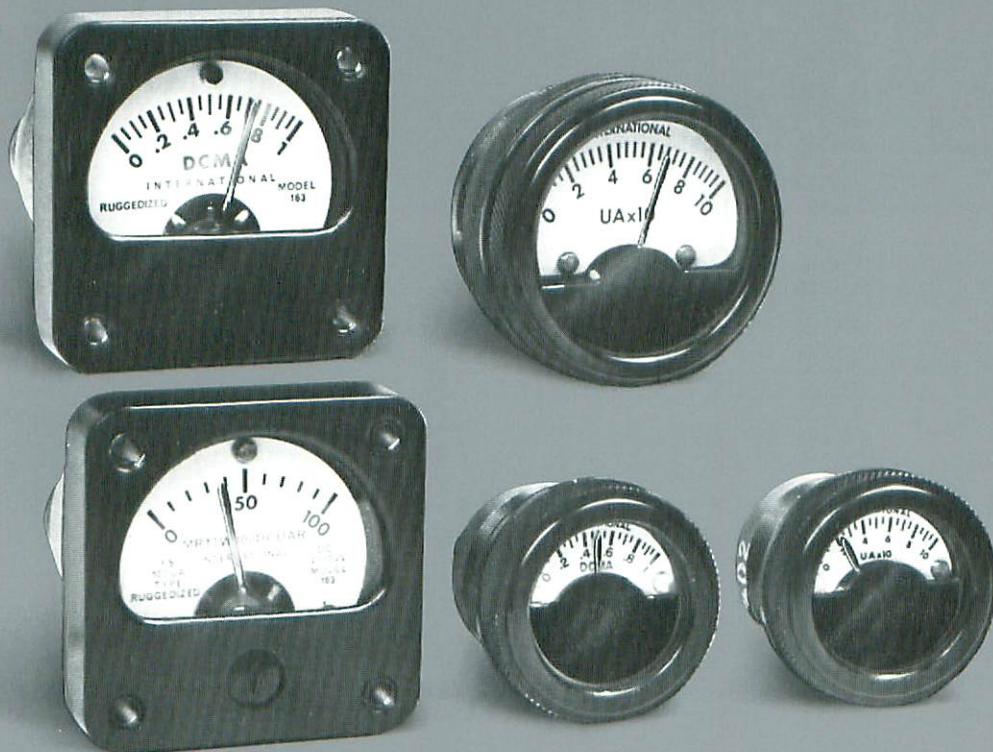


# VI. Ruggedized/Mil Panel Meters: Square and Round Miniatures.

Highly sensitive, miniaturized instruments specifically engineered for commercial, industrial, military and OEM applications.



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



## HOW TO ORDER

### MILITARY METERS

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

Model No.	Range/Scale
From Table A	From Table B
100C	DCmA 0-200

### INDUSTRIAL METERS

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

Model No.	Color Scheme	Range/Scale
MR05 or MR13	From Table C	From Table C
MR05	A	100 DCUAR

**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 Microammeters				DC Milliammeters								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
104C	C/F	1400	1260	209	90	10	5	<1	<1	<1	<1	2	10	20
108	C/F	1400	1260	209	90	10	5	<1	<1	<1	<1	2	10	20
100C	C/F	1400	1260	209	90	10	5	<1	<1	<1	<1	2	10	20
110	C/F	1400	1260	209	90	10	5	<1	<1	<1	<1	2	10	20
MR05	C/F	1400	1260	209	90	10	5	<1	<1	<1	<1	2	10	20
150C	C/F	1650	813	250	.5	4.5	4.5	<1	<1	<1	<1	2	10	20
153C	C/F	1650	813	250	.5	4.5	4.5	<1	<1	<1	<1	2	10	20
163W	C/F	2400	480	364	65	5.7	3.3	<1	<1	<1	<1	1.7	12.5	25
MR13	C/F	2400	480	364	65	5.7	3.3	<1	<1	<1	<1	1.7	12.5	25

### 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

	1" Round					1½" Round	1½" Square		
	100C*	104C*	108	110*	MR05	150*	153C*	163W	MR13
Accuracy (% of F.S.)	DC:3 AC:5								
Repeatability (% of F.S.)	In accordance with MIL-M-10304								
Overload	In accordance with Mil-M-10304								
Response time (sec. max.)	2								
Overshoot (typ)	20%								
Terminals (variations available)	Solder terminals								
Pointer (other colors available)	Black lance								
Dielectric Strength (VRMS 60 Hz/1 min)	100C:500 100W:1000	104C:500 104W:1500	500	1000DC**	1500	150C:500 150W:1500	153C:500 153W:1500	1500	1500
Scale length-inches (mm)	.75(19.1)	.75(19.1)	.75(19.1)	.75(19.1)	.75(19.1)	1.25(31.8)	1.25(31.8)	1.0(25.4)	1.0(25.4)
Zero adjustment	No	No	No	No	No	No	Yes†	Yes†	No
Weight (oz)	2	2	2	2	2	4	4	5	5

\* Watertight available

\*\* DC Dielectric test only due to capacitive terminals.

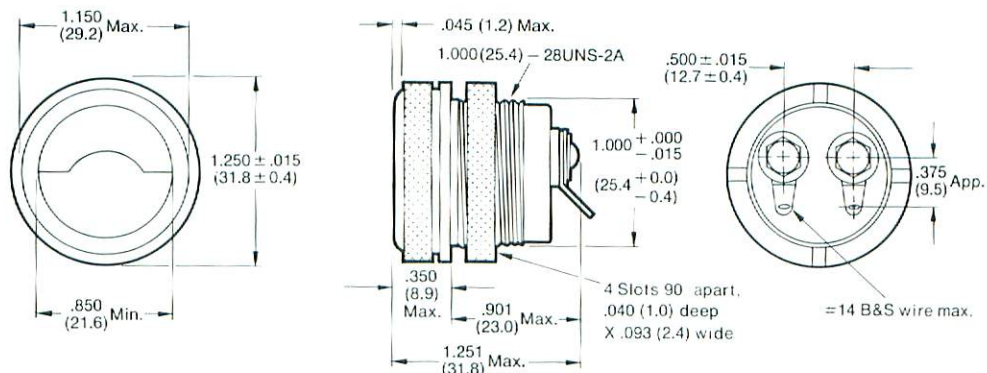
† Can be omitted ‡ 153W: No

**NOTES:** (1) Specifications not listed above (e.g.: shock, vibration, temperature) are typically in accordance with MIL-M-10304. (2) Illumination available for selected models. Consult factory for details.

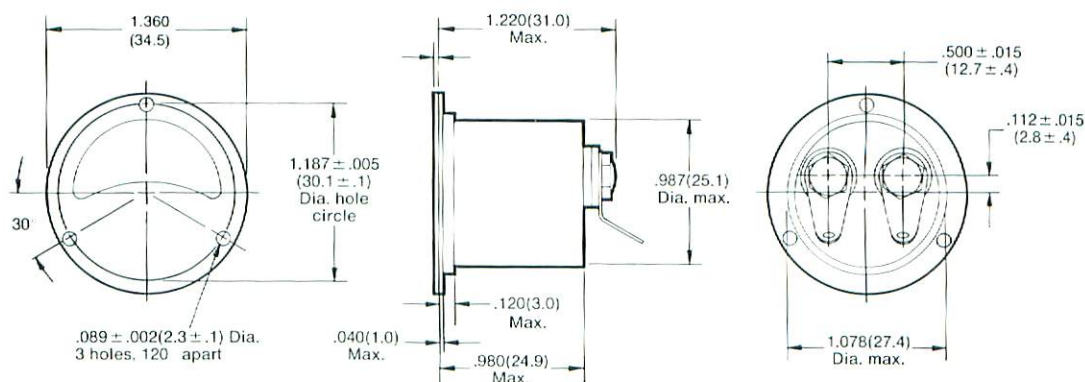
# MECHANICAL DATA

All dimensions  
— inches (mm)

Model 100C/MR05



Model 104C



Model 108

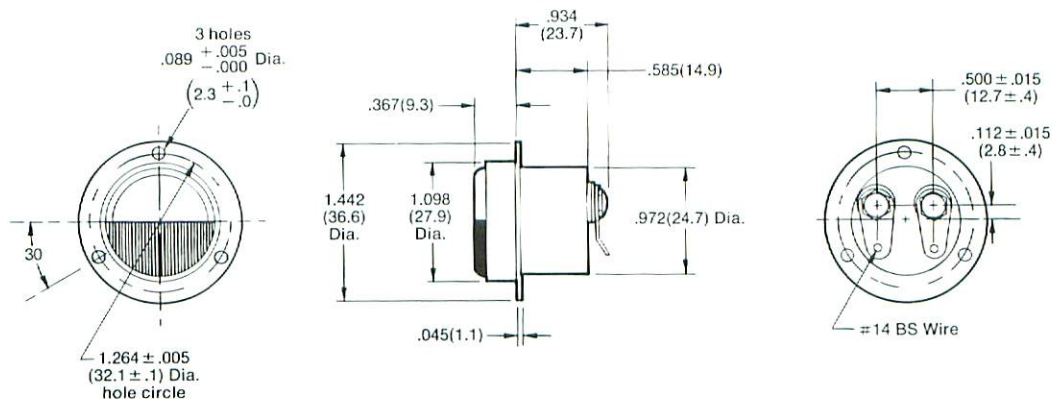
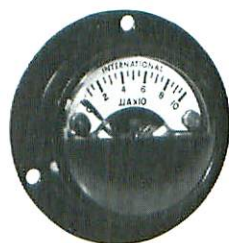


Table C: MILITARY SCALES, RANGES, COLOR SCHEMES ( For MR05 and MR13 )

Scale and Range	Military Identification
<b>DC:uA</b>	
0-100	100 DCUAR
0-200	200 "
0-500	500 "
50-0-50	5T5 "
100-0-100	1H1 "
500-0-500	5H5 "

Scale and Range	Military Identification
<b>DC:mA</b>	
0-1	001 DCMAR
0-2	002 "
0-5	005 "
1-0-1	1U1 "

## Alternate Color Schemes

- A** Additional or other dial markings such as a colored line at a particular reading, or a colored segment or segments on the dial embracing two or more readings, etc.
- B** Black dial background, white markings and pointer.
- F** Fluorescent (yellow) markings and pointer, black dial background.
- M** Multicolored markings. Color of the dial background and of the markings and pointer shall be as specified.
- P** Phosphorescent markings and pointer, black dial background.
- W** White dial background; black markings and pointer.

## 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

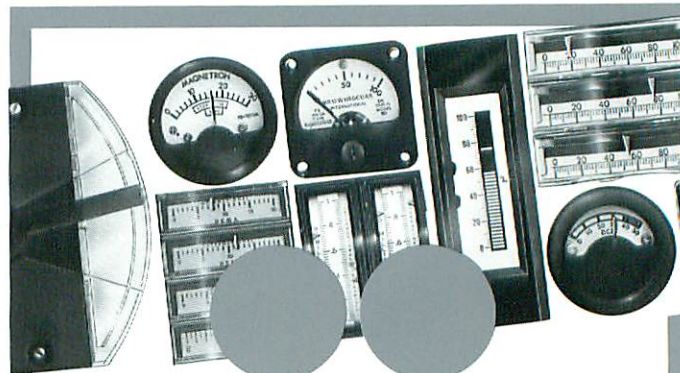


misalignment and helps maintain linearity and repeatability. Effective coil positioning permits longer pointer arms, special pointer shapes and even meter relay flags.

**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.



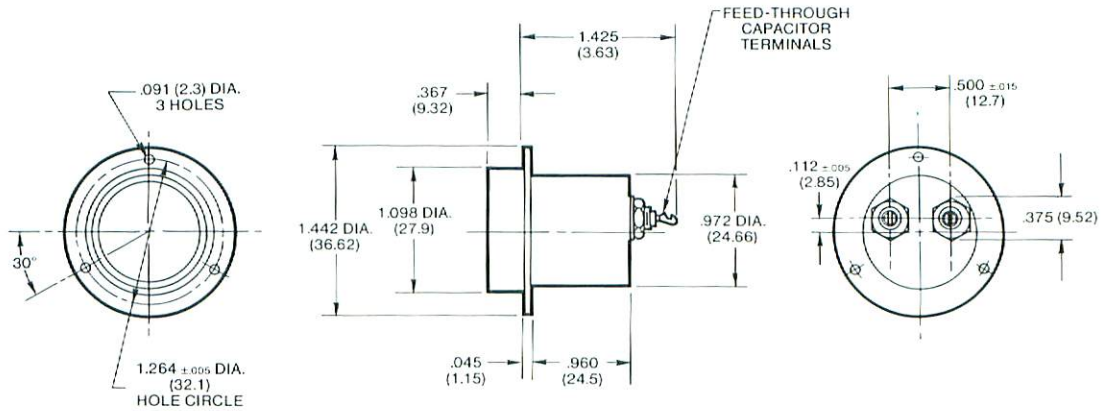
# INTERNATIONAL INSTRUMENTS

A Prime Technology Company

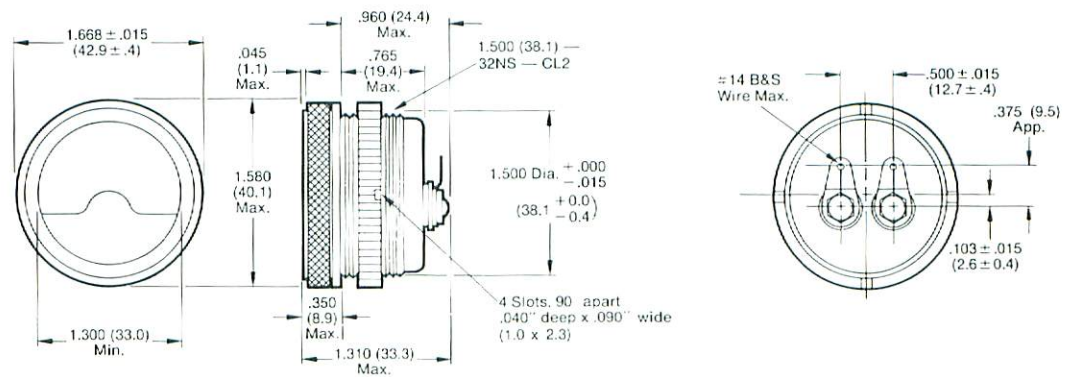
P.O. Box 185, Twin Lakes Road, North Branford, Connecticut 06471 • Telephone: (203) 481-5721/TWX: 710-452-3092/FAX: (203) 481-8937

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.)

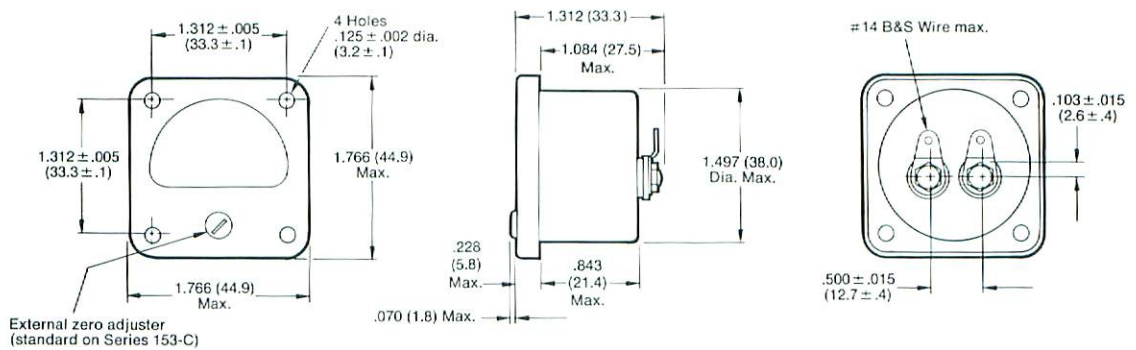
Model 110



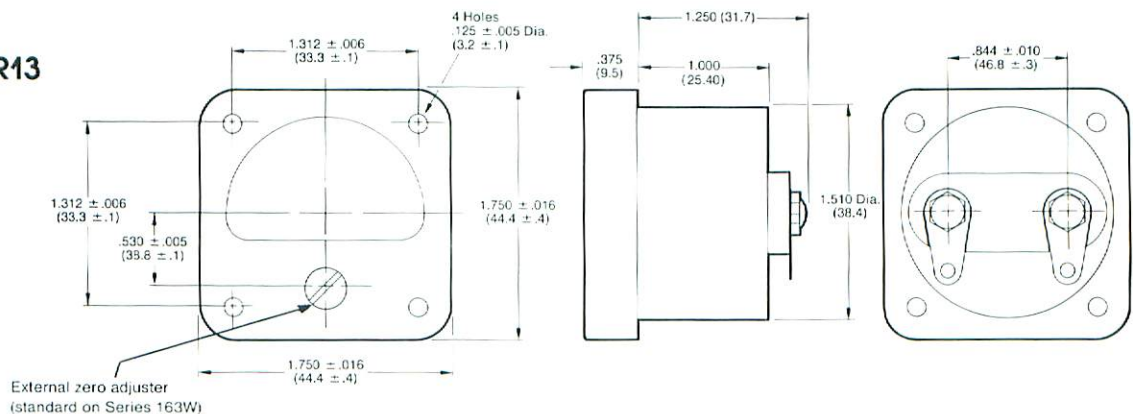
Model 150C



Model 153C



Model 163W/MR13



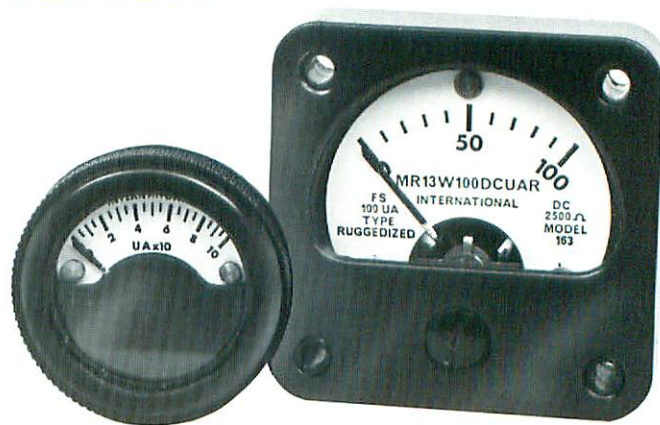
# Panel Meters, Ruggedized / Mil:

## Square & Round Miniatures.

- ❑ Rugged, yet highly sensitive, miniaturized meters in round or square design.
- ❑ Models specifically engineered for commercial, industrial, military and OEM applications.
- ❑ Ideal for airborne, shipboard and missile control measurement systems, vehicular communications, geophysical prospecting equipment, and a wide range of instrumentation and control applications.
- ❑ Special military models with appropriate scales, ranges and color schemes are available.

These precision meters combine small size, light weight and high sensitivity with a rugged construction that withstands extremes of shock, acceleration, altitude, vibration and environment. They are self-contained, individually calibrated and are delivered ready for easy installation and immediate use in a wide range of demanding applications.

- Scales on all Non-Military Models are black on a white background for high visibility. Scale arc is approximately 90° and of exceptional length for a miniature instrument.



- Pointers are black lance-type. Red pointers are optional.
- Scales and pointers on military models come in a range of alternate colors. (See Table C.)
- Zero position is at left. Right or center are optional.
- Miniaturized D'Arsonval-type movement combines small size and light weight with high sensitivity.
- All meters are balanced for vertical use. For mounting on non-vertical panels consult ■ Engineering Department.
- Ruggedized construction provides shock-mounted bearings, Alnico 5 magnets and sapphire jewels. Series 150 meters are built into a tough anodized aluminum case. Series 163/MR13 units have a steel case with black cadmium chromate finish.
- Illumination. Although ambient light sources are normally sufficient when using ■ high-visibility scales, internal white or red illumination is available on special order.
- Series 163/MR13 meters provide internal shielding for mounting on either magnetic or non-magnetic panels.



**Table A: STANDARD MODELS**

Model No.	Size / Shape / Weight	Description
*100C	1 inch / Round / 2 oz.	Commercial model. Case: black anodized aluminum.
MR05	1 inch / Round / 2 oz.	Military model. Same as Model 100C with special scales and color schemes (see Table C, page 4.)
*104C	1 inch / Round / 2 oz.	Same as Model 100C, but with special case designed for flush panel mounting.
108	1 inch / Round / 2 oz.	Same as Model 100C, but with semi-flush case and curved crystal for stylized appearance. For use in edge-lit panels.
110	1 inch / Round / 2 oz.	Same as Model 108, but radio shielded to suppress escape of proximally generated RF signals.
*150C	1½ inch / Round / 4 oz.	Commercial model. Case: black anodized aluminum.
*153C	1½ inch / Square / 5 oz.	Same as Model 150C, but in square design and with external front zero adjust.
*163W	1½ inch / Square / 5 oz.	Same as Model 153C, but designed to meet all requirements of MIL-M-10304.
MR13	1½ inch / Square / 5 oz.	Military model. Same as Model 163W with special scales and color schemes (see Table C, page 4.)

\* AVAILABLE VU or DB