CURTIS® 700/732 SERIES

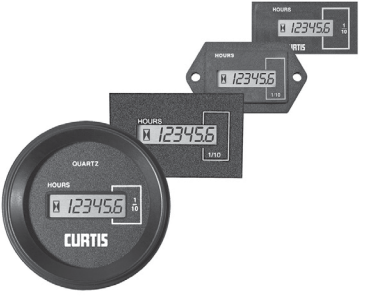
CE

CURTIS

CURTIS INSTRUMENTS, INC.

200 Kisco Ave.
Mount Kisco, New York 10549
914-666-2971 Tel
914-666-2188 Fax

www.curtisinstruments.com



5mm HOUR METERS & COUNTERS

53004 Rev. G 9/14

⚠ 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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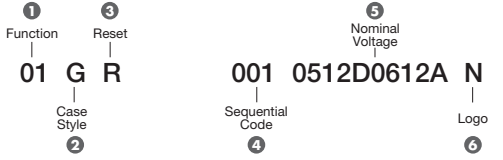
1. MODEL ENCODEMENT

(All models except 732)



1 Function

00	2 wire Hour Meter
01	3 wire Hour Meter
03	Pulse Counter

2 Case Style

See section 2.2 for complete specifications.

3 Reset

R	Electrical Reset
N	No Reset

4 Sequential Code

Factory specified.

5 Nominal Voltage

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

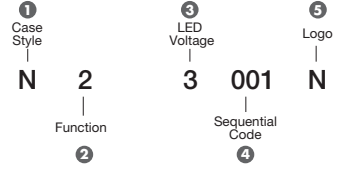
(See Section 2.1 for absolute voltage)

6 Logo

0	Curtis
N	None

732 Model Encodement Only

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



1 Case Style

See section 2.2 for complete specifications.

2 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.

3 LED Voltage (VDC)

0	12
1	24
2	36
3	48

4 Sequential Code

Factory specified.

5 Logo

0	Curtis
N	None

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).

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

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

Operating Voltage 732 Only

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

732 DC only, all voltage models

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

LED voltages betweeen pins 3 and 2.

732 LED Voltage	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

VDC: Same as above.

Operating Voltage (VAC) V+ to V++	Maximum Current @ V+	Maximum Current @ V++
6 to 12	0.7 mA	6.0 mA
20 to 60	0.5 mA	2.5 mA
100 to 230	0.9 mA	2.0 mA

Operating Current continued

(732 Model 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.

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

Range & Resolution

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

Case & Connector Specifications

Case	Bezel Shape	Terminals	Max Pins	Mounting	Lens Matrl.
F	Hexagonal	1/4" Faston	4	Flange	Acrylic
G	Hexagonal	Packard	2	Flange	Acrylic
J	Hexagonal	Packard	4	Flange	Acrylic
K	Hexagonal	Packard	4	Flange	Acrylic
N	Hexagonal	1/4" Faston	4	Flange	Acrylic
D	Rect. - DIN	3/16" Faston	4	U-Bracket	Acrylic
L	Rectangular	Molex-mini	4	Snap-In	Plycarb.
H	Rectangular	Packard	2	Bracket (plast.)	Acrylic
Y	Rectangular	Packard	4	Bracket (plast.)	Acrylic
Z	Rectangular	1/4" Faston	4	Bracket (plast.)	Acrylic
Q	Round	1/4" Faston	4	U-bracket	Glass
R (5mm)	Round	3/16" Faston	4	U-bracket	Glass

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)

Case Matrl.	Bezel Material	Panel Cutout (mm)	Panel Cutout (in.)
ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
ABS (black)	ABS (black)	45x22.2	1.77x0.87
Polycarb.	Polycarb.	36.8x24.1	1.45x0.95
ABS (black)	Acrylic (clear)	36.8x24.1	1.45x0.95
ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
ABS (black)	ABS (black)	36.8x24.1	1.45x0.95
Polycarb.	Alum. Anodzd. (blk)	Ø 52	Ø 2 1/16"
Polycarb.	Alum. Anodzd. (blk)	Ø 52	Ø 2 1/16"

2.3 Environmental

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

* Rated with mating connector installed

3. INSTALLATION

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.

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.

701 Hour Meter continued

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 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.

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.

703 Counter continued

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.

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: For models without separate enable option - elapsed time is activated when power is applied to pins 1 & 2. For models with enable option - 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.

732 Hour Meter continued

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 Cause
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.

7. 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.