

# Rosemount™ 3490 Series

## 4–20 mA + HART® Compatible Controller

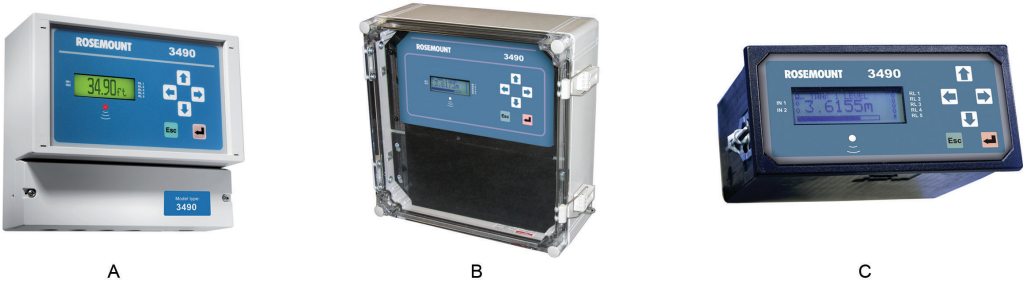


- Field mounted controller with integral multi-function LCD display and keypad
- Tough weatherproof wall mount enclosure for internal or external mounting
- Accepts 4–20 mA and HART inputs
- Compatible with HART 7 transmitters
- Intrinsically safe power supply to a transmitter
- Isolated 4–20 mA output
- Five field adjustable alarm and control relays
- Pre-programmed with tank shapes, flow algorithms, and pump control routines to simplify configuration

# Overview of the Rosemount 3490 Series

The Rosemount 3490 Series of wall and panel mounting control units provide comprehensive control functionality for any 4–20 mA or HART compatible transmitter. A back-lit display gives clear visual indication of the measured value and status of all inputs and outputs.

Figure 1: Mounting Options



- A. Wall mount, IP65 version
- B. Wall mount, NEMA® 4X version
- C. Panel mount version

## Features and benefits

- Tough weatherproof wall mount enclosure for internal and external mounting.
- Accepts 4–20 mA or HART inputs.
- Compatible with HART 5, 6, and 7 transmitters.
- Five voltage-free SPDT relays for alarm and control duties.
- Supports two voltage-free contact closure inputs.
- 4–20 mA 12-bit isolated current output proportional to calculated value.
- Bright local display of measured value and input/output status.
- Programmed tank shapes, flow algorithms, and control routines simplify configuration. A 20-point strapping table facility is provided for non-standard applications.
- Real-time clock for energy saving routines, pump efficiency calculations, and date/time stamping of data logging.
- The Rosemount 3490 Series is mounted in a non-hazardous area, and provides a protected (intrinsically safe) direct current supply to a transmitter mounted in a hazardous area.

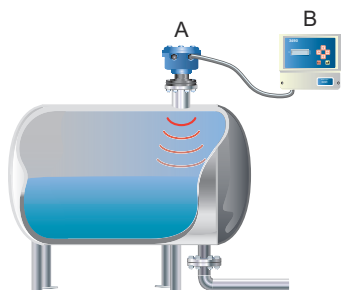
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## Ideal for programming and control of Rosemount level and flow transmitters

Ideal for programming and control of Rosemount 3100 Series level and flow transmitters, and Rosemount 3300 Guided Wave Radar level and interface transmitters (non-explosion-proof only).

**Figure 2: Level or Volume Measurement with a Rosemount 3100 and 3490**



- A. Rosemount 3100 Series Level Transmitter  
B. Rosemount 3490 Series Control Unit

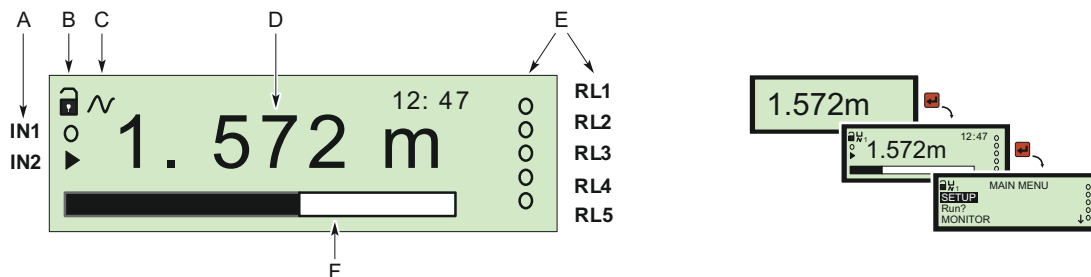
Other HART transmitters can be connected. The Rosemount 3490 Series recognizes transmitters as “unknown instruments” but allows access to programming of Universal and Common Practice HART commands.

## Special features

- Configured and interrogated using an integral six-button keypad.
- Easy to navigate menu structure.
- Wizard assisted programming, with password protection to prevent unauthorized access. Many popular configurations are “Wizard assisted”, enabling fast and accurate programming. Typical applications include level, volume, distance measurement, and open channel flow measurement.
- The HART digital or 4–20 mA analog signal from the transmitter may be offset, dampened, scaled, and linearized. A range of pre-programmed linearization algorithms are user-selectable.
- The 4–20 mA output signal may be scaled to re-transmit all or just part of the transmitter’s input signal or calculated value.
- Five relays are fully field programmable to perform a variety of control, fault indication, and alarm duties.

Two digital inputs can be individually set-up to perform various control actions (e.g. raise an alarm) whenever activated.

**Figure 3: Typical Rosemount 3491 Display**



- A. Digital input status  
B. Online status  
C. Digital communication status  
D. Measured variable  
E. Relay status  
F. Bar graph of 4–20 mA output

## Ordering information

### Online Product Configurator

Many products are configurable online using our Product Configurator. Select the **Configure** button or visit our [website](#) to start. With this tool's built-in logic and continuous validation, you can configure your products more quickly and accurately.

### Specifications and options

See the Specifications and options section for more details on each configuration. Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See the Material selection section for more information.

#### Related information

[Specifications](#)

[Material selection](#)

### Model codes

Model codes contain the details related to each product. Exact model codes will vary; an example of a typical model code is shown in [Figure 4](#).

#### Figure 4: Model Code Example

**3491 L 1 P4 I5**

**1**

1. Required model components (choices available on most)

## Rosemount 3491, 3492, and 3493 ordering information



Each Rosemount 3490 Series Control Unit has been designed for a specific purpose:

The Rosemount 3491 Standard Control Unit accepts input from one transmitter.

[CONFIGURE >](#)
[VIEW PRODUCT >](#)

The Rosemount 3492 Differential Measurement Control Unit accepts input from two HART transmitters and performs sum or differential calculations, providing a single current output proportional to the answer.

[CONFIGURE >](#)
[VIEW PRODUCT >](#)

The Rosemount 3493 Logging Measurement Control Unit provides on-board logging of the process/primary value (PV), and totaled open channel flow.

[CONFIGURE >](#)
[VIEW PRODUCT >](#)

## Required model components

### Model

Code	Description
3491	Standard control unit
3492	Differential control unit
3493	Logging control unit

### Signal output

Code	Description
L	4–20 mA

### Power supply

Code	Description
1	115/230 Vac
2	24 Vdc

### Enclosure/mounting

Code	Description
P6	Wall mounting, IP65
P7	Panel mounting, IP40
P4	Wall mounting, NEMA® 4X

**Product certificates**

Code	Description
I1	ATEX Intrinsically Safe
I5 <sup>(1)</sup>	USA Intrinsically Safe
I6 <sup>(2)</sup>	CSA Intrinsically Safe
I7	IECEx Intrinsically Safe

(1) Enclosure/mounting codes P4 or P7 are required for this option.

(2) Enclosure/mounting codes P4 or P7 are required for this option.

**Accessory****Table 1: Accessory Ordering Information**

Accessory	
03490-7001-0001	IP65 hood kit for panel-mountable control unit (enclosure/mounting code P7)

**Related information**

[Enclosure/mounting](#)

# Specifications

## General

### Products

- Rosemount 3491 Standard Control Unit
- Rosemount 3492 Differential Control Unit
- Rosemount 3493 Logging Control Unit

### Mounting styles

Wall or panel mount

### Power options

AC mains or DC

## Display

### Type

Dot matrix LCD, 32 × 122 pixels, back lit

### Location

Integrated into the housing

### Indicators

Red LED for health status

## Electrical

### AC mains power supply input

115 or 230 Vac ± 10% (switch selectable)

### Power consumption

10 VA nominal, 18 VA maximum

### Fuse

200 mA(T), 5 × 20 mm, 250 V

### DC power supply input

15 to 30 Vdc, 30 Vdc maximum

**Power consumption**

9 W maximum

**Current input**

4–20 mA (Earth referenced in control unit) or HART digital communications (Rev. 5, 6, and 7).

One HART transmitter on the Rosemount 3491 and 3493, and two HART transmitters on the Rosemount 3492.

**Load limitations**

The Rosemount 3490 Series provides an intrinsically safe power supply to an intrinsically safe approved transmitter mounted in a hazardous area. The control unit provides a nominal 24 Vdc supply, but this output varies at the terminals depending on electrical load conditions (see [Table 2](#)).

**Table 2: Minimum Terminal Output Voltages**

Load current (mA)	Rosemount 3490 Series terminal voltage (Vdc)	Maximum loop resistance (Ohms)
3.75 <sup>(1)</sup>	20.9	2370
4.0	20.8	2195
20.0	13.9	95
21.75 <sup>(2)</sup>	13.5	50
22.5 <sup>(3)</sup>	12.8	35

(1) Minimum fault current.

(2) Maximum output (Rosemount standard fault level).

(3) Maximum output (NAMUR NE43 fault level).

**Trigger inputs**

Two voltage-free contact closures

**Current output****Signal range (nominal)**

4–20 mA

**Output range (linear)**

- 3.8 to 20.5 mA (user-selectable alarm current of 3.6, 21, or 22.5 mA) or
- 3.9 to 20.8 mA (user-selectable alarm current of 3.75 or 21.75 mA)

**Load**

$R_{\max}$  is 2370 Ohms

**Resolution**

12-bit

**Regulation**

< 0.1% over load change from 0 to 600 Ohms



## Isolation

Isolated from other terminals to 500 Vdc

## Update rate (software)

Five times per second

## Cable entry

### IP-rated wall mount enclosure

Five positions pre-drilled, two glands and three blanking plugs supplied

### NEMA-4X-rated wall mount enclosure

Positions require drilling by user, glands/conduits and blanking plugs are not supplied

### Panel enclosure

Direct wiring to terminal blocks at rear

## Cable connection

### Wall mount enclosure

Cage clamp terminal blocks in separate terminal compartment

### Panel mount enclosure

Two-part cage clamp terminal blocks at rear

## Mechanical

### Material selection

Emerson provides a variety of Rosemount products with various product options and configurations including materials of construction that can be expected to perform well in a wide range of applications. The Rosemount product information presented is intended as a guide for the purchaser to make an appropriate selection for the application. It is the purchaser's sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product, materials, options, and components for the particular application. Emerson is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product, options, configuration or materials of construction selected.

### Materials of construction

#### Wall mount

- Polycarbonate enclosure and cover
- IP-rated wall mount: 304SST cover fixing screws
- NEMA-4X-rated wall mount: Polyester and Alloy 400 fastening
- UV resistant Polycarbonate membrane keypad
- Nylon cable glands and blanking plugs (IP-rated wall mount version only)

**Panel mount**

- Polyphenylene (PPO) enclosure and cover
- Carbon Steel/Zinc plated fascia fixing screws
- UV resistant Noryl PPO membrane keypad
- Nylon + PBT terminal blocks with plated fittings

**Weight****IP-rated wall mount**

- Mains unit: 3.1 lb (1.4 kg)
- DC unit: 2.2 lb (1.0 kg)

**NEMA-4X-rated wall mount**

- Mains unit: 7.7 lb (3.5 kg)
- DC unit: 6.8 lb (3.1 kg)

**Panel mount**

- Mains unit: 2.6 lb (1.2 kg)
- DC unit: 1.8 lb (0.8 kg)

**Environment****Ambient temperature**

–40 to 131 °F (–40 to 55 °C)

See [Product certifications](#) for approval temperatures ranges.

**Relative humidity****Wall mount**

100%

**Panel mount**

90% non-condensing

**Electrical safety**

EN61010-1

**Ingress protection****IP-rated wall mount**

IP65 indoor/outdoor

**NEMA-4X-rated wall mount**

NEMA 4X indoor/outdoor

**Panel mount**

IP40 indoor mount (or IP65 if with optional hood)

**Maximum vibration**

Control Room: 0.1 to 9 Hz 1.5 mm displacement peak amplitude/9 to 200 Hz 0.5 g.

**Installation category**

- Category III: Supply voltage < 127 Vac (IEC60664)
- Category II: Supply voltage < 254 Vac (IEC60664)

**Pollution degree**

2 (IEC60664)

**Maximum altitude**

6562 ft. (2000 m)

**Electromagnetic compatibility**

Emissions and immunity (for IP-rated wall mount and panel mount): EN61326-1

# Product certifications

Rev 1.00

## European Union directive information

A copy of the EU Declaration of Conformity can be found at the end of the Rosemount 3490 [Product Certifications document](#). The most recent revision of the EU Declaration of Conformity can be found at [Emerson.com/Rosemount](https://emerson.com/Rosemount).

## Installing equipment in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

## North America

### I5 USA Intrinsically safe

<b>Certificate</b>	1830310
<b>Standards</b>	CSA C22.2-No. 0-10, CSA C22.2 No. 142-M1987, CAN/CSA-C22.2 No. 157-92, UL 913-1997, UL 916, CAN/CSA C22.2 No.94-M1991
<b>Markings</b>	Intrinsically safe for Class I, Division 1, Groups A, B, C, and D Intrinsically safe for Class 1, Zone 0, Group IIC [Ex ia] Ambient temperature: -40 °C to +55 °C

	<b>Uo</b>	<b>Io</b>	<b>Po</b>	<b>La</b>	<b>Ca</b>
Safety parameters	+27.3 V	96.9 mA	0.66 W	2.26 mH	70 nF

### I6 CSA Intrinsically safe

<b>Certificate</b>	1830310
<b>Standards</b>	CSA C22.2-No. 0-10, CSA C22.2 No. 142-M1987, CAN/CSA-C22.2 No. 157-92, UL 913-1997, UL 916, CAN/CSA C22.2 No.94-M1991
<b>Markings</b>	Intrinsically safe for Class I, Division 1, Groups A, B, C, and D Intrinsically safe for Class 1, Zone 0, Group IIC [Ex ia] Ambient temperature: -40 °C to +55 °C

	<b>Uo</b>	<b>Io</b>	<b>Po</b>	<b>La</b>	<b>Ca</b>
Safety parameter	+27.3 V	96.9 mA	0.66 W	2.26 mH	70 nF

## Europe

### I1 ATEX Intrinsically Safe

<b>Certificate</b>	Sira 06ATEX7128 (Wall Mount) Sira 06ATEX7129X (Panel Mount)
<b>Standards</b>	EN 60079-0:2012, EN 60079-11:2012, EN 60079-26:2007
<b>Markings</b>	Ⓔ II(1) G D, [Ex ia] IIC, [Ex ia Da] IIIC Ambient temperature: –40 °C to +55 °C (See also <a href="#">ATEX and IECEx conditions for safe use (I1 and I7)</a> )

#### Specific Conditions of Use (X):

- For Sira 06ATEX7129X: Terminal 30 must be connected to a high integrity earth/ground point in a non-hazardous area.

## International

### I7 IECEx Intrinsically Safe

<b>Certificate</b>	IECEx SIR 06.0104X
<b>Standards</b>	IEC 60079-0:2011, IEC 60079-11:2011
<b>Markings</b>	Intrinsically safe for [Ex ia] IIC, [Ex ia Da] IIIC Ambient temperature: –40 °C to +55 °C (See also <a href="#">ATEX and IECEx conditions for safe use (I1 and I7)</a> )

	Uo	Io	Po	Li	Ci
Safety parameters	+27.3 V	96.9 mA	0.66 W	0.22 mH	0.6 nF

#### Specific Conditions of Use (X):

- Terminal 30 of the panel mount control unit (349\*\*\*P7\*\*\*) shall be earthed/grounded in the safe area using a high integrity earth/ground.

## Republic of Korea

### GP KTL KCC mark for ordinary locations use

<b>Certificate</b>	KCC-REM-ERN-RMDUNCU3490XXX
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### ATEX and IECEx conditions for safe use (I1 and I7)

Model numbers covered: 349\*\*\*\*\*I1\*\*\* and 349\*\*\*\*\*I7\*\*\* (“\*” indicates options in construction, function and materials).

The following instructions apply to equipment covered by certificates numbered **Sira 06ATEX7128**, **Sira 06ATEX7129X**, and **IECEx SIR 06.0104X**:

1. The Rosemount 3490 Series Control Unit ("control unit") may be connected to a transmitter located in a hazardous area. The control unit must not itself be located in a hazardous area.
2. General:
  - a. Do not mount the control unit on a structure that is subject to vibration, or in a position where damage may be caused by impact, thermal stress or liquid ingress.
  - b. The fuse must only be replaced with the type specified.
  - c. It is the responsibility of the user to ensure the voltage and current limits for this equipment are not exceeded.
  - d. If the equipment is likely to come into contact with aggressive substances, it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.
    - **Aggressive Substances:** e.g. acidic liquids or gases that may attack metals or solvents that may affect polymeric materials.
    - **Suitable Precautions:** e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.
  - e. The user should not repair this equipment.
3. Wiring instructions:
  - a. Terminal 30 of the control unit must be connected to an intrinsically safe earth/ground point.
  - b. The control unit must not be connected to a supply exceeding 250 V r.m.s. or dc, or to apparatus containing a source of voltage exceeding 250 V r.m.s. or dc.
  - c. The Intrinsically Safe outputs of the control unit may be connected to certified equipment used in a hazardous area requiring Equipment Protection Level Ga or Da (category 1) equipment, with flammable gas and vapor groups IIC, IIB and IIA, and flammable dust groups IIIC, IIIB, and IIIA. No additional I.S. barrier is required.
  - d. If the circuit connected to terminals 1 and 2 does not satisfy IEC60079-11 (EN60079-11) clause 6.3.13 (Isolation of circuits from earth or frame), then equipotential earthing/grounding to the control unit intrinsically safe earth/ground shall be provided.  
An example of equipotential earthing/grounding is a cable with a cross-sectional area greater than 4 mm<sup>2</sup> and a resistance of less than 1 Ohm.
4. Technical data:
  - a. Coding:
 

**ATEX** II (1) GD  
[Ex ia] IIC (−40 °C ≤ Ta ≤ 55 °C)  
[Ex ia Da] IIIC (−40 °C ≤ Ta ≤ 55 °C)

**IECEx** [Ex ia] IIC (−40 °C ≤ Ta ≤ 55 °C)  
[Ex ia Da] IIIC (−40 °C ≤ Ta ≤ 55 °C)
  - b. Safety parameters:
 

Terminals T1 (24 V) with respect to T2 (I <sub>in</sub> ) and T1 (24 V) with respect to T3 (Earth)	Terminals T2 (I <sub>in</sub> ) with respect to T3 (Earth) <sup>(1)</sup>
U <sub>i</sub> = 0, U <sub>o</sub> = 27.3 V, I <sub>o</sub> = 96.9 mA, P <sub>o</sub> = 0.66 W, L <sub>i</sub> = 0.22 mH, C <sub>i</sub> = 0.6 nF	U <sub>i</sub> = 30 V, I <sub>i</sub> = 120 mA, L <sub>i</sub> = 0.1 mH, C <sub>i</sub> = 0.6 nF, U <sub>o</sub> = 6.51 V (capacitive charging only), I <sub>o</sub> = 0, P <sub>o</sub> = 0

(1) Terminal T2 (I<sub>in</sub>) with respect to terminal T3 (Earth) must be treated as a 6.51 V source. The 6.51V is considered as being theoretical maximum to which a capacitive load across these terminals could become charged through leakage via internal series blocking diodes. This voltage does not contribute to the short circuit sparking risk of any external source connected to these terminals.
  - c. The **capacitance** and **inductance** of the load connected must not exceed the following values:

Group	Capacitance	Inductance (mH) or L/R Ratio ( $\mu\text{H}/\text{Ohm}$ )	
IIC	0.082 $\mu\text{F}$ <sup>(1)</sup>	1.2 mH	42 $\mu\text{H}/\text{Ohm}$
IIB	0.65 $\mu\text{F}$	10.9 mH	172 $\mu\text{H}/\text{Ohm}$
IIA	2.15 $\mu\text{F}$	21.9 mH	346 $\mu\text{H}/\text{Ohm}$

(1) 0.082  $\mu\text{F}$  of which total  $C_i$  of the hazardous area apparatus connected must not exceed 0.020  $\mu\text{F}$ .

d. Fuse: 200mA (T) 5 × 20mm 250V

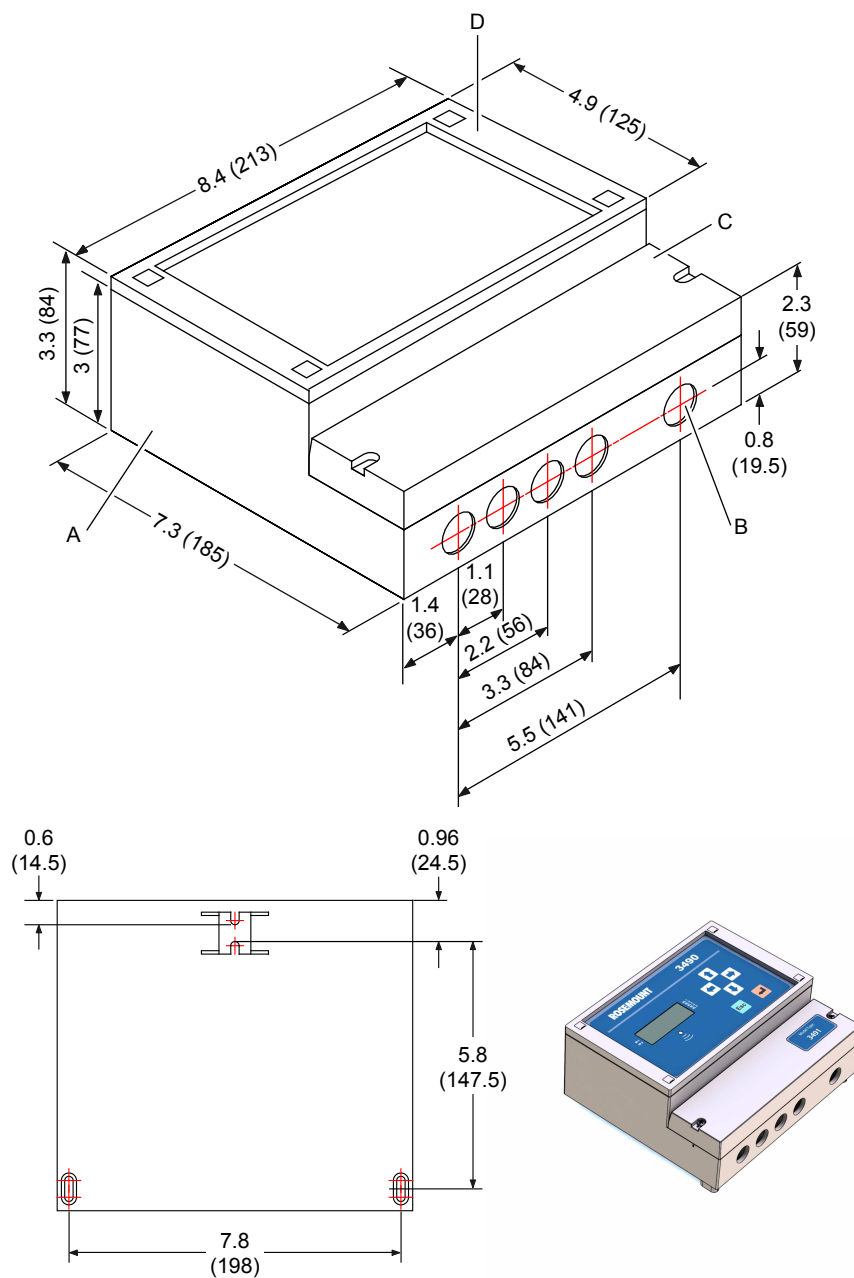
e. Materials of construction:

- 349\*\*\*P6\*** Polycarbonate enclosure and cover  
304SS cover fixing screws  
UV resistant polycarbonate membrane keypad  
Nylon cable glands and blanking plugs
- 349\*\*\*P4\*** Polycarbonate enclosure and cover  
Polyester and alloy 400 fastening  
UV resistant polycarbonate membrane keypad
- 349\*\*\*P7\*** Polyphenylene (PPO) enclosure and cover  
Carbon steel / zinc-plated fascia fixing screws  
UV resistant Polycarbonate membrane keypad  
Nylon and PBT terminal blocks with plated fittings

f. Year of manufacture: printed on product label.

## Dimensional drawings

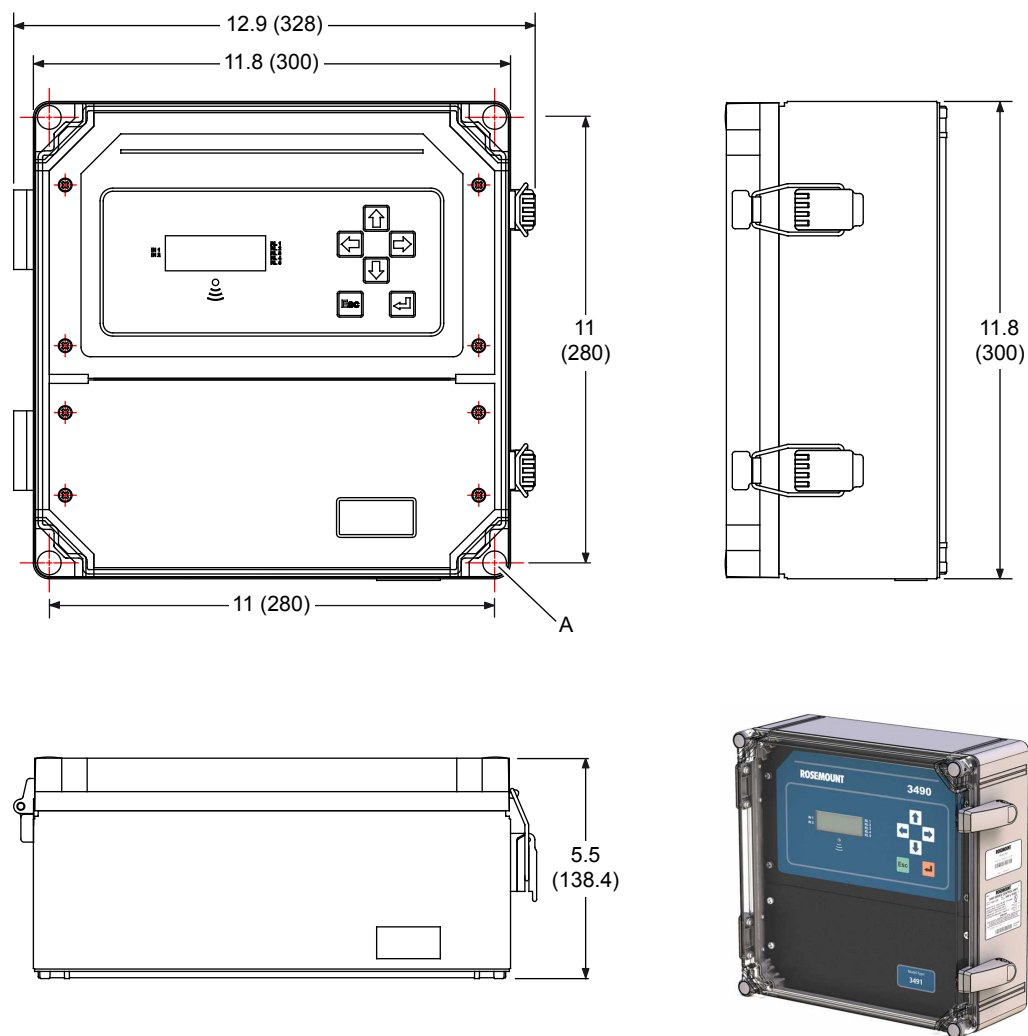
Figure 5: IP-Rated Wall Mount Control Unit



- A. Body
- B. Five holes 0.8 (20.5)
- C. Terminal cover
- D. Lid

Dimensions are in inches (millimeters).

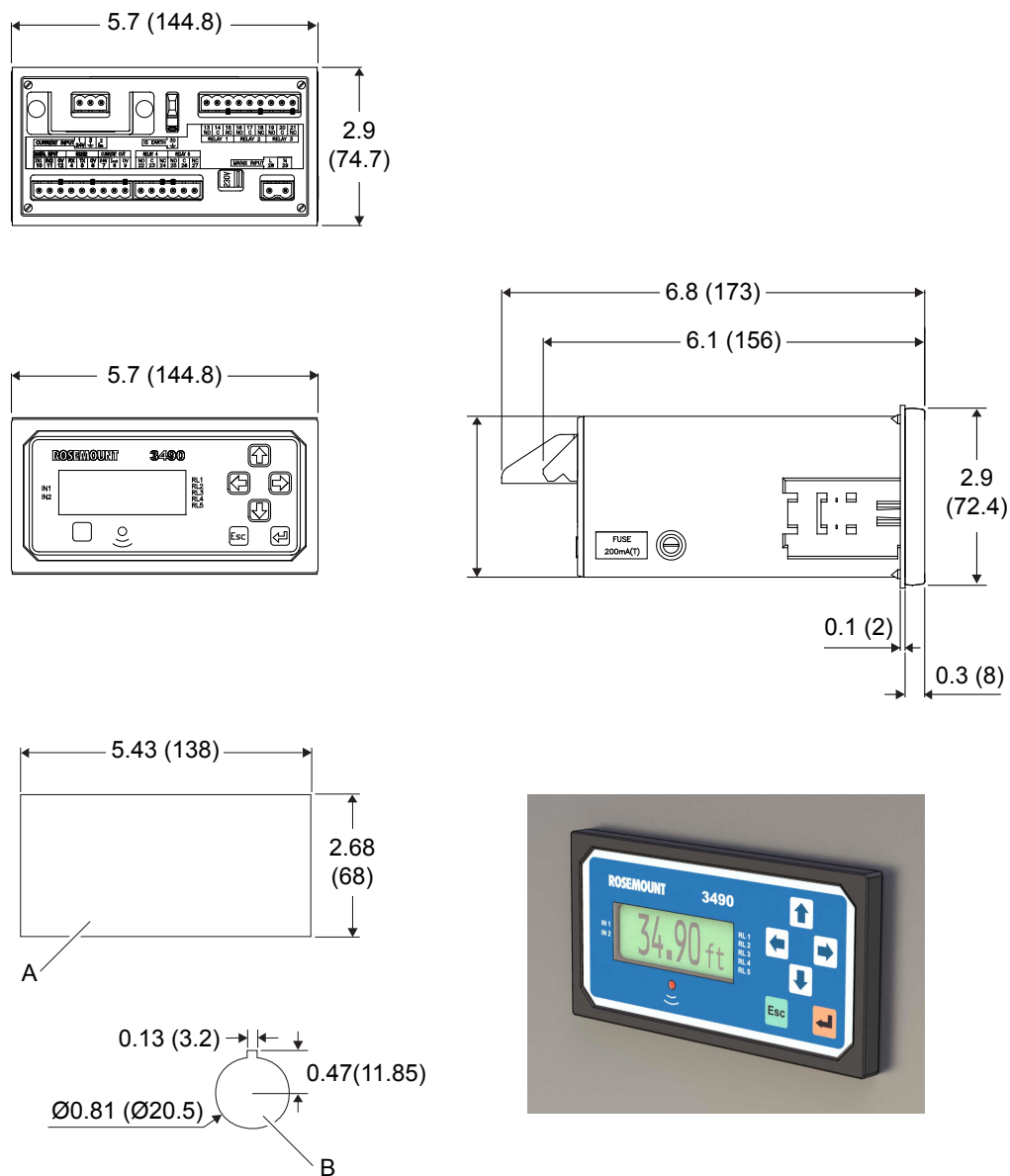


**Figure 6: NEMA-4X-Rated Wall Mount Control Unit**

A. Four mounting holes 0.3 (8)

Dimensions are in inches (millimeters).

Figure 7: Panel Mount Unit



A. Panel cut-out (control unit)

B. Panel cut-out (RS232 data download socket on 3493 only)

Dimensions are in inches (millimeters).

#### Note

For safety, the panel should be strong enough to support the 2.6 lb (1.2 kg) (mains power) or 1.8 lb (0.8 kg) (DC power) mass of the unit.



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