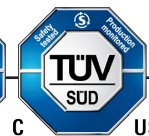
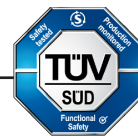


Operating Instructions: Non-Contact Switch



Description

The Non-Contact Switch (NCS) provides a coded, non-contact, safety, proximity switch in a robust package, featuring:

- Stainless steel IP69K housing, ideal for food, beverage and pharmaceutical environments or anywhere hygiene or robustness are paramount.
- PLe Cat 4/SIL3 safety rating.
- Can be used as a coded interlock in accordance with EN14119.
- Based on solid state Hall Effect sensors that do not suffer from vibration and contact bounce. Copes with a high level of misalignment.
- Integrated electronics that monitors for faults and ensure the safety relay does not enter a fault state, irrelevant of the approach direction.
- Local user indication and monitor outputs for use in the control system.
- Available with a variety of termination options; Mating cables are available.



Options & Ordering Information

Description	Part No.
Sensor only with M12 8 pin male connector on 150mm lead	NCS-11SSR-0
Actuator and sensor with M12 8 pin male connector on 150mm lead	NCS-11SSR-A
Sensor only with 2m lead	NCS-21SSR-0
Actuator and sensor with 2m lead	NCS-21SSR-A
Sensor only with 5m lead	NCS-51SSR-0
Actuator and sensor with 5m lead	NCS-51SSR-A
Sensor only with 10m lead	NCS-01SSR-0
Actuator and sensor with 10m lead	NCS-01SSR-A
Actuator only	NCA-SR

Mating Cables

Description	Part No.
2M	Cable-2M-NCS
5M	Cable-5M-NCS
10M	Cable-10M-NCS
20M	Cable-20M-NCS

Important:

The NCS is designed to be used as a component which can be integrated into safety and / or machine control systems. As such the NCS and the systems they are part of, need to be installed and commissioned by suitably competent and qualified personnel, whom have read and understood the whole of this document, prior to commencing the installation. These installation instructions must be retained. A risk assessment must be carried out before installation. This product is not to be used as a mains isolator. When a unit is added to any electrical installation, it must meet the requirements of the applicable local standards, (e.g. IEC or EN). All the voltages used within the connected circuits must be derived from a Safety Extra Low Voltage or Protected Extra Low Voltage power supply (SELV or PELV). Any modification or deviation from these instructions invalidates all warranties. Fortress Interlocks Ltd. accept no liability whatsoever for any situation arising from misuse or misapplication of this product.

Operating Instructions: Non-Contact Switch

Technical Specifications	NCS	Mating Cables
Case	Stainless Steel (EN 1.4435 / AISI 316L)	-
Colour	-	Dark Grey
Ingress Protection	IP69K	IP67
Ambient Temperature	-5°C to + 60°C	-
Supply Voltage	24V DC +10% / -15%	-
Maximum Altitude	2000m	-
Maximum Humidity	50%RH at 70°C	-
Pollution Degree	4	-
Shock (EN60068-2-27)	30gn, 11ms	-
Vibration (EN60068-2-6)	10 to 55Hz, 1mm amplitude, 5min sweep cycle	-
Maximum Operation Speed	7200 operations per minute	-
Potting	Epoxy	-
Cable Grommet	Elastollan C70 A HPM	-
Screw Sleeve	Stainless Steel	Nickel Plated Brass (Cu Zn)
Rated Insulation Voltage	60V	-
Rated Impulse Withstand Voltage	500V	-
Monitor / Fault Output	24V 200mA DC-12	-
Safety Switches	24V 200mA DC-12 AC-12	-
Seal	Viton O-Ring	Viton O-Ring
Cable	PUR	PUR
Overmoulding	PUR	PUR

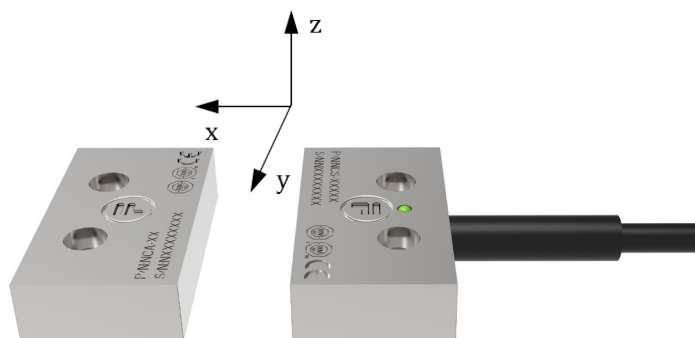
Safety Standards & Safety Related Data	
Standards	IEC 60947-5-3: 2013
	EN ISO 13849-1: 2008
	EN62061:2005/A1: 2012
	ISO 14119:2013
Category	EN ISO13849 PLe category 4
	EN62061 SIL3
	EN ISO 14119 (Type 4 Low Level Coded)
MTTF	High
DCAVG	High
SFF	99%
PFH	1.85×10^{-10}

Operating Instructions: Non-Contact Switch

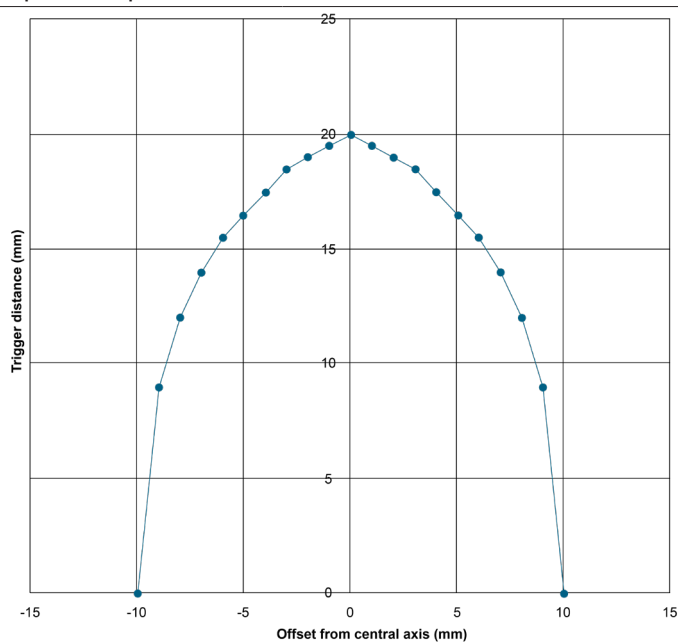
Operating Distances

Operating Distance	20mm
Release Distance	24mm

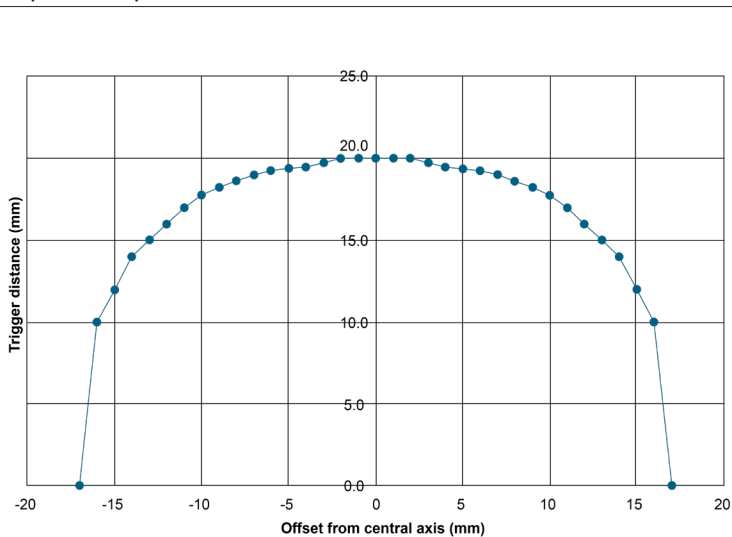
Trigger Point



Operation point in Y direction



Operation point in Z direction



LED Operation

Green	Actuator in detection range
Red	Actuator out of detection range
Amber	Unit in fault state (move actuator fully out of detection zone to reset)

Operating Instructions: Non-Contact Switch

Tools and Fixings Required

4 x M4 Screws

4 x M4 nut / T-nut / Tapped hole

Thread locking compound where appropriate

Driver appropriate to fixing screws used

Spanner appropriate to nuts used (where applicable)

Ø4.5mm for clearance holes in plates when using nuts

Ø3.5mm for tapping plates

M4 tap when tapping plates

Both the sensor and actuator are provided with 2 off M4 clearance holes for fixing with recesses to allow cap head screws to finish below the surface of the unit.

When requested the amGard^{ncs} is provided with an M12, 8pin, male connector; see wiring section for full details. Mating cables are available from a variety of sources or various length cables can be purchased from your Fortress supplier using part number CABLE-_M-NCS see amGard cable datasheet for details.

Mounting

These fixings allow robust mounting in line with requirements of EN14119; please refer to the standard for particular requirements in the application (section 5.3).

The maximum fixing torque is 2.5Nm.

The unit must not be used as a door stop.

Extrusion Mounting

When mounting in extrusion, use 2 off M4 T-nuts (designed for the extrusion used) each for the sensor and actuator. Position t-nuts appropriately and fix with M4 screws.

Plate Mounting (Nuts)

Ensure the plate is at least 3mm thick.

Drill Ø4.5mm holes in plate according to mounting diagram.

Fit with M4 screws using thread locking compound.

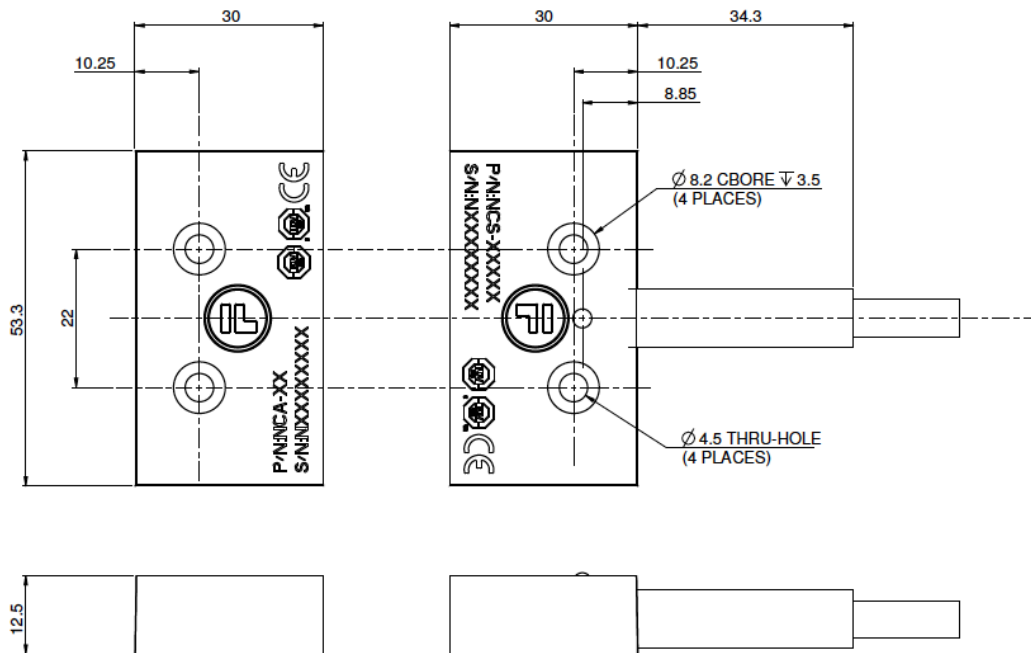
Plate Mounting (Tapping)

Ensure the plate is at least 6mm thick.

Drill Ø3.3mm holes in plate according to mounting diagram and tap.

Fit with M4 screws using thread locking compound.

Figure 1: Dimensional Diagram -



Operating Instructions: Non-Contact Switch

Functional Checking

The following checks must be made during machine commissioning:

1. That the safety evaluation device is placed into the safe state whenever the guard is opened (actuator is outside of the detection zone).
2. The safety evaluation device may be reset when the guard is closed (actuator is in the detection zone).
3. The gate monitor output should output 24V whenever the guard is open (actuator outside of the detection zone) or the unit is in the fault state.
4. The fault output is high whenever the unit is in the fault state (this can be created by moving the actuator into the detection zone then moving one end back out of the detection zone whilst the other end remains in the detection zone. Fully removing the actuator from the detection zone resets the device).
5. The local indicator presents the following behaviour:
 - a. Guard closed (actuator in the detection zone) - Green
 - b. Guard open (actuator outside of the detection zone) - Red
 - c. Unit in fault state - Amber

Electrical Data

All circuits: PELV/SEL

Rated Insulation Voltage: 60V

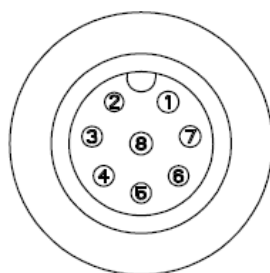
Rated Impulse Withstand Voltage: 500V

The unit is designed to be used in high demand mode.

The unit is intended to be a component in a safety system. See electrical connection for specifications of the evaluation device that should be connected to meet the above conditions.

Electrical Connection

All the voltages used within the connected circuits must be derived from a Safety Extra Low Voltage or Protected Extra Low Voltage power supply (SELV or PELV).



8 PIN QD PIN VIEW

Pin	Colour	Function
1	White	S21
2	Brown	Vs
3	Green	S12
4	Yellow	S22
5	Grey	Gate monitor
6	Pink	S11
7	Blue	0V
8	Red	Fault output

Operating Instructions: Non-Contact Switch

Connector	Parameter	Value
Vs		24V DC +10%/-15%
S11 ¹ S12 S21 S22	Max Current	50mA DC-12 or AC-12
	Max Voltage	24V
Fault /Gate ² Monitor	Max Current	200mA DC-12
	Max Voltage	24V

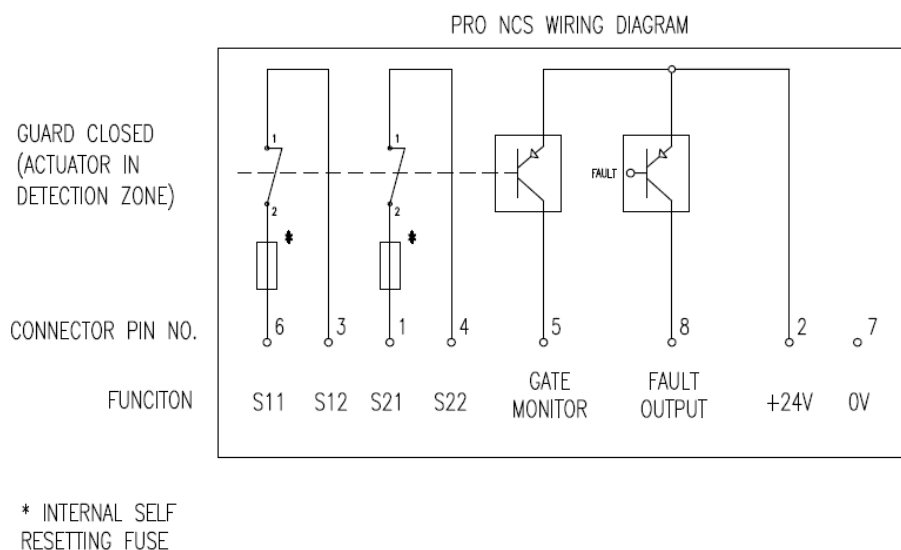
¹Clean contacts from SSR for connection to safety evaluation device. Protected by internal 200mA resettable fuse.

²Outputs are derived from supply voltage Vs. They are internally overcurrent current protected.

In order to achieve the listed safety rating the unit must be connected to an appropriate safety evaluation device with the following specification:

1. External evaluation devices must monitor that both safety circuits exhibit high impedance before it can leave the safe state.
2. External system design or evaluation device must monitor short circuit between the two channels.
3. The evaluation device should have a DC of 99%

Figure 2: Wiring Diagram -



Service and Inspection

Regular inspection of the following is necessary to ensure trouble-free, lasting operation:

- Correct operating function
- Secure mounting of components
- Debris and wear
- Sealing of cable entry
- Loose cable terminals or plug connectors
- WD40 lubricant or equivalent, should be applied to each mechanical element every 10,000 operations, or sooner, to ensure smooth product operation and function. There are no user serviceable parts in this product. If damage or wear is found with an assembly, please contact your local Fortress channel partner. The complete interlock must be replaced after 1 million switching operations.

Disposal

This product does not contain any certified hazardous materials so should be disposed of as industrial waste. Electrical items should not be disposed of in general waste and must be appropriately recycled.

Operating Instructions: Non-Contact Switch

Liability Coverage is Voided Under the Following Conditions:

- If these instructions are not followed.
- Non-compliance with safety regulations.
- Installation and electrical connection not performed by authorised personnel.
- Non-implementation of functional checks.

Protection Against Environmental Influences

A lasting and correct safety function requires that the device be protected against the ingress of foreign bodies such as swarf, sand, blasting shot, etc. The device is to be mounted away from the machine, or by the use of anti-vibration mountings, in order to avoid the effects of vibration, shock and bump.

Use in Dusty Environments: Careful product selection is required, which is best performed under the guidance of a Fortress Representative, in order to assess the dust type and product style required. It is normally accepted that the product performs best in a dusty environment when mounted upside down.

Use in Corrosive Environments: Careful product selection is required, which is best performed under the guidance of a Fortress Representative.

The manufacturer reserves the right to modify the design at any time and without notice.

This guide should be retained for future reference.