**INSTALLATION AND MAINTENANCE INSTRUCTIONS**

**SK-PHOTO-T-W**

**Intelligent Photoelectric and Temperature Sensor**

**SPECIFICATIONS**
- Operating Voltage Range: 15 to 32 VDC
- Operating Current @ 24 VDC: 200 µA (one communication every 5 seconds with green LED blink on communication)
- Maximum Alarm Current: 2 mA @ 24 VDC (one communication every 5 seconds with red LED solid on)
- Maximum Current: 4.5 mA @ 24 VDC (one communication every 5 seconds with amber LED solid on)
- Operating Humidity Range: 10% to 93% Relative Humidity, Non-condensing
- Operating Temperature Range: 32°F to 115°F (0°C to 47°C)
- Air Velocity: 0 to 4000 ft./min. (0 to 1219.2 m/min.)
- Height: 2.0” (51 mm) installed in B300-6 Base
- Diameter: 6.2” (156 mm) installed in B300-6 Base; 4.1” (104 mm) installed in B501 Base
- Weight: 3.4 oz. (95 g)
- Isolator Load Rating: 0.0063*

*Please refer to your isolator base/module manual for isolator calculation instructions.

**UL 268 listed for Open Air Protection**
**UL 521 listed for Heat Detectors**

This sensor must be installed in compliance with the control panel system installation manual. The installation must meet the requirements of the Authority Having Jurisdiction (AHJ). Proper wire gauges should be used. All wiring must be installed in compliance with the National Electrical Code, applicable local codes, and any special requirements of the Authority Having Jurisdiction. Proper connections will prevent a system from responding properly in the event of a fire.

**GENERAL DESCRIPTION**

Model SK-PHOTO-T-W is a plug-in type multi-sensor smoke sensor that combines a photoelectric sensing chamber and 135°F (57.2°C) fixed temperature heat detector across addressable-analog communications. The sensors transmit an analog representation of smoke density over a communication line to a control panel. Rotary dial switches are provided for setting the sensor’s address. (See Figure 1.) The intelligent photoelectric and temperature sensors also transmit an alarm signal due to heat at 135°F (57.2°C) per UL 521.

**FIGURE 1. ROTARY ADDRESS SWITCHES**

Two LEDs on the sensor are controlled by the panel to indicate sensor status. An output is provided for connection to an optional remote LED annunciator (P/N RA100Z).

Silent Knight panels offer different feature sets across different models. As a result, certain features of the photoelectric and temperature sensors may be available on some control panels, but not on others. These devices support SK protocol mode. The possible features available if supported by the control panel are:

1. The sensor’s LEDs can operate in three ways—on, off, and blinking—and they can be set to red, green, or amber. This is controlled by the panel.
2. The remote output may be synchronized to the LED operation or controlled independent of the LEDs.
3. Devices are point addressable up to 159 addresses.

Please refer to the operation manual for the UL listed control panel for specific operation. The photoelectric and temperature sensors require compatible addressable communications to function properly. Connect these sensors to listed-compatible control panels only.

**SPACING**

Silent Knight recommends spacing sensors in compliance with NFPA 72. In low air flow applications with smooth ceilings, space sensors 30 feet apart (9.1 m). When using the photoelectric and temperature sensors as a heat detector in FM3210 compliant applications, space sensors 20 feet apart (6 m). For specific information regarding sensor spacing, placement, and special applications, refer to NFPA 72 or the System Smoke Detector Application Guide, available from Silent Knight.

**FIGURE 2. WIRING DIAGRAM**

**WIRING GUIDE**

All wiring must be installed in compliance with the National Electrical Code, applicable local codes, and any special requirements of the Authority Having Jurisdiction. Proper wire gauges should be used. The installation wires should be color-coded to limit wiring mistakes and ease system troubleshooting. Improper connections will prevent a system from responding properly in the event of a fire.

Remove power from the communication line before installing sensors.

1. Wire the sensor base (supplied separately) per the wiring diagram, Figure 2.
2. Set the desired address on the sensor address switches, see Figure 1.
3. Install the sensor into the sensor base. Push the sensor into the base while turning it clockwise to secure it in place.
4. After all sensors have been installed, apply power to the control panel and activate the communication line.
5. Test the sensor(s) as described in the TESTING section of this manual.

**CAUTION**

Dust covers provide limited protection against airborne dust particles during shipping. Dust covers must be removed before the sensors can sense smoke. Remove sensors prior to heavy remodeling or construction.

**FIGURE 2. WIRING DIAGRAM**

**TAMPER-RESISTANCE**

Photoelectric and temperature sensors include a tamper-resistant capability that prevents their removal from the base without the use of a tool. Refer to the base manual for details on making use of this capability.

**TESTING**

Before testing, notify the proper authorities that the system is undergoing maintenance, and will temporarily be out of service. Disable the system to prevent unwanted alarms.

All sensors must be tested after installation and periodically thereafter. Testing methods must satisfy the Authority Having Jurisdiction (AHJ). Sensors offer maximum performance when tested and maintained in compliance with NFPA 72.
The sensor can be tested in the following ways:

A. Functional: Magnet Test (P/N M02-04-01 or M02-09-00)
   This sensor can be functionally tested with a test magnet. The test magnet
   electronically simulates smoke in the sensing chamber, testing the sensor
   electronics and connections to the control panel.
   1. Hold the test magnet in the magnet test area as shown in Figure 3.
   2. The sensor should alarm the panel.
      Two LEDs on the sensor are controlled by the panel to indicate sensor
      status. Coded signals, transmitted from the panel, can cause the LEDs to
      blink, latch on, or latch off. Refer to the control panel technical documenta-
      tion for sensor LED status operation and expected delay to alarm.

B. Smoke Entry
   Sensitivity readings are available through the FACP. Refer to the manufac-
   turer’s published instructions for proper use.
   Additionally, canned aerosol simulated smoke (canned smoke agent) may be
   used for smoke entry testing of the smoke detector. Tested and ap-
   proved aerosol smoke products are:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSI Fire &amp; Safety</td>
<td>25S, 30S (PURCHECK)</td>
</tr>
<tr>
<td>SDi</td>
<td>SMOKE CENTURIAN, SOLOA4, SMOKEABRE, TRUTEST</td>
</tr>
<tr>
<td>No Climb</td>
<td>TESTIFIRE 2000</td>
</tr>
</tbody>
</table>

When used properly, the canned smoke agent will cause the smoke detector to
   go into alarm. Refer to the manufacturer’s published instructions for proper
   use of the canned smoke agent.

Canned aerosol simulated smoke (canned smoke agent) formulas will vary by
   manufacturer. Misuse or overuse of these products may have long term ad-
   verse effects on the smoke detector. Consult the canned smoke agent manufac-
   turer’s published instructions for any further warnings or caution statements.

C. Direct Heat Method (Hair dryer of 1000-1500 watts).
   A hair dryer of 1000-1500 watts should be used to test the thermistors.
   Direct the heat toward either of the two thermistors, holding the heat source
   approximately 12 inches (30 cm) from the detector in order to avoid dam-
   aging the plastic housing. The detector will reset only after it has had suf-
   ficient time to cool. Make sure both thermistors are tested individually.

D. Multi-Criteria Method.
   A Testifire® by SDi provides testing of the smoke and heat sensors. Consult
   the manufacturer’s published instructions for complete instructions.
   A sensor that fails any of these tests may need to be cleaned as described
   under CLEANING, and retested.
   When testing is complete, restore the system to normal operation and notify
   the proper authorities that the system is back in operation.

CLEANING
   Before removing the detector, notify the proper authorities that the smoke
   detector system is undergoing maintenance and will be temporarily out of
   service. Disable the zone or system undergoing maintenance to prevent un-
   wanted alarms.
   1. Remove the sensor to be cleaned from the system.
   2. Remove the sensor cover by pressing firmly on each of the four removal
      tabs that hold the cover in place.
   3. Vacuum the screen carefully without removing it. If further cleaning is
      required continue with Step 4, otherwise skip to Step 7.
   4. Remove the chamber cover/screen assembly by pulling it straight out.
   5. Use a vacuum cleaner or compressed air to remove dust and debris from
      the sensing chamber.
   6. Reinstall the chamber cover/screen assembly by sliding the edge over the
      sensing chamber. Turn until it is firmly in place.
   7. Replace the cover using the LEDs to align the cover and then gently push-
      ing it until it locks into place. Make sure that the thermistors do not be-
      come bent under the cover.
   8. Reinstall the detector.
   9. Test the detector as described in TESTING.
   10. Reconnect disable circuits.
   11. Notify the proper authorities that the system is back on line.

SPECIAL NOTE REGARDING SMOKE DETECTOR GUARDS
   Smoke detectors are not to be used with detector guards unless the combina-
   tion has been evaluated and found suitable for that purpose.

FIGURE 3. FEATURES OF THE PHOTO/HEAT DETECTOR

FIGURE 4. CLEANING THE PHOTO/HEAT DETECTOR

SPECIAL APPLICATION
   When configured at the fire alarm control panel, this detector is capable of op-
   erating in a special application mode such that it has a higher sensitivity than
   is normally allowed by UL 268 for areas where early warning is important. In
   this mode, the detector does not comply with the Cooking Nuisance Smoke
   Test. Detectors (Sampling ports) set to the special application mode are not
   suitable for use in areas where cooking appliances may be used. If cooking
   appliances are used within the protected space, a normal application detector
   or normal application mode must be used for that area.

   Special application mode is not for general use and the detector may be more
   prone to false alarms if used in unsuitable environments. While no list is
   all-inclusive, some examples of unsuitable environments for special applica-
   tion mode are areas with airborne particulate or aerosols including saving,
   drilling, and grinding operations, textile or agricultural processing, or areas
   with engines that are not vented to the outside. A complete list of aerosol and
   particulate sources is available in the Annex of NFPA 72.

   Suitable environments for special application mode could include early warn-
   ing for hospitals, museums, assisted living and other areas that do not have
   airborne particulate or aerosols.
   Refer to the fire alarm control panel documentation for information on how to
   configure the detector for special application mode.

Please refer to insert for the Limitations of Fire Alarm Systems.