

DA- Niveauswitch

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Forsigtig!

= forbudt;
medfører ukorrekt drift eller
ødelæggelse.

DA- Om sikkerhed

Liquiphant M FTL50H, FTL51H er udviklet til punktniveaudetektering i flydende medier.

Ukorrekt brug kan medføre farer i forbindelse med anvendelsen.

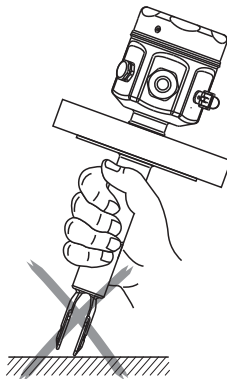
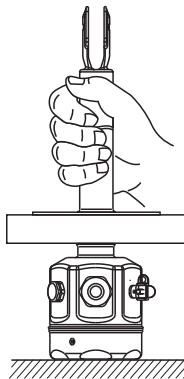
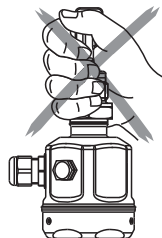
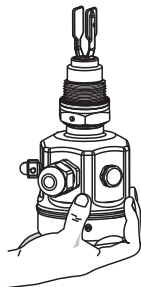
Niveauswitchen Liquiphant M FTL50H, FTL51H må kun installeres, tilsluttes, sættes i drift, betjenes og vedligeholdes **af kvalificeret og autoriseret personale**, under nøjagtig overholdelse af denne betjeningsvejledning, eventuelle relevante standarder, juridiske krav og, hvor dette måtte være relevant, certifikater.

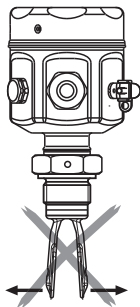
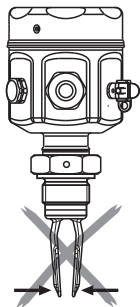
Installer en let tilgængelig el-afbryder i nærheden af enheden.

Markér el-afbryderen som afbryder til enheden.

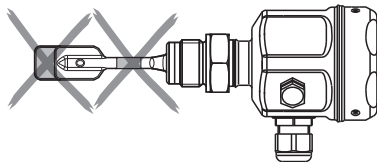
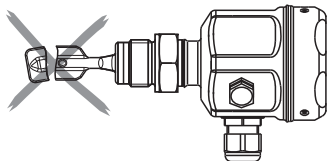
DA- Håndtering

Hold fast i hus, flange eller
forlængerrør.





DA- Må **ikke** bøjes
Må **ikke** forkortes
Må **ikke** forlænges



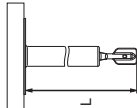


ENDRESS+HAUSER
LIQUIPHANT M

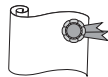
Ordrekode

FTL5#H - ##### mm
in

FTL51H



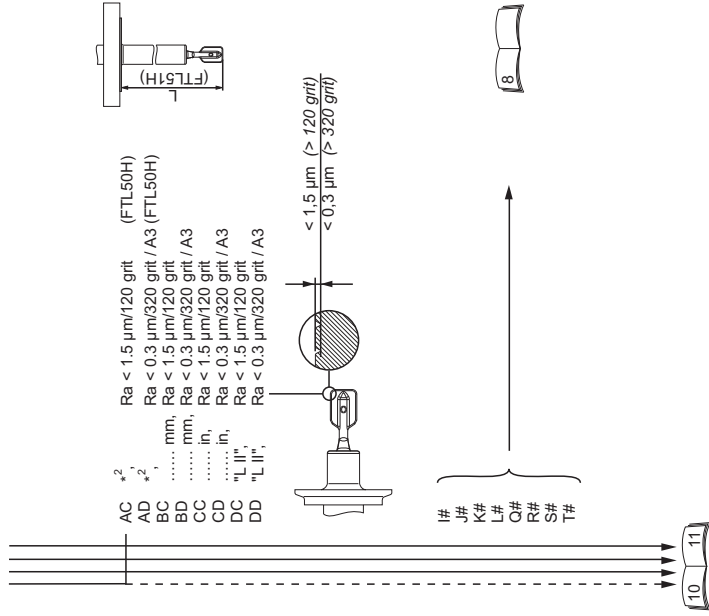
A	* ¹	ATEX II 3 G	EEx nC II T6, WHG
B		ATEX II 3 D	T85°C* ³
C		ATEX II 3 G	EEx nA II T6, WHG
		ATEX II 3 D	T85°C* ³
D	* ¹ , WHG		
E		ATEX II 1/2 G	EEx de IIC T6, WHG
F		ATEX II 1/2 G	EEx ia IIC T6, WHG
		ATEX II 1/2 D	T80°C* ³
G		ATEX II 1/2 G	EEx ia IIC T6
		ATEX II 1/2 D	T80°C* ³
H		ATEX II 1 G	EEx ia IIC T6
I		ATEX II 1/2 G	EEx de IIC T6
J		ATEX II 1 G	EEx ia IIC T6, WHG
K		ATEX II 1/2 G	EEx d IIC T6
L		ATEX II 1/2 G	EEx 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
Q		FM XP, Cl. I, II, III,	Div. 1, Gr. B-G, E5 => Gr. A-G
R		FM Nl, Cl. I,	Div. 2, Gr. A-D
S		CSA IS, Cl. I, II, III,	Div. 1, Gr. A-G
T		CSA XP, Cl. I, II, III,	Div. 1, Gr. A-G
U		CSA Universalbrug	
V		TIIS Ex ia IIC T3	
W		TIIS Ex d IIB T3	
X		TIIS Ex ia IIC T6	
7		TIIS Ex d IIC T3	
8		TIIS Ex d IIC T6	
Y	* ²		



KA164

KA164

10 11



*¹ uden

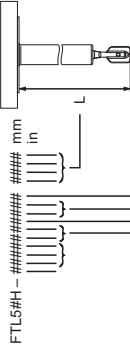
*² andre

*³ gælder ikke for PBT

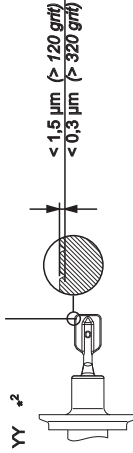
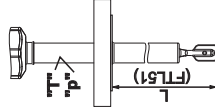


ENDRESS+HAUSER
LIQUIPHANT M

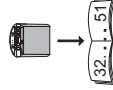
Ordrekode



IC	$\sqrt{2}$	IC	Ra < 1.5 μm /120 grit	+ "T" (FTL50H)
ID	$\sqrt{2}$	ID	Ra < 0.3 μm /320 grit / A3 + "T" (FTL50H)	+ "T" (FTL50H)
JC	$\sqrt{2}$	JC	 mm, Ra < 1.5 μm /120 grit	+ "T" (FTL50H)
JD	$\sqrt{2}$	JD	 mm, Ra < 0.3 μm /320 grit	+ "T" (FTL50H)
KC	$\sqrt{2}$	KC	 in, Ra < 1.5 μm /120 grit	+ "T" (FTL50H)
KD	$\sqrt{2}$	KD	 in, Ra < 0.3 μm /320 grit	+ "T" (FTL50H)
LC	$\sqrt{2}$	LC	"L II", Ra < 1.5 μm /120 grit	+ "T" (FTL50H)
LD	$\sqrt{2}$	LD	"L II", Ra < 0.3 μm /320 grit	+ "T" (FTL50H)
QC	$\sqrt{2}$	QC	Ra < 1.5 μm /120 grit	+ "p" (FTL50H)
QD	$\sqrt{2}$	QD	Ra < 0.3 μm /320 grit / A3 + "p" (FTL50H)	+ "p" (FTL50H)
RC	$\sqrt{2}$	RC	 mm, Ra < 1.5 μm /120 grit	+ "p" (FTL50H)
RD	$\sqrt{2}$	RD	 mm, Ra < 0.3 μm /320 grit	+ "p" (FTL50H)
SC	$\sqrt{2}$	SC	 in, Ra < 1.5 μm /120 grit	+ "p" (FTL50H)
SD	$\sqrt{2}$	SD	 in, Ra < 0.3 μm /320 grit	+ "p" (FTL50H)
TC	$\sqrt{2}$	TC	"L II", Ra < 1.5 μm /120 grit	+ "p" (FTL50H)
TD	$\sqrt{2}$	TD	"L II", Ra < 0.3 μm /320 grit	+ "p" (FTL50H)



A	FEL50A, PROFIBUS PA
1	FEL51, 19...253 V AC
2	FEL52, 10... 55 V DC, PNP
4	FEL54, 19...253 V AC, 19...55 V DC, DPDT
5	FEL55, 11... 36 V DC, 8/16 mA
6	FEL56, NAMUR, L-H
7	FEL57, PFM
8	FEL58, NAMUR, H-L
9	$\sqrt{2}$



32...1...51

E1 F27 NEMA6P, NPT $\frac{3}{4}$
 E4 F16, NEMA4X, NPT $\frac{1}{2}$
 E5 F13/17, NEMA4X, NPT $\frac{3}{4}$
 E6 F15, NEMA4X, NPT $\frac{1}{2}$
 F1 F27, IP68, G $\frac{1}{2}$
 F4 F16, IP66, G $\frac{1}{2}$
 F5 F13/17, IP66, G $\frac{1}{2}$
 F6 F15, IP66, G $\frac{1}{2}$
 G1 F27, IP68, M20
 G4 F16, IP66, M20
 G5 F13/17, IP66, M20
 G6 F15, IP66, M20
 N4 F16, IP66, M12
 N5 F13/17, IP66, M12
 N6 F15, IP66, M12
 Y9 *

#3 Kompakt hus

#7 Alu/sep.

A *

B PWIS-fri

C EN 10204 - 3.1, 316L

K Spec. justeringsdensitet H20

L Spec. justeringsdensitet H20, EN10204-3.1

S GL/ABS-marinecertificering (FTL51: maks. 1600 mm)

Y *

*¹ uden

*² andre

"L II" Koblingspunkt

Liquiphant II FTL 360/365, FDL 30/35

"T" Temperaturafstandsstykke

"p" Trykforseglet



F16 (PBT)



F13/17 (Alu)
F27 (316L)



F15 (316L)



→



→



ENDRESS+HAUSER
LIQUIPHANT M

Ordrekode

FTL5#H - #####



Flanger

ANSI B 16.5

AA2	1/4", 150 lbs, RF, 316/316L
AC2	1/2", 150 lbs, RF, 316/316L
AE2	2", 150 lbs, RF, 316/316L
AF2	2", 300 lbs, RF, 316/316L
AJ2	2 1/2", 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

Procestilslutninger

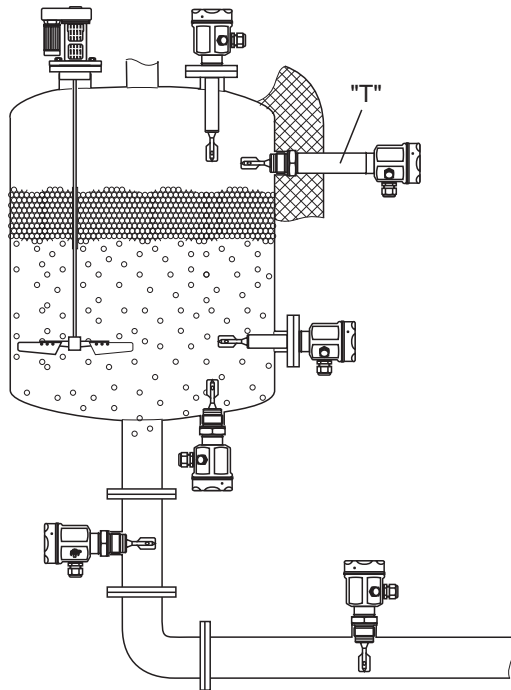
	EE2	1",	316L	. Pe, max. T
	GQ2	G ¾, ISO 228,	316L (FTL50H)	40 bar, 100 °C 25 bar, 150 °C
	GW2	G 1, ISO 228,	316L	40 bar, 100 °C 25 bar, 150 °C
	HE2	DN50, DIN 11864-1 A,	316L	40 bar, 100 °C 25 bar, 150 °C
	MA2	DN32, PN25, DIN 11851,	316L	25 bar, 140 °C
	MC2	DN40, PN25, DIN 11851,	316L	40 bar, 100 °C 25 bar, 140 °C
	ME2	DN50 PN25, DIN 11851,	316L	25 bar, 140 °C
	PE2	DRD, 65 mm,	316L	40 bar, 100 °C 25 bar, 150 °C
	TC2	DN25-38 (1...1½"), ISO 2852, 316L		16 bar, 120 °C 2 bar, 150 °C
	TE2	DN40-51 (2"), ISO 2852,	316L	16 bar, 120 °C 2 bar, 150 °C
	UE2	SMS 2", PN25,	316L	25 bar, 140 °C
	WE2	DN65-162 PN10, Varivent [®] ,	316L	10 bar, 120 °C

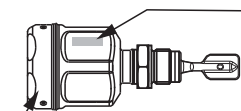
YY9 ²

² andre

DA- Anvendelse

Punktniveaudetektering i væsker

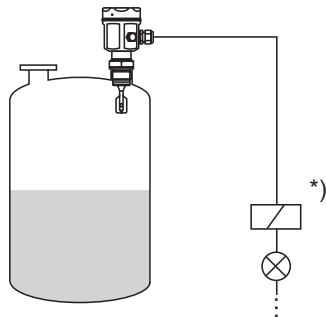




Elektroniske indsatser

Ordrekode:
FTL5#H - # ### ## # ## #

FEL51
FEL52
FEL54

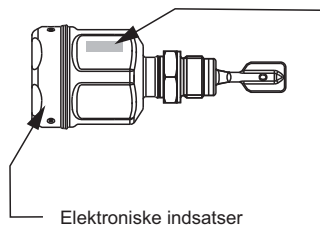


*) Ekstern belastning

DA- Målesystem
til direkte tilslutning

DA- Målesystem

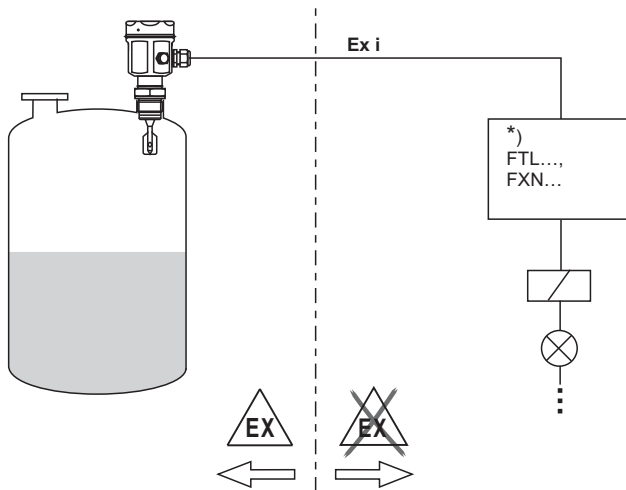
til tilslutning via afbryder



Elektroniske indsatser

Ordrekode:
FTL5#H - # ### ## # ### #

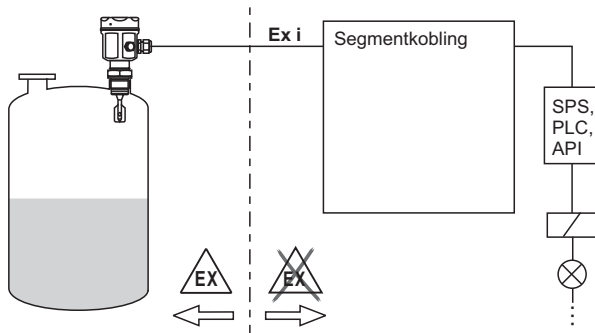
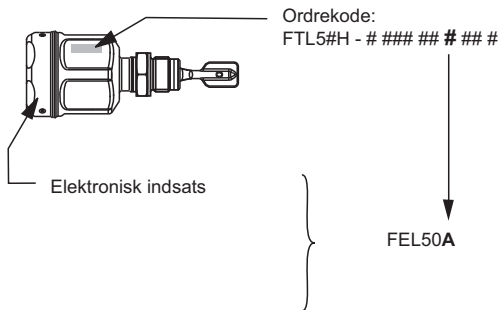
FEL55
FEL56
FEL57
FEL58

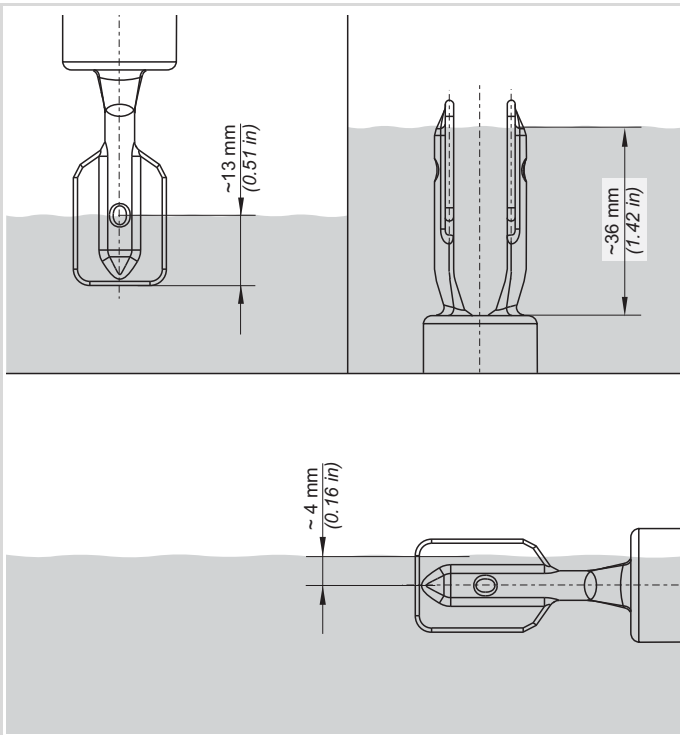


*) Afbryder, plc, skilleforstærker

DA- Målesystem

til tilslutning til PROFIBUS PA



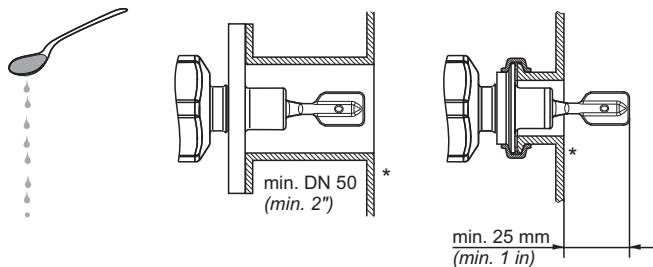


DA- Installation

Koblingspunkt afhænger af monteringsposition

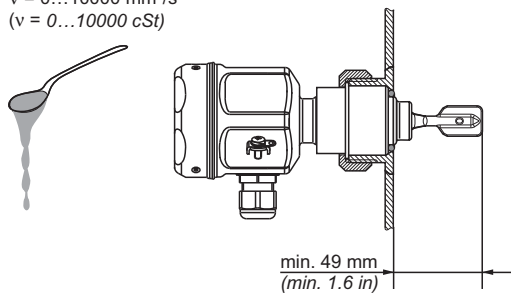
DA- Monteringseksempler afhængigt af væskens viskositet ν

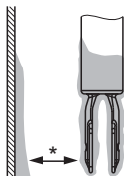
$\nu = 0 \dots 2000 \text{ mm}^2/\text{s}$
 $(\nu = 0 \dots 2000 \text{ cSt})$



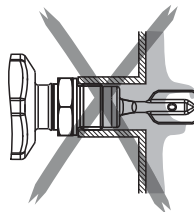
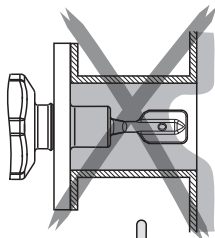
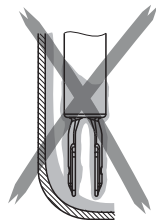
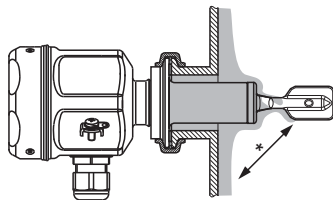
* afgrate

$\nu = 0 \dots 10000 \text{ mm}^2/\text{s}$
 $(\nu = 0 \dots 10000 \text{ cSt})$



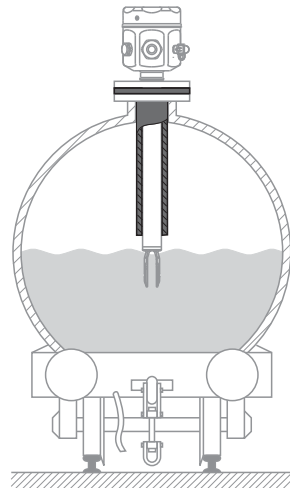
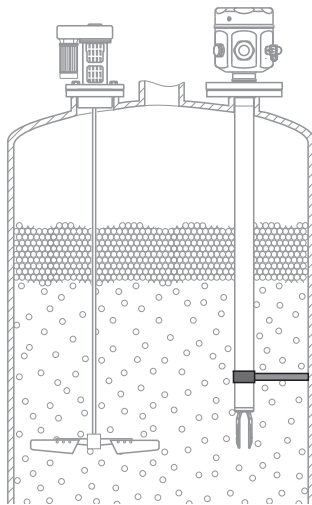


* Afstand!



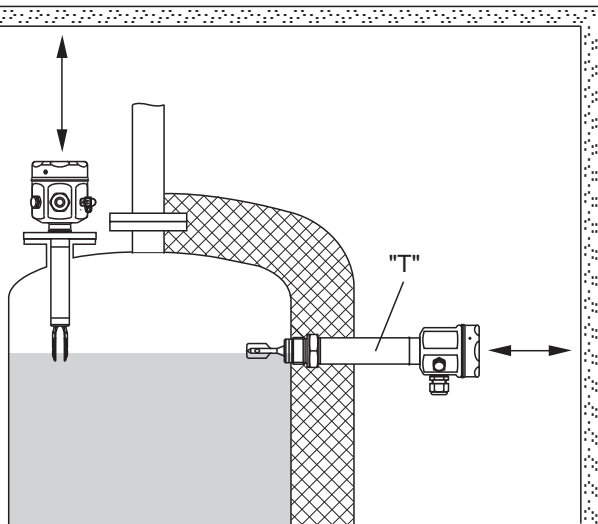
DA- Vær opmærksom på aflejringer.
Gaflen må ikke berøre
aflejringerne.

DA- Sørg for understøttelse ved dynamisk belastning

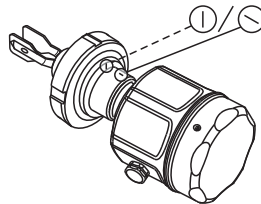
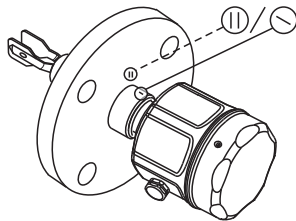
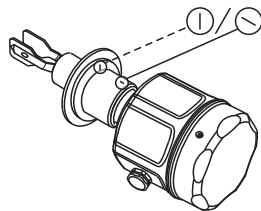
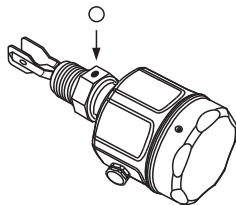
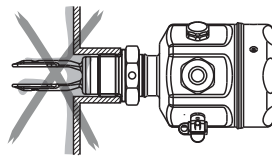
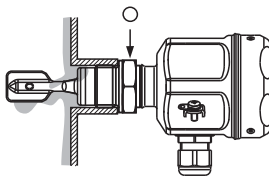


DA- Sørg for, at der er frirum

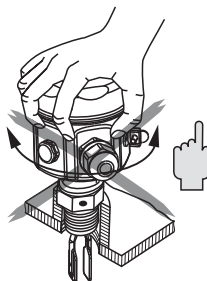
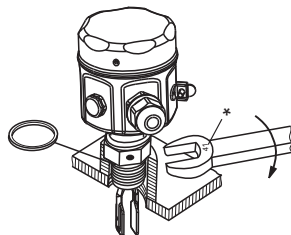
"T" = med temperaturafstandsstykke til isolerede tanke



DA- Positioner gaflen:
Markering over eller under

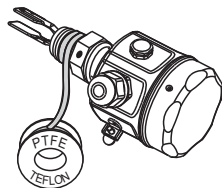


G $\frac{3}{4}$, 32 mm (1 $\frac{1}{4}$ ")*
 G 1, 41 mm (1 $\frac{5}{8}$ ")*

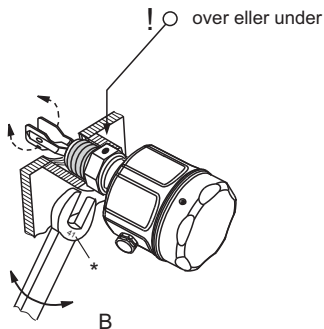


DA- Drej Liquiphant ind i
 procestilslutningen.
Drej ikke på huset.

NPT $\frac{3}{4}$, R $\frac{3}{4}$, G $\frac{3}{4}$, 32 mm (1 $\frac{1}{4}$ ")*
 NPT 1, R 1, G 1, 41 mm (1 $\frac{5}{8}$ ")*

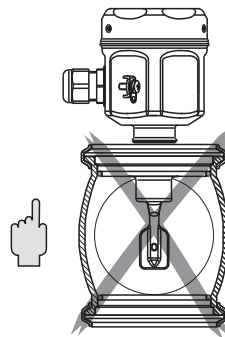
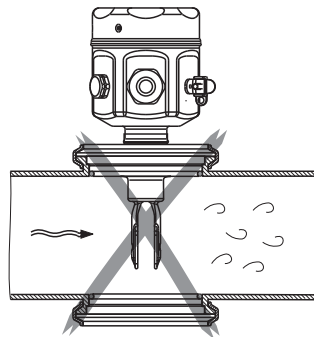
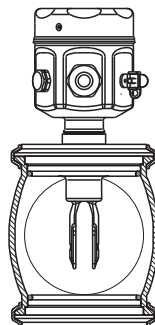
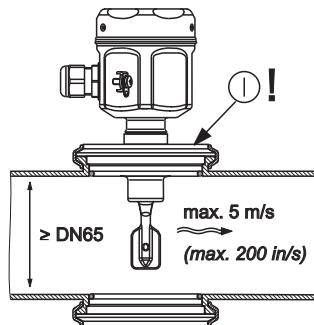


A

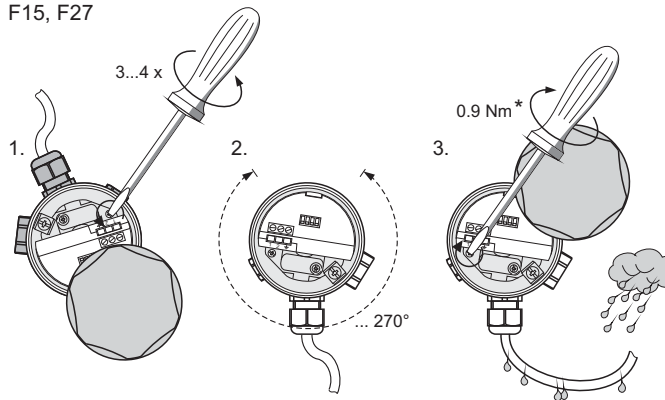


B

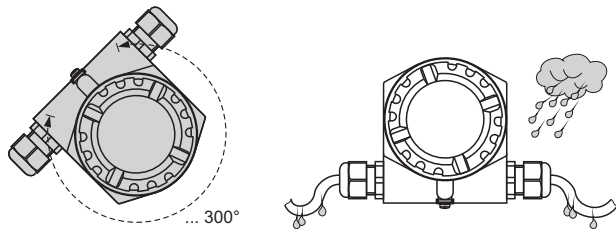
DA- Positionering i rør:



F15, F27



F16, F13, F17

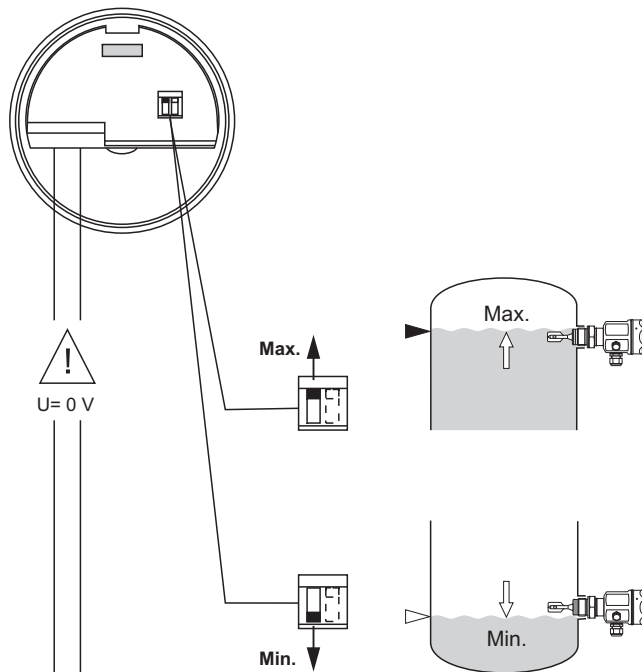


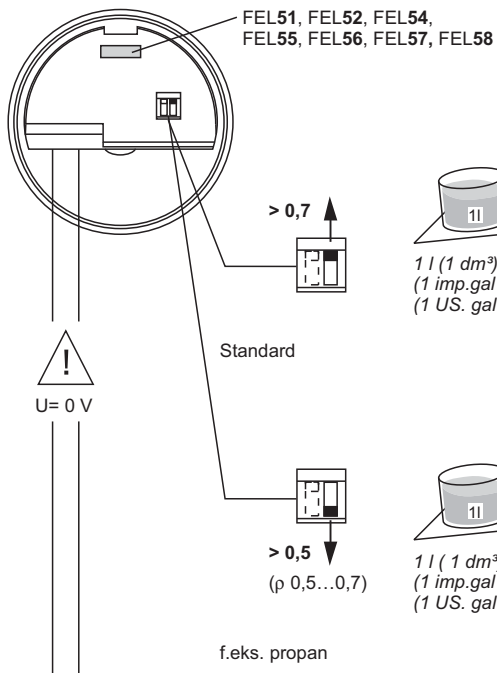
DA- Positionering af kabelforskruning

* Tilspændingsmoment

DA- Opsætning

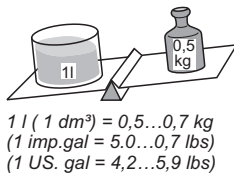
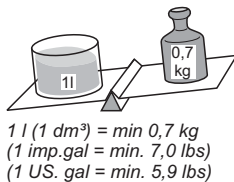
Minimal/maksimal fejlsikker
tilstand



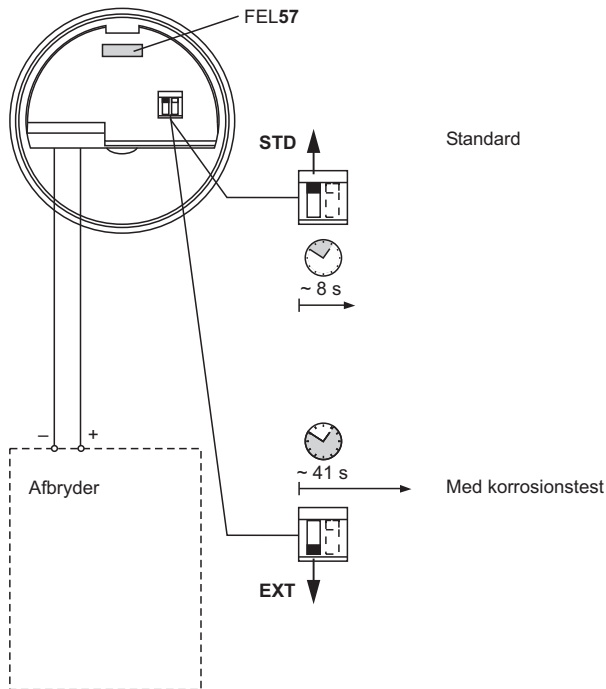


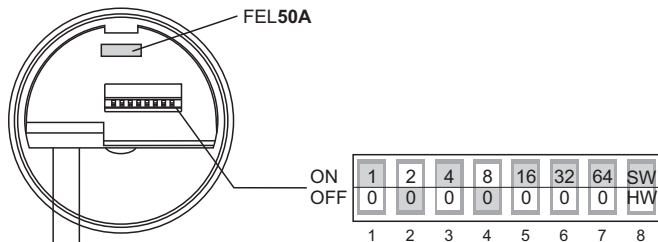
DA- Mediedensitet.

Densitet ρ målt i g/cm³ eller i kg/l.



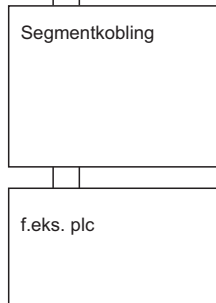
DA- Selvtest FEL57
(funktion, se side 46, 47 og
afbryder)



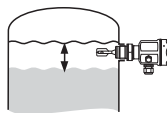


Eksempel

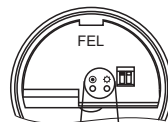
$2 + 8 = 10 = \text{Adresse}$



DA- Indstilling af enhedsadresse
(Indstilling af parametrene, se
BA141F)



Niveau varierer



LED'er



Standby



Omskiftningsstatus



FEL57, FEL50A: Afdækning



on



blinker



off



Udgangssignal



Fejl

GN

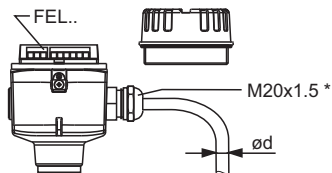


RD

(YE)

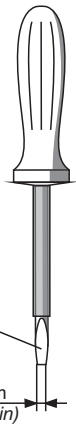
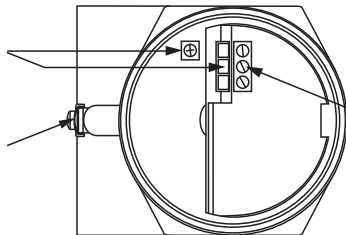


Overhold nationale forskrifter!



max. 2,5 mm²
(max. AWG 14)

max. 4 mm²
(max. AWG 12)



3 mm
(1/8 in)

DA- Tilslutninger

*Kabelindgang

Forniklet messing:

Ød = 7...10,5 mm (0,28...0,41 in)

Plast:

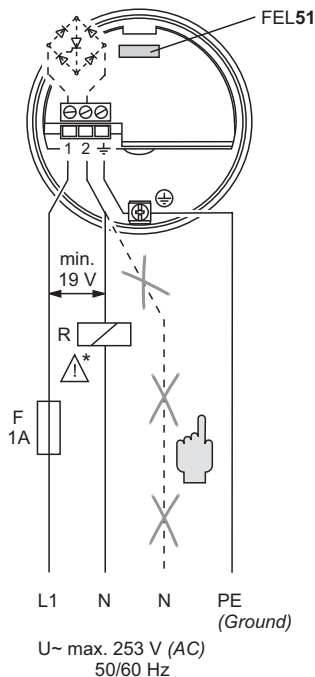
Ød = 5...10 mm (0,2...0,38 in)

Rustfrit stål:

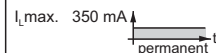
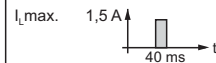
Ød = 7...12 mm (0,28...0,47 in)

DA- Tilslutninger FEL51 Toleder-vekselstrøms tilslutning

 Ødelæggelse

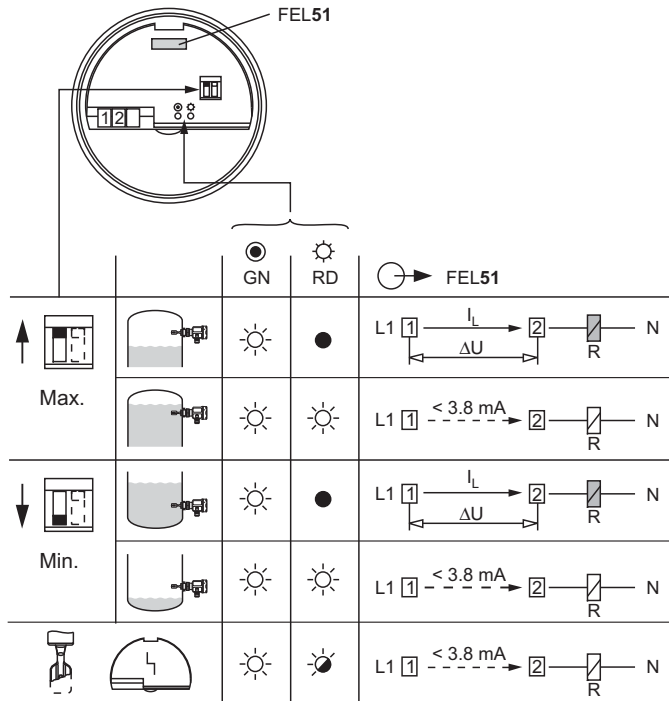


* Ekstern belastning R **skal** være tilsluttet

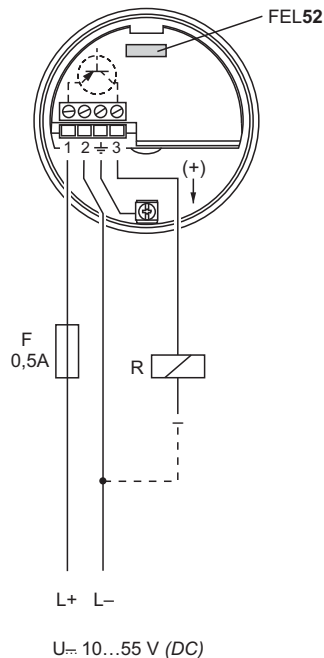


max. 89 VA / 253 V
max. 8,4 VA / 24 V

min. 2,5 VA / 253 V (10 mA)
min. 0,5 VA / 24 V (20 mA)

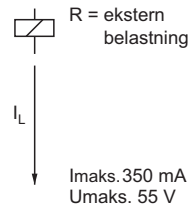

 ΔU_{FEL51} maks. 12 V

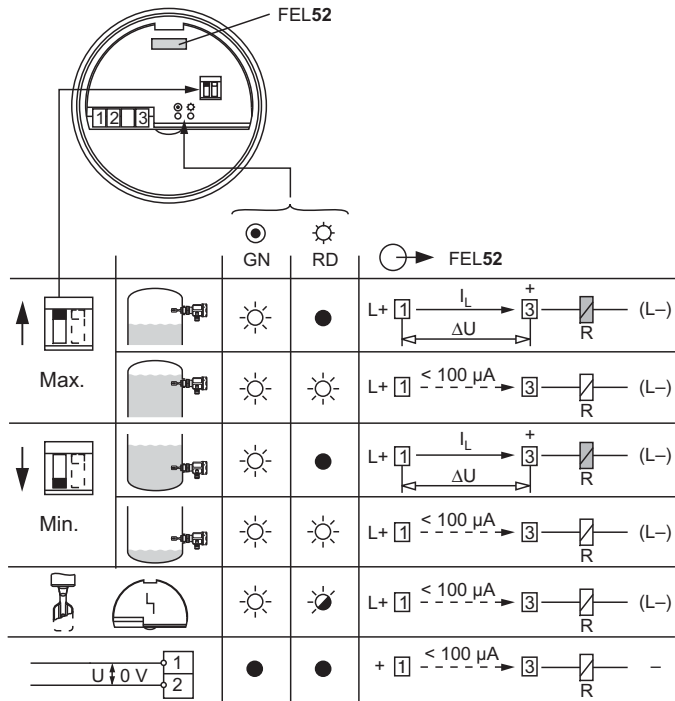
DA- Tilslutninger FEL52 Jævnstrøms tilslutning (PNP)



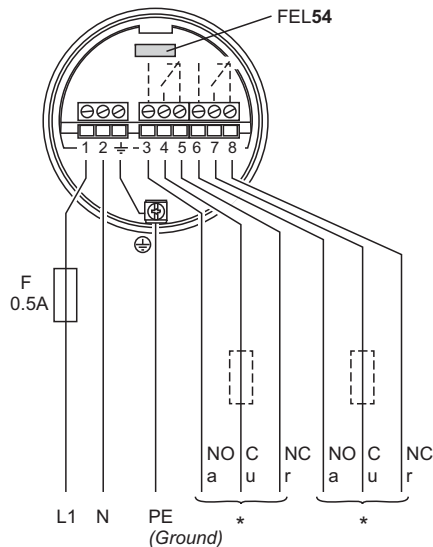
også for DI-moduler

EN 61131-2




 $\Delta U_{FEL52} \text{ maks. } 3 \text{ V}$

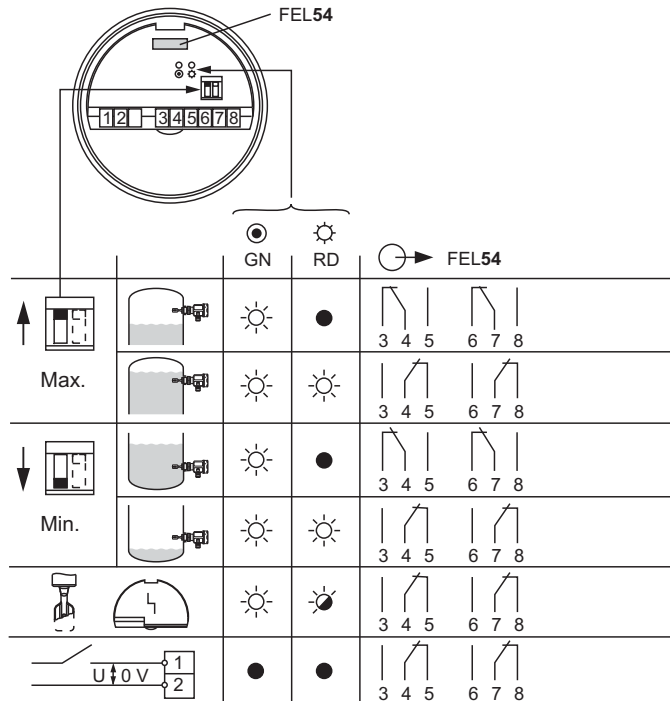
DA- Tilslutninger FEL54
 Universaltilslutning
 Relæudgang



$U \sim 19 \dots 253 \text{ V (AC)}$

$U_{DC} 19 \dots 55 \text{ V (DC)}$
 $L+ \quad L-$

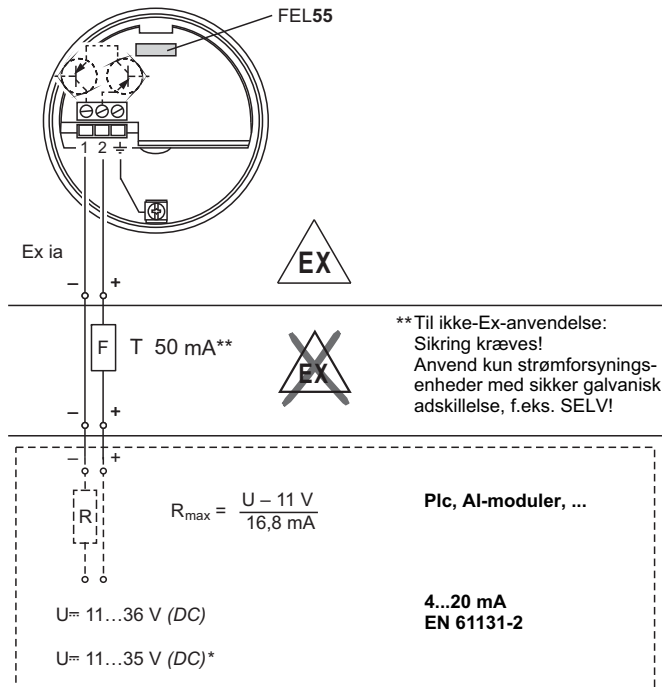
$\left\{ \begin{array}{l} U \sim \text{max. } 253 \text{ V, } I \sim \text{max. } 6 \text{ A} \\ P \sim \text{max. } 1500 \text{ VA, } \cos \varphi = 1 \\ * \quad P \sim \text{max. } 750 \text{ VA, } \cos \varphi > 0.7 \\ I_{DC} \sim \text{max. } 6 \text{ A, } U_{DC} < 30 \text{ V} \\ I_{DC} \sim \text{max. } 0.2 \text{ A, } U_{DC} < 125 \text{ V} \end{array} \right.$

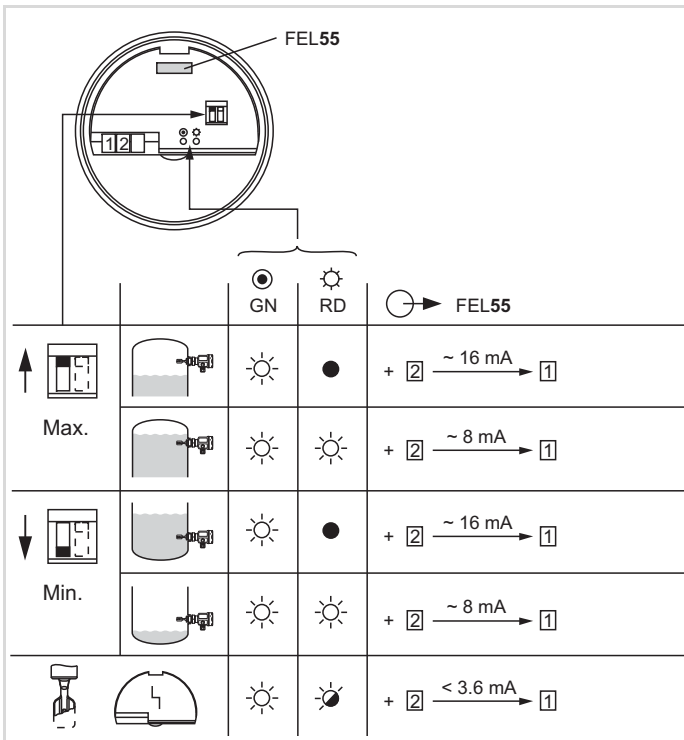


DA- Tilslutninger FEL55

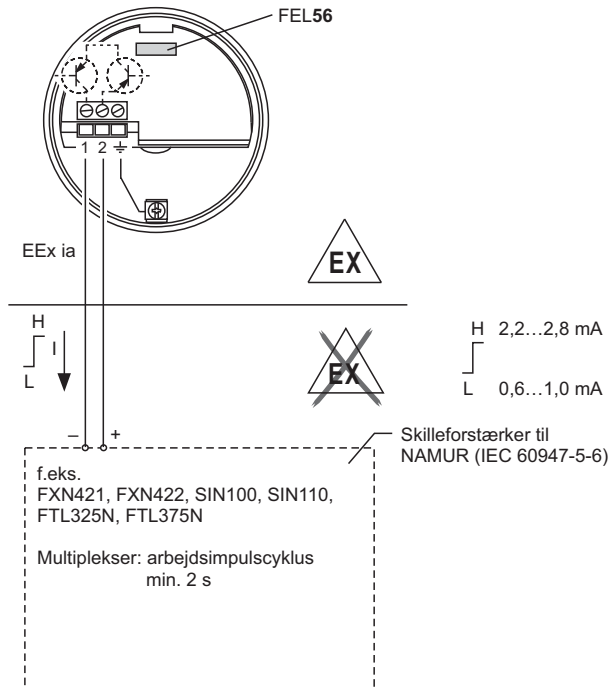
Udgang 8/16 mA

* Våde miljøer.



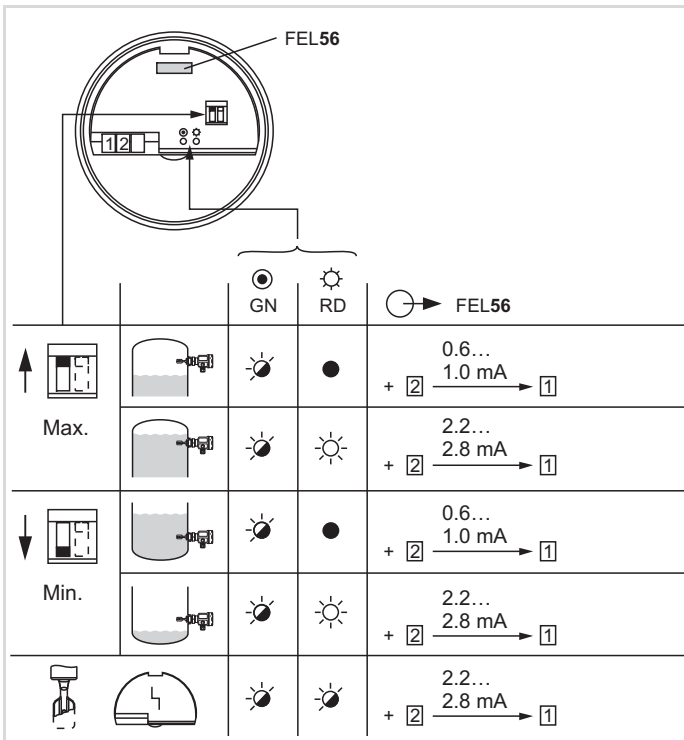


DA- Tilslutninger FEL56
NAMUR-udgang L-H
< 1,0 mA / > 2,2 mA

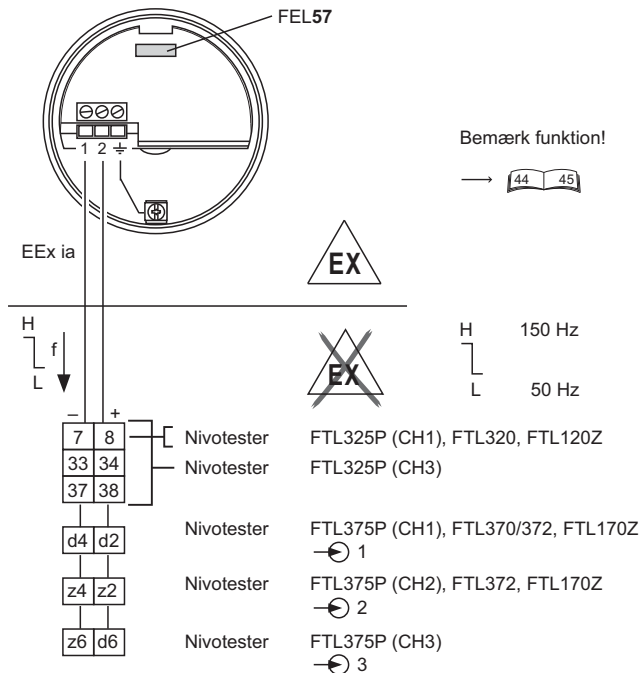


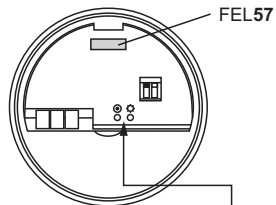
Strømforsyning

DC: 8,2 V +/- 20%



DA- Tilslutninger FEL 57
 PFM-udgang
 150 Hz / 50 Hz

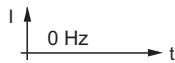
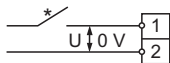
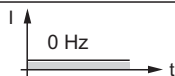
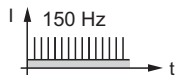




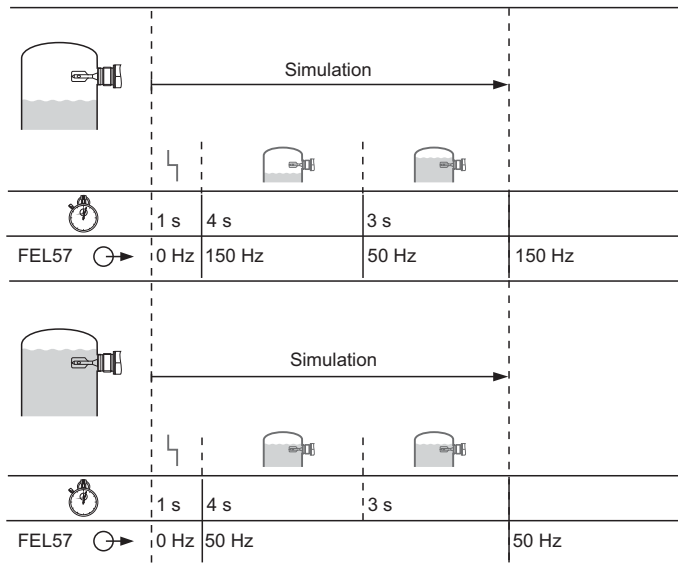
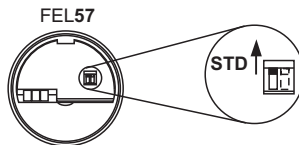
●
GN

☼
YE

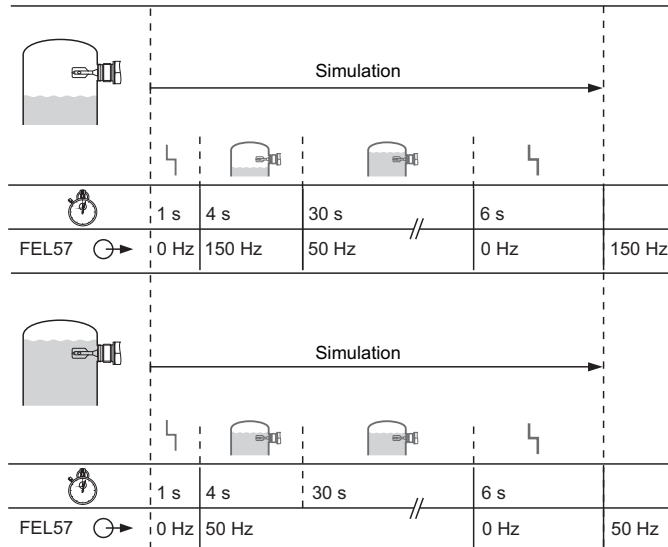
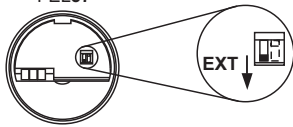
⊖ → FEL57

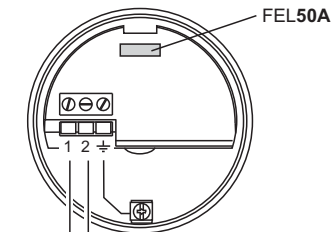


DA- Tilkoblingsmåde Selvtest (STD)



FEL57



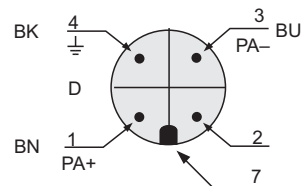


PA- PA+
U: 9...32 V (DC)

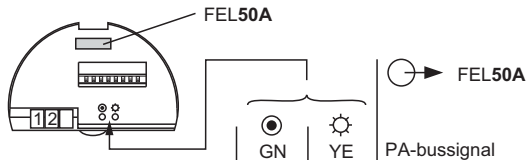
Segmentkobling

f.eks. plc

M12 stik

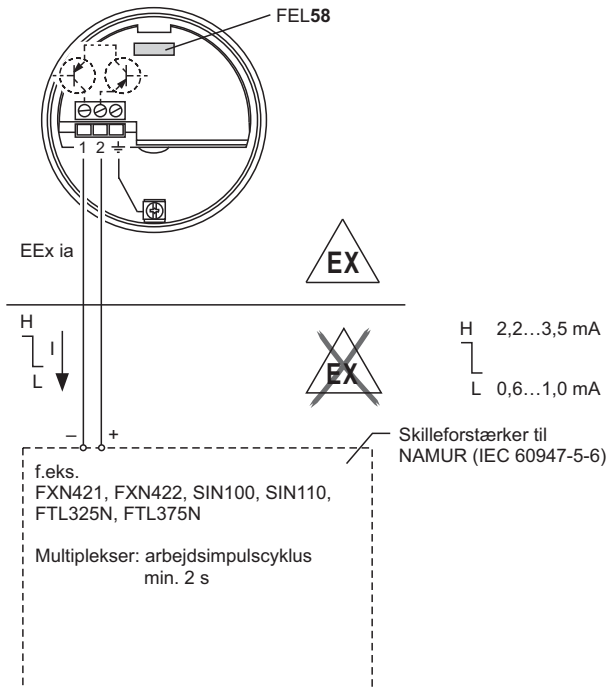


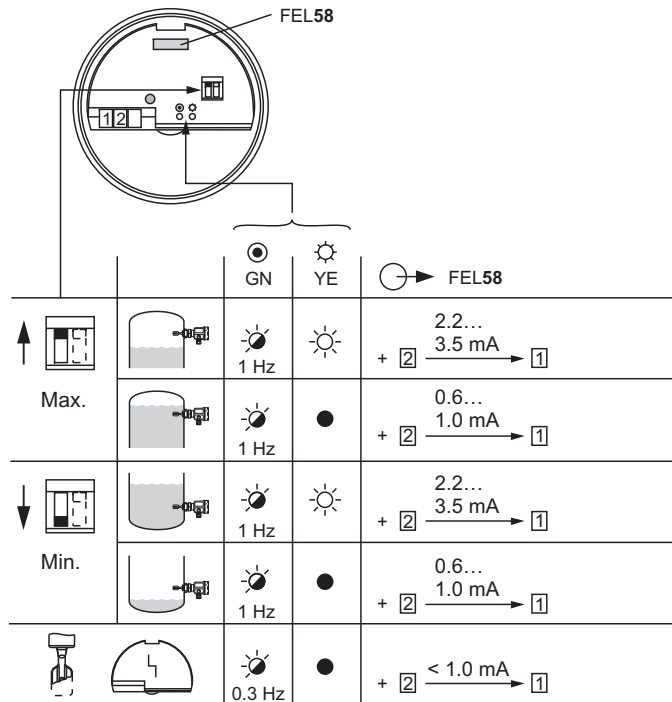
Enhedsstik på hus (hanstik)



		GN	YE	PA-bussignal
ikke inverteret				OUT_D = 0
				OUT_D = 1
inverteret				OUT_D = 0
				OUT_D = 1
↔ SPS Commuwin II			—	Kommunikation
		—		Status, se BA141F
				../..

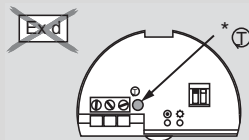
DA- Tilslutninger FEL58
NAMUR-udgang H-L
 $> 2,2 \text{ mA} / < 1,0 \text{ mA}$





DA- Funktionstestknop FEL58
Fejlsikker tilstand MAKS.

MAX  + 		
1. Normal drift	GN  1 Hz YE  + 2 $\xrightarrow{2,2... 3,5 \text{ mA}}$ 1	GN  1 Hz YE  + 2 $\xrightarrow{0,6... 1,0 \text{ mA}}$ 1
2. Tryk på testknappen 	GN  YE  + 2 $\xrightarrow{0 \text{ mA}}$ 1	GN  YE  + 2 $\xrightarrow{0 \text{ mA}}$ 1
3. Slip testknappen efter ~2 s normal drift 	GN  1 Hz YE  + 2 $\xrightarrow{2,2... 3,5 \text{ mA}}$ 1	GN  1 Hz YE  + 2 $\xrightarrow{0,6... 1,0 \text{ mA}}$ 1



MIN  + 



DA- Funktionstestknapp FEL58
Fejlsikker tilstand MIN.

1. Normal drift

GN YE
 
1 Hz
+ 2,2...
3,5 mA
2 → 1

GN YE
 
1 Hz
+ 0,6...
1,0 mA
2 → 1

2. Tryk på testknappen



GN YE
 
+ 0 mA
2 - - - - -> 1

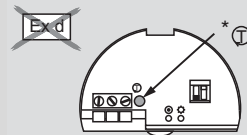
GN YE
 
+ 0 mA
2 - - - - -> 1

3. Slip testknappen
efter ~2 s normal drift



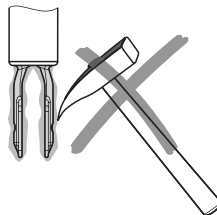
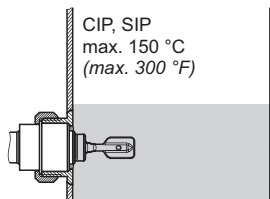
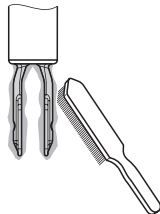
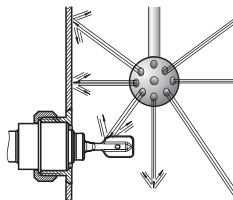
GN YE
 
1 Hz
+ 2,2...
3,5 mA
2 → 1

GN YE
 
1 Hz
+ 0,6...
1,0 mA
2 → 1

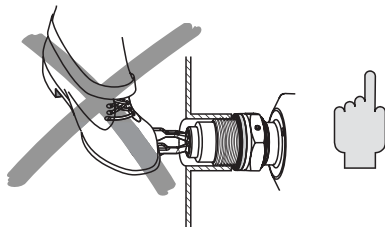


DA- Vedligeholdelse, rengøring

Fjernelse af belægning



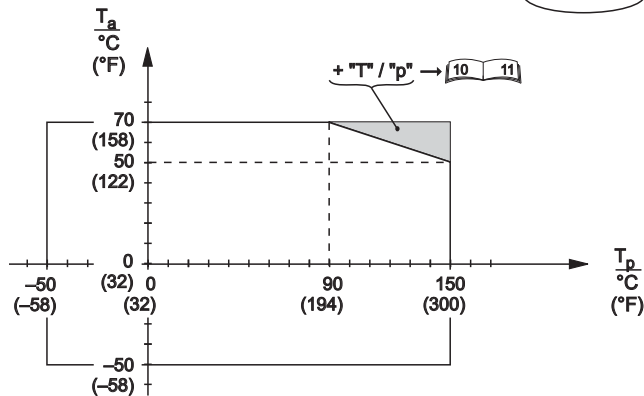
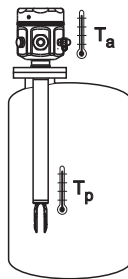
Må **ikke** bruges som
opstigningshjælp!



DA- Tekniske data

Omgivelsestemperatur T_a

Procestemperatur T_p



DA- Fejlfinding

Fejl	Årsag	Afhjælpning
Skifter ikke	Ingen strøm	Kontrollér strømforsyningen
	Defekt signalledning	Kontrollér signalledningen
	Defekt elektronisk indsats - FEL51 sluttet direkte til L1 og N	Ombyt - tilslut altid FEL51 via ekstern belastning
	Densitet for medie for lav	Indstil densitet til > 0,5 på elektronisk indsats
	Gaffel belagt	Rengør gaffel
	Gaffel korroderet (Indikation på FEL: blinker rødt/gult, FEL58: blinker grønt 0,3 Hz)	Udskift komplet instrument
	FEL51: Intern modstand for tilsluttet relæ for stor	Tilslut passende relæ
	FEL51: Holdestrøm for tilsluttet relæ for lav	Tilslut modstand parallelt med relæ
	FEL54: Kontakter svejset sammen (efter kortslutning)	Udskift FEL54; anbring sikring i kontakt-kredsløb
Skifter forkert	Min./maks. fejlsikker tilstand indstillet forkert	Indstil korrekt tilstand på elektronisk indsats
Sporadisk forkerte skift	Tæt tyk skum, meget turbulente forhold, opskummet medie	Monter Liquiphant i bypass
	Ekstrem radiointerferens	Anvend isoleret kabel
	Ekstreme vibrationer	Afkobl, dæmp, drej gafflen 90°
	Vand i huset	Skrub dæksel og kabelforskrumning godt fast
	FEL52: Udgang overbelastet	Nedsæt belastning, (kabel) kapacitans
Skifter forkert efter strømsvigt	FEL57, adfærd under tilkoblingstest (funktionstest)	Vær opmærksom på, hvordan FEL57 skifter; bloker anlægsstyringen i op til 45 s efter et strømsvigt

DA- Supplement til fejlfinding

Hvis gaflens skifteadfærd er unormal, kan gaffelfrekvensen måles på PIN 4 på diagnosesoklen.

På de elektroniske indsatser FEL51/52/54/55/56/57/58 er dette en sinusformet vibration, hvis amplitude gør det muligt at bestemme gaflens tilstand.

På FEL50A kan gaflens frekvens måles på grund af et rektangulært impulssignal.

DA- Reservedele

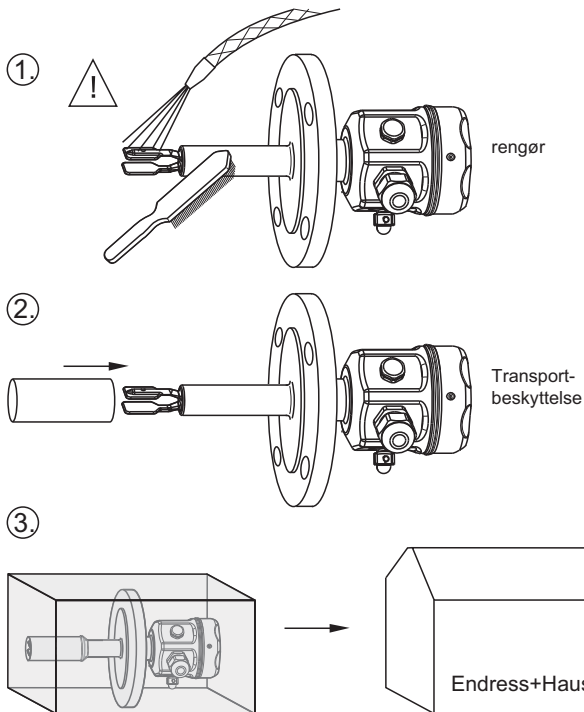
Elektroniske indsatser



FEL51	52002304
FEL52	52002305
FEL54	52002306
FEL55	52002307
FEL56	52002308
FEL57	52002309
FEL58	52006454
FEL50A	52010527

Installationsspecifikation: I forbindelse med installationen er det vigtigt at huske på, at elektriske hjælpemidler (elektroniske indsatser), som forsynes med strøm fra intrinsisk usikre kredsløb, er muligvis **ikke** længere forbundet med intrinsisk sikre kredsløb.

DA- Reparation
hos Endress+Hauser



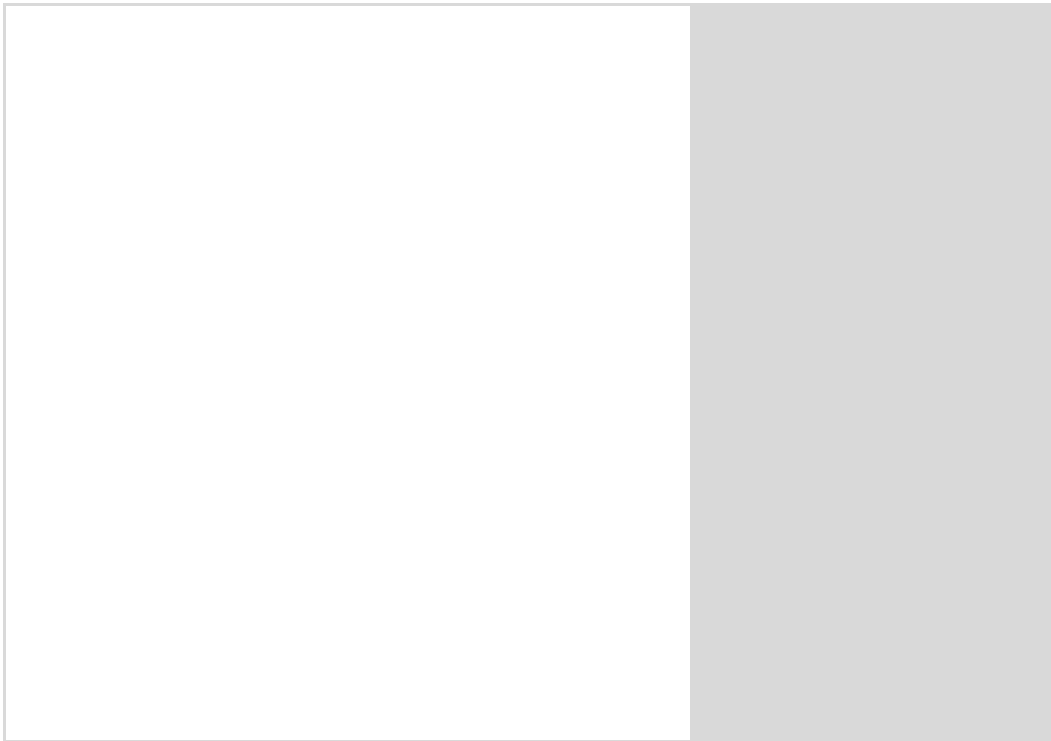
TI328F Liquiphant FTL50, FTL50H, FTL51, FTL51H
TI426F

Betjeningsvejledning

BA00141F FEL50A, PROFIBUS PA

Om sikkerhed

XA00031F	CE Ex	II 1/2 G,	Ex d	IIC/IIB
XA00063F	CE Ex	II 1/2 G, II 1/2 D,	Ex ia/ib	IIC/IIB
XA00064F	CE Ex	II 1 G,	Ex ia	IIC/IIB
XA00108F	CE Ex	II 1/2 G,	Ex de	IIC/IIB
XA00113F	CE Ex	II 1/2 G,	Ex ia/ib	IIC
XA00114F	CE Ex	II 1/2 G,	Ex d	IIC
XA00115F	CE Ex	II 1/2 G,	Ex de	IIC
XA00154F	CE Ex	II 1/2 G, II 1/2 D,	Ex ia/ib	IIC/IIB
XA00158F	CE Ex	II 1/2 G,	Ex ia/ib	IIC
XA00159F	CE Ex	II 1 G,	Ex ia	IIC/IIB
XA00182F	CE Ex	II 3 G, II 3 D,	Ex nA/nC	IIC/IIIC



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