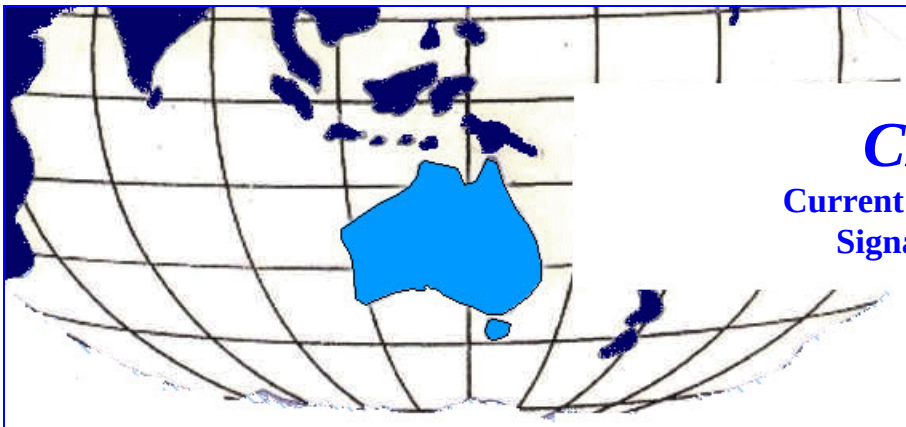
Bulletin 53,
Edition 3



*CMC*sp

Current Meter Counter Signal Processor

- Direct Velocity Reading
- Digitally processes and 'cleans' signals from Catwhisker and Magnetic Head Meters
- Operates with two 'AA' batteries
- Works in high conductivity water(> 50,000µSiemens)
- Self contained unit with 2 x 8 character LCD display showing total meter counts and elapsed time
- Integrated Bluetooth Interface and RS232 Interface
- Also operates with any Palm, PocketPC, or Field Computer.
- Uses simple single character commands for operating modes and setting
- Signal Driver for AquaCalc(s), Sutron DMX and Hydrological Services CMC Series Meter Counters
- Fully compatible with USGS QCALC Discharge Measurement Software
- Fully self calibrating
- 'Self Test' for Serial Interface setup
- Can be used to adjust Current Meter contacts (measures meter 'Dwell Angle')
- Can display and produce 'Spin Test' record
- Selectable 10 second to 90 second fixed measuring intervals; default is 40 seconds
- 'Starts' and 'Ends' measurement on a meter contact closure
- Total Counts to 999, Total Time to 999.9 seconds
- Range of Measurement from < 0.05 ft/sec to > 50 ft/sec (magnetic head meters)
- Continuous measuring mode (no time limit)
- Low battery indication
- Automatically indicates fault conditions

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HYDROLOGICAL SERVICES PTY LTD

Design, Development & Manufacturing of Scientific Instruments & Equipment for Water Level, Water Flow & Meteorology

DESCRIPTION:

The Hydrological Services Current Meter Counter Signal Processor (CMCsp) is a small electronic device used to "clean" the signal from a mechanically rotating current meter such as a Price AA or Pygmy meter and directly reads the velocity on the LCD as well as interfacing to a PDA for computation of velocity and discharge. Meters using a cat whisker head and ball and wire contact to perform a mechanical switch closure can be used with the CMCsp to produce a clean, noise-free signal. Whenever the CMCsp is connected to a hand-held computer and the current meter bucket wheel completes a contact closure, the CMCsp can simultaneously produces four responses:

1) Sounds a buzzer tone;
2) Emits a flash from an LED indicator on the front panel,
3) Updates the LCD count and timer, and
4) Transmits a serial data value at 1-second intervals representing the number of contact closures and elapsed time through the serial interface.

The CMCsp uses two AA batteries for operation and is connected between the current meter and the hand-held computer using either a connecting lead or an optional Bluetooth wireless interface. A program running in the hand-held computer sends commands to the CMCsp to perform a measurement.

The most important operating features of the CMCsp are as follows:

1- Direct Velocity Reading

2- User Serial Interface Program for entering 2 current meters with up to 3 rating equations for each current meter.

3- The ability to signal process each contact closure from any type of meter. For cat whisker contacts, this becomes extremely important since cat whisker contacts offer the poorest quality for marking and counting rotations.

4- The CMCsp offers (2) modes of operation, i.e. NORMAL and SLOW speed mode. NORMAL is selected for meter rotations >0.25 ft/sec while SLOW mode is for velocities below 0.25ft/sec. To improve noise rejection, the sample rate of the input signal at the SLOW speed mode (lower velocities) is 1/10 of the sampling rate that occurs during NORMAL mode.

5- The ability to detect faulty connections from the meter through the wading rod to connected CMCsp. During power up of the CMCsp, a calibration of the input signal is performed.

6- The ability to detect a signal short during a measurement. If such a condition is detected, the '*' symbol is displayed until the fault condition is removed.

SPECIFICATIONS:

Bluetooth	Class 2 / Output power 2.5mW (4dBm) Compliant Bluetooth Spec V1.1 Up to 30ft (10m) range (operating at 2.4GHz)
Communications	RS232 Port (Tx, Rx) @ 19200 baud 8/N/1
Connections	1 x Switchcraft #820 ¼" Jack Socket (Meter input) 1 x sub miniature 5 pin socket (RS232 + filtered meter o/p)
Indicators	8 character x 2 line LCD, 1 x Orange LED, 1 x Red/Green/Blue LED
Power Source	2 x Internal AA alkaline 1.5V batteries Low battery indication 2.8V
Dimensions	120mm x 80mm x 22mm (L x W x D)
Weight	218 grams (with batteries)
Environmental	-5°C to + 50°C, Non Condensing (Splashproof - No IP rating)

Table 1: Water Velocity Flow (absolute maximum)

Mode	Meter Type	Velocity
Normal	Price AA meter	- Mag 45 ft/s (13.7m/s) @ 99° to 204° dwell - CatW 22 ft/s (6.7m/s) @ 10° to 62° dwell
Normal	Pygmy meter	- CatW 9.4ft/s (2.8m/s) @ 10o to 62° dwell
Slow	Price AA meter	- Mag 2.5ft/s (0.76m/s) @ 54o to 265° dwell - CatW 2 ft/s (0.61m/s) @ 17° to 70° dwell (2-cup width) 1.1ft/s (0.33m/s) @ 120o dwell
Slow	Pygmy meter	- CatW 0.9ft/s (0.27m/s) @ 17° to 70° dwell (2-cup width) 0.5ft/s (0.15m/s) @ 120° dwell

Table 2: Water Velocity Flow (absolute minimum) – before setting fault detection (1)

Mode	Meter Type	Velocity
Normal	Price AA meter	- Mag 0.14ft/s(0.04m/s) @ 15° to 210° dwell - CatW 0.1 ft/s (0.03m/s) @ 10° to 90° dwell
Normal	Pygmy meter	- CatW 9.4ft/s (2.8m/s) @ 10o to 62° dwell - CatW 0.06ft/s(0.018m/s)@ 10° to 90° dwell
Slow	Price AA meter	- Mag 0.04ft/s(0.012m/s)@ 10° to 340° dwell - CatW 0.07ft/s(0.021m/s)@ 10° to 170° dwell
Slow	Pygmy meter	- CatW 0.04ft/s(0.012m/s)@ 10° to 90° dwell (2-cup width) 0.5ft/s (0.15m/s) @ 120° dwell

Maximum Conductivity	> 50,000 µSiemens (max velocity ranges must be derated 20%)

Contact time to Fault Detection (absolute maximum)

(Normal Mode)	Magnetic Head Contact	11 Secs
	Cat Whisker Head Contact	7 Secs
(Slow speed Mode)	Magnetic Head Contact	30 Secs
	Cat Whisker Head Contact	20 Secs

Minimum dwell angle for Cat Whisker Head: 10°

Signal Output driver pulse (FET open drain O/P) (Fixed width): Normal mode: 100mS, active high to low pulse; Slow mode: 1 Sec, active high to low pulse

Note:
Specifications are subject to change at anytime without notice.

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