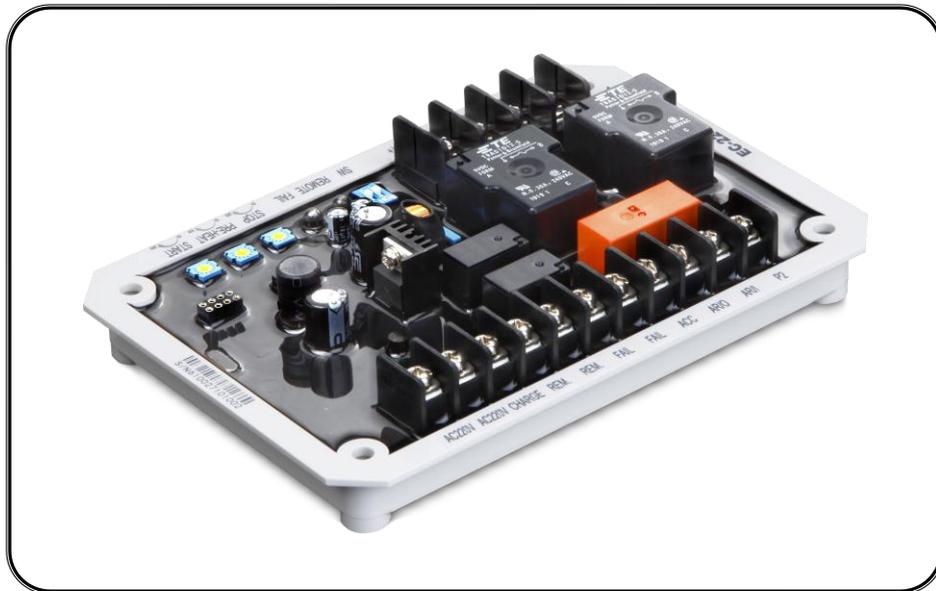


EC-22

Auto Start Control Unit for DENYO Generator Operation Manual



* All manufacturer names and numbers are used for reference purpose only and do not imply that any part is the product of these manufacturer.

SECTION 1 : INTRODUCTION

The EC-22 is an Auto Start Control Unit designed for DENYO generators. It can accept signals from a remote switch or an automatic transfer switch (ATS) to automatically start or stop the generator. The unit will make 3 cranking attempts.

The circuit was controlled by a microprocessor for full digital processing, reliable performance, and significantly reduced size. The circuit board is potted with UL94-V0 rated epoxy resin, enable to use in harsh environments.

SECTION 2 : FEATURES

- Small size, low cost and high stability.
- Very low power consumption in standby mode.
- Potentiometer time delay settings.
- Three cranking attempts.
- Generator fault indicator and alarm output contacts.
- Energize-to-Run and Energize-to-Stop selectable.

SECTION 3 : INSTRUCTIONS

3.1 Operation

When operate in Auto mode, set Key switch at OFF position (Stop), at this time the Start and Stop for Generator will take control by EC-22 Control Unit.

When EC-22 receives external remote start signal, the control module will automatically enter Start procedure. First, the Pre-Heat Timer will start to count down and output terminal will be active. When time delay counts up the engine Start Terminal will send output signal to drive the starter motor. The Pre-Heat Timer and Cranking Timer can be set by potentiometer.

If the engine cannot start up after Cranking timer counts up. It will return to warm-up cycle and execute the second starting procedure. If the engine fails to start in 3 times (Internal preset), EC-22 will judge engine star failure, and the FAIL Indicator LED will light up.

The EC-22 will judge whether the engine is running according to the following two parameters. When any one of the conditions is met, the EC-22 control module will stop sending the starter motor signal to prevent the starter motor from being damaged by the high engine speed.

- Established AC frequency is greater than 18 Hz
- Charging voltage of generator
 - 12V battery system is up to 7 Vdc or more
 - 24V battery system is up to 14 Vdc or more

When remote start signal was terminated during Engine running, the EC-22 will in process Stop procedure by following the Shutdown setting and Timer count down.

3.2 Time Delay Settings and Adjustments

Various Time delay setting and adjument

- STOP : Engine Shutdown Timer
【Adjustment Range : 1 – 20 seconds】
- PRE_HEAT : Engine Pre-Heat Timer
【Adjustment Range : 1 – 10 seconds】
- START : Engine Cranking Timer
【Adjustment Range : 1 – 20 seconds】

NOTE!!

In addition to preheating output control, the preheating delay is also the interval between two starts. Unless there is a special control requirement, even if the Engine doesn't need preheating function, this time delay is still recommended to set for 5 seconds to ensure the starter motor will not be damaged by overheating during repeated starting.

3.3 DIP Switch Settings and Adjustments

EC-22 Control Module has 2P DIP Switch for function setting

- SW. 1 : DC Voltage for Battery system
【ON : 24V OFF : 12V】
- SW.2 : Engine Shutdown Mode
【ON : Energize-to-Stop OFF : Energize-to-Run】

NOTE!!

DENYO Generator set should set DIP SW2 at OFF position.

3.4 Status for Indicator LED

- REMOTE : External Remote start input signal
- FAIL : No AC voltage output when engine is running
 - Engine Failure Shutdown
 - Engine Start Failure

NOTE!!

If the AC power supply suddenly disappears while Engine is running, the FAIL indicator will light up to indicate a system failure, but the EC-22 will not stop the engine. The failure may cause by malfunction AVR or the AC signal is off-line. At this time, the Engine should be stopped manually, then find out main cause of failure and eliminate before performing the Auto Start function. If the generator is started by remote control without solving the failure problem, the AC frequency may not be detected, which may damage the starter motor because it will fail to detach after operation.

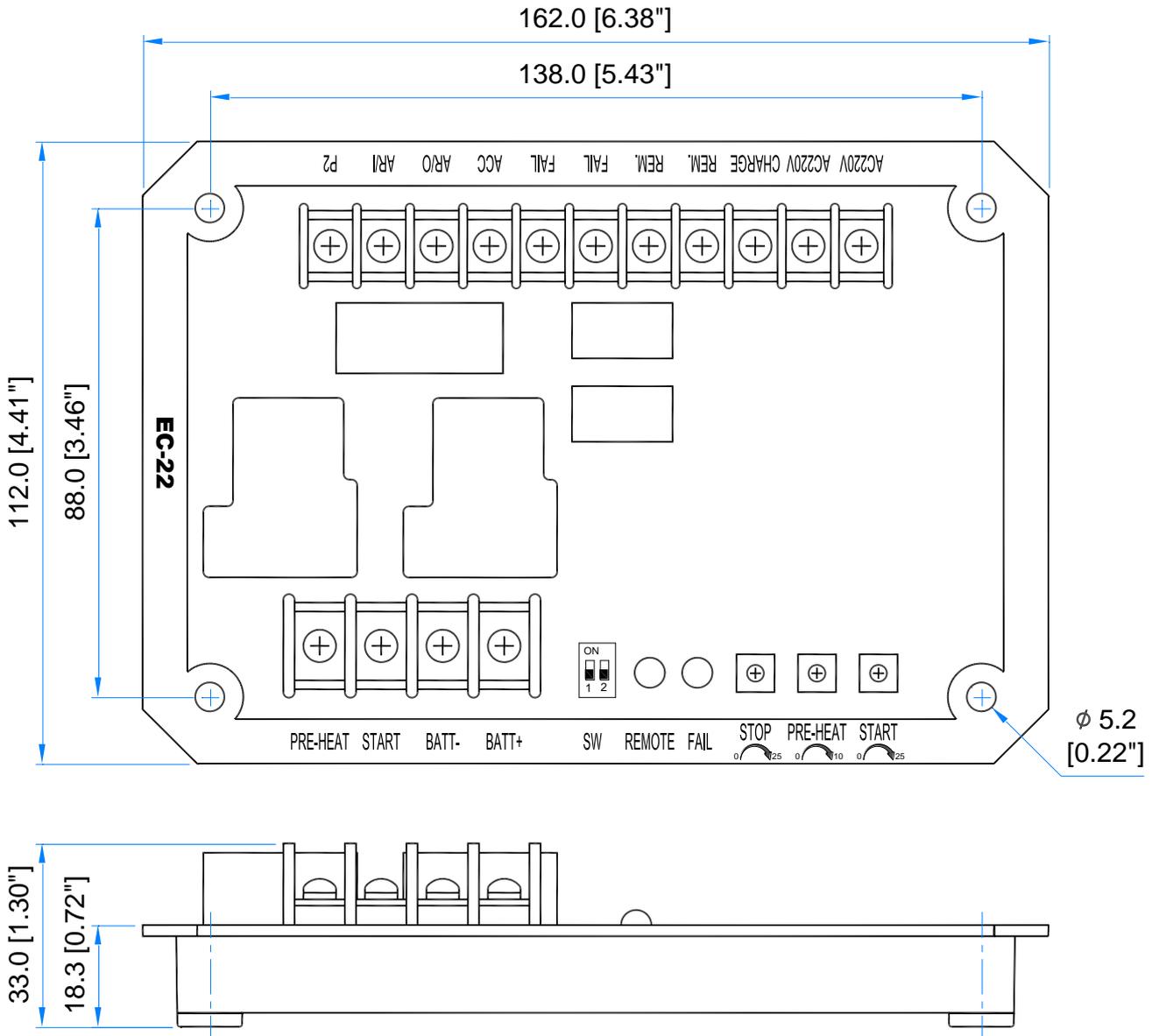
3.5 Electrical Characteristic

ITEM	DESCRIPTION
DC Input Voltage Range	9 - 36 Vdc
Alternator AC Input Voltage Range	10 - 300 Vac @ 50/60 Hz
Operating Temperature	-20 to + 60 °C
Relative Humidity	Max. 90%
Static Power Consumption	Running power consumption : Less than 3 watts Standby power consumption : 0W

3.6 Electrical Connections

PIN No.	DESCRIPTION	NOTES
BATT+	Battery Positive (B+)	Connect to the positive terminal of the battery. Wiring capacity must be greater than 35Amp
BATT-	Battery Negative (B-)	Connect to the negative terminal of the battery. Wiring capacity must be greater than 35Amp
START	Engine Start Signal output terminal.	Connect to Starter Motor Auxiliary voltage (Output capacity : 30 Amp @ 12/24 Vdc)
PRE-HEAT	Engine pre-heat signal output terminal	Connect to Engine Preheat heater (Output capacity : 30 Amp @ 12/24 Vdc)
AC220V	Generator AC voltage Power input terminal (Input range : 5 – 300 Vac)	When AC input frequency is greater than 18 Hz, the EC-22 will cut the starter motor output signal
AC220V		
CHARGE	Charging alternator DC voltage input terminal	When the input voltage of 12V Battery is greater than 7 Vdc (24V Battery is greater than 14Vdc) the control unit will cut the starter motor output signal
REM.	Remote start dry contact signal input terminals	Contacts Open – engine stop
REM.		Contacts Closed – engine running
FAIL	Generator failure auxiliary output terminals	Contacts open – normal status Contacts closed – engine failure Output capacity : 3 Amp @ 12/24 Vdc
FAIL		<ul style="list-style-type: none"> ● FAIL contacts states : <ul style="list-style-type: none"> No AC voltage output when engine is running Engine Failure Shutdown Engine Start Failure
ACC	Engine stop signal output terminal	Connect to ACC pin of the key start switch on Denyo Generator. For other brands of generator this is engine stop signal output terminal. (Output capacity : 10 Amp @ 12/24 Vdc)
AR/O	DENYO key start switch AR/O terminal	Connects to the AR/O pin of the key start switch on Denyo Generator. For other brands of generator this terminal has no function and no wiring is required. (Output capacity : 5 Amp @ 12/24 Vdc)
AR/I	DENYO key start switch AR/I terminal	Connects to the AR/I pin of the key start switch on Denyo Generator. For other other brands of generator this terminal has no function and no wiring is required.
P2	DENYO key start switch P2 terminal	Connects to the P2 pin of the key start switch on Denyo Generator. For other brands of generator this terminal has no function and no wiring is required. (Output capacity : 5 Amp @ 12/24 Vdc)

3.7 DIMENSIONS & TERMINAL CONFIGURATION



Unit : mm [inch]

NOTE!!

When use charge alternator to determine if engine is running, do not connect Battery (+) terminal to charge alternator terminal directly. Must connect a High current diode in series between Battery (+) terminal and charge alternator terminal to isolate battery (+) voltage and charge alternator voltage.

SECTION 4 : WIRING DIAGRAM

