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Millenium 2 is the only logic controller to combine flexible programming using function blocks with the added benefit of sequential flow chart blocks. Its user-oriented design simplifies the process of designing your programs.

Millenium 2 incorporates the most extensive function library on the market, which now includes application-specific functions (calculation, pump rotation, Cam timer, etc). Moreover, Crouzet will offer to design the function which is perfect for your application.

Millenium 2 is the only logic controller to combine flexible programming using function blocks with the added benefit of sequential flow chart blocks. Its user-oriented design simplifies the process of designing your programs.

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Your applications already pre-programmed with our application-specific functions!

CROUZET offers you a library of application-specific functions which can be added to according to your requirements:

- Calculation function
  - Multiplication/Division
  - Addition/Subtraction
- Data archiving function
- Cam timer function
- Clock function with parameter modification
- Pump rotation function
- Up/down counter with calculation function

Example of application-specific function:
Rotation of 3 pumps
The pump rotation function is used to manage the water level in a tank by means of 3 sensors and 3 pumps.

Function toolbar

- **FBD functions**

  21 pre-programmed functions are available for counting, timing, comparison, multiplexing, timer programming and display.

- **Inputs**

  You can connect physical inputs, whether discrete, analogue or potentiometer. There are also internal inputs such as the keypad, constants, etc.

- **Outputs**

  You have two types of output:
  - physical: discrete, solid state with PWM (Pulse Width Modulation),
  - internal: display backlighting.

- **Logic functions**

  AND, OR, NAND, NOR, XOR, NOT functions.
### Millenium II + Controllers

#### Standard versions

- Intuitive programming via function block (FBD) or grafcet (SFC)
- Function: timing, counting, etc.
- Application-specific functions: rotation, cam timers, calculation, etc.
- Discrete, analogue or potentiometer inputs
- Relay or solid state with PWM outputs
- Backlit LCD display
- Program protected by a password
- Calendar program clock
- User-definable from the front panel

<table>
<thead>
<tr>
<th>Type</th>
<th>Input</th>
<th>Output</th>
<th>Power supply</th>
<th>Part Number</th>
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#### Expandable version

- Expandable: communication, inputs/outputs, etc
- Intuitive programming via function block (FBD) or grafcet (SFC)
- Function: timing, counting, etc
- Application-specific functions: load rotation, cam timers, calculation, etc.
- Discrete, analogue or potentiometer inputs
- Relay or solid state with PWM outputs
- Backlit LCD display
- Program protected by a password
- Calendar program clock
- User-definable from the front panel
- Can take an XC adjacent extension and an XL local extension

<table>
<thead>
<tr>
<th>Type</th>
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#### Example of configuration

Communication between two Millenium XT20

- **MODBUS**
- **Local extension XT20-XT20**
- **Adjacent extension 6 I/O**
- **Local extension XT20-XT20**
- **Adjacent extension Slave MODBUS**

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Expandable Economy

■ Performs the same as the XT 20 but without the Display or the Front Panel
■ Ideal for use in applications where modifications of the parameters from the front panel is not a requirement

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Local extensions

■ For EX & XT 20 only (1 local extension per module)
■ Millenium – Millenium local link
■ Doubles the hardware and software capacities
■ Transparent communication between 2 EX & XT 20
■ Max. distance between 2 EX & XT 20: 10 meters
■ Cable type: screened twisted pair
■ 4 Solid State Outputs on XL05

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<td>XL06</td>
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Adjacent extensions

■ For use with XT 20 Models (one adjacent extension per module)
■ Communication using MODBUS or AS-i protocol (Slave module)
■ 6 additional inputs/outputs on XC03

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Economy versions

- No display or parameter-setting buttons
- Intuitive programming via function block (FBD) or grafcet (SFC)
- Function: timing, counting, etc.
- Application-specific functions: load rotation, cam timers, calculation, etc.
- Discrete, analogue or potentiometer inputs
- Relay or solid state with PWM outputs
- Program protected by a password
- Calendar program clock

<table>
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Starter kit

- Each kit includes:
  - a standard or expandable Millenium 2
  - a PC/Millenium 2 link interface
  - an interactive CD-Rom including the software workshop, tutorial, application library and technical brochures

<table>
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<td>KIT XT 20</td>
<td>12</td>
<td>8 relay</td>
<td>100 - 240 VAC</td>
<td>88 950 073</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>8 relay</td>
<td>24 VDC</td>
<td>88 950 074</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>8 relay</td>
<td>100 - 240 VAC</td>
<td>88 950 075</td>
</tr>
</tbody>
</table>

Bare board versions

- For mass-production applications
- Intuitive programming via function block (FBD) or grafcet (SFC)
- Function: timing, counting, etc.
- Application-specific functions: load rotation, cam timers, calculation, etc.
- Discrete, analogue or potentiometer inputs
- Relay or solid state with PWM outputs
- Program protected by a password
- Calendar program clock

Consult factory for availability.
Temperature sensors

Technical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>24 VDC (±10%)</td>
</tr>
<tr>
<td>Output</td>
<td>0 → 10 VDC</td>
</tr>
<tr>
<td>Temperature coefficients</td>
<td></td>
</tr>
<tr>
<td>Derating</td>
<td>0.01% / °C of full scale</td>
</tr>
<tr>
<td>Offset</td>
<td>1.5 mV / °C</td>
</tr>
</tbody>
</table>

Ambient temperature: -10 → +60°C
Ambient humidity: 5 → 95% RH
Casing material: Self-extinguishing

Built-in converter: 0-10V DC output
Applications: Industrial, Services

<table>
<thead>
<tr>
<th>Types</th>
<th>Range</th>
<th>Accuracy</th>
<th>Protection</th>
<th>Part numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone</td>
<td>-10 → +40°C</td>
<td>-0.2°C + 1.2°C (-10 → +40°C)</td>
<td>IP 30 casing</td>
<td>89 750 150</td>
</tr>
<tr>
<td>Ventilation duct</td>
<td>-10 → +60°C</td>
<td>-0.2°C + 1.9°C (-10 → +60°C)</td>
<td>IP 65 casing</td>
<td>89 750 151</td>
</tr>
<tr>
<td>Outdoor</td>
<td>-10 → +40°C</td>
<td>-0.2°C + 1.2°C (-10 → +40°C)</td>
<td>IP 65 casing</td>
<td>89 750 152</td>
</tr>
<tr>
<td>Remote/submersible probe</td>
<td>-10 → +150°C</td>
<td>-0.2°C + 1.9°C (-10 → +150°C)</td>
<td>IP 65 casing</td>
<td>89 750 153</td>
</tr>
<tr>
<td>Remote</td>
<td>-40 → +20°C</td>
<td>-0.2°C + 1.9°C (-40 → +20°C)</td>
<td>IP 68 probe</td>
<td>89 750 155</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Code</th>
<th>Accessory Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>89 750 146</td>
<td>Copper protective sleeve for 89 750 153</td>
</tr>
<tr>
<td>89 750 147</td>
<td>Stainless steel (316) protective sleeve for 89 750 153</td>
</tr>
<tr>
<td>18 372 112</td>
<td>Heat transfer compound</td>
</tr>
</tbody>
</table>

Connection/Dimensions

89 750 153

Accessory 89 750 146 and 89 750 147

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Millenium II +  
Specialty Kits

Discover the possibilities of the Millenium II + with these complete kits for your individual applications. Each kit includes:
- 1 SA12 Millenium II +
- Liquid Level Detector (24 VAC)
  - Liquid Level Adaptor
- Liquid Level Control Kit (24 VAC)
  - 1 CD software
  - 1 Millenium II + programming cable
  - Liquid Level Adaptor
  - 4 Liquid Level sensors S7

<table>
<thead>
<tr>
<th>Type</th>
<th>Input</th>
<th>Output</th>
<th>Power supply</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA12 Liquid Level Detector</td>
<td>8</td>
<td>4 relay</td>
<td>24 VAC</td>
<td>88 950 813</td>
</tr>
<tr>
<td>SA12 Liquid Level Control Kit</td>
<td>8</td>
<td>4 relay</td>
<td>24 VAC</td>
<td>88 950 076</td>
</tr>
</tbody>
</table>
Power Supplies

- Potentiometer allows for the regulation of the output from 100 to 120% to compensate for fluctuation in the voltage lines.
- LED indicator for output status, automatic restart after fault is cleared
- Regulated and protected against short circuits and voltage spikes
- Fits easily into established panels and conforms with the MII line
- CE UL/cUL CSA TUV and C-Tick Certified

Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Input</th>
<th>Output</th>
<th>Consumed Power</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS12</td>
<td>100 – 240 VAC</td>
<td>12 VDC adjustable from 100 – 120%</td>
<td>22W</td>
<td>88 950 300</td>
</tr>
<tr>
<td>PS24</td>
<td>100 – 240 VAC</td>
<td>24 VDC adjustable from 100 – 120%</td>
<td>30W</td>
<td>88 950 301</td>
</tr>
</tbody>
</table>

Conforms to the standards EN 50081-1, EN 50082-1, IEC 61000-8-2 & IEC 950

Cabling

Cables

<table>
<thead>
<tr>
<th>Cables</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC – Millenium cabling</td>
<td>88 950 102</td>
</tr>
<tr>
<td>PC – Millenium II cable DB9</td>
<td>88 950 105</td>
</tr>
<tr>
<td>PC – Millenium II cable USB</td>
<td></td>
</tr>
</tbody>
</table>

Programming

Software

<table>
<thead>
<tr>
<th>Software</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MII Software on CD</td>
<td>88 950 100</td>
</tr>
<tr>
<td>MII modem installation CD</td>
<td>88 950 113</td>
</tr>
<tr>
<td>EEPROM memory module</td>
<td>88 950 101</td>
</tr>
</tbody>
</table>

Converters

Converters

<table>
<thead>
<tr>
<th>Converters</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20mA → 0 – 10VDC converter</td>
<td>88 950 108</td>
</tr>
<tr>
<td>PWM → 0 – 10VDC converter</td>
<td>88 950 112</td>
</tr>
</tbody>
</table>

Covers / Faceplates

Covers / Faceplates

<table>
<thead>
<tr>
<th>Covers / Faceplates</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting faceplate for EC-12 / SA-12</td>
<td>89 750 103</td>
</tr>
<tr>
<td>Mounting faceplate for EC-20 / SA-20 / XT-20 / EX-20</td>
<td>89 750 109</td>
</tr>
<tr>
<td>Water tight covers for SA12 / EC12</td>
<td>89 750 160</td>
</tr>
<tr>
<td>Water tight covers for SA20 / XT20 / EC20 / EX20</td>
<td>89 750 161</td>
</tr>
<tr>
<td>Water tight covers for SA20 / XT20 / EX20 + 1 adjacent extension</td>
<td>89 750 162</td>
</tr>
</tbody>
</table>
### Technical characteristics

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation</td>
<td>7 MΩ</td>
</tr>
<tr>
<td>Safety class</td>
<td>0 industrial / II domestic casing</td>
</tr>
<tr>
<td>Earthing</td>
<td>None</td>
</tr>
<tr>
<td>Protection</td>
<td>IP20/Terminal block IP40</td>
</tr>
<tr>
<td>Protection</td>
<td>IP00 for CN12 and CN20</td>
</tr>
<tr>
<td>Certification</td>
<td>CE, UL, cUL</td>
</tr>
<tr>
<td>Compliance</td>
<td>EN 60947-1, EN 60730-1, EN 60601-1</td>
</tr>
<tr>
<td>Programming method</td>
<td>Function blocks/SFC</td>
</tr>
<tr>
<td>Program size</td>
<td>128 blocks</td>
</tr>
<tr>
<td>Program memory</td>
<td>Flash EEPROM</td>
</tr>
<tr>
<td>Removable memory</td>
<td>EEPROM</td>
</tr>
<tr>
<td>Data memory</td>
<td>256 bits/words backed up for 10 years</td>
</tr>
<tr>
<td>LCD display</td>
<td>Display with 4 lines of 12 characters</td>
</tr>
<tr>
<td>Real-time clock</td>
<td>Drift &lt; 1 min/month at 25°C with user-definable correction of drift</td>
</tr>
<tr>
<td>Data retention</td>
<td>10 years (lithium battery)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>–40 -&gt; +70°C</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>–5 -&gt; +55°C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>90 -&gt; 95%</td>
</tr>
<tr>
<td>Dimensions (w x h x d)</td>
<td>SA12-EC12: 72 x 90 x 60 mm</td>
</tr>
<tr>
<td></td>
<td>SA20-XT-EC20: 125 x 90 x 60 mm</td>
</tr>
<tr>
<td></td>
<td>CN12: 72 x 90 x 42 mm</td>
</tr>
<tr>
<td></td>
<td>CN20: 125 x 90 x 42 mm</td>
</tr>
</tbody>
</table>

### Electrical characteristics

#### 100 - 240 VAC power supply

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>100 VAC -&gt; 240 VAC (+10% – 15%)</td>
</tr>
<tr>
<td>Operating limits</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Immunity from micro power cuts</td>
<td>10 ms</td>
</tr>
<tr>
<td>Maximum inrush current</td>
<td>7 A</td>
</tr>
<tr>
<td>Maximum power consumption</td>
<td>SA12-EC12-CN12: 6 VA</td>
</tr>
<tr>
<td></td>
<td>SA20-EC20-CN20: 6.5 VA</td>
</tr>
<tr>
<td></td>
<td>XT20-EX20: 8 VA</td>
</tr>
</tbody>
</table>

#### 24 VAC power supply

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>24 VAC +20% – 15% 50/60 Hz</td>
</tr>
<tr>
<td>Operating limits</td>
<td>20.4 VAC -&gt; 28.8 VAC</td>
</tr>
<tr>
<td>Immunity from micro power cuts</td>
<td>10 ms</td>
</tr>
<tr>
<td>Maximum inrush current</td>
<td>7 A</td>
</tr>
<tr>
<td>Maximum power consumption</td>
<td>SA12-EC12-CN12: 6 VA</td>
</tr>
<tr>
<td></td>
<td>SA20-EC20-CN20: 6.5 VA</td>
</tr>
<tr>
<td></td>
<td>XT20-EX20: 8 VA</td>
</tr>
</tbody>
</table>

#### 24 VDC power supply

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>24 VDC +20% – 15%</td>
</tr>
<tr>
<td>Operating limits</td>
<td>20.4 VDC -&gt; 28.8 VDC</td>
</tr>
<tr>
<td>Immunity from micro power cuts</td>
<td>1 ms</td>
</tr>
<tr>
<td>Maximum inrush current</td>
<td>7 A</td>
</tr>
<tr>
<td>Maximum power consumption</td>
<td>SA12-EC12-CN12: 3.5 W</td>
</tr>
<tr>
<td></td>
<td>SA20-EC20-CN20: 4 W</td>
</tr>
<tr>
<td></td>
<td>XT20-EX20: 5 W</td>
</tr>
</tbody>
</table>

#### Analogue inputs (24 VDC model only)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN12-SA12-EC12</td>
<td>4 inputs from I5 to I8</td>
</tr>
<tr>
<td>CN20-SA20-EC20-XT20</td>
<td>8 inputs from I5 to I12</td>
</tr>
<tr>
<td>Measuring range</td>
<td>(0 -&gt; 10 V) or (0 -&gt; Power supply V)</td>
</tr>
<tr>
<td>Resolution</td>
<td>8 bits</td>
</tr>
<tr>
<td>Conversion time</td>
<td>10 ms</td>
</tr>
<tr>
<td>Max. input voltage</td>
<td>28.8 VDC</td>
</tr>
<tr>
<td>Input impedance (kΩ)</td>
<td>&gt; 10</td>
</tr>
<tr>
<td>Precision</td>
<td>+/- 5%</td>
</tr>
<tr>
<td>Temperature drift</td>
<td>+/- 3 LSB</td>
</tr>
<tr>
<td>Potentiometer control</td>
<td>2.2 kΩ/0.5 W</td>
</tr>
</tbody>
</table>

#### 100 - 240 VAC input

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>100 - 240 (+10% / -15%) VAC</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Input impedance</td>
<td>700 kΩ</td>
</tr>
<tr>
<td>Pull-in voltage at logic state 1</td>
<td>≥ 80 VAC</td>
</tr>
<tr>
<td>Drop-out voltage at logic state 0</td>
<td>≤ 40 VAC</td>
</tr>
<tr>
<td>Status indicator</td>
<td>On LCD screen for SA12, SA20, XT20</td>
</tr>
</tbody>
</table>

#### 24 VAC input

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>24 (+10% / -15%) VAC</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Input impedance</td>
<td>4 kΩ</td>
</tr>
<tr>
<td>Pull-in voltage at logic state 1</td>
<td>≥ 15 VAC</td>
</tr>
<tr>
<td>Drop-out voltage at logic state 0</td>
<td>≤ 5 VAC</td>
</tr>
<tr>
<td>Status indicator</td>
<td>On LCD screen for SA12, SA20, XT20</td>
</tr>
</tbody>
</table>

#### 24 VDC input

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>24 (+20% – 15%) VDC</td>
</tr>
<tr>
<td>Input current</td>
<td>3.2 mA/5.5 mA max</td>
</tr>
<tr>
<td>Pull-in voltage at logic state 1</td>
<td>≥ 15 VDC</td>
</tr>
<tr>
<td>Drop-out voltage at logic state 0</td>
<td>≤ 5 VDC</td>
</tr>
<tr>
<td>Response time</td>
<td>10 ms</td>
</tr>
<tr>
<td>Sensor type</td>
<td>Contact – 3-wire PNP</td>
</tr>
<tr>
<td>Status indicator</td>
<td>On LCD screen for SA12, SA20, XT20</td>
</tr>
</tbody>
</table>

#### Relay outputs

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. voltage breaking capacity</td>
<td>250 VAC</td>
</tr>
<tr>
<td>Max. current breaking capacity</td>
<td>8 A</td>
</tr>
<tr>
<td>Service life</td>
<td>8 A / 250 VAC Resistive</td>
</tr>
<tr>
<td>(100,000 operations)</td>
<td></td>
</tr>
<tr>
<td>Min. load</td>
<td>10 mA / 5 VDC</td>
</tr>
<tr>
<td>Response time</td>
<td>10 ms</td>
</tr>
<tr>
<td>Status indicator</td>
<td>On LCD screen for SA12, SA20, XT20</td>
</tr>
</tbody>
</table>
### Millenium II + Specifications

#### 12 VDC power supply

<table>
<thead>
<tr>
<th>Operating voltages</th>
<th>12 VDC +30% – 15% (+30% – 11% for XT20 relais 88 950 065)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Limits</td>
<td>10.2 VDC &gt;15.6 VDC (10.68 VDC &gt;15.6 VDC pour XT20 relais 88 950 065)</td>
</tr>
<tr>
<td>Immunity to micro cuts</td>
<td>1 ms</td>
</tr>
<tr>
<td>Maximum inrush current</td>
<td>6 A</td>
</tr>
<tr>
<td>Maximum power consumption</td>
<td>SA12-EC12-CN12: 2.2 W SA20-EC20-CN20: 4.5 W XT20-EX20: 5.5 W</td>
</tr>
</tbody>
</table>

#### Discrete/PWM solid state outputs

<table>
<thead>
<tr>
<th>PWM solid state outputs</th>
<th>SA12-EC12-CN12: 01 to 04 SA20-XT20-EC20-CN20: 01 to 06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage breaking capacity</td>
<td>5-28.8 VDC</td>
</tr>
<tr>
<td>Current breaking capacity</td>
<td>0.7 A / 5-28.8 VDC</td>
</tr>
<tr>
<td>Min. load</td>
<td>1 mA</td>
</tr>
<tr>
<td>Max. inductive load</td>
<td>0.7 A</td>
</tr>
<tr>
<td>Max. incandescent load</td>
<td>0.1 A</td>
</tr>
<tr>
<td>Off-state leakage</td>
<td>0.1 mA / 24 VDC</td>
</tr>
</tbody>
</table>

#### 12 VDC input

<table>
<thead>
<tr>
<th>Input voltage</th>
<th>12(+30%–15%) VDC (Except XT20R +30%–11%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input current</td>
<td>1.9 mA/2.3 mA max.</td>
</tr>
<tr>
<td>Pull in voltage at logic state 1</td>
<td>&gt; 8 VDC</td>
</tr>
<tr>
<td>Drop out voltage at logic state 0</td>
<td>≤ 3 VDC</td>
</tr>
<tr>
<td>Response time</td>
<td>10 ms</td>
</tr>
<tr>
<td>Sensor type</td>
<td>Contact or PNP / NPN 3 wire</td>
</tr>
<tr>
<td>Status Indicator</td>
<td>On LCD display for SA12, SA20, &amp; XT20</td>
</tr>
</tbody>
</table>

| Response time | 1ms |
| Isolated | no |
| PWM frequency | 120 Hz to 1,920 Hz (user-definable) |
| PWM Cyclic ratio | 0 to 100% (256 steps) |
| PWM precision at 120 Hz | < 5% (15% to 85%) load at 10 mA |
| PWM precision at 500 Hz | < 10% (20% to 80%) load at 10 mA |
| Status indicator | On LCD screen for SA12, SA20, XT20 |
812, 814, 815, 816 Series

Panel cut-out

88857 Series

Cut-out
The 816 Series Timer is a multifunction timer with a red backlit LCD display showing actual process time and a high contrast LCD display showing setpoint time. The 816 Timer has eleven selectable time ranges (.01 sec to 9999 hours) and is housed in a 1/16 DIN (48 x 48mm) style enclosure. Easy programming from the front panel push buttons allows selection of up or down timing. 6 different timing functions (Delay on Make, Delay on Break, Interval, Single Shot, Repeat Cycle ON Time First and Repeat Cycle OFF Time First) and 11 different timing ranges. The LCD display also shows relay output, power input and initiate switch status. Slide switch on side of unit provide lockout of front panel access to operating mode programming.

**SPECIFICATIONS:**

- **Input Power**
  - .220 VAC, 110 VAC, 24 VAC/DC, +10%, -15%
- **Input Power Consumption**
  - 1 VA at 24 VAC, 4 VA at 110 VAC, 12 VA at 230 VAC, .5 W at 24 VDC
- **Display**
  - 7 mm High, 4 Digit Backlit LCD
- **Initiate Switch Input**
  - Dry Contact (50 ms min.)
- **Output**
  - SPDT
  - Max Switching Current/Voltage: 8 Amp 250 VAC
  - Max Power Rating: 200 VA/190 W
  - Min Switch Current: 100 mA
  - Electrical Life of Relay: 10^5 Operations at full load
  - Time Ranges: 99.99 s, 999.9 s, 9999 s, 99 min 59 s, 99.99 min, 999.9 min, 9999 min, 9999 hrs, 99.99 hrs, 9999 hrs
- **Front Panel Rating**
  - NEMA 12
- **Repeat Accuracy**
  - +0.03%, +20 ms
- **Reset Time**
  - 50 ms during timing
  - 50 ms after timing
- **Insulation Resistance**
  - 100 mΩ min @ 500 VAC to IEC 255.5
- **Dielectric Strength**
  - 2000 VAC @ 50 Hz for 1 min to VDE 0435
- **Noise Immunity/Interference**
  - IEC 1000.4.4
    - Level IV (Direct 4 KV)
    - Level III (10 V/m)
- **Operating Temperature**
  - +14°F to +140°F (-10°C to +60°C)
- **Weight**
  - 3.5 oz. (100g)
- **Panel Cutout**
  - 45 x 45mm (≈0.6)

**ORDERING INFORMATION:**

- **VOLTAGE**
  - 110 VAC/24 VAC/DC
  - 220 VAC/24 VAC/VDC
- **PART NUMBER**
  - **8 PIN**
    - 88 857 607
    - 88 857 601
  - **11 PIN**
    - 88 857 707
    - 88 857 701

**PROGRAMMING:**

- **VOLTAGE**
  - 110 VAC/24 VAC/DC
  - 220 VAC/24 VAC/VDC
- **PART NUMBER**
  - **8 PIN**
    - 88 857 607
    - 88 857 601
  - **11 PIN**
    - 88 857 707
    - 88 857 701

**MODE OF OPERATIONS:**

- A: Delay on Make
- B: Single Shot
- C: Delay on Break
- D: Repeat Cycle - Equal
- E: Repeat Cycle - Equal
- F: Timing Display
- G: Timing Range Unit
- H: Interval
- I: Timing Indicator
- J: Power On Indicator
- K: Initiate Switch Indicator
- L: Timing Range
- M: Power On
- N: Timing Range
- O: Timing Range
- P: Timing Range
- Q: Timing Range
- R: Timing Range
- S: Timing Range
- T: Timing Range
- U: Timing Range
- V: Timing Range
- W: Timing Range
- X: Timing Range
- Y: Timing Range
- Z: Timing Range

**PROGRAMMING:**

- 1: Power On Indicator
- 2: Initiate Switch Indicator
- 3: Timing Indicator
- 4: Timing Display
- 5: Timing Range Unit
- 6: Decimal Point
- 7: Mode of Operation
- 8: Up or Down Timing
- 9: Timing Range
- 10: Relay Output Status
- 11: Program Mode
- 12: Validation
- 13: Preset Keyboard
- 14: Preset Value Display

**WIRING:**

- For 24 VAC/VDC service voltage for 8 pin versions jumper terminals 2 and 8. For 24 VAC/VDC service voltage for 11 pin versions jumper terminals 2 and 11.

*Load, such as light bulb or contractor, can be connected in parallel with the start switch.

**DIMENSIONS**

See page 2/14
814 SERIES
MULTIFUNCTION TIMER

The 814 Series Timer is a multifunction timer with multi-time ranges (0.01 sec to 9999 hours) housed in a 1/16 DIN (48 x 48mm) style enclosure. Easy programming from the front panel push buttons allows selection of up or down timing, 6 different timing functions (Delay on Make, Delay on Break, Interval, Single Shot, Repeat Cycle ON Time First and Repeat OFF Time First) and 11 different timing ranges. A large 4-digit LCD display indicates current and preset values as well as relay output, power input, and initiate switch status. Load such, as light bulb or contactor can be connected to the start switch. Slide switch on side of unit provides lockout of front panel access to operating mode programming.

SPECIFICATIONS:

- **Input Power:** 220 VAC, 115 VAC, 48 VAC/DC, 24 VAC/DC 12 VDC, 50/60 Hz, ±15%
- **Input Power Consumption:**
  - 11 VA at 220 VAC
  - 0.5 W at 24 VDC
  - 4 VA at 110 VAC
  - 0.5 W at 12 VDC
  - 1 VA at 24 VAC
- **Display:**
  - Timing Display: 3” (7.5mm) High 4 Digit LCD
  - Preset Display: 18” (4.5mm) High 4 Digit LCD
- **Initiate Switch Input:** Dry Contact (50 ms min.)
- **Output:**
  - SPDT Relay
- **Max. Switching Current/Voltage:**
  - 8 pin Version: 10 Amp 250 VAC
  - 11 pin Version: 8 Amp 250 VAC
- **Max. Power Rating:** 2000 VA/50 W
- **Min. Switch Current:** 100 mA
- **Electrical Life of Relay:** 2 x 10^5 Operations
- **Time Ranges:**
  - 99.99 s, 9.999 s
  - 9999 s, 99 min, 59 s
  - 9999 min, 99999 hrs
  - 9999 hrs, 9999 hrs
- **Front Panel Rating:** NEMA 12
- **Repeat Accuracy:** ±0.03%
- **Reset Time:**
  - 50 ms during timing
  - 50 ms after timing
- **Insulation Resistance:** 100 MΩ min @ 500 VAC to IEC 255.5
- **Dielectric Strength:** 2000 VAC @ 50 Hz for 1 min to VDE 0435
- **Operating Temperature:** +14°F to +122°F (-10°C to +50°C)
- **Weight:** 3.5 oz. (100g)
- **Panel Cutout:** 45 x 45mm (1.8 x 1.8"

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>VOLTAGE</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 PIN VERSION</td>
<td></td>
</tr>
<tr>
<td>220/110 VAC/24 VAC/DC</td>
<td>88 857 005</td>
</tr>
<tr>
<td>48/24 VAC/DC/12 VDC</td>
<td>88 857 003</td>
</tr>
<tr>
<td>11 PIN VERSION</td>
<td></td>
</tr>
<tr>
<td>88 857 105</td>
<td></td>
</tr>
<tr>
<td>88 857 103</td>
<td></td>
</tr>
</tbody>
</table>

MODE OF OPERATIONS:

- A: Delay on Make
- B: Single Shot
- C: Delay on Break
- D: Repeat Cycle Equal
- E: Repeat Cycle ON Time First
- F: Repeat Cycle OFF Time First
- G: Interval
- H: Mode of Operation
- I: Validation
- J: Program Mode
- K: Preset Keyboard
- L: Preset Value Display

PROGRAMMING:

1: Power On Indicator
2: Initiate Switch Indicator
3: Timing Indicator
4: Timing Display
5: Timing Range Unit
6: Decimal Point
7: Mode of Operation
8: Up or Down Timing
9: Timing Range
10: Relay Output Status
11: Program Mode
12: Validation
13: Preset Keyboard
14: Preset Value Display

WIRING:

For 24 VAC/VDC service voltage for 8 pin versions jumper terminals 2 and 8.
For 24 VAC/VDC service voltage for 11 pin versions jumper terminals 2 and 11.

*Load, such as light bulb or contractor, can be connected in parallel with the start switch.

DIMENSIONS

See page 2/14

Products and specifications subject to change without notice.
812 SERIES
DELAY ON MAKE TIMER

- DIN-Sized (48 x 48mm) Housing
- Dual LCD Display Shows Setpoint and Actual
- Up or Down Timing
- DPDT Output Relay
- Popular Octal Socket Relay

The 812 Timer is a Delay on Make digital timer with a DPDT output relay in the industry standard octal socket plug-in base. The series has a large, easy to read LCD display that shows actual and preset time values as well as relay output relay output status. Easy programming from front panel allows selection of eleven time ranges from .01 sec. to 9999 hours.

MODES OF OPERATION:
Delay on Make

When input power (S1) is applied, the timer delay begins. DPDT relay energizes after the timing period. Interruption of input power resets timer. Timer is supplied with relay status indicator on LCD display.

PROGRAMMING:

1: Power On Indicator
2: Timing Indicator
3: Timing Display
4: Timing Range Unit
5: Decimal Point
6: Up or Down Timing
7: Timing Range
8: Relay Output Status
9: Program Mode
10: Validation
11: Preset Keyboard
12: Preset Value Display

WIRING:

DIMENSIONS See page 2/14

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 VAC/DC</td>
<td>88 857 409</td>
</tr>
<tr>
<td>110 VAC</td>
<td>88 857 406</td>
</tr>
<tr>
<td>220 VAC</td>
<td>88 857 400</td>
</tr>
</tbody>
</table>

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
**815 SERIES**

**DELAY ON MAKE TIMER WITH MEMORY**

- Retains Cycle Progress During Power Interruptions
- DIN-Sized (48 x 48mm) Housing
- 2 Delayed SPDT or 1 Delayed SPDT and 1 instantaneous SPDT
- Up or Down Timing

The 815 Timer is a Delay on Make digital timer with memory and can be programmed to retain cycle progress during power interruption. Output relays can be programmed either as 2 SPDT delayed outputs or 1 SPDT instantaneous output and 1 SPDT delayed output. The 815 Series has a large, easy to read LCD display that shows actual and preset time values as well as relay output status. Easy programming from front panel allows selection of eleven time ranges from .01 sec. to 9999 hrs. Termination is for 11 pin round socket.

**SPECIFICATIONS:**

- **Input Power:** 110 VAC, 220 VAC, 12 VAC/DC
  - 24 VAC/DC, +10%, -15%
  - 50/60 Hz
- **Input Power Consumption:**
  - 1 W at 24 V
  - 3.5 VA at 110 V
  - 11 VA at 230 V
- **Display:**
  - Timing Display .3” (7.5mm)
  - High 4 Digit LCD
- **Reset Time:**
  - 10 cycles per minute max.
- **Time Ranges:**
  - 99.99 sec. to 9999 hrs
  - 140 cycles per minute max.
  - Min: 0.1 sec.
  - Max: 10 years
- **Front Panel Rating:**
  - NEMA 12
- **Repeat Accuracy:** ±0.03%, ±100 ms
- **Insulation Resistance:**
  - 100 MΩ min @ 1000 VAC to IEC 255.5
- **Dielectric Strength:**
  - 9999 VAC @ 60 Hz for 1 min.
- **Operating Temperature:**
  - -22°F to 150°F (-30°C to 70°C)
- **Storage Temperature:**
  - -22°F to 150°F (-30°C to 70°C)
- **Weight:**
  - 100 grams
- **Dimensions:**
  - 45 x 45 x 85 mm

**ORDERING INFORMATION:**

- **Voltage:**
  - 12 VAC/DC & 48 VAC/DC
  - 24 VAC/DC & 110 VAC
  - 24 VAC/DC & 220 VAC

**WIRING:**

- 1: Power On Indicator
- 2: Initiate Switch Indicator
- 3: Timing Indicator
- 4: Timing Display
- 5: Timing Range Unit
- 6: Decimal Point
- 7: Mode of Operation
- 8: Up or Down Timing
- 9: Timing Range
- 10: Relay Output Status
- 11: Program Mode
- 12: Validation
- 13: Preset Keyboard
- 14: Preset Value Display

For 12 VAC/DC service voltage (Part Number 88-857-302) and for 24 VAC/DC service voltage (Part Numbers 88-857-307 & 88-857-301) jumper terminals 2 and 7.

**For 12 VAC/DC service voltage (Part Number 88-857-302) and for 24 VAC/DC service voltage (Part Numbers 88-857-307 & 88-857-301) jumper terminals 2 and 7.**

**MODES OF OPERATION:**

- **Function A1 - Delay On Make**
  - 1 SPDT Instantaneous Output (R1), 1 SPDT Delayed Output (R2)

- **Function A2 Delay On Make**
  - 2 SPDT Output Relays Programmed for Delayed Output

**PROGRAMMING:**

- **1:** Power On Indicator
- **2:** Initiate Switch Indicator
- **3:** Timing Indicator
- **4:** Timing Display
- **5:** Timing Range Unit
- **6:** Decimal Point
- **7:** Mode of Operation
- **8:** Up or Down Timing
- **9:** Timing Range
- **10:** Relay Output Status
- **11:** Program Mode
- **12:** Validation
- **13:** Preset Keyboard
- **14:** Preset Value Display

For 12 VAC/DC service voltage (Part Number 88-857-302) and for 24 VAC/DC service voltage (Part Numbers 88-857-307 & 88-857-301) jumper terminals 2 and 7.

**WIRING:**

1) Load, such as light bulb or contactor can be connected in parallel with the start switch.

**DIMENSIONS** See page 2/14
TOP 948
LCD MULTI-FUNCTION TIMER

- 8 Timing Functions
- Multi-timing Range
- DIN-Sized (48 x 48mm) Housing
- Large LCD Display
- NEMA 4 Front Panel
- 10 year EEPROM Memory

GENERAL FEATURES:
The 88 857 Series is a programmable timer with multi-time ranges (0.01s to 999.9 hrs) housed in 1/16 DIN (48 x 48mm) style enclosure. The 8 available functions — On Delay, Interval, Single Shot, Repeat Cycle... the large 4 Digit display and the NEMA 4 front panel will fit most industrial applications. The large LCD permits easy programming and monitoring of status such as time remaining, preset value, output relay, time range, function, etc.

SPECIFICATIONS:
Input Power: 220 VAC, 110 VAC, 24/48 VAC, 50/60 Hz ±15%
Input Power Consumption: 8 VA at 115 VAC, 0.5 W at 12 VDC
Display: 4 Digit 3.3” (8mm) High LCD
Memory: 10 years (EEPROM)
Repeat Accuracy: ±0.05%
Protection Rating: NEMA 4 (IP 65)
Dielectric Strength: 3000V (IEC 255-5)
Initiate Switch Input: Dry Contact, PNP Open Collector, Voltage

Output:
- SPDT Relay
- Maximum Switching Current: 8 Amp AC Resistive, 8 Amp DC Resistive
- Maximum Switching Voltage: 250 VAC, 250 VDC
- Maximum Power Rating: 1250 VA, 30 W
- Mechanical Life of Relay: 2 x 10⁶ Operations
- Electrical Life of Relay: 1 x 10⁶ Operations
- Time Ranges: 99.99 sec, 999.9 sec, 99.99 min, 999.9 min, 99.9 hrs, 99 min, 59 sec, 99 hrs, 99 min

Weight: 1.77 oz.
Operating Temperature: 14°F to 122°F
Storage Temperature: 13°F to 158°F

FUNCTIONS:
A: Delay on Make
B: Single Shot
C: Delay on Break
D: Repeat Cycle
H: Interval
T: On Delay w/memory

WIRING DIAGRAM:

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>8-PIN VERSION</th>
<th>11-PIN VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/24 VDC</td>
<td>88 857 800</td>
<td>88 857 502</td>
</tr>
<tr>
<td>24/48 VAC</td>
<td>88 857 800</td>
<td>88 857 504</td>
</tr>
<tr>
<td>110 VAC</td>
<td>88 857 506</td>
<td>88 857 508</td>
</tr>
<tr>
<td>110/220 VAC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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88220 SERIES
MULTIFUNCTION MOTOR TIMER WITH MEMORY
UL listed   CSA recognized

- Five Functions in One Unit
- Timing Range from 0.3 sec to 12 hours
- DIN-Rail, Plug-in, or Panel Mounting

DESCRIPTION:
The 88220 Series is a synchronous motor driven reset timer. The timer is available in 2 standard time ranges from 0.3 sec to 12 hours. Time ranges are knob adjustable and all have a progress pointer which displays the remaining time. Different functions (ON Delay, Interval, One Shot) selectable through external wiring.

FUNCTION AND WIRING DIAGRAMS:
(Octal plug-in mounting shown)

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power</td>
<td>24 VAC, 110 VAC, 220 VAC</td>
</tr>
<tr>
<td>Maximum power consumption</td>
<td>3 VA</td>
</tr>
<tr>
<td>Output</td>
<td>1 x SPST Relay &amp; 1 x SPDT Relay</td>
</tr>
<tr>
<td>Contact material</td>
<td>AgCdO</td>
</tr>
<tr>
<td>Maximum loading</td>
<td>8 Amp 1/3 HP</td>
</tr>
<tr>
<td>Maximum switching voltage</td>
<td>220 VAC</td>
</tr>
<tr>
<td>Mechanical life of relay</td>
<td>2.5 million operations</td>
</tr>
<tr>
<td>Repeat accuracy</td>
<td>±1.5% (except 4% on 6 sec range)</td>
</tr>
<tr>
<td>Setting Accuracy</td>
<td>±2% (except 5% on 6 sec range)</td>
</tr>
<tr>
<td>Reset time</td>
<td>200 ms</td>
</tr>
<tr>
<td>Storage temp. rating</td>
<td>-20° to +70°C (-4° to 158°F)</td>
</tr>
<tr>
<td>Operating temp. rating</td>
<td>-20° to +55°C (-4° to 131°F)</td>
</tr>
</tbody>
</table>

DIMENSIONS: inches (mm)

Type 88 225 0 (DIN - rail mounting)

Type 88 226 0 (paneling mounting)
**GENERAL FEATURES:**

- **MULTI-FUNCTION**
  - On-delay, interval
  - And single shot in
  - On timer

- **MULTI-RANGE**
  - 2 model/3 time ranges
  - Each cover
  - From 0.3 sec to
  - 12 hours

- **CYCLE PROGRESS**
  - Dial shows
  - Time remaining
  - In cycle

- **MEMORY**
  - When “on,”
  - Holds time
  - During power
  - Interruption

- **TRANSIENT IMMUNITY**
  - Built-in

- **TIME RANGES**
  - Model 1 (12 min.): .3 to 6 s, .5 to 12 min.
  - Model 2 (12 hrs.): .3 to 6 min., 3 to 60 min, .5 to 12 hrs.

**ORDERING INFORMATION:**

When ordering, select model, voltage/frequency and mounting to determine part number in chart below

**EXAMPLE**

MODEL 1 (12 MIN.), 115V/60Hz, OCTAL PLUG-IN, 88 226 510

<table>
<thead>
<tr>
<th>MODEL</th>
<th>VOLTAGE/FREQ.*</th>
<th>OCTAL PLUG-IN (PART NUMBER)</th>
<th>PANEL MOUNTING (PART NUMBER)</th>
<th>BASE MOUNTING (PART NUMBER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODEL 1 (12 MIN.)</td>
<td>24 V/60 Hz</td>
<td>88 226 509</td>
<td>88 226 029</td>
<td>88 225 029</td>
</tr>
<tr>
<td>MODEL 1 (12 MIN.)</td>
<td>115 V/60 Hz</td>
<td>88 226 510</td>
<td>88 226 030</td>
<td>88 225 030</td>
</tr>
<tr>
<td>MODEL 1 (12 MIN.)</td>
<td>220 V/60 Hz</td>
<td>88 226 511</td>
<td>88 226 031</td>
<td>88 225 031</td>
</tr>
<tr>
<td>MODEL 1 (12 MIN.)</td>
<td>220 V/50 Hz</td>
<td>88 226 504</td>
<td>88 226 011</td>
<td>88 225 011</td>
</tr>
<tr>
<td>MODEL 2 (12 HRS.)</td>
<td>24 V/60 Hz</td>
<td>88 226 512</td>
<td>88 226 032</td>
<td>88 225 032</td>
</tr>
<tr>
<td>MODEL 2 (12 HRS.)</td>
<td>115 V/60 Hz</td>
<td>88 226 513</td>
<td>88 226 033</td>
<td>88 225 033</td>
</tr>
<tr>
<td>MODEL 2 (12 HRS.)</td>
<td>220 V/60 Hz</td>
<td>88 226 514</td>
<td>88 226 034</td>
<td>88 225 034</td>
</tr>
<tr>
<td>MODEL 2 (12 HRS.)</td>
<td>220 V/50 Hz</td>
<td>88 226 508</td>
<td>88 226 014</td>
<td>88 225 014</td>
</tr>
</tbody>
</table>
**TMR 48 Analog Timers**

- Multi-function or monofunction
- Multi-timing ranges from 0.02 Sec to 300 Hrs
- Multi voltage from 12-240 Vdc / 24-240 Vac
- Time setting displayed on dial
- 2 output relays 5A / 250 Vac
- 2 LED indicators 1 for power and 1 for relay status

<table>
<thead>
<tr>
<th>Type</th>
<th>Functions</th>
<th>Output</th>
<th>Supply Voltage</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMR 48 U</td>
<td>A, B, C, W, Ac, Bw</td>
<td>2 SPDT relays, 11 pin plug in 5A / 250 Vac</td>
<td>12 - 250 Vdc 24 - 240 Vac</td>
<td>88 886 016</td>
</tr>
<tr>
<td>TMR 48 A</td>
<td>A</td>
<td>2 SPDT relays, 8 pin plug in 5A / 250 Vac</td>
<td>12 - 250 Vdc 24 - 240 Vac</td>
<td>88 886 106</td>
</tr>
<tr>
<td>TMR 48 X</td>
<td>A1, A2, H1, H2, Q1, Q2, D-Di</td>
<td>2 SPDT relays, 8 pin plug in 5A / 250 Vac 2 timed or 1 timed &amp; 1 instantaneous</td>
<td>12 - 250 Vdc 24 - 240 Vac</td>
<td>88 886 116</td>
</tr>
<tr>
<td>TMR 48 L</td>
<td>L, Li, G, Gi</td>
<td>2 SPDT relays, 11 pin plug in 5A / 250 Vac</td>
<td>12 - 250 Vdc 24 - 240 Vac</td>
<td>88 886 516</td>
</tr>
</tbody>
</table>

**General Specifications**

- Supply Voltage Un 12 - 250 Vdc 24 - 240 Vac
- Operating Range +/- 10% DC Supply -15% / +10% AC Supply
- Frequency 50 / 60 Hz
- Power Consumption 4.8 VA / 230 Vac 2.5 VA / 110 Vac 1.1 VA / 24 Vac 0.5 W / 24 Vdc 0.6 W / 12 Vdc

<table>
<thead>
<tr>
<th>14 Timing Ranges Available</th>
<th>0.02 - 1.2 s</th>
<th>0.2 - 12 m</th>
<th>0.2 - 12 H</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05 - 3 s</td>
<td>0.5 - 3 m</td>
<td>0.3 - 5 H</td>
<td></td>
</tr>
<tr>
<td>0.2 - 1.2 s</td>
<td>2 - 12 m</td>
<td>2 - 12 H</td>
<td></td>
</tr>
<tr>
<td>0.5 - 30 s</td>
<td>5 - 300 m</td>
<td>5 - 300 H</td>
<td></td>
</tr>
<tr>
<td>2 - 120 s</td>
<td>5 - 300 s</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Repetition Accuracy +/- 0.5% of full scale at 25°C (typical with constant parameters)
- Temperature drift according to IEC / EN 61812 +/- 0.05% of full scale
- Display Accuracy +/-5% of full scale at 25°C
- Minimum required START pulse duration 25ms
- Minimum required GATE pulse duration 60ms
- Minimum required RESET pulse duration 60ms
- Minimum required START pulse duration 50ms

**Output Specifications**

- Nominal Rating 2 x 5A
- Nominal insulation voltage 250Vac
- Rated power (resistive load) 2000VA
- Minimum Current 10mA
- Electrical life at max / Vac resistive (# of operations) 10^6
- Mechanical Life 30 x 10^6

**Function & Use**

- Display of output state by 2 LED’s Green: Power ON, Flashing during timing Yellow: On output ON, OFF output OFF
- Operating Temperature range -20 to +55°C
- Storage Temperature range -40 to +70°C
- Breakdown Voltage 2 KV
- Protection Class (IEC 60529) - Panel Mounted IP 50
- Protection Class (IEC 60529) - Casing IP40
- Housing Material Self extinguishing
- Weight (g) 140

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TIMERS

Dimensions
35 mm DIN rail base with clips 79 237 739

Connections
TMR 48 U

TMR 48 A/X

TMR 48 L

TMR 48 Covers
Decorative Covers
Color  Part Numbers
Black  79 237 783
Grey  79 237 784
Other colors available by special order.

Time Function Curves
Function A (TMR 48 A)
Delay on make (delay on energisation)

Function A1
Delay on make (delay on energisation)

Function A2
Delay on make (delay on energisation)

Function H1
Timing on energisation – interval

Function H2
Timing on energisation – interval

Function Q1
Star-delta

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Function Q2
Star-delta 2

Function A (TMR 48U)
Delay on make (delay on energisation)

Function C
Timing after impulse - Delay on break - Delay off w/constant supply

Function G
Cyclic function

Function Bw
Pulse output (adjustable)

Function L/Li - G/Gi
Cyclic timing : asymmetrical recycler

Function D-Di
Cyclic timing : repeat cycle : symetric recycler

Function B
Timing on impulse : single shot

Function W
Timing after impulse on control contact

Function Ac
Timing after closing and opening of control contact

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TOP 36 SERIES
DELAY ON MAKE TIMER
UL listed   CSA recognized

- DIN-Sized (36 x 36mm) Housing
- Low Cost
- Solid State Technology
- 5 Amp DPDT Relay
- LED Power On Indicator

When input power (S1) is applied, the relay delays the preset time (T) period prior to energizing. Interrupt power to unlatch the relay.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Function: A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power</td>
</tr>
<tr>
<td>Delay on Make</td>
</tr>
<tr>
<td>Relay R1 R2</td>
</tr>
</tbody>
</table>

DIMENSIONS:

WIRING DIAGRAM:

CUT OUT: inches (mm)

MOUNTING CLIP:

ORDERING INFORMATION: (10 pcs. minimum)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Time Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>88 888 111</td>
<td>24 VAC/VDC Version .05 to 5 sec</td>
</tr>
<tr>
<td>88 888 131</td>
<td>220 VAC Version .6 to 60 sec</td>
</tr>
<tr>
<td>88 888 151</td>
<td>110 VAC Version 3 to 300 sec</td>
</tr>
<tr>
<td>88 888 171</td>
<td>.3 to 30 min</td>
</tr>
</tbody>
</table>

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
# 88 901 Series

## Delay on Make Timer

- 22mm Panel Mount Timer
- 2 Wire AC or 3 Wire DC
- PLC Compatible
- NEMA 4 Rating

### Description:

The 88 901 Series is a front panel mount analog timer with a NEMA 4 front panel. The unit is available in a 2 wire AC (110/220 V) or 3 Wire DC (24 V PNP Transistor) Configuration. The unit can drive a contactor or be connected, for the 3 wire DC version, between the input and the output of a PLC for remote setting of a time variable. The delay on make timer is available in 10 different time ranges from 1 sec. to 30 min. The device is protected against reverse polarity and short-circuit.

### Specifications:

<table>
<thead>
<tr>
<th>3 Wire</th>
<th>2 Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Output</td>
<td>PNP Open Collector</td>
</tr>
<tr>
<td>Max. Current at 20°C</td>
<td>200 mA</td>
</tr>
<tr>
<td>Off State Voltage Drop</td>
<td>&lt; 3 VDC</td>
</tr>
<tr>
<td>Derating</td>
<td>1.5 mA/°C</td>
</tr>
<tr>
<td>Off State Leakage Current</td>
<td>&lt; 1 mA</td>
</tr>
<tr>
<td>Max. Reset Time: during timing</td>
<td>20 ms</td>
</tr>
<tr>
<td>after timing</td>
<td>20 ms</td>
</tr>
<tr>
<td>Display Accuracy</td>
<td>±5%</td>
</tr>
<tr>
<td>Repeat Accuracy</td>
<td>±0.2%</td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>1500 V/1 min.</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>1 W</td>
</tr>
<tr>
<td>Connections</td>
<td>Screw Terminals</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>-4°F to 140°F</td>
</tr>
<tr>
<td>Weight</td>
<td>8 oz.</td>
</tr>
</tbody>
</table>

### Wiring:

#### 3 Wire DC with Relay/Contactor

- 01 - Output of programmable controller
- 02 - Input of programmable controller
- 03 - Load

#### 2 Wire AC

### Ordering Information:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Time Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 VDC Version</td>
<td></td>
</tr>
<tr>
<td>88 901 302</td>
<td>.05 to 1 sec</td>
</tr>
<tr>
<td>88 901 322</td>
<td>.5 to 10 sec</td>
</tr>
<tr>
<td>88 901 342</td>
<td>3 to 60 sec</td>
</tr>
<tr>
<td>88 901 372</td>
<td>.5 to 10 min</td>
</tr>
<tr>
<td>88 901 392</td>
<td>3 m to 60 min</td>
</tr>
</tbody>
</table>

### Function:

- Delay on Make

### Dimensions:

![Dimensions Diagram]
RTM SERIES
DELAY ON MAKE TIMER

-ul listed - CSA recognized

- Subminiature 21 x 27mm Enclosure
- Multi timing Range (0.55 to 100 hrs)
- Low Cost
- 2PDT or 4PDT Relay Output
- LED Power On Indicator
- LED Relay Indicator

SPECIFICATIONS:

- Input Power: 230 VAC, 115 VAC, ±15%, 50/60Hz
- Power consumption: 3 VA at 230 VAC, 3 VA at 115 VAC
- Output Rating:
  - Maximum load: 5 Amp
  - Maximum switching voltage: 100 m Amp
  - Maximum power rating: 240 VAC
- Electrical life at 240 VAC: 2 x 105 operations
- Mechanical life: 10^7 operations
- Setting error: ±20%
- Repeat accuracy: ±0.5%
- Reset time:
  - 50 msec. after timing
  - 100 msec. during timing
- Dielectric strength:
  - 2KV VAC between coil and contact
  - 1000 VAC between contacts
- Noise Immunity: Consult Factory
- Operating temperature: -20°C to +60°C
- Weight: 50 grams

Note: When Time Base Selector is on “Inst.”, the output relays will turn on instantaneously.

WIRING DIAGRAM:

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>2PDT Version</th>
<th>4PDT Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Part Number</td>
<td>Part Number</td>
</tr>
<tr>
<td>12 VDC</td>
<td>88895201</td>
<td>88896201</td>
</tr>
<tr>
<td>24 VDC</td>
<td>88895202</td>
<td>88896202</td>
</tr>
<tr>
<td>24 VAC</td>
<td>88895203</td>
<td>88896203</td>
</tr>
<tr>
<td>115 VAC</td>
<td>88895206</td>
<td>88896206</td>
</tr>
<tr>
<td>230 VAC</td>
<td>88895207</td>
<td>88896207</td>
</tr>
</tbody>
</table>

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NAR2 SERIES
OPEN BOARD TIMER

UL listed

Consult factory for custom open-board timers.

WIRING DIAGRAM:

DIMENSIONS: inches (mm)

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Chronos 2 electronic timers - 17.5 mm

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- SPDT relay output: 10A - 250V
- Screw or spring terminals
- 1 LED status indicator
- Option of connecting a small cord to the control input
- 3-wire sensor control option

Technical specifications

Timing
Repetition accuracy (with constant parameters) ± 0.5 % (CEI 1812-1)
Drift
- Temperature ± 0.05 % / °C
- Voltage ± 0.2 % / V
Display precision according to CEI 1812-1 ±10 % / 25 °C
Minimum pulse duration
- Typically (relay version) 30 ms
- Typically (solid state version) 50 ms
- Typically under load (relay version) 100 ms
Maximum reset time by de-energisation
- Typically (relay version) 100 ms
- Typically (solid state version) 350 ms
Immunity to breaks in supply voltage: typically >10 ms

Power supply
Multi-voltage power supply depending on version, see pages 6/2, 6/3
Frequency 50/60 Hz
Operating range 85 to 110 % Un
- 85 to 120 % Un for 12V AC/DC
Load factor 100 %
Maximum power consumption 0.6 W 24V AC/DC
1.5 W 230V AC
32 VA 230V AC

Output elements relay output
1 or 2 changeover relays, AgNi (cadmium-free)
Rated power 2000 VA / 80 W
Maximum breaking current 10 A AC 10 A DC
Minimum breaking current 10 mA / 5 VDC
Voltage breaking capacity 2500V AC/DC
Electrical life 10^6 operations
Mechanical life 5 x 10^6 operations
Breakdown voltage acc. to IEC 1812-1 2.5 kV / 1min / 1 mA / 50Hz
Impulse voltage acc. to IEC 664-1 IEC 1812-1 5 kV, wave 1.2 / 50 µs

Display
State displayed by 1 LED
- Flashing green when on
- Green LED operation indicator
- Flashing: - timing in progress
- typically (functions Di-D and Li-L)
- timing in progress
- Permanently lit:
- Relay waiting, no timing in progress
Input type
- Volt-free contact
- 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply

Other information
For special features, functions etc. please contact us.

Types
Screw terminals MUR1 - MAR1
Spring terminals — —

Part numbers and voltage
24 V = / 24 • 240 V ~ 88 826 105
12 V ~ / 12 • 240 V ~ 88 826 115

Functions
Multi-function
Bifunction
A - At • B - C - H - Ht - Di - D - Ac - Bw
A - At

Nominal current 10 A SPDT 10 A SPDT

Timing ranges (7 ranges)
1s - 10 s - 1 min - 10 min - 1 h - 10 h - 100 h

General specifications
Conforming to standards
IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC
(CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)
Approvals
UL listed CSA recognized

Electromagnetic compatibility
- Immunity to electrostatic discharges acc. to IEC 1000-4-2
- Immunity to electrostatic fields acc. to ENV 5140/204 (IEC 1000-4-3)
- Immunity to rapid transient bursts acc. to IEC 1000-4-4
- Immunity to shock waves on power supply acc. to IEC 1000-4-5
- Immunity to radiofrequency in common mode acc. to ENV
- Immunity to voltage dips and breaks acc. to IEC 1000-4-11
- Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)

Fixing: Symmetrical DIN rail (EN 50022)
Connection capacity
- without ferrule
- with ferrule
Spring terminals, 2 terminals per connection point
- flexible wire
- rigid wire
Gaging material
Self-extinguishing
Weight: 17.5 mm casing
60 g

For special features, functions etc. please contact us.

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Product officer / Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Functions:

A - At / H - Ht / B / C Li
Di - D / Ac / BW L

Function diagrams

Function A
Delay on Make
1 relay

Function H
Interval
1 relay

Function Li
Repeat Cycle
On Time First

Function C
Delay on Break
1 relay

Function At
Accumulative Delay on Make
1 relay

Function Ht
Accumulative Interval
1 relay

Function Di
Repeat Cycle
Equal On/Off Time. On Time First

Function Bw
Pulse output (adjustable)
1 relay

Function L
Repeat Cycle
Offtime First

Function Ac
Combo Delay on Make/Delay on Break. Equal On/Off Time
1 relay

Function B
Single Shot
1 relay

Function D
Repeat Cycle. Equal On/Off Time. Off Time First
Pause start

Function C
Repeat Cycle
Equal On/Off Time. On Time First

Connections (Y1 = C, Function diagrams)

Dimensions

To order, specify:

1 Type
2 Part number
Example: Chronos 2 Timers MUR1 88 826 105

Products and specifications subject to change without notice.
### Chronos 2 electronic timers - 17.5 mm

#### Solid state output
- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- Solid state output: 0.7 A - 250 V (0.5 A UL)
- Screw or spring terminals
- 1 LED status indicator

#### Technical specifications
**Timing**
- Repetition accuracy (with constant parameters) ± 0.5 %
- Drift: ± 0.05 % / °C, ± 0.2 % / V
- Display precision according to IEC 1812-1 ±10 % / 25 °C

**Minimum pulse duration**
- Typically (relay version) 30 ms
- Typically (solid state version) 50 ms
- Typically under load (relay version) 100 ms

**Maximum reset time by de-energisation**
- Typically (relay version) 100 ms
- Typically (solid state version) 350 ms

**Immunity to breaks in supply voltage:** typically >10 ms

**Power supply**
- Multi-voltage power supply: depending on version, see page 6/5
- Frequency: 50/60 Hz
- Operating range: 85 to 110 % Un (85 to 120 % Un for 12V AC/DC)
- Load factor: 100 %
- Maximum power consumption: 0.6 W 24V AC/DC, 1.5 W 230V AC, 32 VA 230V AC

**Output elements: Solid state output**
- Rated power: 0.7 A AC/DC, 20 °C (0.5A UL)
- Derating: 5 mA / °C
- Maximum admissible current: 20 A ± 10 ms
- Minimum breaking current: 10 mA
- Off-state leakage: < 5 mA
- Voltage breaking capacity: 250V AC/VDC
- Maximum voltage drop at terminals: 3 fils 4V - 2 fils 8V
- Electrical life: 10^6 operations
- Mechanical life: 10^8 operations
- Breakdown voltage acc. to IEC 664, IEC 255-5: 2.5 kV to 1 mA / 1 min.

**Display**
- State displayed by 1 LED
- Flashing green when on
- Green LED operation indicator
  - Pulsing: timer on, no timing in progress
  - except functions Di-D and Li-L
  - Flashing: timing in progress
  - Permanently lit: Relay waiting, no timing in progress
- Input type:
  - Volt-free contact
  - 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply

#### Other information
For special features, functions etc. please contact us.

---

### Timing

#### Types

#### Part numbers and voltage
- 24 • 240 V ~ 50 • 60 Hz
- 24 • 240 V ~ 50 • 60 Hz

#### Functions

#### Nominal current
- Timing ranges (7 ranges)
  - 1s - 10 s - 1 min - 10 min - 1 h - 10 h - 100 h

#### General specifications

- Conforming to standards IEC 1812-1, EN 50081-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)

- Approvals
  - UL cUL listed
  - CSA recognized

- Temperatures limits
  - use: -20 °C + 60 °C
  - stored: -30 °C + 60 °C

- Installation category (acc. to IEC 664-1)

- Creepage distance and clearance acc. to IEC 664-1

- Degree of protection acc. to IEC 529
  - terminal block
  - casing
  - front face (except Tk2R1)

- Vibration resistance acc. to IEC 68-2-6

- Relative humidity acc. to IEC 88-2-3

- Electromagnetic compatibility
  - Immunity to electrostatic discharges acc. to IEC 1000-4-2
  - Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)
  - Immunity to rapid transient bursts acc. to IEC 1000-4-4
  - Immunity to shock waves on power supply acc. to IEC 1000-4-5
  - Immunity to radiofrequency in common mode acc. to ENV
  - Immunity to voltage dips and breaks acc. to IEC 1000-4-11
  - Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)

- Fixing: Symmetrical DIN rail (EN 50022)

- Connection capacity:
  - without ferrule: 2 x 2.5 mm²
  - with ferrule: 2 x 1.5 mm²

- Spring terminals, 2 terminals per connection point
  - flexible wire: 1.5 mm²
  - rigid wire: 2.5 mm²

- Casing material: Self-extinguishing

- Weight: 17.5 mm casing: 60 g

---

For special features, functions etc. please contact us.
### Functions:

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.7 A, 0.5 A (UL)</td>
<td>88 826 004</td>
</tr>
<tr>
<td>B</td>
<td>0.7 A, 0.5 A (UL)</td>
<td>88 826 014</td>
</tr>
<tr>
<td>H</td>
<td>0.7 A, 0.5 A (UL)</td>
<td>88 826 044</td>
</tr>
<tr>
<td>Li</td>
<td>0.7 A, 0.5 A (UL)</td>
<td>88 826 054</td>
</tr>
</tbody>
</table>

### Connections

**Function diagrams:**
- **Function A:** Delay on Make
- **Function B:** Single Shot
- **Function At:** Accumulative Delay on Make
- **Function H:** Accumulative Interval
- **Function L:** Repeat Cycle. Off Time First. Pause start
- **Function Di:** Repeat Cycle. Equal On/Off Times. On Time First. Pulse start
- **Function Li:** Repeat Cycle. On Time First. Pulse start
- **Function C:** Delay on Break
- **Function D:** Repeat Cycle. Equal On/Off Time. Off Time First. Pause start
- **Function Bw:** Pulse output (adjustable)
- **Function Ac:** Combo Delay on Make/Delay on Break. Equal On/Off Time.

**Dimensions:**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>44</td>
<td>17.5</td>
</tr>
</tbody>
</table>

### To order, specify:

1. **Type**
2. **Part number**

Example: Chronos 2 Timers MUS2 88 826 004

Products and specifications subject to change without notice.
Chronos 2 electronic timers - 22.5 mm

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- SPDT relay output: 10 A - 250 V
- Screw or spring terminals
- 1 LED status indicator
- Option of connecting a small cord to the control input
- 3-wire sensor control option

### Technical specifications

#### Timing
- Repetition accuracy (with constant parameters) ± 0.5 % (CEI 1812-1)
- Drift
  - Temperature ± 0.05 % / °C
  - Voltage ± 0.2 % / V
- Display precision according to IEC 1812-1 ±10 % / 25 °C
- Minimum pulse duration
  - Typically (relay version) 30 ms
  - Typically (solid state version) 50 ms
  - Typically under load (relay version) 100 ms
- Maximum reset time by de-energisation
  - Typically (relay version) 100 ms
  - Typically (solid state version) 350 ms
- Immunity to breaks in supply voltage: typically > 10 ms

#### Power supply
- Multi-voltage power supply depending on version, see pages 6/8, 6/7
- Frequency 50/60 Hz
- Operating range
  - 85 to 110 % Un (85 to 120 % Un for 12V AC/DC)
- Load factor 100 %
- Maximum power consumption
  - 0.6 W 24V AC/DC
  - 1.5 W 230V AC
  - 32 VA 230V AC

#### Output elements relay output
- 1 or 2 changeover relays, AgNi (cadmium-free)
- Rated power 2000 VA / 80 W
- Maximum breaking current 10 A AC 10 A DC
- Minimum breaking current 10 mA / 5 VDC
- Voltage breaking capacity
  - 250V AC/DC
- Electrical life
  - 10⁶ operations
  - 8 A 250V resistive
- Mechanical life
  - 5 x 10⁶ operations
- Breakdown voltage acc. to IEC 1812-1
  - 2.5 kV / 1min / 1 mA / 55 Hz
- Impulse voltage acc. to IEC 664-1 IEC 1812-1
  - 5 kV, wave 1.2 / 50 µs

#### Display
- State displayed by 1 LED
  - Flashing green when on
- Green LED operation indicator
  - Pulsing: - timer on, no timing in progress (except functions Di-D and Li-L)
  - Flashing: - timing in progress
  - Permanently lit: - Relay waiting, no timing in progress

#### Input type
- Volt-free contact
- 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply

### Other information

For special features, functions etc. please contact us.

### Types
- Screw terminal TUR1
- Spring terminal —

### Part numbers and voltage

<table>
<thead>
<tr>
<th>12 V ~ / 24 V ~</th>
<th>88 865 105</th>
<th>88 865 115</th>
<th>88 865 125</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 V ~ / 24 V ~</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>24 V ~ / 24 V ~</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

### Functions

<table>
<thead>
<tr>
<th>Multi-function</th>
<th>Bifunction</th>
<th>Mono-function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-At - B - C - H</td>
<td>A-At B</td>
<td>D-D - Ac - Bv</td>
</tr>
</tbody>
</table>

### Nominal current

- 10 A SPDT
- 10 A SPDT
- 10 A SPDT

### Timing ranges (7 ranges)

<table>
<thead>
<tr>
<th>0.1s</th>
<th>1s</th>
<th>10s</th>
<th>1 min</th>
<th>10 min</th>
<th>1 h</th>
<th>10 h</th>
<th>100 h</th>
</tr>
</thead>
</table>

### General specifications

- Conforming to standards:
  - IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC)
  - CE marking + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm))
- Approvals
  - UL cUL listed
  - CSA recognized
- Temperatures limits
  - use -20 °C + 60 °C
  - stored -30 °C + 60 °C
- Installation category (acc. to IEC 664-1) Voltage surge category
- Creepage distance and clearance acc. to IEC 664-1
  - 4 kV / 3
- Degree of protection acc. to IEC 529
  - terminal block
  - casing
  - front face (except Tkr2R1)
- Vibrations resistance acc. to IEC 68-2-6
  - f = 10 • 55 Hz
  - A = 0.35 mm
- Relative humidity acc. to IEC 68-2-3
  - without condensation 93 %
- Electromagnetic compatibility
  - Immunity to electrostatic discharges acc. to IEC 1000-4-2
  - Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)
  - Immunity to rapid transient bursts acc. to IEC 1000-4-4
  - Immunity to shock waves on power supply acc. to IEC 1000-4-5
  - Immunity to radiofrequency in common mode acc. to EN
  - Immunity to voltage dips and breaks acc. to IEC 1000-4-11
  - Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)
- Fixing: Symmetrical DIN rail (EN 50022)
- Casing material Self-extinguishing
- Weight: 22.5 mm casing 90 g

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To order, specify:

<table>
<thead>
<tr>
<th>Type</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TAR1 88 865 115</td>
</tr>
</tbody>
</table>

Example: Chronos 2 Timers TAR1 88 865 115
Chronos 2 electronic timers - 22.5 mm

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- DPDT relay output, 10A - 250V including 1 instantaneous
- Screw terminals
- 1 LED status indicator
- Option of connecting a small cord to the control input
- 3-wire sensor control option

Technical specifications

Timing
- Repetition accuracy (with constant parameters) ± 0.5 % (CEI 1812-1)
- Drift ± 0.05 % / °C
- Display precision according to IEC 1812-1 ±10 % / 25 °C
- Minimum pulse duration
  - Typically (relay version) 30 ms
  - Typically (solid state version) 50 ms
  - Typically under load (relay version) 100 ms
- Maximum reset time by de-energisation
  - Typically (relay version) 100 ms
  - Typically (solid state version) 350 ms
- Immunity to breaks in supply voltage: typically >10 ms

Power supply
- Multi-voltage power supply depending on version, see page 6/9
- Frequency 50/60 Hz
- Operating range
  - 85 to 110 % Un (85 to 120 % Un for 12V AC/DC)
- Load factor 100 %
- Maximum power consumption
  - 0.6 W 24V AC/DC
  - 1.5 W 230V AC
  - 32 VA 230V AC

Output elements relay output
- 1 or 2 changeover relays, AgNi (cadmium-free) 2000 VA / 80 W
- Rated power 2000 V A / 80W
- Maximum breaking current 10 A AC 10 A DC
- Minimum breaking current 10 mA / 5 VDC
- Voltage breaking capacity 250V AC/DC
- Electrical life
  - 106 operations
  - 8 A 250V resistive
- Mechanical life
  - 5 x 106 operations
- Breakdown voltage acc. to IEC 1812-1
  - 2.5 kV / 1min / 1 mA / 50Hz
- Impulse voltage acc. to IEC 664-1 IEC 1812-1
  - 5 kV, wave 1.2 / 50 us

Display
- State displayed by 1 LED
  - Flashing green when on
  - Green LED operation indicator
  - Pulses:
    - timer on, no timing in progress
    - Pulsing: (except functions Di-D and Li-L)
  - Flashing:
    - timing in progress
  - Permanently lit:
    - Relay waiting, no timing in progress
- Input type
  - Volt-free contact
  - 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply

Other information

For special features, functions etc. please contact us.

Timing Types

Part numbers and voltage

<table>
<thead>
<tr>
<th>24V</th>
<th>12V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 24 • 240V</td>
<td>a</td>
</tr>
<tr>
<td>1 12 V</td>
<td>a</td>
</tr>
</tbody>
</table>

Functions

Nominal current

Timing ranges (7 ranges)
0.1s - 1s - 10s - 1 min - 10 min - 1 h - 10 h - 100 h
TK2R1 (4 ranges)
0.06s - 0.6s - 2.5s - 20s - 160s

General specifications

Conforming to standards
IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)

Approvals
UL listed cUL listed CSA recognized

Temperatures limits
- use -20 °C + 60 °C
- stored -30 °C + 60 °C

Installation category (acc. to IEC 664-1) Voltage surge category
IP 20
IP 40
IP 50

Vibration resistance acc. to IEC 68-2-6
f = 10 • 55 Hz
A = 0.35 mm

Relative humidity acc. to IEC 68-2-3
30 % / 10 ms
60 % / 100 ms
95 % / 5 s

Electromagnetic compatibility
- Immunity to electrostatic discharges acc. to IEC 1000-4-2
- Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)
- Immunity to rapid transient bursts acc. to IEC 1000-4-4
- Immunity to shock waves on power supply acc. to IEC 1000-4-5
- Immunity to radiofrequency in common mode acc. to IEC

Other information

- Immunity to voltage dips and breaks acc. to IEC 1000-4-11
- Immunity to mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)

Fixing: Symmetrical DIN rail (EN 50022)

Connection capacity
- without ferrule
- with ferrule

Casing material
- Self-extinguishing

Weight: 22.5 mm casing
### Functions

**Function A**
- Delay on Make
- 1 Relay Timed and
- 1 Relay Timed or Instant

**Function C**
- Delay on Break
- 1 Relay Timed and
- 1 Relay Timed or Instant

**Function Ac**
- Combo Delay on Make/Delay on Break. Equal On/Off Time
- 1 Relay Timed and
- 1 Relay Timed or Instant

**Function D**
- Repeat Cycle
- 1 Relay Timed and
- 1 Relay Timed or Instant

**Function Di**
- Repeat Cycle
- 1 Relay Timed and
- 1 Relay Timed or Instant

**Function B**
- Single Shot
- 1 Relay Timed and
- 1 Relay Timed or Instant

**Function H**
- Interval
- 1 Relay Timed and
- 1 Relay Timed or Instant

**Function Ht**
- Accumulative Interval
- 1 Relay Timed and
- 1 Relay Timed or Instant

**Function K**
- True delay OFF
- 2 relays

**Function Bw**
- Pulse output (adjustable)
- 1 Relay Timed and
- 1 Relay Timed or Instant

### Connections (Y1 = C, Function diagrams)

Functions:
- A - At / H - Ht / B / C
- Di - D / Ac / BW

### Dimensions

- L x W x H

### To order, specify:

1. Type
2. Part number

Example: Chronos 2 Timers TA2R1 88 865 215

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
## Chronos 2 electronic timers - Plug-in 8-pin (35 mm)

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- SPDT or DPDT relay output 10A - 250V
- Plug-in
- 1 LED status indicator
- Option of connecting a small cord to the control input
- 3-wire sensor control option

### Technical specifications

| Timing | Repetition accuracy (with constant parameters) | ± 0.5 %
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<td>Typically</td>
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<tr>
<td>Immunity to breaks in supply voltage</td>
<td>Typically</td>
<td>&gt;10 ms</td>
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### Power supply

- Multi-voltage power supply depending on version, see page 6/10, 6/11
- Frequency: 50/60 Hz
- Operating range: 85 to 110 % Un (85 to 120 % Un for 12V AC/DC)
- Load factor: 100 %
- Maximum power consumption: 0.6 W 24V AC/DC, 1.5 W 230V AC, 32 VA 230V AC

### Output elements relay output

- 1 or 2 changeover relays, AgNi (cadmium-free)
- Rated power: 2000 V A / 80 W
- Maximum breaking current: 10 A AC, 10 A DC
- Minimum breaking current: 10 mA / 5 VDC
- Voltage breaking capacity: 250V AC/DC
- Electrical life: 10⁶ operations
- Maximum power consumption: 8 A 250V resistive
- Mechanical life: 5 x 10⁶ operations
- Breakdown voltage acc. to IEC 1812-1: 2.5 kV / 1 min / 1 mA/50Hz
- Impulse voltage acc. to IEC 664-1 IEC 1812-1: 5 kV, wave 1.2 / 50 us

### Display

- State displayed by 1 LED
- Flashing green when on
- Green LED operation indicator
- Flashing: Pulsing:
  - timer on, no timing in progress
  - (except functions Di-D and Li-L)
  - timing in progress
- Permanently lit:
  - Relay waiting, no timing in progress

### Input type

- Volt-free contact
- 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply

### Other information

For special features, functions etc. please contact us.

### Timing

| Types | 0.1s • 100h |

### Part numbers and voltage

| 24V AC/DC | 12 V ~ / 110V AC/DC |
| 240V AC | 120 V ~ / 220 V AC/DC |

### Functions

- Monofunction

### Nominal current

- 8 A DPDT

### Accessories

- 8-pin connector base (for the whole range) S-08

### Timing ranges (7 ranges)

- 0.1s - 1s - 10s - 1 min - 10 min - 1 h - 10 h - 100 h

### General specifications

- Conforming to standards IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)
- Approvals UL cUL listed CSA recognized
- Temperatures limits:
  - use: -20 °C + 60 °C
  - stored: -30 °C + 60 °C
- Installation category (acc. to IEC 664-1)
- Creepage distance and clearance acc. to IEC 664-1
- Degree of protection acc. to IEC 529
  - terminal block: IP 20
  - casing: IP 40
  - front face (except Tk2R1): IP 65
- Vibration resistance acc. to IEC 68-2-6
  - f = 10 • 55 Hz
  - A = 0.35 mm
- Relative humidity acc. to IEC 88-2-3
  - without condensation: 93 %
- Electromagnetic compatibility
  - Level III (Air 8 K / Contact 6 KV)
  - Level III 10V/m: 80 MHz to 1 GHz
  - Level III (common mode 2 KV / residual current mode 1KV)
- Level III (10V rms: 0.15 MHz to 80 MHz)
- Immunity to radiofrequency in common mode acc. to ENV
- Immunity to shocks waves on power supply acc. to IEC 1000-4-5
- Immunity to radiophase in common mode acc. to ENV
- Immunity to voltage damps and breaks acc. to IEC 1000-4-11
- Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)
- Fixing: plug-in bases
- Casing material
- Weight: plug-in casing

### Fixing

- Class B
- 8-pin
- Self-extinguishing
- 80 g

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
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     - Accumulative Delay on Make
   - Function L
     - Repeat Cycle
   - Function Li
     - Repeat Cycle
   - Function Di
     - Repeat Cycle
   - Function Bw
     - Pulse Output

3. **To order, specify:**
   - Type
   - Part number

---

**Definitions**

**Product and Specifications**

- Products and specifications subject to change without notice.
- Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

**Functions**

- A: Single Shot
- B: Single Shot
- C: Delay on Break
- D: Repeat Cycle
- E: Repeat Cycle
- F: Pulse Output

**Connections**

- 8-pin 1 relay
- 8-pin 2 relay

**Dimensions**

- A: 3.5 x 74.5 x 12.5

**Accessories**

- 8-pin connector base S08

---

**Table of Configurations**

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**To order, specify:**

1. Type
2. Part number
   - Example: Chronos 2 Timers OUR1 88 867 105
3. Part number
   - 8-pin connector base S08
Chronos 2 electronic timers - Plug-in 11-pin (35 mm)

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- DPDT Relay output 10A - 250V
- Plug-in
- 1 LED status indicator
- Option of connecting a small cord supply to the control input
- 3-wire sensor control option

Technical specifications

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<td>Immunity to breaks in supply voltage</td>
<td>Typically</td>
<td>&gt; 10 ms</td>
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Power supply

- Multi-voltage power supply depending on version, see page 6/13
- Frequency | 50/60 Hz |
- Operating range | 85 to 110 % Un (85 to 120 % Un for 12V AC/DC) |
- Load factor | 100 % |
- Maximum power consumption | 0.6 W 24V AC/DC |
| | 1.5 W 230V AC |
| | 32 VA 230V AC |

Output elements relay output

- 1 or 2 changeover relays, AgNi (cadmium-free) | 2000 VA / 80 W |
- Rated power | 2000 V A / 80W |
- Maximum breaking current | 10 A AC 10 A DC |
- Minimum breaking current | 10 mA / 5 VDC |
- Voltage breaking capacity | 250V AC/VDC |
- Electrical life | 10^6 operations |
- Mechanical life | 5 x 10^6 operations |
- Breakdown voltage acc. to IEC 1812-1 | 8 A 250V resistive |
- Impulse voltage acc. to IEC 664-1 IEC 1812-1 | 5 kV, wave 1.2 / 50 μs |

Display

- State displayed by 1 LED
  - Flashing green when on
  - Pulsing:
    - timer on, no timing in progress
      (except functions Di-D and Li-L)
    - timing in progress
      (except functions Di-D and Li-L)
  - Permanently lit:
    - Relay waiting, no timing in progress

Input type

- Volt-free contact
- 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply
- 0.4 V

Other information

For special features, functions, etc. please contact us.

Timing Types

Part numbers and voltage

- 24 V :: / 24 • 240V ~
- 12 V ~ / 1
- 12 • 240 V ~ /

Functions

Nominal current

Accessories

11-pin connector base (for the whole range) S11

Timing ranges (7 ranges)

0.1s - 1s - 10s - 1 min - 10 min - 1 h - 10 h - 100 h

General specifications

- Conforming to standards
  - IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC)
  - CE marking + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm))
  
- Approvals
  - UL cUL listed
  - CSA recognized

- Temperatures limits
  - use: -20 °C + 60 °C
  - stored: -30 °C + 60 °C

- Installation category (acc. to IEC 664-1)
  - Voltage surge category

- Creepage distance and clearance acc. to IEC 664-1 | 4 kV / 3 |
- Degree of protection acc. to IEC 529
  - terminal block
  - casing
  - front face (except Tk2R1)
  - IP 20
  - IP 40
  - IP 50
- Vibration resistance acc. to IEC 68-2-6 | f = 10 • 55 Hz |
  - A = 0.35 mm

- Relative humidity acc. to IEC 68-2-3
  - without condensation
  - 93 %

- Electromagnetic compatibility
  - Immunity to electrostatic discharges acc. to IEC 1000-4-2
  - Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)
  - Immunity to lightning surges acc. to IEC 1000-4-4
  - Immunity to radiofrequency in common mode acc. to IEC 1000-4-5
  - Immunity to radiofrequency in common mode acc. to ENV

- Immunity to mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)
  - Level III (10V rms: 0.15 MHz to 80 MHz)
  - Level III (100V: 0.15 MHz to 80 MHz)
  - Level III (1000V: 0.15 MHz to 80 MHz)
  - Mains-borne and radiated emissions acc. to EN 55022

- Fixing: plug-in bases

- Casing material

- Weight: plug-in casing

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
## Cross Reference (For Chronos to Chronos 2)

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<td>88867135</td>
<td>88893823</td>
<td>88865265</td>
<td></td>
</tr>
<tr>
<td>OCR U 220A</td>
<td>88867135</td>
<td>88893916</td>
<td>88865175</td>
<td></td>
</tr>
<tr>
<td>ODR U 12D</td>
<td>Call for assistance</td>
<td>88867100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ODR U 48A</td>
<td>88867155</td>
<td>88867155</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ODR U 110A</td>
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<td>ODR U 220A</td>
<td>88867155</td>
<td></td>
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<tr>
<td>ODR U 220A</td>
<td>88867155</td>
<td>ODR U 12D</td>
<td>Call for assistance</td>
<td></td>
</tr>
<tr>
<td>ODR2 U 12D</td>
<td>Call for assistance</td>
<td>ODR2 U 110A</td>
<td>88867801</td>
<td></td>
</tr>
<tr>
<td>ODR2 U 48A</td>
<td>88867801</td>
<td>ODR2 U 220A</td>
<td>88867801</td>
<td></td>
</tr>
<tr>
<td>ODR2 U 110A</td>
<td>88867801</td>
<td>ODR2 U 220A</td>
<td>88867801</td>
<td></td>
</tr>
<tr>
<td>ODR2 U 220A</td>
<td>88867801</td>
<td>ODR1 U 12D</td>
<td>Call for assistance</td>
<td></td>
</tr>
<tr>
<td>ODR11 U 12D</td>
<td>Call for assistance</td>
<td>ODR12 U 110A</td>
<td>88867801</td>
<td></td>
</tr>
<tr>
<td>ODR12 U 110A</td>
<td>88867801</td>
<td>ODR12 U 220A</td>
<td>88867801</td>
<td></td>
</tr>
<tr>
<td>OHR U 12D</td>
<td>88867100</td>
<td>OHR U 110A</td>
<td>88867105</td>
<td></td>
</tr>
<tr>
<td>OHR U 110A</td>
<td>88867105</td>
<td>OHR U 220A</td>
<td>88867105</td>
<td></td>
</tr>
</tbody>
</table>

Products and specifications subject to change without notice.
GENERAL DETAILS OF TYPE S TIMERS

S series are compact, low cost, precision devices designed to the most demanding specifications. The small size, epoxy filled case is highly resistant against dust, vibrations, shock or humidity. Creep and strike distance according to VDE 0110 Group C 250V. Case protection IP66. Case material - Polymid.

SAS SERIES
DELAY ON MAKE TIMER WITH SOLID STATE OUTPUT
UL listed CSA recognized

SPECIFICATIONS:
Input Power .......................................................... 24 VAC/DC, 110 VAC/DC
220 VAC/DC, ±15%, 50/60 Hz
Output Rating ......................................................... max.: 0.7 A at 20°C
min.: 10 mA
Repetition accuracy .................................................. ±0.5% at a constant ambient
Temp rise derating ................................................... 5 mA / °C
Reset time SAS & SAS-D ........................................... 25 ms after timing
SAS-P .......................................................................... 100 ms during timing
Leakage current during timing ............................... 5 mA max
Peak surge current .................................................. 20 A < 10 ms
Peak surge voltage .................................................. 1400 V, 10 µs
Terminals ................................................................. 1/4” (6.35mm) quick connect
Operating temperature ........................................... -22°F to +140°F (-30°C to +60°C)
Weight ................................................................. 1.9 oz. (55g)

WIRING DIAGRAM:

ORDERING INFORMATION: (500 pcs. minimum order, 250 pcs. minimum release)

MOUNTING
S = Encapsulated requiring DIN-Rail, Panel Adapter or use Base Mounting Holes

SERIES
AS = standard relay
AS-D = remote potentiometer
AS-P = internal potentiometer

TIME RANGE
AS = Fixed .1 sec - 1 min
AS-D = .1 sec - 60 min
Ex: = 10-100 sec maintain 10:1 ratio
AS-P = .1 sec - 10 sec
1-100 sec maintain 100:1 ratio

INPUT POWER
24AD = 24 VAC/DC
110AD = 110 VDC
220AD = 220 VAC/DC

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
**SDS SERIES REPEAT CYCLE TIMER**

**UL listed  CSA recognized**

- Shock Resistant
- SCR Solid State Output
- Optional Remote Potentiometer
- DIN-Rail or Base Mounting

---

**SPECIFICATIONS:**

**Input**
- 24 VAC, 48 VAC, 110 VAC
- 220 VAC, ±15%, 50/60 Hz

**Maximum power consumption**
- 24 VAC: 0.2 VA
- 48 VAC: 0.3 VA
- 110 VAC: 0.6 VA
- 220 VAC: 1.2 VA

**Output**
- SCR

**Output Rating**
- max.: 0.7 A at 20°C
- min.: 10 mA

**Repetition accuracy**
- ±0.5% at a constant ambient temp.

**Temp. rise derating**
- 5 mA/°C

**Reset time**
- 100 ms after timing
- 150 ms during timing

**Leakage current during timing**
- 2 mA max.

**Peak surge current**
- 20 A < 10ms

**Peak surge voltage**
- 1400 V, 100 µs

**Terminals**
- Faston 1/4” (6.35mm)

**Operating temperature**
- -22°F to +140°F (-30°C to +60°C)

**Weight**
- 1.9 oz. (55g)

---

**WIRING DIAGRAM:**

When input power S1 is applied, the solid state output turns on immediately for the timer period specified. It then turns OFF for that same time period and repeats continuously while power is applied.

---

**ORDERING INFORMATION:** (500 pcs. minimum order, 250 pcs. minimum release)

P.S.: Specify maximum time for “D” and “P” versions.

---

**DIMENSIONS See page 3-34**

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

---

**MOUNTING**
- S = Encapsulated, requiring DIN-Rail, Panel Adapter or use Base Mounting Holes

**SERIES**
- DS = Fixed time
- DS-D = remote potentiometer
- DS-P = internal potentiometer

**TIME RANGE**
- DS = Fixed .1s. - 120 min
- DS-D = .1 sec. - 120 min.
  - Maintain 10:1 ratio
- DS-P = 1 -10 sec. or min., 10 - 100 sec. or min.
  - Maintain 100:1 ratio

**INPUT POWER**
- 24A = 24 VAC
- 48A = 48 VAC
- 110A = 110 VAC
- 220A = 220 VAC
SHS SERIES
INTERVAL TIMER WITH
SOLID STATE OUTPUT

UL listed   CSA recognized

- Epoxy Encapsulated
- DIN-Rail or Base Mounting
- Internal or External Time Set
- Fixed Time

SPECIFICATIONS:

**Input**  
24 VAC, 48 VAC, 110 VAC, 220 VAC, ±15%, 50/60 Hz

**Maximum power consumption**  
- 24 VAC: 0.2 VA
- 48 VAC: 0.3 VA
- 110 VAC: 0.6 VA
- 220 VAC: 1.2 VA

**Output**  
SCR

**Output Rating**
- max.: 0.7 A at 20°C
- min.: 10 mA

**Repetition accuracy**  
±0.5% at a constant ambient Temp.

**Temp. rise derating**  
5 mA / °C

**Reset time**
- 100 ms after timing
- 150 ms during timing

**Leakage current during timing**
2 mA max.

**Peak surge current**
20 A < 10 ms

**Peak surge voltage**
1400 V, 100 µs

**Terminals**
Faston 1/4˝ (6.35mm)

**Operating temperature**
- -22°F to +140°F (-30°C to +60°C)

**Weight**
1.9 oz. (55g)

WIRING DIAGRAM:

Function H: Internal Timer

Input Power S1

Output

0  T  t

The solid state output turns on when the input power (S1) is applied. The output turns off at the end of time (T). The timer is reset when the input power is removed.

Note: Available with internal potentiometer in HS-P Series.

ORDERING INFORMATION: (500 pcs. minimum order, 250 pcs. minimum release)

P.S.: Specify maximum time for “D” and “P” versions.

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
GENERAL DETAILS
OF TYPE Q TIMERS

Q series timers are compact, low cost, precision devices designed to the most demanding specifications. The small size, epoxy filled case is highly resistant against dust, vibrations, shock and humidity. Creep and strike distance according to VDE 0110 Group C 250V. Case protection IP66. Case material - Phenolic.

Consult factory for Q TIMER specifications.
88 256.4 and 88 256.5 SERIES
MANUALLY SET INTERVAL TIMER
UL listed   CSA recognized

- Standard Motor
- Standard Switches
- Easy to use and troubleshoot

DESCRIPTION:
An adjustable knob with a graduated dial is mounted on the motor output shaft. A friction clutch allows it to be rotated manually.

In the case of the Single Pole version, the molded cam is set to operate the switch when the zero position is reached.

In the case of the Double Pole version, the second switch (No. 2) changes over after the first switch (No. 1). The second switch (No. 2) controls the motor.

T = desired time.
Dephasing is equal to 3% of total max. time range on switch #2.

SPECIFICATIONS:
Standard Voltage .......................... 115 V - 60 Hz
Input Power ............................. 3.5 Watts
Other voltages on request
Motor 82 344 (Crouzet)
Output Circuit .......................... Switch 83 160.0 (Crouzet)
Contact material .................. AgCdO
Rating ................................. 8 Amp, 125/250 AC
Connections .......................... 1/4˝ spade terminals
Ambient Limits ........................ 23°F to 158.0°F
(-5°C to +70°C)
UL components recognized

NOTE: If motor connected to constant supply, timer becomes a recycle timer.

DIMENSIONS: inches (mm)

WIRING DIAGRAM:

Actuation

End Time Switch 1
(Device)

End Time Switch 2
(Motor)

Switch 1

T

D

Switch 2

R

W = work  R = rest  D = dephasing  T = time

WIRING DIAGRAM:

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
SERIES 88 256.4 AND 88 256.5
MANUALLY SET INTERVAL TIMERS

For other Time & Voltage requirements contact factory.

IMPORTANT NOTE:
The maximum time setting is equal to 17/18 of the maximum dial range.

ORDERING INFORMATION:
Specify Part number
Example: 88 256 4.3 HR

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>NUMBER OF CAMS</th>
<th>MODEL</th>
<th>MAXIMUM TIME RANGE</th>
<th>ACCURACY OF SETTINGS+</th>
<th>DEPHASING OF SWITCHES</th>
<th>VOLTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>88 256 455</td>
<td>1</td>
<td>60 sec.</td>
<td>56 sec.</td>
<td>2.5 sec</td>
<td>–</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 456</td>
<td>1</td>
<td>30 min.</td>
<td>28 min.</td>
<td>1 min.</td>
<td>–</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 457</td>
<td>1</td>
<td>1 hr.</td>
<td>56 min.</td>
<td>2.5 min.</td>
<td>–</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 562</td>
<td>2</td>
<td>60 sec.</td>
<td>56 sec.</td>
<td>2.5</td>
<td>2 sec.</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 563</td>
<td>2</td>
<td>5 min.</td>
<td>4 min. 40 sec.</td>
<td>15 sec.</td>
<td>9 sec.</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 564</td>
<td>2</td>
<td>15 min.</td>
<td>14 min.</td>
<td>30 sec.</td>
<td>27 sec.</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 565</td>
<td>2</td>
<td>1 hr.</td>
<td>56 min.</td>
<td>2.5 min.</td>
<td>1 min. 48 sec.</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 4.30 HR</td>
<td>1</td>
<td>30 hr.</td>
<td>28 hr.</td>
<td>1 hr.</td>
<td>–</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 4.30 SEC</td>
<td>1</td>
<td>30 sec.</td>
<td>28 sec.</td>
<td>1 sec.</td>
<td>–</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 4.5 HR</td>
<td>1</td>
<td>5 hr.</td>
<td>4 hr. 43 min.</td>
<td>15 min.</td>
<td>–</td>
<td>220 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 4.5 MIN</td>
<td>1</td>
<td>5 min.</td>
<td>4 min. 40 sec.</td>
<td>15 sec.</td>
<td>–</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 5.15 SEC</td>
<td>2</td>
<td>15 sec.</td>
<td>14 sec.</td>
<td>.5 sec.</td>
<td>.45 sec.</td>
<td>115 VAC - 60 Hz</td>
</tr>
<tr>
<td>88 256 5.30 SEC</td>
<td>2</td>
<td>30 sec.</td>
<td>28 sec.</td>
<td>1 sec.</td>
<td>.9 sec.</td>
<td>115 VAC - 60 Hz</td>
</tr>
</tbody>
</table>
88 646 SERIES is specifically adapted for applications requiring 2 to 4 circuits. The switches are mounted on both sides of frame to give minimum overall length. Precision SPDT switches rated at 6 Amps, 1/3 H.P., 125/250V AC. are standard. Switches are individually removable. Adjustable cams are simple and quick setting. Adjustable cam key comes as standard.

**STANDARD CAMS FOR SINGLE ON/OFF OPERATION PER CYCLE:**
Cams are adjusted by using red plastic key supplied. Each cam consists of two sections, one red half and one grey half. The grey section is normally adjusted for “START” and the red section for “STOP.” Each cam has a notch which will match the tab on the adjusting key. With the key positioned so the “START” side is facing the knob, the grey cam section can be adjusted by inserting the tab of the key into the notch in the cam while turning the knob. Reversing the key so the “STOP” side faces the knob, the red cam can be adjusted.

**STEP 1.** Insert Cam Adjusting Key into No. 1 cam (grey section) having the word “START” on tool facing adjusted knob and turn knob until the degree reading matches the first transfer point on your time chart for that cam.

**STEP 2.** Insert Cam Adjusting Key into No. 1 (red section) having the word “STOP” on tool now facing cam adjusting knob and turn knob until the degree reading matches the next transfer point on your time chart for that cam. This completes setting of No. 1 cam.

**STEP 3.** Repeat steps 1 and 2 for each additional circuit of your cam timer.

**NOTE:** All switches have single pole, double throw circuitry. On each circuit where the load should be energized for less than 180° of cam shaft rotation, use the NO switch terminal.

---

**SPECIFICATIONS:**

**GENERAL**
- **Voltage** .................. 220 VAC, 115 VAC, 24 VAC, (+10 -15%)
- **Input Power** ............... 50-60 Hz
- **Operating Temperature** .... -5°C +60°C (23°F +140°F)
- **Storage Temperature** ...... -40°C +80°C (-40°F +178°F)
- **Duty Cycle** ................ 100%
- **Circuitry** .................. SPDT
- **Output Switches** .......... 6 A, 1/3 H.P., 125/250
- **Gear Motors** ............... 1/4” spade terminal block
- **Direction** .................. CW direction is standard

**ELECTRICAL**
- **CAMS Minimum Notch or Pulse**
  - Electrical .................. 12° (1/20 of cycle)
  - Rise ........................ 12° (1/20 of cycle)
  - Maximum Cam Speed .......... 30 RPM
  - Setting Accuracy ............ 1°
  - Repeat Accuracy ............ Adjustable and Programmable
  - Cam Construction ............ Adjustable
  - Cut Cams .................... ±1° (+-25% of cycle time)
  - Programmable Cams .......... ±0.5% (-125% of cycle time)

**OPTIONAL:**
- **P:** Programmable Cams: For multiple on/off operations per cycle see page 2/53 for details.
- **C:** Cut Cams: For multiple or non-tamperable operations per cycle, consult factory with time charts for cams.

**ORDERING INFORMATION:**

**SERIES**
- **NO. OF CAMS**
  - **TYPE OF CAM**
  - **SPEED/CYCLE TIME**
  - **ELECTRICAL**

- **EXAMPLE:** 88646002.S.6S.AS ie: 88 646 cam timer with 2 standard cams, 6 second cycle time, and 115 VAC - 60hz

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
STANDARD CAMS FOR SINGLE ON/OFF OPERATION PER CYCLE:
Cams are adjusted by using red plastic key supplied. Each cam consists of two sections, one red half and one grey half. The grey section is normally adjusted for “start” and the red sections for “stop.” Each cam has a notch which will match the tab on the red adjusting key. With the key positioned so the “start” side is facing the knob, the grey cam section can be adjusted by inserting the tab of the key into the notch in the cam while turning the knob. Reversing the key so the “stop” side faces the knob, the red cam can be adjusted.

STEP 1. Insert Cam Adjusting Key into No. 1 cam (grey section) having the word “start” on tool facing adjusted knob and turn knob until the degree reading matches the first transfer point on your time chart for that cam.

STEP 2. Insert Cam Adjusting Key into No. 1 (red section) having the word “stop” on tool now facing cam adjusted knob and turn knob until the degree reading matches the next transfer point on your time chart for that same cam. This complete setting of No. 1 cam.

STEP 3. Repeat steps 1 and 2 for each additional circuit of your cam timer.

note: All switches have single pole, double throw circuitry. On each circuit where the load should be energized for less than 180° of cam shaft rotation, use the NC switch terminal. On each circuit where the load should be energized for more than 180° of cam shaft rotation, use the NO switch terminal.

SPECIFICATIONS:

88 645 Series is specifically adapted for applications requiring 1 to 22 circuits. The switches are mounted on both sides of frame to give minimum overall length. Precision SPDT switches rated at 6 Amps, 1/3 H.P., 125/250 V AC are standard. Switches are individually removable. Adjustable cams, simple and quick setting. Adjustable cam key comes as standard.

GENERAL
Voltage ........................................ 220 VAC, 115 VAC, 24 VAC (+10-15%), 50-60 Hz
Input Power 88 645 (Crouzet motor 82 334) .... 2.3 W
Operating Temperature ................. -5°C to +60°C (23°F to +140°F)
Storage Temperature .................. -40°C to +80°C (40°F to +178°F)
Duty Cycle .................................. 100%
Circuitry ........................................ SPDT
Output Switches (Crouzet 83 160 080) 6 A, 1/3 H.P., 125/250
Wiring Connections
Gear Motor .................................... 1/4” spade terminal block
Switches ........................................ 1/4” spade terminals
Direction ..................................... CW direction is standard

DIMENSIONS: inches (mm)

<table>
<thead>
<tr>
<th>Type</th>
<th>Cams</th>
<th>Circuits</th>
<th>A (in)</th>
<th>B (oz)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>88 645 0</td>
<td>7</td>
<td>1 to 7</td>
<td>3.23</td>
<td>5.12</td>
<td>19.40</td>
</tr>
<tr>
<td>88 645 2</td>
<td>12</td>
<td>8 to 12</td>
<td>4.57</td>
<td>6.46</td>
<td>26.45</td>
</tr>
<tr>
<td>88 645 4</td>
<td>17</td>
<td>13 to 17</td>
<td>5.83</td>
<td>7.72</td>
<td>31.75</td>
</tr>
<tr>
<td>88 645 6</td>
<td>22</td>
<td>18 to 22</td>
<td>7.09</td>
<td>8.98</td>
<td>35.27</td>
</tr>
</tbody>
</table>

OPTIONAL:
P: Programmable Cams: For multiple on/off operations per cycle see page 2/53 for details.
C: Cut Cams: For multiple or non-tamperable operations per cycle, consult factory with time charts for cams.

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>SERIES</th>
<th>NO. OF CAMS</th>
<th>TYPE OF CAM</th>
<th>SPEED/CYCLE TIME S=sec - M=min. - H=Hr</th>
<th>ELECTRICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>88 645</td>
<td>007 7 cam</td>
<td>S=Standard cam</td>
<td>AS = 115 VAC - 60 Hz ES = 220 VAC - 50 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>212 12 cam</td>
<td>P=Programmable cam</td>
<td>2S 6S 15S 60S 4M 30M 4H 12H AL = 24 VAC - 60 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>417 17 cam</td>
<td>C=Cut cam</td>
<td>3S 10S 20S 2M 10M 1H ADL = 24 VAC - 60 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>622 22 cam</td>
<td></td>
<td>4S 12S 30S 3M 15M 2H 24H</td>
<td></td>
</tr>
</tbody>
</table>

EXAMPLE: 88645002.P.10S.AS ie: 88 645 cam timer with 2 programmable cams, 10 second speed/cycle time, and 115 VAC - 60Hz.

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
A cam timer is a simple timing device comprised of a frame which holds a series of cams on a shaft. The shaft is driven by a motor with a gear train that is set to rotate 360° over a certain time period. During this time period the cams actuate snap-acting SPDT (Single Pole Double Throw) switches. The switches can be wired to be either NC (normally Closed) or NO (Normally Open) so that when the individual cam actuates the individual switch, its output changes from Open to Closed. This change will happen once and go back to the rest position once in 360° with the standard cam. Maximum differential per standard cam is 180°.

If multiple tripping of the switch is required, the cam must be changed to either a programmable cam or a custom cut-cam (in large quantities). With the programmable cam, Programmable Cam Pins must also be used and plugged-in at the required 6° intervals to create the desired effect.

Standard cam

Programmable cam with pins

Custom cut-cam

NOTE: Replacement red cam adjustment tool for 88 645 and 88 646 with standard cams: Part Number 79 221 702

NOTE: Programmable cams can be combined with standard cams for the most economical results of a required pattern by the user. See opposite page for more detail.

EXAMPLE:

PROGRAMMING A CAM TIMER:
It is best to create a time chart as shown. Use “T” as the trip-point and “R” as rest for each cam (P1, P2, P3, etc.) and draw throw/off pattern for each movement of the switch. This will make the final adjustment very easy.

STANDARD CYCLE TIMES:

<table>
<thead>
<tr>
<th>TIME</th>
<th>MOTOR SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 sec</td>
<td>30 RPM</td>
</tr>
<tr>
<td>3 sec</td>
<td>20 RPM</td>
</tr>
<tr>
<td>4 sec</td>
<td>15 RPM</td>
</tr>
<tr>
<td>6 sec</td>
<td>10 RPM</td>
</tr>
<tr>
<td>10 sec</td>
<td>6 RPM</td>
</tr>
<tr>
<td>12 sec</td>
<td>5 RPM</td>
</tr>
<tr>
<td>15 sec</td>
<td>4 RPM</td>
</tr>
<tr>
<td>20 sec</td>
<td>3 RPM</td>
</tr>
<tr>
<td>30 sec</td>
<td>2 RPM</td>
</tr>
<tr>
<td>60 sec</td>
<td>1 RPM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TIME</th>
<th>MOTOR SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 min</td>
<td>1 RPM</td>
</tr>
<tr>
<td>2 min</td>
<td>1/2 RPM</td>
</tr>
<tr>
<td>3 min</td>
<td>1/3 RPM</td>
</tr>
<tr>
<td>4 min</td>
<td>1/4 RPM</td>
</tr>
<tr>
<td>10 min</td>
<td>1/10 RPM</td>
</tr>
<tr>
<td>12 min</td>
<td>1/12 RPM</td>
</tr>
<tr>
<td>15 min</td>
<td>1/15 RPM</td>
</tr>
<tr>
<td>24 min</td>
<td>1/24 RPM</td>
</tr>
<tr>
<td>30 min</td>
<td>1/30 RPM</td>
</tr>
</tbody>
</table>
PROGRAMMABLE CAMS
(for 88 645 & 88 646)

INSTALLATION & INFORMATION
Disconnect timer from power sources (motor and switches) before installing programmable cams.

DESCRIPTION:
CROUZET programmable cams should be used whenever multiple actuations are required from the same cam during one timing cycle. Any number of adjustable cams can be replaced with programmable cams.

INSTALLATION:
It is suggested that the programmable cams be installed in timer before the programming pins are installed on the cam. To install cam(s), refer to instructions for your particular model.

MODEL 88 645 SERIES:
1. Remove snap ring and slide knob from cam shaft.
2. Remove the two screws from gray end bracket and slide from cam shaft. Note correct position before removing for reassembly.
3. Loosen two screws on clutch assembly (opposite knob end) and slide shaft assembly free.

NOTE: On some models it may be necessary to run motor to allow access to screws. Position screws for easy access.
4. The adjustable cam(s) can now be removed by sliding them toward knob end of cam shaft.
5. Replace the adjustable cam(s) with programmable cam(s) making sure the total number of adjustable and programmable cams is equal to original number of cams.

NOTE: When replacing adjustable cams, be sure red cam half is facing knob end of cam shaft.
6. There should not be any space between the cams and the first cam should be against the shoulder on cam shaft.
7. Replace gray end bracket on cam shaft noting it is facing same direction as when removed.
8. Replace knob and snap ring on shaft making sure it is square and against the last cam.
9. Replace entire assembly into cam timer so clutch assembly is on motor shaft.
10. Replace knob and tighten hex nut.

PROGRAMMING CAMS
Each slot on the programmable cam is 6° apart. Any operation requires a minimum of one “rise” and one “fall” program pin; therefore, the minimum pulse that can be obtained in 12° or 1/30 of the cycle time. (Cycle time being time for one complete revolution of timer.) It is suggested a timing chart be made for each cam to make programming easier. The chart should be from 0° to 360°. Indicate on the chart each “on” and “off” point. Since the programmable cam has slots ever 6°, the “on” and “off” degree points must be divisible by 6.

IMPORTANT: A “rise” and “fall” pin must always be used at the beginning and end of actuation. Therefore, the minimum pulse will be 12° or 1/30 of total time cycle. For ever intermediate pin used, the time of the pulse will be increased by 6 or 1/60 of time cycle.

In example shown, first pulse will require 1 rise, 1 fall, 2 flat top pins.

NOTE: Rise and fall pins are the same pins, the direction in which they are inserted determines whether it is a “rise” or “fall.”

When programmable cams are complete, the adjustable cams may be adjusted in standard manner.
**P – PANEL MOUNTING ADAPTER**
This panel adapter is a rugged, black, auto extinguishable polycarbonate material. It is mounted with two 6/32 screws. A timer is mounted by clipping to the adapter or panel. Order part number P ADAPT.

**DR – DIN-RAIL**
The DR-DIN-Rail material is an extruded aluminum material of the standard configuration, 35mm. Timers and Controls conveniently snap onto the track. Order part number “DR” which is available in 1 meter (39”) lengths. Shown with S08, S11 and K11 sockets.

**S08, S11 & SCREW TERMINAL SOCKETS**
The S08, and S11 are 8 and 11 pin sockets fabricated from a rugged, durable polycarbonate.* The color is grey to match the majority of accessories available. Mounting is with two 6/32 screws .250 or on .30 DIN-Rail, DR. Order part “S08” or “S11.”

S08-600: 600V, 10A rated 8 pin socket-UL and CSA

**S12 & S15 SOLDER TERMINAL SOCKETS**
The S12 and S15 are 11 and 8 pin solder terminal sockets fabricated from a rugged, durable polycarbonate. They are black and connections are made by soldering to the tabs or by 3/16” (4.8mm) push-on connectors. Order Part Number “S12” (11 pin) and “S15” (8 pin)

**SA8 & SA11 - Back connecting Socket**

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
ACCESSORIES FOR RTM TIMER

SOCKETS
PC Board Sockets (mm)

<table>
<thead>
<tr>
<th>PC Board Sockets (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Poles</td>
</tr>
<tr>
<td>Ref: 26532709</td>
</tr>
<tr>
<td>4 Poles</td>
</tr>
<tr>
<td>Ref: 26532708</td>
</tr>
</tbody>
</table>

Mounting Clip for DIN-Rail Sockets
Ref: 26532702

79 238 250 (Part Number)
PANEL MOUNT REMOTE POTentiOMETER
470K Ohm ±10% / 0.2 W / linearity ±10%

DIMENSIONS: inches (mm)

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Control Relays
CTD 46 AND 43 SERIES
TEMPERATURE CONTROLLER
UL listed  CSA recognized

- 1/16 DIN-Sized Enclosure
- 5 Temperature Control Modes
- Multiple Temperature Range (°F and °C)
- Auto-tuning
- Built-in Alarm
- Soft Start Function
- NEMA 4X Front Panel

DESCRIPTION:
The CTD Series is a temperature controller available in two basic models:
The CTD 43 is a single display unit and the CTD 46 is a dual display unit.
Both models have a temperature range of -199 to 999°F or -199 to 999°C
and will accept J, K, L, or N type thermocouples and RTD’s as temperature
sensors. Control modes include ON-OFF or proportioning action (PID, P,
PI, PD). The main output can be programmed for direct (cooling) or inverse
(heating) and the relay alarm output programmed to 16 different alarm
configurations. The auto-tuning “Smart” function will calculate and set
automatically the optimum values for the PID mode to insure the closest
control of any heating or cooling load.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Input Power</th>
<th>100 to 240 VAC, 50/60 Hz +15% - 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 VAC, 50/60 Hz, +15% - 10%</td>
</tr>
<tr>
<td></td>
<td>24 VDC, +15% - 10%</td>
</tr>
</tbody>
</table>

Display
CTD 43
Measure/Preset Display
3 Digit (10mm) Red Leds

CTD 46
Measure Display
3 Digit (10mm) Red Leds
Preset Display
3 Digit (7.5mm) Green Leds

Output
Main Output
Relay: SPDT, 3 Amp 250 VAC
Logic: Level 1: 24 VDC/1mA
Level 2: 14 VDC/20 mA

Alarm Output
Relay: SPST N.O. 1 Amp 250 VAC

Display Accuracy
4/- 0.3% of full scale range

Reference Function Derating
0.1 deg C/deg C

Max. Power Consumption
5 VA

Insulation Resistance
> 100 M ohm

Dielectric Strength
1500 Vrms

Sampling Period
0.5 sec

NEMA Rating
NEMA 4x

Wiring Connection
Screw Terminals

Weight
11 oz. (300g)

Operating Temperature
32°F to 122°F

ORDERING INFORMATION:

VOLTAGE
110/220 VAC
110/220 VAC
24 VAC/DC
24 VAC/DC

OUTPUT
Relay
Transistor
Relay
Transistor

PART NUMBER
CTD43
89421108
89421118
89421102
89421112

PART NUMBER
CTD46
89422108
89422118
89422102
89422112

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
CTH 46 SERIES
TEMPERATURE CONTROLLER

UL listed   CSA recognized

- Dual Heat/Cooling Function
- 1/16 DIN-Sized Enclosure
- Set Point and Actual Temperature Displayed
- Auto-Tuning
- NEMA 4X Front Panel

DESCRIPTION:
The CTH accepts inputs from various types of sensors (thermocouple and RTD). The CTH provides dual outputs for heating and cooling. The CTH has a temperature range from -199 to 999 degrees Fahrenheit or -199 to 999 degrees Centigrade and will accept J, K, L, or N types thermocouples and RTDs as temperature sensors. Control modes include ON-OFF or proportioning action (PID, P, PI, PD). The auto-tuning “Smart” function will calculate and set automatically the optimum values for the PID mode to insure the closest control of any heating or cooling load.

SPECIFICATIONS:

| Input Power | 100 to 240 VAC, 50/60 Hz +15% - 10%
|-------------|----------------------------------
|             | 24 VAC, 50/60 Hz, +15% - 10%     |
| Power Consumption | 5 VA                        |
| Display      | Measure Display: 3 Digit (10mm) Red Leds |
|              | Preset Display: 3 Digit (7.5mm) Green Leds |
| Output       | Main Output: Relay: SPDT, 3 Amp 250 V AC |
|              | Logic: Maximum load is 700 ohm   |
|              | Level 0: <0.5 V DC              |
|              | Level 1: 14 V DC @ 20 mA        |
|              | 24 V DC @ 1 mA                  |
| Cool Output  | NO-1A contact, 250 VAC resistive |
| Accuracy     | ± 0.3% of full scale range      |
| Insulation Resistance | > 100 M ohm                |
| Dielectric Strength | 1500 Vrms                |
| Sampling Period | 0.5 sec                        |
| Wiring Connection | Screw Terminals          |
| Operating Temperature | 32°F to 122°F             |
| NEMA Panel Rating | NEMA 4X                      |
| Weight       | 11 oz. (300g)                 |

WIRING DIAGRAM:

CTH 46

Voltage output

Relay output

Connection of thermocouple or resistance thermometer

DIMENSIONS: (mm)

ORDERING INFORMATION:

VOLTAGE

<table>
<thead>
<tr>
<th>VOLTAGE</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 to 240 VAC</td>
<td>Relay</td>
</tr>
<tr>
<td>24 VAC/DC</td>
<td>Transistor</td>
</tr>
</tbody>
</table>

PART NUMBER

<table>
<thead>
<tr>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>89422508</td>
</tr>
<tr>
<td>89422518</td>
</tr>
<tr>
<td>89422502</td>
</tr>
<tr>
<td>89422512</td>
</tr>
</tbody>
</table>

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Temperature Control  

- Heating and/or cooling function
- 2 independent alarms
- Load break detection
- 2nd setpoint which can be selected remotely
- Manual/automatic power adjustment
- RS 485 / MODBUS - JBUS serial communication option

### Type

<table>
<thead>
<tr>
<th>MIC 48</th>
<th>Part Number</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>Input Power</td>
<td>Without RS 485 link</td>
</tr>
<tr>
<td>Relay</td>
<td>100 – 240 Vac</td>
<td>89 422 008</td>
</tr>
<tr>
<td>Logic</td>
<td>100 – 240 Vac</td>
<td>89 422 018</td>
</tr>
<tr>
<td>Relay</td>
<td>24 Vac / Vdc</td>
<td>89 422 002</td>
</tr>
<tr>
<td>Logic</td>
<td>24 Vac / Vdc</td>
<td>89 422 012</td>
</tr>
</tbody>
</table>

### Inputs

<table>
<thead>
<tr>
<th>Type</th>
<th>Part Number</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermocouples</td>
<td>J, K, R, S, &amp; N</td>
<td>Conforms to IEC 584-1</td>
</tr>
<tr>
<td>L</td>
<td>Conforms to Din 43710</td>
<td></td>
</tr>
<tr>
<td>Reference Junction</td>
<td>Automatic cold junction compensation 0-50°C</td>
<td></td>
</tr>
<tr>
<td>Reference junction drift</td>
<td>0.1°C / °C</td>
<td></td>
</tr>
<tr>
<td>Input Impedance</td>
<td>&gt; 1MΩ</td>
<td></td>
</tr>
<tr>
<td>Calibration</td>
<td>Conforms to IEC 584-1</td>
<td></td>
</tr>
<tr>
<td>RTD</td>
<td>3 wire PT 100</td>
<td></td>
</tr>
<tr>
<td>Line Resistance</td>
<td>20 Ω Max</td>
<td></td>
</tr>
</tbody>
</table>

### Configuration Inputs and Standard range

<table>
<thead>
<tr>
<th>Input types</th>
<th>Temp Scale in °C</th>
<th>Temp Scale in °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC L</td>
<td>0 / 400.0°C</td>
<td>0 / 1650°F</td>
</tr>
<tr>
<td>TC L</td>
<td>0 / 900°C</td>
<td></td>
</tr>
<tr>
<td>TC J</td>
<td>0 / 400.0°C</td>
<td>0 / 1830°F</td>
</tr>
<tr>
<td>TC J</td>
<td>0 / 1000°C</td>
<td></td>
</tr>
<tr>
<td>TC J</td>
<td>0 / 400.0°C</td>
<td>0 / 2190°F</td>
</tr>
<tr>
<td>TC K</td>
<td>0 / 1200°C</td>
<td></td>
</tr>
<tr>
<td>TC N</td>
<td>0 / 1400°C</td>
<td>0 / 2500°F</td>
</tr>
<tr>
<td>TC R</td>
<td>0 / 1760°C</td>
<td>0 / 3200°F</td>
</tr>
<tr>
<td>TC S</td>
<td>0 / 1760°C</td>
<td>0 / 3200°F</td>
</tr>
<tr>
<td>RTD Pt100</td>
<td>−199.9 / 400.0°C</td>
<td>−330 / 1470°F</td>
</tr>
<tr>
<td>RTD Pt100</td>
<td>−200 / 800.0°C</td>
<td>−330 / 1470°F</td>
</tr>
</tbody>
</table>

### Configurable mA & V inputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 20mA</td>
<td>&lt; 5Ω</td>
</tr>
<tr>
<td>4 – 20mA</td>
<td></td>
</tr>
<tr>
<td>0 – 60mV</td>
<td>&gt; 1MΩ</td>
</tr>
<tr>
<td>12 – 60mV</td>
<td></td>
</tr>
<tr>
<td>0 – 5V</td>
<td>&gt; 200KΩ</td>
</tr>
<tr>
<td>1 – 5V</td>
<td></td>
</tr>
<tr>
<td>0 – 10V</td>
<td>&gt; 400KΩ</td>
</tr>
<tr>
<td>2 – 10V</td>
<td></td>
</tr>
</tbody>
</table>

### Measurement Range

- −1999 to +4000

### Decimal Point

- adjustable 0000, 000.0, 00.00, 0.000

### Outputs

<table>
<thead>
<tr>
<th>Output element</th>
<th>OUT1</th>
<th>N/O contact</th>
<th>3A 250 Va resistive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
<td>N/C</td>
<td>contact is possible via a jumper</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>logic</td>
<td>Level 0: &lt; 0.5 V =</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Level 1: 14 V = ±20% @ 20 mA max</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 V = ±20% @ 1 mA max</td>
<td></td>
</tr>
<tr>
<td>Main output cycle time</td>
<td>1 s to 99 s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cool output or alarm 1 output</td>
<td>N/O -2A contact, 250 V~ resistive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUT3</td>
<td>N/O -2A contact, 250 V~ resistive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load break output and/or Alarm 2 output</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Automatic/manual mode

- It is possible to force the heat or cool output power by pressing the key ( ) on the front panel.
- Manual adjustment of the output power
- Heat 0 to 99%
- Cool 0 to 99%

### Disabling the power status

- It is possible to disable the power output. In this case, the controller operates as a simple temperature display unit. This option is frequently used during machine adjustment.

### General Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply</td>
<td>100 – 240 Vac, 24 Vac / Vdc</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 / 60 Hz</td>
</tr>
<tr>
<td>Tolerance</td>
<td>−15% / +10% Vin</td>
</tr>
<tr>
<td>Power consumption</td>
<td>8VA max</td>
</tr>
<tr>
<td>Display</td>
<td>4 digits, Red LED’s, 7 segment, 10 mm height</td>
</tr>
<tr>
<td>Setpoint</td>
<td>4 digits, Green LED’s, 7 segment, 7.5mm height</td>
</tr>
</tbody>
</table>
**Temperature Control**

**MIC 48**

**Display**

- Lower display:
  - setpoint
  - output power
  - heating element consumption (in amps)
  - abbreviation of the parameter selected during programming.

- Main output status LED, lit when the output is active.

- Cool output or alarm 1 output status LED, lit when the output is active.

- Load break alarm output and/or alarm output 2 status LED, lit when the output is active.

- Manual/automatic operation. The LED flashes when the controller is in manual mode.

- Parameter modification and direct access to the setpoint.

**Inputs**

<table>
<thead>
<tr>
<th>Current Transformer input for monitoring the load break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range with transformer</td>
</tr>
<tr>
<td>Resolution</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Measurement logic</td>
</tr>
<tr>
<td>Threshold</td>
</tr>
<tr>
<td>Measurement update period</td>
</tr>
</tbody>
</table>

**Setpoints**

- 2 setpoints are main setpoint SP
- available auxiliary setpoint SP2
- SP/SP2 50 mA~
- selection point selection via external n/c type contact

N.B.: The 50mA AC input is used either as a load break monitoring input (with an associated current transformer), or as a control input for the 2nd setpoint.

Selection between these two functions is made in configuration mode.

**Alarms**

In addition to its main output, the MIC 48 has two other outputs which can be configured:

- OUT2 cool output or alarm 1 output
- OUT3 load break output and/or alarm 2 output

**Description of alarms 1 and 2**

- **Note:**
  - These 2 alarms can be configured independently of each other.

- **Output type**
  - direct or reverse

- **Functions**
  - absolute alarm
  - band alarm
  - deviation alarm

- **Reset**
  - manual
  - automatic

- **Inhibition**
  - can be configured

- **Note:**
  - Each alarm can be configured using an inhibition sequence.
  - This function means it is possible to ignore any temperature threshold overshoots at the start of the process and after each setpoint change.

**Serial Link**

<table>
<thead>
<tr>
<th>Type</th>
<th>RS 485</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>MODBUS, J.BUS</td>
</tr>
<tr>
<td>Address</td>
<td>1 to 255</td>
</tr>
<tr>
<td>Transmission speed</td>
<td>600 to 19 200 Baud</td>
</tr>
<tr>
<td>Output power</td>
<td>Number of data bits</td>
</tr>
<tr>
<td>Parity</td>
<td>even, odd, no</td>
</tr>
<tr>
<td>Stop bit</td>
<td>1</td>
</tr>
</tbody>
</table>

**Alarms threshold**

<table>
<thead>
<tr>
<th>absolute alarm</th>
<th>absolute value independent from SP</th>
</tr>
</thead>
<tbody>
<tr>
<td>band alarm</td>
<td>value relative to SP, adjustable from 0 to 500°C/°F</td>
</tr>
<tr>
<td>deviation alarm</td>
<td>value relative to SP, adjustable from -500 °C/°F (negative deviation) to +500°C/°F (positive deviation)</td>
</tr>
</tbody>
</table>

**Alarm**

0.1 to 10.0% of scale amplitude

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Temperature Control

**Control characteristics**

<table>
<thead>
<tr>
<th>Control algorithm</th>
<th>PID with auto-tune and adaptive tune: SMART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control type</td>
<td>heat or cool</td>
</tr>
<tr>
<td></td>
<td>heat - cool</td>
</tr>
<tr>
<td>Sampling time</td>
<td>linear input 250 ms</td>
</tr>
<tr>
<td></td>
<td>TC and RTD input 500 ms</td>
</tr>
<tr>
<td>Proportional band Pb</td>
<td>heat or cool 1.0 to 100% of scale amplitude</td>
</tr>
<tr>
<td></td>
<td>heat – cool 1.5 to 100% of scale amplitude</td>
</tr>
<tr>
<td>Note: if Pb = 0%</td>
<td>discrete action</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>0.1 to 10% of scale amplitude</td>
</tr>
<tr>
<td>(during discrete action)</td>
<td></td>
</tr>
<tr>
<td>Integral time ti</td>
<td>20s to 20 min</td>
</tr>
<tr>
<td>Note: if ti &gt; 20 min</td>
<td>integral action is inactive</td>
</tr>
<tr>
<td>Derivative time td</td>
<td>1 s to 10 min</td>
</tr>
<tr>
<td>Note: if td = 0:</td>
<td>derivative action is inactive</td>
</tr>
<tr>
<td>Cycle time</td>
<td>heating 1 to 200 s</td>
</tr>
<tr>
<td></td>
<td>cooling 1 to 200 s</td>
</tr>
<tr>
<td>Heat-cool control</td>
<td>Cool proportional rC x heat band</td>
</tr>
<tr>
<td></td>
<td>proportional band</td>
</tr>
<tr>
<td></td>
<td>rC : relative gain 0.20 to 1.00</td>
</tr>
<tr>
<td></td>
<td>dead/overlap band -20% to +50% of the heat</td>
</tr>
<tr>
<td></td>
<td>proportional band</td>
</tr>
</tbody>
</table>

Note:
The MIC 48 offers the following parameters directly, depending on the cooling medium used:

<table>
<thead>
<tr>
<th>Fluid</th>
<th>rc relative gain</th>
<th>Cooling cycle time</th>
</tr>
</thead>
<tbody>
<tr>
<td>fluid</td>
<td>rc</td>
<td>cycle time</td>
</tr>
<tr>
<td>air</td>
<td>1.00</td>
<td>10 s</td>
</tr>
<tr>
<td>oil</td>
<td>0.80</td>
<td>4 s</td>
</tr>
<tr>
<td>water</td>
<td>0.40</td>
<td>2 s</td>
</tr>
</tbody>
</table>

Note:
These parameters can be adjusted depending on the limitations of the process.

**Protection**

<table>
<thead>
<tr>
<th>Watchdog</th>
<th>detects a fault in the equipment caused by external interference and activates automatic reset without modification of the process.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch</td>
<td>the configuration and calibration are accessed via an internal switch, which can only be accessed when the device is unplugged.</td>
</tr>
</tbody>
</table>

**Approvals**

<table>
<thead>
<tr>
<th>UL / CSA</th>
<th>in progress</th>
</tr>
</thead>
</table>

**Presentation and environment**

<table>
<thead>
<tr>
<th>Insulation resistance</th>
<th>conforming to IEC 348 &gt; 100 M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation voltage</td>
<td>conforming to IEC 348 1500 V</td>
</tr>
<tr>
<td>Immunity to interference</td>
<td>conforming to IEC 801- 4 Level 3</td>
</tr>
<tr>
<td></td>
<td>conforming to IEC 801- 8000 V</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.2% of the full measurement scale</td>
</tr>
<tr>
<td></td>
<td>±1 digit at an ambient temperature of 25°C at Un</td>
</tr>
<tr>
<td>Temperature limits</td>
<td>operation 0 to +50°C</td>
</tr>
<tr>
<td></td>
<td>storage -20° to +70°C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>20 to 85% Rh without condensation</td>
</tr>
</tbody>
</table>

**Housing**

| Housing material       | self-extinguishing UL94 grade VO |
| Front panel made from  | polycarbonate membrane           |
| Protection class       | IP54, conforming to IEC 529      |
| Connection             | screw terminals                  |
| Weight                 | 250 grams                        |

Products and specifications subject to change without notice.

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Temperature Control

Wiring diagrams

Relay output

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 - 12 - 13 - 14 - 15</td>
<td>Serial link</td>
</tr>
<tr>
<td>6 - 7 - 8 - 9 - 10</td>
<td>Main output</td>
</tr>
<tr>
<td>1 - 2 - 3 - 4 - 5</td>
<td>250 V~/2A resistive</td>
</tr>
</tbody>
</table>

Logic output

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 - 12 - 13 - 14 - 15</td>
<td>Serial link</td>
</tr>
<tr>
<td>6 - 7 - 8 - 9 - 10</td>
<td>Main output</td>
</tr>
<tr>
<td>1 - 2 - 3 - 4 - 5</td>
<td>250 V~/2A resistive</td>
</tr>
</tbody>
</table>

Current Transformer

### Description of the load break monitoring alarm

#### Operating mode

The measurement is executed on each cycle CY1 of the main output OUT1.

#### Behavior of output OUT3

- **OUT 1 N/O type**
- **OUT 1 N/C type**

#### Measurement

- **Low level alarm**
- **Threshold in A**

### Part numbers

- **10 A / 50 mA**: 26 852 301
- **25 A / 50 mA**: 26 852 302
- **50 A / 50 mA**: 26 852 303
- **100 A / 50 mA**: 26 852 304

### Wiring diagram

**Example**

**Dimensions**

- **Panel cut-out**

- **Dimensions**

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Accepts J, K, R, S, T, L, N, type Thermocouples and PT100 2 and 3 wire RTD

PID Algorithm, Smart Function, Inverse or Direct action and Soft Start for preheating

2 outputs Contact or Solid State

2 independent ramps for switching from 1 set point to another

Specifications:

<table>
<thead>
<tr>
<th>Type</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output 1</td>
<td>Output 2</td>
</tr>
<tr>
<td>Relay 3 A – 250V resistive load</td>
<td>Relay 3 A – 250V resistive load</td>
</tr>
<tr>
<td>Relay 3A – 250V resistive load</td>
<td>Relay 3 A – 250V resistive load</td>
</tr>
<tr>
<td>Logic 14V – 20mA</td>
<td>Relay 3 A – 250V resistive load</td>
</tr>
<tr>
<td>Logic 14V – 20mA</td>
<td>Relay 3 A – 250V resistive load</td>
</tr>
<tr>
<td>Logic 14V – 20mA</td>
<td>Logic 14V – 20mA</td>
</tr>
<tr>
<td>Logic 14V – 20mA</td>
<td>Logic 14V – 20mA</td>
</tr>
</tbody>
</table>

Display

4 Digit

Thermocouples

J (–100.0 / 999.9°C) (–150 / 1830°F)
K (–100 / 1370°C) (–150 / 2500°F)
R (–50 / 1760°C) (–60 / 3200°F)
S (–50 / 1760°C) (–60 / 3200°F)
T (–199.9 / 400°C) (–330 / 750°F)
L (–100.0 / 900.0°C) (–150 / 1650°F)
N (–100 / 1400°C) (–150 / 2550°F)
PT 100 2 & 3 wire (–199.9 / 850.0°C) (–330 / 1560°F)
Linear 0-60mV, 12-60mV

Dimensions

24 x 48 x 102mm

Front Panel

NEMA 4X, IP 65

Functions

PID Algorithm
SMART Function Auto Tuning
Direct (cooling) or Inverse (heating) Action
Soft Start Function for Preheating

2 Reference Points

Used with the Ramp Function

Alarms

Configurable

Control Loop Monitoring

NOTES:

1. Never run input cables together with power cables.
2. When a shielded cable is used it should be connected at one point only.
3. For TC sensors it is preferred to use shielded cables.
4. For RTD’s use low resistance wires and ensure that all 3 wires are the same resistance.
5. For Linear inputs use only low resistance wires.
Analogue Temperature Control

- Accepts J or K type Thermocouples (Type PT100 can be made available on demand)
- 2 operational modes ON/OFF or PD (Proportional Derivative)
- 8 Pin Plug-in, Relay Output, 1/16 Din, Panel mount

Specifications:

Supply Voltage: 230/240Vac 50/60Hz +/-15%
Max Power Consumption: 2 VA

Inputs:
- Thermocouple: IAW IEC 584 J or K types
- Max line resistance: 150Ω

Derating with regard to setpoint:
- Per 10°C Variation in Ambient Temp. ≤1°C
- Per 10Ω of line resistance variation ≤1°C
- Per 10% variation in supply voltage ≤0.1%

Type

Part Number
Temperature Range / Scale Divisions Thermocouple
0 to +250°C 5°C Type J 89 420 047
0 to +450°C 10°C Type J 89 420 067
0 to +650°C 10°C Type K 89 420 097
0 to +800°C 20°C Type K 89 420 077
0 to +1000°C 20°C Type K 89 420 087

Outputs:
- Contact relay SPDT 5A / 250Vac max
- Mechanical life: 3 x 10⁶ operations
- Scale resolution: 0.05mm
- Display accuracy: J – K (full scale) ±0.2%
- PT100 (full scale) ±1.5%
- Temperature limits:
  - Operational: 0°C to 55°C
  - Storage: -20°C to 70°C

Function diagrams

ON/OFF output action

Temperature Hysteresis (0.4%) Time

Setpoint

Output ON Output OFF

Proportional derivative (PD) action

Temperature Proportional band (PB) Time

Setpoint

Output ON Output OFF

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2/65
Adjusting two levels (min./max.)

- Monitoring filling (UP) or emptying (DOWN), selected by a switch on the front panel.
- Probes supplied with AC current.
- Sensitivity adjustable on front panel from 5 kΩ to 100 kΩ.

### Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Characteristics</th>
<th>Volatges</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENR</td>
<td>Monitoring filling UP</td>
<td>24 V AC</td>
<td>84 870 201</td>
</tr>
<tr>
<td></td>
<td>Monitoring emptying DOWN</td>
<td>48 V AC</td>
<td>84 870 202</td>
</tr>
<tr>
<td></td>
<td></td>
<td>120 V AC</td>
<td>84 870 203</td>
</tr>
<tr>
<td></td>
<td></td>
<td>230 V AC</td>
<td>84 870 204</td>
</tr>
</tbody>
</table>

### General characteristics

- Operating range: 0.85 → 1.10 x Un
- Maximum power consumption: 3 VA
- Adjustable sensitivity: 5 kΩ → 100 kΩ
- Measurement accuracy (at maximum sensitivity): ±30%
- Electrode voltage (max): 24 V AC (50/60 Hz)
- Electrode current (maximum): 1 mA (50/60 Hz)
- Maximum cable capacity: 10 nF
- Response time high level: 300 ms
- Response time low level: 500 ms
- Output relay (according to AC1 resistive load): 1 AgNi changeover relay 8 A AC max.
- Galvanic isolation via transformer (4 kV, 8 mm creepage distance): Class II VDE 0551
- Isolation of contacts and electrodes from power supply: 2.5 kV AC
- Operating temperature range (°C): –20 → +50°C
- Storage temperature range (°C): –40 → +70°C
- Weight (g): 150

### Dimensions

<table>
<thead>
<tr>
<th>ENR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width: 32 mm</td>
</tr>
<tr>
<td></td>
<td>Length: 83 mm</td>
</tr>
<tr>
<td></td>
<td>Height: 18 mm</td>
</tr>
<tr>
<td></td>
<td>Depth: 22.5 mm</td>
</tr>
<tr>
<td></td>
<td>Width: 32 mm</td>
</tr>
<tr>
<td></td>
<td>Length: 83 mm</td>
</tr>
<tr>
<td></td>
<td>Height: 18 mm</td>
</tr>
<tr>
<td></td>
<td>Depth: 22.5 mm</td>
</tr>
</tbody>
</table>

Products and specifications subject to change without notice.
Level Control

Connections

ENR

A1-A2: power supply

Principles

Monitoring filling or emptying ENR

Operating principle
Monitoring maximum and/or minimum levels of conductive liquids (tap water, sea water, waste water, chemical solutions, coffee, etc).
The principle is based on measuring the apparent resistance of the liquid between two submerged probes. When this value is lower than the preset threshold displayed on the unit’s front panel, the output relay changes state. To prevent any occurrences of electrolysis, an AC current is passed through the probes. Areas of application include the agri-food, chemical and other industries.

Adjusting two levels: Minimum/Maximum
The output relay changes state when the level of liquid reaches the maximum electrode, with the minimum electrode submerged. It returns to its initial state when the minimum probe is no longer in contact with the liquid.

Note
If the power break T lasts for 1 second or more, the relay reenergises instantly when in “UP” mode and is de-energised when in “DOWN” mode.

Other information

The probe cable (maximum length 100 meters) does not have to be shielded, but avoid mounting it in parallel with the power supply cables. A shielded cable can be used with the shielding connected to the common terminal.
Adjusting one or two levels (min./max.)
- Monitoring filling (UP) or emptying (DOWN), selected by a switch on the front panel.
- Probes supplied with AC current.
- Sensitivity adjustable on front panel from 250Ω to 1 MΩ.
- Time delay preventing wave effect adjustable from 0.1 to 5s.

**Specifications**

<table>
<thead>
<tr>
<th>Type</th>
<th>Characteristics</th>
<th>Voltages</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENRM</td>
<td>Monitoring filling UP</td>
<td>24 V AC</td>
<td>84 870 211</td>
</tr>
<tr>
<td></td>
<td>Monitoring emptying DOWN</td>
<td>48 V AC</td>
<td>84 870 212</td>
</tr>
<tr>
<td></td>
<td></td>
<td>120 V AC</td>
<td>84 870 213</td>
</tr>
<tr>
<td></td>
<td></td>
<td>230 V AC</td>
<td>84 870 214</td>
</tr>
</tbody>
</table>

**General characteristics**

- Operating range: 0.85 → 1.10 x Un
- Maximum power consumption: 3 VA
- Adjustable sensitivity: 250 Ω → 1 MΩ
- Measurement accuracy (at maximum sensitivity): ±30%
- Electrode voltage (max): 24 V AC (50/60 Hz)
- Electrode current (maximum): 1 mA (50/60 Hz)
- Maximum cable capacity: 10 nF
- Response time high level: 300 ms
- Response time low level: 500 ms
- Output relay (according to AC1 resistive load): 1 AgNi changeover relay 8 A AC max.
- Galvanic isolation via transformer (4 kV, 8 mm creepage distance): Class II VDE 0551
- Isolation of contacts and electrodes from power supply: 2.5 kV AC
- Operating temperature range (°C): –20 → +50°C
- Storage temperature range (°C): –40 → +70°C
- Weight (g): 150

**Dimensions**

ENRM
Connections

Adjusting two levels
Monitoring filling “Up”

Monitoring emptying “Down”

① Common
② Off
③ On
④ Output
A1-A2: power supply
Operating principle

General principle:
The ENRM monitors the levels of conductive liquids. The principle is based on measuring the apparent resistance of the liquid between two submerged probes. When this value is lower than the preset threshold displayed on the unit’s front panel, the relay changes state. To prevent any occurrences of electrolysis, an AC current is passed through the probes. A rotary switch on the front panel can be used to select the desired function and sensitivity range. A level can be monitored using the 2nd rotary switch.
In this instance, the max. probe remains above the liquid and an adjustable time delay prevents the wave effect.

A green LED indicates that the supply voltage is present.
A yellow LED indicates the output relay’s state.
When the green and yellow LEDs are flashing, this indicates an incompatible adjustment position.

Monitoring a level, filling function, activation time
(level: 1 - on delay, function Up LS (Low Sensitivity: 250 W to 5 kW), Up St (Standard Sensitivity: 5 kW to 100 kW), Up HS (High Sensitivity: 50 kW to 1 MW).

When the level of liquid drops below the probe for a period exceeding the value of time delay T set on the front panel, the relay energizes and remains on until the level of liquid reaches the probe again.
If the level of liquid returns above the level set before the time delay elapses, the relay does not come on.

Note
When the power returns after a power break, the output relay only energizes after time delay T if the level of liquid is below the threshold.

Monitoring a level, emptying function, activation time
(level: 1 - on delay, function Dvn LS (Low Sensitivity: 250 W to 5 kW), Dvn St (Standard Sensitivity: 5 kW to 100 kW), Dvn HS (High Sensitivity: 50 kW to 1 MW).

When the level of liquid rises above the probe for a period exceeding the value of time delay T set on the front panel, the relay energizes and remains on until the level of liquid drops back below the probe.
If the level of liquid drops back below the level set before the time delay elapses the relay does not come on.

Note
When the power returns after a power break, the output relay only energizes after time delay T if the level of liquid is above the threshold.

Monitoring a level, filling function, activation time
(level: 1 - off delay, function Up LS (Low Sensitivity: 250 W to 5 kW) or Up St (Standard Sensitivity: 5 kW to 100 kW) or Up HS (High Sensitivity: 50 kW to 1 MW).

When the liquid level drops below the probe the relay energizes immediately and remains on until the level of liquid reaches the probe again and remains above it for a period exceeding time delay T set on the front panel.
If the level of liquid drops back below the level set before the time delay elapses, the relay remains on.

Note
When the power returns after a power break, the output relay only energizes immediately if the liquid is below the threshold.
Monitoring a level, emptying function, deactivation time
(level: 1 - off delay, function Dwn LS (Low Sensitivity: 250 W to 5 kW), Dwn St (Standard Sensitivity: 5 kW to 100 kW) or Dwn HS (High Sensitivity: 50 kW to 1 MW).

When the level of liquid rises above the probe the relay energizes immediately and remains on until the level of liquid drops below the probe for a period exceeding the value of time delay T set on the front panel.
If the level of liquid returns above the level set before the time delay elapses the relay remains on.

Note
When the power returns after a power break, the output relay energizes immediately if the level of liquid is above the threshold.

Monitoring two levels, emptying function
(level: 2 - function Dwn LS (Low Sensitivity: 250 W to 5 kW), Dwn St (Standard Sensitivity: 5 kW to 100 kW), Dwn HS (High Sensitivity: 50 kW to 1 MW).

The output relay remains open as long as the level of liquid has not reached the maximum probe. Once the maximum level is reached the contact closes and the tank can then be emptied (valve opened, pump started, etc). When the level drops below the minimum level the contact opens and interrupts the emptying process.

Note: When monitoring two levels the time delay preventing the wave effect is not in operation.

Note
When the power returns after a power break, the output relay energizes immediately if the level of liquid is above the threshold.

Monitoring two levels, filling function
(level: 2 - function Up LS (Low Sensitivity: 250 W to 5 kW), Up St (Standard Sensitivity: 5 kW to 100 kW) or Up HS (High Sensitivity: 50 kW to 1 MW).

The output relay remains on as long as the level of liquid has not reached the maximum probe. As soon as the maximum level is reached the contact opens and pumping stops. When the level drops below the minimum level the contact closes again and pumping restarts to bring the level of liquid back up.

Note: When monitoring the two levels the time delay preventing the wave effect is not in operation.

Note
When the power returns after a power break, the output relay energizes immediately if the level of liquid is below the threshold.

Other information
The probe cable (maximum length 100 meters) does not have to be shielded, but avoid mounting it in parallel with the power supply cables. A shielded cable can be used with the shielding connected to the common terminal.
L2N
LIQUID LEVEL CONTROL
DUAL PUMP DOWN/PUMP UP
UL listed

- Monitors Emptying and Filling Operations
- Prevents Pump Running Dry
- 5 kΩ to 100 kΩ sensitivity

OPERATING PRINCIPLE:

Combined Fill/Empty Function
The output relay changes state when the level of liquid in the tank reaches the “max” electrode, with the “min” electrode submerged. It returns to its initial state when the “min” sensor is no longer in contact with the liquid. When the level of liquid in the well reaches the “min” electrode, the pump stops.

If, on power-up or after a power break, the “max” electrode in the tank is above the surface, reset the device by pressing the PB pushbutton.

SPECIFICATIONS:

- Input power: 24, 110, 230 VAC ±15%, 50/60 Hz
- Max. power consumption: 3 VA
- Adjustable sensitivity: 5 K ohm to 100 K ohm
- Measurement accuracy (at maximum sensitivity): 0 to 30%
- Electrode voltage (maximum): 24 VAC, 50/60 Hz
- Electrode current (maximum): 1 mA 50/60 Hz
- Maximum cable capacity: 10 nF
- Response time: high level: 300 ms low level: 500 ms
- Galvanic insulation by transformer: Class II VDE 0551
- Insulation of contacts and electrodes: 2.5 K VAC
- From power supply: SPDT relay
- Contact material: AgCdO
- Maximum loading: 8 Amp resistive
- Minimum switching voltage: 250 VAC
- Operating temperature: -4°F to 140°F (-20°C to 60°C)
- Storage temperature: -22°F to 158°F (-30°C to 70°C)
- Weight: 4.9 oz. (140g)

WIRING:

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 VAC</td>
<td>84 870 401</td>
</tr>
<tr>
<td>120 VAC</td>
<td>84 870 403</td>
</tr>
<tr>
<td>230 VAC</td>
<td>84 870 404</td>
</tr>
</tbody>
</table>

DIMENSIONS: inches (mm)

Products and specifications subject to change without notice.
NMR SERIES
LIQUID LEVEL CONTROL
PUMP UP OR DOWN
SWITCH SELECTABLE
UL listed  CSA recognized

- 10 Amp SPDT Rated
- Sensitivity Adjustment 4.7 kΩ to 47 kΩ
- One, Two or Three Probe Operation
- 24 VAC to 220 VAC Voltages

SPECIFICATIONS:

Input .................................. 24, 48, 110, 220 VAC
±15% (50/60 Hz)
Maximum power consumption ....... 24 VAC: 1.5 VA
48 VAC: 1.7 VA
110 VAC: 2 VA
220 VAC: 2 VA
Output .................................... SPDT relay
Contact material ......................... AgCdO (90/10)
Maximum loading ....................... 10 A AC resistive 1 A DC inductive
Maximum switching voltage ............ 250 VAC 30 VDC
Relay maximum power rating .......... 2500 VA 30 VDC
Mechanical life of relay ............... 3 x 10^7 operations
Electrical life of relay ................. 2 x 10^6 at 2200 VA resistive load
Probe isolation ......................... Switching contact: 2000 VA
.......................................... Electrodes: 2000 VAC
Probe sensitivity ........................ 4.7 K ohm to 47 K ohm
Probe voltage .......................... 24 VAC, 60 Hz
Probe current ................................ 2 mA max.
Operating temperature ................ +14°F to 140°F -10°C to +60°C
Weight ..................................... 4.6 oz. (130g)

Note: For best results use shielded cable with the probes and do not run probe cables with other wires.

ORDERING INFORMATION:

NR SERIAL
220A INPUT POWER

A - Pump down function: the output relay energizes when the liquid level reaches the high or max. probe. It remains energized until the level is below the low or min probe. The relay will remain de-energized until the high level is again reached. This control may also be used with only two probes by connecting the maximum and common terminals together. The output is energized when the low probe is in contact with the liquid.

B - Pump up function: when power is supplied to the unit, the output relay is energized. When the level reaches the high probe the relay is de-energized. The relay is energized again when the level falls below the low probe. The control may also be used with only two probes by connecting the maximum and common terminals together. The output is de-energized when the level reaches the low probe.

In both functions, if the container is conductive, it may be used as the common probe in some applications.

WIRING DIAGRAM:

DIMENSIONS:

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NRU SERIES
LIQUID LEVEL CONTROL
PUMP UP
UL listed   CSA recognized

- LED Relay Indicator
- Three Styles
- Pump Up Control
- 4.7 kΩ to 100 kΩ Sensitivity
- 10 Amp SPDT Relay

CONTROL OF CONDUCTIVE LIQUIDS (tap water, sea water, sewage, chemical solutions, coffee, ice cream, etc.)

The relay is energized when the level falls below the low level probe. It de-energizes when the high level probe is reached. The NRU will also control a single level. In this case, a single probe is used and the relay operates when the probe is not immersed. The Max terminal is connected to common with a jumper.

In either case, a common electrode is needed if the container is non-conductive.

WIRING DIAGRAM:

ORDERING INFORMATION:

- **MOUNTING**
  - D = DIN-rail mounting
  - L = 11 pin plug-in
  - P = 8 pin plug-in

- **INPUT POWER**
  - 24A = 24VAC
  - 48A = 48VAC
  - 110A = 110VAC
  - 220A = 220VAC

Note: The cable for probes (max 300ft) should be run in separate conduit. A shielded cable is recommended.
NR SERIES
LIQUID LEVEL CONTROL
PUMP DOWN
UL listed  CSA recognized

- 24 VAC to 220 VAC Operating Voltages
- 4.7 kΩ to 100 kΩ Sensitivity
- LED Relay Indicator
- 10 Amp SPDT Relay

SPECIFICATIONS:

Input .......................... 24, 48, 110, 220 VAC ±15% (50/60 Hz)
Maximum power consumption  24 VAC: 1.5 VA
48 VAC: 1.7 VA
110 VAC: 2 VA
220 VAC: 2 VA
Output .......................... SPDT relay
Contact material .................. AgCdO
Maximum loading ............... 10A AC resistive  8A DC inductive
Maximum switching voltage ... 250 VAC  250 VDC
Relay maximum power rating .. 2500 VA  80 W
Mechanical life of relay ........ 3 x 10^7 operations
Electrical life of relay .......... 2 x 10^5 at 2200 VA resistive load
Probe isolation ................. Electrodes: 2000 VAC
Probe sensitivity ............... 4.7 K to 100 K ohms
Probe voltage .................. 24 VAC, 60 Hz
Probe current .................. 2 mA max.
Operating temperature ........ +14°F to 140°F -10°C to +60°C
Weight ......................... 4.6 oz. (130g)

WIRING DIAGRAM:

ORDERING INFORMATION:

MOUNTING
D = DIN-rail or panel mounting
L = 11 pin plug-in
P = 8 pin plug-in

The output relay energizes when the liquid level reaches the high probe. The relay de-energizes when the liquid falls below the low probe. This control can also be used with only two probes by connecting the maximum and common terminals together. The output is energized when the level reaches the low probe. In both functions, if the container is conductive, it may be used as the common probe in some applications.

Products and specifications subject to change without notice.

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NR2 SERIES LIQUID LEVEL CONTROL
UL listed   CSA recognized

- Switch Selectable Pump Up or Down
- High and Low Sensitivity Models
- LED Power On Status
- LED Output Relay Status

**SPECIFICATIONS:**

<table>
<thead>
<tr>
<th>Input Power</th>
<th>Maximum Power Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>24, 110, 230 VAC, ±15%</td>
<td>3 VA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Available Types</th>
<th>Adjustable Sensitivity</th>
<th>Maximum Cable Capacitance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>250Ω to 5 kΩ</td>
<td>100 nF</td>
</tr>
<tr>
<td>Standard</td>
<td>5 kΩ to 100 kΩ</td>
<td>10 nF</td>
</tr>
<tr>
<td>High</td>
<td>50 kΩ to 1 mΩ</td>
<td>1 nF</td>
</tr>
</tbody>
</table>

- Electrode Voltage: Maximum 24 VAC (50/60 Hz)
- Electrode Current: Maximum 5 mA (50/60 Hz)
- Response time: 100 ms at high level, 500 ms at low level
- Output relay: 1 single pole changeover contact AgCdO 10 A AC
- Galvanic isolation by transformer: Class II VDE 0551 (4 kV; creepage distance: 8mm)
- Isolation of contacts and electrodes with power supply: 2 kV AC
- Operating Temperature: -10°C to +60°C
- Storage Temperature: -20°C to +70°C
- Weight: 160 g

**GENERAL FEATURES:**

Controls maximum and/or minimum levels of conductive liquids (tap water, seawater, waste water, chemical solutions, coffee, etc.) Applications for agri-foodstuffs, chemical industries etc. The operating principle is based on measuring the impedance of a liquid between two submerged sensors. When this value is less than the threshold set on the front panel of the unit, the output relay changes status. The sensors are energized using an AC current to avoid electrolysis.

1 - Regulation of two levels (minimum/maximum):

With the minimum electrode already submerged, the output relay changes status when the liquid level reaches the maximum electrode. It returns to its initial status when the minimum sensor is not longer in contact with the liquid.

**NOTE:**
- When power is restored after an interruption of 0.53 second or less; in “UP” mode the relay is immediately energized; in “DOWN” mode the relay remains de-energized. (Assuming liquid level is below max level).

2-Regulation of one level:

Connect the maximum and common terminals together. The relay will change state when the minimum probe enters or leaves the liquid.

**OBSERVATION:** If the tank is conductive (metallic), it can be used as the reference electrode (terminal C or 6).

**NOTE:**
- A red LED displays the state of the relay, LED “ON” = Relay “ON”
- A green LED displays presence of the power supply

**ORDERING INFORMATION:**

<table>
<thead>
<tr>
<th>D MOUNTING</th>
<th>NR2 SERIES</th>
<th>INPUT POWER</th>
<th>SENSITIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>24A = 24 VAC</td>
<td>LS = 250 Ω to 5 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>110A = 110 VAC</td>
<td>“BLANK” = 5 kΩ to 100 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>230A = 230 VAC</td>
<td>HS = 50 kΩ to 1 mΩ</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
NRT SERIES
LIQUID LEVEL CONTROL
CONSTANT LEVEL
PUMP UP
UL listed CSA recognized

- 100 kΩ Sensitivity
- 10 Amp SPDT Relay
- Maintain Constant Level
- Four Mounting Options

The NRT series is applied for maintaining a constant level of conductive liquid. When the liquid decreases below the probe, the relay is energized after a 4 second time delay to avoid wave disturbances. The relay de-energizes when the liquid reaches the probe. A common electrode is needed if the container is non-conductive.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Input</th>
<th>24 VAC, 48 VAC, 110 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>220 VAC, ± 15%, 50/60 Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum power consumption</th>
<th>24 VAC: 1.5 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>48 VAC: 1.7 VA</td>
</tr>
<tr>
<td></td>
<td>110 VAC: 2 VA</td>
</tr>
<tr>
<td></td>
<td>220 VAC: 2 VA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>SPDT Relay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact material</td>
<td>AgCdO</td>
</tr>
<tr>
<td>Maximum loading</td>
<td>10 A AC resistive 8 A DC resistive</td>
</tr>
<tr>
<td>Maximum switching voltage</td>
<td>250 VAC 250 VDC</td>
</tr>
<tr>
<td>Relay maximum power rating</td>
<td>2500 VA 80 W</td>
</tr>
<tr>
<td>Mechanical life of relay</td>
<td>3 x 10^7 operations</td>
</tr>
<tr>
<td>Electrical life of relay</td>
<td>2 x 10^7 at 2200 VA resistive load</td>
</tr>
<tr>
<td>Probe isolation</td>
<td>Switching contact 2000 VAC</td>
</tr>
<tr>
<td>Probe electrodes</td>
<td>Electrodes: 2000 VAC</td>
</tr>
<tr>
<td>Probe sensitivity</td>
<td>100 kΩ</td>
</tr>
<tr>
<td>Probe voltage</td>
<td>24 VAC, 60 Hz</td>
</tr>
<tr>
<td>Probe current</td>
<td>1 mA max.</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>+14°F to +140°F -10°C to +60°C</td>
</tr>
<tr>
<td>Weight</td>
<td>7 oz. (200g)</td>
</tr>
</tbody>
</table>

Note: The probe cables (max. 300ft) need not be shielded; however, it is not advisable to run the probe cables with power cables. If shielded cable is used, the shield and common should be connected.

ORDERING INFORMATION:

MOUNTING
D = DIN-rail or panel mounting
L = 11 pin plug-in
P = 8 pin plug-in
N = open PC board

NRT SERIES
NRT = Enclosed
NNRT = Open PC board version mounting dimensions same as NNR

110A INPUT POWER
24A = 24 VAC
48A = 48 VAC
110A = 110 VAC
220A = 220 VAC

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
The electronic alternating relay is designed to replace mechanical style devices used in control applications requiring a duplexing or alternating action of the control circuits to operate pumps, compressors, etc. This is achieved by activating a control switch which is common to one side of the input control voltage. The output contact of the relay(s) change state when this switch is opened (on de-energization of the control circuit). When the control initiate switch is actuated and released or opened, the relay will change state. The next time the initiate switch is actuated and released it will change back to its original state. Two red LED’s located on the top of the dust resistant enclosure provide the status of the relay.

**SPECIFICATIONS:**
- **Input**
  - 24 VAC/DC, 110, 220 VAC
  - ± 15%, 50/60 Hz
- **Maximum power consumption**
  - 24 VAC: 1.5 VA
  - 110 VAC: 5 VA
  - 220 VAC: 11 VA
- **Output**
  - SPDT 10 A resistive
  - DPDT 10 A resistive
  - DPDT 10 A crosswired
- **Minimum pulse**
  - 30 ms
- **Contact material**
  - AgCdO
- **Maximum loading**
  - 10 A AC resistive 8 A DC inductive
- **Maximum switching voltage**
  - 250 VAC 250 VDC
- **Relay maximum power rating**
  - 2200 VA 80 W
- **Mechanical life of relay**
  - 3 x 10^6 operations
- **Electrical life of relay**
  - 2 x 10^5 at 2200 VA resistive load
- **Operating temperature**
  - 14°F to 140°F -10°C to +60°C
- **Weight**
  - 2.8 oz. (100g)

**WIRING DIAGRAM:**

**ORDERING INFORMATION:**

**MOUNTING**
- **L** = 11 pin plug-in
- **P** = 8 pin plug-in

**SERIES**
- **JR2** = DPDT (LJRZ only)
- **JR** = SPDT
- **JRX** = DPDT crosswired

**INPUT POWER**
- **24A** = 24 VAC/DC
- **110A** = 110 VAC
- **220A** = 220 VAC
JRS SERIES
ALTERNATING RELAY WITH SELECTOR SWITCH

UL listed

- Duplex Alternating Control
- SPDT or DPDT Control Relay
- 10 Amp Rated
- Externally Controlled
- Selection of Lead or Lag Load

The electronic alternating relay is designed to replace mechanical style devices used in control applications requiring a duplexing or alternating action of the control circuits to operate pumps, compressors, etc. This is achieved by activating a control switch which is common to one side of the input control voltage. The output contact of the relay(s) change state when this switch is opened (on de-energization of the control circuit). When the control initiate switch is actuated and released or opened, the relay will change state. The next time the initiate switch is actuated, it will change back to its original state. Two red LED's located on the top of the dust resistant enclosure provide the status of the relay. A 3 Position Selector switch is installed for selection of normal operation (alternating) or selection of lead or lag load.

SPECIFICATIONS:

- **Input**
  - 24 VAC/DC, 110, 220 VAC
  - ±15%, 50/60 Hz

- **Maximum power consumption**
  - 24 VAC: 1.5 VA
  - 110 VAC: 5 VA
  - 220 VAC: 11 VA

- **Output**
  - SPDT 10 A resistive
  - DPDT 10 A resistive
  - DPDT 10 A crosswired

- **Minimum pulse**
  - 30 ms

- **Contact material**
  - AgCdO

- **Maximum loading**
  - 10 A AC resistive 8 A DC inductive

- **Maximum switching voltage**
  - 250 VAC 250 VDC

- **Relay maximum power rating**
  - 2200 VA 80 W

- **Mechanical life of relay**
  - 3 x 10⁶ operations

- **Electrical life of relay**
  - 2 x 10⁶ at 2200 VA resistive load

- **Operating temperature**
  - 14°F to 140°F -10°C to +60°C

- **Weight**
  - 2.8 oz. (100g)

WIRING DIAGRAM:

ORDERING INFORMATION:

- **MOUNTING**
  - L = 11 pin plug-in
  - P = 8 pin plug-in

- **NOTE:** DPDT relay available only with 11 pin plug-in (L).

**INPUT POWER**

- **JRS 2 SERIES**
  - LJRS2 = DPDT
  - PJRS = SPDT
  - PJRXS = DPDT (crosswired)

- **110A INPUT POWER**
  - 24A = 24 VAC/DC
  - 110A = 110 VAC
  - 220A = 220 VAC

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
**FW SERIES**

**PHASE CONTROL RELAY**

UL cUL listed  CSA recognized

- **Monitors and Protects Against**
  - Phase Loss of One or More Phases
  - Phase Reversal
  - Undervoltage
- **Rugged Construction for Over Voltage and Transient Protection**

**GENERAL FEATURES:**

The unit has two front dial settings. The upper dial is used for the three phase nominal voltage settings that exists in the application. The lower dial setting is for an adjustable time delay to prevent nuisance tripping of the unit. The FW has a space saving 45mm wide DIN-rail mount/surface mount enclosure and LED power-on and relay status indication.

**SPECIFICATIONS:**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>84873010</th>
<th>84873011</th>
<th>84873015</th>
<th>84873016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power</td>
<td>3 x 230VAC</td>
<td>3 x 380VAC</td>
<td>3 x 480VAC</td>
<td>3 x 600VAC</td>
</tr>
<tr>
<td>Threshold Adjustment</td>
<td>184 - 264VAC</td>
<td>301 - 337VAC</td>
<td>384 - 525VAC</td>
<td>460 - 661VAC</td>
</tr>
<tr>
<td>Maximum Voltage</td>
<td>264VAC</td>
<td>337VAC</td>
<td>525VAC</td>
<td>661VAC</td>
</tr>
<tr>
<td>Minimum Voltage</td>
<td>184VAC</td>
<td>304VAC</td>
<td>384VAC</td>
<td>460VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
</tbody>
</table>

- Max. Power Consumption: 6 VA [Powered from L1 & L2]
- Immunity from micro power cuts: 10 ms
- Delay on pick-up: 500 ms
- Isolation coordination: Category III
- Degree of pollution 2
- VDE 0110: 4 KV/2
- acc. to IEC 664-1
- Degree of pollution 2
- 1 kΩ x input power

**OPERATING PRINCIPLE:**

In a 3-phase network, the FW simultaneously monitors phase sequencing, loss of phase with a maximum regeneration rate of 70% of the displayed by a potentiometer on the front face, and the voltage drop on the 3 phases of less than 15% of the preset value. When the 3 phases succeed one another, the output relay de-energizes (LED off) after a time delay T, adjustable between 0.2 and 10 seconds on the front face, if one of the following faults is present:
- reversed direction of phase rotation
- absence of one or more phases
- voltage drop

**CONFORMITY:**

Immunity to interference and noise (EMC)
- IEC 1000.4.5 Surge immunity: Level 3
- IEC 1000.4.2 Electrostatic discharges: Level 3
- IEC 255.5 Damped oscillated waves: Level 3
- IEC 1000.4.3 Radiated disturbance Level 3
- IEC 1000.4.4 Fast transient Level 3
- IEC 1000.4.6 Conducted RF: Level 3 (ENV 50141)

**WIRING:**

**DIMENSIONS:** Inches (mm)

**ORDERING INFORMATION:**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x 230 VAC</td>
<td>84873010</td>
</tr>
<tr>
<td>3 x 380 VAC</td>
<td>84873011</td>
</tr>
<tr>
<td>3 x 480 VAC</td>
<td>84873015</td>
</tr>
<tr>
<td>3 x 600 VAC</td>
<td>84873016</td>
</tr>
</tbody>
</table>

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
WRL SERIES
PHASE CONTROL RELAY
UL listed   CSA recognized

- Monitors
  Phase Sequence
  Loss of Any Phase even if Induced Voltage reaches 95% of Nominal Voltage
- Under Voltage Detection
- Trip Delay Timer Built-in
- LED Relay Status Indicator

MODE OF OPERATION:
The WRL Phase Control Relay monitors the sequence loss or reversal of three phase power supplies. The output relay is energized when the phase sequence is correct and the phase voltage is above the voltage threshold set by the front knob. The output relay will de-energize after 2 seconds (built-in timer) when the phase voltage drops under the voltage threshold or when phase sequence is lost. The WRL Series is available in three voltage ranges: 230 VAC, 380 VAC and 480 VAC.

SPECIFICATIONS:

| Input Power            | 3 x 230 (50/60 Hz) |
| Maximum voltage        | 3 x 280 VAC        |
| Minimum voltage        | 3 x 160 VAC        |
| Threshold adjustment range | 160 to 230 VAC |
| Max power consumption  | 2 VA               |
| Dial accuracy          | ±10%               |
| Temperature De-rating  | ±0.04%/°C          |
| Dead Band              | 4% of 480 VAC      |
| Response Time          | 300 ms on Make     |
|                       | 2 sec on Break     |
| Output                 | SPDT Version (WRL Series) | 10 Amp 250 VAC |
| Max. power consumption | 2000 VA            |
| Max. voltage           | 250 VAC            |
| Electrical life        | 2 x 10^7 operations|
| Mechanical life        | 1 x 10^6 operations|
| Operating temperature  | -10°C to +60°C     |
| Weight                 | 3.5 oz. (100g)     |

ORDERING INFORMATION:

D MOUNTING
WRL SERIES
230A INPUT POWER

INPUT POWER
230A = 3 x 230 VAC
380A = 3 x 380 VAC
480A = 3 x 480 VAC

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
**WRA SERIES**

**PHASE CONTROL RELAY**

UL listed   CSA recognized  (220 VAC Version Only)

- **Monitors**
  - Phase Sequence
  - Loss of Any Phase even if Induced Voltage reaches 95% of Nominal Voltage
- **LED Relay Status Indicator**
- **SPDT 10 Amp Relay Output**

**MODE OF OPERATION:**

```
+---+---+---+---+---+---+---+---+---+
| R | S | T | R | S | T | R | S |
+---+---+---+---+---+---+---+---+
|   |   |   |   |   |   |   |   |
+---+---+---+---+---+---+---+---+
```

The WRL Phase Control Relay monitors the sequence loss or reversal of three phase power supplies. The output relay is energized when the phase sequence is correct and is de-energized when the phase sequence is wrong or one phase is lost. It monitors the symmetry of 3 voltages and a loss of phase even when the voltage is reinjected through a machine. The rate of asymmetry is controlled between 5% and 15% by a top mounted potentiometer.

**SPECIFICATIONS:**

- **Input Power Directly**
  - 3 x 220 VAC 60 Hz
- from controlled voltage ±15%
  - 3 x 380 VAC 60 Hz
  - 3 x 440 VAC 60 Hz
- **Power consumption**
  - 3 VA at 220 V
- **Output**
  - SPDT relay
- **Contact material**
  - AgCdO
- **Maximum Loading**
  - 10 AC resistive
  - 8A DC inductive
- **Maximum switching voltage**
  - 250 VAC
  - 250 VDC
- **Relay max. power rating**
  - 220 VA
  - 80 W
- **Mechanical life of relay**
  - 30 x 10⁶ operations
- **Electrical life of relay**
  - 2 x 10⁶ operations at 2200VA resistive load
- **Operating temperature**
  - +14°F to +140°F
  - -10°C to +60°C
- **Weight**
  - 7 oz. (200g)

**Note:** The alarm threshold adjustment is 5% to 15% of asymmetry between the phases. The initial response time is .1 seconds at 5% asymmetry and 1 second at 15% after input power is applied. When a phase loss or failure occurs, the “off delay” response time is 100 ms.

**ORDERING INFORMATION:**

```
<table>
<thead>
<tr>
<th>WRA SERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOUNTING</td>
</tr>
<tr>
<td>D = DIN-rail mounting</td>
</tr>
<tr>
<td>L = 11 pin plug-in</td>
</tr>
<tr>
<td>P = 8 pin plug-in</td>
</tr>
</tbody>
</table>
```

**WIRING DIAGRAM:**

```
<table>
<thead>
<tr>
<th>WRA SERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT POWER</td>
</tr>
<tr>
<td>380 A</td>
</tr>
<tr>
<td>DWRA 11 12 14 R S T</td>
</tr>
<tr>
<td>LWRA 1 4 3 5 6 7</td>
</tr>
<tr>
<td>PWRA 1 2 8 3 4 5</td>
</tr>
</tbody>
</table>
```

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
WRA 2 SERIES PHASE CONTROL RELAY

UL listed  CSA recognized (220 VAC Version Only)

- Monitors
  Phase Sequence
  Loss of Any Phase even if Induced Voltage reaches 95% of Nominal Voltage
- LED Relay Status Indicator
- DPDT 5 Amp Relay Output

MODE OF OPERATION:

WIRING DIAGRAM:

The WRA 2 Phase Control Relay monitors the sequence loss or reversal of three phase power supplies. The output relay is energized when the phase sequence is correct and is de-energized when the phase sequence is wrong or one phase is lost. It monitors the symmetry of 3 voltages and a loss of phase even when the voltage is reinjected through a machine. The rate of asymmetry is controlled between 5% and 15% by a top mounted potentiometer.

SPECIFICATIONS:

- Power consumption .... 3 VA at 220 V
- Output .................... DPDT relay
- Contact material ........ AgCdO
- Maximum Loading ........ 5 A AC resistive  1 A DC inductive
- Maximum switching voltage ... 250 VAC  250 VDC
- Relay max. power rating .... 1250 VA  30 W
- Mechanical life of relay .... 30 x 10^6 operations
- Electrical life of relay .... 2 x 10^5 operations at 2200 VA resistive load
- Operating temperature .... +14°F to +140°F  -10°C to +60°C
- Weight ...................... 7 oz. (200g)

Note: The alarm threshold adjustment is 5% to 15% of asymmetry between the phases. The initial response time is .1 seconds at 5% asymmetry and 1 second at 15% after input power is applied. When a phase loss or failure occurs, the “off delay” response time is 100 ms.

ORDERING INFORMATION:

D = DIN-rail mounting or panel mounting
L = 11 pin plug-in

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
**WRS SERIES**

**PHASE CONTROL RELAY**

UL listed  CSA recognized

- Monitors
  - Phase Sequence
  - Loss of Any Phase
- LED Indicator
- 10 Amp SPDT Output
- Low Cost

### MODE OF OPERATION:

<table>
<thead>
<tr>
<th>RST</th>
<th>RTS</th>
<th>RST</th>
<th>RS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The WRS Phase Control Relay monitors the sequence loss or reversal of three phase power supplies. The output relay is energized when the phase sequence is correct and is de-energize when the phase sequence is wrong or one phase is lost.

### SPECIFICATIONS:

- **Input Power Directly**
  - 3 x 220 60 Hz
  - 3 x 380 60 Hz
  - 3 x 440 60 Hz

- **Power consumption**
  - 3 VA at 220 V

- **Output**
  - SPDT relay

- **Contact material**
  - AgCdO

- **Maximum Loading**
  - 10 AC resistive
  - 1 A SC inductive

- **Maximum switching voltage**
  - 250 VAC
  - 250 VDC

- **Relay max. power rating**
  - 2200 VA
  - 30 W

- **Mechanical life of relay**
  - 30 x 10^6 operations

- **Electrical life of relay**
  - 2 x 10^5 operations at 2200 VA resistive load

- **Operating temperature**
  - +14°F to +140°F
  - -10°C to +60°C

- **Weight**
  - 7 oz. (200g)

### WIRING DIAGRAM:

![Wiring Diagram](image)

### ORDERING INFORMATION:

- **D** = DIN-rail mounting or panel mounting
- **L** = 11 pin plug-in
- **P** = 8 pin plug-in

**INPUT POWER**

- **WRS SERIES**
  - 220A = 3 x 220 VAC
  - 380A = 3 x 380 VAC
  - 440A = 3 x 415/440 VAC

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
HDI SERIES
CURRENT CONTROL RELAY WITH DISPLAY

- 3 Digit LCD Display
- Monitors AC and DC Current
- Type HDIL Measures from 2 to 500 mA
- Type HDIH Measures from .1 to 10 A

TWO PRODUCT TYPES: HDIL (2 TO 500 mA) and HDIH (.1 TO 10 A) PROVIDE SELECTABLE OVER OR UNDER CURRENT CONTROL.

Control of AC / DC current without memory
When the value of the measured current, AC or DC, reaches the threshold the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s.
Once the current drops below 5 to 50% of the threshold (hysteresis), the output relay changes state again instantly. Changing the hysteresis on the front face does not therefore modify the value of the preset threshold.

Control of AC / DC current with memory
When the value of the measured current, AC or DC, reaches the threshold displayed on the front face, the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s, and stays locked in this position.

MODE OF OPERATION:

SPECSIFICATIONS:

| Input power | 24 VDC, 24, 120, 230 VAC ±15%, 50/60 Hz |
| Max. power consumption | 3 VA |
| Frequency of measured signal (AC) | 40 to 500 Hz |
| Setting accuracy – threshold | ±10% of selected threshold |
| Hysteresis selection | 5 to 50% of displayed threshold |
| Repeat accuracy | ±0.1% with constant parameters |
| Delay on threshold overrun | 0.1 to 3 sec. – adjustable |
| Output | SPDT |
| Maximum loading | 5 Amp resistive |
| Minimum loading | 100 mA |
| Maximum switching voltage | 250 VAC |
| Electrical life of relay | 500,000 operation at full load |
| Mechanical life of relay | 5,000,000 operations |
| Protection | Casing IP 40 Terminal IP 20 |
| Operating temperature | -4°F to 140°F, (-20°C to 60°C) |
| Storage temperature | -22°F to 158°F, (-30°C to 70°C) |
| Weight | 11.2 oz. (320g) |

MEASUREMENT RANGE:

<table>
<thead>
<tr>
<th>TYPES</th>
<th>HDIL</th>
<th>HDIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>E1-M</td>
<td>E2-M</td>
</tr>
<tr>
<td>Measurement range</td>
<td>Sensitivity</td>
<td>2 to 20 mA</td>
</tr>
<tr>
<td>Input resistance</td>
<td>5 Ω</td>
<td>1 Ω</td>
</tr>
</tbody>
</table>

*Important: 24 VDC input version. The input voltage and the measured current must be from separate sources. The "negative" poles of the auxiliary power supply and the measurement circuit are connected inside the unit.

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Type</th>
<th>Supply Voltage</th>
<th>Measurement Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 871 301</td>
<td>HDIL</td>
<td>24 VDC*</td>
<td>2 to 500 mA</td>
</tr>
<tr>
<td>84 871 302</td>
<td>HDIL</td>
<td>24 VAC</td>
<td>2 to 500 mA</td>
</tr>
<tr>
<td>84 871 304</td>
<td>HDIL</td>
<td>120 VAC</td>
<td>2 to 500 mA</td>
</tr>
<tr>
<td>84 871 305</td>
<td>HDIL</td>
<td>230 VAC</td>
<td>2 to 500 mA</td>
</tr>
<tr>
<td>84 871 306</td>
<td>HDIH</td>
<td>24 VDC*</td>
<td>.1 to 10 A</td>
</tr>
<tr>
<td>84 871 307</td>
<td>HDIH</td>
<td>24 VAC</td>
<td>.1 to 10 A</td>
</tr>
<tr>
<td>84 871 309</td>
<td>HDIH</td>
<td>120 VAC</td>
<td>.1 to 10 A</td>
</tr>
<tr>
<td>84 871 310</td>
<td>HDIH</td>
<td>230 VAC</td>
<td>.1 to 10 A</td>
</tr>
</tbody>
</table>

*See "Important" in Specifications

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
MCI SERIES
CURRENT CONTROL RELAY
UL listed  cUL listed

- Simple to Install
- Built in Current Transformer
- 1 to 20 Amp Current Control
- Space Saving 17.5mm Wide Enclosure

When the value of the controlled AC current reaches the threshold displayed on the front face, the output relay changes state at the end of T1 (400 ms fixed). It returns to its initial position at the end of T2 (150 ms fixed), when the controlled current drops below the displayed threshold minus the fixed hysteresis of 15%.

Simple to install. 1.) Run the electric cable through the current transformer on the unit. 2.) Set the over current control threshold between 1 and 20 A. 3.) Connect power to the MCI.

SPECIFICATIONS:
Input power .............................................. 24 VAC/VDC, 110 to 240 VAC, 50/60 Hz
Input power operating range ......................... 24 VAC/VDC ±15% 90 to 260 VAC
Maximum power consumption ....................... 10 VA
Hysteresis .................................................. Fixed at -15% Threshold
Display accuracy of preset threshold ............... ±10% of full scale
Repetition accuracy with constant parameters ........ ±.5%
Temperature drift ....................................... 0.08%
Voltage drift .............................................. 0.01%/degree C
Power up delay .......................................... 150 ms max.
Delay on threshold overrun T1 ......................... 400 ms
Delay on downward crossing on threshold T2 ...................... 150 ms
Output relay ............................................. SPST NO
Maximum output rating .................................. 5 Amp
Operating relay .......................................... +14° to +140°F (-10°C to 60°C)
Storage temperature ..................................... -22° to +150°F (-30°C to 70°C)
Weight ....................................................... 3 oz. (85g)
Conformity to EC Standards .......................... Level 3 according to EN 1000-4-2
Level 3 according to EN 1000-4-3
Level 3 according to EN 1000-4-4
Level 3 according to EN 1000-4-5

ORDERING INFORMATION:
Voltage  Part Number
24 VAC/VDC  84 871 102
110 - 240 VAC

DIMENSIONS: inches (mm)
Three product types; EIL (2 to 500 mA), EIH (.1 to 10A) and EIT (10 to 100A with current transformers) provide selectable over or under current control.

AC/DC control without memory.

When the value of the controlled current, either AC or DC, reaches the threshold displayed on the front face, the output relay change state at the end of time delay T1. It returns to the initial state instantly when the current drops below the hysteresis threshold, or when the power supply is disconnected.

AC/DC control with memory.

When the value of the controlled current reaches the displayed threshold, the output relay changes status at the end of time period T1 and remains locked in this position. To reset the memory function the auxiliary supply must be disconnected.

Over-current function (UPPER).

The power-on time delay T2 prevents current peaks due to motor starting. The delay on upward crossing of threshold T1 provides immunity to transients and other interference, thereby preventing spurious triggering of the output relay.

Under-current function (UNDER).

The power-on delay T2 prevents the occurrence of current troughs. The delay on downward crossing of threshold T1 provides immunity to random dips, thereby preventing spurious triggering of the output relay.

Note: In underload function, the absolute value of the hysteresis cannot be greater than the measurement range maximum.

**Specifications:**

- **Input power:** 24 VDC, 24, 110 to 230 VAC ±15%, 50/60 Hz
- **Power Consumption:** 3 VA
- **Hysteresis Selection:** 5 to 50% of Displayed Threshold
- **Threshold Value:** 10 to 100% of Measurement Range
- **Setting Accuracy-Threshold:** ±10%
- **Repeat Accuracy:** ±0.1% with constant parameters
- **Voltage drift:** ±0.1% (±10% of input voltage)
- **Temperature drift:** ±0.02%
- **Power up delay T2:** 1 s to 20 s, ±30%
- **Delay on threshold overrun T1:** 0.1 s to 3 s, ±20%
- **Output relay:** SPDT Relay
- **Contact Material:** AgCdO
- **Maximum Loading:** 8A AC resist
- **Operating temperature:** to 140°F, -20°C to 60°C
- **Storage temperature:** -30°C to 70°C
- **Weight:** (140g)

**Part number for ordering:**

<table>
<thead>
<tr>
<th>Type</th>
<th>EIL</th>
<th>EIH</th>
<th>EIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>20 mA</td>
<td>100 mA</td>
<td>500 mA</td>
</tr>
<tr>
<td>Input resistance</td>
<td>5 Ω</td>
<td>1 Ω</td>
<td>0.2 Ω</td>
</tr>
</tbody>
</table>

**Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com**

Products and specifications subject to change without notice.
IR.T SERIES
CURRENT CONTROL RELAY

UL listed  CSA recognized

- Automatic or Manual Control
- Start-up Inhibit
- Adjustable Hysteresis
- Multiple Voltages
- LED Relay Status Indicator

1. AC Current Control Without Latching:
   The output relay is energized when the current (peak current on AC) overshoots the level selected on the potentiometer. It de-energizes when the current falls below the normal current by 5 to 50% or when input power breaks. The hysteresis is controlled by a top mounted potentiometer and its selection does not change the chosen current level.

2. AC Current Control With Latching:
   The output relay is energized when the current reaches the selected value and stays latched. The contact between terminal B1 and B2 (or 11 and 9) should be opened or input power to the device interrupted to reset. In this case, it is preferable to reduce the hysteresis 5%.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Input</th>
<th>24 VDC, 24, 48, 110, 220 VAC ±15%, 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>3 VA maximum</td>
</tr>
<tr>
<td>Control Range</td>
<td>DC 24 VDC, AC 24, 48, 110, 220 VAC</td>
</tr>
<tr>
<td>DC CURRENT</td>
<td>AC CURRENT</td>
</tr>
<tr>
<td>5 to 100 mA</td>
<td>3.5 to 70.7 mA</td>
</tr>
<tr>
<td>0.05 to 1 A</td>
<td>0.035 to 0.707 A</td>
</tr>
<tr>
<td>0.5 to 10 A</td>
<td>0.35 to 7.07 A</td>
</tr>
<tr>
<td>Hysteresis selection</td>
<td>5 to 50% of input current</td>
</tr>
<tr>
<td>Repeat accuracy</td>
<td>±2% at a constant ambient</td>
</tr>
<tr>
<td>Response time</td>
<td>100 ms On Make, 200 ms On Break</td>
</tr>
<tr>
<td>Output Relay</td>
<td>SPDT Relay</td>
</tr>
<tr>
<td>Contact material</td>
<td>AgCdO</td>
</tr>
<tr>
<td>Maximum loading</td>
<td>10 A AC resistive 1 A DC inductive</td>
</tr>
<tr>
<td>Maximum switching voltage</td>
<td>250 VAC or DC</td>
</tr>
<tr>
<td>Relay maximum power rating</td>
<td>2500 VA 30W</td>
</tr>
<tr>
<td>Mechanical life of relay</td>
<td>30 x 10^5 operations</td>
</tr>
<tr>
<td>Electrical life of relay</td>
<td>2 x 10^8 at 2500 VA resistive load</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>+14°F to +140°F -10°C to +60°C</td>
</tr>
<tr>
<td>Weight</td>
<td>7 oz. (200g)</td>
</tr>
</tbody>
</table>

Option: 24 VDC power - the voltage and the measured current must be from separate sources.

Note: Upon energization of the current control IR.T Series Relay, the time delay, which is adjustable from .1 to 10 seconds, inhibits the output relay during start-up periods. The delay time is adjustable via a potentiometer located on the side of the case. Applies to both versions, with and without latching.

ORDERING INFORMATION:

- MOUNTING
  - D = DIN-rail mounting
  - L = 11 pin plug-in

- IR.T SERIES
  - 110A INPUT POWER
  - 24D = 24VDC
  - 24A = 24VAC
  - 48A = 48VAC
  - 110A = 110VAC
  - 220A = 220VAC
IAR.T SERIES
CURRENT CONTROL RELAY

UL listed  CSA recognized

- Automatic or Manual Control
- Start-up Inhibit
- Adjustable Hysteresis
- Multiple Voltages
- 5 to 100 Amp RMS

The DIAR.T is a current control which is capable of sensing up to 100 Amps. If requires a stepdown transformer, T1 100. The transformer has a 0.4” diameter center hole through which a current carrying lead is routed. Automatic or manual unlatching is available in each unit.

1. AC Current Control Without Latching:
   - The output relay is energized when the AC current overshoots the level selected on the potentiometer. It de-energizes when the current falls below the selected current by 5 to 50% or when input power breaks. The hysteresis is controlled by a top mounted potentiometer and its selection does not change the chosen current level.

2. AC Current Control With Latching:
   - The output relay is energized when the current reaches the selected value and stays latched. The contact between terminal B1 and B2 (or 11 and 9) should be opened or input power to the device interrupted to reset. In this case, it is preferable to reduce the hysteresis 5%.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>24 VDC, 24, 48, 110, 220 VAC ±15%, 50/60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>3 VA maximum</td>
</tr>
<tr>
<td>Hysteresis selection</td>
<td>5 to 50% of input current</td>
</tr>
<tr>
<td>Repeat accuracy</td>
<td>±2% at a constant ambient ±5% with temperature variation VDE 0435</td>
</tr>
<tr>
<td>Response time</td>
<td>100 ms On Make 200 ms On Break</td>
</tr>
<tr>
<td>Output Relay</td>
<td>SPDT Relay</td>
</tr>
<tr>
<td>Contact material</td>
<td>AgCdO</td>
</tr>
<tr>
<td>Maximum loading</td>
<td>10 A AC resistive 1 A DC inductive</td>
</tr>
<tr>
<td>Maximum switching voltage</td>
<td>250 VAC 30 VDC</td>
</tr>
<tr>
<td>Relay maximum power rating</td>
<td>2500 VA 30 W</td>
</tr>
<tr>
<td>Mechanical life of relay</td>
<td>30 x 10^4 operations</td>
</tr>
<tr>
<td>Electrical life of relay</td>
<td>2 x 10^4 at 2500 VA resistive load</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>+14°F to +140°F -10°C to +60°C</td>
</tr>
<tr>
<td>Weight</td>
<td>7 oz. (200g)</td>
</tr>
</tbody>
</table>

TRANSFORMER: (Part Number 74 525 305)

Current Range: 5 to 100 A RMS
Maximum Overload: 1 max = 150 A

ORDERING INFORMATION:

MOUNTING
D = DIN-rail mounting
L = 11 pin plug-in

IAR.T SERIES
110A

INPUT POWER
24D = 24VDC
24A = 24VAC
110A = 110VAC
220A = 220VAC

Note: Upon energization of the current control IAR.T Series Relay, the time delay, which is adjustable from .1 to 10 seconds, inhibits the output relay during start-up periods. The delay time is adjustable via a potentiometer located on the side of the case.

For additional current transformer see “Accessories” section: L595 Series. Page 2/99

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
HDU SERIES
VOLTAGE CONTROL RELAY WITH DISPLAY
UL cUL listed

- 3 Digit LCD Display
- Monitors AC and DC Voltages
- Type HDUL Measures from .2 to 60 Volts
- Type HDUH Measures from 10 to 600 Volts

TWO PRODUCT TYPES: HDUL (.2 TO 60 V) and HDUH (10 TO 600 V)
PROVIDE SELECTABLE OVER OR UNDER VOLTAGE CONTROL.

Control of AC / DC voltage without memory
When the value of the measured voltage, AC or DC, reaches the threshold $U_e$ the output relay changes state at the end of a time delay $T$ which can be set on the front face at between 0.1 and 3 s.

Once the voltage drops below 5 to 50% of the threshold (hysteresis), the output relay changes state again instantly. Changing the hysteresis on the front face does not therefore modify the value of the preset threshold.

Control of AC / DC voltage with memory
When the value of the measured voltage, AC or DC, reaches the threshold $U_e$ the output relay changes state at the end of a time delay $T$ which can be set on the front face at between 0.1 and 3 s, and stays locked in this position.

MODE OF OPERATION:

VOLTAGE CONTROL WITHOUT MEMORY

Threshold
Hysteresis

VOLTAGE CONTROL WITH MEMORY

Threshold
Hysteresis

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Type</th>
<th>Supply Voltage</th>
<th>Measurement Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 872 301</td>
<td>HDUL</td>
<td>24 VDC*</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 302</td>
<td>HDUL</td>
<td>24 VAC</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 304</td>
<td>HDUL</td>
<td>120 VAC</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 305</td>
<td>HDUL</td>
<td>230 VAC</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 306</td>
<td>HDUH</td>
<td>24 VDC*</td>
<td>10 to 600 V</td>
</tr>
<tr>
<td>84 872 307</td>
<td>HDUH</td>
<td>24 VAC</td>
<td>10 to 600 V</td>
</tr>
<tr>
<td>84 872 309</td>
<td>HDUH</td>
<td>120 VAC</td>
<td>10 to 600 V</td>
</tr>
<tr>
<td>84 872 310</td>
<td>HDUH</td>
<td>230 VAC</td>
<td>10 to 600 V</td>
</tr>
</tbody>
</table>

*Important: For 24 VDC Input power models, the supply voltage and the measured voltage must be from separate sources. The “negative” poles of the auxiliary power and the measurement circuit are connected inside the unit.

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Type</th>
<th>Supply Voltage</th>
<th>Measurement Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 872 301</td>
<td>HDUL</td>
<td>24 VDC*</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 302</td>
<td>HDUL</td>
<td>24 VAC</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 304</td>
<td>HDUL</td>
<td>120 VAC</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 305</td>
<td>HDUL</td>
<td>230 VAC</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 306</td>
<td>HDUH</td>
<td>24 VDC*</td>
<td>10 to 600 V</td>
</tr>
<tr>
<td>84 872 307</td>
<td>HDUH</td>
<td>24 VAC</td>
<td>10 to 600 V</td>
</tr>
<tr>
<td>84 872 309</td>
<td>HDUH</td>
<td>120 VAC</td>
<td>10 to 600 V</td>
</tr>
<tr>
<td>84 872 310</td>
<td>HDUH</td>
<td>230 VAC</td>
<td>10 to 600 V</td>
</tr>
</tbody>
</table>

*See “Important” in Specifications

DIMENSIONS: inches (mm)

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
EU SERIES
VOLTAGE CONTROL RELAY

UL cUL listed

- 2 Product Types – .2 to 60 V and 10 to 600 V
- Selectable Under or Over Voltage Modes
- Space Saving 22.5mm Wide Enclosure
- DIN-Rail / Surface Mount

TWO PRODUCT TYPES: EUL (.2 TO 60V) AND EUH (10 TO 600V) PROVIDE SELECTABLE OVER OR UNDER VOLTAGE CONTROL.

Control of AC / DC voltage without memory
When the value of the controlled voltage, AC or DC, reaches the threshold Ue displayed on the front face, the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s.

Once the voltage drops below 5 to 50% of the threshold (hysteresis), the output relay changes state again instantly. Changing the hysteresis on the front face does not therefore modify the value of the preset threshold.

Control of AC / DC voltage with memory
When the value of the controlled voltage, AC or DC, reaches the threshold Ue displayed on the front face, the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s, and stays locked in this position.

SPECIFICATIONS
Input power: 24 VDC, 24, 120, 230 VAC ±15%, 50/60 Hz
Max. power consumption: 3 VA
Frequency of measured signal: 40 to 500 Hz
Threshold value: 1 to 100% of measurement range
Hysteresis: 5 to 50% of displayed threshold
Display Accuracy: ±10% of full scale
Delay on threshold overun: .1 to 3 sec.
Output: SPDT relay
Contact material: AgCdO
Maximum loading: 8 Amp resistive
Maximum switching voltage: 250 VAC
Operating temperature: -4°F to 140°F, (-20°C to 60°C)
Storage temperature: -22°F to 158°F, (-30°C to 70°C)
Weight: 4.9 oz. (140g)

MEASUREMENT RANGE

<table>
<thead>
<tr>
<th>TYPES</th>
<th>EUL</th>
<th>EUH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>E1-M</td>
<td>E2-M</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>0.2 to 2 V</td>
<td>1 to 10 V</td>
</tr>
<tr>
<td>Input resistance</td>
<td>2 kΩ</td>
<td>10 kΩ</td>
</tr>
</tbody>
</table>

*Important: For 24 VDC Input power models, the supply voltage and the measured voltage must be from separate sources. The “negative” poles of the auxiliary power and the measurement circuit are connected inside the unit.

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Type</th>
<th>Supply Voltage</th>
<th>Measurement Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 872 020</td>
<td>EUL</td>
<td>24 VDC*</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 021</td>
<td>EUL</td>
<td>24 VAC</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 023</td>
<td>EUL</td>
<td>120 VAC</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 024</td>
<td>EUL</td>
<td>230 VAC</td>
<td>.2 to 60 V</td>
</tr>
<tr>
<td>84 872 030</td>
<td>EUH</td>
<td>24 VDC*</td>
<td>10 to 600 V</td>
</tr>
<tr>
<td>84 872 031</td>
<td>EUH</td>
<td>24 VAC</td>
<td>10 to 600 V</td>
</tr>
<tr>
<td>84 872 033</td>
<td>EUH</td>
<td>120 VAC</td>
<td>10 to 600 V</td>
</tr>
<tr>
<td>84 872 034</td>
<td>EUH</td>
<td>230 VAC</td>
<td>10 to 600 V</td>
</tr>
</tbody>
</table>

*See “Important” in Specifications

MODE OF OPERATION

WIRING

DIMENSIONS inches (mm)
EUS and EUSF SERIES
VOLTAGE CONTROL RELAY

UL cUL listed

- Units Check Their Own Supply Voltage Level
- EUS SERIES – Over or Under Voltage Selectable
- EUSF SERIES – Monitors High and Low Voltage
- Space Saving 22.5mm Wide – DIN-Rail / Surface Mount

OPERATING PRINCIPLE:

EUS SERIES
Control of AC / DC voltage without memory
When the value of the controlled voltage, AC or DC, reaches the threshold Ue displayed on the front face, the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s.

Once the voltage drops below 5 to 50% of the threshold (hysteresis), the output relay changes state again instantly. Changing the hysteresis on the front face does not therefore modify the value of the preset threshold.

Control of AC / DC voltage with memory
When the value of the controlled voltage, AC or DC, reaches the threshold Ue displayed on the front face, the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s, and stays locked in this position.

EUSF SERIES

The EUSF window threshold relay monitors an electrical voltage which acts as its own power supply (simplified wiring). When the value of the controlled voltage, AC or DC, goes outside the window, the output relay deenergises at the end of a time delay T which can be set on the front face at between 0.1 and 3 s.

It switches back on when the voltage returns within the window and stays between the upper and lower thresholds displayed by two potentiometers on the front face. Fixed hysteresis ensures bounce-free relay switching around the thresholds.

Note: Time delay T1 on crossing the upper and lower thresholds offers immunity to transient phenomena, thus preventing spurious triggering of the output relay.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>EUS:</th>
<th>EUSF:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input power</td>
<td>12 VDC</td>
<td>12 VDC</td>
</tr>
<tr>
<td>Max. power consumption</td>
<td>3.5 VA</td>
<td>3.5 VA</td>
</tr>
<tr>
<td>Frequency of measured signal</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Threshold value</td>
<td>9.6 to 15.6 VDC</td>
<td>20 to 80 VAC/VDC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90 to 270 VAC/VDC</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>5 to 20% Adjustable</td>
<td>Fixed at 5%</td>
</tr>
<tr>
<td>Display accuracy</td>
<td>±10% of full scale</td>
<td>±10% of full scale</td>
</tr>
<tr>
<td>Delay on threshold overun</td>
<td>.1 to 3 sec.</td>
<td>.1 to 3 sec.</td>
</tr>
<tr>
<td>Output</td>
<td>SPDT relay</td>
<td>SPDT relay</td>
</tr>
<tr>
<td>Contact material</td>
<td>AgCdO</td>
<td>AgCdO</td>
</tr>
<tr>
<td>Maximum loading</td>
<td>8 Amp resistive</td>
<td>8 Amp resistive</td>
</tr>
<tr>
<td>Maximum switching voltage</td>
<td>250 VAC</td>
<td>250 VAC</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-4°F to 140°F, (-20°C to 60°C)</td>
<td>-4°F to 140°F, (-20°C to 60°C)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-22°F to 158°F, (-30°C to 70°C)</td>
<td>-22°F to 158°F, (-30°C to 70°C)</td>
</tr>
<tr>
<td>Weight</td>
<td>4.9 oz. (140g)</td>
<td>4.9 oz. (140g)</td>
</tr>
</tbody>
</table>

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Type</th>
<th>Supply Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 872 040</td>
<td>EUS</td>
<td>12 VDC</td>
</tr>
<tr>
<td>84 872 046</td>
<td>EUS</td>
<td>20 to 80 VAC/VDC</td>
</tr>
<tr>
<td>84 872 047</td>
<td>EUS</td>
<td>90 to 270 VAC/VDC</td>
</tr>
<tr>
<td>84 872 056</td>
<td>EUSF</td>
<td>20 to 80 VAC/VDC</td>
</tr>
<tr>
<td>84 872 057</td>
<td>EUSF</td>
<td>90 to 270 VAC/VDC</td>
</tr>
</tbody>
</table>

MODE OF OPERATION:

WIRING:

DIMENSIONS: inches (mm)

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
UR SERIES
VOLTAGE CONTROL RELAY
UL listed   CSA recognized

- AC or DC Voltage Control
- Manual or Automatic Operation
- Adjustable Threshold
- 5 to 50% Hysteresis Range
- LED Relay Status Indicator

1. AC/DC voltage control without latching:
The output relay is energized when the voltage (AC peak voltage) exceeds the selected threshold. It de-energizes when the voltage falls below the hysteresis setting (5 to 50%) or when supply breaks. The hysteresis is controlled by a potentiometer and its selection does not change the chosen threshold.

2. AC/DC voltage control with latching:
The output relay is energized when the voltage reaches the selected threshold and stays latched in this position. The contact between terminal B1 and M (or 8 or 9) should be opened or the input power of the device interrupted to reset.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Input</th>
<th>24 VDC, 24, 48, 110, 220 VAC ±15%, 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>24 VAC: 1 VA 48 VAC: 1.2 VA 110 VAC: 3.5 VA 220 VAC: 7 VA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range</th>
<th>Resistance</th>
<th>Acceptance load (input)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC or DC</td>
<td>10 kΩ</td>
<td>50 V</td>
</tr>
<tr>
<td>0.1 to 10 V</td>
<td>10 kΩ</td>
<td>100 V</td>
</tr>
<tr>
<td>0.4 to 40 V</td>
<td>400 kΩ</td>
<td>440 V</td>
</tr>
<tr>
<td>4 to 400 V</td>
<td>400 kΩ</td>
<td>400 V</td>
</tr>
</tbody>
</table>

| Hysteresis selection | ±2% at a constant ambient |
| Repeat accuracy | ±0.5% at a constant ambient |

WIRING DIAGRAM:

ORDERING INFORMATION:

- DIN-rail mounting
- 11 pin plug-in

Option: 24 VDC power – the voltage and the measured current must be from separate sources.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
SR SERIES
UNDER VOLTAGE RELAY
UL listed  CSA recognized

- Multiple AC/DC Voltages
- 5 to 20% Hysteresis Adjustment
- Automatic Operation
- Adjustable Threshold

The voltage threshold SR Relay controls a voltage supply which is its own supply. The output relay is energized when the supply (effective for AC) exceeds the selected threshold. It de-energizes when the controlled supply falls below (5 to 20% Hysteresis) of the supply voltage or when the input power breaks. Hysteresis is controlled by a potentiometer and its selection does not change the chosen threshold. Pulses or drops of 100ms or less are ignored.

SPECIFICATIONS:

Input ........................................... 12 VDC, 24 VAC, 24 VDC, 48 VAC
                                         48 VDC, 110 VAC, 220 VAC, 50/60 Hz
                                         -20% to +30% DC,
                                         -30% to +15% AC

Maximum power consumption .............. 24 VAC: 1.5 VA  24 VDC: .6 W
                                         48 VAC: 2 VA  24 VDC: .8 W
                                         220 VAC: 5 VA  48 VDC: 1.8 W
                                         110 VAC: 5 VA

Residual ripple .............................. <Hysteresis value

Output relay ................................... SPDT Relay

Contact material .............................. AgCdO

Maximum loading ........................... 10 A AC resistive  8 A DC inductive

Maximum switching voltage ............... 250 VAC  250 VDC

Maximum power rating ..................... 2200 VA  90 W

Mechanical life of relay .................... 30 x 10⁶ operations

Electrical life of relay ...................... 2 x 10⁴ at 2200 VA resistive load

Operating temperature ..................... +14°F to 140°F  -10°C to +60°C

Weight ....................................... 2.8 oz. (100g)

ORDERING INFORMATION:

MOUNTING
D = DIN-rail or panel mounting
L = 11 pin plug-in
P = 8 pin plug-in

INPUT POWER
12 = 12 VDC
24D = 24 VDC
24A = 24 VAC
48D = 48 VDC
48A = 48 VAC
110 = 110 VAC
220 = 220 VAC
UFR2 SERIES
VOLTAGE CONTROL RELAY – 3 Phase
UL listed  CSA recognized

- Over/Under Voltage Control
- Min. & Max. Threshold Adjustment
- Three LED Indicators
- SPDT IOA Relay
- Adjustable Time Inhibit .1 to 10 seconds

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Input Power</th>
<th>24, 110, 230, 400, 440 VAC, ±15% 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Power Consumption</td>
<td>3 VA</td>
</tr>
</tbody>
</table>

Voltage Inputs

<p>| Three-phase networks measured: |<br />
|-----------------------------|-----------------------------|</p>
<table>
<thead>
<tr>
<th>AC voltage (rms) between phases</th>
<th>Measurement range of min. and max. thresholds, rms voltage between phases</th>
<th>Input resistance</th>
<th>Peak overload, less than 10 ms</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x 230 V</td>
<td>161 V to 299 VAC</td>
<td>400 kΩ</td>
<td>600 V</td>
</tr>
<tr>
<td>3 x 400 V</td>
<td>280 V to 520 VAC</td>
<td>400 kΩ</td>
<td>700 V</td>
</tr>
<tr>
<td>3 x 440 V</td>
<td>308 V to 572 VAC</td>
<td>400 kΩ</td>
<td>800 V</td>
</tr>
</tbody>
</table>

Input Voltage Frequency | 50/60 Hz
Hysteresis | set to 3% of displayed threshold
Display Accuracy | ±10%
Repeat Accuracy | ±0.5%
Output Relay | SPDT 10 Amp Resistive
Operating Temperature | +14°F to 140°F (-10°C to +60°C)
Storage Temperature | -4°F to 158°F (-20°C to +70°C)
Weight | 200g

ORDERING INFORMATION:

L MOUNTING
UFR2 SERIES
230V 3-PHASE
230V INPUT POWER

WIRING DIAGRAM:

NOTE: The input power can be connected between two phases of the three phase network being monitored. Tolerance is ±15% of the selected voltage.

The maximum threshold must be greater than the minimum threshold for proper operation.
UFRN2 SERIES
VOLTAGE CONTROL RELAY
Three Phase with Neutral

- Over/Under Voltage Control
- Min. & Max. Threshold Adjustment
- Three LED Indicators
- Detects Absence of Neutral
- Adjustable Time Inhibit .1 to 10 seconds

SPECIFICATIONS:

| Input Power | 24, 110, 230, 400, 440 VAC, ±15% 50/60 Hz |
| Max. Power Consumption | 3 VA |

Voltage Inputs

<table>
<thead>
<tr>
<th>AC voltage (rms) between phases</th>
<th>Measurement range of min. and max. thresholds. Prms voltage between phases-Neutral</th>
<th>Input resistance</th>
<th>Peak overload, less than 10 ms</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x 230 V + N</td>
<td>92 V to 172 VAC</td>
<td>220 kΩ</td>
<td>600 V</td>
</tr>
<tr>
<td>3 x 400 V + N</td>
<td>161 V to 300 VAC</td>
<td>400 kΩ</td>
<td>700 V</td>
</tr>
<tr>
<td>3 x 440 V + N</td>
<td>177 V to 330 VAC</td>
<td>400 kΩ</td>
<td>800 V</td>
</tr>
</tbody>
</table>

Input Voltage Frequency: 50/60 Hz
Hysteresis: set to 3% of displayed threshold
Display Accuracy: ±10%
Repeat Accuracy: ±0.5%
Output Relay: SPDT 10 Amp Resistive
Operating Temperature: +14°F to 140°F (-10°C to +60°C)
Storage Temperature: -4°F to 158°F (-20°C to +70°C)
Weight: 200g

AVAILABLE PART NUMBERS
- DUFRN2230A110A
- DUFRNZ440A440A
- LUFRN2230A110A
- LUFRN2230A230A

ORDERING INFORMATION:

- L MOUNTING
  - L = 11 pin plug-in
  - D = DIN-rail mounting
- UFRN2 SERIES
- 230V 3-PHASE
- PHASE VOLTAGE
  - 230 V = 3 X 230 VAC
  - 440 V = 3 X 440 VAC
- 230V INPUT POWER
  - 110 V = 110 VAC
  - 230 V = 230 VAC
  - 440 V = 440 VAC

GENERAL FEATURES:

The output relay is activated when the values of the three voltages between phases and neutral lie within the minimum and maximum thresholds (adjusted separately using two potentiometers on the front panel). If one or more voltages between phases lies outside the window constituted by the minimum and maximum thresholds, the output relay de-energizes at the end of time T (adjustable between 0.1 and 10 seconds via front panel).

A set 3% hysteresis ensures clean switching of the output relay at each threshold.

Auxiliary power supply.
The unit is not affected by the sequence of the phases or harmonic distortion.
Application: Protecting electrical installations against variations in mains supply.

NOTE: One red LED displays undervoltage.
A green LED displays the status of the relay LED “ON” = relay “ON”. A second red LED displays overvoltage.

SPECIAL CASE: Relays DUFRN2 and LUFRN2 can control a SINGLE PHASE voltage. For this application, the single phase voltage is connected between terminals R, S, T (5, 6, 7) wired together, and terminal N (11).

WIRING DIAGRAM:

NOTE: The input power can be connected between a phase and neutral or between phases of the three phase network being monitored. Tolerance is ±15% of the selected voltage.

The maximum threshold must be greater than the minimum threshold for proper operation.
**Underspeed control relay**

- Control of underspeed, stopping, running speed, or jamming of a motor.
- Data collected by three-wire or NAMUR sensor, or by contact or voltage.
- Delay adjustable from 100 ms to 10 min in 4 sub-ranges.
- Delay on energisation adjustable from 0.3 to 30 sec.
- LEDs indicate power supply and state of output relay.

### Operating principle

The FRL control relay can be used to solve underspeed problems: conveyor belts, conveyors, etc. where the crossing of a low speed threshold should trigger an alarm.

Speed data is collected via a sensor such as a three-wire output proximity sensor, a NAMUR sensor or by volt-free contact or voltage.

On power-up, to allow the process which is being controlled to reach its operating speed, control is inhibited for a time of between 0.3 and 30 sec, which can be adjusted on the front face.

If starting requires an inhibition time above 30 seconds, external contact S2 must be closed during starting to inhibit the FRL (during this time the yellow LED flashes), then opened when the nominal speed has been reached.

On each cycle of the process being controlled, the sensor sends a pulse to the FRL. Each of these pulses resets the internal time delay of the FRL. If the time between two pulses is less than the value set on the FRL, the delay is reset on each pulse and the output relay remains closed.

If the speed of the process decreases, the time between pulses increases. When the time between two pulses is greater than the value set on the FRL, the controlled process is in underspeed mode, the output relay of the FRL changes state (opens). The output relay closes again when the speed of the controlled process exceeds the preset value plus the hysteresis (5 % of the value displayed).

If ‘memory’ mode is activated, the relay remains open when an underspeed fault is detected. In this case, the output relay can only close again after a manual reset has been performed by closing external contact S2.

A yellow LED indicates the state of the relay. A green LED indicates the presence of the power supply.

### Without latching

<table>
<thead>
<tr>
<th>U</th>
<th>Output relay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysteresis Speed displayed</td>
<td>Inhibition delay</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

### With latching

<table>
<thead>
<tr>
<th>U</th>
<th>Output relay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysteresis Speed displayed</td>
<td>Inhibition delay</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>200 ms min.</td>
<td></td>
</tr>
</tbody>
</table>

### To order, specify:

1. Part number
   - Example: Underspeed control relay FRL - 84 874 304

### Type

<table>
<thead>
<tr>
<th>FRL</th>
<th>Part numbers (and voltages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V</td>
<td>84 874 300</td>
</tr>
<tr>
<td>24 V</td>
<td>84 874 301</td>
</tr>
<tr>
<td>110 V</td>
<td>84 874 302</td>
</tr>
<tr>
<td>230 V</td>
<td>84 874 304</td>
</tr>
</tbody>
</table>

### Power supply characteristics

- Supply voltage Un 24, 120, 230 V ~ 50/60 Hz Galvanic isolation via transformer 24 V ~ without galvanic isolation
- Supply tolerance 0.85 to 1.15 Un
- Maximum power consumption Version ~ 3.5 VA max. at Un and 5 VA at Un + 15 %
- Version = 1 W max. at Un and 1.5 W at Un + 15 %
- Immunity to micro power cuts 10 ms
- Insulation coordination Category III, degree of pollution 2 conforming to IEC 664.1 / VDE 0110 : 4 KV/2

### Control / input circuit characteristics

- Input circuit 3-wire sensors 24 V PNP (50 mA max.)
- NAMUR sensor 8.2 V on 1 kΩ
- Contact Volt-free
- Voltage input 20 V max.
- Input resistance 16 kΩ except for NAMUR 1 kΩ
- High state Min. 4.5 V, max. 30 V
- Low state Min. 0 V, max. 1 V
- Breaking frequency 200 Hz
- Minimum pulse time 5 ms
- Minimum time between pulses 5 ms
- Selection of delay and memory function 8-position switch on front face
  - No memory
  - With memory
  - 0.1 to 1 s, 1 to 10 s, 0.1 to 1 min, 1 to 10 min
  - 0.1 to 1 s, 1 to 10 s, 0.1 to 1 min, 1 to 10 min
- Hysteresis 5 % of threshold displayed
- Display accuracy 10 % of full scale (@ 25 °C)
- Repetition accuracy ± 0.5 % with constant parameters
- Temperature-dependent drift ± 0.05 % / °C
- Voltage-dependent drift ± 1 % / V
- Reset time 200 ms minimum
- Reset time S2 100 ms minimum
- Inhibition delay 0.3 to 30 s ± 10 %

### Output characteristics

- Output 1 AgCdO changeover
- Breaking capacity 2000 VA 80 W
- Maximum breaking current 8 A ~ 8 A =
- Minimum breaking current 100 mA ~ 100 mA =
- Maximum breaking voltage 100 V ~ 100 V =
- Mechanical life 5 x 10⁶ operations
- Electrical life AC12 2000 VA - 10⁵ operations
  - AC15
  - DC13
  - Cos ϕ = 0.3 - 6000 operations
  - L/R = 300 ms - 6000 operations
- Maximum rate 3600 operations / hour at full load

### General characteristics

- Casing material Self-extinguishing
- Terminal capacity 2 x 1.5 mm² with ferrule
  - 2 x 2.5 mm² without ferrule
- Temperature limits Use - 20 °C to + 60 °C (conforming to IEC 68.1.14)
  - Stored - 30 °C to + 70 °C (conforming to IEC 68.1.1/2)
- Relative humidity 93 % (+2 %; -3 %) without condensation
- Weight 255 g approximately
S5 LEVEL PROBE HOLDER
Single probe holder for use with probe rod of various lengths. This probe is particularly suitable for high temperature and/or high pressure applications. It is capable of operating at temperatures up to 200°C (392°F) and pressures up to 700PSI. Order part # S5.

36" Threaded Rod. Order part number S5/1.

NOTE: Internal Threading: 1/4 x 20

S8 LEVEL PROBE
The S8 probe will hold one, two or three 4mm probes. The S8 comes with three (3) one meter lengths of 4mm stainless steel rod. It comes equipped with a black SBS rubber protective top through which the leads are routed at a 90° angle.

SPECIFICATIONS:
- Material - Holder: Polyamide
- Material - Top Boot: SBS (Styrene Butadiene)
- Wire Terminal: Stainless Steel with M2 x 4 brass screws
- Probe Holder: Stainless steel
- Gasket: BB701 (Butadiene)
- Thread Size: 1/2" NPT
- Operating Temp: 176°F (80°C)
- Max Pressure: 2 Kg/CM² (28 PSI)

Note: The end of the rod has to be threaded (#8-32) to fit the probe holder.
S08, S11 SCREW TERMINAL SOCKETS
The S08, and S11 are 8 and 11 pin sockets fabricated from a rugged, durable polycarbonate.* Mounting is with two 6/32 screws .250 or on .30 DIN-Rail, DR. Order part “S08” or “S11.”

S08-600: 600 V, 10 A rated 8 pin socket-UL and CSA

L595 SERIES CURRENT TRANSFORMER
- 20 to 400 Amps
- Compatible with IAR.T Series

SPECIFICATIONS:
- Input Current: 20 to 400 Amps AC 50/60 Hz
- Output Current: 100 mA AC
- Connections: #20 AWG 24” long wires
- Insulation Class: 600 VAC
- Enclosure: Fiberglass reinforced resin

ORDERING INFORMATION:
- Part Number
- Input Current
  - L595-020 20 Amps
  - L595-050 50 Amps
  - L595-100 100 Amps
  - L595-200 200 Amps
  - L595-300 300 Amps
  - L595-400 400 Amps

DIMENSIONS:

L546 SERIES CURRENT TRANSFORMER
- 50 to 500 Amps
- Compatible with F3I and FWIT Series

SPECIFICATIONS:
- Input Current: 50 to 500 Amps AC 50/60 Hz
- Output Current: 5 Amps AC
- Connections: #16 AWG 24” long wires
- Insulation Class: 600 VAC
- Enclosure: Molded thermoplastic

ORDERING INFORMATION:
- Part Number
- Input Current
  - L546-050 50 Amps
  - L546-100 100 Amps
  - L546-200 200 Amps
  - L546-500 500 Amps

DIMENSIONS:
Safety Relays
### Safety category for control systems (according to EN 954-1)

<table>
<thead>
<tr>
<th>Categories</th>
<th>Summary of requirements</th>
<th>System behaviour</th>
<th>Main basis of safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>The part of the machine control system relating to safety and/or protective devices, as well as its components, must be designed, selected, assembled and combined using the most advanced methods in order to be able to cope with expected influences.</td>
<td>- If a fault occurs, it may cause the loss of the safety function.</td>
<td>By selecting components and safety principles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Certain faults are not detected.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>The requirements of B apply. Proven components and safety principles must be used.</td>
<td>As described for category B, but with greater reliability in relation to the safety of the safety function.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>The requirements of B and the use of proven safety principles apply. The safety function must be checked at suitable intervals by the machine control system. <strong>Note</strong>: suitable times will depend on the application and the type of machine.</td>
<td>- The appearance of a fault may cause the loss of the safety function between checking intervals.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The fault is detected by the check.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The control system must be designed so that:</td>
<td>- When there is a single fault, the safety function continues to operate.</td>
<td>By structure</td>
</tr>
<tr>
<td></td>
<td>a) a single fault in control does not cause the loss of the safety function.</td>
<td>- Certain faults are detected, but not all.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) if reasonably possible, the single fault must be detected by suitable measures using the most advanced technology.</td>
<td>- The accumulation of non-detected faults may lead to the loss of the safety function.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>The requirements of B and the use of proven safety principles apply. The control system must be designed so that:</td>
<td>- When faults appear, the safety function continues to operate.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) a single fault in control does not cause the loss of the safety function, and</td>
<td>- Faults will be detected in time to avoid the loss of the safety function.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) if possible, the single fault should be detected, by the next call to the safety function, or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) if b) is not possible, an accumulation of faults should not cause the loss of the safety function.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Estimation of the risk in the event of a fault and selection of a suitable category (according to EN 954-1)

Starting point for estimating the risk for the part of the control system relating to safety.

**S** Seriousness of injury  
S1 Slight injury  
S2 Serious, irreversible injury to one or more person(s) or death

**F** Frequency and duration of exposure  
F1 Rare to quite frequent  
F2 Frequent to continuous

**P** Possibility of avoiding the dangerous phenomenon  
P1 Possible under certain conditions  
P2 Rarely possible

**B. 1-4:** Categories for the parts of the control system relating to safety

---

**Note:** suitable times will depend on the application and the type of machine.

**System behaviour**

- If a fault occurs, it may cause the loss of the safety function.
- Certain faults are not detected.
Guide to selecting a safety relay

<table>
<thead>
<tr>
<th>Function</th>
<th>Safety contacts</th>
<th>Data contacts</th>
<th>Safety level</th>
<th>Type</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency stop and/or mobile guards</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>KNA3-RS</td>
<td>2/106</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>KNA3-XS</td>
<td>2/104</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>KZP3-RS</td>
<td>2/108</td>
</tr>
<tr>
<td>2-hand control</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>KZH2-XS</td>
<td>2/114</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>KZH3-RS</td>
<td>2/116</td>
</tr>
<tr>
<td>Timed contacts</td>
<td>3</td>
<td>1</td>
<td>4 - 3 *</td>
<td>KZR3-RS</td>
<td>2/110</td>
</tr>
<tr>
<td>Zero speed monitoring</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>KSW2-RS</td>
<td>2/112</td>
</tr>
<tr>
<td>Extension unit</td>
<td>3</td>
<td>0</td>
<td>**</td>
<td>KZE3-XS</td>
<td>2/118</td>
</tr>
</tbody>
</table>

* Level 4 on instantaneous contact / level 3 on timed contacts
** Depending on the wiring to the main unit

Conformity

European "Machinery" Directive 89/392/EEC
French Decree 92/765-766-768
European "Usage" Directive 89/655/EEC
French Decree 93-40 / 93-41
European "EMC" Directive 89/336/EEC
IEC 61496-1
IEC 664-1
EN 50081-2
EN 50082-2
EN 60204-1
EN 292-1 and 2
EN 574 / 97
EN 954-1
EN 418
EN 1088
UL 508
C22-2 No. 14-M91
GS-ET-20

Harmonised European standards

These standards have been developed to enable designers, manufacturers or any other person to interpret the essential requirements of the directives in order to ensure conformity with European law.

The standards are designed as a framework and general guide for producing machines which will be safe under normal operating conditions.

Main harmonised standards relating to safety

| EN 292-1/2       | Machine safety
| Basic concepts
| General design principles                                               | EN 418       | Machine safety
| Emergency stop equipment
| Functional aspects                                                        |
| EN 60 204-1      | Machine safety
| Electrical machine equipment                                            | EN 1088      | Machine safety
| Latching and interlocking mechanisms
| Mobile guards                                                            |
| EN 954-1         | Machine safety
| Parts of control systems relating to safety
| Tables of risks and categories                                           | EN 574       | Machine safety
| 2-hand control device                                                    |
### "KNA3-XS" safety relay (22.5 mm)

- "Emergency stop" and "mobile guard monitoring" functions
- "CE" conforming product / BG approved
- Control device with one or two channels
- Safety via redundancy and self-checking
- 3 "N/O" safety contacts with linked contacts - 6 A / 250 ~
- 1 "N/C" signalling contact
- Can be used to obtain level 3 according to NF.EN 954-1

---

#### Technical characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>KNA3-XS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power supply voltage</strong></td>
<td>24 V 50/60 Hz</td>
</tr>
<tr>
<td><strong>Operating range</strong></td>
<td>-15% / +15% of Un for ~</td>
</tr>
<tr>
<td><strong>Power on Indicator</strong></td>
<td>Green LED – PWR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>KNA3-XS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reset time</strong></td>
<td>&lt; 25 ms</td>
</tr>
<tr>
<td><strong>Maximum response time on emergency stop</strong></td>
<td>&lt; 50 ms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output specification</th>
<th>KNA3-XS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>Volt-free outputs</td>
</tr>
<tr>
<td><strong>No. of safety circuits</strong></td>
<td>3 &quot;N/O&quot; AgSnO2 contacts</td>
</tr>
<tr>
<td><strong>No. of data circuits</strong></td>
<td>1 &quot;N/C&quot; AgSnO2 contacts</td>
</tr>
<tr>
<td><strong>Breaking capacity</strong></td>
<td>1500 VA resistive</td>
</tr>
<tr>
<td><strong>Max. current breaking capacity</strong></td>
<td>6.0 A</td>
</tr>
<tr>
<td><strong>Max. voltage breaking capacity</strong></td>
<td>250 VAC</td>
</tr>
<tr>
<td><strong>Electrical life</strong></td>
<td>10^5 operations at 1500 VA resistive</td>
</tr>
<tr>
<td><strong>Mechanical life</strong></td>
<td>5.10^5 operations at 500 VA resistive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation and use</th>
<th>KNA3-XS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Max. absorbed power</strong></td>
<td>AC 1.6 VA / DC 2 W</td>
</tr>
<tr>
<td><strong>Relay on Indicator</strong></td>
<td>Green LED – Out</td>
</tr>
<tr>
<td><strong>Operating temperature</strong></td>
<td>0°C to +50°C acc. to IEC 88-2-14</td>
</tr>
<tr>
<td><strong>Storage temperature</strong></td>
<td>-20°C to +70°C acc. to IEC 88-1/2</td>
</tr>
<tr>
<td><strong>Internal voltage</strong></td>
<td>24 V</td>
</tr>
<tr>
<td><strong>Dielectric strength</strong></td>
<td>2.95 kV according to IEC 664-1</td>
</tr>
<tr>
<td><strong>Resistance to tracking</strong></td>
<td>Material group III</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EMC immunity according to EN 50082-2</th>
<th>KNA3-XS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rapid transients</strong></td>
<td>2 kV directly acc. to IEC 1000.4.4</td>
</tr>
<tr>
<td><strong>Radiated electromagnetic field</strong></td>
<td>80 MHz to 1 GHz / 900 MHz (ENV 50140/204)</td>
</tr>
<tr>
<td><strong>Electrostatic discharges</strong></td>
<td>8 kV in the air acc. to IEC 1000.4.2</td>
</tr>
<tr>
<td><strong>Shock waves</strong></td>
<td>Common mode 1 kV according to IEC1000.4.5</td>
</tr>
<tr>
<td><strong>Radio frequencies in common mode</strong></td>
<td>10 V rms Level 3 according to IEC 1000.4.6</td>
</tr>
<tr>
<td><strong>Drop-out / short breaks / microbreaks</strong></td>
<td>Un-30% for 10 ms every 1 s</td>
</tr>
<tr>
<td><strong>Un-60% for 100 ms every 1 s according to IEC 81496-1/97</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Un-100% for 10 ms every 100 ms</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Un-50% for 20 ms every 200 ms</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Un-50% for 500 ms every 5 s</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casing</th>
<th>KNA3-XS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material</strong></td>
<td>Polycarbonate</td>
</tr>
<tr>
<td><strong>Degree of protection</strong></td>
<td>Casing: IP40</td>
</tr>
<tr>
<td><strong>Terminal capacity</strong></td>
<td>2 X 1.5 mm² multicore with ferrule</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>310 g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To order, specify:</th>
<th>KNA3-XS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part number</strong></td>
<td>85 100 036</td>
</tr>
<tr>
<td><strong>Part number</strong></td>
<td>85 100 037</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Conformity</th>
<th>KNA3-XS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>European &quot;Machinery&quot; Directive 89/392/EEC</strong></td>
<td></td>
</tr>
<tr>
<td><strong>French Decree 92/765-766-768</strong></td>
<td></td>
</tr>
<tr>
<td><strong>European &quot;Usage&quot; Directive 89/655/EEC</strong></td>
<td></td>
</tr>
<tr>
<td><strong>French Decree 93-40 / 93-41</strong></td>
<td></td>
</tr>
<tr>
<td><strong>NF-EN 60204-1</strong></td>
<td></td>
</tr>
<tr>
<td><strong>NF-EN 292-1 and 2</strong></td>
<td></td>
</tr>
<tr>
<td><strong>NF-EN 954-1</strong></td>
<td></td>
</tr>
<tr>
<td><strong>NF-EN 418</strong></td>
<td></td>
</tr>
<tr>
<td><strong>NF-EN 1088</strong></td>
<td></td>
</tr>
<tr>
<td><strong>UL 508</strong></td>
<td></td>
</tr>
<tr>
<td><strong>C22-2 No. 14-M91</strong></td>
<td></td>
</tr>
<tr>
<td><strong>GS-ET-20</strong></td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Connections</th>
<th>KNA3-XS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key</strong></td>
<td></td>
</tr>
<tr>
<td>A1-A2 : Power supply</td>
<td>Power device(s)</td>
</tr>
<tr>
<td>Y1-Y2 : Start / validation</td>
<td></td>
</tr>
<tr>
<td>13-23/24-33-34 : &quot;N/O&quot; safety contacts</td>
<td></td>
</tr>
<tr>
<td>41-42 : &quot;N/C&quot; signalling contacts</td>
<td></td>
</tr>
</tbody>
</table>

---

To order, specify:

Example: KNA3-XS safety relay: 85 100 036
Control devices:
Depending on the degree of safety required, KNA3-XS can receive the following components as inputs:
- emergency stop pushbuttons with one or two contacts (A1-A2)
- position sensors (limit switches) with one or two contacts (A1-A2)
- pushbutton for start or validation (Y1-Y2)
A positive break operation device must be used if a single channel is used. (diagram 1)
To increase the degree of safety, one "N/C" auxiliary contact per power contactor is wired in series with the start (or validation) pushbutton, to ensure self-checking in this part of the installation. (diagram 2)

Examples of use

Control devices:
The KNA3-XS has three "N/O" safety contacts (13-14/23-24/33-34) and one "N/C" signalling contact (41-42). One or more control devices may be wired (diagram 1 and 2) up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KNA3-XS, it is advisable not to exceed 10 A thermal for all three contacts. The signalling contact cannot be used as a safety contact. The signalling contact can be wired on a PLC input or integrated into a fault signalling system.

Extending the number of contacts:
The number of contacts of the KNA3-XS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS (see page 18).
"KNA3-RS" safety relay (45 mm)

- "Emergency stop" and "mobile guard monitoring" functions
- "CE" conforming product / BG approved
- Control device with one or two channels
- Safety via redundancy and self-checking
- Integrity check on control devices
- 3 "NO" safety contacts with linked contacts - 6 A / 250 ~
- 1 "NC" signalling contact
- Separate return loop
- Can be used to obtain level 4 according to NF.EN 954-1

### Technical characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Power supply voltage</th>
<th>Operating range</th>
<th>Power on Indicator</th>
<th>Accuracy</th>
<th>Reset time</th>
<th>Maximum response time on emergency stop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>~ 24 V 50/60 Hz</td>
<td>-15% / +10% of Un</td>
<td>Green LED – PWR</td>
<td>&lt; 25 ms</td>
<td>&lt; 50 ms</td>
<td>&lt; 25 ms</td>
</tr>
</tbody>
</table>

**Output specification**

- **Type**: Volt-free outputs
- **No. of safety circuits**: 3 "NO" AgSnO2 contacts
- **No. of data circuits**: 1 "NC" AgSnO2 contacts
- **Breaking capacity**: 1500 VA resistive
- **Max. current breaking capacity**: 6.0 A
- **Max. voltage breaking capacity**: 250 VAC
- **Electrical life**: 10^5 operations at 1500 VA resistive
- **Mechanical life**: 5.10^5 operations at 500 VA resistive

**Operation and use**

- **Max. absorbed power**: AC 1.6 VA / DC 2 W
- **Relay on Indicator**: Green LED – Out
- **Operating temperature**: 0°C to +50°C acc. to IEC 68-2-14
- **Storage temperature**: -20°C to +70°C acc. to IEC 68-1/2
- **Internal voltage**: 24 V
- **Dielectric strength**: 2.95 kV according to IEC 664-1
- **Resistance to tracking**: Material group III

**EMC immunity according to EN 50082-2**

- **Rapid transients**: 2 kV directly acc. to IEC 1000.4.4
- **Storage temperature**: 2 kV when coupled
- **Radiated electromagnetic field**: 30 V/m Level X acc. to IEC 1000.4.3
- **Electrostatic discharges**: 15 kV in the air acc. to IEC 1000.4.2
- **Shock waves**: Level 3 according to IEC 1000.4.5
- **Radio frequencies in common mode**: 30 V rms Level X acc. to IEC 1000.4.6
- **Drop-out / short breaks / microbreaks**: 150 kHz to 80 MHz (ENV 50140/204)
- **Un-30% for 10 ms every 1 s**
- **Un-30% for 60 ms every 1 s** according to IEC 61496-1/97
- **Un-100% for 10 ms every 100 ms**
- **Un-50% for 20 ms every 200 ms**
- **Un-50% for 500 ms every 5 s**

**Casing**

- **Material**: Polycarbonate
- **Degree of protection**: Casings: IP40
- **Terminal capacity**: 2 x 1.5 mm² multicore with ferrule
- **Weight**: 310 g 24 AC DC

### Conformity

- European “Machinery” Directive 89/392/EEC
- European “Usage” Directive 89/655/EEC
- French Decree 92/765-766-768
- French Decree 93-40 / 93-41
- IEC 61496-1
- IEC 664-1
- EN 50081-2
- EN 50082-2
- EN 60204-1
- EN 954-1
- EN 418
- EN 1088
- UL 508
- CS6-2 No. 14-M91
- GS-ET-20

### Connections

- **A1-A2**: Power supply
- **Y11-Y12** and **Y21-Y22**: Redundant inputs with differentiated voltage for control devices
- **X1-X2**: Return loop
- **S1-S2**: Short-circuit protection on start / validation input
- **Y1-Y2**: Start / validation
- **X1-X2**: Return loop
- **S1-S2**: Short-circuit protection on start / validation input
- **KNA3-RS**: "NO" safety contacts
- **KNA3-RS**: "NC" signalling contacts

**To order, specify:**

- **Part number**: 85 100 436
- **Example**: KNA3-RS safety relay: 85 100 434

---

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
**Control devices:**

Depending on the degree of safety required, KNA3-RS can receive the following components as inputs:
- emergency stop pushbuttons with two contacts (Y11-Y12 and Y21-Y22)
- position sensors (limit switches) with one or two contacts (Y11-Y12 and Y21-Y22)
- pushbutton for start or validation (Y1-Y2)

A positive break operation device must be used if a single contact is used.

To increase the degree of safety, one "N/C" auxiliary contact per power contactor is wired on terminals X1-X2 to ensure self-checking in this part of the installation.

**Control devices:**

The KNA3-RS has three "N/O" safety contacts (13-14/23-24/33-34) and one "N/C" signalling contact (41-42). One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KNA3-RS, it is advisable not to exceed 10 A thermal for all three contacts. The signalling contact cannot be used as a safety contact.

The signalling contact can be wired on a PLC input or integrated into a fault signalling system.

**Extending the number of contacts:**

The number of contacts of the KNA3-RS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS (see page 2/118).

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**Examples of use**

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**Dimensions**

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**Mounting - Removing see page 2/105**
**Technical characteristics**

**Power supply**
- Power supply voltage: ~ 24 V 50/60 Hz
- Operating range: -15% / +15% of Un for ~
- Power on Indicator: Green LED – PWR

**Accuracy**
- Reset time: < 25 ms
- Maximum response time on emergency stop: < 50 ms

**Output specification**
- Volt-free outputs
- 3 "N/O" AgSnO2 contacts
- 1 "N/C" AgSnO2 contacts
- 10" operations at 1500 VA resistive
- 5.105 operations at 500 VA resistive

**Operation and use**
- Max. absorbed power: AC 3 VA / DC 3 W
- Relay on Indicator: Green LED – Out
- Operating temperature: 0°C to +50°C acc. to IEC 68-2-14
- Storage temperature: -20°C to +70°C acc. to IEC 68-1/2
- Internal voltage: 24 V~
- Dielectric strength: 2.95 kV according to IEC 664-1

**Resistance to tracking**
- Material group III

**EMC immunity according to EN 50082-2**
- Rapid transients: 2 kV directly acc. to IEC 1000.4.4
- Radiated electromagnetic field: 30 V/m Level X acc. to IEC 1000.4.3
- Electrostatic discharges: 15 kV in the air acc. to IEC 1000.4.2
- Shock waves: Level 3 according to IEC 1000.4.5
- Radio frequencies in common mode: 30 V/m Level X acc. to IEC 1000.4.8
- Drop-out / short breaks / microbreaks: Un-30% for 10 ms every 1 s

**Casing**
- Material: Polycarbonate
- Degree of protection: Casing: IP40
- Terminal capacity: 2 x 1.5 mm² multicore with ferrule
- Weight: 410 g

---

**Type**

**Part number (and voltage)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Part number</th>
<th>85 100 536</th>
</tr>
</thead>
<tbody>
<tr>
<td>KZP3-RS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conformity**

- European "Machinery" Directive 89/392/EEC
- French Decree 92/765-766
- European "Usage" Directive 89/655/EEC
- French Decree 93-40 / 93-41
- IEC 61496-1
- IEC 664-1
- EN 50081-2
- EN 50082-2
- EN 60204-1
- EN 292-1 and 2
- EN 954-1
- EN 418
- EN 1088
- UL 508
- C22-2 No. 14-M91
- GS-ET-20

**Connections**

- KZP3-RS
- 85 100 536

**Key**

- A1-A2: Power supply
- Y11-Y12 and Y21-Y22: Redundant inputs with differentiated voltage for control devices
- Y31-Y32 and Y41-Y42: Redundant inputs with differentiated voltage for control devices
- Y1-Y2: Start / validation
- S1-S2 and S3-S4: Short-circuit protection on start / validation input
- 13-14/23-24/33-34: "N/O" safety contacts
- 41-42: "N/C" signalling contacts

---

**To order, specify:**

1. Part number
2. Example: KZP3-RS safety relay: 85 100 536
Control devices:
The KZP3-RS is used to obtain and maintain a category 4 level of safety for an installation with two control devices (see wiring example). Depending on the degree of safety required, KZP3-RS can receive the following components as inputs:
- emergency stop pushbuttons with two contacts (Y11-Y12 / Y21-Y22 and Y31-Y32 / Y41-Y42)
- position sensors with one or two contacts (Y11-Y12 / Y21-Y22 and Y31-Y32 / Y41-Y42)
- pushbutton for start or validation (Y1-Y2)
A positive break operation device must be used if a single contact is used.

Examples of use

To increase the degree of safety, one "N/C" auxiliary contact per power contactor is cabled in series with the start (or validation) pushbutton, to ensure self-checking in this part of the installation.

NOTE: If a mobile guard is used instead of an ES with automatic starting, the contact which closes first on terminals Y11-Y12 (if the guard is connected on Y11-Y12 on Y21-Y22) or terminals Y41-Y42 (if it is connected on Y31-Y32 and Y41-Y42) must be connected.
"KZR3-RS" safety relay (45 mm)

- "Emergency stop" and "mobile guard monitoring" functions
- Safety timer function from 0.5 s to 30 s
- "CE" conforming product / BG approved
- Safety via redundancy and self-checking
- Integrity check on control devices
- 1 "N/O" instantaneous safety contact with linked contacts - 6 A / 250 V~
- 1 "N/O" timed safety contact with linked contacts - 6 A / 250 V~
- 1 "N/C" timed safety contact with linked contacts- 6 A / 250 V~
- 1 "N/C" timed signalling contact
- Can be used to obtain level 4 according to NF.EN 954-1

Technical characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>KZR3-RS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number (and voltage)</td>
<td>85 100 736</td>
</tr>
</tbody>
</table>

Conformity

- European "Machinery" Directive 89/392/EEC
- French Decree 92/765-766-768
- European "Usage" Directive 89/655/EEC
- French Decree 93-40 / 93-41
- IEC 61496-1
- IEC 664-1
- EN 50081-2
- EN 50082-2
- EN 60204-1
- EN 292-1 and 2
- EN 954-1
- EN 418
- EN 1088
- UL 508
- C22-2 No. 14-M91
- GS-ET-20

Connections

- Power-up
- Timed

Key

- A1-A2 : Power supply
- Y1-Y2 and Y21-Y22 : Redundant inputs with differentiated voltage for control devices
- Y1-Y2 : Start / validation
- 13-14 : "N/O" instantaneous safety contact
- 23-24 : "N/O" timed safety contact
- 31-32 : "N/C" timed safety contact
- 41-42 : "N/C" timed data contact

To order, specify:

- Example: KZR3-RS safety relay: 85 100 736

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Control devices:
Depending on the degree of safety required, KZR3-RS can receive the following components as inputs:
- emergency stop pushbuttons with two contacts (Y11-Y12 and Y21-Y22)
- position sensors (limit switches) with one or two contacts (Y11-Y12 and Y21-Y22)
- auxiliary contact for electromagnetic lock (Y11-Y12 and Y21-Y22)
- pushbutton for start or validation (Y1-Y2)
A positive break operation device must be used if a single contact is used.

Control devices:
The KZR3-RS has one "N/O" instantaneous safety category 4 contact (13-14), one "N/O" timed safety category 3 contact (23-24) and one "N/C" (31-32) timed safety category 3 contact, and one "N/C" (41-42) signalling contact. One or more control devices may be wired (diagram 1 and 2) up to the breaking capacity of the safety contacts: 1500 VA.

Extending the number of contacts:
The number of contacts of the KZR3-XS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS.

Examples of use

Dimensions

Mounting - Removing see page 2/105
"KSW2-RS" safety relay (45 mm)

- "Zero speed monitoring" function for a single or 3-phase motor
- Detection of actual stopping by measuring remanent voltages
- "CE" conforming product / BG approved
- Safety via redundancy and self-checking
- Wiring integrity check
- Galvanic isolation
- 1 "N/O" safety contact with linked contacts - 6 A / 250 V~
- 1 "N/C" safety contact with linked contacts - 6 A / 250 V~
- Separate return loop
- Can be used to obtain level 4 according to NF.EN 954-1

Technical characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>KSW2-RS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply voltage</td>
<td>~24 V 50/60 Hz</td>
</tr>
<tr>
<td>Operating range</td>
<td>-15% / +10% of Un for ~</td>
</tr>
<tr>
<td>Power on Indicator</td>
<td>Green LED – PWR</td>
</tr>
<tr>
<td>Accuracy</td>
<td>3 s (self-test)</td>
</tr>
<tr>
<td>Setting for channels 1 and 2</td>
<td>20 mV to 500 mV +/- 15%</td>
</tr>
<tr>
<td>Synchronisation difference</td>
<td>40% +/- 50%</td>
</tr>
<tr>
<td>Max. current breaking capacity</td>
<td>6.0 A</td>
</tr>
<tr>
<td>Max. voltage breaking capacity</td>
<td>250 VAC</td>
</tr>
<tr>
<td>Electrical life</td>
<td>1000 operations at 1500 VA resistive</td>
</tr>
<tr>
<td>Mechanical life</td>
<td>5.10^5 operations at 500 VA resistive</td>
</tr>
<tr>
<td>Operation and use</td>
<td>Volt-free outputs</td>
</tr>
<tr>
<td>Max. absorbed power</td>
<td>AC 1.6 VA / DC 2 W</td>
</tr>
<tr>
<td>Relay on Indicator</td>
<td>Green LED – Out</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0°C to +50°C acc. to IEC 68-2-14</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20°C to +70°C acc. to IEC 68-1/2</td>
</tr>
<tr>
<td>Diectric strength</td>
<td>2.95 kV according to IEC 664-1</td>
</tr>
<tr>
<td>Resistence to tracking</td>
<td>Material group III</td>
</tr>
</tbody>
</table>

EMC immunity according to EN 50082-2

- Rapid transients: 2 kV directly acc. to IEC 1000.4.4
- Radiated electromagnetic field: 30 V/m Level X acc. to IEC 1000.4.3
- Electrostatic discharges: 15 kV in the air acc. to IEC 1000.4.2
- Shock waves: 1500 VA resistive
- Common mode: 2 kV for 24 V~ and 24 V~

Connections

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1-A2</td>
<td>Power supply</td>
</tr>
<tr>
<td>X1-X2</td>
<td>Return loop</td>
</tr>
<tr>
<td>L1-L2</td>
<td>Input channel 1 (motor winding)</td>
</tr>
<tr>
<td>L2-L3</td>
<td>Input channel 2 (motor winding)</td>
</tr>
<tr>
<td>13-14</td>
<td>&quot;N/O&quot; safety contacts</td>
</tr>
<tr>
<td>21-22</td>
<td>&quot;N/C&quot; safety contacts</td>
</tr>
</tbody>
</table>

To order, specify:

Part number
Example: KSW2-RS safety relay: 85 100 326

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Self-test:
When terminals A1-A2 are powered up, a test sequence is initiated: the output relays (terminals 13-14 and 21-22) are energised for 1.5 s then separate for 1.5 s. If no fault is detected, the relays reattach. This test checks:
- failure of the output contacts (terminals 13-14 and 21-22)
- breaking of one of the phases (L1, L2 or L3)
- the validity of the return loop (X1-X2)
- the failure of an internal component

Safety function:
When an electric motor rotates while no longer supplied with power, it behaves like a generator, supplying voltage (called remanent) to the terminals of its windings. This voltage varies according to several parameters: speed of rotation, the motor characteristics, remanent magnetisation, inertia of the mechanical assembly. The KSW2-RS measures this voltage and interprets it so that the doors and mobile guards can only be opened once the motor has actually stopped.

Setting:
Both channels are set on the front of the KSW2-RS using two potentiometers. This mitigates the effects of any imbalance between the windings or remanent voltages. Setting is within a range of 20 mV to 500 mV in order to adapt a threshold to a slow or zero speed, which is not dangerous for the operator.

Control devices:
The KSW2-RS has one "N/O" (13-14) and one "N/C" (21-22) safety contact. One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA.

Extending the number of contacts:
The number of contacts of the KSW2-XS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS.

Examples of use
"KZH2-XS" safety relay (22.5 mm)

- Type III C "2-hand control" functions according to EN 574/97
- "CE" conforming product with type-examination
- BG approved product
- INRS certification: Q3.99
- Control device with two channels
- Safety via redundancy and self-checking
- Integrity check on control devices
- 2 "N/O" safety contacts with linked contacts - 6 A / 250 V~
- Can be used to obtain level 4 according to NF.EN 954-1

### Technical characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>24 V 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating range</td>
<td>-15% / +10% of Un for “N/O”</td>
</tr>
<tr>
<td>Power indicator</td>
<td>Green LED – PWR</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Synchronisation difference &lt; 500 ms, Response time on release of control device &lt; 20 ms</td>
</tr>
<tr>
<td>Output specification</td>
<td>Type Volt-free outputs, No. of safety circuits 2 &quot;N/O&quot; AgSnO2 contacts, Breaking capacity 1500 VA resistive, Max. current breaking capacity 6.0 A, Max. voltage breaking capacity 250 VAC, Electrical life 10^6 operations at 1500 VA resistive, Mechanical life 5.10^5 operations at 500 VA resistive</td>
</tr>
<tr>
<td>Operation and use</td>
<td>Max. absorbed power AC 1.5 VA / DC 1.5 W, Relay indicator Green LED – Out, Operating temperature 0°C to +50°C acc. to IEC 68-2-14, Storage temperature -20°C to +70°C acc. to IEC 68-1/2, Internal voltage 24 V~</td>
</tr>
<tr>
<td>Electromagnetic immunity</td>
<td>2.95 kV according to IEC 664-1</td>
</tr>
<tr>
<td>Resistance to tracking</td>
<td>Material group III</td>
</tr>
</tbody>
</table>

### Connections

- A1-A2: Power supply
- Y11-Y12-Y13 and Y21-Y22-Y23: Redundant inputs with differentiated voltage for control devices
- 13-14 / 23-24: "N/O" safety contacts

### Weight

230 g
Examples of use

Control devices:
The KZH2-XS can receive the following components as inputs:
- two pushbuttons with two positions "N/O" + "N/C" (Y11-Y12-Y13 and Y21-Y22-Y23)
- one or two emergency stop pushbuttons with one or two channels (A1-A2).

Extending the number of contacts:
The KZH2-XS has two "N/O" safety contacts (13-14/23-24). One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KZH2-XS, it is advisable not to exceed 8 A thermal for both contacts.

Extending the number of contacts:
The number of contacts of the KZH2-XS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS.

Dimensions Mounting - Removing see page 2/105

![Diagram showing control connections and dimensions](image-url)
**Technical characteristics**

**Power supply**
- Power supply voltage: \(\sim 24\) V 50/60 Hz
- Operating range: \(-15\% / +10\%\) of Un for ~
- Power on Indicator: Green LED – PWR

**Accuracy**
- Reset time: < 500 ms
- Maximum response time on emergency stop at Un: < 20 ms

**Output specification**
- Type: Volt-free outputs
- No. of safety circuits: 3 "N/O" AgSnO₂ contacts
- No. of data circuits: 1 "N/C" AgSnO₂ contacts
- Breaking capacity: 1500 VA resistive
- Max. current breaking capacity: 6.0 A
- Electrical life: 10³ operations at 1500 VA resistive
- Mechanical life: 10³ operations

**Operation and use**
- Max. absorbed power: 24 AC 1.5 VA / 24 DC 1.5 W / 115-230 AC 3.2 VA
- Relay on Indicator: Green LED – Out
- Operating temperature: 0°C to +50°C acc. to IEC 68-2-14
- Storage temperature: -20°C to +70°C acc. to IEC 68-1/2
- Internal voltage: 24 V
- Diellectric strength: 2.85 kV according to IEC 664-1
- Resistance to tracking: Material group III

**EMC immunity according to EN 50082-2**
- Rapid transients: 2 kV directly acc. to IEC 1000.4.4
- 4 kV directly for the 230 V~ version
- 2 kV when coupled
- Radiated electromagnetic field: 30 V/m Level X acc. to IEC 1000.4.3
- 80 MHz to 1 GHz / 900 MHz (ENV 50140/204)
- Electrostatic discharges: 15 kV in the air acc. to IEC 1000.4.2
- Shock waves: Level 3 according to IEC 1000.4.5
- Common mode 4 kV for 230 V~
- 2 kV residual current mode
- Common mode 2 kV for 24 V~ and 24 V~
- Radio frequencies in common mode: 10 V rms on inputs / Level 3 according to IEC 1000.4.6
- 30 V rms on supp. / Level X according to IEC 1000.4.6
- 150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11
- Drop-out / short breaks / microbreaks: Un-30% for 10 ms every 1 s
- Un-60% for 100 ms every 1 s according to IEC 61496-1/97
- Un-100% for 10 ms every 100 ms*
- Un-50% for 20 ms every 200 ms*
- Un-50% for 500 ms every 5 s**

**Casing**
- Material: Polycarbonate
- Degree of protection: Self-extinguishing - UL94 class VO
- Terminal: IP20
- Terminal capacity: 2 \times 1.5\ mm² multicore with ferrule
- 2 \times 2.5\ mm² solid conductor
- Weight: 310 g 24 AC/DC
- 410 g 115-230 AC

---

**Conformity**
- European "Machinery" Directive 89/392/EEC
- French Decree 92/765-766-768
- European "Usage" Directive 89/655/EEC
- French Decree 93-40 / 93-41
- European "EMC" Directive 89 336/EEC
- IEC 61496-1
- IEC 864-1
- EN 50081-2
- EN 50082-2
- EN 50084-1
- EN 574 / 97
- EN 954-1
- EN 418
- EN 1088
- UL 508
- C22-2 No. 14-M91
- GS-ET-20
- UL
- (C) UL
- BG

**Connections**
- A1-A2 : Power supply
- Y11-Y12-Y13 and : Redundant inputs with differentiated voltage
- Y21-Y22-Y23 for control devices
- 13-14/23-24/33-34 : "N/O" safety contacts
- 41-42 : "N/C" signalling contacts

**Part number (and voltage)**
- 24 V~: 85 100 634
- 115 V~: 85 100 635
- 230 V~: 85 100 635

**Type**
- KZH3-RS

---

**To order, specify:**

1. Part number

Example: KZH3-RS safety relay: 85 100 634
Control devices:
The KZH3-RS can receive the following components as inputs:
- two pushbuttons with two positions "N/O" + "N/C" (Y11-Y12-Y13 and Y21-Y22-Y23)
- one or two emergency stop pushbuttons with one or two channels (A1-A2).

Control devices:
The KZH3-RS has three "N/O" safety contacts (13-14/23-24/33-34) and one "N/C" signalling contact (41-42). One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KZH3-RS, it is advisable not to exceed 10 A thermal for all three contacts.

Examples of use

Extending the number of contacts:
The number of contacts of the KZH3-RS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS.
Extension for "KZE3-XS" safety relay (22.5 mm)

- Extending the number of contacts in a safety relay
- Used to increase the breaking capacity of the main unit
- "CE" conforming product / BG approved
- Safety via redundancy and self-checking
- 3 "N/O" safety contacts with linked contacts - 6 A / 250 V~
- 1 "N/C" return loop

### Technical characteristics

<table>
<thead>
<tr>
<th><strong>Power supply</strong></th>
<th><strong>Part number (and voltage)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply voltage</td>
<td>~ 24 V 50/60 Hz</td>
</tr>
<tr>
<td>Operating range</td>
<td>-15% / +10% of Un for ~</td>
</tr>
<tr>
<td>Power on Indicator</td>
<td>Green LED – PWR</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Synchronisation difference: &lt; 25 ms</td>
</tr>
<tr>
<td>Electrical life</td>
<td>10^5 operations at 500 VA resistive</td>
</tr>
<tr>
<td>Mechanical life</td>
<td>10^7 operations</td>
</tr>
<tr>
<td>Operation and use</td>
<td>Max. absorbed power: AC 1.6 VA / DC 2 W</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>~ 24 V max. ripple 10%</td>
</tr>
<tr>
<td>Operating range</td>
<td>-15% / +15% of Un for ~</td>
</tr>
<tr>
<td>Power on Indicator</td>
<td>Green LED – PWR</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Synchronisation difference: &lt; 25 ms</td>
</tr>
<tr>
<td>Maximum response time on emergency stop at Un</td>
<td>50 ms</td>
</tr>
<tr>
<td>Output specification</td>
<td>Type: Volt-free outputs</td>
</tr>
<tr>
<td>No. of safety circuits</td>
<td>3 &quot;N/O&quot; AgSnO2 contacts</td>
</tr>
<tr>
<td>Return loop</td>
<td>1 &quot;N/C&quot; AgSnO2 contact</td>
</tr>
<tr>
<td>Breaking capacity</td>
<td>1500 VA resistive</td>
</tr>
<tr>
<td>Max. current breaking capacity</td>
<td>8.0 A</td>
</tr>
<tr>
<td>Max. voltage breaking capacity</td>
<td>250 VAC</td>
</tr>
<tr>
<td>Electrical life</td>
<td>10^5 operations at 1500 VA resistive</td>
</tr>
<tr>
<td>Mechanical life</td>
<td>5.10^5 operations at 500 VA resistive</td>
</tr>
<tr>
<td>Operation and use</td>
<td>Max. absorbed power: AC 1.6 VA / DC 2 W</td>
</tr>
<tr>
<td>Relay on Indicator</td>
<td>Green LED – Out</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0°C to +50°C acc. to IEC 68-2-14</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20°C to +70°C acc. to IEC 68-1/2</td>
</tr>
<tr>
<td>Internal voltage</td>
<td>24 V~</td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>2.95 kV according to IEC 664-1</td>
</tr>
<tr>
<td>Resistance to tracking</td>
<td>Material group III</td>
</tr>
<tr>
<td>EMC immunity according to EN 50082-2</td>
<td>Radiant Transients: 2 kV directly acc. to IEC 1000.4.4</td>
</tr>
<tr>
<td>Radiated electromagnetic field</td>
<td>2 kV when coupled</td>
</tr>
<tr>
<td>Electrostatic discharges</td>
<td>8 kV in the air acc. to IEC 1000.4.2</td>
</tr>
<tr>
<td>Shock waves</td>
<td>Common mode 1 kV according to IEC1000.4.5</td>
</tr>
<tr>
<td>Radio frequencies in common mode</td>
<td>10 V rms Level 3 acc. to IEC 1000.4.3</td>
</tr>
<tr>
<td>Radiated electromagnetic field</td>
<td>80 MHz to 1 GHz / 900 MHz (ENV 50140/204)</td>
</tr>
<tr>
<td>Electrostatic discharges</td>
<td>8 kV in the air acc. to IEC 1000.4.2</td>
</tr>
<tr>
<td>Shock waves</td>
<td>Common mode 1 kV according to IEC1000.4.5</td>
</tr>
<tr>
<td>Radio frequencies in common mode</td>
<td>10 V rms Level 3 acc. to IEC 1000.4.6</td>
</tr>
<tr>
<td>Radiated electromagnetic field</td>
<td>150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11</td>
</tr>
<tr>
<td>EMC immunity according to EN 50082-2</td>
<td>Electromagnetic immunity according to EN 50081-2</td>
</tr>
<tr>
<td>Rapid transients</td>
<td>10 V rms Level 3 acc. to IEC 1000.4.3</td>
</tr>
<tr>
<td>Radiated electromagnetic field</td>
<td>80 MHz to 1 GHz / 900 MHz (ENV 50140/204)</td>
</tr>
<tr>
<td>Electrostatic discharges</td>
<td>8 kV in the air acc. to IEC 1000.4.2</td>
</tr>
<tr>
<td>Shock waves</td>
<td>Common mode 1 kV according to IEC1000.4.5</td>
</tr>
<tr>
<td>Radio frequencies in common mode</td>
<td>10 V rms Level 3 acc. to IEC 1000.4.6</td>
</tr>
<tr>
<td>Radiated electromagnetic field</td>
<td>150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11</td>
</tr>
</tbody>
</table>
| **Example of wiring**

**To order, specify:**

To order, specify:

- Part number
- Example: Extension for KZE3-XS safety relay: 85 100 936
Control devices:
Depending on the degree of safety required, the KZE3-XS can be controlled by one or two channels. In most cases, control by one channel will be sufficient. Please consult your inspection office for further information.

Control devices:
The KZE3-XS has three "N/O" safety contacts (13-14/23-24/33-34) and a return loop (X1-X2) which must be included in the "start / validation" line (Y1-Y2) of the main unit. One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KZE3-XS, it is advisable not to exceed 10 A thermal for all three contacts.

Extending the number of contacts:
It is possible to wire several extension KZE3-XS units in cascade. All the return loops (X1-X2) will be in series with the "start / validation" line (Y1-Y2) of the main unit.

Examples of use

![Wiring diagram for KNA3-XS with a KZE3-XS relay extension unit]

Dimensions

Mounting - Removing see page 2/105
Illuminated indicator banks

1 to 5 lens units

General characteristics

<table>
<thead>
<tr>
<th>Environment</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certifications</td>
<td>In normal operation: CSA, UL: ~ 240 V maximum</td>
</tr>
<tr>
<td>Protective treatment</td>
<td>In normal operation: &quot;TC&quot; treatment</td>
</tr>
<tr>
<td>Ambient air Use</td>
<td>-10°C, +55°C</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-20°C, +70°C</td>
</tr>
<tr>
<td>Electric shock protection</td>
<td>Direct mounting: class II, Tube mounting: class I according to IEC 536 and NF C 20-030</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 42 according to IEC 529 and NF C 20-010, vertical, base unit underneath</td>
</tr>
<tr>
<td>Materials</td>
<td>Lens units: Polycarbonate, Base and cover: Glass polyamide, Tube: Anodised aluminium, Pedestal: Polycarbonate or aluminium</td>
</tr>
</tbody>
</table>

Electrical characteristics

<table>
<thead>
<tr>
<th>Assigned insulation voltage</th>
<th>Ui = 250 V according to IEC 947-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assigned impulse voltage</td>
<td>Uimp = 4 kV according to IEC 947-1</td>
</tr>
<tr>
<td>Type of bulb</td>
<td>Fixed signalling lens unit: BA15d base fitting bulbs, power 10 W</td>
</tr>
<tr>
<td>Terminal labelling</td>
<td>1 terminal labelled &quot;NC&quot; (C) common to the 5 units, 1 or 5 terminals labelled from 1 to 5 according to the number of units</td>
</tr>
<tr>
<td>Connection</td>
<td>On protected and open terminals with captive screw clamps: max. clamping capacity: 2 x 2.5 mm²</td>
</tr>
</tbody>
</table>

Part numbers

<table>
<thead>
<tr>
<th>Illuminated lens units</th>
<th>83 895 201</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>83 895 202</td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td>83 895 203</td>
<td>Orange</td>
</tr>
<tr>
<td></td>
<td>83 895 204</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>83 895 205</td>
<td>Clear</td>
</tr>
<tr>
<td></td>
<td>83 895 206</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

Audible alarms

| Buzzer 24 VDC                | 83 895 211 |
| Buzzer 120-230 VAC Black     | 83 895 212 |

Mounting accessories

| 100 mm tube, supplied with clamping system on base | 83 895 207 |
| 400 mm                                             | 83 895 213 |
| 800 mm                                             | 83 895 214 |
| Pedestal on horizontal support, for tube mounting  | 83 895 208 |
| Pedestal on vertical support Direct mounting on base or pedestal | 83 895 209 |
| Base with axial or lateral cable entry and cover   | 83 895 210 |

Connection diagram

To order, specify:

Example: Blue lens unit 83 895 204 - Pedestal 83 895 209 - Bulb 79 214 588

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
**General information**

Type 83 895 2 indicator banks are optical signalling devices used in particular for 360° remote signalling of the various states and sequences of a machine or installation.

Examples: operation, machine stop, missing materials, paging personnel, fault signalling, etc.

**The indicator bank is modular**

It forms an assembly which can be constructed to form several different versions with between one and five lens units, and is not assembled on delivery (to be assembled by the customer).

It comprises:

1 - A base with a removable connection terminal block and an axial or lateral cable entry.
2 - One to five green, red, orange, blue, clear or yellow lens units.
3 - A cover on the top section.

The lens units fit together easily by stacking one on top of the another and can be locked and unlocked using a built-in peripheral nut.

Electrical connection of the various parts is automatic.

Accessories:

4 - 100 mm tube.
5 - Pedestal screwed onto the tube for fixing it to the horizontal support.
6 - Pedestal for fixing to the vertical support.

**Installation**

Fixing: direct fixing of the base to the support using 2 screws or using a pedestal screwed onto the tube.

Wiring: this is carried out on the removable connection terminal block which is built into the base (to make wiring easier). The terminals are protected to make the screw clamps captive and to avoid any contact with live parts.

**Dimensions**

Tube 83 895 207 and pedestal 83 895 208

- 1 Tube 83 895 207, Ø 25 mm
- 2 Pedestal on horizontal support 83 895 208

Mounting using pedestal 83 895 208 screwed onto tube 83 895 207

- 1 Tube Ø 25 mm
- 2 Pedestal on vertical support 83 895 209

- Ø27
- 4xØ5.5 ou M5

Drilling of horizontal support for fixing on pedestal 83 895 208

- Ø27
- 4xØ5.5 ou M5

Drilling of vertical support for fixing on pedestal 83 895 207

- 3xØ5 ou M5

**Other information**

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Counters

Crouzet

Products and specifications subject to change without notice.
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Electro-mechanical impulse counters totalizing - 24 x 48

- Front panel 24 x 48 mm
- 6 or 5 digits, 4 mm in height
- With or without manual zero reset
- White digits on black background

**Characteristics**

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counting capacity</td>
<td>999 999 imp without zero reset</td>
</tr>
<tr>
<td></td>
<td>999 999 imp with zero reset</td>
</tr>
<tr>
<td>Height of digits</td>
<td>4 mm</td>
</tr>
<tr>
<td>Max. count rate</td>
<td>~ 18 imp/s</td>
</tr>
<tr>
<td></td>
<td>~ 25 imp/s</td>
</tr>
<tr>
<td>Min. count rate</td>
<td>~ 28 ms</td>
</tr>
<tr>
<td></td>
<td>~ 20 ms</td>
</tr>
<tr>
<td>Min. pause time between 2 pulses</td>
<td>~ 28 ms</td>
</tr>
<tr>
<td></td>
<td>~ 20 ms</td>
</tr>
<tr>
<td>Max. pulse length (count coil)</td>
<td>No limit</td>
</tr>
<tr>
<td>Voltage variation</td>
<td>+10% / -15% from Un</td>
</tr>
<tr>
<td>Operation factor</td>
<td>100%</td>
</tr>
<tr>
<td>Absorbed power</td>
<td>24 V~ / 115 V~ 1.1 VA</td>
</tr>
<tr>
<td></td>
<td>230 V~ 2.1 VA</td>
</tr>
<tr>
<td></td>
<td>24 V~ 0.8 W</td>
</tr>
<tr>
<td>Mechanical life (count function)</td>
<td>&gt; 50 x 10⁸ operations</td>
</tr>
<tr>
<td>Voltage tests to IEC 255 100</td>
<td>U ≤ 60 V : 500 V</td>
</tr>
<tr>
<td></td>
<td>U &gt; 60 V : 2000 V</td>
</tr>
<tr>
<td>Protection</td>
<td>Case IP 40</td>
</tr>
<tr>
<td>Environmental protection</td>
<td>Terminal IP 00</td>
</tr>
<tr>
<td>Maintenance</td>
<td>None</td>
</tr>
<tr>
<td>Operates in any position</td>
<td>Yes</td>
</tr>
<tr>
<td>Temperature limits</td>
<td>Use - 10 + 60 °C</td>
</tr>
<tr>
<td></td>
<td>Stored - 40 + 80 °C</td>
</tr>
<tr>
<td>Connections</td>
<td>6.35 faston connectors or link screws</td>
</tr>
<tr>
<td>Mounting</td>
<td>2 x M3 screws - F90° on front panel</td>
</tr>
<tr>
<td>Weight</td>
<td>50 g</td>
</tr>
</tbody>
</table>

**Part numbers (and voltages)**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Part number without zero reset</th>
<th>Part number with zero reset</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 V - 50 • 60 Hz</td>
<td>99 766 901</td>
<td>99 766 902</td>
</tr>
<tr>
<td>115 V - 50 • 60 Hz</td>
<td>99 766 900</td>
<td>99 766 921</td>
</tr>
<tr>
<td>24 V - 50 • 60 Hz</td>
<td>99 766 904</td>
<td>99 766 922</td>
</tr>
<tr>
<td>24 V ~</td>
<td>99 766 907</td>
<td>99 766 924</td>
</tr>
</tbody>
</table>

N.B. No count pulse must be received during the zero reset time. If a pulse is received damage may be caused.

**Dimensions**

- 24 x 48 - 5 decades 99 766 92e
- 24 x 48 - 6 decades 99 766 90e

**Rear panels**

- 99 766 92e
- 99 766 90e

**Panel cut-out** 99 766 9e

**To order, specify:**

1. Part number
   Example: Electro-mechanical impulse counters totalizing - 6 decades - 99 766 901

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Electro-mechanical impulse counters totalizing - 36 x 37

- Front panel 36 x 37 mm
- 6 or 5 digits, 4 mm in height
- With or without manual zero reset
- White digits on black background

**Characteristics**

<table>
<thead>
<tr>
<th>Counting capacity</th>
<th>999 999 imp without zero reset</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>99 999 imp with zero reset</td>
</tr>
<tr>
<td>Height of digits</td>
<td>4 mm</td>
</tr>
<tr>
<td>Max. count rate</td>
<td>18 imp/s</td>
</tr>
<tr>
<td>Min. count rate</td>
<td>25 imp/s</td>
</tr>
<tr>
<td>Min. pause time between 2 pulses</td>
<td>28 ms</td>
</tr>
<tr>
<td>Max. pulse length (count coil)</td>
<td>20 ms</td>
</tr>
<tr>
<td>Voltage variation</td>
<td>No limit</td>
</tr>
<tr>
<td>Absorbed power</td>
<td>1.1 VA</td>
</tr>
<tr>
<td></td>
<td>2.1 VA</td>
</tr>
<tr>
<td>Mechanical life (count function)</td>
<td>24 V~</td>
</tr>
<tr>
<td>Voltage tests to IEC 255-5</td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td></td>
</tr>
<tr>
<td>Environmental protection</td>
<td></td>
</tr>
</tbody>
</table>

**Maintenance**

- Operates in any position
- None
- Yes

**Temperature limits**

- Use
- - 10 to + 60 °C
- - 40 to + 80 °C

**Connections**

- 6.35 faston connectors or link screws
- 2 x Ø 2.5 screws - F90° on front panel

**Mounting**

- 50 g

**Weight**

**Dimensions**

- 36 x 37 - 5 decades 99 766 61
- 36 x 37 - 6 decades 99 766 60

**Part numbers (and voltages)**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Part numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V~</td>
<td>99 766 60</td>
</tr>
<tr>
<td>- 50 • 60 Hz</td>
<td>99 766 601</td>
</tr>
<tr>
<td>230 V~</td>
<td>99 766 602</td>
</tr>
<tr>
<td>- 50 • 60 Hz</td>
<td>99 766 604</td>
</tr>
<tr>
<td>115 V~</td>
<td>99 766 610</td>
</tr>
<tr>
<td>- 50 • 60 Hz</td>
<td>99 766 611</td>
</tr>
<tr>
<td>24 V~</td>
<td>99 766 613</td>
</tr>
<tr>
<td>&gt; 50 x 10⁶</td>
<td>99 766 616</td>
</tr>
<tr>
<td>operations</td>
<td></td>
</tr>
<tr>
<td>U ≤ 60 V : 500 V</td>
<td></td>
</tr>
<tr>
<td>U &gt; 60 V : 2000 V</td>
<td></td>
</tr>
<tr>
<td>Case IP 40</td>
<td></td>
</tr>
<tr>
<td>Terminal IP 00</td>
<td></td>
</tr>
<tr>
<td>Metal parts</td>
<td></td>
</tr>
<tr>
<td>protected (by</td>
<td></td>
</tr>
<tr>
<td>surface treatment)</td>
<td></td>
</tr>
<tr>
<td>or non-corroding</td>
<td></td>
</tr>
</tbody>
</table>

**N.B.**

No count pulse must be received during the zero reset time. If a pulse is received, damage may be caused.

Other voltages : please consult us

To order, specify :

| Part number | Electro-mechanical impulse counters totalizing - 6 decades - 99 766 601 |

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Electro-mechanical impulse counters totalizing - 36 x 48

- Front panel 36 x 48
- 6 or 5 digits, 4 mm in height
- With or without manual zero reset
- White digits on black background

**Characteristics**

<table>
<thead>
<tr>
<th>Counting capacity</th>
<th>999 999 imp without zero reset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height of digits</td>
<td>~ 18 imp/s</td>
</tr>
<tr>
<td>Max. count rate</td>
<td>~ 25 imp/s</td>
</tr>
<tr>
<td>Min. count rate</td>
<td>~ 28 ms</td>
</tr>
<tr>
<td>Min. pause time between 2 pulses</td>
<td>~ 28 ms</td>
</tr>
<tr>
<td>Max. pulse length (count coil)</td>
<td>No limit</td>
</tr>
<tr>
<td>Voltage variation</td>
<td>+10% / -15% from Un</td>
</tr>
<tr>
<td>Absorbed power</td>
<td>24 V~ 1.1 VA</td>
</tr>
<tr>
<td></td>
<td>24 V~ 2.1 VA</td>
</tr>
<tr>
<td>Mechanical life (count function)</td>
<td>&gt; 50 x 10⁶ operations</td>
</tr>
<tr>
<td>Voltage tests to IEC 255-5</td>
<td>U ≤ 60 V : 500 V</td>
</tr>
<tr>
<td></td>
<td>U &gt; 60 V : 2000 V</td>
</tr>
<tr>
<td>Protection</td>
<td>Terminal IP 00</td>
</tr>
<tr>
<td>Environmental protection</td>
<td>Metal parts protected (by surface treatment) or non-corroding</td>
</tr>
<tr>
<td>Maintenance</td>
<td>None</td>
</tr>
<tr>
<td>Operates in any position</td>
<td>Yes</td>
</tr>
<tr>
<td>Temperature limits</td>
<td>Use - 10 + 60 °C</td>
</tr>
<tr>
<td></td>
<td>Stored - 40 + 80 °C</td>
</tr>
<tr>
<td>Connections</td>
<td>2 x ø 2.5 screws - F90° on front panel</td>
</tr>
<tr>
<td>Mounting</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>50 g</td>
</tr>
</tbody>
</table>

**Part numbers (and voltages)**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Without zero reset</th>
<th>With manual zero reset</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 V - 50 • 60 Hz</td>
<td>99 766 701</td>
<td>99 766 710</td>
</tr>
<tr>
<td>115 V - 50 • 60 Hz</td>
<td>99 766 702</td>
<td>99 766 711</td>
</tr>
<tr>
<td>24 V - 50 • 60 Hz</td>
<td>99 766 704</td>
<td>99 766 713</td>
</tr>
<tr>
<td>24 V</td>
<td>99 766 707</td>
<td>99 766 716</td>
</tr>
</tbody>
</table>

**N.B.**

No count pulse must be received during the zero reset time. If a pulse is received, damage may be caused.

**Dimensions**

- 36 x 48 - 5 decades: 99 766 71●
- 36 x 48 - 6 decades: 99 766 70●

**Rear panels**

- 99 766 71●
- 99 766 70●

**Panel cut-out**

- 99 766 7●

Other voltages: please consult us

To order, specify:

1. Part number
   Example: Electro-mechanical impulse counters totalizing - 6 decades - 99 766 701

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
GENERAL FEATURES:
The 2108 Series is a totalizing counter housed in a DIN-sized (24 x 48mm) enclosure. The 2108 has an eight digit 7mm high LCD display. The count input (slow speed) and reset input can be by contact closure and by NPN open collector transistor. The high speed input (7 kHz max) requires a 4 to 30 VDC voltage pulse and is compatible with 2 and 3 wire DC proximity switches and encoders. The unit is powered by a 3 volt lithium battery with an eight year life. When changing the battery, the current count value is retained long enough to allow battery replacement without losing the count value. The unit can be set remotely or from the front panel. The front panel reset can be enabled or disabled with jumpering of terminals on back of unit.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Lithium battery, 8 year life</td>
</tr>
<tr>
<td>Count Inputs</td>
<td>Contact Closure (slow speed) NPN open collector (slow speed) Voltage input (high speed)</td>
</tr>
<tr>
<td>Low Speed</td>
<td>40 Hz</td>
</tr>
<tr>
<td>Minimum Pulse</td>
<td>12 ms</td>
</tr>
<tr>
<td>Current Consumption</td>
<td>52 µA max.</td>
</tr>
<tr>
<td>Leakage Current</td>
<td>0.2 µA max.</td>
</tr>
<tr>
<td>Residual Voltage</td>
<td>0.4 V max.</td>
</tr>
<tr>
<td>High Speed</td>
<td>7 kHz max.</td>
</tr>
<tr>
<td>1 State</td>
<td>4 to 30 VDC</td>
</tr>
<tr>
<td>0 State</td>
<td>0 to 1 VDC</td>
</tr>
<tr>
<td>Absorbed current</td>
<td>6 mA at 24 VDC</td>
</tr>
<tr>
<td>Reset Remote</td>
<td>Contact Closure NPN open collector 12 ms min.</td>
</tr>
<tr>
<td>Reset Pushbutton</td>
<td>Activate with jumper across terminals 2 &amp; 4</td>
</tr>
<tr>
<td>Memory</td>
<td>Yes, 1 lithium battery - 8 year life</td>
</tr>
<tr>
<td>Protection</td>
<td>Front Panel IP64 Terminal IP20</td>
</tr>
<tr>
<td>Connections</td>
<td>Screw terminals 2 x 1.5mm² capacity</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>+32 to 131°F (0 to +55°C)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-13° to 158°F (-25°C to 70°C)</td>
</tr>
<tr>
<td>Weight</td>
<td>2.1 oz. (60g)</td>
</tr>
</tbody>
</table>

CONFORMITY:

Electromagnetic environment
Radiated field IEC 1000-4-3, level 3, 10 V/M, 26 MHz to 1 GHz
Fast transients IEC 1000-4-4, level 3, 1 KV
Damped oscillatory wave IEC 255.4, level 3, 1 KV
Electrostatic discharge IEC 1000-4-2, level 3, 8 KV

ORDERING INFORMATION:
87 610 340

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Products and specifications subject to change without notice.
2108H SERIES
ELAPSED TIME INDICATOR

- 6 Digit .3” High LCD Display
- 4 Selectable Time Ranges
  - Hours, 1/10 Hours
  - Minutes, 1/10 Minutes
  - Seconds, 1/10 Seconds
  - Hours, Minutes, Seconds

GENERAL FEATURES:
The 2108H Series is an elapsed time indicator in a DIN-sized 24 x 48mm (.95” x 1.89”) enclosure. Unit is compact with a 37.5mm (1.48”) depth. The start/stop input can be a contact closure or an NPN open collector transistor. The unit is powered by a replaceable lithium battery.

SPECIFICATIONS:
- Power Supply: Replaceable lithium battery, 5 year life
- Display: 6 Digit LCD
- Display height: .3”
- Accuracy: +50 PPM (Quartz)
- Input: Start/Stop and Reset Inputs (Dry Contact), Min. Closure Time: 40 ms (start/stop), 100 ms (reset)
- Memory: Yes, 5 year life
- Connection: Screw terminal
- Front panel rating: IP64
- Operating temperature: +32 to 131°F (0 to 55°C)
- Storage temperature: -13 to 158°F (-25 to 70°C)
- Weight: 2.1 oz. (60g)

CONFORMITY:
Electromagnetic environment
- Radiated field: IEC 1000-4-3, level 3, 10 V/M, 26 MHz to 1 GHz
- Fast transients: IEC 1000-4-4, level 3, 1 KV
- Damped oscillatory wave: IEC 255.4, level 3, 1 KV
- Electrostatic discharge: IEC 1000-4-2, level 3, 8 KV

WIRING:
87 610 440
1- Reset Input
2- Enable Reset
3- Common
4- Prog.
5- Start/Stop

ORDERING INFORMATION:
87 610 440

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
87 610 050 SERIES
TOTALIZING COUNTER

- Voltage Input Version
- 8 Digit .3” High LCD Display
- NEMA 4 Front Panel
- Screw Terminal
- Custom CMOS Technology

GENERAL FEATURES:
The 87 601 050 Series is a totalizing counter housed in a DIN-sized (24 x 48mm) enclosure. Count input and reset input can be a 5 to 50 VAC/DC and 48 to 240 VAC voltage pulse. The unit is powered by an internal lithium battery which can be disconnected via a dip-switch for storage purposes.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Display</th>
<th>8 Digit LCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Height</td>
<td>0.3”</td>
</tr>
<tr>
<td>Count/Reset Inputs</td>
<td>Voltage Pulse 5 to 50 VAC/DC 48 to 240 VAC</td>
</tr>
<tr>
<td>Input Speed</td>
<td>40 Hz</td>
</tr>
<tr>
<td>Min. low level time</td>
<td>12 ms</td>
</tr>
<tr>
<td>Min. high level time</td>
<td>12 ms</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Internal lithium battery (8 year life)</td>
</tr>
<tr>
<td>Connection</td>
<td>Screw Terminals</td>
</tr>
<tr>
<td>Front Panel Rating</td>
<td>NEMA 4 (IP66)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>+14°F to 122°F (-10 to 50°C)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-13°F to 158°F (-25 to 70°C)</td>
</tr>
<tr>
<td>Weight</td>
<td>2.1 oz. (60g)</td>
</tr>
</tbody>
</table>

WIRING:
87 610 050
1 - 48 to 240 VAC Reset Input
2 - OV Reset Input
3 - 5 to 50 VAC/DC Reset Input
4 - 5 to 50 VAC/DC Count Input
5 - OV Count Input
6 - 48 to 240 VAC Count Input

DIMENSIONS: (mm)

ORDERING INFORMATION:
Voltage Input Version 87 610 050

Products and specifications subject to change without notice.
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
87 610 150 SERIES

ELAPSED TIME INDICATOR

- Voltage Input Version
- 6 Digit .3” High LCD Display
- 4 Selectable Time Ranges:
  - Hours, 1/10 Hours
  - Minutes, 1/10 Minutes
  - Seconds, 1/10 Seconds
  - Hours, Minutes, Seconds
- NEMA 4 Front Panel

GENERAL FEATURES:
The 87 610 150 Series is an elapsed time indicator in a DIN-sized (24 x 48mm) enclosure. The start/stop input can be a 5 to 50 VAC/DC and 48 to 240 VAC voltage pulse. The unit is powered by an internal lithium battery which can be disconnected via a dip-switch for storage purposes.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Display</th>
<th>6 Digit LCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Height</td>
<td>0.3”</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±50 PPM</td>
</tr>
<tr>
<td>Input</td>
<td></td>
</tr>
<tr>
<td>Start/Stop and Reset Inputs</td>
<td>5 to 50 VAC/DC</td>
</tr>
<tr>
<td>Min. Closure Time</td>
<td>40 ms</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Internal lithium battery (5 year life)</td>
</tr>
<tr>
<td>Connection</td>
<td>Screw Terminal</td>
</tr>
<tr>
<td>Front Panel Rating</td>
<td>NEMA 4 (IP66)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>+14 to 122°F (-10 to 50°C)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-13 to 158°F (-25 to 70°C)</td>
</tr>
<tr>
<td>Weight</td>
<td>2.1 oz. (60g)</td>
</tr>
</tbody>
</table>

DIMENSIONS: (mm)

ORDERING INFORMATION:
Voltage Input Version 87 610 150

WIRING:
87 610 150
1 - 48 to 240 VAC Reset Input
2 - OV Reset Input
3 - 5 to 50 VAC/DC Reset Input
4 - 5 to 50 VAC/DC Start/Stop Input
5 - OV Start/Stop Input
6 - 48 to 240 VAC Start/Stop Input

Products and specifications subject to change without notice.
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
ACCESSORIES FOR TOTALIZING COUNTERS AND ELAPSED TIME INDICATORS

Retrofit Panel Plates will retrofit most of the popular electromechanical totalizing counters and elapsed time indicators and discontinued 6108 Series.

### 26 546 829: Retrofits 25 x 50mm cut-outs

![Image of 25 x 50mm cut-outs](image)

### 26 546 830: Retrofits 45 x 45mm cut-outs

![Image of 45 x 45mm cut-outs](image)

### 26 546 831: Retrofits 50mm Ø cut-outs

![Image of 50mm Ø cut-outs](image)

10071 Retrofit Panel Plate with Keylock Reset

![Image of 10071 retrofit panel plate](image)

The 10071 panel plate comes complete with 6072 SPST key lock. It will retrofit following models:

**RETROFIT INFORMATION**

- Redington
- Veeder Root
- Durant

P102 Series
1205, 1981, 7443, 7995, 7997
Key lock resettable RMF, MF, YP, 54000 Series

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Products and specifications subject to change without notice.
99761 SERIES
ELAPSED TIME INDICATOR

UL-E47668    CSA-LR44080

- 7 Digit .15” High Display
- Front Panel Mounting
- Low Cost
- Capacity: 99999.99 Hours
- DIN-Sized (48 x 48mm) with Bezel

GENERAL FEATURES:
The 99761 Elapse Time Indicators are AC synchronous Hour Meters which are ruggedly constructed true time mechanisms for recording the “ON” time of electrical equipment and machinery. The instrument is connected in parallel with the equipment being monitored to determine maintenance intervals, routine and component life.

SPECIFICATIONS:
Display ................ 7 Digit .15” high
Capacity ................ 99999.99 Hours
Input Power ............... 24 VAC, 110 VAC, 220 VAC +10%, -15%
                        60 Hz (50 Hz Special Order)
Vibration Resistance ....... 5 G (10-2000 Hz)
Digit Color ............... Hours: white on black
                        Decimals: red on black
Body Material ............. Noryl
Weight ................... 2 oz. (60g)

DIMENSIONS:

ACCESSORIES:
- DIN-Rail Adapter
- Square Bezel

MOUNTING:

NOTE: Round cutout is only possible if square bezel accessory is used.

ORDERING INFORMATION:

ORDER/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
The CP4 Series of 1/16 DIN-sized digital counters offers the choice of a large green backlit LCD display or a large red illuminated display. The CP4 Series includes one and two presets versions. The large LCD display permits easy programming and monitoring of status such as counts preset values output scaling factor. Front panel reset can be enabled or disabled. Data such as counts, preset values, setup data are saved in case of a power failure by a 10 year EEPROM memory. The front panel is rated NEMA 12.

**SPECIFICATIONS:**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Power</strong></td>
<td>80 to 260 VAC</td>
</tr>
<tr>
<td></td>
<td>20 to 55 VAC</td>
</tr>
<tr>
<td></td>
<td>10 to 30 VDC</td>
</tr>
<tr>
<td><strong>Sensor Supply</strong></td>
<td>12 VDC 100 mA</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>5 digit, Green backlit LCD</td>
</tr>
<tr>
<td></td>
<td>5 digit, Red Illuminated</td>
</tr>
<tr>
<td><strong>Display digit height</strong></td>
<td>8mm - actual</td>
</tr>
<tr>
<td></td>
<td>4mm - preset</td>
</tr>
<tr>
<td><strong>Count Inputs</strong></td>
<td>2 Inputs, IN1, IN2</td>
</tr>
<tr>
<td></td>
<td>Contact Closure, DC Voltage, NPN/PNP transistor</td>
</tr>
<tr>
<td></td>
<td>Low Level: 0 to 1 VDC</td>
</tr>
<tr>
<td></td>
<td>High Level: 4 to 30 VDC</td>
</tr>
<tr>
<td></td>
<td>Impedance: 10 KΩ</td>
</tr>
<tr>
<td></td>
<td>Low Speed: 30 Hz Max.</td>
</tr>
<tr>
<td></td>
<td>High Speed: 5 kHz</td>
</tr>
<tr>
<td><strong>Input Modes</strong></td>
<td>Up IN1 - Count input</td>
</tr>
<tr>
<td></td>
<td>DN IN1 - Count input</td>
</tr>
<tr>
<td></td>
<td>IND IN1 - one direction</td>
</tr>
<tr>
<td></td>
<td>IN2 - opposite direction</td>
</tr>
<tr>
<td></td>
<td>DIR IN1 - Count input</td>
</tr>
<tr>
<td></td>
<td>IN2 - Change in direction input</td>
</tr>
<tr>
<td></td>
<td>CUMUL IN1 - Input</td>
</tr>
<tr>
<td></td>
<td>IN2 - Same direction input</td>
</tr>
<tr>
<td></td>
<td>Phase: Quadrature Up/Down Mode</td>
</tr>
<tr>
<td><strong>Reset Input</strong></td>
<td>Dry contact, voltage, solid state: NPN/PNP, front panel</td>
</tr>
<tr>
<td><strong>Scale factor</strong></td>
<td>Programmable from 0.001 to 99.999</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>2 Amp SP N.O. Relay</td>
</tr>
<tr>
<td></td>
<td>100 mA 40 VDC NPN transistor</td>
</tr>
<tr>
<td><strong>Output Modes</strong></td>
<td>Repeat or single cycle</td>
</tr>
<tr>
<td></td>
<td>Maintained or pulsed output of 500 ms</td>
</tr>
<tr>
<td><strong>Connections</strong></td>
<td>Screw terminals: 2 x 1.5mm²</td>
</tr>
<tr>
<td><strong>Front Panel Rating</strong></td>
<td>NEMA 12, IP54</td>
</tr>
</tbody>
</table>

**CONFORMITY:**

- Immunity to interference and noise (EMC)
  - IEC 1000.4.2 Level 3
  - IEC 1000.4.3 Radiated disturbance Level 3
  - IEC 1000.4.4 Fast transient Level 3
  - IEC 295.4 Level 3
- RF Emissions (EMC)
  - CENELEC EN 55022; Class A
- Vibration limits (in 3 axes)
  - IEC 68-2-6; 10-55Hz/.0375mm

**WIRING:**

- Power supply
- NPN
- PNP

**DIMENSIONS:** inches (mm)

- Panel cut-out: 1.78" x 1.50" (45.2 x 38.1 mm)

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
**COUNT/RATE**

**Input Modes**

- PNP Count on rising edge
- NPN Count on falling edge

1-Input IN1

- 1
- 2
- 3
- 4
- 5
- 6

2-Display

- 1
- 2
- 3
- 4
- 5
- 6

**Output Modes**

- Count in the direction of the cycle
- Count in the opposite direction from the cycle

**Single Shot**

- Maintained

**4142/4342 - 4144/4344**

- P1 - P2
- P1
- P2

**Repetitive Cycle**

- Pulsed with auto reset to value of P2 (or P for 4141/4341) (t=500 ms)

- Accessory

Adaptor frame: 79 237 807 to replace 1000PA Series cutout

- ø 49 x 50.5 mm

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Input Voltage</th>
<th>Presets</th>
<th>Input Modes</th>
<th>Display</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>87618018</td>
<td>80 to 250VAC</td>
<td>1</td>
<td>UP, DN, PH</td>
<td>Backlit, Green</td>
<td>Contact and Solid State</td>
</tr>
<tr>
<td>87618014</td>
<td>20 to 50VAC</td>
<td>1</td>
<td>UP, DN, PH</td>
<td>Backlit, Green</td>
<td>Contact and Solid State</td>
</tr>
<tr>
<td>87618012</td>
<td>10 to 30VDC</td>
<td>1</td>
<td>UP, DN, PH</td>
<td>Backlit, Green</td>
<td>Contact and Solid State</td>
</tr>
<tr>
<td>87618026</td>
<td>80 to 250VAC</td>
<td>2</td>
<td>UP, DN, PH</td>
<td>Backlit, Green</td>
<td>Contact</td>
</tr>
<tr>
<td>87618024</td>
<td>20 to 50VAC</td>
<td>2</td>
<td>UP, DN, PH</td>
<td>Backlit, Green</td>
<td>Contact</td>
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<tr>
<td>87618022</td>
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<td>UP, DN, PH</td>
<td>Backlit, Green</td>
<td>Contact</td>
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<tr>
<td>87618038</td>
<td>80 to 250VAC</td>
<td>2</td>
<td>DR, IND, CUMUL, PH</td>
<td>Backlit, Green</td>
<td>Contact</td>
</tr>
<tr>
<td>87618034</td>
<td>20 to 50VAC</td>
<td>2</td>
<td>DR, IND, CUMUL, PH</td>
<td>Backlit, Green</td>
<td>Contact</td>
</tr>
<tr>
<td>87618032</td>
<td>10 to 30VDC</td>
<td>2</td>
<td>DR, IND, CUMUL, PH</td>
<td>Backlit, Green</td>
<td>Contact</td>
</tr>
<tr>
<td>87618118</td>
<td>80 to 250VAC</td>
<td>1</td>
<td>UP, DN, PH</td>
<td>Red Illuminated</td>
<td>Contact and Solid State</td>
</tr>
<tr>
<td>87618114</td>
<td>20 to 50VAC</td>
<td>1</td>
<td>UP, DN, PH</td>
<td>Red Illuminated</td>
<td>Contact and Solid State</td>
</tr>
<tr>
<td>87618112</td>
<td>10 to 30VDC</td>
<td>1</td>
<td>UP, DN, PH</td>
<td>Red Illuminated</td>
<td>Contact and Solid State</td>
</tr>
<tr>
<td>87618128</td>
<td>80 to 250VAC</td>
<td>2</td>
<td>UP, DN, PH</td>
<td>Red Illuminated</td>
<td>Contact</td>
</tr>
<tr>
<td>87618124</td>
<td>20 to 50VAC</td>
<td>2</td>
<td>UP, DN, PH</td>
<td>Red Illuminated</td>
<td>Contact</td>
</tr>
<tr>
<td>87618122</td>
<td>10 to 30VDC</td>
<td>2</td>
<td>UP, DN, PH</td>
<td>Red Illuminated</td>
<td>Contact</td>
</tr>
<tr>
<td>87618138</td>
<td>80 to 250VAC</td>
<td>2</td>
<td>DR, IND, CUMUL, PH</td>
<td>Red Illuminated</td>
<td>Contact</td>
</tr>
<tr>
<td>87618134</td>
<td>20 to 50VAC</td>
<td>2</td>
<td>DR, IND, CUMUL, PH</td>
<td>Red Illuminated</td>
<td>Contact</td>
</tr>
<tr>
<td>87618132</td>
<td>10 to 30VDC</td>
<td>2</td>
<td>DR, IND, CUMUL, PH</td>
<td>Red Illuminated</td>
<td>Contact</td>
</tr>
</tbody>
</table>

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
The CP4-92 Series is a programmable dual preset up/down counter, batch counter, chronometer and rate controller with relay outputs. The CP4-92 display shows both actual and preset values. Both count and preset values are saved in EEPROM memory. The unit provides a built-in sensor power supply of 12 VDC, 100mA and will accept contact or solid state inputs.

**SPECIFICATIONS:**

- **Input Power**
  - 80 to 260 VAC
  - 20 to 55 VAC
  - 10 to 30 VDC

- **Sensor Supply**
  - 12VDC, 100mA

- **Display**
  - 5 digit, Green backlit LCD
  - 5 digit, Red Illuminated
  - -9999 to +99999

- **Display digit height**
  - 8mm - actual
  - 4mm - preset

- **Presets**
  - 2

- **Count Inputs**
  - 2 Inputs, IN1, IN2
  - Contact Closure, DC Voltage, NPN/PNP transistor
  - Low Level: 0 to 1 VDC
  - High Level: 4 to 30 VDC
  - Impedance: 10 KΩ
  - Low Speed: 5 kHz Max.
  - High Speed: 5 kHz

- **Input Modes**
  - **Up**: IN1 - Count input
  - **DN**: IN1 - Count input
  - **IND**: IN1 - one direction
  - **DIR**: IN1 - Change in direction input
  - **CUMUL**: IN1 - Input
  - **IN2**: Same direction input
  - Phase; Quadrate/Up/Down Mode
  - Phase x 2, Phase x 4

- **Reset Input**
  - Dry contact, voltage, solid state: NPN/PNP front panel

- **Scale factor**
  - Programmable from 0.001 to 99.999

- **Output**
  - 2 x 2 Amp SP N.O. Relay

- **Output Modes**
  - Repeat or single cycle
  - Maintained or pulsed output of 500ms.

- **Connections**
  - Screw terminals: 2 x 1.5mm²

- **Front Panel Rating**
  - NEMA 12, IP54

**CONFORMITY:**

- **Immunity to interference and noise (EMC)**
  - IEC 1000.4.2 Level 3
  - IEC 1000.4.3 Radiated disturbance Level 3
  - IEC 1000.4.4 Fast transient Level 3
  - IEC 255.4 Level 3

- **RF Emissions (EMC)**
  - CENELEC EN 55022; Class A

- **Vibration limits (in 3 axes)**
  - IEC 68-2-6; 10-55Hz/.0375mm

**WIRING:**

- Power supply
- OUT : 2A/250V ~
- OUT1 OUT2
- 100mA

**DIMENSIONS:** inches (mm)

- Panel cut-out
- 1.78" x 1.78" (45 x 45 mm)

**ORDERING INFORMATION:**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Input Voltage</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>87 618 228</td>
<td>80 to 260 VAC</td>
<td>Backlit Green</td>
</tr>
<tr>
<td>87 618 224</td>
<td>20 to 55 VAC</td>
<td>Backlit Green</td>
</tr>
<tr>
<td>87 618 222</td>
<td>10 to 30 VDC</td>
<td>Backlit Green</td>
</tr>
<tr>
<td>87 618 328</td>
<td>80 to 260 VAC</td>
<td>Red Illuminated</td>
</tr>
<tr>
<td>87 618 324</td>
<td>20 to 55 VAC</td>
<td>Red Illuminated</td>
</tr>
<tr>
<td>87 618 322</td>
<td>10 to 30 VDC</td>
<td>Red Illuminated</td>
</tr>
</tbody>
</table>

Products and specifications subject to change without notice.
Batch counter function

Principle
P1 is the “batch” preset.
When P2 is displayed, the value displayed on the upper digits represents the current counter value (reset to P2).
In this configuration the “RST” key on the front panel reinitializes the current value.
When P1 (batch preset) is displayed, the value displayed on the upper digits represents the value of the Batch counter.
In this configuration the “RST” key on the front panel resets the batch counter.
An “electrical” reset (RST terminal) still resets the current counter value and that of the batch counter.

Example
On a packing line, bottles need to be counted into packs of 6 bottles and then dispatched in a box containing a batch of 4 packs.
P2: current counter preset value: 00006
P1: batch counter preset value: 00004

Tachometer function

Measurement principle
Measurement begins on a rising edge of the signal to be measured. The measurement time is greater than TR, but less than TL. Measurement stops at the end of the current period (3), after TR. If the period (3) does not end before TL, the measurement result will be zero (0).
The outputs are updated each time measurement ends according to the selected output mode.
– Maintained output: output active if the measured speed is greater than the preset speed.
– Pulsed output: output activated during time T, when the preset threshold is crossed.

Chronometer function (Precision: 150 ppm)

Accessory
Adaptor frame: 79 237 807

ø 49 x 50.5 mm
The CP7 Series of 72 x 72mm DIN-sized digital counters offers the choice of a large green backlit LCD display or a large red illuminated display. The CP7 Series includes one and two presets versions. The large LCD display permits easy programming and monitoring of status such as counts, preset, values, output scaling factor. The programmed selections are shown continuously in the RUN mode. Front panel reset can be enabled or disabled. Data such as counts, preset values, setup data are saved in case of a power failure by a 10 year EEPROM memory. The front panel is rated NEMA 12.

SPECIFICATIONS:

- **Input Power**
  - 80 to 260 VAC
  - 20 to 55 VAC
  - 10 to 30 VDC

- **Sensor Supply**
  - 12 VDC 100mA

- **Display**
  - 6 digit, Green backlit LCD
  - 6 digit, Red Illuminated

- **Display digit height**
  - 10mm - actual
  - 5.5mm preset

- **Count Inputs**
  - 2 Inputs, IN1, IN2
    - Contact Closure, DC Voltage, Solid State: NPN and PNP
    - Low Level: 0 to 1 VDC
    - High Level: 4 to 30 VDC
    - Impedance: 10K
    - Low Speed: 30 Hz Max.
    - High Speed: 5 kHz

- **Input Modes**
  - Up IN1 - Count input
  - DN IN1 - Count input
  - IND IN1 - one direction
  - IN2 - opposite direction
  - DIR IN1 - Count input
  - IN2 - Change in direction input
  - CUMUL IN1 - Input
  - IN2 - Same direction input
  - Phase; Quadrature Up/Down Mode
  - Phase x 2
  - Phase x 4

- **Reset Input**
  - Dry contact, voltage, solid state: NPN front panel

- **Scale factor**
  - Programmable from 0.0001 to 99.9999

- **Output**
  - 1 Preset Version
    - 2 Amp SPDT Relay
  - 2 Preset Version
    - 2 x 2 Amp SPDT Relay

- **Output Modes**
  - Repeat or single cycle
  - Maintained or pulsed output of 500 ms.

- **Connections**
  - Screw terminals: 2 x 1.5mm²

- **Front Panel Rating**
  - NEMA 12, IP54

- **CONFORMITY:**
  - Immunity to interference and noise (EMC)
    - IEC 1000.4.2
    - IEC 1000.4.3 Radiated disturbance
    - IEC 1000.4.4 Fast transient
    - IEC 255.4
    - Level 3

  - RF Emissions (EMC)
    - CENELEC EN 55022; Class A

  - Vibration limits (in 3 axes)
    - IEC 68-2-6, 10-55Hz/0.375mm

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Input Modes

- PNP Count on rising edge
- NPN Count on falling edge

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Input IN1</td>
<td>Count in the direction of the cycle</td>
</tr>
<tr>
<td>2-Display</td>
<td>Count in the opposite direction from the cycle</td>
</tr>
</tbody>
</table>

Output Modes

- Single Shot
- Repetitive Cycle

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Input Voltage</th>
<th>Presets</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>87619018</td>
<td>80 to 250VAC</td>
<td>1</td>
<td>Backlit LCD, Green</td>
</tr>
<tr>
<td>87619014</td>
<td>20 to 50VAC</td>
<td>1</td>
<td>Backlit LCD, Green</td>
</tr>
<tr>
<td>87619012</td>
<td>10 to 30VDC</td>
<td>1</td>
<td>Backlit LCD, Green</td>
</tr>
<tr>
<td>87619028</td>
<td>80 to 250VAC</td>
<td>2</td>
<td>Backlit LCD, Green</td>
</tr>
<tr>
<td>87619024</td>
<td>20 to 50VAC</td>
<td>2</td>
<td>Backlit LCD, Green</td>
</tr>
<tr>
<td>87619022</td>
<td>10 to 30VDC</td>
<td>2</td>
<td>Backlit LCD, Green</td>
</tr>
<tr>
<td>87619118</td>
<td>80 to 250VAC</td>
<td>1</td>
<td>Red Illuminated</td>
</tr>
<tr>
<td>87619114</td>
<td>20 to 50VAC</td>
<td>1</td>
<td>Red Illuminated</td>
</tr>
<tr>
<td>87619122</td>
<td>10 to 30VDC</td>
<td>1</td>
<td>Red Illuminated</td>
</tr>
<tr>
<td>87619128</td>
<td>80 to 250VAC</td>
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<td>87619124</td>
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</tr>
<tr>
<td>87619122</td>
<td>10 to 30VDC</td>
<td>2</td>
<td>Red Illuminated</td>
</tr>
</tbody>
</table>

Products and specifications subject to change without notice.
**SPECIFICATIONS:**

**Input Power**
- 80 to 260 VAC
- 20 to 55 VAC
- 10 to 30 VDC

**Sensor Supply**
- 12VDC 100mA

**Display**
- 6 digit, Green backlit LCD
- 6 digit, Red Illuminated
- -9,999,999 to +999,999

**Display digit height**
- 10mm - actual
- 6mm preset

**Count Inputs**
- 2 Inputs, IN1, IN2
- Contact Closure, DC Voltage, Solid State:
  - NPN and PNP
  - Low Level: 0 to 1 VDC
  - High Level: 4 to 30 VDC
  - Impedance: 10KΩ
  - Low Speed: 30 Hz Max.
  - High Speed: 5 kHz

**Input Modes**
- Up IN1 - Count input
- DN IN1 - Count input
- IND IN1 - one direction
- IN2 - opposite direction
- DIR IN1 - Count input
- IN2 - Change in direction input
- CUMUL IN1 - Input
- IN2 - Same direction input
- Phase; Quadrature Up/Down Mode
- Phase x 2
- Phase x 4

**Reset Input**
- Dry contact, DC voltage, Solid State: NPN/PNP front panel

**Scale factor**
- Programmable from 0.0001 to 99.9999

**Output**
- 2 x 2 Amp SPDT Relay
- (2 Amps resistive @ 250 VAC)
- 2 x 100 mA 40 VDC NPN transistor

**Output Modes**
- Repeat or single cycle
- Maintained or pulsed output (.9 to 9.9 s)

**Connections**
- Screw terminals: 2 x 1.5mm²

**Front Panel Rating**
- NEMA 12, IP54

**Operating temperature**
- 0°F to 131°F, (0 to 55°C)

**Storage temperature**
- -13°F to 158°F, (-25°C to 70°C)

**Weight**
- 10.2 oz. (290g)

**ORDERING INFORMATION:**

<table>
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<td>Backlit, Green</td>
</tr>
<tr>
<td>87619224</td>
<td>20 to 55VAC</td>
<td>Backlit, Green</td>
</tr>
<tr>
<td>87619222</td>
<td>10 to 30VDC</td>
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</tr>
<tr>
<td>87619328</td>
<td>80 to 260VAC</td>
<td>Red Illuminated</td>
</tr>
<tr>
<td>87619324</td>
<td>20 to 55VAC</td>
<td>Red Illuminated</td>
</tr>
<tr>
<td>87619322</td>
<td>10 to 30VDC</td>
<td>Red Illuminated</td>
</tr>
</tbody>
</table>

The CP7-92 Series is a programmable dual preset up/down counter, batch counter, chronometer and rate controller with relay outputs. The CP7-92 is 72 x 72mm DIN-sized and offers the choice of a large green backlit LCD display or a large red illuminated display. The CP7-92 display shows both actual and preset values. Both count and preset values are saved in EEPROM memory. The unit provides a built-in sensor power supply of 12 VDC, 100 mA and will accept contact or solid state inputs. Front panel reset can be enabled or disabled. The front panel is rated NEMA 12.

**CONFORMITY:**

- Immunity to interference and noise (EMC)
  - IEC 1000.4.2 Level 3
  - IEC 1000.4.3 Radiated disturbance Level 3
  - IEC 1000.4.4 Fast transient Level 3
  - IEC 255.4 Level 3

- RF Emissions (EMC)
  - CENELEC EN 55022; Class A

- Vibration limits (in 3 axes)
  - IEC 68-2-6, 10-55Hz/.0375mm

**WIRING:**

**DIMENSIONS:** inches (mm)

**ORDERING INFORMATION:**

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Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com
Batch counter function

Principle

P1 is the “batch” preset.

When P2 is displayed, the value displayed on the upper digits represents the current counter value (reset to P2).

In this configuration the “RST” key on the front panel reinitializes the current value.

When P1 (batch preset) is displayed, the value displayed on the upper digits represents the value of the Batch counter.

In this configuration the “RST” key on the front panel resets the batch counter.

An “electrical” reset (RST terminal) still resets the current counter value and that of the batch counter.

Example

On a packing line, bottles need to be counted into packs of 6 bottles and then dispatched in a box containing a batch of 4 packs.

P2: current counter preset value: 00006
P1: batch counter preset value: 00004

Tachometer function

Measurement principle

Measurement begins on a rising edge of the signal to be measured. The measurement time is greater than TR, but less than TL.

Measurement stops at the end of the current period (3), after TR.

If the period (3) does not end before TL, the measurement result will be zero (0).

The outputs are updated each time measurement ends according to the selected output mode:

– Maintained output: output active if the measured speed is greater than the preset speed.
– Pulsed output: output activated during time T, when the preset threshold is crossed.

Measurement precision: \(100 + \frac{200}{TR}\) PPM

Example: for \(TR = 1\)s \(\rightarrow\) 300 PPM (0.03%)

Chronometer function (Precision: 150 ppm)

1 - Input IN1
2 - Display (0 → PR), 1-channel pulse measurement
3 - Display (PR → 0), 1-channel pulse measurement

1 - Input IN1
2 - Display (0 → PR), 1-channel pulse measurement
3 - Display (PR → 0), 1-channel pulse measurement

1 - Input IN1 (start counting)
2 - Input IN2 (stop counting)
3 - Display (0 → PR), measurement on 2 separate channels
4 - Display (PR → 0), measurement on 2 separate channels