

# CERTIFICATE OF CONFORMITY



- HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
- Certificate No:** FM19US0169X
- Equipment:** Model TD1 and TD2 Thermal Dispersion Switch  
**(Type Reference and Name)**
- Name of Listing Company:** Magnetrol International Inc.
- Address of Listing Company:** 705 Enterprise Street  
Aurora, IL 60504  
USA
- The examination and test results are recorded in confidential report number:  
  
3022611 dated 16<sup>th</sup> June 2005
- FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:  
  
FM Class 3600:2018, FM Class 3611:2018, FM Class 3615:2018, FM Class 3810:2018,  
ANSI/ISA 61010-1:2012, ANSI/UL 60079-0:2019, ANSI/UL 60079-1:2015, ANSI/UL 60079-11:2014,  
ANSI/UL 60079-26:2017, ANSI/NEMA 250:1991, ANSI/IEC 60529:2004
- If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
- This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.
- Equipment Ratings:**  
  
The TD1 and TD2 Thermal Dispersion Switches and associated T Series Thermal Probes are rated as Explosionproof for Class I, Division 1, Groups B, C and D; Dust-ignitionproof for Class II, Division 1, Groups E, F and G; Class III, Division 1, T5; Nonincendive for Class I, II, III, Division 2, Groups A, B, C, D, E, F and G, T5; Flameproof with Flameproof + Intrinsically Safe sensor for Class I, Zone 0, 1, AEx db+ib / db IIC T5...T4

## Certificate issued by:

J.E. Marquedant  
VP, Manager - Electrical Systems

4 August 2020

Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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Ga/Gb; Flameproof for Class I, Zone 0, 1 AEx db IIC T5...T4 Ga/Gb with a minimum probe thickness of 1 mm; Flameproof for Class I, Zone 1 AEx db IIC T5...T4 Gb and TD2 Transmitter as Flameproof with Intrinsically Safe Outputs for Class I, Zone 1, AEx db [ib] IIC T4 Gb hazardous (classified) locations, indoors and outdoors (Type 4X, IP66) with an ambient temperature rating of  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ .

11. The marking of the equipment shall include:

## Group 1.

***TD1-2D00-0ab. Integral Thermal Dispersion Switch with Tjk-mnpr-stu. Thermal Probe***

***TD2-cd0e-fgh. Integral Thermal Dispersion Switch with Tjk-mnpr-stu. Thermal Probe***

XP for Class I, Division 1, Groups B, C, D; T5  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

DIP for Class II, Division 1, Groups E, F, G, Class III, Division 1; T5  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

NI for Class I, II, III Division 2, Groups A, B, C, D, E, F, G; T4  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

Class I, Zone 0, 1, AEx db+ib / db, Group IIC T5...T4 Ga/Gb  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ , Type 4X, IP66

Class I, Zone 1, AEx db IIC T5 ...T4 Gb  $T_a = -40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ , Type 4X, IP66

## Group 2.

***TD1-2D00-0ab. Integral Thermal Dispersion Switch with Tjk-mnpr-stu. Thermal Probe***

***TD2-cd0e-fgh. Integral Thermal Dispersion Switch with Tjk-mnpr-stu. Thermal Probe***

XP for Class I, Division 1, Groups B, C, D; T5  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

DIP for Class II, Division 1, Groups E, F, G, Class III, Division 1; T5  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

NI for Class I, II, III Division 2, Groups A, B, C, D, E, F, G; T4  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

Class I, Zone 1, AEx db IIC T5 ...T4 Gb  $T_a = -40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ , Type 4X, IP66

## Group 3.

***TD1-2D00-0ab. Integral Thermal Dispersion Switch with Tjk-Dnpr-stu. Thermal Probe***

***TD2-cd0e-fgh. Integral Thermal Dispersion Switch with Tjk-Dnpr-stu. Thermal Probe***

XP for Class I, Division 1, Groups B, C, D; T5  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

DIP for Class II, Division 1, Groups E, F, G, Class III, Division 1; T5  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

NI for Class I, II, III Division 2, Groups A, B, C, D, E, F, G; T4  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

Class I, Zone 0, 1, AEx db IIC T5 ...T4 Ga/Gb  $T_a = -40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ , Type 4X, IP66

## Group 4.

***TD2-cH0e-f7h. Integral Thermal Dispersion Switch with Tjk-mnpr-stu. Thermal Probe***

NI for Class I, II, III Division 2, Groups A, B, C, D, E, F, G; T4  $-25^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

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## Group 5.

### ***TD2-cd0e-fgh. Thermal Dispersion Switch***

Class I, Division 1, Groups B, C, D; T5  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

Class II, Division 1, Groups E, F, G, Class III, Division 1; T5  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

Class I, II, III Division 2, Groups A, B, C, D, E, F, G; T4  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

Class I, Zone 1, AEx db [ib] IIC T4 Gb  $T_a = -40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ , Type 4X, IP66

## Group 6.

### ***Tjk-mnpr-stu Thermal Probe:***

Class I Division 1, Groups B, C, D; T4  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

Class II, Division 1, Groups E, F, G, Class III, Division 1; T4  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

Class I, II, III Division 2, Groups A, B, C, D, E, F, G; T4  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ; Type 4X, IP66

Class I, Zone 0, 1, AEx db+ib, Group IIC T5...T4 Ga/Gb  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ , Type 4X, IP66

Class I, Zone 1, AEx db IIC T5 ...T4 Gb  $T_a = -40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ , Type 4X, IP66

## Group 7.

### ***Tjk-Dnpr-stu. Thermal Probe***

Class I, Zone 0, 1, AEx db IIC T5 ...T4 Ga/Gb  $T_a = -40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ , Type 4X, IP66

## 12. **Description of Equipment:**

**General:** Thermatel TD1/TD2 can easily be adjusted to detect flow (gases and liquids), level or liquid-liquid interface. The TD1 is a 28.8 Vdc line powered unit with integral electronics and a built-in DPDT relay. The TD2 is either Vdc or Vac line powered, has integral or remote electronics and offers additionally LED indication, time delay and mA output for diagnostics and trending.

The sensor consists of two RTD (Resistance Temperature Detector) elements. One is the reference and the second is heated to a temperature above the process temperature. The electronics detect the temperature difference between the two elements. The temperature difference is greatest in air, then decreases when cooling occurs due to a change in media. An increase in the flow rate further decreases the temperature difference. The set point is adjusted for the switch to alarm at the desired temperature difference. Once the set point is reached, the relay will change state.

The control electronics are mounted in a flameproof enclosure (aluminium alloy or stainless steel) and can include intrinsically safe signal circuits for the probe. In this case the probe uses two independent types of protection in order to achieve EPL Ga (flameproof enclosure + intrinsically safe protection type "ib"), in another case the probe contains a mechanical separation element as part of the equipment to seal off the electrical circuits of the equipment from the zone 0 area in order to achieve EPL Ga. The third probe version only uses the flameproof enclosure for EPL Gb. The probe can be fixed directly on the bushing or via an extension tube. The heat extension tube of the probe reduces the temperature of the process towards the electronics to a max 5°C increase. The device can be made with integrated electronics or remote electronic (TD2 only). In the case of the remote version two flameproof enclosures are used, one of them contains the control electronics while the other contains only a terminal block and is connected to the probe.

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The ambient temperature range of the apparatus is  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$  with a temperature classification of T5...T4 depending on the maximum operating voltage. The Thermal Probe has an ambient temperature range of  $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$  with a temperature classification of T4.

## **Electrical Ratings:**

The TD1 Transmitter shall be connected to a safety extra low-voltage circuit (SELV) with a  $U_m \leq 28.8 \text{ V}$ .

Power: TD1: 28.8 Vdc, 3.5 W at 24 Vdc;

TD2: 19.2 – 28.8 Vdc, 4 W, or 100 - 264 Vac, 50-60 Hz, 5 W

Signal Output: TD1: 8 A DPDT relay @ 30 Vdc

TD2: 8 A DPDT relay @ 30 Vdc/250 Vac or

1 A DPDT relay @ 28 Vdc and

4 – 20 mA (not for all models)

**The equipment model codes are as follows:**

### **Group 1.**

#### ***TD1-2D00-0ab. Integral Thermal Dispersion Switch with Tjk-mnpr-stu. Thermal Probe***

a = Agency Approval 3, C or G.

b = Enclosure type/connection 0 or 1, 2 or 3.

j = Measurement system E or M.

k = Sensor tip style A, B, C, D, H, L or M.

m = Material A, D, K, M, N, B, F, C or G.

n = Process connector size 0, 1, 2, 3, 4, B, C, D, T or V.

p = Process connection type 0, 1, 2, 3, 4, 5, 7, 8, A, B, C, D, E, G, J, N, P, S, T or V.

r = Sensitivity 0 or 1.

stu = Probe Length (3 digits) up to 130 inch or 330 cm..

#### ***TD2-cd0e-fgh. Integral Thermal Dispersion Switch with Tjk-mnpr-stu. Thermal Probe***

c = Power 7 or 8.

d = Relay Output D or H.

e = Enclosure Cover 0 or 1.

f = Location 0 or 1.

g = Agency Approval 3, C or G.

h = Enclosure type/connection 0, 1, 2, 3.

j = Measurement system E or M.

k = Sensor tip style A, B, C, D, H, L or M.

m = Material A, D, K, M, N, B, F, C or G.

n = Process connector size 0, 1, 2, 3, 4, B, C, D, T or V.

p = Process connection type 0, 1, 2, 3, 4, 5, 7, 8, A, B, C, D, E, G, J, N, P, S, T or V.

r = Sensitivity 0 or 1.

stu = Probe Length (3 digits) up to 130 inch or 330 cm.

### **Group 2.**

#### ***TD1-2D00-0ab. Integral Thermal Dispersion Switch with Tjk-mnpr-stu. Thermal Probe***

a = Approval Requirements 3 or G.

b = Enclosure type/connection 0 or 1

j = Measurement system E or M.

k = Sensor tip style C or D.

m = Material A, D, K, M, N, B, F, C or G.

n = Process connector size 0, 1, 2, 3, 4, B, C, D, T or V.

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p = Process connection type 0, 1, 2, 3, 4, 5, 7, 8, A, B, C, D, E, G, J, N, P, S, T or V.

r = Sensitivity 0 or 1.

stu = Probe Length (3 digits) up to 130 inch or 330 cm.

***TD2-cd0e-fgh. Integral Thermal Dispersion Switch with Tjk-mnpr-stu. Thermal Probe***

c = Power 7 or 8.

d = Relay Output D or H.

e = Enclosure Cover 0 or 1.

f = Location 0 or 1.

g = Approval Requirements 3 or G.

h = Enclosure type/connection 0, 1, 2, 3.

j = Measurement system E or M.

k = Sensor tip style C or D.

m = Material A, D, K, M, N, B, F, C or G.

n = Process connector size 0, 1, 2, 3, 4, B, C, D, T or V.

p = Process connection type 0, 1, 2, 3, 4, 5, 7, 8, A, B, C, D, E, G, J, N, P, S, T or V.

r = Sensitivity 0 or 1.

stu = Probe Length (3 digits) up to 130 inch or 330 cm.

**Group 3.**

***TD1-2D00-0ab. Integral Thermal Dispersion Switch with Tjk-Dnpr-stu. Thermal Probe***

a = Approval Requirements 3 or G.

b = Enclosure type/connection 0 or 1

j = Measurement system E or M.

k = Sensor tip style C or D.

n = Process connector size 0, 1, 2, 3, 4, B, C, D, T or V.

p = Process connection type 0, 1, 2, 3, 4, 5, 7, 8, A, B, C, D, E, G, J, N, P, S, T or V.

r = Sensitivity 0 or 1.

stu = Probe Length (3 digits) up to 130 inch or 330 cm.

***TD2-cd0e-fgh. Integral Thermal Dispersion Switch with Tjk-Dnpr-stu. Thermal Probe***

c = Power 7 or 8.

d = Relay Output D or H.

e = Enclosure Cover 0 or 1.

f = Location 0 or 1.

g = Agency Approval 3, 7, C, or G.

h = Enclosure type/connection 4 or 5

j = Measurement system E or M.

k = Sensor tip style A, B, C, D, H, L or M.

n = Process connector size 0, 1, 2, 3, 4, B, C, D, T or V.

p = Process connection type 0, 1, 2, 3, 4, 5, 7, 8, A, B, C, D, E, G, J, N, P, S, T or V.

r = Sensitivity 0 or 1.

stu = Probe Length (3 digits) up to 130 inch or 330 cm.

**Group 4.**

***TD2-cd0e-f7h. Integral Thermal Dispersion Switch with Tjk-mnpr-stu. Thermal Probe***

c = Power 7 or 8.

d = Relay Output D or H.

e = Enclosure Cover 0 or 1.

f = Location 0 or 1.

h = Enclosure type/connection 4 or 5

j = Measurement system E or M.

k = Sensor tip style A, B, C, D, H, L or M.

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m = Material A, D, K, M, N, B, F, C or G.  
n = Process connector size 0, 1, 2, 3, 4, B, C, D, T or V.  
p = Process connection type 0, 1, 2, 3, 4, 5, 7, 8, A, B, C, D, E, G, J, N, P, S, T or V.  
r = Sensitivity 0 or 1.  
stu = Probe Length (3 digits) up to 130 inch or 330 cm.

## Group 5.

### ***TD2-cd0e-fgh. Thermal Dispersion Switch***

c = Power 7 or 8.  
d = Relay Output D or H.  
e = Enclosure Cover 0 or 1.  
f = Location 0 or 1.  
g = Agency Approval 3, C, or G.  
h = Enclosure type/connection 0, 1, 2, 3.

## Group 6.

### ***Tjk-mnpr-stu. Thermal Probe***

j = Measurement system E or M.  
k = Sensor tip style A, B, C, D, H, L or M.  
m = Material A, D, K, M, N, B, F, C or G.  
n = Process connector size 0, 1, 2, 3, 4, B, C, D, T or V.  
p = Process connection type 0, 1, 2, 3, 4, 5, 7, 8, A, B, C, D, E, G, J, N, P, S, T or V.  
r = Sensitivity 0 or 1.  
stu = Probe Length (3 digits) up to 130 inch or 330 cm.

## Group 7.

### ***Tjk-Dnpr-stu. Thermal Probe***

j = Measurement system E or M.  
k = Sensor tip style A, B, C, D, H, L or M.  
n = Process connector size 0, 1, 2, 3, 4, B, C, D, T or V.  
p = Process connection type 0, 1, 2, 3, 4, 5, 7, 8, A, B, C, D, E, G, J, N, P, S, T or V.  
r = Sensitivity 0 or 1.  
stu = Probe Length (3 digits) up to 130 inch or 330 cm.

## 13. **Specific Conditions of Use:**

1. The enclosure contains aluminum and is considered to present a potential risk of ignition by impact or friction. Care must be taken during installation and use to prevent impact or friction.
2. To maintain the T5 to T4 temperature code care shall be taken to ensure the "Enclosure Temperature" does not exceed 70°C
3. The risk of electrostatic discharge shall be minimized at installation, following the direction given in the instructions.
4. Contact the original manufacturer for information in the dimensions of flameproof joints.
5. For Installation with ambient temperature of 70°C, refer to the manufacturer's instructions for guidance on proper selection of conductors.
6. The TD1 Transmitter shall be connected to a safety extra low-voltage circuit (SELV) with a  $U_m \leq 28.8$  V.
7. For Relay Output Option D the device shall be installed using Class I, Division 1 wiring methods when used in Class I, Division 2 applications.

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**Tjk-mnpr-stu. Thermal Probe:**

**Tjk-Dnpr-stu. Thermal Probe:**

1. The Thermal Probe is only for use with the TD1 and TD2 Thermal Dispersion Switch.
2. To maintain the T5 to T4 temperature code care shall be taken to ensure the “Enclosure Temperature” does not exceed 70°C
3. The risk of electrostatic discharge shall be minimized at installation, following the direction given in the instructions.
4. Contact the original manufacturer for information in the dimensions of flameproof joints.

**14. Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

**15. Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

**16. Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
16 <sup>th</sup> June 2005	Original Issue.
18 <sup>th</sup> December 2019	<u>Supplement 3:</u> Report Reference: – PR452105 dated 18 <sup>th</sup> December 2019. Description of the Change: Addition of epoxy material options used in the construction for the feed-through assembly. Issued certificate using new format.
4 <sup>th</sup> August 2020	<u>Supplement 4:</u> Report Reference: – PR452809 dated 4 <sup>th</sup> August 2020. Description of the Change: Addition of Zone ratings.

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