

Note: For hazardous installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

Information affixed to equipment that complies with the Pressure Equipment Directive can be found on the internet at www.micromotion.com/library.

If you require the information given in this manual in a different language, please contact Micro Motion Customer Service.

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Reference no. EB-20000916 Rev. KA

F-Series Sensors

ATEX Installation Instructions

- For installing Micro Motion F-Series sensors with ATEX certificate number BVS 03 ATEX E 176 X



Subject: Equipment type

Manufactured and submitted for examination

Address

Basis for examination:

Standard basis

Code for type of protection

EC Type Examination Certificate

Sensor type F* *****Z*******

Micro Motion, Inc.

Boulder, Co. 80301, USA

Annex II of Directive 94/9/EC

EN 60079-0:2006 General requirements

EN 60079-11:2007 Intrinsic safety 'i'

EN 61241-0:2006 and EN 61241-1:2004 Dust evaluation 'tD A'

II 2G Ex ib IIB/IIC T1–T4/T5/T6

II 2D Ex tD A21 IP65 T*

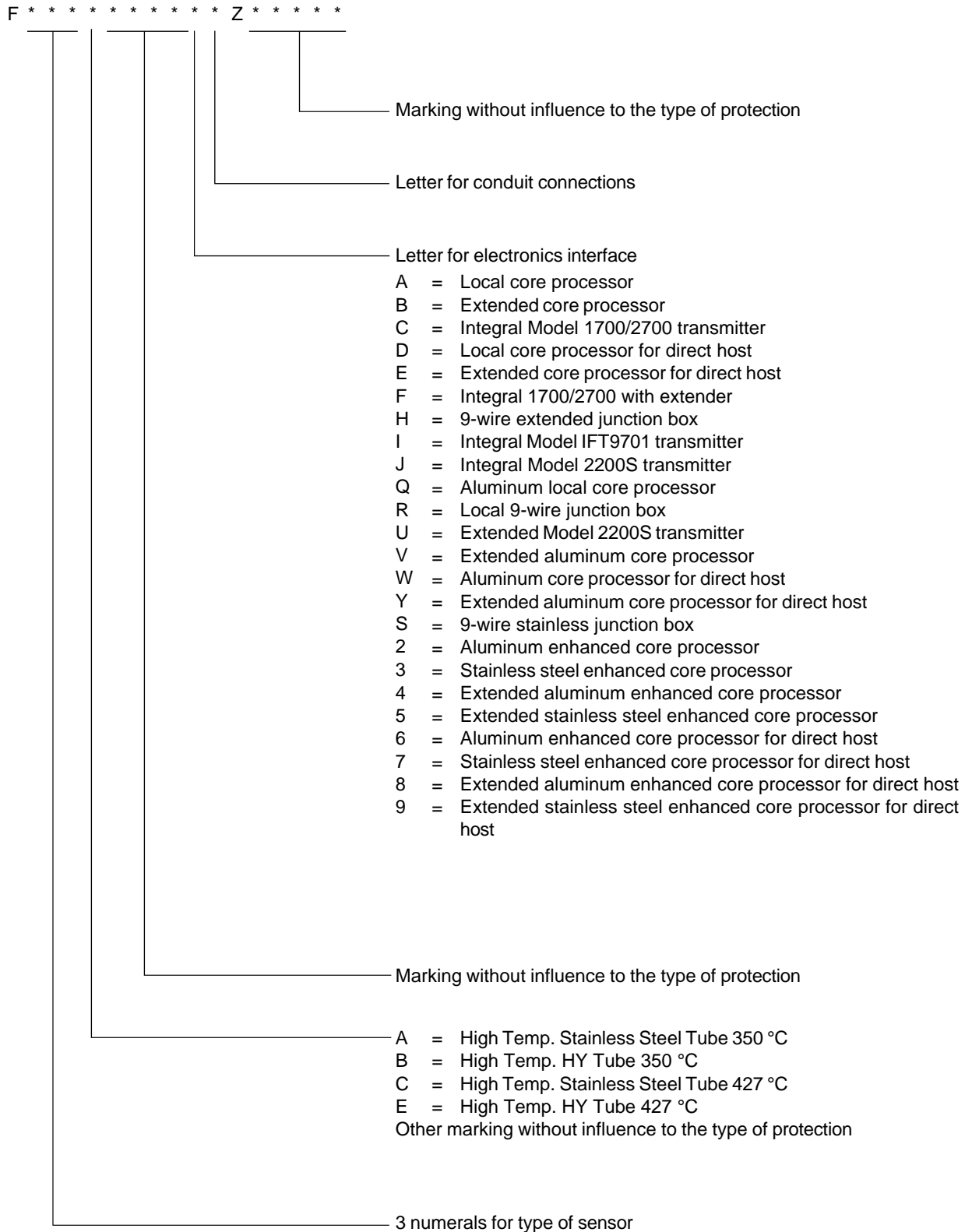
BVS 03 ATEX E 176 X



1) Subject and type

Sensor type F*** *****Z*****

Instead of the *** letters and numerals will be inserted which characterize the following modifications:



2) Description

The flow sensor in combination with a transmitter is used for flow measurement.

The flow sensor, which consists of magnetically excited oscillating tubes, contains as electrical components coils, resistors, temperature sensors and terminals and connectors.

- When used with an integral mounted junction box, the variation gets the denomination F*** *****(S or T)***** for a SS enclosure and F*** *****(R or H)***** for an aluminum enclosure. See Sections 3.1 and 3.2.
- When used with an integral mounted signal processing device type 700, the variation gets the denomination type F*** *****(A, B, D, or E)***** for a SS enclosure and F*** *****(Q, V, W, or Y)***** for an aluminum enclosure. See Sections 3.3 and 3.4.



- When used with an integral mounted enhanced signal processing device type 800, the variation gets the denomination type F*** *****(3, 5, 7, or 9)***** for a SS enclosure and F*** *****(2, 4, 6, or 8)***** for an aluminum enclosure. See Sections 3.3 and 3.4.



- The high temperature version F*** (A, B, C, or E)***** can be executed with a junction box (see Section 3.2), or transmitter (see Sections 3.6 and 3.8), or core processor/enhanced core processor (see Section 3.4); this variation has therefore always the denomination F*** (A, B, C, or E)*****.



- When used with an integral transmitter type 2200S***** , the variation gets the denomination type F*** *****(J or U)***** . See Sections 3.5 and 3.6. By mounting the sensor directly to the 2200S transmitter the use of the unit will be modified according to the following table:

	Sensor type	
	F025 *****(J or U)*Z***** F025 *****(J or U)*Z***** CIC A2 F050 *****(J or U)*Z***** F050 *****(J or U)*Z***** CIC A2 F100 *****(J or U)*Z***** F100 *****(J or U)*Z***** CIC A2 F200 *****(J or U)*Z***** F200 *****(J or U)*Z***** CIC A1 F300 *****(J or U)*Z***** CIC A4 F300 *****(J or U)*Z***** F025(A, B, C, or E) *****J*Z***** F050(A, B, C, or E) *****J*Z***** F100(A, B, C, or E) *****J*Z***** F025(A, B, C, or E) *****J*Z***** CIC A3 F050(A, B, C, or E) *****J*Z***** CIC A3 F100(A, B, C, or E) *****J*Z***** CIC A3	F300 *****(J or U)*Z***** F300(A, B, C, or E) *****J*Z*****
Transmitter type 2200S***1*Z****	Ex ib IIC T1–T4 Ex ibD 21 T70°C	Ex ib IIB T1–T4 Ex ibD 21 T70°C

- When used with an integral transmitter type *700***** the variation gets the denomination type F***
*****(C or F)*****. See Sections 3.7 and 3.8. By mounting the sensor directly to the *700 transmitter the
use of the unit will be modified according to the following table:



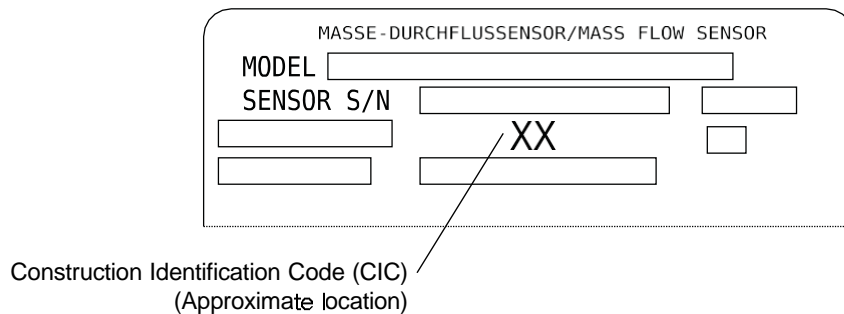
	Sensor type	
	F025 *****(C or F)*Z***** F025 *****(C or F)*Z***** CIC A2 F050 *****(C or F)*Z***** F050 *****(C or F)*Z***** CIC A2 F100 *****(C or F)*Z***** F100 *****(C or F)*Z***** CIC A2 F200 *****(C or F)*Z***** F200 *****(C or F)*Z***** CIC A1 F300 *****(C or F)*Z***** CIC A4 F300 *****(C or F)*6***** F025(A, B, C, or E) *****C*Z***** F050(A, B, C, or E) *****C*Z***** F100(A, B, C, or E) *****C*Z***** F025(A, B, C, or E) *****C*Z***** CIC A3 F050(A, B, C, or E) *****C*Z***** CIC A3 F100(A, B, C, or E) *****C*Z***** CIC A3	F300 *****(C or F)*Z***** F300(A, B, C, or E)*****C*Z*****
Transmitter type *700*1(1 or 2)*****	Ex ib IIB+H ₂ T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C	Ex ib IIB T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C
Transmitter type *700*1(3, 4, or 5)*****	Ex ib IIC T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C	Ex ib IIB T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C
Transmitter type *700*1(1 or 2)D*****	Ex ib IIB+H ₂ T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C	Ex ib IIB T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C
Transmitter type *700*1(3, 4, or 5)D*****	Ex ib IIC T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C	Ex ib IIB T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C
Transmitter type 2700*1(1 or 2)(E or G)*****	Ex ib IIB+H ₂ T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C	Ex ib IIB T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C
Transmitter type 2700*1(3, 4, or 5)(E or G)*****	Ex ib IIC T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C	Ex ib IIB T1–T5 Ex tD A21 IP 65 T ⁽¹⁾ °C

(1) For dust temperature ratings, see temperature graphs.

- When used with an integral transmitter type IFT9701***** the variation gets the denomination type F***
*****|*Z*****. See Section 3.9.



Modifications to the design which have impact on the electrical parameters are indicated by a Construction Identification Code (CIC). This code consists out of two digits, starting with an A and followed by a sequence number; for example A4. The CIC can be found on the approval label, see picture below:



Supplement 1 covers:

- The addition of the F300 sensor.

Supplement 2 covers:

- Revised pick off coil parameters for the F200 sensors. Sensors constructed using these revised coil parameters will be identified with a construction identification code (C.I.C.) of A1.

Supplement 3 covers:

- The addition of the dust approval and the alternative 9-wire feed-through.

Supplement 4 covers:

- The addition of the F300A sensor.

Supplement 5 covers:

- Revised drive and pick-off coil parameters for the F025–F100 Sensors. Sensors constructed using these revised coil parameters will be identified with a construction identification code (C.I.C.) of A2.
- Electronic option codes 2–9 have been added to cover the 800ECP.
- Option code S has been added for the 9-wire stainless junction box.
- Maximum fluid temperature has been increased to 204 °C and the lower ambient/fluid temperature has been changed as well: see temperature graphs.

Supplement 6 covers:

- The addition of the F025 A, B, C, or E – F100 A, B, C, or E.
- The addition of the F300 B, C, or E Sensors.
- The lower ambient/fluid temperature for the F300A has changed.

Supplement 7 covers:

- Revised coil parameters of the F025-F100 A, B, C, or E. Sensors constructed using these revised coil parameters will be identified with a construction identification code (C.I.C.) of A3.
- New standard series EN 60079-** and EN 61241-*.

Supplement 8 covers:

- The addition of the 2200S.
- Option code T added for the 9-wire stainless steel junction box with extender.
- Added the F300 IIC, approval option code 6 and CIC A4.
- Revised electrical parameters for sensors with junction box.


3) Parameters

3.1) Type F*** *****(R, H, S, or T)*Z*****

Sensor with junction box, excluding F*** (A, B, C, or E)****(R or S)*Z*****


3.1.1) Drive circuit (connections 1–2 or red and brown)

Voltage	U _i	DC	11,4	V
Current	i _i		2,45	A
Power	P _i		2,54	W
Effective internal capacitance	C _i		Negligible	

Sensor type 		Inductance (mH)	Coil resistance (Ω)	Series resistor (Ω)	Minimum ambient /fluid temp (°C)
F025 *****(R, H, S, or T)*Z*****	IIC	5,83	24,1	988,8	-40
F025 *****(R, H, S, or T)*Z***** CIC A2	IIC	7,5	84,95	569,0	-68
			77,27	568,83	-83
F050 *****(R, H, S, or T)*Z*****	IIC	5,83	24,1	988,8	-40
F050 *****(R, H, S, or T)*Z***** CIC A2	IIC	7,5	84,95	569,0	-68
			77,27	568,83	-83
F100 *****(R, H, S, or T)*Z*****	IIC	29,9	262,1	207,7	-40
F100 *****(R, H, S, or T)*Z***** CIC A2	IIC	7,5	84,95	569,0	-68
			77,27	568,83	-83
F200 *****(R, H, S, or T)*Z*****	IIC	9,4	37,4	148,3	-40
F200 *****(R, H, S, or T)*Z***** CIC A1	IIC	9,4	37,4	148,3	-40
			27,5	148,17	-90
			18,43	148,03	-138
F300 *****(R, H, S, or T)*Z*****	IIB	11,75	83,5	7,9	-40
F300 *****(R, H, S, or T)*Z***** CIC A4	IIC	11,75	57,8	129	-100
F300 *****(R, H, S, or T)*6*****	IIC	11,75	57,8	129	-100

3.1.2) Pick-off circuit (connections 5/9 and 6/8 or green/white and blue/gray)

Voltage	U _i	DC	21,13	V
Current	i _i		18,05	mA
Power	P _i		45	mW
Effective internal capacitance	C _i		Negligible	

Sensor type 		Inductance (mH)	Coil resistance (Ω)	Series resistor (Ω)	Minimum ambient /fluid temp (°C)
F025 ***** (R, H, S, or T) *Z*****	IIC	6,9	105	0	-40
F025 ***** (R, H, S, or T) *Z***** CIC A2	IIC	7,5	84,95 77,27	0-569 0-568,83	-68 -83
F050 ***** (R, H, S, or T) *Z*****	IIC	6,9	105	0	-40
F050 ***** (R, H, S, or T) *Z***** CIC A2	IIC	7,5	84,95 77,27	0-569 0-568,83	-68 -83
F100 ***** (R, H, S, or T) *Z*****	IIC	6,9	105	0	-40
F100 ***** (R, H, S, or T) *Z***** CIC A2	IIC	7,5	84,95 77,27	0-569 0-568,83	-68 -83
F200 ***** (R, H, S, or T) *Z*****	IIC	23,8	182,5	0	-40
F200 ***** (R, H, S, or T) *Z***** CIC A1	IIC	12,4	128,4 94,3 63,21	0-569,3 0-568,73 0-568,19	-40 -90 -138
F300 ***** (R, H, S, or T) *Z*****	IIB	12,4	128,4	0-569,3	-40
F300 ***** (R, H, S, or T) *Z***** CIC A4	IIC	12,4	88,6	0-568,63	-100
F300 ***** (R, H, S, or T) *6*****	IIC	12,4	88,6	0-568,63	-100

3.1.3) Temperature circuit (connections 3, 4, and 7 or orange, yellow, and violet)

Voltage	U _i	DC	21,13	V
Current	i _i		26	mA
Power	P _i		112	mW
Effective internal capacitance	C _i		Negligible	
Effective internal inductance	L _i		Negligible	


3.1.3.1) Identification resistor circuit (terminals 3 & 4 or wires orange & yellow)

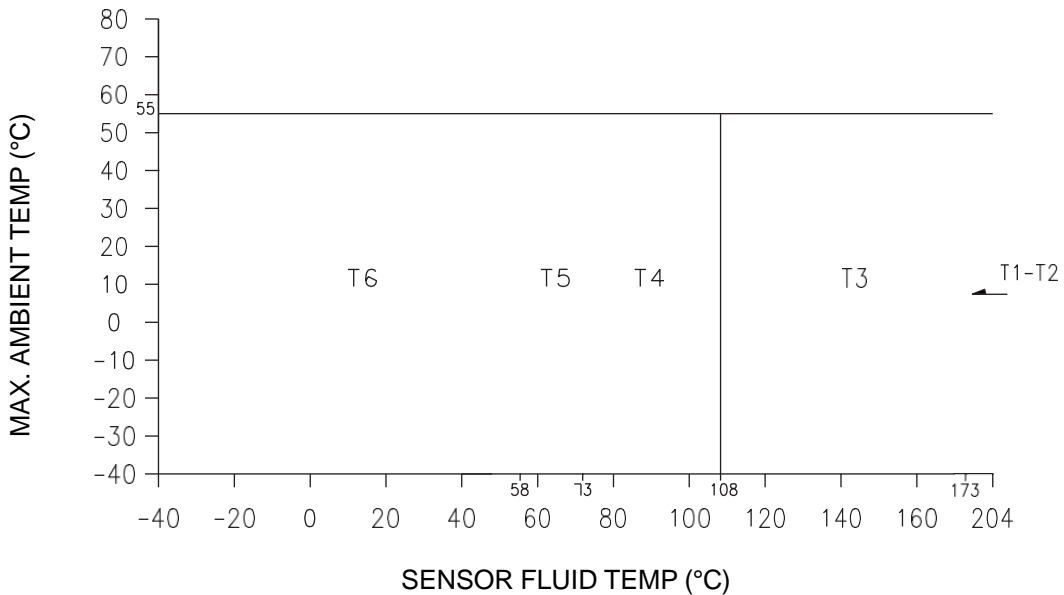
Sensor type	Inductance (mH)	Coil resistance (Ω)	Serial resistor (Ω)	Minimum ambient /fluid temperature (°C)
F300***** (R,H,S,T) *Z*****	N/A	N/A	42,2 to 44,3	-40
F300***** (R,H,S,T) *Z***** CIC A4	N/A	N/A	42,2 to 44,3	-100
F300***** (R,H,S,T) *6*****	N/A	N/A	42,2 to 44,3	-100

3.1.4) Temperature class/ maximum surface temperature T

The classification into a temperature class/determination of the maximum surface temperature T depends on the temperature of the medium taking into account the maximum operating temperature of the sensor and is shown in the following graphs.

3.1.4.1)

Sensor type	
F025*****(R,H,S,T)*Z*****	IIC
F050*****(R,H,S,T)*Z*****	IIC
F100*****(R,H,S,T)*Z*****	IIC
F200*****(R,H,S,T)*Z*****	IIC




Note 1: Use the above graph to determine the temperature class for a given fluid and ambient temperature.

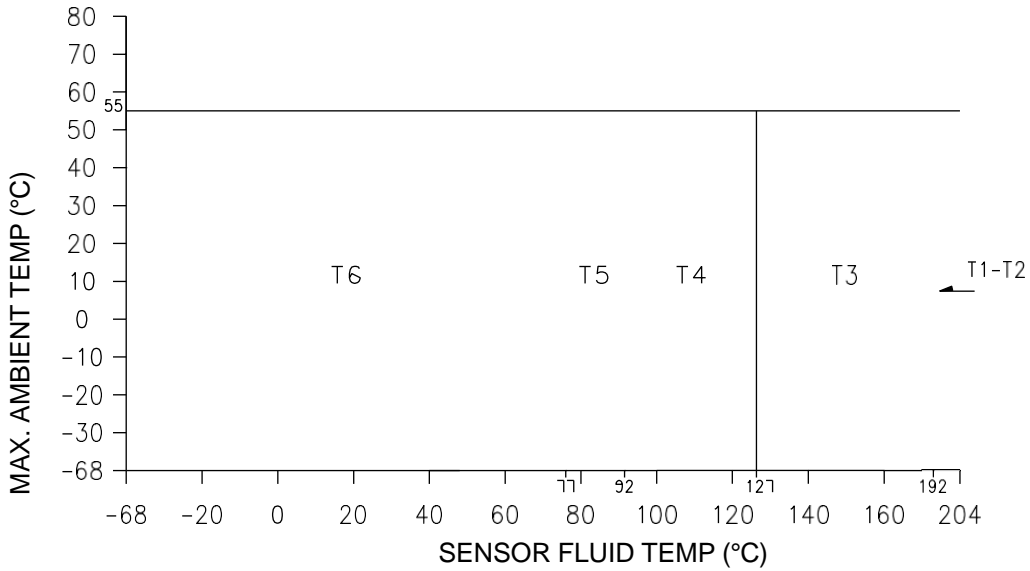
Note 2: The maximum surface temperature for dust is as follows: T6:T 80°C, T5:T 95°C, T4:T 130°C, T3:T 195°C, T2 to T1:T 226°C.

Ambient temperature range Ta -40 °C up to +55 °C

The use of the sensor at an ambient temperature higher than +55°C is possible, provided that the ambient temperature does not exceed the maximum temperature of the medium taking into account the temperature classification and the maximum operating temperature of the sensor.

3.1.4.2)

Sensor type		
F025*****(R,H,S,T)*Z***** CIC A2	IIC	Connected to non-MVD transmitter (e.g., RFT9739)
F050*****(R,H,S,T)*Z***** CIC A2	IIC	



Note 1: Use the above graph to determine the temperature class for a given fluid and ambient temperature.

Note 2: The maximum surface temperature for dust is as follows: T6:T 80°C, T5:T 95°C, T4:T 130°C, T3:T 195°C, T2 to T1:T 207°C.

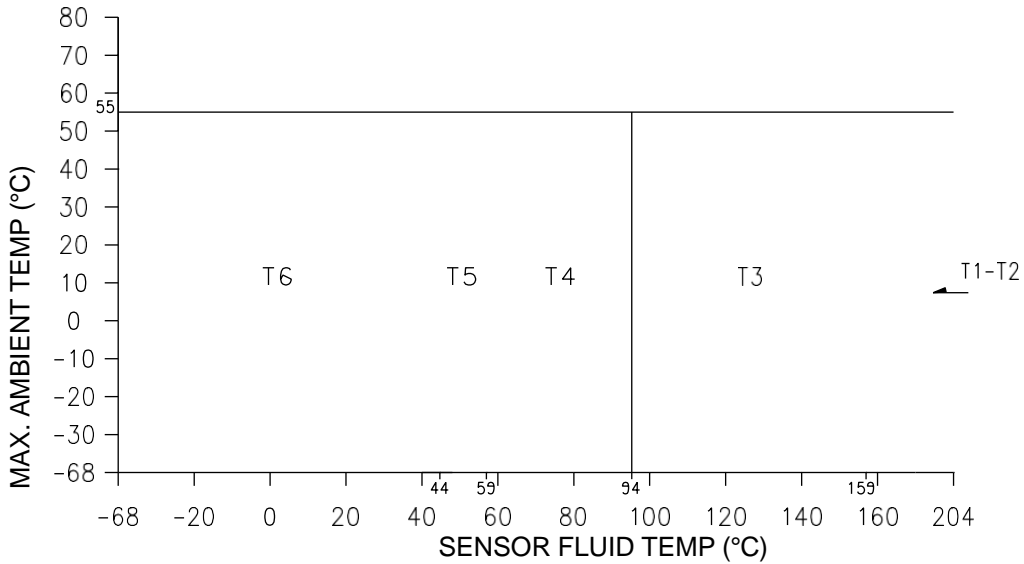
Note 3: The minimum ambient and process fluid temperature allowed for dust is -40°C.

Ambient temperature range Ta -68 °C up to +55 °C

The use of the sensor at an ambient temperature higher than +55°C is possible, provided that the ambient temperature does not exceed the maximum temperature of the medium taking into account the temperature classification and the maximum operating temperature of the sensor.

3.1.4.3)

Sensor type		
F100*****(R,H,S,T)*Z***** CIC A2	IIC	Connected to non-MVD transmitter (e.g., RFT9739)



Note 1: Use the above graph to determine the temperature class for a given fluid and ambient temperature.

Note 2: The maximum surface temperature for dust is as follows: T6:T 80°C, T5:T 95°C, T4:T 130°C, T3:T 195°C, T2 to T1:T 240°C.

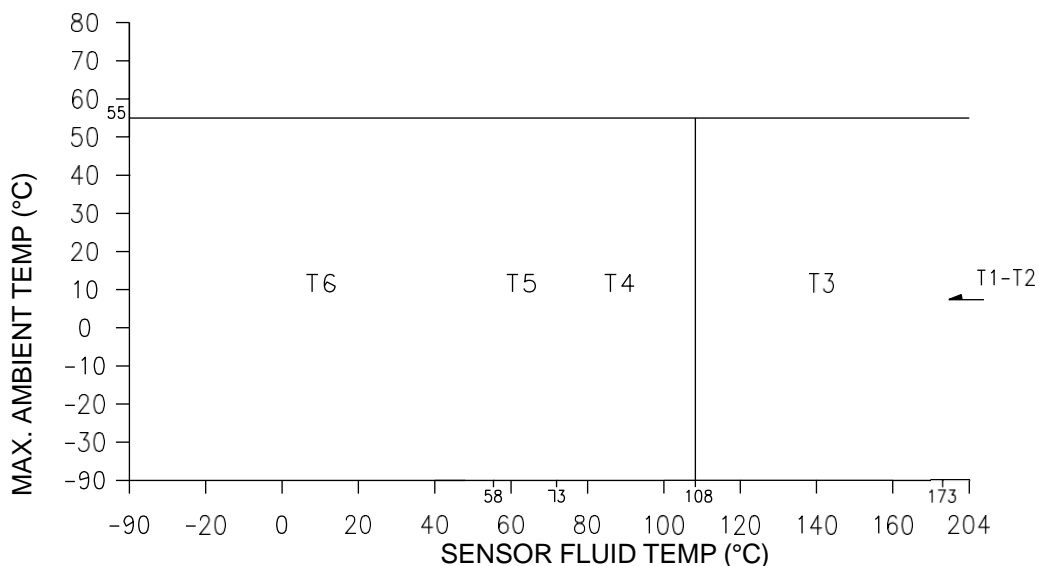
Note 3: The minimum ambient and process fluid temperature allowed for dust is -40°C.

Ambient temperature range Ta -68 °C up to +55 °C

The use of the sensor at an ambient temperature higher than +55°C is possible, provided that the ambient temperature does not exceed the maximum temperature of the medium taking into account the temperature classification and the maximum operating temperature of the sensor.

3.1.4.4)

Sensor type		
F200*****(R,H,S,T)*Z***** CIC A1	IIC	Connected to non-MVD transmitter (e.g., RFT9739)



Note 1: Use the above graph to determine the temperature class for a given fluid and ambient temperature.

Note 2: The maximum surface temperature for dust is as follows: T6:T 80°C, T5:T 95°C, T4:T 130°C, T3:T 195°C, T2 to T1:T 226°C.

Note 3: The minimum ambient and process fluid temperature allowed for dust is -40°C.

Ambient temperature range Ta -90 °C up to +55 °C

The use of the sensor at an ambient temperature higher than +55°C is possible, provided that the ambient temperature does not exceed the maximum temperature of the medium taking into account the temperature classification and the maximum operating temperature of the sensor.

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