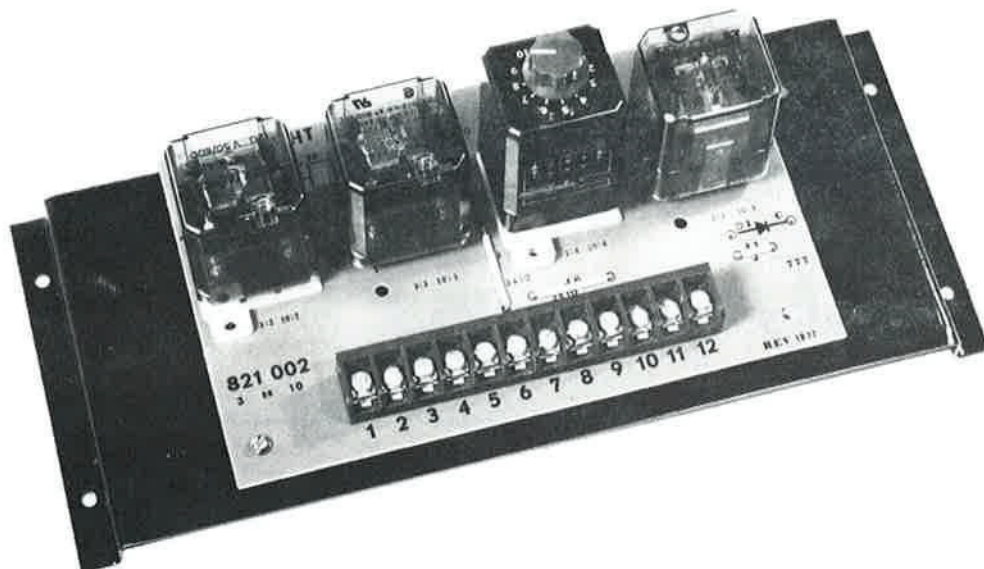




KATOLIGHT

AUTOMATIC START CONTROLS TECHNICAL BULLETIN

MODELS:
KLAS 103
KLAS 110



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

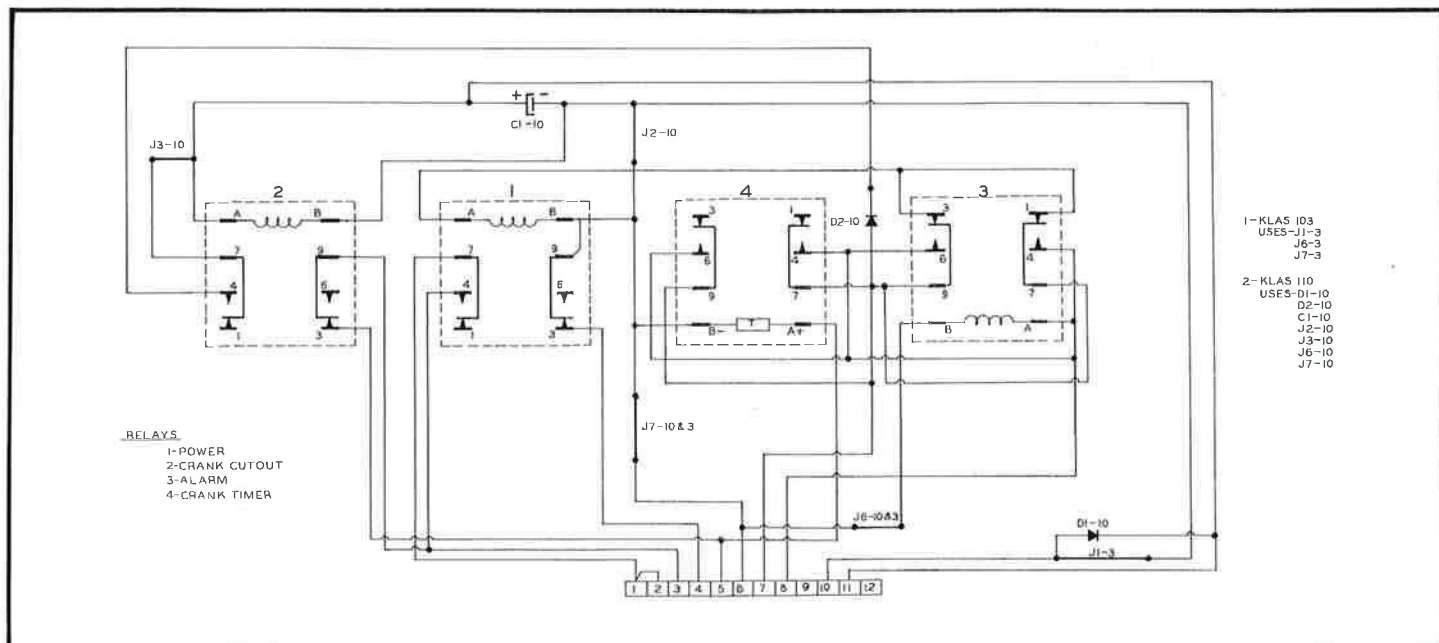
The Katolight KLAS 103 and KLAS 110 are non-cyclic automatic engine start controls that provide visual indication (light) and automatic engine shutdown due to an overcrank condition. An optional audible alarm can also be provided.

FEATURES

- Consistent operation from -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.
- 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. The control must be reset after any failure.)
- Printed circuits are extra heavy construction of .093 board and .004 copper.
- Available for 12 or 24 volt battery systems; negative ground.
- Positive lockout circuits prohibit re cranking while engine is running.
- Reverse polarity protection.

MODEL	CRANKING MODE	OPERATING CONTROL MODE	BATTERY VOLTAGE	CRANK DISCONNECT
KLAS 103	Continuous Adjustable	* Energized to run	12 or 24	120 VAC
KLAS 110	Continuous Adjustable	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 and 1-7 Relay 3, to energize Relay 1. Relay 1 breaks normally closed Contact 3-9 magneto ground circuit to Terminal No. 4 (if used) also closes normally open Contact 4-7 energizing Terminal No. 3 (ignition coil or throttle solenoid on Diesel units) and through normally closed contact 3-9 Relay 2 energizes Terminal No. 5 (start solenoid) and crank timer, Relay 4.

If engine starts, Relay 2 is energized from either a 115 volt AC source on Terminals No. 10 and No. 11 on KLAS 103, or a positive DC voltage on Terminal No. 10 on KLAS 110. This positive DC voltage for Terminal No. 10 on KLAS 110 can come from the AC or ACC. tap on battery charging alternator, or speed switch or pressure switch. Relay 2 breaks normally closed Contact 3-9 removing power to

Terminal No. 5 (disconnecting start solenoid) and crank timer, Relay 4. On KLAS 110, Relay 2, locks itself in through normally open Contact 4-7 to prevent starter re-engaging from loss of signal on Terminal No. 10.

If engine doesn't start, timer Relay 4 will time out (normally set at 45 seconds). Relay 4 closes normally open Contact 4-7, energizes Relay 3. Relay 3 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. Terminal No. 8 energizes failure light.

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.

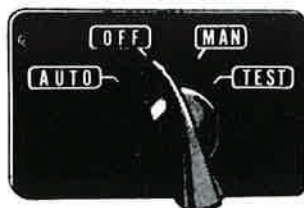
"MAN" Starts engine and operates with all safety shutdown features in operation.

"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 light. Engine failed to start. Engine cranked for length of time set on adjustable crank timer but engine did not start.



3 POSITION SWITCH



4 POSITION ROTARY SWITCH



FAILURE INDICATING LIGHT

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 in engine control.
Unit will start then fail	Loss of fuel	Tank may be empty — fuel line may be broken or loose.
	Failure light	May have gone into overcrank and shutdown. If this happened, may not have received crank disconnect signal on Terminal No. 10.
	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.

KATOLIGHT CORPORATION

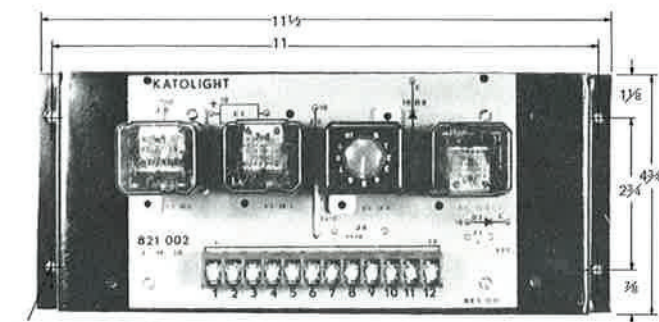
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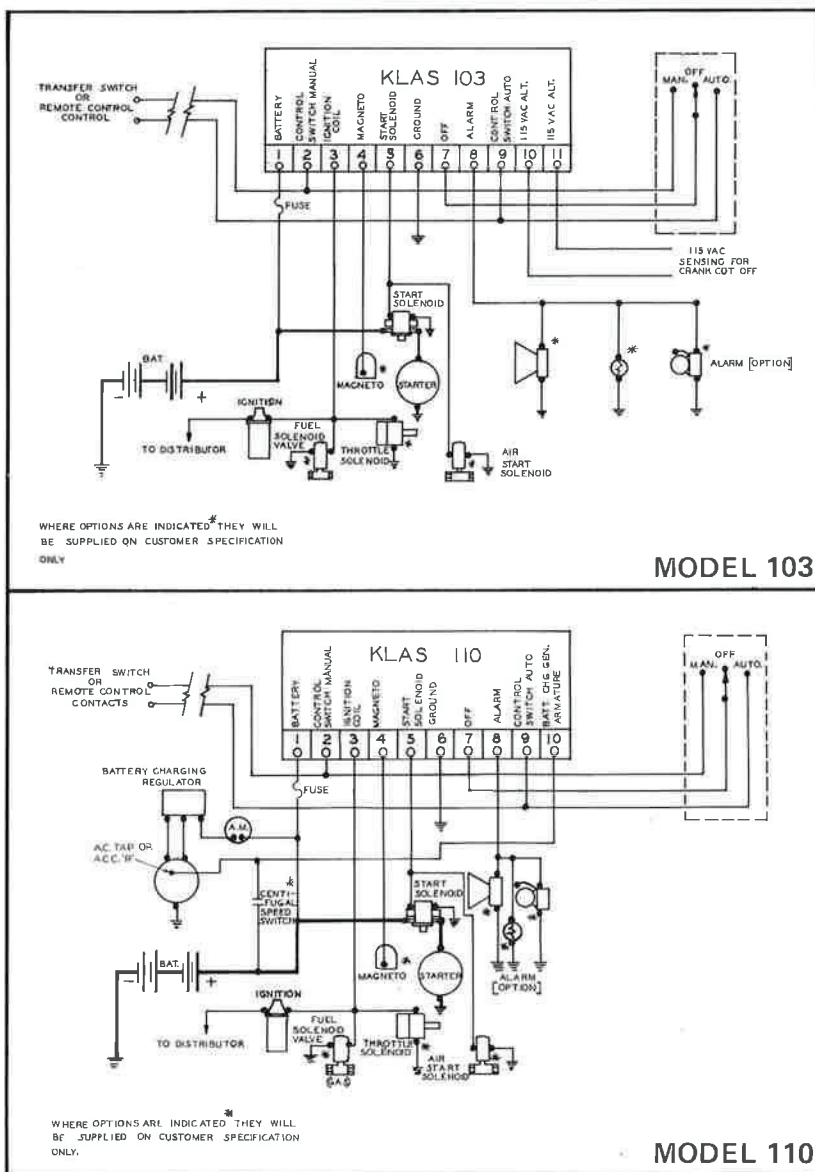
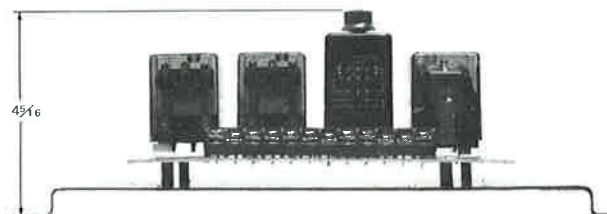
KLAS TEC 103-110-81

For more information contact your nearest Representative, Distributor, or Dealer below.

DIMENSIONS & WIRING DIAGRAMS



4 - MOUNTING HOLES
3/16 DIA.



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)