



Member of the FM Global Group

FM Approvals
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CERTIFICATE OF COMPLIANCE

HAZARDOUS LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

Model TTH300-ab, Temperature Transmitter

IS/I,II,III/1/ABCDEFGH/ T* ; — SAP_214829; Entity; I/0/AEx ia IIC; T*-SAP_214829;NI/II/2/ABCD/ T*; NI/2/II T*=Ta=*-SAP_214831; S/II,III/2/EFG T*.

Entity Parameters:

$V_{max}=30v$, $I_{max}= 130mA$, $P_{max}= 0.8W$ $C_i=5nF$, $L_i=500\mu H$

Output Terminals(1,2,3,4,5 and 6)

Group AB $V_{oc}=6.5v$, $I_{sc}= 25.0mA$, $P_o= 38mW$ $C_a=1.55\mu F$, $L_a=5mH$

Group CD $V_{oc}=6.5v$, $I_{sc}= 25.0mA$, $P_o= 38mW$ $C_a=8.75\mu F$, $L_a=5mH$

Output Terminals (JP1)

$V_{oc}=6.2v$, $I_{sc}= 65.2mA$, $P_o= 101mW$ $C_a=1.4\mu F$, $L_a=5mH$

NonIncendive Field Wiring parameters

$V_{max}=30v$, $I_{max}= 130mA$, $P_{max}= 0.8W$

a = Type of protection; L1 or L2.

b = Communication Protocol; H.

Special Conditions of Use:

1. The Model TTH300 must be used with an IP54 NRTL certified enclosure.
2. For Intrinsic Safety and Non Incendive Approvals the Temperature code and Ambient temperatures are as follows:
T*=Temperature Code T6 for a Maximum Ambient Temperature of 56°C.
T*=Temperature Code T5 for a Maximum Ambient Temperature of 71°C
T*=Temperature Code T4 for a Maximum Ambient Temperature of 85°C.

Model TTF300-abcd, Temperature Transmitter

IS/I,II,III/1/ABCDEFGH/ T* ; — SAP_214832; Entity; I/0/AEx ia IIC; T*-SAP_214832;NI/II/2/ABCD/ T*; NI/2/II T*=Ta=*-SAP_214828; S/II,III/2/EFG T**, XP/II/ABCD/ T*; DIP/II,III/EFG/ T**; Type 4X; IP66, IP67.

Entity Parameters:

$V_{max}=30v$, $I_{max}= 130mA$, $P_{max}= 0.8W$ $C_i=5nF$, $L_i=500\mu H$

Output Terminals(1,2,3,4,5 and 6)

Group AB $V_{oc}=6.5v$, $I_{sc}= 25.0mA$, $P_o= 38mW$ $C_a=1.55\mu F$, $L_a=5mH$

Group CD $V_{oc}=6.5v$, $I_{sc}= 25.0mA$, $P_o= 38mW$ $C_a=8.75\mu F$, $L_a=5mH$

Output Terminals (JP1)

$V_{oc}=6.2v$, $I_{sc}= 65.2mA$, $P_o= 101mW$ $C_a=1.4\mu F$, $L_a=5mH$

NonIncendive Field Wiring parameters

$V_{max}=30v$, $I_{max}= 130mA$, $P_{max}= 0.8W$

a = Type of protection; L1 or L2.

b = Housing/Display; A, B, C, D.

c = Cable Entry; 1,2,3.Certificates CS

d = Communication protocol; H.

Special Conditions of Use:

1. For Intrinsic Safety and Non Incendive Approvals the Temperature code and Ambient temperatures are as follows:

T*=Temperature Code T6 for a Maximum Ambient Temperature of 44°C.

T*=Temperature Code T5 for a Maximum Ambient Temperature of 56°C

T*=Temperature Code T4 for a Maximum Ambient Temperature of 84°C.

2. For Explosionproof and Dust-Ignitionproof Approvals the Temperature code and Ambient temperatures are as follows:

T**=Temperature Code T6 for a Maximum Ambient Temperature of 56°C.

T**=Temperature Code T5 for a Maximum Ambient Temperature of 71°C

T**=Temperature Code T4 for a Maximum Ambient Temperature of 85°C.

Model TTH200-ab, Temperature Transmitter

IS/I,II,III/1/ABCDEFG/ T* ; — TTH200-L1H; Entity; I/O/AEx ia IIC; T*-TTH200-L1H;NI/II/2/ABCD/ T*; NI/2/II

T*=Ta*-.TTH200-L2H; S/II,III/2/EFG T*.

Entity Parameters:

$V_{max}=30v$, $I_{max}= 130mA$, $P_{max}= 0.8W$ $C_i=5nF$, $L_i=500\mu H$

Output Terminals(1,2,3,4,5 and 6)

Group AB $V_{oc}=6.5v$, $I_{sc}= 25.0mA$, $P_o= 38mW$ $C_a=1.55\mu F$, $L_a=5mH$

Group CD $V_{oc}=6.5v$, $I_{sc}= 25.0mA$, $P_o= 38mW$ $C_a=8.75\mu F$, $L_a=5mH$

Output Terminals (JP1)

$V_{oc}=6.2v$, $I_{sc}= 65.2mA$, $P_o= 101mW$ $C_a=1.4\mu F$, $L_a=5mH$

NonIncendive Field Wiring parameters

$V_{max}=30v$, $I_{max}= 130mA$, $P_{max}= 0.8W$

a = Type of protection; L1 or L2.

b = Communication Protocol; H.

Special Conditions of Use:

1. The Model TTH200 must be used with an IP54 NRTL certified enclosure.

2. For Intrinsic Safety and Non Incendive Approvals the Temperature code and Ambient temperatures are as follows:

T*=Temperature Code T6 for a Maximum Ambient Temperature of 56°C.

T*=Temperature Code T5 for a Maximum Ambient Temperature of 71°C

T*=Temperature Code T4 for a Maximum Ambient Temperature of 85°C.

Model TTF350-abcdef, Temperature Transmitter

IS/I,II,III/1/ABCDEFG/ T* ; — TTF350-L4; Entity; I/O/AEx ia/IIC; T*-TTF350-L4;NI/II/2/ABCD/ T*;

NI/2/II T*=Ta*-.TTF350-L5; S/II,III/2/EFG T**, XP/II/ABCD/ T*; DIP/II,III/EFG/ T**; Type 4X; IP66

IP67.

Entity Parameters:

$V_{max}=30v$, $I_{max}= 130mA$, $P_{max}= 0.8W$ $C_i=5nF$, $L_i=500\mu H$

Output Terminals(1,2,3,4,5 and 6)

Group AB $V_{oc}=6.5v$, $I_{sc}= 25.0mA$, $P_o= 38mW$ $C_a=1.55\mu F$, $L_a=5mH$

Group CD $V_{oc}=6.5v$, $I_{sc}= 25.0mA$, $P_o= 38mW$ $C_a=8.75\mu F$, $L_a=5mH$

Output Terminals (JP1) $V_{oc}=6.2v$, $I_{sc}= 65.2mA$, $P_o= 101mW$ $C_a=1.4\mu F$, $L_a=51mH$ **NonIncendive Field Wiring parameters** $V_{max}=30v$, $I_{max}= 130mA$, $P_{max}= 0.8W$

a = Type of protection; L3 or L4 or L5.

b = Housing/Display; N, or R.

c = Cable Entry; 5,6 or 8.

d = Communication protocol; H.

Special Conditions of Use:

1. For Intrinsic Safety and Non Incendive Approvals the Temperature code and Ambient temperatures are as follows:

T*=Temperature Code T6 for a Maximum Ambient Temperature of 44°C.

T*=Temperature Code T5 for a Maximum Ambient Temperature of 56°C

T*=Temperature Code T4 for a Maximum Ambient Temperature of 84°C.

2. For Explosionproof and Dust-Ignitionproof Approvals the Temperature code and Ambient temperatures are as follows:

T**=Temperature Code T6 for a Maximum Ambient Temperature of 56°C.

T**=Temperature Code T5 for a Maximum Ambient Temperature of 71°C

T**=Temperature Code T4 for a Maximum Ambient Temperature of 85°C.

Equipment Ratings:

The TTF350, TTH300, TTH200 and TTF300 Series Temperature Transmitters are FM Approved for Intrinsic Safety for Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; Non Incendive for Class I, Division 2, Groups A, B, C, D and Suitable for Class II, III, Division 2, Groups E, and G when connected in conjunction with Control Drawings SAP_214828, SAP_214829, SAP_214830, SAP_214831, SAP_214832, TTH200-L1H, TTH200-L2H, TTF350-L4...H(1), TTF350-L4...H(2), TTF350-L5...H(1) and TTF350-L5...H(2).

In addition, the TTF300 and TTF350 Temperature Transmitter is FM Approved for Explosionproof For Class I, Division 1, Groups A, B, C and D and Dust-Ignition Proof for Class II, III, Division 1, Groups E, F and G Hazardous(classified) Locations Indoors and Outdoors Type 4X, IP66, IP67.

FM Approved for:

ABB Automation Products GmbH
Alzenau, Germany

This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

Class 3600	1998
Class 3610	1999
Class 3611	2004
Class 3615	2006
Class 3616	1989
ISAS12.00.01	2002
Class 3810	2005
Nema 250	2003
IEC60529	2004

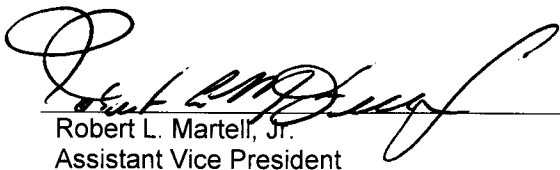
Original Project ID: 3027610

Approval Granted: January 5, 2007

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
070801	November 2, 2007		
3028938	<i>DECEMBER 10, 2007</i>		

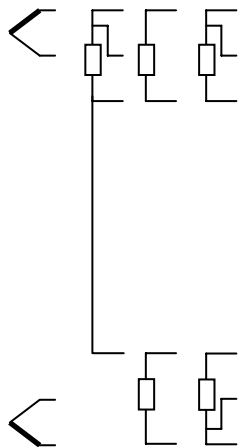
FM Approvals LLC


Robert L. Martell, Jr.
Assistant Vice President

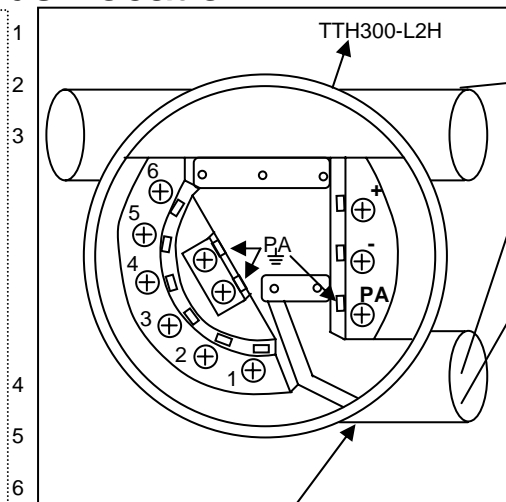
DECEMBER 10, 2007
Date

Hazardous Location

Sensors must be FM approved or be a simple apparatus. Simple apparatus is a device which will neither generate or store more than 1.5 V; 0.1 A; 25 mW or 20 µJ such as switches; RTD's, TC or LED's



Sensor Types Overview
Channel 1 and 2
RTD or TC or Voltage or ...

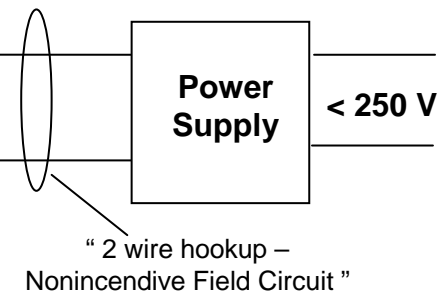


HMI / Display – Interface
(Protection Window Cover, open with screw before connect !)

Type 2-2 T,
Enclosure Type 4X

Apparatus Input Values
V max <= 30.0 V ; I max <= 130 mA

Non – Hazardous Location



Nonincendive Class I Div.2 Groups A, B, C, D and suitable for Class II and III Div.2 Groups E,F,G Hazardous Location Installations.

1. Install per National Electrical Code (NEC) using Threaded Metal Conduit.
2. 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.
3. A dust tight seal must be used at the conduit entry, when the transmitter is used in a class II & III Location.

Sensor Field Circuit Nonincendive Parameters

Class I Div. 2; Groups: A,B,C,D
or Class 1 Zone 2 Group IIC T6
Temp.Ident: T6 at Tamb = 56 °C;
T5 at Tamb = 71 °C;
T4 at Tamb = 85 °C;

Voc = 6.5 V; Isc < 25.0 mA; Po = 38 mW

Terminals: 1,2,3,4,5,6

GP A,B Ca = 1.54 µF; La = 5.0 mH

C,D Ca = 8.74 µF; La = 5.0 mH

HMI / Display Interface

Nonincendive Output Parameters

Voc = 6.2 V;

Isc < 65.2 mA;

Po = 101 mW

Terminals: 6 PIN Connector

GP A,B Ca = 1.4 µF; La = 5.0 mH

C,D Ca = 8.9 µF; La = 5.0 mH

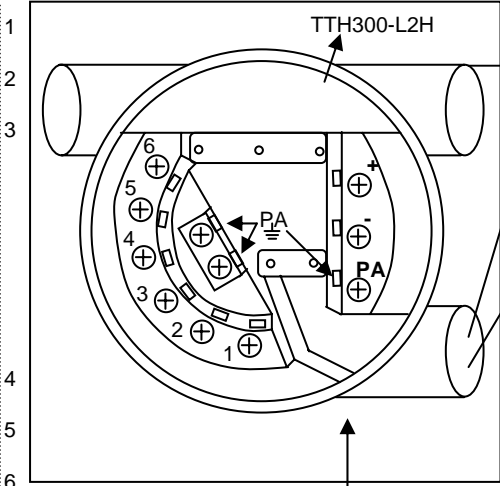
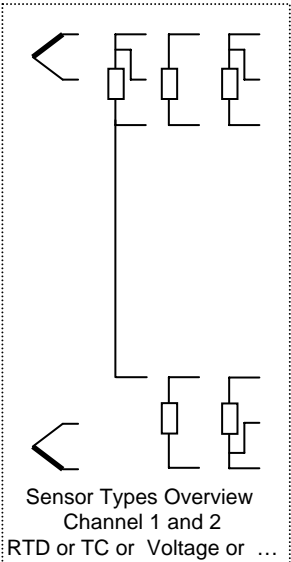
Temperature Transmitter Model "TTF350" ordering code "TTF350-L5..H" is an Temperature Transmitter Type TTH300-L2H which is installed in an enclosure Type 2-2 T Dual Chamber w/wo FM approved display HMI-Ex type B. (ID:)

				Approv.	13.07.07 Müller
				Date	Name
1.01	O-Code	13.07.07	Zeiger		
1.00	Release	04.12.06	Zeiger		
Rev.	Desc.	Date	Name		

Title:		Scale:	
TTF350 HART N. I. Temperature Transmitter Control Drawing		-----	
Drawing / Part No.:		Page : of	
TTF350-L5..H (1)		1 / 1	
Replacement of: -----			

Division 2 Hazardous Location

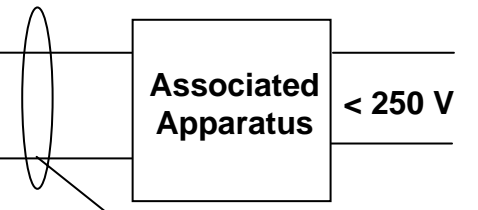
Sensors must be FM approved or be a simple apparatus. Simple apparatus is a device which will neither generate or store more than 1.5 V; 0.1 A; 25 mW or 20 μJ such as switches; RTD's, TC or LED's



Type 2-2 T Enclosure Type 4X

Apparatus Input Values
N.I. V max ≤ 30.0 V ;
I max ≤ 130 mA ; Pi ≤ 0,8W
Ci = 5 nF; Li = 0,5mH

Non – Hazardous Location



“ 2 wire hookup – Nonincendive Field Circuit ”

Associated Apparatus
Nonincendive Parameters must meet the following Requirements :
Voc or Vt ≤ Vmax; Ca ≥ Ci + Ccable;
Isc or It ≤ I max; La ≥ Li + Lcable
The temperature transmitter are FM approved for nonincendive field circuits when installed per national electrical code (NEC) article 501-4(B) or 502-4(B) exception with FM nonincendive field circuit output apparatus which meet the parameters shown on this drawings.

Exception: Wiring in nonincendive circuits shall be permitted using any of the methods suitable for wiring in ordinary locations !

HMI / Display – Interface
(Protection Window Cover, open with screw before connect !

HMI / Display Interface Non-incendive Output Parameters

Voc = 6.2 V; Isc < 65.2 mA; Po = 101 mW
Terminals: 6 PIN Connector
GP A,B Ca = 1.4 μF; La = 5.0 mH
C,D Ca = 8.9 μF; La = 5.0 mH

Sensor Field Circuit Nonincendive Parameters

Voc = 6.5 V; Isc < 25.0 mA; Po = 38 mW
Class I Div. 2; Groups:A,B,C,D or Class I Zone 2 Group IIC T6
Temp.Ident: T6 at Tamb = 56 °C;
T5 at Tamb = 71 °C;
T4 at Tamb = 85 °C;
Terminals: 1,2,3,4,5,6 GP A,B Ca = 1.54 μF; La = 5.0 mH
C,D Ca = 8.74 μF; La = 5.0 mH

Temperature Transmitter Model “TTF350”
Ordering Code “TTF350-L5..H” is an Temp. Transmitter Type TTH300-L2H which is Installed in an enclosure Type 2-2 T Dual Chamber, w/wo FM approved display HMI-Ex type B.. (ID:)

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				Date	Name
1.01	O-Code	13.07.07	Zeiger		
1.00	Release	04.12.06	Zeiger		
Rev.	desc.	Date	Name		

Title:	TTF350 HART N. I. Temperature Transmitter Control Drawing	Scale:	-----
Drawing / Part No.:	TTF350-L5..H (2)	Page : of	1 / 1
Replacement of:	-----		