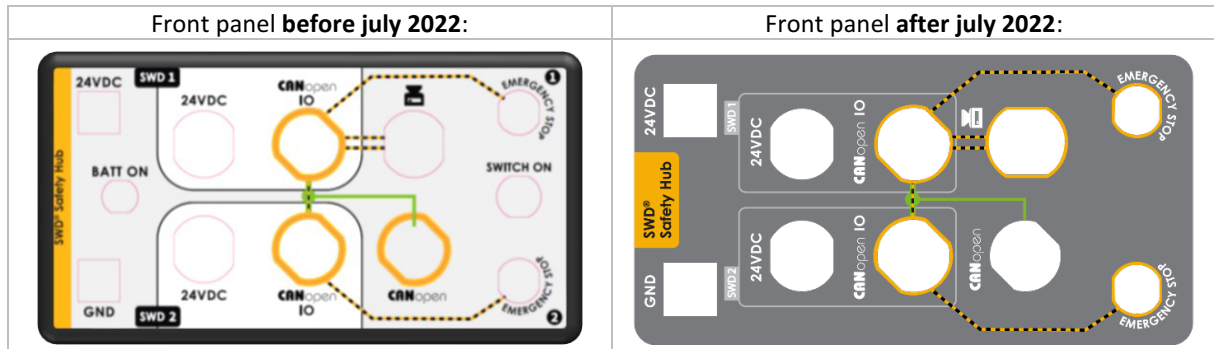


5. Interfaces

5.1. Overview

The **SWD® Starter Kit** is using the **SWD® Safety Hub** interface to centralize the connections of all devices and facilitate the overall wiring.



Details for both versions:

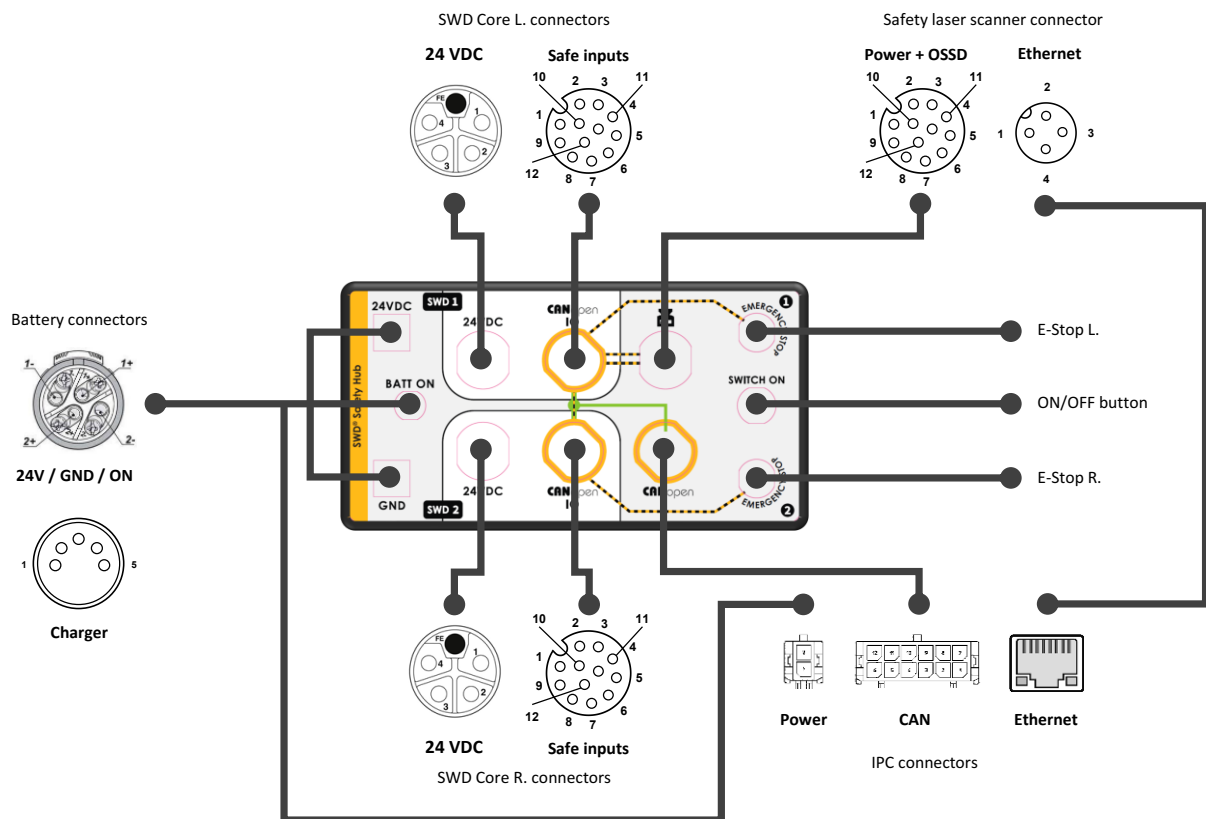


Figure 4 - Wiring synoptic, **SWD® Safety Hub** before July 2022

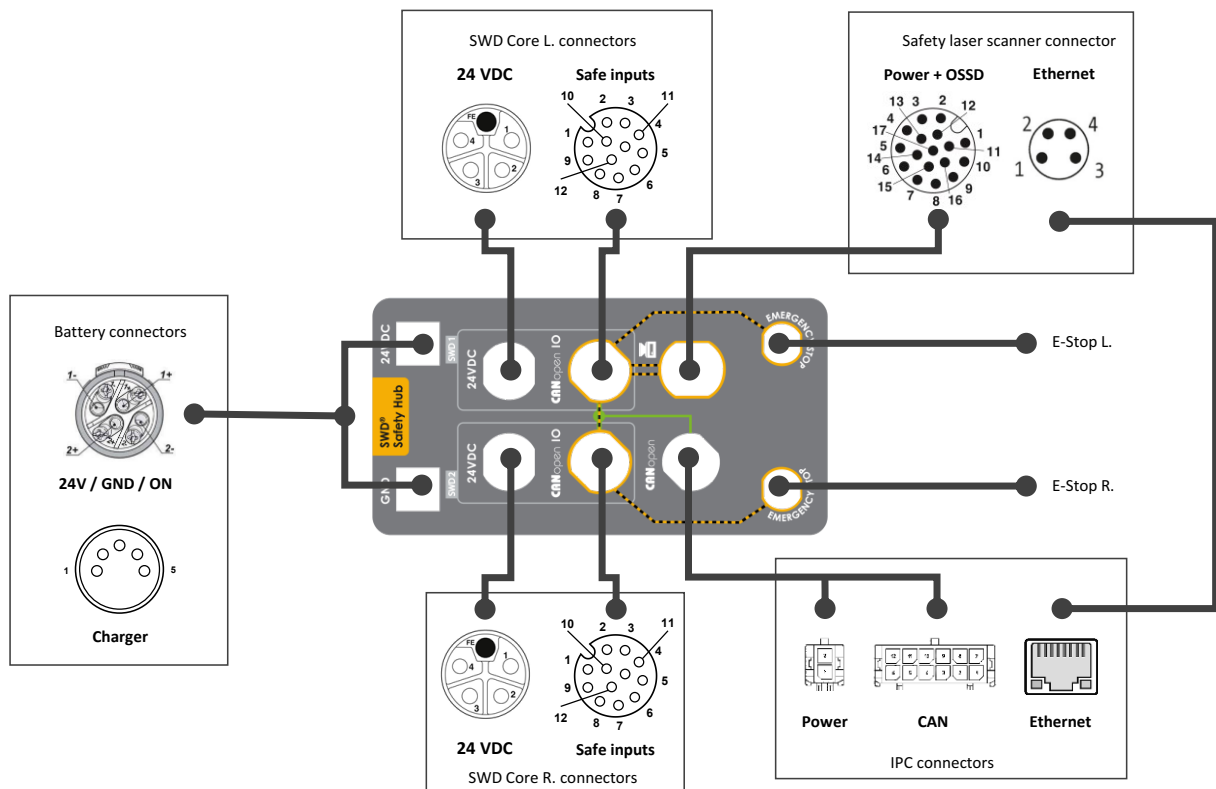


Figure 5 - Wiring synoptic, **SWD® Safety Hub** after July 2022

5.2. **SWD®** connectors

The I/O connector and 24 VDC connector of the **SWD®** are used in the **SWD® Starter Kit**.

The other connectors (CAN, USB, Ethernet, and Brake) are not used, please refer to the Instruction Manual of the **SWD®** for details on the complete connections of the product.

- i** The same connector types and pin numbers are used in the **SWD®**, and the associated connection featured on the **SWD® Safety Hub**. The following pinout description is therefore valid for both.

I/O connector

The I/O connector is type M12 - 12 pin A-coded.

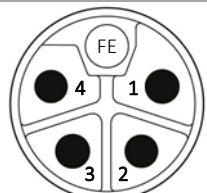
It is used for the CAN interface between the drives and the IPC, and for the safety loops coming from the safety laser scanner and E-Stops.

Pin #	Designation	
1	CAN H - used for CANopen Safety	
2	INSafe_4 - used for OSSD	
3	CAN L - used for CANopen Safety	
4	Power supply 24 VDC (2A) - disabled	
5	STO_1 - used for E-Stop	
6	GND Power Supply (2A) - unused	
7	INSafe_1 - used for OSSD	
8	STO_2 - used for E-Stop	

9	INSafe_3 - used for OSSD	
10	INSafe_2 - used for OSSD	
11	GND – unused	
12	ON - unused	

24 VDC connector

The 24 VDC power connector is of type M12 Power - 5-pin L-coded (4 pin + FE).
It is used to distribute the battery power on the drives.

Pin #	Designation	
1	+ Power supply 24 VDC (16A)	
2	+ Power supply 24 VDC (16A)	
3	GND Power Supply (16A)	
4	GND Power Supply (16A)	
FE	Mechanical ground connected to the chassis	

5.3. Safety laser scanner connectors

The Power+OSSD connector and Ethernet connector of the safety laser scanner are used in the **SWD® Starter Kit**.

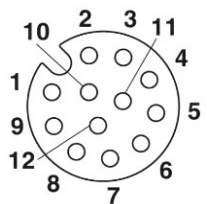
Please refer to the safety laser scanner User Manual for details on the complete connections of the product.

- ⚠ The original connector of the safety laser scanner has been replaced by an M12 Power + OSSD connector to get homogeneous connections with the **SWD® products**.
- i The same connector types and pin numbers are used in the safety laser scanner, and the associated connection featured on the **SWD® Safety Hub**. The following pinout description is therefore valid for both.

Power + OSSD adapter (if any)

After July 2022, an adapter might be used for Power + OSSD of the safety scanner. The connector is of type M12 - 12 pin A-coded.

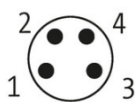
It is used for safety loops going to the **SWD®**.

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

Ethernet connector

The Ethernet connector is an M8 4-pin A-coded.

It is used to exchange non-safe data between the safety laser scanner and the IPC.

Pin #	Designation	
1	TD+	
2	RD+	
3	RD-	
4	TD-	

5.4. IPC connectors

5.4.1. iMX6 version

The Power connector, CAN connector and Ethernet connector of the iMX6 embedded PC are used in the **SWD® Starter Kit**.

Please refer to the TEK3-IMX6 BOX PC Product Manual for details on the complete connections of the product.

Power connector

The Power connector is a Molex 43025-0200 (2-pin Micro-Fit 3.0)

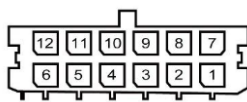
It is used to bring the battery power on the iMX6.

Pin #	Designation	
1	GND	
2	DC Voltage input (8-36 VDC)	

CAN connector

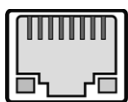
The CAN connector is a Molex 43025-1200 (12-pin Micro-Fit 3.0)

It is used for the CANopen interface between the drives and the iMX6.

Pin #	Designation	
1	Ground for CAN	
2	NC	
3	CAN Bus 1A high	
4	CAN Bus 1A low	
5	NC	
6	NC	
7	NC	
8	NC	
9	NC	
10	NC	
11	NC	
12	NC	

Ethernet connector

The Ethernet connector is a standard RJ45 for 10/100 Mbps transmission.
It is used to exchange non-safe data between the safety laser scanner and the iMX6.

Pin #	Designation	
1	TD+	
2	TD-	
3	RD+	
4	NC	
5	NC	
6	RD-	
7	NC	
8	NC	

5.4.2. iMX8 version

The Power connector, CAN connector and Ethernet connector of the iMX8 embedded PC are used in the **SWD® Starter Kit**.

Please refer to the COMPULAB IOT-GATE-iMX8 Reference guide for details on the complete connections of the product.

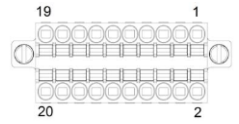
Power

The Power connector is a DC Power Jack.
It is used to bring battery power on the iMX8.

Pin #	Designation	
1	DC Voltage IN (8-36 VDC)	
2	GND	

CAN

The CAN connector is a Kunacon PDFD25420500K (20-pin dual-row plug with push-in spring connections)
It is used for the CANopen interface between the drives and the iMX8.

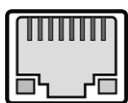
Pin #	Designation	
1	NC	
2	ISO GND A	
3	NC	
4	NC	
5	NC	
6	NC	
7	CAN High	
8	ISO GND B	
9	CAN Low	
10	NC	
11	NC	
12	NC	
13	NC	
14	NC	
15	NC	
16	NC	

17	NC	
18	NC	
19	NC	
20	ISO GND C	

Ethernet

The 100 / 1000Mbps Ethernet ports are RJ45 connectors.

ETH1 (1000 Mbps port) is used to exchange non-safe data between the safety laser scanner and the iMX8.

Pin #	Designation	
1	TD+	
2	TD-	
3	RD+	
4	NC	
5	NC	
6	RD-	
7	NC	
8	NC	

Serial Debug connector

The serial debug console via UART-to-USB bridge is a micro-USB connector.

It can be used to open a serial connection between your local PC and the iMX8.

***NB:** Baud Rate speed is 115200.*

USB - Wi-Fi dongle

An additional Wi-Fi USB dongle is provided with the iMX8 **SWD®** StarterKit, thus it is possible to connect the Kit to a Guest Wi-Fi for example. Consequently you can access and download resources from the internet, directly from the Wi-Fi.

A USB-A female connector is mounted on the side of the **SWD® Starter Kit**, next to the emergency button to plug it.

***NB:** You can also use the second Ethernet port of the iMX8, to connect the robot to your network's company.*

Battery connectors

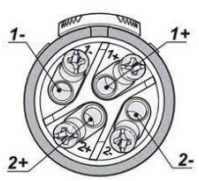
The Power connector and Charger connector of the Mobility Module battery are used in the **SWD® Starter Kit**.

⚠ Please refer to the Mobility Module User Manual for details on the complete connections of the product.

Power connector

The Power connector is a Neutrik Speakon 4-pin.

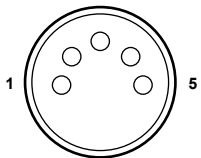
It is used to power the kit and to turn ON and OFF the battery.

Pin #	Designation	
1+	24 VDC	
2+	GND	
1-	RD+ / BPCI*	
2-	ON signal	

*BPCI = Battery Protection & Communication Interface

Charger connector

The Charger connector is a Neutrik XLR 5-pin.
It is used to connect the charger to the battery.

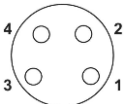
Pin #	Designation	
1	Charger+	
2	NC	
3	NC	
4	NC	
5	GND	

5.5. SWD® Safety Hub connectors

The **SWD®** and Scanner connectors of the **SWD® Safety Hub** follow the pinouts of the above-described connectors.

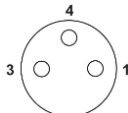
Emergency stop connector

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

Pin #	Designation	
1	SW1 NC1	
2	SW1 NC2	
3	SW2 NC1	
4	SW2 NC2	

Switch ON and Batt ON connectors (Only for SWD® Safety Hub before July 2022)

The Switch ON and Batt ON connectors are of type M8 3-pin A coded.
They are used to forward the ON button signal to the activation signal of the battery.

Pin #	Designation	
1	SW	
3	GND	
4	NC	

Safety Laser Scanner connector

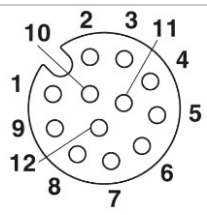
It is used to connect the Safe Inputs/Outputs between the laser scanner and the **SWD®**. It is also used to supply the power for the safety laser scanner.

Version before July 2022:

The Safety Laser Scanner connector is a M12 12-pin A coded.

Pin #	Designation	
1	24 VDC	
2	GND	

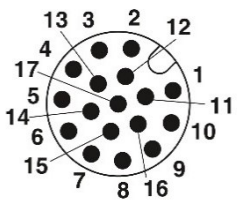
3	OSSD1
4	OSSD2
5	OSSD3
6	OSSD4
7	NC
8	NC
9	NC
10	NC
11	NC
12	NC



Version after July 2022:

The Safety Laser Scanner connector is a M12 17-pin A coded.

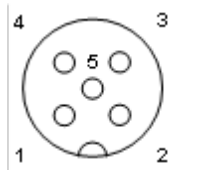
Pin #	Designation
1	24 VDC
2	GND
3	OSSD1
4	OSSD2
5	NC
6	NC
7	NC
8	NC
9	OSSD3
10	OSSD4
11	NC
12	NC
13	NC
14	NC
15	NC
16	NC
17	NC



CANopen connector

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

Pin #	Désignation
1	Masse mécanique
2	+ Alimentation 24 VDC (4A) - si activée = 
3	GND Alimentation (4A)
4	CAN H
5	CAN L



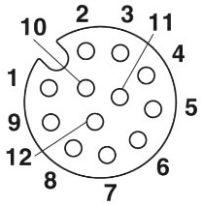
CANopen IO connector

The CANopen IO connector are of type M12 12-pin A coded.

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
1	CAN H - used for CANopen Safety
2	INSafe_3 - used for OSSD / SafeOUT1

3	CAN L - used for CANopen Safety
4	Power supply 24 VDC (2A) - disabled
5	STO_1 - used for E-Stop
6	GND Power Supply (2A) - unused
7	INSafe_1 - used for OSSD
8	STO_2 - used for E-Stop
9	INSafe_4 - used for OSSD / SafeOUT2
10	INSafe_2 - used for OSSD
11	GND - unused
12	ON - unused



24VDC connector

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

Pin #	Designation
1	+ Power supply 24 VDC (16A)
2	+ Power supply 24 VDC (16A)
3	GND Power Supply (16A)
4	GND Power Supply (16A)
FE	Mechanical earth connected to the chassis

