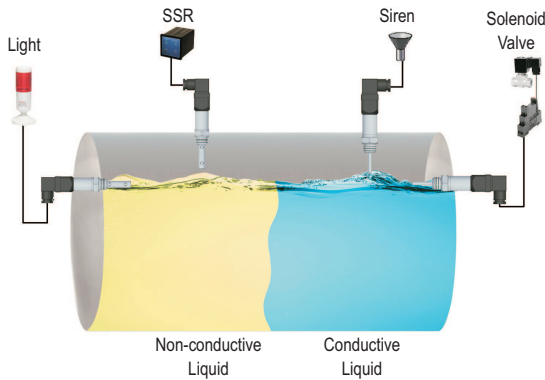
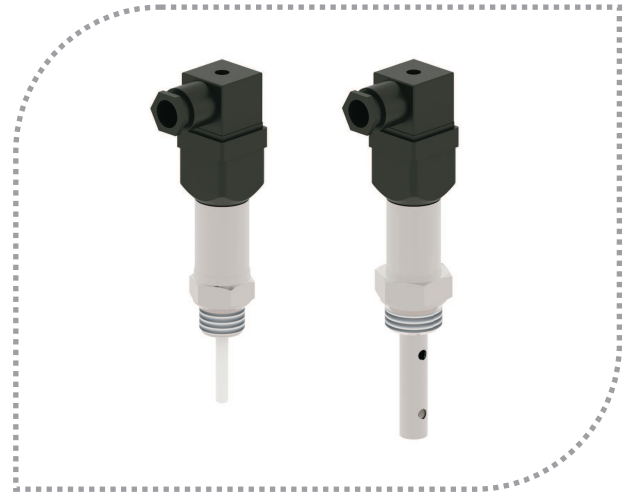


ECAM level switch is a capacitive level sensor for level measurement of conductive liquid, low conductive liquid. When product comes over the sensor, a capacitance change occurs and when this change exceed adjustment threshold, contact output is delivered.

Designed for difficult process conditions.

Refrigerated models can be manufactured for high temperature and pressure conditions.

Calibrations of triggering point and relay operation range can be performed by the user under workplace conditions. It can be connected horizontally or vertically.



### Application Areas

Liquid tanks, food machines, cooling liquid tanks, shipping, glycol tanks, brine, waste water tanks.

Oil tanks, CO2 liquid tanks, high temperature tanks, non-conductive liquids.

### Technical Specifications:

Measurable Material	Conductive liquids Low conductive liquids
Supply	10...30 VDC Maks.35 V
Signal Output	NPN or PNP Open Collector Transistor NO or NC (Please specify when ordering) (Check that it is compatible with the supply voltage of the relay operation.)
Min.Di-Electric Constant	1,6 $\epsilon_r$
Accuracy	Set of the factory
Connection	1/2" BSP Male Thread (Std.)
Connection Material	316 Stainless Steel
Isolation Material	PFA, PTFE, Opt. PEEK, Ceramic
Working Pressure	Max. 150 bar (Depending on the model)
Working Temperature	(-) 30 °C / (+) 150 °C 200°C with cooling apparatus
Ambient Temperature	(-) 20 °C / (+) 80 °C
Delay	2 sec ( Standard)
Electrical Connection	Socket (According to ISO 4400)
Protection Class	IP 65
Power Consumption	Max. 1 W
Lenght	50 mm. (Std)
Test	EMC, Low Voltage
Max. Tensile Force	Max. 20 Nm
Weight	130 g.

# ECAM

## CAPACITIVE LEVEL SENSORS

**ECAM 101**

**ECAM 203**

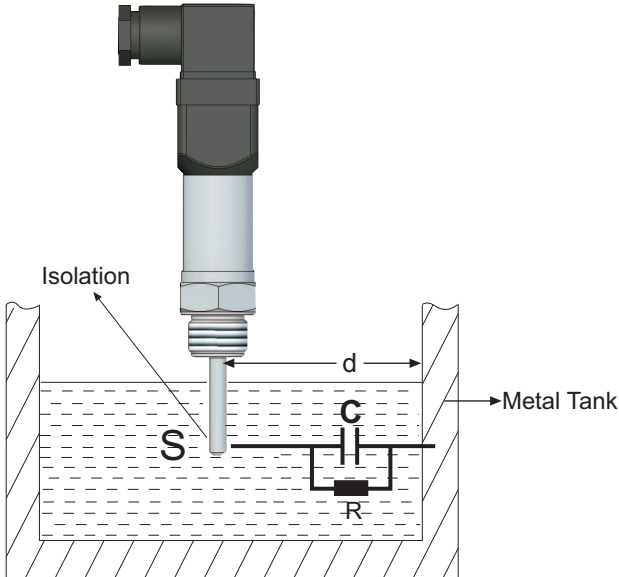
### Advantages :

- \* Optionally high temperature-resistant design.
- \* Easy assembly and sensitivity adjustment.
- \* Not affected by foam, liquid splash and probe coating.
- \* Can be mounted upside.



## Working Principle :

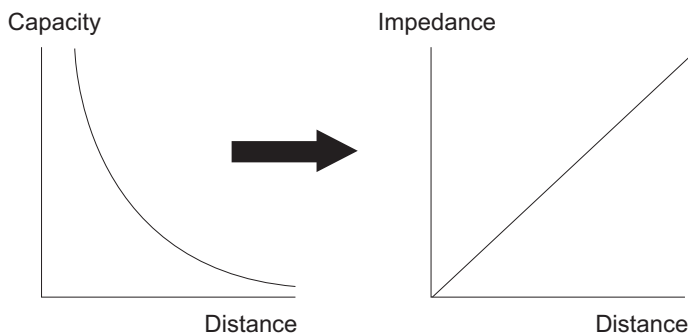
Capacitance definition, assuming two parallel conductive plates are used;



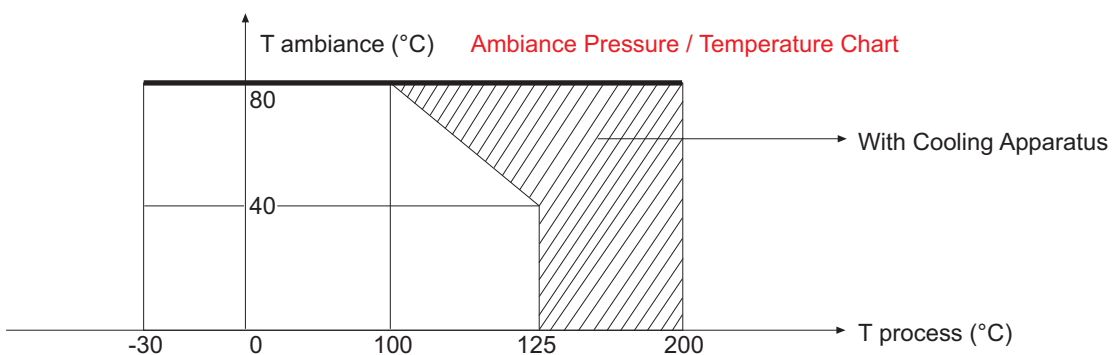
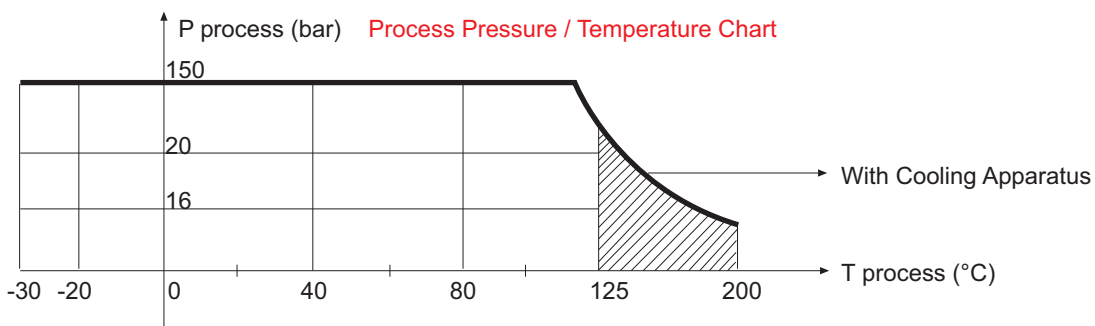
$$C = \frac{\epsilon_0 \cdot \epsilon_r \cdot S}{d}$$

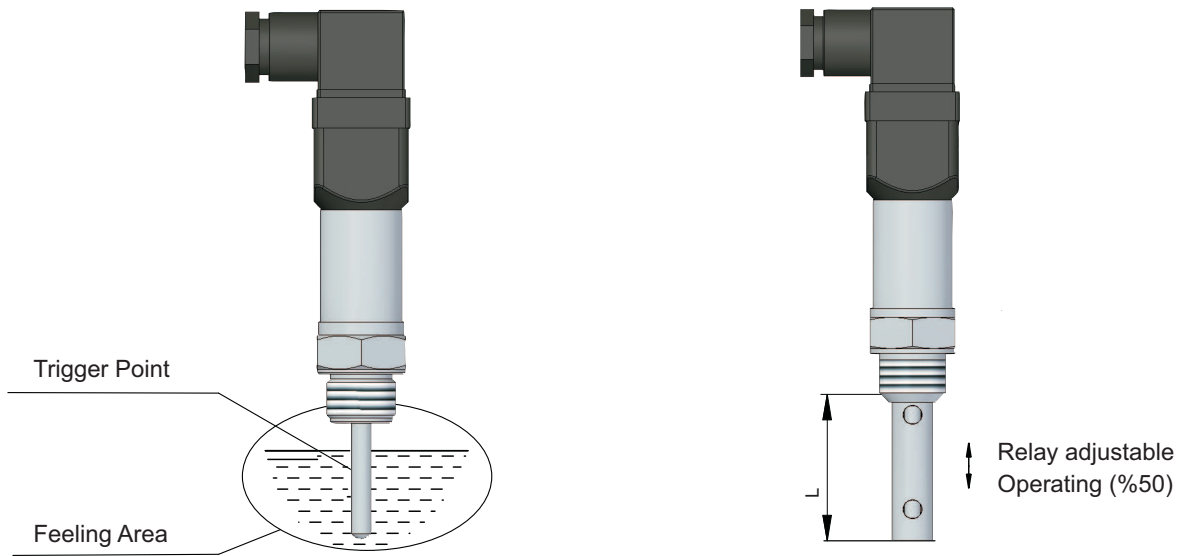
C: Capacity , Farad  
S: Surface Area , m<sup>2</sup>  
d: Distance , m

However, there are scarcely any sensor type which this definition can be practically utilized. Above Formula can no longer be reliable especially when residual areas increase due to large distance (d) (which is usually the case). Thus, measuring impedance for distance measurements give more accurate results than capacitance measurement.

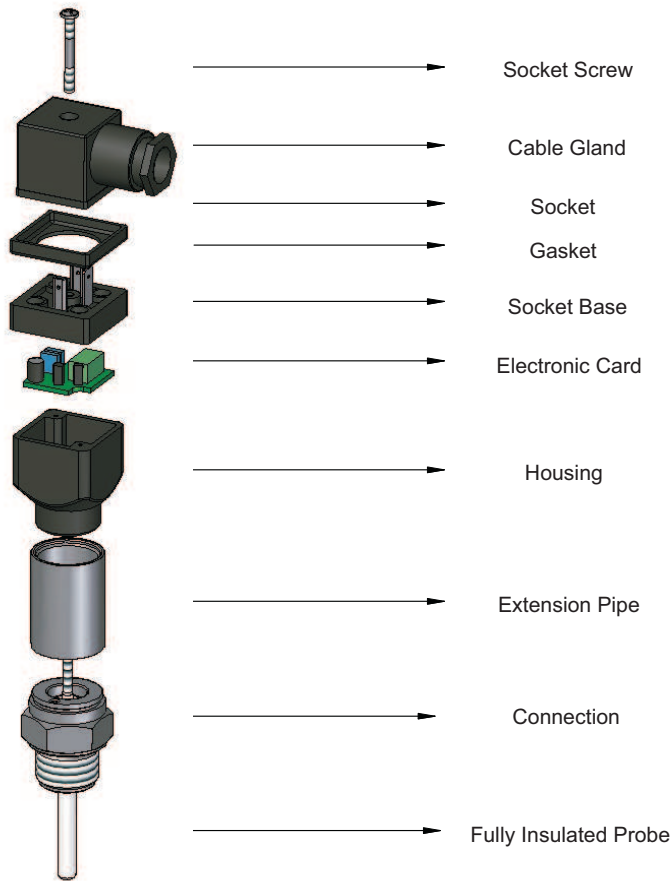


Excitation applied between 10KHz...250KHz based on length for all our models. ( $\omega = 2\pi \cdot f$ ) Linearity error that may be caused by conductivity component (R) effect is prevented by electronic circuit design and mechanical design. Reduced to a level lower than 1ppm, acceptable as zero.

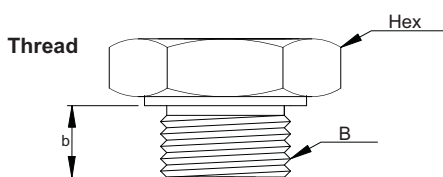




**Parts :**



**Mechanical Connection :**



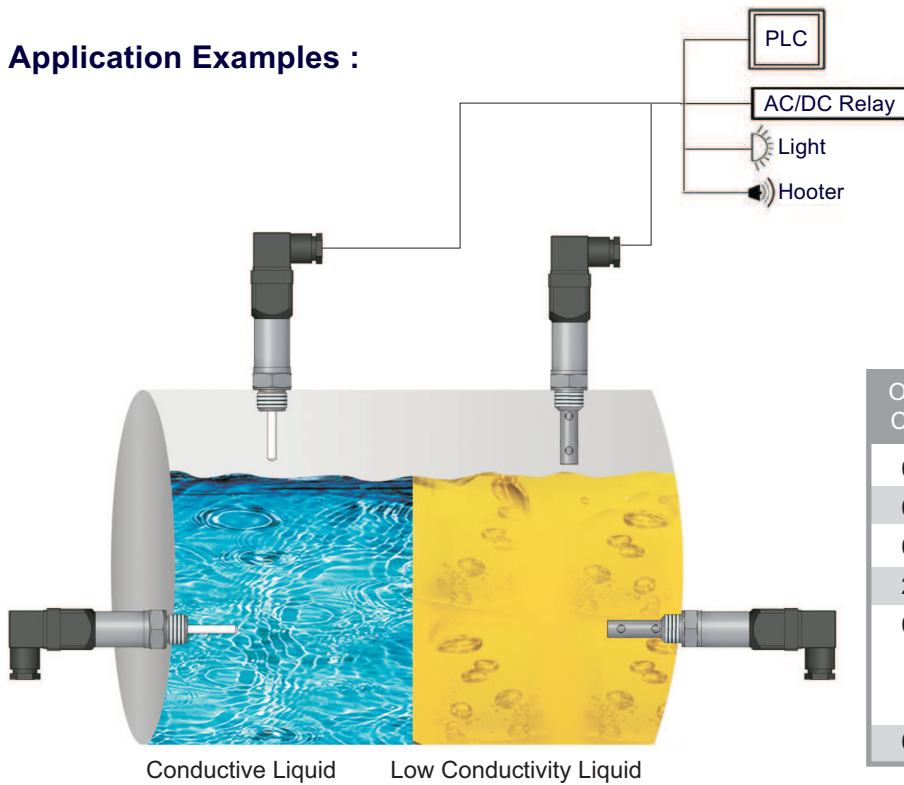
(ISO 228-1)

Dimension (B)	Hex (mm)	Screw Length b (mm)
3/8" BSP	27	14
1/2" BSP	27	14
3/4" BSP	32	14
1" BSP	36	23
1 1/4" BSP	51	23
1 1/2" BSP	60	23
2" BSP	70	23

(ISO 228-1)

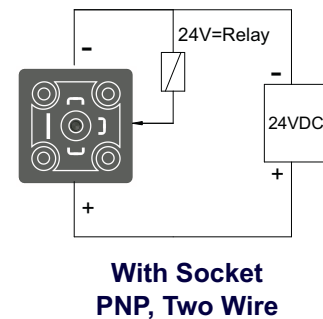
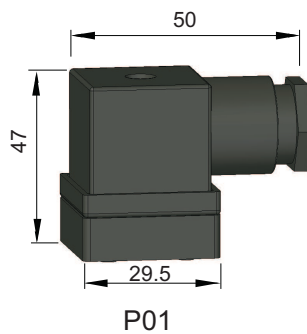
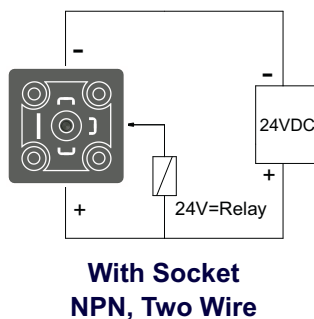
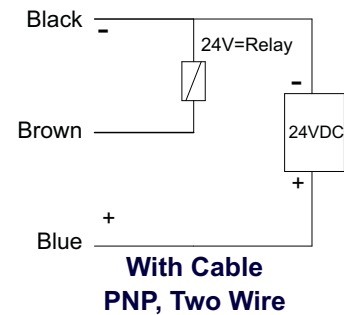
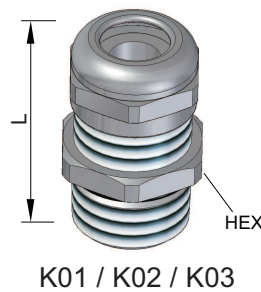
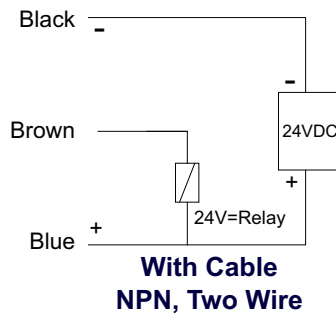
Dimension (B)	Hex (mm)	Screw Length b (mm)
M 14	27	12
M 16	27	14
M 18	27	14
1/2" NPT	27	16
3/4" NPT	27	23
1" NPT	27	23

### Application Examples :



Order Code	Material	Protection Class	HEX (mm)	L
01	Metal	PG 7	14	22
02	Metal	PG 9	17	22
03	Metal	PG 11	20	25
24	Plastik	PG 13.5	24	31
05	Metal-Ex 1/2" NPT	IP 66/68 CESI 03ATEX	22	25
06	Metal	1/2" BSP	22	21

### Electrical Connection :



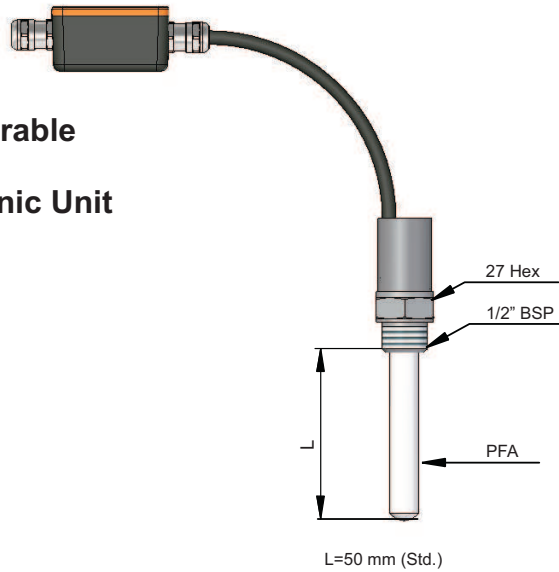
### Housing :

TYPE	MATERIAL	PROTECTION CLASS	TEMPERATURE (°C)	SIZE a x b x c (mm)
P01	Polyamid	IP 65	(-) 20...(+) 125	60 x 55 x 30
K01	Polyamid-With PVC Cable	IP 68	(-) 20...(+) 120	60 x 55 x 30
K02	Polyamid-With Silicon Cable	IP 68	(-) 20...(+) 150	60 x 55 x 30
K03	Metal-PTFE Cable	IP 68	(-) 40...(+) 230	60 x 55 x 30

**Sample Models:**

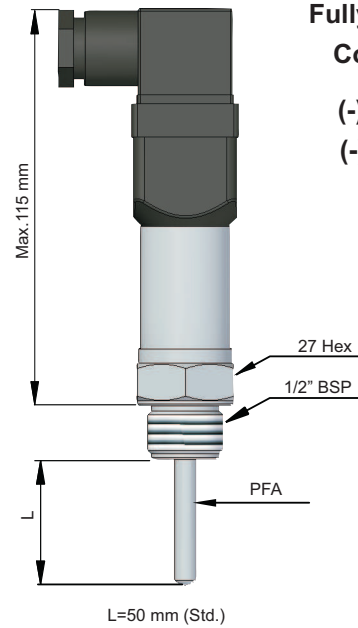
**CONDUCTIVE LIQUIDS**

**Seperable  
Electronic Unit**



**ECAM 101**

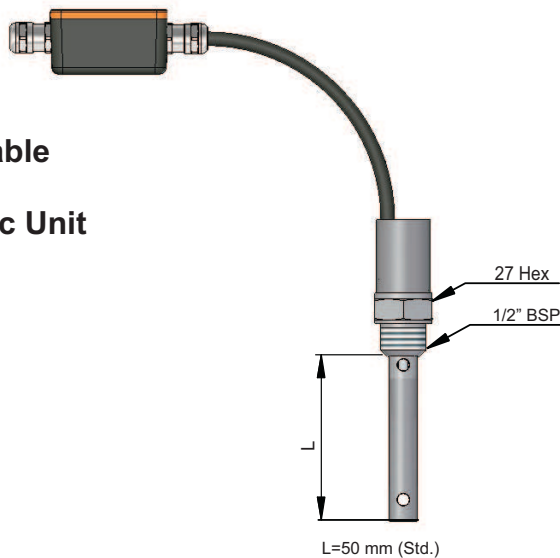
**L=50 mm (Std.)**



**Fully Insulated Probe  
Conductive Tank**  
(-) 1... (+) 150 bar  
(-) 30...(+) 150 °C

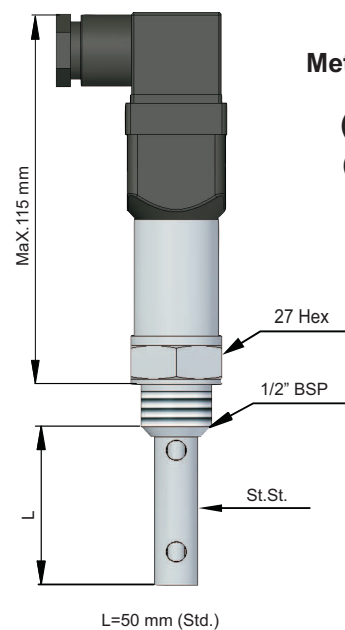
**LOW CONDUCTIVE LIQUIDS**

**Seperable  
Electronic Unit**



**ECAM 203**

**L=50 mm (Std.)**



(-) 1... (+) 100 bar  
(-) 30...(+) 150 °C

**Coaxial Probe  
Metal / Insulated Tank**  
(-) 1... (+) 100 bar  
(-) 30...(+) 150 °C

Order Form : Please consider sample models when coding.

## 1 MODEL ECAM

Conductive Liquids.....1 Non-Conductive Liquids .....2

## 2 CERTIFICATE

None.....0

## 3 PROBE TYPE

Fully Insulated Probe.....1 Coaxial Probe ...Ø 10.....3  
Special.....x

## 4 STEM LENGHT

50 mm (Standard).....0 Special.....x

## 5 PROCESS TEMPERATURE

150 °C Standard .....0 (-)196 °C Cryogenic Tank .....2  
Max. 200 °C with Cooling Apparatus .....1 Max.200°C with Cooling Apparatus (PEEK Isolation)....3  
Special.....x

## 6 CONNECTION

3/8" BSP.....003 1/2" NPT.....054  
1/2" BSP.....004 3/4" NPT.....055  
3/4" BSP.....005 1" NPT.....056  
1" BSP.....006 M 14 x 1,5.....083  
1 1/4" BSP .....007 M 16 x 1,5.....084  
1 1/2" BSP .....008 M 18 x 1,5.....085  
2" BSP.....009 Special.....x

## 7 OUTPUT

NPN-NO Contact.....00 PNP-NO Contact.....03  
NPN-NC Contact .....01 PNP-NC Contact .....04  
Special.....x

## 8 HOUSING

None.....00 Special.....x

## 9 INSULATION MATERIAL

PTFE.....66 Ceramic.....70  
PFA.....67 Rubber.....81  
PEEK.....68 FKM.....84  
Polyamide.....69 Special.....x

## 10 CONNECTION MATERIAL

316 Stainless Steel .....02 Polypropylene.....62  
With chrome plating Steel .....21 PVDF.....64  
Pirinç.....41 PTFE.....66  
Delrin.....63 Special.....x

## 11 ELECTRICAL CONNECTION

Terminal (For Housing Models) ..... 00 Military Socket ML-2 , 2 Pin.....60  
PVC Cable (Max. 60 °C) ..... 01 Military Socket ML-5 , 5 Pin.....61  
PVC Cable (Max.105 °C) ..... 02 M12 - 2 Pin.....70  
Silicon Cable (Max.200 °C) .....03 M12 - 5 Pin.....71  
PTFE Cable (Max.230 °C) ..... 04 M12 - 8 Pin.....72  
Polyamide Large Socket P01 ..... 50 Special.....x  
Polyamide Small Socket P02 ..... 51  
Polyamide Large Lighted Socket P03 ..... 52

## 12 OPTIONAL

None...../ 0 With CAble Electronic Unit...../ S  
Special...../ x

## SAMPLE

ECAM 101 - 0 - 0 - 0 - 0 - 05 - 00 - 00 - 17 - 02 / 0

For conductive liquids , ECAM 101 , L=50 mm, 3/4" BSP, NPN - NO , With Socket