



Description

Water Analytics manufactures four models of liquid level controllers to satisfy most industrial applications. These controllers operate on the principle of electrolytic conductivity in liquids. A built-in sensitivity adjustment permits field tuning the instrument so that one model is suitable for most conductivity liquids. For instance the LL4 or LL7 may be adjusted to respond to either foam or liquid. Some controllers may be as far as 300 meters from the electrodes, and connections are made with unshielded cable.

The AquaMetrix design limits the voltage at the electrodes to 18 volts, and also limits the current even if electrodes are shorted. Some competitive controllers may require as much as 500 volts across the electrodes.

A variety of electrode holders are available. Model LP, which accepts 1/4" threaded electrodes, is suitable for high pressure applications. It is available to hold 1, 2 or 3 electrodes. The economical model LR may be used in applications up to 95 psi. It accepts unthreaded 1/4" rod and has the added advantage of permitting easy adjustment of the electrode length. Other fittings accommodating up to 5 electrodes are also offered.

MODEL LL4

This model has one normally open and one normally closed contact (form C) rated at 10A resistive. It is suitable for single level service with high or low alarm; or differential service pump up or pump down. It is housed in an ABS plastic enclosure with exposed terminals, or mounted in a NEMA 1 or NEMA 4X enclosure.

MODEL LL7 and LL7H

These units have the added feature of an auxiliary pair of normally open contacts for use with an annunciator or other device. The LL7 version is suitable for most industrial applications. The LL7H has much greater sensitivity and is specifically designed for use with low conductivity liquids.

MODEL LLW

This model has several features not normally found in liquid level controllers. It is housed in a self-contained NEMA1 plug-in enclosure. The base is mounted and wired and then the cover containing the electronics is plugged in and secured with two screws. It has two LED's which indicate power on and relay status. A switch allows manual or automatic operation of the controlled device. It has an auxiliary set of Form C contacts. Fail-safe operation can be achieved by field selection of "Direct" or "Inverse" operation.

Features

- Ideal for applications where the controller is mounted remotely, up to 300' from the electrodes
- Built-in sensitivity adjustment for foam or liquid applications
- Safety Low voltage at the electrodes
- Custom electrode lengths available
- Model LL7H for use with low conductivity liquids

Applications

- Waste water flow accumulation
- Water Treatment systems
- Irrigation
- Chemical Mixing
- Process cooling systems
- Neutralization Systems
- Process flow control
- Filtration systems

Model LL4, LL7 and LLW Liquid Level Controllers

Specifications and Ordering Information

Controllers

	Model LL4	Model LL7	Model LL7H	Model LLW
Power Supply	115 V + 15% -10%			
Standard Housing	Open Terminals			Plug-In NEMA 1
Optional Housing	NEMA 1 or 4X			None
Contacts	DPDT Form C 10A resistive 120 Vac 1/3 HP			
Auxilliary Contacts	None	Form A 10A res	Form A 10A res	Form C 10A res
Max. Interconnected Length	100 meters		300 meters	
Sensing Circuit Resistance	10 kΩ maximum		1 MΩ maximum	
Auto/Off/Main Switch	No			Yes
Indicating LED's	No			Yes

Electrode Holders

	LP1	LP2	LP3	LR*	LR5
No. Electrodes	1	2	3	1	5
Fitting Size NPT	3/8"	1 1/2"	1 1/2"	1/4"	2"
Materials	304 SS, Teflon			Polypropylene	PVC, Epoxy
Rating	100 psi steam			95 psi @ 100 C	

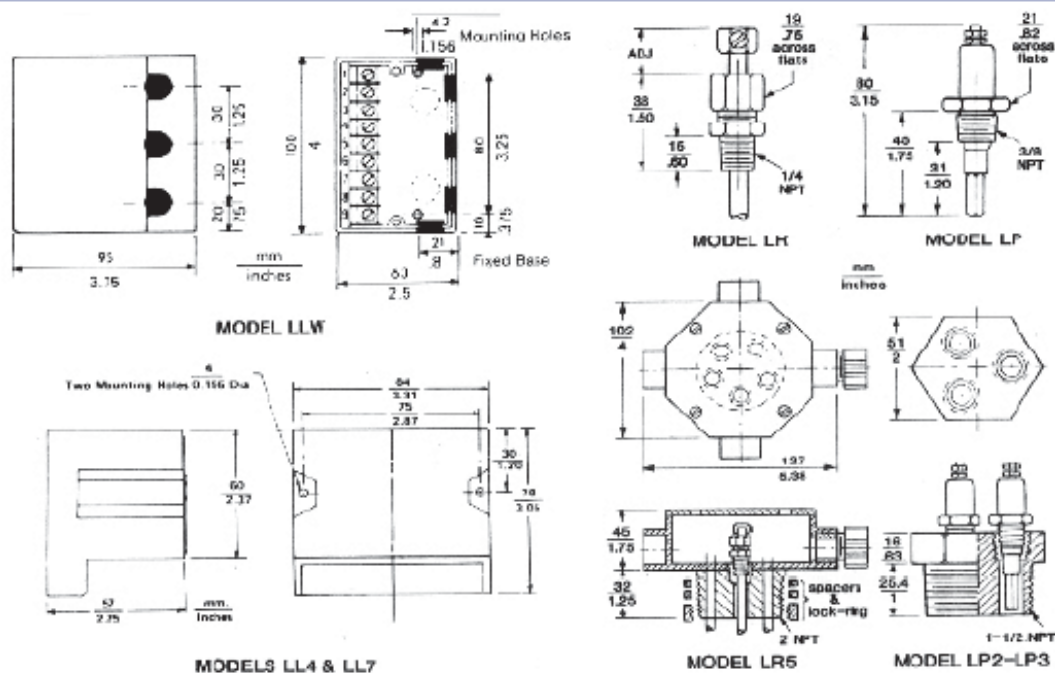
*Type LR is supplied as a kit comprising special compression fitting and electrode terminal.

Electrodes

	Type 316 1/4" diameter stainless steel. Available in four standard lengths. Custom cut and PVC coated electrodes are available
Type EP	For LP Holder, threaded one end. Field cut to suit EP-1 – 1ft EP-2 – 2ft EP-3 – 3ft EP-4 – 4ft
Type ER	For LR Holder. Immersed length is field adjustable. ER-1 – 1ft ER-2 – 2ft ER-3 – 3ft ER-4 – 4ft

Interconnect Cable Part No. A42-8. Four conductor cable dressed both ends. Order length required.

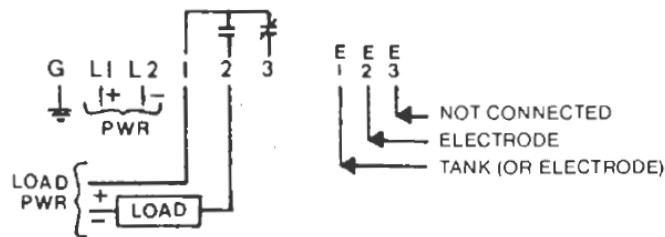
Dimensions



Model LL4 and LL7 External Wiring Diagrams

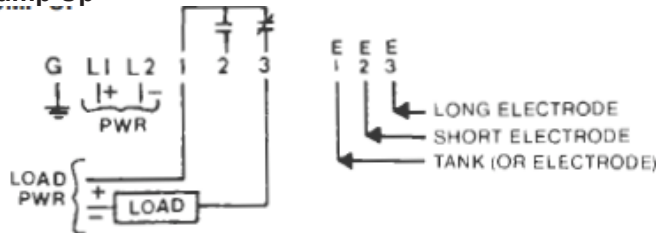
LL4

Single Level Service High Alarm or Low Level Cutoff



Normally open load contacts 1-2 close when liquid reaches electrode and open when liquid falls below electrode.

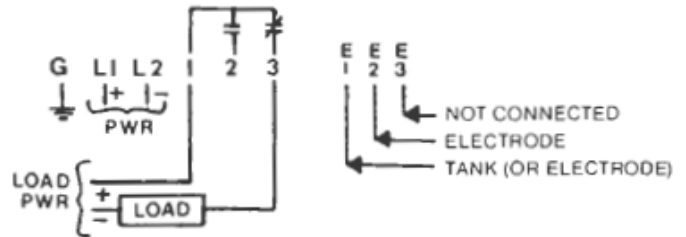
Differential Level Service Pump Up



Normally closed contacts 1-3 open when liquid rises to short electrode connected to E2 and close when liquid falls below long electrode connected to E3.

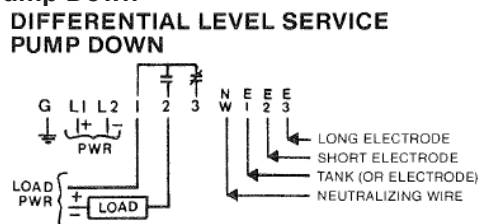
Connect E1 to tank if metallic and grounded. For ungrounded tank connect a third electrode, which must always be immersed in liquid, to E1.

Single Level Service Low Alarm or High Level Cutoff



Normally closed contacts 1-3 open when liquid reaches electrode and close when liquid falls below electrode.

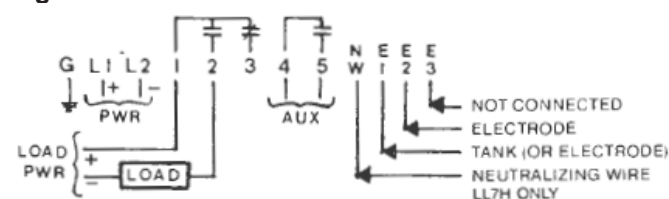
Differential Level Service Pump Down



Normally open load contacts 1-2 close when liquid rises to short electrode connected to E2 and open when liquid falls below long electrode connected to E3.

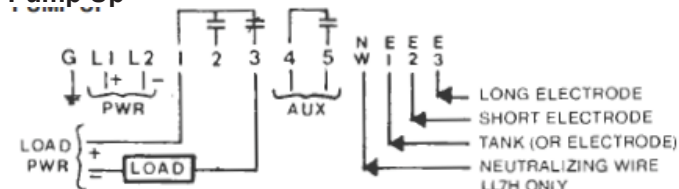
LL7 and LL7H

Single Level Service High Alarm or Low Level Cutoff



When liquid reaches electrode connected to E2, normally open contacts 1-2 close and N.O. auxiliary contacts 4-5 close. When liquid falls below electrode, load contacts 1-3 open and auxiliary contacts 4-5 open.

Differential Level Service Pump Up

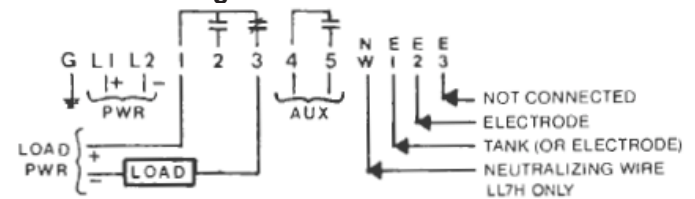


When liquid rises to short electrode connected to E2, normally closed contacts 1-3 open and N.O. auxiliary contacts 4-5 close. When liquid falls below long electrode connected to E3, load contacts 1-3 close and auxiliary contacts 4-5 open.

Connect E1 to tank if metallic and grounded. For ungrounded tank connect a second electrode, which must always be immersed in liquid, to E1.

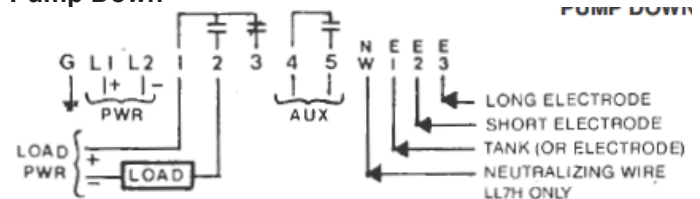
LL7H ONLY; Terminal NW is used to neutralize capacitance effect of cable. If controller is more than 20 meters from tank use a three conductor cable and connect a one wire to NW and leave unconnected at tank. Do not use the shield for this purpose.

Single Level Service Low Alarm or High Level Cutoff



When liquid reaches electrode connected to E2, normally closed contacts 1-3 open and N.O. auxiliary contacts 4-5 close. When liquid falls below electrode, load contacts 1-3 open and auxiliary contacts 4-5 open.

Differential Level Service Pump Down

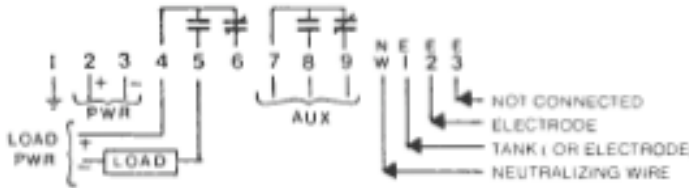


When liquid rises to short electrode connected to E2, normally open contacts 1-2 close and N.O. auxiliary contacts 4-5 close. When liquid falls below long electrode connected to E3, load contacts 1-2 open and auxiliary contacts 4-5 open.

Model LL4 and LL7 External Wiring Diagrams

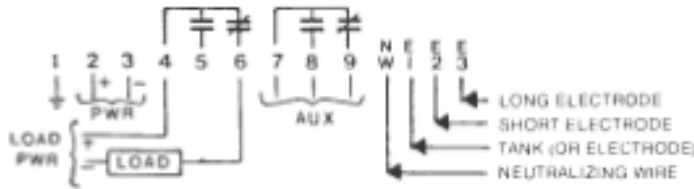
LLW

Single Level Service High Alarm Or Low Level Cutoff



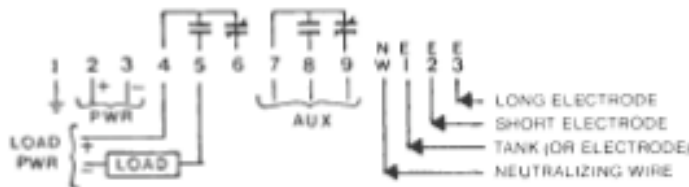
With switch in AUTO position, normally open load contacts 4-5 close when liquid reaches electrode connected to E2; auxiliary Form C contacts 7-8 close while 7-9 open. When liquid falls below electrode, load contacts 4-5 open; auxiliary contacts 7-8 open while 7-9 close.

Differential Level Service Pump Up Direct Action



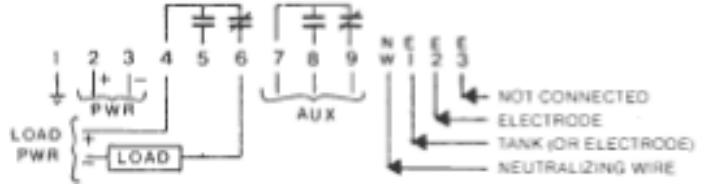
With switch in AUTO position, normally closed load contacts 4-6 open when liquid rises to short electrode connected to E2; auxiliary Form C contacts 7-8 close while 7-9 open. When liquid falls below long electrode connected to E3, load contacts 4-6 close; auxiliary contacts 7-8 open while 7-9 close. On loss of controller power load remains energized (pump continues to run). See note.

Differential Level Service Pump Up Inverse Action



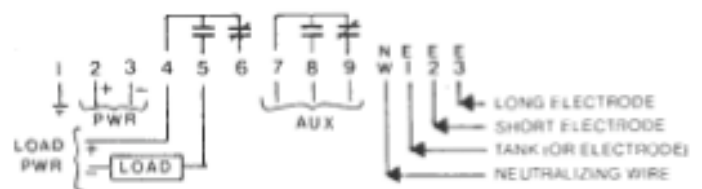
With switch in AUTO position, normally open load contacts 4-5 close when power is applied to controller. When liquid rises to short electrode connected to E2, load contacts 4-5 open; auxiliary Form C contacts 7-8 open while 7-9 close. When liquid falls below long electrode connected to E3, load contacts 4-5 close; auxiliary contacts 7-8 close while 7-9 open. On loss of controller power load is de-energized (pump stops). See note.

Single Level Service Low Alarm Or High Level Cutoff



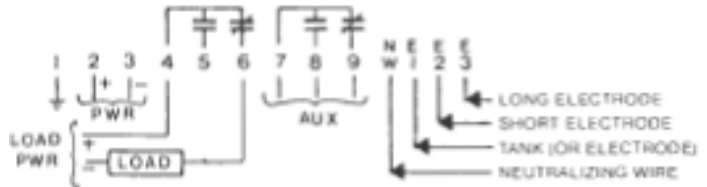
With switch in AUTO position, normally closed load contacts 4-6 open when liquid reaches electrode connected to E2; auxiliary Form C contacts 7-8 close while 7-9 open. When liquid falls below electrode, load contacts 4-6 close; auxiliary contacts 7-8 open while 7-9 close.

Differential Level Service Pump Down Direct Action



With switch in AUTO position, normally open load contacts 4-5 close when liquid rises to short electrode connected to E2; auxiliary Form C contacts 7-8 close while 7-9 open. When liquid falls below long electrode connected to E3, load contacts 4-5 open; auxiliary contacts 7-8 open while 7-9 close. On loss of controller power load is de-energized (pump stops). See note.

Differential Level Service Pump Down Inverse Action



With switch in AUTO position, normally closed load contacts 4-6 open when power is applied to controller. When liquid rises to short electrode connected to E2, load contacts 4-6 close; auxiliary Form C contacts 7-8 open while 7-9 close. When liquid falls below long electrode connected to E3, load contacts 4-6 open; auxiliary contacts 7-8 close while 7-9 open. On loss of controller power load is energized (pump continues to run). See note.

Connect E1 to tank if metallic and grounded. For ungrounded tank connect a third electrode, which must always be immersed in liquid, to E1.

Terminal NW is used to neutralize capacitance effect of cable. If controller is more than 20 meters from tank use a three conductor cable and connect a one wire to NW and leave unconnected at tank. Do not use the shield for this purpose.

NOTE: All LLW units are shipped from factory in the "Direct Action" configuration, (unless specifically order for "Inverse Action") but may be easily converted in the field to "Inverse Action".