Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Safety Instructions

Levelflex M
FMP40, FMP45

Zone 20/21 Ex tD A20/21 IP68 T 115 °C
Zone 21 Ex tD A21 IP68 T 115 °C
Zone 20/22 Ex tD A20/22 IP68 T 83 °C
Zone 22 Ex tD A22 IP68 T 83 °C

IECEx TUN 04.0010

XA218F-B

Safety instructions for electrical apparatus for explosion-hazardous areas according to IEC standards

XA218F-B/00/en/02.08
71071334

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Levelflex M
FMP40, FMP45

english

HART

Associated Documentation

This document is an integral part of the following Operating Instructions:
BA242F/00

The Operating Instructions which are supplied and correspond to the device type apply.

Supplementary Documentation

Explosion-protection brochure:
CP021Z/11

Designation

Explanation of the labelling and type of protection can be found in the explosion protection brochure.

Designation according to IECEx	**Zone 20/21** **Zone 21** **Zone 20/22** **Zone 22**
Designation of explosion protection	**Ex tD A20/21 IP68 T 115 °C** **Ex tD A21 IP68 T 115 °C** **Ex tD A20/22 IP68 T 83 °C** **Ex tD A22 IP68 T 83 °C**

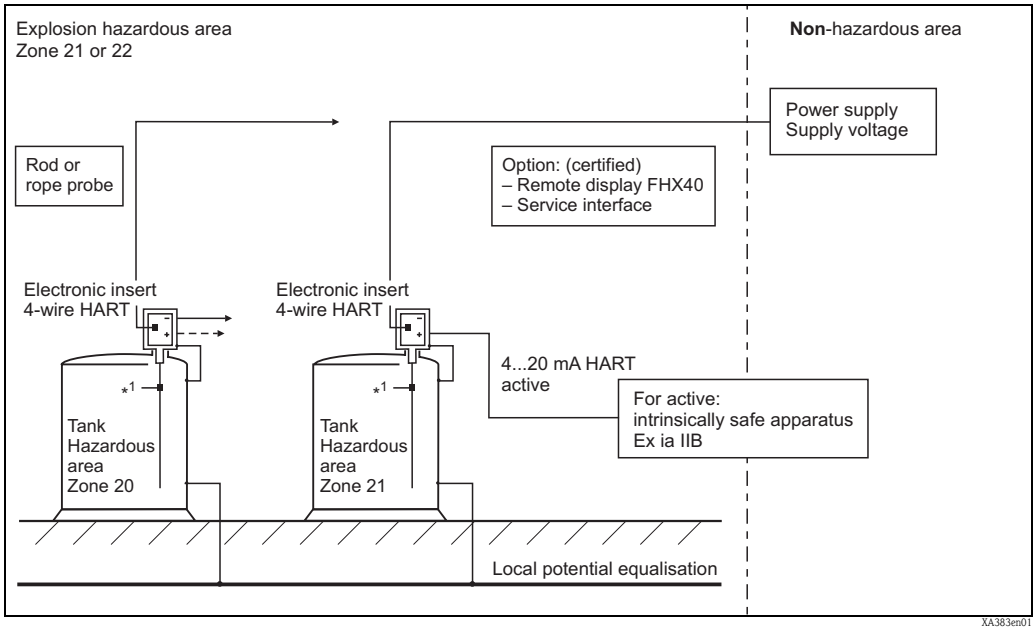

Fig. 1

4-wire:

Power supply Ue	Ue = 90...253 V AC, 50/60 Hz Um = 250 V AC	or Ue = 10.5...32 V DC Um = 60 V DC	Housing protection IP6x Observe voltage version

Signal circuit	4...20 mA	Ex [ia] IIB, Ex [ib] IIB	active; see Tab. 3

Application	A20/21, A20/22 A21, A22	Probe in Zone 20 and housing in Zone 21 or 22 Probe and housing in Zone 21 or 22
Type of protection	Ex tD Axx/xx IP68 T xx °C	
Max. working pressure	dependent on the probe	
Process temperature	dependent on the probe	

Housing F12	–40 °C ≤ Tu ≤ +80 °C	optionally with or without VU331 display and operating module
	Zone 21	only closed electronics compartment cover permitted
	Zone 22	electronics compartment cover with inspection glass permitted

Option	**Remote display, e.g. FHX40**	IECEx TUN 04.0011	observe associated Safety Instructions
	Service interface	IEC certified	observe associated Safety Instructions

Safety instructions: Installation

- Install the device according to the manufacturer's instructions and any other valid standards and regulations.
- Do not operate the device outside the specified electrical, thermal and mechanical parameters.
- The electrical apparatus must be integrated into the local potential equalisation line (PML).
- Only intrinsically safe signal circuit permitted (for active or passive version):
  Minimum requirement for:
  probe in Zone 20: Ex [ia] IIB
  probe in Zone 21: Ex [ib] IIB
  (intrinsically safe values, see Tab. 2 and Tab. 3)
- The intrinsically safe signal circuit of the device is isolated from ground potential and has a dielectric strength of at least 500 Vrms with respect to it.
- The instrinsically safe signal circuits are galvanically isolated from other circuits up to a peak value of the nominal voltage of 375 V.
- The connection compartment cover must be mounted before commissioning (voltage activation).
  Isolation between an intrinsically safe signal circuit and a non-intrinsically safe power supply circuit must not be lifted.
- Connection compartment cover: "Do not open under voltage".
- The relationship between the permitted ambient temperature for the electronics housing, dependent on the range of application, and the temperature classes is shown in the tables (Tab. 1a FMP40 and Tab. 1b FMP45).
- After aligning (rotating) the housing, retighten the fixing screw (see Operating Instructions).
- Only use suitable cable entries for the application.
- Continuous duty temperature of the cable ≥ Ta +5 K.
- Electronics compartment may be opened under voltage for configuring the device. If the cover of electronics compartment is opened, make sure that no dust may deposit.
  Cover of terminal compartment or cover of electronics compartment: Torque ≥ 40 Nm.
- Only install the devices in media for which the wetted materials have sufficient durability.
- Install the device to exclude any mechanical damage or friction during the application.
  Pay particular attention to flow conditions and fittings.
- The following components of the device correspond to the low risk of mechanical danger.
  They must be mounted in a protected position if installed within a hazardous location area rated Zone 21 or Zone 22 if mechanical danger is expected:
  – Cover with inspection window
  – Plug connectors of devices for supply/communication (e.g. PROFIBUS PA or FOUNDATION Fieldbus) not supplied with a category Ex iaD circuit. This circuit may not be disconnected in energized state.

Zone 20/21 - Application (housing without blanketing)

Tab. 1a FMP40

Maximum permitted medium temperature (process connection) Probe in Zone 20 or 21	Maximum permitted ambient temperature at the electronics housing (electronics housing in Zone 21) dependent on the medium temperature				
	FMP40 with ¾" probe, compact	FMP40 with ¾" probe, remote electronics / spacer tube	FMP40 with 1½" probe, compact	FMP40 with 1½" probe, remote electronics / spacer tube	FMP40 with remote electronics / spacer hose
+ 80 °C	80 °C	80 °C	80 °C	80 °C	80 °C
+ 95 °C	75 °C	75 °C	75 °C	75 °C	80 °C
+130 °C	70 °C	75 °C	70 °C	75 °C	80 °C
+150 °C	65 °C	75 °C	70 °C	75 °C	80 °C

Note: Permitted probe temperature range must be observed

Tab. 1b FMP45

Maximum permitted medium temperature (process connection) Probe in Zone 20 or 21	Maximum permitted ambient temperature at the electronics housing (electronics housing in Zone 21) dependent on the medium temperature		
	FMP45 type A (XT version)	FMP45 type B (HT version)	FMP45 with remote electronics / spacer hose
+ 80 °C	80 °C	80 °C	80 °C
+ 95 °C	78 °C	79 °C	80 °C
+130 °C	76 °C	77 °C	80 °C
+150 °C	74 °C	76 °C	80 °C
+280 °C	67 °C	71 °C	80 °C
+400 °C	not permitted	66 °C	80 °C

Note: Permitted probe temperature range must be observed

Tab. 2 Option

Power supply and signal circuit for remote display, e.g. FHX40, in protection type: intrinsic safety Ex ia IIC or IIB

Uo = 4.2 V Io = 34 mA Po = 36 mW	effective inner inductance effective inner capacitance characteristic curve:	Li = negligible Ci = negligible linear

For connecting the Commubox service interface with the associated ToF cable

Commubox output + ToF cable:						
Uo = 3.74 V Io = 9.9 mA Po = 9.2 mW	effective inner inductance effective inner capacitance characteristic curve:	Li = negligible Ci = negligible linear				
	for material group IIC	permitted outer inductance permitted outer capacitance	Lo ≤ 340 mH Co ≤ 100 µF			
When interconnected to a Levelflex M, the following results apply:						
	Lo =	0.15 mH	0.5 mH	1 mH	2 mH	5 mH
for material group IIC	Co =	≤ 8 µF	≤ 7 µF	≤ 5.5 µF	≤ 5 µF	≤ 4 µF
for material group IIB	Co =	10 µF				

Tab. 3
Electrical data

Power supply circuit:		
Voltage version	**AC**	**DC**
Supply voltage	90...253 V AC, 50/60 Hz	10.5...32 V DC
Max. power	3.5 VA	1 W
Um	253 V AC	60 V DC

Signal circuit in protection type: intrinsic safety Ex [ia] IIB or Ex [ib] IIB

For installation as per IEC/EN 60079-14 for connection to a certified intrinsically safe circuit with the following maximum values:	
Version FMP40	**active**
	Uo = 21.4 V Io = 237.48 mA Po = 1.271 W Ri = 90.1 ohms Characteristic curve: linear Permanent values: Io = 85 mA Po = 1.17 W
effective inner inductance	Li = negligible
effective inner capacitance	Ci ≤ 10 nF
permitted outer capacitance for electric circuit in category ia	La = 2 mH, Ca ≤ 540 µF La = 1 mH, Ca ≤ 620 nF La = 0.1 mH, Ca ≤ 1 µF
permitted outer capacitance for electric circuit in category ib	La = 2.1 mH Ca = 1.2 µF

Thermal data

Tab. 4a

An irreversible thermal fuse with cut-off temperature of 115 °C is implemented in the 4-wire transmitter			
	Probe in	Electronics housing in	
	Zone 20	Zone 21	Zone 22
Maximum permitted ambient temperature	–40...+150 °C	–40...+80 °C	
Maximum surface temperature at 40 °C ambient temperature	+40 °C	+80 °C	+43 °C
Maximum surface temperature at 80 °C ambient temperature	+80 °C	+115 °C	+83 °C
Maximum surface temperature for probe ambient temperatures > 80 °C and under simultaneous compliance of the ambient temperature at the electronics housing in accordance with Tab. 1a	...+150 °C (identical to process temperature)	+115 °C	+83 °C

Tab. 4b

An irreversible thermal fuse with cut-off temperature of 115 °C is implemented in the 4-wire transmitter			
	Probe in	Electronics housing in	
	Zone 20	Zone 21	Zone 22
Maximum permitted ambient temperature	–200...+400 °C	–40...+80 °C	
Maximum surface temperature at 40 °C ambient temperature	+40 °C	+80 °C	+43 °C
Maximum surface temperature at 80 °C ambient temperature	+80 °C	+115 °C	+83 °C
Maximum surface temperature for probe ambient temperatures > 80 °C and under simultaneous compliance of the ambient temperature at the electronics housing in accordance with Tab. 1b	...+150 °C (identical to process temperature)	+115 °C	+83 °C
	...+280 °C	+115 °C	+83 °C
	...+400 °C	+115 °C	+83 °C

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