

# New Gauges and Panels Raise the Bar on Instrumentation Capabilities

The new enGage series gauges and panels from Curtis Instruments bring a new level of technological capability to off-road vehicle instrumentation. Fully programmable and adaptable to wide-ranging customization, these units are designed to accommodate more functions in a smaller package. Because one basic housing can serve many needs, inventory costs are lowered and the manufacturing process is simplified. Because functions are programmed rather than built into units from scratch, lead times are also shortened. This can all add up to significant advantages for OEMs in the marketplace.

Designed as a series with escalating levels of capability provides a comprehensive and common platform for a manufacturer's full range of vehicles. Applications encompass a wide range of off-road vehicles including material handling, industrial, aerial lift, airport construction and outdoor power equipment. Solid-state design eliminates moving parts to help OEMs reduce warranty costs.

## One Case - Multiple Possibilities

The key point of difference with this new type of instrumentation is profound flexibility by design. One integrated gauge or panel can perform any number of desired functions. This enables OEMs and aftermarket buyers to take a single housing and customize it, rather than buying and storing a variety of units, with all the associated inventory costs. Functions can be selected in virtually any combination to meet any vehicle application requirements, including: fuel, temperature, pressure, voltage, field programmable maintenance monitor, settable hour meter, battery discharge indicator, tachometer, time-of-day clock and hour meter. The gauge panels can be further customized with corporate logos, special icons and other visuals that reinforce the OEM's marketing image.

This marks a significant breakthrough from traditional instrumentation in many aspects of its technology. Even the specification process has been rethought and "retooled" into an interactive online procedure. Here are the details:

## Electrical Aspects

Microprocessors are the source of powerful functionality and flexibility. While historically, instrumentation has used specific electronics to achieve specific goals, now one microprocessor achieves any number of functions.

This new generation of gauge electronics enables engineers and designers to think outside the box in deciding what their product can do. For example, names and phone numbers of dealers can be programmed into the instrumentation. When a gauge determines that the vehicle needs servicing, the dealer's name and phone number can appear on the panel.

The advanced microprocessors used includes the following technologies in a single device, which increases functionality and reduces parts count, to lower cost and increase reliability:

**Improved Logic:** Vehicle designers can reduce vehicle cost by using the microprocessor logic to replace existing costly logic boards.

**EEPROM:** Non-volatile memory eliminates the need for battery backup, simplifying design and eliminating both the prospect of vital memory loss and the need for service.

**Flash Memory:** Provides unique functional "DNA" personality as the final step of the production process, to create a single hardware platform.

**Multi-Purpose Input:** A universal input provides design engineers the flexibility to specify voltage, current or resistive-based senders for their gauge functions.

**Hi-Intensity LEDs:** Warning icons are a critical element of any gauge. Traditional incandescent bulbs need to be replaced multiple times during a vehicle's life, compromising warning performance and increasing overall vehicle operating cost. Additionally, the incandescent bulb consumes significant energy in order to be visible in sunlight. These issues are resolved with high-intensity LEDs that never need replacement, and are brighter both in low-light and full-sun conditions. Customization affords the ability to accommodate multiple warnings. The highest level of the series can display as many as 15 warning symbols.

**Customized Warning Indicators:** Customization extends to multiple choices in warning methods. Designers can specify LCD icons or flashing bar graphs in addition to Warning LED icons. All can be specified as flashers or solid, in a wide range of colors.

**High-Endurance LCDs:** Wide-temperature-range LCDs (a technology pioneered by Curtis Instruments) paved the way for usage in demanding industrial/outdoor applications. These gauges take full advantage of this capability; they are rated for use in environments ranging from -40°C to +85 °C.

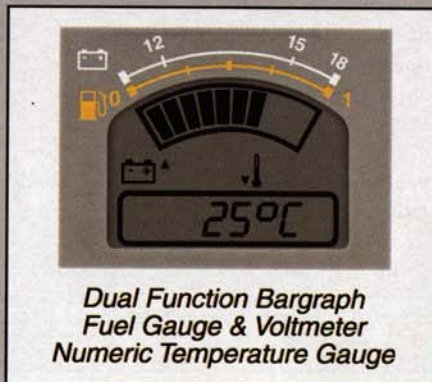
## Custom-Configuration

### 1. Select the Functions

Pick from: fuel, temperature, pressure, voltage, field-programmable maintenance monitor, settable hour meter, battery discharge indicator, tachometer and hour meter.

### 2. Choose the Housing

enGage™ I - 24 x 36 mm rectangular (cutout)  
enGage™ II - 52 mm round (cutout).  
enGage™ III - 50 x 100



Dual Function Bargraph Fuel Gauge & Voltmeter Numeric Temperature Gauge

mm rectangular (face).  
enGage™ IV - 96 x 144 mm rectangular (cutout).

### 3. Select the Display

View any of the selected functions as bargraph or numeric; mix and match in any combination.

### 4. Choose Warning Icons

Pick standard ISO/SAE icons or design your own. enGage™ III accommodates up to 8 icons.

## Series Summary

### Single Function: enGage™ I

Offered as a Battery Discharge Indicator (BDI) or an hour meter in a compact package for small industrial vehicles. Available in IP 65 Housings with hexagonal or rectangular face and sealed Packard connector or quick-disconnect terminals. Convenient mounting clip eliminates hardware.

### Mid-Range: enGage™ II

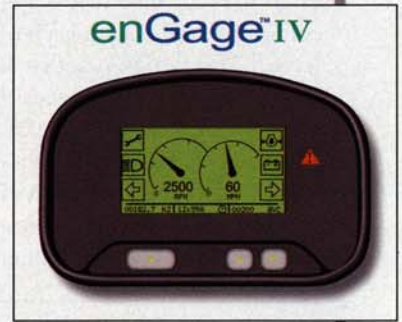
Dual-function, microprocessor-based instruments in 52mm round housings. Can accept one sender input and be factory or user defined to monitor various functions. Also includes a high intensity LED to signal critical equipment status.

### Mid-Range: enGage™ III

Three function, microprocessor-based instruments in 50 x 100 mm rectangular housings. Can accept two sender inputs and be factory or user defined to monitor various functions. Also includes 8 LED warning icons for comprehensive vehicle status.

### Top-of-the-Line: enGage™ IV

The top of the series offers the most flexibility and advanced functionality. Dot-matrix display is fully customizable for style and location of elements. Options include bargraph, numeric, needle and message center. Accommodates four gauge functions plus additional on-off indicators. Can be further customized with OEM's logo, end-user's logo or other desired graphics. Display icons can also be designed.



## Mechanical Aspects of enGage™

**Insert-Molded Lenses:** Another key point is the quality of the environmental protection. All products within the series feature one-part seamless construction, with the lens solidly encased in the plastic housing. Sealing by design creates an instrument rated IP65 from both front and rear, reduces the cost to achieve IP65 and also enhances the aesthetics of the control panel.

**Snap-Fit Mounting:** Hardware kits, a necessity for traditional gauge installation, have been eliminated. Instead, a mounting method is incorporated into the actual housing. Flexible plastic flanges slide in to the cover panel and pop out to create a snug fit. No screws, washers, nuts or brackets are required in the manufacturing line - a boon to inventory and assembly.

**An Overmolded Gasket:** achieves the same seal back and front without any additional steps in the assembly process. The single snap-in part creates a completely sealed unit, appropriate for demanding applications such as paving equipment.

**Rear Loading:** Reversing the typical gauge assembly process, rear-loading the electronics into the back of the gauge designs flexibility into these gauges and panels. All artwork, with customized scales in desired colors, is accommodated in the overlay and can be applied as the final step in the production process.

**Sealed Membrane Switches:** Engineers designing industrial vehicles for harsh environments will welcome this innovation. A completely sealed, one-piece membrane switch (with ribbon cable connection to battery) is incorporated into the overlay and enables set, reset and change functionality - creating a truly interactive gauge. This gives manufacturers an opportunity to add new features such as time-of-day clocks, field-programmable maintenance monitors and other value-enhancing functions that previously may not have been practical to provide.

## Advanced Specification Logistics

Curtis engineers have created a new Web-based tool, available at [www.curtisinst.com](http://www.curtisinst.com), to enhance the designer's or buyer's specification process. users can custom-design their own gauge in minutes with an easy-to-use graphical program. Upon completing a design, a free sample of the gauge exactly as configured is automatically ordered, generated and shipped. The sample's specifications are automatically documented, given a model number, and placed on file for future ordering or modification.

The interactive Configurator uses pull-down menus along with drag and drop features to display and select all the variables, from housing, connector and voltage, to the desired combination of functions. Users enjoy full flexibility to determine the number of gauges within a unit, the style of display, and where the gauges are located. Designers can choose from 50 different icons. If further customization is desired (e.g. logos or other special artwork), this can be added in an off-line process.

For more information, contact Curtis Instruments at 914-666-2971 or [www.curtisinst.com](http://www.curtisinst.com).