Document Title: Operating & Maintenance Manuals

Document Number: 25472-101-V1A-JL10-Z0008

Revision Number: 01

PO Number: 4500257847

Material Requisition Number: KXL1399-CH2M-I-MR-0001

Tag Nos. : 125-BDLSS-B0-LSHH-0302, 126-FXVLY-B0-LSHH-0302

Endress+Hauser
People for Process Automation

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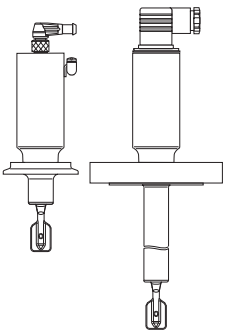
Rev No.	Rev Date yyyy-mm-dd	Reason for Issue	Contractor Originator	Contractor Reviewer	Contractor Approver
01	2019-06-17	Issued For Information	A. Patil	A. Patil	C. Penney

CODE 1: Work may proceed.

TransCanada ch2m

Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods or materials developed or selected by the supplier and does not relieve the supplier from full compliance with contractual obligations.

Name: kloca Date: 06/25/2019



Operating Instructions
Liquiphant M FTL5x (H)-# ### ## # #3 #

DE- Grenzschalter mit Kompaktgehäuse
EN- Point Level Switch with compact housing
FR - Détecteur de niveau en boîtier compact
ES - Detector de nivel con cabezal compacto
IT - Interruttore di livello con testa compatta
NL- Niveauschakelaar met compacte behuizing

Endress+Hauser
People for Process Automation

DE- Inhalt

en - Contents

FR - Sommaire

Achtung!
= verboten;
führt zu fehlerhaftem Betrieb oder Zerstörung.

Caution!
= forbidden;
leads to incorrect operation or destruction.

Attention!
= interdit; peut provoquer des dysfonctionnements ou la destruction.

ES - Indice

IT - Indice

NL- Inhoud

Atención!
= Prohibido; peligro de mal funcionamiento o de destrucción.

Attenzione!
= Vietato; pericolo di malfunzionamento o di distruzione.

Opgelet!
= verboden; leidt tot foutieve werking of storing.

DE- Sicherheitshinweise

Der Liquiphant M FTL50, FTL51, FTL 50H, FTL51H mit Kompaktgehäuse darf nur als Füllstandgrenzschalter für Flüssigkeiten verwendet werden.
Bei unsachgemäßem Einsatz können Gefahren von ihm ausgehen.
Das Gerät darf **nur von qualifiziertem und autorisiertem Fachpersonal** unter strenger Beachtung dieser Betriebsanleitung, der einschlägigen Normen, der gesetzlichen Vorschriften und der Zertifikate (je nach Anwendung) eingebaut, angeschlossen, in Betrieb genommen und gewartet werden.
In der Gebäudeinstallation ist ein Netzschalter für das Gerät leicht erreichbar in dessen Nähe zu installieren.
Er ist als Trennvorrichtung für das Gerät zu kennzeichnen.

EN- Notes on Safety

The Liquiphant M FTL50, FTL51, FTL50H, FTL51H with compact housing is designed for level limit detection in liquids.
If used incorrectly it is possible that application-related dangers may arise.
The device may be installed, connected, commissioned, operated and maintained **by qualified and authorised personnel only**, under strict observance of these operating instructions, any relevant standards, legal requirements, and, where appropriate, the certificates.
Install an easily accessible power switch in the proximity of the device.
Mark the power switch as a disconnector for the device.

FR- Conseils de sécurité

Le Liquiphant M FTL50, FTL51, FTL50H, FTL51H en boîtier compact doit être exclusivement utilisé comme détecteur de niveau pour liquides.
Il peut être source de danger en cas d'utilisation non conforme aux prescriptions.
L'appareil ne doit être installé, raccordé, mis en service et entretenu **que par un personnel qualifié et autorisé**, qui tiendra compte des indications contenues dans les instructions de service présentes, des normes en vigueur et des certificats disponibles (selon l'application).
Installer un commutateur réseau à proximité immédiate de l'appareil, en veillant à ce qu'il soit facilement accessible.
Repérer ce commutateur comme sectionneur de l'appareil.

ES - Notas sobre seguridad

El detector de nivel Liquiphant M FTL50, FTL51, FTL50H, FTL51H con cabezal compacto sólo debe utilizarse para la detección de límite en fluidos.
Su empleo inapropiado puede resultar peligroso.
El equipo deberá ser montado, conectado, instalado y mantenido **única y exclusivamente por personal cualificado y autorizado**,
bajo rigurosa observación de las presentes instrucciones de servicio, de las normativas y legislaciones vigentes,
así como de los certificados (dependiendo de la aplicación).
Instalar un interruptor de fácil acceso en las proximidades del equipo.
Este interruptor se utilizará para desconectar el equipo.

IT - Note sulla sicurezza

Il Liquiphant M FTL50, FTL51, FTL50H, FTL51H con testa compatta è particolarmente studiato per l'impiego come soglia di livello in liquidi.
Un'installazione non corretta può determinare pericolo.
Lo strumento può essere montato **solamente da personale qualificato ed autorizzato**.
Il montaggio, il collegamento, la messa in esercizio e la manutenzione devono rispettare le presenti istruzioni, le norme vigenti e i certificati (a seconda dell'applicazione).
Installare un interruttore di alimentazione di facile accesso nelle vicinanze dello strumento.
Contrassegnare l'interruttore di alimentazione come interruttore di disattivazione dello strumento.

NL- Veiligheidsinstructies

Gebruik de Liquiphant M FTL50, FTL51, FTL50H, FTL51H met compacte behuizing alleen als niveauschakelaar voor vloeistoffen.
Indien niet correct gebruikt kunnen gevaarlijke situaties ontstaan.
Het instrument **alleen door gekwalificeerd en geautoriseerd personeel** laten inbouwen, aansluiten, in bedrijf nemen en onderhouden.
Neem de instructies in deze Inbedrijfstellingsvoorschriften, de desbetreffende normen, de wettelijke voorschriften en eventuele certificaten in acht.
Installeer een makkelijk bereikbare voedingschakelaar in de nabijheid van het instrument. Kenmerk de voedingschakelaar specifiek voor het instrument.

DE- Geräte-Identifikation
FTL50, FTL51

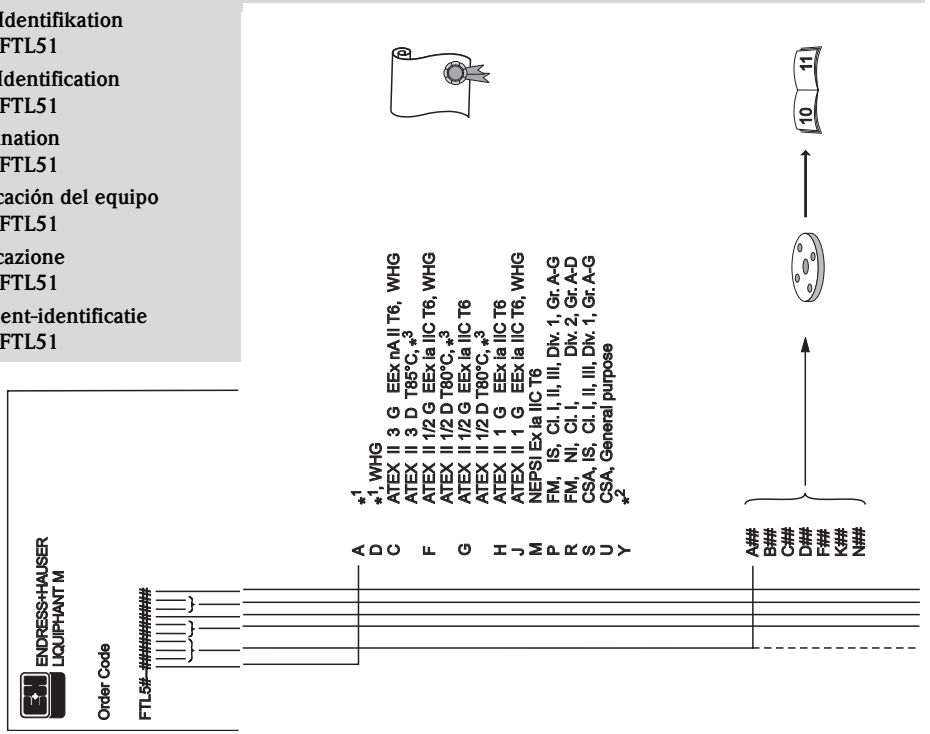
EN- Device Identification
FTL50, FTL51

FR - Dénomination
FTL50, FTL51

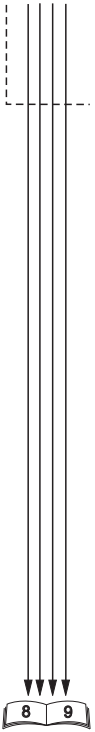
ES - Identificación del equipo
FTL50, FTL51

IT - Identificazione
FTL50, FTL51

NL- Instrument-identificatie
FTL50, FTL51



GE2	R ¾, DIN 2999, 316L	 max. 100 bar, 150 °C
GE5	R ¾, DIN 2999, AlloyC4	
GF2	R 1, DIN 2999, 316L	
GF5	R 1, DIN 2999, AlloyC4	
GM2	NPT ¾, ANSI, 316L	
GM5	NPT ¾, ANSI, AlloyC4	
GN2	NPT 1, ANSI, 316L	
GN5	NPT 1, ANSI, AlloyC4	
GQ2	G ¾, ISO 228, 316L	 max. 100 bar, 150 °C
GQ5	G ¾, ISO 228, AlloyC4	
GR2	G 1, ISO 228, 316L	
GR5	G 1, ISO 228, AlloyC4	
GW2	G 1, ISO 228, 316L	 max. 40 bar, 100 °C max. 25 bar, 150 °C
TC2	DN 25-38 (1...1½"), ISO 2852, 316L Tri-Clamp	 max. 16 bar, 120 °C max. 2 bar, 150 °C
TE2	DN 40-51 (2"), ISO 2852, 316L Tri-Clamp	
YY9	*[2]	



*[1] ohne / without / sans / sin / senza / zonder

*[2] andere / others / autres / otros / altri / andere

*[3] nicht gültig für PBT / not valid for PBT / non valable pour PBT / no es válido para PBT / non valido per PBT / niet geldig voor PBT

ENDRESS+HAUSER
LIQUIPHANT M
Order Code
FTL5# ##########
mm
in
FTL51
L
AA
BB
BE
CB
CE
DB
DE
IA
JB
JE
KB
KE
LB
LE
QA
RB
RE
SB
SE
TB
TE
YY
Ra < 3.2 µm/80 grit (FTL50)
Ra < 3.2 µm/80 grit
Ra < 3.2 µm/80 grit
Ra < 3.2 µm/80 grit
Ra < 3.2 µm/80 grit
Ra < 3.2 µm/80 grit
Ra < 3.2 µm/80 grit
+ "T" (FTL50)
+ "T"
+ "T"
+ "T"
+ "T"
+ "T"
+ "T"
+ "p" (FTL50)
+ "p"
+ "p"
+ "p"
+ "p"
+ "p"
+ "p"
< 3.2 µm (80 grit)
"T"
"p"
(FTL51)
L

32. . . . 47

1	FEL51, 19…253 V AC	
2	FEL52, 10… 55 V DC, PNP	
8	FEL58, NAMUR, H-L	
9	*2	
C3	316L, IP66/68, 5 m	
D3	316L, IP65, Pg11, ISO 4400	
E3	316L, NEMA 4x, NPT ½, ISO 4400	
N3	316L, IP66/68, M12	
Y9	*2	
A	*1	
C	EN 10204-3.1, 316L	
N	EN 10204-3.1, NACE MR0175, 316L	
P	100 bar (FTL51)	
R	100 bar, EN 10204-3.1, NACE MR0175 (FTL51)	
S	GL/ABS marine certificate (FTL51: max. 1600 mm)	
Y	*2	

*1 ohne / without / sans / sin / senza / zonder

*2 andere / others / autres / otros / altri / andere

"L II" Schaltpunkt / Switchpoint / Point de commutation / Punto de conmutación / Punto di commutazione / Schakelpunt

Liquiphant II FTL360/365, FDL30/35

"T" Temperaturdistanzstück / Temperature spacer / Elément de refroidissement / Tramo disipador detemperatura / Distanziale per temperatura / Temperatuurreductiestuk

"p" Druckdichte Durchführung / Pressure sealed bushing / Entrée résistant à la pression / Extensión resistente a la presión / Passacavo a tenutadi pressione / Gasdichte doorvoering

DE- Flansche

EN- Flanges

FR - Brides

ES - Brida

IT - Flangia

NL- Flens

ANSI B 16.5

AA2	1¼", 150 lbs, RF, 316/316L	
AB2	1¼", 300 lbs, RF, 316/316L	(FTL51)
AC2	1½", 150 lbs, RF, 316/316L	
AD2	1½", 300 lbs, RF, 316/316L	(FTL51)
AE2	2", 150 lbs, RF, 316/316L	
AE5	2", 150 lbs, AlloyC4 >316/316L	
AF2	2", 300 lbs, RF, 316/316L	
AG2	2", 600 lbs, RF, 316/316L	(FTL51)
AJ2	2½", 300 lbs, RF, 316/316L	(FTL51)
AL2	3", 150 lbs, RF, 316/316L	
AM2	3", 300 lbs, RF, 316/316L	(FTL51)
AN2	3", 600 lbs, RF, 316/316L	(FTL51)
AP2	4", 150 lbs, RF, 316/316L	
AQ2	4", 300 lbs, RF, 316/316L	(FTL51)
AR2	4", 600 lbs, RF, 316/316L	(FTL51)
A82	1", 150 lbs, RF, 316/316L	

EN 1092-1

BA2	DN32, PN6 A,	316L
BB2	DN32, PN25/40 A,	316L
BC2	DN40, PN6 A,	316L
BD2	DN40, PN25/40 A,	316L
BE2	DN50, PN6 A,	316L
BG2	DN50, PN25/40 A,	316L
BH2	DN65, PN6 A,	316L
BJ2	DN50, PN100 A,	316L (FTL51)
BK2	DN65, PN25/40 A,	316L
BM2	DN80, PN10/16 A,	316L
BN2	DN80, PN25/40 A,	316L
BQ2	DN100, PN10/16 A,	316L
BR2	DN100, PN25/40 A,	316L
B12	DN80, PN100 A,	316L (FTL51)
B82	DN25, PN25/40 A,	316L

CA2	DN32,	PN6 B1,	316L
CA5	DN32,	PN6,	AlloyC4 >316L
CE2	DN50,	PN6 B1,	316L
CE5	DN50,	PN6,	AlloyC4 >316L
CG2	DN50,	PN25/40 B1,	316L
CG5	DN50,	PN25/40,	AlloyC4 >316L
CJ2	DN50,	PN100 B2,	316L (FTL51)
CN2	DN80,	PN25/40 B1,	316L
CN5	DN80,	PN25/40,	AlloyC4 >316L
CQ2	DN100,	PN10/16 B1,	316L
CQ5	DN100,	PN10/16,	AlloyC4 >316L
C12	DN80,	PN100 B2,	316L (FTL51)
C82	DN25,	PN25/40 B1,	316L
C85	DN25,	PN25/40,	AlloyC4 >316L
DG2	DN50,	PN40 B1,	316L
DN2	DN80,	PN40 B1,	316L
D82	DN25,	PN40 B1,	316L
FG2	DN50,	PN40 C,	316L
NG2	DN50,	PN40 D,	316L

JIS B2220

KA2	10K 25,	RF,	316L
KC2	10K 40,	RF,	316L
KE2	10K 50,	RF,	316L
KE5	10K 50,		AlloyC4 >316L
KL2	10K 80,	RF,	316L
KP2	10K 100,	RF,	316L

DE- Geräte-Identifikation
FTL50H, FTL51H

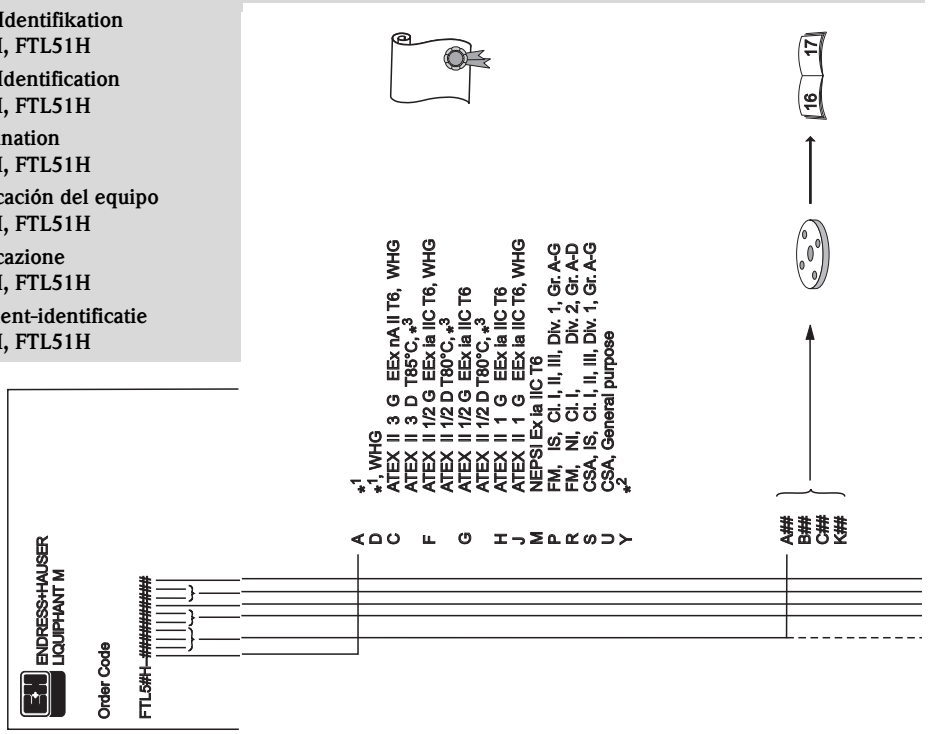
EN- Device Identification
FTL50H, FTL51H

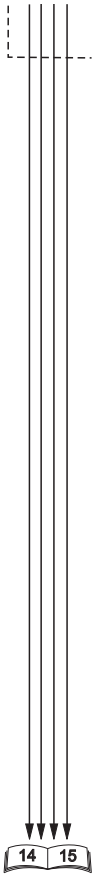
FR- Dénomination
FTL50H, FTL51H

ES - Identificación del equipo
FTL50H, FTL51H

IT - Identificazione
FTL50H, FTL51H

NL- Instrument-identificatie
FTL50H, FTL51H





EE2	1", 316L	max. 40 bar, 100 °C max. 25 bar, 150 °C
GQ2	G ¾, ISO 228, 316L (FTL50H)	max. 100 bar, 150 °C
GW2	G 1, ISO 228, 316L	max. 40 bar, 100 °C max. 25 bar, 150 °C
HE2	DIN 11864-1 A, DN50, 316L	max. 25 bar, 140 °C
MA2	DIN 11851, DN32 PN25, 316L	DN32/40: max. 40 bar, 100 °C DN32/40, DN50: max. 25 bar, 140 °C
MC2	DIN 11851, DN40 PN25, 316L	
ME2	DIN 11851, DN50 PN25, 316L	
PE2	DRD, 65 mm, 316L	max. 40 bar, 100 °C max. 25 bar, 150 °C
TC2	DN25-38 (1...1½"), ISO 2852, 316L Tri-Clamp	max. 16 bar, 120 °C
TE2	DN40-51 (2"), ISO 2852, 316L Tri-Clamp	max. 2 bar, 150 °C
UE2	SMS 2", PN25, 316L	max. 25 bar, 140 °C
WE2	Varivent®, DN65-162 PN10, 316L	max. 64 bar, 150 °C
YY9	*[2]	

*[1] ohne / without / sans / sin / senza / zonder

*[2] andere / others / autres / otros / altri / andere

*[3] nicht gültig für PBT / not valid for PBT / non valable pour PBT / no es válido para PBT / non valido per PBT / niet geldig voor PBT

ENDRESS+HAUSER
LIQUIPHANT M
Order Code
FTL5#H- ##########
mm
in
FTL51H
L
AC *2 Ra < 1.5 µm/120 grit (FTL50H)
AD *2 Ra < 0.3 µm/320 grit 3A (FTL50H)
BC ..... mm, Ra < 1.5 µm/120 grit
BD ..... mm, Ra < 0.3 µm/320 grit 3A
CC ..... in, Ra < 1.5 µm/120 grit
CD ..... in, Ra < 0.3 µm/320 grit 3A
DC "L in", Ra < 1.5 µm/120 grit
DD "L in", Ra < 0.3 µm/320 grit 3A
IC *2 Ra < 1.5 µm/120 grit + "T" (FTL50H)
ID *2 Ra < 0.3 µm/320 grit 3A + "T" (FTL50H)
JC ..... mm, Ra < 1.5 µm/120 grit + "T"
JD ..... mm, Ra < 0.3 µm/320 grit + "T"
KC ..... in, Ra < 1.5 µm/120 grit + "T"
KD ..... in, Ra < 0.3 µm/320 grit + "T"
LC "L in", Ra < 1.5 µm/120 grit + "T"
LD "L in", Ra < 0.3 µm/320 grit + "T"
QC *2 Ra < 1.5 µm/120 grit + "p" (FTL50H)
QD *2 Ra < 0.3 µm/320 grit 3A + "p" (FTL50H)
RC ..... mm, Ra < 1.5 µm/120 grit + "p"
RD ..... mm, Ra < 0.3 µm/320 grit + "p"
SC ..... in, Ra < 1.5 µm/120 grit + "p"
SD ..... in, Ra < 0.3 µm/320 grit + "p"
TC "L in", Ra < 1.5 µm/120 grit + "p"
TD "L in", Ra < 0.3 µm/320 grit + "p"
"T"
"p"
(FTL51H)
L
< 1.5 µm (120 grit)
< 0.3 µm (320 grit)
YY *2

32. . . 47

1	FEL51, 19…253 V AC
2	FEL52, 10… 55 V DC, PNP
8	FEL58, NAMUR, H-L
9	*2

C3	316L, IP66/68, 5 m
D3	316L, IP65, Pg11, ISO 4400
E3	316L, NEMA 4x, NPT ½, ISO 4400
N3	316L, IP66/68, M12
Y9	*2

A	*1
B	EN 10204-3.1, CoC
C	EN 10204-3.1, 316L
S	GL/ABS marine certificate (FTL51H: max. 1600 mm)
Y	*2

*1 ohne / without / sans / sin / senza / zonder

*2 andere / others / autres / otros / altri / andere

"L II" Schaltpunkt / Switchpoint / Point de commutation / Punto de conmutación / Punto di commutazione / Schakelpunt

Liquiphant II FTL360/365, FDL30/35

"T" Temperaturdistanzstück / Temperature spacer / Elément de refroidissement / Tramo disipador detemperatura / Distanziale per temperatura / Temperatuurreductiestuk

"p" Druckdichte Durchführung / Pressure sealed bushing / Entrée résistant à la pression / Extensión resistente a la presión / Passacavo a tenutadi pressione / Gasdichte doorvoering

DE- Prozessanschlüsse

EN- Process connections

FR - Raccords process

ES - Conexiones a proceso

IT - Attacchi al processo

NL- Procesaansluiting

ANSI B 16.5

AA2	1¼",	150 lbs, RF, 316/316L
AC2	1½",	150 lbs, RF, 316/316L
AE2	2",	150 lbs, RF, 316/316L
AF2	2",	300 lbs, RF, 316/316L
AJ2	2½",	300 lbs, RF, 316/316L (FTL51H)
AL2	3",	150 lbs, RF, 316/316L
AM2	3",	300 lbs, RF, 316/316L (FTL51H)
AP2	4",	150 lbs, RF, 316/316L
AQ2	4",	300 lbs, RF, 316/316L (FTL51H)
A82	1",	150 lbs, RF, 316/316L

EN 1092-1

BA2	DN32,	PN6 A,	316L
BB2	DN32,	PN25/40 A,	316L
BC2	DN40,	PN6 A,	316L
BD2	DN40,	PN25/40 A,	316L
BE2	DN50,	PN6 A,	316L
BG2	DN50,	PN25/40 A,	316L
BH2	DN65,	PN6 A,	316L
BK2	DN65,	PN25/40 A,	316L
BM2	DN80,	PN10/16 A,	316L
BN2	DN80,	PN25/40 A,	316L
BQ2	DN100,	PN10/16 A,	316L
BR2	DN100,	PN25/40 A,	316L
B82	DN25,	PN25/40 A,	316L
CG2	DN50,	PN25/40 B1,	316L
CN2	DN80,	PN25/40 B1,	316L
CQ2	DN100,	PN10/16 B1,	316L

JIS B2220

KA2	**10K 25, RF,**	**316L**
KC2	**10K 40, RF,**	**316L**
KE2	**10K 50, RF,**	**316L**
KL2	**10K 80, RF,**	**316L**
KP2	**10K 100, RF,**	**316L**

DE- Behandlung
Am Gehäuse, Flansch oder Verlängerungsrohr anfassen

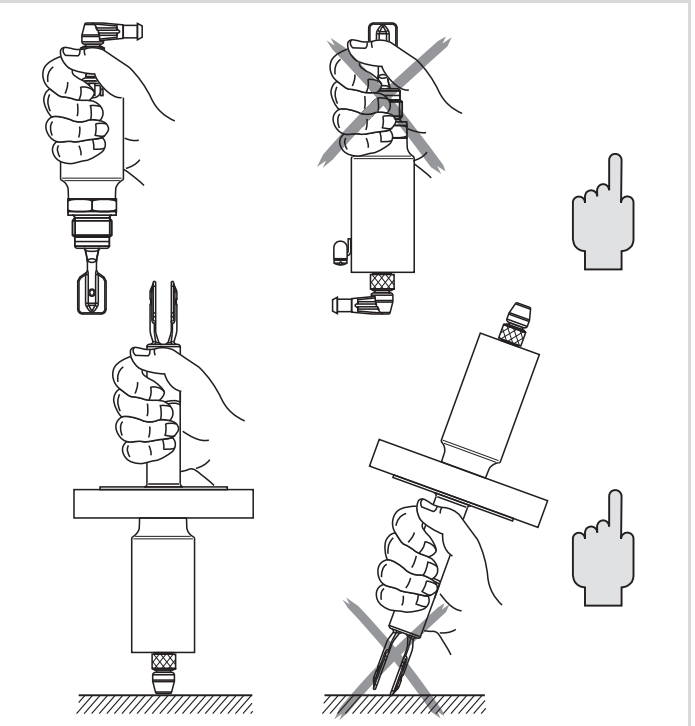
EN- Handling
Hold by housing, flange or extension tube

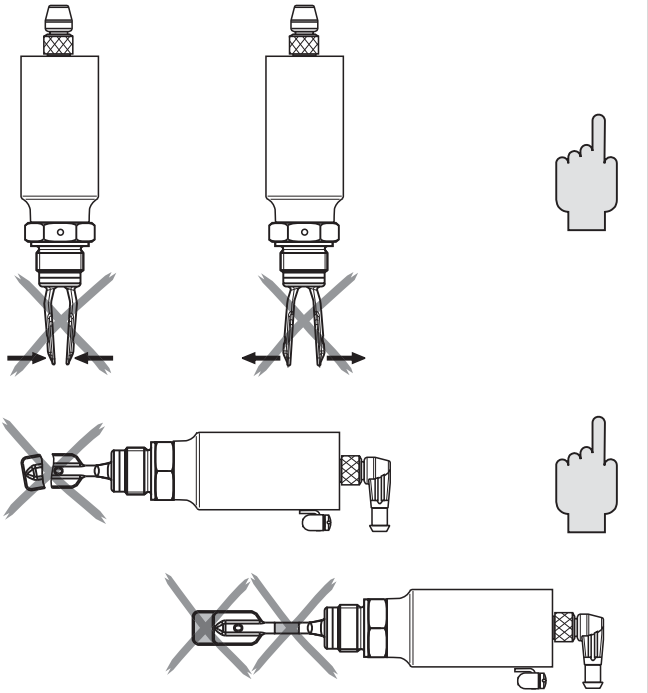
FR- Manipulation
Tenir par le boîtier, la bride ou le tube prolongateur

ES - Modo de empleo
Coger por el cabezal, brida o tubo de extensión

IT - Come maneggiare
Afferrare la custodia, per la flangia o per il tubo di estensione

NL- Behandeling
Vastpakken via behuizing, flens of verlengbuis





DE- **Nicht** verbiegen
Nicht kürzen
Nicht verlängern

EN- Do **not** bend
Do **not** shorten
Do **not** lengthen

FR- **Ne pas** déformer
Ne pas raccourcir
Ne pas rallonger

ES - **No** torcer
No acortar
No alargar

IT - **Non** stringere o allargare
Non accorciare o allungare
Non piegare

NL- **Niet** verbuigen
Niet inkorten
Niet verlengen

DE- Verwendung
Grenzstanddetektion in Flüssigkeiten

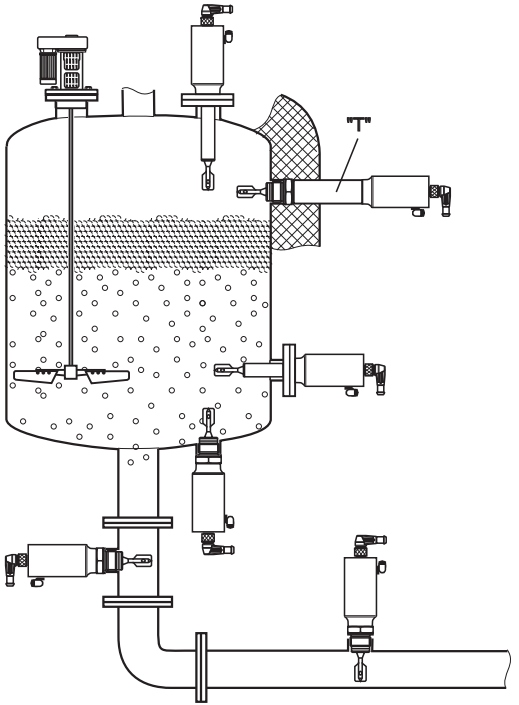
EN- Application
Point level detection in fluids

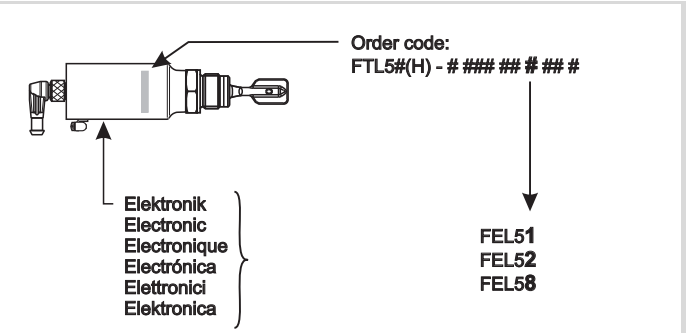
FR- Utilisation
Détection de niveau dans les liquids

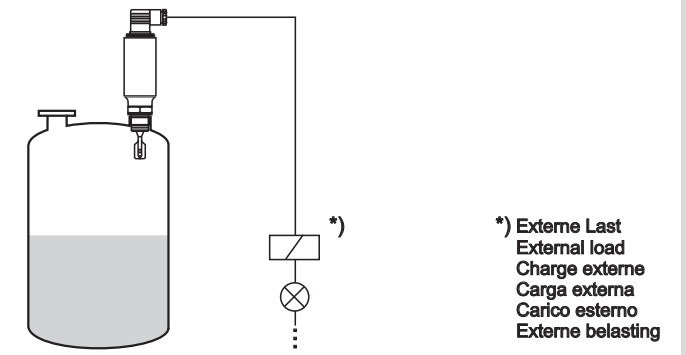
ES - Aplicación
Detección de nivel en líquidos agua

IT - Applicazione
Controllo livello nei liquidi

NL- Toepassing
Niveaudetectie in vloeistoffen







DE- Messeinrichtung
für direkten Anschluss

EN- Measuring system
for direct connection

FR - Ensemble de détection de niveau
pour raccordement direct

ES - Sistema de medida
para conexión directa

IT - Sistema di misura
per connessione diretta

NL- Meetopstelling
voor directe aansluiting

DE- Messeinrichtung
für Anschluss über Schaltgerät

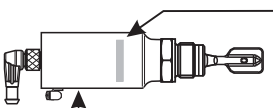
EN- Measuring system
for connection via switching unit

FR- Ensemble de détection de niveau
pour raccordement via détecteur

ES - Sistema de medida
para conexión vía interruptores

IT - Sistema di misura
per connessione mediante unità di commutazione

NL- Meetopstelling
voor aansluiting aan een schakelversterker

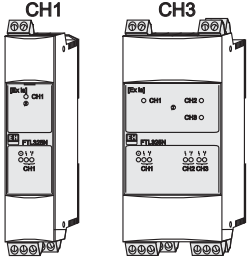


Order code:
FTL5#(H) - # ### ## # ### #

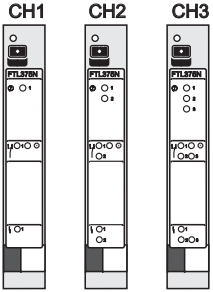
Elektronik
Electronic
Electronique
Electrónica
Elettronici
Elektronica

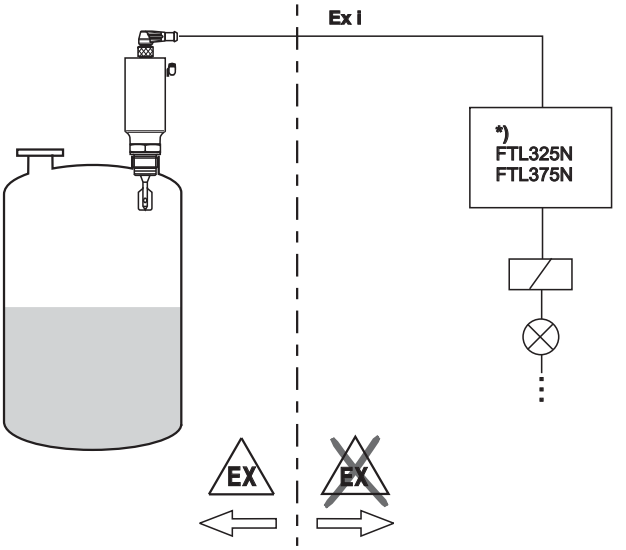
FEL58

FTL325N



FTL375N





*) Schaltgerät, SPS, Trennverstärker
Switching unit, PLC, isolating amplifier
Détecteur, API, convertisseur/séparateur
Interruptor, PLC, amplificador aislado
Unità di commutazione, PLC, barriera di separazione
Schakelversterker, PLC, scheidingsversterker

DE- Einbau
Schaltpunkt in Abhängigkeit vom Einbau

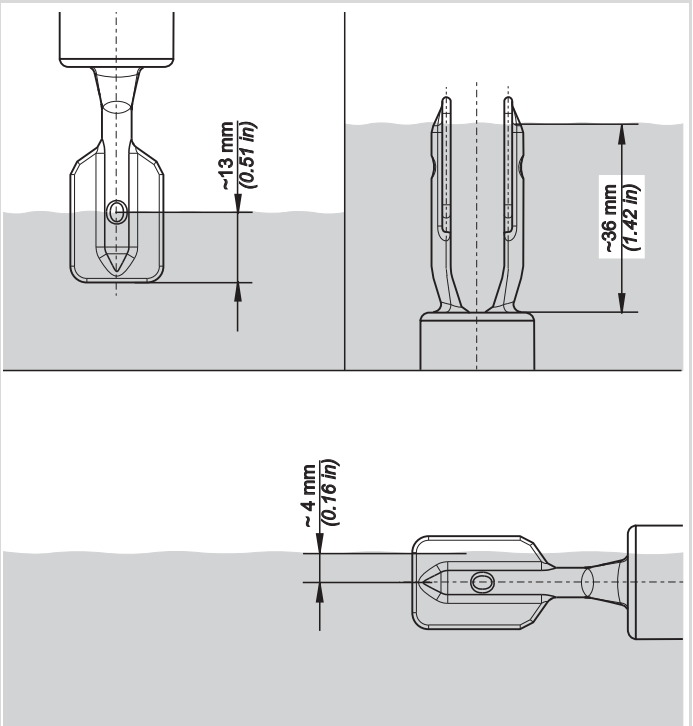
EN- Installation
Switchpoint depends on mounting position

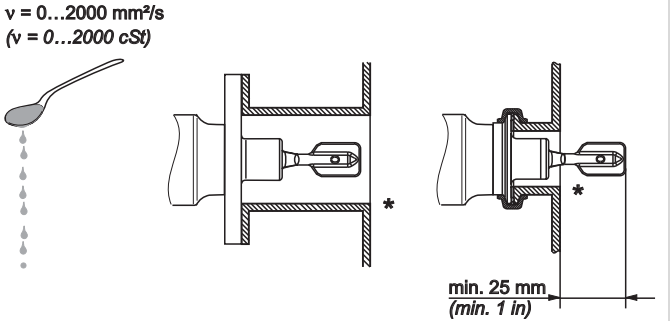
FR- Montage
Point de commutation en fonction de l'implantation

ES - Montaje
Punto de conmutación dependiendo de la posición de montaje

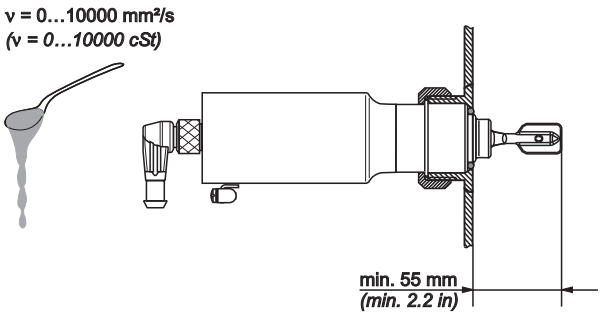
IT - Montaggio
Punto di commutazione in funzione della posizione di montaggio

NL- Inbouw
Schakelpunt afhankelijk van inbouw





* entgraten / deburr / ébarber / libre / sbavare / ontbramen



DE- Einbaubeispiele in Abhängigkeit von der Viskosität ν der Flüssigkeit

EN- Mounting examples as a function of liquid viscosity ν

FR - Exemples d'implantation dépendant de la viscosité ν du liquide

ES - Ejemplos de montaje dependiendo de la viscosidad ν del líquido

IT - Esempi di montaggio come funzione di viscosità ν del liquido

NL- Inbouwvoorbeelden afhankelijk van de viscositeit ν van de vloeistof

DE- Ansatzbildung berücksichtigen. Schwinggabel darf Ansatz nicht berühren

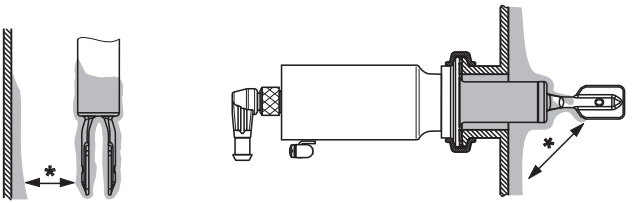
EN- Consider build-up. Fork may not contact the build-up

FR- Tenir compte du colmatage. Fourche ne doit pas entrer en contact avec le dépôt

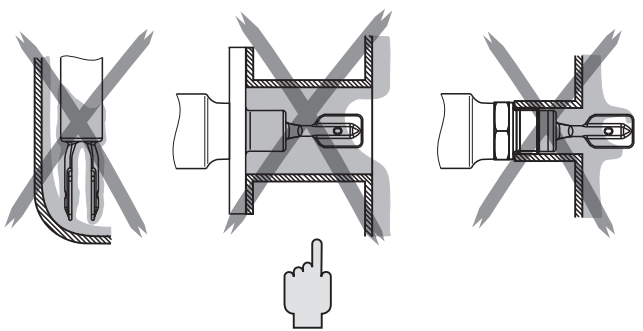
ES - Tener en cuenta las adherencias. Las horquillas no deben estar en contacto con las adherencias

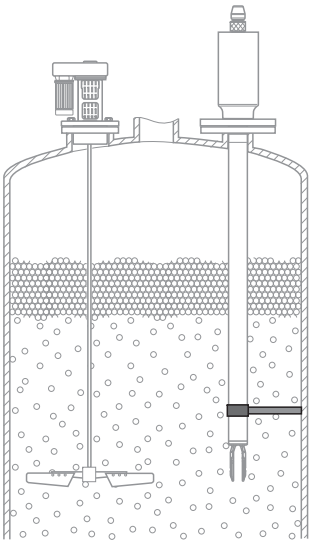
IT - Tenere conto dei depositi. La forcella non deve entrare in contatto con i depositi

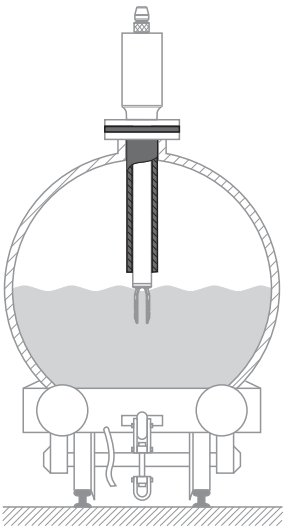
NL- Rekening houden met aangroei. Trilvork mag de aangroei niet aanraken



*** Abstand! / Distance! / Distance! / ¡Distancia! / Distanza! / Afstand!**







DE- Bei dynamischer Belastung abstützen

EN- In cases of dynamic forces support

FR- En cas de contraintes dynamiques, étayer le tube

ES- En caso de cargas dinámicas altas debe ser apoyado

IT - In caso di carichi dinamici, rinforzare con un supporto meccanico

NL- Bij mechanische belasting verstevigen

DE- Freiraum vorsehen

EN- Allow clearance

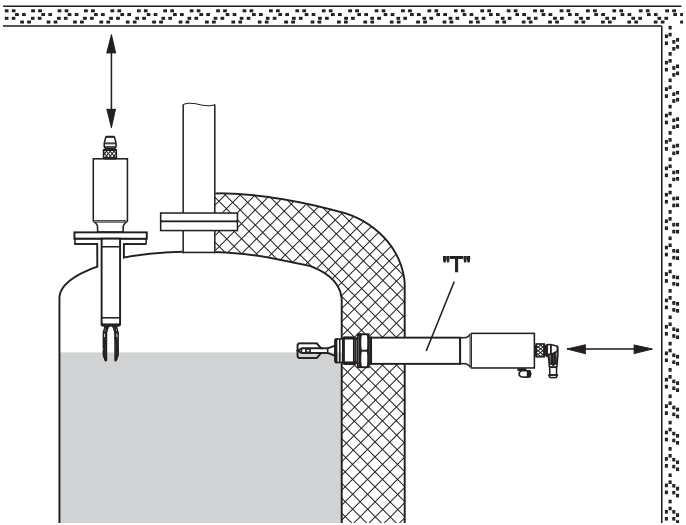
FR - Prévoir un espace libre

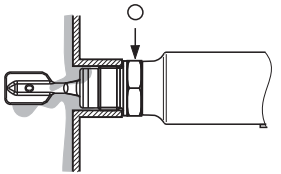
ES - Prever espacio

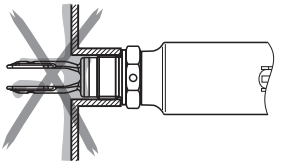
IT - Lasciare spazio per estrazione

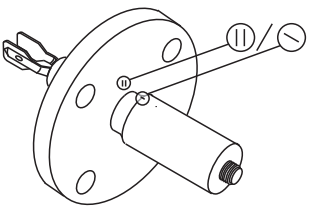
NL- Ruimte vrijhouden

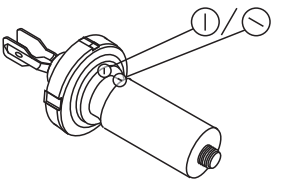
"T" = mit Temperaturdistanzstück für isolierten Tank
"T" = with temperature spacer for insulated tanks
"T" = avec élément de refroidissement pour réservoir isolé
"T" = con tramo disipador de temperatura para tanques aislados
"T" = con distanziale di temperatura per serbatoi isolati
"T" = met temperatuurreductiestuk voor geïsoleerde tanks

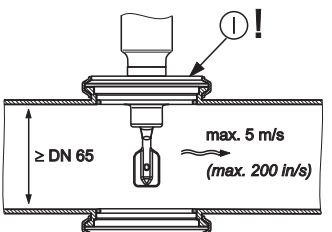


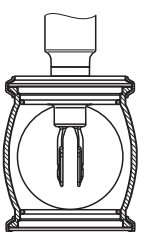












DE- Schwinggabel ausrichten:
Markierung oben oder unten
Ausrichten in Rohrleitungen:
Markierung in Fließrichtung

EN- Orientation of fork tines:
Marking above or below
Orientation in pipes:
Marking in direction of flow

FR - Orientation des lames vibrantes:
Repères en haut ou en bas
Orientation dans une conduite:
Dans le sens de l'écoulement

ES - Orientación de la horquilla:
Marca arriba o abajo
Orientación dentro de tuberías:
Marca en dirección del caudal

IT - Allineamento della forcella:
Marcatura in alto o in basso
Allineamento in tubazioni:
Nella direzione del flusso

NL- Vork uitrichten:
Markering boven of onder
Opstelling in leidingen:
stroomrichting

DE- Liquiphant einschrauben.
Nicht am Gehäuse drehen.

EN- Screw Liquiphant into process connection.
Don't use housing to turn.

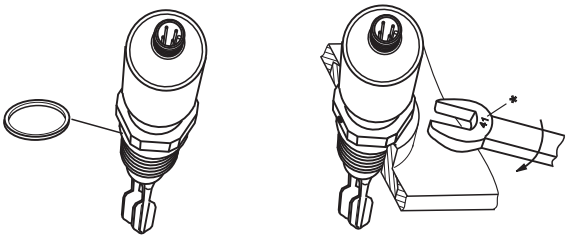
FR- Visser le Liquiphant.
Ne pas se servir du boîtier.

ES - Roscar el Liquiphant a la conexión a proceso.
No girar el cabezal.

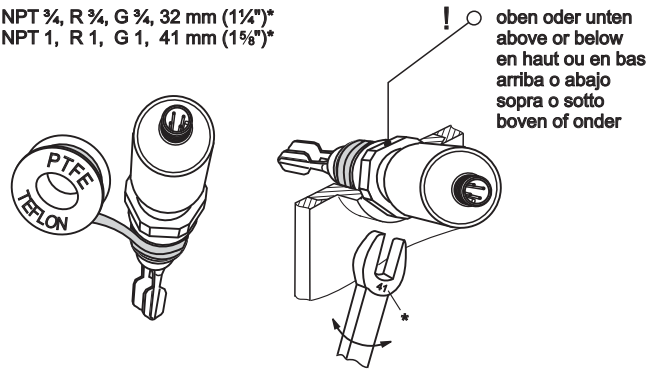
IT - Avvitare il Liquiphant all'attacco di processo.
Allo scopo **non** utilizzare la custodia.

NL- Schroef de Liquiphant in de procesaansluiting.
Draai hierbij **niet** aan de behuizing.

G ¾, 32 mm (1¼")*
G 1, 41 mm (1 5/8")*



NPT ¾, R ¾, G ¾, 32 mm (1¼")*
NPT 1, R 1, G 1, 41 mm (1 5/8")*



de - Nummer = Farbe
en - Number = Colour
fr - Numéro = Couleur
es - Número = Color
it - Numero = Colore
nl - Nummer = Kleur

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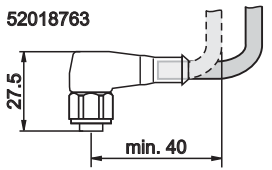
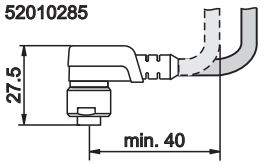


1 = BN
2 = WT
3 = BU
4 = BK

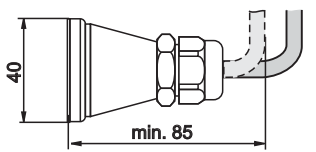
FTL5#(H) #######N3# (M12x1)

52010285



1 = BN
2 = WT
3 = BU
4 = BK

FTL5#(H) - #######C3#



1 = BU
2 = BK
3 = BN
4 = GNYE

DE- Anschluss
Abmessungen in mm

EN- Connections
Dimensions in mm

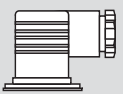
FR - Raccordement
Dimensions en mm

ES - Conexiones
Dimensiones en mm

IT - Collegamenti elettrici
Dimensioni in mm

NL- Aansluiting
Afmetingen in mm

FTL5#(H)-#######D3# (PG11)
FTL5#(H)-#######E3# (NPT1/2")



-30°C ≤ TA ≤ +70°C

100 mm = 3. 94 in

DE- Anschluss M12x1
FEL52 DC-PNP

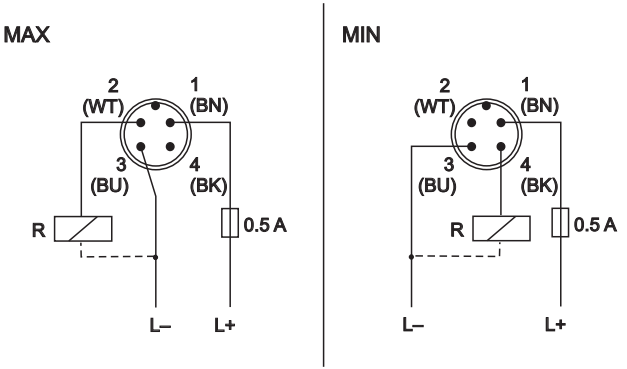
EN- Connections M12x1
FEL52 DC-PNP

FR - Raccordement M12x1
FEL52 DC-PNP

ES - Conexiones M12x1
FEL52 DC-PNP

IT - Collegamenti elettrici M12x1
FEL52 DC-PNP

NL- Aansluiting M12x1
FEL52 DC-PNP



R = externe Last / external load / charge externe / carga exterior / carico esterno / externe belasting

Imax. 350 mA
U = 10...55 V

Speisegerät mit galvanischer Trennung, z.B. nach EN 61558-1

Power supply with galvanic isolation acc. to e.g. EN 61558-1

Alimentation avec séparation galvanique, par ex. selon EN 61558-1

Fuente de alimentación con aislamiento galvanico de acuerdo con el ejemplo EN 61558-1

Alimentazione con isolamento galvanico in accordo a EN 61558-1

Voedingsunit met galvanische scheiding, bijv. conform EN 61558-1

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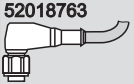

FTL5#(H)-#######N3# (M12x1)

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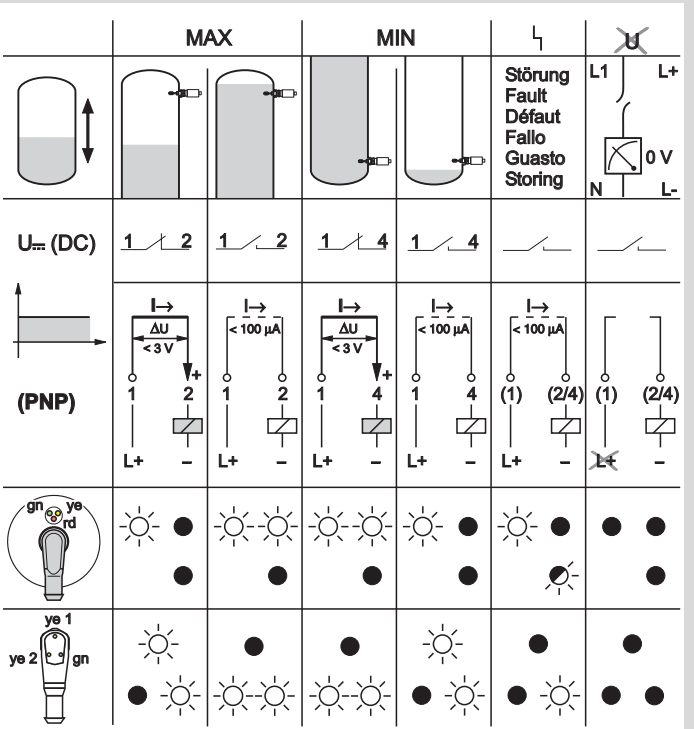
FTL5#(H)-#######N3# (M12x1)



DE- Funktion
FEL52 DC-PNP

EN- Function
FEL52 DC-PNP

FR - Fonction
FEL52 DC-PNP

ES - Funcionamiento
FEL52 DC-PNP

IT - Funzione
FEL52 DC-PNP

NL- Functie
FEL52 DC-PNP

leuchtet / lights up / allumé / iluminado / acceso / aan

blinkt / flashes / clignote / parpadea / lampeggia / knippert

aus / off / éteint / apagado / spento / uit

DE- Anschluss M12x1
FEL58 NAMUR

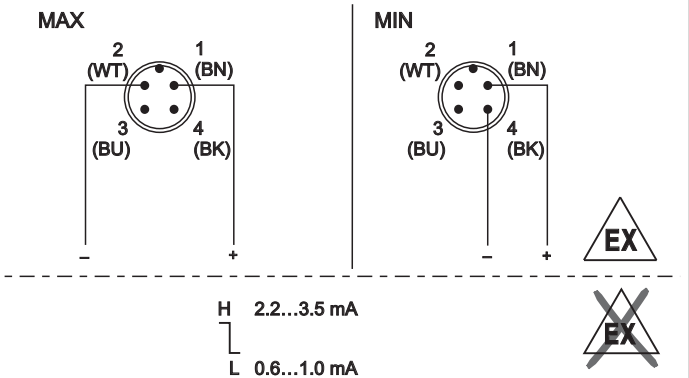
EN- Connections M12x1
FEL58 NAMUR

FR - Raccordement M12x1
FEL58 NAMUR

ES - Conexiones M12x1
FEL58 NAMUR

IT - Collegamenti elettrici M12x1
FEL58 NAMUR

NL- Aansluiting M12x1
FEL58 NAMUR



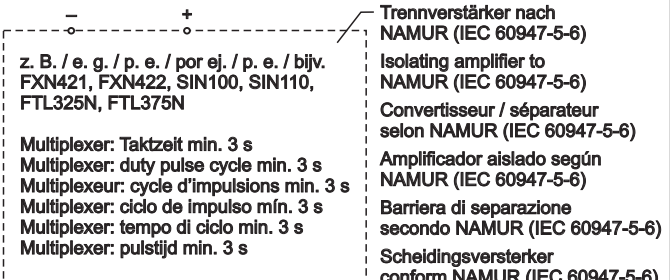
Power supply
DC: 8.2 V +/- 20%

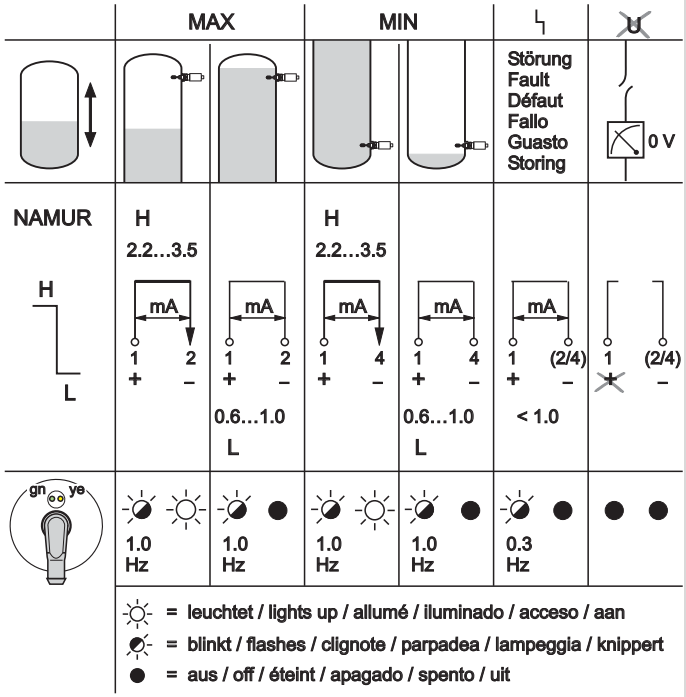
~~52018763~~

~~FTL5#(H)-#######N3#~~ (M12x1)

52010285

FTL5#(H)-#######N3# (M12x1)





DE- Funktion
FEL58 NAMUR

EN- Function
FEL58 NAMUR

FR - Fonction
FEL58 NAMUR

ES - Funcionamiento
FEL58 NAMUR

IT - Funzione
FEL58 NAMUR

NL- Functie
FEL58 NAMUR

DE- Anschluss Ventilstecker
FEL51 AC

EN- Connection valve plug
FEL51 AC

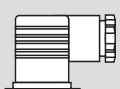
FR - Raccordement connecteur EV
FEL51 AC

ES - Terminal de conexiones
FEL51 AC

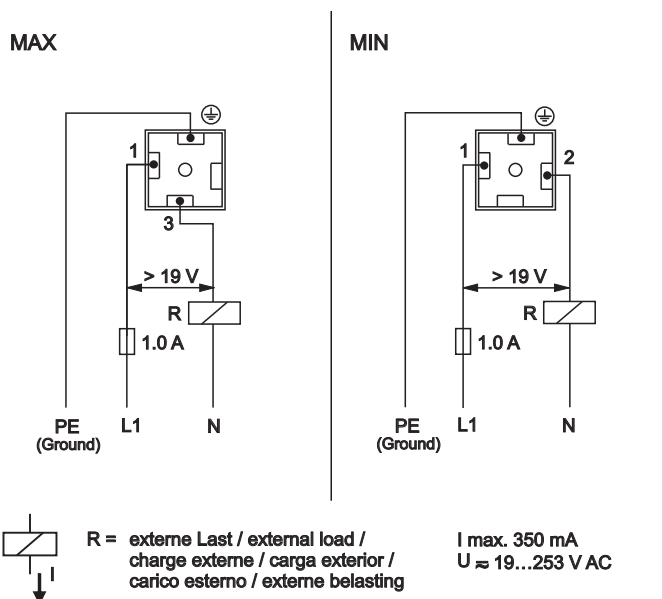
IT - Collegamento connettore valvola
FEL51 AC

NL- Connector aansluiting
FEL51 AC

FTL5#(H)-#######D3# (PG11)
FTL5#(H)-#######E3# (NPT1/2")



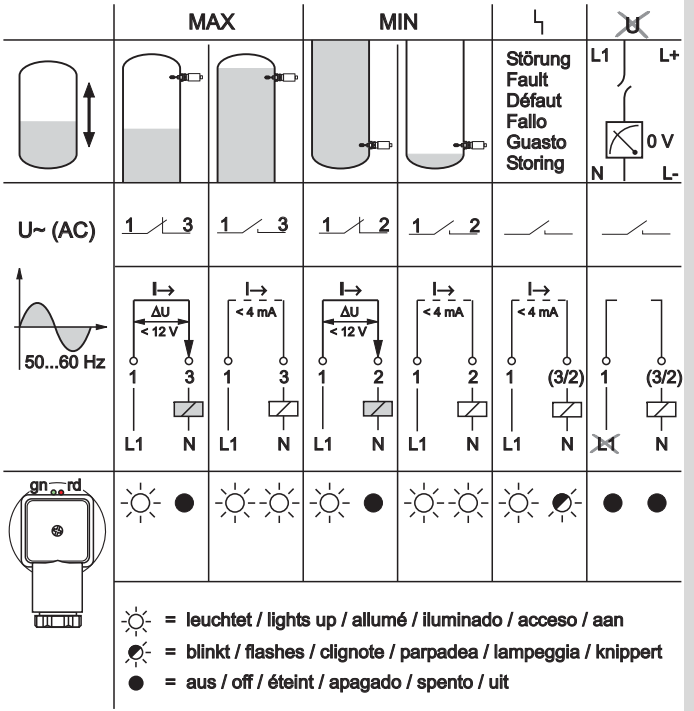
-30°C ≤ TA ≤ +70°C



R = externe Last / external load /
charge externe / carga exterior /
carico esterno / externe belasting

I max. 350 mA
U ≈ 19...253 V AC

min. 2.5 VA / 253 V (10 mA)
min. 0.5 VA / 24 V (20 mA)



DE- Funktion
FEL51 AC

EN- Function
FEL51 AC

FR - Fonction
FEL51 AC

ES - Funcionamiento
FEL51 AC

IT - Funzione
FEL51 AC

NL- Functie
FEL51 AC

DE- Anschluss Ventilstecker
FEL52 DC-PNP

EN- Connection valve plug
FEL52 DC-PNP

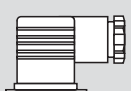
FR - Raccordement connecteur EV
FEL52 DC-PNP

ES - Terminal de conexiones
FEL52 DC-PNP

IT - Collegamento connettore valvola
FEL52 DC-PNP

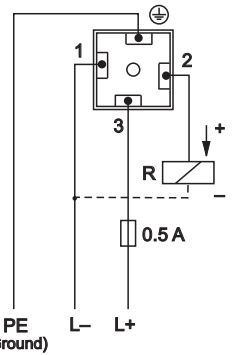
NL- Connector aansluiting
FEL52 DC-PNP

FTL5#(H)-#######D3# (PG11)
FTL5#(H)-#######E3# (NPT1/2")

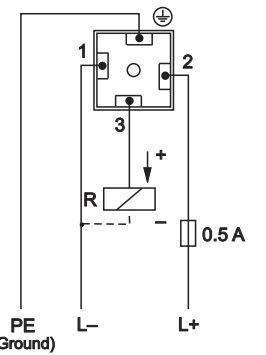


-30°C ≤ TA ≤ +70°C

MAX

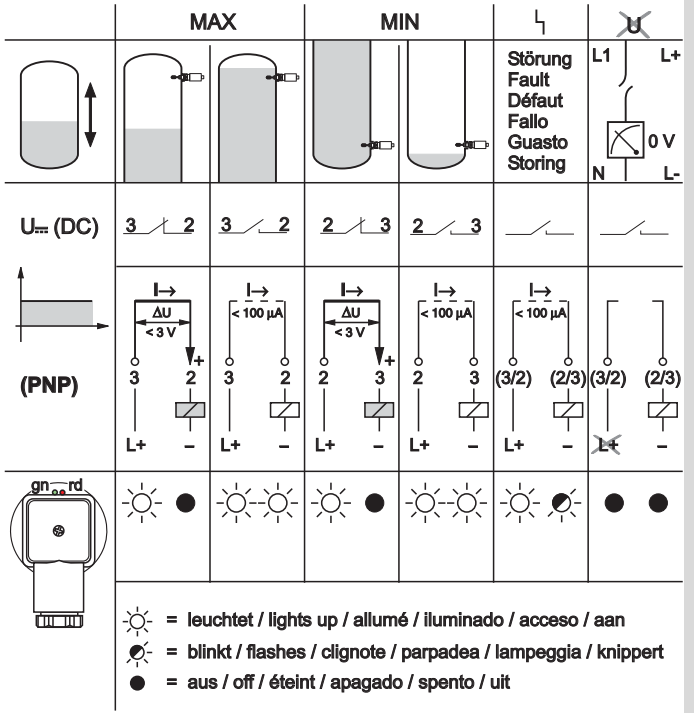


MIN



R = externe Last / external load / charge externe / carga exterior / carico esterno / externe belasting

Imax. 350 mA
U = 10...55 V



DE- Funktion
FEL52 DC-PNP

EN- Function
FEL52 DC-PNP

FR - Fonction
FEL52 DC-PNP

ES - Funcionamiento
FEL52 DC-PNP

IT - Funzione
FEL52 DC-PNP

NL- Functie
FEL52 DC-PNP

DE- Anschluss Ventilstecker
FEL58 NAMUR

EN- Connection valve plug
FEL58 NAMUR

FR- Raccordement connecteur EV
FEL58 NAMUR

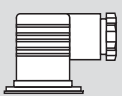
ES- Terminal de conexiones
FEL58 NAMUR

IT - Collegamento connettore valvola
FEL58 NAMUR

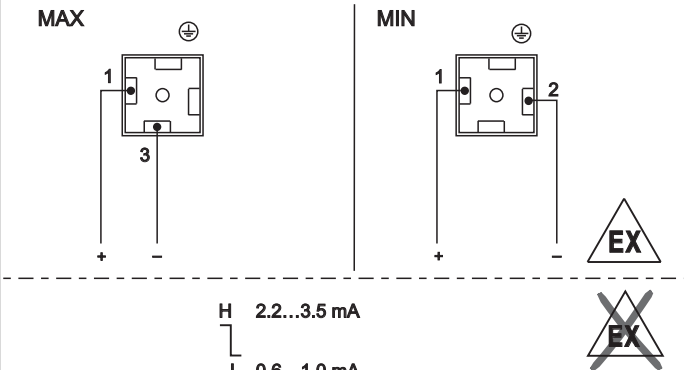
NL- Connector aansluiting
FEL58 NAMUR

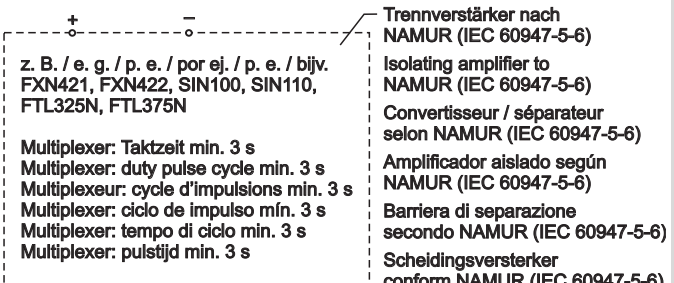
Power supply
DC: 8.2 V +/- 20%

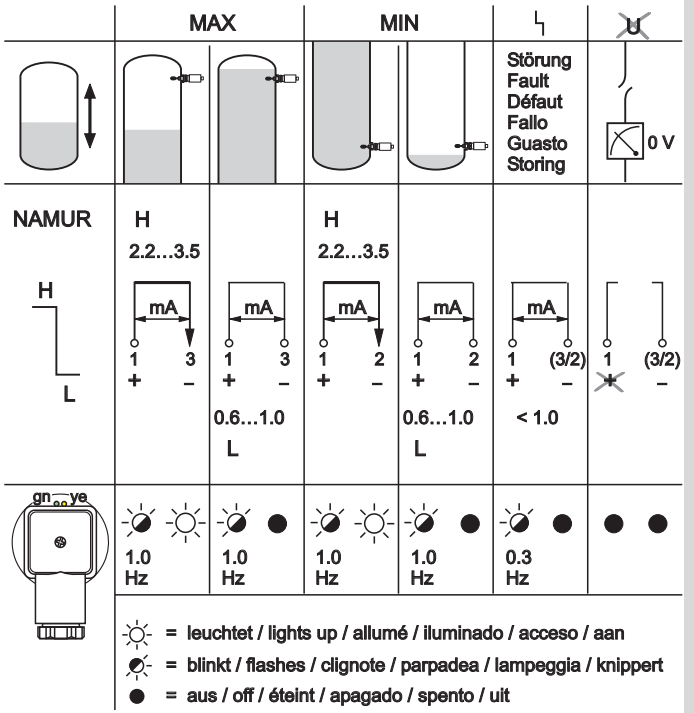
FTL5#(H)-#######D3# (PG11)
FTL5#(H)-#######E3# (NPT1/2")



-30°C ≤ TA ≤ +70°C







DE- Funktion
FEL58 NAMUR

EN- Function
FEL58 NAMUR

FR - Fonction
FEL58 NAMUR

ES - Funcionamiento
FEL58 NAMUR

IT - Funzione
FEL58 NAMUR

NL- Functie
FEL58 NAMUR

DE- Anschluss Kabelschwanz
FEL51 AC

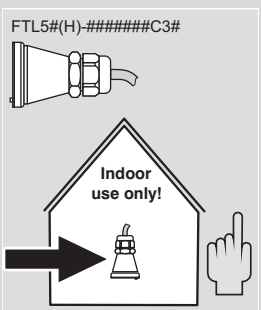
EN- Connection
unconnected cable end
FEL51 AC

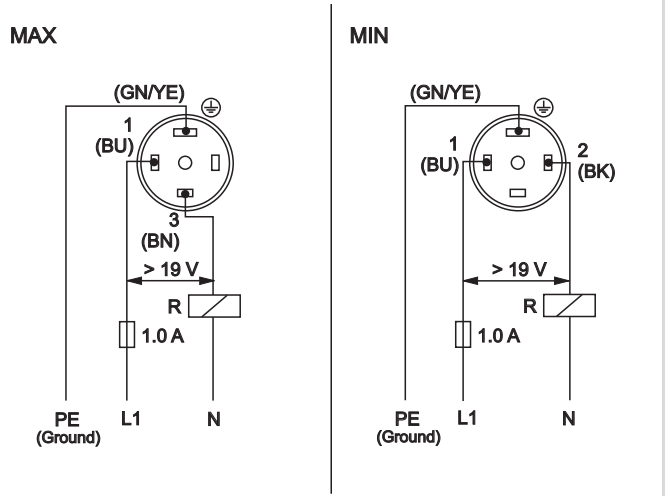
FR- Raccordement extrémité de câble
FEL51 AC

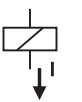
ES - Conexión del cable integrado
FEL51 AC

IT - Collegamento
cavo senza connettore
FEL51 AC

NL- Kabel/wartel aansluiting
FEL51 AC



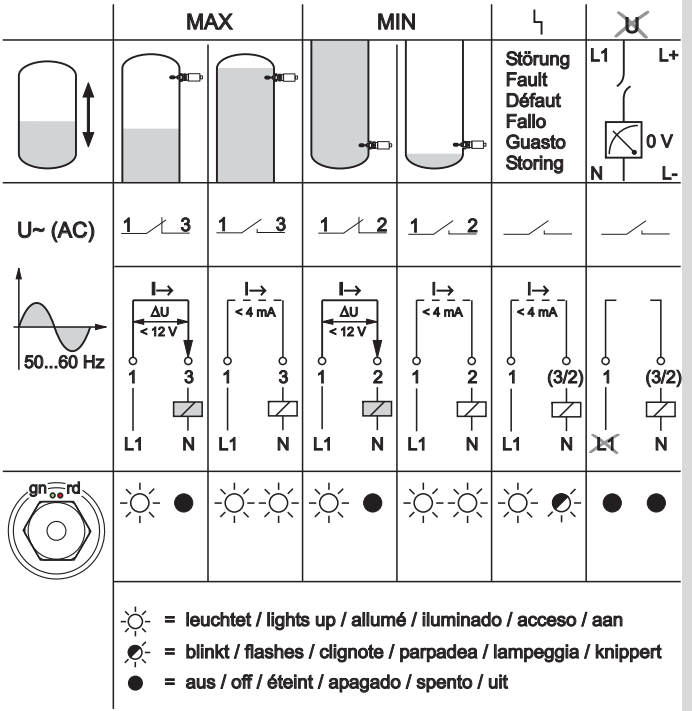




R = externe Last / external load /
charge externe / carga exterior /
carico esterno / externe belasting

Imax. 350 mA
U ≈ 19...253 V AC

min. 2.5 VA / 253 V (10 mA)
min. 0.5 VA / 24 V (20 mA)



DE- Funktion
FEL51 AC

EN- Function
FEL51 AC

FR - Fonction
FEL51 AC

ES - Funcionamiento
FEL51 AC

IT - Funzione
FEL51 AC

NL- Functie
FEL51 AC

DE- Anschluss Kabelschwanz
FEL52 DC-PNP

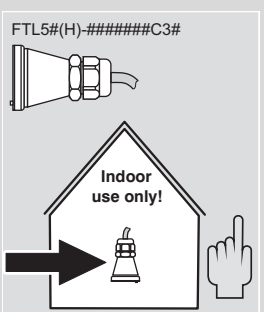
EN- Connection
unconnected cable end
FEL52 DC-PNP

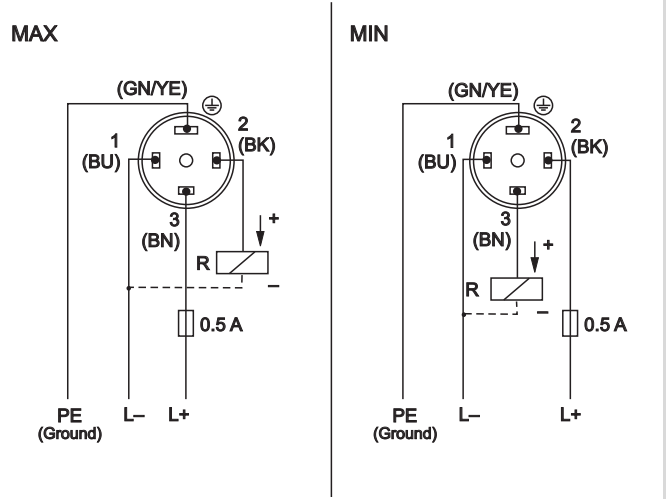
FR- Raccordement extrémité de câble
FEL52 DC-PNP

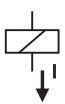
ES - Conexión del cable integrado
FEL52 DC-PNP

IT - Collegamento
cavo senza connettore
FEL52 DC-PNP

NL- Kabel/wartel aansluiting
FEL52 DC-PNP

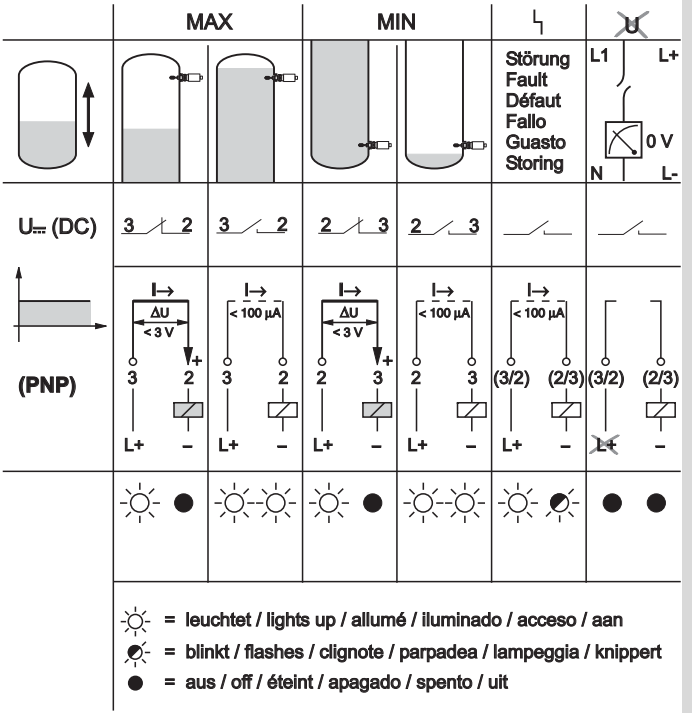






R = externe Last / external load /
charge externe / carga exterior /
carico esterno / externe belasting

Imax. 350 mA
U = 10...55 V



DE- Funktion
FEL52 DC-PNP

EN- Function
FEL52 DC-PNP

FR - Fonction
FEL52 DC-PNP

ES - Funcionamiento
FEL52 DC-PNP

IT - Funzionamento
FEL52 DC-PNP

NL- Functie
FEL52 DC-PNP

DE- Anschluss Kabelschwanz
FEL58 NAMUR

EN- Connection
unconnected cable end
FEL58 NAMUR

FR- Raccordement extrémité de câble
FEL58 NAMUR

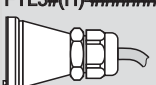
ES - Conexión del cable integrado
FEL58 NAMUR

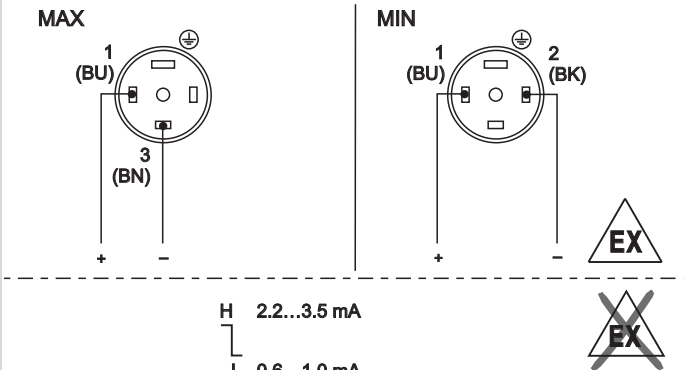
IT - Collegamento
cavo senza connettore
FEL58 NAMUR

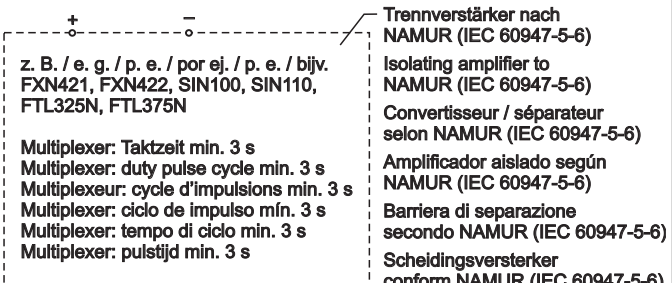
NL- Kabel/wartel aansluiting
FEL58 NAMUR

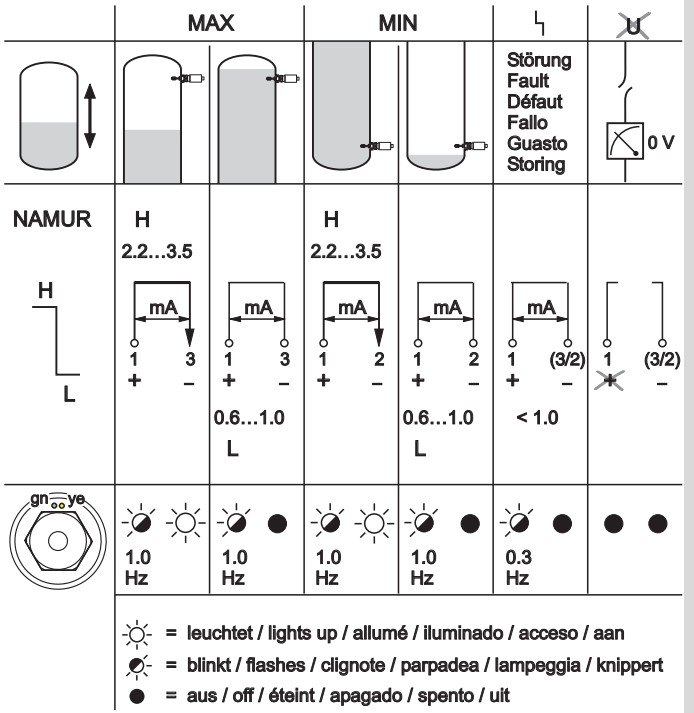
Power supply
DC: 8.2 V +/- 20%

FTL5#(H)-#######C3#









DE- Funktion
FEL58 NAMUR

EN- Function
FEL58 NAMUR

FR - Fonction
FEL58 NAMUR

ES - Funcionamiento
FEL58 NAMUR

IT - Funzione
FEL58 NAMUR

NL- Functie
FEL58 NAMUR

DE- Test mit Prüfmagnet

EN- Test with test magnet

FR- Test avec aimant de contrôle

ES - Test con imán de contol

IT - Test con magnete di prova

NL- Test met testmagneet

Sie müssen sicherstellen, dass keine gefährlichen Prozesse an der Anlage ausgelöst werden /

You must ensure that no hazardous processes on the system are triggered /

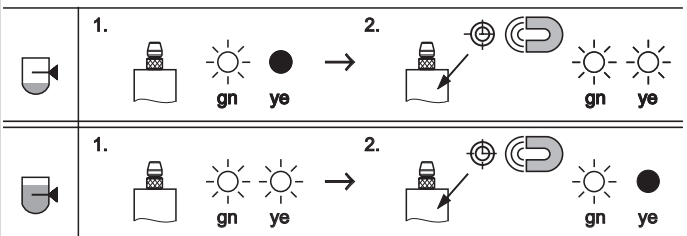
Vous devez vous assurer qu'aucun processus dangereux n'est déclenché sur l'installation /

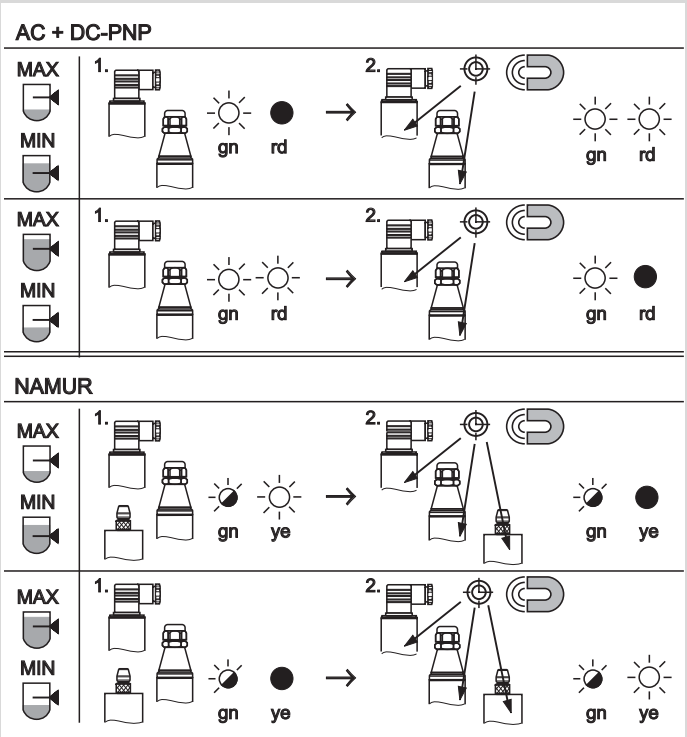
Deberá asegurarse de que no pueda activarse ningún proceso peligroso en la instalación /

Assicurarsi che non si generino processi pericolosi nell'impianto /

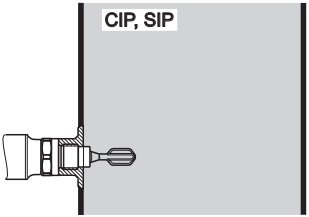
Zorg ervoor dat er geen gevaarlijke processen in de installatie worden gestart

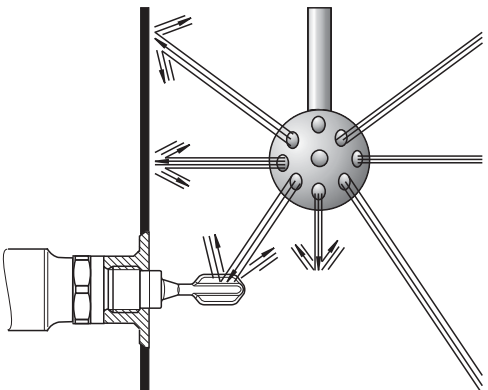
DC-PNP + M12x1

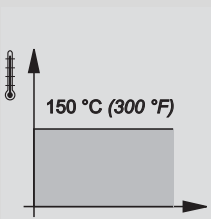


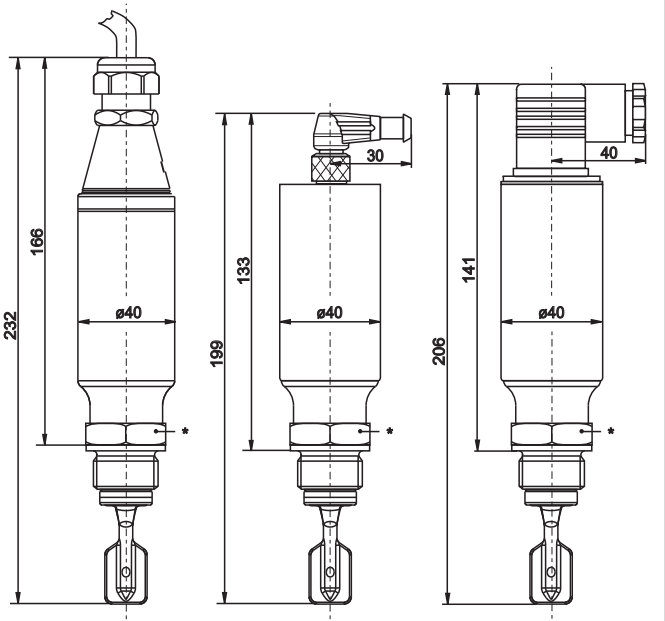

AC + DC-PNP
MAX
MIN
1.
gn
rd
2.
gn
rd
MAX
MIN
1.
gn
rd
2.
gn
rd
NAMUR
MAX
MIN
1.
gn
ye
2.
gn
ye
MAX
MIN
1.
gn
ye
2.
gn
ye

DE- Reinigung
EN- Cleaning
FR - Nettoyage
ES - Limpieza
IT - Pulizia
NL- Reiniging









* SW 32 / 32 AF

DE- Technische Daten
Abmessungen in mm

EN- Technical Data
Dimensions in mm

FR - Caractéristiques techniques
Dimensions en mm

ES - Datos técnicos
Dimensiones en mm

IT - Dati tecnici
Dimensioni in mm

NL- Technische gegevens
Afmetingen in mm

100 mm = 3. 94 in

DE- Umgebungstemperatur T_a
Prozesstemperatur T_p

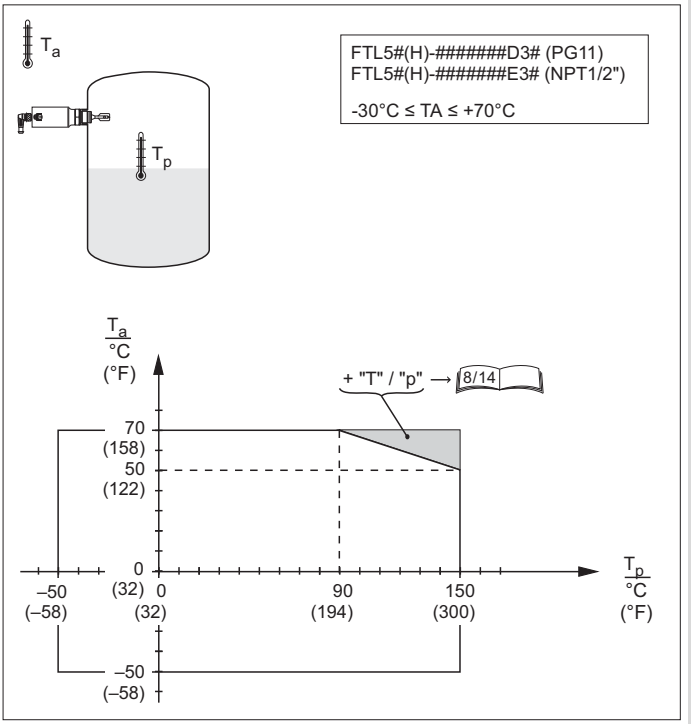
EN- Ambient temperature T_a
Process temperature T_p

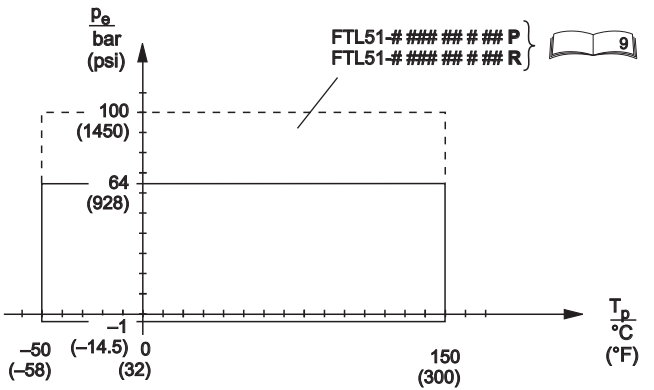
FR- Température ambiante T_a
Température de process T_p

ES- Temperatura ambiente T_a
Temperatura del proceso T_p

IT - Temperatura ambiente T_a
Temperatura di processo T_p

NL- Omgevingstemperatuur T_a
Procestemperatuur T_p





DE- Prozessdruck p_e
Prozesstemperatur T_p

EN- Process pressure p_e
Process temperature T_p

FR- Pression de process p_e
Température de process T_p

ES- Presión del proceso p_e
Temperatura del proceso T_p

IT- Pressione di processo p_e
Temperatura di processo T_p

NL- Procesdruk p_e
Procestemperatuur T_p

DE- Zubehör, Ersatzteile
Abmessungen in mm

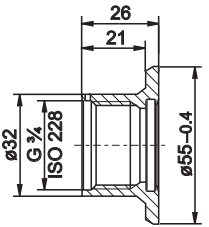
EN- Accessories, Spare parts
Dimensions in mm

FR - Accessoires, Pièces de rechange
Dimensions en mm

ES - Accesorios, Repuestos
Dimensiones en mm

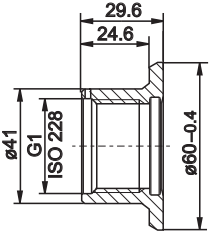
IT - Accessori, Pezzi di ricambio
Dimensioni in mm

NL- Toebehoren, Reserve-onderdelen
Afmetingen in mm

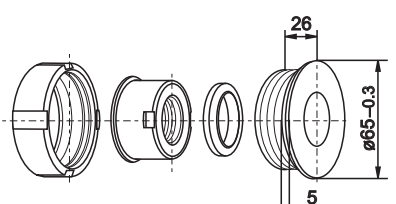


G ¾
52001052

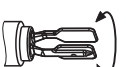
Einschweißmuffe
Weld-in socket
Manchon à souder
Manguito soldado
Attacco a saldare
Inlassok



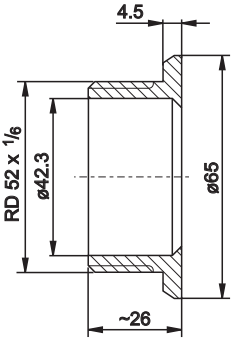
G 1
52001051



G 1
52001221



100 mm = 3. 94 in



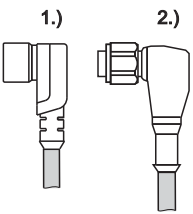
Einschweißadapter
Weld-in adapter
Adaptateur à souder
Adaptor soldado
Adattatore a saldare
Inlasadapter

DE- Abmessungen in mm
EN- Dimensions in mm
FR - Dimensions en mm
ES - Dimensiones en mm
IT - Dimensioni in mm
NL- Afmetingen in mm

Kabel / Cable / Câble / Cable / Cavo / Kabel
4 x 0.34

1.) M12 gewinkelt / M12, angled / M12 coudé / M12, acodado / ad angolo M12 / M12 haaks
52010285

2.) mit Dose M12 (+LED) / with M12 socket (+LED) / avec boîtier M12 (+ LED) / con caja M12 (+LED) / con attacco M12 (+LED) / met aansluiting (+LED)
52018763



1.)
Cable fixed in position:
–25...+70 °C (-13 to +158 °F)
Cable flexible:
–5...+70 °C (23 to +158 °F)
Not for Ex nA application!

100 mm = 3. 94 in

DE- Zubehör, Ersatzteile
für Montage und Test

EN- Accessories, Spare parts
for mounting and test

FR - Accessoires, Pièces de rechange
pour montage et test

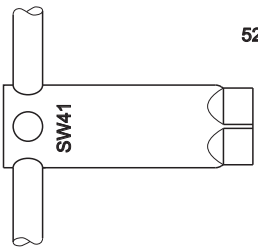
ES - Accesorios, Repuestos
para montaje y comprobación

IT - Accessori, Pezzi di ricambio
di montaggio e verifica

NL- Toebehoren, Reserve-onderdelen
voor montage en test

Steckschlüssel SW 41 für Prozessanschluss
Socket spanner 41 AF for process connection
Clé de 41 pour raccord process
Llave de fijación SW 41 para conexión a proceso
Chiave a tubo 41 per attacco al processo
Pijpsleutel SW 41 voor procesaansluiting

52010156



52013204

Prüfmagnet
Test magnet
Aimant de contrôle
Imán de control
Magnete di prova
Testmagneet

Varianten AC- und DC-PNP mit Ventilstecker

Fehlfunktion	Ursache	Maßnahme
Grünes Licht leuchtet nicht	Keine Spannungsversorgung	Stecker, Kabel und Spannungsversorgung prüfen
Rotes Licht blinkt	Überlast oder Kurzschluss im Laststromkreis	Kurzschluss beheben
		Maximalen Laststrom auf unter 350 mA reduzieren
	Interner Sensorfehler oder Sensor korrodiert	Gerät austauschen

DC-PNP mit M12x1 Stecker

Fehlfunktion	Ursache	Maßnahme
Rotes Licht leuchtet (DC-PNP)	Überlast oder Kurzschluss im Laststromkreis	Kurzschluss beheben
		Maximalen Laststrom auf unter 250 mA reduzieren
Grünes Licht leuchtet nicht	Keine Spannungsversorgung	Stecker, Kabel und Spannungsversorgung prüfen
Rotes Licht blinkt (2 Hz)	Interner Sensorfehler oder Sensor korrodiert	Gerät austauschen

NAMUR

Fehlfunktion	Ursache	Maßnahme
Grünes Licht blinkt nicht	Keine Spannungsversorgung vom Trennschaltverstärker	Stecker, Kabel und Spannungsversorgung prüfen
Rotes Licht blinkt mit 0.3 Hz	Interner Sensorfehler oder Sensor korrodiert	Gerät austauschen

AC and DC-PNP versions with valve plug

Malfunction	Cause	Measure
Green light does not light up	No voltage supply	Check plug, cable and voltage supply
Red light flashes	Overload or short-circuit in the load-current circuit	Rectify short-circuit
		Reduce maximum load current to under 350 mA
	Internal sensor error or sensor corroded	Replace device

DC-PNP versions with M12x1 plug

Malfunction	Cause	Measure
Red light lights up (DC-PNP)	Overload or short-circuit in the load-current circuit	Rectify short-circuit
		Reduce maximum load current to under 250 mA
Green light does not light up	No voltage supply	Check plug, cable and voltage supply
Red light flashes (2 Hz)	Internal sensor error or sensor corroded	Replace device

NAMUR

Malfunction	Cause	Measure
Green light is not flashing	No voltage supply from switching amplifier	Check plug, cable and voltage supply
Red light flashes (0.3 Hz)	Internal sensor error or sensor corroded	Replace device

Variantes AC et DC-PNP avec connecteur EV

Dysfonctionnement	Cause	Mesure
Le témoin vert n'est pas allumé	Pas de tension d'alimentation	Vérifier la prise, le câble et l'alimentation en tension
Le témoin rouge clignote	Surcharge ou court-circuit dans le circuit de courant de charge	Eliminer le court-circuit
		Réduire le courant de charge maximal à moins de 350 mA
	Défaut interne de capteur ou capteur corrodé	Remplacer l'appareil

DC-PNP avec prise M12x1

Dysfonctionnement	Cause	Mesure
Le témoin rouge est allumé (DC-PNP)	Surcharge ou court-circuit dans le circuit de courant de charge	Eliminer le court- circuit
		Réduire le courant de charge maximal à moins de 250 mA
Le témoin vert n'est pas allumé	Pas de tension d'alimentation	Vérifier la prise, le câble et l'alimentation en tension
Le témoin rouge clignote (2 Hz)	Défaut interne de capteur ou capteur corrodé	Remplacer l'appareil

NAMUR

Dysfonctionnement	Cause	Mesure
Témoin vert ne clignote pas	Pas d'alimentation	Vérifier la prise, le câble et l'alimentation en tension
Le témoin rouge clignote (0.3 Hz)	Défaut interne de capteur ou capteur corrodé	Remplacer l'appareil

ES - Identificación de fallos

Variantes AC y DC-PNP con terminal de conexión

Fallo	Causa	Medidas
La luz verde no se enciende	No hay suministro de tensión	Comprobar terminales, cable y suministro de tensión
La luz roja parpadea	Sobrecarga o cortocircuito en la corriente de carga	Subsanar el cortocircuito
		Reducir la corriente de carga por debajo de 350 mA
	Error interno del sensor o sensor corroído	Sustituir el aparato

DC-PNP con terminal M12x1

Fallo	Causa	Medidas
La luz roja se enciende (DC-PNP)	Sobrecarga o cortocircuito en la corriente de carga	Subsanar el cortocircuito
		Reducir la corriente de carga por debajo de 250 mA
La luz verde no se enciende	No hay suministro de tensión	Comprobar terminales, cable y suministro de tensión
La luz roja parpadea (2 Hz)	Error interno del sensor o sensor corroído	Sustituir el aparato

NAMUR

Fallo	Causa	Medidas
La luz verde no se enciende	No hay suministro de tensión	Comprobar terminales, cable y suministro de tensión
La luz roja parpadea (0.3 Hz)	Error interno del sensor o sensor corroído	Sustituir el aparato

Varianti CA e CC-PNP con connettore valvola

Anomalia	Causa	Rimedio
La luce verde non si accende	Nessuna alimentazione	Controllare le spine, i cavi e l'alimentazione
La luce rossa lampeggia	Sovraccarico o cortocircuito nel circuito della corrente di carico	Eliminare il cortocircuito
		Ridurre la corrente di carico massimo al di sotto di 350 mA
	Guasto interno al sensore o corrosione del sensore	Sostituire lo strumento

DC-PNP con spina M12x1

Anomalia	Causa	Rimedio
La luce rossa è accesa (CC-PNP)	Sovraccarico o cortocircuito nel circuito della corrente di carico	Eliminare il cortocircuito
		Ridurre la corrente di carico massimo al di sotto di 250 mA
La luce verde non si accende	Nessuna alimentazione	Controllare le spine, i cavi e l'alimentazione
La luce rossa lampeggia (2 Hz)	Guasto interno al sensore o corrosione del sensore	Sostituire lo strumento

NAMUR

Anomalia	Causa	Rimedio
La luce verde non si accende	Nessuna alimentazione	Controllare le spine, i cavi e l'alimentazione
La luce rossa lampeggia (0.3 Hz)	Guasto interno al sensore o corrosione del sensore	Sostituire lo strumento

Varianten AC- en DC-PNP met connector

Storingsfunctie	Oorzaak	Maatregelen
Groene lampje brandt niet	Geen voedingsspanning	Steker, kabel en voedingsspanning controleren
Rode lampje knippert	Overbelasting of kortsluiting in laststroomkring	Kortsluiting opheffen
		Maximale belastingsstroom reduceren tot onder 350 mA
	Interne sensorstoring of sensor gecorrodeerd	Instrument vervangen

DC-PNP mit M12x1 Stecker

Storingsfunctie	Oorzaak	Maatregelen
Rode lampje gaat aan (DC-PNP)	Overbelasting of kortsluiting in laststroomkring	Kortsluiting opheffen
		Maximale belastingsstroom reduceren tot onder 250 mA
Groene lampje brandt niet	Geen voedingsspanning	Steker, kabel en voedingsspanning controleren
Rode lampje knippert (2 Hz)	Interne sensorstoring of sensor gecorrodeerd	Instrument vervangen

NAMUR

Storingsfunctie	Oorzaak	Maatregelen
Groene lampje knippert niet	Geen voeding van de schakelversterker	Steker, kabel en voedingsspanning controleren
Rode lampje knippert (0.3 Hz)	Interne sensorstoring of sensor gecorrodeerd	Instrument vervangen

Technische Information / Technical Information / Information technique / Información técnica / Informazioni tecniche / Technische Informatie

TI00328F Liquiphant FTL50, FTL50H, FTL51, FTL51H

Betriebsanleitung / Operating Instruction / Mise en service / Instrucciones de funcionamiento / Istruzioni operative / Inbedrijfstellingsvoorschrift

BA00141F FEL50A, PROFIBUS PA

Sicherheitshinweise / Notes on Safety / Conseils de sécurité / Notas sobre seguridad / Note sulla sicurezza / Veiligheidsinstructies

XA00031F	CE ⟨Ex⟩	II 1/2 G,	Ex d	IIC/IIB
XA00063F	CE ⟨Ex⟩	II 1/2 G,	Ex ia/ib	IIC/IIB
XA00064F	CE ⟨Ex⟩	II 1 G,	Ex ia	IIC/IIB
XA00154F	CE ⟨Ex⟩	II 1/2 G/D,	Ex ia/ib	IIC/IIB
XA00159F	CE ⟨Ex⟩	II 1 G,	Ex ia	IIC/IIB

DE- Ergänzende Dokumentation

EN- Supplementary Documentation

FR - Documentation complémentaire

ES - Documentación adicional

IT - Documentazione supplementare

NL- Aanvullende documentatie

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People for Process Automation

Technical Information

Liquiphant M
FTL50, FTL51, FTL50H, FTL51H

Vibronic

Point level switch for all kinds of liquids

Application

- Process temperatures from −50 °C to 150 °C (-58 to 302 °F)
- Pressures up to 100 bar (1450 psi)
- Viscosities up to 10,000 mm^2/s (cSt)
- For liquids with densities ≥ 0.5 g/cm^3(SGU)

FTL50: Compact design
FTL51: Extension pipe up to 3 m (9.8 ft) and up to 6 m (20 ft) on request
FTL50H, FTL51H: Certified for the food and pharmaceutical industries

Ideal substitute for float switches, as reliable function not affected by flow, turbulence, bubbles, foam, vibration, solids content or buildup.

Your benefits

- Recommended for safety systems requiring functional safety to SIL2/SIL3 as per IEC 61508/IEC 61511-1
- Design in accordance with ASME B31.3
- Recommended for use in sterile applications in the life science industry (design in accordance with ASME BPE)
- No adjustment: quick, low-cost startup
- No mechanically moving parts: no maintenance, no wear, long operating life
- Functional safety: Monitoring of tuning fork for damage
- Compact stainless steel housing (optional): the IP69 protection rating guarantees that the unit remains impermeable, even in the event of intensive cleaning or flooding for several hours

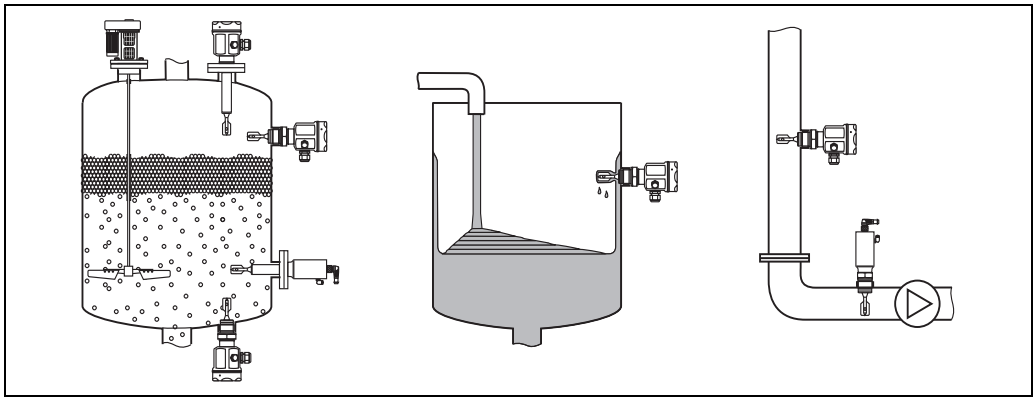
Endress+Hauser
People for Process Automation

Table of contents

Application

Point level detection

Maximum or minimum detection in tanks or pipes containing all kinds of liquids, including use in hazardous areas, food and pharmaceuticals.



L00-FTL5xxxx-11-05-xx-xx-000

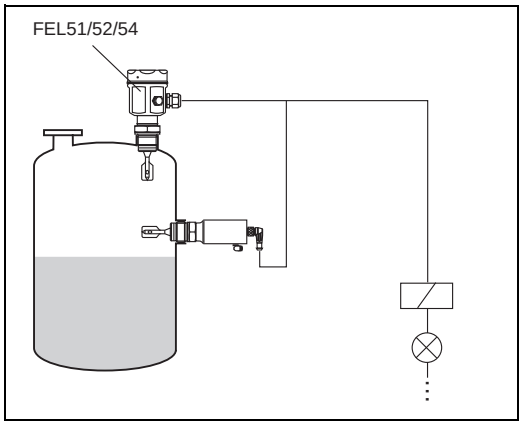
Function and system design

Measuring principle

The sensor's fork vibrates at its intrinsic frequency. This frequency is reduced when covered with liquid. This change in frequency causes the point level switch to switch.

Modularity

Point level switch
Liquiphant M FTL with electronic versions
FEL51, FEL52, FEL54



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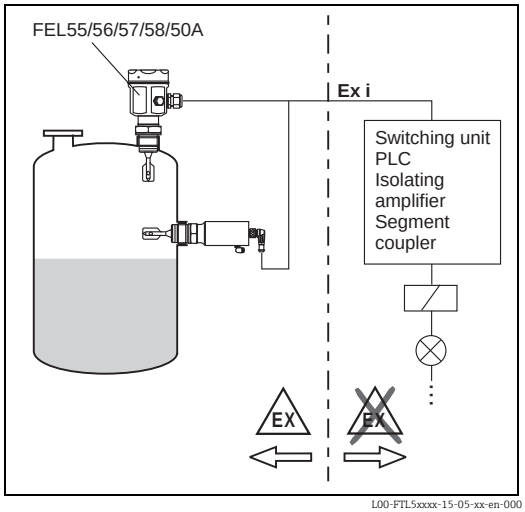
Point level switch
Liquiphant M FTL with electronic versions
FEL55, FEL56, FEL57, FEL58
for connecting to a separate switching unit
or an isolating amplifier FEL50A
for connecting to a PROFIBUS PA segment



L00-FTL5xxxx-15-05-xx-en-000

Electronic versions	FEL51: Two-wire AC version; Switches the load directly into the power supply circuit via an electronic switch. FEL52: Three-wire DC version; Switches the load via the transistor (PNP) and separate connection e.g. in conjunction with programmable logic controllers (PLCs), DI modules as per EN 61131-2. FEL54: Universal current version with relay output; Switches the loads via 2 floating change-over contacts. FEL55: Signal transmission 16/8 mA on two-wire cabling e.g. in conjunction with programmable logic controllers (PLCs), AI modules 4 to 20 mA as per EN 61131-2. FEL56: For separate switching unit; signal transmission L-H edge 0.6 to 1.0 / 2.2 to 2.8 mA to EN 50227 (NAMUR) on two-wire cabling. FEL58: For separate switching unit; signal transmission H-L edge 2.2 to 3.5 / 0.6 to 1.0 mA to EN 50227 (NAMUR) on two-wire cabling. Checking of connecting cabling and other devices by pressing a key on the electronic insert. FEL57: For separate switching unit; PFM signal transmission; Current pulses superposed on the power supply along the two-wire cabling. Proof test from the switching unit without changing levels. FEL50A: For connecting to PROFIBUS PA; Cyclic and acyclic data exchange acc. to PROFIBUS-PA Profile 3.0 Discrete Input
Electronics for continuous density measurement	FEL50D: For connecting to Density Computer FML621
Galvanic isolation	FEL51, FEL52, FEL50A: between sensor and power supply FEL54: between sensor and power supply and load FEL55, FEL56, FEL57, FEL58, FEL50D: see connected switching unit
Design	FTL50: Compact FTL51: With extension pipe FTL50H: Compact, with polished tuning fork and hygienic process connections FTL51H: With extension pipe, polished tuning fork and hygienic process connections

Input

Measured variable	Level (limit value)
Measuring range (detection range)	FTL50: dependent on mounting point FTL51: dependent on mounting point and the extension pipe ordered. Standard extension pipe up to 3 m (9.8 ft) and up to 6 m (20 ft) on request.
Density	Setting on the electronic insert > 0.5 g/cm³ (SGU) or > 0.7 g/cm³ (SGU) (others on request)

Electronic insert FEL51 (AC 2-wire)

Power supply

Supply voltage: AC 19 to 253 V
Power consumption: < 0.83 W
Residual current consumption: < 3.8 mA
Short-circuit protection
Overvoltage protection FEL51: overvoltage category III

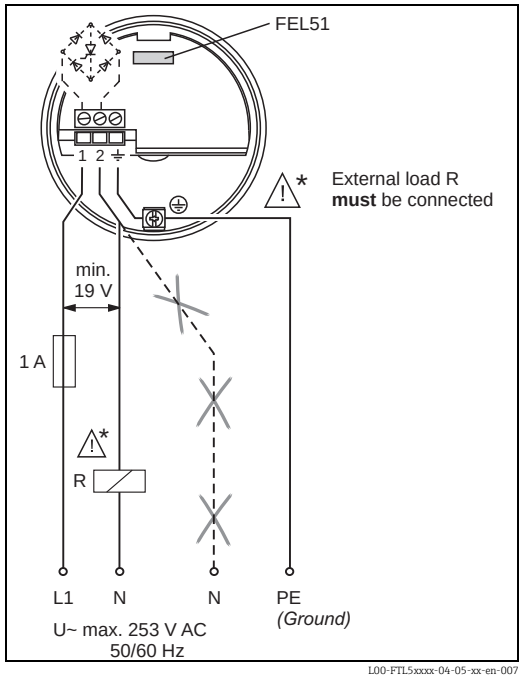
Electrical connection

Two-wire AC connection

Switches the load directly into the power supply circuit via an electronic switch.

Always connect in series with a load!

Check the following:
- The residual current in blocked state (up to 3.8 mA)
- That for low voltage
  - the voltage drop across the load is such that the minimum terminal voltage at the electronic insert (19 V) when blocked is not undershot.
  - the voltage drop across the electronics when switched through is observed (up to 12 V)
- That a relay cannot de-energize with holding power below 3.8 mA. If this is the case, a resistor should be connected parallel to the relay. An RC module is available under the part number: 71107226
- When selecting the relay, pay attention to the holding power / rated power (see "Connectable load")



L00-FTL5xxxx-04-05-xx-en-007

Output signal

I_L = load current (switched through)

< 3.8 mA = residual current (blocked)

☼ = lit

● = unlit

L00-FTL2xxxx-07-05-xx-xx-000

Safety mode	Level	Output signal	LEDs green	LEDs red
MAX		1 —I_L→ 2	☼	●
		1 --< 3.8 mA--> 2	☼	☼
MIN		1 —I_L→ 2	☼	●
		1 --< 3.8 mA--> 2	☼	☼

L00-FTL5xxxx-04-05-xx-xx-001

Signal on alarm

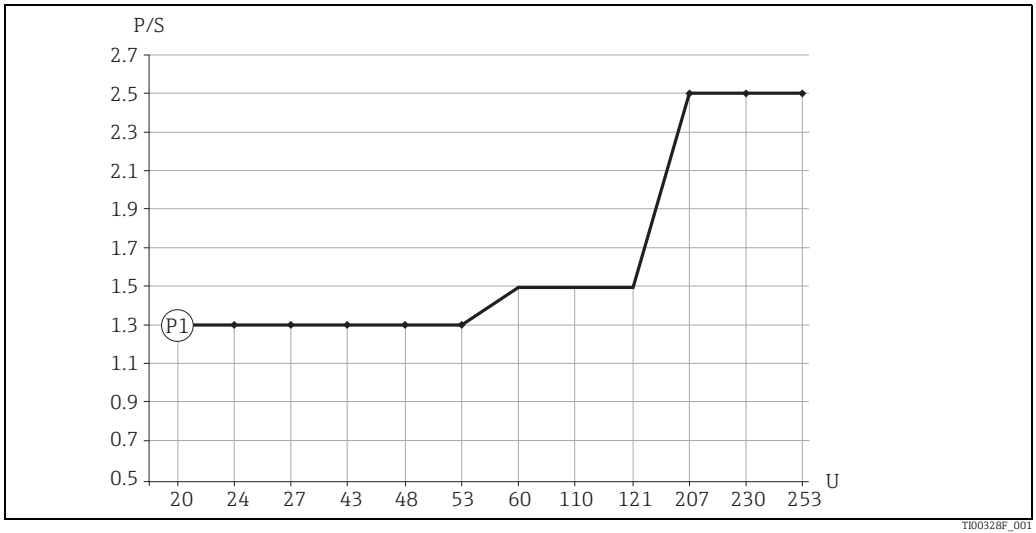
Output signal on power failure or in the event of damaged sensor: < 3.8 mA

Connectable load

- Voltage drop via FEL51 ≤ 12 V
- Residual current if electrical switch is blocked: ≤ 3.8 mA
- Load switched directly into the power supply circuit via the thyristor. Transient (40 ms) ≤ 1.5 A, ≤ 375 VA at 253 V or ≤ 36 VA at 24 V (not short-circuit-proof)

The load is switched via an electronic switch directly in the power circuit.
Always connect in series with a load!
Not suitable for connection to low-voltage PLC inputs!

Selection guide for relays



Minimum nominal power of load
P/S nominal power in [W] / [VA]
U operating voltage in [V]

Position	Operating voltage	Nominal power	
		min.	max.
P1	24 V	> 1.3 VA	< 8.4 VA
AC operation	110 V	> 1.5 VA	< 38.5 VA
	230 V	> 2.5 VA	< 80.5 VA

Relays with less nominal power can be operated via an RC module connected in parallel (optional).

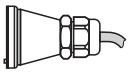
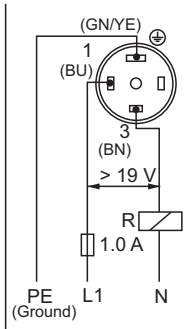
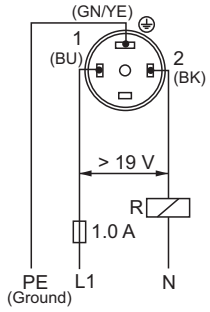
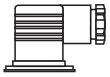
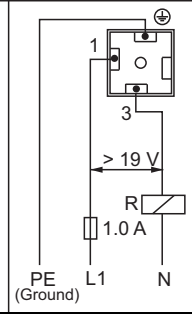
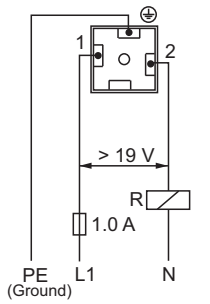
Electronics FEL51 (AC, in compact housing)

Power supply

Supply voltage: AC 19 to 253 V
Power consumption: < 0.83 W
Residual current consumption: < 3.8 mA
Short-circuit protection
Overvoltage protection FEL51: overvoltage category III

Electrical connection

Two-wire AC connection

	Connector	MAX	MIN
Switches the load directly into the power supply circuit via an electronic switch. Always connect in series with a load! Check the following: ▪ The residual current in blocked state (up to 3.8 mA) ▪ That for low connection voltage – the voltage drop across the load is such that the minimum terminal voltage at the electronic insert (19 V) when blocked is not undershot. – the voltage drop across the electronics when switched through is observed (up to 12 V)	FTL5#(H)- #######C3# 		
	FTL5#(H)- #######D3# (Pg11) oder FTL5#(H)- #######E3# (NPT ½")  -30°C ≤ TA ≤ +70°C -22° F ≤ TA ≤ +158°F		

L00-FTL5xxxx-04-05-xx-xx-012

- That a relay cannot de-energize with holding power below 3.8 mA.
  If this is the case, a resistor should be connected parallel to the relay (e.g. RC module: part number 71107226).
- When using in conjunction with a cable end (FTL5#(H)- #######C3#), the compact housing should only be used in enclosed areas.

Output signal

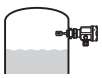
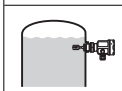
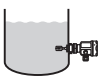
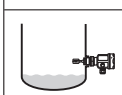
I_L = load current (switched through)

< 3.8 mA = residual current (blocked)

☼ = lit

● = unlit

L00-FTL2xxxx-07-05-xx-xx-000

Safety mode	Level	Output signal	LEDs green	LEDs red
MAX		1 —I_L→ 3	☼	●
		1 - - < 3.8 mA - - → 3	☼	☼
MIN		1 —I_L→ 2	☼	●
		1 - - < 3.8 mA - - → 2	☼	☼

L00-FTL5xxxx-04-05-xx-xx-001a

Signal on alarm

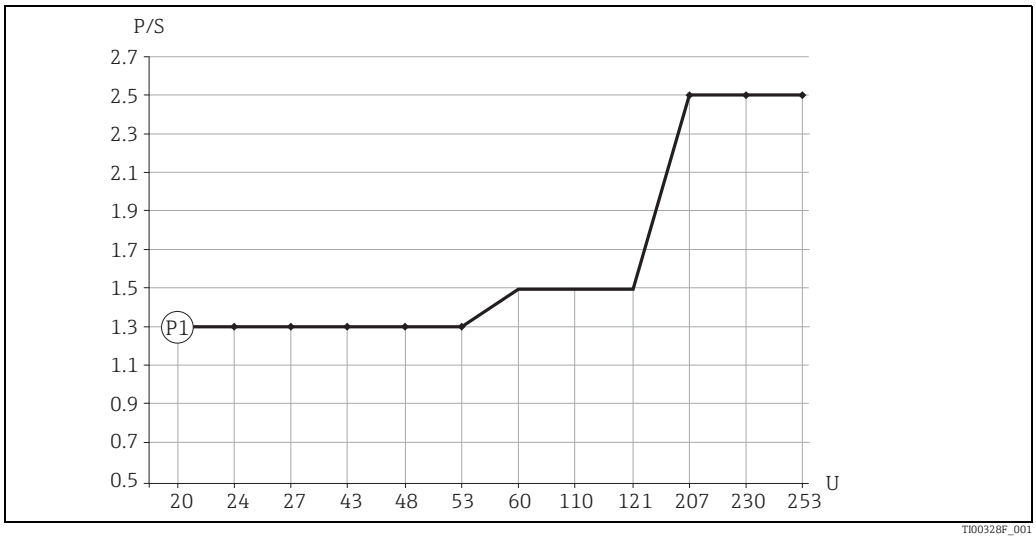
Output signal on power failure or in the event of damaged sensor: < 3.8 mA

Connectable load

- Voltage drop via FEL51 ≤ 12 V
- Residual current if electrical switch is blocked: ≤ 3.8 mA
- Load switched directly into the power supply circuit via the thyristor.
  Transient (40 ms) ≤ 1.5 A, ≤ 375 VA at 253 V or ≤ 36 VA at 24 V (not short-circuit-proof)

The load is switched via an electronic switch directly in the power circuit.
Always connect in series with a load!
Not suitable for connection to low-voltage PLC inputs!

Selection guide for relays



Minimum nominal power of load
P/S nominal power in [W] / [VA]
U operating voltage in [V]

Position	Operating voltage	Nominal power	
		min.	max.
P1	24 V	> 1.3 VA	< 8.4 VA
AC operation	110 V	> 1.5 VA	< 38.5 VA
	230 V	> 2.5 VA	< 80.5 VA

Relays with less nominal power can be operated via an RC module connected in parallel (optional).

Electronic insert FEL52 (DC PNP)

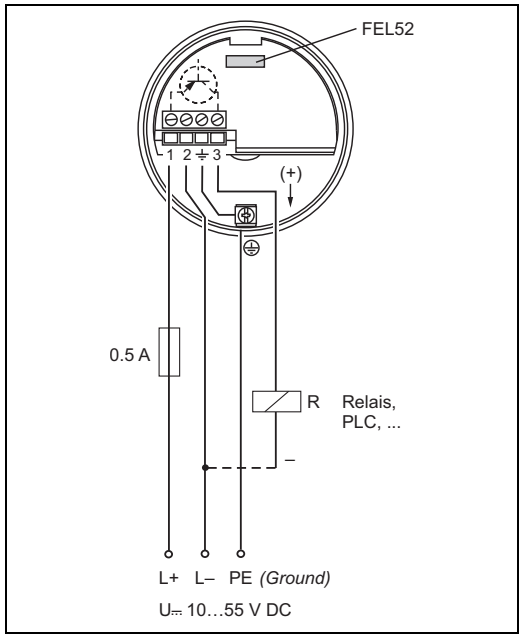
Power supply

Supply voltage: DC 10 to 55 V
Ripple: ≤ 1.7 V, 0 to 400 Hz
Current consumption: ≤ 15 mA
Power consumption: ≤ 0.83 W
Reverse polarity protection
Overvoltage protection FEL52: overvoltage category III

Electrical connection

Three-wire DC connection

Switches the load via the transistor (PNP) and separate connection.
Preferably used with programmable logic controllers (PLC),
DI modules as per EN 61131-2.
Positive signal at switching output of the electronics (PNP); Output blocked on reaching point level.



L00-FTL5xxxx-04-05-xx-xx-030

Output signal

I_L = load current (switched through)

< 100 µA = residual current (blocked)

☼ = lit

● = unlit

L00-FTL2xxxx-07-05-xx-xx-000

Safety mode	Level	Output signal	LEDs green	LEDs red
MAX		L+ 1 I_L + 3	☼	●
		1 < 100 µA 3	☼	☼
MIN		L+ 1 I_L + 3	☼	●
		1 < 100 µA 3	☼	☼

L00-FTL5xxxx-04-05-xx-xx-004

Signal on alarm

Output signal on power failure or in the event of damaged sensor: < 100 µA

Connectable load

- Load switched via the transistor and separate PNP connection, ≤ DC 55 V
- Load current ≤ 350 mA (pulsed overload and short-circuit protection)
- Residual current < 100 µA (with transistor blocked).
- Capacitance load ≤ 0.5 µF at 55 V, ≤ 1.0 µF at 24 V
- Residual voltage < 3 V (with transistor switched through);

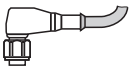
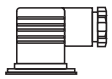
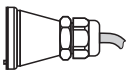
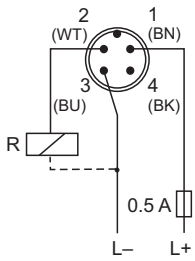
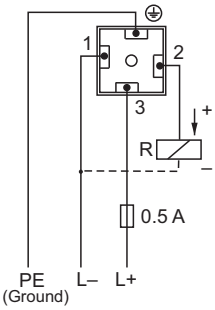
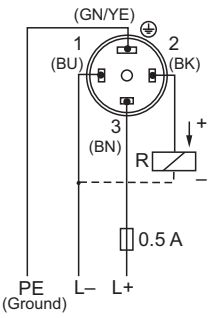
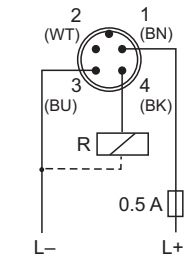
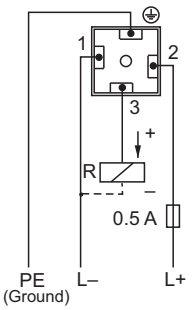
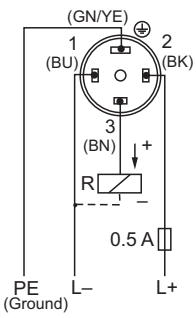
Electronics FEL52 (DC PNP, in compact housing)

Power supply

Supply voltage: DC 10 to 55 V
Ripple: ≤ 1.7 V, 0 to 400 Hz
Current consumption: ≤ 15 mA
Power consumption: ≤ 0.83 W
Reverse polarity protection
Overvoltage protection FEL52: overvoltage category III

Electrical connection

Three-wire DC connection

	Connector	MAX	MIN
Preferably used with programmable logic controllers (PLC), DI module as per EN 61131-2. Positive signal at switching output of the electronics (PNP); Output blocked on reaching point level. Note! When using in conjunction with a cable end (FTL5#(H)-#######C3#), the compact housing should only be used in enclosed areas.	FTL5#(H)- #######N3# (M12x1) 52018763  FTL5#(H)- #######N3# (M12x1) 52010285 / 52024216  FTL5#(H)- #######D3# (Pg11) oder FTL5#(H)- #######E3# (NPT ½")  -30°C ≤ TA ≤ +70°C -22°C ≤ TA ≤ +158°C FTL5#(H)- #######C3# 	  	  

L00-FTL5xxxx-04-05-xx-xx-014

Output signal

With valve connector or cable tail

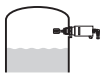
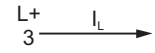
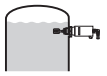
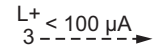
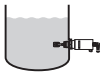
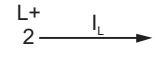
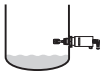
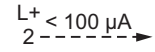
I_L = load current (switched through)

< 100 µA = residual current (blocked)

☼ = lit

● = unlit

L00-FTL2xxxx-07-05-xx-xx-000

Safety mode	Level	Output signal	LEDs green	LEDs red
MAX			☼	●
			☼	☼
MIN			☼	●
			☼	☼

L00-FTL5xxxx-04-05-xx-xx-004a

With M12x1 connector 52010285 / 52024216 (without LEDs)

L00-FTL5xxxx-16-05-xx-xx-002

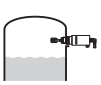
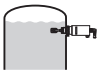
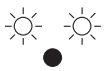
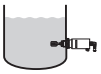
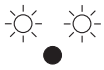
I_L = load current (switched through)

< 100 µA = residual current (blocked)

☼ = lit

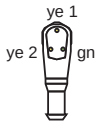
● = unlit

L00-FTL2xxxx-07-05-xx-xx-000

Safety mode	Level	Output signal	LEDs
MAX		L+ 1 → I_L → – 2	
		L+ 1 - - - < 100 µA → – 2	
MIN		L+ 1 → I_L → – 4	
		L+ 1 - - - < 100 µA → – 4	

L00-FTL5xxxx-04-05-xx-xx-010

With M12x1 connector 52018763 (with LEDs)



L00-FTL5xxxx-16-05-xx-xx-001

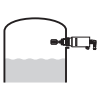
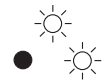
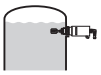
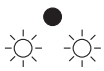
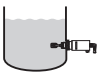
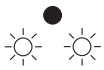
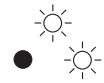
I_L = load current (switched through)

< 100 µA = residual current (blocked)

☼ = lit

● = unlit

L00-FTL2xxxx-07-05-xx-xx-000

Safety mode	Level	Output signal	LEDs
MAX		L+ 1 → I_L → – 2	
		L+ 1 - - - < 100 µA → – 2	
MIN		L+ 1 → I_L → – 4	
		L+ 1 - - - < 100 µA → – 4	

L00-FTL5xxxx-04-05-xx-xx-011

Signal on alarm

Output signal on power failure or in the event of damaged sensor: < 100 µA

Connectable load

- Load switched via the transistor and separate PNP connection, ≤ DC 55 V
- Load current ≤ 350 mA (pulsed overload and short-circuit protection)
- Residual current < 100 µA (with transistor blocked).
- Capacitance load ≤ 0.5 µF at 55 V, ≤ 1.0 µF at 24 V
- Residual voltage < 3 V (with transistor switched through);

Electronic insert FEL54 (AC/DC with relay output)

Power supply

Supply voltage: AC 19 to 253 V, 50/60 Hz or DC 19 to 55 V
Power consumption: ≤ 1.3 W
Reverse polarity protection
Overvoltage protection FEL54: overvoltage category III

Electrical connection

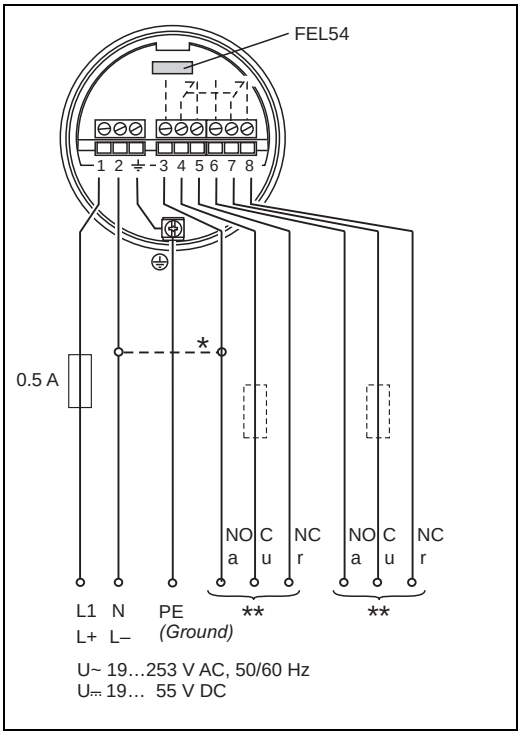
Universal current connection with relay output

Power supply:
Please note the different
voltage ranges for AC and DC.
AC.

Output:
When connecting an instrument with
high inductance, provide a spark arrester
to protect the relay contact.
A fine-wire fuse (depending on the
load connected) protects the relay
contact on short-circuiting.
Both relay contacts switch simultaneously.

* When jumpered, the relay
output works with NPN logic.

** See "Connectable load"

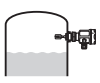
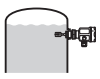
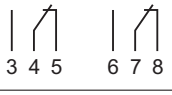
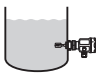
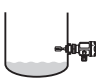


L00-FTL5xxxx-04-05-xx-xx-002

Output signal

= relay energized
= relay de-energized
= lit
= unlit

L00-FTL2xxxx-07-05-xx-xx-001

Safety mode	Level	Output signal	LEDs green	LEDs red
MAX		 3 4 5 6 7 8	☼	●
		 3 4 5 6 7 8	☼	☼
MIN		 3 4 5 6 7 8	☼	●
		 3 4 5 6 7 8	☼	☼

L00-FTL5xxxx-04-05-xx-xx-005

Signal on alarm

Output signal on power failure or in the event of damaged sensor: relay de-energized

Connectable load

- Loads switched via 2 floating change-over contacts (DPDT).
- I~ ≤ 6 A (Ex de 4 A), U~ ≤ AC 253 V; P~ ≤ 1500 VA, cos φ = 1, P~ ≤ 750 VA, cos φ > 0.7
- I⎓ ≤ 6 A (Ex de 4 A) to DC 30 V , I⎓ ≤ 0.2 A to 125 V
- When connecting a low-voltage circuit with double insulation according to IEC 1010, the following applies: the sum of the voltages of the relay output and power supply is ≤ 300 V
- The electronic insert FEL52 DC-PNP is preferred for low DC load currents (e.g. when connecting to a PLC)
- Relay contact material: silver/nickel AgNi 90/10

Electronic insert FEL55 (8/16 mA)

Power supply

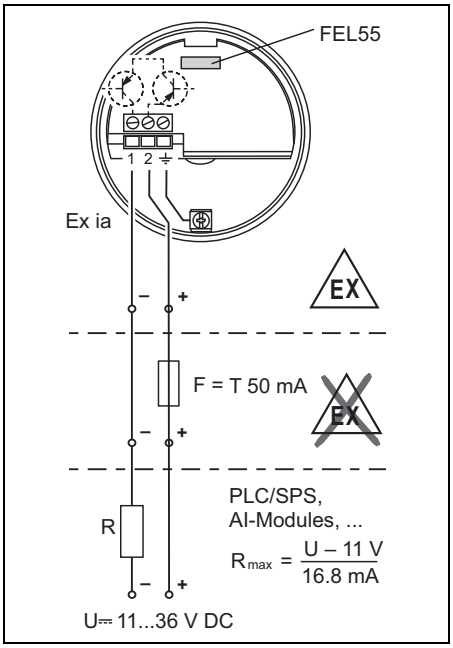
Supply voltage: DC 11 to 36 V
Power consumption: < 600 mW
Reverse polarity protection
Overvoltage protection FEL55: overvoltage category III

Electrical connection

Two-wire connection for separate switching unit

For separate switching unit.
Signal transmission 16/8 mA on two-wire cabling.
For connection to programmable logic controllers (PLC) for example, AI modules 4 to 20 mA to EN 61131-2.
Output signal jump from high to low current on point level.

Fuse required for non-Ex applications!
Only use power units with safe galvanic isolation (e.g. SELV).



L00-FTL5xxxx-04-05-xx-en-000

Output signal

~ 16 mA = 16 mA ± 5 %

~ 8 mA = 8 mA ± 6 %

☼ = lit

● = unlit

L00-FTL2xxxx-07-05-xx-xx-000

Safety mode	Level	Output signal	LEDs green	LEDs red
MAX		+ 2 ~16 mA 1	☼	●
		+ 2 ~8 mA 1	☼	☼
MIN		+ 2 ~16 mA 1	☼	●
		+ 2 ~8 mA 1	☼	☼

L00-FTL5xxxx-04-05-xx-xx-006

Signal on alarm

Output signal on power failure or in the event of damaged sensor: < 3.6 mA

Connectable load

- R = (U - 11 V) : 16.8 mA
- U = connection voltage: DC 11 to 36 V (in wet environments DC 11 to 35 V)

Example: PLC with 250 Ω with 2-wire version

250 Ω = (U – 11V) / 16.8 mA
4.2 [Ω /A] = U – 11 V
U = 15.2 V

Electronic insert FEL56 (NAMUR L-H edge)

Power supply

Supply voltage: DC 8.2 V ±20 %
Power consumption: < 6 mW at I < 1 mA; < 38 mW at I = 2.8 mA
Connection data interface: IEC 60947-5-6

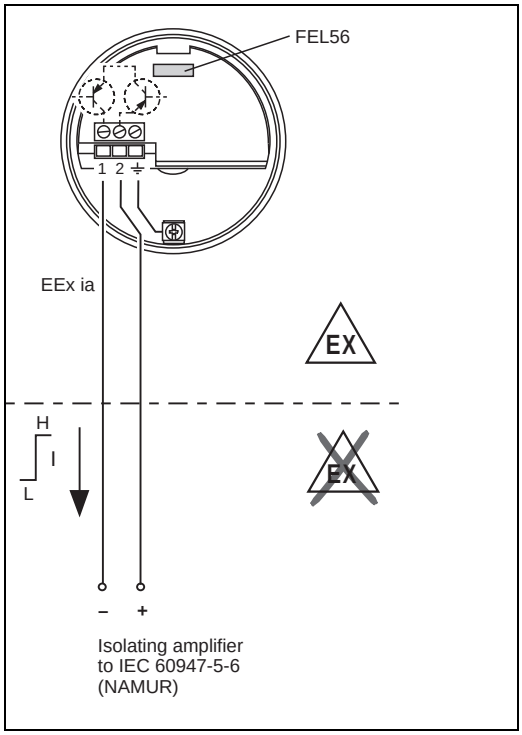
Electrical connection

Two-wire connection for separate switching unit

For connecting to isolating amplifiers acc. to NAMUR (IEC 60947-5-6), e.g. FTL325N, FTL375N from Endress+Hauser.
Output signal jump from low to high current on point level.

(L–H edge)

Connecting to multiplexer:
Set clock time to min. 2 s.



L00-FTL5xxxx-04-05-xx-en-004

Output signal

= lit
= flashes
= unlit

L00-FTL5xxxx-07-05-xx-xx-002

Safety mode	Level	Output signal	LEDs green	LEDs red
MAX		+ 2 — 0.6 … 1.0 mA → 1	☼	●
		+ 2 — 2.2 … 2.8 mA → 1	☼	☼
MIN		+ 2 — 0.6 … 1.0 mA → 1	☼	●
		+ 2 — 2.2 … 2.8 mA → 1	☼	☼

L00-FTL5xxxx-04-05-xx-xx-003

Signal on alarm

Output signal in the event of damaged sensor: > 2.2 mA

Connectable load

- See Technical Data of the isolating amplifier connected according to IEC 60947–5–6 (NAMUR)

Electronic insert FEL58 (NAMUR H-L edge)

Power supply

Supply voltage: DC 8.2 V ±20 %
Power consumption: < 6 mW at I < 1 mA; < 38 mW at I = 3.5 mA
Connection data interface: IEC 60947-5-6

Electrical connection

Two-wire connection for separate switching unit

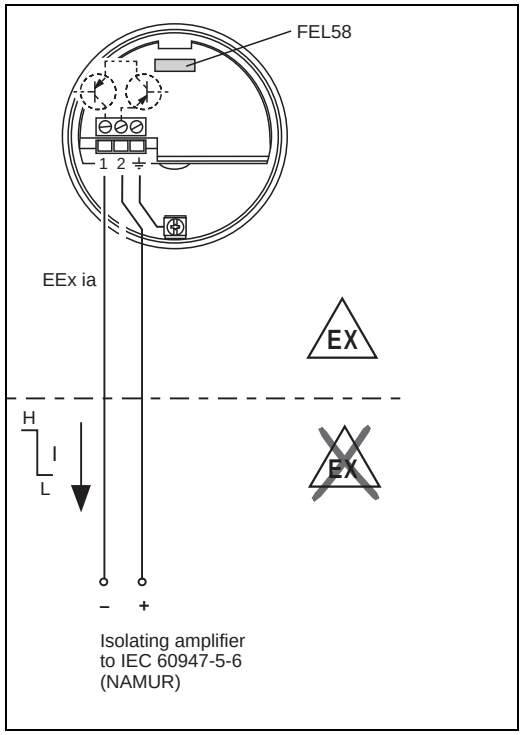
For connecting to isolating amplifiers as per NAMUR (IEC 60947-5-6), e.g. FTL325N, FTL375N from Endress+Hauser.
Output signal jump from high to low current on point level.

(H–L edge)

Additional function:
Test key on the electronic insert.
Pressing the key breaks the connection to the isolating amplifier.

Note!
In Ex–d applications, the additional function can only be used if the housing is not exposed to an explosive atmosphere.

Connecting to multiplexer:
Set clock time to min. 2 s.



L00-FTL5xxxx-04-05-xx-en-002

Output signal

= lit
= flashes
= unlit

L00-FTL5xxxx-07-05-xx-xx-002

Safety mode	Level	Output signal	LEDs green	LEDs yellow
MAX		+ 2 → 1 2.2 … 3.5 mA		
		+ 2 → 1 0.6 … 1.0 mA		●
MIN		+ 2 → 1 2.2 … 3.5 mA		
		+ 2 → 1 0.6 … 1.0 mA		●

L00-FTL5xxxx-04-05-xx-xx-007

Signal on alarm

Output signal in the event of damaged sensor: < 1.0 mA

Connectable load

- See Technical Data of the isolating amplifier connected according to IEC 60947–5–6 (NAMUR)
- Connection also to isolating amplifiers which have special safety circuits (I > 3.0 mA)

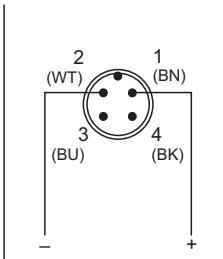
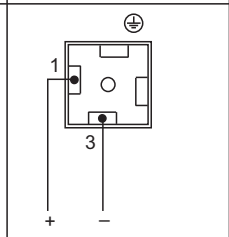
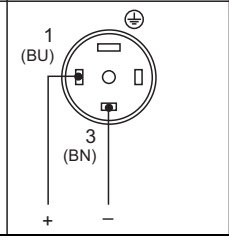
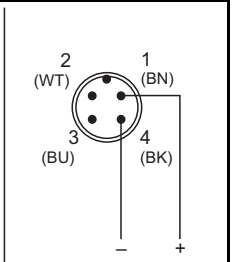
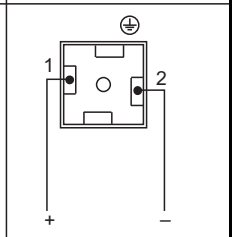
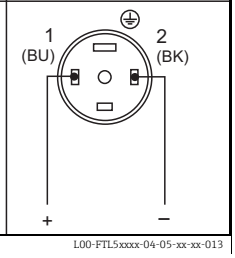
Electronics FEL58 (NAMUR H-L edge, compact housing)

Power supply

Supply voltage: DC 8.2 V ±20 %
Power consumption: < 6 mW at I < 1 mA; < 38 mW at I = 3.5 mA
Connection data interface: IEC 60947-5-6

Electrical connection

Two-wire connection for separate switching unit

	Connector	MAX	MIN
For connecting to isolating amplifiers acc. to NAMUR (IEC 60947-5-6), e.g. FTL325N, FTL375N from Endress+Hauser. Output signal jump from high to low current on point level. **(H–L edge)** Additional function: If the test magnet is held against the marking on the nameplate, the output signal is inverted. Connecting to multiplexer: Set clock time to min. 3 s. The NAMUR interface has a defined power consumption rate. Thus, it is not possible to use the M12 connector with an integrated LED (52018763).	FTL5#(H)- #######N3# (M12x1) 52018763 FTL5#(H)- #######N3# (M12x1) 52010285 / 52024216 FTL5#(H)- #######D3# (Pg11) FTL5#(H)- #######E3# (NPT½") -30°C ≤ TA ≤ +70°C -22° F ≤ TA ≤ +158°F FTL5#(H)- #######C3#	  	  

L00-FTL5xxxx-04-05-xx-xx-013

Output signal

Safety mode	Level	Output signal	LEDs green	LEDs yellow
MAX		+ 1 — 2.2… 3.5 mA → — 3	☼	☼
		+ 1 — 0.6… 1.0 mA → — 3	☼	●
MIN		+ 1 — 2.2… 3.5 mA → — 2	☼	☼
		+ 1 — 0.6… 1.0 mA → — 2	☼	●

L00-FTL5xxxx-04-05-xx-xx-007a

☼ = lit
☼ = flashes
● = unlit

L00-FTL5xxxx-07-05-xx-xx-002

Note!
The light emitting diodes are not readable on the version FTL5x(H)-## ## ## #C 3# (compact IP66/68 316L with a 5 m cable).

Signal on alarm

Output signal in the event of damaged sensor: < 1.0 mA

Connectable load

- See Technical Data of the isolating amplifier according to IEC 60947–5–6 (NAMUR)
- Connection also to isolating amplifiers which have special safety circuits (I > 3.0 mA)

Electronic insert FEL57 (PFM)

Power supply

Supply voltage: DC 9.5 to 12.5 V
Current consumption: 10 to 13 mA
Power consumption: < 150 mW
Reverse polarity protection

Electrical connection

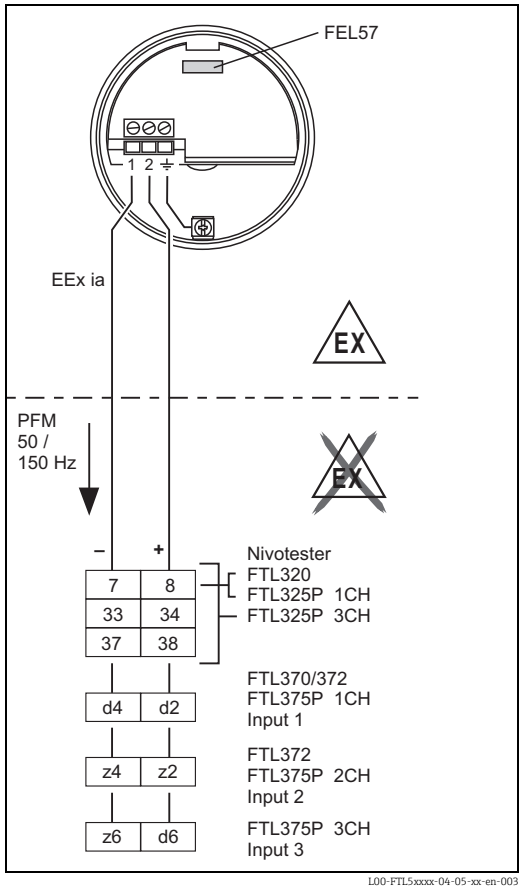
Two-wire connection for separate switching unit

For connecting to Endress+Hauser switching units Nivotester FTL320, FTL325P, FTL370, FTL372, FTL375P (also with proof test).

Output signal jump of the PFM signal from high to low frequency when sensor is covered. Switching between minimum/maximum safety in the Nivotester.

Additional function “proof test”:
After interruption of the power supply, a test cycle is activated which checks the sensor and electronics without any change in level.
Approved for overfill protection acc. to WHG (German Water Resources Act).
The following can be switched at the electronic insert:

- **Standard (STD):**
  Corrosion of the fork unlikely;
  simulation approx. 8 s
  tuning fork exposed – covered – exposed.
  For proof testing, the Nivotester tests the sensor's level notification function.
- **Extended (EXT)**:
  Corrosion of the fork possible;
  Simulation approx. 41 s: tuning fork exposed – covered – corroded – exposed.
  For proof testing, the Nivotester tests the sensor's level notification function and fault notification (alarm) function.

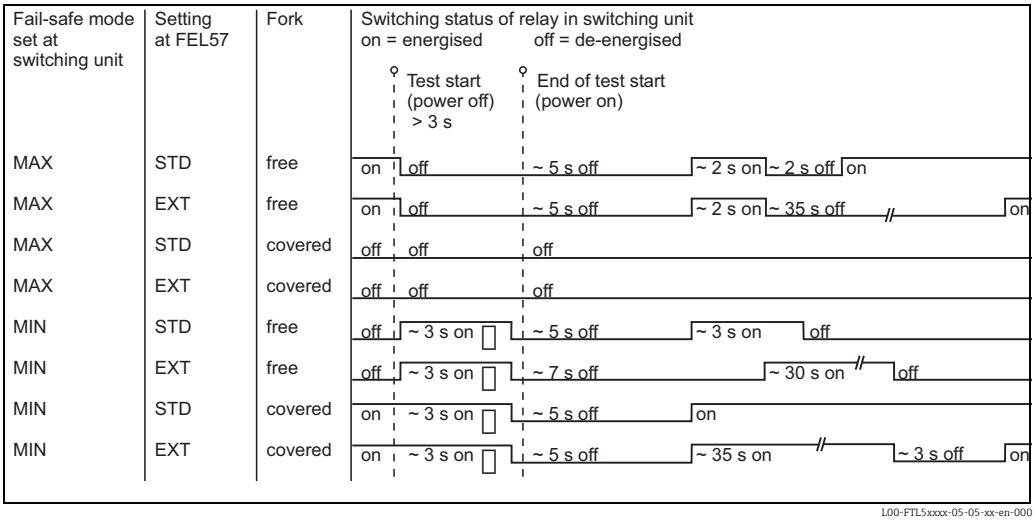


The check is activated and monitored at the switching unit.

The twin-core connecting cable (instrument cable) with a cable resistance of ≤ 25 Ω per core is connected to the screw terminals (conductor cross-sections 0.5 to 2.5 mm / 0.02 to 0.1 in) in the connection compartment. Protective circuits against reverse polarity, HF influences and overvoltage peaks are installed.
Maximum cable length up to 1000 m (3281 ft).

A shielded connecting cable is recommended in the event of strong electromagnetic interference. Here the shielding must be connected to the sensor and the power supply.

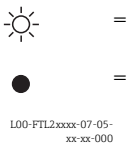
Switching behavior of the connected device:

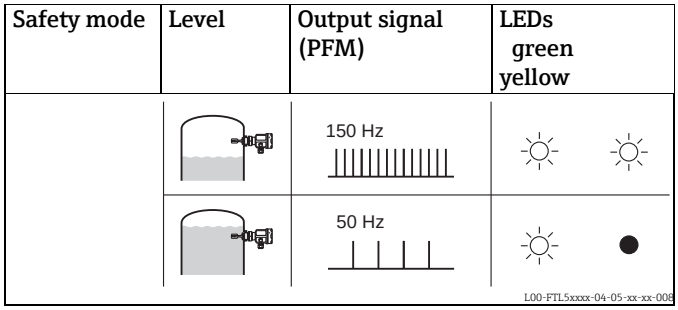


* De-energized on power supply failure

Please note this switching response and function of the plant especially when replacing a Liquiphant incorporating electronic insert EL17Z or FEL37 with a Liquiphant M incorporating electronic insert FEL57.

Output signal





Signal on alarm

Output signal on power failure or in the event of damaged sensor: 0 Hz

Connectable load

- Floating relay contacts in the connected switching unit Nivotester FTL325P, FTL375P
- For contact load, see the Technical Data of the switching unit.

Electronic insert FEL50A (PROFIBUS PA)

Power supply

Bus voltage: DC 9 to 32 V
Bus current:
- 12.5 mA +/– 1.0 mA (software version: 01.03.00, hardware version: 02.00)
- 10.5 mA +/– 1.0 mA (software version: 01.03.00, hardware version: 01.00)

Electrical connection

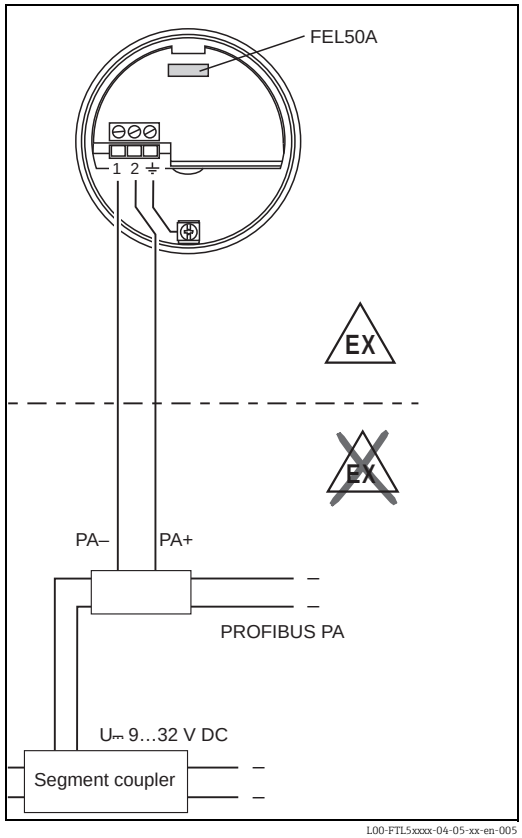
Two-wire connection for power supply and data transfer

For connecting to PROFIBUS PA

Additional functions:

– Digital communication enables the representation, reading and editing of the following parameters: Fork frequency, switch-on frequency, switch-off frequency, switch-on time and switch-off time, status, measured value, density switch.

– Matrix locking possible
– Switch to WHG mode possible (WHG approval)
– For a detailed description, see BA00198F



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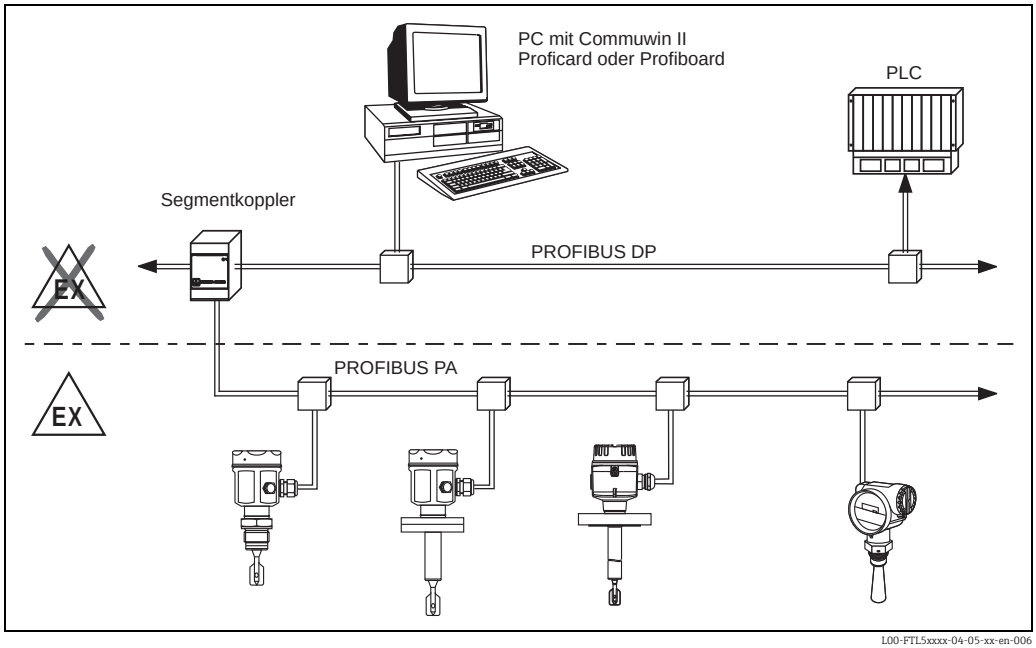


L00-FTL5xxxx-04-05-xx-en-006

Output signal

☼ = lit

● = unlit

L00-FTL2xxxx-07-05-xx-xx-000

Setting	Level	LEDs green	LEDs yellow	FEL50A
not inverted		☼	●	OUT_D = 0 PA bus signal
		☼	☼	OUT_D = 1 PA bus signal
inverted		☼	☼	OUT_D = 0 PA bus signal
		☼	●	OUT_D = 1 PA bus signal

L00-FTL5xxxx-04-05-xx-xx-009

Signal on alarm

- Failure information can be opened using the following interfaces:
  Yellow LED flashing, status code, diagnostic code; see BA00198F

Electronic insert FEL50D (density)

Power supply

Frequency range: 300 to 1500 Hz
Signal level: 4 mA
Pulse height: 16 mA
Pulse width: 20 µS

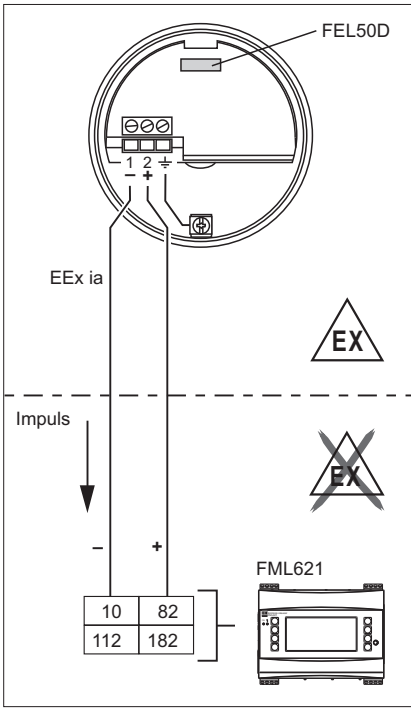
Electrical connection

Two-wire connection at Density Computer FML621
For connecting to the density and concentration computer FML621.

The output signal is based on pulse technology.
With the aid of this signal, the fork frequency is constantly forwarded to the switching unit.

Caution!
Operation with other switching units, such as FTL325P, is not permitted.

This electronic insert cannot be installed in devices that were



TI420Fen004

Signal on alarm

Output signal on power failure or in the event of damaged sensor: 0 Hz

Adjustment

In the Liquiphant M modular system, the option of an adjustment is also provided in addition to the electronics
(see feature 60: "Accessories").

There are three types of adjustment:

Standard adjustment (see ordering information for additional option, basic version A)
- Here, two fork parameters are determined to describe the sensor characteristics, indicated in the adjustment report and provided with the product.
  These parameters must be transmitted to the Density Computer FML621.

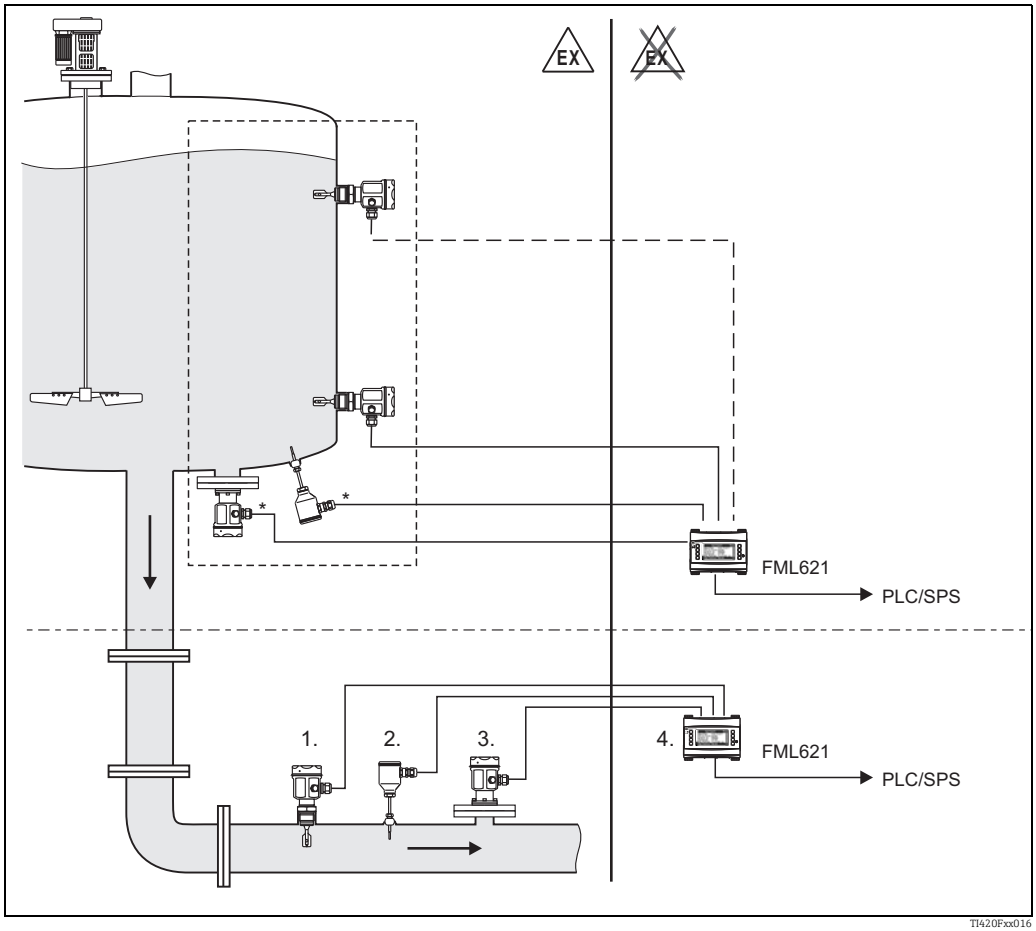
Special adjustment (see ordering information for additional option, special adjustment, density H_2O (K) or special adjustment, density H_2O with 3.1 certificate (L))
- Here, three fork parameters are determined to describe the sensor characteristics, indicated in the adjustment report and provided with the product.
  These parameters must be transmitted to the Density Computer FML621.
  Greater accuracy is achieved with this type of adjustment (see also "Performance characteristics").

Field Adjustment
- During field adjustment, a density value actually determined by the customer is entered and the system is automatically adjusted to this value (wet adjustment).

Note!
More information on Liquiphant M Density is available in Technical Information TI00420F. This can be downloaded from www.endress.com => Download.

Operating principle

Measuring the density of a liquid medium in pipes and tanks. Also suitable for use in hazardous areas, and preferably for applications in the chemical and food industry.



** Pressure and temperature information required depending on the application.*
1. Liquiphant M sensor with electronic insert FEL50D (pulse output);
2. Temperature sensor (e.g. 4 to 20 mA output);
3. Pressure transmitter (4 to 20 mA output);
4. Liquiphant density and concentration computer FML621 with display and operating unit

Light signals

LED	Symbol	Information
Yellow		Measurement valid
		Unstable process situation
		Maintenance required
Green		Power on
		Power off
Red		No fault
		Maintenance required
		Device failure

Connection and function

Connecting cables

- Electronic inserts: cross-section ≤ 2.5 mm² (14 AWG); strand in ferrule as per DIN 46228
- Protective ground in housing: cross-section ≤ 2.5 mm² (14 AWG)
- External equipotential bonding connection on housing: cross-section ≤ 4 mm² (12 AWG)

Safety mode

Minimum/maximum residual current safety selectable on electronic insert.
(with FEL57 on Nivotester only)

MAX = maximum safety:
The output switches to the power fail response when the fork is covered
For use with overfill protection for example

MIN = minimum safety:
The output switches to the power fail response when the fork is exposed
For use with dry running protection for example

Switching time

When fork is covered: approx. 0.5 s
When fork is exposed: approx. 1.0 s
Additionally configurable for PROFIBUS PA:
0.5-60 s

Other switching times available on request.

Switch-on behavior

When switching on the power supply, the output assumes the alarm signal.
After ≤ 3 s it assumes the correct switching mode (exception: FEL57)

Performance characteristics

Reference operating conditions

Ambient temperature: 23 °C (73 °F)

Medium temperature: 23 °C (73 °F)

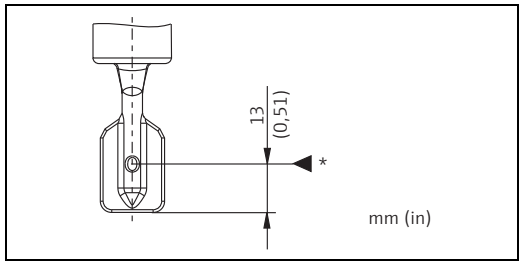
Medium density (water): 1 g/cm³ (SGU)

Medium viscosity: 1 mm²/s (cSt)

Medium pressure p_e: 0 bar (0 psi)

Sensor mounting: vertical from above

Density switch: to > 0.7 g/cm³ (SGU)



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** Switch point under reference operating conditions*

Maximum measured error

Under reference operating conditions: max. +/−1 mm (0.04 in)

Repeatability

0.1 mm (0.004 in)

Hysteresis

approx. 2 mm (0.08 in)

Influence of medium temperature

max. +1.8 to −2.8 mm (−50 to +150 °C / -58 to 302 °F)

Influence of medium density

max. +4.8 to −3.5 mm ((0.5 to 1.5 g/cm³ (SGU))
max. +0.19 to -0.14 in

Influence of medium pressure

max. 0 to −2.5 mm (−1 to 64 bar (-14.5 to 928 psi))
max. 0 to -0.1 in

Switching delay

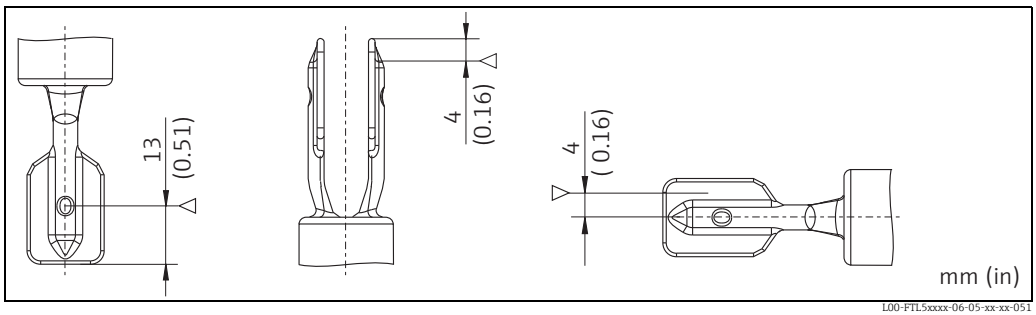
- When fork is covered: 0.5 s
- When fork is exposed: 1.0 s
- Available on request: 0.2 s; 1.5 s or 5 s (when the tuning fork is covered or exposed)

Operating conditions

Installation

Installation instructions

Switch points $\mathbb{L}_+$ on the sensor depend on the mounting position, with reference to water, Density 1 g/cm³ (SGU), 23 °C (73 °F), p_e 0 bar (0 psi).



Mounting from above *Mounting from below* *Mounting from the side*

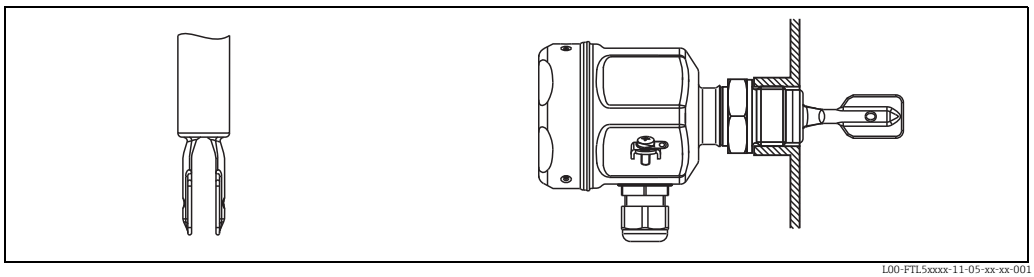
Note!
- The switch points of the Liquiphant**M** are at other positions to those of the previous version Liquiphant**II**.
- Minimum distance between the tip of the fork and the tank wall or pipe wall: 10 mm

Examples of mounting

Examples of mounting with regard to the viscosity ν of the liquid and the tendency to form buildup

Optimum mounting, without problem even with high viscosity:

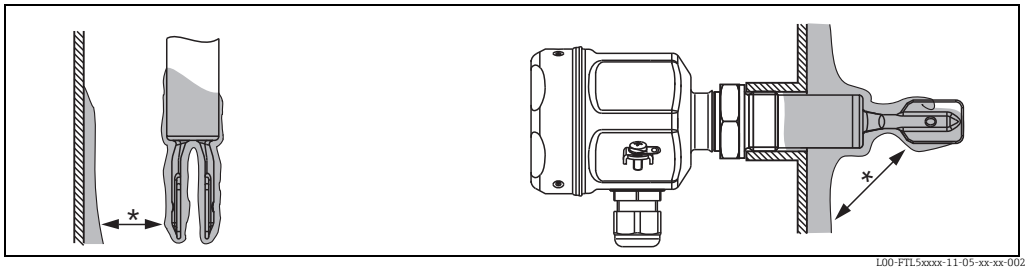
Position the fork so that the narrow edge of the tines is vertical to ensure that the liquid can run off easily.



Vertical from above *Flush-mounted from the side*

With buildup on the tank walls:

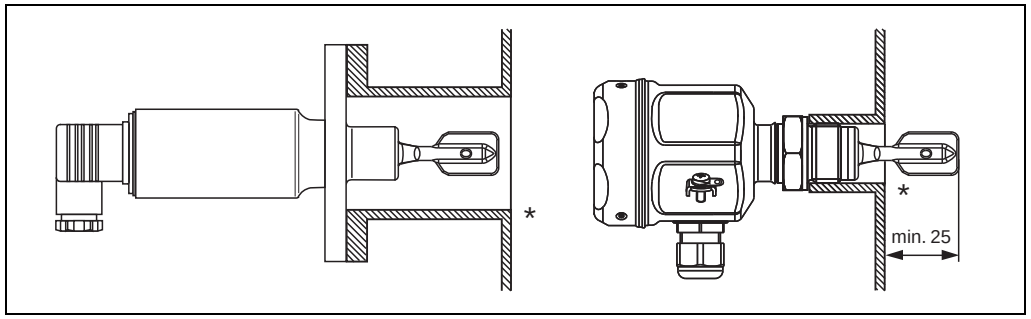
* Ensure that there is sufficient distance between the buildup expected on the tank wall and the fork.



Vertical from above *Protruding into the tank from the side*

Mounting positions in the case of low viscosity up to 2000 mm²/s (cSt):

* Deburr the nozzle surfaces



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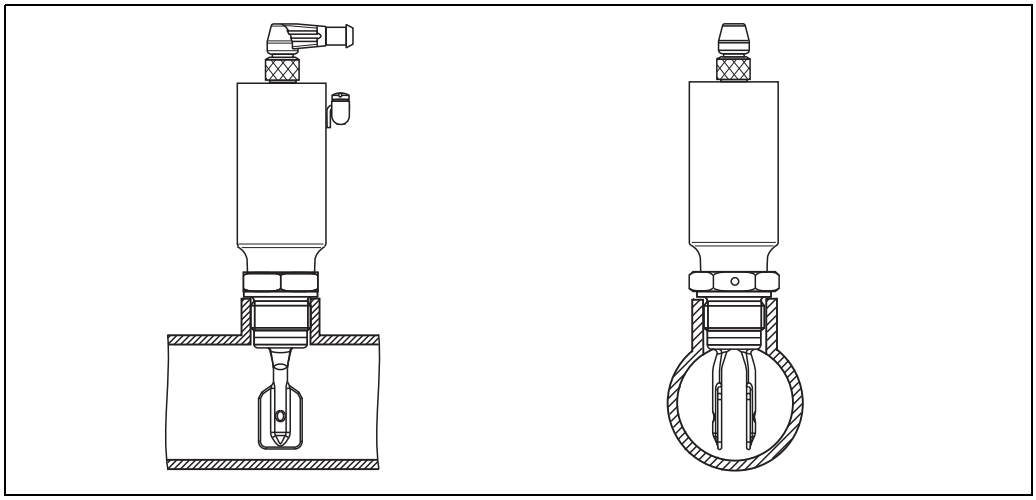
Mounting in piping from 2"

Flow velocities up to 5 m/s for viscosity of 1 mm²/s (cSt) and density 1 g/cm³ (SGU).
(Check the function for other medium conditions.)



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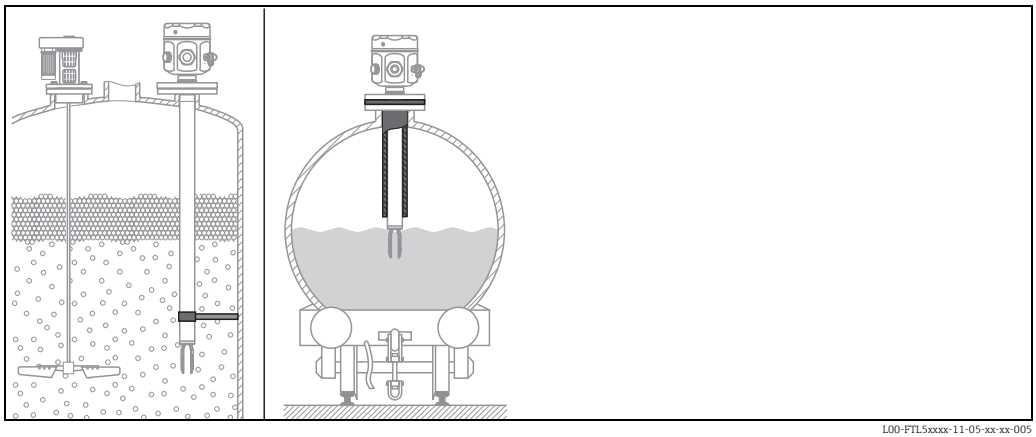
Dynamic load

Support the Liquiphant M FTL51(H) in the event of a severe dynamic load.



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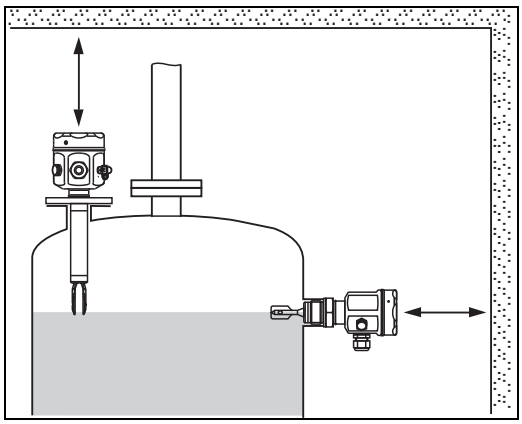
Ensure adequate space outside the tank for mounting, connection and configuration.



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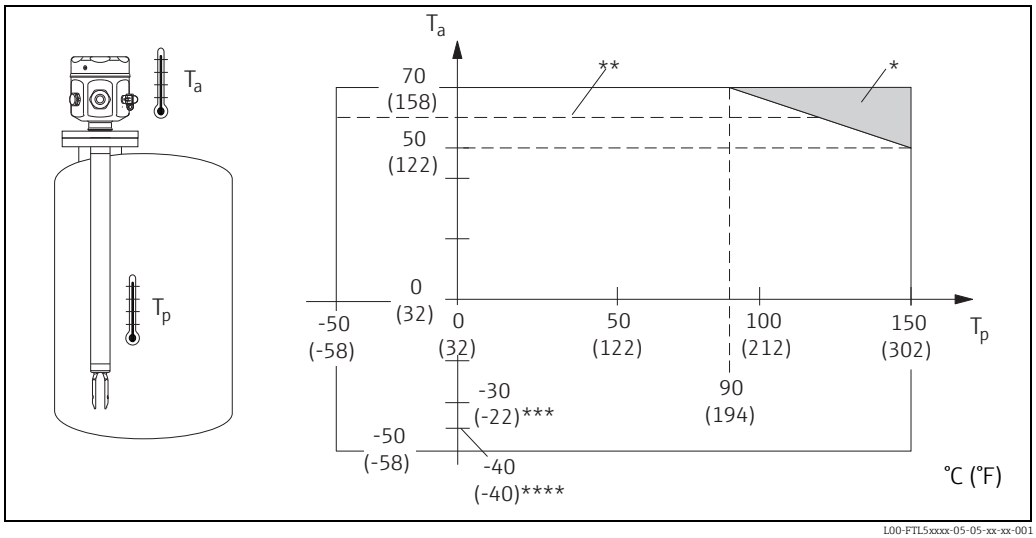
Orientation

- FTL50(H) and FTL51(H) with short pipe up to approx. 500 mm (19.7 in): any position
- FTL51(H) with long pipe: vertical

Environment

Ambient temperature range

Permitted ambient temperature T_a at the housing depending on the medium temperature T_p in the tank:



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* Additional temperature range for devices with a temperature spacer or pressure-tight feedthrough.
** Maximum ambient temperature with FEL50D/FEL50A in hazardous areas.
*** The following applies for devices with a compact housing according to version D3, E3: -30 °C ≤ Ta ≤ +70 °C
**** The following applies for the F16 housing: -40 °C ≤ Ta ≤ +70 °C

Storage temperature

−50 to +80 °C (-58 to 176 °F)

Installation height as per IEC61010-1 Ed.3

Up to 2000 m (6600 ft) above sea level.

Can be extended up to 3000 m (9800 ft) above sea level if overvoltage protection is used, for example HAW562 or HAW569.

Climate class

Climate protection to IEC 68, Part 2-38,
Fig. 2a

Degree of protection

Types of housing	IP65	IP66*	IP67*	IP68*	IP69	NEMA type**
Compact housing with valve connector Pg11/NPT ½	X	–	–	–	–	–
Compact housing with 5 m (16 ft) cable tail	–	X	–	X	–	–
Compact housing with M12x1 connector (52010285) 316L (metal)	–	X	–	X	–	–
Compact housing with elbowed connector (52024216) / L= 5 m (16 ft), without integrated LEDs	–	X	–	X	X	–
Compact housing with elbowed connector (52018763) / L= 5 m (16 ft), with integrated LEDs	–	X	–	X	X	–
Polyester housing F16	–	X	X	–	–	4X
Stainless steel housing F15	–	X	X	–	–	4X
Aluminum housing F17	–	X	X	–	–	4X
Aluminum housing F13****	–	X	–	X***	–	4X/6P
Stainless steel housing F27	–	X	–	X	–	4X/6P
Aluminum housing T13 with separate connection compartment (Ex d)	–	X	–	X***	–	4X/6P

* As per EN60529
** As per NEMA 250
*** only with M20 cable entry or G1/2 thread
**** F13 housing only in conjunction with XP or Ex d approval

Vibration resistance

As per IEC 68, parts 2-6 (10 to 55 Hz, 0.15 mm (0.01 in), 100 cycles)
In the event of increased vibrations, the following additional option is recommended: feature "060" version "P" 100 bar (1450 psi) process pressure.

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)

Medium conditions

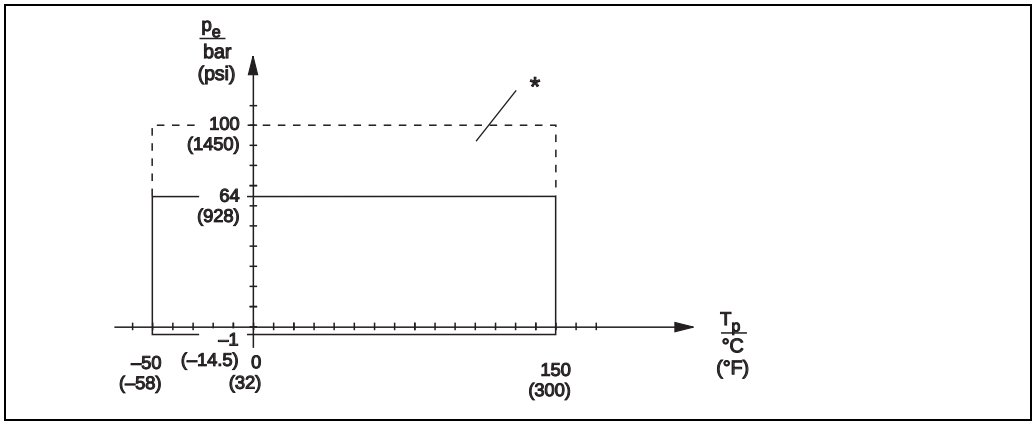
Medium temperature

−50 to +150 °C (-58 to 302 °F); for exceptions, see "Process connections"

Thermal shock

≤ 120 °C/s (248 °F/s)

Medium pressure p_e



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* Permitted pressure rating when the "100 bar (1450 psi)" option is selected (see "Product structure FTL51", feature 060, from → 43).
See "Process connections" → 33 for exceptions.
Canadian CRN approval: Additional details on maximum pressure values are available in the download area of the product page at "www.endress.com".

Please refer to the standards listed for the permitted pressure values of the flanges at higher temperatures:

- pR EN 1092-1: 2005
  With regard to their stability-temperature property, the materials 1.4435 and 1.4404 are identical and are grouped together in EN 1092-1 Tab. 18 under 13E0. The chemical composition of the two materials can be identical.
- ASME B 16.5 - 2013 Tab. 2-2.2 F316
- ASME B 16.5 - 2013 Tab. 2-3.8 N10276
- JIS B 2220

The lowest value from the derating curves of the device and selected flange applies in each case.

Test pressure

p_e = 64 bar (928 psi):
- ≤ 100 bar (1450 psi) or 1.5 times the medium pressure p_e
- Sensor burst pressure at 200 bar (2900 psi)

p_e = 100 bar (1450 psi):
- ≤ 150 bar (2175 psi) or 1.5 times the medium pressure p_e)
- Sensor burst pressure at 400 bar (5800 psi)

Note!
The device function is restricted during pressure testing.

State of aggregation

Liquid

Density

0.7 g/cm³ (SGU) = delivery status

0.5 g/cm³* (SGU) can be adjusted via switches

* Density settings for the compact housing on request

Viscosity

≤ 10,000 mm²/s (cSt)

Solids content

≤ ø5 mm (0.2 in)

Lateral loading capacity

≤ 75 Nm

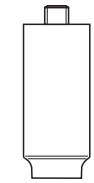
Mechanical construction

Note!
2D and 3D drawings containing individual dimensions can be generated and downloaded in the Configurator on the product pages of the Liquiphant FTL5x at www.endress.com.

Design

Summary of all electrical and mechanical versions

Housing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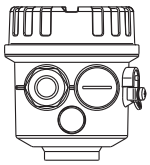
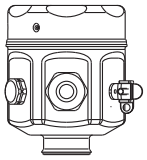
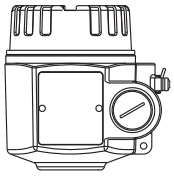
Compact
Pipe housing (316L)


L00-FTL5xxxx-03-05-xx-xx-001

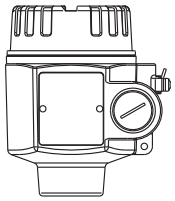
F16
Polyester (PBT)


L00-FTL5xxxx-03-05-xx-xx-002

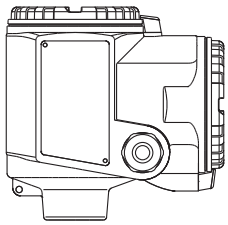
F15
Stainless steel (316L)


L00-FTL5xxxx-03-05-xx-xx-031

F17
Aluminum
Housing coated


L00-FTL5xxxx-03-05-xx-xx-033

F27
Stainless steel (316L)
F13
Aluminum
(also for Ex d/XP),
housing coated


L00-FTL5xxxx-03-05-xx-xx-004

T13
Aluminum with separate connection compartment (also Ex de and Ex d), housing coated

Plug-in electronic inserts to mount in the housing


L00-FTL5xxxx-03-05-xx-xx-000

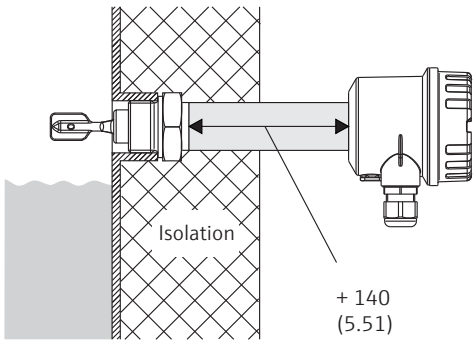
FEL51*:	Two-wire AC connection
FEL52*:	Three-wire DC connection PNP
FEL54:	Universal current connection, 2 relay outputs
FEL55:	Output 16/8 mA for separate switching unit
FEL56:	Output 0.6 to 1.0 / 2.2 to 2.8 mA for separate switching unit (NAMUR)
FEL58*:	Output 2.2 to 3.5 / 0.6 to 1.0 mA for separate switching unit (NAMUR)
FEL57:	Output 150/50 Hz, PFM, for separate switching unit (Nivotester)
FEL50A:	Digital communication PROFIBUS PA
FEL50D:	Pulse output for Density Computer FML621

* Electronics also available as compact housing. The electronics cannot be exchanged!
If the housing is ordered with a cable gland: the cable gland is ready-mounted upon delivery. A second cable gland is included in conjunction with FEL54.

Temperature spacer and pressure-tight feedthrough

Temperature spacer (optional)
Provides sealed insulation for the vessel and normal ambient temperatures for the housing.

Pressure-tight feedthrough (optional)
Protects the housing from pressures up to 100 bar (1450 psi) if the sensor is damaged. Provides sealed insulation for the vessel and normal ambient temperatures for the housing.

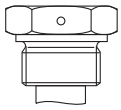


L00-FTL5xxxx-06-05-xx-xx-091

Process connections

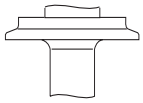
L00-FTL5xxxx-03-05-xx-xx-006

G ¾, DIN ISO 228/I
R ¾, EN10226
NPT ¾, ASME B 1.20.1
(AF 32)



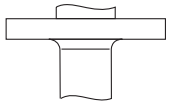
L00-FTL5xxxx-03-05-xx-xx-007

G 1, DIN ISO 228/I
R 1, EN10226
NPT 1, ASME B 1.20.1
(AF 41)



L00-FTL5xxxx-03-05-xx-xx-008

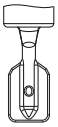
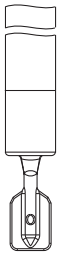
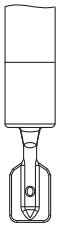
Diverse
hygienic and
aseptic
connections



L00-FTL5xxxx-03-05-xx-xx-009

Flanges as per DIN,
ASME,
JIS
from DN 25 / 1"

Sensors

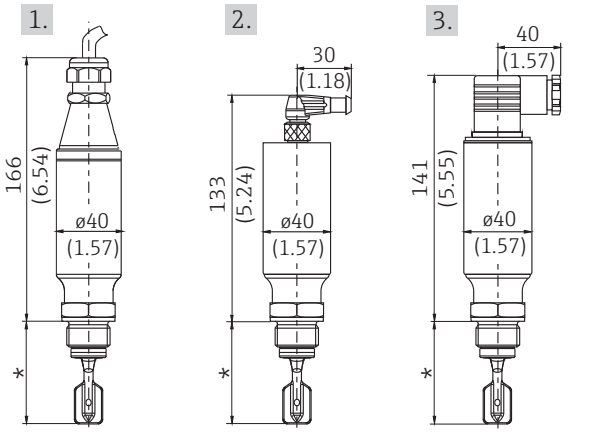
Compact, with extension pipe up to 3 m (up to 6 m on request) or special "length L II" (see → 🖹 33ff.)	Compact	Length L	Length L II
			
		L00-FTL5xxxx-03-05-xx-xx-018	
p_e = bar/psi	64/928	64/928 100/1450	64/928 100/1450

Dimensions

Dimensions in mm (in)!

Housing FTL50(H), FTL51(H) with sensor FTL50(H)

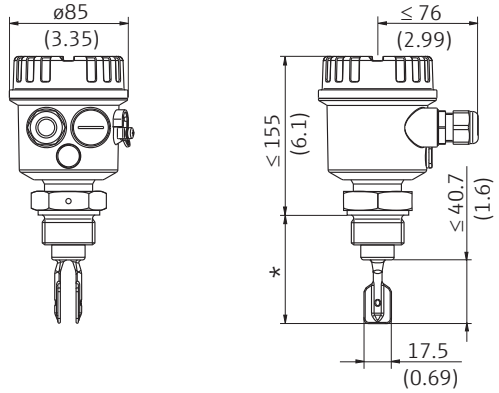
Compact housing, primarily for hygiene applications



L00-FTL5xxxx-06-05-xx-xx-085

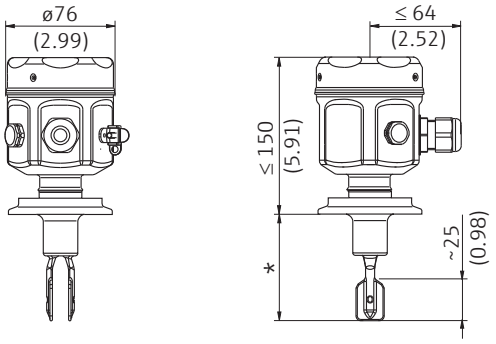
1. 5 m cable
2. M12 connector
3. Pg11/NPT ½ connector

Polyester housing F16



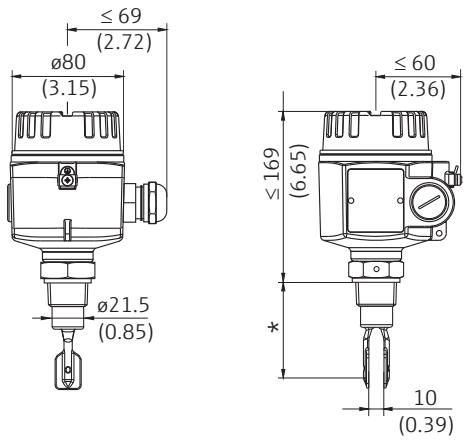
L00-FTL5xxxx-06-05-xx-xx-086

F15 stainless steel housing primarily for hygiene applications



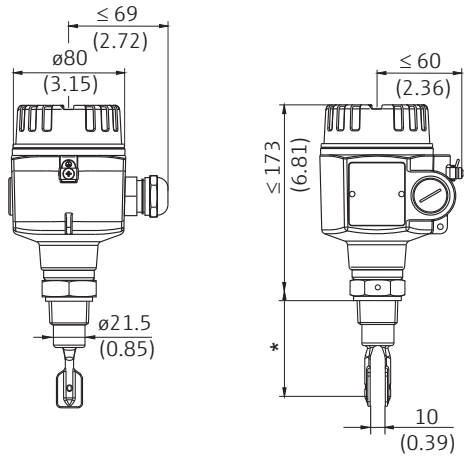
L00-FTL5xxxx-06-05-xx-xx-087

Aluminum housing F17



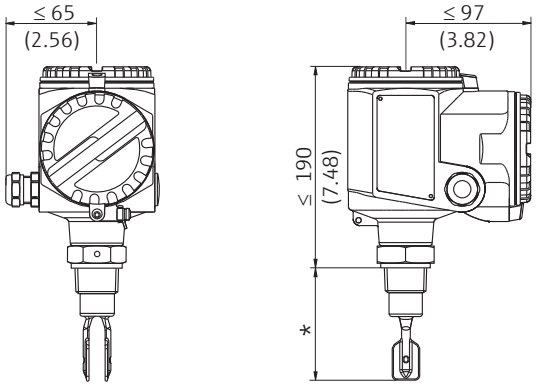
L00-FTL5xxxx-06-05-xx-xx-088

Stainless steel housing (316L) F27
Aluminum housing F13



L00-FTL5xxxx-06-05-xx-xx-089

Aluminum housing T13
with separate connection compartment

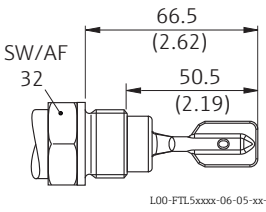
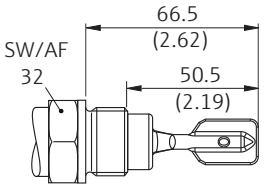
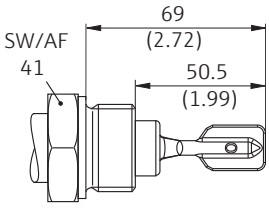
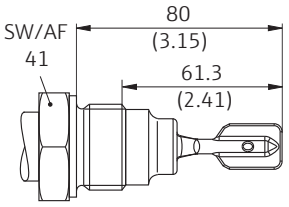
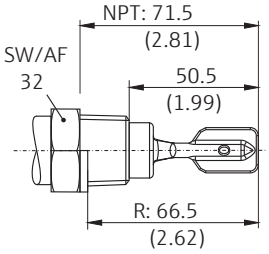
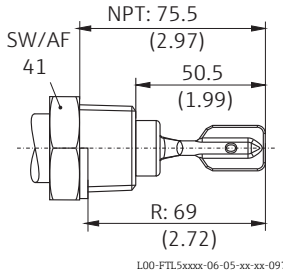


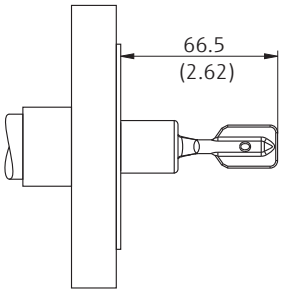
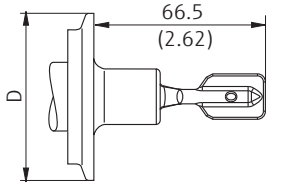
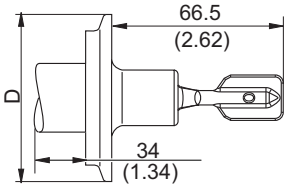
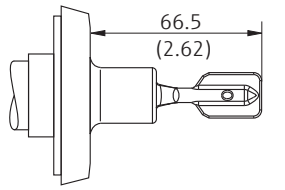
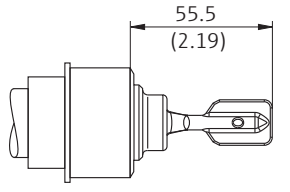
L00-FTL5xxxx-06-05-xx-xx-090

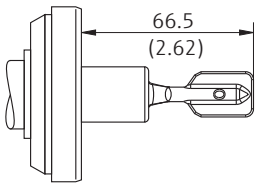
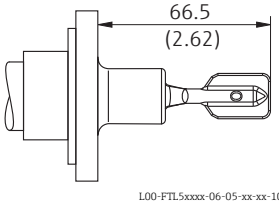
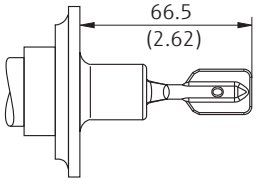
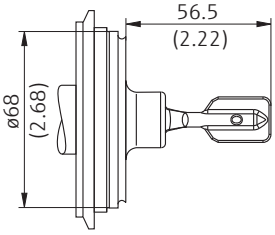
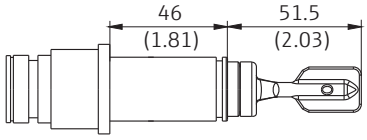
* See "Process connections"

Note!
The switch points of the Liquiphant**M** are at other positions to those of the previous version Liquiphant**II**.

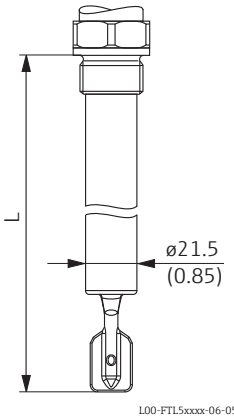
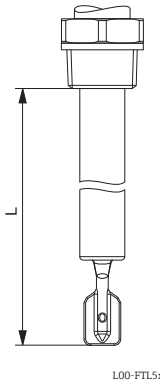
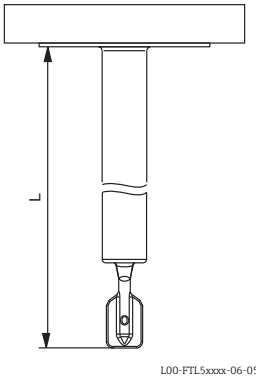
Process connections for FTL50(H) and FTL51(H)

Process connection		Dimensions	Accessories	Pressure Temperature
G ¾ DIN ISO 228/1 with defined thread start; Flat seal to DIN 7603: supplied	GQ2 GQ6			≤ 100 bar / only FTL51 (≤ 1450 psi) ≤ 150 °C (302 °F)
G ¾ DIN ISO 228/1 with defined thread start for flush-mounted installation in weld-in adapter	GQ2 GQ6		**Weld-in adapter** (with defined thread start) with silicone O- ring only FTL50, FTL50H See "Accessories" In conformity with FDA*	≤ 25 bar (363 psi) ≤ 150 °C (302 °F) ≤ 40 bar (580 psi) ≤ 100 °C (212 °F)
G 1 DIN ISO 228/1 Flat seal to DIN 7603: supplied	GR2 GR6			≤ 100 bar / only FTL51 (1450 psi) ≤ 150 °C (302 °F)
G 1 DIN ISO 228/1 with defined thread start With seal surface for flush-mounted installation in weld-in adapter	GW2		**Weld-in adapter** (with defined thread start) with silicone O- ring See "Accessories" In conformity with FDA*	≤ 25 bar (363 psi) ≤ 150 °C (302 °F) ≤ 40 bar (580 psi) ≤ 100 °C (212 °F)
NPT ¾ ASME B 1.20.1 or **R ¾** DIN/EN 10226	GM2 GM6 GE2 GE6			≤ 100 bar / only FTL51 (1450 psi) ≤ 150 °C (302 °F)
NPT1 ASME B 1.20.1 or **R 1** DIN/EN 10226	GN2 GN6 GF2 GF6			≤ 100 bar / only FTL51 (1450 psi) ≤ 150 °C (302 °F)

Process connection		Dimensions	Accessories	Pressure Temperature
* FDA-compliant material in accordance with 21 CFR Part 177.2600 (silicone)				
Flanges ASME B 16.5 EN 1092-1 (DIN 2527 B) JIS B2220	A## B## C## F## N## K##		Seal depending on design installed on site	See nominal pressure of flange, however ≤ 100 bar (1450 psi) (only FTL51) ≤ 150 °C (302 °F)
	For higher chemical-resistance, AlloyC22-plated flanges are available. The flange carrier material is made of 316L and is welded with a 2 to 3 mm (0.08 to 0.12 in) thick AlloyC22 disk.			
Tri-Clamp ISO 2852 DN25-38 (1 to 1 ½") DIN 32676 DN25-40 ø D = 50.5 mm (1.99 in) ISO 2852 DN40-51 (2") DIN 32676 DN50 ø D = 64.0 mm (2.52 in)	TC2 TE2		Clamping ring and front seal installed on site**	≤ 25 bar (363 psi) ≤ 150 °C (302 °F)
	TE2: Mounting with NA connector only in conjunction with housing T13, F13 and compact housing. TC2: Mounting with NA connector only in conjunction with compact housing.			
Tri-Clamp NA Connect only for FTL50H, FTL51H ISO 2852 DN25-38 (1 to 1 ½") DIN 32676 DN25-40 ø D = 50.5 mm (1.99 in) ISO 2852 DN40-51 (2") DIN 32676 DN50 ø D = 64.0 mm (2.52 in)	TD2 TF2		Clamping ring and front seal installed on site**	≤ 25 bar (363 psi) ≤ 150 °C (302 °F)
	TD2, TF2: Mounting with NA connector only in conjunction with housing F15, F16 and F17.			
Threaded pipe joint DN 32 DN 40 DN 50 DIN 11851 with thread adapter nut	MA2 MC2 ME2		Sealing ring with collar, installed on site**	DN 32, DN 40: ≤ 40 bar (580 psi) up to 100 °C (212 °F) ≤ 25 bar (363 psi) up to 140 °C (284 °F) DN 50: ≤ 25 bar (363 psi) ≤ 140 °C (284 °F)
Flush-mounted for weld-in adapter Factory standard Endress+Hauser with silicone seal and thread adapter nut: supplied	EE2		**Weld-in adapter** (fork can be positioned) See "Accessories" In conformity with FDA*	≤ 40 bar (580 psi) ≤ 100 °C (212 °F) ≤ 25 bar (363 psi) ≤ 150 °C (302 °F)

Process connection		Dimensions	Accessories	Pressure Temperature
Aseptic DN 50 DIN 11864-1 Form A for pipe DIN 11850 with thread adapter nut	HE2		sealing ring installed on site**	≤ 25 bar (363 psi) ≤ 140 °C (284 °F)
DRD With clamped flange	PE2		Welding flange with PTFE flat seal (fork can be positioned) See "Accessories" (or installed on site)** In conformity with FDA*	≤ 40 bar (580 psi) ≤ 100 °C (212 °F) ≤ 25 bar (363 psi) ≤ 150 °C (302 °F)
* FDA-compliant material in accordance with 21 CFR Part 177/2600 (silicone), 21 CFR Part 177.1550 (PTFE) ** The maximum temperature and the maximum pressure are dependent on the clamping ring used and the seal used. The lowest value applies in each case.				
SMS 2" (DN 51) with thread adapter nut	UE2		sealing ring installed on site**	≤ 25 bar (363 psi) ≤ 140 °C (284 °F)
Varivent for piping ≥ DN 65 ≥ O.D. 3" ≥ I.P.S. 3"	WE2		Clamping ring and O-ring seal, installed on site**	However, see specification as per Tuchenhagen VARIVENT-Inline housing: ≤ 25 bar (363 psi) ≤ 150 °C (302 °F)
Ingold fitting DN 25 Fitting length 46 mm (2.52 in) Thread adapter nut G 1 ¼ with O-ring seal, EPDM (FDA-compliant, USP Class VI*)	TT2			≤ 16 bar (232 psi) ≤ 150 °C (302 °F)
* FDA-compliant material in accordance with 21 CFR Part 177/2600 (EPDM) ** The maximum temperature and the maximum pressure are dependent on the clamping ring used and the seal used. The lowest value applies in each case.				

Sensor length L for FTL51 and FTL51H, depending on process connection

Thread: G ¾ G 1	Thread: NPT ¾ NPT1 R ¾ R 1	Flanges and flange-like process connections
		
From seal surface of thread adapter	From lower edge of thread	

Customized length L:
- 148 mm to 3000 mm (6 to 115 in); special version (TSP) on request up to 6000 mm (235 in)
- Length tolerances L: < 1 m (−5 mm), 1 to 3 m (−10 mm) / < 3.3 ft (-0.2 in), 3.3 to 9.8 ft (-0.39 in)

Note!
The switch points of the Liquiphant**M** are at other positions to those of the previous version Liquiphant**II**.
Special length "L II":
With vertical mounting from above approximately the same switch point as for the Liquiphant II FTL360, FTL365, FDL30, FDL35

"L II" depends on process connection:

L = 115 mm (4.53 in) for flanges and flange-like process connections such as Clamp, DRD...
L = 99 mm (3.9 in) for threads NPT and R (BSPT)
L = 118 mm (4.65 in) for threads G1 (BSP 1)
L = 115 mm (4.53 in) for threads G ¾ (BSP ¾)
L = 104 mm (4.09 in) for flush-mounted 1" (G1" Endress+Hauser welding bosses)

Weights

See "Ordering information" → 📄 43ff

Materials and surfaces

Material specifications as per AISI and DIN-EN.

Parts in contact with process

- Process connection and extension pipe:
  - FTL5x → 316L (1.4404 or 1.4435) optional 2.4602 (AlloyC22)
  - FTL5xH → 316L (1.4435)
- Tuning fork: 316L (1.4435) optional 2.4602 (AlloyC22)
- Flanges:
  - ASME: 316/316L
  - EN: 316L (1.4404)
  - JIS: 316L (1.4404)
- Flange plating: AlloyC22 (2.4602)
- Flat seal for process connection G ¾ or G 1: elastomer fiber, asbestos-free

Surface roughness

Choice of mechanically polished surface roughness (version → probe length → type):

- Ra < 1.5 µm (59.1 µin), with EHEDG approval

- Ra < 0.3 µm (11.8 µin), 3-A and EHEDG approval and CoC-ASME-BPE

Note!
The surface is electropolished if the additional option "B"
(CoC - ASME BPE) is selected in addition to surface roughness quality Ra < 0.3 µm (11.8 µin). The surface roughness is then: Ra < 0.38 µm (15.0 µin).
With this combination, the wetted parts are made of 316L (1.4435) in accordance with BN2 (delta-ferrite content < 1 %).

Parts with no process contact

- Tuning fork/housing seal: EPDM
- Temperature spacer: 316 L (1.4435)
- Pressure-tight feedthrough: 316L (1.4435)
- Ground terminal on housing (external): 316L (1.4404)
- Cable glands
  - Housing F13, F15, F16, F17: polyamide (PA)
    With B or C approval (→ 43 ordering information): nickel-plated brass
  - Housing F27: polyamide PA, with approval "B" or "C" 316L (1.4435)
  - Housing T13: nickel-plated brass
- Polyester housing F16: PBT-FR with PBT-FR cover or with PA12 transparent cover
  - Cover seal: EPDM
  - Nameplate glued: polyester film (PET)
  - Pressure compensation filter: PBT-GF20
- Stainless steel housing F15: 316L (1.4404)
  - Cover seal: silicone
  - Safety claw: 304 (1.4301)
  - Pressure compensation filter: PBT-GF20, PA
- Aluminum housing F17/F13: EN-AC-AlSi10Mg, plastic-coated
  - Nameplate: aluminum, anodized
  - Cover seal: EPDM
  - Safety claw: nickel-plated brass
  - Pressure compensation filter: silicone
- Stainless steel housing F27: 316L
  - Nameplate: 316L (1.4404)
  - Cover seal: FVMQ (optional: EPDM seal available as spare part)
  - Safety claw: 316L (1.4435)
- Aluminum housing T13: EN-AC-AlSi10Mg, plastic-coated,
  - Nameplate: aluminum, anodized
  - Cover seal: EPDM
  - Safety claw: nickel-plated brass
- Compact housing (valve connector or M12 connector): 316L (1.4435)

Process connections

- Parallel thread G ¾, G 1 to DIN ISO 228/I with flat seal to DIN 7603
- Tapered thread R ¾, R 1 to EN10226
- Tapered thread ¾ -14 NPT, 1 - 11½ NPT as per ASME B 1.20.1
- Flush-mounted installation with weld-in adapter to factory standard Endress+Hauser (G ¾, G 1)
- Flush-mounted installation with weld-in adapter to factory standard Endress+Hauser (1"), sensor can be positioned
- Tri-Clamp 1½", 2" to ISO 2852
- Threaded pipe joint DN 32, 40, 50 to DIN 11851
- Aseptic connection DN 50 to DIN 11864-1
  Form A for pipe DIN 11850
- SMS connection 2" (DN 51)
- DRD flange
- Varivent® DN 50 (50/40) to factory standard Tuchenhagen
- Flanges: as per EN/DIN 1092-1 from DN 25, as per ASME B 16.5 from 1", as per JIS B2220 (RF)
- Ingold DN25 fitting length 46 mm (1.81 in) with thread adapter nut G1 ¼

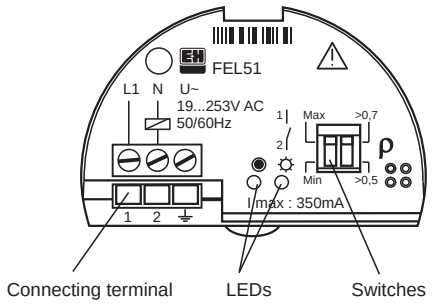
Further details at Ordering information → 43.

Human interface

Electronic inserts

With FEL51, FEL52, FEL54, FEL55:

- 2 switches for safety mode and density change
- green LED to indicate operational status
- red LED to indicate the switching status, flashes in the event of corrosion damage on sensor or if the electronics are defective



L00-FTL5xxxx-03-05-xx-en-001

With FEL56:

- 2 switches for safety mode and density change
- green LED flashes to indicate operational status
- red LED to indicate the switching status, flashes in the event of corrosion damage on sensor or if the electronics are defective

With FEL57:

- 2 switches for density change and Testing
- green LED to indicate operational status
- yellow LED to indicate the covered status, flashes in the event of corrosion damage on sensor or if the electronics are defective

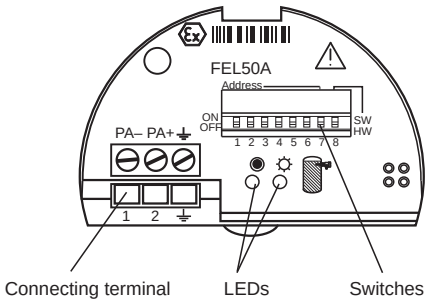
L00-FTL5xxxx-03-05-xx-xx-013

With FEL58:

- 2 switches for safety mode and density change
- green LED
  - flashes quickly to indicate operational status,
  - flashes slowly in the event of corrosion damage to the sensor of if the electronics are defective
- yellow LED to indicate the switching status, Test key – breaks the cable connection

With FEL50A:

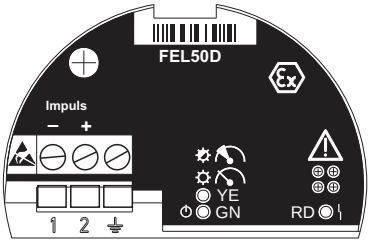
- 8 switches for configuring the device address
- green LED to indicate operational status, pulsing to indicate communication;
- yellow LED to indicate the switching status, flashes in the event of corrosion damage on sensor or if the electronics are defective



L00-FTL5xxxx-03-05-xx-en-002

With FEL50D:

- yellow LED: to indicate the validation of the measurement
- green LED: to indicate the operational status
- red LED: to indicate faults



TI328Fxx004

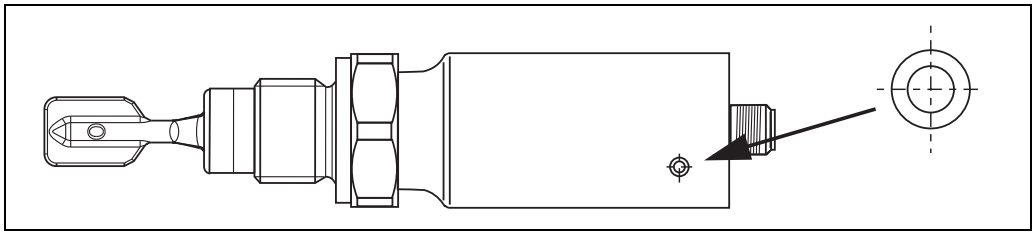
Compact housing

Function test with test magnet

Versions AC, DC-PNP and NAMUR:

During the test, the current state of the electronic switch is reversed.

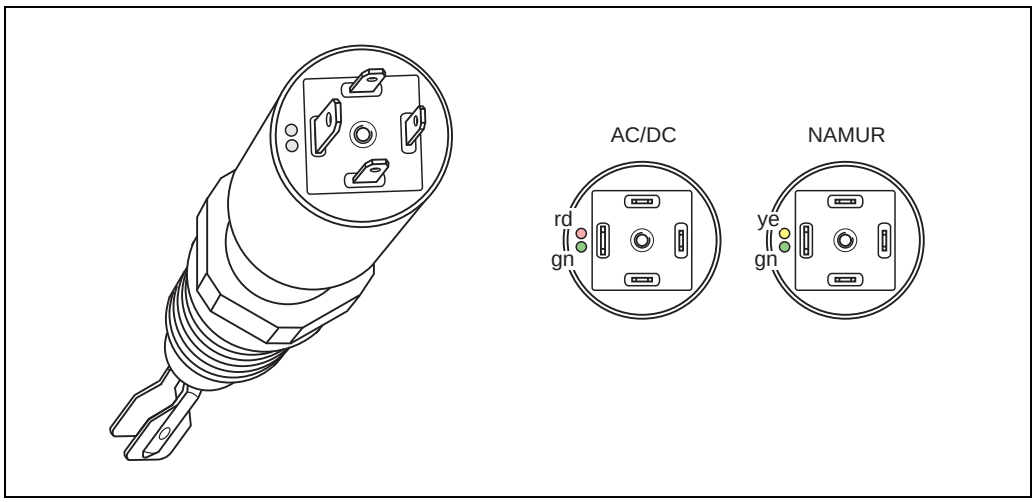
Hold the test magnet against the marking on the nameplate: The switching status is changed.



L00-FTL5xxxx-19-05-xx-xx-001

Light signals

Versions AC and DC-PNP with valve connector or cable tail



L00-FTL5xxxx-07-05-xx-xx-005

Green light (gn) lights up (AC/DC):

Liquiphant M is connected to the power supply and is operational.

Green light (gn) flashing (NAMUR):

Liquiphant M is connected to the power supply and is operational.

Red light (rd) lights up (AC/DC):

MAX application mode (overfill protection): sensor is immersed in liquid.
MIN application mode (dry running protection): sensor is not immersed in liquid.

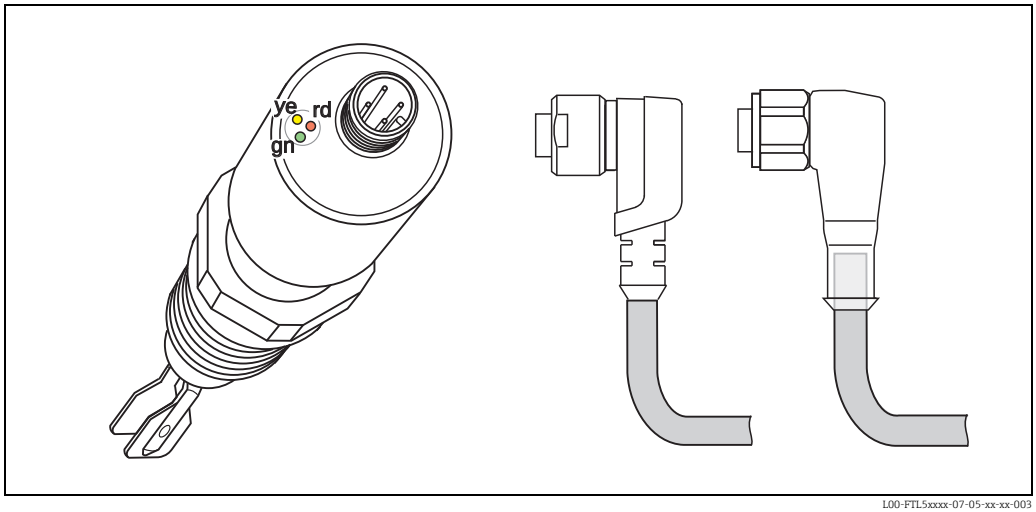
Yellow light (ye) lights up (NAMUR):

MAX application mode (overfill protection): sensor is not immersed in liquid.
MIN application mode (dry running protection): sensor is immersed in liquid.

Red light (rd) flashing (AC/DC):

Liquiphant M has detected a fault.

Version NAMUR and DC-PNP with M12x1 round connector 316L



L00-FTL5xxxx-07-05-xx-xx-003

Green light (gn) lights up (DC-PNP):

Liquiphant M is connected to the power supply and is operational.

Green light (gn) flashing with 1 Hz (NAMUR):

Liquiphant M is connected to the power supply and is operational.

Yellow light (ye) lights up (DC-PNP):

Sensor is immersed in liquid.

Yellow light (ye) lights up (NAMUR):

MAX application mode (overfill protection): sensor is not immersed in liquid.
MIN application mode (dry running protection): sensor is immersed in liquid.

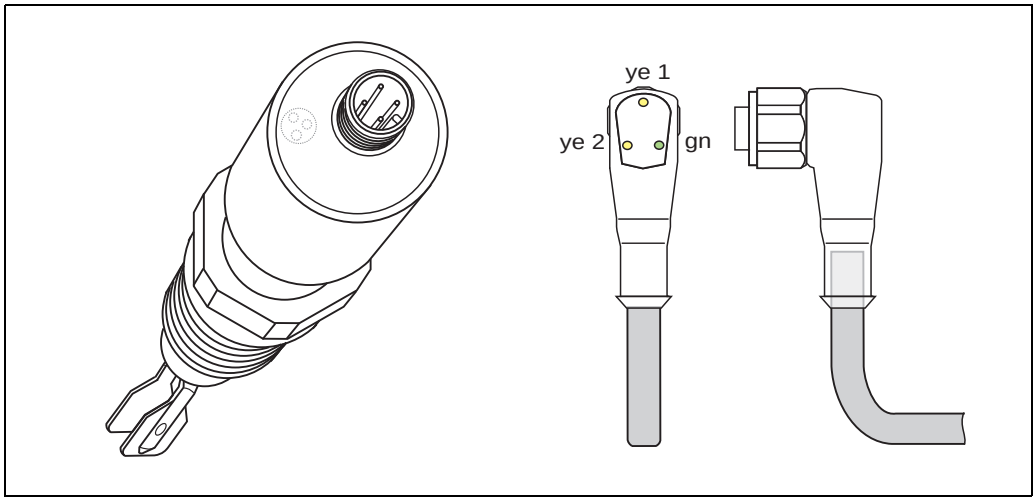
Red light (rd) flashing (DC-PNP):

Liquiphant M has detected a fault.

Green light (gn) flashing with 0.3 Hz (NAMUR):

Liquiphant M has detected a fault.

Version DC-PNP with M12x1 round connector 316L



L00-FTL5xxxx-07-05-xx-xx-004

Green light (gn) lights up:

Liquiphant M is connected to the power supply and is operational.

Yellow light (ye 1) lights up:

MAX application mode (overfill protection): sensor is not immersed in liquid.
MIN application mode (dry running protection): sensor is not immersed in liquid.

Yellow light (ye 2) lights up:

MAX application mode (overfill protection): sensor is immersed in liquid.
MIN application mode (dry running protection): sensor is immersed in liquid.

Green light (gn) lights up, both yellow lights (ye 1+2) do not light up:

Liquiphant M has detected a fault.

Operating concept

Onsite configuration

Certificates and approvals

CE mark

The measuring system meets the legal requirements of the applicable EC Directives. These are listed in the corresponding EC Declaration of Conformity along with the standards applied.
Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

RoHS

The measuring system complies with the substance restrictions of the EU Directive on the restriction of the use of certain hazardous substances 2011/65/EU (RoHS 2).

RCM-tick mark

The product or measuring system supplied complies with the regulations of the Australian Communications and Media Authority (ACMA) for network integrity, performance characteristics and health and safety requirements. The specifications for electromagnetic compatibility, in particular, are observed. The products bear the RCM-tick mark on their nameplate.

A0029561

EAC conformity

The measuring system meets the legal requirements of the applicable EAC Directives.
These are listed in the corresponding EAC Declaration of Conformity along with the standards applied.

Endress+Hauser confirms successful testing of the device by affixing to it the EAC mark.

CRN approval

Versions with a CRN approval (Canadian Registration Number) are marked with a "*" in ordering information feature 20 "process connection" (s. Seite 43 ff.). CRN-approved devices are assigned the registration number CRN: 0F10904.5CADD1 on the nameplate.

Pressure Equipment Directive 2014/68/EU (PED)

Pressure instruments with permitted pressure ≤ 200 bar (2 900 psi)

Pressure instruments with permitted pressure ≤ 200 bar (2 900 psi) Pressure instruments with a flange and threaded boss that do not have a pressure-bearing housing do not fall within the scope of the Pressure Equipment Directive, irrespective of the maximum permitted pressure.

Reason:

According to Article 2, point 5 of EU Directive 2014/68/EU, pressure accessories are defined as "devices with an operational function and having pressure-bearing housings".
If a pressure instrument does not have a pressure-bearing housing (no identifiable pressure chamber of its own), there is no pressure accessory present within the meaning of the Directive.

Note:

A separate analysis must be performed for pressure instruments that are part of safety equipment designed to protect a pipe or vessel from exceeding allowable limits (safety accessory in accordance with Pressure Equipment Directive 2014/68/EU, Article 2, point 4).

Process seal according to ANSI/ISA 12.27.01

Practice in North America for the installation of process seals
Endress+Hauser devices are designed as either single seal or dual seal devices with an alarm in accordance with ANSI/ISA 12.27.01. This means that the user does need to install for an external secondary process seal in the thermowell which is required in ANSI/NFPA 70 (NEC) and CSA 22.1 (CEC). These devices comply with installation practice in North America and enable very safe, low-cost installation in pressurized applications with hazardous media.
Further information is provided in the Safety Instructions (XA) for the specific device → 58 ff.

Product	Type	Max. process pressure	Marking	Listing
Liquiphant M	FTL50-S/T##... FTL50-P/Q/R##...	64 bar (928 psi)	Single Seal	CSA/FM
	FTL51-S/T##... FTL51-P/Q/R##...	64/100 bar (928/1450 psi)	Single Seal	CSA/FM
	FTL50H-S/T##... FTL50H-P/Q/R##...	64 bar (928 psi)	Single Seal	CSA/FM
	FTL51H-S/T##... FTL51H-P/Q/R##...	64 bar (928 psi)	Single Seal	CSA/FM

General approvals

The following approvals are available for Liquiphant M FTL50H, FTL51H:

- EHEDG: certification (from TNO, The Netherlands), Report No. V99.394:
- 3A: 3A certificate (USA), Authorization no. 459: 74-06 Sensors and Sensor Fittings and Connections
- Certificate of Compliance as per ASME BPE-2012. (Order code: additional option = B)

Process connections	Order code	EHEDG + 3A	ASME BPE + CoC		
			Ra (µm)		
			<0.3	< 0.38	< 1.5
Thread ISO228 G3/4, 316L, installation Thread ISO228 G1, 316L, installation Accessories: weld-in adapter	GQ2 GW2	X	X	–	X
Tri-Clamp ISO2852 DN25-38 (1 to 1-1/2"), 316L Tri-Clamp ISO2852 DN40-51 (2"), 316L	TC2 TE2	X	X	X	X
DIN11851 DN32 PN25 slotted nut, 316L DIN11851 DN40 PN25 slotted nut, 316L DIN11851 DN50 PN25 slotted nut, 316L	MA2 MC2 ME2	X	X	X	X
Flush-mounted, 316L, installation Accessories, weld-in adapter	EE2	X	X	X	X
DIN11864-1 A DN50 pipe DIN11850, Slotted nut, 316L	HE2	X	X	X	X
DRD 65mm, 316L	PE2	X	–	–	X
SMS 2" PN25, 316L	UE2	X	X	X	X
Varivent N pipe DN65-162 PN10, 316L	WE2	X	X	X	X
Ingold fitting 25x46mm, 316L	TT2	–	–	X	–

Warning!
To avoid risk of contamination, install according to the "Hygienic Equipment Design Criteria (HDC)" as stated in the Subgroup Design Principles of the EHEDG, Doc. 8, July 1993.
The flow of liquid during cleaning is important and should be in compliance with the HDC.

Note!
- For CIP (Clean in Place) and SIP (Sterilize in Place) processes the pressure and temperature specifications of the process connections must be observed.

- Suitable fittings and seals must be used to ensure hygiene-compliant design according to 3A, EHEDG, ASME BPE etc.
- Surfaces with ASME-BPE option: Ra < 0.38 µm (< 15 µin) electropolished and passivated or Ra < 1.5 µm (59 µin) mechanically polished.

Other certificates

- Material certificate as per EN 10204/3.1 for all wetted parts NACE MR0175/MR0103, AD2000
- Leak detection system in conjunction with WHG approval
  Approval number: Z–65.40–446 (see also "Ordering information" s. Seite 43 ff.)
- TSE Certificate of Suitability
  The following applies to wetted device components:
  – They do not contain any materials derived from animals.
  – No additives or operating materials derived from animals are used in production or processing.

Note!
Wetted device components are listed in the "Mechanical construction" (→ 30 ff.) and "Ordering information" (→ 43 ff.) sections.

Manufacturer declarations

The following documents can be ordered together with the document, depending on the desired device configuration:

- FDA conformity
- TSE-free: Materials not derived from animals
- Regulation (EC) no. 2023/2006 (GMP)
- Regulation (EC) No. 1935/2004 materials in contact with food

The applicable European guidelines and standards can be found in the relevant EU Declarations of Conformity.

Regulation (EU) No. 10/2011: The regulation on plastic materials does not apply to the Liquiphant FTL5x, as the wetted materials are made exclusively of stainless steel.
The silicone seals supplied comply with BFR recommendation XV (commodities based on silicones from the Federal Institute for Risk Assessment - BFR), and the EPDM seals provided comply with BFR recommendation XXI (commodities based on natural and synthetic rubber).

Use in hazardous zones

Pay particular attention to the information provided in the documentation: Safety Instructions, Control Drawings etc. → 58

ASME B 31.3

Design and materials in accordance with ASME B31.3 The welding seals are through-penetration welded and comply with ASME Boiler and Pressure Vessel Code Section IX and EN ISO 15614-1.

Pressure equipment directive

The Pressure Equipment Directive 97/23/EC does not apply to the Liquiphant FTL5x, as it does not have a pressurized housing in accordance with Article 1, Paragraph 2.1.4 of the directive.

Ordering information

Detailed ordering information is available from the following sources:
- In the Product Configurator on the Endress+Hauser website: www.endress.com → Click "Corporate" → Select your country → Click "Products" → Select the product using the filters and search mask → Open the product page → The "Configuration" button to the right of the product image opens the Product Configurator.
- From your Endress+Hauser Sales Center: www.addresses.endress.com

Note!
Product Configurator - the tool for individual product configuration

- Up-to-the-minute configuration data
- Depending on the device: direct input of information specific to measuring point, such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly from the Endress+Hauser online shop

Note!
Versions that are mutually exclusive are not indicated in this table.

Product structure for Liquiphant M FTL50, FTL51

Design		*Basic weight*
FTL50	Compact	0.6 kg
FTL51	With extension pipe	0.6 kg

10	Approval:
A	Non-hazardous area
B	ATEX II 3G Ex nC IIC T6, WHG, ATEX II 3D Ex tc IIIC T85°C, NEPSI II 3G Ex nC IIC T6
C	ATEX II 3G Ex nA IIC T6, WHG, ATEX II 3D Ex tc IIIC T85°C, NEPSI II 3G Ex nA IIC T6
D	Non-hazardous area, WHG
E	ATEX II 1/2G Ex de IIC T6, WHG
F	ATEX II 1/2GD Ex ia IIC T6, WHG/IECEx
G	ATEX II 1/2GD Ex ia IIC T6/IECEx Zone0/1
H	ATEX II 1G Ex ia IIC T6
I	ATEX II 1/2G Ex de IIC T6/IECEx Zone0/1
J	ATEX II 1G Ex ia IIC T6, WHG
K	ATEX II 1/2G Ex d IIC T6/IECEx Zone0/1
L	ATEX II 1/2G Ex d IIC T6, WHG
M	NEPSI Ex ia IIC T6
N	NEPSI Ex d IIC T6
P	FM IS Cl.I,II,III Div.1 Gr.A-G, Zone 0,1,2,20,21,22
Q	FM XP Cl.I,II,III Div.1 Gr.B-G, Gr.A-G if E5 housing selected, Zone 1,2
R	FM NI Cl.I Div.2 Gr.A-D, Zone 0,1,2,20,21,22
S	CSA C/US IS Cl I,II,III Div.1 Gr.A-G, Zone 0,1,2
T	CSA C/US XP Cl I,II,III Div.1 Gr.A-G, Zone 1,2
U	CSA C/US General Purpose
V	TIIS Ex ia IIC T3
W	TIIS Ex d IIB T3
7	TIIS Ex d IIC T3
8	TIIS Ex d IIC T6
1	INMETRO Ex ia IIC T6 Ga/Gb
2	INMETRO Ex d IIC T6 Ga/Gb
3	INMETRO Ex de IIC T6 Ga/Gb
Y	Special version, TSP-No. to be spec.

20	Process connection:					*Additional weight*
	Note! For 100 bar (1450 psi) process pressure, select the appropriate option under "Additional option"					
	GQ2	G ¾		316L	Thread ISO 228	
		Installation > accessories: weld-in adapter				
	GQ6	G ¾		AlloyC22	Thread ISO 228	
	GR2	G 1		316L	Thread ISO 228	0.2 kg
	GR6	G 1		AlloyC22	Thread ISO 228	0.2 kg
	GW2*	G 1		316L	Thread ISO 228	0.2 kg
		Installation > accessories: weld-in adapter				
	GM2*	NPT ¾		316L	Thread ASME	
	GM6	NPT ¾		AlloyC22	Thread ASME	
	GN2*	NPT1		316L	Thread ASME	0.2 kg
	GN6	NPT1		AlloyC22	Thread ASME	0.2 kg
	GE2	R ¾		316L	Thread EN10226	
	GE6	R ¾		AlloyC22	Thread EN10226	
	GF2	R 1		316L	Thread EN10226	0.2 kg
	GF6	R 1		AlloyC22	Thread EN10226	0.2 kg
	BA2	DN32	PN6 A	316L	Flange EN 1092-1 (DIN 2527 B)	1.2 kg
	BB2	DN32	PN25/40 A	316L	Flange EN 1092-1 (DIN 2527 B)	2.0 kg
	BC2	DN40	PN6 A	316L	Flange EN 1092-1 (DIN 2527 B)	1.4 kg
	BD2	DN40	PN25/40 A	316L	Flange EN 1092-1 (DIN 2527 B)	2.4 kg
	BE2	DN50	PN6 A	316L	Flange EN 1092-1 (DIN 2527 B)	1.6 kg
	BG2	DN50	PN25/40 A	316L	Flange EN 1092-1 (DIN 2527 B)	3.2 kg
	BH2	DN65	PN6 A	316L	Flange EN 1092-1 (DIN 2527 B)	2.4 kg
	BJ2	DN50	PN100 A	316L (FTL51)	Flange EN 1092-1 (DIN 2527 B)	

20		Process connection:							*Additional weight*
		BK2	DN65	PN25/40 A		316L		Flange EN 1092-1 (DIN 2527 B)	4.3 kg
		BM2	DN80	PN10/16 A		316L		Flange EN 1092-1 (DIN 2527 B)	4.8 kg
		BN2	DN80	PN25/40 A		316L		Flange EN 1092-1 (DIN 2527 B)	5.9 kg
		BQ2	DN100	PN10/16 A		316L		Flange EN 1092-1 (DIN 2527 B)	5.6 kg
		BR2	DN100	PN25/40 A		316L		Flange EN 1092-1 (DIN 2527 B)	7.5 kg
		B12	DN80	PN100 A		316L	(FTL51)	Flange EN 1092-1 (DIN 2527 B)	
		B82	DN25	PN25/40 A		316L		Flange EN 1092-1 (DIN 2527 B)	1.4 kg
		CA2	DN32	PN6 B1		316L		Flange EN 1092-1 (DIN 2527 C)	1.1 kg
		CA6	DN32	PN6 B1		AlloyC22 >316L		Flange EN 1092-1 (DIN 2527)	1.1 kg
		CE2	DN50	PN6 B1		316L		Flange EN 1092-1 (DIN 2527 C)	1.5 kg
		CE6	DN50	PN6 B1		AlloyC22 >316L		Flange EN 1092-1 (DIN 2527)	1.5 kg
		CG2	DN50	PN25/40 B1		316L		Flange EN 1092-1 (DIN 2527 C)	2.9 kg
		CG6	DN50	PN25/40 B1		AlloyC22 >316L		Flange EN 1092-1 (DIN 2527)	2.9 kg
		CJ2	DN50	PN100 B2		316L	(FTL51)	Flange EN 1092-1 (DIN 2527)	
		CN2	DN80	PN25/40 B1		316L		Flange EN 1092-1 (DIN 2527 C)	5.2 kg
		CN6	DN80	PN25/40 B1		AlloyC22 >316L		Flange EN 1092-1 (DIN 2527)	5.2 kg
		CQ2	DN100	PN10/16 B1		316L		Flange EN 1092-1 (DIN 2527 C)	5.3 kg
		CQ6	DN100	PN10/16 B1		AlloyC22 >316L		Flange EN 1092-1 (DIN 2527)	5.3 kg
		C12	DN80	PN100 B2		316L	(FTL51)	Flange EN 1092-1 (DIN 2527)	
		C82	DN25	PN25/40 B1		316L		Flange EN 1092-1 (DIN 2527 C)	1.3 kg
		C86	DN25	PN25/40 B1		AlloyC22 >316L		Flange EN 1092-1 (DIN 2527)	1.3 kg
		DG2	DN50	PN40 B1		316L		Flange EN 1092-1 (DIN 2526 D)	
		DN2	DN80	PN40 B1		316L		Flange EN 1092-1 (DIN 2526 D)	
		D82	DN25	PN40 B1		316L		Flange EN 1092-1 (DIN 2526 D)	
		EG2	DN50	PN25/40 E		316L		Flange EN 1092-1	2.6 kg
		FG2	DN50	PN40 C		316L		Flange EN 1092-1 (DIN 2512 F)	2.6 kg
		NG2	DN50	PN40 D		316L		Flange EN 1092-1 (DIN 2512 N)	2.9 kg
		AA2*	1¼"	150 lbs	RF	316/316L		Flange ASME B16.5	1.2 kg
		AB2*	1¼"	300 lbs	RF	316/316L	(FTL51)	Flange ASME B16.5	2.0 kg
		AC2*	1½"	150 lbs	RF	316/316L		Flange ASME B16.5	1.5 kg
		AD2*	1½"	300 lbs	RF	316/316L	(FTL51)	Flange ASME B16.5	2.7 kg
		AE2*	2"	150 lbs	RF	316/316L		Flange ASME B16.5	2.4 kg
		AE6	2"	150 lbs	RF	AlloyC22 >316/316L		Flange ASME B16.5	2.4 kg
		AF2*	2"	300 lbs	RF	316/316L		Flange ASME B16.5	3.2 kg
		AG2*	2"	600 lbs	RF	316/316L	(FTL51)	Flange ASME B16.5	4.2 kg
		AJ2*	2½"	300 lbs	RF	316/316L	(FTL51)	Flange ASME B16.5	4.8 kg
		AL2*	3"	150 lbs	RF	316/316L		Flange ASME B16.5	4.9 kg
		AM2*	3"	300 lbs	RF	316/316L	(FTL51)	Flange ASME B16.5	6.8 kg
		AM6	3"	300 lbs	RF	AlloyC22 >316/316L		Flange ASME B16.5	6.8 kg
		AN2*	3"	600 lbs	RF	316/316L	(FTL51)	Flange ASME B16.5	
		AP2*	4"	150 lbs	RF	316/316L		Flange ASME B16.5	7.0 kg
		AQ2*	4"	300 lbs	RF	316/316L	(FTL51)	Flange ASME B16.5	11.5 kg
		AQ6	4"	300 lbs	RF	AlloyC22 >316/316L		Flange ASME B16.5	11.5 kg
		AR2*	4"	600 lbs	RF	316/316L	(FTL51)	Flange ASME B16.5	17.3 kg
		A82*	1"	150 lbs	RF	316/316L		Flange ASME B16.5	1.0 kg
		KA2	10 K 25 A		RF	316L		Flange JIS B2220	
		KC2	10 K 40 A		RF	316L		Flange JIS B2220	

20	Process connection:					*Additional weight*
	KE2	10 K 50 A	RF	316L	Flange JIS B2220	1.7 kg
	KE6	10 K 50 A	RF	AlloyC22 >316L	Flange JIS B2220	1.7 kg
	KL2	10 K 80 A	RF	316L	Flange JIS B2220	
	KP2	10 K 100 A	RF	316L	Flange JIS B2220	
	TC2*	DN25-38 (1 to 1½")		316L	Tri-Clamp ISO 2852	0.1 kg
	TE2*	DN40-51 (2")		316L	Tri-Clamp ISO 2852	0.1 kg
	YY9	Special version * With CRN approval.				

30	Probe length; Type:				
	FTL50				
	AA	Compact;		Ra <3.2 µm/126 µin	
	IA	Compact;		Temperature spacer	0.6 kg
	QA	Compact;		Pressure-tight feedthrough	0.7 kg
	FTL51				
	BB	..... mm;	316L**	Ra <3.2 µm/126 µin	
	BE	..... mm;	Alloy**	Ra <3.2 µm/126 µin	
	CB	..... inch;	316L**	Ra <3.2 µm/126 µin	
	CE	..... inch;	Alloy**	Ra <3.2 µm/126 µin	2.3 kg/100 in
	DB	Length: type II*;	316L	Ra <3.2 µm/126 µin	0.1 kg
	DE	Length: type II*;	Alloy	Ra <3.2 µm/126 µin	0.1 kg
	JB	..... mm;	316L**	+ Temperature spacer	0.9 kg/m +0.6 kg
	JE	..... mm;	Alloy**	+ Temperature spacer	0.9 kg/m +0.6 kg
	KB	..... inch;	316L**	+ Temperature spacer	2.3 kg/100 in +0.6 kg
	KE	..... inch;	Alloy**	+ Temperature spacer	2.3 kg/100 in +0.6 kg
	LB	Length: type II*;	316L	+ Temperature spacer	0.1 kg +0.6 kg
	LE	Length: type II*;	Alloy	+ Temperature spacer	0.1 kg +0.6 kg
	RB	..... mm;	316L**	+ Pressure-tight feedthrough	0.9 kg/m +0.7 kg
	RE	..... mm;	Alloy**	+ Pressure-tight feedthrough	0.9 kg/m +0.7 kg
	SB	..... inch;	316L**	+ Pressure-tight feedthrough	2.3 kg/100 in +0.7 kg
	SE	..... inch;	Alloy**	+ Pressure-tight feedthrough	2.3 kg/100 in +0.7 kg
	TB	Length: type II*;	316L	+ Pressure-tight feedthrough	0.1 kg +0.7 kg
	TE	Length: type II*;	Alloy	+ Pressure-tight feedthrough	0.1 kg +0.7 kg
	YY	Special version			
		*) If replacing devices: when vertically mounting a Liquiphant **M** FTL51 with length II the switch point is at the same height as for a Liquiphant **II** FTL360, FTL365, FDL30, FDL35. See also Seite 36 "L II" depends on process connection.			
		**) Order 3001 to 6000 mm (116 to 235 in) via yy			

40	Electronics; output:			
	A	FEL50A	PROFIBUS PA	
	D	FEL50D	Density/concentration without WHG approval (Germany)	
	1	FEL51*	2-wire,	AC 19 to 253 V
	2	FEL52*	3-wire PNP,	DC 10 to 55 V
	4	FEL54	Relay DPDT,	AC 19 to 253 V, DC 19 to 55 V
	5	FEL55	8/16 mA,	DC 11 to 36 V
	6	FEL56	NAMUR (L-H signal)	
	7	FEL57	2-wire PFM	
	8	FEL58*	NAMUR + test keys (H-L signal)	
	9	Special version		
		*) Also available in compact housing		

50	Housing; cable entry:				
	C3	Compact 316L	IP66/68;	Cable 5 m	
	D3	Compact 316L	IP65;	Plug Pg11	ISO4400
	E1	F27 316L	NEMA 4X/6P;	Thread NPT ¾	

50												Housing; cable entry:				
											E3	Compact 316L Hygiene	NEMA4X;	Plug NPT ½	ISO4400	
											N3	Compact 316L Hygiene	IP66/68;	M12 connector		
											E4	F16 Polyester	NEMA4X;	Thread NPT ½		
											E5	F13 Alu F17 Alu	NEMA4X/6P; NEMA4X	Thread NPT ¾		0.5 kg
											E6	F15 316L hygiene	NEMA4X;	Thread NPT ½		0.1 kg
											E7	T13 Alu	NEMA4X/6P;	Thread NPT ¾		0.9 kg
												Separate connection compartment				
											F1	F27 316L	IP66/68	Thread G1/2		
											F4	F16 Polyester	IP66/67;	Thread G ½		
											F5	F13 Alu F17 Alu	IP66/68; IP66/67;	Thread G ½		0.5 kg
											F6	F15 316L Hygiene	IP66/67;	Thread G ½		0.1 kg
											F7	T13 Alu	coated IP66/68; thread G ½			0.9 kg
												Separate connection compartment				
											G1	F27 316L	IP66/68;	M20 threaded joint		
												Ex d > M20 thread				
											G4	F16 Polyester	IP66/67;	M20 threaded joint		
											G5	F13 Alu F17 Alu	IP66/68; IP66/67;	M20 threaded joint Ex d > thread M20		0.5 kg
											G6	F15 316L Hygiene	IP66/67;	M20 threaded joint		0.1 kg
											G7	T13 Alu	coated IP66/68;	M20 threaded joint		0.9 kg
												Separate connection compartment		Ex d > thread M20		
											N4	F16 Polyester	IP66/67;	M12 connector		
											N5	F13 Alu F17 Alu	IP66/68; IP66/67;	M12 connector		
											N6	F15 316L hygiene	IP66/67;	M12 connector		
											Y9	Special version				

60										Additional option	
										A	Basic version
										B	PWIS-free, PWIS = paint-wetting impairment substances, max 2000 mm (78.7 in)
										C	EN 10204 - 3.1 material (316L wetted) inspection certificate
										D	EN10204-3.1 AD2000 material, wetted, apart from cast parts, inspection certificate
										K	Special adjustment, density H20
										L	Special adjustment, density H20, EN10204-3.1, material (wetted), inspection certificate
										N	EN 10204 - 3.1 material, NACE MR0175 (316L wetted) Inspection certificate
										P	100 bar (1450 psi) process pressure (FTL51)
										R	100 bar (1450 psi) process pressure, EN 10204 - 3.1 material, NACE MR0175 (316L wetted) Inspection certificate (FTL51)
										S	GL/ABS marine approval for FTL51: ≤ 1600 mm (63 in)
										Y	Special version

580											Test, certificate:
										KD	Helium leak test, internal procedure, inspection certificate
										KE	Pressure test, internal procedure, inspection certificate
										KG	PMI test (XRF), internal procedure, wetted metal parts, EN10204-3.1 inspection certificate
										KP	Dye penetration test AD2000-HP5-3(PT), wetted/pressurized metal parts, inspection certificate
										KQ	Dye penetration test ISO23277-1 (PT), wetted/pressurized metal parts, inspection certificate
										KR	Dye penetration test ASME VIII-1 (PT), wetted/pressurized metal parts, inspection certificate
										KS	Welding documentation, wetted/pressurized seams
										KV	Declaration of Conformity ASME B31.3
										K9	Special version, TSP-No. to be spec.

FTL5x -									Complete product designation

Note!
The basic weight includes the compact sensor, thread adapter G ¾, electronic insert, polyester housing

Product structure for Liquiphant M FTL50H, FTL51H

Design		Basic weight
FTL50H	Compact	0.7 kg
FTL51H	With extension pipe	0.7 kg

10	Approval:
	A Non-hazardous area
	B ATEX II 3G Ex nC IIC T6, WHG, ATEX II 3D Ex tc IIIC T85°C, NEPSI II 3G Ex nC IIC T6
	C ATEX II 3G Ex nA IIC T6, WHG, ATEX II 3D Ex tc IIIC T85°C, NEPSI II 3G Ex nA IIC T6
	D Non-hazardous area, WHG
	E ATEX II 1/2G Ex de IIC T6, WHG
	F ATEX II 1/2GD Ex ia IIC T6, WHG/IECEx
	G ATEX II 1/2GD Ex ia IIC T6/IECEx Zone0/1
	H ATEX II 1G Ex ia IIC T6
	I ATEX II 1/2G Ex de IIC T6/IECEx Zone0/1
	J ATEX II 1G Ex ia IIC T6, WHG
	K ATEX II 1/2G Ex d IIC T6/IECEx Zone0/1
	L ATEX II 1/2G Ex d IIC T6, WHG
	M NEPSI Ex ia IIC T6
	N NEPSI Ex d IIC T6
	P FM IS Cl.I,II,III Div.1 Gr.A-G, Zone 0,1,2,20,21,22
	Q FM XP Cl.I,II,III Div.1 Gr.B-G, Gr.A-G if E5 housing selected, Zone 1,2
	R FM NI Cl.I Div.2 Gr.A-D, Zone 0,1,2,20,21,22
	S CSA C/US IS Cl I,II,III Div.1 Gr.A-G, Zone 0,1,2
	T CSA C/US XP Cl I,II,III Div.1 Gr.A-G, Zone 1,2
	U CSA C/US General Purpose
	V TIIS Ex ia IIC T3
	W TIIS Ex d IIB T3
	7 TIIS Ex d IIC T3
	8 TIIS Ex d IIC T6
	1 INMETRO Ex ia IIC T6 Ga/Gb
	2 INMETRO Ex d IIC T6 Ga/Gb
	3 INMETRO Ex de IIC T6 Ga/Gb
	Y Special version, TSP-No. to be spec.

20		Process connection:						Additional weight
		GQ2	G ¾		316L	(FTL50H)	Thread ISO 228	
			Installation > accessories: weld-in adapter					
		GW2*	G 1		316L		Thread ISO 228	0.2 kg
			Installation > accessories: weld-in adapter					
		BA2	DN32	PN6 A	316L		Flange EN 1092-1 (DIN 2527 B)	1.2 kg
		BB2	DN32	PN25/40 A	316L		Flange EN 1092-1 (DIN 2527 B)	2.0 kg
		BC2	DN40	PN6 A	316L		Flange EN 1092-1 (DIN 2527 B)	1.4 kg
		BD2	DN40	PN25/40 A	316L		Flange EN 1092-1 (DIN 2527 B)	2.4 kg
		BE2	DN50	PN6 A	316L		Flange EN 1092-1 (DIN 2527 B)	1.6 kg
		BG2	DN50	PN25/40 A	316L		Flange EN 1092-1 (DIN 2527 B)	3.2 kg
		BH2	DN65	PN6 A	316L		Flange EN 1092-1 (DIN 2527 B)	2.4 kg
		BK2	DN65	PN25/40 A	316L		Flange EN 1092-1 (DIN 2527 B)	4.3 kg
		BM2	DN80	PN10/16 A	316L		Flange EN 1092-1 (DIN 2527 B)	4.8 kg
		BN2	DN80	PN25/40 A	316L		Flange EN 1092-1 (DIN 2527 B)	5.9 kg
		BQ2	DN100	PN10/16 A	316L		Flange EN 1092-1 (DIN 2527 B)	5.6 kg
		BR2	DN100	PN25/40 A	316L		Flange EN 1092-1 (DIN 2527 B)	7.5 kg
		B82	DN25	PN25/40 A	316L		Flange EN 1092-1 (DIN 2527 B)	1.4 kg
		CG2	DN50	PN25/40 B1	316L		Flange EN 1092-1 (DIN 2527 C)	3.2 kg
		CN2	DN80	PN25/40 B1	316L		Flange EN 1092-1 (DIN 2527 C)	5.9 kg
		CQ2	DN100	PN10/16 B1	316L		Flange EN 1092-1 (DIN 2527 C)	5.6 kg

20		Process connection:					*Additional weight*
	EE2	1" flush-mounted (52001047)			316L		0.3 kg
		Installation > accessories: weld-in adapter					
	HE2	DN50	Pipe DIN 11850 slotted nut		316L	DIN 11864-1 A	0.3 kg
	AA2*	1¼"	150 lbs	RF	316/316L	Flange ASME B16.5	1.2 kg
	AC2*	1½"	150 lbs	RF	316/316L	Flange ASME B16.5	1.5 kg
	AE2*	2"	150 lbs	RF	316/316L	Flange ASME B16.5	2.4 kg
	AF2*	2"	300 lbs	RF	316/316L	Flange ASME B16.5	3.2 kg
	AJ2*	2½"	300 lbs	RF	316/316L (FTL51H)	Flange ASME B16.5	4.8 kg
	AL2*	3"	150 lbs	RF	316/316L	Flange ASME B16.5	4.9 kg
	AM2	3"	300 lbs	RF	316/316L (FTL51H)	Flange ASME B16.5	6.8 kg
	AP2*	4"	150 lbs	RF	316/316L	Flange ASME B16.5	7.0 kg
	AQ2*	4"	300 lbs	RF	316/316L (FTL51H)	Flange ASME B16.5	11.5 kg
	A82*	1"	150 lbs	RF	316/316L	Flange ASME B16.5	1.0 kg
	KA2	10 K 25		RF	316L	Flange JIS B2220	
	KC2	10 K 40		RF	316L	Flange JIS B2220	
	KE2	10 K 50		RF	316L	Flange JIS B2220	1.7 kg
	KL2	10 K 80		RF	316L	Flange JIS B2220	
	KP2	10 K 100		RF	316L	Flange JIS B2220	
	MA2	DN32	PN25		316L	DIN 11851	0.1 kg
	MC2	DN40	PN25		316L	DIN 11851	0.2 kg
	ME2	DN50	PN25		316L	DIN 11851	0.3 kg
	PE2	DRD	65 mm		316L		0.3 kg
	TC2*	DN25-38 (1 to 1½")			316L	Tri-Clamp ISO 2852	0.1 kg
	TF2*	DN25-38 (1 to 1½")			316L	Tri-Clamp NA-Connector ISO 2852	0.1 kg
	TE2*	DN40-51 (2")			316L	Tri-Clamp ISO 2852	0.1 kg
	TF2*	DN40-51 (2")			316L	Tri-Clamp NA-Connector ISO 2852	0.1 kg
	TT2	Ingold fitting 25x46mm			316L		
	UE2	SMS 2"	PN25		316L		0.2 kg
	WE2*	DN65-162 PN10			316L	Varivent N pipe	0.5 kg
	YY9	Special version					
		* CRN approval					

30			Probe length; Type:		
			FTL50H		
		AC	Compact;	Ra <1.5 µm/59 µin	
		AD	Compact;	Ra <0.3 µm/12 µin	
		IC	Compact;	Ra <1.5 µm/59 µin + temperature spacer	0.6 kg
		ID	Compact;	Ra <0.3 µm/12 µin / A3 + temperature spacer	0.6 kg
		QC	Compact;	Ra <1.5 µm/59 µin + pressure-tight feedthrough	0.7 kg
		QD	Compact;	Ra <0.3 µm/12 µin / A3 + pressure-tight feedthrough	0.7 kg
			FTL51H		
		BC	..... mm;	Ra <1.5 µm/59 µin	0.9 kg/m
		BD	..... mm;	Ra <0.3 µm/12 µin / A3	0.9 kg/m
		BF	.....mm;	Ra<0.76 µm/30 µin	0.9 kg/m
		CC	..... inch;	Ra <1.5 µm/59 µin	2.3 kg/100 in
		CD	..... inch;	Ra <0.3 µm/12 µin / A3	2.3 kg/100 in
		DC	Length: type II*;	Ra <1.5 µm/59 µin	0.1 kg
		DD	Length: type II*;	Ra <0.3 µm/12 µin / A3	0.1 kg
		JC	..... mm;	Ra <1.5 µm/59 µin + Temperature spacer	0.9 kg/m +0.6 kg
		JD	..... mm;	Ra <0.3 µm/12 µin + Temperature spacer	0.9 kg/m +0.6 kg
		KC	..... inch;	Ra <1.5 µm/59 µin + Temperature spacer	2.3 kg/100 in +0.6 kg
		KD	..... inch;	Ra <0.3 µm/12 µin + Temperature spacer	2.3 kg/100 in +0.6 kg
		LC	Length: type II*;	Ra <1.5 µm/59 µin + Temperature spacer	0.1 kg +0.6 kg
		LD	Length: type II*;	Ra <0.3 µm/12 µin + Temperature spacer,	0.1 kg +0.6 kg
		RC	..... mm;	Ra <1.5 µm/59 µin + Pressure-tight feedthrough	0.9 kg/m +0.7 kg
		RD	..... mm;	Ra <0.3 µm/12 µin + Pressure-tight feedthrough	0.9 kg/m +0.7 kg
		SC	..... inch;	Ra <1.5 µm/59 µin + Pressure-tight feedthrough	2.3 kg/100 in +0.7 kg

30	Probe length; Type:		
SD	..... inch;	Ra <0.3 µm/12 µin + Pressure-tight feedthrough	2.3 kg/100 in +0.7 kg
TC	Length: type II*;	Ra <1.5 µm/59 µin + Pressure-tight feed through,	0.1 kg +0.7 kg
TD	Length: type II*;	Ra <0.3 µm/12 µin + Pressure-tight feed through,	0.1 kg +0.7 kg
YY	Special version		

*) If replacing devices: when vertically mounting a Liquiphant **M** FTL51H with length II the switch point is at the same height as for a Liquiphant **II** FTL360, FTL365, FDL30, FDL35.
See also Seite 36 "L II" depends on process connection.

40	Electronics; output:		
A	FEL50A	PROFIBUS PA	
D	FEL50D	Density/concentration without WHG approval (Germany)	
1	FEL51*	2-wire,	AC 19 to 253 V
2	FEL52*	3-wire PNP,	DC 10 to 55 V
4	FEL54	Relay DPDT,	AC 19 to 253 V, DC 19 to 55 V
5	FEL55	8/16 mA,	DC 11 to 36 V
6	FEL56	NAMUR (L-H signal)	
7	FEL57	2-wire PFM	
8	FEL58*	NAMUR + test keys (H-L signal)	
9	Special version		

*) Also available in compact housing

50	Housing; cable entry:				
C3	Compact 316L	IP66/68;	Cable 5 m		
D3	Compact 316L	IP65;	Plug Pg11	ISO4400	
E3	Compact 316L Hygiene	NEMA4X;	Plug NPT ½	ISO4400	
N3	Compact 316L Hygiene	IP66/68;	M12 connector		
E4	F16 Polyester	NEMA4X;	Thread NPT ½		
E5	F13 Alu F17 Alu	NEMA4X/6P; NEMA4X	Thread NPT ¾		0.5 kg
E6	F15 316L Hygiene	NEMA4X;	Thread NPT ½		0.1 kg
E7	T13 Alu	NEMA4X/6P;	Thread NPT ¾		0.9 kg
	Separate connection compartment				
F4	F16 Polyester	IP66/67;	Thread G ½		
F5	F13 Alu F17 Alu	IP66/68; IP66/67;	Thread G ½		0.5 kg
F6	F15 316L hygiene	IP66/67;	Thread G ½		0.1 kg
F7	T13 Alu	coated IP66/68; thread G ½			0.9 kg
	Separate connection compartment				
	Ex d > M20 thread				
G4	F16 Polyester	IP66/67;	M20 threaded joint		
G5	F13 Alu F17 Alu	IP66/68; IP66/67;	M20 threaded joint		0.5 kg
			Ex d > thread M20		
G6	F15 316L Hygiene	IP66/67;	M20 threaded joint		0.1 kg
G7	T13 Alu	coated IP66/68;	M20 threaded joint		0.9 kg
	Separate connection compartment		Ex d > thread M20		
N4	F16 Polyester	IP66/67;	M12 connector		
N5	F13 Alu F17 Alu	IP66/68; IP66/67;	M12 connector		
N6	F15 316L hygiene	IP66/67;	M12 connector		
Y9	Special version				

60	Additional option
A	Basic version
B	CoC-ASME BPE, EN10204-3.1 material (316L wetted) Inspection certificate
C	EN 10204 - 3.1 material (316L wetted), Inspection certificate
D	EN10204-3.1 AD2000 material, wetted, apart from cast parts, inspection certificate
K	Special adjustment, density H2O
L	Special adjustment, density H2O, EN10204-3.1 (316L wetted) inspection certificate
S	GL/ABS marine approval for FTL51H: ≤ 1600 mm (63 in)
Y	Special version

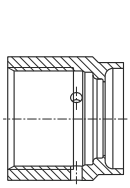
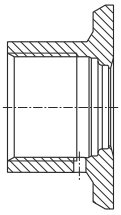
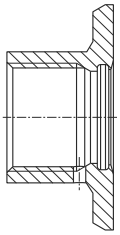
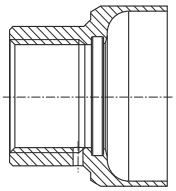
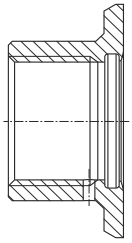
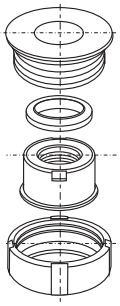
FTL5#H -							Complete product designation

Note!
Basic weight = compact sensor, thread adapter G ¾, electronic insert, stainless steel housing

Accessories

Note!
- All dimensions in mm (in)!
- For additional information on weld-in adapters, refer to TI00426F.
- The tolerance of the thread start between the weld-in adapter and sensor is ± 15°.

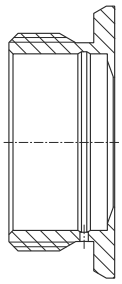
Weld-in adapter **Overview**

		 a0008246	 a0008251	 a0008256	 a0011924	 a0008248	 a0008253
		G¾, d=29 (1.14) without flange	**G¾, d=50 (1.97) with flange**	**G¾, d=55 (2.17) with flange**	**G1, d=53 (2.09) without flange**	**G1, d=60 (2.36) with flange**	**G1 can be positioned**
Material roughness µm (µin)		316L 1.5 (59.1)	316L 0.8 (31.5)	316L 0.8 (31.5)	316L 0.8 (31.5)	316L 0.8 (31.5)	316L 0.8 (31.5)
Without inspection certificate EN10204-3.1 material		71258357	71258355	52001052[3)]	71258358	52001051[1), 3)]	52001221[2), 3)]
With inspection certificate EN10204-3.1 material		52028295[3)]	52018765[3)]	52011897[3)]	71093129[1), 3)]	52011896[1), 3)]	52011898[2), 3)]
Seal (replacement part: set of 5)		Silicone O-ring 52021717	Silicone O-ring 52021717	Silicone O-ring 52014473	Silicone O-ring 52014472	Silicone O-ring 52014472	Silicone profile gasket 52014424)
Weld-in dummy		–	–	71168889	71166879	71166879	71181945
Liquiphant M	Feature	**Version**					
FTL50	020			GQ2			
FTL5x					GW2	GW2	GW2
FTL50H				GQ2			
FTL5xH					GW2	GW2	GW2

1) This weld-in adapter replaces the weld-in adapter with the order number 917969-1000.

2) This weld-in adapter replaces the weld-in adapter with the order number 215159-0000.

3) A seal is included in the delivery.

		 a0008252	 a0008254
		RD52	**DRD DN50 65 (2.56) (welding flange)**
Material roughness µm (µin), process side		316L 0.8 (31.5)	316L/304 0.8 (31.5)
Without inspection certificate EN10204-3.1 material		52001047 [1), 2)]	52002041[2)]/ 916743-0000
With inspection certificate EN10204-3.1 material		52006909 [1), 2)]	52011899[2)]/ –
Seal (replacement part: set of 5)		Silicone profile gasket 52014424	PTFE flat seal 52024228
Weld-in dummy		M40167	–
Device	Feature	**Version**	
Liquiphant M			
FTL5xH	020	EE2	PE2

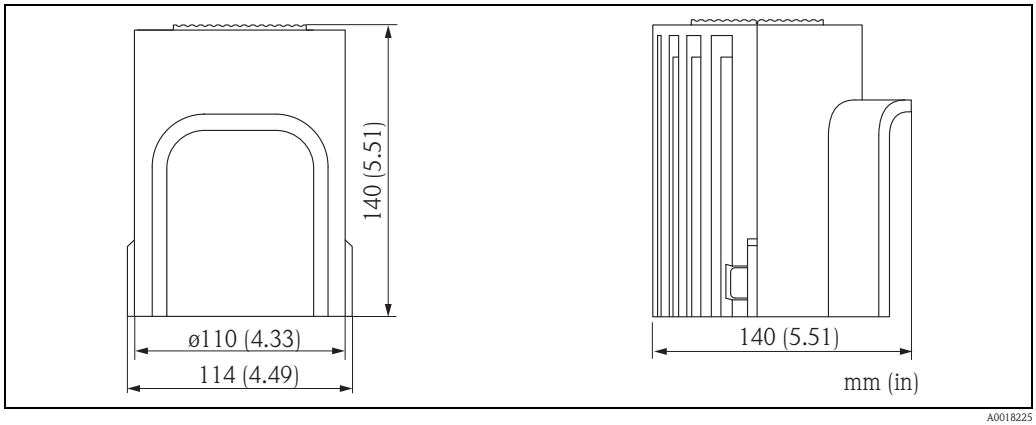
1) This weld-in adapter replaces the weld-in adapter with the order number 942329-0001.

2) A seal is included in the delivery.

Note!
All the weld-in adapters available are described in document TI00426F.
www.endress.com --> Download -->Advanced--> Documentation code --> TI00426F.

Weather protection cover

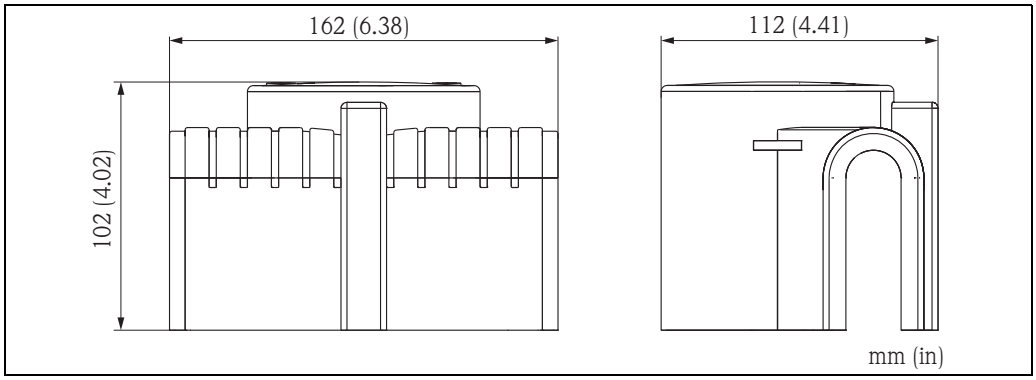
For F16 housing



A0018225

Material	Order No.	Weight
PBT, gray	71127760	240 g (8.46 oz)

For F13, F17 and F27 housing



A0018226

Material	Order No.	Weight
PA6, gray	71040497	300 g (10.58 oz)

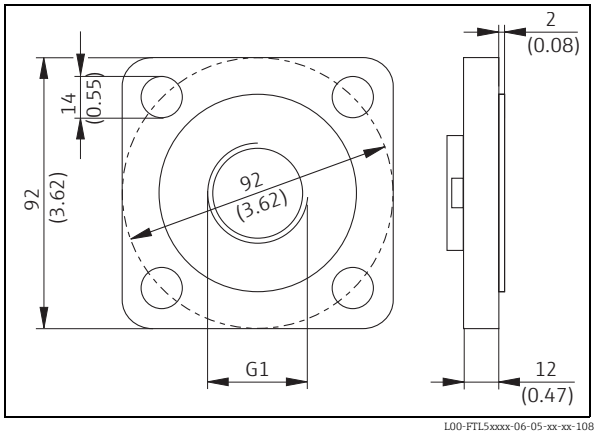
Lap joint flange

Order number: 918158-0000
With G 1 thread for mounting a Liquiphant FTL50, FTL51 with process connection GR2

Pressure up to 40 bar (580 psi)

Material: corrosion-resistant steel 1.4301 (AISI 304)

Weight: 0.54 kg (1.19 lbs)



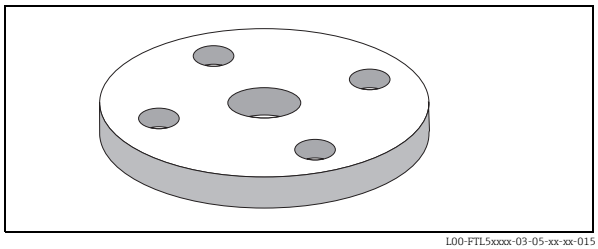
L00-FTL5xxxx-06-05-xx-xx-108

Lap joint flanges

With G 1 thread for mounting a Liquiphant FTL50, FTL51 with process connection GR2

Material: corrosion-resistant steel 1.4571 (AISI 316Ti)

- Order number: 918143-0000
  Flange DN50 PN40, EN 1092-1
  Weight: 3.11 kg (6.86 lbs)
- Order number: 918144-0000
  Flange ASME 2", 150 psi, RF
  Weight: 2.38 kg (5.25 lbs)



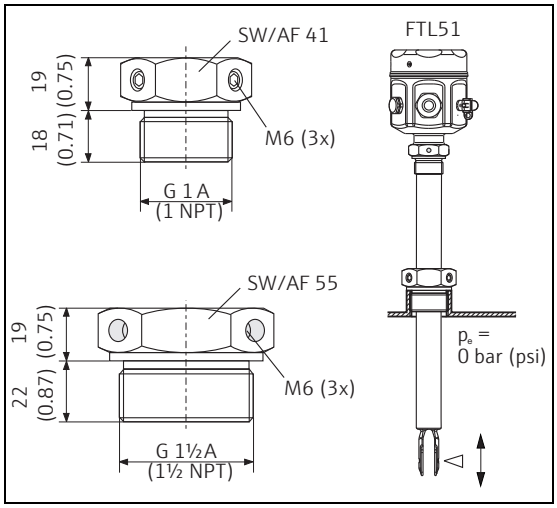
L00-FTL5xxxx-03-05-xx-xx-015

Sliding sleeves for unpressurized operation

Switch point infinitely variable for Liquiphant MFTL51

Material: corrosion-resistant steel 1.4435 (AISI 316 L)

Weight for G 1, NPT 1: 0.21 kg (0.46 lbs)
Weight for G 1½, NPT 1½: 0.54 kg (1.19 lbs)



Thread	Standard	Material	Order number	Approval
G 1	DIN ISO 228/I	1.4435 (AISI 316 L)	52003978	
G 1	DIN ISO 228/I	1.4435 (AISI 316 L)	52011888	With inspection certificate EN 10204 - 3.1 material
NPT1	ASME B 1.20.1	1.4435 (AISI 316 L)	52003979	
NPT1	ASME B 1.20.1	1.4435 (AISI 316 L)	52011889	With inspection certificate EN 10204 - 3.1 material
G 1½	DIN ISO 228/I	1.4435 (AISI 316 L)	52003980	
G 1½	DIN ISO 228/I	1.4435 (AISI 316 L)	52011890	With inspection certificate EN 10204 - 3.1 material
NPT1½	ASME B 1.20.1	1.4435 (AISI 316 L)	52003981	
NPT1½	ASME B 1.20.1	1.4435 (AISI 316 L)	52011891	With inspection certificate EN 10204 - 3.1 material

High pressure sliding sleeves

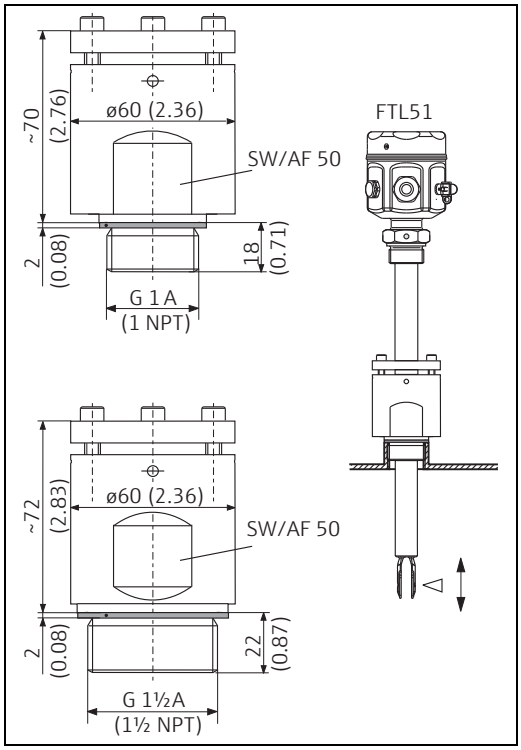
For continuous adjustment of the switch point of a Liquiphant M FTL51.
Also for use in hazardous areas. Additional information → 📄 58ff. (ATEX, NEPSI).

Material: corrosion-resistant steel 1.4435 (AISI 316L) or AlloyC22

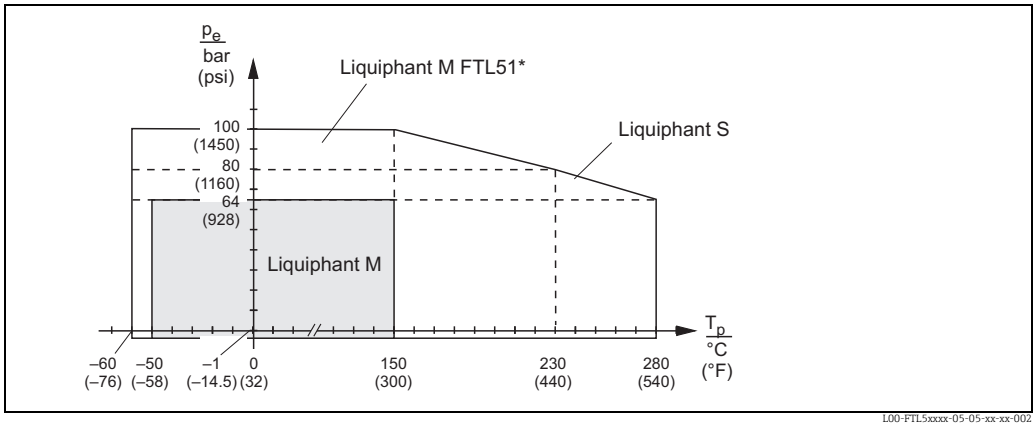
Weight for G 1, NPT 1: 1.13 kg (2.49 lbs)
Weight for G 1½, NPT 1½: 1.32 kg (2.91 lbs)

Seal package made of graphite.

For G1, G 1½:
Seal is included in the delivery.



Thread	Standard	Material	Order number	Approval
G 1	DIN ISO 228/1	1.4435 (AISI 316 L)	52003663	
G 1	DIN ISO 228/1	1.4435 (AISI 316 L)	52011880	With inspection certificate EN 10204 - 3.1 material
G 1	DIN ISO 228/1	AlloyC22	71118691	With inspection certificate EN 10204 - 3.1 material
NPT1	ASME B 1.20.1	1.4435 (AISI 316 L)	52003667	
NPT1	ASME B 1.20.1	1.4435 (AISI 316 L)	52011881	With inspection certificate EN 10204 - 3.1 material
NPT1	ASME B 1.20.1	AlloyC22	71118694	With inspection certificate EN 10204 - 3.1 material
G 1½	DIN ISO 228/1	1.4435 (AISI 316 L)	52003665	
G 1½	DIN ISO 228/1	1.4435 (AISI 316 L)	52011882	With inspection certificate EN 10204 - 3.1 material
G 1½	DIN ISO 228/1	AlloyC22	71118693	With inspection certificate EN 10204 - 3.1 material
NPT1½	ASME B 1.20.1	1.4435 (AISI 316 L)	52003669	
NPT1½	ASME B 1.20.1	1.4435 (AISI 316 L)	52011883	With inspection certificate EN 10204 - 3.1 material
NPT1½	ASME B 1.20.1	AlloyC22	71118695	With inspection certificate EN 10204 - 3.1 material



L00-FTL5xxxx-05-05-xx-xx-002

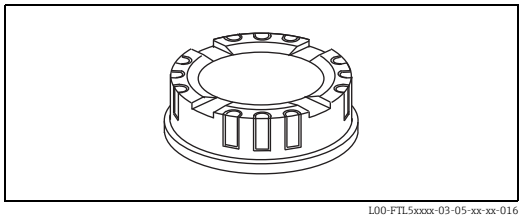
** FTL51 with high-pressure sliding sleeve (100 bar (1450 psi)). See "Additional option" Seite 44 ff. option "P" or "R".l*

Cover with sight glass

Order number: 943461-0001
for polyester housing F16

Material: PA 12

Weight: 0.04 kg (0.09 lbs)



L00-FTL5xxxx-03-05-xx-xx-016

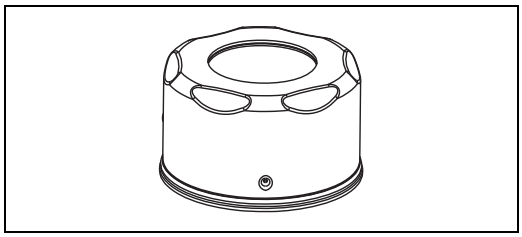
Cover with sight glass

For stainless steel housing F15

Material: AISI 316L

Weight: 0.16 kg (0.35 lbs)

- Order number: 52027002
  With glass sight glass
- Order number: 52028207
  With PC sight glass
  (Not for CSA, General Purpose)



L00-FTL5xxxx-03-05-xx-xx-017

Circular connector

Order number: 52010285

4x0.34 M12 socket

Cable: PVC (gray) 5 m (16 ft)

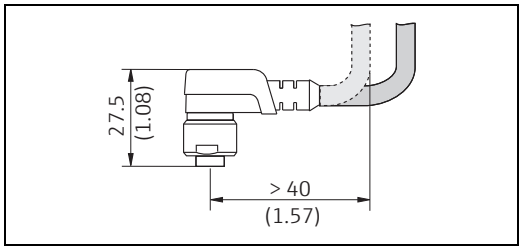
Body: PUR (blue)

Thread adapter nut: Cu Sn/Ni

Degree of protection: IP67

Temperature range with fixed cable:
–25 to +70 °C (-13 to +158 °F)

Temperature range with flexible cable:
–5 to +70 °C (23 to +158 °F)



L00-FTL5xxxx-06-05-xx-xx-111

Order number: 52024216

4x0.34 M12 socket

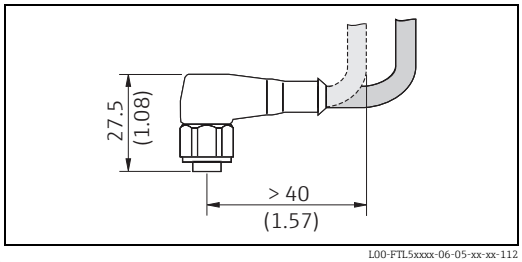
Cable: PVC (orange) 5 m (16 ft)

Body: PVC (orange)

Thread adapter nut: 316L

Degree of protection: IP69 (fully locked)

Temperature range: –25 to +70 °C (-13 to +158 °F)



L00-FTL5xxxx-06-05-xx-xx-112

Order number: 52018763

4x0.34 M12 socket with integrated LEDs

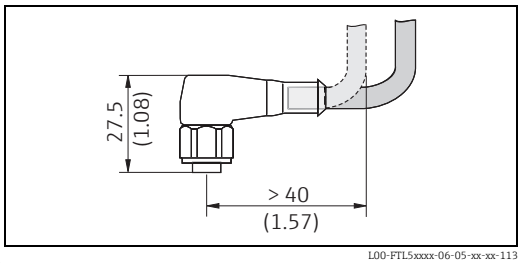
Cable: PVC (orange) 5 m (16 ft)

Body: PVC (transparent)

Thread adapter nut: 316L

Degree of protection: IP69IP69 (fully locked)

Temperature range: –25 to +70 °C (-13 to +158 °F)



L00-FTL5xxxx-06-05-xx-xx-113

Documentation

Note!
You can find supplementary documentation on the product pages at www.endress.com

Operating Instructions

Electronic insert FEL50A for Liquiphant M, PROFIBUS PA
BA00141F

Liquiphant M Density, density computer FML621
BA00335F

Liquiphant M FTL50, FTL51
KA00143F

Liquiphant M FTL50(H), FTL51(H)
KA00144F

Liquiphant M FTL51C
KA00162F

Liquiphant M FTL50-######## # 7 #, FTL51-######## # 7 #
KA00163F

Liquiphant M FTL50H-######### 7 #, FTL51H-######### 7 #
KA00164F

Liquiphant M FTL51C-######### 7 ##
KA00165F

Liquiphant M FTL5#-# ### ## # #3 #, FTL5#H-# ### ## # #3 #
KA00220F

Electronic insert FEL50D for Liquiphant M Density FTL50, FTL51
KA00284F

Electronic insert FEL50D for Liquiphant M Density FTL50H, FTL51H
KA00285F

Electronic insert: FEL50D for Liquiphant M Density FTL51C
KA00286F

Liquiphant M sliding sleeve for FTL51, G 1, NPT 1
KA00151F

Liquiphant M sliding sleeve for FTL51, G 1½, NPT 1½
KA00152F

Liquiphant M high-pressure sliding sleeve for FTL51, G 1, NPT 1
KA00153F

Liquiphant M high-pressure sliding sleeve for FTL51, G 1½, NPT 1½
KA00154F

Technical Information

General instructions for electromagnetic compatibility
(Test procedure, installation recommendation)
TI00241F

Liquiphant M FTL51C, wetted parts with highly corrosion-resistant coating
ECTFE, PFA or enamel coating
TI00347F

Isolating amplifier FTL325P, 1- or 3-channel switching units for top-hat rail mounting
for Liquiphant M with electronic insert FEL57
TI00350F

Isolating amplifier FTL325N, 1- or 3-channel switching units for top-hat rail mounting
for Liquiphant M with electronic insert FEL56, FEL58
TI00353F

Liquiphant S FTL70/71, for medium temperatures up to 280 °C (536 °F)
TI00354F

Isolating amplifier FTL375P,
1 to 3-channel switching units for top-hat rail mounting
for Liquiphant M with electronic insert FEL57
TI00360F

Liquiphant M Density, density computer FML621
TI00420F

Weld-in adapter,
TI00426F

Functional safety (SIL)

Liquiphant M with electronic insert FEL51 (MAX)
SD00164F

Liquiphant M with electronic insert FEL51 (MIN)
SD00185F

Liquiphant M with electronic insert FEL52 (MAX)
SD00163F

Liquiphant M with electronic insert FEL52 (MIN)
SD00186F

Liquiphant M with electronic insert FEL54 (MAX)
SD00162F

Liquiphant M with electronic insert FEL54 (MIN)
SD00187F

Liquiphant M with electronic insert FEL55 (MAX)
SD00167F

Liquiphant M with electronic insert FEL55 (MIN)
SD00279F

Liquiphant M with electronic insert FEL57 + Nivotester FTL325P
SD01508F (MAX + MIN)

Liquiphant M with electronic insert FEL56 + Nivotester FTL325N
SD01521F (MAX + MIN)

Liquiphant M with electronic insert FEL58 + Nivotester FTL325N
SD01522F (MAX + MIN)

Safety Instructions

ATEX

DEKRA 15 ATEX 0088
- Ex d, Ex de
  XA00115F, XA00114F, XA00108F, XA00031F

KEMA 99 ATEX 0523 X
- Ex d, Ex de
  XA00113F, XA00064F, XA00063F

EG 01 007 X
- Ex nA
  XA00182F

IEC Ex

IECEx DEK 15.0060
- Ex d, Ex de
  XA01371F, XA00114F, XA00108F, XA00031F

KEMA 99 ATEX 0523 X; IECEx DEK 15.0028X
- Ex d, Ex de
  XA00113F, XA00064F, XA00063F

Safety Instructions (NEPSI)

Ex d IIC/IIB T3-T6 , Ex d IIC T2-T6
(NEPSI GYJ06424)
XA00401F/00/B2

Ex ia IIC T2-T6, Ex ia IIB T3-T6
(NEPSI GYJ05556, NEPSI GYJ06464),
XC00009F/00/b2

Ex nA II T3-T6, Ex nC/nL IIC T3-T6
(NEPSI GYJ04360, NEPSI GYJ071414)
XC00010F/00/b2

Control Drawings

Liquiphant M (IS and NI) Current output PFM, NAMUR Entity installation
Class I, Div. 1, 2, Groups A, B, C, D
Class I, Zone 0
Class II, Div. 1, 2, Groups E, F, G
Class III
ZD00041F

Liquiphant M, Liquiphant S (cCSAus / IS)
Class I, Div. 1, Groups A, B, C, D Ex ia IIC T6
Class II, Div. 1, Groups E, F, G
Class III
ZD00042F

Liquiphant M (NI), FTL50(H), FTL51(H), FTL51C, FTL70, FTL71
Class I, Div. 2, Groups A, B, C, D
Class II, Div. 2, Groups F, G
Class III
ZD00043F

Liquiphant M, Liquiphant S (cCSAus / XP)
Class I, Groups A, B, C, D
Class II, Groups E, F, G
Class III
ZD00240F

Liquiphant M (IS and NI) PROFIBUS PA, FOUNDATION FieldbusClass I, Zone 0, IIC
Class I, Division 1, 2, Groups A, B, C, D
Class II, Division 1, 2, Groups E, F, G
Class III
ZD00244F

System information

Liquiphant M
SI00040F

www.addresses.endress.com

Endress+Hauser

People for Process Automation