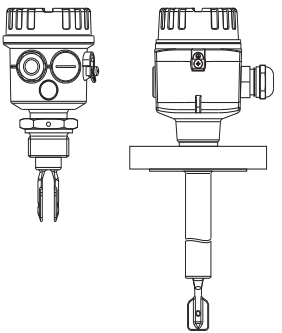
Betjeningsvejledning
Liquiphant M FTL50, FTL51



DA- Punktniveauafbryder

Endress+Hauser
People for Process Automation

DA -Indhold

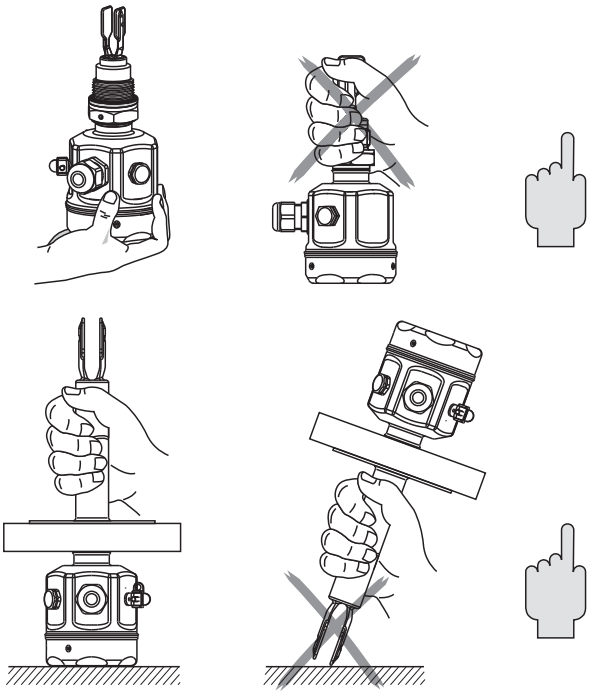
Forsigtig!
= forbudt;
medfører ukorrekt drift eller ødelæggelse.

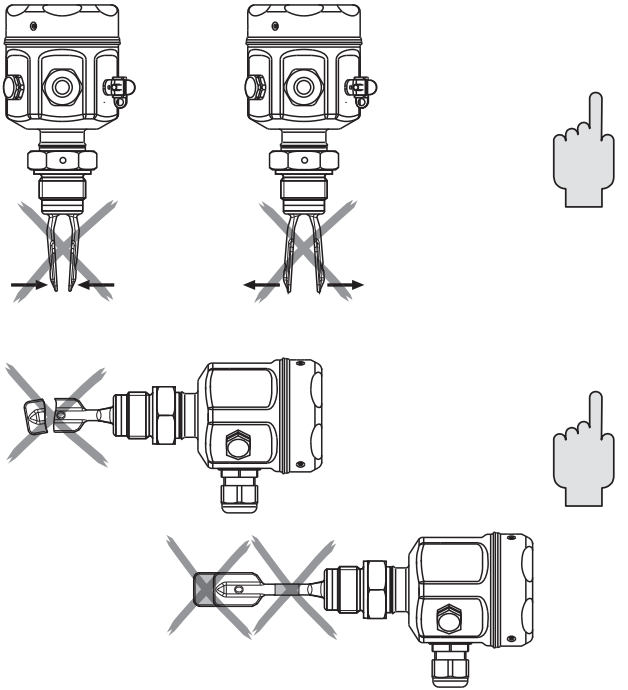
DA- Om sikkerhed

Liquiphant M FTL50, FTL51 er udviklet til punktniveaudetektering i flydende medier.
Ukorrekt brug kan medføre farer i forbindelse med anvendelsen.
Niveaugrænseafbryderen Liquiphant M FTL50, FTL51 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, certifikatet.
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

DA- Enhedsidentifikation

A##			
B##			
C##			
D##	Flanger		
F##			
K##			
N##			
GE2	R ¾,	DIN 2999, 316L	max. 100 bar, 150 °C
GE5	R ¾,	DIN 2999, AlloyC4	
GE6	R ¾,	DIN 2999, AlloyC22	
GF2	R 1,	DIN 2999, 316L	
GF5	R 1,	DIN 2999, AlloyC4	
GF6	R 1,	DIN 2999, AlloyC22	
GM2	NPT ¾,	ANSI, 316L	
GM5	NPT ¾,	ANSI, AlloyC4	
GM6	NPT ¾,	ANSI, AlloyC22	
GN2	NPT 1,	ANSI, 316L	
GN5	NPT 1,	ANSI, AlloyC4	
GN6	NPT 1,	ANSI, AlloyC22	
GQ2	G ¾,	ISO 228, 316L	max. 100 bar, 150 °C
GQ5	G ¾,	ISO 228, AlloyC4	
GQ6	G ¾,	ISO 228, AlloyC22	
GR2	G 1,	ISO 228, 316L	
GR5	G 1,	ISO 228, AlloyC4	
GR6	G 1,	ISO 228, AlloyC22	
GW2	G 1,	ISO 228, 316L	max. 25 bar, 150 °C max. 40 bar, 100 °C
TC2	DN25-38 (1...1½"), Tri-Clamp	ISO 2852, 316L	max. 16 bar, 120 °C max. 2 bar, 150 °C
TE2	DN40-51 (2"), Tri-Clamp	ISO 2852, 316L	
YY9	*[2]		

10 11

8 9

*[1] uden

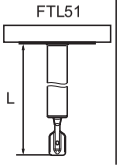
*[2] andre

*[3] gælder ikke for PBT

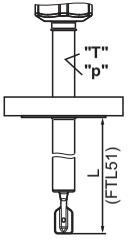
ENDRESS+HAUSER
LIQUIPHANT M

Ordrenummer

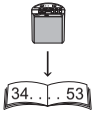
FTL5#-########## #### mm
in



AA	*[2],	Ra < 3.2 µm/80 grit (FTL50)
BB	..... mm, 316L,	Ra < 3.2 µm/80 grit
BE	..... mm, AlloyC4,	Ra < 3.2 µm/80 grit
CB	..... in, 316L,	Ra < 3.2 µm/80 grit
CE	..... in, AlloyC4,	Ra < 3.2 µm/80 grit
DB	"L II", 316L,	Ra < 3.2 µm/80 grit
DE	"L II", AlloyC4,	Ra < 3.2 µm/80 grit
IA	*[2],	+ **"T"** (FTL50)
JB	..... mm, 316L	+ **"T"**
JE	..... mm, AlloyC4	+ **"T"**
KB	..... in, 316L	+ **"T"**
KE	..... in, AlloyC4	+ **"T"**
LB	"L II", 316L	+ **"T"**
LE	"L II", AlloyC4	+ **"T"**
QA	*[2],	+ **"p"** (FTL50)
RB	..... mm, 316L	+ **"p"**
RE	..... mm, AlloyC4	+ **"p"**
SB	..... in, 316L	+ **"p"**
SE	..... in, AlloyC4	+ **"p"**
TB	"L II", 316L	+ **"p"**
TE	"L II", AlloyC4	+ **"p"**
YY	*[2]	



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	*[2]



E1	F27	NEMA6P, NPT ¾	
E4	F16,	NEMA4X, NPT ½	F16 (PBT)
E5	F13/17,	NEMA4X, NPT ¾	
E6	F15,	NEMA4X, NPT ½	
F1	F27,	IP68, G ½	
F4	F16,	IP66, G ½	F13/17 (Alu)
F5	F13/17,	IP66, G ½	F27 (316L)
F6	F15,	IP66, G ½	
G1	F27,	IP68, M20	
G4	F16,	IP66, M20	
G5	F13/17,	IP66, M20	
G6	F15,	IP66, M20	F15 (316L)
N4	F16,	IP66, M12	
N5	F13/17,	IP66, M12	
N6	F15,	IP66, M12	
Y9	*2		

#3 Kompakt hus → KA220

#7 Alu/sep. → KA163

A	*1
B	PVIS free
C	EN 10204 - 3.1, 316L
K	Spec. adjustment density H20
L	Spec. adjustment density H20, EN10204-3.1
N	EN 10204 - 3.1, NACE MR0175, 316L
P	100 bar (FTL51)
R	100 bar, EN 10204 - 3.1, NACE MR0175, 316L (FTL51)
S	GL/ABS marine certificate (FTL51: max. 1600 mm)
Y	*2

*1 uden

*2 andre

"L II" Koblingspunkt

Liquiphant II FTL 360/365, FDL 30/35

"T" Temperaturafstandsstykke

"p" Trykforseglet bøsning

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, RF, AlloyC4 >316/316L
AE6 2", 300 lbs, RF, Alloy C22 >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

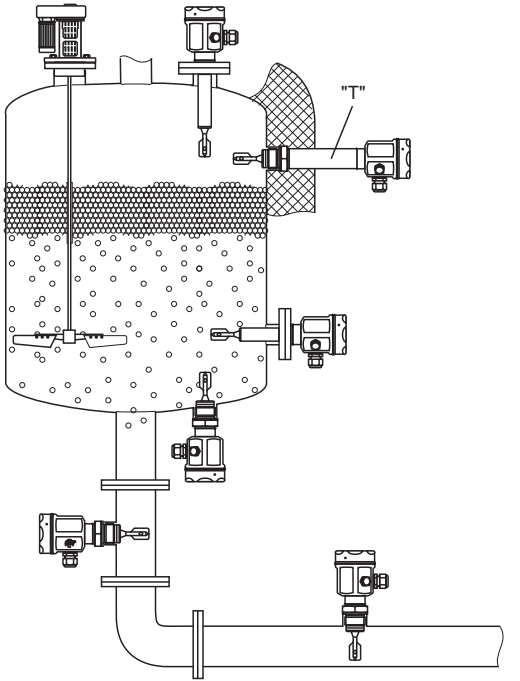
B12	DN80,	PN100 A,	316L (FTL51)
B82	DN25,	PN25/40 A,	316L
CA2	DN32,	PN6 B1,	316L
CA5	DN32,	PN6,	AlloyC4 >316L
CA6	DN32,	PN6,	AlloyC22 >316L
CE2	DN50,	PN6 B1,	316L
CE5	DN50,	PN6,	AlloyC4 >316L
CE6	DN50,	PN6,	AlloyC22 >316L
CG2	DN50,	PN25/40 B1,	316L
CG5	DN50,	PN25/40,	AlloyC4 >316L
CG6	DN50,	PN25/40,	AlloyC22 >316L
CJ2	DN50,	PN100 B2,	316L (FTL51)
CN2	DN80,	PN25/40 B1,	316L
CN5	DN80,	PN25/40,	AlloyC4 >316L
CN6	DN80,	PN25/40,	AlloyC22 >316L
CQ2	DN100,	PN10/16 B1,	316L
CQ5	DN100,	PN10/16,	AlloyC4 >316L
CQ6	DN100,	PN10/16,	AlloyC22 >316L
C12	DN80,	PN100 B2,	316L (FTL51)
C82	DN25,	PN25/40 B1,	316L
C85	DN25,	PN25/40,	AlloyC4 >316L
C86	DN25,	PN25/40,	AlloyC22 >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

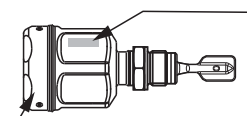
JIS B2220

KA2	10K 25,	RF,	316L
KC2	10K 40,	RF,	316L
KE2	10K 50,	RF,	316L
KE5	10K 50,	RF,	AlloyC4 >316L
KE6	10K 50,	RF,	AlloyC22 >316L
KL2	10K 80,	RF,	316L
KP2	10K 100,	RF,	316L

DA- Anvendelse

Punktniveaudetektering i væsker

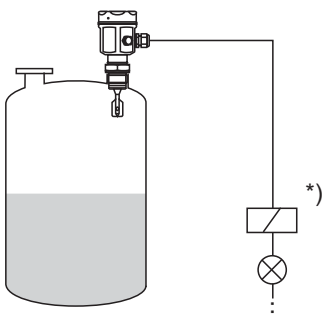




Ordrenummer:
FTL5# - # ### ## **#** ## #

Elektroniske indsatser

FEL5**1**
FEL5**2**
FEL5**4**



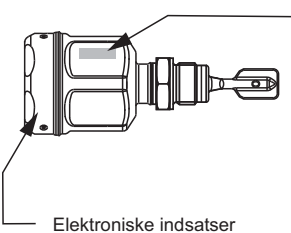
*)

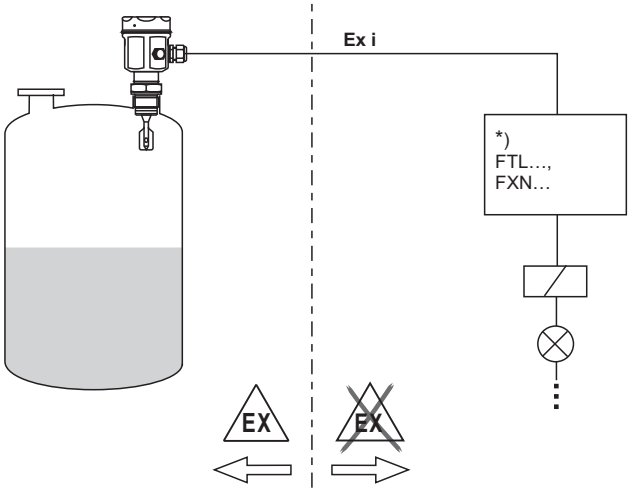
*) Ekstern belastning

DA- Målesystem
til direkte tilslutning

DA- Målesystem

til tilslutning via afbryder

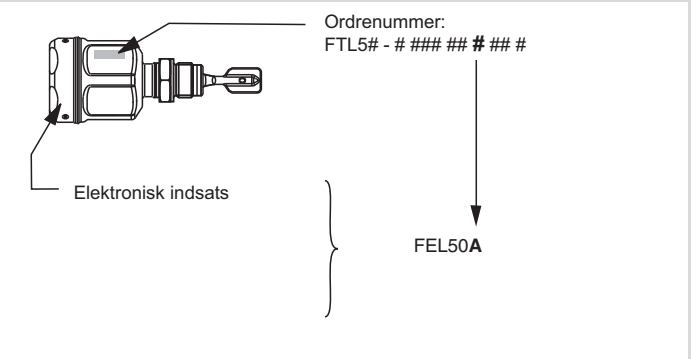


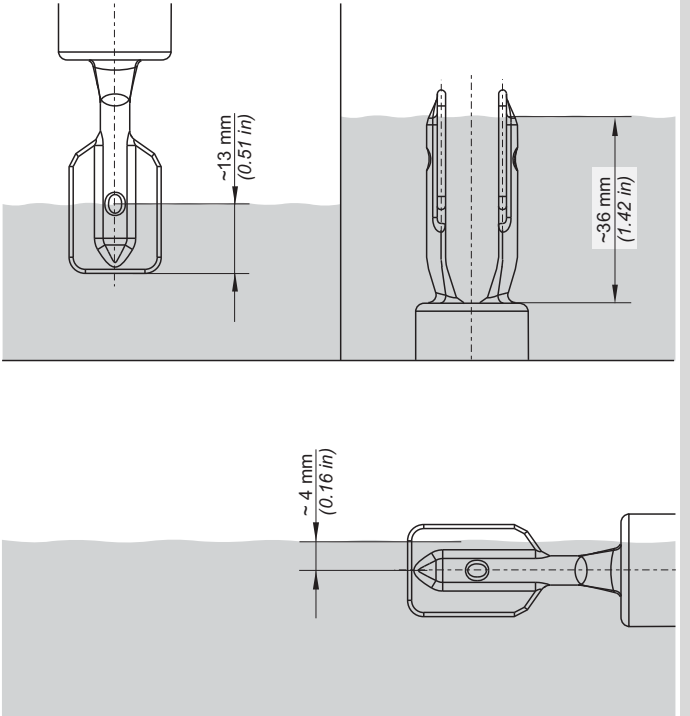


*) Afbryder, plc, skilleforstærker

DA- Målesystem

til tilslutning til PROFIBUS PA



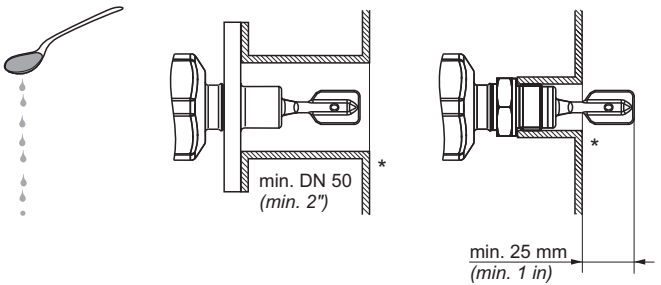


DA- Installation

Koblingspunkt afhænger af monteringsposition

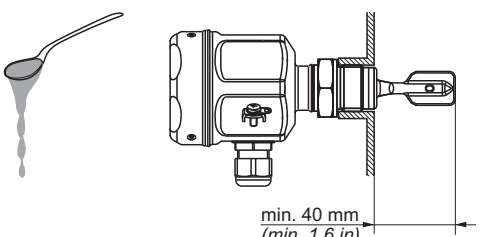
DA- Monteringseksempler afhængigt af væskens viskositet ν

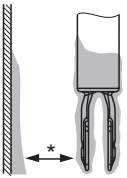
ν = 0…2000 mm²/s
(ν = 0…2000 cSt)

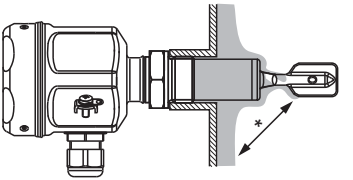


* afgrate

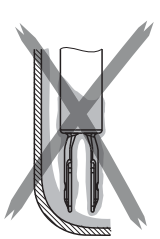
ν = 0…10000 mm²/s
(ν = 0…10000 cSt)

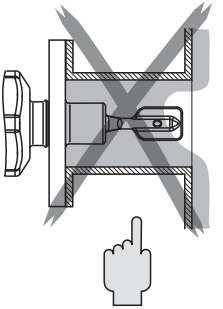


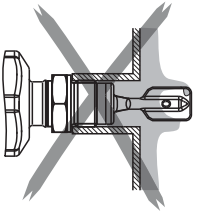




* Afstand!

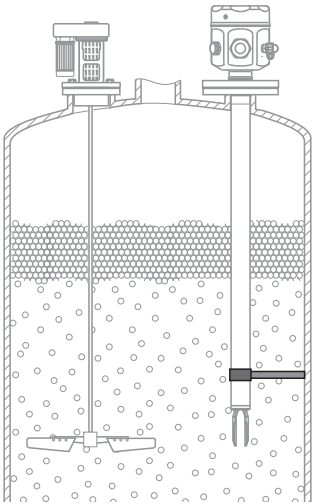


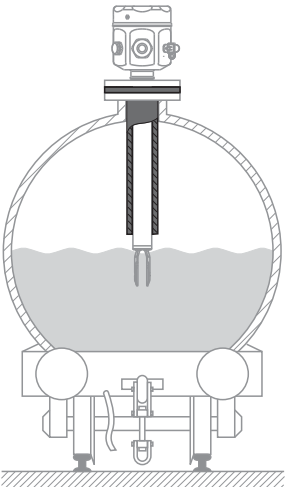




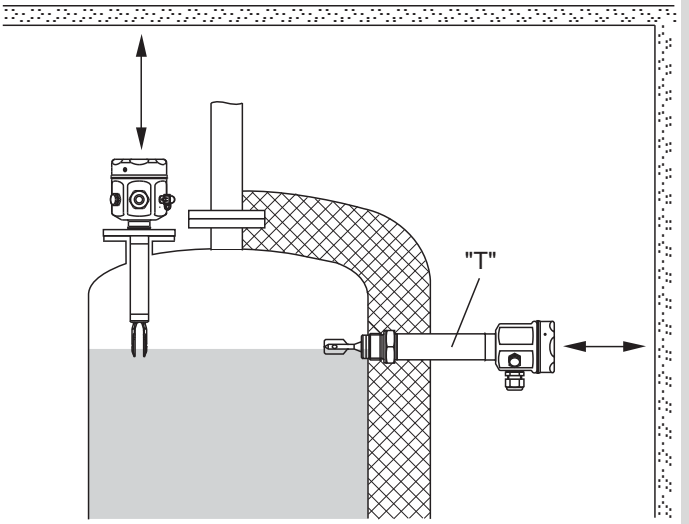
DA- Vær opmærksom på aflejringer. Gaflen må ikke berøre aflejringerne.

DA- Sørg for understøtning ved dynamisk belastning



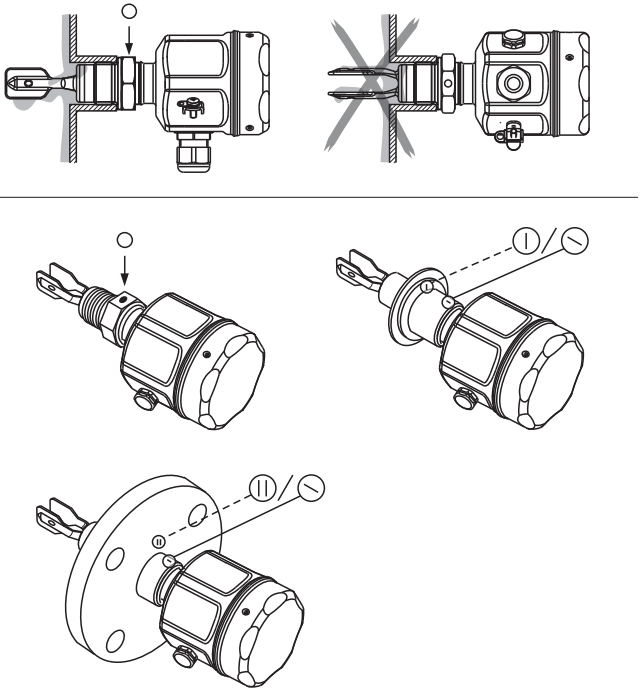


"T" = med temperaturafstandsstykke til isolerede tanke

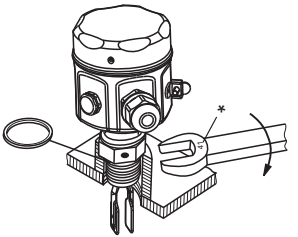


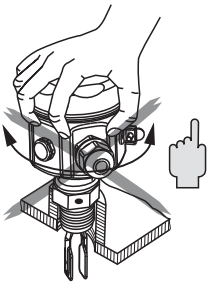
DA- Sørg for, at der er frirum

DA- Positioner gaflen:
Markering over eller under

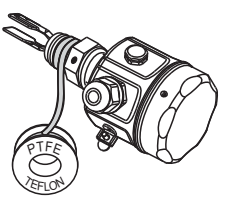


G ¾, 32 mm (1¼")*
G 1, 41 mm (1⅝")*

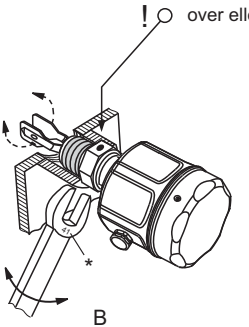




NPT ¾, R ¾, G ¾, 32 mm (1¼")*
NPT 1, R 1, G 1, 41 mm (1⅝")*



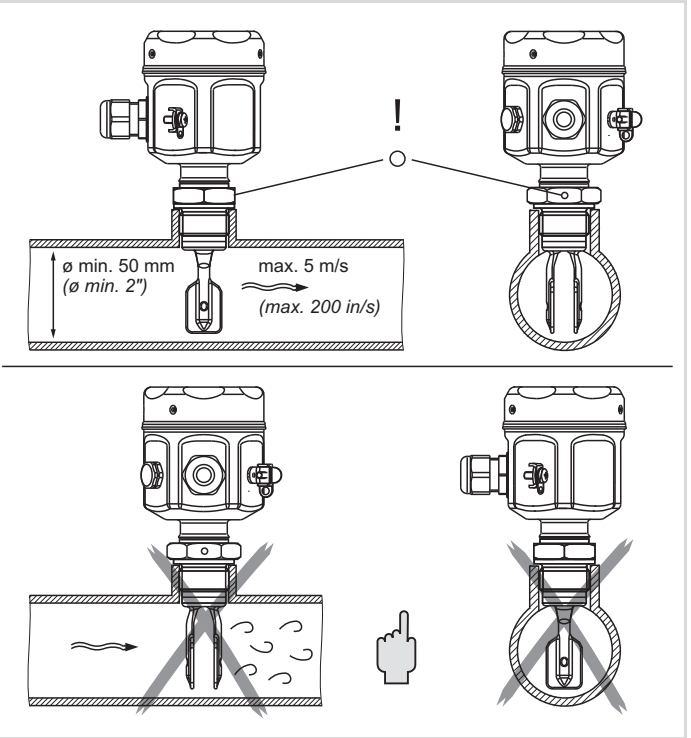
A



B

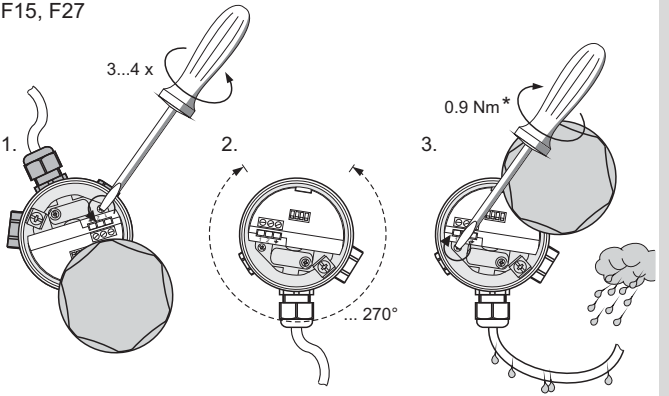
DA- Skru Liquiphant ind i procestilslutningen.
Drej **ikke** på huset.

DA- Positionering i rør:
Markering i strømretningen

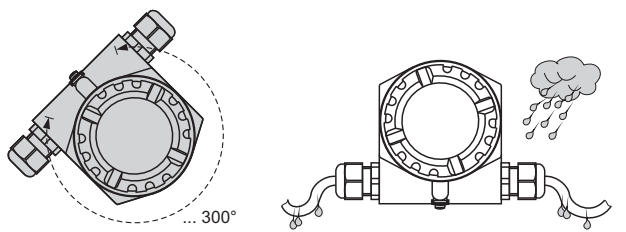


DA- Positionering af kabelforskruning

F15, F27



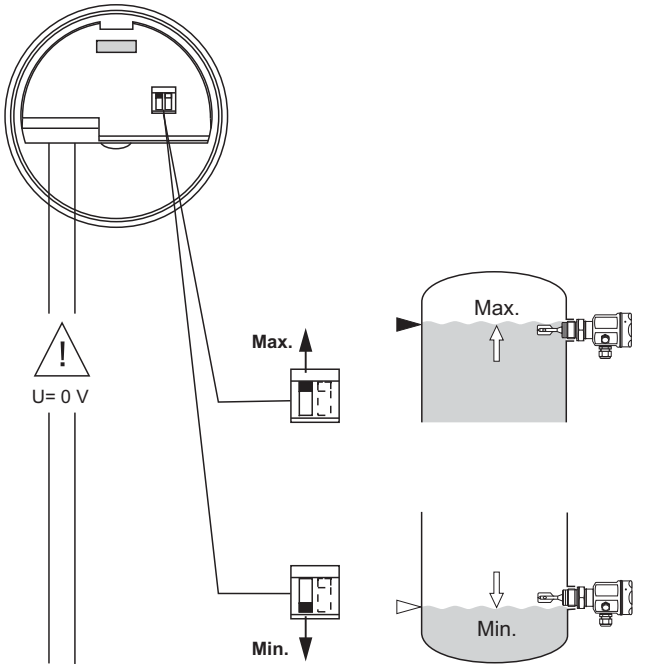
F16, F13, F17

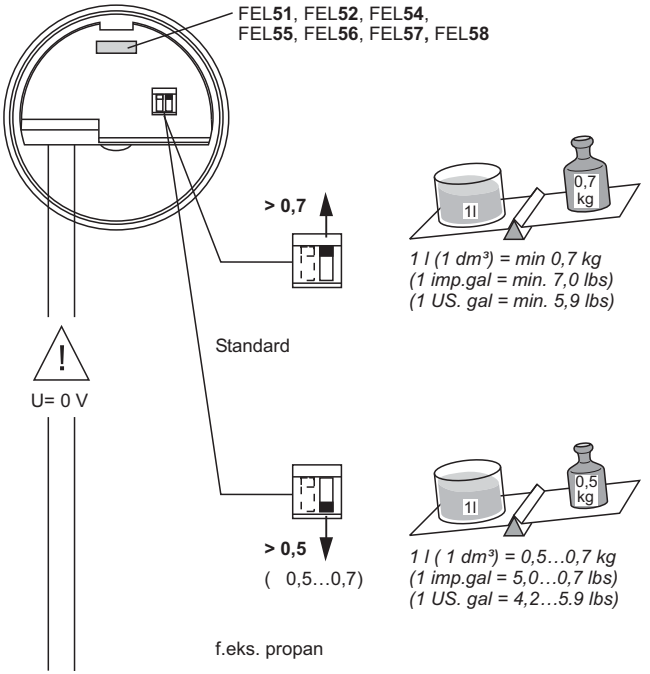


* Tilspændingsmoment

DA- Opsætning

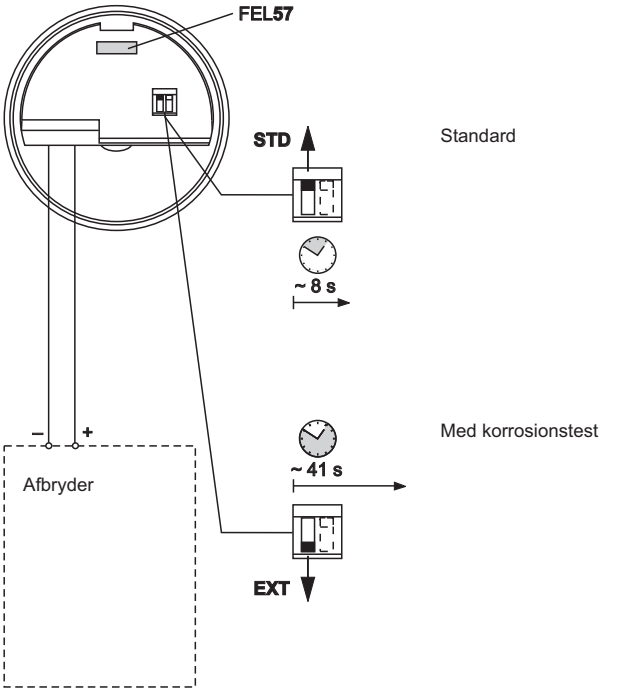
Minimums/maksimums fejlsikker tilstand

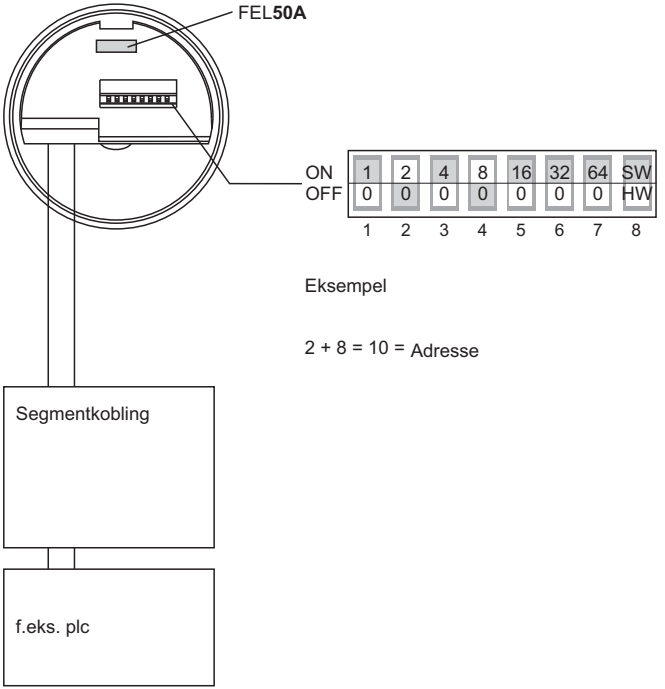




DA- Mediedensitet.
Densitet ρ målt i g/cm³ eller i kg/l.

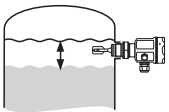
DA- Selvtest FEL57
(funktion, se side 46, 47 og afbryder)



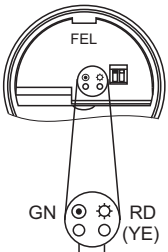


DA- Indstilling af enhedsadresse (Indstilling af parametrene, se BA141F)

DA- Lyssignaler



Niveau varierer



LED'er

Standby

Omskiftningsstatus

FEL57, FEL50A: Afdækning

on

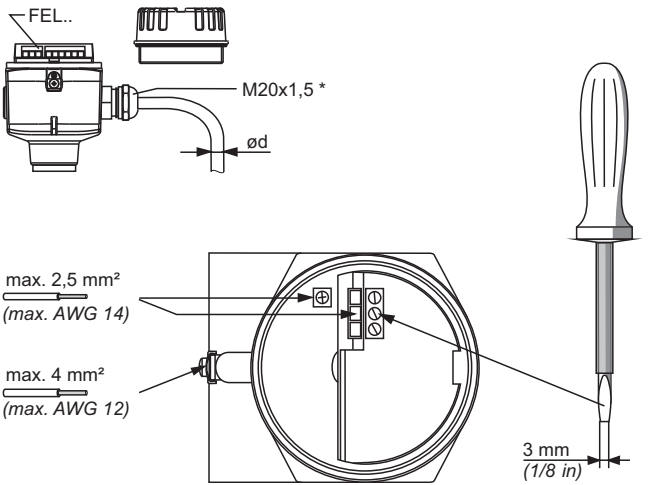
blinker

off

Udgangssignal

Fejl

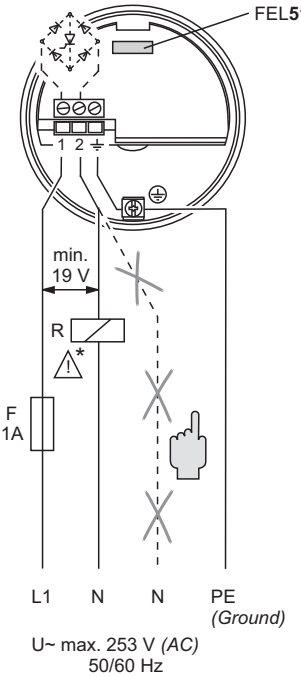
Overhold nationale forskrifter!



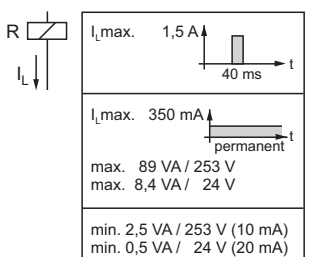
DA- Tilslutninger

***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)

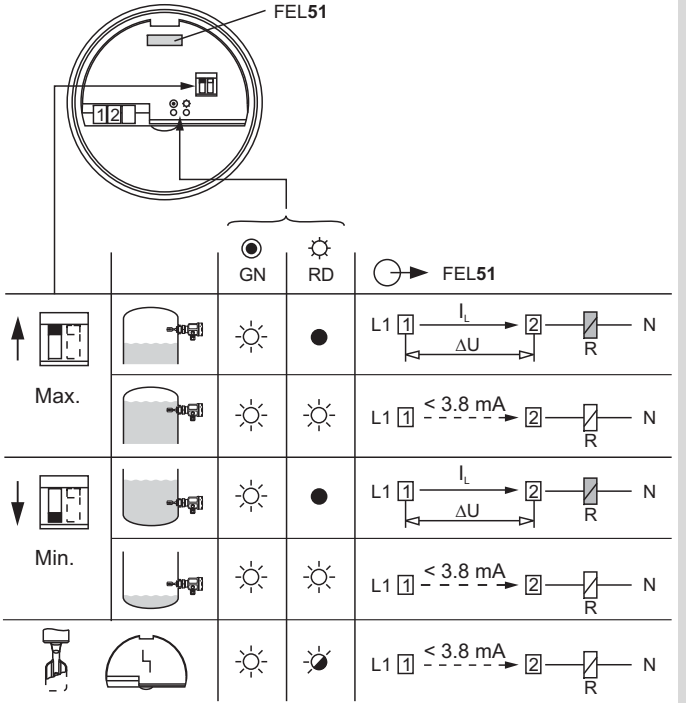
DA- Tilslutninger FEL51



* Ekstern belastning R **skal** tilsluttes



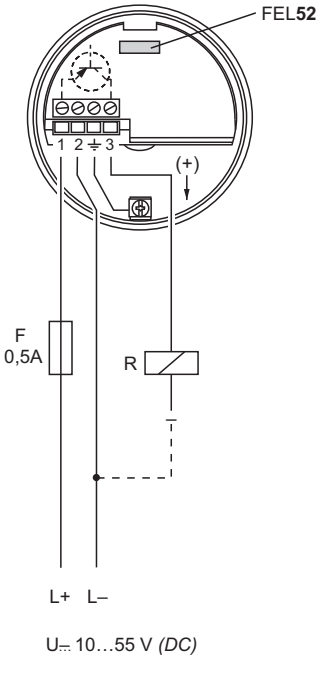
Ødelæggelse



DA- Funktion FEL51

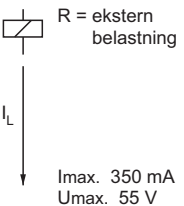
ΔU_{FEL51} maks. 12 V

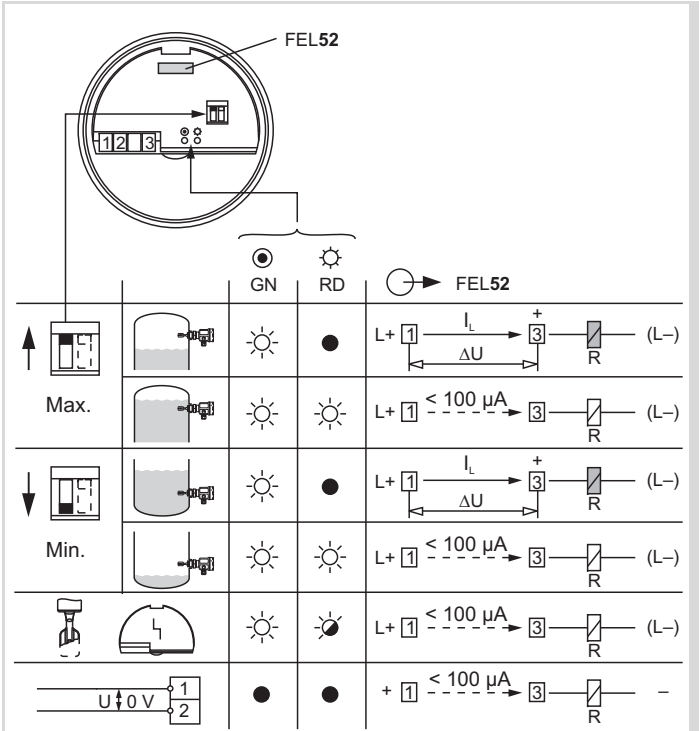
DA- Tilslutninger FEL52
Jævnstrømstilslutning (PNP)



også for DI-moduler

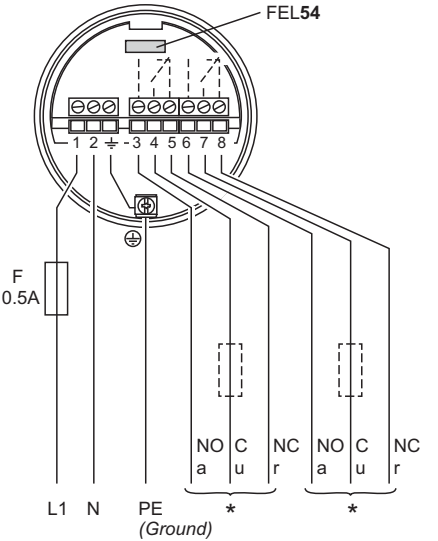
EN 61131-2





ΔU_{FEL52} maks. 3 V

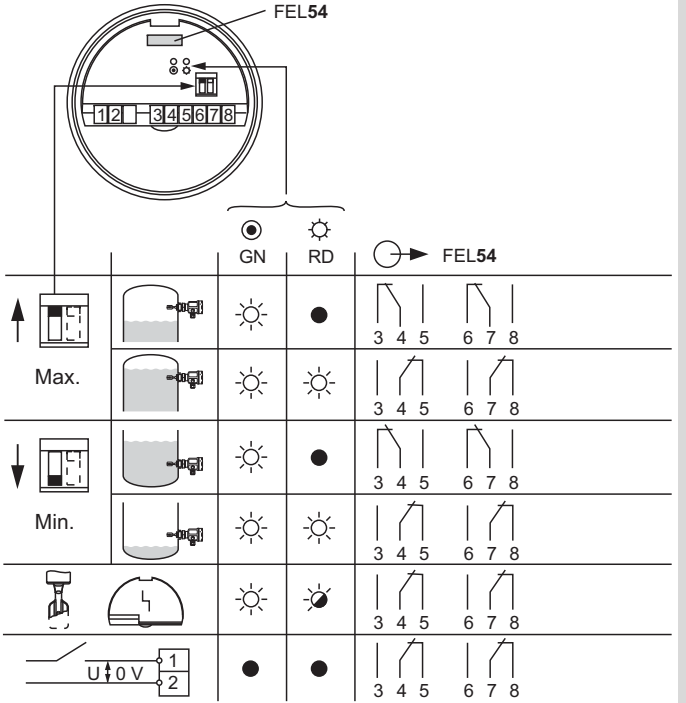
DA- Tilslutninger FEL54
Universaltilslutning
Relæudgang



U~ 19…253 V *(AC)*

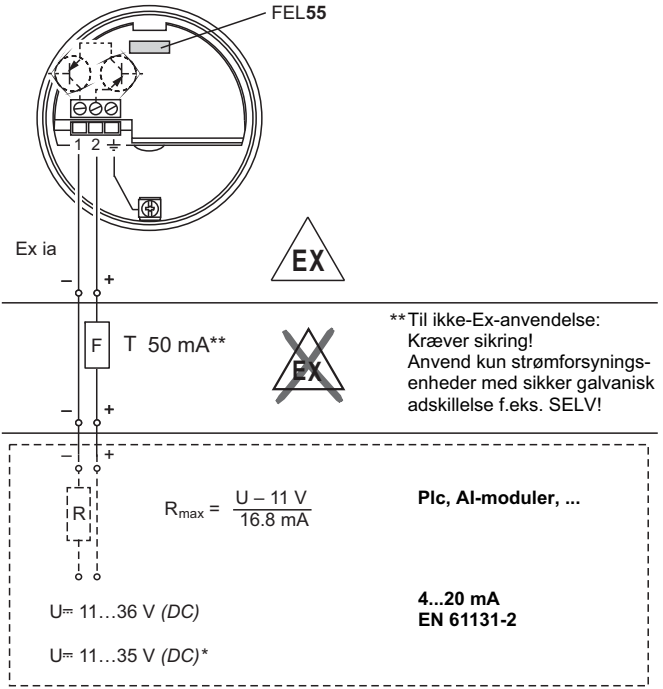
L+ L–
U⎓ 19… 55 V *(DC)*

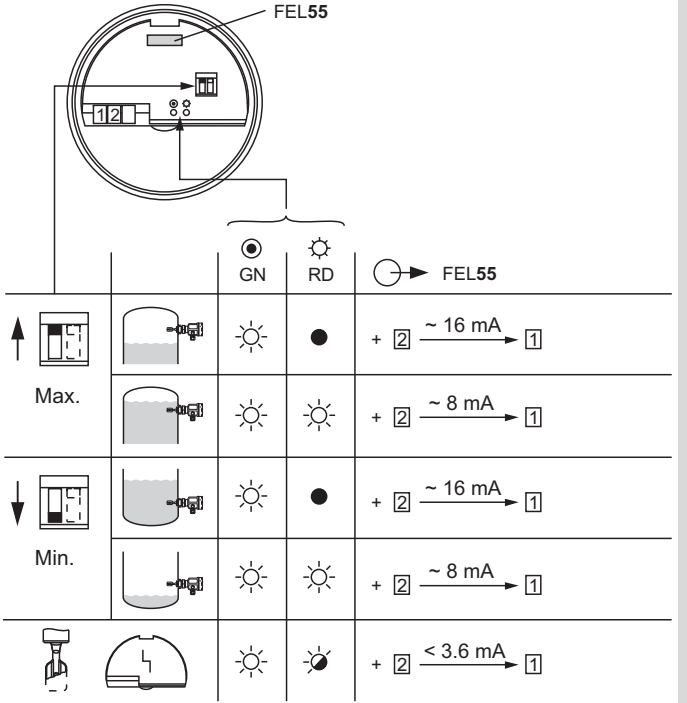
* { U~ max. 253 V, I~ max. 6 A
P~ max. 1500 VA, cos φ = 1
P~ max. 750 VA, cos φ > 0.7
I⎓ max. 6 A, U⎓ < 30 V
I⎓ max. 0.2 A, U⎓ < 125 V



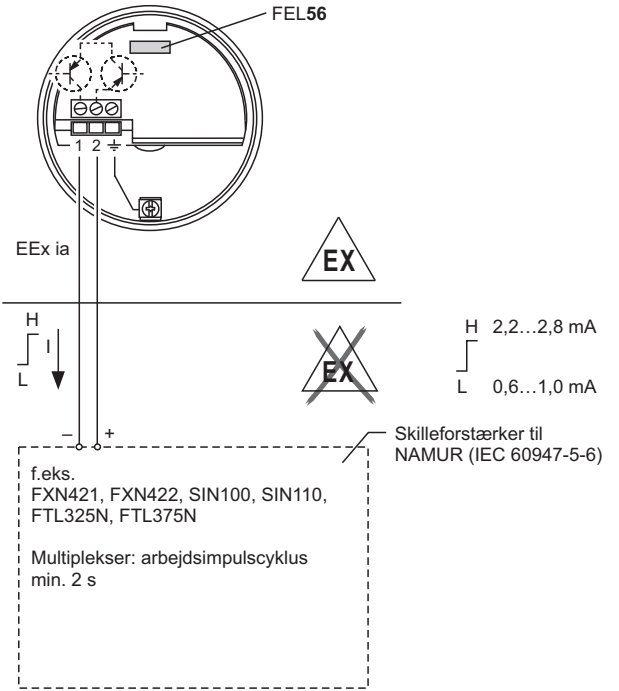
DA- Funktion FEL54

DA- Tilslutninger FEL55
Udgang 8/16 mA
* Våde miljøer.

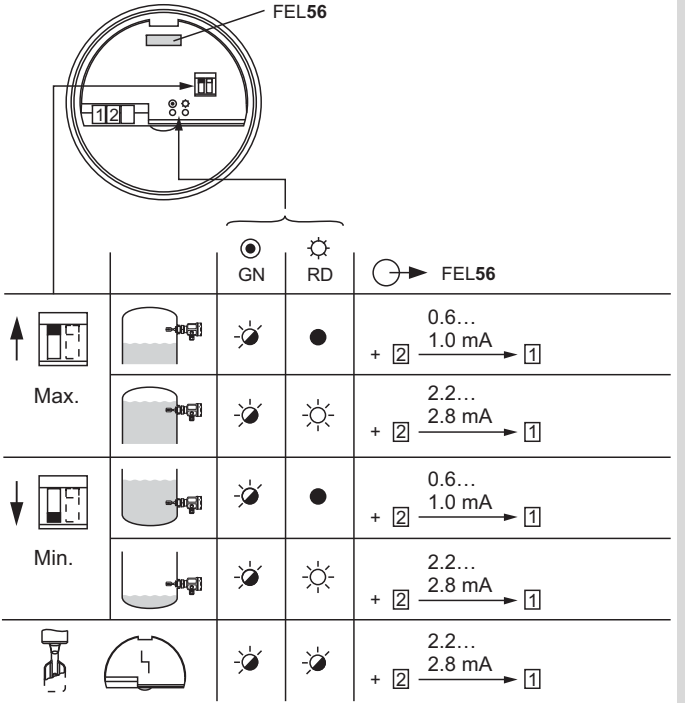



FEL55
1 2
GN
RD
FEL55
Max.
Min.
+ 2 ~ 16 mA 1
+ 2 ~ 8 mA 1
+ 2 ~ 16 mA 1
+ 2 ~ 8 mA 1
+ 2 < 3.6 mA 1

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

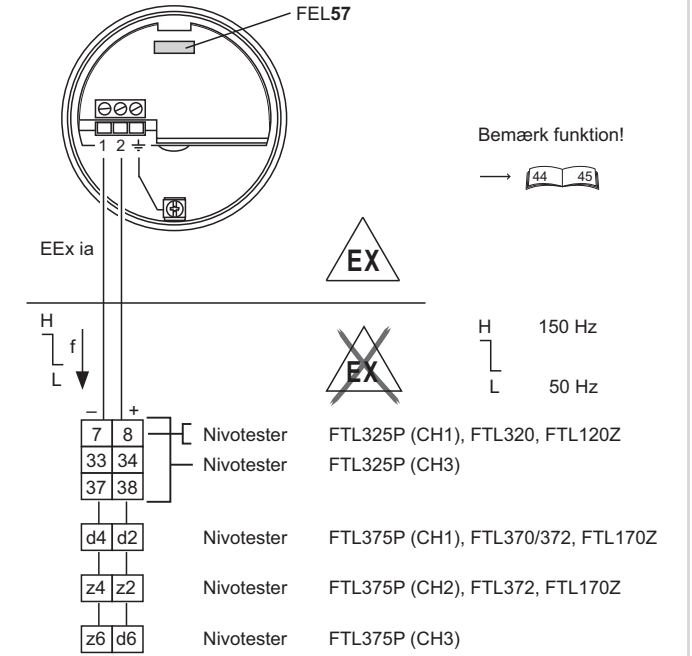


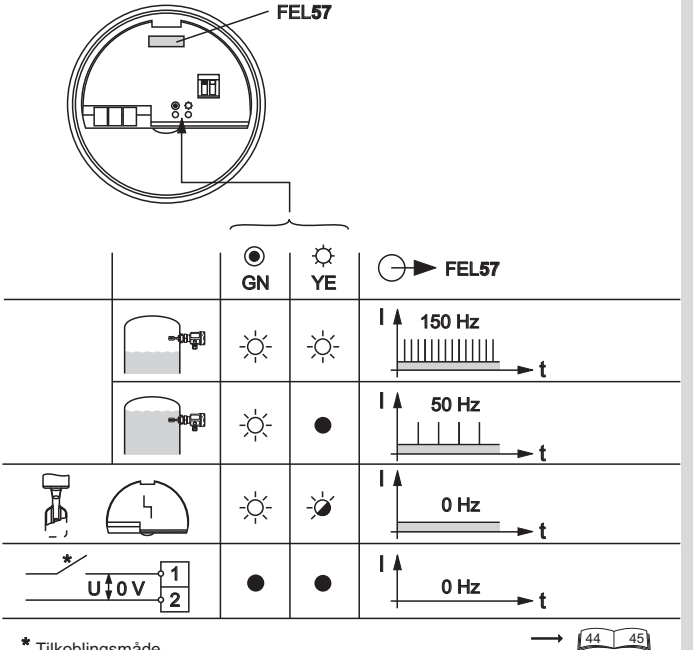
Strømforsyning
DC: 8,2 V +/- 20%



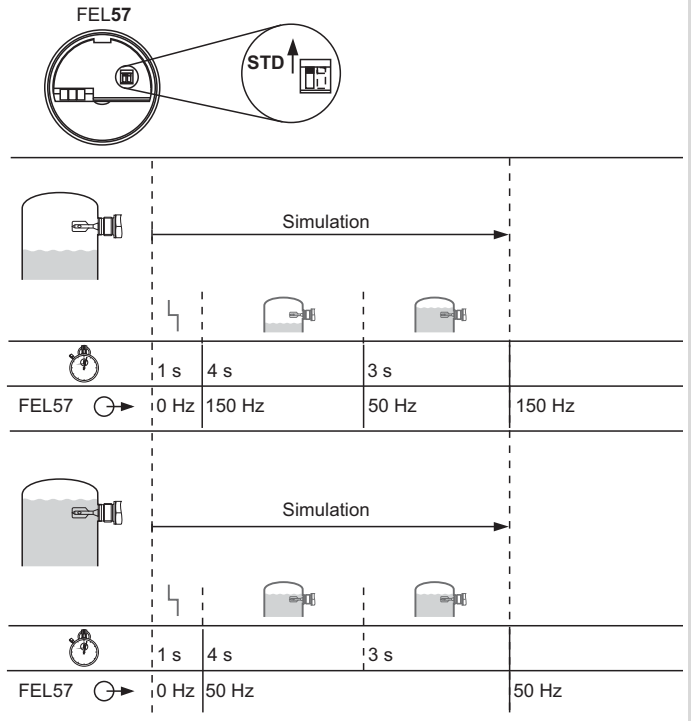
DA-Funktion FEL56

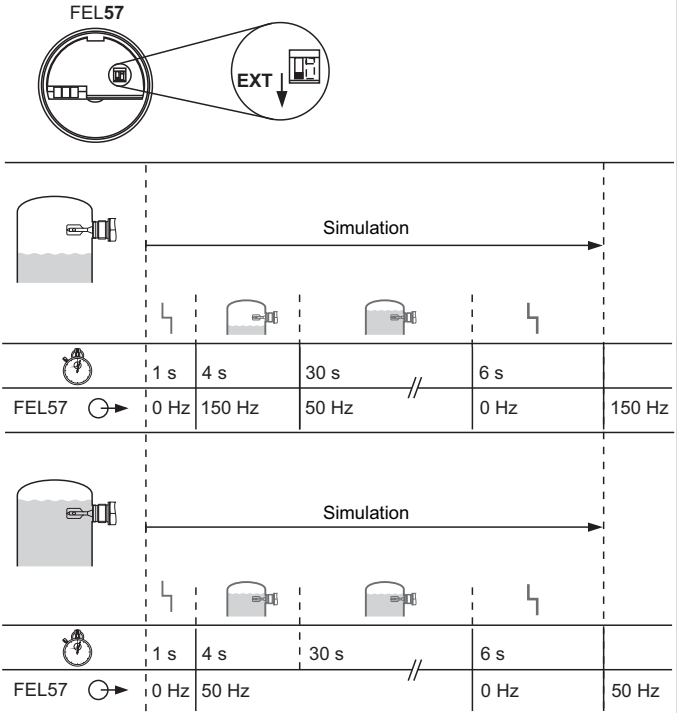
DA- TilslutningerFEL 57
PFM-udgang
150 Hz / 50 Hz



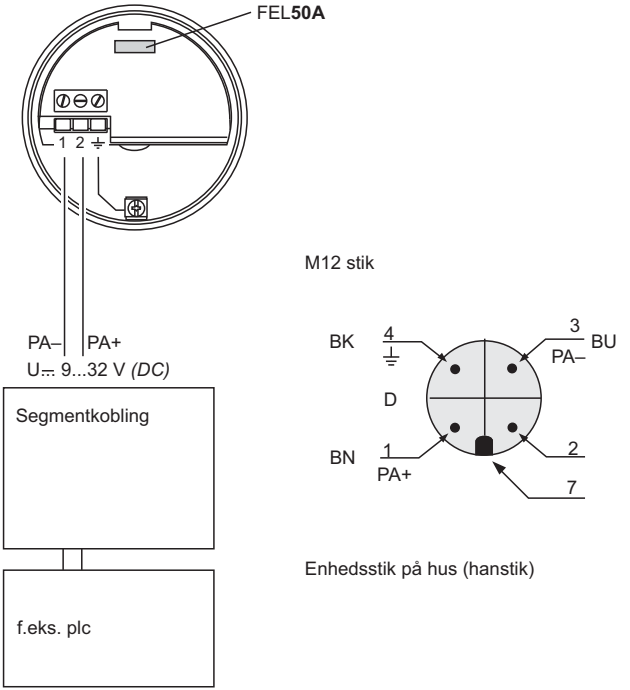

FEL57
GN
YE
FEL57
I
150 Hz
t
I
50 Hz
t
I
0 Hz
t
*
U
0 V
1
2
I
0 Hz
t
* Tilkoblingsmåde
44
45

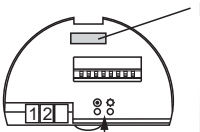
DA- Tilkoblingsmåde
Selvtest (STD)

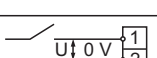




DA- Tilkoblingsmåde
Selvtest (EXT)

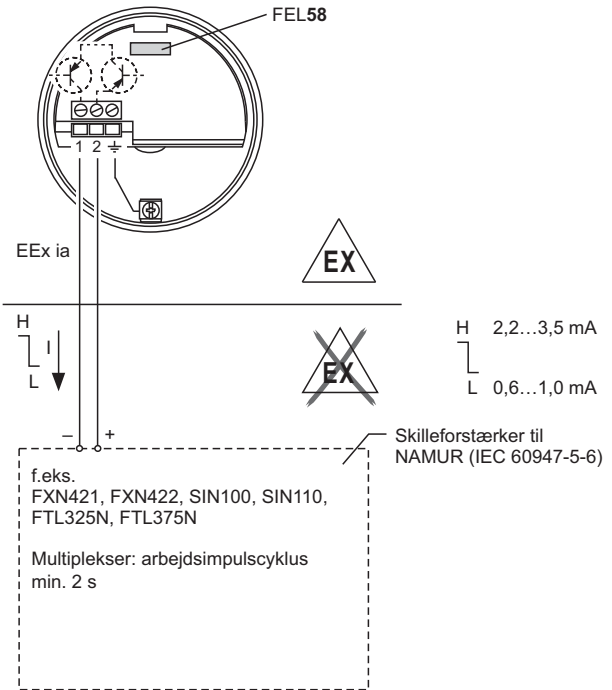

FEL**50A**
1 2
PA–
PA+
U⎓ 9...32 V *(DC)*
Segmentkobling
f.eks. plc
M12 stik
BK
4
3
BU
PA–
D
BN
1
PA+
2
7
Enhedsstik på hus (hanstik)

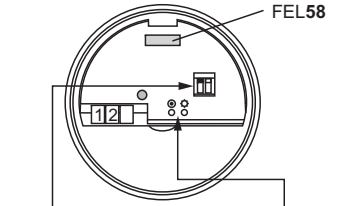


		FEL50A GN	FEL50A YE	FEL50A PA-bussignal
ikke inverteret		☼	●	OUT_D = 0
		☼	☼	OUT_D = 1
inverteret		☼	☼	OUT_D = 0
		☼	●	OUT_D = 1
 SPS Commuwin II		☼	–	Kommunikation
		–	☼	Status, se BA141F
 U 0 V 1 2		●	●	../..

DA-Funktion FEL50A

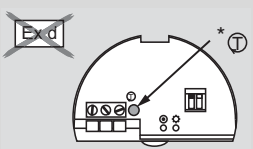
DA- Tilslutninger FEL58
NAMUR-udgang H-L
> 2,2 mA / < 1,0 mA





		GN	YE	FEL**58**
Max.		1 Hz	☼	+ 2 — 2.2… 3.5 mA → 1
		1 Hz	●	+ 2 — 0.6… 1.0 mA → 1
Min.		1 Hz	☼	+ 2 — 2.2… 3.5 mA → 1
		1 Hz	●	+ 2 — 0.6… 1.0 mA → 1
		0.3 Hz	●	+ 2 — < 1.0 mA → 1

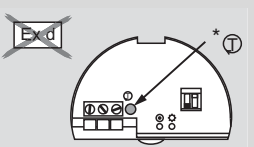
DA- Funktionstestknap FEL58
Fejlsikker tilstand MAKS.



MAX + T			
1. Normal drift		GN ● 1 Hz, YE ☼ + 2 — 2,2… 3,5 mA → 1	GN ● 1 Hz, YE ● + 2 — 0,6… 1,0 mA → 1
2. Tryk på testknappen	>3 s	GN ●, YE ● + 2 — 0 mA → 1	GN ●, YE ● + 2 — 0 mA → 1
3. Slip testknappen efter ~2 s normal drift		GN ● 1 Hz, YE ☼ + 2 — 2,2… 3,5 mA → 1	GN ● 1 Hz, YE ● + 2 — 0,6… 1,0 mA → 1

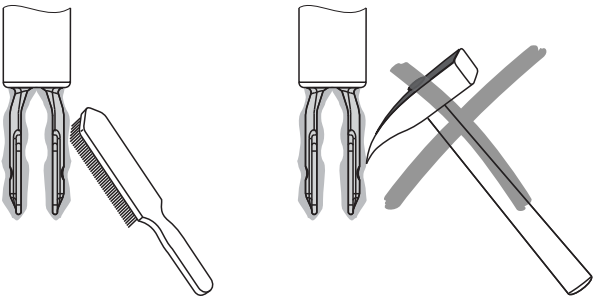
DA- Funktionstestknap FEL58
Fejlsikker tilstand MIN.

MIN + T		
1. Normal drift	GN YE 1 Hz + 2 — 2,2… 3,5 mA → 1	GN YE 1 Hz + 2 — 0,6… 1,0 mA → 1
2. Tryk på testknappen >3 s	GN YE + 2 — 0 mA → 1	GN YE + 2 — 0 mA → 1
3. Slip testknappen efter ~2 s normal drift	GN YE 1 Hz + 2 — 2,2… 3,5 mA → 1	GN YE 1 Hz + 2 — 0,6… 1,0 mA → 1

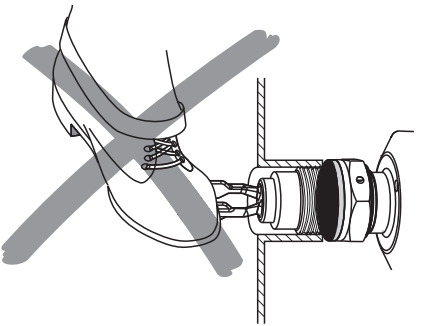


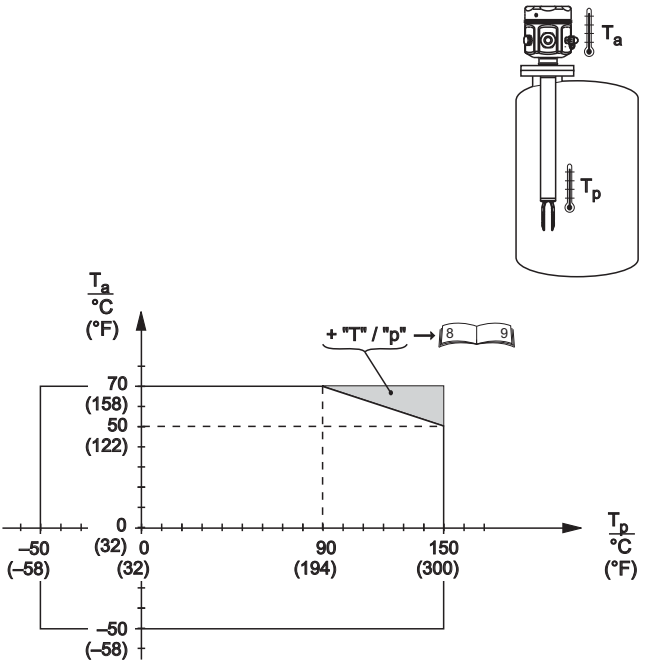
DA- Vedligeholdelse, rengøring

Fjernelse af belægning



Må **ikke** bruges som opstigningshjælp!



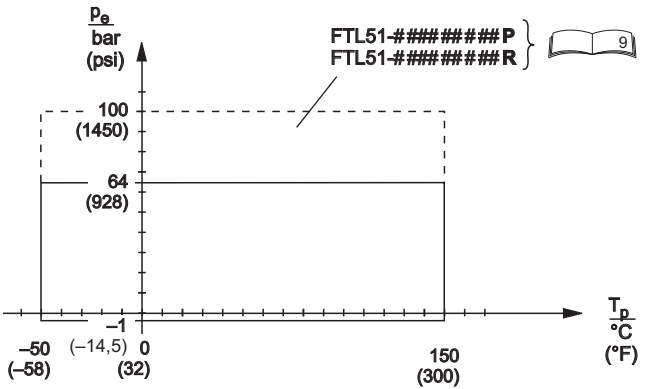


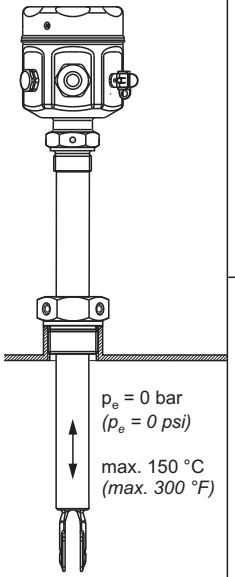
DA- Tekniske data

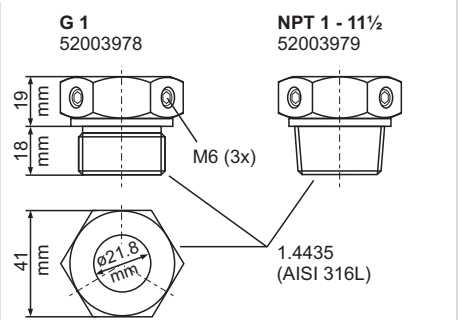
Omgivende temperatur T_a

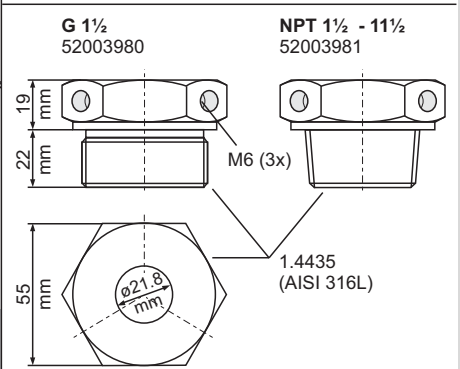
Procestemperatur T_p

DA- Procestryk p_e
Procestemperatur T_p









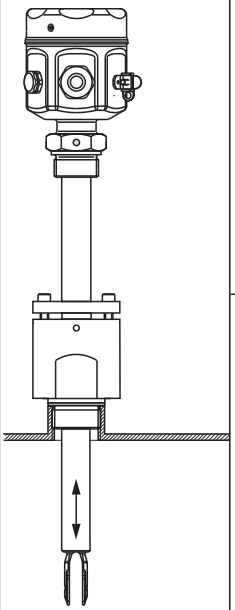
DA- Tilbehør

Glidemuffer til trykløs drift

se:
KA00151F (G 1, NPT 1)
KA00152F (G 1½, NPT 1½)

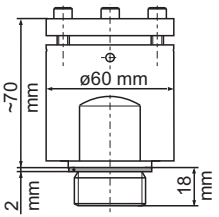
100 mm = 3.94 in

DA- Højtryksglidemuffer



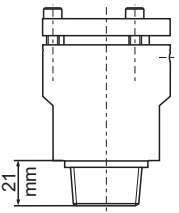
G 1
1.4435 (AISI 316L)
52003663

AlloyC4: 52003664
AlloyC22: 71118691



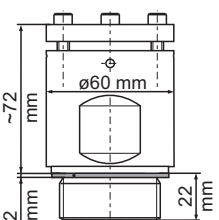
NPT 1 - 11½
1.4435 (AISI 316L)
52003667

AlloyC4: 52003668
AlloyC22: 71118694



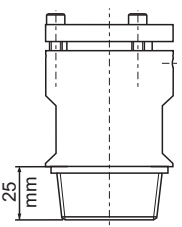
G 1½
1.4435 (AISI 316L)
52003665

AlloyC4: 52003666
AlloyC22: 71118693



NPT 1½ - 11½
1.4435 (AISI 316L)
52003669

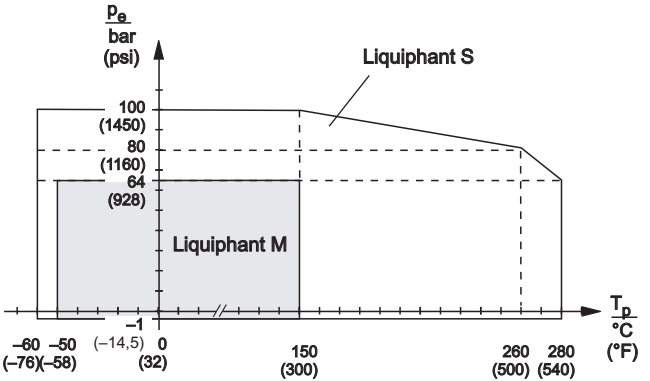
AlloyC4: 52003670
AlloyC22: 71118695



se:
KA00153F (G 1, NPT 1)
KA00154F (G 1½, NPT 1½)

100 mm = 3.94 in

DA- Højtryksglidemuffer:
Procestryk p_e
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 gaffel komplet med procestilslutning
	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 kontaktkredsløb
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 et bypass
	Ekstrem radiointerferens	Anvend isoleret kabel
	Ekstreme vibrationer	Afkobl, dæmp, drej gaflen 90°
	Vand i huset	Skru dæksel og kabelforskruning godt fast
	FEL52: Udgang overbelastet	Nedsæt belastning,(kabel) kapacitans
Skifter forkert efter strømsvigt	FEL57, adfærd under tilkoblingstest (funktionstest)	Vær opmærksom på, hvordan FEL57 skifter; blokeranlægsstyringen i op til 45 s efter et strømsvigt

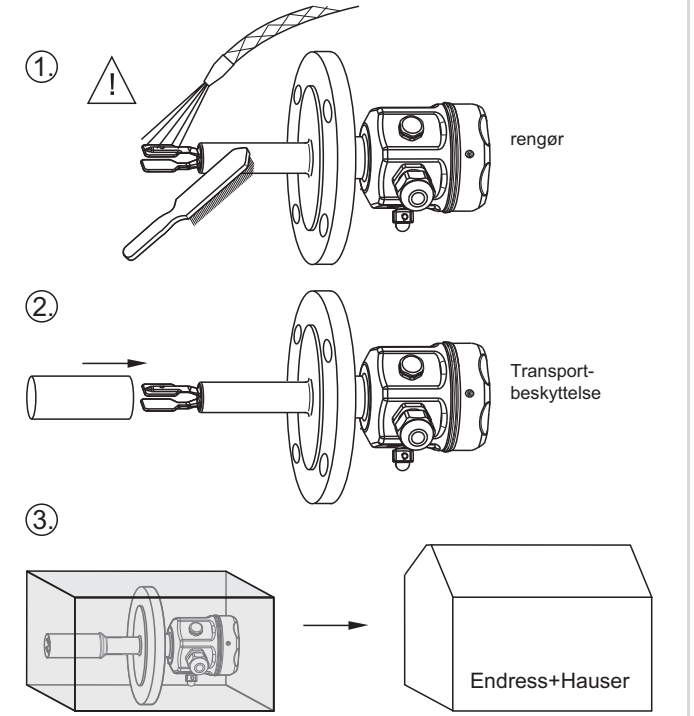
Hvis gaflens skifteadfærd er unormal, kan gaffelfrekvensen måles på PIN 4 på diagnosesoklen. På de elektroniske indsatser FEL51/52/54/55/56/57/58 er dette en sinusformet vibration, hvis amplitude gør det muligt at bestemme gaflens tilstand. På FEL50A kan kun gaflens frekvens måles på grund af et rektangulært impulssignal.

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



Tekniske oplysninger

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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