ZD127F-D/00/en/03.08
CCS/FM6.0
FM/ D 16.11.07
71072437

# FM Control Drawing
# 960402-1072 D

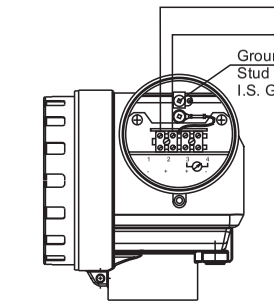
Micropilot M
FMR230/231/232/233/240/244/245
(T12-OVP / IS-HART)

Endress+Hauser
People for Process Automation

## HAZARDOUS LOCATION

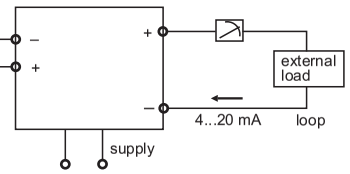
Class I, Div. 1, 2, Groups A, B, C, D
Class I, Zone 0, IIC
Class II, Div. 1, 2, Groups E, F, G
Class III

T12-OVP Housing:
IS / I, II, III / 1 / A, B, C, D

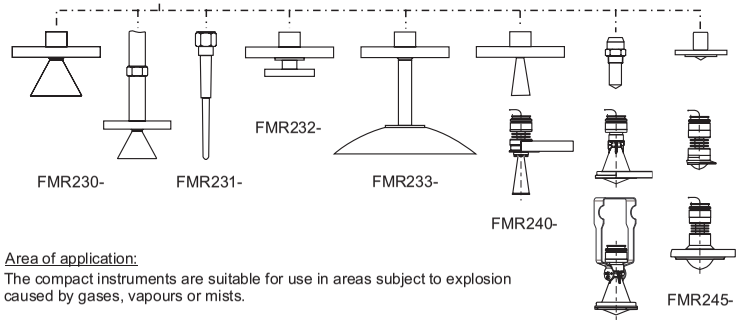



## NON HAZARDOUS LOCATION

Any FM approved associated apparatus or
associated nonincendive field wiring apparatus




Option:
Interconnection with FM Approved
Service Interface
Commubox FXA193 with ToF-Cable
from Endress+Hauser




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: T12 enclosure with integrated surge protection (OVP) –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

**Functional ratings:** These ratings do not supersede Hazardous Locations values
Unom ≤ 30 V,
Inom = 4...20 mA (max. 25 mA).

Notes.

**Intrinsically safe installation**
Intrinsically safe (entity), Class I, Div. 1, Groups A, B, C, D, Hazardous Location Installation.

1. Control room equipment may not use or generate over 250 Vrms.
2. Use FM Approvals Entity-Approved intrinsic safety barrier with Voc or Vt ≤ Vmax, Isc or It ≤ Imax, Ca ≥ Ci + Ccable, La ≥ Li + Lcable barrier must be incapable of delivering more than 1 W to a matched load.
   Transmitter entity parameters are as follows: Vmax = 30 V, Imax = 273 mA, Ci ≤ 13 nF, Li = 0 µH, Pmax = 1 W.
3. Installation should be in accordance with ANSI / ISA RP12.06.01.
   Installation of intrinsically safe systems for Hazardous (Classified) locations and the National Electrical Code (ANSI / NFPA 70).
4. Warning: Substitution of components may impair intrinsic safety.
5. Intrinsic safty barrier manufacturer's installation drawing must be followed when installing this equipment.
   The configuration of the intrinsic safety barrier(s) must be FM Approved.
6. Use supply wires suitable for 5 K above surrounding ambient.
7. 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).
8. The surge protection device (OVP) fulfills the requirements of IEC 60079-14 clause 12.3.
9. 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.

**Division 2 and Zone 2 installation**
Nonincendive, Class I, Div. 2, Groups A, B, C, D, Hazardous Location Installation.

1. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.
   Intrinsic safety barrier not required. Max. supply voltage 30 V. For T-code see table.
2. Nonincendive field wiring installation.
   The Nonincendive Field Wiring Circuit Concept allowes interconnection of nonincendive field wiring apparatus with associated nonincendive field wiring apparatus or associated apparatus not specifically examined in combination as a system using any of the wiring methods permitted for unclassified locations, when Vmax ≥ Voc or Vt, Ca ≥ Ci + Ccable, La ≥ Li + Lcable.
   Transmitter non incendive field wiring parameters for these current controlled circuit are as follows:
   Vmax = 30 V; Ci ≤ 13 nF; Li = 0 µH; Imax = see note 3.
3. For these current controlled circuit, the parameter Imax is not required and need not to be aligned with parameter Isc and It of the associated nonincendive field wiring apparatusor associated apparatus.
4. Warning: Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be Non-Hazardous.
   Warning: Substitution of components may impair suitability for Class I, Division 2.

**Class II, III installation**
DIP for Class II and III, Div. 1, Groups E, F, G, Hazardous Location Installation.

1. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.
2. Use a dust tight seal at the conduit entry.

| 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 T12 (OVP) Ex i with internal surge protection device) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 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<br>+ 60 °C | +55/50 °C<br>+60/55 °C | +60/55 °C<br>+60/55 °C | +60/55 °C<br>+60/55 °C | +55/50 °C<br>+60/55 °C | +50/45 °C<br>+60/55 °C | +55/50 °C<br>+60/55 °C | +55/50 °C<br>+60/55 °C | +55/50 °C<br>+60/55 °C | +60/55 °C<br>+60/55 °C | +55/50 °C<br>+60/55 °C | +55/50 °C<br>+60/55 °C |
| T5 | + 95 °C<br>+ 75 °C | +70/65 °C<br>+75/70 °C | +70/65 °C<br>+75/70 °C | +70/65 °C<br>+75/70 °C | +70/65 °C<br>+75/70 °C | +65/60 °C<br>+75/70 °C | +70/65 °C<br>+75/70 °C | +70/65 °C<br>+75/70 °C | +70/65 °C<br>+75/70 °C | +70/65 °C<br>+75/70 °C | +70/65 °C<br>+75/70 °C | +70/65 °C<br>+75/70 °C |
| T4 | +130 °C<br>+ 80 °C | +70 °C<br>+80 °C | +75 °C<br>+80 °C | +75 °C<br>+80 °C | +75 °C<br>+80 °C | +65 °C<br>+80 °C | +70 °C<br>+80 °C | +70 °C<br>+80 °C | +70 °C<br>+80 °C | +75 °C<br>+80 °C | +75 °C<br>+80 °C | +70 °C<br>+80 °C |
| T3C (functional) | +150 °C<br>+ 80 °C | +70 °C<br>+80 °C | +75 °C<br>+80 °C | +75 °C<br>+80 °C | +70 °C<br>+80 °C | +65 °C<br>+80 °C | +70 °C<br>+80 °C | +60 °C<br>+80 °C | +70 °C<br>+80 °C | +75 °C<br>+80 °C | not allowed | +70 °C<br>+80 °C |
| T3 | +195 °C<br>+ 80 °C | +65 °C<br>+80 °C | +75 °C<br>+80 °C | +75 °C<br>+80 °C | +70 °C<br>+80 °C | not allowed | not allowed | +60 °C<br>+80 °C | not allowed | +75 °C<br>+80 °C | not allowed | +65 °C<br>+80 °C |
| T2B (functional) | +250 °C<br>+ 80 °C | +60 °C<br>+80 °C | +70 °C<br>+80 °C | +75 °C<br>+80 °C | +65 °C<br>+80 °C | not allowed | not allowed | not allowed | not allowed | not allowed | not allowed | not allowed |
| T2 (functional) | +280 °C<br>+ 80 °C | not allowed | +70 °C<br>+80 °C | +75 °C<br>+80 °C | +65 °C<br>+80 °C | not allowed | not allowed | not allowed | not allowed | not allowed | not allowed | not allowed |
| T2 | +290 °C<br>+ 80 °C | not allowed | not allowed | +75 °C<br>+80 °C | +65 °C<br>+80 °C | not allowed | not allowed | not allowed | not allowed | not allowed | not allowed | not allowed |
| T1 (functional) | +350 °C<br>+ 80 °C | not allowed | not allowed | +70 °C<br>+80 °C | +55 °C<br>+80 °C | not allowed | not allowed | not allowed | not allowed | not allowed | not allowed | not allowed |
| T1 (functional) | +400 °C<br>+ 80 °C | not allowed | not allowed | +70 °C<br>+80 °C | +55 °C<br>+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