



## Technical Data Sheet

# Smartlook Series Meter



E471457



C US  
263805



The moving iron & moving coil panel meters sizes 2<sup>1/2</sup>" , 3<sup>1/2</sup>" are housed in a moulded polycarbonate cases which are suitable for the measurement of AC & DC current, voltage & frequency utilizing a high torque pivot and jewel movement and elapsed time meters.

### Special Features

- Surface mounting.
- Near linear scale.
- Glass filled Polycarbonate housing (UL 94 V-0).
- Compact case sizes.
- NEMA 4X Enclosure (Optional)

## Application

The smartlook range of analog panel meters offer accurate measurement and indication of most electrical & electronics parameters in industry standard 2<sup>1/2</sup>", 3<sup>1/2</sup>" case sizes.

A range of short scale panel meters that comply with Internationally recognised specifications. Their rugged design will suit demanding environmental applications.

## Functional Areas

- Switchgear
- Distribution systems
- Control panels
- Generator sets
- Energy management
- Building management
- Utility power management
- Process control
- Motor monitoring

## Features

- Two case sizes available : 2<sup>1/2</sup>", 3<sup>1/2</sup>" inches
- Dust & water jet protected IP54/NEMA 3 (From Front)
- Water jet protected to NEMA 4X\* (p/n option. see page 7)
- Withstands high levels of shock, vibration, dirt and humidity.
- UL approved.
- Instruments comply with EN61010-1 and meets IEC414 Dielectric Test.
- Complies with international standards : IEC51 (EN60051) or ANSI-C39.1

## Benefits

- AC moving iron and moving coil mechanisms.
- ANSI standard case sizes.
- Elapsed time movement mechanism.

## Operation

### Moving Coil Meter

These meters offers a centre cored, self shielding moving coil movements using pivots, hairspring and spring jewels. Variations in movement are limited by design. All DC voltmeters are 1000 ohms per volt except mv ranges and moving coil rectified voltmeter run at 900 ohms per volt. Refer # standard measuring ranges table for details (page 3 of 9).

### Moving Iron Meter

This clapper type repulsion design utilizes a pivot, hairspring and jewel movement. The bottom jewel is oil filled to provide damping while the top spring is for resilience. All voltmeters are manufactured with internal voltage dropper resistor.

### Frequency Meter

Frequency meters use a 90 $\mu$ A/4Kohm movement driven by an EMC hard frequency conversion circuit.

### Dials, Pointers and Scales

Standard dials are matt white black printed scales and a spear black pointer is balanced within 1% of scale length and feature a highly repeatable flattened scale shape, ensuring consistently accurate measurement reading. Dials are interchangeable between the smartlook range of products using the same input within the published specification of the meter. Options for non standard customer specific dials are available upon request.

## Technical Specifications

### Applicable Standards

Terminal bolts/leads	DIN 46200/46282
Safety requirements and protective measures for Electrical indicating instruments and their accessories	IEC 529, IEC 61010-1
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IS 1248 ANSI C39.1 1981(IEC 51)
UL Compatibility	UL 94 V-0

### Comply with following European directives

2004 / 108 / EC (EMC directive), 2006 / 95/EC ( low voltage directive ) & amendment 93/68/EEC, For CE Marking.

### Scale and Pointer

Pointer	Spear type	
Pointer deflection	90°	
Scale characteristics	(A) Near Linear above 10% of nominal full Scale value for moving iron  (B) Linear scale for moving coil , frequency, moving coil with rectifier	
Scale division	Coarse /Fine	
Scale length	212	312
	50.61 mm	64.76 mm

## Mechanical Data

Case details	Moulded case suitable for mounting in Control / switchgear panels Machinery consoles.
Case material	Polycarbonate , flame retardant and drip proof as per UL 94 V-0.
Front window	Polycarbonate (transparent)
Colour of case	Black
Position of use	Vertical
Panel fixing	Fixing stud
Panel thickness	≤ 10 mm

### Terminals

Voltmeters and Ammeters & Frequency meters	Terminal 10-32 UNF, Washer 10-32 UNF(Recommended lug M5 ring type)
Fixing	Surface mounting with 2 studs/3 studs /4 studs by 4-40 UNC studs.

## Reference Conditions

Accuracy	According to ANSI C39.1(IEC 51)/ DIN EN 60051
DC Ammeters & Voltmeters	1.5% 0 to 100% of full scale deflection
AC Ammeters & Voltmeters	Moving iron: 1.5% 10 to 100% of full scale deflection Moving coil: 1.5% 0 to 100% of full scale deflection
Frequency Meters	0.5% of end scale value
Ambient temperature	23 C ± 2°C
Position of use	Nominal position ±1°
Input Waveform	Rated value of measured quantity sine wave, distortion factor ≤ 5%
Frequency	45 - 65Hz
Other Conditions	IEC 51/DIN EN 60051
mV Meter	Total lead resistance of 0.035 Ohm is considered for mV ranges while calibration

## Nominal Range of use

Ambient Temperature	0 ...40 °C
Position of use	Vertical ± 5°
Frequency	FN ± 10%
External Magnetic Field	At 0.4 kA/m

## Electrical Data

<b>Elapsed Time Meter and Frequency Meter</b>	
<b>Voltage</b>	100/125V 200/250V
<b>Frequency Meters</b>	45 or 55Hz 55 or 65Hz 45 or 65 Hz
<b>Burden</b>	4 VA Maximum
<b>Moving Iron A.C. Ammeters &amp; Voltmeters</b>	
<b>Accuracy Class</b>	1.5
<b>Rating</b>	
<b>Ammeters</b>	1 to 30 A
<b>Voltmeters</b>	10V to 600V
<b>Overload</b>	
<b>Ammeters</b>	x 1.2 for 2 Hours x 10 for 5 Sec
<b>Voltmeters</b>	x 1.2 for 2 Hours x 2 for 5 Sec
<b>Burden</b>	
<b>Ammeters</b>	0.5 VA
<b>Voltmeters</b>	4.5 VA
<b>Moving Coil D.C. Ammeters &amp; Voltmeters</b>	
<b>Accuracy Class</b>	1.5
<b>Rating</b>	
<b>Ammeters</b>	100mA to 30A
<b>Voltmeters</b>	50mV to 600V

## Options

<b>Case</b>	
Front Window	Polycarbonate (Transparent)
Color of Case	Black

<b>Dial</b>	
Blank dial	With initial and end values marked
Special marking	Numbering/Lettering
Division dial	Basic divisions without numbering
Color markings/bands	Red or green
Over range (Moving Iron Ammeter)	Two, three and /five times over range

## Environmental Conditions

Climatic Suitability	Climate category II as per IEC 60051 (climatic class 3 according to VDE/VDI 3540)
Operating Temperature	0°C... + 40°C
Storage temperature	- 20°C ...+55°C
Relative humidity	25% to 80% nominal range of use
Shock resistance	15 g. for pulse duration 11ms
Vibration resistance	ANSI C39.1 cl. 5. 13

## # Standard Measuring Ranges

<b>DC moving coil Ammeters (PQ)</b>	50 mA to 30 A (Approx. mV drop = 60 mV)		
<b>DC moving coil Voltmeters (PQ)</b>	50 mV* to 600 V** (*=0.16Kohm/V & **=1Kohm/V)		
<b>AC moving iron Ammeters (EQ)</b>	100 mA to 30 A		
<b>AC moving iron Voltmeters (EQ)</b>	6 V to 600 V		
<b>Frequency Meters</b>	45-50-55Hz, 55-60-65Hz, 45-55-65Hz, 360-440 Hz		
<b>Elapsed Time Meters (ETM)</b>	110/130 V, 60 Hz		
<b>AC moving coil Ammeters (VQ)</b>			
AC Current		AC Voltage	
Rated	Approx Vtg. Drop	Rated	Sensitivity(+10%)
1mA	2.4V	40V	900 ohm/V
1.5mA	1.4V	60V	
4mA		100V	
6mA		150V	
10mA		250V	
15mA	1.7V	400V	
25mA		500V	
40mA		600V	
60mA			
100mA			

### Safety Precautions

- 1) Instruments with damaged window or glasses must be disconnected from the mains.
- 2) Adequate safety clearance must be maintained to control panel fasteners and to sheet metal housing. If non - insulated connector wires are used.
- 3) Instruments to be used in grounded panel.

**Specifications**

A.C. AMMETERS - PIVOT & JEWEL - MOVING IRON TYPE (EQ)

Rating	Scale	212	312
1A	0-1A	PK-250-240-LALA	PK-250-340-LALA
5A	0-5A	PK-250-240-LSLS	PK-250-340-LSLS
10A	0-10A	PK-250-240-MTMT	PK-250-340-MTMT
15A	0-15A	PK-250-240-NDND	PK-250-340-NDND
20A	0-20A	PK-250-240-NGNG	PK-250-340-NGNG
30A	0-30A	PK-250-240-NLNL	PK-250-340-NLNL
1A	Transformer Rated	PK-250-240-LAXX	PK-250-340-LAXX
5A	Transformer Rated	PK-250-240-LSXX	PK-250-340-LSXX

A.C. VOLTMETERS - PIVOT & JEWEL - MOVING IRON TYPE (EQ)

Rating	Scale	212	312
150V	0-150V	PK-250-244-PZPZ	PK-250-344-PZPZ
300V	0-300V	PK-250-244-RXRX	PK-250-344-RXRX
600V	0-600V	PK-250-244-SJSJ	PK-250-344-SJSJ
150V	Transformer Rated	PK-250-244-PZXX	PK-250-344-PZXX

D.C. AMMETERS - PIVOT & JEWEL - MOVING COIL TYPE (PQ)

Rating	Scale	212	312
0-1 mA	0-1 mA	PK-250-200-FAFA	PK-250-300-FAFA
0-5 mA	0-5 mA	PK-250-200-FXFX	PK-250-300-FXFX
0-10 mA	0-10 mA	PK-250-200-GZGZ	PK-250-300-GZGZ
0-20 mA	0-20 mA	PK-250-200-HFHF	PK-250-300-HFHF
0-50 mA	0-50 mA	PK-250-200-HYHY	PK-250-300-HYHY
0-100 mA	0-100 mA	PK-250-200-JRJR	PK-250-300-JRJR
0-200 mA	0-200 mA	PK-250-200-KAKA	PK-250-300-KAKA
0-500 mA	0-500 mA	PK-250-200-KMKM	PK-250-300-KMKM
4-20 mA	4-20 mA	PK-250-200-HEHE	PK-250-300-HEHE
0-1A	0-1A	PK-250-200-LALA	PK-250-300-LALA
0-1.5A	0-1.5A	PK-250-200-LCLC	PK-250-300-LCLC
0-3A	0-3A	PK-250-200-LJLJ	PK-250-300-LJLJ
0-5A	0-5A	PK-250-200-LSLS	PK-250-300-LSLS
0-10A	0-10A	PK-250-200-MTMT	PK-250-300-MTMT
0-15A	0-15A	PK-250-200-NDND	PK-250-300-NDND
0-20A	0-20A	PK-250-200-NGNG	PK-250-300-NGNG
0-30A	0-30A	PK-250-200-NLNL	PK-250-300-NLNL
0-50mV	Shunt Rated	PK-250-224-ECXX	PK-250-324-ECXX
0-100mV	Shunt Rated	PK-250-224-GBXX	PK-250-324-GBXX

D.C. VOLTMETERS - PIVOT & JEWEL - MOVING COIL TYPE (PQ)

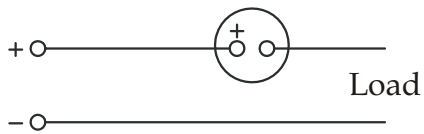
Rating	Scale	212	312
0-15 V	0-15 V	PK-250-220-NDND	PK-250-320-NDND
0-50 V	0-50 V	PK-250-220-NTNT	PK-250-320-NTNT
0-75 V	0-75 V	PK-250-220-PBPB	PK-250-320-PBPB
0-150 V	0-150 V	PK-250-220-PZPZ	PK-250-320-PZPZ
0-400 V	0-400 V	PK-250-220-SCSC	PK-250-320-SCSC
0-600 V	0-600 V	PK-250-220-SJSJ	PK-250-320-SJSJ

FREQUENCY METERS, 120V - PIVOT & JEWEL (Self Contained)

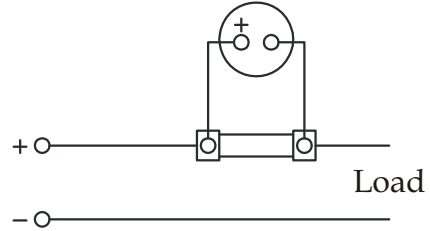
Rating	Scale	212	312
55 Hz	45-65 Hz	PK-254-250-AJAJ	PK-254-350-AJAJ
60 Hz	55-65 Hz	PK-254-250-ANAN	PK-254-350-ANAN

**Electrical Connections**

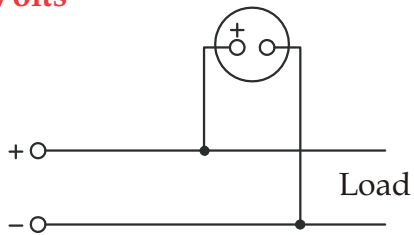
**DC Amps - Self Contained**



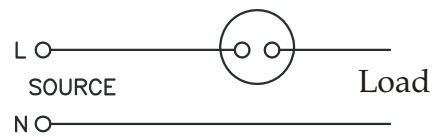
**DC Amps - For use with external shunt**



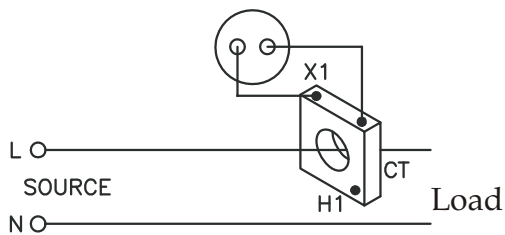
**DC Volts**



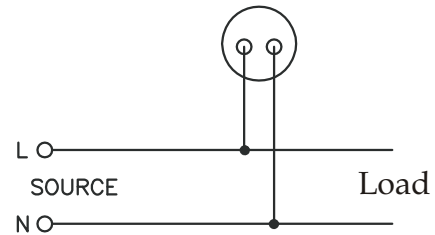
**AC Amps - Self Contained**



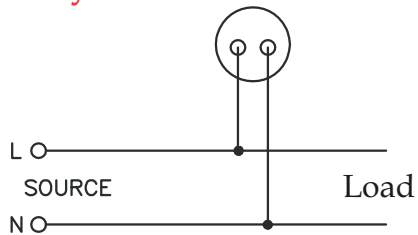
**AC Amps - For use with Current Transformer**



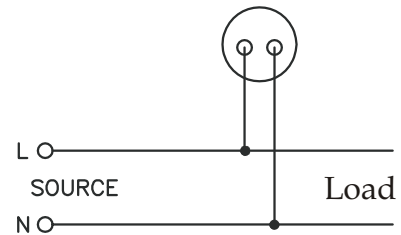
**AC Volts**



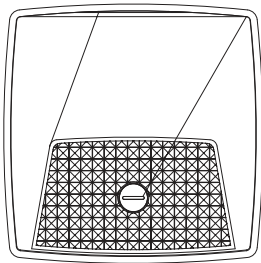
**Frequency Meter**



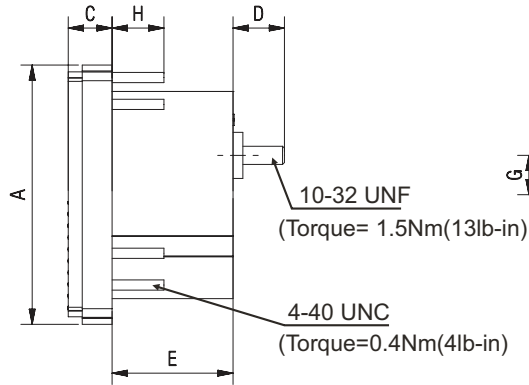
**Elapsed Time Meter**



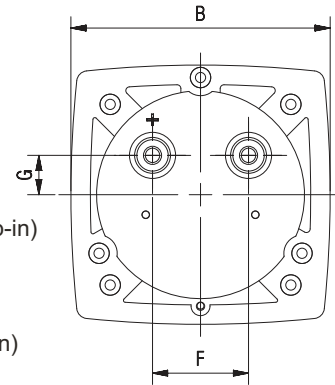
# Dimensions



FRONT VIEW



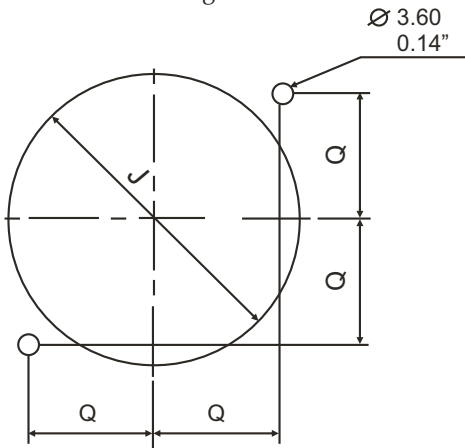
SIDE VIEW



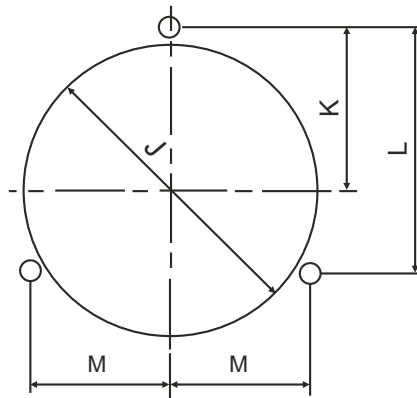
BOTTOM VIEW

## PANEL CUT-OUT :-

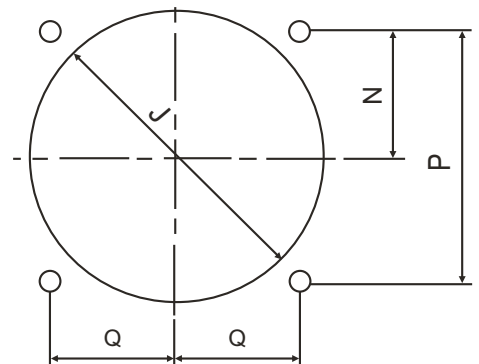
Specify the No. of fixing studs while ordering



STUD POSITION FOR TWO FIXING STUDS



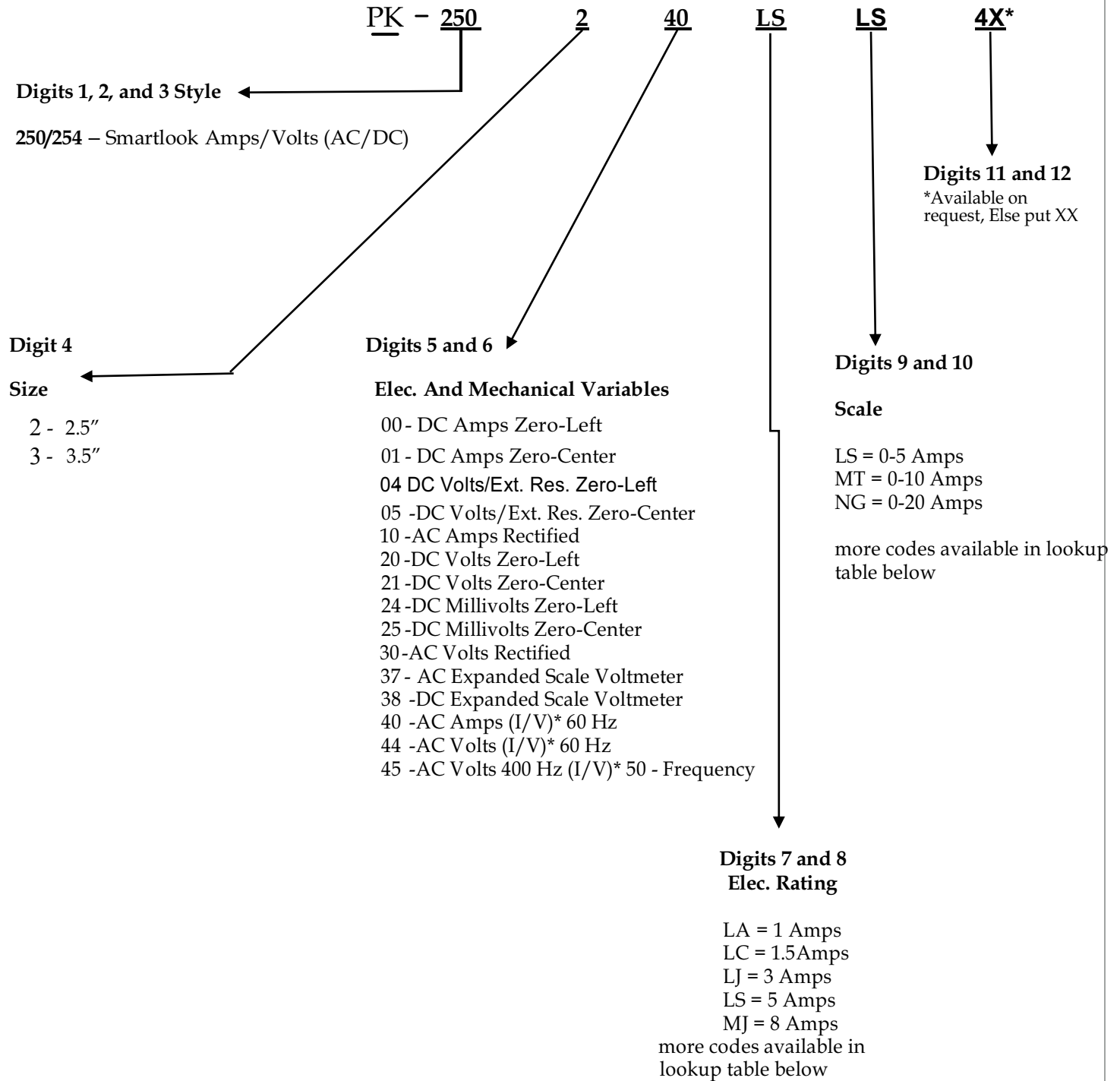
STUD POSITION FOR THREE FIXING STUDS



STUD POSITION FOR FOUR FIXING STUDS

	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
<b>2 ½ mm</b>	68.6	68.6	11.6	14.6	32.0	25.4	10.4	13.72	55	31	46.5	26.9	23.9	47.8	23.9
<b>Inch</b>	2.70	2.70	0.46	0.58	1.26	1.00	0.41	0.54	2.16	1.22	1.83	1.06	0.94	1.88	0.94
<b>3 ½ mm</b>	88.9	88.9	11.6	14.6	35.7	25.4	10.4	13.72	69	40.2	60.3	34.8	28.5	57.0	28.5
<b>Inch</b>	3.5	3.5	0.46	0.58	1.4	1.00	0.41	0.54	2.71	1.58	2.37	1.37	1.12	2.24	1.12

# Smartlook Series Coding



## Lookup Table for Codes (Digits 7 and 8 and Digits 9 and 10)

Code	Range	Code	Range	Code	Range	Code	Range	Code	Range	Code	Range
<b>CF</b>	0-20 $\mu$	<b>CY</b>	0-50 $\mu$								
<b>DR</b>	0-100 $\mu$										
<b>EA</b>	0-200 $\mu$	<b>EM</b>	0-500 $\mu$	<b>EW</b>	0-800 $\mu$						
<b>FA</b>	0-1 m	<b>FD</b>	0-1.5 m	<b>FG</b>	0-2 m	<b>FN</b>	0-3 m	<b>FX</b>	0-5 m		
<b>GZ</b>	0-10 m										
<b>HC</b>	0-15 m	<b>HF</b>	0-20 m	<b>HJ</b>	0-25 m	<b>HM</b>	0-30 m	<b>HY</b>	0-50 m		
<b>JJ</b>	0-80 m	<b>JR</b>	0-100 m	<b>JX</b>	0-150 m						
<b>KA</b>	0-200 m	<b>KD</b>	0-250 m	<b>KG</b>	0-300 m	<b>KM</b>	0-500 m	<b>KU</b>	0-750 m	<b>KW</b>	0-800 m
<b>LA</b>	0-1	<b>LC</b>	0-1.5	<b>LJ</b>	0-3	<b>LS</b>	0-5				
<b>MJ</b>	0-8	<b>MT</b>	0-10								
<b>ND</b>	0-15	<b>NG</b>	0-20	<b>NL</b>	0-30	<b>NP</b>	0-40	<b>NT</b>	0-50	<b>NW</b>	0-60
<b>PB</b>	0-75	<b>PD</b>	0-80	<b>PK</b>	0-100	<b>PZ</b>	0-150				
<b>RL</b>	0-200	<b>RS</b>	0-250	<b>RX</b>	0-300						
<b>SC</b>	0-400	<b>SF</b>	0-500	<b>SJ</b>	0-600	<b>SM</b>	0-750	<b>SN</b>	0-800	<b>SS</b>	0-1000
<b>TC</b>	0-1500	<b>TM</b>	0-2000								
<b>VA</b>	0-1 kilo	<b>VB</b>	0-1.2 kilo	<b>VC</b>	0-1.5 kilo	<b>VE</b>	0-2 kilo	<b>VJ</b>	0-3 kilo		

For more details and product codes, please contact our local office

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