

| REVISIONS |  |         |       |      |
|-----------|--|---------|-------|------|
| REV.      | DESCRIPTION  | DATE    | ECO   | APP. |
| A         | ADDED NOTES 2-8, WAS INST 702(-), ADDED "SIMPLE APPARATUS" NOTES | 6/14/93 | 10344 | MWG  |

**INST. 704(A)**

**Control Document, System Approvals for Intrinsically Safe Transmitters**

ANY CHANGES TO THIS  
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The approved entity parameters specified are for Class I, Div. 1 Groups A, B, C, and D hazardous locations.

|  |  |  |
|--|--|--|
| Models<br>TT210, TT211<br><u>TT710, TT711</u>              | Models<br>TT176, TT216, TT676<br><u>TT190, TT230</u>       | Models<br><br><u>TT220, TT221, TT720</u>                   |
| Vmax = 35 volts<br>Imax = 150 Ma<br>Ci = 0 μF<br>Li = 0 mH | Vmax = 35 volts<br>Imax = 150 mA<br>Ci = 0 μF<br>Li = 0 mH | Vmax = 35 volts<br>Imax = 150 mA<br>Ci = 0 μF<br>Li = 0 mH |

1. The selected associated apparatus and intrinsically safe apparatus must meet the following conditions for single channel operation:

$$\begin{aligned} V_{oc} &\leq V_{max} \\ I_{sc} &\leq I_{max} \\ C_a &\geq C_i \\ L_a &\geq L_i \end{aligned}$$

2. The selected associated apparatus and intrinsically safe apparatus must meet the following conditions for dual channel or multiple single channel operation:

$$\begin{aligned} V_t &\leq V_{max} \\ I_t &\leq I_{max} \\ C_a &\geq C_i \\ L_a &\geq L_i \end{aligned}$$

3.  $V_{oc}$ ,  $V_t$ ,  $I_{sc}$ ,  $I_t$ ,  $C_a$  and  $L_a$  are parameters of the associated apparatus where:

$V_{oc}, V_t$  = maximum open circuit voltage  
 $I_{sc}, I_t$  = maximum short circuit current  
 $C_a$  = maximum allowable connected capacitance  
 $L_a$  = maximum allowable connected inductance

4.  $V_{max}$ ,  $I_{max}$ ,  $C_i$  and  $L_i$  are parameters of the intrinsically safe apparatus where:

$V_{max}$  = maximum safe input voltage  
 $I_{max}$  = maximum safe input current  
 $C_i$  = maximum unprotected internal capacitance  
 $L_i$  = maximum unprotected internal inductance

5. Installation must be in accordance with the barrier manufacturers instructions, ANSI/ISA RP12.6 and the National Electrical Code (ANSI/NFPA 70).

6. Control room equipment connected to the associated apparatus must not contain a source of potential with respect to earth in excess of 250 Vrms or 250 Vdc.

7. Associated apparatus is not required for operation in Division 2 hazardous (classified) locations.

8. For Division 2 installations, the transmitters must be mounted within an enclosure meeting the requirements of ANSI/ISA S82.

|                          |                    |                    |
|--------------------------|--------------------|--------------------|
| DR: <u>T.P.B.</u>        | CHK: <u>M.W.G.</u> | APP: <u>D.K.S.</u> |
| DATE: <u>05/04/93</u>    | <u>05/05/93</u>    | <u>05/05/93</u>    |
| F:\MOD\TT176\LIT\704.DOC |                    | 10/29/01 DKS       |

ANY OF THE LISTED INTRINSIC SAFETY BARRIERS ARE FACTORY MUTUAL APPROVED UNDER THE SYSTEM CONCEPT (SINGLE BARRIER ONLY) FOR USE WITH ANY OF THE FOLLOWING MINCO TEMPTRAN™ 4-20mA TRANSMITTER MODELS:

TT176, TT190, TT210, TT211, TT216, TT220,  
TT221, TT230, TT676, TT710, TT711, TT720

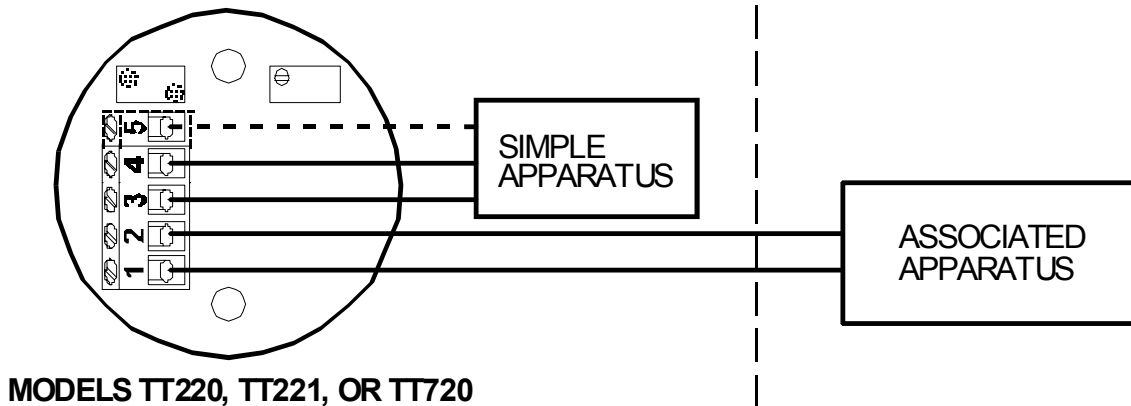
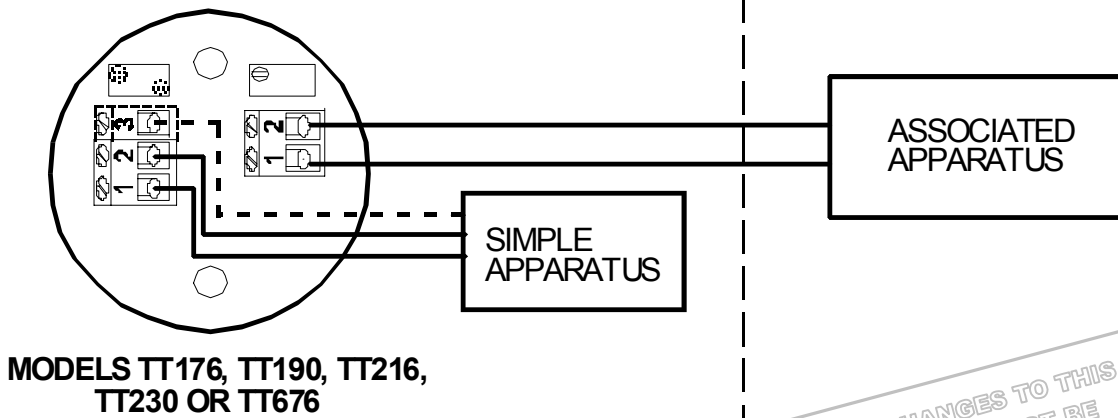
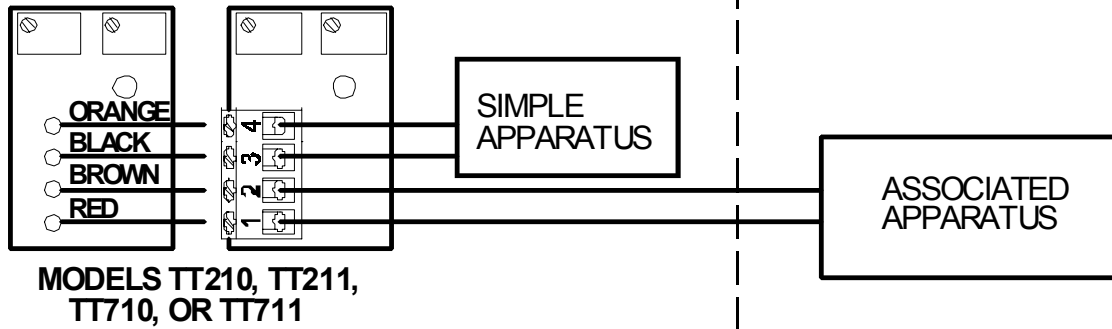
FOR USE IN CLASS I, DIVISION 1, GROUPS A, B, C, D HAZARDOUS LOCATIONS.

| <u>BARRIER</u><br><u>MANUFACTURER</u>              | <u>BARRIER</u><br><u>MODEL</u> |
|--|--------------------------------|
| MTL<br>(MANASSAS, VA<br>703-361-0111)              | 702+                           |
|  | 706+                           |
|  | 787S+                          |
|  | 788+                           |
|  | 2441                           |
|  | 3041                           |
|  | 3046B                          |
|  | 4041                           |
| R. STAHL<br>(WOBBURN, MA<br>800-782-4357)          | 9001/01-280-100-10             |
|  | 9001/51-280-091-14             |
|  | 9001/51-280-110-14             |
|  | 9002/13-280-110-00             |
|  |                                |
| PEPPERL & FUCHS<br>(TWINSBURG, OH<br>216-425-3555) | KHD3-ICR/EX130 200             |
|  | KHD3-ICR/EX130 240             |
|  | KHP-103/EX-1A                  |
|  | KHP-104/EX-2A                  |
|  | KHP-105/EX-2A                  |
|  | KHZ-428/EX3                    |
|  | KHZ-487/EX3                    |
|  | KHZ-907/EX                     |
|  | Z130/EX                        |
|  | Z428/EX                        |
|  | Z479/EX                        |
|  | Z487/EX                        |

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**HAZARDOUS AREA**  
CLASS I, DIVISION 1 OR 2,  
GROUPS A, B, C, AND D

**NON-HAZARDOUS AREA**



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