ENGINE MONITOR
VOTT
MODEL: 023-4400-0
3 YEAR WARRANTY

INTRODUCTION

The VOTT meter is an ideal engine monitor, which displays data via the J1939 CAN Bus. The meter utilizes a large LCD screen to simultaneously display DC volts, oil pressure, temperature and tachometer. It provides accurate digital metering and user programmable alarms. When alarm thresholds are exceeded, the built-in 85 dB alarm will sound and the affected display reading will change to RED for the out-of-limit condition. Additionally, a new feature always for user selectable baud-rate, 50k – 1000k bits/sec.

The meter is waterproof and rugged with a large color LCD display screen. The screen read-out is divided into 4 display sections allowing the operator quick, and accurate assessment of engine conditions.

DC volts are displayed from 9.5 – 33.0 VDC. Oil pressure is displayed from 0 – 99 PSI. Additionally engine temp and RPM are displayed, 100 – 250 F and 0000 – 9999 RPM, respectively.

The meter is powered by 12-24 VDC. Four levels of backlighting can be selected for optimal performance. All set-up, calibration and alarm values are saved to non-volatile memory. The system is complete with all necessary mounting hardware. The large LCD display draws only 0.08 amps at full brightness and only 0.02 in sleep mode. The meter comes with a 3 year warranty.

I. WIRING

The VOTT comes with a 33 inch length six conductor cable with a Deutsch Connector #DT04_ 6P attached.

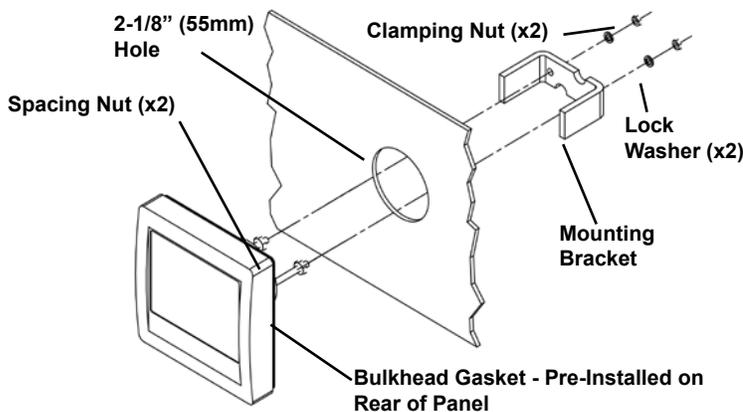The VOTT will operate from 9.5 to 33.0 VDC input. It displays data via J1939 CAN Bus.

Meter Deutsch connector pin ID is

Pin	Signal	Wire Color
1	+9.5- 33.0 VDC	Red
2	Power/Signal Ground	Black
3	J1939+	Yellow
4	J1939 -	Green
5	External buzzer 12 VDC alarm output **+**	White
6	External buzzer 12 VDC alarm output **-**	Blue

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II. MOUNTING

The VOTT requires a 2-1/8" diameter round hole for mounting. The meter comes with a aluminum U shaped mounting bracket and #8-32 nuts and lock washers to secure bracket.

See Figure 1. (FINGER TIGHTEN ONLY, DO NOT USE TOOLS)

2-1/8" (55mm) Hole
Clamping Nut (x2)
Spacing Nut (x2)
Lock Washer (x2)
Mounting Bracket
Bulkhead Gasket - Pre-Installed on Rear of Panel

III. MENU NAVIGATION

1. Main Page

When the instrument is powered up it displays the "Main" page. The "Main" page displays: ENGINE RPM,OIL PSI, ENGINE TEMP F (OR C) and BATT VOLTS. Values are displayed in GREEN if within acceptable alarm set limits or RED if out of limits condition exists.

ENGINE RPM	OIL PSI
2971	**53**
ENGINE TEMP F	BATT VOLTS
125	**13.8**

From MAIN PAGE display:

- Pressing the ▲ key for ½ second (longer than a quick press but shorter than 2 seconds) will cause a white ALARM bell symbol to be displayed and enable the alarms.

- Pressing the ▼ key for ½ second (longer than a quick press but shorter than 2 seconds) will disable the alarms and remove the white alarm bell symbol.

ENGINE RPM	OIL PSI
2971	**53**
ENGINE TEMP F	BATT VOLTS
125	**13.8**

ENGINE RPM	OIL PSI
2971	**53**
ENGINE TEMP F	BATT VOLTS
125	**13.8**

- Press the "+" key momentarily while an alarm conditi0n exists will silence the audible and external alarm as indicating by Red "X"

- Pressing the + key for ½ second (longer than a quick press but shorter than 2 seconds) will increment the backlight level through four different intensities.

2. Menu Tree:

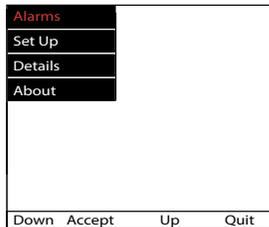### *Press ＊*

A) Secured Access Pages

While in the Main page or Generator Hours page, a Quick press of the ＊ key brings up the Security Access page and a default number 5000 is displayed in the ACCESS CODE box.

```
        Security Access Code
                        Change
                         Value
   Enter Access Code    5000
                       Access Code


   Down   Accept      Up     Quit
```

Use the ▲ and ▼ keys to scroll to the correct access code and press "ACCEPT" to enter that number (default ACCESS CODE is 1234). The longer you hold down the p or q key, the faster the scrolling of numbers. False entry results in Main Page being displayed. Entry of correct access code unlocks the instrument and brings up the following menu:
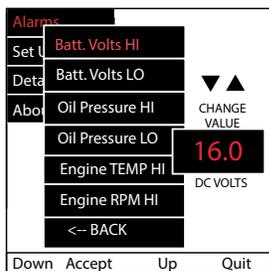
B) Category:
I.ALARMS
II.SETUP
III.DETAILS
IV.ABOUT

```
   Alarms
   Set Up
   Details
   About




   Down   Accept      Up     Quit
```

I. ALARMS Menu:
BATT VOLTS HI
BATT VOLTS LO
OIL PRESSURE HI
OIL PRESSURE LO
ENGINE TEMP. HI
ENGINE RPM HI
<-- BACK

```
   Alarms
   Set    Batt. Volts HI
   Deta   Batt. Volts LO      ▼▲
   Abo    Oil Pressure HI   CHANGE
          Oil Pressure LO    VALUE
          Engine TEMP HI     16.0
          Engine RPM HI     DC VOLTS
          <-- BACK
   Down   Accept      Up     Quit
```
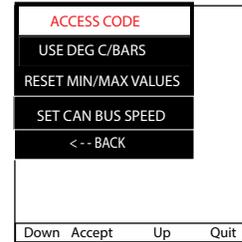
Alarm Ranges:
Engine RPM: 0000 - 9999 is set to 1300 (whole numbers only)
Oil Pressure: Low/High settable to 00 - 99 (whole numbers only)
Engine Temp: High settable to 100 - 250
Battery Volts: Low/High settable to 9.0 - 33.0

II. SET UP:
ACCESS CODE
USE DEG C/BARS (or use DEG F/PSI)
RESET MIN/MAX VALUES (see Details page)
<-- BACK

```
        ACCESS CODE
       USE DEG C/BARS
     RESET MIN/MAX VALUES
      SET CAN BUS SPEED
         <-- BACK


   Down   Accept      Up     Quit
```
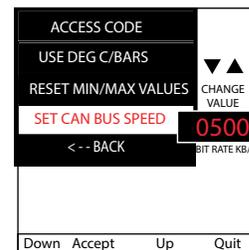
-ACCESS CODE SETTING

If no key has been pressed for 60 seconds from any of the menus or submenus, the instrument will revert to displaying the Main Page.

The ACCESS CODE is required to access alarm settings, and instrument setup menus. Set the ACCESS CODE to
a number from 0000 to 9999 by using the ▲ and ▼ keys then press the + key to accept. The factory default is set to 1234.

If the ACCESS CODE is ever forgotten, the instrument can be reset back to factory default. Reset to "Factory Defaults" by pressing and holding the ▲ and ▼ keys while applying DC power. Answer "Yes" by pressing key labeled "Yes". This will reset pasword to 1234. Caution: Resetting to factory default will reset all alarm settings as well.

-SET CAN BUS SPEED

```
        ACCESS CODE
       USE DEG C/BARS      ▼▲
     RESET MIN/MAX VALUES  CHANGE
      SET CAN BUS SPEED     VALUE
         <-- BACK           0500
                         BIT RATE KB/S

   Down   Accept      Up     Quit
```

Serial #'s starting with the letter 'B' can be adjusted to various Can Bus Bit Rates: 50,125,250,500,1000 K Bits. Units are factory set to 500K.
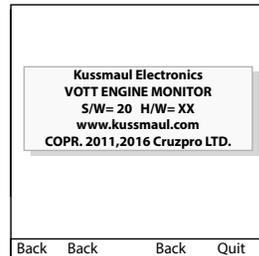

-PRESS ACCEPT

The Bit Rate can be changed by accessing the SET UP category and selecting "SET CAN BUS SPEED" use Up/Down arrows to set changes in VALUES.

III. DETAILS: Displays details page. SN, Min/Max, Alarm Values, etc.

```
            DETAILS
SERIAL NUMBER: 111003002 | UNITS
ACCESS CODE:      4999    | DEG F
INSTRUMENT HOURS: 1.1     | PSI
DC VOLTS ALARM HI: 16.0 LO: 11.3
OIL PRESS ALARM HI: 75 LO:  9
ENG. TEMP. ALARM HI: 224
RPM ALARM HI: 3500
OIL PRESSURE MAX: 99   MIN: 2
BATT. VOLTS  MAX: 99.9 MIN: 13.8
MAX RPM: 8031     MAX TEMP: 410
BACK   BACK     BACK    QUIT
```

IV. ABOUT: Displays splash screen, SW version, HW version and copyright information.

```
        Kussmaul Electronics
        VOTT ENGINE MONITOR
        S/W= 20  H/W= XX
        www.kussmaul.com
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Back   Back       Back     Quit
```

Additional Information:

- Low Oil Pressure only updated if Rpm>100 (ie: engine running)

- Battery Voltage limited to 99.9 (only 3 digits for display)

- Oil Pressure limited to 99 PSI (only 2 digits for display**)**

- Engine Temperature 32 deg F (0 deg C) minimum (avoid negative numbers when in Deg C)

- MaxRpm only updated if Rpm > MaxRpm+10 (help prevent exceeding max number of Flash writes)

- "LOST COMM" message displayed if no J1939 data received for 10 or more seconds. Restore display on valid data or any key

- A press of any button activates/restarts 5 minute alarm "silence" timer

- Don't allow INSTRUMENT hours to increment in Sleep mode

SPECIFICATIONS

Power Supply: 9.50 to 33.00 VDC, @ 80mA
Operating Temperature: 32° to 122° F (0° to 50° C)
Size: 4.3" x 4.3" x 3.5" deep (110 x 110 x 89 mm)
Display Data:

Engine RPM: 0000-9999 (or as provided by J1939) On screen title "ENGINE RPM**"**

Oil Pressure: 0199 PSI (or as provided by J1939). On screen title "OIL LSI" (factory default).User selectable for Millibars or European standard. On Screen "MBRS".

Engine Temp:100-250° F (or as provided by J1939) On screen title " ENGINE TEMP F" (factory default0. User selectable for Centigrade, on screen title "ENGINE TEMP C"

Battery Volts: 9.5 - 33.0 On screen title "BATT VOLTS**".** Displays "COMM LOSS" & red dashes with loss of J1939 DATA. No alarm on COMM LOSS.

Accuracy:

Battery Volts: As provided by J1939
Engine RPM : As provided by J1939
Engine Temperature: As provided by J1939
Oil Pressure: As provided by J1939

Supplied Transducers:

Voltage (1 each) Current transformers (2 each)

Alarms: Engine RPM, Low/High Oil Pressure, High Engine Temp. and Low/High Battery Volts
Alarm Output: 12 VDC, 50 mA max.

INSTALLATION RECORD

DATE INSTALLED _____

INSTALLED BY _____

VEHICLE IDENTIFICATION _____

VEHICLE OWNER _____

WARRANTY POLICY

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