



FUNCTIONAL SAFETY CERTIFICATE

This is to certify that the

2CCP Cable Pull Safety Switch

manufactured by

Honeywell International Inc.

315 E Stephenson Street
Freeport
Illinois
IL 61032
USA

have been assessed by Sira Certification Service with reference to the CASS methodologies and found to meet the requirements of

IEC 61508-2:2010 Routes 1_H & 1_S Systematic Capability (SC2)

as an element/subsystem suitable for use in safety related systems performing safety functions up to and including

**SIL 2 capable with HFT=0 (1oo1)*
SIL 3 capable with HFT=1 (1oo2)***

when used in accordance with the scope and conditions of this certificate.

* This certificate does not waive the need for further functional safety verification to establish the achieved Safety Integrity Level (SIL) of the safety related system

Certification Decision:

James Lynskey

Initial Certification : 14/02/2020
This certificate re-issued : 14/02/2020
Renewal date : 13/02/2025

This certificate may only be reproduced in its entirety, without any change.



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Product description and scope of certification

The 2CCP Series Cable Pull Safety Switch is a dual head-ropes pull switch intended for Conveyor applications and machine perimeter/multiple e-stop replacement in industrial machinery. The 2CCP is available in either single actuator or dual actuator versions.

The direct acting switch contacts are held closed when the actuating cable is under proper tension and the reset knob is set to RUN. When the actuating cable is pulled, slackened or broken, a cam positively opens the NC (Normally Closed) switch contacts. The snap action, trip operation causes the switch contacts to change state and mechanically latch almost simultaneously when the cable is pulled, slackened or broken. The NC switch contacts remain open until the 2CCP is reset by properly tensioning the cable and manually rotating the reset knob.

When the direct acting switch contacts open, the auxiliary contacts also actuate (open contacts close and closed contacts open). The auxiliary contacts are electrically isolated from the direct acting switch contacts. These NO (Normally Open) contacts may be used for monitoring or signaling.



Figure 1: Typical Assembly of the Cable Pull Safety Switch (2CCP Series)

Element Safety Function

The safety function of the certified equipment is:

To open a normally closed switch contact when an actuating cable is pulled, the actuating cable is slackened or the E-Stop is depressed.



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Certified Data in support of use in safety functions

The assessment has been carried out with reference to the *Conformity Assessment of Safety-related Systems* (CASS) methodology using the Route 1_H approach.

As part of the product assessment and supporting evidence of conformity in with respect to 'hardware safety integrity' against the requirements of IEC 61508-2; Honeywell International have submitted the Cable Pull Safety Switch (2CCP Series) for FMEA assessment to attain SIL capability. The component failure rates and modes for the Cable Pull Safety Switch (2CCP Series) have been extracted from or calculated using Quanterion Automated Databook. Table 2 summarises the FMEA assessment for the Cable Pull Safety Switch (2CCP Series).

Table 1: FMEA Summary for the Cable Pull Safety Switch (2CCP Series)

<u>Safety Function:</u>			
<i>To open a normally closed switch contact when an actuating cable is pulled, the actuating cable is slackened or the E-Stop is depressed.</i>			
Summary of IEC 61508-2 Clauses 7.4.2 and 7.4.4		Cable Pull Safety Switch (2CCP Series)	
		1001	1002
Architectural constraints & Type of product A/B		HFT = 0 Type A	HFT = 1 Type A
Safe Failure Fraction (SFF)		70%	70%
Random hardware failures: [h ⁻¹]	λ_{DD} λ_{DU}	0.00E+00 3.06E-07	0.00E+00 3.06E-07
Random hardware failures: [h ⁻¹]	λ_{SD} λ_{SU}	0.00E+00 7.17E-07	0.00E+00 7.17E-07
Diagnostic coverage (DC)		0%	0%
PFD @ PTI = 8760 Hrs. MTTR = 8 Hrs.		1.34E-03	1.36E-04
Probability of Dangerous failure (High Demand - PFH) [h ⁻¹]		3.06E-07	3.13E-08
Hardware safety integrity compliance		Route 1 _H	Route 1 _H
Systematic safety integrity compliance		Route 1 _S See report R70216114B	Route 1 _S See report R70216114B
Systematic Capability (SC1, SC2, SC3, SC4)		SC 2	SC 2
Hardware safety integrity achieved		SIL 2	SIL 3



Note 1: The failure data:

- 1) The PFD_{AVG} figure shown is for illustration only assuming a proof test interval of 8760 hours and MTTR of 8 hours. Refer to IEC 61508-6 for guidance on PFD_{AVG} calculations from the failure data.
- 2) The verified failure rates used in the safe failure fraction and diagnostic coverage do not include (λ no parts or no effect) failures in the calculation.

The failure data above is supported by the base information given in Table 2 below.

Table 2: Base information for the Cable Pull Safety Switch (2CCP Series)

1	Product identification:	Cable Pull Safety Switch (2CCP Series)
2	Functional specification:	<i>To open a normally closed switch contact when an actuating cable is pulled, the actuating cable is slackened or the E-Stop is depressed.</i>
3-5	Random hardware failure rates:	Refer to table 1 of this certificate.
6	Environment limits:	Operating temperature: -40 to +85 °C.
7	Lifetime/replacement limits:	375,000 operations
8	Proof Test requirements:	Refer to safety manual
9	Maintenance requirements:	Refer to safety manual
10	Diagnostic coverage:	0% diagnostic coverage
11	Diagnostic test interval:	Refer to safety manual
12	Repair constraints:	Refer to safety manual
13	Safe Failure Fraction:	70%
14	Hardware fault tolerance (HFT):	See Table 1 above
15	Highest SIL (architecture/type A/B):	Type A, SIL2.
16	Systematic failure constraints:	The hardware safety integrity assessment was based on a proof test interval of 1 year
17	Evidence of similar conditions in previous use:	Not applicable
18	Evidence supporting the application under different conditions of use:	Not applicable
19	Evidence of period of operational use:	Not applicable
20	Statement of restrictions on functionality:	See systematic report R70216114B
21	Systematic capability (SC1, SC2, SC3)	SC2 - See systematic report R70216114B
22	Systematic fault avoidance measures:	Compliance with techniques and measures from IEC 61508-2 Annex B to SIL 2 - See systematic report R70216114B
23	Systematic fault tolerance measures:	Compliance with techniques and measures from IEC 61508-2 Annex A to support the SFF achieved – see hardware safety integrity report R70216114A
24	Validation records:	All documents that have been used in support of the hardware have been documented in section 5.24 of report R70216114A; this includes the FMEA document and insertion tests.

Management of functional safety

The assessment has demonstrated that the product is supported by an appropriate functional safety management system that meets the relevant requirements of IEC 61508-1:2010 clause 6, see report R70216114B.

Identification of certified equipment

The certified equipment and its safe use is defined in the manufacturer's documentation listed in Table 3 below.



Table 3: Certified documents

Document no.	Rev	Date	Document description
2CCP SERIES CHART 1, Type E	D	13/01/2020	Engineering Drawing
2CCP SERIES CHART 1 , Type I	A	15/04/2019	Installation Drawing
32344326-001	A	N/A	Installation Instructions

Conditions of Certification

The validity of the certified base data is conditional on the manufacturer complying with the following conditions:

1. The manufacturer shall analyse failure data from returned products on an on-going basis. Sira Certification Service shall be informed in the event of any indication that the actual failure rates are worse than the certified failure rates. (A process to rate the validity of field data should be used. To this end, the manufacturer should co-operate with users to operate a formal field-experience feedback programme).
2. Sira shall be notified in advance (with an impact analysis report) before any modifications to the certified equipment or the functional safety information in the user documentation is carried out. Sira may need to perform a re-assessment if modifications are judged to affect the product's functional safety certified herein.
3. On-going lifecycle activities associated with this product (e.g., modifications, corrective actions, field failure analysis) shall be subject to surveillance by Sira in accordance with 'Regulations Applicable to the Holders of Sira Certificates'.

Conditions of Safe Use

The validity of the certified base data in any specific user application is conditional on the user complying with the following conditions:

1. The user shall comply with the requirements given in the manufacturer's user documentation in regard to all relevant functional safety aspects such as application of use, installation, operation, maintenance, proof tests, maximum ratings, environmental conditions, and repair.
2. Selection of this product for use in safety function and the installation, configuration, overall validation, maintenance and repair shall only be carried out by competent personnel, observing all the manufacturer's conditions and recommendations in the user documentation.
3. All information associated with any field failures of this product should be collected under a dependability management process (e.g., IEC 60300-3-2) and reported to the manufacturer.
4. The safety device is to have an independent power supply, it must not share the same power supply as non-safety devices that may cause a fault to the safety device.
5. A proof test interval of 1 year.

General Conditions and Notes

1. This certificate is based upon a functional safety assessment of the product described in Sira Test & Certification Assessment Report R70216114A and any further reports referenced (R70216114B).
2. If the certified product or system is found not to comply, Sira Certification Service should be notified immediately at the address shown on this certificate.



3. The use of this Certificate and the Sira Certification Mark that can be applied to the product or used in publicity material are subject to the 'Regulations Applicable to the Holders of Sira Certificates' and 'Supplementary Regulations Specific to Functional Safety Certification'.
4. This document remains the property of Sira and shall be returned when requested by the issuer.
5. No part of the Functional safety related aspects stated in the instruction manual shall be changed without approval of the certification body.
6. This certificate will remain valid subject to completion of two surveillance audits within the five year certification cycle, and upon receipt of acceptable response to any findings raised during this period. This certificate can be withdrawn if the manufacturer no longer satisfies scheme requirements.

Certificate History

Issue	Date	Report no.	Comment
0	14/02/2020	R70216114A R70216114B	The release of prime certificate.

Additional Manufacturing Locations

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 Mexico, 32630

