

SECTION L

LEVEL PROBE METER LPM1

Revision Date: 7-22-24

Description

The logic in the Level Probe Meter LPM1 counts the number of the Electrodes E1 - E10 on the Level Probe that are covered by liquid and using the Electrode Spacing (Parameter P.27) and determines the wet well level in feet and tenths of feet. For the calculated level at each of the Level Probe's Electrodes see page L-4.

The value of the Level Probe Meter LPM1, is always available to SCADA as Parameter LPd.1 at Modbus Register 42142, even if the Level Probe Meter is not selected on the Level Input Select (Parameter P.22).

When the Level Probe Meter LPM1 is selected as the Level Input (Parameter P.22 = 2), the level from the Level Probe Meter will be shown on the Numerical Display on the front of the Controller and it will be used for all Pump Control and Level Alarms. The value of Parameter LPd.1 will also be copied into Parameter Ld.11 and made available to SCADA at Modbus Register 40011. Both Parameters LPd.1 and Ld.11 show the simulated value for level while Level Simulation is being performed.

When the Level Input Select (Parameter P.22) is not set to select the Level Probe Meter LPM1 as the Level Input, the Level Probe inputs may then be used for LEVEL PROBE BACKUP. See Section N.

The Level Probe Meter LPM1 requires a Level Probe having 10 Electrodes to be connected to the ten Level Probe Inputs E1 - E10. See the Level Probe Connection Example on page L-5.

When a Level Probe Electrode is not covered by the liquid (out of the liquid), then the Level Probe Input's Test Signal has no path to Control Panel Ground, and the Input is considered Open.

When a Level Probe Electrode is covered by the liquid, then the Level Probe Input's Test Signal does have a path to Control Panel Ground, and the Input is considered Closed.

The liquid being measured must be grounded to the Control Panel Ground.

The Status of the Test Signals for each of the Level Probe Inputs (as an analog value) may be viewed from Parameters L.01 - L.10. The status of the Level Probe Inputs (as a discrete value) may be viewed from Parameters n.21 - n.30. See page L-2.

Please note that the Level Probe Inputs are designed to read sewage very effectively but will not reliably read storm water or well water.

Sensitivity

The Sensitivity of the Level Probe Inputs can be changed on Parameter P.28.

The Standard Sensitivity (the default) setting is 100 which is the best setting for reading typical sewage.

For extra sensitivity while reading light sewage it should be changed to 150 or higher.

User / Operator Info.			SCADA	Description of Parameters and SCADA Notes
Parameter	Default Value	Current Value	Register Address	
Level Probe Meter LPM1 - Setup Parameters				
P.27	12 in.		40127	Level Probe Electrode Spacing 3 - 24 inches
P.28	100		40128	Level Probe Input Sensitivity 100 = Standard Sensitivity 150 = Extra Sensitive Range: 90 - 210
Level Probe Meter LPM1 - Data				
LPd.1	-	-	42142	Level Probe Meter LPM1 - Scaled into feet and 1/10 feet Note: For Parameter LPd.1 to read correctly the Level Probe Meter Electrode Spacing (Parameter P.27) must be set for the Electrode spacing of the Level Probe, in inches.
Ld.11	-	-	40011	Wet Well Level - Scaled into feet. Note: With the Level Input Select (Parameter P.22) set on "2", Parameter Ld.11 will be a copy of Parameter LPd.1.

LEVEL PROBE STATUS

Parameter	Coil Address	Description of Parameters and SCADA Notes	
Level Probe Input - Discrete Status			
n.21	Coil 583	Electrode - E1	Level Probe Input Status: 0 = Input Open 1 = Input Closed
n.22	Coil 584	Electrode - E2	
n.23	Coil 585	Electrode - E3	
n.24	Coil 586	Electrode - E4	
n.25	Coil 587	Electrode - E5	
n.26	Coil 588	Electrode - E6	
n.27	Coil 589	Electrode - E7	
n.28	Coil 590	Electrode - E8	
n.29	Coil 591	Electrode - E9	
n.30	Coil 592	Electrode - E10	

Parameter	Register Address	Description of Parameters and SCADA Notes	
Level Probe Input - Analog Status			
L.01	41801	Electrode - E1	<p>Notes:</p> <ol style="list-style-type: none">Each of the Discrete Inputs send out a low voltage (+/- 6 V), low current (0.6 mA), AC (60Hz) square wave as a Test Signal to determine the status of the input, either Open or Closed. The Status of the Test Signals for each of the Discrete Input (as an analog value) may be viewed from Parameters L.01 - L.10.The Controller compares each of the Test Signal analog values with the Level Probe Input Sensitivity set on Parameter P.28. The Discrete Input is considered to be: <div>Open - When the Test Signal is above the Sensitivity setting.</div><div>Closed - When the Test Signal is below the Sensitivity setting.</div>The status of all the Level Probe Inputs as a discrete value may also be read by SCADA. See below.
L.02	41802	Electrode - E2	
L.03	41803	Electrode - E3	
L.04	41804	Electrode - E4	
L.05	41805	Electrode - E5	
L.06	41806	Electrode - E6	
L.07	41807	Electrode - E7	
L.08	41808	Electrode - E8	
L.09	41809	Electrode - E9	
L.10	41810	Electrode - E10	
L.11	41811	Clock Signal for Level Probe Inputs: E1 - E10	

Register Address	Description of Register Contents (Where a Modbus Coil is represented by a Bit in a Register)																
40037	592	591	590	589	588	587	586	585	584	583	582	581	580	579	578	577	Coil
	Level Probe Electrode E10 Status	Level Probe Electrode E9 Status	Level Probe Electrode E8 Status	Level Probe Electrode E7 Status	Level Probe Electrode E6 Status	Level Probe Electrode E5 Status	Level Probe Electrode E4 Status	Level Probe Electrode E3 Status	Level Probe Electrode E2 Status	Level Probe Electrode E1 Status	Level Probe Fault Status Electrode Out of Sequence						
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit

LEVEL PROBE FAULTS

When one of the Level Probe Electrodes is covered by liquid Out of Sequence the FAULT LED on the Controller will be turned on and a Fault Code will be generated.

The Fault Code may be viewed from Parameter FLC in the menu.

The Electrode Out of Sequence Fault Codes (1001 - 1009) may be reset by pressing the down push-button while viewing Parameter FLC, or by cycling the electrical power to the Controller.

When an Electrode is covered Out of Sequence SCADA Modbus Coil 582 (Register 40037 Bit 5) will be set.

FAULT CODE TABLE

Fault Code	Description of Condition
0	Normal
Level Probe Fault	
1001	Level Probe Fault - Electrodes Covered Out of Sequence - Electrode 1 Covered before Electrode 2
1002	Level Probe Fault - Electrodes Covered Out of Sequence - Electrode 2 Covered before Electrode 3
1003	Level Probe Fault - Electrodes Covered Out of Sequence - Electrode 3 Covered before Electrode 4
1004	Level Probe Fault - Electrodes Covered Out of Sequence - Electrode 4 Covered before Electrode 5
1005	Level Probe Fault - Electrodes Covered Out of Sequence - Electrode 5 Covered before Electrode 6
1006	Level Probe Fault - Electrodes Covered Out of Sequence - Electrode 6 Covered before Electrode 7
1007	Level Probe Fault - Electrodes Covered Out of Sequence - Electrode 7 Covered before Electrode 8
1008	Level Probe Fault - Electrodes Covered Out of Sequence - Electrode 8 Covered before Electrode 9
1009	Level Probe Fault - Electrodes Covered Out of Sequence - Electrode 9 Covered before Electrode 10

LEVEL PROBE ELECTRODE SPACING

ELECTRODE SPACING - PARAMETER P.27

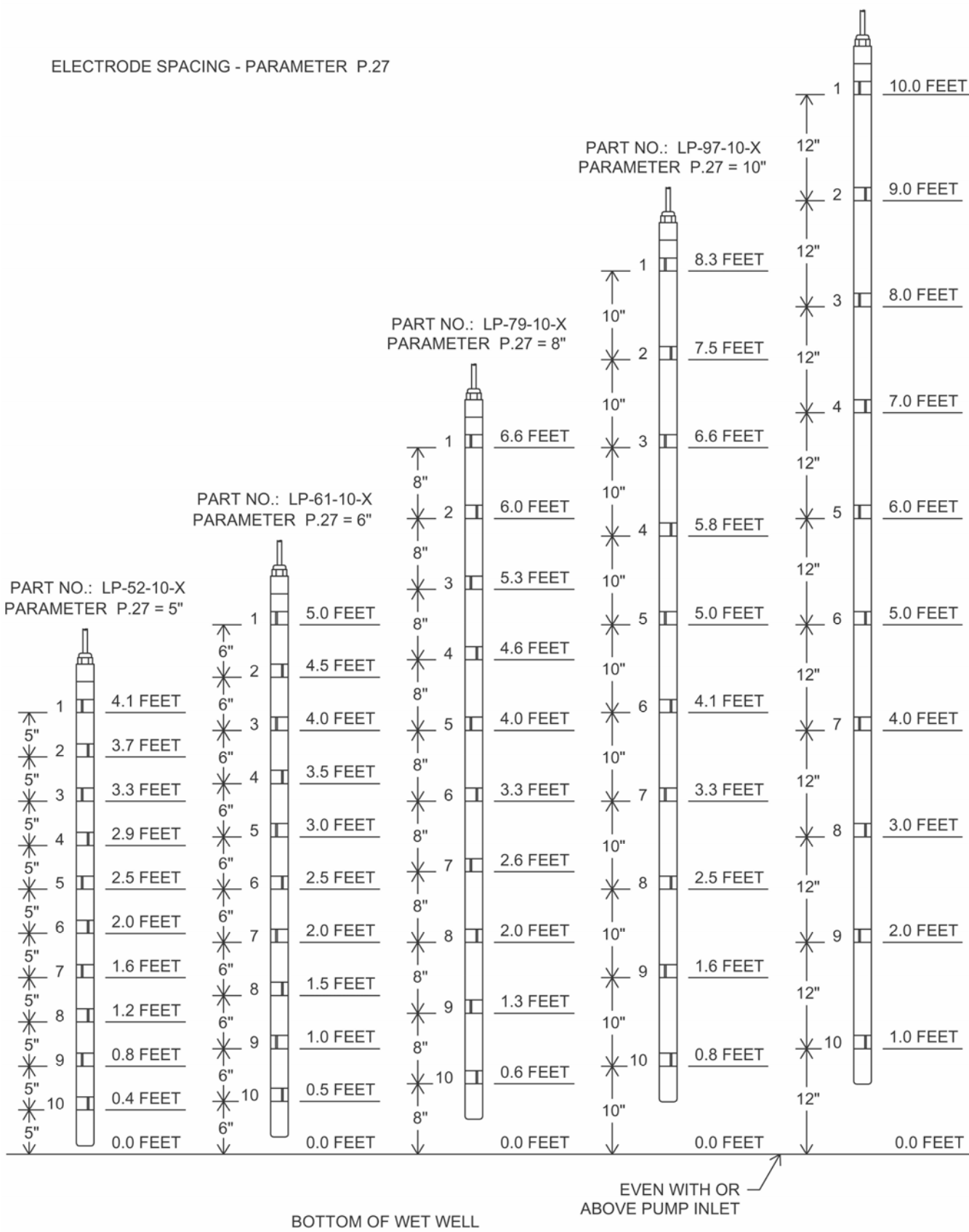
PART NO.: LP-115-10-X
PARAMETER P.27 = 12"

PART NO.: LP-97-10-X
PARAMETER P.27 = 10"

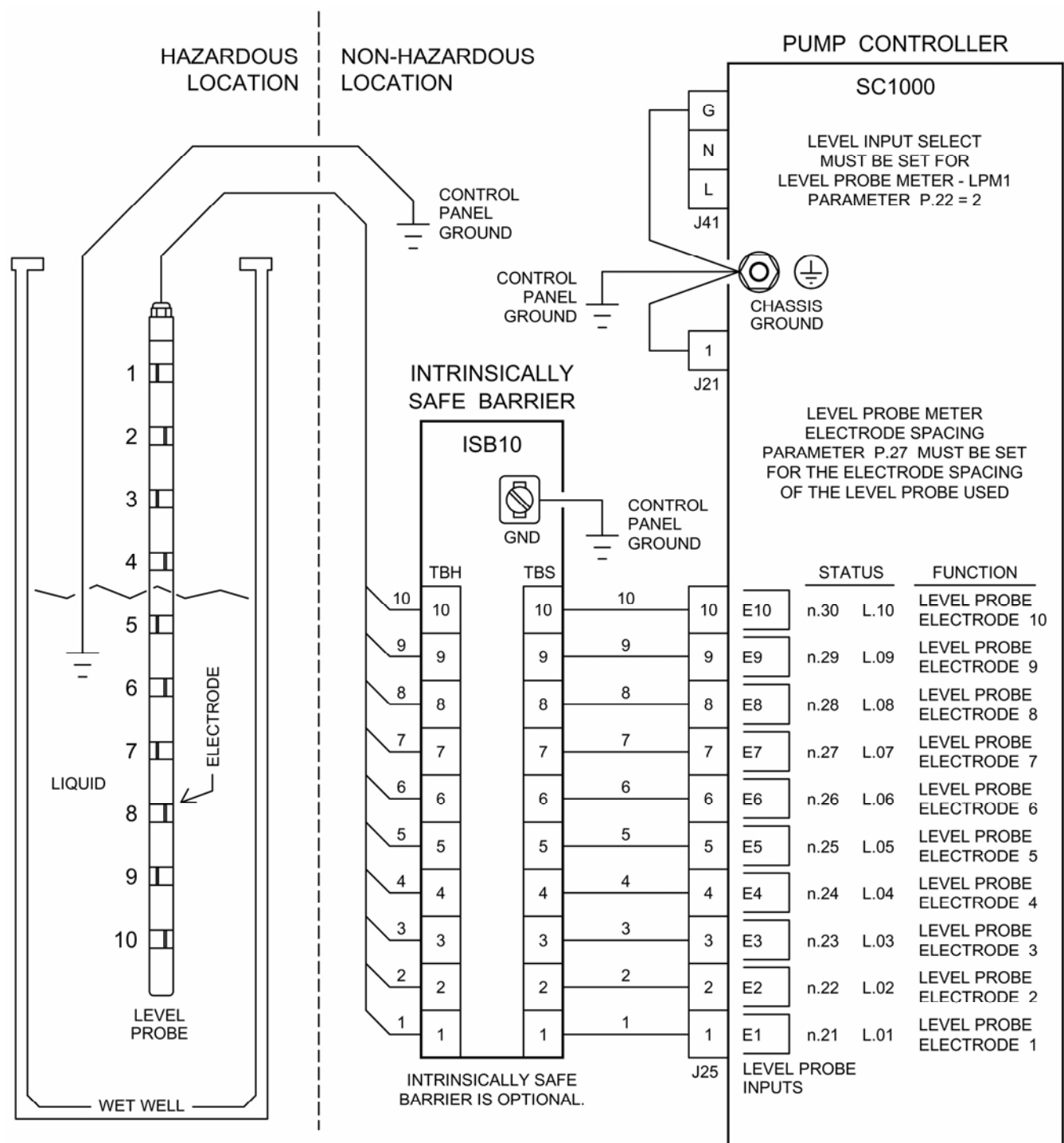
PART NO.: LP-79-10-X
PARAMETER P.27 = 8"

PART NO.: LP-61-10-X
PARAMETER P.27 = 6"

PART NO.: LP-52-10-X
PARAMETER P.27 = 5"



LEVEL PROBE CONNECTION EXAMPLE



Note:
The liquid in the wet well must be grounded to the control panel ground.
Where a submersible pump is present the grounded housing of the pump is sufficient to ground the water to the control panel.