



**FR302**

***Fieldbus Relay***

# FR302

## Fieldbus Relay

### Highlights

- Discrete Output connected direct onto FOUNDATION™ Fieldbus
- Instantiable Function Blocks for regulatory and discrete control in the field.
- Two built-in Solid State Relay Outputs.
- Designed for DC and AC loads.
- Mix Fieldbus with conventional devices.
- Reduce wiring cost.
- Network master capability.

### Description

FR302 is a fieldbus device that has two built-in relays making integration of Fieldbus to conventional devices such as solenoids, on/off valves, electrical actuators, motors, pumps, and starters and similars. The FR302 Fieldbus Relay can be located at the field, mounted close to the conventional output devices without the need to run the conventional wiring to the control room. The FR302 is an integral part of SYSTEM302 but also integrates into other systems supporting FOUNDATION™ Fieldbus.

An extensive function block library enables the FR302 to perform logic and regulatory control functions in the field integrating it to the control strategy with other H1 Fieldbus devices on the same network.

Instantiable function blocks provide great flexibility in control strategy. Link master capability allows the FR302 to work as a backup LAS for greater availability of network communications.

One very interesting application for FR302 is as interface for electrical actuators. Any electrical actuator, including Smar series AD/AR/AL becomes a Fieldbus actuator, making FR302 ideal in upgrades and plant reinstrumentations. The PID Step block is ideal in these cases since it can modulate the valve without the need for actual position feedback.

### Easy Configuration

The FR302 is fully configured from the Syscon software in SYSTEM302 or any other FOUNDATION™ Fieldbus configuration tool.



## Instantiable Function Blocks

The FR302 makes conventional discrete outputs available using standard FOUNDATION™ Function blocks making the system homogenous and control strategy configuration easy as conventional I/O appears as if they were regular Fieldbus devices. Control loops can be implemented consistently regardless of I/O being conventional or Fieldbus based.

Conventional discrete Output now works together with pure Fieldbus devices on the same network and in the same loop. Output function blocks include standard FOUNDATION™ safety mechanism in case of failures.

### Function Blocks Table

BLOCK	
RES	<b>RESOURCE</b> – This block contains data that is specific to the hardware that is associated with the device.
FFET	<b>FLIP-FLOP AND EDGE TRIGGER</b> – It can be configured to work as SR flip-flop, RS flip-flop, D-latch and Edge-Trigger (rising, falling and bi-directional)
AALM	<b>ANALOG ALARM</b> – This alarm block has dynamic or static alarm limits, hysteresis, temporary expansion of alarm limits on step setpoint changes to avoid nuisance alarms, two levels of alarm limits and delay for alarm detection
TIME	<b>TIMER</b> – This block has four discrete inputs, that are processed by a combination logic. The selected timer processing type operates on the combined input signal to produce a measurement, delay, extension, pulse or debounce.
DO	<b>DISCRETE OUTPUT</b> – The DO block converts the value in SP_D to something useful for the hardware found at the CHANNEL selection.
ARITH	<b>ARITHMETIC</b> – This calculation block provides some pre-defined equations ready for using in applications as flow compensation, HTG, ratio control and others.
ISEL	<b>INPUT SELECTOR</b> – This block has four analog inputs that may be selected by an input parameter or according to a criterion as first good, maximum, minimum, middle and average.
PID	<b>PID CONTROL</b> – This standard block has a lot of valuable features as setpoint treatment (value and rate limiting), filtering and alarm on PV, feedforward, output tracking and others.
PID STEP	<b>STEP OUTPUT PID</b> – It is used when the final control element has an actuator driven by an electric motor.

## Technical Characteristics

### General

<b>Communication</b>	FOUNDATION™ Fieldbus, 31.25 kbits/s voltage mode.
<b>Current consumption quiescent</b>	17.5 mA from Fieldbus network.
<b>Turn-on Time</b>	Approximately 10 seconds.
<b>Update Time</b>	Approximately 0.5 second.
<b>Humidity Limits</b>	0 to 100% RH.
<b>Indication</b>	Optional 4½ digit LCD indicator.
<b>Temperature Limits</b>	Operation: -40 to 85° C (-40 to 185 °F) Storage: -40 to 120° C (-40 to 250 °F) Display: -10 to 60° C (14 to 140 °F) operation: -40 to 85° C (-40 to 185 °F) without damage.
<b>Vibration Effect</b>	Designed to comply with SAMA PMC 31.1.
<b>Electro-Magnetic Interference Effect</b>	Designed to comply with IEC61000-6-2:1999, IEC61000-6-2-4:1997, IEC61326:2002.
<b>Hardware</b>	Physical: according to IEC 61158-2.
<b>Electrical Connection</b>	1/2-14 NPT, Pg 13.5 or M20 x 1.5.
<b>Material of Construction</b>	Injected low copper aluminum with polyester painting or 316 Stainless Steel housing, with Buna N O-rings on cover (NEMA 4X, IP67).
<b>Mounting</b>	With an optional bracket can be installed on a 2" pipe or fixed on awall or panel.
<b>Weight</b>	Without display and mounting bracket: 0.80 kg. Add for digital display: 0.13 kg. Add for mounting bracket: 0.60 kg.

**Technical  
Characteristics**

**Output** The outputs are designed with Solid State relays that are able to drive incandescence lamps, solenoids and other DC and AC loads.  
When the output relays are N.C., if via function block is assigned a state “on” to the outputs, it means that the loads will be switched off.  
When the output relays are N.O., if via function block is assigned a state “on” to the outputs, it means that the loads will be switched on.

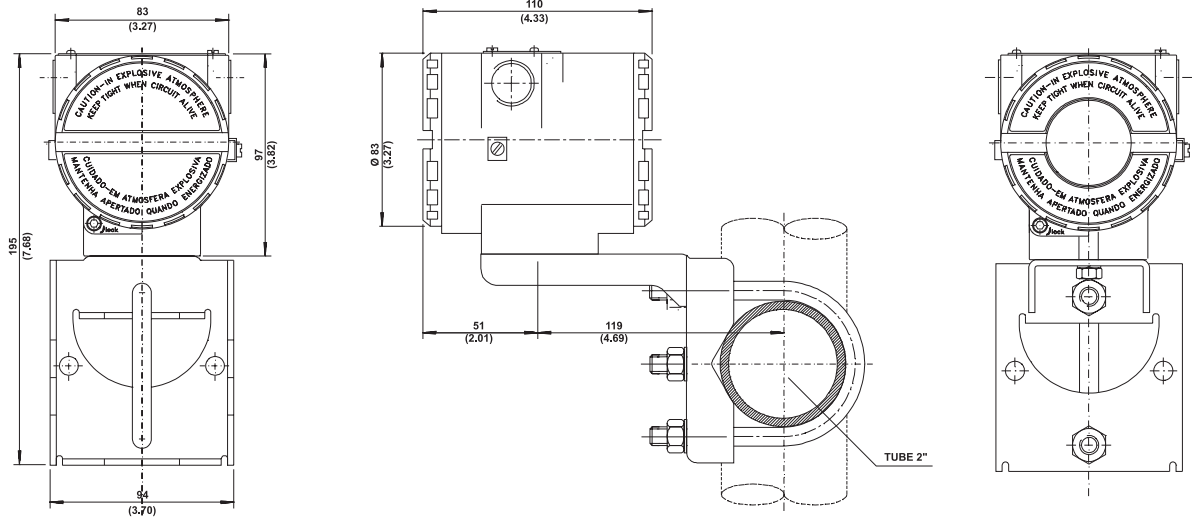
**Technical specifications for Normally Closed relays**

<b>Architecture</b>	Number of normally closed relays according to ordering code.
<b>Switching Voltage</b>	350 V <sub>peak</sub>
<b>Switching Current: AC mode</b>	100 mA
<b>Switching Current: DC mode</b>	165 mA
<b>On Resistance AC mode</b>	18 Ohms
<b>On Resistance DC mode</b>	4.5 Ohms
<b>Off State Resistance</b>	Min: 0.1 GOhms Typ: 1.4 GOhms
<b>Turn Off Time</b>	Typ: 1.0 μA
<b>Off State Leakage</b>	5ms
<b>Turn On Time</b>	1ms
<b>Capacitance - Across Output</b>	20 to 200 pF
<b>Thermal Offset Voltage</b>	0.20 mV
<b>Output Status with no power supply connected to the H1 bus</b>	OFF
<b>Output Status During: Firmware Download</b>	OFF
<b>Output Status During Turn-on Time:</b>	OFF
<b>Output Status During: Configuration Download</b>	OFF

## Technical specifications for Normally Open relays

<b>Architecture</b>	Number of normally open relays according to ordering code.
<b>Switching Voltage</b>	400 V <sub>peak</sub>
<b>Switching Current: AC mode</b>	150 mA
<b>Switching Current: DC mode</b>	250 mA
<b>On Resistance AC mode</b>	18 Ohms
<b>On Resistance DC mode</b>	4.5 Ohms
<b>Off State Resistance</b>	Min: 0.5 GOhms Typ: 5000 GOhms
<b>Off State Leakage</b>	Typ: 1.0 μA
<b>Turn On Time</b>	5ms
<b>Turn On Time</b>	1ms
<b>Capacitance - Across Output</b>	10 to 95 pF
<b>Thermal Offset Voltage</b>	0.20 mV
<b>Output Status with no power supply connected on the H1 bus</b>	ON
<b>Output Status During: Firmware Download</b>	ON
<b>Output Status During Turn-on Time:</b>	ON
<b>Output Status During: Configuration Download</b>	ON

## Dimensions



## Ordering Code

MODEL FR302 FIELDBUS RELAY

### CODE Local Indicator

- 0 Without Indicator
- 1 With Digital Indicator

### CODE Relay Output Conditions

- 1 Both Normally Open(N.O.)
- 2 Both Normally Closed(N.C.)
- 3 One N.O. and other N.C.

### CODE Mounting Bracket for 2" Pipe Mounting

- 0 Without Bracket
- 1 Carbon Steel Bracket
- 2 316 SST Bracket

### CODE Electrical Connections

- 0 1/2-14 NPT
- A M20 x 1,5
- B Pg 13,5 DIN

### CODE Options\*

- H1 316 SST Housing
- A1 316 SST Bolts
- ZZ Special Options - Specify

FR302 1 1 1 0 \* ◀ TYPICAL MODEL NUMBER

\* Leave it blank for no optional items.

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Specifications and information are subject to change without notice.  
Up-to-date address information is available on our website.

web: [www.smar.com/contactus.asp](http://www.smar.com/contactus.asp)

