

# 4 1/2 and 8 3/4-inch Rectangular, Type K-241 and 261, For Commercial and Military Service

## Application

Type K-241 & 261 instruments have been designed to achieve the ultimate in reliability and performance. Instruments of this class are recommended for use on electric utility switchboards and process control panels for similar industrial service.

Navy HI-Shock instruments were developed to meet the special needs of the U.S. Navy. These instruments are used almost universally for military shipboard applications. They may be used to advantage on commercial marine and industrial applications or wherever humid conditions or severe mechanical shocks are sustained.

Selection of Type K-241 & 261 instruments is indicated whenever there is a need for frequent, accurate, quick readings and where failure in an instrument circuit could affect an associated critical circuit.

## Standards

Type K-241 & 261 commercial instruments comply with ANSI Standard C39.1 for 1% class switchboard instruments. HI-Shock instruments meet the stringent requirements of their associated standards (see table 1).

## Features

### Taut-Band Suspension

All Type K-241 & 261 instruments, except those which rotate continuously, use taut-band suspension. Instruments incorporating this feature are identified by the trademark *tbs*. The taut-band suspension instrument has certain unique advantages over the conventional pivot and jewel types:

1. It eliminates friction, giving better accuracy and almost perfect repeatability.
2. It gives top performance under adverse conditions of shock and vibration.
3. It reduces maintenance, thereby saving money throughout the lifetime of the instrument.
4. It assures longer life, reducing annual depreciation and replacement costs.
5. It has greater sensitivity, reducing power burdens on circuits being measured.

### Enclosures

The window of 241 types is shatterproof polycarbonate.

The window of HI-Shock instruments is shatterproof and 241 types are chemical and scratch resistant. Bases are made from a high strength plastic with nontoxic combustion products.

Cases and hardware for all types are heavily plated to resist harsh environments.



TYPE KX-261 High Shock

### Mechanisms

Type K-241 and 261 instruments are built with permanent-magnet moving-coil mechanisms for all direct current and rectifier types, as well as for those employing self-contained or external transducers. For RNS measurement of alternating current, the mechanisms use iron-vane principles. Both types are built with taut-band suspensions. The power factor meter and the synchroscope are of the rotating vane type with pivot and jewel bearings.

### Full View Design

To facilitate quick, accurate reading, even under adverse conditions, all K-241 instruments feature the Westinghouse "full view" design. The window is flat, reducing light reflection to minimize the need for a non-glare surface. The dial scale is beveled so that there is no dial shadow, making it possible to read the instrument from a 60-degree angle.

### High Overload Capacity

While the exact overload capacities vary with ratings, the K-241 and 261 instruments generally will withstand momentary overloads in excess of industry standards without sustaining damage. For ac instruments this overload capacity is in excess of 35 times normal current, and for dc it is in excess of 150 times. Therefore, it is permissible to select instruments to read at a preferred three-quarters scale at normal current and yet permit "pegging" the instrument during high-current transient conditions.

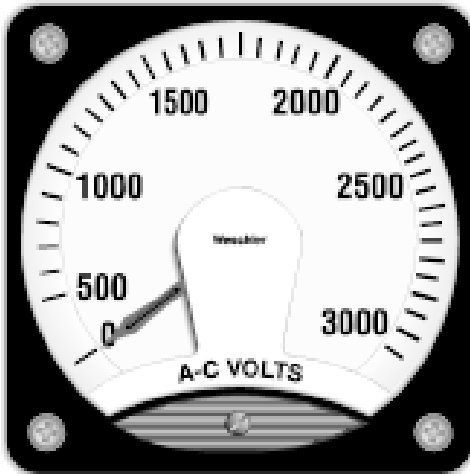
### Sensitivity

DC instruments are available in ratings from 100 microamps up. All *tbs* mechanisms have much lower resistance than their pivot and jewel counterparts and most competitive mechanisms.

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# Type K-241 and K-241 High Shock

KA-241 Commercial



KX-241 High Shock



## Types Available

Function	Ranges	Type Designation	Mechanism	Applicable Specification(s)
DC Microammeter	100uA to 1mA	KX-241 Com & HI, 261 Com	Permanent-magnet moving coil	ANSI C39.1-1981, MIL-M-16034A
DC Milliammeter	1mA to 1A	KX-241 Com & HI, 261 Com	Permanent-magnet moving-coil	ANSI C39.1-1981, MIL-M-16034A
DC Ammeter	1A to 50A	KX-241 Com & HI, 261 Com	Permanent-magnet moving-coil	ANSI C39.1-1981, MIL-M-16034A
DC Millivoltmeter	50mV to 1V	KX-241 Com & HI, 261 Com	Permanent-magnet moving-coil	ANSI C39.1-1981, MIL-M-16034A
DC Voltmeter	1V to 800V	KX-241 Com & HI, 261 Com	Permanent-magnet moving-coil	ANSI C39.1-1981, MIL-M-16034A
AC Milliammeter	10mA to 1A	KA-241 Com & HI, 261 Com	Iron Vane	ANSI C39.1-1981, MIL-M-16034A
AC Ammeter	1A to 20A	KA-241 Com & HI, 261 Com	Iron Vane	ANSI C39.1-1981, MIL-M-16034A
AC Voltmeter	10V to 750V	KA-241 Com & HI, 261 Com	Iron Vane	ANSI C39.1-1981, MIL-M-16034A
AC Frequency Meter	50, 60 & 400 Hz	KX-241 Com & HI	With Separate Transducer	ANSI C39.1-1981, MIL-M-16125
AC Frequency Meter	50, 60 & 400 Hz	KR3-241 Com	Self Contained Transducer	ANSI C39.1-1981
AC Frequency Meter	395-405 Hz	KR4-241 HI	Self Contained Transducer	MIL-M-23167
AC Power Factor Meter	0-1-0	KI-241 Com & HI, 261 Com	Rotating Vane	ANSI C39.1-1981, MIL-M-19261
AC Power Factor Meter	.5-1-.5	KJ-241 Com	Self Contained Transducer	ANSI C39.1-1981
AC Synchroscope	.....	KI-241 Com & HI, 261 Com	Rotating Vane	ANSI C39.1-1981, MIL-M-16104B
AC Wattmeter	.1 to 10A	KP-241 Com & HI, 261 Com & HI	Self Contained Transducer	ANSI C39.1-1981, MIL-W-19088
AC Varmeter	.1 to 10A	KP-241 Com & HI, 261 Com & HI	With External Phase Shifter	ANSI C39.1-1981
AC Varmeter	.1 to 10A	KV-241 Com & HI, 261 Com & HI	Self Contained Transducer	ANSI C39.1-1981
Rectifier Milliammeter	1mA to 1A	KC-241 Com & HI, 261 Com	Permanent-magnet moving-coil	ANSI C39.1-1981, MIL-V-23151
Rectifier Ammeter	1A to 17A	KC-241 Com & HI, 261 Com	Permanent-magnet moving-coil	ANSI C39.1-1981, MIL-V-23151
Rectifier Voltmeter	5V to 600V	KC-241 Com & HI, 261 Com	Permanent-magnet moving-coil	ANSI C39.1-1981, MIL-V-23151
Resistance Thermometer	All Popular Ranges	KX-241 Com & HI, 261 Com	Self Contained Bridge	MIL-T-15377F (NOTE 1)
Speed Indicator (Tachometer)	0-25, up to 13000 PPS	KR-241 Com & HI, 261 Com	Self Contained Transducer	ANSI C39.1-1981, MIL-T-16049
Synchrotie	0-360°	KS-241 Com, Unmounted Transmitter	Self-Synchronous	.....

### Notes:

1) For readout and bridge circuit.

### Specifications

#### Accuracy:

1% accuracy class. See AD 43-200 for accuracy of specific instruments

#### Case Size:

4 1/2-inch class (4 27/61 inches (11.2 cm) square).

#### Insulation Rating:

800 V

#### Shielding:

DC- 1 % influence at 50-200 gauss.  
AC - 1 % influence at 15 gauss.

#### Scale Length:

7.1 inches (18 0 cm) for 250° rotation.

### Net Weight:

3 to 5 pounds (1.4 to 2.2 kg), exclusive of accessories.

### AC Burdens:

5A ac ammeter- .375 VA  
AC wattmeter- 2.0 VA (current coil)  
AC wattmeter- 2.5 W (potential Coil)  
150V ac voltmeter- 2.4 W  
For details, see Application Data 43-200.

### Wiring Diagrams:

See Application Data 43-200

### Further Information

Ordering Information, Styles & Ratings:  
See index of this catalog  
Instructions: IL 43-241  
Renewal Parts: RPD 43-241

### Modifications

#### Mechanism Dials:

Black with white marking  
Fluorescent  
Dual scale  
Special colors, trademarks, legends etc.

#### Windows:

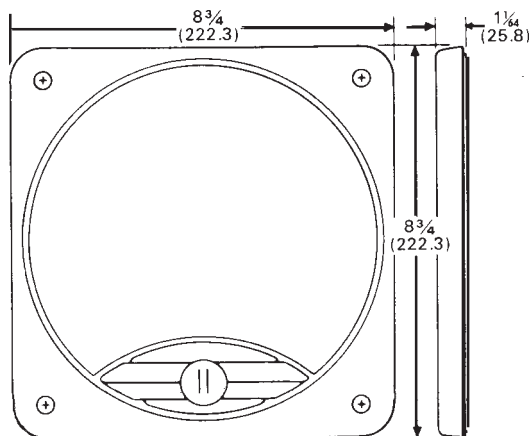
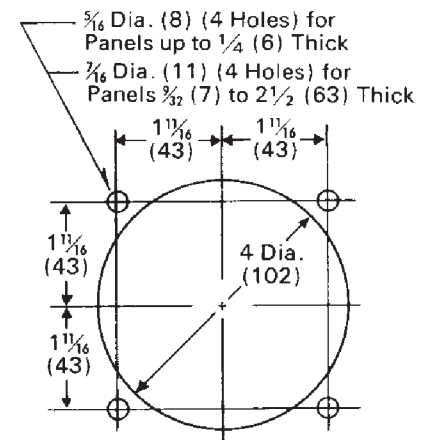
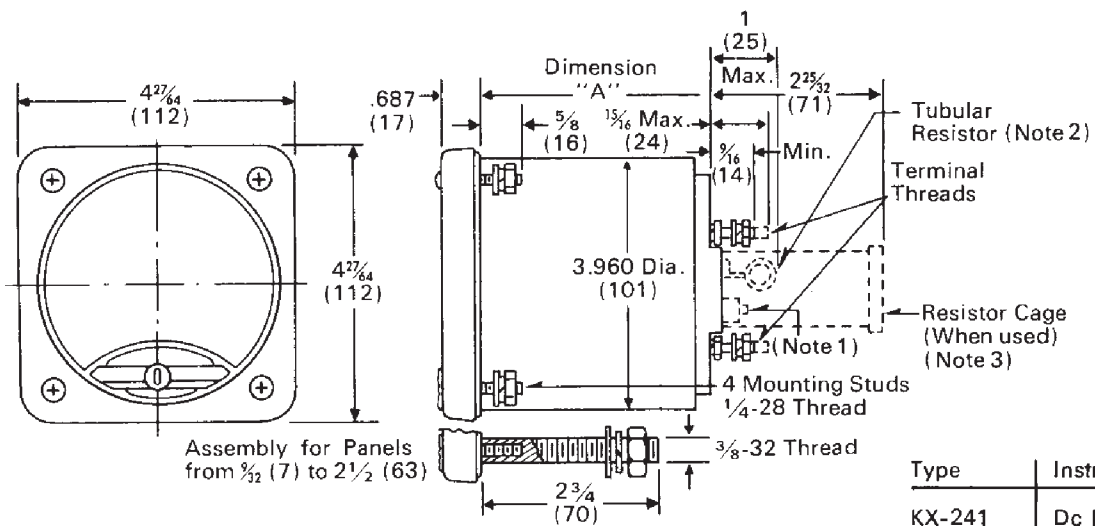
Non-glare, Shatterproof

#### Electrical:

Intermediate ratings  
Special calibrations  
Offset or suppressed Zero  
Multiple rating  
Special sensitivity

#### Mechanical:

Pusher or index pointers, Weatherproof, HI-Shock (MIL-S-901C)



Type	Instrument	Dimension	A
KX-241	Dc Instruments . . . . .	2.813	( 71)
KC-241	Rectifier Instruments, Except Transducer Type . . . . .	2.813	( 71)
KA-241	Ac Voltmeters and Ammeters . . . . .	2.813	( 71)
KC-241	Transformer Type Rectifier Ammeter . . . . .	3.750	( 95)
KR3-241	Frequency Meter . . . . .	3.750	( 95)
KX-241	Electrical Resistance Thermometer . . . . .	3.750	( 95)
KI-241	Synchroscope, Single Phase . . . . .	5.312	(135)
KI-241	Power Factor Meters . . . . .	5.312	(135)
KP-241	Wattmeters . . . . .	5.312	(135)
KV-241	Varmeters . . . . .	5.312	(135)
KJ-241	Power Factor Meters . . . . .	5.312	(135)

- Note 1 – Potentiometer for factory adjustment of 150, 300 and 600 V ac voltmeters.  
 Note 2 – Tubular resistor on single phase 50 and 60 Hz synchrosopes and power factor meters. (commercial grade)  
 Note 3 – Resistor cage used with 400 Hz synchrosopes and power factor meters, 3 phase power factor meters, high shock power factor meters & high shock synchrosopes.