

NUTONE SERVICE MANUAL

GARAGE DOOR OPERATOR

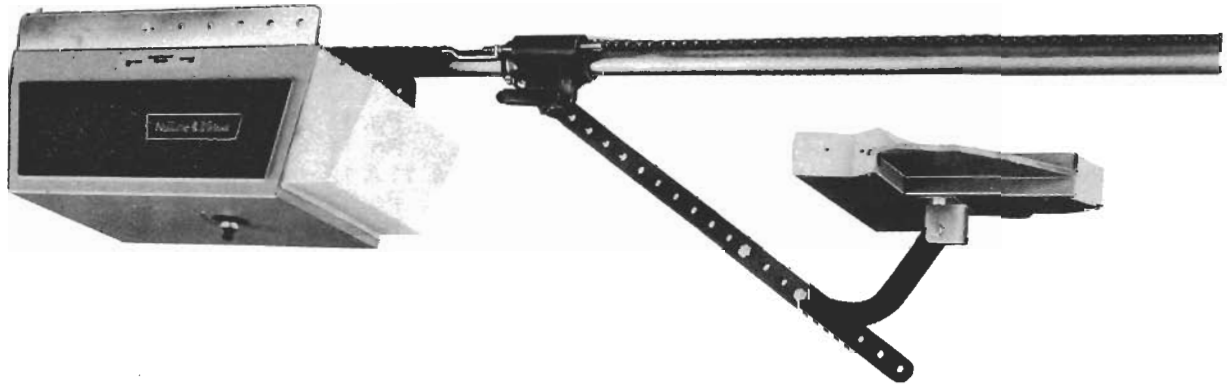
MODELS

GB575, GB575S, G577, G577S, GB580, GB580S, GB580-8

CB75, C77, GB575XK, & GB580XK

REMOTE RADIO CONTROLS

MODELS 590 and 595



NuTone Housing Products

Scovill

MADISON & RED BANK ROADS

CINCINNATI, OHIO 45227

PHONE 1-513-527-5415

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SECTION I

OPERATIONAL FEATURES

(1) OPERATING VOLTAGE:

(1.1) All Models except GB575XK and GB580XK: 120 volts AC, 60 HZ.

(1.2) Models GB575XK and GB580XK: 240 Volts AC, 50/60 HZ.

(2) MOTORS:

(2.1) GB575, G577, GB580, GB580-8, CB75, C77, GB575XK, GB580XK — all are 900 RPM.

(2.2) GB575S, G577S, GB580S — all are 450 RPM

(2.3) All Motors include Automatic Overload Resets.

(2.3.1) Motor Overload, breaks circuit to Motor Windings.

(2.3.2) All Models except GB575XK and GB580XK: Low Voltage (24 volts AC) overload breaks 24 volts AC control circuit. This overload should open at approximately 10 degrees lower temperature than that required to open the motor overload. This allows the motor to continue running until the door is fully opened or closed, and still prevent operation of the low voltage control circuit.

(2.3.3) Models GB575XK and GB580XK do not employ low voltage (24 volts AC) overload control circuit.

(2.3.4) All Motors are designed for intermittent use.

If run continuously for opening and closing, the temperature will rise and trip the overload resets.

ALLOW 8 - 10 MINUTES FOR OVERLOADS TO AUTOMATICALLY RESET IN THE EVENT YOU HAVE TRIPPED THE OVERLOADS DUE TO EXTENSIVE OPERATION OF THE DOOR.

(3) All Operators are supplied with provisions for a convenience lamp that comes on approximately two seconds after the operator is turned on and the light remains on approximately one and a half minutes after the operator is turned off when the door is opened or closed. The incandescent lamp is not supplied by NuTone.

(4) All Operators are supplied with automatic safety reverse when the door meets an obstruction on its downward (closing) travel.

(5) All Models are supplied with a slip clutch. When the door meets an obstruction on its upward (opening) travel.

(6) All Models are supplied with an automatic safety reverse cutout that prevents the door from reversing when it meets an obstruction such as packed snow, garden hose, etc., within approximately two inches of the floor.

(7) The Operator can be started to open or close the door from an inside pushbutton (NuTone PB-12), outside the key switch (NuTone Model 562), and remotely by radio control.

INTENDED USE

(1) Model GB575 and G577 Operators are designed for use with sectional or one-piece doors up to seven feet high and sixteen feet wide using overhead track hardware.

(2) Model GB580, CB75, C77, GB575XK, and GB580XK Operators are designed for use with sectional or one-piece doors up to seven feet high and eighteen feet wide using overhead track hardware.

(3) Model GB580-8 Operators are designed for use with sectional or one-piece doors up to eight

feet high and eighteen feet wide using overhead track hardware.

(4) Model GB575S, and G577S Operators are designed for use with one-piece doors up to seven feet high and sixteen feet wide using jam or pivot type hardware.

(5) Model GB580S Operators are designed for use with one-piece doors up to seven feet high and eighteen feet wide using jam or pivot type hardware.

SECTION II

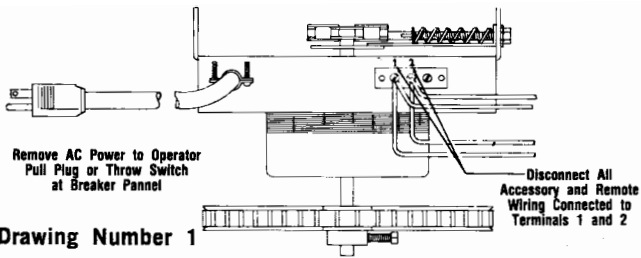
CORRECT MANUAL DOOR OPERATION

THE FIRST AND MOST IMPORTANT STEP IN SERVICING A GARAGE DOOR OPERATOR IS TO DETERMINE IF THE PROBLEM IS BEING CAUSED BY THE DOOR OR BY THE OPERATOR.

(1) Remove AC Power to Operator, pull plug, or

throw switch at circuit breaker.

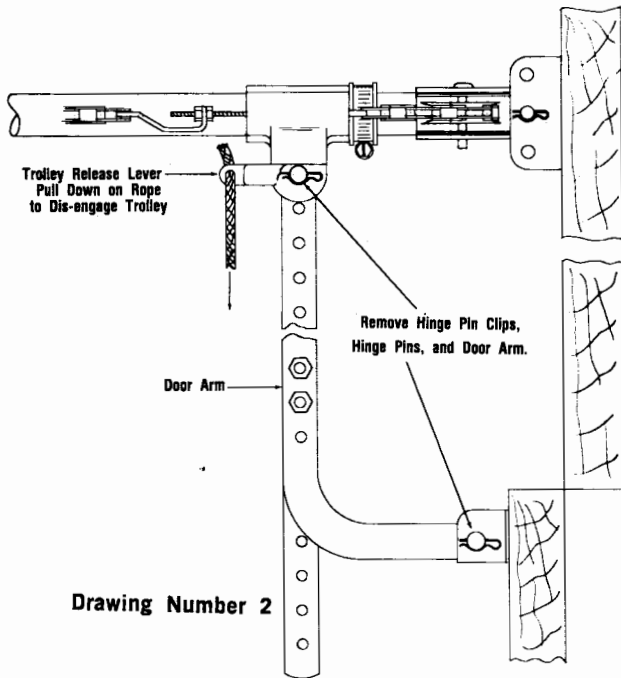
(2) Disconnect all accessory and remote wiring connected to Terminals 1 and 2 on Operator Power Head.



Drawing Number 1

(3) Disengage the door from the Operator by pulling down on the rope connected to the Trolley Release Lever.

(4) Disconnect door arm from Operator and door.



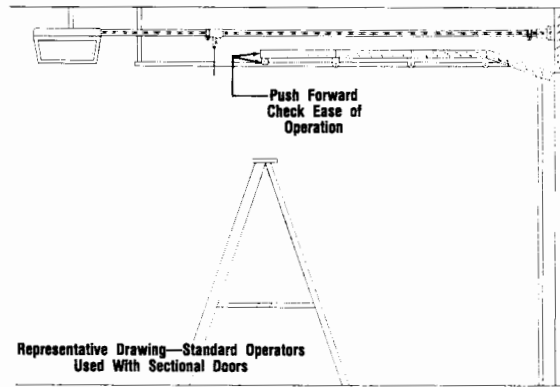
Drawing Number 2

(5) Manually open and close the door, checking for sticking or erratic movement. Does the door move freely? Are the door counter balance springs adjusted properly, allowing the door to be opened and closed with ease?

(6) Open the door to its fully open position, and by positioning yourself on a step ladder, simulate operation of the Operator by pushing forward on the door towards the closed position — at the point where the door mounting bracket is attached.

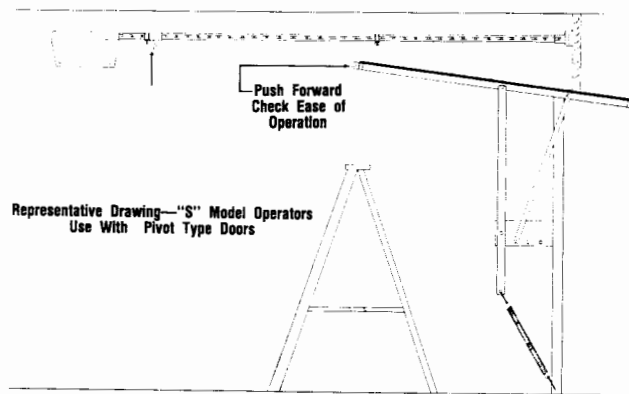
(7) Check for ease of operation. The pressure you exert must be exerted by the Operator. Continue pushing forward as the door starts to reach its closed position. Check to see if the door binds on the header board or the sides.

(8) If the door jams, binds, or requires an unusual amount of effort to open or close, the door must be readjusted for proper operation.



Representative Drawing—Standard Operators Used With Sectional Doors

Drawing Number 3-A



Representative Drawing—"S" Model Operators Use With Pivot Type Doors

Drawing Number 3-B

(9) DO NOT ATTEMPT ADJUSTMENT UNLESS YOU HAVE THE PROPER TOOLS AND TRAINING.

(9.1) Counter balance springs can cause serious injury.

(9.2) Inform the customer of the problem. The Operator cannot be properly adjusted until operation of the door has been corrected by a qualified overhead door service company.

(9.3) Leave the Operator door arm disconnected until service has been performed.

(9.4) **NOTE:** In most cases, the Operator will require adjustment for proper operation after the door has been serviced.

(10) If the door operates satisfactorily manually, proceed to **Section III** — Correct Operator Installation.

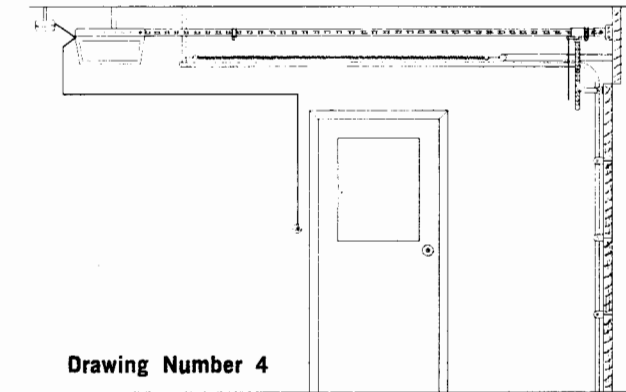
SECTION III

CORRECT OPERATOR INSTALLATION

(1) In order for a garage door operator to function properly, it must be installed correctly.

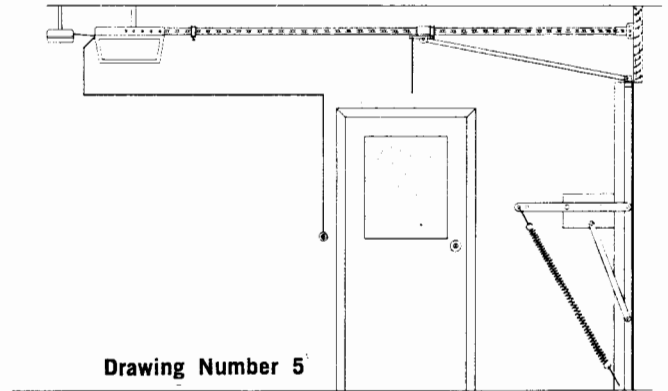
(1.1) A visual inspection of the installation will quickly tell you if the Operator has been installed properly.

(2) Drawing #4 indicates a typical installation using Models GB575, G577, GB580, GB580-8, CB75, C77, GB575XK, and GB580XK Operators on an overhead track door.



Drawing Number 4

(3) Drawing #5 shows a standard installation using Models GB575S, G577S, and GB580S Operators on a one-piece door using jam hardware.



Drawing Number 5

(4) Installation may vary slightly, depending on the type of garage door and the spring or counter balance method employed.

(5) The Operator should be properly secured to the ceiling and should be centered over the door.

(6) The installation instructions covering Models G577 and G577S (Part Number 51333) is a helpful guide and reference.

(7) If the Operator has been poorly or incorrectly installed, **MAKE THE NECESSARY CORRECTIONS**. If you are satisfied with the installation of the Operator, **RECONNECT THE DOOR ARM AT THIS POINT**, but leave the trolley release lever in the down (disengaged) position. Proceed to Section IV — Front and Rear Bumper Adjustments.

SECTION IV

FRONT AND REAR RUBBER BUMPER ADJUSTMENTS

(1) **MANUALLY CLOSE THE DOOR.**

(2) Models GB575, G577, GB580, GB580-8, CB75, C77, GB575XK, and GB580XK: The front rubber bumper must be in front of the trolley. With the door fully closed, the door arm should be vertical in relation to the garage floor, and the trolley should be against the front rubber bumper, as shown. (Dwg. #6)

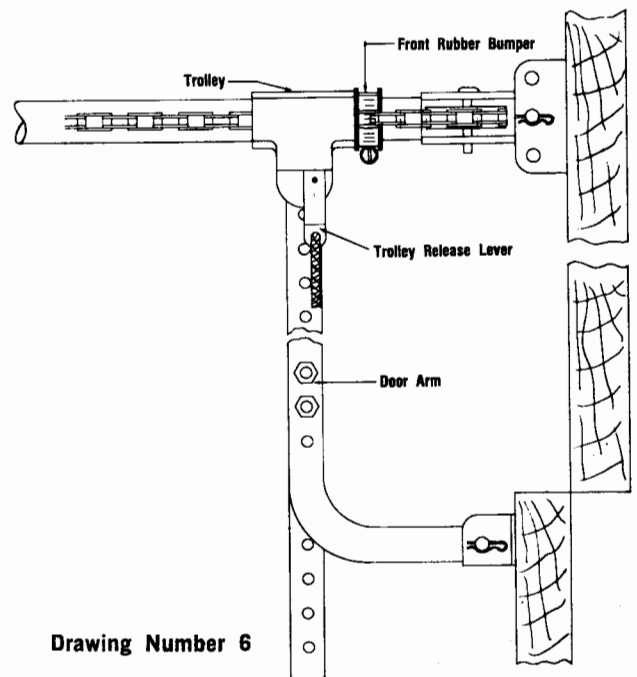
(2.1) Adjust the bumper, if necessary, and retighten the hose clamp.

(3) Models G575S, G577S, and GB580S: The front rubber bumper must be in front of the trolley. With the door fully closed, the trolley should be against the front rubber bumper as shown. (Dwg. #7)

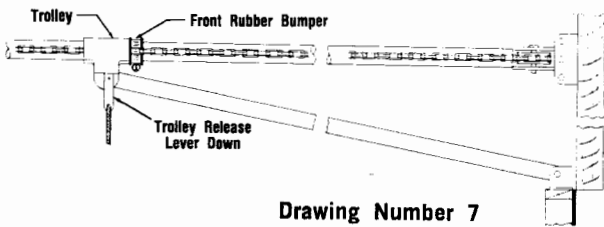
(3.1) Readjust bumper, if necessary.

(4) **MANUALLY OPEN THE DOOR.**

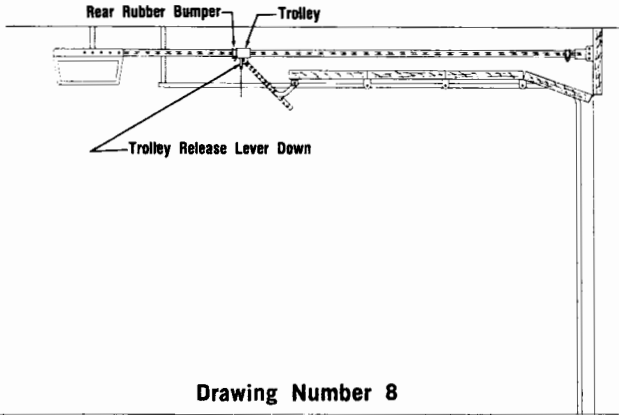
(5) Models GB575, G577, GB580-8, CB75, C77, GB575XK, and GB580XK: When fully open, the bottom of the door should be even with the header



Drawing Number 6



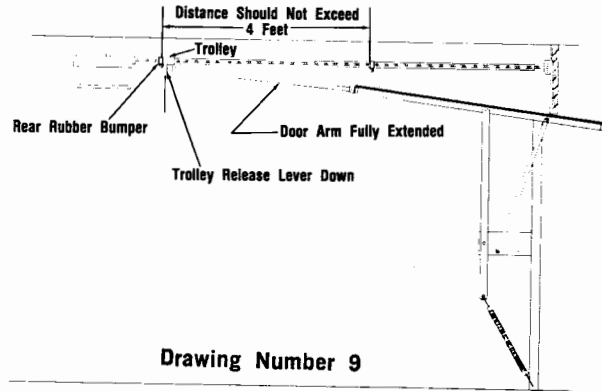
Drawing Number 7



Drawing Number 8

and the trolley should be against the rear rubber

bumper, as shown in Drawing #8. Adjust bumper, if necessary, and tighten securely. A prop may be required to hold the door in the correct open position.



Drawing Number 9

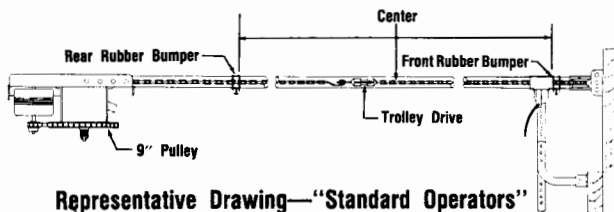
(6) Models G575S, G577S, and GB580S: With the trolley against the rear rubber bumper, the door arm should be fully extended and the front edge of the door should tilt slightly downward. The distance between the front rubber bumper and the rear rubber bumper should not exceed four feet as shown in drawing #9. Readjust the rear bumper, if necessary. A prop may be required to hold the door in the correct open position.

SECTION V

ADJUSTING OPERATOR TO ORIGINAL FACTORY SETTINGS

TO PROVIDE A STARTING REFERENCE POINT, ADJUST THE OPERATOR TO THE ORIGINAL FACTORY SETTINGS.

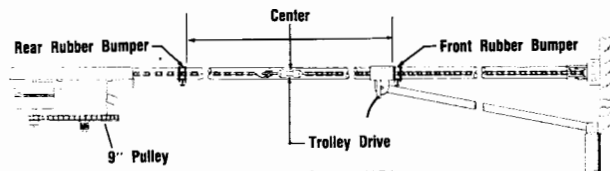
- (1) Make an inspection of the complete Operator, and its components for broken or malfunctioning parts. Make the necessary corrections before attempting adjustments.
- (2) Make sure AC Power Supply to Operator is disconnected.
- (3) Remove incandescent convenience lamp, and remove Operator Power Head Cover. Loosen the four (two in front and two in back) #8 - 32 by 3/8" hex head cover mounting screws. Pull cover straight down, and then rotate cover slightly to clear pulley.



Representative Drawing—"Standard Operators"

Drawing Number 10-A

- (4) With trolley disengaged from trolley drive (trolley release lever down), turn the 9" pulley by hand until the trolley drive is positioned approximately halfway between the front and rear rubber bumpers as shown in Drawing #10, Fig. A & B.



Representative Drawing—"S" Model Operators

Drawing Number 10-B

(5) CHAIN TENSION

- (5.1) The chain should be centered over the pulley in the front tube mounting bracket assembly. Check the chain to make sure that it is not twisted.
- (5.2) Chain tension is important. A chain that is too loose can cause as many problems as one that is too tight.
- (5.3) Consider the chain tight enough when it is evenly parallel to the tubing as shown in Drawing #11.

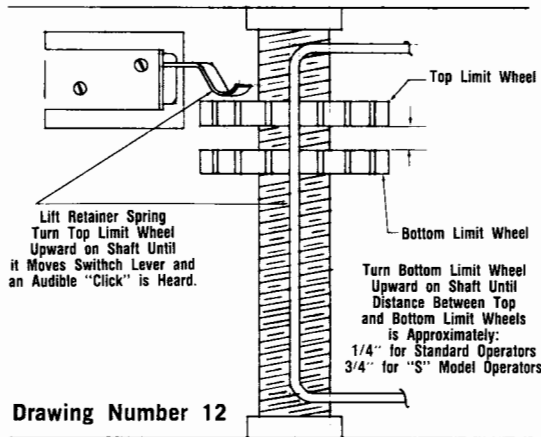


Drawing Number 11

(6) LIMIT WHEELS

(6.1) Lift limit wheel retainer spring out of limit wheels. Turn top limit wheel upward on limit shaft until it moves the open limit switch lever (open switch) and an audible click is heard.

(6.2) Turn bottom limit wheel upward on limit shaft, until there is approximately $\frac{1}{4}$ " between the two limit wheels. **NOTE:** On "S" Models, increase distance to $\frac{3}{4}$ ". Reset retainer spring in wheel notches.



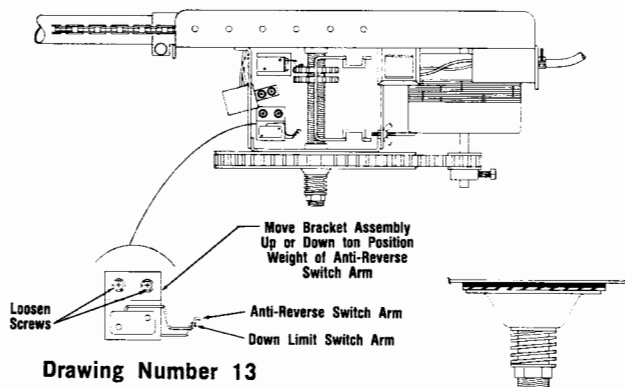
Drawing Number 12

(7) ANTI-REVERSE SWITCH ADJUSTMENT

(7.1) Anti-reverse switch must be activated prior to the down limit switch by the movement of the down limit wheel during closing of the door.

(7.2) Check the height of the anti-reverse switch arm. The arm must be $\frac{1}{16}$ inch to $\frac{1}{8}$ inch higher than the down limit switch arm as shown. (Dwg. #13)

(7.3) To adjust the anti-reverse switch, loosen anti-reverse switch mounting bracket screws and



Drawing Number 13

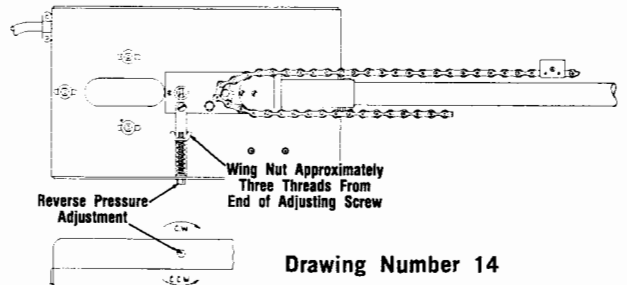
reposition for proper height, if necessary. Re-tighten screws.

(8) REVERSE PRESSURE

(8.1) The reverse pressure is set to operate satisfactorily with most properly adjusted doors when the operator leaves the factory.

(8.2) Turn the reverse pressure adjustment clockwise until the wing nut on the adjusting screw is approximately three threads from the end.

(8.3) Then turn reverse pressure adjustment clockwise 8 turns to obtain original factory setting.



Drawing Number 14

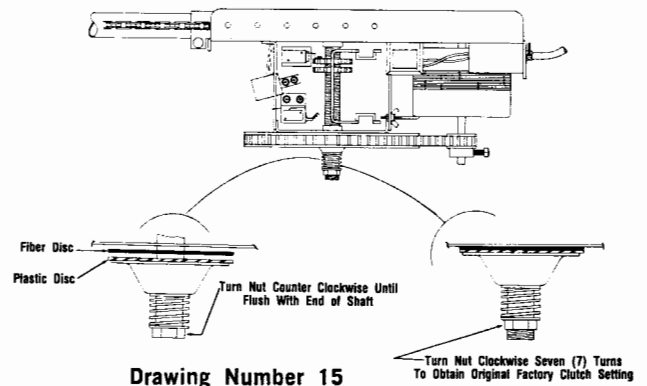
(9) CLUTCH

(9.1) The clutch was originally factory set to lift most properly adjusted doors.

(9.2) To return the clutch to its original factory setting, turn the clutch adjusting nut counterclockwise until the nut is flush with the end of the threaded shaft.

(9.3) Check fiber and plastic clutch discs for unusual wear. Replace if necessary.

(9.4) Then turn the nut clockwise 7 turns.



Drawing Number 15

SECTION VI

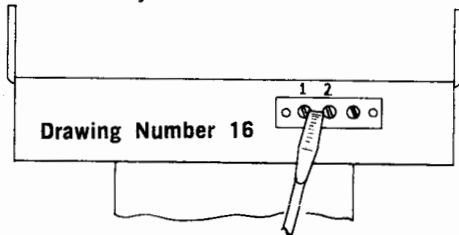
ELECTRICAL OPERATIONAL CHECK OUT

(1) Make sure the trolley release lever is in the down (disengaged) position and close the door.

(2) Remove retaining clip and hinge pin connecting the door arm to the trolley. Allow the door

arm to rest against the door making sure that it has been completely disengaged from the trolley.

- (3) Move trolley to trolley drive and engage.
- (4) Reconnect AC Power Supply.
- (5) Momentarily short between terminals 1 and 2 with the blade of a screw driver, or temporarily connect a push button to terminal 1 and 2 and press momentarily.



NOTE: IF OPERATOR STARTS WHEN AC POWER IS CONNECTED IT IS NOT NECESSARY TO SHORT BETWEEN TERMINALS 1 AND 2.

(5.1) Operator should start and should reverse direction when the trolley contacts the front rubber bumper.

(5.2) Allow the trolley to travel approximately one (1) foot after reverse, then short between terminals 1 and 2 and hold or depress pushbutton and hold.

(5.3) Operator will again reverse direction, slip the clutch and turn itself off on the front rubber bumper.

(6) Momentarily short between terminals 1 and 2.

(6.1) Trolley will move to the rear rubber bumper, slip the clutch and the Operator will turn itself off.

(7) Disconnect AC Power Supply.

(8) If Operator has performed satisfactorily, proceed to **Section VII**.

SECTION VII

ADJUSTMENT OF OPERATOR FOR USE WITH CUSTOMER'S DOOR

PREPARATION

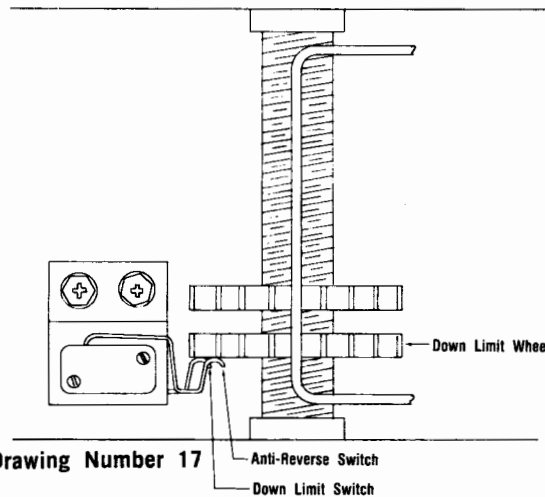
- (1) Disengage trolley by pulling down on trolley release lever. Slide the trolley forward on the tubing to a position where it can be reconnected to the door arm.
- (2) Reconnect the door arm to the trolley using hinge pin and clip previously removed.
- (3) Place trolley release lever in the up (engage) position.
- (4) Reconnect AC Power Supply. (Operator should not start).

DOWN LIMIT ADJUSTMENT

- (1) Using the blade of a screwdriver or a temporarily connected pushbutton, make a continuous short across terminals 1 and 2 on the Operator Power Head.
 - (1.1) The Operator should start and the trolley drive should engage the trolley and lock into position.
 - (1.2) Hold the connection at Terminals 1 and 2 until the Operator turns itself off.
 - (1.3) Remove short, or release pushbutton.
- (2) The down limit adjustment has now been automatically set by the lower limit wheel as shown in Drawing #17.

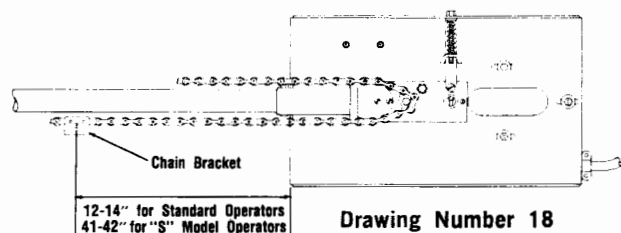
ROLLER CHAIN BRACKET

(1) The purpose of the roller chain bracket is to safely limit the travel of the trolley drive during



operation of the power unit in the event the limit wheels are misadjusted and the trolley drive is disengaged from the trolley.

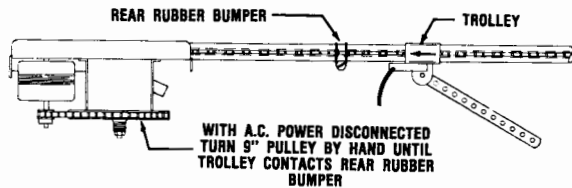
(2) Check position of roller chain bracket. The bracket should be approximately 12 to 14 inches from the edge of the Power Unit for standard operators, and 41 to 42 inches for "S" Models.



(3) Readjust the position of the bracket, if necessary.

UP LIMIT ADJUSTMENT

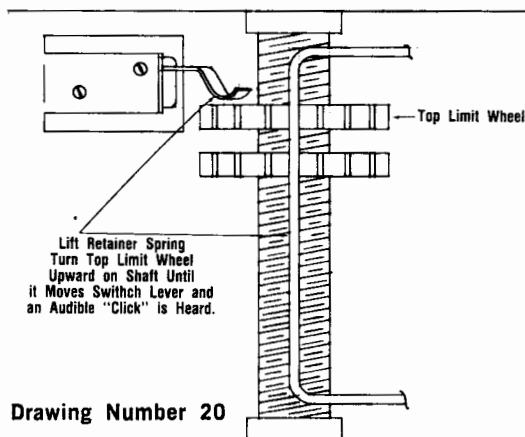
(1) Momentarily short across Terminals 1 and 2 with a screwdriver or press pushbutton to start the Operator. The door will begin to open. When the trolley reaches a position close to the rear rubber bumper, disconnect the AC Power Supply to the Operator stopping movement.



Drawing Number 19

(2) With the Power disconnected from the Operator, turn the 9" pulley by hand until the trolley contacts the rear rubber bumper.

(3) Lift the limit wheel retaining spring out of the limit wheels. Turn the top limit wheel (only) by hand up the threaded shaft until it moves the up limit switch arm and an audible click is heard. Reset the limit wheel spring into the notches in both the upper and lower limit wheels.



Drawing Number 20

(4) Reconnect AC Power Supply. (Operator should not start).

(5) NOTE: IF IN THE EVENT THE DOOR STARTS TO OPEN AND STOPS BEFORE THE TROLLEY NEARS THE REAR RUBBER BUMPER, DISCONNECT THE AC POWER SUPPLY.

(5.1) The clutch pressure will require adjustment.

(5.2) As previously mentioned, the Operator was set to lift most properly adjusted doors of the normal weight and size. If the door is unusually heavy or if the counterbalance system does not work smoothly, adjustment of the clutch may eliminate the problem.

(5.3) With the AC Power Supply disconnected, turn the clutch pressure adjusting nut clockwise to increase the pressure. It is not recommended that the clutch pressure be adjusted more than one turn at a time.

(6) **CAUTION:** If the clutch pressure is overly increased, the clutch will be eliminated, therefore, applying full horsepower output of the Operator to the door. If the door is binding, the Operator may cause physical damage.

(6.1) Disengage the door from the Operator by pulling the trolley release lever down.

(6.2) Physically close the door and place the trolley release lever in the up automatic (lock) position.

(6.3) Due to the clutch slippage, the down limit adjustment must be reset.

(6.4) It will be necessary to reperform the Operator adjustments starting with the down limit adjustment on page 6, and then reperform the up limit adjustment before proceeding.

REVERSE PRESSURE ADJUSTMENT

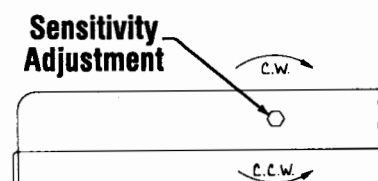
(1) Momentarily short across terminals 1 and 2 of the Operator power head.

(2) Take note of the Operator's Operation.

(3) The door should start to close and continue until it has reached the completely closed position at which time the Operator should shut off.

(4) If while closing, the door stops and reverses to the fully opened position, the reverse pressure sensitivity should be increased by turning the pressure sensitivity nut clockwise.

(5) Adjust the pressure sensitivity approximately two turns at a time until the door completely closes without reversing when momentarily shorting across terminals 1 and 2.



Drawing Number 21

(6) When this has been accomplished, give the pressure nut one additional full turn. This will eliminate the need for further adjustments which may be required should there be a change in the weather, such as dampness, possibly causing swelling of the door, etc.

(7) **NOTE:** If the door requires maximum pressure adjustment to operate, the safety reverse feature of the Operator has been eliminated.

(7.1) The door may cause damage or injury should it come in contact with an object or person in its closing path.

(8) If this condition exists, notify the customer

that the Operator cannot be properly adjusted until operation of the door has been corrected by a qualified overhead door company.

OPERATIONAL CHECKOUT

- (1) Install 60 watt convenience lamp. **Do not** install power unit cover.
- (2) Reconnect wall pushbutton wiring to Terminals 1 and 2 on Operator Power Head.
- (3) Check Operation of Operator using pushbutton.
 - (3.1) The convenience lamp should come on approximately two seconds after the Operator is turned on and the light should remain on for approximately 1 and ½ minutes after the Operator is turned off.
 - (3.2) Operation of the lamp is identical for both

opening and closing cycles.

- (4) Connect radio controls in addition to push-button and check operation.
 - (4.1) If an optional Model 562 Outside Key Switch assembly is being used, connect the Model 562 Key Switch in addition to the above mentioned controls and check operation.
- (5) **Safety Reverse:** Check safety reverse feature by placing an obstruction in the closing path of the door, such as a metal trash container, 24" two by four, etc.
 - (5.1) When the door makes contact with the obstruction during the closing cycle, the door should stop and reverse to the full open position.
- (6) If the Operator performs satisfactorily, remove the convenience lamp, replace the power unit cover, and reinstall the convenience lamp.

SECTION VIII

ELECTRO — MECHANICAL OPERATION

ELECTRICAL OPERATION: ALL MODELS EXCEPT GB575XK and GB580XK

(1) STATUS OF ELECTRICAL CIRCUIT WHEN DOOR IS FULLY OPENED (Drawing #22, Page 10)

- (1.1) S1 Safety Reverse Switch — open.
- (1.2) S2 Anti-Reverse Switch — closed.
- (1.3) S3 Open-Limit Switch — open (held open by the Open-Limit Wheel).
- (1.4) S4 Close — Limit Switch — closed.
- (1.5) S5 Lamp Switch — open (light, off), if temperature switch has cooled.
- (1.6) K1 Control Relay — in "Door Opening" position, i.e. connected through terminal K1a to the open S3.
- (1.7) Automatic Overload* Reset Switches in Motor are closed (motor temperature normal).
- (1.8) S10 and S11 — open. (These switches are representative of the externally located pushbutton and radio control that are used to initiate opening and closing of the garage door.)

(2) CLOSING THE DOOR ELECTRICAL SEQUENCE:

- (2.1) Activate (close) S10 or S11. This will connect K1 Relay Coil across the 24V, 60 HZ secondary of T1.
 - (2.1.1) If the motor is overheated and the 24V automatic overload reset is open, the relay cannot be energized.
 - (2.1.2) K1 is a one-kick latching relay. When energized as in (2.1) above, its switch will be thrown, and the 120V supply from TB2-4 will be fed through K1a and the Close-Limit Switch S4 to TB2-6.

(2.2) From TB2-6 the 120V will be connected to one side of S5's heating element. The other side of S5's heating element is connected to the other side of the 120V supply at TB2-5.

(2.2.1) When the 120V is connected across the heating element of S5, the rise in temperature will close its switch, and connect one side of the 120V from TB2-5 through TB2-7, to one side of Lamp Socket I1. The other side of I1 is connected to the other side of the 120V supply at TB2-4 and the light will be ON.

If the power to the heating element is on for approximately 8 seconds and then turned off, the switch should remain closed — keeping the light on for 1½ minutes. This is the time required for the heating element to cool and the switch to open.

(2.3) From TB2-6, the one side of the 120V line will be connected to one motor winding Lm1 and through capacitor C1 to one side of the other motor winding Lm2. The other side of Lm1 and Lm2 are connected through the motor's automatic overload reset, and its white lead to the other side of the 120V supply at TB2-5.

(2.3.1) When the motor is so energized, it will turn in the proper direction for lowering (closing) the garage door.

(2.3.2) When the motor is running in the closing direction, the threaded limit shaft will turn so as to move the Open-Limit Wheel away from S3. When S3's operating lever is released, the switch will close, but will have no effect on the door's operation, as it is open ended at K1a.

(2.4) If operation is normal and door is free to completely close, the motor will remain running until the closed-limit wheel has moved far enough

along the threaded limit shaft to activate (open) S4 — breaking the 120V supply to S5 and M1.

(2.4.1) The door should be closed WHEN S4 is opened, by the close limit wheel.

(2.5) The light will remain on for approximately 1½ minutes after the motor has stopped. K1 will be connected through terminal K1a, and the open-limit switch S3 will be closed.

(2.6) **SAFETY REVERSE:** If the door's downward (closing) travel is interfered with to a sufficient degree, the safety reverse switch S1 will be closed. (See MECHANICAL OPERATION); relay coil K1 will be energized, and the 120V from terminal TB2-4 will be connected through K1a to the now closed open-limit switch S3.

(2.6.1) When the 120V is fed through S3, it is connected to one side of the motor winding Lm2 and through C1 to the other motor winding Lm1. With the motor so energized, it will turn in the opposite direction, i.e. raise (open) the door.

(2.6.2) If anti-reverse switch is open, the 24V will not be connected across K1 even though S1 is closed.

(2.6.3) To prevent activating the safety-reverse when the door has arrived at the full closed position, the close-limit wheel will open anti-reverse switch S2 when the door is approximately two inches above the floor.

(3) OPENING THE DOOR ELECTRICAL SEQUENCE:

(3.1) Activate (close) S10 or S11, this will connect K1 relay coil across the 24V, 60 Hz secondary of T1.

(3.1.1) If the motor is overheated and the 24V automatic overload reset is open, the relay will not be energized.

(3.2) When energized, latching relay K1 will switch the 120V power lead from TB2-4 through its contact K1a and the Open-Limit Switch S3 to one

side of motor winding Lm2 and through C1 to one side of the other motor winding Lm1. When the motor M1 is energized in this manner, it will turn the proper direction for raising (opening) the garage door.

(3.3) When the 120V line from TB2-4 is connected through K1a and S3, it will also be connected through C1 and the black lead to terminal TB2-6 and then to one side of S5's heating element. The other side of the heating element is connected to other side of the 120V supply at TB2-5.

(3.3.1) The rise in temperature across the heating element will cause S5 switch to close. This will connect the 120V line from TB2-5, through TB2-7, to one side of lamp socket I1. The other side of I1 is connected to the other side of the 120V supply at TB2-4.

(3.3.2) The light will come on approximately 2 seconds after the heating element of S5 is energized.

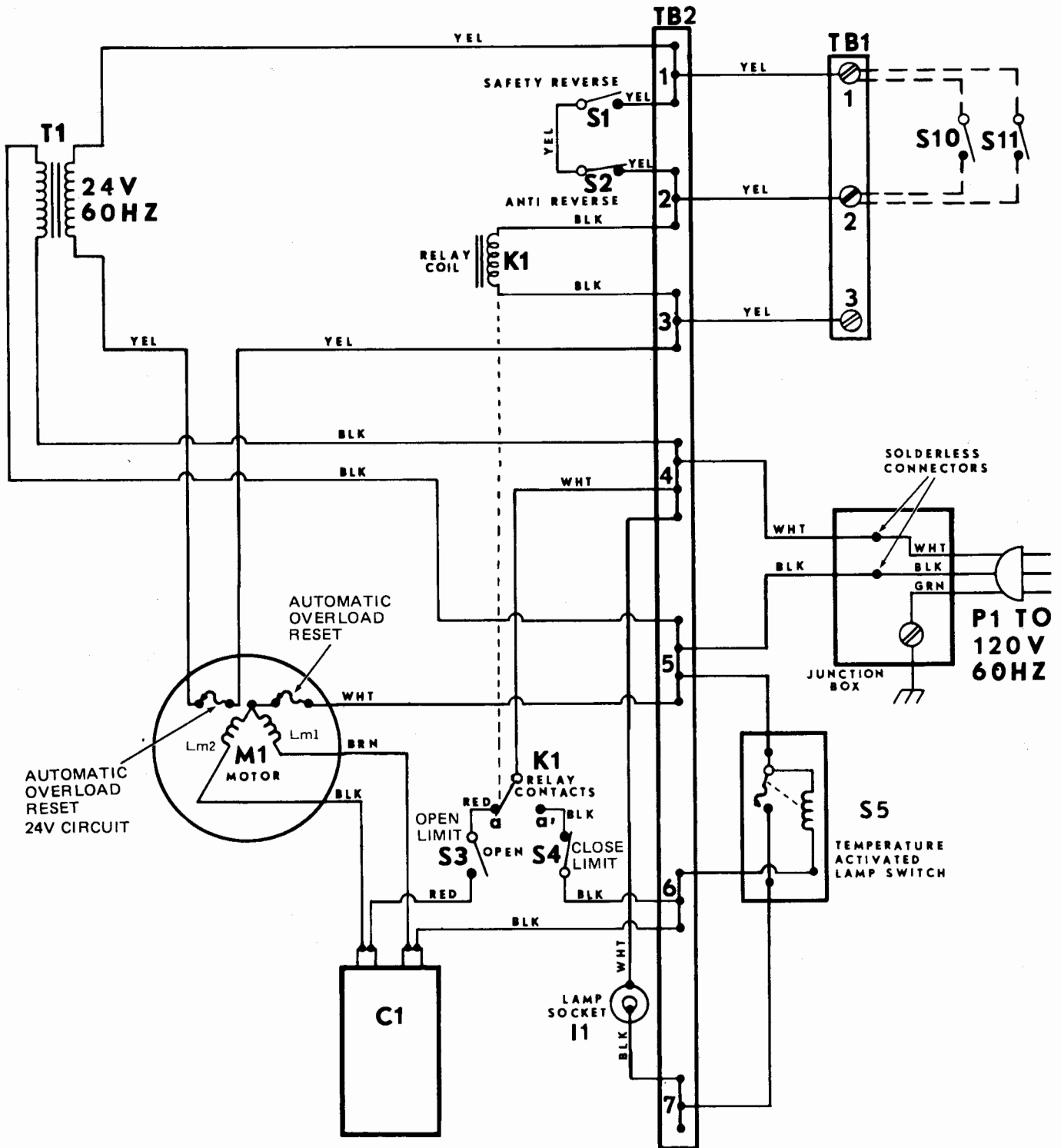
(3.4) When the motor is running in the door opening direction, the threaded limit shaft will turn so as to move the close-limit wheel away from S4. When S4's spring lever is released, the switch will close, but will have no effect on the door's opening operation as it is open ended at K1a.

(3.5) In normal operation the door will continue to raise (open) until the trolley is against the rear rubber bumper. (See MECHANICAL OPERATION). When door reaches this position, the open limit wheel activates (opens) the open limit switch S3.

(3.5.1) When S3 is opened, the 120V line from TB2-4 will be opened; the motor stopped; and the power to the heating element of S5 removed.

(3.5.2) After the power to the heating element of S5 is removed, the light should remain on for approximately 1½ minutes.

(3.6) If the door meets an obstruction and is stopped in its upward (opening) travel, the 9" pulley will continue turning (the clutch will slip) and the threaded limit shaft will turn until the open limit wheel activates (opens) S3. The motor will stop and the power to the heating element of S5 will be removed.



AUTOMATIC OVERLOAD RESET IN 24V CIRCUIT SHOULD OPEN APPROXIMATELY 12 SECONDS BEFORE MOTOR AUTOMATIC OVERLOAD RESET

SEE REPLACEMENT PARTS LIST FOR COMPLETE DESCRIPTION OF INDIVIDUAL COMPONENTS

Drawing Number 22

ELECTRICAL SCHEMATIC

Models: GB575, GB575S, G577, G577S, GB580, GB580S, GB580-8, CB75, and C77
 (Circuit shown with door in full open position)

ELECTRICAL OPERATION: MODELS GB575XK AND GB580XK

(1) STATUS OF ELECTRICAL CIRCUIT WHEN DOOR IS FULLY OPENED (Drawing #23, Page 13)

- (1.1) S1 SAFETY REVERSE SWITCH—open.
- (1.2) S2 ANTI-REVERSE SWITCH—closed.
- (1.3) S3 OPEN-LIMIT SWITCH—open (held open by the Open-Limit Wheel).
- (1.4) S4 CLOSE-LIMIT SWITCH—closed.
- (1.5) S5 LAMP SWITCH—open (light, off)
- (1.6) K1 CONTROL RELAY—in "Door Opening" position, i.e., switch lever a is connected through a' to the open S3 Open-Limit Switch; and switch arm b is connected through b' contact.
- (1.7) Automatic Overload Reset Switch in Motor is closed (motor temperature normal).
- (1.8) S10 and S11—open. (These switches are representative of the externally located push-button and radio control that are used to initiate opening and closing of the garage door.)

(2) CLOSING THE DOOR ELECTRICAL SEQUENCE:

- (2.1) Activate (close) S10 or S11. This will connect K1 Relay Coil across the 24V, 60 Hz secondary of T1.
 - (2.1.1) K1 is a one-kick DPDT latching relay. When energized as in (2.1) above, levers a and b will be connected through contacts a" and b" respectively.
 - (2.1.2) One side of the 240Vac supply — from TB2-4 — will be connected through a" and the closed S4 Closed-Limit Switch to one side of Motor Winding LM2 and through C1-C2 to one side of the other Motor Winding Lm1. The other side of Lm2 and Lm1 are connected through the Automatic Overload Reset Switch to other side of the 240Vac supply at TB2-5.
 - (2.1.2.1) When energized in this manner, the motor shaft will turn in the proper direction for lowering (closing) the door.
- (2.2) When the motor is running in the closing direction, the threaded Limit-Shaft will turn so as to move the Open-Limit Wheel away from S3.

When S3's spring lever is released, the switch will close but will have no effect on the Door's operation as it is open ended at K1a'.

- (2.3) From S4, the 240Vac will also be connected through K1b" and lever b to TB2-6 and then through the heater winding of Temperature Activated Lamp Switch S5 to the other side of the 240Vac supply at TB2-5.
 - (2.3.1) When the 240Vac is connected across the heating element of S5: in approximately two seconds the rise in temperature will close its switch, and connect one side of the 240Vac from TB2-5

through TB2-7 to one side of Lamp Socket I1. The other side of I1 is connected to the other side of the 240Vac supply at TB2-4 and the light will be on.

- (2.3.2) If the power to the heating element is on for approximately 8 seconds and then turned Off, the switch should remain closed — keeping the light on for approximately 1½ minutes, the time required for heating element to cool and the switch to open.
- (2.4) If operation is normal and door is free to completely close, the motor will remain running until the Close-Limit Wheel has moved far enough along the threaded limit shaft to activate (open) S4—breaking the 240V supply to S5 and M1.
 - (2.4.1) The door should be closed when S4 is opened, by the close limit wheel.
- (2.5) The light will remain on for approximately 1½ minutes. K1a will be connected through K1a". The Close-Limit Switch S4 will be open and the Open-Limit Switch S3 will be closed.

(2.6) SAFETY REVERSE: If the door's downward (closing) travel is interfered with to a sufficient degree, the Safety Reverse Switch S1 will be closed (See MECHANICAL OPERATION); relay coil K1 will be energized and the 240V from terminal TB2-4 will be connected through K1a' to the now closed Open-Limit Switch S3.

- (2.6.1) When the 240V is fed through S3, it is connected to one side of motor winding Lm1 and through C2-C1 and other motor winding Lm2. With the motor so energized, it will turn in the opposite direction, i.e. raise (open) the door.
- (2.6.2) To prevent activating the Safety-Reverse when the door has arrived at the full closed position, the Close-Limit Wheel will open Anti-Reverse Switch S2 when the door is approximately two inches above the floor.

(3) OPENING THE DOOR ELECTRICAL SEQUENCE:

- (3.1) Activate (close) S10 or S11. This will connect K1 Relay Coil across the 24V, 60 Hz, secondary of T1.
 - (3.2) When K1 is energized and thrown to "Door Opening" position, the 240Vac from TB2-4 will be connected through K1a' and the closed S3 Open-Limit Switch to one side of Motor Winding Lm1 and through C2-C1 to one side of the other Motor Winding Lm2. The other side of Lm1 and Lm2 are connected through the Automatic Overload Reset Switch to other side of 240Vac supply at TB2-5.
 - (3.2.1) When energized in this manner, the motor shaft will turn in the proper direction for raising (opening) the door.
 - (3.2.2) When the motor is running in the opening direction, the threaded limit shaft will turn so as

to move the Close-Limit Wheel away from S4. When S4's spring lever is released, the switch will close but have no effect on the door's operation as it is open ended at K1a".

(3.3) From S3, the 240Vac will also be connected through K1b' and lever b to TB2-6 and then through the heater winding of Temperature Activated Lamp Switch S5 to the other side of the 240Vac supply at TB2-5.

(3.3.1) When the 240Vac is connected across the heating element of S5; in approximately two seconds the rise in temperature will close its switch, and connect one side of the 240Vac from TB2-5 through TB2-7 to one side of Lamp Socket I1. The other side of I1 is connected to the other side of the 240Vac at TB2-4 and the light will be on.

(3.3.2) If the power to the heating element is on for approximately 8 seconds and then turned off, the switch should remain closed — keeping the light on for approximately 1½ minutes, the time

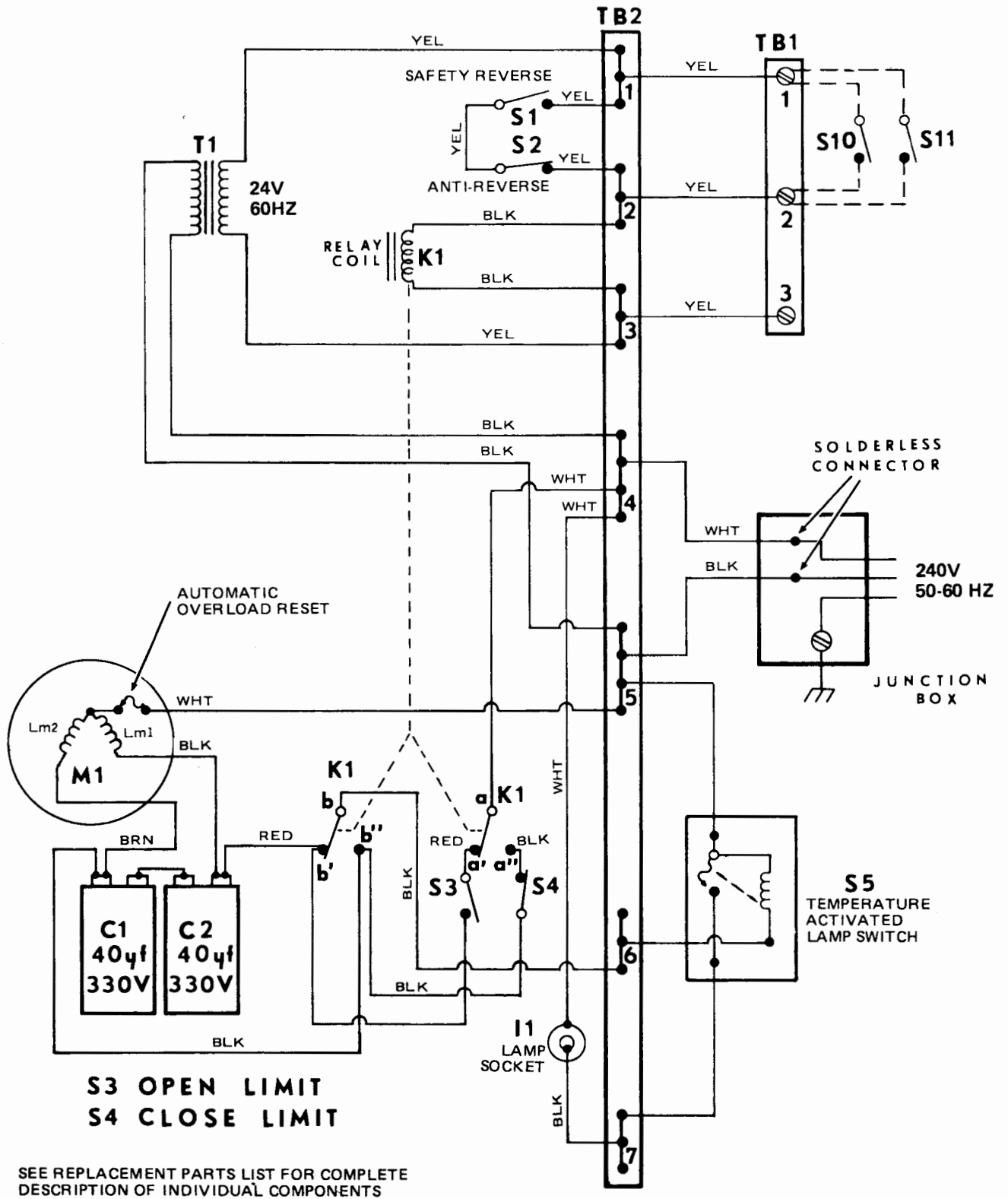
required for heating element to cool and the switch to open.

(3.4) Note: If the Motor's Automatic Reset Overload is opened, the light can be on, but the Motor will not turn.

(3.5) In normal operation the door will continue to raise (open) until the trolley is against the rear rubber bumper. (See MECHANICAL OPERATION). When the door reaches this position, the open limit wheel activates (opens) the open limit switch S3.

(3.5.1) When S3 is opened, the 240V line from TB2-4 will be opened; the motor stopped; and the power to the heating element of S5 removed.

(3.6) If the door meets an obstruction and is stopped in its upward (opening) travel, the 9" pulley will continue turning (the clutch will slip) and the threaded limit shaft will turn until the Open-Limit Wheel activates (opens) S3. Then the motor will stop, and the power to the heating element of S5 will be removed.



Drawing Number 23

ELECTRICAL SCHEMATIC

MODELS: GB575XK and GB580XK
(CIRCUIT SHOWN WITH DOOR IN FULL OPEN POSITION)

MECHANICAL OPERATION

POWER UNIT MECHANICAL DRIVE TRAIN

(REFER TO EXPLODED VIEW PGS. 27 & 28)

(1) When energized, the Motor 1 turns the 1½" Pulley 3. The 1½" Pulley drives the 9" Pulley and Limit Shaft 5 via the Drive Belt 4.

(2) When the Pulley and Limit Shaft rotate, the Open Limit Wheel 20 and the Close Limit Wheel 20 move up or down the shaft depending on the direction of the shaft's rotation. The limit-wheels can move up and down the shaft because they are prevented from turning with the shaft by the Limit Wheel Retainer Spring 21.

(2.1) When the door is being lowered (closing), the Limit-Wheels move down the shaft.

(2.2) When the door is being raised (opening), the Limit-Wheels move up the shaft.

(3) The bottom surface of the 9" Pulley is coupled through the Clutch Drive Discs 6 and 7 to the keyed clutch plate 8.

(3.1) When the proper tension is applied by the Clutch Pressure Spring (controlled by the Clutch Pressure Adjusting Nut 10), the Clutch will turn the keyed drive shaft 11.

(3.2) The clutch pressure must be great enough to drive the shaft (plus chain and door), and yet

allow the clutch to slip if the door meets an obstruction in its upward (opening) travel. The Clutch pressure is factory set to operate properly with most properly adjusted doors.

(4) The drive belt tension is set and checked at the factory and normally should not require adjusting.

(4.1) If the belt slips from being too loose, there will be a loss of torque; and the belt will overheat and result in reduced belt life.

(4.2) To adjust belt tension, loosen the motor bracket lock nut to the end of the threads. Loosen the motor mounting nuts and place a hammer handle (or similar object) between the motor housing and bracket and move to tighten drive belt. While holding tension on drive belt, hand tighten wing nut against bracket. Release hammer and wrench — tighten lock nut and the three motor mounting nuts.

(5) The 1½ inch and 9 inch Pulleys should be in horizontal alignment. Adjust by positioning the 1½" Pulley 3. Loosen the two set screws; position motor Pulley and retighten screws. (Note: two "Flats" on motor shaft for proper positioning of the set screws.)

CHAIN DRIVE ASSEMBLY

(1) The Roller Chain 60 is driven by the Sprocket at the top of the Drive Shaft 11. The Chain is continuous with the ends joined to the Trolley Drive Assembly 58. The Chain is centered over the Pulley 52 in the front tube mounting bracket assembly 50.

(2) Each end of the Roller Chain is joined to the Trolley Drive Assembly by a connecting link assembly 48.

(3) The Trolley Drive Assembly acts as a turn-buckle. Use a wrench and loosen the locking (jam) nut 59 on the trolley drive stud. Tighten the tension nut 59 to take up slack in the chain. Hold the chain connector 49 straight and steady with a wrench when tightening the nut. Make sure the chain is not twisted on either end of the trolley drive. Consider the chain tight enough when it is evenly parallel to the tubing.

SECTION IX

SERVICING THE OPERATOR

(1) POWER UNIT

(1.1) Cover does not have to be removed when adjusting safety reverse pressure.

(1.2) DISCONNECT POWER. Most installation, pull plug out of AC socket; others, throw switch.

(1.3) Loosen the four (two in front and two in back) #8-32 x ¾" hex head cover mounting screws. Remove light bulb.

(1.4) Pull cover straight down and then rotate cover slightly to clear pulley.

(1.5) The power should be applied only if voltage measurements or operating check is required. If making adjustments to Limit-Wheel, Limit-Switches, etc., and/or if making resistance (continuity) measurements, leave power disconnected.

(1.6) When checking the Light Switch S5: Terminal Board TB2 and Relay K1, the protecting, insulating barrier must be removed.

(1.7) When removing suspected component, it is always best to identify wiring terminations before or during removal to assure correct replacement. After wiring is removed, the mounting screws and/or clamps should be removed.

(1.8) When installing components, physically secure in place and CONNECT WIRING IN EXACT COMPLIANCE WITH THE APPROPRIATE SCHEMATIC WIRE DIAGRAM.

(2) REMOVAL OF OPERATOR

(Exploded View, Pages 27 & 28)

(2.1) Close Door.

(2.2) Disconnect power wiring: Most installations — pull Plug.

(2.2.1) Where the Operator is fixed wired, throw switch or remove fuse and disconnect wiring at the electrical junction box on Operator Power Head.

(2.3) Disconnect wiring from inside Pushbutton; Radio Control Receiver and/or from Outside Key Switch at terminal #1 and #2 of TB1.

(2.4) Remove the Hinge Pin Clip **63** from $\frac{7}{8}$ " Hinge Pin **73**. Remove Hinge Pin and lower the Door Arm away from trolley.

(2.5) Remove screws that hold Power Unit to Hanger Strap. Support the Power Unit close to its installed height. **NOTE:** If no counterbalance system is present above the garage door as is the case when Extension Springs are used, the Power Unit may be lowered to the floor immediately after removing the screws that secure it to the Hanger Straps.

(2.6) Remove Hinge Pin Clip **63** from 3" Hinge Pin **62**, and remove Hinge Pin from Front Mounting Bracket **51** and front hanger bracket **61**, and then lower the operator to the floor.

(3) **TO REINSTALL OPERATOR:** Reverse Steps (2.2) through (2.6) above.

(3.1) Check GDO's complete operation and adjustments according to Section VII, Pgs. 6, 7 & 8.

(4) **REPLACING TROLLEY** (Exploded View, Pgs. 27 & 28.)

(4.1) Close door.

(4.2) Remove the Hinge Pin Clip **63** from $\frac{7}{8}$ " Hinge Pin **73**. Remove Hinge Pin and lower the door arm away from Trolley.

(4.3) Disengage Trolley (Drawing #2, Pg. 2)

(4.4) Short Terminals 1 and 2 of TB1 (or press inside pushbutton, PB-12), starting operator: when Trolley Drive **58** has moved toward Power Unit approximately midway, turn off the power — pull plug or throw switch — to stop the movement.

(4.4.1) Disconnect wiring from Inside Pushbutton; Radio Control Receiver and/or from Outside Key Switch at terminal 1 and 2 of TB1.

(4.4.2) If required, disconnect the AC power wiring at the electrical junction box.

(4.5) Remove garage door operator and lower to floor.

(4.6) Secure Roller Chain to front section of tubing in a couple of places. Use tape; wire, or string.

(4.7) Using a wrench, loosen locking (jam) nut on trolley drive stud. Remove adjusting nut from trolley drive stud and remove stud from chain connection.

(4.8) Remove chain from around drive shaft sprocket and chain shoe.

(4.9) Remove tubing at Power Unit tubing clamp.

(4.10) Slide new (or repaired) Trolley on and reassemble and install operator by reversing steps (4.2) through (4.9) above.

(4.11) Make sure chain is not twisted. Refer to (Drawing #11) for proper chain tension.

(5) Chain should be clean and free of rust and corrosion; and lightly oiled.

(6) When the GDO is completely assembled and installed, check its operation and adjustments according to charts on Pages 22 and 23.

SECTION X

REMOTE RADIO CONTROLS — MODELS 590 and 595

DO NOT ATTEMPT SERVICE OF RECEIVER AND TRANSMITTERS. THESE UNITS **MUST** BE RETURNED TO NUTONE SERVICE DEPARTMENT FOR REQUIRED SERVICE.

RADIO CONTROLS

The all solid state UHF controls are manufactured especially for the remote control of residential

garage door operators. They are built to operate over a wide range of environmental conditions.

The RF carrier frequencies used are in the 290-

400 M Hz frequency band. They are amplitude modulated using the 12-19 K Hz frequency band. The receiver is powered by the electricity available from the low voltage (24V AC NEC Class 11) circuit of the operator.

Upon receipt of a properly coded signal a relay contract in the receiver will close, and remain closed for approximately 0.2 seconds. This contract controls the door operator motor relay circuit. In the normal application, the receiver is activated by its transmitter, provided the range (approximately 75'-100') is not exceeded. This distance will vary depending on the location of the receiver, the type of garage construction, the type of automobile, and the location in the automobile.

Receiver radiation is at a low level. For this reason, multiple systems can be operated in close proximity, such as apartment house complexes and planned housing projects.

Contact NuTone for help in planning a project.

MODEL 590

The transmitter transmits an amplitude modulated UHF signal. The receiver will reject any other signals except the properly tuned carried and

modulating frequencies. This provides a high level of security.

The receiver components and printed circuit board are mounted in a sturdy aluminum case. A snap-in mounting bracket is included for installation on the garage ceiling or other surfaces near the operator. Connects — with only two wires — to the 24V AC control circuit of the operator. All connections are external and the wire is provided. The transmitter mounts conveniently on the sun visor or car dash with mounting hardware provided. The transmitter operates from a self-contained 9 volt (NEDA 1604) battery and is housed in a high impact polystyrene case.

MODEL 595

The Model 595 system operates similar to the Model 590 except it adds a third coded signal. This is achieved by shifting the frequency of the modulating signal at a given rate. The receiver must detect this frequency shift rate along with the properly tuned RF carrier and modulating frequency before it will operate. The number of frequency combinations available are far in excess of any present requirements, making this model ideally suited for use in hi-density areas where there are many side-by-side door operator installations.

MODEL 590 SPECIFICATIONS

RECEIVER

RF Carrier	290-400 MHz
Modulation Frequency	12 - 19 KHz
Selectivity	5 MHz @ 500 uv input
Radiated Output	Complies with FCC Requirements Part 15
Operating Temperature Range	- 20 to +140 F
Power Requirements	16 - 35 volts A.C. 60 Hz
Current Consumption	16 Milliamperes @ 27 volts
Standby Current Consumption	5 Milliamperes @ 27 volts
Relay Contact Rating	1 amp. 15 watts, NED Class 11 Circuit
Size	Approximately 4.6 by 3.0 by 1.6 inches

Weight	8 ounces
UL Approval	Not required NED Class 11 Circuitry

TRANSMITTER

RF Carrier: Tuning Range	290-400 MHz
Modulation Frequencies	12 - 19 KHz
Useful Temperature Range	Battery Limited
Operating Range	Up to 100 feet from receiver
Power Requirements	Battery, NEDA Type 1604
Voltage	9 volts
Current Consumption	2.0 Milliamperes
Size	Approx. 3.9 by 2.5 by 1.2 inches
Weight	5 ounces

MODEL 595 SPECIFICATIONS

RECEIVER

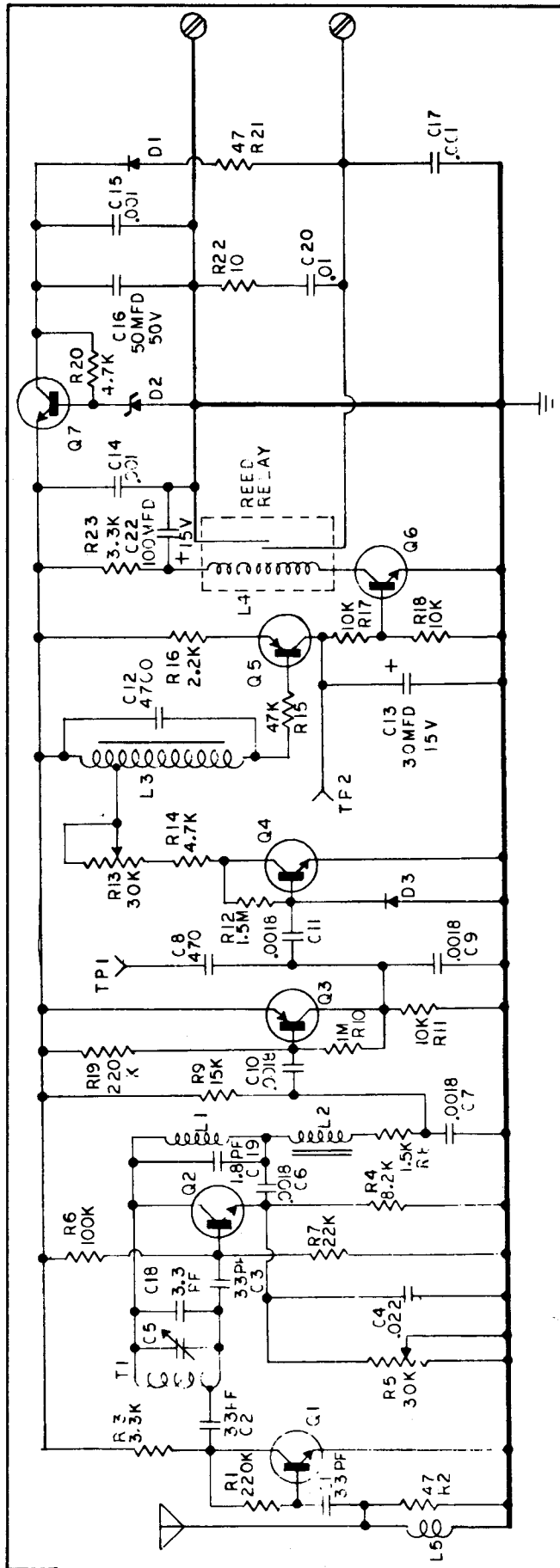
RF Carrier	290-400 MHz
Sub Carrier	12 - 19 KHz
Sub Carrier Deviation	± 1.5%
Time Base Code Rate	100 Hz
Selectivity	5 MHz @ 500 uv input
Radiated Output	Complies with FCC Requirements Part 15
Operating Temp. Range	- 20 to +140 F
Power Requirements	16 - 35 volts A.C. 60 Hz
Current Consumption	16 Milliamperes @ 27 volts
Standby Current Consumption	5 Milliamperes @ 27 volts
Relay Contact Rating	1 amp. 15 watts, NEC Class 11 Circuit

Size	5.5 x 3.5 x 1.5 inches
Weight	16 ounces

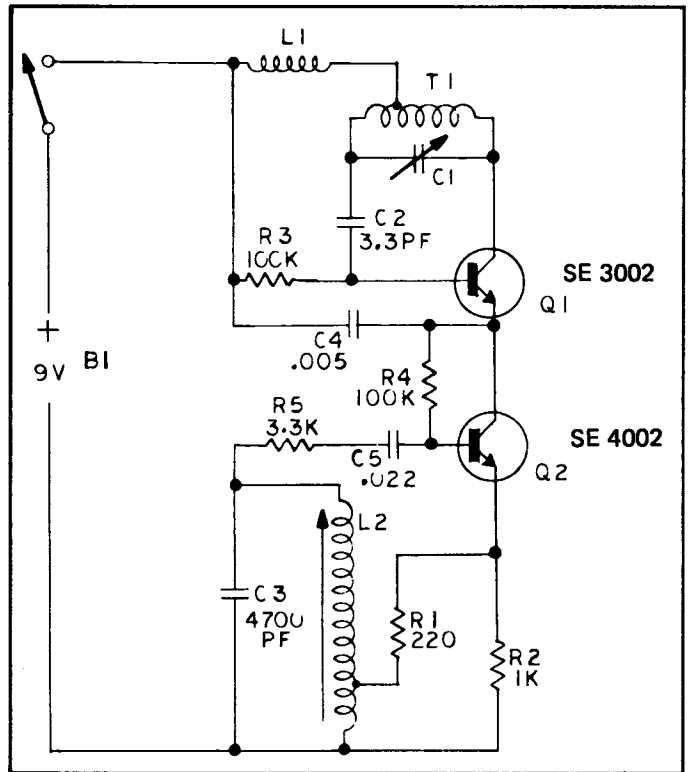
TRANSMITTER

RF Carrier	290-400 MHz
Sub Carrier	12 - 19 KHz
Sub Carrier Deviation	± 1.5%
Time Base Code Rate	100 Hz
Operating Temp. Range	Battery Limited
Operating Range	Up to 100 feet from receiver
Power Requirements	Battery NEDA TYPE 1604
Voltage	9 volts
Current Consumption	2.0 Milliamperes
Size	Approx. 3.9 by 2.5 by 1.2 inches
Weight	5 ounces

MODEL 590 RECEIVER

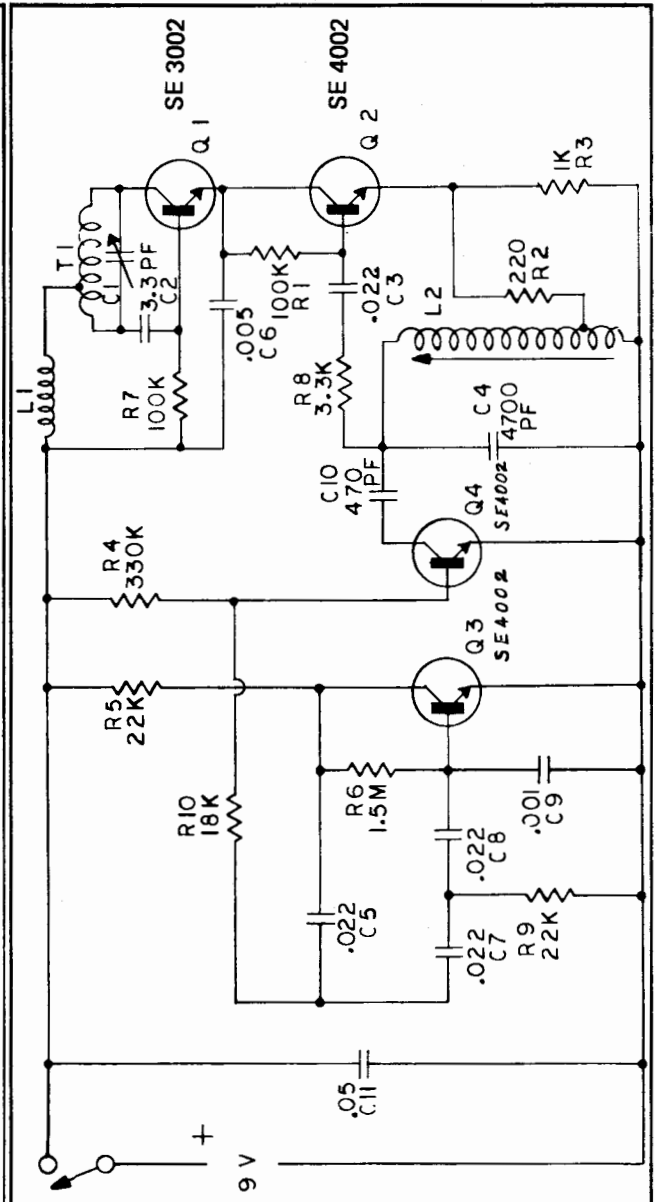
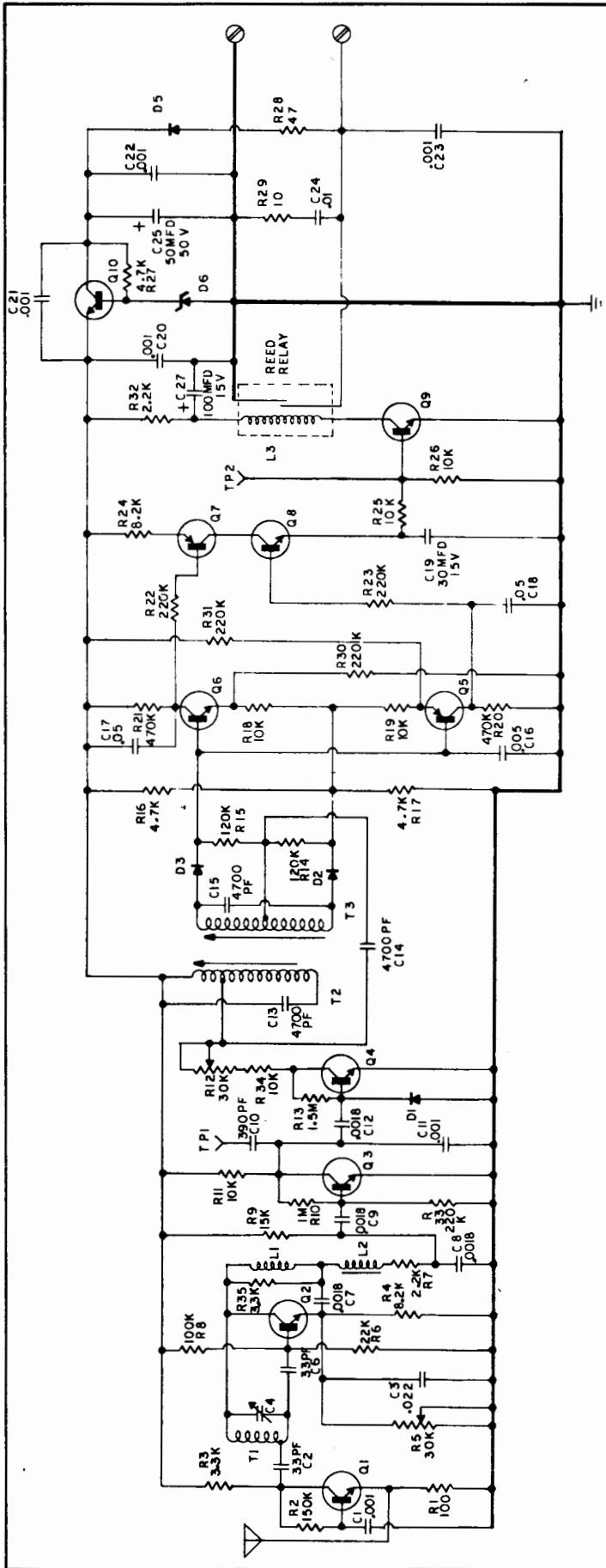


MODEL 590 TRANSMITTER



This schematic does not provide information necessary for field service. The radio controls (receiver and transmitter) must be returned to the factory for repairs requiring component changes.

This schematic does not provide information necessary for field service. The radio controls (received and transmitters) must be returned to the factory for repairs requiring component changes.



This schematic does not provide information necessary for field service. The radio controls (receiver and transmitters) must be returned to the factory for repairs requiring component changes.

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R-F AND AUDIO FREQUENCY ALIGNMENT

All transmitters and receivers are pre tuned at the factory to a specific R-F audio frequency. However, the transmitters can be retuned in the field to match an existing system. Also, additional transmitters may be matched to the transmitter/receiver sets when required. Changing the frequency is accomplished by repositioning the transmitter's R-F trimmer and audio coil slug as described in the following pages.

TUNING WITH THE MODEL 75 METER — (NuTone Part No. 69724)

The Model 75 has a self-contained battery which serves as the power supply for receivers that operate from 24 volt power sources. Every part of the Model 75 Meter was designed especially for tuning NuTone controls. Thus, tuning and testing tasks can be performed rapidly and with greater reliability.

The Model 75 Meter provides the following:

- (1) A battery contained in the meter supplies power to 24 volt receivers during tuning procedures.
- (2) A solid-state amplifier in the meter improves sensitivity and isolates the receiver test circuit.
- (3) Jacks and leads for R-F tuning.
- (4) Jacks and leads for audio tuning.



Model 75 METER



- (5) The red battery test button on the meter is used to check battery power. Also, it can be used to check polarity for power input.

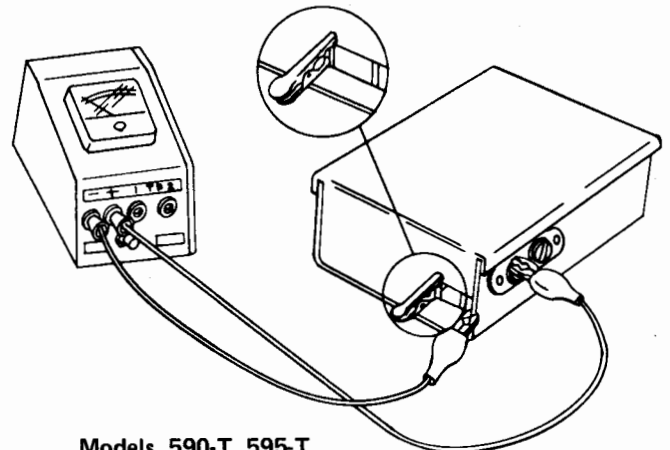
NOTE: For proper operation, the Battery Test reading must indicate at least 160 micro-amps while a receiver is connected to the meter power.

RECEIVER POWER CONNECTIONS

NuTone's radio control receivers operate on a nominal power input of 24 volts AC/DC. Both the 590R and 595R must be powered while used for transmitter tuning. Typically, the Model 75 Meter and its self-contained battery power supply are used.

The procedure for powering the receiver is as follows:

- Step 1. Ground TP-2 **MUST BE GROUNDED** as described in Fig. 2. If TP-2 is not grounded, the relay can close and short out the power supply when the tuned transmitter is actuated.
- Step 2. Connect a - (neg.) lead from the meter to the receiver case (ground) as shown in Figure 2.
- Step 3. Connect + (pos.) on the meter to + (pos.) on the terminal strip of the receiver. This is the terminal closest to the test points.



Models 590-T, 595-T
Two-Wire, 24 VAC, Operator Powered Receiver

TRANSMITTER TUNING, R-F AND AUDIO STAGES

In preparing to tune a transmitter to match one of NuTone's receivers, be sure that:

- (1) TP-2 on the receiver is grounded to the case as shown in Figures 2 and 3.
- (2) Power is supplied to the receiver as described in the preceding section.
- (3) Only a fiber glass or plastic alignment tool is used.

- (4) The transmitter battery is fresh. It must be in good condition in order to obtain the optimum meter readings.

R-F TUNING

In the transmitter tuning sequence, the R-F stage is tuned first. To tune, perform the following steps.

- Step 1. Connect TP-1 on the meter to TP-1 on the receiver as shown in Figure 3.

Step 2. Remove the case assembly — screw from the back of the transmitter. Then (with the switch still face down), slowly remove the back cover.

NOTE: For proper tuning results, the battery must be in the position shown, and the transmitter must be held in the illustrated position. Held correctly, the thumb is on the battery and the index finger is used to actuate the transmitter switch.

Step 3. Actuate the transmitter switch and carefully adjust the R-F capacitor for maximum reading on the meter.

CAUTION: Do not tune transmitter near metal benches, ladders, etc. Masses of metal will effect the meter reading.

AUDIO TUNING

The procedures for tuning a transmitter's audio stage are similar to those used for R-F tuning, and all power connections remain the same. However, before tuning the audio stage follow the instructions contained in the note below.

Step 1. Be sure to remove the jumper (alligator clip) used to ground TP-2 to the receiver case. The audio stage cannot be tuned until it is removed.

Step 2. Remove wire lead from TP-1 on meter and Receiver and reconnect to TP-2 on the meter and TP-2 on the receiver.

Step 3. Carefully adjust audio coil slug for maximum meter reading (See Figure 4).

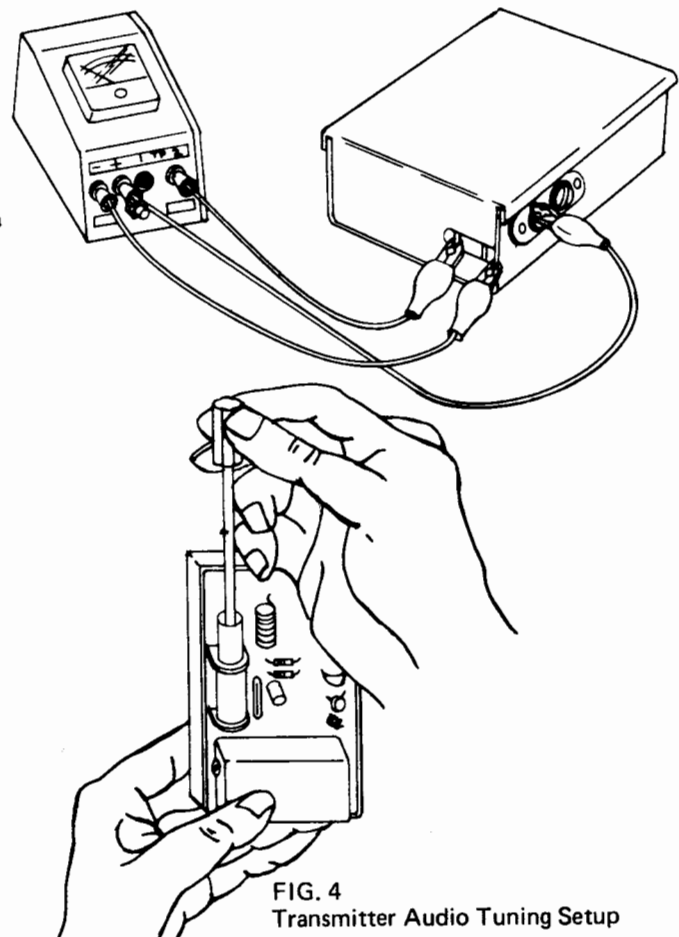
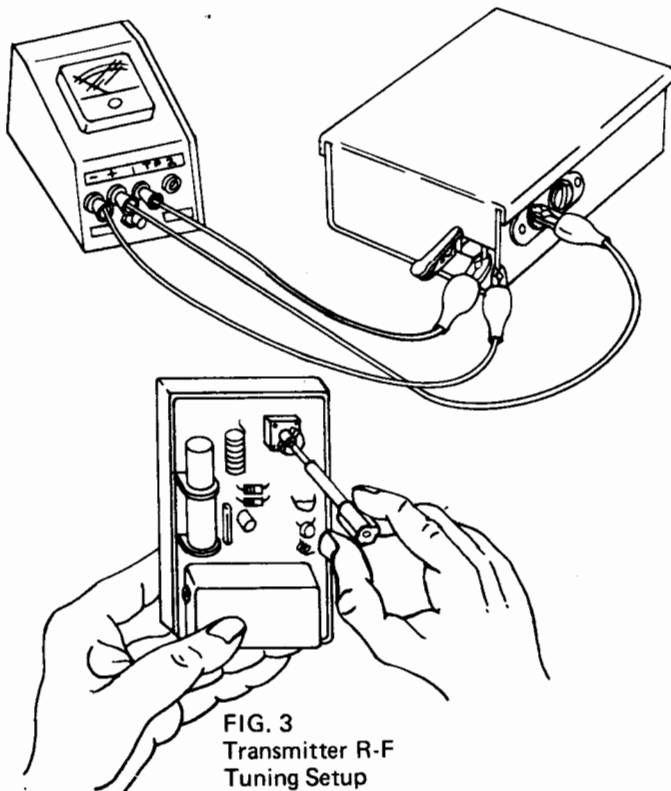
NOTE: To avoid receiver overload transmitter should be at least 2 feet from the receiver.

Step 4. Reassemble the transmitter case and range check. The transmitter should operate from a distance of 75 to 100 feet.

Remote Radio Controls 27 M Hz or 40 M Hz used with Canadian or Export Model Operators are not covered in this manual.

The 27 and 40 M Hz Controls are not to be serviced in the field.

Return Controls to NuTone Electrical, Limited, 2 St. Lawrence Avenue, Toronto, Ontario M8Z-5T8 for service.



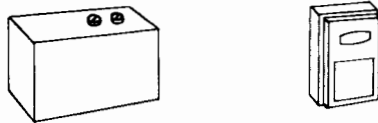
OPTIONAL EQUIPMENT



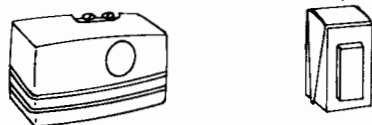
Model 562



Model 563



Model 590-1



Model 595-1

1. Model 562 — OUTSIDE KEY SWITCH:

With its mounting plate, installs on door jamb or wall. Permits security operation of the door from outside the garage.

2. Model 563 — OUTSIDE KEY OPERATED MANUAL RELEASE:

Used primarily in garages without a secondary entrance. Permits disengagement of the trolley from outside so that door can be manually opened in case of operator failure.

3. Model 564 — LOW HEADROOM KIT:

For use with doors in garages with low ceilings where normal installation clearance between door and tubing is not possible. (Not Shown)

4. Model 565 — CONNECTING ARM:

Supplied with "S" Model Operators used on doors using jamb or pivot type hardware. (Not Shown)

5. Model 566 — INSTALLATION STRAPPING:

Six pieces of strapping, $\frac{3}{4}$ " x $\frac{3}{4}$ " x 25", 18-gauge galvanized angle arm with $\frac{1}{32}$ " holes on 1" centers, for securing the power unit to the ceiling. Two pieces are normally furnished with each operator. (Not Shown)

6. Model 590 — RADIO CONTROLS:

Model 590-1:

Single set, includes one 590-R receiver, and one 590-T transmitter. Both tuned to same frequency.

Model 590-2:

Double set, includes one 590-R receiver, and two 590-T transmitters. All tuned to same frequency.

Model 590-T:

Additional transmitter(s) for use in additional car(s). Tuned to same frequency as other transmitters and receiver in system.

7. Model 595 — RADIO CONTROLS:

Model 595-1:

Single set, includes one 595-R receiver, and one 595-T transmitter. Both tuned to same frequency.

Model 595-2:

Double set, includes one 595-R receiver, and two 595-T transmitters. All tuned to the same frequency.

Model 595-T:

Additional transmitter(s) for use in additional car(s). Tuned to same frequency as other transmitters and receiver.

TROUBLE SHOOTING CHART

MALFUNCTION	CHECK	SERVICE PROCEDURE
1. Operator does not run when inside pushbutton is pressed; when outside key switch is activated; nor when remote radio transmitter is turned on.	120 or 240V A.C. Supply and connections thereto	120V Models: Remove Power Plug P1 from receptacle and plug-in drill, lamp, or other electrical appliance. If appliance operates properly, 120Vac to receptacle is normal. If device does not work, check line fuses and if required wiring to receptacle. If test appliance works, check plug, and wiring at Junction Box. 240V Models: Check supply voltage at switch box with volt meter. If okay check at junction box on operator If Junction box and plug wiring is okay, check motor temperature. If motor is hot, the 24V circuit Automatic Overload Reset will be open. Allow 8-10 minutes for motor to cool. Check for 24Vac between terminals #1 and #3 of TB1. If voltage is present, check Relay K1 for open coil. If coil is okay, check contacts for pitting, wear, etc. Replace if defective.
2. Operator does not run when inside pushbutton is pressed but, does run when key switch is activated and when remote radio transmitter is turned on.	Inside Pushbutton PB-12 and IW-2 wiring between TB1 and pushbutton	Check pushbutton with ohm meter, should read "Short" between contacts when button is pressed. Replace if defective. Check individual wires in IW-2 cable for "OPEN", if defective, replace cable. (#18-2, NuTone IW-2).
Operator does not run when key switch is activated. Other operations normal.	Model 562 Key Switch and IW-2 wiring between switch and TB1	Check switch contacts for continuity when key is operated. Should read "Short". Replace if defective. Check individual wires in IW-2 cable for "Open". Replace defective cable.
Operator does not run when remote radio control transmitter is turned on. All other operations normal.	Model 590 or 595 receiver.	Connections between receiver and TB1. Wiring between TB1 and receiver for open, replace if defective. Position of receiver antenna: Must not be shielded by beams, metal partitions, etc., should be fully extended from receiver.
	Model 590 or 595 transmitter.	Check battery. Replace with 9V (NEDA 1604) if suspected. Check transmitter/receiver alignment with NuTone Model 75 Meter (Part No. 69724) in compliance with Radio Control Service Manual.
3. Operator runs properly most of the time, but occasionally will inadvertently open or close.	Inside Pushbutton and Outside Key Switch.	Make certain that Pushbutton does not partially stick. Check switches for intermittent short, replace if suspected. Check wiring between TB1 and switches, and make certain that they do not short—look for frayed insulation, etc. Replace if defective. (Use IW-2).
	Radio Controls	Spurious signals can key the receiver. Check alignment as directed in Radio Control Service Manual. If receiver is being keyed by a particular device (CB Radio, Transmitter harmonic; Homing Equipment; Radar; Diathermy; etc.) it may require replacing the receiver and transmitter with ones operating on a different frequency.
4. Door completes opening or closing cycle; motor and light are turned off but power unit continues to buzz (loud hum).	PB-12 Inside Pushbutton, Outside Key Switch, and Radio Receiver and the wiring between TB1 and these components.	Disconnect wiring at TB1 Terminals #1 and #2. If buzz stops, check the Pushbutton and Key Switch for hanging up (shorted); Receiver for closed relay; wiring between units for shorts. The wiring from the Pushbutton, Key Switch and Radio Receiver can be reconnected, one-at-a-time, and each operation checked to isolate defective component.
5. Door starts down, but reverses and opens.	Manual operation of the door.	Disengage Trolley from Trolley Drive (Drawing #2, Pg. 2). If door does not operate free and easy, correct any binding, drag or severe out of balance condition. (NOTE: Older doors can have paint wear from the door and gather in tracks. This can exert stopping pressure on outside edge of door when closing. Clean excess paint from doors, and make certain that there is free space between front of door and door track, OR TRIM BOARD.)
	Reverse Pressure Adjustment.	If pressure adjustment is too light, door will reverse at the slightest resistance to its downward travel. Increase spring pressure in small increments. (NOTE: When door is coming down and it is obstructed it should reverse).
6. Door starts up, but stops before it is completely open.	Manual operation of the door.	See 5 above.
	Clutch Adjustment	Remove Power. Increase clutch pressure by adjusting clutch pressure nut clockwise one turn at a time. If clutch has slipped it will be necessary to realign limit wheels following limit adjustment procedure — Pages 6 & 7.

MALFUNCTION	CHECK	SERVICE PROCEDURE
7. Door goes down (closes) will not re-open. Hum present — relay K1 hums. Door will open if AC power is removed from operator momentarily, then re-connected.	Anti-Reverse Switch S-2	Anti-Reverse switch must be activated prior to down time switch. Set Anti-reverse switch arm $\frac{1}{8}$ "- $\frac{1}{4}$ " higher than down limit switch arm. Refer to Page 5.
8. Door goes down (closes) until it hits floor, and then reverses and fully opens.	Misalignment of limit wheels.	Realign limit wheels following limit wheel adjustment Procedures — Pages 6 & 7.
	Re-adjustment of S-2 anti-reverse switch. Replacement of S2 anti-reverse switch.	If re-alignment of limit wheels does not correct operation check anti-reverse switch adjustment following service procedure / above. NOTE: If anti-reverse switch S-2 is shorted, it will allow the safety reverse to operate even when the close-limit wheel has activated its lever. Replace switch if defective and align.
9. Door goes down but does not completely close; motor and light are turned off.	Front Rubber Bumper/Hose Clamp and Door Arm	Door Arm should rest against front rubber bumper — refer to Page 3. (See Drawing #6 or #7 as applicable). Adjust and tighten as required and reset Down-Limit Switch — Refer to Page 6.
10. Push the wall push-button and the motor starts, but the door does not move or moves erratically.	Manual operation	See 5 above.
	Drive Belt	Disconnect power. Remove power unit cover. Check belt tension and alignment of pulleys. If belt is too loose readjust belt tension following adjustment procedure — Page 14.
	Loose 1½" pulley on motor shaft.	Tighten pulley set screws. Shaft has two flats at right angle, and both screws must be tight. Pulley should be horizontally aligned with 9" pulley.
11. When unit is started, light comes on, but motor does not turn.	Motor windings and motor's automatic overload reset	Check motor connections. Check motor windings: The d-c resistance between the WHT and BRN wires should be approximately equal to that between the WHT and BLK wires. The d-c resistance between the BRN and BLK wires should be equal to the sum of the previous two measurements. If the motor's automatic overload reset is opened, resistance measurement between the WHT wire and either the BRN or BLK wire will show an open circuit. If the 24V automatic overload reset and/or the motor automatic overload reset has been opened as a result of temperature rise in the motor, allow the motor to cool for 8-10 minutes before attempting to start Operator. If defective winding and/or overload reset is noted, replace motor. Connect wires in exact compliance with appropriate Schematic Wiring Diagram.
	Capacitor C1 120 volt models. Capacitor C1 and C2 240 volt models.	Check for open. (charge and discharge with ohmmeter) Check for shorts with ohmmeter. Generally if a capacitor has been overheated through sustained operation or through an internal short, it will show evidence of the electrolyte around its top. Replace defective unit, and connect as directed in appropriate Schematic Wiring Diagram.
12. When operator is turned on, light does not come on, all other operations normal.	Incandescent lamp	Replace if burnt out.
	Light Switch S5	Remove insulating barrier, and pull switch straight forward away from TB2. Check switch for open heater coil; pitted and/or worn contacts; and for fatigued switch. Replace defective switch.

REPLACEMENT PARTS LIST

(Some Components Appear in Both Electrical & Mechanical Listings)

ELECTRICAL COMPONENTS

Circuit Symbol	NuTone Part No.	Description	Model Used On	Circuit Symbol	NuTone Part No.	Description	Model Used On
	51281-000	Power Unit Complete	GB575, GB580, GB580-8	M1	50594-000	Motor, .273 HP @ 900 (+100-0), RPM, 220V, 50-60 Hz Automatic Overload Reset. Use with Two Series Connected 40 Microfarad 330V. Capacitors.	GB575XK, GB580XK
	51282-000	Power Unit Complete	GB575S, GB580S		51133-015	Stud, #10-32 x 2 1/4", right angle end, motor, position lock.	ALL
	51322-000	Power Unit Complete	CB75		51134-038	Nut, #10-32 wing, motor stud	ALL
	51253-000	Power Unit Complete	G577S		10435-015	Lockwasher, #10 Int. Th. Mtr. Stud	ALL
	51219-000	Power Unit Complete	G577		51098-015	Washer, #10 motor stud	ALL
	50630-000	Power Unit Complete	C77		28321-015	Nut, #10-32 Keps, motor stud	ALL
	51338-000	Power Unit Complete	GB575XK, GB580XK	P1	50006-000	Power Plug, Wire & Ring Terminal Assy.	GB575, GB575S, G577, G577S, GB580, GB580S, GB580-8
C1	50130-000	Capacitor, Motor, 48 microfarad @ 330 V: G.E. #35F815BA1	GB575, G577	P1	50445-000	Power Plug, Wire & Ring Terminal Assy.	CB75, C77
C1, C2	50593-000	Capacitor, Motor, 40 microfarad @ 330 V: G.E. #35F304BA1	GB575XK, GB580XK, GB575S, G577S, GB580S		21018-000	Solderless Connector. Ideal Wire-nut type No. 73B	ALL
C1	50055-000	Capacitor, Motor, 60 microfarad @ 330 V: G.E. #35F307BA1	CB75, GB580, GB580-8, C77		50052-000	Junction Box	ALL
	50056-000	Clamp, capacitor mtg.	ALL		50450-000	Junction Box, Connector & Wire Clamp	ALL
	28058-015	Screw #8-32 x 3/8" Sit. Hex/W #1, Secure Capacitor Mtg. clamp	ALL		13028-000	Screw, #10-32 x 5/8" Sit. Pan #1, ground wire connector	ALL
I1	51088-000	Socket, lamp	ALL		28058-015	Screw, #8-32 x 3/8" Sit. Hex/W #1, Junction Box Mtg.	ALL
	28058-015	Screw, #8-32 x 3/8" Sit. Hex/W #1, Lamp Socket Mtg.	ALL		50053-000	Cover, Junction Box	ALL
K1	51146-000	Relay Assy., Latching-Switching, SPDT, Coil: 24 volts AC Intermittent Duty, Contacts: 1/2 HP @ 117 Volts AC, Mid-Tex #48-11Q100, AmPar #330-32	All, except GB575XK, & GB580XK		14990-000	Grommet, Strain Relief, Black Nylon, for 1/2" wiring hole in Junction Box	ALL
K1	51199-000	Relay Assy., Latching-Switching, SPDT, Coil: 24 Volts AC intermittent duty, Contacts: 1 HP @ 230V AC MidTex #48-12Q100	GB575XK, GB580XK	S1	50044-000	Switch, toggle, SPST normally open, momentary close: 20A @ 120V AC; 10A @ 250V AC, Safety Reverse	ALL
	28058-015	Screw, #8-32 x 3/8" Sit. Hex/W #1, Relay Mtg.	ALL		50045-000	Locking Ring, use with S1	ALL
	51096-000	Barrier, insulating fish-paper for K1	ALL		63207-000	Lock Washer, use with S1	ALL
M1	1900A-000	Motor, .141 HP @ 450 (+100-0) RPM, 115V, 60 Hz. Automatic Overload Reset, use with 36-43 Microfarad 330V capacitor, includes automatic overload reset for 24 Volts AC circuit.	GB575S, G577S, GB580S	S2	50013-000	Switch, lever activated, normally closed, momentary open: 15A 1/2 HP 120-250V AC ANTI-REVERSE: OPEN LIMIT: CLOSE LIMIT, McGill Mfg. Co., No. 4600 Series.	ALL
M1	1901A-000	Motor, 1/3 HP @ 900 (+100-0) RPM, 115V, 60 Hz. Automatic overload reset, use with 60 microfarad 330V Capacitor. Includes automatic overload reset for 24V AC Circuit.	CB75, C77, GB580, GB580-8	S3	51086-000	Bracket, Mtg. for S2	ALL
M1	1902A-000	Motor, 1/4 HP @ 900 (+100-0) RPM, 115V, 60 Hz. Automatic Overload Reset, use with 48 microfarad 330V capacitor. Includes automatic reset for 24V AC circuit.	GB575, G577	S4	28058-015	Screw #8-32 x 3/8" Sit. Hex/W #1 for S2 mtg. bracket	ALL
					29129-039	Washer, 3/8" x 3/8". For S2 Mtg. Bracket Screws	ALL
					51087-000	Barrier, insulating fish-paper for S2, S3, & S4	ALL

Circuit Symbol	NuTone Part No.	Description	Model Used On
S5	50015-015	Screw, #4-40 x 5/8" Slit. RD, SF, Mtg. for S2, S3 and S4	ALL
	50037-000	Limit Wheel, White Nylon, for activating S2, S3, and S4	ALL
	50043-000	Spring, Limit Wheel Positioning Control	ALL
	51095-000	Switch, Lamp, Temperature Activated, Contacts close on energize in 2 to 4 sec.: hold time after 8 seconds, energized is 1.5 minutes minimum ambient compensated: -20 degrees F to 440 degrees F.	All except GB575XK, and GB580XK
S5	51194-000	Switch, Lamp, Temperature Activated, Contacts close on energize in 2 to 4 sec.: hold time after 8 seconds energized, 1.5 minutes minimum ambient compensated: -29 degrees C to +60 degrees C.	GB575XK, GB580XK

Circuit Symbol	NuTone Part No.	Description	Model Used On
T1	51089-000	Transformer Assembly, Primary 117V AC, 60 Hz, Secondary 30V AC @ No-Load, 24V AC @ 0.5A AC Resistive Load.	GB575, GB575S, G577, G577S, GB580, GB580S, GB580-8, CB75, C77
T1	51203-000	Transformer Assembly, Primary 117V AC, 60 Hz, Secondary 30V AC @ no-load, 24V AC @ 0.5A AC Resistive Load.	GB575XK, GB580XK
T1	51199-000	Transformer Assembly, Primary 220V AC, 50-60 Hz. Secondary 30V AC @ no-load, 24V AC @ 0.5A AC Resistive Load.	ALL
	28058-015	Screw, #8-32 x 3/8" Slit. Hex Hd./W #1, Transformer Mtg.	ALL
TB1	31068-000	Terminal Strip, 3 screw connections	ALL
TB2	51093-000	Terminal Board, 7 screw connections	ALL
	64867-\$15	Screw, #8-32 x 5/8" PH RH Taptite, TB2 mtg.	ALL
	50475-007	Spacer standoff for TB2 mtg. screws	ALL

MECHANICAL COMPONENTS

Reference Number	NuTone Part No.	Description	Models Used In
1	1900A-000	Motor	GB575S, G577S, GB580S
1	1901A-000	Motor	CB75, C77, GB580, GB580-8
1	1902A-000	Motor	GB575, G577
1	50594-000	Motor	GB575XK, GB580XK
2	51133-015	Stud, #10-32 x 2 1/4" right angle end motor position lock	ALL
	51134-028	Nut, #10-32 wing, motor stud	ALL
	10435-015	Lockwasher, #10 Int. Th. motor stud	ALL
	51098-015	Washer, #10 motor stud	ALL
	28321-015	Nut, #10-32 Keps motor stud	ALL
3	51263-038	Pulley, motor, 1 1/2" Drive Belt, V, 1/2" x 32"	ALL
4	69515-000	Drive Belt & Clutch Drive Disc Assy. (only way supplied)	ALL
5	51107-000	Pulley 9" Assembly complete with Limit Shaft Sleeve	ALL
6	50608-000	Disc Fiber, Clutch Drive	ALL
7	50609-000	Disc Plastic, Clutch Drive	ALL
8	50612-000	Clutch	ALL
9	50610-000	Spring, Clutch Pressure	ALL
10	50041-003	Nut, 1/2-20 Hex, Clutch Adjusting	ALL
11	51113-000	Drive Shaft Assembly Complete	ALL
12	51083-000	Drive Shaft Bearing (2 required)	ALL
13	51085-000	"Z" Bracket	ALL
14	50028-000	Reverse Arm Pressure Adjustment	ALL
15	51117-015	Bolt, 1/4-20 x 2 3/4" Hex Hd., Pressure Adjustment	ALL

Reference Number	NuTone Part No.	Description	Models Used In
16	51223-000	Spring, Compression, Pressure Adjustment	ALL
17	50426-015	Washer, 1/4 Pressure	ALL
18	16133-000	Nut, 1/4-20 Wing Pressure Adjustment	ALL
19	50044-000	S1 Safety Reverse Switch, Toggle	ALL
20	50037-000	Open Limit Wheel	ALL
20	50037-000	Close Limit Wheel	ALL
21	50043-000	Spring, Limit Wheel, retaining	ALL
22	50013-000	S3-Open Limit Switch	ALL
22	50013-000	S2 Anti-Reverse Switch	ALL
22	50013-000	S4 Close Limit Switch	ALL
23	51086-000	Bracket, Mtg. for S2	ALL
24	51087-000	Barrier, Insulating Fishpaper for S2, S3, & S4	ALL
25	50130-000	Capacitor, Motor	GB575, G577
25	50593-000	Capacitor, Motor	GB575XK, GB580XK, GB575S, G577S, GB580S
25	50055-000	Capacitor, Motor	CB75, GB580, GB580-8, C77
26	50056-000	Clamp, Capacitor Mtg.	ALL
27	51088-000	Socket, Lamp	ALL
28	51146-000	Relay, Assembly	All except GB575XK & GB580XK
28	51199-000	Relay, Assembly	GB575XK, GB580XK
29	51089-000	Transformer, Assembly	GB575, GB575S, G577, G577S, GB580, GB580S, GB580-8
29	51203-000	Transformer, Assembly	CB75, C77
29	51199-000	Transformer, Assembly	GB575XK, GB580XK
30	31068-000	Terminal Strip, 3 Screw Connections	ALL

Reference Number	NuTone Part No.	Description	Models Used In
31	51093-000	Terminal Board, 7 Screw Connections	ALL
32	51095-000	Switch, Lamp	All except GB575XK and GB580XK
32	51194-000	Switch, Lamp	GB575XK, GB580XK
33	50052-000	Junction Box	ALL
34	50053-000	Cover, Junction Box	ALL
35	50006-000	Power Plug, Wire & Ring Terminal Assembly	GB575, GB575S, G577, G577S, GB580, GB580S, GB580-8
35	50445-000	Power Plug, Wire & Ring Terminal Assembly	CB75, C77
	51259-000	Reverse Plate Assembly	ALL
36	51100-000	Reverse Plate	ALL
37	51222-000	Chain Shoe	ALL
38	51247-015	Tubing Section (3 required)	C77, G577, G577S, GB575XK, GB580XK
39	51271-015	Tubing Section (1 required)	CB75, GB575, GB575S, GB580, GB580S, GB580-3
39	51272-015	Tubing Section (1 required)	
40	51269-000	Tube Coupling (2 required)	C77, G577, G577S, GB575XK, GB580XK
41	51224-000	Tube Mtg. Bracket	ALL
42	50108-015	Carriage Belt 1/4-20 x 1 3/4 LG, Tube Mtg. Bracket	ALL
43	31903-015	Lockwasher, Tube Mtg. Bracket	ALL
44	08747-003	Nut, 1/4-20 Hex, Tube Mtg. Bracket	ALL
45	50009-000	Screw 1/4-20 x 3/8 Hex/W SF Tube Mtg. Bracket (4 required)	ALL
46	51234-000	Hose Clamp (2 required for both front and rear)	ALL
47	51233-000	Rubber Bumper, front and rear	ALL
48	69486-000	Chain connecting Link Assy. (1 link, 1 plate, 1 clip)	ALL
49	51232-020	Chain connector	ALL
50	51243-000	Front Mtg. Bracket Assy. Complete	ALL
51	51244-000	Front Mtg. Bracket	ALL
52	51245-000	Pulley	ALL
53	51246-020	Pin	ALL
54	31992-004	Washer	ALL
55	50106-015	Clip	ALL
56	51156-000	Bracket, Roller Chain Mtg., Complete Assembly	ALL
57	51235-000	Trolley Assembly, Complete	ALL
58	51240-000	Trolley Drive	ALL
59	08747-003	Trolley Drive Adjusting Nuts	ALL
60	64910-000	Roller Chain (Incl. 2 Links, 2 Plates, 2 Clips)	All except GB580-8
60	50458-000	Roller Chain (Incl. 2 Links, 2 Plates, 2 Clips)	GB580-8

Reference Number	NuTone Part No.	Description	Models Used In
61	50573-000	Bracket, Installation front hanger	ALL
62	50103-015	Pin 3" hinge Front Bracket	ALL
63	50106-015	Clip, hinge pin	ALL
64	50102-015	Bolt, Lag, 3/8-9 x 1 1/2" front hanger, bracket mtg.	ALL
65	50574-000	Bracket, door mtg.	ALL
66	50104-015	Pin, 1" hinge door bracket	ALL
67	50096-005	Arm Curved, Door Connecting	C77, CB75, GB575, GB580, GB580-8, GB575XK, GB580XK
68	50095-005	Arm 20" Straight Door Connecting (2 used on G577S)	C77, CB75, G577, G577S, GB575, GB580, GB580-8, GB575XK, GB580XK
69	50201-005	Arm, 4' straight door connecting	GB575S, GB580S
70	50099-015	Bolt, 3/8-18 x 1" Hex. Hd., Curved Arm to Straight Arm, or 20" straight arm to 20" straight arm on G577S	All except GB575S and GB580S
71	22077-038	Lockwasher 3/8"	All except GB575S and GB580S
72	50100-015	Nut, 3/8"-18 Hex	All except GB575S and GB580S
73	50105-015	Pin 7/8" hinge straight arm to trolley	ALL
74	50631-000	Cover, Power Unit, complete assembly	C77
74	51323-000	Cover, Power Unit, complete assembly	CB75
74	51293-000	Cover, Power Unit, complete assembly	GB575
74	51294-000	Cover, Power Unit, complete assembly	GB575S
74	51225-000	Cover, Power Unit, complete assembly	G577
74	51254-000	Cover, Power Unit, complete assembly	G577S
74	51291-000	Cover, Power Unit, complete assembly	GB580, GB580-8
74	51319-000	Cover, Power Unit, complete assembly	GB580S
74	51335-000	Cover, Power Unit, complete assembly	GB575XK, GB580XK
	28058-015	Screw, #8-32 x 3/8 Hex/W SF cover to power unit mtg. (not shown)	ALL
75	69484-000	Light Lens, complete	CB75, GB580, GB580S, GB580-8, GB575XK, GB580XK
76	50204-000	Strap, hanger, power unit installation	ALL
	50100-000	Rope, 36" plastic covered trolley manual release (not shown)	ALL
77	05120-900	Pushbutton inside (Nu-Tone Model PB-12)	ALL
78	50138-000	Wire, 22/2 ribbon type, 30' coil, control between pushbutton and TB1	

