

Fusion™ Series

Technical Data

New Information
December 2003



Durant Fusion

Product Description

The Durant® Fusion from Eaton Electrical® is an industrial control unit consisting of a high speed count control module and a logic control capable of processing up to 100 rungs of ladder logic. The Fusion also features a multi-line, alphanumeric display and 18 front panel input keys as an operator interface. Configuration programming may be done using the display and keys, or may be accomplished by serially downloading from a PC.

The count module has two dedicated count inputs and a high speed reset input. These inputs can be simultaneously used as ladder logic input contacts. The unit has 10 discreet control inputs that can be used as counter control inputs and/or ladder logic inputs. Four analog inputs, two 4 – 20 mA and two 0 – 10V, are dedicated to ladder comparators only.

The Fusion has three form C and two form A relay outputs, and two NPN transistor outputs. These outputs can be individually assigned to counter functions, or as ladder outputs. Two analog outputs, one 0 – 10V and one 4 – 20 mA, are also available. These outputs may be used as followers assigned to count or rate functions, or as open loop control outputs from the counter or the ladder.

The high speed count module is capable of counting at a sustained count speed of 6 kHz in any of 13 count modes. The module consists of a ratemeter and three counters, a main counter, a totalizer and a batch counter. The six digit main counter has up to five presets, plus prewarn. The eight digit totalizer and six digit batch counter each have a single preset, and the five digit ratemeter has two presets. Presets can be pre-loaded as "parameter sets" for programming recipes or for job stacking. Up to 10 parameter sets are available. Both the main counter and the totalizer are bi-directional (for up-down counting),

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and can be reset to zero, or to a selected offset value. The batch counter counts up only, and can be reset to zero only.

The ladder logic processor can process a program of up to 100 rungs. Each rung can contain up to six contacts and one coil. In addition to the 10 control inputs and three high speed count inputs, contacts also include:

- one power up signal
- 11 front panel keys
- eight analog comparators for use with the four analog inputs
- eight real time clock comparators
- seven digital and two analog outputs
- 16 memory bits
- 16 display and print messages
- eight counters
- eight timers
- one totalizer preset, one batch counter preset and two ratemeter presets (from the high speed counter)

Coil types include:

- seven digital and two analog outputs
- 16 memory bits
- 16 display and print messages
- eight counters
- eight timers
- seven high speed counter inputs
- nine high speed counter output unlatches
- nine high speed counter output latches

Features and Benefits

Table 1. Features and Benefits

Feature	Customer Benefit
High speed count functions; including scaling, main counter, five presets, prewarn, totalizer, batch and rate	"Canned" count functions offer flexibility and ease of setup in the desired units of measure.
High speed counting independent of ladder scan time	Precise and repeatable output response for high performance applications.
Flexible display with selectable character sizes (large, medium, small), run screens and ladder triggered messages.	Minimizes confusion and operator errors as information can be tailored to what they need and in their language. Maintenance/management data can be separated. Different character sizes allow optimization of information displayed. Machine status information can be displayed allowing operators to take action.
Simple front panel layout and keypad. Four soft keys & six function keys can be used as inputs.	Ease of use for operator. Numeric keypad allows for ease of preset and machine parameter entry. Function keys and soft keys allow easy and quick access to information and/or parameters needed by the operator and don't require using additional inputs. Eliminates cost associated with external pushbuttons and inputs.
Parameter sets	Allows for predefined recipes/jobs to be pre-loaded for the operator. Simplifies operator interaction and minimizes errors.
Programmable relay logic	Well understood programming method that allows flexibility in control functionality. Easy to tailor the control to various applications.
26 I/O (digital & analog)	Provides application flexibility. Analog inputs allow monitoring key process parameters. Analog outputs allow interfacing to drives and other control products.
Integrated solution	Reduced overall control costs, installation and commissioning. More flexible and capable than traditional count/control solutions but less complex than many PLC solutions.
Windows® and front panel programming	Ease of programming and configuration control.
RS-232 and RS-485 serial communication ports	Allow for direct connection to PC for programming, connection to Modbus® networks, interface to serial printer.
Robust type 4X package. DIN cutout and short depth 2.82 Inches (71.6 mm).	Suited for wet applications. Same cutout as the President Series — easing the migration. Short depth minimizes the cost and size of the machine panel or control enclosure.
Input power: 85 – 265V AC 50/60 Hz or 10 – 30V DC models	Greatly reduces models required for different control voltages.
Output power: 12V DC @75 mA, 24V DC @100 mA	Eliminates the need for an external power supply for encoders, analog transducers, etc.
Depluggable screw terminals	Allows for ease of wiring and removal of control. Terminals are different sizes to error-proof installation.
Non-volatile memory and capacitor backed real time clock	Don't have to worry about a battery failing down the road.
Real time clock	Allows for control functions to be performed on day/time and allows for date/time stamping on printouts.
UL, cUL and CE marked	Ease of meeting machine agency requirements and robust EMC performance.

Technical Data and Specifications

Environmental

- Operation: Indoor use to 2000m
- Temperature:
 - 32° to 122°F (0° to 50°C) operating
 - -4° to 158°F (-20° to 70°C) storage
- Humidity: 0 to 85% RH, non-condensing
- Vibration: 2.5 Gs, 30 – 200 Hz
- Shock: 30 Gs, 11 mS half sinewave

- EMC:
 - EN61326:1997
 - All I/O lines except RS-485 <30m
- Front Panel:
 - Type 4X indoor use only, when mounted with gasket provided
- Safety: UL, cUL Listed, CE Compliant

Mechanical

- Cutout: 138 mm x 68 mm DIN standard
- Outline: 157 mm x 87 mm x 81 mm
- Panel depth: 72 mm maximum
- Enclosure: Polycarbonate/ABS
- Label: Polyester

Input Power

- AC Model: 85 – 265V AC, 47 – 63 Hz, 20 VA; Isolation 2300V AC
- DC Model: 10 – 30V DC, 15 VA

Inputs

- Control:
 - Number: 10
 - Impedance: 4.75k Ohms to +5V DC
 - Thresholds:
 - High 3.5 – 30V DC
 - Low 0 – 1.0V DC
- Counter:
 - Number: 3 (including reset)
 - Impedance : 4.75k Ohms to +5V DC or 26.9k Ohms to ground
 - Thresholds:
 - High 3.5 – 30V
 - Low 0 – 1.5V, or 200 mV p-p to 50V rms @ 26.9k Ohms (mag pickup)
 - Response:
 - 140 Hz or 14 kHz for sinking, push-pull or mag pickup inputs
 - 60 Hz or 6 kHz for sourcing only inputs
 - All frequencies based on 50-50 duty cycle
 - 6 kHz maximum sustained count speed
- Analog:
 - Number: 4
 - Type: 4 – 20 mA and two 0 – 10V DC
 - Accuracy: +/- 0.5% FS and +/- 200 PPM/°C
 - Impedance: 100 Ohms (current input), 1.27M Ohms (voltage input)
 - Overrange: 45 mA max. (current input), 20V max. (voltage input)

Outputs

- Power (AC input model only):
 - 24V DC +/- 15%, 100 mA max., short circuit protected
 - 12V DC +/- 10%, 75 mA max., short circuit protected
- Relays:
 - Number: 3 (Form C), 2 (Form A)
 - Contacts: 5A, 250V AC, 30V DC
 - Isolation: 2300V AC
- Transistors:
 - Number: 2
 - Type: NPN Darlington
 - Ratings: 150 mA max. ON current, 30V DC max. OFF voltage
- Analog:
 - Number: 2, short circuit protected
 - Type: 4 – 20 mA (<450 Ohms), 0 – 10V (>2500 Ohms)
 - Accuracy: +/- 0.5% FS and +/- 200 PPM/°C
 - Common Mode Voltage Rating: 250V AC
 - Isolation: 2300V AC
- RS-232:
 - Connector: DB-9S
 - Polarity: DCE
 - Baud Rate: 1200 – 19200
- RS-485:
 - Connector: 6 wire RJ-12 phonejack
 - Baud Rate: 1200 – 19200

Data Retention

- Program Data:
 - Type: Non-volatile
 - Duration: 100 Years, no batteries
- Real Time Clock:
 - Type: Capacitor
 - Charge Time: 3 Minutes
 - Retention: 1 – 5 Days

Human Interface

- Display:
 - Type: 128 x 64 pixel graphic LCD with LED backlight
 - Character Size:
 - 0.12" high, 21 characters per line, 6 lines maximum
 - 0.24" high, 10 characters per line, 3 lines maximum
 - 0.35" high, 7 characters per line, 2 lines maximum
- Keys:
 - Number: 18
 - Type: membrane switches with tactile feedback
- Real Time Clock Format: Seconds, minutes, hours, day and date

Table 2. DIP Switch Settings

DIP Switch Number	"1" Setting	"0" Setting
1	A Input Sink	A Input Source
2	A Input Slow Response	A Input Fast Response
3	A Input Mag Pickup	A Input Single Ended
4	B Input Sink	B Input Source
5	B Input Slow Response	B Input Fast Response
6	Reset Input Slow Response	Reset Input Fast Response

Wiring Diagrams

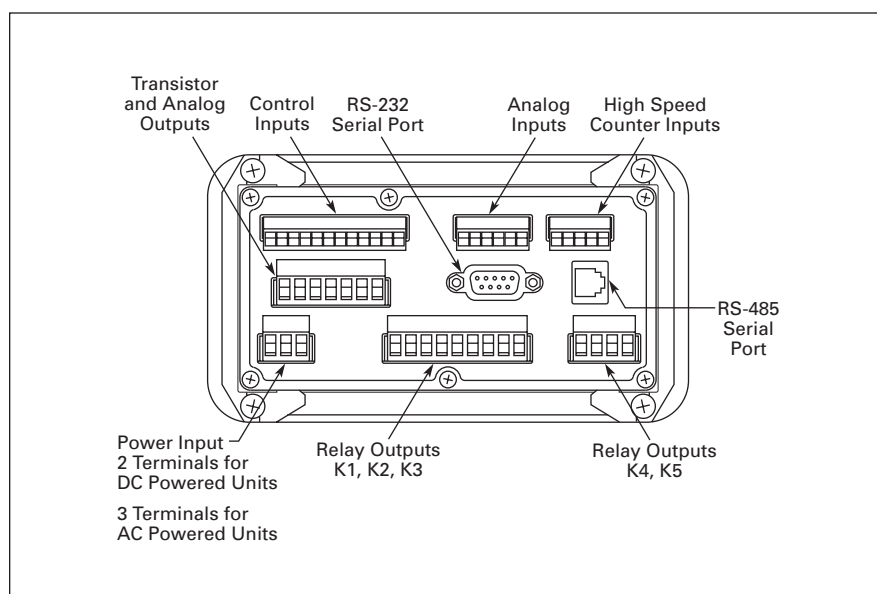


Figure 1. Rear Terminal Layout

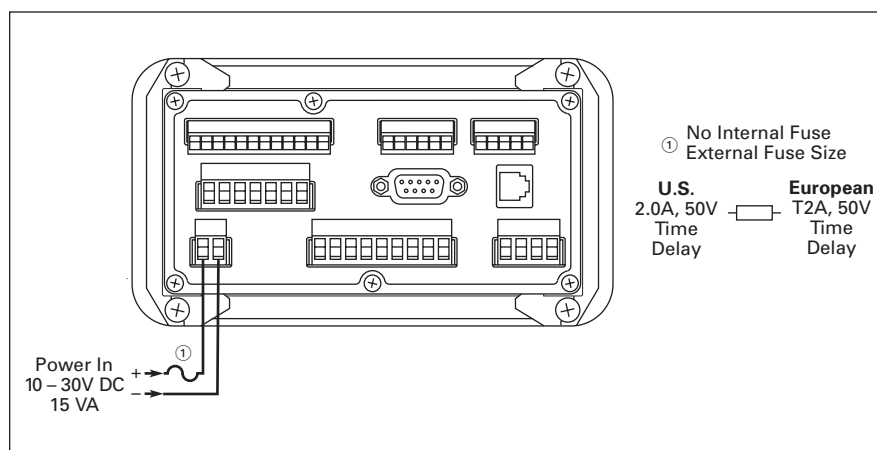


Figure 2. DC Power Input (for DC powered model 57550400)

Terminal ratings: 10A, 380V AC, wire size 12 – 24 AWG (3.1 mm² – 0.24 mm²) 600V

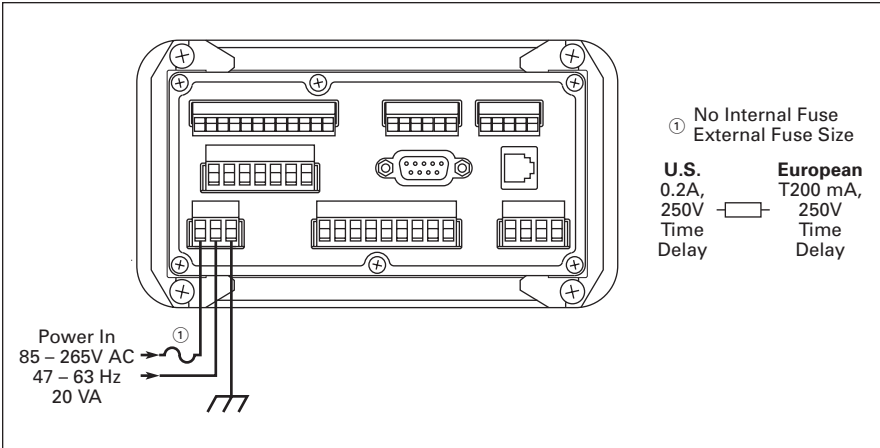


Figure 3. AC Power Input (for AC powered model 57551400)

Terminal ratings: 10A, 250V AC, wire size 12 – 24 AWG (3.1 mm² – 0.24 mm²) 600V

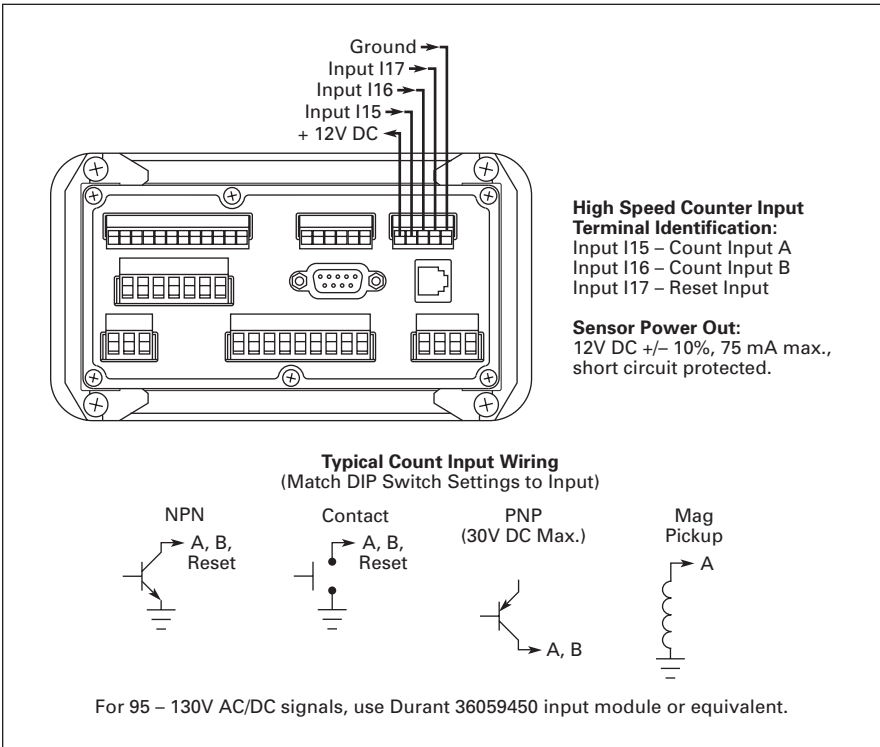


Figure 4. High Speed Counter Inputs I15 – I17 and DIP Switches

Terminal ratings: 8A, 125V AC, wire size 16 – 28 AWG (1.3 mm² – 0.1 mm²) 600V

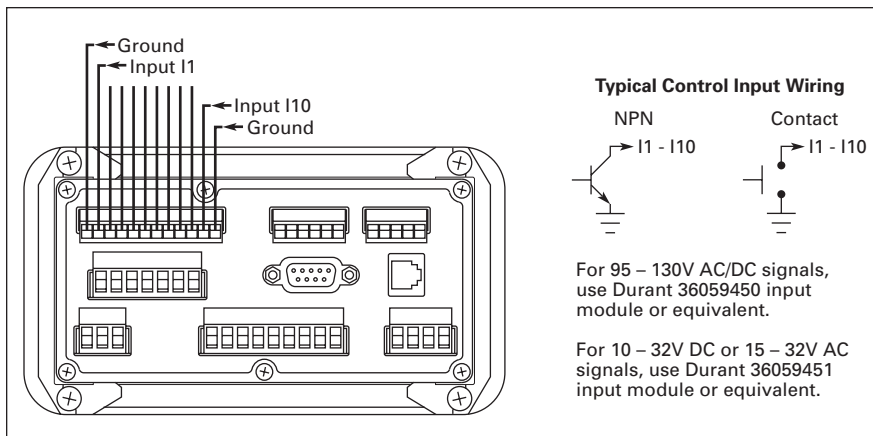


Figure 5. Control Inputs I1 – I10

Terminal ratings: 8A, 125V AC, wire size 16 – 28 AWG (1.3 mm² – 0.1 mm²) 600V

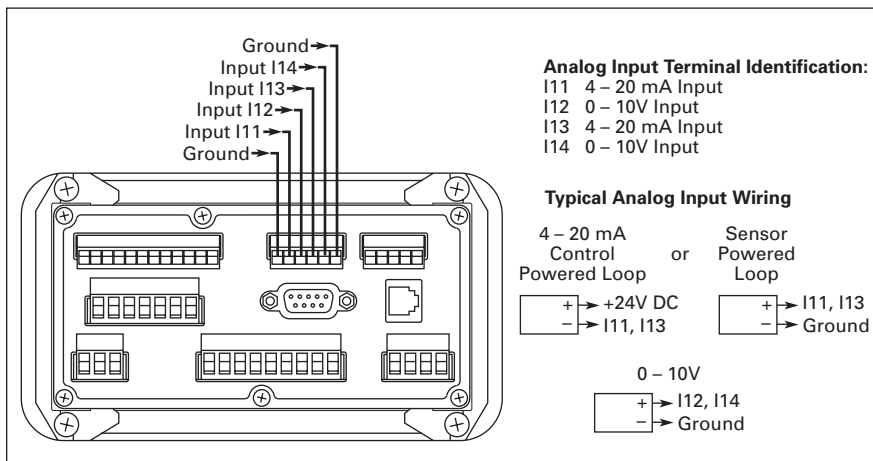


Figure 6. Analog Inputs I11 – I14

Terminal ratings: 8A, 125V AC, wire size 16 – 28 AWG (1.3 mm² – 0.1 mm²) 600V

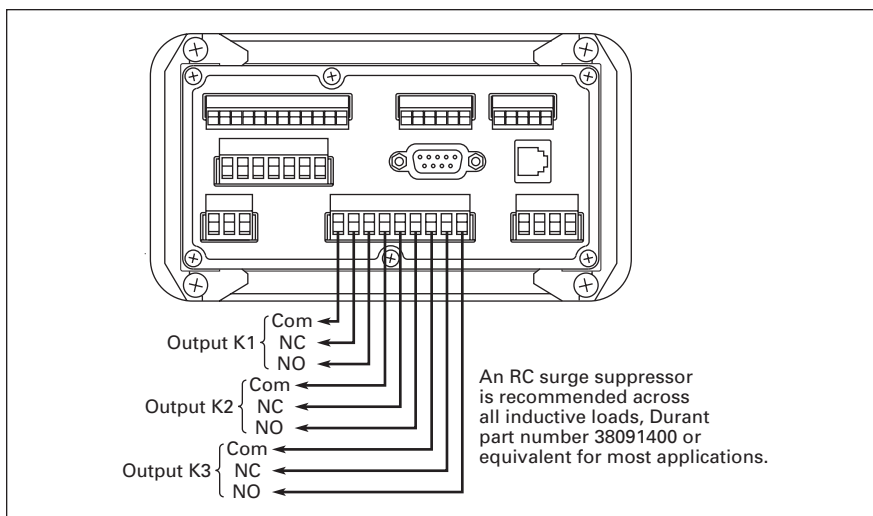


Figure 7. Relay Outputs K1, K2 and K3

Terminal ratings: 10A, 250V AC, wire size 12 – 24 AWG (3.1 mm² – 0.24 mm²) 600V

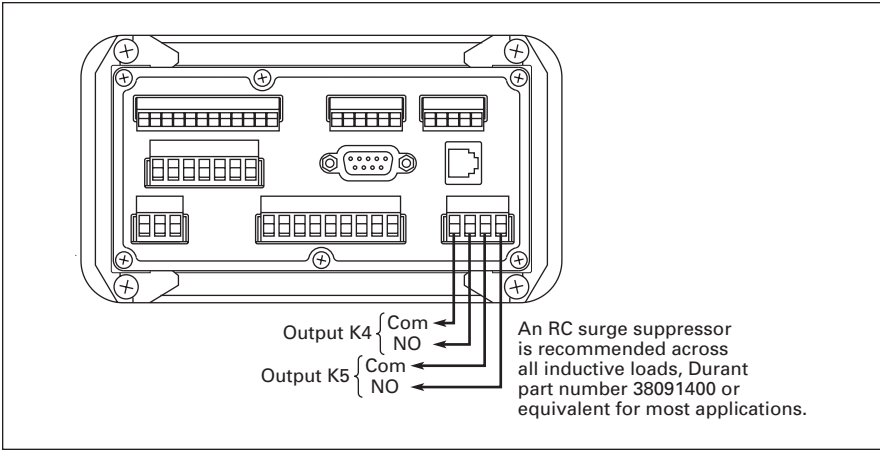


Figure 8. Relay Outputs K4 and K5

Terminal ratings: 10A, 250V AC, wire size 12 – 24 AWG (3.1 mm² – 0.24 mm²) 600V

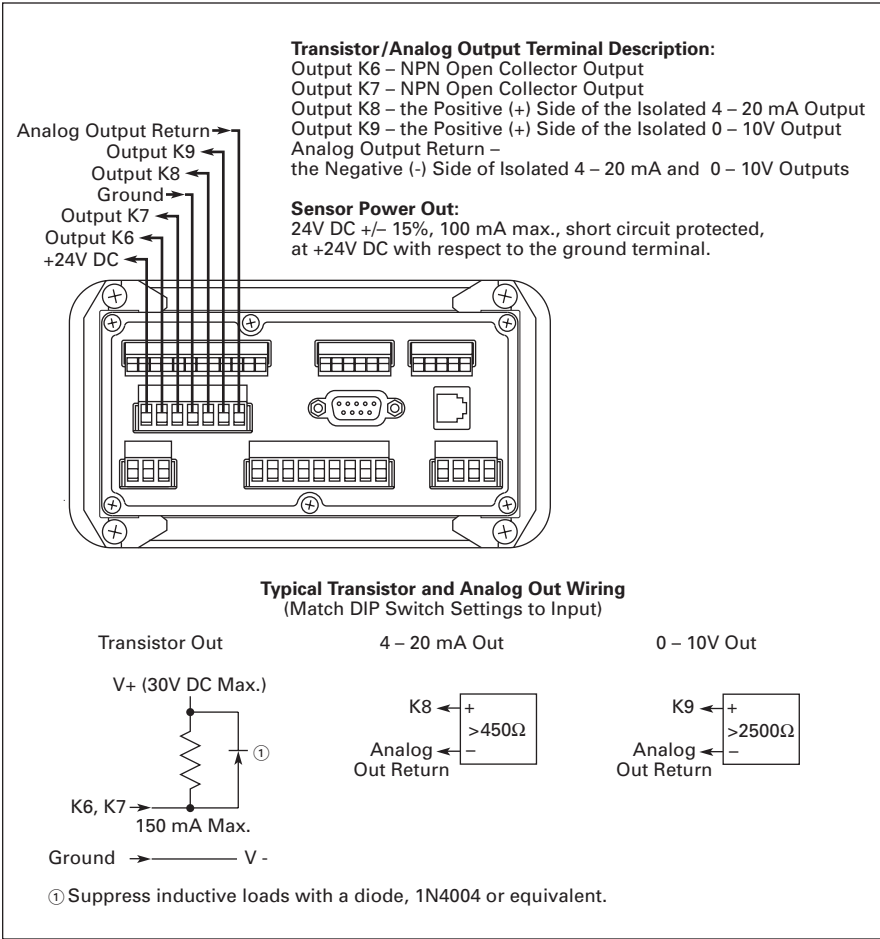


Figure 9. Transistor and Analog Outputs K6 – K9

Terminal ratings: 10A, 250V AC, wire size 12 – 24 AWG (3.1 mm² – 0.24 mm²) 600V

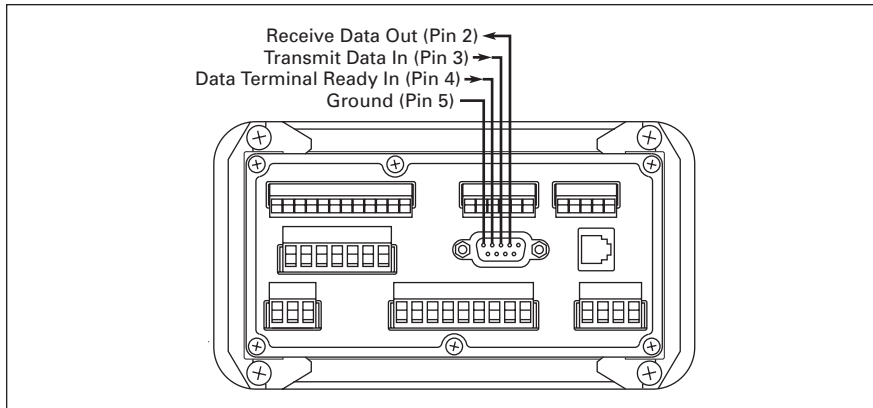


Figure 10. RS-232 Serial Port (DCE polarity)

Mating connector: DB-9P

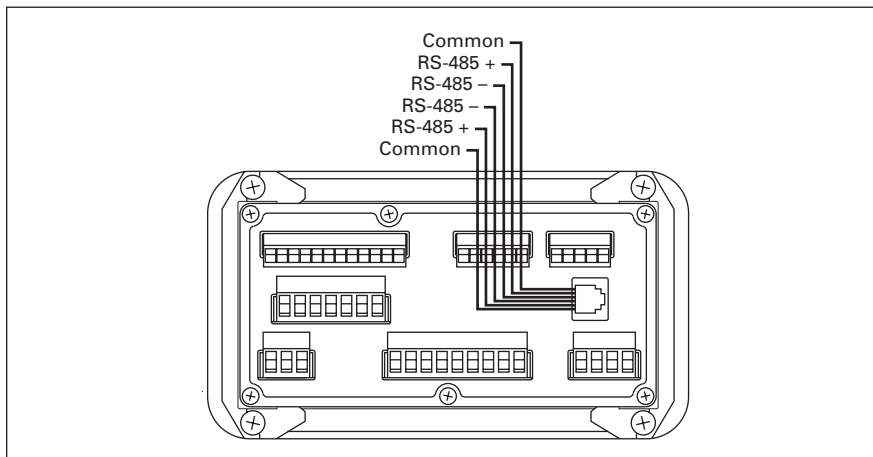


Figure 11. RS-485 Serial Port

Mating connector: RJ-12 plug

Typical wiring: Both commons are connected inside the control, as are both RS-485+ terminals and both RS-485- terminals. Connect all devices on the RS-485 network + to +, - to - and common to common, using three conductor cable.

Dimensions

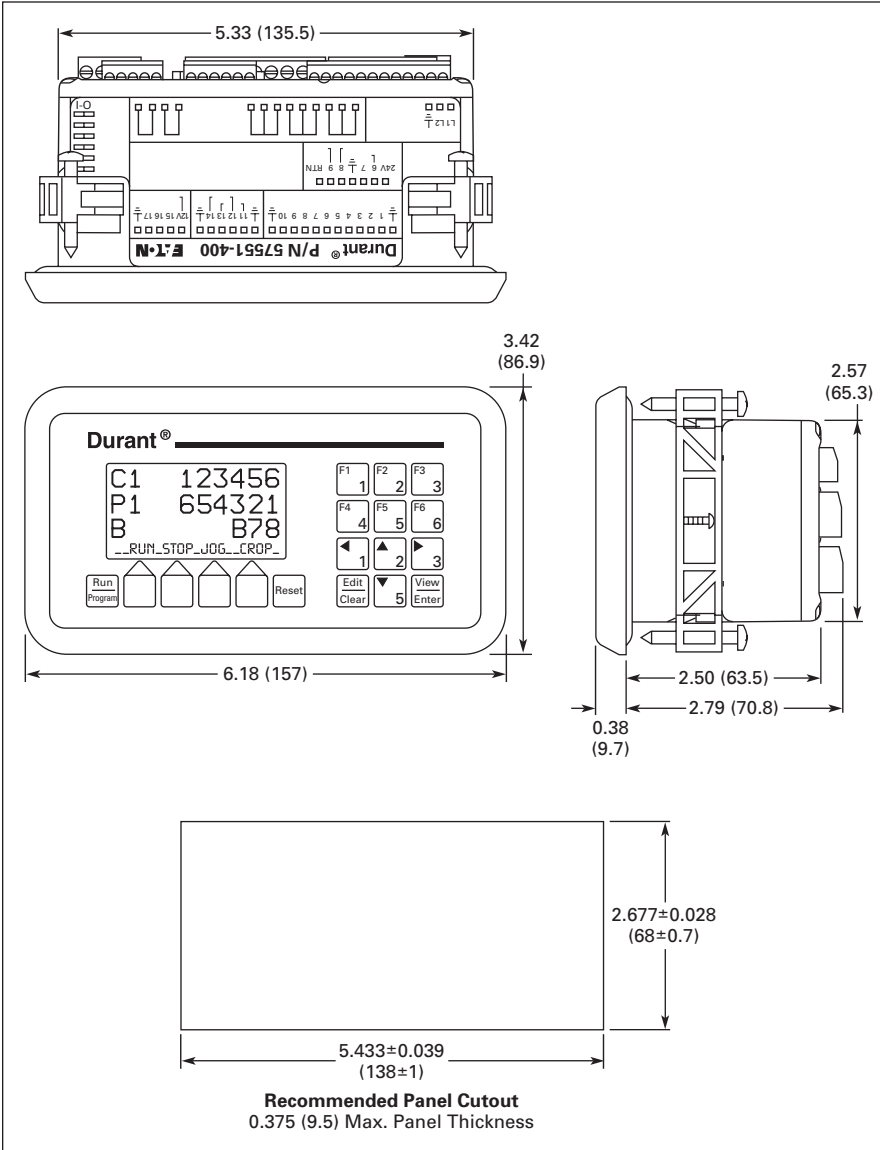


Figure 12. Approximate Dimensions in Inches (mm)

Product Selection

Table 3. Fusion Product Selection

Input Power	Catalog Number
10 – 30V DC	57550-400
85 – 265V AC	57551-400

Table 4. Accessories

Description	Catalog Number
Windows Programming Software & User Manual	57590-400
AC (95 – 130) to DC Input Module – Wire Leads	36059-450
Eight Slot I/O Module Mounting Board	58490-444
120V AC Input Module	36059-200
DC (10 – 32V) Input Module	36059-201
240V AC Input Module	36059-206
Analog to Frequency Converter	48160-45X
Surge Suppressor	38091-400
Comm Converter, RS-485/RS-232 with Terminals	58801-461
Comm Converter, RS-485/RS-232 with AC Line Cord	58801-460
Medium Duty, Single Channel Shaft Encoder	38150-XXX
Medium Duty, Quadrature Shaft Encoder	38151-XXX
Heavy Duty, Single Channel Shaft Encoder	48370-XXX
Heavy Duty, Quadrature Shaft Encoder	48371-XXX
Mating Connector and Encoder Cable (10')	29665-300
Rotary Contactor	41100-4XX 39100-4XX
Vane Pickup	39400-400
Solid-State Relays	E45 Series
Desk Mounting Kit	58802-420

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