

## Key Features

- ▶ Easy mounting and robot setup
- ▶ Digital Inputs, Outputs & RS485
- ▶ Python software for Force control
- ▶ Ethernet port for accessories
- ▶ Selectable Power & IO Voltage

## Configurations

This kit is customizable and can be purchased in different configurations. The table below describes these configurations in form of ordering number:

Ordering number	Description
KIT-SSER-GEN3-ISO	SensONE T15 6-axis F/T sensor with Serial interface with robotiq adapter
KIT-SSER-GEN3	SensONE T15 6-axis F/T sensor with Serial interface
KIT-SECAT-GEN3-ISO	SensONE T15 6-axis F/T sensor with EtherCAT interface with robotiq adapter
KIT-SECAT-GEN3	SensONE T15 6-axis F/T sensor with EtherCAT interface
KIT-DSER-GEN3-ISO	SensONE T5 6-axis F/T sensor with Serial interface with robotiq adapter
KIT-DSER-GEN3	SensONE T5 6-axis F/T sensor with Serial interface
KIT-DECAT-GEN3-ISO	SensONE T5 6-axis F/T sensor with EtherCAT interface with robotiq adapter
KIT-DECAT-GEN3	SensONE T5 6-axis F/T sensor with EtherCAT interface

## List of Components

Please refer to the table for all sensor specifications. For additional information, consult our sales team at [info@botasys.com](mailto:info@botasys.com)

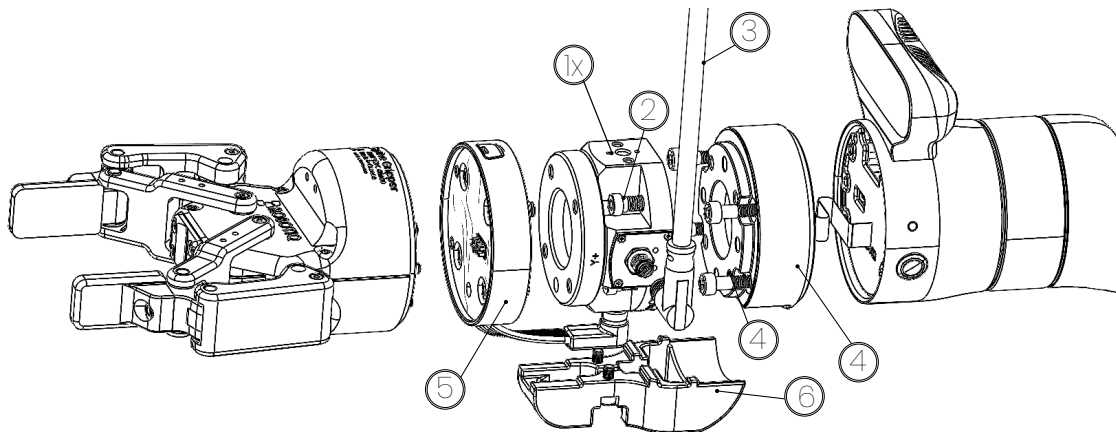


Figure 1a

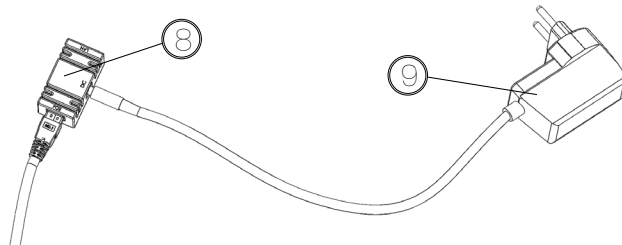


Figure 1b

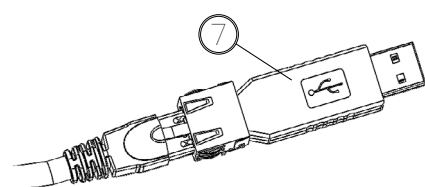


Figure 1c

#	Component	Description	Included in configuration
1a	BFT-SENS-ECAT-M8	SensONE T15 6-axis F/T sensor with EtherCAT interface, best resolution and additional IMU	KIT-SECAT-GEN3-ISO KIT-SECAT-GEN3
1b	BFT-SENS-SER-M8	SensONE T15 6-axis F/T sensor with Serial interface	KIT-SSER-GEN3-ISO KIT-SSER-GEN3
1c	BFT-DENS-ECAT-M8	SensONE T5 6-axis F/T sensor with EtherCAT interface,	KIT-DECAT-GEN3-ISO KIT-DECAT-GEN3
1d	BFT-DENS-SER-M8	SensONE T5 6-axis F/T sensor with Serial interface,	KIT-DSER-GEN3-ISO KIT-DSER-GEN3
2	ACC-SENS-MOUNT	Screw mounting kit for SensONE	All configurations
3	ACC-RJ45-M8-3M-ANGLE	3.0m Cat 5e cable with angled M8 connector	All configurations
4	ACC-KIN-GEN3	Accessory adapter for Kinova Gen3 to ISO 9409-1-50-4-M6 cobot flange with tool IO and ethernet	All configurations
5	RQ-GRP-ES-CPL-062	Robotiq Gripper coupling for ISO flange	All: KIT-xxxx-xxxx-ISO
6	ACC-KIN-GEN3-BUMP	Protective bumper for Kinova adapter cable	All: KIT-xxxx-xxxx-ISO
7	ACC-USB-PROG	USB to RS422 Serial adapter with RJ45 connector	All KIT-xSER-GEN3-xxx
8	ACC-POE-B	PoE injector 802.3af mode B	All KIT-xECAT-GEN3-xxx
9	ACC-PSU-12V-GLOBAL	Power adapter 12V 12W global plug	All KIT-xECAT-GEN3-xxx

## Mechanical Interface

The Kinova GEN3 adapter **ACC-KIN-GEN3[4]** converts the robot's flange to **ISO 9409-1-50-4-M6** commonly used in collaborative robots **[Figure 2]**. It includes four pin holes allowing the SensONE F/T sensor to be mounted in all orientation **[Figure 3]**. Optionally the ISO to Kinova Gen3 adapter **RQ-GRP-ES-CPL-062[5]** can be included in the kit to convert the sensors flange back to Kinova GEN3 flange, so tools like the Robotiq Gripper can be mounted **[Figure 4]**. The **RQ-GRP-ES-CPL-062[5]** will directly connect to J2 connector of **ACC-KIN-GEN3[4]** for seamless integration.

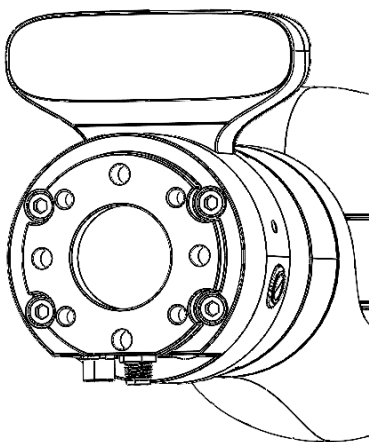


Figure 2

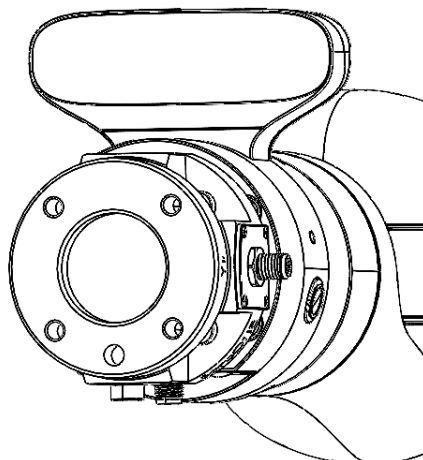


Figure 3

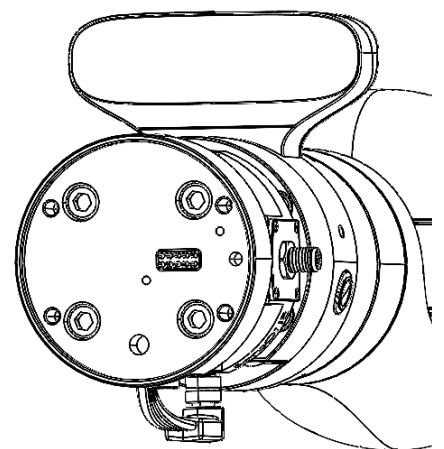


Figure 4

## Electrical Interface

### F/T Sensor – Control Computer

The sensor is being wired externally along the robot body with the included cable **ACC-RJ45-M8-3M-ANGLE[3]** to the control computer leaving both connection of the Kinova GEN3 adapter free to be used by other tools.

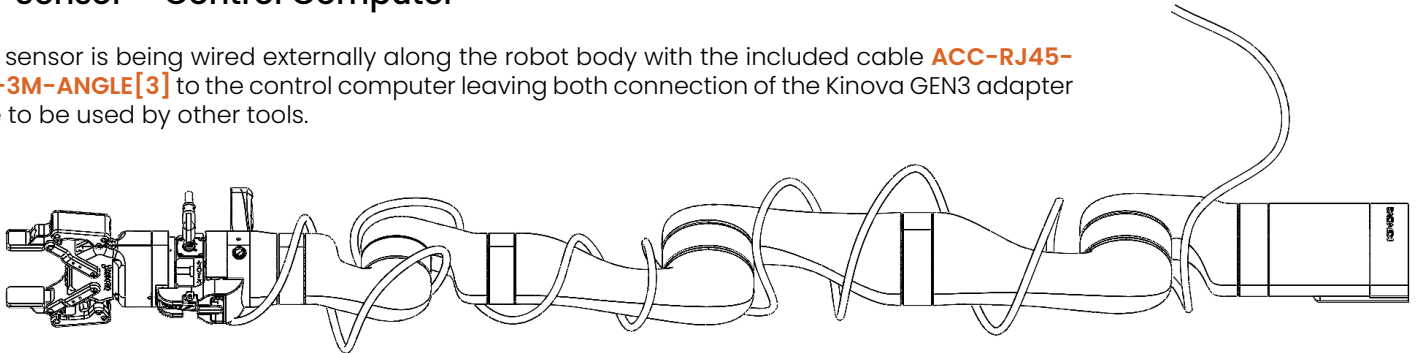


Figure 5

### ISO Adapter

The Kinova adapter **ACC-KIN-GEN3[4]** is offering the following interfaces:

- ▶ **J2**: M8 8Pin Tool IO
- ▶ **J3**: M8 4Pin Industrial ethernet with optional PoE mode A
- ▶ **SW1**: voltage selector for Tool IO
- ▶ **J5**: Terminating resistance for RS485
- ▶ **LED**: Power indicator

The **Ethernet** interface **J3** is connected to the robot Internal network and is using the standard industrial 4 pin M8 ethernet connector. Here is a link for compatible cables and connectors.

<https://catalog.weidmueller.com/catalog/Start.do?ObjectID=1201210500>

<https://www.te.com/en/product-T4011008041-000.html>

The **Tool IO** Interface **J2** is compatible with Universal Robots (UR), Kassow, Fanuc CRX, etc robots accessories offer offers **digital Inputs & Outputs**, Analog inputs and **RS485 Serial** communication (Modbus RTU). It can be used for the **RQ-GRP-ES-CPL-062[5]** or other end effector tools to connect Kinova compatible tools.

Use a flat screw driver to remove the cover of the voltage switch. The Voltage selector **SW1** is selecting the supply voltage VSS and IOs voltage between: 5, 12, 24 Volts

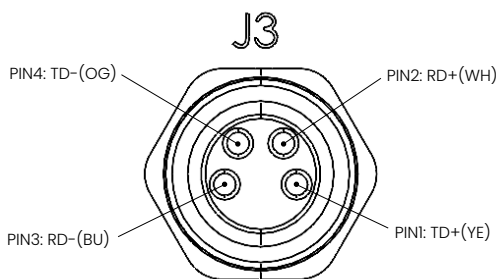


Figure 6

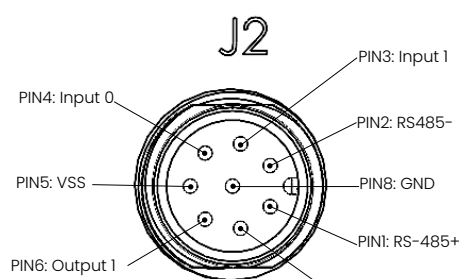


Figure 7

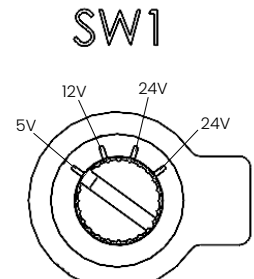


Figure 8

## Software Interface

### Python

An **admittance controller** is implemented based on Kinova's **Kortex** python library. The controller is **tuneable** to match the different performance and stability levels required per applications. The python code is running on a **host** computer and is connected to the robot through the **ethernet** interface. The F/T sensor is required to be connected directly to the same computer with the provided USB to RS422 serial adapter **ACC-USB-PROG[7]** or through a secondary ethernet port for **Serial** or **EtherCAT** communication respectively. It is **IMPORTANT** to understand that EtherCAT and Ethernet networks cannot be mixed a secondary ethernet port is required to be used with the EtherCAT sensor.



Figure 9