DM640XP & DM640XTC

Intrinsically Safe Battery Powered Digital Thermometers

Designed, manufactured and supported by:

STATUS INSTRUMENTS

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1.0   DESCRIPTION

The DM640X series of intrinsically safe battery powered temperature indicators are designed to work with industrial standard temperature sensors. The DM640XP variant accepts a RTD (pt100) sensor, whilst the DM640XTC accepts a thermocouple sensor.

The sensor type, temperature units and other flexible configuration settings are selectable via a simple to use menu system, navigated by the use of three push-button keys located on the rear of the display. This is described in detail further on in this guide. The entire assembly is encapsulated into a cap that fits directly onto the Status SCH4 series of connecting heads. Please refer to the SCH4 data sheet for further information.

2.0   RECEIVING AND UNPACKING

Please inspect the packaging and instrument thoroughly for any signs of transit damage. If the instrument has been damaged, please notify your supplier immediately.

3.0   SPECIFICATION @ 20 ℃

DM640XP

Accuracy	±0.2 ℃ ± 0.1 % of reading (Plus sensor error)
Resolution	0.1 ℃
Measuring range	(-100 to 800) ℃
Stability	Zero 0.01 ℃ /℃
	Span 0.005 %/℃
Sensor	3 wire Pt100 to BS EN 60751(adjustable), or Ni120
Lead effect	10 Ω per leg insignificant effect
Units	℃ (default) or ℉
Sensor type	Pt100 (default) or Ni120

DM640XTC

Accuracy	± 0.1 % of FS ± 0.5 ℃ (plus sensor)
Resolution	0.1 ℃
Measuring range	See table below
Stability	Zero 0.02 ℃ /℃
	Span 0.01 %/℃
Cold Junction Accuracy	±0.05 ℃/℃
Units	℃ (default) or ℉
Sensor type	K (default), T, J, N, R, S, E, F

Sensor	Range (℃)
K	-200 to 1370
T	-210 to 400
J	-100 to 1200
N	-180 to 1300
R *	-10 to 1760
S *	-10 to 1760
E	-200 to 1000
F	-100 to 600

* For type R and S sensors accuracy only applies between 800 and 1760 ℃

DM640X General

Display	4 digit LCD
Battery Life	> 1 year @ 20℃ ambient
Battery type	**special battery refer to section 4**
Ambient Temperature	(-10 to 50) ℃
ATEX Approval	Refer to section 6
EMC Approval	Tested to BS EN 61326
Mechanical	Low profile SCH4 Head ABS, IP67 rating when used with base unit
Connection	Sensor three way screw terminal block to accept 18-22 AWG wire

4.0   INSTALLATION AND WIRING
4.1 Configuration

Warning The DM640X configuration operation must not be performed in the hazardous area, return unit to the safe area for this operation.

Fit the battery as described in section 4.4, then follow the simple configuration menu shown on pages 3 & 4, using the INC, DEC and CYC key (*see Fig 2*) to navigate. This procedure can be performed with or without the sensor connected. If the DM640X has been configured for ° F, then affix the ℉ legend to the front panel, over the ℃ symbol.

4.2 Enclosure

The SCH4 case offers various options for sensor entry. Please refer to the SCH4 data sheet for further details. The sensor may be fixed directly to the SCH4 housing, or remotely connected using cable and gland. All external cabling/sensor entries must maintain IP67 rating.

4.3 Wiring

The DM640X series is provided with a two part connector block, this allows for the cap assembly to be un-plugged from the sensor for maintenance, whilst in the hazardous area. Refer to the internal product label *(Fig2)* for the correct sensor connection details. On the DM640X TC version, to maintain correct operation of the automatic cold junction correction, ensure the thermocouple wires are either connected directly into the terminal block or connected using the correct type of thermocouple extension wires.
On the DM640XP variant ensure three sensor wires are of the same type and length. Cable length must be no greater than 10 metres to comply with CE certification.

4.4 Battery

BATTERY WARNING !!!

- **Important The battery must only be replaced in the safe area !!**
- **Fire, Explosion and severe burn hazard. Do not Recharge, Crush, Disassemble, Heat above 100℃ (212℉), Incinerate or expose contents to water.**
- **Never short circuit the battery.**
- **Disposal, the battery may be regulated by national and local regulations. Please follow the instructions of the proper regulator.**
- **The battery must only be replaced with a Tekcell SB-AA11 manufactured by vitzo cell, available from either Status Instruments or your local distributor, part number 28-302-0036-00.**

To install battery,:-

- First gain access to the cap assembly by unscrewing the SCH4 cap retaining nut and removing cap from base. Unplug the sensor connect *(fig2 -3)*, then transport the cap assembly to the safe area.
- Only when in the safe area, unscrew the two battery cover retaining SHCS screws *(fig 2 items 1)* using a suitable key. Then remove the cover *(fig 2 item 2)*.
- To remove a fitted battery *(fig 2 item 6)*, ease out the positive end of the battery from the holder, using a screw driver blade.
- To fit battery, insert battery negative into the spring contact end of the battery holder, then press battery into place. See *fig 2* for correct polarity.
- Replace the battery cover *(Fig 2 item 2)* ensure it is fitted the correct way, secure with the two SHCS retaining screws *(fig 2 items 1)*.
- Ensure unit is operating correctly, then transport cap to the application in the hazardous area.
- Re-connect sensor plug *(fig 2 item 3)*, fit cap onto base and secure with nut.

The DM640X contains a battery monitoring system. When the battery approaches the end of its lifetime (over 1 years under normal conditions), the display will toggle the message "LO BAT".

5.0 MAINTENANCE

Warning

- The DM640X contains no user serviceable parts apart from the battery.
- The DM640X must not be configured in the hazardous area.
- No attempt should be made to repair the DM640X, all units must be returned to the manufacturer for repair or replacement. Attempted repair or service may invalidate the explosive protection feature of this equipment.
- If re-calibration is required please contact your supplier for further information. Under certain circumstances, it may be possible to re-calibrate the device while it is still out in an application.

6.0 ATEX CERTIFICATE

The DM640X have been issued with a EC- type examination certificate, confirming compliance with the European ATEX directive 94/9/EC for :-

Classification   **II 1 G D EEx ia IIC T4**

The unit bears the Community Mark and subject to local codes of practice, may be installed in any of the European Economic Area (EEA) Members countries. The equipment must be installed and maintained in accordance with local requirements for electrical equipment for use in potentially explosive atmospheres, eg EN60079-14 & EN60079-17. This instruction sheet describes installation, which confirms with BSEN60079-14 & BS EN60079-17. When designing systems outside the UK, the local code of practice should be consulted.

- When installed correctly the DM640X series may be used in the following areas :-

ZONE		HAZARDOUS AREA CHARACTERISTIC worst case
GAS	DUST	
0	20	Hazard Continuously present
1	21	Hazard likely to occur in normal use
2	22	Hazard not likely to occur and if it does, only for a short time.

- Be used in gas groups :-

    Group A   propane
    Group B   ethylene
    Group C   hydrogen

- Allowable temperature class

    T4   135℃   Tamb -20 to 50℃

6.1 ATEX Mark

The DM640X/P and DM640X/TC product labels carry the following information:-

Front Panel Label

Manufacturer	**Status instruments Ltd**
Type	**DM640X/P DM640X/TC**
Explosive protection mark	⟨Ex⟩
CE mark	CE
Approval	**II 1 G D EEx ia IIC T4**
Certification reference	**TRL06ATEX11100X**

Internal Label

Serial Number	(includes date code)
Type	DM640X/TC or DM640X/P
Manufacturer information	www.status.co.uk

- Environmental protection: The equipment must be housed in the SCH4 series of enclosure offering protection to IP67. The enclosure must be suitable for the atmosphere and environment in which it is installed.

6.2 SPECIALCONDITIONS FOR SAFE USE

- ELECTROSTATIC HAZARD. DO NOT CHARGE BY RUBBING OR CLEANING WITH SOLVENTS.

- DO NOT CHANGE BATTERY IN THE HAZARDOUS AREA.

- DM640XTC – ONLY SUITABLE FOR CONNECTION TO TYPE K,T,J,R,S,N,E,F THERMOCOUPLES, THEY SHALL CONFORM TO THE REQUIREMENTS FOR SIMPLE APPARATUS AS DEFINED IN CLAUSE 5.4 OF EN 50020:2002 AND THE INPUT PARAMETERS MARKED ON THIS UNIT.

- DM640XP – ONLY SUITABLE FOR CONNECTION TO RESISTANCE TEMPERATURE SENSORS TYPES PT100 , NI120. THEY SHALL CONFORM TO THE REQUIREMENTS FOR SIMPLE APPARATUS AS DEFINED IN CLAUSE 5.4 OF EN 50020:2002 AND THE INPUT PARAMETERS MARKED ON THIS UNIT.

- USE ONLY TEKCELL SB-AA11 BATTERY, PART NO 28-302-0036-00.

- THE UNIT SHALL BE CLEANED REGULARLY TO PREVENT THE BUILD UP OF EXCESSIVE DUST LAYERS.

6.3 ENCLOSURE MATERIALS

SCH4 enclosure material – ABS.
SCH4 cap – Polycarbonate.
O ring seals – NBR – Acrylonitrile / Butadiene Rubber (Black).
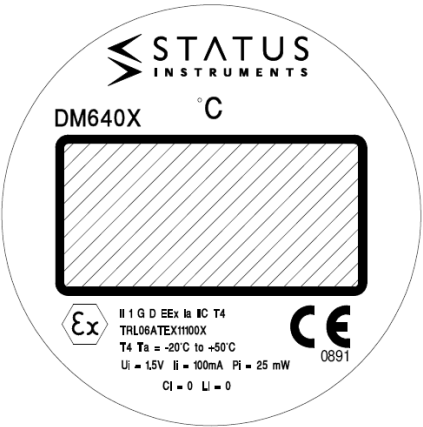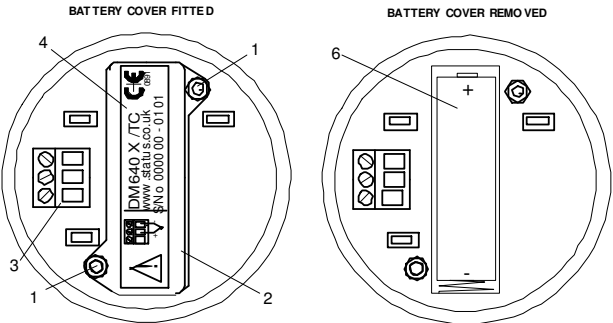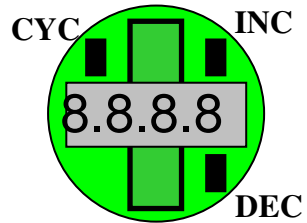
Fig. 1 Front Panel label

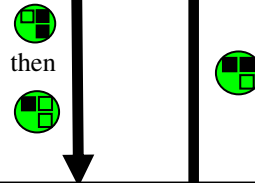**Fig 2 Rear view**

DM640P Configuration Menu Guide

There are three buttons, which the operator must press in various combinations in order to configure and/or calibrate the device. These buttons are located on the underside of the indicator's circuit board.

CYC   **INC**

8.8.8.8

DEC

Viewed from the front, the three buttons (CYCle INCrement and DECrement are shown in black and located as shown in the diagram to the left.

Pressing 2 buttons simultaneously causes ENTer or ESCape actions.

RUN-TIME

8.8.8.8

then

If no buttons are pressed for a minute or more, the device assumes run-time mode.

The LCD shows the temperature (if the input is in range) or shows [   ] or [   ] to indicate over/under range.
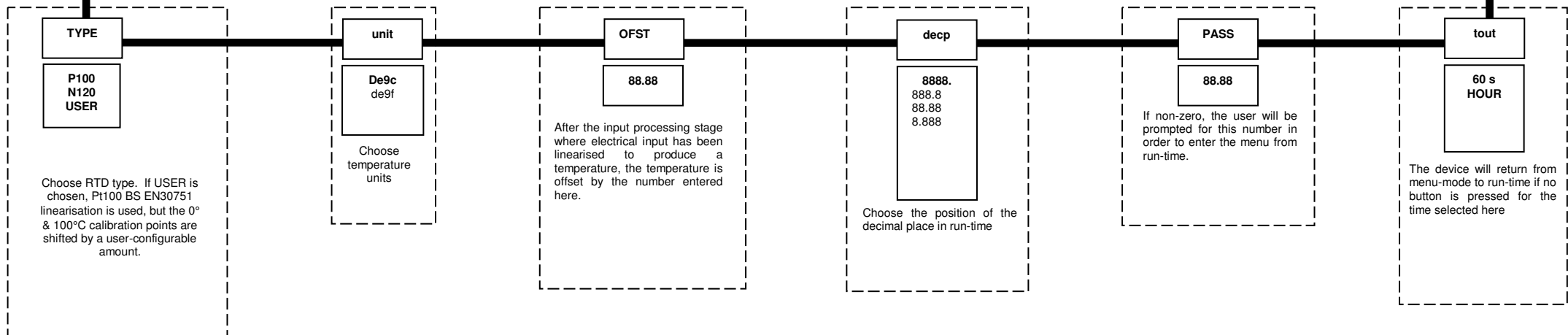
In order to access menu configuration mode, the user must press **ENT**er followed immediately by **CYC**le .

In order to exit the menu and return to run-time, a user must press **ESC**ape

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When cycling around menu, the title (e.g. type, unit etc.) is displayed for a second, then the menu entry is displayed ready for editing. Then use INC/DEC to move through the entries in a list, or to edit a real number.
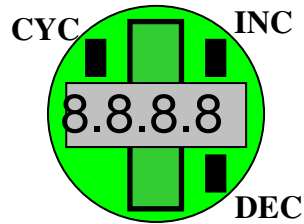
Cycle around menu

↑ **INC**rement menu entry

↓ **DEC**rement menu entry

✦ **ENT**er to confirm entry, or:

↻ **CYC**le to reject and move on

TYPE	unit	OFST	decp	PASS	tout
P100 N120 USER	De9c de9f	88.88	8888. 888.8 88.88 8.888	88.88	60 s HOUR

TYPE — Choose RTD type. If USER is chosen, Pt100 BS EN30751 linearisation is used, but the 0° & 100°C calibration points are shifted by a user-configurable amount.

unit — Choose temperature units

OFST — After the input processing stage where electrical input has been linearised to produce a temperature, the temperature is offset by the number entered here.

decp — Choose the position of the decimal place in run-time

PASS — If non-zero, the user will be prompted for this number in order to enter the menu from run-time.

tout — The device will return from menu-mode to run-time if no button is pressed for the time selected here
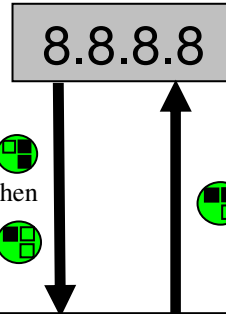
DM640TC Configuration Menu Guide

There are three buttons, which the operator must press in various combinations in order to configure and/or calibrate the device. These buttons are located on the underside of the indicator's circuit board.

CYC   INC

8.8.8.8

DEC

Viewed from the front, the three buttons (CYCle INCrement and DECrement are shown in black and located as shown in the diagram to the left.

Pressing 2 buttons simultaneously causes ENTer or ESCape actions.

RUN-TIME

8.8.8.8

then

If no buttons are pressed for a minute or more, the device assumes run-time mode.

The LCD shows the temperature (if the input is in range) or shows or to indicate over/under range.

In order to access menu configuration mode, the user must press **ENT**er followed immediately by **CYC**le .

In order to exit the menu and return to run-time, a user must press **ESC**ape

Cycle around menu

When cycling around menu, the title (e.g. type, unit etc.) is displayed for a second, then the menu entry is displayed ready for editing. Then use INC/DEC to move through the entries in a list, or to edit a real number.

↑ **INC**rement menu entry

↓ **DEC**rement menu entry

↕ **ENT**er to confirm entry, or:

↻ **CYC**le to reject and move on

TYPE	unit	OFST	decp	PASS	tout
cA J T R S E L N B	De9c de9f	88.88	8888. 888.8 88.88 8.888	88.88	60 s HOUR

TYPE: Choose TC type

unit: Choose temperature units

OFST: After the input processing stage where electrical input has been linearised to produce a temperature, the temperature is offset by the number entered here.

decp: Choose the position of the decimal place in run-time

PASS: If non-zero, the user will be prompted for this number in order to enter the menu from run-time.

tout: The device will return from menu-mode to run-time if no button is pressed for the time selected here