Technical
Information
TI 282F/00/en

Level Limit Switch
liquiphant FTL 330 H

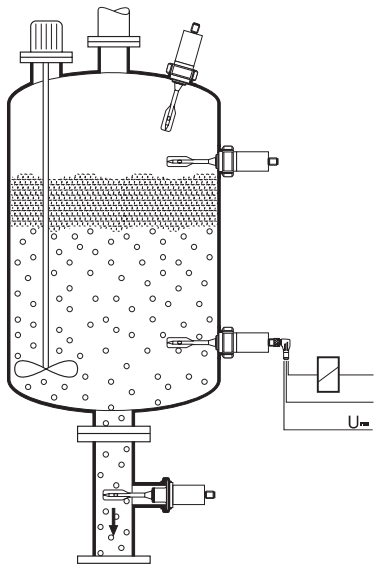
Vibration limit switch for liquid foodstuffs and pharmaceuticals Compact design with welded housing in stainless steel

Application
The Liquiphant is a limit switch for liquids in storage tanks, agitators and piping where especially high standards in hygiene are demanded both internally and externally.

It can also be used in systems where other measuring principles cannot be used:
e.g. for pastes, build-up, turbulence, liquid flow, gas bubbles and rapid temperature variations when cleaning.

Features and Benefits
- Stainless steel housing, welded, with M 12x1 round plug connector, ingress protection IP 66/68: always water-tight even when submerged for many hours or after intensive cleaning
- Small slender design: low space requirement, easy mounting in places with limited access
- Large selection of process connections: easy to install in existing plants
- Switching status and external testing: simple control

Measuring system
The Liquiphant FTL 330 H compact limit switch: programmable logic controllers (PLC), contactors or magnetic valves can be directly connected



Endress+Hauser
The Power of Know How

Function
Dimensions
Product Structure
Connection

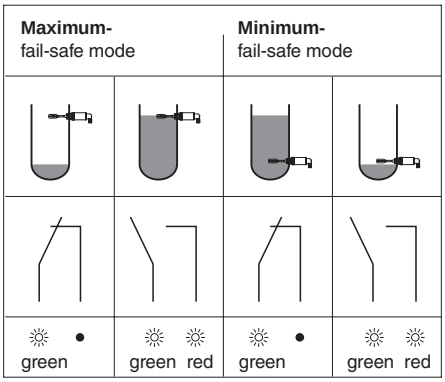


Diagram showing function of the switching transistor and LEDs

The symmetrical vibrating fork is excited to its resonance frequency which changes when the fork is submerged in liquid. The change is registered by the electronics, which actuate an electronic switch at the PNP output.

The Liquiphant FTL 330 H can be operated in both minimum and fail-safe mode, i.e. the switching transistor blocks on reaching the limit value, in cases of fault or a loss of power.

a) Electrical connection with M 12x1 round plug connection (IP 66/68).

b) Welded housing in stainless steel

c) A magnet (directly on the housing) enables the switching function to be checked from outside the unit

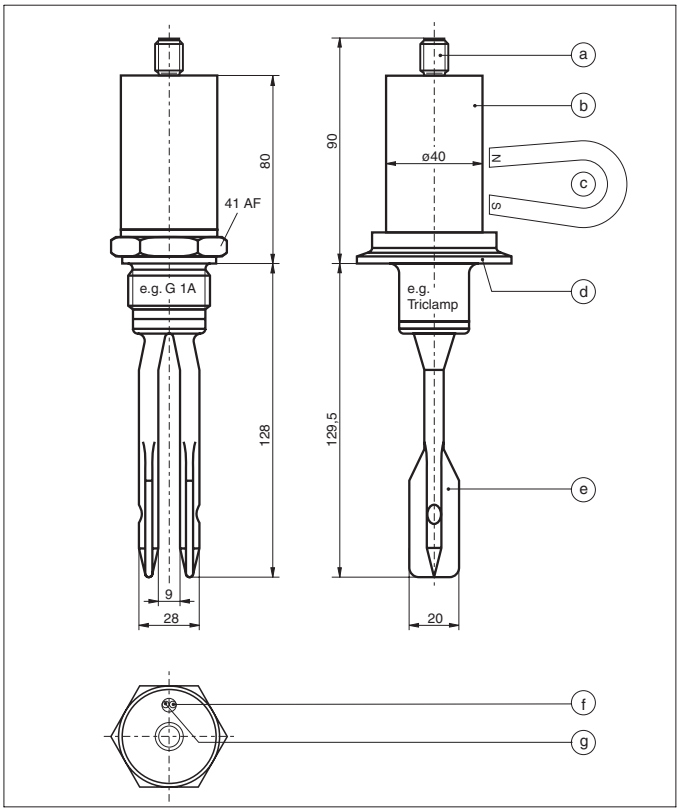
d) Process connection versions, all in stainless steel
see Page 3

e) Vibrating fork in solid stainless steel

f) Red LED to indicate switching "circuit open"

g) Green LED "stand-by"

100 mm = 3.94 in



FTL 330 H **Level limit switch** Product Structure

Certificate **Weigth**

R Standard

Process Connection

1	Threaded boss 1 - 11½ NPT (tapered)	0,23 kg
G	Threaded boss G 1 A (parallel)*	0,23 kg
F	Flush-mounted for weld-in adapter*	0,50 kg
U	Tri-clamp 1½"	0,22 kg
T	Tri-clamp 2"	0,31 kg
M	Sanitary thread DN 50	0,73 kg

* see accessories

Sensor Surface

A Standard finish (with process connection 1, G only)
B Polished, surface finish < 1.5 µm
S Highly polished, surface finish < 0.5 µm (with process connections F, U, T, M only)

Electronics

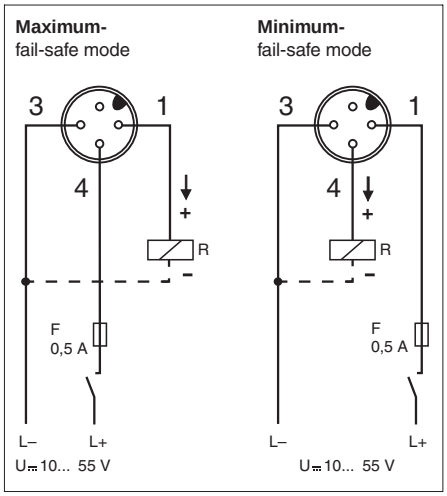
2 Three-wire DC connection (PNP) 10 ... 55 V Switching delay 0.5 / 1.0 s
3 Three-wire DC connection (PNP) 10 ... 55 V Switching delay 0.5 / 0.5 s

Version

0 Standard
9 Others

FTL 330 H- [ ][ ][ ][ ][ ][ ] Full product designation

1 kg = 2.2 lbs



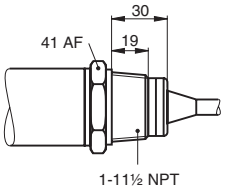
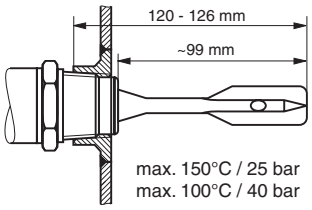
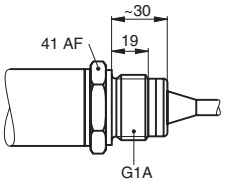
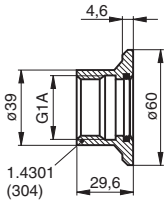
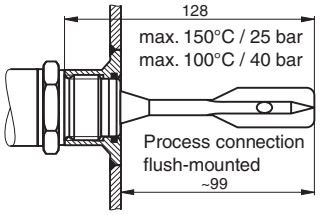
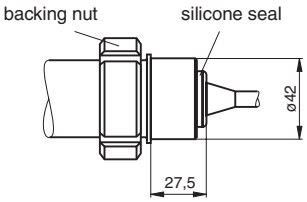
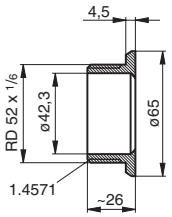
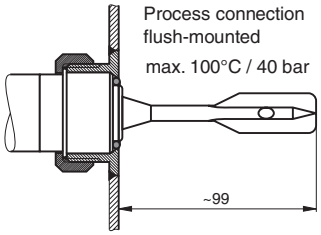
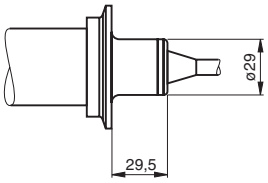
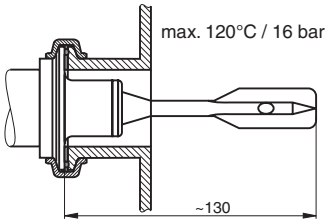
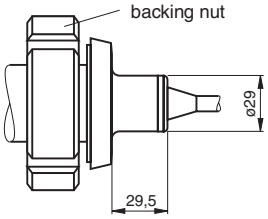
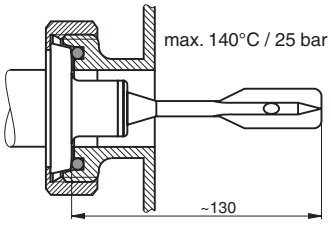
Electrical connection depending on fail-safe mode

Seen on the pins of the round plug connector

R = external load, e.g. PLC or contactor

No ground connection; protection with indirect contact according to EN 60204-1 and EN 61010-1 ⧈

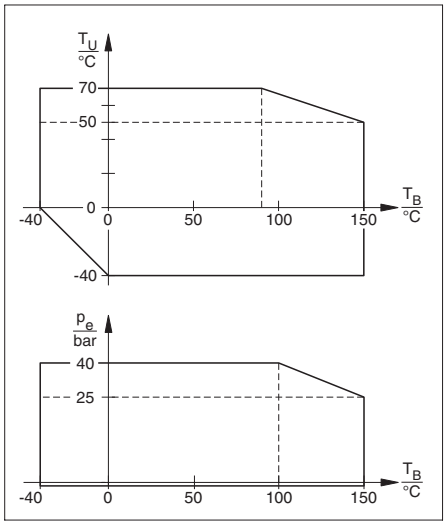
Process Connections, Specifications

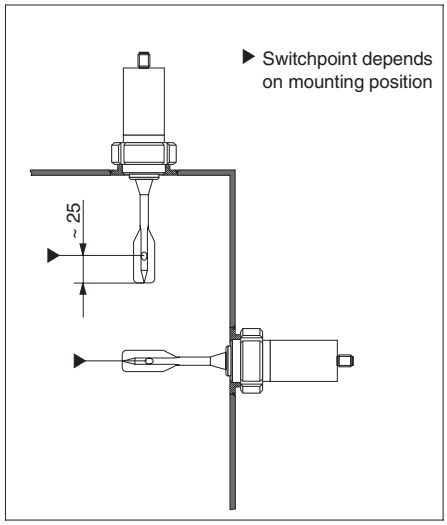
Version	Scope of supply	Mounting accessories	Final assembly
Process connection 1 **= 1 - 11½ NPT**		**Weld-in socket** with tapered internal thread 1 - 11½ NPT - supplied by customer -	
Process connection G **= G 1 A** a) Mounting accessories: Weld-in socket (without fork orientation) with FPM O-ring (Viton) Order No. 917969-1000		a) 	
Process connection F **= flush-mounted connection** **E+H** b) Mounting accessories: Weld-in adapter (fork orientation variable) Order No. 942329-0001		b) 	
Process connection U **= Tri-clamp 1½ "** **Process connection T** **= Tri-clamp 2 "**		**Tension ring** (clamp) and **front seal** -supplied by customer-	
Process connection M **= sanitary thread DN 50**		**Sealing ring** with collar -supplied by customer-	

The specified limits for temperature and pressure apply in each case to the limit switch with special process connection
Also note the limits for the seal and clamping ring used!

100 mm = 3.94 in, x°C = (1.8x + 32)°F, 1 bar = 14.5 psi, 1.4571 = AISI 316 Ti

Technical Data





Top graph:
Limit values for ambient temperature T_U at housing are dependent on the operating temperature T_B in the tank

x°C = (1.8x + 32)°F

Bottom graph:
Limit values for operating pressure p_e are dependent on the operating temperature T_B in the tank.
See also process connections, specifications

1 bar = 14.5 psi

Technical Data

Output

Power supply	DC voltage 10 ... 55 V, ripple max. 1.7 V, 0 ... 400 Hz, current consumption max. 15 mA, reverse polarity protection
Connectable load (load switched via PNP transistor)	Short-term (1 s) max. 1 A, max. 55 V (cyclical overload and short-circuit protection) continuous max. 350 mA max. 0.5 µF at 55 V, max. 1.0 µF at 24 V Residual voltage < 3 V (with closed transistor) Residual current < 100 µA (with open transistor)
Fail-safe mode	Minimum- or Maximum fail-safe, depending on load connection
Signal failure	Output open
Switching time	Approx. 0.5 s when covered, approx. 1.0 s when free or Approx. 0.5 s when covered, approx. 0.5 s when free
Hysteresis	Approx. 4 mm with vertical mounting

Process conditions

Orientation	As required
Ambient temperature	–40°C ... + 70°C (–40°F … +160°F), see also graphs on Page 3
Temperature of product	–40°C ... +150°C (–40°F … +300°F), see also graphs on Page 3
Operating pressure p_e	–1 bar ... +40 bar (–14.5 psi … +580 psi), see also graphs on Page 3
Storage temperature	–40°C ... + 85°C (–40°F … +185°F)
Climatic protection	Climatic protection to IEC 68, Part 2-38, Fig. 2a
Ingress protection	IP 66/68 (24 h, 1.5 m) to EN 60529 (when using the appropriate plug!)
Electromagnetic compatibility	Interference Emission to EN 61326, Electrical Equipment Class B Interference Immunity to EN 61326, Annex A (Industrial) and NAMUR Recommendation NE 21 (EMC)
Density ρ of product	min. 0.7 g/cm^3
Viscosity ν of product	up to 10000 mm^2/s (up to 10000 cSt)

Mechanical construction

Design	Compact unit
Dimensions	see dimensional sketch on Page 2 and process connections on Page 3
Materials	Process connection and vibrating fork: stainless steel 1.4571 (AISI 316 Ti) Housing: stainless steel 1.4404 (AISI 316 L), completely welded Round plug connector: 1.4571 (AISI 316 Ti) Sight glass for LEDs: glass
Process connections	– Tapered thread 1 - 11½ NPT to ANSI 1.20.1 – Parallel thread G 1 A to DIN ISO 228/I with flat seal 33x39 to DIN 7603 – Flush-mounted version for weld-in adapter to Endress+Hauser in-house standards – Tri-clamp 1½ “, 2" to ISO 2852 – Sanitary thread DN 50 to DIN 11851
Electrical connection	M 12x1 round plug connector, 4-pole (without ground connection) □

Ordering

Product structure	See product structure on Page 2
Accessories	– Weld-in socket without fork orientation for process connection G: Order No. 917 969-1000 – Weld-in adapter with fork orientation for process connection F: Order No. 942 329-0001 – Socket spanner 41 AF for process connection G: Order No. 942 667-0000 – Test magnet: Order No. 016 920-0000 – Plug with cable: – e.g. from Binder: Series 763 – from Lumberg: RKT, RKWT – from Amphenol: C 164 P compact
Supplementary documentation	System Information “Vibration” SI 007F/00/en

Endress+Hauser
GmbH+Co. KG
Instruments International
P.O. Box 2222
D-79574 Weil am Rhein
Germany

Tel. (0 76 21) 9 75-02
Fax (0 76 21) 9 75-3 45
http://www.endress.com
info@ii.endress.com

Endress+Hauser
The Power of Know How

05.02/PT1

TI 282F/00/en/02.04
SL/CV5