



# DAT5280 Ambient Temperature Sensor Module User Manual

***Dr Robot***<sup>®</sup>

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### Related Document:

WiRobot PMS5005 Sensing and Motion Controller User Manual

## I. Introduction

The DAT5280 Ambient Temperature Sensor Module uses high-precision CMOS temperature sensor to generate linear voltage signal according to the ambient air temperature. With a temperature coefficient of 25.5 mV/°C and nonlinearity of  $\pm 0.5\%$ , the DAT5280 is superior in the functionality over conventional temperature sensors like thermometers. Typical applications include robotic system and high-precision thermal control.

### Features

- High linearity:  $\pm 0.5\%$
- Standard output: 0 – 3.3V
- High temperature accuracy
- Plug-and-play in the WiRobot system

### Applications

- Robotic system
- Temperature sensing
- Thermal control

## II. Operations

### II.1. Typical performance characteristics

The performance characteristics are shown in the figures II.1 and II.2. If needed, the temperature accuracy error could be removed by calibration on the individual module basis.

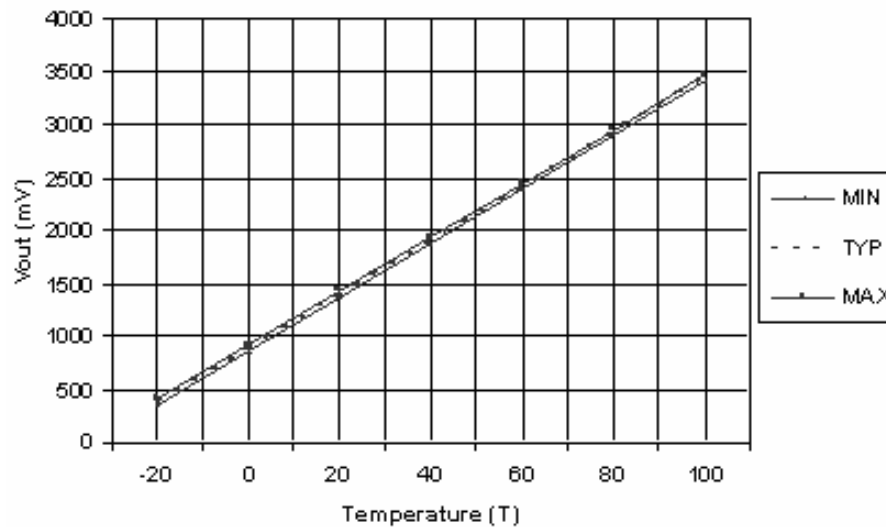


Figure II.1 Output Voltage vs Ambient Temperature

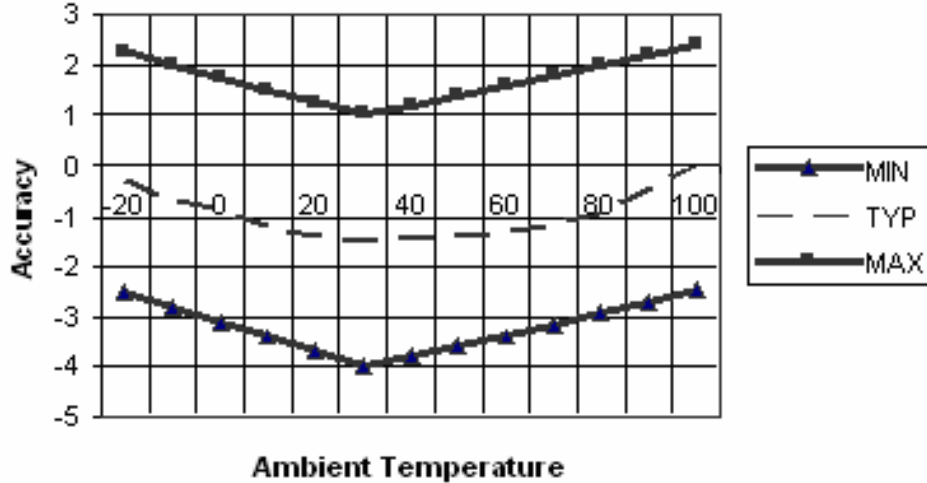


Figure II.2 Accuracy vs Temperature

## II.2. Running as part of WiRobot System

When using the DAT5280 with WiRobot system, user can simply connect the module to the temperature sensor module connector on the PMS5005 controller board and the PMS5005 built-in sensor device driver will take care of the data acquisition. Users can simply call a function (offered by the WiRobot SDK software on PC (requires Microsoft platform) or send a data request packet (platform independent) to obtain the data.

## II.3. Running as a General Purpose Temperature Sensor Module

When using the DAT5280 with a third party controller, the power supply and the input/output signals should be connected properly (please refer to Section III). The controller can get the temperature data via an analog to digital converter. The temperature reading can then be calculated according to Figure II.1 or the following equation

$$TV \text{ (in V)} = 0.92 + 0.0255 * (\text{Temperature})$$

## III. Connections

### III.1. Board Structure

Figure III.1 illustrates the structure of the board.

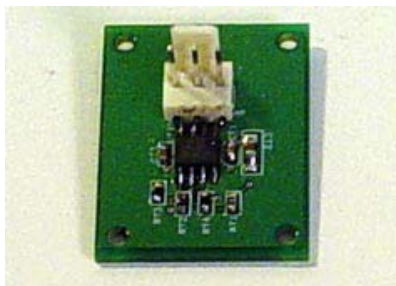


Figure III.1 DAT5280 Structure

### III.2. Connector Description

The DAT5280 can be connected to the controller system via a 3-pin 2.54 mm-pitch single row connector.

**Table III.1 Temperature Sensor Connectors**

| Pin | Name            | Function                                  |
|-----|-----------------|---|
| 1   | V <sub>CC</sub> | Positive power source, 5 V DC             |
| 2   | TV              | Temperature voltage, analog signal output |
| 3   | GND             | Power ground                              |

## IV. Specifications

**Table IV.1 DAT5280 Specification**

| Parameter               | Conditions            | MIN  | TYP     | MAX   | Unit    |
|-------------------------|-----------------------|------|---------|-------|---------|
| Power Supply Voltage    |                       | 4.9  | 5.0     | 5.1   | V       |
| Current Consumption     | V <sub>CC</sub> = 5 V |      |         | 5.0   | mA      |
| Nonlinearity            | -20°C ~ +80°C         |      | ±0.5    |       | %       |
| Temperature Sensitivity | -20°C ~ +100°C        | 4.66 | 25.5    | 26.34 | mV/°C   |
| Board Size              |                       |      | 30 x 24 |       | mm x mm |