APPLIED TEST SYSTEMS

THE MARK OF RELIABILITY

Instruction Manual

Test Oven

Series 3600 and 3700

APPLIED TEST SYSTEMS **Instruction Manual**

THE MARK OF RELIABILITY

Contents

Revised July 2015

Preface

Unpacking

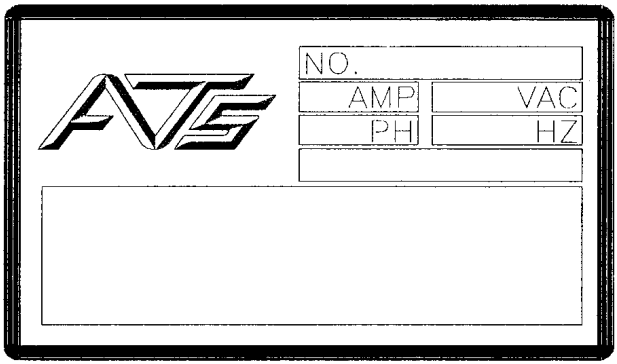
Retain all cartons and packing materials until the unit is operated and found to be in good condition. If damage has occurred during shipping, notify Applied Test Systems (ATS) and the carrier immediately. If it is necessary to file a damage claim, retain the packing materials for inspection by the carrier.

Warranty

All new ATS systems are shipped with a warranty. Units have a warranty against defective parts and workmanship for one full year from date of shipment. Please see Appendix A of this manual for complete details on the warranty.

After-Sale Support

If there are any questions concerning the operation of the unit, contact the ATS Service Department at +1-724-283-1212. Before calling, please obtain the serial number from the unit's data tag. A sample data tag is shown below and can be completed with the unit's information for easy reference. Please be prepared to give a complete description of the problem to ATS Service Engineers.



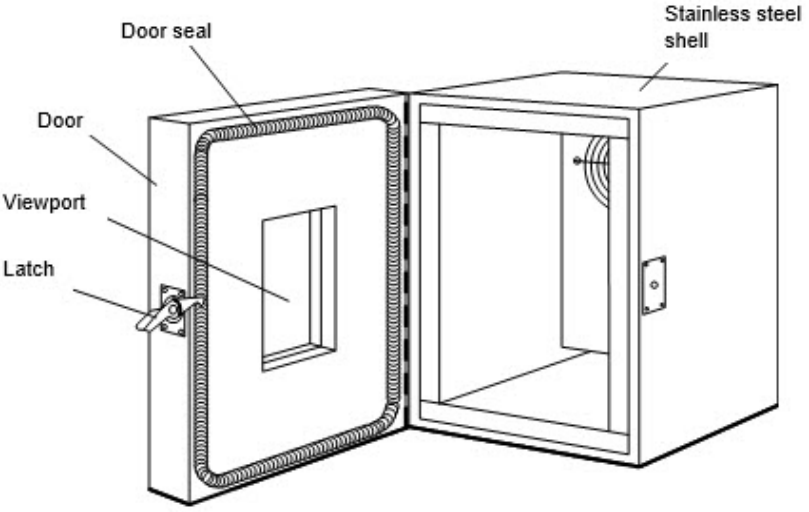
Section 1: Introduction

1.1 General Description

The Applied Test Systems (ATS) Series 3600 and 3700 Test Ovens are available in a variety of sizes and temperature ranges. The ovens are constructed with a stainless steel shell. The stainless steel liner is standard for the 3700 Series and is an optional item on the 3600 Series. A recirculating blower/plenum system provides uniform temperature performance for critical testing requirements and heavy-duty usage.

This information is related to the function, setup, safe operation, and maintenance of the Oven and its related components.

This manual is intended for anyone who will be setting up and/or operating the Test Oven.



The oven shown above is a typical configuration used for descriptive purposes only. Ovens vary according to available options and customer specifications.

1.2 Specifications

Maximum Oven Temperature Rating

_____

Oven Series _____

Dimensions

Internal _____

External _____

Ports _____

Viewports _____

Oven Power Requirements

_____

Watts	Amps	VAC	Hz
_____	_____	_____	_____

Thermocouple Type

_____

1.3 Environmental Conditions

- Temperature of 150° C to 350° C
- Relative humidity not more than 75%
- Air pressure of 75 kPa to 106 kPa
- No hard-frost, dew, percolating water rain, solar irradiation, etc.
- Installation category II
- Pollution degree 2

1.4 Controls

The ATS 3600 and 3700 Series Test Ovens are controlled by a temperature controller. Refer to the manufacturer's literature for operating procedures.

Section 2: Safety

All ATS equipment is designed to be operated with the highest level of safety. This manual and ATS endeavor to educate the operator about safety issues surrounding certain parts of the machinery by using equipment labeling.

2.1 For Owners, Operators, and Maintenance Personnel

Read and understand all instructions and safety precautions listed in this manual before installing or operating the unit. If there are any questions regarding operation of the unit or the instructions in this manual, contact the ATS Service Department at +1-724-283-1212.

In addition to the safety warnings listed on the equipment, warnings are posted throughout this manual. Read and follow these important instructions. Failure to observe these instructions can result in permanent damage to the unit, significant property damage, personal injury, or death.

Thoroughly understand the safety features and operation of the equipment. This manual will provide operators with safety concerns and general procedures. Be familiar with correct operating procedures and use good judgment. Also refer to the appropriate manuals for system component safety.

Use caution when working with elements at elevated temperatures. Prevent burns by wearing protective clothing, and follow safety, operation, and maintenance procedures described in the appropriate instruction manuals.

Avoid radiating heat. Items with a large mass retain heat for a long time. First degree burns may occur from heat radiation as well as from direct contact with a hot surface.

Obey all national and local electric code requirements. Ovens and control systems must be grounded and wired accordi ng to national and local electrical code requirements.

Handle the oven carefully. Avoid dropping and jarring the oven. Damage to elements and insulation may result.

Avoid damage to cables. Do not let the power cables touch the heated furnace shell.

Do not exceed maximum operating temperature. Operate the oven and accessories within the appropriate temperature range. Refer to the appropriate manuals.

This is the electrical hazard symbol. It indicates that there are DANGEROUS HIGH VOLTAGES PRESENT inside the enclosure of this product. TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, do not attempt to open the enclosure or gain access to areas where you are not instructed to do so.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.

This is the user caution symbol. It indicates a condition where injury to the operator could occur if operational procedures are not followed.

TO REDUCE THE RISK OF DAMAGE OR INJURY, follow all steps or procedures as instructed. Refer to accompanying documents.

VENTILATION – slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product. To protect the unit from overheating, those openings must not be blocked or covered.

This product should not be placed in a built-in installation, such as a wall cutout, unless proper ventilation is provided or hot temperatures will result.

Refer to manual - Before tuning the temperature controller, be sure to read and understand the tuning instructions in the controller manual. Follow all instructions carefully.

CLEANING – If it should become necessary to clean this equipment, disconnect the unit from its power source first.

Do not use liquid cleaners, aerosols, abrasive pads, scouring powders, or solvents such as benzine or alcohol. Use a soft cloth lightly moistened with a mild detergent solution.

Ensure the cleaned surface is fully dry before reconnecting power.

Section 3: Unpacking and Installation

3.1 Unpacking

Carefully unpack the equipment and inspect it for damage during shipment. Retain all cartons and packaging materials until the unit is operated and found to be in good condition. If damage has occurred during shipping, notify the carrier and ATS immediately. If it is necessary to file a damage claim, retain the packing materials for inspection by the carrier.

3.2 Positioning and Connecting

1. If the oven is equipped with mounting brackets, install them at this time. Refer to the mounting bracket installation drawing at the back of this manual if available.

2. Place the unit on a sturdy work surface. Remove any package materials from the unit. Adjust the oven position to align with the load train and other applicable accessories.

WARNING: If this device weighs in excess of 35 lbs (16 kg), a two-man lift is required.

CAUTION: If the oven is used on a workbench, all supporting and contacting surfaces must be nonflammable. Do not allow flammable materials to contact the shell.

3. Connect the thermocouple to the control system. Use the thermocouple type required for the control system. Refer to the appropriate manufacturer's literature.

NOTE: Thermocouple extension cables and connectors must be compatible with the thermocouple type being used.

4. Connect the control cable to the terminals on the oven as marked. Refer to the oven wiring diagram enclosed in this manual for terminal identification.

5. If equipped, mount the cooling solenoid valve to the injector assembly on the oven. Use suitable flexible line or tubing to connect the supply tank to the solenoid valve. refer to Section 3.5 for procedural steps. Be sure to insulate the tubing as required.

6. Supply Cord Type: Flexible cordage that meets IEC 60227 or IEC 60245. Alternatively may be <HAR> marked or approved for use in the country in which the equipment is installed and suitable for the voltage and application.

Rating	250 VAC, 25A minimum
Conductor Size	2.5 mm2 (12 AWG)
Maximum Length	4.5 m (15 ft)
Number of Conductors	Two conductor (L, N) plus Ground

Connector (Male) Approved for use in the country in which the equipment is installed and suitable for the voltage and application.

CAUTION: The oven and the control system must be grounded according to code requirements.

3.3 Oven Bake-out

The following bake-out procedure must be performed on new ovens, those ovens that have new insulation, and ovens that have been in storage for a long period of time in an unheated storage area. Ovens with newly-replaced heating elements do not require a bake-out.

NOTE: Internal light should be removed during oven bake-out. Remove the light and replace it with the insulation plug provided.

NOTE: If the oven is used with a retort, perform the bake-out procedure with the retort. Be sure to vent the retort during the procedure.

WARNING: Bake-out will produce odors and smoke. It should be performed in a well-ventilated area.

1. Heat the oven to 400° F (205° C), and open the end caps or door slightly to ventilate. Let the oven soak at this temperature for approximately two (2) to four (4) hours until all traces of water vapor and gases are gone. If this is a high temperature model, soak time is four (4) to eight (8) hours.

2. Increase the oven temperature to 800° F (425° C) or the rated oven temperature, whichever is lower. Bake until smoke and odor are eliminated.

NOTE: Use 1000° F (537° C) for high temperature models.

3. Increase the temperature to the expected operating temperature, if it is higher than 800° F (425° C).

NOTE: Use 1000° F (537° C) as the baseline for high temperature models.

4. After the operating temperature is reached, shut off the power. With the odor or end caps closed, allow the oven to cool 8-10 hours or overnight before opening.

3.4 Oven Mounting to a Test Machine

Many ATS ovens are designed to mount on an ATS test machine. Use the mounting brackets and refer to the mounting bracket drawing (if provided) in the back of this manual. Also refer to applicable manuals for installation and operation procedures for each of the testing accessories.

3.5 Solenoid Valve Installation

Many ATS ovens are designed for cryogenic cooling. Before operating, install the solenoid valve using the following procedure.

NOTE: The customer must supply the following: CO_2 or LN_2 tank with a relief valve, flexible line with a 2500 minimum air pressure, and a ¼ NPT elbow.

1. Attach a siphon type CO_2 or LN_2 tank with a relief valve to a flexible line (2500 minimum air pressure).

NOTE: CO_2 tanks must be the inverted, bottom siphon type.

NOTE: Do not use regulators between the tank and the chamber.

NOTE: Avoid using manifolds. Changes in the cross section of the liquid path can result in the fluid solidifying.

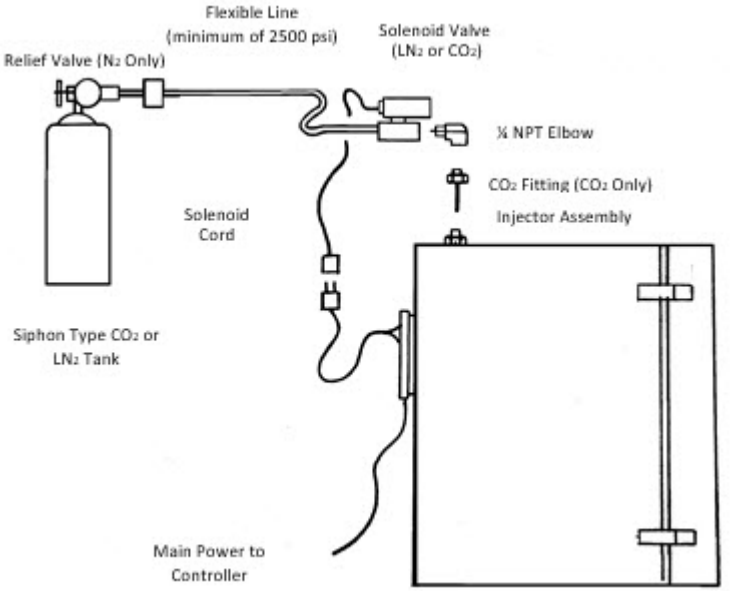
2. Attach the other end of the flexible line to the fitting on the solenoid valve.

3. Connect the solenoid cord to the mating connection that comes from the back of the oven.

4. Attach a ¼ NPT elbow to the solenoid valve according to the diagram.

5. If an LN_2 solenoid valve is used, skip to step 6. If a CO_2 solenoid valve is used, attach the elbow to the CO_2 fitting.

6. Insert the elbow (of the CO_2 fitting) into the injector assembly.



Section 4: Operation

1. Install the specimen and related components, such as the load train and testing accessories. Allow sufficient clearance with specimen and load train; this will prevent damage to the oven if the specimen fails.

   NOTE: Keep the load train components as small as possible in order to minimize heat transfer.

2. Turn on the temperature controller and adjust it to room temperature. Check the blower operation and air flow inside the oven. The blower should operate continuously when the temperature controller is turned on.

   NOTE: Refer to the manufacturer's literature for temperature controller operation.

3. Close the oven door and set the desired temperature setpoint on the temperature controller.

   NOTE: Internal lamps have a maximum operating temperature of 600° (315° C) unless stated otherwise. To operate the oven above this temperature, remove the lamp and replace it with the insulation plug provided.

CAUTION: Prevent injury from escaping heat. Keep hands and face from the oven door opening.

NOTE: If applicable, do not start cryogenic cooling when the oven temperature is above 300° F (148° C).

4. Upon completion of the test, return the controller setpoint to room temperature and open the door slightly to vent the oven.

5. After the oven has returned to room temperature, turn off the temperature controller and the main power.

CAUTION: Failure to disconnect the power may result in personal injury or death.

Section 5: Maintenance

WARNING: When performing maintenance and servicing, disconnect power first. Failure to do so could result in serious injury or death from electrical shock.

WARNING: REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.

5.1 Preventive Maintenance

If the blower motor is equipped with oil cups, lubricate with 5 drops of SAE 20 non-detergent oil at 6-month intervals.

Check the blower motor extension shaft at monthly intervals or between tests to make certain the assembly is secure. Heating and cooling cycles cause expansion and contraction of the assembly that may loosen the set screws and/or mounting screws.

5.2 Corrective Maintenance

5.2.1 Blower Replacement

1. Disconnect power to the oven and remove the plenum cover.

2. Loosen the set screws and remove the machine screw holding the blower on the shaft. Remove the blower wheel. If replacing the motor or shaft adapter, remove the motor from the rear of the oven. Loosen the set screws holding the shaft to the motor and remove the shaft.

NOTE: Before reassembling the blower assembly, use an anti-seize compound to coat the mating surfaces of the blower shaft, the adapter, the blower wheel hub, and the set screws.

3. Mount the blower motor onto its moutning bracket.

4. Secure the bracket in a vise.

5. Install the shaft adapter onto the motor shaft.

6. Spin to check shaft concentricity with an indicator - adjust with 4 set screws until adapter is concentric within ± 0.001."

7. Install assembly onto oven.

8. Install blower wheel onto shaft (blower wheels are pre-balanced).

9. Tighten the set screws.

10. Install the machine screw.

11. Install the plenum cover.

5.2.2 Thermocouple Replacement

1. Disconnect the thermocouple connector at the side of the oven and remove the thermocouple from the oven.

2. Remove the old thermocouple from the connector and replace it with the new device.

3. Route the replacement unit into the chamber following the original routing and reconnect.

NOTE: If the temperature reading drops as the oven temperature increases, the polarity of the thermocouple is reversed. Correct the polarity problem by stopping the heating process and reversing the thermocouple. Continue the heating process if the temperature reading rises as the oven temperature rises.

5.2.3 Heating Element Replacement

ATS ovens are equipped with either cartridge or fin strip elements. Both element types may be replaced in the field.

1. Disconnect power to the oven before replacing the heating elements.

CAUTION: Failure to disconnect the power may result in personal injury or death.

2. Refer to the wiring diagram in the back of this manual. Follow the instructions below, depending on the oven's wiring type.

3. Cartridge Elements: Remove two screws from the affected element.

   a. Use a DMV (Digital Volt Meter) to check resistance of each heating element. Note that resistance should be low because infinite resistance corresponds to an open or defective element.

   b. Remove the defective element's wires from wire bundle.

   c. These elements are accessed through the side of the oven and are held in place by two screws.

   d. Remove and replace the heating elements.

   e. Trim and connect wires to the terminal block, and use the wire ties to dress up the wire harness. Allow a space between the wire harness wires and oven shell.

4. Fin Strip Elements: Access these elements by removing the plenum cover.

   a. Disconnect the wires at the element.

   b. Unbolt the defective heating element and replace it with the new one.

   c. Replace the nuts and bolts.

   d. Connect the wiring and check for shorts to electrical ground.

   e. After electrical shorts have been checked for and/or fixed, replace the plenum cover.

Appendix A: Warranty

Warranty Statement

Your Applied Test Systems product has been manufactured and inspected by experienced craftsmen. Applied Test Systems warrants, for the original purchaser, each product to be free from defects in material and workmanship for a period of thirteen (13) months from date of shipment or twelve (12) months from date of installation whichever comes first. This warranty does not apply to failures caused by normal usage, misuse, or repair or service by unauthorized personnel, nor does it cover limited life electrical components which deteriorate with age such as tubes, lamps, fuses, and heaters. The warranty does not extend to products not manufactured or assembled by Applied Test Systems.

This warranty is expressly limited to the repair, replacement, or adjustment of the product at Applied Test Systems' option. The product must be returned to the Applied Test Systems factory or an authorized repair center. Applied Test Systems shall not be liable for any labor, transportation, or installation costs that may arise in connection with the product or return.

To obtain warranty service:

1. Applied Test Systems must be promptly notified in writing of the defect.

2. Upon receipt of written authorization, said defective equipment is returned as directed, with transportation charges prepaid by the buyer and –

3. Applied Test Systems examination of such equipment discloses to its satisfaction that the defect exists and was not caused by negligence, misuse, improper installation, accident, or unauthorized repair or alteration.

This warranty is in lieu of all other warranties, expressed or implied, including the implied warranty of merchantability or fitness for particular purpose. In no event shall Applied Test Systems be liable for direct, indirect, special, incidental, collateral or consequential damages.

The aforementioned provisions do not extend the original warranty period of any article that has been either repaired or replaced by Applied Test Systems.

Applied Test Systems reserves the right to change published specifications.

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