Swema 05
Instructions
vers 1.01 MB20130530

SWEMA AB
Pepparv. 27
SE-123 56 FARSTA
Tel: +46 8 94 00 90
Fax: +46 8 93 44 93
E-mail: swema@swema.com
Web page: www.swema.com

Contents:

1. Introduction

Swema 05 is a black globe temperature sensor. It has a high frequency digital output (Max 100Hz) and connects directly to PC with USB cable (Part no: 767300). Swema 05 is powered by the USB.

To measure with one probe at a time and also to change settings for the probe, download the free software SwemaTerminal 3 from website www.swema.com and connect the probe with the USB cable (part nr. 767300).

Swema 05 can be set up with multiple probes with the PC-software SwemaMultipoint (Part nr: 763710) or any other software connecting with USB.

2. Technical data

Measuring range: 0...50°C
Uncertainty: ±0,1°C (95% coverage probability)
Sensor: Pt-100
4-wire
2 m cable
Black globe: Ø 150 mm
Rod: 200mm long Ø 10mm
Communication: USB & RS 485 MODBUS
Sampling frequency: Max 100Hz for one probe connected to PC.
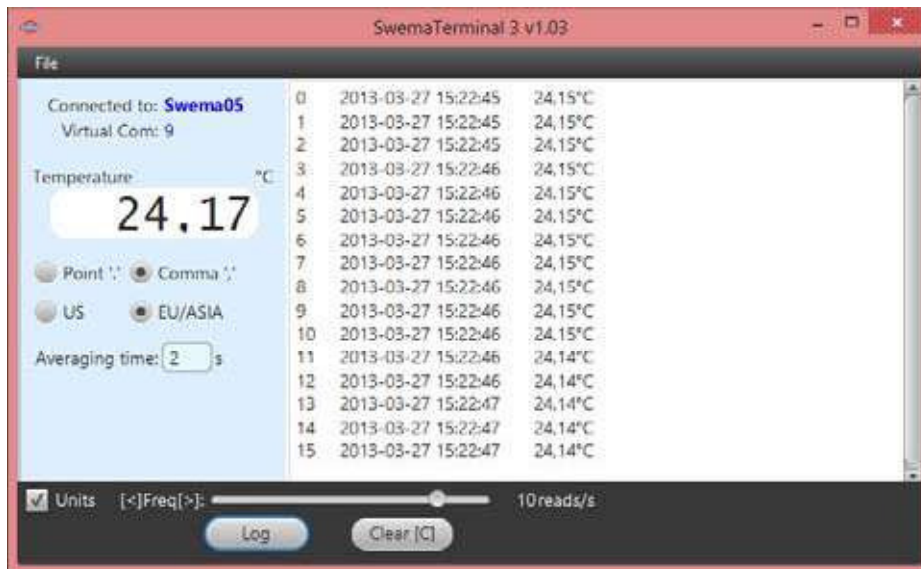
3. Driver installation

To be able to use Swema 05 with a PC or to change settings a driver for the probe needs to be installed. The drivers are automatically installed after installation of the of the fre software "SwemaTerminal 3".
1. Download "SwemaTerminal 3" (is a zip-file) from www.swema.com.

2. Unzip the file and run the setup file.When the setup is done connect the USB cable (Part no: 767300) between the probe and PC. The PC will now install the necessary drivers automatically.

In case the driver installation dosen`t succeed you can also do it manually. Open the device manager, right click on "unknown device" and then "update driver". The drivers can be found at "C:/Program Files/Swema" (make sure that the box "include sub folders" is checked).

4. SwemaTerminal 3

With SwemaTerminal 3 it's possible to measure with a single probe. You can also do online logging and store the logged data on your PC, update firmware, print calibration protocol and change settings. Information of what kind of probe and at which COM-port it's connected can be found on the top left side.

"Temperature":
Here Swema 05 shows the measured values.

"Point" or "Comma":
Set point or comma as decimal separator.

"US" or "EU/ASIA":
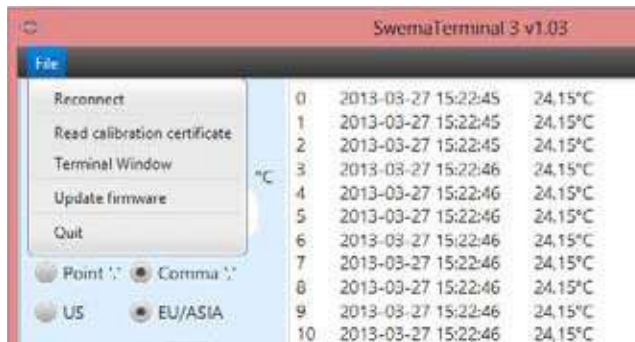Set unit system to US (°F) or EU/ASIA (°C).

Averaging time:
Swema 05 has an internally sampling frequency of 100 Hz (100 mearsurement/s). With "Averaging time" it's possible to set a floating averaging that is calculated of the internal sampled values. The read out values from Swema 05:s digital output will be an average of the internal sampling. A higher "Averaging time" will use more internal samples for the averaging and by that give a more stable read out from the probe. Swema 03 will independent of set "Averaging time" always use an internally sampling frequency of 100Hz.

Log:
Press the "Log" button to start an online logging of measured values (will be saved as a txt-file). If the box to the left of "Unit" is checked the logged values will be shown/stored with chosen unit (°C or °F) With "Freq:" it's possible to set how often a new value should be stored.

5. Terminal Window

It's possible to open a Terminal window through SwemaTerminal 3 to access some extra settings such as RS 485 communication setup. In the terminal it's also possible to adjust and calibrate Swema 03. Click on "File" in SwemaTerminal 3 and a drop down menu opens, click on "Terminal Window" and a new window is opened. Press "Enter" on the keyboard and the main terminal menu for Swema 03 will be opened. To change a setting or enter a sub menu such as the "Calibration and Adjustment Menu" or "Advanced settings" just use the keyboard and press on the corresponding letter.

Swema 05 main terminal menu:

```
Swema 05 - Software version: 1.01

[ ] Space - Print measurement values
[,] Comma - Print measurement values with units

[T] Averaging Time (0.01 - 1200 s, 0.1s for ISO 7726): 0.1 s
[O] Decimal delimiter: Comma
[U] Unit System: EU/ASIA

[P] Print Calibration Certificate
[C] Calibration and Adjustment Menu
[A] Advanced settings
```

6. Calibration and Adjustment

If you want to calibrate and adjust Swema 05 press "C" on the keyboard when in the main terminal menu. In the Calibration and Adjustment menu it's possible to put in a temperature offset and also make a calibration. If an offset is put in a "?" will appear on several rows to show that something has been changed and new calibration data is needed to be put in. Before you exit this menu you will be asked if you want to save your changes or not. **NOTE: If you save changes done in the calibration and adjustment menu it's NOT possible to restore Swema:s original calibration data.**If you want to see how the changes looks like you can print a calibration certificate by pressing "P" in the main terminal menu.

```
CALIBRATION AND ADJUSTMENT MENU for Swema 05

SETUP AND CONDITION
[1] Calibration date: 2012-05-11
[2] Next Calibration date: 2014-05-11
[3] Calibrated at: SWEMA
[4] Calibrated by: Tomas Olsson

ADJUSTMENT
[Y] Temperature offset: 0.00 ˚C

CALIBRATION
     True value   Read value      Corr
     ----------   ----------      ----
[T]  24,51 ˚C     24,50 ˚C        0,01
[U]     -
[V]     -

UNCERTAINTIES
[8] Velocity:
[9] Velocity:
[0] Air Temperature: ±0.1 ˚C
[(] Barometric Pressure: ±2.5 hPa
[)] Coverage probability: 95 %
     Instrument uncertainty: See Manual

REFERENCES
[>] Temperature Reference: R/N 4+6

[Enter] List,  [Esc] Exit
```

7. Advanced settings

Press "A" in the main menu and following menu will be opened:

```
ADVANCED SETTINGS for Swema 05

[ ] Space - Print measurement values
[,] Comma - Print measurement values with units

[R] Time since Power on
[*] Activate for Firmware upgrade

[B] RS485 baud rate: off

[Esc] Exit
```

Press "R" to get information for how long Swema 05 has been powered on.
Press "*" to activate the probe for firmware upgrade. It's however recommended to instead do the firmware upgrade through Swema-Terminal 3 main window (see chapter firmware upgrade).
Press "B" to activate RS 485 communication. When RS 485 communication is activated following settings will appear:

```
[B] RS485 Baud rate: 9600 bps
[P] RS485 Protocol: 0=none, 1=MODBUS: 0
[D] RS485 Address: 50
[E] RS485 Errors via USB: 0=off, 1=on: 0
[C] RS485 Check: 0=normal, 1=no CRC, 2=1s, 3=1s no CRC: 0
```

[B]: Set baud rate by pressing "B". Choose baud rate between 4800 - 460800bps.
[P]: Press "P" to choose RS 485 protocol. Set to "1" if Modbus protocol should be used.
[D]: Press "D" to set the RS 485 address for the probe, set an address from 1 to 247.
[E] & [C]: This is used for error checking and should only be used by experienced users of RS 485. It's recommended to have both of these set to "0" for normal usage.

8. RS 485-Modbus protocol

Modbus data string:

Byte 1 = Address
Byte 2 = Command
Byte 3 =Length of returned data
Byte 4 = Low CRC for byte 1-3
Byte 5 = High CRC for byte 1-3
Byte 6 = Low CRC for returned data byte 1-5
Byte 7 = High CRC for returned data byte 1-5

Command for reading:

<33> will return 2 bytes representing the temperature

Command string in hex to read the temperature:

<0A><33><00><95><3F<<00><00>

Example of response data in hex from probe (2 bytes):

<0A><33><02><09><6E><09><3C>
<09><6E> = 2414/100 = 24,14°C

9. Firmware update

On www.swema.com new firmware version will be possible to down-load. To update the firmware first download the new firmware to your PC. Start SwemaTerminal 3 with the probe connected to a USB port with the USB cable (Part no: 767300). In SwemaTerminal 3 click on "File" and then "Update firmware". A new window is opened, just follow the instructions given to you in that window.

10. Accessories

Part no	Product
767300	USB cable, Swema 03/05 - PC
767610	RS 485 USB cable, RS 485 - PC
767630	RS 485 cable, Swema 03/05 - RS 485
767660	RS 485 3-way splitter
767670	RS 485 2m cable
767680	RS 485 5m cable
767690	RS 485 terminator
763710	SwemaMultipoint, software