

# INSTRUCTIONS FOR THE INSTALLATION OF ATC INSTRUMENTS AND CONTROLS

atc

FORM IN 305B

## INSTALLATION AND MAINTENANCE INSTRUCTIONS TYPE 305-B "ATCOTROL" TIMERS

### DESCRIPTION:

The 305-B "Atcotrol" is a synchronous motor-driven interval or delay timing unit of the resetting or non-resetting type for timed control of electrical load circuitry in machinery and process operation.

### OPERATING ARRANGEMENTS (See Diagram attached)

On all Arrangements of a 305-B Timer, it is the external wiring and how the timer is used that determines the arrangement designation. For example, a standard timer taken off the shelf, although complete in itself and ready to run has no wiring "Arrangement" designation until the external wiring is added. This timer can be used as wiring Arrangement A, B, C, D or E by merely changing external wiring (See circuit arrangements.)

Arrangement G reflects back to the standard "off the shelf" timer with the linkage to the clutch reversed. (Refer to Paragraph "Changing on delay (reset on power interruption) to off delay (Non-reset on power interruption).")

Timers are shipped with clutch linkage set for either on delay or off delay (as ordered). In the coded type number stamped on the timer (such as 305 B 08 A 10 MX) a 10 in the position underlined designates a timer set for on delay. Such a timer can be customer wired for wiring arrangements A, B, C, D or E. With a 20 in this position in type number instead of 10, the timer was factory adjusted for off delay. Such a timer can be used on Arrangement G.

### MOUNTING

The standard "Atcotrol" Timer is supplied for mounting into a 3-3/16" diameter cutout (Refer to Drawing SK-40495-X). A metal clamping ring presses a retaining O-ring on the timer cover and three pointed screws press against the back panel to hold the timer in position.

Shipped with the timer, there will be found a metal clamping ring, three screws, and three clip type nuts and an O-ring. Slip the clip nuts over the metal ring aligning each with a hole in the ring and start a screw thru each nut (See SK-40495-X).

To mount the timer, insert it from the front thru cutout in the panel, slip clamping ring over the tubular cover of timer positioning it ahead of the O-ring groove in the cover. Roll the O-ring onto the tubular cover and forward until it seats in the groove. Now tighten each screw in the metal clamping ring until the entire ring presses firmly against the O-ring and the timer is clamped firmly in the panel. DO NOT TIGHTEN Clamping Screws beyond the point necessary to firmly mount timer.

To remove timer from panel, reverse this procedure.

AUTOMATIC TIMING & CONTROLS, INC.

KING OF PRUSSIA, PENNSYLVANIA

A SUBSIDIARY OF AMERICAN MANUFACTURING COMPANY, INC.

WIRING \* (Refer to Diagram)

Wiring of the timer may be in accordance with one of the circuit arrangement diagrams supplied or customer can create his own circuitry.

\*If a special arrangement is supplied with timer ordered, a special wiring diagram is supplied with the timer and should be thoroughly checked and understood before proceeding with wiring.

CAUTION

Check the line voltage and be certain that it checks with the nominal printed on the timer identification. Low voltage, below 10% may cause erratic timing action or malfunctioning of the timer.

TIME INTERVAL SETTING

All dials are graduated over 320 degrees in the following ranges: 6, 15, 30, 60, 120 or 240 seconds or minutes, 6, 15, 30 or 60 hours. Set the interval before starting the timer, dial setting should be made while the timer is running ONLY if the traveling pointer (elapsed time indicator) has progressed below the desired time setting toward zero. Timers set for Arrangements A+B+C+D or E are the "resetting" type and the clutch is engaged only when timing; those set for Arrangement G are "non-resetting" and the Clutch is engaged at all times during and after cycle, except while the "start" or "reset" circuit is energizing the clutch solenoid.

CIRCUIT ARRANGEMENTS

The "Atcotrol" Timer is available for use in six standard circuit arrangements. Arrangement A, B, C, D and E are "on delay", while Arrangement G is "off delay on power failure".

The Arrangements A to G are suggested arrangements only and may be used in part or as shown. Since all circuit components of the timer are connected to terminals for maximum flexibility, the user can create many other "arrangements" as needed.

CHANGING ON DELAY (RESET ON POWER INTERRUPTION) TO OFF DELAY (NON-RESET ON POWER INTERRUPTION)

1. Remove timer from case or panel. Then remove timer cover by first pulling off the "0" ring between the terminal block and back of cover (use convenient "pull tab" on "0" ring), then slide off back cover.
2. Remove cotter pin from rocker arm end of link.
3. Remove truarc "E" ring from relay armature pin.
4. Remove straight end of link from pin on rocker arm and offset end from relay (depress armature to seated position).
5. Rotate link 180° and reinstall offset end on relay link and straight end on opposite pin of rocker arm.
6. Install truarc "E" ring and cotter pin (round head of cotter pin toward dial).
7. Adjust the arm on the clutch tension spring, (located on relay frame below the moving contacts), to obtain proper clutch grip or "bite" so that no slipping occurs after clutch is engaged.

8. Check clutch operation with power on. Be sure the elapsed time indicator resets properly from zero to several different points around the dial.....without dragging. Reset should be instantaneous. Try the timer with its motor running and with the clutch engaged by its actuating relay. If unit doesn't have proper clutch grip or throwout clearance, the link may be adjusted by holding the plastic section with a 1/4" wrench and turning the steel center screw. This will either increase or decrease stroke positions by changing the link length.
9. Slide the cover into place, seating the keyed slot of the cover into the key at the front. Seat the back "O" ring into place between the cover and terminal block.

NOTE: Check wiring diagram for proper wiring, according to the arrangement desired.

### SWITCHES AND CONTACTS

#### RELAY CONTACTS:

1. The two moving contacts and the four stationary contacts should be dressed occasionally with fine sandpaper to insure maximum conductivity.
2. To replace relay contacts:
  - A. Moving contacts -- Remove the leads from the terminal tabs and remove the two screws holding the molded mounting piece to the relay. Replace with new contact assembly. Mount the two screws and then push tabs on terminal posts. Be certain that the contacts are in their proper alignment.

#### SWITCHES

1. Remove the tabs from terminal connections (both switches).
2.
  - A. Remove the switches from the brackets by loosening the two clamping screws. Replace the switch or switches and re-assemble the switch brackets. Attach the lead wires to the terminal lugs. Be sure to check wiring against wiring diagram; mount the entire unit to the front plate with the #6 screws.
  - B. Check the timer for accurate timing-out at the zero position. Contacts of upper switch, wired to 3, 4 & 5 terminals should trip when the elapsed time indicator crosses the zero graduation. If the trip point has shifted, use a #4 set screw wrench to adjust the trip position of the upper switch (the switch next to the mounting plate). If the timing is too long, advance the screw into the nut; if the timing is short, back the screw off slightly. Both adjustments should be made in small steps...about 1/8 turn of the screw.
  - C. After setting the upper switch, check the setting of the lower switch. It should trip out just after the upper switch (approx. 1/2% of total dial time). If this does not occur in the sequence described, the timer will time out and shut off the motor and/or solenoid circuit before the other switch is actuated, resulting in faulty load circuit action, Switch can be set for shorter gap if desired, down to 1/4% of range.

#### RELAY REPLACEMENT

1.
  - A. Remove motor (2 screws holding motor to terminal block). Loosen the two terminal block screws holding the motor leads and remove these leads.
  - B. Remove the connecting link between the relay frame and crank arm.
  - C. Remove the 3 screws holding the terminal block to hex studs.

- D. At this point the terminal block may be swung approximately 90 degrees from its normal position. Remove the two relay mounting screws and the leads from the relay coil to terminals #1 and #2 at the terminal block. (Pull tabs from terminal).
- E. Mount the new relay in place and install its mounting screws. Reinstall tabs for the coil leads to the terminals #1 and #2.
- F. Reverse the disassembly procedure; mount the terminal block to the hex studs; replace the connecting link. Remount the motor and be certain that there is no binding in the end guide hole. Check the unit for correct operation and for contact alignment.

#### CHANGING THE DIAL RANGE

1. Remove the motor.
2. Remove the front plastic cover and knob assembly by loosening for four flat head screws and prying the cover gently from the rubber mounting posts, or completely removing the screws.
3. Slide the dial downward, rocking slightly, to clear the switch actuator and clutch disc and lift off.
4. Put the new dial in position by reversing the above procedure. Re-install cover, being certain first to advance the moving pointer past the time setting pointer towards zero position and hold the relay in the "energized" position manually. This prevents the moving pointer from being "behind" the setting pointer. Be certain that the cover is firmly seated on its mounting posts and that the traveling pointer lies between zero and the timer interval setting pointer...then tighten the four flat-head screws.

#### CAUTION

Never over-tighten the flat head dial screws. The cover is held in place by friction on an expansion ring which enlarges as these screws are tightened. Only a firm setting on the screws is required to hold the dial securely in place.

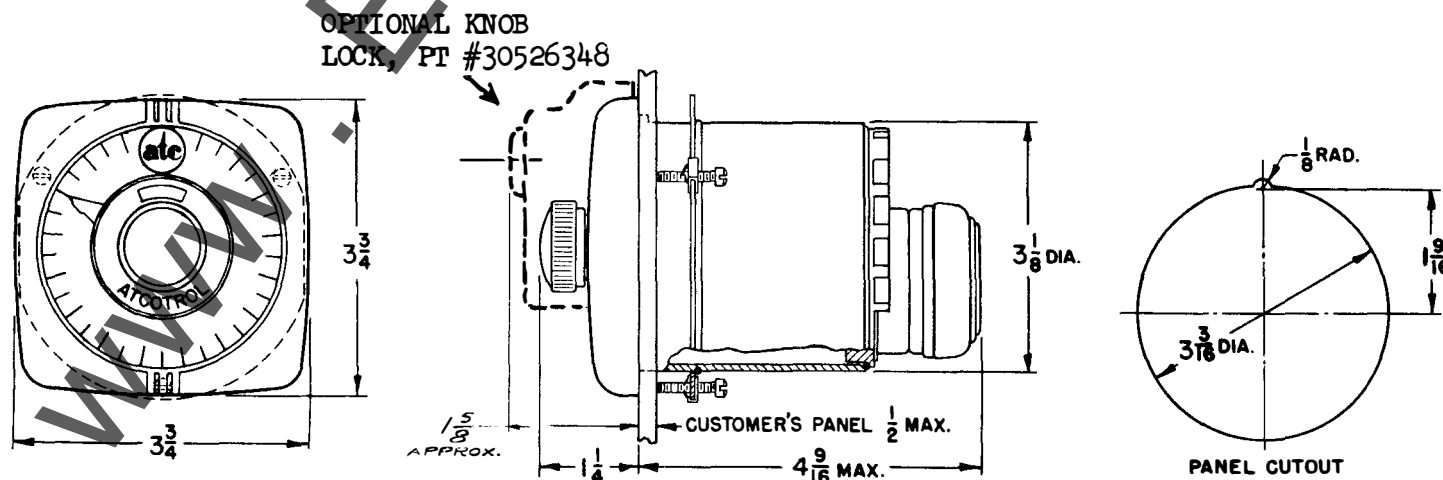
Position the new motor on the terminal block, replace its two mounting screws, and replace wire leads on the terminal block.

NOTE: All units have a "tear-drop" shaped motor whose shaft engages the slotted end of the drive shaft, and these are coupled by means of a small coil spring (to prevent misalignment of slot and tongue).

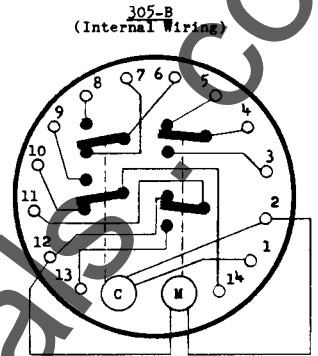
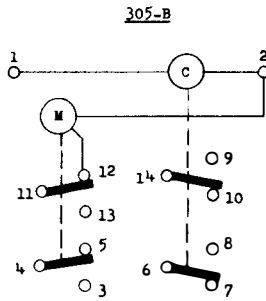
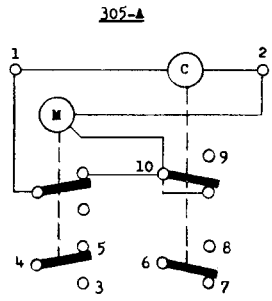
#### ANTI-BACK-UP DEVICE

On 6, 15 and 30 sec. range timers, an anti-back-up device is needed to prevent load switches and reset spring from driving the motor backwards. This device, consisting of a spring loaded pawl and a ratchet wheel, is installed in all units. This permits changing ranges, without difficulties, by substitution of only motors & dials.

#### **DIMENSIONS**



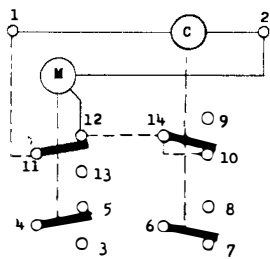
BASIC DIAGRAMS



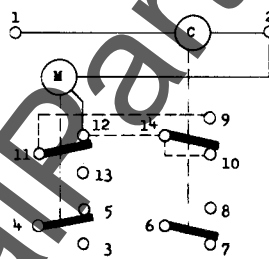
Refer to Arrangement Diagrams  
 W-6039-Z (Form)  
 W-6040-Z (781)

CONVERSION DIAGRAMS

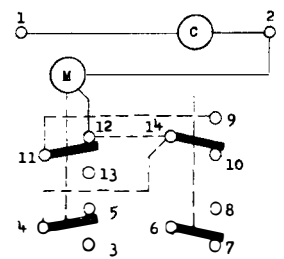
ARRANGEMENTS A, B, C, D, E, F & M



ARRANGEMENTS G & L



ARRANGEMENT J



NOTES:

1. On Models 305-A and 305-B, motor leads can be moved to any terminals as required.
2. WHEN REPLACING 305-A ARRANGEMENTS F, G, J & L TIMERS, THE 305-B TIMERS MUST BE ARRANGEMENT 20.
3. ----- Jumpers to be added by Customer.
4. For replacing 305-A Arrangement C, motor lead of the 305-B must be moved from Terminal 12 to Terminal 8.
5. For replacing 305-A Arrangement F, motor lead of the 305-B must be moved from Terminal 12 to Terminal 7.
6. For replacing 305-A Arrangement L, use basic Arrangement G, then motor lead of 305-B must be moved from Terminal 12 to Terminal 7.

REVISIONS  
 C.S. 3-23-61

|   |               |                   |   |
|---|---------------|-------------------|---|
| DIMENSIONS IN INCHES<br>TOLERANCE UNLESS NOTED                            |               | REFERENCE         | AUTOMATIC TIMING & CONTROLS, INC.<br>A SUBSIDIARY OF AMERICAN MANUFACTURING CO., INC.<br>KING OF PRUSSIA, PA. USA |
| DIMENSION   | TOLERANCE     | MATERIAL          |   |
| .XX (8 PLACE DEC.)  | + .010 - .010 | FINISH            | TITLE   |
| SIZE (8 PLACE DEC.)   | + .008 - .008 | DRILLED HOLES (Ø) | SCHEMATIC & WIRING DIAGRAM<br>Field conversion of 305 Model B Timer<br>for use in 305 Model A circuitry           |
| DRILLED HOLES (Ø)   | + .008 - .008 | FRAMED HOLES (Ø)  |   |
| FRAMED HOLES (Ø)  | + 1/64 - 1/64 | FRACTIONS         | SCALE - None  |
| ALL THREADS   | CLASS 2 FIT   | +                 | DRAWN   |
| FORMING ANGLES  | + M° - M°     |                   | 3-20-61 W.E.L.  |
| MACHINED SURFACE FINISHES   |               |                   | CHECKED   |
| √ MICROINCHES <sup>2</sup> - 4, 8, 16, 32, 64, 128, 256, 500, 1000, 2000. |               |                   | 3-21-61 H.C.P.  |
| FUSE 15° UNLESS NOTED   |               |                   | APPROVED  |
| ALL DIAMETERS TO BE CONCENTRIC WITHIN .001" ± UNLESS NOTED                |               |                   |   |
|   |               |                   | SUPERSEDED  |
|   |               |                   | PRODUCT   |
|   |               |                   | DRAWING NO.   |
|   |               |                   | W-6405-Y  |

# 305-B WIRING DIAGRAM

## KEY SYMBOLS

- (C) CLUTCH SOLENOID
- (M) MOTOR
- INDEPENDENT LOADS
- DEPENDENT LOADS
- ALL TIMERS SHOWN IN "BEFORE START" POSITION
- DIAGRAMS SHOWN WITH POWER OFF UNLESS OTHERWISE MARKED
- MOMENTARY STARTING CONTACT
- SUSTAINED STARTING CONTACT
- NORMALLY CLOSED RESET CONTACT
- ON** LOAD ENERGIZED
- OFF** LOAD DEENERGIZED
- \* APPROX 1% OF TOTAL CYCLE IF DESIRED
- SWITCHES ARE OPERATED BY MOTOR DRIVEN POINTER WHEN UNIT "TIMES OUT" AT DIAL ZERO.
- CONTACTS ARE TRANSFERRED WHEN CLUTCH IS ENERGIZED OR DEENERGIZED.

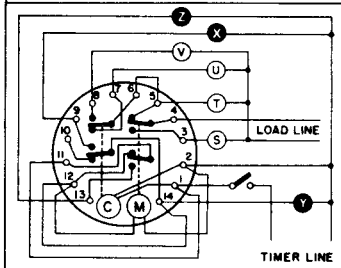
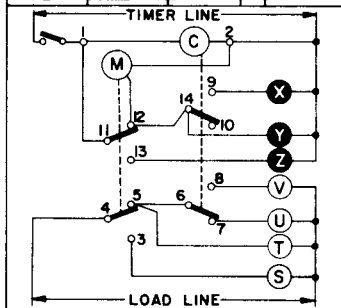
MAXIMUM LOAD CURRENT THRU ANY LOAD CARRYING CONTACT IS 10 AMPERES. THEREFORE, ON ARRANGEMENTS A, C & G, THE SUM OF LOADS U OR V & T MUST NOT EXCEED 10 AMPERES. ON ARRANGEMENT E, THE SUM OF LOADS S OR T & V MUST NOT EXCEED 10 AMPERES.

ALL WIRING EXTERNAL OF TIMER (HEAVY CIRCLE) TO BE DONE BY CUSTOMER.



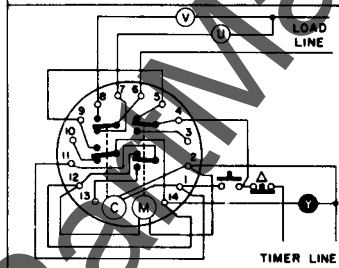
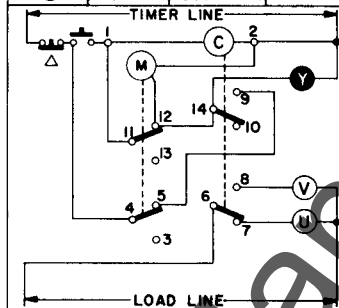
OPTIONAL PILOT LIGHT IS BUILT INTO DIAL TO INDICATE TIMER MOTOR IS RUNNING.

| LOAD CIRCUIT | BEFORE START | DURING CYCLE | END OF CYCLE |
|--------------|--------------|--------------|--------------|
| (S)          | OFF          | ON           | ON           |
| (T)          | ON           | ON           | OFF          |
| (U)          | ON           | OFF          | OFF          |
| (V)          | OFF          | ON           | OFF          |
| (X)          | OFF          | ON           | OFF          |
| (Y)          | OFF          | ON           | OFF          |
| (Z)          | OFF          | OFF          | ON           |



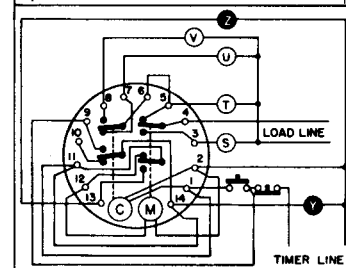
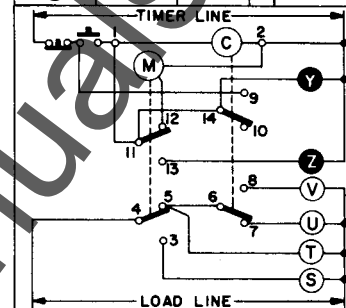
ARRANGEMENT A  
SUSTAINED START SWITCH

| LOAD CIRCUIT | BEFORE START | DURING CYCLE | END OF CYCLE           |
|--------------|--------------|--------------|------------------------|
| (U)          | ON           | OFF          | RESETS TO BEFORE START |
| (V)          | OFF          | ON           | RESETS TO BEFORE START |
| (Y)          | OFF          | ON           | RESETS TO BEFORE START |



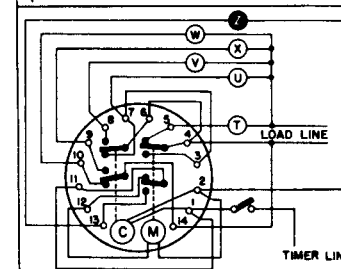
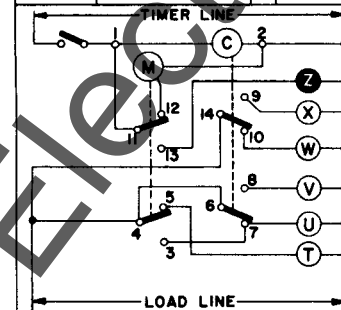
ARRANGEMENT B  
MOMENTARY START SWITCH

| LOAD CIRCUIT | BEFORE START | DURING CYCLE | END OF CYCLE |
|--------------|--------------|--------------|--------------|
| (S)          | OFF          | ON           | ON           |
| (T)          | ON           | ON           | OFF          |
| (U)          | ON           | OFF          | OFF          |
| (V)          | OFF          | ON           | OFF          |
| (Y)          | OFF          | ON           | ON           |



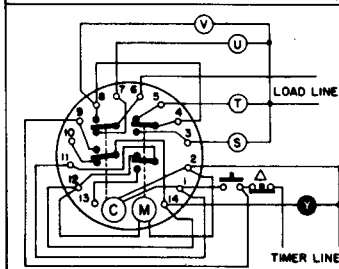
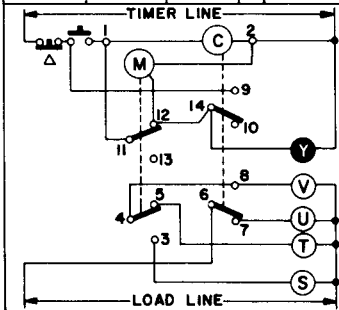
ARRANGEMENT C  
MOMENTARY START SWITCH  
(TO RESET, OPEN A SEPARATE SWITCH)

| LOAD CIRCUIT | BEFORE START | DURING CYCLE | END OF CYCLE |
|--------------|--------------|--------------|--------------|
| (T)          | ON           | ON           | OFF          |
| (U)          | ON           | OFF          | ON           |
| (V)          | OFF          | ON           | OFF          |
| (W)          | ON           | OFF          | OFF          |
| (X)          | OFF          | ON           | ON           |
| (Z)          | OFF          | OFF          | ON           |



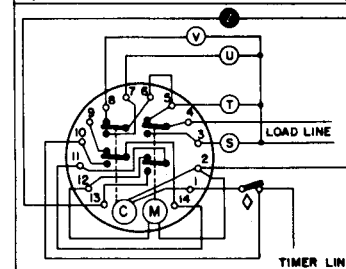
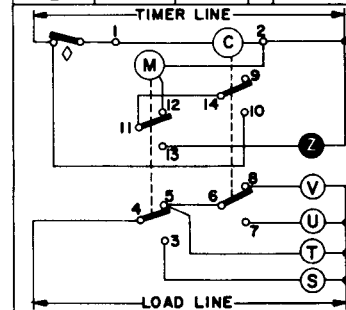
ARRANGEMENT D  
SUSTAINED START SWITCH  
(NORMAL: "ON" LOAD, "OFF" DURING TIMING)

| LOAD CIRCUIT | BEFORE START | DURING CYCLE | END OF CYCLE    |
|--------------|--------------|--------------|-----------------|
| (S)          | OFF          | ON           | ON              |
| (T)          | OFF          | ON           | OFF             |
| (U)          | ON           | OFF          | TO BEFORE START |
| (V)          | OFF          | ON           | TO BEFORE START |
| (Y)          | OFF          | ON           | START           |



ARRANGEMENT E  
MOMENTARY START SWITCH  
(PULSE AT END OF TIMED CYCLE)

| LOAD CIRCUIT | BEFORE START | DURING CYCLE | END OF CYCLE |
|--------------|--------------|--------------|--------------|
| (S)          | OFF          | ON           | ON           |
| (T)          | ON           | ON           | OFF          |
| (U)          | OFF          | ON           | OFF          |
| (V)          | ON           | OFF          | OFF          |
| (Z)          | OFF          | ON           | ON           |



ARRANGEMENT G  
SUSTAINED START SWITCH (OPEN TO START)  
(NON RESET ON POWER FAILURE)  
SHOWN WITH POWER ON AND CLUTCH ENERGIZED  
○ MAY BE WHICH CLOSES MOMENTARILY TO RESET TIMER.

W - 6367 -21