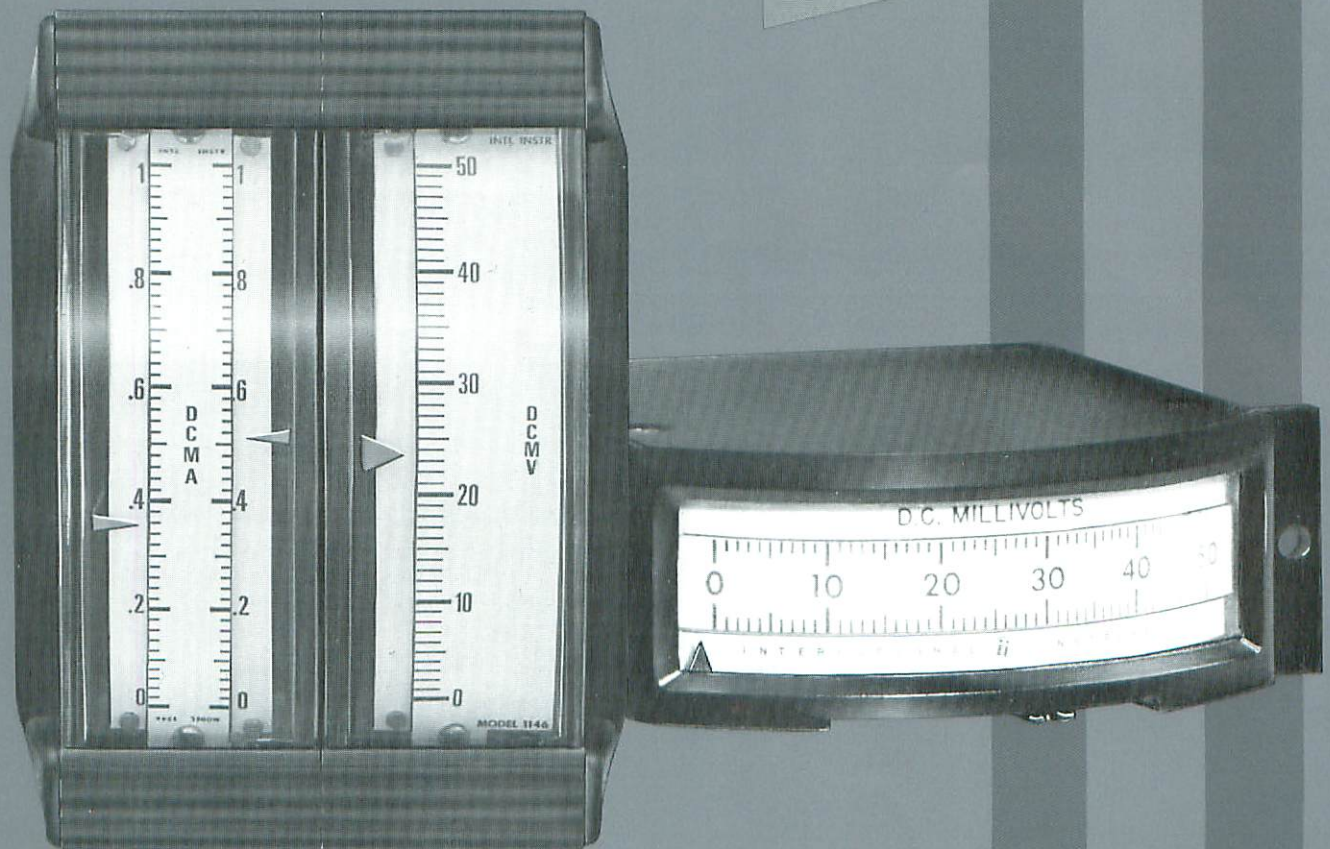



II. Edgewise Panel Meters: Single/Dual Scale Models.

Switchboard instruments that combine edgewise space-saving advantages with a format that incorporates two meters in one.



we deliver. analog. edgewise. rounds. squares. and more. on time.

Table A: STANDARD MODELS

Model No.	Size, weight, single/dual	Description
1146	3½ inch Single scale 8 oz.	Models 1146/1246 and 1151/1251 are design compatible. External front zero adjust and anti-parallax scale are standard. Dual units incorporate two independent meters in one 6-inch or 3½-inch case, permitting related functions to be displayed in a single unit. Case: self-extinguishing, non-drip plastic with clear Lexan® window. Color: Black.
1246	3½ inch Dual scale 10 oz.	
1151	6 inch Single scale 25 oz.	
1251	6 inch Dual scale 30 oz.	
2500	3½ inch Single scale 14 oz.	Companion or satellite indicating units for use with  Electronic Control Meter 2548. Case: metal housing, glass window, dust proof commercial construction. Color: semi-dull black.
2520	3½ inch Dual scale 15 oz.	

HOW TO ORDER

Establish Order No., as shown below, or call Order Dept., (203) 481-5721, and describe your requirements.

Model No.	H or V	Zero Position	Range/Scale
From Table A	Hor. or Vertical	Hor.: L, C or R (left, center, right) Vert.: T, C or B (top, center, bottom)	From Table B
1151	V	B	DCmA 0-100

To order Dual Meters with different zero positions and/or ranges and scales, specify each movement separately as follows:
Horizontal meters: specify upper unit first (as viewed from front).
Vertical meters: specify left hand unit first (as viewed from front).

1251 - V - B DCμA 0-100 T DCμA 0-200

OPTIONS AND SPECIAL ORDERS: Almost *any* deviation from the standard specifications detailed in this bulletin — as well as almost *any* new and challenging concept that falls within our product area — *is available as an option or special order.*

WHATEVER YOUR UNUSUAL REQUIREMENTS, call our Customer Service Dept., (203) 481-5721.

Table B: RANGES/SCALES/RESISTANCES

Model	DC Microamperes				DC Milliamperes							DC Millivoltmeters		
	0-50	0-100	0-200	0-500	0-1	0-5	0-10	0-50	0-100	0-200	0-500	4-20	0-50	0-100
1146/1246	N/A	2300	1500	265	71	3.2	1.6	<1.5	<1.5	<1.5	<1.5	1.6	12.5	25
1151/1251	N/A	2300	1540	265	71	2.7	1.5	<1	<1	<1	<1	1.25	12.5	25
2500	C/F	2400	867	235	78	2.6	3.4	<1	<1	<1	<1	1.5	40	80
2520	C/F	2140	950	700	270	74	37	<1	<1	<1	<1	1.5	20	40

OTHER STANDARD RANGES AVAILABLE INCLUDE:

- DC Ammeters.** Limited ranges, internal shunt.
- AC Milliammeters and AC Ammeters.**
- AC & DC Voltmeters.** All meters 1000 ohm/volt standard, ranges available up to 100 volts. Consult factory for higher ranges and other ohm/volt sensitivities.

SPECIFICATIONS

	1146 / 1246	1151 / 1251	2500 / 2520*
Accuracy (% of F.S.)	DC:2 AC:3	DC:1.5 AC:2.5	DC:2 AC:3
Repeatability	← In accordance with ANSI C39.1 →		
Overload	← In accordance with ANSI C39.1 →		
Response time (sec. max.)	3.0	2.5	2.5
Dielectric strength (VRMS 60Hz/1 min.)	2600	2600	500
Overshoot (max)	40%	20%	50%
Terminals (variations available)	Threaded stud (10-32)	Threaded stud (¼-28)	2500: Threaded studs (10-32) 2520: Terminal barrier strip
Scale length-inches (mm)	2.7(68.6)	4.5(114.3)	2500: 2.7(68.6) 2520: 2.5(63.5)
Zero adjustment	Yes	Yes	Yes†
Pointer (other colors available)	← Red Delta →		
Weight (oz)	1146:8/1246:10	1151:25/1251:30	2500:14/2520:15

* For matching Controller see Product Data Bulletin IV.

† Can be omitted

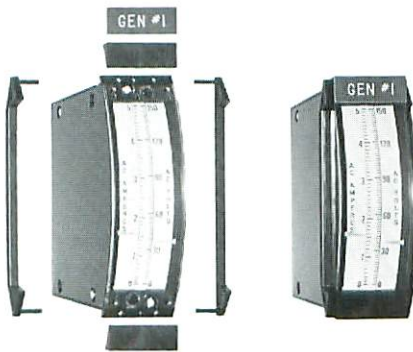
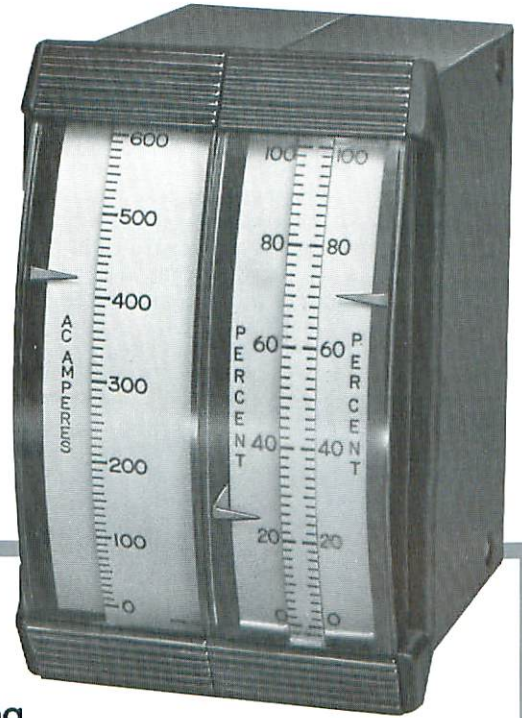
NOTES: (1) Specifications not listed above (e.g.: shock, vibration, temperature) are typically in accordance with ANSI C39.1. **(2)** Illumination available on selected models. Consult factory for details.

SWITCHBOARD PANEL METERS: SINGLE/DUAL

Models 1151/1251 and 1146/1246

These meters were initially developed to meet the demanding specifications of the Atomic Energy Commission with respect to seismic qualifications, long-life and high accuracy. The resulting product line is the most rugged and reliable available. Models 1146 and 1246 are 3½-inch meters, 1151 and 1251 6-inch models, both series of instruments manufactured of modern black plastic with a design compatibility that makes them perfectly suited for use together on the same panel board. Windows are tough clear Lexan®.

Note that front end caps on Model 1151/1251 meters only are removable to provide easy access to adjustable mounting clips. This feature allows front panel installation and removal from the front for service by one man. (Two men are normally required to service competitive switchboard instruments.)



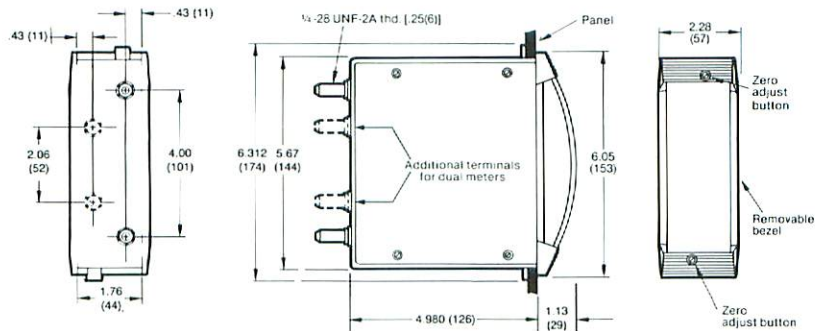
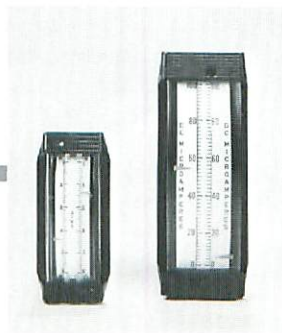
Custom End Caps Bearing Individual Process or Service Legends

Process or service legends can be engraved on special lamcoid end caps designed to replace the standard plastic end caps. These custom end caps can be quickly and easily installed or replaced without going inside the instrument. They can be colored to match panel color coding. If desired, special ranges or engineering units — V, A, Hz, GPM, RPM, etc. — can also be printed on the scale face of the meter.

MECHANICAL DATA

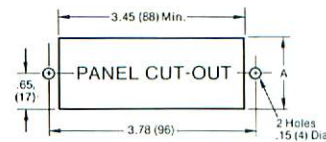
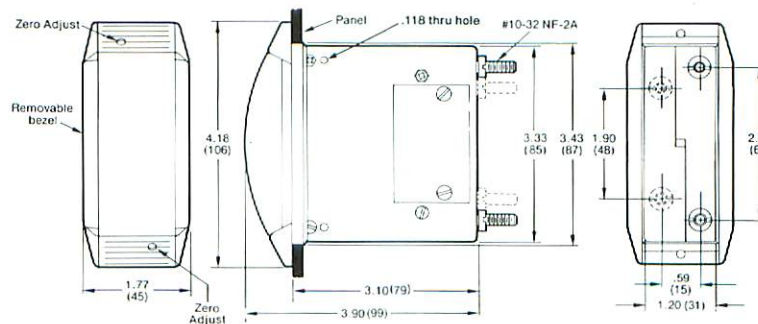
All dimensions — inches (mm)

Model 1151/1251



Number of Instruments	"A" Dimension
1	1.77 (45)
2	3.51 (89)
3	5.25 (133)
4	6.99 (177)

Model 1146/1246



Number of Instruments	"A" Dimension
1	1.30 (33)
2	2.58 (66)
3	3.86 (98)
4	5.14 (131)

Custom Meters and Meter Movements from the specialists in High-Performance Edgewise Technology


International Instruments mounts and calibrates meters in customer supplied bases, or mounts and ships movements in plastic containers for installation by the customer.

Exclusive cantilevered coil construction produces torque to weight ratios on the order of four times greater than conventional edgewise movements of similar size.

Single, through-pivot shaft, used instead of stub shafts attached to two sides of the coil, eliminates pivot

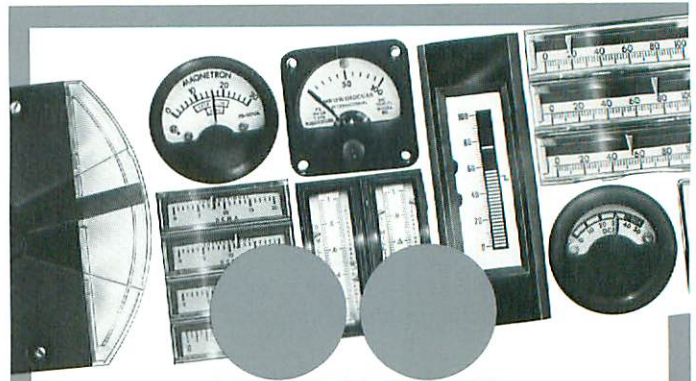


misalignment and helps maintain linearity and repeatability. Effective coil positioning permits longer pointer arms, special pointer shapes and even meter relay flags.

Dual and triple meter movements. Two or three movements can be mounted on a single base. Applications often require that two or three related signals be compared at a single control station, sometimes with the additional requirement that two of the units be tracked in unison. Difficult . . . but easily handled by  movements.

Long pointer movements. Permit shorter reading arcs. Previously discussed cantilevered coil construction allows flatter edgewise presentation and reduces reading errors near scale extremities.


Custom control alarm systems. International Instruments is recognized as a leader in control and alarm instrumentation. Many of the control packages designed around customers' specialized requirements include solid-state devices, with or without meters.



Who we are . . .

International Instruments, the world's leading manufacturer of edgewise panel meters, was founded in 1947 with the purpose of developing a series of analog instruments that realized the full potential of the flat, stackable, compact edgewise style of meter.


Today we offer a complete edgewise family of panel meters, alarm/control devices and electronic display instruments, supplemented by a special line of ruggedized miniature meters and the innovative Flat-Pak® line of "space-saver" meters.

 has been a member of the Prime Technology group of companies since 1984. Applications assistance is immediately available from the factory or a comprehensive network of distributors, representatives and agents strategically located throughout the world.

For further information . . .

For further detail on products, options or special orders, or for additional mechanical data and engineering drawings, call and ask for Customer Service:

(203) 481-5721

If it is more convenient, you may also contact  through the following TWX and FAX numbers. You may also write to the address listed beneath our signature.

TWX: 710-452-3092
FAX: 203-481-8937

Product Data Bulletins available from

Order by Bulletin Number:

- I — Edgewise Meters: Standard Models.
- II — Edgewise Meters: Single/Dual Models.
- III — Edgewise Meters: Mil. Spec. Models.
- IV — Edgewise Meters: Alarm/Control Models.
- V — Electronic Controllers and Indicators.
- VI — Square & Rounds (Ruggedized/Mil.)
- VII — Flat-Pak® Meters.
- VIII — Full Line (Short Form) Catalog.






INTERNATIONAL INSTRUMENTS

A Prime Technology Company

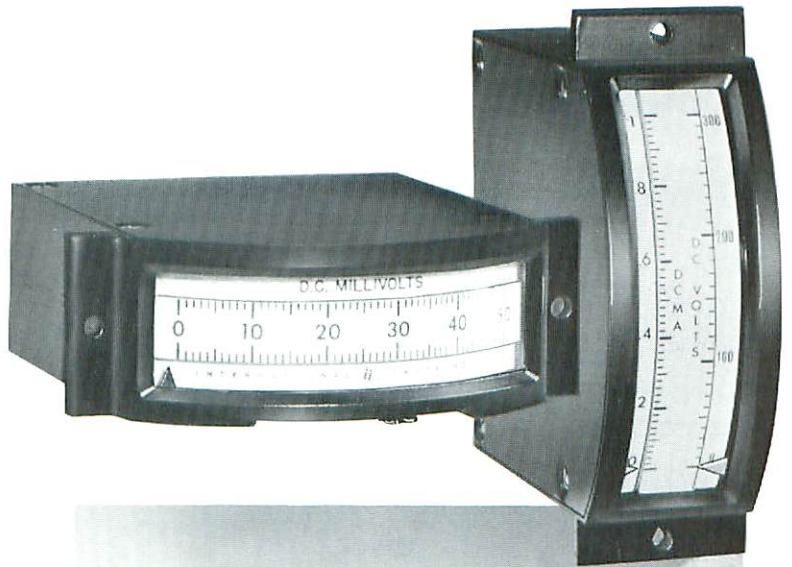
PANEL METERS: SINGLE/DUAL

Model 2500/2520

These auxiliary indicating units are primarily designed as companion or satellite units for use with  Model 2547/2548 Electronic Control Meters. (See **Product Data Bulletin IV.**) They are also specified in a wide range of applications calling for high density data presentation, interchangeable scales and rugged, static-free glass-and-metal cases.

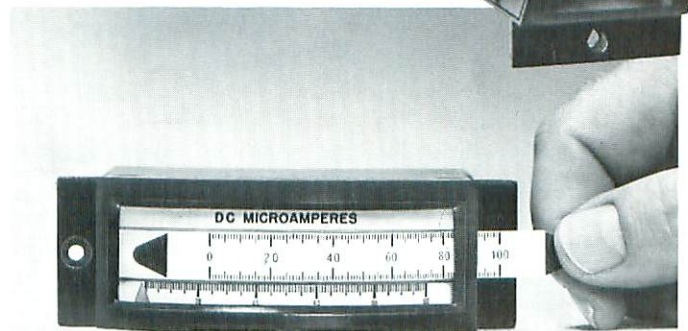
A typical application is on a space vehicle monitoring console. Electronic Control Meters from  are used to monitor and alarm important data points. The indicating meter monitors those points not requiring an output signal. All meters are fitted with the  scale changer, permitting new scales to be made up for each launch program. The use of meters of one design, with comparable performance characteristics, greatly facilitates comparative readings.

Both single and dual meters can have diode overload protection to 25 times full scale, and can be supplied with RF shielding meeting Grumman Spec. LSP-530.001, Class 1.



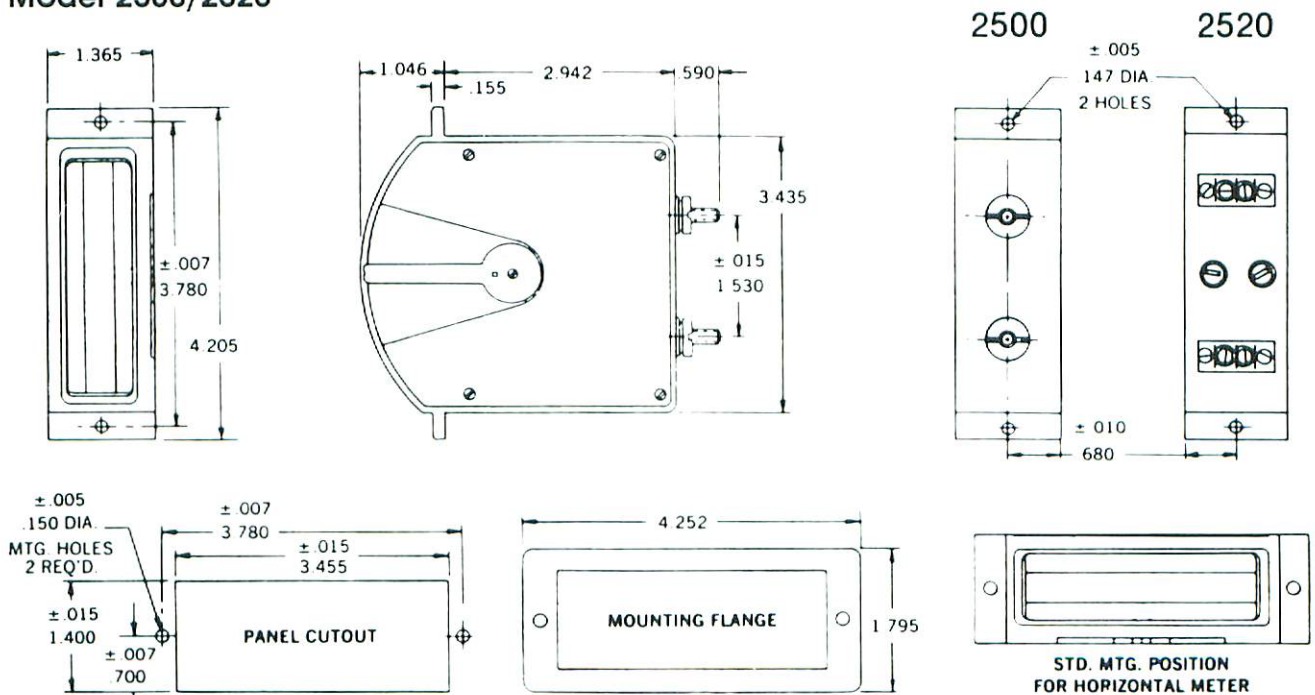
INTERCHANGEABLE SCALES ▶

This useful option, available on both Model 2500 and Model 2520, retains the anti-parallax bi-level scale while replacing the center scale itself with a snug-fitting groove that accepts slide-in blanks. New scales can be slid into place and aligned for calibration in seconds without removing the meter from the panel. Six durable blank scales are included with each meter ordered with this special feature.



All dimensions nominal and subject to change without notice. Please request latest mechanical data from factory before preparing buying specifications or critical engineering drawings. (See back cover.)

Model 2500/2520



Edgewise Panel Meters: Single/Dual Scale Models.

- Compact edgewise design for high density data presentation.
- Two-in-one meter design makes it possible to display related readings in a single unit.
- Designed for industrial, commercial, military and OEM applications.

Edgewise meters from International Instruments are the industry's most comprehensive line of these space-saving, flush-stacking instruments. This bulletin presents Single/Dual Scale Models only. Other bulletins provide showings of standard models, switchboard class units, special mil. spec. instruments, alarm/control meters and pyrometer/controllers. (See **Product Data Bulletins** from ■■ on back cover.)

Single/Dual Scale Models are designed to combine edgewise economy of space, cost and installation time with the additional advantages inherent in a design that combines two meters in one.

ADVANTAGES

- **Space-saving.** Edgewise unit takes up about one-third the space required by conventional meters.
- **Flush-stacking.** Side-by-side or top-to-bottom.
- **Ease of comparative readout.** Maximum information compacted into minimal panel area.
- **Graphic display that is easier to take in at a glance.** Choice of horizontal or vertical presentation offers more meaningful presentation of right/left or high/low information.
- **Internal Shielding** permits mounting on magnetic as well as non-magnetic panels. In dual meters the two movements are shielded from one another as well as from external magnetic fields.
- **Anti-parallax bi-level scales** reduce reading errors. Pointers — in ■■ bi-level design — travel in a separate depressed level section to be viewed on the same plane as the scale.
- **Horizontal and vertical** formats available in all models.



Dual scale design incorporates two independent meter movements in one case, permitting related functions to be displayed in a single unit — specific gravity/temperature, tank level/density, speed with R.P.M., etc.

- **Standard scale faces** have a white background and black markings. (White-on-black or other color combinations available on special order.)
- **Fluorescent red delta pointers** combine with bi-level design to produce instruments of maximum readability, even in high density panels that stack many meters side-by-side.
- **External zero adjust** is mounted at the front of all instruments, except for Series 2520 meters which have rear external adjust.
- **Zero position** for vertical meters can be top, center or bottom, for horizontal meters left, center or right.
- **Jeweled D'Arsonval movement** produces torque-to-weight ratios (meter efficiency) four times greater than those offered by conventional movements.
- **Exclusive Cantilevered Coil Construction.** This new ■■ approach to movement design is the key to ultra-thin meter profiles (as slim as ½ inch) and complete magnetic shielding. The superior shielding characteristics hold compass effect to under ½° (as compared to current aircraft specifications which permit 4°) and allow virtually unlimited “stacking” of instruments for optimum utilization of space. The single pivot-through-shaft assembly eliminates zero shift, assuring pivot alignment by removing the pivot axis from the active field. Other benefits include higher torque-to-weight ratio and excellent linearity and repeatability.
- **Illumination.** Although ambient light sources are normally sufficient when using ■■ high-visibility scales, white or red illumination is available on special order.