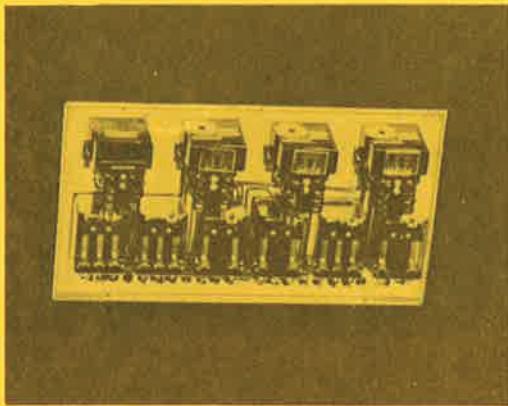
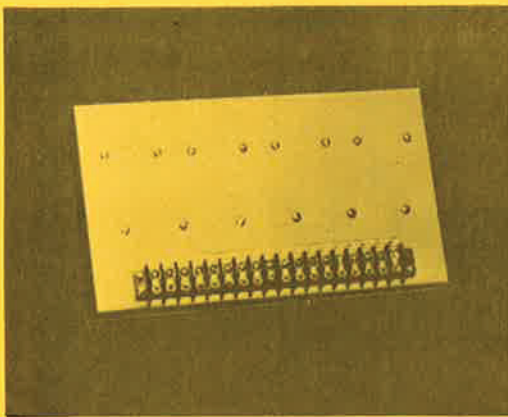




AUTOMATIC START CONTROLS

MODEL
KLAS 61-D61

Components are carefully selected to provide maximum reliability and service life. The critical engine-crank circuits are equipped with highly dependable solid state time delay relays for consistent timing of crank and rest intervals.

Mode of operation is selected by a three or four position switch as specified. In "MANUAL" position the control is energized immediately; in "AUTOMATIC", operation commences only when a remote set of contacts close, such as those of an automatic transfer switch; "OFF" position disables engine operation. The four position switch give an additional "TEST" position in which the automatic control is out of the circuit and engine may be started manually.

Current during cranking cycle flows thru normally closed contacts of relays 5, 6, 3 & 4 to energize relay 1 which closes completing the current path to the throttle solenoid (terminal 3) and thru (N.C.) contact relay 2 to starter solenoid (terminal 5) and to the coil of cranking timing relay (7).

If engine fails to start within 7 seconds, relay 7 closes energizing crank rest timing relay 8 and relay 4 to de-energize relay 1. After about 7 seconds, relay 8 opens to de-energize relay 4 and re-energize relays 1 and 7. If engine does not start after 5 attempts (about 90 seconds), the contacts of overcrank relay 9 close, activating alarm and overcrank light and stopping crank cycle.

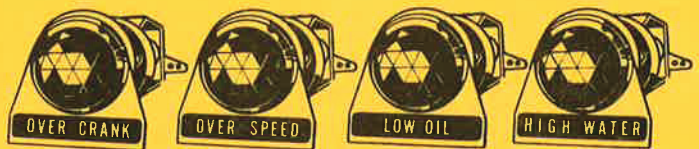
If engine starts, relay 2 is energized from terminal 10 by voltage from battery charging generator or from battery thru (N.O.) speed switch and relays 7, 9 and start solenoid are de-energized. After about 15 seconds of engine operation, relay 10 activates the low-oil pressure sensing circuits.



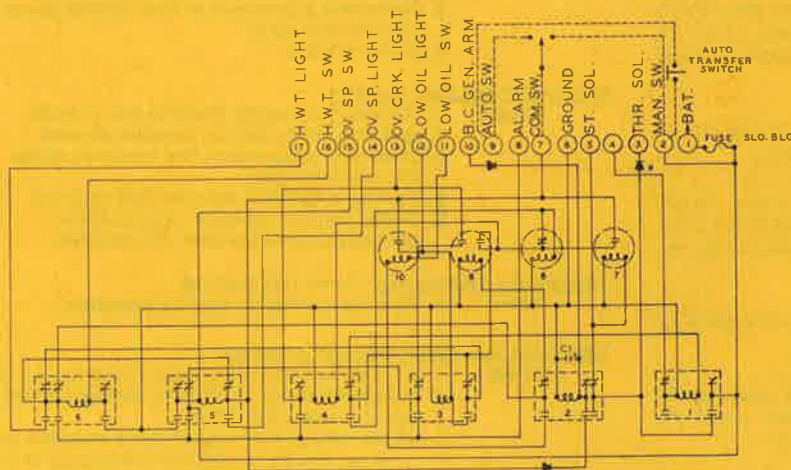
THREE POSITION SWITCH • FOUR POSITION



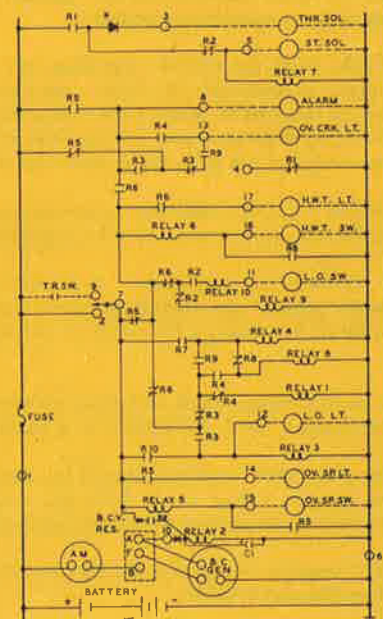
ROTARY SWITCH

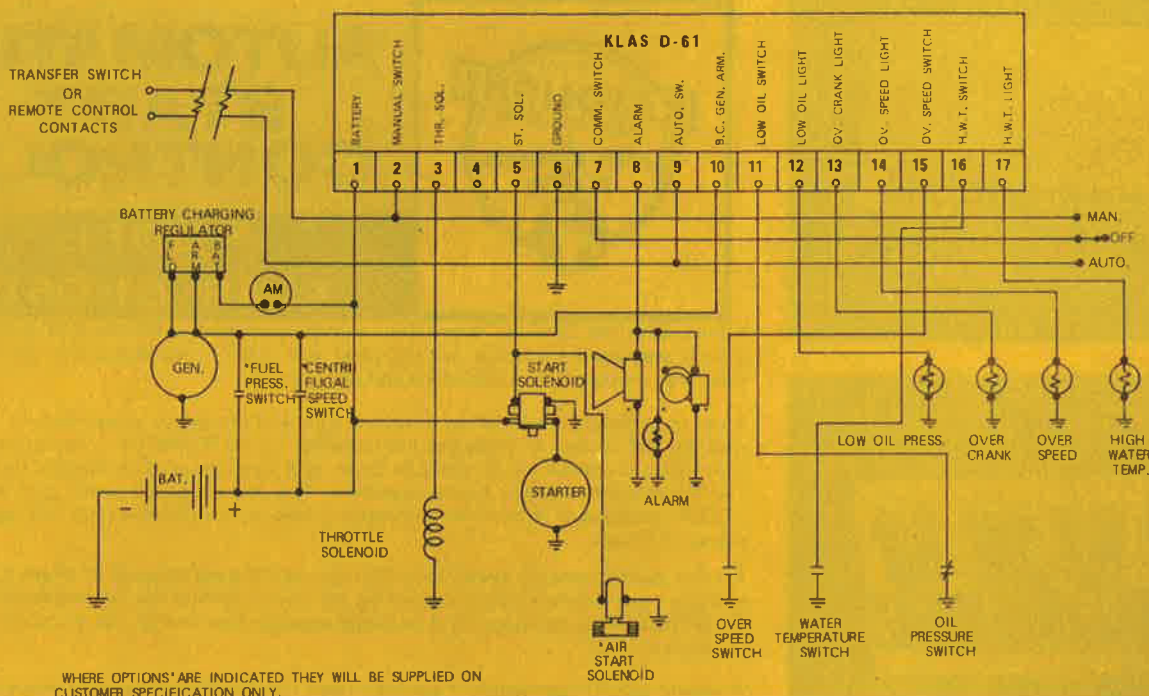


FAILURE INDICATING LIGHTS



* THIS DIODE USED ONLY WHEN USING A FOUR POSITION SWITCH





This bulletin covers normal installation, operating and test procedures. The Klas 61 and Klas D61 control provide basic engine control features. This control has 5 crank cycles of approximately 7 to 10 seconds cranking and 7 to 10 seconds rest for an approximate cranking time of 90 seconds. This is predetermined by the settings of rheostats on solid state relay 7, 8 and 9. These solid state relays give precise timing and are not affected by the fluctuations of ambient temperature and battery voltage. After The crank interval and the engine has attempted to start and has not started, the control will remain off and the alarm and overcrank light will be activated until reset. With normal engine start and operation safety shutdowns for high temperature, low oil pressure and overspeed are connected, providing switches on the engine for these functions. Oil pressure failure occurs instantly except immediately following cranking period. During this period, there is a 10 to 15 second delay provided.

The Klas 61 and Klas D61 are designed for automatic operation in conjunction with an automatic transfer switch or load start switch. (It may be used on either standard battery ignition, magneto or diesel systems, dependent on accessories specified.)

INSTALLATION: With the Klas 61 and Klas D61 controls, horizontal chassis mounting is preferred. If severe vibration is present shock insulators may be required to prevent the relays from cycling when not energized. Mounting in an enclosure or panel free of dust and fumes will afford maximum contact life and reduce spark hazard.

Wire terminations should be made with solderless connectors. Use No. 14 flexible wire for short runs, heavier wire for remote locations.

CAUTION: Circuitry of this control is limited to 9 amps. Starter solenoids, audio alarms, etc., requiring more than 9 amps must be controlled by additional heavy duty relays or contactor operated by the control.

A 3 position switch, failure lights and decal are provided for control of the unit. Functions are "OFF, AUTOMATIC & MANUAL".

OPERATION: The "OFF" position should be used while servicing the engine, since cranking cannot occur. It is also used to shut down the engine for any reason and to reset the control after a failure.

In "MANUAL" position, the engine will start and operate normally with safety shutdown features in effect.

"AUTO" position places the control directly across a remote automatic transfer contactor or other device which then controls the engine. The failure lights will indicate either an overcrank (unit failed to start during cranking cycle) or a shutdown from overspeed, high water or oil pressure failure. It will remain on until unit is manually reset. An alarm horn (same voltage as control) may also be used in conjunction with failure lights.

RESET CONTROL AFTER FAILURE BY TURNING FUNCTION SWITCH TO "OFF".

Should unit fail to crank:

- Check:**
1. Battery
 2. Fuse
 3. Dirt in engine control contacts
 4. Voltage at starter solenoid
 5. Starter and solenoid for malfunction
 6. Voltage on term. 10 (no voltage during cranking)

Unit will start, then fail:

- Check:**
1. Fuel and fuel supply filters
 2. Ignition system - fuel or throttle solenoid
 3. Carburetor adjustment or fuel injector pump - fuel solenoid valve
 4. Engine control

Unit cranks but does not start:

- Check:**
1. Fuel and fuel supply lines for dirt or leaks
 2. Ignition system, fuel or throttle solenoid
 3. Carburetor adjustment, fuel injection pump, fuel solenoid valve
 4. Voltage at ignition, throttle, fuel solenoid
 5. Engine control - contacts may be dirty. Use contact cleaning tool, not abrasives.

Unit cranks continuously: (over 100 seconds)

- Check**
1. Time delay relay 9 - may be defective.

Unit starts but starter does not disengage:

- Check:**
1. All leads in crank disconnect circuit for continuity.
 2. Voltage on term. 10 (battery voltage present after engine reaches 600 RPM)
 - a) No voltage after engine starts indicates defective speed switch, if used for crank disconnect or no battery charging generator buildup.
 - b) If voltage on terminal 10, check for defective relay 2 in control or open diode.