Instruction

MI 019-038

November 2020

CFS300A / CFS400A / CFS600A and CFS700A series of meters and CFT34A transmitter

Supplementary Instructions

Hazardous areas

Schneider Electric

1.1 General

The Coriolis flowmeter system consists of a flow sensor and a flow transmitter, or a flow sensor and associated equipment.

The separate mass flow sensor with a mass flow transmitter is identified as:

- Coriolis Flow Sensor CFS300A(F) with CFT34A(F) transmitter
- Coriolis Flow Sensor CFS400A(F) with CFT34A(F) transmitter
- Coriolis Flow Sensor CFS600A(F) with CFT34A(F) transmitter
- Coriolis Flow Sensor CFS700A(F) with CFT34A(F) transmitter

The flowmeter in a compact configuration is identified as:

- Coriolis Flow Sensor CFS300A(C) with CFT34A(C) transmitter
- Coriolis Flow Sensor CFS400A(C) with CFT34A(C) transmitter
- Coriolis Flow Sensor CFS600A(C) with CFT34A(C) transmitter
- Coriolis Flow Sensor CFS700A(C) with CFT34A(C) transmitter

1.2 EN standards compliance

As part of the hazardous areas approval, the Coriolis flowmeter system satisfies the requirements of the following standards:

- BS EN 60079-0:2012+A11:2013 - Explosive atmospheres. Equipment. General requirements
- BS EN 60079-1:2014 - Explosive atmospheres. Equipment protection by flameproof enclosures "d"
- BS EN 60079-7:2015 - Explosive atmospheres. Equipment protection by increased safety "e"
- BS EN 60079-11:2012 - Explosive atmospheres. Equipment protection by intrinsic safety "i"
- BS EN 60079-26:2015 - Explosive atmospheres. Equipment with Equipment Protection Level (EPL) Ga
- BS EN 60079-31:2014 - Explosive atmospheres. Equipment dust ignition protection by enclosure "t"

1.3 Hazardous areas approvals

The hazardous areas approvals for the Coriolis flowmeter system, relating to this supplementary manual, are as follows:

- ATEX - PTB ATEX X, PTB ATEX X and PTB ATEX X
- IECEx -
- cFMus -

1.4 Identification of CORIOLIS flowmeter systems

The complete Coriolis flowmeter system is identified by the models of the Coriolis Flow Sensor (CFS) and the Coriolis Flow Transmitter (CFT).

The model codes are unique and are used to identify the models and variants of the CFS and CFT and therefore the complete flowmeter system; through the original order specification and manufacture of the system. The model code for each flowmeter system is included on the product nameplate/s. Please refer to the nameplates section.

On integral / compact systems, where the transmitter is mounted directly to the sensor, the nameplate is on the transmitter housing. On remote systems, where the transmitter housing is separate to the sensor and linked by a dedicated cable, the nameplate is on the remote transmitter housing and essential data is duplicated on the junction box of the sensor.

Not all elements of the model codes are Ex safety relevant. The following tables describe the model code structure and defines the hazardous area relevant options.

1.5 Coriolis Flow Sensor model code

The flow sensor variant is identified by the model code number on the nameplate:

①	X	ab	c	d	e	fg	h	j	k	l	m	n	p	q	r	s	t	u	v	w
②	1	2-3	4	5	6	7-8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
③	√	√	x	x	x	x	x	x	√	√	x	√	x	x	x	√	√	x	x	x

① Code
② Position
③ Hazardous areas relevant?

Code	Description
X	Flow sensor type
ab	Flow sensor size
c	Manufacturer specific
d	Wetted part material
e	Surface finish
fg	Flange size and rating
h	Flange sealing face
j	Outer case material / secondary containment / operating pressure
k	Options
l	Hazardous area approval
m	Sanitary and material approvals
n	Configuration
p	Calibration
q	Cleaning / degreasing / process requirements
r	Extended options / custody transfer approval
s	Not used
t	Transmitter type
u	Destination
v	Functional safety
w	Spare

1.6 Coriolis Flow Transmitter model code

The flow transmitter variant is identified by the model code number on the nameplate:

①	ab	c	d	e	f	g	h	j	k	l	m	n	p	q	r	s	t	u	v	w
②	1-2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
③	√	x	√	√	√	x	x	x	x	x	x	√	√	√	x	x	√	x	x	x

① Code
② Position
③ Hazardous areas relevant?

Code	Description
ab	Transmitter type
c	Manufacturer specific
d	Type
e	power supply
f	Hazardous areas approval
g	Cable connection
h	Languages
j	Custody transfer
k	Process diagnostics
l	Transmitter housing
m	Not used
n	Outputs (base I/O module)
p	Outputs (first I/O module)
q	Outputs (second I/O module)
r	measuring functions
s	Manuals
t	Remote option: signal cable
u	Destination
v	Sensor type
w	Spare

1.7 Additional markings

For installation in aggressive environments, Coriolis Flow Sensors and Coriolis Flow Transmitters are available with a painted finish. These meters have the word “Painted” after the model number.

Example: CORIOLIS FLOW SENSOR CFS300A(C) – Painted

The model code for the CFT34A transmitter contains details about the output configuration: model code 34b……npq and is shown on the nameplate. Please refer to the section on transmitter codes for details.

Meter	Intended use	
	Zone 0 category 1	Zone 1 category 2
CFS300A(C)	√	√
CFS300A(F)	√	√
CFS400A(C)	√	√
CFS400A(F)	√	√
CFS600A(C)	√	√
CFS600A(F)	√	√
CFS700A(C)	√	√
CFS700A(F)	√	√

1.8 CFT34A(F)

The CFT34A(F) is defined by the model code 34…d…f…npq… where “f” defines the hazardous area approval and “d” = H

The CFT34A(F) has intrinsically safe connections to the mass flow sensor with either increased safety or intrinsically safe signal outputs. The signal output connection compartment can be configured with protection type Ex d or Ex e. The marking is as follows:

Ex i outputs (where the model code 34...d...f...npq and "n" = 2, 3, D or E and "p" = 0, 1 or 2)	
Ex d connection compartment ①	II 2 (1) G Ex db [ia Ga] IIC T6 Gb
	II 2 (1) D Ex tb [ia Da] IIIC T75°C Db
Ex e connection compartment ②	II 2 (1) G Ex db eb [ia Ga] IIC T6 Gb
	II 2 (1) D Ex tb [ia Da] IIIC T75°C Db
Non Ex i outputs (where the model code 34...d...f...npq and "n" ≠ 2, 3, or "n" = D or E and "p" ≠ 0, 1 or 2)	
Ex d connection compartment ①	II 2 G Ex db [ia] IIC T6 Gb
	II 2 D Ex tb IIIC T75°C Db
Ex e connection compartment ②	II 2 G Ex db eb [ia] IIC T6 Gb
	II 2 D Ex tb IIIC T75°C Db

① Where "f" = 1
② Where "f" = 2

1.9 CFS300A(F) / CFS300A(C)

The CFS300A(F) is defined by the sensor model code Xab…k…l…n… where “l” defines the hazardous area approval, “ab” = 0H, 01, 1H or 02 and “n” = 1 or 2

The CFS300A(C) is defined by the sensor model code Xab…k…l…n…, where “l” defines the hazardous areas approval, “ab” = 0H, 01, 1H or 02 and “n” = 0

The markings for the CFS300A(C) / CFS300A(F) are shown in the following tables:

CFS300A(F) with ("k" = 1 or 2) or without ("k" = 0 or 3) heating jacket / insulation	
Intrinsically safe	II 1 G Ex ia IIC T6...T1 Ga
	II 1 D Ex ia IIIC T185°C Da
CFS300A(C) Non Ex i signal outputs (where the transmitter model code Xb…f…npq… and n ≠ 2 or 3, or n = D or E when “p” ≠ 0, 1 or 2) with (“k” = 1 or 2) or without (“k” = 0 or 3) sensor heating jacket / insulation (“k” is from the sensor model code)	
Ex d connection compartment ①	II 1/2 G Ex db ia IIC T6...T1 Ga/Gb
	II 2 D Ex tb IIIC T185°C Db
Ex e connection compartment ②	II 1/2 G Ex db eb ia IIC T6...T1 Ga/Gb
	II 2 D Ex tb IIIC T185°C Db
CFS300A(C) Ex i signal outputs (where the transmitter model code Xb…f…npq… and “n” = 2, 3, D or E and “p” = 0, 1 or 2) with (“k” = 1 or 2) or without (“k” = 0 or 3) sensor heating jacket / insulation. (“k” is from the sensor model code)	
Ex d connection compartment ①	II 1/2 (1) G Ex db ia [ia Ga] IIC T6...T1 Ga/Gb
	II 2 (1) D Ex tb [ia Da] IIIC T185°C Db
Ex e connection compartment ②	II 1/2 (1) G Ex db eb ia [ia Ga] IIC T6...T1 Ga/Gb
	II 2 (1) D Ex tb [ia Da] IIIC T185°C Db

① Where "f" = 1 from the transmitter model code

② Where "f" = 2 from the transmitter model code

1.10 CFS400A(F) / CFS400A(C)

The CFS400A(F) is defined by the sensor model code Xab…k…l…n… where “l” defines the hazardous areas approval, “ab” = 04, 06, 10 or 16 and “n” = 1 or 2

The CFS400A(C) is defined by the sensor model code Xab…k…l…n… where “l” defines the hazardous areas approval, “ab” = 04, 06, 10 or 16 and “n” = 0

The marking for the the CFS400A(F) / CFS400A(C) is shown in the following tables:

CFS400A(F) with ("k" = 1, 2, C or D) or without ("k" = 0, 3 or B) heating jacket / insulation	
Intrinsically safe	II 1 G Ex ia IIC T6...T1 Ga
	II 1 D Ex ia IIIC T160°C Da
CFS400A(C) Non Ex i signal outputs (where the transmitter model code Xb…f…npq… and n ≠ 2 or 3, or n = D or E when “p” ≠ 0, 1 or 2) with (“k” = 1, 2, C or D) or without (“k” = 0, 3 or B) sensor heating jacket / insulation (“k” is from the sensor model code)	
Ex d connection compartment ①	II 1/2 G Ex db ia IIC T6...T1 Ga/Gb
	II 2 D Ex tb IIIC T160°C Db
Ex e connection compartment ②	II 1/2 G Ex db eb ia IIC T6...T1 Ga/Gb
	II 2 D Ex tb IIIC T160°C Db
CFS400A(C) Ex i signal outputs (where the transmitter model code Xb…f…npq… and “n” = 2, 3, D or E and “p” = 0, 1 or 2) with (“k” = 1, 2, C or D) or without (“k” = 0, 3 or B) sensor heating jacket / insulation. (“k” is from the sensor model code)	
Ex d connection compartment ①	II 1/2 (1) G Ex db ia [ia Ga] IIC T6...T1 Ga/Gb
	II 2 (1) D Ex tb [ia Da] IIIC T160°C Db
Ex e connection compartment ②	II 1/2 (1) G Ex db eb ia [ia Ga] IIC T6...T1 Ga/Gb
	II 2 (1) D Ex tb [ia Da] IIIC T160°C Db

① Where "f" = 1 from the transmitter model code

② Where "f" = 2 from the transmitter model code

1.11 CFS600A(F) / CFS600A(C)

Standard temperature version ("j" = K and "q" ≠ T)

The CFS600A(F) is defined by the sensor model code Xab…j…k…l…n…q… where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and “n” = 1 or 2, "j" = K and "q" ≠ T

The CFS600A(C) / CFS600A is defined by the sensor model code Xab…j…k…l…n…q… where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and “n” = 0, "j" = K and "q" ≠ T

The markings for the CFS600A(C) / CFS600A(F) are shown in the following tables:

CFS600A(F) with ("k" = 1, 3 or 5) or without ("k" = 0 or A) heating jacket / insulation)	
Intrinsically safe	II 1 G Ex ia IIC T6...T1 Ga
	II 1 D Ex ia IIIC T270°C Da
CFS600A(C) Non Ex i signal outputs (where the transmitter model code Xb…f…npq… and n ≠ 2 or 3, or n = D or E when “p” ≠ 0, 1 or 2) with (“k” = 1, 3 or 5) or without (“k” = 0 or A) sensor heating jacket / insulation (“k” is from the sensor model code)	
Ex d connection compartment ①	II 1/2 G Ex db ia IIC T6...T1 Ga/Gb
	II 2 D Ex tb IIIC T270°C Db
Ex e connection compartment ②	II 1/2 G Ex db eb ia IIC T6...T1 Ga/Gb
	II 2 D Ex tb IIIC T270°C Db
CFS600A(C) Ex i signal outputs (where the transmitter model code Xb…f…npq… and “n” = 2, 3, D or E and “p” = 0, 1 or 2) with (“k” = 1, 3 or 5) or without (“k” = 0 or A) sensor heating jacket / insulation. (“k” is from the sensor model code)	
Ex d connection compartment ①	II 1/2 (1) G Ex db ia [ia Ga] IIC T6...T1 Ga/Gb
	II 2 (1) D Ex tb [ia Da] IIIC T270°C Db
Ex e connection compartment ②	II 1/2 (1) G Ex db eb ia [ia Ga] IIC T6...T1 Ga/Gb
	II 2 (1) D Ex tb [ia Da] IIIC T270°C Db

① Where "f" = 1 from the transmitter model code

② Where "f" = 2 from the transmitter model code

Short stem version ("j" = 0)

The CFS600A(F) is defined by the sensor model code Xab…j…k…l…n…q… where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and “n” = 1 or 2, and "j" = 0

The CFS600A(C) is defined by the sensor model code Xab…j…k…l…n…q… where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and “n” = 0, and "j" = 0

The markings for the CFS600A(F) / CFS600A(C) are shown in the following tables:

CFS600A(F) with ("k" = 1, 3 or 5) or without ("k" = 0 or A) heating jacket / insulation)	
Intrinsically safe	II 1 G Ex ia IIC T6...T1 Ga
	II 1 D Ex ia IIIC T190°C Da
CFS600A(C) Non Ex i signal outputs (where the transmitter model code Xb…f…npq… and n ≠ 2 or 3, or n = D or E when “p” ≠ 0, 1 or 2) with (“k” = 1, 3 or 5) or without (“k” = 0 or A) sensor heating jacket / insulation (“k” is from the sensor model code)	
Ex d connection compartment ①	II 1/2 G Ex db ia IIC T6...T1 Ga/Gb
	II 2 D Ex tb IIIC T190°C Db
Ex e connection compartment ②	II 1/2 G Ex db eb ia IIC T6...T1 Ga/Gb
	II 2 D Ex tb IIIC T190°C Db
CFS600A(C) Ex i signal outputs (where the transmitter model code Xb…f…npq… and “n” = 2, 3, D or E and “p” = 0, 1 or 2) with (“k” = 1, 3 or 5) or without (“k” = 0 or A) sensor heating jacket / insulation. (“k” is from the sensor model code)	
Ex d connection compartment ①	II 1/2 (1) G Ex db ia [ia Ga] IIC T6...T1 Ga/Gb
	II 2 (1) D Ex tb [ia Da] IIIC T190°C Db
Ex e connection compartment ②	II 1/2 (1) G Ex db eb ia [ia Ga] IIC T6...T1 Ga/Gb
	II 2 (1) D Ex tb [ia Da] IIIC T190°C Db

① Where "f" = 1 from the transmitter model code

② Where "f" = 2 from the transmitter model code

High temperature version ("q" = T)

The CFS600A(F) is defined by the sensor model code Xab…j…k…l…n…q… where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and “n” = 1 or 2, and "q" = T

CFS600A(F) with ("k" = 1, 3 or 5) sensor heating jacket / insulation	
Intrinsically safe	II 1 G Ex ia IIC T6...T1 Ga
	II 1 D Ex ia IIIC T440°C Da

1.12 CFS700A(F) / CFS700A(C)

CFS700A(F) is defined by the sensor model code Xab…k…l…n… where “l” defines the hazardous area approval, "ab" = 0Q, 3E, 0H, 01, 02, or 03 and "n" = 1 or 2

The CFS700A(C) is defined by the sensor model code Xab...k…l…n…q where “l” defines the hazardous areas approval, "ab" = 0Q, 3E, 0H, 01, 02, or 03 and "n" = 0

The markings for the CFS700A(F) / CFS700A(C) are shown in the following tables:

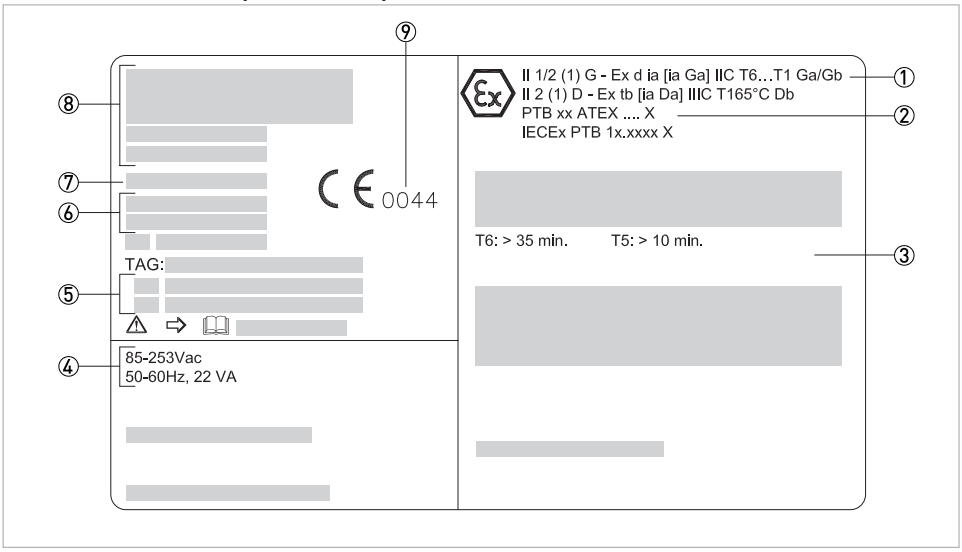
CFS700A(F) with ("k" = 1 or 2) or without ("k" = 0 or 3) sensor heating jacket / insulation)	
Intrinsically safe	II 1 G Ex ia IIC T6...T1 Ga
	II 1 D Ex ia IIIC T165°C Da
CFS700A(C) Non Ex i signal outputs (where the converter transmitter model code Xb…f…npq… and n ≠ 2 or 3, or n = D or E when “p” ≠ 0, 1 or 2) with (“k” = 1 or 2) or without (“k” = 0 or 3) sensor heating jacket / insulation (“k” is from the sensor model code)	
Ex d connection compartment ①	II 1/2 G Ex db ia IIC T6...T1 Ga/Gb
	II 2 D Ex tb IIIC T165°C Db
Ex e connection compartment ②	II 1/2 G Ex db eb ia IIC T6...T1 Ga/Gb
	II 2 D Ex tb IIIC T165°C Db
CFS700A(C) Ex i signal outputs (where the transmitter model code Xb…f…npq… and “n” = 2, 3, D or E and “p” = 0, 1 or 2) with (“k” = 1 or 2) or without (“k” = 0 or 3) sensor heating jacket / insulation. (“k” is from the sensor model code)	
Ex d connection compartment ①	II 1/2 (1) G Ex db ia [ia Ga] IIC T6...T1 Ga/Gb
	II 2 (1) D Ex tb [ia Da] IIIC T165°C Db
Ex e connection compartment ②	II 1/2 (1) G Ex db eb ia [ia Ga] IIC T6...T1 Ga/Gb
	II 2 (1) D Ex tb [ia Da] IIIC T165°C Db

① Where "f" = 1 from the transmitter model code

② Where "f" = 2 from the transmitter model code

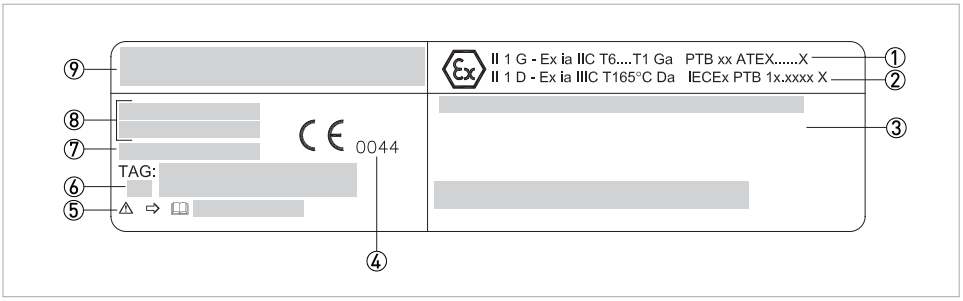
1.13 Nameplates

Transmitter nameplate (compact and remote versions)



① Ex marking (example shown)
② Certificate number
③ Ex specific requirement
④ Power supply data
⑤ Codes for sensor and / manual document number
⑥ Year of manufacture / serial number
⑦ Model type
⑧ Logo and address of manufacturer
⑨ Identification number of the notified body (example shown)

Sensor nameplate (remote version only)



① Ex marking (example shown)
② Certificate number
③ Ex specific requirement
④ Identification number of the notified body (example shown)
⑤ Manual document number
⑥ Model Code for CFSxxxA sensor
⑦ Serial number
⑧ Model type CORIOLIS FLOW SENSOR CFSxxxA -- painted)
⑨ Logo and address of manufacturer

2.1 Equipotential bonding

The CFT34A (remote) transmitter and the Coriolis Flow Sensor xxxA(C) (compact) must be included in the equipotential bonding of the installation. Use the bonding terminal on the transmitter housing, wall bracket or mass flow meter housing mounting stem.

In separated systems, a screened cable is used and is earthed at the meter and transmitter ends. Fit an equalisation cable with a minimum cross section area of $4mm^2$ to the equipotential bonding terminals on the mass flow transmitter housing bracket and the mass flow sensor electronics stem.

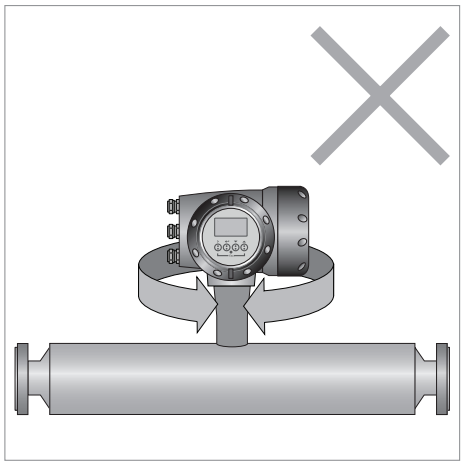
2.2 Electrostatic charge

To reduce the ignition hazard caused by an electrostatic charge collecting on the instrument, you must obey the following instructions:

- DO NOT clean the meter and / or transmitter with a dry cloth.
- DO NOT install the meter and / or transmitter near to any process that uses an electrostatic charge, for example a dry powder coating system.
- DO NOT use the meter for applications where the process can generate a strong electrostatic charge.
- DO NOT install the meter in an area where it will be in contact with airborne particles that can cause an electrostatic charge.

CAUTION!
Electrostatic charging of the meter and / or transmitter housing MUST be avoided.

2.3 Transmitter orientation (compact version)



DO NOT rotate the transmitter housing on the meter stem. Rotating the transmitter housing can cause damage to the internal wiring.

⚠	***CAUTION!*** *Damage to the internal wiring could effect the Ex integrity of the meter.*

2.4 Temperature limits

2.4.1 Introduction

Because of the effect that the process temperature has on the meter, mass flow sensors and compact mass flow meters are not given a fixed temperature class. The tables in this section give details of the temperature class for each meter.

Notes

- Make sure that the flowmeter is installed and operated as shown in the relevant Master Instruction.
- Make sure that the flowmeter is not exposed to a source of heat (for example direct sunlight or heat from adjacent equipment) that causes the ambient temperature to rise above the ambient temperature range for the meter.
- Make sure that insulation is not preventing ventilation of the meter housing.

2.4.2 CFT34A(F)

The CFT34A(F) is defined by the transmitter model code Xab…d…f…l…npq… where “f” defines the hazardous area approval and “d” = H

The CFT34A(F) mass flow transmitter is suitable for temperature classes T6…T1 and has a maximum surface temperature of 75ºC

Note:

These temperature classes are subject to the following temperature limits. For information on cable parameters, please refer to the ELECTRICAL CONNECTIONS chapter.

Transmitter housing	Ambient temp. T_{amb} °C	
	Standard Transmitter	SIL capable Transmitter
Aluminium (model code option "l" = 1)	-40...+65°C / -40...+149°F	-40...+55°C / -40...+131°F
Stainless Steel (model code option "l" = 3)	-40...+60°C / -40...+140°F	-40...+55°C / -40...+131°F

2.4.3 CFS300A(F) / CFS300A(C)

The CFS300A(F) / CFS300A(C) is suitable for temperature classes T6...T1

Note:

These temperature classes are subject to the following temperature limits. For information on cable parameters, please refer to the ELECTRICAL CONNECTIONS chapter.

	Ambient temp. T_{amb} °C	Max medium temp. T_m °C	Temp. class	Max. Surface temp. °C
CFS300A(F) is defined by the sensor model code Xab…k…l…n… where "l" defines the hazardous areas approval, "ab" = 0H, 01, 1H or 02 and "n" = 1 or 2 with ("k" = 1 or 2) or without ("k" = 0 or 3) heating jacket / insulation	-40...+40	45	T6 - T1	T80
		60	T5 - T1	T95
		95	T4 - T1	T130
		130	T3 - T1	T165
		150	T3 - T1	T185
	-40...+50	60	T5 - T1	T95
		95	T4 - T1	T130
		130	T3 - T1	T165
		150	T3 - T1	T185
	-40...+65	95	T4 - T1	T130
		130	T3 - T1	T165
		150	T3 - T1	T185
	Minimum medium temp: -50°C			
CFS300A(C) – aluminium transmitter housing is defined by the sensor model code Xab…k…l…n… where "l" defines the hazardous areas approval, "ab" = 0H, 01, 1H or 02 and "n" = 0 – with ("k" = 1 or 2) or without ("k" = 0 or 3) heating jacket / insulation and the transmitter model code ab…d…f…l…npq and "d" = 4 and "l" = 1	-40...+40	45	T6 - T1	T80
		60	T5 - T1	T95
		95	T4 - T1	T130
		130	T3 - T1	T165
		150	T3 - T1	T185
	-40...+50	60	T5 - T1	T95
		95	T4 - T1	T130
		130	T3 - T1	T165
		150	T3 - T1	T185
	-40...+65	65	T4 - T1	T100
	Minimum medium temp: -45°C			
CFS300A(C) – SS transmitter housing is defined by the sensor model code Xab…k…l…n… where "l" defines the hazardous areas approval, "ab" = 0H, 01, 1H or 02 and "n" = 0 – with ("k" = 1 or 2) or without ("k" = 0 or 3) heating jacket / insulation and the transmitter model code ab…d…f…l...npq "d" = 4 and "l" = 2	-40...+40	45	T6 - T1	T80
		60	T5 - T1	T95
		95	T4 - T1	T130
		130	T3 - T1	T165
		150	T3 - T1	T185
	-40...+50	60	T5 - T1	T95
		95	T4 - T1	T130
	-40...+60	60	T5 - T1	T95
	Minimum medium temp: -45°C			

2.4.4 CFS400A(F) / CFS400A(C)

The CFS400A(F) / CFS400A(C) is suitable for temperature classes T6...T1

Note:

These temperature classes are subject to the following temperature limits. For information on cable parameters, please refer to the ELECTRICAL CONNECTIONS chapter.

	Ambient temp. T_{amb} °C	Max medium temp. T_m °C	Temp. class	Max. Surface temp. °C
CFS400A(F) - with or without heating jacket / insulation is defined by the sensor model code Xab…k…l…n…, where "l" defines the hazardous areas approval, "ab" = 04, 06, 10 or 16 and "n" = 1 or 2 with ("k" = 1, 2, C or D) or without ("k" = 0, 3 or B) heating jacket / insulation	-40...+40	40	T6 - T1	T70
		55	T5 - T1	T85
		90	T4 - T1	T120
		130	T3 - T1	T160
	-40...+50	55	T5 - T1	T85
		90	T4 - T1	T120
		130	T3 - T1	T160
	-40...+65	65	T5 - T1	T95
		90	T4 - T1	T120
		130	T3 - T1	T160
	Minimum medium temp: -50°C			
CFS400A(C) – aluminium transmitter housing is defined by the sensor model code Xab…k…l…n… , where "l" defines the hazardous areas approval, "ab" = 04, 06, 10 or 16 and "n" = 0 – with ("k" = 1, 2, C or D) or without ("k" = 0, 3 or B) sensor heating jacket / insulation and the transmitter model code Xb…d…f…l…npq – where "d" = 4 and "l" = 1	-40...+40	40	T6 - T1	T70
		55	T5 - T1	T85
		90	T4 - T1	T120
		130	T3 - T1	T160
	-40...+50	55	T5 - T1	T85
		90	T4 - T1	T120
		130	T3 - T1	T160
	-40...+60	65	T5 - T1	T95
		100	T4 - T1	T130
	-40...+65 ①	65	T5 - T1	T95
	Minimum medium temp: -45°C			
CFS400A(C) – SS transmitter housing is defined by the sensor model code Xab…k…l…n…, where "l" defines the hazardous areas approval, "ab" = 04, 06, 10 or 16 and "n" = 0 – with ("k" = 1, 2, C or D) or without ("k" = 0, 3 or B) heating jacket / insulation and the transmitter model code Xb…d…f…l...npq… - where "b" = 3 or 4 and "d" = 4 and "l" = 2	-40...+40	40	T6 - T1	T70
		55	T5 - T1	T85
		90	T4 - T1	T120
		130	T3 - T1	T160
	-40...+50	55	T5 - T1	T85
		90	T4 - T1	T120
	-40...+60	60	T5 - T1	T90
	Minimum medium temp: -45°C			

① Depending on I/O option. Please call for more information.

2.4.5 CFS600A(F) / CFS600A(C) - standard temperature ("j" = K & "q" ≠ T)

The CFS600A(F) / CFS600A(C) standard temperature is suitable for temperature classes T6...T1

Note:

These temperature classes are subject to the following temperature limits. For information on cable parameters, please refer to the ELECTRICAL CONNECTIONS chapter.

	Ambient temp. T_{amb} °C	Max medium temp. T_m °C	Temp. class	Max. Surface temp. °C
CFS600A(F) is defined by the sensor model code. Xab…j...k…l…n…, where "l" defines the hazardous areas approval, "ab" = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and "j" = K and "n" = 1 or 2 and "q" = 0 or 1 - with ("k" = 1, 3 or 5) or without ("k" = 0 or A) sensor heating jacket / insulation	-40...+40	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
	-40...+50	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
	-40...+65	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
	Minimum medium temp: -50°C			
	Cryogenic version ("q" = C or D and "k" = 0, 2 or A)			
	-25...+65	-140...+40	T6 - T1	T80
		-160...+40		
	-20...+65	-180...+40		
		-200...+40		
	Minimum medium temp: <-50°C			

<table>
<tr><td rowspan="20">CFS600A(C) – aluminium transmitter housing

is defined by the sensor model code Xab…j…k…l…n… , where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and “j” = K and "n" = 0 and "q" = 0 or 1 - with (“k” = 1, 3 or 5) or without (“k” = 0 or A) sensor heating jacket / insulation and the transmitter model code Xb…d…f…l…npq – where “b” = 3 or 4 and “d” = 4 and “l” = 1</td><td rowspan="5">-40...+40</td><td>40</td><td>T6 - T1</td><td>T80</td></tr>
<tr><td>55</td><td>T5 - T1</td><td>T95</td></tr>
<tr><td>90</td><td>T4 - T1</td><td>T130</td></tr>
<tr><td>150</td><td>T3 - T1</td><td>T190</td></tr>
<tr><td>230</td><td>T2 - T1</td><td>T270</td></tr>
<tr><td rowspan="5">-40...+50</td><td>40</td><td>T6 - T1</td><td>T80</td></tr>
<tr><td>55</td><td>T5 - T1</td><td>T95</td></tr>
<tr><td>90</td><td>T4 - T1</td><td>T130</td></tr>
<tr><td>150</td><td>T3 - T1</td><td>T190</td></tr>
<tr><td>230</td><td>T2 - T1</td><td>T270</td></tr>
<tr><td>-40...+65</td><td>65</td><td>T4 - T1</td><td>T105</td></tr>
<tr><td colspan="4">Minimum medium temp: -50°C</td></tr>
<tr><td colspan="4">Cryogenic version ("q" = C or D and "k" = 0, 2 or A)</td></tr>
<tr><td rowspan="3">-35...+65</td><td>-140...+40</td><td rowspan="4">T6 - T1</td><td rowspan="4">T80</td></tr>
<tr><td>-160...+40</td></tr>
<tr><td>-30...+65</td><td>-180...+40</td></tr>
<tr><td>-25...+65</td><td>-200...+40</td></tr>
<tr><td colspan="4">Minimum medium temp: <-50°C</td></tr>
<tr><td rowspan="20">CFS600A(C) – SS transmitter housing

is defined by the sensor Model code Xab…j…k…l…n…, where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and “j” = K and "n" = 0 and "q" = 0 or 1 – with (“k” = 1, 3 or 5) or without ("k" = 0 or A) heating jacket / insulation and the Code Xb…d…f…l…npq… - where and “b” = 3 or 4 and “d” = 4 and “l” = 2</td><td rowspan="5">-40...+40</td><td>40</td><td>T6 - T1</td><td>T80</td></tr>
<tr><td>55</td><td>T5 - T1</td><td>T95</td></tr>
<tr><td>90</td><td>T4 - T1</td><td>T130</td></tr>
<tr><td>150</td><td>T3 - T1</td><td>T190</td></tr>
<tr><td>230</td><td>T2 - T1</td><td>T270</td></tr>
<tr><td rowspan="5">-40...+50</td><td>40</td><td>T6 - T1</td><td>T80</td></tr>
<tr><td>55</td><td>T5 - T1</td><td>T95</td></tr>
<tr><td>90</td><td>T4 - T1</td><td>T130</td></tr>
<tr><td>150</td><td>T3 - T1</td><td>T190</td></tr>
<tr><td>230</td><td>T2 - T1</td><td>T270</td></tr>
<tr><td>-40...+60</td><td>60</td><td>T4 - T1</td><td>T100</td></tr>
<tr><td colspan="4">Minimum medium temp: -50°C</td></tr>
<tr><td colspan="4">Cryogenic version ("q" = C or D and "k" = 0, 2 or A)</td></tr>
<tr><td rowspan="3">-35...+60</td><td>-140...+40</td><td rowspan="4">T6 - T1</td><td rowspan="4">T80</td></tr>
<tr><td rowspan="2">-30...+60</td><td>-160...+40</td></tr>
<tr><td>-180...+40</td></tr>
<tr><td>-25...+60</td><td>-200...+40</td></tr>
<tr><td colspan="4">Minimum medium temp: <-50°C</td></tr>
</table>

2.4.6 CFS600A(F) / CFS600A(C) - short stem ("j" = 0)

The CFS600A(F) / CFS600A(C) short stem is suitable for temperature classes T6...T1

Note:

These temperature classes are subject to the following temperature limits. For information on cable parameters, please refer to the ELECTRICAL CONNECTIONS chapter.

	Ambient temp. T_{amb} °C	Max medium temp. T_m °C	Temp. class	Max. Surface temp. °C
CFS600A(F) short stem is defined by the sensor model code Xab…j...k…l…n…, where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and "j" = 0 and "n" = 1 or 2 and "q" = 0 or 1 - without ("k" = 0 or A) sensor heating jacket / insulation.	-40...+40	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
	-40...+50	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
	-40...+65	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		135	T3 - T1	T175
	Minimum medium temp: -50°C			
	Cryogenic version ("q" = C or D and "k" = 0 or A)			
	+10...+65	-140...+40	T6 - T1	T80
	+20...+65	-160...+40		
	+30...+65	-180...+40		
	+40...+65	-200...+40		
	Minimum medium temp: <-50°C			

CFS600A(C) short stem with aluminium transmitter housing is defined by the sensor model code Xab…j…k…l…n… , where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and “j” = 0 and "n" = 0 and "q" = 0 or 1 - without (“k” = 0 or A) sensor heating jacket / insulation and the transmitter model code Xb…d…f…l…npq – where “b” = 3 or 4 and “d” = 4 and “l” = 1	-40...+40	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
	-40...+50	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		145	T3 - T1	T185
	-40...+65	65	T4 - T1	T105
	Minimum medium temp: -50°C			
	Cryogenic version ("q" = C or D and "k" = 0 or A)			
	-20...+65	-140...+40	T6 - T1	T80
	-15...+65	-160...+40		
		-180...+40		
	-10...+65	-200...+40		
	Minimum medium temp: <-50°C			
CFS600A(C) short stem with SS transmitter housing is defined by the sensor model code Xab…j…k…l…n…, where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and “j” = 0 and "n" = 0 and "q" = 0 or 1 – without (“k” = 0 or A) heating jacket / insulation and the transmitter model code Xb…d…f…l…npq… - where “b” = 3 or 4 and “d” = 4 and “l” = 2	-40...+40	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
	-40...+50	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		145	T3 - T1	T185
	-40...+60	60	T4 - T1	T100
	Minimum medium temp: -50°C			
	Cryogenic version ("q" = C or D and "k" = 0 or A)			
	-10...+60	-140...+40	T6 - T1	T80
	-5...+60	-160...+40		
	0...+60	-180...+40		
	+10...+60	-200...+40		
	Minimum medium temp: <-50°C			

2.4.7 CFS600A(F) high temperature ("q" = T)

The CFS600A(F) high temperature is suitable for temperature classes T6...T1

Note:

These temperature classes are subject to the following temperature limits. For information on cable parameters, please refer to the ELECTRICAL CONNECTIONS chapter.

	Ambient temp. T_{amb} °C	Max medium temp. T_m °C	Temp. class	Max. Surface temp. °C
CFS600A(F) high temperature with aluminium junction box and heating jacket is defined by sensor model code Xab…j...k…l…n…, where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and "j" = K and "n" = 1 and "q" = T with ("k" = 3 or 5) sensor heating jacket.	-40...+40	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
		400	T1	T440
	-40...+55	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
		400	T1	T440
	-40...+60	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
		400	T1	T440
	-40...+65	350		T390
	Minimum medium temp: -50°C			

CFS600A(F) high temperature with stainless steel junction box and heating jacket is defined by sensor model code Xab…j…k…l…n…, where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and "j" = K and "n" = 2 and "q" = T with ("k" = 3 or 5) sensor heating jacket.	-40...+40	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
		400	T1	T440
	-40...+50	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
		400	T1	T440
	-40...+55	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
		400	T1	T440
	-40...+60	350		T390
	Minimum medium temp: -50°C			
CFS600A(F) high temperature with aluminium or stainless steel junction box and no heating jacket is defined by the sensor model code Xab…j…k…l…n…, where “l” defines the hazardous areas approval, “ab” = 0Q, 3E, 0H, 01, 02, 03, 04, 06, 08 or 10 and “j” = K and "n" = 1 or 2 and "q" = T with (“k” = 1) insulation	-40...+40	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
		400	T1	T440
	-40...+55	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
		400	T1	T440
	-40...+65	40	T6 - T1	T80
		55	T5 - T1	T95
		90	T4 - T1	T130
		150	T3 - T1	T190
		230	T2 - T1	T270
		400	T1	T440
	Minimum medium temp: -50°C			

2.4.8 CFS700A(F) / CFS700A(C)

The CFS700A(F) / CFS700A(C) is suitable for temperature classes T6...T1

Note:

These temperature classes are subject to the following temperature limits. For information on cable parameters, please refer to the ELECTRICAL CONNECTIONS chapter.

	Ambient temp. T_{amb} °C	Max medium temp. T_m °C	Temp. class	Max. Surface temp. °C
CFS700A(F) is defined by sensor model code Xab...k…l…n…, where “l” defines the hazardous areas approval, "ab" = 0Q, 3E, 0H, 01, 02, or 03 and "n" = 1 or 2 - with ("k" = 1 or 2) or without (“k” = 0 or 3) sensor heating jacket / insulation.	-40...+40	65	T6 - T1	T80
		80	T5 - T1	T95
		100	T4 - T1	T115
		115		T130
		150	T3 - T1	T165
	-40...+50	80	T5 - T1	T95
		100	T4 - T1	T115
		115		T130
		150	T3 - T1	T165
	-40...+65	100	T4 - T1	T115
		115		T130
		130	T3 - T1	T145
	Minimum medium temp: -50°C			
CFS700A(C) with aluminium transmitter housing is defined by sensor model code Xab...k…l…n…, where “l” defines the hazardous areas approval, "ab" = 0Q, 3E, 0H, 01, 02, or 03 and "n" = 0 - with ("k" = 1 or 2) or without (“k” = 0 or 3) sensor heating jacket / insulation and the transmitter model code Xb…d…f…l…npq… - where “b” = 3 or 4 and “d” = 4 and “l” = 1.	-40...+40	65	T6 - T1	T80
		80	T5 - T1	T95
		100	T4 - T1	T115
		115		T130
		150	T3 - T1	T165
	-40...+50	100	T4 - T1	T115
		115		T130
		150	T3 - T1	T165
	-40...+65	65	T4 - T1	T80
	Minimum medium temp: -50°C			
CFS700A(C) with Stainless Steel transmitter housing is defined by the sensor model code Xab…j…k…l...n…, where “l” defines the hazardous areas approval, "ab" = 0Q, 3E, 0H, 01, 02, or 03 and "n" = 0 - with ("k" = 1 or 2) or without (“k” = 0 or 3) sensor heating jacket / insulation and the model code Xb…d…f…l…npq… - where “b” = 3 or 4 and “d” = 4 and “l” = 2.	-40...+40	65	T6 - T1	T80
		80	T5 - T1	T95
		100	T4 - T1	T115
		115		T130
		130	T3 - T1	T145
	-40...+50	80	T5 - T1	T95
		100	T4 - T1	T115
		115	T4 - T1	T130
	-40...+60	60	T6 - T1	T75
	Minimum medium temp: -50°C			

2.4.9 Painted options

A painted finish helps to prevent corrosion in aggressive environments.
The following meters are available with a painted finish

CORIOLIS FLOW SENSOR (CFS)	300A(F)
	300A(C)
CORIOLIS FLOW SENSOR (CFS)	400A(F)
	400A(C)
CORIOLIS FLOW SENSOR (CFS)	600A(F) without insulation (short stem only)
	600A(C) without insulation (short stem only)
CORIOLIS FLOW SENSOR (CFS)	700A(F)
	700A(C)

Temperature limits

	Ambient temp. T_{amb} °C	Max. medium temp. T_m °C
Meter	-40...+40	110
Stainless Steel transmitter	-40...+40	110

Note

These temperature limits are subject to the maximum temperature class / limit of the meter, which might be lower.

2.5 Electronics compartment

Let the electronics de-energise before opening the electronics compartment. Please wait for the following times according to the temperature class of the meter.

Temp. class	**Time required to de-energise**
T6	35 minutes
T5	10 minutes

2.6 Certified cable glands

Meters supplied with an Ex d terminal compartment (“f” = 1) are also supplied with one Ex d stopping plug and two temporary plugs for shipping and storage. When installing the meter, remove the temporary plugs and use suitable Ex d certified cable glands, plugs or conduit.

All unused openings must be closed with suitable, certified plugs.

2.7 Cable protection

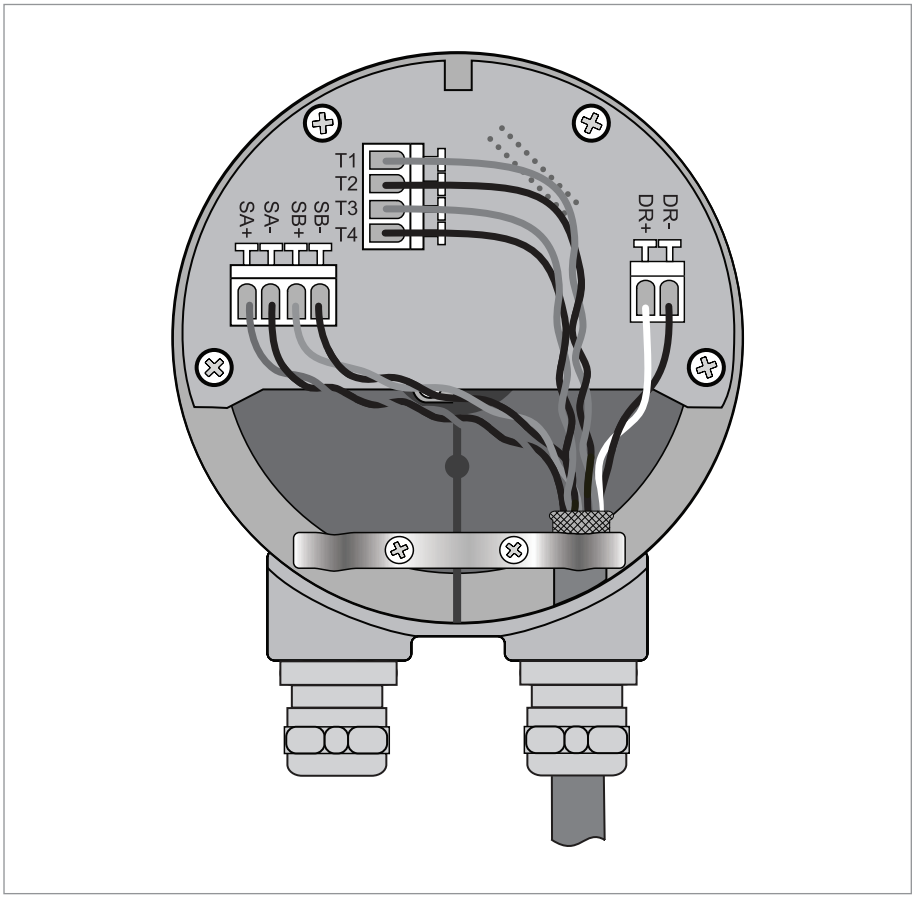
Install the connecting cables as fixed wiring so that they are protected from damage.

2.8 Aluminium junction box

If the meter has an aluminium junction box and if it has been installed in an area classified as Zone 0, then you MUST protect the meter from ignition hazards caused by impact and / or friction.

3.1 Remote / field terminal connections

The information below is based on cable supplied by the manufacturer.



Cable pair / terminal block configuration.

Circuit	Terminal	Cable colour
Signal	SB-	Black
	SB+	Green
	SA-	Black
	SA+	Yellow
Strain Gauge and temperature sensor	T1	Blue
	T2	Black
	T3	Red
	T4	Black
Driver	DR+	White
	DR-	Black

Screening

Fit the cable screen as shown in the above illustration.

3.1.1 Separated systems

In the case of field and remote meters, the sensor and transmitter are connected using a cable that has five pairs and an outer screen. Each pair of cables carries an intrinsically safe circuit

When using cable not supplied by the manufacturer, the following points should be noted:

- The cable MUST NOT have capacitance and / or inductance levels higher than those shown in the cable parameters section.
- You MUST obey IEC / EN 60079-14 when installing a CORIOLIS FLOW SENSOR (CFS).

3.1.2 Cable parameters

Cable supplied by the manufacturer		
Capacitance	<78 ρF/m	
Inductance	<0.8 µH/m	
Temperature range	-40°C...+85°C	
Maximum length	20 meters ①	
Cable supplied by the customer		
Capacitance	90 nF (for total cable length)	②
Inductance	36 µH (for total cable length)	
Temperature range	≥ Max temperature range of the installation ③	
Test voltage	≥ 1000 VAC	
Insulation thickness	≥ 0.2mm (IEC / EN 60079-14 S. 12.2.2.7)	
Casing colour	Blue	

① No further intrinsic safety analysis is necessary if the cable length is not more than the maximum
② No further intrinsic safety analysis is necessary if the cable used is within maximum limits
③ When calculating the temperature range, give consideration to the flow sensor temperature gradients. Please refer to the Temperature limits section.

3.2 Electronics and I/O terminal compartments

When working on the CFT34A transmitter electronics and / or the I/O terminal compartments, the following points must be noted:

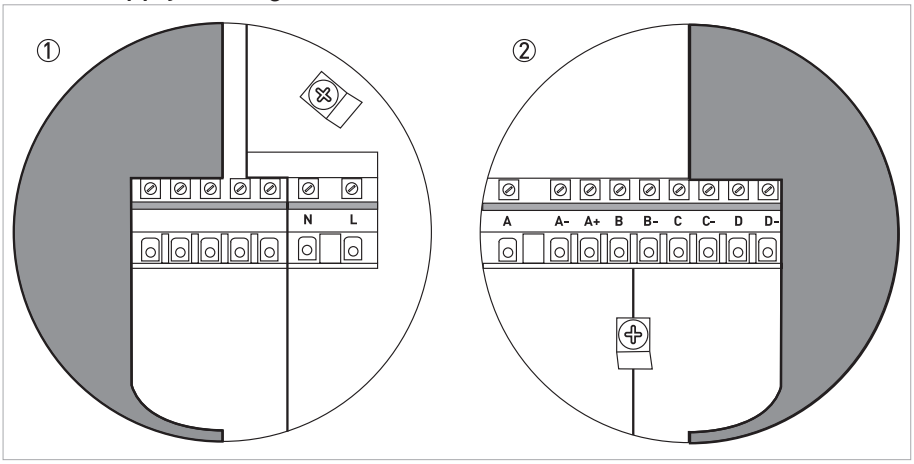
- The covers on the electronics compartment have a flameproof thread that is a tight fit. When removing / re-fitting the covers, take care and do not use a lot of force.
- Keep the threads clean and apply Teflon grease (for example NONTRIBOS® type Li EP) before re-fitting the cover. The grease will help to prevent corrosion that will cause the threads to lock together.
- To open the compartment covers, first remove the hexagonal retention lock using a 2.5mm hex-head tool. After re-fitting the cover, re-fit the retention lock.

3.2.1 I/O terminal compartment

The I/O terminal compartment can be opened for a short period of time, where the electronics are energised and the meter is in a hazardous area. For example, to check the wiring configuration. However the following conditions MUST all be met:

1. the I/O terminal compartment has an “increased safety” ignition protection type (standard), and;
2. the I/O circuits have an “intrinsic safety” protection type, and;
3. the touch guard (cover) for the power supply terminals (L,N) is closed (see illustration).

Power supply touch guard (cover)



① Touch guard (cover) open
② Touch guard (cover) closed

Work on I/O terminals A…D can be done with the electronics energised, but you MUST follow the regulations regarding intrinsically safe circuits.

When the work has been finished, replace the cover and re-fit the retention lock.

Terminal	Function / electrical data
L, N L+, N-	Connection for main supply. Always non-Ex i
	100...230 VAC, +10% / -15%, 22VA
	12...24 VDC, +30% / -25%, 12W
	24 VAC +10% / -15%, 22VA
	24 VDC +30% / -25%, 12W
	U_m = 253V
A, A-, A+ B, B- C, C- D, D-	Intrinsic safety of I/O circuits is determined by the I/O options chosen by the customer. I/O configuration of the CFT34A is defined in the transmitter model code Xab. See below for details.

3.2.2 Transmitter model code for I / O options

The transmitter model code number is defined in the Introduction section at the beginning of this Supplementary Instruction.

Overviews of the transmitter model code I / O option defined by “n”, “p” and “q” can be found in the following section. However, the overviews do not show all details. The exact connection diagram can be found on the label on the inside cover of the connection compartment.

If the meter is being installed in a gas hazardous area, the terminal compartment cable glands must have the appropriate protection type: increased safety (Ex e) or flameproof (Ex d).

Meters supplied with an Ex e terminal compartment (“f” = 2) are also supplied with two Ex e certified cable glands and one Ex e or Ex d stopping plug.

All wiring must comply with current, relevant national or regional standards for electrical installations (for example IEC / EN 60079-14). If you are using IEC / EN 60079-14 please pay attention to sections: 9, 10, 11 and 12.

The torque settings for the terminals is 0.7 Nm. Maximum conductor or ferrule size is $4mm^2$

"p" and "q" functions

Option code	Function "p"	Function "q" ①
0	Without, no module possible (only with "n" = F)	Without, no module possible (only with "n" = F)
8	Without, no module possible (only with "n" ≠ F)	Without, no module possible
A	Current output: active	Current output: active
B	Current output: passive	Current output: passive
C	Current output: active, high current	Current output: active, high current
E	Current output: passive, high current	Current output: passive, high current
F	Current output: passive, Namur	Current output: passive, Namur
G	Control input: active, high current (only with "n" = F)	Control input, active high current
H	Control input: active, Namur (only with "n" = F)	Control input: active, Namur
K	Control input: passive, high current (only with "n" = F)	Control input: passive, high current

① unless otherwise stated only with "n" ≠F

3.2.3 Transmitter model code I / O overviews

Non intrinsically safe I/O connections

I/O PCB	**Input / output functions** (U_n<32 VDC, I_n <100 mA U_m = 253 V)
Basic I/O	Active / passive current output with HART
	Status output / control input
	Status output
	Pulse / status output
Modular I/O	Active or passive current output with HART (according to options selected)
	Active or passive pulse status output, highC or Namur (according to options selected)
Modular carrier with 1 or 2 I/O modules	Each module can have one of the three following I/O functions: • Active or passive current output • Active or passive status / pulse output, high current or Namur • Active or passive control input, high current or Namur
Profibus DP I/O	Profibus DP, active
Fieldbus I/O	Profibus PA or Foundation Fieldbus
RS485 Modbus	Modbus, with or without termination

Overview of possible combinations					
Character "n", "p" and "q"	Name I/O circuits	Terminals A, A-	Terminals B, B-	Terminals C, C-	Terminals D, D-
4pq	Modular I/O ①	"p" ②	"q" ②	CO (a)	PO(a) / SO
6pq					PO / SO
6pq					PO (Namur) / SO
8pq				CO	PO(a) / SO
Bpq					PO / SO
Cpq					PO (Namur) / SO
D88	Fieldbus I/O Profibus PA	Not connected	Not connected	PA	PA
Dpq	Fieldbus I/O Profibus PA ①	"p" ②	"q" ②	FF	FF
E88	Fieldbus I/O Foundation Fieldbus	Not connected	Not connected	FF	FF
Epq	Fieldbus I/O Foundation Fieldbus ①	"p" ②	"q" ②	FF	FF
F00	Profibus DP I/O	Not connected	DP(a)	DP(a)	DP(a)
Fp0	Profibus DP I/O with one module	"p" ②	DP(a)	DP(a)	DP(a)
Gpq	RS485 Modbus	"p" ②	"q" ②	RS485	RS485
Hpq	Modbus with one or two modules				

① With module carrier and with one or two modules

② See section on converter codes above.

Key: CO = current ouput, CI = control input, PO = pulse output, FF = Foundation Fieldbus, SO = status output

Intrinsically safe I/O connections

Ex I/O	**I/O functions**	
Ex i I/O	Passive current output plus HART Pulse/ status output	Ex ia IIC U_i = 30 V, Ii = 130mA,P_i = 1.0 W, C_i = 10nF, Li = not significant
	Active current output plus HART	Ex ia IIC linear characteristics: Uo = 21 V, I_o = 90 mA, P_o = 0.5 W C_o = 90 nF, L_o = 2.0 mH C_o = 110 nF, L_o = 0.5 mH
Ex i option or Ex i option 2	Passive current input Current output Pulse / status output / control input	Ex ia IIC Ui = 30 V, Ii = 130mA, P_i = 1.0 W Ci = 10 nF, L_i = not significant
	Active current output	Ex ia IIC linear characteristics: U_o = 21 V, I_o = 90 mA, P_o = 0.5 W C_o = 90 nF, L_o = 2.0 mH C_o = 110 nF, L_o = 0.5 mH
Fieldbus I/O	Profibus PA Foundation Fieldbus	Ex ia IIC U_i = 24 V, Ii = 380 mA, P_i = 5.32 W, C_i = 5 nF, L_i = 10 µH Intrinsically safe Fieldbus complies with the FISCO model.

Overview of possible combinations

Character "n", "p" and "q"	Name I/O circuits	Terminals A, A-	Terminals B, B-	Terminals C, C-	Terminals D, D-
200	Ex i I/O	Not connected	Not connected	CO (a)	PO /SO
300		Not connected	Not connected	CO	PO /SO
210	Ex i I/O with Ex i options	CO (a)	PO / SO / CI	CO (a)	PO /SO
220		CO	PO / SO / CI	CO	PO /SO
310		CO (a)	PO / SO / CI	CO	PO /SO
320		CO	PO / SO / CI	CO	PO /SO
D00	Profibus PA	Not connected	Not connected	PA	PA
D10	Profibus PA (with Ex i options)	CO (a)	PO / SO / CI	PA	PA
D20		CO	PO / SO / CI	PA	PA
E00	Foundation Fieldbus	Not connected	Not connected	FF	FF
E10	Foundation Fieldbus (with Ex i options)	CO (a)	PO / SO / CI	FF	FF
E20		CO	PO / SO / CI	FF	FF

The output connections to the mass flow sensor have the values shown in the table below. No further intrinsic safety evaluation is required if: a) cable length provided by manufacturer is not exceeded, or b) it is within maximum limits. See section on cable parameters.

Maximum transmitter values

Driver circuit, intrinsically safe. Type of protection intrinsic safety: Ex ia IIC		
Terminals PCB Board	Maximum values	
DR+, DR-	U_o	11.8 V
	I_o	1325 mA
	P_o	0.53 W
	C_o	1000 nF
	L_o	36 µH
Sensor circuit, intrinsically safe. Type of protection intrinsic safety: Ex ia IIC		
Terminals PCB Board	Maximum values	
SA+, SA-, SB+, SB-	U_o	11.8 V
	I_o	13 mA
	P_o	39 mW
	C_o	90 nF
	L_o	100 mH
	Linear characteristic	
RTD / DMS circuit, intrinsically safe. Type of protection intrinsic safety: Ex ia IIC		
Terminals PCB Board	Maximum values	
T1, T2, T3, T4	U_o	11.8 V
	I_o	10.5 mA
	P_o	31 mW
	C_o	340 nF
	L_o	100 mH
	Linear characteristic	

Notes:

- Options separated with "/" are set by the user in the transmitter.
- Options separated with "or" are hardware options and must be ordered.
- All outputs are passive unless marked differently.
- I/O circuits shown as Ex i are always in the intrinsically safe (Ex ia) protection category. Fieldbus I/O, Profibus, Fieldbus I/O and Foundation Fieldbus can all be in the intrinsically safe category.

- A maximum of four intrinsically safe (Ex ia) I/Os are possible. All intrinsically safe circuits are galvanically insulated, with respect to earth and each other. To prevent the possible hazard of combined voltages and currents, the wiring of Ex ia circuits must be separated and where applicable, local legislation / regulations should be followed. For example: IEC/EN 60079-14 clause 12.2.
- The Ex ia signal I/Os can only be connected to other Ex ia or ib certified devices (for example intrinsically safe isolation amplifiers) even if such devices are installed in the non-hazardous area.
- Connection to non Ex i devices will mean that the meter is no longer intrinsically safe.
- Terminals L and N (or L+ and L-) for power supply connection are not intrinsically safe. To achieve the required separation between the non-Ex i and the Ex i circuits (IEC / EN 60079-11) the power supply terminals have a touch guard (cover) that can be closed and secured with a snap-in lock. The touch guard (cover) MUST be in the closed position before power is supplied to the transmitter.
- Do not try to repair flameproof joints. For more information regarding flameproof joints, please contact the manufacturer.

4.1 General

The manufacturer recommends that flowmeters installed in hazardous areas should be inspected at regular intervals. As part of the inspection procedure, check the flameproof transmitter housing and covers for any signs of damage or corrosion.

4.2 Replacing the power supply fuse

DANGER!
Work on the signal transmitter electronics may only be performed when disconnected from the power supply.

DANGER!
Observe the waiting period for Ex devices.

WARNING!
Observe without fail the local occupational health and safety regulations.
Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

- Remove the front panel. Use a small screwdriver to open the plastic clips that hold the display.
- Remove the 2 locking screws.
- Carefully pull the electronics out of the housing.
- When the unit is almost removed from the converter housing, disconnect the rectangular (10 way) blue connector at the back of the unit. This connector is for the flow sensor circuits.
- The power supply fuse is contained in a fuse holder located at the back of the electronics unit.
- The table below gives the specifications for the correct fuse.

Cartridge fuse size 5 x 20mm (type H according to IEC 60127-2/V)		
Power supply	**Time lag**	**Schneider part No**
12...24 VDC	250 V / 2 A	5060200000
24 VAC	250 V / 2 A	5060200000
100...230 VAC	250 V / 1.6 A	5080850000

4.3 Returning the device to the manufacturer

4.3.1 General information

This device has been carefully manufactured and tested. If installed and operated in accordance with these operating instructions, it will rarely present any problems.

WARNING!

Should you nevertheless need to return a device for inspection or repair, please pay strict attention to the following points:

- *Due to statutory regulations on environmental protection and safeguarding the health and safety of the personnel, the manufacturer may only handle, test and repair returned devices that have been in contact with products without risk to personnel and environment.*
- *This means that the manufacturer can only service this device if it is accompanied by the following certificate (see next section) confirming that the device is safe to handle.*

WARNING!

If the device has been operated with toxic, caustic, radioactive, flammable or water-endangering products, you are kindly requested:

- *to check and ensure, if necessary by rinsing or neutralising, that all cavities are free from such dangerous substances,*
- *to enclose a certificate with the device confirming that it is safe to handle and stating the product used.*

4.3.2 Preapproval form - Customer returned process-wetted products

§	***LEGAL NOTICE!*** *In compliance with **U.S. Federal OSHA Standard 29CFR1910.1200** process information must be reviewed previous to receiving authorization to return material to Schneider Electric Systems USA, Inc.*

NO PRODUCT EXPOSED TO HYDROFLUORIC ACID OR MERCURY WILL BE ACCEPTED!

Date: _____

Customer information

Customer's name:

Address:

Phone no:

Fax no.:

Contact's name:

Rep information

Rep's name:

Address:

Phone no:

Fax no.:

Contacts' name:

Product being returned:

Model No.:

Serial no.:

Under warranty? YES NO

Copies of MSDS sheets for all processes including cleaning solutions may be required.

Type of process (what chemicals/materials were processed through the unit):

Explain what steps were taken to decontaminate the unit: (was unit steam cleaned, rinsed out with water, chemically cleaned etc.)

Form completed by: _____ _____

Print name Signature

Date: _____

CLEANING STATEMENT
(Note: Your item will not be serviced unless the following cleaning statement has been signed):

I certify that the above referenced item has been properly purged and cleaned, complies with U.S. Department of Transportation shipping requirements and DOES NOT present a health and/or safety hazard (as defined by OSHA) to our Customer Repair personnel.

Print name: _____ Signature: _____

Print title: _____ Date: _____

Please fax the completed form to the Customer Satisfaction Center +1-508-549-4999

4.3.3 Disposal

§	***LEGAL NOTICE!*** *Disposal must be carried out in accordance with legislation applicable in your country.*

Separate collection of WEEE (Waste Electrical and Electronic Equipment) in the European Union:

According to the directive 2012/19/EU, the monitoring and control instruments marked with the WEEE symbol and reaching their end-of-life **must not be disposed of with other waste**.
The user must dispose of the WEEE to a designated collection point for the recycling of WEEE or send them back to our local organisation or authorised representative.

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