V-DOG2 *Ver1.0*

User Manual for AC Voltage & Frequency Detector

ISO 9001
ETC

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SECTION 1 : INTRODUCTION

1.1 Preliminary Comments & Safety Precautions

This manual covers installation, operation and maintenance of the V-DOG2 AC Voltage & Frequency Detector to assist the user in operating the V-DOG2. This manual is for use by authorized and qualified personnel only.

WARNING
High voltage will cause severe injury or death

1.2 Product Overview

The V-DOG2 control module is a programmable, multi-function voltage and frequency detector. With compact size it has the benefit that it can be installed on the door of a panel and replace traditional relays.

It's main functions are as follows：
- Programmable through control panel
- Compact size with user-friendly 7-segment display
- User selected cycle-mode or fix-mode displays for 3-phase and single-phase voltages and frequency
- Monitors AC power source for over or under voltage
- Monitors AC power source over or under frequency
- User and Factory set parameters are permanently saved and will not be lost due to power failure
- Control panel displays power status and fault alarms

1.2.1 Operational Simplicity

From installation to programming and usage, the V-DOG2 controller is designed with operational simplicity in mind. The user-friendly front panel interface simplifies routine operation, programming and setting.

1.3 Specifications

The wide range of parameter settings in the V-DOG2 control module can supply all the requirements of a power system. These features can be set through a user-friendly operating panel interface. All user and factory settings are permanently saved and will not be lost due to power failure.

Feature 1：Full phase Over voltage/Under voltage / Lost phase sensing

The V-DOG2 control module can detect each phase voltage in the power supply. Users can set their own over-voltage and under-voltage ranges. (Refer to setting items 1, 2, 3 & 4 in Table 3.4)

Over Voltage Setting range：110 – 530 Vac

Over Voltage reset value： -5Vac (not adjustable)

Under Voltage Setting range：80 – 470 Vac

Under Voltage reset value：+5 Vac (not adjustable)

Feature 2 ： Over Frequency/Under Frequency Sensing

The controller is able to detect the frequency of the power supply. Users can set their own over frequency and under frequency ranges. (Refer to setting items 5, 6 & 7 in Table 3.4)

Over Frequency setting range：51 – 75 Hz

Over Frequency reset value：1 Hz (not adjustable)

Under Frequency setting range：40 – 59 Hz

Under Frequency setting value：-1 Hz (not adjustable)

Feature 3：Control Panel Lighting Test

The Control Panel Lighting test provides users with a convenient view of whether the panel LED indicators are normal. Press the Setting button on the control panel and all displays will light at the same time.
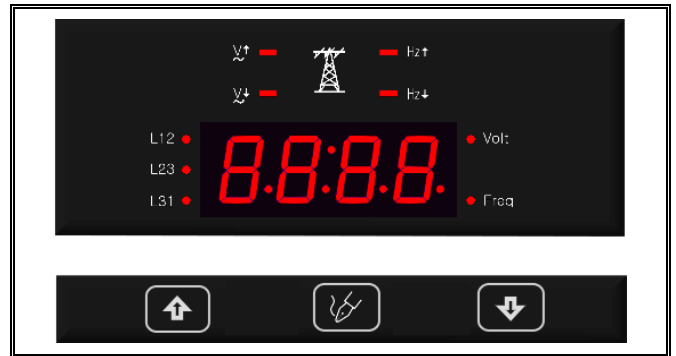
SECTION 2 : OPERATOR PANEL

2.1 Overview

This section introduces the hardware architecture and features of the V-DOG2. The contents are divided into the following sections :

- Display screen
- Function buttons
- Panel LEDs

2.2 Display screen

The V-DOG2 controller has a four-digit, seven-segment display for all parameters, setting and messages.

The screen displays：
- Full phase voltage / frequency
- Program setting parameter

2.3 Function Buttons

The front panel uses three membrane switch buttons.

2.3.1 Increase (▲) Button

In normal mode pressing the Increase (▲) button changes the display to the next phase voltage reading.

When entering system parameters in setting mode each press of the up (▲) button increases the displayed parameter by a single unit. If held down the Increase (▲) button continues to scroll rapidly.

2.3.2 Decrease (▼) Button

In normal mode pressing the Decrease (▼) button changes the display between voltage, duty time and frequency.

When entering system parameters in setting mode every press of the Decrease (▼) button decreases the displayed parameter by a single unit. If held down the Decrease (▼) button the displayed parameter will continue to scroll rapidly.
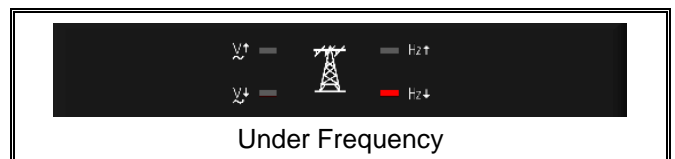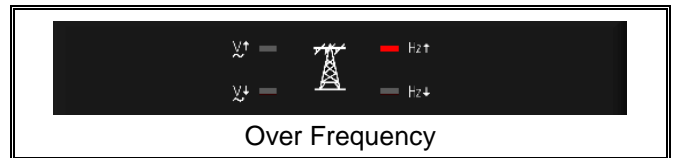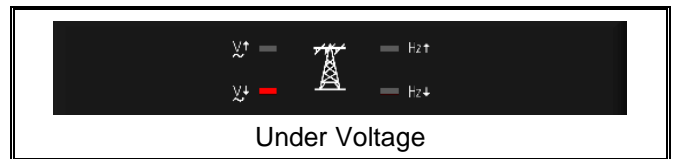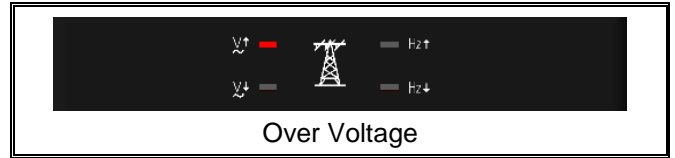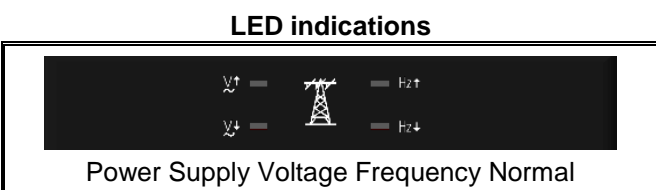
2.3.3 Setting button - between (▲) & (▼)

When the Setting button is pressed the V-DOG2 will enter the setting mode and the control LED indicators will flash for several seconds. In this mode all controller functions of V-DOG2 will be temporarily halted.
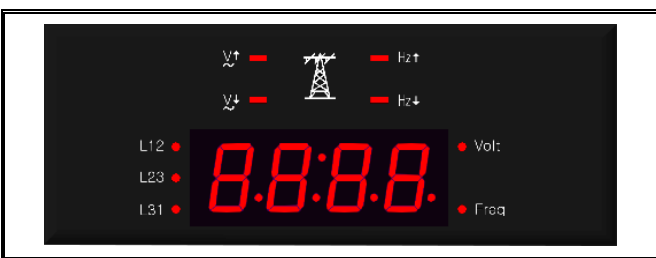
2.4 Panel LED indicators

The red LEDs on the control panel indicate different power failure conditions. Refer to the following illustrations for details.

LED indications

Power Supply Voltage Frequency Normal

Over Voltage

Under Voltage

Over Frequency

Under Frequency

SECTION 3 : OPERATION

3.1 Overview

This section will introduce the operation mode and user functions of the V-DOG2 control module. It is divided into two main parts :

● Programming settings mode
● AC voltage correction

This section contains all actual operating and use situations. The user should first read the previous sections before reading this section.

3.2 Programming Settings

In the Program Settings mode all parameters can be set directly on the V-DOG2 operator panel. To enter the system Program Setting mode hold down the Setting button for 4 seconds. The "Vr. 01.01" will appear on the display for 2 seconds displaying the current version of the program.

Press the Setting button to skip to the next line in the System Settings Table 3.4 below. Use the increase button (▲) and the decrease button (▼) to set the value of each parameter for each step. If you press the increase button (▲) or decrease button (▼) the parameter value will increase or decrease by 1. If you hold down the increase button (▲) or decrease button (▼) the parameter value will increase or decrease until the built-in limit is reached.

Press the Setting button to jump to the next line until "END" is displayed and end the program setting mode. Or press and hold the Setting button for 4 seconds can also directly end the program setting mode.

If an error appears during the settings process or you want to return to factory settings you only need to press the Increase button (▲), Setting button and Decrease button (▼) at the same time. Press for 4 seconds until the letters "Au.Po" appear on the display screen. Confirm that all settings have been reset to the factory settings. (For factory setting values refer to System Settings Table 3.4).

3.3 Voltage Calibration

The voltage value of the V-DOG2 controller is accurately calibrated at the factory. However, if the voltage value needs to be modified perform voltage calibration according to the following procedure.

Step 1 : Before carrying out voltage calibration confirm that the AC power is properly connected.

Step 2 : Enter the program setting mode and set item 9 to (01). Then press the Setting button and the word "VAdJ" appears in the display.

Step 3 : Press the Setting button to select the phase you want to recalibrate.

Step 4 : Use a precision multimeter to measure the voltage value of the phase you want to calibrate.

Step 5 : Press the increase button (▲) and the decrease button (▼) to enter the voltage reading from the meter.

Step 6 : It is necessary to press the Setting button to change to the next phase to be calibrated or until "End" appears on the screen. To end the program immediately press and hold the Setting button for 4 seconds to exit the program.

Step 7 : If the display shows (FAIL) it means that the calibration has failed. Press the Setting button to clear the alarm message and start the operation again according to step 1.

3.4 System Settings Selection Table

LINE	DESCRIPTION	SETTING VALUE	FACTORY SETTING
1	Is input power single-phase or 3-phase?	00 → Single-phase 01 → 3-phase	**01**
2	Over voltage setting	110 – 530V	**250V**
3	Under voltage setting	80 – 470V	**180V**
4	Timer to confirm voltage fault	01 – 99 seconds	**10 sec.**
5	Over frequency setting	51 – 75 Hz	**65 Hz**
6	Under frequency setting	40 – 59 Hz	**55 Hz**
7	Timer to confirm fault with power supply frequency	00 – 99 seconds (0 means no frequency detection function = Function Disabled)	**10 sec.**
8	Display mode	00) Cyclic 01) Fixed setting	**00**
9	Enter AC voltage calibration mode?	00 → No 01 → Yes	**00**

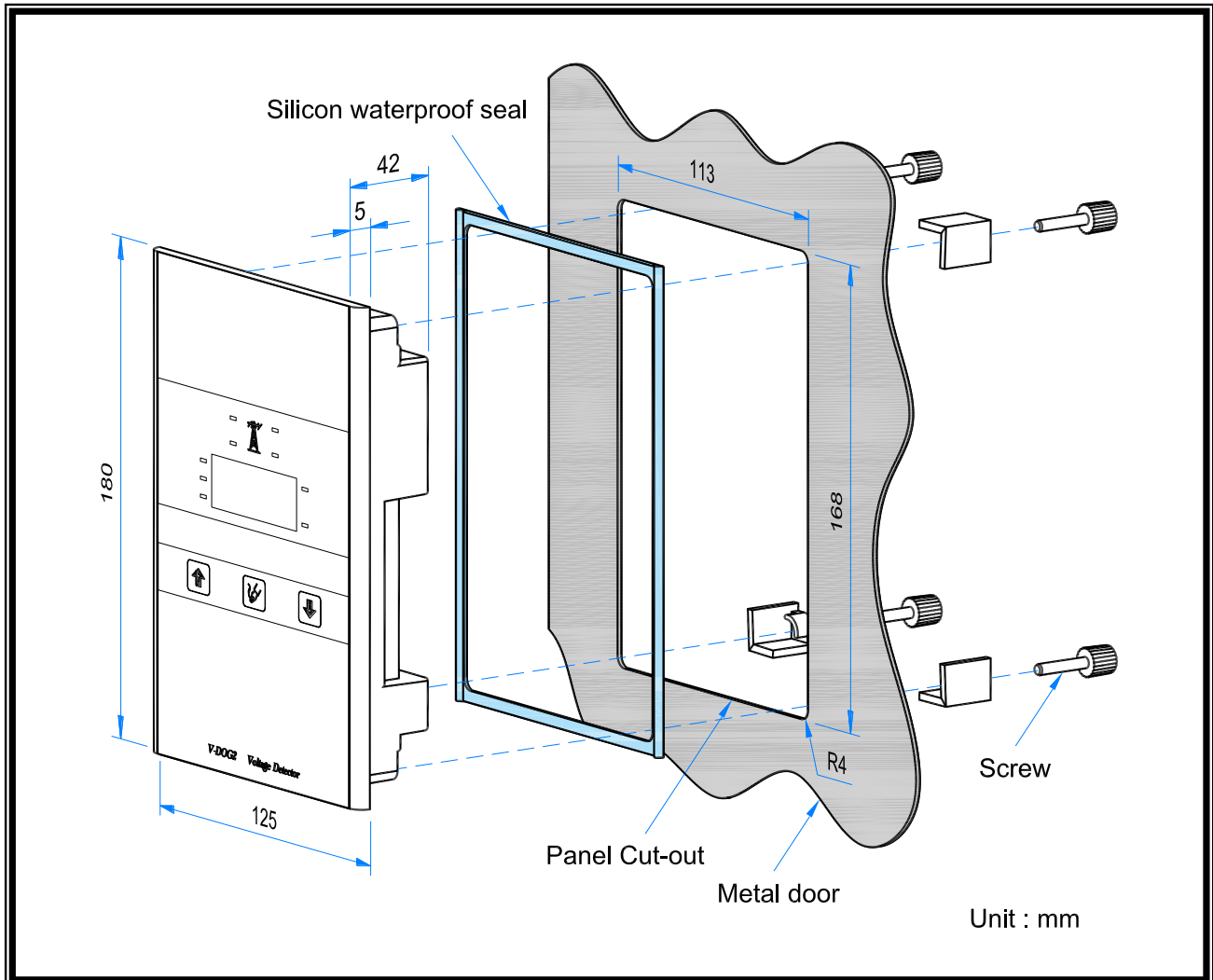### 3.5 Specification Summary

DESCRIPTION	SPECIFICATION
AC Voltage Detection Range	50 – 550 Vac 50/60 Hz
Frequency Detection Range	40 – 75 Hz
Auxiliary Output Contact capacity	7A @ 250 Vac Max
Operating Temperate	-20 to +70 °C
Storage Temperature	-30 to +80 °C
Relative Humidity	Max. 90%
Control panel fastener hole dimensions	113.0 (L) x 168.0 (W) +/- 0.5 mm
Unit dimensions	125.0 (L) x 180.0 (W) x 42.0 (H) mm
Weight	450 g +/- 2%

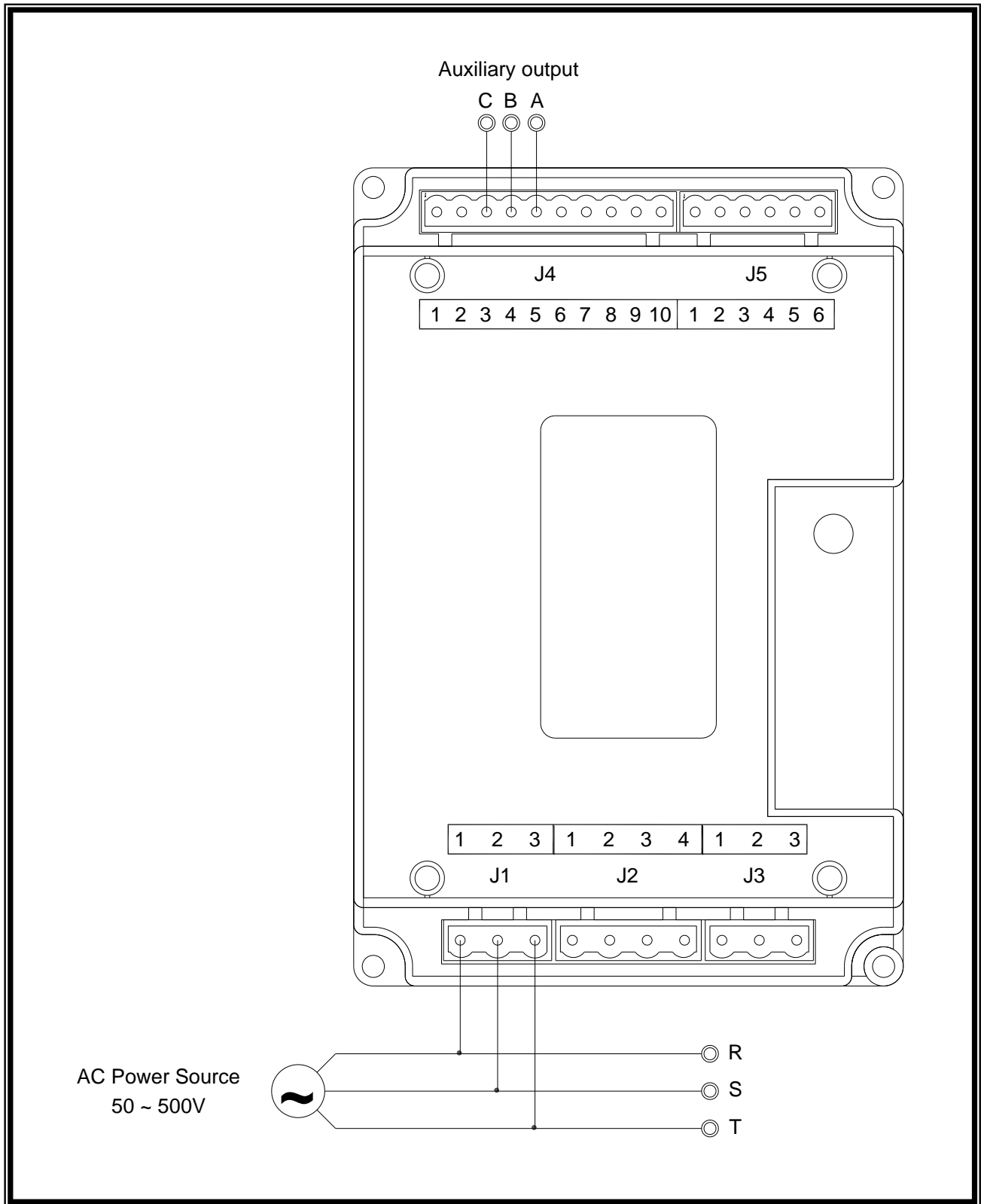# SECTION 4 : INSTALLATION INSTRUCTIONS

4.1   General
The V-DOG 2 controller is designed for front panel mounting

4.2   External Appearance / Dimensions / Installation Drawings (Units：mm)

Silicon waterproof seal
42
5
180
125
113
168
R4
Screw
Panel Cut-out
Metal door
Unit : mm

V-DOG2   Voltage Detector

SECTION 5 : WIRING CONNECTION ILLUSTRATIONS

5.1   3-phase system connection illustration

5.2 Single-phase system connection illustration