KP2W-3R

CAPACITIVE LEVEL ELECTRODE

GENERAL FEATURES

Ayvaz KP2W-3R works according to the capacitance measuring principle. It is used to indicate different levels in conductive and non-conductive liquids. The KP2W-3R is an electrode body integrated and contains a level transmitter that generates a standard analog signal of 4-20 mA. 4-20 mA analog output can be followed from the display on the panel cover.

The capacitance measuring principle is used to indicate the level. The electrode rod and the vessel wall form a capacitor. Basically it is based on the fact that the value of a capacitance is affected by the dielectric value of the material between the plates, the areas of the plates and the distance between them.

Since the area of the electrode and the tank wall is constant, the only variable is the material inside the tank acting as the dielectric. If the level of this dielectric material changes, the current through the plates also changes in proportion to the level. A dielectric is defined as an insulating material that excludes many liquids, such as water.

While the dielectric constant of air and vacuum is 1, it is bigger than 1 for other substances. In that case, the capacity also changes with the change in the amount of substance in the tank. To obtain a useful measurement result, the dipstick immersed in the liquid at varying depths must be completely insulated. After setting the measuring degree, the level can be read from a display unit.

Applications
Steam boilers, liquid tanks, fuel tanks, concentrate tanks, marine applications, glycol tanks, food machinery, cooling liquid tanks, ships, brine tanks, wine tanks, clean water tanks, oil tanks, CO_2 liquid tanks, high temperature tanks, low conductivity liquids, hot sticky and high viscosity acid and chemical liquids etc.

Advantages
- Easy to calibrate & install.
- Calibration possibility for lower and upper point.
- High accuracy.
- Operates at high temperature and high pressure.
- 50-4000pF measuring range

TECHNICAL PARAMETERS	
Max Working Temp	238 °C
Max Working Pressure	32 bar
Main Supply	220V AC 50/60 Hz
Body	Stainless Steel 1,4571 (CrNiMoTi 17 12 2)
Flange	Steel Casting 1,0460 (C 22,8)
Electrical Cardboard Body	Alluminum Injection 3,2161 (G AlSi8Cu3)
Electrodes	Stainless Steel 1,4571 (CrNiMoTi 17 12 2)
Connection	3/4" BPS / DN32 - DN50 PN40
Power	5VA - 220VAC
Accuracy	Su ≥ 20 µS/cm
Output	4-20 mA Max Load 500 Ω 3 Relay Contact Output
Relay Contact Specs.	SPDT, 10A 120VAC / 24VDC 10A / 6A 250VAC
IP Class	IP 62

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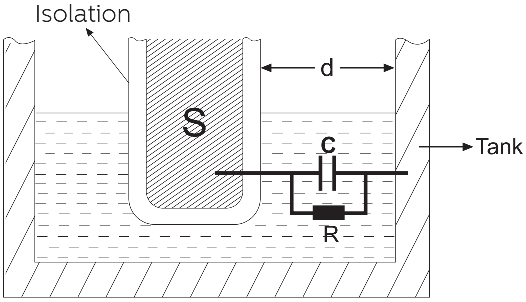
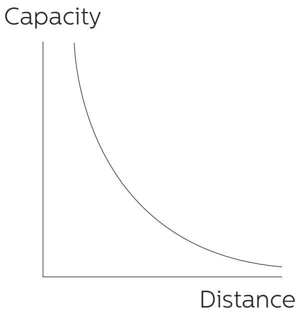
Working Principle:
Electrical capacitance definition, assuming two parallel conductive plates are used;

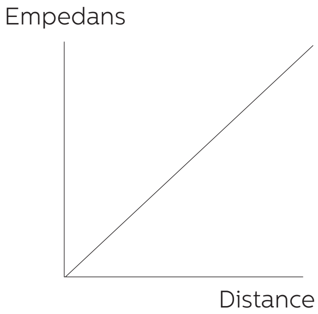


C(Farad)
S,d (mt)

$C = \frac{\varepsilon_0 . \varepsilon_r . S}{d}$ ifadesiyle tanımlanabilir.

In practice, there is hardly any sensor type for which this expression can be used. It is no longer possible to rely on the correctness of the above formula, especially since the gap (d) is large - this is the case in general - due to the increase in leakage fields. Therefore, measuring impedance rather than capacitance gives much more accurate results, especially in distance measurements.





The impedance expression is given as Z = R + jLω + (jC ω)$^{-1}$. R is defined as the real component and represents the conductivity of the medium. The second component jLw is defined as inductive reactance. This component is present even if we are measuring capacitively. However, we assume that it does not exist. In this way, there will be no errors since we evaluate the result based on the electrostatic properties of the environment. As a result, our impedance expression will be Z = R + (jC ω)$^{-1}$.
The measurement of the capacitive sensors we produce is made by the load transfer method. The total impedance is given by the expression Z = V / I.

I = Q / t
Q (Coulomb)
t (sec)
If the capacitive reactance we want to measure is; (jCω) is -1. That is, the load and the impedance are in phase.
In summary, the load transferred to the medium is directly proportional to the capacitive reactance.

a : Center electrode radius
b : Radius of outer screen
L : Length

$\frac{2.\pi.\varepsilon_0.\varepsilon_r}{\ln (b/a)}.L$ Impedance calculation is made with the expression.

Depending on the length, stimulation is applied in the range of 10 KHz to 250 KHz in all our models in production.
(ω = 2 x p x f) conductivity component (R) effect causing linearity error is prevented by electronic circuit design and mechanical design. Less than 1 ppm and zero has been reduced to an acceptable value.

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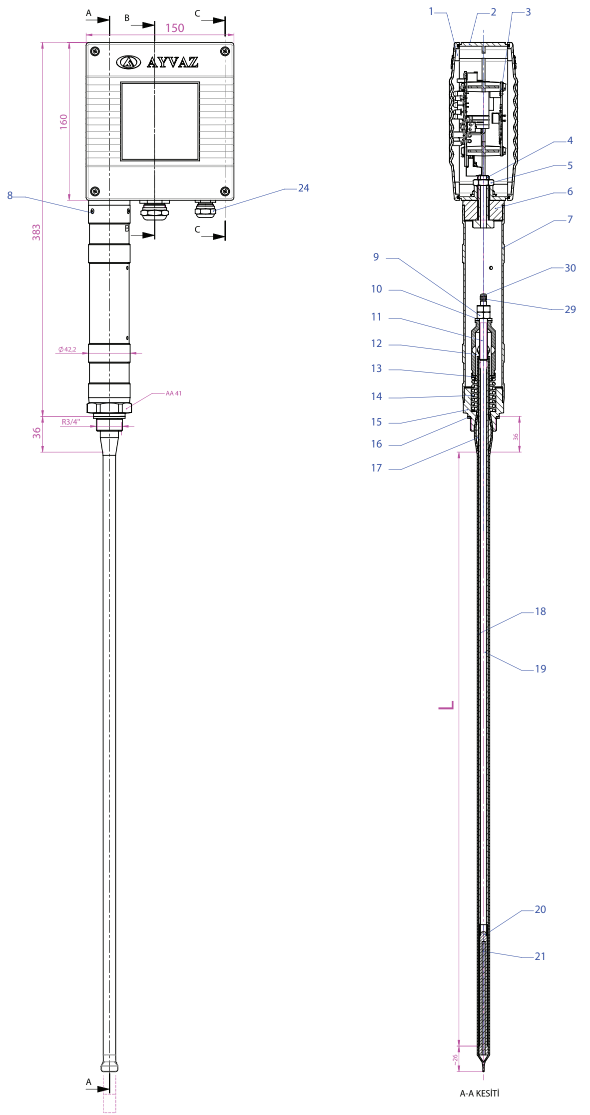
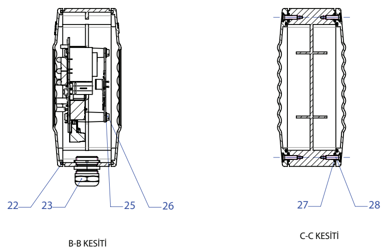
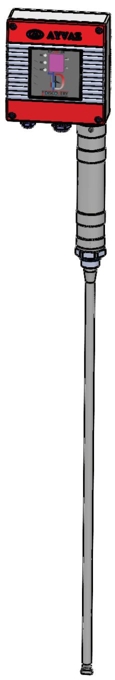
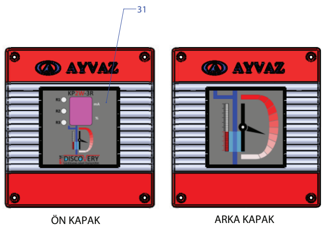
TREADED TECHNICAL DRAWING









L (mm)
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
2000
4000

Part		Material
1	Cover	Aluminum
2	Panel Body	Aluminum
3	Control Panel Curcuit	Pertinax
4	Bolt	8.8
5	A.K.B Nut	
6	Isolation Pipe Cover	
7	Isolation Pipe	Aluminum
8	Pim	
9	A.K.B Nut	
10	Pim	
11	Fixing Bolt	AISI 316
12	Fixing Point	PEEK
13	Spring Seat	AISI 304
14	Spring	AISI 302
15	Electrode Body	AISI 316 Ti
16	Bolt	AISI 304
17	Fixing Point	AISI 316
18	Cover	PFA
19	Electrode	AISI 316 Ti
20	Cover	Teflon
21	Wire	Welding Wire
22	Gasket	Silicone
23	Record	
24	Record	
25	Pim	
26	Bolt	
27	Gasket	
28	Bolt	
29	A.K.B Nut	
30	Bolt	
31	Label	

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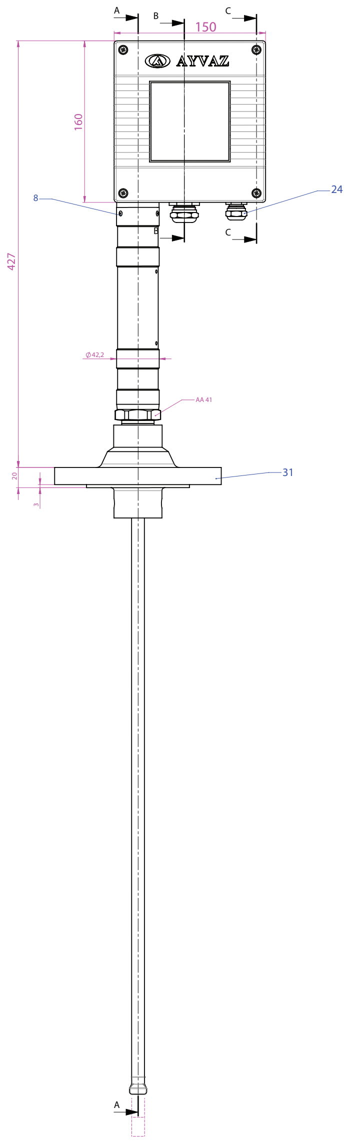
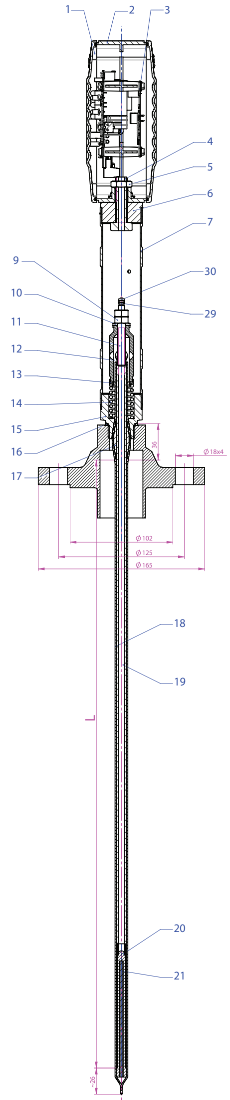
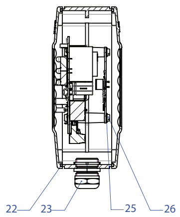
FLANGED TECHNICAL DRAWING

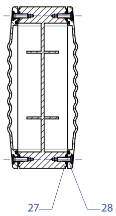




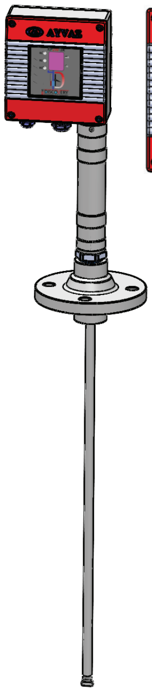
A-A KESİTİ

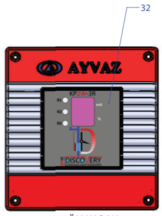


B-B KESİTİ

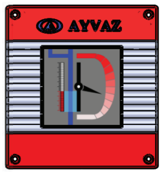


C-C KESİTİ





ÖN KAPAK



ARKA KAPAK

L (mm)
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
2000
4000

	Part	Material
1	Cover	Aluminum
2	Panel Body	Aluminum
3	Control Panel Curcuit	Pertinaks
4	Bolt	8.8
5	A.K.B Nut	
6	Isolation Pipe Cover	Kestamid
7	Isolation Pipe	Aluminum
8	Pim	Bolt
9	A.K.B Nut	
10	Pim	
11	Bolt	AISI 316
12	Fixing Point	PEEK
13	Spring Seat	AISI 304
14	Spring	AISI 302
15	Electrode	AISI 316 Ti
16	Bolt	AISI 304
17	Fixing Point	AISI 316
18	Pfa Cover	PFA
19	Electrode	AISI 316 Ti
20	Wire Cover	Teflon
21	Wire	Welding Wire
22	Gasket	Silicone
23	Record	
24	Record	
25	Pim	
26	Bolt	
27	Gasket	
28	Bolt	
29	A.K.B Nut	
30	Bolt	
31	Flange	
32	Label	

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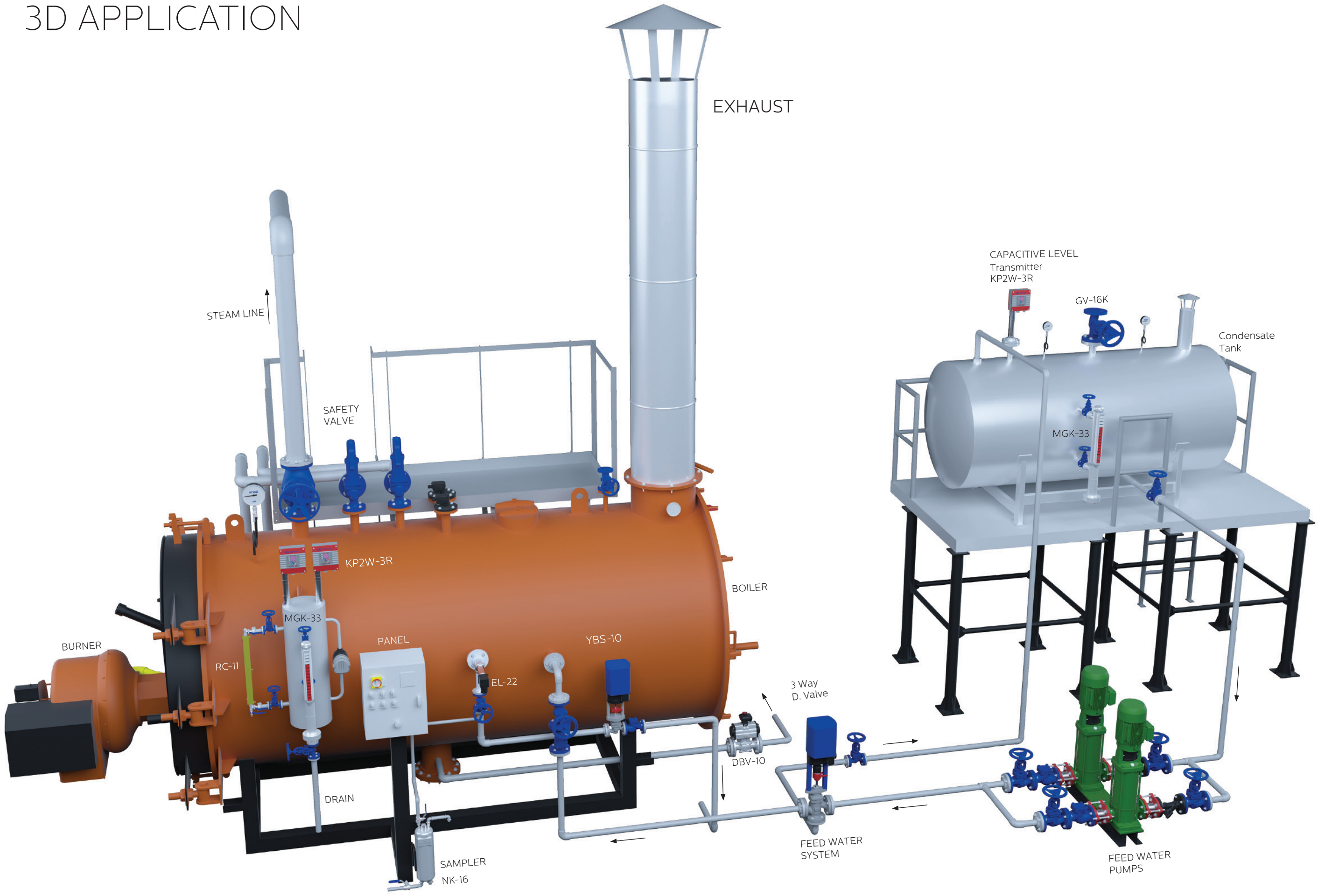
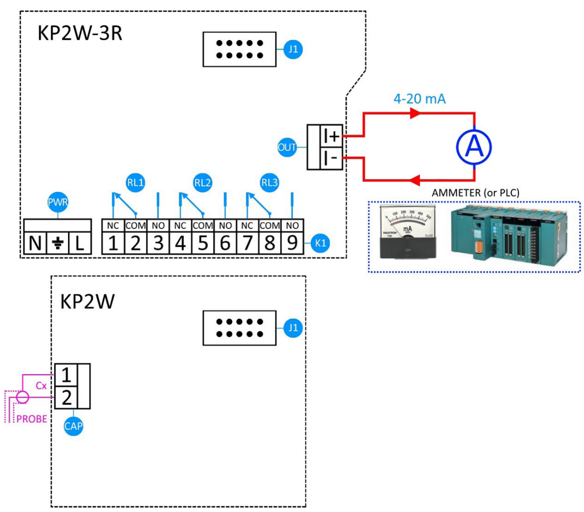
3D APPLICATION



ELECTRICAL CONNECTION



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