



DST600 Series Digi-Stem[®] Thermometers

User Manual



04/12/12
WD1032 Rev L (05/24/16)

For use with models:
DST600
DST610, DST611, DST620 & DST621
DST640
DST650, DST651, DST660, DST661
Including "I", "R" and "P" versions

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DST600 Series USER MANUAL

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1. Applications, Key Features, and Models

The Wahl DST6xx series is designed for temperature monitoring applications, specifically in the food, dairy and pharmaceutical markets, however it is well suited for any application requiring a high degree of accuracy and reliability. To achieve this objective the DST6xx Series incorporates the following features:

- High reliability, 4-wire, 100 ohm, .00385Ω/Ω/°C, thin-film platinum RTD sensor per DIN EN 60751, Class A.
- High accuracy 24-bit Delta-Sigma Analog/Digital Converter.

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- Self-checking Electronic Circuitry: Meter repetitively checks the electronics accuracy by measurement of on-board ultra-stable, low ppm precision resistors against embedded firmware values and displays “err” in the event the electronics is out by more than $\pm 0.5^{\circ}\text{F}$ (0.3°C). The self-checking electronic circuit may be tested by rapidly changing the temperature of the sensor, such as placing from room temperature into ice bath or heated process. Unit will display “err” occasionally when going through rapid changes and will return to normal as temperature begins to stabilize (usually within 10° of final temperature). This serves as a test and indicator that the self-checking circuitry is functioning properly.
- Probe Error checking: Checks for open wire, open sensor, shorted sensor, incorrect wiring.
- Probe ID feature: Alerts the operator that the probe has been changed and the calibration may be void. Requires the use of calibration software to calibrate and associate the new probe with the meter. Available on fixed stem and remotes less than 25 meters.
- Programmable R0: Allows programming of the sensing probes specific R0 value into the meter for accurate temperature calibration.
- Optional versions include “I” version for International shipping using a AA battery, “R” version with adjustable resolution and “P” version for panel mount option.

Models:

DST600 – Temperature Indicating Device – Nema 4X rated Stainless Steel enclosure

DST610/611 – Temperature Indicating Device with independent secondary RTD sensor and terminal block connection

DST620/621 – Temperature Indicating Device with independent secondary RTD sensor and 4-20mA transmitter

DST640 – Harsh environment Temperature Indicating Device – All Stainless Steel enclosure and increased RFI protection.

DST650/651 – Harsh environment Temperature Indicating Device - with independent secondary RTD sensor with terminal block connection

DST660/661 – Harsh environment Temperature Indicating Device - with independent secondary RTD sensor with 4-20mA transmitter



2. CE Approval

The DST600 Model only carries CE approval per EN61326: 2006 for Radiated Electromagnetic Field Immunity, Electrostatic Discharge Immunity and Radiated Emissions Disturbances. See sections 3.4 and 3.5 for detailed installation instructions.

3. Installation

Caution! See important information regarding Lithium Metal Batteries in Wahl document #WD1053, before proceeding!

Your unit was shipped partially assembled. Installation of the battery by the end-user is necessary as transportation regulations prohibit shipping units with the battery installed. Units with long probes or remote cables may be shipped unassembled. After installation of the battery, verify the display is operational and remove the protective film from the window. In the event the display is not operational, check that the battery is installed properly by following the battery installation procedure, section 4.

3.1. Meter Mounting – Fixed Probe

Fixed probes may be mounted by the threaded fitting or sanitary clamp into the process. Apply thread sealing compound or Teflon tape to the threaded fitting as required. Units with swivel nut fittings or adjustable angle stems may be adjusted after installation for best viewing angle.

Caution! Do not rotate Digi-Stems with adjustable angles more than 360° in one direction as wire breakage may occur. See 3.7 for adjustment procedure.

Caution! Do not use the Digi-Stem enclosure to tighten meter. Use a wrench on the coupling nut for tightening.

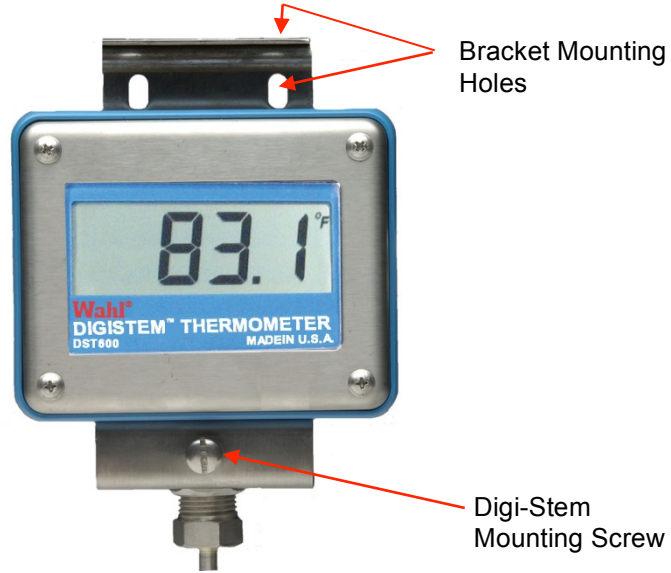
3.2. Meter Mounting – Remote Probe

An optional mounting bracket is available for mounting remote meters to walls, panels, pipes, etc. The mounting bracket may be attached by the top or rear surface with user provided mounting screws, U-bolts, clamps, etc. The mounting bracket is available in 2 styles, p/n DSA3030, without ground lug and DSA3031, which includes a grounding lug for grounding of the meter when the probe will not be grounded.

3.2.1. For remote mounting: Mount the bracket with the Digi-Stem mounting screw towards the bottom (Fig. 1). The Digi-Stem's coupling nut should be inserted from the top, with the display facing out and secured with the Digi-Stem mounting screw. Loosen or remove the Digi-Stem mounting screw.

3.2.2. For remote cables, thread the cable through the slotted sections of the mounting bracket holes, so the cable moves freely. Insert the meter's coupling nut through the top hole of the mounting bracket and secure with the large slotted Digi-Stem mounting screw.

Fig. 1



3.3. Meter Mounting – Panel mount version (designated by “P” suffix)

3.3.1. Panel mount versions are equipped with the probe and secondary sensor connections mounted on the rear of the enclosure. They are also equipped with two threaded studs on the rear with a U-bracket, wing nuts and washers. An additional gasket is placed on the rear facing surface of the H-frame to seal the panel opening.

3.3.2. For detailed installation instructions see Wahl document WD1100 and reference Wahl drawing 13615, both included in section 11 of this manual.

3.4. Wire Connections – In the event that your probe was shipped disconnected from the meter, the following describes the probe wiring and installation process.

3.4.1. Loosen the four Phillips head screws in the front cover until the cover is removed. **Note:** The screws are held captive by retaining washers and should not be removed completely.

3.4.2. Remove the 6 pin pluggable terminal strip connector (J1) from the PCB mating connector and connect probe wires per the following table and as shown in Fig. 4.

Probe Connection Wiring		Wire Color	
P1 Pin	Signal Name	Fixed Probe	Remote Probe
1	Excite +	White	Brown
2	RTD +	White	White
3	RTD -	Black	Blue
4	Excite -	Black	Black
5	Probe ID Ground	Brown	Gray
6	Probe ID Signal	Orange	Pink

3.4.3. Connect the pluggable terminal strip to PCB connector J1.

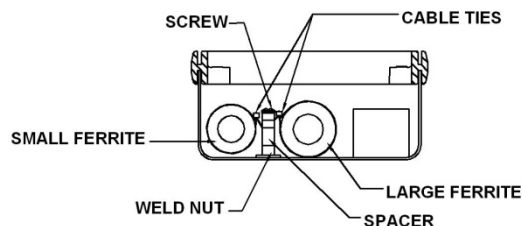
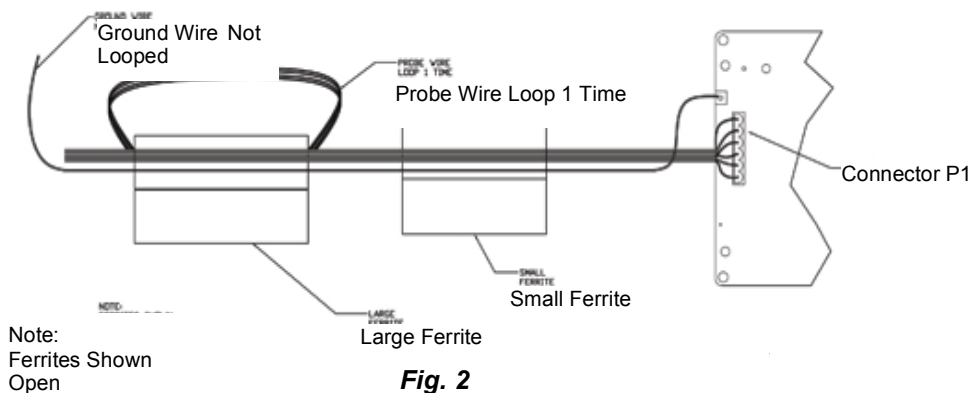
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- 3.4.4. Install the battery with polarity as indicated on battery holder.
- 3.4.5. Replace cover on Digi-Stem enclosure and secure with four screws tightened to a force of 4 to 5 in-lbs. of torque.

3.5. Ferrite Installation

The Wahl DST600 CE compliance requires installation of 2 clamp-on ferrites around the internal wiring. For other DST6xx series, 2 clamp-on ferrites are included to minimize RFI susceptibility. These ferrites should be placed around the internal wiring. These are normally installed when the system is delivered, however on units with extremely long probes or when meters are shipped without a probe, these may need to be installed by the end-user.

There is 1 large ferrite and 1 small ferrite that are required to comply with the CE directive on model DST600, and are recommended to be installed for EMI immunity. See Fig. 2 for reference. The wires coming from the probe should be passed through the large ferrite, looped around once and passed through again. Also, route the green/yellow PCB ground lead through the ferrite once, with the connector toward the probe end of the ferrite. The large ferrite can then be snapped closed, making sure that the wires are not pinched. The small ferrite is then installed on the remaining length of all wires, toward the connector with it passing through the ferrite only once. The wire does not have to loop through the small ferrite. The small ferrite can then be snapped closed, making sure that the wires are not pinched. Cable ties can then be installed as shown (see Fig. 3) to secure the ferrites in place.



3.6. Grounding

- 3.6.1. The DST600 should be grounded for CE compliance and optimum noise immunity.
- 3.6.2. The DST640/65x/66x should be grounded for optimum noise immunity.
- 3.6.3. Grounding on DST6xx's with rigid probes is accomplished by grounding the probe shank. Typically, the equipment that the probe shank is installed in will be grounded, which will also ground the DST6xx meter assembly.
- 3.6.4. Grounding on most DST6xx's with remote probes is accomplished in the same manner as the rigid probes. If the remote probe or the meter bracket are not grounded, optional meter mounting bracket, DSA3031, should be used. This mounting bracket includes a ground lug that allows the connection of a ground wire for grounding the unit for CE compliance (DST600 only) and for optimum noise immunity.
- 3.6.5. Be certain the PCB ground wire is connected to the housing's ground lug, after servicing.

3.7. Ventilation

- 3.7.1. The DST6xx should be installed in an area of adequate air exchange so that the specified ambient conditions are not exceeded.

3.8. Adjustable Angle Probe – Adjustment

- 3.8.1. For rotational adjustment, loosen the two long Phillips head screws on the ends of the bracket and rotate the bracket around the coupling nuts. Tighten screws when position is set to the desired location.
Caution! Do not rotate Digi-Stems with adjustable angles more than 360° in one direction as wire breakage may occur.
- 3.8.2. Angular adjustment, loosen the two short Phillips head screws in the center slots and pivot the bracket to desired angle. Tighten screws.

4. **Battery Installation / Replacement / Battery Life**

The DST6xx Series use a single 3.6V C-cell Lithium Thionyl Chloride battery, Wahl Catalog # DSA3062. The DST6xxI uses a single 3.6V AA-cell Lithium Thionyl Chloride battery, Wahl part number 12234-03. Low battery is indicated by "LOW BATT" displaying in the lower right corner of the display. This indicates approximately 2-6 weeks of battery life left. Actual time will vary dependent on Display Update Rate Setting. See section 4.2 for additional information on update rate and battery life.

4.1. Procedure

- 4.1.1. For installation or replacement, loosen the four Phillips-head screws in the front cover until the cover is removed. **Note:** The screws are held captive by retaining washers and should not be removed completely.

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- 4.1.2. Remove old battery and dispose of in accordance with local, state and federal regulations.
 - 4.1.3. Insert new battery with polarity as indicated on battery holder. Positive terminal should be at the top of the PCB.
 - 4.1.4. Replace cover on Digi-Stem enclosure and secure with four screws tightened to a force of 4 to 5 in-lbs. of torque.
- 4.2. Battery Life – Battery life is a function of the display update rate and may be changed to fit the user’s needs. See section 5.3 for details on display update rate. The following table shows approximate battery life for a given display update rate.

Display update rate in seconds	DST6xx w/ DSA3060 battery approximate life in months	DST6xxl w/ 12234-03 battery approximate life in months
1	15.7	5.2
2	32.2	10.7
4	60.7	20.2
5	73.8	24.6
10	129.3	43.1



Fig. 4

5. Operation

- 5.1. Scale Selection °F/°C - Temperature scale is user selectable via jumper J8 (Fig. 5) on the Printed Circuit Board (PCB). The scale is indicated in the upper right corner of the display (Fig. 4).
- 5.2. Resolution Selection – DST6xxR offers the user the capability of changing the displayed resolution by selecting either 0.1° or 1° resolution. Resolution is selectable via jumper J7 (fig. 5) on the PCB, located to the left of the F/C selection jumper. Selecting 1° will display the truncated value, so a temperature of 255.9°F would display as 255°F.
NOTE: If using this feature, it is advised to set the meter to 0.1° resolution for doing calibration measurements, as using 1° can add up to 0.9° of error to the displayed reading.
- 5.3. Making measurements and display update rate - With the batteries installed and probe connected the meter automatically updates the display with the most recent measurement. Factory default for display update rate is once every 2 seconds. Display update rate is settable from .25 seconds to 10 seconds in .25 second increments, using optional DSTCAL software.

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5.4. Error Codes - During normal operation, the DST6xx continually performs diagnostic testing on the sensor lines. Errors are indicated by the following error codes:

Error Code	Description
HI	Reading is above meters usable range
LO	Reading is below meters usable range or sensor is shorted
CbL1	Indicates cable 1 is open (J1 pin 1)
CbL2	Indicates cable 2 is open (J1 pin 2)
CbL3	Indicates cable 3 is open (J1 pin 3)
CbL4	Indicates cable 4 is open (J1 pin 4), or open sensor
CbL5	Indicates a short between pins 2 & 3
err	Indicates accuracy error detected. Will also display during rapid changes of temperature to the RTD sensor.
Prb	Indicates probe ID does not match probe ID programmed in meter
- - -	Indicates Low Battery Shutdown Mode

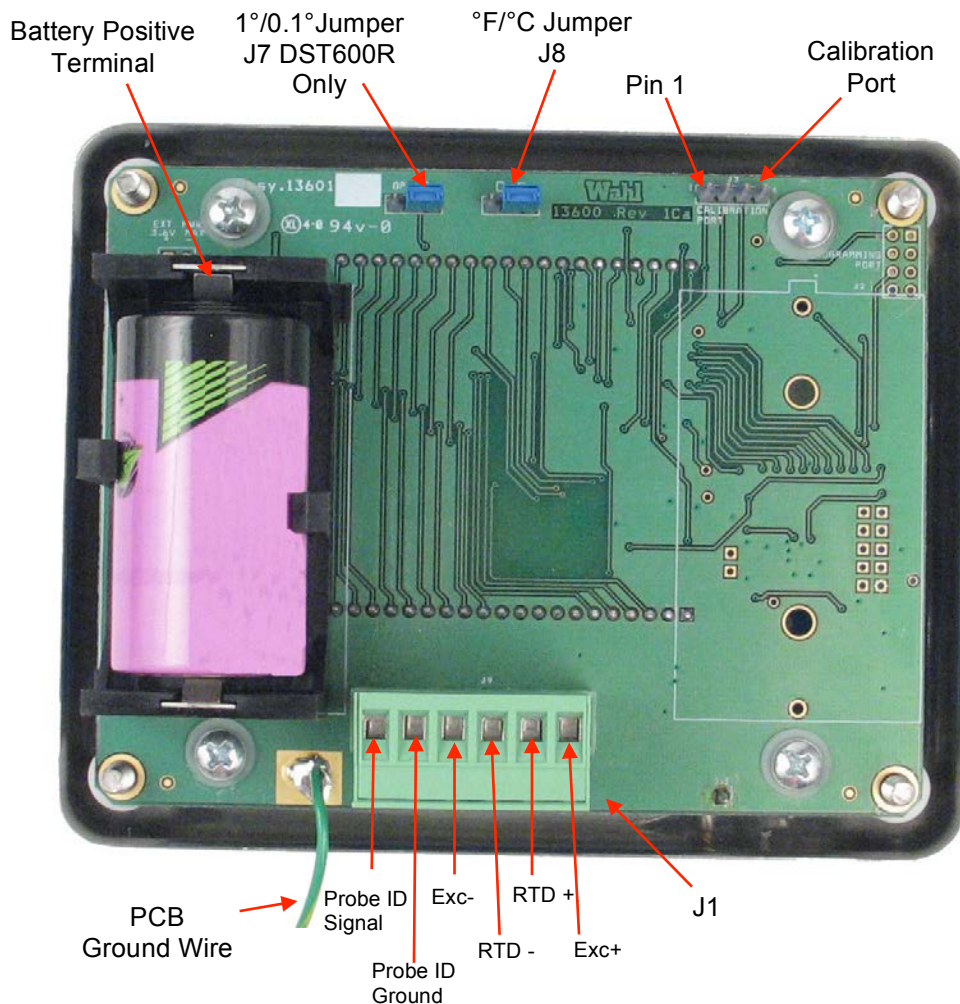


Fig. 5 (DST600R Shown)

6. Calibration

As with all electronic RTD thermometers, there are two main components to the system. The first component is the electronics, which measures the resistance of the sensing element and then converts this resistance value to a temperature indication. The second component is the probe, also referred to as the sensor. The probes sensor resistance changes as its temperature changes. This change is in conformance to the DIN EN 60751 Class A standard. As in all manufactured goods, there are slight variations in the finished parts. A key variable of an RTD sensor is its resistance at 0°C, referred to as “R0” value. Once this value is measured, it may be programmed into the meter to correct the temperature conversion algorithm. Programming and/or calibration require the use of the DSTCAL software package. This package includes the USB cable, USB/DST Interface Box and DST calibration cable. DSTCAL programming software includes the ability to set the Sample Rate, R0, associate a new probe with the meter, calibration of the meter and/or calibration of the system (probe with meter). The DST6xx uses the following techniques for calibration. For details of the calibration, see the DSTCAL user manual, Wahl document # WD1037.

- 6.1. Ohm Meter calibration – Ohm Meter calibration is a 2-point calibration, which calibrates the DST6xx’s electronics. It requires a NIST traceable precision resistance source with a known accuracy of ± 0.03 ohms at 90 and 194.1 ohms. Resistors used should have a temperature coefficient of <5.0 -ppm.
- 6.2. Probe (system) calibration - Probe calibration is a single point calibration that is performed by placing the probe into an ice bath and following the on screen prompts of the DSTCAL software. The DST6xx and software will measure the probes R0 value and program it into the DST6xx’s memory. The system is then calibrated. After system calibration is completed, the calibration should be checked at the temperatures of interest to the end user, using calibrated measuring equipment and calibration baths. If traceability to a National Standard, such as NIST is required, this check should be performed using traceable instruments, performed and documented in compliance to documented procedures.
- 6.3. Adjusting for Negative Error Only – Low Acid Canned Food
While 21CFR Part 113.40 requirements for accuracy of a Temperature Indicating Device (TID) are specified to be “accurate to 1° F (0.5° C)”, some manufacturer’s Quality Control System requires either “no positive error” or a lesser amount of positive error, for example, +0.2°F maximum error. It is possible on the Wahl DST6xx series thermometer to offset the error to achieve this accuracy. It should be noted that in doing this, there may be a slightly larger negative error at some temperatures; however it typically should be within the mandated accuracy of 1°F.

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To achieve this we will be using the programmable R0 value in the DST6xx Series TID, which is accessed using the DSTCAL program. The R0 value (R0 stands for resistance at 0°C), is a variable in the equation for converting resistance to temperature for platinum RTD's and is factory set to match the specific value of the probe connected to the DST6xx. Without going into great detail of the equation and its variables, the R0 variable essentially serves as an offset control, shifting the response curve up or down the scale. Since the slope of the curve is controlled by other variables that are not programmable, different meters may have slightly different response to the same change in R0.

The process for performing this type of adjustment is as follows:

1) Measure the system error by putting the meter and probe into a stable liquid bath monitored by an appropriate standard instrument (Reference Device) and record. This should be measured at a temperature representative of your process temperatures.

2) Determine the error and note if it is positive (TID > Ref. Dev.) or negative (TID < Ref Dev.).

3) If error is negative, no action is needed.

4) If error is positive, R0 will need to be increased to lower the temperature displayed. A good starting point is:

A + .03 ohm adjustment to R0, will drop the reading by about 0.2 to 0.3°F

A + .06 ohm adjustment to R0, will drop the reading by about 0.4 to 0.5°F

5) After adjustment, repeat step 1. If the results meet your requirements, record this data on your calibration form and this will be your new calibration record. Be certain to record your results and mark your equipment in accordance with 21CFR part 113.100.

6) If the results still do not meet your requirements, then increase R0 slightly and repeat step 5.

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7. Specifications – DST600 / DST640 Series

DST600 / DST640 SERIES RTD METER SPECIFICATIONS			
Standard Series	DST600	DST600R	DST600I
All Stainless Steel, Upgraded Board, RFI Protection Series	DST640	DST640R	DST640I
Model	Standard	Selectable Resolution	AA Battery for International shipments
Meter Range / Scale	-50° to 500°F (-45.5° to 260°C) / User Selectable for °F or °C		
Meter Accuracy	± 0.1°F/C, over 1-year period (@ Tamb = 23°C ± 5°C)		
Meter and Probe Accuracy	Temp ≤ 300°F (148.8°C) = ± 0.3°F (± 0.2°C), Temp > 300°F (148.8°C) = ± 0.25% of reading		
Display	1.0" 4-digit LCD display with icons for °F, °C and Low Battery, Readable up to 30 ft.		
Display Resolution	0.1°F/C	User Selectable 1/0.1°F/C	0.1°F/C
Sample/Display Rate	2 seconds standard, adjustable in .25 second intervals from .25 to 10 seconds		3 seconds standard, adjustable in .25 second intervals from .25 to 10 seconds
Ambient Operating Environment	-40° to 158°F (-40° to 70°C) / 10% to 100% RH non-condensing		
Ambient Temperature Coefficient	Maximum of 0.003°/°C over Ambient Operating Temperature Range from 23°C ± 5°C		
Sensor/Probe	<ul style="list-style-type: none"> • Sensor - 4-wire RTD, R0 = 100Ω, Alpha = .00385 Ω / Ω / °C with serial ID chip • 304 or 316L Stainless Steel Probe construction • Adjustable Angle Stem Probes • Rigid Stem Probes • Remote Probes with rugged IP68 connection system. • Sanitary Fittings in compliance with 3A Sanitary Standard 74-06 		
Sensor Cables	PVC insulation, shielded, 6 conductor, 105°C rating		
Power	1 Lithium Thionyl Chloride "C" Battery, User Replaceable		1 AA Battery, User Replaceable
Battery Life	2 years nominal at 2 second update interval		1 year nominal at 3 second update interval
NIST Calibration	Optional NIST Traceable Certificate of Conformance at 3 points: 180°F, 220°F, 250°F (For User Specified Fixed Points please contact Customer Service)		
Programming & Calibration Software	Optional: DSTCAL Calibration Software		
Enclosure	DST600 Series: Stainless Steel Enclosure with Polycarbonate H Frame and Window (NEMA 4X) DST640 Series: All Stainless Steel Enclosure with Polycarbonate Window (NEMA 4X)		
Enclosure Dimensions/Weight	Dimensions: 5.3" W x 4.3" H x 2.7" D (13.5 x 10.9 x 6.9 cm). Weight: 2 lbs. (1kg)		

Specifications subject to change without notice

8. DST610/650, DST611/651, DST620/660, and DST621/661

Models DST610/650, DST611/651, DST620/660 and DST621/661 are variations of the DST600/640 that include an isolated secondary sensor housed in the same probe shank. This enables the user to have an independent signal from the same probe for use by a controller or recorder.

8.1. DST610/650 – Consists of DST600/640 meter with an isolated secondary sensor and terminal block. The DST610/650 provides an isolated secondary RTD for independent external use allowing the user to have an additional measuring circuit located in the same probe shank. This reduces the number of penetrations made into the process and reduces error due to non-uniformity of the process.

8.1.1. Connection is made via a 4-circuit terminal strip (see Fig. 4). A ½” NPT female fitting on the side of the enclosure allows access to connections. This connection should be sealed to prevent moisture, water or dust entry. We recommend using a liquid-tight conduit fitting or cable gland for wire entry. User may use in a 2, 3 or 4 wire configuration as shown in Figure A1.

8.1.2. Secondary RTD specifications are as follows:

R0	100 ohms per DIN EN 60751
Accuracy	Class A per DIN EN 60751
Temperature coefficient	TCR = 3850 ppm/K
Connection	Factory wired for 4-wire, user selectable 2, 3, or 4-wire connection
Self-heating	0.4 K/mW at 0°C
Measuring current	0.3 to 1.0 mA, self-heating must be considered
Terminal Block type	Euro style
Maximum wire size	10 AWG

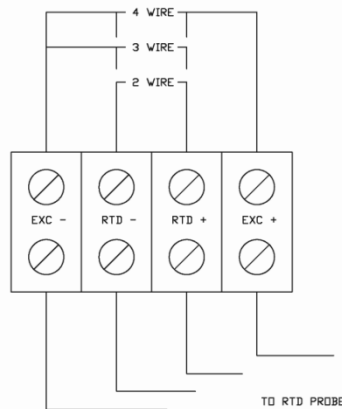


Fig. 6 – DST610/650 Terminal Block Wiring

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8.2. DST611/651 - All the features of the DST610/650, and includes a pre-wired Turck 4-pin connector mounted in the side enclosure fitting. This allows convenient user connection/disconnection. This option requires the use of a connecting cable or connector (ordered separately). Connector wiring are shown in Figure A2.

8.2.1. Optional IP68 rated field wireable connectors and cables:

<u>Wahl P/N</u>	<u>Description</u>
12075-07	Straight field wireable connector, 4-6 mm cable gland
12075-08	Straight field wireable connector, 6-8 mm cable gland
12075-09	Right angle field wireable connector, 4-6 mm cable gland
12075-10	Right angle field wireable connector, 6-8 mm cable gland

Cable assemblies are single-ended and feature a molded IP68 rated connector. Opposite end is left un-stripped. Insulation is PVC and rated to 105°C.

<u>Wahl P/N</u>	<u>Description</u>
12361-xxx	xxx denotes length in meters, i.e. 12361-010 is 10-meter cable, 12361-120 is 120-meter length.

Connections for 12361 cable for DST611/651 are as follows:

Wire Color	Connection	Signal
Brown	Pin 1	Excite +
White	Pin 2	RTD +
Blue	Pin 3	RTD -
Black	Pin 4	Excite -
Non-insulated	Coupling nut	Shield*

*Shield lead should not be terminated if either meter housing or probe shank is grounded, to avoid ground loops.

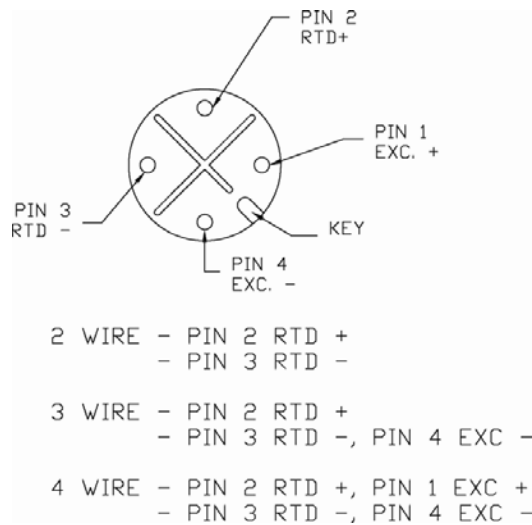


Fig. 7 – DST611/651 connector wiring

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8.3. DST620/660 – Consists of DST600/640 meter with an isolated secondary sensor and 4-20 mA programmable transmitter. Transmitters are programmed at the factory. The DST620/660 provides an isolated current output from the same probe shank. This reduces the number of penetrations made into the process and reduces error due to non-uniformity of the process.

8.3.1. Connection is made by hardwiring to the transmitter power supply terminals as shown in Figure 8. A ½” NPT female fitting on the side of the enclosure allows access to connections. This connection should be sealed to prevent moisture, water or dust entry. We recommend using a liquid-tight conduit fitting or cable gland for wire entry.

8.3.2. Secondary RTD/transmitter specifications are as follows:

R0	100 ohms per DIN EN 60751
Accuracy	Class A per DIN EN 60751
Temperature coefficient	TCR = 3850 ppm/K
Connection	4-wire
Programming	PC programming (optional cable required)
Power Supply Req.	10 to 35 VDC
Range	-58°F to 500°F (-50 to 260°C)
Accuracy	Greater of ±0.4°F or .1% ± (0.2°C or .1%)
Fault monitoring	Programmable Hi (>21.6 mA) or Low (<3.5 mA)

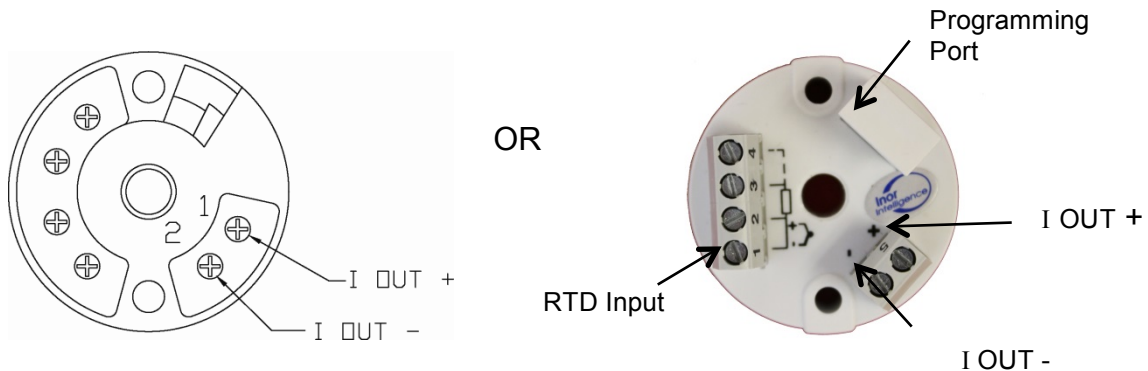


Fig. 8 – DST620/660 transmitter connection

8.4. DST621/661 - All the features of the DST620/660, and includes a Turck 4-pin connector mounted in the side enclosure fitting that is pre-wired to the transmitter. This allows convenient user connection/disconnection. This option requires the use of a connecting cable or connector (ordered separately). Connector wiring and cable wiring are shown in Figure 9. See below for connectors and cables:

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8.4.1. Optional IP68 rated field wireable connectors and cables:

<u>Wahl P/N</u>	<u>Description</u>
12075-07	straight field wireable connector, 4-6 mm cable gland
12075-08	straight field wireable connector, 6-8 mm cable gland
12075-09	right angle field wireable connector, 4-6 mm cable gland
12075-10	right angle field wireable connector, 6-8 mm cable gland

Cable assemblies are single-ended and feature a molded IP68 rated connector. Opposite end is left un-stripped. Insulation is PVC and rated to 105°C.

<u>Wahl P/N</u>	<u>Description</u>
12361-xxx	xxx denotes length in meters, i.e. 12361-010 is 10-meter cable, 12361-120 is 120-meter length.

Connections for 12361 cable for DST621/661 are as follows:

Wire Color	Connection	Signal
Brown	Pin 1	Current out + (+V DC)
White	Pin 2	Current out – (-V DC)
Blue	Pin 3	N/C
Black	Pin 4	N/C
Non-insulated	Coupling nut	Shield*

*Shield lead should not be terminated if meter housing or probe shank is grounded, to avoid ground loops.

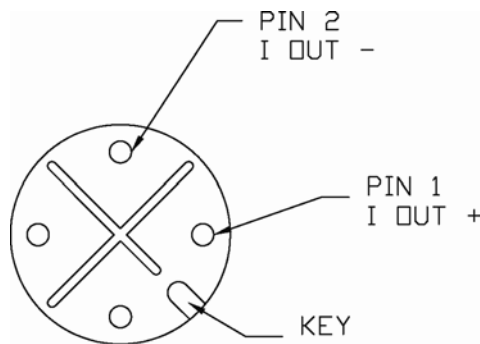


Figure 9 – DST621/661

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9. Specifications – DST610/650, DST611/651, DST620/660, DST621/661

DST610 - 620 SERIES / DST650 - 660 SERIES RTD METER SPECIFICATIONS				
Standard Series	DST610	DST611	DST620	DST621
All Stainless Steel Series, Increased RFI Protection	DST650	DST651	DST660	DST661
Model	RTD Meter with Local Display and Isolated Second RTD Sensor			
Isolated Secondary Sensor	Internal Terminal Block		4-20mA Transmitter	
	1/2" NPT Female Connector	Turck 4 pin Connector	1/2" NPT Female Connector	Turck 4 pin Connector
DISPLAY SPECIFICATIONS				
Meter Range / Scale	-50° to 500°F (-45.5° to 260°C) / User Selectable for °F or °C			
Meter Accuracy	± 0.1°F/C, over 1-year period (@ Tamb = 23°C ± 5°C)			
Meter and Probe Accuracy	Temp ≤ 300°F (148.8°C) = ± 0.3°F (± 0.2°C), Temp > 300°F (148.8°C) = ± 0.25% of reading			
Display	1.0" 4-digit LCD display with icons for °F, °C and Low Battery, Readable up to 30 ft.			
Display Resolution	0.1°F/C			
Sample/Display Rate	2 seconds standard, adjustable in .25 second intervals from .25 to 10 seconds			
Ambient Operating Environment	-40° to 158°F (-40° to 70°C) / 10% to 100% RH non-condensing			
Ambient Temperature Coefficient	Maximum of 0.003%/°C over Ambient Operating Temperature Range from 23°C ± 5°C			
Sensor/Probe	<ul style="list-style-type: none"> • Sensor - 4-wire RTD, R0 = 100Ω, Alpha = 0.00385 Ω/Ω/°C w/ serial ID chip • 304 or 316L Stainless Steel Probe construction • Adjustable Angle Stem Probes • Rigid Stem Probes • Remote Probes with rugged IP68 connection system • Sanitary Fittings (3A Sanitary Std 74-06) • Models 610/650, 611/651, 620/660, 621/661 - 3/8" & 1/2" OD Shank & Tapered Bulbs only 			
Sensor Cables	PVC insulation, shielded, 6 conductor, 105°C rating			
SECONDARY RTD SPECIFICATIONS				
RO	100 ohms per DIN EN 60751		100 ohms per DIN EN 60751	
Accuracy	Class A per DIN EN 60751		Class A per DIN EN 60751	
Temperature Coefficient	TCR = 3850 ppm/k		TCR = 3850 ppm/k	
Connection	Factory wired for 4-wire, user selectable 2, 3 or 4 wire		4-wire	
Self-Heating	0.4 K/mW at 0°C		NA	NA
Measuring Current	0.3 to 1.0 mA, self-heating must be considered		NA	NA
Terminal Block Type	Euro Style		NA	NA
Maximum Wire Size	10 AWG		NA	NA
TRANSMITTER SPECIFICATIONS				
Programming	NA	NA	PC Programming*	
Power Supply Requirements	NA	NA	10 to 35 Volts DC	
Range	NA	NA	-58° to 500°F (-50° to 260°C)	
Accuracy	NA	NA	Greater of 0.1°C or 0.05% of input span	
Fault Monitoring	NA	NA	Programmable High (> 21.6 mA), Programmable Low (< 3.5 mA)	
Power	One Lithium Thionyl Chloride "C" Battery, User Replaceable			
Battery Life	2 years nominal at 2 second update interval			
NIST Calibration	Optional NIST Traceable Certificate of Conformance at 3 points: 180°F, 220°F, 250°F (For User Specified Fixed Points please contact Customer Service)			
Programming & Calibration Software	Optional: DSTCAL Calibration Software			
Enclosure	DST610/DST620 Series: Stainless Steel Enclosure with Polycarbonate H Frame and Window (NEMA 4X) DST650/DST660 Series: All Stainless Steel Enclosure with Polycarbonate Window (NEMA 4X)			
Dimensions/Weight	5.3" W x 4.3" H x 2.7" D (13.5 x 10.9 x 6.9 cm). / 2 lbs. (1kg)			

* Factory Programmable or optional programming kit required. Specifications subject to change without notice.

10. **Service** - For calibration, service or technical support, contact Wahl Instruments at: Toll Free: 800-421-2853, or Phone: 828-658-3131, or email sales@palmerwahl.com.

11. Panel Mount Instructions

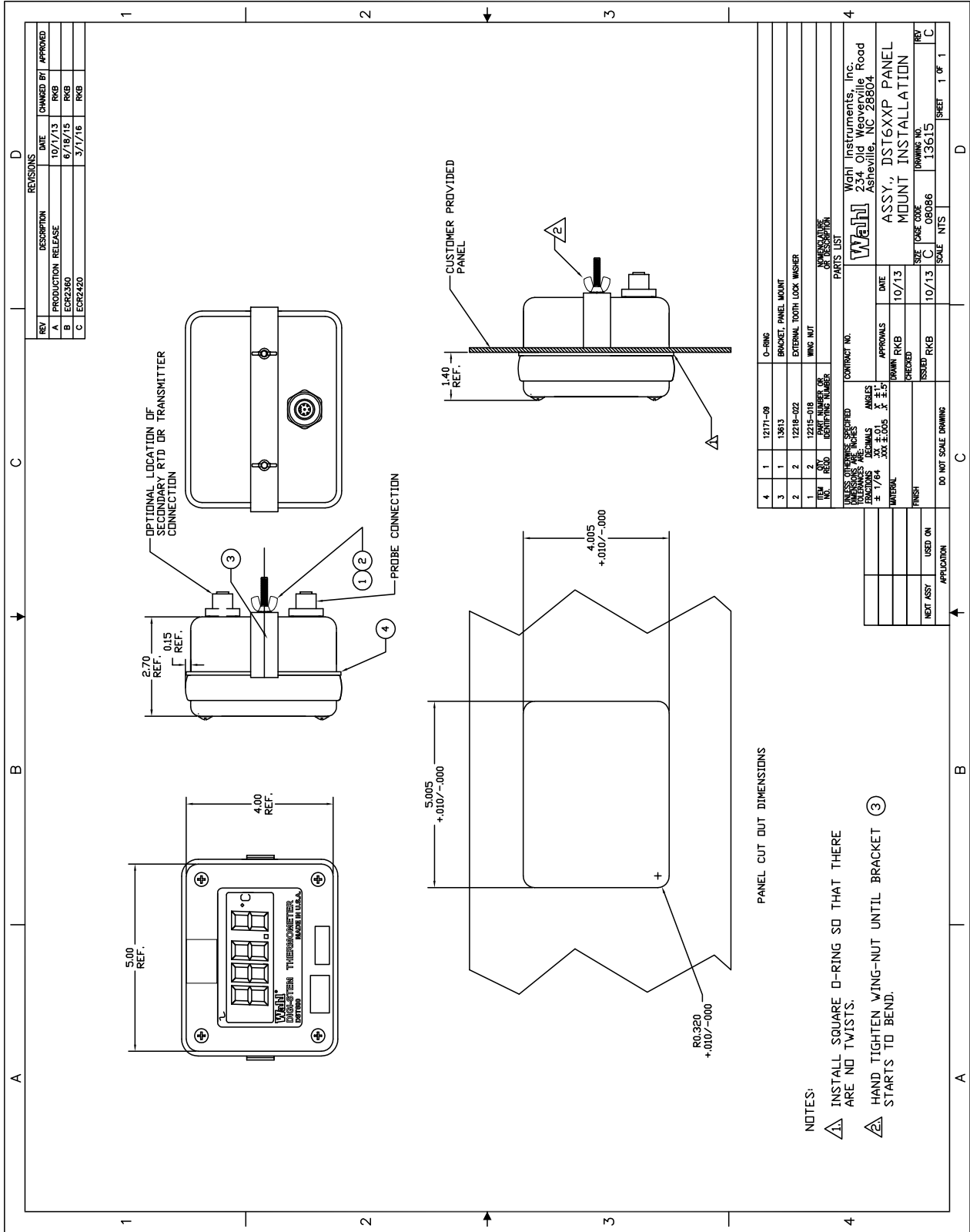
The Panel Mount system for Wahl Digi-Stem is designed for use with panels from 1/8" to 3/8" thickness. The system uses a square O-ring to seal around the meters H-Frame and the panel. The unit is secured by a U-bracket with 2 #8 wing nuts and lock washers.

For Panel cutout dimensions and installation reference Wahl Drawing 13615. (see below)

- 1) Remove Hardware and bracket from mounting studs on rear of meter enclosure.
- 2) Ensure the square O-ring is installed flat against the H-frame and is not twisted.
- 3) Slide the meter from the front surface of the panel through the panel opening.
- 4) Install the U bracket over the mounting studs with the short arms facing the rear side of the panel.
- 5) Install a lock washer and wing nut onto the studs.
- 6) Gently tighten the wing nuts until they just start tightening. The bracket should not be deflected more than 0.020" (approximately $\frac{3}{4}$ to 1 turn after touching).

CAUTION: Excessive force may result in bending and fracturing the U bracket or damaging the mounting studs.

12. 13516 Panel Mount Drawing



13. See Addendum – WD1053 Battery Install & Shipping Instructions



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