Satchwell

DWT, DST

WATER TEMPERATURE SENSORS

Specification Nos. DWT 0001
DST 0001

The DWT 0001 simplifies product selection and improves control loop performance with its unique probe assembly. The shaft is simply extended and inserted into the pocket, ensuring a good contact. The DWT 0001 sensor can be used with a vast range of other manufacturer's pockets when used in conjunction with the pocket adaptor DWA 0001. The use of the adaptor avoids system drain downs and costly down time.

The DWT 0001 has a 7s response time, making it the optimum choice for economic control solutions.

The DST 0001 pipe surface sensor permits the monitoring and control of fluid temperature through its specially designed thermistor housing. Its simple installation promotes its flexible use for temporary or permanent monitoring/control applications.

FEATURES

- **Easily removable screw lid with simple wiring connections**
- **DWT 0001 shaft is variable in length - 100mm to 330mm**
- **Sensor crown ensures good thermal contact with pocket end**
- **Fast response - DWT 0001 has a 7s response time**
- **120mm Brass pocket (DWA 0005) and heat conductive paste supplied as standard**
- **Optional pocket adaptor ensures compatibility with pocket head sizes up to 30mm A/F neck dimension**
- **Simple commissioning**
- **Range of pocket lengths and materials to choose from**
- **DST 0001 allows direct mounting to pipe surface, allowing any point to be monitored**
- **Easily fitted, making it perfect for permanent or temporary situations**

MLI 1.203a - Mounting Details
MLI 1.203b - Mounting Details
Controllers
DS 2.021 - CSC
DS 2.541 - CSMC 3805
DS 2.110 - CXR
DS 2.101 - CXT
DS 2.105 - CZT
DS 2.801 - IAC 420
DS 2.951 - IAC 600
DS 2.120 - KMC
DS 2.751 - MMC 4601
DS 2.701 - MMC 4701
DS 10.101 - MN 300
DS 10.102 - MN 440
DS 10.103 - MN 500
DS 10.104 - MN 620

SPECIFICATION

Type	Mounting & Stem Length	Resistance at 20°C	Temperature Sensing Range	Compatible Controllers
DWT 0001	Immersion; Min 100mm, Max 330mm	5573Ω	-10 to 120°C	BAS, CSC, CSMC, CXR, CXT, CZT, IAC, KMC, MMC, MicroNet
DST 0001	Pipe Surface	5573Ω	5 to 120°C	BAS, CSC, CSMC, CXR, CXT, CZT, IAC, KMC, MMC, MicroNet

Protection Class: IP 65

Sensing Element: Negative temperature coefficient thermistor

Max Sensing Temperature: 120°C

Time Constant: DST 0001 - 47s
DWT 0001 - 7s

Wiring: 2-wire non-polarised low voltage dc (Safety Extra Low Voltage (SELV))

Ambient Temperature Limits - at Head: -40 to +70°C (DWT 0001 only: -40 to 100°C)

Max Ambient Temperature in Operation: 120°C

Min Ambient Temperature in Operation: -40°C

Max Temperature in Storage/Transit: 55°C

Min Temperature in Storage/Transit: -40°C

Max Humidity in Operation: 95%RH

Min Humidity in Operation: 0%RH

Max Humidity in Storage/Transit: 95%RH

Min Humidity in Storage/Transit: 0%RH

Head: Moulded base with screw on lid.

Head Material: Polyamide (Nylon 66), UV and heat stabilised, UL 94-V0 rated

Head Colour: Matt Black

Stem Material: (DWT 0001) Chromium plated Brass.

Max Stem Length: 330mm.

Min Stem Length: 100mm.

Terminals: Terminal block accepts 2 x 1.5mm^2 wires; larger sizes not recommended.

Pocket: DWT 0001 only: Corrosion resisting Brass pocket screwed ½" BSP parallel (DWA 0005) is supplied as standard. Maximum working pressure of 16 bar.

Fixing Strap: DST 0001 only: Metal fixing strap (DWA 0006) supplied is sufficient for pipes up to 100mm diameter.

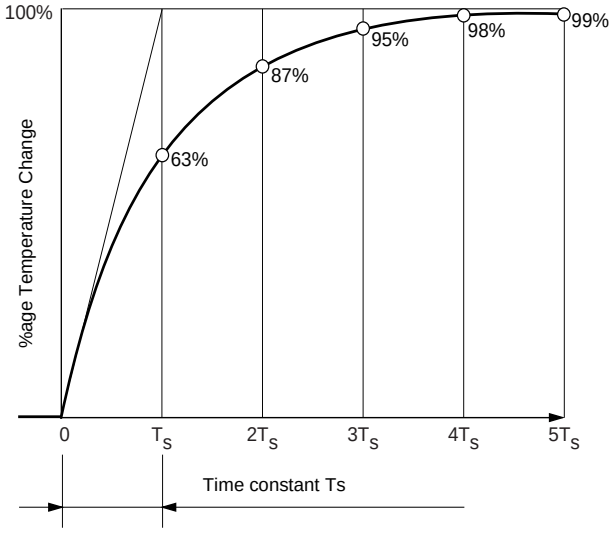
Accessories: DWA 0001 Brass pocket adaptor
DWA 0002 Immersion pocket, 120mm, Stainless Steel
DWA 0003 Immersion pocket, 200mm, Brass
DWA 0004 Immersion pocket, 200mm, Stainless Steel
DWA 0005 Immersion pocket, 120mm, Brass (supplied with DWT 0001)

Characteristics: Non linear - see table/graph on Page 3.

SENSOR PRINCIPLES

A sensor does not transmit the change of a measured variable instantaneously. The delay in transmission (*time constant* or *lag coefficient* Ts) can be shown in graph form.

Change in Temperature

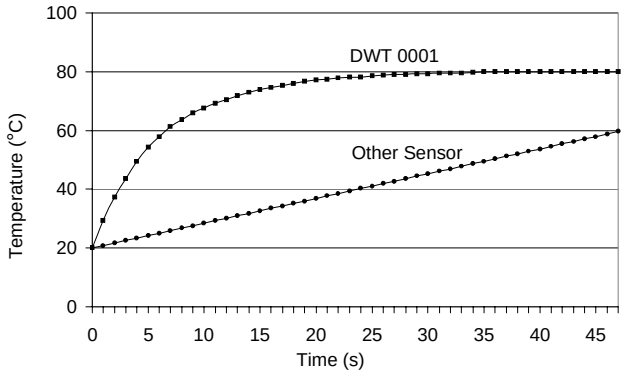


The time taken to transmit 63% of the total change in the measured variable is referred to as the time constant or lag coefficient Ts.

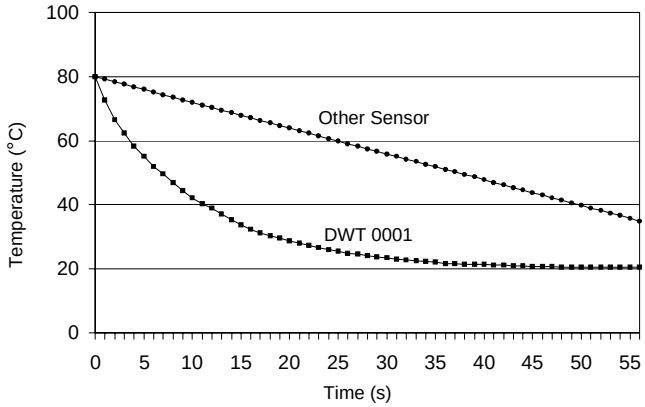
It takes a period equivalent to five times the lag coefficient to transmit approximately 99% of the change in measured variable.

The test is conducted for step temperature change from 20°C to 80°C.

Step Increase in Temperature



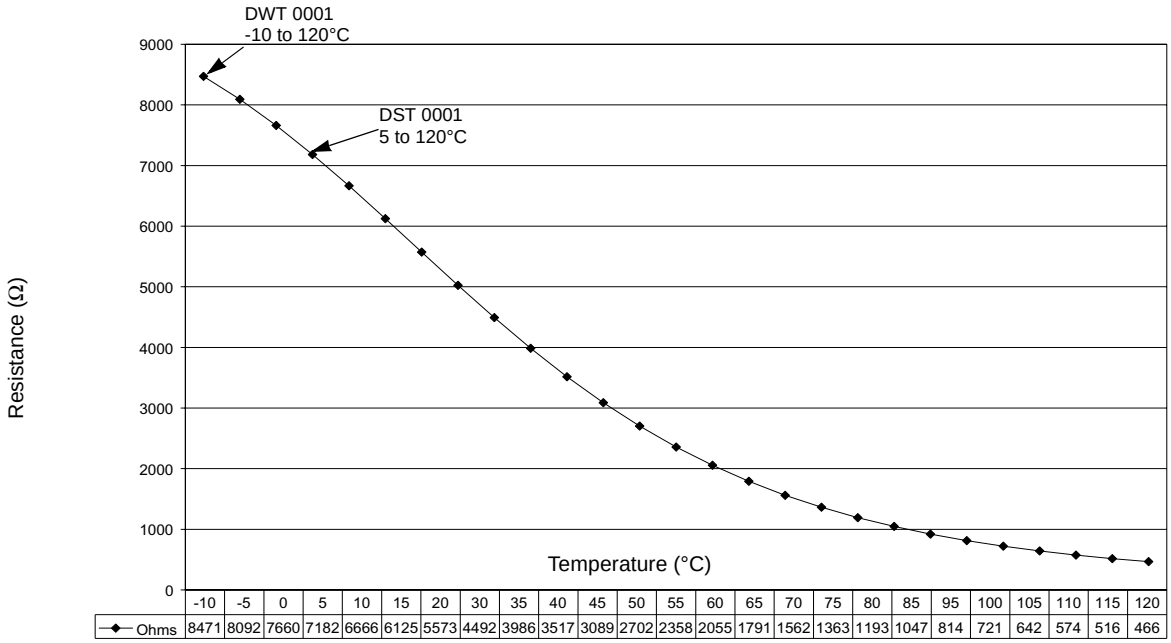
Step Decrease in Temperature



CHARACTERISTICS

Sensor Temperature v Resistance

DWT 0001: -10 to 120°C
DST 0001: 5 to 120°C



	-10	-5	0	5	10	15	20	30	35	40	45	50	55	60	65	70	75	80	85	95	100	105	110	115	120
Ohms	8471	8092	7660	7182	6666	6125	5573	4492	3986	3517	3089	2702	2358	2055	1791	1562	1363	1193	1047	814	721	642	574	516	466

INSTALLATION

INSTALLATION GUIDELINES

- Always comply with local and installation safety regulations.
- Install sensors against the direction of flow.
- Install sensors at the correct angle.
- Maintain an adequate space between the sensor and any obstruction, so that the sensor can be removed from the immersion pocket.
- An additional immersion pocket should be provided adjacent to each sensor, for test purposes.
- Sensors installed without immersion pockets or with slotted or perforated pockets must be labelled accordingly.
- When mixing water at different temperatures, always maintain an adequate distance between the mixing point and the sensor (to take account of stratification).

IMMERSION SENSOR TYPE DWT 0001

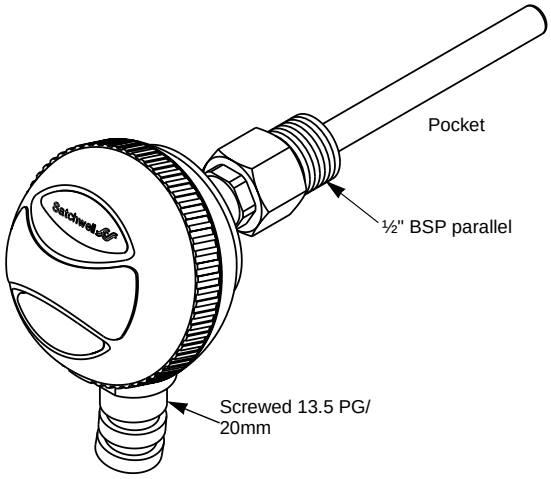
Caution

Do not extend/retract the telescopic tube more than is necessary for installation only, otherwise damage to the internal connecting wires may be caused.

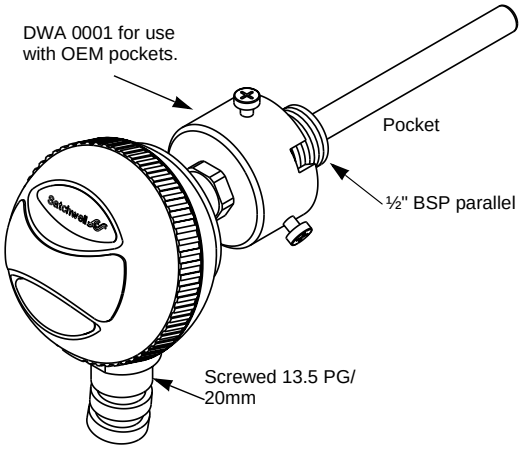
1. If installing sensor only, proceed from Step 2. If installing sensor and sensor pocket:
   a. Select location where water can circulate freely around the sensor pocket, ensuring that the whole of the pocket is immersed in the water to be controlled.
   b. The pocket should be plugged before sensor is fitted to prevent entry of foreign matter.

Note: For chilled water applications pocket should be mounted horizontally or sloping downwards towards mouth to allow condensation to drain away. If this is not possible the pocket may be filled with a suitable oil, e.g. Fina 'Solco' AC43 or Shell 'Dialo Oil B'.

   c. Fix sensor pocket into pipe.



2. If installing sensor only to an existing pocket:
   a. First check that the sensor screw is compatible with the pocket screw. If not, insert a pocket adaptor DWA 0001 (see illustration) over the pocket head and fix in place with the three screws.



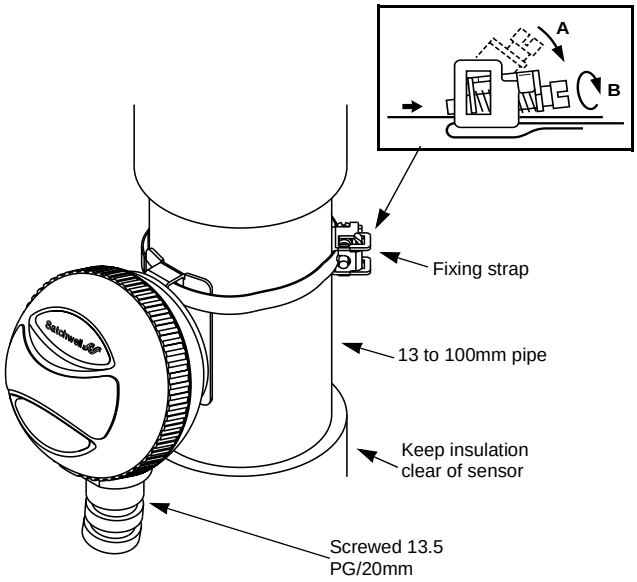
   b. Set the sensor telescopic tube to its maximum extent.

Note: Heat conductive paste is applied to the thermistor at the end of the tube to ensure maximum heat transfer.

   c. Gently insert the telescopic tube until it has reached the end of the pocket, then push further, shortening the telescopic tube, until fully inserted. Screw the sensor into the pocket/pocket adaptor and keep turning the sensor head clockwise until the conduit entry point is at the required position. Tighten the sensor neck using a spanner.
   d. Connect the flexible conduit to the sensor base. Allow a sufficient length of flexible conduit for complete withdrawal of the sensor.
   e. Unscrew sensor lid for access to terminals.
   f. Connect the two controller wires (non-polarised) to the terminal block.
   g. Replace lid.

SURFACE SENSOR TYPE DST 0001

1. Select location on pipe surface which has an unrestricted flow of water.
2. Clean pipe contact area and assemble the strap to the sensor. Fix to the pipe as shown in the diagram.
3. Connect the flexible conduit to the sensor base. Allow sufficient flexible conduit to avoid straining sensor fixing.
4. Unscrew sensor lid for access to terminals.
5. Connect the two controller wires (non-polarised) to the terminal block.
6. Replace lid.
7. Keep pipe insulation clear of cover.



WIRING DIAGRAMS

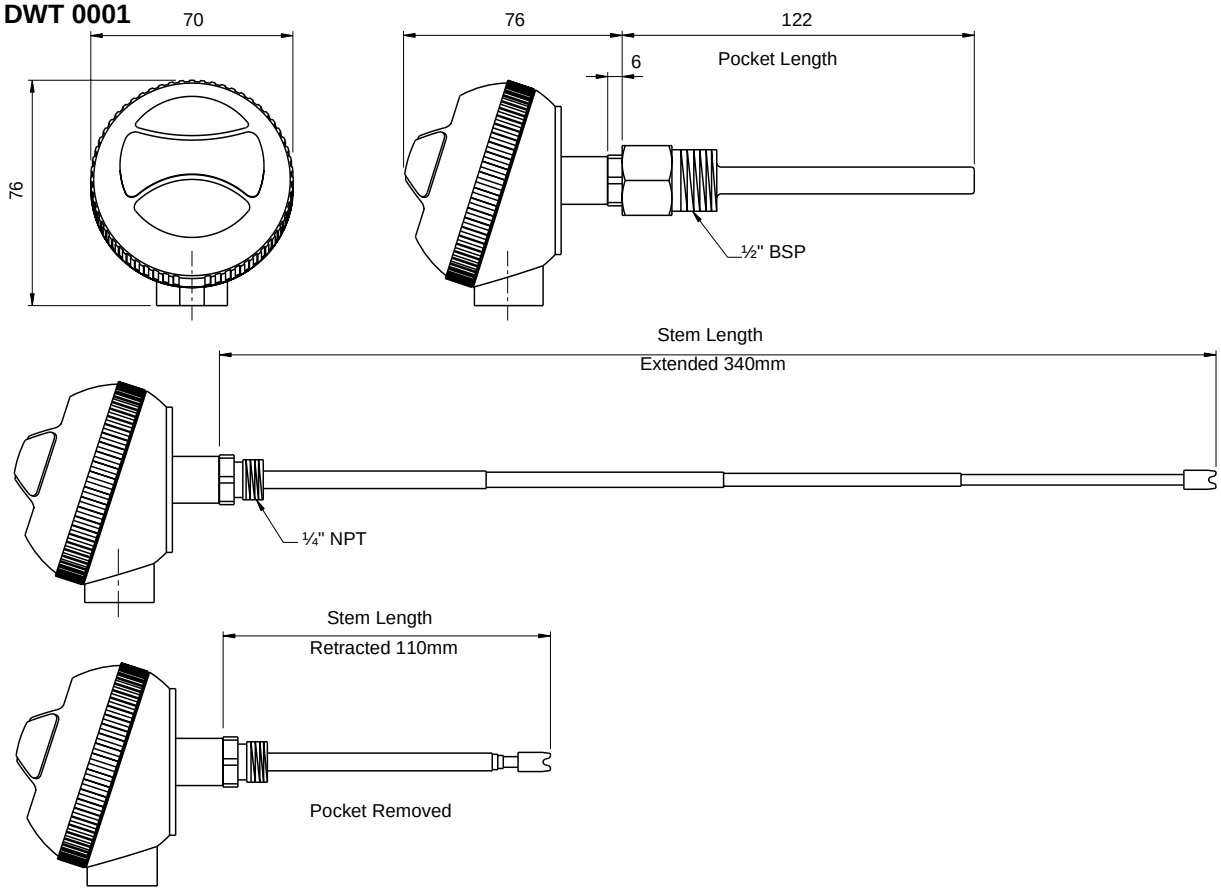
Wiring Precautions

Refer to Data Sheet relevant to the controller to which sensor is to be connected. (See Table on Page 2).

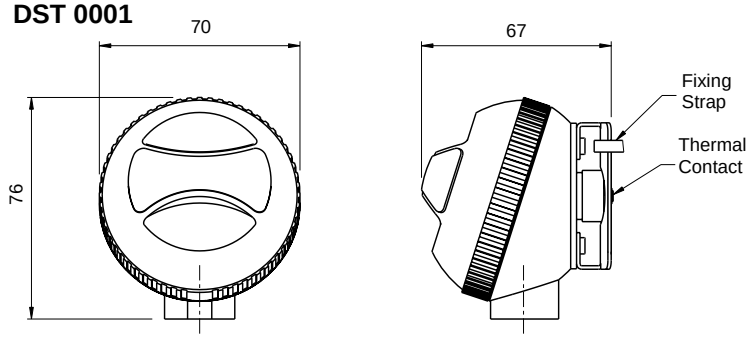
Maximum resistance, 15Ω per core.

DIMENSION DRAWINGS

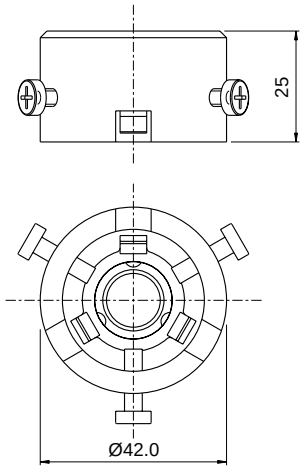
DWT 0001



DST 0001



DWA 0001



Dimensions in mm

Cautions

- **Do not apply power to the system until it has been checked by a qualified technician and the commissioning procedures have been completed.**
- **These sensors must only be used in conjunction with the appropriate Satchwell controllers shown on Page 2.**
- **Observe wiring precautions given on the data sheet for the controller that the sensor will be connected to.**
- **Do not exceed the maximum ambient temperature.**
- **Interference with parts under sealed covers invalidates guarantee.**
- **Design and performance of Satchwell equipment are subject to continuous improvement and therefore liable to alteration without notice.**
- **Information is given for guidance only and Satchwell do not accept responsibility for the selection and installation of its products unless information has been given to the Company in writing relating to a specific application.**
- **A periodic system and tuning check of the control system is recommended. Please contact your local Satchwell service office for details.**

Satchwell

Satchwell Control Systems Limited
Farnham Road
Slough
Berkshire SL1 4UH
United Kingdom

Telephone +44 (0)1753 611000
Facsimile +44 (0)1753 611001
Web site www.satchwell.com

Invensys
An Invensys company

Printed in England. 04/00