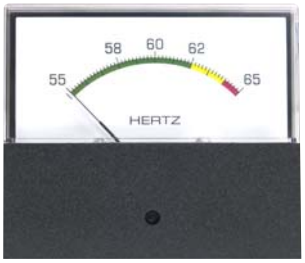
YOKOGAWA Supplies A Complete Line of Precise Panel Meters . . . RoHS compliant

Elapsed Time Meters

Devices will match the frequency of AC power systems. Six-digit counters record hours, tenths of hours, minutes and tenths of minutes. Reset or non-reset models available.



Horizon Line Panel Meters

These meters possess the same precision qualities as New Big Look. In addition, Horizon Line panel meters can be front or rear mounted on panel.

New Big Look Panel Meters

These meters feature extra-wide scales, big bold numerals above the scale and divisions for unobstructed reading. Tapered needle-sharp pointers and shadow-free acrylic covers help to pinpoint values. Available in taut band and pivot and jewel types. Gasket sealer gives New Big Look dust and moisture resistant design. (Except 1½").

Stylist Series Panel Meters

Available in Window mount or Surface mount styles. Optional bezels for Surface mount permit rear panel mounting. Standard movement torque to weight ratio is approximately 4 times greater than most other manufacturer's high torque versions.

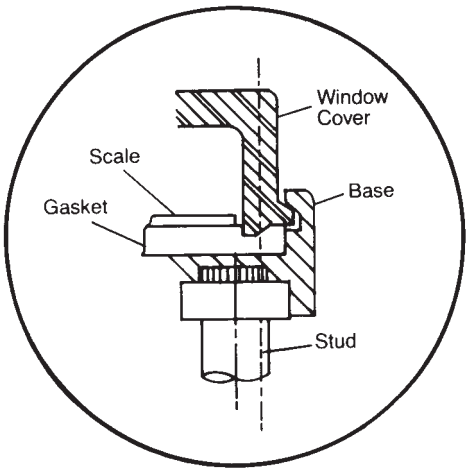
Thin edgewise meters

Our thin element design provides the maximum performance in the smallest of spaces. Available in 1½" to 3½" sizes for vertical or horizontal mounting.

Edgewise Meters

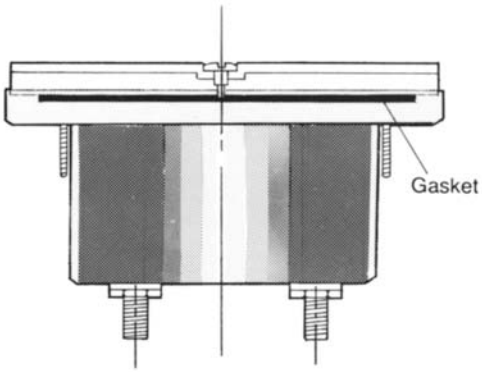
YOKOGAWA's answer to the squeeze for space problem. This design allows meters to be mounted vertically or horizontally. They can stand alone or be stacked in space-saving clusters. Built-in magnetic shielding prevents interference among meters and removes the burden of special calibration.

YOKOGAWA Offers These Advantages . . .



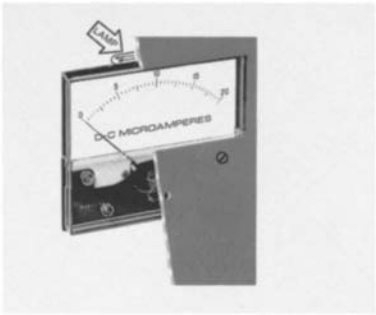
Gasket Sealing Design Establishes A New Industry Standard

Dust resistant construction is now a standard feature of all New Big Look panel meters 2½"-4½" only. YOKOGAWA's unique gasket sealing design eliminates the need for a crimped bezel, providing for quick modification and scale changes while maintaining the integrity of the meters.



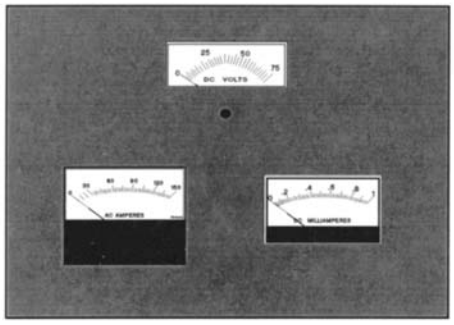
Dust Resistant Construction

YOKOGAWA Big Look panel meters, except 11⁄2", feature gasketed construction to seal out dust and other air-suspended damaging particles. Application is ideal for adverse environments. Special dust resistant features are included on all YOKOGAWA New Big Look meters, (except 1½"). For more severe applications, to meet UL-1437 or IEC 144 requirements, other models are also available upon request.



Back-Of-Panel Mounting For Horizon Line

Horizon Line panel meters can be mounted either behind or in front of the panel. Behind-panel mounting is easy . . . just remove snap-off mask and mount. No special mounting hardware or bezel is required. This design feature improves panel appearance . . . saves time and money. When illuminated scales are required, simply position light source as shown, or in any suitable position along the edge of the instrument.

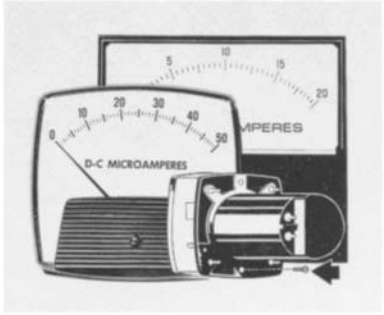


Three Mounting Types Available in Stylist Series

Rear Panel Window Mount

Front of Panel Surface Mount

Rear Panel Surface Mount Available with Optional Bezel



Clean, Readable Case Design Provides Extra Safety

YOKOGAWA's brand New Big Look and Horizon Line panel meters are designed to provide attractive styling, quick, sure readability for any application . . . and a built in safety feature to help you meet national safety requirements. If you must remove the acrylic cover, you have to remove the instrument itself from the panel in order to reach the special safety screws holding on the cover. Removing the meter prevents shock hazard. This safety feature is standard on all New Big Look and Horizon Line meters. All windows and bases are UL94V0 rated (non-flammable)

New Big Look, Horizon Line and Stylist Panel Meters

Suspension

Taut Band

Taut band is a means of suspending the moving mechanism between two ribbons of metal, obviating the need for pivots, jewels and control springs found in conventional mechanisms. The absence of friction resulting from this permits greater sensitivities and provides more rugged meters. Common failures of conventional meters subjected to shock testing are cracked jewels and/or blunted pivots. Taut band, without pivot and jewels, consequently, will withstand shock in excess of that specified for pivot and jewel meters. For example, ANSI Specifications for panel meters require 50G shock. Taut-band meters will withstand 100G shock.

Pivot and Jewel

In this design the coil and pointer are supported by polished steel pivots at each end which fit into jewel bearings. Pivot and jewel meters are recommended for high-vibration environments because of the mechanism's inherent stability and strength. Accuracy and repeatability are almost equal to the taut-band's, and good performance from the pivot and jewel construction is the reason for its long popularity. Don't specify pivot and jewel meters for applications that involve high shock, but do take advantage of this meter's ability to withstand vibration.

High-sensitivity DC Voltmeters

Standard DC voltmeter sensitivity is 1000 ohms/volt. Expressed differently, 1000 ohms/volt sensitivity means that the meter draws approximately one milliamp full-scale current.

Occasionally lower current drains are necessary, hence higher sensitivities may be required. The table below compares available sensitivities, maximum self-contained voltages, and approximate full-scale currents. The voltage range could be extended by using external resistors.

Expanded-scale Voltmeters

For very close monitoring of voltages, Zener diode expanded scale voltmeters are available in 3½- and 4½-inch sizes for AC and DC ratings. Accuracy is ±0.5% of full-scale value. Standard voltage spans are listed in "Ratings."

Expanded scale voltmeters can be furnished for any mid-span values from 12 to 300 volts. Minimum span is 16% of mid-span value.

Frequency Effect — AC Meters

Iron vane voltmeters are sensitive to frequency and should not be used on frequencies other than design frequency. (Standard voltmeters are calibrated at 60 Hertz. Used at 50 Hertz, accuracy becomes ±2¼%. There are also 150- and 300-volt ratings listed which are calibrated at 400 Hertz). For calibrations at frequencies other than 60 and 400 Hertz, refer to factory.

All Iron-vane ammeters (which produce a conventional scale distribution with divisions crowded in lower third of scale) from 10 milliamperes to 50 amperes are virtually unaffected by a change in frequency; e.g., a stock ammeter (calibrated at 60 Hertz) when used at 400 Hertz incurs an additional error of only .5 percent full-scale. If used on 1000 Hertz, the additional error is 4 percent. We recommend use of stock (60 Hertz) ammeters on any
frequency in the range of 25 Hertz to 400 Hertz. For calibration at frequencies outside the 25-Hertz to 400-Hertz range, refer to factory or use a rectifier-type AC ammeter.

Rectifier-type Meters

Rectifier-type meters differ from iron-vane mechanisms in that:

- They provide a nominally linear (DC) scale rather than conventional iron-vane distribution which has a slight crowding at low end of scale.
- AC current measurements of microamperes and milliamperes at minimum power consumption are permitted.
- AC voltmeters of higher sensitivity (ohms/volt) than iron-vane types can be made.
- Frequency response of rectifier type meters is essentially flat from 20 to 1,000 Hertz (1% effect from reference to 60 Hertz). Rectifier-type meters employ a full-wave rectifier and are available in ratings of 500µA to 30A.

Suppressed-zero DC Meters

DC meters can be mechanically suppressed up to 20% of end-scale value. However, additional errors are introduced by suppressions; e.g.,

Errors at 20% suppression = ±3% of end-scale

Many process transmitters in use today provide a 4-20mA signal (occasionally 10-50 mA or 1-5mA) and require a suppressed-zero meter with operating zero set. These are known as "live-zero" and are standard.

Higher Accuracy

Standard calibration accuracy is ±2% of full scale. DC meters can be calibrated to ±1% of full scale as a special model in 3½" and 4½" with mirrored scale.

Conduit Mounting Case — 2½-inch New Big Look Meter

Available only for 2½-inch Type 250 panel meters, for indoor or outdoor use, the conduit-mounted case provides protection to the meter under severe environmental conditions. The conduit case is both sealed and weatherproof and is pre-drilled, ready for mounting of separately ordered panel meters. Assembly of meter into case is done by purchaser. (Drawing No. 2579K10700.)

Data subject to change without notice.

Maximum and Minimum Ratings

In general, the maximum and minimum ratings of current and voltage are those listed in "Ratings." Listed are rating limits for self-contained meters.

Ratings greater than those listed can be accomplished by use of external shunts, resistors or transformers. Meters to be used with external accessories are shown in "Ratings." See page 29 for Shunts, and resistors.

MINIMUM RATING

SERIES	STYLIST				BIG LOOK & HORIZON LINE			
SIZE/RATING	1½	2½	3½	4½	1½	2½	3½	4½
DC CURRENT	10µA				20µA			50µA
DC VOLTAGE	50mV				50mV			
AC CURRENT (IRON VANE)	---	10mA			---	10mA		
AC VOLTAGE (IRON VANE)	---	3V			---	3V		
AC CURRENT (RECTIFIER)	1mA				500µA			
AC VOLTAGE (RECTIFIER)	3V				10V			

MAXIMUM RATING

DC CURRENT	10A	50A		15A	30A	50A
DC VOLTAGE	1000V			300V		600V
AC CURRENT (IRON VANE)	---	50A		---	30A	80A
AC VOLTAGE (IRON VANE)	---	600V		---	300V	600V
AC CURRENT (RECTIFIER)	100mA	30A		20mA		
AC VOLTAGE (RECTIFIER)	600V			150V		300V

Table of Contents

Key to 200-Prefix Catalog Numbers

250 **2** **40** **LS** **LS** **7,8,9,10** **XXX or XXXXXXXXXX**

Digits 1, 2, and 3 Style
250 - New Big Look (Taut Band), (I/V*-P&J)
251 - Horizon Line (Taut Band), (I/V*-P&J)
254 - New Big Look (P&J)
255 - Horizon Line (P&J)
260 - Stylist Surface Mount (Taut Band), (I/V*-P&J)
261 - Stylist Window Mount (Taut Band), (I/V*-P&J)
264 - Stylist (P&J) Surface Mount
265 - Stylist (P&J) Window Mount

Digit 4 - Size
1 - 1½"
2 - 2½"
3 - 3½"
4 - 4½"

Digits 5 and 6
Elec. and Mechanical Variables
00 - DC Amps Zero-Left
01 - DC Amps Zero-Center
04 - DC Volts/Ext. Res. Zero-Left
05 - DC Volts/Ext. Res. Zero-Center
10 - AC Amps Rectified
20 - DC Volts Zero-Left
21 - DC Volts Zero-Center
24 - DC Millivolts Zero-Left
25 - DC Millivolts Zero-Center
30 - AC Volts Rectified
37 - AC Expanded Scale Voltmeter
38 - DC Expanded Scale Voltmeter
40 - AC Amps (I/V)* 60 Hz
44 - AC Volts (I/V)* 60 Hz
45 - AC Volts 400 Hz (I/V)*
50 - Frequency

Digits 7 and 8 - Elec. Rating
Example:
LS = 5 Amps
MT = 10 Amps
NG = 20 Amps

Digits 9 and 10 - Scale
Example:
LS = 0-5 Amps
MT= 0-10 Amps
NG = 0-20 Amps

Digit 11 - Factory Style
For factory use.

Digits 12, 13, 14, 15, 16, 17-18 Special Units
When used, these denote unique models. Refer to factory for details.

*I/V = Iron Vane Mechanism

AC Frequency Meters - Available in Horizon Line or New Big Look

Size			1½	2½	3½	4½
Voltage ±20%	Center Frequency Hertz	Scale Hertz	Cat. No.	Cat. No.	Cat. No.	Cat. No.

AC FREQUENCY — PIVOT AND JEWEL, SELF-CONTAINED, ACCURACY ±3 PERCENT OF SPAN; I.E., 0.3 Hz FOR 45-55 AND 55-65, AND 1.2 Hz FOR 380-420 RANGE

120	50	45-55	. . . . .	250 AGAG	350 AGAG	450 AGAG
120	55	45-65	. . . . .	250 AJAJ	350 AJAJ	450 AJAJ
120	60	55-65	. . . . .	250 ANAN	350 ANAN	450 ANAN
120	400	380-420	. . . . .	250 BKBK	350 BKBK	450 BKBK
208	50	45-55	. . . . .	250 GGGG	350 GGGG	450 GGGG
208	55	45-65	. . . . .	250 GJGJ	350 GJGJ	450 GJGJ
208	60	55-65	. . . . .	250 GNGN	350 GNGN	450 GNGN
208	400	380-420	. . . . .	250 HKHK	350 HKHK	450 HKHK
240	50	45-55	. . . . .	250 DGDG	350 DGDG	450 DGDG
240	55	45-65	. . . . .	250 DJDJ	350 DNDN	450 DNDN
240	60	55-65	. . . . .	250 DNDN	350 DNDN	450 DNDN
240	400	380-420	. . . . .	250 EKEK	350 EKEK	450 EKEK
480	60	55-65	. . . . .	254 250 LNLN	254 350 LNLN	254 450 LNLN

Choose prefix 254 or 255

NOTE: For non-listed voltages, up to 480 VAC, frequency ranges or special calibration (accuracy ±2% of span) contact factory. For taut-band suspension replace prefix 254 with 250 and prefix 255 with 251.

YOKOGAWA ◆ Stylist Series

Type 260 and 264
Stylist Surface Mount

Specifications

Accuracy: All DC and AC iron vane, ±2% of fullscale, AC rectifier type; ±3% of fullscale (with 60 Hz sine wave at 25°C). Expanded scale voltmeters ±0.5% of fullscale. Special order
DC with mirror back scale (DC only) 31/2 - 41/2" Available @ ±1%.

ANSI Specification: All meters meet ANSI Specifications C-39.1 (See page 14 for exceptions.)

Overload: Voltmeters (AC + DC) - 50% momentary, 20% sustained. Ammeters (AC +DC) momentary: 10 times the rated current for 10 consecutive intervals of .5 seconds with 1 minute interval between successive applications; sustained: 20% for six hours.

Scale Data:

ARC	90°	95°
METER SIZE	AC IRON VANE	TAUT BAND/ PIVOT & JEWEL
1½"	—	1.66"
2½"	2.15"	2.29"
3½"	2.70"	2.85"
4½"	3.80"	4.01"

Insulation Level: 2600V/1 min. (2½"-4½")
1500V/1 min. (1½")

Response Time:
3 seconds (Max.) - Microammeters
2 seconds (Max.) - All other DC ratings
2.5 seconds (Max.) - All AC ratings
Maximum 40% overshoot

Dimensions: See page 38.

Burden Data: AC Ammeter 5 amps @ 60 Hz, 0.5VA, Max. .5 Power factor lagging, AC voltmeter - unity power factor.

Notes:
Severe-duty meters are available to meet /CUL or /UL 1437 requirements in 2½"-4½" sizes. To order, add /UL or /CUL after catalog number, or contact factory.