

Series 3560 Complete Remote Electronics

MAGNETIC FLOWMETERS

Description

The IE Series 3560 Complete Remote Electronics, hereafter referred to as the CRE, (Models 3561, 3562, and 3563) is for use with either IE Mag-Flo or IE Mag-Cell electromagnetic flowmeter elements. These electronics convert the low level voltage output of the electromagnetic flowmeter element into digital frequency and analog current outputs for process flow rate indication and/or totalization. The CRE can be mounted as much as 1000 feet from the pipeline-mounted electromagnetic flowmeter element eliminating the need for supplying line voltage at the electromagnetic flowmeter element and permitting convenient, accessible location of the CRE. The IE CRE is designed for survival and serviceability. The wall or pipe stand mounted enclosure is weatherproof (IP-67), with analog indicator or totalizer, depending on the selected model. In addition, the CRE is designed to be suitable for location in areas classified as Gr. IIA & Gr. IIB by the Central Mining Research Institute (CMRI) (Only for explosion proof version). The analog output is derived from a Standard Three Board Printed Circuit Module mounted in the main chassis. The analog output is selected with four direct-reading digital detent selection switches for selecting the velocity at which a 20 mAdc output is provided. This maximum output velocity may be set between 1.000 and 10.000 which represent meters per second or feet per second. The digital output is that a factored and scaled pulse (digital) output to provide an output in pulses per engineering unit (10 pulses per litre, etc.). The digital output is selected with four direct reading-digital detent switches by entering the K-factor of the electromagnetic flowmeter flowhead as a number between 1.000 and 15.000 (F.000). The order of magnitude of the K-Factor is selected by the position of a single eight-position dip switch representing a value of 1, 10, 100, 1,000 or 10,000. Thus, a K-Factor value is selectable between 1.000 and 150.00*10³. This range will suffice for any Mag-Cell and Mag-Flo electromagnetic flowmeter flowhead. The Three Board Printed Circuit Module is the same regardless of whether it is used for remote or integral mounting. As a result, interchangeability is maximised and spare parts stocking is minimised.



SERIES 3560 COMPLETE REMOTE ELECTRONICS

Design Features

- Accuracy +/- 0.5% of rate
- DC Magnetic Field Drive -- bi-directionally excited up to 37-1/2 times each second
- Automatic Zero -- no adjustments required. Zero voltage reference dynamically verified up to 75 times/sec
- Interchangeable Electronics -- interchangeable with any 3560 remotely mounted electronics modules. No test equipment required

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- Digital Full Scale Setting -- Simplified span selection without affecting calibration
- Wall or Pipe Stand Mounting.
- Remote Mount -- up to 1,000 feet.
- Positive Zero Return -- drives the output from the magnetic flowmeter to zero indication on a dry contact closure.
- Low Flow Cut-off -- 2.3% of analog span setting.
- Built-in Test Signal -- enables local verification of meter zero and span, and remote verification of proper operation of the electronics.
- Range Selection -- 1.0 to 10.0 m/sec. or 1.0 to 10.0 ft/sec. for full scale output selected by jumper position.
- Digital Span Adjustment -- set span of analog output using direct reading digital detent switches.
- Low Power Consumption -- approximately 15 watts regardless of meter size or type.
- Easy access -- hinged instrument panel swings out for internal access.

PRINCIPLE OF OPERATION

The input to the Series 3560 CRE is a low level voltage proportional to the velocity of a conductive liquid or slurry through the magnetic field of a Mag-Cell, Mag-Flo electromagnetic flowmeter flowhead. For specific detail regarding the principle of operation for electromagnetic flowmeters, refer to Design Specifications DS-7400 for Mag-Cell, DS-7500 for Mag-Flo.

The low level voltage is converted to a frequency proportional to that voltage, to a maximum of 10kHz at a flow velocity of 10.000 units per second. This output serves as the input to the Output Printed Circuit Board where additional signal conversion is accomplished.

The Output Printed Circuit Board utilises two modes; to provide an analog current output and factored scaled (digital) pulse output. In the CRE configuration, the type of output is selected by proper wiring hook-up at the output terminals of the CRE.

SPECIFICATIONS

WARNING: Do not operate this instrument in excess of the specifications listed below. Failure to heed warning may result in serious personal injury or damage to equipment.

POWER REQUIREMENTS

Standard: 230 Vac +/-15%, 50/60 Hz; 115 Vac +/-15%, 50/60 Hz; 10-30 Vdc

POWER FUSE RATINGS

230 Vac .25A; 115 Vac .5A; 10-30 Vdc 2A.

POWER CONSUMPTION

Approximately 15 watts

RECOMMENDED WIRE SIZE

Between electromagnetic flowmeter and CRE

- a. Coil Drive: 14 AWG; Alpha 2472 or Belden 8720 or equal.
- b. Electrode Signal (low level voltage); 20 AWG; Alpha 2411 or Belden 8762 or equal.

WIRING TO CRE

- a. AC Power Cable: 12 AWG, three conductor.
- b. Electrode Signal (low level voltage); 20 AWG; Alpha 2411 or Belden 8762 or equal.
- c. Totalizer Reset: 18 AWG, general purpose.
- d. PZR Activate: 18 AWG, general purpose.
- e. Ground Cable: Third wire ground of ac power cable

FULL SCALE LIQUID VELOCITY

1.000 to 10.000 m/sec, or 1.00 to 10.000 ft/sec. (jumper selected)

OPERATING TEMPERATURE LIMITS

Electronics: -15°C to +65°C

LCD Display (Totalizer only): 0°C to 50°C

STORAGE TEMPERATURE LIMITS

-15°C to 65°C

CAPACITIES

As specified in the individual meter design specifications, reference DS-7400 and DS-7500.

PERFORMANCE SPECIFICATIONS

Accuracy: $\pm 0.5\%$ of flow rate from 1.0 m/sec. to 10.0 m/sec.

± 0.005 unit/sec below flow rate of 1.0 unit/sec.

ANALOG OUTPUT

Add $\pm 0.1\%$ full scale to above Performance Specifications.

REPEATABILITY

0.25%

INPUT SIGNALS

Low level voltage proportional to flow velocity from IE dc field electromagnetic flowmeter element. (Minimum conductivity - three micromhos per centimetre).

OUTPUT SIGNALS (STANDARD)

Isolated 0-10 kHz open collector unscaled pulse

Options

Analog: Isolated 4-20 mAdc into 0-1,000 ohm load. Used to drive integral rate indicator (1-100% standard, direct reading optional), and available for re-transmission.

Digital: Isolated factored/scaled open collector/TTL output. Pulse width inversely proportional to frequency with 50/50 duty cycle.

The open collector pulse has no voltage but will accept an external power supply to 30 Vdc, 500 mA.

PZR (Positive Zero Return) drives to zero indication, (4 mAdc, etc.) the output from the CRE on a dry contact closure. The dry contact closure is supplied by others and can be used to prevent an erratic output whenever process control results in the electromagnetic flowmeter element becoming empty. If the electromagnetic flowmeter element does not empty under operating or standby conditions, it is not necessary.

Materials of Construction

HOUSING: IP-67

enclosure for wall or pipe stand mounting.

Serviceability

Serviceability of the CRE is enhanced by modular construction. Two self-retaining screws permit release of the hinged, gasketed outer door of the CRE enclosure. The hinged door of the CRE is of steel and provides for mounting of indicators and/or totalizers, depending on the CRE model selected. Wiring connections to the rear of the analog indicator or totalizer are quick release push-type connectors to eliminate cumbersome wiring interconnection for indicator/totalizer change-out.

All CRE components are mounted in a steel main chassis secured by four (4) self-retaining screws. This permits rapid change-out of the complete main chassis with a minimum of down-time. In its basic configuration, the CRE provides a frequency output and an analog current output with local 0-100% rate indication. These outputs are derived from the Signal Conditioning Module comprised of a steel chassis with three 4" x 7" printed circuit boards. The bottom printed circuit board is the Power Supply Board that converts line voltage to dc instrument operating power. The middle board in the stack is the Signal Conditioner Board that contains factory set calibration adjustments and the top board is the Digital/Analog Factor Board. This one convenient drop in module not only services the 3560 remote converters but also services all flanged and Mag-Cells with integral electronics.

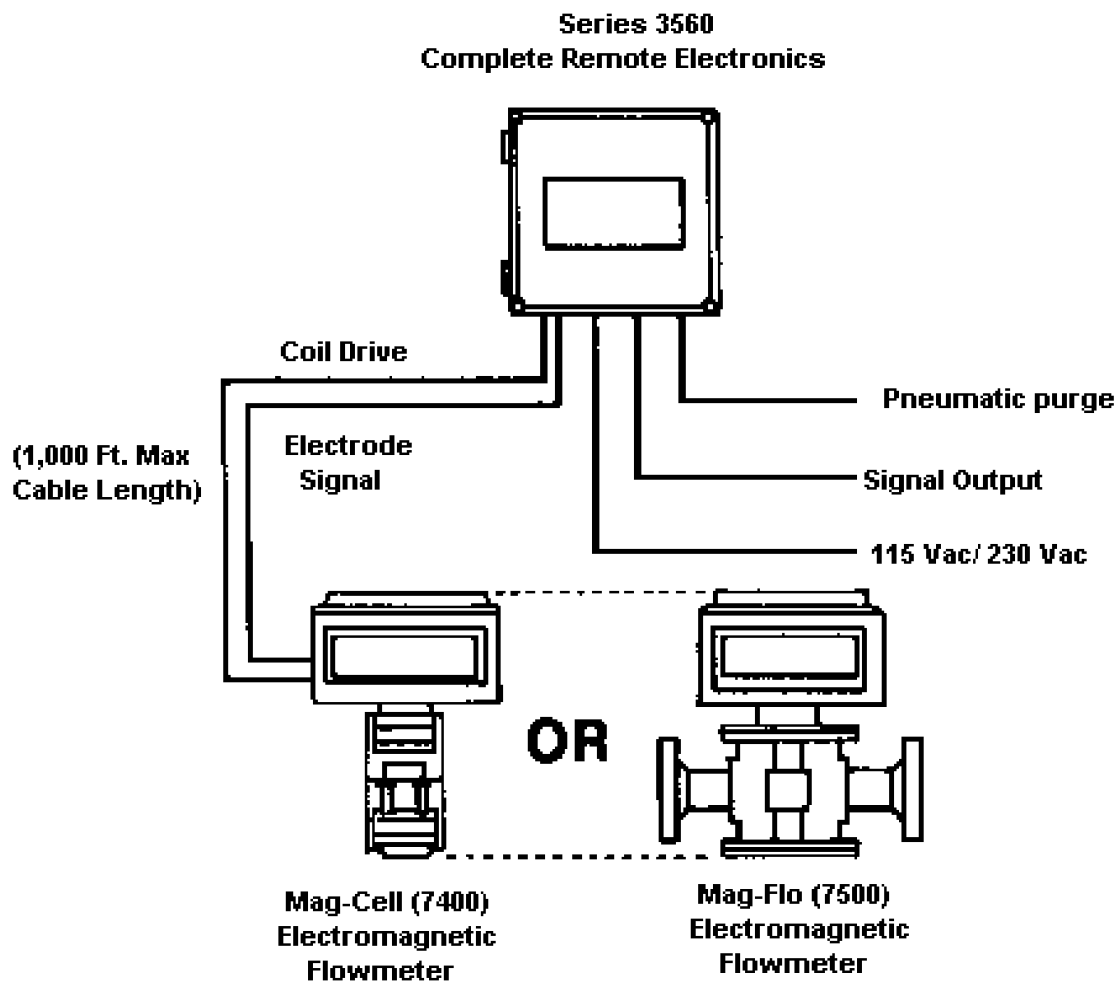


Figure 1 Typical Installation Series 3560 Remote Electronics

3560 COMPLETE REMOTE ELECTRONICS (CRE) MODEL CODING	
MODEL	DESCRIPTION
356	IE CRE - Complete Remote Electronics for Models 7400 Mag-Cell and 7500 Mag-Flo Magnetic Flowmeters
	CODE ACCESSORIES
13	8 digit LCD INDICATING totalizer
33	Rate Meter (ANALOG)
	CODE MOUNTING
2A	Wall Mounting
3A	Pipe Mounting
	CODE RATE INDICATOR SCALE
2C	0-100%
3C	Customer Specified Direct Reading
	CODE INPUT VOLTAGE
1	115 Vac, 15 Va Maximum
2	230 Vac, 15 Va Maximum
4	10-30 Vdc, 15 Watts Maximum
	CODE ENCLOSURE TYPE
A	Weather proof
B	Explosion proof

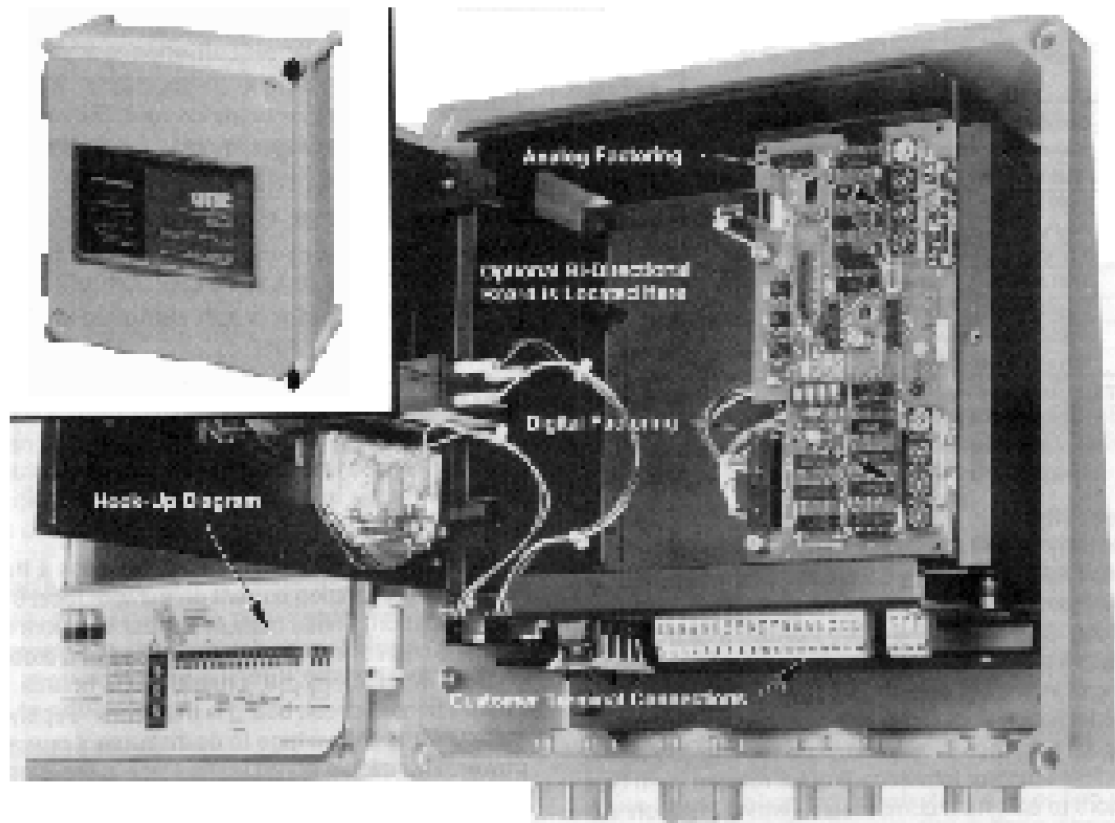


Figure 2. Outside/Inside View of CRE Box

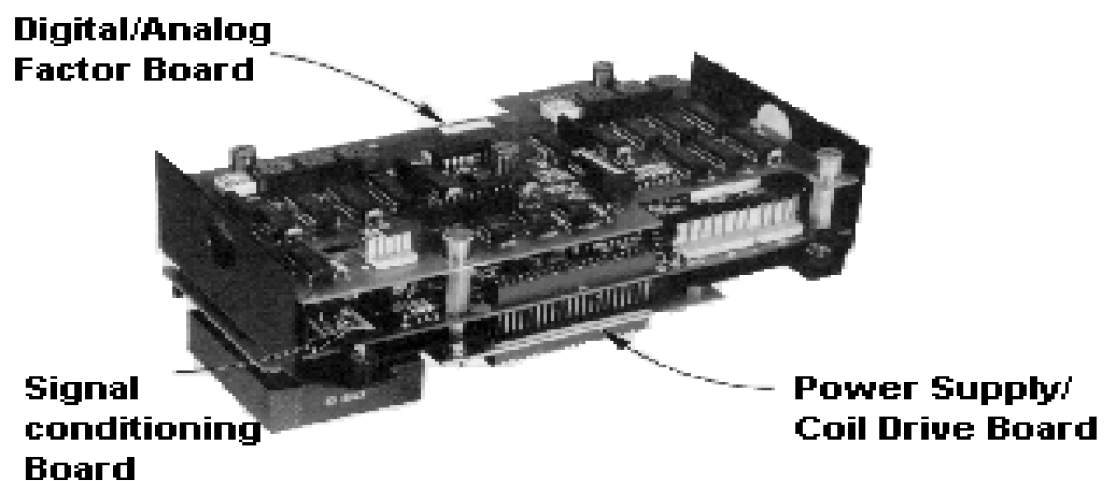


Figure 3 Support Bracket Module Assembly