If you have not found what you are looking for or you have further questions, please feel free to call us at 217-753-7797 or fax us at 217-753-7789. It will help us process your request more efficiently and effectively if you can provide as much detailed information about your requirements/application as possible.

Thanks for considering Hobbs meters from Honeywell!

MANUFACTURING

Honeywell Hobbs’ commitment to the customer in past years and present is what has helped us develop our world-class manufacturing systems. Some of the methods by which we continuously improve our products and processes are as follows:

- Six Sigma methodology is a strategy used to accelerate improvements in our processes, products and services, and to reduce manufacturing costs and improve quality. It achieves this by relentlessly focusing on eliminating waste and reducing defects and variations.
- Continuous Flow Process utilizing “Rabbit Chase” concepts are used in the focused factories in order to achieve the lowest total cost, defect-free product.
- Single Minute Exchange of Dies (SMED method) provides reduced time in molding cell.
- Statistical Process Control is used for measuring critical dimensions and controlling manufacturing processes.
- Poka-Yoke method and computerized test equipment are utilized to eliminate scrap and rework.
- Kanban cards are used to pull raw material and piece parts through the factory.
- Bar coding and electronic data interchange (EDI) are available.

Quality Systems

It is the goal of Honeywell Hobbs to meet customer value needs through continuously improved products and processes. That is the basis by which we work to create a partnership with our customers. Evidence of our commitment is proven by a goal of a Shipped Product Quality Level (SPQL) of 100 ppm. We utilize Advanced Quality Planning and QS9000 based quality systems.

Honeywell

Sensing and Control

www.honeywell.com/hobbs
email: www.honeywellhobbs.marketing@honeywell.com
Honeywell
P.O. Box 19424
Springfield, IL 62794-9424
USA
Catalog 28-1183, S/LG Printed in the USA
Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application. Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service
Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact a nearby sales office or the Internet: www.honeywell.com/hobbs

E-mail: honeywellhobbs.marketing@honeywell.com

Warranty Periods:
The products listed are warranted for the periods shown:

<table>
<thead>
<tr>
<th>Series</th>
<th>Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>98000</td>
<td>2 years</td>
</tr>
<tr>
<td>85000</td>
<td>2 years</td>
</tr>
<tr>
<td>20000</td>
<td>2 years</td>
</tr>
</tbody>
</table>

The Hobbs brand is well known worldwide for the development of quality electro-mechanical products. The invention of the first electrically wound automobile clock in 1938 created what is now known as Honeywell Hobbs. John Weston Hobbs was the inventor that cultivated this electrically-wound vehicle clock into a company that has over the years expanded to include hour meters, pressure and vacuum switches, halogen lamps, transmission shifters, and other custom electro-mechanical products. Honeywell’s broad customer and market base includes industries such as automotive, agricultural, material handling, construction, marine, medical, heavy truck, lawn and garden, recreational, generators, compressors and aviation.

Honeywell’s commitment to continuous improvement and total quality management will allow for further expansion of its product lines and customer base while maintaining the highest standards of excellence.

Contents:
- LCD .............. P. 3-5
- D.C. .............. P. 6-7
- A.C. ................ P. 8-11
- Accessories ........... P. 11
- Warranty ............. P. 11

www.honeywell.com/hobbs

Custom Instrument Panel Clusters
Let Hobbs custom design your display panel saving you time and money. We can assemble a panel to your specifications that frees up your engineering resources, reduces parts counts and reduces your vendor base.

Warranty and remedy
Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer’s sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service
Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact a nearby sales office or the Internet: www.honeywell.com/hobbs

E-mail: honeywellhobbs.marketing@honeywell.com

Warranty Periods:
The products listed are warranted for the periods shown:

<table>
<thead>
<tr>
<th>Series</th>
<th>Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>98000</td>
<td>2 years</td>
</tr>
<tr>
<td>85000</td>
<td>2 years</td>
</tr>
<tr>
<td>20000</td>
<td>2 years</td>
</tr>
</tbody>
</table>
### 28100 Series

Unlike conventional AC hour meters that are limited to one primary voltage and frequency, the Hobbs Multi-Range Quartz hour meter will operate over a full range of voltages and frequencies. The meters will work accurately over a voltage range of 90 VAC to 264 VAC and at frequencies of either 50 Hz or 60 Hz. This unique feature means that one hour meter will work for virtually any application anywhere in the world.

**Specifications**
- Operating Voltage: 90 to 264 VAC
- Frequencies: 50 to 60 Hz
- Temperature Range: -40°F to +85°F

**Features**
- Records time 0 to 99,999.9 hours
- Accuracy ±0.02%
- UL Recognized
- CSA (UL)
- CE Mark
- Totally sealed from dirt and moisture
- Termination: 1/4" spade

**Benefits**
- Reduced parts count
- Reduced inventories
- Fewer purchase orders
- Eliminate production line errors
- Reduce service parts

**Options**
- Wire leads
- Custom lens
- Terminals (up, down, straight)

**WARNING!** Applied voltage not to exceed 264 Vac RMS. The meter was not intended to be used in applications where excessive transient voltages are present. It is the responsibility of the customer to determine the suitability of this device for use in their system.

---

### 98000 Series

The Hobbs 98000 Series LCD hour meters provide a large easy-to-read display in a conventional size package. The hour meters are available in a variety of mounting styles and voltage ranges that will fit virtually any application.

**Specifications**
- Run Accuracy ±200ppm ±0.02%
- Start Time: maximum 1 second
- 6 Digit Display
- Digit Height: 6mm
- Power draw: 8 mA at 12 VDC (Power Terminal)
- Terminations: 1/4" Black, 3/16" Black optional
- Temperature Range: Operating -40°C to +85°C
- Vibration: 20 g’s per SAE J1378
- Shock: 55 g’s per SAE J1378
- Operating ranges: 4.5 to 16 VDC (optional) 9 to 64 VDC >64 VDC Contact Factory
- Display: 0 to 99,999.9 Hours 0 to 999,999 Counter
- Transient Voltage Protection
  - Load Dump
  - Inductive
  - Reverse Polarity

**Features**
- Totally sealed from moisture and dirt
- Direct replacement for current hour meter
- No battery backup needed
- Fits in existing panel openings
- Custom bezels and dial artwork available
- Snap-in retainer mount combines easy installation with rugged design
- Compact Depth
- Rugged Design
- Pulse Counter Option
- Reset Option
- Run Indicator

---

### 28103 Series

The 28103 series are designed for those applications requiring an AC meter with a frequency range of 50 to 60 Hz. This series is ideal for electrical systems that require monitoring of both voltage and frequency, such as in power plants and substations. The meters are available in a variety of mounting styles and voltage ranges that will fit virtually any application.

**Specifications**
- Operating Voltage: 90 to 264 VAC
- Frequencies: 50 to 60 Hz
- Temperature Range: -40˚F to +185˚F

**Features**
- Records time 0 to 99,999.9 hours
- Accuracy ±0.02%
- UL Recognized
- CSA (UL)
- CE Mark
- Totally sealed from dirt and moisture
- Termination: 1/4" spade

---

### 28104 Series

The 28104 series are designed for specific applications requiring a compact, easy-to-install AC hour meter. The meters are available in a variety of mounting styles and voltage ranges that will fit virtually any application.

**Specifications**
- Operating Voltage: 90 to 264 VAC
- Frequencies: 50 to 60 Hz
- Temperature Range: -40˚F to +185˚F

**Features**
- Records time 0 to 99,999.9 hours
- Accuracy ±0.02%
- UL Recognized
- CSA (UL)
- CE Mark
- Totally sealed from dirt and moisture
- Termination: 1/4" spade

---

### 28105 Series

The 28105 series are designed for those applications requiring a compact, easy-to-install AC hour meter with a frequency range of 50 to 60 Hz. The meters are available in a variety of mounting styles and voltage ranges that will fit virtually any application.

**Specifications**
- Operating Voltage: 90 to 264 VAC
- Frequencies: 50 to 60 Hz
- Temperature Range: -40˚F to +185˚F

**Features**
- Records time 0 to 99,999.9 hours
- Accuracy ±0.02%
- UL Recognized
- CSA (UL)
- CE Mark
- Totally sealed from dirt and moisture
- Termination: 1/4" spade
### LCD Hour Meters

**98000 Series**

- **Part #**
  - **98311**
  - **98312**
  - **98321**
  - **98322**

- **Terminals**
  - 2 terminal
  - 3 terminal
  - 4 terminal

- **Applications**
  - Garden Tractors
  - Generators
  - Utility Vehicles
  - Construction Equipment
  - Material Handling Equipment
  - Recreational Vehicles
  - Medical
  - Electronic Panels
  - Rental Equipment
  - Boom Lifts
  - Pressure Washers
  - Sweeper
  - Test Equipment

---

### 20000 Series Deluxe AC Hour Meters

- **Part #**
  - **20174**
  - **20183**
  - **20116**
  - **20182**
  - **20170**
  - **20177**

- **Terminals**
  - Screw
  - Blade

- **Applications**
  - Single phase, 2 wire, 120V system: Connect power wire to one terminal and neutral wire to the opposite terminal.
  - Single phase, 3 wire, 120/240V system: Connect any one power wire to one terminal and the neutral wire to the opposite terminal.
  - Three phase, 4 wire wye, 120/240V system: Connect any one power wire to one terminal of the meter and the neutral wire to the opposite terminal. Do not connect the high leg (208V) to the meter.
  - Three phase, 4 wire delta with a high leg, 120/240V system: Connect any one of the two available 120V power wires to one terminal of the meter and the neutral wire to the opposite terminal. Do not connect the high leg (208V) to the meter.

---

### 20000 Series Wiring Diagrams

- **Single phase, 2 wire, 240V system:** Connect power wire to one terminal and neutral wire to the opposite terminal.
- **Single phase, 3 wire, 120/240V system:** Connect meter across two high sides of the line. Do not connect the neutral wire to the meter.
- **Three phase, 3 wire delta, 240V system:** Connect meter across any two power lines.
- **Three phase, 4 wire delta with a high leg, 120/240V system:** Connect any one power wire to one terminal of the meter. Connect one of the remaining two power lines to the opposite terminal. Do not connect the neutral wire to the meter.

---

### Retainer Mount

- **Panel cutout dimensions are ± .010 tolerance. All dimensions shown in inches and (metric).**

---

### Round Chrome Bezel

- **Part #**
  - **98314**
  - **98324**
  - **98304**

- **Applications**
  - Single phase, 2 wire, 240V system: Connect power wire to one terminal and neutral wire to the opposite terminal.
  - Single phase, 3 wire, 120/240V system: Connect meter across two high sides of the line. Do not connect the neutral wire to the meter.
  - Three phase, 3 wire delta, 240V system: Connect meter across any two power lines.
  - Three phase, 4 wire delta with a high leg, 120/240V system: Connect any one power wire to one terminal of the meter. Connect one of the remaining two power lines to the opposite terminal. Do not connect the neutral wire to the meter.
**20000 Series**

When there's a need to keep track of run time, quality-minded companies choose Hobbs! Whether it's for testing purposes, leasing applications, maintenance reasons, and/or warranty programs, you want an accurate and reliable hour meter. The Hobbs 20000 Series hour meter delivers!

To ensure our high standards of quality, all parts are inspected in-process. Every meter must pass 100% function and timing accuracy tests before shipping. These "Deluxe" AC meters are also totally sealed and benefit from an uncommon design which integrates the motor and frame into one substructure.

**Specifications**
- Records up to 99,999 hours
- Automatic recycle to zero
- 24.120 and 240 VAC models available (Range ±10%)
- 60 and 60 Hertz versions
- 10% Power rating
- Operating temperature: -65°F to +154°F
- Accuracy: ±.02%
- Weight: 3 oz
- Screw termination or 7” lead wires
- Lens material: Glass
- Number size: 0.12” (3mm)
- UL Listed (File # E47098): Screw terminals
- UL Recognized: Wire lead versions
- CSA Certified (File #1432455)
- Conforms to MIL-M-3971 *
- CE Mark

**Features**
- Polycarbonate, shock resistant, tamper proof case
- Totally sealed *
- Single phase, synchronous, permanently lubricated motor
- Custom logo dials, 1/4” blade terminals, special wire lengths.

**Options:** If you need it, let us know.

YOUR satisfaction is our goal!

* Applicable on shown “screw terminal” meters. Contact Hobbs for specifications on other available models.

---

**Deluxe AC Hour Meters**

The Hobbs Deluxe AC hour meter is a custom engineered elapsed time meter designed to be mounted directly to your printed circuit board (PCB). It can be used in a variety of AC or DC applications that require an hour meter, counter or odometer for preventive maintenance, warranty verification, renting and leasing.

**Specifications**
- 6 digit/6mm display
- ±0.02% Accuracy
- Vibration tested per MIL-M-3971D at 10 g’s and SAE J1378 at 20 g’s
- Shock tested per MIL-M-3971D at 75 g’s and SAE J1378 at 55 g’s
- Operating temp. range: -40˚C to +85˚C
- Operating voltage range: 9 to 64 VDC (optional 4.5 to 16 VDC)
- Transient Voltage Protected
- Over Voltage, Load Dump, Inductive, EMI, Reverse Polarity
- Power Consumption: 0.8 ma max at 12V (power terminal)
- Start time: maximum 1 second

All Hobbs modules have crucial components exposed. The module must be sufficiently protected if used in an environment other than specified. Consult Hobbs marketing department when suitability of application is questioned.

**Operating Voltage**
- Round 3 Screw
  - 108 to 132 VAC: 50 Hz, 50 Hz, 60 Hz
  - 20028

- Rectangular 2 Screw
  - 108 to 132 VAC: 50 Hz, 50 Hz, 60 Hz
  - 20001

**Part #**
- 98706
- 98707

---

**LCD Hour Meter Module**

The Hobbs LCD hour meter module is a custom engineered elapsed time meter designed to be mounted directly to your printed circuit board (PCB). It can be used in a variety of AC or DC applications that require an hour meter, counter or odometer for preventive maintenance, warranty verification, renting and leasing.

**Specifications**
- 6 digit/6mm display
- ±0.02% Accuracy
- Vibration tested per MIL-M-3971D at 10 g’s and SAE J1378 at 20 g’s
- Shock tested per MIL-M-3971D at 75 g’s and SAE J1378 at 55 g’s
- Operating temp. range: -40˚C to +85˚C
- Operating voltage range: 9 to 64 VDC (optional 4.5 to 16 VDC)
- Transient Voltage Protected
- Over Voltage, Load Dump, Inductive, EMI, Reverse Polarity
- Power Consumption: 0.8 ma max at 12V (power terminal)
- Start time: maximum 1 second

All Hobbs modules have crucial components exposed. The module must be sufficiently protected if used in an environment other than specified. Consult Hobbs marketing department when suitability of application is questioned.

**Features**
- Large easy-to-read numbers
- Silent operation
- Low power demand
- Resettable and nonresettable
- 10 years data retention (without power)

**Operating Voltage**
- Round 3 Screw
  - 108 to 132 VAC: 50 Hz, 50 Hz, 60 Hz
  - 20028

- Rectangular 2 Screw
  - 108 to 132 VAC: 50 Hz, 50 Hz, 60 Hz
  - 20001

**Part #**
- 98706
- 98707

---

**Applications**

**AC APPLICATIONS**
- Business machines
- Control panels
- Lighting systems
- Generators
- Compressors & pumps
- Refrigeration
- Air conditioning
- Furnaces
- Lab test equipment
- Sun tanning equipment
- Oxygen concentrators
- Many more!

**LCD Module APPLICATIONS**
- Medical
- Vending Machines
- Floor Cleaning Equip.
- Electronic Panels
- Instrument Panels
- Recreational
- Office Equipment

**Options**
- 9 to 64 VDC: with enable & reset
- 9 to 64 VDC: without reset

---

**Applications**

**Rectangular 2 Screw**
- Part #: 20028
  - Operating Voltage: 108 to 132 VAC
  - Hertz: 50 Hz, 50 Hz, 60 Hz
  - Terminal: Screw *

**Round 3 Screw**
- Part #: 20001
  - Operating Voltage: 108 to 132 VAC
  - Hertz: 50 Hz, 50 Hz, 60 Hz
  - Terminal: Screw *

---

**Counter Version**

**Operating Voltage**
- 9 to 64 VDC
  - 4 terminal
  - 98704

**Rectangular 2 Screw**
- Part #: 98704
  - Operating Voltage: 108 to 132 VAC
  - Hertz: 50 Hz, 50 Hz, 60 Hz
  - Terminal: Screw *
  - 9 to 64 VDC
  - 4 terminal
  - 98705

**Round 3 Screw**
- Part #: 98705
  - Operating Voltage: 108 to 132 VAC
  - Hertz: 50 Hz, 50 Hz, 60 Hz
  - Terminal: Screw *
  - 9 to 64 VDC
  - 7” Leads **
  - 98707

---

* Panel cutout dimensions are ± .010 tolerance
All dimensions shown in inches and (metric)
The 85000 Series provides legendary Hobbs performance and reliability in a technically advanced quartz package. The Quartz Plus features a highly reliable drive mechanism, an improved odometer gear train, and a snap-together integrated chassis. The chassis fits into a shockproof, totally-sealed case made of an engineered plastic that is impervious to acids and solvents.

To ensure our high standards of quality, all parts are in-process inspected. Every Quartz Plus meter must pass 100% function, burn-in, and timing accuracy test before shipping.

Specifications
- 10,000 hour version standard, with automatic recycle to zero
- Temperature range: -40° F to +185° F (-40° C to +85° C)
- Quartz accuracy: ±200 ppm, ±0.02% (entire voltage and temperature range)
- Operating voltage range: 5-110 VDC (Voltage range covered by 85000 Series line)
- Precision built relay driven odometer
- Excellent vibration & shock resistance:
  - Vibration: 20 g's @ 10-80 Hz (SAE J1378)
  - 10 g’s (per MIL-M-3971)
  - Shock: 55 g’s @ 9-13 msec (SAE J1378)
  - 75 g's (per MIL-M-3971)
- Transient Voltage Protection
- Alternator load dump: 150V
- EMI: electromagnetic interference: +400V @ 500 Hz
- Inductive switching and reverse polarity
- Standard terminals: 1/4” male blade
- Lens material: Glass
- Case material: Polyester
- Number size: 0.12” (3mm)

Features
- Custom CMOS integrated circuit
- Indicates operating time in hours and tenths, plus has a running indicator
- Totally-sealed
- Battery system voltages: 6, 12, 24, 36, 48, 60, 72, and 80 VDC
- UL Recognized (File number AU1774)
- CSA Certified (File number UL2455-12)
- Conforms to MIL-M-3971

Options:
- Custom logos, polycarbonate lenses, and various bezels: Wire, stud, blades, and screw terminals. 100,000 hour,killermeter and filtered versions available too.

85000 Series Wiring Diagrams (Polarity Sensitive)

CAUTION: Always make sure power is removed from equipment before working on electrical circuit! Only qualified personnel should make electrical connections. Damage to equipment and/or serious bodily injury can result from improperly made electrical connections, or a failure to adhere to normal electrical safety guidelines.

DC APPLICATIONS
- Lawn Tractors
- Garden Tractors
- Farm Equipment
- Gen Sets
- Construction Equipment
- Utility Vehicles
- Industrial Equipment
- Recreational Vehicles
- Golf Carts
- Aircraft
- Medical Equipment
- Office Equipment
- Any application requiring a very accurate and dependable hour meter.