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**CURTIS<sup>®</sup>** MODEL 803  
"FUEL" GAUGE/HOUR METER



53002 REV E 3/13



**Read Instructions Carefully !**

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# 1. MODEL ENCODEMENT

**803RB**

**vvvv**

*Voltage*

12

24

1224

2436

2448

3648

7280

**w**

*Reset level*

(See page 17)

**x**

*Discharge profile*

C = Adjustable

(See Table 3)

**y**

*Output*

J = N.C. holding relay

Contact rating =

3 Amps

when continuously  
closed, 1 Amp  
when opening

K = N.C. relay

Y = N.O. relay

Contact rating =

1 Amp

**zzzz**

*3zzO*

O = Curtis  
logo





## 2. TECHNICAL SPECIFICATIONS

### 2.1 Electrical

#### Operating Range

± 25% of nominal voltage



			B+ HIGH (Pin 8) Current		B+ LOW (Pin 7) Current	
	Model Voltage	Output Option	I Nominal @B+=Nom	I Maximum @B+=Max	I Nominal @B+=Nom	I Maximum @B+=Max
Single Voltage Untis	12V	J	35mA@12V	59mA@15V	N/A	N/A
	24V	K/Y	34mA@24V	53mA@30V	N/A	N/A

			B+ HIGH (Pin 8) Current		B+ LOW (Pin 7) Current	
	Model Voltage	Output Option	I Nominal @B+=Nom	I Maximum @B+=Max	I Nominal @B+=Nom	I Maximum @B+=Max
Dual Voltage Untis	12/24V	G/Z	26mA@24V	39mA@30V	61mA@12V	120mA@15V
	24/36V	J	34mA@36V	48mA@45V	27mA@24V	42mA@30V
	24/36V	K/Y	49mA@36V	67mA@45V	33mA@24V	52mA@30V
	24/48V	J	34mA@48V	48mA@60V	27mA@24V	42mA@30V
	24/48V	K/Y	47mA@48V	64mA@60V	33mA@24V	52mA@30V
	36/48V	J	35mA@48V	48mA@60V	29mA@36V	42mA@45V
	36/48V	K/Y	44mA@48V	60mA@60V	34mA@36V	50mA@45V
	72/80V	J	30mA@80V	40mA@100V	28mA@72V	38mA@90V
	72/80V	K/Y	33mA@80V	45mA@100V	29mA@72V	41mA@90V

## 2.2 Mechanical

### Display

Battery state-of-charge: 10-bar, tri-color LED

Hour Meter: 6-digit LCD, 5mm high

### Resolution

*Hour Meter*

99,999.9 Hours

### Hardware Kit

Mounting bracket, thumbnuts or M4 Hex nuts (2), lock washers (2), mating connector Molex No. 39-01-2085, w/pins No. 39-00-0039, no connectors in bulk shipments.

### Panel Cutout

52mm, 2  $\frac{1}{16}$ " diameter

## 2.3 Environmental



### Temperature

Operating: -40°C to +65°C

Storage: -50°C to +90°C

### Humidity

95% RH (Non Condensing) at 38°C

### Shock & Vibration

2.2 G, 20-200 Hz; 20 minute period; X,Y,Z, 13 cycles each

### 3. INSTALLATION

The Model 803 Installation Kit includes a pre-assembled mating connector with 5" terminated wires.

Ask for Curtis Part Number 15369002.

The Model 803 fits into a dash-panel cutout measuring 2 1/16" (52 mm).

#### Terminal Assignment (see diagram on page 13)

##### **Pin 7 or 8 = Battery +**

**Single voltage models:** Pin 8 to battery +; Pin 7, open.

**Dual voltage models:** When vehicle voltage is the higher voltage of the 2 operating voltages, Pin 8 connects to battery +; Pin 7, open. When vehicle voltage is the lower of the 2 operating voltages, Pin 7 connects to battery +, Pin 8, open.

The discharge indicator uses Pin 7 or 8 for its battery state-of-charge measurements. Connection are to be made as close as possible to battery to prevent voltage drops that will cause errors in discharge indicator readings. The connection is not to be switched by the vehicle's keyswitch.



##### **Pin 5 = Battery -**

Connect to battery ground as close to battery as possible.

##### **Pin 2 = Keyswitch**

The keyswitch turns on and off the LED display of the battery discharge indicator. Monitoring of the battery continues when Pin 2 is turned off and the display is not lit.

The hour meter display is unaffected by Pin 2, although it cannot accumulate more time as long as the keyswitch pin is not energized. The control inputs HRM (+) and HRM (-) are enabled by the keyswitch. Pin 2 is connected to the vehicle's keyswitch.

##### **Pins 1 & 6 = Hour Meter Control**

In normal operation, Pin 1 or 6 is connected and the other is left open. Only one of these pins is connected when using normal hour meter function. It is possible to OR the hour meter between the two inputs so that it accumulates the total time either system is on. Hour meter control logic is detailed in Table 2.



**Pin 6 = Hour Meter +**

HRM (+) (for use with a switched positive voltage)  
 Pin 6 connects to a high voltage as defined in Table 1 to activate the hour meter. Leaving Pin 6 open or connecting it to a low voltage gives control of the hour meter to the Hour Meter (-) input. See Table 2.

**Pin 1 = Hour Meter -**

HRM (-) (for use with a switched ground)  
 Pin 1 connects to a low voltage level as defined in Table 1 to activate the hour meter. Leaving Pin 1 open or connecting it to high voltage gives control of the hour meter to the Hour Meter (+) input.

**Pin 3 = Relay**

Pin 3 connects in series with the lift coil circuit (or the circuit to be switched at empty). For holding relay (J), Pin 3 must be electrically closer to battery + than Pin 4

**Pin 4 = Relay**

Pin 4 also connects in series with the circuit to be switched at empty.

**Table 1. Hour Meter Control Line Specifications**

	Model	HRM				HRM+ & Keyswitch	
		Enabled		Disabled		Enabled	Disabled
		V <sub>L</sub>	Resistance	V <sub>H</sub>	Resistance	V <sub>H</sub>	V <sub>L</sub>
<b>Single Voltage Units</b>	12V	<1.5V	<1.8k0hm	>5V	>6.8k0hm	>8.5V	<2.5V
	24V	<2.3V	<5.5k0hm	>7.5V	>20k0hm	>8.5V	<2.5V
<b>Dual Voltage Units</b>	12/24V	<1.7V	<4.4k0hm	>5.5V	>20k0hm	>8.5V	<2.5V
	24/36V	<2.3V	<5k0hm	>7.5V	>20k0hm	>8.5V	<2.5V
	24/48V	<2.3V	<5k0hm	>7.5V	>20k0hm	>8.5V	<2.5V
	36/48V	<2.3V	<3.2k0hm	>7.5V	>20k0hm	>8.5V	<2.5V
	72/80V	<3.3V	<5.8k0hm	>11V	>20k0hm	>11.5V	<3.5V



## Table 2. Hour Meter Control Logic

Pin 1 (HRM-)	Pin 6 (HRM+)	Hour Meter Status
High	Low	Off
High	Open	Off
Open	Low	Off
Open	Open	Off
Low	High	On
Low	Low	On
Low	Open	On
High	High	On
Open	High	On

## NOTE: Fuses and Wires

Regulations may require that the Model 803 be fused. If installing a fuse, use a 10A fuse wired with 1.5mm or equivalent wire. The voltage drop across the fuse, its holder, and connectors must be less than 1% of the nominal system voltage.

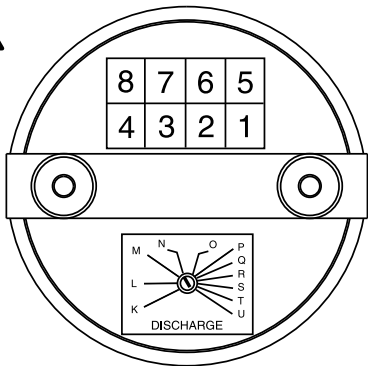


## Discharge Adjustments

Table 3 lists the voltages per cell under load that correspond to an empty indication on the gauge (lockout point).

### Table 3. Discharge Adjustment Settings

Setting	Volt/Cell at Empty
K	1.57
L	1.63
M	1.68
N	1.73 (factory setting)
O	1.78
P	1.82
Q	1.84
R	1.86
S	1.89
T	1.91
U	1.93



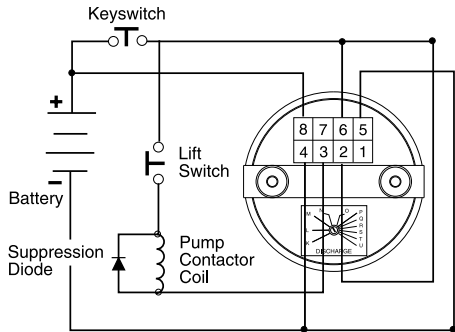
CURTIS Model 803 Rear View

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### Connections for Typical Model 803 Application

Vehicle system voltage is the higher of the two operating voltages of a dual voltage unit. Hour meter measures "keyswitch on" time.



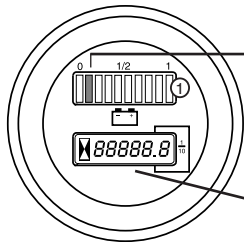
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## 4. OPERATION

### Display

The Curtis Model 803 combines in one instrument a completely solid state LED battery state-of-charge indicator, an LCD hour meter, and lift lockout.

Only when battery is properly charged is right most LED ① lit. As battery's state-of-charge decreases, successive LEDs light up, one at a time.



Here, the LED flashes indicating "energy reserve" (70% discharged).

The left most 2 LEDs flash indicating "empty" (80% depth of discharge). At this point, lift lockout occurs.

**LCD Hour Meter**

### Reset type/level (after or during recharge)

CTR = Charge Tracking Reset

If the gauge is connected to the battery during recharge, the gauge will track the battery charge level.

For standard "B" profile, CTR Full = 2.35 vpc and CTR Empty = 2.10 vpc.

OCR = Open Circuit Reset

If the gauge is disconnected from the battery during recharge, the gauge will retain the last indication. It will advance to full when reconnected only if the battery voltage is above the OCR level. For standard ("B") reset, OCR = 2.09 VPC\*.

\*VPC = volts per cell.



## 5. Troubleshooting

The following checklist should help you to troubleshoot any problems with the instrument.

<b>Problem</b>	<b>Possible Causes</b>
No display	Terminals not connected or improper voltage
Stays at FULL	Instrument voltage does not match battery voltage, B+ connected to the wrong terminal
Will not reset	Instrument voltage does not match battery voltage, or battery not fully charged
Resets w/o 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 directly connected to battery

## 6. Maintenance

Model 803 Series is not serviceable in the field. Units returned to the factory within the warranty period (see inside backcover) will be replaced without charge.

### Notes:

This equipment is intended to be used on battery powered industrial vehicles such as Lift Trucks (Forklifts), Pallet Trucks, and Scrubbers.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

 Direct Current

 Reinforced Insulation

## 7. 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.

## 8. Warranty

Curtis Instruments' products and/or components are guaranteed against defects in workmanship and material for a period of two years, 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.***