

Atek Alfa

CAPACITIVE LEVEL SENSOR



CLS 410

RS485 INTERFACE

USER MANUAL

CONTENTS

1. Warnings.....	3
2. Technical Specifications	3
3. Mechanical Dimensions.....	4
4. Mounting Warnings	4
5. Electrical Connections	6
6. Modbus Adress Table.....	7

1. WARNINGS

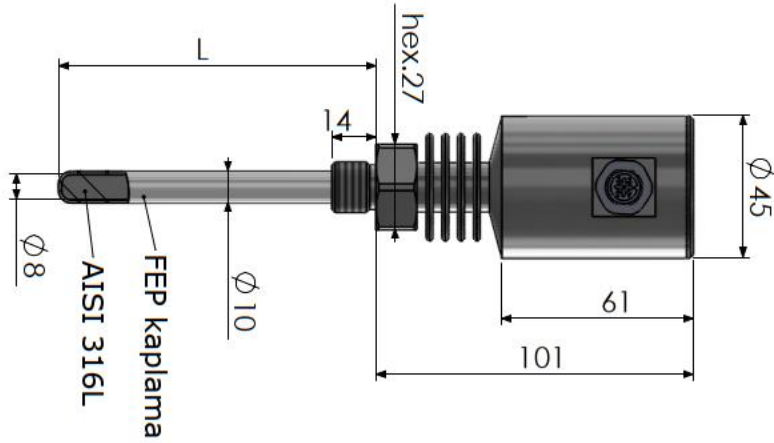
- The product must be installed by the customer in accordance with the connection diagrams, installation instructions, and other relevant information provided in this manual.
- Maintenance and repair must only be carried out by technicians authorized by the manufacturer.
- The distance between the sensor and the control unit should be kept as short as possible. Unless necessary, no extensions or splices other than the appropriate connector should be used.
- The system may perform uncontrolled movements during initial commissioning, particularly when it is part of a control system whose parameters have not yet been configured. Therefore, the sensor must not be used in applications where the safety of people or property depends on the operation of the device.
- To prevent damage to the sensor, the correct power supply polarity and voltage range must be observed. Power must not be applied before all connections have been completed.
- The sensor and controller must be connected using a shielded cable. The cable shield must be connected to ground.
- Very strong magnetic fields located in the immediate vicinity of the position marker may cause incorrect signals.
- The product must be transported, shipped, and stored in its original packaging, protected from dust, moisture, impact, falling, and water exposure, and at an ambient temperature of -40°C to +70°C.
- For cleaning by the user, alcohol, thinner, or similar chemical substances must not be used. The product should be wiped with a damp cloth.
- The product may be damaged or become unusable if it is used outside the specifications stated in this user manual. In such cases, the product will be excluded from the warranty.

2. TECHNICAL SPECIFICATIONS

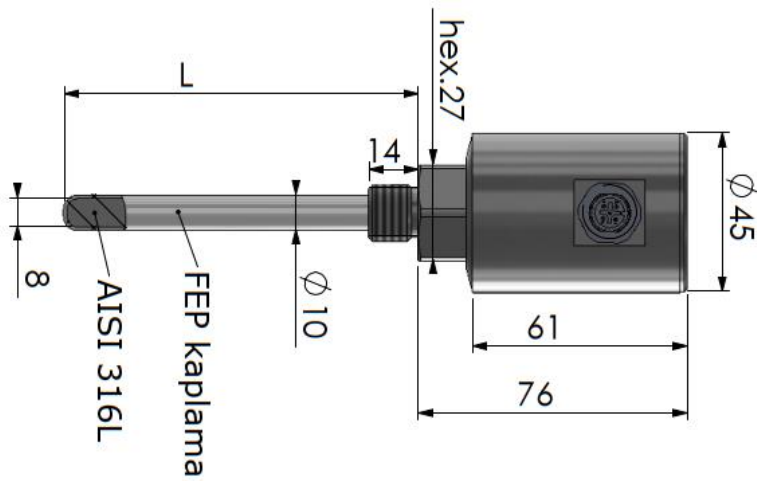
Mechanical Data		
Immersion Length(L)	Between 100 mm and 1400 mm	
Mechanical Connection	M16, G1/2", G1", G1-1/2"	
Cooling	4 Steps(Standard)	
Protection Rating	IP67	
Operating Temperature	Non-Cooled Model	-40...+85 °C
	Cooled Model	-40...+150 °c
Storage Temperature	-40°C...+85°C	
Material	Housing: AISI 316L	
	Insulation: FEP	
Electrical Specifications		
Measurement Principle	Capacitive	
Repeatability	± 0.5 %	
Measurement Error	%±2 @25°C	
Measurement Range	10-1000 pF	
Operating Frequency	50-400 kHz	
Communication Protocols	Modbus RTU, Modbus ASCII	
Baud Rate	600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200 MODBUS RTU / MODBUS ASCII Default: 9600	
Data Bits	MODBUS ASCII: 7 ASCII / MODBUS RTU: 8	
Parity	None, Odd, Even Default: None	
Address	Between 1 and 247 Default: 1	
Output Update Rate	500 Hz	
Supply Voltage	12...24 V _{DC}	
Supply Voltage Ripple	≤ %10 V _{SS}	
Power Consumption (w/o load)	0.5W	
Overvoltage Protection	33 VDC	
Reverse Polarity Protection	Yes, up to supply voltage max	
Short Circuit Protection	Yes (outputs, GND and supply voltage max.)	

3. MECHANICAL DIMENSIONS (MM)

Cooled Model



Non-Cooled Model



Immersion Length(L)

0100:	100 mm	0325:	325 mm	0575:	575 mm	0825:	825 mm
0125:	125 mm	0350:	350 mm	0600:	600 mm	0850:	850 mm
0150:	150 mm	0375:	375 mm	0625:	625 mm	0875:	875 mm
0175:	175 mm	0400:	400 mm	0650:	650 mm	0900:	900 mm
0200:	200 mm	0425:	425 mm	0675:	675 mm	0925:	925 mm
0225:	225 mm	0450:	450 mm	0700:	700 mm	0950:	950 mm
0250:	250 mm	0500:	500 mm	0725:	725 mm	0975:	975 mm
0275:	275 mm	0525:	525 mm	0750:	750 mm	1000:	1000 mm
0300:	300 mm	0550:	550 mm	0800:	800 mm	1400:	1400 mm

†

* Thread is included in the insertion length.

4. MOUNTING WARNINGS

Correct Mounting Method

- The product is installed away from the material inlet points. It is not affected by turbulence or fluctuations caused by material entry, ensuring stable measurement.
- The product is installed in a vertical position.

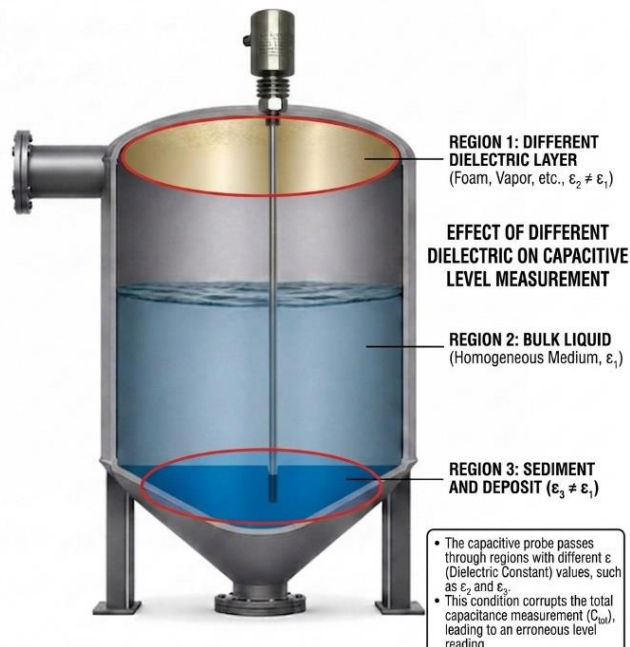


Incorrect Mounting Method

- The product is installed too close to the material inlet. Turbulence and fluctuations caused by material entry may result in measurement errors.
- The product is installed at an angle.

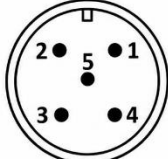


EFFECT OF DIFFERENT DIELECTRIC CONSTANTS ON CAPACITIVE LEVEL MEASUREMENT



- Care must be taken to prevent damage to the measurement probe. Accurate measurement cannot be ensured if the measurement probe is damaged.
- The connector/cable pins must be checked to ensure that they are clean and properly aligned.
- The connector/cable connection must be made as specified in the technical specifications.
- To prevent damage to the sensor, the specified power supply polarity and voltage must be observed.
- To prevent water from entering the device, the cable gland must be positioned downward during installation.
- If there are any elements in the application area that may damage the product, it is recommended to install a protective shield at the measurement point.

5. ELECTRICAL CONNECTION

M12 / 5 Pin Male Connector (S13M Connection) 		
Signal	Cable	Pin No
SHIELD - SWITCH	SHIELD - SWITCH	1
+V (Power Supply)	Red	2
GND	Black	3
(RS485 - A)	Yellow	4
(RS485 - B)	Green	5

LED Function

Led Color	Description
Off	Sensor not operating / No power supply
Green	If the sensor is operating, the green LED flashes once per second.
Yellow	If the measurement is outside the measuring range, the yellow LED flashes every 500 ms.
Red	If the sensor detects an analog output error, the red LED flashes every 500 ms.

6. MODBUS ADRESS TABLE

COIL ADRESS TABLE

Coil Adress (hex)	Parameter Name	Parameter Description	Number of Bits	Value	Read/Write
0x01	RESET_DEVICE	Sensor Reset	1 bit	Default Value=0 1=Reset	Read/Write

HOLDING REGISTER ADRESS TABLE

Holding Register Adress (hex)	Parameter Name	Parameter Description	Number of Bits	Default Value	Read/Write
0x01	UART_ADRESS	Address Information for Network Connection (1 to 247)	16 bit (word)	1	Read/Write
0x02	UART_BAUD	Baudrate (0=600, 1=1200, 2=2400, 3=4800, 4=9600, 5=14400, 6=19200, 7=38400, 8=57600, 9=115200)		4	
0x03	UART_PROTOCOL	Protococol(0= Modbus RTU, 1=geçerisiz 2=Modbus Ascii)		0	
0x04	UART_PARITY	Parity (0=None, 1=Odd, 2=Even)		0	
0x05	UART_PERIOD	Data Update Period (ms) (1 to 1000)		1	
0x06	CALIBRATE_POINT_COUNT	Number of Calibration Points (2 to 10)		2	

0x07	CALIBRATE_POINT_COMMAND	Calibration Commands (*CALIBRATE_POINT_1 = 11 To Be Calibrated Point 1, *CALIBRATE_POINT_2 = 12 To Be Calibrated Point 2, *CALIBRATE_POINT_3 = 13 To Be Calibrated Point 3, *CALIBRATE_POINT_4 = 14 To Be Calibrated Point 4, *CALIBRATE_POINT_5 = 15 To Be Calibrated Point 5, *CALIBRATE_POINT_6 = 16 To Be Calibrated Point 16, *CALIBRATE_POINT_7 = 17 To Be Calibrated Point 7, *CALIBRATE_POINT_8 = 18 To Be Calibrated Point 8, *CALIBRATE_POINT_9 = 19 To Be Calibrated Point 9, *CALIBRATE_POINT_10 = 20 To Be Calibrated Point 10, *CALIBRATION_SAVE = 200 Saves the Calibration. *SWOUT_SETTINGS_SAVE = 220 Saves the Switch-Out Settings. *UART_SETTINGS_SAVE = 230 UART Saves the Settings.)		0	
0x08	SWITCH_MODE	Switch Out Mode (0=Disabled, 1=Standard, 2=Band, 3=Catch, 4=Dual, 5=Periodic, 6_Rising Edge, 7=Falling Edge		1	Read/Write
0x09	SWITCH_CONDITION	Switch Condition (0=Normally Open(NO) 1=Normally Close(NC))		0	Read/Write
0x0A	SWITCH_DELAY_HIGH	32 bit Delay Time (ms) High Word	16 bit (H word)	0	Read/Write
0x0B	SWITCH_DELAY_LOW	32 bit Delay Time (ms) Low Word	16 bit (L word)	0	Read/Write
0x0C	SWITCH_DEAD_TIME_HIGH	32 bit Dead Time (ms) High Word	16 bit (H word)	0	Read/Write
0x0D	SWITCH_DEAD_TIME_LOW	32 bit Dead Time (ms) Low Word	16 bit (L word)	0	Read/Write
0x0E	SWITCH_HYSUP_HIGH	32 bit Hysteresis Up Time (ms) High Word	16 bit (H word)	0	Read/Write
0x0F	SWITCH_HYSUP_LOW	32 bit Hysteresis Up Time (ms) Low Word	16 bit (L word)	0	Read/Write

0x10	SWITCH_HYSDOWN_HIGH	32 bit Hysteresis Down Time (ms) High Word	16 bit (H word)	0	Read/Write
0x11	SWITCH_HYSDOWN_LOW	32 bit Hysteresis Down Time (ms) Low Word	16 bit (L word)	0	Read/Write
0x12	SWITCH_OFFSET_HIGH	32 bit Offset Value High Word	16 bit (H word)	0	Read/Write
0x13	SWITCH_OFFSET_LOW	32 bit Offset Value Low Word	16 bit (L word)	0	Read/Write
0x14	SPAN_START_HIGH	32 bit Span Start Value High Word	16 bit (H word)	0	Read/Write
0x15	SPAN_START_LOW	32 bit Span Start Value Low Word	16 bit (L word)	0	Read/Write
0x16	SPAN_END_HIGH	32 bit Span End Value High Word	16 bit (H word)	0	Read/Write
0x17	SPAN_END_LOW	32 bit Span End Value Low Word	16 bit (L word)	200	Read/Write
0x18	SWITCH1_SETT_HIGH	32 bit Switch Out Set Value High Word	16 bit (H word)	0	Read/Write
0x19	SWITCH1_SETT_LOW	32 bit Switch Out Set Value Low Word	16 bit (L word)	100	Read/Write

INPUT REGISTER ADRESS TABLE

Input Register Adress(hex)	Parameter Name	Parameter Description	Number of Bits	Default Value	Read/Write
0x01	INPT_REG_HRAW	32 Bit unSigned Raw Capacitance Data High Word	16 (H word)	-	Read-only
0x02	INPT_REG_LRAW	32 Bit unSigned Raw Capacitance Data Low Word	16 (L word)		
0x03	INPT_REG_HLEVEL	32 Bit Signed Level Data High Word	16 (H word)		
0x04	INPT_REG_LLEVEL	32 Bit Signed Level Data Low Word	16 (L word)		
0x05	INPUT_CALIBRATE_HPOINT1	32 Bit Unsigned Calibrate Point1 Data High Word	16 (H word)		
0x06	INPUT_CALIBRATE_LPOINT1	32 Bit Unsigned Calibrate Point1 Data Low word	16 (L word)		
0x07	INPUT_CALIBRATE_HPOINT2	32 Bit Unsigned Calibrate Point2 Data High Word	16 (H word)		

0x08	INPUT_CALIBRATE_LPOINT2	32 Bit Unsigned Calibrate Point2 Data Low word	16 (L word)
0x09	INPUT_CALIBRATE_HPOINT3	32 Bit Unsigned Calibrate Point3 Data High Word	16 (H word)
0x0A	INPUT_CALIBRATE_LPOINT3	32 Bit Unsigned Calibrate Point3 Data Low word	16 (L word)
0x0B	INPUT_CALIBRATE_HPOINT4	32 Bit Unsigned Calibrate Point4 Data High Word	16 (H word)
0x0C	INPUT_CALIBRATE_LPOINT4	32 Bit Unsigned Calibrate Point4 Data Low word	16 (L word)
0x0D	INPUT_CALIBRATE_HPOINT5	32 Bit Unsigned Calibrate Point5 Data High Word	16 (H word)
0x0E	INPUT_CALIBRATE_LPOINT5	32 Bit Unsigned Calibrate Point5 Data Low word	16 (L word)
0x0F	INPUT_CALIBRATE_HPOINT6	32 Bit Unsigned Calibrate Point6 Data High Word	16 (H word)
0x10	INPUT_CALIBRATE_LPOINT6	32 Bit Unsigned Calibrate Point6 Data Low word	16 (L word)
0x11	INPUT_CALIBRATE_HPOINT7	32 Bit Unsigned Calibrate Point7 Data High Word	16 (H word)
0x12	INPUT_CALIBRATE_LPOINT7	32 Bit Unsigned Calibrate Point7 Data Low word	16 (L word)
0x13	INPUT_CALIBRATE_HPOINT8	32 Bit Unsigned Calibrate Point8 Data High Word	16 (H word)
0x14	INPUT_CALIBRATE_LPOINT8	32 Bit Unsigned Calibrate Point8 Data Low word	16 (L word)
0x15	INPUT_CALIBRATE_HPOINT9	32 Bit Unsigned Calibrate Point9 Data High Word	16 (H word)
0x16	INPUT_CALIBRATE_LPOINT9	32 Bit Unsigned Calibrate Point9 Data Low word	16 (L word)
0x17	INPUT_CALIBRATE_HPOINT10	32 Bit Unsigned Calibrate Point10 Data High Word	16 (H word)
0x18	INPUT_CALIBRATE_LPOINT10	32 Bit Unsigned Calibrate Point10 Data Low word	16 (L word)

NOTE: For values to be entered using the H Word and L Word, the Write Multiple Registers (0x10) function code must be used, and both values must always be entered. The decimal point value is always 2 for these values.

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