

2GIG CANOPEN PROTOCOL

The CANOpen tilt sensors communicate via the following standard protocol. The table below shows the options that can be selected, as well as the default output and input PDOs. The sensor outputs the (X), (Y), temperature (°C) reading, and output rate. The sensor will accept an input PDO which is used to zero the device, adjust the Node ID, and adjust the output rate frequency. The standard protocol, PDOs, and outputs can be modified to fit custom systems. The default specifications are listed in the table below:

| Specification | CANOPEN | | | | | |
|----------------------------|---|----|-----|-----|-----|------|
| Baudrate (kbit/s) | 20 | 50 | 125 | 250 | 500 | 1000 |
| Node ID | 1 to 127 (0x01 to 0x7F) | | | | | |
| Output | PDO 0x180 6 Data Bytes: Bytes 0 – 1: Signed 16-bit X-Axis Reading in hundredths of a degree (0.00), LSB first Bytes 2 – 3: Signed 16-bit Y-Axis Reading in hundredths of a degree (0.00), LSB first Byte 4: Signed 8-bit Internal Sensor Temperature Reading in Degrees Celsius Byte 5: Current Output Rate in Hertz (Hz) | | | | | |
| Input | PDO 0x200 8 Adjustable Data Bytes: Bytes 0-4: Reserved Byte 5: Zero out the device (1) or revert back to factory zero (2) Byte 6: Unsigned 8-bit adjustable Node ID from 1 - 127 Byte 7: Adjustable output rate in Hertz (Hz) (1 – 100) <u>In order to program the device correctly, complete messages must be sent</u> | | | | | |
| Network Termination | A 120 Ohm resistor is required between CAN+ and CAN- (Resistor not included, but can be provided) | | | | | |

OUTPUT MESSAGE FORMAT

Output TPDO 0x180 message with node ID of 0x20

| 11-bit ID | Data Byte 0 | Data Byte 1 | Data Byte 2 | Data Byte 3 | Data Byte 4 | Data Byte 5 |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 0x1A0 | X Byte LSB | X Byte MSB | Y Angle LSB | Y Angle MSB | Temperature | Output Rate |

Example Angle Output
 LSB = 0x94, MSB = 0x11
 Angle = 0x1194
 Decimal Value = 4500
 4500 / 100 = **45°**

Example Angle Output 2
 LSB = 0x18, MSB = 0xFC
 Angle = 0xFC18
 Decimal Value = -1000
 1000 / 100 = **-10°**

Example Outputs:
 Byte 4 = 0x19 = **25°C**
 Byte 4 = 0xE2 = **-30°C**
 Byte 5 = 0x0A = **10 Hz**

INPUT MESSAGE FORMAT

Input PDO 0x200 message with a node ID of 0x20

| 11-bit ID | Data Byte 0 | Data Byte 1 | Data Byte 2 | Data Byte 3 | Data Byte 4 | Data Byte 5 | Data Byte 6 | Data Byte 7 |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 0x220 | 0 | 0 | 0 | 0 | 0 | Zero | Node ID | Output Rate |

EXAMPLE INPUT MESSAGES

Relative zero the X and Y readings

Message to Send:

| 11-bit ID | Data Byte 0 | Data Byte 1 | Data Byte 2 | Data Byte 3 | Data Byte 4 | Data Byte 5 | Data Byte 6 | Data Byte 7 |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 0x220 | 0 | 0 | 0 | 0 | 0 | 0x01 | 0 | 0 |

Change the Node ID to 0x03 and Output Rate to 20Hz

Message to Send:

| 11-bit ID | Data Byte 0 | Data Byte 1 | Data Byte 2 | Data Byte 3 | Data Byte 4 | Data Byte 5 | Data Byte 6 | Data Byte 7 |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 0x220 | 0 | 0 | 0 | 0 | 0 | 0 | 0x03 | 0x14 |