Calibration in measurement technology and metrology is the comparison of measurement values delivered by a device under test with those of a calibration standard of known accuracy. Such a standard could be another measurement device of known accuracy, a device generating the quantity to be measured such as a voltage, current and resistance.

Scientech 2478 Calibration and Measuring Instrument Workbench is an industrial grade workbench that allows the user to perform instrument calibration and testing applications in one workspace. This workbench is used to measure & test electrical, pressure, temperature and loop signals. Scientech 2478 calibration and measuring instrument workbench contains MSO, Digital multi meter, DC Power Supply, DC source (0-10V DC and 0-20mA DC), milliampere (mA) display, temperature display, AC voltmeter, AC ammeter, energy meter, digital pressure gauge, electronic pressure gauge, pressure vessel, tachometer, electronic thermometer, universal calibrator, loop calibrator, RTD and temperature bath. There are a wide range of experiments that can be performed on the platform.

Features

- Universal calibrator and loop calibrator for calibration.
- Temperature display, industrial temperature sensor (RTD), electronic thermometer, and milliampere (mA) display.
- On panel DC power supply and DC source (0-10V DC, 0-20mA DC).
- On panel measuring instrument like DC voltmeter, DC ammeter, energy meter, and digital multi meter.
- DC geared motor with tachometer for RPM measurement.
- Pressure gauge with digital and mA output.
- On board temperature display, current display.
- Temperature bath for water.
- Heavy duty workbench.
- Self contained and easy to operate.
- System frame with caster wheel arrangement for ease in moment.
- Practice troubleshooting skills.
- Enhanced electrical safety considerations.

Scope of Learning

Study and use of :

- Digital and electronic (mA output) pressure gauge.
- DC source (voltage 0-10V DC and current 4 - 20mA DC) and current display.
- DC motor and tachometer for RPM measurement.
- Temperature measurement using RTD sensor and temperature display in temperature bath.
- Characteristics of RTD sensor.
- Temperature measurement using electronic thermometer (IR) in temperature bath.
- AC voltmeter, AC ammeter and energy meter with lamp load.
- Universal calibrator in source and measure mode.
- Loop calibrator in source and measure mode.

Mechanical Specifications

WorkBench is ergonomically designed and suitable for a batch of 3 students.

Frame: Cold rolled seamless 18G rectangle tube sections; rust preventive coat and powder coating.

Work area: 18mm board with lamination.

Storage drawers with the following facilities-

- Telescopic with locking facility.
- Place in drawers for meters, patch cords, components and other accessories for storage, easy identification and access.
- MCB for On/Off control and over load protection.
- Modular design for instruments removal and maintenance.
- Power indicator, On/Off control, circuit breaker of rating 6Amp with On/Off control and with over load protection.

Technical Specifications

Energy meter

Voltage range	:	0-440V AC
Current range	:	0-5 Ampere
Watt range	:	1000W

DC Power Supply

DC output	:	0-30 V, 2A
Current limit	:	0-2A
Setting resolution	:	Voltage: 100 mV
		Current: 10 mA
Internal resistance	:	$\leq 10\ m\Omega$
Load regulation	:	$\pm (0.05\ \% +10\ mV)$
Line regulation	:	$\pm (0.05\ \% +10\ mV)$
Temperature coefficient	:	$\pm (0.05\ \% + 5\ mV/^{0}C)$
Ripple & noise	:	$\leq 1\ mV$
Display	:	3 digit 7-segment LED indicator for voltage and current
Accuracy	:	$\pm (1\% + 1\ digit)$
Over range indication	:	Glowing 'CC' LED indicates overload

AC voltmeter

Range : 0-440V AC

AC ammeter

Range : 0-25 Ampere

Digital multi meter

Measurement function range

DC voltage : 200mV-1000V

DC current : 200uA-10A

AC voltage (RMS) : 200mV-750V

AC current (RMS) : 20mA-10A

Resistance : 200-100M (2-wire and 4-wire)

Capacitance : 2nF-10000uF

Diode : 2.0V

Continuity : 2k

Temperature bath

Power Supply : 230V AC

Heater : 1000watt

Temperature display

Display : 4 digit, 7 segment

Keys : 3 nos. for parameter setting

Input type : RTD

Input range : -150 to 850^{0}C

Current display

Display : 4 digit, 7 segment

Keys : 3 nos. for parameter setting

Input type : Current

Input range : 4-20mA

DC source

Supply : 24V DC

Voltage source range : 0-10V DC

Current source range : 0-20mA DC

DC motor

Type : Geared

Supply : 12V DC

RPM : 0-100 RPM

RTD sensor

Type : RTD (PT100)

Wire : 3 wire

Rod length : 6"

Temperature range : (-99-850°C)

Loop calibrator

Source (output) range

Voltage (DC) : 0-11V

Voltage (DC) : 0-110mV

Current (DC) : 0-24mA

Thermocouple (TC)

R type thermocouple : 0-1700^{0}C

S type thermocouple : 0-1600^{0}C

B type thermocouple : 500-1800^{0}C

K type thermocouple : -200-1370^{0}C

E type thermocouple : -200-1000^{0}C

J type thermocouple : -200-1200^{0}C

T type thermocouple : -200-400^{0}C

N type thermocouple : -200-1300^{0}C

RTD : PT100

Measure range

Voltage (DC) : 0-30V

Voltage (DC) : 0-150mV

Resistance : 0-999Ω

Thermocouple (TC)

R type thermocouple : 0-1700^{0}C

S type thermocouple : 0-1600^{0}C

B type thermocouple : 500-1800^{0}C

K type thermocouple : -200-1370^{0}C

E type thermocouple : -200 - 1000^{0}C

J type thermocouple : -200-1200^{0}C

T type thermocouple : -200-400^{0}C

N type thermocouple : -200-1300^{0}C

RTD type thermocouple : -200-850^{0}C

Scale conversion : 0-24mA

Digital pressure gauge

Pressure range : 0-150 Psi

Output : Contact type (COM and NO)

Dial size : 60mm

Electric pressure gauge

Power Supply	:	24V DC
Pressure range	:	0-10 bar
Output	:	4-20mA
Dial size	:	84mm
Thread size	:	¼"

Electronic thermometer

Parameter	:	^{0}C
Measurement range	:	-30-400^{0}C
Resolution	:	0.1^{0}C
Power Supply	:	9V block battery

Digital tachometer

Type	:	Non contact type

Multifunction calibrator

LCD Display	:	5 digits 7 segment

Source and measure range

Voltage (in volts)	:	0-20V DC
Voltage (in mV)	:	0-200mV (DC)
Resistance	:	0-2000Ω
Current	:	0-20mA (DC)
Power Supply	:	9V DC adaptor

Lamp load

Load capacity	:	200 watt (2 bulbs)
Caster wheel	:	4 nos. (2 with lock), 2 (without lock)
Size	:	4"

Mixed Signal Oscilloscope (MSO)

Bandwidth	:	50MHz
Channels	:	4 nos.
Max sample rate	:	1GSa/s (single-channel), 500MSa/s (dual-channel), 250MSa/s (three/four-channel) Digital channel MSO : 1 GSa/s (8-channel), 500 MSa/s (16-channel)

MCB

Supply	:	230V AC
Current	:	16Ampere

Pressure vessel

Range	:	100psi (maximum)

Safety valve

Range	:	100psi (maximum)

Air compressor

Voltage	:	220V AC
Power	:	0.75HP
Pressure range	:	0-110psi
Tank and capacity	:	24 liter

Package contains : (in nos.)

Temperature bath	:	1
Lamp load box	:	1
Bulb	:	2 (100watt)
Universal calibrator	:	1
Loop calibrator	:	1
Electronic thermometer	:	1
Tachometer	:	1
Air compressor	:	1
PU tube	:	6 feet
Drawer lock key	:	3
4mm red patch cord 16"	:	4
4mm black patch cord 16"	:	4
4mm yellow patch cord 16"	:	4
4mm red patch cord 40"	:	5
4mm black patch cord 40"	:	5
Allen key 5mm	:	1
DSO test probe	:	1
Multi meter probe	:	1
4mm red patch cord 40"	:	6 (1-3 output)
4mm black patch cord 40"	:	6 (1-3 output)