CURTIS

CURTIS INSTRUMENTS, INC.
200 Kisco Avenue, Mt. Kisco, NY 10549
Tel. (914) 666-2971 • FAX (914) 666-2188

www.curtisinst.com

53004 REV F 06/02

CURTIS 700/732 SERIES

CE ℝ𝕌

5mm HOUR METERS & COUNTERS

⚠️ **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 A. MODEL ENCODEMENT (except 732)

7uuvw001zxxyy

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7	uu *Function*	v *Case*	w *Reset*	001 *Sequential Code*	z *Logo*
	00 = 2 wire Hour Meter 01 = 3 wire Hour Meter 03 = Pulse Counter	See Section 2.2 for specifications	R = Electrical reset N = No reset		O = Curtis N = No Logo

xxyy

Nominal Voltage (See Section 2.1 for absolute voltage ranges)

0512D = 5 to 12VDC
1248D = 12 to 48VDC
48150D = 48 to 150VDC
0512D0612A = 5 to 12VDC, 6 to 12VAC
1248D2060A = 12 to 48VDC, 20 to 60VAC
48150D100230A = 48 to 150VDC, 100 to 230VAC

1 B. MODEL ENCODEMENT (732 only)

732 u
Case

N = Hex-shaped bezel, with ¼" Faston terminals

K = Hex-shaped bezel, with Packard connector

See Section 2.2 for Specifications

v
Function

0= 2-wire Hour Meter, no enable LED gnd-enabled, no reset

1= 2-wire Hour Meter, no enable LED pwr-enabled, no reset

2= 2-wire Hour Meter, no enable LED gnd-enabled, w/reset

3= 2-wire Hour Meter, no enable LED pwr-enabled, w/reset

4= 3-wire Hour Meter, w/enable LED gnd-enabled, no reset

5= 3-wire Hour Meter, w/enable LED pwr-enabled, no reset

w
LED Voltage (VDC)

0 = 12
1 = 24
2 = 36
3 = 48

xx
Sequential Code

factory specified

y

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Logo

N= No Logo
O= Curtis

Note: 732 has a built-in LED in its face

2. TECHNICAL SPECIFICATIONS ⚠️

2.1 Electrical
Operating Voltage 700 Series

The operating voltage ranges specified apply to voltages connected between terminal 1 and terminal 2 (700,701,703), terminal 3 and terminal 2 (701,703 only), and terminal 4 and terminal 2 (Reset option).

1. DC Only Models:

Nominal (VDC)	Absolute (VDC)
5 to 12	4.75 to 15
12 to 48	9.0 to 60
48 to 150	36 to 185

2. DC/AC Models:

Nominal (VDC)	Absolute (VDC)
Same As Above	

Nominal (VAC)	Absolute (VAC)
6 to 12	5.0 to 15
20 to 60	15 to 75
100 to 230	75 to 270

732 Only ⚠️

a) Voltages connected between pins 1 and 2 and between 4 and 2 (Enable option)

3a. 732 DC only, all voltage models:

Nominal (VDC)	Absolute (VDC)
12 to 48	9.0 to 60

b) LED voltages beteween pins 3 and 2

3b. 732 LED voltages:

	Absolute (VDC)
12	9 to 15
24	18 to 30
36	27 to 45
48	36 to 60

Frequency (AC models)

The AC operating frequency range is 48 to 440 Hz.

Maximum AC-Reset Frequency is 150 Hz.

Accuracy

Model 700, 701, 732 = ±0.1%
Model 703 = ±1 count

Operating Current (All models except 732)

The maximum operating current at terminal 1 is tabulated below for each nominal operating voltage limit.

DC Only Model	Operating Voltage (VDC) V+ to V++	Maximum Current @ V+	Maximum Current @ V++
	5 to 12	0.5 mA	10.0 mA
	12 to 48	0.8 mA	5.0 mA
	48 to 150	0.8 mA	2.5 mA
DC/AC Model	**Operating Voltage V+ to V++**	**Maximum Current @ V+**	**Maximum Current @ V++**
	VDC - same as above		
	6 to 12 VAC	0.7 mA	6.0 mA
	20 to 60 VAC	0.5 mA	2.5 mA
	100 to 230VAC	0.9 mA	2.0 mA

Operating Current (continued)

Operating Current - 732 only
Single Voltage, DC only

Operating Voltage (VDC)	Maximum Current w/LED (mA)
12	15.0
24	10.0
36	7.0
48	5.0

Impedance

The minimum impedance at terminal 3 and at terminal 4 are tabulated below for each model.

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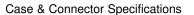| Voltage Encodement	Impedance (Min) Terminal 3	Impedance (Min) Terminal 4
0512D	10 KΩ	25 KΩ
1248D	60 KΩ	70 KΩ
48150D	480 KΩ	480 KΩ
0512D 0612A	10 KΩ	25 KΩ
1248D 2060A	70 KΩ	70 KΩ
48150D 100230A	480 KΩ	480 KΩ
732 (all voltages)	–	70 KΩ

2.2 Mechanical

Display 6-digit LCD, 5 mm high

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Range & Resolution

700, 701, 732 Hour Meters	*703 Counter*
99,999.9 Hours	999,999 Counts

Case & Connector Specifications

Case	Bezel Shape	Terminals	Max Pins	Mounting	Lens Matrl.	Case Matrl.	Bezel Matrl.	Panel Cutout (mm)	Panel Cutout (in)
F	Hexagonal	$1/4$" Faston	4	Flange	Acrylic	ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
G	Hexagonal	Packard	2	Flange	Acrylic	ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
J	Hexagonal	Packard	4	Flange	Acrylic	ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
K	Hexagonal	Packard	4	Flange	Acrylic	ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
N	Hexagonal	$1/4$" Faston	4	Flange	Acrylic	ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
D	Rect.-DIN	$3/16$" Faston	4	U-bracket	Acrylic	ABS (black)	ABS (black)	45x22.2	1.77x0.87
L	Rectangular	Molex-mini	4	Snap-in	Polycarb.	Polycarb.	Polycarb.	36.8x24.1	1.45x0.95
H	Rectangular	Packard	2	Bracket (plast.)	Acrylic	ABS (black)	Acrylic (clear)	36.8x24.1	1.45x0.95
Y	Rectangular	Packard	4	Bracket (plast.)	Acrylic	ABS (black)	ABS (black)	36.8x24.1	1.77x0.87
Z	Rectangular	Packard	4	Bracket (plast.)	Acrylic	ABS (black)	ABS (black)	36.8x24.1	1.77x0.87
Q	Round	$1/4$" Faston	4	U-bracket	Glass	Polycarb.	Alum. Anodzd. (blk)	⌀ 52	⌀ 2 $1/16$"
R (5mm)	Round	$3/16$" Faston	4	U-bracket	Glass	Polycarb.	Alum. Anodzd. (blk)	⌀ 52	⌀ 2 $1/16$"

Note: **K & N** - LED indicator molded in bezel face (available as 732 models only)
G & H - Require 2-pin Delphi-Packard mating connector P/N 12162000
J, K & Y - Require 4-pin Delphi-Packard mating connector P/N 12162035
L - Snap tabs built in(no mounting hardware required); case and bezel 1-piece clear
Hexagonal - Screw mount through flange (optionally mounted with plastic bracket, available separately)

2.3 Environmental

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Temperature
Operating: -40°C to +85°C
Storage: -50°C to +90°C

Humidity
95% RH (Non Condensing) at 38°C

Shock & Vibration
Meets SAE J 1378

Case - IP Ratings

Case Style	D, Q, R	F, Z, N	G, J, Y, H, K	L
Front	65	65	65	65
Rear	50	65	*65	40

*Note: Rated with mating connector installed

3. INSTALLATION

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Case Style	Pin 1	Pin 2	Pin 3	Pin 4
D, F, Q, R , J, Y, Z	V+	V–	I	R
G, H	V+	V–	NC	NC
L	V+	V–	I	NC
K, N	V+	V–	LED	I

V+ Operating voltage
V– Common (ground)
I   Enable (optional, use operating voltage to power this pin to record elapsed time (701) or increment count (703))
R Reset (optional, supply with operating voltage when unit is to be reset to 0)
LED – Externally driven by active high or low – factory configured
NC No connection

4. OPERATION

NOTE: All models display an 8 in all digits for 1 sec. at power-up.

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700 Hour Meter (AC/DC)

To Display & Operate: Apply DC+ or AC hot to pin 1 and DC– or AC neutral to pin 2. The accumulation of elapsed time is indicated by the flashing hourglass icon. If power has been applied for 5 seconds minimum, the accumulated time will be stored in non-volatile memory when power is removed.

To Reset: (for Resettable Models) Apply DC+ or AC hot to pin 4 for ¹/₂ second minimum while power (pins 1 & 2) is applied for 5 seconds minimum. The reset voltage must be at the same level as the voltage used to power the unit.

701 Hour Meter (AC/DC or DC Only)

To Display: Apply DC+ or AC hot to pin 1 and DC– or AC neutral to pin 2. The display is activated at this point but the elapsed time will not be accumulated until a signal is applied to pin 3.

Note, for proper operation: Power must be applied to pins 1 & 2 before or coincident with pin 3.

To Operate: Apply DC+ or AC hot to pin 3 for ¹/₂ second minimum (AC/DC model) or DC+ for 1 millisecond mimimum (DC Only model). The accumulation of elapsed time is indicated by the flashing hourglass icon. If power (pins 1 & 2) has been

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applied for 5 seconds minimum, the accumulated time will be stored in non-volatile memory when power is removed.

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To Reset: (for Resettable Models) Apply DC+ or AC hot to pin 4 for ¹/₂ second minimum while power (pins 1 & 2) is applied for 5 seconds minimum. The reset voltage must be at the same level as the voltage used to power the unit.

703 Counter (AC/DC or DC Only)

To Display: Apply DC+ or AC hot to pin 1 and DC– or AC neutral to pin 2. The display is activated at this point but the count will not be started until a signal is applied to pin 3.

Note, for proper operation: Power must be applied to pins 1 & 2 before or coincident with pin 3.

To Operate: Apply DC+ or AC hot to pin 3. The count is incremented when the input signal is removed from pin 3. The input signal must be applied for ¹/₂ second minimum (AC/DC model) or for 1 millisecond mimimum (DC Only model). If power (pins 1 & 2) has been applied for 5 seconds minimum, the incremented count will be stored in non-volatile memory when power is removed.

To Reset: (for Resettable Models) Apply DC+ or AC hot to pin 4 for ¹/₂ second minimum while power (pins 1 & 2) is applied for 5 seconds minimum. The reset voltage must be at the same level as the voltage used to power the unit.
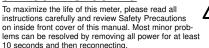
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732 Hour Meter (DC Only)

To Activate Display: Apply DC+ to pin 1 and DC- to pin 2.
To Activate LED: Apply DC+ (for active-high models) or DC- (for active-low models) to pin 3 during indicator-on condition.
To Activate Elapsed Time: <u>For models without separate enable option</u> - elapsed time is activated when power is applied to pins 1 & 2. <u>For models with enable option</u> - apply signal to pin 4. **Note:** Power (to pins 1 & 2) must be applied before or at the same time as signal to pin 4.
Operation: Apply DC+ to pin 4 for 1 millisecond minimum. Activation (accumulation) of elapsed time is indicated by the hourglass icon flashing. Time accumulated will be stored into non-volatile memory when power is removed, if power (to pins 1 & 2) has been applied for the minimum of 5 seconds.
Reset: (for resettable models), Apply DC+ to pin 4 for 1/2 second minimum, while power to pins 1 & 2 has been applied for 5 seconds minimum. **Note:** The reset voltage must be at the same level as the voltage used to power the unit.

5. TROUBLESHOOTING

To maximize the life of this meter, please read all instructions carefully and review Safety Precautions on inside front cover of this manual. Most minor problems can be resolved by removing all power for at least 10 seconds and then reconnecting.

Problem	Possible Causes
No Display	Power not connected or too low.
Display Present, but counter does not activate.	Input (or enable) wire not connected. Start Input not connected. Input voltage not reaching specified minimum signal level.
LED not turning ON during activation condition.	Switch or switch-connection faulty.

6. MAINTENANCE

Curtis Model 700 & 732 Series hour meters are not serviceable in the field. Units returned to the factory within the warranty period (see inside backcover) will be replaced without charge.

WARNING

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