

# BTB TYPE AUTOMATIC TRANSFER SWITCH (ATS)

## *UL Programmable Automatic Transfer Switch Operation Manual*



Main Switch Rated Current 2P/3P/4P 250Amp 2P 400 Amp

Main Switch Rated Voltage 690 Vac

Patent Number : M553490

U.S. Patents Pending

UL 1008 E511560



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***Easy on Screen programing without Reading the Manual***

*After connecting the battery press OFF for 5 sec and program each line with up/down arrow  
advance to the next line pressing OFF again*

***The instruciones apper under each line you are programing***

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## SECTION 1 : SAFETY PRECAUTIONS

### NOTICE

Make sure that all required steps are completed.

### CAUTION

Failure to follow proper procedure may result in permanent damage to the device.

### WARNING

Failure to follow proper procedure may result in personal injury or death.

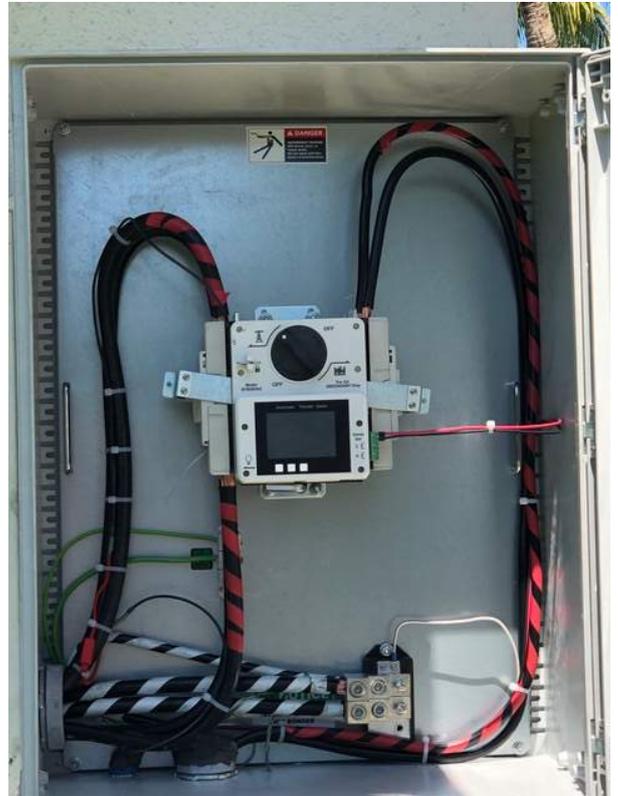
This manual contains information for the installation, wiring, suitable applications, operation and maintenance of the Automatic Transfer Switch. This manual should be read before operating the device. is

### WARNING

Installation, wiring and setting of system parameters for this Automatic Transfer Switch should be done by qualified technical personnel. Improper installation, wiring or system settings may result in personal injury or damage to the equipment.

## SECTION 2 : RECEIVING INSPECTION

The product should be inspected immediately after delivery to determine whether any damage has occurred due to collision during shipping. Also check that the product model and system voltage and the number of poles all match. If the container or the product is short of any items, or damaged, immediately contact the agent you purchased the unit from.



### 2.1 Sample Instalation

### CAUTION

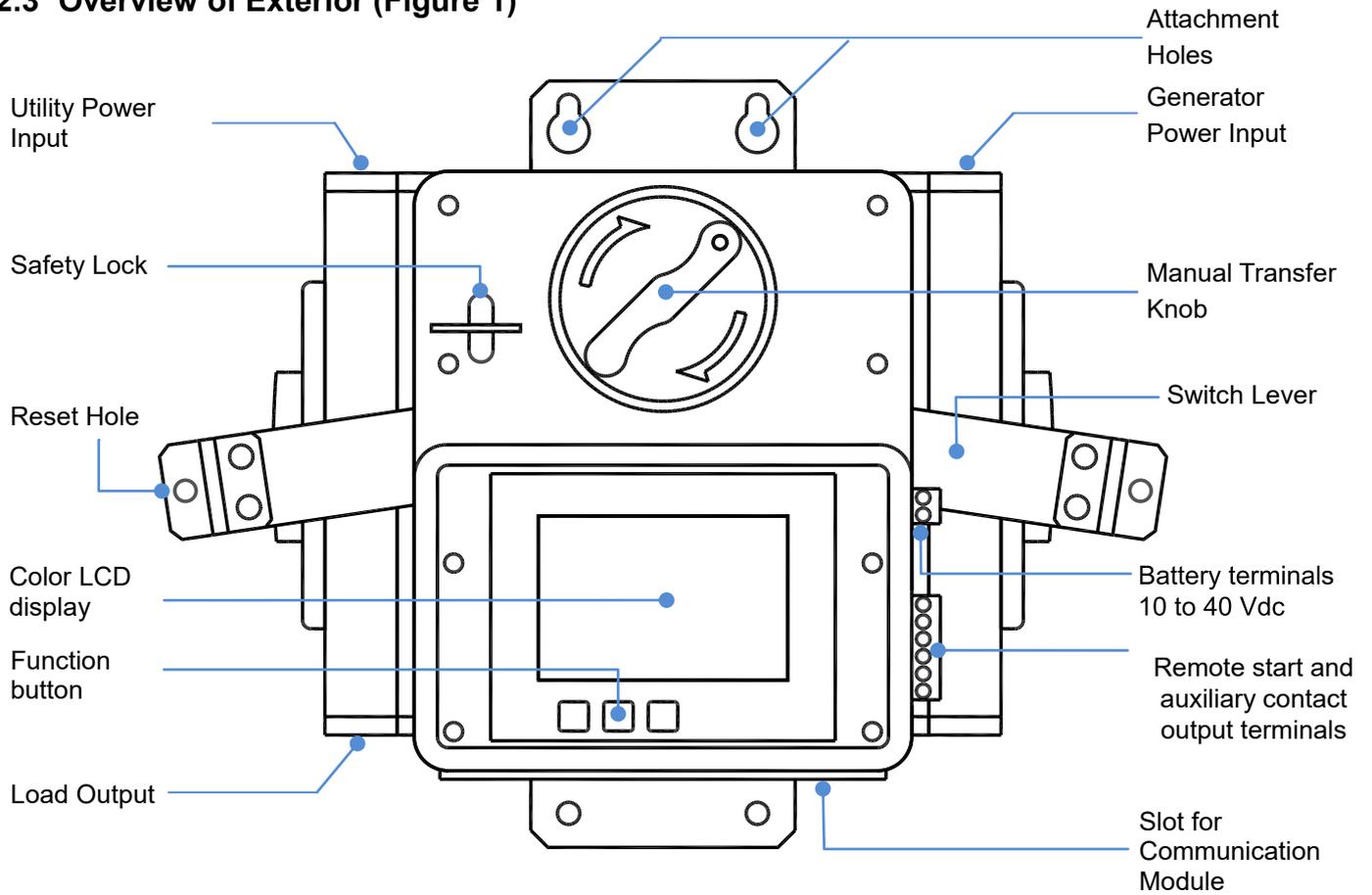
Model nos. correspond to utility voltage range. If improper model is used it will cause malfunction or damage to equipment.

### 2.2 Contents of Shipping Container

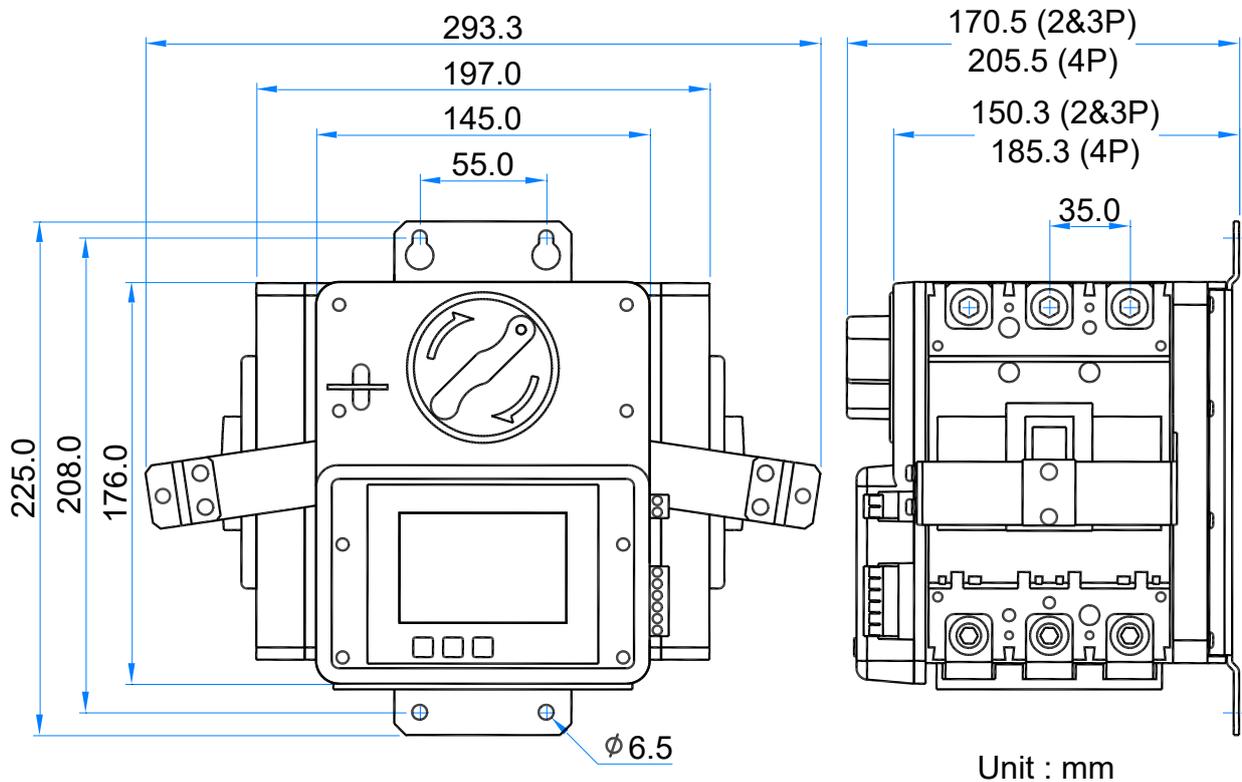
2.2.1 ATS without enclosure : 1. Automatic Transfer Switch (1 set) 2. 5/16" hex key 1 ea.

2.2.2 ATS with enclosure : 1. Automatic Transfer Switch (1 set) 2. 5/16" hex key 1 ea.  
3. Enclosure 1 ea. 4. Enclosure mounting hooks 4 ea.

### 2.3 Overview of Exterior (Figure 1)



### 2.4 Dimensions (Figure 2)



## 2.5 Operation Buttons and Display Screen

### Utility Power Status

- No power and switch not closed
- Power ready but switch not closed
- No power but switch is closed
- Power ready and switch closed
- Transfer failure
- Switch has Tripped

### Load Status

- Power to Load
- No power to Load

### Generator Power Status

- No power and switch not closed
- Power ready but switch not closed
- No power but switch is closed
- Power ready and switch closed
- Transfer failure
- Switch has Tripped

### Automatic Transfer Switch

**Utility Power**

**Load Side Meter**

**Generator Power**

**Message area**

- Mon. 12:00 Nov/28/2016 Current time
- Locked & Control Disable Safety lock latched
- Utility Over Voltage Power fault warning
- Utility Transfer Fail Transfer failure warning
- Utility Trip Failure Switch has Tripped

All fault warnings are accompanied by a Beeping audio alarm

**AUTO button**  
In AUTO mode the controller continuously monitors the status of Utility and Generator power and automatically Start / Stop the engine and transfers power according to system settings.

**OFF button**  
The OFF mode has two purposes.  
1. Disables all switching and protection functions.  
2. Resets all fault messages.

**Test (TEST) button**  
Pressing TEST button simulates Utility power outage. Engine will start immediately and execute load transfer if Test with Load is selected in Item 29.

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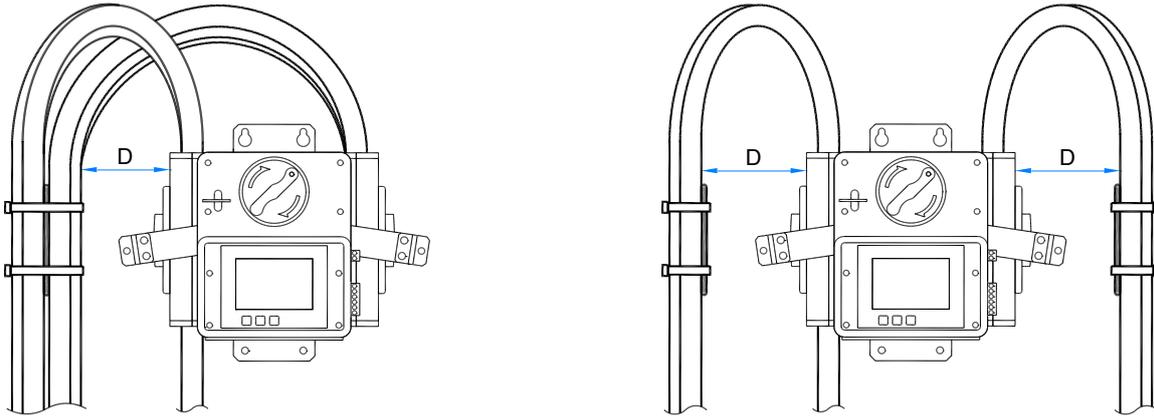
*After connecting the battery press OFF for 5 sec and program each line with up/down arrow advance to the next line pressing OFF again*

***The instructions appear under each line you are programming***

## SECTION 3 : INSTALLATION

### 3.1 Installation Precautions (Figure 3)

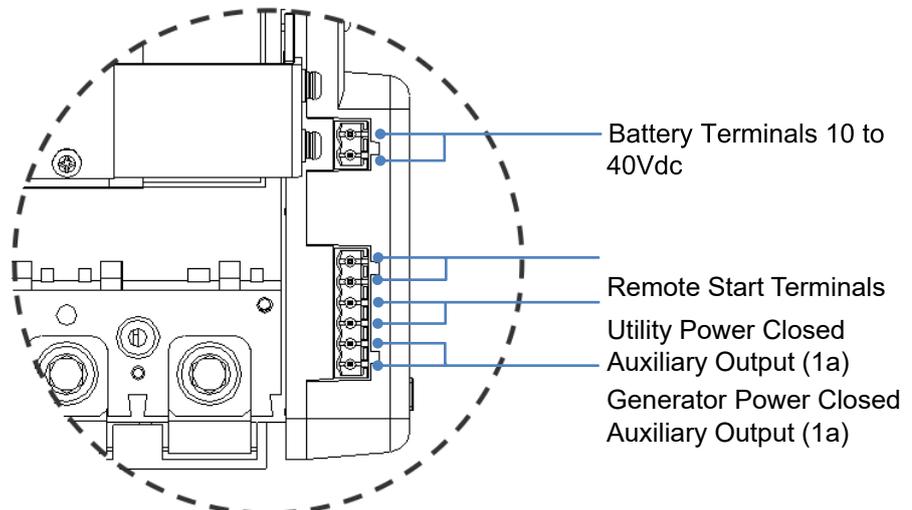
1. When connecting power cables to the Automatic Transfer Switch reserve room for action of the transfer switch lever ( Distance 80mm ) to avoid hindering the action of the lever and preventing the switch from operating normally. All power cables should be fixed to the housing with tie straps.
2. The phase sequence of the Utility and Generator power must be the same to prevent reversal of operation of 3-phase motors.



### 3.2 Recommended Cable Sizes and Torque Values

Cable Size and Recommended Torque			
Rated Current (A)	Cable Size	Torque	Expose conductor
125	1 AWG ( 42.4 mm <sup>2</sup> )	204 lb-in ( 23 N-m )	
150	1/0 AWG ( 53.5 mm <sup>2</sup> )		
175	2/0 AWG ( 67.4 mm <sup>2</sup> )		
200	3/0 AWG ( 85.0 mm <sup>2</sup> )		
225	4/0 AWG ( 107.2 mm <sup>2</sup> )		
250	250 MCM ( 127 mm <sup>2</sup> )		

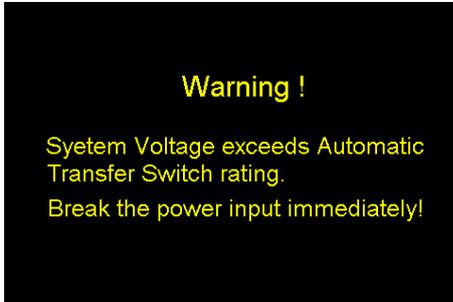
### 3.3 Description of Connection Terminals



## SECTION 4 : SYSTEM PARAMETER SETTINGS

### 4.1 Precautions when Connecting Power

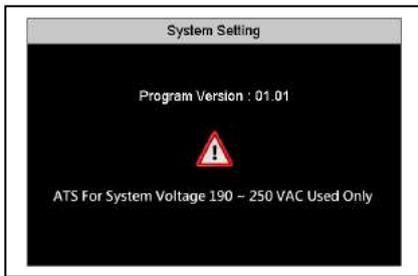
10 to 40Vdc power supply is required to set system parameter settings.



This screen indicates that the input voltage is too high and all power should be turned off immediately.

### 4.2 System Parameter Settings

All parameters of the ATS can be set directly from the operator panel. To enter setting mode press and hold **OFF** for 4 seconds until the program version screen appears. See the screen below.



Green highlight represents the current setting Black highlight indicates setting range.

System Setting	
01- System Phase Setting	3 P
Adjustment : Single Phase (1P) / Three Phase (3P)	
02- TDEN Time Delay Emergency to Normal	10 sec
03- TDNE Time Delay Normal to Emergency	10 sec
04- TDES Time Delay Engine Start	05 sec
05- TDEC Time Delay Engine Cool-Down	30 sec
06- TDOF Time Delay in the OFF Position	05 sec
07- Normal Over Voltage Protection	250 V
08- Normal Under Voltage Protection	180 V

Use the ▲ and ▼ keys to change setting value. Press the ▲ or ▼ key to increase or decrease the setting value by 1 unit. If you hold down the ▲ or ▼ key the setting value will increase or decrease continuously until the built-in limit is reached. After completing the individual settings, press **ENTER** to save the setting and skip to the next line. For the factory settings of each parameter refer to Table.4.4.

The following three ways will end setting mode and return to normal operation.

1. Press **ENTER** repeatedly until the last setting item is reached.
2. Press and hold **ENTER** for 4 seconds
3. No button is touched for 60 seconds

### 4.3 Screen Saver

#### NOTICE

If the switch is not touched for 30 minutes the screen will go into Sleep Mode. Touch any button below to re-wake the screen or end the countdown screen. If there are any changes in status or faults power the screen will wake up automatically.

#### 4.4 System Parameter Settings Table

LINE	DESCRIPTION	Setting Range	FACTORY SETTING
01	<b>TDEN</b> Time Delay Emergency to Normal	0 to 999 sec	<b>10 sec</b>
02	<b>TDNE</b> Time Delay Normal to Emergency	0 to 250 sec	<b>10 sec</b>
03	<b>TDES</b> Time Delay Engine Start	0 to 30 sec	<b>05 sec</b>
04	<b>TDEC</b> Time Delay Engine Cool-down	0 to 250 sec	<b>30 sec</b>
05	<b>TDOF</b> Time Delay in the OFF Position	0 to 99 sec	<b>05 sec.</b>
06	Utility over voltage protection	210 to 290 Vac	<b>250V</b>
07	Utility under voltage protection	160 to 230 Vac	<b>190V</b>
08	Generator over voltage protection	210 to 290 Vac	<b>250V</b>
09	Generator under voltage protection	160 to 230 Vac	<b>190V</b>
10	Set current Year	2017 to 2099	<b>Current</b>
11	Set current Month	01 to 12	<b>Current</b>
12	Set current Day of the Month	01 to 31	<b>Current</b>
13	Set current time Day of Week	Monday to Sunday	<b>Current</b>
14	Set current Hour	00 to 23 ( 24 hour system )	<b>Current</b>
15	Set current Minute	00 to 59	<b>Current</b>

**Setting items for automatic exercise or remote monitoring**

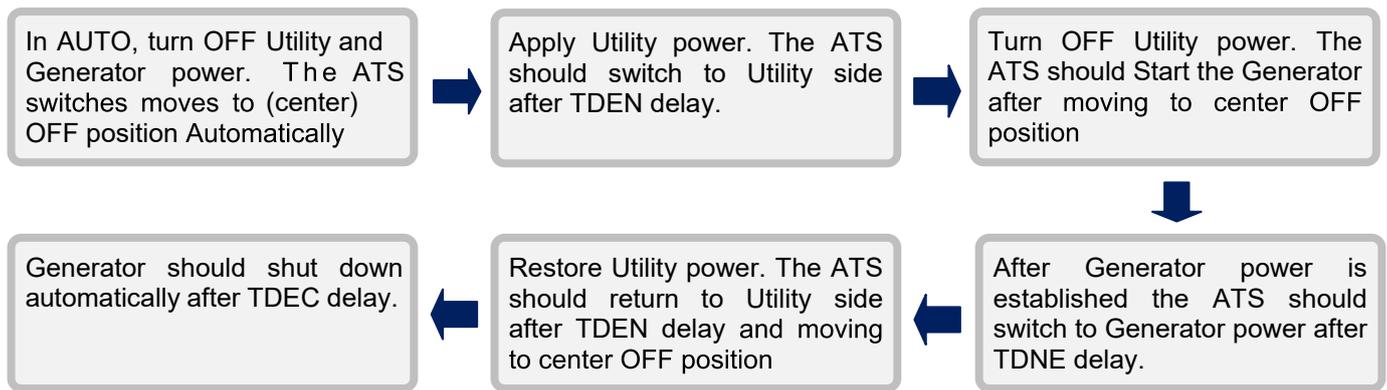
LINE	DESCRIPTION	VALUE	FACTORY SETTING
16	Set Day of Week for Automatic Exercise	Monday to Sunday	<b>Saturday</b>
17	Set the Hour to start Automatic Exercise	00 to 23(use 24 hour system )	<b>12</b>
18	Duration of Automatic Excercise	0 to 99 Minutes (set 0 for no exercise)	0 Min
19	Auto Exercise test with load or without load?	With Load or Without Load	<b>Without</b>
20	Meter Display on front screen	Display Voltage (V) or Frequency (Hz)	<b>Volts</b>
21	Remote Control by KCUxxx Module	Disable or Enable	<b>Disable</b>
22	Read or Delete Event Logs?	No - Read or delete	<b>NO</b>

**SECTION 5 : FUNCTIONAL TEST**

**5.1 Functional TEST**

After wiring and system settings are completed, the user should perform (AUTO) and (TEST)

**5.1.1 AUTO Functional Test**

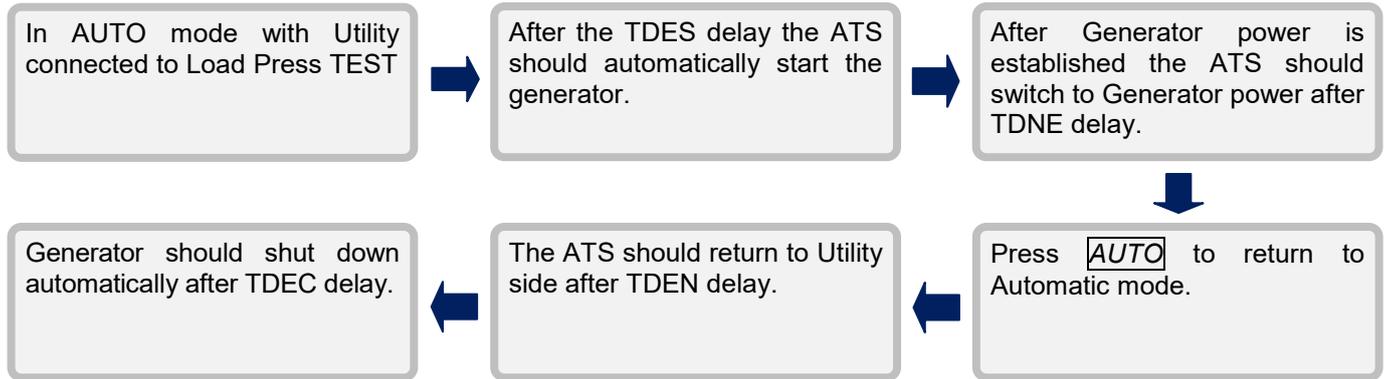


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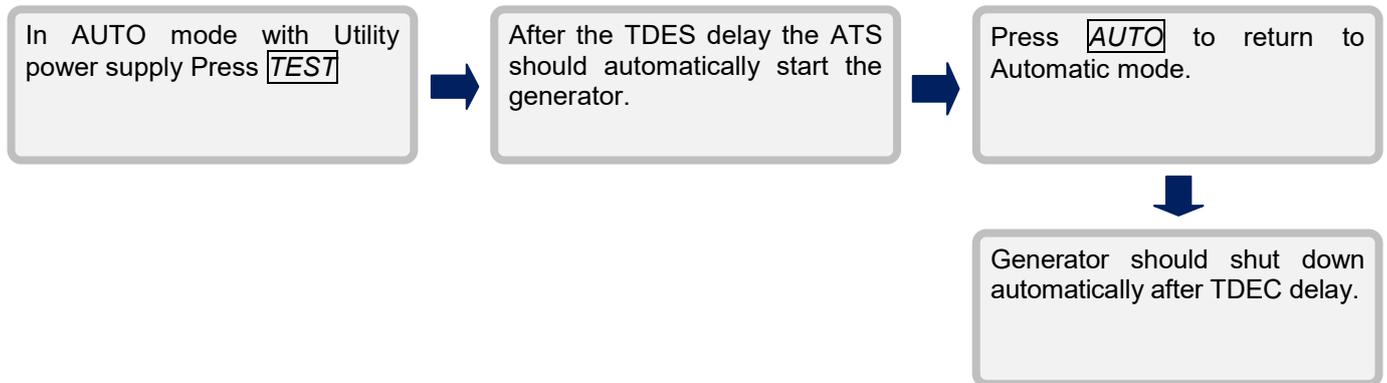
*After connecting the battery press OFF for 5 sec and program each line with up/down arrow advance to the next line pressing OFF again*

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### 5.1.2 TEST with Load



### 5.1.3 TEST without Load



## 5.2 Manual Transfer Knob when in OFF

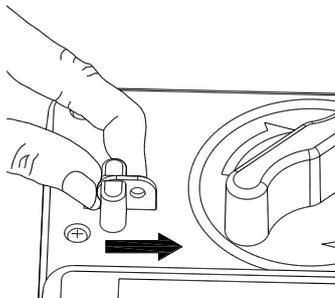
The Manual Transfer Knob turns only in clockwise direction to force a transfer of the switch unless in AUTO mode and status of power inputs changes.

## 5.3 Safety Lock

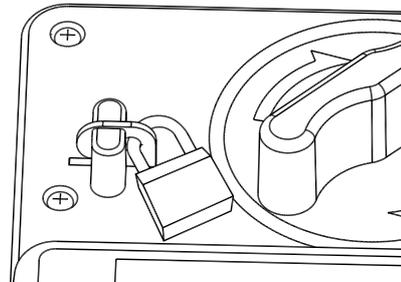
The Safety Lock is an override device. Once it is locked the following functions will become ineffective.

1. The manual operation handle will not operate and the switch will be held in current position.
2. All protection functions and panel buttons on the controller will be disabled.
3. The generator will continue its current state – either Running or Stopped.

Refer to the drawings below :



Step 1 : Push the safety lock inward



Step 2 : Use a padlock to secure the lock in a closed position

## SECTION 6 : PRODUCT INTRODUCTION

### 6.1 Display Parameters

Graphic display of switch status  
 Utility power All Phase Voltage and Frequency  
 Generator power All Phase Voltage and Frequency  
 Analog meter for load side voltage or frequency  
 Fault Message and Warning Display

### 6.2 Monitoring Protection

Utility power All Phase Over/Under Voltage and Loss of Phase Protection  
 Generator power All Phase Over/Under Voltage and Loss of Phase Protection  
 Utility power Over / Under Frequency Protection  
 Generator power Over/Under Frequency Protection  
 Transfer Failure Warning  
 Breaker Tripped Warning (Class CB only)

## 6.3 Electrical Characteristics

ITEM	SPECIFICATION
Operating Voltage	Refer to Model No.
AC Power Frequency	45 to 65 Hz
Remote Start Terminals capacity	7 Amp @ 250 Vac Max.
Utility power auxiliary contact capacity	3 Amp @ 250 Vac Max.
Generator power auxiliary contact capacity	2.5 Amp @ 12/24 Vdc
TDNE Time Delay Normal to Emergency	0 – 250 seconds
TDES Time Delay Engine Start	0 – 30 seconds
TDEN Time Delay Emergency to Utility	0 – 999 seconds
TDEC Time Delay Engine Cool-down	0 – 250 seconds
TDOF Time Delay in the OFF Position	0 – 99 seconds
Static Power Consumption	Below 3W
Operating Temperature	-20 to +70 °C
Relative Humidity	Below 95%

### 6.4 M<sub>C</sub>S Rated Current 200 Amp Max 250 Amps

## SECTION 8 : OPTIONAL ACCESSORIES

- ModBus communication module (KCU-05) Refer to KCU-05 User Manual for installation instructions.
- SNMP communication module (KCU-06) Refer to KCU-06 User Manual for installation instructions.
- Ethernet (Dynamic IP) Communication Module (KCU-31) Refer to KCU-31 User Manual for installation instructions.
- KCU communication module cable (1 meter).
- KCU communication module Interface Module (KCU-IF)

### ⚠ WARNING

When an optional communication module is used with the Automatic Transfer Switch can enable remote control and monitoring of ATS status and also start the generator unit. When using a remote communication module it is necessary to follow the instructions below, otherwise it could lead to injury to personnel or death :

- The generator should be surrounded by a protective fence.
- A permanent warning sign must be posted clearly to alert personnel. The warning sign should convey that "Generator could start at any time".
- When servicing or working around the ATS or generator the ATS safety lock should be latched and the generator controller in the (OFF) mode to ensure the safety of personnel.

