

FIELDTR

User Reference Manual

ALS 50203 e-en

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Meaning of terms that may be used in this document / Notice to readers

WARNING

Warning notices are used to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist or may be associated with use of a particular equipment.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution

Caution notices are used where there is a risk of damage to equipment for example.

Note

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

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Index letter	Date	Nature of revision
b	02-2000	Alstom branding of manual
c	08-2000	New : network transmission rate 5 Mbits/s
d	11-2002	Modifications in the implementation example of a fieldbus connection (Figure 5.1)
e	1-2007	Addition of the “Lead-free” component specification. Deletion of the N-size transformer.

Revisions

1. CONTENT OF THIS MANUAL

This manual is structured as follows:

Chapter 1: General presentation

Chapter 2: Pin description

Chapter 3: Electrical characteristics

Chapter 4: Physical dimensions

Chapter 5: Application notes

2. RELATED PUBLICATIONS

For more information refer to these publications:

For more information refer to these publications:

[1] EN50170 part 3:	WorldFIP Standards
[2] FIP Network General Introduction	ALS 50249
[3] FIELDRIVE User Reference Manual	ALS 50261
[4] FULLFIP2 Component User Reference Manual	ALS 50262
[5] FIELDDUAL User Reference Manual	ALS 50273
[6] FIPCODE Release 6 Software User Reference Manual	ALS 50277
[7] MICROFIP User Reference Manual	ALS 50280

3. WE WELCOME YOUR COMMENTS AND SUGGESTIONS

ALSTOM strives to produce quality technical documentation. Please take the time to fill in and return the "Reader's Comments" page if you have any remarks or suggestions.

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Chapter 1

General presentation

The FIELDTR components are insulation transformers which supply a galvanic isolation between the FIELDRIVE line driver and the fieldbus physical medium.

FIELDTR associated with FIELDRIVE are implementing the Medium Attachment Unit (MAU) function.

The FIELDTR transformers have been developed to run in the half-duplex mode for all the speeds: 31.25 kbit/s, 1 Mbit/s, 2.5 Mbit/s, and 5 Mbit/s according the IEC 1158-2 (Physical Layer Specification and Service Definition) and to be compliant with highest levels of the EMC regulation.

FIELDTR31.25S	FIELDTR1S	FIELDTR2.5S
voltage mode coupling 31.25 kbit/s on twisted pair	voltage mode coupling 1 Mbit/s on twisted pair	voltage mode coupling 2.5 Mbit/s and 5 Mbit/s on twisted pair

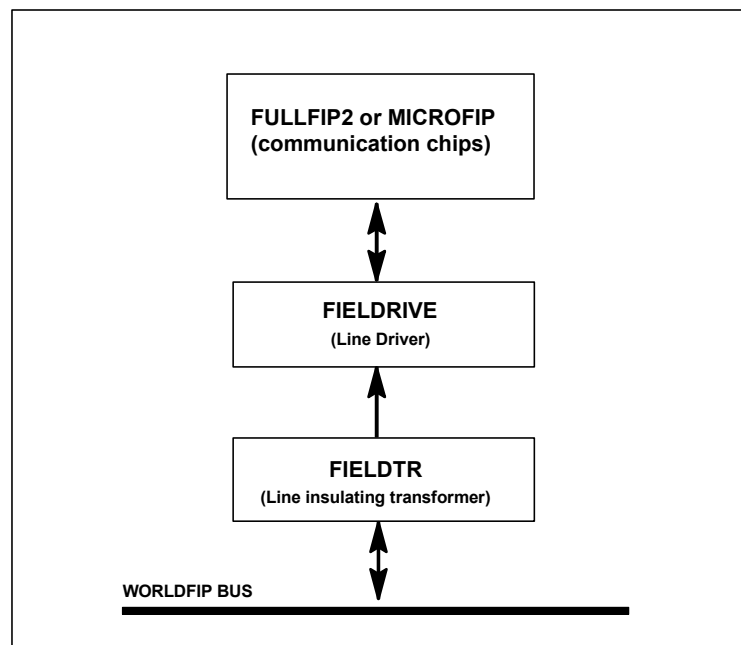


Figure 1.1 - Subscriber connection on WorldFIP bus

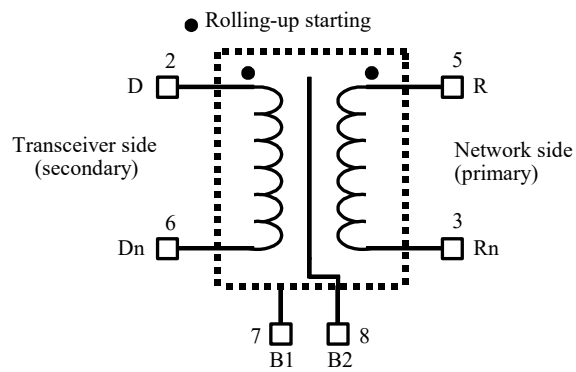


Figure 1.2 - Functional diagram

This component is available in 2 lead finishes :

- Current component : SnPb;
- From January 2007 : SnCu to be in accordance with the RoHs directives (2002/95/CE)
- Component references

Bit Rates	31.25 kbps	1 Mbps	2.5 Mbps
Standard components	JMF - 9538	JMF - 9539	JMF - 9540
RoHs components	FALS - 126	FALS - 122	FALS - 124

Chapter 2

Pin description

Pin description is shown in Table 2.1 below.

The pins D and R are phased pins.

The pins 7 and 8 must be connected together to 0 V.

No.	Pin Name	Description
2	D	Input/Output pin to transceiver
3	Rn	Input/Output pin to fieldbus medium
5	R	Input/Output pin to fieldbus medium
6	Dn	Input/Output pin to transceiver
7	B1	Internal ground (to be connected to 0 V)
8	B2	Internal ground and shield (to be connected to 0 V)

Table 2.1 - FIELDTR isolating transformer pin description

Chapter 3

Electrical characteristics

Parameters		Conditions	Min.	Typ.	Max.	Unit
Dielectric rigidity between:	(2-6)/(5-3)(7-8)	sinus., 50 Hz during 1 mn	2000			Vrms
	(5-3)/(2-6)(7-8)	sinus., 50 Hz during 1 mn	2000			Vrms
Choc wave between:	(2-6)/(5-3)(7-8)	Wave 1.2/50 μ s on 500 Ω	\pm 3000			Vpk
	(5-3)/(2-6)(7-8)	Wave 1.2/50 μ s on 500 Ω	\pm 3000			Vpk
Insolation resistance between	(2-6)/(5-3)(7-8)	500 VDC during 1 mn	500			M Ω
	(5-3)/(2-6)(7-8)	500 VDC during 1 mn	500			M Ω

Parameters	Conditions	Min.	Typ.	Max.	Unit
Storage temperature		-40		85	C°
Normal operating free-air temperature		0		70	C°
Extended operating free-air temperature		-40		85	C°
Δ of temperature				20	C°/h
Humidity relative	at 25°C, no condensating	5		95	%
Atmospheric pressure		860		1060	mbar

Table 3.1 - Absolute maximum ratings ¹

¹ Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

FIELDTR31.25S

Parameters		Conditions	Min.	Typ.	Max.	Unit
Speed				31.25		kbit/s
Ratio		(5-3)/(2-6)	0.95	1	1,05	
Impedance from primary	from 1.5 to 6.2 kHz	secondary open, 25°C	2.5			kΩ
	from 6.2 to 40 kHz		9			kΩ
	from 40 to 157 kHz		2.5			kΩ
Current peak to peak		on 50 Ω		20	100	mA
Current average		on 50 Ω		10	50	mA
Common mode rejection		between 1 kHz and 325 kHz	35			dB

FIELDTR1S

Parameters		Conditions	Min.	Typ.	Max.	Unit
Speed				1		Mbit/s
Ratio		(5-3)/(2-6)	1.49	1.57	1.63	
Impedance from primary	from 50 to 200 kHz	secondary open, 25°C	2.5			kΩ
	from 0.2 to 1.25 MHz		9			kΩ
	from 1.25 to 5 MHz		2.5			kΩ
Current peak to peak		on 75 Ω		86	120	mA
Current average		on 75 Ω		43	60	mA
Common mode rejection		between 1 kHz and 10 MHz	35			dB

FIELDTR2.5S

Parameters		Conditions	Min.	Typ.	Max.	Unit
Speed				2.5		Mbit/s
Ratio		(5-3)/(2-6)	1.49	1.57	1.63	
Impedance from primary	from 125 to 500 kHz	secondary open, 25°C	2.5			kΩ
	from 0.5 to 3.2 MHz		9			kΩ
	from 3.2 to 12.5 MHz		2.5			kΩ
Current peak to peak		on 75 Ω		86	120	mA
Current average		on 75 Ω		43	60	mA
Common mode rejection		between 1 kHz and 25 MHz	35			dB

Table 3.2 - Functional characteristics

Chapter 4

Physical dimensions

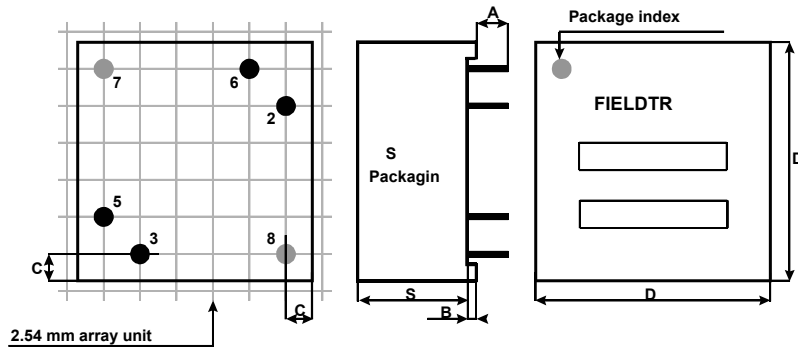


Figure 4.1 - Common features

FIELDTR31.25, FIELDTR1, and FIELDTR2.5 use N type packaging

FIELDTR31.25S, FIELDTR1S and FIELDTR2.5S use S type packaging

Sizes	Min. (mm)	Typ. (mm)	Max. (mm)
A	2.5		
B		0.5	
C			2.15
D			17
S			10
hole size for pins: 1.05 mm			

Table 4.1 - Package dimensions

The package index is associated to the secondary of the transformer to be connected to the FIELDTRIVE line driver

Chapter 5

Application notes

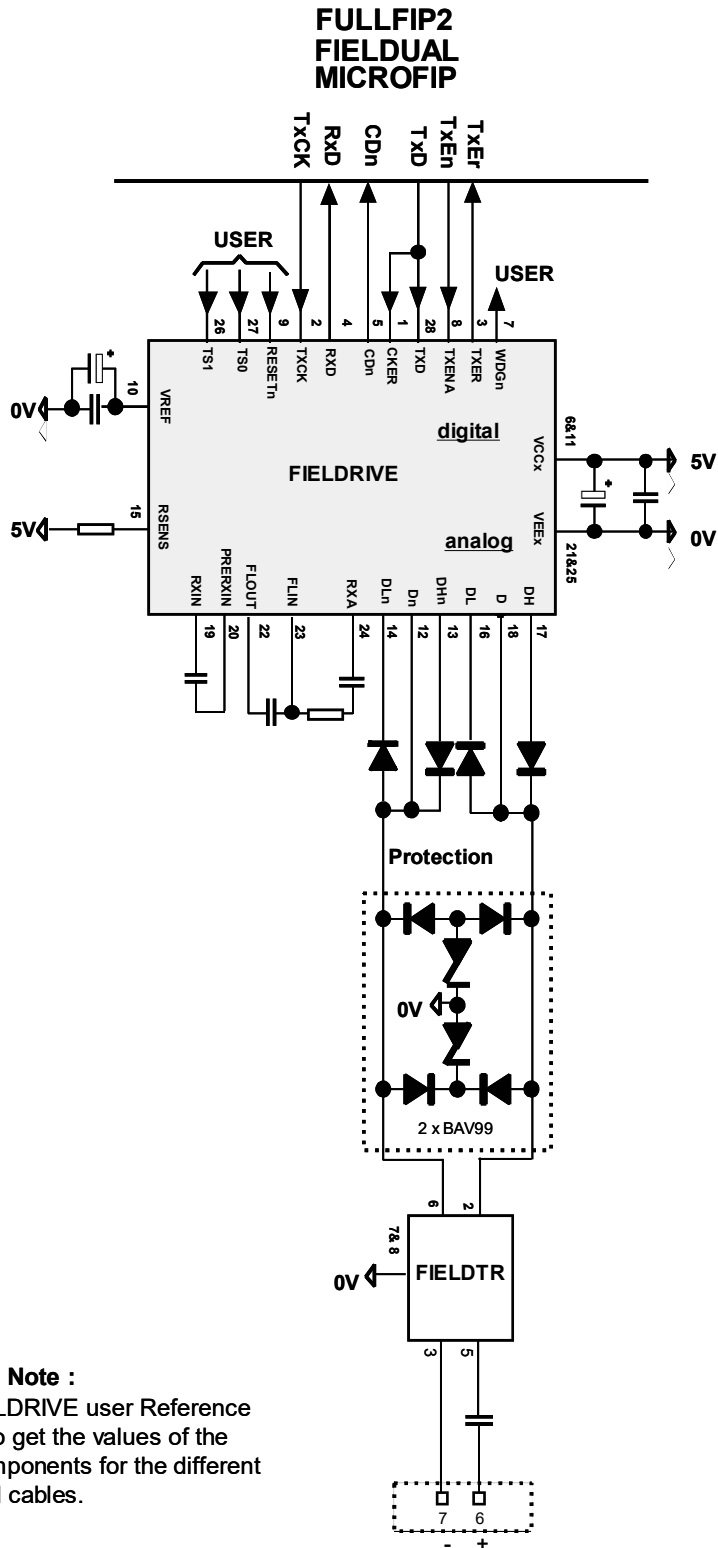
The communication processors (FULLFIP2, MICROFIP, etc...) must be connected to the bus through a line driver such as FIELDRIVE which is especially designed to adapt the logical signal of the communication processor inputs/outputs with the signal of the WorldFIP fieldbus.

Moreover, it is recommended in most of applications to ensure a galvanic isolation between the bus and the line driver with a transformer such as FIELDTR. The insertion of a capacitor between the bus and the FIELDTR line isolating transformer avoids transformer saturation by an eventual continuous current component (bus powered networks).

The example given is relative to the use of the FIELDTR line isolating transformer connected to the FIELDRIVE line driver.

A protection of the FIELDRIVE line driver input/output against overvoltage generated on the WorldFIP bus outside the nominal range is proposed.

The connection of the subscriber to the bus is generally made with a D-Sub 9-pin male connector as described in the physical layer standard.



Note :
See the FIELDRIVE user Reference Manual [3] to get the values of the Discrete components for the different Bit rates and cables.

Figure 5.1 - Implementation example of a fieldbus connection