

Key Features

- ▶ High accuracy force feedback for demanding applications
- ▶ Zero hysteresis & minimal drift
- ▶ No adapters required, bolt-on installation
- ▶ Easy mounting and robot setup
- ▶ URcap with extended functionality
- ▶ Robust design & high stiffness



Configurations

Ordering number	Description
KIT-SENS-UR	SensONE T15 6-axis F/T sensor kit for Universal Robots CB series and e-series
KIT-DENS-UR	SensONE T5 6-axis F/T sensor kit for Universal Robots CB series and e-series

List of Components

Please refer to the table for all sensor specifications. For additional information, consult our sales team at info@botasys.com

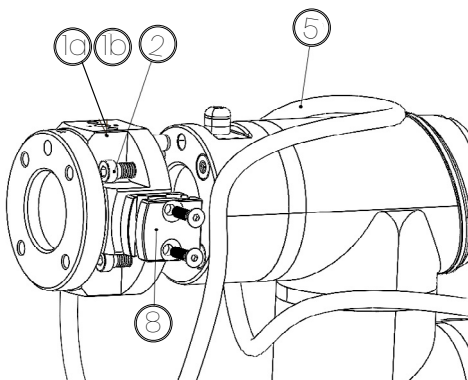


Figure 1

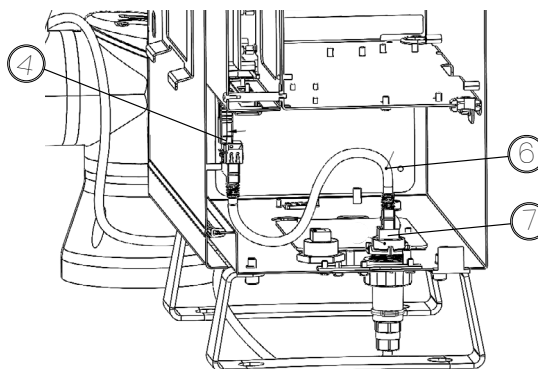


Figure 2

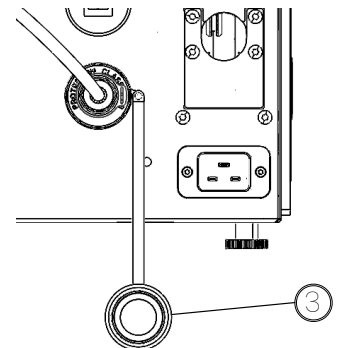


Figure 3

#	Component	Description	Included in configuration
1a	BFT-SENS-SER-M8	SensONE T15 6-axis F/T sensor with Serial interface	KIT-SENS-UR
1b	BFT-DENS-SER-M8	SensONE T5 6-axis F/T sensor with Serial interface	KIT-DENS-UR
2	ACC-SENS-MOUNT	Screw mounting kit for SensONE	All configurations
3	ACC-RJ45-SOCKET-CAP	cap for the RJ45 IP67 connector	All configurations
4	ACC-USB-PROG	USB to Serial adapter RS422 with RJ45 connector	All configurations
5	ACC-RJ45UR-M8-ANGLE	Custom length sensor cable with RJ45 to M8 angled for UR kit (5m default)	All configurations
6	ACC-RJ45-RJ45	30 cm cat6 RJ45 to RJ45 ethernet cable	All configurations
7	ACC-RJ45-SOCKET	RJ45 IP 67 plug for UR kit	All configurations
8	ACC-SENS-CLAMP	SensONE cable holder for the sensor cable and a 5mm auxiliary cable	All configurations
9	ACC-URCAP-FD	Flash drive for URcap Installation	All configurations

Mechanical Interface

The Universal Robot kit comes with all the required material to connect and safely operate a UR robot CB or E-series with SensONE series sensors. The **sensor** can be directly attached to the robot flange with the supplied hardware **[Figure 4]**. It has minimum size and weight making it the most lightweight and compact sensor for UR robots. The kits include the necessary cabling to wire the sensor inside **[Figure 6]** and outside **[Figure 5]** of the control box. The cabling and all the connections are **IP67 rated**.

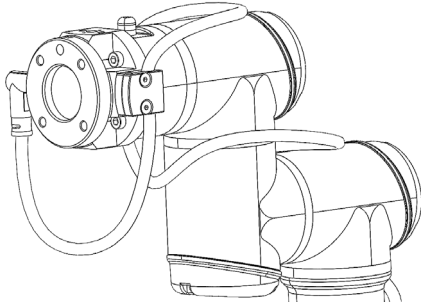


Figure 4

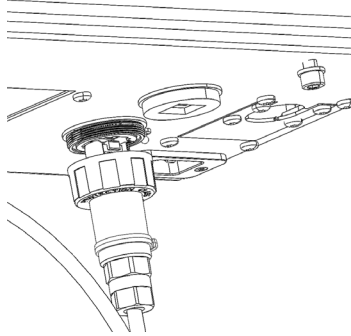


Figure 5

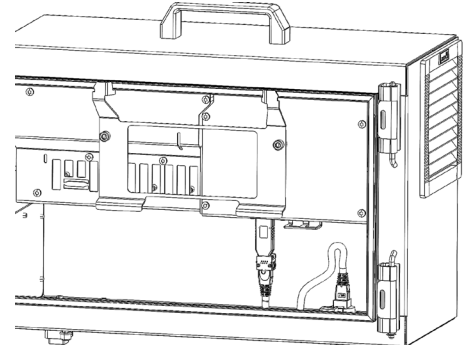


Figure 6

Electrical Interface

F/T Sensor – Control Box

The sensor is being wired externally along the robot body with the included cable (**ACC-RJ45UR-M8-ANGLE [5]**) to the control box of the UR Robot. Using the connector that was provided with the kit. Proper cable fixation is ensured with the included cable clamp **ACC-SENS-CLAMP [8]**, minimizing parasitic measurements from the sensor cable and other tool mounted accessories. It also protects the M8 connector from robot collisions and tagging on the cable. **[Figure 7]**

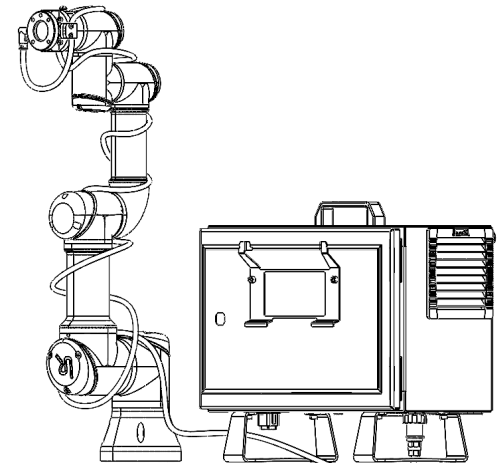


Figure 7

UR Control Box – PC

The kit includes all required hardware for the connections inside the UR Control Box. The USB to RS-422 serial adapter **ACC-USB-PROG [4]** is plugged to the available USB port of the PC connecting to the panel-mount connector **ACC-RJ45-SOCKET [7]** with the short Ethernet cable **ACC-RJ45-RJ45 [6]**. **[Figure 8]**

The **ACC-RJ45UR-M8-ANGLE [5]** sensor cable connects the **SensONE [1a]** sensor to the **UR Control Box**. It has an IP67 RJ45 connector that connects to the Control Box an M8 8pin IP67 connector that connects to the sensor. **[Figure 9]**

The sensor cable is secured with the provided cable clamp **ACC-SENS-CLAMP [8]** and in case of cable tagging is acting as a strain relief for the connector and limiting the damage to the cable. **[Figure 10]**

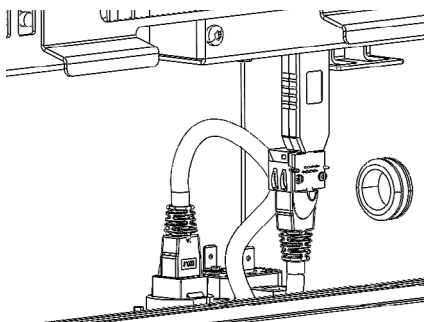


Figure 8

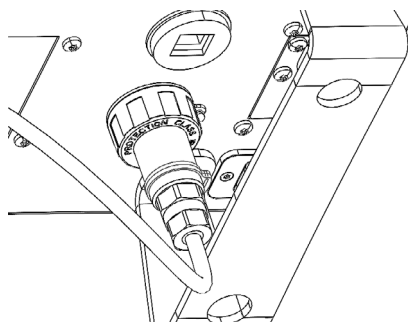


Figure 9

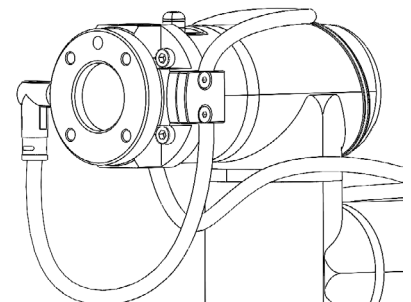


Figure 10

Software Interface

URcap

The URcap is available on our website under the kit's page including everything needed to configure the sensor and control the robot in force mode. Bota Systems is offering a proprietary force mode offering higher accuracy, stability and resolution than the built in one, utilizing the performance of SensONE sensor. On top of this, a set of functions allowing the user to create highly flexible programs without accurate knowledge of the position and mass of the tool or workpiece reducing the complexity of the code and promotes re-usability.

The installation tab is made for easy configuration of the sensor on initial setup. The URcap includes a set of example programs and plotting capabilities for debugging purposes.

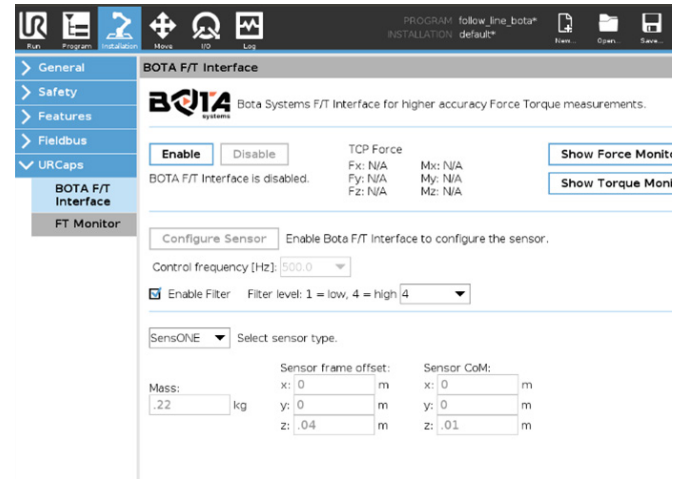


Figure 11

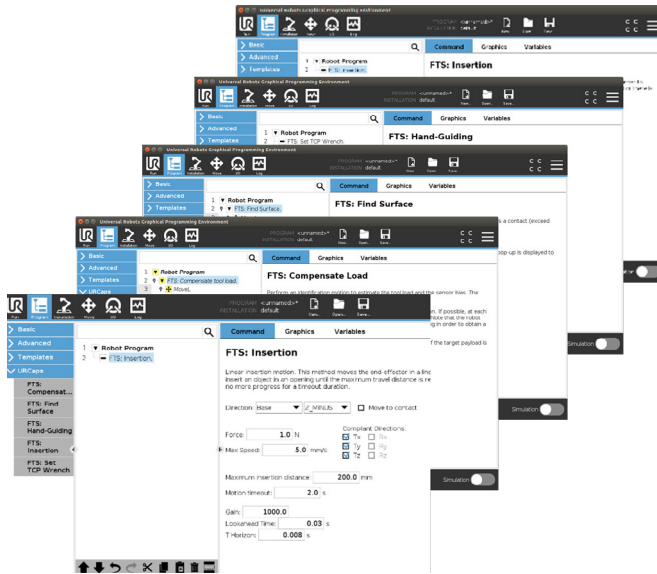


Figure 12

The URcap Includes several functions to accelerate and simplify force controllable tasks like polishing, sanding, assembly, deburring and product testing. Some of the functionalities are:

Tare sensor setting the sensor bias based on an expected wrench.

Hand-Guidance allows the robot position to be taught by an operator with dragging the end-effector of the robot.

Find Surface moves the robot in the desired direction until the contact force threshold is reached.

Compensate Tool Load is used to identify and compensate the TCP load of the robot; Can be used to identify a successful grasp; identify the component grasped based on its mass and position in the gripper; or can be used to adjust on the fly fore new tool masses.

Insertion is a helping function for insertion, enabling safe insertion and monitoring of the process.