

Hawkeye™ HK by StoneL

Solid state proximity sensors

Installation, Maintenance and
Operating instructions



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READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the limit switch.
If you require additional assistance, please contact the manufacturer or manufacturer’s representative.
Address and phone numbers are printed on the back cover.

SAVE THESE INSTRUCTIONS!

Subject to change without notice.
All trademarks are property of their respective owners.

Model Guide

SERIES

HK Hawkeye (will trigger on any metal)

SENSOR TYPE

- 30** SST sensor (NO type sensor)
- 31** SST sensor (NC type sensor)
- 40** NAMUR (EN 60947-5-6; IS)
- 50** (1) 3-wire PNP (NO type sensor)
- 51** (1) 3-wire PNP (NC type sensor)
- 60** (1) 3-wire NPN (NO type sensor)
- 61** (1) 3-wire NPN (NC type sensor)

HOUSING

7 Stainless

CONDUIT ENTRY

- 7** 1/2"-14 NPT
- 8** 3-pin mini male in stainless steel

FEATURES

- SR** Red LED
- SG** Green LED

MODEL NUMBER

Partnership ID*

*Some models may include 5-digit suffix for partnership identification

Model number example

HK 30 7 7 SR - (optional)

WARNINGS



1. **Never remove enclosure cover or make/break electrical connections with power connected to unit.**
2. **Perform all wiring in accordance with site and local codes, as well as with the National Electric Code ANSI-NFPA-70 (US) or the Canadian Electric Code Part I (Canada) for the appropriate area classifications.**
3. **Confirm that the HK model being installed is approved for the hazardous area (found on unit identification label).**
4. **Confirm that supply power to switches is within rated specifications listed on the unit identification label.**
5. **Protect the unit from exposure to aggressive substances or atmospheres to ensure that hazard rating is no compromised.**

Description and Principles of Operation

Description

The StoneL Hawkeye HK models are solid state sensors encapsulated in a 316 stainless steel casing sealed with epoxy resin and shock absorbent potting compound. The Hawkeye HK models feature integral three conductors, conduit entry, and externally threaded casing for ease of mounting and position adjustment. They are supplied with jam nuts and fender washers that facilitate adjustment of the gap between the HK unit and the triggering mechanism.

Principles of Operation

The StoneL Hawkeye HK models operate on the principle of solid state inductive technology, reacting to any metal that comes within range of the sensing head. All HK sensors, when actuated by the presence of any metal will change the state of the electrical circuit output .

ATEX Conditions of Safe Use

1. Encapsulating compound must be protected from UV radiation.
2. Cable entry thread is 1/2-14 NPT.
3. Only suitably approved cable glands may be used.
4. The integral conductors must be mechanically protected and terminated in a suitable terminal or junction facility.
5. An external earth bonding connection may be maintained by either the external mounting thread and/or the integral grounding wire.
6. **WARNING: DO NOT OPEN PRODUCT IN HAZARDOUS AREA**

Installation

1. Sensor and trigger may be mounted in any position. Individually, side-by-side, at 90° from each other, or facing each other at a minimum of 3" apart.
2. Locate sensor and/or trigger to assure that the trigger comes within sensor's sensing range.
3. Avoid contact between sensor and trigger, as this may damage the unit.
4. Keep all magnetic material at least 1 inch away from sensor.

Field Wiring

1. Attach conduit or cable correctly.
2. All conduit connected electrical devices must be sealed against water intrusion through the conduit system. Properly installed conduit will have a drip loop with provision for water to escape. Additional protection against water ingress can be obtained by carefully filling the HK conduit entry with electrical grade RTV.
3. When using long runs of conduit or cable, place supports close to the switch to avoid pulling switch out of position.
4. For installation in hazardous locations, check local electrical codes.

General Specifications

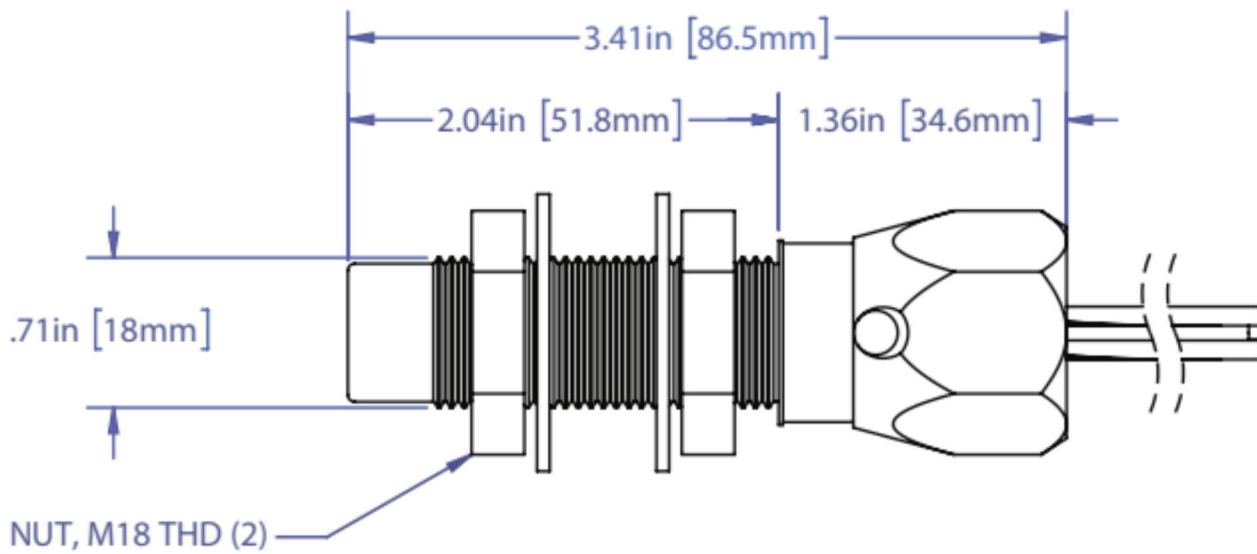
General specifications

Conduit Connection: 1/2-14 NPT or 3-pin mini male receptacle
 Integral Conductors 36" (0.91 meters) length, 18AWG multi-strand
 Sensing Distance: 0.236" (6mm) with supplied trigger
 Operating Temperature -40° C to 80° C (-40° F to 176° F)
 Enclosure Protection: 4, 4X & 6
 Ingress Protection : IP67
 Operating Life: Unlimited
 Warranty: Five years

Materials of construction

Housing and Fasteners: 316 Stainless Steel
 Sensing head cover: Polycarbonate
 LED Lens: Polycarbonate
Ratings
 Nonincendive: All switch models
 Intrinsically safe: HK40 models only
Approvals* See StoneL.com/approvals
 *Only models listed on StoneL's official website are approved for specific hazardous locations/ratings.

Dimensions Inches [mm]



2-Wire Sensor Specifications & Wiring Diagrams

Specifications:		Nominal Sensing Distance:	6 mm (Mild Steel Target)
Supply Voltage:	8 to 125 VDC, 24 to 125 VAC	Temp Range:	- 40° F to 180° F (- 40° C to 82° C)
Max Continuous Current:	0.1 Amp @ Rated Voltage	Housing Material & Fasteners:	316 Stainless Steel
Max Inrush Current:	2.0 Amps	Conduit Connection:	1/2"NPT
Min Switching Current:	2.5 milliamps	Wiring:	36" length 18 gauge multi-strand
Max Leakage Current:	0.25 mA with DC voltage 0.50mA with AC voltage	Enclosure Protection:	NEMA 4, 4X & 6 / IP67
Maximum Voltage Drop:	6.5V @ 10 mA 7.5V @ 100 mA	Warranty:	5 Years

To Bench Test a Hawkeye 2-Wire Sensor: Use StoneL Light Read Tester. Or use a 24 VDC or 120 VAC power supply with series load resistor (2K - 6K Ω).

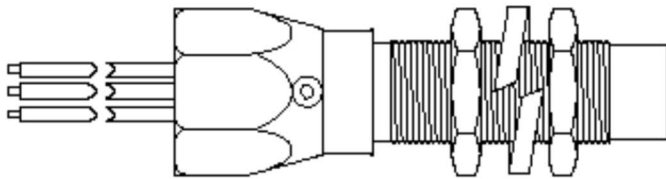
Sensor Wiring

1. Connect sensors per wiring diagram below.
2. Sensors may be wired for Division 2 Hazardous locations using standard code practice for explosion proof systems. For Division 1 Hazardous areas intrinsically safe wiring and circuit protection must be followed. See Page Four for Intrinsic Safety wiring instructions

WARNING:

FAILURE TO USE A SERIES LOAD RESISTOR WHEN BENCH TESTING SENSORS WITH A POWER SUPPLY WILL RESULT IN PERMANENT DAMAGE TO THE UNIT.

HK3077 ___ or HK3177 ___



HK3077SG

Wire Color	Signal
White/Green Stripe	Common*
White/Green Stripe	Normally Open*
Green	Case Ground**

HK3077SR

Wire Color	Signal
White/Red Stripe	Common*
White/Red Stripe	Normally Open*
Green	Case Ground**

HK3177SG

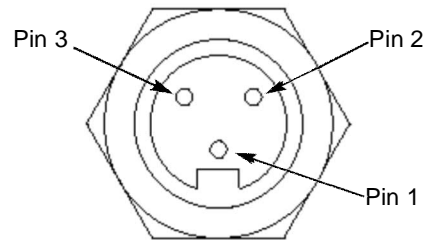
Wire Color	Signal
Green/White Stripe	Common*
Green/White Stripe	Normally Closed*
Green	Case Ground**

HK3177SR

Wire Color	Signal
Red/White Stripe	Common*
Red/White Stripe	Normally Closed*
Green	Case Ground**

* Sensors are not polarity sensitive
 ** Case Ground not required for circuit operation

HK3078 ___ or HK3178 ___



Pin Number	Signal
Pin 1	Case Ground**
Pin 2	NO/NC*
Pin 3	Common*

* Sensors are not polarity sensitive
 ** Case Ground not required for circuit operation

3-Wire Sensor Specifications & Wiring Diagrams

Specifications for Sourcing (PNP) Sensors: (HK5077__, HK5177__)	Specifications for Sinking (NPN) Sensors: (HK6077__, HK6177__)
Supply Voltage: 6 to 28 VDC	Supply Voltage: 6 to 28 VDC
Max Continuous Current: 200 mA	Max Continuous Current: 200 mA
Quiescent Current: 160 μ A	Quiescent Current: 160 μ A
Min Switching Current: 2.0 mA	Min Switching Current: 2.0 mA
Max Leakage Current: 0.6 μ A	Max Leakage Current: 0.6 μ A
Maximum Voltage Drop: 0.65 VDC	Maximum Voltage Drop: 0.65 VDC
Nominal Sensing Distance: 4 mm (Mild Steel Target)	Nominal Sensing Distance: 4 mm (Mild Steel Target)
	3 mm (Stainless Steel Target)
Temp Range: - 40° F to 180° F (- 40° C to 82° C)	Temp Range: - 40° F to 180° F (- 40° C to 82° C)
Housing Material & Fasteners: 316 Stainless Steel	Housing Material & Fasteners: 316 Stainless Steel
Conduit Connection: 1/2"NPT	Conduit Connection: 1/2"NPT
Wiring: 36" length 18 gauge multi-strand	Wiring: 36" length 18 gauge multi-strand
Enclosure Protection: NEMA 4, 4X & 6 / IP. 67	Enclosure Protection: NEMA 4, 4X & 6 / IP. 67
Warranty: 5 Years	Warranty: 5 Years

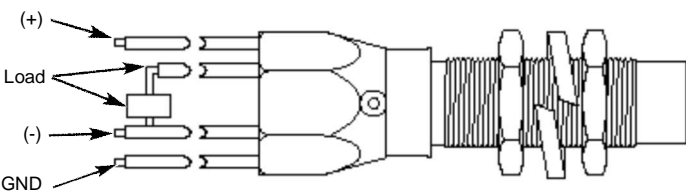
To Bench Test a Hawkeye 3-Wire Sensor: Use StoneL Light Read Tester. Or use a 24 VDC power supply with series load resistor (2K - 6K Ω).

Sensor Wiring - Connect sensors per wiring diagram below.

WARNING:

FAILURE TO USE A SERIES LOAD RESISTOR WHEN BENCH TESTING SENSORS WITH A POWER SUPPLY WILL RESULT IN PERMANENT DAMAGE TO THE UNIT.

HK5077__ or HK5177__



HK5077SG

Wire Color	Signal
Brown	(+)
White/ Green Stripe	Load
Blue	(-)
Green	Case Ground*

HK5077SR

Wire Color	Signal
Brown	(+)
White/ Red Stripe	Load
Blue	(-)
Green	Case Ground*

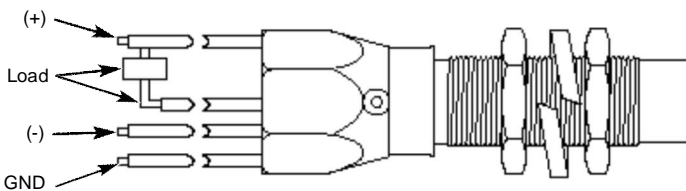
HK5177SG

Wire Color	Signal
Brown	(+)
Green/ White Stripe	Load
Blue	(-)
Green	Case Ground*

HK5177SR

Wire Color	Signal
Brown	(+)
Red/ White Stripe	Load
Blue	(-)
Green	Case Ground*

HK6077__ or HK6177__



HK6077SG

Wire Color	Signal
Brown	(+)
White/ Green Stripe	Load
Blue	(-)
Green	Case Ground*

HK6077SR

Wire Color	Signal
Brown	(+)
White/ Red Stripe	Load
Blue	(-)
Green	Case Ground*

HK6177SG

Wire Color	Signal
Brown	(+)
Green/ White Stripe	Load
Blue	(-)
Green	Case Ground*

HK6177SR

Wire Color	Signal
Brown	(+)
Red/ White Stripe	Load
Blue	(-)
Green	Case Ground*

* Case Ground not required for circuit operation

* Case Ground not required for circuit operation

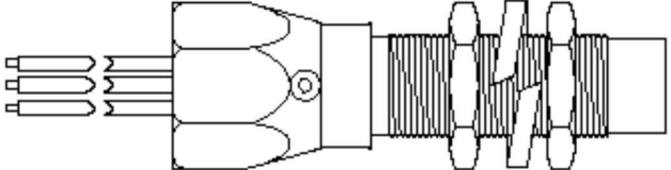
NAMUR Sensor Specifications & Wiring Diagrams

<p>Specifications for NAMUR Sensors: (Namur Sensors conform to EN 60947-5-6 Standard) Indications: Target On Sensor = LED Off Target Off Sensor = LED On Operating Voltage: 6-29 VDC Current Ratings: Target On (LED Off) <1.0mA Target Off (LED On) >2.1mA</p> <p>Entity Parameters: $U_i = 22 \text{ Vdc}$ $I_i = 120 \text{ mA}$ $C_i = 98 \text{ nF}$ $L_i = 1.56 \text{ mH}$ $P_i = 2.0 \text{ W}$</p> <p>Must use intrinsically safe repeater barrier.</p>	<p>Nominal Sensing Distance: 4 mm (Mild Steel Target) 3 mm (Stainless Steel Target) Temp Range: - 40°F to 176°F (- 40°C to 80°C) Housing Material & Fasteners: 316 Stainless Steel Conduit Connection: 1/2"NPT Wiring: 36" length 18 gauge multi-strand Enclosure Protection: NEMA 4, 4X & 6 / IP67 Warranty: 5 Years</p>
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To Bench Test a Hawkeye NAMUR Sensor: Use StoneL Light Read Tester or a 24 VDC power supply. Sensors are polarity sensitive

Sensor Wiring - Connect sensors per wiring diagram below.

HK4077SR or HK4077SG

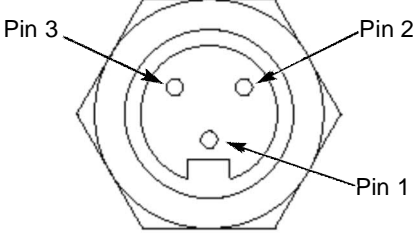


Wire Color	Signal
Brown	(+)
Blue	(-)
Green	Case Ground**

Wire Color	Signal
Brown	(+)
Blue	(-)
Green	Case Ground**

* Sensors are polarity sensitive
 ** Case Ground not required for circuit operation

HK4078SR or HK4078SG



Pin Number	Signal
Pin 1	Case Ground**
Pin 2	(-)*
Pin 3	(+)*

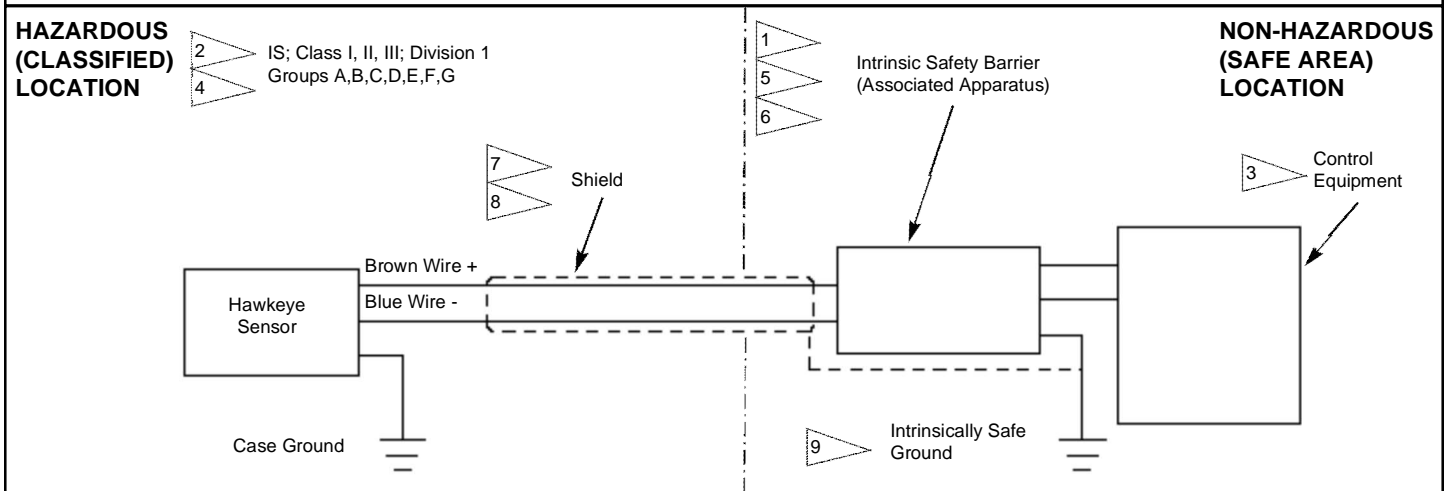
* Sensors are polarity sensitive
 ** Case Ground not required for circuit operation

Hawkeye™ Intrinsic Safety Hazardous Location Installation Diagram

Hawkeyes models approved for Intrinsically Safe Installations:

(Class I, II, III; Division 1; Gas Groups A, B, C, D, E, F, G)

HK4077SR; HK4077SG; HK4078SR; HK4078SG



FM (US) INSTALLATION NOTES:

Hawkeye Entity Parameters: $U_i = 22 \text{ Vdc}$; $I_i = 120 \text{ mA}$; $C_i = 98 \text{ nF}$; $L_i = 1.56 \text{ mH}$; $P_i = 2.0 \text{ W}$

1. V_{oc} or $V_t \leq V_{max}$, I_{sc} or $I_t \leq I_{max}$, $C_a \geq C_i + C_{cable}$, $L_a \geq L_i + L_{cable}$.
2. For Class II and III, Division 1 installations, where conduit is not used, use Listed dust-tight cable-gland fittings.
3. Control equipment connected to intrinsic safety barrier must not use or generate more than 250 Vrms or Vdc.
4. Installation should be in accordance with ANSI/ISA RPA12.6 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70).
5. The configuration of the intrinsic safety barrier for each Hawkeye sensor must be FMRC Approved.
6. Intrinsic safety barrier manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each Hawkeye sensor must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
9. Resistance between Intrinsic Safe Ground and earth ground must be less than one ohm.

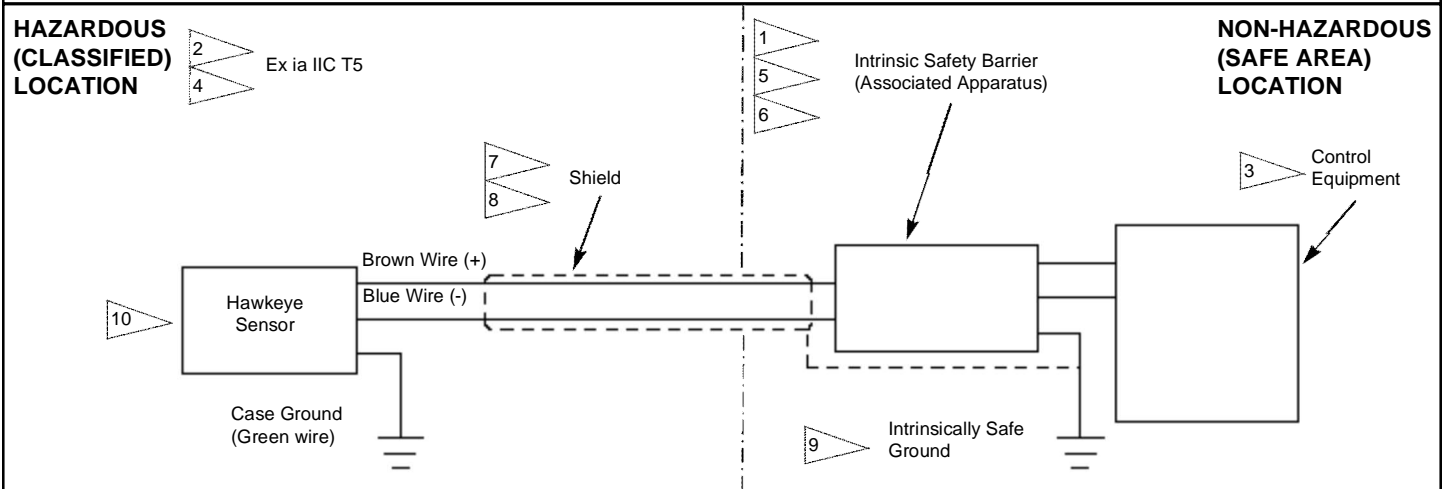
CANADIAN INSTALLATION NOTES:

1. Barrier must be a Canadian Certified, Single Channel grounded Shunt Diode Zener Barrier or a Single Channel Isolating Barrier, or; One dual-channel or two single-channel barriers may be used where both channels have been Certified for use together with combined entity parameters.
2. For Class II and III, Division 1 installations, where conduit is not used, use Canadian Certified dust-tight cable gland fittings.
3. Control equipment connected to Intrinsic Safety barriers must not use or generate more than 250 VRMS or VDC.
4. Install in accordance with the Canadian Electrical Code.
5. The configuration of intrinsic safety barriers for each Hawkeye sensor must be Canadian Certified.
6. Intrinsic safety barrier manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each Hawkeye sensor must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
9. Resistance between Intrinsic Safe Ground and earth ground must be less than one ohm.

Hawkeye™ Intrinsic Safety Hazardous Location Installation Diagram

Hawkeyes models approved for Intrinsically Safe Installations: (Ex ia IIC T5)

HK4077SR; HK4077SG; HK4078SR; HK4078SG



INSTALLATION NOTES (Ex ia IIC T5):

Hawkeye Entity Parameters: $U_i = 22 \text{ Vdc}$; $I_i = 120 \text{ mA}$; $C_i = 98 \text{ nF}$; $L_i = 1.56 \text{ mH}$; $P_i = 2.0 \text{ W}$

1. V_{oc} or $V_t \leq U_i$, I_{sc} or $I_t \leq I_i$, $C_a \geq C_i + C_{cable}$, $L_a \geq L_i + L_{cable}$.
2. Dust-tight conduit seal must be used when installed in Zone 20, Zone 21, and Zone 22 environments or where Ingress Protection of IP67 is required.
3. Control equipment connected to barrier must not use or generate more than 250 Vrms or Vdc.
4. Installation should be in accordance with appropriate local code or practice.
5. The configuration of associated apparatus for each sensor wiring pair or solenoid wiring pair must be approved.
6. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each sensor or solenoid coil wiring must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
9. Resistance between Intrinsic Safe Ground and earth ground must be less than one ohm.
10. Parts of the enclosure are non-conducting and may generate an ignition-capable level of electrostatic charge under certain extreme conditions. The user should ensure that the equipment is not installed in location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of electrostatic charge on non-conducting surfaces. Additionally, cleaning of the equipment should only be done with a damp cloth.
11. Substitution of components may impair hazardous location safety.



DECLARATION OF CONFORMITY

Manufacturer:

Neles USA Inc. dba StoneL
26271 US Highway 59
Fergus Falls, Minnesota 56537 USA

Products:

Hawkeye HK Series – Valve Position Sensor

Model - Type	Certificates / Directives / Standards	Marking
HK Series	EU Type Examination Certificate FM10ATEX0035 ATEX 2014/34/EU EN 60079-0:2018, EN 60079-11:2012 EMC 2014/30/EU EN 60947-5-2:2007/A1:2012	 ATEX II 1 G Ex ia IIC T5 Ga
HK Series	EMC 2014/30/EU EN 60947-5-2:2007/A1:2012	

ATEX Notified Bodies for EU Type Examination Certificates:

FM Approvals Europe Ltd., Dublin, Ireland (Notified Body Number 2809)

We declare under our sole responsibility that the products, as described, are in conformity with the listed standards and directives.

Fergus Falls, 28th January 2021



Bryan Beckman, Quality Manager
Authorized Person of the Manufacturer

SPECIFIC CONDITIONS OF USE / MARKING

For HK Series – FM10ATEX0035	
Specific Conditions of Use - Notes	Marking
None	ATEX II 1 G Ex ia IIC T5 Ga Ta = -40°C to +80°C

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