

Instruction sheet

Metra-count instruction sheet

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Overview

These Metra-count (battery totaliser - BT) instruments are specifically designed for computing & displaying totals from flowmeters with pulse or frequency outputs. They are battery powered or can be powered by an external 8~24Vdc regulated supply.

The instrument will display Resettable Total and an Accumulated Total in engineering units as programmed by the user. Simple PIN protected flow chart programming with English prompts guide you through the programming routine greatly reducing the need to refer to the manual.

Two models are available, without and with a scaleable pulse output.



Special Features

Standard : PIN Protection. Amplified non-scaled repeater pulse output.
: NPN/PNP selectable - scaleable pulse output (380-051 only).

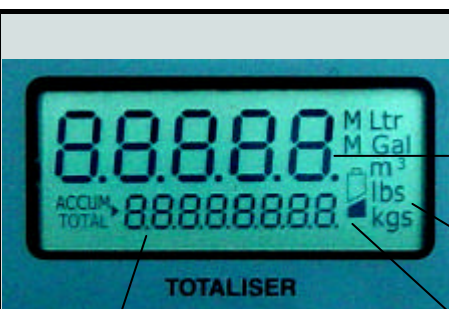
Optional : Display backlighting (needs external dc power for this option to illuminate).

Environments

The series is designed to suit harsh indoor and outdoor industrial and marine environments. The robust housing is weatherproof to IP66 (Nema 4X) standards, UV resistant, glass reinforced nylon with stainless steel screws & viton O-ring seals.

Installation

Specifically engineered to be directly mounted on a variety of flowmeters, wall, surface or pipe mounted in the field or control room. Various mounting kits are available. The instrument is totally self powered using one 3.6Vdc lithium battery, pulse output option requires 8~24Vdc.



Full LCD display test feature illuminates all characters and script text displays for 5 seconds when entering the program mode.

The 5 digit **Total** display is front panel resettable and can be programmed for up to 3 decimal places.

Engineering units are selected during the initial programming routine.

Battery condition indicator shows only when battery is low, battery life can last up to 7~10 years.

The 8 digit **Accumulative Total** display can be programmed for up to 3 decimal places. Reset is only possible when in the program mode which can be PIN protected for security.

KEY	FUNCTION IN OPERATING MODE	FUNCTION IN PROGRAM MODE
	Resets the 5 digit resettable total display to zero.	Resets the 8 digit accumulative total display to zero.
	1. Pressing the Program & Reset keys for 5 seconds enters you into the program mode . 2. Displays model & software revision No.	1. Each press steps you through each level of the program chart. 2. Holding for 3 seconds fast tracks to the END of the program from any program level.
	No function	Selects the digit to be set, the selected digit will be "flashing " indicating that it can be incremented.
	No function	Increments the selected digit each time that it is pressed.

2. OPERATION

2.1 Resettable Total

Pressing the RESET key will cause the large 5 digit total to reset to zero. The reset function is possible at any time during counting.

2.2 Accumulative Total

There are 8 digits in the accumulative total display, these can only be reset in the program mode or can be protected by enabling the PIN protection feature at the front end of program mode.

2.4 Battery replacement

The instrument draws very little power and will run for many years* without the need to replace the battery. A battery condition indicator on the LCD display will appear when the battery is low, if the low battery is not replaced the programmed detail & totals will be lost.

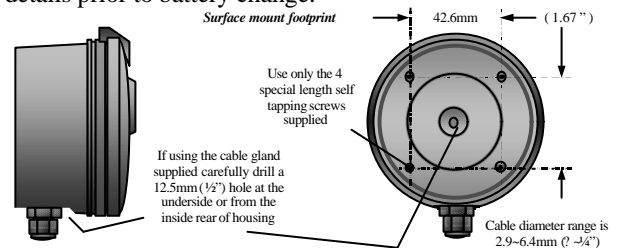
When changing the battery a small capacitor within the instrument will maintain the programmed detail & totals in memory for up to 10 seconds providing sufficient time for the battery change to take place. Changing the battery whilst flow is taking place could cause loss of the programmed detail. It is advisable to record program details prior to battery change.

** The battery can last 7~10 years depending on application & environment.*

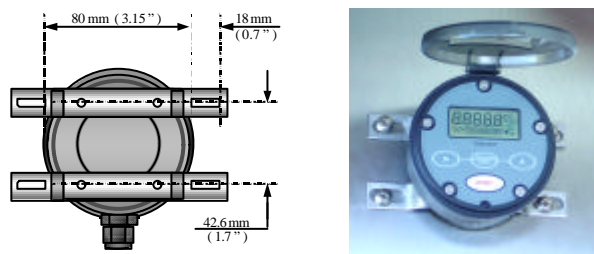
2.5 Processor reset button

Should the instrument be corrupted by an electrical hit the processor can be reset by pressing the black re-boot button located above the red DIP switch block on the input interface board

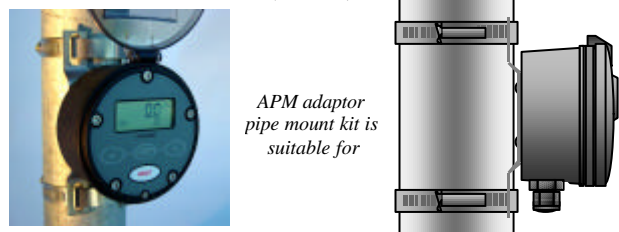
(refer page 10). This procedure does not effect totals or programmed data.



Wall- surface mount using optional bracket kit (P/No. AWM)

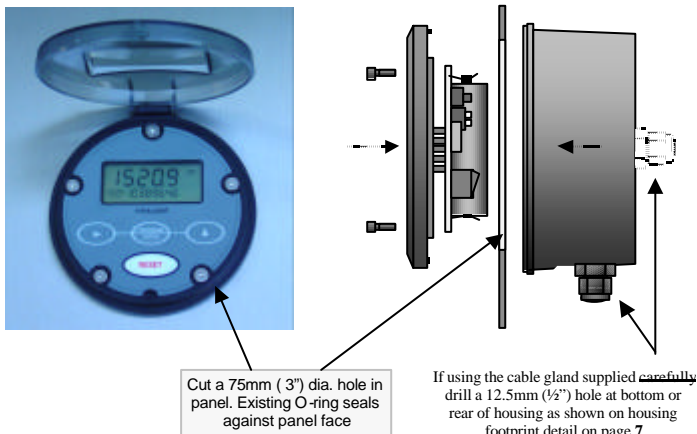


Pipe mounting (P/No. APM)



APM adaptor pipe mount kit is suitable for

Panel mounting



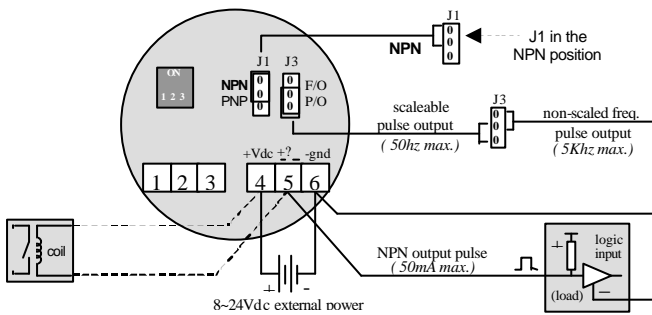
Wiring connections - pulse outputs

Current Sinking outputs (NPN)

Current sinking derives its name from the fact that it "sinks current from a load". The current flows from the load into the appropriate output (terminal 5).

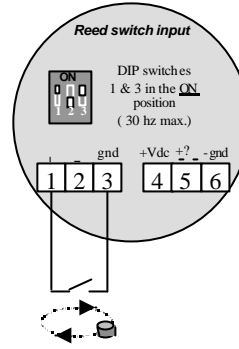
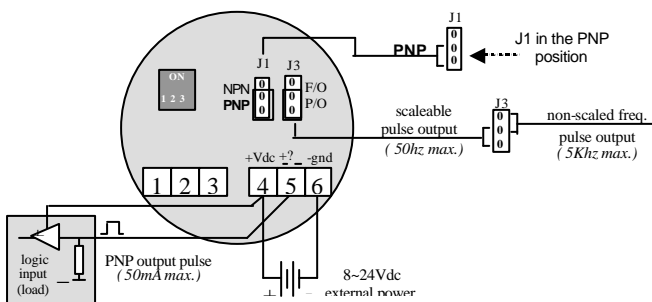
Driving a logic input - The output voltage pulse is typically the internal voltage of the load. The load would normally have an internal pull up resistor on its input.

Driving a coil - The NPN style of output is to be used when driving a coil. The coil load is obtained by dividing the coil voltage by coil impedance (), is expressed in amps & is not to exceed 0.1A. The coil voltage is connected across, & must match, the units supply voltage & the output.

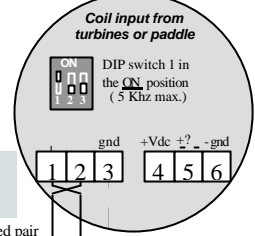


Current Sourcing outputs (PNP)

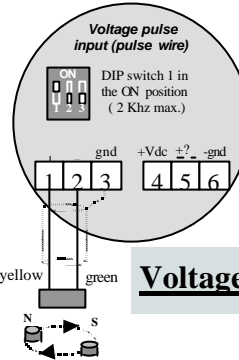
Current sourcing gets its name from the fact that it "sources current to a load". The current flows from the output (terminal 5) into the load. When wired as below the output voltage pulse is the supply voltage of the load. The load would normally have an internal pull down resistor on its input.



Reed switch input



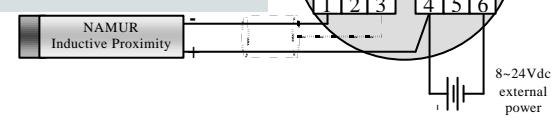
Coil input (turbine)



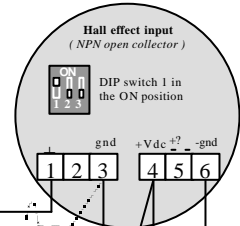
Voltage pulse (pulse wire)

NOTE : Voltage not to exceed 13.4 Vdc through an approved barrier if when using an intrinsically safe NAMUR proximity in a hazardous area (EEx Ia 11C). Typically these proximity's are limited to 8.2 Vdc

Namur sensor input

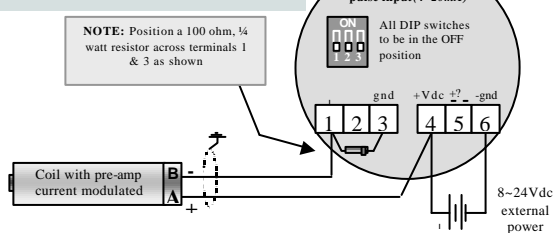


NOTE: For an input >800Hz position a 1/4 watt resistor across terminals 1 & 4. 12Vdc: 1Meg ?



Hall effect input

Modulated current pulse



4. PROGRAM PARAMETERS

4.1 PIN No. Program Protection

The option exists to protect the programmed detail & Accum. Total with a user selected four digit PIN No. (0000 represents no PIN protection). If activated the user must input the correct PIN No., failure to do so will deny access to change any of the program parameters or reset the Accumulative Total but will allow the user to step through and view the program details.

Only one PIN number may be set but this can be changed at any time after gaining access through PIN entry. A second back up PIN number is installed at the factory should the programmed PIN be lost or forgotten.

4.2 Resetting Accumulated Total

Resetting the accumulated total can only be done within the program mode.

4.3 Engineering Units

Select from available Eng. units to right of the display, no eng. units denote NIL shown.

4.4 K-factor (scale factor)

Enter K-factor starting with the most significant number, up to 8 prime numbers & 3 decimal numbers can be entered. Trailing decimal numbers move into view as digits to the right are progressively selected, any significant digits which may move from view remain functional.

4.5 Pulse outputs

Both models have a NPN-PNP link selectable output at **J1**. The pulse output is also link selected at **J3** to act as a non-scaled pre-amplified pulse output or scaleable pulse output (380-051 only), maximum load is 50mA.

Non-scaleable pulse output:

The un-scaled repeater pulse output represents one pulse out for each input pulse from the primary measuring element (*flowmeter*). This output acts as an input signal pre-amplifier particularly suitable for pick-up coil inputs up to 5Khz.

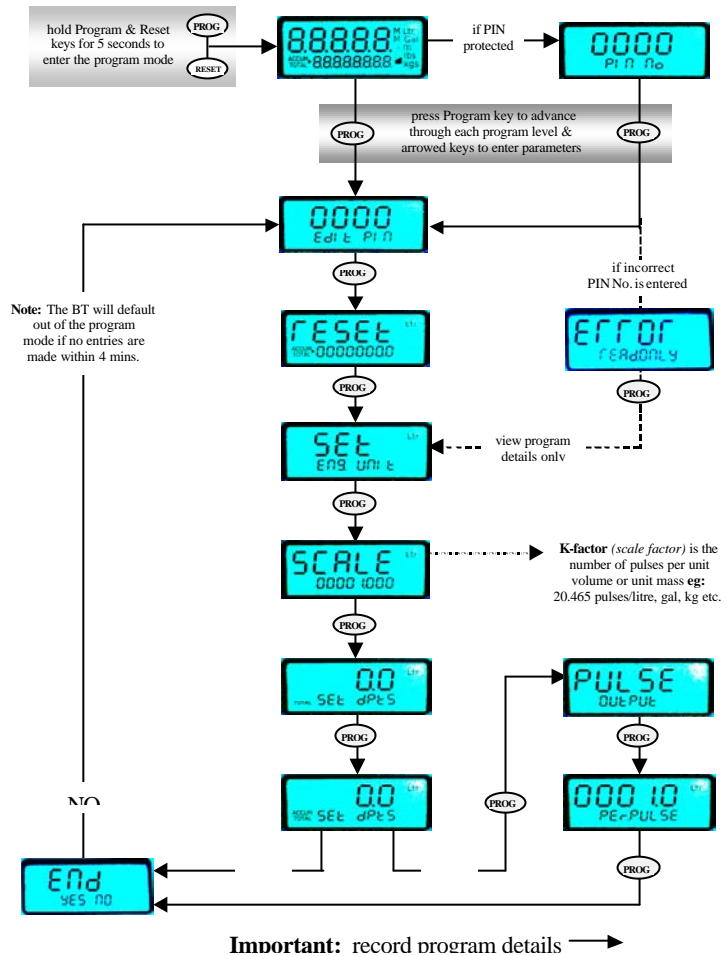
Scaleable pulse output : (model 380-051 only)

The pulse output is fully scaleable & is set as the number of litres / gallons etc. per output pulse *Eg.* 0.1 litres/pulse, 10 litres/pulse, 100 gallons/pulse. Range is 0.1 ~ 9999.9 Eng. unit/pulse. The unit needs to be externally powered for this feature to operate.

The scaleable pulse output is suitable only for remote integration due to the spasmodic nature of its output frequency, it is limited to 50hz. Should the potential incidence of this output exceed 50hz it can continue to count after flow has stopped until such time as the processor buffer has completed integration. Most scaleable pulse output requirements are low frequency due to down scaling and therefore not effected by the buffer count effect.

Output pulse width :

The pulse width (*pulse duration 1:1*) automatically adjusts to the output frequency defaulting to a maximum pulse width of 300 milliseconds at frequencies below 1.66hz. To calculate pulse width at higher frequencies use: $1000 \div (\text{hz} \times 2) = \text{pulse width in milliseconds}$.



5.1 Program detail record


If not powered for more than 10 seconds the programmed detail & Accumulated Total will be lost from the processor memory, it is advisable to record your programmed detail. Specific instructions on changing the battery without loss of program detail are given at 2.4.

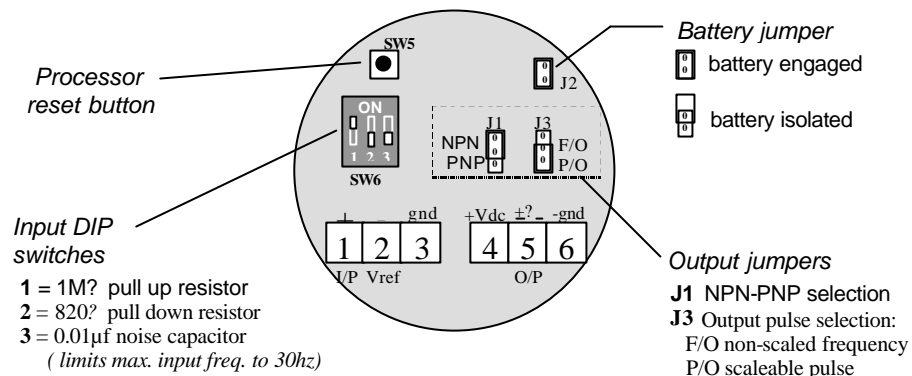
Pencil your program details here

User selected PIN		0000
Engineering units		litres
K-factor (scale	K =	1.000
Decimal for reset	<input type="checkbox"/> 0 <input type="checkbox"/> 0.0 <input type="checkbox"/> 0.00	0.0
Decimal for Accum.	<input type="checkbox"/> 0 <input type="checkbox"/> 0.0 <input type="checkbox"/> 0.00	0.0
Output pulse value	(model BT11 only)	0001.0

Factory default

Wiring connections**Terminal designation**

1	+	I/P	Flow input pulse signal
2	-	Vref.	Flow input (<i>coils & voltage type</i>)
3	gnd	GND	Flow input (<i>pulse type</i>)
4	+Vdc	+Vdc	External power (
5		O/P	Output pulse (<i>J1 & J3</i>)
6	-gnd	GND	External power

Interface board layout**Wiring practice**

Use multi-core screened twisted pair instrument cable (0.5mm²) for electrical connection between the BT and any remote flowmeter or receiving instrument. The screen needs to be earthed to the signal ground or the receiving instrument, this is to protect the transmitted signal from mutual inductive interference. Do not earth the screen at both ends of the cable.

Instrument cabling is not to be run in a common conduit or parallel with power and high inductive load carrying cables, power surges & power line frequencies may induce erroneous noise transients onto the signal. Run instrument cables in a dedicated low energy, low voltage conduit.

TROUBLESHOOTING**No display.**

Check position of the battery jumper J2 (see interface board layout page 10).

Display shows the model number at all times.

The instrument has not been fully programmed after power up, enter the program mode & enter program parameters, be sure to exit the program mode before the 4 minute no data entry time out or the instrument will revert back to model number display.

Scaleable pulse output counts on after flow has stopped.

The scaled pulse output has exceeded its output limit of 50Hz. Allow the memory buffer to catch up or increase the pulse value - number of litres etc. per pulse, (clause 4.5, p12.)

Display shows random characters.

The instrument may have taken an electrical "hit", press the processor reset button (p10).

Specifications

- Display :** 5 digit resettable LCD totaliser 7.5mm (0.3") high with second line 8 digit accumulative total display & text 3.6mm (0.15") high. 3 programmable decimal points with both display lines.
- Signal Inputs :** Universal pulse-frequency input compatible with Reed switch, Hall effect, Coil-sine (20mV P-P min.), Voltage pulse & Namur proximity detectors. Maximum input frequency is 5Khz for coils, 2.5Khz for Hall effect & current pulse inputs, 2Khz for voltage pulse devices & 500Hz for a Namur proximity sensor.
- Powering :** 3.6Vdc Ultra Lithium battery supplied, life expectancy can be up to 7~10 years. Battery life reduces when connected with a coil input from turbine flowmeters. The BT may also be externally powered from a regulated 8~24Vdc supply.
- Pulse outputs :** Both models have an NPN-PNP selectable field effect output transistor which is non-scaleable. This output is particularly suitable for pre-amplifying pick-off coil inputs up to 5Khz.
- The 380-051 output is link selectable for either non-scaleable pulse output to 5Khz or fully scaleable pulse output with a limit of 50hz . Both pulse outputs have a 50mA maximum drive capability.
- Physical :**
- A) IP66 (NEMA 4X) high impact, glass reinforced nylon enclosure.
 - B) Self drill cable gland entry at base & rear of the enclosure.
 - C) Overall 85mm diameter x 45mm deep x 175g (0.4lb).
 - D) Operating temperature -20°C ~ +80°C (-4°F ~ +176°F).

Configuration

- Functions :** Accumulated & Resettable totals, pre-amplifier pulse output & an optional scaleable pulse output.
- Configuration :** Flow chart entry of data with English text prompts. User selectable 4 digit PIN number program protection. Programmable engineering units, decimal points and K-factors. All programmed data is battery protected.
- K-factor range :** Entered as pulses / litre, gallon, lb etc. Programmable range is 0.001~9,999,999.999 with a floating decimal point during K-factor (*scale factor*) entry.
- Engineering units :** Selectable Ltr, Gal, m3, kgs, lbs, MLtr & Mgal or no units of display.

Replacement Battery
use only

3.6V x 2.4Ah AA
Lithium Thionyl

Suitable replacement batteries are available

R S Components	Farnell Components
Stock No. 5966-602	Order code 206-532

----- Cut from manual for increased security -----

Your back up 4 digit PIN number is 0220
0220 is referenced to the model No. BT, "B" is the 2nd(02) & "T" the 20th (20) letter of the alphabet.