Pliant Technology Specialists

Pliant: readily yielding to influence

PSE-RTU/D: Pliant ModBus-RTU Incremental Shaft Encoder

The ///AMASSER **PSE-RTU/D** 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 1/400th 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 ModBus-RTU slave communications interface
- FLASH memory for non-volatile storage of set-up parameters
- Resolution of 1/400th 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 delrin shaft hub for lightning protection
- 8 digit LED Display and operator switches

Options

The standard unit, the PSE-RTU/D, provides data by means of a Modbus-RTU full or half duplex cable connected to a Programmable Logic Controller (PLC) or personal computer. In addition to the features included in the standard unit are those provided by the following 2 options: the **"\4-20" option** provides an add-on 4-20ma. Current Loop adaptor with user configurable Zero and Span of data, 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 8 digit 5x7 LED digital display enables the user to display and set up parameters without the need for a PLC or portable computer. These setup parameters are as follows: the offset and scale of the encoder as well as the node address for ModBus slave device. 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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APPENDIX A: Register Assignments

Register(s)	Value
1 & 2	Shaft encoder position
3	16-bit encoder count/Comm. Status (PRTU only)
4	Shaft encoder SCALE
5 &6	Shaft encoder OFFSET
7 &8	Upper Alarm Level
9 &10	Upper Alarm Reset
11 & 12	Lower Alarm Level
13 & 14	Lower Alarm Reset
15	MODBus RTU Address

NOTE: Registers can only be written simultaneously if they represent a single value. For instance, registers 1 & 2 can be written simultaneously, but 3 and 4 cannot. Registers 3 and 4 must be written using separate commands.

APPENDIX B: PSE/RTU ERROR MESSAGES

The following error codes may be transmitted by the PSE/RTU:

Error Code	Meaning
Er1	Invalid transmission length
Er3	Incorrect checksum
Er4	Tx buffer overflow
Er5	Invalid command (if checksum is correct, otherwise 'Er3' is returned)