

POWER ROOM VENTILATION EQUIPMENT

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1. GENERAL

1.1 Scope

1.11 This section covers requirements and adjusting procedures for the exhaust fans, shutters, shutter motors, transformers, controllers, and thermostats furnished with KS-5592-01, KS-5704 and KS-20023 ventilation equipment.

1.12 Information concerning engine air discharge ducts is included in Section 132 which covers engine piping.

1.13 Coordinate information in this section with the test of the engine-alternator.

1.2 Description

1.21 The M204A Shutter Motor

1.211 The M204A shutter motor is used to operate the shutters to either fully open or fully closed position. This motor rotates in one direction and causes the cam follower to make a one half revolution for upping or closing the shutter. When the engine-alternator reaches full output voltage a relay closes in the alternator control circuit and causes the M204A type air intake shutter motor to operate and open the shutters. Conversely the motor will close the air intake shutters as soon as the engine stops.

1.212 The recirculating shutters, when furnished are located on the side of the engine air duct. Their purpose is to heat the engine room when the temperature is below a certain value. A room thermostat TA42 set for minimum temperature value, will operate to close a contact in the thermostat. The closing of this contact operates the M204A type recirculating shutter motor to operate and open the recirculating shutter.

NOTE: Schematic circuits in this section are for general information and do not supersede the job circuits.

1.22 The M904E type shutter motor, is used to control the engine air exhaust shutters. Under the control of a T915C type controller, (see Figure 2), it will hold the air exhaust shutters in any position from fully open to fully closed depending upon the engine radiator water temperature. The water temperature affects the operation of the controller thru a tube at the end of which is a thermostatic bulb immersed in the water.

1.23 In operation, a change in the temperature of the liquid, in which the thermostatic bulb is immersed, causes pressure changes in the bulb which are transmitted thru the tube to the bellows in the T915C type controller. See Figure 3. Movement of the bellows causes the balancing potentiometer in the controller to move which results in an unbalance on the balancing relay in the M904E type shutter motor. This condition causes the relay to close and operate the shutter motor in a direction to move the motor balancing potentiometer, thru the cam mechanism, to a position which will re-establish the balance on the balancing relay. When relay is rebalanced, the closed contact opens and stops the shutter motor. Limit switches stop the motor when shutters are either fully open or closed.

1.24 Load Banks (KS-20023) - A balanced three-phase resistive load providing supplementary loading of reserve engine alternator sets during routine periods. A shutter motor provided, if requested, to operate the shutter fully open and fully closed.

1.3 Inspection

1.31 To insure satisfactory installation, as soon as possible, make a visual inspection for damage, missing parts and defects of finish.

1.32 Report any defects, damage or missing parts in accordance with established routines.

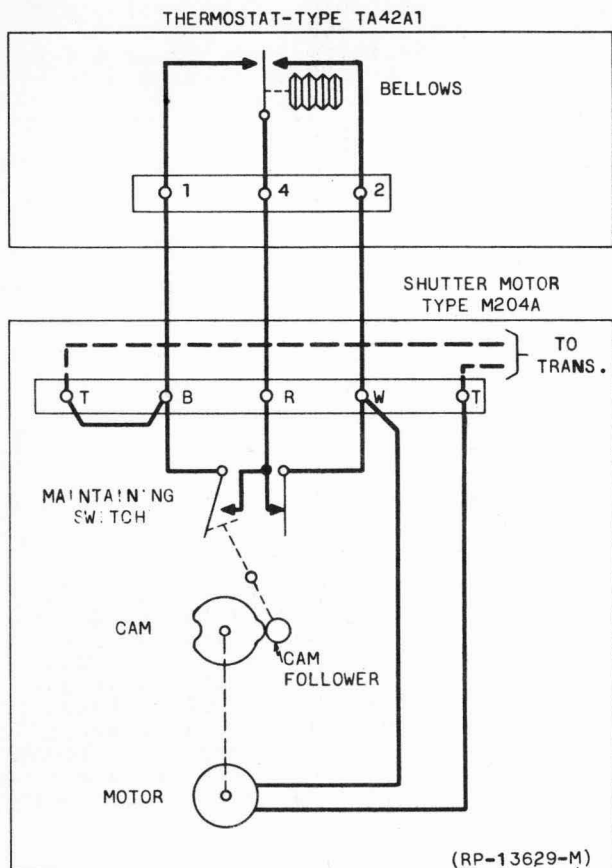


FIG. 1 SCHEMATIC -M204A TYPE SHUTTER MOTOR

1.4 CAUTIONS

1.41 This equipment is arranged to operate automatically without any visible or audible warning.

1.42 When working on shutters connected to power supply, avoid personal contact with the top terminal of the capacitor.

1.43 All work involving contacts or balancing potentiometers in the shutter motors or the controllers should be done with the equipment disconnected from the power supply.

1.44 The covers of shutter motors should be removed only when necessary and replaced as promptly as possible to prevent the entrance of dust.

2. INSTALLING EQUIPMENT

2.1 Tools

Code	Description
265C	Burnisher, Contact
KS-6015	Pliers, Duckbill
KS-6854	Screwdriver, 3-1/2"

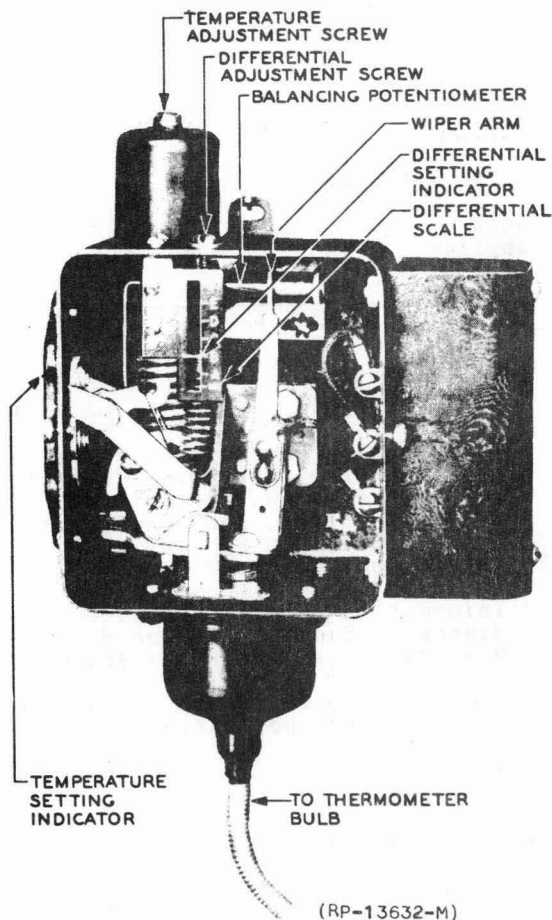


FIG. 2 T915C TYPE CONTROLLER

2.2 Supplies

Code	Description
KS-14666	Cloth, Cleaning
KS-16326	Oil Medium Light

3. SHUTTERS

3.1 Installation

3.11 Wall Louver, Screen and Shutter Assemblies

3.111 Wall louver, screen and shutter assemblies which include a shutter motor shall be installed as shown in Figure 4. These assemblies, specified by KS-5592-01, require a minimum depth of 10 inches. If the wall is less than 10 inches thick, filler pieces shall be used as shown in the figure. These filler pieces are not furnished and should be made up on the job.

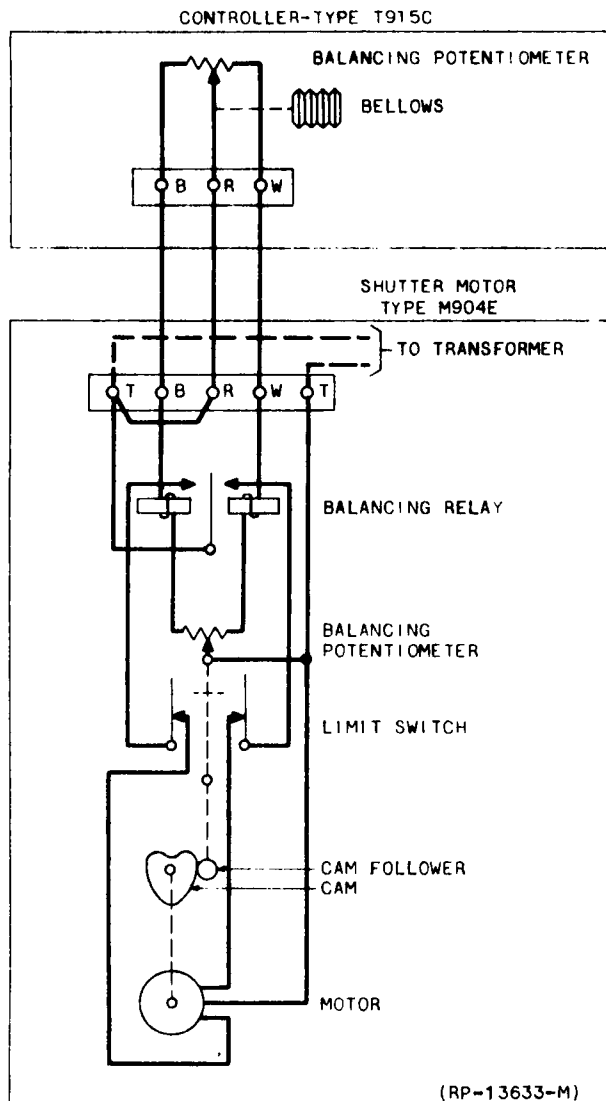


FIG. 3 SCHEMATIC - T915C TYPE CONTROLLER AND M904E TYPE SHUTTER MOTOR

3.112 To install wall louver assemblies first establish that the outside louver flanges are straight so that uniform contact will be made against the edge of the wall opening. Apply caulking compound liberally to the inner surface of the outer flange on three edges only, the top and vertical sides. Wall louver assemblies are designed to be self draining and the bottom of the outer flange should not be caulked. Place louver assembly in position applying steady pressure to force out excess caulking. Remove excess caulking to leave a neat tapered edge. Avoid any further horizontal or vertical movement as it would tend to break the caulking seal.

3.2 Lubrication

3.21 The bearing surfaces of the shutters shall be lubricated at the time of installation with KS-16326 medium light oil.

3.211 Apply one drop of oil to each of the bearings at the ends of the shutter vanes and to each trunnion by means of which the operating rods are attached to the vanes.

3.22 M204A and M904E type shutter motors, T915C type controllers and thermostats do not require lubrication.

3.3 Freedom of Operation

3.31 The shutters and their associated linkage shall be clean and shall operate without binding.

3.32 Wipe dust from shutters with a cleaning cloth.

3.4 M204A Type Shutter Motors

3.41 Operation: The motor shall operate to open or close its associated shutter within approximately 1 minute, without stopping at intermediate points.

3.42 If the motor does not operate as required, see that the contacts of the maintaining switch make reliably when in the nonoperated position. Observe that the operating mechanism of the switch follows the cam and opens the contacts as required to stop the motor at the end of each half revolution. If necessary, loosen the locknut and adjust the screw which opens the contact. Tighten the locknut when the adjustment is completed. Use KS-6854 screwdriver and 388A wrench.

3.43 If the motor opens the shutters when it should close them and vice versa, reverse the blue and white leads at the motor terminals.

3.44 Contact Surfaces of the maintaining switch shall be clean and free from buildups which might interfere with reliable contact.

3.45 The purpose of cleaning contacts is to remove any gummy or dirty substance that would interfere with reliable contact. Clean contacts by wiping with a dry cleaning cloth.

3.46 There shall be as little smoothing of contacts as is consistent with satisfactory operation. Contacts should be smoothed while closed. Disconnect the power supply and insert a 265C burnisher between the contacts to be cleaned, and draw it back and forth until the buildups are reduced enough to insure satisfactory operation. Then wipe the contacts with a clean dry cloth.

3.5 M904E Type Shutter Motors

3.51 Operation: The motor shall operate to close its shutter or to hold it partially or fully open under the control of its associated controller. There shall be no objectionable hunting. The motor is controlled by a T915C type controller. The motor and associated controller are factory set and shall cause the main shutter to start to open when the engine radiator water is 135 to 140°F and be wide open when the engine radiator water is 170°F or above. The motor and controller

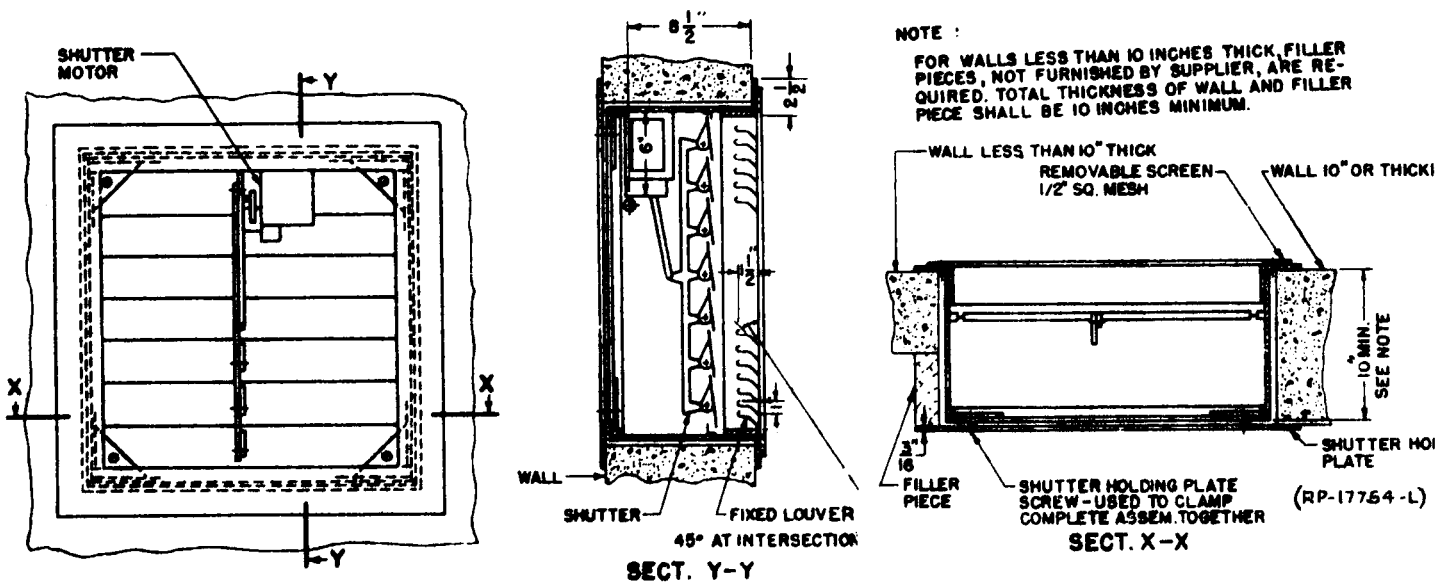


FIG. 4 KS-5592-01 WALL LOUVER, SCREEN AND SHUTTER ASSEMBLY

shall similarly close the shutters as the temperature drops from 170°F to 140 or 135°F.

3.511 If the motor fails to open or close its shutter, as required, look for open leads, short circuits, or poor contacts in the motor and controller. If the operation in intermediate positions of the shutter is erratic, look for poor contact of the wiper arms of the balancing potentiometer in the motor or controller. If hunting is experienced, see that the balancing relay in the motor is meeting its requirement. See Paragraphs 3.52 thru 3.54.

3.512 If the motor opens the shutters when it should close them and vice versa, reverse the blue and white leads at the motor terminals.

3.52 Contact Surfaces of the limit switches, balancing relay, balancing potentiometer, and its wiper arm shall be clean and free from buildups which might interfere with reliable contact.

3.53 Clean the contact surfaces of the balancing potentiometer and its wiper arm and the balancing relay with a dry cleaning cloth. Use the 265C burnisher to reduce buildups on the balancing relay as required to insure satisfactory operation.

3.54 Contact Alignment: With the circuit disconnected, the movable contact of the balancing relay shall rest against the right hand stationary contact. If necessary, bring the movable contact to its required position by adjusting the retaining lug with duckbill pliers. Avoid changing the tension of the armature spring.

3.6 T915C Controllers

3.61 Operation: The wiper arm shall be at the right end of the active part of the balancing potentiometer (Figure 2 shows this condition) when the water in the radiator is cold and shall move to

the left as the temperature of the water rises above 135 to 140°F, at which point the shutter shall begin to open. When the water temperature reaches 170°F, the specified value for the shutter to be fully open, the wiper arm shall be at the left end of the potentiometer. Use the temperature indicator installed on the engine. See Paragraphs 1.23 and 3.51.

3.62 This controller is normally set correctly at the factory. If adjustment is required use the temperature adjustment screw, set the temperature setting indicator at 135 to 140°F. See Figure 2. Start the engine and as the water temperature rises, observe the action of the wiper arm. As the temperature continues to rise, observe the wiper and adjust the differential setting indicator, by means of the differential adjusting screw, to bring the wiper to the left end of the potentiometer when the temperature reaches 170°F.

3.63 Contact Surfaces of the balancing potentiometer and its wiper arm shall be clean and shall make reliable contact.

3.64 Clean the contact surfaces of the balancing potentiometer and its wiper arm with a dry cleaning cloth.

3.7 Thermostat

3.71 Operation: The room thermostat, through its associated shutter motor, shall open and close the recirculating shutter.

3.72 The thermostat is factory set to open the shutter if the room air temperature is below approximately 75°F and close the shutter at temperatures above approximately 75°F.

3.73 To adjust the thermostat, slowly turn the temperature setting knob from highest toward lowest temperature setting until thermostat operates at which point the shutters will begin to close. At this point the temperature setting indicator should read the same as the thermometer on the cover of the thermostat. If temperature readings do not agree, remove cover and loosen indicator set screw located just behind the indicator. Move the indicator so that it corresponds with the thermometer and tighten indicator set screw

3.74 Retest the thermostat by moving temperature setting indicator to a temperature higher than room temperature and noting that the thermostat causes the M204A motor to open the recirculating shutters. Then slowly decrease temperature indicator setting and note that the thermostat operates at approximately room temperature (as indicated by both the thermometer and indicator on the thermostat) and causes the M204A motor to close the recirculating shutters.

Arrows not shown due to extensive changes.

[Vertical line at side of paragraphs indicates requirements.

4. LOAD BANKS

4.1 The units are arranged for installation in the engine-alternator radiator discharge ducts and are intended to provide supplementary loading of reserve alternator sets during routine period.

4.2 A spring will operate the shutter from the fully closed to the fully open position in less than 30 seconds when commercial power is removed.

4.3 When commercial power is restored, the shutter motor will operate the shutter from fully open to fully closed position in one minute or less.

4.4 All tests on these load banks will be conducted during the engine alternator test.

Manager, Product Engineering

Reason for Reissue:

- (1) To give a general description of load banks.
- (2) To make general revisions.