

OVEN CHARACTERISTICS

The instructions contained in this Manual are for an oven of the following type and operating characteristics.

TYPE OF OVEN - - - - V-31 Electric heated oven - - - - -
 SERIAL NO. - - - - 74960 - - - - -
 HEATING CAPACITY - - 20 K.W. - - - - - B.T.U. Per Hour
 MAXIMUM OPERATING TEMPERATURE - - 500F - - - - - Degrees Fahrenheit

FUEL

Gas - - - - - BTU Per Cu. Ft. - - - - - Operating Pressure - - - - -
 Oil - - - - - Grade - - - - - Operating Pressure - - - - -
 Electricity - - - - - Volts - 220 - - - - - Cycles - 60 - - - - - Phase - - - 3 - - - - -
 Steam - - - - - Gauge Pressure - - - - -

ELECTRIC CURRENT

Fan Motors - - - - - Volts 220 - - - - - Cycles - 60 - - - - - Phase - - - 3 - - - - -
 Controls - - - - - Volts 110 - - - - - Cycles - 60 - - - - - Phase - - - 1 - - - - -

The purpose of this Manual is to provide information for the operation and maintainance of this oven. To save time and expense in case of trouble it is urged that the operators search this Manual for helpful suggestions before requesting factory assistance.

It is particularly important that the oven operators have a practical understanding of the automatic controls. These regulate the temperature, provide safety features and generally govern the consistently uniform and satisfactory performance of the oven.

When gas or oil is the fuel, safe operation is more critical than for ovens using other types of fuel. The safety controls for these fuels are consequently more elaborate. But it must be understood that these safety controls are only safety assistants. They will do their job if kept in repair and adjustment. There are some things they cannot do, such as the regulation of dampers, valves, thermostats, burners etc. which is manually done. This is the operators' job and is of equal importance to the controls in the safe and proper operation of the oven.

It is also important, where oil or gas is the fuel, that the operators have an understanding of burner adjustment to secure good combustion. Safe, economical operation with these fuels largely depends on good combustion.

The equipment should be kept in good repair and adjustment at all times. Parts requiring lubrication should be checked frequently. The electrical contact points, burner parts, controls, bearings, etc., should be kept free of dirt and dust. Burners should be checked daily for proper combustion and dampers for proper setting. A regular maintainance schedule, rigidly adhered to, will pay dividends in safety and long life of the equipment, and in regular, uniform rates of production.

The operators are urged to be alert at all times. Careful, intelligent operation is the best guarantee of safe operation.

THINGS TO DO BEFORE OVEN IS PUT IN OPERATION

1. ADVISE GAS COMPANY:

The gas company is interested in the proper use of its product. It will also want to become acquainted with the oven and its controls. Request that their representative be present when the oven is first put in operation. His advice will be useful and helpful.

2. TEST GAS PRESSURE AT OVEN:

Install a standard dial gauge between gas pressure regulator and burners. With regulator wide open the shut-off pressure should be approximately the same as Operating Pressure given under "Oven Characteristics". If very much lower, proceed according to Item 1 under "Cause and Correction of Faulty Operation of Atmospheric Gas Burners".

3. CHECK LINE VOLTAGE:

This should correspond to name plate requirements of motors and controls. A wrong voltage can result in serious damage.

4. CHECK LUBRICATION OF FAN AND MOTOR BEARINGS:

See "Despatch Fan Bearings" for full information.

5. CHECK BELTS, BELT TENSION AND BELT ALIGNMENT:

Belts in the same drive should match. Slight differences in length will correct themselves during operation. Large differences should be corrected by replacements. Belt tension should be somewhat tighter than necessary to prevent slippage on fan start. Check belt alignment.

6. START FANS AND CHECK ROTATION:

Rotation should correspond to the directional arrows provided; otherwise to the obvious direction. Reverse motor rotation where necessary.

7. CHECK AIR FLOW SWITCHES:

Check for proper installation and for proper Make and Break of the mercury contacts when fans are started and stopped. Refer to "The Air Flow Switch" for full information.

8. ADJUST THERMOSTATS TO OPERATING POSITIONS:

Manufacturers instructions are packaged with the instruments. Make adjustments as directed. Insert instructions in this Manual for future reference.

The High Limit Thermostat, when used, protects both the product and oven against excessive heat. It is normally set at twenty or twenty five degrees above the controlled oven temperature.

High Limit Thermostats of the non-indicating type (ones which do not show the temperature) can be properly set only after oven is in operation. Until then, such thermostats should be set at their maximum positions so that all preliminary testing and adjusting can be done. Before putting oven in production adjust this type of thermostat as follows:

Set the Temperature Control Thermostat at twenty five degrees above the desired operating temperature. Operate oven until the Control Thermostat is regulating. Carefully adjust the High Limit downward until it takes over the control. Re-set the Temperature Control Thermostat at the desired operating temperature. The two instruments are now set in their correct positions.

NOTE:

Never operate oven at a temperature in excess of the maximum operating temperature shown under "Oven Characteristics".

9. POSITION EXHAUST AND FRESH AIR DAMPERS:

Place these in wide open position until product goes into the oven. For full information on the regulation of these dampers refer to "Ventilation of Work Space".

10. REGULATE AND ADJUST BURNERS:

This is done as directed under "Atmospheric Gas Burners and their Adjustment".

NOTE:

Before oven is put into regular production, it should be tested and adjusted for air circulation, and temperature regulation and all doors, hinges, latches, and other miscellaneous parts should be inspected and adjusted for operation at oven temperature. For helpful suggestions, refer to the sections pertaining to these items.

A CHECK LIST OF THINGS TO DO TO ASSURE SAFE, ECONOMICAL OPERATION

1. KNOW THE SYSTEM:

Read this manual carefully. Make use of its instructions and explanations. The "Know How" of safe, continuous, satisfactory, trouble free operation depends primarily on the degree of your understanding of the system and of your willingness to keep all parts in proper operating condition.

2. MAKE USE OF THE GAS COMPANY'S SERVICE DEPARTMENT:

This applies only if any part of this system is gas fired. The Gas Company is interested in the proper use of its' product. Do not hesitate to seek their advise and assistance. It can be very helpful.

3. LUBRICATE ALL BEARINGS AND WEAR SURFACES:

Provide the correct oils and greases for the proper lubrication of bearings and wear surfaces.

All fan, motor and blower bearings and Safety Valves should be lubricated at least once every three months if the operation is 40 hours per week. Increase proportionately for an increased work week.

All door latches, hinges, door operating mechanisms, conveyor chains or other bearing or wear surfaces should be lubricated as required.

4. CHECK BELTS, BELT TENSION AND ALIGNMENT:

This should be done frequently for the first several months of operation; afterwards, at each time bearings are lubricated. When tightening belts, be careful to keep the drive in good alignment, otherwise wear of belts and bearings will be excessive.

5. CHECK TEMPERATURE CONTROL INSTRUMENTS

Adjust instruments as directed by manufacturers' instructions packaged with the instruments. Insert the instructions in this manual or attach them permanently to the instruments.

Adjust the Hi-Limit Instrument to a temperature 25 degrees Fahrenheit above operating temperature. If this is too high for the material in process, adjust it within the safe limit of the material.

Never operate this system at a temperature in excess of the maximum temperature listed in "Characteristics".

6. CHECK SAFETY CONTROLS:

This should be done daily and never less than once a week.

Check the Combustion Control Unit, Air Flow Switches, Pressure Switches, Vaporstats and any other safety device provided for proper setting and operation.

Make these tests carefully and do them regularly. The safety of personnel as well as the equipment may depend upon the sure operation of any one of these controls at any time.

7. CHECK BURNER OPERATION:

Do this daily. Keep the burner and burner tile free of dirt, soot or carbon accumulations. Check burner flame for color, length and freedom of sparks, soot or smoke.

8. KEEP EQUIPMENT CLEAN:

Keep all filters clean. Gradual dirt accumulation retards air flow wherever filters are used. Dirty filters can be the source of several unsatisfactory operations such as unbalanced temperatures in the work chamber, reduced heating capacity, reduced production, etc.

Keep the operating mechanisms of all safety controls clean. Do not let dirt accumulation slow the action of these controls.

Keep the walls, floor and ceiling of the work chamber free of dirt and dust. Floating dust or accumulated dirt which becomes loose and falls upon the work, produce very unsatisfactory results.

Keep fan impellers free of accumulations of paint or other substances.

Keep electrical contacts clean.

Keep all equipment accessible. Do not permit other materials to be stored or piled against it.

9. PROTECT CONTROLS AGAINST EXCESSIVE HEAT:

This is particularly true of the Combustion Control Unit, the Safety Valve, Control Motors or other equipment containing electrical relays or similar delicate electrical contacts. Temperatures in excess of 125 degrees Fahrenheit can warp these contacts to such an extent as to destroy their effectiveness as controls. Provide shields against radiation or cool them with ventilating air.

10. CHECK SETTING OF FRESH AND EXHAUST AIR DAMPERS:

This is vitally important where solvents or other explosive vapors are liberated during the heating process. Sufficient ventilation must always be used to keep the concentration of such vapors below the point of ignition. Do not be careless about the setting of dampers. Where filters are used on the fresh air intake, inspect them once a week or more frequently if conditions require it. Clean or replace the filters frequently. Under no condition permit them to become so filled with dirt that they appreciably reduce the air quantity.

11. MAINTAIN EQUIPMENT IN GOOD REPAIR:

Make repairs immediately. Delays may be costly in added expense for labor and materials and in prolonged shut down.

12. ESTABLISH MAINTENANCE AND CHECK-UP SCHEDULES:

Do this promptly and follow them faithfully. Careful operation and maintenance will be more than paid for in continuous, safe and economical operation.

13. PRACTICE SAFETY:

Remember always that fuel, whether it be gas, oil, steam or electricity can be extremely destructive when carelessly or recklessly used. In any action having to do with the ignition, regulation or adjustment of these fuels make it a prime policy to "know what you are doing before you do it". Make CAREFULNESS, PATIENCE and GOOD JUDGEMENT the safety watch words for the operation of your furnace or oven.

INSTRUCTIONS FOR OPERATING A DESPATCH ELECTRIC OVEN
WITH AUTOMATIC TEMPERATURE CONTROL

Set the oven in position. Make sure that it is level. This is necessary to assure best heat distribution and proper operation of temperature control instruments.

Electric service connections are made direct to terminals as shown on print.

To operate the oven, carry out the following start up procedure:

1. Turn timer switch to "ON" position.
2. Set ATC process timer for the desired process time.
3. The cool-off timer, an Eagle Timoflex timer, allows the fan motors to run for a period after the process timer has shut the heaters off. It should be set for a period of time sufficient to allow the oven to cool to 300 degrees F., before the motors shut off.
4. Set the control instrument to the desired operating temperature.
5. Set the hi-limit instrument, if used, several degrees higher. See additional hi-limit instructions.
6. Start fan motor(s).
7. Press start button on process timer.
8. Turn control switch to "ON" position. The white pilot light will come on indicating that the heater is receiving power. When the oven has reached operating temperature, the control instrument will cycle the heater on and off to maintain the preset temperature.

At the end of the process cycle, the process timer shuts the heater off and will reset itself to the previous setting. At the end of the cool-down period, the Eagle Timoflex timer will shut off the fan(s) and reset itself. This timer need not be manually started.

To manually control process and cool-off times, turn timer switch to "OFF" position. To manually shut the oven down, turn control switch to "OFF", wait until the oven has cooled to 300 degrees F., and then press motor STOP button(s).

Should oven temperature exceed the hi-limit setting, the heater will be shut down. To energize the heaters again, press the reset switch in the hi-limit instrument.

Further information will be gladly furnished upon request.

349/10-66

V-7, V-15, V-29 to V-37
Std., SD., HD., & TT.
V-23 TT.

D A M P E R I N S T R U C T I O N S

(Fresh air and exhaust air adjustments)

This oven is equipped with two dampers. One damper is on the exhaust stack on top of the oven and controls the amount of air exhausted. The other damper is operated by a small knob and dial, about 3" diameter, on the lower front of the oven toward the left. The damper controls the amount of fresh air brought into the oven.

If this oven has a forced exhaust fan, there will be a damper on the stack leading to the fan. This damper replaces the regulator exhaust damper and controls the amount of air exhausted.

(5. - Elec.)

DESPATCH OVEN COMPANY

MINNEAPOLIS, MINNESOTA

(ME-22/4/13/67) pf

(11-F)

CAUTION - READ BEFORE OPERATING UNIT

HI-LIMIT CONTROLS

We Recommend A Hi-Limit Control For All Ovens And Furnaces

IF A HI-LIMIT CONTROL IS INCLUDED ON THIS UNIT, IT IS INSTALLED TO PROTECT THE EQUIPMENT.

The location of the thermal element in the heater system has been chosen to supervise that temperature which most directly affects safety. Since this location will run slightly hotter than the work chamber operating temperature, it is necessary to set the Hi-Limit instrument approximately 50 to 100 degrees F., higher than the maximum operating temperature. This setting will eliminate nuisance shutdowns when operating at maximum operating temperature of the unit and still give adequate protection to the oven or furnace.

DESPATCH OVEN COMPANY CANNOT BE RESPONSIBLE FOR EITHER THE PROCESS USED OR THE QUALITY OF THE PRODUCT BEING PROCESSED.

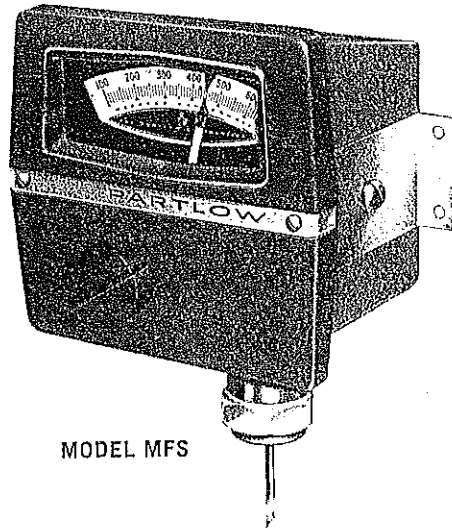
If the product on which the equipment is being used is critical of over-temperature a "Process Hi-Limit" should be purchased in addition to the "Equipment Hi-Limit". The thermal element should be located in the supply duct where the hot air enters the work chamber. The temperature setting on the "Process Hi-Limit" should be somewhat below the temperature at which the product would be damaged. If the product has a flash point at which it would ignite, the setting should be well below this temperature. It is recommended that a millivolt meter and a thermocouple or other suitable pyrometer be used to make the safe lower setting.

IT IS THE PURCHASER'S RESPONSIBILITY THAT THE "EQUIPMENT HI-LIMIT" AND/OR THE "PROCESS HI-LIMIT" BE SET PER THE INSTRUCTIONS ON THIS SHEET AND ALSO THE INSTRUCTION SHEET FOR THE PARTICULAR HI-LIMIT INSTRUMENT FURNISHED WITH THIS UNIT.



Instruction Sheet MODEL MFS

Indicating Temperature Control



MODEL MFS

CHECK LIST

- Avoid excessive heat on control
- Check wiring diagram
- Check line voltage
- Check rated load
- Bulb must be fully immersed



GENERAL

The Model MFS is a compact electrical, single-switch indicating temperature controller designed to operate fuel valves or relays which start and stop heating or cooling systems.

It may be supplied with a two-wire (normally-closed or normally-open) or a three-wire single-pole double-throw switch of the enclosed snap-acting type.

The instrument is powered by a Partlow PISTON-PAK* mercury-filled thermal sensing element, which is field-replaceable and interchangeable with other elements of the same range (with a change to the appropriate range dial, it is field-replaceable with any range Partlow element).

SPECIFICATIONS

In the general description of the control, the letter S means switch. To describe specific models, the letter is replaced by a Partlow switch number. For example, an MF2 is a Model MFS equipped with a normally-closed two-wire Partlow No. 2 switch.

The MFS terminal block, accessible through top hatch of the control body, is marked HCL, and is adaptable to either 2-wire or 3-wire hook-up. Normally-closed uses C and L terminals, normally-open uses C and H. In a 2-wire arrangement, one terminal will be unused. In a 3-wire arrangement, C is always common.

As a mechanism function of Partlow controls, with a normally-closed switch, or normally-closed side of a three-wire switch (L & C), the circuit is energized (closed) when the indicating pointer is below set point. When the pointer is above set point, the circuit is de-energized (open).

With a normally-open switch, or normally-open side of a three-wire switch (H & C), the reverse is true.

The instrument is rated at 50 volt amperes, inductive load (500 volt amperes non-inductive), maximum 250 volts, AC only.

INSTALLATION

1. Mount the control where it will be as free as possible from vibration. Shock mounting may be necessary on mobile applications.

2. Locate the control body far enough from the source of heat to be hand-held comfortably. Instrument body should not be subjected to temperatures above 150°F. or below -30°F.

3. Locate the thermal sensing element in the most agitated part of the controlled medium.

4. Be sure entire sensing bulb is completely immersed in the medium to be sensed (coupling between capillary and bulb should be carefully noted before positioning U or Y-type bulbs).

5. A thermal well or separable socket should be used to protect the bulb when immersed in substances which might have a corrosive or scouring effect on bulb or tubing.

6. Bulbs may be elevated 25 feet above the control without affecting calibration. For bulb elevations exceeding this height, consult factory.

7. Connect wires according to wiring diagram and install in accordance with local electrical codes. A short section of flexible cable is recommended for all installations, especially flush mount.

8. When control is used with direct current, a three-wire thermostatic relay circuit is required.

*U. S. Patent No. 3,103,818

ELECTRICAL HOOK-UP

Conduit holes ($\frac{7}{8}$ "") for $\frac{1}{2}$ " electrical fittings are located on each side of the case. A drill guide hole is spotted in the rear of the case for optional rear opening, recommended, along with flexible cable, for flush-mount installations when there is limited space behind the panel.

MOUNTING

The Model MFS is shipped with wall-mounting brackets already fastened to case. If the control is to be flush-mounted, remove brackets and install as follows:

1. Cut panel opening $5\frac{1}{4}$ " w x $5\frac{5}{16}$ " h, drill $\frac{7}{32}$ " clearance holes or tap for No. 10 flat head screws, according to mounting diagram.
2. Make necessary electrical connections.
3. Remove setting knob and cover, insert element and element head into the opening and tip in the control. Fasten through mounting holes in control flange. Replace cover and knob.

CHECKING TEMPERATURE

Check reading of the control should be made after installation. Before comparing process temperature with dial setting, be sure test thermometer is of known accuracy and its sensing bulb or probe is placed adjacent to the Partlow thermal sensing bulb. Set control temperature at or above process temperature. If test instrument and indicating pointer do not agree after temperature stabilizes, control should be re-zeroed.

REZEROING

1. Make certain process temperature is stabilized.
2. Move set pointer to temperature indicated by the test instrument.
3. Remove setting knob and cover, loosen set screw S and turn shaft J with wrench provided until black indicating pointer agrees with the test instrument. Be certain check thermometer and control setting still agree. If they do not, repeat above procedure.
4. Retighten set screw and replace cover and knob.

BRAKE TIGHTENING

With use, setting shaft brake may require tightening. Turn screw U clockwise to tighten.

ELEMENT REPLACEMENT

To change the thermostatic element, remove screws D and withdraw element and flange from case. Remove flange and screw it tightly on the new element, *making sure that the hub of the flange inserts into the case*, and replace screws. Temperature setting should be checked, as explained under Checking Temperature.

SWITCH REPLACEMENT

To replace switch, remove the two screws holding the switch to switch arm. Take out the switch and remove wires. Replace wires on new switch, making sure wires are replaced on same terminals as removed, and reassemble in mechanism.

Following switch replacement there may be need for switch adjustment. If, during normal process temperature cycling, indicating pointer registers a constant differential over or under set pointer, make slight adjustment of switch actuating screw E.

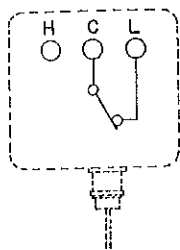
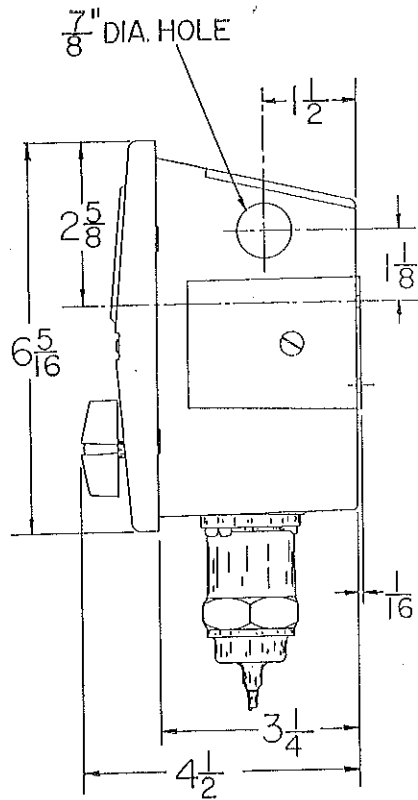
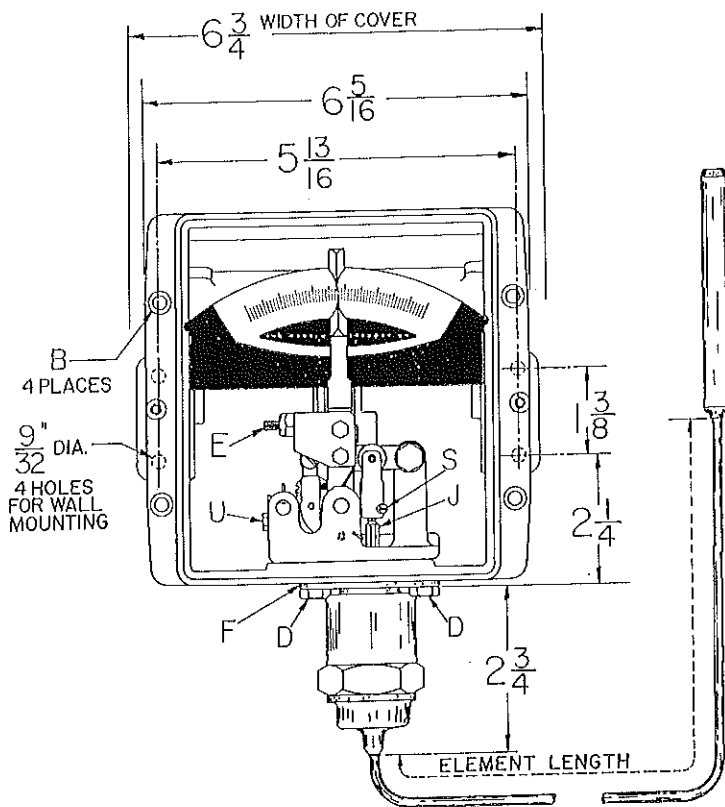
CAUTION

The inside mechanism, particularly the inside of the element housing, should never be oiled. However, control mechanisms subject to corrosion or gunking conditions should be sprayed periodically with corrosion-inhibiting CRC 3-36 or equivalent.

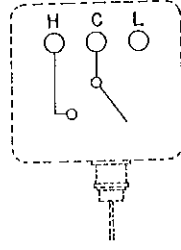
MANUAL RESET

In order to reset the switch in MFSX (MF8X, MF9X, MF10X) controls equipped as temperature high limit devices, process temperature must have dropped below set point. Then, after turning setting knob up-scale until it reaches the stop to reset the switch, return black pointer to desired temperature.

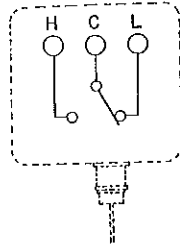
DIMENSIONS AND CONNECTIONS



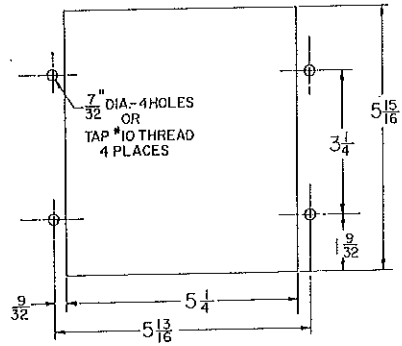
2-WIRE
NORMALLY-CLOSED
SWITCH



2-WIRE
NORMALLY-OPEN
SWITCH



3-WIRE SPDT
SWITCH



PANEL CUT-OUT FOR
FLUSH MOUNTING

NOTE: Above diagrams illustrate condition of switch when temperature is below set point.
See Bulletin 112, Common Circuit Diagrams, for guide to application circuits.

We warrant our products to be free from defects in material and workmanship when leaving our Factory; provided, however, that our liability under this warranty is limited to repairing or replacing without charge F.O.B. our Factory, any defective product if returned to our Factory transportation prepaid within one year from date of shipment from our Factory; and provided further that in no event shall we be liable for consequential or other damages. No other representation or warranty, either expressed or implied, is made.



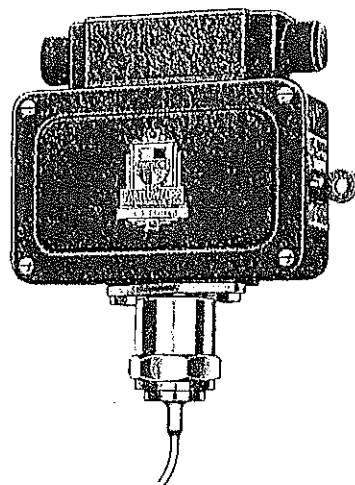
THE PARTLOW CORPORATION, NEW HARTFORD (UTICA), NEW YORK 13413



Instruction Sheet

MODELS NSS, NSSX

Non-Indicating Temperature Controls



CHECK LIST

- Avoid Excessive Heat on Control
- Check Wiring Diagram
- Check Line Voltage
- Check Rated Load
- Bulb Must Be Fully Immersed



SPECIFICATIONS

Models NSS and NSSX are equipped with a combination of any two of the following switch numbers: 2, 3, 4, 5, 6, 7, 27, 37, or 47 or a combination of any one of the above and one of the following: 8X 9X or 10X. The letters, SS, are omitted and substituted by 2 of the above numbers.

The instrument is rated for 500 volt amperes non-inductive load or 50 volt amperes inductive load. Maximum voltage, 250 volts, A.C. only.

NOTE: This is a self-imposed rating, purposely conservative to provide extra-long switch life.

FOR LIMIT DUTY

When this basic control is specified as an N58X, N59X or N510X, and used for limit duty only it is rated at 15 amp., 250 volts, max. At this rating, the control is Factory Mutual approved but will not carry the UL label.

In this higher rated application, the first designated switch (No. 5) should only be used as an element failure switch (see page 2) never in temperature control duty at the higher rating.

If instrument is equipped with integral built-in relay or relays, the contact capacity of the relay is 30 amp. 110 or 220 volts A.C. as labelled or if D.C. 10 amp. at 115 volts, 2 amp. at 230 volts.

Leads for two-wire switches are black. The leads to any three-wire switches are color-coded to identify the proper switch terminals as follows: Blue, normally-closed or "L"; Red, common or "C", and White, normally-open or "H."

A feature of all Partlow controls is that all elements of the same scale range regardless of bulb type are interchangeable on the same instrument.

If switch settings are to be made in the field, be sure to write them on the contact sticker affixed to the terminal block housing.

INSTALLATION

Mount the control where it will be as free from vibration as possible. It is important that it be mounted in a location far enough from the heat so that the hands may be held comfortably on it at all times. Make sure that the bulb will always be *fully immersed*.

A protective housing should be placed over the mercury bulb when used in a substance which might have a corrosive or scouring action on bulb or tubing. (See Bulletin 860.) Wires should be run in conduit or flexible armor to prevent dirt and dust from entering the control. When the control is used on direct current the use of a three-wire control circuit is recommended. As an alternative, a suitable resistor and condenser may be shunted across the instrument contacts of a two-wire control when used with D. C. (See Partlow Bulletin No. 860.)

ADJUSTMENTS

To change temperature setting on the Model NSS, turn hex head adjusting screw F until desired temperature is being maintained.

The inside mechanism and particularly the inside of the element housing should never be oiled.

ELEMENT OR SWITCH REPLACEMENT

To change the thermostatic element, remove screws D and withdraw element and flange from case. Unscrew flange and place it on the new element, making sure that the hub on the flange will enter the case

and replace screws. Check the temperature setting as explained on page 1.

To replace switch, remove the two screws holding the switch to switch arm. Take out the switch and remove the wires. Replace wires on new switch and reassemble in case, making sure wires are replaced on same switch terminals as removed.

APPLICATION

The Model NSS provides the versatility of two independent temperature controls in a single instrument. It is used when two fixed temperatures are specified as control points and a change or adjustment of these points is seldom required. Among the many control applications possible are:

- (1) Differential control for either two or three wire control devices (see figs. 1 and 2 on page 3).
- (2) Two stage heating in which the process is fired by two sets of burners or heaters to provide quick recovery with a minimum of overshoot. One control point is set at a somewhat lower point than the temperature to be maintained. Should a drop in temperature occur below this lower setting, maximum heat will be supplied. As the temperature rises above this point, the rate of heating is reduced, thereby minimizing overshoot. Temperature will then be maintained by controlling the lesser heating rate. (See fig. 3 on page 3.)
- (3) Two stage heating in which the process is fired by two sets of heaters or burners to provide a slow rate of heating on initial start to minimize the danger of damage to heated pots, kettles or their contents from too rapid initial heat input. One control point is usually set just above the melting point of the product being melted allowing heat at the lesser rate to be applied. As the temperature rises beyond this point, full heat is supplied. (See fig. 4 on page 3.)
- (4) One stage of heating and one stage of cooling for processes such as electroplating or varnish cooking where heat must be applied to the bath or cooker when it is below a selected temperature range, but also electrolytic or exothermic heat must be removed by cooling if the temperature should rise above a critical level. (See fig. 5 on page 3.)
- (5) Separate control with provision for signaling in case of excessive overshoot. (See fig. 5 on page 3.)
- (6) Separate operating and holding temperatures for intermittent operations such as those involving pots in which the metal must be kept molten at a fixed temperature for pouring and a holding temperature just above the melting point during standby. This system prevents the metal from freezing and reduces pot cracking. In addition, less fuel and recovery time is required. (See fig. 6 on page 3.)

FOR LIMIT CONTROL WITH ELEMENT FAILURE PROTECTION

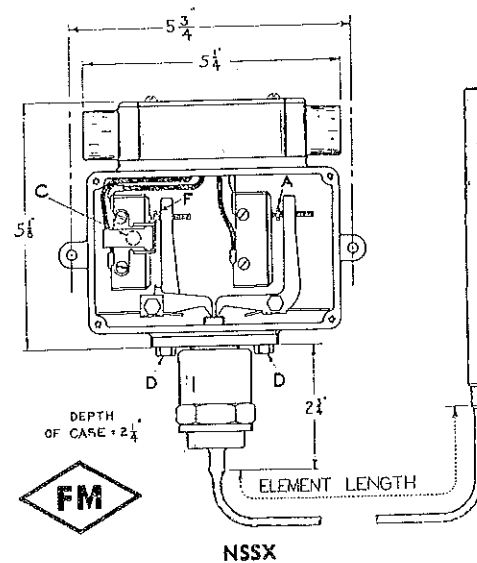
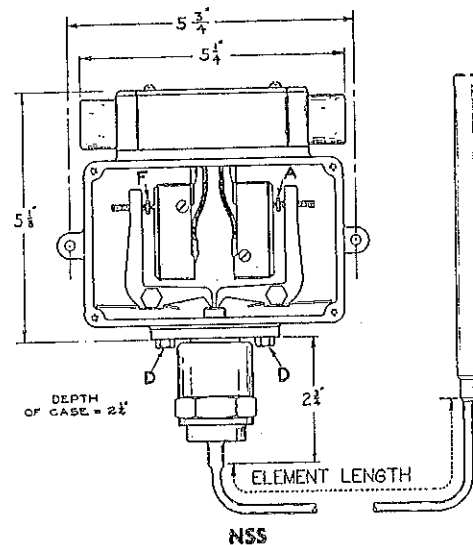
The Model NSSX is supplied with a manual reset

switch to act as a limit control to shut off a heating medium at any predetermined temperature. In this case, it is used in connection with a temperature control to provide a safeguard against possible damage resulting from control or accessory failure (solenoid valves, motor valves, etc.).

The limit switch is set a few degrees higher than the control setting. Should the control fail to shut off (from any cause), the limit control will operate to stop the flow of heating medium. An external reset button is provided which must be pressed to restore the operation of the process.

The Model NSSX is also provided with a second switch which is set to operate normally if the temperature should drop below normal room temperature. Thus, if the thermal element should fail, the first time the appliance is shut down, subsequently, the element will indicate lower than room temperature, thereby depressing the element failure switch and making it impossible to restart the appliance. (See fig. 7, page 3.)

DIMENSIONS



CONNECTIONS

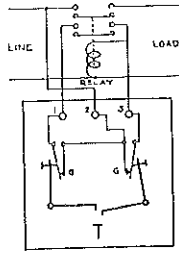


Fig. 1
Model N3-3

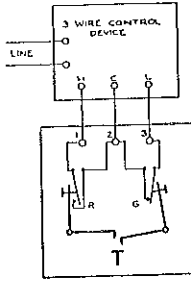


Fig. 2
Model N3-2

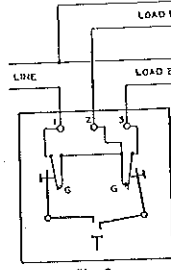


Fig. 3
Model N3-3

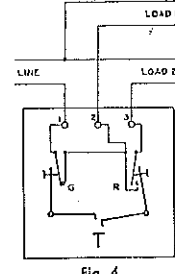


Fig. 4
Model N2-3

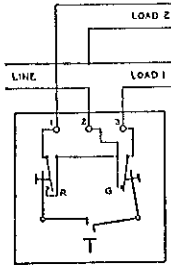


Fig. 5
Model N3-2

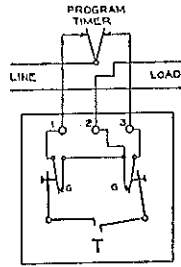


Fig. 6
Model N3-3

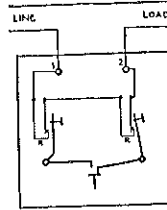
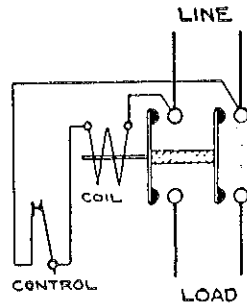
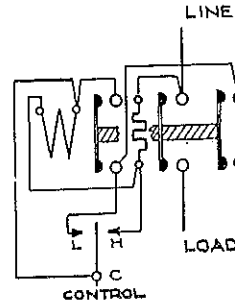


Fig. 7
Model N5-8X

Letter R denotes normally closed switch, G denotes normally open switch in diagrams shown on this page.



Wiring Diagram
For 2 Pole Relay



Wiring Diagram
For 3 Wire
Thermostatic Relay

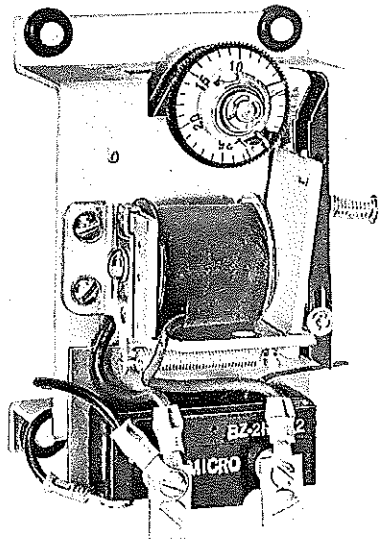
We warrant our products to be free from defects in material and workmanship when leaving our Factory; provided, however, that our liability under this warranty is limited to repairing or replacing without charge F.O.B. our Factory, any defective product if returned to our Factory transportation prepaid within one year from date of shipment from our Factory; and provided further that in no event shall we be liable for consequential or other damages. No other representation or warranty, either expressed or implied, is made.



THE PARTLOW CORPORATION, NEW HARTFORD (UTICA), NEW YORK 13413



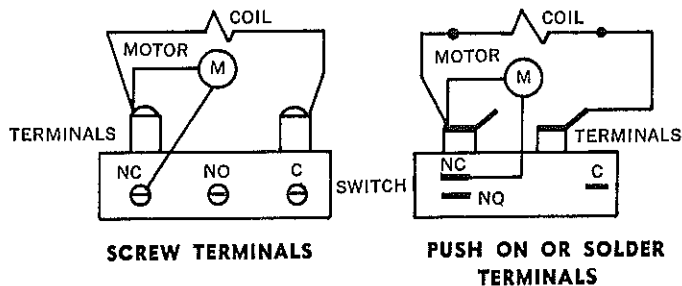
**BULLETIN 171 RESET TIMER
TIMOFLEX TIME DELAY
HD50 - HD60 SERIES**



Actuates a load switch after a preset delay.

APPLICATION

Use the Timoflex as an On Delay Relay or Off Delay Relay with consistent timing. Dial settings may be changed when desired. This is an ideal single switch reset timer most useful in circuits requiring a simplified timing circuit. These units are recognized under the component program of Underwriters' Laboratories Inc.



On Delay (HD50)

The Timoflex is powered by a synchronous motor. This turns a ratchet wheel carrying a calibrated time setting dial. Upon energizing the timer coil, a pawl is engaged with the ratchet. At the end of the preset time, the pawl moves the load switch to the "Timed Out" position. This position is held until the timer resets by de-energizing the timer coil.

Off Delay (HD60)

The HD60 operation is similar to the HD50 except the pawl engages the ratchet wheel when the coil is deenergized. This means that the coil is energized briefly to disengage the pawl, resetting the Timoflex. This unit will not reset if power fails during timing, but merely stops, resuming operation when power is restored.

SPECIFICATIONS

TIME SCALE	CATALOG SYMBOL
55 sec.	21
5.5 min.	22
27.5 min.	23
55 min.	24
14 sec.	25
14 min.	26
110 min.	27
110 sec.	28

Minimum Setting

4% of dial range (example, 2 seconds on 55 seconds dial).

Time Setting Accuracy

Within 1% of total scale.

Electrical Ratings

VOLTAGE	FREQUENCY	SYMBOL
120 volt	50 cycle	A5
240 volt	50 cycle	B5
120 volt	60 cycle	A6
240 volt	60 cycle	B6

Reset Time

0.2 second maximum.

Power Consumption

Coil, 25 volt amperes Inrush.
15 volt amperes Normal
Motor, 5 volt amperes

Load Switch Rating

15 amps. 125, 250 vac.
1/8 HP-125 VAC, 1/4 HP-250 VAC.

Life

Average Mechanical Life — 4 1/2 Million Operations minimum.

Terminals

Screw type standard, solder or push-on to order.

Mounting

Surface mounting with 4 rubber shock dampeners.



A DIVISION OF THE E. W. BLISS COMPANY

736 FEDERAL STREET / DAVENPORT, IOWA 52803

BULLETIN 171

TIMOFLEX

TIME DELAY RELAY — RESET TIMER

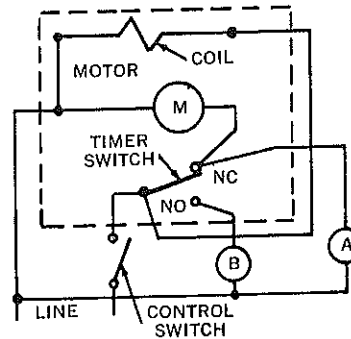
HD50 SERIES: Conventional ON Delay Timer with Motor and Coil energized during timing. For use with maintained Control Switch.

RESET: Control Switch Open, Load "A" OFF, Load "B" OFF.

TIMING: Closing Control Switch starts timing and supplies power to Load "A" through N.C. contact. Load "B" OFF.

TIMED OUT: Control Switch remains closed. Timer Switch transfers to N.O. position. (Load "A" OFF, Load "B" ON).

NOTE: Opening Control Switch, or Power Failure, Resets Timer.



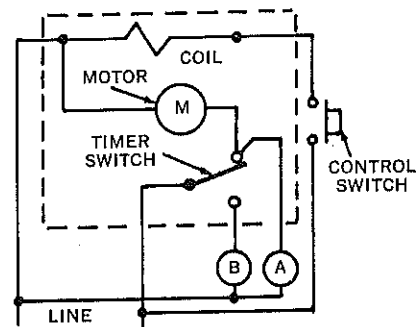
HD60 SERIES: Reverse Coil Action, Off Delay Timer with Coil de-energized during timing. A momentary closure of the control switch resets the timer. A Power Failure stops timer which restarts from point where stopped.

RESET: Control Switch Closed, Load "A" ON, Load "B" OFF.

TIMING: Control Switch Open, Load "A" ON, Load "B" OFF.

TIMED OUT: Control Switch Open, Load "A" OFF, Load "B" ON.

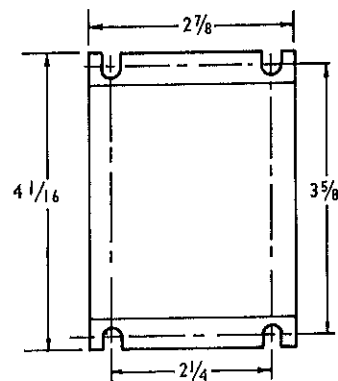
NOTE: Timing Starts When Control Switch Opens.



ORDERING INFORMATION

List the required specifications from each of the 5 groups below. The corresponding symbols comprise the catalog number.

<p>Type:</p> <p>Symbol 5 — On-Delay 6 — Off-Delay</p> <hr/> <p>01 — Solder Terminal 02 — Push On Terminal 03 — Screw Terminal — End Facing 04 — Screw Terminal — Side Facing</p> <hr/> <p>VOLTAGE</p> <p>Symbol A — 120 volts B — 240 volts</p>	<p>HD 5 03 A 6 21</p>	<p>TIME SCALE</p> <p>Symbol 21 — 55 Seconds 22 — 5.5 Minutes 23 — 27.5 Minutes 24 — 55 Minutes 25 — 14 Seconds 26 — 14 Minutes 27 — 110 Minutes 28 — 110 Seconds</p> <hr/> <p>FREQUENCY</p> <p>Symbol 6 — 60 Cycles 5 — 50 Cycles</p>
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INSTRUCTIONS FOR THE INSTALLATION OF ATC INSTRUMENTS AND CONTROLS



SERIES 309A and 309B ATCOTROL
PUSHBUTTON DIAL TIMERS

FORM IN 309-A&B

DESCRIPTION:

The type 309 "Atcotrol" is a synchronous motor-driven interval timer incorporating automatic reset, started on each cycle by an integral push-button. It's application is in the time control of machinery and process operations such as lapping machines, copying machines, mixers, ovens and vending machines.

PRINCIPLE OF OPERATION:

1. Use knurled knob to set green pointer to desired time interval.
2. Depress built-in push-button to mechanically engage clutch (this engages red pointer with the clutch ring when the switch actuator plate is locked by the spring loaded nylon detent) and operate the timer's SPDT switch (or switches).
3. The synchronous motor drives the red cycle progress pointer clockwise toward zero through a gear train and the clutch.
4. When the red pointer reaches zero on the dial it:
 - (a) trips the detent actuator lead and spring returns counter-clockwise to the green set pointer.
 - (b) disengages the clutch.
 - (c) returns the S. P. D. T. switch (or switches) to the "before start" position.
 - (d) de-energizes the motor.
5. Timer is ready for next cycle starting with step 2 above.

Installation:

The standard type 309 "Atcotrol" timer is supplied for mounting into a 3 3/16" diameter cut-out (refer to Dwg. SK-40750-X attached). A metal clamping ring presses against a retaining O-ring on the timer cover and three pointed screws press against the back of customer's 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-40750-X).

To Mount:

With the sleeve-cover on the timer held in place by the O-ring recessed between the terminal block and rear of the cover:

1. Insert the timer through the cut-out in the panel from the front.
2. Slip the clamping ring over the rolled laminate cover (from the back) making certain the three screws have been backed off sufficiently to allow the ring to be positioned between the O-ring groove and the customer's panel.
3. Place the O-ring into the groove on the timer cover by rolling it into place from the rear of the timer. When the ring has been securely seated into the groove, tighten down on each of the three screws in the clamping ring until the entire circumference of the ring presses firmly against the O-ring and the timer is clamped. **DO NOT TURN CLAMPING SCREWS BEYOND POINT NECESSARY TO MAKE A FIRM GRIP ON O-RING AND PANEL.**

AUTOMATIC TIMING & CONTROLS, INC.

KING OF PRUSSIA, PENNSYLVANIA

A SUBSIDIARY OF AMERICAN MANUFACTURING COMPANY, INC.

Wiring:

Note: The "A" model of the 309 timer has a 10 point terminal block. The "B" model uses a 14 point block. As a max. of 8 points are used in either type the wiring diagram is the same for both models.

Wiring of the timer should be in accordance with diagrams W-6234-Y or W-6382-Y (attached). If a special arrangement is supplied with the timer ordered, a special wiring diagram is supplied with the timer.

CAUTION:

Check the line voltage and be certain that it checks with the nominal voltage printed on the timer identification. Low voltage (below NEMA standard of rated voltage plus 10% or minus 15%) may cause erratic timing action or malfunctioning of the timer.

Time Interval Setting:

All dials are graduated over 320 degrees in the following ranges: 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 red pointer has progressed below the desired time setting toward zero

Maintenance and Adjustments:

A. LOAD SWITCH (OR SWITCHES):

To replace either or both switches:

1. Remove timer cover by pulling the small tab on the O-ring between the terminal block and back of the cover, removing the ring from the seat at the back of the cover. Slide the cover over the terminal block and motor, exposing the internal mechanism for service.
2. Remove push-on connections from terminal block.
3. Using a small off-set (right angle) screw-driver, loosen the two switch mounting screws until they are clear of mounting plate. Remove switch and insulator from mounting plate.
4. Install new switch and insulator in same position. (with screws in place) Tighten screws securely. Bend wires and install push-on lugs.
5. Check contact action by depressing push button and moving latch arm. This will verify action of both N.O. and N.C. contacts. Each should have a slight amount of wipe. Stroke action may be adjusted by repositioning of nylon screw.
6. Check the timer for accurate timing-out at the zero position. The switch contacts should trip when the elapsed time indicator crosses the zero graduation. If the trip point has shifted, it may be necessary to adjust the arms on the switch actuator plate to compensate for any differences in switch differential tolerances. This is done by SLIGHTLY bending the arm at a greater or lesser angle with respect to the switch actuator plate.
7. If the unit contains two switches check the setting of the independent load switch (the one connected to terminal numbers 4, 5 & 6) to see that it trips out just ahead (approximately $\frac{1}{2}$ % of total dial time) of the motor load switch. If this does not occur in the sequence described, the timer will time out and shut-off the motor before the other switch is actuated, resulting in faulty load circuit action.

B. Motor Replacement:

1. Remove lead connections to terminal block.
2. Remove the two (No. 4) motor mounting screws.
The motor is coupled to the drive shaft by a splined coupling and retaining spring (over the splined section). When the new motor is installed be certain the spring retainer is in place.
3. Rewire per diagram.

C. Changing the Dial Range:

1. Remove the motor.
2. Remove the dial by only loosening the four flat-head screws (DO NOT REMOVE SCREWS) and prying the dial gently away from the die cast front plate of the timer. Pry evenly at all four sides until cover is free. Lift off.
3. Put the new dial in position by reversing the above procedure, being certain first to advance the moving pointer past the time setting pointer towards zero position and locking the switch actuator plate in the "energized" or detented position; by pressing inwards on the center of the red pointer. This prevents the moving pointer from being "behind" the setting pointer. Be certain that the dial is firmly seated on its' mounting posts and that the traveling pointer lies between zero and the time interval setting pointer.
4. Tighten the four flat-head screws.

CAUTION! Never over-tighten the flat head dial screws. Dial is held in place by function of 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.

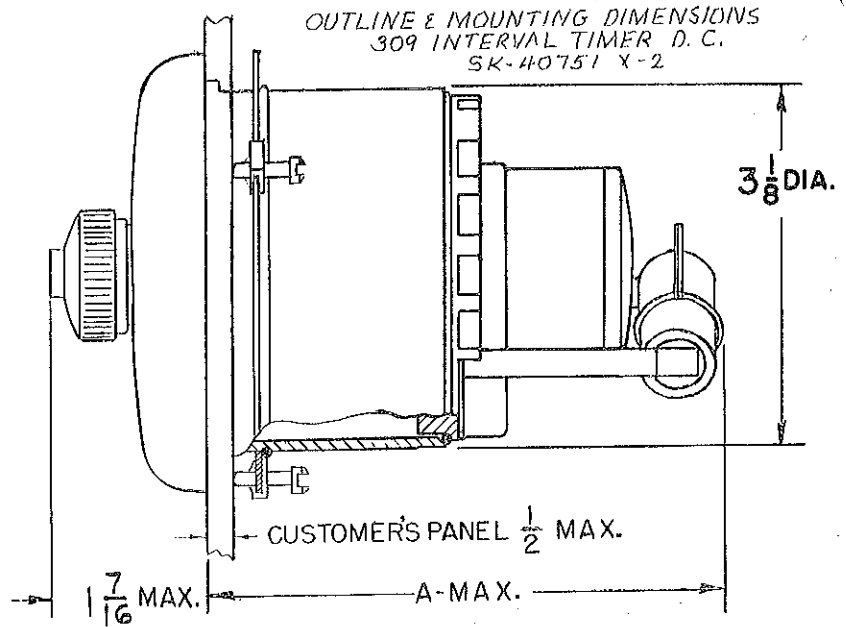
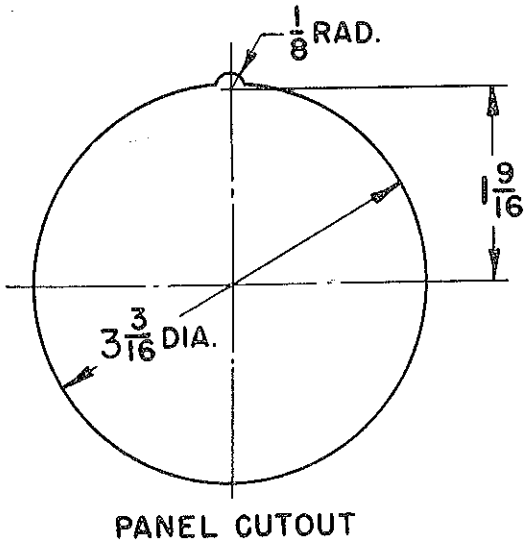
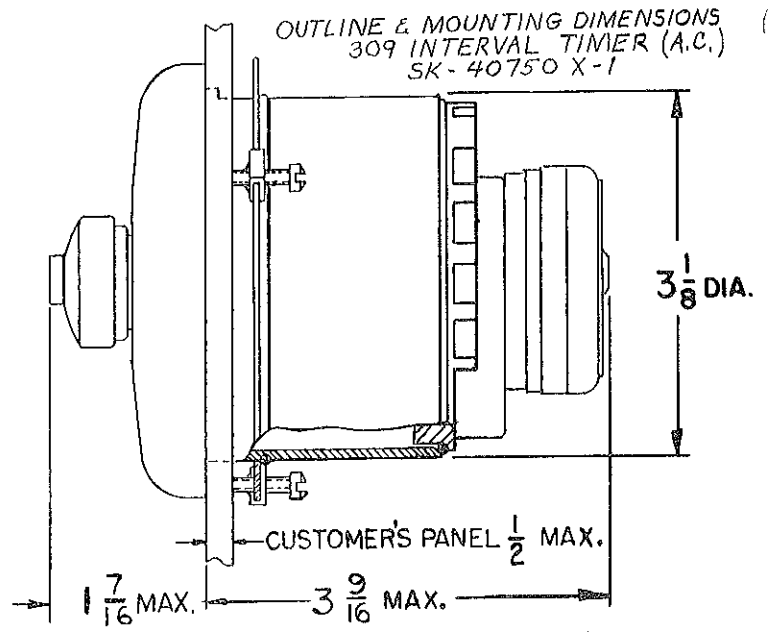
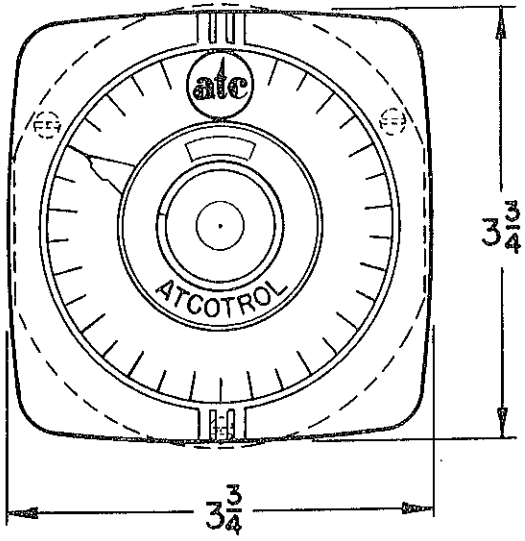
5. Position the new motor on the terminal block, replace its' two mounting screws, and replace wire leads on the terminal block. (See Section B for more detail).

CAUTION! Be certain that the motor and idler gear pinion are always seated properly and not binding, before tightening the mounting screws.

WIRING DIAGRAM W-6234-Y & W-6382-Y
OUTLINE & DIMENSION DRAWINGS -

ST'D UNIT - SK-40750-X
D. C. UNIT - SK-40751-X
SURFACE MTG. BRACKET SK-40752-X

PLUG-IN MOUNTING - SK-40754-X



A	D.C. TIMER RATED
$3\frac{11}{16}$	28V.
$4\frac{11}{16}$	48V, 125V, OR 250V.

KEY SYMBOLS



MOTOR



INDEPENDENT LOADS



DEPENDENT LOADS

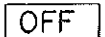
TIMER SHOWN IN "BEFORE START" POSITION WITH POWER OFF.



LINE SWITCH



LOAD ENERGIZED



LOAD DEENERGIZED



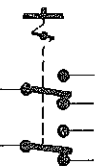
TIMER MAY OR MAY NOT BE SUPPLIED WITH SECOND SWITCH (TERMINALS 4, 5 & 6)



NORMALLY OPEN SWITCHES



NORMALLY CLOSED SWITCHES



SWITCH OR SWITCHES ARE OPERATED BY A MAINTAINED PUSHBUTTON WHICH IS RELEASED AT END OF TIMING PERIOD BY THE RED POINTER. PUSHBUTTON MUST BE DEPRESSED TO START TIMER.

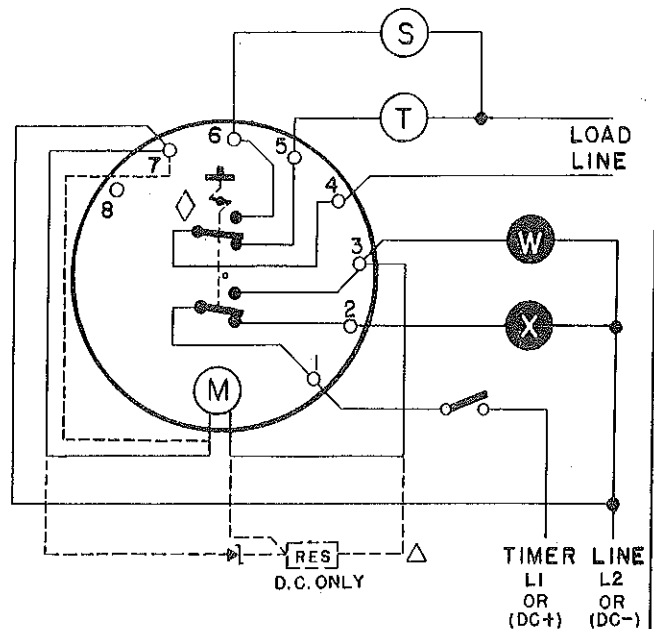
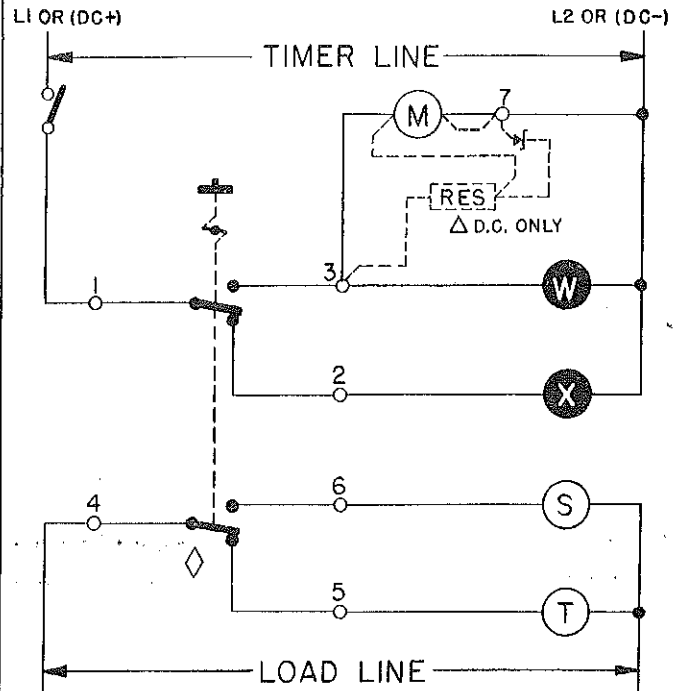
ALL WIRING EXTERNAL OF TIMER (HEAVY CIRCLE) TO BE DONE BY CUSTOMER.



D.C. OPERATED TIMERS (TIMER LINE) VOLTAGE DIVIDING RESISTOR ADDED (28 VOLTS D.C. UNITS WIRED SAME AS A.C. UNITS.)

UNIT RATING D.C. VOLTS	RESISTOR VALUE
48	1,000 OHMS
125	5,000 OHMS
250	10,000 OHMS

LOAD CIRCUIT	BEFORE START	DURING CYCLE	END OF CYCLE
◇ (S)	OFF	ON	RESETS TO BEFORE START
◇ (T)	ON	OFF	
● (W)	OFF	ON	
● (X)	ON	OFF	



REVISIONS	DATE	BY	DESCRIPTION
1	C.S. 8-12-60		
2	C.S. 11-18-60		
3	11-17-60 W.E.L.		
4	11-17-60 H.C.P.		
5	C.S. 2-3-61		
6	2-7-61 W.E.L.		
7	2-7-61 H.C.P.		
8	C.S. 1-11-63		
9	1-9-63 W.L.H.		
10	1-9-63 H.C.P.		
11	C.S. 3-30-64		
12	W.L.H. 3-23-66		
13	F.R. 3-23-66		

DIMENSIONS IN INCHES		REFERENCE	AUTOMATIC TIMING & CONTROLS, INC.	
TOLERANCE UNLESS NOTED		MATERIAL	A SUBSIDIARY OF SAFETY INDUSTRIES, INC. KING OF PRUSSIA, PA. USA	
EX (8 PLACE DEC.)	+ .010 - .010	FINISH	TITLE	
SEE (9 PLACE DEC.)	+ .001 - .001	PART	CIRCUIT ARRANGEMENT DIAGRAM	
DRILLED HOLER (Ø)	+ .003 - .000	SCALE	SERIES 309 PUSHBUTTON START	
REAMED HOLER (Ø)	+ .0003 - .0000		INTERVAL TIMER	
FRACTIONS	1/64 - 1/32		NEXT ASSEMBLY DWG.	NEXT ASSY PART
ALL THREADS	CLASS 2 FIT		DRAWING NO.	S. O.
JOINED ANGLES	+ 9° - 1/2°		SUPERSEDES	
MACHINED SURFACE FINISHES			SUPERSEDED BY	
V MICROINCHES - .8, 1.6, 3.2, 6.3, 12.5, 25.0, 50.0, 100.0, 200.0				
USE 3/16" BULBS NOTED				
ALL DIAMETERS TO BE CONCENTRIC				
APPROVED				

6-22-60 W.E.L.
6-22-60 H.C.P.
W. 6234-V.1

KEY SYMBOLS



MOTOR



INDEPENDENT LOADS

TIMER SHOWN IN "BEFORE START" POSITION WITH POWER OFF



LINE SWITCH



LOAD ENERGIZED



LOAD DEENERGIZED



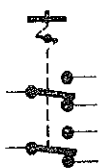
TIMER MAY OR MAY NOT BE SUPPLIED WITH SECOND SWITCH. (TERMINALS 4, 5 & 6)



NORMALLY OPEN SWITCHES



NORMALLY CLOSED SWITCHES



SWITCH OR SWITCHES ARE OPERATED BY A MAINTAINED PUSHBUTTON WHICH IS RELEASED AT END OF TIMING PERIOD BY THE RED POINTER. PUSHBUTTON MUST BE DEPRESSED TO START TIMER.

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

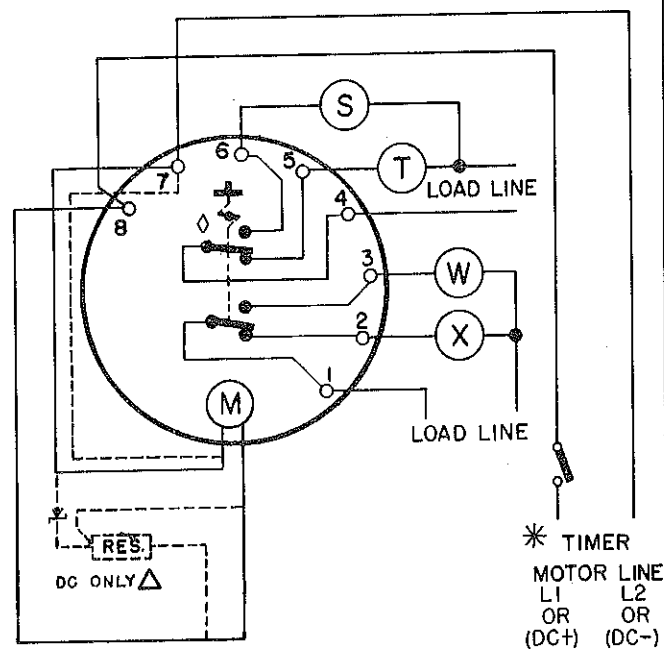
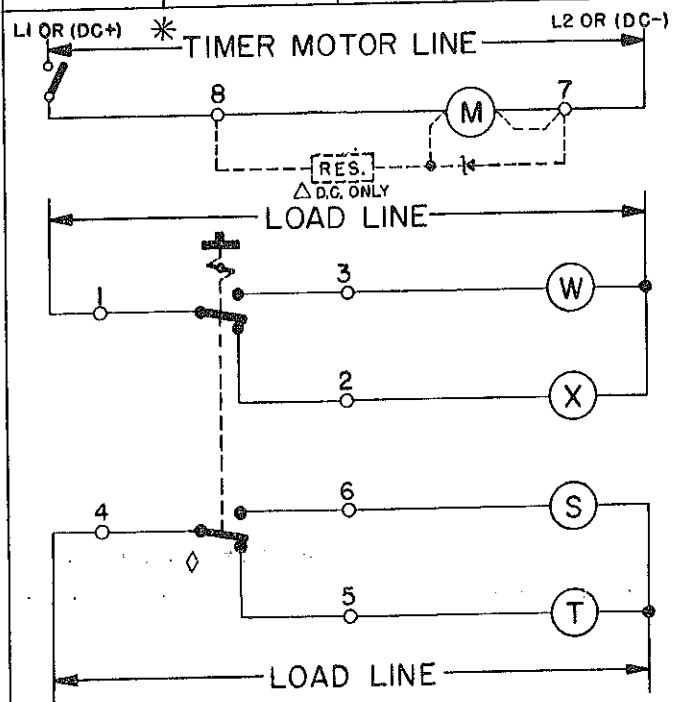


DC OPERATED TIMERS (TIMER LINE)
VOLTAGE DIVIDING RESISTOR ADDED.
(28 VOLTS D.C. UNITS WIRED SAME AS A.C. UNITS.)

* NOTE: TIMER MOTOR WILL RUN CONTINUOUSLY AS LONG AS TIMER MOTOR LINE IS ENERGIZED.

UNIT RATING D.C. VOLTS	RESISTOR VALUE
48	1,000 OHMS
125	5,000 OHMS
250	10,000 OHMS

LOAD CIRCUIT	BEFORE START	DURING CYCLE	END OF CYCLE
◇ (S)	OFF	ON	RESETS
◇ (T)	ON	OFF	TO
(W)	OFF	ON	BEFORE
(X)	ON	OFF	START



DIMENSIONS IN INCHES		REFERENCE
TOLERANCE UNLESS NOTED	TOLERANCE	MATERIAL
.125 (8 PLACE DEC.)	+ .005 - .008	FINISH
DRILLED HOLES (Ø)	+ .002 - .004	PART
REAMED HOLES (Ø)	+ .0005 - .0010	SCALE - NONE
FRACTIONS	1/16" - 1/8"	
ALL THROUGH	CLASS 2 FIT	
POUNDED ANGLES	± .01" - .02"	
MACHINING SURFACE FINISHES		
V MICROFINISH	4, 8, 16, 32, 64, 128	DRAWN 2-8-61 W.E.L.
FIN. 100, 1000, 10000		CHECKED 2-8-61 H.C.P.
* USE UNLESS NOTED		APPROVED
ALL DIAMETERS TO BE CONCENTRIC WITHIN .002 I.D. UNLESS NOTED.		

AUTOMATIC TIMING & CONTROLS, INC.	
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.	
KING OF PRUSSIA, PA. USA	
TITLE	CIRCUIT ARRANGEMENT DIAGRAM
SERIES	309 PUSHBUTTON START
INTERVAL	TIMER WITH
INDEPENDENT	MOTOR LINE
NEXT ASSEMBLY DWG.	NEXT ASSY PART
DRAWING NO.	W-6382-Y2
SUPERSEDED BY	

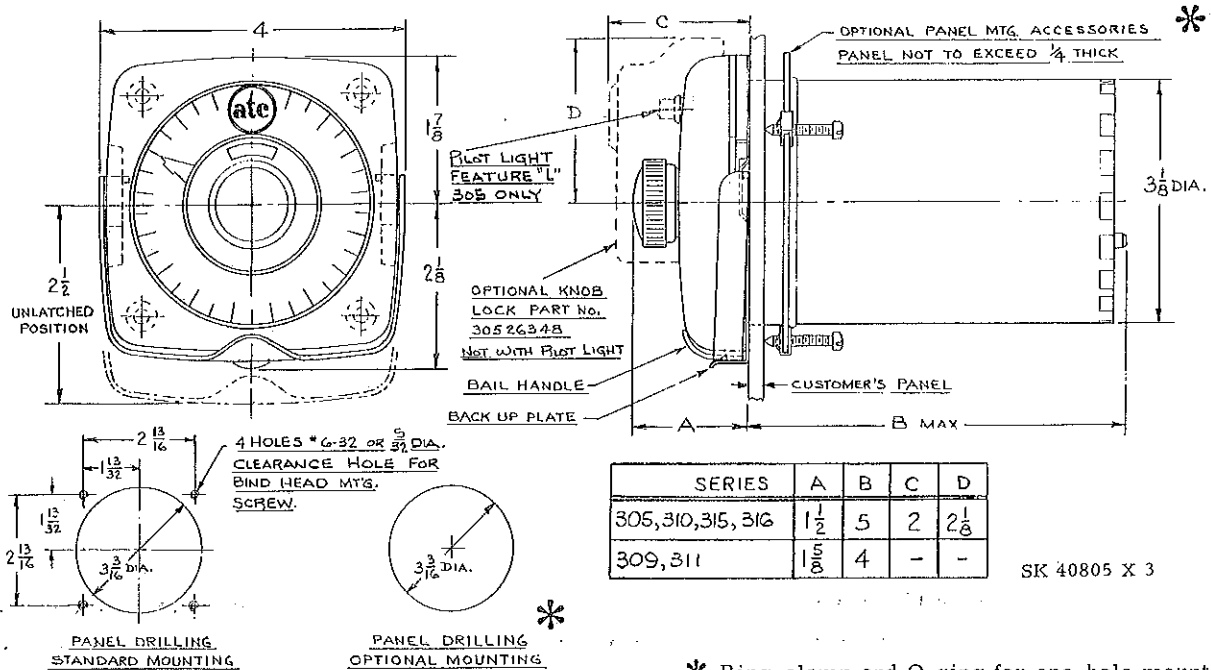
REV	DATE	BY	CHKD	DESCRIPTION
1	1-8-63	W.L.H.		W.L.H. 2-8-61
2	1-9-63	H.C.P.		
3	2-8-61	H.C.P.		

Instructions Supplement
PLUG-IN MODELS

ATC Series 305, 309, 310, 311, 315 & 316

PANEL MOUNTING

(Surface Mounting - next page)



* Ring-clamp and O-ring for one-hole mounting may be ordered separately by ordering Kit No. 30526444.

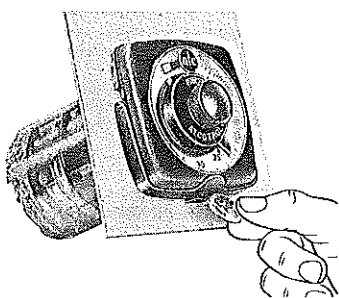


Fig. 1.

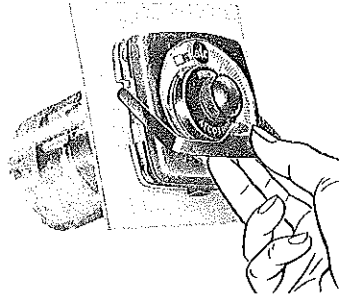


Fig. 2

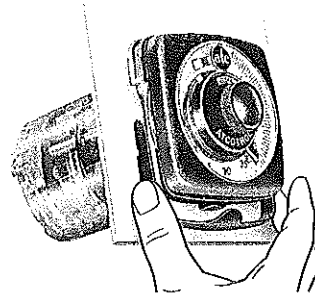


Fig. 3

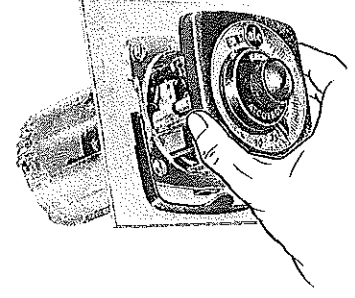


Fig. 4

INSTALLATION PROCEDURE

1. Drill panel per either Fig. A or Fig. B.
2. Slip the back-up metal plate over the Lexan housing, push forward to seat snugly on rear flange surface. (Tab must be at bottom and facing front).
3. Insert into panel and secure by either Fig. A or Fig. B whichever is used.
4. Gently spring bail handle and insert tip ends behind the bridge of the metal back-up plate and panel. Drop the bail handle free and insert the timer. Locating pin prevents timer from being oriented improperly.
5. To secure timer, push bail handle up and out about 1/2 inch (Fig. 3) then insert between bottom of timer face and back up plate tab just below timer face. Snap into locked position (as in Fig. 1).

SIMPLE REMOVAL PROCEDURE

- Fig. 1 Check rear of timer and remove cotter-pin safety clip if one is used. With a coin or screw driver, spring open the bail handle.
- Fig. 2 Lift bail handle with an upward motion to partially jack the timer free from its plug-in housing.
- Fig. 3 Drop the bail handle with a downward motion to free the area around the timer face.
- Fig. 4 Grasp the timer and pull it forward and free from its plug-in housing.

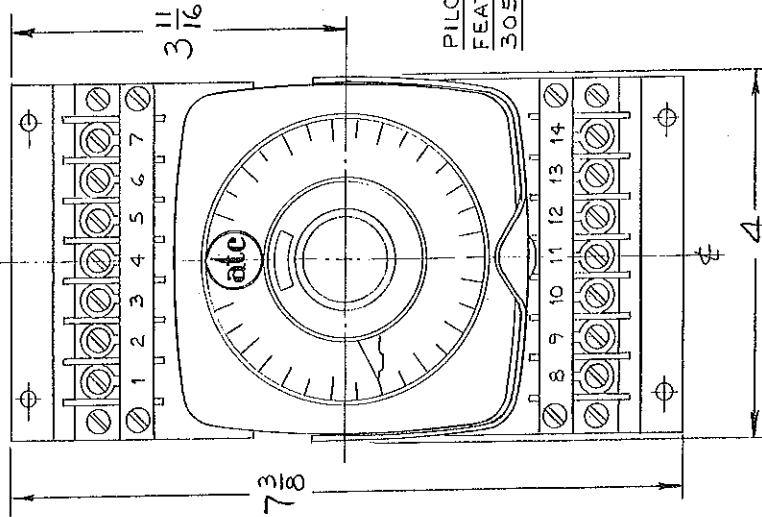
MARKED UP PRINTS ARE VOID UNLESS INITIALED & DATED

REVISIONS

1	AS L-1076
2	AS 5-3-66
3	AS 5-3-66
4	AS 5-3-66
5	AS 5-6-66

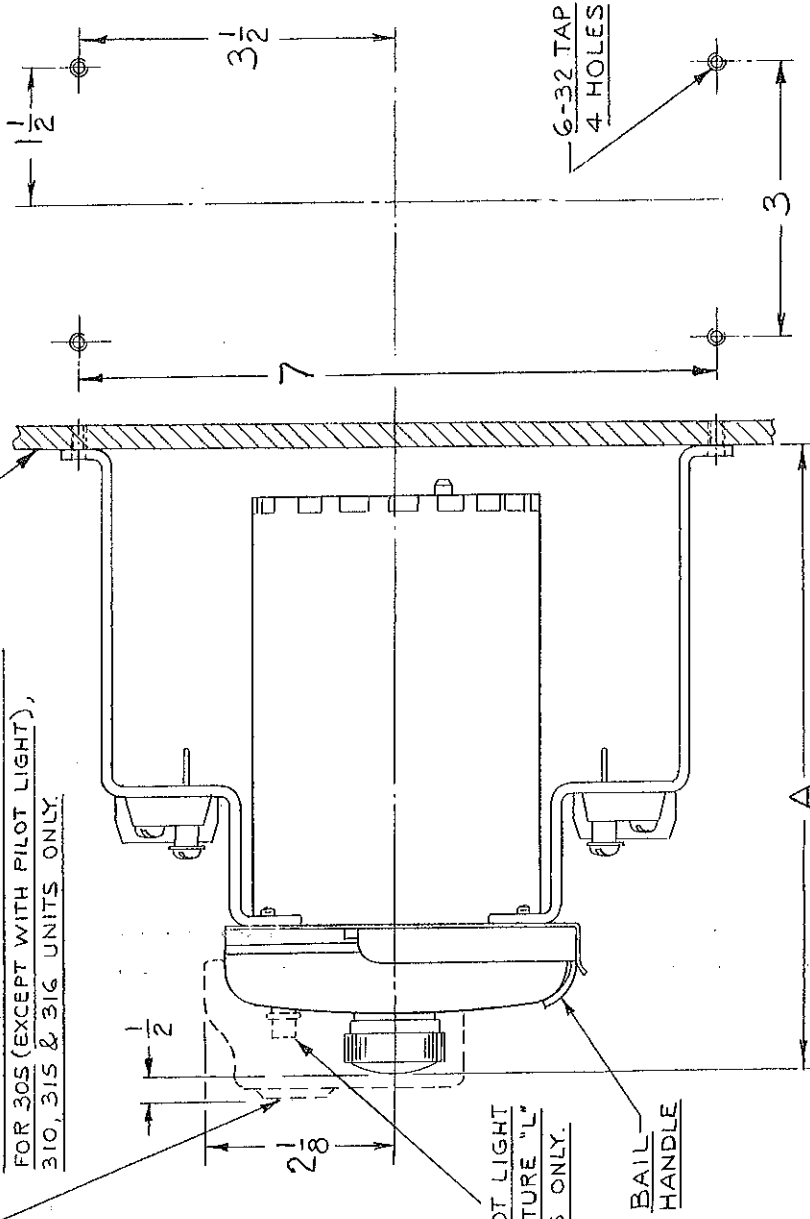
CUSTOMER'S PANEL

OPTIONAL KNOB LOCK PART 30526348 FOR 305 (EXCEPT WITH PILOT LIGHT), 310, 315 & 316 UNITS ONLY.



PILOT LIGHT FEATURE "L" 305 ONLY.

BAIL HANDLE



PANEL DRILLING

A	SERIES
$6 \frac{13}{16}$	305, 310, 315, 316
$6 \frac{15}{16}$	309, 311

DIMENSIONS IN INCHES		REFERENCE												
TOLERANCE UNLESS NOTED														
DIMENSION	TOLERANCE	MATERIAL												
.XX (X PLACE DEC.)	+ .010 - .010	FINISH												
.XX (X PLACE DEC.)	+ .009 - .008	PART												
DRILLED HOLE (Ø)	+ .003 - .000	SCALE												
REAMED HOLE (Ø)	+ .0003 - .0000	IN												
FRACTIONS	+ 1/64 - 1/32	CLASS & FIT												
ALL THREADS	+ .0015 - .0015	FORMED ANGLE												
SURFACE FINISHES		DRAWN												
√ MICROINCHES	1, 1.5, 2.5, 4, 6, 10, 15, 25, 40, 63, 100, 200, 300, 500, 1000	DISCHECKED												
FACE 32 UNLESS NOTED		APPROVED												
ALL DIAMETERS TO BE CONCENTRIC WITHIN .002 T. I. R. UNLESS NOTED														
<table border="1"> <tr> <td colspan="2"> </td> <td> AUTOMATIC TIMING & CONTROLS, INC. A SUBSIDIARY OF AMERICAN MANUFACTURING CO., KING OF PRUSSIA, PA. USA </td> </tr> <tr> <td colspan="3"> TITLE OUTLINE & MOUNTING DIMENSIONS SURFACE MTD. PLUG-IN TYPE UNITS WITH FRONT FACING TERMINALS </td> </tr> <tr> <td colspan="2"> SUPERSEDES SK-60430-Y-1 </td> <td> DRAWING NO. SK-60430-Y-1 </td> </tr> <tr> <td colspan="3"> PRODUCT </td> </tr> </table>				AUTOMATIC TIMING & CONTROLS, INC. A SUBSIDIARY OF AMERICAN MANUFACTURING CO., KING OF PRUSSIA, PA. USA	TITLE OUTLINE & MOUNTING DIMENSIONS SURFACE MTD. PLUG-IN TYPE UNITS WITH FRONT FACING TERMINALS			SUPERSEDES SK-60430-Y-1		DRAWING NO. SK-60430-Y-1	PRODUCT			
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PRODUCT														

1. PURPOSE

Industrial oven doors serve three purposes; to provide access to the work space; to confine heat to the work space; and to relieve pressure from the work space in event of ignition of solvents, fuel or other combustible gases. Their proper adjustment and operation are essential to the safety, economy and general satisfaction in the use of the oven.

2. ADJUSTMENTS AND CORRECTIONS

Despatch oven doors are strongly built to meet the hard use expected of them. Nevertheless unavoidable irregularities, or accidental damage may occur, resulting in mal-adjustments, which, where at all possible, are best corrected on the job.

Door adjustments should not be considered final until the oven has been at operating temperature for several hours. This permits inner and outer surface temperatures to stabilize, and all expansion of frame and door parts to cease. Changes due to expansion, will in some cases, radically undo any previous adjustments made at room temperature.

Some door irregularities and suggestions for their correction are as follows:

Warping causes poor door fit, leakage, mal-adjustment of latches and hinges and generally poor and unsatisfactory operation. Despatch doors are designed to minimize warping but it may occur to a degree sufficient to require correction. Size of door and oven temperature are factors which directly effect the extent of the warp.

When warping occurs it most generally takes place on the initial heating of the oven. Correction should be prompt to prevent a "set" at the warped position. Several straightenings may be required to force the door to assume a "set" shape which fits the frame properly, and which it will maintain at hot or cold temperatures.

To straighten the door, remove it from its hinges and with suitable steel members, clamps and jacks, spring door to its original shape and a little beyond. The "little beyond" will provide a margin of safety to take up expansion when the door is reheated. With patience, a door which tends to warp can be forced to assume a "set" at practically perfect shape.

Where warp is not extensive it can often be easily corrected by fixing a beam upright in the door opening and closing the door sharply against it.

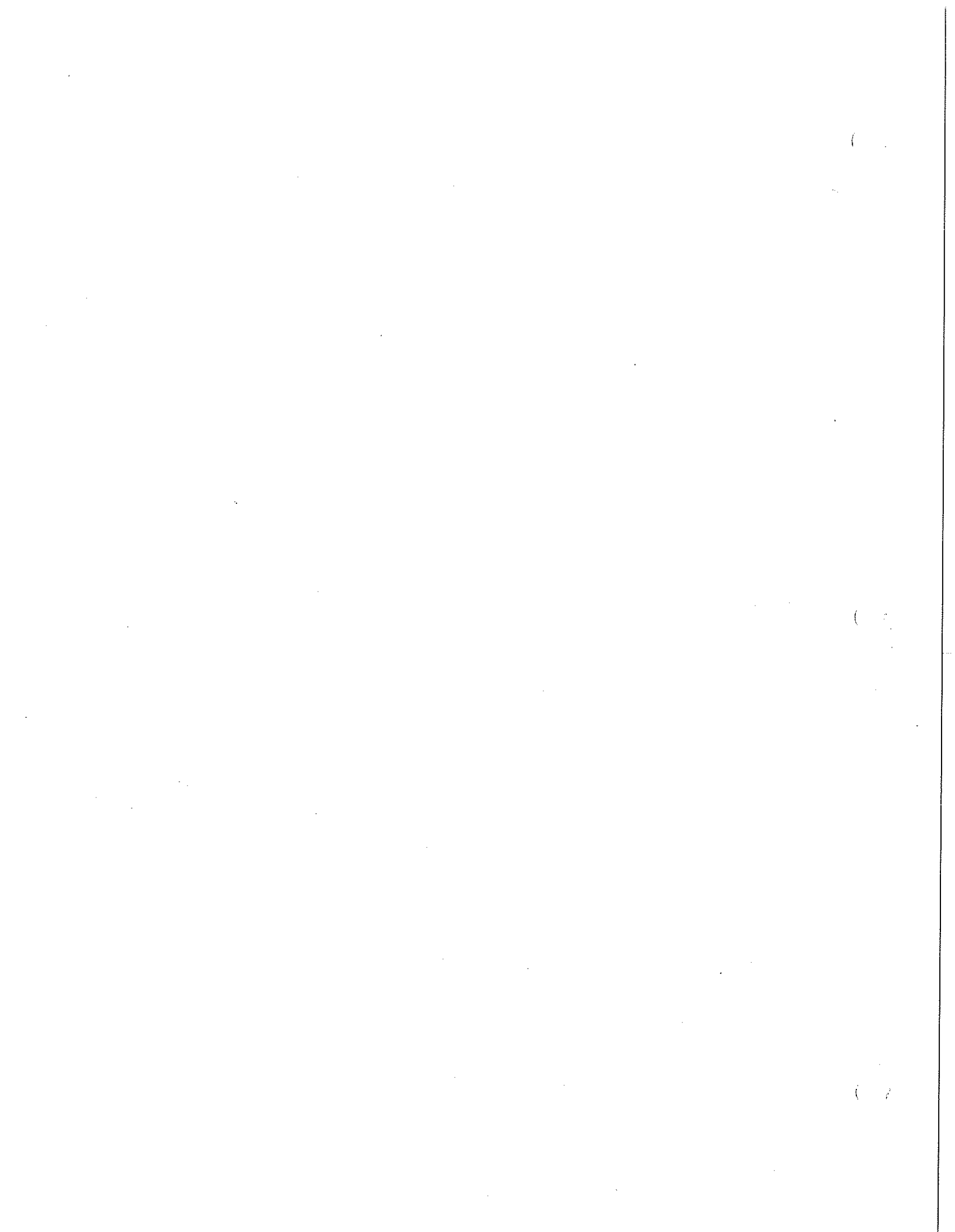
Binding occurs along the hinged side of the door. It indicates too close a clearance between the door and frame. Correct by placing shims under the hinge butts, or forcing the gasket to a more favorable position or by forcing the door and hinges slightly outward by squeezing a strip of wood between the door and frame.

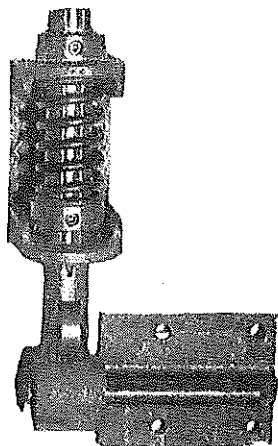
Loose Fit is failure of the door to seal tightly against the gasket. This can generally be corrected by forcing a slight inward bend in the hinge straps near the butts. This can best be done by removing the door, and heating the straps in the area of the bend, until red hot, then forcing the bend with a hammer. It is not good practice to force the bend with a heavy hammer, with the door in place and the hinge strap cold, although slight corrections may be accomplished in this way. Care must be used not to injure the door or frame or force the hinges out of alignment.

Hinge Misalignment causes sag, hinge binding, poor fit and generally poor operation. It may be caused by damage to the frame or to the hinges themselves. Correction may require repairs to the damaged parts or relocation or replacement of the hinges.

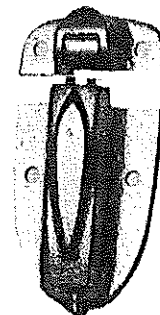
3. MAINTENANCE

Oil or grease hinges occasionally. Do not jam, force or otherwise abuse doors or door frames in any way.





Despatch type AA Latch



Brixon Latch

1. PURPOSE

Latches on industrial oven doors serve two purposes; to keep the doors properly closed and to permit the instant opening of the doors to relieve internal pressure. Of these, the latter is extremely important to safe operation.

Internal pressure is caused by the ignition of solvents or other combustible vapors liberated from the work, or of fuel allowed into the oven because of improper burner adjustment or other reasons. The pressure created is instantaneous and if not quickly relieved can cause serious damage to both life and property.

2. ADJUSTMENT

A latch is properly adjusted when it holds a door closed and at the same time permits a minimum effort to open it. Latch adjustments should always be checked with the oven at temperature. See "Oven Doors and Hinges".

Insurance companies have adopted 50 pounds per square foot as the maximum allowable pressure to force a door open. Latches furnished with Despatch equipment, when properly adjusted, operate well within this limitation.

3. DESPATCH TYPE AA LATCH

This is a heavy latch used on large doors and is made in only one size. Striker pin and spring tension can both be adjusted.

To adjust the pin, loosen both set screws in the ring nuts and move pin as required. To adjust spring tension loosen set screw on the inside ring nut and with a pinch bar or similar tool, adjust tension as required.

4. THE BRIXON LATCH

This latch is made in three sizes, all of similar design. It has spring tension adjustment only. Increased spring tension makes the latch harder to operate and vice versa. To increase tension screw the spring pin to the right. This forces a blocked nut down on the spring. To release tension, reverse the process.

Note: The striker of this latch is an elliptical ring with a quarter section removed. On closing the door one flat surface of this section meets the roller strike which turns the striker through a quarter turn thus forcing the other flat surface behind the roller to hold the door closed. On opening the door a reverse action occurs. When the door is first put in

operation it may be necessary to position the striker to properly engage the strike. This can best be done by loosening the spring tension and with a hammer, forcing the striker into the right position.

5. MAINTENANCE

To prevent wear and binding, oil latches occasionally with heavy machine oil or light grease. Keep latches firmly bolted in place.

Check latch adjustment frequently. If door becomes increasingly difficult to open and close, do not allow it to persist in this condition, but make corrective adjustments immediately.

Important - If a latch becomes broken replace it with a similar latch. Under no condition use a lock type latch to replace or augment the latch furnished with the door.

Note: Apply to the Despatch Oven Co., for replacement latches give the serial number of the oven in your order.

1. GENERAL

Fresh and exhaust air provide ventilation for the work chamber. This is vitally important to safe and satisfactory operation, especially where solvents or similar volatiles are liberated from the work during the heating process. Such gases when sufficiently concentrated, constitute explosive mixtures which may be readily ignited by the heater. An explosion from such a cause can be destructive to both life and property. In many oven installations, constant precautions are necessary to prevent such dangerous concentrations.

The regulation of ventilation is usually the sole responsibility of the operators. It is vitally important that they be ever alert to this responsibility.

2. FRESH AND EXHAUST AIR REGULATION

The fresh air connection is usually at the heater and on the suction side of the recirculating fan. The exhaust connection is usually at the top of the furnace or oven and may lead to an exhaust fan or to a gravity flue. Both connections are provided with manual dampers. Adjustment depends upon the nature and quantity of the product and the amount of solvent, vapor or other gases liberated during the heating process.

To regulate, begin with both dampers wide open and system in operation with normal work load. Observe the work space atmosphere frequently. Gradually close the exhaust damper a little at a time. Off set any resulting positive pressure with similar adjustments of the fresh air damper. Take care not to close the exhaust damper too rapidly especially where combustible gases are liberated from the work. The dampers are well adjusted when they provide ventilation sufficient to keep the atmosphere fresh and clean, without unnecessary excess of fresh air, and with a slight positive pressure on the work space:

For systems which operate on constantly uniform loadings, the dampers, once adjusted, may be fixed in position.

3. DAMPER ADJUSTMENT DURING OPERATION

This applies where the load is not constantly uniform. Slight variations can be neglected. But where large differences occur, especially where full loading is infrequent and light loading the rule, the dampers should be adjusted to conserve on the use of fuel. A good operator will quickly learn the proper position of the dampers for the varying loads.

4. GRAVITY STACKS

Test for "draw" before the system is put into production. To test, partially close the fresh air damper, open the exhaust damper fully and set controls to operate at about 160°F. Close the oven as for normal operation. With smoke or a torch, observe the draft where the stack opens into the work space. There should be a continuous uniform and uninterrupted movement of air up the stack.

5. DOWN DRAFTS

Where down drafts occur in gravity stacks, their cause should be determined and corrections made without delay. They can cause concentrations of dangerous volatiles within the work chamber, poorly baked products, poor burner operation or the spreading of odors into the plant proper

Down drafts may result from insufficient gravity stack height, or its failure to extend above nearby buildings, roofs, pent houses, or other obstructions which cause downward wind movements into the stack. Such causes are usually easily remedied. Or they may result from a negative pressure within the factory proper caused by excessive gravity or forced exhaust ventilation from the factory. Where this condition exists it usually causes little or no difficulty during summer when windows and doors are open, but in winter with the building closed, it can cause serious trouble, even where work space exhaust fans are used. The most effective remedy for this condition is the installation of a "make-up" supply air system equal in capacity to the total exhaust from the factory.

THE WORK SPACE

ITS AIR AND TEMPERATURE REGULATION - CLEANLINESS AND MAINTENANCE

1. GENERAL

Satisfactory performance depends primarily on a constantly uniform temperature within the work space, combined with uniform air circulation, free of dirt, dust, smoke, solvent vapors or other contaminations.

2. CONTROL THERMOSTAT

For small standard ovens and furnaces the position of the Control Thermostat's thermal element is fixed at the factory and the temperature and air circulation are balanced for uniformity. For these standard units only minor adjustments are usually required to meet production requirements.

For large field assembled systems the thermal element must be located where it will "feel" an air temperature and air movement which are approximately average for the work space. If located otherwise some areas may be overheated and some underheated. In no sense does a thermostat, which indicates an evenly controlled temperature, assure that a like condition exists throughout the work space. There still may exist pockets of high or low temperature to which it does not respond and the air circulation may still require very considerable regulation.

In the final analysis, proper uniformity of temperature and air circulation is indicated by the condition of the finished product.

3. PORTS IN AIR DUCTS

Unless of very special design, Despatch ovens and furnaces are equipped with one of two types of air duct ports. One type consists of adjustable plates which form slots and are used principally on small "cross flow" units. The other consists of punched U shaped cuts in the ducts the center parts of which can be bent inward to increase the opening area.

For Supply ducts the U ports form scoops to direct the air into the work space. For recirculating ducts they serve as guides to direct the air into the duct and toward the heater or recirculating fan. A U port is to be considered fully open when bent into the duct to an angle of about 40 degrees. To avoid restricting the duct they should be bent no farther than this.

4. SUPPLY AND RECIRCULATED AIR ADJUSTMENTS

Uniform temperature and air circulation depend on a uniform rate of supply and recirculation of the air throughout the length of the ducts. It also depends to a large extent on a relatively high supply port velocity. The energy existing in the high velocity air expends itself by drawing into the stream, the cooler work space air. This causes a desirable mixing and a brisk turbulence within the work space which tends to equalize air movement and temperature.

To "balance" an oven or furnace, operate the fans cold and adjust all ports to full open position that is, set the "scoops" inward at an angle of 30 to 40 degrees. Doors, if any, should be closed where possible to simulate normal operating conditions.

It will generally be found that the supply air has a higher velocity at ports farthest from the fan than for those nearest the fan. For the recirculation duct the reverse is true.

Test the supply air velocity by the "feel" of the air on the hand. Test the recirculation velocity with a torch. These are crude methods but when combined with good judgment will usually prove adequate. Greater accuracy could be obtained with proper instruments perhaps, but these require skill in their use and are not always available.

According to best judgment, equalize the volume or amount of air entering and leaving the ports by partially closing those ports with the highest velocities. This will possibly not

decrease the velocity at these ports but will decrease their volume and increase both volume and velocity at the remaining ports.

After completing the "cold" adjustment, bring the oven or furnace to operating temperature and make a trial run with a minimum load of the product. If it proves satisfactory, increase the load gradually to full production. If it does not prove satisfactory, cool the system and re-adjust as the trial runs indicate.

In the final adjustments of the ports do not "starve" or restrict the recirculating fan unduly. Full fan volume always assures better air and temperature uniformity. A too greatly restricted recirculation or suction duct should be avoided. It will cause high draft at the burner and increase "cold start" difficulties.

5. CLEANLINESS

The work space should at all times be kept free of dirt and dust. Good results cannot be had with a dirty, dusty atmosphere.

An effective means of reducing dust to a minimum is to apply an inert substance to the walls and ceiling to which the dust will cling. For this we can recommend a chemical grease called No-ox-id which is manufactured by the Dearborn Chemical Company of Chicago, Illinois. It may be brushed on, or, if mixed with synthetic paint solvent, may be sprayed on. Complete instructions for its use and application, should be obtained from the manufacturer. It should be removed and renewed at least twice a year or otherwise as required.

6. OPERATION AND MAINTENANCE

- a. Do not crowd the work too closely. Allow space for good air circulation.
- b. Do not put work too close to the supply duct. The supply air temperature is some what higher than average work space temperature and may overheat or otherwise damage product.
- c. Do not put product on the floor or in isolated corners where air movement and temperature are not likely to be at average conditions.
- d. Do not mix thick heavy parts with light parts. The heavy parts require longer to heat and should be treated separately.
- e. Do not slam doors as this may cause dirt to fall on work.
- f. Do not strike ducts with trucks. It may injure the ducts and interfere with the air distribution in the work space.
- g. Do not strike doors or door frames with trucks or other heavy equipment.
- h. Sweep floors frequently. Water sprinkled on the floor will help to prevent dust from rising and scattering.