



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/ABCDEFGF/ 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/ABCDEFGF/ 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 |

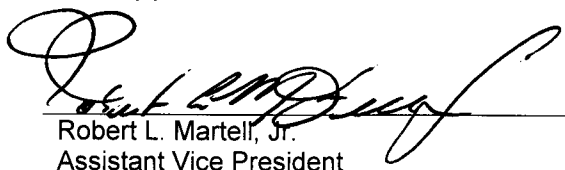
Original Project ID: 3027610

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> | | |

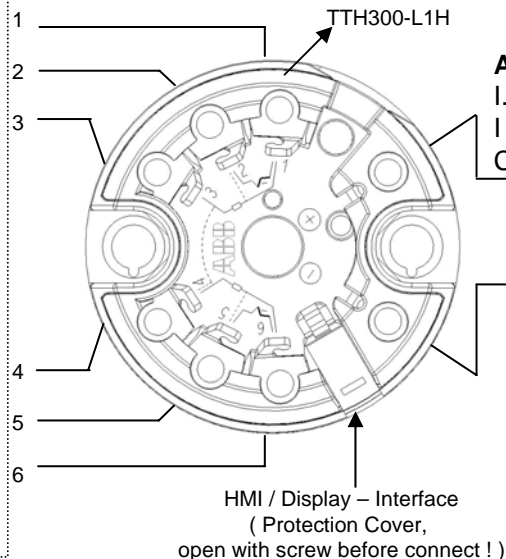
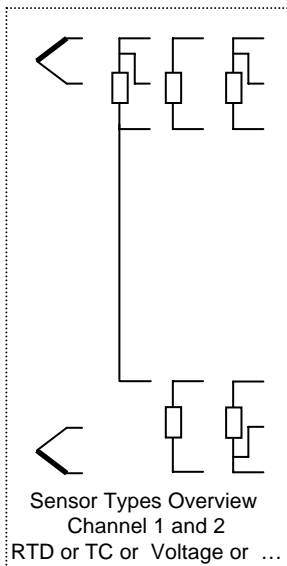
FM Approvals LLC


Robert L. Martell, Jr.
Assistant Vice President

DECEMBER 10, 2007
Date

Hazardous Location

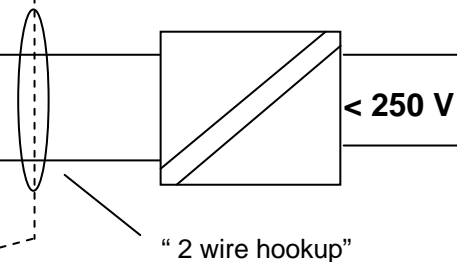
Sensors must be FM approved or be a simple apparatus. Simple apparatus is a device which will neither generate or store more than 1.5 V; 0.1 A; 25 mW or 20 μJ such as switches; RTD's, TC or LED's



Apparatus Input Values
I. S. V max \leq 30.0 V DC ;
I max \leq 130 mA ; Pi \leq 0.8W
Ci = 5nF Li = 0,5mH

Non – Hazardous Location

**Barrier
Galvanic Isolator**



- Barrier or Galvanic Isolator must be FM approved and must be installed in accordance with manufactures instructions.
- Barrier or Galvanic Isolator parameters must meet the following Requirements :
- Voc or Vt \leq V max; Ca \geq Ci + Ccable;
Isc or It \leq I max; La \geq Li + Lcable
Po or Pt \leq P max
- Maximum non hazardous area voltage must not exceed 250V
- Install in accordance with the NEC (ANSI/NFPA 70) and ANSI/ISA RP12.6. " Installation of intrinsically safe systems" Do not alter without FM authorization

I.S. Sensor Field Circuit Entity Parameters

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

Tem. Ident. for Class I Div. 1 and Div. 2; Groups A,B,C,D

T6 at Tamb = 56 °C; T5 at Tamb = 71 °C;

T4 at Tamb = 85 °C

Tem. Ident. For Class I Zone 0 AEx ia IIC

T6 at Tamb = 44 °C; T5 at Tamb = 56 °C;

T4 at Tamb = 84 °C

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

Intrinsically Safe Output Parameters

Voc = 6.2 V; Isc < 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

Temperature Transmitter Model "TTH300"
Ordering Code "TTH300-L1H" is an open type Unit which must be installed within an enclosure appropriate for environmental protection accordance with ANSI/ISA S82 01 and S82 03 standards.

Warning: Resistance between barrier ground and earth ground must be less then 1.0 Ohm!

| Rev. | Desc. | Date | Name |
|------|-----------|----------|--------|
| 1.03 | HART | 17.07.07 | Zeiger |
| 1.02 | FM Report | 05.10.06 | Zeiger |
| 1.01 | FM input | 10.07.06 | Zeiger |
| 1.00 | Release | 23.05.06 | Zeiger |

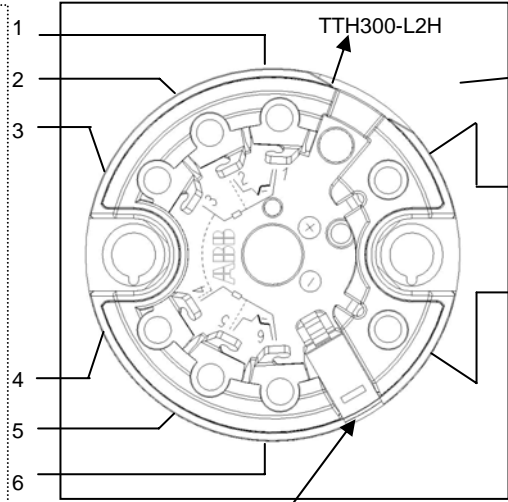
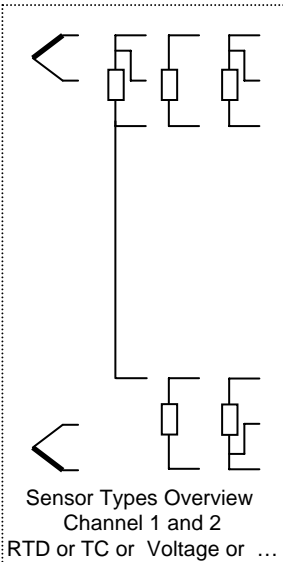
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|---------|----------|--------|
| Approv. | 17.07.07 | Müller |
| Date | | Name |

ABB
Automation Products

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|---------------------|--|-----------|-------|
| Title: | TTH300 HART I.S. Temperature Transmitter Control Drawing | Scale: | ----- |
| Drawing / Part No.: | SAP_214829 | Page : of | 1 / 1 |
| Replacement of: | ----- | | |

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

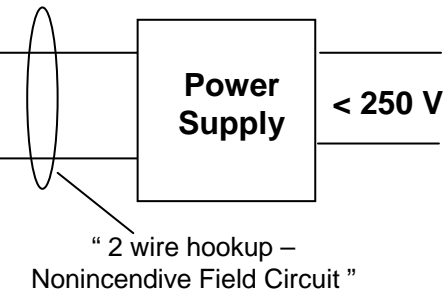


(Protection Cover, open with screw before connect !)

AGLF, AGSF, AGLFD,
AGSFD Enclosure Type 4X

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

Non – Hazardous 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 = 1.55 µF; La = 5.0 mH
C,D Ca = 8.75 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

- 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.

Temperature Transmitter Model “TTF300” ordering code “TTF300-L2...” is an Temperature Transmitter Type TTH300-L2 which is installed in an enclosure type AGLF, AGSF , AGLFD or AGSFD w/wo FM approved display HMI-Ex type A

| Rev. | Desc. | Date | Name |
|------|-----------|----------|--------|
| 1.03 | HART | 17.07.07 | Zeiger |
| 1.02 | FM-Report | 05.10.06 | Zeiger |
| 1.01 | FM input | 10.07.06 | Zeiger |
| 1.00 | Release | 23.05.06 | Zeiger |

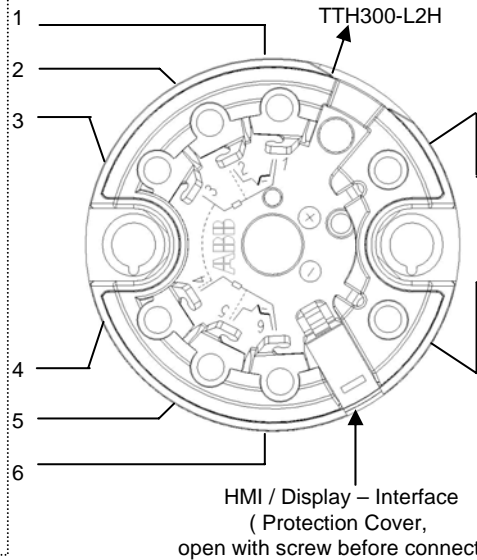
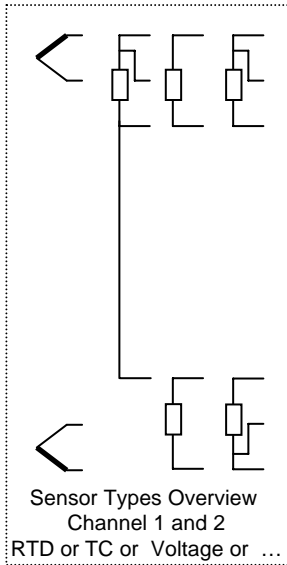
| | | |
|---------|----------|--------|
| Approv. | 17.07.07 | Zeiger |
| Date | | Name |

ABB
Automation Products

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|---------------------|---|-----------|-------|
| Title: | TTF300 HART N. I. Temperature Transmitter Control Drawing | Scale: | ----- |
| Drawing / Part No.: | SAP_214830 | Page : of | 1 / 1 |
| Replacement of: | ----- | | |

Hazardous Location

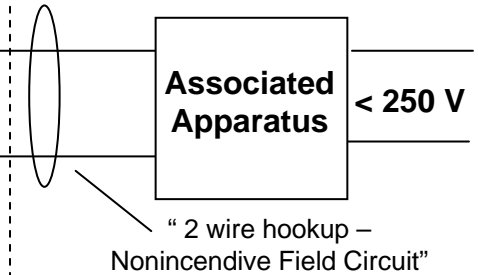
The sensor must be FM approved or be a simple apparatus. Simple apparatus is a device which will neither generate or store more than 1.5 V; 0.1 A; 25 mW or 20 μJ such as switches; RTD's, TC or LED's



Apparatus Input Values

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

Non – Hazardous Location



Associated Apparatus

Nonincendive Parameters must meet the following Requirements :

Voc or Vt ≤ V max; Ca ≥ Ci + Ccable;
Isc or It ≤ I max; La ≥ Li + Lcable

The temperature transmitter is FM approved for nonincendive field circuits when installed per national electrical code (NEC) article 501-4(B) exception or 502-4(B) exception with FM approved nonincendive field circuit output apparatus which meet the parameters indicated below. Article 501-4(B)/502-4(B)

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

FM nonincendive field circuit approval
Temp.Ident:T6 at Tamb = 56 °C;

T5 at Tamb = 71 °C;

T4 at Tamb = 85 °C;

Cass I Div 2; Groups: A,B,C,D or

Cass 1 Zone 2 Group IIC T6

Sensor Field Circuit Entity Parameters

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

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 Output Parameters

N.I. Cass I Div 2; Group: A,B,C,D or

N.I. Class 1 Zone 2 Groups IIC T6

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 “TTH300”
Ordering Code “TTH300-L2H” is an open type unit which must be installed within an enclosure appropriate for environmental protection accordance with ANSI/ISA S82 01 and S82 03 standards.

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|------|-----------|----------|--------|-----------------------------------|----------|-----------------------|-----------|
| | | | | | Title: | | Scale: |
| | | | | Approv. | 17.07.07 | Müller | ----- |
| | | | | Date | | Name | |
| 1.03 | HART | 17.07.07 | Zeiger | ABB Automation Products | | Drawing / Part No.: | Page : of |
| 1.02 | FM Report | 05.10.06 | Zeiger | | | SAP_214831 | 1 / 1 |
| 1.01 | FM Input | 10.07.06 | Zeiger | | | | |
| 1.00 | Release | 23.05.06 | Zeiger | | | | |
| Rev. | Desc. | Date | Name | | | Replacement of: ----- | |