

DESCRIPTION

These are Moving Coil DC, Moving Coil rectifier type AC, Moving Iron AC ammeters & voltmeters which are suitable for use in school, laboratories, workshops & for field operation. Specially designed to be operated in horizontal position (also in inclined position upto 45°) & can be carried along safely.

FEATURES / ADVANTAGES

- ◆ Instruments with accuracy class 1.0% for DC/AC, 1.5% for Rectifier type AC.
- ◆ Instruments with multiple scale (refer table).
- ◆ Robust housing.

ELECTRICAL SPECIFICATIONS

MODEL	TYPE	SCALE	RANGE	ACCURACY
PORT MSSB-1	D.C. μ -AMMETER	Single	50 μ A, 100 μ A, 150 μ A, 250 μ A, 500 μ A, 1000 μ A	1.0%
		Dual	50/100 μ A, 100/200 μ A, 150/300 μ A, 250/500 μ A, 500/1000 μ A.	
	D.C. MILLI-AMMETER	Single	1mA, 2.5mA, 3mA, 5mA, 7.5mA, 10mA, 25mA, 30mA, 50mA, 75mA, 100mA, 250mA, 300mA, 500mA, 750mA, 1000mA	
		Dual	0.5/1mA, 1/2mA, 2.5/5mA, 5/10mA, 10/20mA, 15/30mA, 25/50mA, 50/100mA, 150/300mA, 250/500mA, 500/1000mA	
	D.C. AMMETER	Single	0.5A, 1A, 2.5A, 3A, 5A, 10A, 15A, 20A, 25A, 30A, 50A (INT. SHUNT)	
		Double	1/2A, 2.5/5A, 5/10A, 10/20A, 15/30A, 25/50A (INT. SHUNT)	
	D.C. MILLIVOLTMETER	Single	10mV, 25mV, 50mV, 75mV, 100mV, 150mV, 300mV, 500mV, 1000mV	
		Dual	10/20mV, 25/50mV, 50/100mV, 75/150mV, 100/200mV, 150/300mV, 250/500mV, 500/1000mV	
		Triple	25/50/100mV, 50/100/200mV, 75/150/300mV, 150/300/600mV, 250/500/1000mV	
		Quadruple	25/50/100/200mV, 125/250/500/1000mV, 75/150/300/600mV	
	D.C. VOLTMETER	Single	1V, 2.5V, 3V, 5V, 7.5V, 10V, 15V, 20V, 25V, 30V, 50V, 75V, 100V, 150V, 200V, 250V, 300V, 500V, 600V, 1000V	
		Dual	1/2V, 2.5/5, 5/10V, 30/60V, 50/100V, 75/150V, 100/200V, 150/300V, 250/500V, 300/600V, 500/1000V.	
Triple		1.5/3/7.5V, 3/7.5/15V, 7.5/15/30V, 15/30/75V, 25/50/100V, 75/150/300V, 125/250/500V, 150/300/600V, 250/500/1000V		
Quadruple		1.5/3/7.5/15V, 3/7.5/15/30V, 7.5/15/30/60V, 15/30/75/150V, 30/75/150/300V, 75/150/300/600V, 125/250/500/1000V.		
PORT MSSB-2	A.C. MILLI-AMMETER	Single	10mA, 50mA, 100mA, 250mA, 500mA, 1000mA	1.5%
	A.C. AMMETER.	Single	1A, 5A, 10A, 15A, 20A, 25A, 30A.	
	A.C. VOLTMETER	Single	7.5V, 10V, 15V, 20V, 25V, 50V, 100V, 150V, 300V, 600V.	
		Dual	7.5/15V, 10/20V, 15/30V, 25/50V, 50/100V, 150/300V, 300/600V.	
		Triple	7.5/15/30V, 15/30/75V, 30/75/150, 75/150/300V, 125/250/500V, 150/300/600V.	
PORT MSSB-3	A.C. AMMETER.	Single	0.2A, 0.5A, 1A, 2.5A, 5A, 10A, 15A, 20A, 30A, 50A, 100A.	1.0%
		Dual	0.5/1A, 1/2A, 2.5/5A, 5/10A. & also 0.2/1A, 0.5/2.5A, 1/5A, 2/10A, 10/20A, 15/30A, 25/50A, 50/100A.	
		Triple	1/3/10A, 3/10/30A, 10/30/100A, 5/10/25A, 10/25/50A, 25/50/100A.	
		Quadruple	1/3/10/30A, 3/10/30/100A, 5/10/25/50A, 10/25/50/100A.	
		5 TH	1/3/10/30/100A, 5/10/25/50/100A.	
	A.C. VOLTMETER	Single	15V, 30V, 62.5V, 75V, 125V, 150V, 250V, 300V, 500V, 600V.	
		Dual	15/30V, 30/60V, 62.5/125V, 75/150V, 125/250V, 150/300V, 250/500V, 300/600V.	
		Triple	15/30/75V, 62.5/125/250V, 75/150/300V, 125/250/500V, 150/300/600V.	

Any other Non-Std. Range enquiry solicited.

MECHANICAL SPECIFICATIONS

Size	length	width	height	housing	model	Scale length	division	weight
1	250 mm	190 mm	80 mm	Black Engineering Plastic	MSSB	145 mm (approx)	60-150	1Kg (approx)

Ordering information

1) Type 2) Model 3) Scale 4) Range 5) Accuracy




DESCRIPTION

These are Moving Coil DC, Moving coil rectifier type AC, Moving iron AC ammeters & voltmeters which are suitable for use in school, laboratories, workshops & for field operation. Specially designed to be operated in horizontal position (also in inclined position upto 45°) & can be carried along safely.

FEATURES

- ◆ Instruments with accuracy class 1.0% for DC, 1.5% for AC.
- ◆ Instruments with multiple scale (refer table).
- ◆ Robust housing.
- ◆ These instruments have high resistance to shock & vibrations.

ELECTRICAL SPECIFICATIONS

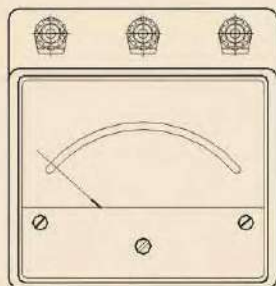
MODEL	TYPE	SCALE	RANGE	ACCURACY
 PORT SSSP - 1	D.C. μ -AMMETER	Single	250 μ A, 500 μ A, 1000 μ A	1.0%
		Dual	250/500 μ A, 500 / 1000 μ A	
	D.C. MILLI-AMMETER	Single	1mA, 2.5mA, 3mA, 5mA, 7.5mA, 10mA, 25mA, 30mA, 50mA, 75mA, 100mA, 250mA, 300mA, 500mA, 750mA, 1000mA	
		Dual	1/2mA, 2.5/5mA, 5/10mA, 10/20mA, 15/30mA, 25/50mA, 50/100mA, 150/300mA, 250/500mA, 500/1000mA.	
	D.C. AMMETER	Single	1A, 2.5A, 3A, 5A, 10A, 15A, 20A, 25A, 30A (INT. SHUNT)	
		Dual	1/2A, 2.5/5A, 5/10A, 10/20A, 15/30A. (INT. SHUNT)	
	D.C. MILLIVOLTMETER	Single	50mV, 75mV, 100mV, 150mV, 300mV, 500mV, 1000mV	
		Dual	50/100mV, 75/150mV, 100/200mV, 150/300mV, 250/500mV, 500/1000mV.	
		Triple	50/100/200mV, 75/150/300mV, 150/300/600mV, 250/500/1000mV.	
	D.C. VOLTMETER	Single	1V, 2.5V, 3V, 5V, 7.5V, 10V, 15V, 20V, 25V, 30V, 50V, 75V, 100V, 150V, 200V, 250V, 300V, 500V, 600V.	
Dual		1/2V, 2.5/5V, 5/10V, 15/30V, 30/60V, 50/100V, 75/150V, 100/200V, 150/300V, 250/500V, 300/600V.		
Triple		1.5/3/7.5V, 15/30/75V, 25/50/100V, 75/150/300V, 125/250/500V, 150/300/600V.		
 PORT SSSP - 2	A. C. MILLI-AMMETER	Single	10mA, 50mA.	1.5%
	A.C. VOLTMETER	Single	10V, 15V, 20V, 25V, 50V, 100V, 150V, 300V, 600V.	
 PORT SSSP - 3	A.C. AMMETER.	Single	0.5A, 1A, 2.5A, 5A, 10A.	1.5%
		Dual	0.5/1A, 1/2A, 2.5/5A, 5/10A.	
	A.C. VOLTMETER	Single	62.5V, 75V, 125V, 150V, 250V, 300V, 500V, 600V.	
		Dual	62.5/125V, 75/150V, 125/250V, 150/300V, 250/500V, 300/600V.	
		Triple	62.5/125/250V, 75/150/300V, 125/250/500V, 150/300/600V	

Any other Non-Std. Range enquiry solicited.

MECHANICAL SPECIFICATIONS

SIZE	LENGTH mm	WIDTH mm	HEIGHT mm	HOUSING MATERIAL	MODEL IDENTIFICATION	SCALE		WEIGHT gm. (Approx.)
						LENGTH mm (Approx.)	DIVISION no.	
1	115	110	50	Polycarbonate	SSSP —	90	30 - 50	400

Ordering information 1) Type 2) Model 3) Scale 4) Range 5) Accuracy



Width

Height





DESCRIPTION


These are Moving Coil DC, Moving Coil Rectifier type AC, ammeters & voltmeters and can be used in conjunction with transducers for measurement of frequency, power factor and low power factor wattmeter. Single phase dynamometric type of instrument is used for measurement of power at UPF.

FEATURES / ADVANTAGES:

- ◆ Instruments with 1.0%, 1.5% accuracy class.
- ◆ Instruments with multiple scale (refer table).
- ◆ Robust housing suitable for schools, workshops, field operations for continuous use.

ELECTRICAL SPECIFICATIONS

MODEL	TYPE	SCALE	RANGE	ACCURACY
 PORT - MSMB - 2	MOVING COIL DC VOLT-AMMETER	Quadruple	0-0.075/15/150/600V & 0-1.5/15/75/150A (with 75mV shunt)	1.5%
 PORT - MSMB - 3	MOVING COIL DC & AC VOLTMETER	Quadruple	0-1.5 / 15 / 150 / 600V DC * 0-6 / 60 / 300 / 600V AC	1.5%
	FREQUENCY METER	Single	45-55Hz or 55-65Hz or 380-420Hz at Voltages - 62.5V/110V/220V/440V	1%
		Tripple	110/220/440 V	
PORT SPW-LPFR	LPF (0.2PF)WATT METER 1 Phase	Single/Dual	62.5V/125V to 300V/600V & 50mA/100mA to 5A/10A	0.5%

MODEL	TYPE	SCALE	* POTENTIAL COIL (V)	CURRENT COIL (A)	ACCURACY
 PORT - MSMB - 4	# WATT METER 1Ph UPF	SPSC	75, 150, 300, 600	0.5, 1, 2, 2.5, 5, 10, 15, 20	1.0%
		DPSC	75/150, 150/300, 300/600.		
		TPSC	75/150/300, 150/300/600.		
		SPDC	75, 150, 300, 600	0.5/1, 1/2, 2.5/5, 5/10, 10/20, 15/30	
		DPDC	75/150, 150/300, 300/600.		
		TPDC	75/150/300, 150/300/600.		

* 62.5 / 125 / 250 / 500V INSTEAD OF 75 / 150 / 300 / 600V ON REQUEST.

CENTRE ZERO WATT ON REQUEST

MECHANICAL SPECIFICATIONS

SIZE	LENGTH mm	WIDTH mm	HEIGHT mm	HOUSING MATERIAL	MODEL IDENTIFICATION	SCALE		WEIGHT kg. (Approx.)
						LENGTH mm (Approx.)	DIVISION no.	
1	250	190	80	Black Engineering Plastic	MSMB —	145	80 ~ 120	1.5

Ordering information

Ammeter / Voltmeter

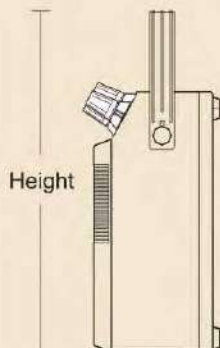
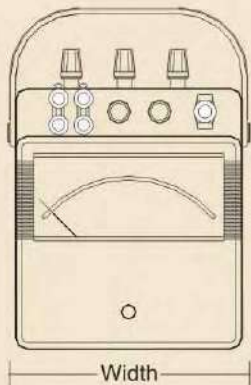
1) Type 2) Model 3) Range 4) Scale 5) Accuracy

Frequency Meter

1) Type 2) Model 3) Range 4) Voltage 5) Accuracy

Watt / PF Meter

1) Type 2) Model, Parameter, Phase & Range
3) Operating Voltage & PTR 4) Operating Current & CTR.



DESCRIPTION

These are dynamometric type instruments, incorporating single element / two elements or three elements power measurement methods and specially designed to be operated in horizontal condition.

FEATURES / ADVANTAGES:

- ◆ Instruments with accuracy class 0.5% for 1Ph Watt, 1.5% for 3Ph, 2° for PF.
- ◆ Instruments with multiple scale available (refer table).
- ◆ Robust housing suitable for schools, workshops, field operations for continuous use.

ELECTRICAL SPECIFICATIONS

TYPE	MODEL	SCALE	POTENTIAL COIL (V)	CURRENT COIL (A)	ACCURACY	
WATT METER WITH LOW POWER FACTOR COS $\phi=0.2$	# PORT LSDW - 1	SPDC DPSC TPDC	SPSC, DPSC, DPSC 75/150/300, 150/300/600	0.5/1, 1/2, 2.5/5, 5/10, 10/20	1.5%	
	WATT METER	# PORT LSDW - 2	SPSC	75, 150, 300, 600	0.5, 1, 2, 2.5, 5, 10, 20	0.5%
DPSC			75/150, 150/300, 300/600.			
TPSC			75/150/300, 150/300/600.			
SPDC			75, 150, 300, 600	0.5/1, 1/2, 2.5/5, 5/10, 10/20		
DPDC			75/150, 150/300, 300/600.			
TPDC			75/150/300, 150/300/600.			
VAR METER	PORT LSDW - 3	SPSC	75, 150, 300, 600	0.5, 1, 2, 2.5, 5, 10, 20	1.5%	
		PORT LSDW - 4	SPSC	75, 150, 300, 600		0.5, 1, 2, 2.5, 5, 10, 20
			DPDC	75/150, 150/300, 300/600.		0.5/1, 1/2, 2.5/5, 5/10, 10/20
		PORT LSDW - 5	SPSC	75, 150, 300, 600		0.5, 1, 2, 2.5, 5, 10
			SPDC			0.5/1, 1/2, 2.5/5, 5/10, 10/20
VAR METER	PORT LSDW - 6	SPSC	75, 150, 300, 600	0.5, 1, 2, 2.5, 5, 10, 20	1.5%	
		DPDC	75/150, 150/300, 300/600.	0.5/1, 1/2, 2.5/5, 5/10, 10/20		
	PORT LSDW - 7	SPSC	75, 150, 300, 600	0.5, 1, 2, 2.5, 5, 10, 20		
		SPDC		0.5/1, 1/2, 2.5/5, 5/10, 10/20		
POWER FACTOR METER	# PORT LSDW - 8	SPSC	75, 150, 300, 600	0.5, 1, 2, 2.5, 5, 10	2°	
		DPSC	75/150, 150/300, 300/600.			
		TPSC	75/150/300, 150/300/600.			
		SPDC	75, 150, 300, 600	0.5/1, 1/2, 2.5/5, 5/10, 10/20		
		DPDC	75/150, 150/300, 300/600.			
	TPDC	75/150/300, 150/300/600.				
	PORT LSDW - 9	SPSC	75, 150, 300, 600	0.5, 1, 2, 2.5, 5, 10,		

* 62.5/125/250/500V ON REQUEST
CENTRE ZERO WATT ON REQUEST

SELECTION OF RANGES :

Upper limit of measuring range for meters shall be one of the following values - 1, 1.2, 1.5, 2, 2.5, 3, 4, 5, 6, 7.5, 8 or their decimal multiples.

Example for selection of proper range

1) Formula for 1Phase active power

$$P(\max) = VI \cos \phi. \text{ Where } \cos \phi = 1.$$

$$\text{If Voltage} = 500V \text{ \& Current} = 2.5A \text{ calculated power} = 500 \times 2.5 \times 1 = 1.25kW.$$

If the calculated value is 1.25kW 0 - 1.2kW or 0 - 1.25kW shall be selected as a range for power.

2) Formula for 3Phase active power with PT & CT.

$$P(\max) = \sqrt{3}VI \cos \phi \times PTR \times CTR. \text{ Where } \cos \phi = 1.$$

$$\text{If Voltage} = 110V \text{ \& Current} = 5A \text{ PTR} = 400kV/110V \text{ CTR} = 1000A/5A$$

$$\text{calculated power} = \sqrt{3} \times 110 \times 5 \times (400 \times 1000 / 110) \times (1000 / 5) = 692MW.$$

If the calculated value is 692MW 0 - 600MW or 0 - 750MW shall be selected as a range for power.

Note : ■ All Wattmeters are calibrated at $\cos \phi = 1$ and Varmeter at $\sin \phi = 1$

■ All Low Power Factor Wattmeters are calibrated at $\cos \phi = 0.2$ lag.

■ Voltage & Current range other than specified can be supplied on request, if feasible.

MECHANICAL SPECIFICATIONS

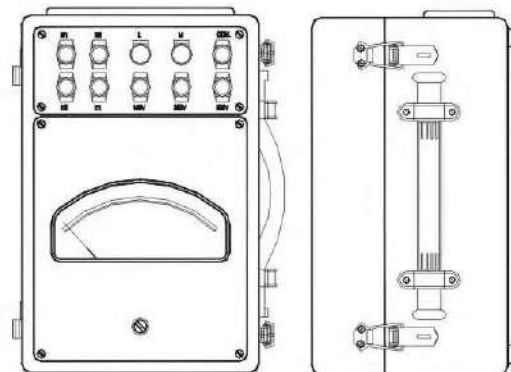


Fig. 1

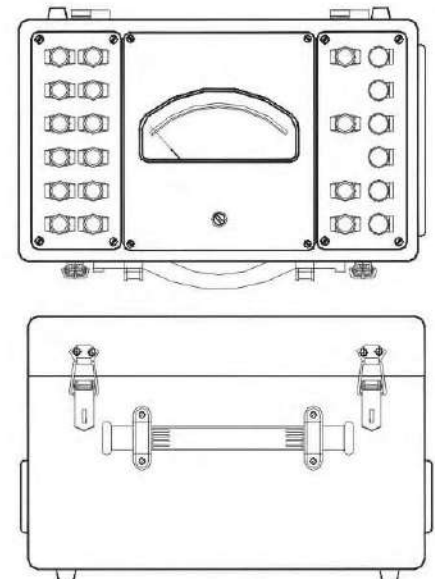


Fig. 2

SIZE	LENGTH mm	WIDTH mm	HEIGHT mm	HOUSING MATERIAL	MODEL IDENTIFICATION	SCALE		WEIGHT kg. (Approx.)
						LENGTH mm (Approx.)	DIVISION nos.	
1	300	200	155 / 190	Wooden Box	LSDW —	150	100 - 150	4 ~ 5
2	225	355	190 / 225	Wooden Box	LSDW —	150	100 - 150	5.5 ~ 7.5

Ordering information

1) Type 2) Model, Parameter, Phase, Range 3) Operating Voltage & PTR 4) Operating Current & CTR.





DESCRIPTION

These are Moving Coil or Moving Iron type instruments or dynamometric type instruments, specially designed to be operated in horizontal position (also in inclined position upto 45°) & can be carried along safely.

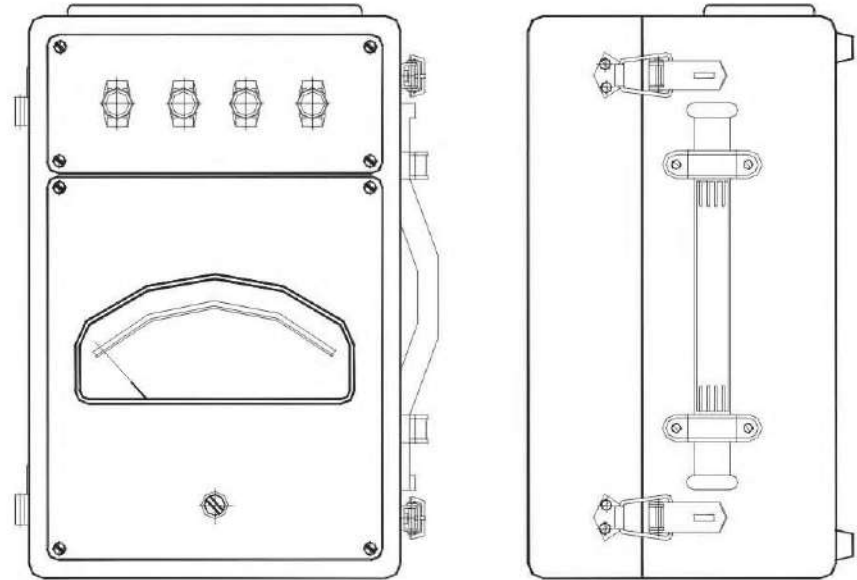
FEATURES / ADVANTAGES:

- Instruments with 0.5% accuracy class.
- Instruments with multiple scale available (refer table).
- Robust housing suitable for schools, workshops, field operations for continuous use.
- Precision instruments suitable for standard laboratories (Size: 1).

ELECTRICAL SPECIFICATIONS

MODEL	TYPE	SCALE	RANGE	ACCURACY
 PORT LSPW – 1	D.C. μ -AMMETER	Single	500 μ A, 1000 μ A	0.5%
		Dual	500/1000 μ A,	
	D.C. MILLI-AMMETER	Single	1mA, 2.5mA, 3mA, 5mA, 7.5mA, 10mA, 25mA, 30mA, 50mA, 75mA, 100mA, 250mA, 300mA, 500mA, 750mA, 1000mA	
		Dual	1/2mA, 2.5/5mA, 5/10mA, 10/20mA, 15/30mA, 25/50mA, 50/100mA, 150/300mA, 250/500mA, 500/1000mA.	
	D.C. AMMETER	Single	0.5A, 1A, 2.5A, 3A, 5A, 10A, 15A, 20A, 25A, 30A	
		Dual	0.5/1A, 1/2A, 2.5/5A, 5/10A, 10/20A, 15/30A	
	D.C. MILLIVOLTMETER	Single	25mV, 50mV, 75mV, 100mV, 150mV, 300mV, 500mV, 1000mV	
		Dual	25/50mV, 50/100mV, 75/150mV, 100/200mV, 125/250mV, 150/300mV, 250/500mV, 500/1000mV.	
		Tripple	25/50/100mV, 50/100/200mV, 75/150/300mV, 125/250/500mV, 150/300/600mV, 250/500/1000mV	
		Quadruple	25/50/62.5/75/100/125/150/200/250/300/500/600/1000mV	
	D.C. VOLTMETER	Single	1V, 2.5V, 3V, 5V, 7.5V, 10V, 15V, 20V, 25V, 30V, 50V, 75V, 100V, 150V, 200V, 250V, 300V, 500V, 600V, 1000V	
		Dual	1/2V, 2.5/5V, 5/10V, 15/30V, 30/60V, 50/100V, 75/150V, 100/200V, 125/250V, 150/300V, 250/500V, 300/600V, 500/1000V	
Tripple		1.5/3/7.5V, 3/7.5/15V, 7.5/15/30V, 15/30/75V, 25/50/100V, 75/150/300V, 125/250/500V, 150/300/600V		
Quadruple		1.5/3/7.5/15V, 3/7.5/15/30V, 7.5/15/30/60V, 15/30/75/150V, 30/75/150/300V, 75/150/300/600V		
 PORT LSPW – 2	A.C. AMMETER.	Single	0.5A, 1A, 2.5A, 5A, 10A, 15A, 20A, 30A.	0.5%
		Dual	1/2A, 2.5/5A, 5/10A, & also 0.2/1A, 0.5/2.5A, 1/5A, 2/10A, 10/20A, 15/30A.	
	A.C. VOLTMETER	Single	62.5V, 75V, 125V, 150V, 250V, 300V, 500V, 600V	
		Dual	62.5/125V, 75/150V, 125/250V, 150/300V, 250/500V, 300/600V	
		Tripple	62.5/125/250V, 75/150/300V, 125/250/500V, 150/300/600V	
	 LSDW 10	AC/DC AMMETER	Single	
Dual		0.5/1A, 1/2A, 2.5/5A, 5/10A		
 LSDW 11	AC/DC VOLTMETER	Single	75, 150, 300, 600V	
		Dual	75/150V, 150/300V, 300/600V	
		Tripple	75/150/300V, 150/300/600V	

MECHANICAL SPECIFICATIONS



SIZE 1

SIZE	LENGTH mm	WIDTH mm	HEIGHT mm	HOUSING MATERIAL	MODEL IDENTIFICATION	SCALE		WEIGHT kg. (Approx.)
						LENGTH mm (Approx.)	DIVISION nos.	
1	300	200	155	Wooden Box	LSPW —	150	100 ~ 150	4
2	300	200	190	Wooden Box	LSPW —	150	100 ~ 150	5

Ordering information

1) Type 2) Model 3) Scale 4) Range 5) Accuracy