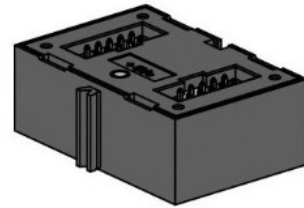# fischertechnik ®

Combi Sensor part no. 158402
3-in-1 absolute-orientation sensor

Quick reference guide

The fischertechnik 3-in-1 absolute-orientation sensor contains an acceleration sensor, a gyroscope and a geomagnetic sensor which can be addressed by the I²C interface of the ROBOTICS TXT Controller as three independent devices. The connection of the sensor is made by a ribbon cable (117336), which is attached to the TXT controller via the extension port (EXT) and a single power line (9V), which is plugged into the 9V OUT connector of the TXT controller. The correct connection can be seen in Figure 1. A detailed description of the sensor can be found in the manual of the used MEMS sensor by Bosch Sensortec BMX055, which can be found here:
https://ae-bst.resource.bosch.com/media/_tech/media/datasheets/BST-BMX055-DS000-02.pdf
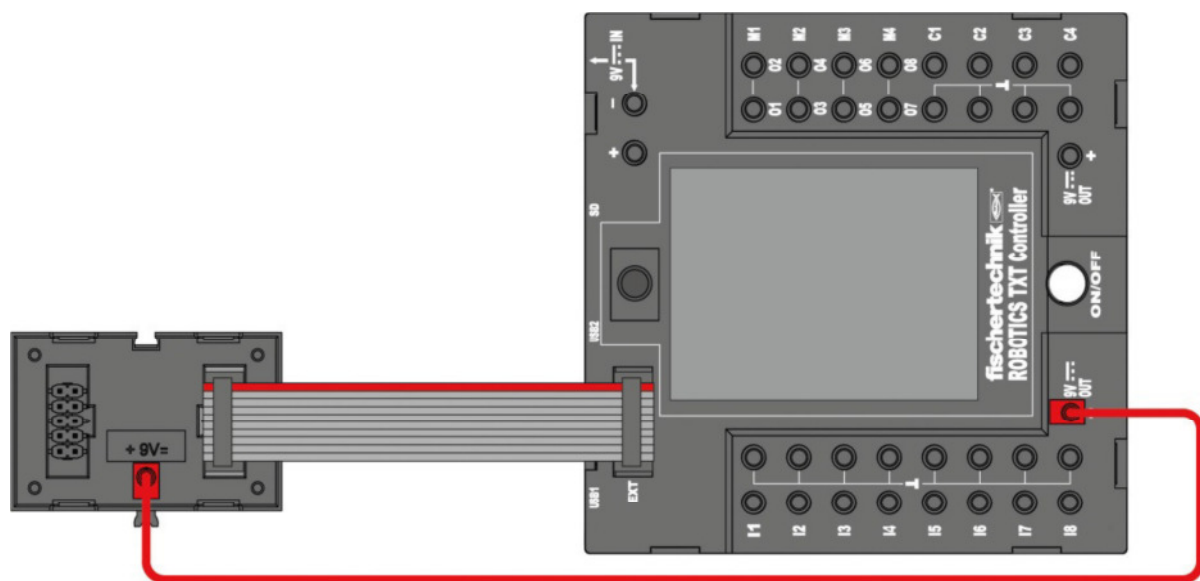

Fig.1: Connection of the fischertechnik 3-in-1 absolute-orientation sensor to the ROBOTICS TXT Controller.

Specifications:

- Integrated 3-axis gyrosensor / 3-axis acceleration sensor
- resolution: up to 12 bit
- measurement range acceleration: +-2/+-4/+-8/+-16g
- measurement range gyroscope: +-125/+-245/+-500/+-1000/+-2000°/s
- sample rate 1k/s
- I²C-port

I²C addresses of the devices

- Acceleration sensor: 0x18
- Gyroscope: 0x68
- Geomagnetic sensor: 0x10

Assignment in ROBOPro (Version 4.2.4)

The three units of the 3-in-1 sensor have to be assigned independently in ROBOPro. For each sensor unit, there are three important blocks, which have to be used in order to obtain sensor values. They are availbale as subprograms in the element groups – Library – I2C – BMX055
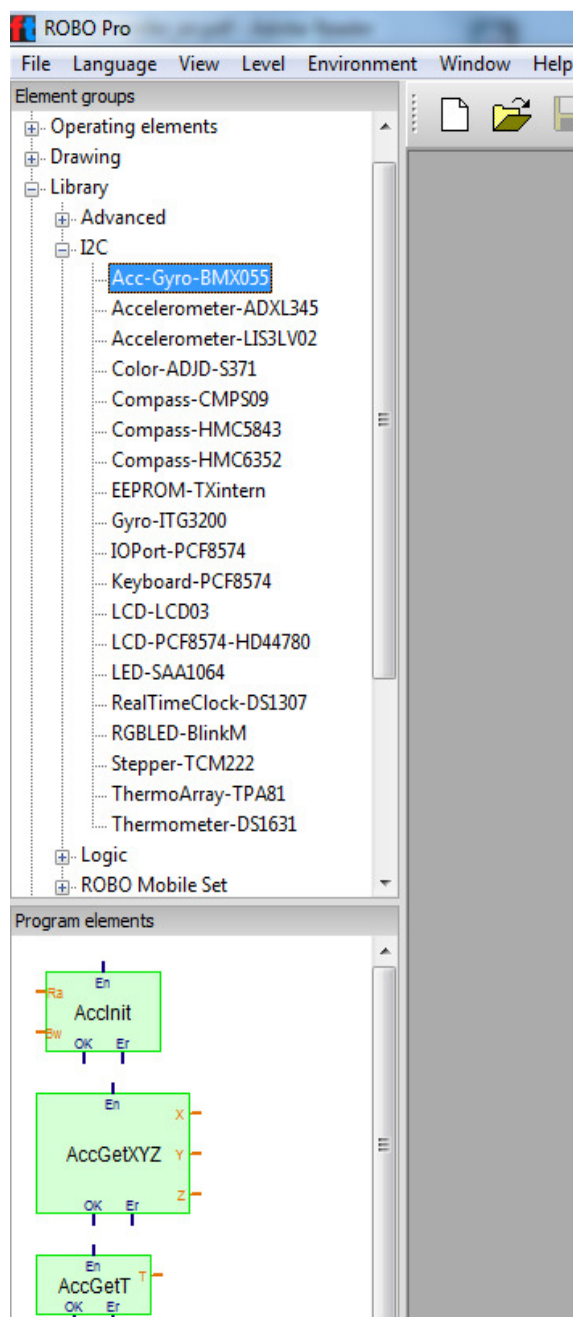
On the one hand, these are the initialization blocks, which have to be called at the beginning of the program and on the other hand, the waiting blocks and the actual reading blocks, which have to be called continuously. These blocks can be found under 'Library->I2C->Acc-Gyro-BMX055'. In case of the acceleration sensor, these blocks are called 'AccInit', 'AccWait' and 'AccGetXYZ'.The gyroscope can be assigned by the functions 'GyroInit', 'GyroWait' and 'GyroGetXYZ'. The functions of the geomagnetic sensor are called 'MagInit', 'MagWait' and 'MagGetA'. The initialization blocks are also used to configure the sensor units. Thereby, it is possible to set the bandwidth and the range of the sensor.

A typical configuration can be seen in the example program 'Acc-Gyro-BMX055.rpp', which can be seen in the figure below.
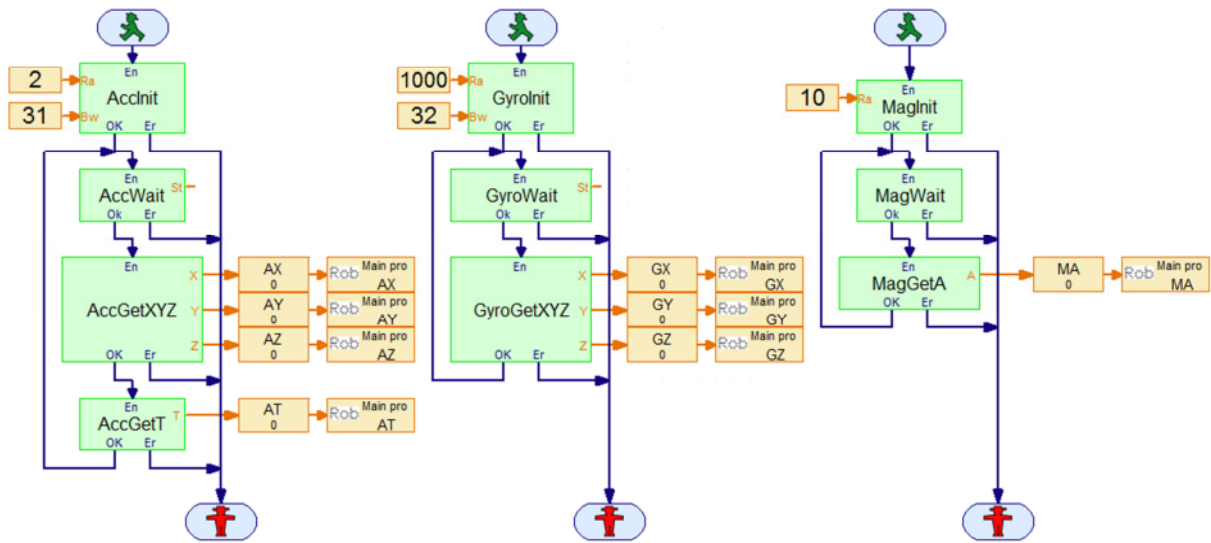
This sample is available in the folder ROBOPro\Library\I2C\Acc-Gyro-BMX055.rpp

The program reads all the values from the sensor and displays them in download mode on the display of the TXT Controller.