



Networked Robotics Corp.
825 Chicago Ave, Suite F
Evanston, IL 60202, USA
Toll free: (877) FRZ-TEMP
(877) 379-8367

info@networkedrobotics.com
support@networkedrobotics.com
NetworkedRobotics.com

Glycerine Cells for TPL3 Digital Temperature Probes (#50001 and #50003)

Networked Robotics' Glycerine Cells for TPL3-series digital temperature probes enable the measurement of stable, mass-reflective, temperature data from refrigerators and freezers. A liquid solution, usually glycerine/water dampens the response to temperature fluctuations in emulsion of sample or product of similar mass.



The Glycerine Cells are designed for use with Networked Robotics' TPL3-series digital temperature probes (see Networked Robotics products #30001 and #30012). These digital probes are ordered separately. The cell/probe assembly is used with the Networked Robotics NTMS (Network Telemetry Monitoring System) hardware and with Networked Robotics Tempurity™ System software in order to monitor temperatures in regulated environments. Most commonly these will be the interior chambers of refrigerators, freezers, and other cold storage devices, but may also include incubators, rooms, and other environmentally-sensitive areas.

Glycerine Cells are available in 35ml (#50001) and 200ml (#50003) sizes. Select the cell that is appropriate for the regulations that apply to your laboratory and/or to match the thermal mass of the product being stored.

Description

Glycerine/water (glycerol) solutions of 33% and 50% are common in monitoring applications. Ethylene glycol and other liquids that are used in freezer monitoring applications can also be used with this product. For some applications water is required. The liquids that are used to fill the Glycerine Cells must be obtained separately.

Many Networked Robotics customers monitor temperatures via our digital temperature probes without the need for methods of thermal dampening. See your regulatory rules and the "Liquids in Temperature Monitoring" section for the applicability of this product in your regulatory or quality environment.

Packing List

This package includes:

- (1) Glycerine Cell
- (3) Dual-lock mounting strips

Digital temperature probes and glycerine or other liquid solutions are obtained separately.

Installation

The cell is comprised of two pieces – 1) the “chamber” and 2) the “cover assembly”. The cover assembly contains the digital temperature probe and fits into the liquid-filled chamber. **The acrylic cells are fragile – sensitive to impacts. Please handle carefully during the process of installation.**

The main steps in installation are as follows:

- 1) Partially fill the chamber with the desired solution.
- 2) Insert the Networked Robotics TPL3 Digital Temperature Probe in the window in the cover assembly, and lower it carefully into the chamber.
- 3) Attach the entire cell to the freezer using either the dual-lock strips provided or the cell’s hook.

1. Fill the chamber

Remove the Glycerine Cell from the box. Remove the cover assembly from the chamber. Stand the chamber on the bottom of a sink, on a table, or another flat surface.

The solution that you select must be appropriate for the type of device (refrigerator, freezer, incubator, etc.) being monitored. The solution must not freeze as a frozen chamber will not be capable of measuring temperature effectively. Frozen liquid will also affect the cell’s physical integrity. Do not use water in any device that could reach below 0° C.

Fill the chamber about 2/3 of the way full with 35 ml of the chosen solution. You may choose to use less liquid. In many cases 10 ml, or even empty may provide sufficient temperature stability. See the response time chart in the “Reference” section.

If you intend to mount the cell via its hook, do not fill the unit completely as the cell will tilt forward and leak briefly.

2. Insert the Temperature Probe

The dual-lock that is attached physically to the back of the TPL3 digital probe need not be removed. If a similar mating dual lock piece is on the probe disconnect it.

From the “backside” of the cover assembly place the TPL3 digital probe in the “window” of the cover assembly. Apply an even and perpendicular force such that the TPL3 is inserted firmly in the cover assembly. The fit is tight so you may need to position the probe carefully. Some probes may have a wider head due to the epoxy fill. In these cases consider filing down the edges of the probe and the interior window of the cell.

Slowly lower the probe/cover assembly into the filled chamber taking care to feed the probe wire through the J-shaped slot in the cover.

Ensure that the probe is completely submerged in liquid.

3. Attach the Glycerine Cell with Probe to the Monitored Device

Check that the area under the installation location is free from any product or sample that could be affected by a spill from the cell. Move any sensitive product.

Some refrigerators and freezers have wire shelves from which the glycerine cell can be hung. If you are going to hang the unit from the hook, make sure that it is placed in an open space where its position will not interfere with the movement of samples in and out of the freezer. Ensure that samples and sample movement will not damage the hook as it extends slightly over the plane of the rack. The cell will tilt forward slightly when hung. Ensure that the probe wire has no visible slack that could snag or cause stress on the cell.

It is best if the cell is mounted in a visible location. From within the cell, the temperature probe's LED tells you at-a-glance whether temperature data collection is enabled properly. Some quality standards recommend the placement of temperature sensors in central locations. You may also wish to attach the cell assembly to the interior side wall. When side-wall mounting Networked Robotics recommends attachment to the hinge-side wall about 2/3 to the top vertically and at least a foot backward from the door. The unit should not be mounted in a location where it touches any sample as this may affect the reading.

When applying the dual-lock to the side of the freezer use a gloved hand to warm the location, wipe off any moisture or condensation with a paper towel, and apply the dual-lock. Check to ensure that the unit is mounted vertically and is stable.

The Use of Liquids in Temperature Monitoring

There was a time when mercury thermometers were the only means of measuring the temperature within a freezer. On their own, they respond too quickly to temperature changes, so the cold storage industry's long-standing solution is to mount the bulb of the thermometer in a sealed container of glycerine or other non-freezing liquid.

Small-mass probes like a plain mercury thermometer can detect transient temperature changes. Bottled-up thermometers however lose the ability to detect fast rise-times in the ambient temperature. From the point-of-view of providing the most information therefore, the small-mass probe is better. The goal of most monitoring applications is to tell whether important products or samples that are stored in the freezer are compromised. From this point-of-view thermal-mass-dampened products are better because they have the potential to provide readings that more correctly reflect the temperature of the stored product rather than the freezer's internal air.



Operation

Caution must be used when implementing this product. This product slows the reaction of sensors to temperature changes. The Tempurity System will send alarm notifications later than if the probe alone is used. If your product is lower-mass than the cell/fill combination it is possible that the internal temperature will be higher than that recorded by the Tempurity System. Consider the possibility of reducing your Stage One and/or Stage Two threshold times which will counteract the delay produced by these cells.

If needed wash the cell with dish soap and sterilize with alcohol or bleach. If you are using water in the cell, consider the possibility of adding bleach to the tank during monitoring. The glycerine cell may be cleaned in a dishwasher.

Glycerine is hygroscopic and if exposed to the air will absorb moisture over time changing thermal properties slightly. Also some liquids evaporate. Consider refilling the cells periodically.

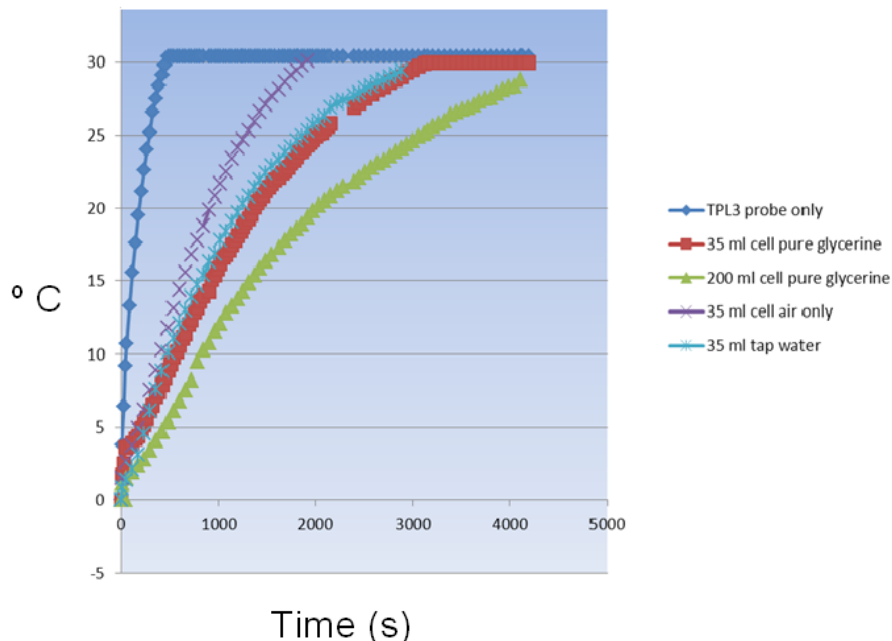
The cells are strong but have poor impact resistance! Store them independently in individual boxes filled with bubble-wrap or other packing material.

Reference

Response Time Analysis

The graph below shows the response time of several cells and fill types when the ambient temperature of the probe/cell combination is changed from near 0° C conditions to 36° C. Response time is tracked to 30° C.

Pure glycerine and water have roughly the same thermal properties however water cannot be used in freezers. Using less liquid than 35 ml in the smaller cell will produce a curve intermediate to the air-only curve and the filled pure glycerine curve. Some customers may find sufficient thermal dampening by using glycerine cells without any liquid fill.



Physical Specifications

35 ml cell

Weight
(empty):

48.2 grams (1.7 ounces)

Weight
(full - water)

83.2 grams (2.9 ounces)

Depth:

31.8 mm (1.25 inches)

Width:

57.1 mm (2.25 inches)

Height:

76.2 mm (3 inches)

200 ml cell

147.4 grams (5.2 ounces)

374.2 grams (13.2 ounces)

57.2 mm (2.25 inches)

108 mm (4.25 inches)

79.4 mm (3.125 inches)

Support

If you need assistance with your Glycerine Cell, your TPL3 digital temperature probe or other Networked Robotics products, contact us by phone at 877-FRZ-TEMP (877-379-8367) or by email at support@networkedrobotics.com