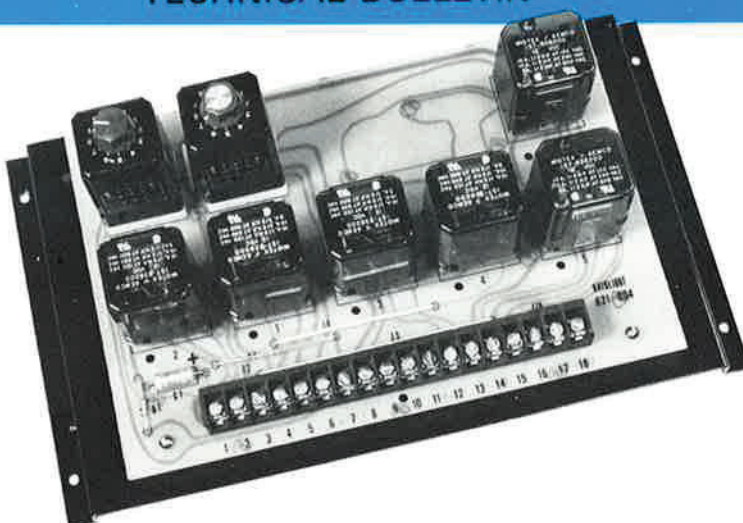




KATOLIGHT

AUTOMATIC START CONTROLS TECHNICAL BULLETIN

MODEL:
KLAS 133



Katolight Automatic Start controls will automatically start and stop diesel, gasoline, natural gas, or LPG engine-generator sets under the control of an automatic transfer switch or load start contact closed to run. These controls are manufactured to highest quality control standards to insure reliability.

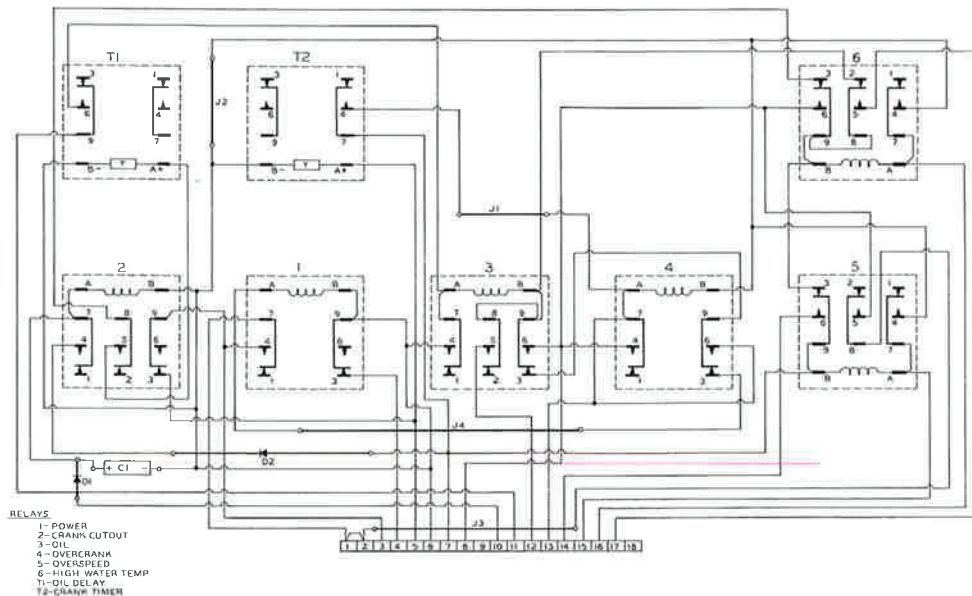
The Katolight KLAS 133 are non-cyclic automatic start controls that provide individual visual indication and automatic engine shutdown due to overcrank, low oil pressure, high water temperature, and overspeed conditions. An audible alarm can also be provided as an option.

FEATURES

- Consistent operation for -20 to +60 degrees Centigrade.
- Reliable Katolight solid-state design timing relays.
- Heavy duty 10 amp relays with gold flashed contacts for reliable operation at low D.C. voltage.
- Compatibility with virtually all engines in today's market place.
- Ease of installation, simple bracket mounting.
- Barrier screw type terminals U.L. & C.S.A. Listed, with approved means for solderless connection of conductors.
- Accomodates requirements of NFPA-76A annunciator for hospital approval.
- Non-cyclic or one-shot crank featuring an adjustable one (1) to one-hundred (100) second engine cranking circuit.
- Plug-in type solid-state timers with sockets and retaining clips.
- External alarm circuit for remote failure indication.
- Available from stock.
- Three position "Auto, Off, Manual" switch. 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. The center position is "Off". (The "Off" position is also reset. after any failure.)
- Printed circuits are extra heavy construction of .093 board and .004 copper.
- Available for 12 and 24 volt battery systems; negative ground.
- Positive lock-out circuits prohibit recranking while engine is running.
- Reverse polarity protection.

MODEL	CRANKING MODE	OPERATING CONTROL MODE	BATTERY VOLTAGE	CRANK DISCONNECT
KLAS 133	Continuous - non-cyclic	* Energized to run	12 or 24	12 or 24 VDC

* Katolight Automatic Start controls are "Energized to Run" as standard, but "Energized to Stop" option is available.



CONTROL OPERATION

Current during cranking flows from Terminal No. 7 through normally closed Contact 3-9 Relay 5, through normally closed Contact 2-8 Relay 6, through normally closed Contact 3-9, Relay 3, through normally closed Contact 3-9 Relay 4, through Jumper J4 to energize Relay 1.

Relay 1 operates opening normally closed Contact 3-9 ungrounding Terminal No. 4 magneto (if used) and closes normally open Contact 4-7 energizing Terminal No. 3, (ignition coil or throttle solenoid) and through normally closed Contact 3-9 Relay 2, to Terminal No. 5 (start solenoid) and crank timer T-2.

If engine starts, Terminal No. 10 must be energized with a positive voltage from either speed switch, pressure switch, or battery charging alternator etc., which energizes Relay 2 through diode D1. Relay 2 opens normally closed Contact

3-9 de-energizing Terminal No. 5 (start solenoid) and crank timer T-2 and closes normally open Contact 5-8 activating timer T-1 oil delay and closes normally open Contact 4-7 locking in Relay No. 2 to prevent starter from becoming energized if the crank disconnect signal on Terminal No. 10 is lost during engine operation.

If engine doesn't start, timer T-2 will time out (normally set at 45 seconds). Timer T-2 closes normally open Contact 4-7, energizes Relay 4 and Terminal 13 overcrank light. Relay 4 will open normally closed Contact 3-9, de-energize Relay 1 (to stop cranking) and close normally open Contact 4-7 energizing Terminal No. 8 and latch itself in Failure mode. Terminal No. 8 energizes failure alarm (if used).

To reset control after failure, turn engine control switch to "off" position.

SELECTOR SWITCH MODE OF OPERATION

"AUTO" Places the control under control of remote start contact. This contact will control the engine—close to start—open to stop.

"OFF" Shuts engine down and/or resets control after failure. **CAUTION:** Always put switch in "off" position when servicing engine.

"MAN" Starts engine and operates with all safety shutdown features in operation.

"TEST" Additional position on 4 position switch. Allows you to start engine by bypassing engine control completely. **CAUTION:** No safety shutdown features will function in "test" position.

"FAILURE" Failure indicating lights. Overcrank engine cranked but failed to start. **Overspeed** = engine started and exceeded 10% overspeed. **Low oil** = engine started then lost oil pressure. **High water** = engine started then overheated.



3 POSITION SWITCH

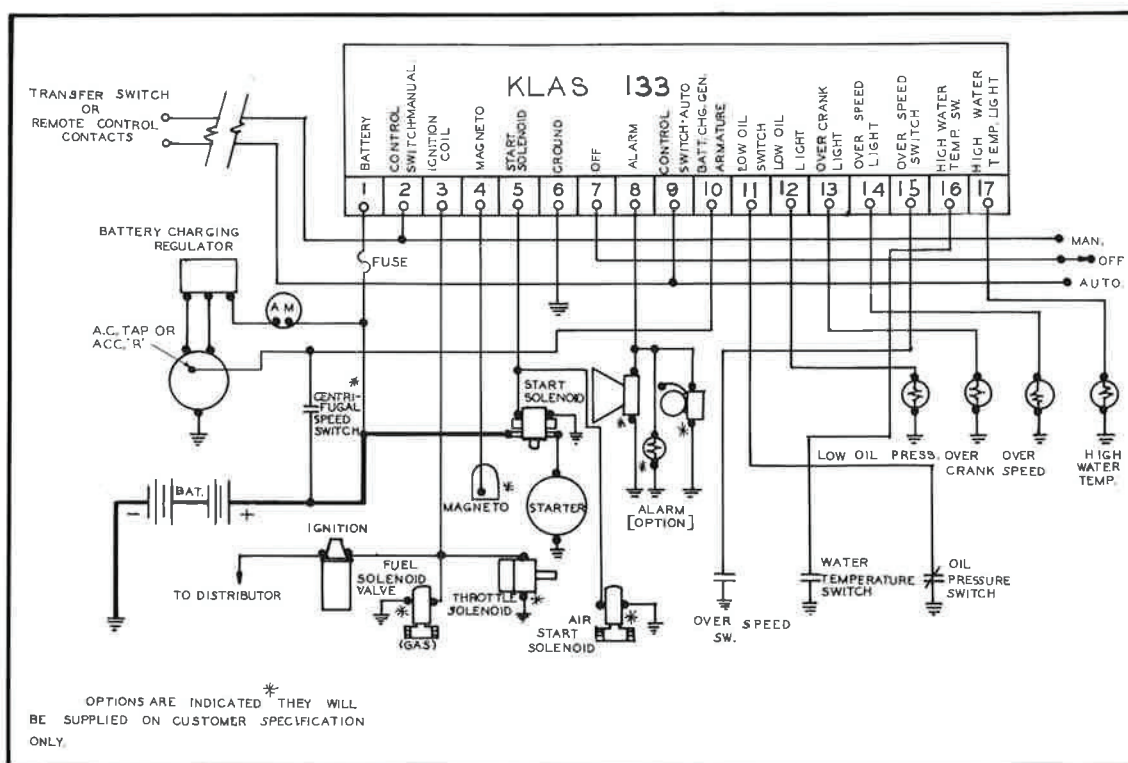
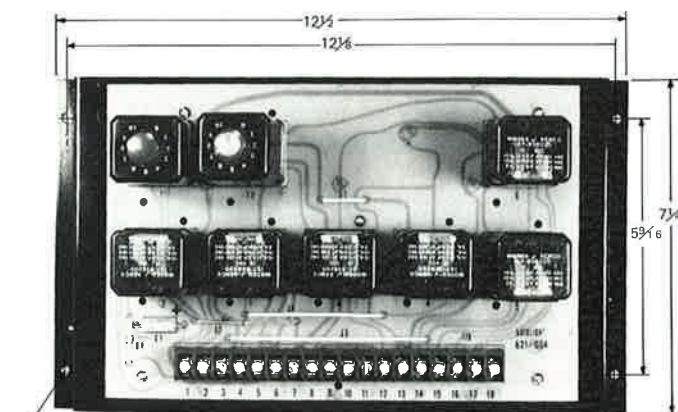


4 POSITION ROTARY SWITCH



FAILURE INDICATING LIGHTS

DIMENSIONS & WIRING DIAGRAMS



ACCESSORIES

Dust cover

Audible alarm, horn or bell—available as an option, in addition to the standard visual alarm light.

ORDER PROCESSING

When ordering specify:

- KLAS - model number
- battery voltage
- engine manufacturer
- enclosure number
- (dust cover optional)
- control switch (3 pos. std.)
- or (4 pos. optional)

TROUBLE SHOOTING CHART

SYMPTOM	CHECK FOR	CAUSE
Fail to crank	Blown fuse	Shorted leads when hooking up or overloaded circuits replace with SFE9.
	Low battery	May have defective battery or charger may not be functioning. Could have corroded or loose battery connection.
	Voltage at start solenoid	If voltage is present at starter, could have defective starter or solenoid. If no voltage at starter, could have open leads or you may have a signal already present at Terminal No. 10 to disconnect starter.
	Voltage on Terminal No. 10	There should be no voltage on Terminal No. 10 during cranking. If present, check signal source.
Unit cranks, does not start	Fuel supply	May have empty tank — bleed fuel supply line. Gas units may have wrong pressure, 4-6 oz. on naturally aspirated units. Turbo charged units require higher pressure.
	Voltage on Terminal No. 3	If present, may have defective fuel valve or ignition system or loose connection. If no voltage present, may have dirty Contact 4-7 Relay 1 or bad diode (4 position switch only) D3 in engine control.
Unit will start then fail	Loss of fuel	Tank may be empty — fuel line may be broken or loose.
	Failure lights	Overcrank = May not have received crank disconnect signal on Terminal No. 10 — defective timer. Low oil = Low oil level in crankcase — oil pump failed — defective switch. High water = Low water level in radiator — thermostat closed — broken fan belt — restricted air flow through radiator — ambient temperature too high — Defective switch. Overspeed = Lost governor control — defective switch.
	Loose or open connections	May have lost power to control or ignition system.
Unit starts, but starter does not disengage	Voltage on Terminal No. 10	Voltage must be present after unit starts to operate crank disconnect relay in control. No voltage after engine starts indicates defective signal source, speed switch, pressure switch, battery charging alternator, etc. Voltage present on Terminal No. 10 would indicate defective Relay 2 or Diode D1 or Capacitor C1.
	Malfunctioning starter	Starter could be hanging up or pilot solenoid not disengaging.

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