



**CURTIS**

# Manual

**enGage<sup>®</sup> VI**

CAN Color Instrument



**Curtis Instruments, Inc.**  
200 Kisco Avenue  
Mt. Kisco, NY 10549  
[www.curtisinstruments.com](http://www.curtisinstruments.com)



Read Instructions Carefully!

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# 1.0 TECHNICAL SPECIFICATIONS

## 1.1 ELECTRICAL

### Power Requirements

The following electrical specifications apply over the operating temperature of  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  unless otherwise noted.

### Operating Voltage

enGage<sup>®</sup> VI models are designed to operate from a nominal B+ voltage range of either 12–48 VDC or 60–144 VDC. B+ operating voltage ranges are given in Table 1.

Table 1

Voltage Rating (VDC)	Minimum Operating Voltage (VDC)	Maximum Operating Voltage (VDC)
12–48	9	60
60–144	45	180

The 12V–48V model incorporates an over-voltage protection circuit which turns off power to the unit in the event of a potentially damaging over-voltage condition. Power is restored when over-voltage condition is removed.

### Operating Current

Operating current for B+ input is given in Table 2.



**CAUTION: B+ line must be protected by 1A fuse.**

Table 2 Operating Current

Model	B+ (VDC)	Typical Operating Current <sup>1</sup> (mA)	Maximum Operating Current <sup>2</sup> (mA)	
		Key switch on	Key switch off	Key switch on
12–48	9	400	417	633
	12	300	293	450
	15	240	234	358
	24	155	150	227
	36	120	96	149
	48	88	86	125
	60	75	68	99
60–144	45	96	80	129
	60	74	63	99
	72	63	51	82
	80	57	48	76
	96	49	43	66
	120	41	35	54
	144	35	30	46
	180	30	26	40

<sup>1</sup> No senders connected; all switches open;  $25^{\circ}\text{C}$

<sup>2</sup> Maximum current conditions; senders connected to 0 ohms; switches closed;  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$

## 1.2 MECHANICAL

### Display

The enGage® VI features a color TFT quarter-VGA (QVGA) backlit dot matrix LCD, 320x240 pixels. The LCD module has a 3.5" active viewing area, measured diagonally. The display is designed to be viewable in direct sunlight and other high ambient lighting conditions.

### LCD Heater B+ Input (Optional)

The enGage® VI features a high performance LCD that operates efficiently down to approx -20°C. If the optional LCD heater circuit was specified at time of purchase, LCD heater B+ input (pin J1-12) is used to power the LCD heater for very low temperature operation.

Pin J1-12 may be wired to B+ to allow the heater to operate whenever power is connected.

Otherwise, the LCD heater may be connected to B+ via the keyswitch to allow the LCD heater to operate only when the keyswitch is turned on.



**CAUTION: Voltage at J1-12 must be same as voltage at B+ (J1-1).**



**CAUTION: Heater B+ line must be protected by 3A fuse.**

The LCD heater circuit senses the temperature of the LCD module and turns the heater on and off as needed. The heater turns on at a temperature of approximately -20°C, and turns off at approximately 0°C. The LCD heater circuit uses a PWM circuit to apply constant power to the heater over the range of B+ operating voltages. The average maximum current is given in Table 3 below.

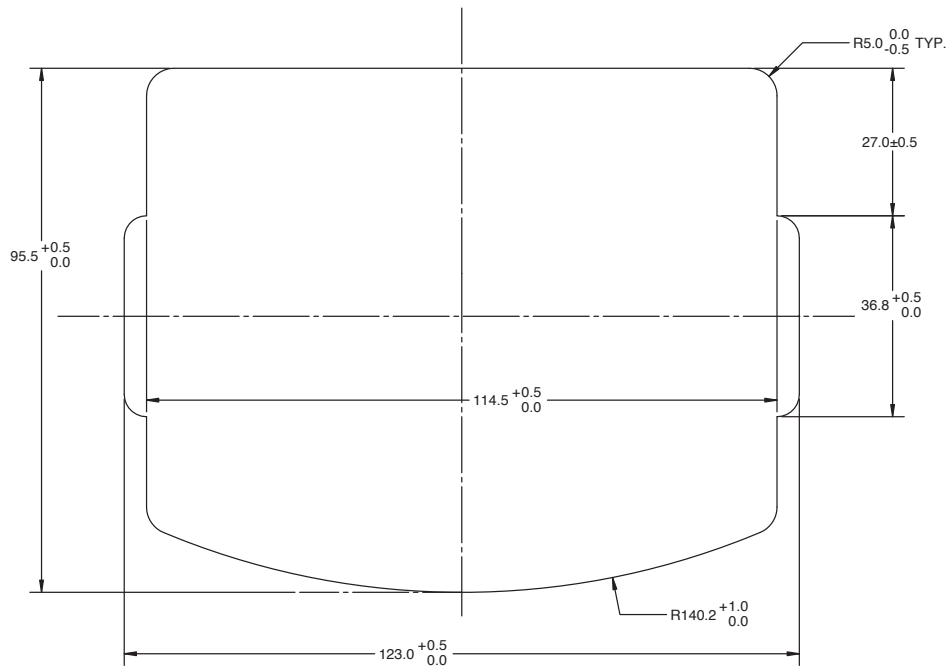
Table 3 LCD Heater Max Avg Values

Voltage Rating (VDC)	Maximum Current (mA)
12-48	2,300
60-144	350

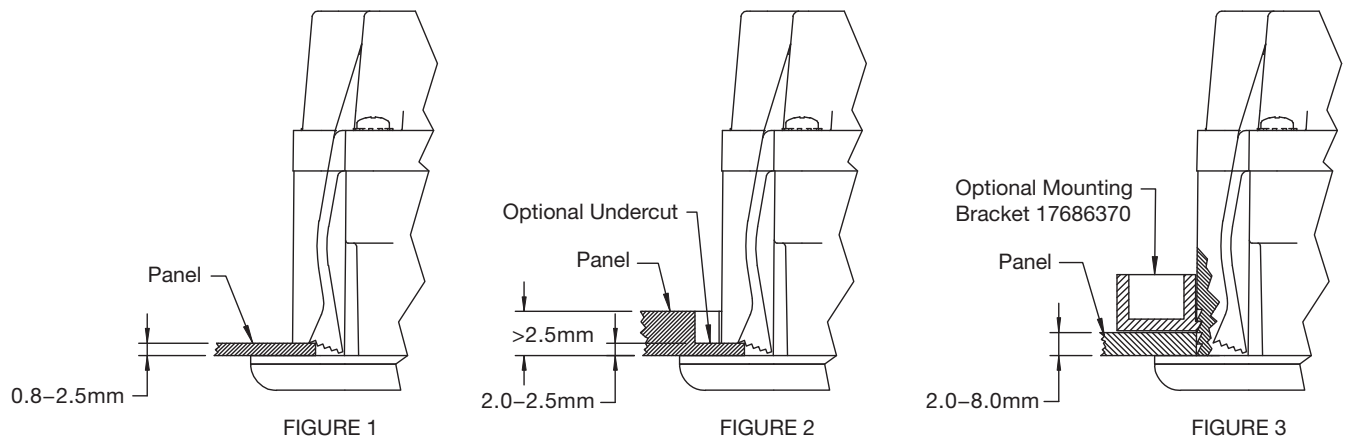
Table 4 Size & Weight (Max)

Item	Fully Enclosed Unit	Module (PCB + LCD only)
	Model 3601T	Model 3601P
Bezel H & W	102 x 132 mm	N / A
Case H & W	95.5 x 123 mm	85.5 x 113 mm
Depth	63.1 mm (back of bezel to end of connector)	49.2 mm (top of connector to top of LCD)
Weight	357 grams	178 grams

## Panel Cutout Detail



## Mounting Options



**NOTE:** Mounting bracket 17686370 can be used for panel thicknesses 2.0–8.0mm. Mounting bracket is designed for one installation only. Destruction of mounting bracket may occur if attempted to remove.

## 2.0 INSTALLATION

### 2.1 CONNECTORS

#### Cased / Enclosed Products (Model 3601T):

- Standard connector series is sealed Deutsch DTM.
- Optional video input uses connector J3 for input signals.

#### Module Products (Model 3601P):

- Standard connector series is AMP MATE-N-LOK.
- Pushbutton signals are available on connector J4.
- Optional video input uses connector J3 for input signals.

The Curtis enGage® VI is available with extensive I/O & CAN communications or as a CANbus display unit, “CAN only” design (no I/O).

Models designated as “CAN only” do not offer access to I/O pins and have only one connector “J1” (no other connectors required).

I/O connections for module and cased models are detailed in Tables 6 and 7, on the following pages.

#### Mating Connectors, Cased / Enclosed Product Model 3601T



- Deutsch DTM series mating connectors for J1 through J4 are detailed in Table 5.
- Deutsch Wedge Lock, 1 per connector, part number: WM-12S (Curtis p/n 12690CA29)
- Deutsch pin, up to 12 per connector, part number 0462-201-20141 (Curtis p/n 12690FC59)

#### **CAUTION: Video connector not sealed unless mating connector attached!!**

Table 5 Cased / Enclosed Product Model 3601T Deutsch Mating Connector

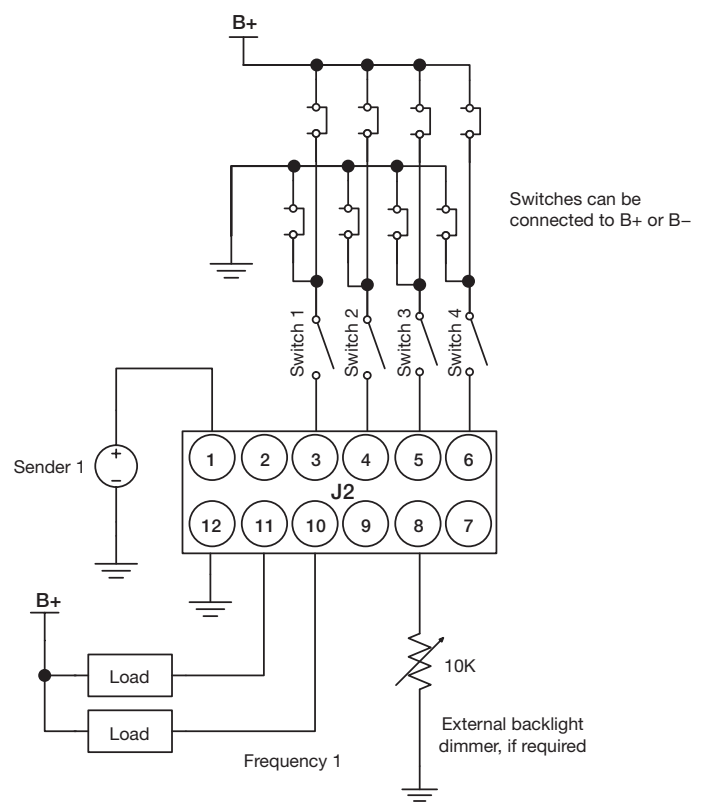
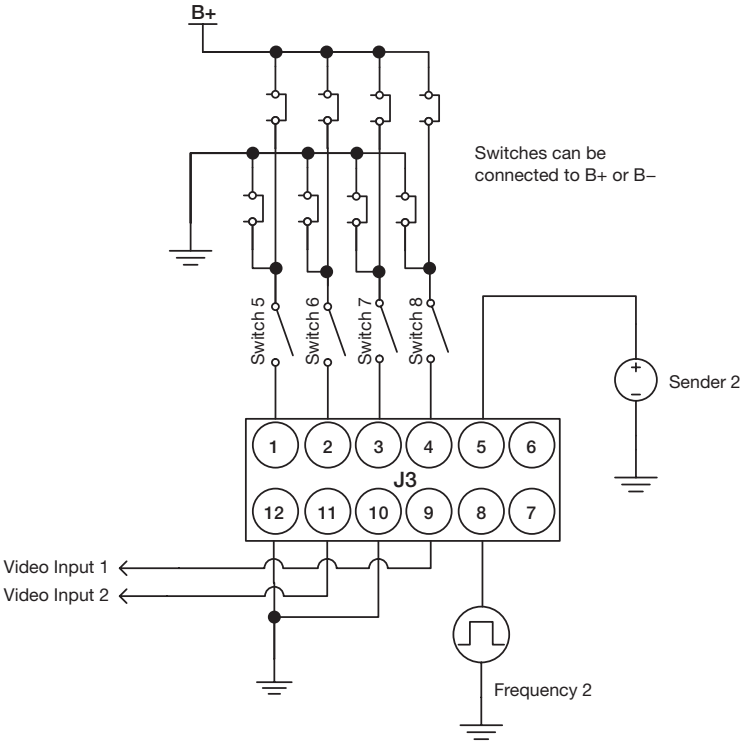
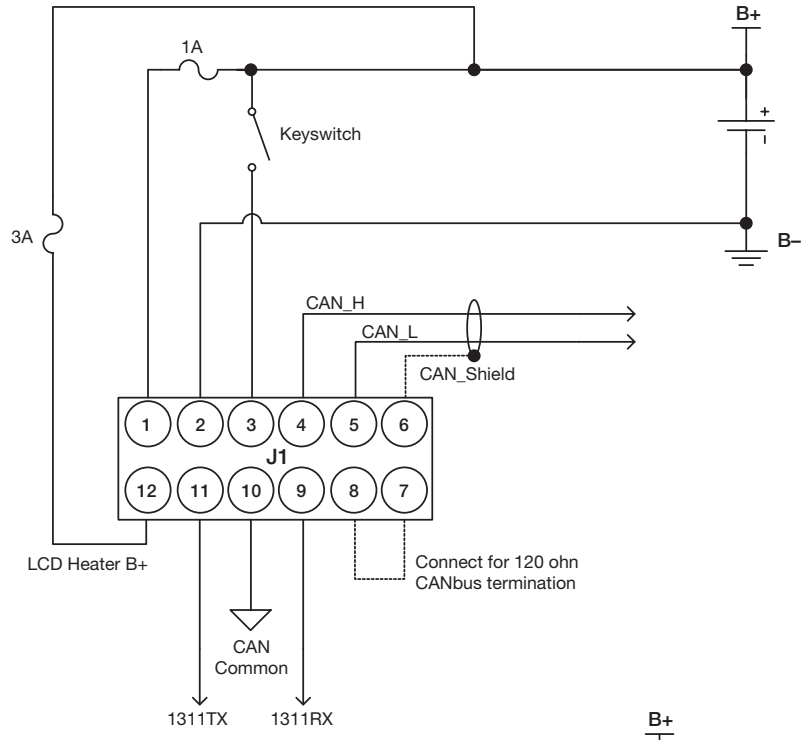
Connector	Mating Connector	Maximum Operating Voltage (VDC)
	Deutsch p/n	Curtis p/n
J1	DTM06-12SA	12690FH140
J2	DTM06-12SB	12690FH141
J3	DTM06-12SC	12690FH142

**NOTE: Housing p/n only, see Page 4 for Wedge Lock and Pin p/n's.**

**Table 6 Cased / Enclosed Product, Model 3601T Deutsch I/O Connector Signals**

Pin No.	Signal Description	Pin No.	Signal Description
J1-1	Battery Voltage (B+)	J2-1	Sender 1
J1-2	Battery Common (B-)	J2-2	No Connect
J1-3	Keyswitch	J2-3	Switch Input 1
J1-4	CAN High	J2-4	Switch Input 2
J1-5	CAN Low	J2-5	Switch Input 3
J1-6	CAN Shield	J2-6	Switch Input 4
J1-7	CAN_Term1	J2-7	No Connect
J1-8	CAN_Term2	J2-8	Backlight Dimmer Input
J1-9	1311 RX	J2-9	Frequency Input 1
J1-10	CAN Common	J2-10	MOSFET Output 1
J1-11	1311 TX	J2-11	MOSFET Output 2
J1-12	LCD Heater B+	J2-12	MOSFET Common
J3-1	Switch Input 5		
J3-2	Switch Input 6		
J3-3	Switch Input 7		
J3-4	Switch Input 8		
J3-5	Sender 2		
J3-6	No Connect		
J3-7	No Connect		
J3-8	Frequency Input 2		
J3-9	Video Input 1 Signal		
J3-10	Video Input Ground		
J3-11	Video Input 2 Signal		
J3-12	Video Input Ground		

# Cased Unit





## Optional Mating Harness Assemblies (connectors with flying leads and butt splices)

- Connector J1: 15233014-1
- Connector J2: 15233014-2
- Connector J3: 15233014-3

Table 7 Module Product, Model 3601P AMP I/O Connector Signals

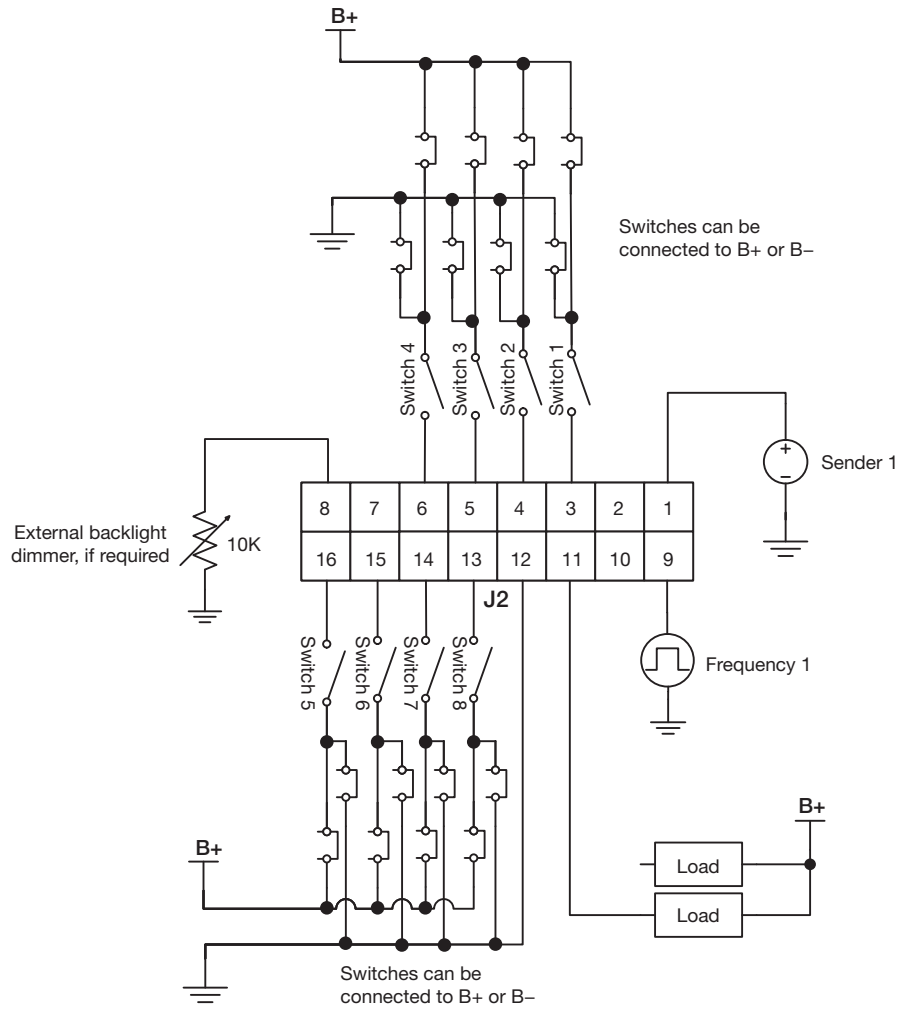
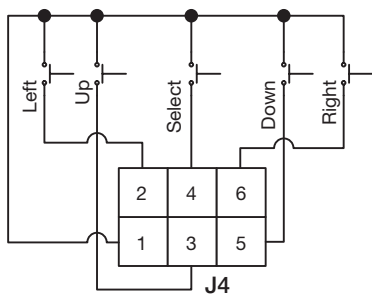
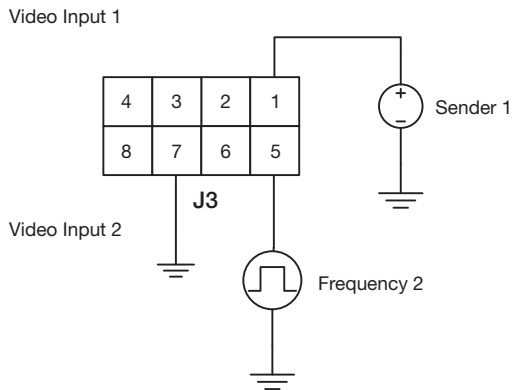
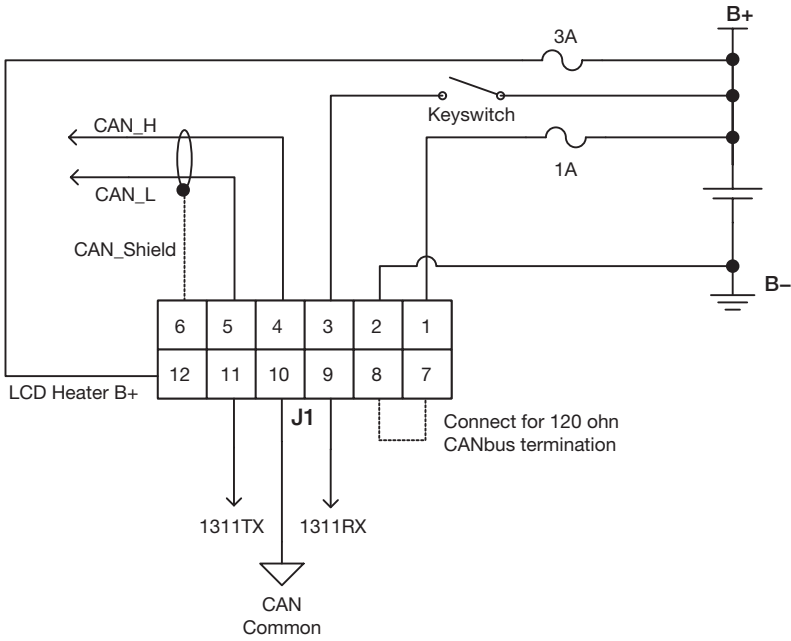
Pin No.	Signal Description
J1-1	Battery Voltage (B+)
J1-2	Battery Common (B-)
J1-3	Keypad
J1-4	CAN High
J1-5	CAN Low
J1-6	CAN Shield
J1-7	CAN_Term1
J1-8	CAN_Term2
J1-9	1311 RX
J1-10	CAN Common
J1-11	1311 TX
J1-12	LCD Heater B+
J3-1	Sender 2
J3-2	No Connect
J3-3	Video Input 1 Signal
J3-4	Video Input Ground
J3-5	Frequency Input 2
J3-6	No Connect
J3-7	Video Input Ground
J3-8	Video Input 2 Signal

Pin No.	Signal Description
J2-1	Sender 1
J2-2	No Connect
J2-3	Switch Input 1
J2-4	Switch Input 2
J2-5	Switch Input 3
J2-6	Switch Input 4
J2-7	No Connect
J2-8	Backlight Dimmer Input
J2-9	Frequency Input 1
J2-10	MOSFET Output 1
J2-11	MOSFET Output 2
J2-12	MOSFET Common
J2-13	Switch Input 5
J2-14	Switch Input 6
J2-15	Switch Input 7
J2-16	Switch Input 8

Table 8 Pushbutton Connector

Pin No.	Signal Description
1	Ground
2	Pushbutton 1 (Left)
3	Pushbutton 2 (Up)
4	Pushbutton 3 (Select)
5	Pushbutton 4 (Down)
6	Pushbutton 5 (Right)

# AMP Module



**Table 9 Module Product, Model 3601P J4 Pushbutton Connector**

Pin No.	Signal Description
1	Common
2	Pushbutton 1 (Left)
3	Pushbutton 2 (Up)
4	Pushbutton 3 (Select)
5	Pushbutton 4 (Down)
6	Pushbutton 5 (Right)

### Mating Connectors Module Product, Model 3601P

See Table 10 below for AMP Mini Universal MATE-N-LOK series mating connectors for J1 through J3.

AMP connector pin part number is 770904-1 (Curtis p/n 12690FC36) for use with 18-22 AWG wire.

**Table 10 Mating Connector for Module Units, Model 3601P**

Connector	Mating Connector	
	<sup>1</sup> AMP p/n	Curtis p/n
J1	770581-1	12690FH81
J2	770585-1	12690FH138
J3	770583-1	12690FH154

<sup>1</sup>Housing p/n only, see above for AMP connector pin part number.

### Optional Mating Harness Assemblies (connectors with flying leads and butt splices)

- Connector J1: 15233011
- Connector J2: 15233013
- Connector J3: 17633308-03

### Video Input Option

The optional video input accepts signals from two video sources. It can accept signals in NTSC or PAL format. The video can be displayed in normal or mirrored mode. The unit can be programmed to place the video from either source on the screen when activated. The ◀ pushbutton switches the display to video input 1. The ▲ pushbutton switches the display to video input 2, if two video inputs are enabled. The ▶ pushbutton returns to the main display. The signal to switch to each video display can also be based on one of the switch inputs or on CANbus data. The video image is shown with full resolution and no scaling or zooming.

## 2.2 SWITCH INPUTS

The switch inputs may be Active-low (switched to B-) or Active-high (switched to B+). The input specifications are given in Table 11 below.

Table 11 Switch Input Specifications

Parameter	Min.	Max.	Units
Input Range	0	180	Volts
Active-High Threshold	8.0	—	Volts
Active-Low Threshold	—	1.0	Volts
Input Impedance	741 k	819 k	Ohms

### Keyswitch Input

The keyswitch input meets the same input specifications as the switch inputs (see Table 11). This input is active only when switched to B+.

### Backlight Dimmer Control Input

Backlighting is adjustable via the front panel buttons & menu or an optional 10k potentiometer can be connected to J2-8 & B- to externally control the backlight. If an external pot is used for backlight adjustment, backlight adjustment via the menu is disabled.

### Sender Inputs

Each sender input can be programmed for either a resistive or voltage based sender. The sender must be referenced to the system ground (B-) connected to the unit. Input requirements and specifications are given in Table 12 below.

Table 12 Sender Input Specifications

Parameter	Min.	Max.	Units
Voltage Input Range	0	180	V DC
Voltage Measurement Range	0	10	V DC
Voltage Resolution	—	10	mV
Voltage Measurement Error	—	+/- (1% + 40 mV)	
Resistance Measurement Range	0	10 k	Ohms
Resistance Resolution (0–1200 Ω)	0.2	5	Ohms
Resistance Resolution (1.2k–10k Ω)	5	35	Ohms
Resistance Measurement Error	—	+/- (3% + 2 Ω)	

## 2.3 BATTERY DISCHARGE INDICATOR

The enGage® VI may be configured with a battery discharge indicator (BDI). The BDI function uses the Curtis voltage under load method. The following parameters are needed for accurate BDI tracking:

<b>CTR-Full</b>	Charge Tracking Reset – full voltage
<b>CTR-Empty</b>	Charge Tracking Reset – empty voltage
<b>Discharge-Full</b>	Discharge profile – full voltage
<b>Discharge-Empty</b>	Discharge profile – empty voltage
<b>OCR</b>	Open Circuit Reset voltage
<b>Integration Time</b>	Integration time - charge and discharge
<b>Lockout On</b>	State of charge where lockout is activated
<b>Lockout Off</b>	State of charge where lockout is de-activated

### Frequency Inputs

The frequency input pins are used to input signals for a tachometer, speedometer, etc. The input signal is filtered and conditioned, then sent to one of the microcontroller's input-capture timer peripherals. The timer measures the period of the signal's waveform. The default frequency input specifications are given in table 13. Note: additional hardware variations on the PCB may be used for non-standard input signals, in which case the values in Table 13 will vary.

Table 13 Frequency Input Specifications

Parameter	Min.	Max.	Units
Active High Threshold	1.38	—	V DC
Active Low Threshold	—	1.34	V DC
Input Impedance	138.2 k	141.8 k	Ohms
Input Voltage	—	200	V DC
Frequency	1	10 k	Hz
Duty Cycle	10	90	%
Resolution	1	—	µsec
Accuracy	0.5	—	%

### MOSFET Outputs

The enGage® VI has two independent open-drain MOSFET outputs. These MOSFET outputs make a connection to their common pin when activated. The MOSFET common pin must be connected to B– externally. Each of the four MOSFET output pins incorporate an inductive spike protection diode connected to B+. **These outputs have no current-limiting circuitry.**

MOSFET output specifications are given in Table 14 below.

Table 14 MOSFET Output Specifications

Parameter	Min.	Max.	Conditions
Continuous Current	0	2 A	
Off Voltage	—	200 V	
On Voltage	0	0.9 V	I = 2A DC

## 2.4 CANBUS OPTION

CANbus pins CAN TERM 1 & CAN TERM 2 can be connected together to provide a 120 Ohm CANbus termination.

### Isolated CANbus Option

The optional isolated CANbus interface allows the enGage® VI to be connected to a CANbus system that is referenced to a separate isolated ground system. The isolated CANbus circuitry has its own power supply and provides galvanic isolation from the rest of the unit's circuitry. The ground for the isolated power supply is connected to J1-10.

The specification for the isolated CANbus option is detailed in Table 15 below.

Table 15 Isolated CANbus Specification

Parameter	Value	Units	Conditions
Dielectric Insulation Voltage	2500	V rms	1 minute duration

## 2.5 HOUR METER

The enGage® VI keeps track of four hour meters, any of which can be resettable if this option is selected at time of unit purchase. Optional resettable hour meters may be reset via the menu system. Each hour meter may be programmed to accumulate time based on a switched input, keyswitch, CANbus data, etc. More sophisticated logic can be programmed to handle various conditions. Hour meter range is 99,999.9

## 2.6 MAINTENANCE MONITOR

The enGage® VI keeps track of three count-down maintenance monitors. Each maintenance monitor can be programmed to activate based on a switched input, keyswitch, CANbus data, etc. More sophisticated logic can be programmed to handle various conditions. Each maintenance monitor can be typically reset via the menu system. Maintenance monitor range is 999. Note that maintenance monitors are set using whole number amounts (no decimal point shown). However, once set they will show elapsed time remaining with tenths of an hour resolution.

## 2.7 ODOMETER

The enGage® VI keeps track of three odometers, any of which can be resettable. The odometer function requires vehicle speed data. This data may come from a frequency input or the CANbus. The units can be displayed as miles or kilometers. The user may switch between miles and kilometers and set the pulses / mile or pulses / km constant via the menu system. Each odometer may be a cumulative type or a "trip" odometer which is resettable. Odometer range is 999,999.9 (units as necessary).

## 2.8 AUDIBLE ALARM

The enGage® VI includes a PCB mounted audible alarm that has a fixed frequency and volume level of 2,300 Hz, 80 dB respectively. On cased products (model 3601T), sound emits from a vent in the rear of the unit. The alarm can be programmed to activate with one of the switch inputs, CANbus data, when a specified gauge element reaches a certain value, when a sender input reaches a certain value or when an internal calculation reaches a certain value. More sophisticated logic can be programmed to handle various conditions.

## 2.9 USER INTERFACE

Curtis enGage® VI / enclosed / cased unit (model 3601T) includes 5 front panel buttons\*. The buttons are sealed to IP67 and can be used for navigating through a menu system and for programming display functions\*\* such as:

- Time Of Day Clock
- Battery Discharge Indicator
- Maintenance Intervals Set & Reset
- Settable Hour Meters (if applicable)
- Trip Odometer Reset
- Units - Metric / English Conversion
- Backlight Dimmer Control

\*For module units (Model 3601P), customer must provide applicable push button interface.

\*\*For complete listing of menu driven adjustable items, see menu diagram later in this manual.

### 2.9.1 Configuring Your Panel

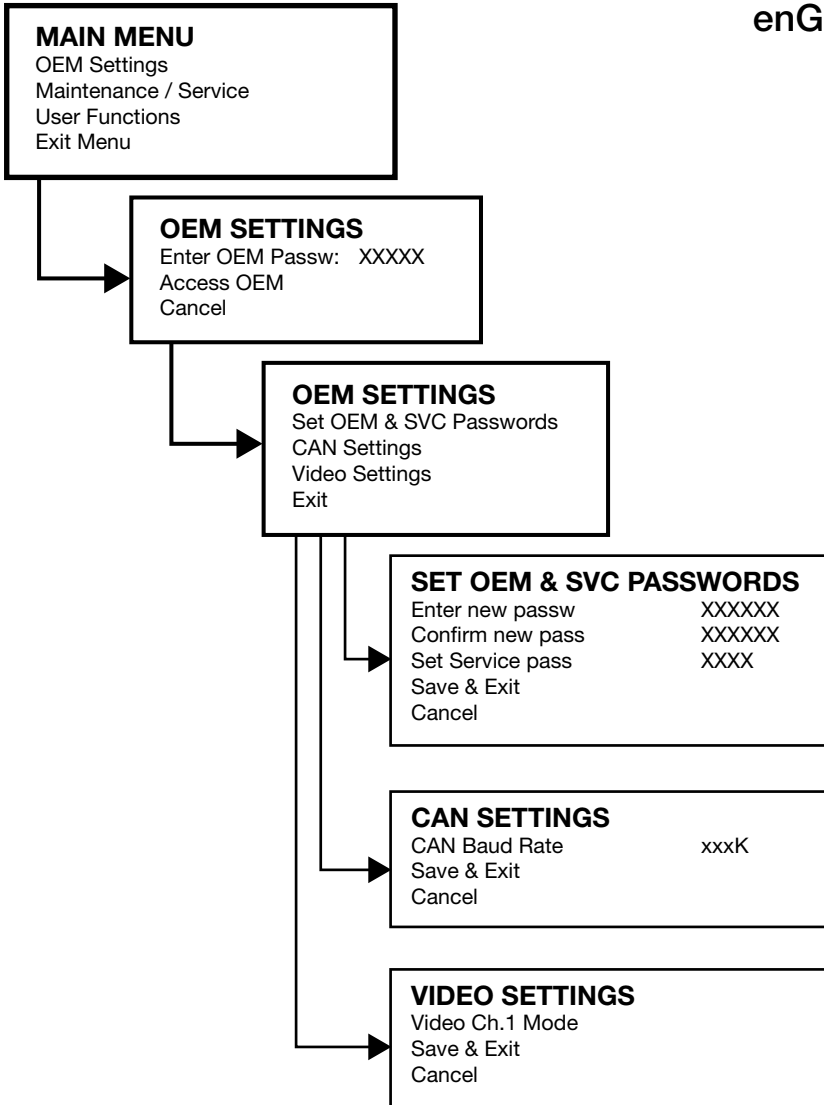
In order to configure an enGage® VI panel, main power must be applied (12–80VDC or 60–144VDC) to V+ and V– and the keyswitch must be active. Following a power up sequence, the OEM logo (if applicable) will be displayed. Once the start-up process is complete, the specified default (normal) instrumentation screen will appear.

### 2.9.2 enGage® VI Menu System

The menu system is activated by pressing the center / select button (●) then releasing when the Main Menu screen appears. The following choices will appear on the Main Menu screen:

- OEM Settings
  - » Present if applicable. Six-digit password protected, consult vehicle / system OEM for additional information on password access.
- Maintenance / Service
  - » Present if applicable. Four-digit password protected, consult vehicle / system OEM for additional information on password access.
- User Functions
- Exit Menu

# enGage® VI Menu Navigation Flow Chart

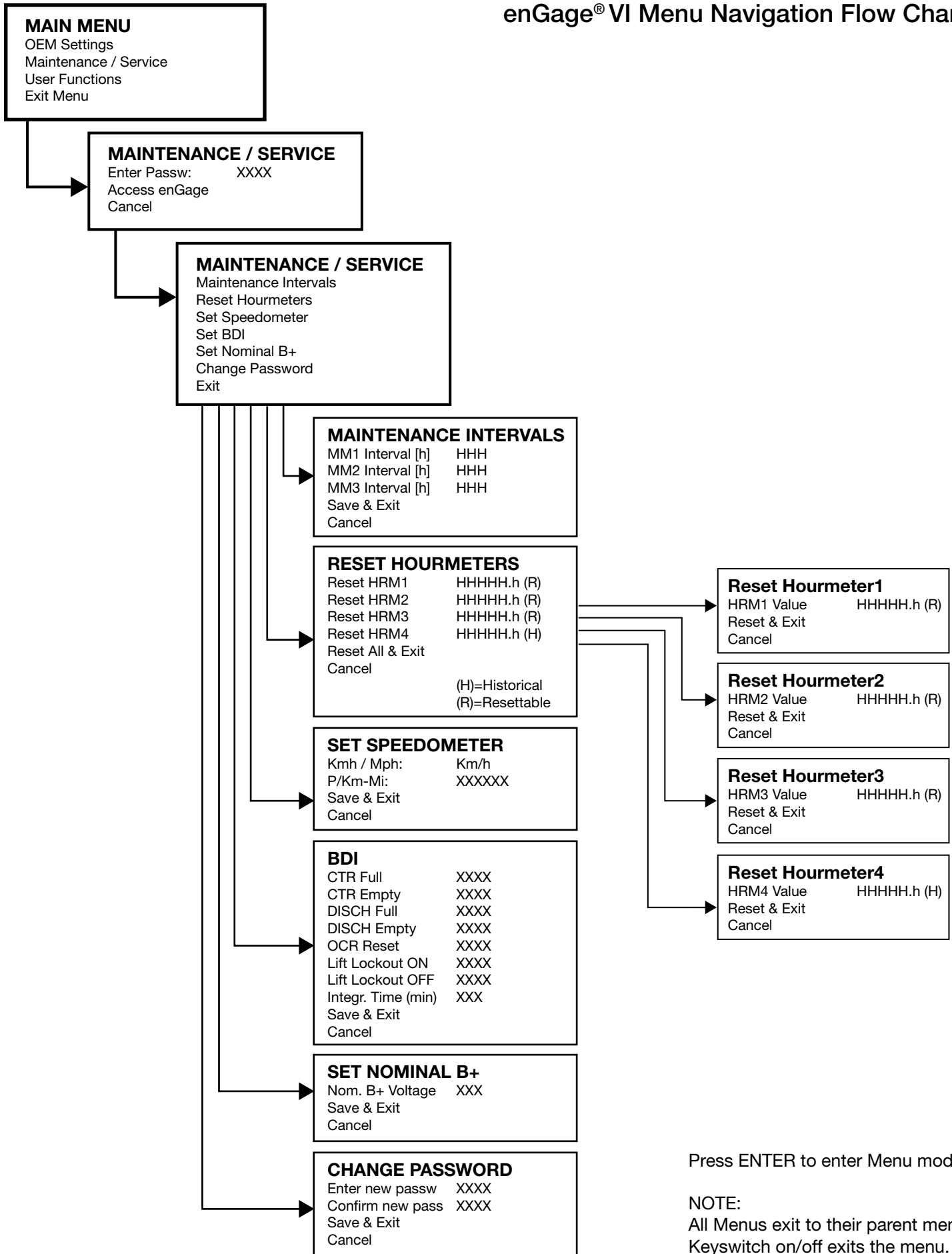


Press ENTER to enter Menu mode.

**NOTE:**  
All Menus exit to their parent menu.  
Keypress on/off exits the menu.



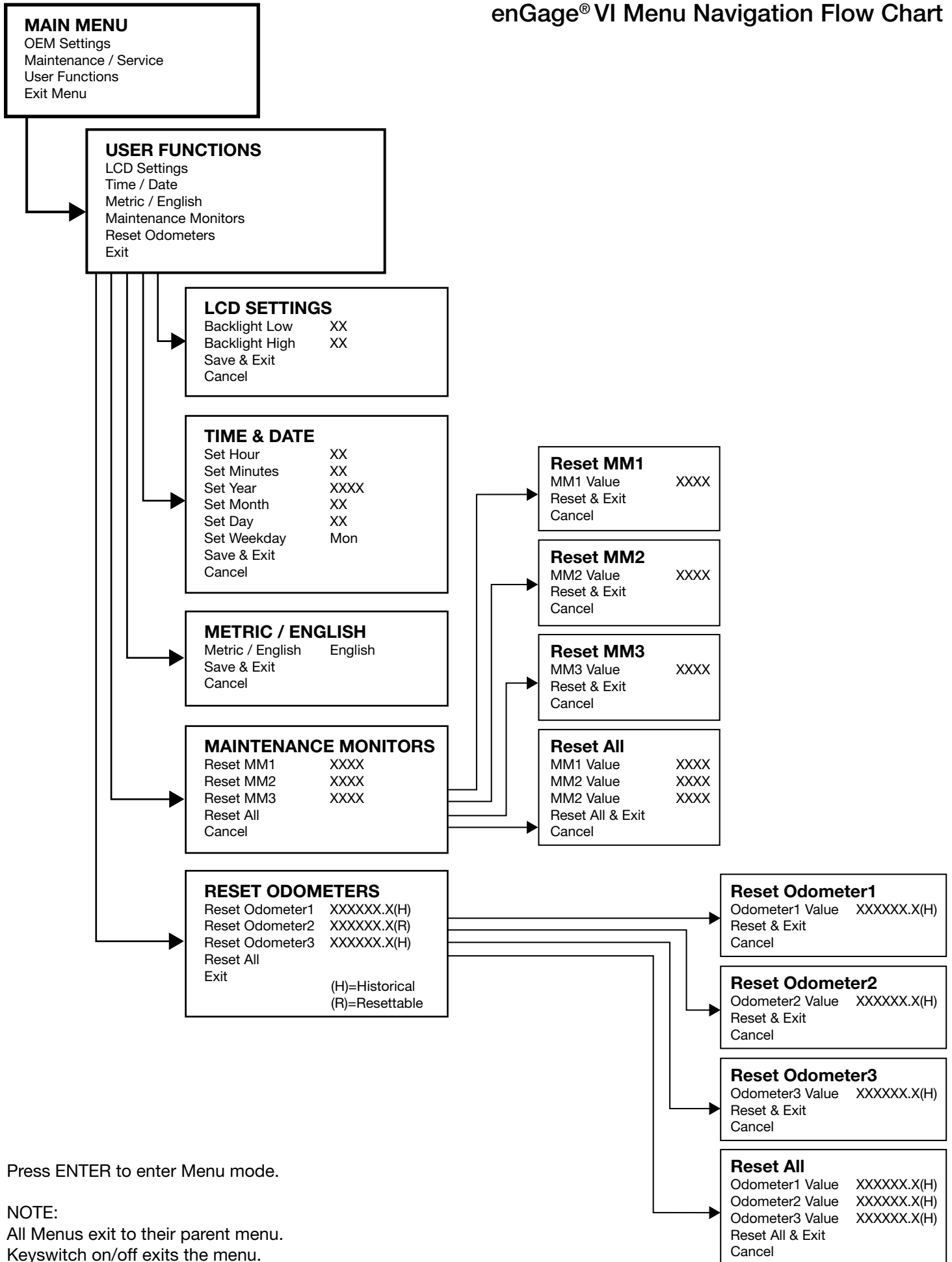
# enGage® VI Menu Navigation Flow Chart



Press ENTER to enter Menu mode.

**NOTE:**  
All Menus exit to their parent menu.  
Keyswitch on/off exits the menu.

# enGage® VI Menu Navigation Flow Chart



Press ENTER to enter Menu mode.

**NOTE:**  
All Menus exit to their parent menu.  
Keypress on/off exits the menu.

### 2.9.3 Choosing Menu System Items

Items are selected within each menu utilizing the up (▲), down (▼) right (▶), left (◀) and center / select buttons (●).

After navigating to the desired menu choice using the arrow buttons, the desired item will be highlighted. Pressing the center / select button (●) chooses the highlighted menu item.

You will then see a new set of choices for the selected item. Depending on your configuration, some menu items may not be present or accessible (consult factory for more details).

Below are select examples for using the menu system to set or re-set various display parameters. All remaining adjustable items are detailed in the menu-tree located on pages 13-15 in this manual.

#### Maintenance Monitor Reset

Starting from the main menu (you will be in the Main Menu section once you press the center / select button (●) from the standard operating screen), using the up (▲), down (▼), right (▶), left (◀) arrow buttons and center / select button (●) choose “User Functions.” The following choices will appear:

- LCD Settings
- Time / Date
- Metric / English
- Maintenance Monitors
- Reset Odometers
- Exit

Using the up (▲), down (▼), right (▶), left (◀) arrow buttons and center / select button (●) choose “Maintenance Monitors”. Once in the “Maintenance Monitors” menu you will see the following choices:

- Reset MM1
- Reset MM2
- Reset MM3
- Reset All
- Exit

You can now reset the three maintenance monitors. Using the up (▲), down (▼), right (▶), left (◀) arrow buttons and center / select button (●), reset individual Maintenance Monitor channels as desired or all three at once by choosing “Reset All”.

For example, to reset Maintenance Monitor 1, move cursor to choice labeled “Reset MM1” and press center / select button (●). You will then see new menu with the following choices:

- MM1 Value
- Reset & Exit
- Cancel

Utilizing the arrow and select buttons as needed, choose “Reset & Exit”.

You will now be returned to the “Maintenance Monitor” screen detailed above. If you are finished resetting maintenance monitors, using the down arrow (▼) button and center / select button (●) choose “Exit”. You are now returned to the main “User Functions” menu screen.

You can choose to adjust additional user items or return to the “Main Menu” by utilizing the up (▲), down (▼) arrow buttons and center / select button (●) “Exit”.

## Setting Metric / English Units

Starting from the main menu screen, choose “User Functions” then “Metric / English”.

Using the right arrow button (▶) move the cursor to the word “English”. You can also change to “Metric” using the up (▲), down (▼) arrow buttons and selecting (●).

Once the desired units are chosen, return to the main menu by pressing the left arrow button (◀) once then down arrow button (▼) to select “Save & Exit”.

## Set Clock

Starting from the main menu, choose “User Functions” then choose “Time/Date”. A new list of items will appear:

- Set Hour
- Set Minutes
- Set Year
- Set Month
- Set Day
- Set Weekday
- Save & Exit
- Cancel

Using the up (▲), down (▼), right (▶), left (◀) arrow buttons you can change the desired item. For example, to set “Hour”, using up (▲) or down (▼) arrow buttons highlight “Set Hour”, then press right (▶) arrow button to highlight number. Then press up (▲) or down (▼) arrows to reach desired value. To move on to setting additional items, press left arrow button (◀) once and follow similar procedure for all other items you wish to change.

When finished setting all desired values, choose “Save & Exit”.

### 2.9.4 Exiting Menu System

From the “Main Menu” screen, using the navigation buttons as outlined above, choose “Exit”. From any other menu screen, keep selecting “Exit” until you arrive at the desired screen.

## 3.0 ENVIRONMENTAL SPECIFICATIONS

### Temperature

#### Operating:

–40°C to +70°C (see \*Note below)

#### Storage:

–40°C to +85°C

#### Cycling:

Per SAE J1455 section 4.1.3.1.

#### Shock:

Per SAE J1455 section 4.1.3.2.

\*Note: Deviation from SAE J1455 Aug. 95, section 5.2.1.1 maximum temperature of +85°C due to LCD module limitations.

### Humidity

Applicable to enclosed units only: 95% RH (non-condensing) at +38°C as per SAE J1455 Aug. 94, section 4.2.3.

### Water / Dust Ingress, IP Rating

Applicable to enclosed units only: sealed front and rear to IP67 with video connector (J5) installed.

### Lens Fogging

Applicable to enclosed units only: meets SAE 1810, section 5.6.1.

### Lens Scratch Resistance

The standard glass lens is chemically strengthened. The optional polycarbonate lens is hard coated on the outside.

### Salt Spray (Fog)

Applicable to enclosed units only: meets SAE 1810, section 5.7.1.1.

### Shock

Applicable to enclosed units only: meets SAE 1378 July 98, section 5.6.

### Vibration

Applicable to enclosed units only: Meets SAE J 1378 July 98, section 5.5.

### EMC Specifications

#### Emissions

Designed to meet the following:

- Radiated Emissions: Broadband and Narrowband: UN ECE/324 Addendum 9 Regulation 10 Revision 4 for an Electrical/electronic sub-assembly (ESA).

## EMC Specifications continued

### Immunity

Designed to meet the following:

- Radiated Immunity: ISO 11451-1, 30V/m with 80% amplitude modulation (AM) with a 1 kHz sinusoid, ISO 11452-4 Bulk Current Injection.
- Conducted Immunity: ISO 7637-2.
- ESD Immunity: ISO 10605  $\pm 15$ kV air discharge and  $\pm 8$ kV contact discharge.

### Compliance

RoHS 2: enGage VI and enGage VII.

## 4.0 TROUBLE-SHOOTING

### GENERAL

#### Problem / Possible Cause

##### No Display –

V+ (keyswitch) voltage not present at J1-1, J1-3.

Battery voltage too low. Battery terminals not connected.

##### Display Too Dark/Light –

LCD backlight not adjusted correctly.

### BDI FUNCTION

#### Problem / Possible Cause

##### No Display –

Terminals not connected.

Improper voltage – Check B+ / B- is connected to proper pins (see tables earlier in this manual).

##### Stays At FULL –

Instrument voltage range selected does not match battery voltage.

V+ connected to wrong terminal.

BDI information coming from CAN network, CAN network value not correct.

##### Will Not Reset –

Instrument voltage does not match battery voltage.

Battery not fully charged, battery may be defective.

BDI information coming from CAN network, CAN network value not correct.

**Resets Without Charging Battery –**

Not connected directly to battery terminals.

**Empty Too Soon –**

Range Select V+ connected to wrong terminal.

Instrument voltage does not match battery voltage.

Terminals not connected directly to battery.

## **REAL TIME CLOCK (RTC)**

**Problem / Possible Cause**

**Correct Time, Date Not Saved When Main System Power (Battery) Disconnected –**

Internal battery depleted. Note that internal RTC battery life rated for 10 years minimum.

**Correct Time, Date Not Shown On Main Display –**

Time, date not set correctly per RTC time, date set section of manual.

## **SENDER FUNCTION**

**Problem / Possible Cause**

**No Display –**

Improper voltage – Check B+ / B- is connected to proper pins (see tables earlier in this manual)

**Stays At Maximum/Minimum –**

Sender or sender connection issues.

Sender connected to wrong terminal.

Incorrect sender used.

## **MAINTENANCE FUNCTION**

**Problem / Possible Cause**

**Will Not Reset –**

Procedure as described in earlier section not being followed.

## 5.0 MAINTENANCE

The enGage® VI is not field serviceable.



**CAUTION:** The protection provided by enGage® VI may be impaired if the device is used in a manner not specified by Curtis Instruments, Inc.

## 6.0 SAFETY

### SAFETY

This instrument was manufactured and tested according to the applicable technical standards. It complies with all the safety regulations as shipped from the factory.

Installation and startup must be performed by skilled personnel.

Failure to install and operate the unit in accordance with these instructions may result in damage or injury.

If safe operation of the instrument can no longer be ensured, stop and secure it against accidental operation.

If instrument failure or malfunction may cause personal injury or material damage, use additional safety measures such as limit switches, guards, etc.

Read Operating Instructions carefully before startup.

Note the safety instructions marked with this warning symbol in this manual.

## 7.0 WARRANTY

Two year limited warranty from time of delivery.