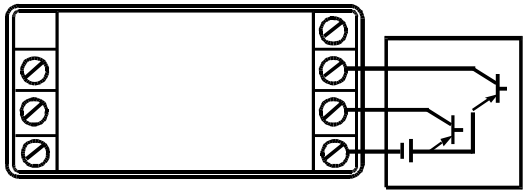
BATTERY SAFETY

The lithium battery that powers your device contains inflammable materials such as lithium organic solvent, and other chemical ingredients. Explosion or fire may result if the battery is not handled correctly. To avoid an accident follow these guidelines:

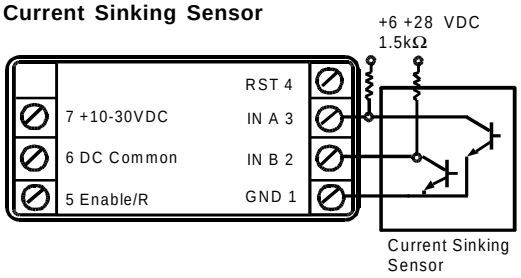
* Do not heat batteries above 95°C
* Do not recharge lithium batteries
* Do not dispose of batteries in fire
* Insert battery with correct polarity

WIRING DIAGRAMS

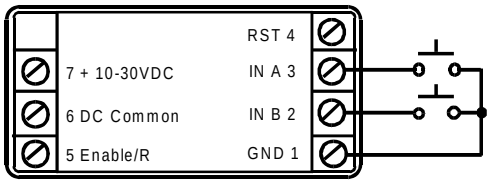
Solid State Add/Subtract Input (53300-401)
Current Sourcing Sensor



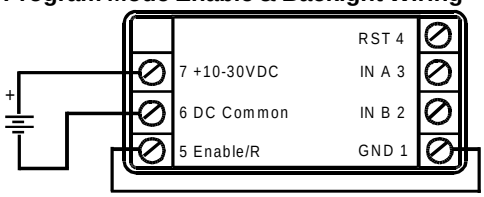
Solid State Add/Subtract Input (53300-401)
Current Sinking Sensor



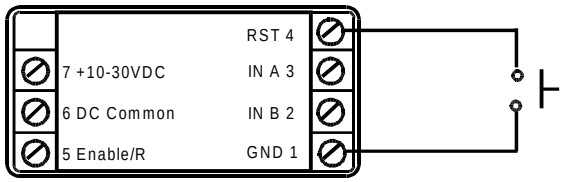
Contact Closure Count Input (53300-402)



Program Mode Enable & Backight Wiring



Remote Reset (All Models)



Terminal	Function	Operation
1	Ground	
2	Input B Count Input	Current Source Input (401) Current Sink Input (402)
3	Input A Count Input	Current Source Input (401) Current SInk Input (402)
4	Reset	Connect through Contact Closure to Ground
5	Program Enable	Connect to Ground to Enter Program Mode
6	Backlight Common	
7	Backlight Power	Connect to Power to Light Display

REPLACEMENT PARTS

36367-202	Battery
46066-210	Gasket
53300-241	Mounting Clip
28772-200	Mounting Screw

COURIER SERIES ACCESSORIES

49750-400	Power Supply (+15VDC, 300 mA)
38091-400	Count Source RC Suppressor

Devices Requiring External Power for Proper Operation

48770-401, -402	Inductive Proximity Sensor (8mm, 12mm, 18mm)
48771-400	Diffuse-Reflective Photoelectric Sensor
48771-401	Retro-Reflective Photoelectric Sensor
48771-402	Thru-Beam Photoelectric Sensor Emitter
48771-404	Thru-Beam Photoelectric Sensor Receiver (Thru-beam emitter and receiver must be used together)
38151-XXX	Standard Duty, Quadrature Shaft Encoder (XXX denotes pulses per revolution. Example: 38151-060 for 60 pulses/rev).
48371-XXX	Heavy Duty, Quadrature Shaft Encoder (XXX denotes pulses per revolution. Example: 48371-060 for 60 pulses/rev).

OTHER COURIER SERIES PRODUCTS

53300-400	Totalizer
53300-403	Quadrature Indicator/Totalizer
53300-404	Ratemeter
53300-405	Totalizer/Ratemeter
53301-400	Totalizer - Extended Temperature
53301-401	Add/Subtract Totalizer (Solid State Input)
53301-402	Add/Subtract Totalizer (Contact Input)
53301-404	Ratemeter - Extended Temperature
53301-405	Totalizer/Ratemeter Extended Temperature
53302-400	Totalizer w/Backlight
53302-401	Add/Subtract Totalizer w/Backlight (Solid State Inputs)
53302-402	Add/Subtract Totalizer w/Backlight (Contact Inputs)
53302-404	Ratemeter w/Backlight
53302-405	Totalizer/Ratemeter w/Backlight

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This equipment is capable of generating radio frequency energy. If not installed and used in accordance with the instructions, this unit may interfere with radio communications.

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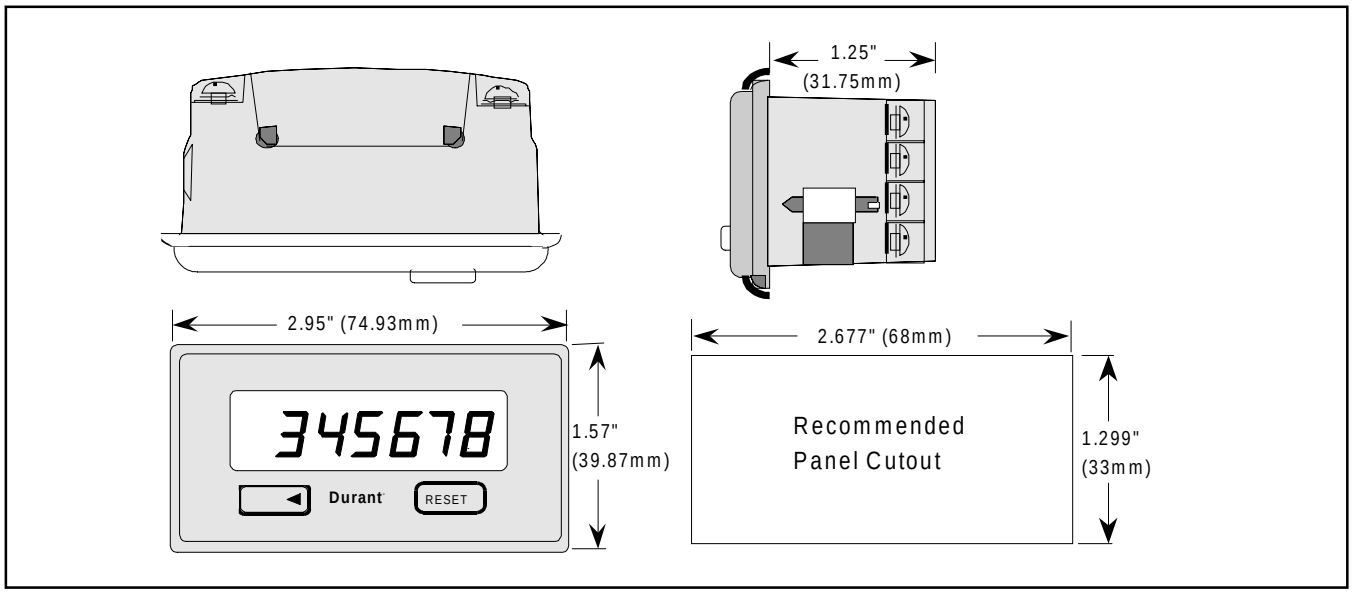
Installation and Operation
Manual Number 53300-901-04

Courier Models:	53300-401	Add/Subtract Totalizer (Solid State Inputs)
	53300-402	Add/Subtract Totalizer (Contact Inputs)
	53302-401	Add/Subtract Totalizer (Solid State Inputs) w/Backlight
	53302-402	Add/Subtract Totalizer (Contact Inputs) w/Backlight

CE



POWER

Internal Battery: 3V, Lithium.
Life expectancy: 5 years +.
Replacement Part: 36367-202.

BACKLIGHT

10-30 VDC @ 30 mA max.
(Derate operating temperature 1°C/Volt above 17VDC.)
Reverse polarity protected.

PHYSICAL

Operating Temperatures: 53300 is -20° to 70°C.
53302 is -20° to 55°C with backlight on.
Storage Temperature: -20° to 70°C.
Operating Humidity: 60% Non-condensing.
Weight: 2.2 oz. net.
Display Size: .43" high.
Front Panel Rating: NEMA 4X when mounted with gasket provided.
Case Material: Cycolac X-17.

TOTALIZER

Type: Up/Down Counting.
Digits: 8 digits positive/minus sign and 7 digits negative.
Scaler: 0.0001 - 100.0000.
(0.0000 scales by 100 in the Courier Series).
Decimal Point: 5 positions, programmable.

COUNT ACCURACY

100% when operated within specifications.

DC COMMON (Terminal 1)

RESET INPUT (Terminal 4)

Resets totalizer when connected to DC common.
Min. Low Time: 0.25 to 1.0 sec. (maintained).
The required pulse width varies with count speed, scale factor and number of digits displayed.
Voltage Thresholds: Low 0 to 0.4 VDC.
High 2.0 to 28 VDC.

COUNT INPUT A (SUBTRACT); COUNT INPUT B (ADD) (TERMINALS 2 & 3)

Model -401

Inputs A & B require a voltage source, such as a current sourcing sensor or a current sinking sensor used with the provided pull up resistors.

Speed: 0 to 10 kHz.
Min Low Time: 80 microseconds.
Min High Time: 20 microseconds.
(These times are with a 0.0V to 5.0V swing).
Input Impedance: 2KΩ above 5 VDC.
Voltage Thresholds: Low 0 to 1.2 VDC.
High 2.0 to 28 VDC.
Max High 28 VDC.

Model - 402

Inputs A & B are designed for contact closures to DC common.

Speed; 0 to 20 Hz.
Min Low Time: 10 milliseconds.
Min High Time: 40 milliseconds.
Input Impedance: 101K½.
Voltage Thresholds: Low 0 to 0.4 VDC.
High 2.0 to 28 VDC.
Max High 28 VDC.

PROGRAM ENABLE INPUT (Terminal 5)

Operation: Level sensitive (maintained).