

## DIN RANGE PANEL METERS

### DESCRIPTION

Available with moving iron or moving coil movements for a.c. or d.c. use, these DIN panel meters have been supplied worldwide and are recognised for their quality and value. Standard scales or customised dials can be offered.



- Manufactured to: DIN 43700, IEC51 and BS89.
- 48mm, 72mm and 96mm sizes.
- a.c. or d.c. use.
- Interchangeable dials (72mm & 96mm).
- Rugged pivot and jewel movement.
- Ammeters, Voltmeters, Frequency Meters, Power Factor Indicators, Wattmeters, Elapsed Time Indicators and Maximum Demand Indicators.
- Optional red secondary pointer and terminal cover.
- Special customised dials.



Howard Butler Limited is one of the largest independent UK manufacturers of panel meters and associated products.

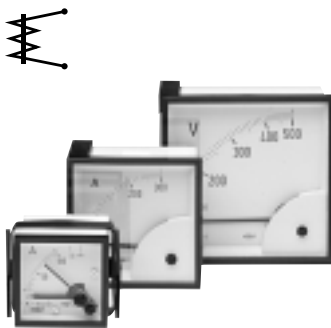
With over 80 years experience in the industry HOBUT products have built a reputation for high quality and modern design at competitive prices.

# DIN RANGE PANEL METERS

DIN 96 | DIN 72 | DIN 48

# CONNECTION DIAGRAMS

## MOVING IRON

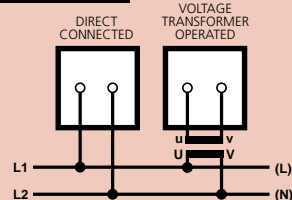


Moving Iron panel meters can be used for D.C. operation at reduced accuracy.

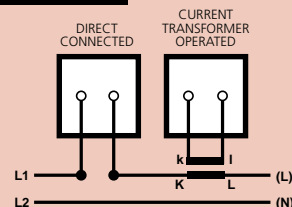
<b>Types:</b>	D48SD, D72SD, D96SD.
<b>Accuracy:</b>	Class 1.5 (Class 2.5-60A and above).
<b>AC ratings:</b>	<ul style="list-style-type: none"> <li>1A to 100A direct connected (D48SD - 40A max).</li> <li>1A or 5A CT operated.</li> <li>30V to 600V direct connected.</li> </ul>
<b>Burden:</b>	0.7VA typical for 1A or 5A CT operated at 50Hz. 1.2VA max up to 30A 2.4VA max for 40A to 100A. 6VA max for voltmeters up to 600V.
<b>Frequency:</b>	Calibrated at 50Hz. Specify for frequencies 15Hz up to 400Hz
<b>Scaling:</b>	Standard ammeter and voltmeter scales. (2x and 6x overload ammeter scales available on request).
<b>Damping:</b>	Heavily damped movements available.



### VOLTMETER



### AMMETER



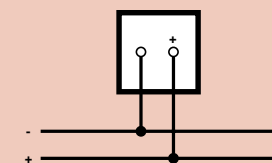
## MOVING COIL



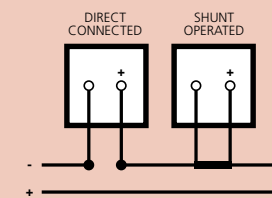
<b>Types:</b>	D48MC, D72MC, D96MC.
<b>Accuracy:</b>	Class 1.5.
<b>DC ratings:</b>	<ul style="list-style-type: none"> <li>100µA to 50A direct connected (D48MC - 40A max).</li> <li>4-20mA, 1mA or 20mA transducer operated.</li> <li>50mV to 600V direct connected.</li> <li>50mV to 300mV shunt operated.</li> </ul>
<b>AC ratings:</b>	Rectifier types available for a.c. use (mean sensitivity).
<b>DC burden:</b>	80mV to 150mV volt drop for direct connect ammeters 1mA (1000Ω/V) for voltmeters and shunt operated ammeters.
<b>Non std.:</b>	Suppressed zero voltmeters and trim potentiometer types available.



### VOLTMETER



### AMMETER



## WATTMETER

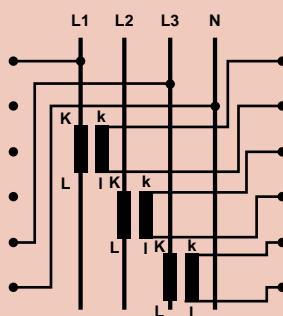


All DIN range panel meters are available as Wattmeters using a separate transducer.

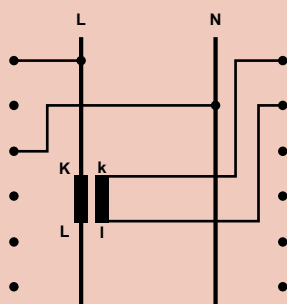
<b>Type:</b>	D96WA.
<b>Accuracy:</b>	Class 1.5.
<b>AC ratings:</b>	<ul style="list-style-type: none"> <li>1A or 5A CT operated.</li> <li>63.5V to 500V direct connected.</li> </ul>
<b>Burden:</b>	Current < 0.5VA } each circuit. Voltage < 2.0VA }
<b>Working range:</b>	Current 0-120% Voltage 75-125%.
<b>Frequency:</b>	Calibrated for 50Hz or 60Hz.
<b>Systems:</b>	WA1 Single phase. WA2 3ph 3 wire balanced load WA3 3ph 4 wire balanced load WA4 3ph 3 wire unbalanced load WA5 3ph 4 wire unbalanced load
<b>Terminals:</b>	Screw clamps - connection diagram supplied.



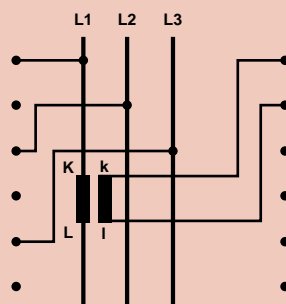
### 3PH 4W UNBALANCED LOAD



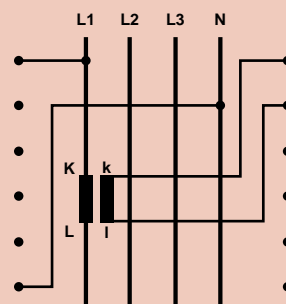
### SINGLE PHASE



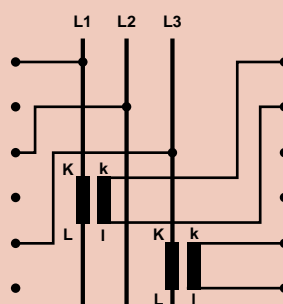
### 3PH 3W BALANCED LOAD



### 3PH 4W BALANCED LOAD



### 3PH 3W UNBALANCED LOAD



# DIN RANGE PANEL METERS

DIN 96

DIN 72

DIN 48

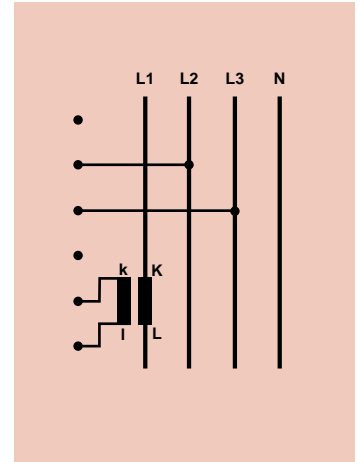
## CONNECTION DIAGRAMS

### POWER FACTOR INDICATOR



All DIN panel meters are available as Power Factor Indicators using a separate transducer.

<b>Type:</b>	D96PF.
<b>Accuracy:</b>	Class 1.5 ( $\pm 2$ electrical degrees).
<b>AC ratings:</b>	<ul style="list-style-type: none"> <li>• 1A or 5A CT operated.</li> <li>• 63.5V to 500V direct connected.</li> </ul>
<b>Burden:</b>	Current < 0.5VA Voltage < 2.0VA each circuit.
<b>Working range:</b>	Current 20-150% Voltage 75-125%.
<b>Scaling:</b>	Cos $\phi$ 0.5 CAP -I- 0.5 IND.
<b>Frequency:</b>	Calibrated for 50Hz or 60Hz
<b>Systems:</b>	PF2 3 phase 3 or 4 wire balanced load. Separate transducer required for single phase use.
<b>Terminals:</b>	Screw clamps - connection diagram supplied.

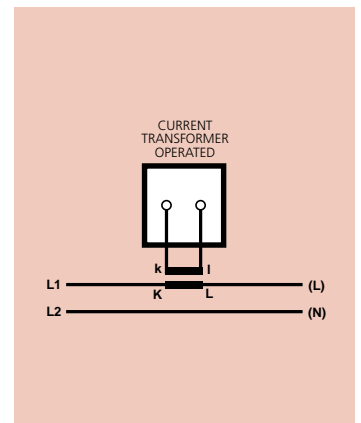


### MAXIMUM DEMAND INDICATOR



Bi-metallic movement indirectly heated.

<b>Type:</b>	D96MD, conforming to ES50-2.
<b>Accuracy:</b>	Class 3.
<b>AC rating:</b>	<ul style="list-style-type: none"> <li>• 5A CT operated with 1.2 x overscaling to 6A.</li> <li>1A version available on request.</li> </ul>
<b>Burden:</b>	5VA.
<b>Time lag:</b>	15, 20 or 30 mins.
<b>Frequency:</b>	Calibrated at 50Hz Specify for frequencies up to 400Hz.
<b>Scaling:</b>	Range of interchangeable scales to suit 5A CT's. For double ratio CT's two interchangeable dials are fitted.
<b>Mounting:</b>	Front of panel fixings are available.

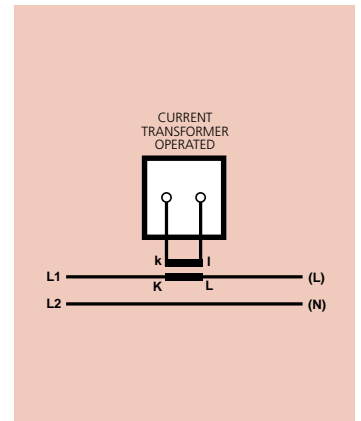


### COMBINED MAXIMUM DEMAND INDICATOR



Bi-metallic movement with additional Moving Iron movement, for instantaneous reading

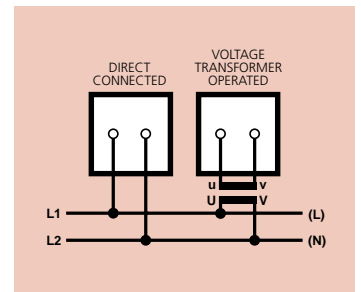
<b>Type:</b>	D96CMD.
<b>Accuracy:</b>	Class 3, moving iron Class 1.5.
<b>AC rating:</b>	<ul style="list-style-type: none"> <li>• 5A CT operated with 1.2 x overscaling to 6A.</li> <li>1A version available on request.</li> </ul>
<b>Burden:</b>	5.6VA.
<b>Time lag:</b>	15, 20 or 30 mins.
<b>Frequency:</b>	Calibrated at 50Hz Specify for frequencies up to 400Hz.
<b>Scaling:</b>	Range of interchangeable scales to suit 5A CT's. For double ratio CT's two interchangeable dials are fitted.
<b>Mounting:</b>	Front of panel fixings are available.



### FREQUENCY METER



<b>Types:</b>	D48HZ, D72HZ, D96HZ.
<b>Accuracy:</b>	Class 0.5 ( $\pm 0.5\%$ of nominal frequency). Class 1.0 for 45/65 Hz. Class 1.5 for D48HZ types.
<b>Ranges:</b>	<ul style="list-style-type: none"> <li>• 45/55, 45/65, 55/65, 360/440Hz.</li> <li>Ranges incorporating RPM scale also available.</li> </ul>
<b>Input volts:</b>	110V $\pm 15\%$ , 225V $\pm 15\%$ 380 to 440V $\pm 5\%$ .
<b>Burden:</b>	6mA at nominal voltage.

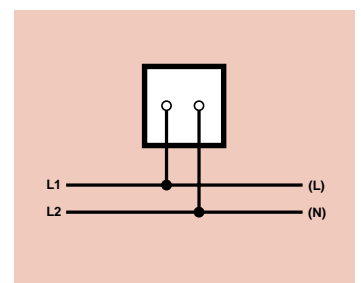


### ELAPSED TIME METER



<b>Types:</b>	D48HR, D72HR, D96HR.
<b>AC Ratings:</b>	110V or 240V.
<b>Frequency:</b>	50Hz or 60Hz. DC models also available.
<b>Range:</b>	<ul style="list-style-type: none"> <li>• Seven digits up to 99999.99hrs.</li> </ul>
<b>Terminals:</b>	Connections to terminal block.

Note:  
D48HR has a special panel cut-out=45.5  $\pm 0.5$  mmsq



# DIN RANGE PANEL METERS

# HOBUT

## TECHNICAL SPECIFICATION

<b>Standards</b>	IEC 51, BS 89.
<b>Enclosure:</b>	DIN 43700. Flame retardant: base material UL94V1, case & terminal cover material UL94V0. Scale marking DIN 43802 Protection IP52: IP54 can be supplied.
<b>Overload:</b>	CURRENT - 1.2 x rating for 2hrs. - 10 x rating for 5 secs.  VOLTAGE - 1.2 x rating for 2hrs. - 2 x rating for 5 secs.
<b>Insulation test:</b>	2kV 50Hz for 1min.
<b>Temperature:</b>	Calibrated at 23°C. Suitable for use at -25°C to +40°C.
<b>Available extras:</b>	Adjustable red secondary pointer. Terminal cover. Special scale. Polycarbonate window. 6.4mm "Faston" terminal tag (voltmeters & ammeters to 5A).
<b>Other DIN products:</b>	Our illustrations and technical specifications apply to meters with 90° scale arcs. Instruments with 240° scale arcs are also available.

Data sheets on the following HOBUT product ranges are available on request:

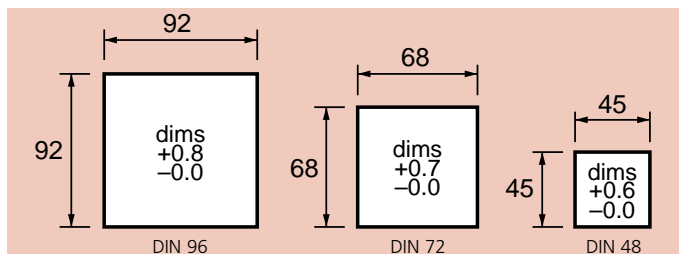


- Digital panel meters.
- Current Transformers.
- Shunts.
- Power transducers.
- Protection relays.
- Battery charger indicators.
- Thermal cut-outs.

### New HOBUT products include:

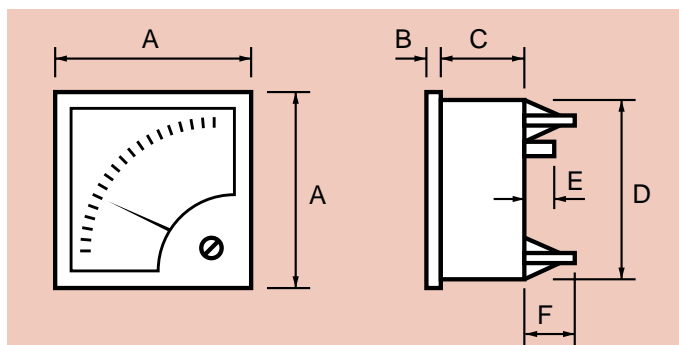
- Pro-Din panel meters.
- 240° panel meters.
- kWh meters.
- Multi-function meters.
- Protective current transformers.

## PANEL CUT-OUTS (All dimensions mm)



DIN 48 can be slot mounted using the standard fixing clip.  
DIN 72 & DIN 96 can be supplied with special fixing clips for slot mounting.  
Slot dimensions available on request.

## DIMENSIONS (All dimensions mm)



	A	B	C	D	E	F
DIN48 (M4 screw clamps) Ammeters up to 5A & Voltmeters	48	5	43	44.8	10	-
DIN48 (M6 stud terminals) Ammeters 6A to 40A	48	5	43	44.8	21	-
DIN72 (M4 screw clamps) Ammeters up to 5A & Voltmeters	72	5.5	38.5	66	10	-
DIN72 (M6 stud terminals) Ammeters 6A to 50A	72	5.5	38.5	66	19	-
DIN72 (M8 stud terminals) Ammeters 60A to 100A	72	5.5	38.5	66	22	-
DIN96 (M4 screw clamps) Ammeters up to 5A & Voltmeters	96	5.5	38.5	90	10	20
DIN96 (M6 stud terminals) Ammeters 6A to 50A	96	5.5	38.5	90	19	20
DIN96 (M8 stud terminals) Ammeters 60A to 100A	96	5.5	38.5	90	22	20
DIN96 Watt-meter	96	5.5	123	90	13	-
DIN96 Power Factor Indicator	96	5.5	123	90	13	-
DIN96 Max. Demand Indicator (M4 screw clamps)	96	5.5	58	90	10	20
DIN96 Combined M.D.I. (M4 screw clamps)	96	5.5	58	90	10	20

Note: If terminal covers are fitted as an optional extra, add 23mm to dimension 'C' for DIN72 & DIN96 meters, and 25mm to dimension 'C' for DIN48 meters.

Our policy is one of continuous development and therefore specifications may change without notice.

# HOBUT

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