DORIC INSTRUMENTS
A Division of VAS Engineering

620 Series

- **Laboratory Accuracy to 0.01%**
- **Full 5-digit (99999 Counts) Resolution**
- **14 Plug-in Options**
- **Sensitivity to 1 Microvolt/Count**
- **Simple, Front Panel Programming**
- **Superior Temperature Measurement**
- **Process Voltage and Current Loop**
- **Strain-Gage Measurement**
- **LED Displayed Engineering Units**
- **Made in USA**

Call For Manual

Digital Strain-gage Indicators

The Series 600 of Digital Strain-gage Indicators is equally compatible with lower output bonded foil type transducers as with high output semiconductor transducers (up to 100mV). Each instrument allows selection from one of four full-scale voltage ranges to optimize sensitivity.

The measuring technique used is the unique voltage-to-frequency conversion, dual slope method with a true, four-wire ratio measurement. This method assures accurate and stable readings even in noisy environments that can occur with fluctuating excitation power. Also, it allows for use of indicators with floating or grounded transducers.

Three alphanumeric LEDs are supplied either for display of engineering unit tables (e.g., PSI, KG, LBS) or as "0" for active display of dead zeros.

Digital scaling is standard. Drift-free scaling is set to precise engineering units and decimal location via the instrument's simple, front panel keyboard

entry.

Dual engineering units (e.g., LBS and KG) are standard. The primary and secondary engineering unit displays are easily toggled via the front panel. For example, the primary could be pounds (lbs) while the secondary, a mathematically proportional kilograms (kg). Because of their math equivalency, all options function correctly, regardless of display selection.

System calibration can be accomplished using a 3-point "live" load, such as actual weight on a scale, or via electronic instrument calibration using a DC voltage source.

To reduce settling indications on the display or option outputs, the display may be rounded to count by 1, 2, 5, 10, or 100 counts via a simple program menu selection.

Auto zero (tare) may be accomplished by the auto zero menu command or while the process is running. A simple, simultaneous push of the arrow down - (**Ø**) and ENT keys rezeros the indicator.

Three Base Models

There are three base models of strain-gage indicators from which you can select. The models vary by their excitation power supply and the availability of option slots.

The Model 620 is for a user-supplied, external excitation source. It has two available option slots.

The Model 621 includes a built-in excitation supply capable of driving one or two 350Ω bridges. Supply voltage is switch selectable for 5, 10, or 15VDC. One option slot is available.

The Model 622 includes a higher output built-in excitation supply and, because it comes in a larger double-width chassis, the ability to add up to four options. This excitation supply provides 5, 10, 15, or 20VDC selection with the capability to excite up to eight 350Ω bridges.

Order Models 620G--8 for use with external supply and up to two options, 621G -8 for built-in supply and one option slot, 622g--8 for built-in supply and four options slots.

NOTE: " " specifies power: 1 = 115VAC, 2 = 230VAC.

Strain-gage Range Table				
	Range	**Order Code**	**Accuracy(±)***	**Resolution**
-15mV to +100mV	-8	0.01%	1µV per count	

-30mV to +200mV	-8	0.01%	1µV per count
-75mV to +500mV	-8	0.01%	1µV per count
-1500mV to +1V	-8	0.01%	1µV per count
* Accuracy percentage is of reading, ±1digit.			

Series 600 Options

Tailor the basic instruments and your applications with options to extend your measurement capabilities. A complete explanation, any usage restrictions, and option ordering codes are included in the following descriptions. Any option can be ordered now or added in the future so your Series 600 Indicator will never be obsolete.

Available options slot summary: 610 Models: 2, 612 Models: 5, 620 Model: 2, 621 Model: 1, 622 Model: 4.

Multiple inputs. Monitor as many as 24 inputs. The first multiple input card provides an additional five channels of thermocouple or voltage, or two channels of RTD, or thermistor inputs. Additional cards add six more thermocouple or voltage, or three more RTD or thermistor inputs. One card per Model 610 or a maximum of 4 cards per Model 612 instruments. (This feature is not for use with current loop or strain-gage versions.) *Order Option -21 for 6 input of thermocouple or voltage, -21 for 3 inputs of RTD or thermistor.*

Differential measurement. This card provides an additional input channel and the capability to display the difference (**s**T) between the two channels.

The -22 option card can be specified with thermocouple and voltage input models. The -23 option is specifically for use with RTD or thermistor configurations.

This function can be combined with other options: maximum, minimum, and average deltas when used with math capability, scaled analog output of differentials when used with analog output, and alarm points based on differential limits (Cannot be used in same indicator with -20 and -21 options. Not for use with current loop or strain-gage versions.) *Order Option -22 for DELTA and 2 thermocouple or voltage inputs, -23 for DELTA and 2 RTD or thermistor inputs.*

Scaling and offset. Specifically designed for use with voltage and current loop versions of the 610 and 612, this option provides wide range user scaling of the display to process units.

With this option you can rescale and offset inputs for display in direct engineering units to ±99999 counts. In addition, you can assign

alphanumeric labels or dead zeros to the displayed units.

For example, 4-20mA could be scaled to display "0.00-255.00 PSI", "LBS", "KG", "GPM", etc. And it's easy.

Unlike with other instruments, you need not perform any computations or enter any formulas. Simply enter upper and lower input and output values. The Series 600 does the rest, adjusting the optimum slope and offset for you automatically. (This option is not for use with Models 620, 621, or 622 as digital scaling is included as standard.) *Order Option -1*

Math expressions. Provides display of maximum, minimum, rate of change, or the timed average value of measurements. Front panel keys allow you to view the math value or switch back to view the actual measured value. *Order Option -04*

Alarms. Each option card provides two alarms with separate limits and relays. Up to two cards can be specified. Any combination of high, low, or ± values can be used to trigger the alarm from either actual or math processed input. Trigger delay and a settable dead-band are included as standard. *Order Option -03 (Up to 2 per instrument.)*

DC power. For automotive, marine, aviation, or plant DC power loops, the Series 600 can be configured for 12 or 24VDC power operation. (Cannot be used in Models 621 or 622.) *Order Option -10 for 9-16VDC, -11 for 18-32VDC (One type per instrument.)*

Analog output. For output to recorders or other analog input instruments, you can choose from two fully isolated linearized and analog outputs. Both output types, 4-20mA or 0-10VDC, can be fully scaled. Output can be assigned to direct measurements or math values. *Order Option: -06 for 4-20mA, -05 for 0-10VDC*

Scanning Option. The scanning option gives the capability to scan multiple inputs by working with the multi-input cards in your indicator. This new option requires no programming; thus, no special menu prompts are given with this option installed.

The display readout shows the value of multi-input card channels at a default rate of 3.4 seconds a channel. The display rate can be made slower (6.8 sec) - refer to the configuration instructions to change the rate of display.

It is recommended that the scanning option not be used with a communications option such as serial output, etc., since measurement data cannot be identified as discrete channels. Order Option: -31

Digital Outputs

Three digital output modes are available for output to digital equipment.

Serial output. RS232C or 20mA interface sends display information in serial ASCII format. Includes user-selectable transmission rates from 300 to 9600 baud, line feed, and carriage return. *Order Option -07*

IEEE-488 output. For integrating IEEE-488 Bus based measurement or analytical systems. Main indicator and other options can be programmed via the IEE-488 Bus. *Order Option -08*

Series 600 accessories. The Rack Adapter Plate permits mounting of the Series 600 instruments in a standard 19" (48.2cm) instrument rack. Different versions have cutouts for 1, 2, or 3 indicators.

Order Accessory -RKM1 for 1 cutout for Models 610, 620, or 621; -RKM2 for 2 cutouts for Models 610, 620, or 621; -RKM3 for 3 cutouts for Models 610, 620, or 621; -RKD1 for 1 cutout for Models 612 or 622.

Model 600 Series General Specifications

Repeatability

±1 digit

Stability with Ambient Temperature

Zero: 0.5µV/°C
Span: 0.005% rdg/°C
Reference Junction automatic built-in,
0.018°/° for 0°-50°C J, K, T, E, N, C,
G, D, CGI,FeCon, and CuCon thermocouples
For R, S, and B thermocouples: 0.03°/°

Noise Rejection

NMRR: ≥60dB at 50Hz or 60Hz ±0.1Hz
CMRR: ≥120dB at 50Hz or 60Hz ±0.1Hz

Overload Protection

Power lead to ground: 1500VDC or VAC RMS
Input to ground: 270VDC or VAC RMS
Across inputs: 270VDC or VAC RMS continuous

4-20mA range: 80mA
10-50mA range: 200mA

Input Impedance

Thermocouples: 22MΩ (with 20nA of break detect current)
RTDs: I1 to VinLo (10MΩ),
12 to VinLo (12.3KΩΩ),
depending on range VinHi to VinLo (500MΩ)
Thermistors: I1 to VinHi (3.2KΩ),

I1-12, (9.45KΩ)
Voltage: 10MΩ to 500MΩ depending on range
Current: <15Ω
Strain-gage: 10MΩ to 500MΩ depending on range

Environmental Ranges
Operating: 0° to 50°C
Storage: -40° to +65°C
Humidity: ≤90%RH noncondensing

Display
8 digits, 14-segment alphanumeric red LEDs
0.54" (13.7mm) H.
Also one negative ("-") LED at left of array

Input Connections
Sensors: screw terminal blocks
Multi-input: quick connect
AC power: plug-in
DC power: screw terminal blocks

Alarms Option
2 alarm settings per alarm option -
up to 2 alarm options per instrument,
Form C relay output (1A at 120VAC) reset
auto, manual, remote, and override selectable
alarm delay and deadband

Multi-input Options -20 and -21 Accuracy
Thermocouple: ±10µV to ±70µV depending on T/C type and measurement point
RTD:
Cu10: ±10mΩ
All others: ±50mΩ
Current loop and thermistor: no effect

Point Update Rate
2 readings per second,
1 reading/second for R, S, B, C, G, D,
and CGI thermocouples

Linearization, Temperature Inputs
100% digital, using variable length,
second-order, polynomial segments

Program Storage
EEROM

Case Construction
Metal, black anodized, extruded aluminum

Reliability

40,000 hours MTBF

Installation

Panel mounting from front, secured at sides
by rail clamps supplied with each indicator

Size (H x W x D)

Single-wide Models 610, 620, 621

Case: 2.63" x 5.34" x 9.87"
(6.7cm x 13.6cm x 25cm)
Bezel: 2.84" x 5.67" (7.2cm x 14.4cm)
Panel cutout: 2.68" x 5.44" (6.8cm x 13.8cm)

Double wide Models 612, 622

Case: 2.63" x 10.69" x 9.87"
(6.7cm x 27.2cm x 25cm)
Bezel: 2.84" x 11.01" (7.2cm x 28.cm)
Panel cutout: 2.68" x 10.79" (6.8cm x 27.4cm)

Weight

Single-wide: 4 lbs (1800 g)
Double-wide: 6 lbs (2800 g) without options

Power

AC power, 90V to 132V: 48Hz to 400Hz,
190V to 262 V: 48Hz to 400Hz,
8.0W typical (without options)
detachable 6-foot (1.8m) power cord is supplied,
two detachable 6-foot power cords are supplied
with Model 622

Excitation Supply

Model 621: 5, 10, and 15 volts, switch selectable
isolated, will drive two parallel 350Ω
strain-gages at 15V (90mA)

Model 622: 5, 10, 15, and 20 volts, switch selectable,
isolated, will drive eight parallel 350Ω
strain-gages at 15V (350mA)

Warranty

1 Year

600 Series Ordering Guide			
Base Model	**Power Code**	**Range Codes**	**Options Code**

610 612	1= 90-132VAC 2=190-262VAC	-1 (Thermocouple) -2 (Voltage) -4 (Current & Loop) -5 (RTD) -6 (Thermistor)	See 600 Series Options List for individual details and codes.
620 621 622		-8 (Strain-gage)	
Examples:	610-1-1-03 612-2-5-21-21-06-04 621-18 622-1-8-16-03-03-07		

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