ZD059F-E/00/en/03.08
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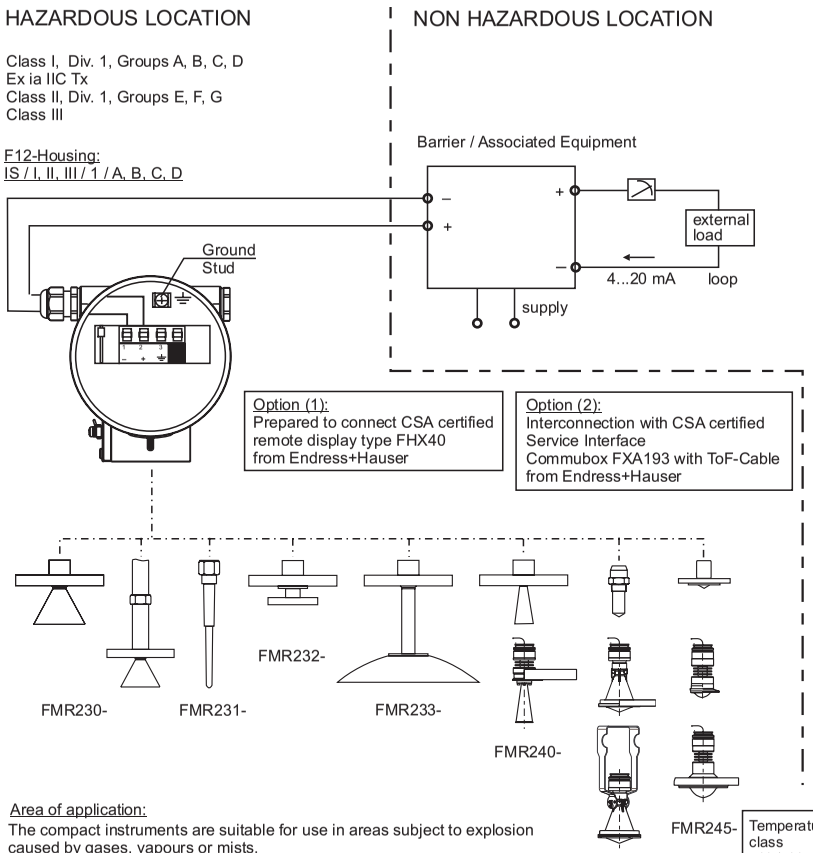
CSA Control Drawing 960402-2065 E

Micropilot M
FMR230/231/232/233/240/244/245
(F12 / IS-HART)

Endress+Hauser
People for Process Automation



Area of application:
The compact instruments are suitable for use in areas subject to explosion caused by gases, vapours or mists.

Permissible ambient temperature:
Electronic: F12 enclosure –40...+80 °C resp. –40...176 °F

Type	Type of antennas	Operation temperature [1]
FMR230 -	Horn antenna with PTFE-Korund feeder	–40 °C/–40 °F to +200 °C/392 °F
-..F	HT antenna (Tantal gasket)	–40 °C/–40 °F to +350 °C/662 °F
-..G	HT antenna (Graphite gasket)	–60 °C/–76 °F to +400 °C/752 °F
	Horn antenna with scavenge connection	depends on type
-..L	XT (extended temperature)	–60 °C/–76 °F to +280 °C/536 °F
-..M	HT (high temperature)	–60 °C/–76 °F to +400 °C/752 °F
FMR231 -	Rod antenna PPS	–20 °C/– 4 °F to +120 °C/250 °F
	Rod antenna PTFE	–40 °C/–40 °F to +150 °C/300 °F
	Rod antenna PTFE cladded	–40 °C/–40 °F to +150 °C/300 °F
	Sanitary (process connection)	–40 °C/–40 °F to +150 °C/300 °F
	PVDF (process connection)	–20 °C/– 4 °F to + 80 °C/176 °F
FMR232 -	Planar antenna	–40 °C/–40 °F to +150 °C/300 °F
FMR233 -	Parabolic antenna	–40 °C/–40 °F to +200 °C/392 °F
FMR240 -	> 20 GHz horn antenna	–40 °C/–40 °F to +150 °C/300 °F
	Wave guide antenna	–60 °C/–76 °F to +200 °C/392 °F
	Horn compact, extended, special edition	–40 °C/–40 °F to +150 °C/300 °F
FMR244 -	Compact antenna (PTFE capsuled)	–40 °C/–40 °F to +130 °C/266 °F
	80 mm/3", PP cladded (type 4)	–40 °C/–40 °F to + 80 °C/176 °F
FMR245 -	Compact antenna (types 3, 4)	–40 °C/–40 °F to +150 °C/302 °F
	DN50 + DN80 (types B, C, F, G)	–40 °C/–40 °F to +200 °C/392 °F

[1] Note: take care to specific temperature ranges of antenna versions

Notes.

INTRINSICALLY SAFE (Ex ia), CLASS I, DIV. 1, GROUPS A, B, C, D or Ex ia IIC HAZARDOUS LOCATION INSTALLATION
DIVISION 1 INSTALLATION

1. Control room equipment may not use or generate over 250 Vrms.
2. Install per the Canadian Electrical Code.
3. Warning: Substitution of components may impair intrinsic safety.
   Avertissement: La substitution de composants peut compromettre la sécurité intrinsèque.
4. Ex ia IS defined as intrinsically safe / sécurité intrinsièque.
5. For entity installation use CSA certified safety barrier or other associated equipment that satisfy the following conditions: with Uo/Voc ≤ Ui/Vmax, Io/Isc ≤ Ii/Imax, Co/Ca ≥ Ci + Ccable, Lo/La ≥ Li + Lcable.

Ui/Vmax (V)	Ii/Imax (mA)	Pi/Pmax (W)	Ci (nF)	Li (µH)
30	300	1.0	≤ 13	negligible

6. For system installation use: CSA certified safety barriers as follows:
   (a) 28 V / 300 Ω + Ground or (b) 28 V / 300 Ω + 28 V / Diode or (c) 28 V / 300 Ω + 10 V / 50 Ω.
7. Use supply wires suitable for 5 K above surrounding ambient.
   Utiliser des fils d álimentation qui conviennent a une température de 5 K au-dessus de la température ambiante.
8. Install barrier / associated equipment in accordance with manufacturer's instruction.
9. In case of use of PTFE rod antenna (white), planar, parabolic, enamelled horn, type 244 or type 245 avoid electrostatic charge at the antenna; (e.g. do not rub with dry cloth; do not install within the filling curtain).
10. Apparatus with faucet: In case of disconnection of Micropilot M from the faucet (e.g. for maintenance) we recommend to secure resp. to close the faucet e.g. with an additional blind flange. The responsibility for applicability of the arrangement behooves exclusive the operator.
11. Use specific cables, supplied with the Service Interface Commubox FXA193 or Remote Display FHX40. Refer to the applicable Control Drawing.

CLASS I, DIV. 2, GROUPS A, B, C, D or Ex nC IIC and DIP. for CLASS II and III, DIV. 1, GROUPS E, F, G HAZARDOUS LOCATION INSTALLATION

1. Install per Canadian Electrical Code (CEC) using threaded metal conduit.
   Intrinsic safety barrier not required max. supply voltage 30 V. For T-code see table.
2. Warning: Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
   Avertissement: Risque d'éxplosion - Avant de déconnecter l'équipement, couper le courant ou s'assurer que l'emplacement est désigne non dangereux.
   Warning: Explosion Hazard - Substitution of components may impair suitability for Class I, Div. 2.
   Avertissement: Risque d'éxplosion - La substitution de composants peut rendre ce matèriel inacceptable pour les emplacements de Classe I, Div. 2.

For CLASS II and III; DIV. 1

WARNING: Keep cover tight unless power has been switched off or the area is known to be non-hazardous.

Temperature class with/without display VU331	Permissible max. medium temperature at the antenna process connection (Tmed)	Permissible max. ambient temperature of the electronic compartment (Ta) (enclosure F12)										
		FMR230 - ..E/V/K/D/H	FMR230 - ..L	FMR230 - ..M	FMR230 - ..F/G	FMR231	FMR232	FMR233	FMR240	FMR240 Wave Guide	FMR244	FMR245
T6	+ 80 °C + 60 °C	+55/50 °C +60/55 °C	+60/55 °C +60/55 °C	+60/55 °C +60/55 °C	+60/55 °C +60/55 °C	+55/50 °C +60/55 °C	+55/50 °C +60/55 °C	+55/50 °C +60/55 °C	+60/55 °C +60/55 °C	+60/55 °C +60/55 °C	+60/55 °C +60/55 °C	+60/55 °C +60/55 °C
T5	+ 95 °C + 75 °C	+70/65 °C +75/70 °C	+75/70 °C +75/70 °C	+75/70 °C +75/70 °C	+75/70 °C +75/70 °C	+70/65 °C +75/60 °C	+70/65 °C +75/70 °C	+70/65 °C +75/70 °C	+75/70 °C +75/70 °C	+75/70 °C +75/70 °C	+75/70 °C +75/70 °C	+75/70 °C +75/70 °C
T4	+130 °C + 80 °C	+70 °C +80 °C	+75 °C +80 °C	+75 °C +80 °C	+75 °C +80 °C	+65 °C +80 °C	+70 °C +80 °C	+70 °C +80 °C	+70 °C +80 °C	+75 °C +80 °C	+70 °C +80 °C	+70 °C +80 °C
T3C (functional)	+150 °C + 80 °C	+70 °C +80 °C	+70 °C +80 °C	+75 °C +80 °C	+70 °C +80 °C	+55 °C +80 °C	+65 °C +80 °C	+60 °C +80 °C	+65 °C +80 °C	+75 °C +80 °C	not allowed	**+65 °C** **+80 °C**
T3	+195 °C + 80 °C	+60 °C +80 °C	+70 °C +80 °C	+75 °C +80 °C	+70 °C +80 °C	not allowed	not allowed	+60 °C +80 °C	not allowed	+75 °C +80 °C	not allowed	+65 °C +80 °C
T2B (functional)	+250 °C + 80 °C	+55 °C +80 °C	+70 °C +80 °C	+70 °C +80 °C	+65 °C +80 °C	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed
T2 (functional)	+280 °C + 80 °C	not allowed	+65 °C +80 °C	+70 °C +80 °C	+65 °C +80 °C	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed
T2	+290 °C + 80 °C	not allowed	not allowed	+70 °C +80 °C	+65 °C +80 °C	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed
T1 (functional)	+350 °C + 80 °C	not allowed	not allowed	+70 °C +80 °C	+60 °C +80 °C	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed
T1 (functional)	+400 °C + 80 °C	not allowed	not allowed	+65 °C +80 °C	+55 °C +80 °C	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed

Note: the applicable temperature of antenna must be within their specified limits; Tx (functional) means limited through type of antenna;
T6 and T5 requires for FF electronic enlarged derating: for ambient; 1st number = PA electronic insert; 2nd number = FF electronic insert
e.g. +60/55 °C expression means: Apparatus with PA electronic insert max. ambient at housing = +60 °C;
Apparatus with FF electronic insert max. ambient at housing = +55 °C