Tri-level Control HF Sensor

**HC403VRC-KD**
Detached Version with Daylight Monitoring

**Applications**

Occupancy detector with tri-level dimming control suitable for indoor use.

Suitable for building into the fixture:
- Office / Commercial Lighting
- Classroom
- Warehouse
Use for new luminaire designs and installations

**Features**

- 24 hour daylight monitoring dawn/dusk sensor
- Tri-level dimming control based upon occupancy (also known as corridor function)
- 1-10V dimming control method
- One-touch daylight learning via remote control
- Zero crossing detection circuit reduces in-rush current and prolongs relay life
- Loop-in and loop-out terminal for efficient installation

**Technical Data**

**Input Characteristics**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>HC403VRC-KD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains voltage</td>
<td>120–277VAC 50/60Hz</td>
</tr>
<tr>
<td>Stand-by power</td>
<td>&lt;0.5W</td>
</tr>
<tr>
<td>Load ratings:</td>
<td></td>
</tr>
<tr>
<td>Capacitive</td>
<td>400VA @ 120VAC 800VA @ 230VAC 1000VA @ 277VAC</td>
</tr>
<tr>
<td>Warming-up</td>
<td>20s</td>
</tr>
</tbody>
</table>

**Safety and EMC**

- EMC standard [EMC] EN55015, EN61000
- Safety standard [LVD] EN60669, AS/NZS60669
- Radio Equipment [RED] EN300440, EN301489, EN62479
- Certification SEMKO, CB, CE, EMC, RED, RCM

- **Sensor Data**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>SAMS5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor principle</td>
<td>High Frequency (microwave)</td>
</tr>
<tr>
<td>Operation frequency</td>
<td>5.8GHz +/- 75MHz</td>
</tr>
<tr>
<td>Transmission power</td>
<td>&lt;0.2mW</td>
</tr>
<tr>
<td>Detection range:</td>
<td>SAMS5 Max.</td>
</tr>
<tr>
<td>Detection angle</td>
<td>30° – 150°</td>
</tr>
<tr>
<td>DIP Switch Settings (HC403VRC-KD):</td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>10% / 50% / 75% / 100%</td>
</tr>
<tr>
<td>Hold-time</td>
<td>5s – 30min [selectable]</td>
</tr>
<tr>
<td>Daylight threshold</td>
<td>2 – 50 lux, disabled</td>
</tr>
<tr>
<td>Stand-by period</td>
<td>0s – 1h, +∞ [selectable]</td>
</tr>
<tr>
<td>Stand-by dimming level</td>
<td>10% / 20% / 30% / 50%</td>
</tr>
</tbody>
</table>

**Environment**

- Operation temperature | Ta: -20°C – +60°C |
- Case temperature (Max.) | Tc: +80°C |
- IP rating | IP20 |
Sensor Main Body
HC403VRC-KD (rectangular size)

Detection area
Hold-time
Daylight threshold
Stand-by period
Stand-by dimming level
Sensor antenna interface

Daylight threshold
63.2
4827.5
26
21.4
13.5

Model SAMS
Super-compact sensor antenna, with optional cable entry (side entry and back entry).

Sensor antenna module
Typical applications:

1. Office light, most of which have aluminium louvres and is impossible for microwave sensors to go through.
2. LED bulkhead or high/low bay, which has limited space and ordinary sensor is too big or too thick to be built in, also easy to cast shadow in the shade.

For linear T5, T8, TCL lamps

Most of the linear office lights have metal louvre, where microwave cannot penetrate through. An easy alternative solution is to use this detached sensor antenna head, grip on the T5 and T8 tube, and put the sensor main body behind the metal louvre, together with the ballast or driver.

For LED bulkhead

In such applications, only the detached small antenna is needed on the outer surface, while the sensor body and the driver/ballast can be hidden behind the panel. No shadow is cast in the shade.

Functions and Features

1. Tri-level Control (Corridor Function)

Hytronik builds this function inside the motion sensor to achieve tri-level control, for some areas which require a light change notice before switch-off. The sensor offers 3 levels of light: 100%->dimmed light (natural light is insufficient) ->off; and 2 periods of selectable waiting time: motion hold-time and stand-by period; Selectable daylight threshold and freedom of detection area.

With sufficient natural light, the light does not switch on when presence is detected.

With insufficient natural light, the sensor switches on the light automatically when presence is detected.

After hold-time, the light dims to stand-by level if the surrounding natural light is below the daylight threshold.

Light switches off automatically after the stand-by period elapses.

2. Zero-cross Relay Operation

Designed in the software, sensor switches on/off the load right at the zero-cross point, to ensure that the in-rush current is minimised, enabling the maximum lifetime of the relay.
24h Daylight Monitoring Function

Our innovative and patented software enables our antenna with built-in daylight sensor to provide a “smart photocell” function. This function is activated when stand-by period is set to “+∞”.

The light switches on at 100% when there is movement detected.

The light turns off completely when natural light lux exceeds daylight threshold pre-set.

The light dims to stand-by level after the hold-time.

The light remains in dimming level at night.

The light automatically turns on at 10% when natural light is insufficient (no motion).

Settings on this demonstration:
Hold-time: 10min
Daylight threshold: 50lux
Stand-by dimming level: 10%
Stand-by period: +∞
The light does not switch on when there is presence being detected.

Short push to activate the sensor and switch on the light.

The light turns on full, and the sensor stays in sensor mode.

The light keeps being ON during the presence.

People left, the light dims to stand-by level after the hold-time.

The light switches off automatically after the stand-by period elapses.

Note: end-user can choose either function 1 or function 5 for application. Default function is manual override.

1. Loop-in and Loop-out Terminal

Double L N terminal makes it easy for wire loop-in and loop-out, and saves the cost of terminal block and assembly time.

Note: this 1-10V output is isolated, SELV output. Do not connect the 1-10V terminals on driver X to Driver Y.
Press this button, the built-in daylight sensor stops working, and all motion detected could turn on the lighting fixture, no matter how bright the natural light is.

**Scene mode**

There are 4 scene modes fixed program built in the remote control to choose for different applications:

<table>
<thead>
<tr>
<th>Scene options</th>
<th>Detection range</th>
<th>Hold-time</th>
<th>Stand-by period</th>
<th>Stand-by dimming level</th>
<th>Daylight sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC1</td>
<td>100%</td>
<td>1min</td>
<td>10min</td>
<td>10%</td>
<td>2lux</td>
</tr>
<tr>
<td>SC2</td>
<td>100%</td>
<td>5min</td>
<td>10min</td>
<td>10%</td>
<td>2lux</td>
</tr>
<tr>
<td>SC3</td>
<td>100%</td>
<td>10min</td>
<td>30min</td>
<td>10%</td>
<td>10Lux</td>
</tr>
<tr>
<td>SC4</td>
<td>100%</td>
<td>10min</td>
<td></td>
<td>10%</td>
<td>50Lux</td>
</tr>
</tbody>
</table>

* End-user can adjust the settings by pressing buttons of detection range/hold-time/stand-by period/stand-by dimming level/daylight sensor. The last setting stays in validity.

**Detection range**

Press the buttons of “detection range” to set detection range at 10% / 50% / 100%.

**Hold-time**

Press the buttons of “hold-time” to set hold-time at 30s / 1 min / 5 min / 10min / 30min.

**Daylight sensor**

Press the buttons of “daylight sensor” to set daylight threshold at 2Lux / 10Lux / 50Lux.

**Stand-by period (corridor function)**

Press the buttons of “stand-by period” to set stand-by period at 0s / 10s / 1 min / 10min / 30min / +∞.

* “0s” means on/off control; “+∞” means bi-level dimming control, the fixture never switches off when daylight sensor is disabled.

**Stand-by dimming level**

Press the buttons of “stand-by dimming level” to set the stand-by dimming level at 10% / 20% / 30%.

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**Detection Pattern (Ceiling mounted)**

Model SAM5
### DIP Switch Settings (HC403VRC-KD)

#### 1. Detection Range
Sensor sensitivity can be adjusted by selecting the combination on the DIP switches to fit precisely for each specific application.

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>10%</td>
<td>75%</td>
<td>50%</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
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</table>

#### 2. Hold-time
Select the dip switch configuration for the full brightness on-time after presence detection.

*Please note that this function is disabled when the natural daylight exceeds the daylight threshold setting for more than 5 minutes.*

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
</tr>
</thead>
<tbody>
<tr>
<td>0s</td>
<td>10s</td>
<td>1min</td>
<td>5min</td>
<td>10min</td>
<td>30min</td>
<td>1H</td>
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<td></td>
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#### 3. Daylight Threshold
Set the level according to the fixture and environment. The light will not turn on if ambient lux level exceeds the daylight threshold preset.

*Please note that the ambient lux level refers to internal light reaching the sensor.*

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<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disable</td>
<td>50Lux</td>
<td>10Lux</td>
<td>2Lux</td>
<td>100%</td>
<td>75%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
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</table>

#### 4. Stand-by period (corridor function)
This is the time period you would like to keep at the low light output level before it is completely switched off in the long absence of people.

*Note: “0s” means on/off control;  “+ ∞” means the stand-by time is infinite and the fixture never switches off.*

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
</tr>
</thead>
<tbody>
<tr>
<td>0s</td>
<td>10s</td>
<td>1min</td>
<td>5min</td>
<td>10min</td>
<td>30min</td>
<td>1H</td>
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</tbody>
</table>

#### 5. Stand-by dimming level
The setting is used to select the desired dimmed light level used in periods of absence for enhanced comfort and safety.

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>20%</td>
<td>30%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>