

The Reflection of Quality

PALEC

MEASURING INSTRUMENTS

Palec

HISTORY and CONSTRUCTION

It is now approaching five years since the first "PALEC" meter was assembled. From that early pioneering period, rapid advancement was made in raising this unknown Australian product to a standard ranking with the world's best. Unceasing development and research, combined with the fruits of experience, have brought this about.

To-day, "PALEC" meters are successfully competing against all the better grade importations. The advantages of "PALEC" being:—

- (1) Lower cost.
- (2) The avoidance of indent delay.
- (3) The quick service and repair facilities available for damaged meters.
- (4) The wide choice of types available.

The above are only a few of the reasons why "PALEC" moving coil and moving iron measuring instruments are now so well and favourably known, not only in radio and electrical fields, but also in Government Departments, Universities, Technical Schools and large industrial corporations.

GENERAL CONSTRUCTION.—An inspection of the Unit, with case removed, will reveal its neat yet sturdy construction. Extreme lightness, combined with maximum

strength and rigidity has been obtained by channel pressing moving parts, such as pointer and coil former, etc., thus severe overloads can be withstood without appreciably affecting the movement's accuracy.

METAL PARTS.—All metal parts, including pole pieces and armature are plated to ensure proof against the humidity even of tropical climates.

MAGNETS.—An important feature is the use of special solid Cobalt Steel and Alnico Magnets. (The latter being used in the larger models.) Both types are artificially aged by heat treatment and can be relied upon never to vary their magnetic properties, even over a period of years.

LINEARITY—the hall mark of a meter's quality—is an outstanding characteristic. This is achieved by great care in construction and perfect balancing.

The aid of specially designed apparatus is resorted to with great advantage. For instance, as an aid to balance, all moving coils are machine layer wound, even when wire as fine as 50 S.W.G. (1 mil. dia.) is employed. Pivots are polished to a mirror finish at the correct angle and automatically positioned to perfect dead centre.

AGEING OF SPRINGS AND WORKING TEST.—Another original and exclusive device applies a final working test and at the same time AGES THE SPRINGS. This apparatus works on the principle of a relaxation oscillator and when connected to a bank of instruments, moves the pointers steadily across the scale and flicks them back to zero. On the usual two day test this process is repeated approximately 10,000 times, the result being of great benefit to the movement generally. It also serves to bring to the surface any defect that might otherwise escape notice.

SPRINGS AND JEWELS.—The springs and jewels used in "PALEC" meters are imported direct from Switzerland, and are of the highest grade procurable.



PATON ELECTRICAL PTY. LTD., 90 Victoria St., ASHFIELD, N.S.W., AUSTRALIA

Telephones : UA 1960, UA 1982.

MODEL K475

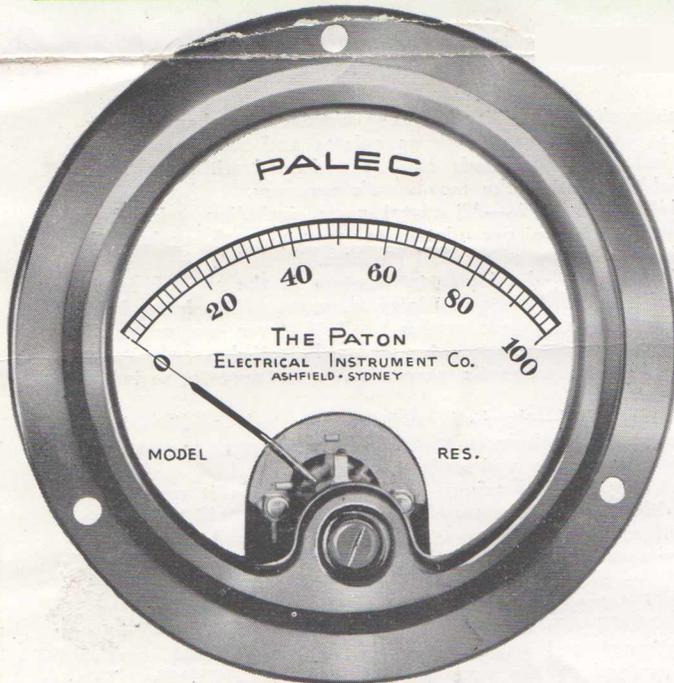
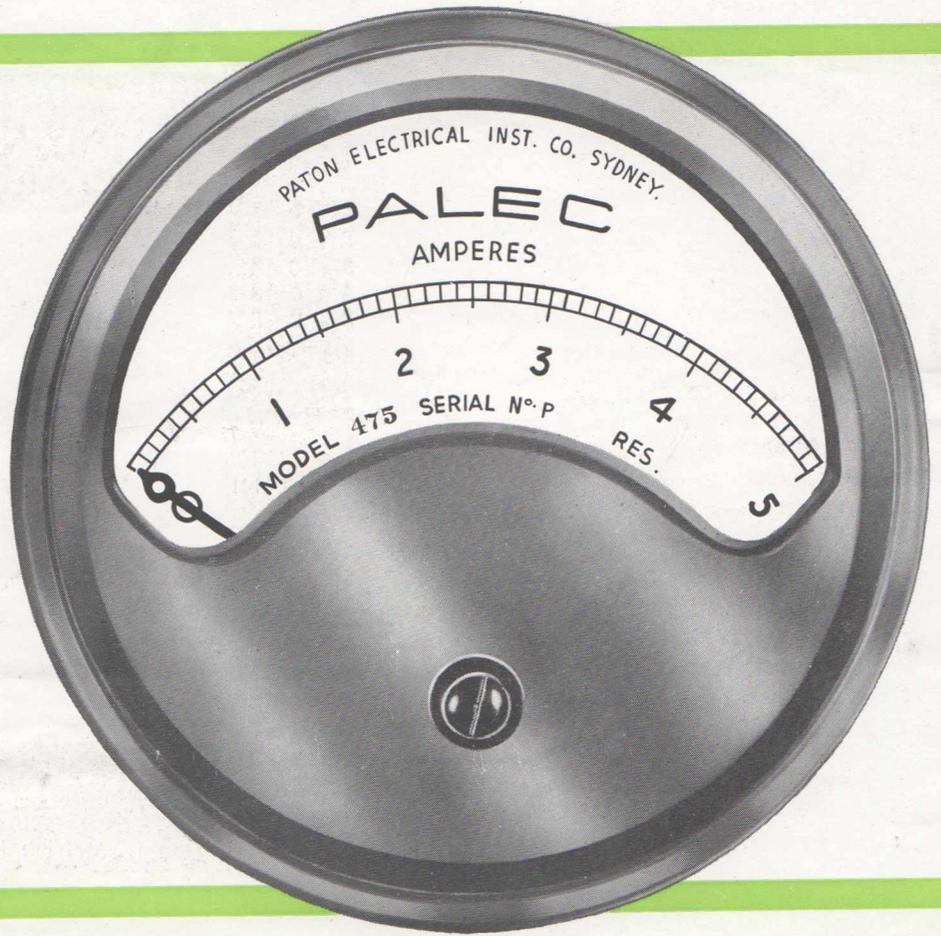
Diameter across flange, 4.75 inch.
 Diameter across body, 4.125 inch.
 Scale length (single range), 4.25 inch.
 Angle of Arc, 95 degrees.
 Available as flush or projection types.

This high grade line of Meters (5 inch class) is of the protected Dial pattern and is fitted with a modified standard movement and special Alnico magnet.

The convex face of the highly polished bakelite case is symmetrically curved. This feature adds considerably to the Instrument's appearance and at the same time enables the movement to be raised high enough, with respect to the Dial, for a straight through needle of minimum weight to be fitted.

The long, clearly-marked scale, in conjunction with the knife-edge or arrow pointer, reduces parallax errors to a minimum.

No flange screws are required for mounting. This is accomplished by means of the special back bracket provided.



MODEL K35

The model K35 is shown above. The front view and movement are also illustrated on cover. The particulars of this Model are as follows :—
 Diameter across flange, 3.5 inch.
 Approximate scale length, 2.5 inch.
 Diameter across body, 2.75 inch.
 Angle of Arc, 95 degrees.

The Model K35 is of a class known generally as the 3 inch type. Due to its compactness and general utility, this size Meter is popular the world over, particularly in Radio and Electrical Test Units.

AVERAGE CONSTANTS OF PALEC METERS

	Micro-Ammeters	Switch Board Type	High speed level indicators	Standard Type
Torque—dyne cm's.	12.9	60	100	70
Ratio of moment of inertia/weight—gm. cms. grms. ....	.38	.386	.388	.385
Weight of movement—grms. ....	.6	.65	.412	.78
Torque/weight—dyne cm. per gm.	21.5	92.5	250.	27.0
Period of movement—seconds	1.11	.54	.33	1.0
Aperiodic Time of movement—seconds	2.0	.64	.36	1.5
Moment of inertia—gm. cm. per radian	7.4	34.4	57.5	12.0
Gap induction—gausses	1,800	1,800	1,800	650
Moment of inertia—gm cm. ....	.228	.25	.16	.3
Damping co-efficient	1.56	5.8	5.57	2.8
Damping constant—dyne cm. per radian per second ....	.6	.96	.92	.75
Per cent. of critical damping	60%	96%	92%	75%
Inertia efficiency — dyne cm. per unit inertia	56.5	239	625	70

MODEL K400

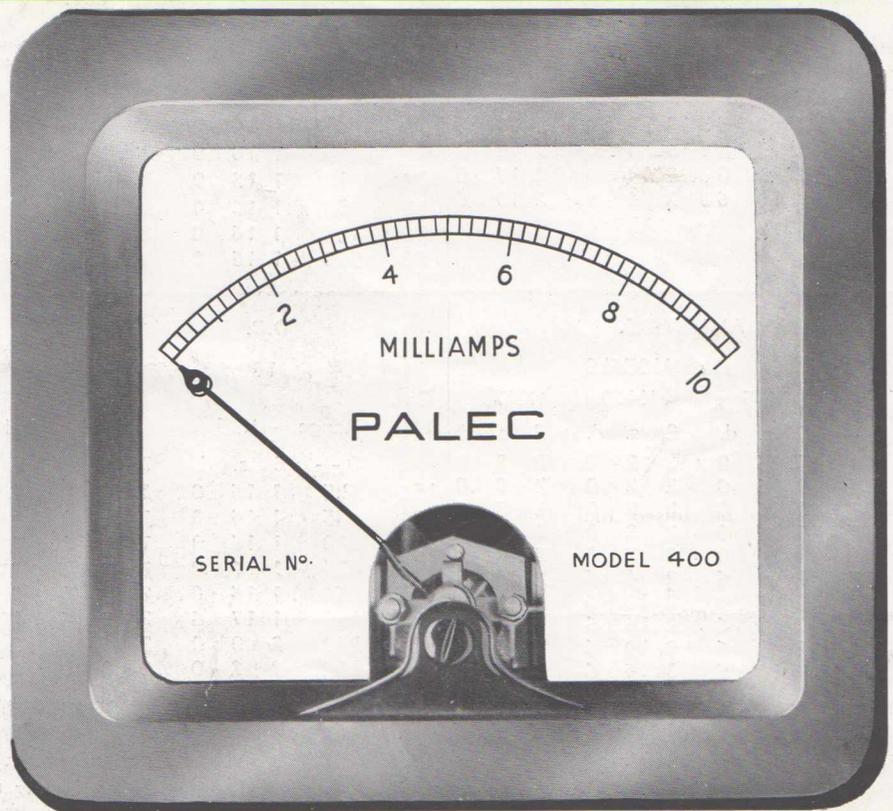
Case size, 4½ inch by 4 inch.

Scale length, 3¼ inch.

Angle of arc, 95 degrees.

The Model 400 series of Moving Coil and Moving Coil Meters is of the square pattern, and is suitable for instruments or panel mounting.

The diameter of the hole required for fitting to a panel is 2-13/16 inches.



MOVING IRON TYPE METERS MODELS R35, R400, R475

We are pleased to announce the introduction of a complete range of Moving Iron type measuring Instruments.

These instruments should find a wide application in Electrical and Industrial fields due to their ability to read A.C. and also—with reasonable accuracy—D.C.; then again, the reliability of this type is high, notwithstanding the lower cost.

The principle of operation follows the repelling iron type of movement. This movement is connected to a phosphor bronze hair spring and is swung on polished pivots between jeweller bearings.

An air vane in an enclosed box effectively provides the damping without influencing the sensitivity.

The use of a special grade iron lowers hysteresis and phase lag to a minimum, while eddy currents are reduced to produce an open scale.

The full range of Moving Iron Meters is available in three sizes, similar outwardly to Models K35, K400 and K475, and will be known as Models R35, R400, and R475 respectively.

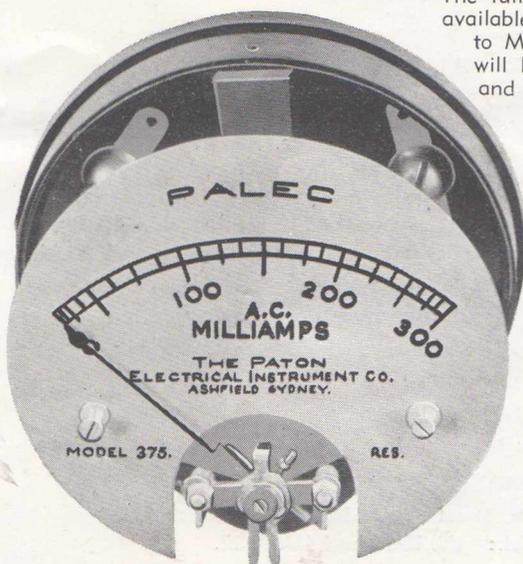
FREQUENCY CHARACTERISTICS.

The Moving Iron range will be found accurate to within 2% on frequencies of sine wave form between 40–60 cycles. Special calibrations for other frequencies can be made if required.

POWER CONSUMPTION.

The approximate consumption on Ampere ranges is .1 VA. On Voltage, the current drain is 20 milliamps for all ranges above 25 volts.

The illustration on left depicts the movement and open scale of the standard R35 Moving Iron Meter.



MOVING IRON TYPE

A.C.—D.C. VOLTMETERS.

Cat. No.	Range	MODELS					
		R35		R400		R475	
		£	s. d.	£	s. d.	£	s. d.
10	3	1	7 6	1	13 6	1	15 6
12	5	1	7 6	1	13 6	1	15 6
14	7.5	1	7 6	1	13 6	1	15 6
16	10	1	7 6	1	13 6	1	15 6
18	25	1	7 6	1	13 6	1	15 6
20	50	1	10 0	1	16 0	1	18 0
22	100	1	12 6	1	18 6	2	0 6
24	250	1	15 0	2	1 0	2	3 0
26	300	1	17 6	2	3 6	2	5 6
28	500	2	0 0	2	6 0	2	8 0

MOVING IRON TYPE

A.C.—D.C. AMMETERS.

Cat. No.	Range	MODELS					
		R35		R400		R475	
		£	s. d.	£	s. d.	£	s. d.
30	.01	1	10 0	1	16 0	1	18 0
32	.05	1	7 6	1	13 6	1	15 0
34	1	1	7 6	1	13 6	1	15 6
36	2.5	1	7 6	1	13 6	1	15 6
38	5	1	7 6	1	13 6	1	15 6
40	10	1	7 6	1	13 6	1	15 6
42	25	1	10 0	1	16 0	1	18 0
44	50	1	15 0	2	1 0	2	3 0
46	100	2	0 0	2	6 0	2	8 0
48	150	2	5 0	2	11 0	2	13 0
50	200	2	10 0	2	16 0	2	18 0

MOVING COIL TYPE

D.C. MICROAMMETERS.							D.C. MILLIAMMETERS.							R. F. (THERMO) AMMETERS.																		
Cat. No.		Range		MODELS			Cat. No.		Range		MODELS			Cat. No.		Range		MODELS														
		0 --		K35		K400		K475		Cat. No.		Range		MODELS			Cat. No.		Range		MODELS											
		£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.									
60	50	3	2	6	3	8	6	3	14	6	70	1*	1	16	0	2	2	0	2	8	0	90	.25	3	4	0	3	10	0	3	16	0
62	100	2	15	0	3	1	0	3	7	0	72	5	1	16	0	2	2	0	2	8	0	92	.5	2	17	6	3	3	6	3	9	6
64	250	2	5	0	2	11	0	2	17	0	74	10	1	16	0	2	2	0	2	8	0	94	1	2	15	0	3	1	0	3	7	0
66	500	1	18	6	2	4	6	2	10	6	76	50	1	16	0	2	2	0	2	8	0	96	2.5	2	15	0	3	1	0	3	7	0
											78	100	1	16	0	2	2	0	2	8	0	98	5	2	15	0	3	1	0	3	7	0
											80	500	1	16	0	2	2	0	2	8	0	100	10	2	15	0	3	1	0	3	7	0
																						102	25	2	15	0	3	1	0	3	7	0

D.C. AMMETERS.							D.C. VOLTMETERS, 100 Ohms. Per Volt.							D.C. VOLTMETERS, 1000 Ohms. Per Volt.																		
Cat. No.		Range		MODELS			Cat. No.		Range		MODELS			Cat. No.		Range		MODELS														
		0 --		K35		K400		K475		Cat. No.		Range		MODELS			Cat. No.		Range		MODELS											
		£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.									
120	1	1	16	0	2	2	0	2	8	0	150	2.5	1	16	0	2	2	0	2	8	0	180	10	1	16	0	2	2	0	2	8	0
122	2.5	1	16	0	2	2	0	2	8	0	152	5	1	16	0	2	2	0	2	8	0	182	50	1	16	0	2	2	0	2	8	0
124	3	1	16	0	2	2	0	2	8	0	154	10	1	16	0	2	2	0	2	8	0	184	100	1	16	0	2	2	0	2	8	0
126	5	1	16	0	2	2	0	2	8	0	156	25	1	16	0	2	2	0	2	8	0	186	250	1	17	6	2	3	6	2	9	6
128	10	1	16	0	2	2	0	2	8	0	158	50	1	16	0	2	2	0	2	8	0	188	500	1	19	0	2	5	0	2	11	0
130	25	1	18	6	2	4	6	2	10	6	160	100	1	17	6	2	3	6	2	9	6	190	1000	2	2	0	2	8	0	2	14	0
132	50	2	6	0	2	12	0	2	18	0	162	250	2	0	0	2	6	0	2	12	0	192	2000	2	5	0	2	11	0	2	17	0
134	100	2	8	6	2	14	6	3	0	6	164	300	2	2	0	2	8	0	2	14	0	194	3000	2	10	0	2	16	0	3	2	0
136	200	2	13	6	2	19	6	3	5	6											196	5000	3	0	0	3	6	0	3	12	0	
138	300	2	18	6	3	4	6	3	10	6																						

When ordering, please quote both Catalogue and Model numbers.
*With universal scale, unless otherwise ordered.

HIGH SPEED LEVEL INDICATORS (as supplied to the P.M.G.) with minus 10 to plus 6db scale. Reference level 6 mW across 600 ohms. Complete with rectifier. Catalogue Number 200, Model K35. Price £4/10/-

VOLTMETERS, A.C. RECTIFIER TYPE. Any of the 1,000 ohms per volt range of Meters are available, together with a Westinghouse Copper Oxide Rectifier. Additional cost of same fitted to Meter, nett 1/12/6

MILLIVOLT METERS. All ranges. Prices on application.

GENERAL INFORMATION

ACCURACY.—Moving Coil D.C. Current and Voltmeters 1½% of full scale deflection. Moving Iron Types (at 40-60-cycles of sine wave form) — 2% of full scale deflection.

GALVANOMETERS.—Any range D.C. Current or Voltmeter with centre zero can be supplied at no additional charge.

INTERMEDIATE RANGES.—Unlisted ranges can be supplied at a cost equivalent to that of the next highest in value.

VOLTMETERS 100 OHMS PER VOLT.—Wire resistors are employed on all Voltmeters of the 100 Ohms per volt class.

VOLTMETERS 1,000 OHMS PER VOLT.—Unless otherwise specified, all high resistance Voltmeters will have metalised series resistors. The metalised resistors in question are specially selected and are of a type possessing low temperature and voltage coefficients. The maximum load per resistor is always less than half its rating, therefore on the higher ranges a number of resistors are supplied fitted on an external mounting strip. **NOTE:** The best of metalised resistors vary plus and minus following marked changes in atmospheric temperatures. This variation is not serious in general work, although when additive to the meter error—if any—may cause an inaccuracy greater than that specified (see paragraph "Accuracy"). Should wire resistors be preferred, the cost of the Voltmeter required may be computed by adding the price of the wire resistor (see below) to that of an 0-1 ma. Meter.

WIRE RESISTORS.—Palc wire wound bobbin resistors are wound with D.S.C. Eureka and can be relied on to ½ of 1% of their rated value. Prices: 10,000 Ohms 4/-, 50,000 Ohms 5/-, 100,000 Ohms 7/-, 250,000 Ohms 12/6, 500,000 Ohms 20/-. Intermediate sizes at prices shown for next highest range. The

standard bank with tappings at 10-50-100-250-500 volts, price 25/-.

AMMETER SHUNTS.—External shunts are provided for all Ammeters above 25 amps.

THERMO COUPLES.—Palc Thermo Couples will stand overloads up to 50% of full scale value, and are accurate to within 2% on D.C. and on alternating current at frequencies up to and well beyond the broadcast band.

EXTERNAL COUPLES.—Thermo Couples for external mounting are available at 6/- extra. It will be necessary when ordering to stipulate the length of leads required.

CURRENT SHUNTS.—Milliamp shunts are 3/- per range. Amp. shunts, Prices on application.

IRON PANELS.—If it is intended to mount Instruments on iron panels, please notify when ordering, so that they may be corrected accordingly.

METER SERVICE.—Palc Meters inadvertently damaged through excessive overload will be repaired and returned within 48 hours of receipt at factory. Charges: Burnt out moving coil 12/6, Springs only, 2/6 each, Pointers only 2/6 each. (Postage extra.)

MULTI-RANGE AND SPECIAL TEST INSTRUMENTS.—Please let us quote you for special Instruments of all types.

ORDERS.—When ordering, please quote both Catalogue and Model numbers.

All prices listed are trade, subject to tax, and are F.O.B., Sydney.

PATON ELECTRICAL PROPRIETARY LTD.,
90 Victoria Street, Ashfield, N.S.W., Australia.
Tel.: UA 1960 and UA 1982.