



**MOWDEN CONTROLS LTD
NORTHALLERTON, UK**

TECHNICAL SPECIFICATION

**BATTERY POWERED TEMPERATURE LOGGERS FOR USE WITH
WORTHINGTON DRY SHIPPERS**

REVISION STATUS

| REV | DATE | EQMS /F21 | REVISION DETAILS | BY | CHKD | APPD |
|-----|-------|----------------------|---|-----|------|------|
| A | 02/03 | | First Issued | GHL | NM | NM |
| B | 04/03 | | Updated for first prototypes | GHL | NM | NM |
| C | 09/03 | | Revised for extra memory and DO160D approval. | GHL | NM | NM |
| 1 | 01/04 | | First production of M380CE variant | GHL | NM | NM |
| 2 | 02/04 | F21/1450 | M385CE added | GHL | NM | NM |
| 3 | 01/05 | F76/1093 F21/1594 | Temperature alarm feature added. | GHL | NM | NM |
| 4 | 12/06 | F21/1735 | . Tip over switch added to M38x loggers. | GHL | NM | NM |
| 5 | 02/15 | F21/2638 | . TW logo removed from images. M382 photo added. | GHL | RA | RA |
| 6 | 11/18 | 11320 | Memory size increase to 16K records. | GHL | AS | NM |
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1. Introduction

This specification has been developed in response to the requirement for a Data Logger for monitoring of the storage temperature of biological materials while in transit.

The main intended use is with Worthington Dry Shippers

Other variants are possible to suit different applications. These will be covered by product specific information in future issues of this specification.

2. Key features

Logging and non-volatile storage of 16000+ temperature measurements

(Previously 8K records maximum – See section 4.5)

Logging intervals adjustable from 1 minute to 30 minutes

Battery operation (Non rechargeable Lithium cell). Typically greater than 5 years life.

PC Interface.

Product specific software for setting up, status checking, and downloading of data.

Data output as tables in PDF format or as Excel spreadsheet with temperature graph.

Status indication by LED (Logging Active/Standby and Battery condition).

Alarm indication by LED if temperature rises above a preset limit. Limit may be set using PC software.

For m38x-T variants (with tilt switch):-

Alarm indication by LED if container is transported in a non-vertical position..

Time limit (to allow for normal handling procedures) may be set using PC software.

Measuring range -199 °C to +40 °C,

Accuracy +/- 3 °C.

3. Accessories

PC Cable (9 pin serial or USB) + Software (Supplied Separately)

4. Product specific details

4.1 M380CE and M380CE-T Temperature Loggers for CP100 and CX100 Dry Shippers

The electronics are housed in a modified neck plug (Figs 1a and 1b).
The height of the plug cap is increased by 4mm approx.

The Sensor plate reduces the available headroom in the container by 15mm approx.
The plate is approximately level with the top of the canister when fully inserted.

The PC Interface connector and LED indicator are accessible from the top of the plug cap (Fig 1b).

Operating temperature -20 °C to +50 °C

Environmental protection to IP64

Compliance with RTCA DO160D Section 21.4 Cat B (RF Emissions).
Safe for air transport.

-T variant has Tilt switch. (See 4.4).



Fig 1a M380CE Temperature Logger



Fig 1b Top view – M380CE installed in a CX100 Dry Shipper.

Note: Reduction in ‘Holding’ time

Due to extra heat leakage caused by the thermocouple and electronics the holding time will be reduced slightly.

Users should be aware of this if using the container for extended periods.

4.2 M385CE and M385CE-T Temperature Loggers for CP500 and CX500 Dry Shippers

The electronics are housed in a modified neck plug (Fig 2a).

The height of the lid is increased by 4mm approx.

The Sensor plate projects from the bottom of the neck plug by 15mm approx (Fig 2b).

Specifications are the same as for the M380CE (4.1)

See also note on 'Holding Time'.



Fig 2a – M385CE-T Temperature Logger

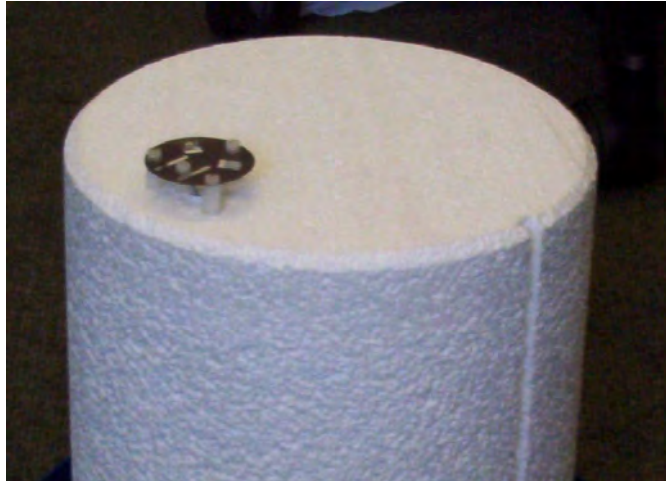


Fig 2b M385CE - Sensor Plate Position

4.3 M382CE and M382CE-T Temperature Loggers for CXR100 Dry Shippers

Specification is similar to the M380 but is housed in the CXR100 neck plug with a metal lid.



4.4 M38xCE-T – Loggers with Tilt Switch

From January 2007 the M38x range of temperature loggers were fitted with a tilt switch. This can be used to monitor the position of the container during transit.

If the container and logger are tipped from the vertical by more than 60 degrees (+/- 10 degrees) the switch operates. This is recorded in the log.

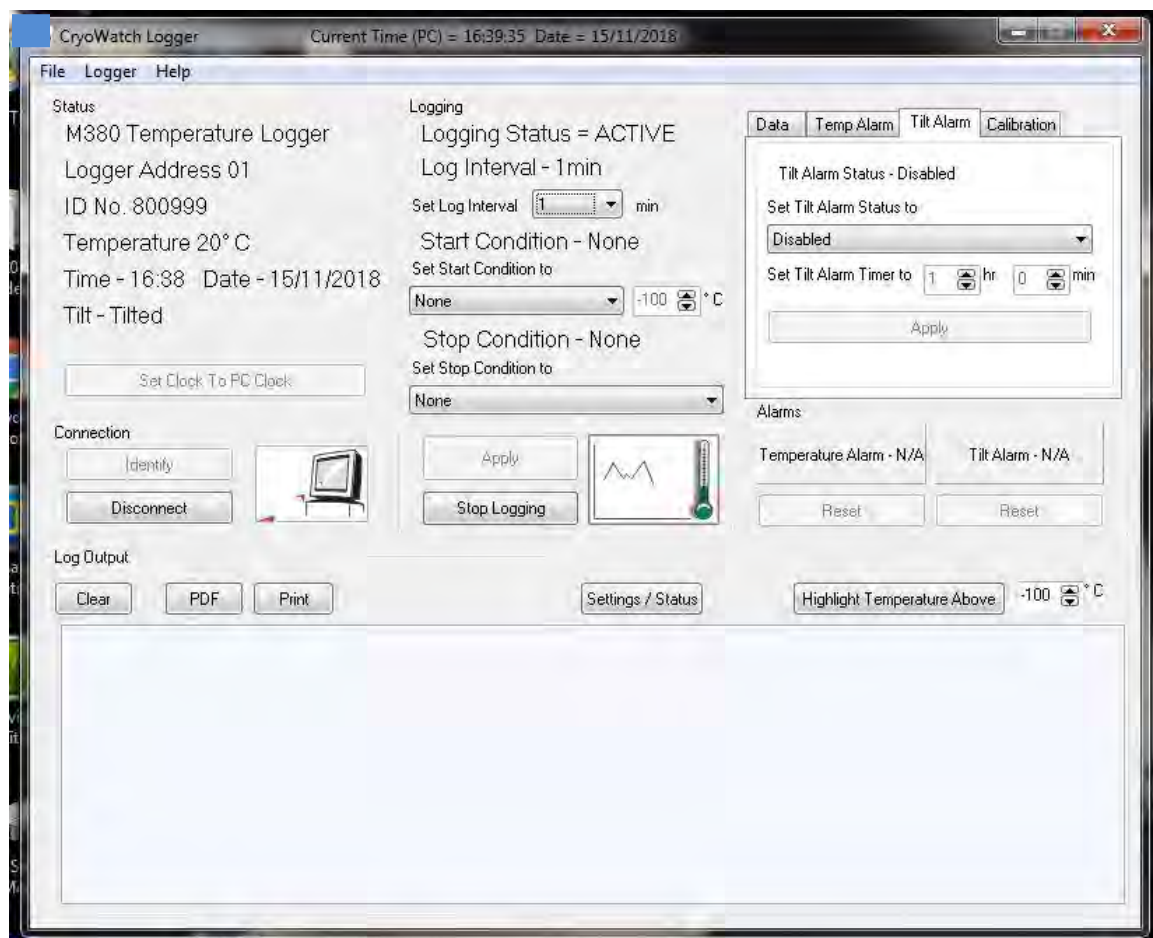
There is also a timer which can be set between 1 minute and 4 hours. The timer counts down while the logger is tilted and stops when the container is upright.

A second LED indicates an alarm if the timer counts down to zero.

The alarm is also indicated in the log and there is a status indicator in the PC Software. The timer avoids nuisance alarms caused by normal handling.

PC Software V1.6. or later is required to enable and program the tilt alarm.

See pictures below:-



4.5 M38xCE-T – Loggers with 16K memory.

Units from the following serial no.s onwards have the 16K memory :-

M380/0291

M382/0082

M385/0445

This can be seen as 'Maximum Number of Records' if the Data tab is opened on the main status screen.

