



# IF/FI300 Series

## 3302-3303

### ANALOG SIGNAL CONVERTERS

FOR FOUNDATION™ fieldbus  
OR PROFIBUS-PA  
DIGITAL PROTOCOLS

- Available on FOUNDATION™ fieldbus and PROFIBUS-PA technologies
- Ideal for conventional devices in industrial systems with digital technology
- Universal interfaces between 0 to 20mA or 4 to 20 mA signals and FOUNDATION™ fieldbus and PROFIBUS-PA digital protocols
- Enables remote or local calibration and parameterization in classified areas
- Self-diagnostics for asset management
- Project cost reduction through the availability of three independent current channels by converter
- Interoperable with control systems available on the market
- Several Function Blocks available
- Capability for dynamic instantiation of function blocks and master backup with FOUNDATION™ fieldbus technology
- Configuration, parameterization and asset management through engineering tools based on EDDL and FDT/DTM technologies, etc
- Digital indicator (optional) makes possible configuration through local adjustment
- Explosion-proof and intrinsically safe (ATEX (NEMKO and DEKRA EXAM), FM, CEPEL, CSA and NEPSI)
- Designed to comply with European regulations ATEX 94/9/EC, LVD 2006/95/EC and EMC 2004/108/EC standards



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**IF300 Series**

**Current converters for fieldbus with three channels**

The **IF300** line is made up by the **IF302** (FOUNDATION™ fieldbus) and **IF303** (PROFIBUS-PA) converters. They are equipment that facilitate the integration of conventional 4-20 mA or 0-20 mA analog equipment with automation systems with digital technology. Supports up to 3 analog current signals to be converted into fieldbus signals, through analog input function blocks, thus considerably reducing installation, operation and maintenance costs.

Available on FOUNDATION™ fieldbus e PROFIBUS-PA technologies.

- Power supply through H1 bus: 12 mA @ 9 a 32 Vcc;
- Digital input signal compliant with IEC 61158-2;
- Analog input signal accepts any values between 0-20 mA ou 4-20 mA, while the conventional equipment are powered by external supply;
- Exactness: ±0.03%;
- Housing in aluminum or stainless steel 316;
- Configuration via engineering stations through tools based on EDDL and FDT/DTM or local adjustment;
- Integration with Profibus automation systems through GSD file;
- Explosion-proof and intrinsically safe (ATEX (NEMKO and DEKRA EXAM), FM, CEPEL, CSA and NEPSI);
- Function blocks:
  - Up to 20 Function Blocks dynamically instantiable for the IF302 with capability of LAS backup master;
  - Physical Block, 3 transducer blocks, 3 Analog Input blocks, 3 Totalizers and 1 display block for IF303 adjustment;
  - Fail-safe functions;
  - Compatible with PROFIBUS Profile 3.



**FI300 Series**

**Fieldbus current converters with three channels**

The **FI300** line is made up by the **FI302** (FOUNDATION™ fieldbus) and **FI303** (PROFIBUS-PA) converters. This equipment makes easier the integration of conventional 4-20 mA equipment with automation systems with digital technology. Support up to 3 fieldbus control signals to be converted into 4-20mA current signals. They are available on FOUNDATION™ fieldbus e PROFIBUS-PA technologies.

The converted signals can be used for speed control on frequency converters, valve positioners, electric actuators or any other equipment with 4-20mA inputs.

- Power supply through H1 bus: 12 mA @ 9 a 32 Vcc;
- Digital input signal compliant with IEC 61158-2;
- Analog input signal accepts any values between 0-20 mA or 4-20 mA, while the conventional equipment is powered by external supply;
- Exactness: ±0.03%;
- Housing in aluminum or stainless steel 316;
- Configuration via engineering stations through tools based on EDDL and FDT/DTM or local adjustment;
- Integration with Profibus automation systems through GSD file;
- Explosion-proof and intrinsically safe (ATEX (NEMKO and DEKRA EXAM), FM, CEPEL, CSA and NEPSI);
- Function Blocks:
  - Up to 20 Function Blocks dynamically instantiable for the **FI302** with capability of LAS backup master;
  - 1 Physical Block, 3 transducer blocks, 3 Analog Input blocks, 3 Totalizers and 1 Display Block for **FI303** adjustment;
  - Fail-safe functions.
  - Compatible with PROFIBUS Profile 3.



The converters are used to make the communication between conventional 0-20 mA or 4-20 mA signals with FOUNDATION™ fieldbus and PROFIBUS-PA digital communication systems.

The adoption of fieldbus systems is backed by a series of advantages, like simplification and reduction of installation, immunity to communication noises, easy reconfiguration, easy access to field information, standardization, interchangeability and interoperability, among others.

If your plant does not have a complete line of equipment with FOUNDATION™ fieldbus or PROFIBUS-PA technology or even when it is not economical to replace all existing conventional devices, Smar converters with fieldbus signal are a practical solution.

The Smar fieldbus signal converters make possible for your plant or process to benefit from the technological innovations with the least initial investment and more economy, performance and productivity.



## FOUNDATION™ fieldbus

FOUNDATION™ fieldbus is a totally digital, open, serial and bidirectional communication system that connects fieldbus equipment such as sensors, actuators and controllers. Fieldbus is a local area network (LAN) for process control automation and instrumentation, with resources for distributing field control through the physical means, in compliance with the IEC 61158-2 standard.

The FOUNDATION™ fieldbus technology with its capability of interconnecting multiple equipment devices makes possible creating big projects. The function block concept allows programming and visualizing the most complex control strategies, all in a single ambient. Another advantage is flexibility, as the control strategy can be altered without changing the wiring or any hardware modification.



## PROFIBUS-PA

PROFIBUS-PA is one of the PROFIBUS variants. It is an open protocol compliant with the DIN 19245 standard. In March 1996 it was incorporated in the EN 50170 standard, which is considered as the European fieldbus standard.

The PROFIBUS-PA physical means complies with the IEC 61158-2 standard.

The advantages provided by the PROFIBUS-PA technology are: reliable information transmission functionalities, variable status treatment, fail-safe system, equipment with self-diagnostics feature, equipment rangeability, high measurement resolution, etc. All this besides economical benefits concerning the installations, such as up to 40% in some cases in relation to conventional systems, maintenance costs reduction (up to 25% in some cases versus conventional systems) and less commissioning and startup time.



The PROFIBUS-PA, PROFIBUS Profile 3, is based on the function block model, which is the manufacturers guarantee for interoperability and interchangeability.



**FI302 - FOUNDATION™ fieldbus converter for 3-channel current**

The **FI302** is a converter designed to connect FOUNDATION™ fieldbus systems to 4-20mA actuators and valve positioners. The **FI302** produces 4-20 mA outputs proportional to the information provided by the FOUNDATION™ fieldbus network, through analog output function blocks.

**FI303 - PROFIBUS-PA fieldbus converter for 3-channel current**

The **FI303** is a converter designed to connect PROFIBUS-PA systems to elements like control valves and other final control elements. The **FI303** produces 4-20 mA outputs proportional to the information provided by the PROFIBUS-PA network through analog output function blocks.

**IF302 - FOUNDATION™ fieldbus current converter with 3-channels**

The **IF302** is a converter for interface of analog transmitters (0-20 mA and/or 4-20mA) with a FOUNDATION™ fieldbus. The **IF302** receive typical 4-20 mA and/or 0-20 mA current signals and make them available to a FOUNDATION™ fieldbus system through analog block function blocks.

**IF303 - Current converter for PROFIBUS-PA with 3-channels**

The **IF303** is a converter for interface of analog transmitters (0-20 mA and/or 4-20mA) with a PROFIBUS-PA network. The **IF303** receive typical 4-20 mA and/or 0-20 mA current signals and make them available to a PROFIBUS-PA system through analog block function blocks.

Smar Field signal converters 300 Series is available on the FOUNDATION™ fieldbus and PROFIBUS-PA Technologies. These equipment are configured through Smar configuration software and also with configuration tools from other manufacturers.

Local adjustment is also available for the 300 series and requires the use of the LCD display.

Smar developed the AssetView, a tool for the Ethernet environment, based on the EDDL and FDT/DTM Technologies. The AssetView offers a friendly interface that can be accessed anywhere, anytime, with the use of an Internet navigator. It was projected for the management of field devices diagnostics, as an auxiliary for corrective, preventive, predictive and proactive maintenance.

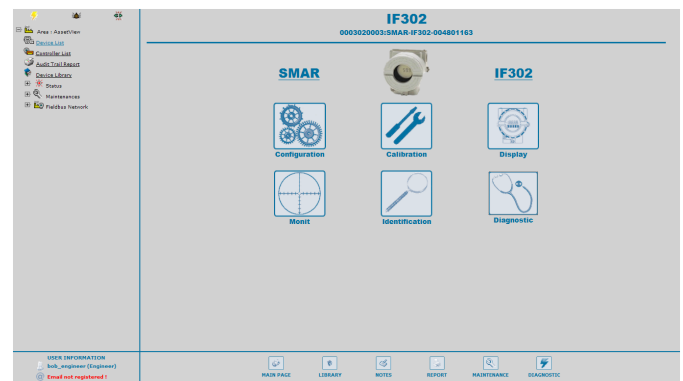
## FOUNDATION™ fieldbus

The **IF302** e **FI302** converters can be configured by any FOUNDATION™ fieldbus converter based on EDDL. The Syscon (System Configurator Tool) is a Smar open software used to configure, operate and provide maintenance to field equipment. The Syscon offers efficient and friendly interaction with the user in Windows environment.

Configuration tools as AMS™, FieldCare™ and HHT375/475 can be used to configure Smar Series 300 Fieldbus Signal Converters. DD (Device Description) and CF (Capability File) files can be loaded from the Smar site or the fieldbus FOUNDATION™ official site.

FOUNDATION™ fieldbus converters support complex control strategies, due to their high capability and the variety of instantiable function blocks.

The FOUNDATION™ fieldbus technology enables asset management systems like the AssetView to access information on status and diagnostics. Therefore, the maintenance procedures became more efficient, providing more plant safety and availability.



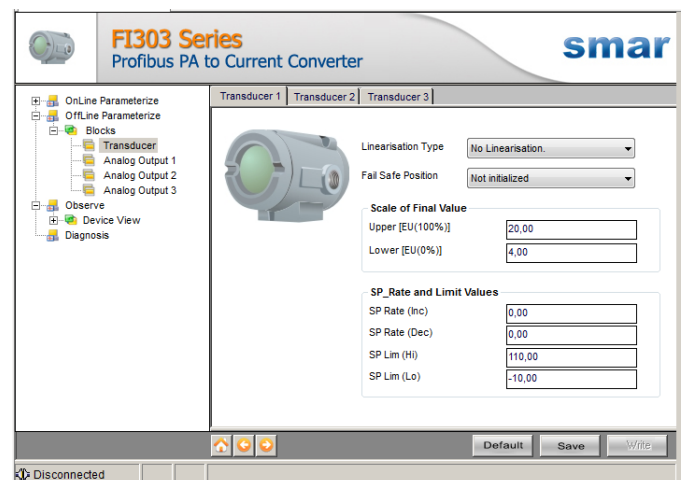
## PROFIBUS-PA

The **IF303** and **FI303** can be configured by any PROFIBUS-PA configurator based on EDDL (Simatic PDM) or FDT/DTM (AssetView, FieldCare, Pactware, etc).

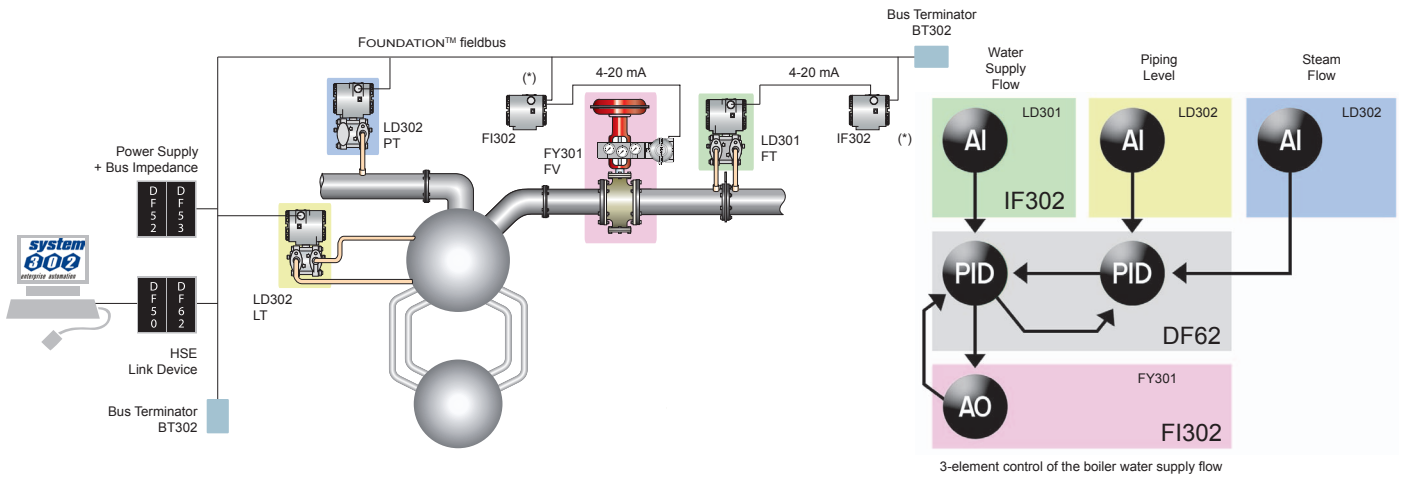
The ProfibusView is a Smar software used to configure, operate and provide maintenance on field equipment.

The PROFIBUS-PA allows that quality and diagnostics information to be provided in a friendly way, improving plant management and maintenance. Device Description (DDL), Device Type Manager (DTM) and Device Master Data (GSD) can be downloaded from Smar site.

The PROFIBUS-PA technology enables the AssetView to access status and diagnostics information. So, the maintenance procedures become more efficient, providing more plant safety and availability.



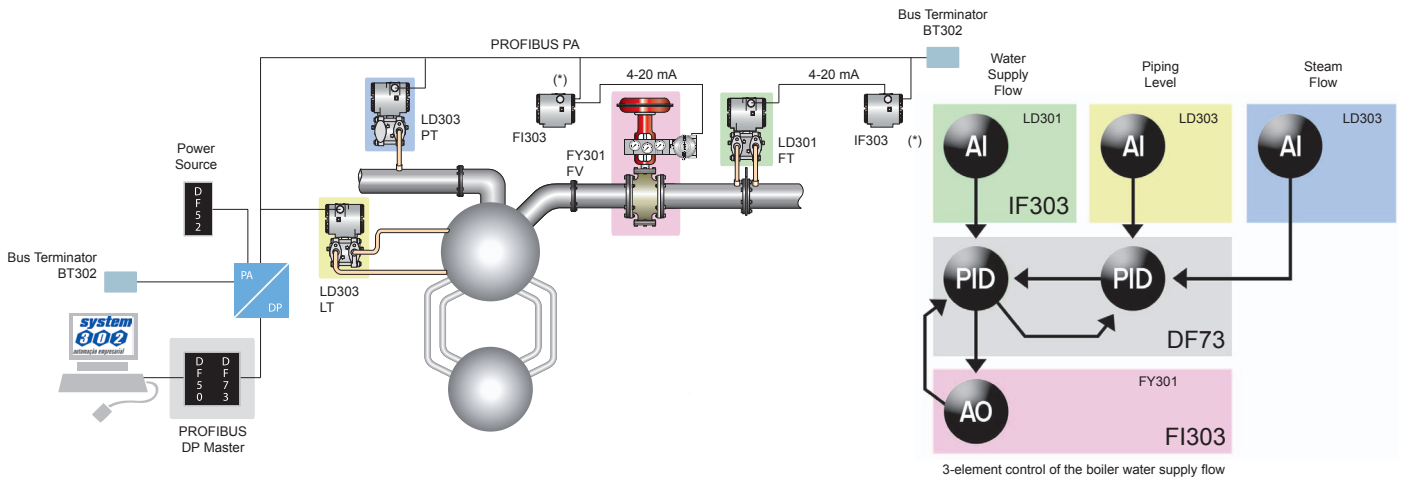
FOUNDATION™ fieldbus: IF302 & FI302



3-element control of the boiler water supply flow

\* external sources powering the 4-20mA equipment were suppressed to simplify the design.

PROFIBUS-PA: IF303 & FI303



3-element control of the boiler water supply flow

\* external sources powering the 4-20mA equipment were suppressed to simplify the design.

**Function Specifications**

<b>Communication Signal</b>	Only-digital Fieldbus compliant with IEC 611258-2 (H1): 31,25 kbit/s and voltage mode with power supply through bus.
<b>Input Signal</b>	<b>IF300</b> Up to three 0-20 mA channels, 4-20 mA or any other value of current between 0 and 20 mA. Protected against reverse polarity. The 0-20/4-20 mA devices must be powered by external power supply.
<b>Analog Output Signal</b>	<b>FI300</b> Three 4-20 mA current outputs with external power supply, common ground.
<b>Input Impedance</b>	<b>IF300</b> Resistive 100Ω, plus 0.8 V of fall on the protection diode.
<b>Power Source</b>	<b>IF300</b> Power through 9-32 Vdc bus. 12 mA quiescent consumption current. <b>FI300</b> Through 9-32 Vdc bus. Quiescent mode current consumption. Output impedance: non-intrinsic safety of 7.8 kHz to 39 kHz must be higher or equal to 3 KΩ. Intrinsic safety output impedance (assuming an IS barrier on the power source) of 7.8 kHz to 39 kHz must be high or equal to 400 Ohm.
<b>Output Load Limit</b>	<b>FI300</b> External Output Voltage: 3-45 Vdc.
<b>Indicator</b>	LCD Indicator of 4½ dígits.
<b>Classified Area Certification</b>	Explosion-proof and intrinsically safe (ATEX (NEMKO and DEKRA EXAM), FM, CEPEL, CSA and NEPSI). Designed to comply with European Regulations (ATEX 94/9/EC and LVD 2006/95/EC).
<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) in operation; -40 to 85 °C (-40 to 185 °F) without damages.
<b>Humidity Limits</b>	0 to 100% RH.
<b>Operation start time</b>	Approximately 10 seconds.
<b>Update Time</b>	Approximately 0.5 seconds.
<b>Configuration</b>	The basic configuration can be made with the magnetic screwdrive for equipment with display options. <b>IF302 &amp; FI302</b> The complete configuration is carried out through SYSTEM302 or other FOUNDATION™ fieldbus configurator (Ex.: Syscon, AssetView, etc). <b>IF303 &amp; FI303</b> The complete configuration is carried out through a remote condigurator (Ex.: ProfibusView, AssetView FDT or through Simatic PDM).

**Performance Specifications**

<b>Exactness</b>	<p><b>IF300</b> 0.03% of span for 4-20 MA, 5 µA for other spans.</p> <p><b>FI300</b> 0.1%.</p>
<b>Ambient Temperature Effect</b>	For a variation between 10 °C: ± 0.05%.
<b>Output Power Source Effect</b>	<p><b>FI300</b> ± 0.005%/V.</p>
<b>Vibration Effect</b>	Complies with SAMA PMC 31.1 standard.
<b>Eletromagnetic Interference Effect</b>	Designed to comply with European Directive EMC 2004/108/EC.

**Physical Specifications**

<b>Hardware</b>	Physical: compliant with IEC 61158-2 and in conformity with FISCO model.
<b>Electrical Connection</b>	½ -14 NPT, PG 13.5 or M20 x 1.5.
<b>Material of Construction</b>	Injected aluminum, with low copper content and polyester paint finishing, or stainless steel 316, and cover with Buna N gaskets.
<b>Mounting</b>	With the use of an optional mounting bracket, it can be installed on a 2" pipe fixed to the wall or panel.
<b>Weight</b>	Without the LCD display and the mounting bracket: 0.80 kg. Additional LCD display: 0.12 kg. Additional mounting support: 0.60 kg.



## IF300

MODEL	CURRENT CONVERTERS FOR FIELDBUS WITH THREE CHANNELS	
IF302 IF303	FOUNDATION™ fieldbus PROFIBUS PA	
	<b>COD.</b>	<b>Local Indicator</b>
	0	Without indicator
	1	With indicator
	<b>COD.</b>	<b>Mounting Bracket</b>
	0	Without Bracket
	1	Carbon Steel Accessories: Carbon Steel
	2	316 Stainless Steel. Accessories: Al316
	7	Carbon Steel. Accessories: Al316
	<b>COD.</b>	<b>Electrical Connections</b>
	0	1/2" - 14 NPT
	1	1/2" - 14 NPT x 3/4 NPT (Al 316) - with adapter
	2	1/2" - 14 NPT x 3/4 BSP (Al 316) - with adapter
	3	1/2" - 14 NPT x 1/2 BSP (Al 316) - with adapter
	A	M20 x 1.5
	B	PG 13.5 DIN
	<b>SPECIAL OPTIONS</b>	
	<b>COD.</b>	<b>Housing</b>
	H0	Aluminum (IP/TYP E)
	H1	316 Stainless Steel (IP/TYP E)
	H2	Aluminum for saline atmosphere (IPW/TYP E X)
	H3	316 Stainless Steel for saline atmosphere (IPW/TYP E X)
	<b>COD.</b>	<b>Identification Plate</b>
	I1	FM: XP, IS, NI, DI
	I3	CSA: XP, IS, NI, DI
	I4	EXAM (DMT): EX-IA, NEMKO, EX-D
	I5	CEPEL: EX-D, EX-IA
	I6	Without Certification
	IE	NEPSI: EX-IA
	IJ	NEMKO: EX-D
	<b>COD.</b>	<b>Painting</b>
	P0	Gray Munsell N 6.5 Polyester
	P3	Black Polyester
	P4	White Epoxi
	P5	Yellow Polyester
	P8	Without Painting
	P9	Safety Blue Epoxy - Electrostatic Painting
	PC	Safety Blue Polyester - Electrostatic Painting
	PG	Safety Orange Epoxi Paint - Electrostatic Painting
	<b>COD.</b>	<b>Input Signal</b>
	T0	3 input, 4 to 20 mA
	<b>COD.</b>	<b>Tag Plate</b>
	J0	With tag
	J1	Blank

IF302	-	1	1	-	0	/	*	/	*	/	*	/	*	/	*
IF303	-	1	1	-	0	/	*	/	*	/	*	/	*	/	*

← TYPICAL MODEL

\* Leave it blank for no optional items.

FI300

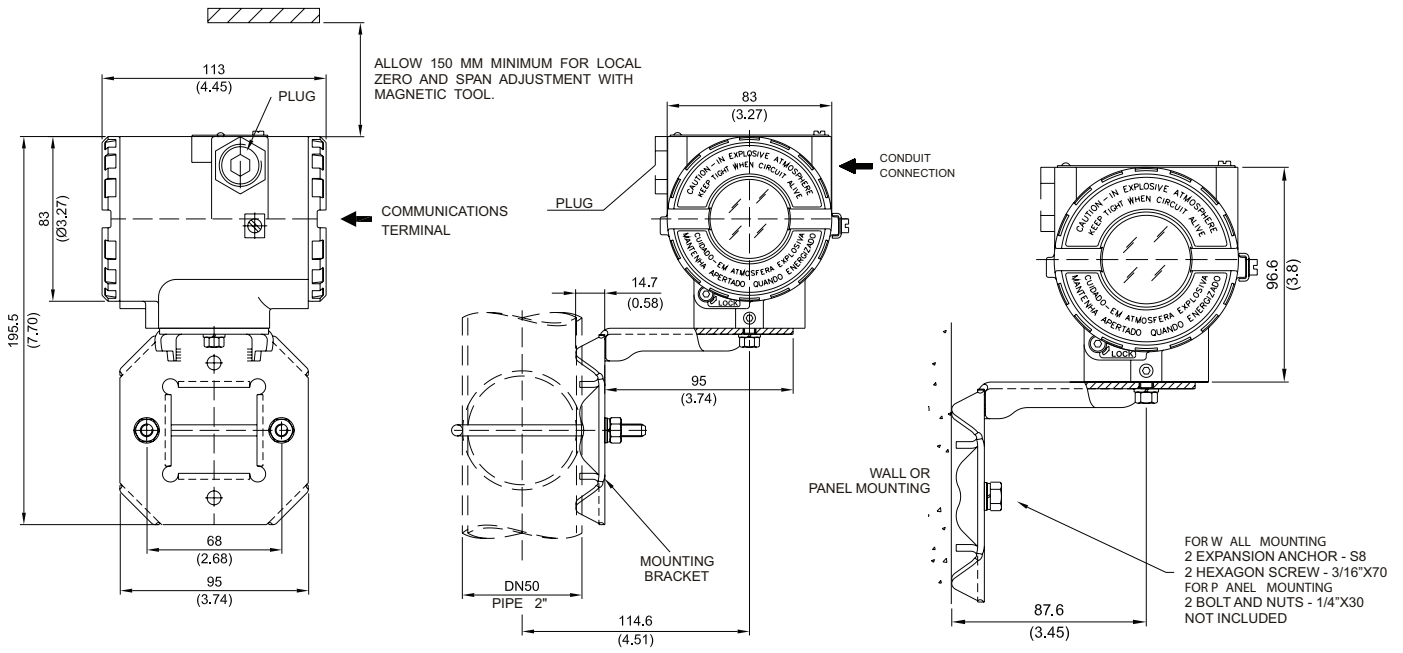
MODELO	FIELDBUS CURRENT CONVERTERS WITH THREE CHANNELS			
FI302 FI303	FOUNDATION™ fieldbus PROFIBUS PA			
<b>COD. Local Indicator</b>				
0	Without indicator			
1	With indicator			
<b>COD. Mounting Bracket</b>				
0	Without Bracket			
1	Carbon Steel Accessories: Carbon Steel			
2	316 Stainless Steel. Accessories: Al316			
7	Carbon Steel. Accessories: Al316			
<b>COD. Electrical Connections</b>				
0	1/2" - 14 NPT			
1	1/2" - 14 NPT x 3/4 NPT (Al 316) - with adapter			
2	1/2" - 14 NPT x 3/4 BSP (Al 316) - with adapter			
3	1/2" - 14 NPT x 1/2 BSP (Al 316) - with adapter			
A	M20 x 1,5			
B	PG 13.5 DIN			
<b>SPECIAL OPTIONS</b>				
<b>COD. Housing</b>				
H0	Aluminum (IP/TYPE)		H2	Aluminum for saline atmosphere (IPW/TYPE X)
H1	316 Stainless Steel (IP/TYPE)		H3	316 Stainless Steel for saline atmosphere (IPW/TYPE X)
<b>COD. Identification Plate</b>				
I1	FM: XP, IS, NI, DI			
I3	CSA: XP, IS, NI, DI			
I4	EXAM (DMT): EX-IA, NEMKO, EX-D			
I5	CEPEL: EX-D, EX-IA			
I6	Without Certification			
IE	NEPSI: EX-IA			
IJ	NEMKO: EX-D			
<b>COD. Painting</b>				
P0	Gray Munsell N 6.5 Polyester			
P3	Black Polyester			
P4	White Epoxi			
P5	Yellow Polyester			
P8	Without Painting			
P9	Safety Blue Epoxy - Electrostatic Painting			
PC	Safety Blue Polyester - Electrostatic Painting			
PG	Safety Orange Epoxi Paint - Electrostatic Painting			
<b>COD. Output Signal</b>				
T0	3 output, 4 to 20 mA			
<b>COD. Tag Plate</b>				
J0	With tag			
J1	Blank			

FI302 - 1 1 - 0 / \* / \* / \* / \* / \*

← TYPICAL MODEL

FI303 - 1 1 - 0 / \* / \* / \* / \* / \*

\*Leave it blank for no optional items.



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Up-to-date address information is available on our website.

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



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