

CERTIFICATE OF CONFORMITY

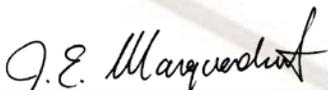


- HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
- Certificate No:** FM16US0203X
- Equipment:** 706 Eclipse Guided Wave Level Transmitter
(Type Reference and Name) Level Transmitter
- Name of Listing Company:** Magnetrol International Inc
- Address of Listing Company:** 705 Enterprise St
Aurora IL 60504
United States
- The examination and test results are recorded in confidential report number:

3051920 dated 6th April 2015
- 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 3610:2010, FM Class 3611:2004, FM Class 3615:2018,
FM Class 3616:2011, FM Class 3810:2018, UL 60079-0:2019, UL 60079-1:2015,
ANSI/ISA 60079-11:2014, ANSI/ISA 60079-15:2012, ANSI/ISA 60079-26:2011 ANSI/NEMA 250:2003,
ANSI/IEC 60529:2004, ANSI/ISA 12.27.01:2011, ANSI/UL 61010:2015
- 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.

Certificate issued by:



J.E. Marquedant
VP, Manager - Electrical Systems

4 September 2019

Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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SCHEDULE



US Certificate Of Conformity No: FM16US0203X

10. Equipment Ratings:

706-51ab-cde / 7fg-hijk-lmn-op-q. Eclipse Level Transmitter / Eclipse Level Probe.

706-51ab-cde. Eclipse Level Transmitter with Model 705 adapter.

Intrinsically Safe (Entity) for use in Class I, II and III, Division 1, Groups A, B, C, D, E, F and G, Temperature Class T4 Ta = -40°C to +70°C in accordance with Control Drawing No. 099-5072; Intrinsically Safe (Entity) for use in Class I, Zone 0, AEx ia IIC, Temperature Class T4, Ta = -40°C to +70°C in accordance with Control Drawing No. 099-5072; Explosionproof-Intrinsically Safe for Class I, Division 1, Groups B, C and D, Temperature Class T4 Ta = -40°C to +70°C; Dustignitionproof for Class II, III, Division 1, Groups E, F and G, Temperature Class T4 Ta = -40°C to +70°C; for use in Class I, Zone 1, AEx db IIB + H2 with connections to Class I, Zone 0, AEx ia IIC, Temperature Class T4 Ta = -40°C to +70°C; Nonincendive for use in Class I, Division 2, Groups A, B, C and D, Temperature Class T4, Ta = -40°C to +70°C; for use in Class I, Zone 2, AEx nA IIC with connection to connections to Class I, Zone 0, AEx [ia] IIC, Temperature Class T4 Ta = -15°C to +70°C hazardous (classified) locations, indoors and outdoors (Type 4X and IP67); Dual Seal.

706-52ab-cde / 7fg-hijk-lmn-op-q. Eclipse Level Transmitter / Eclipse Level Probe.

706-52ab-cde. Eclipse Level Transmitter with Model 705 adapter.

Intrinsically Safe (FISCO) for use in Class I, II and III, Division 1, Groups A, B, C, D, E, F and G; Temperature Class T4 Ta = -40°C to +70°C in accordance with Control Drawing No. 099-5072; Intrinsically Safe (FISCO) for use in Class I, Zone 0, AEx ia IIC, temperature Class T4 Ta = -40°C to +70°C; Explosionproof–Intrinsically Safe for Class I, Division 1, Groups B, C and D, Temperature Class T4 Ta = -40°C to +70°C; Dust-ignitionproof for Class II, III, Division 1, Groups E, F and G, Temperature Class T4 Ta = -40°C to +70°C; for use in Class I, Zone 1, AEx db IIB + H2 with connections to Class I, Zone 0, AEx ia IIC, Temperature Class T4 Ta = -40°C to +70°C; Nonincendive (FNICO) for use in Class I, Division 2, Groups A, B, C and D, Temperature Class T4, Ta = -40°C to +70°C; for use in Class I, Zone 2, AEx nA IIC with connection to connections to Class I, Zone 0, AEx [ia] IIC, Temperature Class T4 Ta = -15°C to +70°C in accordance with Control Drawing No. 099-5072; hazardous locations, indoors and outdoors (Type 4X and IP67); Dual Seal.

706-540a-3bc / 7de-fghi-jkl-mn-o. Eclipse Level Transmitter / Eclipse Level Probe.

706-540a-3bc. Eclipse Level Transmitter with Model 705 adapter.

Explosionproof-Intrinsically Safe for Class I, Division 1, Groups B, C and D; Temperature Class T4 Ta = -40°C to +70°C; Dust-ignitionproof for Class II, III, Division 1, Groups E, F and G; Temperature Class T4 Ta = -40°C to +70°C; Nonincendive for Class I, II and III, Division 2, Groups A, B, C, D, E, F and G, Temperature Class T4, Ta = -40°C to +70°C hazardous (Classified) locations, indoors and outdoors (Type 4X and IP67); Dual Seal.

11. The marking of the equipment shall include:

706-51ab-cde / 7fg-hijk-lmn-op-q. Eclipse Level Transmitter / Eclipse Level Probe.

706-51ab-cde. Eclipse Level Transmitter with Model 705 adapter.

Class I, II and III, Division 1, Groups A, B, C, D, E, F and G, T4 Ta = -40°C to +70°C - 099-5072; Entity; Type 4X, IP67; Dual Seal*

Class I, Division 1, Groups BCD, T4 Ta = -40°C to +70°C; Type 4X, IP67; Dual Seal*

Class II, Division 1, Groups E, F, G, Class III, Division 1, T4 Ta = -40°C to +70°C; Type 4X, IP67

Class I, Division 2, Groups A, B, C, D, E, F and G, T4 Ta = -40°C to +70°C - 099-5072; Entity; Type 4X, IP67; Dual Seal*

Class I, Zone 0, AEx ia IIC T4 Gb Ta = -40°C to +70°C - 099-5072; Entity; Type 4X, IP67

Class I, Zone 1, AEx db/ia [ia IIC Ga] IIB+H2 T4 Gb Ta = -40°C to +70°C, Type 4X, IP67

Class I, Zone 2, AEx nA [ia Ga] IIC Gc T4 Ta = -15°C to +70°C – 099-5072; Entity; Type 4X, IP67; Dual Seal*

Entity Parameters:

Ui (Vmax) = 28.4V, Ii (Imax) = 120mA, Pi (Pmax) = 0.84W, Ci = 0.5nF, Li = 2.7uH

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SCHEDULE



US Certificate Of Conformity No: FM16US0203X

706-520a-bcd / Tef-ghij-klm-no-p. Eclipse Level Transmitter / Eclipse Level Probe.

706-52ab-cde. Eclipse Level Transmitter with Model 705 adapter.

Class I, II and III, Division 1, Groups A, B, C, D, E, F and G; T4 Ta = -40°C to +70°C - 099-5072; FISCO; Type 4X, IP67; Dual Seal*

Class I, Division 1, Groups BCD T4 Ta = -40°C to +70°C; Type 4X, IP67; Dual Seal*

Class II, Division 1, Groups E, F, G, Class III, Division 1; T4 Ta = -40°C to +70°C, Type 4X, IP67

Class I, Division 2, Groups A, B, C, D, E, F and G; T4 Ta = -40°C to +70°C - 099-5072; FNICO; Type 4X, IP67; Dual Seal*

Class I, Zone 0, AEx ia IIC T4 Gb Ta = -40°C to +70°C - 099-5072; FISCO; Type 4X, IP67

Class I, Zone 1, AEx db/ia [ia IIC Ga] IIB+H2 T4 Gb Ta = -40°C to +70°C, Type 4X, IP67

Class I, Zone 2, AEx nA [ia Ga] IIC Gc T4 Ta = -15°C to +70°C - 099-5072; FISCO; Type 4X, IP67; Dual Seal*

FISCO Parameters:

Ui (Vmax) = 17.5V, li (Imax) = 380mA, Pi (Pmax) = 5.32W, Ci = 0.5nF, Li = 2.7uH

FNICO Parameters:

Ui (Vmax) = 17.5V, li (Imax) = 380mA, Pi (Pmax) = 5.32W, Ci = 0.5nF, Li = 2.7uH

706-540a-3bc / 7de-fghi-jkl-mn-o. Eclipse Level Transmitter / Eclipse Level Probe.

706-51ab-cde. Eclipse Level Transmitter with Model 705 adapter.

Class I, Division 1, Groups BCD, T4 Ta = -40°C to +70°C; Type 4X, IP67; Dual Seal*

Class II, Division 1, Groups E, F, G, Class III, Division 1, T4 Ta = -40°C to +70°C, Type 4X, IP67

Class I, Division 2, Groups A, B, C, D, E, F and G, T4 Ta = -40°C to +70°C; Type 4X, IP67; Dual Seal*

12. Description of Equipment:

The Model 706 is an Eclipse Wave Radar Level Transmitter, for liquid and bulk solids level control, utilizing guided wave radar (GWR) technology. Guided Wave Radar functions according to the principal of Time Domain Reflectometry (TDR). A pulse of electromagnetic energy travels down the probe and is reflected by the liquid (or bulk solid) surface. The time of pulse travel, down the probe and back to the electronics unit, is used to determine the distance to the process surface. That distance is used to compute process level, and control the transmitter output.

The Model 706 is an advanced two-wire transmitter. It uses a nominal input voltage of 24VDC and it provides an analog 4-20mA signal with HART or Fieldbus digital communication. With the FISCO and FNICO concepts, the input voltage is limited to 17.5 V. A digital display and keypad are optional. The Model 706 is available with HART Communication as the Model 706-51 and with Fieldbus Communication as the Model 706-52.

The Model 706 is housed in a dual compartment (die-cast aluminium or investment cast 316SS) enclosure with separate wiring and electronics compartments. The Model 706 housing is a new design that has been designed for approval as explosion-proof.

The wiring compartment at the top of the transmitter isolates the power/signal conductors from the electronics compartment beneath it by way of an environmentally sealed feed-through. A quick disconnect probe coupling eases installation and allows probes to be installed without concern for their orientation to the transmitter head. Probe mounting can be provided integrally, directly to the electronics housing, or can be remotely mounted up to 12 feet from the electronics housing.

Model Code structure and relevant parameters:

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US Certificate Of Conformity No: FM16US0203X

706-51ab-cde / 7fg-hijk-lmn-op-q. Eclipse Level Transmitter / Eclipse Level Probe.

Entity Parameters:

$U_i = 28.4V$, $I_i = 120mA$, $P_i = 0.84W$, $C_i = 4.4nF$, $L_i = 2.7\mu H$

a = Safety option 1 or 2.

b = Accessories/mounting A, B, C, 0, 1 or 2.

c = Classification 3, A, C or D.

d = Housing 1 or 2.

e = Conduit connection 0, 1, 2 or 3.

f = Measurement system A or C.

g = Configuration/style D, F, G, J, K, L, M, N, P, S, T, V, Y, Z, 1, 2, 3, 4, 5, 6 or 7.

h = Process connection size 1, 2, 3, 4, 5, 6, B, C, D, E or F.

i = Process connection type 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, J, K, L, M, N, T or U
(h = 1 or 2 with f = D, J or S; h = 9 with f = K).

j = Construction codes 0, K, L, M, N or P.

k = Flange option 0, 1 or 2.

l = Material of construction A, B, C, F, P, Q, R, S or T (k = F only with f = F).

m = Spacer material 0, 1, 2, 3, 4 or 5 (l = 3 only with f = D).

n = O-ring/seal material 0, 2, 8, A, B, D or N (m = B only with f = G or T).

o = Probe size/flushing connection 0, 1 or 2.

p = Special option 0, 1 or 2.

q = Insertion length (3 digits max) in:

inches (English units e = A, rigid probes f = D, F, G, J, K, L, M, N, P, S, T, V, Y, Z).

feet (English units e = A, flexible probes f = 1, 2, 3, 4, 5, 6 or 7).

centimeters (metric units e = C, rigid probes f = D, F, G, J, K, L, M, N, P, S, T, V, Y, Z).

meters (metric units e = C, flexible probes f = 1, 2, 3, 4, 5, 6 or 7).

706-51ab-cde. Eclipse Level Transmitter with Model 705 adapter.

Entity Parameters:

$U_i = 28.4V$, $I_i = 120mA$, $P_i = 0.84W$, $C_i = 4.4nF$, $L_i = 2.7\mu H$

a = Safety option 1 or 2.

b = Accessories/mounting A, B, C, 0, 1 or 2.

c = Classification 3, A, C or D.

d = Housing A or B.

e = Conduit connection 0, 1, 2 or 3.

706-52ab-cde / 7fg-hijk-lmn-op-q. Eclipse Level Transmitter / Eclipse Level Probe.

FISCO Parameters:

$U_i = 17.5V$, $I_i = 380mA$, $P_i = 5.32W$, $C_i = 0.5nF$, $L_i = 2.7\mu H$

FNICO Parameters:

$U_i = 17.5V$, $I_i = 380mA$, $P_i = 5.32W$, $C_i = 0.5nF$, $L_i = 2.7\mu H$

a = Safety option 1 or 2.

b = Accessories/Mounting: A, B, C, 0, 1 or 2.

c = Classification: 3, A, C or D.

d = Housing Material: 1 or 2.

e = Conduit: 0, 1, 2 or 3.

f = Measurement: A or C.

g = Configuration/Style: D, F, G, J, K, L, M, N, P, S, T, V, Y, Z, 1, 2, 3, 4, 5, 6, or 7.

h = Process connection size: 1, 2, 3, 4, 5, 6, B, C, D, E or F.

i = Process connection type: 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, J, K, L, M, N, T or U (h = 1 or 2 only with f = F, J, 1, 2, 5 or 7; h = 1, 2, 3, 4, A or B only with f = D, P, S, T or V; h = 5, 6, 7, 8, K, L, M or N only with f = D,

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- J or S; h = 9 only with K).
- j = Construction codes: 0, K, L, M, N or P.
- k = Flange option: 0, 1, or 2.
- l = Material of construction: A, B, C, F, P, Q, R or S (k = F only with f = F).
- m = Spacer Material: 0, 1, 2, 3, 4 or 5 (l = 3 only with f = D).
- n = O-ring / seal material: 0, 2, 8, A, B, D or N (m = B only with f = G or T).
- o = Probe size/Flushing Connection: 0, 1 or 2.
- p = Special Option: 0, 1, or 2.
- q = Probe Length:
 - inches (English units e = A, rigid probes f = D, F, G, J, K, L, M, N, P, S, T, V, Y, Z)
 - feet (English units e = A, flexible probes f = 1, 2, 3, 4, 5, 6 or 7)
 - centimeters (metric units e = C rigid probes f = D, F, G, J, K, L, M, N, P, S, T, V, Y, Z).
 - meters (metric units e = C flexible probes f = 1, 2, 3, 4, 5, 6 or 7)

706-52ab-cde. Eclipse Level Transmitter with Model 705 adapter.

FISCO Parameters:

Ui = 17.5V, li = 380mA, Pi = 5.32W, Ci = 0.5nF, Li = 2.7µH

FNICO Parameters:

Ui = 17.5V, li = 380mA, Pi = 5.32W, Ci = 0.5nF, Li = 2.7µH

a = Safety option 1 or 2.

b = Accessories/Mounting: A, B, C, 0, 1 or 2.

c = Classification: 3, A, C or D.

d = Housing Material: A or B.

e = Conduit: 0, 1, 2 or 3.

706-540a-3bc / 7de-fghi-jkl-mn-o. Eclipse Level Transmitter / Eclipse Level Probe.

a = Accessories/mounting A, B, C, 0, 1 or 2.

b = Housing 1 or 2.

c = Conduit connection 0, 1, 2 or 3.

d = Measurement: A or C.

e = Probe configuration/Style: D, F, G, J, K, L, M, N, P, S, T, V, Y, Z, 1, 2, 3, 4, 5, 6, or 7 (*Dual Seal marking applies only with e = D, J, L, M, N or P).

f = Process connection size: 1, 2, 3, 4, 5, 6, B, C, D, E or F.

g = Process connection type 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, J, K, L, M, N, T or U (g = 1 or 2 with e = D, J or S; g = 9 with e = K).

h = Construction codes: 0, K, L, M, N or P.

i = Flange option: 0, 1, or 2.

j = Material of construction: A, B, C, F, P, Q, R or S (j = F only with e = F).

k = Spacer Material: 0, 1, 2, 3, 4 or 5 (k = 3 only with e = D).

l = O-ring / seal material: 0, 2, 8, A, B, D or N (l = B only with e = G or T).

m = Probe size/Flushing Connection: 0, 1 or 2.

n = Special Option: 0, 1, or 2.

o = Probe Length:

inches (English units d = A, rigid probes e = D, F, G, J, K, L, M, N, P, S, T, V, Y, Z)

feet (English units d = A, flexible probes e = 1, 2, 3, 4, 5, 6 or 7)

centimeters (metric units d = C rigid probes e = D, F, G, J, K, L, M, N, P, S, T, V, Y, Z).

meters (metric units d = C flexible probes e = 1, 2, 3, 4, 5, 6 or 7)

706-540a-3bc. Eclipse Level Transmitter with Model 705 adapter.

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- a = Accessories/mounting A, B, C, 0, 1 or 2.
b = Housing A or B.
c = Conduit connection 0, 1, 2 or 3

13. **Specific Conditions of Use:**

Model: 706-51ab-cde / 7fg-hijk-lmn-op-q.

Model: 706-52ab-cde / 7fg-hijk-lmn-op-q.

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 T4 temperature code care shall be taken to ensure the enclosure temperature does not exceed 75°C.

3. The risk of electrostatic discharge shall be minimized at installation, following the direction given in the instruction.

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. Provisions shall be made to provide transient overvoltage protection to a level not to exceed 119 Vdc

7. Flameproof joints are not intended to be repaired

Model: 706-51ab-cde.

Model: 706-52ab-cde.

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 T4 temperature code care shall be taken to ensure the enclosure temperature does not exceed 75°C.

3. The risk of electrostatic discharge shall be minimized at installation, following the direction given in the instruction.

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. Provisions shall be made to provide transient overvoltage protection to a level not to exceed 119 Vdc.

7. The model 706 Transmitter with adapter shall be used only with FM Approved Model 705 probe assemblies per installation instructions in the product manual.

Model: 706-540a-3bc / 7de-fghi-jkl-mn-o.

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.

Model: 706-540a-3bc.

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. The model 706 Transmitter with adapter shall be used only with FM Approved Model 705 probe assemblies per installation instructions in the product manual.

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

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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
6 th April 2015	Original Issue.
17 th October 2016	<u>Supplement 8:</u> Report Reference: - RR205631 dated 17 th October 2016. Description of the Change: For Model 706-51 and 706-52: Addition of first digit in Model code named Safety option to new safety Sil certified option. Correction to Model code "Classification" variable options.
8 th July 2019	<u>Supplement 9:</u> Report Reference: - RR218207 dated 8 th July 2019. Description of the Change: Conduct Division and Zone standards review, update standards to the latest issue date, for clarification added ANSI/UL 61010 Standard, added EPL "b" to AEx markings, added "Special Condition of Use" per zone standard requirements.
4 th September 2019	<u>Supplement 10:</u> Report Reference: - PR453174 dated 4 th September 2019. Description of the Change: Addition of 706-51, 706-52 and 706-540 with Model 705 probe adapter.

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