Liquid Level Controller

Cat. No. : **4411AD1**
4421AD1
4431AD1

CE RoHS

Features:
1.Used for drain and fill control.
2.Adjustable sensitivity 1K to 200K Ohm.
3.AC modulation of probe signal to prevent electrolytic corrosion.
4.8A SPDT output.
5.Power On and Relay On LED's.
6.Manual Start Switch to allow manual pump start for filling while taking care of dry run condition and overfill conditions.
7.CE ROHS certified.

Liquid Level Controller is used to detect levels of liquids which are electrically conductive. This controller senses the resistance value between the probe(s) & the common point. The conductive liquid completes the electrical path between the probe and the common input. The Liquid Level Controller then compares this value with the required set point value determined by the setting of the potentiometer. The output of these Liquid Level Controller can be used to turn ON & OFF pumps, solenoids or valves to lower, raise or maintain the liquid level in containment tank.

FUNCTION:
1. Level Monitoring of conductive Liquid
2. One Level or Two Level monitoring
3. One Tank or Two Tank level monitoring

Sensitivity Setting:
To set and fix sensitivity according to the liquid conductivity with the help of sensitivity potentiometer
1)Keep CMN,P1 & P2 probes in conductive Liquid & Potentiometer at minimum(1K) position
2)Turn the potentiometer towards Maximum(200K Ohm) side till Product RED LED & Relay gets "ON"
3)Now remove P1 probe from conductive Liquid & check product RED LED & Relay switched "Off"(if relay is not switched off turn the potentiometer again towards maximum side till the relay is switched off.)
Note -Position of potentiometer is adjusted according to conductivity level of Liquid, Do not disturb potentiometer setting once fixed.

Applications:
This device monitors the levels of conductive liquid.
It controls the actuation of pumps or valves to regulate levels.
It is also suitable for protecting submersible pumps against dry running, or protecting tanks from "overflow".

Precautions:
1.This product is not for pure water, oils , corrosive liquids & flammable liquids.
2.For correct operation of level controller, it is good practice to regulate the sensitivity at a value slightly higher or next POT position than the actual liquid resistivity to control.

Note:
1. The technical information provided in this document is correct at the time of going to press.
2. Product innovation being a continuous process, we reserve the right to alter specifications without any prior notice.
3. Only qualified persons are authorized to install the device.

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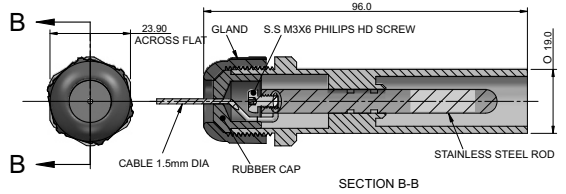
Product Specifications:

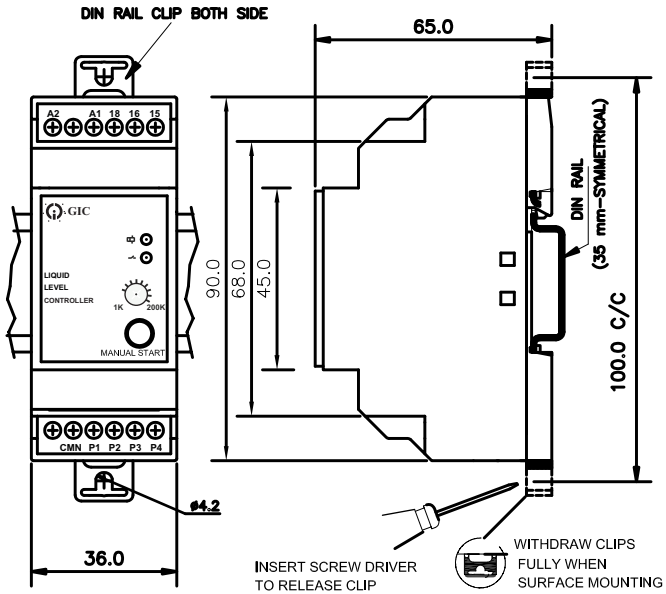
Catalogue Nos.	4411AD1	4421AD1	4431AD1
SUPPLY CHARACTERISTICS :			
Supply Voltage	110VAC, +/-20%	240VAC, +/-20%	400VAC, +/-20%
Supply Frequency	47Hz - 63Hz		
Power Consumption	3VA		
DEVICE CHARACTERISTICS :			
Conductive Sensor Probes	Stainless Steel SS304, 3 or 6Nos		
Probe Length	10 cm		
Control Action Modes	Only Draining, Only Filling, Draining & Filling Simultaneous (One Tank or Two tanks)		
Sensitivity	1K to 200 K Ohm (Potentiometer adjustable)		
Probe Voltage & Current	12 Vp-p, 100 Hz,< 1 mA		
Probe cable	Cable gauge (Min):0.5 sqmm Tin coated,Cable dia(Min):1.5mm Max Cable Length-1000m (For set value < 50%) Max Cable Length-300m (For set value 100%) Max capacitances of wire- 80 nF / km		
Manual Start Switch	If Lower tank water level is greater than Low level & upper tank water level is belowHigh level then by pressing a switch Relay can be switched ON manually.		
Output Control Mode	Relay ON/OFF		
Contact Ratings	1 C/O,8A@250VAC,Resistive,Terminal 15-Pole, Terminal 16-NC,Terminal 18-NO		
Utilization Category	AC-15: Rated Voltage (Ue):120/240V, Rated Current(Ie): 3.0/1.5A DC-13: Rated Voltage (Ue):24/125/250V, Rated Current(Ie): 2.0/0.22/0.1A		
Electrical Life	1 x 10^5 Operations		
Mechanical Life	1 x 10^7 Operations		
LED Indication	GREEN LED: Power ON, RED LED : Relay Output ON		
Operating Temperature	-10°C to +60°C		
Storage Temperature	-10°C to +70°C		
Weight Approx.(Packed)	260 gm		
Relative Humidity	5 to 95 % RH (non condensing)		
Mounting Type	Base/Din Rail Mounting		
EMI/EMC COMPLIANCE :			
Harmonic Current Emission	IEC 61000-3-2	Ed. 4.0 (2014-05) Class A	
ESD	IEC 61000-4-2	Ed. 2.0 (2008-12) Level II	
Radiated Susceptibility	IEC 61000-4-3	Ed. 3.2 (2010-04) Level III	
Electrical Fast Transient	IEC 61000-4-4	Ed. 3.0 (2012-04) Level IV	
Surge	IEC 61000-4-5	Ed. 3.0 (2014-05) Level IV	
Conducted Susceptibility	IEC 61000-4-6	Ed. 4.0 (2013-10) Level III	
Voltage Dips & Interruptions (AC)	IEC 61000-4-11	Ed. 2.0 (2004-03) All seven Levels	
Conducted Emission	CISPR 14-1	Ed. 5.2 (2011-11) Class B	
Radiated Emission	CISPR 14-1	Ed. 5.2 (2011-11) Class B	
SAFETY COMPLIANCE :			
Voltage between I/P & O/P	IEC 60947-5-1	E d. 3.1 (2009-07) 2.5 KV	
Impulse Voltage between I/P & O/P	IEC 60947-5-1	Ed. 3.1 (2009-07) 4 KV	
Single Fault Test	IEC 61010-1	Ed. 3.0 (2010-06)	
Insulation resistance	UL 508	Ed. 17 (1999-01) >50K Ohm	
Leakage Current	UL 508	Ed.17 (1999-01) <3.5mA	
Degree of Protection	IP 20 for Terminal; IP-40 for Housing		
Pollution Degree	II		
Type of Insulation	Reinforced		
ENVIRONMENTAL COMPLIANCE :			
Cold Heat	IEC 60068-2-1	Ed. 6.0 (2007-03)	
Dry Heat	IEC 60068-2-2	Ed. 5.0 (2007-07)	
Vibration	IEC 60068-2-6	Ed. 7.0 (2007-12) 5g	
Repetitive Shock	IEC 60068-2-27	Ed. 4.0 (2008-02) 40g, 6ms	
Non-Repetitive Shock	IEC 60068-2-27	Ed. 4.0 (2008-02) 30g, 15ms	

Probe Diagram:

A single pole electrode used for level control in wells or storage tanks. It comprises stainless steel probe with plastic holder and cable gland. A seal ring and the tightening of the cable gland prevent liquid from entering the cable terminal connector and causing its oxidation.
Cable connection: Screw
The external cable diameter must be 1.5 mm to warrant perfect sealing.

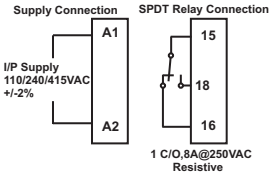


Product Diagram:



Terminal Details

Ø3.5 mm	0.54 N.m (5 Lb.in) Terminal screw - M2.6
	1 x 0.2...3.3 mm² Solid Wire
AWG	1 x 24 to 12

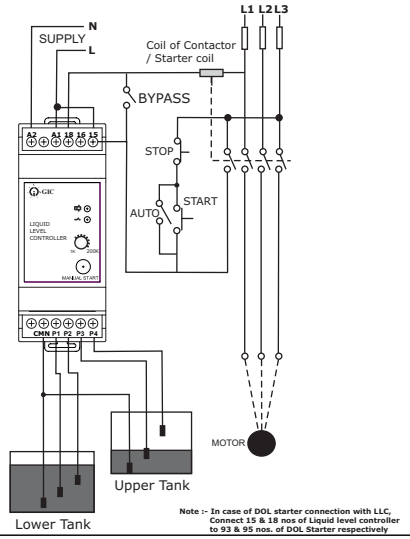


Ordering Code:

Sr. No.	Cat-ID	Description
1	4411AD1	110VAC +/-20%,50/60 Hz,1 C/O,1K to 200K SENSITIVITY,DRAINING & FILLING
2	4421AD1	240VAC +/-20%,50/60 Hz,1 C/O,1K to 200K SENSITIVITY,DRAINING & FILLING
3	4431AD1	400VAC +/-20%,50/60 Hz,1 C/O,1K to 200K SENSITIVITY,DRAINING & FILLING
4	44S0003	ACCESSORIES,SET OF 3 STAINLESS STEEL SENSORS
5	44S0006	ACCESSORIES,SET OF 6 STAINLESS STEEL SENSORS

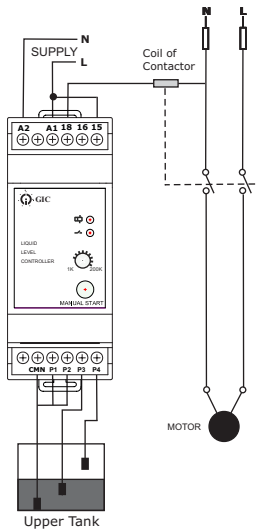
Operating Function diagram:

Simultaneous filling and draining with 6 probes

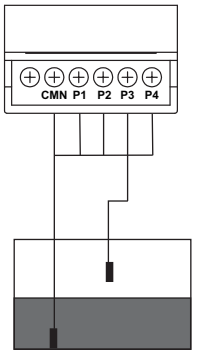


Note :- In case of DOL starter connection with LLC, Connect 15 & 18 nos of Liquid level controller to 93 & 95 nos. of DOL Starter respectively

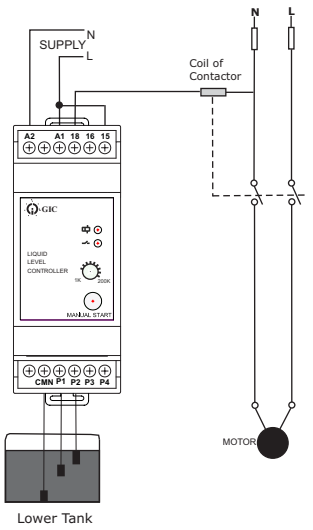
Filling Control (One Tank Monitoring with 3 probes)



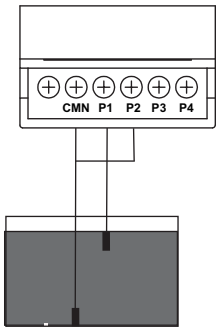
Filling Control (Single level Monitoring with two probes)



Draining Control (One Tank Monitoring with 3 probes)

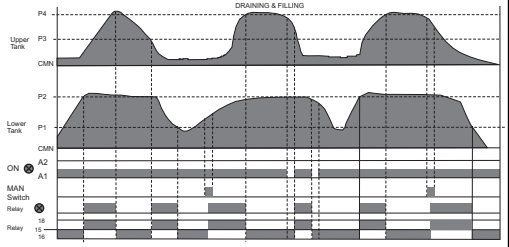


Draining Control (Single level Monitoring with two probes)



Simultaneous Filling & Draining Control:

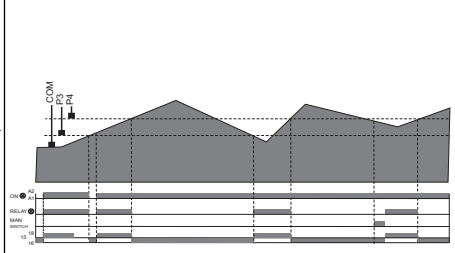
The system starts up whenever the upper tank requires liquid and the lower tank has sufficient level to supply it, and it stops when the liquid reaches its maximum level in the upper tank or if the Lower tank reaches its minimum level. If all Probes are non conducting then Relay is "OFF". If Liquid level reached to "P1" probe then relay will be OFF (maintains previous state). When liquid reached to "P2" probe then relay will be switched ON (As liquid level reached to Maximum level of Lower tank.) Now Filling of Upper tank will start. When liquid level reaches to "P3" probe relay will be ON (Maintains previous state). Now when liquid level reaches to "P4" probe relay will be switched "OFF" (As Liquid level reaches to maximum level of Upper tank). Now if Liquid level of upper tank is decreasing and it goes below "P4" probe then relay will be "OFF" (Maintains previous state), But when it falls below "P3" level then relay will be switched "ON" till liquid level is more than "P1" probe (i.e. till there is enough liquid in upper tank).



P1	P2	P3	P4	Relay & RED LED Indication
OUT	OUT	OUT	OUT	OFF
IN	OUT	OUT	OUT	OFF
IN	IN	OUT	OUT	ON
IN	IN	IN	OUT	ON
IN	IN	IN	IN	OFF
IN	IN	IN	OUT	OFF
IN	IN	OUT	OUT	ON
IN	OUT	OUT	OUT	ON
OUT	OUT	OUT	OUT	OFF

Filling Control (One Tank Monitoring with 3 probes):

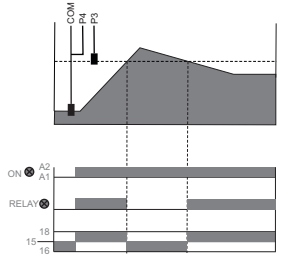
When the level in the tank drops below the low level probe, the relay energies. The relay then remains energized until the level reaches the high level probe. As soon as the high level probe becomes submerged, the relay DE-energizes and remains off until the level has dropped sufficiently below the low level probe. When "P3" & "P4" are non conducting i.e. tank is empty, Relay is "ON". Whenever water level reaches to"P3" probe then also relay will be ON (Maintains previous state of relay). But when water level touched to the "P4" probe then relay will be switched "OFF" (As Liquid reached to maximum level). Now again when water level is decreasing below "P4" level then relay will be switched "OFF"(Maintains previous state of relay). When water level reaches below "P3" then relay will be switched "ON" (As Liquid reached to minimum level).



P3	P4	Relay & RED LED Indication
OUT	OUT	ON
IN	OUT	ON
IN	IN	OFF
IN	OUT	OFF
OUT	OUT	ON

Filling Control (One Tank Monitoring with two probes):

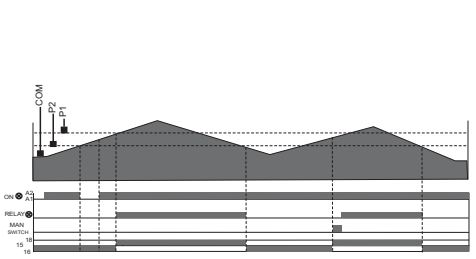
The output relay switches "ON" which starts up the relay when the Minimum level probe "P3" is no longer in contact with the liquid and switches "OFF" when the liquid reaches the "P3". **This operation is not recommended for pump controlling.**



P3	Relay & RED LED Indication
OUT	ON
IN	OFF

Draining Control (One Tank Monitoring 3 probes):

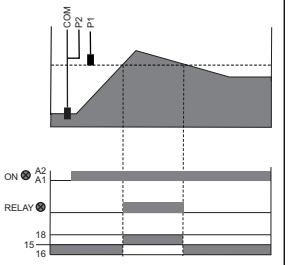
When the level in the tank rises sufficiently to submerge the high level probe, the relay energizes. The relay then remains energized until the level has dropped below the low level probe. As the liquid drops below the low level probe, the relay DE-energizes and remains off until the level has risen sufficiently to submerge the high level probe. When "P1" & "P2" are non conducting i.e. tank is empty, Relay is "OFF". Whenever water level reaches to "P1" probe then also relay will be "OFF" (Maintains previous state of relay). But when water level touched to the "P2" probe then relay will be switched "ON" (As Liquid reached to maximum level). Now again when water level is decreasing below "P2" level then relay will remain switched "ON" (Maintains previous state of relay). When water level reaches below "P1" then relay will be switched "OFF" (As Liquid reached to minimum level).



P1	P2	Relay & RED LED Indication
OUT	OUT	OFF
IN	OUT	OFF
IN	IN	ON
IN	OUT	ON
OUT	OUT	OFF

Draining Control (One Tank Monitoring 2 Probes):

The output relay switches ON which starts up the relay, when liquid level goes above a maximum level, fixed by the probe "P1", When the level drops below a "P1" probe, relay switches "OFF" which stops the relay. **This operation is not recommended for pump controlling.**



P1	Relay & RED LED Indication
OUT	OFF
IN	ON

NOTE:

P1,P3	Lower level probes
P2,P4	Upper level probes
IN	Probe is conducting
OUT	Probe is not conducting