

Standard Operation Procedure 0029: t-Scan monitoring system

Contents of Policy

1) Purpose and Scope of the policy	2
2) How does T scan work	2
3) The alarming process	3
4) Running an alarm test on tscanweb	4

Document Control

Date document last changed	12 May 2022
Date document reviewed	12 May 2023
Version number	1.00
Number of pages	4

Standard Operation Procedure 0029: t-Scan monitoring system

1) **Purpose**

The purpose of this SOP is to describe the use of t-Scan monitoring system, which provides confidence and peace of mind through comprehensive and traceable monitoring, reporting and alerting services.

2) **Scope of Policy**

The scope of this SOP for t-Scan monitoring. It targets ULT freezers and cryogenic storage materials designated for research purposes, particular medical and life sciences research.

3) **Introduction**

T-scanweb is the User interface accompanying the t-Scan real-time temperature monitoring system. It provides 24/7 wireless temperature monitoring solutions. This SOP aims to ensure that all samples that are stored in ULT freezers and cryogenic vessel are monitored and maintained to a high standard and there is a response if any of the equipment has emergency breakdown. The response time is critical in responding to an emergency breakdown in order to save valuable research samples.

4) **How does t-Scan work**

T-Scan is a system that remotely monitors temperature readings from sensors which are collected by a local network via LAN receivers or a GPRS receiver to the cloud. These are all stored and displayed in t-scanweb. Various threshold is set on the sensors and if the threshold is breached than, an alarm will be triggered and sent to alarm & stale date report (SDR) group for that sensor via voice alarm (VoIP), email and SMS. This will be repeated until the alarm is responded to or the sensor comes back into threshold. Also have functionality for persistent alarming if the alarm is accepted but the sensor stays out of threshold.

5) **Sensor setting**

Threshold values – Low and high set values used for alarm triggering.

Log interval – The frequency at which a sensor reading is obtained.

Alarm delay – Allowable time that a sensor can be outside its acceptable Thresholds limits before an Alarm will be triggered.

ULT Freezer setting on First Floor Freezer Room

Log Interval	5 min
Alarm Delay	30 min
Low Threshold	-90°C
High Threshold	-70°C

Liquid Nitrogen Tank on First Floor Freezer Room

Log Interval	5 min
Alarm Delay	30 min
Low Threshold	-200°C
High Threshold	-150°C

Standard Operation Procedure 0029: t-Scan monitoring system

Ground Floor Walk-in Cold Room

Log Interval	5 min
Alarm Delay	30 min
Low Threshold	0°C
High Threshold	8°C

TC lab CO2 Incubators

Log Interval	5 min
Alarm Delay	30 min
Low Threshold	32°C
High Threshold	42°C

6) Alarm & SDR group

Alarm groups – How sensors are grouped together to notify specific users when sensor outside Threshold limits.

Stale data report (SDR) groups - How sensors are grouped together to notify specific users when sensor data is late.

Alarm & SDS groups - users will receive an alarm (phone call (VoIP), email and SMS), all three of these, as selected. When a sensor goes into alarm, it will alert all members of Alarm & SDR group in order specified on this page.

An alarm occurs when a sensor's reading goes outside of its Low or High threshold for a period of time that exceeds the set Alarm delay.

Alarm Group Priority Order:

Laboratory Manager
Business Manager
Apprentice Laboratory Technician

SDR Group Priority Order:

Laboratory Manager
Business Manager
Apprentice Laboratory Technician

7) The alarming process

There are three alarm types. It is recommended that all three are utilised and assigned appropriately to those responsible for responding to alarms:

- i. **Email** – An email is sent with details of the alarming event and a cancellation email is also sent when the sensor is back in bounds.
- ii. **SMS** – An SMS is sent with details of the alarming event and a cancellation email is also sent when the sensor is back in bounds.
- iii. **Telephone** – An automated message feature contacts all Users in succession for a pre-defined amount of time until the alarm has been acknowledged or remedial have been exhausted*.

Users will only receive an Alarm if:

- Sensors continue to be out of bounds after a pre-set alarm delay.
- Users are in the Alarm Group to which the sensor is assigned.

Standard Operation Procedure 0029: t-Scan monitoring system

- Users contact details are correct i.e. mobile number (SMS), phone number (automated voice call), and/or email address.
- Users status is set to **AT Work** on the Users account settings.

*the number that shall alert Users is **+44 (0) 1886 211004**. To acknowledge a voice call alert and stop the process-alarming event, press 7 on the telephone key pad. When accepted the action is recorded and the user is expected to take the appropriate action.

**Note the alarm is only reset when device returns to within its set thresholds. It is the responsibility of the User acknowledging the Alarm to fully investigate and resolve the issue.

All Alarm Group members may receive SMS and Email alerts simultaneously. However, automated voice calls will be issued according to the Alarm Group's Priority Order.

An automated voice call can be "acknowledged" by pressing the 7 key on the dial pad. If an automated voice call is not acknowledged, the system will then issue a call to the second User in the Priority Order. This will continue 10x per User at which point automated voice calls will cease. Eg. if an Alarm Group has 10 members, 100x calls will be attempted (unless somebody acknowledges the automated voice call prior to this at which point calls will cease).

8) Avoiding Alarms

Users should be aware that multiple alarm respondents may be on call-out list. It is highly important that all Users that use a freezer understand that potentially serious implications of inadvertently setting off an alarm or setting incorrectly, resulting in an unnoticed temperature rise beyond the set high threshold and system alarms. Below are examples of how an alarm could be inadvertently triggered:

- Working in a freezer or leaving a freezer door open for an excessive period of time.
- Not disabling the alarm system when defrosting a freezer.
- Removing a sensor.

To avoid an alarm in the case of an intentional defrost, always inform others in your Alarm group that you are conducting a defrost process. Change the High threshold setting by going to the sensor box on t-scanweb and make sure to change it back once its complete.

9) Running an alarm test on tscanweb

Lab manager or Apprentice Lab technician will run weekly Alarm tests in order to ensure all Alarm channels (SMS, VoIP and EMAIL) are functional. This will be recorded on a excel spreadsheet.

To trigger an alarm Test, follow steps 1 to 6, found below:

Step 1.

Check that the alarm group for your desired test sensor has user assigned with the appropriate notifications field correctly filled (e.g. SMS, email, VoIP). Record all original alarm group setting such as threshold, so that they can be correctly re-set following the alarm test.

Step 2.

For your test sensors, reduce the **alarm delay and log interval to 1 minute** and then alter either the **lower** or **upper** threshold such that the sequence of following readings will be higher than the upper threshold or lower than the lower threshold. This will force the sensor out of bounds and trigger an Alarm event.

Standard Operation Procedure 0029: t-Scan monitoring system

Step 3.

Once the sensor is out of bounds and the Alarm Delay has been exceeded, an alarm sequence will be triggered and will continue to notify Users in the order specified in Alarm groups. Users shall receive notifications according to preference.

Step 4.

Check with individual Users that the Alarm sequence has triggered as expected and all calls, SMS and emails have been received. Recommendation that you leave any Alarm calls unacknowledged for the first round to ensure all users are contacted in the correct order (call acknowledgement will stop the Alarm cycle).

Step 5.

Go to the **Remedial Actions** page on tscanweb and write a note, Alarm Test, in the Remedial Action field.

Step 6.

Following the alarm test, ensure that all sensors and Alarm Group settings have been reverted to their original state:

- Thresholds
- Alarm Delay
- Log Interval
- Alarm Group
- User notification preferences.

10) Notifications Setting

Holiday Status

User can access and manage their notification settings for tscanweb by clicking their name or initials in the top right-hand corner of the navigation bar. By selecting **account setting** and then navigate to "**Notification Settings**" a user can amend their notification settings and the frequency of SDR notifications.

If a user sets their status to '**On Holiday**' they will not receive alarm notifications until they change their status back to '**At Work**' (or an administrator changes the setting on the user page).

'I am currently: **on Holiday**' means they not receive alarm notifications.

Please ensure you set yourself as 'I am currently: **at Work**' if you want to receive alarm notifications.

The lab manager **never** uses the Holiday status for extra peace of mind. The lab manager is also the system administrator.