CURTIS® MODEL 909
"Fuel" Gauge

CURTIS INSTRUMENTS, INC.
200 Kisco Ave.
Mount Kisco, New York 10549
914-666-2971
www.curtisinstruments.com

53092 Rev B 3/18

Read Instructions Carefully!

SAFETY INSTRUCTIONS

This instrument was manufactured and tested according to the applicable technical standards. It complies with all the safety regulations as shipped from the factory.

Installation and startup must be performed by skilled personnel.

Failure to install and operate the unit in accordance with these instructions may result in damage or injury.

If safe operation of the instrument can no longer be ensured, stop and secure it against accidental operation.

If instrument failure or malfunction may cause personal injury or material damage, use additional safety measures such as limit switches, guards, etc.

Read the Operating Instructions carefully before startup.

Note the safety instructions marked with this warning symbol in this manual!

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1. MODEL ENCODEMENT

Example: Model 909 R 3648 B N O -0001

❶		❸	❺
Case Style		Backlight	Logo
	Voltage ❷	Buzzer ❹	Sequential Number ❻

❶ **Case Style Options:**
R = Round (52mm)

❷ **Voltage Options:**

36 V	48 V	60 V
27 V	36 V	45 V
27 V	36/48 V	60 V

❸ **Backlight Options**
B = Backlit
N = No Backlight

❹ **Buzzer Options**
B = With Buzzer
N = No Buzzer

❺ **Logo Options**
O = Curtis Logo
N = No Logo

2. TECHNICAL SPECIFICATIONS

2.1 Electrical Operating Voltages and Currents:

Signal Name	Min	Nom	Max
B++ (48 V)	36 V	48 V	60 V
B+ (36 V)	27 V	36 V	45 V
Keyswitch	27 V	36/48 V	60 V

	36 V Input		48 V Input	
Signal Name	Typical (mA)	Max. (mA)	Typical (mA)	Max. (mA)
B++ (48 V)	N/A	N/A	17	28
B+ (36 V)	16	28	N/A	N/A
Keyswitch	375	570	270	425

2.2 Mechanical

Display
Monochrome LCD, leading digit is “1” when illuminated, 2 following digits are seven segments to display the numbers 0 through 9. Digit height is 15 mm.

Hardware Kit
Mounting bracket and gasket.

Panel Cutout
52 mm, $2\frac{1}{16}$” diameter

Mating Connector
Housing: 794821-1
Terminal (18 – 24 AWG): 770904-X
Wire Seal: 794758-1
Interface Seal: 794758-1

2.3 Environmental

Temperature

Operating: –40°C to +85°C
Storage: –40°C to +85°C

Humidity

Soak: Designed to meet EN 60068-2-78.
Test Cab: Damp Heat, Steady State, 10 days at 93 % RH (±3 %), 30°C.

Cyclic: Designed to meet EN 60068-2-30.
Test Db: Damp Heat, Cyclic (12 hr + 12 hr cycle). Test method variant 1. Six cycles (each cycle is 24 hrs.), 90 % RH

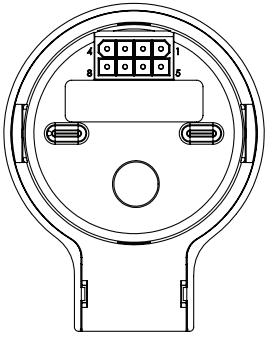
Shock and Vibration

Shock: Designed to meet EN 60068-2-27: 3 shocks in all 3 axes in both directions (18 shocks in total), 500 m/s², 11 ms, half sine wave.

Vibration: Designed to meet EN 60068-2-6, Swept Sine Wave method, Section 8.2, 5g, 20 cycles in each plane, 5 to 500 Hz, 1 Octave/min. Amplitude = +/– 15 mm; Amplitude < +/- 15 mm Acceleration = 5g.

3. INSTALLATION

The Model 909 fits into a dash-panel cutout measuring 2 1/16" (52 mm).

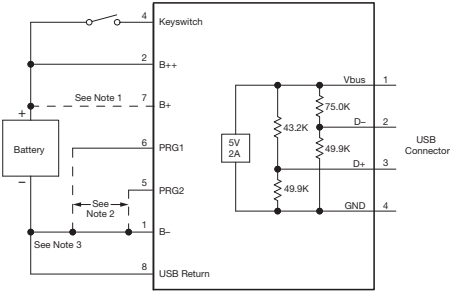


CURTIS Model 909 Rear View

Terminal Assignments

Pin	Signal Name	Description
1	B–	Common
2	B++	High Voltage B+
3	N.C.	
4	Keyswitch	
5	PRG2	BDI profile select
6	PRG1	BDI profile select
7	B+	Low Voltage B+
8	USB Return	

4. WIRING DIAGRAM



Wiring Diagram, cont'd

Note 1: For 48V System, connect B+ to Pin 2 (B++); for 36V System, connect B+ to Pin 7 (B+).

Note 2: Connect PRG 1 & PRG 2 for desired BDI Reset & Discharge Profile, per Section 5.

Note 3: For optimal BDI accuracy, B+ (Pin 2 or 7) & B– (Pin 1) should be wired directly to the Battery Terminals and a separate wire run from USB Return (Pin 8) back to B– (Pin 1).

5. OPERATION

Display

The 909R is a combination BDI gage with a USB port for charging smart phones, tablets etc. for the golf aftermarket.

The design uses the isolated 1415 circuitry to fulfill the USB charger function. The 906-like BSoC code is used to display Battery State of Charge as a numerical percentage on a, monochrome, backlit, LCD. The BSoC is continuously calculated while the unit is powered, regardless of the Keyswitch status; it is stored in internal memory on power down and retrieved on next power-up. The display and USB charging function are disabled with Keyswitch off.

The electronics are housed in a 52 mm, round, case (similar to an e2) with an appendage that houses a USB port on the circumference of the bezel. The face of the gage is a PMMA lens covered with an overlay, similar to an e2. The rear of the case includes an integral molded AMP connector and an aperture for an audible buzzer.

Display cont'd

A slide-on mounting bracket, similar to the e2, was designed, as well as a new panel gasket with an integral, molded, USB port plug to reduce the likelihood of water ingress. The LCD is a monochrome, single-line, 2 – ½ digit, seven segment, direct-drive with a 15 mm digit height. It is backlit, and a heater is not required as it is direct driven.

Four programmable charge/discharge profiles are available and can be selected using external pins PRG1 and PRG2.

PRG1	PRG2	Reset Profile	Discharge Profile
Open	Open	B	N
Open	B–	N	G
B–	Open	B	G
B–	B–	N	M

Discharge Profile Options:

Letter Code	Volts Per Cell	
	Full	Empty
G	1.97	1.75
M	2.00	1.83
N	2.04	1.73

Reset Profile Options:

Letter Code	Volts Per Cell		
	Open Circuit Reset	Charge Tracking Reset Full	Charge Tracking Reset Empty
B	2.090	2.35	2.10
N	1.980	2.230	2.10

6. TROUBLESHOOTING

The following checklist should help you troubleshoot any problem with Model 909.

Problem	Possible Cause
No display	Terminals not connected or improper voltage
Stays at FULL	Instrument voltage does not match battery voltage; B+ connected to the wrong terminal (see page 11)
Will not reset	Instrument voltage does not match battery voltage or battery not fully charged
Reset without charging battery	Not connected directly to battery terminals
EMPTY too soon	B+ connected to wrong terminal, or instrument voltage does not match battery voltage, or terminals not connected directly to battery

7. MAINTENANCE

Curtis Model 909 series is not field serviceable. Return defective units to your distributor for warranty coverage.

8. WARRANTY

Curtis Instruments' products and/or components are guaranteed against defects in workmanship and material for a period of one year, or as defined in the individual product literature, from date of shipment from our factory, when applied in a proper application within specified ratings. This guarantee is limited to repair or replacement F.O.B. our factory. There is no further warranty or implied representation, guarantee, promise or agreement as to any Curtis Instruments product and/or component. Curtis Instruments, Inc., cannot assume responsibility or accept invoices for unauthorized repairs to its products and/or components, even though defective. In no case will Curtis Instruments' responsibility extend to products, components or equipment not of its manufacture. Under no circumstances shall Curtis Instruments, Inc., be liable for any special or consequential damages or loss of profits or other damages. Returned goods will not be accepted unless identified by a Curtis Return Material Authorization (RMA).

All specifications are subject to change without notice.