



Level



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Technical Information

Liquicap M FTI51, FTI52

Level limit switch

Universal capacitive limit switch for liquids



Application

The Liquicap M FTI5x is a compact transmitter for level limit detection. It is preferably used for the following measuring tasks:

- Measurement of liquids that are highly viscous and tend to form build-up
- Interface detection of different liquids (e.g. oil on water)
- Two-point control (pump control) with just one process connection
- Foam detection of conductive liquids

Thanks to its robust and tried-and-tested construction (self-sealing cone), the probe can be used both in vacuums and in overpressure up to 100 bar. The sealing and insulation materials used allow operating temperatures of -80 °C to $+200\text{ °C}$ in the medium container.

Your benefits

- Active build-up compensation for high-viscosity media
- Easy and fast commissioning as calibration takes place at the press of a button
- Universal application thanks to wide range of certificates and approvals
- Material in contact with the process made of corrosion-resistant material and FDA-listed materials for wetted parts
- Two-stage overvoltage protection against discharge from the container (gas discharger + protective diodes)
- Short measured value reaction time
- No need for recalibration after replacing electronics
- Automatic monitoring of electronics

Function and system design

Measuring principle

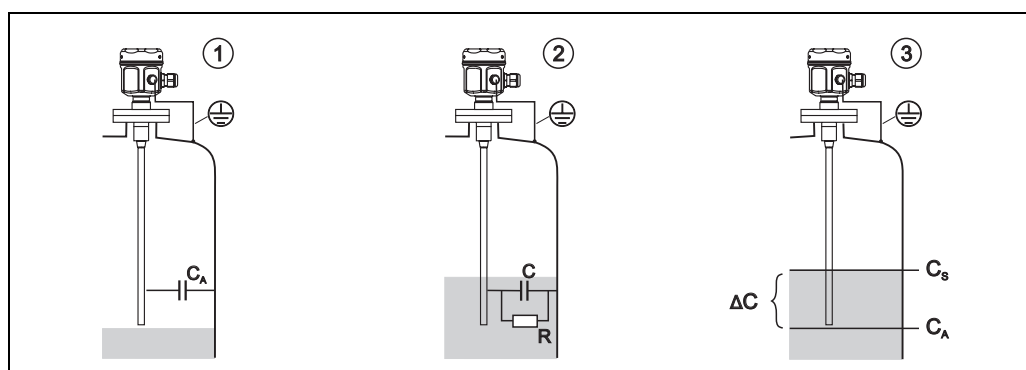
The principle of capacitive level limit detection is based on the change in capacitance of the capacitor due to the probe being covered by liquid. The probe and container wall (conductive material) form an electric capacitor. When the probe is in air ①, a certain low initial capacitance is measured. When the container is filled, the capacitance of the capacitor increases the more the probe is covered ②, ③.

The limit switch switches when the capacitance C_S specified during calibration is reached. Furthermore, the system also prevents the effect of medium build-up or condensate near the process connection for probes with an inactive length. A probe with active build-up compensation compensates influences resulting from build-up on the probe.



Note!

A ground tube is used as a counterelectrode for containers made of nonconductive materials.



L00-FT15xxxx-15-05-xx-xx-001

R : Conductivity of liquid

C : Capacitance of liquid

C_A : Initial capacitance (probe not covered)

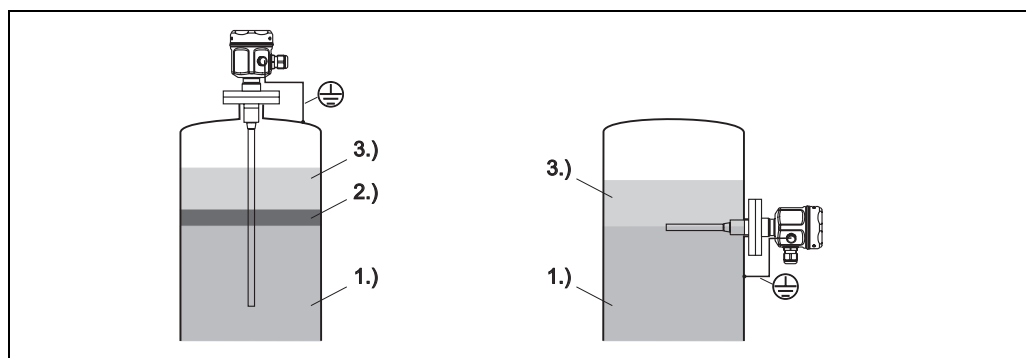
C_S : Switching capacitance

ΔC : Change in capacitance

Function

The selected electronic insert of the probe determines the change in capacitance of the liquid depending on how much the probe is covered and thereby allows precise switching at the switch point (level) calibrated for this.

Interface detection



L00-FT15xxxx-15-05-xx-xx-000

1.) Water, for example (the medium must be conductive $\geq 100 \mu S/cm$)

2.) Emulsion

3.) Oil, for example (nonconductive medium $< 1 \mu S/cm$)

A certain and definite switch point is ensured even if the emulsion layer is of varying thickness.

Ordering information



Note!

In this list, versions which are mutually exclusive are not marked.

Liquicap M FTI51

10	Approval:
	<p>A Non-hazardous area</p> <p>B Non-hazardous area, WHG (German Water Resources Act)</p> <p>C ATEX II 1/2 GD EEx ia IIC T6</p> <p>D ATEX II 1/2 GD EEx ia IIC T6, WHG (German Water Resources Act)</p> <p>G ATEX II 1/2 GD EEx de (ia) IIC T6, WHG (German Water Resources Act)</p> <p>XA, observe safety instructions (electrostatic charge)!</p> <p>H ATEX II 1/2 GD EEx ia IIC T6, XA, observe safety instructions (electrostatic charge)!</p> <p>J ATEX II 1/2 GD EEx ia IIC T6, WHG (German Water Resources Act) XA, observe safety instructions (electrostatic charge)!</p> <p>K ATEX II 1/2 G EEx ia IIC T6, WHG (German Water Resources Act) XA, observe safety instructions (electrostatic charge)!</p> <p>L ATEX II 1/2 G EEx d (ia) IIC T6, WHG (German Water Resources Act) XA, observe safety instructions (electrostatic charge)!</p> <p>M ATEX II 3GD EEx nA II T6, WHG (German Water Resources Act) XA, observe safety instructions (electrostatic charge)!</p> <p>N CSA General Purpose, C US CSA</p> <p>P CSA/FM IS Cl. I, II, III Div. 1+2 Gr. A-G</p> <p>R CSA/FM XP Cl. I, II, III Div. 1+2 Gr. A-G</p> <p>S TIIS Ex ia IIC T3</p> <p>T TIIS Ex d IIC T3</p> <p>Y Special version, to be specified</p>
20	Inactive length (L3):
	<p>L3: 100 to 2000 mm/4 to 80 inch for 316L</p> <p>L3: 150 to 1000 mm/6 to 40 inch for PTFE fully insulated</p> <p>Protection against condensate + bypassing container nozzles</p> <p>A Not selected</p> <p>B Not selected + 125mm/5inch 316L Active build-up compensation</p> <p>Price per 100 mm</p> <p>1 mm 316L</p> <p>2 mm 316L, PTFE fully insulated</p> <p>Price is independent from length</p> <p>3 mm (<= 500 mm) 316L + 125 mm active build-up compensation</p> <p>4 mm (> 500 mm) 316L + 125 mm active build-up compensation</p> <p>Price per 1 inch</p> <p>5 inch 316L, PTFE fully insulated</p> <p>6 inch 316L</p> <p>Price is independent from length</p> <p>7 inch (<= 20 inch) 316L + 5 inch active build-up compensation</p> <p>8 inch (> 20 inch) 316L + 5 inch active build-up compensation</p> <p>9 Special version</p>
30	Active probe length (L1); insulation:
	<p>Price per 100 mm/1 inch</p> <p>L1: 100 to 4000 mm/4 to 160 inch for Ø10 mm, Ø16 mm</p> <p>L1: 150 to 3000 mm/6 to 120 inch for Ø22 mm (fully insulated)</p> <p>A mm L1, 10 mm, 316L; PTFE</p> <p>B mm L1, 16 mm, 316L; PTFE</p> <p>C mm L1, 22 mm, 316L; PTFE</p> <p>D mm L1, 16 mm, 316L; PFA</p> <p>E mm L1, 10 mm, 316L; PTFE + ground tube</p> <p>F mm L1, 16 mm, 316L; PTFE + ground tube</p> <p>G mm L1, 16 mm, 316L; PFA + ground tube</p> <p>H inch L1, 0.4 inch, 316L; PTFE</p> <p>K inch L1, 0.6 inch, 316L; PTFE</p> <p>M inch L1, 0.9 inch, 316L; PTFE</p> <p>N inch L1, 0.6 inch, 316L; PFA</p>

30				Active probe length (L1); insulation:		
	P	inch L1,	0.4 inch,		316L; PTFE + ground tube	
	R	inch L1,	0.6 inch,		316L; PTFE + ground tube	
	S	inch L1,	0.6 inch,		316L; PFA + ground tube	
	Y	Special version, to be specified				
40				Insulation (L2)		
	1	Fully insulated				
	2	... mm, partially insulated				
	3	... inch, partially insulated				
	9	Special version, to be specified				
50				Process connection:		
				Threaded connection		
	GCJ	G ½,		316L, 25 bar		Thread ISO228
	GDJ	G ¾,		316L, 25 bar		Thread ISO228
	GEJ	G 1,		316L, 25 bar		Thread ISO228
	GGJ	G 1½,		316L, 100 bar		Thread ISO228
	RCJ	NPT ½,		316L, 25 bar		Thread ANSI
	RDJ	NPT ¾,		316L, 25 bar		Thread ANSI
	REJ	NPT 1,		316L, 25 bar		Thread ANSI
	RGJ	NPT 1½,		316L, 100 bar		Thread ANSI
				Hygiene connection		
	GQJ	G ¾		316L, 25 bar, EHEDG		Thread ISO2852
		Accessories installation, welding neck				
	GWJ	G 1		316L, 25 bar, EHEDG		Thread ISO2852
		Accessories installation, welding neck				
	MRJ	DN50 PN40,		316L		DIN11851
	UPJ	Adapter 44 mm		316L, 16 bar, EHEDG		
				Tri-Clamp connection		
	TCJ	DN25 (1"),	EHEDG	316L,		Tri-Clamp ISO2852
	TJJ	DN38 (1½"),	EHEDG	316L,		Tri-Clamp ISO2852
	TDJ	DN40-51 (2"),		316L,		Tri-Clamp ISO2852
	TNJ	DN38 (1½"),		316L, 3A		Tri-Clamp ISO2852
		Tri-Clamp removable				
				EN flanges		
	B0J	DN25	PN25/40 A,	316L		Flange EN1092-1 (DIN2527 B)
	B1J	DN32	PN25/40 A,	316L		Flange EN1092-1 (DIN2527 B)
	B2J	DN40	PN25/40 A,	316L		Flange EN1092-1 (DIN2527 B)
	B3J	DN50	PN25/40 A,	316L		Flange EN1092-1 (DIN2527 B)
	CRJ	DN50	PN25/40 B1,	316L		Flange EN1092-1 (DIN2527 C)
	DRJ	DN50	PN40 C,	316L		Flange EN1092-1 (DIN2512 F)
	ERJ	DN50	PN40 D,	316L		Flange EN1092-1 (DIN2512 N)
	BSJ	DN80	PN10/16 A,	316L		Flange EN1092-1 (DIN2527 B)
	CGJ	DN80	PN10/16 B1,	316L		Flange EN1092-1 (DIN2527 C)
	DGJ	DN80	PN16 C,	316L		Flange EN1092-1 (DIN2512 F)
	EGJ	DN80	PN16 D,	316L		Flange EN1092-1 (DIN2512 N)
	BTJ	DN100	PN10/16 A,	316L		Flange EN1092-1 (DIN2527 B)
	CHJ	DN100	PN10/16 B1,	316L		Flange EN1092-1 (DIN2527 C)
		PTFE clad				
	B0K	DN25	PN25/40,	PTFE >316L		Flange EN1092-1 (DIN2527)
	B1K	DN32	PN25/40,	PTFE >316L		Flange EN1092-1 (DIN2527)
	B2K	DN40	PN25/40,	PTFE >316L		Flange EN1092-1 (DIN2527)
	B3K	DN50	PN25/40,	PTFE >316L		Flange EN1092-1 (DIN2527)
	BSK	DN80	PN10/16,	PTFE >316L		Flange EN1092-1 (DIN2527)
	BTK	DN100	PN10/16,	PTFE >316L		Flange EN1092-1 (DIN2527)
				ANSI flanges		
	ACJ	1"	150 lbs RF,	316/316L		Flange ANSI B16.5
	ANJ	1"	300 lbs RF,	316/316L		Flange ANSI B16.5
	AEJ	1½"	150 lbs RF,	316/316L		Flange ANSI B16.5
	AQJ	1½"	300 lbs RF,	316/316L		Flange ANSI B16.5
	AFJ	2"	150 lbs RF,	316/316L		Flange ANSI B16.5
	ARJ	2"	300 lbs RF,	316/316L		Flange ANSI B16.5

Liquicap M FTI52

10	Approval:		
	A	Non-hazardous area	
	B	Non-hazardous area, WHG (German Water Resources Act)	
	G	ATEX II 1/2 GD EEx de (ia) IIC T6, WHG (German Water Resources Act) XA, observe safety instructions (electrostatic charge)!	
	H	ATEX II 1/2 GD EEx ia IIC T6, XA, observe safety instructions (electrostatic charge)!	
	J	ATEX II 1/2 GD EEx ia IIC T6, WHG (German Water Resources Act) XA, observe safety instructions (electrostatic charge)!	
	K	ATEX II 1/2 G EEx ia IIC T6, WHG (German Water Resources Act) XA, observe safety instructions (electrostatic charge)!	
	L	ATEX II 1/2 G EEx d (ia) IIC T6, WHG (German Water Resources Act) XA, observe safety instructions (electrostatic charge)!	
	M	ATEX II 3GD EEx nA/nL/nC II T6, WHG XA, observe safety instructions (electrostatic charge)!	
	N	CSA General Purpose, C US CSA	
	P	CSA/FM IS Cl. I, II, III Div. 1+2 Gr. A-G	
	R	CSA/FM XP Cl. I, II, III Div. 1+2 Gr. A-G	
	S	TIIIS Ex ia IIC T3	
	T	TIIIS Ex d IIC T3	
	Y	Special version, to be specified	
20	Inactive length L3:		
		Price per 100 mm/1 inch L3: 100 to 2000 mm/4 to 80 inch for 316L L3: 150 to 1000 mm/6 to 40 inch for PFA fully insulated Protection against condensate + bypassing container nozzles	
	1	Not selected	
	2	... mm,	316L
	3	... mm,	316L + PFA fully insulated
	5	... inch,	316L
	6	... inch,	316L + PFA fully insulated
	9	Special version, to be specified	
30	Active length L1; insulation:		
		Price per 1000 mm/10 inch L1: 420 to 10000 mm/17 to 400 inch; fully insulated	
	A	... mm,	316; FEP
	B	... mm,	316; PFA
	C	... inch,	316; FEP
	D	... inch,	316; PFA
	Y	Special version, to be specified	
40	Insulation L2		
	1	Fully insulated	
	9	Special version, to be specified	
50	Process connection:		
	Threaded connection		
	GDJ	G ¾,	316L, 25 bar Thread ISO228
	GEJ	G 1,	316L, 25 bar Thread ISO228
	GGJ	G 1½,	316L, 100 bar Thread ISO228
	RDJ	NPT ¾,	316L, 25 bar Thread ANSI
	REJ	NPT 1,	316L, 25 bar Thread ANSI
	RGJ	NPT 1½,	316L, 100 bar Thread ANSI
	Hygiene connection		
	GWJ	G 1	316L, 25 bar, EHEDG Thread ISO2852
		Accessories installation, welding neck	
	MRJ	DN50 PN40,	316L DIN11851
	UPJ	Adapter 44 mm	316L, 16 bar, EHEDG
	Tri-Clamp connection		
	TCJ	DN25 (1"), EHEDG	316L, Tri-Clamp ISO2852
	TJJ	DN38 (1½"), EHEDG	316L, Tri-Clamp ISO2852
	TDJ	DN40-51 (2"),	316L, Tri-Clamp ISO2852

50		Process connection:		
EN flanges				
B0J	DN25 PN25/40 A,	316L		Flange EN1092-1 (DIN2527 B)
B1J	DN32 PN25/40 A,	316L		Flange EN1092-1 (DIN2527 B)
B2J	DN40 PN25/40 A,	316L		Flange EN1092-1 (DIN2527 B)
B3J	DN50 PN25/40 A,	316L		Flange EN1092-1 (DIN2527 B)
CRJ	DN50 PN25/40 B1,	316L		Flange EN1092-1 (DIN2527 C)
DRJ	DN50 PN40 C,	316L		Flange EN1092-1 (DIN2512 F)
ERJ	DN50 PN40 D,	316L		Flange EN1092-1 (DIN2512 N)
BSJ	DN80 PN10/16 A,	316L		Flange EN1092-1 (DIN2527 B)
CGJ	DN80 PN10/16 B1,	316L		Flange EN1092-1 (DIN2527 C)
DGJ	DN80 PN16 C,	316L		Flange EN1092-1 (DIN2512 F)
EGJ	DN80 PN16 D,	316L		Flange EN1092-1 (DIN2512 N)
BTJ	DN100 PN10/16 A,	316L		Flange EN1092-1 (DIN2527 B)
CHJ	DN100 PN10/16 B1,	316L		Flange EN1092-1 (DIN2527 C)
PTFE clad				
B0K	DN25 PN25/40,	PTFE >316L		Flange EN1092-1 (DIN2527)
B1K	DN32 PN25/40,	PTFE >316L		Flange EN1092-1 (DIN2527)
B2K	DN40 PN25/40,	PTFE >316L		Flange EN1092-1 (DIN2527)
B3K	DN50 PN25/40,	PTFE >316L		Flange EN1092-1 (DIN2527)
BSK	DN80 PN10/16,	PTFE >316L		Flange EN1092-1 (DIN2527)
BTK	DN100 PN10/16,	PTFE >316L		Flange EN1092-1 (DIN2527)
ANSI flanges				
ACJ	1" 150 lbs RF,	316/316L		Flange ANSI B16.5
ANJ	1" 300 lbs RF,	316/316L		Flange ANSI B16.5
AEJ	1½" 150 lbs RF,	316/316L		Flange ANSI B16.5
AQJ	1½" 300 lbs RF,	316/316L		Flange ANSI B16.5
AFJ	2" 150 lbs RF,	316/316L		Flange ANSI B16.5
ARJ	2" 300 lbs RF,	316/316L		Flange ANSI B16.5
AGJ	3" 150 lbs RF,	316/316L		Flange ANSI B16.5
ASJ	3" 300 lbs RF,	316/316L		Flange ANSI B16.5
AHJ	4" 150 lbs RF,	316/316L		Flange ANSI B16.5
ATJ	4" 300 lbs RF,	316/316L		Flange ANSI B16.5
AJJ	6" 150 lbs RF,	316/316L		Flange ANSI B16.5
AUJ	6" 300 lbs RF,	316/316L		Flange ANSI B16.5
PTFE clad				
ACK	1" 150 lbs,	PTFE >316/316L		Flange ANSI B16.5
ANK	1" 300 lbs,	PTFE >316/316L		Flange ANSI B16.5
AEK	1½" 150 lbs,	PTFE >316/316L		Flange ANSI B16.5
AQK	1½" 300 lbs,	PTFE >316/316L		Flange ANSI B16.5
AFK	2" 150 lbs,	PTFE >316/316L		Flange ANSI B16.5
ARK	2" 300 lbs,	PTFE >316/316L		Flange ANSI B16.5
AGK	3" 150 lbs,	PTFE >316/316L		Flange ANSI B16.5
AHK	4" 150 lbs,	PTFE >316/316L		Flange ANSI B16.5
JIS flanges				
KCJ	10K 25 RF,	316L		Flange JIS B2220
KEJ	10K 40 RF,	316L		Flange JIS B2220
KFJ	10K 50 RF,	316L		Flange JIS B2220
KGJ	10K 80 RF,	316L		Flange JIS B2220
KHJ	10K 100 RF,	316L		Flange JIS B2220
KRJ	20K 50 RF,	316L		Flange JIS B2220
PTFE clad				
KCK	10K 25 RF,	PTFE >316L		Flange JIS B2220
KEK	10K 40 RF,	PTFE >316L		Flange JIS B2220
KFK	10K 50 RF,	PTFE >316L		Flange JIS B2220
KGK	10K 80 RF,	PTFE >316L		Flange JIS B2220
KHK	10K 100 RF,	PTFE >316L		Flange JIS B2220
YY9	Special version, to be specified			
60		Electronics		
W	Prepared for FEI5x			
Y	Special version, to be specified			
2	FEI52; 3-wire PNP, 10 to 55 V DC			

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