

INSTRUCTION MANUAL AND PARTS LIST

FOR

ONAN AUTOMATIC DEMAND CONTROL

SERIES

H

TWO WIRE, SINGLE PHASE



907-4

Printed in U.S.A.



2515 University Avenue S.E.,
Minneapolis 14, Minnesota



Minneapolis 14, Minnesota

MANUFACTURER'S WARRANTY

The Manufacturer warrants, to the original user, that each product of its manufacture is free from defects in material and factory workmanship if properly installed, serviced and operated under normal conditions according to the Manufacturer's instructions.

Manufacturer's obligation under this warranty is limited to correcting without charge at its factory any part or parts thereof which shall be returned to its factory or one of its Authorized Service Stations, transportation charges prepaid, within one year after being put into service by the original user, and which upon examination shall disclose to the Manufacturer's satisfaction to have been originally defective. Correction of such defects by repair to, or supplying of replacements for defective parts, shall constitute fulfillment of all obligations to original user.

This warranty shall not apply to any of the Manufacturer's products which must be replaced because of normal wear, which have been subject to misuse, negligence or accident or which shall have been repaired or altered outside of the Manufacturer's factory unless authorized by the Manufacturer.

Manufacturer shall not be liable for loss, damage or expense directly or indirectly from the use of its product or from any other cause.

The above warranty supersedes and is in lieu of all other warranties, expressed or implied, and of all other liabilities or obligations on part of Manufacturer. No person, agent or dealer is authorized to give any warranties on behalf of the Manufacturer nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an officer of the Manufacturer.

IMPORTANT

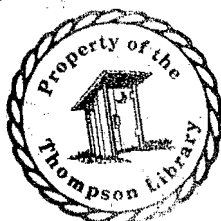
RETURN WARRANTY CARD ATTACHED TO UNIT

INTRODUCTION 1

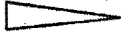
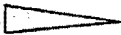
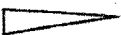


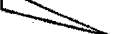
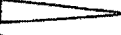
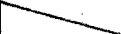
This manual applies to ONAN 2 wire 120 or 240 volt Automatic Demand Controls. It contains information to help you install, operate and maintain your automatic control, and a complete parts list.

The automatic controls described in this manual are designed for use with remote starting 2 wire, single-phase, ONAN generating plants. The control automatically starts the generating set whenever a load is turned on and stops it when the load is turned off. Consult the dealer regarding ONAN generating plants that can be used with this control. We suggest that you keep this manual handy so you can refer to it when necessary.

If you wish to contact your dealer or the factory about this control, be sure to supply the complete MODEL and SPEC NO., and the full serial number of the equipment as shown on the nameplate. This information is necessary to identify your control among the many basic and special optional types ONAN manufactures.



MODEL DESIGNATION

- D**  **SPEC LETTER** - Advances with production modification resulting in parts not interchangeable.
-  **SPEC NO.** - Identifies optional equipment. No. "1" designates no options or basic as advertised.
 12 designates 5 second delay on starting and no other options.
 10 designates 20 second delay on starting and no other options.
- **  **DIAGONAL** - Separates basic model from specification.
- 4**  **STANDARD MODIFICATIONS** - 4 designates 32 volt model.
- 21**  **CODE NO. (Unit's Digit)** - Designates voltage, wire and phase. NOTE: 1 = 120 volts, 1 phase; 2 = 240 volts, 1 phase.
- 2**  **CODE NO. (Tens Digit)** - No number designates 60 cycle. Number "5" designates 50 cycle; 2 designates 50 or 60 cycle.
- H**  **SERIES** - Designates ONAN Automatic Demand Control.
- 305**  **KILOWATT RATING** 305 designates 3.5 KW

FOR MODEL NUMBER, SEE THE CONTROL NAMEPLATE

GENERAL INFORMATION

For your future reference, fill in the blanks below:

Control Model Number _____

Serial Number _____

Wiring Diagram Number (diagram furnished with control)

Installed By _____ Date _____

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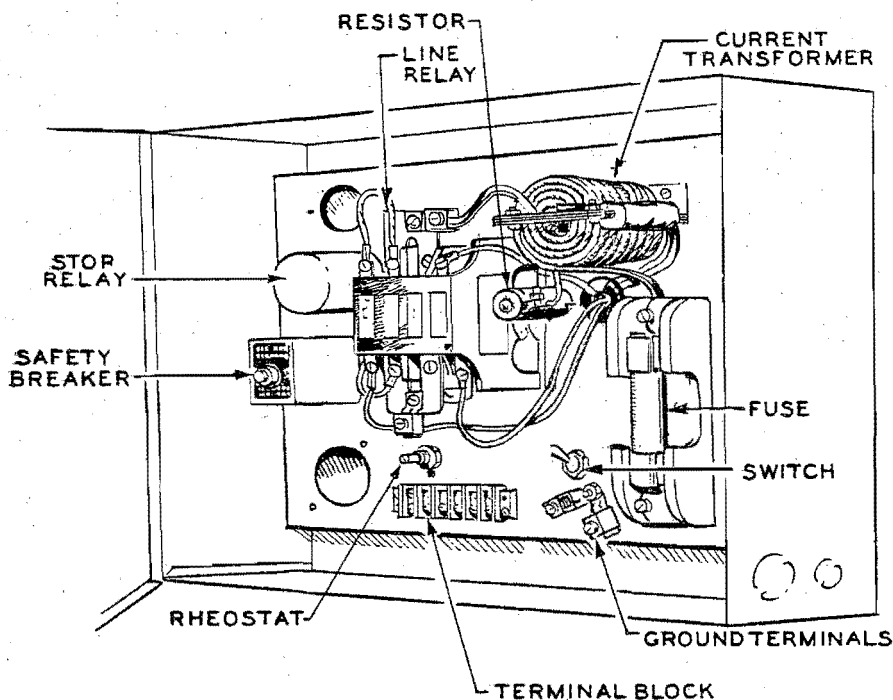


FIG 1 - AUTOMATIC DEMAND CONTROL PICTORIAL VIEW
models beginning spec D (models Spec A, B, and C are
illustrated in Fig. 4)



INSTALLATION

Before installing your automatic control, install and operate the generating plant from its own controls. Follow instructions in the manual accompanying the plant.

If the generating plant is already installed, disconnect all remote station wires and the output leads at the plant control box. You can't use both remote start-stop stations and an Automatic Control at the same time. If your generating plant has reconnectable output (4 wires) be sure it's connected for voltage to match the control. See the operator's manual.

Before installing the control, disconnect the battery leads from the generating plant to prevent accidental starting.

MOUNTING

Mount the automatic control on a wall or other vertical support near the plant where it will be readily accessible. Be sure the control won't be subject to excessive vibration. The standard control box is designed for installation indoors; protect it from excessive heat, moisture, dust, and dirt. Don't mount the control outdoors.

Secure the control with 4 bolts or screws through the 9/32 in. holes in the back of the box.

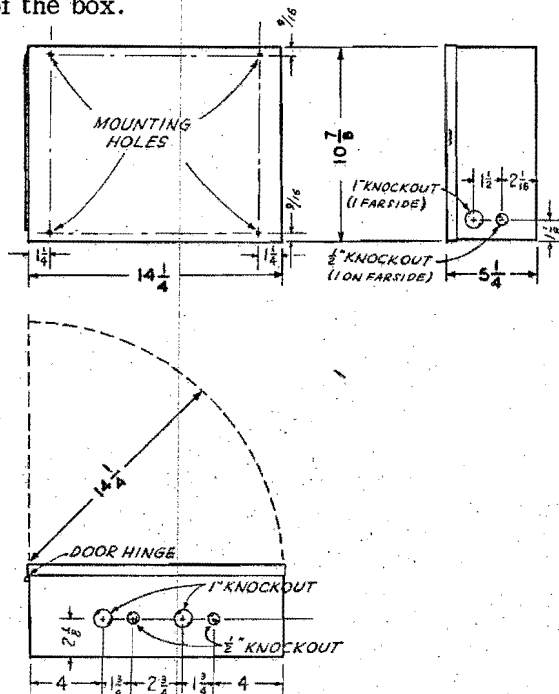


FIG 2 - CONTROL BOX DIMENSIONS (models beginning Spec D)

WIRING

The wire interconnecting the Automatic Demand Control and generating plant is furnished in sleeving. **NOTE:** On models Spec A, B, and C the interconnecting wires are in conduit.

Before wiring the automatic control, set the switch on the inside panel at **MANUAL** and be sure the generating plant batteries are disconnected to prevent accidental starts. Observe all electrical codes.

Automatic control wiring is divided into 3 steps: (1) control wires between the generating plant and automatic control, (2) load wires from plant to control, and (3) load wires to the automatic control output.

1. **Control Wires between Plant and Control.** If using other than the furnished wire, use #16 wire for the control. Connect 3 control wires (small conductors in cable) between the remote control terminal block in the generating plant control box and the automatic control terminal block. Follow the color code (Fig 3 for models beginning Spec D; Fig 4 for Spec A, B, and C models), connecting each wire to the same number terminal at each end.

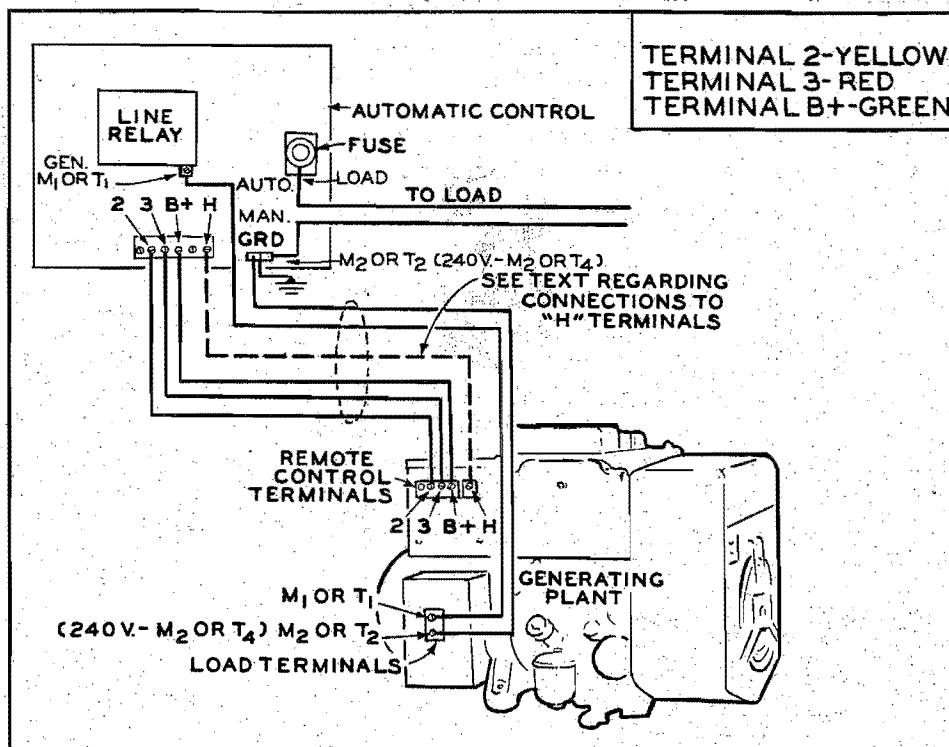


FIG 3 - WIRING PLANT, LOAD, AND CONTROL
(Models beginning Spec D)

NOTE: On Automatic Controls with time delay on starting (pre-heat delay) there is a 4th control terminal marked H. When used with diesel generating plants, having a terminal marked H on the remote control terminal block, remove the jumper between 3 and H of the plant control. Then install the small (#16) black wire of the control cable between the plant and control H terminals. This control wire isn't used with ONAN gasoline generating plants.

2. **Load Wires between Generator and Automatic Control.** Install the heavy wires in the furnished cable between the generating plant load terminals and the automatic control. Install the black wire from the hot side of the generator output (M1 or T1) to the automatic control terminal marked GEN M1 or T1. Install the grounded side (white wire) from M2 or T2 of the generator to the automatic control terminal marked GEN M2 or T2 or GRD.

NOTE: If the interconnecting cable is to be discarded, use the load wire sizes recommended in Table 1.

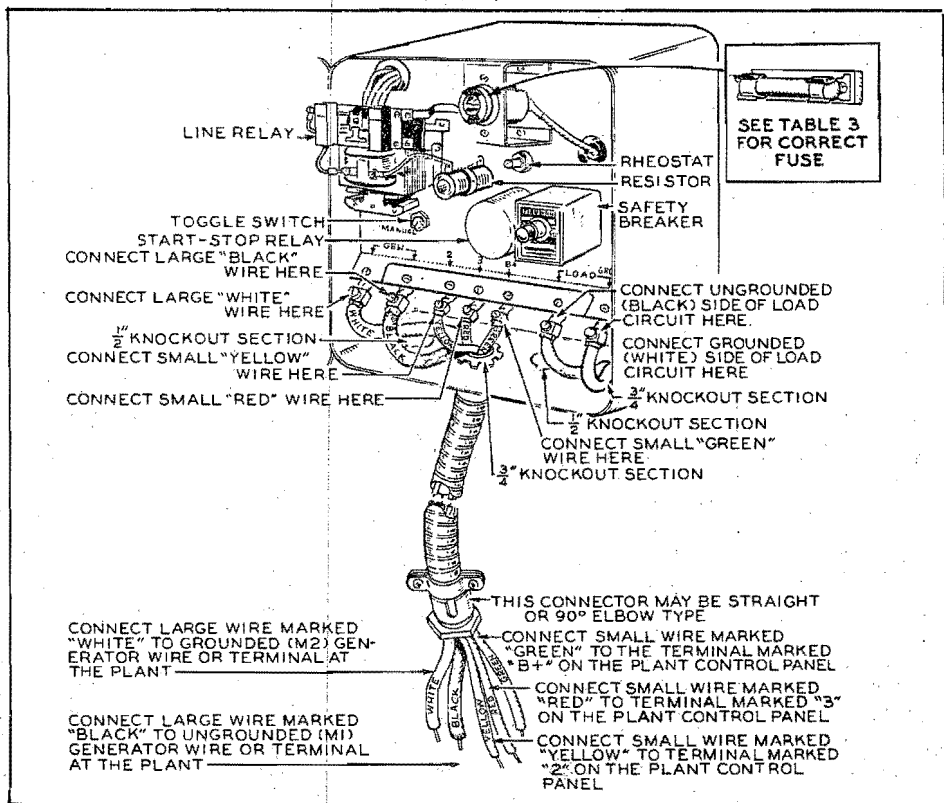


FIG 4 - AUTOMATIC CONTROL PICTORIAL VIEW AND WIRING INSTRUCTIONS (models prior to Spec D)

3. **Load Wires.** Using wires of adequate size for your plant's current capacity (Table 1) install load wires to the automatic control output. Install the grounded side of the load to the terminal marked M2 or T2, or LOAD GRD and the "hot" side to the fuse block load connection (unmarked LOAD terminal on Spec A, B, and C models).

FUSES

Install the proper fuses for your generating plant in the fuse receptacle or block. Several fuses are furnished with the control, but install only the one that matches your generating plant (see Table 1) and throw the others away. Don't use time lag fuses.

WARNING: Using other than the correct fuses voids the factory warranty on the generating plant.

TABLE 1 - FUSE RATING AND PLANT CAPACITY

Control Model No.	Spec Letter	Plant Voltage	Generating Plant Capacity Watts	Auto. Control Fuse Rating Amps†	Min. Load Wire Size★ Gage No. AWG
3H1/1A, 305H1/1 3H51/1A, 305H51/1	A, B, C	120	1000	10	14
			1500	15	14
			2000	20	12
			3000	30	10
			3500	30	10
3H1/4A, 3H1-4/1	A, B, C	120	2250	30	10
		32DC	750DC		
5H1/1, 5H51/1	A, B, C	120	5000	50	6
3H2/1A, 305H2/1 3H52/1A, 305H52/1	A, B, C,	240	1000	6	14
			1500	10	14
			2000	10	14
			3000	15	14
			3500	15	14
5H2/1, 5H52/1	A, B, C	240	5000	25	10
3H21-4/1	Begin Spec D	120	2250	30	10
		32DC	750DC		
305H21/1	Begin Spec D	120	1000	10	14
			2000	20	12
			2500	25	10
			3500	30	10
705H21/1	Begin Spec D	120	4000	35	8
			5000	50	6
			6000	50	6
			7500	60	4
705H21-4/1	Begin Spec D	120 32DC	4000	35	8
			5000	50	6
			6000	50	6
			7500	60	4
			750DC		
705H22/1	Begin Spec D	240	2000	10	14
			2500	15	14
			3500	15	14
			4000	20	12
			5000	25	10
			6000	25	10
			7500	30	10

† - Use the fuse rated for your generating plant.

★ - These wire sizes apply to wire types R and T in conduit or cable. For other types of wire, see the National Electrical Code. Also the wire sizes specified will give a 2% voltage drop up to about 50 feet. For longer runs with the same voltage drop, larger wire must be used, as specified by the National Electrical Code.

OPERATION

When installation is completed, simply throw the automatic control toggle switch to AUTO. Your automatic control is then set for automatic operation and will start the generating plant when you switch on the proper size load. If your control has a time delay relay, the plant won't start until a few seconds after you apply the load. The ac load must be greater than the minimum required load (Table 2) but less than the maximum rated load of your generating plant.

NOTE: For automatic operation, the ELECT START-HAND CRANK switch on the generating plant (where used) must be in the ELECT START position.

TABLE 2 - MINIMUM STARTING LOADS

Plant Voltage	Incandescent Bulbs	Heating Appliances	Fluorescent Bulbs
120	60 watts	600 watts	See
240	100	1200	Text

LOADS

To start the generating plant, a load must meet the requirements shown in Table 2. Some special loads, because of their electrical characteristics, cause trouble for the automatic control.

Fluorescent lights many times either won't start a generating plant or will cause it to cycle (alternately start and stop) because of the starting mechanism. However, once started, fluorescent lights above the minimum power requirements will keep the generating plant running. To be sure of starting with fluorescent lights, install a 60 watt (100 watt for 240 volt control) incandescent bulb to be turned on at the same time.

Transformers, small motors, electric clocks and other inductive loads with running power below the control's minimum power requirements also create trouble for the automatic control. These inductive loads draw enough direct current to start the generating plant, but not enough alternating current to keep it running, so the plant cycles. To run these loads, connect a light bulb in the load circuit to be turned on whenever the inductive load is on.

For more detailed information on loads, see ONAN Technical Bulletin T-010.

MANUAL-AUTOMATIC SWITCH

For normal operation, keep the MANUAL-AUTO switch in the AUTO position. In the MANUAL position, the automatic control won't start the generating plant. When servicing the generating plant or whenever you don't want automatic starting, throw the switch to MANUAL. With the switch on MANUAL, you can start the plant either from its own START-STOP switch or by hand cranking.

SAFETY BREAKER

If, because of lack of fuel or another reason, the plant does not start within about one minute of cranking, the safety breaker trips and cranking stops. When this occurs, the safety breaker reset button will project out of the breaker case far enough to expose the red on the side of the button. Determine the cause of the failure and correct the trouble. Then reset the breaker by pushing the button in firmly. Wait at least 1 minute after it trips to allow the breaker to cool.

STARTING WITH DISCHARGED BATTERY

To start a plant with a discharged battery, throw the automatic control's toggle switch to MANUAL, and the generating plant's ignition toggle switch (where used) to HAND CRANK. Start the plant manually as described in the plant's instruction manual. Return the automatic control's switch to AUTO position, and the plant's switch to ELEC START position, as soon as the plant starts. Be sure the proper minimum load is connected to keep the plant running.

BATTERY CHARGING

Using an automatic control increases the drain on generating plant batteries, with additional starts and control operation. Increase the battery charge rate, following instructions in the plant operators manual. Check the batteries often for the first few weeks to be sure they remain fully charged under normal operation.

TIME DELAY CIRCUIT (Optional)

The time delay serves two separate functions on diesel and gasoline generating plants.

Normally used with diesel generating plants, as a preheating circuit, it delays starting for 20 seconds after the load is switched on. During this delay, the control energizes the diesel engine preheaters to improve starting. For diesel starting below 32° F, the preheat delay can be lengthened by changing the time delay relay. See parts section for ONAN number of 1 minute delay relay.

The time delay circuit must also be used with ONAN generating plants having a separate automotive type starter. The delay prevents damage to the starter if the load is switched off and then back on immediately. Without a delay, the starter would try to mesh with the spinning flywheel, damaging both starter and flywheel. When used on gasoline plants having automotive starters, a 5 second delay plug-in relay in the control allows just enough time for the plant to stop before it can be restarted.

ADJUSTMENTS**STARTING LOAD ADJUSTMENT**

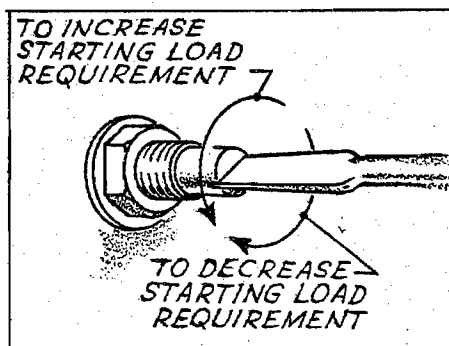
If the control won't start the generating plant with a load of 60 watts (100 watts with 240 volt) incandescent bulb, adjust the starting load rheostat (600 ohm rheostat). Turn the rheostat slightly clockwise to reduce the starting load required. Don't turn it too far or the generating plant will cycle (alternately start and stop), when a small load is turned on. If the generating plant cycles, adjust the control slightly counterclockwise.

Whenever a new stop relay is installed, adjust this rheostat so the plant will start with a 60 watt incandescent bulb load.

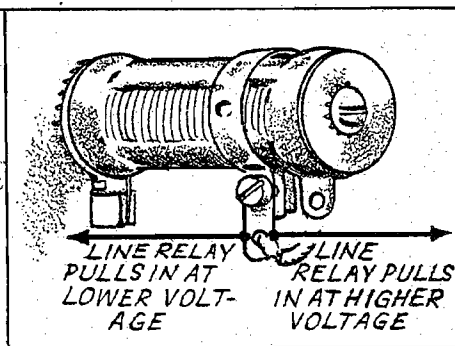
LINE RELAY PULL-IN VOLTAGE ADJUSTMENT

An adjustable resistor in series with the line relay coil adjusts the voltage at which that relay pulls in. It was factory adjusted so the relay pulls in when the generator voltage reaches 102 to 108 volts (204 to 216 volts on 240 volt models). Don't adjust this relay unless the line relay won't pull in when the plant starts or it pulls in at too low a voltage, causing the generating plant to cycle.

NOTE: On some early model AJ generating plants, the factory adjustment won't allow the relay to pull in. Using a 60 watt bulb for load, adjust the slide band inward slightly and restart the plant. Repeat until the line relay pulls in, but don't push the slider too far or the generating plant will cycle.



**FIG 5 - STARTING LOAD
ADJUSTMENT**



**FIG 6 - LINE RELAY PULL-
IN VOLTAGE ADJUSTMENT**

TROUBLE SHOOTING AND REPAIR

If installed and used properly, the automatic control requires little attention. But in case trouble occurs, use the information in this section to diagnose and repair it. Use the trouble-shooting chart, to diagnose the trouble. Remember, it could be in either the automatic control, the generating plant, or the load.

Use the wiring diagrams in this book to help diagnose trouble. When using the wiring diagrams, remember the following points. These diagrams are called modified pictorial views. They show each component in its actual position in the control, normally as seen from the front. The terminals of each component are shown in their actual position on the component. All relays are shown de-energized. A dotted line indicates the edge of the control.

A circuit description and discussion of all components are included here to aid trouble-shooting and repair of the control. Understanding how the control works is the first step to repairing it.

CIRCUIT DESCRIPTION

The automatic demand control consists of 4 circuits: the pilot circuit, cranking circuit, generating circuit, and stopping circuit. It operates in the following manner.

The pilot circuit (Fig. 7) connects the generator's 12 volt battery, through remote terminal B+, across the load terminals in place of ac. When a load is switched on, the current flowing from B+ through the line relay contacts and stop relay coil pulls in the stop relay. The relay contacts then ground the cranking circuit (Fig. 8) and the plant cranks.

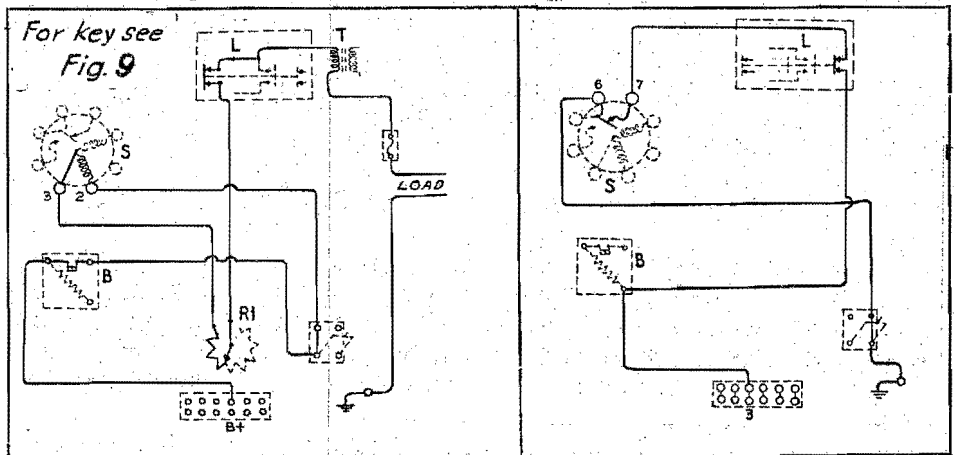


FIG 7 - CONTROL PILOT CIRCUIT

FIG 8 - CRANKING CIRCUIT

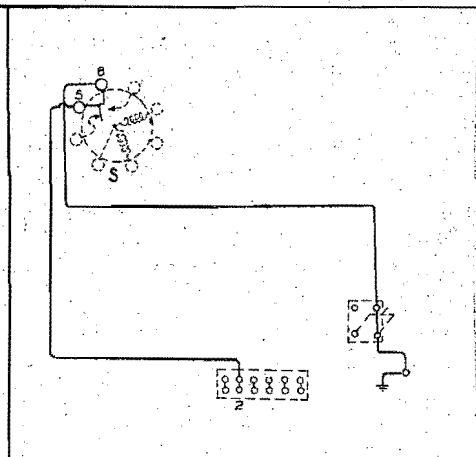
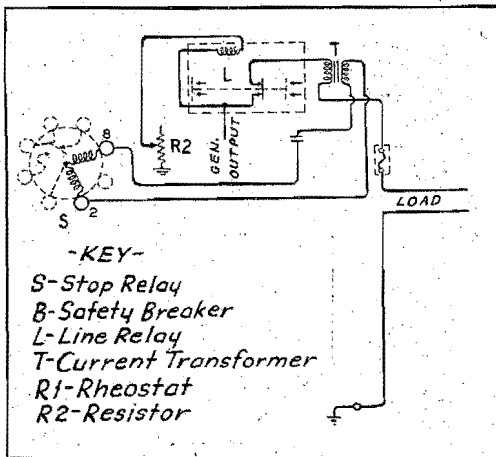


FIG 9 - PLANT RUNNING CIRCUIT

FIG 10- STOPPING CIRCUIT

When the generating plant starts and builds up voltage, it pulls in the line relay (Fig. 9) feeding power to the load and breaking both the pilot circuit and cranking circuit. This is the generating circuit. Current to the load passes through the current transformer which keeps the stop relay energized. If, however, the load is shut off or reduced below the level necessary to keep the stop relay energized, the relay drops out grounding the plant stop circuit through remote terminal 2 (Fig. 10) . This stops the generating plant.

When the generator stops, the line relay drops out, reconnecting the pilot circuit to the automatic control load terminals to detect the next load switched on.

AUTOMATIC CONTROL COMPONENTS

STOP RELAY — A plug-in relay, the Sigma relay controls starting and running of the generating plant. When the relay is energized, the plant starts and runs — when de-energized, the plant stops. If the relay and the rest of the pilot circuit are operating, there will be a noticeable "clicking" sound when a load is switched on.

The easiest way to test this relay is to use a new one in the circuit.

It can also be tested by measuring the resistance of each coil and checking the contact continuity. Between terminals 2 and 3 resistance should be about 110 ohms, between terminals 8 and 3 it should be about 850 ohms. Replace the relay if defective. When the stop relay is replaced, the starting load rheostat must be readjusted for the new relay. See Adjustments.

LINE RELAY — The line relay connects the generator ac output to the load, after generator voltage builds up. It also contains auxiliary contacts to disconnect the pilot and cranking circuits after the plant starts. Both the contacts and coil of all line relays are replaceable.

In some cases, the line relay contacts may require cleaning. To clean them, rub with hard paper, or gauze tape soaked in carbon tetrachloride. Don't file contacts. If the contacts are badly burn't or pitted, replace them.

If the line relay appears defective, check the coil resistance. Resistance (Spec D models) should be 150-200 ohms, slightly higher if hot.

SAFETY BREAKER — The safety breaker controls the maximum cranking time. If the engine won't start with about 45 seconds of cranking the breaker opens, removing battery voltage from the pilot circuit and stop relay.

The breaker contains a heating coil and bi-metal strip. When the strip heats, it bends, unlatching the spring loaded contacts. Because the contacts are spring operated, they must be manually reset by pushing the reset button on the front of the breaker.

The breaker can be tested by checking coil continuity of the heater and checking for heating during a starting cycle. To test circuit breaking, disconnect the plant remote start lead (remote terminal 3) and turn on a load. The stop relay should actuate and the breaker heat. After the about 45 seconds, the breaker should open. If it doesn't, disassemble it for repair by removing the 2 screws holding the cover on. No repair parts are furnished for this breaker, so if it requires new parts, the complete breaker must be replaced. To replace the breaker, remove the control panel. Be sure to use the insulating washers between the breaker terminals and the panel.

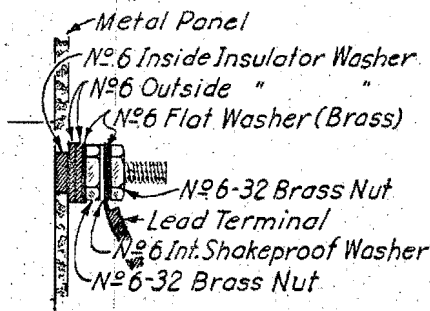


FIG 11- DETAIL OF SAFETY BREAKER MOUNTING TERMINAL

CURRENT TRANSFORMER — The current transformer is a step-up transformer that supplies power from ac current to the stop relay when the generator is operating. It transforms a low voltage drop across the ac line to a higher voltage that energizes the stop relay.

If the current transformer is believed defective, check it by testing continuity of both windings, and testing each for grounding to the iron core. If the transformer is defective, replace it.

TIME DELAY RELAY (Optional)—

The time delay relay is a thermostatic relay with delay between heater energization and contact pull-in. Energized by the pilot circuit, it starts pre-heat immediately by grounding remote terminal H. After the prescribed delay, the relay contacts close starting the cranking cycle. To test this relay, either replace it in the circuit or apply a load to the control and watch contact operation. One contact should bend, to close the circuit, within the time delay. If the contacts don't close, check voltage at the heater terminals of the relay socket and check continuity of the heater.

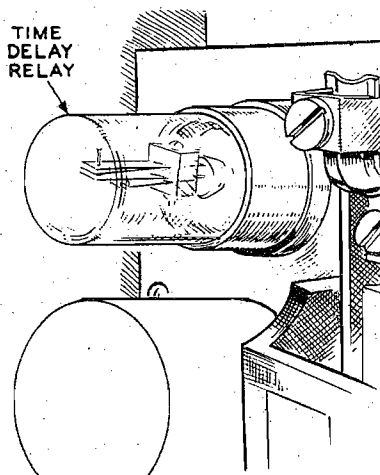


FIG 12 - TIME DELAY RELAY

TROUBLE-SHOOTING PROCEDURE

Use the following procedure to determine whether trouble is in the control, the load, or generating plant. Determine the exact cause before making adjustments or repairs.

1. Check the load. Be sure it is more than the minimum required for starting and running but doesn't overload the plant.
2. Check the AUTO-MANUAL switch. It must be in the AUTO position.
3. Check all load and control connections. They must be secure and clean.
4. If there is an ELEC-START switch on the plant be sure it's in the ELEC-START position.
5. Check the safety breaker reset button. Push it to be sure the breaker contacts are closed.

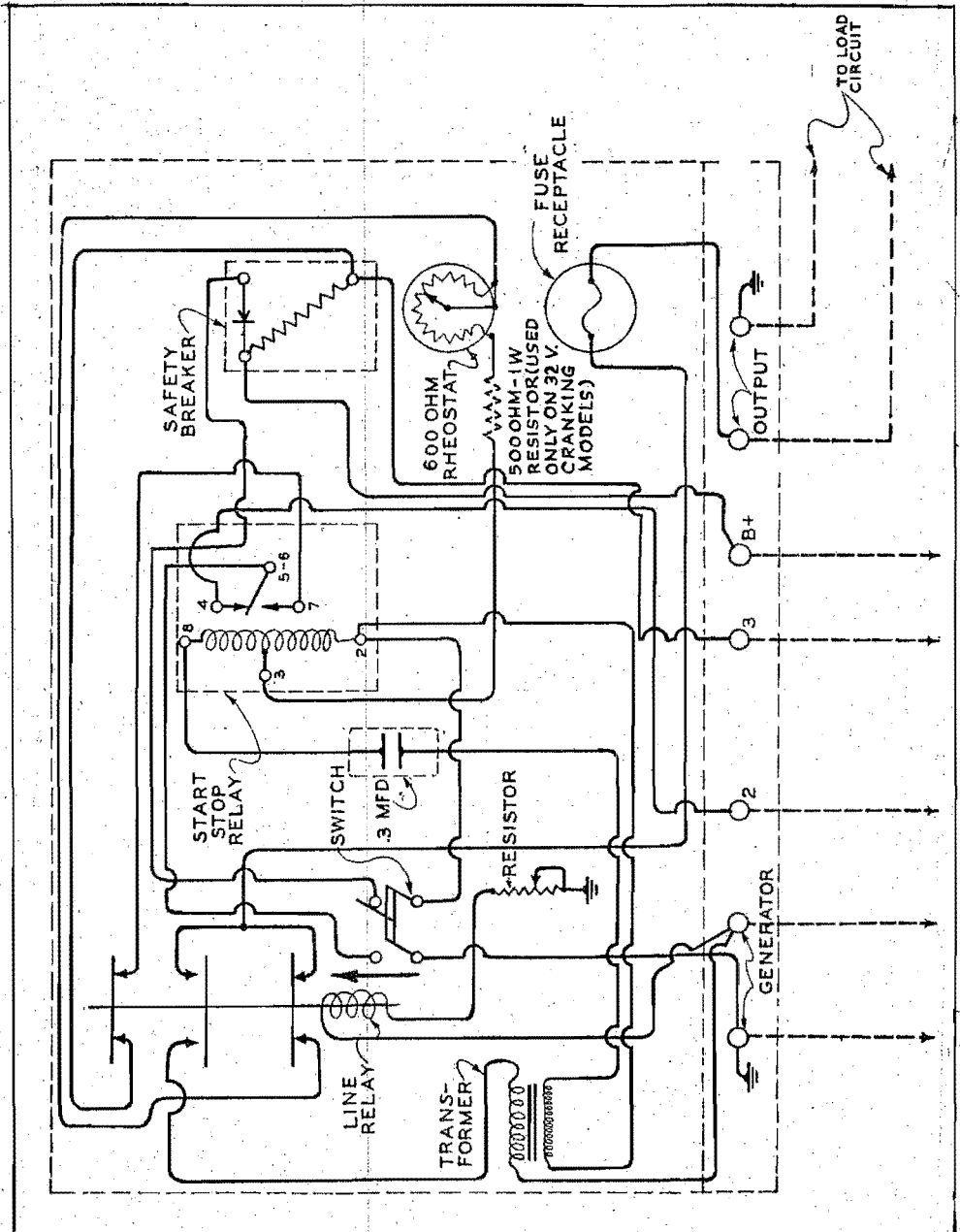
6. Check the load fuse. If necessary, test by substituting a new fuse.
7. Check the battery and battery circuit. Check battery condition with a hydrometer. Be sure battery voltage appears at the B + terminal of the automatic control.
8. Test the load. To do this, remove the load connections to the automatic control and substitute a 60 watt bulb and socket (100 watt with 240 volt plant). If the plant starts, operates and stops satisfactorily when the bulb is screwed into its socket and then unscrewed, the trouble is probably in the load.
9. If the plant didn't operate properly in step 8, set the automatic control toggle switch at MANUAL. Start the generating plant from its START-STOP switch. If it operates properly, check to see that it assumes the load (the line relay pulls in). If the plant operates and output voltage is normal, the defect is in the automatic control. If it doesn't assume the load, check the plant output voltage and the automatic control line relay coil.

If the plant doesn't operate, disconnect the control wires between automatic control and plant and again operate the plant from its controls. If the plant doesn't operate properly independent of the automatic control refer to the plant instruction manual for repair. If the plant operates only when the control wires are disconnected, the control is defective or the control wires shorted. Consult the control trouble-shooting chart.

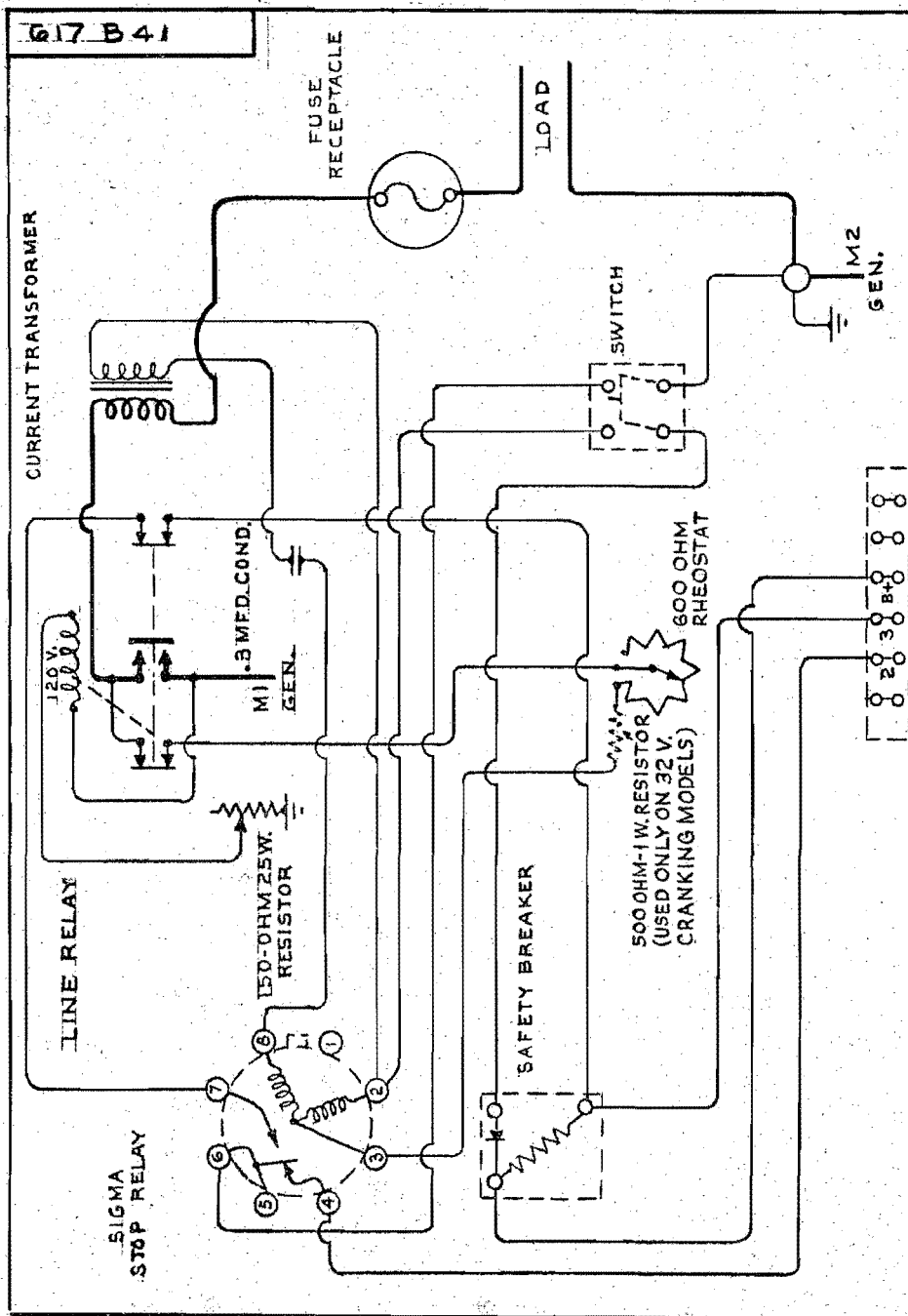
TROUBLE-SHOOTING CHART

TROUBLE	POSSIBLE CAUSE	REMEDY
CONTROL WON'T START GENERATING PLANT, BUT PLANT OPERATES PROPERLY INDEPENDENT OF CONTROL	Defective load fuse	Replace fuse, check with ohmmeter if necessary.
	Dirty line relay contacts	Clean the contacts with paper
	Incorrect adjustment of 600 ohm starting load resistor (too high resistance or open)	Adjust resistor, see ADJUSTMENTS
	Defective stop relay	Test or replace relay
	Open circuit in battery circuit	Check for battery voltage between B+ and ground
	Open circuit in pilot circuit	Check for voltage at load terminal. Check back through complete pilot circuit to find open circuit
PLANT STARTS BUT STOPS WHEN IT BUILDS UP SPEED	Overload burning out load fuse	Inspect load
PLANT CYCLES (Alternately starts and stops)	Line relay adjusted to pull-in at too low voltage	Readjust resistor, see ADJUSTMENTS
	Starting load resistor adjusted for too small a starting load	Readjust, see ADJUSTMENTS
	Stop relay defective	Test or replace relay
	Current transformer defective	Check coil continuity. Replace if defective
PLANT WON'T STOP WHEN LOAD REMOVED	Stop relay contacts sticking	Check relay contact continuity
	Defective wiring in remote control	Inspect plant-to-control connections
PLANT STARTS AND RUNS FOR 45 SECONDS (UNTIL CRANKING LIMITER OPENS) THEN STOPS. NO VOLTAGE TO LOAD BUT GENERATOR OUTPUT VOLTAGE OK	Defective line relay coil	Check coil resistance
	Defective coil resistor	Check resistance. Replace resistor if necessary.

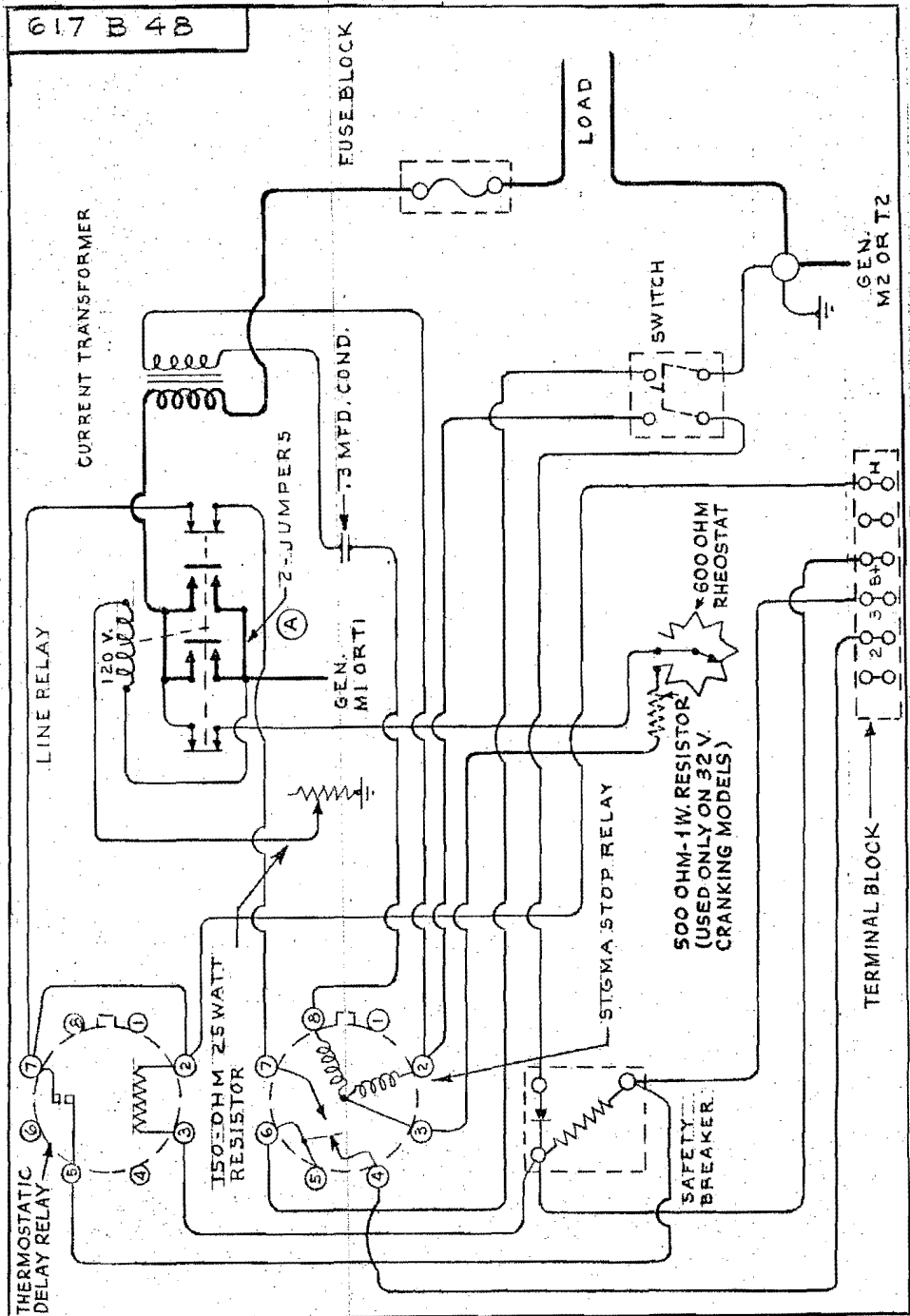
WIRING DIAGRAMS



STANDARD MODEL AUTOMATIC CONTROL (Prior to Spec D)



STANDARD MODEL (beginning Spec D)



MODEL WITH OPTIONAL TIME DELAY RELAY
(beginning Spec D)

PARTS SECTION

For parts or service, contact the dealer from whom you purchased this control or refer to your nearest authorized service station.

Find your model in the chart below and use the correct parts list column.

CONTROL MODEL DATA

MODEL	SPEC LETTER	PART COLUMN	MODEL	SPEC LETTER	PART COLUMN
3H1/	A	A	305H2/	Prior to D	C
3H2/	A	C	305H52/	Prior to D	C
3H51/	A	A			
3H52/	A	C	5H1/	Prior to D	B
3H1-4	A	D	5H51/	Prior to D	B
3H1-4/	Prior to D	D	5H2/	Prior to D	C
3H21-4/	Begin D	H	5H52/	Prior to D	C
305H1/	Prior to D	A	705H21/	Begin D	F
305H51/	Prior to D	A	705H22/	Begin D	G
305H21/	Begin D	E	705H21-4/	Begin D	J

To avoid errors or delay in filling your parts order, please furnish all information requested.

REFER TO THE NAMEPLATE OF YOUR CONTROL

1. Always give the Model No. and Serial No. of the Control.
2. Order only parts that have a quantity shown under the "Parts Reference Letter" that applies to your control.
3. Give the part number, description and quantity needed of each item. If an old part cannot be identified, return the part prepaid to your dealer or nearest **AUTHORIZED SERVICE STATION**. Print your name and address plainly on the package. Write a letter to the same address stating the reason for returning the part.
4. State definite shipping instructions.

Any claim for loss or damage to your control in transit should be filed promptly against the transportation company making the delivery. Shipments are complete unless the packing list indicates items are back ordered.

PARTS LIST

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REF. PART NO.	DESCRIPTION	QUANTITY USED									
		A	B	C	D	E	F	G	H	J	
PARTS LIST											
301C442	Box, Automatic Control	1	1		1						
301C2132	Box, Automatic Control					1	1	1	1	1	
301B444	Panel, Control	1	1	1	1						
301C2133	Panel, Control					1	1	1	1	1	
332A229	Block, Terminal	1	1	1	1						
332A749	Block, Terminal					1	1	1	1	1	
332A137	Strip, Terminal	1	1	1	1						
332A138	Strip, Terminal	1	1	1	1						
332A235	Strip, Terminal	1	1	1	1						
308-11	Switch, Toggle DPST 3A, 250 V	1	1	1	1	1	1	1	1	1	
323-52	Socket, Amphenol Start-Stop Relay *	1	1	1	1	1	1	1	1	1	
307A62	Relay, Start-Stop	1	1	1	1	1	1	1	1	1	
312A62	Condenser, .3 Mfd 400 VDC	1	1	1	1	1	1	1	1	1	
303-57	Rheostat - 600 Ohm	1	1	1	1	1	1	1	1	1	
303-32	Knob, Rheostat	1	1	1	1	1	1	1	1	1	
304-5	Resistor, 150 Ohm 25 Watt, Adjustable	1	1	1	1	1	1	1	1	1	
304-119	Resistor, 500 Ohm 1 Watt Fixed	1	1	1	1	1	1	1	1	1	
304A131	Resistor, 750 Ohm, 25 Watt Adjustable	1	1	1	1	1	1	1	1	1	
	Relay, Time Delay			1							
307A689	5 Seconds - For Model Spec 12 and other possible special models										
307A645	20 Seconds - For Model Spec 10 and other possible special models										
307A658	1 Minute										
304-14	Washer, 5/16" I.D. x 9/16" O.D. Resistor Centering	1	1	1	1	1	1	1	1	1	
508-1	Grommet, 3/4" I.D. Rubber	1	1	1	1	1	1	1	1	1	
508-8	Grommet, 1/2" I.D. Rubber	1	1	1	1	1	1	1	1	1	
332-142	Terminal, Solderless - Gen. (2) Load (2)	4	4	4	4						
332-180	Terminal, Solderless - Gen. (2) Load (2)	4	4	4	4						
332-442	Terminal, Solderless - B+, (1), 2(1), 3(1)	3	3	3	3						
332-442	Terminal, Solderless										
325K2	Breaker, Safety - 12 Volt 45 Second 3 Terminal - Including required					3	3	3	3	3	
	Insulating washers	1	1	1	1	1	1	1	1	1	
								</			

Use type recommended for your control application. See Time Delay Relay operator's section.

* - Models with Time Delay Relay Use 2 Sockets

WHEN ORDERING PARTS BE SURE TO INCLUDE MODEL AND SERIAL NUMBER OF UNIT

REF. PART NO.	DESCRIPTION	QUANTITY USED									
		A	B	C	D	E	F	G	H	J	
320-68	Breaker, Safety - 32 Volt 30 Second										
302B142	Transformer, Current	1			1				1	1	
302B146	Transformer, Current - 50 Amp, 115 V.		1								
302B147	Transformer, Current - 25 Amp, 230 V.			1					1		
315C122	Transformer, Current - 115 V.					1					
315C123	Transformer, Current - 230 V.										
315C116	Transformer, Current - 115 V.						1			1	
301-458	Spacer, Transformer - 3/8" O. D. x 1" Long	2	2	2	2						
508P14	Washer, Insulating - #8 x 1/4 x 1/32	6	6	6	6	6	6	6	6	6	
508-15	Washer, Insulating - #8 x 7/16 x 3/64	6	6	6	6	6	6	6	6	6	
526-7	Washer, 57/64 I. D., 1-1/2 O. D., 3/32 Thick	1	1	1	1	1					
526-49	Washer, 200 I. D., 7/16 O. D. 1/32 Thick	13	13	13	13	13	16	13	13	16	
331A16	Washer, Reducer	2	2	2	2	2					
321P68	Receptacle, Fuse	1	1	1	1						
321A73	Receptacle, Fuse (Replaces 312-61)			1					1		
321-116	Receptacle, Fuse					1					
321-2	Clip, Fuse										
321-19	Block, Fuse										
321-72	Block, Fuse										
321-17	Block, Fuse										
321-8	Fuse, Plug Type (10A No Time Lag) 1000 Watt 120 Volt Plants Only										
321-9	Fuse, Plug Type (15A No Time Lag) 1500 Watt 120 Volt Plants Only										
321-10	Fuse, Plug Type (20A, No Time Lag) 2000 Watt 120 Volt Plants Only										
321-11	Fuse, Plug Type (25A, No Time Lag) 2500 Watt 120 Volt Plants Only										
321-12	Fuse, Plug Type (30A, No Time Lag) 3000 Watt and 3500 Watt 120 Volt Plants Only										
321-56	Fuse, Cartridge Type (6A, No Time Lag) 1000 Watt, 240 Volt Plants Only										
321-39	Fuse, Cartridge Type (10A, No Time Lag) 2000 Watt, 240 Volt Plants Only										
321-40	Fuse, Cartridge Type (15A, No Time Lag) 2500 and 3500 Watt, 240 Volt Plants Only										

When replacing fuses use only the type and capacity recommended for the applicable plant voltage and wattage.

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REF. PART NO.	NO.	DESCRIPTION	QUANTITY USED																	
			A	B	C	D	E	F	G	H	J									
321-42		Fuse, Cartridge Type (20A, No Time Lag) 4000 Watt, 240 Volt Plants Only																		
321-54		Fuse, Cartridge Type (25A, No Time Lag) 5000 and 6000 Watt 240 Volt Plants Only																		
321-48		Fuse, Cartridge Type (30A, No Time Lag) 7500 Watt, 240 Volt Plants Only																		
321-60		Fuse, Cartridge Type (35A, No Time Lag) 4000 Watt, 120 Volt Plants Only																		
321-5		Fuse, Cartridge Type (50A, No Time Lag) 5000 and 6000 Watt, 120 Volt Plants Only																		
321-20		Fuse, Cartridge Type (60A, No Time Lag) 7500 Watt, 120 Volt Plants Only																		
307B596		Relay, Line - Spec B-C (Replaces Relay 307A11, 307P55 Spec A)	1	1		1														
307B595		Relay, Line - Spec B-C (Replaces Relay 307P35, 307P66 Spec A)																		
307C663		Relay, Line																		
307C664		Relay, Line																		
307C665		Relay, Line																		
307A685		Jumper, Line Relay - Use with Relay 307C665																		
		Components of Relays 307A11, 307P35, 307P55, 307P66																		
307P88		Contact Set L. H. Stationary, Line Relay	1	1		1														
307P89		Contact Set R. H. Stationary, Line Relay	1	1		1														
307-90		Contact, Movable - Line Relay	4	4		4														
307-91		Spring, Line Relay Contact	4	4		4														
307-92		Washer, Spring Retaining Cup, Line Relay	4	4		4														
		Components of Relays 307B595, 307B596																		
307-606		Contact Block L. H. Stationary (Includes 4 Contacts)	1	1		1														
307-607		Contact Block R. H. Stationary (Includes 4 Contacts)	1	1		1														
307-608		Contact Assembly, Movable (Includes 4 Contacts, 1 Spring)	4	4		4														
307-609		Coil, 240 Volt Operating																		
307-610		Coil, 120 Volt Operating	1	1		1														
		Components of Relays 307C663, 307C664, 307C665																		
		Coil, 120 Volt																		
		Coil, 220 Volt																		
		Contact Set																		
335B9		Cable Assembly, Connecting - (Includes Wires, Conduit and Connectors)	1	1		1														
335B10		Cable Assembly, Connecting - (Includes Wires, Conduit and Connectors) - Use with 240 Volt 5KW Auto Controls.																		

When replacing fuses use only the type and capacity recommended for the applicable plant voltage and wattage.

WHEN ORDERING PARTS BE SURE TO INCLUDE MODEL AND SERIAL NUMBER OF UNIT

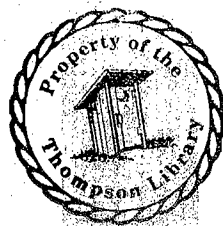
When replacing fuses use only the type and capacity recommended for the applicable plant voltage and wattage.

WHEN ORDERING PARTS BE SURE TO INCLUDE MODEL AND SERIAL NUMBER OF UNIT!

PARTS LIST

REF. PART NO. NO.	DESCRIPTION	QUANTITY USED									
		A	B	C	D	E	F	G	H	J	
335B11	Cable Assembly, Connecting - (Includes Wires, Conduit and Connectors) . . .	1									
338B286	Cable Assembly, Connecting - (Includes 3 Control Wires, 2 Load Wires, Sleeving and Connectors) Use with Gasoline Plants.		1					1	1		
338B287	Cable Assembly, Connecting - (Includes 3 Control Wires, 2 Load Wires, Sleeving and Connectors) Use with Gasoline Plants.						1			1	
338B292	Cable Assembly, Connecting - (Includes 4 Control Wires, 2 Load Wires, Sleeving and Connectors) Use with Diesel Plants					1		1	1		
338B293	Cable Assembly, Connecting - (Includes 4 Control Wires, 2 Load Wires, Sleeving and Connectors) Use with Diesel Plants						1			1	

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- ★ **Two-Bearing Generators**
- ★ **Air Cooled Engines**

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WHENEVER YOU NEED an independent source of electric power for any purpose, be sure to see the complete line of Onan Gasoline or Diesel Engine-Driven Electric Plants and Onan Generators. You'll find a type and size to fit every job...portable or mobile...heavy duty primary or emergency standby. AC - 500 to 200,000 Watts. DC to 15,000 Watts. Battery Chargers to 5,000 Watts.

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