

general index

<u>description</u>	<u>page number</u>
General Description .....	..II
Disclaimer .....	..II
General Specification .....	..III
Special Function 1, user offset (Turbo 6, Turbo Kelvin ) .....	..1
Special Function 2, user span multiplier (Turbo 6, Turbo Kelvin ) .....	..2
Special Function 3, user span divisor (Turbo 6, Turbo Kelvin ) .....	..3
Special Function 4, setpoint 1 hysteresis (Turbo 6, Turbo Kelvin ) .....	..4
Special Function 5, setpoint 2 hysteresis (Turbo 6, Turbo Kelvin ) .....	..5
Special Function 6, setpoint 1 value (Turbo 6, Turbo Kelvin ) .....	..6
Special Function 7, setpoint 2 value (Turbo 6, Turbo Kelvin ) .....	..7
Function 8, volt meter, 0 - 2 vdc (Turbo 6 only ) .....	..8
Function 9, ammeter, 0 - 20 madc (Turbo 6 only ) .....	..9
Function 10, ammeter, 4 - 20 madc (Turbo 6 only ) .....	..10
Function 11, rate monitor, 1 to 10 000 ppm (Turbo 6 only ) .....	..11
Function 12, period monitor, milli seconds (Turbo 6 only ) .....	..12
Function 13, period monitor, seconds (Turbo 6 only ) .....	..13
Function 14, temperature meter, LM 35 (Turbo 6 only ) .....	..14
Function 15, user span calibration (Turbo 6, Turbo Kelvin ) .....	..15
Function 16, cold junction offset (Turbo Kelvin only ) .....	..16
Function 17, cold junction span (Turbo Kelvin only ) .....	..17
Installation (Turbo 6, Turbo Kelvin ) .....	..18
Errors and Calibration Notes (Turbo 6, Turbo Kelvin ) .....	..21
Turbo Kelvin Functions (Turbo Kelvin only ) .....	..22
Assembly Board AB 200 (Turbo 6, Turbo Kelvin ) .....	..24
Hot-Keys (Turbo 6, Turbo Kelvin ) .....	..25

general description

The Turbo 6 and Turbo Kelvin multi function panel meters and setpoint controllers are low cost 4 1/2 digit instruments with high accuracy and flexibility.

The units can be user configured and the displayed value may be calibrated for offset and span via the front panel membrane key pad.

Hot-Key features for tare, anti-tare and shift decimal point are also available.

Turbo 6 will monitor voltage, current, rate and temperature. To indicate and control periods, inverse rate functions have also been included.

Turbo Kelvin has been developed to measure temperature only and will interface a host of thermocouples and RTD sensors.

Two setpoints with programmable hysteresis from 0 to 100% are available for controlling purposes.

The instruments are suitable for any general purpose monitoring and setpoint control in industrial and commercial applications.

The Turbo meters are available in the standard 110 vac / 240 vac supply formats. A 24 vac / vdc model is available as an option.

Disclaimer

Autoplex International Pty. Ltd. shall not be liable for any damages or problems whatsoever arising from the use or application of the Turbo instruments be it due to hardware, firmware or software.

Information in this document is given without any guarantees and is subject to change without prior notice. No part of this document may be reproduced in any form without express written permission of Autoplex International.

general specification

SUPPLY VOLTAGE:

110 vac / 240 vac
24 vac / 24 vdc (optional)

DISPLAY:

7 segment, 4 1/2 digit, 12mm LCD

USER SUPPLY OUTPUT:

12 vdc, 50 mA (Turbo 6 only)

INPUT FORMATS:

+/- 2 vdc, +/- 0-20mA, 4-20mA, +/- 5 vdc (rate), TTL levels (Turbo 6)
thermocouple, RTD PT 100 (Turbo Kelvin)

INPUT OVER - RANGE:

12 vdc continuous without damage

INPUT IMPEDANCE:

Volts: 1000 kohms
Milli-amps: 100 ohms
Rate: 1000 kohms

SETPOINTS:

3 amp, change-over contacts for both setpoints

CALIBRATION:

Auto calibration every 10 to 30 seconds
User calibration for span and offset

ACCURACY:

Voltage and Current: 0.1 % , +/- least significant digit
Rate: 0.01%, +/- 1 digit

HOT-KEY FEATURES:

Tare, anti-tare and shift decimal point, via membrane key board.

COMMON SPECIFICATION:

Operating temperature: 0 to 45 degrees centigrade
Storage temperature: -20 to 85 degrees centigrade
Humidity: 0-90% non condensing
Front protection with membrane: IP65
Cut-out dimensions: 44mm x 92mm
Front dimensions: 51mm x 99mm
Depth dimension: 150mm
Case material: high impact flame retardant ABS.
Membrane material: polycarbonate

special function

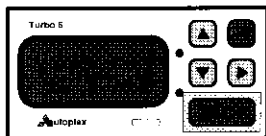
1

PROGRAM USER OFFSET

Selection Procedure

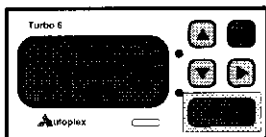
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



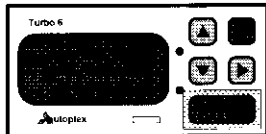
Step 2

Press the cursor keys (arrow keys) to select the above special function number on the display. The up - down arrows will change digits signs and decimal points. The right arrow will select the next digit.



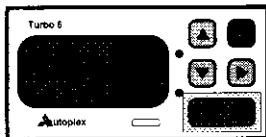
Step 3

Press ENTER - This will show the existing special function value. The user may modify this value using the arrow keys if required.



Step 4

Press PGM/RUN - The Instrument will now program the new special function value selected and restart normal operation.



Special Function Details

This special function will program the user offset as required. The offset range is from -19999 through 00.00 to +19999. The default value is 00.00. All offsets are relative to the values shown on the instrument display.

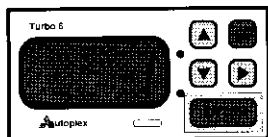
EXAMPLE : The display = 35.66 and is required to indicate 50.00, the user simply enters 14.34 with special function 1 as described above. All displayed values will now be offset by +14.34.

PROGRAM USER SPAN MULTIPLIER

Selection Procedure

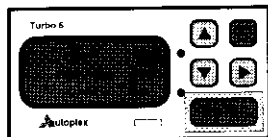
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



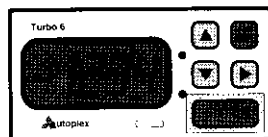
Step 2

Press the cursor keys (arrow keys) to select the above special function number on the display. The up - down arrows will change digits signs and decimal points. The right arrow will select the next digit.



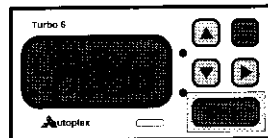
Step 3

Press ENTER - This will show the existing special function value. The user may modify this value using the arrow keys if required.



Step 4

Press PGM/RUN - The instrument will now program the new special function value selected and restart normal operation.



Special Function Details

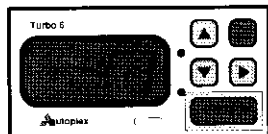
This special function will program the user span multiplier as required. The range is from 00.01 to +19999. The default value is 1.00. The span multiplier is relative to the values shown on the instrument display. EXAMPLE: The display = 5.32 and is required to indicate 10.64, the user simply enters 2.00 with this special function as described above. All displayed values will now be multiplied by 2.

PROGRAM USER SPAN DIVISOR

Selection Procedure

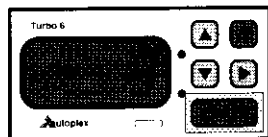
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



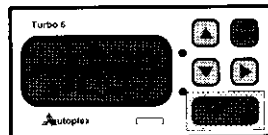
Step 2

Press the cursor keys (arrow keys) to select the above special function number on the display. The up - down arrows will change digits signs and decimal points. The right arrow will select the next digit.



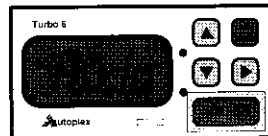
Step 3

Press ENTER - This will show the existing special function value. The user may modify this value using the arrow keys if required.



Step 4

Press PGM/RUN - The Instrument will now program the new special function value selected and restart normal operation.



Special Function Details

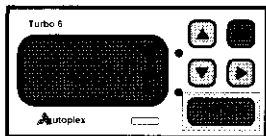
This special function will program the user span divisor as required. The range is from 00.01 to +19999. The default value is 01.00 . The span divisor is relative to the values shown on the instrument display. EXAMPLE : The display = 9.33 and is required to indicate 3.11 , the User simply enters 3.00 with this special function as described above. All displayed values will now be divided by 3 .

PROGRAM SETPOINT No. 1 HYSTERESIS

Selection Procedure

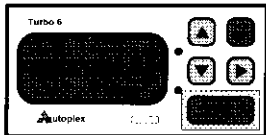
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



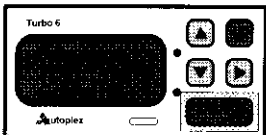
Step 2

Press the cursor keys (arrow keys) to select the above special function number on the display. The up - down arrows will change digits signs and decimal points. The right arrow will select the next digit.



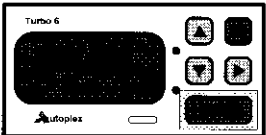
Step 3

Press ENTER - This will show the existing special function value. The user may modify this value using the arrow keys if required.



Step 4

Press PGM/RUN - The instrument will now program the new special function value selected and restart normal operation.



Special Function Details

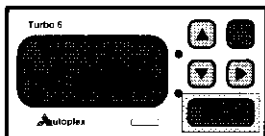
This special function will program the hysteresis of the unimeters setpoint No. 1. The range of values are limited from 0 to 100 % of the setpoint value and can only be entered in integers. Example: Setpoint No. 1= 240.00, setpoint No. 1 hysteresis = 10%. The setpoint will be energized when the input reaches 240.01 and de-energized when the input falls to 216.00.

PROGRAM SETPOINT No. 2 HYSTERESIS

Selection Procedure

Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



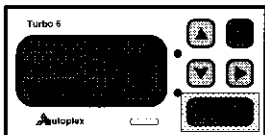
Step 2

Press the cursor keys (arrow keys) to select the above special function number on the display. The up - down arrows will change digits signs and decimal points. The right arrow will select the next digit.



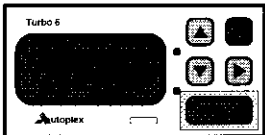
Step 3

Press ENTER - This will show the existing special function value. The user may modify this value using the arrow keys if required.



Step 4

Press PGM/RUN - The instrument will now program the new special function value selected and restart normal operation.



Special Function Details

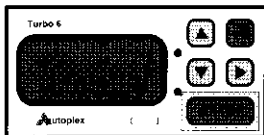
This special function will program the hysteresis of the Unimeters setpoint No. 2. The range of values are limited from 0 to 100 % of the setpoint value and can only be entered in integers. Example: Setpoint No. 2= 320.00, setpoint No. 2 hysteresis = 50%. The setpoint will be energized when the input reaches 320.01 and de-energized when the input falls to 160.00.

PROGRAM SETPOINT 1

Selection Procedure

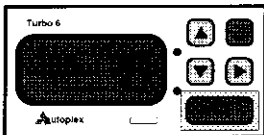
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



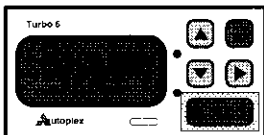
Step 2

Press the cursor keys (arrow keys) to select the above special function number on the display. The up - down arrows will change digits signs and decimal points. The right arrow will select the next digit.



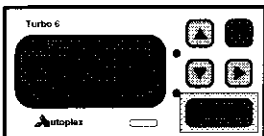
Step 3

Press ENTER - This will show the existing special function value. The user may modify this value using the arrow keys if required.



Step 4

Press PGM/RUN - The instrument will now program the new special function value selected and restart normal operation.



Special Function Details

This special function will program the value of setpoint number 1. The range is from -19999 through 00.00 to +19999. The default value is 19999. The setpoint relays will be energised when the measured value exceeds the setpoint value. De-energisation takes place when the measured value falls 1% below the setpoint value. (see special function No. 241)

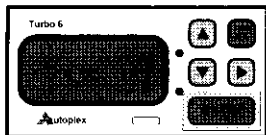
EXAMPLE: Setpoint 1 = 100.0, relay 1 turns on at 100.01 and off at 99.0

PROGRAM SETPOINT 2

Selection Procedure

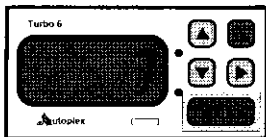
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



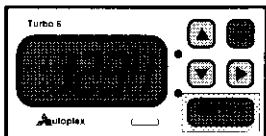
Step 2

Press the cursor keys (arrow keys) to select the above special function number on the display. The up - down arrows will change digits signs and decimal points. The right arrow will select the next digit.



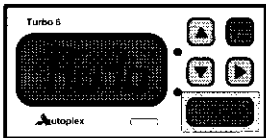
Step 3

Press ENTER - This will show the existing special function value. The user may modify this value using the arrow keys if required.



Step 4

Press PGM/RUN - The Instrument will now program the new special function value selected and restart normal operation.



Special Function Details

This special function will program the value of setpoint number 2. The range is from -19999 through 00.00 to +19999. The default value is 19999. The setpoint relays will be energised when the measured value exceeds the setpoint value. De-energisation takes place when the measured value falls 1% below the setpoint value.(see special function No. 240)

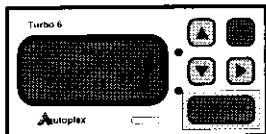
EXAMPLE: Setpoint 2 = 100.0, relay 2 turns on at 100.01 and off at 99.0

Selection of the above function will configure the Instrument as a dc volt meter with an input range of 0 to 2 vdc. The display will indicate +/- 0 - 199.99 and may be modified to any desired range by special functions 1, 2, and 3.

Selection Procedure

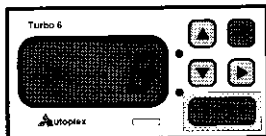
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



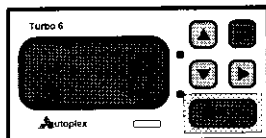
Step 2

Press the cursor keys (arrow keys) to select the above function number on the display. The up - down arrows will change digits, signs and decimal points. The right arrow will select the next digit.



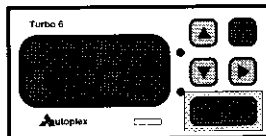
STEP 3

Press ENTER - This will confirm the selection made and flash the first active digit again. At this point the user may re-select another function by repeating steps 2 and 3.



STEP 4

Press PGM/RUN - The Instrument will now initialise and execute the selected function.



Auxiliary Functions

User Offset : +/- full scale
 User Span Multiplier : full scale
 User Span Divisor : full scale

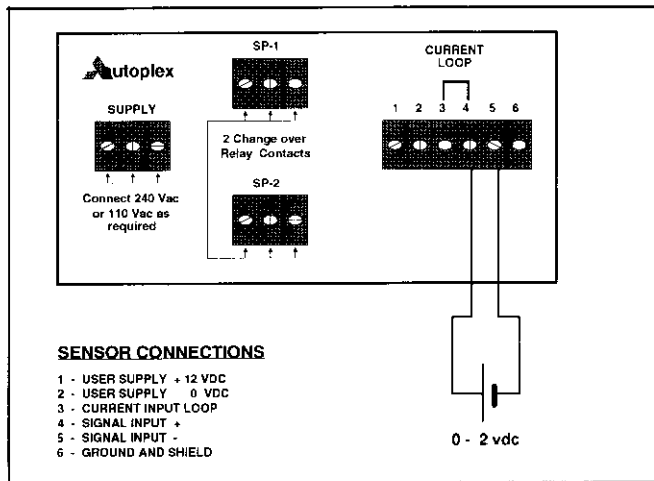
Setpoint 1 Range : +/- full scale
 Setpoint 2 Range : +/- full scale
 User Power Supply : 12 vdc

voltmeter 0 - 2 vdc

ELECTRICAL SPECIFICATIONS

Supply :	110 vac / 240 vac
Input Format :	.volts dc
Input Range :	0 - 2 vdc
Input Impedance :	1000 kohms
Input Overrange :	600 % continuous
Input Conversion :	quad slope/dual referenced, 14.5 bits
Conversion Response :	typically 20 ms
Accuracy :	+/- 0.1 %
Resolution :	20.5 bits
Auto Recalibration :	approx. every 10 seconds
Setpoints :	2 relays, 3 amp change over contacts
Display Range :	00.00 to +/- 19999
User Power Supply :	12 vdc, 50 ma

CONNECTION DIAGRAM

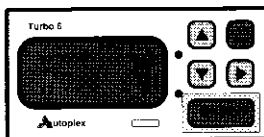


Selection of the above function will configure the instrument as a dc ammeter with an input range of 0 to 20 mADC. The display will indicate +/- 0 - 199.99 but may be modified to any desired range by special functions 1, 2, and 3.

Selection Procedure

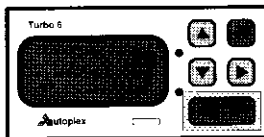
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



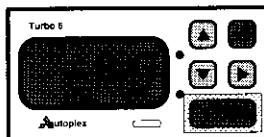
Step 2

Press the cursor keys (arrow keys) to select the above function number on the display. The up - down arrows will change digits, signs and decimal points. The right arrow will select the next digit.



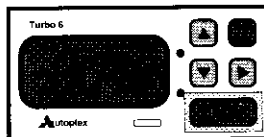
STEP 3

Press ENTER - This will confirm the selection made and flash the first active digit again. At this point the user may re-select another function by repeating steps 2 and 3.



STEP 4

Press PGM/RUN - The Instrument will now initialise and execute the selected function.



Auxiliary Functions

User Offset :	+/- full scale	Setpoint 1 Range :	+/- full scale
User Span Multiplier :	full scale	Setpoint 2 Range :	+/- full scale
User Span Divisor :	full scale	User Power Supply :	12 vdc

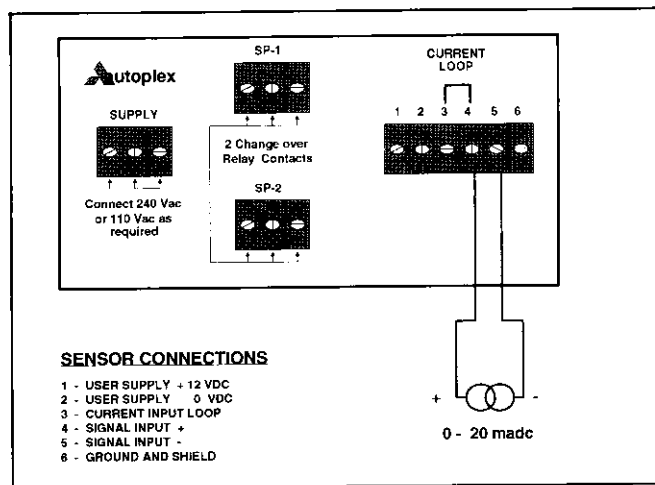
ammeter 0 - 20 ma

ELECTRICAL SPECIFICATIONS

Supply :	110 vac / 240 vac
Input Format :	milli-amps dc
Input Range :	0 - 20 macc
Input Impedance :	100 ohms
Input Overrange :	300 % continuous
Input Conversion :	quad slope/dual referenced, 14.5 bits
Conversion Response :	typically 20 ms
Accuracy :	+/- 0.1 %
Resolution :	20.5 bits
Auto Recalibration :	approx. every 10 seconds
Setpoints :	2 relays, 3 amp change over contacts
Display Range :	00.00 to +/- 19999
User Power Supply :	12 vdc, 50 ma

NOTE: Current Loop between terminals 3 and 4 must be connected for this function !

CONNECTION DIAGRAM

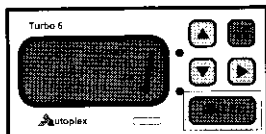


Selection of the above function will configure the Instrument as a dc ammeter with an input range of 4 to 20 mADC. The display will indicate +/- 0 - 199.99 but may be modified to any desired range by special functions 1, 2, and 3.

Selection Procedure

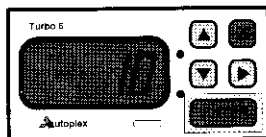
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



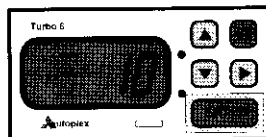
Step 2

Press the cursor keys (arrow keys) to select the above function number on the display. The up - down arrows will change digits, signs and decimal points. The right arrow will select the next digit.



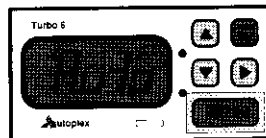
STEP 3

Press ENTER - This will confirm the selection made and flash the first active digit again. At this point the user may re-select another function by repeating steps 2 and 3.



STEP 4

Press PGM/RUN - The Instrument will now initialise and execute the selected function.



Auxiliary Functions

User Offset :	+/- full scale	Setpoint 1 Range :	+/- full scale
User Span Multiplier :	full scale	Setpoint 2 Range :	+/- full scale
User Span Divisor :	full scale	User Power Supply :	12 vdc

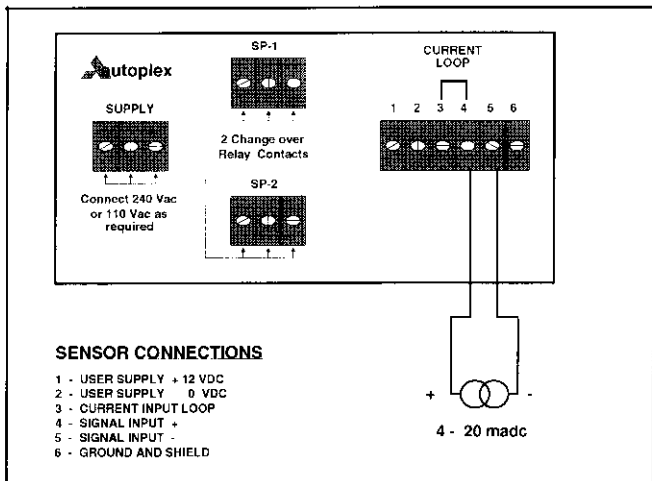
ammeter 4 - 20 ma

ELECTRICAL SPECIFICATIONS

Supply :	110 vac / 240 vac
Input Format :	milli-amps dc
Input Range :	4 - 20 madc
Input Impedance :	100 ohms
Input Overrange :	600 % continuous
Input Conversion :	quad slope/dual referenced, 14.5 bits
Conversion Response :	typically 20 ms
Accuracy :	+/- 0.1 %
Resolution :	20.5 bits
Auto Recalibration :	approx. every 10 seconds
Setpoints :	2 relays, 3 amp change over contacts
Display Range :	00.00 to +/- 19999
User Power Supply :	12 vdc, 50 ma

NOTE: Current Loop between terminals 3 and 4 must be connected for this function !

CONNECTION DIAGRAM

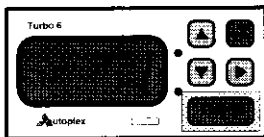


Selection of the above function will configure the instrument as a rate monitor. The display will indicate rate per minute but may be modified to any desired engineering units by special functions 1, 2, and 3.

Selection Procedure

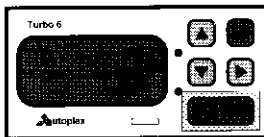
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



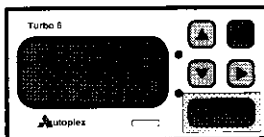
Step 2

Press the cursor keys (arrow keys) to select the above function number on the display. The up - down arrows will change digits, signs and decimal points. The right arrow will select the next digit.



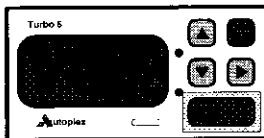
STEP 3

Press ENTER - This will confirm the selection made and flash the first active digit again. At this point the user may re-select another function by repeating steps 2 and 3.



STEP 4

Press PGM/RUN - The Instrument will now initialise and execute the selected function.



Auxiliary Functions

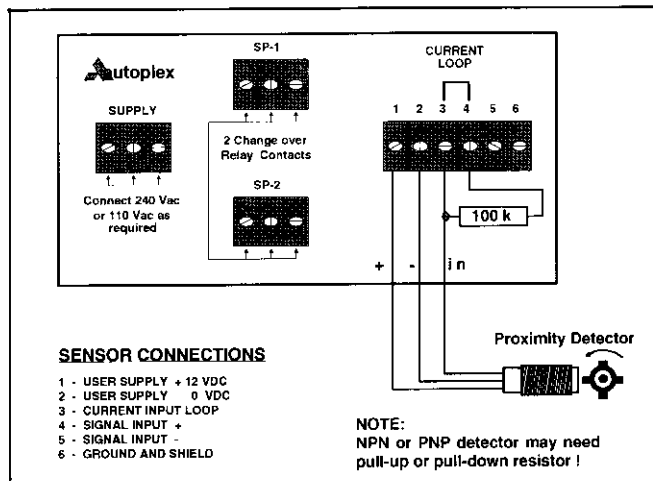
User Offset :	+/- full scale	Setpoint 1 Range :	+/- full scale
User Span Multiplier :	full scale	Setpoint 2 Range :	+/- full scale
User Span Divisor :	full scale	User Power Supply :	12 vdc

rate monitor

ELECTRICAL SPECIFICATIONS

Supply :	110 vac / 240 vac
Input Format :	volts
Input Range :	+/- 5 vdc
Input Impedance :	100 kohms
Accuracy :	+/- 0.01
Setpoints :	2 relays, 3 amp change over contacts
Display Range :	00.00 to +/- 19999
User Power Supply :	12 vdc, 50 ma

CONNECTION DIAGRAM

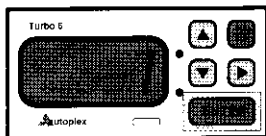


Selection of the above function will configure the Instrument as an inverse rate or period monitor. The display will indicate the period in milli seconds but may be modified to any desired engineering units by special functions 1, 2, and 3.

Selection Procedure

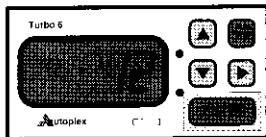
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



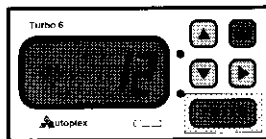
Step 2

Press the cursor keys (arrow keys) to select the above function number on the display. The up - down arrows will change digits, signs and decimal points. The right arrow will select the next digit.



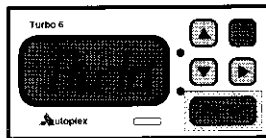
STEP 3

Press ENTER - This will confirm the selection made and flash the first active digit again. At this point the user may re-select another function by repeating steps 2 and 3.



STEP 4

Press PGM/RUN - The Instrument will now initialise and execute the selected function.



Auxiliary Functions

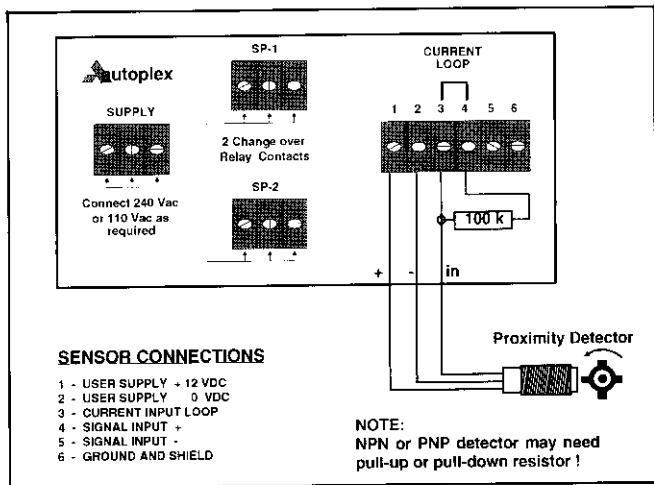
User Offset :	+/- full scale	Setpoint 1 Range :	+/- full scale
User Span Multiplier :	full scale	Setpoint 2 Range :	+/- full scale
User Span Divisor :	full scale	User Power Supply :	12 vdc

period monitor (milli seconds)

ELECTRICAL SPECIFICATIONS

Supply :	110 vac / 240 vac
Input Format :	volts
Input Range :	+/- 5 vdc
Input Impedance :	100 kohms
Accuracy :	+/- 0.01
Setpoints :	2 relays, 3 amp change over contacts
Display Range :	00.00 to +/- 19999
User Power Supply :	12 vdc, 50 ma

CONNECTION DIAGRAM

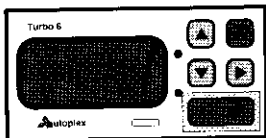


Selection of the above function will configure the Instrument as an inverse rate or period monitor. The display will indicate the period in seconds but may be modified to any desired engineering units by special functions 1, 2, and 3.

Selection Procedure

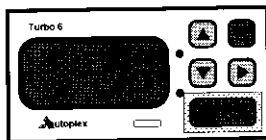
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



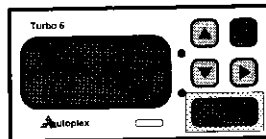
Step 2

Press the cursor keys (arrow keys) to select the above function number on the display. The up - down arrows will change digits, signs and decimal points. The right arrow will select the next digit.



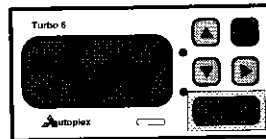
STEP 3

Press ENTER - This will confirm the selection made and flash the first active digit again. At this point the user may re-select another function by repeating steps 2 and 3.



STEP 4

Press PGM/RUN - The Instrument will now initialise and execute the selected function.



Auxiliary Functions

User Offset : +/- full scale

User Span Multiplier : full scale

User Span Divisor : full scale

Setpoint 1 Range : +/- full scale

Setpoint 2 Range : +/- full scale

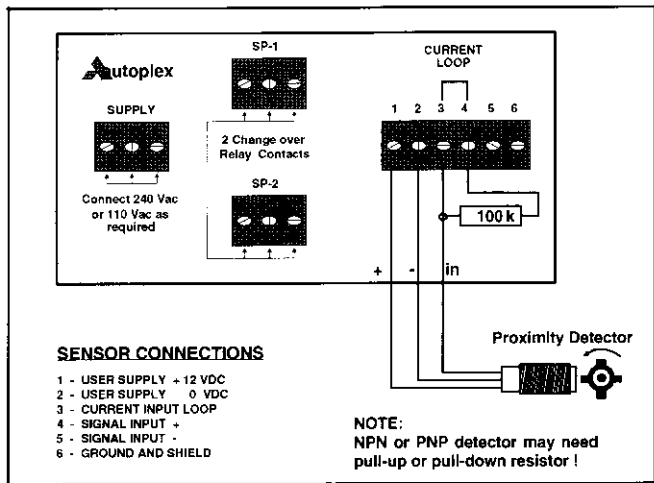
User Power Supply : 12 vdc

period monitor (seconds)

ELECTRICAL SPECIFICATIONS

Supply :	110 vac / 240 vac
Input Format :	volts
Input Range :	+/- 5 vdc
Input Impedance :	100 kohms
Accuracy :	+/- 0.01
Setpoints :	2 relays, 3 amp change over contacts
Display Range :	00.00 to +/- 19999
User Power Supply :	12 vdc, 50 ma

CONNECTION DIAGRAM

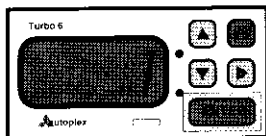


Selection of the above function will configure the Instrument as a temperature meter with an LM 35 input sensor. The display will indicate temperature in degrees C but may be modified to any desired range by special functions 1, 2, and 3.

Selection Procedure

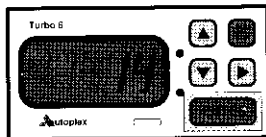
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



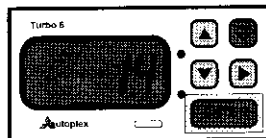
Step 2

Press the cursor keys (arrow keys) to select the above function number on the display. The up - down arrows will change digits, signs and decimal points. The right arrow will select the next digit.



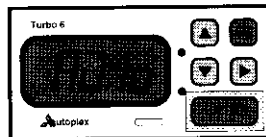
STEP 3

Press ENTER - This will confirm the selection made and flash the first active digit again. At this point the user may re-select another function by repeating steps 2 and 3.



STEP 4

Press PGM/RUN - The Instrument will now initialise and execute the selected function.



Auxiliary Functions

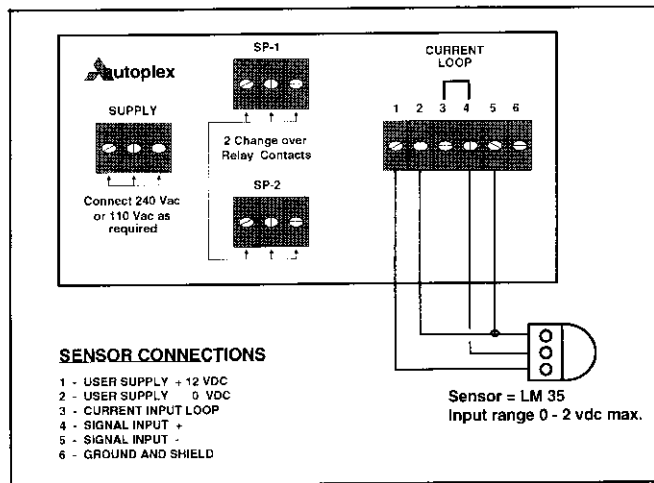
User Offset :	+/- full scale	Setpoint 1 Range :	+/- full scale
User Span Multiplier :	full scale	Setpoint 2 Range :	+/- full scale
User Span Divisor :	full scale	User Power Supply :	12 vdc

temperature meter

ELECTRICAL SPECIFICATIONS

Supply :	110 vac / 240 vac
Input Format :	volts dc
Input Range :	0 - 2 vdc
Input Impedance :	1000 kohms
Input Overrange :	600 % continuous
Input Conversion :	quad slope/dual referenced, 14.5 bits
Conversion Response :	typically 20 ms
Accuracy :	+/- 0.1 %
Resolution :	20.5 bits
Auto Recalibration :	approx. every 10 seconds
Setpoints :	2 relays, 3 amp change over contacts
Display Range :	00.00 to +/- 19999
User Power Supply :	12 vdc, 50 ma

CONNECTION DIAGRAM

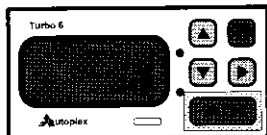


Selection of the above function will configure the Instrument as dc volt meter with an input range of 0 to 2 vdc. The user may increase or decrease the displayed value by pressing the INC and DEC keys. This procedure will establish new span calibration values for the instrument. Press PROG/RUN twice to reprogram other functions.

Selection Procedure

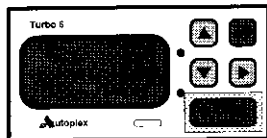
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



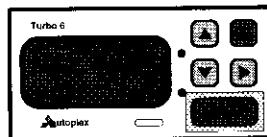
Step 2

Press the cursor keys (arrow keys) to select the above function number on the display. The up - down arrows will change digits, signs and decimal points. The right arrow will select the next digit.



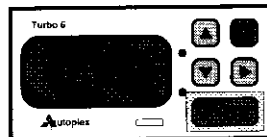
STEP 3

Press ENTER - This will confirm the selection made and flash the first active digit again. At this point the user may re-select another function by repeating steps 2 and 3.



STEP 4

Press PGM/RUN - The Instrument will now initialise and execute the selected function.



Auxiliary Functions

User Offset : +/- full scale
 User Span Multiplier : full scale
 User Span Divisor : full scale

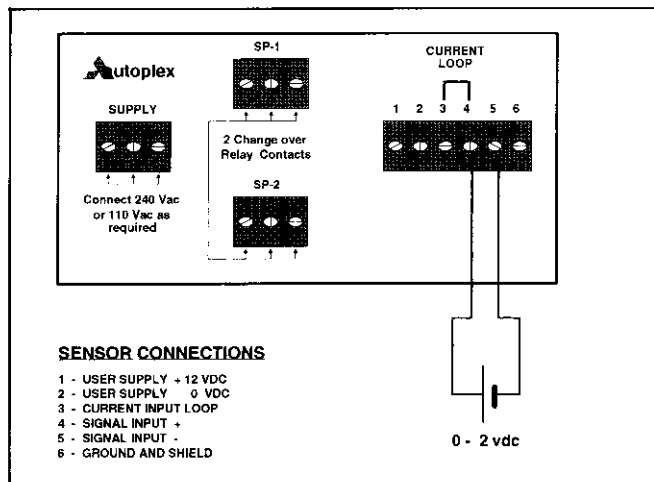
Setpoint 1 Range : +/- full scale
 Setpoint 2 Range : +/- full scale
 User Power Supply : 12 vdc

span calibration

ELECTRICAL SPECIFICATIONS

Supply :	110 vac / 240 vac
Input Format :	volts dc
Input Range :	0 - 2 vdc
Input Impedance :	1000 kohms
Input Overrange :	600 % continuous
Input Conversion :	quad slope/dual referenced, 14.5 bits
Conversion Response :	typically 20 ms
Accuracy :	+/- 0.1 %
Resolution :	20.5 bits
Auto Recalibration :	approx. every 10 seconds
Setpoints :	2 relays, 3 amp change over contacts
Display Range :	00.00 to +/- 19999
User Power Supply :	12 vdc, 50 ma

CONNECTION DIAGRAM

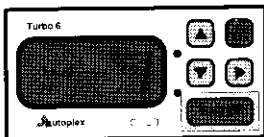


PROGRAM COLD JUNCTION OFFSET

Selection Procedure

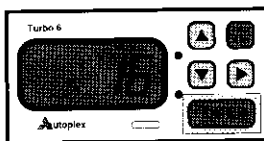
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



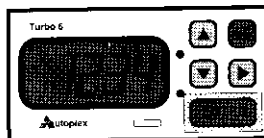
Step 2

Press the cursor keys (arrow keys) to select the above special function number on the display. The up - down arrows will change digits signs and decimal points. The right arrow will select the next digit.



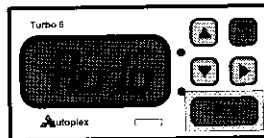
Step 3

Press ENTER - This will show the existing special function value. The user may modify this value using the arrow keys if required.



Step 4

Press PGM/RUN - The Instrument will now program the new special function value selected and restart normal operation.



Special Function Details

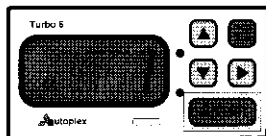
This special function will program the cold junction offset for the Turbo Kelvin meter. The range is from 0.00 to 2.50 degrees centigrade. The standard factory setting is 1.00 but is automatically offset to have no effect. The user can thus offset the cold junction temperature from -1.00 degree (enter 0.00) to + 1.50 (enter 1.50).

PROGRAM COLD JUNCTION SPAN

Selection Procedure

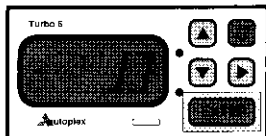
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



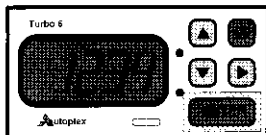
Step 2

Press the cursor keys (arrow keys) to select the above special function number on the display. The up - down arrows will change digits signs and decimal points. The right arrow will select the next digit.



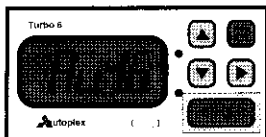
Step 3

Press ENTER - This will show the existing special function value. The user may modify this value using the arrow keys if required.



Step 4

Press PGM/RUN - The Instrument will now program the new special function value selected and restart normal operation.



Special Function Details

This special function will program the cold junction span for the Turbo Kelvin meter. The range is from 0.01 to 2.55. The standard factory setting is 1.00 .

installation

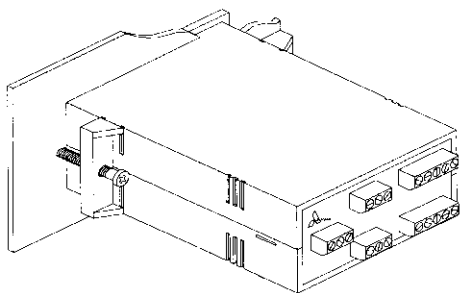
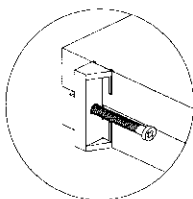
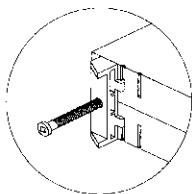
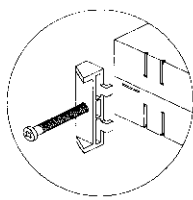
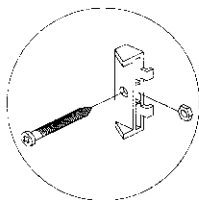
The Turbo 6 and Turbo Kelvin Instruments should be installed generally as per the detailed sketches below. It is important that the panel cut-out be a relative good fit to ensure that the dust and water proofing membrane (if used) will create a good seal to avoid ingress of dust and water to the Instrument.

Care should be taken when fastening the instrument to the panel. The two fixing screws must not be over tightened to guarantee a good seal and prevent damage.

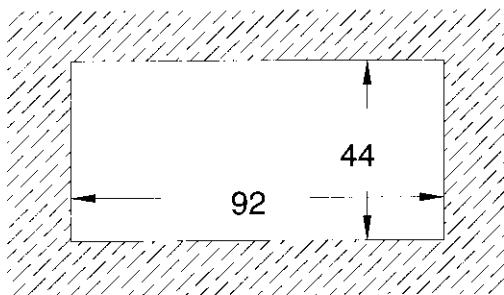
All electrical connections should be made as per the circuit diagrams in the Function literature in this manual.

Turbo 6 and Turbo Kelvin are ready for operation once installed and connected. However, if the Instruments are employed to measure small analog signals, the User should allow the Instruments 10 minutes to warm up and stabilize before programming any span or offset modifications.

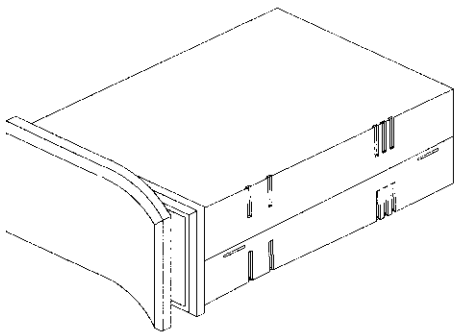
ASSEMBLY OF CLAMPING MECHANISM



PANEL CUT-OUT



DUST AND WATER MEMBRANE



errors and calibration

error 1-

This error message appears when the user has entered incorrect values. Remedy - The user should re-enter new values taking care not to program unwanted decimal points etc.

error 2-

When programming and entering new values like span, offset or setpoints, there exists a small potential for corrupting the previously stored data if power to the Turbo 6 meter is lost. This will result in an error 2 message being displayed .

To recover from this error, the user should simply turn off power to the instrument, press and hold the ENTER and PGM/RUN buttons simultaneously and turn on power.

This will result in re-programming standard values into the meter. The user can now calibrate the span of the instrument by exercising function 15. The value displayed by function 15 should be modified to indicate real voltage as measured by a voltage standard. The procedure will result in and automatic span calibration for all of the instruments linear functions and modes. Suggested calibration value for the Turbo 6 meter is 2 vdc and 50 mvdc for the Turbo Kelvin instrument.

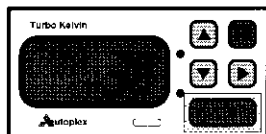
function number 30-37, 40-47

Selection of the above functions will configure the instrument as a temperature monitor for thermocouples. Page 22A shows the connection diagram and the function numbers for a selection of thermocouple types. (Model Turbo Kelvin only !)

Selection Procedure

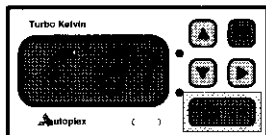
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



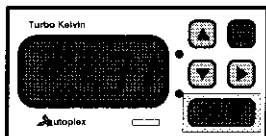
Step 2

Press the cursor keys (arrow keys) to select the above function number on the display. The up - down arrows will change digits, signs and decimal points. The right arrow will select the next digit.



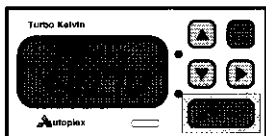
STEP 3

Press ENTER - This will confirm the selection made and flash the first active digit again. At this point the user may re-select another function by repeating steps 2 and 3.



STEP 4

Press PGM/RUN - The Instrument will now initialise and execute the selected function.



Auxiliary Functions

User Offset : +/- full scale
User Span Multiplier : full scale
User Span Divisor : full scale

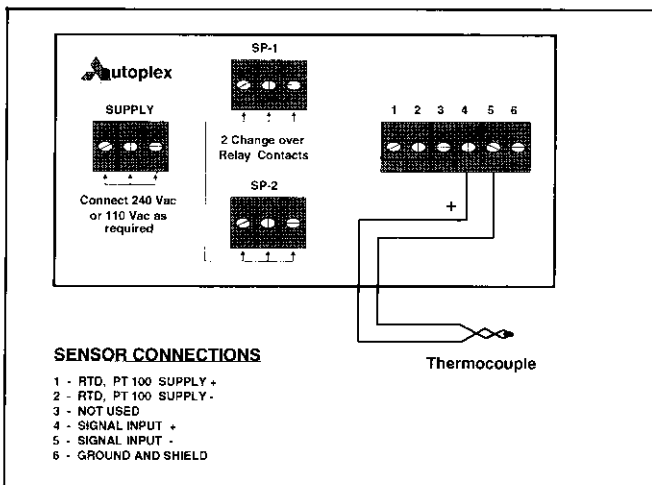
Setpoint 1 Range : +/- full scale
Setpoint 2 Range : +/- full scale
User Power Supply : N.A.

thermocouple meter

Thermocouple Type and Function Numbers

Type B (degrees C)	function 30
Type B (degrees F)	function 40
Type E (degrees C)	function 31
Type E (degrees F)	function 41
Type J (degrees C)	function 32
Type J (degrees F)	function 42
Type K (degrees C)	function 33
Type K (degrees F)	function 43
Type N (degrees C)	function 34
Type N (degrees F)	function 44
Type R (degrees C)	function 35
Type R (degrees F)	function 45
Type S (degrees C)	function 36
Type S (degrees F)	function 46
Type T (degrees C)	function 37
Type T (degrees F)	function 47

CONNECTION DIAGRAM

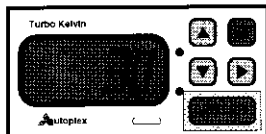


Selection of the above functions will configure the instrument as a temperature monitor for RTD type PT 100 sensors. The sensor may be connected in a 2, 3, or 4 wire configuration as required. (Model Turbo Kelvin only !)

Selection Procedure

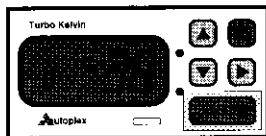
Step 1

Press PGM/RUN - The instrument will beep 3 times display the last selected function and flash the active digit.



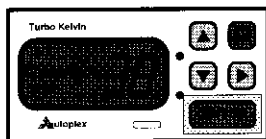
Step 2

Press the cursor keys (arrow keys) to select the above function number on the display. The up - down arrows will change digits, signs and decimal points. The right arrow will select the next digit.



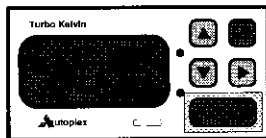
STEP 3

Press ENTER - This will confirm the selection made and flash the first active digit again. At this point the user may re-select another function by repeating steps 2 and 3.



STEP 4

Press PGM/RUN - The Instrument will now initialise and execute the selected function.



Auxiliary Functions

User Offset : +/- full scale
 User Span Multiplier : full scale
 User Span Divisor : full scale

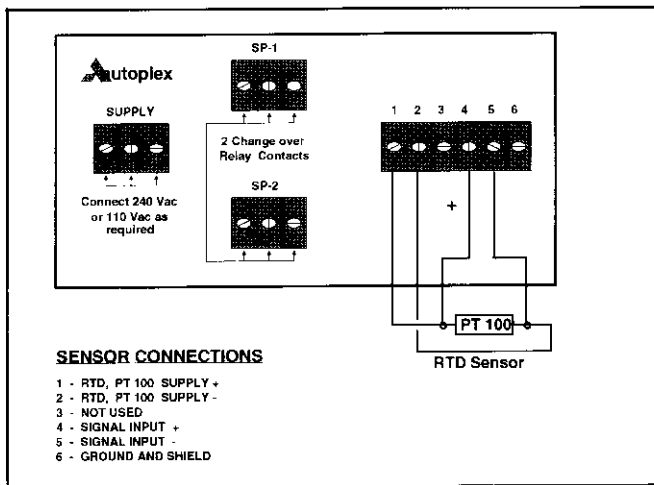
Setpoint 1 Range : +/- full scale
 Setpoint 2 Range : +/- full scale
 User Power Supply : N.A.

temperature meter, PT 100

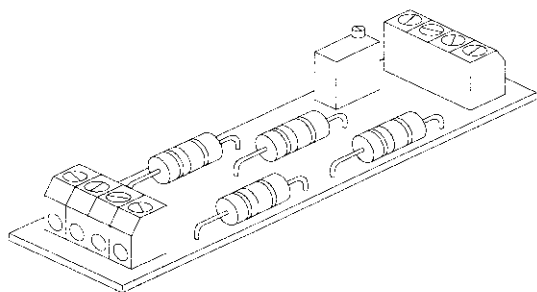
Type and Function Numbers

Type PT 100 (degrees C)	function 38
Type PT 100 (degrees F)	function 48

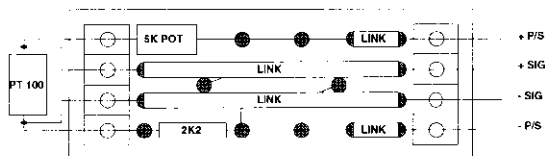
CONNECTION DIAGRAM



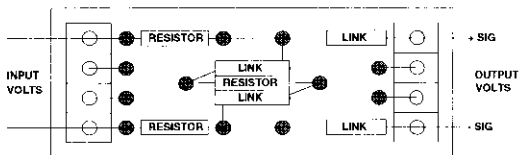
AB 200 assembly board



AB 200 external assembly board



TYPICAL ARRANGEMENT FOR 4 WIRE RTD CONNECTIONS



TYPICAL ARRANGEMENT FOR HIGH TO LOW VOLTAGE CONNECTIONS

hot - keys

These are keys or buttons used to facilitate short-cut functions via the membrane key board of the Turbo meters. Complex functions can be achieved with ease and speed by pressing a combination of keys.

TARE -

Holding down the shift right arrow key and pressing the PGM/RUN key will tare the instrument. (Meter will display zero following this procedure.) The keys should only be depressed until the first beep sounds.

ANTI-TARE -

Holding down the down arrow key and pressing the PGM/RUN key will reverse the above tare procedure. Turbo 6 will again display the full measured value.

SHIFT DECIMAL POINT -

Holding down the up arrow key and pressing the PROG/RUN key will toggle the decimal point from two decimal places to one decimal place and back again. This feature allows the user to increase or decrease display resolution.