1 # EU-TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3 **EU-Type Examination Certificate No:** **FM17ATEX0027X**

4 **Equipment or protective system: (Type Reference and Name)** **PULSAR R86-5abc-def 26 GHz Radar Level Transmitter Level Transmitter**

5 **Name of Applicant:** **Magnetrol International Inc.**

6 **Address of Applicant:** **705 Enterprise St Aurora IL 60504 United States**

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Ltd, notified body number 1725 in accordance with Article 17 of Directive 2014/34/EU of 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:

3059033 dated 9th July 2017

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN 60079-0:2012 +A11:2013, EN 60079-1:2014, EN 60079-11:2012, EN 60079-26:2015, EN 60079-31:2014, EN 60529 +A1:2000 +A2:2013

10 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.

11 This EU-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:

Version with Quartz Seal

II 1 G Ex ia IIC; T4…T1 Ga Ta = -40 °C to +70 °C; FISCO; IP67
II 1/2 G Ex ia/db IIB + H_2; T4…T1 Ga/Gb Ta = -40 °C to +70 °C; FISCO; IP67
II 2 D Ex ia tb IIIC T100 °C Db; Ta = -15 °C to +70 °C; IP67

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Issue date: 18th July, 2017

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12 The marking of the equipment or protective system shall include (continued):

Version with PTFE Seal
II 1 G Ex ia IIC; T4…T3 Ga Ta = -40 °C to +70 °C; FISCO; IP67
II 2 G Ex db ia IIB + H2; T4…T3 Gb Ta = -40 °C to +70 °C; FISCO; IP67
II 2 D Ex ia tb IIIC T100 °C Db; Ta = -15 °C to +70 °C; IP67;

13 **Description of Equipment or Protective System:**

General - The Pulsar Model R86 26 GHz Radar Level Transmitters are, non-contact radar level transmitters utilizing the engineering principle of pulse burst radar technology. The primary components are the antenna, an RF (radio frequency) Board assembly, and a potted electronics assembly containing other PC Boards. A digital display and keypad are optional.

Short bursts of 26GHz microwave energy are emitted and subsequently reflected from the liquid level surface. Distance is calculated by the equation D = Transit time (round trip)/2. Liquid level is then calculated based on transmitter configuration..

Construction - The Pulsar Model R86 is housed in a dual compartment (die-cast aluminum or investment cast 316SS) enclosure with separate wiring and electronics compartments. 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 connect coupling eases installation and allows antennas to be installed without concern for their orientation to the transmitter head. The enclosure is provided with two (2) ½ inch NPT openings.

Ratings - The ambient operating temperature range is -40 °C to 70 °C for gas atmospheres and -15 °C to +70 °C for dust atmospheres. The transmitter antenna are rated for use in a process temperature range of -40 °C to +400 °C.

Intrinsically Safe Model options (when installed per 099-5077-001):
Entity Parameters: Ui = 28.6 V, Ii = 140 mA, Pi = 1 W, Ci = 4.4 nF, Li = 2.7 µH

Intrinsically Safe/ FISCO Model options (when installed per 099-5077-001)::
FISCO Parameters: Ui = 17.5 V, Ii = 380 mA, Pi = 5.32 W, Ci = 440 pF, Li = 2.7 µH

PULSAR R86-5abc-def – RBx-xxxx-x0N-xx-000 26 GHz Radar Level Transmitter (Quartz Seal Version)
a = Signal Output = 1 (HART) or 2 (Fieldbus)
b = Safety Options: 0, or 1.
c = Accessories/Mounting 0, or A.
d = Classification: 1, 3, A, B, C or D.
e = Housing 1 or 2
f = Conduit Connection 0, 1, 2 or 3
x = Non-FM Controlled Options
0 = None

PULSAR R86-5abc-def – RBx-xxxx-x0g-xx-000 26 GHz Radar Level Transmitter (PTFE Seal Version)
a = Signal Output = 1 (HART) or 2 (Fieldbus)
b = Safety Options: 0, or 1.
c = Accessories/Mounting 0, or A.
d = Classification: 1, 3, A, B, C or D.
e = Housing 1 or 2
f = Conduit Connection 0, 1, 2 or 3
x = Non-FM Controlled Options
0 = None
g = 0, 2, 8, or A

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14 **Specific Conditions of Use:**

Version with Quartz Seal

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. Provisions shall be made to provide transient overvoltage protection to a level not to exceed 119Vdc.
3. To maintain the T4 temperature code care shall be taken to ensure the enclosure temperature does not exceed 70 °C.
4. For Installation with ambient temperature of 70 °C, refer to the manufacturer's instructions for guidance on proper selection of conductors.
5. The risk of electrostatic discharge shall be minimized at installation, following the direction given in the instruction manual.
6. The Pulsar R86 includes flamepath joints, consult Magnetrol if repair of the flamepath joints is necessary.
7. Temperature class for the process temperature ranges is defined by the following table.

Process temperature range	Temperature Code
From 0 °C to 130 °C	T4
From 130 °C to 195 °C	T3
From 195 °C to 295 °C	T2
From 295 °C to 400 °C	T1

Version with PTFE Seal

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. Provisions shall be made to provide transient overvoltage protection to a level not to exceed 119Vdc.
3. To maintain the T4 temperature code care shall be taken to ensure the enclosure temperature does not exceed 70 °C.
4. For Installation with ambient temperature of 60 °C, refer to the manufacturer's instructions for guidance on proper selection of conductors.
5. The risk of electrostatic discharge shall be minimized at installation, following the direction given in the instruction manual.
6. The Pulsar R86 includes flamepath joints, consult Magnetrol if repair of the flamepath joints is necessary.
7. Temperature class for the process temperature ranges is defined by the following table:

Process temperature range	Temperature Code
From 0 °C to 130 °C	T4
From 130 °C to 195 °C	T3
From 195 °C to 200 °C	T2

8. PTFE seal is limited for use where process temperature range is -40 to + 200 °C

15 **Essential Health and Safety Requirements:**

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16 **Test and Assessment Procedure and Conditions:**

This EU-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

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Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Ltd's ATEX Certification Scheme.

17 **Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

18 **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
18 July 2017	Original Issue.

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Blueprint Report

Magnetrol International Inc (1000000020)

Class No 3610

Original Project I.D. 3059033

Certificate I.D. FM17ATEX0027X

Drawing No.	Revision Level	Drawing Title	Last Report	Electronic Drawing
005-8038	AB	Caution Plate	3059033	Yes (pdf)
005-8086	M	(Nameplates) Pulsar R86	3059033	Yes (pdf)
009-6188	B	Terminal Block 2 Pos 375MIL DBL PIN (1/4 in QCs not acceptable)	3059033	Yes (pdf)
009-6278	C	Isolation Transformer	3059033	Yes (pdf)
009-9365-001	C	(Gerber Display board)	3059033	Yes (zip_html)
009-9375-002	E	(Gerber Fieldbus Wiring board)	3059033	Yes (zip)
009-9383-001	C	(Gerber RF board)	3059033	Yes (zip)
009-9383	C	R86 RF Fabrication board (Layers)	3059033	Yes (pdf)
009-9386-002	E	(Gerber Analog board)	3059033	Yes (zip)
009-9387	B	R86 Galvanic Fabrication Wiring Board	3059033	Yes (pdf)
009-9388-001	F	(Gerber HART galvanic Transformer board)	3059033	Yes (zip)
009-9388	C	R86 Galvanic Transformer Fabrication PC board	3059033	Yes (pdf)
009-9389-001	E	(Gerber HART Digital board)	3059033	Yes (zip)
009-9390-001	E	(Gerber Fieldbus Digital board)	3059033	Yes (zip)
009-9391-001	C	(Gerber HART Wiring board)	3059033	Yes (zip)
030-9166	J	Foundation Fieldbus Wiring Board (Assembly)	3059033	Yes (pdf)
030-9170	B	Bill Of Materials Model R86 Analog PC Board Assembly	3059033	Yes (pdf)
030-9171	C	R86 Hart XP Wiring Board	3059033	Yes (pdf)
030-9172	G	R86 Hart XP Transformer Board	3059033	Yes (pdf)
030-9177	H	Model R86 HART Digital PC Board (BOM/Placement)	3059033	Yes (pdf)
030-9178	F	Model R86 FIELDBUS Digital PC Board (BOM/Placement)	3059033	Yes (pdf)
030-9180	C	R86 HART “IS” Wiring Board (Assembly)	3059033	Yes (pdf)
070-2015	D	UR 3001 HP2 Clear Two Part Urethane Encapsulant	3059033	Yes (pdf)
09-9387-001	A	(Gerber XP Wiring board)	3059033	Yes (zip)
094-6070	B	Display Board Eclipse 706 (Schematic)	3059033	Yes (pdf)
094-6075	F	Foundation Fieldbus Wiring Board “Model R86 & R96 (Schematic page 2)	3059033	Yes (pdf)
094-6081	B	Model R86_RF board (schematic)	3059033	Yes (pdf)
094-6084	C	R86_Pulsar 2X 26GHZ Analog Board Schematic	3059033	Yes (pdf)
094-6085	D	Model R86 Pulsar 2X 26GHZ Wiring Board Schematic	3059033	Yes (pdf)
094-6086	J	Model R86 Pulsar 2X 26GHZ Galvanic Switcher Schematic	3059033	Yes (pdf)
094-6087	G	R86_Pulsar 2X 26GHZ Hart Digital Board Schematic	3059033	Yes (pdf)
094-6088	F	R86 Pulsar 2X 26GHZ Fieldbus Digital Board Schematic	3059033	Yes (pdf)
094-6089	C	Wiring Board Pulsar R86 (Schematic)	3059033	Yes (pdf)
099-5077	E	(Installation DWG) System Drawing Pulsar R86 Transmitter	3059033	Yes (pdf)
099-6562	H	Model R86 Enhanced Pulsar 2X 26GH Version	3059033	Yes (pdf)
58-603	2	Installation and Operation Manual for Pulsar Model R86	3059033	Yes (pdf)
99-3532	A	Galvanic Hi Pot Test Procedure 99-3532-001	3059033	Yes (pdf)