DIGI-STEM® DST700
ADVANCED DIGITAL RTD TEMPERATURE SYSTEM
OPTIONAL TRANSMITTER AND SWITCH OPTIONS

USER MANUAL

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WD1122 Rev B
September 2026

WAHL DIGI-STEM® DST700
ADVANCED DIGITAL RTD TEMPERATURE SYSTEM USER MANUAL

Contents

Digi-Stem® DST700 Advanced Digital RTD Warranty

Manufacturer warrants all Wahl Digi-Stem® DST700 Advanced Digital RTD Meters manufactured by us to be free from defects in material or workmanship under normal use and service. The Manufacturer agrees to repair or replace any product listed above which upon examination is revealed to have been defective due to faulty workmanship or material if returned to our factory, transportation charges prepaid, within the product specific warranty period of two (2) years from date of purchase. This warranty is in lieu of all other warranties, expressed or implied and of all obligations or liabilities on its part for damages including but not limited to normal wear and tear or consequential damages following the use or misuse of this or any instrument sold by the Manufacturer. In addition, if the product is tampered with or calibrated in any way other than by the instructions supplied by Palmer Wahl, it will immediately void the warranty. No agent is authorized to assume, for the manufacturer, any liability except as set forth above. Freight cost to return item(s) for evaluation, duties and other fees are not covered by the manufacturer.

Product is automatically registered for warranty by serial number at time of purchase. Serial numbers must remain attached to product upon return.

Thank you for purchasing a Wahl Digi-Stem® DST700 Advanced Digital RTD Meter. We appreciate your business.

Meter Only

Safety Instructions

This document contains important information and should be read carefully before using this instrument. All users of this instrument should be given these instructions.

Future updates to this information can be found in the most recent version of the User Manual at http://www.palmerwahl.com. The instrument should only be operated by trained personnel in accordance with these instructions and local safety regulations.

- Carefully read all instructions.
- Do not alter the instrument.
- Use the instrument only as specified, or the protection provided by the instrument can be compromised.
- Do not use the instrument if it operates incorrectly.
- Do not use the instrument if it is altered or damaged.
- Disable the instrument if it is damaged.
- Avoid any action that can generate an electrostatic charge. Electrostatic discharge is an explosion hazard.
- Replace the batteries when the battery status indicator appears low to prevent incorrect measurements.
- Ensure the battery polarity is correct to prevent battery leakage.

To avoid possible damage to the instrument or to the equipment under test

- Always apply thread seal tape to the threads of the gauge. When installing in Stainless Steel, use Nickel Filled PTFE Thread Sealant Tape to prevent galling.
- Never tighten the gauge threads by holding the body of the meter. This could damage the gauge threads and make the meter inoperable. Use a wrench to tighten the gauge to the process.
- When the data logger and transmitter/switch access port(s) are not in use, keep the included dust cover protectors screwed down to prevent damage to the connectors.

 **Caution! DO NOT USE HIGH PRESSURE WATER OR STEAM FOR CLEANING!**

 **Caution!** See important information regarding Lithium Batteries on the enclosed document #WD1053, before proceeding!

 **Caution! DO NOT USE ALKALINE BATTERIES**

 **Caution!** Never tighten the meter threads by holding and turning the body of the meter. This could damage the connection to the meter, making it inoperable. See below for specific directions on meter mounting.

 **Caution!** Do not leave Data Logger USB plugged in continuously to computer to prevent inadvertent loss of data before saving.

 **Caution!** To prevent possible damage to equipment, be certain to connect to 24 V DC power source only.

 **Caution!** To prevent possible damage to equipment, DO NOT power the 24 V for the transmitter until the meter's transmitter mode has been configured, either 4-20 mA or 0-5 V DC.

Selecting the 4-20ma transmitter option could potentially place more than 5V on the 5V transmitter line which may cause damage to the 0-5V transmission equipment. Please use caution in selecting the correct transmitter mode.

Acceptable Operation

This instrument is intended only for the measurement of temperature. The instrument is appropriate for continuous use and operates reliably in demanding conditions if the documented technical specifications for all instrument components are adhered to. Compliance with the operating instructions is necessary to ensure the expected results.

Unacceptable Operation

Replacement Parts and Accessories: Use only original parts and accessories approved by the manufacturer. The use of other parts can compromise the operation, safety, and functionality of the instrument.

Instrument Disposal

Disposal of old instruments and batteries should be handled according to professional and environmental regulations of your area for electronic waste.

Unpacking & Inspection

For any questions about the shipment, please call our Customer Service Department at 1-800-421-2853 or 828-658-3131. We can also be reached online at www.palmerwahl.com, or by email to info@palmerwahl.com.

Items included in package:

- DST700 Advanced Digital Process RTD Meter
- Quick Start Guide
- #24040-01 Data Logger Connection Cable with M12-4, 90° Easy Connect to USB-A, 1 meter length.
- Data Logger Software on USB Flash Drive
- Custom fit foam lined box, suitable for returning unit for Calibration.
- User manual available as Download at www.palmerwahl.com/

Items sold separately that may be included:

- DSA3062 - C size battery or 12234-03 – AA size battery
- 24040-03-XX DST/DSP Transmitter Cable, M12-8, 90° Easy Connect to Bare Wires
- Any additional Accessories

Battery Installation/Replacement:

Caution! See important information regarding Lithium Batteries on the enclosed document #WD1053, before proceeding!

The DST700 meter is shipped assembled and ready for out-of-box usage after battery installation. Systems with long probes or remote cables may be shipped unassembled.

Please follow battery installation instructions on p.7 before proceeding. In the event the display is not operational, check that the battery is seated properly by following the battery installation procedure in this section.

Be sure that the battery polarity is correct to prevent battery leakage

Caution! DO NOT USE ALKALINE BATTERIES

The DST700 uses a single 3.6V Lithium Thionyl Chloride battery, Part #DSA3062, or 1- AA Lithium Battery, Part #12234-03. A general bar indicator on the screen is lit to display battery level. Actual battery life will vary depending on the battery type chosen and the display update rate setting.

Battery life is a function of the display update rate and may be changed to fit the user's needs. The following table shows approximate battery life for a given display update rate.

DST700		
Display update rate in seconds	DSA3062, C size battery (8500mAH) approximate life	12234-03, AA size battery (3000mAH) approximate life
0.3	3.73 years	1.10 years
0.5	3.59 years	1.06 years
1	4.04 years	1.19 years
2	5.11 years	1.50 years
5	7.46 years	2.20 years

Battery Installation/Replacement Procedure:

When the battery status indicator shows low battery, replace the battery by first loosening the 4 screws and lock washers on the corners of the case with Philips head screwdriver. The screws are captive, so they will release when they are protruding less than ¼" from the cover.	
Lift the case cover off carefully. The blue H-Frame will remain attached to the cover when you remove it.	

When the PC Board is exposed, gently hold down the board while pulling the battery out of the holder.

Place the battery in the holder in the direction of the sticker and snap into place.

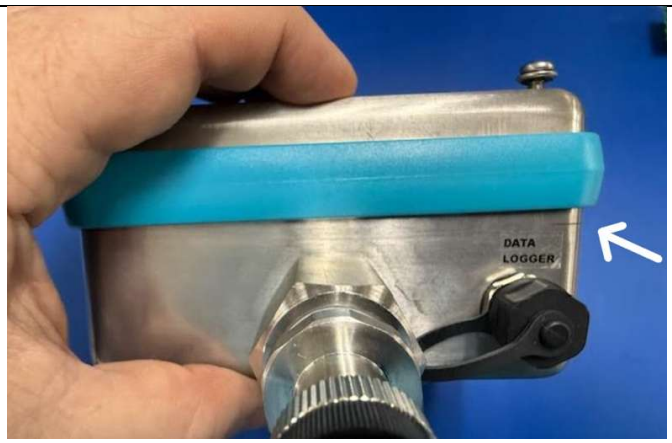
When the new battery is connected the screen will cycle through red, blue and green lights.

Replace the case cover, ensuring that the H-frame has been installed evenly onto the base unit.

To facilitate this, both the cover and the base have engraved marks to be used as indicators that the cover is seated properly. These marks will not be visible when the cover is installed correctly.

Tighten the screws ¼ turn past snug to ensure the meter stays waterproof. Recommended torque is 4 to 5 inch pounds. Permanent damage may occur if overtightened or cross-threaded.

Caution! Do not use a power screwdriver to install the case cover screws.



Remember! Set the time and date on the Digi-Stem unit after replacing the battery.

Meter Installation

Ventilation
The DST700 should be installed in an area of adequate air exchange so that the specified ambient conditions are not exceeded.

Meter Mounting – Fixed Probe

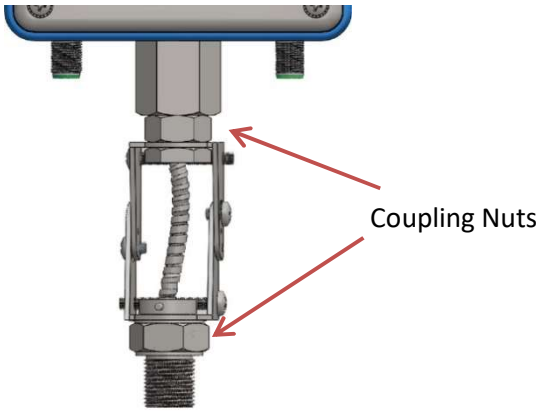
Fixed probes may be mounted by the threaded fitting or sanitary clamp into the process. Apply thread seal tape (use Nickel Filled PTFE Thread Sealant Tape) to the threaded fitting of the probe as required. Units with swivel nut fittings or adjustable angle stems may be adjusted after installation for best viewing angle. See below for details.

Caution! Never tighten the meter threads by holding and turning the body of the meter. This could damage the connection to the meter, making it inoperable. For fixed probe installation use a wrench on the hex connection at the base of the meter to tighten the probe to the system.

Meter Mounting – Remote Probe

An optional mounting bracket, part number DSA3030ST, is available for mounting meters with remote stems to walls, panels, etc. The mounting bracket may be attached by the top or rear surface with user provided mounting screws, clamps, etc.

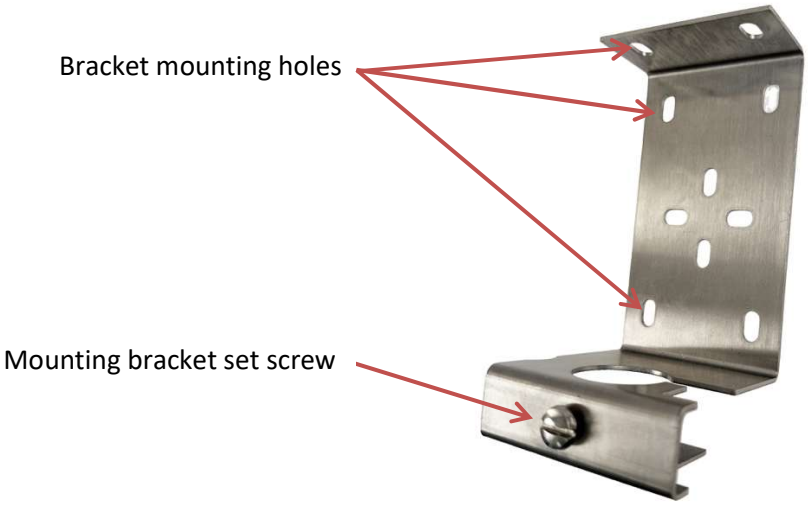
- Mount the bracket with the Digi-Stem mounting screw towards the bottom. The Digi-Stem's coupling nut should be inserted from the top, with the display facing out and secured with the mounting bracket set screw.



- For remote cables, disconnect the cable connector from the meter, insert the meter's coupling nut through the top hole of the mounting bracket and secure with the Digi-Stem mounting screw. Re-connect the cable and secure.

Caution! Do not use the Digi-Stem enclosure or the mounting bracket as a wrench. For remote probe installation hold the coupling nut with one wrench and tighten the remote cable nut with another wrench.

Note: If battery power is on, the unit will display “CbLA1” when the cable is disconnected, indicating an open sensor. It will self-correct when the cable is reconnected.

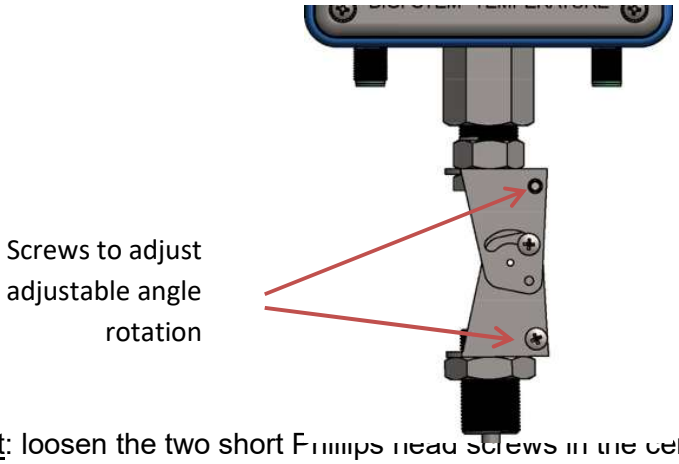


DSA3030ST – Optional Accessory Mounting Bracket for DST700 Digi-Stem Meters with Remote Probes.

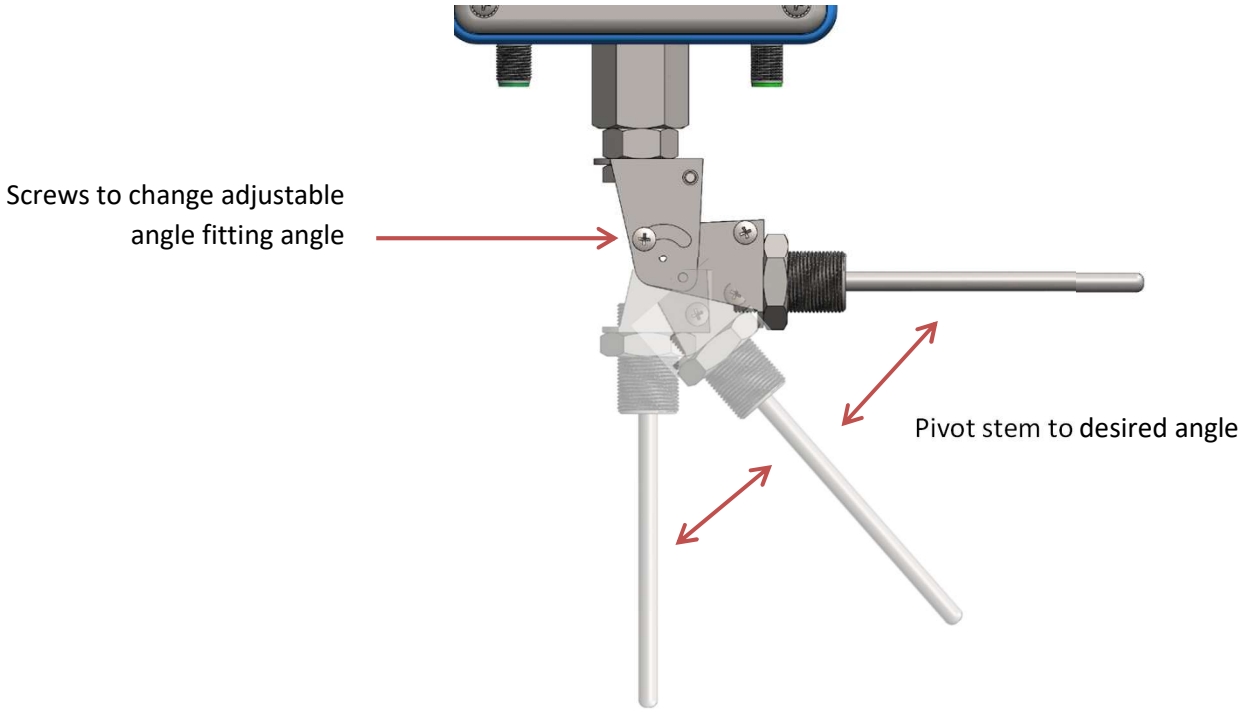
Adjustable Angle Probe – Adjustment

Caution! Never tighten the meter threads by holding and turning the body of the meter. This could damage the connection to the meter, making it inoperable.

- Rotational adjustment: loosen the two long Phillips head screws on each side of the adjustable angle fitting to rotate the fitting around the coupling nuts to the desired location. Tighten screws when position is set to the desired location.



- Angular adjustment: loosen the two short Phillips head screws in the center slots (one on each side) and pivot the bracket to the desired angle. Tighten screws.



DST700 Probes - Interchangeability

DST700 Meters with Wahl remote probes have a Plug and Play feature, giving you the option of interchangeability with your probes. The meter or any Wahl DST700 series remote probe can easily be changed in the field, maintaining accuracy without Calibration.

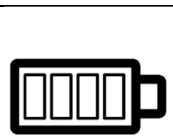
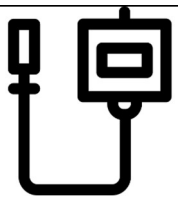
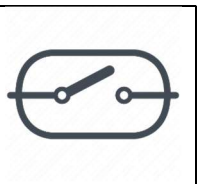
If purchased with a remote probe, use the Easy Connect feature to disconnect your in-process meter to return for calibration and exchange with another calibrated meter. Keep your cable and probe installed and maintain accuracy with zero downtime.

If a NIST Certificate of Conformance is required, return only the meter to the factory.

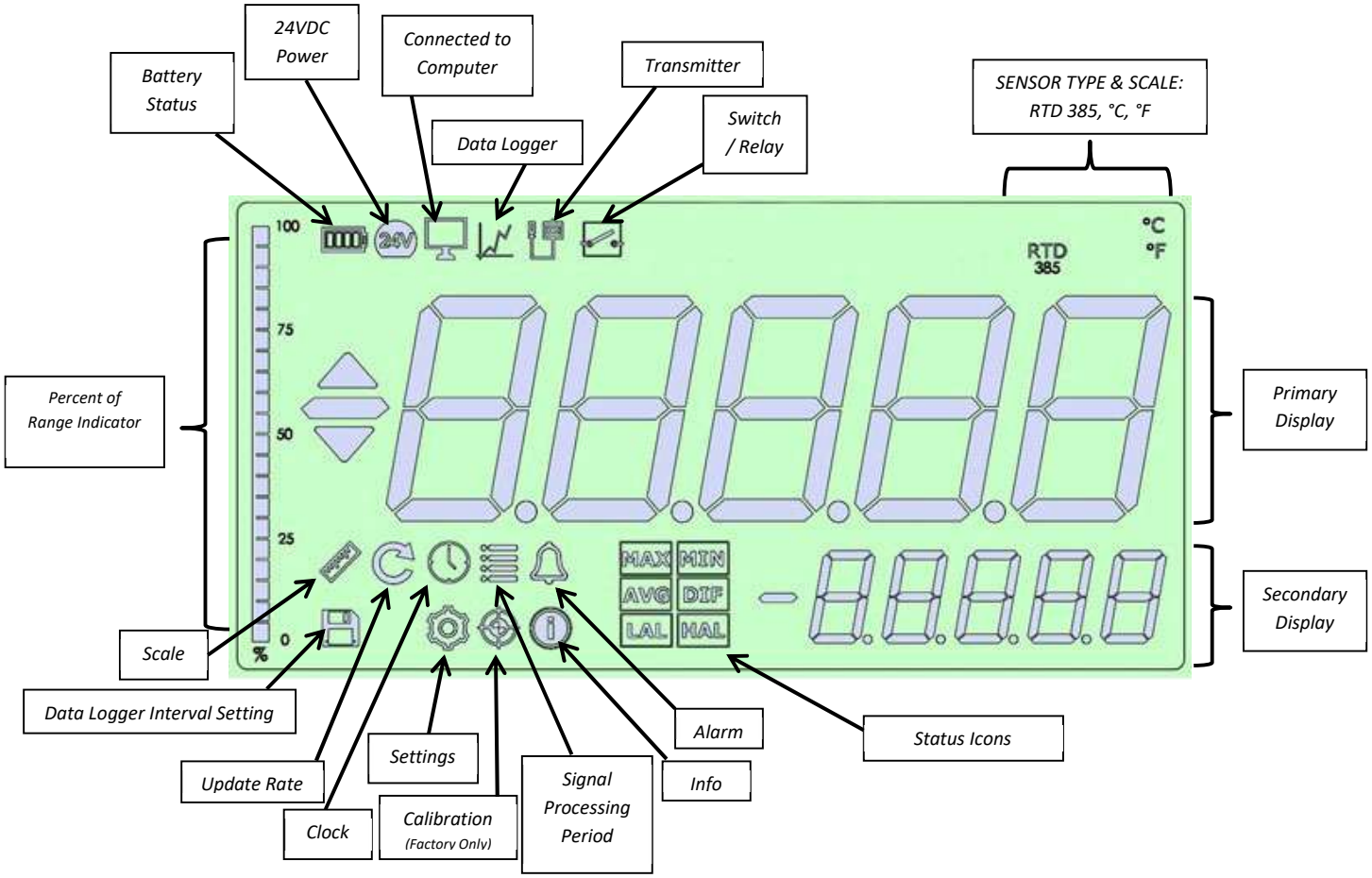
Meter may drift approx. 0.1°F annually. Manufacturer suggests annual calibration for meters.

Note: Class A RTD probes max drift approx. 0.25°F over 5 years.

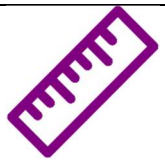
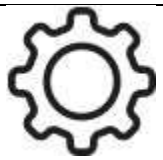
Digi-Stem® Status

					
Battery	24VDC	Connected to Computer	Data Logger	Transmitter	Switch (Relay)

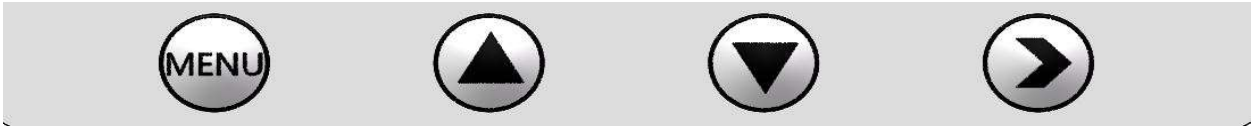
Display and Keypad Info



Display Icons

				
Unit	Update Rate	Clock	Signal Processing Period	Alarm
				
Data Logger Interval Setting	Settings	Calibration (Factory only)	Info	

Digi-Stem® Keypad & Setup Mode Navigation



The instrument will enter Measuring Mode by default.
In Measuring Mode, the instrument displays the current temperature.

1) Press the ► key to see the Time & Date settings.
2) Press UP ▲or DOWN ▼keys to change the display resolution tenths of degrees to whole degrees

To enter the Setup Mode, press the MENU button.
To enter into a sub-menu, press and hold the MENU button for 2 seconds.

When in Setup Mode, if you do not press any buttons for 5 seconds, the unit will return to Measuring Mode.

Press the MENU button to scroll through the list of Settings. Use the ► key to traverse between options or digits where applicable. Once you have selected your desired option, hit the MENU button again to select the option.

1) Temperature Scale. Choose °F or °C
    a. Press Menu to select and continue
2) UP: Update Rate. Use the ▲ key to choose the desired update rate. Choose from 0.3 seconds, 0.5 seconds, 1 second, 2.5 seconds, 5 seconds
    a. Press Menu to select and continue
3) Date. Setup in MM-DD-YYYY to assign the correct date/time stamps to your records for data logging. Use the ► key to navigate between the MM, DD, and YYYY fields and the ▲ key to scroll through the options.
    a. Press Menu to select and continue
4) Time. Setup in HH-MM-SS to assign the correct date/time stamps to your records for data logging. Use the ► key to navigate between the MM, DD, and SS fields and the ▲ key to scroll through the options.
    a. Note: When setting the time, the 24 hour clock setting is the default.
    b. Press Menu to select and continue
5) [---]: Signal Processing Period. The Signal Processing Period is the length of time over which the maximum temperature, minimum temperature, average temperature, and temperature differential will be calculated. (MAX, MIN, AVG, DIF).
    a. Choose the UP ▲or DOWN ▼ key to scroll through options: 24 Hours, 12 Hours, 8 Hours, 4 Hours, 1 Hour, 900 Seconds (15 minutes), 300 Seconds (5 minutes), 120 Seconds (2 minutes)
        i. Press Menu to select and continue
6) LAL: Low Alarm. Choose UP ▲or DOWN ▼ arrow to scroll through ON and OFF. Press the ► key to select the option.
    a. If ON is chosen, the unit will allow you to set the low alarm temperature in the secondary display at the bottom right hand corner of the screen. Use the UP ▲and DOWN ▼ keys to choose each digit. Using the ► button will allow you to traverse through the digits of the temperature.
        i. NOTE: The Low Alarm point can be set anywhere in the meter operating temperature range but must be at a *lower* temperature than the High Alarm point.
            1. Press Menu to select and continue
7) HAL: High Alarm. Choose UP ▲or DOWN ▼ key to scroll through ON and OFF. Press the ► key to select the option.
    a. If ON is chosen, the unit will allow you to set the low alarm temperature in the secondary display at the bottom right hand corner of the screen. Use the UP ▲and DOWN ▼ keys to choose each digit. Using the ► key will allow you to traverse through the digits of the temperature.
        i. NOTE: The High Alarm point can be set anywhere in the meter operating temperature range but must be at a *higher* temperature than the Low Alarm point.
8) SAVE: Data Logging Interval. Set how often a temperature reading is recorded. Use the UP ▲or DOWN ▼ key to scroll between Off, 10 seconds, 20 seconds, 30 seconds, 60 seconds (1 minute), 120 seconds (2 minutes), 300 seconds (5 minutes), and 600 seconds (10 minutes)

   a. Press Menu to select and continue
9) Wireless: ON or OFF: Not yet available – Do Not Use.
10) Out L: Transmitter Range – Low Limit. Override the unit's default transmitter output range by setting the low limit temperature of the transmitter output. This temperature will be assigned to the 4mA setting when 4-20mA output is chosen, or 0V when 0-5V output is chosen.
    a. NOTE: The Low Limit value must be within meter operating temperature range but must be at a *lower* temperature than the High Limit Transmitter Range point.
11) Out H: Transmitter Range – High Limit. Override the unit's default transmitter output range by setting the high limit temperature of the transmitter output. This temperature will be assigned to the 20mA setting when 4-20mA output is chosen, or 5V when 0-5V output is chosen.
    a. NOTE: The High Limit value must be within meter operating temperature range, but must be at a *higher* temperature than the Low Limit Transmitter Range point

    Note: When overriding the default output range, the published meter accuracy does not apply.
12) O tyP: Output Type. Select 4 – 20 to select 4 to 20mA output, or 0 – 5 to choose 0 to 5 Volts output.
    a. NOTE: To prevent issues, the Output Type should be correctly selected prior to connecting equipment to the analog output of the unit.
        i. Press Menu to select and continue

4 to 20mA output

When the 4-20mA output is enabled, failure will be expressed as follows:

a) If the DST700 reads below the operating range, the 4mA signal will read 3.8mA to indicate failure.
b) If the DST700 reads above the operating range, the 20mA signal will read 20.5mA to indicate failure.

0 to 5V output

When the 0-5V output is enabled, failure will be expressed as follows:

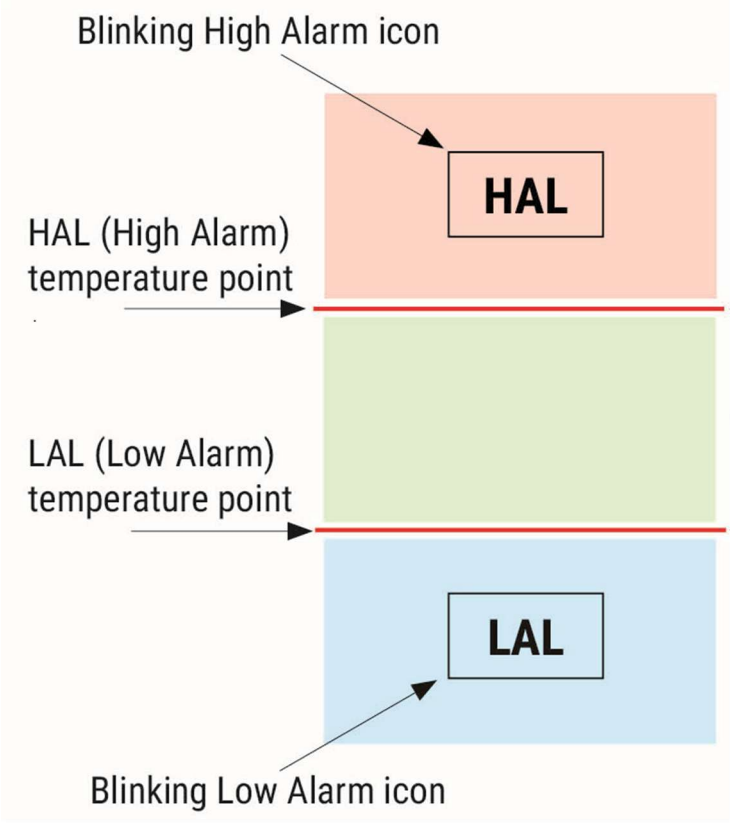
a) If the DST700 reads below the operating range, the 0V signal will read 0V to indicate failure.
b) If the DST700 reads above the operating range, the 5V signal will read 5.1V to indicate failure.

13) bL: Backlight. Set how long the green backlight is lit after a button press. Choose between 15 seconds, 30 seconds, 45 seconds, and 60 seconds.
    a. NOTE: The green backlight can be set when the unit is battery powered. When externally powered, the green backlight is continuously on.
        i. Press Menu to select and continue
14) SECr
    a. Secure Access: Factory Use Only

15) Information: Press the ► key unit to scroll through the screens.
   a. Screen 1: Displays the high end of the temperature range of the unit, as well as the firmware version in the bottom right hand corner of the screen.
   b. Screen 2: Displays the low end of the temperature range of the unit, as well as the firmware version in the bottom right hand corner of the screen.
   c. Screen 3: Displays the serial number of the unit, with the first two digits of the serial number shown in the main screen, while the subsequent digits are shown in the bottom right hand corner of the screen.

Alarms

The DST700 includes visual alarms to correspond with the High and Low alarm points set in steps 6 & 7 above. If temperatures are higher that the High Alarm point, the screen will display a Red backlight. Temperatures lower than the Low Alarm point will cause the screen to display a Blue backlight. Normal temperatures between the two points will display a Green backlight.



If alarm conditions are met, when the meter is powered by battery, the appropriate color backlight shown above will come on for one second, while the HAL of LAL icon on the screen will blink until the alarm condition is resolved. When the meter is externally powered by 24V DC, the appropriate color backlight will blink, while the HAL or LAL alarm icon blinks on the screen until the alarm condition is resolved.

Display Error Codes

During normal operation, the DST700 continually performs self-checking diagnostic testing of the system. Errors are indicated by the following error codes with the action required:

DST700 Display Error Codes		
Error Code	**Description**	**Action Required**
HI	Temperature above meter range	Wait for temperature to return to meter range
LO	Temperature below meter range	Wait for temperature to return to meter range
AHI	Ambient above 50°C	Wait for Ambient to return to less than 50°C
ALO	Ambient below 0°C	Wait for Ambient to return to greater than 0°C
PRb	RTD sensor signal unstable	Return meter and probe to Factory
PCb	PCB problem	Return meter and probe to Factory
CLbA1	Cable and/or probe disconnected. Backlight will blink purple.	If battery power is on, the unit will display “CbLA1” when the cable is disconnected, indicating an open sensor. It will self-correct when the cable is reconnected.
PErr	Power supply problem	Return meter and probe to Factory
EErr	Memory problem	Return meter and probe to Factory

Troubleshooting

Data is not being recorded.	Each time the Digi-Stem is powered on, the data logger function defaults to “Off”. Turn the data logger function back On in the setup menu.
Date/Time is not correct on downloaded data.	The data logger gets the time and date information from the Digi-Stem unit itself. Be sure the correct time and date are programmed in the setup menu to ensure accuracy of downloaded data.
Data is being recorded in multiple events.	When first recording, all data is automatically assigned to Event 1. When turning off the data logger, disconnecting

	the probe, changing the data logger interval, or powering off the Digi-Stem, the current event will be completed and closed. When data logging resumes, it will be in a new event. Data from multiple events can be combined in Excel.
Screen appears to be responding slowly	The update rate setting may be set too high. Check and adjust.
The meter is running through batteries quickly	Several factors can contribute. • Check the duration the backlight stays on after a button press. Choose the shortest reasonable time period. • Check the update rate. Choose the longest reasonable update rate. • Check the Alarm State. If an alarm is active for an extended period of time, the battery life can be shortened.

Wahl Digi-Stem DST700 Specifications

Digi-Stem DST700 Series Specifications

CASE STYLE	Stainless Steel Case Polycarbonate H Frame/Window	DST700
	Model Feature	**Advanced RTD Meter with Display, Alarm and Data Logger Optional Transmitter and Switch**
PROBES	**Probes / Sensor**	DIN EN 60751 Pt100 Class A 4-wire platinum RTD Sensor. R0 = 100 Ω, Alpha = .00385 Ω/Ω/°C
METER SPECIFICATIONS	**Meter Range / Scale**	-60° to 600°F (-51° to 315°C) / User Selectable °F or °C
	System Accuracy	±0.3°F Full Range
	Interchangeable Probe	Plug and Play with Meter and any 4-pin Wahl DST700 Remote Probe, without Calibration, and maintain Standard 0.3°F Accuracy.
	Operating Environment	-4° to 158°F (-20° to 70°C)
	Relative Humidity	10% to 100% RH non-condensing
	Storage Temperature	-25° to 85°C (-13° to 185°F)
	Ambient Temperature Coefficient	0.002°/°C Ambient Operating Temperature Range from 0° to 60°C
	Vibration	Vibration Resistant
	Meter Battery Option	1 - C size, Lithium Thionyl Chloride Battery, 3.6 V, User Replaceable or 1 - AA, Lithium Thionyl Chloride Battery, 3.6 V, User Replaceable
	Battery Life	4 years standard operation with C size lithium battery at 1 second update rate, (default) AA Battery Life - 1.2 years at default 1 second update rate
DISPLAY SPECIFICATIONS	**Primary Display**	0.9" 5-digit LCD Display of Real-Time Temperature, Readable up to 30 ft. away
	Secondary Display	0.4" 5-digit for Secondary Temperature: MAX / MIN / AVG / Delta T, Hi and Low Alarm Settings and Internal Electronics Temperature
	Advanced Visual Alarm Backlight	High Alarm RED/Icon, Low Alarm BLUE/Icon, Normal Operation GREEN, Fully Adjustable
	Display Resolution	User selectable display resolution switchable between whole degree or tenths of a degree, F/C
	Sample / Display Update Rate	For Long Battery Life or Quicker Response Time, 5 User Selectable Update Rates: 0.3s, 0.5s, 1s (default), 2s, 5s
DATA LOGGER (Included)	**Data Storage**	1,000,000 Temperature Readings with Date/Time Stamp
		30 Second Intervals for 365 Days Recording
		120 Second Intervals for 4 Years Recording
	Time Stamp	Year: 20xx / Month: xx / Day: xx / Hour: xx / Minute: xx / Second: xx
	Sampling Interval	10 Seconds Default. Keypad Selectable: 20 / 30 / 60 / 120 / 300 / 600 Seconds
	Digital Output	Utilize Wahl Protocol to integrate digital output with your application
	Output File	MS Excel File (Download via Wahl Data Logger software)
TEMPERATURE TRANSMITTER AND SWITCH (Optional)	**Analog Output**	4-20mA or 0-5V
	Output Accuracy	Transmitter: 0.075% plus 0.005% Span
		Switch: 0.1% plus 0.1% Span
	Switch	Switch triggered at High Alarm and Low Alarm Two programmable temperature points for High/Low (On/Off) Switch
	Switch Relays	Consistent Open Relay, Overload Protection Relay, Polarized Relay, Safety Relays, Solid-State Relay, Time Delay Relay
	Power Supply Requirements	Loop Powered, 24 V DC (Customer supplied). Required for Switch and Transmitter Option. (Battery required for display backup).
ENCLOSURE	**EMI Interference**	EMI and RFI Protection. External Electromagnetic Signals do not affect function.
	Protection Ratings	NEMA 6P, IP68. Dust Tight - Survives Water Submersion up to 1 meter.
	Enclosure Dimensions / Weight	5.3" W x 4.3" H x 2.7" D (135 x 109 x 69 mm) / Weight: 2.0 lbs. (1kg)
Includes: Quick Start Guide, Data Logger cable/software on USB flash drive, User Manual as download, and custom foam lined box, suitable for returning unit for Calibration.		

Wahl Digi-Stem Data Logger Software Installation and Instructions

Caution! Do not leave Data Logger USB plugged in continuously to computer to prevent inadvertent loss of data before saving.

The DST700 Data Logger records up to 1 million temperature data points with Date/Time Stamp, to the memory chip on the PCB. Users can turn the data logger on or off and choose a data logging interval via the menu using the 4-key keypad. MS Excel file Output, download via Wahl Data Logger Software.

NOTE: Each time the Digi-Stem is powered on, the data logger function defaults to “Off”.

Wahl Data Logger software allows the user to download and store all data stored recorder with the Digi-Stem to a PC. Store data as an MS Excel file for further analysis and data storage. Use the included tools to view temperature history as a data chart, with options to zoom on the time axis and temperature ranges, as well as pan and snapshot the desired graph.

Wahl Data Logger software is compatible with Windows 8, Windows 10, and Windows 11 and Windows 12 operating systems.

Before you Begin

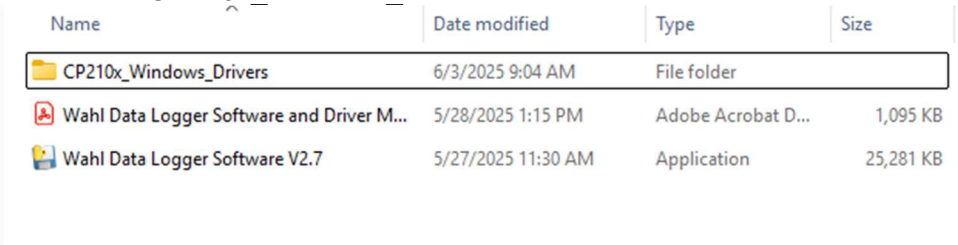
1. In order to use the data logger feature, the correct date and time must be set *on the instrument itself*. Reference page 15 to set correct date/time stamp.
2. After setting the date/time stamp on the instrument, select your desired data logging interval using the instructions on p. 16. The Digi-Stem can record up to one million data points.
   Examples: Select 30 second intervals for 365 days of recordings or 20 second intervals for 4 years of recording

Connection between the Digi-Stem and Data Logger software is made via PN: 24040-01 Data Logger Connection Cable. Align the notch to plug the 4-pin connector into the Data Logger port on the right side of the DST700 meter and plug the USB end into the USB port on the computer.

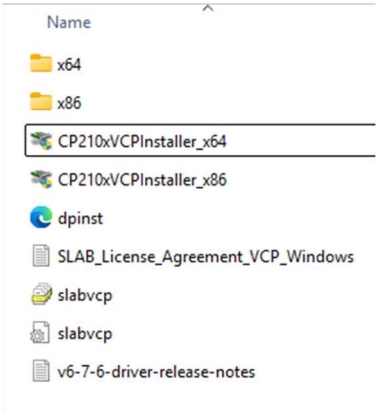
Installing the Wahl Data Logger Software:

Installing the Required CP210x USB to UART Bridge Driver

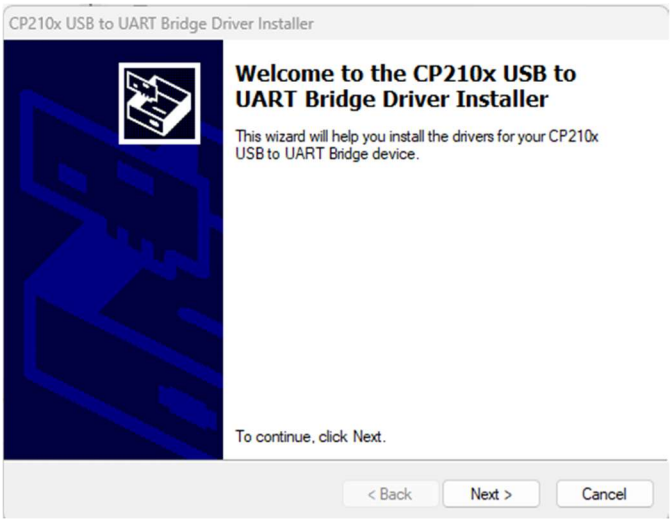
1. The driver required to connect to the instrument must be installed on each PC before connecting the instrument for the first time.
    a. NOTE: Administrative privileges may be required. Contact your IT team if necessary.
2. Insert the USB drive into your machine. Open the drive to view the contents.
3. Double click the CP210x_Windows_Drivers Folder to view the contents.



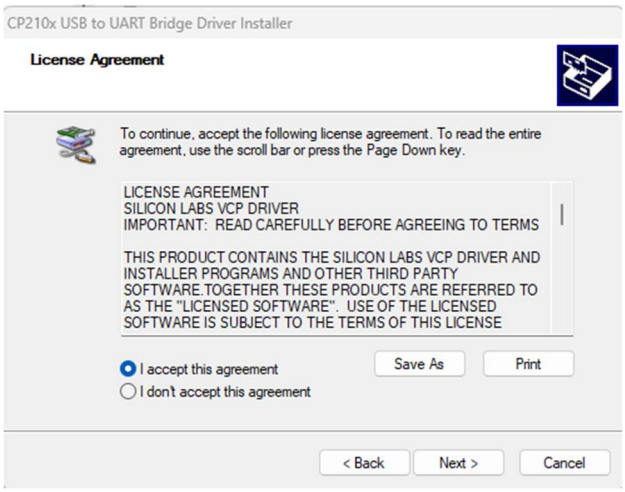
4. Double click on CP210xVCInstaller_x64



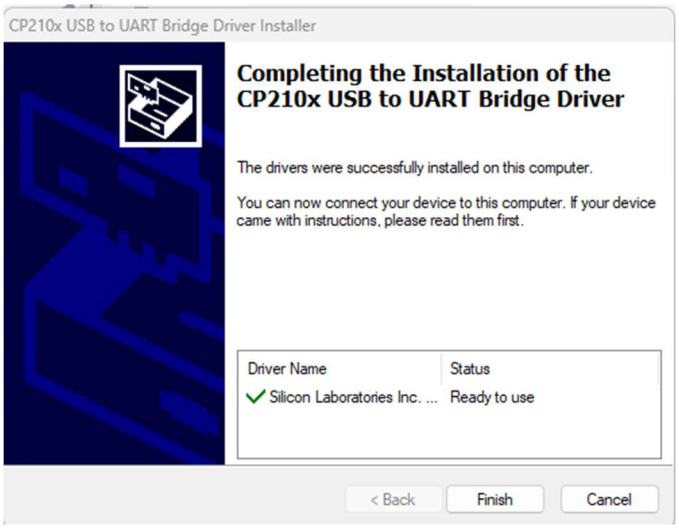
5. Follow the on-screen prompts to install the driver.



You must accept the license agreement to proceed with installation.



The following screen will appear when the driver is successfully installed.

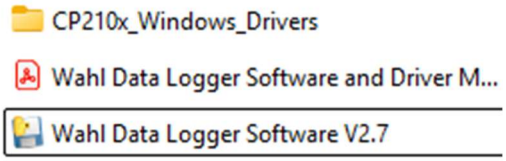


Using the Wahl Data Logger Software

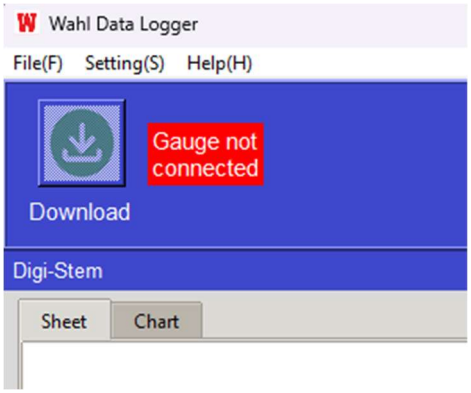
Remember! The Wahl Data logger software will utilize the date and time stamp that was set on the Digi-Stem meter itself. Be sure to set up the correct date and time on the Digi-Stem meter before choosing the interval on the meter. *Reference page 16 to set correct date/time stamp and data logging intervals.*

1. The Wahl Data Logger Software does not install but rather runs directly from the provided file. You may copy the software file from the USB drive to as many PCs as necessary.

2. To launch the software, double-click the Wahl Data Logger Software application file.

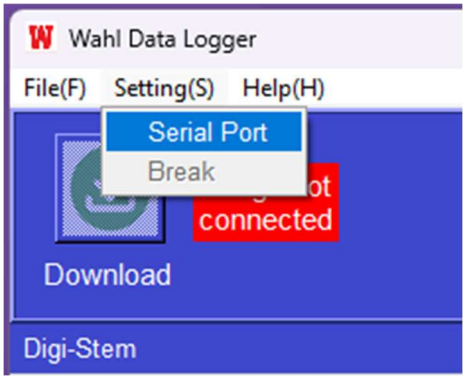


When the Wahl Data Logger software is launched, the following screen will appear:

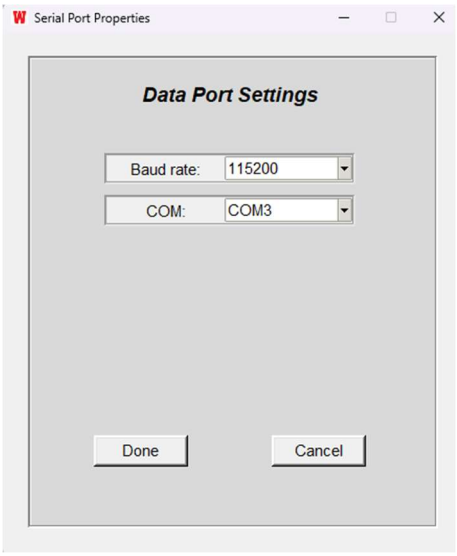


If the Digi-Stem is not already connected to the computer, the “Gauge not connected” status box will be red.

3. Attach PN: 24040-01 Data Logger Connection Cable to the port marked “Data Logger” on the Digi-Stem. Plug the USB connector into PC. The backlight on the instrument will turn on.
4. Choose Setting(S) > Serial Port from the menu bar.

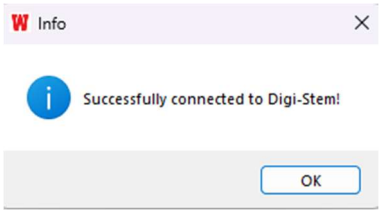


The Serial Port Properties – Data Port Settings screen will appear.



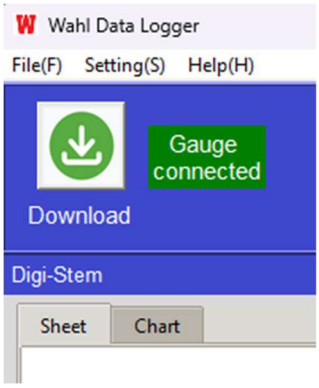
5. The software will automatically assign available COM port with the fastest baud rate.

6. Click “Done” to complete.



Click “OK”

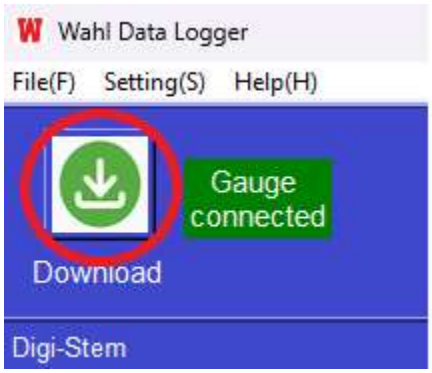
The “Gauge Connected” box will now be green, indicating that the instrument is now connected to the Data Logger software.



7. Click “Download” to start transfer data from Digi-Stem to the computer.

   NOTE: Please ensure that enough of your selected data intervals have passed to allow the recording of data points in the unit for transfer to the software.

8.

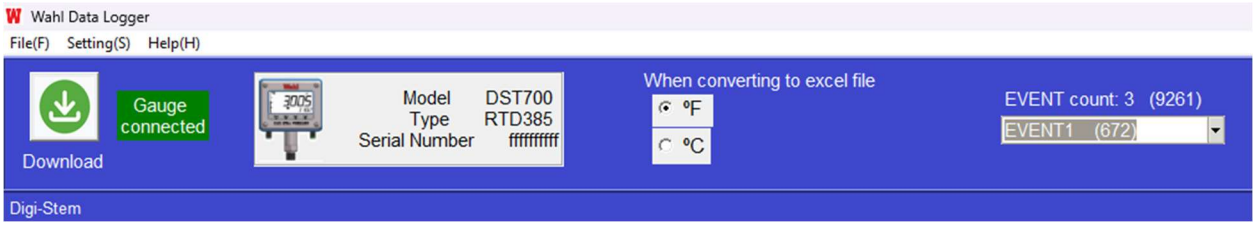


NOTE: While transferring data from the instrument to the software, “SENd_” is displayed on the Dig-Stem screen.

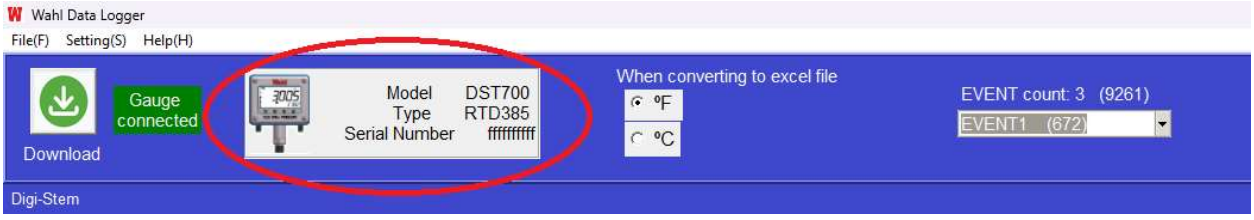
9. The “Download Status Bar” at the bottom of the window will show the progress of the data transfer.

NOTE: Because the Digi-Stem uses ultra-low power consumption microprocessors, it is much slower than a computer. The download rate is approx. 6 seconds per 10,000 records. For example, it may take up to 10 minutes to transfer 1 million data points to the software.

10. After successful downloading, the software will display a new interface at the top of the screen.



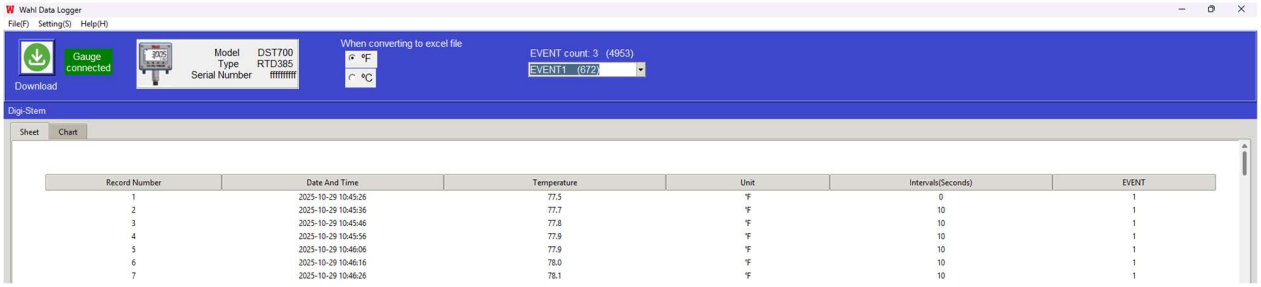
11. Data Logging Events
    a. When first recording, all data will automatically be assigned to Event 1.
    b. When turning off the data logger, disconnecting the probe, or powering off the Digi-Stem, the current Event is completed and closed.
    c. If data logging interval length is changed, a new Event will be started.
    d. If the Digi-Stem is powered off, all data will be automatically saved to that event.
    NOTE: Each time the Digi-Stem is powered on, the data logger function defaults to “Off”.



12. On the right-hand side of screen, click the drop-down box and select the appropriate event, select the radio button for the appropriate temperature scale for your data, and then click on the Digi-Stem Info button (circled above) to display the data sheet and chart. *This will take a few seconds.*

    NOTE: Do not leave Data Logger USB plugged in continuously to computer to prevent inadvertent loss of data before saving.

13. Data - Sheet View



After the initial download, you can download the new data from the unit by clicking “Download” at any time.

14. Data - Chart View

a. Chart View: Menu

b. Home

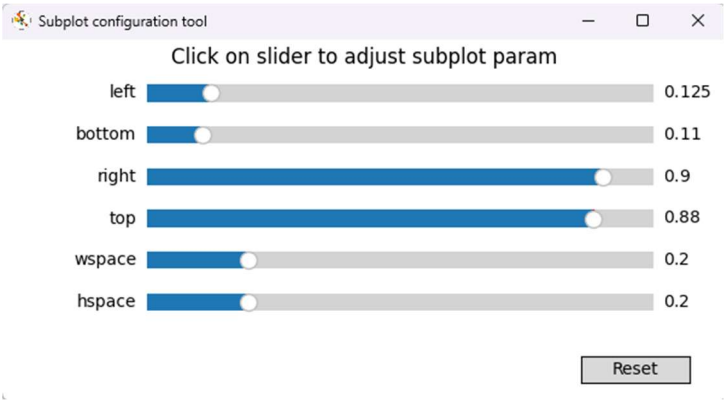
c. Navigate Back to the Previous View

d. Navigate Forward to the Next View

e. Mouse Actions: Click , then:
   - Left click on chart and hold left mouse button to pan (move chart on screen)
   - Right click on chart and hold right mouse button and:
     - Move right or left to adjust Time Axis scale
     - Move up or down to adjust Temperature Axis scale

f. Zoom In / Out: Click and place the "+" on the chart.
   - Left click and drag to draw a box over the chart of the area to zoom in.
   - Right click and drag to draw a box over the chart of the area to zoom out.

g. Configure Viewing Options. The Subplot configuration tool screen will open. Adjust each slider to manipulate the chart settings, seeing the adjustments take place on the screen.



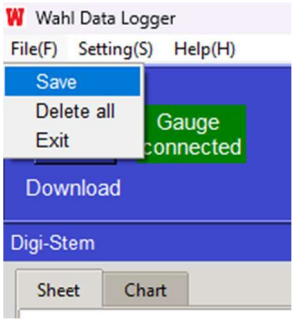
h. Save a .png image file of the chart view to your PC.

NOTE: We strongly recommend users delete all downloaded data by clicking "File (F) – Delete all" AFTER saving all recorded data to Excel file on computer. (See Deleting Data below.)

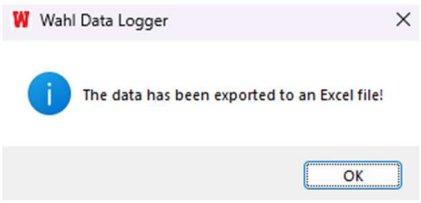
15. Exporting Data. To Export data from the Wahl Data Logger software to an Excel spreadsheet using File > Save option from the main toolbar.

NOTE: We strongly recommend users delete all downloaded data by clicking "File (F) – Delete all" AFTER saving all recorded data to Excel file on computer. (See Deleting Data below.)

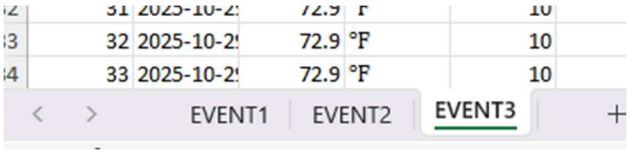
16. Exporting Data. To Export data from the Wahl Data Logger software to an Excel spreadsheet using File > Save option from the main toolbar.



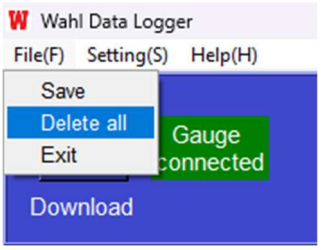
After clicking Save, choose the desired location and file name and click Save.



All recording events will be in one Excel file, each in a separate worksheet, named with the corresponding event.

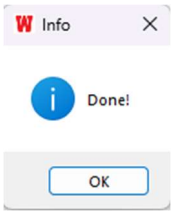


17. Deleting Data. Delete all data stored in the Digi-Stem unit memory by clicking “File (F) – Delete All”.



As the data is deleted the Digi-Stem will display “CLr_ _”.

A pop-up menu will appear to confirm data deletion is complete.



NOTE: The records will clear from the memory of the Digi-stem but may still be displayed on the computer screen.

Wahl Protocol

The Wahl protocol is a set of commands that define all possible communications between the Digi-Stem and computer.

The commands below are described along with their associated ASCII command characters and related message format information. These commands can be used to write custom programs for your applications or when communicating with your sensor via a terminal program.

Serial Port Settings

Data bits	8
Parity	None
Stop bits	1
Baud Rate	115,200
Communication Mode	The host (computer) sends commands. The device (Digi-Stem) responds to commands and returns requested data.

Command Frame Format

Each command frame is 13 bytes, fixed length:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5 – 12	Byte 13
C0H	48H	Command	Data1	Data2 – Data9	Data10

Synchronize Date/Time

Command 44H (‘D’). No return data.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5 – 12	Byte 13
C0H	48H	Command	Data1	Data2 – Data9	Data10

Field Definition:

Year = Data1 x 100 + Data2

Month = Data3

Day = Data4

Hour = Data5

Minute = Data6

Second = Data7

Read Sensor Model, Temperature, Ambient Temperature

Device returns 12 bytes.

Command frame:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5 – 12	Byte 13
C0H	48H	Command	Data1	Data2 – Data9	Data10

Return Frame Format: 12 bytes

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13
F0H	48H	B8H	0	Temp_H	Temp_L	xx	xx	Amb_H	Amb_L	-	-	Data10

Data Interpretation:

Temperature = (Temperature = (Temp_H × 256 + Temp_L) / 10

Ambient temperature = (Amb_H × 256 + Amb_L) / 10

RTD table units: °F

Read Serial Number

Device returns 12 bytes.

Command frame:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5 – 12	Byte 13
C0H	48H	96H	Data1	Data2 – Data9	Data10

Return Frame Format: 12 bytes

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5 – 12	Byte 13
C0H	48H	96H	Data1	Data2 – Data9	Data10

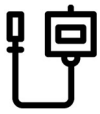
Serial number format:

Data1–Data10: 10 digit serial number

Characters are ASCII '0'–'9'

Invalid characters are represented by 2AH (*)

Connecting the Transmitter and Switch



M12 Transmitter and Switch Plug Definition	
Feature	**Label**
Power Supply	24 VDC
	24V GND
Analog Output	4-20mA +
	+5V
	Analog COM
	Unused
Switch	Relay NO
	Relay COM

The Temperature Transmitter and Switch require user supplied 24V DC via a connection cable (PN: 24040-03, ordered in the customer specified length). Each wire within the cable is heat shrink labeled with its function as defined in the table above.

NOTE: The recommended that the cable length for 0–5V signals is 30 feet or less.

Transmitter

Caution! To prevent possible damage to equipment, DO NOT power the 24 V for the transmitter until the meter's transmitter mode has been configured, either 4-20 mA or 0-5 V DC.

Selecting the 4-20ma transmitter option could potentially place more than 5V on the 5V transmitter line which may cause damage to the 0-5V transmission equipment. Please use caution in selecting the correct transmitter mode.

Connecting to 24 V Power

24v DC power is required for models with Transmitter and Switch functionality.

Connecting the Transmitter

Connection is made by connecting the Easy Connect connector (M12, 8-pin) on the transmitter cable to the labeled transmitter port on the bottom of the DST700 meter. To connect the 24v DC power, attach the marked strands of the transmitter cable to the power supply.

The transmitter will allow for continuous, precise temperature measurement data, and detailed monitoring and control of the process.

DST700 follows NAMUR NE 43 Standard, a widely adopted recommendation that standardizes how sensor faults are communicated via the 4–20 mA analog signal in industrial automation systems.

Key Concepts of NAMUR NE 43

- Normal Operating Range:
  - 4 mA = Lower measurement limit
  - 20 mA = Upper measurement limit

- Out-of-Range (Saturation):
  - Slight deviations beyond 4–20 mA indicate process values outside the calibrated range
    - Typical saturation limits:
      - Low saturation: ≈ 3.8 mA
      - High saturation ≈ 20.5 mA
    - Fault Indication:
      - Fault: Output drops to ≤ 3.6 mA

Switch

The Switch is a consistent Open Relay which can be connected to an external device like a buzzer, strobe light, fan, heater, etc. It works with any device meeting the following requirements:

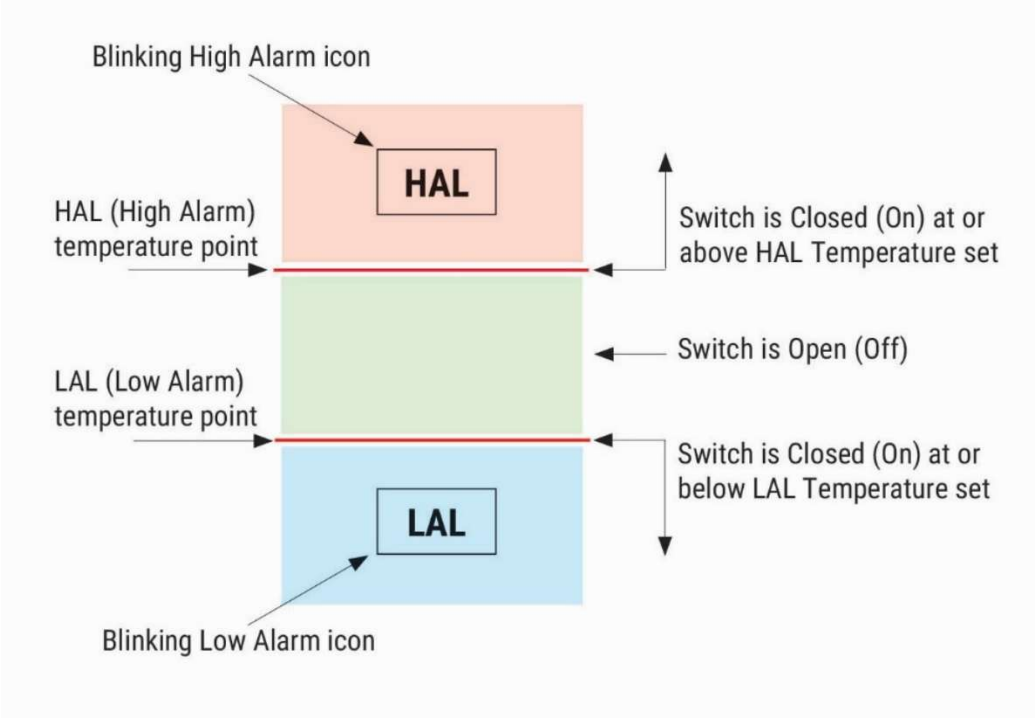
- Maximum 60V
- Maximum 1A

The switch enables the programmed MAX and MIN setpoints to control the switch.

- Closed (On) / Open (Off) operation
- Overload Protection Relay
- Solid-State Relay
- Polarized Relay
- Time Delay Relay

The temperature switch allows for connection to a remote alarm and real-time monitoring of critical temperature points. Use the keypad to set the desired high alarm (HAL) and low alarm (LAL) temperature points.

During normal operation, the switch is Open (Off) *and the LCD screen will show the Green (Normal) backlight*. If the HAL or LAL temperature points are exceeded, the switch is Closed (ON) and the alarm remote is triggered. The LCD screen backlight will blink (red if temperature is above set point, blue if temperature is below set point) and the HAL or LAL icons will continuously blink until the alarm condition is resolved.



Caution! To prevent possible damage to equipment, be certain to connect to 24 V DC and no other power sources.

Caution! To prevent possible damage to equipment, DO NOT power the 24 V for the transmitter until the meter's transmitter mode has been configured, either 4-20 mA or 0-5 V DC.

Analog transmitter output is user selectable 4-20 mA or 0-5 Volt.

NOTE: Selecting the 4-20ma transmitter option could potentially place more than 5V on the 5V transmitter line which may cause damage to the 0-5V transmission equipment. Please use caution in selecting the correct transmitter mode.

Ranging the Transmitter Output

Ranging the output involves selecting the type of output, then configuring what reading will correspond to the highest and lowest analog output values.

Setting up 4-20 mA or 0-5 VDC Analog Output

Press Menu key until "O typ" is displayed. Use ▲ and ▼keys to select "4-20" (mA) or "0-5" (volts).

Override Transmitter Range for Analog Output

The DST700's default transmitter settings correspond to the meter temperature range, -60 to 600°F (-51° to 315°C). The transmitter range function overrides the DST700's default factory range and allows the customer to input their own values for the high and low transmitter settings. However, this advanced functionality has three key considerations when enabled:

1. The override transmitter range must be within the meter specification range.
2. The customer transmitter minimum span must be at least 100°C or 100°F between the "Out L" and "Out H" settings.
3. The readings will fluctuate when you override the transmitter settings.
4. Overriding the transmitter range will decrease the published accuracy of DST700 meter.

Example configuration:

Current loop output, ranged so that 4 mA = -50°F and 20 mA = 300°F

"O typ" set to "4-20"

"Out L" set to "-50"

"Out H" set to "300"

Example:

O typ	Sub Range	Out L	Out H
Default and Maximum Range	660	-60	600
Example Range	260	140	400
Minimum Range	100	220	320

Calibration Service or Repair

To receive a NIST Traceable Certificate of Conformance or repair service on your product, go to palmerwahl.com and click on: Request an RMA (Return Material Authorization Number) and follow the instructions. An RMA number will be sent via email once the item is received at our facility. If you prefer, call Customer Service at: 1-800-421-2853 for assistance with the RMA process.

Digi-Stems are packed and shipped in a custom fit foam lined box, suitable for returning unit for Calibration. Material being returned to us should be packed well, preferably in the original shipping container.

Our quality management system is certified to conform to ISO 9001:2015. We maintain a calibration system in conformance with ANSI/NCSL Z-540 and MIL-STD-45662A.

All calibrations are performed against standard instruments, traceable to NIST. Records are stored for a minimum of three years. Standards used have a test ratio of four times greater than the unit being calibrated. We can perform certified, traceable calibrations in support of companies that require meeting FAA, FDA and USDA quality standards.

Palmer Wahl
BEYOND THE SCALE

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Asheville, NC 28804
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FAX: 828-658-0728
Email: info@palmerwahl.com

CALIBRATION TRACEABLE TO NIST

IP68 COMPLIANT
Meter only

TWO YEAR 2 WARRANTY
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A3®

MNC Manufactured in North Carolina

ISO 9001:2015 CERTIFIED QUALITY MANAGEMENT SYSTEM

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