

CruzPro<sup>®</sup>



VAF110



AC Volts, Amps,  
Frequency, kW Monitor

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# Introduction

The CruzPro VAF110 provides accurate digital metering for AC Volts, Amps, Frequency and Kilowatts. Low/High Voltage, Low/High Frequency and High KW alarms are easily set. When activated, the built-in 85 dB alarm will sound and the display will flash the out-of-limit condition.

Volts can be displayed from 90 to 300 VACRMS. Amps can be displayed from 0 to 150 amps. Killowatts are displayed from 0.0 to 45.0 kW in tenths.

The VAF110 outputs standard NMEA 0183 serial data sentences of AC volts, amps, frequency and kW. If the NMEA 0183 serial data is not required, then this output line can be programmed to turn off a faulty generator.

Five levels of backlighting can be selected and the backlights can be remotely turned ON/OFF. All set-up, calibration and alarm values are saved to non-volatile memory. The VAF110 comes complete with voltage and current transformers and is factory calibrated to read within 1%. The large LCD display draws only .035 amps and only .055 amps with full backlighting.

The VAF110 is powered with a power source of 9.5 to 33.0 VDC and transient protected.

# Specifications

**Power supply:** 9.50 to 33.00 VDC, .037 amps nominal

**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:** AC Volts, AC Amps, Frequency, Kilowatts

**Resolution:** 1 VAC, 1 amp, 0.1 kW

**Accuracy:** Better than 1% for volts and 2% +/-1 digit for amps, .05% for frequency. Volts, amps, frequency all front panel adjustable.

**Ranges:** 90 to 300 VAC  
0 - 150 Amps AC  
30 - 100 Hz  
0 - 45.0 kW

**Supplied Transducers:** Voltage and Current transformers

**Alarms:** High/Low Voltage, High & Low Frequency, High kW

**Display:** 4 digit LCD, 5 levels of backlighting.

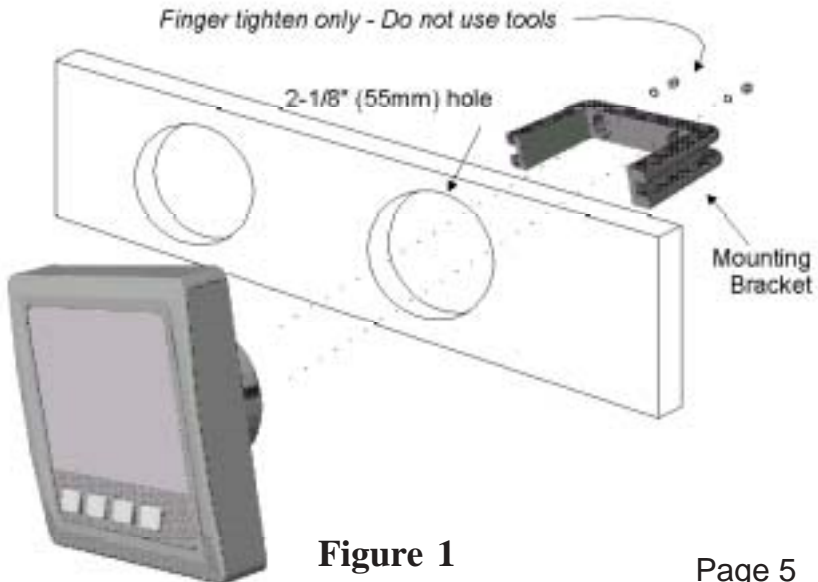
**NMEA 0183:** \$IIXDR,U,xxx,V,VAF30,\*CS for Volts  
\$IIXDR,I,yyy,A,VAF30,\*CS for Amps  
\$IIXDR,F,zz.z,H,VAF30,\*CS for Frequency  
\$IIXDR,G,aa.a.,VAF30,\*CS for Kw

**Generator Control:** NMEA 0183 line programmable as automatic generator shut-down control if generator volts/frequency/kW out of range.

# Installation

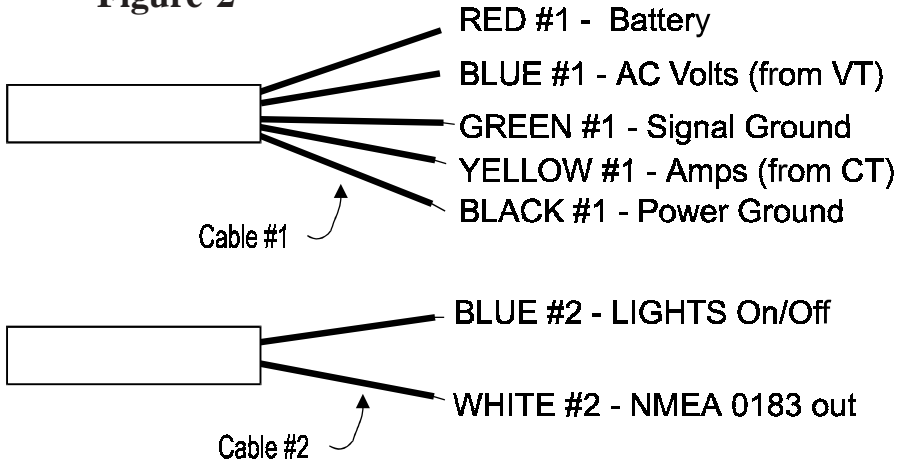
*Before starting the installation, please read this entire section first. Finger tighten the screws that mount the instrument bracket - It is not necessary or recommended to use tools.*

- Drill a 2-1/8" (55mm) mounting hole where you desire to mount the instrument (Figure 1).
- Connect the various wires from Cable 1 and Cable 2 as shown in Figures 2 and Figure 3.
- Carefully check all your wiring against figures 2 and 3 and then mount the instrument in the hole. Use only finger tension to tighten the bracket hold-down nuts

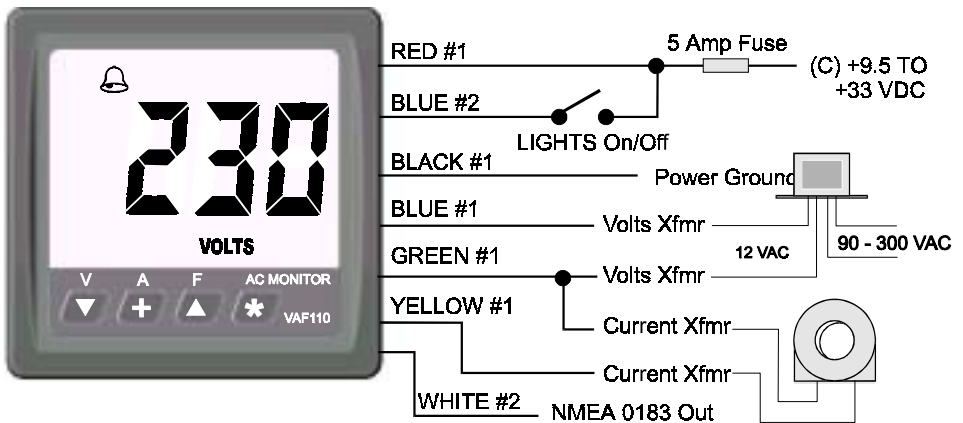


**Figure 1**

**Figure 2**



**Figure 3**



# Operation

## Key Functions

The **▼**, **+**, **▲** and **\*** (**V**, **A**, **F** and **\***) keys are used to select what to display, set backlight levels, calibrate volts/amps/frequency, turn alarms on/off, set alarms and set/change constants. New information is automatically saved to non-volatile memory.

## Turning Alarms ON/OFF

Press the **▲** key 1/2 second to turn alarms ON. In Voltage mode, the alarm icon will light. Press the **▼** key 1/2 second to turn the alarms OFF.

## Backlight Intensity

Press **+** the key 1/2 second to adjust the backlight level for night viewing. Each time you press the **+** key 1/2 second, the level will get brighter 1, 2, 3, 4, OFF, 1, 2, ... etc. The blue backlight ON/OFF control wire in cable #2 must be switched to +12/24V for the backlights to work.

## Display Volts/Amps/Frequency/kW

Quick press the **V**, **A**, or **F** key to select Voltage, Amps or Frequency display. To display Killowatts, press the **V** and **A** keys simultaneously.

## Setting High Volts Alarm

While viewing Volts, press and hold the ▲ key for ten (10) seconds until you hear a long beep. The High Volts alarm value will be displayed. Use the ▼ and ▲ keys to set the desired alarm value. Press the + key to save the High Volts alarm value to memory.

## Setting Low Volts Alarm

While viewing Volts, press and hold the ▼ key for ten (10) seconds until you hear a long beep. The Low Volts alarm value will be displayed. Use the ▼ and ▲ keys to set the desired alarm value. Press the + key to save the Low Volts alarm value to memory.

## Setting High Frequency Alarm

While viewing Frequency, press and hold the ▲ key for ten (10) seconds until you hear a long beep. The High Frequency alarm value will be displayed. Use the ▼ and ▲ keys to set the desired alarm value. Press the + key to save the High Frequency alarm value to memory.



## Setting Low Frequency Alarm

While viewing Frequency, press and hold the ▼ key for ten (10) seconds until you hear a long beep. The Low Frequency alarm value will be displayed. Use the ▼ and ▲ keys to set the desired alarm value. Press the + key to save the Low Frequency alarm value to memory.

## Setting High Killowatts Alarm

Press the V and A keys simultaneously to view the kW display. While viewing kW, press and hold the ▲ key for ten (10) seconds. You will hear a beep and the High kW alarm value will be displayed. Use the ▼ and ▲ keys to set the desired alarm value. Press the + key to save the High kW alarm value to memory.

## Calibrating the Voltmeter

The VAF110 is calibrated at time of manufacture, but can be calibrated using the front panel keys. To calibrate the voltmeter, press and hold the V and \* keys for 10 seconds (until you hear a long beep) to enter into voltage calibration mode. Use the ▼ and ▲ keys to make the displayed value read correctly. Press the + key to save the calibration data to memory.

## Auto-Zeroing the Ammeter

Press the **A** key to display amps. Then press and hold the **A** key for 10 seconds (until you hear a long beep) to auto-zero the ammeter.

## Calibrating the Ammeter

To calibrate amps, press and hold the **A** and **\*** keys for 10 seconds (until you hear a long beep) to enter into amps calibration mode. Pass a known amount of current through the current transformer (CT) and use the **▼** and **▲** keys to make the displayed value read correctly. Press the **+** key to save the calibration data to memory. A reasonably high value of current should be used (30 amps minimum) to obtain an accurate calibration.

## Calibrating Frequency

To calibrate frequency, press and hold the **F** and **\*** keys for 10 seconds (until you hear a long beep) to enter into frequency calibration mode. Using a known frequency, press the **▼** and **▲** keys to make the displayed value read correctly. Press the **+** key to save the calibration data to memory.

## NMEA 0183 Sentences

The VAF110 outputs serial data of voltage, amps, frequency and kW in NMEA 0183 format. The sentences are output in the following formats:

**Volts:**            \$IIHDR,U,xxx,V,VAF30,\*CS  
**Amps:**            \$IIHDR,I,yyy,A,VAF30,\*CS  
**Frequency:** \$IIHDR,F,zz.z,H,VAF30,\*CS  
**kW:**               \$IIHDR,G,aa.a.,VAF30,\*CS

\*CS = Check Sum

## Selecting NMEA 0183 or External Alarm Output

The NMEA 0183 serial data line can be programmed to function as an external generator cut-off switch. In this way the generator can be shut down automatically if the voltage or frequency falls outside the alarm ranges set by the user.

To toggle the data line between NMEA 0183 and Generator Shut-Off, press and hold down both the ▼ and ▲ keys for 10 seconds (until you hear a long beep). The new output mode is automatically saved to memory. A 5V signal in series with 270 ohms (10 mA Max.) is output to the generator shut-down circuitry whenever an alarm condition exists and the alarms are enabled (armed).

### Notes and Warnings

a) During calibration or setting of alarm values, pressing and holding down the ▼ or ▲ keys will cause the values to scroll faster the longer you hold down the keys.







## Other CruzPro Products

- Depthsounders/w Keel Offset, Deep/Shallow/Anchor Drag Alarms
- PC Based DSP Fishfinder for Windows 98, NT, SE, XP, 2000
- Speed/Temperature/Logs
- Digital DC Volts Gauge/w Alarms
- Digital DC Volts Gauge/w Alarms for 3 Battery Banks
- Digital Amps Gauge
- DC Volts/Amps/Amp-Hour Monitors
- AC Volts/Amps/Freq/kW Monitors
- LPG/Petrol Gas Detectors/Alarms
- Bilge Water Alarms/w Stainless Steel Water Sensor
- Intelligent Bilge Pump Controllers/w Stainless Steel Water Sensors
- Intelligent Windlass Controller/Chain Counters
- Digital Fuel Gauges & Fuel Consumption Calculator
- Digital Tank Level Gauges for 1 or 3 Tanks/w Separate Alarms
- Smart 4 step Alternator Regulator
- Marine Security System/w Reliable Intrusion Sensors
- RPM/Engine Hours/Elapsed Time Gauges/w Alarm
- Digital Engine Temperature Gauge/w Alarms
- Digital Oil Pressure Gauge/w Alarms
- Digital Temperature Gauges for 1 or 3 Areas/w Alarms
- Digital Clock/Watch/Race Timers/w 8 Alarms
- 8 and 16 Amp Light Dimmers/Motor Speed Controller
- Solar Panel Charge Controllers 6/8/9 & 20 Amps
- 4 & 8 Channel NMEA Combiners/RS-232 Convertors
- Engine/Exhaust Temp. Monitor & Digital Pyrometer
- NMEA 0183 Remote Data Repeater/w 4 Input Channels

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