Pliant Technology Specialists

Pliant: readily yielding to influence

PSE-SDI: Pliant SDI-12 Incremental Shaft Encoder

The ///AMASSER **PSE-SDI** Pliant Incremental Shaft Encoders are intelligent and reliable microprocessor-based incremental shaft encoders which may be used with a pulley, tape, and float arrangement to measure stream stage or other fluid levels. Accumulating position data adaptively, up to one thousand times per second results in a drastic power consumption reduction. The resolution of the encoder is 1/384th of a revolution (standard); when used with a stream stage pulley with a 375 mm circumference, the resolution of the system is 0.98 mm.

Inquire about our pulleys and punched tapes.

- Standard SDI-12 interface (version 1.3)
- EEPROM for non-volatile storage of set-up parameters
- Resolution of 1/384th of a revolution
- Internal battery insures absolute tracking in the event of power interruption
- Instantaneous, average, minimum and maximum water level readings provided
- Low power consumption of about 5 mA quiescent
- Non-conductive shaft hub for lightning protection
- Optional LED Display and operator switches as shown above (order PSE-SDI/D)

Options

The standard unit, the PSE-SDI, provides data by means of a SDI-12 cable connected to a Data Collection Platform (DCP) or personal computer. In addition to the features included in the standard unit are those provided by the following 3 options: the **"\D" option** is an 8-digit display with switches that provide an additional interface to the SDI-12 communications, the **"\Ev" option** provides one user-configurable event counter (Switch Closure vs Pulse and Rollover vs Reset), and the **"\LiPo" option** substitutes the 9V alkaline battery backup with a 7.4V LiPo 900 maHr rechargeable battery along with an intelligent battery charger which provides practically unlimited life of the battery.

The optional digital display enables the user to display and set up parameters without the need for a DCP or portable computer. These setup parameters are as follows: the offset and scale of the encoder as well as the node address for SDI-12 communications. Note that the display also allows the user to enter the password that is required to access the setup parameters. When not setting these parameters the display provides the instantaneous position of the encoder, i.e. the water level.

Specifications

Processor : Atmel 89c51-RE2 @ 3.6864 MHz.
Word Size : 8 bit data - 8 bit instruction
Memory : 89S8252, 256 bytes RAM
EEPROM 2 kbytes

Shaft Encoder

C-Model
Sensor type - two channel optical incremental encoder
100 x 4 counts per revolution
Resolution - 400 counts per revolution;
software conversion to engineering units provided in firmware. (Units per revolution)

Range

+/- 32.0 m with .375 m circ. Pulley (available separately)

Max. Response Speed

2.5 rev/sec.

Output

SDI-12 protocol :
ASCII accumulated level

Connector

9 pin AMP CPC Connector
Current Carrying Capability - 1.5 Amp rating
Dielectric Withstanding Voltage >1500V

Power Supply

+10.5 to 15 V input for external battery, charger or power supply

Power Consumption

< 5mA quiescent current at shaft encoder with sample rate of 600Hz.
maximum current : < 30 mA

Battery Backup

9 V 565 mAHr Alkaline battery backup

Option: 7.4V Lithium Poly battery with built in intelligent charger.

Event Counter Input (with \Ev only)

5 kHz max. (Pulse mode)
100 Hz max. (Switch Closure mode)

Mechanical Interface

Threaded shaft

1/4 x 32 thread
#303 stainless
Clamping assembly available

Mounting hub

Made of non-conductive Delrin
Three 6-32 holes for PPULLEY

Maximum safe load

4.5 kg (10 lb)

Starting Torque

47 cm-g (0.65 inch-oz) max.

Physical Characteristics

Height : 152.0 mm. (6.0 in.)
Width : 114.0 mm. (4.5 in.)
Depth : 70.0 mm. (2.75 in.)
Weight : 1.35 Kg (3.0 lb.)
Mounting brackets: Use four #10 bolts or screws.

Environmental Characteristics

Operating : -40 to +55 C
Storage : -60 to +65C
Humidity : <= 100% non-condensing

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PSE-SDI(\D)(\R) SDI-12 Command Set

Retrieve Data Commands

1. Get encoder value in scaled units
   - command: aM!, aM0!, aC! or aC0!
   - response: a0001<cr><lf> data buf: <encoder value>
2. Start verification command
   - command: aV! or aV0!
   - response: a+<data buffer 1>+<data buffer 2>+<data buffer 3><cr><lf>
3. Get event counter value
   - command: aM3! or aC3!
   - response: a0001<cr><lf> data buf: <event counts>
4. Get average, Max/Min encoder position
   - command: aM5! or aC5!
   - response: attt1<cr><lf> data buf <average position, max, min>, ttt=(actual sampling period X # of samples) + 1 sec
5. Return data buffer
   - command: aD! or aD0! Response: a<data buffer><cr><lf>
6. Return identification string
   - command: aI! response: a<identificationstring><cr><lf>
7. Acknowledge active command
   - command: a! response: a<cr><lf>
8. Address query command
   - command: ?! Response: a<cr><lf>
9. Change SDI device (node) address
   - command: aA<new address>! Response: <new address><cr><lf>
10. Query Command
    - command: aQ0! or aQ1! or aQ2! or aQ3! etc… Response: a<information string><cr><lf>
11. Read Value of Set-up Parameter
    - command: aS0?!, aS1?!, aS6?! Response: a<data buffer><cr><lf>

Set Commands

1. Set encoder offset
   - command: aS0<offset>! Response: a<cr><lf>
2. Set encoder scale (units per revolution)
   - command: aS1<scale>! Response: a<cr><lf>
3. Set Scale of the Event Counter
   - command: aS3+<scale>! Response: a<cr><lf>
4. Set Mode of Event Counter
   - command: aS2+<mode>! See App. B for modes
   - Response: a<cr><lf>
5. Reset Event Counter
   - command: aS5! Response: a<cr><lf>
6. Set averaging parameters
   - command: aS6+<sampling period>+<number of samples>!
   - response: a<cr><lf>