

# 77-90353-54

Replacement for KASSEC 1.5 90353-90354

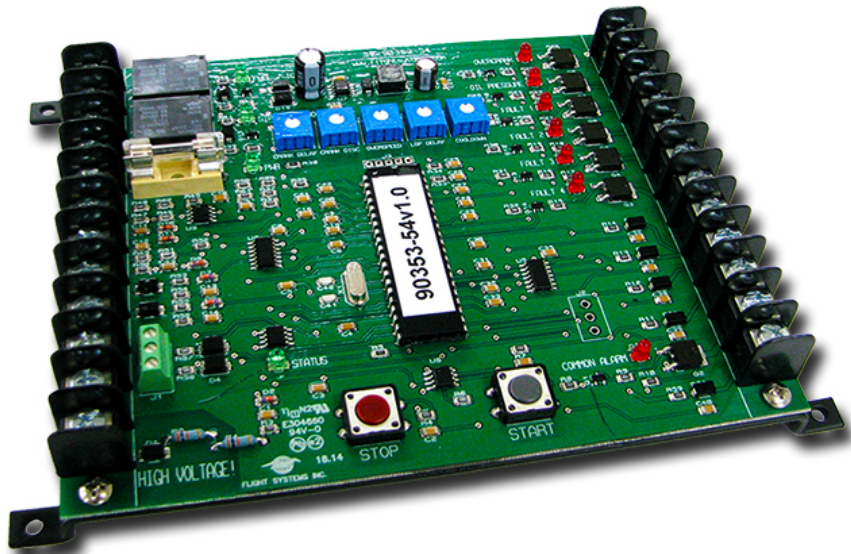
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## DESCRIPTION

The 77-90353-54 is a universal generator controller that will start, stop, and provide engine protection for most generators.

- Universal replacement for both the 90353 and 90354 KASSEC
- Compatible with most LP, diesel, NG, and gas generators
- Easy to install with simple mounting and self learning option
- Added features for improved reliability and engine protection



## SPECIFICATIONS

- Compatible with KASSEC 1.5, 12 or 24 VDC (90353 / 90354)
- Adjustable cyclic engine cranking circuit (3 to 30 seconds)
- 4 crank disconnects available (Mag pickup, alternator, DC, and AC)
- Adjustable crank disconnect speed 10-85% of nominal speed
- Adjustable overspeed alarm 110-185% of nominal speed
- Adjustable low oil pressure delay and loss of speed sensor (3 - 30 seconds)
- Adjustable cooldown cycle (0-600 seconds)
- 8 amp relay contacts for fuel/ignition and start solenoid
- Overcrank, low oil pressure, overspeed, loss of speed sensor, and 4 auxiliary shutdown alarms
- 2 amp alarm outputs for external notification
- 2 amp common alarm output
- Diagnostic indicators for all outputs
- Optional self learning setup mode
- RS485 serial communications port

## INSTALLATION

The 77-90353-54 is a drop-in replacement for the 90353/90354. When replacing a failed control, mounting and connections are all compatible with the original 90353/90354. For new installations refer to the provided wiring diagrams and terminal descriptions.

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## TERMINAL DESCRIPTIONS

- TERMINAL #1 – Constant battery source for fuel/ignition output (#2), start solenoid output (#3), and fault indicator outputs (#13-18, #23).
  - TERMINAL #2 – Battery voltage output to fuel/ignition (MAX 8 AMPS).
  - TERMINAL #3 – Battery voltage output to start solenoid (MAX 8 AMPS).
  - TERMINAL #4 – Switched battery source for controller logic. The AUTO input will supply a minimum of 1 AMP at 6 VDC. Maximum voltage on TERMINAL #4 is 36VDC.
  - TERMINAL #5 – Magnetic pickup input.
  - TERMINAL #6 – Alternator R-terminal input.
  - TERMINAL #7 – DC disconnect input (6-36 VDC).
  - TERMINAL #8 – Positive voltage (6-36VDC) to initiate AUTO START.
  - TERMINAL #9 – Battery ground for controller logic.
  - TERMINAL #10 – Open.
  - TERMINAL #11 – Open.
  - TERMINAL #12 – AC disconnect (30-150 VAC).
  - TERMINAL #13 – Overcrank alarm output (2 AMPS).
  - TERMINAL #14 – Low oil pressure alarm output (2 AMPS).
  - TERMINAL #15 – Fault 1 alarm output (2 AMPS).
  - TERMINAL #16 – Fault 2 alarm output (2 AMPS).
  - TERMINAL #17 – Fault 3 alarm output (2 AMPS).
  - TERMINAL #18 – Fault 2 alarm input (switched to ground).
  - TERMINAL #19 – Fault 4 alarm input (switched to ground).
  - TERMINAL #20 – Fault 4 alarm output (2 AMPS).
  - TERMINAL #21 – Fault 3 alarm input (switched to ground).
  - TERMINAL #22 – Fault 1 alarm input (switched to ground).
  - TERMINAL #23 – Common alarm output (2 AMPS).
  - TERMINAL #24 – Low oil pressure alarm input (switched to ground).
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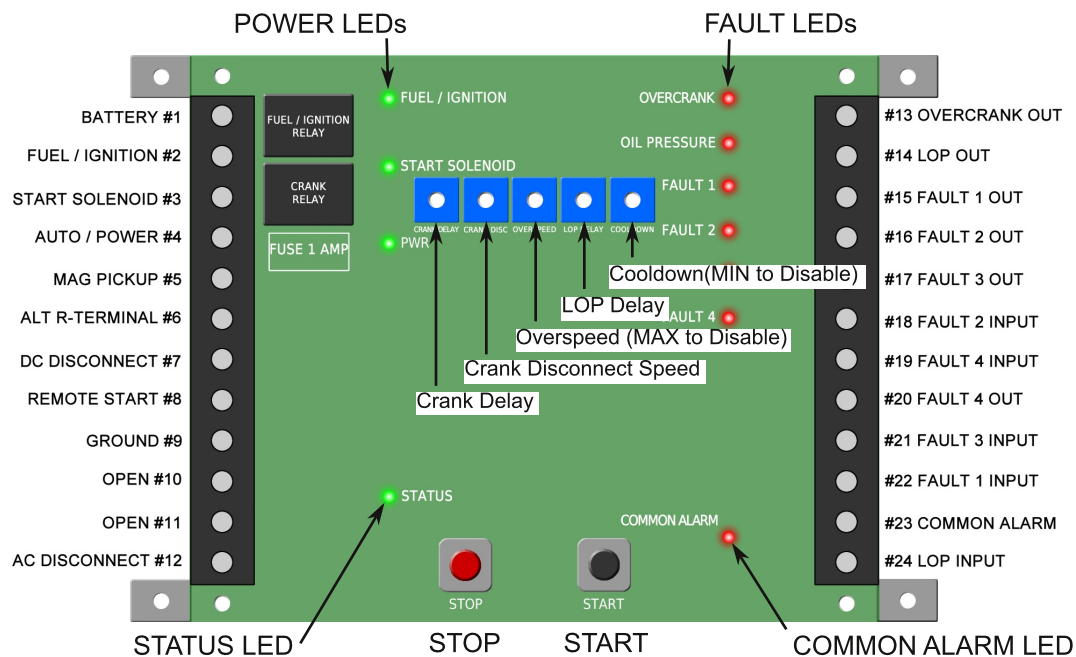
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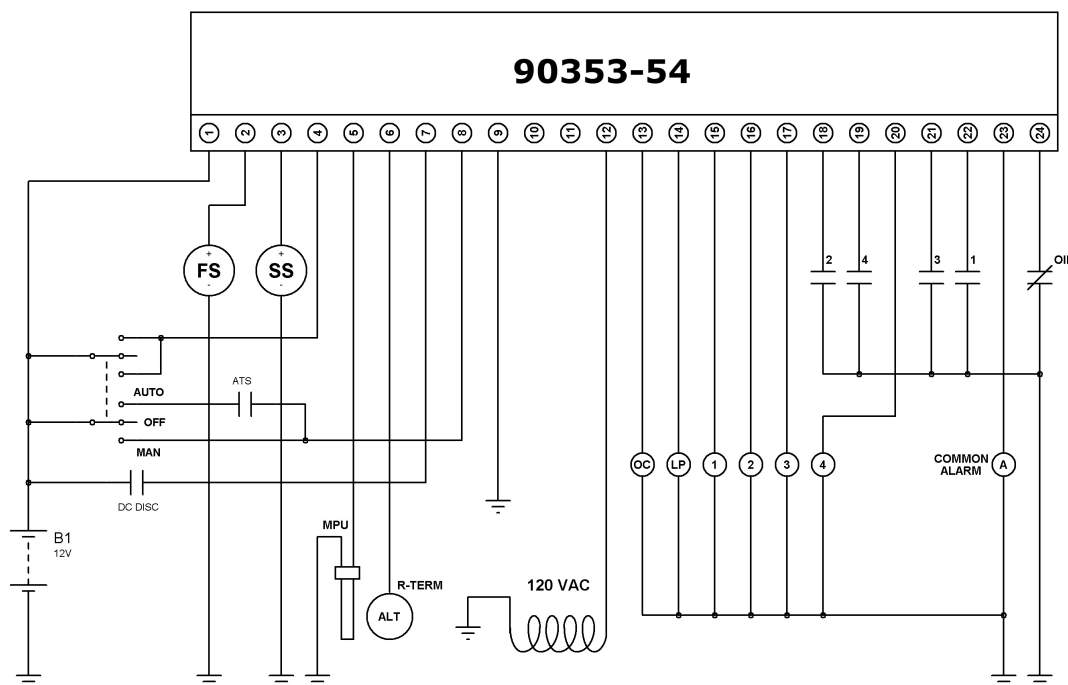
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## LAYOUT



## WIRING



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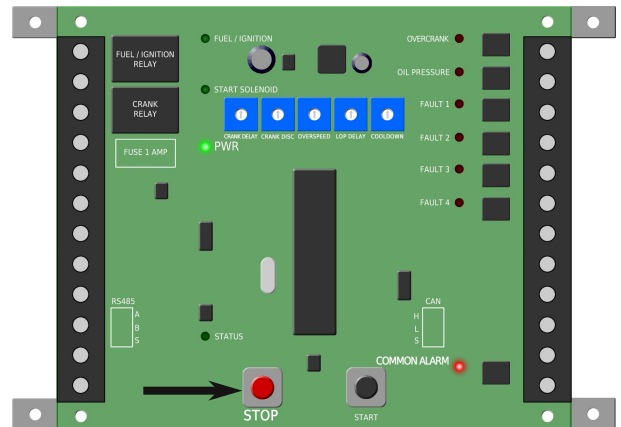
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### LEARNING MODE (OPTIONAL)

In learning mode, the controller will look at all the crank disconnects being used and adjust the nominal speed of the controller accordingly. After the setup is complete, the nominal speed of the generator is saved and the controller will use these settings on startup.

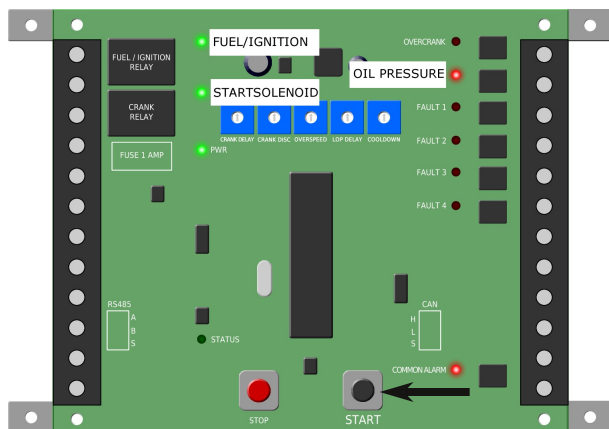
1. Place the Manual/Off/Auto switch into the OFF position (if there is no Manual/Off/Auto switch on this generator, disconnect terminal #4 to remove power.) Wait 5 seconds for the control to power down. Set all of the adjustments to mid-range. Press and hold STOP while placing the Manual/Off/Auto switch to the AUTO position (or, if no switch, reattach terminal #4 while holding STOP.) Continue to hold STOP until the COMMON ALARM light turns on. Release STOP and wait until the COMMON ALARM light blinks rapidly to indicate that the controller is ready to learn.

**NOTE: Pressing STOP will cancel the setup and return the controller to the default settings.**



2. Press and hold START to manually start the generator. Allow the generator to stabilize at rated speed. Verify that the oil pressure indicator has turned off indicating that the oil pressure switch has opened.

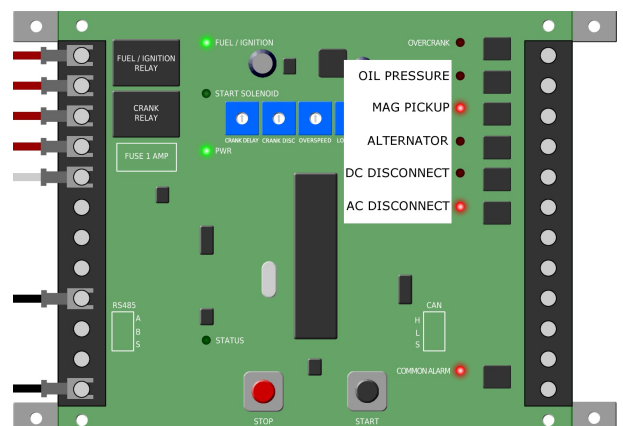
**NOTE: The oil pressure indicator will display the status of the oil pressure switch TERMINAL #24 for the duration of the test. Verify that the correct condition is being displayed. With the engine not running, the oil pressure indicator should be on.**



3. Fault indicators 1-4 will display which, if any, crank disconnects are detected.

- FAULT 1 - Mag Pickup #5**
- FAULT 2 - Alternator R-Terminal #6**
- FAULT 3 - DC Disconnect #7**
- FAULT 4 - AC Disconnect #12**

If none of the fault indicators 1-4 turn on, then a valid crank disconnect has not been detected. Disconnect power to shutdown and diagnose the problem.

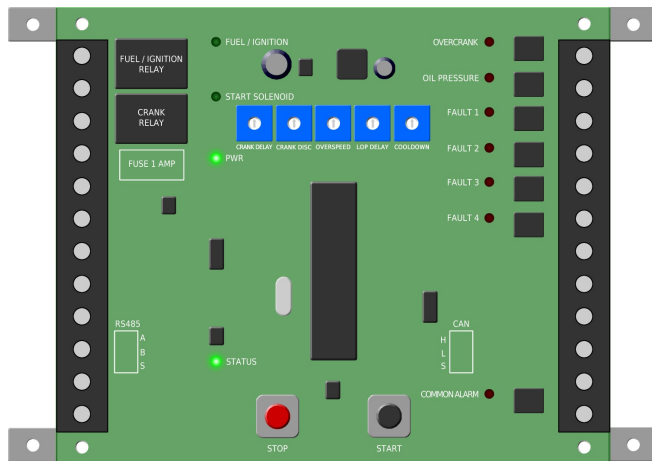


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## LEARNING MODE CONT.

4. With the generator running at rated speed and the oil pressure indicator off, press STOP to save the settings to memory. Wait for all fault indicators to turn off and the STATUS LED to blink once per second to indicate that the controller is now in standby mode.

To perform an auto start test you, can activate remote start externally on TERMINAL #8, or press and release the START button.

## ADJUSTMENTS

### CRANK DELAY

Adjust the on and off cycle time of the cyclic engine crank output (3-30 sec).

### CRANK DISC

Adjust the percentage of nominal speed at which the crank will disconnect (10-85%). The factory default is a nominal speed of 5khz on TERMINAL #5, 300Hz on TERMINAL #6, and 60Hz on TERMINAL #12.

### OVERSPEED

Adjust the percentage of nominal speed at which the overspeed alarm will shut down the engine (110-185%). Turn the overspeed adjustment to maximum to disable.

### LOP DELAY

Adjust the time delay before the low oil pressure delay and speed sensor loss alarm will activate (3-30 sec).

### COOLDOWN

Adjust the time that the generator will continue to run after the remote start signal is removed from TERMINAL #8 (0-10 minutes). Turn the cooldown adjustment to minimum to disable.

## ON-BOARD MANUAL START

You can perform an auto start test by pressing the START button anytime the controller is in standby mode. To shutdown from an on-board manual start, press the STOP button and the controller will resume standby mode.



## OPERATION

### Standby

With battery voltage applied to TERMINAL #4 and ground on TERMINAL #9, the 56-90353-54 will default to standby mode. The PWR indicator should be on and the STATUS LED should be blinking once per second. While in standby mode, the controller will draw approximately 34mA of current at 12 VDC and 20mA at 24VDC.

### Auto Start

While in standby mode, applying battery voltage to TERMINAL #8 will place the controller in auto start mode and begin the cranking sequence. The STATUS LED will flash rapidly. During cranking, determined by the Crank Delay adjustment (0-30sec), constant battery voltage from TERMINAL #1 will be switched to TERMINAL #2 and #3. The status of the fuel/ignition and start solenoid relays can be determined by the fuel and crank indicators. During crank rest, also set by the Crank Delay adjustment, both the fuel/ignition and start solenoid relays will be off or open. If the controller does not receive a crank disconnect signal within 5 cycles, the controller will go into overcrank shutdown.

### Crank Disconnects

Crank disconnect is determined by the CRANK DISC adjustment, 10-85% of nominal speed. The default nominal speed of the controller is 5kHz on TERMINAL #5, 300Hz on TERMINAL #6 and 60Hz on TERMINAL #12. This will provide crank disconnect with a range of 500-4250Hz on TERMINAL #5, 30-255Hz on TERMINAL #6, and 6-51Hz on TERMINAL #12. To alter the nominal speed of the controller, follow procedures for the SELF LEARNING mode.

### Auto Run

If the controller sees a crank disconnect signal on TERMINAL #5, #6, #7, or #12, the crank relay will be locked out and fuel will remain on. The controller is now in run mode. The STATUS LED will cycle once per second to indicate run mode. The low oil pressure delay, determined by the LOP DELAY (0-30sec), starts timing out. If the ground signal is not removed from TERMINAL #24 before the end of the low oil pressure delay, the controller will shut down. The OIL PRESSURE indicator will illuminate as well as the COMMON ALARM. Both fuel/ignition (TERMINAL #2) and start solenoid (TERMINAL #3) will be disabled until reset.

### Loss of Speed Sensor

If the magnetic pickup input (TERMINAL #5) or DC disconnect (TERMINAL #7) was found in either auto start or auto run mode, the loss of speed sensor fault is enabled. If the signal on either of these 2 inputs is lost during auto run mode and no other crank disconnect is found the controller will go into speed sensor failure and shut down the generator. The COMMON ALARM indicator will illuminate and the OVERCRANK indicator will cycle once per second.

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**Overspeed Shutdown**

Optionally the OVERSPEED adjustment can be set from 110-185% of nominal speed. If the frequency of the magnetic pickup input, alternator input, or VAC input exceeds the value of the OVERSPEED adjustment, the controller will go into overspeed and shut down the generator. The COMMON ALARM indicator will illuminate and the OVERCRANK indicator will flash rapidly about twice per second. Both the fuel/ignition and start solenoid outputs will be disabled until reset.

**Faults**

If any of the 4 fault input terminals (#18, #19, #21, or #22) are grounded during auto start or auto run mode, the controller will shut down the generator. Both the fuel/ignition (TERMINAL #2) and start solenoid (TERMINAL #3) will be disabled until reset. The corresponding fault indicator will illuminate and battery voltage will be supplied on the terminal indicating that fault. The COMMON ALARM output will be enabled as well.

**Cooldown Mode**

Optionally, you can set the controller to run a cooldown cycle set by the COOLDOWN adjustment (0-600 sec or 0-10 min). While in RUN mode, removing battery voltage from AUTO START (TERMINAL #8) will put the controller in cooldown mode and the generator will continue to run until the time delay expires. To disable cooldown mode, turn the COOLDOWN adjustment to minimum. All alarms are monitored during the cooldown cycle.

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FEATURE	KASSEC 1.5	90353-54
Overcrank Alarm	YES	YES
Oil Pressure Alarm	YES	YES
4 Auxiliary Shutdowns	YES	YES
Adjustable Magnetic Pickup Input	YES	YES
Adjustable Alternator R-Terminal Input	YES	YES
DC Disconnect	YES	YES
Adjustable AC Disconnect	FIXED	YES
Adjustable Oil Pressure Delay	YES	YES
Adjustable Crank Delay	YES	YES
Adjustable Overspeed Alarm	NO	YES
Optional Cooldown Delay	NO	YES
Optional Learning Mode	NO	YES
Diagnostic Indicators	NO	YES
Replaceable Fuse	NO	YES
12 or 24 VDC Supply	FIXED	YES
Serial Communications	NO	YES

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