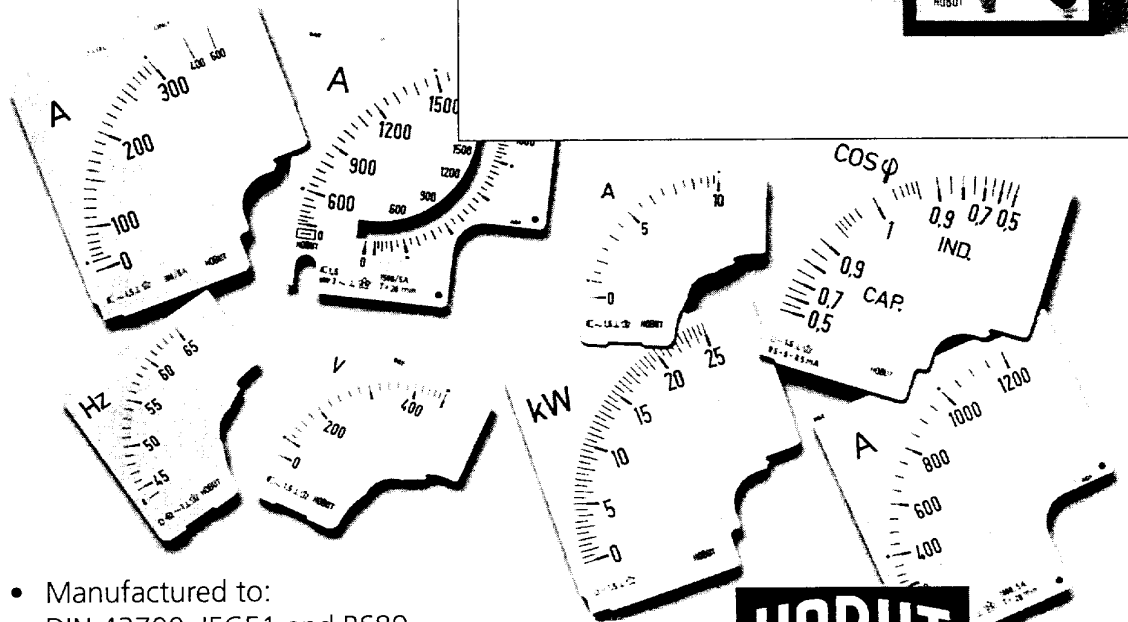
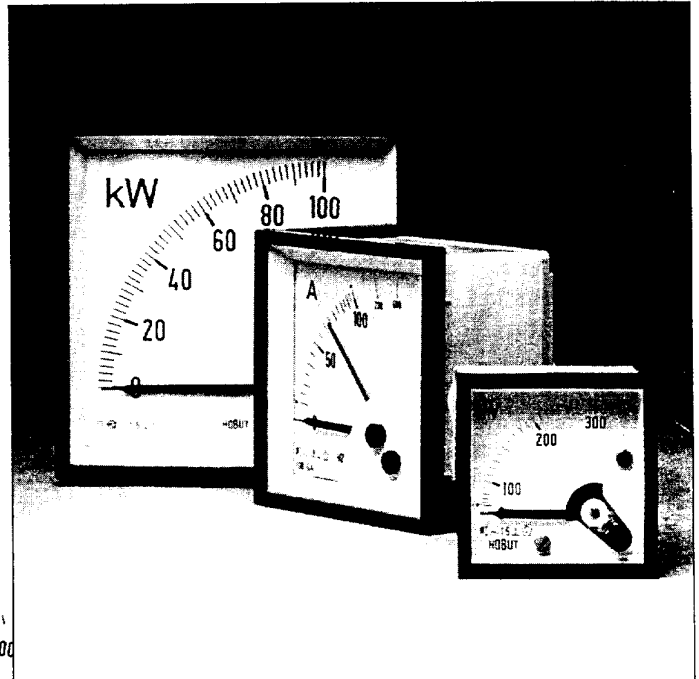


THE MEASURE OF QUALITY
HOBUT

DIN RANGE PANEL METERS

— 472-347 —

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.



HOBUT

- 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 quality and modern design at competitive prices.



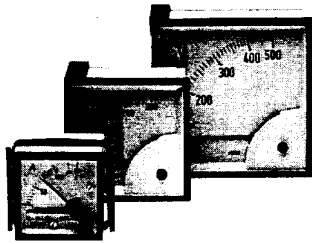
ANALOGUE PANEL METERS • DIGITAL PANEL METERS • HOURS COUNTERS • SELECTOR SWITCHES • PROTECTION RELAYS • TRANSDUCERS
SHUNTS • CURRENT TRANSFORMERS • POLARISED METERS • THERMAL CUT-OUTS • AUTOMOTIVE PRODUCTS

DIN RANGE PANEL METERS

DIN 96 | DIN 72 | DIN 48

CONNECTION DIAGRAMS

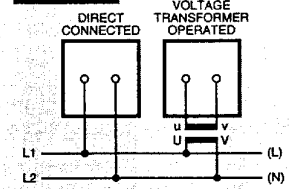
MOVING IRON



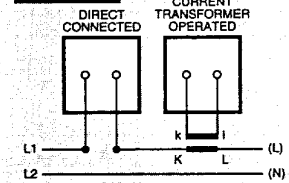
TYPES: D48SD, D72SD, D96SD.
ACCURACY: Class 1.5 (Class 2.5 - 60A and above).
A.C. RATINGS: 1A to 100A direct connected (D48SD - 40A max).
BURDEN: 0.7VA typical for 1A or 5A CT operated at 50Hz.
 1.2VA max up to 30A
 2.4VA max for 40A to 100A.
 6VA max for voltmeters up to 600V.
FREQUENCY: Calibrated at 50Hz. Specify for frequencies 15Hz to 400Hz.
SCALING: Standard ammeter and voltmeter scales or 2x and 6x overload scales.
DAMPING: Heavily damped movements available.

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

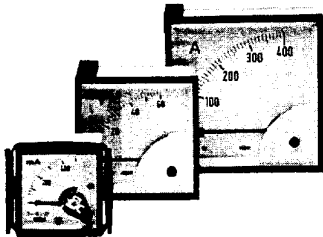
VOLTMETER



AMMETER

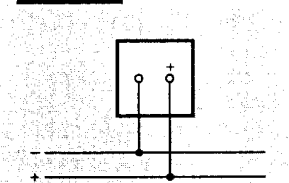


MOVING COIL

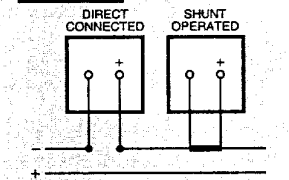


TYPES: D48MC, D72MC, D96MC.
ACCURACY: Class 1.5.
D.C. RATINGS: 100µA to 50A direct connected (D48MC - 40A max).
 4 - 20mA, 1mA or 20mA transducer operated.
 50mV to 600V direct connected.
 50mV, 60mV or 75mV shunt operated.
A.C. RATINGS: Rectifier types available for a.c. use (mean sensitivity).
D.C. BURDEN: 80mV to 150mV volt drop for direct connect ammeters
 1mA(1000Ω/V) for voltmeters and shunt operated ammeters.
NON STD.: Suppressed zero voltmeters and trim potentiometer types available.

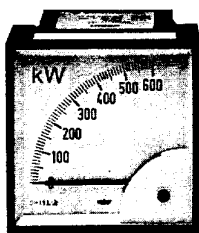
VOLTMETER



AMMETER



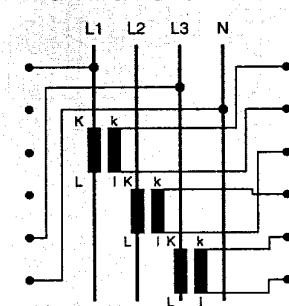
WATTMETER



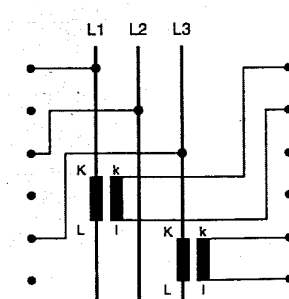
TYPE: D96WA
ACCURACY: Class 1.5
A.C RATINGS: 1A or 5A CT operated.
 63.5V to 500V direct connected
BURDEN: Current <0.5VA } each circuit
 Voltage <2.0VA }
WORKING RANGE: Current 0 - 120%
 Voltage 75 - 125%
FREQUENCY: Calibrated for 50Hz or 60Hz
SYSTEMS: WA1 Single phase
 WA2 3 ph 3 wire balanced load
 WA3 3 ph 4 wire balanced load
 WA4 3 ph 3 wire unbalanced load
 WA5 3 ph 4 wire unbalanced load
TERMINALS: Connections are to a terminal block with connection diagrams supplied

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

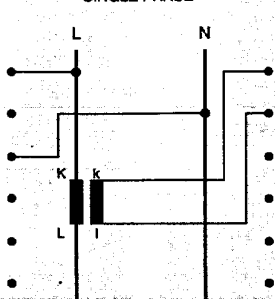
3PH 4W UNBALANCED LOAD



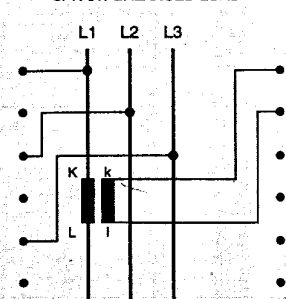
3PH 3W UNBALANCED LOAD



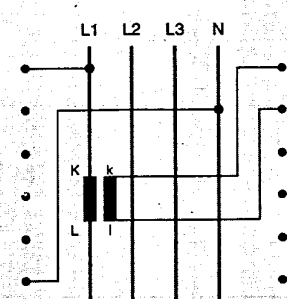
SINGLE PHASE



3PH 3W BALANCED LOAD



3PH 4W BALANCED LOAD

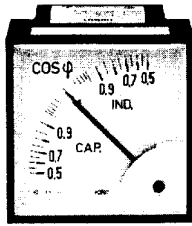


DIN RANGE PANEL METERS

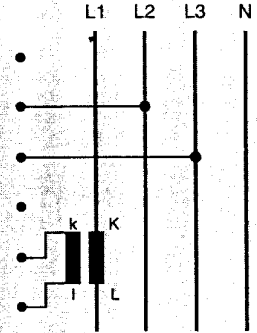
DIN 96 | DIN 72 | DIN 48

CONNECTION DIAGRAMS

POWER FACTOR INDICATOR

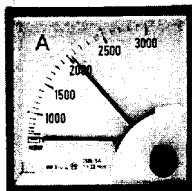


TYPE: D96PF.
 ACCURACY: Class 1.5 (± 2 electrical degrees).
 A.C RATINGS: 1A or 5A CT operated.
 63.5V to 500V direct connected.
 BURDEN: Current $< 0.5VA$ } each circuit
 Voltage $< 2.0VA$ }
 WORKING RANGE: Current 20 - 150%
 Voltage 75 - 125%.
 SCALING: $\text{Cos } \phi$ 0.5 CAP -I- 0.5 IND.
 FREQUENCY: Calibrated for 50Hz or 60Hz.
 SYSTEMS: PF2 3 phase 3 or 4 wire balanced load.
 Separate transducer required for single phase use.
 TERMINALS: Connections are to a terminal block with connection diagrams supplied

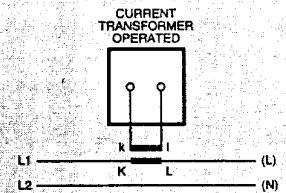


All DIN range panel meters are available as Power Factor Indicators using a separate transducer.

MAXIMUM DEMAND INDICATOR

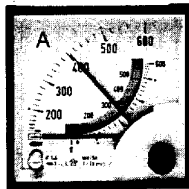


TYPES: D96MD.
 ACCURACY: Class 3.
 AC RATING: 5A CT operated with 1.2 x overscaling to 6A
 1A version available on request.
 BURDEN: 5VA.
 TIME LAG: 15, 20 or 30 mins.
 FREQUENCY: Calibrated at 50Hz.
 Specify for frequencies up to 400Hz.
 SCALING: Range of interchangeable scales to suit 5A C.T.s. For double ratio C.T.s two interchangeable dials are fitted.
 MOUNTING: Front of panel fixings are available.

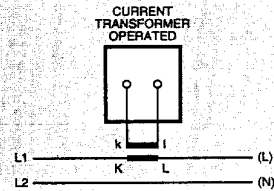


Bi-metallic movement, indirectly heated.

COMBINED MAXIMUM DEMAND INDICATOR

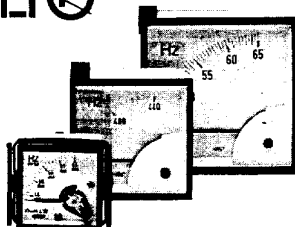


TYPES: D96CMD.
 ACCURACY: Class 3, moving iron Class 1.5.
 AC RATING: 5A CT operated with 1.2 x overscaling to 6A
 1A version available on request.
 BURDEN: 5.6VA.
 TIME LAG: 15, 20 or 30 mins.
 FREQUENCY: Calibrated at 50Hz
 Specify for frequencies up to 400Hz.
 SCALING: Range of interchangeable scales to suit 5A C.T.s. For double ratio C.T.s two interchangeable dials are fitted.
 MOUNTING: Front of panel fixings are available.

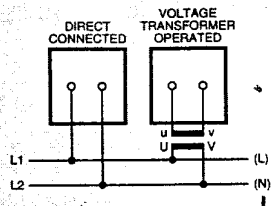


Bi-metallic movement with additional Moving Iron movement.

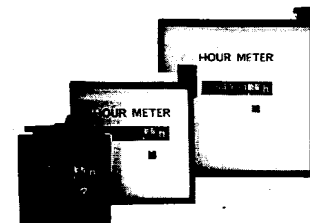
FREQUENCY METER



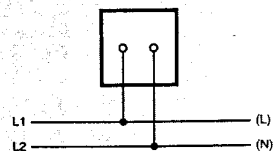
TYPES: D48HZ, D72HZ, D96HZ.
 ACCURACY: Class 0.5 ($\pm 0.5\%$ of nominal frequency).
 Class 1.0 for 45/65 Hz
 Class 1.5 for D48HZ types.
 RANGES: 45/55, 45/65, 55/65, 360/440Hz
 ranges incorporating RPM scale also available.
 INPUT VOLTS: 110V $\pm 15\%$, 225V $\pm 15\%$,
 380 to 440V $\pm 5\%$.
 BURDEN: 6mA at nominal voltage.



ELAPSED TIME METER



TYPES: D48HR, D72HR, D96HR.
 AC RATINGS: 110V or 240V.
 FREQUENCY: 50Hz or 60Hz.
 DC models also available.
 RANGE: Seven digits up to 99999.99hrs.
 TERMINALS: Connections to terminal block.



Note: D48HR has a special panel cut-out = 45.5 ± 0.5 mmsq

DIN RANGE PANEL METERS

TECHNICAL SPECIFICATION

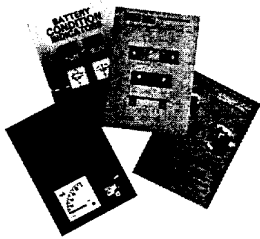
STANDARDS: IEC 51, BS 89.
 ENCLOSURE: DIN 43700.
 Flame retardant: base material UL9V0, case & terminal cover material UL94V0. Scale marking DIN 43802. Protection IP52: IP54 can be supplied.

OVERLOAD: CURRENT - 1.2 x rating for 2hrs.
 - 10 x rating for 5secs.
 VOLTAGE - 1.2 x rating for 2hrs.
 - 2 x rating for 5secs.

INSULATION TEST: 2kV 50Hz for 1min.
 TEMPERATURE: Calibrated at 23°C.
 Suitable for use -25°C to +40°C.

AVAILABLE EXTRAS: Adjustable red secondary pointer.
 Terminal cover.
 Special scale.
 Polycarbonate window.
 6.4mm "Faston" terminal tag (voltmeters & ammeters to 5A).

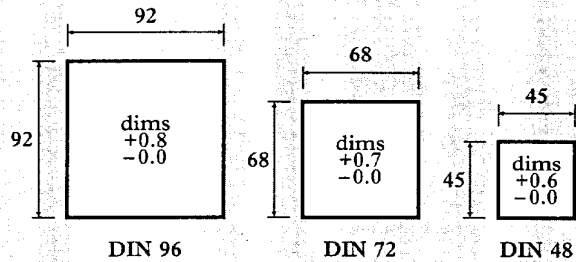
OTHER DIN PRODUCTS: Our illustrations and technical specifications, apply to meters with 90° scale arcs.
 Instruments with 240° scales arcs are also available.



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

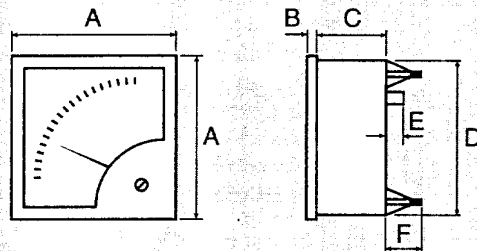
- Digital Panel Meters
- Current Transformers
- Shunts
- Power Transducers
- Protection Relays
- Battery Charger Indicators
- Thermal Cut-outs

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 terminal) Ammeters 6A - 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 - 50A	72	5.5	38.5	66	19	-
DIN72 (M8 stud terminals) Ammeters 60A - 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 - 50A	96	5.5	38.5	90	19	20
DIN96 (M8 stud terminals) Ammeters 60A - 100A	96	5.5	38.5	90	22	20
DIN96 Watt-meter	96	5.5	99	90	13	-
DIN96 Power Factor Indicator	96	5.5	99	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 DIN 48 meters

Every effort is made to ensure accuracy of information but due to our policy of continuous development, specifications should be checked at the time of ordering.

HOBUT

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