vGauge G12C/G12N

User's Manual
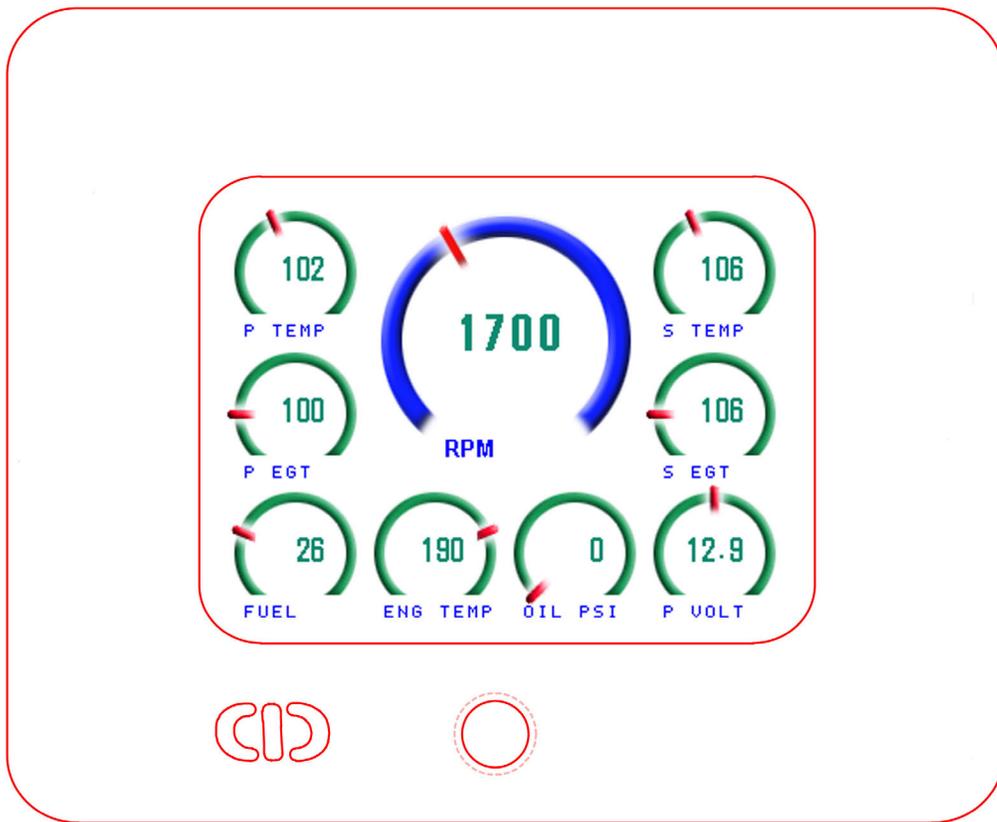
Chetco Digital Instruments

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SeaGauge™ is a trademark of Chetco Digital Instruments, Inc.

SeaSwitch™ is a trademark of Chetco Digital Instruments, Inc.

vDash™ is a trademark of Chetco Digital Instruments, Inc.

WARNING!

**USE THIS UNIT ONLY AS AN AID TO MONITORING ENGINE
PERFORMANCE INFORMATION.**

CAUTION

When showing sensor data, this unit will only show information based on the
sender used and its installed position.

The operating and storage temperature for your unit is from -4 degrees to+167
degrees Fahrenheit (-20 to +75 degrees Celsius). Extended storage temperatures
higher or lower than specified will cause the liquid crystal display to fail. Neither
this type of failure nor its consequences are covered by the warranty. For more
information, consult the factory customer service department.

All features and specifications subject to change without notice.

Chetco Digital Instruments may find it necessary to change or end our policies,
regulations, and special offers at any time. We reserve the right to do so without
notice.

All screens in this manual are simulated.

NOTICE!

Free software upgrades will be available on our website at http://
www.chetcodigital.com as they are released. Please check our website periodically
for these and other information as they become available.

Thank you for choosing Chetco Digital Instruments

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the factory customer service department for help.

SPECIFICATIONS

CASE Dimensions: ....7.75" W x 6.5" H x 2.3" D

Input Voltage:..4.5-5.6 vDC, 5-volt Nominal

Processor Frequency:.. 18.432 MHz

Maximum Current:...800 mA

Display:... 5.5"W x 4.5"H LCD 30 char H x 40 char W

Operating and Storage Temperature .... -4 to +167 degrees Fahrenheit
-20 to +75 degrees Celsius

Firmware Revision:... G12R1.14

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Introduction

Welcome

Thank you for purchasing a Chetco Digital Instruments product. vGauge G12C™ is a multi-function display head that provides custom instrumentation in a rugged compact design. Its menu driven functions allow it adapt to and monitor many different sensors from a single location. Optional built-in wireless capability allows display of real-time data from remote locations.

This manual covers the vGauge G12C/vGauge G18C/ vGauge G12N /vGauge G24N products. All are functionally the same except for screen sizes and enclosures.

vGauge G12C features 5.7" (320 X 240) Sunlight viewable color LCD screen and rugged Aluminum enclosure. Digital input via USB/Serial

vGauge G12N features 4" (320 X 240) Sunlight viewable color LCD screen and NMEA 4 sealed enclosure. Digital input USB/Serial

vGauge G18C features 4.3" (480 X 272) Sunlight viewable color LCD screen and sealed plastic enclosure. Digital input via USB/Serial.

vGauge G24N features 8.4" (640 X 320) Sunlight viewable color LCD screen and sealed NMEA 4 rated enclosure. Digital input via Serial

All products are designed to work with vGauge Remote sensor unit which provides interface to external sensors to create a virtual instrumentation system. The vGauge G12C display heads support both USB and Serial interfaces to vGauge Remote units or PC.

Display data is received in digital format from an attached vGauge Remote sensor unit using RS232 serial format or USB 2.0.

Touch Panel

The vGauge™ G12 display head is shipped with a protective film to prevent damage to the touch panel during shipping. Keep the protective film in place until finished with installation. It is easily removed by pealing off when ready for use.

The special anti-glare display window should only be cleaned with soap and water or window cleaner. A mild dish soap works well and then rinse with clean water. Do not wipe surface with a paper towel as it will mar the finish. A lens cleaning tissue used for eye glasses works best. Be sure it is safe for plastic lenses and anti-glare coatings.

The G12C contains a touch controller that interfaces to a four wire resistive touch screen. Touch sensitive areas of the display are defined as either "hotspots" or "buttons". When either of these is pressed or released, the G12C can either notify the vGauge Remote host directly or execute a "macro", or both. A macro is a predefined sequence of G12C commands.

Hotspot

A hotspot is an area of the display that is touch sensitive. There are two types of hotspots – visible and invisible. A visible hotspot is the standard type and when touched, the display area of the hotspot is color inverted (technically XOR'd with the foreground color) to provide a visual indication that a hotspot has been activated. An invisible hotspot does not provide any visual indication when touched.

The invisible hotspot is useful where a touch control is used to switch display screens. If a visible hotspot is used, and the host redraws the screen when the hotspot is pressed, the hotspot area can become inverted when the user removes their finger from the screen.

Button

A button is a touch sensitive area that has two bitmaps associated with it. These bitmaps correspond to the two states of the button – 1) normal /not pressed and 2) active / pressed. This allows a button to look like any GUI object including pushbuttons, toggle switches, radio buttons, check boxes, and so forth.

There are two major types of buttons: normal (momentary) and latching. A momentary button changes visual state only when pressed. This is like a momentary pushbutton or a keyboard key. A latching button is like a checkbox – press and release it once and the checkbox is filled, press and release again to clear it.

vGauge Remote Host Notification

When a touch sensitive area is pressed or released, the G12C can either notify the host, execute a macro or both. In most cases, touch events are used to notify the Remote Sensor unit to change display screen graphics. In some cases, touch events are used to enter temporary self configuration modes and then exit back to normal gauge display.

Touch Screen Precautions

The following precautions will guide you in handling of our product correctly:

- The liquid crystal display device panel used in the liquid crystal display module is made of plate glass. Avoid any strong mechanical shock on LCD and touch screen. Should the glass break, handle it with care.
- The polarizer adhering to the surface of the LCD is made of a soft material. Guard against scratching it.
- Wash your hands or clothes if you touch liquid crystal!
- Protect the modules from high temperature and humidity.
- Keep the modules out of direct sunlight or direct exposure to ultraviolet rays.
- Protect the modules from excessive external forces.

What You Get

Unit

vGauge G12C head unit with power and data input. Unit constantly monitors the data inputs and updates the graphic LCD display two times per second. Digital data is received from vGauge Remote sensor unit via both serial (RS232) and USB protocols and is decoded for display based on user configured formats.

Multiple instrumentation display can be configured and scrolled though using touch screen buttons on the unit. Custom configurations can be created using supplied **vDash** software on PC and downloaded to G12C display unit using the USB interface.

A single water-resist connector in the rear provides a quick disconnect for both power and data inputs. Unit can be powered directly from vGauge Remote sensor unit or USB.

Cables

Maximum distance using standard serial format is 25 feet and up to 150 feet can be achieved using serial cable and power adapter. Custom interface cables are required to support both interface types

vGauge G12C is supplied with a standard Serial interface cable with a length of 25 feet. One end is a 8-pin water-resist quick-connect (display side) and opposite end is 6-pin circular water-resist connector for attachment to Remote Sensor unit.

For distances longer than 25 feet, a custom serial cable can be ordered up 150 feet. Please contact Chetco Digital Instruments if you need a longer cable.

Flash Programming cable – A custom USB interface cable is available for reprogramming the unit firmware. This cable is only used to reprogram the unit and is not required for normal operations including configuration via attached PC

Software

vGauge G12C units come with **vDash** instrumentation software for WindowsXP and Vista platforms. **vDash** allows creation of custom screen layouts and graphic elements for up to 8 user defined pages. These settings can be arranged on the host PC connected to vGauge Remote sensor unit and then transferred to attached vGauge G12C units via supplied serial cable.
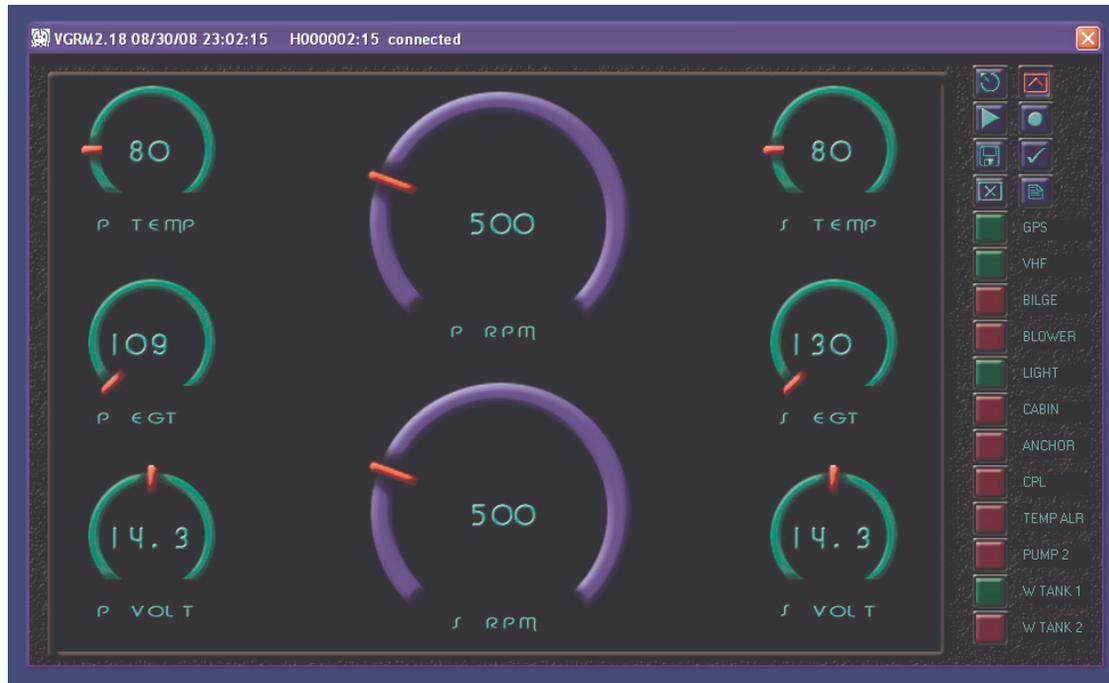
Please consult **vDash** user manual for details on user configuration.

Operation

This manual covers operation for vGauge G12C Dash units and the vGauge G12N NMEA4 enclosure. All units feature a color touch sensitive LCD display. Operation of both units is the same with the exception of the location of the reset button. On the vGauge G12C Dash units, the sealed button is located on the front of the case while the vGauge G12N NMEA4 unit has a rear connector for attachment of a separate reset button if desired. The single momentary button resets the unit to show the main menu or first gauge display screen.

Control of the vGauge G12C unit is done using the touch sensitive screen. The screen contains 5 hidden touch areas used to change display modes and options. The 5 touch areas are divided in quadrants

- **Upper Left** - Gauge Display mode
- **Upper Right** – vSwitch Display mode
- **Lower Left** – Display Menu Selections
- **Lower Right** - Next Gauge Display Page
- **Center** – Main Menu Display
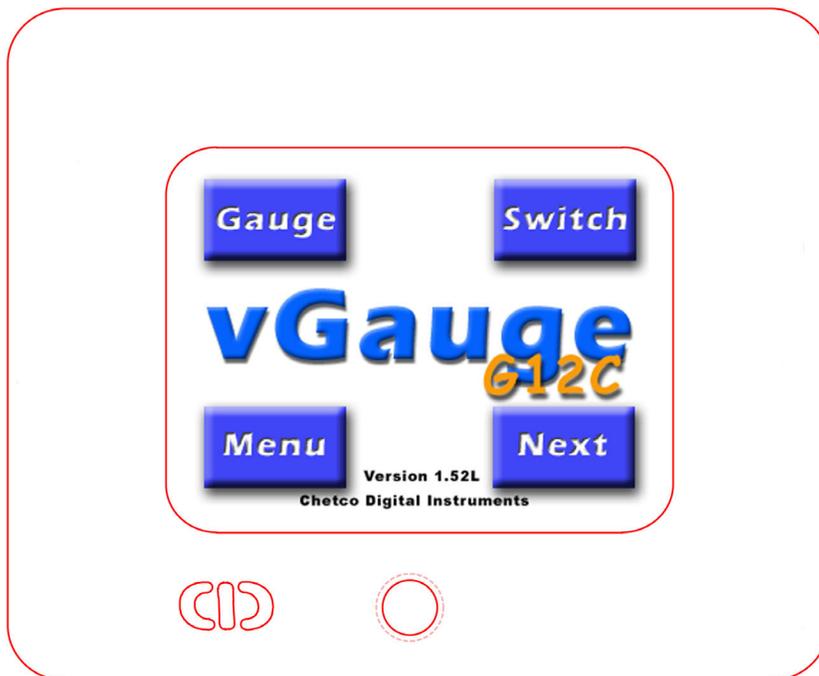
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When you receive your unit, it has been programmed to display gauge readings in groups with a maximum of eight groups. On power-up the unit will briefly display the Main Menu screen and then revert to the first Gauge Display page if connected to a vGauge Remote Sensor unit.

If not properly connected to a vGauge Remote Sensor unit, the MENU screen will remain until the unit starts to receive valid data.

The Main Menu screen shows 4 buttons with text to describe the locations of the touch areas. These hidden touch areas are normally active when in Gauge Display mode.

The Main Menu screen can be activated at any time by touch in the center of the screen

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The Main Menu screen will only show for 2 seconds, after which the display will revert back to normal gauge display mode. During the 2 seconds the Main Menu is active, touch any of the 4 buttons to switch display modes.

Normal Operation

When the unit is powered up and receiving data, it will display the first group of display values. The vGauge G12C can display from 1 to 12 values per group and up to 8 groups. The total number of groups displayed is an option that can be changed in the vGauge Remote setup mode. For example if the number of groups is set to three – pressing the **NEXT touch area** will take you through the following possible displays.
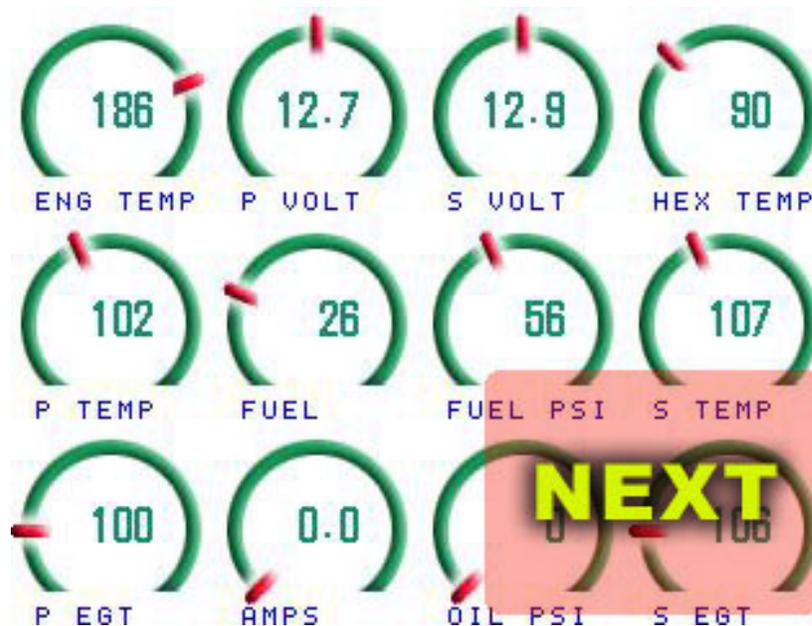
Figure 1 Display Group 1

The NEXT touch area is hidden in the lower right quadrant.
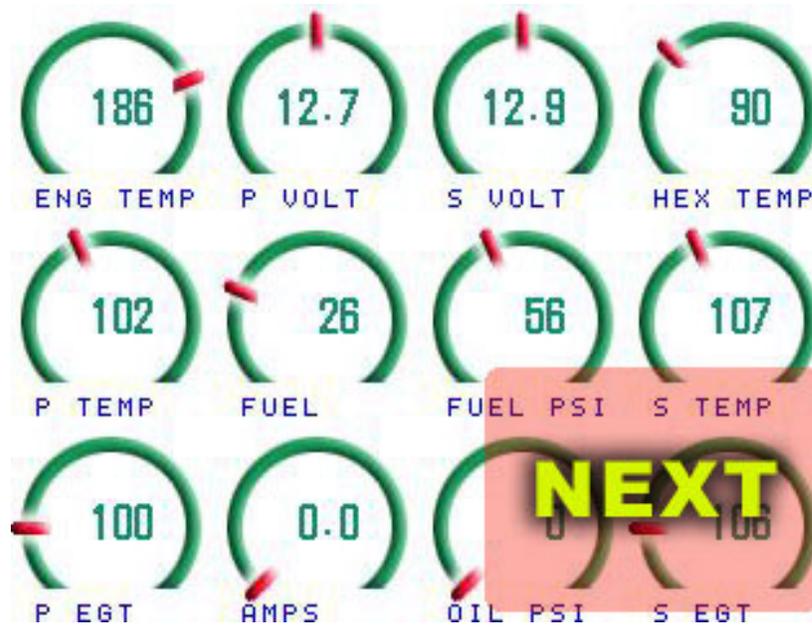
Figure 2 Display Group 2

Touch of the lower right area will again cycle to the next screen.

Figure 3 Display Group 3

Once you cycle through all display groups they will restart from the first display group.

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At anytime in Gauge Display Mode, all other touch areas are active to allow jumping to other display modes by touch of those areas.

Figure 4 Display Group 4.

Touch of the upper left quadrant (GAUGE MODE) will reset the display to the first page.

Graphic Modes

vGauge G12C supports ten graphics modes to display digital data. The modes can be selected dependent on the type of desired display format.

- **Digital Data Display (1)**
- **Histogram (2)**
- **Horizontal Bar Graph (4)**
- **Small Gauge Dial (6)**
- **Large Gauge Dial (8)**
- **Large Half Dial (9)**
- **Large Digital Data Display (10)**
- **Vertical Bar Graph (11)**
- **Small Digital Data Display (12)**
- **Huge Text Graph (13)**

Graphic display modes can be combined with digital data display in each display group. Graphic display modes are available for the analog inputs and NMEA $IIXDR inputs. Non - NMEA $IIXDR data can be displayed using Digital Data Display (D) only.

Graphic display modes are assigned on vGauge Remote Sensor page group configuration. As specific gauge values are being assigned to each of the eight possible groups there is an option to choose which graphic display mode to use for that sensor input.

Digital Data – An 8 character text label followed by a 6 character digital readout. The characters are 16 X 8 for a total of 12 readouts (6 rows by 2 columns) per display page. Digital data display modes can be mixed with other graphic display modes

Figure 5 Digital Data Element

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Bar Graph – 24 segment Bar graph used to show relative signal level with low values to the left and high values to the right. Each segment contains represents 1/10th of full scale value. As sensor signal increases, the graph will grow to the right in real time.

Figure 6 Bar Graph Element

Sensor text label and digital value are displayed on the left of the graph. One Bar Graph can be assigned to each row of the display for a total of 6 per display page.

NO OTHER GRAPHIC ELEMENTS CAN BE ASSIGNED TO THE SAME ROW WITH THE BAR GRAPH

Histogram Graph – A Bar Histogram graph shows the relative strength of sensor input over a user configured time interval. Recent time values are on the left and oldest time values on the right. As new values arrive - the graph scrolls to the right adding the newest value and dropping the oldest. Signal strength is depicted by color with lowest strength dark blue and highest bright yellow. Histograms show signal trends over time.

Figure 7 Histogram Graphic Element

Sensor text label and digital value are displayed on loft of the graph. One Histogram Graph uses 1 rows of the display. There can be eight Bar Histograms per group.

NO OTHER GRAPHIC ELEMENTS CAN BE ASSIGNED TO THE SAME ROWS WITH THE HISTOGRAM

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Digital Gauge Dial Graph – A 15 segment digital dial shows the relative signal strength using a analog style gauge display.

The needle at the 9:00 O'clock position represents low signal

The needle at the 12:00 O'clock represent Mid-strength

The needle at the 3:00 O'clock represents Max strength

The needle moves in real-time in a clockwise direction to represent the relative strength of the analog signal.

Sensor text label is displayed in small text under the dial and digital sensor readout is display in center of dial using larger text.

Each display page can have up to 12 digital dial elements arranged as 3 rows of 4 elements. Other graphic elements can be mixed with digital dial displays.

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Large Half Digital Dial – This graphic mode shows relative signal strength using a familiar dial display with a 14 element needle around the other edge. As sensor value increases, the needle moves in a clockwise direction This graph is an instantaneous display of signal strength.

Figure 8 Large Half Dial Display Mode

Sensor text label is display in small text below dial and digital readout of sensor is shown in the middle using large text.

Six Large Half Digital Dials can be used on a single display page arranged as three rows and two columns. A Large Half Digital Dial can be combined with other graphic elements as long as they do not overlap the dial position.

Large Full Digital Dial – This graphic mode shows relative signal strength using a familiar dial display with a 24 element needle around the other edge. As sensor value increases, the needle moves in a clockwise direction This graph is an instantaneous display of signal strength.

Figure 9 Large Full Dial Display Mode

Sensor text label is display in small text below dial and digital readout of sensor is shown in the middle using large text.

Four Large Digital Dials can be used on a single display page arranged as two rows and two columns. A Large Digital Dial can be combined with other graphic elements as long as they do not overlap the dial position.

Big Vertical Bar – This graphic mode shows relative signal strength using a vertical bar display with a 20 elements and a large digital readout. As sensor value increases, the bars fill in from bottom to top. When bar fill in, the signal is at maximum strength. Up to 6 Vertical Bar graphs can be shown on one screen. This graph is an instantaneous display of signal strength.

Figure 10 Big Vertical Bar Display Mode

Sensor text label is display in small text below dial and digital readout of sensor is shown on top using large text.

Huge Text Bar – This graphic mode shows large digital readout. Text shows instantaneous readout of sensor values in a large banner across the screen. Up to 3 Huge Text displays can be shown on one screen. This graph is an instantaneous display of signal strength.

Figure 11 Huge Text Display Mode

Sensor text label is displayed on Left side and a huge numerical readout of sensor value is on the right. No other items can be placed on the same row and the mode fills all 4 columns of the display

NO OTHER GRAPHIC ELEMENTS CAN BE ASSIGNED TO THE SAME ROW WITH THE HUGE TEXT BAR GRAPH

Small Digital Data – An 8 character text label followed by a 6 character digital readout. The characters are 8 X 6 for a total of 24 readouts (12 rows by 2 columns) per display page. Digital data display modes can be mixed with other graphic display modes

Figure 12 Small Digital Data Element

All Display pages are configurable to use any of the graphic display formats for each sensor input. It is possible to mix some graphic display formats on the same page. For example –
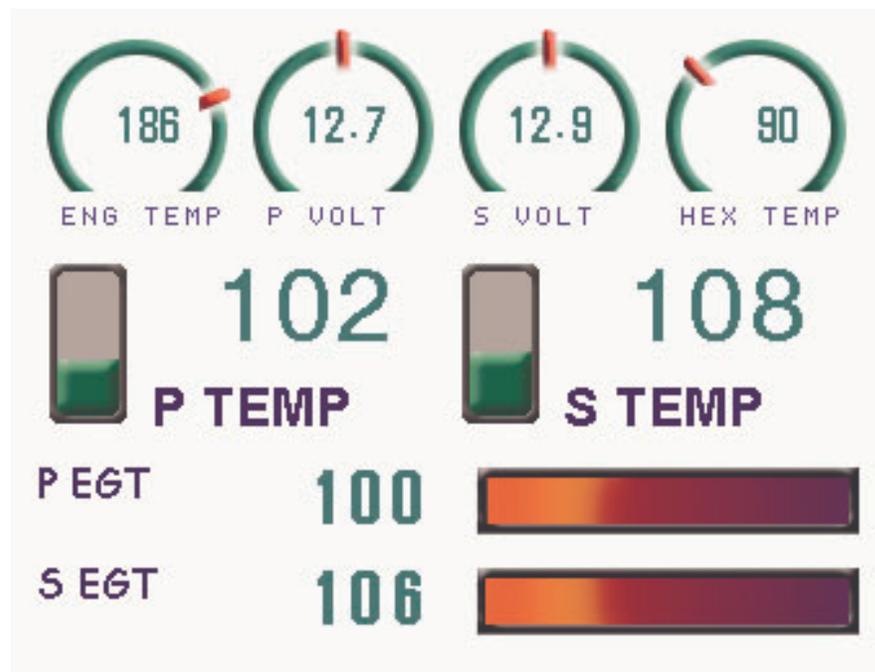
Figure 9 Mixed Display modes

These can be configured by using the display setup options in the vDash configuration program

Display Menu Configuration

The Display Menus allows selection of different Display Modes, This menu can be entered by touching the lower left quadrant while in any gauge display page or from the MAIN MENU screen

The Display Menu screen consists of 8 touch buttons.

VGAUGE 0 – Switch the active data input to Port 0 (serial), This is the default and should not be changed if no other vGauge Remote Sensor unit is attached to the secondary port.

VGAUGE 1 – Switches the active data input to Port 1 (USB). This should only be done if a vGauge Remote Sensor unit is attached to the second port. This option is not saved and will be disabled when the display is re-powered.

Selecting Port 1 when no vGauge Remote Sensor unit is attached will disable the entire display until the next reset or re-power

VSWITCH – Changes the display to vSwitch mode and shows all enabled switch buttons. This is the same as selecting the Switch mode (upper right quadrant) from any Gauge Display page.

SETUP – Enter a separate display setup screen to adjust backlight and other options.

LOG OFF(ON) – Enables or Disables data logging to installed memory stick on attached vGauge Remote Sensor unit. This is toggle function and will turn RED when actively logging data.

TIME – Shows a separate screen that displays current time from attached vGauge Remote Sensor unit.
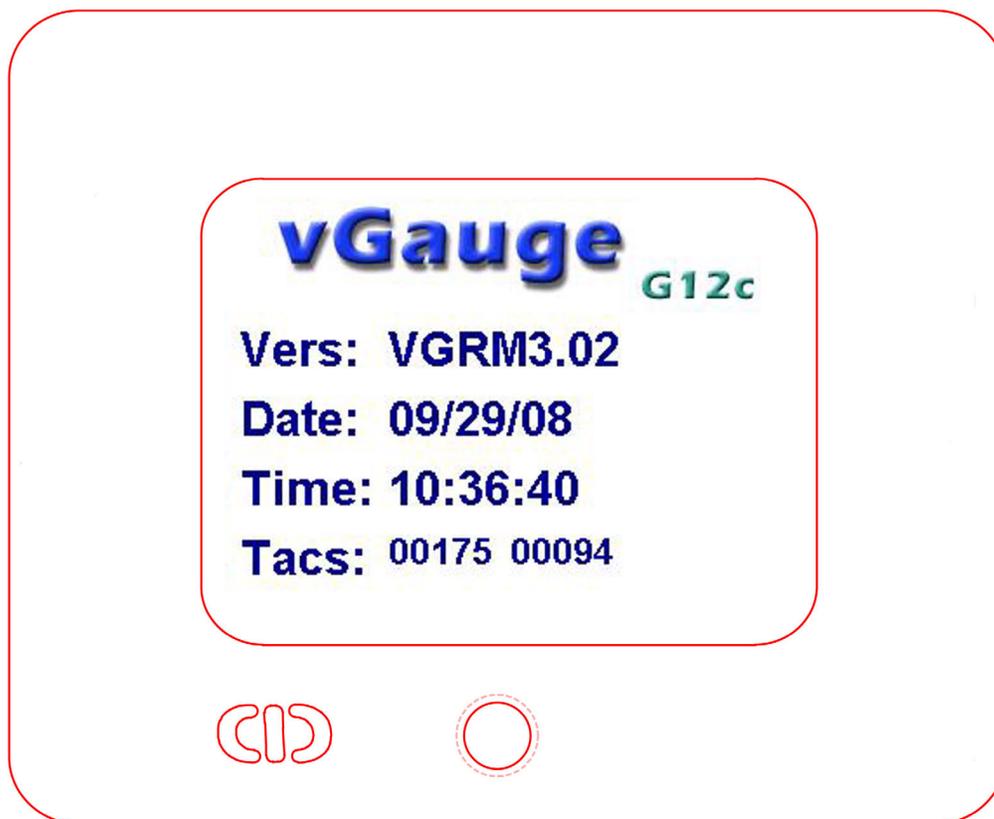
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Touch the top part of the screen to exit Time Display and revert back to normal gauge display mode

ALARM ON(OFF) – Enables or Disables and active audio alarms. This is a toggle function and will turn RED when alarms are deactivate. This setting is not saved and will revert back to ENABLED on next power up or reset. This setting only affects audio alarms from G12C displays and not vGauge Remote Sensor units.

EXIT – clears screen and reverts back to Gauge Display mode

Setup Menu Configuration

The Setup on-screen Menus allows configuration of basic display options, This mode can be entered by touching the SETUP button while in Display Menu Mode.
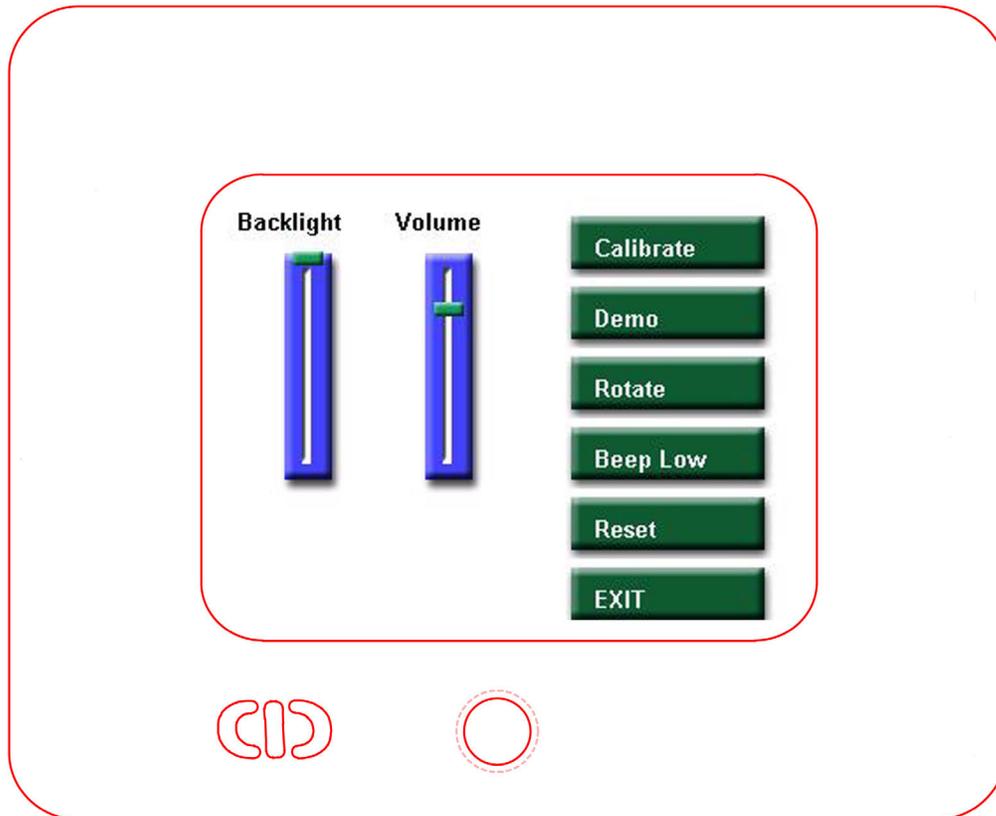
BACKLIGHT ADJUST – Touch Slider to allow adjustment of backlight brightness. Touch and drag down to dim or drag up to brighten.

VOLUME – Touch Slider to adjust audio volume. Touch and drag down to lower volume and drag up to increase volume.

CALIBRATE – Button to enter Touch Screen Calibration procedure. Used to recalibrate screen area for touch operations. Only required after firmware update or screen rotation.

DEMO – Enters self demo mode to simulate unit operation without an attached vGauge Remote Sensor unit. Uses stored data to create simulated screens. Exit Demo mode by touch in screen center. Also exit Demo Mode by reset or re-power

ROTATE – Flips screen by 180 degrees. Setting is stored and takes effect on all resets or re-power.

BEEP LOW(HIGH) - Sets audio frequency to low or high. Toggle Button.

RESET – Touch button to reset unit

EXIT – Touch to exit screen and revert back to Gauge Display mode

vSwitch Menu

The vSwitch screen allows remote control of switches using the optional vSwitch module on any vGauge Remote Sensor unit, This mode can be entered by touching the upper right quadrant on any Gauge Display page or from the vSwitch button while in Display Menu Mode.
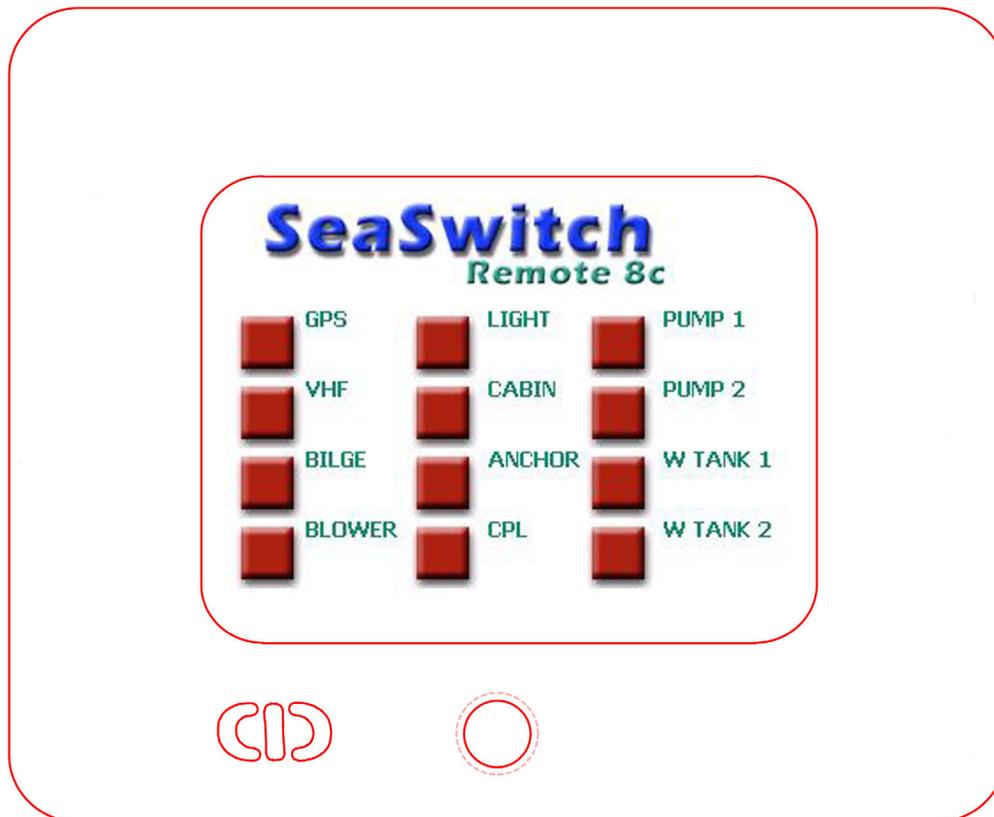
The color of the switch buttons indicate the current state as received from an attached vGauge Remote sensor unit.

RED is **OFF**   **GREEN** is **ON**

When a switch button is touched, it will not change state until the G12C receives a response back from the vGauge Remote to indicate it processed the command to activate/deactivate the desired switch. Depending on distance and other activities, there may be a slight delay in receiving confirmation of the switch event. This exchange ensures reliable operation and status from the remote switch unit.
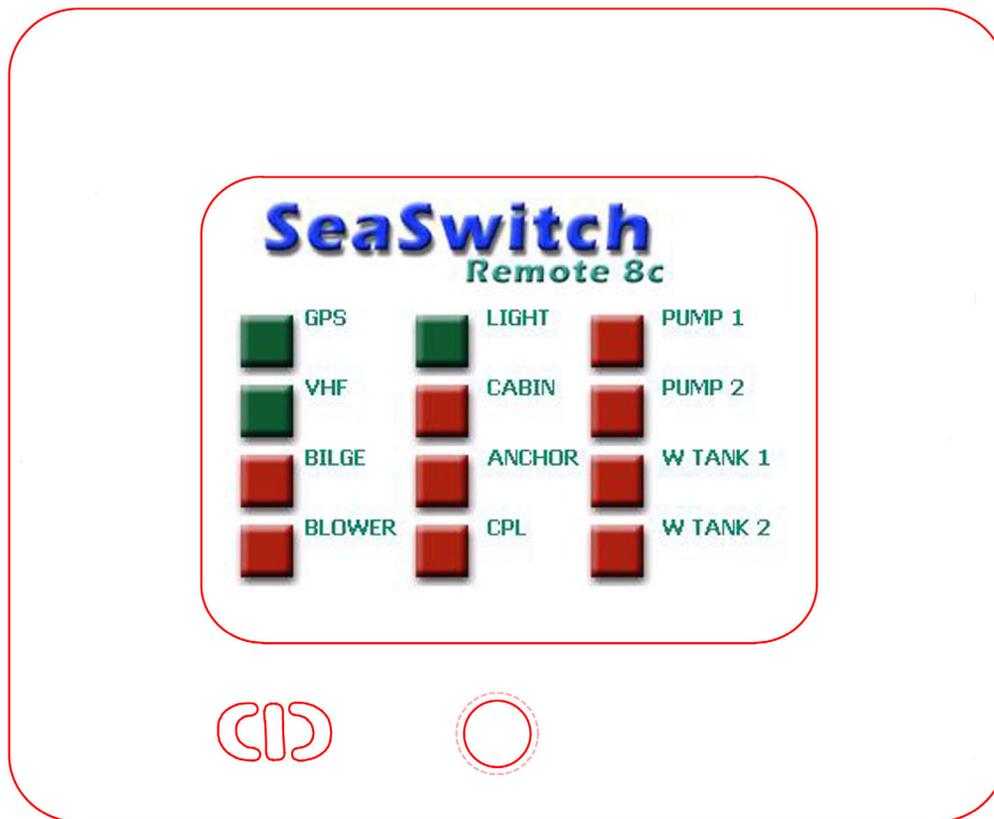
The Switch display names are programmed into the vGauge Remote Sensor unit during initial configuration. Switch names can not be directly altered by the G12C display head. Switch names can be easily modified using the vDash configuration utility.

Exit vSwtch mode by touch of the upper screen area (vSwitch Logo area)

main display. vGauge G12 can have up to 8 groups or pages. Any Display Label and associated sensor can be assigned to any of the 8 groups. Most groups hold from 1 to 12 gauge readings depending on the chosen graphics display format.

vGauge Remote Options File

vGauge G12C displays receive all data from properly configured vGauge Remote Sensor units. All Gauge Display information is generated in the Remote Sensor unit and transmitted over serial or USB interfaces to the display. There is no user programming required for any G12C display head.

Most vGauge G12C configurations are contained in a separate configuration files created by the **vDash** Program and transferred to vGauge Remote flash memory from a PC using a USB or Serial cable.

Use the vDash configuration program to edit any vGauge12C settings.

The options file is used to configure each unit

- **Disable Alarms**
- **Set alarm parameters**
- **Set number of display pages**
- **Set data input ports and rates**
- **Set NMEA input modes**

While it is not necessary to create or edit the options file directly, it can be useful to understand its format. Not all values in the options file are used for the vGauge G12C since the options file may be shared with vGauge Remote and other vGauge products.

Value	Description	Index
db %05	Number of display pages	0
db %00	NOT USED	1
db %04	NOT USED	2
db %00	Number of analog inputs (select models only)	3
db %00	Number of NMEA inputs	4
db %00	NOT USED	5
db %08	DISPLAY TYPE	6

db %26	Screen Contrast	7
db %1E	P0 Scale factor (select models only)	8
db %4B	P0 Time constant(select models only)	9
db %00	Pulse0 Enable(select models only)	10
db %01	P0 Edge(select models only)	11
db %1E	P1 Scale factor (not used)	12
db %4B	P1 Time (not used)	13
db %00	Pulse1 Enable (not used)	14
db %01	P1 Edge (not used)	15
db %03	Data input ports 0=Serial 1=USB 2=Both	16
db %00	Data Out (not used)	17
db %00	NOT USED	18
db %1E	Serial Baud Rate 120 = 9600 30=38600 20=57400	19
db %00	NOT USED	20
db %00	NOT USED	21
db %01	Display Labels 0=Master mode (Uses local labels) 1=Slave mode (uses remote labels)	22
db %00	NOT USED	23
db %01	Alarm Enable 0=disable 1=enable	24
db %00	NOT USED	25
db %00	Invert Display 1=invert	26
db %E3	Backlight POWER ON (greater then %80)	27
db %04	Scroll Button NOT USED	28
db %02	Set Button NOT USED	29
db %10	Pulse0 Dial Scale factor (select models only)	30
db %10	Pulse1 Dial Scale factor NOT USED	31
db %86	Input Channel 0 (< then %80 is NMEA, >%80 Analog)	32
db %85	Input Channel 1 (< then %80 is NMEA, >%80 Analog)	33
db %84	Input Channel 2 (< then %80 is NMEA, >%80 Analog)	34
db %83	Input Channel 3 (< then %80 is NMEA, >%80 Analog)	35
db %82	Input Channel 4 (< then %80 is NMEA, >%80 Analog)	36

db %81	Input Channel 5 (< then %80 is NMEA, >%80 Analog)	37
db %80	Input Channel 6 (< then %80 is NMEA, >%80 Analog)	38
db %87	Input Channel 7 (< then %80 is NMEA, >%80 Analog)	39
db %88	Input Channel 8 (< then %80 is NMEA, >%80 Analog)	40
db %89	Input Channel 9 (< then %80 is NMEA, >%80 Analog)	41
db %CC	Input Channel 10 (< then %80 is NMEA, >%80 Analog)	42
db %8B	Input Channel 11 (< then %80 is NMEA, >%80 Analog)	43
db %8C	Input Channel 12 (< then %80 is NMEA, >%80 Analog)	44
db %8D	Input Channel 13 (< then %80 is NMEA, >%80 Analog)	45
db %8E	Input Channel 14 (< then %80 is NMEA, >%80 Analog)	46
db %8F	Input Channel 15 (< then %80 is NMEA, >%80 Analog)	47
db %00	Output Channel 0 Map	48
db %01	Output Channel 1 Map	49
db %02	Output Channel 2 Map	50
db %03	Output Channel 3 Map	51
db %04	Output Channel 4 Map	52
db %05	Output Channel 5 Map	53
db %06	Output Channel 6 Map	54
db %07	Output Channel 7 Map	55
db %08	Output Channel 8 Map	56
db %09	Output Channel 9 Map	57
db %0A	Output Channel 10 Map	58
db %0B	Output Channel 11 Map	59
db %0C	Output Channel 12 Map	60
db %0D	Output Channel 13 Map	61
db %0E	Output Channel 14 Map	62
db %0F	Output Channel 15 Map	63
db %25	**ALARM 0 LOW VALUE**	64
db %FF	**ALARM 0 HIGH VALUE**	65
db %00	**ALARM 1 LOW VALUE**	66

db %FF	ALARM 1 HIGH VALUE	67
db %00	ALARM 2 LOW VALUE	68
db %FF	ALARM 2 HIGH VALUE	69
db %00	ALARM 3 LOW VALUE	70
db %FF	ALARM 3 HIGH VALUE	71
db %00	ALARM 4 LOW VALUE	72
db %FF	ALARM 4 HIGH VALUE	73
db %00	ALARM 5 LOW VALUE	74
db %FF	ALARM 5 HIGH VALUE	75
db %00	ALARM 6 LOW VALUE	76
db %FF	ALARM 6 HIGH VALUE	77
db %00	ALARM 7 LOW VALUE	78
db %FF	ALARM 7 HIGH VALUE	79
db %00	ALARM 8 LOW VALUE	80
db %FF	ALARM 8 HIGH VALUE	81
db %00	ALARM 9 LOW VALUE	82
db %FF	ALARM 9 HIGH VALUE	83
db %00	ALARM 10 LOW VALUE	84
db %FF	ALARM 10 HIGH VALUE	85
db %00	ALARM 11 LOW VALUE	86
db %FF	ALARM 11 HIGH VALUE	87
db %00	ALARM 12 LOW VALUE	88
db %00	ALARM 12 HIGH VALUE	89
db %00	ALARM 13 LOW VALUE	90
db %FF	ALARM 13 HIGH VALUE	91
db %00	ALARM 14 LOW VALUE	92
db %FF	ALARM 14 HIGH VALUE	93
db %00	ALARM 15 LOW VALUE	94
db %FF	ALARM 15 HIGH VALUE	95
db %00	NOT USED	96
db %00	NOT USED	97
db %00	NOT USED	98
db %00	NOT USED	99
db %00	NOT USED	100
db %00	NOT USED	101
db %00	NOT USED	102
db %00	NOT USED	103
db %00	NOT USED	104
db %00	NOT USED	105
db %00	NOT USED	106

db %00	NOT USED	107
db %00	NOT USED	108
db %00	NOT USED	109
db %00	NOT USED	110
db %00	NOT USED	111
db %00	NOT USED	112
db %00	NOT USED	113
db %00	NOT USED	114
db %00	NOT USED	115
db %00	NOT USED	116
db %00	NOT USED	117
db %00	NOT USED	118
db %00	NOT USED	119
db %00	NOT USED	120
db %00	NOT USED	121
db %00	NOT USED	122
db %00	NOT USED	123
db %00	NOT USED	124
db %00	NOT USED	125
db %00	NOT USED	126
db %00	NOT USED	127
db %01	INVERT FLAG Channel 0	128
db %00	INVERT FLAG Channel 0	129
db %01	INVERT FLAG Channel 1	130
db %00	INVERT FLAG Channel 1	131
db %00	INVERT FLAG Channel 2	132
db %01	INVERT FLAG Channel 2	133
db %00	INVERT FLAG Channel 3	134
db %01	INVERT FLAG Channel 3	135
db %00	INVERT FLAG Channel 4	136
db %01	INVERT FLAG Channel 4	137
db %00	INVERT FLAG Channel 5	138
db %01	INVERT FLAG Channel 5	139
db %00	INVERT FLAG Channel 6	140
db %01	INVERT FLAG Channel 6	141
db %00	INVERT FLAG Channel 7	142
db %01	INVERT FLAG Channel 7	143
db %01	INVERT FLAG Channel 8	144
db %00	INVERT FLAG Channel 8	145
db %01	INVERT FLAG Channel 9	146

db %00	INVERT FLAG Channel 9	147
db %00	INVERT FLAG Channel 10	148
db %01	INVERT FLAG Channel 10	149
db %01	INVERT FLAG Channel 11	150
db %00	INVERT FLAG Channel 11	151
db %00	INVERT FLAG Channel 12	152
db %00	INVERT FLAG Channel 12	153
db %00	INVERT FLAG Channel 13	154
db %00	INVERT FLAG Channel 13	155
db %00	INVERT FLAG Channel 14	156
db %00	INVERT FLAG Channel 14	157
db %00	INVERT FLAG Channel 15	158
db %00	INVERT FLAG Channel 15	159
db %00	NOT USED	160
db %00	NOT USED	161
db %00	NOT USED	162
db %00	NOT USED	163
db %00	NOT USED	164
db %00	NOT USED	165
db %00	NOT USED	166
db %00	NOT USED	167
db %00	NOT USED	168
db %00	NOT USED	169
db %00	NOT USED	170
db %00	NOT USED	171
db %00	NOT USED	172
db %00	NOT USED	173
db %00	NOT USED	174
db %00	NOT USED	175
db %00	NOT USED	176
db %00	NOT USED	177
db %00	NOT USED	178
db %00	NOT USED	179
db %00	NOT USED	180
db %00	NOT USED	181
db %00	NOT USED	182
db %00	NOT USED	183
db %00	NOT USED	184
db %00	NOT USED	185
db %00	NOT USED	186

db %00	NOT USED	187
db %00	NOT USED	188
db %00	NOT USED	189
db %00	NOT USED	190
db %00	NOT USED	191
db %00	USB AUTODET(Not Used)	192
db %00	USB 1 ENABLE (Not Used)	193
db %00	USB 2 ENABLE (Not Used)	194
db %00	USB STATUS (Not Used)	195
db %00	SIO0 ENABLE (Not Used)	196
db %00	SIO1 ENABLE (Not Used)	197
db %03	USB BAUDRATE 1=9600 2=1800 3=38400 4=57600	198
db %00	(Not Used)	199
db %1F	OPTIONS RPM2 SCALE(Not Used)	200
db %4B	OPTIONS RPM2 TIME(Not Used)	201
db %04	OPTIONS RPM2 ENABLE(Not Used)	202
db %01	OPTIONS RPM2 EDGE(Not Used)	203
db %01	OPTIONS P2 DIAL SCAL (Not Used)	204
db %00	OPTIONS RPM3 TIME 205	205
db %00	OPTIONS RPM3 ENABLE 206	206
db %00	OPTIONS RPM3 EDGE 207	207
db %01	OPTIONS TIMER0ENABLE 208	208
db %01	OPTIONS TIMER1ENABLE 209	209
db %01	OPTIONS TIMER2ENABLE (must be %01)	210
db %01	OPTIONS TIMER3ENABLE 211	211
db %00	OPTIONS TIMER0 HB 212	212
db %01	OPTIONS TIMER0 LB 213	213
db %00	OPTIONS TIMER1 HB 214	214
db %01	OPTIONS TIMER1 LB 215	215
db %FF	OPTIONS TIMER2 HB	216
db %FF	OPTIONS TIMER2 LB	217
db %FF	OPTIONS TIMER3 HB 218	218
db %FF	OPTIONS TIMER3 LB 219	219
db %02	OPTIONS BASE TIMMER (must be %02)	220
db %00	(Not Used)	221
db %FF	OPTIONS LCD TEMP ADJ 222	222

db %00	(Not Used)	223
db %00	(Not Used)	224
db %00	(Not Used)	225
db %00	(Not Used)	226
db %00	(Not Used)	227
db %00	(Not Used)	228
db %00	(Not Used)	229
db %00	(Not Used)	230
db %00	(Not Used)	231
db %00	(Not Used)	232
db %00	(Not Used)	233
db %00	(Not Used)	234
db %00	(Not Used)	235
db %00	(Not Used)	236
db %00	(Not Used)	237
db %00	(Not Used)	238
db %00	(Not Used)	239
db %00	(Not Used)	240
db %00	(Not Used)	241
db %00	(Not Used)	242
db %00	(Not Used)	243
db %00	(Not Used)	244
db %00	(Not Used)	245
db %00	(Not Used)	246
db %00	(Not Used)	247
db %00	(Not Used)	248
db %00	(Not Used)	249
db %00	(Not Used)	250
db %00	(Not Used)	251
db %00	(Not Used)	252
db %00	(Not Used)	253
db %00	(Not Used)	254
db %00	(Not Used)	255
db %00	**LCD TEMPERATURE ADJUST Table (Select Models)**	**256**

The **vDash** configuration program is used to set or change any options and will construct the correct OPTIONS File for G12C displays. The most important setting is to select for the correct G12C display.
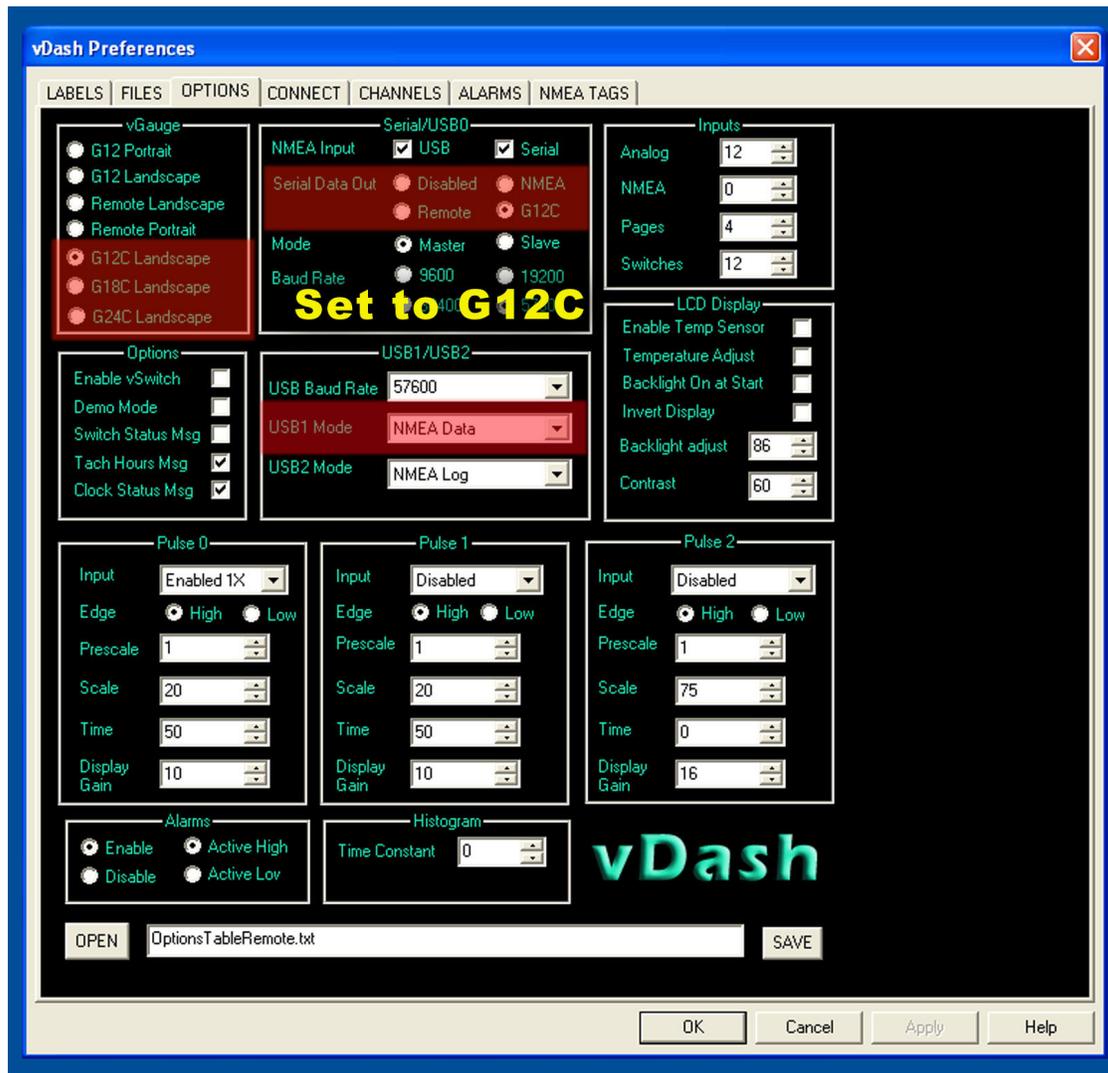
VGAUGE SECTION

Be sure the unit type is set to G12C Landscape (320 X 240) or G18 Landscape (480 X 272) or G24C Landscape (640 X 480).

SERIAL/USB0 SECTION

The Serial Data Out of the vGauge Remote must be set to G12C when communicating over serial link (default port 0) to any vGauge G12C display.

When Serial Data Out of vGauge Remote is set to G12C, data can not be viewed by vDash on that port. If you wish to view data in **vDash** while connected to a G12C display, you must use an alternate port (USB1) which has been set to NMEA

The Mode must be set to Master to allow vGauge G12C to display sensor labels and calibrated readings from a vGauge Remote sensor unit.

Set the Baud rate to 57600 (default)

USB1/USB2 SECTION

The USB1 out of the vGauge Remote must be set to G12C when communicating over USB link to any vGauge G12C display (secondary PORT 1).

USB cable length is a maximum of 16 feet.

When USB1 of vGauge Remote is set to G12C, data can not be viewed by vDash on that port. If you wish to view data in **vDash** while connected to a G12C display on USB1, you must use an alternate port (SERIAL0) which has been set to NMEA

Set the Baud rate to match the source of the NMEA data (default is 57600)

vGauge Remote Page Format file

The Page Format file is created by the **vDash** application and downloaded into non-volatile memory (FLASH) on vGauge Remote units and does not need to be directly edited.

The file allows display graphic elements to be assigned to each possible channel for each of 8 display page groups

 The ten display mode symbols are:

- |0| - not assigned to the group
- |1| - Digital Data Display Mode
- |2| - Histogram Graph
- |4| - Bar Graph
- |6| - Digital Gauge
- |8| - Large Half Dial Gauge
- |9| - Large Full Dial Gauge
- |10| - Large Digital Text
- |11| - Vertical Bar Graph
- |12| -Small Digital Text
- |13| - Huge Digital Text

For example the following entry would assign 6 small dials and 2 large dials to the first display page group

db %06	DISPLAY CHANNEL 00-PAGE 00
db %06	DISPLAY CHANNEL 01-PAGE 00
db %00	DISPLAY CHANNEL 02-PAGE 00
db %06	DISPLAY CHANNEL 03-PAGE 00
db %06	DISPLAY CHANNEL 04-PAGE 00
db %00	DISPLAY CHANNEL 05-PAGE 00
db %06	DISPLAY CHANNEL 06-PAGE 00
db %06	DISPLAY CHANNEL 07-PAGE 00
db %00	DISPLAY CHANNEL 08-PAGE 00
db %00	DISPLAY CHANNEL 09-PAGE 00
db %00	DISPLAY CHANNEL 10-PAGE 00

db %00	DISPLAY CHANNEL 11-PAGE 00
db %00	DISPLAY CHANNEL 12-PAGE 00
db %00	DISPLAY CHANNEL 13-PAGE 00
db %09	DISPLAY CHANNEL 14-PAGE 00
db %09	DISPLAY CHANNEL 15-PAGE 00

The location of each graphic element on a page is determined by a index to a screen position. The entire 320X240 graphic space is divided to 24 regions where elements can be assigned

The Position Index determines the display location of the selected sensor value on the 40X30 character display matrix as outlined below.

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15
16	17	18	19
20	21	22	23

The following table sets the positions for each element on the first page

db %00	POSITION 00 - PPOS0
db %03	POSITION 01 - PPOS0
db %00	POSITION 02 - PPOS0
db %08	POSITION 03 - PPOS0
db %0B	POSITION 04 - PPOS0
db %00	POSITION 05 - PPOS0
db %10	POSITION 06 - PPOS0
db %13	POSITION 07 - PPOS0
db %00	POSITION 08 - PPOS0
db %00	POSITION 09 - PPOS0
db %00	POSITION 10 - PPOS0
db %00	POSITION 11 - PPOS0
db %00	POSITION 12 - PPOS0
db %00	POSITION 13 - PPOS0
db %0D	POSITION 14 - PPOS0
db %01	POSITION 15 - PPOS0

These settings would create the following screen format for the first page

The Page Format file contains 15 pairs for Format and position assignments but only the first 8 are used.

The final entry in the Page Format file is the NMEA tag assignment table

db %00	POSITION 00 - NMEA
db %00	POSITION 01 - NMEA
db %00	POSITION 02 - NMEA
db %00	POSITION 03 - NMEA
db %00	POSITION 04 - NMEA
db %00	POSITION 05 - NMEA
db %00	POSITION 06 - NMEA
db %00	POSITION 07 - NMEA
db %00	POSITION 08 - NMEA
db %00	POSITION 09 - NMEA
db %00	POSITION 10 - NMEA
db %00	POSITION 11 - NMEA
db %E1	POSITION 12 - NMEA
db %D1	POSITION 13 - NMEA
db %00	POSITION 14 - NMEA
db %00	POSITION 15 – NMEA

This table assigns selected NMEA 0183 tags to selected channels for display at the specified location. A non-zero entry in a specific channel location will decode that NMEA string and place it according to chosen graphic and location.

The following table shows the currently available tags that can be captured and displayed. Once a selected tag is detected for the designated display label, the data is decoded and displayed if that label is assigned to a Display Group. NMEA data can only be displayed in Digital Data format..

INDEX	NMEA TAG	Function
0x00	$IIXDR,G	Instrumentation Data
0x10	$GPGGA	UTC TIME, Position, Sat info
0x20	$GPVTG	Track and ground speed
0x30	$SDDBT	depth below transducer
0x40	$SDMTW	water temperature
0x50	$GPRMC	Position, ground speed, true heading
0x60	$GPRMB	Destination WP position, Bearing to WP, Closing speed to WP, Distance to WP
0x70	$VWVHW	Speed and heading
0x80	$VWVLW	Water traveled distance
0xA0	$SDDPT	depth below transducer
0xB0	$GPGLL	Basic position
0xC0	$SDVHW	Sonar Water Speed and heading
0xD0	$PCDIS,T	Custom tag for DATE TIME
0xE0	$PCDIS,H	Custom tag for Engine Hour Meter Display
0xF0	$GPRMC	Used for adjusted UTC time to local time

All NMEA tags use a comma "," to separate data fields in the NMEA sentence. The lower half (nibble) if the index determines which position to extract.

A value of 0x25

The example pulls the 5th data position to obtain the GPS Speed in knots.

is important to always pair the selected NMEA tags with the correct Display Labels. This flexibility allows freedom to choose any text label for selected NMEA data.

If the same NMEA Tag is used in more then one display location, both locations will receive random updates.

For example, here are two NMEA display positions (NMEA0 and NMEA1) with two different Display Labels (SPEED1 and SPEED2) looking for the same NMEA TAG ($GPVTG).

In this case both NMEA positions will receive random updates since it is impossible to determine which location to assign the incoming data to. It is important to avoid using the same NMEA TAG in multiple display location with the exception of $IIXDR, G tags.

The unit handles $IIXDR,G tags differently to allow multiple display positions. For example, here are two NMEA display positions (NMEA0 and NMEA1) with two different Display Labels (TEMP1 and TEMP2) looking for the same NMEA TAG ($IIXDR).

In the case of $IIXDR,G tags, display positions are determined by looking at the last character of the Data Label field of the incoming NMEA sentence.

$IIXDR,X,DATA,U,LABEL,CHECKSUM

- X = sensor type (G,P,C,..)
- DATA = 8 character sensor data value returned from the lookup table
- U = unit of measurement specifier
- LABEL = 8 character sensor label and a 1 character number representing the channel
- CHECKSUM = NEMA check sum calculation on the string

EXAMPLE - $IIXDR,G, 175.6,D,TEMP1 1,*45

All vGauge units append a sequential number to the end of the LABEL field that corresponds to the display position assigned on that unit. This allows other units to decode that number and place the received data in the correct location on the slave unit. Multiple vGauge units can cascade data while sharing the same $IIXDR.G tag.

Display Engine Hour Meter

A special NMEA tag ($PCDIS,H) is reserved for allowing display of the internal Engine Hour Meter in one of the NMEA data positions. Selecting this tag for any of the NMEA positions will display a 40 character readout of the current hour tachometers with the display label assigned to the selected NMEA position. This display is Text readout only.

Display Date/Time

A special NMEA tag ($PCDIS,T) is reserved for allowing display of the internal Date and Time in one of the NMEA data positions. Selecting this tag for any of the NMEA positions will display a 16 character readout of the current Date and time with the display label assigned to the selected NMEA position. This display is Text readout only.

vGauge Remote Alarms

vGauge G12C display units are capable of indicating alarms for each of the 16 inputs to a vGauge Remote Sensor unit. The NMEA $IIXDR sentences contain a sensor value index (0-255) that can be used to lookup user defined alarm thresholds for both Low and High conditions. The alarms are set using the **vDash** configuration application and stored in non-volatile memory (FLASH) on the vGauge Remote sensor unit.

If an individual Alarm condition is active and the Mode is set to **FLASH** – vGauge Remote will instruct the G12 Display to flash the select sensor value. If an alarm indication is set to **BEEP**, vGauge Remote will send a command to the G12C display to sound a audio alarm tone.

The following screen shows an example of setting 3 high temperature alarms.

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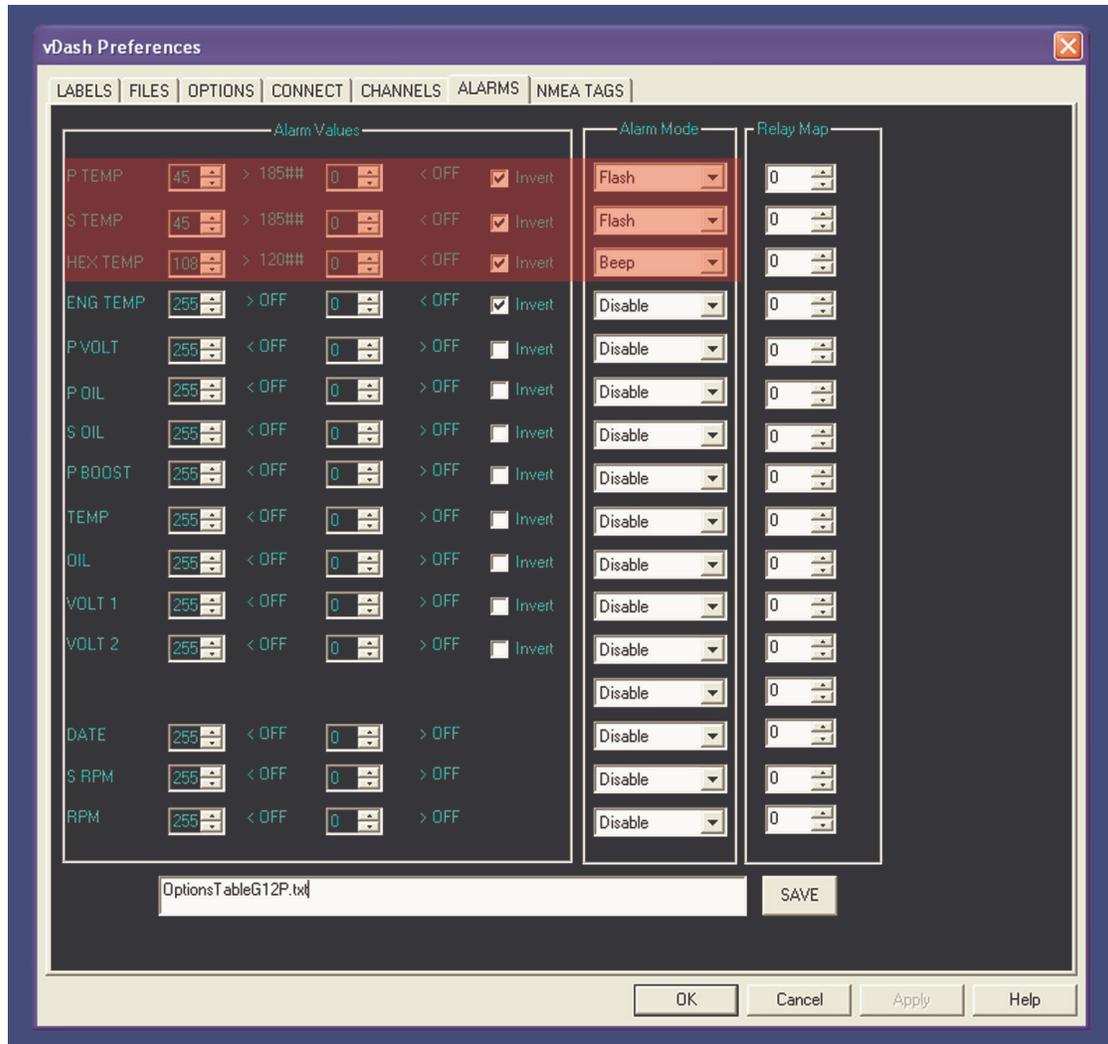
vGauge G12 parses incoming NMEA $IIXDR sentences and extracts the raw sensor index value

This value is then compared according to the user specified conditions from the Alarm Options and the indicated action performed. The Alarm Mode determines what action is taken for each individual sensor input.

Alarm Mode = Disabled results in no alarm indication

Alarm Mode = Flash will flash the indicated sensor value on the display if currently shown.

Alarm Mode = Beep will sound an internal buzzer if the sensor is in alarm. It will also flash the display value if shown. If no sensor is in alarm state, the G12C will disable the audio tone.

All other Alarm Modes do not apply to vGauge G12 Display heads.

Important Note – When using **vDash** to set alarms for vGauge G12C display units – it is important to be sure the correct corresponding calibration tables are chosen for each sensor to achieve the desired conditions.

Connectors

The vGauge G12C display unit has single water-resist quick-connect connector on the rear panel for serial data and unit power. Each connector is keyed to ensure proper alignment when attaching the supplied cables. Never force a cable in. Rotate the cable until the keys align and it should smoothly insert.

The 8-pin Power/Data cable (P1) it typically used for direct attachment to a 6-pin vGauge Remote sensor connector . The interface contains both Power (+5V) and digital data.

A second 6-pin connector may also be installed on some G12C units for optional USB interface to a secondary input port. This feature in mainly used for field update of unit firmware but may also be used for direct connection to the USB1 port on some vGauge Remote sensor units. For normal operations, this connector should be left unconnected and the dust cap secured in place
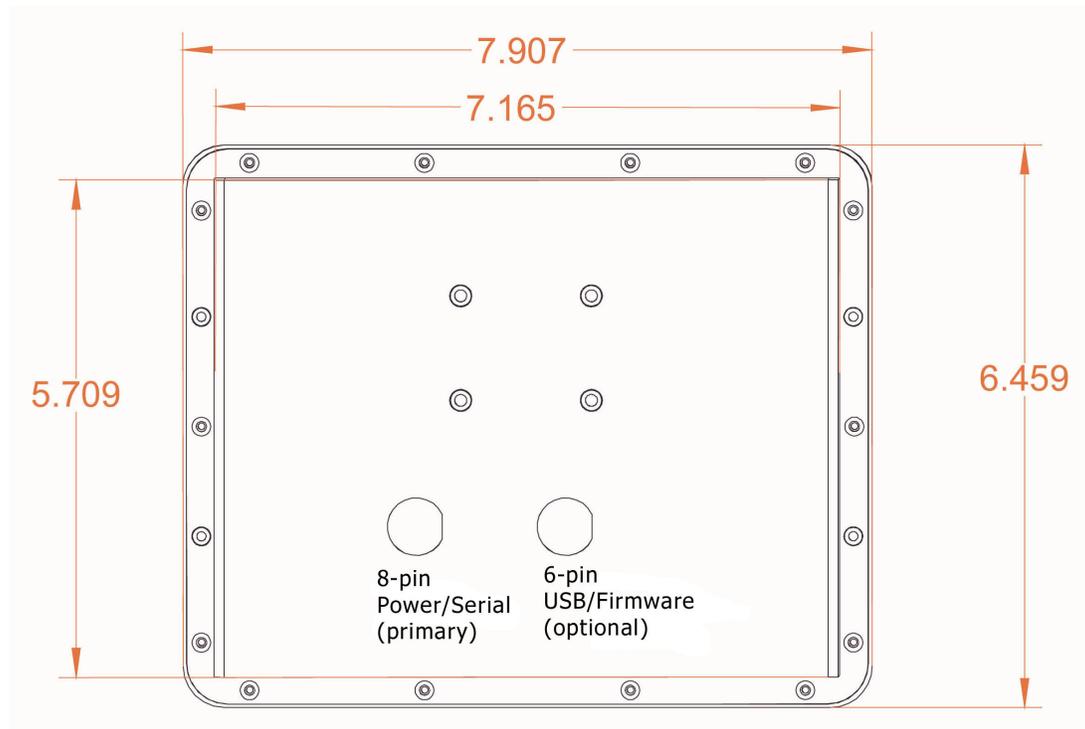
Rear View vGauge-G12C Case

System Power

System power is supplied via the 8-pin power/Serial connector. G12C/G18C units can be powered directly from +5V bus if less then 25 feet.

8-#20*

POWER (P2)				
Pin	**Color**	**Function**	**Direction**	**Volt**
1	Green (not used)	USBP	IN	0-5
2	Green/White	Serial (RX)	IN	-5 - +5
3	Blue (not used)	Flash	OUT	0-5
4	Brown & Brown/White	Power	IN	5V/12V*
5	Blue/White (not used)	Flash	IN	0-5
6	Orange/White	Serial (TX)	OUT	-5 - +5
7	White (not used)	USBM	IN	0-5
8	Green & Orange	Ground	IN	0

- **vGauge G12C units attached with a cable length longer then 25 feet must use a Power adapter for proper operation.**

G12C/G18C Power

vGauge G12C and 18C display units are designed to work directly off power supplied from vGauge Remote sensor units and will be supplied with a custom 8-Pin cable adapter which provides both power and a digital data. The cable can be plugged directly into the 6-pin vGauge Remote Serial port.

Less then 25 feet

```
┌──────────────┐                        ┌──────────────┐
│   vGauge     │  6-pin        8-pin     │   vGauge     │
│   Remote     │  serial       serial    │  G12C/18C    │
│              │                        │              │
└──────────────┘                        └──────────────┘
```
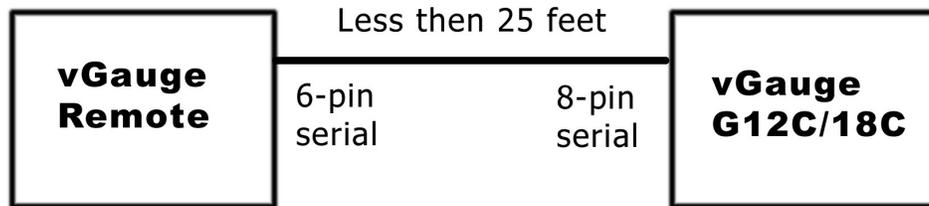
For distances longer then the specified 25 foot maximum, a separate power adapter will be required for G12C units. The adapter requires a switched 12 volt source located near the G12C display

```
                6pin  8pin              8pin 8pin
┌──────────┐            ┌──────────┐            ┌──────────┐
│  vGauge  │            │   G12C   │            │   G12C   │
│  Remote  │            │  Power   │            │ Display  │
│          │   2 pin    │  Adapter │            │          │
└──────────┘            └──────────┘            └──────────┘

              12 volt
              Power
              Source
```

```
8-pin from          ┌───────────────────┐
vGaugeRemote        │                   │
                    │                   │
                    │       G12C        │
                    │      Power        │
                    │     Adapter       │      8-pin to
                    │                   │      G12C Display
2-pin power         │                   │
red = +12V          │                   │
black = Ground      │                   │
2 Amp fuse          └───────────────────┘
```
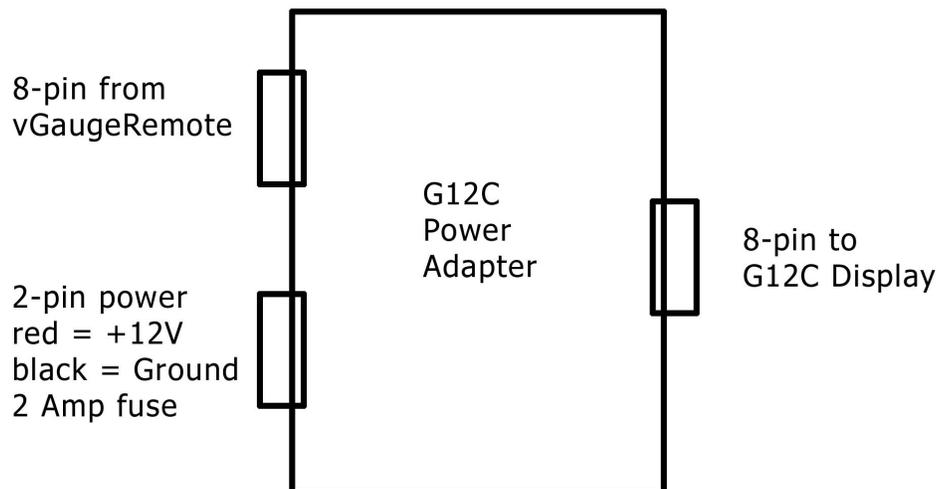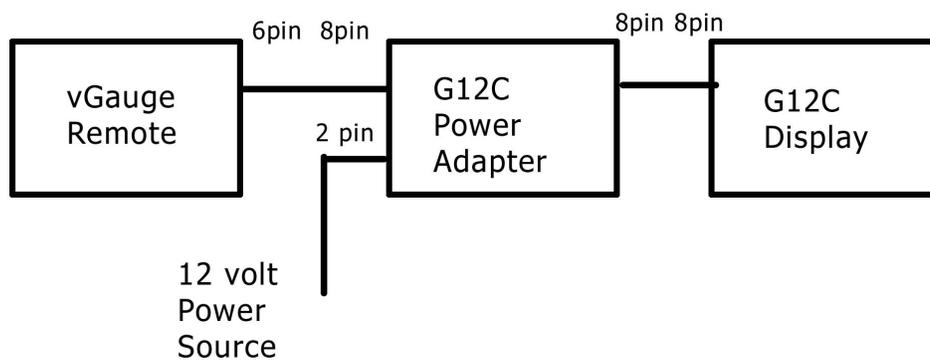
G12N/G24N Power

vGauge G12N and G24C units with NMEA4 enclosures require a separate switched 12 volt source to power the display. A separate 6-pin to 3-wire cable is used for the serial connection between the vGauge Remote and the panel serial input. This cable can be up to 150 feet

G12N and G24C (rear view)

Serial In	RS-485 IN	POWER IN
R T G	R+R-T+T-G	+12 GND
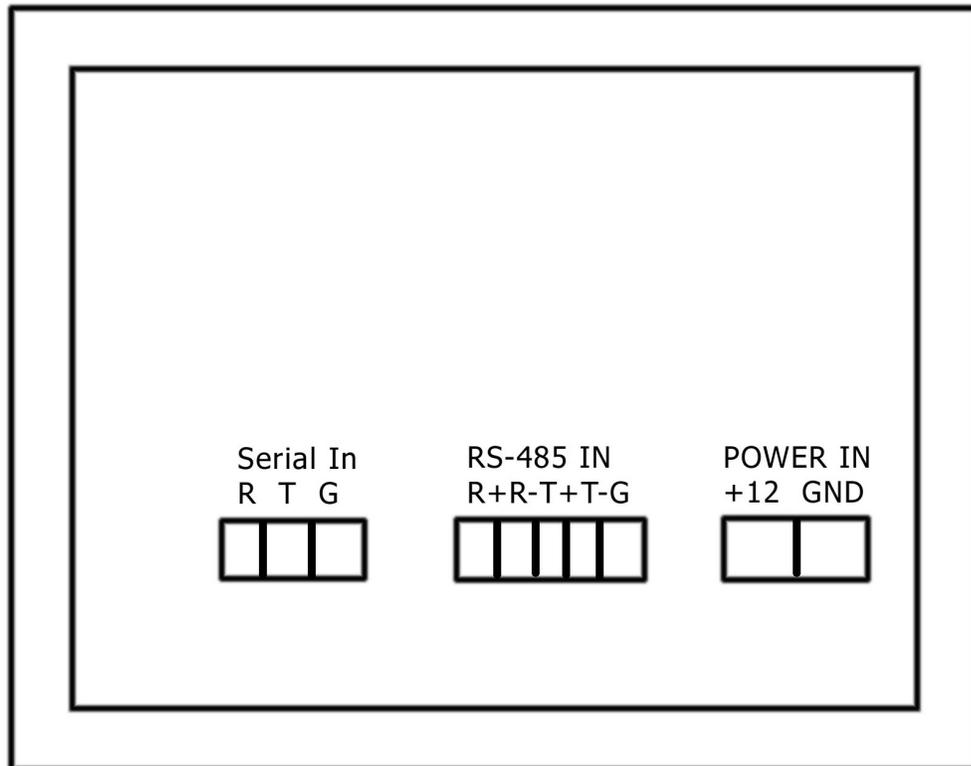
Power Input should be switched and fused to 4 Amps.

Serial Data Cable

vGauge G12C and G18C units are attached to vGauge Remote sensor units via a single cable that contains both power and serialized digital data. vGaugeG12N and G24N display units use the same cable for digital data and a separate cable for 12 volt power.

Serial Data Cable (vGauge Remote end)

6-#20

Pin	Color	Function	Voltage
1	Green/White	Serial Out (TX)	-5 to + 5
2	Orange & White	Ground	0 V
3	-	-	-
4	Brown and Brown/White	Supply Volt	+5 Volts
5	Orange/White	Serial IN (RX)	-5 to + 5
6	-	-	-

The serialized digital data cable can have a maximum cable length of up to 150 feet. Contact Chetco Digital Instruments to order a custom length serial cable for your installation.

Installation

Cutout

vGauge-G12 can be mounted directly in the dash by performing a rectangular cut out as shown in the figure. The bezel lip is 0.5" from the cutout dimensions so care must be taken to not to make the cutout any larger then specified. It is a good idea to practice on scrap material before cutting into the panel. You must allow for the 1.5" depth of the unit plus another 4" to support the cables for a total of 6" behind the dash.

The G12P cutout dimensions are 7.17" X 5.71"

The G12A cutout dimensions are 7.125" X 5.4"
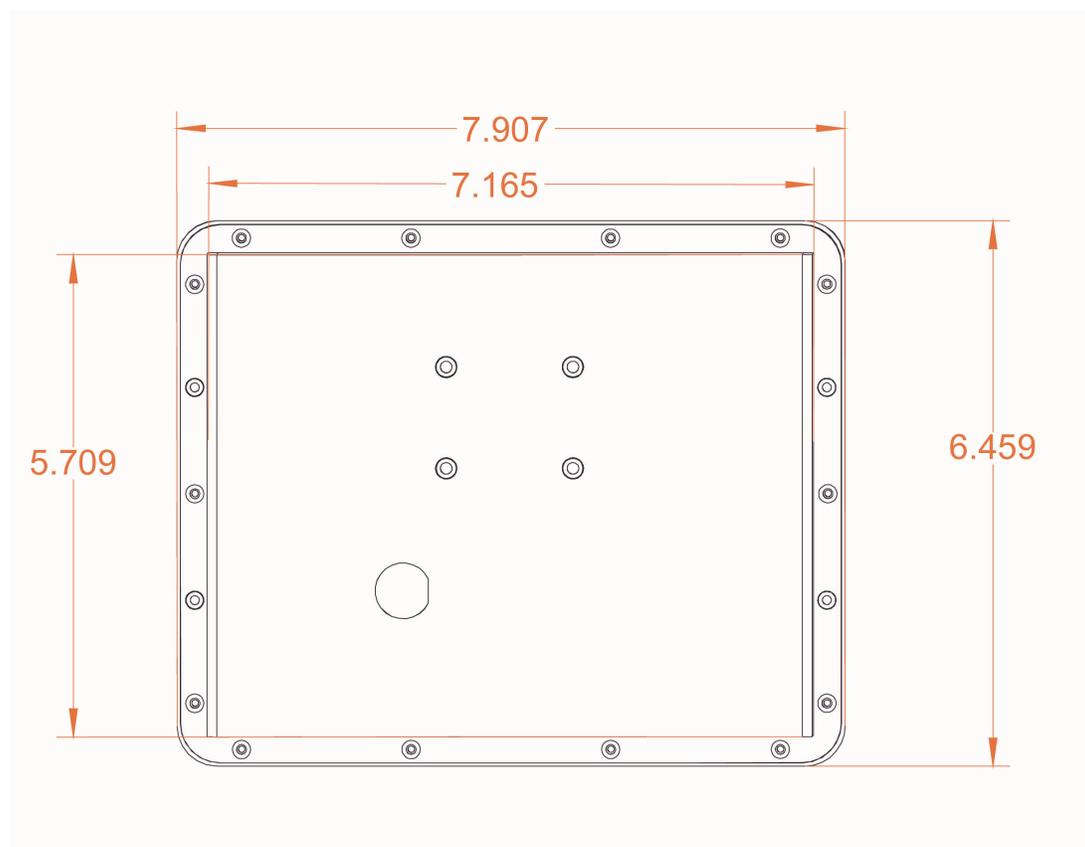
vGauge G12P Rear case dimensions
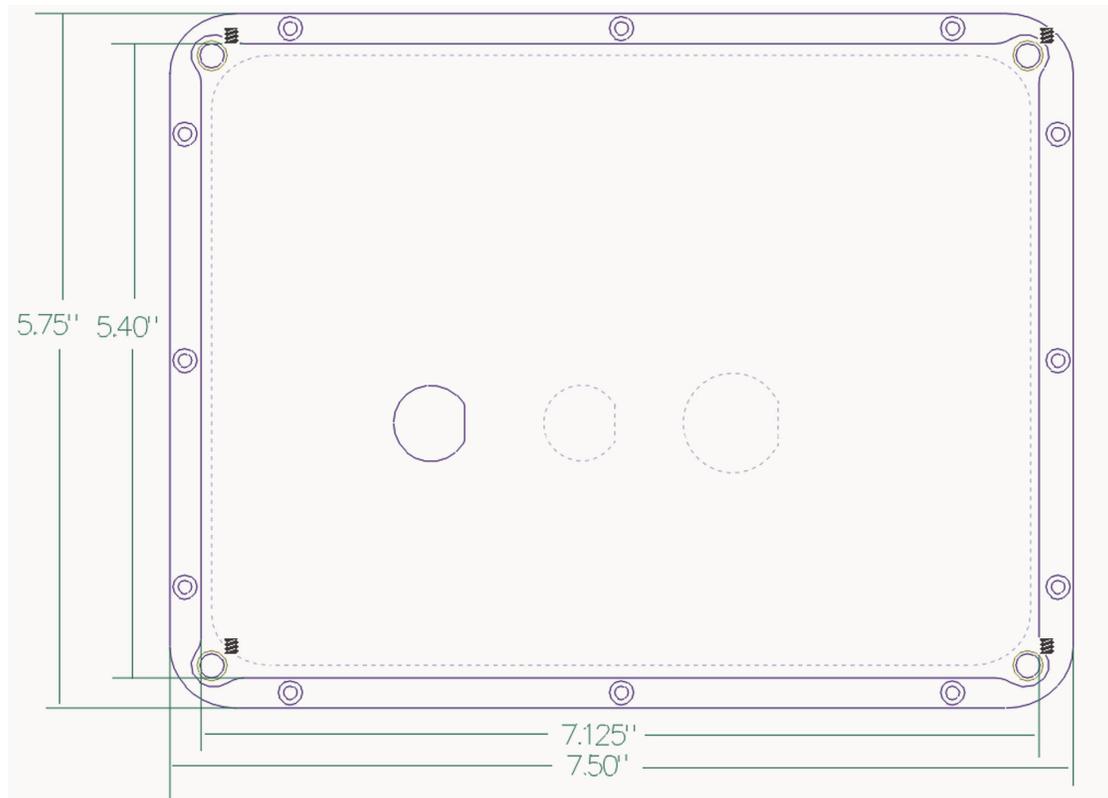
vGauge G12A Rear case dimensions

The unit can be secured in place by using slotted "L" brackets in the threaded gimbal holes on either side of the unit. Be careful not to tighten down the supplied screws into the holes with out a washer or "L" bracket - else damage to the internal seal will result.

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vGauge-G12N NMEA4 MODULE can be mounted directly in the dash by performing a rectangular cut out a shown in the figure. You must allow for the 1.5" depth of the unit plus another 3.5" to support the cables for a total of 5" behind the dash.

The cutout dimensions are 4.6" X 3.5" to allow for the display area. Six mounting holes are required as shown in the diagram.

MOUNTING HOLE DIMENSIONS
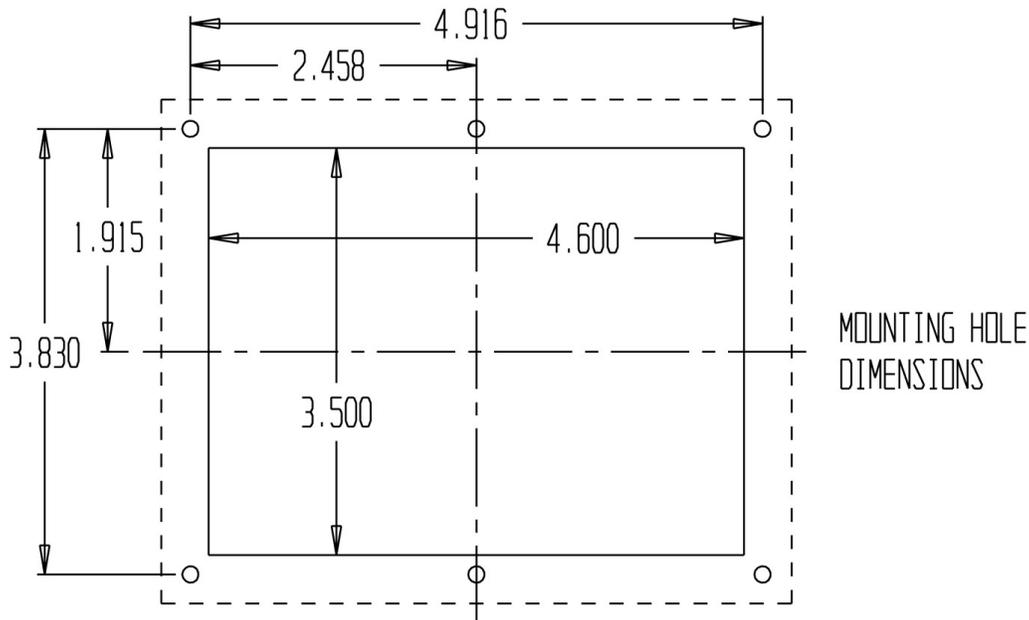
The unit can be secured in place by using bolts through the mounting holes. **Do not let the glass of the display touch the dash**. Use standoffs and foam tape to insolate the glass from the rear of the dash. The module should be suspended by the mounting bolts only.

Power

Power is supplied from the accessory bus via a 2 amp fuse. Never attempt to connect power without providing a fused input or serious damage may result. Unit should have power applied when key is in the accessory or run position and power removed when key is off.

Be sure to attach ground lead to a solid ground bus for proper operation. All sensor/sender grounds should be attached to the same ground buss.

Alarm

The vGauge G12C contains an internal buzzer which will sound when any of the sensor inputs exceed the preset alarm conditions.

To momentarily deactivate the alarm, Enter Display Menu mode by touch of the lower left quadrant and select the Alarm button. Alarms will be silenced until reactivated or unit reset.

Serial Port Protocols

The serial port interface of the vGauge G12C unit is used for real-time display of graphic information transmitted by an attached vGauge Remote Sensor unit. The vGauge Remote interfaces to various sensors and formats the collected data into a sequence of digital messages that instruct the G12C display on how to construct each of the 8 possible graphics pages.

The digital protocol is a proprietary format developed by Chetco Digital Instruments for exclusive use with G12C displays

Each graphic display command is a fixed length ASCII text string terminated by a carriage return.

m _PCDIGMNNNN "**XXX YYY**" **III** "**DDDD**" "**LLLLLLLL**"

- **m_PCDIGM** – Graphic Display command preamble
- **NNNN** – 4 digit number that identifies the specific graphic mode to display
- **XXX YYY** - 3 digit X and Y coordinate for placement of graphic element on display. Range varies with display type
- **III** - 3 digit index identifying the exact graphic element to be displayed. All graphic elements are preload in display flash memory and accessed by index number
- **DDDD** – 4 character string for the displayed sensor value. The vGauge Remote sensor unit uses calibration tables to look up the correct 4 character display vale based on sensor input
- **LLLLLLLL** – 8 character string for the sensor label. Labels are user specified and stored in vGauge Remote memory using the vDash configuration program.

For example, the command -

m _PCDIGM0002 "000 120" 28 "420 " "P TEMP "

Would display a large dial in the lower left corner with a readout of "420" and a label of "P TEMP". The index vale of 28 would point to a Large dial Graphic with needle at max and dial face red.

The vGauge Remote Sensor unit transmits display messages in a constant stream for each display page. So the following stream -

m _PCDIGM0002 "000 120" 28 "420 " "P TEMP "
m _PCDIGM0002 "160 120" 12 "152 " "S TEMP "
m _PCDIGM0002 "160 000" 10 "132F" "ENG TEMP"
m _PCDIGM0002 "000 000" 08 " 980" "P RPM   "

would construct a display page with 4 large dials
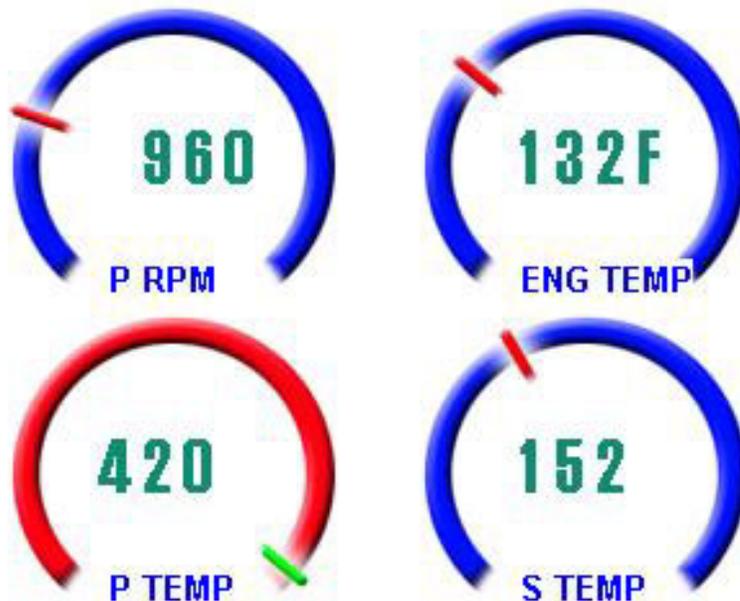
When a NEXT page area is touched,
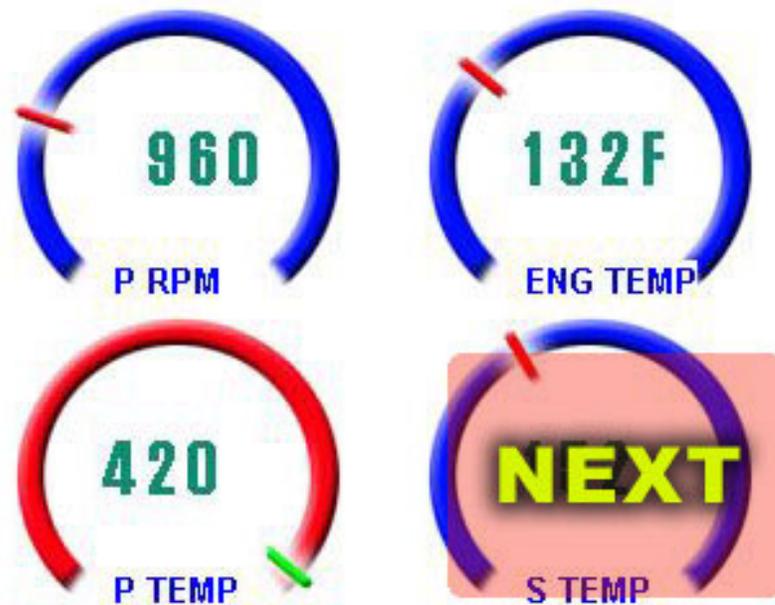
the G12C sends a command back to the vGauge Remote sensor unit to construct the next display page in sequence.

$PCDIC,N

The vGauge Remote then looks up the new graphics formats and alters the serial output stream to create the proper display commands.

m _PCDIGM0007 "000 081" 96 "420 " "P TEMP "
m _PCDIGM0007 "160 081" 84 "148 " "S TEMP "
m _PCDIGM0007 "160 000" 86 "159 " "HEX TEMP"
m _PCDIGM0007 "000 000" 83 "132F" "ENG TEMP"
m _PCDIGM0007 "000 161" 76 "OPEN" "P EGT   "
m _PCDIGM0007 "160 161" 76 "OPEN" "S EGT   "

Which then results in the following display on the G12C

All graphic elements are pre-loaded in G12C Flash memory to speed display updates. Different display themes can be created by loading new graphic elements in G12C Flash memory using an Firmware Update utility without effecting any programming or configuration of vGauge Remote sensor unit.

For example, by loading a new graphic library into G12C Flash memory, the following display can be created using the same command messages from a vGauge Remote unit.

This feature allows for a wide range of graphic display options.

Firmware Update

vGauge G12C unit firmware can be updated when attached to PC/Laptop via optional USB cable. Firmware updates may be required to change screen graphics or enhancement of unit features.

To perform a firmware update, the unit will need to powered by a vGauge Remote Sensor unit or optional power adapter. **vGauge G12C units can not be powered directly by any host USB port** as the current draw exceeds the USB maximum specification.

The optional USB cable is attached to the auxiliary 6-pin port on the vGauge G12C and the type A USB plug attached to host PC/Laptop.

Firmware Update software on the host PC is used to load new files into the unit Flash memory.

Please contact Chetco Digital Instruments technical support to obtain the latest firmware updates and further information.

Unit Dimensions

vGauge-G12C Case

The following table provides dimension information for the vGauge-G12 case unit with 320 X 240 LCD display. All dimensions are in inches.
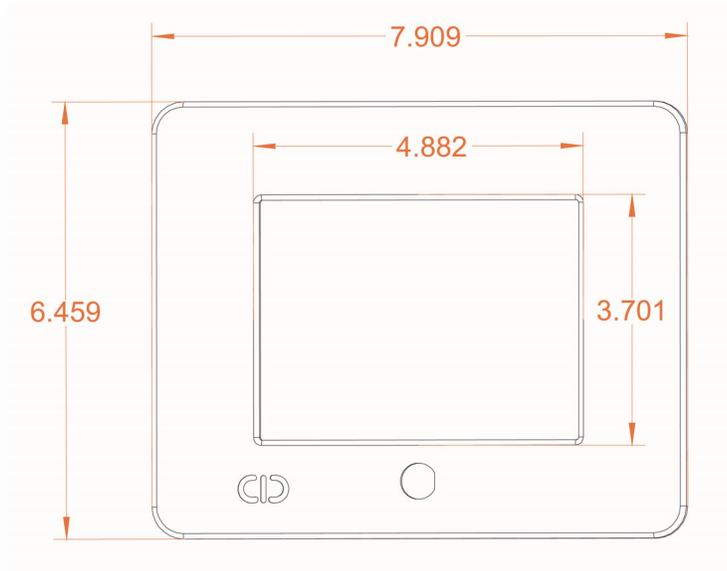
G12P case Front
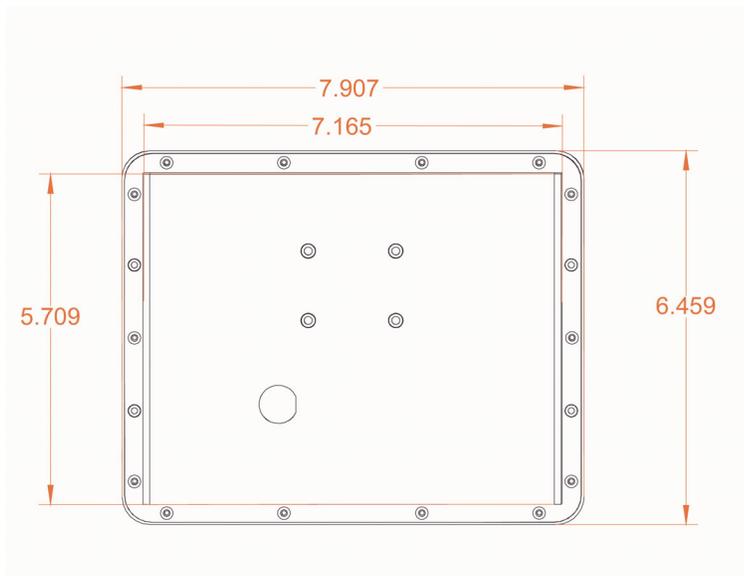
G12P case Rear
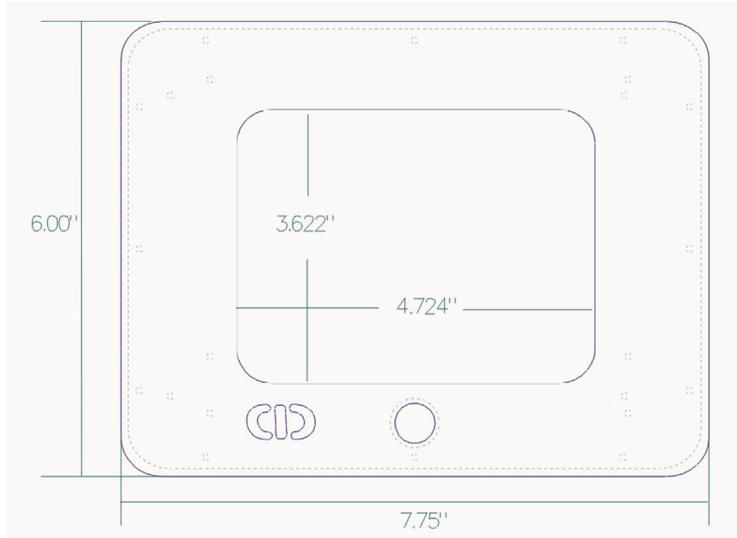
G12A case Front
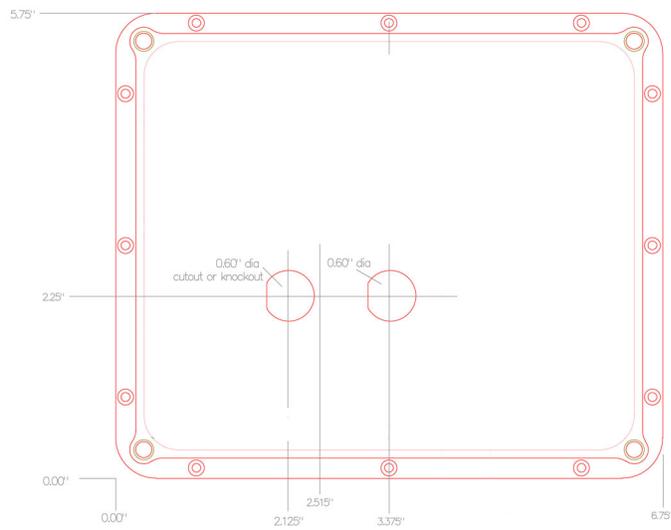
G12A case Rear

vGauge-G18C Case
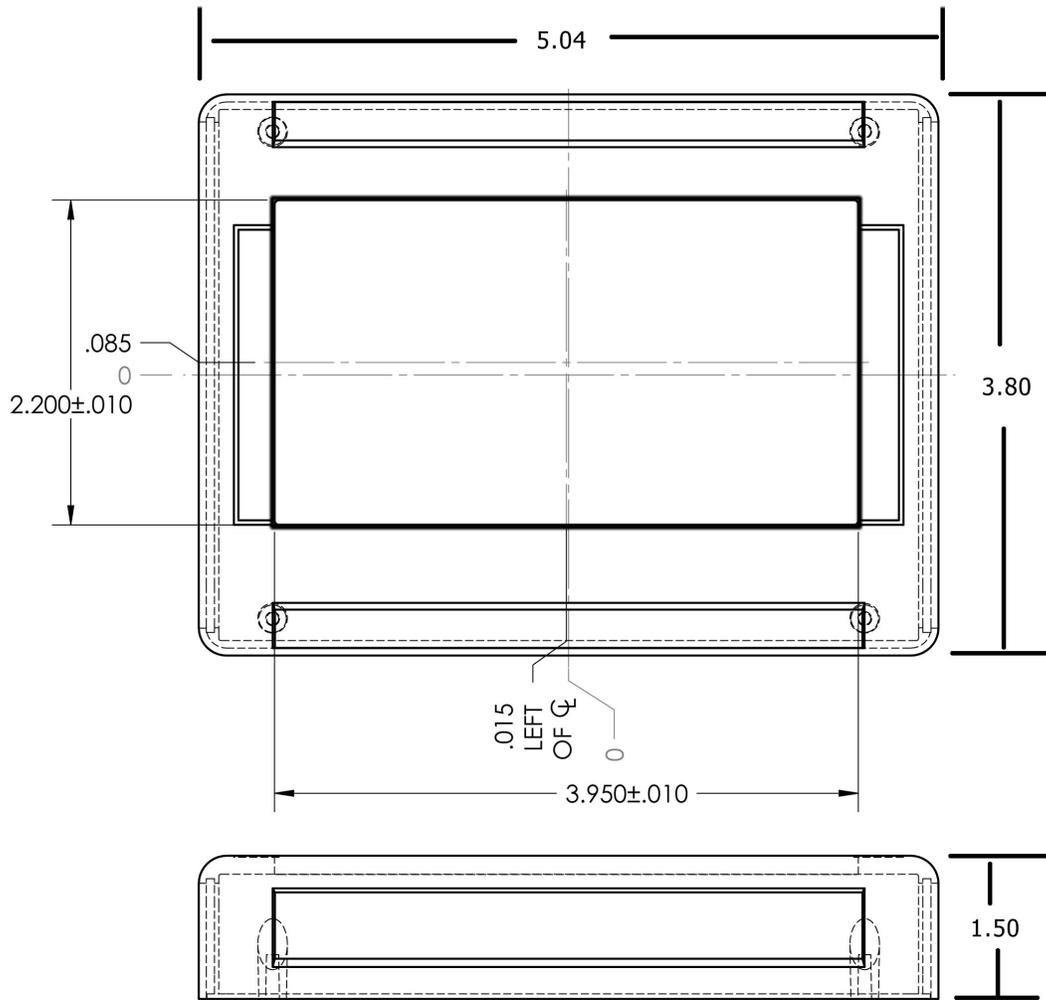
vGauge-G12N NMEA 4 Enclosure

The following table provides dimension information for the vGauge-G12N module with 320 X 240 LCD display. All dimensions are in inches..

MOUNTING HOLE
DIMENSIONS
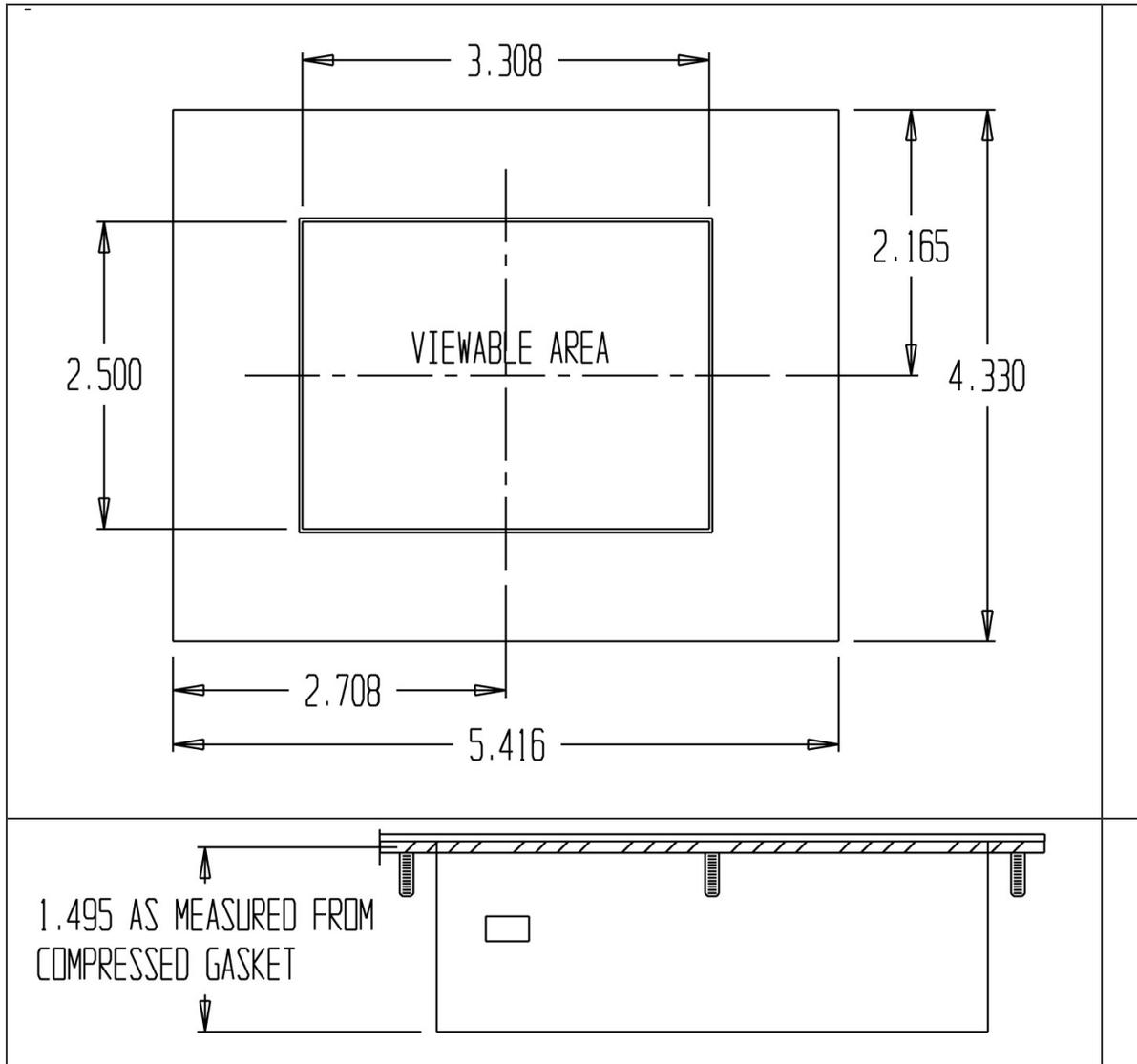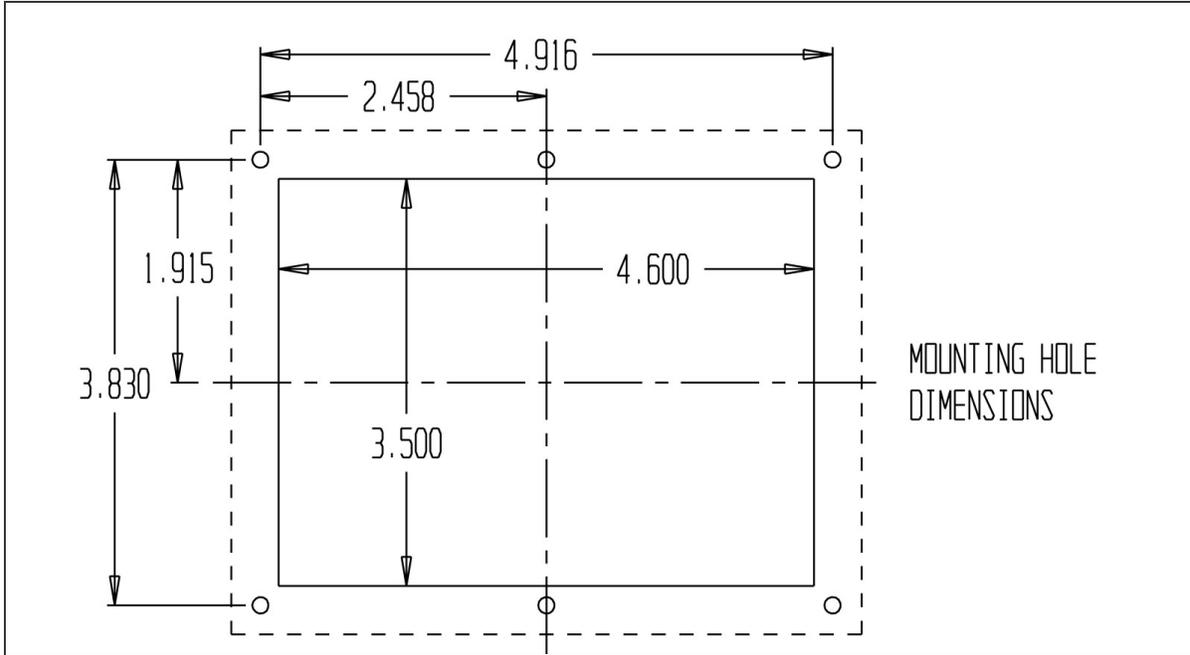
vGauge-G24N NMEA 4 Enclosure
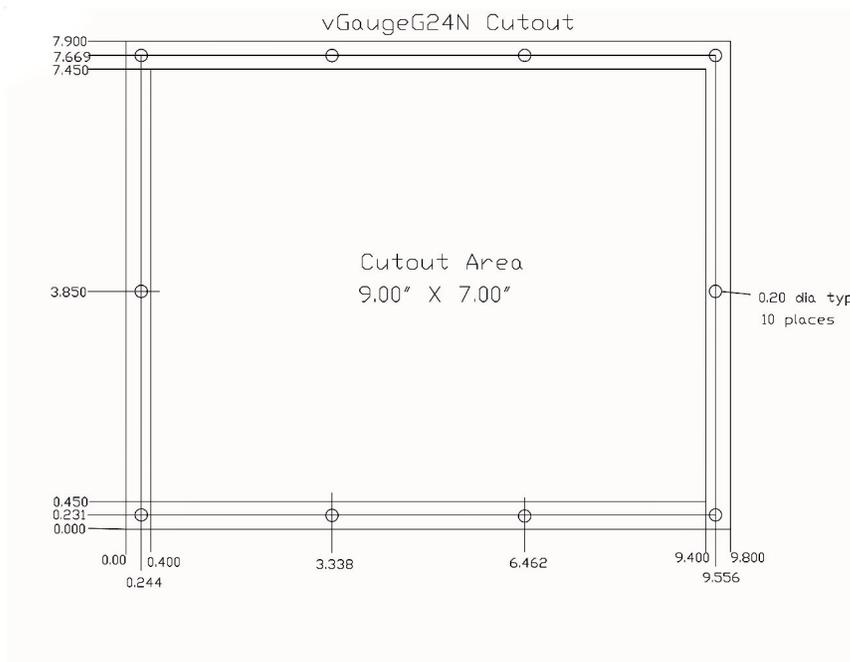
G12N and G24C (rear view)
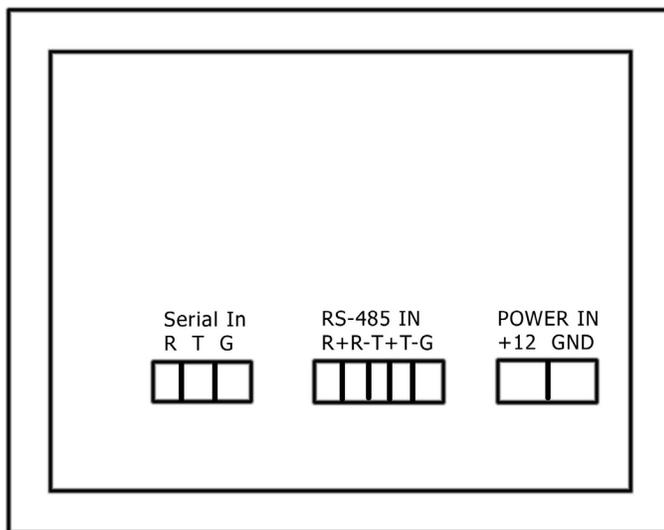
90 day Warranty

 "We", "our", or "us" refers to **Chetco Digital Instruments**, the manufacturer of this product. "You" or "your" refers to the first person who purchases this product as a consumer item for personal, family, or household use.

We warrant this product against defects or malfunctions in materials and workmanship, and against failure to conform to this product's written specifications, all for 90 days from the date of original purchase by you. WE MAKE NO OTHER EXPRESS WARRANTYOR REPRESENTATION OF ANY KIND WHATSOEVER CONCERNING THIS PRODUCT. Your remedies under this warranty will be available so long as you can show in a reasonable manner that any defect or malfunction in materials or workmanship, or any nonconformity with the product's written specifications, occurred within 90 days from the date of your original purchase, which must be substantiated by a dated sales receipt or sales slip. Any such defect, malfunction, or non-conformity which occurs within 90 days from your original purchase date will either be repaired without charge or be replaced with a new product identical or reasonably equivalent to this product, at our option, within a reasonable time after our receipt of the product. If such defect, malfunction, or non-conformity remains after a reasonable number of attempts to repair by us, you may elect to obtain without charge a replacement of the product or a refund for the product. THIS REPAIR, REPLACEMENT, OR REFUND (AS JUST DESCRIBED) IS THE EXCLUSIVE REMEDY AVAILABLE TO YOU AGAINST US FOR ANY DEFECT, MALFUNCTION, OR NON-CONFORMITY CONCERNING THE PRODUCT OR FOR ANY LOSS OR DAMAGE RESULTING FROM ANY OTHER CAUSE WHATSOEVER. WE WILL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO ANYONE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, OR OTHER INDIRECT DAMAGE OF ANY KIND.

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This warranty does NOT apply in the following circumstances: (1) when the product has been serviced or repaired by anyone other than us, (2) when the product has been connected, installed, combined, altered, adjusted, or handled in a manner other than according to the instructions furnished with the product, (3) when any serial number has been effaced, altered, or removed, or (4) when any

defect, problem, loss, or damage has resulted from any accident, misuse, negligence, or carelessness, or from any failure to provide reasonable and necessary maintenance in accordance with the instructions of the owner's manual for the product.

We reserve the right to make changes or improvements in our products from time to time without incurring the obligation to install such improvements or changes on equipment or items previously manufactured.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

REMINDER: You must retain the sales slip or sales receipt proving the date of your original purchase in case warranty service is ever required.

Chetco Digital Instruments, INC.
BOX 5359
Brookings, OREGON 97415
541-661-2051

vGAUGE FIRMWARE LICENSE AGREEMENT

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 5. Prices and programs are subject to change without notice.

6. This License Agreement shall be governed by the laws of the State of Oregon and comprises the complete and exclusive understanding between you and us concerning the above subject matter.

SeaGauge-G12C User's Manual

How to Obtain Service

We back your investment in quality products with quick, expert service and genuine replacement parts. If you're in the United States and you have questions, please contact the Factory Customer Service Department using our number listed below. You must send the unit to the factory for warranty service or repair. Please call the factory before sending the unit. You will be asked for your unit's serial number (shown above). Use the following number:

541-661-2051

U.S.A.only. Monday through Friday, except holidays.

Your unit is covered by a full 90 day warranty. (See inside for complete warranty details.) If your unit fails and the failure is not covered by the original warranty, Chetco Digital Instruments has a flat-rate repair policy that covers your unit and accessories packed with the unit at the factory. There is a 30-day warranty on all non-warranty repairs from the factory, which is similar to the original warranty, but is for 30 days rather than 90 days. For further details, please call us at the above number.

Remember, non-warranty repairs are subject to Chetco Digital Instruments published flat rate charges and 30-day warranty.

CHETCO DIGITAL INSTRUMENTS, INC

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541-661-2051

http://www.chetcodigital.com