



# Transmation

## QUIKCAL™ 190 FAMILY MULTIFUNCTION CALIBRATOR USER'S GUIDE



QuikCal 190 –11 to 100 PSI Multifunction Calibrator

QuikCal 195 Documenting –11 to 100 PSI Multifunction Calibrator

QuikCal 191 –10 to 10 PSI Multifunction Calibrator

QuikCal 196 Documenting –10 to 10 PSI Multifunction Calibrator

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**NOTE!**

*Do not discard this user's guide. The information provided in this document is essential to safe equipment operation and maintenance. To prevent possible personal injury or equipment damage through misuse, the procedures outlined in this document should be performed by qualified service personnel.*

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# GENERAL INFORMATION

## SPECIFICATIONS

These specifications are referred to an attached volume of 2.0 cubic inches (33 ml). The pneumatic functions of the QuikCal Family have been characterized over the entire specified temperature range to minimize temperature effects. The pump in the 190/195 has been designed to produce 100 psi (690 kPa) while the pump in the 191/196 has been optimized for draft range pressure generation.

## COMPRESSOR

Model	190/195	191/196
Output Pressure Range	-11 to 100 psi -75 to 690 kPa	-10 to 10 psi -69 to 69 kPa
Control Stability	0.02" WC max	0.005" WC max, 0.002" WC Typical
Compressor Resolution	1 x 10 <sup>-5</sup> cubic inch change in volume	5 x 10 <sup>-6</sup> cubic inch change in volume
Time to Pressure	<5 psi: 8 sec typical 30 psi: 15 sec typical 100 psi: 45 sec typical	<10 psi: 15 sec typical

### Pressure Accuracy:

Refer to the QuikCal 90 Module manual for module accuracy and resolution

### Pressure Connections:

1/8"-27 NPT via module connection

### Filtration:

40 micron sintered brass filter; cleanable

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**Media Compatibility: (See Chapter 3, Compatible Media, for details)**

Controllable Modules: Non-conductive, non-corrosive gas  
Measure Only Modules: Media compatible with 316 stainless steel  
and fluorocarbon rubber

**Unswep Internal Volume:**

< 1 cubic inch nominal

**ELECTRICAL**

**Standard Engineering Units:**

Electrical: mA, V, %  
Pressure: psi, Pa, kPa, MPa, bar, mbar, atm, kgf/cm<sup>2</sup>, torr, mm Hg  
@ 0°C, inch Hg @ 32°F and 60°F, inch H<sub>2</sub>O @ 4°C,  
60°F, 68°F, 23°C, mm H<sub>2</sub>O @ 4°C, 20°C and 23°C, cm  
H<sub>2</sub>O @ 4°C, 20°C and 23°C  
Temperature: °C, °F

**SI Engineering Units:**

Electrical: mA, V, %  
Pressure: Pa, kPa, MPa, bar, mbar  
Temperature: °C

**Input Ranges:**

Current: ±50.000 mA  
Voltage: ±50.000 Volts  
RTD (100Ω Platinum RTD, DIN 43760, IEC 751 Curve):  
-40.0°F to 212.0°F (-40.0°C to 100.0°C)

**Input Calibrated Accuracy:**

Current: ±0.01% of reading ± 0.01% of full scale  
Voltage: ±0.05% of reading ± 0.01% of full scale  
RTD: ±0.5°C

**Input Impedance**

Current: 10 Ohms nominal  
Voltage: >1 megohm

**Loop Power:**

24 Volts ± 20%; current limited to 25 mA nominal

**Maximum Common Mode Voltage:**

200V peak to peak (between switch test terminals and any other terminal)

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**Normal Mode Rejection:**

80 dB @ 50/60 Hz

**Input Protection:**

mA input is fuse protected (0.125A)

**Switch Test:**

Isolated, wet or dry, 250 VAC maximum

**Isolation (Input-to-Case):**

500 VAC

**Power:**

Rechargeable 12V sealed lead acid battery, 5000 mAh

**Charge Life:**

6 hours in typical calibration use

**Display:**

320 x 240 dot matrix paperwhite graphics LCD; 8 digit resolution; with back lighting feature and contrast adjustments

**Input/Output Connections:**

Electrical: Full-size double insulated banana jacks

Pressure: 1/8" NPT via module connection

Serial I/O: 8 pin Mini-DIN terminal (external module connection)  
DB9 serial port (RS-232)

6 pin Mini-DIN terminal (external keyboard connection)

**PC Communications (Documenting Models)**

Serial Port: Male 9 pin D subminiature DB-9, supports RS-232C as a DCE, 9600 Baud, 8 data bits, 1 stop bit, no parity with XON/XOFF flow control.

The proper connection to a 9 pin serial port on a PC is accomplished with a straight through cable, A "null modem" cable is not required for connection to a PC.

**Printer Communications (Documenting Models)**

Serial Port: Male 9 pin D subminiature DB-9, supports RS-232C as a DCE, 9600 Baud, 8 data bits, 1 stop bit, no parity with XON/XOFF flow control.

The proper connection to a serial printer is accomplished with a "null modem" cable. A serial-to-parallel converter is required for connection to a parallel printer.

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## GENERAL

### **Housing:**

Black ABS/Polycarbonate (UL 94 V-O)

### **Dimensions (HWD):**

6.0" x 7.75" x 16.25" (153 mm x 197 mm x 413 mm)

### **Weight:**

12.65 lb. (5.75 kg)

### **Storage Temperature:**

-4°F to 140°F (-20°C to 60°C)

### **Operating Temperature:**

32°F to 122°F (0°C to 50°C)

## NON-PRESSURE MODULES

Non-pressure modules (such as the QuikCal 40 Electrical Module, the QuikCal 60 Thermocouple Module, the QuikCal 65 Hart Scientific Dry Block Module, and the QuikCal 70 RTD Module) are constantly being introduced or enhanced; contact the Factory for availability and specifications.

## PRESSURE MODULES

New pressure modules are constantly being introduced or existing modules enhanced; contact the Factory for availability and specifications on the latest products.

**Refer to the QuikCal 90 Module manual for module accuracy and resolution:**

### **Electrical Connections (to base unit):**

10 pin (5 x 2) connector, 0.1 center, female

### **Housing:**

Black ABS/Polycarbonate (UL 94 V-O)

### **Dimensions (HWD):**

2.875" x 2.375" x 2.0" (73 mm x 60 mm x 48 mm)

### **Weight:**

13.0 oz. (370 g)

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**Storage Temperature:**

-40°F to 185°F (-40°C to 85°C)

**Operating Temperature:**

14°F to 122°F (-10°C to 50°C)

## SAFETY CONSIDERATIONS

Sudden release of compressed or stored gas can cause personal injury. Always vent the system before connecting or disconnecting pressure fittings. The amount of energy stored in a closed system is a function of the pressure and total volume; the greater the volume, the greater the stored energy. As a result, it is highly recommended that the attached volume be as small as possible to minimize potential injury and/or damage.

## POTENTIAL DAMAGE TO EQUIPMENT

To prevent potential damage to the QuikCal 19x during use, observe the following precautions:

Ensure that the charger input voltage rating matches the power system.

Do not apply excessive voltage or current to the electrical terminals.

Do not connect any controllable QuikCal 90 Pressure Modules in slot 1 to pressure sources greater than 10 psi (69 kPa) to the 191/196 or 100 psi (690 kPa) to the 190/195. Pressures above these values may be measured with any module rated for that pressure in slot 2. Overpressurization will result in damage to the module sensor or the calibrator. Refer to the QuikCal 90 Pressure Module User's Guide for information.

Do not connect the calibrator to pressure sources other than clean, dry air or clean inert gas. (See Chapter 3, Compatible Media, for details)

### **WARNING!**

*To prevent the potentially hazardous release into the atmosphere of substances introduced into the pneumatic system by the user, no relief*

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*valves are provided in the QuikCal 19x. Consequently, if a module is overpressurized, the sensor will be damaged.*

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## CONTAMINATED CUSTOMER EQUIPMENT

Any QuikCal 19x exposed to hazardous process fluids or biological agents cannot be accepted for return without a written certificate of decontamination furnished by the customer.

## UNPACKING

Packing materials should be retained in case the QuikCal 19x needs to be returned to the Factory. Verify that the shipping carton contains:

- 1 QuikCal 19x Pressure Calibrator
- 1 Charging transformer of proper input voltage rating
- 1 Set of test leads
- 1 Spare 0.125A fuse
- 1 Spare 4A fuse
- 1 Carrying strap
- 1 QuikCal 190 Family User's Guide

Documenting QuikCal 195 & 196 also include the following:

- 1 CD-ROM with programs to transfer Quik Test Results to a PC
- 1 Quik Test Transfer User Guide
- 1 Cable for serial communications with a PC

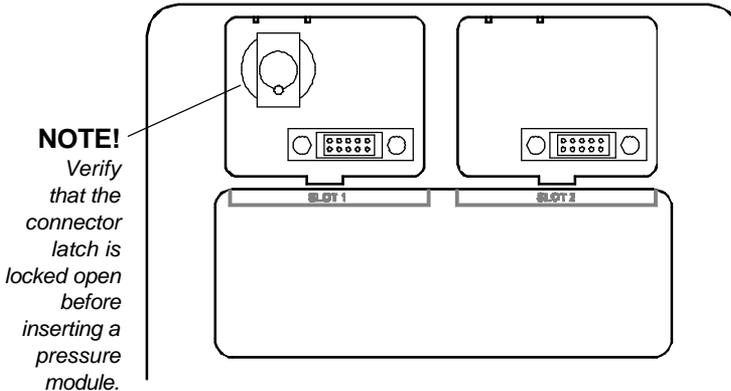
# FUNCTIONAL DESCRIPTION

## OPERATING CONTROLS

All operating controls (pressure module slots, electrical input terminals, keypad, battery charger jack, serial port, and external equipment terminals) are conveniently located on the top or right side of the QuikCal 19x case.

## MODULE SLOTS

There are two module slots. The interchangeable modules provide a quick and convenient means of changing measurement capabilities while maintaining high accuracy in a field-portable unit. When using the QuikCal 19x to generate pressure, use a Controllable pressure module in Slot 1. When using the QuikCal 19x with an external pressure source, use a Measure Only pressure module in Slot 2. A module may be installed or removed while power is applied to the unit.



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To insert a module, do the following:

1. Orient the module so the data label is facing forward (towards the keypad).

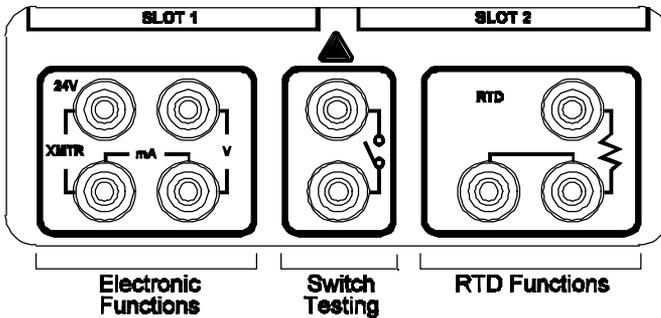
2. Insert the module into one of the slots and firmly press down until the module seats.

To remove a module, do the following:

1. Push inward on the locking tab on the rear of the module while pulling upward on the module.

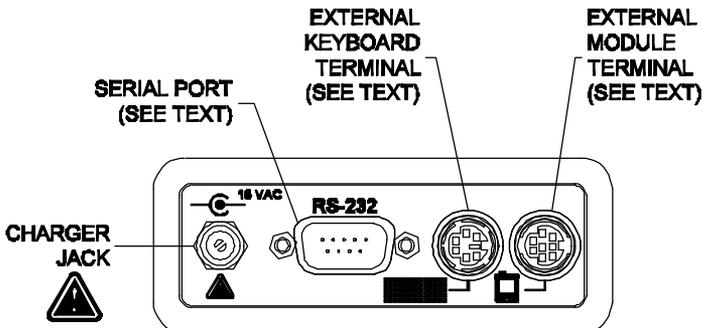
## ELECTRICAL INPUT TERMINALS

The electrical input terminals are full size, double insulated banana jacks. The terminals are grouped by function: electronic functions, switch testing, and RTD functions. The front panel labels indicate shared terminals, where applicable.



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## BATTERY CHARGER JACK, SERIAL PORT, AND EXTERNAL EQUIPMENT TERMINALS



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## BATTERY CHARGER JACK

The battery charger provides a convenient means of charging the QuikCal 19x's battery. Refer to "Charging the QuikCal 19x" on page 5-1 for information on charging the battery.

## SERIAL PORT

A QuikCal 19x Base Unit running software version 4.0 or higher can use the RS-232 serial port to upgrade firmware.

## EXTERNAL KEYBOARD TERMINAL

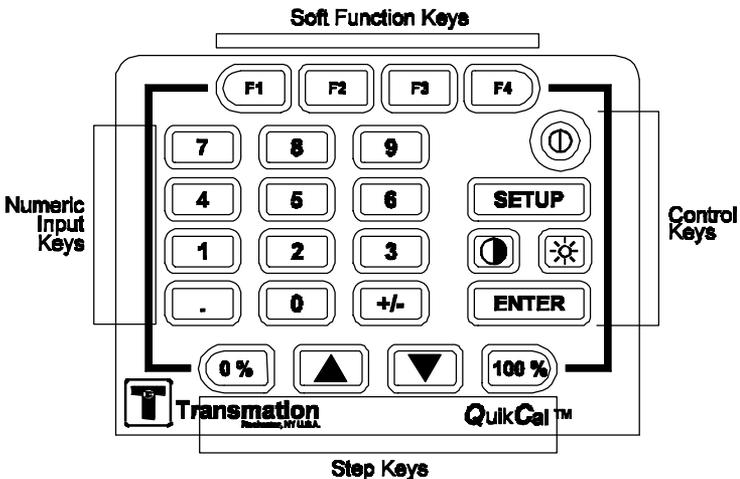
Not currently used.

## EXTERNAL MODULE TERMINAL

The external module terminal allows a ModPack 91 Remote Module Holder to be plugged into the QuikCal 19x. The ModPack 91 permits remote connection of a QuikCal module, effectively allowing three modules to be used simultaneously with the QuikCal 19x.

## KEYPAD CONTROLS

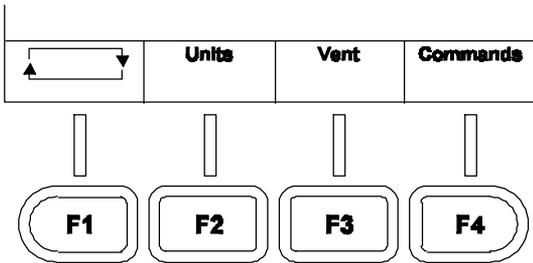
The QuikCal 19x keys are arranged into four groups: the Soft Function Keys, the Control Keys, the Step Keys, and the Numeric Input Keys.



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## SOFT FUNCTION KEYS

The Soft Function Keys are used in conjunction with the corresponding menu choices displayed on the screen.



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Four boxes containing command choices are displayed at the bottom of each screen. Pressing the corresponding soft function key executes that command. If there is a hard key equivalent of a soft function key, the hard key operates the same as the soft function key.

## CONTROL KEYS



The Control Keys are used to control calibrator operation.

To turn power on, press the **Power** pushbutton. To turn the power off, press the **Power** pushbutton again.



When pressed, **Setup** calls up the Setup menu. Refer to "Using the Setup Feature" on page 2-25 for complete information on the Setup menu.



When pressed, **Contrast** adjusts the display contrast. Each time the pushbutton is pressed, the display contrast changes. Twenty contrast levels are provided.



provided.

When pressed, **Brightness** adjusts the display brightness. Each time the pushbutton is pressed, the brightness intensity changes. Six brightness levels are



When pressed, **Enter** accepts the current entry or prompt response.

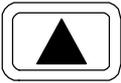
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## STEP KEYS

The Step Keys allow convenient stepping, zero, and full scale values to be entered with one key stroke. The default step size is 25%.



When pressed, the **100%** key sets the output of the QuikCal 19x to the value entered in the Setup menu for "Full Scale". In addition, when a list box is displayed, pressing this key moves the cursor to the bottom of the list.



When pressed, the **Step Up/Step Down** keys increase/decrease the output of the calibrator by the increment programmed in the Setup menu for "Step Size". In addition,

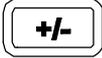
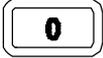
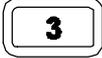
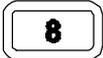


when a list box is displayed, pressing the **Step Up** or **Step Down** key moves the cursor to the next item in the list.



When pressed, the **0%** key sets the calibrator output to the value entered in the Setup menu for "Zero". In addition, when a list box is displayed, pressing this key moves the cursor to the top of the list.

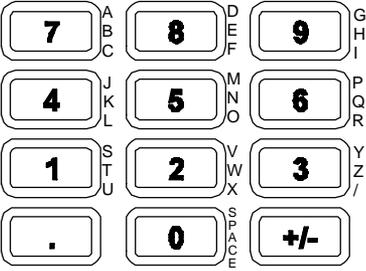
## NUMERIC INPUT KEYS



The Numeric Input Keys permit direct numerical entry of a positive or negative value.



## ALPHANUMERIC INPUT KEYS



The Alphanumeric Input Keys permit alphabetical as well as direct numerical entry of a positive or negative value into a field that allows alphanumeric input, such as Operator Name for Downloaded Tests.

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## USING THE QUIKCAL 19X

### NOTE!

*The screen illustrations provided in this section are representative of the screens a user will see during normal QuikCal 19x operation. Some of the screens only appear on the documenting version of the 19x Family. As new features and enhancements are incorporated into the QuikCal 19x, the actual screens may be visually different from the illustrations; however, they will continue to function as described in the text.*

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### USAGE CONVENTIONS

All soft function key or pushbutton names are printed in **bold** in the text of this document. Items in a command list are enclosed in "quotation marks".

To select a data window, press the  key. The data window label will reverse highlight and a thick outline will appear around the selected data window. Only one data window is selected at a time. The soft function keys displayed at the bottom of the screen relate to the selected data window.

If there is a hard key equivalent of a soft function key, the hard key operates the same as the soft function key.

To call up a command list, press the corresponding soft function key. A list box will appear. Use the **?** and **?** keys to highlight the desired command, then press **Enter** to select that command.

The Step Keys (**0%**, **?**, **?**, **100%**) are useful when navigating through a list box. Pressing the **100%** key moves the cursor to the bottom of the list. Pressing the **Step Up** or **Step Down** key moves the cursor to the preceding/succeeding item in the list. Pressing the **0%** key moves the cursor to the top of the list.

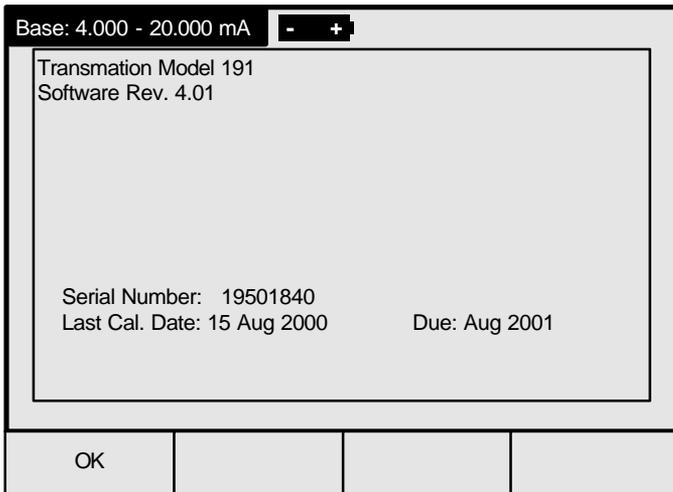
All data entry fields work the same. To enter data, either press **Enter** to call up the data entry window, or simply begin typing to call up the data entry window. If an entry exceeds the allowable limits, an audible tone will sound and the field will flash. Re-enter a value within the limits and press **Enter**, or press the **Cancel** key.

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To exit from a function without completing the action or saving the results, press the **Cancel** key.

## STARTUP SCREENS

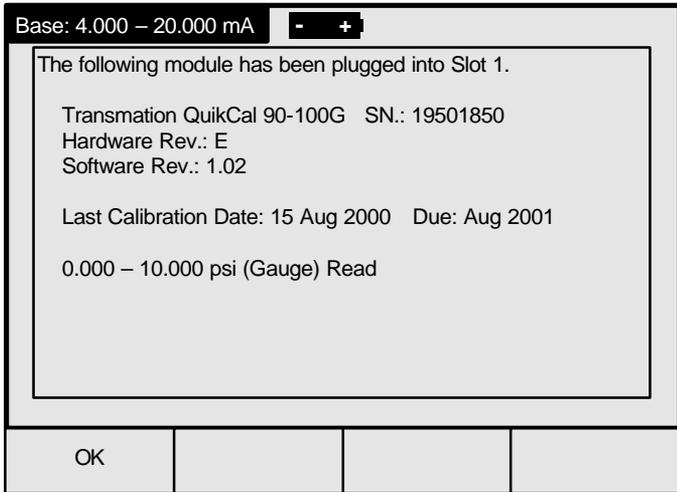
When the QuikCal 19x is powered up, a Startup screen appears that lists the Base Unit software revision level, the serial number, the last factory calibration date, the factory calibration due date, the last user calibration date, and the user calibration due date. See chapter 5 for calibration information.



After 15 seconds, the Base Unit Startup screen will disappear and a module Startup screen will be presented. Pressing the **OK** key will cause the Base Unit Startup screen to disappear more rapidly.

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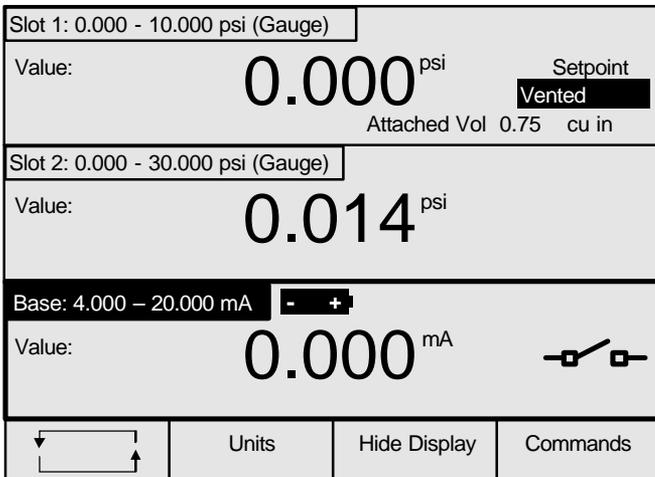
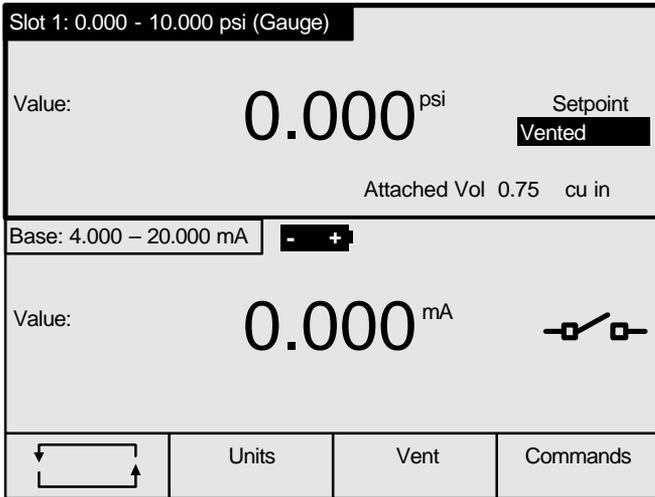
A Startup screen will be presented for each module that is plugged in. The module part number and serial number, the hardware and software revision levels, the last factory calibration date, the factory calibration due date, the last user calibration date, the user calibration due date, and the module range in the specified engineering units will be displayed.



Press the **OK** key to continue.

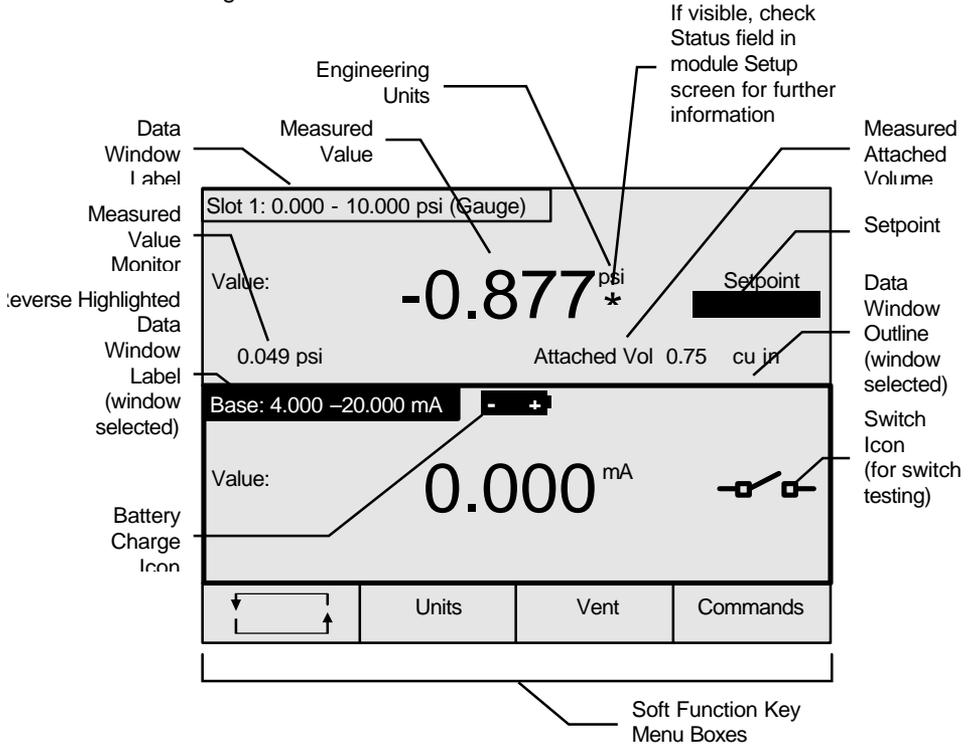
## SELECTING DATA WINDOWS

The display normally contains two (Slot 1 and Base) or three (Slot 1, Slot 2, and Base) data windows, depending on the number of modules plugged in. External modules can also be displayed. Only one data window is selected at a time. To select a data window, press the  key. The label will reverse highlight and a thick outline will appear around the selected data window. The soft function keys displayed at the bottom of the screen relate to the selected data window.



## UNDERSTANDING THE DATA WINDOW DISPLAY

Each data window provides information concerning the status of the QuikCal 19x as well as electrical values being measured or pneumatic values being measured/generated.



The display will flash if a value falls outside the measurement range of the module or Base Unit. Five exclamation points (“!!!!”) will be displayed if a measured value is significantly beyond the measurement range of the module or Base Unit.

### **WARNING!**

*Do not connect a pressure module to pressure sources greater than the pressure sensor rating. Overpressurization will result in damage to the pressure module sensor.*

## SELECTING ENGINEERING UNITS

The engineering units used to display measured or generated values may be selected. To select the engineering units, do the following:

1. Call up the Engineering Units list by pressing the **Units** key.
2. Select the desired engineering units, then press **Enter**.

Slot 1: 0.000 - 10.000 psi (Gauge)		psi	
Value:	-0.877	Pa	↑
	Attached	kPa	
Slot 2: 0.000 - 30.000 psi (Gauge)		MPa	
Value:	0.014	bar	
		mbar	
Base: 4.000 - 20.000 mA		atm	
	- +	kgf/cm <sup>2</sup>	
Value:	0.000	torr	
		mm Hg @ 0°C	
		in Hg @ 0°C	
		in Hg @ 60°F	
		in H <sub>2</sub> O @ 4°C	
		in H <sub>2</sub> O @ 60°F	
		in H <sub>2</sub> O @ 68°F	
		in H <sub>2</sub> O @ 72°C	↓
?	?	Cancel	Enter

Slot 1: 0.000 - 10.000 psi (Gauge)			
Value:	-0.877	psi	
	Attached Vol 0.75	cu in	
Slot 2: 0.000 - 30.000 psi (Gauge)			
Value:	0.014	psi	
Base: 4.000 - 20.000 mA		4.000 - 20.000 mA	
	- +	-50.000 - 50.000 mA	
Value:	0.000	1.000 - 5.000 V	
		-50.000 - 50.000 V	
		-40.0 - 100.0°C	
		-40.0 - 212.0°F	
?	?	Cancel	Enter

The selected engineering units will be indicated on the display next to the numeric value.

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## HIDING/SHOWING A DATA WINDOW

It may be desirable to “hide” a data window in order to provide a larger viewing area for the remaining data.

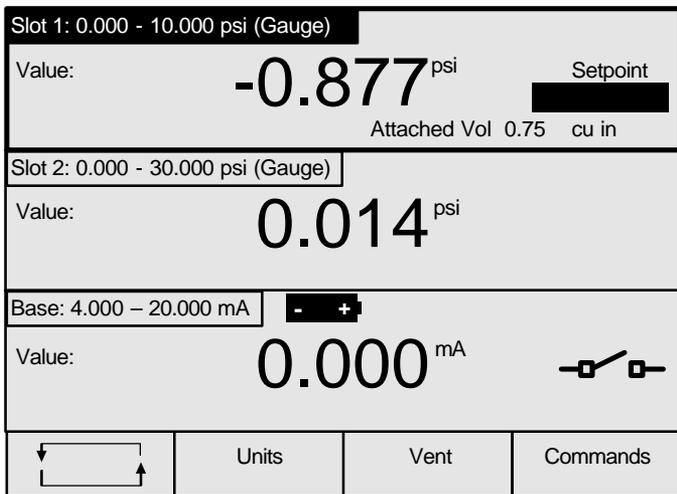
To hide a data window, do the following:

### NOTE!

*If a module is removed from a slot while the QuikCal 19x is turned on, the corresponding data window automatically disappears. If the module is reinstalled in a slot, the normal Startup screen sequence is performed.*

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1. Call up the Commands list by pressing the **Commands** key.



2. Select "Hide Display", then press **Enter**.

Slot 1: 0.000 - 10.000 psi (Gauge)			
Value:	<b>-0.877</b> psi	Vent Zero Input Quik Test Switch Test Attached Volume Measure Only <b>Hide Display</b> Error Graph Login	
	Attached Vol		
Slot 2: 0.000 - 30.000 psi (Gauge)			
Value:	<b>0.014</b> psi		
Base: 4.000 - 20.000 mA		<b>- +</b>	
Value:	<b>0.000</b> mA		
?	?	Cancel	Enter

The specified data window will disappear from the display.

To show all data windows, do the following:

1. Call up the Commands list by pressing the **Commands** key.
2. Select "Show All", then press **Enter**.

Vent
Zero Input
Quik Test
Switch Test
Attached Volume
Measure Only
Hide Display
<b>Show All</b>
Error Graph
Login

All data windows will be displayed.

---

## HIDING/SHOWING AN ERROR GRAPH

To facilitate equipment calibration, an error graph can be generated that provides a display of the numeric difference of the percent value of the selected data window (Slot 1 or Slot 2) to the percent value of the Base display window. Alternately, when the Base data window is selected, its value as a percent of span is shown. Data can be graphed either linearly or logarithmically. The error value is automatically graphed using the specified zero and span ranges.

To show an error graph, do the following:

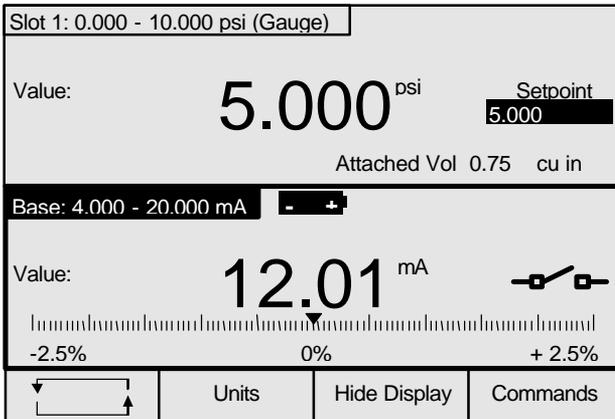
1. Call up the Commands list by pressing the **Commands** key.
2. Select "Error Graph", then press **Enter**.



3. Select the desired type of graph, then press **Enter**.



The selected error graph will be displayed in the lower data window.



---

To hide an error graph, do the following:

1. Call up the Commands list by pressing the **Commands** key.
2. Select "Error Graph", then press **Enter**.



3. Select "Hidden", then press **Enter**.



The error graph will be removed from the data window.

## VENTING THE PRESSURE MODULE IN SLOT 1

To vent the pressure module in Slot 1 to atmosphere, do the following:

1. Select the Slot 1 data window.
2. Press the **Vent** key.

"Working ..." will appear at the bottom of the display. When the pressure module in Slot 1 is vented to atmosphere, "Vented" will be displayed in the Setpoint field.

## ZEROING A PRESSURE MODULE

### NOTE!

---

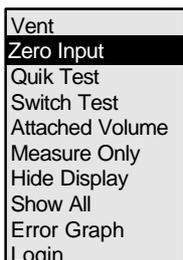
*When zeroing the input of a single output pressure module in Slot 1, the QuikCal 19x will equalize with atmospheric pressure (vent) and establish sensor zero. When zeroing the input of a pressure module in Slot 2, the user must manually vent the system prior to zeroing the module. When zeroing the input of a differential pressure module in Slot 1, the QuikCal 19x will only vent the High Side. The Low side requires manual venting (see diagram on page 4-14). If both High and Low are not vented, an offset at zero will be present, effecting all tests. A good zero is required to meet the accuracy of the differential pressure module.*

---

---

To zero the input of a pressure module, do the following:

1. Call up the Commands list by pressing the **Commands** key.
2. Select “Zero Input”, then press **Enter**.



The input of the pressure module will be zeroed. The user will be prompted to vent the system if the selected pressure module is not Controllable.

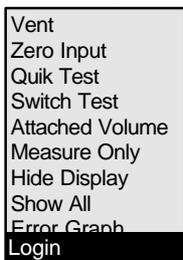
## LOGGING IN/OUT

Note that the “Login/Logout” options appear on the Commands list only if the Password function is enabled. When the QuikCal 19x is shipped, the Password function is enabled with a password matching the model number. For the 190 the default password is “190”, 191 is “191”, 195 is “195” and 196 is “196.” When the Password function is enabled, “Maintenance” appears on the Setup list and “Calibrate” appears on the Commands list only when the user is logged in. To disable the Password function, refer to “Setting/Changing the Password” on page 2-19.

### Logging In

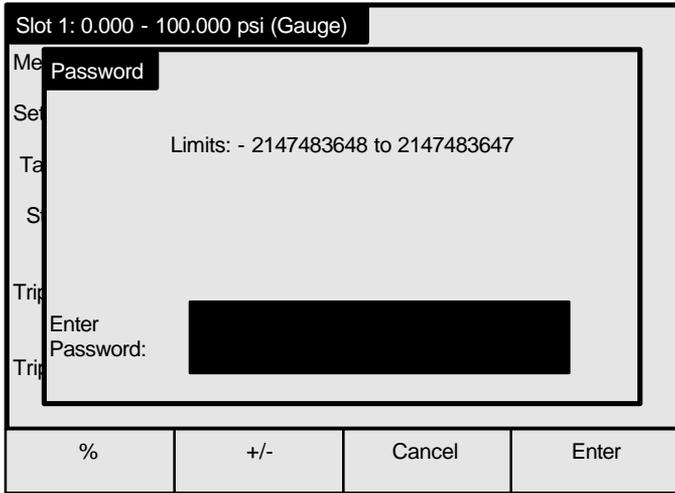
To log in, do the following:

1. Call up the Commands list by pressing the **Commands** key.
2. Select “Login”, then press **Enter**.



- 
- At the Password window, enter the password in the Enter Password field, then press **Enter**.

If the entry in the Enter Password field does not match the defined password, an audible tone will sound and the Enter Password field will flash. Re-enter the password in the Enter Password field and press **Enter**, or press the **Cancel** key.



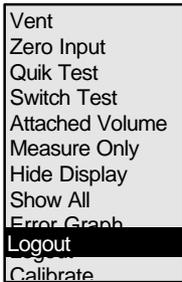
---

## Logging Out

Once a user has logged in using the password, all calibration and maintenance functions are available until the user logs out or turns off the QuikCal 19x. Consequently, it is important that the user logs out (or turns off the QuikCal 19x) after each session is complete to prevent unauthorized access of the restricted calibration or maintenance functions.

To log out, do the following:

1. Call up the Commands list by pressing the **Commands** key.
2. Select "Logout", then press **Enter**.



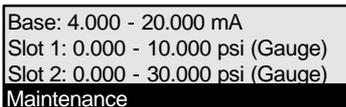
## SETTING/CHANGING THE PASSWORD

To prevent unauthorized personnel from accessing calibration and other critical maintenance functions, the QuikCal 19x has a Password feature. Once enabled, the user must enter the password in order to perform maintenance and calibration functions on the QuikCal 19x.

### Setting the Password

To set the password (i.e., to enable the password function), do the following:

1. Call up the Setup list by pressing **Setup**.
2. Select "Maintenance", then press **Enter**.



---

The Maintenance screen will be displayed.

Password	***		
Date:	15-Aug-2000		
Time:	04:34:05 PM 12 Hour		
?	?		Done

3. Press **Enter** to call up the Change Password window.

Pa	<b>Change Password</b>		
Da	Limits: - 2147483648 to 2147483647		
Tim			
Enter New Password:			
	+/-	Cancel	Enter

4. Enter the password in the Enter New Password field, then press **Enter**. Valid entries include positive and negative numeric values (0-9) and the decimal point (".").

- 
5. Re-enter the password in the Confirm Password field, then press **Enter**.

If the entry in the Confirm Password field does not match the entry in the Enter New Password field, an audible tone will sound and the Confirm Password field will flash. Re-enter the password in the Confirm Password field and press **Enter**, or press the **Cancel** key.

**NOTE!** \_\_\_\_\_

*If just setting the password, proceed to Step 6. If also modifying the Date and Time, refer to “Setting the Internal Date and Time” below.*

---

6. Press the **Done** key.

### Changing the Password

To change the password, do the following:

1. Log in as described in “Logging In” on page 2-17.
2. Perform the procedure described in “Setting the Password” on page 2-19.

**NOTE!** \_\_\_\_\_

*Once the Password feature is enabled, it is important that the user logs out (or turns off the QuikCal 19x) when a Password session is complete to prevent unauthorized access of the restricted calibration or maintenance functions. Refer to “Logging Out” on page 2-19.*

---

### SETTING THE INTERNAL DATE AND TIME

To set the internal date and time, do the following:

1. Log in as described in “Logging In” on page 2-17.
2. Call up the Setup list by pressing **Setup**.
3. Select “Maintenance”, then press **Enter**.

Base: 4.000 - 20.000 mA
Slot 1: 0.000 - 10.000 psi (Gauge)
Slot 2: 0.000 - 30.000 psi (Gauge)
<b>Maintenance</b>

---

The Password screen will be displayed.

Password	***		
Date:	15-Aug-2000		
Time:	04:34:05 PM 12 Hour		
?	?		Done

4. Press the ? key to select the Day field, then press **Enter** to call up the Day data entry window.

Pa	<b>Data Entry</b>		
Da	Limits: 1 to 31		
Time			
Old Value:	<input type="text" value="15"/>		
New Value:	<input type="text"/>		
		Cancel	Enter

5. Enter the day in the New Value field, then press **Enter**.
6. Press the ? key to select the Month field, then press **Enter** to call up the Month list.
7. Select the desired month, then press **Enter**.

- 
8. Press the ? key to select the Year field, then press **Enter** to call up the Year data entry window.
  9. Enter the year in the New Value field, then press **Enter**.
  10. Press the ? key to select the Hour field, then press **Enter** to call up the Hour data entry window.
  11. Enter the hour in the New Value field, then press **Enter**.
  12. Repeat Steps 10-11 for the Minutes and Seconds.
  13. Press the ? key to select the AM/PM field, then press **Enter** to call up the AM/PM list.
  14. Select the desired item, then press **Enter**.
  15. Press the ? key to select the 12/24 Hour Clock field, then press **Enter** to call up the Clock Type list.
  16. Select 12 or 24 Hour Clock, then press **Enter**.
  17. Press the **Done** key.

## **NOTE!**

---

It is important that the user logs out (or turns off the QuikCal 19x) when the session is complete to prevent unauthorized access of the restricted calibration or maintenance functions. Refer to “Logging Out” on page 2-19.

## **MEASURING ATTACHED VOLUME**

To control pressure with maximum accuracy and speed, the QuikCal 19x needs to know how much volume is attached to the compressor. The attached volume can be measured by selecting “Attached Volume” from the Commands list. When the “Attached Volume” command is selected, the following steps are taken:

1. The compressor is vented.
2. The pressure module input is zeroed.
3. The attached volume is measured.

Step 2 is only performed the first time the attached volume is calculated after the pressure module is plugged into the QuikCal 19x. This allows multiple devices to be calibrated without unplugging the pressure module.

---

If the setpoint for Slot 1 is set before the attached volume is measured, a prompt will be displayed asking if the attached volume should be calculated. If **No** is answered, then a default attached volume of 0.75 cu. in. will be used. (The default value is user-definable for Controllable modules via the Setup feature.)

Attached volume affects battery life, speed of operation, and leak detection of the QuikCal 19x. To conserve energy (optimizing battery life) and increase measurement speed, minimize the attached volume by using short connections and small diameter tubing (1/8"). In addition, a small attached volume can help identify unacceptably large leaks.

When calibrating draft range devices requiring very low pressures (ie  $\pm 0.25$ " of water) adding volume can improve the stability of the pressure output of the 191. In these ranges the piston in the 191 acts as like a vernier to vary the volume of air in the pump, tubing and the device being calibrated. Increasing the volume of air gives the pump greater resolution which allows for greater stability.

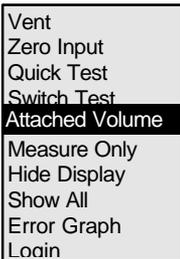
To measure and display the attached volume, do the following:

**WARNING!**

*Pressures may reach the maximum range of the module (not to exceed 1 psi) while measuring the attached volume. Use care to ensure that attached gauges and instruments are rated for this pressure.*

---

1. Select the Slot 1 data window.
2. Call up the Commands list by pressing the **Commands** key.
3. Select "Attached Volume" then press **Enter**.



"Measuring Attached Volume ..." will be indicated at the bottom of the display while the attached volume is being measured. The attached volume

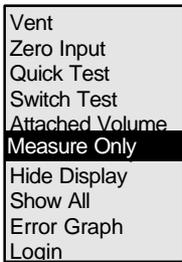
---

will be displayed in the Slot 1 data window. For best results, the attached volume should be measured each time a different device under test is connected.

## SETTING THE PRESSURE MODULE IN SLOT 1 FOR MEASURE ONLY

To set the pressure module in Slot 1 for measure only use, do the following:

1. Select the Slot 1 data window.
2. Call up the Commands list by pressing the **Commands** key.
3. Select "Measure Only", then press **Enter**.

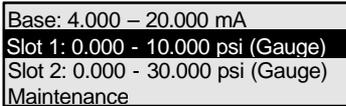


"Measure" will be displayed in the Setpoint field.

## USING THE SETUP FEATURE

The Setup key allows the configuration of the Base Unit or a module. To review and/or modify a setup parameter, do the following:

1. Call up the Setup list by pressing **Setup**.
2. Select the desired item, then press **Enter**.



A Setup screen will be displayed. Each Setup screen displays parameters and information pertinent only to the combination of module and slot in use.

Slot 1: 0.000 - 10.000 psi (Gauge)			
Service:	0.000 - 10.000 psi (Gauge) Read		
Eng Units:	psi		
Relationship:	Linear		
Zero:	0.000 psi		
Full Scale:	10.000 psi		
Display State:	Visible		
Step Size:	5.00 points	25.000 % Span	2.500 psi
Output:	Disabled		
Att. Volume:	0.75 cu in		
Status:	Normal		
?	?	Cancel Changes	Save Changes

- Use the ? and ? keys to select a parameter, then press **Enter** to call up the selection list or data entry window associated with the selected item.

- Select an item from the selection list or enter a value, then press **Enter**.

<b>Slot 1: 0.000 - 10.000 psi (Gauge)</b>			
Service:	0.000 - 10.000 psi (Gauge) Read		
Eng Units:	psi		
Relationship:	Linear		
Zero:	0.000 psi		
Full Scale:	10.000 psi		
Display State:	Visible		
Step Size:	5.00 points	25.000 % Span	2.500 psi
Output:	<input checked="" type="checkbox"/> Enabled	<input type="checkbox"/> Disabled	
Att. Volume:	0.75 cu in		
Status:	Normal		
?	?	Cancel Changes	Save Changes

- When finished, press the **Save Changes** key to save the changes and exit the Setup screen.

## RELATIONSHIP

The following are the possible relationships .

- Linear - The value is displayed as engineering units. Select this when the relationship between the input and output of the device under test (DUT) is linear.
- % Span - The value is displayed as a percentage of span. Select this when the relationship between the input and output of the DUT is linear.
- % Flow - The value is displayed as a percentage of flow. Select this when the relationship between the input and output of the DUT is square root.
- Square Root - The value is displayed as engineering units. Select this when the relationship between the input and output of the DUT is square root.

Note: The step Up/Down keys will step as a percentage of flow for % Flow and Square Root.



# PERFORMING TESTS

## PERFORMING A QUIK TEST WITH A NON-DOCUMENTING 190/191

The Quik Test feature allows a pre-configured test to be performed and recorded with just a few keystrokes.

The following test parameters can be configured:

Test - Quik Test			
<b>1</b>	Source:	Slot 1: 0.000 - 10.000 psi (Gauge)	
	Measure:	Base: 4.000 - 20.000 mA	
<b>2</b>	Test Direction:	<b>Asc.</b>	Steps / Scan: 5
<b>3</b>	Recording Delay:	5	Repeat Count: 1
<b>4</b>	Fail Limit - % FS:	0.100	Alert Limit - % FS: 0.080
<b>5</b>	Fail Limit - % Rdng:	0.000	Alert Limit - % Rdng: 0.000
	Start Test		Vent Done

---

1	Source/Measure	The configured ranges and service (Source or Measure) for the module and the Base Unit. These values must be configured via the Setup feature as described in "Using the Setup Feature" on page 2-25.
2	Test Direction	The direction of the test (Ascending, Descending, or Both).
3	Recording Delay	The delay (in seconds) from the time the setpoint is reached before data recording begins.
4	Fail Limit - % Full Scale	The fail limit as a percentage of full scale.
5	Fail Limit - % Reading	The fail limit as a percentage of reading.
6	Steps/Scan	The number of steps during the test.
7	Repeat Count	The number of times the test is performed.
8	Alert Limit - % Full Scale	The alert limit as a percentage of full scale.
9	Alert Limit - % Reading	The alert limit as a percentage of reading.

To perform a Quik Test, do the following:

1. Insert a module into Slot 1 of the Base Unit.
2. Select the Base Unit data window.
3. As required, press **Setup** to configure the Service as described in "Using the Setup Feature" on page 2-25.
4. Select the Slot 1 data window.
5. Press **Setup** to configure the Engineering Units, Relationship, and Zero and Full Scale values as described in "Using the Setup Feature" on page 2-25.
6. Perform the applicable connections from the module to the device under test.
7. Press the **Commands** key to call up the Commands list.

8. Select "Quik Test", then press **Enter**.

Vent
Zero Input
<b>Quik Test</b>
Switch Test
Attached Volume
Measure Only
Hide Display
Show All
Error Graph
Login

9. Verify that the test parameters are correct. If not, do the following:
  - a. Press **Setup**.
  - b. Use the **?** and **?** keys to select a parameter, then press **Enter** to call up the selection list or data entry window associated with the selected item.
  - c. Select an item from the selection list or enter a value, then press **Enter**.
  - d. Press the **Save Changes** key.
10. Press the **Start Test** key to start the Quik Test.

Test - Quik Test			
Source:	Slot 1: 0.00 - 110.00 in H2O (Gauge)		
Measure:	Base: 4.000 - 20.000 mA		
Test Direction:	<b>Asc.</b>	Steps / Scan:	5
Recording Delay:	5	Repeat Count:	1
Fail Limit - % FS:	0.100	Alert Limit - % FS:	0.080
Fail Limit - % Rdnq:	0.000	Alert Limit - % Rdnq:	0.000
Start Test		Vent	Done

11. While the test sequence is being performed, the top half of the screen displays the parameters of the test in progress. The bottom half of the screen displays the target Source value on the left and the current Source and Measure Values on the right. An advancing bar displays a visual indication of the progress of the test.

Test - Quik Test			
Source:	Slot 1: 0.00 - 110.00 in H2O (Gauge)		
Measure:	Base: 4.000 - 20.000 mA		
Test Direction:	Asc.	Steps / Scan:	5
Recording Delay:	5	Repeat Count:	1
Fail Limit - % FS:	0.100	Alert Limit - % FS:	0.080
Fail Limit - % Rdng:	0.000	Alert Limit - % Rdng:	0.000
Source:	54.99 inH2O		
55.00			
Measure:	13.064 mA		
Working...			
Cancel Test		Vent	Done

12. When the Quik Test is complete, the following screen will appear.

Test - Quick Test				
Source (in H2O)	Read (mA)	Expected (mA)	Error (mA)	Tolerance (mA)
0.00	4.226	4.000	0.226	0.016 F
27.50	8.649	8.000	0.649	0.016 F
55.00	13.064	12.000	1.064	0.016 F
82.50	17.442	16.000	1.442	0.016 F
110.00	21.794	20.000	1.794	0.016 F
				Done

13. Press the **Done** key to exit the Quik Test screen.

## PERFORMING A QUIK TEST WITH A DOCUMENTING 195/196

The Quik Test feature allows a pre-configured test to be performed, with As Found and As Left data recorded, using just a few keystrokes. Results from 20 to 30 five point Quik Tests may be stored in the 195/196 for Recalling on the screen, Printing or for Exporting to a PC.

The following test parameters can be configured:

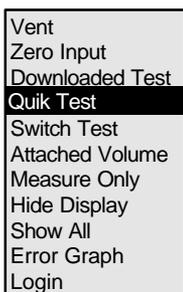
Test - Quik Test				
1	Source:	Slot 1: 0.000 - 10.000 psi (Gauge)		
	Measure:	Base: 4.000 - 20.000 mA		
2	Test Direction:	Asc.	Steps / Scan:	5
3	Recording Delay:	5	Repeat Count:	1
4	Fail Limit - % FS:	0.100	Alert Limit - % FS:	0.080
5	Fail Limit - % Rdng:	0.000	Alert Limit - % Rdng:	0.000
Start Test			Vent	Done

- |   |                 |   |
|---|-----------------|---|
| 1 | Source/Measure  | The configured ranges and service (Source or Measure) for the module and the Base Unit. These values must be configured via the Setup feature as described in "Using the Setup Feature" on page 2-25. |
| 2 | Test Direction  | The direction of the test (Ascending, Descending, or Both).   |
| 3 | Recording Delay | The delay (in seconds) from the time the setpoint is reached before data recording begins.  |

4	Fail Limit - % Full Scale	The fail limit as a percentage of full scale.
5	Fail Limit - % Reading	The fail limit as a percentage of reading.
6	Steps/Scan	The number of steps during the test.
7	Repeat Count	The number of times the test is performed.
8	Alert Limit - % Full Scale	The alert limit as a percentage of full scale.
9	Alert Limit - % Reading	The alert limit as a percentage of reading.

To perform a Quik Test, do the following:

1. Insert a module into Slot 1 of the Base Unit.
2. Select the Base Unit data window.
3. As required, press **Setup** to configure the Service as described in “Using the Setup Feature” on page 2-25.
4. Select the Slot 1 data window.
5. Press **Setup** to configure the Engineering Units, Relationship, and Zero and Full Scale values as described in “Using the Setup Feature” on page 2-25.
6. Perform the applicable connections from the module to the device under test.
7. Press the **Commands** key to call up the Commands list.
8. Select “Quik Test”, then press **Enter**.



9. If there are no stored Quik Test Results, the following screen will be bypassed. Otherwise, elect "Run Quik Test", then press **Enter**.

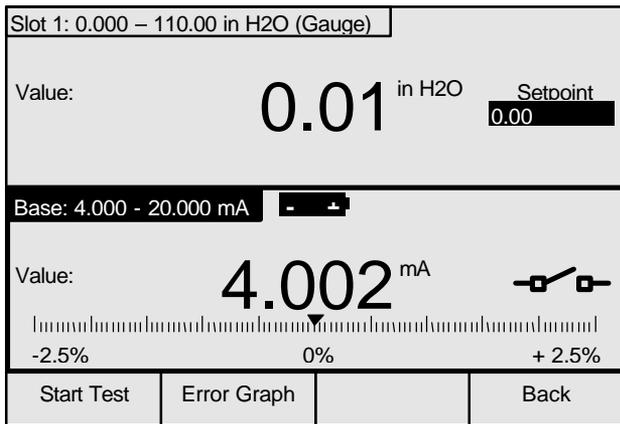
Run Quik Test
Recall Results
Delete Quik Tests
Print Results
Export Results

10. Verify that the test parameters are correct. If not, do the following:
- e. Press **Setup**.
  - f. Use the **?** and **?** keys to select a parameter, then press **Enter** to call up the selection list or data entry window associated with the selected item.
  - g. Select an item from the selection list or enter a value, then press **Enter**.
  - h. Press the **Save Changes** key.
11. Press the **Start Test** key to start the Quik Test.

Test - Quik Test	
Source:	Slot 1: 0.00 - 110.00 in H2O (Gauge)
Measure:	Base: 4.000 - 20.000 mA
Test Direction:	Asc. Steps / Scan: 5
Recording Delay:	5 Repeat Count: 1
Fail Limit - % FS:	0.100 Alert Limit - % FS: 0.080
Fail Limit - % Rdng:	0.000 Alert Limit - % Rdng: 0.000
Source:	54.99 inH2O
55.00	
Measure:	13.064 mA
Working...	
	Cancel Test
	Vent
	Done



14. Press "Save As Found" to continue the test.
15. Press "Adjust" to continue the test or "Save As Left" to save the same data from the "As Found" into the "As Left" fields.
16. If "Adjust" was pressed a screen similar to the one below will appear. The top of the screen displays the controlled output of the 19x while the bottom of the screen displays the measured input. The Error Graph may be displayed for a fast visual indication of your adjustments, which can shorten the time need to adjust the device under test.



17. Press "Start Test" after all adjustments have been made to continue the test.

18. When the Test is complete, the following screen will appear.

Test - Quick Test				
Source (in H2O)	Read (mA)	Expected (mA)	Error (mA)	Tolerance (mA)
0.00	3.990	4.000	-0.010	0.016 P
27.50	7.999	8.000	-0.001	0.016 P
55.00	12.000	12.000	0.000	0.016 P
82.50	16.005	16.000	0.005	0.016 P
110.00	20.009	20.000	0.009	0.016 P
Save As Left	Adjust			Done

19. Press "Save As Left" to conclude the test or Done to go back and make more adjustments.

## RECALLING QUIK TEST RESULTS WITH A DOCUMENTING 195/196

The Recall Results feature allows any Quik Test Results to be displayed on the screen.

To recall a Quik Test, do the following:

1. Call up the Commands list by pressing the **Commands** key.
2. Select "Quik Test", the press **Enter**.

Vent
Zero Input
Downloaded Test
<b>Quik Test</b>
Switch Test
Attached Volume
Measure Only
Hide Display
Show All
Error Graph
Login

3. Select "Recall Results", then press **Enter**.

Run Quik Test
Recall Results
Delete Quik Tests
Print Results
Export Results

4. Use the **?** and **?** keys to highlight the desired Quik Test Result, then press **Enter** to select that result. The results appear in the order the tests were performed. "AF" indicates that only 'As Found' data was recorded while "AL" indicates both 'As Found' and 'As Left' data were recorded.

Quik Test 1	AL	9 Jan 2001	09:54:48 AM
Quik Test 2	AF	10 Jan 2001	12:23:14 PM
Quik Test 3	AL	10 Jan 2001	01:14:23 PM

5. The Test Parameter screen is displayed for recall of the settings for the test.

<b>Test - Quik Test 2</b>			
Source:	Slot 1: 0.00 - 110.00 in H2O (Gauge)		
Measure:	Base: 4.000 - 20.000 mA		
Test Direction:	Asc.	Steps / Scan:	5
Recording Delay:	5	Repeat Count:	1
Fail Limit - % FS:	0.100	Alert Limit - % FS:	0.080
Fail Limit - % Rdng:	0.000	Alert Limit - % Rdng:	0.000
As Found Results	As Left Results		Done

6. Press **F1** to display the "As Found Results" or **F2** to display the "As Left Results".

---

## PRINTING QUIK TEST RESULTS WITH A DOCUMENTING 195/196

The Print Results feature allows any, or all, stored Quik Test Results to be printed. Serial Port Specification: Male 9 pin D subminiature DB-9, supports RS-232C as a DCE, 9600 Baud, 8 data bits, 1 stop bit, no parity with XON/XOFF flow control.

The proper connection to a serial printer is accomplished with a "null modem" cable. A serial-to-parallel converter is required for connection to a parallel printer.

To Print a Quik Test, do the following:

1. Call up the Commands list by pressing the **Commands** key.
2. Select "Quik Test", then press **Enter**.

Vent
Zero Input
Downloaded Test
<b>Quik Test</b>
Switch Test
Attached Volume
Measure Only
Hide Display
Show All
Error Graph
Login

3. Select "Print Results", then press **Enter**.

Run Quik Test
Recall Results
Delete Quik Tests
<b>Print Results</b>
Export Results

4. Use the ? and ? keys to highlight the desired Quik Test Result, then press **Enter** to print that result. The results appear in the order the tests were performed. "AF" indicates that only 'As Found' data was recorded while "AL" indicates both 'As Found' and 'As Left' data were recorded. The Quik Test Results are immediately sent to the printer.

Print All	
Quik Test 1	AL 9 Jan 2001 09:54:48 AM
<b>Quik Test 2</b>	<b>AF 10 Jan 2001 12:23:14 PM</b>
Quik Test 3	AL 10 Jan 2001 01:14:23 PM

---

## EXPORTING QUIK TEST RESULTS WITH A DOCUMENTING 195/196

The Export Results feature allows any, or all, stored Quik Test Results to be exported to a PC. Serial Port Specification: Male 9 pin D subminiature DB-9, supports RS-232C as a DCE, 9600 Baud, 8 data bits, 1 stop bit, no parity with XON/XOFF flow control.

The proper connection to a 9 pin serial port on a PC is accomplished with a straight through cable, A “null modem” cable is not required for connection to a PC.

To Export a Quik Test, do the following:

1. Call up the Commands list by pressing the **Commands** key.
2. Select “Quik Test”, the press **Enter**.

Vent
Zero Input
Downloaded Test
<b>Quik Test</b>
Switch Test
Attached Volume
Measure Only
Hide Display
Show All
Error Graph
Login

3. Select “Export Results”, then press **Enter**.

Run Quik Test
Recall Results
Delete Quik Tests
Print Results
<b>Export Results</b>

4. Use the ? and ? keys to highlight the desired Quik Test Result, then press **Enter** to export that result. The results appear in the order the tests were performed. “AF” indicates that only ‘As Found’ data was recorded while “AL” indicates both ‘As Found’ and ‘As Left’ data were recorded. The Quik Test Results are immediately sent to the computer.

Print All	
Quik Test 1	AL 9 Jan 2001 09:54:48 AM
<b>Quik Test 2</b>	<b>AF 10 Jan 2001 12:23:14 PM</b>
Quik Test 3	AL 10 Jan 2001 01:14:23 PM

---

## DOWNLOADING TESTS FROM A PC RUNNING A CMS PACKAGE TO A DOCUMENTING 195/196

Serial Port Specification: Male 9 pin D subminiature DB-9, supports RS-232C as a DCE, 9600 Baud, 8 data bits, 1 stop bit, no parity with XON/XOFF flow control.

The proper connection to a 9 pin serial port on a PC is accomplished with a straight through cable, A "null modem" cable is not required for connection to a PC.

To Download a Test, do the following:

1. Turn on the 19x.
2. Plug the serial cable between the 19x and the PC.
3. Use the CMS package to select and downloaded the tests to the 19x.

---

## RUNNING A DOWNLOADED TEST WITH A DOCUMENTING 195/196

To Run a Downloaded Test, do the following:

1. Call up the Commands list by pressing the **Commands** key.
2. Select "Downloaded Test", the press **Enter**.

Vent
Zero Input
<b>Downloaded Test</b>
Quick Test
Switch Test
Attached Volume
Measure Only
Hide Display
Show All
Error Graph
Login

3. Select "Run Downloaded Test", then press **Enter**.

<b>Run Downloaded Test</b>
Recall Results

4. Use the **?** and **?** keys to highlight the desired Test, then press **Enter** to select that test.

Test Tag 1	AL 9 Jan 2001 09:54:48 AM
<b>Test Tag 2</b>	

5. The following screen displays the test setup pre-defined in the CMS package on the PC. The following test parameters can be configured:

Test – Test Tag TT 45																			
1	<table> <tr> <td>Tag:</td> <td>Test Tag TT 45</td> <td></td> </tr> <tr> <td>Manufacturer:</td> <td>Transmotion</td> <td></td> </tr> <tr> <td>Model:</td> <td>2800</td> <td></td> </tr> <tr> <td>Serial:</td> <td>6637735</td> <td></td> </tr> <tr> <td>Source:</td> <td>-200 – 800 °F (J T/C)</td> <td>Slot 1</td> </tr> <tr> <td>Measure:</td> <td>4 – 20 mA</td> <td>Base</td> </tr> </table>	Tag:	Test Tag TT 45		Manufacturer:	Transmotion		Model:	2800		Serial:	6637735		Source:	-200 – 800 °F (J T/C)	Slot 1	Measure:	4 – 20 mA	Base
Tag:	Test Tag TT 45																		
Manufacturer:	Transmotion																		
Model:	2800																		
Serial:	6637735																		
Source:	-200 – 800 °F (J T/C)	Slot 1																	
Measure:	4 – 20 mA	Base																	
3	Operator:																		
4	Ambient Temp:	Not Used																	
	Barometric Press:	Not Used																	
	Rel. Humidity:	Not Used																	
Start Test		Vent	Done																

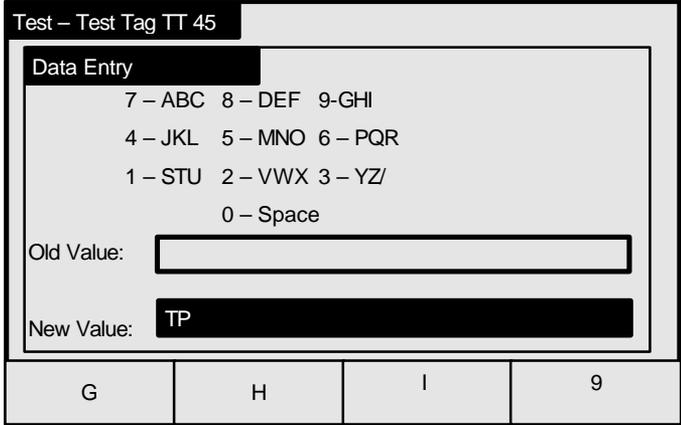
- |   |                    |   |
|---|--------------------|---|
| 1 | Manufacturer/Model | This information is downloaded as part of the test setup from the CMS package. Not all packages support these fields.   |
| 2 | Slot #             | Select the slot that the appropriate module is plugged into. Controlled pressure modules must be used in Slot 1 when the 19x is generating pressure. Base refers to measurements made with connections to the base unit.                              |
| 3 | Operator           | The initials or name of the person performing the test.   |
| 4 | Test Conditions    | Ambient Temperature, Barometric Pressure and Relative Humidity may be entered. Note: Not all CMS packages support test conditions. These values will display after the corresponding Engineering Unit value has been selected in place of “Not Used”. |

Note: The Operator and Test Conditions values may be entered only before the test is run the first time.

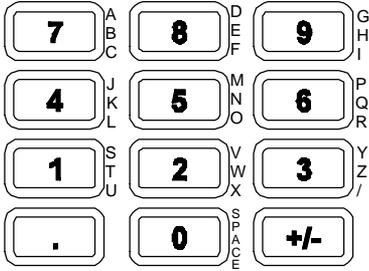
Test – Test Tag TT 45			
Tag:	Test Tag TT 45		
Manufacturer:	Transmation		
Model:	2800		
Serial:	6637735		
Source:	-200 – 800 °F (J T/C)	Slot 1	
Measure:	4 – 20 mA	Base	
Operator:	TPG		
Ambient Temp:	72.00	°F	
Barometric Press:	14.32	psi	
Rel. Humidity:	56.000	%	
◆	?		Done

6. Press the **SETUP** key to add or edit the Slot#, Operator or Test Condition entries.
7. An Alphanumeric Data Entry screen is used to enter the operator's name or initials. Scroll down to the Operator field and press the **ENTER** key.

Test – Test Tag TT 45			
<b>Data Entry</b>			
7 – ABC 8 – DEF 9 – GHI			
4 – JKL 5 – MNO 6 – PQR			
1 – STU 2 – VWX 3 – YZ/			
0 – Space			
Old Value:	<input type="text"/>		
New Value:	<input type="text"/>		
	+/-	Cancel	Enter

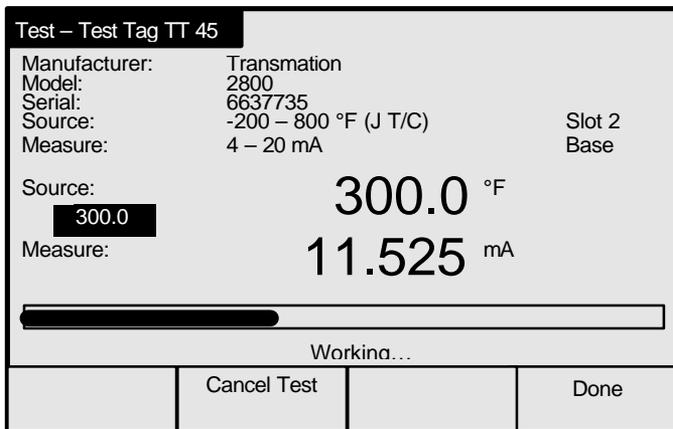


8. While in the Data Entry box, pressing on a numeric key will map the corresponding letter of the alphabet to the soft function keys. In the example above the 9 key was pressed to bring up G, H, I & 9 for selection with the soft keys. Pressing the F1 soft key will enter the letter “G” as the next letter in the New Value field for the operator initials “TPG”. If you accidentally press the wrong number key simply press the correct key and the soft keys will change accordingly. Note: you can Press Enter to accept the name or initials or Cancel to start over.



9. When all the fields in the test setup are complete press Done then Save Changes.
10. Insert the required module(s) and make all your connections to the device under test.

11. Press Start Test and the Downloaded Test will begin.
12. While the test sequence is being performed, the top half of the screen displays the parameters of the test in progress. The bottom half of the screen displays the target Source value on the left and the current Source and Measure Values on the right. An advancing bar displays a visual indication of the progress of the test.



13. When the Test is complete, the following screen will appear.

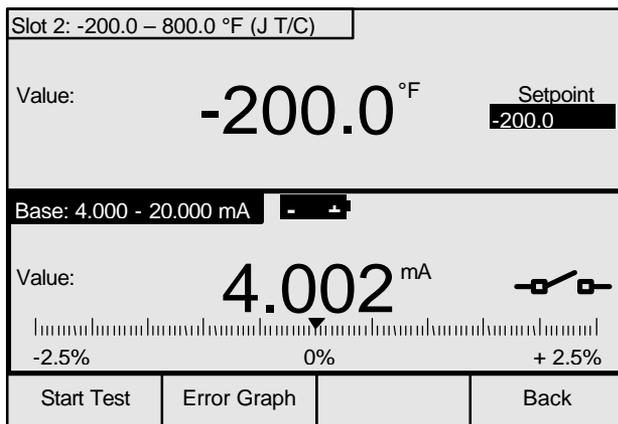
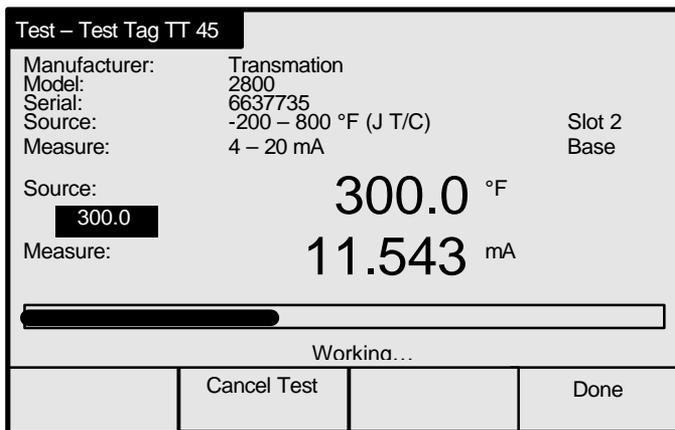
Test – Test Tag TT45				
Source (°F)	Read (mA)	Expected (mA)	Error (mA)	Tolerance (mA)
-200.0	3.978	4.000	-0.022	0.008 F
50.0	7.429	8.000	-0.571	0.009 A
300.0	11.525	12.000	-0.475	0.010 A
550.2	15.763	16.000	-0.237	0.010 A
800.2	19.988	20.000	-0.012	0.011 F
Save As Found				Done

14. Press “Save As Found” to continue the test.
15. Press “Adjust” to continue the test or “Save As Left” to save the

Test – Test Tag TT45				
Source (°F)	Read (mA)	Expected (mA)	Error (mA)	Tolerance (mA)
-200.0	3.978	4.000	-0.022	0.008 F
50.0	7.429	8.000	-0.571	0.009 A
300.0	11.525	12.000	-0.475	0.010 A
550.2	15.763	16.000	-0.237	0.010 A
800.2	19.988	20.000	-0.012	0.011 F
Save As Left	Adjust			Done

same data from the “As Found” into the “As Left” fields.

16. If “Adjust” was pressed a screen similar to the one below will appear. The top of the screen displays the controlled output of the 19x while the bottom of the screen displays the measured input. The Error Graph may be displayed for a fast visual indication of your adjustments, which can shorten the time need to adjust the device under test.
17. Press “Start Test” after all adjustments have been made to continue the test.



18. When the Test is complete, the following screen will appear.

Test – Test Tag TT45				
Source (°F)	Read (mA)	Expected (mA)	Error (mA)	Tolerance (mA)
-200.0	4.005	4.000	0.005	0.008P
50.0	7.449	8.000	-0.551	0.009 A
300.0	11.543	12.000	-0.457	0.010 A
550.0	5.781	16.000	-0.219	0.010 A
800.0	0.003	20.000	0.003	0.011 P
Save As Left				Done

19. Press “Save As Left” to conclude the test or Done to go back and make more adjustments.

---

## RECALLING DOWNLOADED TEST RESULTS

The Recall Results feature allows any Downloaded Test Results to be displayed on the screen.

To recall a Downloaded Test, do the following:

1. Call up the Commands list by pressing the **Commands** key.
2. Select "Downloaded Test", then press **Enter**.

Vent
Zero Input
<b>Downloaded Test</b>
Quick Test
Switch Test
Attached Volume
Measure Only
Hide Display
Show All
Error Graph
Login

3. Select "Recall Results", then press **Enter**.

Run Downloaded Test
<b>Recall Results</b>

4. Use the **?** and **?** keys to highlight the desired Test Result, then press **Enter** to select that result. The results appear in the order the tests were performed. "AF" indicates that only 'As Found'

Test Tag PT56	AF	9 Jan 2001	09:54:48 AM
<b>Test Tag TT45</b>	<b>AL</b>	<b>10 Jan 2001</b>	<b>12:23:14 PM</b>
Test Tag TT46	AL	9 Jan 2001	09:54:48 AM

data was recorded while "AL" indicates both 'As Found' and 'As Left' data were recorded.

5. The Test Parameter screen is displayed for recall of the settings for the test.

Test – Test Tag TT45			
Tag:	Test Tag TT 45		
Manufacturer:	Transmation		
Model:	2800		
Serial:	6637735		
Source:	-200 – 800 °F (J T/C)	Slot 1	
Measure:	4 – 20 mA	Base	
Operator:	TPG		
Ambient Temp:	72.00	°F	
Barometric Press:	14.32	psi	
Rel. Humidity:	56.000	%	
As Found Results	As Left Results		Done

6. Press F1 to display the “As Found Results” or F2 to display the “As Left Results”.

Test – Test Tag TT45				
Source (°F)	Read (mA)	Expected (mA)	Error (mA)	Tolerance (mA)
-200.0	4.005	4.000	0.005	0.008P
50.0	7.449	8.000	-0.551	0.009 A
300.0	11.543	12.000	-0.457	0.010 A
550.0	5.781	16.000	-0.219	0.010 A
800.0	0.003	20.000	0.003	0.011 P
				Done

---

## UPLOADING TESTS TO A PC RUNNING A CMS PACKAGE FROM A DOCUMENTING 195/196

Serial Port Specification: Male 9 pin D subminiature DB-9, supports RS-232C as a DCE, 9600 Baud, 8 data bits, 1 stop bit, no parity with XON/XOFF flow control.

The proper connection to a 9 pin serial port on a PC is accomplished with a straight through cable, A "null modem" cable is not required for connection to a PC.

To Upload a Test, do the following:

1. Turn on the 19x.
2. Plug the serial cable between the 19x and the PC.
3. Use the CMS package to select and upload the tests from the 19x.

## PERFORMING A SWITCH TEST

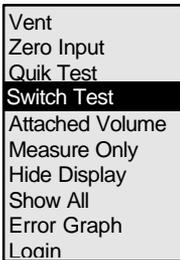
The Switch Test feature provides a convenient method of testing switches. Each Switch Test must be configured, then performed.

Refer to "Testing a Pressure Switch" on page 4-16 for a switch test configuration diagram.

### Setting Up a Switch Test

To set up a switch test, do the following:

1. Insert a module into Slot 1 of the Base Unit.
2. Select the Slot 1 data window.
3. Call up the Commands list by pressing the **Commands** key.
4. Select "Switch Test", then press **Enter**.



The Switch Test screen will be displayed.

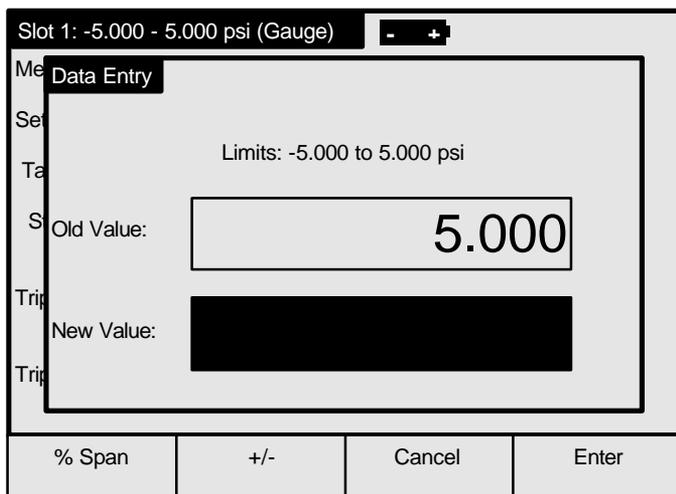
The anticipated trip point of the switch

The endpoints of the test relative to the Target

The resolution of the result

Slot 1: 0.000 - 10.000 psi (Gauge)		-	+
Meas Value	0.036 psi	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Setpoint:	[Redacted]		
Target:	5.000 psi		
+/-:	0.500 psi		
Steps:	11 points		
Trip Open:	-----		
Trip Closed:	-----		
Start Test	Clear	Vent	Done

5. Press **Setup** to select “Target”, then press **Enter** to call up the Data Entry window.



6. Enter the Target value, then press **Enter**.
7. Press the ? key to select “+/-”, then press **Enter** to call up the Data Entry window.
8. Enter the “+/-” value, then press **Enter**. Note that the **0%** key equals the Target value less the “+/-” value; the **100%** key equals the Target value plus the “+/-” value.
9. Press the ? key to select Steps, then press **Enter** to call up the Data Entry window.
10. Enter the number of steps, then press **Enter**. Note that a greater number of steps equals increased resolution.
11. Press the **Save Changes** key.

### Performing a Switch Test

While the Switch Test screen is displayed, any change in the switch state will be displayed as either the Trip Open or Trip Closed value. If the selected slot contains a Controllable module, then a Setpoint field and a set

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of switch test setup fields will be displayed. With these, the user can perform a switch test in either of two ways:

Manually enter setpoints in the Setpoint field until the switch trips in both directions.

OR

Set the Step Keys using the switch test setup fields and then perform the automatic switch test.

To perform a manual switch test, do the following:

1. Perform Steps **1-4** as described in “Setting Up a Switch Test” on page 3-26.
2. Press the **0%** key and wait for the displayed pressure to stabilize.
3. Press the **?** key and wait for the displayed pressure to stabilize.
4. Repeat Step **3** until the switch trips.
5. Press the **?** key and wait for the displayed pressure to stabilize.
6. Repeat Step **5** until the switch trips.
7. Adjust the switch as required.
8. Press the **Done** key.

The manual procedure described above can be performed automatically by pressing the **Start Test** key. To perform an automatic switch test, do the following:

1. Set up the switch test parameters as described in “Setting Up a Switch Test” on page 3-26.
2. Press the **Start Test** key. “Working ...” will appear at the bottom of the display while the test is in process. An audible signal will sound and the switch’s Trip Open/Trip Closed values will be indicated when the test is complete.
3. Adjust the switch as required.
4. Press the **Done** key.

---

## Switch Test Example

An example may be helpful in clarifying the Switch Test procedure. Assume a pneumatic switch trips at 5.0 psi and resets at 4.8 psi. Using this criteria:

The Target would be specified as *5.0*, the anticipated trip point of the switch.

The “+/-” value would be specified as *0.5*, the endpoints of the test relative to the target (or approximately 2 times the deadband of 0.2 psi).

The Steps would be specified as *11*, resulting in resolution of 0.1 psi.

When the **Start Test** key is pressed, the QuikCal 19x will ramp pressure up from 4.5 psi (the lower defined test endpoint) in 0.1 psi increments (the defined Steps) until the switch trips at 5.0 psi (the defined Target). Once the switch trips, the QuikCal 19x will ramp pressure down in 0.1 psi increments until the switch resets. The Trip Open/Trip Closed values will be displayed when the test is complete.

---



# CONNECTIONS

## PRELIMINARY INFORMATION

### TEMPERATURE CONSIDERATIONS

The pressure change of a contained volume of gas is directly proportional to its temperature. The QuikCal 19x automatically compensates for temperature related pressure changes.

### LEAK PREVENTION/DETECTION

The sensitivity of Transmation pressure calibrators will detect system leaks. Therefore, it is imperative to avoid leaks for stable pressure indication. If a leak is suspected, set the calibrator output to full scale. When maximum pressure is attained, enable the Measure Only mode as described in "Setting the Pressure Module in Slot 1 for Measure Only" on page 2-25. Any pressure changes can now be monitored. If the system is closed, a continuous downward pressure change after one minute will indicate a leak.

To determine if a leak is internal to the QuikCal 19x, disconnect all pressure tubing and seal the pressure module outlet. If the QuikCal 19x is able to maintain the assigned pressure, then the leak is external. If the QuikCal 19x is not able to maintain the assigned pressure, change pressure modules. If the leak persists, then contact the Factory.

The use of either Teflon® tape or commercial pipe dope at all tapered fittings and connections is recommended. When connecting stainless steel fittings to stainless steel connections, use pipe dope; the use of Teflon tape in this application is not recommended. When using Teflon tape, ensure that the proper amount is applied. Excessive tape may fray and cause plugging of orifices, nozzles, etc. Overuse of pipe dope may have similar results.

External equipment should also be checked carefully for leaks. Process connections, flange bolts, and vents must be tightly closed. Defective

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gaskets, leaking valves, and damaged diaphragms are all sources of possible leaks.

## COMPATIBLE MEDIA

Pressure modules for use with the QuikCal 19x are available as two types, Controllable (300 psi and less) and Measure Only. Although the QuikCal 19x will only generate pressure to 10 psi, it can be used with controllable modules rated to 300 psi to generate up to 10 psi. Controllable pressure modules used in Slot 1 are connected via tubing to the internal compressor. The compressor is designed for use with non-conductive, non-corrosive gas; use care to keep all liquids out of modules in Slot 1 to avoid potential instrument damage or contamination. Measure Only pressure modules may be used with liquids compatible with type 316 stainless steel and fluorocarbon elastomers. Refer to the pressure module data sheet for further compatibility information. If a controllable module becomes contaminated while being used to measure pressure in slot 2 it should be thoroughly cleaned before being placed in slot 1 to avoid contaminating the internal compressor.

## OPERATING SAFETY CONSIDERATIONS

### **WARNING!**

*Pressure must be relieved prior to making any connections or disconnections. Failure to relieve system pressure could result in serious personal injury or equipment damage.*

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Overpressuring is an inherent danger in all pressure applications. Insure that any media released is captured in a safe manner.

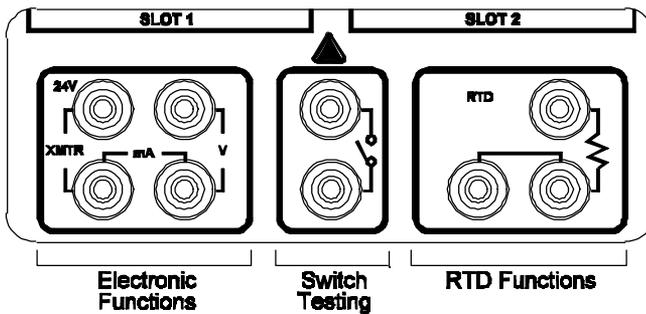
Gas, as a compressible media, is capable of storing large amounts of energy. Consequently, minimum volume and minimum flow are desirable for increased safety as well as improved accuracy. It is good practice to secure all pressure lines and, when dealing with very high pressure, institute the use of a cage to contain the tested equipment in case of equipment failure. Take precautions that potentially hazardous gases are not released into the atmosphere and do not come into contact with operations personnel or equipment.

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Exercise standard physical protection practices: eye protection, gloves, protective clothing, etc.

## INPUT TERMINALS

The electrical input terminals are full size, double insulated banana jacks. The terminals are grouped by function: electronic functions, switch testing, and RTD functions. The front panel labels indicate shared terminals, where applicable.



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## FITTING INSTALLATION

All external pneumatic connections to the QuikCal 19x are made via 1/8"-27 NPT threads in the module pressure port. Adapter fittings are available locally that provide standard 1/4"-18 NPT threads and straight 10-32 threads to accommodate common process connections.

To install a fitting in a module pressure port, do the following:

1. Apply pipe dope to the fitting threads. Do not use Teflon tape.
2. Carefully install the fitting in the pressure port on top of the module.
3. Using a 5/8" wrench to support the module pressure port, tighten the fitting. Do not overtighten.
4. Check for leaks.

---

## CONNECTION DIAGRAMS

The **Power** pushbutton may be pressed either before or after electrical and pneumatic connections are made. However, to ensure that the range of the instrument under test is not exceeded, Transmation recommends that the **Power** pushbutton be pressed before any connections are performed so that the output can be adjusted as required.

### **NOTE!**

*For optimum resolution, it is recommended that a pressure module that most closely matches the expected working range be used whenever possible.*

---

### **NOTE!**

*When using the QuikCal 19x to generate pressure, use the pressure module in Slot 1. When using the QuikCal 19x with an external pressure source, use the pressure module in Slot 2.*

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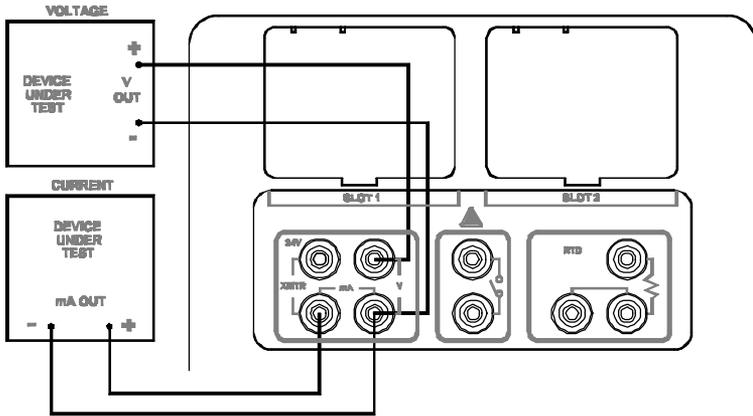
### **NOTE!**

*Vent, zero, and measure the attached volume as required when working with pressure in the Controlled mode (Slot 1). Attached volume is meaningless for Slot 2.*

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## MEASURING DC VOLTS OR CURRENT



10643

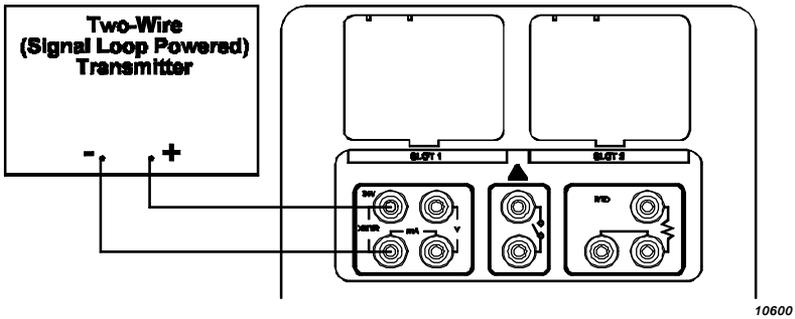
1. When measuring voltage, do the following:
  - a. Connect the negative output lead of the instrument under test to the black (-) VOLTS terminal on the QuikCal 19x.
  - b. Connect the positive output lead of the instrument under test to the red (+) VOLTS terminal on the QuikCal 19x.

When measuring current, do the following:

- a. Connect the negative output lead of the instrument under test to the black (-) mA terminal on the QuikCal 19x.
  - b. Connect the positive output lead of the instrument under test to the white (+) mA terminal on the QuikCal 19x.
2. If Volts or mA engineering units are not already specified, do the following:
  - a. Select the Base Unit data window.
  - b. Call up the Engineering Units list by pressing the **Units** key.
  - c. Select the desired electrical engineering units, then press **Enter**.
3. The measured electrical values will be displayed.

---

## POWERING A TWO-WIRE TRANSMITTER AND MEASURING ITS OUTPUT CURRENT



1. Connect the negative output lead of the two-wire transmitter to the white (-) XMTR terminal on the QuikCal 19x.
2. Connect the positive output lead of the two-wire transmitter to the red (+) 24V terminal on the QuikCal 19x.
3. If mA engineering units are not already selected, do the following:
  - a. Select the Base Unit data window.
  - b. Call up the Engineering Units list by pressing the **Units** key.
  - c. Select the desired electrical engineering units, then press **Enter**.
4. The transmitter mA output will be displayed.

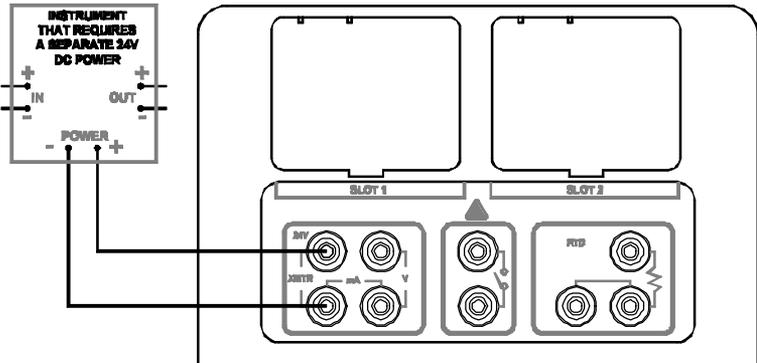
### NOTE!

*The 24V is a nominal value. Exact voltage is a function of the transmitter current.*

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## GENERATING 24 VDC POWER



10655

1. Connect the negative power lead of the instrument to the white (-) XMTR terminal on the QuikCal 19x.
2. Connect the positive power lead of the instrument to the red (+) 24V terminal on the QuikCal 19x.

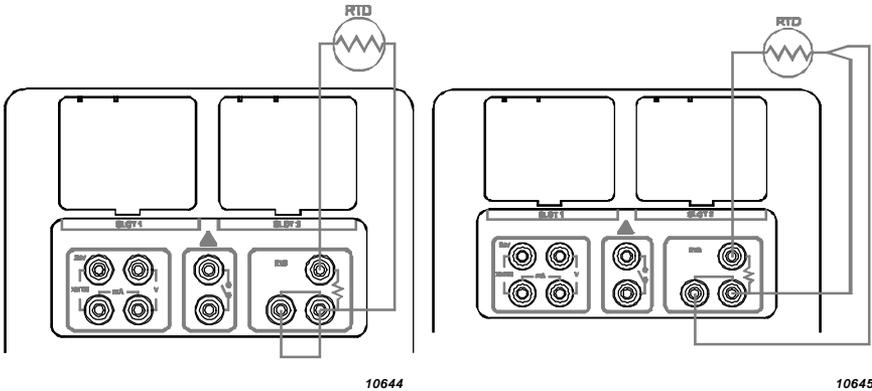
### **NOTE!**

*The 24V is a nominal value. Exact voltage is a function of the instrument current.*

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## MEASURING TEMPERATURE WITH AN RTD



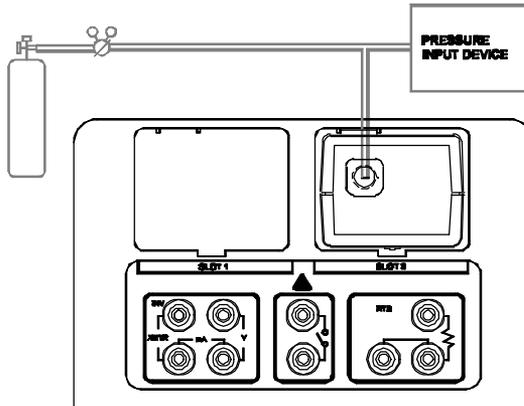
1. Connect one leg of the RTD to the black (+) RTD terminal on the QuikCal 19x.
2. For a two-wire RTD, perform the following:
  - a. Connect the other leg of the RTD to the white (-) RTD terminal on the QuikCal 19x.
  - b. Install a jumper between the two white RTD terminals on the QuikCal 19x.

For a three-wire RTD, perform the following:

- a. Connect one of the paired RTD legs to the white (-) RTD terminal on the QuikCal 19x.
  - b. Connect the other paired leg of the RTD to the other white RTD terminal on the QuikCal 19x.
3. If “°C” or “°F” is not already specified in the label of the Base data window, do the following:
    - a. Select the Base Unit data window.
    - b. Call up the Engineering Units list by pressing the **Units** key.
    - c. Select either “°C” or “°F”, then press **Enter**.
  4. The measured temperature value will be displayed.

---

## MEASURING GAUGE PRESSURE



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### **WARNING!**

*Manually vent pressure before disconnecting any pressure connections to prevent possible personal injury or equipment damage.*

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1. Select the Slot 2 data window.

### **NOTE!**

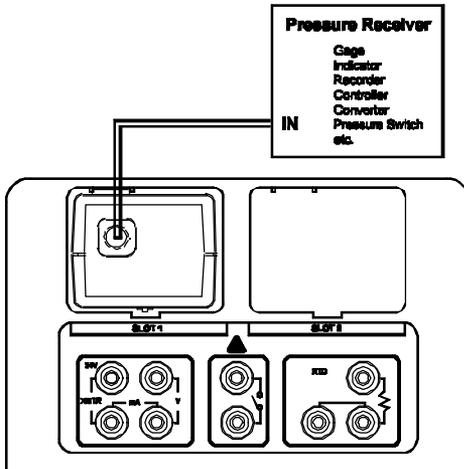
*The module can be used in Slot 1 if the Base Unit is in Measure mode. Do not use any module at  $\geq 12.5$  psi if inserted into Slot 1.*

---

2. Manually vent the Slot 2 system to ambient pressure.
3. Press the **Zero Input** key to zero the QuikCal 19x input.
4. Connect the air line from the pressure source being measured to the input pressure port on the pressure module in Slot 2.
5. The input pressure value will be displayed.

---

## GENERATING PRESSURE



10647a

### **WARNING!**

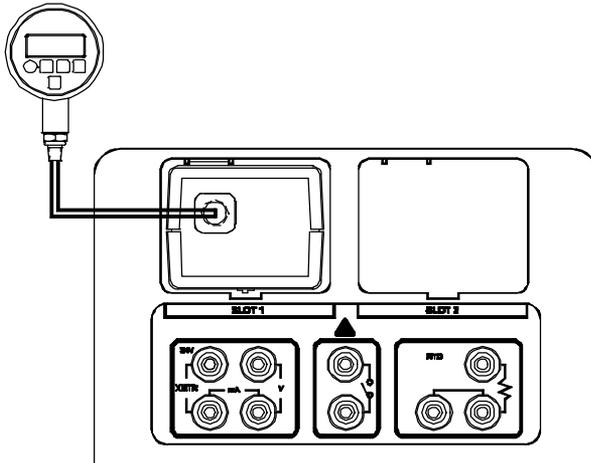
*In the pressure output mode, the QuikCal 19x is capable of generating pressures up to 10 psi. To avoid damage to the instrument under test, set the QuikCal 19x output pressure range to match the input pressure range of the instrument before connecting them together.*

---

1. Connect the air line from the device to be pressurized to the Controllable pressure port on the pressure module in Slot 1.
2. Select the Slot 1 data window.
3. Press the **Vent** key to zero the QuikCal 19x to ambient pressure.
4. Perform the attached volume procedure as described in "Measuring Attached Volume" on page 2-23.
5. Enter the output pressure to be generated via the numeric keypad. Use the **0%**, **?**, **?**, or **100%** keys to generate other pressures.

---

## CALIBRATING A PRESSURE GAUGE

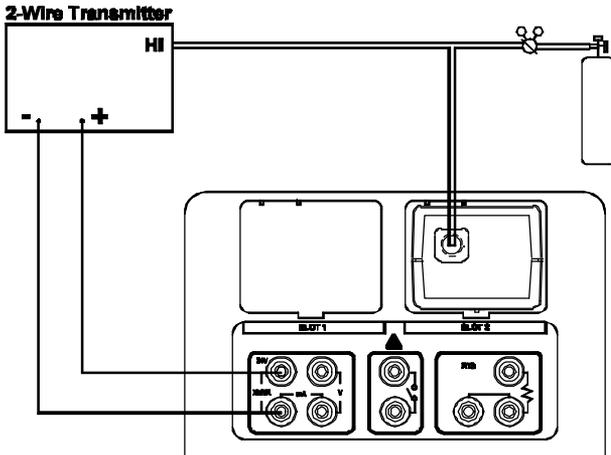


10656

1. Connect an air line from the gauge to the input pressure port on the pressure module in Slot 1.
2. Select the Slot 1 data window.
3. Press the **Vent** key to zero the QuikCal 19x to ambient pressure.
4. Enter the output pressure to be generated via the numeric keypad.
5. Adjust the pressure gauge as required.

---

## CALIBRATING A TRANSMITTER WITH AN EXTERNAL PRESSURE SOURCE



10648

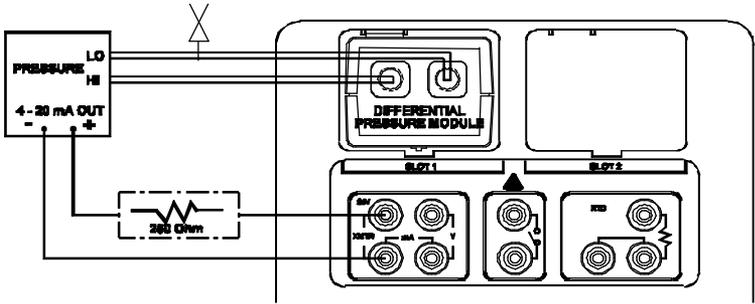
1. Connect the negative output lead of the transmitter to the white (-) XMTR terminal on the QuikCal 19x.
2. Connect the positive output lead of the transmitter to the red (+) 24V terminal on the QuikCal 19x.
3. Connect the air line from the external source to both the device under test and the input pressure port on the pressure module in Slot 2.
4. The pressure generated by the external source and the transmitter mA output values will be displayed.
5. Adjust the transmitter as required.



---

# CALIBRATING A DIFFERENTIAL PRESSURE TRANSMITTER — $\Delta P/I$

LO SIDE VENT VALVE (Not included) See note on page 2-16



10650a

## NOTE!

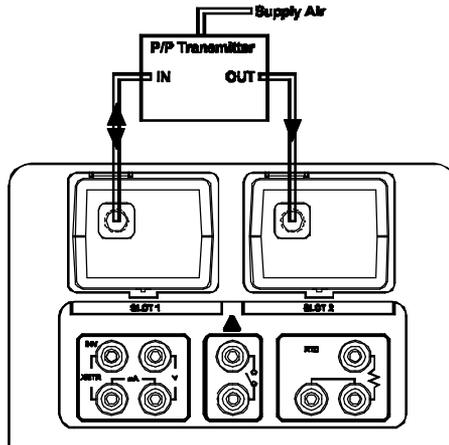
Some digital (“smart”) transmitters might require that a 250 Ohm resistor be installed in series with the transmitter output loop as illustrated above. Consult the transmitter manufacturer’s manual for additional information.

---

1. Connect the negative output lead of the transmitter to the white (-) XMTR terminal on the QuikCal 19x.
2. Connect the positive output lead of the transmitter to the red (+) 24V terminal on the QuikCal 19x.
3. Connect the high pressure line from the transmitter to the input pressure port on the pressure module in Slot 1.
4. If using a differential pressure module, connect the low pressure line from the transmitter to the differential port on the module. Otherwise, verify that the low pressure port of the transmitter is open to atmosphere (vented).
5. Select the Slot 1 data window.
6. Press the **Vent** key to zero the QuikCal 19x to ambient pressure.
7. Perform the attached volume procedure as described in “Measuring Attached Volume” on page 2-23.
8. Enter the output pressure to be generated via the numeric keypad.
9. The generated pressure and the transmitter mA output values will be displayed.
10. Adjust the transmitter as required.

---

## CALIBRATING/TESTING A PNEUMATIC TRANSMITTER — P/P

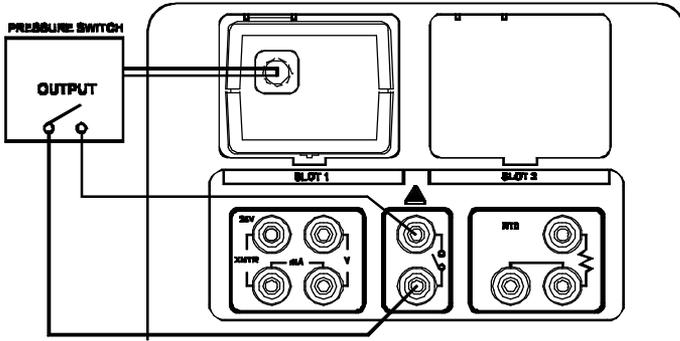


10654

1. Connect the air line from the transmitter input port to the pressure module in Slot 1.
2. Connect the air line from the transmitter output port to the pressure module in Slot 2.
3. Connect the transmitter to the external air supply.
4. Manually vent the Slot 2 system to ambient pressure.
5. Select the Slot 1 data window.
6. Press the **Vent** key to zero the QuikCal 19x to ambient pressure.
7. Perform the attached volume procedure as described in "Measuring Attached Volume" on page 2-23.
8. Enter the output pressure to be generated via the numeric keypad.
9. The appropriate pressures will be displayed.
10. Adjust the transmitter as required.

---

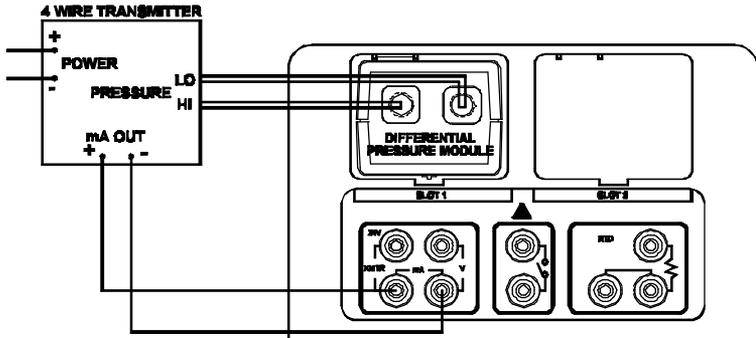
## TESTING A PRESSURE SWITCH



10649

1. Connect one lead of the pressure switch to the red terminal on the QuikCal 19x.
2. Connect the other lead of the pressure switch to the black terminal on the QuikCal 19x.
3. Connect the air line from the pressure switch to the input pressure port on the pressure module in Slot 1.
4. Press the **Vent** key to zero the QuikCal 19x to ambient pressure.
5. Perform the setup and test procedures described in "Performing a Switch Test" on page 3-25.

## CALIBRATING A FOUR-WIRE DIFFERENTIAL $\Delta P/I$ TRANSMITTER



10651

1. Connect the negative output lead of the four-wire transmitter to the black (-) mA terminal on the QuikCal 19x.
2. Connect the positive output lead of the four-wire transmitter to the white (+) mA terminal on the QuikCal 19x.
3. Connect the air line from the four-wire transmitter's HI pressure port to the input pressure port on the pressure module in Slot 1.
4. If using a differential pressure module, connect the low pressure line from the transmitter to the differential port on the module. Otherwise, verify that the low pressure port of the transmitter is open to atmosphere (vented).
5. Select the Slot 1 data window.
6. Press the **Vent** key to zero the QuikCal 19x to ambient pressure.
7. Perform the attached volume procedure as described in "Measuring Attached Volume" on page 2-23.
8. Enter the output pressure to be generated via the numeric keypad.
9. The generated pressure and the transmitter mA output values will be displayed.
10. Adjust the transmitter as required.



# MAINTENANCE

## OVERVIEW

Field service procedures for the QuikCal 19x include cleaning the case exterior, recharging and/or replacing the battery, replacing the fuses, and servicing the intake/exhaust filter. It is strongly recommended that units requiring service beyond the scope of the procedures listed above be returned to Transmation. Refer to “Factory Service and Warranty” in Chapter 7 for shipping information.

## CLEANING THE QUIKCAL 19X

The exterior of the calibrator can be cleaned with a damp soft cloth with mild non-abrasive detergent. Solvents or abrasives should not be used since they can damage the display and keypad.

Contact the Factory for information concerning specific media contamination removal procedures.

## CHARGING THE QUIKCAL 19X

The QuikCal 19x is powered by a 12 volt sealed lead acid battery rated for a nominal six hours use. When the battery is discharged, turn off the QuikCal 19x, then plug the charger power lead into an AC outlet and plug the low voltage lead into the charger jack on the side of the calibrator.

The QuikCal 19x should not be used while the charging process is underway. Transmation recommends that the charger be connected whenever practical. Be advised, however, the QuikCal 19x may not fully charge while in use.

### **NOTE!**

*While maintaining or generating higher pressures, the discharge rate may exceed the charge rate.*

---

---

**WARNING!**

---

*Do not charge the battery with the QuikCal 19x in any position other than “normal” (i.e., with the unit positioned upright on the four rubber feet). In positions other than normal, the battery cannot vent properly and electrolyte may leak from the battery.*

---

The QuikCal 19x uses a dual-rate charging circuit capable of recharging a discharged battery in about 8 hours and trickle charging a unit indefinitely.

**NOTE!**

---

*During normal charging operation, the charger will become warm to the touch. If the charger becomes too hot to touch, something is wrong. Discontinue charger use immediately and determine the cause of the malfunction.*

---

For maximum battery life, charge the QuikCal 19x whenever it is not in use. The calibrator can be used while the charging process is underway; however, the charging period will be longer. For maximum battery life, do not discharge the battery below about 50%.

**NOTE!**

---

*Battery condition is displayed at the top of the Base screen.*

---

Battery life will be significantly reduced if the battery is completely discharged repeatedly or stored in a fully discharged condition. The recommended charge practice is to recharge the battery after each period of use, and every three months when stored unused.

**NOTE!**

---

*Battery capacity is reduced by operation in very cold temperatures.*

---

The QuikCal 19x will shut off at about 10% of battery capacity to preserve memory and data integrity.

---

## REPLACING THE BATTERY

The QuikCal 19x is powered by a 12 volt lead acid battery. After a number of charge/discharge cycles, the battery will not hold a reasonable charge and must be replaced.

### **NOTE!**

---

*The life of the battery is reduced by very deep discharge cycles (below about 50%) or operation at extreme temperatures.*

---

To replace the battery, do the following:

1. Turn off the QuikCal 19x and remove all electrical and pneumatic connections.
2. Remove all modules.
3. Remove the eight Philips-head screws from the bottom of the calibrator and carefully pivot the upper exterior case to the right. Use care not to stress the electrical cabling.
4. Remove the four Philips-head screws from the battery compartment cover and remove the cover.
5. Remove the battery from its compartment.
6. Disconnect the battery power leads.
7. Connect the leads to the replacement battery. Be sure to observe proper polarity.
8. Install the replacement battery in the battery compartment.
9. Install the battery compartment cover and replace the four screws.
10. Carefully orient the pneumatic hoses to prevent any kinks in the tubing.
11. Install the upper exterior case and replace the eight screws.
12. Fully charge the new battery as explained in "Charging the QuikCal 19x" on page 5-1.

---

## SERVICING THE FUSES

The power circuit and mA input circuit of the QuikCal 19x are protected by dedicated fuses mounted behind an access cover located on the bottom of the instrument case.

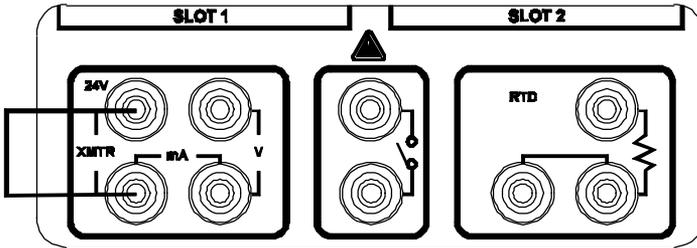
### CHECKING THE POWER CIRCUIT FUSE

If the QuikCal 19x won't power up, it is likely that the 4 amp power circuit fuse is blown. Perform the fuse replacement procedure described in "Replacing a Fuse" on page 5-5.

### CHECKING THE mA INPUT FUSE

If the QuikCal 19x won't display a mA input, the 0.125 amp mA input fuse is blown. To check the mA input fuse, do the following:

1. Connect the red 24V terminal to the white mA terminal.



10652a

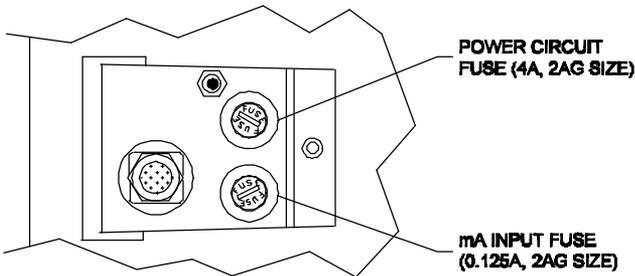
2. If the fuse is good, the display will indicate a nominal 25 mA value.  
If the fuse is blown, the display will indicate 0.00 mA.

---

## REPLACING A FUSE

To replace a fuse, do the following:

1. Turn off the QuikCal 19x and remove all electrical and pneumatic connections.
2. Remove the Philips head screw from the access cover located on the bottom of the instrument case and remove the cover.



3. Using a wide flat-bladed screwdriver, loosen and remove the proper fuse assembly from the instrument case. Be sure that both the plastic and metal parts of the fuse body rotate together as a unit.
4. Install a replacement fuse of the proper rating into the fuse assembly.
5. Install the replacement fuse assembly into the instrument case and firmly tighten.
6. Install the access cover and replace the screw.

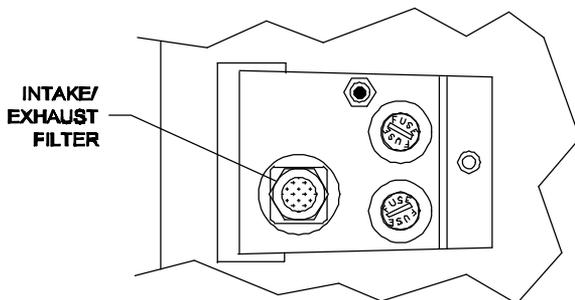
10641a

## SERVICING THE INTAKE/EXHAUST FILTER

After an extended period of usage, the intake/exhaust filter should be removed and cleaned. Service intervals are dependent on usage and ambient air quality. To service the filter, do the following:

1. Turn off the QuikCal 19x and remove all electrical and pneumatic connections.

- 
2. Remove the Philips head screw from the access cover located on the bottom of the instrument case and remove the cover.
  3. Using a 7/16" wrench, remove the filter from the case.



10641b

4. Clean the filter with a solvent compatible with brass.
5. Install the filter in the case and tighten it with the 7/16" wrench.
6. Install the access cover and replace the screw.

## **WARNING!**

*Do not operate the QuikCal 19x without the intake/exhaust filter in place to prevent harmful contaminants from reaching the sensor and valves.*

---

## RESETTING THE CALIBRATOR

If the display on the QuikCal 19x appears "frozen" or the unit won't respond to keypad commands, perform a software or hardware reset.

### SOFTWARE RESET

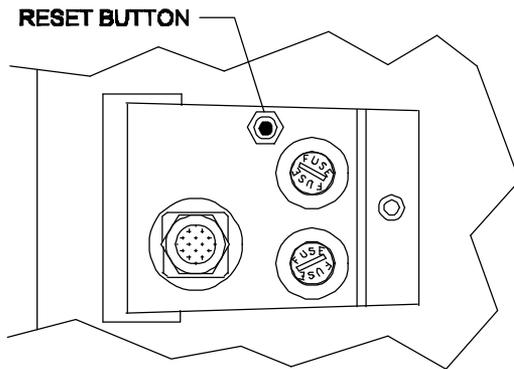
If the QuikCal 19x doesn't complete a normal shutdown in a nominal time period after pressing the **Power** pushbutton, press and hold the **Power** pushbutton for three seconds.

---

## HARDWARE RESET

To perform a hardware reset on the QuikCal 19x, do the following:

1. Place the QuikCal 19x on its side while power is applied to the unit.
2. Remove the Philips head screw from the access cover located on the bottom of the instrument case and remove the cover.
3. Press and hold the red **Reset** button for approximately five seconds.



10641c

4. Install the access cover and replace the screw.

## TROUBLESHOOTING

Refer to Table 5.1 on page 5-8 for common troubleshooting information.  
Refer to Table 5.2 on page 5-9 for status field definitions.

**TABLE 5.1 TROUBLESHOOTING**

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
QuikCal 19x won't power up	Battery not sufficiently charged	Charge battery
	Defective battery	Replace battery
	Defective charger	Replace charger
	Blown power circuit fuse	Replace power circuit fuse
	Component failure within QuikCal 19x	Return QuikCal 19x to Transmation
QuikCal 19x won't power down	Software "hung up"	Press and hold <b>Power</b> pushbutton for three seconds or press and hold <b>Reset</b> button for five seconds
Display frozen	Battery not sufficiently charged	Charge battery
	Defective battery	Replace battery
	Software "hung up"	Press and hold <b>Reset</b> button for five seconds
Battery won't accept charge	Defective battery	Replace battery
	Defective charger	Replace charger
Short battery life	Defective battery	Replace battery
	Defective charger	Replace charger
QuikCal 19x operates erratically	Battery not sufficiently charged	Charge battery
	Defective battery	Replace battery
Displayed value is erratic	Leak in system	Correct leak
Cannot measure milliamps	mA input fuse blown	Replace mA input fuse
Won't generate proper pressure	Battery not sufficiently charged	Charge battery
	Gross leak in pressure line	Correct leak
	Filters clogged	Replace filters
	Transducers damaged	Check transducers in input (measuring) mode

**TABLE 5.2 STATUS FIELD DEFINITIONS**

<b>MESSAGE</b>	<b>DESCRIPTION</b>	<b>SOLUTION</b>
SEProm Checksum Error	There was an error reading the Base Unit's or module's serial EEPROM	For the Base Unit, turn the power off, then back on  For a module, unplug the module, then plug it back in  If the problem persists, contact Transmation
A/D Error	There was a hardware error reading the module's input	Unplug the module, then plug it back in  If the problem persists, contact Transmation
A/D Over Range A/D Under Range	There was an error reading the module's input	Remove any pressure from the module  If the problem persists, unplug the module, then plug it back in  If the problem persists, contact Transmation
Temperature Sensor Over Range Temperature Sensor Under Range	The module's temperature sensor indicates the ambient temperature exceeds the temperature range the module is calibrated for	If the ambient temperature exceeds the module's temperature range, move to a new location with an appropriate ambient temperature  Unplug the module, then plug it back in  If the problem persists, contact Transmation
Not Calibrated	The module's calibration information is not valid	Unplug the module, then plug it back in  If the problem persists, contact Transmation
Normal	The Base Unit is functioning properly	None required

---

## RECOMMENDED SPARE PARTS

### **WARNING!**

*To ensure proper operation of the QuikCal 19x, use only genuine Transmation replacement parts unless commercially available parts are specified as acceptable. The use of unapproved replacement parts can result in potentially hazardous equipment malfunctions, and may void the warranty.*

---

Call Transmation for available spare and accessory parts.

**TABLE 5.3 RECOMMENDED SPARE PARTS**

Item	Part Number
Fuse, 0.125A	759300-038
Fuse, 4A	759300-039
Filter/breather	500136-282
Test leads, set	500143-010
Blank module	100867-020
Battery, 12V	759550-030
Charging transformer, 110 VAC	502226-117
Charging transformer, 220 VAC	502226-118
Charging transformer, 12 VDC With Automotive Cigarette Lighter Plug	502226-131
<b>Additional Items Included with Documenting QuikCal 195 &amp; 196</b>	
CD-ROM with Quik Test Test Transfer	100866-260
DB9 Female to DB9 Female RS232 Cable	496300-710

# CALIBRATION

## OVERVIEW

To ensure optimum instrument operation, the QuikCal 19x should be returned to Transmation at regular intervals (at least once every 12 months) for calibration to NIST standards. Due to the QuikCal 19x's sophisticated electronics and software, calibration beyond the zero and span adjustment procedures described in "User Calibration" below requires equipment and procedures available only at Transmation.

## USER CALIBRATION

When a QuikCal 19x is factory calibrated, correction factors are calculated and stored in non-volatile memory. These corrections are then applied to all readings before display.

The QuikCal 19x actually stores two sets of correction factors. The first is determined during factory calibration. It provides not only accuracy traceable to NIST standards, but also corrections to compensate for drift with ambient temperature. This insures accuracy over the entire operating temperature range (32°F to 122°F/0°C to 50°C). Factory calibration numbers can only be accessed by factory authorized service personnel.

The second set of correction numbers used by the QuikCal 19x can be calibrated by users that have suitable calibration standards. This set does not replace the factory calibration, but is used in conjunction with the factory numbers. This allows the user's qualified service personnel to calibrate the QuikCal 19x using suitably accurate equipment without returning the unit to the Factory. The effects of noise, temperature variations, and sensor non-linearities require that the QuikCal 19x be calibrated with devices which are accurate and traceable to NIST better than 0.008% of full scale in order to maintain factory specified accuracy.

---

## CONDITIONS FOR CALIBRATION

Do not bring the QuikCal 19x in from a very cold or hot environment and immediately run a calibration. The instrument should be left at calibration temperature for at least four hours before the calibration is performed. The QuikCal 19x will be accurate at the ambient temperature during calibration.

The QuikCal 19x should be powered only by the internal battery for the calibration. The battery should be fully charged before the calibration, and any external battery charger should be disconnected.

**HINT:** While the QuikCal 19x is acclimating to ambient temperature, use this time to charge the battery completely.

## UNLOCKING/LOCKING USER CALIBRATION

To prevent unauthorized personnel from accessing calibration and other critical maintenance functions, the QuikCal 19x has a Password feature. Once enabled, the user must enter the password in order to calibrate the QuikCal 19x.

If the Password function is enabled, "Calibrate" appears on the Commands list only when the user is logged in. To "unlock" User Calibration, log in as described in "Logging In" on page 2-17. Once a user has logged in using the password, all calibration functions are available until the user logs out or turns off the QuikCal 19x. Consequently, it is important that the user logs out (or turns off the QuikCal 19x) after each calibration session is complete to prevent unauthorized access of the restricted functions. To "lock" user calibration, log out as described in "Logging Out" on page 2-19.

## INPUT CALIBRATION

### CALIBRATION EQUIPMENT

#### **Electrical**

The electrical I/O calibration requires a voltage/current source capable of generating values close to ( $\pm 5\%$ ) 0-50 mA, 0-50V, and 60-160 Ohm (-40°C-100°C). A low accuracy source with an adequately high accuracy instrument monitoring the value (series or parallel) is a suitable alternative. The accuracy of the reference instrument at the listed values and at the ambient temperature should be better than  $\pm 50$  ppm (0.005%).

---

## Pressure

The only equipment required for the pressure calibration is a precision pressure source capable of generating pressures of 0%-100% of the pressure module range with a minimum required accuracy of 0.008% of reading or better. A low accuracy source connected to a high accuracy gauge can be used in place of a high precision source.

## CALIBRATION PROCEDURE

To calibrate the zero and span, do the following:

1. "Unlock" User Calibration as described in "Logging In" on page 2-17.
2. Select the Base Unit data window.
3. Call up the Commands list by pressing the **Commands** key.
4. Select "Calibrate", then press **Enter**.

Hide Display
Error Graph
Logout
<b>Calibrate</b>

The Calibration screen will be displayed.

<b>Calibrate Base: 4.000 – 20.000 mA</b>			
Factory Cal. Date: 15 Aug 2000		Due: Aug 2001	
User Cal. Date:		Due:	
Meas. Value:	0.000 mA		
Zero:	<b>4.000 mA</b>		
Full Scale:	20.000 mA		
Next Cal. Due:	12 months		
Set the input to be calibrated to the Zero value. Press CONTINUE when the value is stable.			
Factory Settings	Continue		Done

5. Press **Enter** to call up the Zero data entry window.

Calibrate Base: 4.000 - 20.000 mA

Data Entry

Limits: -0.801 to 24.801 mA

Old Value: 4.000

New Value:

+/- Cancel Enter

6. Enter the Zero value corresponding to the reading of the external precision source in the New Value field, then press **Enter**.
7. Press the **Continue** key to highlight the Full Scale field, then press **Enter** to call up the Full Scale data entry window.
8. Enter the Full Scale value corresponding to the reading of the external precision source in the New Value field, then press **Enter**.
9. Press the **Continue** key to highlight the Next Cal. Due field, then press **Enter** to call up the Next Cal. Due data entry window.
10. Enter the calibration interval in months in the New Value field, then press **Enter**.
11. Press the **Continue** key.
12. Press the **Done** key.
13. When the verification screen is displayed, press **Yes** to accept the calibration values or press **Factory Settings** to reset to the default factory calibration settings.  
  
All data collection and computation is performed automatically. When the QuikCal 19x display returns to normal, the instrument is ready for use.
14. "Lock" User Calibration as described in "Logging Out" on page 2-19.

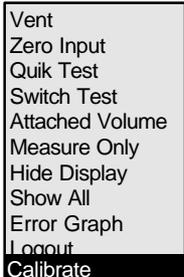
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## RESTORING FACTORY CALIBRATION CORRECTION FACTORS

If any problems are encountered during a user calibration, the calibration data can be reset to the Factory calibration correction factors. This is not equivalent to a new calibration. If the last Factory calibration was over one year ago, restoring the Factory calibration data will eliminate any user calibration values and return the QuikCal 19x to one year old Factory calibration correction factors. Only the Factory calibration data will be applied to readings.

To restore the Factory calibration settings, do the following:

1. "Unlock" User Calibration as described in "Logging In" on page 2-17.
2. Call up the Commands list by pressing the **Commands** key.
3. Select "Calibrate", then press **Enter**.



Vent  
Zero Input  
Quik Test  
Switch Test  
Attached Volume  
Measure Only  
Hide Display  
Show All  
Error Graph  
Logout  
Calibrate

4. Press the **Factory Settings** key.

Calibrate Slot 1: 0.000 - 10.000 psi (Gauge)			
Factory Cal. Date: 15 Aug 2000	Due: Aug 2001		
User Cal. Date:	Due:		
Meas. Value: 0.054 psi			
Zero: 0.000 psi			
Full Scale: 10.000 psi			
Next Cal. Due: 12 months			
Set the input to be calibrated to the Zero value. Press CONTINUE when the value is stable.			
Factory Settings	Continue		Done

5. At the prompt, press the **Yes** key.

Calibrate Slot 1: 0.000 - 10.000 psi (Gauge)			
F			
U			
M			
Z			
F	Press YES to reset the calibration values to their factory settings.		
N			
S			
P			
Yes	No		

6. Press the **Done** key.

The calibration settings are reset to the Factory calibration correction factors.

7. "Lock" User Calibration as described in "Logging Out" on page 2-19.

---

## COMPLETION

Once user calibration is completed, don't forget to "lock" User Calibration as described in "Logging Out" on page 2-19 (or turn off the QuikCal 19x).

## A FINAL NOTE

Transmation has supplied the capability to do on-site calibration as a convenience to the customer. However, Transmation's authorized service technicians are best qualified to calibrate the QuikCal 19x to ensure optimum operation. We recommend that the QuikCal 19x be returned for Factory calibration annually. This calibration serves as a checkup. Our service department can also inform the customer of any recent product upgrades, retrofits, modifications, or enhancements.



## FACTORY SERVICE AND WARRANTY

### FACTORY SERVICE

Should Factory service become necessary, the QuikCal 19x should be returned to the nearest service facility for repair or replacement. Do not return any item to Transmation without first contacting us and obtaining an authorization number. This number should appear clearly on the outside of all packages sent to Transmation and on all associated paperwork.

When contacting Transmation for service help, please assist our service department by clearly and thoroughly describing the problem.

### WARRANTY

Transmation products are warranted to be free from defects in material and workmanship (excluding fuses, batteries and leads) for a period of one year from the date of shipment. Warranty repairs can be obtained by returning the equipment prepaid to our factory. Products will be replaced, repaired, or adjusted at our option. *Transmation gives no other warranties, including any implied warranty of fitness for a particular purpose.* Also, Transmation shall not be liable for any special, indirect, incidental or consequential damages or losses arising from the sale or use of its products.

**Transmation, Inc**

PO Box 837, Everett, WA 98206

1520 75<sup>th</sup> Street SW, Everett, WA 98203

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U.S.A. (800) 260-5492

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E-mail: [sales@transmation.com](mailto:sales@transmation.com)

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