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:** **FM12ATEX0036X**

4 **Equipment or protective system: (Type Reference and Name)** **FTL80, FTL81, FTL85 Liquiphant FailSafe Level Switch**

5 **Name of Applicant:** **Endress+Hauser SE+Co. KG**

6 **Address of Applicant:** **Haupstrasse 1**
Postfach 1261
Maulburg, D79689
Germany

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 Europe Ltd, notified body number 2809 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:

3044854 dated 29 May 2012

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 IEC 60079-0:2018, EN60079-1:2014, EN60079-7:2015, EN60079-11:2012, EN60079-26:2015, EN60079-31:2014 and EN 60529:1991+A1:2000+A2:2013

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe 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.

Digitally signed by Richard Zammitt
DN: cn=Richard Zammitt, o, ou=FM Approvals Europe Limited, email=richard.zammitt@fmapprovals.com, c=IE

Richard Zammitt
Certification Manager, FM Approvals Europe Ltd.

Issue date: 13th February 2020

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SCHEDULE

to EU-Type Examination Certificate No. FM12ATEX0036X

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

Model Code	Ex Marking
FTL8*-BA********+*******	II 1 G Ex ia IIC T6* Ga
FTL8*-BB********+******* or FTL8*-8B********+*******	II 1/2 G Ex ia IIC T6* Ga/Gb
FTL8*-BC********+******* or FTL8*-8C********+*******	II 1/2 G Ex db IIC T6* Ga/Gb
FTL8*-BD********+*******	II 1/2 G Ex db eb IIC T6* Ga/Gb
FTL8*-B2********+*******	II 1/2 G Ex ia IIC T6* Ga/Gb II 1/2 D Ex ia IIIC T80°C Da/Db
FTL8*-B3********+*******	II 1/2 G Ex db IIC T6* Ga/Gb II 1/2 D Ex ta IIIC T80°C Da / Ex tb IIIC T80°C Db
FTL8*-B4********+*******	II 1/2 G Ex ia IIC T6* Ga/Gb II 1/2 G Ex db IIC T6* Ga/Gb

**refer to control drawing for Temperature Code*

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

The Liquiphant FailSafe Liquid Level Switch Type FTL80, FTL81 and FTL85 for use in explosive atmospheres caused by the presence of combustible gasses, fluids, vapors or dust, directly detect a liquid level by means of a symmetrical vibrating fork and converts it into an electrical signal. The device is designed for Max- and Min- Detection suitable for functional safety applications up to SIL3. The electronic insert (FEL85) of the level transmitter generates an output signal of 4...20mA with discrete current steps depending on the level at the Liquiphant fork.

The electronic enclosure is made of plastic, aluminum or stainless steel. Depending on the version selected, the stainless steel sensor is mounted directly to the enclosure (compact version, type FTL80) or via an extension tube (type FTL81 or FTL85).
Ambient temperature range at the electronics enclosure is -50°C to +70°C* for Ex i, db, eb and ta version and -60°C to +70°C for the Ex db version. (*-50°C to +60°C for Ex i version with T-code T6 and process temperature ≤ 80°C)

Process temperature range is -60°C to 300°C.
The relationship between process temperature at the sensor and the temperature class is listed in the Safety Instructions.
The maximum surface temperature of the enclosure is T80°C based on the maximum ambient temperature of 70°C.

Electrical data:

Supply and output circuit (terminals 1 and 2 or 2 and 3):

In type of protection intrinsic safety Ex ia IIC, connection can only be made to a certified intrinsically safe

SCHEDULE

to EU-Type Examination Certificate No. FM12ATEX0036X

circuit with the following values:

$U_i \leq 30Vdc$; $I_i \leq 170mA$; $P_i \leq 1W$; $C_i \leq 16nF$; $L_i = 0$

In type of protection Ex d, Ex t, the electronic connection has the following values:

$U \leq 30Vdc$; I = 4…20mA; $P \leq 0.6W$

The sensor circuit is an internal circuit with the type of protection intrinsically safe Ex ia IIC.

Model Codes:

FTL80-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL81-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL85-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch

a = Approval: BA
b = Electronics, Output: S or Y= Special versionwith different switching delays
c = Display, Operating: A or Y= Special version with different LED colors
d = Housing: C, D, E, H or I
e = Electrical connection: A, B, C, D, E or I
f = Application A, B, C, D or Y; For FTL85: N, P, T or Y
g = Sensor Material: 1, 2, 5 or 9 = Special sensor material with higher corrosion protection
h = Surface Refinement: A, N, P, Q, R, T or Y = Special version, Ra<0,3um/12uin
i = Sensor Type: AC, AJ, BC, BJ, CC, CJ, DC, DJ, BN, BP, BQ, BR, BT, CN, CP, CQ, CR, CT, DN, DP, DQ, DR, DT, ET, FT, GT, HT, IT or YY=Special version, Ra<0,3um/12uin, AlloyC or 316L or YY=Special version, with different individual length (<=6m) from standard
j =Process connection: triple combinations of numbers or characters representing ANSI DIN JIS flange, threads, hygienic or other standardized process connections
+ Separator symbol: only used when additional options selected
k = Services: HC or I9=Special version of cleaning
l = Test, Certificate: Double combination of numbers or characters representing different types of in-process production tests
m = Additional Approval: LC, LE, LF, LV or L9=Special version, to be specified
n = Sensor Design: MP, MR, MS or M9=Special version
o = Accessory Mounted: NC, ND, NE, NH or O9=Special version
p = Accessory Enclosed: PB or R9 = Special version
q = Marking: Z1

FTL80-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL81-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL85-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch

a = Approval: BB or 8B
b = Electronics, Output: S or Y = special version with different switching delays
c = Display, Operating: A or Y Special version with different LED colors
d = Housing: A, C, D, E, H or I
e = Electrical connection: A, B, C, D, E or I
f = Application A, B, C, D or Y
g = Sensor Material: 1, 2, 5 or 9 = Special sensor material with higher corrosion protection
h = Surface Refinement: A, N, P, Q, R, T or Y = Special version, Ra<0,3um/12uin
i = Sensor Type: AC, AJ, BC, BJ, CC, CJ, DC, DJ, BN, BP, BQ, BR, BT, CN, CP, CQ, CR, CT, DN, DP, DQ, DR, DT, ET, FT, GT, HT, IT or YY=Special version, Ra<0,3um/12uin, AlloyC or 316L or YY=Special version, with different individual length (<=6m) from standard

SCHEDULE

to EU-Type Examination Certificate No. FM12ATEX0036X

j =Process connection: triple combinations of numbers or characters representing ANSI DIN JIS flange, threads, hygienic or other standardized process connections
+ Separator symbol: only used when additional options selected
k = Services: HC or I9=Special version of cleaning
l = Test, Certificate: Double combination of numbers or characters representing different types of in-process production tests
m = Additional Approval: LC, LE, LF, LV or L9=Special version, to be specified
n = Sensor Design: MP, MR, MS or M9=Special version
o = Accessory Mounted: NA, NC, ND, NE, NH or O9=Special version
p = Accessory Enclosed: PB or R9 = Special version
q = Marking: Z1

FTL80-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL81-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL85-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch

a = Approval: BC or 8C
b = Electronics, Output: S or Y = special version with different switching delays
c = Display, Operating: A or Y Special version with different LED colors
d = Housing: D, E or I
e = Electrical connection: B, C, D or E
f = Application A, B, C, D or Y
g = Sensor Material: 1, 2, 5 or 9 = Special sensor material with higher corrosion protection
h = Surface Refinement: A, N, P, Q, R, T or Y = Special version, Ra<0,3um/12uin
i = Sensor Type: AC, AJ, BC, BJ, CC, CJ, DC, DJ, BN, BP, BQ, BR, BT, CN, CP, CQ, CR, CT, DN, DP, DQ, DR, DT, ET, FT, GT, HT, IT or YY=Special version, Ra<0,3um/12uin, AlloyC or 316L or YY=Special version, with different individual length (<=6m) from standard
j =Process connection: triple combinations of numbers or characters representing ANSI DIN JIS flange, threads, hygienic or other standardized process connections
+ Separator symbol: only used when additional options selected
k = Services: HC or I9=Special version of cleaning
l = Test, Certificate: Double combination of numbers or characters representing different types of in-process production tests
m = Additional Approval: LC, LE, LF, LV or L9=Special version, to be specified
n = Sensor Design: MP, MQ, MR, MS or M9=Special version
o = Accessory Mounted: ND , NE or O9=Special version
p = Accessory Enclosed: PB or R9 = Special version
q = Marking: Z1

FTL80-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL81-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL85-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch

a = Approval: BD
b = Electronics, Output: S or Y = special version with different switching delays
c = Display, Operating: A or Y Special version with different LED colors
d = Housing: E
e = Electrical connection: A, B, C, D or E
f = Application A, B, C, D or Y
g = Sensor Material: 1, 2, 5 or 9 = Special sensor material with higher corrosion protection
h = Surface Refinement: A, N, P, Q, R, T or Y = Special version, Ra<0,3um/12uin
i = Sensor Type: AC, AJ, BC, BJ, CC, CJ, DC, DJ, BN, BP, BQ, BR, BT, CN, CP, CQ, CR, CT, DN, DP, DQ, DR, DT, ET, FT, GT, HT, IT or YY=Special version, Ra<0,3um/12uin, AlloyC or 316L or YY=Special version, with different individual length (<=6m) from standard

j =Process connection: triple combinations of numbers or characters representing ANSI DIN JIS flange, threads, hygienic or other standardized process connections
+ Separator symbol: only used when additional options selected
k = Services: HC or I9=Special version of cleaning
l = Test, Certificate: Double combination of numbers or characters representing different types of in-process production tests
m = Additional Approval: LC, LE, LF, LV or L9=Special version, to be specified
n = Sensor Design: MP, MR, MS or M9=Special version
o = Accessory Mounted: NE or O9=Special version
p = Accessory Enclosed: PB or R9 = Special version
q = Marking: Z1

FTL80-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL81-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch or
FTL85-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch

a = Approval: B2
b = Electronics, Output: S or Y = special version with different switching delays
c = Display, Operating: A or Y Special version with different LED colors
d = Housing: C, D, E, H or I
e = Electrical connection: A, B, C, D, E or I
f = Application A, B, C, D or Y
g = Sensor Material: 1, 2, 5 or 9 = Special sensor material with higher corrosion protection
h = Surface Refinement: A, R, T or Y = Special version, Ra<0,3um/12uin
i = Sensor Type: AC, AJ, BC, BJ, CC, CJ, DC, DJ, BR, BT, CR, CT, DR, DT, ET, FT, GT, HT, IT or YY=Special version, Ra<0,3um/12uin, AlloyC or 316L
or YY=Special version, with different individual length (<=6m) from standard
j =Process connection: triple combinations of numbers or characters representing ANSI DIN JIS flange, threads, hygienic or other standardized process connections
+ Separator symbol: only used when additional options selected
k = Services: HC or I9=Special version of cleaning
l = Test, Certificate: Double combination of numbers or characters representing different types of in-process production tests
m = Additional Approval: LC, LE, LF, LV or L9=Special version, to be specified
n = Sensor Design: MP, MR, MS or M9=Special version
o = Accessory Mounted: NC, ND, NE, NH or O9=Special version
p = Accessory Enclosed: PB or R9 = Special version
q = Marking: Z1

FTL80-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL81-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL85-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch

a = Approval: B3
b = Electronics, Output: S or Y = special version with different switching delays
c = Display, Operating: A or Y Special version with different LED colors
d = Housing: D, E or I
e = Electrical connection: B, C, D or E
f = Application A, B, C, D or Y
g = Sensor Material: 1, 2, 5 or 9 = Special sensor material with higher corrosion protection
h = Surface Refinement: A, R, T or Y = Special version, Ra<0,3um/12uin
i = Sensor Type: AC, AJ, BC, BJ, CC, CJ, DC, DJ, BR, BT, CR, CT, DR, DT, ET, FT, GT, HT, IT or

YY=Special version, Ra<0,3um/12uin, AlloyC or 316L
or YY=Special version, with different individual length (<=6m) from standard
j =Process connection: triple combinations of numbers or characters representing ANSI DIN JIS flange, threads, hygienic or other standardized process connections
+ Separator symbol: only used when additional options selected
k = Services: HC or I9=Special version of cleaning
l = Test, Certificate: Double combination of numbers or characters representing different types of in-process production tests
m = Additional Approval: LC, LE, LF, LV or L9=Special version, to be specified
n = Sensor Design: MP, MR, MS or M9=Special version
o = Accessory Mounted: ND, NE or O9=Special version
p = Accessory Enclosed: PB or R9 = Special version
q = Marking: Z1

FTL80-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch
FTL81-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch or
FTL85-abcdefghij+klmnopq. Liquiphant FailSafe Level Switch

a = Approval: B4
b = Electronics, Output: S or Y = special version with different switching delays
c = Display, Operating: A or Y Special version with different LED colors
d = Housing: D, E or I
e = Electrical connection: B, C, D or E
f = Application A, B, C, D or Y
g = Sensor Material: 1, 2, 5 or 9 = Special sensor material with higher corrosion protection
h = Surface Refinement: A, N, P, Q, R, T or Y = Special version, Ra<0,3um/12uin
i = Sensor Type: AC, AJ, BC, BJ, CC, CJ, DC, DJ, BN, BP, BQ, BR, BT, CN, CP, CQ, CR, CT, DN, DP, DQ, DR, DT, ET, FT, GT, HT, IT or YY=Special version, Ra<0,3um/12uin, AlloyC or 316L
or YY=Special version, with different individual length (<=6m) from standard
j =Process connection: triple combinations of numbers or characters representing ANSI DIN JIS flange, threads, hygienic or other standardized process connections
+ Separator symbol: only used when additional options selected
k = Services: HC or I9=Special version of cleaning
l = Test, Certificate: Double combination of numbers or characters representing different types of in-process production tests
m = Additional Approval: LC, LE, LF, LV or L9=Special version, to be specified
n = Sensor Design: MP, MR or M9=Special version
o = Accessory Mounted: ND, NE or O9=Special version
p = Accessory Enclosed: PB or R9 = Special version
q = Marking: Z1

14 **Specific Conditions of Use:**

1. In the case of process connections made of polymeric material or with polymeric coatings, avoid electrostatic charging of the plastic surface.
2. For Group IIC, if electrostatic charging of the probe can be avoided (e.g. through friction, cleaning, maintenance, strong medium flow), a probe coated with non-conductive material can be used.
3. Contact manufacturer for flamepath joint details when repair is necessary.

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.

SCHEDULE

to EU-Type Examination Certificate No. FM12ATEX0036X

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.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Europe 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 Europe 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
7th June 2012	Original Issue.
29th April 2013	Supplement 1: Report Reference –3048191 dated 15th April 2013. Description of the Change – 1. minor component changes to non-safety critical circuits for performance and functional issues, 2. addition of test certificates to the order code for in-process production tests 3. correction of typographical errors in the order code listings. 4. Updated the EN60079-0 from 2009 to 2012 5. added EN60529 which was mistakenly omitted.
13th February 2020	Supplement 2: Report Reference –RR220182 dated 05th February 2020. Description of the Change – 1) EN 60079-0 updated to 2018 Edition 2) EN 60079-1 updated to 2014 Edition 3) EN 60079-7 updated to 2015 Edition 4) EN 60079-26 updated to 2015 Edition 5) EN 60079-31 updated to 2014 Edition 6) EN 60529 A2:2013 added 7) Removal of EN 61241-11 from the assessment 8) EN60079-15 (2010) removed from the assessment 9) Model FTL8*-BL removed from Approval 10) Certificate transferred from FM Approvals Ltd., notified body no. 1725, to FM Approvals Europe Ltd., notified body no. 2809.