

# 1 EC-TYPE EXAMINATION CERTIFICATE



2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 94/9/EC**

3 **EC-Type Examination Certificate No:** FM12ATEX0036X

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

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

6 **Address of Applicant:** Hauptstraße 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 Ltd, notified body number 1725 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, 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:

EN60079-0:2012, EN60079-1:2007, EN60079-7:2007, EN60079-11:2012, EN60079-15:2010,  
EN60079-26:2007, EN60079-31:2009, EN61241-11:2006, EN 60529 + A1: 2000

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 EC-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. 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 Mick Gower  
DN: cn=Mick Gower, o=FM Approvals, ou,  
email=mick.gower@fmapprovals.com,  
c=GB  
Date: 2013.05.02 07:58:51 +0100'

**Mick Gower**  
**Certification Manager, FM Approvals Ltd.**

Issue date: 29<sup>th</sup> April 2013

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# SCHEDULE

to EC-Type Examination Certificate No. FM12ATEX0036X

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

Model Code	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 d IIC T6* Ga/Gb
FTL8*-BD*****+*****	II 1/2 G Ex de IIC T6* Ga/Gb
FTL8*-BL*****+*****	II 1/3 G Ex nA IIC T6* Ga/Gc
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 d IIC T6* Ga/Gb II 1/2 D Ex ta IIIC T80°C Da/Db
FTL8*-B4*****+*****	II 1/2 G Ex ia IIC T6* Ga/Gb II 1/2 G Ex d 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, de, nA and ta version and -60°C to +70°C for the Ex d 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.

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## 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 circuit with the following values:

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

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

$U \leq 30\text{Vdc}$ ;  $I = 4 \dots 20\text{mA}$ ;  $P \leq 0.6\text{W}$

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

## Model Codes:

**FTL80-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**

**FTL81-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**

**FTL85-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**

a = Approval: BA

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, N, P, Q, R, T or Y = Special version,  $R_a < 0,3\mu\text{m}/12\mu\text{in}$

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,  $R_a < 0,3\mu\text{m}/12\mu\text{in}$ , Alloy C or 316L or YY = Special version, with different individual length ( $\leq 6\text{m}$ ) 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

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to EC-Type Examination Certificate No. FM12ATEX0036X

**FTL80-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL81-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL85-abcdefghijklmnpq. 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  
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-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL81-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL85-abcdefghijklmnpq. 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

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Member of the FM Global Group

to EC-Type Examination Certificate No. FM12ATEX0036X

**FTL80-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL81-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL85-abcdefghijklmnpq. 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,  $Ra < 0,3\mu m/12\mu in$   
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,  $Ra < 0,3\mu m/12\mu in$ , AlloyC or 316L or YY=Special version, with different individual length ( $\leq 6m$ ) 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-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL81-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL85-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**

a = Approval: BL  
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 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,  $Ra < 0,3\mu m/12\mu in$   
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,  $Ra < 0,3\mu m/12\mu in$ , AlloyC or 316L or YY=Special version, with different individual length ( $\leq 6m$ ) 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, LG or L9=Special version, to be specified  
n = Sensor Design: MP, MR or MS  
o = Accessory Mounted: NA, NC, ND, NE, NH or O9=Special version  
p = Accessory Enclosed: PB or R9 = Special version  
q = Marking: Z1

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Member of the FM Global Group

to EC-Type Examination Certificate No. FM12ATEX0036X

**FTL80-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL81-abcdefghijklmnpq. Liquiphant FailSafe Level Switch or**  
**FTL85-abcdefghijklmnpq. 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,  $Ra < 0,3\mu m/12\mu in$   
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,  $Ra < 0,3\mu m/12\mu in$ , AlloyC or 316L  
or YY=Special version, with different individual length ( $\leq 6m$ ) 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-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL81-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL85-abcdefghijklmnpq. 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,  $Ra < 0,3\mu m/12\mu in$   
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,  $Ra < 0,3\mu m/12\mu in$ , AlloyC or 316L  
or YY=Special version, with different individual length ( $\leq 6m$ ) 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  
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**FTL80-abcdefghijklmnpq. Liquiphant FailSafe Level Switch**  
**FTL81-abcdefghijklmnpq. Liquiphant FailSafe Level Switch or**  
**FTL85-abcdefghijklmnpq. 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,  $Ra < 0,3\mu m/12\mu in$   
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,  $Ra < 0,3\mu m/12\mu in$ , AlloyC or 316L or YY=Special version, with different individual length ( $\leq 6m$ ) 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.

## 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 EC-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 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.

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## 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
7 <sup>th</sup> June 2012	Original Issue.
29 <sup>th</sup> April 2013	<u>Supplement 1:</u> Report Reference –3048191 dated 15 <sup>th</sup> April 2013 Description of the Change – <ol style="list-style-type: none"><li>1. minor component changes to non-safety critical circuits for performance and functional issues,</li><li>2. addition of test certificates to the order code for in-process production tests</li><li>3. correction of typographical errors in the order code listings.</li><li>4. Updated the EN60079-0 from 2009 to 2012</li><li>5. added EN60529 which was mistakenly omitted.</li></ol>

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