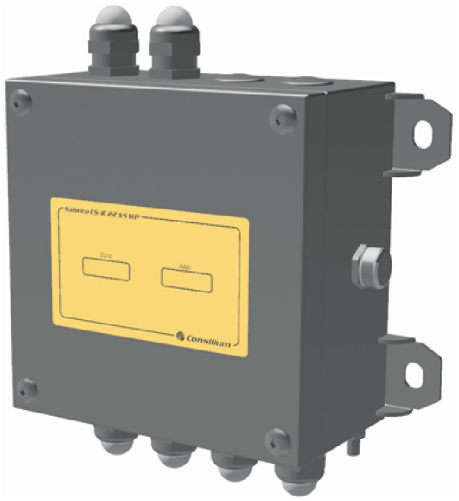

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Input/Output Loop Unit
CS-IC22 SS WP

Part no. 5210067-00A

System: CFD5000 T

General description

The CS-IC22 SS WP is an input and output unit for various integration of safety inputs/outputs. It has been designed for use in harsh and corrosive environments and to comply with the standards for the industrial, maritime, offshore and rolling stock markets up to Safety Integrity Level 2 (SIL 2).

The CS-IC22 SS WP has two inputs that can be connected to external equipment with a dry relay contact. The CS-IC22 WP supervises the cable to the external equipment for cable break and short circuit, and the inputs can be configured as active high or active low. The function of the inputs can be configured to be:

- a general input
- a fault
- an alarm from a manual call point
- an alarm from a smoke sensor
- an alarm from a heat sensor
- an alarm from a flame sensor
- an alive signal (output)

The CS-IC22 SS WP can control and monitor external devices, such as fire doors, fire dampers, sprinklers, hatches etc. The outputs on the CS-IC22 SS WP can be configured to be activated when there is a fire, fault, disablement or input condition locally on the loop-line.

Features:

- Two dry relay contact outputs, used as safety relays for external control
- Two configurable I/O – they can either be 'remote indication' outputs, alive signals or dry contact inputs
- Handling of short circuits and cable breaks on the loop-line
- Stainless steel enclosure IP66

Local intelligence via an integrated CPU

The integrated CPU makes it possible to make decisions locally, like evaluation of the alarm condition.

IDAxt protocol

The IDAxt protocol is an extension of Consilium's communication protocol (IDA) and meets the demands on data integrity, reliability and robustness required for use in SIL 1 and SIL 2 safety functions and safety systems.

Periodic BIST

The Periodic Built-In Self-Test is a central mechanism which the system uses to ensure long proof test intervals.

Countermeasures (defences) have been implemented in order to address the fault modes (threats) in the fire detection system. These countermeasures are done in order to increase the confidence in the system.

The system has two types of Built-In Self-Tests (BIST). The first BIST is made continuously; for instance when reading A/D values from hardware. This typically involves evaluation of the read value to determine if the hardware is broken; i.e. gives measurements outside an acceptable interval.

The second BIST is the Periodic Built-In Self-Test (Periodic BIST) which is made once every five minutes in order to verify the safety function by testing communication paths. All internal

communication paths and all testable parts of the loop-units are included in the Periodic BIST mechanism, to verify the whole path from detection to reporting (fire) status.

The system creates a log with the results of the Periodic BIST. This log can be extracted from the system with a USB memory stick.

Short Circuit Isolator (SCI)

The built-in SCI isolates short circuits on the loop-line and also has a probe function for evaluating a short circuit. The SCI ensures that the fire detection system does not lose contact with the loop units when there is one short circuit on the loop-line. The probe function makes it possible to reset the short circuit condition without restart of the loop-line.

Data

Operating voltage	22–38 VDC
Operating current:	
- Normal condition	0.1 mA ± 5%
- Alarm condition with LED activated	3 mA ± 5%
Sub-Loop (Remote indication, supervised dry-contact reading)	Current limited: 5 mA
Loop communication protocol	IDAxt
Relay output	30 VDC, max 1 A resestive load
Operating temperature	-40 °C to +70 °C
Storage temperature	-50 °C to +70 °C
Relative humidity	≤ 95 % RH non-condensing
Addressing method	DIP switch
Ingress protection	IP66
Cable gland	M20 for cable ø 6–13mm Material: Nickel plated brass
Cable terminals	2.5 mm^2
Material	Enclosure: Stainless steel AISI 304 Gasket: Polyurethane and Silicone
Weight	1 kg ± 5%
Colour	Polished surface
Loop cable requirement	See the Installation & Commissioning manual
Approvals	EN 50155, EN 45545-2 CE

Functional Safety Data

Type	B
HFT	0
SFF	92 %
PFD_{avg}	3.24×10^{-4}

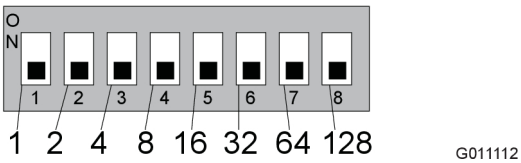
PFD_{avg} is calculated for MTTR 8 h and proof test interval 1 year.
Suitable for use in SIL 1 and SIL 2 environments.

Data for built-in Short Circuit Isolator (SCI)

Ic max (Maximum Continuous current)	500 mA
Is max (Maximum Switching current)	800 mA
Current when short circuited (IL max)	< 1 mA
Open to Close voltage	22 ± 2 VDC
Open to Close, maximum load expressed in ohms on the non-energized side	≈1.2 kΩ
Close to Open voltage	14 ± 2 VDC

Address switch

The loop units are identified by a physical address. The address number is set on an 8 pole DIP switch located on the loop unit. (For settings use a pointed tool of suitable size.)



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1 to 150 are valid addresses. The DIP switch value follows the binary system.

Location of DIP switches

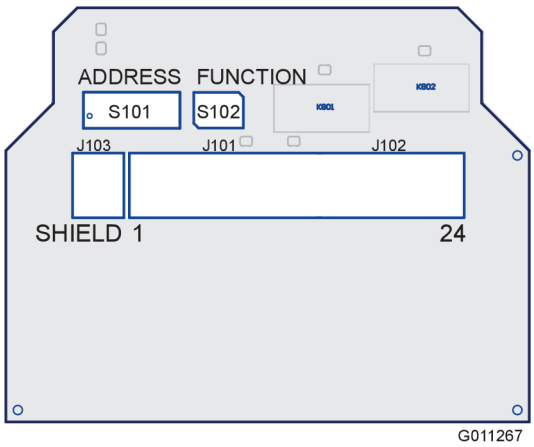


Figure 1. Location of DIP switches and terminals on the PCB

Address switch S101 (8 pole) for the loop address.

Function switch S102 (4 pole) is factory set and will not be used for current operation modes. Do not change !

Terminals

	Cable shield
1 +	Loop
2 -	Loop/SCI
3 +	Loop
4 -	Loop/SCI
5 +	Sub-loop 1, High
6 -	Sub-loop 1, Low
7 +	Sub-loop 2, High
8 -	Sub-loop 2, Low
11 C	Relay output 1
12 NC	
14 NO	
21 C	Relay output 2
22 NC	
24 NO	

Configuration of Safe I/O and Safe Relay

The CS-IC22 has:

- two configurable input/outputs, called Safe I/O
- two relay contact outputs, called Safe Relay

Table 1. The allowed configurations of Safe I/O

Safe I/O		**Active High/Low**	**Monitored 1)**	**CS-IC22**
Input	Alarm[2)]	H/L	X	X[3)]
	Fault	H/L	X	X[4)]
	General	H/L	X	X
Output	Alive signal	NA		X
	Remote Indication (RIL)	NA		

1) Monitored for cable break and short circuit.

2) A Safe I/O configured as an Alarm input can be assigned the alarm sub-types: 'Smoke', 'Heat', 'Flame' and 'MCP'.

3) Only one alarm input per CS-IC22 is allowed.

4) Only one fault input per CS-IC22 is allowed.

Table 2. The allowed configurations of Safe Relay

Safe Relay		**Active High/Low**	**Monitored**	**CS-IC22**
Output	Fire	H		
	Fault	L		X
	Disable-ment	H		
	General	H/L		X

Connection examples

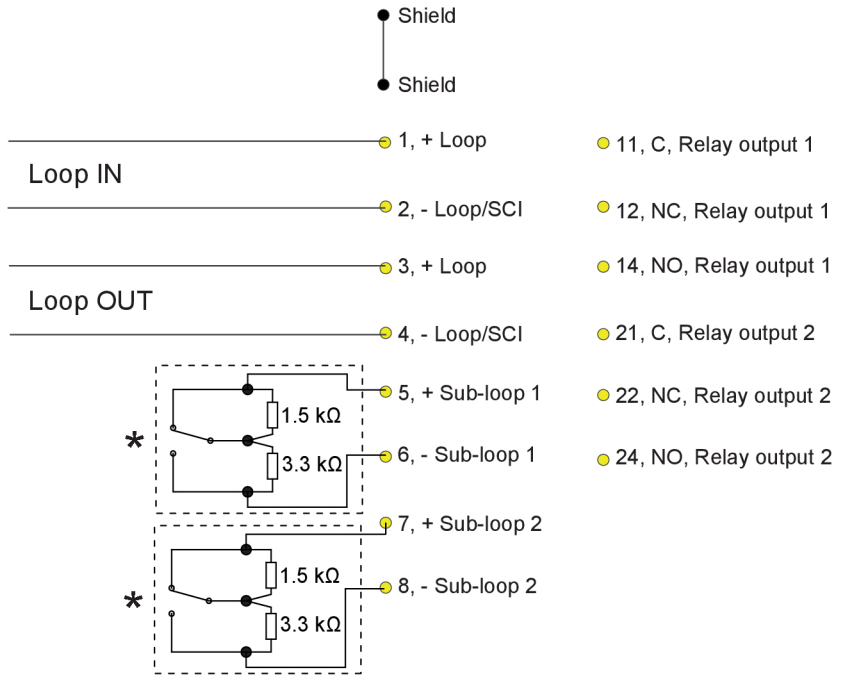


Figure 2. Terminals J101, J102 and J103

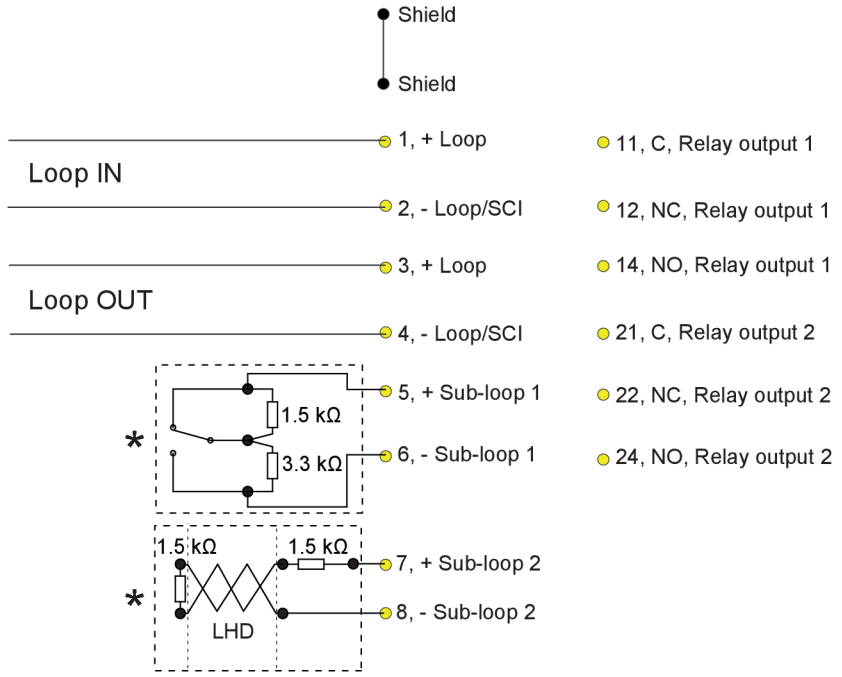


Figure 3. Linear Heat Detection (LHD) cable

* External connection shown in normal not active state

NOTE!
If a shielded cable is used on the sub-loop it shall only be terminated at one end. If the shield is terminated in the I/O unit it is connected to the shield terminal, this is only possible if the loop line is shielded.

External earth connection

The external earth connection on the enclosure shall be connected to earth. For more information see the Installation & Commissioning manual.

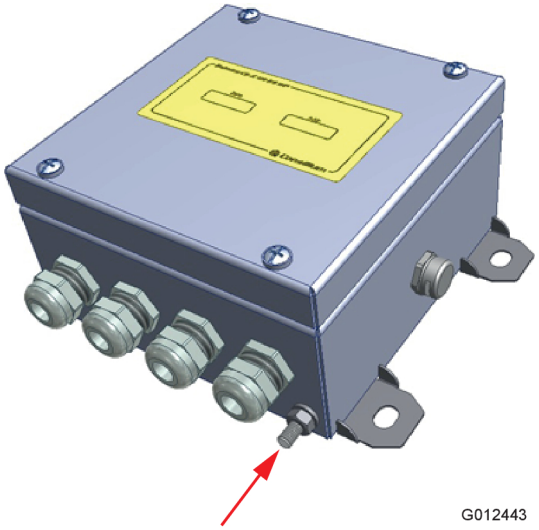
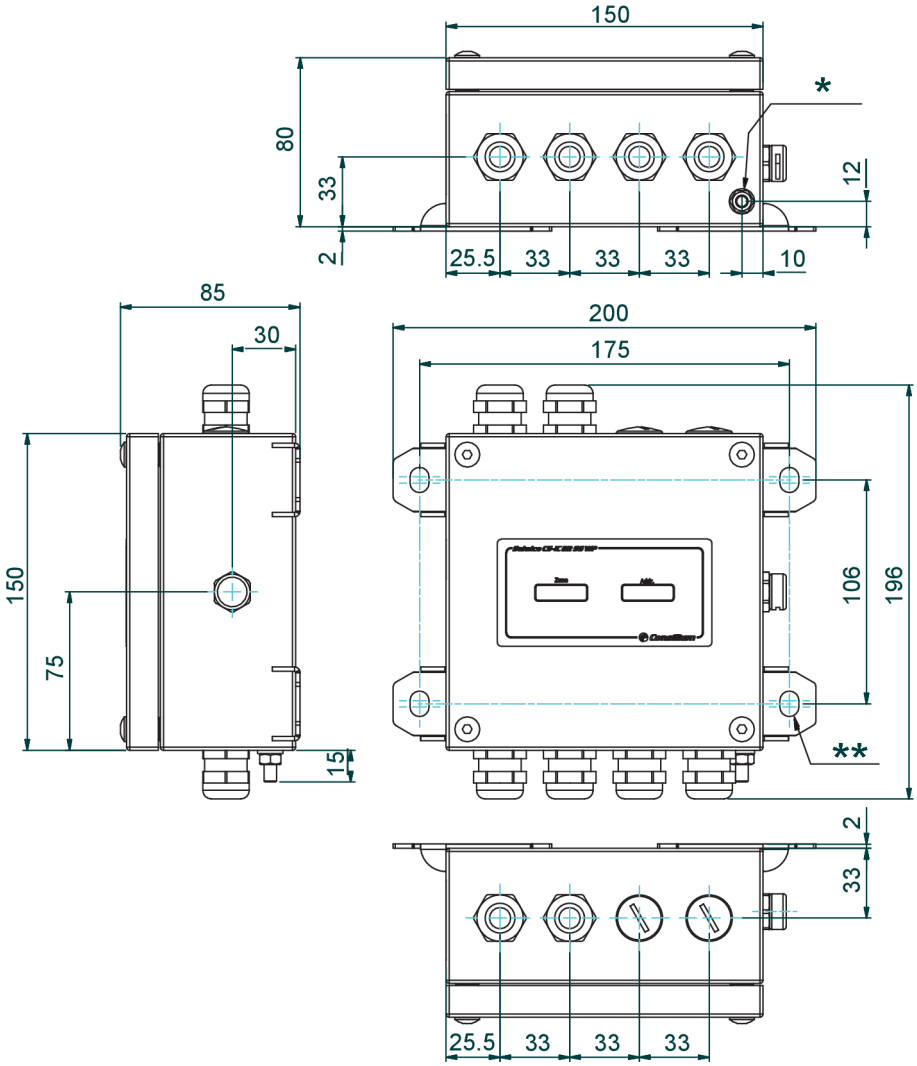


Figure 4. The M6 external earth connection

Dimensions (mm)



* **M6 external earth connection**

** **Holes for wall mounting (x4)**: Max screw thread M8

CAUTION!
Do not use electrical screwdriver.
Maximum torque 2 Nm.