ELECTRO-MOTIVE DIVISION • GENERAL MOTORS CORPORATION

SERVICE DEPARTMENT

MAINTENANCE INSTRUCTION

TIME DELAY RELAY

DESCRIPTION

The time delay relays, Figs. 1 and 2, listed under Maintenance Data are single coil, air dashpot types. They all consist of a magnet coil and frame, a plunger type armature, a pneumatic time delay unit and a snap action micro-switch, Figs. 3 and 4. These components are mounted on a metal base using rubber grommets for shock and vibration absorption. The relays are surface mounted with all electrical connections to the coil, microswitch contacts, and instantaneous interlocks (if applied) made to the front of the relay.

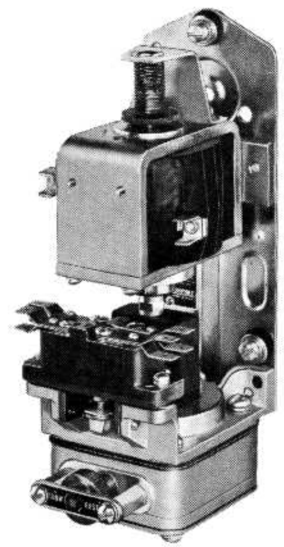

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Fig. 1 — Relay 8276597

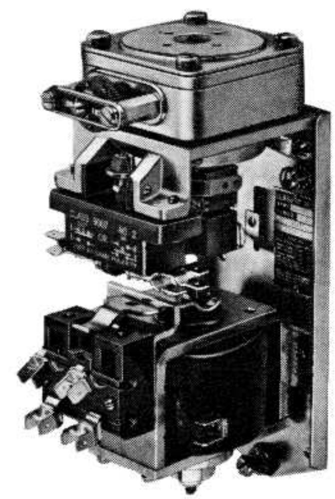

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Fig. 2 — Relay 8276599

The pneumatic timing mechanism is mounted at the bottom of relays 8253242, 8253244, 8262424, 8267199, 8272600, 8276597, and 8297115, Fig. 1, while the other five relays have the timing unit mounted at the top, Fig. 2. Relays 8253242, 8253244, 8262424, 8297115, 8276597, 8267199 and 8272600, have the time delay upon energization (pickup) of the coil while the other five relays have the time delay feature upon de-energization (drop-out) of the coil. The range of the timer unit on all relays is adjustable between .2 seconds and 3.0 minutes depending upon their application. The length of the timing period may be adjusted by turning a knurled adjusting knob, Fig. 4. This positions a needle valve which acts to restrict the orifice between the upper and lower air chambers to the degree necessary to produce the desired time delay.

The upper and lower air chambers are separated by a silicone rubber diaphragm. A clapper valve is used to admit air to the upper chamber when the diaphragm is moved upward by the action of the plunger, Fig. 4. The valve then seats and the trapped air can escape only through the orifice which is restricted by the needle valve. A felt filter is provided for cleaning the air admitted, thereby protecting the moving parts from dirt.

These time delay relays are equipped with a Series "A" timing head which is flat across the top. The microswitch operating screw is held by a nylon clinch nut for permanent grip which eliminates the possibility of its loosening to cause erratic

*This bulletin is revised and supersedes previous issues of this number.

switch action. The microswitch is equipped with either screw type terminals or slip-on terminals. The lubricant used for the adjusting knob provides permanent lubrication without danger of contamination of the needle valve. The clapper valve is constructed of silicone rubber having a large ratio of area to sealing surface.

A microswitch is located in front of the timing unit plunger, Fig. 4, and is actuated by the operation of a lever arm. The lever arm is pivoted on one end at the timing unit plunger and at its mid-point on the timing mechanism housing. Thus, any movement of the timing unit plunger upward will depress the button on the microswitch, and any movement of the timing plunger downward will cause the button to be released.

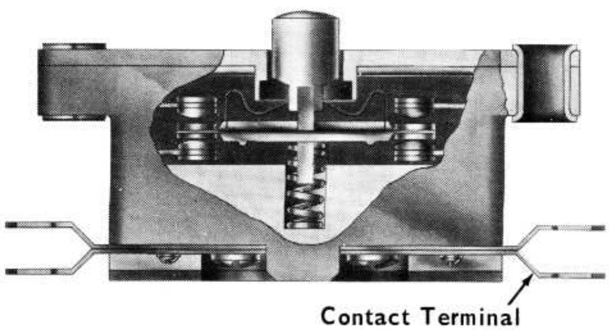
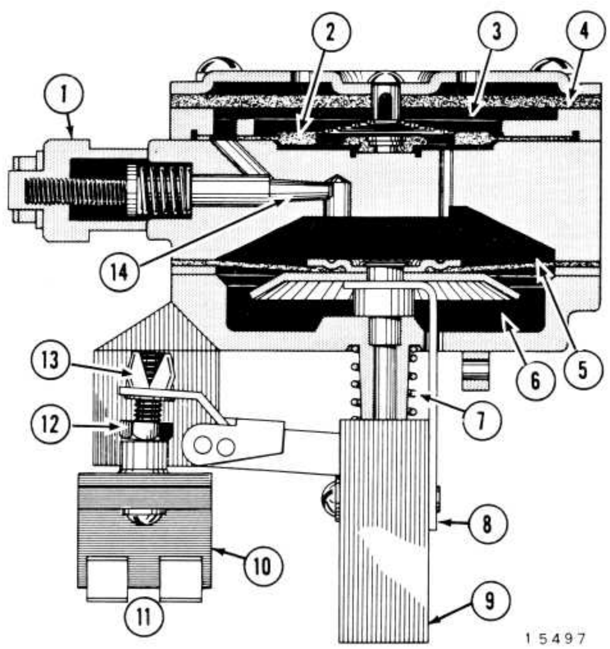


Fig. 3 — Switch Assembly Cutaway View



1. Adjusting Knob
2. Clapper Valve
3. Upper Chamber
4. Felt Filter
5. Diaphragm
6. Lower Chamber
7. Operating Block Spring
8. Bracket
9. Timing Unit Plunger
10. Micro-Switch
11. Slip-On Terminals
12. Set Screw
13. Clinch Nut
14. Needle Valve

Fig. 4 — Pneumatic Timing Unit

The arrangement of switch contacts differ between the twelve relays, however, they are all designed for either 74 or 120 volt DC pilot control and secondary circuit operation. Double throw contact arrangement for the relays is illustrated in Fig. 5. Contacts A and B in Fig. 5 are the time delay contacts and C, D, E, and F are instantaneous interlocks.

OPERATION

The armature plunger, Fig. 6, extends through the magnet coil and makes physical contact with the timing unit plunger. In the de-energized position, the magnet coil armature extends below the coil and is held in this position by the return spring. When the relay is energized, the armature is pulled into the coil immediately, closing the microswitch and instantaneous interlocks (if equipped). When the coil is de-energized, the armature drops to open the instantaneous interlocks (if equipped) and to start the downward movement of the timing unit plunger which follows at a rate depending upon the timer setting to open the microswitch.

As previously stated, relays 8253242, 8253244, 8262424, 8297115, 8276597, 8272600, 8267199 have the time delay feature upon pickup. When the top mounted coil of these relays is energized, Fig. 1, the armature is pulled upward into the coil and the timing unit plunger follows at the predetermined rate. Upon de-energization, the return spring immediately forces both plungers downward to open the microswitch.

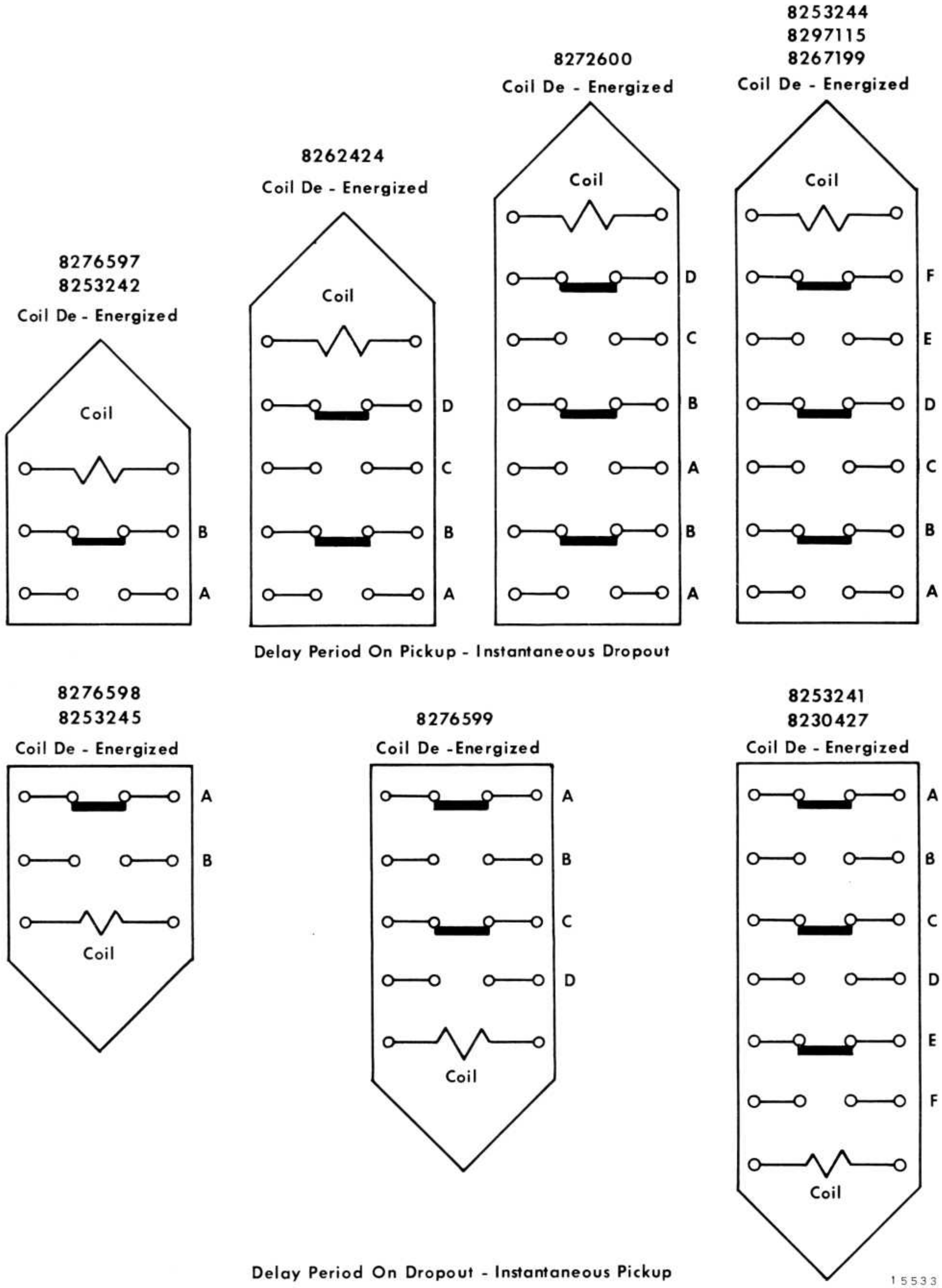
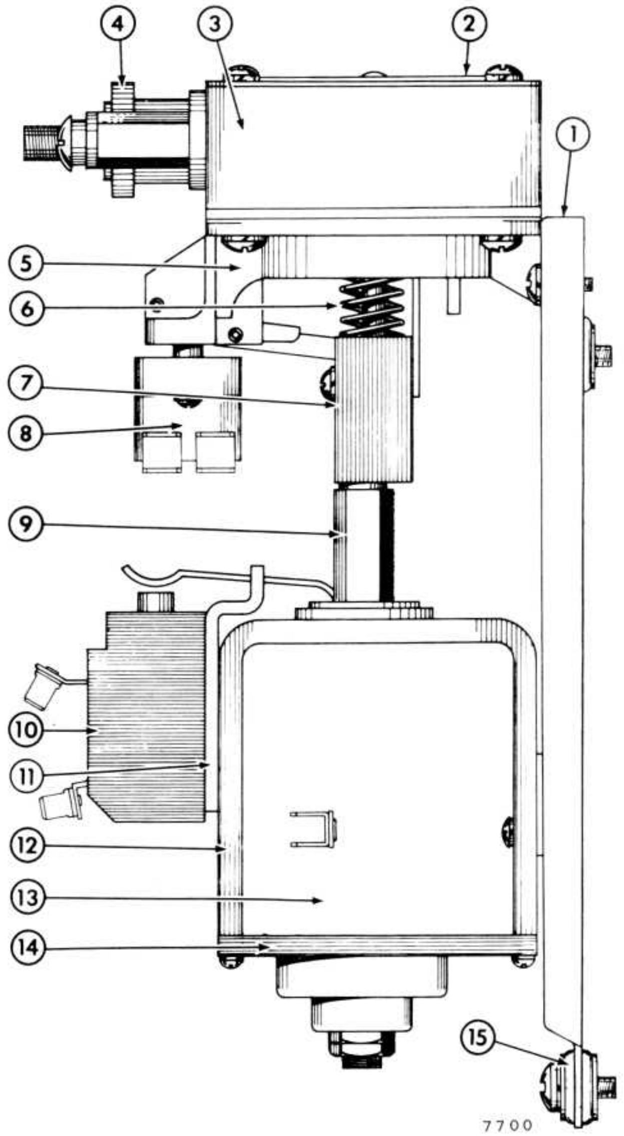


Fig. 5 — Schematic Of Coil And Contact Arrangement



1. Mounting Base
2. Timer Cover
3. Timer Unit
4. Timer Adjusting Knob
5. Lower Chamber
6. Block Spring
7. Timing Unit Plunger
8. Microswitch
9. Armature Plunger
10. Instantaneous Interlocks
11. Interlock Bracket
12. Magnet Yoke
13. Magnet Coil
14. Yoke Bottom Plate
15. Grommets

Fig. 6 — Relay — 8276599

MAINTENANCE

At regular intervals, the assembly should be examined for free movement of all moving parts, security of mounting, continuity of electrical circuits and tightness of connections. Examine the magnet coil for damaged insulation and repair or replace as necessary.

The microswitch must be replaced as a unit since it is not possible to change out the contacts. When installing a new microswitch, check the wiring diagram of the particular equipment on which the relay is used to see that the correct interlocks are normally open or closed, as required for the application. At the annual inspection date, the relay should be checked visually and electrical tests made. Check the timing and adjust if necessary.

DIAPHRAGM REPLACEMENT

If it should become necessary to replace the diaphragm, Fig. 4, the entire timing unit should be replaced.

DISASSEMBLY

Due to slight variations in models, the disassembly procedure may vary. The general disassembly procedure is as follows: Remove the two screws holding the magnet assembly to the mounting base, Fig. 6, and the four screws from the magnet yoke bottom plate which hold the magnet coil in the magnet yoke. On those relays which have instantaneous interlocks, remove the two screws holding each interlock to the interlock bracket.

To disassemble the timing unit assembly, remove the two screws holding the timing unit assembly to the mounting base, the two screws holding the microswitch, and two screws holding the plunger. Remove the four screws holding the top cover to the timing unit and the four screws holding the lower chamber to the timer unit.

ASSEMBLY

Assembly of the magnet assembly and timing unit assembly is basically the reverse of the disassembly procedure.

MICROSWITCH ADJUSTMENT

1. Set screw (12), Fig. 4, so that microswitch just trips at the extreme limit

of travel of the plunger. (This screw can be adjusted without loosening nut).

2. Turn the screw "in" 1/3 turn.

3. The microswitch will have approximately .011" overtravel and the timing unit plunger .042" overtravel.

ADJUSTMENT OF INSTANTANEOUS INTERLOCKS

1. Adjust the instantaneous interlock unit so that its button has 1/64" to 1/32" travel when the magnet coil is energized, Fig. 6. This adjustment is made by bending lever slightly. Use extreme care.

2. Readjust the microswitch so that the instantaneous interlock closes at approximately the same time as the microswitch contact opens when the coil is energized. Recheck for proper microswitch and plunger overtravel.

TIMING UNIT ADJUSTMENT

NOTE: The relay timing should not be set by turning the knurled nut on the timer unit to a certain number of turns since this method is not accurate.

The correct timing period is accomplished by positioning the needle valve in the orifice between the upper and lower air chambers, Fig. 4. Indicating arrows on the plate show the direction in which the adjusting knob should be turned to increase or decrease the delay period.

Outlined below is the proper method for accurately measuring the time delay period. This is the only method to use when the desired time delay period is very short. Longer periods can be set accurately without the necessity of cycling 10 times.

1. With the engine shut down and the isolation switch in the START position (if provided), make preliminary test and adjustments if necessary, in order to obtain an approximate cycling time.

2. Turn the adjusting knob all the way in the direction for FAST timing, then turn the knob back toward SLOW to the estimated point for proper time delay.

3. Open the control circuit at the control stand, disconnect and tape the positive lead to the magnet coil.

4. Disconnect positive leads to normally closed contacts of microswitch.

5. Connect a snap switch in series with one terminal of the NC contacts of the microswitch. Connect the other terminal of the NC contact to the magnet coil and connect the other terminal of the snap switch to a positive battery supply, Fig. 7.

6. Connect a low watt 64 volt lamp to one terminal of the NO contact of the microswitch and the other terminal

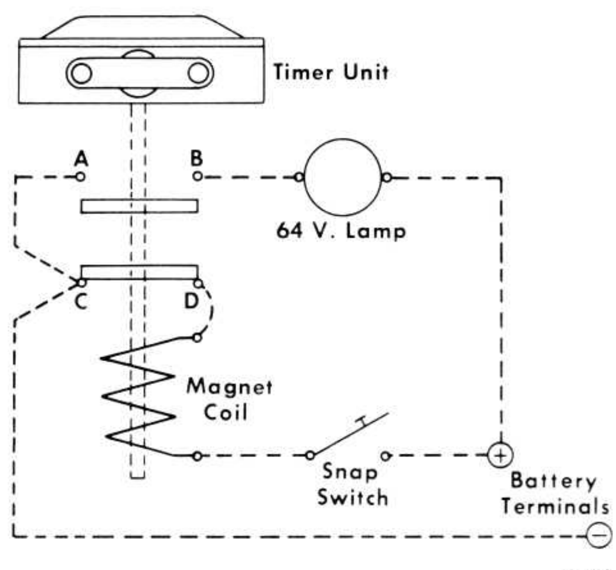


Fig. 7 — Schematic Test Connections

to battery negative. Connect the other terminal of the snap switch (OPEN) to battery positive, Fig. 7.

7. When the snap switch is closed, the relay will cycle and the lamp will indicate the time lapse of the relay. Allow the relay to cycle ten times. Measure the time required for the ten cycles with a stop watch and divide by ten to compute the relay timing. (Time delay periods may be obtained for .2 seconds to 3.0 minutes as required, minimum to maximum orifice opening.)

8. In case the timing is not within the limits listed as required for the particular application, readjust and repeat until proper timing is obtained.

9. After satisfactory relay timing has been obtained, disconnect the testing equipment and reconnect the relay into its normal circuits and run a sequence check. On relays which have holes provided in the adjusting knob, apply a lead seal to prevent tampering by unauthorized personnel. On relays on which no holes are provided, a No. 8 locknut may be applied to the exposed threads of the adjusting nut.

MAINTENANCE DATA

Time Delay Settings . . . . Refer to specific product wiring diagram for proper time delay.

	Magnet Coil				Contact Rating	
Part No.	Working Voltage	Pickup	Dropout	Resistance @ 20° C (68° F)	Time Delay (Micro switch)	Instantaneous Interlocks
8230427	74 V DC	48 V DC Max.	5-28 V DC Min.	510 Ohms ± 10%	0.5 Ampere @ 115 V DC	0.5 Ampere @ 115 V DC
8253241	120 V DC	98 V DC Max.	12-42 V DC	1200 Ohms ± 10%	0.5 Ampere @ 115 V DC	0.5 Ampere @ 115 V DC
8253242	120 V DC	98 V DC Max.	12-42 V DC	1200 Ohms ± 10%	0.5 Ampere @ 115 V DC	
8253244	120 V DC	98 V DC Max.	12-42 V DC	1200 Ohms ± 10%	0.5 Ampere @ 115 V DC	0.5 Ampere @ 115 V DC
8253245	120 V DC	98 V DC Max.	12-42 V DC	1200 Ohms ± 10%	0.5 Ampere @ 115 V DC	
8262424	120 V AC	98 V AC Max.	12 V AC Min.	43 Ohms ± 10%	15 Ampere @ 110 V AC	6 Ampere @ 110 V AC
8297115	120 V AC	102 V AC Max.	12 V AC Min.	61 Ohms ± 10%	15 Ampere @ 115 V AC	6 Ampere @ 115 V AC
8267199	74 V DC	48 V DC Max.	5-28 V DC Min.	480 Ohms ± 10%	3 Ampere DC	3 Ampere DC
8272600	74 V DC	48 V DC Max.	5-28 V DC Min.	480 Ohms ± 10%	3 Ampere DC	3 Ampere DC
8276597	74 V DC	48 V DC Max.	5-28 V DC Max.	480 Ohms ± 10%	3 Ampere DC	
8276598	74 V DC	48 V DC Max.	5-28 V DC	480 Ohms ± 10%	3 Ampere DC	
8276599	74 V DC	48 V DC Max.	5-28 V DC	485 Ohms ± 10%	3 Ampere DC	

Hi Pot Data

Relays 8230427, 8267199, 8272600, 8276597, 8276598, 8276599

Coil To Ground	600 Volts RMS	- 60 Cycles - 1 Minute
Coil To Contacts	600 Volts RMS	- 60 Cycles - 1 Minute
Contacts To Ground	2400 Volts RMS	- 60 Cycles - 1 Minute

Relays 8253241, 8253242, 8253244, 8253245, 8262424, 8297115

Coil To Ground	1500 Volts RMS	- 60 Cycles - 1 Minute
Coil To Contacts	1500 Volts RMS	- 60 Cycles - 1 Minute
Contacts To Ground	1500 Volts RMS	- 60 Cycles - 1 Minute

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