THYRISTORS HCL-1PH
from 35A to 40A Specifications
Phase Angle and Delay Triggering
55-77-03-39, March 2012

GENERAL DESCRIPTION

- THYRISTORS HCL-1PH has been specifically designed to be an Universal Unit.
- Frontal Key Pad to configure the unit and to read V, I and Power.
- Configurability via RS485, USB Port and frontal Key Pad.
- Microprocessor based electronic circuit fully isolated from power.
- Universal input signal: RS485, Pot, Analog and SSR.
- Soft Start + Phase Angle and Delayed Triggering Firing.
- Configurable Control Mode: V, I, V2 and VxI.
- Current Limit Std adjustable from front unit.
- Profiling current limit via analog input.
- Heather Break alarm to diagnose partial or total load failure and Thyristor Short circuit.
- Digital input configurable.
- Fuse and Fuse Holder Standard.
- Current transformer integrated in Fuse Holder.
- Comply with EMC, cUL pending.
- IP20 Protection.
- DIN RAIL mounting.
### TECHNICAL SPECIFICATION

**Voltage power supply**  
From 24V to 480V Max (Std) or 600V on request.

**Voltage Frequency**  
50 or 60 Hz no setting needed from 47 to 70 Hz.

**Nominal Current**  
35A, 40A.

**Input Signal**  
<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
<th>Impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage input</td>
<td>0:10Vdc</td>
<td>15 K ohm</td>
</tr>
<tr>
<td>Current input</td>
<td>0:20/4:20mA</td>
<td>100 Ohm</td>
</tr>
</tbody>
</table>

**Digital input**  
4:30V dc 5 mA Max (On > 4Vdc Off < 1Vdc)

**Firing**  
Soft Start + Phase Angle, Delay Triggering + Burst Firing.

**Control Mode**  
Voltage, Current, Square Voltage and Power selectable via frontal Key Pad, and RS485 or via Digital input to transfer from one control mode to another one to establish a control strategy.

**Auxiliary Voltage Supply**  
<table>
<thead>
<tr>
<th>Voltage Range</th>
<th>VA Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>90:130Vac</td>
<td>8VA Max</td>
</tr>
<tr>
<td>170:265Vac</td>
<td>8VA Max  (Standard)</td>
</tr>
<tr>
<td>230:345Vac</td>
<td>8VA Max</td>
</tr>
<tr>
<td>300:530Vac</td>
<td>8VA Max  (Standard)</td>
</tr>
<tr>
<td>510:690Vac</td>
<td>8VA Max</td>
</tr>
</tbody>
</table>

**Heater Break Alarm**  
HB alarm setting on front unit or RS485 with possibility to set sensitivity. Relay output 0,5A at 110V.

**Mounting**  
DIN RAIL Mounting or Panel Mounting.

**Operating Temperature**  
40 °C without derating. Over this temperature see below derating curve.

**Storage temperature**  
-25 °C to 70 °C Max.

**Altitude**  
Over 1000 m of altitude reduce the nominal current of 2% for each 100m.

**Humidity**  
From 5 to 95% without condense and ice.

![Derating curve](image)

\[
I_{\text{MAX}} = I_{\text{NOM}} \times K
\]

Derating curve

- Temperature
- Nominal Current
- Maximum Current
HEATER BREAK ALARM HB

ON FRONT CABINET

The Heather Break circuit diagnostic partial or total load failure. It reads load resistance with an internal voltage transducer and current transformer to calculate the resistance value V/I.

The Heather Break circuit is compensated for voltage fluctuation, in fact a voltage variation has no influence on resistance value because V/I ratio remain constant.

On this unit is possible to set the nominal resistance value and the alarm sensitivity.

HB alert in addition diagnostic the thyristor in short circuit.

A normal open contact gives the alarm condition and an indication of the alarm type appears on display.

PHASE ANGLE PA

PA controls the power to the load by allowing the thyristor to conduct for part of the AC supply cycle only. The more power required, the more the conduction angle is advanced until virtually the whole cycle is conducting for 100% power. The load power can be adjusted from 0 to 100% as a function of the analogue input signal, normally determined by a temperature controller or potentiometer; PA is normally used with inductive loads.

DELAYED TRIGGERING DT

Used to switch the primary coil of transformers when coupled with normal resistive loads (not cold resistance) on the secondary, DT prevents the inrush current when zero voltage (ON-OFF) is used to switch the primary. The thyristor unit switches OFF when the load voltage is negative and switches ON only when positive with a pre-set delay for the first half cycle.

FIELD BUS MODULE

CD-RS Used to convert RS232 to RS422.
TU-RS485-PDP Used to convert RS485 Modbus to Profibus DP.
TU-RS485-ETH Used to convert RS485 Modbus to Ethernet.

For more informations see "Field Bus Module".

POWER SCALING

It's a scaling factor of the input command signal and limit the output of Thyristor unit. This parameter can be adjusted from 1 to 99% via RS485 or by the front of the unit. If this parameter is set at 50% and the input signal is 100% the output become 50%. This feature is very useful to reduce the power when a zone has been oversized or when a temperature controller gives same reference to more unit along a furnace.

Imagine 3 zones with left and right one close to the door where in an continuous furnace the material come into and flow out. The profile of temperature along furnace is higher in central zone because there is less dispersion but if we scale its input we can have a flat profile.

APPLICATIONS AND FOCUS ON:

- Infrared lamp
- Autoclaves
- Fournaces
- Chemical
- Petrochemical
- Extrusion line.
- Dryers
- Climatic chambers
- Pharmaceutical
### Load Type

- **Silicon carbide elements**
  - Silicon carbide elements
- **Molibdenum, Tungsten, kanthalSuper, Platinum**
- **Infrared Lamps**

### Note

1. The user installation must be protected by an electromagnetic circuit breaker or a fuse isolator. The semiconductor I²t should be 20% less than the power controller I²t. Semiconductor fuses are classified for UL as supplementary protection for the semiconductor. They are not approved for branch circuit protection.

2. The auxiliary voltage supply of the Revo unit must be synchronized with the load voltage supply. If the Auxiliary Voltage (written on the identification label) is different from the Supply Voltage (to the load), use an external transformer connected as above.

### Dimension and Fixing Holes

**SR9**
- **W 72 mm.**
- **H 121 mm.**
- **D 185 mm.**
- **kg. 1,15**

**Thyrists HCL-1PH 35A - 40A**

- **Height (H): 24.5**
- **Width (W): 58.7**
- **Depth (D): 11.5**
### OUTPUT FEATURES (POWER DEVICE)

#### Nominal current in continuous service:
- 35A, 40A

#### Max peak current (10ms):
- 600A for unit type 035
- 800A for unit type 040

#### Voltage range:
- 24÷600V

#### Repetitive peak reverse voltage:
- 1200V (480V), 1600V (600V)

#### Latching current:
- 250mA

#### Leakage current:
- 15mA eff

#### I’t value tp=10msec:
- 1750A/5 for unit type 035
- 3110A/5 for unit type 040

#### Frequency range:
- 47÷70Hz

#### Power loss (I=Inom):
- 44W for unit type 035
- 50W for unit type 040

#### Isolation Voltage:
- 2500Vac

### ORDERING CODES

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THYRISTORS HCL-1PH</strong></td>
<td><strong>H</strong></td>
<td><strong>C</strong></td>
<td><strong>L</strong></td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description code</td>
<td>Numeric code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35A</td>
<td>0 3 5</td>
<td>40A</td>
<td>0 4 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Max Voltage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description code</td>
<td>Numeric code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>480V</td>
<td>4</td>
<td>600V</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aux. Voltage supply</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description code</td>
<td>Numeric code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90:130V (4)</td>
<td>1</td>
<td>170:265V (4)</td>
<td>2</td>
<td>230:345V (4)</td>
<td>3</td>
<td>300:530V (4)</td>
<td>5</td>
<td>510:690V (4)</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description code</td>
<td>Numeric code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSR</td>
<td>S</td>
<td>0:10V dc</td>
<td>V</td>
<td>4:20mA</td>
<td>A</td>
<td>10Kpot</td>
<td>K</td>
<td>RS485</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fuse &amp; Option</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description code</td>
<td>Numeric code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuse + Fuse Holder +CT</td>
<td>Y</td>
<td>Fuse + Fuse Holder +CT +HB</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control Mode</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description code</td>
<td>Numeric code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open Loop</td>
<td>0</td>
<td>Voltage Feed Back V</td>
<td>U</td>
<td>Power Feed Back Volt</td>
<td>W</td>
<td>Voltage Square f/b V^2</td>
<td>Q</td>
<td>Current Feed Back I</td>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description code</td>
<td>Numeric code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE EMC For European Market</td>
<td>0</td>
<td>CUL For American Market, Pending</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Manual</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description code</td>
<td>Numeric code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td>Italian Manual</td>
<td>1</td>
<td>English Manual</td>
<td>2</td>
<td>German Manual</td>
<td>3</td>
<td>French Manual</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Version</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description code</td>
<td>Numeric code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std version with one fuse + Fuse Holder</td>
<td>1</td>
<td>Second fuse used with Phase to Phase voltage Supply for unit (1)</td>
<td>2</td>
<td>Second fuse + additional safety relay (2)</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LEGEND**
- CT = Current Transformer
- HB = Heater Break Alarm

**Notes**
1. If you need one THYRISTOR HCL-1PH with 2 Fuse & Fuse Holder
   For dimensions see THYRISTOR HM2-2PH.
2. If you need one THYRISTOR HCL-1PH with 2 Fuse & Fuse Holder + safety relay
   For dimensions see THYRISTOR HM3-2PH.
3. After 16th digit write current and voltage of load inside brackets Ex. (40A-400V)
4. Load voltage must be included in Selected Auxiliary Voltage Range.
## Sales and Service

For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact one of the offices below.

<table>
<thead>
<tr>
<th>ASIA PACIFIC</th>
<th>EMEA</th>
<th>NORTH AMERICA</th>
<th>SOUTH AMERICA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Australia</strong></td>
<td><strong>Honeywell Process Solutions</strong>&lt;br&gt;Phone: +80012026455&lt;br&gt;or +44 (0)1202645583&lt;br&gt;Fax: +44 (0) 1344 655554&lt;br&gt;Email: &lt;br&gt;(Sales) <a href="mailto:sc-cp-apps-salespa62@honeywell.com">sc-cp-apps-salespa62@honeywell.com</a>&lt;br&gt;or &lt;br&gt;(TAC) <a href="mailto:hfs-tac-support@honeywell.com">hfs-tac-support@honeywell.com</a></td>
<td><strong>Honeywell Process Solutions</strong>&lt;br&gt;Phone: 1-800-423-9883&lt;br&gt;or 1-800-343-0228&lt;br&gt;Email: &lt;br&gt;(Sales) <a href="mailto:ask-ssc@honeywell.com">ask-ssc@honeywell.com</a>&lt;br&gt;or &lt;br&gt;(TAC) <a href="mailto:hfs-tac-support@honeywell.com">hfs-tac-support@honeywell.com</a></td>
<td><strong>Honeywell do Brasil &amp; Cia</strong>&lt;br&gt;Phone: +(55-11) 7266-1900&lt;br&gt;Fax: +(55-11) 7266-1905&lt;br&gt;Email: &lt;br&gt;(Sales) <a href="mailto:ask-ssc@honeywell.com">ask-ssc@honeywell.com</a>&lt;br&gt;or &lt;br&gt;(TAC) <a href="mailto:hfs-tac-support@honeywell.com">hfs-tac-support@honeywell.com</a></td>
</tr>
<tr>
<td><strong>China - PRC - Shanghai</strong>&lt;br&gt;Honeywell China Inc.&lt;br&gt;Phone: (86-21) 5257-4568&lt;br&gt;Fax: (86-21) 6237-2826</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Singapore</strong>&lt;br&gt;Honeywell Pte Ltd.&lt;br&gt;Phone: +65) 6580 3278&lt;br&gt;Fax: +65) 6445-3033</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>South Korea</strong>&lt;br&gt;Honeywell Korea Co Ltd.&lt;br&gt;Phone: +(822) 799 6114&lt;br&gt;Fax: +(822) 792 9015</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Specifications are subject to change without notice.

---

### For More Information

Learn more about how Honeywell’s **THYRISTORS HCL-1PH** and how it can help improve plant performance.

Visit our website [www.honeywellprocess.com/](http://www.honeywellprocess.com/) or contact your Honeywell account manager.