SWD® Safety Hub

Interconnection hub

Instruction manual

Version 1-a – Original version

ez-Wheel®
A brand of the **IDEC Corporation Group**

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1. About this document

1.1. Who is this manual for?

This manual is dedicated to any user of the ***SWD® Safety Hub*** who intends to use it in a system using a pair of ***SWD®*** drives or wheel drives, a Safety laser scanner and emergency stops.

1.2. Additional resources

- ***SWD®*** Instruction Manual available on the website: https://ez-wheel.com/en/resources
- 2D and 3D mechanical drawings

1.3. Disclaimer

APEM SAS
IDEC Mobility Solutions division
LE MOULIN DE L'ABBAYE - 135 ROUTE DE BORDEAUX
16400 LA COURONNE – FRANCE

2. Prerequisites

To ensure the safe and effective use of the ***SWD® Safety Hub***, it is essential that only qualified personnel operate or interact with the product.

Required knowledge and competencies:

- Electrical fundamentals: understanding of voltage, current, resistance, and safe handling of electrical components.
- Automation systems: familiarity with industrial automation environments.
- Wiring and circuit design: ability to read and interpret electrical schematics and safely connect components.
- Risk awareness: knowledge of electrical hazards, including short circuits, electric shock, and arc flash risks.
- Standards compliance: awareness of relevant safety standards and regulations (e.g., IEC, ISO, or local equivalents)

3. Product overview

The ***EW9Z-2HUB1 SWD® Safety Hub*** is designed for use in Automated Guided Vehicles (AGVs), Automated Guided Carts (AGCs), and Autonomous Mobile Robots (AMRs). It serves as a centralized interface for intuitive connectivity, supporting efficient system architecture and reducing the risk of wiring errors.

Figure 1 - SWD® Safety Hub side view

⚠ Electrical safety notice ⚠

The ***SWD® Safety Hub*** contains exposed 24VDC and GND stud terminals. These terminals are designed to handle high current levels and are positioned with a short distance between them, which increases the risk of accidental electric shock or short circuit.
To ensure your safety and the proper functioning of the equipment, please observe the following precautions:

- Avoid placing conductive materials (e.g., tools, metal parts, wires) near the terminals.
- Ensure proper insulation and secure connections when interfacing with the terminals.
- Only qualified personnel should perform maintenance or modifications.
- Always disconnect power before servicing or adjusting wiring.

Failure to follow these precautions may result in equipment damage.

The Safety Hub is used in a wired architecture which may include the following components:

- 2x ***SWD®***
- 1x 24VDC Power source
- 1x CAN controller (e.g. IPC or PLC)
- 1x Safety Sensor (e.g. a Safety Laser scanner)
- Emergency Stops
- Cables with M12 and M8 connectors

An architecture synoptic using the ***SWD® Safety Hub*** is available in the ***SWD® Starter Kit*** Instruction manual: https://ez-wheel.com/en/resources.

It will show how the components can be used and wired using the above components.

4. Connectors

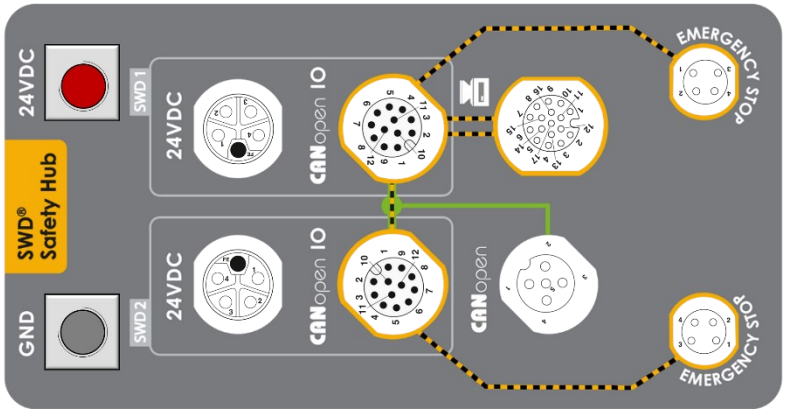


Figure 2 - SWD® Safety Hub connectors

Legend:

(FE) Mechanical mass

24V DC; *M5 thread*

GND; *M5 thread*

CAN signal

Safety Signals

24VDC; *M12 female, 4-pin + FE, L-coded*

CANopen **IO;** *M12 male, 12-pin, A-coded*

Safety Laser Scanner; *M12, 17-pin, A-coded*

CANopen; *M12 female, 5-pin, A-coded*

Emergency Stop; M8 female, 4-pin, A-coded

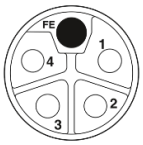
4.1. Power Supply connectors (GND, 24VDC)

The GND & 24VDC connectors are Power One Bush vertical blind hole, M5.
They are used to connect the battery connector to power supply the system.

4.2. 24VDC connector (SWD1 and SWD2)

The 24VDC connectors are of type M12, 4-pin + FE, L-coded, female.
They are used to supply the power to the ***SWD®***.

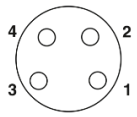
Pin #	Designation	i
1	24 VDC Power supply (16A)	*Usually supplies SWD®*
2	24 VDC Power supply (16A)	*Usually supplies SWD®*
3	GND Power Supply (16A)	*Usually supplies SWD®*
4	GND Power Supply (16A)	*Usually supplies SWD®*
FE	Mechanical earth connected to the chassis	



4.3. Emergency stop connectors

The Emergency stop connectors are of type M8, 4-pin, A-coded, female.
They are used to connect two normally closed switches, from an E-Stop button for instance (2NC type).

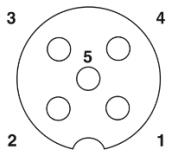
Pin #	Designation	i
1	SW1 NC1	*Usually 24 VDC input*
2	SW1 NC2	
3	SW2 NC1	*Usually 24 VDC input*
4	SW2 NC2	



4.4. CANopen connector

The CANopen connector is a M12, 5-pin, A-coded, female. It is used to connect the CAN bus to the controller.

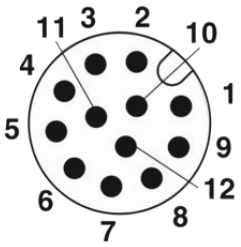
Pin #	Designation	i
1	Mechanical mass (FE)	
2	24 VDC output power supply (4A)	*Usually supplies IPC*
3	GND output power supply (4A)	*Usually supplies IPC*
4	CAN High	
5	CAN Low	



4.5. SWD1 CANopen IO connector (usually SWD left)

The CANopen IO connectors are of type M12, 12-pin, A-coded, male.
They are used to connect the safe Inputs/Outputs of the safety devices, such as the emergency buttons, the safety laser scanner and the ***SWD®***.

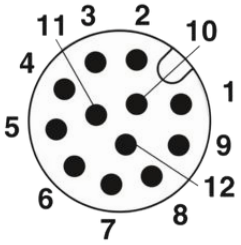
Pin #	Designation	i
1	CAN High	
2	SWD1_SAFE_IN_4	*Usually OSSD4 to SWD INSafe_4*
3	CAN Low	
4	24 VDC output power supply (2A)	
5	STO_1	*Usually from emergency stop SW1 NC2*
6	*GND output power supply (2A)*	*Not connected*
7	SWD1_SAFE_IN_1	*Usually OSSD1 to SWD INSafe_1*
8	STO_2	*Usually from emergency stop SW2 NC2*
9	SWD1_SAFE_IN_3	*Usually OSSD3 to SWD INSafe_3*
10	SWD1_SAFE_IN_2	*Usually OSSD2 to SWD INSafe_2*
11	*GND - unused*	*short-circuited*
12	*ON - unused*	



4.6. SWD2 CANopen IO connector (usually SWD® right)

The CANopen IO connectors are of type M12, 12-pin, A-coded, male.
They are used to connect the safe Inputs/Outputs of the safety devices, such as the emergency buttons, the safety laser scanner and the ***SWD®***.

Pin #	Designation	i
1	CAN High	
2	*SWD2_SAFE_IN_4*	
3	CAN Low	
4	24 VDC output power supply (2A)	
5	STO_1	*Usually from emergency stop SW1 NC2*
6	*GND output power supply (2A)*	*Not connected*
7	*SWD2_SAFE_IN_1*	
8	STO_2	*Usually from emergency stop SW2 NC2*
9	*SWD2_SAFE_IN_3*	
10	*SWD2_SAFE_IN_2*	
11	*GND - unused*	*short-circuited*
12	*ON - unused*	

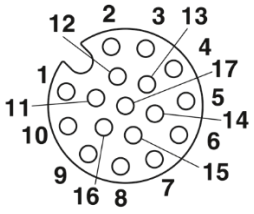


4.7. Safety Laser Scanner connector

The laser scanner connector is used to connect the Safe Inputs/Outputs between the laser scanner and the ***SWD®***. It is also used to supply the power for the safety laser scanner.

The Safety Laser Scanner connector is of type M12, 17-pin, A-coded, female.

Pin #	Designation	i
1	24 VDC	*Usually supplies SE2L*
2	GND	*Usually supplies SE2L*
3	SWD1_SAFE_IN_1	*Usually OSSD1*
4	SWD1_SAFE_IN_2	*Usually OSSD2*
5	-	*Not connected*
6	SWD2_SAFE_IN_1	
7	SWD2_SAFE_IN_2	
8	-	*Not connected*
9	SWD1_SAFE_IN_3	*Usually OSSD3*
10	SWD1_SAFE_IN_4	*Usually OSSD4*
11	SWD2_SAFE_IN_3	
12	SWD2_SAFE_IN_4	
13	-	*Not connected*
14	-	*Not connected*
15	-	*Not connected*
16	-	*Not connected*
17	-	*Not connected*



5. Mechanical characteristics

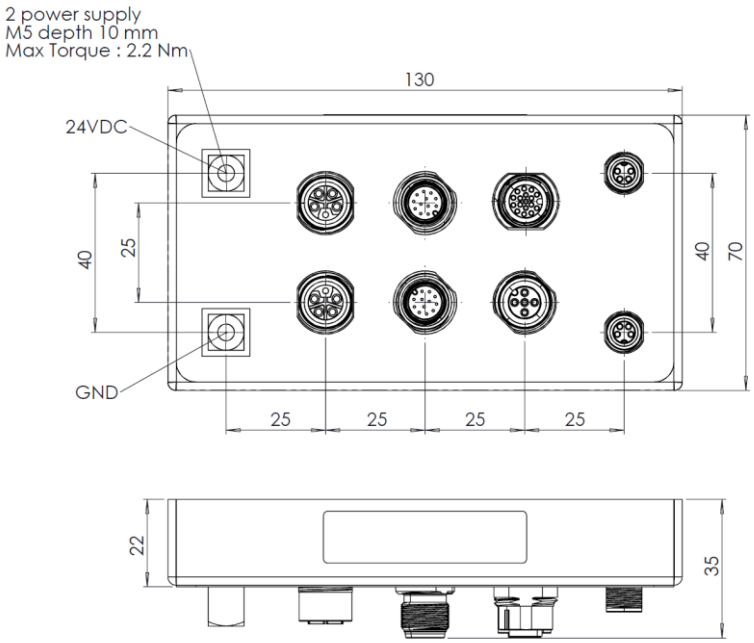


Figure 3 - Dimensions and overall dimensions

The ***SWD® Safety Hub*** can be mounted with 4 screws from its back. The fixations are also used to connect the mechanical and electrical ground.

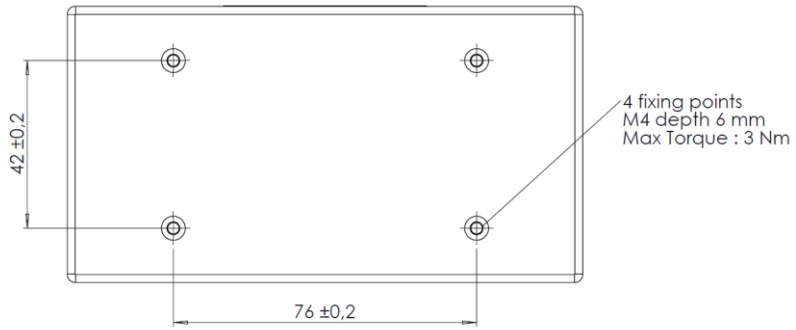


Figure 4 - Layout for integration

For further details on the mechanical integration, please download the technical drawings of the ***SWD® Safety Hub*** from the website: https://ez-wheel.com/fr/accessoires-ez-wheel

6. Overall pinout and schematic

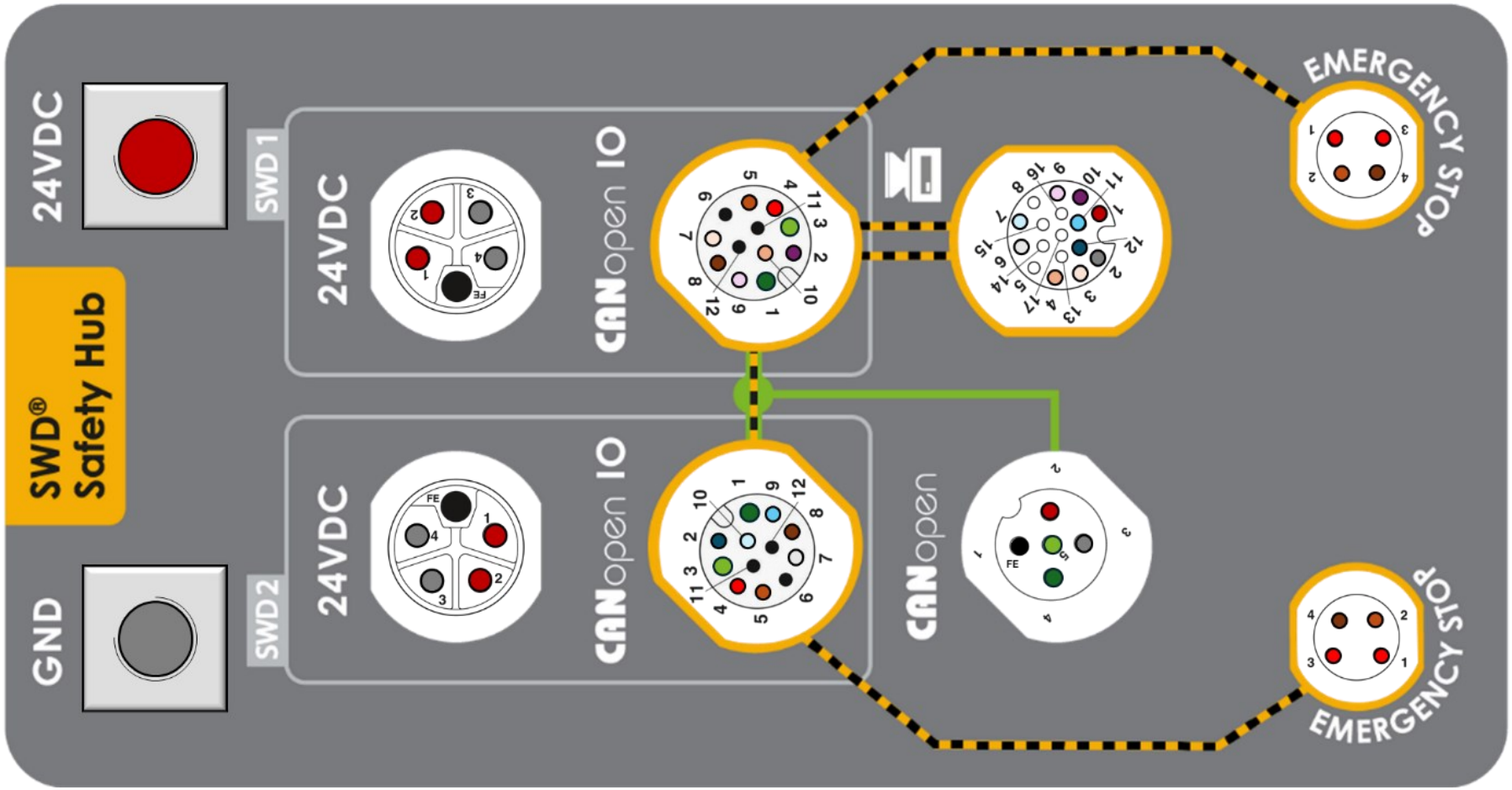


Figure 5 - Overall pinout

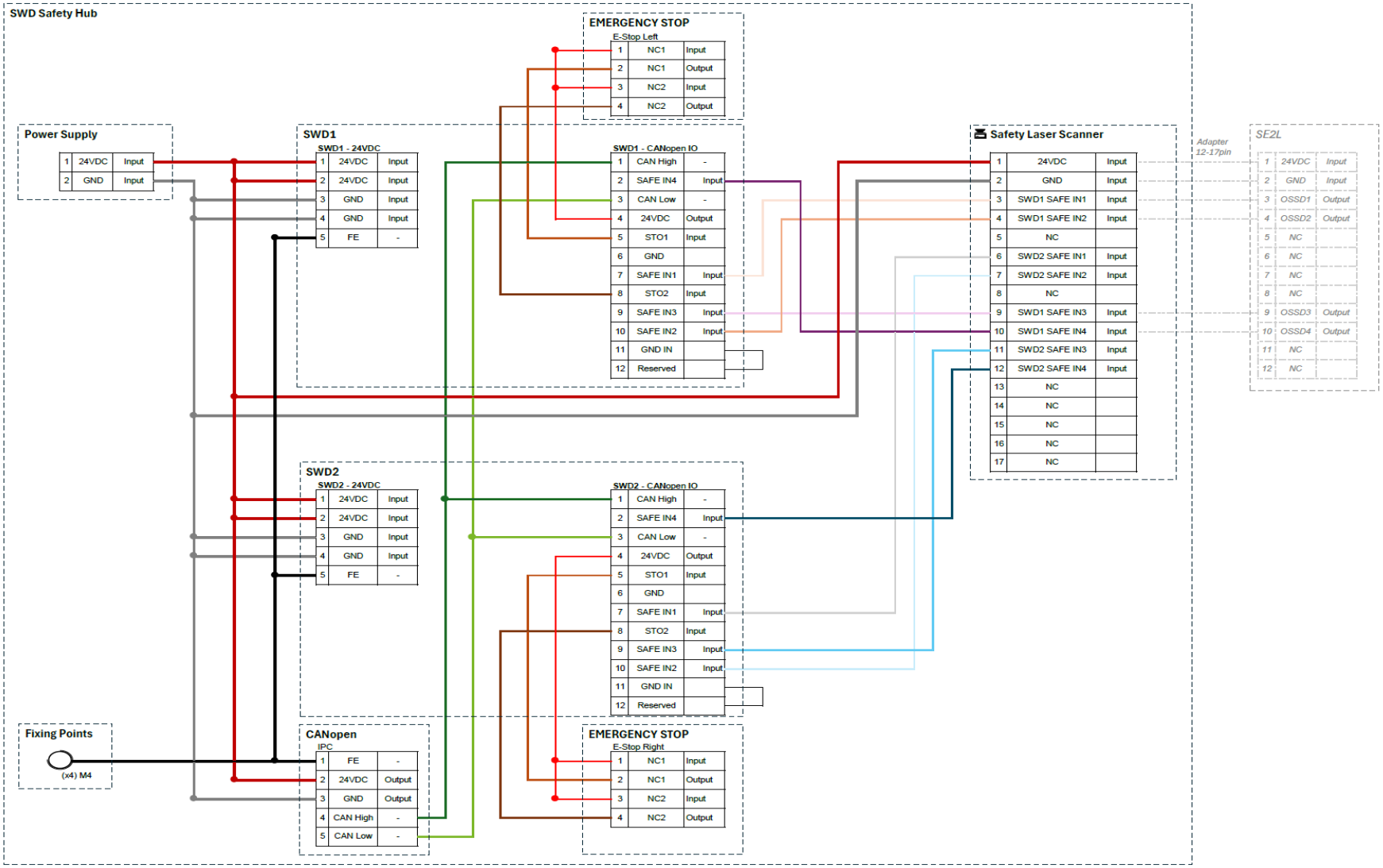


Figure 6 - Schematic

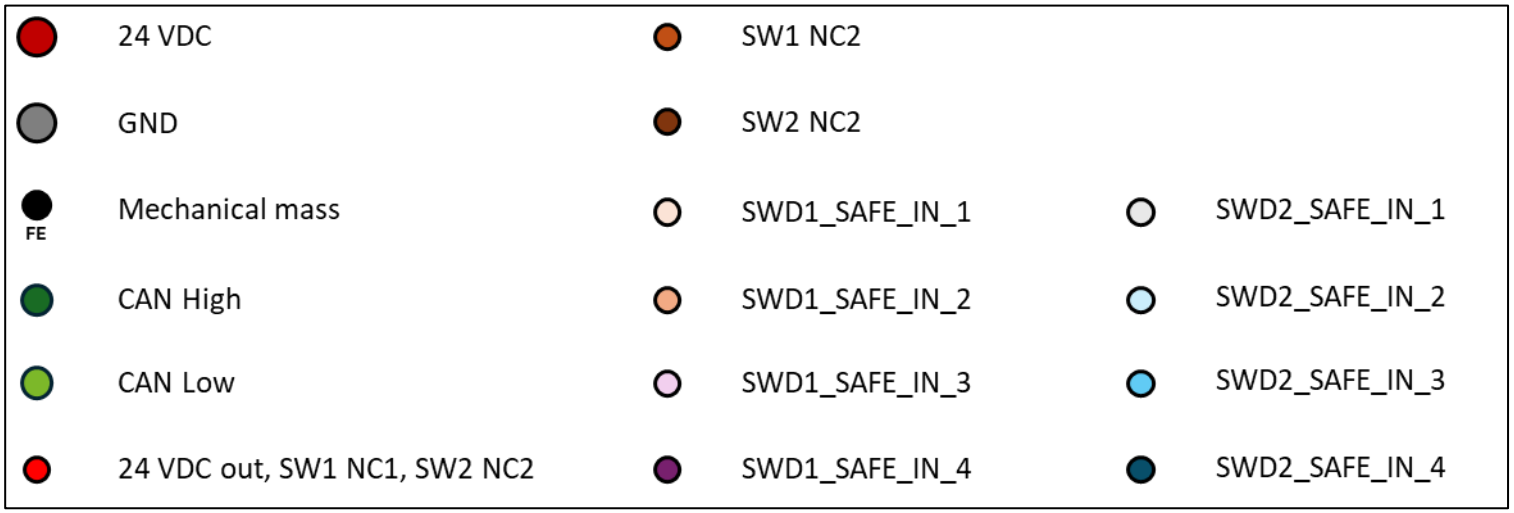
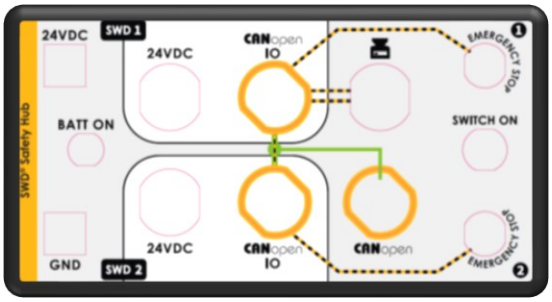
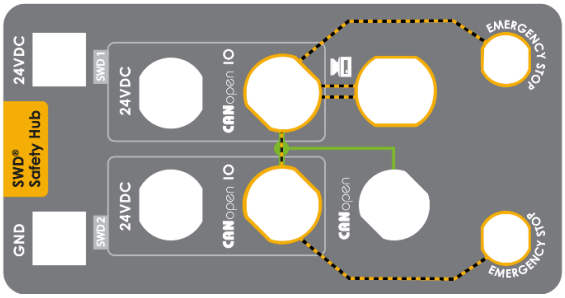


Figure 7 - Legend for colours

APPENDICE

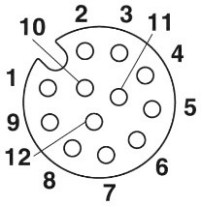
1. Front panel versions

Front panel **before July 2022**:	Front panel **after July 2022**:
	

2. Safety Laser connector, pinout for version before July 2022

The Safety Laser Scanner connector is of type M12, 12-pin, A-coded, female.

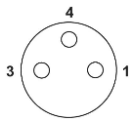
Pin #	Designation
1	24 VDC
2	GND
3	OSSD1
4	OSSD2
5	OSSD3
6	OSSD4
7	*NC*
8	*NC*
9	*NC*
10	*NC*
11	*NC*
12	*NC*



3. Switch ON, Batt ON connector, only for version before July 2022

The Switch ON, Batt ON connector is of type M8, 3-pin, A-coded.
It is used to forward the ON button signal to the activation signal of the battery.

Pin #	Designation	
1	SW	
3	GND	
4	*BUS_BPCI*	*Not connected*



4. Modification history

Revision	Release date	Changes
V1-a	June 2025	First Release