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CERTIFICATE OF COMPLIANCE

HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS

This certificate is issued for the following equipment:

Model TTH200-ab, Temperature Transmitter

IS/I,II,III/1/ABCDEFG/ T*; - TTH200-L1P/F(IS) or TTH200-R1P/F(IS); Entity;
I/0/Ex ia IIC; T*- TTH200-L1P/F(IS) or TTH200-R1P/F(IS);
NI/I/2/ABCD/ T*; NI/2/II T* = Ta = *- TTH200-L1P/F(NI) or TTH200-R1P/F(NI); DIP/II,III/2/EFG T*

a = Type of protection; L1, L2, R1 or R2.
b = Communication protocol; P or F.

Entity Parameters:

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W, Ci = 5 nF, Li = 10µH
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W, Ci = 5 nF, Li = 10µH

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

Group AB: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 1.55µF, Lo (La) = 5mH
Group CD: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 8.75µF, Lo (La) = 5mH

Output Terminals (JP1)

Uo (Voc) = 6.2V, Io (Isc) = 65.2mA, Po = 101mW, Co (Ca) = 1.4µF, Lo (La) = 5mH

NonIncendive Field Wiring parameters

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W

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 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.

2 *The product will be required in a enclosure which fullfil the NEMA 4X Standard for Class II and III.*

Model TTH300-ab, Temperature Transmitter

IS/I,II,III/1/ABCDEFG/ T*; - TTH300-L1P/F(IS) or TTH300-R1P/F(IS); Entity;

I/0/Ex ia IIC; T*- TTH300-L1P/F(IS) or TTH300-R1P/F(IS);
NI/I/2/ABCD/ T*; NI/2/II T* = Ta = *- TTH300-L1P/F(NI) or TTH300-R1P/F(NI);
DIP/II,III/2/EFG T*

a = Type of protection; L1, L2, R1 or R2.
b = Communication protocol; P or F.

Entity Parameters:

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W, Ci = 5 nF, Li = 10µH
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W, Ci = 5 nF, Li = 10µH

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

Group AB: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 1.55µF, Lo (La) = 5mH
Group CD: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 8.75µF, Lo (La) = 5mH

Output Terminals (JP1)

Uo (Voc) = 6.2V, Io (Isc) = 65.2mA, Po = 101mW, Co (Ca) = 1.4µF, Lo (La) = 5mH

NonIncendive Field Wiring parameters

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W

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 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.

2 *The product will be required in a enclosure which fullfil the NEMA 4X Standard for Class II and III.*

Model TTR200-ab, Temperature Transmitter

IS/I,II,III/1/ABCDEFG/ T*; - TTR200_TTR200-L6H(IS); Entity;
I/0/Ex ia/IIC; T*- TTR200_TTR200-L6H(IS);
NI/I/2/ABCD/ T*; NI/2/II T* = Ta = *- TTR200_TTR200-L6H(NI).

a = Type of protection; L6, R6.
b = Communication protocol; P or F.

Entity Parameters:

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W, Ci = 5 nF, Li = 10µH
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W, Ci = 5 nF, Li = 10µH

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

Group AB: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 1.55µF, Lo (La) = 5mH
Group CD: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 8.75µF, Lo (La) = 5mH

Display Connector

Uo (Voc) = 6.2V, Io (Isc) = 65.2mA, Po = 101mW, Co (Ca) = 1.4µF, Lo (La) = 5mH

NonIncendive Field Wiring parameters

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W

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 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.

2. *For a Class II,III rating the instrument is required to be mounted into an Class II, Class III rated*

enclosure that is compliant to ANSI/ISA 61010 standard.

Model TTR300-ab, Temperature Transmitter

IS/I,II,III/1/ABCDEFG/ T*; - TTR200_TTR300-L6H(IS); Entity;
I/0/Ex ia/IIC; T*- TTR200_TTR300-L6H(IS);
NI/I/2/ABCD/ T*; NI/2/II T* = Ta = *- TTR200_TTR300-L6H(NI).

a = Type of protection; L6, R6.
b = Communication protocol; P or F.

Entity Parameters:

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W, Ci = 5 nF, Li = 10µH
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W, Ci = 5 nF, Li = 10µH

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

Group AB: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 1.55µF, Lo (La) = 5mH
Group CD: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 8.75µF, Lo (La) = 5mH

Display Connector

Uo (Voc) = 6.2V, Io (Isc) = 65.2mA, Po = 101mW, Co (Ca) = 1.4µF, Lo (La) = 5mH

NonIncendive Field Wiring parameters

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W

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 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.

2. *For a Class II,III rating the instrument is required to be mounted into an Class II, Class III rated enclosure that is compliant to ANSI/ISA 61010 standard.*

Model TTF300-abcd, Temperature Transmitter

IS/I,II,III/1/ABCDEFG/ T*; - TTF300-L1..P/F(IS) or TTF300-R1..P/F(IS); Entity;
I/0/AEx ia IIC; T*- TTF300-L1..P/F(IS) or TTF300-R1..P/F(IS);
NI/I/2/ABCD/ T*; NI/2/II T* = Ta = *- TTF300-L2..P/F(NI) or TTF300-R2..P/F(NI);
S/II,III/2/EFG T**,
XP/I/ABCD/ T*;
DIP/II,III/EFG/ T**

a = Type of protection; L1, L2, L3,R1, R2 or R3.
b = Housing/Display; A or B or C or D.
c = Cable Entry; 1 or 2 or 3 or 4
d = Communication protocol; P or F.

Entity Parameters:

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W, Ci = 5 nF, Li = 10µH
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W, Ci = 5 nF, Li = 10µH

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

Group AB: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 1.55µF, Lo (La) = 5mH
Group CD: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 8.75µF, Lo (La) = 5mH

Output Terminals (JP1)

Uo (Voc) = 6.2V, Io (Isc) = 65.2mA, Po = 101mW, Co (Ca) = 1.4µF, Lo (La) = 5mH

NonIncendive Field Wiring parameters

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W

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 TTF350-abcd, Temperature Transmitter

IS/I,II,III/1/ABCDEFG/ T*; - TTF350-L4..P/F(IS); Entity;
I/0/Ex ia IIC; T*-TTF350-L4..P/F;
NI/I/2/ABCD/ T*; NI/2/II T* = Ta = *-TTF350-L5..P/F(NI) or TTF350-L5..P/F(NI); DIP/II,III/2/EFG T**,
XP/I/ABCD/ T*;
DIP/II,III/EFG/ T**; Type 4X; IP66 IP67 TTF350-L3..(FM).

Vmax=30v, Imax= 130mA, Pmax= 0.8Wa = Type of protection; L3, L4, L5, R3, R4 or R5.
b = Housing/Display; N, or R.
c = Cable Entry; 5,6 or 8.
d = Communication protocol; P or F.

Entity Parameters:

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W, Ci = 5 nF, Li = 10µH
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W, Ci = 5 nF, Li = 10µH

Vmax=30v, Imax= 130mA, Pmax= 0.8W Ci=5nF, Li=500µH
Output Terminals (1, 2, 3, 4, 5 and 6)

Group AB: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 1.55µF, Lo (La) = 5mH
Group CD: Uo (Voc) = 6.5V, Io (Isc) = 25.0mA, Po = 38mW, Co (Ca) = 8.75µF, Lo (La) = 5mH

Output Terminals (JP1)

Uo (Voc) = 6.2V, Io (Isc) = 65.2mA, Po = 101mW, Co (Ca) = 1.4µF, Lo (La) = 51mH

NonIncendive Field Wiring parameters

FISCO: Ui (Vmax) = 17.5V, Ii (Imax) = 380mA, Pi (Pmax) = 5.32W, Ci = 5 nF, Li = 10µH
Entity I.S.: Ui (Vmax) = 24V, Ii (Imax) = 250mA, Pi (Pmax) = 1.2W, Ci = 5 nF, Li = 10µH

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.
T** = Temperature Code T3 for a Maximum Ambient Temperature of 120°C.

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Equipment Ratings:

The TTH200-.P/F, TTH300-.P/F, TTF300-.P/F, TTF350-.P/F, TTR200-.P/F and TTR300-.P/F Profibus/Fieldbus 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 In addition, the TTF300-.P/F, TTF350-.P/F 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

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

CSA C22.2 No.142	1992
CSA C22.2 No.157	1992
CSA C22.2 No.213	1987
CSA C22.2 No. 60529	2005
CSA C22.2 No 94	1976
CAN/ CSA E60079-0;00	2006
CAN/CSA E60079-11	2007

Original Project ID: 3027610

Canadian Project ID: 3037064 Approval Granted: December 18, 2009

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date

FM Approvals LLC

J. E. Marquedant

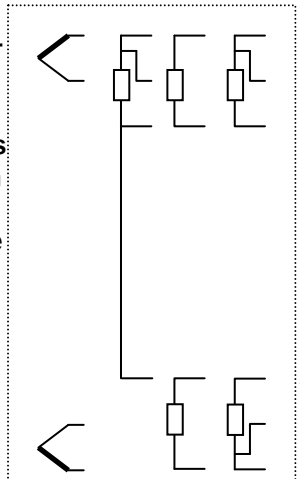
J. É. Marquedant
Group Manager, Electrical

18 December 2009
Date

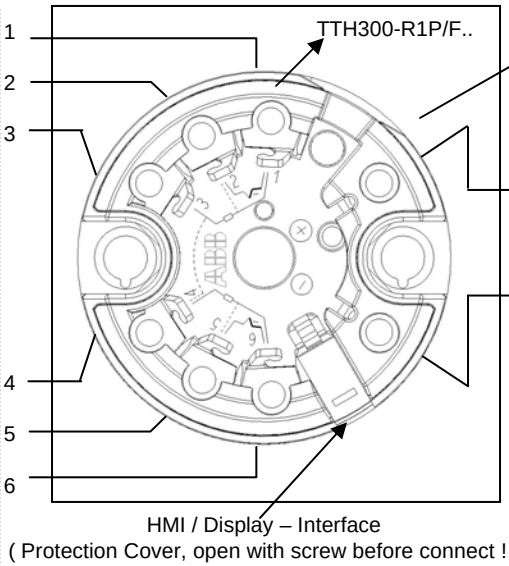
Hazardous Location

Non – Hazardous Location

Sensors must be CSA 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 Cover, open with screw before connect !)

AGLF, AGSF,
AGLFD, AGSFD
Enclosure Type 4X

Apparatus input Values
FISO-Model I.S. V max = 17.5 V ;
I max = 380 mA ; Pi = 5.32 W
Ci = 5 nF Li = 0,5 mH, Io <= 50 µA
Entity-Model I.S V max = 24 V;
I max = 250 mA, Pi = 1.2 W
Li <= 10 µH, Ci <= 5 nF
Io <= 50 µA

Barrier
Galvanic Isolator

< 250 V

" 2 wire hookup"

I.S. Sensor Field Circuit Parameters
Voc/Uo = 6.5 V; Isc/Io < 25.0 mA; Po = 38 mW
Tem. Ident. T6 at Tamb = 56 °C; T4 at Tamb = 85 °C;
Class I Div 1 and Div 2; ; Groups: A,B,C,D Class II Group E,F,G and Class III or Class I Zone 0 Ex ia IIC
Terminals: 1,2,3,4,5,6
GP A,B Ca = 1.55 µF; La = 5.0 mH
C,D Ca = 8.75 µF; La = 5.0 mH

Temperature Transmitter Model "TTF300" Ordering Code "TTF300-R1..H" is an Temperature Transmitter Type TTH300-R1P/F, which is installed in an enclosure type AGLF, AGSF or AGLFD, AGSFD w / wo CSA Approved display type HMI.

A dust tight seal must be used at the conduit entry when the transmitter is used in a Class II & III location.

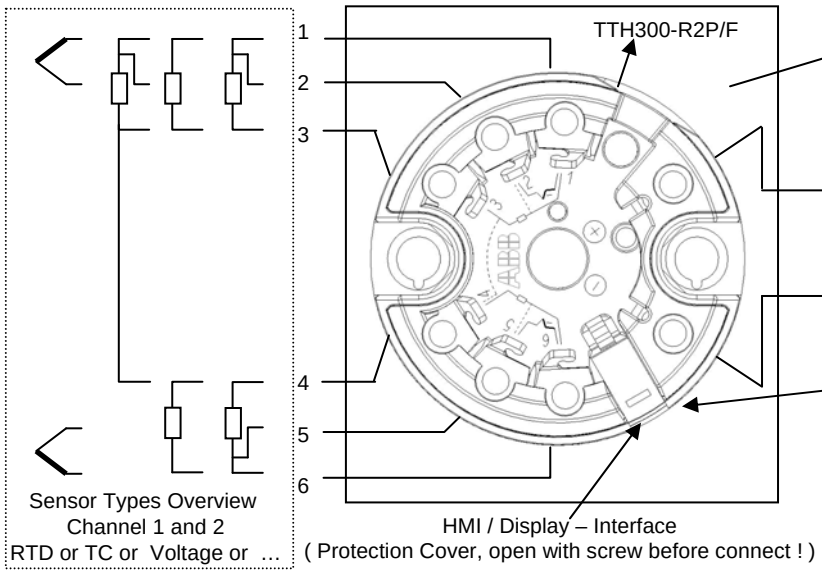
HMI / Display Interface Circuit
I.S. Output Parameters
Voc/Uo = 6.2 V; Isc/Io < 65.2 mA;
Po = 101 mW
Class I Div 1 and Div 2; ; Groups: A,B,C,D or Class I Zone 0 AEx ia IIC
Terminals: 6 PIN Connector
GP A,B Ca = 1.4 µF; La = 5.0 mH
C,D Ca = 8.9 µF; La = 5.0 mH

Associated Apparatus

1. Barrier or Galvanic Isolator must be CSA approved and must be installed in accordance with manufactures instructions.
2. Barrier or Galvanic Isolator parameters must meet the following Requirements : Voc / Uo ≦ V max;
   Isc / Io ≦ I max;
   Po ≦ Pmax
   Ca ≧ Ci + Ccable
   La ≧ Li + Lcable
1. Maximum non hazardous area voltage must not exceed 250V.
2. Install in accordance with the CEC, Part 1.

						Title: TTF300 Fieldbus I.S. Temperature Transmitter Control Drawing	Scale: -----
				Approv.	13.02.09	Müller	
					Date	Name	
				ABB Automation Products		Drawing / Part No.: TTF300-R1..P (IS) TTF300-R1..F (IS)	Page : of 1 / 1
1.00	Release	13.02.09	Zeiger			Replacement of: --------	
Rev.	Desc.	Date	Name				

Hazardous Location



Sensor must be a simple apparatus

RTD`s, TC, LED`s

Non – Hazardous Location

AGLF, AGSF, AGLFD,
AGSFD Enclosure Type 4X

Electrical Rating 30V dc;
IEC 1158-2

Power Supply

< 250 V

2 wire hookup

HMI / Display Interface Circuit
Nonincendive output Parameters

Voc/Uo = 6.2 V; Isc/Io < 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

Suitable for use in Class I, Div. 2 Groups A, B, C, D, Class II, Div.1 Group E,F,G; Class III without safety barriers(ie. conduit connected), and provides non-incendive circuits for Class I, Div. 2, Group A,B,C,D to RTD`s, Thermocouples for passiv-resistive non-energy-storing switch devices. Temp. Ident T6 at Tamb = 56°C, T4 at Tamb = 85°C

Temperature Transmitter Model “TTF300” Ordering Code “TTF300-R2..P/F” is an Temperature Transmitter type TTH300-R2H which is installed in an enclosure type AGLF, AGSF or AGLFD, AGSFD w/wo CSA approved display HMI-Ex type A, AS, B, BS.

1. **Install per Canadian Electrical Code (CEC) 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 1 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.**

							Title: TTF300 Fieldbus N. I. Temperature Transmitter Control Drawing
					Approv.	13.02.09	Müller
						Date	Name
				ABB Automation Products			Drawing / Part No.: TTF300-R2..P (NI PS) TTF300-R2..F (NI PS)
1.00	Release	13.02.09	Zeiger				Replacement of: --------
Rev.	Desc.	Date	Name				

Scale: -----

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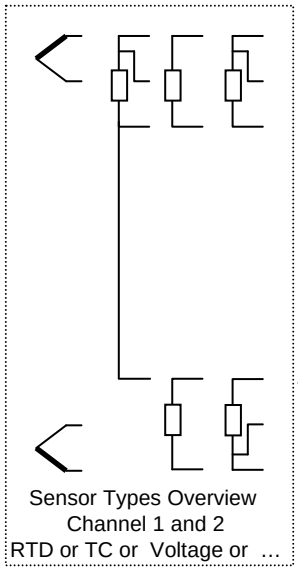
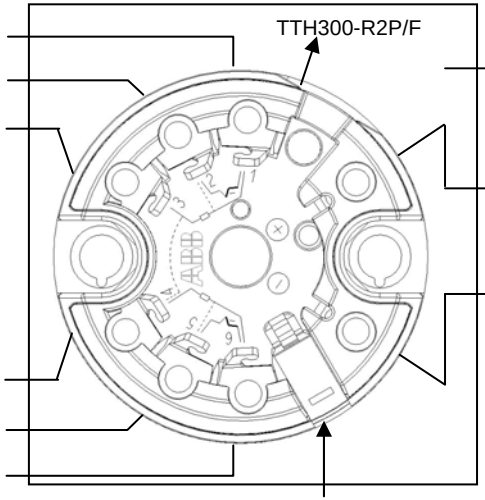
Division 2 Hazardous Location

Non – Hazardous Location

Sensors must be a simple apparatus. RTD's, TC or LED's



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



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

AGLF, AGSF,
AGLFD, AGSFD
Enclosure Type 4X

Associated Apparatus

< 250 V

" 2 wire hookup – Nonincendive Field Circuit "

Apparatus input Values
FISO-Model I.S. V max = 17.5 V ;
I max = 380 mA ; Pi = 5.32 W
Ci = 5 nF Li = 0,5 mH, Io <= 50 µA
Entity-Model I.S V max = 24 V;
I max = 250 mA, Pi = 1.2 W
Li <= 10 µH, Ci <= 5 nF
Io <= 50 µA

Associated Apparatus
Nonincendive Parameters must meet the following Requirements :
Voc ∗ Vmax; Ca / Ci + Ccable;
Isc ∗ I max; La / Li + Lcable

Sensor Field Circuit Nonincendive Parameters
Voc = 6.5 V; Isc < 25.0 mA; Po = 38 mW
Temp.Ident T6 at Tamb = 56 °C;
T4 at Tamb = 85 °C; CLASS I DIV 2;
Groups:A,B,C,D or CLASS I Zone 2 Group IIC T6
Terminals: 1,2,3,4,5,6 GP A,B Ca = 1.55 µF; La = 5.0 mH
C,D Ca = 8.75 µF; La = 5.0 mH

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

Temperature Transmitter Model "TTF300" Ordering Code "TTF300-R2..F/P" is an Temp. Transmitter Type TTH300-R2H which is installed in an enclosure type AGLF, AGSF or AGLFD, AGSFD w/wo CSA approved display HMI-Ex type A, AS, B, BS.

Attention: No Conduit Seal Required.

The Temperature Transmitter is CSA Certified as Non-Incendive for use in Class I, Div. 1 Groups A, B, C, D hazardous locations, with Entity input parameters, and provides Non-Incendive Circuits for Class I, Div. 1 Groups A, B, C, D hazardous locations, with Entity output parameters

Rev.	Desc.	Date	Name
1.00	Release	13.02.09	Zeiger

Approv.	13.02.09	Müller
	Date	Name

ABB
Automation Products

Title:
TTF300 Fieldbus
N. I. Temperature Transmitter
Control Drawing

Scale: -----

Drawing / Part No.:
TTF300-R2..P (NI AA)
TTF300-R2..F (NI AA)

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Replacement of: --------