For technical support, contact: 011 202 5884 or 083 235 4916.

SMS TEMPERATURE ALERT
User Manual (updated 17/01/2021)

Main features

1. Ideal to provide SMS notifications for **fridges/freezers/computer/server/air-conditioned rooms.**
2. Reports to **8 cell phone users** when temperature goes above or below the range you are monitoring. The SMS will also contain the temperature at that specific moment.
3. The system will send keep on sending you an SMS **every 15 minutes** until the temperature is back to normal. The repeat feature can be turned off.
4. **LCD screen** on which you can check the temperature.
5. Also monitors **power loss/restore** (Eskom power). It notifies you via SMS when the power is off/on.
6. Temperature range is **adjustable** by the user (you programme it yourself).
7. Plugs into wall with a **three-point plug** & operate – no installation needed.
8. It has a **1,5m wire** (6-core) with a temperature **probe at the edge** that you **put inside the fridge**, under though the rubber of the door (the whole system is not put inside the fridge/freezer). **The 1,5m cable must not be extended.**
9. It has a **1 Amp battery** inside, which will give you a **battery back-up** time of **2-6 hours**.
10. Available configurations:
    a. Extra Temperature Sensor with 16x2 LCD

   b. A custom SMS Temperature Alert can be made up to monitor up to **4 fridges** if you connect extra sensors. Each extra sensor can be up to **5m away** from the main SMS Temperature Alert, on the same premises. The older systems that don't show the temperature in the SMS's can monitor 12 fridges.

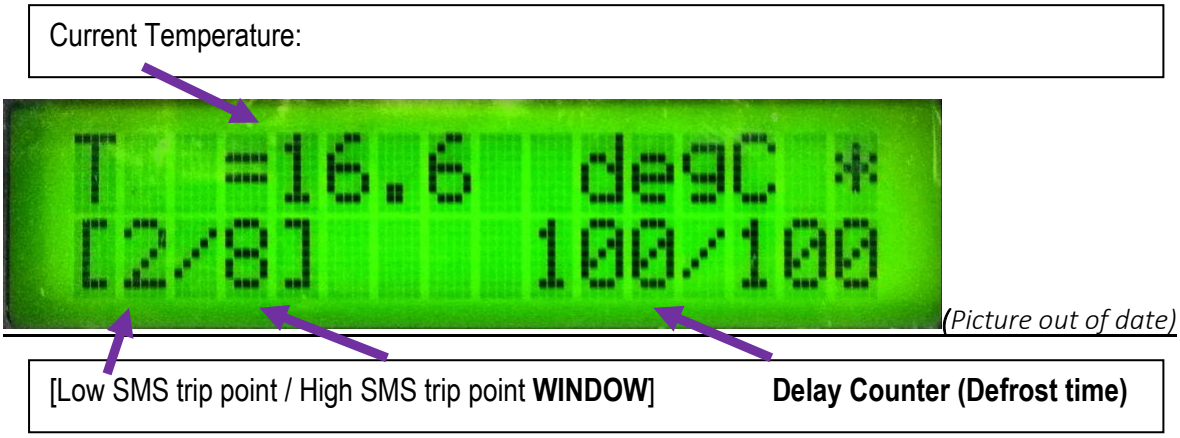
11. It is a **DIY** system. Plug and Play
12. The unit does not require **calibration** although an external calibration is required on a regular by an independent service provide in your area as per pharmacuitial requirements. This product is not WHO "approved", but does meet or comply with required temperature settings.
13. **If there is a lot of airflow in the fridge**, we recommend the tip of the probe be put into an **empty match box** to protect it from the wind. The probe is very sensitive and reacts quickly to changing temperatures. The Mercury thermometers are slow to react.
14. The unit is normally placed/fitted on the top/next to the fridge, and the 1.5m cable with the probe normally enters the fridge via the door rubber, otherwise a hole must be drilled somewhere on the fridge which is not always allowed or possible.
15. The unit has another 1.5m cable with a three-point plug on it that must get power.
16. When you receive the unit, you must open the box, fit the SIM-card and connect the battery.
17. The LCD shows the current temperature and your safe window temperature range.
18. You can also adjust the "safe window" (e.g. 2-8 degrees) shown between the **[** and **]**
19. **"Temp1 Over/Under -1.23** " SMS is received when the temperature is **below** 2 or **above** 8 degrees.
20. **"Temp1 normal/OK 6.23"** SMS is received when the temperature is **within** 2 to 8 degrees.\
21. Last value shown is the temperature at that point
22. The temperature in point 18 and 19 will be included in the SMS. The current temperature can at any time be requested via SMS (1234 r)
23. The 8 users that will receive an SMS can be loaded and changed via SMS, or we can pre-load it for you.
24. Should the Eskom power (three-point plug power) go off, then you will receive an SMS "**Power Loss" or "Power restored**".
25. Battery standby time is approximately four hours, and you will receive a "**battery low**" SMS when it is depleted before it will shut down. A bigger battery can be fitted.
26. The temperature probe can measure between **-50 and +125 degrees** Celsius. Special cable must be quoted on for temperatures above 40 degrees or below -20 degrees.
27. Airtime balance can be checked via SMS, or on the internet (if Vodacom is used), otherwise a contract SIM-card can be used.
28. An external aerial is optional in areas with weak cellphone reception (lower than 4 to 5 bars cellphone reception).
29. The unit has a separate upper and lower **Defrost cycle** time delay adjustable between 1 and 60 minutes. We normally pre-set these values and the client can change it later.
30. Several other custom features are not listed here. E.g. optional **siren output** with a **reset button** when the temperature SMS alarm is sent.
31. An independent USB to PDF **datalogger** is also available. It is the size of a tag and must be replaced after 2.5 years. By default, it reads the temperature every 5 to 15 minutes (adjustable).
32. Future remote units (March 2018) will be wireless and will mange more than the current 4 units.

Changing the Temperature

The current product does not SMS the physical temperature value, only whether the temperature is over/under or temperature OK. There is a Beta version that can SMS the physical temperature contained within the SMS. When **T** is outside the **WINDOW**, the **Delay Counter** will count up or down,

when it reaches 0 or 100 only then a SMS will be sent. This is to prevent a flood of sent SMS messages when the doors are temporarily opened.

1. Reboot the LCD display – Hold in both the UP and DOWN button.
2. During startup, when pressing the UP button, the delay counter can be changed (default 5 = 5 minutes).
3. Press the "UP" button to set the Low Temperature value.
4. Press the "Down" button to set the High Temperature value.
5. If you miss the value, just continue and the values with loop(circle) at -50 and +125.



(Picture out of date)

Changing the defrost cycle(s)

Refer to the video
https://www.dropbox.com/s/r6d299gch73ignh/Setting%20the%20ceiling%20and%20floor%20timeout%20defrost%20cycle.mp4?dl=0

Quick Start Steps

1. **Preparing SIM-card** - Buy an MTN, Vodacom or Cell C starter pack (prepaid or contract) and RICA it (you need your id and proof of address for this). Ensure that you can send an SMS out from the SIM-card, before you put it in the SIM-card slot of the SMS Alert. Making a call to the SMS Alert only is not sufficient to test the SIM-card. PIN-code request must be deactivated before you insert the SIM-card into the SMS Alert.
2. **Airtime** - Ensure that the SIM-card has sufficient credit. Load airtime if necessary.
3. **Insert the SIM-card** into the SIM-card slot. Apply 12VDC.
4. **Red LED** - The red LED will flash when an SMS is sent.
5. SMS **1234 b** from your cellphone to the SMS Alert. Note the **yellow LED** will light up when B is active. This step tells the SMS Alert where to send SMSe when inputs are tripped. **There must be a space between 1234 and b. If you SMS 1234 b again, you will cancel user B. If you SMS 1234 b again, you will reload user B. (In other words you will toggle it on & off).**
6. The SMS Alert will respond to step 5 by sending its status back to you (e.g. RELAY ON B----------, #0 #0). Ensure the character "B" appears in the SMS to show user B is loaded. The string means the following:

How to program the SMS Alert to report to a 2nd, 3rd or 4th cellphone

There are 8 users (recipients): B,C,D,E,F,G,H,I. Follow step 5 of Quick Start Steps to activate user B which is the first user. If you want the SMS Alert to report to the 2nd cellphone, SMS **1234 c** from the second

cellphone to the SMS Alert. To toggle this feature **off**, SMS **1234 c** again from any cellphone to the SMS Alert. The last phone that toggled a user **on**, becomes that user.

E.g: 1234 c (There **must be one space** between **1234** and **c**, and no spaces afterwards. User **lower case.** Do the same for **1234 d** (3rd), and **1234 e** (4th). User B must be **on** for the other users (if loaded) to also receive SMS messages.

New function to add cellphone numbers: (It is recommended to use the above method outside of South Africa)

In conjunction with the current method of loading numbers the following command allow users to be loaded from one point/cellphone. This eliminates the need to send a SMS from each cellphone handset that needs to be added.

When a DOT and phone number is placed after the current command, the phone number will be loaded into that position. The return SMS will be sent to the new cellphone number, not the cellphone number that loads it. You can however check if all the numbers are loaded, by sending **1234 r** to the cellphone number of the SMS Alert.
Example: To load 27821231234 into User B, send the following SMS from one cellphone, to the cellphone number of the SMS Alert:

1234 b.27821231234 (only use 1234 b,c etc., with no phone number if it is not a remote number)
or
1234 e.27821231234

If a user is already loaded, then the command will first delete it (toggle off). It then needs to be sent again. The international setting must be activated for use outside of SA before this can be done (not tested). If it fails, then revert back to the current method. Applicable to the GSM module marked Version 2.5 and up.

Please keep track which user is loaded as B, C, D etc. Otherwise all users/numbers will be deleted when you want to load or delete users, and you cannot remember which person is assigned as which user.

Requesting the temperature via SMS (products from May 2016 onwards):

1234 02	On/Off Toggle - 15 min **repeat** SMS will be sent when out of range – by default on.
1234 r	To check temperature at any time. Return SMS will be: B------1,-,- 1=23.4* 2=10.3 An asterisk (*) next to the temperature indicates that the temperature has tripped before and not yet back to normal The 1 = Eskom Power on 0 = Eskom Power off **The temperature reading will not work if user B is not loaded**.
1234 07	24 Hour general overall report
1234 05	International setting, normally set in factory – phone or email us for support.
1234 10	5 Min delay on Power Loss notification vs instant notification. Will clear 1234 11
1234 11	30 Min delay on Power Loss notification vs instant notification. Will clear 1234 10
1234 12	Enable Remote data logging – must be ON for below to work – 2 yearly subscription required – however, we trust this will later be available for free.
1234 13	Toggle between 5 min (disable) and 15 min (enabled) interval logging
1234 14	Change to 45 min logging – 1234 13 must be disabled (off) as 13 is preference

Loading & checking airtime balance

SMS COMMANDS	FUNCTION	SMS TO BE SENT TO SMS ALERT
Vodacom	Check balance	1234 AIRT*111*502#
MTN	Check balance	1234 AIRT*136#

Airtime can also be loaded via internet banking, an ATM, or by removing the SIM-card and putting it in your own personal phone using the voice method.

It is recommended that the GOOGLE APP of the applicable Service Provider be used to check balances.

Future plug and play options on the SMS Alert will allow either or both SMS and DATA usage but an APP will be required for DATA.

****Disconnect the power from the SMS Alert when the SIM-card is removed.**

Lower Case and Upper Case of Commands (VERY IMPORTANT)

1. Use **lower case** for **all commands** sent to the SMS Alert (e.g. 1234 **r**, 1234 **b**, etc.)
2. Use **UPPER CASE** only with the following 2 commands:
    a. 1234 **TC** (terminate call)
    b. 1234 **AIRT** (checking airtime).

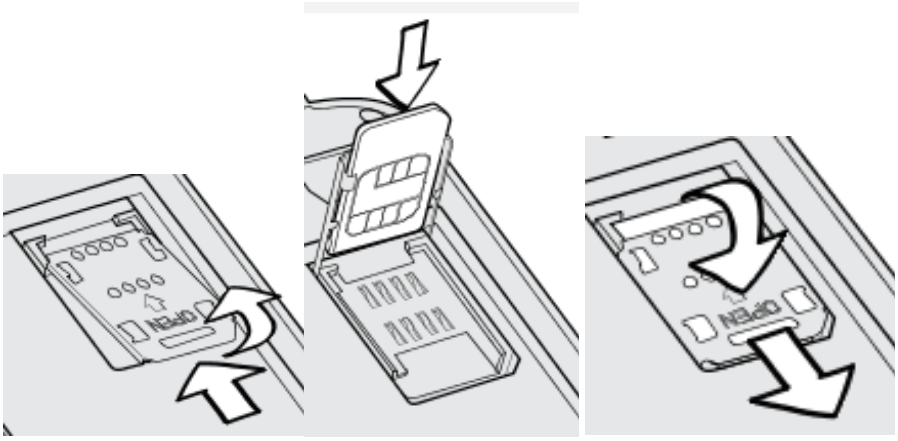
Temperature Data Loggers are available for sale, as an optional extra

The data logger is an independent device from the SMS Alert. It looks like an access tag, but it is a monitor with a battery and a USB port, that records the temperature every 15 minutes. The device has a life expectancy of 2.5 years then it has then to be replaced. Once a month or as often as you wish, you take the device out of the fridge, connect it to your PC's usb port, and download the temperatures log in chart report format to see if there were fluctuations, etc. Mainly used for history purposes.

Antennas for poor reception:

3 meter Antenna available for external GSM reception, or poor reception

Inserting the SIM-card on the PC Board



A B C

1. A - Push/slide flap in the same direction as the board (about 1- 2 mm).
2. A - The flap will unlock, lift the flap.
3. B - Insert SIM-card.
4. C – Close flap, while pressing it down, slide it back to lock (about 1 – 2 mm).
5. Also refer to https://www.dropbox.com/s/qgztyir821vwgbx/20170315_temperature%20alert%20install%20insert%20sim.mp4?dl=0

Testing, Calibration and Logging

Recommended testing procedures:

1. Each Friday: switch off by wall socket:
    a. Receive **Power Loss** SMS – this may take up to 1 minute.
    b. Check that unit stays on (LCD) e.g. running off battery.
    c. Switch power back on and get **Power Restore** SMS.

2. Once every 2 to 6 months do a full end to end test:
    a. Heat up the probe tip either via placing it in normal tap or hot water that is above the safe window.
    b. Wait for the unit to Time Out (counter will count upwards) and check that a **Temp Over/Under** SMS is received.
    c. Place probe back inside the fridge. The timer should then count backwards up to 0, then a **Temp Normal** SMS must be received.

Data Logger

(This is only applicable if you bought the Data Logger with the SMS Temperature Alert)

To comply with pharmacy council requirements for a monthly hard copy, one needs to print out the data monthly. This is done by downloading and printing the report page and filing it for audit purposes. You can then re-configure the data logger for next use. All back up data will be saved on your computer, under Documents in the MY Logtag data folder

WHO guidelines for good pharmacy practise suggest: 15 minute reading interval, 30 minute start delay and temperature parameters as follows:
Fridge: < 2 °c for 1 hour consecutively / > 8°c for 2 ~ 4 hours accumulative. Ambient pharmacy: < 0 for 1 hour consecutively / > 25° For 2 ~ 4 hours accumulatively)

As for the existing data logger files you have, they may not be separated on a monthly basis **but all the data is there to validate your cold chain** throughout the period.

The sensor fitted on the tip of the wire cannot be calibrated. It is a digital sensor (from Maxim) that sends out data which is displayed on the LCD.
Sensors that are analog may require calibration or an offset adjustment.

However, it is recommended that your SMS Temperature Alert's display temperature is checked (calibrated) on a regular basis, for example every 6 months. You may contact the following numbers for possible service providers related to calibration:

Mario @ Repcal- JHB - 011 315 3134, 082 414 4664
Melony - 012 333 7709, 082 367 4340

Technical information on the probe

The datasheet below/attached show the accuracy is 0.5 degrees.
Refer to bullet point 7 below (1st page of PDF link at the end of this document).

Also note that the sensor response is almost immediate. For this reason, an adjustable time delay is used (which in the long terms acts as an average),
to allow the temperature readings to go outside the set limit for a certain period.

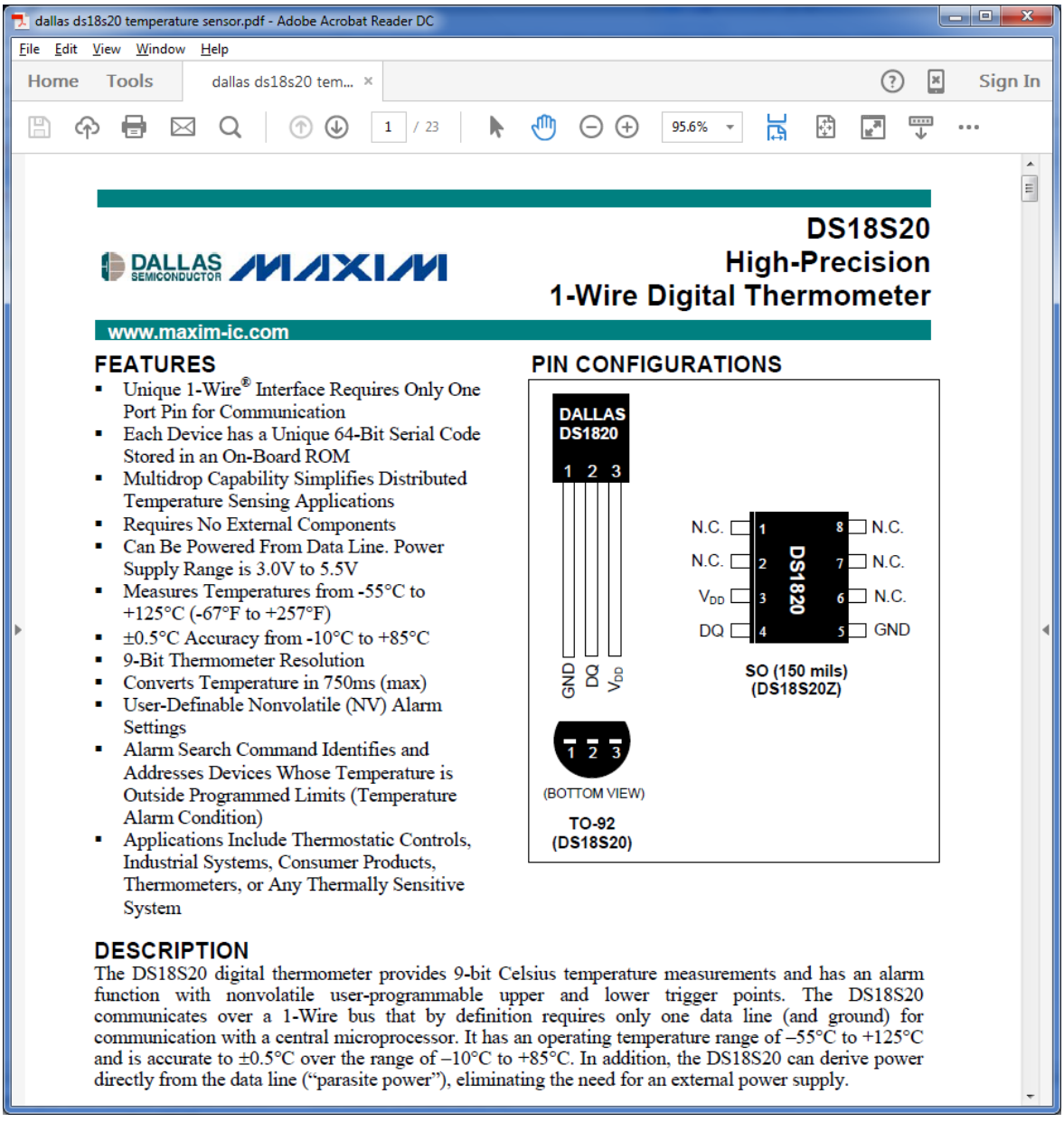
Mercury based thermometers may react slower to temperature change, and as a result displays the "average" running temperature.

If the two sensors are compared in the same fridge then note the following:

1. Both sensors must be placed together because temperatures differ in different spots in e.g. fridge.
2. Some fridges have fans inside which will also affect immediate vs average readings.
3. Sections/spots of some fridge's inside sides/walls may be hotter that the air due to electronics/pipes/heat exchange process etc.
4. The best is to place measurement devices slightly away from the inside walls in a fridge.
5. It has been noted with thermal imaging performed by us that there can be up to a 4 degrees difference inside some of the freezers, therefore the probe should not initially be fixed. Some doctor rooms have placed the tip of the probe in an empty open ended small container.

Also see
https://pharmcouncil.co.za/media/default/documents/Good_Pharmacy_Practice_(2004)_Consolidated.pdf

or
https://www.google.co.za/search?q=WHO+approved+and+according+to+GPP+requirements&sxsrf=ALiCzsY8-erOMYc-T9rTbFyRBfslclfu_Q%3A1652086978617&source=hp&ei=wth4Yq7KI4q0gQbvrqvIBA&iflsig=AJiK0e8AAAAAYnjm0khXF59-2jWGHa_unYH8KoFuDznJ&ved=0ahUKEwius_zLh9L3AhUKWsAKHW_XCkkQ4dUDCAc&uact=5&oq=WHO+approved+and+according+to+GPP+requirements&gs_lcp=Cgdnd3Mtd2l6EAMyBwghEAoQoAFQAFgAYJgIaABwAHgAgAH6AogB-gKSAQMzLTGYAQCgAQKgAQE&sclient=gws-wiz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FEATURES

- Unique 1-Wire® Interface Requires Only One Port Pin for Communication
- Each Device has a Unique 64-Bit Serial Code Stored in an On-Board ROM
- Multidrop Capability Simplifies Distributed Temperature Sensing Applications
- Requires No External Components
- Can Be Powered From Data Line. Power Supply Range is 3.0V to 5.5V
- Measures Temperatures from -55°C to +125°C (-67°F to +257°F)
- ±0.5°C Accuracy from -10°C to +85°C
- 9-Bit Thermometer Resolution
- Converts Temperature in 750ms (max)
- User-Definable Nonvolatile (NV) Alarm Settings
- Alarm Search Command Identifies and Addresses Devices Whose Temperature is Outside Programmed Limits (Temperature Alarm Condition)
- Applications Include Thermostatic Controls, Industrial Systems, Consumer Products, Thermometers, or Any Thermally Sensitive System

PIN CONFIGURATIONS

DALLAS DS1820

1 2 3

GND DQ V_{DD}

(BOTTOM VIEW)

TO-92 (DS18S20)

N.C. 1 | N.C. 2 | V_{DD} 3 | DQ 4 | 8 N.C. | 7 N.C. | 6 N.C. | 5 GND

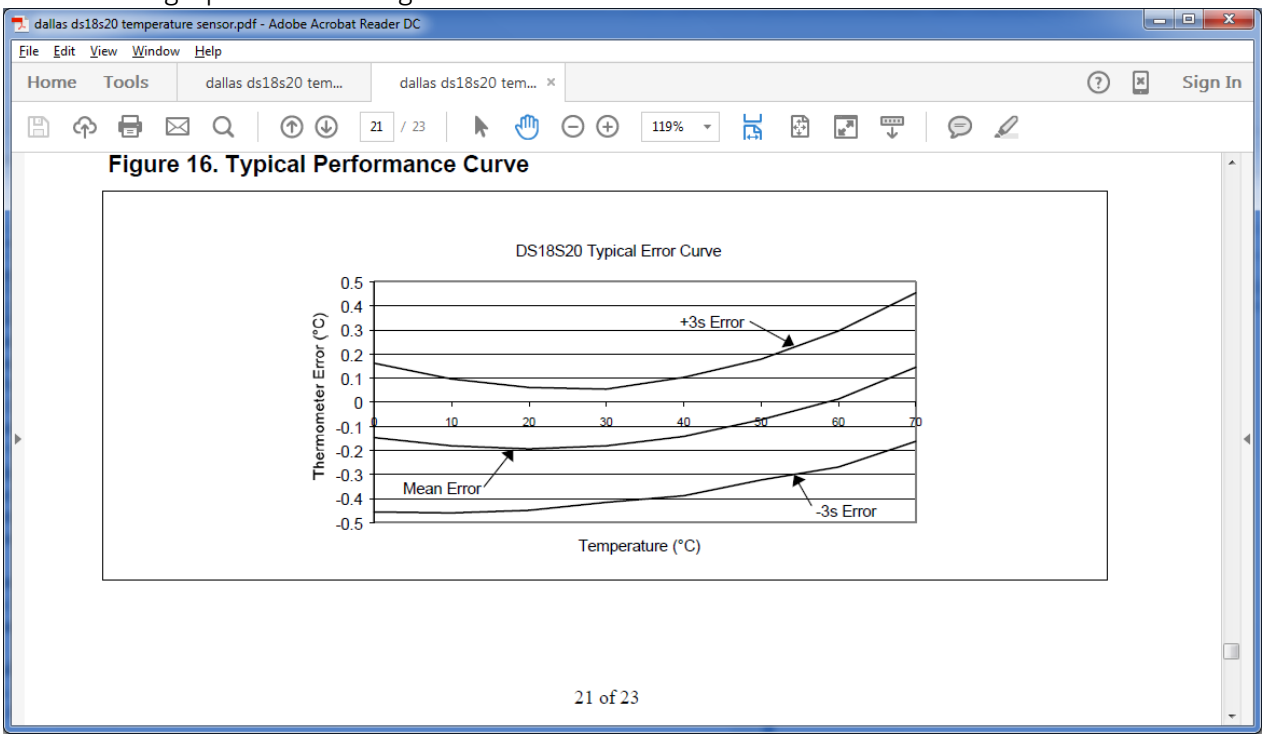
DS1820

SO (150 mils) (DS18S20Z)

DESCRIPTION

The DS18S20 digital thermometer provides 9-bit Celsius temperature measurements and has an alarm function with nonvolatile user-programmable upper and lower trigger points. The DS18S20 communicates over a 1-Wire bus that by definition requires only one data line (and ground) for communication with a central microprocessor. It has an operating temperature range of –55°C to +125°C and is accurate to ±0.5°C over the range of –10°C to +85°C. In addition, the DS18S20 can derive power directly from the data line ("parasite power"), eliminating the need for an external power supply.

Refer to the graph below or Page 21 of 23 in PDF link at the end of the document.



Source - https://www.maximintegrated.com/en/products/analog/sensors-and-sensor-interface/DS18B20.html

Support:

1. Additional requests can be emailed to info@smsalert.co.za.
2. For software/hardware updates, please visit www.smsalert.co.za
3. **For support, phone us on 083 235 4916. Please note that your first point of call must be your supplier or installer. If they are unable to help you, we will be more than happy to assist.**

Disclaimer:

PicC Electronics will not be held responsible for loss, damage or injury to any persons, company or legal entity using PicC Electronics products or for GSM Network changes or reliability. There is no guarantee that SMS's will always go through. It is recommended that a prepaid SIM-card is used, or that a process is in place to cancel or stop the SIM-card, or to limit SMS's - should a malfunction occur where many SMS's are sent and unforeseen costs are incurred. It is recommended to test your SMS Alert on a regular basis. A product of PicC Electronics must be installed by an installer trained by PicC Electronics or with relevant installation experience.

Additional information: Temperature reading

The SMS Alert will SMS
"Temp out of range x.xx "
or
"Temp Normal x.xx"

x.xx is the temperature at that specific moment.

An alarm SMS is sent on the following conditions

1. The unit has timed out – been out of range for 20 mins (unless differently setup) AND
2. If the alarm is **confirmed 3 times** in a row – AFTER time out

When the above 2 point are confirmed – then the SMS is sent
BUT only then the temperature is read again at THAT moment.

So, the x.xx

1. Is a secondary indicator (not confirmed 3 times, and also not averaged)
2. To reconfirm the temperature, 1234 r may be used – only if curious

Temp out of range
or
Temp Normal
This is the primary indicator, confirmed 3 times.
Confirmation is done because of possible interference, (on/off start of fridge motor etc)

Safety net
In conjunction, a repeat out of range setting is available, where the unit will keep sending and alarm SMS.
This is useful in case there where any Cellular issues during the first SMS transmission, maybe Cell phone tower off etc.

Temp OK SMSes
From time to time Temp OK SMS may be sent. This is due to a restart of the SMS Alert product (reboot)
A reboot occurs when

1. There was an issue with the cellular network
2. Loss of signal
3. or any other fault the product detected, and for safety reasons issued a reboot.

The focus should be on the first part of the SMS, the x.xx is not confirmed 3 times for various technical matters, and temperature averaging considerations