

ES-651

Low Cost, Totalizer/Ratemeter for ROOTS® SSP & ICEx Meters

Features

- Separate Scaling Factors For A & B Inputs
- Display Rate & Total
- Pulse Input - 10 kHz Max.
- RS422/RS232 Serial Communication (optional)
- Modbus RTU RS422/RS485/RS232 (optional)
- NEMA 4X / IP65 Front Panel
- Separate Add/Subtract Simultaneous Inputs
- Quadrature and Up/Down Direction Control Inputs (optional)
- 30mV Magnetic Pickup Inputs (optional)

Application:

Any rate, total or blending application where 2 preset alarms and scaling are required.

Description:

The ES651MRT is a 6 digit totalizer / ratemeter with two level, 5 digit preset alarm control of total or rate. Inputs A & B have separate scaling K-factors. The totalizer can be programmed for "A" subtract "B", "A" add "B" or A & B as separate totalizers, with display and control of the "net" total and rate of "A". The ES651MRT is also available in 4 other versions. ES651MC2: a two preset totalizer with scaling, ES651MR2: a high/low alarm ratemeter with scaling; The "ES651MC": a totalizing counter only, and the "ES651MR": a rate meter display only. If only one input is required, the unit will display the total and rate from that one channel. The ES-651MRT can accept up to 10,000 pulses per second. It has a 5 digit floating decimal scale factor allowing total readout in true engineering units and rate per second, minute or hour. Input "A" simultaneously drives a ratemeter which can be programmed to display the basic frequency (rate per second) or factored to show rate per minute or rate per hour. Simply push the "VIEW" button to see either total or rate without losing a count. Two separate 5 A relay contacts can be set to operate at either rate or total presets in a latch or auto-recycle mode with output timing from 0.1 to 99.9 seconds. Two control outputs can be assigned to either the totalizer or ratemeter and can automatically recycle at the batch or stay latched until reset. Up to 99 units can communicate to a host computer on a single RS232 or RS422 loop. When two inputs are received (A & B), the unit can either add or subtract the two inputs or display the two inputs as separate totalizers.



- 4-20mA or 0-20mA Analog Output (optional)
- CSA Listed

Specifications:

Display: 6 digit, 0.55" High LED

Input Power:

110 VAC \pm 15% or 12 to 15 VDC

220 VAC \pm 15% or 12 to 15 VDC

24VAC \pm 15% or 12 to 15 VDC

Current: 250 mA DC max. or 6.5 VA AC

Output Power: (AC powered units only)

+10 VDC @ 50 mA

Temperature:

Operating:

+32°F (0°C) to +130 F (+54°C)

Storage:

-40 F (-40°C) to +200°F (93°C)

Humidity: 0-90% Noncondensing

Memory: EEPROM stores data for 10 years if power is lost.

Inputs:

- 3: High Impedance DC pulse input 4-30 VDC (high), Open or 0-1 VDC (low), 10 K Ω imp. 10 kHz max. speed. Accepts simultaneous inputs.
- 3M: Mag. Input, Input A only, accepts 30mV input (50 V max. P/P) signals 10 K Ω imp. 5 kHz max. (Input B, 4-30V)
- 3MB: Mag. Input, Inputs A & B, accepts 30mV input (50 V max. P/P) signals 10 K Ω imp. 5 kHz max.
- 5: 4-30 V Count pulses on Input A, 4-30 V Direction Control input (level) on Input B.
- 5M: 30 mV Count pulses on Input A (50 V max. P/P) 4-30 V Direction Control input (level) on Input B.
- 9: Quadrature, accepts 4-30 V pulses with 90° phase shift for direction detection.
- 9MB: Quadrature, accepts 30 mV (50 V max. P/P) pulses with 90° phase shift for direction detection.

Approvals: CSA File# LR91109-7, CE Compliant

Reset:

Front Panel:

Resets displayed value and control output

Remote:

4-30 VDC negative edge resets Totalizer "A" and control output

Control Outputs:

Relays:

2 each N.O. Relay; 5 Amps 120/240 VAC or 28 VDC. (N.C. relay contacts and NPN transistor output available with solder jumpers. Transistor output is internally pulled up to 10 VDC through relay coil, sinks from 10 VDC to .5 V @ 100 mA)

Analog Output:

An optional 4-20mA (0-20mA) output is available for the ES651MRT series. The output can be programmed

to track rate or total. This feature is available by adding suffix A to the part number. Connections are via a 2 terminal pluggable screw connector.

Programming is accomplished by using the front panel in conjunction with rear dip switches.

Accuracy: $\pm 0.25\%$ FS worst case.

Compliance Voltage: 3 to 30 VDC non inductive.

Scaling Factor (K-Factor): In the standard unit, a user programmable K-Factor is used to convert the input pulses to engineering units. The 5 digit K-Factor dividers, with decimal keyed into any position, allow easy direct entry of any K-Factor from 0.0001 to 99999. Separate factors may be entered for the 2 separate input channels.

Presets: Two control outputs are provided. To set relay values, press "menu" button until "Relay" appears on the display, the A and B outputs can be assigned to the ratemeter (high/low), one preset for rate and one for total, or two presets on the A and B totalizers. A 5 digit value can be entered for both presets and the decimal point location is the same as the counter. The outputs can be set to energize from 0.1 to 99.9 seconds or latch (0.0). If a value other than 0.0 is entered, the totalizers will auto reset at the preset. In the A-B or A+B versions, the relays will be assigned to either net total or A rate.

Lockout: Unauthorized front panel changes can be prevented by entering a user selected 5 digit code in the "LOC" mode. The front panel can be completely locked out or the presets can remain accessible.

Ratemeter: Accuracy: 0.01% FS (± 1 display digit).

The rate display updates once per second. The rate meter can be programmed to accept almost any number of pulses per unit of measurement, sample from 2 to 24 seconds maximum, and auto-range up to 5 digits of significant information. In the "RPS" mode, the ratemeter displays in units per second, and in the "scale" mode, units per hour or per minute. The unit will display the rate of the A Input only.

Totalizer: The two 6-digit totalizers can count at 10 kHz max. Each can have a 5-digit dividing scale factor. The totalizer advances on the positive edge of each pulse. Count up or down modes available, as are quadrature inputs from encoders for position or flow measurement. The unit can be programmed to view the net value of "A+B" or "A-B", or A and B as separate totalizers.

RS232/RS422 with KEP Protocol:

If the serial interface option is supplied, multiple units can be linked together. (The terminal addressing the unit must be capable of driving all loads in the loop.) Unit status and new set points can be communicated by serial communication. Mode changes, however, must always be made on the front panel.

Data is received and transmitted over standard EIA RS232 or RS422 levels. Unit number, baud rate and parity are entered in the "Program Setting" set up mode and remain in memory even if power is off.

RS232/RS422/RS485 with Modbus RTU Protocol:

The serial port can be used for serial printing or also for data acquisition. The unit can assign addresses up to 247 units (The terminal addressing the unit must be capable of driving all loads in the loop.) The unit can communicate with a master device through a Modbus-RTU protocol. The data given for each parameter is in IEEE float format comprising of 2 words. The unit can be connected in a network.

Device ID: 01-247

Baud Rates: 300, 600, 1200, 2400, 4800, 9600

Parity: None, Odd, Even

Protocol: Modbus RTU (Half Duplex)

Ordering Information

Example: ES651MRT A 3 1

Series: _____

ES651MRT= 6 digits, ratemeter/totalizer with presets and scaling.

ES651MC2= 6 digits, totalizer only with presets and scaling.

ES651MR2= 5 digits, rate only with presets and scaling.

Operating Voltage: _____

A= 110 VAC $\pm 15\%$ or 12 to 15 VDC

B= 220 VAC $\pm 15\%$ or 12 to 15 VDC

C= 24 VAC $\pm 15\%$ or 12 to 15 VDC

Count Inputs: _____

3 = Standard, 4-30 VDC simultaneous inputs.

3M = Mag. Input, Input A only, 30mV input (Input B, 4-30V)

3MB = Mag. Input, Inputs A & B, 30mV input

5 = 4-30 V pulses on Input A, 4-30 V Direction Control input on Input B.

5M = 30 mV pulses on Input A, 4-30 V Direction Control input on Input B

9 = Quadrature, accepts 4-30 V pulses

9MB = Quadrature, accepts 30 mV pulses (A & B)

Options _____

1= RS232 Communications

2= RS422 Communications

3= Modbus RTU RS232

4= Modbus RTU RS422/RS485

A= Analog Output (4-20/0-20 mA)

NOTE: RS232/RS422/RS485 & Analog Output options can not be combined

Accessories

Separate non keyboard panel order #34235

Separate keyboard panel - order #34234

NEMA4 wall mount enclosure available, see NEMAtr0l

Explosion proof enclosure available, see XHV

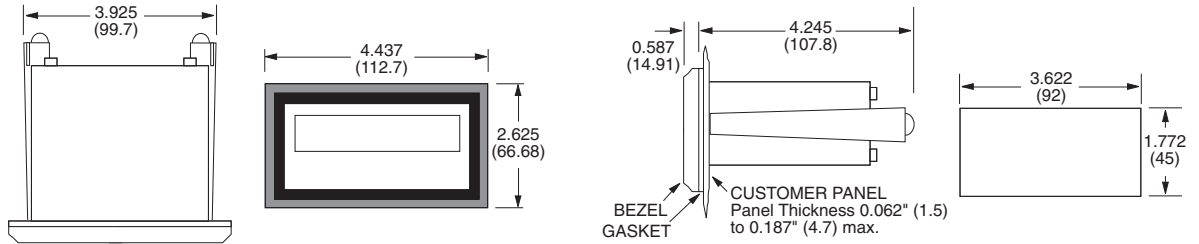
Serial printer available, see P1000, P295

Ethernet Port Server available, see IEPS

RS-422/485 to RS-232 Communication Adaptor available, see CA285

Modbus DDE/OPC Server available, see KEPserver

Mounting:



Wiring ES651 and ROOTS® ICEX Meter:

HAZARDOUS LOCATION

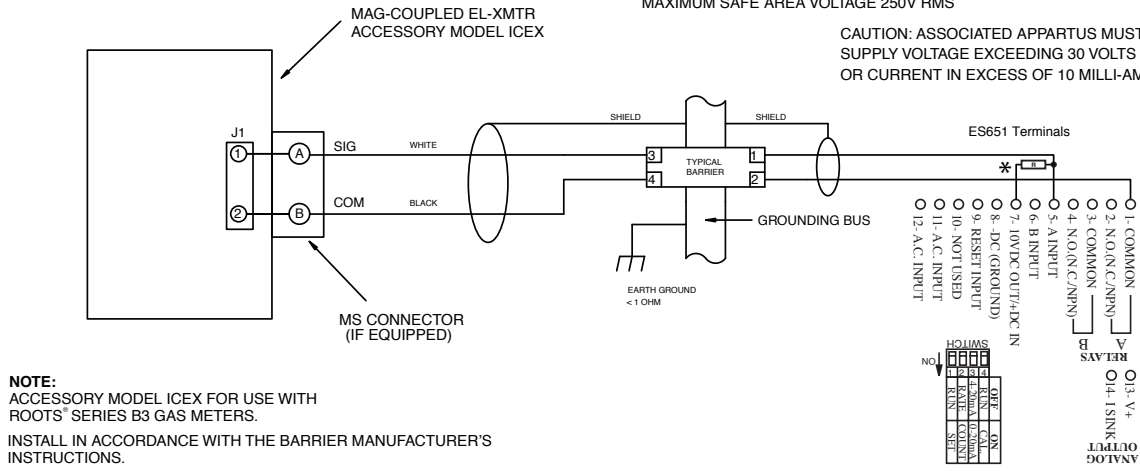
INSTALLATION MUST BE IN ACCORDANCE WITH ANSI/ISA RP 12.6 OR NEC ANSI/NFPA 79, ARTICLE 504 FOR INSTALLATION IN CANADA, INSTALL IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1.

USE CSA APPROVED POSITIVE BARRIERS HAVING THE FOLLOWING PARAMETERS: 28 Vdc (Max) 300 ohms (Min) (CONNECTIONS SHOWN IN DIAGRAM)

NON-HAZARDOUS LOCATION

MAXIMUM SAFE AREA VOLTAGE 250V RMS

CAUTION: ASSOCIATED APPARTUS MUST NOT SUPPLY VOLTAGE EXCEEDING 30 VOLTS OR CURRENT IN EXCESS OF 10 MILLI-AMPS



NOTE:
ACCESSORY MODEL ICEX FOR USE WITH ROOTS® SERIES B3 GAS METERS.
INSTALL IN ACCORDANCE WITH THE BARRIER MANUFACTURER'S INSTRUCTIONS.

* RESISTOR MUST BE INSTALLED, CHOOSE VALUE BY $R = VDC / 0.1$
EXAMPLE: IF VDC IS 10 VOLTS,
 $R = 10 / 0.1 = 1000$ OHMS.
DO NOT USE A VALUE SMALLER THAN THIS.

Wiring ES651 and ROOTS® SSP Meter:

HAZARDOUS LOCATION

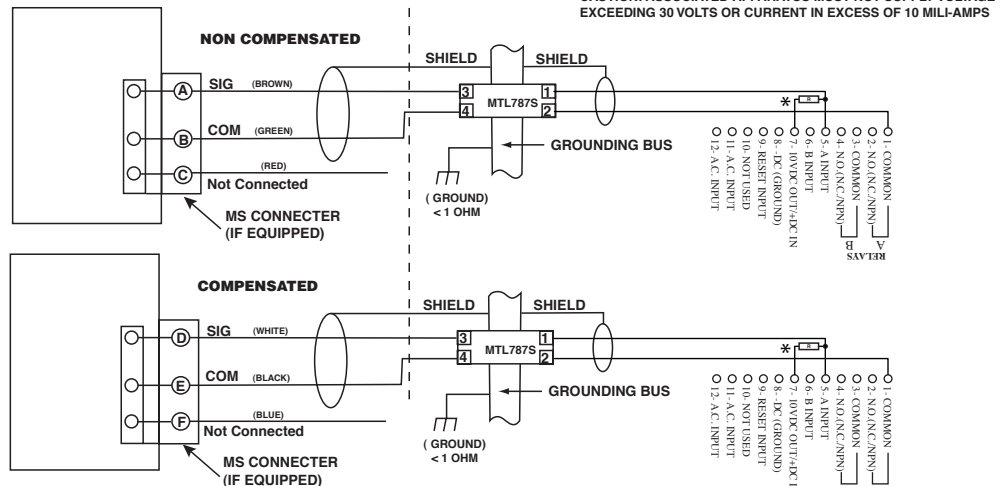
INSTALLATION MUST BE IN ACCORDANCE WITH ANSI/ISA RP 12.6 OR NEC ANSI/NFPA 79, ARTICLE 504. FOR INSTALLATION IN CANADA, INSTALL IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1.

USE CSA APPROVED POSITIVE BARRIERS HAVING THE FOLLOWING PARAMETERS: 28 Vdc (Max), 300 ohms (Min) EXAMPLE: MTL787S (CONNECTIONS SHOWN IN DIAGRAM)

NON-HAZARDOUS LOCATION

MAXIMUM SAFE AREA VOLTAGE 250V RMS

CAUTION: ASSOCIATED APPARATUS MUST NOT SUPPLY VOLTAGE EXCEEDING 30 VOLTS OR CURRENT IN EXCESS OF 10 MILLI-AMPS



NOTE:
ACCESSORY MODEL SSP FOR USE WITH ROOTS® SERIES B3 GAS METERS.
INSTALL IN ACCORDANCE WITH THE BARRIER MANUFACTURER'S INSTRUCTIONS.

* RESISTOR MUST BE INSTALLED, CHOOSE VALUE BY $R = VDC / 0.1$
EXAMPLE: IF VDC IS 10 VOLTS,
 $R = 10 / 0.1 = 1000$ OHMS.
DO NOT USE A VALUE SMALLER THAN THIS.