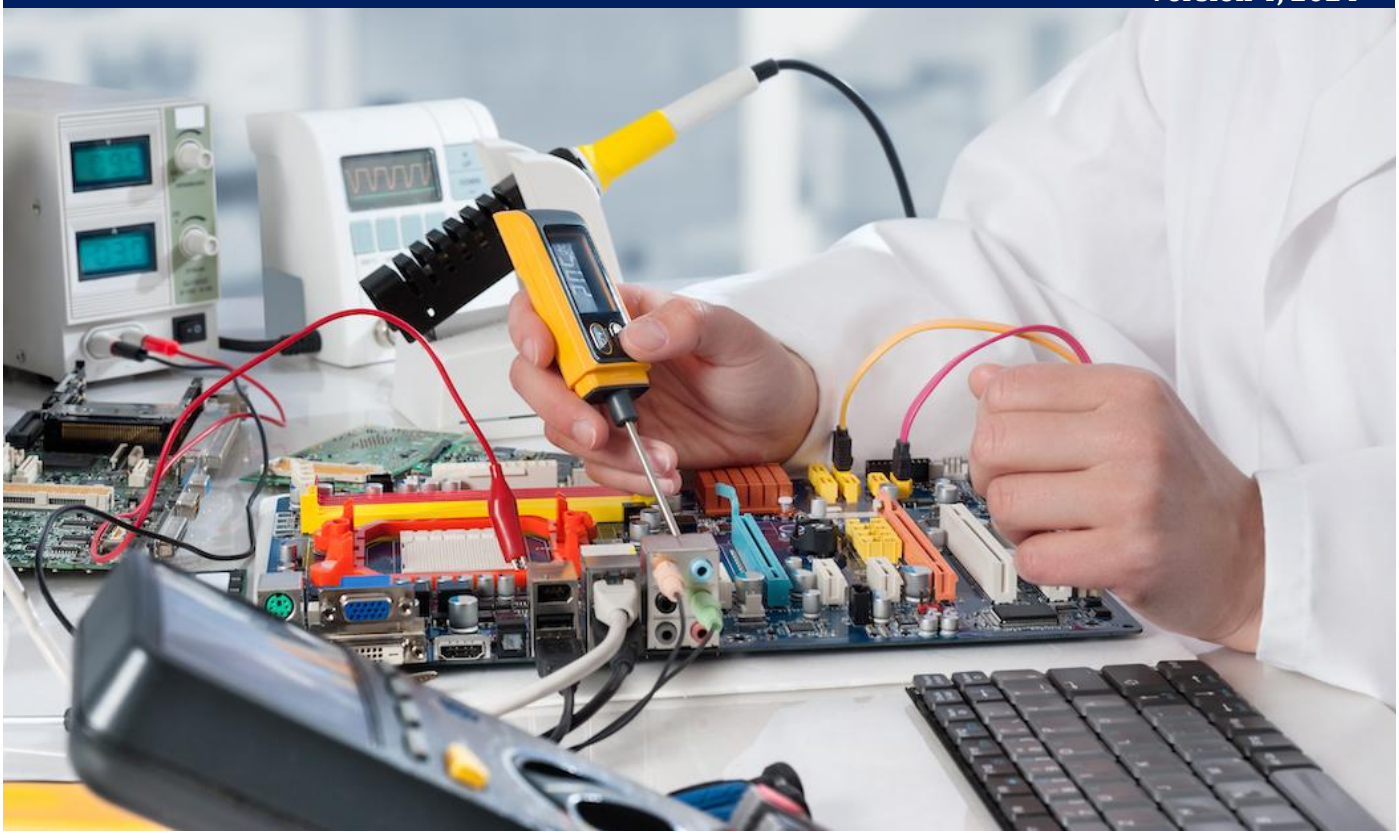
Government of Maharashtra

Directorate of Vocational Education and Training

Craftsman Training Scheme

SPECIFICATION FOR
ELECTRICAL AND ELECTRONICS TOOLS AND EQUIPMENTS

Version 4, 2024



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1 Anti Static Pads - 2 X 3 Feet

1.1 Basic Indicative Diagram

1.2 Two layers
1.3 Thickness - 1.5 mm
1.4 Color - Blue/ Red/ Black/ Green

2 Anti Static Wrist Strap

2.1 Basic Indicative Diagram

2.2 Should be lightweight, flexible and comfortable to wear
2.3 Should be adjustable 1" wide polyethylene wrist strap
2.4 Should have removable 6' ground cord with built-in one megaohm resister
2.5 Should be ESD SAFE and useful to ground all solder iron tips and equipment for better safety
2.6 Flexible Wrist strap should have coiled Cord of 2 meter length
2.7 Should be comfortable to wear and work on any type of Equipment
2.8 Should be suitable to wear for any Semiconductor/ Electrical/ Electronic Services and Repairs
2.9 Should smoothly discharge all static charge

3 Decade Capacitance Box

3.1 Basic Indicative Diagram

3.2	Range:	100pF to 10□F
3.3	Dials:	5 Dials
3.4	Steps:	10 steps in each dial
3.5	Accuracy:	±1%
3.6	Types of resistors:	Low Drift Capacitor
3.7	Output:	4.0 mm plug Terminals

3.8 Should have long life low leaking high voltage polystyrene capacitors mounted on a single PCB by selection of values through silver contact DAP Wafer Switches

4 Decade Inductance Box

4.1 Basic Indicative Diagram

4.2	Range:	100 µH to 10 H
4.3	Dials:	5 Dials
4.4	Steps:	10 steps in each dial
4.5	Accuracy:	±1%
4.6	Type of Inductor:	Potted Ferrite
4.7	Output:	4.0 mm plug Terminals

4.8 Should have Pot Core Type Inductors mounted on a single PCB By Selecting their values through Silver Contact DAP Wafer Switches

5 Decade Resistance Box

5.1 Basic Indicative Diagram

5.2	Range:	1 Ohms to 100K ohms
5.3	Dials:	4/5 Dials
5.4	Steps:	10 steps in each dial
5.5	Accuracy:	±1%
5.6	Type of Resistors:	Resistor (2.5□)
5.7	Output:	4.0 mm plug Terminals

5.8 0°C to 40°C at <70% R.H.

5.9 Should have higher wattage wire wound resisters

5.10 Should have low resistance contact rotary switches

6 Digital Function Generator

6.1 Basic Indicative Diagram

6.2	Waveforms:	Sine, Square, Triangle, Pulse, Ramp etc
6.3	Resolution:	0.1mV Frequency
6.4	Range of Sine Wave:	2 KHz to 5 MHz
6.5	Accuracy:	≤ ±1%
6.6	Output Impedance:	50Ω
6.7	Attenuator:	20dB + 40dB
6.8	DC Offset:	-10V to + 10V
6.9	Display:	Frequency: 4 digits LED Amplitude: 3 digits LED
6.10	Duty Cycle:	from 10% to 90%
6.11	Rise time of Square:	≤ 50 ns
6.12	Frequency Counter	
6.13	Frequency Range:	1 Hz to 20 MHz
6.14	Input Impedance:	≤ 1 MΩ / 20 pF
6.15	Power:	AC 220V, 50 Hz
6.16	Weight:	2.5 Kg. (Appox.)
6.17	Size:	300mm X 250mm X 100mm (±10%)

6.18 Should be supplied with accessories

- 6.18.1 BNC to Alligator Clips
- 6.18.2 Power Cord
- 6.18.3 BNC to BNC cord

7 Digital Line Frequency Indicator

7.1 Basic Indicative Diagram

7.2	Display Range:	0.56” High brightness red LED 5 digit (0~65535)
7.3	Accuracy:	± 0.5% RD at 23° C ± 3° C
7.4	Input Range:	Input 30 ~ 600 V
7.5	Input Frequency:	0 ~ 400 Hz
7.6	Dielectric Strength:	2.0 KV 50/ 60 Hz AC /Min Between Input Power/ Case
7.7	Mounting:	Panel Flush Mounting
7.8	Measurement:	Upto 400Hz
7.9	Dimensions:	96 mm (W) X 48 mm (H) X 100 mm (D)

8 Ammeter - AC - 0 - 1 A, Digital Type

8.1 Basic Indicative Diagram

8.2 Should have Low Back Depth (behind the panel) of less than 40 mm
8.3 The meter should be completely programmable.
8.4 Auxiliary supply: 230 V (60 - 300 AC/ DC)
8.5 Ultra-Bright LED display: 14mm full range display should be possible of 4 digits having maximum count - 9999
8.6 Enclosure Protection for dust and water: Should conforms to IP 50 (front face) as per IEC 60529
8.7 Should Comply with International Safety standard IEC 61010-1- 2010
8.8 EMC Compatibility: Should Comply with International standard IEC 61326 Class B
8.9 Input Current: 0 - 1 A AC
8.10 Max continuous input current: 120% of Nominal value
8.11 Accuracy: (Voltage drop < 600mV) < 0.5% of Display End value ±1 digit for A
8.12 Influence of Variations:
- 8.12.1 Temperature coefficient: 0.05% / °C
- 8.12.2 Zero point drift: 0.025% / °C

8.13 Display:
- 8.13.1 Type: 1 line, 4 digit LED display
- 8.13.2 Display Count Setting: -9999...-10 or +10...+9999 counts
- 8.13.3 Digit Height: 14mm
- 8.13.4 Decimal point position: As per CT Ratio
- 8.13.5 Negative Display indication: '-'
- 8.13.6 Overload Indication: "- oL -" (above 125% of nominal value)

8.14 Auxiliary Supply: 230 V AC (60 - 300 AC/ DC)
8.15 Reference Conditions for Accuracy
- 8.15.1 Reference Temperature: 23° C ± 2° C
- 8.15.2 Auxiliary Supply Voltage Rated Value: ±1 %
- 8.15.3 Auxiliary Supply Frequency Rated Value: ±1 %

8.16 Applicable Standards:
- 8.16.1 EMC: IEC 61326-1: 2005
- 8.16.2 Immunity: IEC 61000-4-1 up to 4. Level 3 Industrial Low level
- 8.16.3 Safety: IEC 61010-1:2010, Permanently connected use
- 8.16.4 IP for water and dust: IEC 60529
- 8.16.5 Pollution degree: 2
- 8.16.6 Installation category: III

8.17 High Voltage Test: 2 KV, 50Hz for 1 minute between Aux and Measuring Input
8.18 Environmental

8.18.1	Operating temperature:	0° C to +55° C
8.18.2	Storage temperature:	-25° C to +70° C
8.18.3	Relative humidity:	0... 90% non-condensing
8.18.4	Warm up time:	Minimum 3 minute

9 Ammeter - MC - 0 - 1 A, Analog

9.1 Basic Indicative Diagram

9.2 Range: Moving Coil, 0 - 1 A, Analog
9.3 Type: Moving Coil DC, Analog
9.4 Input: 1 A
9.5 Accuracy: Class 1.5
9.6 Should have linear scale
9.7 Should be easily replaceable glass and bezel
9.8 Scale should have interchangeability
9.9 Should be easy installation with swivel screws
9.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer
9.11 Self lifting terminal clamp assembly
9.12 IP 52 protection
9.13 Wide measurement band: 10 to 100% of FSD
9.14 Movement:
- 9.14.1 Moving coil movement should have pivots of very high hardness
- 9.14.2 Movement should have suspended between spring loaded Sapphire Jewels
- 9.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

9.15 Reference standards:

9.15.1	Performance Standard:	IEC 60051 and IS 1248
9.15.2	Safety standard:	IEC 61010
9.15.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
9.15.4	Scale and Pointer:	DIN 43802
9.15.5	Connection and Terminal markings:	DIN 43807
9.15.6	Terminal bolts / leads:	DIN 46200 / 46282
9.15.7	Safety requirements and protective measures:	IS 9249 - 1979
9.15.8	Front frames dimensions:	DIN 43718
9.15.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

9.16 Certifications:
- 9.16.1 ERDA Type tested
- 9.16.2 CE Certified
- 9.16.3 UL Approved
- 9.16.4 RoHS complied

9.17 Portable Box Type housed in Bakelite Case.

10 Ammeter - MC - 0 - 10 A, Analog

10.1 Basic Indicative Diagram

10.2 Range: Moving Coil, 0 - 10 A, Analog
10.3 Type: Moving Coil DC, Analog
10.4 Input: 10 A,
10.5 Accuracy: Class 1.5
10.6 Should have linear scale
10.7 Should be easily replaceable glass and bezel
10.8 Scale should have interchangeability
10.9 Should be easy installation with swivel screws
10.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
10.11 Self-lifting terminal clamp assembly
10.12 IP 52 protection
10.13 Wide measurement band: 10 to 100% of FSD
10.14 Movement:
- 10.14.1 Moving coil movement should have pivots of very high hardness.
- 10.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 10.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

10.15 Reference standards:

10.15.1 Performance Standard:	IEC 60051 and IS 1248
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10.15.6 Terminal bolts / leads:	DIN 46200 / 46282
10.15.7 Safety requirements and protective measures:	IS 9249 - 1979
10.15.8 Front frames dimensions:	DIN 43718
10.15.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

10.16 Certifications:
- 10.16.1 ERDA Type tested
- 10.16.2 CE Certified
- 10.16.3 UL Approved
- 10.16.4 RoHS complied

10.17 Portable Box Type housed in Bakelite Case.

11 Ammeter - MC - 0 - 100 mA, Analog

11.1 Basic Indicative Diagram

11.2 Range: Moving Coil, 0 - 100 mA, Analog
11.3 Type: Moving Coil DC - Analog
11.4 Input: 100 mA,
11.5 Accuracy: Class 1.5
11.6 Should have linear scale
11.7 Should be easily replaceable glass and bezel
11.8 Scale should have interchangeability
11.9 Should be easy installation with swivel screws
11.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
11.11 Self lifting terminal clamp assembly
11.12 IP 52 protection
11.13 Wide measurement band: 10 to 100% of FSD
11.14 Movement:
- 11.14.1 Moving coil movement should have pivots of very high hardness.
- 11.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 11.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

11.15 Reference Standards:

11.15.1 Performance Standard:	IEC 60051 and IS 1248
11.15.2 Safety standard:	IEC 61010
11.15.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
11.15.4 Scale and Pointer:	DIN 43802
11.15.5 Connection and Terminal markings:	DIN 43807
11.15.6 Terminal bolts / leads:	DIN 46200 / 46282
11.15.7 Safety requirements and protective measures:	IS 9249 - 1979
11.15.8 Front frames dimensions:	DIN 43718
11.15.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

11.16 Certifications:
- 11.16.1 ERDA Type tested
- 11.16.2 CE Certified
- 11.16.3 UL Approved
- 11.16.4 RoHS complied

11.17 Portable Box Type housed in Bakelite Case.

12 Ammeter - MC - 0 - 1000 µA, Analog

12.1 Basic Indicative Diagram

12.2 Range: 0 - 1000 µA, Analog
12.3 Type: Moving Coil DC - Analog
12.4 Input: 1000 µA,
12.5 Accuracy: Class 1.5
12.6 Should have linear scale
12.7 Should be easily replaceable glass and bezel
12.8 Scale should have interchangeability
12.9 Should be easy installation with swivel screws
12.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
12.11 Self lifting terminal clamp assembly
12.12 IP 52 protection
12.13 Wide measurement band: 10 to 100% of FSD
12.14 Movement
- 12.14.1 Moving coil movement should have pivots of very high hardness.
- 12.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 12.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

12.15 Reference standards:

12.15.1 Performance Standard:	IEC 60051 and IS 1248
12.15.2 Safety standard:	IEC 61010
12.15.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
12.15.4 Scale and Pointer:	DIN 43802
12.15.5 Connection and Terminal markings:	DIN 43807
12.15.6 Terminal bolts / leads:	DIN 46200 / 46282
12.15.7 Safety requirements and protective measures:	IS 9249 - 1979
12.15.8 Front frames dimensions:	DIN 43718
12.15.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

12.16 Certifications:
- 12.16.1 ERDA Type tested
- 12.16.2 CE Certified
- 12.16.3 UL Approved
- 12.16.4 RoHS complied

12.17 Portable Box Type housed in Bakelite Case.

13 Ammeter - MC - 0 - 15 A, Analog

13.1 Basic Indicative Diagram

13.2 Range: Moving Coil, 0 - 15 A, Analog
13.3 Type: Moving Coil DC, Analog
13.4 Input: 15 A
13.5 Accuracy: Class 1.5
13.6 Should have linear scale
13.7 Should be easily replaceable glass and bezel
13.8 Scale should have interchangeability
13.9 Should be easy installation with swivel screws
13.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
13.11 Self lifting terminal clamp assembly
13.12 IP 52 protection
13.13 Wide measurement band: 10 to 100% of FSD
13.14 Movement
- 13.14.1 Moving coil movement should have pivots of very high hardness.
- 13.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 13.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

13.15 Reference Standards:

13.15.1 Performance Standard:	IEC 60051 and IS 1248
13.15.2 Safety standard:	IEC 61010
13.15.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
13.15.4 Scale and Pointer:	DIN 43802
13.15.5 Connection and Terminal markings:	DIN 43807
13.15.6 Terminal bolts / leads:	DIN 46200 / 46282
13.15.7 Safety requirements and protective measures:	IS 9249 - 1979
13.15.8 Front frames dimensions:	DIN 43718
13.15.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

13.16 Certifications:
- 13.16.1 ERDA Type tested
- 13.16.2 CE Certified
- 13.16.3 UL Approved
- 13.16.4 RoHS complied

13.17 Portable Box Type housed in Bakelite Case.

14 Ammeter - MC - 0 - 2000 mA, Panel type

14.1 Basic Indicative Diagram

14.2 Range: 0 - 2000 mA, Analog
14.3 Type: Moving Coil DC - Analog
14.4 Input: 2000 mA,
14.5 Accuracy: Class 1.5
14.6 Should have linear scale
14.7 Should be easily replaceable glass and bezel
14.8 Scale should have interchangeability
14.9 Should be easy installation with swivel screws
14.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
14.11 Self lifting terminal clamp assembly
14.12 IP 52 protection
14.13 Wide measurement band: 10 to 100% of FSD
14.14 Movement:
- 14.14.1 Moving coil movement should have pivots of very high hardness.
- 14.14.2 Movement should have suspended between spring loaded Sapphire Jewels
- 14.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

14.15 Reference Standards

14.15.1 Performance Standard:	IEC 60051 and IS 1248
14.15.2 Safety standard:	IEC 61010
14.15.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
14.15.4 Scale and Pointer:	DIN 43802
14.15.5 Connection and Terminal markings:	DIN 43807
14.15.6 Terminal bolts / leads:	DIN 46200 / 46282
14.15.7 Safety requirements and protective measures:	IS 9249 - 1979
14.15.8 Front frames dimensions:	DIN 43718
14.15.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

14.16 Certifications
- 14.16.1 ERDA Type tested
- 14.16.2 CE Certified
- 14.16.3 UL Approved
- 14.16.4 RoHS complied

14.17 Portable Box Type housed in Bakelite Case.

15 Ammeter - MC - 0 - 25 A, Analog

15.1 Basic Indicative Diagram

15.2 Range: Moving Coil, 0 - 25 A, Analog
15.3 Type: Moving Coil DC - Analog
15.4 Input: 25 A,
15.5 Accuracy: Class 1.5
15.6 Should have linear scale
15.7 Should be easily replaceable glass and bezel
15.8 Scale should have interchangeability
15.9 Should be easy installation with swivel screws
15.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
15.11 Self lifting terminal clamp assembly
15.12 IP 52 protection
15.13 Wide measurement band: 10 to 100% of FSD
15.14 Movement
- 15.14.1 Moving coil movement should have pivots of very high hardness
- 15.14.2 Movement should have suspended between spring loaded Sapphire Jewels
- 15.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

15.15 Reference standards

15.15.1 Performance Standard:	IEC 60051 and IS 1248
15.15.2 Safety standard:	IEC 61010
15.15.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
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15.15.5 Connection and Terminal markings:	DIN 43807
15.15.6 Terminal bolts / leads:	DIN 46200 / 46282
15.15.7 Safety requirements and protective measures:	IS 9249 - 1979
15.15.8 Front frames dimensions:	DIN 43718
15.15.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

15.16 Certifications
- 15.16.1 ERDA Type tested
- 15.16.2 CE Certified
- 15.16.3 UL Approved
- 15.16.4 RoHS complied

15.17 Portable Box Type housed in Bakelite Case.

16 Ammeter - MC - 0 - 5 A, Analog

16.1 Basic Indicative Diagram

16.2 Range: Moving Coil, 0 - 5 A, Analog
16.3 Type: Moving Coil DC, Analog
16.4 Input: 5 A
16.5 Accuracy: Class 1.5
16.6 Should have linear scale
16.7 Should be easily replaceable glass and bezel
16.8 Scale should have interchangeability
16.9 Should be easy installation with swivel screws
16.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
16.11 Self lifting terminal clamp assembly
16.12 IP 52 protection
16.13 Wide measurement band: 10 to 100% of FSD
16.14 Movement
- 16.14.1 Moving coil movement should have pivots of very high hardness
- 16.14.2 Movement should have suspended between spring loaded Sapphire Jewels
- 16.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

16.15 Reference Standards

16.15.1 Performance Standard:	IEC 60051 and IS 1248
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16.15.8 Front frames dimensions:	DIN 43718
16.15.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

16.16 Certifications
- 16.16.1 ERDA Type tested
- 16.16.2 CE Certified
- 16.16.3 UL Approved
- 16.16.4 RoHS complied

16.17 Portable Box Type housed in Bakelite Case.

17 Ammeter - MC - 0 - 50 mA, Analog

17.1 Basic Indicative Diagram

17.2 Range: Moving Coil, 0 - 50 mA, Analog
17.3 Type: Moving Coil DC - Analog
17.4 Input: 0 to 50 mA,
17.5 Accuracy: Class 1.5
17.6 Should have linear scale
17.7 Should be easily replaceable glass and bezel
17.8 Scale should have interchangeability
17.9 Should be easy installation with swivel screws
17.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
17.11 Self lifting terminal clamp assembly
17.12 IP 52 protection
17.13 Wide measurement band: 10 to 100% of FSD
17.14 Movement
- 17.14.1 Moving coil movement should have pivots of very high hardness
- 17.14.2 Movement should have suspended between spring loaded Sapphire Jewels
- 17.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

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17.15.1 Performance Standard:	IEC 60051 and IS 1248
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17.15.7 Safety requirements and protective measures:	IS 9249 - 1979
17.15.8 Front frames dimensions:	DIN 43718
17.15.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

17.16 Certifications:
- 17.16.1 ERDA Type tested
- 17.16.2 CE Certified
- 17.16.3 UL Approved
- 17.16.4 RoHS complied

17.17 Portable Box Type housed in Bakelite Case.

18 Ammeter - MC - 300A, 60A with external shunt, Analog

18.1 Basic Indicative Diagram

18.2 Range: Moving Coil, 0 - 300 A, Analog
18.3 Type: Moving Coil DC, Analog
18.4 Input: 75 mV,
18.5 Accuracy: Class 1.5
18.6 Should have linear scale
18.7 Should be easily replaceable glass and bezel
18.8 Scale should have interchangeability
18.9 Should be easy installation with swivel screws
18.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
18.11 Self lifting terminal clamp assembly
18.12 IP 52 protection
18.13 Wide measurement band: 10 to 100% of FSD
18.14 Movement
- 18.14.1 Moving coil movement should have pivots of very high hardness
- 18.14.2 Movement should have suspended between spring loaded Sapphire Jewels
- 18.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

18.15 Reference Standards:

18.15.1 Performance Standard:	IEC 60051 and IS 1248
18.15.2 Safety standard:	IEC 61010
18.15.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
18.15.4 Scale and Pointer:	DIN 43802
18.15.5 Connection and Terminal markings:	DIN 43807
18.15.6 Terminal bolts / leads:	DIN 46200 / 46282
18.15.7 Safety requirements and protective measures:	IS 9249 - 1979
18.15.8 Front frames dimensions:	DIN 43718
18.15.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

18.16 Certifications:
- 18.16.1 ERDA Type tested
- 18.16.2 CE Certified
- 18.16.3 UL Approved
- 18.16.4 RoHS complied

18.17 Portable Box Type housed in Bakelite Case.

19 Ammeter - MC - Centre Zero - 5 - 0 - 5 A, Analog

19.1 Basic Indicative Diagram

19.2 Range: Centre Zero - 5 - 0 - 5 A, Analog
19.3 Type: Moving Coil DC - Analog
19.4 Input: 5 A,
19.5 Accuracy: Class 1.5
19.6 Should have linear scale
19.7 Should be easily replaceable glass and bezel
19.8 Scale should have interchangeability
19.9 Should be easy installation with swivel screws
19.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
19.11 Self lifting terminal clamp assembly
19.12 IP 52 protection
19.13 Wide measurement band: 10 to 100% of FSD
19.14 Movement:
- 19.14.1 Moving coil movement should have pivots of very high hardness
- 19.14.2 Movement should have suspended between spring loaded Sapphire Jewels
- 19.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

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19.16 Certifications:
- 19.16.1 ERDA Type tested
- 19.16.2 CE Certified
- 19.16.3 UL Approved
- 19.16.4 RoHS complied

19.17 Portable Box Type housed in Bakelite Case.

20 Ammeter - MI - 0 - 1 A, Analog

20.1 Basic Indicative Diagram

20.2 Range: 0 - 1 A
20.3 Type: Moving Iron AC - Analog
20.4 Input: 1 A
20.5 Accuracy: Class 1.5
20.6 Should be moving iron, panel meters
20.7 Should be housed in molded polycarbonate cases
20.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
20.9 Front window glass and bezel should be easily replaceable.
20.10 Should have nearly Linear scale
20.11 Scale should have interchangeability
20.12 Should be easy installation with swivel screws
20.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
20.14 Should have self lifting terminal clamp assembly
20.15 Should have IP 52 protection
20.16 Movement:
- 20.16.1 Moving Iron movement should have pivots of very high hardness
- 20.16.2 Movement should have suspended between spring loaded Sapphire Jewels
- 20.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

20.17 Reference Standards

20.17.1 Performance Standard:	IEC 60051 and IS 1248
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- 20.18.3 UL Approved
- 20.18.4 RoHS complied

20.19 Portable Box Type housed in Bakelite Case.

21 Ammeter - MI - 0 - 1 mA, Analog

21.1 Basic Indicative Diagram

21.2 Range: 0-1 mA
21.3 Type: Moving Iron with Rectifier - Analog
21.4 Input: 1 mA
21.5 Accuracy: Class 1.5
21.6 Should have less VA burden
21.7 Should have Linear scale
21.8 Should have glass filled polycarbonate housing (UL 94-V-0)
21.9 Should have knife edge pointer
21.10 Should be easily replaceable glass and bezel
21.11 Movement:
- 21.11.1 Moving Iron movement should have pivots of very high hardness
- 21.11.2 Movement should have suspended between spring loaded Sapphire Jewels
- 21.11.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

21.12 Reference Standards

21.12.1 Performance Standard:	IEC 60051 and IS 1248
21.12.2 Safety standard:	IEC 61010
21.12.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
21.12.4 Scale and Pointer:	DIN 43802
21.12.5 Connection and Terminal markings:	DIN 43807
21.12.6 Terminal bolts / leads:	DIN 46200 / 46282
21.12.7 Safety requirements and protective measures:	IS 9249 - 1979
21.12.8 Front frames dimensions:	DIN 43718
21.12.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

21.13 Certifications
- 21.13.1 ERDA Type tested
- 21.13.2 CE Certified
- 21.13.3 UL Approved
- 21.13.4 RoHS complied

21.14 Portable Box Type housed in Bakelite Case.

22 Ammeter - MI - 0 - 10 A, Analog

22.1 Basic Indicative Diagram

22.2 Range: 0-10 A
22.3 Type: Moving Iron AC - Analog
22.4 Input: 10 A
22.5 Accuracy: Class 1.5
22.6 Should be moving iron, panel meters
22.7 Should be housed in molded polycarbonate cases
22.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
22.9 Front window glass and bezel should be easily replaceable.
22.10 Should have nearly Linear scale
22.11 Scale should have interchangeability
22.12 Should be easy installation with swivel screws
22.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
22.14 Should have self lifting terminal clamp assembly
22.15 Should have IP 52 protection
22.16 Movement
- 22.16.1 Moving Iron movement should have pivots of very high hardness
- 22.16.2 Movement should have suspended between spring loaded Sapphire Jewels
- 22.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

22.17 Reference Standards

22.17.1 Performance Standard:	IEC 60051 and IS 1248
22.17.2 Safety standard:	IEC 61010
22.17.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
22.17.4 Scale and Pointer:	DIN 43802
22.17.5 Connection and Terminal markings:	DIN 43807
22.17.6 Terminal bolts / leads:	DIN 46200 / 46282
22.17.7 Safety requirements and protective measures:	IS 9249 - 1979
22.17.8 Front frames dimensions:	DIN 43718
22.17.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

22.18 Certifications
- 22.18.1 ERDA Type tested
- 22.18.2 CE Certified
- 22.18.3 UL Approved
- 22.18.4 RoHS complied

22.19 Portable Box Type housed in Bakelite Case.

23 Ammeter - MI - 0 - 100 mA, Analog

23.1 Basic Indicative Diagram

23.2 Range: 0 - 100 mA
23.3 Type: Moving Iron AC - Analog
23.4 Input: 100 mA,
23.5 Accuracy: Class 1.5
23.6 Should be moving iron, panel meters
23.7 Should be housed in molded polycarbonate cases
23.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
23.9 Front window glass and bezel should be easily replaceable.
23.10 Should have nearly Linear scale
23.11 Scale should have interchangeability
23.12 Should be easy installation with swivel screws
23.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
23.14 Should have self lifting terminal clamp assembly
23.15 Should have IP 52 protection
23.16 Movement
- 23.16.1 Moving Iron movement should have pivots of very high hardness
- 23.16.2 Movement should have suspended between spring loaded Sapphire Jewels
- 23.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

23.17 Reference Standards

23.17.1 Performance Standard:	IEC 60051 and IS 1248
23.17.2 Safety standard:	IEC 61010
23.17.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
23.17.4 Scale and Pointer:	DIN 43802
23.17.5 Connection and Terminal markings:	DIN 43807
23.17.6 Terminal bolts / leads:	DIN 46200 / 46282
23.17.7 Safety requirements and protective measures:	IS 9249 - 1979
23.17.8 Front frames dimensions:	DIN 43718
23.17.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

23.18 Certifications
- 23.18.1 ERDA Type tested
- 23.18.2 CE Certified
- 23.18.3 UL Approved
- 23.18.4 RoHS complied

23.19 Portable Box Type housed in Bakelite Case.

24 Ammeter - MI - 0 - 25 A, Analog

24.1 Basic Indicative Diagram

24.2 Range: 0-25 A
24.3 Type: Moving Iron AC - Analog
24.4 Input: 25 A
24.5 Accuracy: Class 1.5
24.6 Should be moving iron, panel meters
24.7 Should be housed in molded polycarbonate cases
24.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
24.9 Front window glass and bezel should be easily replaceable.
24.10 Should have nearly Linear scale
24.11 Scale should have interchangeability
24.12 Should be easy installation with swivel screws
24.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
24.14 Should have self lifting terminal clamp assembly
24.15 Should have IP 52 protection
24.16 Movement
- 24.16.1 Moving Iron movement should have pivots of very high hardness
- 24.16.2 Movement should have suspended between spring loaded Sapphire Jewels
- 24.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

24.17 Reference Standards

24.17.1 Performance Standard:	IEC 60051 and IS 1248
24.17.2 Safety standard:	IEC 61010
24.17.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
24.17.4 Scale and Pointer:	DIN 43802
24.17.5 Connection and Terminal markings:	DIN 43807
24.17.6 Terminal bolts / leads:	DIN 46200 / 46282
24.17.7 Safety requirements and protective measures:	IS 9249 - 1979
24.17.8 Front frames dimensions:	DIN 43718
24.17.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

24.18 Certifications
- 24.18.1 ERDA Type tested
- 24.18.2 CE Certified
- 24.18.3 UL Approved
- 24.18.4 RoHS complied

24.19 Portable Box Type housed in Bakelite Case.

25 Ammeter - MI - 0 - 5 A, Analog

25.1 Basic Indicative Diagram

25.2 Range: 0-5 A
25.3 Type: Moving Iron AC - Analog
25.4 Input: 5 A
25.5 Accuracy: Class 1.5
25.6 Should be moving iron, panel meters
25.7 Should be housed in molded polycarbonate cases
25.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
25.9 Front window glass and bezel should be easily replaceable.
25.10 Should have nearly Linear scale
25.11 Scale should have interchangeability
25.12 Should be easy installation with swivel screws
25.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
25.14 Should have self lifting terminal clamp assembly
25.15 Should have IP 52 protection
25.16 Movement
- 25.16.1 Moving Iron movement should have pivots of very high hardness
- 25.16.2 Movement should have suspended between spring loaded Sapphire Jewels
- 25.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

25.17 Reference Standards

25.17.1 Performance Standard:	IEC 60051 and IS 1248
25.17.2 Safety standard:	IEC 61010
25.17.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
25.17.4 Scale and Pointer:	DIN 43802
25.17.5 Connection and Terminal markings:	DIN 43807
25.17.6 Terminal bolts / leads:	DIN 46200 / 46282
25.17.7 Safety requirements and protective measures:	IS 9249 - 1979
25.17.8 Front frames dimensions:	DIN 43718
25.17.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

25.18 Certifications
- 25.18.1 ERDA Type tested
- 25.18.2 CE Certified
- 25.18.3 UL Approved
- 25.18.4 RoHS complied

25.19 Portable Box Type housed in Bakelite Case.

26 Ammeter - MI - 0 - 5 mA, Analog

26.1 Basic Indicative Diagram

26.2 Range: 0-5 mA
26.3 Type: Moving Iron with Rectifier - Analog
26.4 Input: 5 mA
26.5 Accuracy: Class 1.5
26.6 Should have less VA burden
26.7 Should have Linear scale
26.8 Should have glass filled polycarbonate housing (UL 94-V-0)
26.9 Should have knife edge pointer
26.10 Should be easily replaceable glass and bezel
26.11 Movement
- 26.11.1 Moving Iron movement should have pivots of very high hardness
- 26.11.2 Movement should have suspended between spring loaded Sapphire Jewels
- 26.11.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

26.12 Reference Standards

26.12.1 Performance Standard:	IEC 60051 and IS 1248
26.12.2 Safety standard:	IEC 61010
26.12.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
26.12.4 Scale and Pointer:	DIN 43802
26.12.5 Connection and Terminal markings:	DIN 43807
26.12.6 Terminal bolts / leads:	DIN 46200 / 46282
26.12.7 Safety requirements and protective measures:	IS 9249 - 1979
26.12.8 Front frames dimensions:	DIN 43718
26.12.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

26.13 Certifications
- 26.13.1 ERDA Type tested
- 26.13.2 CE Certified
- 26.13.3 UL Approved
- 26.13.4 RoHS complied

26.14 Portable Box Type housed in Bakelite Case.

27 Ammeter - MI - 0 - 50 mA, Analog

27.1 Basic Indicative Diagram

27.2 Range: 0 - 50 mA
27.3 Type: Moving Iron with Rectifier - Analog
27.4 Input: 0 to 50 mA AC
27.5 Accuracy: Class 1.5
27.6 Should have less VA burden
27.7 Should have Linear scale
27.8 Should have glass filled polycarbonate housing (UL 94-V-0)
27.9 Should have knife edge pointer
27.10 Should be easily replaceable glass and bezel
27.11 Movement
- 27.11.1 Moving Iron movement should have pivots of very high hardness
- 27.11.2 Movement should have suspended between spring loaded Sapphire Jewels
- 27.11.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

27.12 Reference Standards

27.12.1 Performance Standard:	IEC 60051 and IS 1248
27.12.2 Safety standard:	IEC 61010
27.12.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
27.12.4 Scale and Pointer:	DIN 43802
27.12.5 Connection and Terminal markings:	DIN 43807
27.12.6 Terminal bolts / leads:	DIN 46200 / 46282
27.12.7 Safety requirements and protective measures:	IS 9249 - 1979
27.12.8 Front frames dimensions:	DIN 43718
27.12.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

27.13 Certifications
- 27.13.1 ERDA Type tested
- 27.13.2 CE Certified
- 27.13.3 UL Approved
- 27.13.4 RoHS complied

27.14 Portable Box Type housed in Bakelite Case.

28 Ammeter - MI - 0 - 500 mA, Analog

28.1 Basic Indicative Diagram

28.2 Range: 0 - 500 mA
28.3 Type: Moving Iron AC - Analog
28.4 Input: 500 mA
28.5 Accuracy: Class 1.5
28.6 Should be moving iron, panel meters
28.7 Should be housed in molded polycarbonate cases
28.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
28.9 Front window glass and bezel should be easily replaceable.
28.10 Should have nearly Linear scale
28.11 Scale should have interchangeability
28.12 Should be easy installation with swivel screws
28.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
28.14 Should have self lifting terminal clamp assembly
28.15 Should have IP 52 protection
28.16 Movement
- 28.16.1 Moving Iron movement should have pivots of very high hardness
- 28.16.2 Movement should have suspended between spring loaded Sapphire Jewels
- 28.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former

28.17 Reference Standards

28.17.1 Performance Standard:	IEC 60051 and IS 1248
28.17.2 Safety standard:	IEC 61010
28.17.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
28.17.4 Scale and Pointer:	DIN 43802
28.17.5 Connection and Terminal markings:	DIN 43807
28.17.6 Terminal bolts / leads:	DIN 46200 / 46282
28.17.7 Safety requirements and protective measures:	IS 9249 - 1979
28.17.8 Front frames dimensions:	DIN 43718
28.17.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

28.18 Certifications
- 28.18.1 ERDA Type tested
- 28.18.2 CE Certified
- 28.18.3 UL Approved
- 28.18.4 RoHS complied

28.19 Portable Box Type housed in Bakelite Case.

29 Signal Generator - 1 to 100 Khz

29.1 Basic Indicative Diagram

29.2 Strongly steady electro-circuit.
29.3 Digital Display about frequency and operate conveniently.
29.4 Frequency Range: 6-phases from 0.2Hz ~ 2MHz.
29.5 Output for empty carry arrive at 5V, 600Ω carried will be higher than 2V (sine wave).
29.6 Output Voltage balance may be adjusted by 2 groups of attenuators every 20dB and 40dB, total 60dB or potentiometer in continuity.
29.7 Sine wave or square wave may be chosen to output.
29.8 Frequency Range:

29.8.1	X1 Shift:	0.2Hz ~ 20Hz
29.8.2	X10 Shift:	2Hz ~ 200Hz
29.8.3	X100 Shift:	20Hz~ 2KHz
29.8.4	X1K Shift:	200Hz ~ 20KHz
29.8.5	X10K Shift:	2KHz ~ 200KHz
29.8.6	X100K Shift:	20KHz ~ 2MHz

29.9	Sine Wave Nature:	Output Voltage: Minimum 5V, in MΩ: 2.7V
29.10	Square wave nature:	Output Voltage: >9V (highest point), in MΩ: 2.7V
29.11	Power:	
	29.11.1 Input Voltage:	110V or 220V AC
	29.11.2 Burden:	About 10 VA
29.12	The Nature of Output:	Output impedance: 600Ω ±10%
29.13	Attenuator:	20dB, 40dB and in 60dB series
29.14	Dimension:	270 x 250 x 100 mm (±10%)
29.15	Accessories:	User Manual and Mains Power Cord

30 Single Phase Power Quality Analyzer

30.1 Basic Indicative Diagram

30.2	Power Parameters:	W, KW, VA, kVA, Var, kVar
30.3	Sensing:	AC and AC+DC True RMS
30.4	Jaw Opening and Conductor Diameter:	51mm MAX
30.5	Display:	Dual Backlight LCD Display
30.6	DC Current and AC+DC Current (Clamp-on):	999.9A
30.7	AmpTip DC Current (Clamp-on):	40.00 A
30.8	AC Current (Clamp-on):	999.9 A
30.9	AmpTip AC and AC+DC Current (Clamp-on):	40.00 A
30.10	AC Voltage (with low-pass):	999.9 V
30.11	DC Voltage and AC + DC Voltage:	999.9 V
30.12	Resistance:	6.000 KΩ
30.13	Capacitance:	10.0 µF ~ 999.9 µF
30.14	Temperature:	-40.0° C ~ 400.0° C(K-thermocouple)
30.15	Hz Line Level Frequency:	40.00Hz ~ 70.00Hz

30.16 Non-Contact EF-Detection

30.17 1 Phase and 3 Phase balanced load power

30.18 AC + DC power (VA)

30.19 Total Harmonics distortion THD% - F 2% ~ 600%

30.20 Total distortion Factor - DF%

30.21 MAX / MIN Record mode and Relative Zero mode

30.22 Display Hold Function

30.23 Flashlight for dim areas.

30.24 Safety: Double insulation as per IEC/UL/EN/BSEN 61010-1 Ed. 3.1, IEC/UL/EN/BSEN 61010-2-032 Ed. 4.0, IEC/UL/EN/BSEN 61010-031 Ed. 2.0 and the corresponding

30.25 CAN/CSA-C22.2 regulations to Measurement Categories III 1000V AC and DC and Category IV 600V AC and DC.

30.26 Transient Protection: 8.0kV (1.2/50µs surge)

30.27 E.M.C.: Meets EN61326-1:2013

30.28 Pollution degree: 2

30.29 Power Supply: 1.5V AA Size (IEC LR6) battery X 2

30.30 Power Consumption: Typical 33mA for Current and Power functions and 22mA for others.

30.31 Accessories:

30.31.1 Test Leads (Pair)

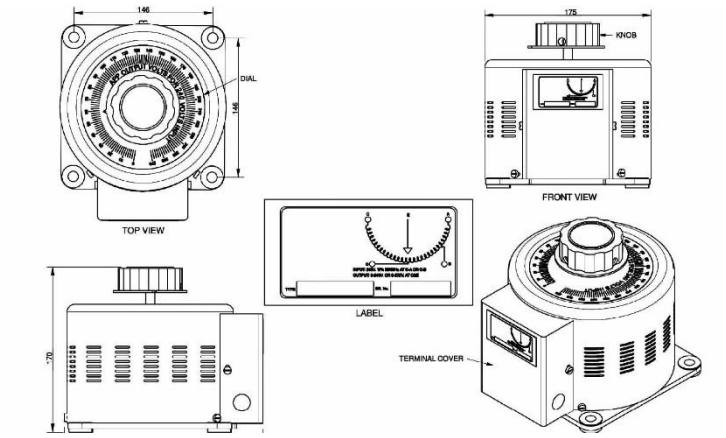
30.31.2 Battery

30.31.3 User manual

30.31.4 Carrying case

31 Auto Transformer - Single Phase, 0 - 270 V, 1 KVA

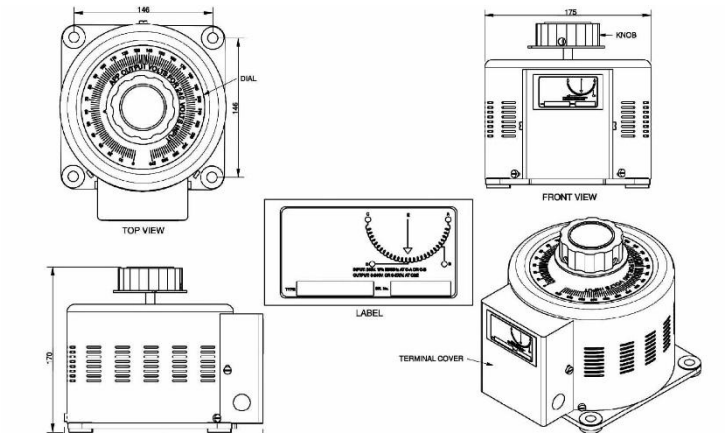
31.1 Basic Indicative Diagram



31.2 Single Phase, 1 KVA
31.3 Input: 240V
31.4 Output: 0-270V
31.5 Capacity: 10 Amps
31.6 Should be wound with electrolytic grade Class F insulated super enameled copper wire
31.7 Should be fitted with High grade - Low Loss CRGO
31.8 Should be fully covered with sheet steel enclosure powder coated
31.9 Should have Knob showing 0 to 100% and Terminal at Top
31.10 Class F insulated, Double Vacuum impregnated with Class H Varnish
31.11 CE marked

32 Auto Transformer - Single Phase, 0 - 270 V, 2 KVA

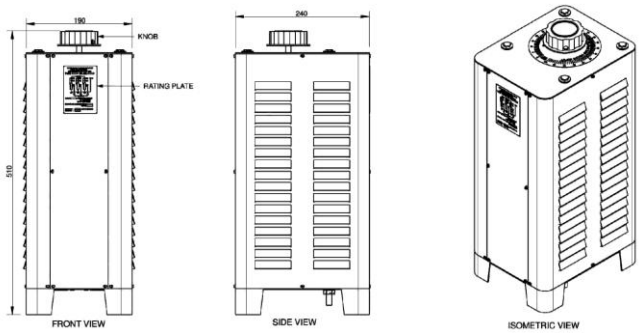
32.1 Basic Indicative Diagram



32.2 Single Phase, 2 KVA
32.3 Input: 240V
32.4 Output: 0 - 270 V
32.5 Capacity: 20 Amps
32.6 Should be wound with electrolytic grade Class F insulated super enameled copper wire
32.7 Should be fitted with High grade - Low Loss CRGO
32.8 Should be fully covered with sheet steel enclosure powder coated
32.9 Should have Knob showing 0 to 100% and Terminal at Top
32.10 Class F insulated, double vacuum impregnated with Class H Varnish
32.11 CE marked

33 Auto Transformer - Three Phase, 0 - 500 V, 5 KVA

33.1 Basic Indicative Diagram



33.2 Three Phase, 5KVA
33.3 Input: 415 V
33.4 Output: 0 - 470 V
33.5 Capacity: 20 A (each phase)
33.6 Should be wound with electrolytic grade Class F insulated super enameled copper wire
33.7 Should be fitted with High grade - Low Loss CRGO
33.8 Should be fully covered with sheet steel enclosure powder coated
33.9 Should have Knob showing 0 to 100% and Terminal at Top
33.10 Class F insulated, double vacuum impregnated with class H Varnish
33.11 CE marked

34 Battery Analyser

34.1 Basic Indicative Diagram

34.2 Should have integrated thermal printing facility.
34.3 Should be designed for testing all types of 6V and 12V starter batteries, including lead-acid, gel and AGM, Bad cell detection capability.
34.4 Should have voltmeter mode for testing both the starter and the charging system, Anti-sparking clamps for safe operation.
34.5 Should have back-lit Display, 4 Lines 16 Characters LCD for easy viewing.
34.6 Button layout and housing design should allow for one-handed operation.
34.7 Test Range: 100-1400 CCA (Cold Cranking Amps)
34.8 Starter system testing: Pressing the down arrow should display the captured voltage from cranking the engine.
34.9 Charging system testing: Pressing the up arrow should display the captured high voltage from the alternator.
34.10 Detachable Test Lead: 50cm/2”
34.11 Screen Size: 75mm x 40mm (±5%)
34.12 Voltmeter: 7.6V ~ 17V via Battery Clamp
34.13 Clamp Size: 90mm

35 Domestic Blower - 650 W, 240 V

35.1 Basic Indicative Diagram

35.2 Should have dual function blower with blowing and extracting functions
35.3 Power: 650 W Motor
35.4 Should have air flow of 4.5 cubic meters per min for powerful cleaning performance
35.5 Should have variable speed control for extra versatility in different applications
35.6 Should have ergonomic handle design and good weight of balance to reduce fatigue
35.7 Should easy-to-change carbon brush allows fast servicing
35.8 Should have 3-meter power cord for more flexible work

36 Currency Counting and Fake Note Detection

36.1 Basic Indicative Diagram

36.2 Counting Speed: Over 1000 pcs/min
36.3 Counting Range: 1 ~ 999
36.4 Preset Range: 5 ~ 999
36.5 Bank Note Size: Long 110 ~ 190mm Wide 50 ~ 85mm Thick 0.075 ~ 0.15mm
36.6 Power Consumption (internal design) Working < 90W Sleep <3W
36.7 Noise (design): <60dB
36.8 Ambient Temperature: 0 ~ 40°C
36.9 Ambient Humidity: 60%h ~ 90%h
36.10 Features:
- 36.10.1 Automatic Counting
- 36.10.2 Preset Counting
- 36.10.3 Add up Counting
- 36.10.4 UV / IR and MG Detecting
- 36.10.5 Automatic Clearing Zero
- 36.10.6 Counterfeit Alarm
- 36.10.7 Half Notes Detection
- 36.10.8 Chain Note Checking
- 36.10.9 Automatic Self Checking

36.11 Power Supply: 220V ±10%, 50Hz
36.12 Dimension: 290 X 240 X 220 mm (±10%)
36.13 Weight: 5.5 Kgs (±10%)

37 Energy Meter - 3 Phase, 2 Element, 110V, 5A for CT/ PT operation

37.1 Basic Indicative Diagram

37.2 Type: 96mm X 96mm Panel Mounted Kilowatt Hour Meter
37.3 3 Phase, 4 Wire
37.4 Accuracy: Class 1.0 accuracy
37.5 Should have auto-resetting 8 digit seven segment LED counter
37.6 Should provide LED indication for healthy phase, load reverse current.
37.7 Applicable to Standards IEC 62053-21 Ø
37.8 True RMS measurement
37.9 Fully programmable CT ratios
37.10 Fully programmable PT ratios
37.11 On site programmable 3 phase 4 wire or 3phase 3 wire
37.12 Fully isolated current input
37.13 Built in transient protection
37.14 State of art SMD technology
37.15 Pulse output: one potential free relay contact
37.16 Remote data reading through mod bus (RS 485)
37.17 Programmable Energy format and Energy rollover count
37.18 Input Voltage PT Secondary Settable Range:
- 37.18.1 110V L-L (63.5V L-N)
- 37.18.2 100V - 120V L-L (57V - 69V L-N)
- 37.18.3 230V L-L (133V L-N)
- 37.18.4 121V - 239V L-L (70V - 139V L-N)
- 37.18.5 415V L-L (239.6V L-N)
- 37.18.6 240V - 480V L-L (140V - 277V L-N)

37.19 Nominal input current: 5A AC RMS
- 37.19.1 External CT (30/5) to be connected to meter to stepdown current to 5A

37.20 Display
- 37.20.1 Counter: 8 Digit seven segment LED display
- 37.20.2 Reading resolution: Auto ranging
- 37.20.3 Display Height: 9 mm

37.21 Environmental
- 37.21.1 Operating temperature: -10 to +55°C
- 37.21.2 Storage temperature: -20 to +65°C
- 37.21.3 Relative humidity: 0... 90% non-condensing

37.21.4 Warm up time Minimum: 3 minute
37.21.5 Shock: 15g in 3 planes
37.21.6 Vibration: 10... 55 Hz, 0.15mm amplitude
37.21.7 Enclosure: IP54 (front face only)

37.22 Standards:

37.22.1 EMC IEC 61326 Immunity IEC 61000-4-3: 10V/m min - Level 3 industrial low level
37.22.2 Safety: IEC 61010-1-2001
37.22.3 Permanently connected use IP for water and dust: IEC60529
37.22.4 Pollution degree: 2
37.22.5 Installation category: CAT III 300V ac rms
37.22.6 High Voltage Test: 2.2 kV AC, 50Hz for 1 minute between all electrical circuits

38 Energy Meter - 3 Phase, 4 Wire, 30A, 415V

38.1 Basic Indicative Diagram

38.2 Type: 96mm X 96mm Panel Mounted Kilowatt Hour Meter
38.3 3 Phase, 4 Wire
38.4 Should work on 230 V AC Supply
38.5 Accuracy: Class 1.0 accuracy
38.6 Should have auto-resetting 8 digit seven segment LED counter
38.7 Should provide LED indication for healthy phase, load reverse current.
38.8 Applicable to Standards IEC 62053-21 Ø
38.9 True RMS measurement
38.10 Fully programmable CT ratios
38.11 Fully programmable PT ratios
38.12 On site programmable 3 phase 4 wire or 3phase 3 wire
38.13 Fully isolated current input
38.14 Built in transient protection
38.15 State of art SMD technology
38.16 Pulse output: one potential free relay contact
38.17 Remote data reading through mod bus (RS 485)
38.18 Programmable Energy format and Energy rollover count
38.19 Input Voltage PT Secondary Settable Range:
- 38.19.1 110V L-L (63.5V L-N)
- 38.19.2 100V - 120V L-L (57V - 69V L-N)
- 38.19.3 230V L-L (133V L-N)
- 38.19.4 121V - 239V L-L (70V - 139V L-N)
- 38.19.5 415V L-L (239.6V L-N)
- 38.19.6 240V - 480V L-L (140V - 277V L-N)

38.20 Input Current:
- 38.20.1 Nominal input current 5A AC RMS
- 38.20.2 External CT(30/5) to be connected to meter to stepdown current to 5A

38.21 Display
- 38.21.1 Counter: 8 Digit seven segment LED display
- 38.21.2 Reading resolution: Auto ranging
- 38.21.3 Display Height: 9 mm

38.22 Environmental
- 38.22.1 Operating temperature: -10 to +55°C
- 38.22.2 Storage temperature: -20 to +65°C
- 38.22.3 Relative humidity: 0... 90% non-condensing
- 38.22.4 Warm up time Minimum: 3 minute

38.22.5 Shock: 15g in 3 planes
38.22.6 Vibration: 10... 55 Hz, 0.15mm amplitude
38.22.7 Enclosure: IP54 (front face only)

38.23 Standards

38.23.1 EMC IEC 61326 Immunity IEC 61000-4-3: 10V/m min - Level 3 industrial low level
38.23.2 Safety: IEC 61010-1-2001
38.23.3 Permanently connected use IP for water and dust: IEC60529
38.23.4 Pollution degree: 2
38.23.5 Installation category: CAT III 300V ac rms
38.23.6 High Voltage Test: 2.2 kV AC, 50Hz for 1 minute between all electrical circuits

39 Energy Meter - DC - 250V, 5 - 20A, Digital Type

39.1 Basic Indicative Diagram

39.2 Should work on 230 V AC Supply

39.3 Multi-Channel Support: Single meter should measure energy consumption of four independent loads connected to one Voltage source Bi-Directional Voltage

39.4 The meter should be able to measure both charging and discharging current

39.5 Should be possible to log-in previous 5 Events of factory-default parameters with Date and Time stamp

39.6 Onsite Configuration should be possible via Front Keys, USB-based Serial Interface or RS485 (MODBUS)

39.7 Data Logging: User Selectable parameters (1 to 30) should be logged at regular intervals (1 to 60 min) with Date and Time stamp in internal memory and should be accessed via Modbus Max Records can vary from 8532 to 91010 depending upon number of selected parameters

39.8 Load Profile Analysis: Logging of Energy consumed and Peak Demand (Power and Current) in a day and in a month should be possible for efficient tracking of load behavior. Daily Data should be available for last 1 year and Monthly Data should be available for last 14 years

39.9 Relay Functions:Limit Switch - For protection against over-shoot or under-shoot of any selected parameter. Pulse Output - To drive an external counter for energy measurement Timer - Cyclic ON-OFF operation of relay for user-defined cycles with programmable ON-OFF Delays Remote Operation - Relays should be activated remotely via Modbus Reverse Locking Alarm RTC Relay - Relay should beable to be activated and deactivated at predefined ON and OFF Time on any or all Days of Week

39.10 Enclosure Protection for dust and water: Should conforms to IP 54 (front face) as per IEC60529

39.11 Should Comply with International Safety standard IEC 61010 - 1 - 2010

39.12 EMC Compatibility: Should Comply with International standard IEC 61326 - 2012

39.13	Input Voltage Range:	250 V DC
39.14	Input Current:	5A - 20 A (via external shunt)
	39.14.1 Shunt Setting Range:	50 ~ 150 mV
	39.14.2 No of Channels:	4
	39.14.3 Current Sensor External Shunt	
	39.14.4 Max continuous input current:	125% of nominal value

39.15	Display Range:	
	39.15.1 Voltage:	0 to ±9999
	39.15.2 Current:	0 to ±9999
	39.15.3 Power:	0 to ±9999
	39.15.4 Energy (Import and Export):	0 to 99999999
39.16	Environmental	
	39.16.1 Operating temperature:	-10 to +55°C
	39.16.2 Storage temperature:	-20 to +70°C
	39.16.3 Relative humidity:	0... 90% non-condensing
	39.16.4 Warm up time Minimum:	3 minute
	39.16.5 Shock:	15g in 3 planes
	39.16.6 Vibration:	10... 55...10 Hz, 0.15mm amplitude
39.17	Dimensions and Weights	
	39.17.1 Bezel Size:	96 mm x 96 mm DIN 43 718
	39.17.2 Panel Cut-out:	92 + 0.8 mm x 92 + 0.8 mm
	39.17.3 Overall Depth:	80 mm
	39.17.4 Weight:	620 gm. (±10%)
39.18	Standards	
	39.18.1 EMC IEC 61326-2012	
	39.18.2 Immunity IEC 61000-4-3. 10V/m min - Level 3 industrial Low level	
	39.18.3 Safety IEC 61010-1-2010	
	39.18.4 Ingress Protection for water and dust IEC 60529 (IP 54) Pollution degree 2	
	39.18.5 Installation category 1000V CATII, 600V CATIII (Measuring Inputs)	

40 Energy Meter - Single Phase, 5 - 20 A, 240V

40.1 Basic Indicative Diagram

40.2 Type: 96mm X 96mm Panel Mounted Kilowatt Hour Meter
40.3 Should work on 230 V AC Supply
40.4 Accuracy: Class 1.0 accuracy
40.5 Should have auto-resetting 8 digit seven segment LED counter
40.6 Should provide LED indication for healthy phase, load reverse current.
40.7 Applicable to Standards IEC 62053-21 Ø
40.8 True RMS measurement
40.9 Fully programmable CTratios
40.10 Fully programmable PTratios
40.11 Fully isolated current input
40.12 Built in transient protection
40.13 State of art SMD technology
40.14 Pulse output: one potential free relay contact
40.15 Remote data reading through modbus (RS 485)
40.16 Programmable Energy format and Energy rollover count
40.17 Input Voltage PT Secondary Settable Range:
- 40.17.1 110V L-L (63.5V L-N)
- 40.17.2 100V - 120V L-L (57V - 69V L-N)
- 40.17.3 230V L-L (133V L-N)
- 40.17.4 121V - 239V L-L (70V - 139V L-N)
- 40.17.5 415V L-L (239.6V L-N)
- 40.17.6 240V - 480V L-L (140V - 277V L-N)

40.18 Input Current
- 40.18.1 Nominal input current: 5A AC RMS
- 40.18.2 External CT (20/5) should be connected to meter to stepdown current to 5A

40.19 Display
- 40.19.1 Counter: 8 digit seven segment LED display
- 40.19.2 Reading resolution: Auto ranging
- 40.19.3 Display Height: 9 mm

40.20 Environmental
- 40.20.1 Operating temperature: -10 to +55°C
- 40.20.2 Storage temperature: -20 to +65°C
- 40.20.3 Relative humidity: 0... 90% non condensing
- 40.20.4 Warm up time Minimum: 3 minute
- 40.20.5 Shock: 15g in 3 planes
- 40.20.6 Vibration: 10... 55 Hz, 0.15mm amplitude
- 40.20.7 Enclosure: IP54 (front face only)

40.21 Standards

40.21.1 EMC IEC 61326 Immunity IEC 61000-4-3: 10V/m min - Level 3 industrial low level

40.21.2 Safety: IEC 61010-1-2001

40.21.3 Permanently connected use IP for water and dust: IEC60529

40.21.4 Pollution degree: 2

40.21.5 Installation category: CAT III 300V ac rms

40.21.6 High Voltage Test: 2.2 kV AC, 50Hz for 1 minute between all electrical circuits

41 Galvanometer - Centre Zero - 30-0-30 V

41.1 Basic Indicative Diagram

41.2 Type: Moving Coil Meters DC.
41.3 Square Clear acrylic front cover, fully enclosed
41.4 Accuracy: + 2.5% accuracy
41.5 Scale length: 60 mm
41.6 Overall size: 125 X 80 X 80 mm
41.7 With zero adjustment and connection terminals
41.8 Range: 30 - 0 - 35 mV
41.9 Sensitivity: 1mV/Div

42 Wheat Stone Bridge with galvanometer and Battery

42.1 Basic Indicative Diagram

42.1 Construction

- 42.1.1 Switches: Special type offering high precision, low contact resistance, and long life
- 42.1.2 Coils
  - 42.1.2.1 Made from high-quality Manganin wire
  - 42.1.2.2 Non-inductively wound
  - 42.1.2.3 Heat-treated and aged for stability
  - 42.1.2.4 Temperature coefficient: Approximately 0.00001 per °C (15°C to 45°C range)

42.2 Technical Specifications

- 42.2.1 Measurement Range: 0.001 to 11.1 Megohms
- 42.2.2 Ratio Arm: Seven ratios (×1000, ×100, ×10, ×1, ×0.1, ×0.01, ×0.001)

42.3 Features

- 42.3.1 Power Supply: Built-in 4.5V dry battery (easily replaceable)
- 42.3.2 Case: Polished hardwood with carrying handle
- 42.3.3 Galvanometer: Built-in sensitive galvanometer (20µA/mm)
- 42.3.4 External Connections: Provision for external battery and galvanometer
- 42.3.5 Operating Controls: Fixed inside the lid for easy access

43 Pulse Generator

43.1 Basic Indicative Diagram

43.2	Waveforms:	Sine, Square, Triangle, Pulse, Ramp etc
43.3	Range of Sine Wave:	100KHz to 5MHz
43.4	Accuracy:	≤ ±1%dB
43.5	Output Impedance:	50Ω
43.6	Attenuator:	20dB 40dB
43.7	Rise time of Square:	<50ns
43.8	Frequency Counter	
43.9	Frequency Range:	1Hz to 20MHz >10V p-p
43.10	Input Impedance:	≤ 1MΩ / 20F
43.11	Power:	AC 220V， 50Hz
43.12	Weight:	2-3 Kg (Appox)
43.13	Size (LxWxH):	310mm X 230mm X 90mm
43.14	Accessories:	

43.14.1 User Manual
43.14.2 Cable (50Ω test line)
43.14.3 Cable (BNC Line)
43.14.4 Fuse
43.14.5 Power Cord.

44 Anemometer - Digital Type

44.1 Basic Indicative Diagram:

44.2	Wind Speed:	0〜45 m/s
44.3	Resolution:	0.1m/s
44.4	Accuracy:	±5% rdg + 5dgts
44.5	Temperature:	0˚ C - 45˚ C, Accuracy ± 2˚ C
44.6	Overload Protection:	> 45 m/s
44.7	MAX/AVG:	Should Be Available
44.8	Data Hold:	Should Be Available
44.9	Auto Power Off:	Should Be Available
44.10	LCD Backlight:	Should Be Available
44.11	Low Battery Indication:	Should Be Available
44.12	Display Units:	Short press switch between m/s, ft/m, mph, Km/h, Knots, ˚C, ˚F
44.13	Battery:	4.5V/ 6V/ 9V
44.14	Working:	≤ 25 mA
44.15	Power off:	≤ 10 uA
44.16	Working Environment:	
	44.16.1 Temperature:	-10 〜 50˚ C
	44.16.2 Humidity:	≤ 80% RH
44.17	Accessories:	

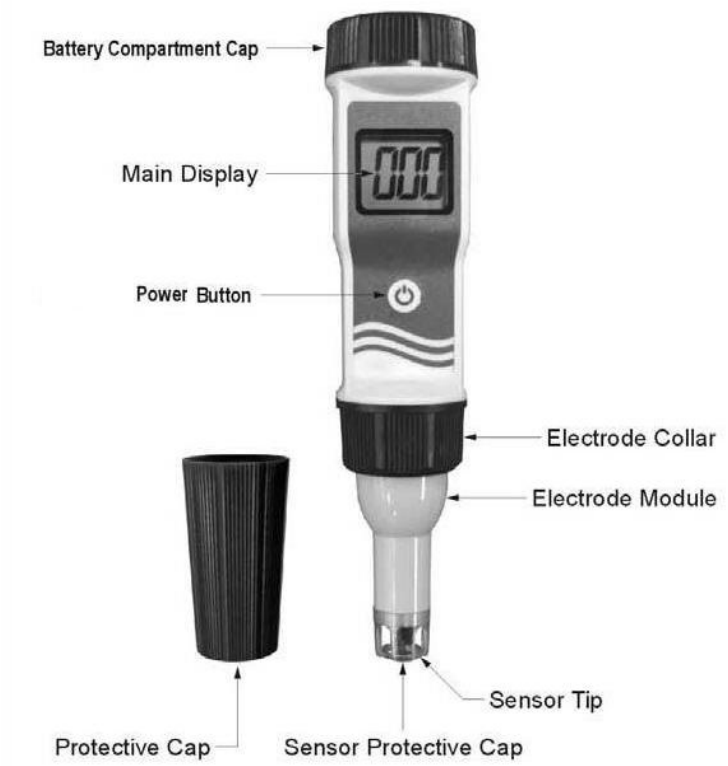
44.17.1 Operating Manual

44.17.2 Test Certificate

44.17.3 Plastic/ Resin/ Wooden Carrying Case with required cushioning, Required Batteries

45 Conductivity Meter - Digital

45.1 Basic Indicative Diagram

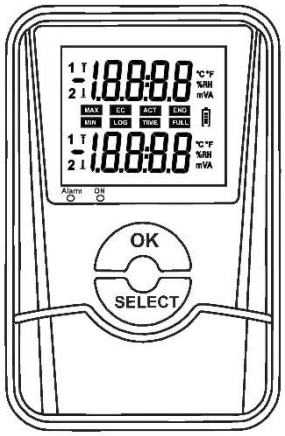


45.2 Type: Conductivity
45.3 Range: 0~19990 µS/cm
45.4 Accuracy: ± 1% FS
45.5 Resolution 10 µS/cm
45.6 ATC (Automatic Temperature Compensation): Yes
45.7 Net Weight (±10%): Approx. 100 Grams (Including battery)
45.8 Accessories
- 45.8.1 Battery
- 45.8.2 Screw Drive
- 45.8.3 Carrying Case
- 45.8.4 Calibration Solution
- 45.8.5 User Manual

45.9 Power Supply: 3V X 2 Lithium battery CR2032
45.10 Calibration: User should be able to self calibrate
45.11 Electrode: Replaceable
45.12 Dimensions (LXWXH) in mm: 170 X 40 X 40 (±10%)

46 Data Logger (Temperature and Humidity Recorder)

46.1 Basic Indicative Diagram



46.2 Humidity range: 0.0 - 99.9%
46.3 Temperature Range: -30.0 to 70.0° C
46.4 Accuracy: ± 0.5° C, ± 4.0% RH
46.5 Housing: IP65
46.6 Resolution: Temperature: 0.1 Degree Celsius; Humidity: 0.1%
46.7 LCD Display
46.8 Other Features:
- 46.8.1 Up to 16000 data record point
- 46.8.2 Low power Indication
- 46.8.3 Real Time Clock RTC
- 46.8.4 Auto Dormancy and wake up function
- 46.8.5 Maximum / Minimum display and alarm function
- 46.8.6 Sampling time Settable

46.9 Power Supply: Suitable battery
46.10 Accessories:
- 46.10.1 Carrying Case
- 46.10.2 Battery Installed
- 46.10.3 PC Software
- 46.10.4 USB Cable
- 46.10.5 User Manual.

47 Decibel (DB) Meter

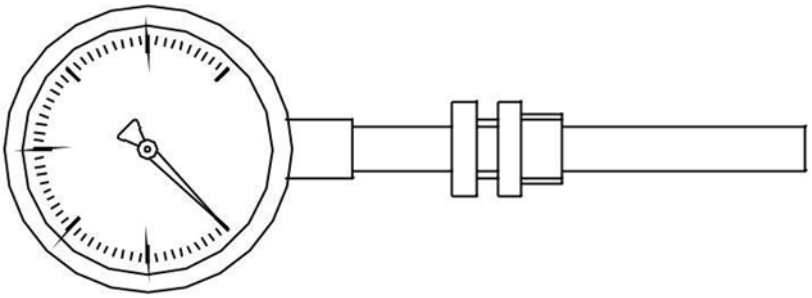
47.1 Basic Indicative Diagram

47.2	Noise: Range:	30～130dB
47.3	Resolution:	0.1dB
47.4	Accuracy:	±1.5 dB
47.5	Sampling Rate	
	47.5.1 Fast:	125 ms
	47.5.2 Slow:	1000 ms
47.6	Overload indication:	Required
47.7	LCD Display	
47.8	MAX/ MIN Indication:	Should Be Available
47.9	Auto Power Off:	Should Be Available
47.10	Low Battery Indication:	Should Be Available
47.11	Sensor Type:	Silicon Photocell
47.12	Battery:	6 V
47.13	Accessories:	

47.13.1 Operating Manual
47.13.2 Calibration Certificate
47.13.3 Required Batteries
47.13.4 Plastic/ Resin/ Wooden Carrying Case with required cushioning

48 Dial Thermometer, Capillary Type Gas Filled - Surface Mounting

48.1 Basic Indicative Diagram



48.2	Dial Size:	100 mm
48.3	Case and Bezel:	SS 316
48.4	Capillary Material:	3/16” SS 304
48.5	Capillary Length:	2 Meter
48.6	Stem Material:	SS 316
48.7	Stem Diameter:	10MM
48.8	Stem Length:	300MM
48.9	Connection “P”:	½” NPT (M)
48.10	Temperature Range:	0 to 200° C
48.11	Accuracy:	±1% FSD

49 Digital Panel Meter - AC/ DC Voltmeter - 4 Digit

49.1 Basic Indicative Diagram

49.2 Set of two meters. One for AC and the other for DC

49.3 Range should be user adjustable, from 10% to 100% of the full-scale value, for simple adaptation of the digital readout to the input value.

49.4 Size:96mm x 48mm DIN-standard housings.

49.5 Display

49.5.1	Display range:	9999
49.5.2	Decimal point position:	selectable by rear jumper position
49.5.3	Negative display indication:	"-" (only for DC Meter)
49.5.4	Digit height:	14 mm / 7-segment digits

49.6 Accuracy: Measuring Accuracy DC < 0.5% + 1 digit

49.7 Temperature coefficient:

49.7.1	For AC Meter:	0.025%/ ° C for Voltage 0.05%/° C for Current
49.7.2	For DC Meter:	0.05%/° C

49.8 Zero point drift: 0.025%/° C for DC Meters

49.9 Input Current DC: 4.20 mA

49.10 Input Voltage DC: 0..75 mV/0..150mV/0..2V/0..20V/0..200V/0..500V

49.11 Input Current AC: 5 A (Higher current range requires external CT)

49.12 Input Voltage AC: 0…500 V (50/ 60Hz)

49.13 Auxiliary Supply

49.13.1	DC:	24 V ± 15% 4.5 V Approx.
49.13.2	AC:	230 V ± 10% -15% 4.5 V approx.

49.14 Operating temperature: 0 ... 50 C

49.15 Storage temperature: -40 ... 80 C

49.16 Regulations and Standards

49.16.1	Protection class front:	IP50
49.16.2	Climatic class:	Class 2 VDE/ DIN 3540
49.16.3	Safety class:	IEC 61010-1:2010 Permanently Connected
49.16.4	Device safety to:	IEC EN 61 010
49.16.5	EMC immunity:	DIN EN 61 000-4-1 to 4
49.16.6	EMC radiated interference:	DIN EN 50 081 class B

50 Digital Temperature Calibrator, mV/mA Injector and Measuring unit

50.1 Basic Indicative Diagram

50.2 Display: 5 Digits Dual LCD display with White LED backlight can set Back light ON Time 0-9000 S.

50.3 Display Size: 68.0 x36.3mm

50.4 Measuring Function:

- 50.4.1 DC Voltage: -5.000 mV ~ 55.000 V (4 Ranges)
- 50.4.2 DC Current: -5.000 mA ~ 55.000 mA
- 50.4.3 Resistance: 0.01 Ω ~ 5.5000 KΩ. (2 Ranges)
- 50.4.4 Frequency: 0.01 Hz ~ 50.000 KHz
- 50.4.5 Thermocouple: R, S, K, E, J, T, N, B
- 50.4.6 Thermo Resistance: PT100 / PT1000 / PT200 / PT500 / Cu10 / Cu50

50.5 Output Function (Source):

- 50.5.1 DC Voltage: -10.000 mV ~ 11.0000 V (3 Ranges)
- 50.5.2 DC Current: 0.001 mA ~ 22.000 mA
- 50.5.3 Resistance: 0.01 Ω ~ 40.000 KΩ. (3 Ranges)
- 50.5.4 Thermocouple: R, S, K, E, J, T, N, B.
- 50.5.5 Thermo Resistance: PT100 / PT200 / PT500 / PT1000 / Cu50 / Cu10
- 50.5.6 Frequency: 1Hz ~ 110KHz (4 Ranges)
- 50.5.7 Loop: 24V Loop Current Power

50.6 Other Functions: ± 0.02 % Accuracy.

50.7 Warm-up time: 10 minutes.

50.8 Continuity Test: 500 Ω (± 50 Ω sound)

50.9 Power supply: 4 X 1.5V AAA alkaline battery External Power Supply.

50.10 Accessories:

- 50.10.1 Test leads
- 50.10.2 Fuse
- 50.10.3 User Manual
- 50.10.4 Alligator Clips
- 50.10.5 Carrying Case.

51 Dry Film Thickness (DFT) Gauge Meter - Digital

51.1 Basic Indicative Diagram

51.2 Detectable Substrate Material
51.3 Thickness Range: 0 ~ 80.0 mils (0 ~ 2000 mm).
51.4 Display Resolution: 0.1 mils/1mm
51.5 Ferrous: ±4 dgts on 0 to 7.8 mils
51.6 ± (3% + 4 dgts) on 7.9 mils to 39.0 mils
51.7 ± (5% + 4 dgts) on 39.1 mils to 80 mils
51.8 ± (3% + 10 dgts) on 200mm to 1000mm
51.9 ± (5% + 4 dgts) on 1001mm to 1999mm
51.10 Stated accuracy at 23^0 C ± 5^0 C, <75% RH
51.11 Operating Environment: 0^0 C to 50^0 C (32^0 F to 122^0 F) at < 75% RH
51.12 Relative Humidity:
51.12.1 Maximum relative humidity 80% for temperature
51.12.2 Upto 60ºC decreasing linearly to 75% relative humidity at 50^0C
51.13 Storage Temperature: 20°C ~ 60°C (-4^0F to 140^0F), <80% R.H. (with battery removed)
51.14 Power Supply: Standard 1.5 V AAA Size Battery X 2
51.15 Dimension: Standard 1.5 V AAA Size Battery X 2
51.16 Weight: Approx. 80 g (including battery)

52 Earth Resistance/ Leakage Tester - Digital Clamp Type

52.1 Basic Indicative Diagram

52.2 Display: 4 Digit LCD Backlight Display.
52.3 Should also measure leakage current
52.4 Jaw Size: 65 x 32 mm.
52.5 Span of Jaw: 32mm.
52.6 Operating Temperature: -10 C ~ 55 C
52.7 Relative humidity: 10% ~ 90%RH
52.8 Protection grade: Double Insulation
52.9 Range selection: Automatic
52.10 PC interface: RS232 interface
52.11 Sampling Time: 1 second
52.12 Earth Resistance Measurement Range: 0.100 ~ 1200Ω
52.13 Resistance Measurement Resolution: 0.001 Ω
52.14 Resistance Measurement Range: 0.10 mA ~ 20.0A
52.15 Dimensions (LxWxH) in mm (±10%): Approx. 300 X 90X 55
52.16 Net Weight (±10%): Approx. 1000 Grams (Excluding batteries)
52.17 Power Supply: 6VDC (4 x AAA Alkaline Dry Battery).
52.18 Accessories
- 52.18.1 Standard 5.1 ohm Testing Coil
- 52.18.2 Batteries
- 52.18.3 Operating Manual
- 52.18.4 Software CD
- 52.18.5 Interface Cable
- 52.18.6 Heavy Duty Carrying Case

53 Frequency Counter

53.1 Basic Indicative Diagram

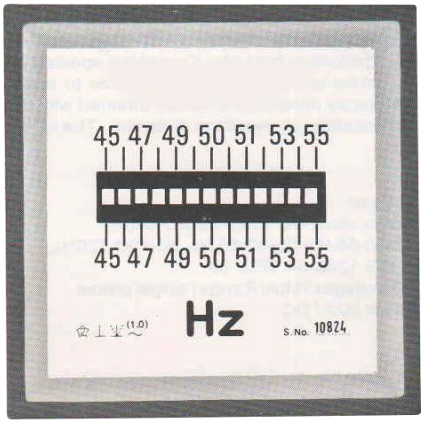
53.2 Frequency measurement method
53.3 Simultaneously in cycle a self-test function.
53.4 Cycle cumulative measurement.
53.5 Display:
- 53.5.1 8 LED high brightness display windows
- 53.5.2 0 to 9 characters display.

53.6 Both importations frequency ranges: 10Hz to 2.7GHz
53.7 Highest input sensitivity: 20mVrms.
53.8 Stability: ± 3 x 10-9s
53.9 Multifunction: Frequency , Period measurement.
53.10 Frequency measurement
53.11 A Channel
- 53.11.1 Range: 10Hz ~ 10MHz (Direct count); 10MHz ~ 100MHz (proportion count)
- 53.11.2 Direct count: 1Hz, 10Hz, 100Hz (your choice)
- 53.11.3 Proportion count: 10Hz, 100Hz, 1000Hz (your choice)
- 53.11.4 Strobe time: 0.01s, 0.1s, 1s (your choice)
- 53.11.5 Accuracy: ± count value ± base time error X measured frequency

53.12 B Channel
- 53.12.1 Range: 100MHz ~ 1GHz
- 53.12.2 Resolution: 100Hz, 1KHz, 10KHz
- 53.12.3 Strobe time: 0.01s, 0.1s, 1s
- 53.12.4 Accuracy: ± count value ± base time error x measured frequency
- 53.12.5 Humidity: Working Humidity : 10-90%RH
- 53.12.6 Storage Humidity: 5-95%RH
- 53.12.7 Dimension: Approx. 230 x 200 x 75 mm
- 53.12.8 Weight: Approx. 2Kg

54 Frequency Meter - 45 to 55 Hz, Vibrating Reeds Type

54.1 Basic Indicative Diagram



54.2	Voltage Rating:	115; 230; 420V (Triple Range)
54.3	Test Voltage:	2000V, AC for 1 minute.
54.4	Insulation Resistance (design):	More than 20MΩ at 500V DC.
54.5	Casing:	ABS White with narrow black ring.
54.6	Accuracy:	±0.5 Hz as per I.S.S. 1248-84, BSS 89-81
54.7	Ranges:	45-50-55 Hz
54.8	Dimensions in mm (±10%):	95 X 75 X 95

55 Gas Leak Detector - For Halogen Gas

55.1 Basic Indicative Diagram

55.2 Should have audible ticker signal and visual leak size indicator.
55.3 Should have adjustable sensitivity, fast warm-up
55.4 Should have Goose neck probe
55.5 Should have detection of following gases

55.6	CFCs:	R12, R11, R500, R503
55.7	HCFCs:	HCFCs
55.8	HCFCs:	R134a, R404a, R125
55.9	SF6, Halogen gases	
55.10	Warm up time:	6 Second
55.11	Sensitivity:	Adjustable, Maximum 14 gram / year
55.12	Alarm mode:	Sound and Light
55.13	Length of Probe:	23cm
55.14	Operating Temperature:	0°C ~ 50°C with 90%RH. and Humidity
55.15	Power Supply:	1.5V AAA battery
55.16	Weight:	250g (±10%)
55.17	Dimensions:	175 mm X 45mm X 45mm (±10%)
55.18	Accessories:	Battery and Carrying Case

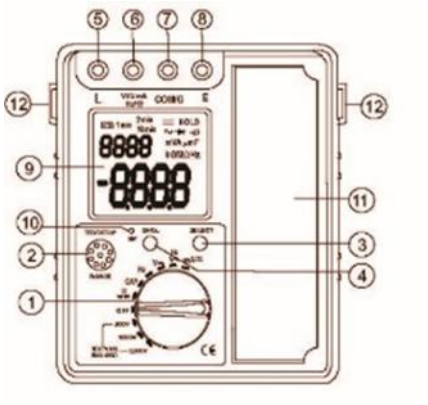
56 Gloss Meter - Digital

56.1 Basic Indicative Diagram

56.2	Measuring Range:	0.1 ~ 200GU
56.3	Measuring Geometry:	75 Degrees
56.4	Stability (internal design):	±0.4GU/30min
56.5	Error:	< ±1.2GU
56.6	Accuracy:	±1.0 gloss unit (against reference standard)
56.7	Resolution:	0.1GU
56.8	Repeatability (Internal Design):	±0.5GU (0…99.9)
56.9	Environment Temperature:	0 ~ 40°C
56.10	Relative Humidity:	No more than 85%
56.11	Size:	136 X 44 X 78 mm
56.12	Power Supply:	Built-In 3.7V Lithium Battery
56.13	Weight:	350 Grams (Including Batteries)
56.14	Standard Accessories	
	56.14.1 Host	
	56.14.2 Carrying Case	
	56.14.3 Operating Manual	
	56.14.4 Charger	

57 Insulation/ Resistance Tester - 1000V, Digital Type with Multimeter Functions

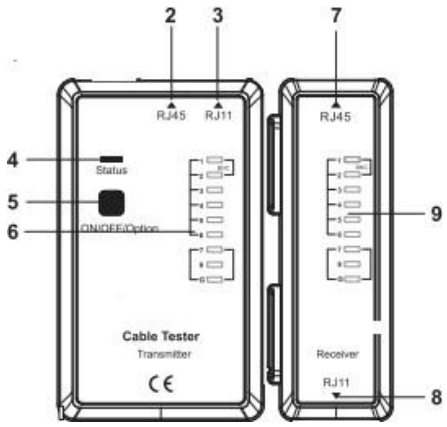
57.1 Basic Indicative Diagram



57.2	Basic Accuracy DC Voltage:	±(0.5% rdg + 5 dgts)
57.3	Display:	3¾ digit Max. 4000 Counts liquid crystal display
57.4	Sampling Rate:	2 times per second
57.5	Short Circuit (internal design):	1.5mA
57.6	OL Indication:	Display should indicate overload
57.7	Operating Temperature:	0°C-40°C, < 75%R.H.
57.8	Storage Temperature:	-10°C-60°C, < 80%R.H.
57.9	DC Voltage Range:	1000V
57.10	AC Voltage Range:	700V
57.11	DC Current:	400mA
57.12	AC Current:	400mA
57.13	Resistance:	40M Ω
57.14	Capacitance:	40uF
57.15	Frequency:	4MHz
57.16	Diode and Continuity:	Required
57.17	Auto Power Off Required	
57.18	Guard Terminal for Insulation Testing:	Required
57.19	Insulation Resistance Range:	250V (0.25M Ω ~ 400M Ω) /500V (0.5M Ω ~ 4G Ω) / 1000V (1.5M Ω ~ 40G Ω).
57.20	Overload Protection (internal design):	Must be present
57.21	High Voltage Output Status:	Should be indicated by LED light (The meter should display actual insulation test voltage)
57.22	Should be able to measure:	Insulation Resistance, AC and DC Voltage
57.23	Other Features	
	57.23.1 Backlight	
	57.23.2 Function Characters Indication	
	57.23.3 Auto Power Off	
	57.23.4 Low Battery indicator	
	57.23.5 Dimensions (LXWXH) in mm:	168 x 155 x 65 (±10%)
	57.23.6 Net Weight:	650 Grams Excluding Battery (±10%)
57.24	Accessories	
	57.24.1 Test Leads	
	57.24.2 Carrying Case	
	57.24.3 Batteries	
	57.24.4 User Manual	

58 LAN Cable Tester

58.1 Basic Indicative Diagram:



58.2	Should be able to test:	Test Ethernet Cables and telephone lines
58.3	To test for RJ45, RJ11, Short Circuit, Cross Over, Open Circuit	
58.4	Should be able to automatic test:	Open Circuits, Shorts, MIS Wires and Reversals
58.5	Visible LED Indication:	Should be available Green LED indication for correct wiring Red LED indication for wrong wiring
58.6	Single key operation:	Should be available
58.7	Low battery indication:	Should be available
58.8	Power Supply:	DC 9 V Battery

58.9 Accessories:

58.9.1 Plastic/ Resin/ Wooden Carrying Case with required cushioning
58.9.2 Required Batteries
58.9.3 Operation Manual
58.9.4 Required Batteries

59 LCR Meter - Digital 3 ½ Digit

59.1 Basic Indicative Diagram

59.2	Basic Accuracy (Resistance):	± (1 % + 2 digits)
59.3	Display:	3½ digit LCD display (4000 Counts)
59.4	Resistance:	400 Ω to 40 M Ω
59.5	Capacitance:	4 nF to 100 µF
59.6	Inductance:	4 mH to 40 H
59.7	Diode measurement:	Should be available
59.8	Transistor Measurement:	Should be available
59.9	Continuity Buzzer:	Should be available
59.10	Low battery Indicator:	Should be available
59.11	Overload Protection:	Should be available
59.12	Compliance:	CE certificate
59.13	LCD Size	
59.14	Product Size:	187 mm X 88 mm X 32 mm (± 10%)
59.15	Accessories	

59.15.1 Required Batteries
59.15.2 Test Clip
59.15.3 Holster
59.15.4 Operation Manual
59.15.5 Calibration Certificate
59.15.6 Plastic/ Resin/ Wooden Carrying Case with required cushioning

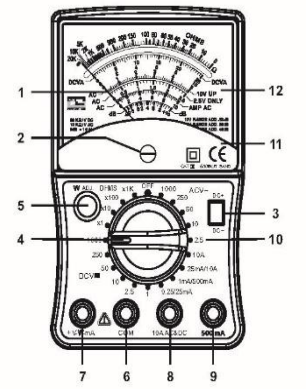
60 LUX Meter - Upto 1 Lakh LUX

60.1 Basic Indicative Diagram

60.2 Luminance Range: 1 ~ 1,00,000 Lux (3 ranges)
60.3 3 ranges: 0 ~ 1,999 Lux
2,000 ~ 19,999 Lux
20,000 ~ 1,00,000 Lux
60.4 Lux Resolution: 1 / 10 / 100 LUX
60.5 Accuracy: 0 ~ 1,9999 : ± (4%rdg + 2 digits);
20,000 ~ 1,00,000 : ± (5%rdg + 2 digits)
60.6 Sample Rate: 0.4 seconds
60.7 Operating Temperature: 0° C ~ 50° C (32° F ~ 122° F)
60.8 Operating Humidity: less than 80% R.H.
60.9 Display in LUX
60.10 High Accuracy in measuring.
60.11 Auto zero Adjustment
60.12 Data Hold Function
60.13 LCD display
60.14 Separate LIGHT SENSOR allows user take measurements at an optimum position.
60.15 Low Battery Indication and Auto Power Off.
60.16 Accessories
60.16.1 Operating Manual
60.16.2 Calibration Certificate
60.16.3 Required Batteries
60.16.4 Plastic / Rexine/ Wooden Carrying Case with required cushioning,

61 Multimeter - Analog

61.1 Basic Indicative Diagram



61.2	DC Voltage Ranges:	0.25/ 1/ 2.5/ 10/ 50/ 250/ 1000V
61.3	Accuracy:	± 2% F.S.
61.4	Sensitivity:	50 kohm/ V
61.5	AC Voltage Ranges:	2.5/ 10/ 50/ 250/ 1000V
61.6	Accuracy:	± 3% F.S.
61.7	Sensitivity:	10 kohm/ V
61.8	Decibel Meter:	-20 to 62 dB (0 dB = 1 mW/ 600 Ω)
61.9	Direct Scale:	-20 to + 10 dB
61.10	DC Current Ranges:	25uA/ 1mA/ 25mA/ 500mA 10A (on separate input)
61.11	Accuracy:	± 2% F.S.
61.12	Sensitivity:	250 mV
61.13	AC Current Ranges:	10 A
61.14	Accuracy:	± 3% F.S.
61.15	Resistance Ranges:	R X 1 (0.2 to 20 kΩ) R X 10 (2 Ω to 200 kΩ) R X 100 (20 Ω to 2 MΩ) R X 1K (200 Ω to 20 MΩ)
61.16	Zero Corrector:	Required
61.17	Polarity Reversal Switch:	Required
61.18	Range Selector:	Required

61.19 Features:

61.19.1 EN 61010-1 CAT III 600V

61.19.2 EN 61326 -1

61.19.3 High quality Taut Band movement. Easy to read 3-color scale for mistake Proof reading

61.19.4 Mirror scale to make reading pointer easy

61.19.5 Safety features: safety fused (10A, 1A, 0.5A)

61.19.6 Safety "OFF" position, dB measurement.

61.19.7 Stand to make reading and measuring easy

61.20 Accessories

61.20.1 Test leads

61.20.2 Batteries in built

61.20.3 User Manual

61.20.4	Power Supply:	1.5 V(AA) X 2
61.20.5	Dimensions in mm:	160 (L) X 100 (W) X 45 (D) (± 10%)
61.20.6	Net Weight:	375 Grams (Battery included) (±10%)

62 Multimeter - Digital - 3 ½ Digit

62.1 Basic Indicative Diagram

62.2	Sensing:	True RMS
62.3	Display:	3-5/6 digits 6000 counts liquid crystal LCD display
62.4	Maximum Display:	5999 counts
62.5	Sampling Time:	About 3 times/ second
62.6	Operating Temperature:	0° C to 40° C, Relative Humidity < 80%
62.7	Measurement:	Double integral A/D conversion
62.8	Overrange Display:	'OL'
62.9	Automatic Polarity display	
62.10	Auto Power Off:	About 15 minutes when no signal
62.11	Low Battery Indication:	Below 2.3 V
62.12	Power Supply:	1.5V AAA X 2 battery
62.13	Backlight Display	
62.14	Pulse Output	
62.15	Data Hold	
62.16	Non-Contact Voltage Measurement (NCV)	
62.17	Flash Light	
62.18	MAX/MIN and Rel Zero	
62.19	DC Voltage	
	62.19.1 Ranges:	6 V, 60 V, 600 V, 1000 V
	62.19.2 Resolution:	0.00 1V to 1 V
	62.19.3 Accuracy:	± (0.5% rdg + 3dgts) for 6 V - 600 V ± (0.8% rdg + 10dgts) for 1000 V
	62.19.4 Input Impedance:	10 MΩ
	62.19.5 Maximum input voltage: 750 VAC (RMS) or 1000 V DC	
62.20	AC Voltage	
	62.20.1 Ranges:	6 V, 60 V, 600 V, 750 V
	62.20.2 Resolution:	0.001 V to 1 V
	62.20.3 Accuracy:	± (0.8% rdg + 3dgts) for 6 V-600 V ± (1.2% rdg + 10dgts) for 750 V
	62.20.4 Input Impedance:	10 MΩ
	62.20.5 Frequency response:	40 Hz ~ 1 kHz (sine wave and triangular wave) 40Hz ~ 200Hz (other waveforms)
62.21	DC Current	
	62.21.1 Ranges:	600 µA to 10 A
	62.21.2 Resolution:	0.1 µA to 0.01 A
	62.21.3 Accuracy:	± (1.2% rdg + 10 dgts) to ± (2.0% rdg + 30 dgts)

62.22	AC Current	
	62.22.1 Ranges:	600 µA to 10 A
	62.22.2 Resolution:	0.1 µA to 0.01 A
	62.22.3 Accuracy:	± (1.2% rdg + 10 dgts) to ± (2.0% rdg + 30 dgts)
62.23	Resistance	
	62.23.1 Ranges:	600 Ω to 40 MΩ
	62.23.2 Resolution:	0.1 Ω to 10 kΩ
	62.23.3 Accuracy:	± (0.8% rdg + 3 dgts) to ± (2.5% rdg + 3 dgts)
62.24	Capacitance	
	62.24.1 Ranges:	99.99 nF to 9.999 mF
	62.24.2 Resolution:	0.01 nF to 0.001 mF
	62.24.3 Accuracy:	± (3.5% rdg + 20 dgts) to ± (5.0% rdg + 3 dgts)
62.25	Frequency	
	62.25.1 Ranges:	10 Hz to 10 MHz
	62.25.2 Resolution:	0.01 Hz to 10 kHz
	62.25.3 Accuracy:	± (0.1% rdg + 3 dgts)
62.26	Additional Functions	
	62.26.1 Diode Test	
	62.26.2 Continuity Test	
62.27	Accessories:	
	62.27.1 Test Lead	
	62.27.2 User Manual	
	62.27.3 Required Batteries	
	62.27.4 Calibration Certificate	
	62.27.5 Plastic / Rexine/ Wooden Carrying Case with required cushioning	

63 PH Meter - Digital

63.1 Basic Indicative Diagram

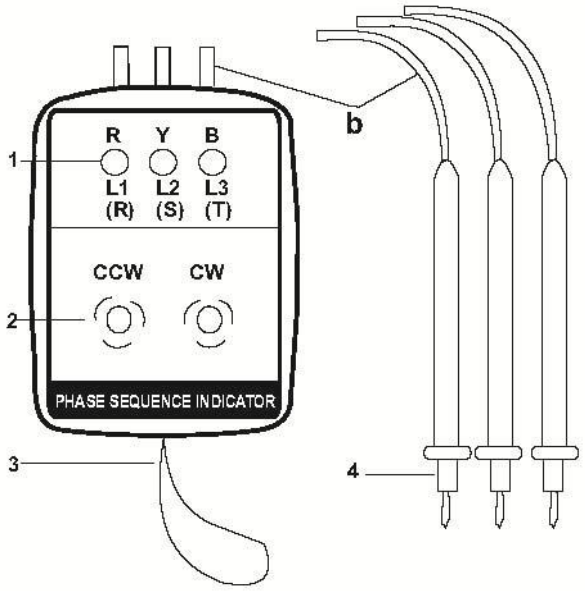
63.2	Type:	pH
63.3	Range:	0~14.0
63.4	Accuracy:	±0.1+1 digit
63.5	Resolution:	0.1 pH
63.6	LCD Display:	21 mm x 18mm (±10%)
63.7	Casing: Impact resistant ABS case by waterproof designed IP 57 rated (for short time)	
63.8	Calibration:	1 or 2 points (pH only) manual calibration via screw trim pot
63.9	Electrode Module:	Changeable for replacement by user
63.10	Auto Power Off after approximately 5 minutes of not in use	
63.11	Calibration:	By User
63.12	Dimensions in mm:	170 (L) X 40(W) (±10%)
63.13	Net Weight:	Approx. 90 g. (Including Battery) (±10%)
63.14	Power Supply:	3V x 2 Lithium battery CR2032.

63.15 Accessories

63.15.1 Standard Solution (pH4 and pH7)
63.15.2 Soaking Solution
63.15.3 Battery
63.15.4 Screw Driver
63.15.5 User Manual
63.15.6 Carrying Case

64 Phase Sequence Indicator/ Meter

64.1 Basic Indicative Diagram



64.2 Should measure the Phase sequence (R, Y, B) and Open phase Condition through LED and Buzzer.

64.3 Operational Voltage: 60 ~ 600V (3 phase AC)

64.4 Dielectric Strength (internal design): 2000V / minute (impulse Voltage 4000V)

64.5 Measuring Frequency Range: 20Hz ~ 400Hz

64.6 Time limit for continuous: 60 min. at 200V AC, 4 min. at 600V AC

64.7 Test Leads: 3 color Test leads for Phase identification

64.8 LED Indications with Buzzer: Correct Phase, Reverse Phase, Open Phase

64.9 Accessories

- 64.9.1 Test leads (fit to meter) with Pin Terminal
- 64.9.2 Separate Insulated Crocodile Clips
- 64.9.3 Carrying Case
- 64.9.4 User Manual

64.10 Dimensions: 85 (L) X 60 (W) X 25 (H) (excluding the test leads) (± 10%)

64.11 Net Weight: Approx. 160 Grams (± 10%)

65 Power Factor Meter - 240 V, 10 A, Single Phase

65.1 Basic Indicative Diagram

65.2 Should have On Site Programmable PT/CT Ratios
65.3 Should work on 230 V AC Supply
65.4 Should have User Selectable Power Parameter (Active / Reactive /Apparent)
65.5 True RMS Measurement: The instrument should measure distorted waveform up to 15th harmonic
65.6 LED Display
- 65.6.1 High Brightness
- 65.6.2 Single line four digit
- 65.6.3 Digit heights 20 mm

65.7 Enclosure Protection for Dust and Water: Should Conform to IP 54 (front face) as per IEC60529
65.8 Should be Compliant to International Safety standard IEC 61010-1 - 2001
65.9 EMC Compatibility: Should be Compliant to International standard IEC 61326
65.10 Should have very low back depth (behind the panel) of less than 80 mm
65.11 Input Voltage
- 65.11.1 Nominal Input Voltage (AC RMS): Phase-Neutral 57.7 - 277V L-N (Line-Line 100 - 480V L-L)
- 65.11.2 Max Continuous Input Voltage: 120% of rated value

65.12 Input Current
- 65.12.1 Nominal Input Current: 5A AC RMS
- 65.12.2 External CT (10/5) to be connected to meter to stepdown current to 5A

65.13 Operating Range
- 65.13.1 Voltage: 5%....120% rated Value
- 65.13.2 Current: 5%....120% rated Value
- 65.13.3 Frequency: 45.....70Hz
- 65.13.4 P.F: 0.5 Lag...1...0.5 lead for kW, kVAr DPM / 0.1 Lag...1...0.1 lead for PF DPM

65.14 Accuracy-Power Factor: ±2° (0.1 Lag...1...0.1 Lead)
65.15 Environmental
- 65.15.1 Operating Temperature: -10 to + 55°C
- 65.15.2 Storage temperature: -20 to + 65°C
- 65.15.3 Relative humidity: 0...90% non condensing
- 65.15.4 Warm up time: Minimum 3 minute
- 65.15.5 Shock: 15g in 3 planes
- 65.15.6 Vibration: 10...55 Hz, 0.15mm amplitude
- 65.15.7 Enclosure: IP54 (front face only)

65.16 Portable Box Type housed in Bakelite Case

66 Power Factor Meter - 415 V, 20 A, Three Phase

66.1 Basic Indicative Diagram

66.2 Should have On Site Programmable PT/CT Ratios
66.3 Should work on 230 V AC Supply
66.4 Should have User Selectable Power Parameter (Active / Reactive /Apparent)
66.5 True RMS Measurement: The instrument should measure distorted waveform up to 15th harmonic.
66.6 LED Display
- 66.6.1 High Brightness
- 66.6.2 Single line four digit
- 66.6.3 Digit heights 20 mm

66.7 Enclosure Protection for Dust and Water: Should Conform to IP 54 (front face) as per IEC60529
66.8 Compliance to International Safety Standards: Should be Compliant to International Safety standard IEC 61010-1 - 2001
66.9 EMC Compatibility: Should be Compliant to International standard IEC 61326
66.10 The instrument should have very low back depth (behind the panel) of less than 80 mm.
66.11 Input Voltage
- 66.11.1 Nominal Input Voltage (AC RMS): Phase-Neutral 57.7 - 277V L-N (Line-Line 100 - 480V L-L)
- 66.11.2 Max Continuous Input Voltage: 120% of rated value

66.12 Input Current
- 66.12.1 Nominal Input Current: 5A AC RMS
- 66.12.2 External CT (20/5) to be connected to meter to stepdown current to 5A

66.13 Operating Range
- 66.13.1 Voltage: 5%....120% rated Value
- 66.13.2 Current: 5%....120% rated Value
- 66.13.3 Frequency: 45.....70Hz
- 66.13.4 P.F: 0.5 Lag...1...0.5 lead for kW, kVAr DPM / 0.1 Lag...1...0.1 lead for PF DPM

66.14 Accuracy-Power Factor: ±2° (0.1 Lag...1...0.1 Lead)
66.15 Environmental
- 66.15.1 Operating Temperature: -10 to + 55°C
- 66.15.2 Storage temperature: -20 to + 65°C
- 66.15.3 Relative humidity: 0...90% non condensing
- 66.15.4 Warm up time: Minimum 3 minute
- 66.15.5 Shock: 15g in 3 planes
- 66.15.6 Vibration: 10...55 Hz, 0.15mm amplitude
- 66.15.7 Enclosure: IP54 (front face only)

66.16 Portable Box Type housed in Bakelite Case

67 Power Meter

67.1 Basic Indicative Diagram

67.2 Should have On Site Programmable PT/CT Ratios
67.3 Should have User Selectable Power Parameter (Active / Reactive /Apparent)
67.4 True RMS Measurement: The instrument should measure distorted waveform up to 15th harmonic.
67.5 LED Display
- 67.5.1 High Brightness
- 67.5.2 Single line four digit
- 67.5.3 Digit heights 20 mm.

67.6 Enclosure Protection for Dust and Water: Should Conform to IP 54 (front face) as per IEC60529
67.7 Compliance to International Safety Standards: Should be Compliant to International Safety standard IEC 61010-1 - 2001
67.8 EMC Compatibility: Should be Compliant to International standard IEC 61326
67.9 The instrument should have very low back depth (behind the panel) of less than 80 mm.
67.10 Input Voltage
- 67.10.1 Nominal Input Voltage (AC RMS): Phase-Neutral 57.7 - 277V L-N (Line-Line 100 - 480V L-L)
- 67.10.2 Max Continuous Input Voltage: 120% of rated value

67.11 Input Current: 1A /5A AC RMS
67.12 Operating Range
- 67.12.1 Voltage: 5%....120% rated Value
- 67.12.2 Current: 5%....120% rated Value
- 67.12.3 Frequency: 45…..70Hz
- 67.12.4 P.F: 0.5 Lag...1...0.5 lead for kW, kVAr DPM / 0.1 Lag...1...0.1 lead for PF DPM

67.13 Accuracy-Power Factor: ±2° (0.1 Lag...1...0.1 Lead)
67.14 Environmental
- 67.14.1 Operating Temperature: -10 to + 55°C
- 67.14.2 Storage temperature: -20 to + 65°C
- 67.14.3 Relative humidity: 0...90% non condensing
- 67.14.4 Warm up time: Minimum 3 minute
- 67.14.5 Shock: 15g in 3 planes
- 67.14.6 Vibration: 10...55 Hz, 0.15mm amplitude
- 67.14.7 Enclosure: IP54 (front face only)

68 Pressure Gauge - Digital Type, Diameter 63mm with Recalibration Set

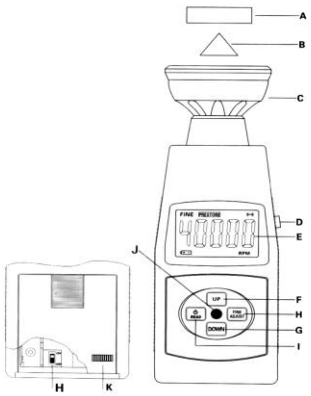
68.1 Basic Indicative Diagram

68.2 Should have Re-zero feature and peak pressure reading
68.3 Backlight should turn on when on/off button is pressed and with pressure changes
68.4 Should have 316L welded diaphragm seal

68.5	Case Size:	2.5” (63mm)
68.6	Case material:	ABS (IP64)
68.7	Rubber Boot:	Silicone rubber (IP65)
68.8	LCD Display:	2” x ¾” (48mm x 16mm)
68.9	Connection:	¼” NPT 304SS
68.10	Sensor:	316L Welded, Piezo
68.11	Operation Life:	1 million cycles
68.12	Power Supply:	2 x AAA battery (1.5V)
68.13	Battery Life:	2 years (auto shut-off mode)
68.14	Power Mode:	Auto or manual shut off mode
68.15	Display Digits:	4 digits to 5,000 psi
68.16	Five digits for 10, 000 psi	
68.17	Resolution:	1 digit
68.18	Pressure Unit Selection:	psi mmH2O
68.19	Operation Mode:	Continuously reading or peak pressure reading
68.20	Accuracy:	±0.5%

69 Stroboscope

69.1 Basic Indicative Diagram



69.2	Display:	5 Digits 40,000 Counts backlight LCD display
69.3	Range:	60 - 40,000 RPM.
69.4	Time Base (internal design):	10MHz Quartz Crystal Oscillator.
69.5	Coarse Tuning:	Required
69.6	Fine Tuning:	Required
69.7	Accuracy:	±0.05%
69.8	Resolution:	<1000 RPM: 0.1 RPM / FPM, >1000 RPM: 1 RPM / FPM.
69.9	Features:	Measuring Tach By Non-contact Large LCD Display With Backlight Digital Control to adjust Flash Frequency

70 Tachometer - Digital Type - Contact and Non Contact - 9999 RPM

70.1 Basic Indicative Diagram

70.2	Display:	5 digits 18mm LCD White Backlight display
70.3	Sampling Time (internal design):	0.8 Sec (Over 120 RPM)
70.4	Test Range:	Auto Ranging
70.5	Range I:Non contact:	2.5 to 99999 RPM
70.6	Range II:	Contact: 0.5 to 19999 RPM (Surface speed 0.05 to 1999.9 m/min)
70.7	Accuracy:	±(0.05% + 1digits)
70.8	Resolution:	Non contact, 2.5 to 99999 RPM - 0.1 (2.5 ~ 999.9) / 1 RPM (over 1000RPM)
70.9	Contact:	0.1 RPM(0.5 to 999.9 RPM) / 1 RPM over 1000 RPM
70.10	Surface speed:	0.01m/min (0.05 to 99.99m/min), 0.1m/min (over 100m/min)
70.11	Memory:	Last value, Max Value, Min Value
70.12	Detecting Distance:	50 to 500mm (photo)
70.13	Operating Temperature:	0 - 50 °C
70.14	Operating Humidity:	Less than 80% RH
70.15	Power Consumption (Internal Design):	Approx. 65mA
70.16	Dimensions with Adaptor:	210 (L) X 70 (W) X 43 (H) mm (±10%)
70.17	Net Weight:	Approx. 175 Grams excluding batteries (±10%)
70.18	Power Supply:	3 x 1.5 V AA Size Battery

70.19 Other Features

- 70.19.1 Photo Light Pointer
- 70.19.2 Automatic Data Hold
- 70.19.3 Auto Power Off
- 70.19.4 Low Battery Indication

70.20 Response Time 500ms

70.21 Accessories

- 70.21.1 Carrying Case
- 70.21.2 Surface speed Test Wheel
- 70.21.3 RPM Adapter (Cone)
- 70.21.4 RPM Adapter (Funnel)
- 70.21.5 2 Pieces of Reflecting Tape (350mm)
- 70.21.6 User Manual

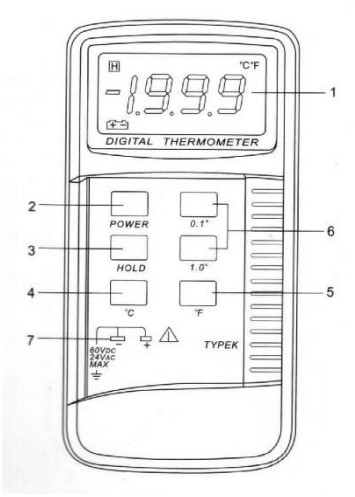
71 Thermo Hygrometer - Digital

71.1 Basic Indicative Diagram

71.2	Temperature Range:	-50°C ~ 70°C / (-58°F ~ 158°F)
71.3	Temperature Accuracy:	±1°C / (±1.8°F)
71.4	Temperature Resolution:	0.1°C / °F
71.5	Humidity Range:	10% RH ~ 99 % RH
71.6	Humidity Resolution:	1 % RH
71.7	Humidity Accuracy:	±5% (35% ~75%) and else ±10%
71.8	12 / 24 Hour Display:	Required
71.9	Clock, Temperature and Humidity display:	Should be available
71.10	Room temperature display:	Should be available
71.11	Room Humidity display:	Should be available
71.12	Maximum or minimum memorization function:	Should be available
71.13	Alarm clock function at a desired hour:	Should be available
71.14	Dimensions (L X W X H) in mm:	120 X 100 X 20 (±10%)
71.15	Net Weight:	125 Grams (±10%) (Including Batteries)
71.16	Power Supply:	Single 1.5V DC AAA battery
71.17	Accessories	
	71.17.1 Battery 1 Number	
	71.17.2 User Manual	

72 Thermometer - Digital - 0 to 1000 Degree Celsius

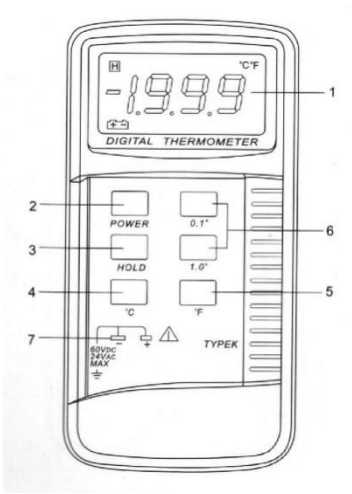
72.1 Basic Indicative Diagram



72.2 Display: 3½ digit liquid crystal display (LCD) with maximum reading of 1999.
72.3 Temperature Range: 0°C ~ 1000°C
72.4 Basic Accuracy: ±(0.3% + 1°C).
72.5 Temperature Type: K-Type Thermocouple
72.6 °C / °F Selection: Required
72.7 Data Hold Function: Required
72.8 Resolution: 0.1 °C / 1 °C
72.9 Battery: Standard 9V battery (NEDA 1604, IEC 6F22)
72.10 Probe 1 No. type “K” thermocouple bead probe (125°C, Teflon tape insulated)
72.11 Probe accuracy ±2.2°C or ±0.75 % of 0.75% of reading (whichever is greater) from 0°C to 800°C
72.12 Dimensions: 160 (L) x 80 (W) x 40 (H) mm (including Holster) (±10%)
72.13 Net Weight: 220 g (Excluding battery) (±10%)
72.14 Accessories
72.14.1 9V Battery
72.14.2 Holster and “K” thermocouple bead probe - 1 Number (upto 125 deg. C)
72.14.3 User Manual

73 Thermometer - Digital - 0 to 150 Degree Celsius

73.1 Basic Indicative Diagram



73.2 Display: 3½ digit liquid crystal display (LCD) with maximum reading of 1999.
73.3 Battery: Standard 9V battery (NEDA 1604, IEC 6F22)
73.4 Power Consumption: Approx. DC 3.8mA (typical)
73.5 Dimension: 150 (H) x 70 (W) x 40 (D) mm (±10%)
73.6 Weight: 200 Grams (including battery) (±10%)
73.7 Supplied probe: 1 No. type “K” thermocouple bead probe (Teflon tape insulated) 4 feet long
73.8 Maximum Insulation temperature 260°C (500°F).
73.9 Probe accuracy ±2.2°C or ±0.75 % of 0.75% of reading (whichever is greater) from 0°C to 800°C
73.10 Input Protection: 60VDC or 24V AC max input.
73.11 Accessories
73.11.1 9V battery (installed)
73.11.2 Instruction Manual
73.11.3 Holster and “K” thermocouple bead probe 1 No.

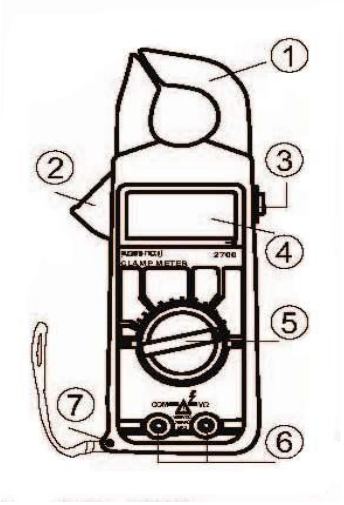
74 Thermometer - Infrared Type, Digital Sensor - -50 to +1500 Degree Celsius

74.1 Basic Indicative Diagram

74.2	Temperature Range:	-50 ~ 1500°C
74.3	Accuracy:	±2% or 2°C
74.4	Resolution:	0.1°C (0.1°F)
74.5	Response Time and Wavelength:	500ms and (8-14 µm)
74.6	Emissivity Adjustable:	0.1 to 1.0
74.7	Distance to spot ratio:	50:1
74.8	Repeatability:	±1% or ±1°C
74.9	High / Low Temperature Alarm Setup	
74.10	Two Laser Target Pointer Selection.	
74.11	Max / Min / Avg / Dif Temperature Measurement.	
74.12	°C / °F select switch	
74.13	Backlight display selection	
74.14	Data Hold Function	
74.15	Auto Power Off	
74.16	Low Battery Indication	
74.17	Power Supply:	9V Battery
74.18	Accessories:	
	74.18.1 User Manual	
	74.18.2 Battery	
	74.18.3 Carrying case	
74.19	Net Weight:	196 Gram ±10% (Excluding Batteries)
74.20	Dimensions(mm):	165 X 40 X 120 (±10%)

75 Tong Tester - 0 - 300 A Digital Type

75.1 Basic Indicative Diagram



75.2 Display: 3½ digit 1999 counts LCD display with automatic sign and functions.

75.3 Jaw opening size: 26 mm

75.4 Sensing: TRMS sensing

75.5 DC Voltage: 0.1mV ~ 600V

75.6 AC Voltage: 0.001V ~ 600V

75.7 AC Current: 0.001A ~ 600A

75.8 Resistance: 0.1Ω ~ 40 MΩ.

75.9 Diode and Continuity Test: Required

75.10 Capacitance: 0.001 nF ~ 40 mF.

75.11 Temperature: -40 °C ~ 1000 °C

75.12 Safety: IEC61010, IEC61010-2-032 Dual insulation CAT III 600V and Pollution Class 2.

75.13 Non-Contact Voltage Detection

75.14 Backlight display and Flashlight

75.15 Auto Power Off in 15 minutes

75.16 Over range indication

75.17 Low battery indication: Low battery symbol should be displayed when the battery voltage drop below the operating Voltage.

75.18 Operating Temperature and Humidity: 0°C to 50°C 40°C; < 70% R.H.

75.19 Storage Temperature and Humidity: -20°C to 60°C; < 80% R.H. with battery removed.

75.20 Features

75.20.1 Overload protection on all ranges

75.20.2 Recessed safety designed input jacks

75.20.3 Data Hold switch to freeze reading

75.20.4 Tough ABS plastic housing

75.21 Power Supply: Single standard 9 V Suitable battery.

75.22 Accessories

75.22.1 Test leads (Pair)

75.22.2 Battery

75.22.3 Carrying Case

75.22.4 Drop Proof Wrist Strap

75.22.5 Thermocouple upto 250°C

76 Vibrometer - Digital Type

76.1 Basic Indicative Diagram

76.2 Should Visually display measurement value and state
76.3 Should have Acceleration, Velocity and displacement measurement
76.4 Should have Different vibration frequency selection
76.5 Should be Provided with long and short probe head, each one suitable for different situation measurement.
76.6 Should be equipped with AC signal output interface
76.7 Display: 3.5 Digits LCD Backlight display.
76.8 Display update cycle: 1 second
76.9 Output: AC output 2V peak (display full scale) load impedance 10KΩ or more earphones can be connected.
76.10 Static current: ??20?A
76.11 Operating Current: ??25mA
76.12 Operating Temperature: 0 ~ 40°C
76.13 Operating humidity range: 30 ~ 90% RH
76.14 Battery life: Approx. 20H continuous use
76.15 Auto power off: Should turns off automatically after 60 seconds.
76.16 Power supply: 9V battery
76.17 Dimension: 70 X 30 X 180 mm (±10%)
76.18 Weight: 180 Grams (including battery) (±10%)
76.19 Vibration pickup: Piezoelectric ceramic accelerometer (shear-type)
76.20 Measurement range of acceleration: 0.1 ~ 199.9m/s^2 peak
76.21 Measurement range of velocity: 0.1 ~ 199.9mm/s rms
76.22 Measurement range of displacement: 0.001 ~ 1.999 mm p-p Velocity and displacement range is limited by acceleration 199.9m/s^2
76.23 Measurement accuracy: ±(5% + 2 digits)
76.24 Measurement frequency range of acceleration: 10Hz ~ 1KHz (LO) 1KHz ~ 15KHz (HI)
76.25 Measurement frequency range of velocity: 10Hz ~ 1KHz (LO)
76.26 Measurement frequency range of displacement:10Hz ~ 1KHz (LO)

77 DC Ohmmeter 0 to 1000 Ohms, mid scales at 0 Ohms, Analog Type

77.1 Basic Indicative Diagram

77.2 Analog type
77.3 Rated Insulation Resistance: 1000 MΩ
77.4 Scale Range: 0-1000 MΩ
77.5 Rated Voltage: 500 V
77.6 AC Voltage Range: 0-600 V
77.7 Accuracy: Within ±5% of full scale
77.8 Terminal to Terminal Voltage:
77.8.1 ±10% of rated voltage for infinite scale
77.8.2 About 90% of rated voltage for center scale
77.9 AC Voltage Accuracy: Within ±5% of maximum scale value
77.10 Accessories:
77.10.1 Test lead with probe (x1)
77.10.2 Test lead with clip (x1)
77.10.3 Instruction Manual
77.11 Usage: Insulation tests for general equipment and electronic components
77.12 Core magnet type meter for stability and reduced influence from external magnetic fields
77.13 AC voltage measurement capability
77.14 Lockable measuring switch for continuous measurements
77.15 LED indicator for output voltage status
77.16 DC-DC converter for stable voltage
77.17 Power Supply: Suitable batteries

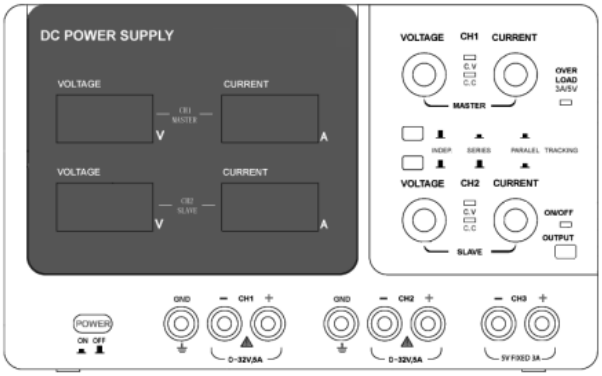
78 DC Power Supply - 0 - 30 V, 5 A

78.1 Basic Indicative Diagram

78.2	Output voltage:	0 to 30 Volt
78.3	Output Current:	0-5 A
78.4	Ripple and Noise:	≤ 0.3 mVrms
78.5	Display Accuracy:	
	78.5.1 3 digit ≤ ± (0.1% + 5)	
	78.5.2 3 digit ≤ ± (0.4% + 3)	
78.6	Reliability (MTBF):	< 2000 Hours
78.7	Display:	LED should display the voltage and current values
78.8	Power Input Voltage:	110 V AC/ 230 V AC
78.9	Frequency:	50Hz/ 60Hz
78.10	Should be supplied with Power Cord	
78.11	Temperature coefficient:	< 300PPM / °C
78.12	Constant Voltage State:	
	78.12.1 Voltage Stability:	< 0.01% + 3 mV
	78.12.2 Load stability:	< 0.01% + 5 mV
	78.12.3 Recovery time:	< 100 mS
	78.12.4 Ripple and noise:	< 1.0 mVrms
78.13	Constant Current State:	
	78.13.1 Current Stability:	< 0.2% + 3mA
	78.13.2 Load stability:	< 0.2% + 3mA
	78.13.3 Ripple and noise:	< 3 mArms
78.14	Additional Functions	
	78.14.1 Signal channel output.	
	78.14.2 Digital Meter show the Voltage and Current values.	
	78.14.3 Voltage / Current adjust knob with Coarse and fine adjustable.	
	78.14.4 Constant Voltage and constant Current operation.	
	78.14.5 Low ripple and noise.	
	78.14.6 Have current limitation protection.	

79 Dual Power Supply - 0 to 30 Volts, 5 Amp

79.1 Basic Indicative Diagram



79.2 Type: Variable Dual Channel + One Channel Fixed Bench Type
79.3 Output Voltage: 0 - 30 V (CH1 and CH2), 5V (CH3)
79.4 Output Current: 0 - 5 A (CH1 and CH2), 5A (CH3)
79.5 Load Regulation
79.5.1 Voltage: ≤0.01% + 2mV (rated at ≤ 5A) +5mV (rated at >5A)
79.5.2 Current: ≤0.01% + 6mA
79.6 Line Regulation
79.6.1 Voltage: ≤0.01% + 3mV
79.6.2 Current: ≤0.01% + 6mA
79.7 Ripple and Noise: CV≤1mV(rms), CV≤20mV(P-P), CC≤3mA(rms), CC≤50mA(P-P)
79.8 Display Accuracy: ±1%rdg + 2digits Volt, ±2%rdg + 2digits
79.9 Overload Protection: Required
79.10 Polarity Inversion Protection: Required
79.11 Power Button: Required
79.12 Indication light for constant current and Voltage: Required
79.13 Display panel for both Voltage and Current: Required
79.14 Certification: CE Compliance
79.15 Power: 230V AC, 50Hz
79.16 Accessories
79.16.1 Power Cord
79.16.2 Manual
79.16.3 Calibration Certificate

80 Rheostat - 0 - 1 Ohm

80.1 Basic Indicative Diagram

80.2 Resistance: 0-1 ohms (±10%)
80.3 Current Ratings: 10 Amps (±10%)
80.4 Open type slide wire type
80.5 Suitable to be used as series resistors or potentiometers.
80.6 Oxidized Constantan wire is wound on pipe to give perfect insulation.
80.7 Three 4 mm socket terminals are provided.
80.8 Supports are made of ABS molded

81 Rheostat - 0 - 10 Ohm

81.1 Basic Indicative Diagram

81.2 Resistance: 0-10 ohms (±10%)
81.3 Current Ratings: 5 Amps (±10%)
81.4 Open type slide wire type
81.5 Suitable to be used as series resistors or potentiometers.
81.6 Oxidized Constantan wire is wound on pipe to give perfect insulation.
81.7 Three 4 mm socket terminals are provided.
81.8 Supports are made of ABS molded.

82 Rheostat - 0 - 100 Ohm

82.1 Basic Indicative Diagram

82.2 Resistance: 0-100 ohms (±10%)
82.3 Current Ratings: 1 Amps (±10%)
82.4 Open type slide wire type
82.5 Suitable to be used as series resistors or potentiometers.
82.6 Oxidized Constantan wire is wound on pipe to give perfect insulation.
82.7 Three 4 mm socket terminals are provided.
82.8 Supports are made of ABS molded.

83 Rheostat - 0 - 25 Ohm

83.1 Basic Indicative Diagram

83.2 Resistance: 0-25 ohms (±10%)
83.3 Current Ratings: 2 Amps (±10%)
83.4 Open type slide wire type
83.5 Suitable to be used as series resistors or potentiometers.
83.6 Oxidized Constantan wire is wound on pipe to give perfect insulation.
83.7 Three 4 mm socket terminals are provided.
83.8 Supports are made of ABS molded.

84 Rheostat - 0 - 300 Ohm

84.1 Basic Indicative Diagram

84.2 Resistance: 0-300 ohms (±10%)
84.3 Current Ratings: 2 Amps (±10%)
84.4 Open type slide wire type
84.5 Suitable to be used as series resistors or potentiometers.
84.6 Oxidized Constantan wire is wound on pipe to give perfect insulation.
84.7 Three 4 mm socket terminals are provided.
84.8 Supports are made of ABS molded.

85 Rheostat - 0 - 500 Ohm

85.1 Basic Indicative Diagram

85.2 Resistance: 0-500 ohms (±10%), Current Ratings: 0.6 Amps (±10%)
85.3 Open type slide wire type
85.4 Suitable to be used as series resistors or potentiometers.
85.5 Oxidized Constantan wire is wound on pipe to give perfect insulation.
85.6 Three 4 mm socket terminals are provided.
85.7 Supports are made of ABS molded.

86 Rheostat - 0 - 600 Ohm

86.1 Basic Indicative Diagram

86.2 Resistance: 0-600 ohms (±10%), Current Ratings: 0.5 Amps (±10%)
86.3 Open type slide wire type
86.4 Suitable to be used as series resistors or potentiometers.
86.5 Oxidized Constantan wire is wound on pipe to give perfect insulation.
86.6 Three 4 mm socket terminals are provided.
86.7 Supports are made of ABS molded.

87 Rheostat - 0 - 1 Kilo Ohm

87.1 Basic Indicative Diagram

87.2 Resistance: 0-1 Kilo Ohms (±10%), Current Ratings: 0.5 Amps (±10%)
87.3 Open type slide wire type
87.4 Suitable to be used as series resistors or potentiometers.
87.5 Oxidized Constantan wire is wound on pipe to give perfect insulation.
87.6 Three 4 mm socket terminals are provided.
87.7 Supports are made of ABS molded.

88 De - Soldering Pump

88.1 Basic Indicative Diagram:

88.2 Should be used to remove heated solder from a PCB
88.3 Material - High grade aluminium for light weight and airtight function
88.4 Mechanism should be a piston which sucks air and solder from the tip at the press of a button.
88.5 High temperature resistant Teflon tip

89 SMD Soldering and De - Soldering Station

89.1 Basic Indicative Diagram

89.2 Hot Air Blower: Qty 1 No.

89.2.1	Working Voltage:	AC 220-240 V OR AC 100-130 V
89.2.2	Frequency:	50 Hz/60 Hz
89.2.3	Output Power:	750 W
89.2.4	Temperature Range:	100°C ~ 480°C
89.2.5	Blower speed:	1 to 10 digitally controlled
89.2.6	Temperature Stability:	± 2° C
89.2.7	Air Flow:	150 L/ min (max)

89.3 Soldering Iron: Qty 1 No.

89.3.1	Working Voltage:	AC 220-240 V OR AC 100-130 V
89.3.2	Output Power:	80 W
89.3.3	Frequency:	50 Hz/ 60 Hz
89.3.4	Temperature Range:	180°C ~ 500°C
89.3.5	Temperature Stability:	± 1° C
89.3.6	Soldering Iron :	ESD design
89.3.7	Heater Material:	Ceramics
89.3.8	Fine Needle Bit	
89.3.9	Tip Type:	Black Ceramic Coated Deluxe Fine Needle Bit

89.3.9.1 Tip

- Size: 1mm
- Shape: Fine Needle - The fine needle shape should allow for precise soldering work

89.3.9.2 Material

- Copper base with nickel and black ceramic coating
- The black ceramic coating should enhance durability and extend the tip's lifespan
- Should allow quick and easy tip replacement less than 40 seconds

89.3.10 Ten additional sets of spare Needle Bits should be supplied.

89.4 Square Sponge: Qty 2 Nos.

89.4.1 Material Cellulose

89.4.2 Size: 50mm X 50mm (approx.)
89.4.3 Should be used Wiping the tip of the soldering bit (when hot) to clean the residue

89.5 Solder Wire - 100 grams: Qty 4 Nos.
89.5.1 Grade 60:40 (60% TIN and 40% LEAD)
89.5.2 Weight 100 gms.
89.5.3 Gauge 18-20 swg
89.5.4 Should offer Minimum Resistance

89.6 Soldering Flux and Cleaner: Qty 2 Nos.
89.6.1 Volume: 10 ml
89.6.2 Type: Spray-on flux remover
89.6.3 Should be suitable for all types of flux residues.
89.6.4 Dry Time: under 2 minutes.
89.6.5 Should meet industry standards for electronics cleaning products.

89.7 Soldering Flux Paste: Qty 4 Nos.
89.7.1 Type of flux: Rosin based
89.7.2 Lead Free
89.7.3 Appearance: Paste or Gel
89.7.4 Syringe type package
89.7.5 Capacity: 10cc
89.7.6 Can be washed down with alcohol based agents

89.8 Tweezer Set: Qty 1 set
89.8.1 6 various sizes and type of Tweezers
89.8.2 Should be ESD safe
89.8.3 Should be Non magnetic
89.8.4 Shapes - Standard Tip, Slim Tip, High Elasticity Tip, Round Tip, Pin Tip, Eagle Beak Tip
89.8.5 Material: Stainless steel
89.8.6 Should be supplied with cutter
89.8.7 Cutter and Tweezer should be in canvas pouch

89.9 Tripod: Qty 2 Nos.
89.9.1 Adjustable PCB Clamps
89.9.2 Securely holds PCBs of various sizes.
89.9.3 Adjustable arms provide flexibility for boards of different dimensions and shapes.
89.9.4 360° Rotation Mechanism
89.9.5 Rotatable clamps should allow access to both sides of the PCB without removing it from the holder.
89.9.6 Smooth rotation ensures seamless workflow.
89.9.7 Sturdy Tripod Base - Should Provide excellent stability during operation.
89.9.8 Heat-resistant to withstand high temperatures during soldering tasks.

89.10 Desoldering Pump: Qty 1 No.
89.10.1 Should be used to remove heated solder from a PCB
89.10.2 Material: High grade aluminium for light weight and airtight function
89.10.3 Mechanism should be a piston which sucks air and solder from the tip at the press of a button.
89.10.4 High temperature resistant Teflon tip

89.11 Tip Tinner: Qty 2 Nos.
89.11.1 Combination of mild acid and solder powder
89.11.2 Should effectively remove oxide build-up and residue from soldering tips
89.11.3 Should maintain tips protective layer of solder
89.11.4 Should ensure tip can accept solder and transfer heat efficiently

89.12 Wick: Qty 5 Nos.
- 89.12.1 Length: 1.5 mm
- 89.12.2 Width: 1.85mm
- 89.12.3 Material: 100% Copper
- 89.12.4 Thickness: Comfortable for Desoldering
- 89.12.5 Should be useful for:
  - Removing faulty components from circuit boards
  - Correcting solder bridging issues
  - Cleaning up excess solder on PCB pads and connections
  - General tidying of solder areas or joints

89.13 Digital Multimeter: Qty 1 No.
- 89.13.1 Maximum voltage: 1000 V DC or 700 V A terminals and earth ground
- 89.13.2 Fuse protection: 200mA/250V
- 89.13.3 Power: 1.5V X 2 battery AAA
- 89.13.4 Display: LCD, 1999 counts, updates 2-3/sec.
- 89.13.5 Measuring method: Dual-slope integration A/D converter
- 89.13.6 Overrange Indication: Only figure “1” on the display
- 89.13.7 Polarity indication: ”-” displayed for negative polarity
- 89.13.8 Operating Environment: 0 to 40° C
- 89.13.9 Storage temperature: -10° C to 50° C
- 89.13.10 Low battery indication appears on the display

89.14 Blower Nozzle Set: Qty 2 Nos.
- 89.14.1 Hot Air Blower's Nozzles
- 89.14.2 Should be compatible with Hot Air Blower

89.15 IC Extractor: Qty 1 Nos.
- 89.15.1 Color Black
- 89.15.2 Primary material Plastic-metal
- 89.15.3 Should be used to safely remove integrated circuits (ICs) from printed circuit boards (PCBs) or sockets without causing damage
- 89.15.4 Should minimize the risk of bending pins or damaging the PCB
- 89.15.5 Should have plastic shielding to prevent static discharge

89.16 Set of 5 Extra Bits: Qty 2 Nos.

- 89.16.1 Should include the following shapes
  - Fine needle bit
  - Long-lasting needle bit
  - Deluxe spade bit
  - Conical bit
  - Spade bit
- 89.16.2 These different shapes are designed to cater to various soldering tasks, providing versatility and precision for different applications.
  - The needle bits should be ideal for fine, detailed work
  - The spade bits offer a larger surface area for general soldering tasks.
  - The conical bit provides a balance between precision and heat distribution, making it suitable for a range of soldering needs.

89.16.3 Each bit in this set should be durable and made of nickel or ceramic plating to enhances their longevity and heat conductivity.

89.17 Fume Extractor: Qty 1 No.

89.17.1 Input Voltage: 230V/ 50 Hz AC

89.17.2 Watts: 15 W

89.17.3 Fan Size: 4 X 4 Inches

89.17.4 Filter Material: Micro Fiber

89.17.5 Should have sufficient suction force for effective fume extraction

89.17.6 Should remove harmful soldering fumes and protect the user from potential health risks associated with lead exposure and other toxic substances.

89.17.7 Should have a multi-stage filtration system for effective removal of various particulates and harmful chemicals from the soldering fumes.

- Moisture metal filter
- Pre-filter
- Activated carbon filter
- 3-micron cartridge filter

89.17.8 Should have an effective smoke removal, even from a distance of 8-12 inches

89.17.9 Should have quiet operation, allowing for focus on soldering work

89.17.10 Should have sturdy construction with minimal vibration

90 Soldering Pot with accessories

90.1 Basic Indicative Diagram

90.2 Soldering Pot: Qty 1 No.

- 90.2.1 Capacity: 500 g
- 90.2.2 Material: Stainless Steel
- 90.2.3 Pot Internal Diameter: 50 mm
- 90.2.4 Heavy and stable base for preventing tip-overs
- 90.2.5 Max. Power: 75 W
- 90.2.6 Temperature Range: Min 200 °C to Max 450 °C
- 90.2.7 Melting Time: 5 min - 15 min
- 90.2.8 Temperature adjustable
- 90.2.9 Anti-corrosive
- 90.2.10 Quick melting speed

90.3 Soldering iron with solder Pot - 50 gms: Qty 01 No.

- 90.3.1 Dual functionality: Combines solder pot and soldering iron
- 90.3.2 Power supply: 230V AC
- 90.3.3 Maximum temperature: 510°C (±10°C)
- 90.3.4 Solder capacity: 50g
- 90.3.5 Temperature range: 200°C to 480°C
- 90.3.6 Heating Element: Ceramic heating element
- 90.3.7 Self-regulating characteristics
- 90.3.8 Quick heat-up time
- 90.3.9 Built-in self-protection
    - Temperature Control: Adjustable temperature control
    - Heavy mounting tray for enhanced safety
    - Removable solder pot for easy cleaning
- 90.3.10 Accessories: Soldering bit, Dross removal tool, ESD safe design

90.4 Solder Bar - 250 gm: Qty 2 Nos.

91 Soldering - Copper Hatchet Type

91.1 Basic Indicative Diagram

91.2 Should have wooden handle
91.3 Length: 14 inches long (±10 %)
91.4 Weight: 250 grams
91.5 Hatchet material Copper
91.6 Shape: Chisel type
91.7 Should be suitable for soldering

92 Soldering Iron - 10 Watt, 240 Volt

92.1 Basic Indicative Diagram

92.2 Input Voltage: 90 to 250VAC (100V - 300V range)
92.3 Power Output: Variable: 4W to 18W
92.4 Temperature Range: 180° C to 450° C (adjustable)
92.5 Tip Size: 0.5mm
92.6 Heating Element: Ceramic type with MCH micro-element
92.7 Cable Length: 1.2 meters
92.8 ESD-safe design
92.9 Fuse: 1A Maximum
92.10 Display: LED display for temperature control
92.11 Sleep Mode: Activates after 15 minutes of inactivity
92.12 Digital temperature control
92.13 Pre-printed Set and Run modes on station
92.14 LED power indicator
92.15 Easily replaceable bits
92.16 Accessories
92.16.1 Soldering stand with spring
92.16.2 Sponge
92.16.3 Bit
- Material: Black Ceramic
- Shape: Fine Needle
- Size: 1 mm

92.17 Solder Wire - 100gm: Qty 1 Nos.
92.17.1 Grade: 60:40 (60% Tin and 40% Lead)
92.17.2 Weight: 100 gms.
92.17.3 Gauge: 18-20 swg
92.17.4 Specifications Core Solder
92.17.5 No Dry Solder
92.17.6 Minimum Resistance
92.17.7 No Additional Flux required
92.18 Soldering Flux and Cleaner: Qty 1 No.
92.18.1 Volume: 10 ml
92.18.2 Type: Spray-on flux remover
92.18.3 Should be suitable for all types of flux residues.
92.18.4 Dry Time: under 2 minutes.
92.18.5 Should meet industry standards for electronics cleaning products.
92.19 Desoldering Pump: 1 No.
92.19.1 Should be used to remove heated solder from a PCB
92.19.2 Material: High grade aluminium for light weight and airtight function
92.19.3 Mechanism should be a piston which sucks air and solder from the tip at the press of a button.
92.19.4 High temperature resistant Teflon tip

93 Soldering Iron - 100 Watt, 240 Volt

93.1 Basic Indicative Diagram:

93.2 100 W Soldering iron: Qty 1 No.

- 93.2.1 Input Voltage: 220V AC
- 93.2.2 Output Temperature: 280°C - 550°C
- 93.2.3 Output Power: 50-100 W
- 93.2.4 Wire Length: 3 core mains cord 1.2 meters
- 93.2.5 Bit Supplied
- 93.2.6 Tip Shape: Normal Spade
- 93.2.7 Power Rating: 100 W
- 93.2.8 Material: Nickel-plated
- 93.2.9 Replacement Method: Slide-on technology for easy tip replacement
- 93.2.10 Extra Set of 5 Bit should be supplied

93.3 Solder Wire - 100 gm: Qty 2 Nos.

- 93.3.1 Grade: 60:40 (60% TIN and 40% LEAD)
- 93.3.2 Weight: 100 gms.
- 93.3.3 Gauge: 18-20 swg
- 93.3.4 No Dry Solder
- 93.3.5 Minimum Resistance
- 93.3.6 No Additional Flux required

93.4 Soldering Flux and Cleaner: Qty 2 Nos.

- 93.4.1 Volume: 10 ml
- 93.4.2 Type: Spray-on flux remover
- 93.4.3 Should be suitable for all types of flux residues.
- 93.4.4 Dry Time: under 2 minutes.
- 93.4.5 Should meet industry standards for electronics cleaning products.

93.5 Tripod: Qty 1 No.

- 93.5.1 Adjustable PCB Clamps
- 93.5.2 Securely holds PCBs of various sizes.
- 93.5.3 Adjustable arms provide flexibility for boards of different dimensions and shapes.
- 93.5.4 360° Rotation Mechanism
- 93.5.5 Rotatable clamps should allow access to both sides of the PCB without removing it from the holder.
- 93.5.6 Smooth rotation ensures seamless workflow.
- 93.5.7 Sturdy Tripod Base - Should Provide excellent stability during operation.
- 93.5.8 Heat-resistant to withstand high temperatures during soldering tasks.

93.6 Tweezer Set: Qty 1 Set

- 93.6.1 6 various sizes and type of Tweezers
- 93.6.2 Should be ESD safe
- 93.6.3 Should be Non magnetic

93.6.4 Shapes: Standard Tip, Slim Tip, High Elasticity Tip, Round Tip, Pin Tip, Eagle Beak Tip
93.6.5 Material: Stainless steel
93.6.6 Should be supplied with cutter
93.6.7 Cutter and Tweezer should be in canvas pouch

93.7 Desoldering Pump: Qty 1 No.
93.7.1 Should be used to remove heated solder from a PCB
93.7.2 Material: High grade aluminium for light weight and airtight function
93.7.3 Mechanism should be a piston which sucks air and solder from the tip at the press of a button.
93.7.4 High temperature resistant Teflon tip

93.8 Fume Extractor: Qty 1 No.
93.8.1 Input Voltage 230 V/ 50 Hz AC
93.8.2 Watts 15 W
93.8.3 Fan Size 4 X 4 Inches
93.8.4 Filter Material: Micro Fibre
93.8.5 Should have sufficient suction force for effective fume extraction
93.8.6 Should remove harmful soldering fumes and protect the user from potential health risks associated with lead exposure and other toxic substances.
93.8.7 Should have a multi-stage filtration system for effective removal of various particulates and harmful chemicals from the soldering fumes.
- Moisture metal filter
- Pre-filter
- Activated carbon filter
- 3-micron cartridge filter

93.8.8 Should have an effective smoke removal, even from a distance of 8-12 inches
93.8.9 Should have quiet operation, allowing for focus on soldering work
93.8.10 Should have sturdy construction with minimal vibration

94 Soldering Iron - 25 Watt, 240 Volt

94.1 Basic Indicative Diagram

94.2 25 W Soldering Iron: Qty 1 No.
- 94.2.1 Wattage: 25W
- 94.2.2 Input: 230 Vac
- 94.2.3 Temperature: 380c (±10ºC)
- 94.2.4 Wire: 3 Core, 1.4 meters length

94.3 Bit: Qty 5 Nos.
- 94.3.1 Material: Nickel Plated
- 94.3.2 Shape: Spade, 3 mm and needle
- 94.3.3 5 Extra set of bits should be supplied

94.4 Solder Wire - 100gm: Qty 1 No.
- 94.4.1 Grade: 60:40 (60% TIN and 40% LEAD)
- 94.4.2 Weight: 100 gms.
- 94.4.3 Gauge: 18-20 swg
- 94.4.4 Specifications Core Solder
- 94.4.5 No Dry Solder
- 94.4.6 Minimum Resistance
- 94.4.7 No Additional Flux required

94.5 Soldering Flux and Cleaner: Qty 2 Nos.
- 94.5.1 Volume: 10 ml
- 94.5.2 Type: Spray-on flux remover
- 94.5.3 Should be suitable for all types of flux residues.
- 94.5.4 Dry Time: under 2 minutes.
- 94.5.5 Should meet industry standards for electronics cleaning products.

94.6 Desoldering Pump: Qty 1No.
- 94.6.1 Should be used to remove heated solder from a PCB
- 94.6.2 Material: High grade aluminium for light weight and airtight function
- 94.6.3 Mechanism should be a piston which sucks air and solder from the tip at the press of a button.
- 94.6.4 High temperature resistant Teflon tip

95 Soldering Iron - 65 Watt, 240 Volt

95.1 Basic Indicative Diagram

95.2 65 W Soldering iron: Qty 1 No.

95.2.1	Input Voltage:	220 V AC
95.2.2	Output Temperature:	250° C - 480° C
95.2.3	Output Power:	35-75 W
95.2.4	Wire Length:	3 core mains cord 1.2mtrs
95.2.5	Bit Supplied	
95.2.6	Power Rating:	65 W
95.2.7	Tip Shape:	Spade (Normal Spade Tip)
95.2.8	Plating:	Nickel-plated
95.2.9	Tip Size:	6 mm
95.2.10	Material:	Long-life premium grade
95.2.11	Replacement Method:	Slide-on technology for easy tip replacement
95.2.12	Extra Set of 5 Bit should be supplied	

95.3 Solder Wire - 100gm: Qty 1 No.

95.3.1	Grade:	60:40 (60% TIN and 40% LEAD)
95.3.2	Weight:	100 gms.
95.3.3	Gauge:	18-20 swg
95.3.4	Specifications Core Solder	
95.3.5	No Dry Solder	
95.3.6	Minimum Resistance	
95.3.7	No Additional Flux required	

95.4 Soldering Flux and Cleaner: Qty 1 No.

95.4.1	Volume:	10 ml
95.4.2	Type:	Spray-on flux remover
95.4.3	Should be suitable for all types of flux residues	
95.4.4	Dry Time:	under 2 minutes
95.4.5	Should meet industry standards for electronics cleaning products.	

95.5 Desoldering Pump: Qty 1 No.

95.5.1 Should be used to remove heated solder from a PCB

95.5.2 Material: High grade aluminium for light weight and airtight function

95.5.3 Mechanism should be a piston which sucks air and solder from the tip at the press of a button.

95.5.4 High temperature resistant Teflon tip

96 Soldering Iron - Changeable Bit - 15 Watt, 240 Volt

96.1 Basic Indicative Diagram

96.2 15 W Soldering Iron - Qty. 1 No.

96.2.1 Wattage Range: 15-30 watts (variable)
96.2.2 Voltage: 230 volts
96.2.3 Temperature Range: 280°C to 450°C
96.2.4 Ceramic heater
96.2.5 Bit Type: Aluminum-coated long-life bit
96.2.6 Wattage Control should be on the handle
96.2.7 Continuous Rating: 24 hours
96.2.8 Handle: Ergonomically shaped, tri-grip handle with ridges for comfortable, slip-free use
96.2.9 Wire: FR-grade and burn-resistant 3-core copper wire
96.2.10 Thermostat: Semi-thermostatic
96.2.11 Bits

- Ceramic-coated
- Shape - Spade and needle
- Extra 5 set bits should be supplied

96.3 Solder Wire - 100gm: Qty 1 No.

96.3.1 Grade: 60:40 (60% TIN and 40% LEAD)
96.3.2 Weight: 100 gms.
96.3.3 Gauge: 18-20 swg
96.3.4 Specifications Core Solder
96.3.5 No Dry Solder
96.3.6 Minimum Resistance
96.3.7 No Additional Flux required

96.4 Soldering Flux and Cleaner: Qty 2 Nos.

96.4.1 Volume: 10 ml
96.4.2 Type: Spray-on flux remover
96.4.3 Should be suitable for all types of flux residues.
96.4.4 Dry Time: under 2 minutes.
96.4.5 Should meet industry standards for electronics cleaning products.

96.5 Desoldering Pump: Qty 1 No.

96.5.1 Should be used to remove heated solder from a PCB
96.5.2 Material: High grade aluminium for light weight and airtight function
96.5.3 Mechanism should be a piston which sucks air and solder from the tip at the press of a button.
96.5.4 High temperature resistant Teflon tip

97 Soldering Iron - Changeable Bit - 65 Watt, 240 Volt

97.1 Basic Indicative Diagram

97.2 65 W Soldering iron

- 97.2.1 Input Voltage: 220V AC
- 97.2.2 Output Temperature: 250°C - 480°C
- 97.2.3 Output Power: 35-75 W
- 97.2.4 Wire Length: 3 core mains cord 1.2mtrs
- 97.2.5 Bit Supplied
- 97.2.6 Power Rating: 65 W
- 97.2.7 Tip Shape: Spade (Normal Spade Tip)
- 97.2.8 Plating: Nickel-plated
- 97.2.9 Tip Size: 8mm
- 97.2.10 Material: Long-life premium grade
- 97.2.11 Replacement Method: Slide-on technology for easy tip replacement
- 97.2.12 Extra Set of 5 Bit should be supplied

97.3 Solder Wire - 100 gm: Qty 1 Nos.

- 97.3.1 Grade: 60:40 (60% TIN and 40% LEAD)
- 97.3.2 Weight: 100 gms.
- 97.3.3 Gauge: 18-20 swg
- 97.3.4 Specifications Core Solder
- 97.3.5 No Dry Solder
- 97.3.6 Minimum Resistance
- 97.3.7 No Additional Flux required

97.4 Soldering Flux and Cleaner: Qty 1 No.

- 97.4.1 Volume: 10 ml
- 97.4.2 Type: Spray-on flux remover
- 97.4.3 Should be suitable for all types of flux residues.
- 97.4.4 Dry Time: under 2 minutes.
- 97.4.5 Should meet industry standards for electronics cleaning products.

97.5 Desoldering Pump: Qty 1 No.

- 97.5.1 Should be used to remove heated solder from a PCB
- 97.5.2 Material: High grade aluminium for light weight and airtight function
- 97.5.3 Mechanism should be a piston which sucks air and solder from the tip at the press of a button.
- 97.5.4 High temperature resistant teflon tip

98 Soldering Iron - Copper Bit, 250gm, 250 W

98.1 Basic Indicative Diagram

98.2 Bit should be made of Copper
98.3 Weight: 250 grams (±10%)
98.4 250 Watts
98.5 Element Type: Round
98.6 Bit: Pointed

99 Current Transformer - 5/1, 10/1, 20/1, 25/5, 30/1, 50/5, 100/5 and 300/5

99.1 Basic Indicative Diagram

99.2 Set of Seven Transformers

S.N.	Primary Current	Secondary Current	VA
1	5 A	1 A	5
2	10 A	1 A	5
3	20 A	1 A	5
4	25 A	5 A	5
5	30 A	1 A	5
6	50 A	5 A	5
7	100 A	5 A	2.5
8	300 A	5 A	2.5

99.3 Should have 2 Connection on each side.
99.4 Should have M4 screws with self lifting clamp strap assembly
99.5 Should have Wire sealable and hinged terminal covers
99.6 Should have Self lifting terminal clamps.
99.7 CE and Primary / Secondary terminal markings should be engraved in casing
99.8 Terminal Cap Sealing Facility should be provided for Energy Meter purpose.
99.9 Continuous Current: 1.2X Rated current (In)
99.10 Rated short-time thermal current (Ith): Wound Primary Type CT - 40 X In for 1 sec
99.11 Ring Type CT - 60 X In for 1 sec (max. 40 kA for 1 sec)
99.12 Rated Dynamic current (Idyn): 2.5 Ith
99.13 Ambient Temperature Range: -20 to +45°C
99.14 Storage Temperature Range: -50 to +80°C
99.15 UL 94 V-0 approved Polycarbonate casing
99.16 Certifications
99.16.1 ERDA Type tested
99.16.2 CE certified
99.16.3 RoHS complied

100 Voltmeter - DC - 0 - 30 V, Digital, Panel Type

100.1 Basic Indicative Diagram

100.2 Should have Low Back Depth (behind the panel) of less than 40 mm.
100.3 Rescalable Display range: The meter should be completely programmable and user should easily scale the values as per his requirements on-field. Setting for '-ve' sign and decimal point position should also be provided.
100.4 Should be provided with 2 Function keys so that it becomes easy and convenient for the user to program the meter without any difficulty
100.5 The meter should support bent characteristics so that the user can configure the meter as per requirement.
100.6 The meter should give an accurate indication of the ambient temperature in °C and °F.
100.7 Auxiliary supply: 230V AC
100.8 Ultra-Bright LED display: 14mm full range display should be possible of 4 digits having maximum count - 9999.
100.9 Enclosure Protection for dust and water: Should conforms to IP 50 (front face) as per IEC 60529.
100.10 Compliance to International Safety standards: Should Comply with International Safety standard IEC 61010-1- 2010.
100.11 EMC Compatibility: Should Comply with International standard IEC 61326 Class B.
100.12 Input Voltage: 0-30 V
100.13 Accuracy:(Voltage drop < 600mV): <0.5% of Display End value ±1 digit for A/mA
100.14 Display

100.14.1	Type:	1 line 4-digit LED display
100.14.2	Display Count Setting:	-9999...-10 or +10...+9999 counts
100.14.3	Digit Height:	14mm
100.14.4	Decimal point position:	Configurable
100.14.5	Negative Display indication:	'-'
100.14.6	Overload Indication:	"-oL-" (above 125% of nominal value)

100.15 Applicable Standards:

100.15.1	EMC:	IEC 61326-1:2005
100.15.2	Immunity:	IEC 61000-4-1 up to 4. Level 3 industrial Low level
100.15.3	Safety:	IEC 61010-1:2010, Permanently connected use
100.15.4	IP for water and dust:	IEC60529
100.15.5	Pollution degree:	2
100.15.6	Installation category:	III

100.15.7 High Voltage Test: 2.2 kV AC, 50Hz for 1 minute between all Electrical circuits.
100.16 Environmental:

100.16.1	Operating temperature:	-10 to +55°C
100.16.2	Storage temperature:	-20 to +70°C
100.16.3	Relative humidity:	0... 90% non condensing
100.16.4	Warm up time:	Minimum 3 minute

101 Voltmeter - MC - 0 - 30 V, Analog

101.1 Basic Indicative Diagram

101.2 Range: Moving Coil - 0 - 30 V, Analog
101.3 Type: Moving Coil DC - Analog
101.4 Input: 30 V,
101.5 Accuracy: Class 1.5
101.6 Should have linear scale
101.7 Should be easily replaceable glass and bezel
101.8 Scale should have interchangeability
101.9 Should be easy installation with swivel screws
101.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
101.11 Self lifting terminal clamp assembly
101.12 IP 52 protection
101.13 Wide measurement band - 10 to 100% of FSD
101.14 Movement
- 101.14.1 Moving coil movement should have pivots of very high hardness.
- 101.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 101.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

101.15 Reference Standards

101.15.1	Performance Standard:	IEC 60051 and IS 1248
101.15.2	Safety standard:	IEC 61010
101.15.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
101.15.4	Scale and Pointer:	DIN 43802
101.15.5	Connection and Terminal markings:	DIN 43807
101.15.6	Terminal bolts / leads:	DIN 46200 / 46282
101.15.7	Safety requirements and protective measures:	IS 9249 - 1979
101.15.8	Front frames dimensions:	DIN 43718
101.15.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

101.16 Certifications
- 101.16.1 ERDA Type tested
- 101.16.2 CE Certified
- 101.16.3 UL Approved
- 101.16.4 RoHS complied

102 Voltmeter - MC - 0 - 300 V, Analog

102.1 Basic Indicative Diagram

102.2 Range: Moving Coil - 0 - 300 V, Analog
102.3 Type: Moving Coil DC - Analog
102.4 Input: 300 V
102.5 Accuracy: Class 1.5
102.6 Should have linear scale
102.7 Should be easily replaceable glass and bezel
102.8 Scale should have interchangeability
102.9 Should be easy installation with swivel screws
102.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
102.11 Self lifting terminal clamp assembly
102.12 IP 52 protection
102.13 Wide measurement band - 10 to 100% of FSD
102.14 Movement
- 102.14.1 Moving coil movement should have pivots of very high hardness.
- 102.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 102.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

102.15 Reference Standards

102.15.1	Performance Standard:	IEC 60051 and IS 1248
102.15.2	Safety standard:	IEC 61010
102.15.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
102.15.4	Scale and Pointer:	DIN 43802
102.15.5	Connection and Terminal markings:	DIN 43807
102.15.6	Terminal bolts / leads:	DIN 46200 / 46282
102.15.7	Safety requirements and protective measures:	IS 9249 - 1979
102.15.8	Front frames dimensions:	DIN 43718
102.15.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

102.16 Certifications
- 102.16.1 ERDA Type tested
- 102.16.2 CE Certified
- 102.16.3 UL Approved
- 102.16.4 RoHS complied

103 Voltmeter - MC - Centre Zero, 100 - 0 - 100 mV

103.1 Basic Indicative Diagram

103.2 Range: Centre Zero, 100 - 0 - 100 mV, Analog
103.3 Type: Moving Coil DC - Analog
103.4 Input: 100 mV
103.5 Accuracy: Class 1.5
103.6 Should have linear scale
103.7 Should be easily replaceable glass and bezel
103.8 Scale should have interchangeability
103.9 Should be easy installation with swivel screws
103.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
103.11 Self lifting terminal clamp assembly
103.12 IP 52 protection
103.13 Wide measurement band - 10 to 100% of FSD
103.14 Movement
- 103.14.1 Moving coil movement should have pivots of very high hardness.
- 103.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 103.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

103.15 Reference Standards

103.15.1	Performance Standard:	IEC 60051 and IS 1248
103.15.2	Safety standard:	IEC 61010
103.15.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
103.15.4	Scale and Pointer:	DIN 43802
103.15.5	Connection and Terminal markings:	DIN 43807
103.15.6	Terminal bolts / leads:	DIN 46200 / 46282
103.15.7	Safety requirements and protective measures:	IS 9249 - 1979
103.15.8	Front frames dimensions:	DIN 43718
103.15.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

103.16 Certifications
- 103.16.1 ERDA Type tested
- 103.16.2 CE Certified
- 103.16.3 UL Approved
- 103.16.4 RoHS complied

104 Voltmeter - MC - Centre Zero, 15 - 0 - 15 V

104.1 Basic Indicative Diagram

104.2 Range: Centre Zero, 15 - 0 - 15 V, Analog
104.3 Type: Moving Coil DC - Analog
104.4 Input: 15 V
104.5 Accuracy: Class 1.5
104.6 Should have linear scale
104.7 Should be easily replaceable glass and bezel
104.8 Scale should have interchangeability
104.9 Should be easy installation with swivel screws
104.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
104.11 Self lifting terminal clamp assembly
104.12 IP 52 protection
104.13 Wide measurement band - 10 to 100% of FSD
104.14 Movement
- 104.14.1 Moving coil movement should have pivots of very high hardness.
- 104.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 104.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

104.15 Reference Standards
- 104.15.1 Performance Standard: IEC 60051 and IS 1248
- 104.15.2 Safety standard: IEC 61010
- 104.15.3 Nominal case and cutout dimensions: IS 2419 and DIN 43700
- 104.15.4 Scale and Pointer: DIN 43802
- 104.15.5 Connection and Terminal markings: DIN 43807
- 104.15.6 Terminal bolts / leads: DIN 46200 / 46282
- 104.15.7 Safety requirements and protective measures: IS 9249 - 1979
- 104.15.8 Front frames dimensions: DIN 43718
- 104.15.9 Environmental conditions specifications: IS 9000 part 5, 7, 8

104.16 Certifications
- 104.16.1 ERDA Type tested
- 104.16.2 CE Certified
- 104.16.3 UL Approved
- 104.16.4 RoHS complied

105 Voltmeter - MC - Multi Range 0-15, 30, 60 and 75 V

105.1 Basic Indicative Diagram

105.2 Range: Multi Range 0-15, 30, 60 and 75 V, Analog
105.3 Type: Moving Coil DC - Analog
105.4 Input: 75 V
105.5 Accuracy: Class 1.5
105.6 Should have linear scale
105.7 Should be easily replaceable glass and bezel
105.8 Scale should have interchangeability
105.9 Should be easy installation with swivel screws
105.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
105.11 Self lifting terminal clamp assembly
105.12 IP 52 protection
105.13 Wide measurement band - 10 to 100% of FSD
105.14 Movement
- 105.14.1 Moving coil movement should have pivots of very high hardness.
- 105.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 105.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

105.15 Reference Standards
- 105.15.1 Performance Standard: IEC 60051 and IS 1248
- 105.15.2 Safety standard: IEC 61010
- 105.15.3 Nominal case and cutout dimensions: IS 2419 and DIN 43700
- 105.15.4 Scale and Pointer: DIN 43802
- 105.15.5 Connection and Terminal markings: DIN 43807
- 105.15.6 Terminal bolts / leads: DIN 46200 / 46282
- 105.15.7 Safety requirements and protective measures: IS 9249 - 1979
- 105.15.8 Front frames dimensions: DIN 43718
- 105.15.9 Environmental conditions specifications: IS 9000 part 5, 7, 8

105.16 Certifications
- 105.16.1 ERDA Type tested
- 105.16.2 CE Certified
- 105.16.3 UL Approved
- 105.16.4 RoHS complied

106 Voltmeter - MC - Multi Range 0-150, 300, 600 V

106.1 Basic Indicative Diagram

106.2 Range: Multi Range 0-150, 300, 600 V
106.3 Type: Moving Coil DC - Analog
106.4 Input: 600 V
106.5 Accuracy: Class 1.5
106.6 Should have linear scale
106.7 Should be easily replaceable glass and bezel
106.8 Scale should have interchangeability
106.9 Should be easy installation with swivel screws
106.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
106.11 Self lifting terminal clamp assembly
106.12 IP 52 protection
106.13 Wide measurement band - 10 to 100% of FSD
106.14 Movement
- 106.14.1 Moving coil movement should have pivots of very high hardness.
- 106.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 106.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

106.15 Reference Standards

106.15.1	Performance Standard:	IEC 60051 and IS 1248
106.15.2	Safety standard:	IEC 61010
106.15.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
106.15.4	Scale and Pointer:	DIN 43802
106.15.5	Connection and Terminal markings:	DIN 43807
106.15.6	Terminal bolts / leads:	DIN 46200 / 46282
106.15.7	Safety requirements and protective measures:	IS 9249 - 1979
106.15.8	Front frames dimensions:	DIN 43718
106.15.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

106.16 Certifications
- 106.16.1 ERDA Type tested
- 106.16.2 CE Certified
- 106.16.3 UL Approved
- 106.16.4 RoHS complied

107 Voltmeter - MC - Multi Range 0-75, 150, 300 and 600 V

107.1 Basic Indicative Diagram

107.2 Range: Multi Range 0-75, 150, 300 and 600 V, Analog
107.3 Type: Moving Coil DC - Analog
107.4 Input: 600 V
107.5 Accuracy: Class 1.5
107.6 Should have linear scale
107.7 Should be easily replaceable glass and bezel
107.8 Scale should have interchangeability
107.9 Should be easy installation with swivel screws
107.10 Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
107.11 Self lifting terminal clamp assembly
107.12 IP 52 protection
107.13 Wide measurement band - 10 to 100% of FSD
107.14 Movement
- 107.14.1 Moving coil movement should have pivots of very high hardness.
- 107.14.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 107.14.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

107.15 Reference Standards

107.15.1	Performance Standard:	IEC 60051 and IS 1248
107.15.2	Safety standard:	IEC 61010
107.15.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
107.15.4	Scale and Pointer:	DIN 43802
107.15.5	Connection and Terminal markings:	DIN 43807
107.15.6	Terminal bolts / leads:	DIN 46200 / 46282
107.15.7	Safety requirements and protective measures:	IS 9249 - 1979
107.15.8	Front frames dimensions:	DIN 43718
107.15.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

107.16 Certifications
- 107.16.1 ERDA Type tested
- 107.16.2 CE Certified
- 107.16.3 UL Approved
- 107.16.4 RoHS complied

108 Voltmeter - MI - 0 - 1 V

108.1 Basic Indicative Diagram

108.2 Range: 0 - 1 V
108.3 Type: Moving Iron AC - Analog
108.4 Input: 1 V
108.5 Accuracy: Class 1.5
108.6 Should be moving iron, panel meters
108.7 Should be housed in molded polycarbonate cases
108.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
108.9 Front window glass and bezel should be easily replaceable.
108.10 Should have nearly Linear scale
108.11 Scale should have interchangeability
108.12 Should be easy installation with swivel screws
108.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
108.14 Should have self lifting terminal clamp assembly
108.15 Should have IP 52 protection
108.16 Movement
- 108.16.1 Moving Iron movement should have pivots of very high hardness.
- 108.16.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 108.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

108.17 Reference Standards

108.17.1	Performance Standard:	IEC 60051 and IS 1248
108.17.2	Safety standard:	IEC 61010
108.17.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
108.17.4	Scale and Pointer:	DIN 43802
108.17.5	Connection and Terminal markings:	DIN 43807
108.17.6	Terminal bolts / leads:	DIN 46200 / 46282
108.17.7	Safety requirements and protective measures:	IS 9249 - 1979
108.17.8	Front frames dimensions:	DIN 43718
108.17.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

108.18 Certifications
- 108.18.1 ERDA Type tested
- 108.18.2 CE Certified
- 108.18.3 UL Approved
- 108.18.4 RoHS complied

109 Voltmeter - MI - 0 - 10 V

109.1 Basic Indicative Diagram

109.2 Range: 0-10 V
109.3 Type: Moving Iron AC - Analog
109.4 Input: 10 V
109.5 Accuracy: Class 1.5
109.6 Should be moving iron, panel meters
109.7 Should be housed in molded polycarbonate cases
109.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
109.9 Front window glass and bezel should be easily replaceable.
109.10 Should have nearly Linear scale
109.11 Scale should have interchangeability
109.12 Should be easy installation with swivel screws
109.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
109.14 Should have self lifting terminal clamp assembly
109.15 Should have IP 52 protection
109.16 Movement
- 109.16.1 Moving Iron movement should have pivots of very high hardness.
- 109.16.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 109.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

109.17 Reference Standards

109.17.1	Performance Standard:	IEC 60051 and IS 1248
109.17.2	Safety standard:	IEC 61010
109.17.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
109.17.4	Scale and Pointer:	DIN 43802
109.17.5	Connection and Terminal markings:	DIN 43807
109.17.6	Terminal bolts / leads:	DIN 46200 / 46282
109.17.7	Safety requirements and protective measures:	IS 9249 - 1979
109.17.8	Front frames dimensions:	DIN 43718
109.17.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

109.18 Certifications
- 109.18.1 ERDA Type tested
- 109.18.2 CE Certified
- 109.18.3 UL Approved
- 109.18.4 RoHS complied

110 Voltmeter - MI - 0 - 150 V

110.1 Basic Indicative Diagram

110.2 Range: 0-150 V
110.3 Type: Moving Iron AC - Analog
110.4 Input: 150 V
110.5 Accuracy: Class 1.5
110.6 Should be moving iron, panel meters
110.7 Should be housed in molded polycarbonate cases
110.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
110.9 Front window glass and bezel should be easily replaceable.
110.10 Should have nearly Linear scale
110.11 Scale should have interchangeability
110.12 Should be easy installation with swivel screws
110.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
110.14 Should have self lifting terminal clamp assembly
110.15 Should have IP 52 protection
110.16 Movement
- 110.16.1 Moving Iron movement should have pivots of very high hardness.
- 110.16.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 110.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

110.17 Reference Standards

110.17.1	Performance Standard:	IEC 60051 and IS 1248
110.17.2	Safety standard:	IEC 61010
110.17.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
110.17.4	Scale and Pointer:	DIN 43802
110.17.5	Connection and Terminal markings:	DIN 43807
110.17.6	Terminal bolts / leads:	DIN 46200 / 46282
110.17.7	Safety requirements and protective measures:	IS 9249 - 1979
110.17.8	Front frames dimensions:	DIN 43718
110.17.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

110.18 Certifications
- 110.18.1 ERDA Type tested
- 110.18.2 CE Certified
- 110.18.3 UL Approved
- 110.18.4 RoHS complied

111 Voltmeter - MI - 0 - 300 - 600 V

111.1 Basic Indicative Diagram

111.2 Range: 0 - 300 - 600 V
111.3 Type: Moving Iron AC - Analog
111.4 Input: 600 V
111.5 Accuracy: Class 1.5
111.6 Should be moving iron, panel meters
111.7 Should be housed in molded polycarbonate cases
111.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
111.9 Front window glass and bezel should be easily replaceable.
111.10 Should have nearly Linear scale
111.11 Scale should have interchangeability
111.12 Should be easy installation with swivel screws
111.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
111.14 Should have self lifting terminal clamp assembly
111.15 Should have IP 52 protection
111.16 Movement
- 111.16.1 Moving Iron movement should have pivots of very high hardness.
- 111.16.2 Movement should be suspended between spring loaded Sapphire Jewels.
- 111.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

111.17 Reference Standards

111.17.1	Performance Standard:	IEC 60051 and IS 1248
111.17.2	Safety standard:	IEC 61010
111.17.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
111.17.4	Scale and Pointer:	DIN 43802
111.17.5	Connection and Terminal markings:	DIN 43807
111.17.6	Terminal bolts / leads:	DIN 46200 / 46282
111.17.7	Safety requirements and protective measures:	IS 9249 - 1979
111.17.8	Front frames dimensions:	DIN 43718
111.17.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

111.18 Certifications
- 111.18.1 ERDA Type tested
- 111.18.2 CE Certified
- 111.18.3 UL Approved
- 111.18.4 RoHS complied

112 Voltmeter - MI - 0 - 300 V

112.1 Basic Indicative Diagram

112.2 Range: 0 - 300 V
112.3 Type: Moving Iron AC - Analog
112.4 Input: 300 V
112.5 Accuracy: Class 1.5
112.6 Should be moving iron, panel meters
112.7 Should be housed in molded polycarbonate cases
112.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
112.9 Front window glass and bezel should be easily replaceable.
112.10 Should have nearly Linear scale
112.11 Scale should have interchangeability
112.12 Should be easy installation with swivel screws
112.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
112.14 Should have self lifting terminal clamp assembly
112.15 Should have IP 52 protection
112.16 Movement
- 112.16.1 Moving Iron movement should have pivots of very high hardness.
- 112.16.2 Movement should be suspended between spring loaded Sapphire Jewels.
- 112.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

112.17 Reference Standards

112.17.1	Performance Standard:	IEC 60051 and IS 1248
112.17.2	Safety standard:	IEC 61010
112.17.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
112.17.4	Scale and Pointer:	DIN 43802
112.17.5	Connection and Terminal markings:	DIN 43807
112.17.6	Terminal bolts / leads:	DIN 46200 / 46282
112.17.7	Safety requirements and protective measures:	IS 9249 - 1979
112.17.8	Front frames dimensions:	DIN 43718
112.17.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

112.18 Certifications
- 112.18.1 ERDA Type tested
- 112.18.2 CE Certified
- 112.18.3 UL Approved
- 112.18.4 RoHS complied

113 Voltmeter - MI - 0 - 5 KV

113.1 Basic Indicative Diagram

113.2 Range: 0 - 5 kV
113.3 Type: Moving Iron AC - Analog
113.4 Input: 110 V
113.5 Accuracy: Class 1.5
113.6 Should be moving iron, panel meters
113.7 Should be housed in molded polycarbonate cases
113.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
113.9 Front window glass and bezel should be easily replaceable.
113.10 Should have nearly Linear scale
113.11 Scale should have interchangeability
113.12 Should be easy installation with swivel screws
113.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
113.14 Should have self lifting terminal clamp assembly
113.15 Should have IP 52 protection
113.16 Movement
- 113.16.1 Moving Iron movement should have pivots of very high hardness.
- 113.16.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 113.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

113.17 Reference Standards

113.17.1	Performance Standard:	IEC 60051 and IS 1248
113.17.2	Safety standard:	IEC 61010
113.17.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
113.17.4	Scale and Pointer:	DIN 43802
113.17.5	Connection and Terminal markings:	DIN 43807
113.17.6	Terminal bolts / leads:	DIN 46200 / 46282
113.17.7	Safety requirements and protective measures:	IS 9249 - 1979
113.17.8	Front frames dimensions:	DIN 43718
113.17.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

113.18 Certifications
- 113.18.1 ERDA Type tested
- 113.18.2 CE Certified
- 113.18.3 UL Approved
- 113.18.4 RoHS complied

114 Voltmeter - MI - 0 - 500 mV

114.1 Basic Indicative Diagram

114.2 Range: 0 - 500 mV
114.3 Type: Moving Iron AC - Analog
114.4 Input: 500 mV
114.5 Accuracy: Class 1.5
114.6 Should be moving iron, panel meters
114.7 Should be housed in molded polycarbonate cases
114.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
114.9 Front window glass and bezel should be easily replaceable.
114.10 Should have nearly Linear scale
114.11 Scale should have interchangeability
114.12 Should be easy installation with swivel screws
114.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
114.14 Should have self lifting terminal clamp assembly
114.15 Should have IP 52 protection
114.16 Movement
- 114.16.1 Moving coil movement should have pivots of very high hardness.
- 114.16.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 114.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

114.17 Reference Standards

114.17.1	Performance Standard:	IEC 60051 and IS 1248
114.17.2	Safety standard:	IEC 61010
114.17.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
114.17.4	Scale and Pointer:	DIN 43802
114.17.5	Connection and Terminal markings:	DIN 43807
114.17.6	Terminal bolts / leads:	DIN 46200 / 46282
114.17.7	Safety requirements and protective measures:	IS 9249 - 1979
114.17.8	Front frames dimensions:	DIN 43718
114.17.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

114.18 Certifications
- 114.18.1 ERDA Type tested
- 114.18.2 CE Certified
- 114.18.3 UL Approved
- 114.18.4 RoHS complied

115 Voltmeter - MI - 0 - 75 V

115.1 Basic Indicative Diagram

115.2 Range: 0 - 75 V
115.3 Type: Moving Iron AC - Analog
115.4 Input: 75 V
115.5 Accuracy: Class 1.5
115.6 Should be moving iron, panel meters
115.7 Should be housed in molded polycarbonate cases
115.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
115.9 Front window glass and bezel should be easily replaceable.
115.10 Should have nearly Linear scale
115.11 Scale should have interchangeability
115.12 Should be easy installation with swivel screws
115.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
115.14 Should have self lifting terminal clamp assembly
115.15 Should have IP 52 protection
115.16 Movement
- 115.16.1 Moving Iron movement should have pivots of very high hardness.
- 115.16.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 115.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

115.17 Reference Standards

115.17.1	Performance Standard:	IEC 60051 and IS 1248
115.17.2	Safety standard:	IEC 61010
115.17.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
115.17.4	Scale and Pointer:	DIN 43802
115.17.5	Connection and Terminal markings:	DIN 43807
115.17.6	Terminal bolts / leads:	DIN 46200 / 46282
115.17.7	Safety requirements and protective measures:	IS 9249 - 1979
115.17.8	Front frames dimensions:	DIN 43718
115.17.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

115.18 Certifications
- 115.18.1 ERDA Type tested
- 115.18.2 CE Certified
- 115.18.3 UL Approved
- 115.18.4 RoHS complied

116 Voltmeter - MI - Multi Range 0-50, 75, 150 V

116.1 Basic Indicative Diagram

116.2 Range: 0-50, 75, 150 V
116.3 Type: Moving Iron AC - Analog
116.4 Input: 150 V
116.5 Accuracy: Class 1.5
116.6 Should be moving iron, panel meters
116.7 Should be housed in molded polycarbonate cases
116.8 Should be suitable for the measurement of AC currents and voltages in the usual frequency range of 15...100Hz.
116.9 Front window glass and bezel should be easily replaceable.
116.10 Should have nearly Linear scale
116.11 Scale should have interchangeability
116.12 Should be easy installation with swivel screws
116.13 Should have glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
116.14 Should have self lifting terminal clamp assembly
116.15 Should have IP 52 protection
116.16 Movement
- 116.16.1 Moving Iron movement should have pivots of very high hardness.
- 116.16.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 116.16.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

116.17 Reference Standards

116.17.1	Performance Standard:	IEC 60051 and IS 1248
116.17.2	Safety standard:	IEC 61010
116.17.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
116.17.4	Scale and Pointer:	DIN 43802
116.17.5	Connection and Terminal markings:	DIN 43807
116.17.6	Terminal bolts / leads:	DIN 46200 / 46282
116.17.7	Safety requirements and protective measures:	IS 9249 - 1979
116.17.8	Front frames dimensions:	DIN 43718
116.17.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

116.18 Certifications
- 116.18.1 ERDA Type tested
- 116.18.2 CE Certified
- 116.18.3 UL Approved
- 116.18.4 RoHS complied

117 Watt Meter - 1 KW, Analog

117.1 Basic Indicative Diagram

117.2 Range: Watt Meter - 1 KW, Analog
117.3 Accuracy: Class 1.5
117.4 Should work with single phase 230 V power supply
117.5 Should be suitable to indicate forward (export / outgoing) and reverse (import / in coming) power flow.
117.6 Should be suitable to be used both on sinusoidal and non - sinusoidal current. These meters offer several advantages in Switchboard and Generating Set panels.
117.7 Should have less VA burden
117.8 Should have Linear scale
117.9 Should have glass filled polycarbonate housing (UL 94-V-0)
117.10 Should have knife edge pointer
117.11 Should be easily replaceable glass and bezel
117.12 Movement
- 117.12.1 Moving coil movement should have pivots of very high hardness.
- 117.12.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 117.12.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

117.13 Reference Standards

117.13.1	Performance Standard:	IEC 60051 and IS 1248
117.13.2	Safety standard:	IEC 61010
117.13.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
117.13.4	Scale and Pointer:	DIN 43802
117.13.5	Connection and Terminal markings:	DIN 43807
117.13.6	Terminal bolts / leads:	DIN 46200 / 46282
117.13.7	Safety requirements and protective measures:	IS 9249 - 1979
117.13.8	Front frames dimensions:	DIN 43718
117.13.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

117.14 Certifications
- 117.14.1 ERDA Type tested
- 117.14.2 CE Certified
- 117.14.3 UL Approved
- 117.14.4 RoHS complied

118 Watt Meter - 1 KW, Digital, Panel Type

118.1 Basic Indicative Diagram

118.2 Range: Watt Meter - 1 KW, Digital
118.3 96 mm X 96 mm panel mounted kilowatt hour meter
118.4 Should work on 230 V AC Supply
118.5 Accuracy: Class 1.0 accuracy
118.6 Should have 3 Line 4 Digit Seven Segment LED
118.7 True RMS measurement
118.8 Fully programmable CTratios
118.9 Fully programmable PTratios
118.10 Fully isolated current input
118.11 State of art SMD technology
118.12 Pulse output: One potential free relay contact
118.13 Remote data reading through modbus (RS 485)
118.14 Input Voltage PT Secondary Settable Range
- 118.14.1 Programmable - Input: 100…500 V L-L1/ %A))
- 118.14.2 110V L-L (63.5V L-N)
- 118.14.3 100V - 120V L-L (57V - 69V L-N)
- 118.14.4 230V L-L (133V L-N)
- 118.14.5 121V - 239V L-L (70V - 139V L-N)
- 118.14.6 415V L-L (239.6V L-N)
- 118.14.7 240V - 480V L-L (140V - 277V L-N)

118.15 Input Current:
- 118.15.1 Nominal input current: 5A AC RMS
- 118.15.2 External CT to be connected to meter to stepdown current to 5A

118.16 Display
- 118.16.1 Counter: 8 digit seven segment LED display
- 118.16.2 Reading resolution: Auto ranging
- 118.16.3 Display Height: 14 mm

118.17 Environmental
- 118.17.1 Operating temperature: -10 to +60° C
- 118.17.2 Storage temperature: -25 to +70° C
- 118.17.3 Relative humidity: 0... 95% non condensing
- 118.17.4 Warm up time Minimum: 3 minute
- 118.17.5 Shock: Half sine wave, Peak acceleration 30gn (300m/s^2), duration 18ms
- 118.17.6 Vibration: 10... 55 Hz, 0.15mm amplitude
- 118.17.7 Enclosure: IP50 (front face only)

118.18 Standards

118.18.1 EMC IEC 61326 Immunity IEC 61000-4-3.: 10V/m min - Level 3 industrial low level

118.18.2 Safety: IEC 61010-1-2001

118.18.3 Permanently connected use IP for water and dust: IEC60529

118.18.4 Pollution degree: 2

118.18.5 Installation category: CAT III 300 V AC RMS

118.18.6 High Voltage Test: 2.2 kV AC, 50 Hz for 1 minute between all electrical circuits

119 Watt Meter - 1.5 KW, Dynamometer Type, Analog, 5A, 240V

119.1 Basic Indicative Diagram

119.2 Range: Watt Meter - 1.5 KW, Analog
119.3 Current: 5 A
119.4 Voltage: 240 V
119.5 Steel Tough Bakelite Case to provide very high insulation.
119.6 Shock resistant Pivot jewel movement: The pivots should be made from carbon Steel hard chrome plated and should be mounted in spring loaded sapphire jewels to ensures shock resistance due to vibrations in transit and minimum friction during use.
119.7 The Movement should be placed in a separate compartment making it completely dust proof
119.8 Should have Knife edge pointer and Anti-parallax mirror scale.
119.9 The resistances should be housed separately in a ventilated compartment to make heating problems negligible.
119.10 Should have Quick Response
119.11 Scale Length: 140mm approx
119.12 Test Voltage: 2000V AC (rms) for 1 minute
119.13 Insulation Resistance: Over 20 Megohms at 500 V DC
119.14 ±1.0% of full scale value as per BIS 1248 between 10% to 100% of the scale for Single Phase Wattmeter

120 Watt Meter - 10 KW, Analog

120.1 Basic Indicative Diagram

120.2 Range: Watt Meter - 10 KW, Analog
120.3 Accuracy: Class 1.5
120.4 Should work with single phase 230 V power supply
120.5 External CT (50/5) to be connected to meter to stepdown current from 50A to 5A
120.6 Should be suitable to indicate forward (export / outgoing) and reverse (import / in coming) power flow.
120.7 Should be suitable to be used both on sinusoidal and non - sinusoidal current. These meters offer several advantages in Switchboard and Generating Set panels.
120.8 Features
- 120.8.1 Should have less VA burden
- 120.8.2 Should have Linear scale
- 120.8.3 Should have glass filled polycarbonate housing (UL 94-V-0)
- 120.8.4 Should have knife edge pointer
- 120.8.5 Should be easily replaceable glass and bezel

120.9 Movement
- 120.9.1 Moving coil movement should have pivots of very high hardness.
- 120.9.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 120.9.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

120.10 Reference Standards

120.10.1	Performance Standard:	IEC 60051 and IS 1248
120.10.2	Safety standard:	IEC 61010
120.10.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
120.10.4	Scale and Pointer:	DIN 43802
120.10.5	Connection and Terminal markings:	DIN 43807
120.10.6	Terminal bolts / leads:	DIN 46200 / 46282
120.10.7	Safety requirements and protective measures:	IS 9249 - 1979
120.10.8	Front frames dimensions:	DIN 43718
120.10.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

120.11 Certifications
- 120.11.1 ERDA Type tested
- 120.11.2 CE Certified
- 120.11.3 UL Approved
- 120.11.4 RoHS complied

121 Watt Meter - 200 W, Analog

121.1 Basic Indicative Diagram

121.2 Range: Watt Meter - 200 W, Analog
121.3 Accuracy: Class 1.5
121.4 Should work with Single Phase 230 V AC
121.5 Should be suitable to indicate forward (export / outgoing) and reverse (import / in coming) power flow.
121.6 Should be suitable to be used both on sinusoidal and non - sinusoidal current. These meters offer several advantages in Switchboard and Generating Set panels.
121.7 Features
- 121.7.1 Should have less VA burden
- 121.7.2 Should have Linear scale
- 121.7.3 Should have glass filled polycarbonate housing (UL 94-V-0)
- 121.7.4 Should have knife edge pointer
- 121.7.5 Should be easily replaceable glass and bezel

121.8 Movement
- 121.8.1 Moving coil movement should have pivots of very high hardness.
- 121.8.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 121.8.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

121.9 Reference Standards

121.9.1 Performance Standard:	IEC 60051 and IS 1248
121.9.2 Safety standard:	IEC 61010
121.9.3 Nominal case and cutout dimensions:	IS 2419 and DIN 43700
121.9.4 Scale and Pointer:	DIN 43802
121.9.5 Connection and Terminal markings:	DIN 43807
121.9.6 Terminal bolts / leads:	DIN 46200 / 46282
121.9.7 Safety requirements and protective measures:	IS 9249 - 1979
121.9.8 Front frames dimensions:	DIN 43718
121.9.9 Environmental conditions specifications:	IS 9000 part 5, 7, 8

121.10 Certifications
- 121.10.1 ERDA Type tested
- 121.10.2 CE Certified
- 121.10.3 UL Approved
- 121.10.4 RoHS complied

122 Watt Meter - 3 KW, Analog

122.1 Basic Indicative Diagram

122.2 Range: Watt Meter - 3 KW, Analog
122.3 Accuracy: Class 1.5
122.4 Should work with 230 V Single Phase Power Supply
122.5 External CT (15/5) to be connected to meter to stepdown current to 5A
122.6 Should be suitable to indicate forward (export/outgoing) and reverse (import / in coming) power flow.
122.7 Should be suitable to be used both on sinusoidal and non - sinusoidal current. These meters offer several advantages in Switchboard and Generating Set panels.
122.8 Should have less VA burden
122.9 Should have Linear scale
122.10 Should have glass filled polycarbonate housing (UL 94-V-0)
122.11 Should have knife edge pointer
122.12 Should be easily replaceable glass and bezel
122.13 Movement
- 122.13.1 Moving coil movement should have pivots of very high hardness.
- 122.13.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 122.13.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

122.14 Reference Standards

122.14.1	Performance Standard:	IEC 60051 and IS 1248
122.14.2	Safety standard:	IEC 61010
122.14.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
122.14.4	Scale and Pointer:	DIN 43802
122.14.5	Connection and Terminal markings:	DIN 43807
122.14.6	Terminal bolts / leads:	DIN 46200 / 46282
122.14.7	Safety requirements and protective measures:	IS 9249 - 1979
122.14.8	Front frames dimensions:	DIN 43718
122.14.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

122.15 Certifications
- 122.15.1 ERDA Type tested
- 122.15.2 CE Certified
- 122.15.3 UL Approved
- 122.15.4 RoHS complied

123 Watt Meter - 3 KW, Dynamometer Type, Analog, 240V

123.1 Basic Indicative Diagram

123.2 Range: Watt Meter - 3 KW, Analog
123.3 Voltage: 240 V
123.4 Steel Tough Bakelite Case to provide very high insulation.
123.5 Shock resistant Pivot jewel movement: The pivots should be made from carbon Steel hard chrome plated and should be mounted in spring loaded sapphire jewels to ensures shock resistance due to vibrations in transit and minimum friction during use.
123.6 The Movement should be placed in a separate compartment making it completely dust proof
123.7 Should have Knife edge pointer and Anti-parallax mirror scale.
123.8 The resistances should be housed separately in a ventilated compartment to make heating problems negligible.
123.9 Should have Quick Response
123.10 Scale Length: 140mm approx
123.11 Test Voltage: 2000V AC (rms) for 1 minute
123.12 Insulation Resistance: Over 20 Megohms at 500 V DC
123.13 ±1.0% of full scale value as per BIS 1248 between 10% to 100% of the scale for Single Phase Wattmeter
123.14 ±1.5% of full scale value as per BIS 1248 for Three Phase Wattmeter
123.15 ±1.5% of full scale value as per BIS 1248 for 0.2 P.F. (LPF) Single Phase Wattmeter

124 Watt Meter - 3 Phase, 2 Element, 415V, 10A, Analog

124.1 Basic Indicative Diagram

124.2 Range: Watt Meter - 5 KW, Analog
124.3 Accuracy - Class 1.5
124.4 Should work with 3 phase balanced load 3 or 4 wire
124.5 External CT (10/5) to be connected to meter to stepdown current to 5A
124.6 Should be suitable to indicate forward (export / outgoing) and reverse (import / in coming) power flow.
124.7 Should be suitable to be used both on sinusoidal and non - sinusoidal current. These meters offer several advantages in Switchboard and Generating Set panels.
124.8 Features
- 124.8.1 Should have less VA burden
- 124.8.2 Should have Linear scale
- 124.8.3 Should have glass filled polycarbonate housing (UL 94-V-0)
- 124.8.4 Should have knife edge pointer
- 124.8.5 Should be easily replaceable glass and bezel

124.9 Movement
- 124.9.1 Moving coil movement should have pivots of very high hardness.
- 124.9.2 Movement should have suspended between spring loaded Sapphire Jewels.
- 124.9.3 Movement should have properly shielded and critically damped by eddy currents induced in coil former.

124.10 Reference Standards

124.10.1	Performance Standard:	IEC 60051 and IS 1248
124.10.2	Safety standard:	IEC 61010
124.10.3	Nominal case and cutout dimensions:	IS 2419 and DIN 43700
124.10.4	Scale and Pointer:	DIN 43802
124.10.5	Connection and Terminal markings:	DIN 43807
124.10.6	Terminal bolts / leads:	DIN 46200 / 46282
124.10.7	Safety requirements and protective measures:	IS 9249 - 1979
124.10.8	Front frames dimensions:	DIN 43718
124.10.9	Environmental conditions specifications:	IS 9000 part 5, 7, 8

124.11 Certifications
- 124.11.1 ERDA Type tested
- 124.11.2 CE Certified
- 124.11.3 UL Approved
- 124.11.4 RoHS complied

125 Weighing Machine - Platform, 200 Kg

125.1 Basic Indicative Diagram

125.2	Capacity:	200 Kg
125.3	Scale Type:	Platform Type
125.4	Weighing Scale Approval	
125.5	Legal Metrology Department, India	
125.6	Class III Approved	
125.7	Readability (gm):	20 gm
125.8	Platform Size (mm):	600 mm x 600 mm
125.9	Display	
	125.9.1 Green Vacuum Flurocent Display (VFD)	
	125.9.2 6-digit	
	125.9.3 Height (minimum):	14 mm
125.10	Platform Material:	SS304
125.11	Temperature Range:	0- 45 degrees
125.12	Power Supply:	230 V AC 50 Hz

126 Weighing Machine - Table Top, 25 Kg

126.1 Basic Indicative Diagram

126.2	Nominal Capacity:	25 Kg
126.3	Maximum Capacity (kg):	30 kg
126.4	Scale Type:	Table Top Type
126.5	Weighing Scale Approval	
	126.5.1 Legal Metrology Department, India	
	126.5.2 Class III Approved	
126.6	Readability (gm):	5 gm
126.7	Platform Size (mm):	300 mm x 225 mm (±5%)
126.8	Display	
	126.8.1 6-digit, 7-segment LED/LCD display	
	126.8.2 Display Size (Minimum):	14 mm
	126.8.3 Resolution:	1/ 6200
126.9	Battery:	6V/ 4 Ah (Rechargeable)
126.10	Dual Display:	Built-in
126.11	Load plate - Material:	Stainless Steel 304
126.12	Operating Temperature Range:	0°C to +45°C
126.13	Humidity (Maximum):	85% RH

127 Weighing Machine - Table Top, 5 Kg

127.1 Basic Indicative Diagram

127.2	Nominal Capacity:	5 Kg
127.3	Maximum Capacity (kg):	6 kg
127.4	Scale Type:	Table Top Type
127.5	Weighing Scale Approval	
	127.5.1 Legal Metrology Department, India	
	127.5.2 Class III Approved	
127.6	Readability (gm):	1gm
127.7	Platform Size (mm):	300 mm x 225 mm (±5%)
127.8	Display	
	127.8.1 6-digit, 7-segment LED/LCD display	
	127.8.2 Display Size (Minimum):	14 mm
	127.8.3 Resolution:	1/6000
127.9	Battery:	6V / 4 Ah (Rechargeable)
127.10	Dual Display:	Built-in
127.11	Load plate - Material:	Stainless Steel 304
127.12	Operating Temperature Range:	0°C to +45°C
127.13	Humidity (Maximum):	85% RH