APPLIED TEST SYSTEMS
THE MARK OF RELIABILITY

INSTRUCTION MANUAL

RTFO Touch

Rolling Thin Film Oven

This manual contains important operating and safety information. Carefully read and understand the contents of this manual prior to the operation of this equipment.

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Information in this document is subject to change without notice and does not represent a commitment on the part of Applied Test Systems (ATS).

For assistance with set-up or operation, contact the ATS service department. Please have this manual and product serial number available when you call.

Telephone: +1-724-283-1212.

Manual Contents

A. Introduction

A.1 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.

A.2 After Sale Support

If there are any questions concerning the operation of the unit or software, contact the ATS service department at +1-724-283-1212. Before calling, please obtain the software revision number and the serial number from the unit's data tag or View Screen. A sample data tag is illustrated in Figure A.1, and can be completed with the unit's information for easy reference. Please be prepared to give a complete description of the problem to the ATS service department.

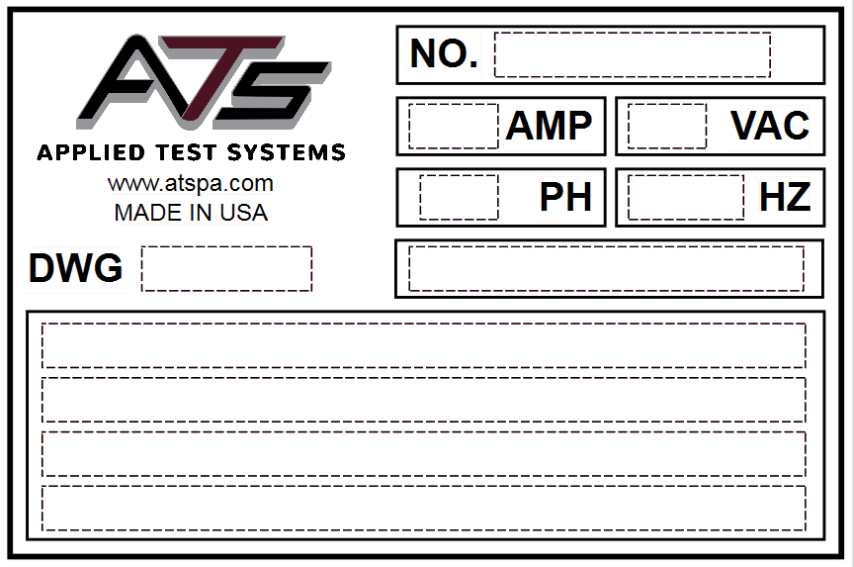


Figure A.1 - ATS Sample Data Tag

B. Safety

B.1 For Owners, Operators, and Maintenance

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.

All ATS equipment is designed to be operated with the highest level of safety. To maintain the safe operation of this tester, ATS endeavors to educate the operator about safety issues surrounding certain parts of the machinery. These safety issues are addressed through the use of labeling on the equipment. The following labels may appear on your test unit:


Burn Hazard/Hot Surface


Electrical Shock/Electrocution


Protective Earth (Ground)


General Danger. When this symbol is displayed, user must **always** consult the manual to determine the potential hazard(s) and any actions required to avoid them.


No Access for Unauthorized Persons


Read Operator’s Manual


Hand Entanglement


Ignition/Explosion

Additionally, the responsible body shall ensure that:

i. appropriate decontamination is carried out if hazardous material is spilled onto or into the equipment

ii. no decontamination or cleaning agents are used which could cause a hazard as a result of a reaction with parts of the equipment or with material contained in it

iii. the manufacturer or his agent is consulted if there is any doubt about the compatibility of decontamination or cleaning agents with parts of the equipment or with material contained in it

B.2 Warnings

The following statements are warning statements. Unlike caution statements, warning statements alert the operator to conditions that may injure personnel. Operators must be aware of these conditions in order to prevent injuries that may occur while operating this equipment.

WARNING: Disconnect power prior to performing maintenance. Place Main Power Switch in ‘OFF’ position and disconnect the line cord from the power source before performing any maintenance procedures

WARNING: Obey electrical code requirements. The oven and control system must be wired and grounded in accordance with national and electrical code requirements.

WARNING: Be careful when working with equipment at elevated temperatures. In order to prevent burns, wear protective clothing.

WARNING: Use caution when opening the oven. Electrically heated equipment can cause severe burns.

WARNING: The air circulation fan is controlled by a door switch to protect operators from the fan. If the fan continues to operate after the door is opened, discontinue use immediately and contact the ATS Service Department at +1-724-283-1212.

WARNING: Unpack and operate on a stable surface.

WARNING: Pinch hazard.

WARNING: Do not open the side panel unless explicitly instructed to do so for troubleshooting purposes.

WARNING: Do not use flammable solvents to clean the oven or use with products other than designed for.

WARNING: Using solvents or products not specified by the equipment manufacturer may create potential for formation of flammable or volatile gas mixtures. Always refer to

product SDS or contact the manufacterer.

WARNING: Do not place objects that may obstruct the sample rack or blower.

WARNING: Before removing the air coil assembly always make sure the unit is powered off and unplugged.

WARNING: Unit should always be operated in a well ventilated area. Refer to and adhere to SDS sheets of product being tested.

WARNING: Proper Personal Protective Equipment (PPE) required for removal of hot glassware.

B.3 Cautions

The following statements are caution statements. These statements alert the operator to conditions that may damage equipment. Operators must be aware of these conditions in order to ensure safe operation of the equipment.

CAUTION: Installation of electrical devices must be accomplished by competent personnel and done in accordance with any current local and national codes.

CAUTION: The RTFO Touch must be grounded and wired in accordance with national and local electrical code requirements.

CAUTION: Before energizing the electrical power to the RTFO Touch, place all controls in an OFF position.

CAUTION: Do not exceed the maximum operating temperature.

CAUTION: All supporting and contacting surfaces must be non-flammable. Do not allow flammable materials to contact the shell.

CAUTION: If an emergency shutdown needs to be performed, place ON/OFF switch in an OFF position.

CAUTION: Do not overflow RTFO Touch bottles. Refer to test specifications for proper amount of material.

C. System Overview

C.1 Equipment Parts

Front of Unit

Figure C.1 - RTFO Touch Front

1. HMI
2. Fan Motor
3. Carousel Wheel Motor
4. Power Indicator
5. Power Switch
6. USB Interface
7. Jog Button
8. Carousel with High Temp. Silicon Rings
9. Leveling Legs

Back of Unit

Figure C.2 - RTFO Touch Back

1. Ethernet Port
2. Cooling Fan
3. Alarm
4. Air Inlet/Input Filter
5. Power Cord

Interior Chamber

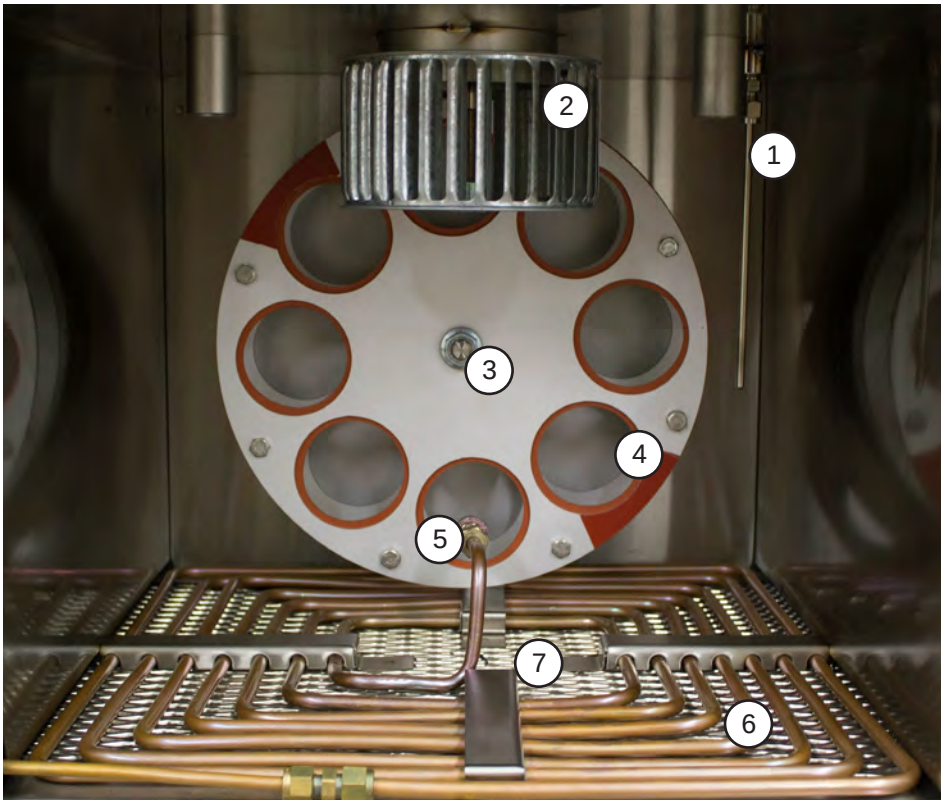


Figure C.3 - RTFO Touch Chamber

1. Internal RTD
2. Fan
3. Carousel
4. Jar Holder
5. Air Oriface
6. Airline Plumbing
7. Tray
8. Heaters (located under tray)

Interior Controls

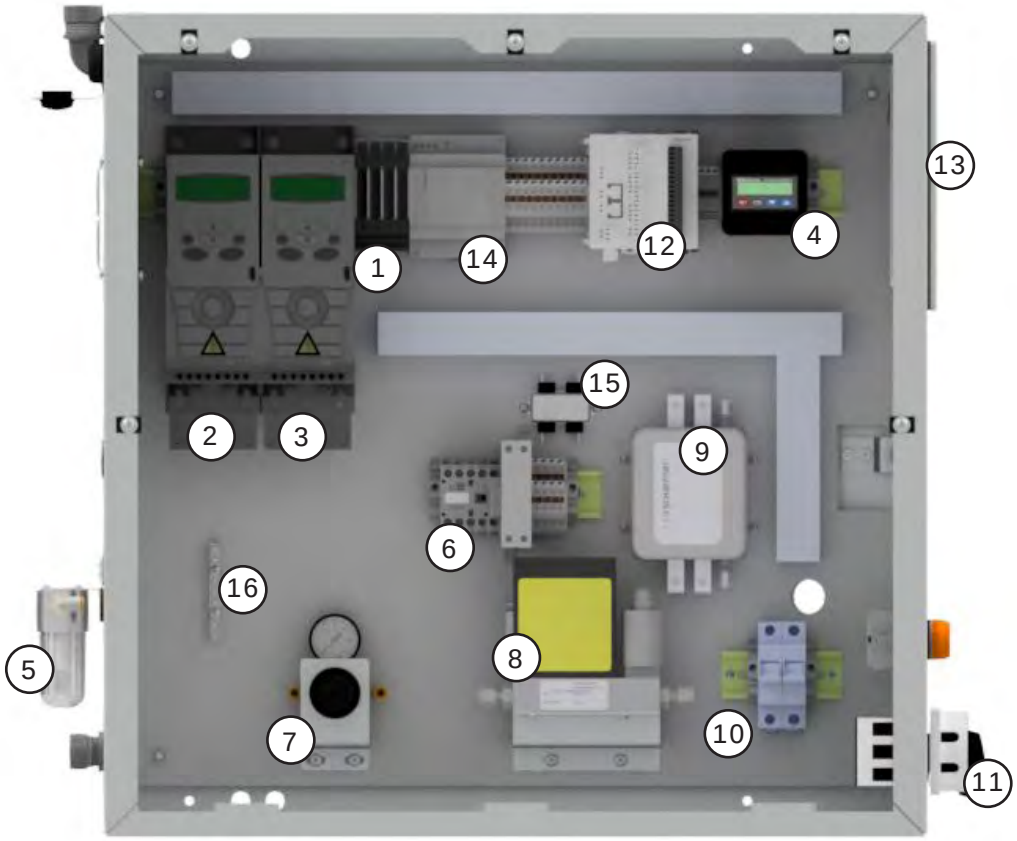


Figure C.4 - Panel Layout & Components

1. Fuses 1-4*
2. Fan Drive
3. Carousel Drive
4. Temperature Controller
5. Air Input Filter
6. Heat Control
7. Air Regulator
8. Air Flow Control
9. Line Filter
10. Circuit Breaker
11. Main power Switch
12. PLC
13. HMI
14. Power Supply
15. Line Filter
16. Ground Bar

*Fuses 1 & 2 for Fan, Fuses 3 & 4 for Carousel

C.2 General Description

The RTFO Touch provides a controlled flow of heated air directed into the openings of horizontal glass bottles as they rotate on a carousel rack, simulating short term aging of binder during production, handling, and paving operations. It exceeds ASTM D2872, AASHTO T 240 and California 346 testing standards with a 5 to 8 minute recovery time.

When operating the RTFO Touch, always make sure to wear the proper personal protective gear (PPG), including high temperature work gloves.

This equipment is intended to be used only as described in this manual and the applicable standards. Use in any other manner may result in personal injury, property damage, damage to the equipment, and void of warranty.

Accessory Items

- Specimen Containers
- RTFO Bottle Scraper
- Specimen Removal Tool/Tongs

Product Specifications

Size	32.50” W x 28.00” D x 31.258” H
Power Requirements	240V, 1ph, 50/60Hz, 10A
Power Rating	2400 VA (+/- 10%: 2640 VA - 2160 VA)
Air Pressure	60 PSI inlet pressure (414 kpa) @ Class 3 Quality max particle of 5um
Weight	270 lbs.
Temperature Range	0°C to 200°C ± 0.5°C
Specimen Capacity	8 high temperature glass bottles

D. Installation

D.1 General Installation

The following procedure describes how to properly unpack, connect, and power the RTFO Touch.

1. Carefully remove the RTFO Touch from shipping packaging, removing any packing material and/or accessories that may have been placed inside of the oven chamber for shipment.

WARNING: Always lift from under the oven with forks or proper lifting equipment. Do not lift from the electrical enclosure.

2. Connect the power cord to the proper receptacle on the wall. Be sure to verify that the power switch on the front is in the OFF position. Using the attached plug will properly ground the unit. If the country the unit is shipped to doesn't use NEMA style plugs then they should use a suitable 3 prong plug installed by a qualified person. This unit is a 230-240 VAC 50/60 Hz/10 amp capacity.

Figure D.1 - Power switch in the OFF position

Figure D.2 - Power switch in the ON position

4. Rotate the power switch on the front from the horizontal OFF position to the vertical ON position (Figure D.1 and Figure D.2) to turn the unit on. The power light above the switch should now be illuminated.

5. This unit requires an air supply of at least 90 PSI. Set up the air by installing your male air fitting into the female receiver (Figure D.3). Secure with Teflon tape.

Figure D.3 - RTFO female air connection

D.2 Leveling the Machine

1. Using a digital level check the level on the top of the RTFO and the bottom portion of the RTFO for a reference point

2. Insert a cut jar in the carriage to check the level at different points of rotation. The level should be +/- 1.0 Degrees from the reference point

3. If adjustments are needed, adjust the legs on the bottom of the RTFO until level.

D.3 Remote Communication Setup (Optional)

The RTFO Touch is equipped with the ability to connect remotely, and is ready to be connected as soon as it is uncrated. All you will need is an internet connection and a VNC Viewer program loaded onto your mobile device.

Both the VNC Password and IP Address fields are programmed with factory default numbers when each unit is shipped. Before connecting remotely, the administrator will need to change both the password and IP address to custom numbers unique to your system. This can be done by accessing the View Screen (Figure D.4). Enter your numbers in the “VNC Password” and “IP Address” fields and press “Done”.

Users attempting to access the RTFO Touch remotely using the VNC Viewer program will need both the VNC Password and IP address to login. Caution should be used when distributing this information as the remote login can control the machine.

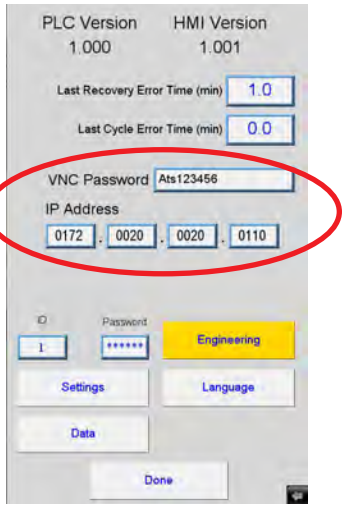


Figure D.4 - IP Address and Password, View Screen

E. Verification

E.1 Temperature Verification

1. Insert a temperature probe into the top left porthole

2. Connect probe with a brass block to the RTD inside (right side)

3. On the HMI select “Preheat”

4. Allow unit to heat up and stabilize

5. Once stabilized at the temperature that needs verifying, take 5 readings, 10 minutes apart and compare results.

E.2 Verification of Air Flow

1. Attach a flow verification device to the copper tubing inside the RTFO (if using a flow through device the orifice can be removed from the tubing and attached to the downstream end.

2. Allow 15 minutes to stabilize

3. Take 5 comparison readings every 3-5 minutes. 3 readings minimum, 5 recommended.

F. Operation

WARNING: Electrical shock hazard. Heating elements are electrically live during operation. Do not insert anything through the tray that will contact these elements!

Operator shall observe at least one of the following precautions against Electric Shock when accessing the inside of the oven:

i) Use only insulated tools

ii) Wear insulated gloves

iii) Stand on insulated surface

F.1 Test Setup

Figure F.1 (below) illustrates the proper navigation of the RTFO Touch's software screens. Use this map along with the instructions in this section to properly setup your test.

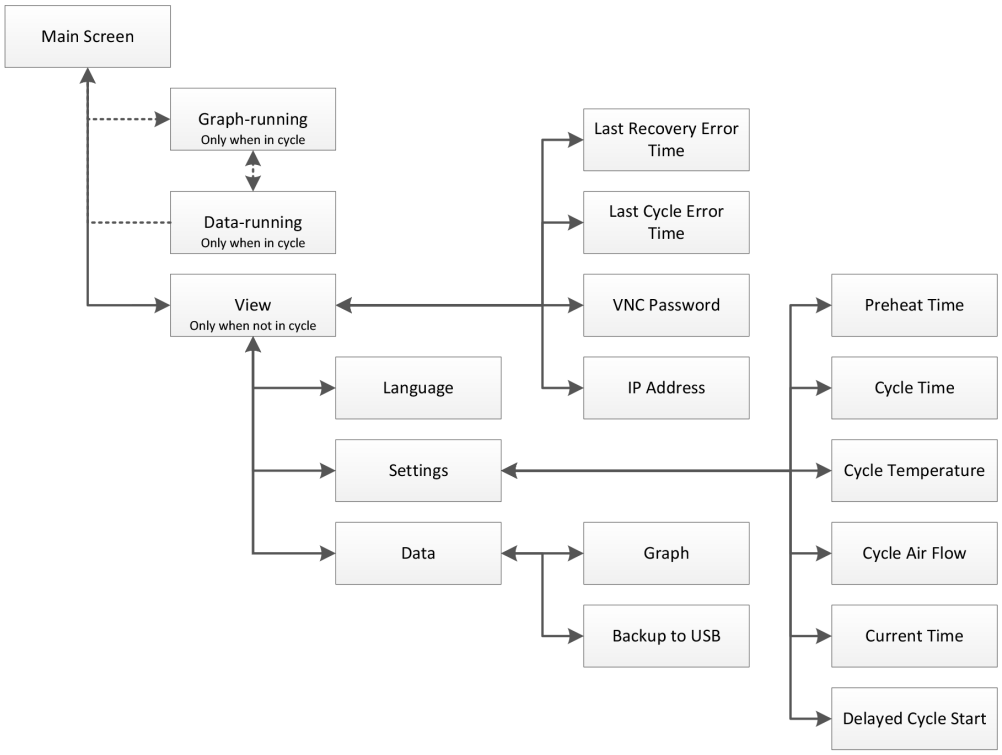


Figure F.1 - RTFO Touch Software Screen map

Once the RTFO Touch has been turned on, the Main Screen (Figure F.2) will launch. This screen screen will show values for machine temperature and air flow. It also has several controls to set-up and run the machine.

Figure F.2 - Main Screen

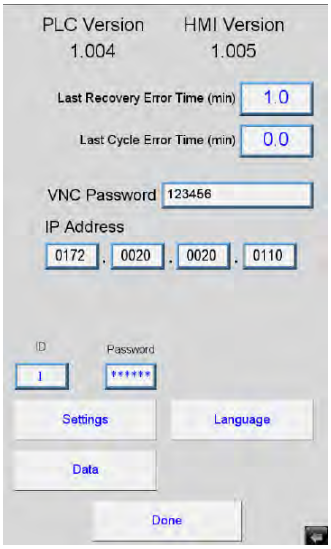


Figure F.3 - View Screen

Figure F.4 - Language Screen

Language

1. From the Main Screen (Figure F.2) press the “View” button to access the View Screen (Figure F.3).

2. Once on the View Screen, press the “Language” button located at the bottom of the screen.

3. This will take you to the Language Screen (Figure F.4), which will present you with several language choices. Select the appropriate language for operation, then press “Done” to return to the View Screen.

Preheat

1. From the View Screen, press the “Settings” button to access the Settings Screen (Figure F.5). The majority of your test setup will occur on this screen.

2. On the Settings Screen, the Preheat (min) field indicates the amount of time the system heats after the “Preheat” button is pressed. The system status bar on the Main Screen will read “Preheat” during this time. Using the touchscreen, enter your desired preheat time into this section.

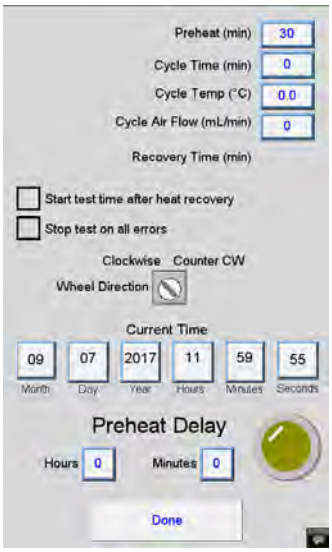


Figure F.5 - Settings Screen

Cycle Time (min)

1. Below the Preheat field there is a field for the Cycle Time (min). The Cycle Time (min) field indicates the amount of time the system runs the cycle after the “Run Cycle” button is pressed. Enter your desired cycle/ aging time here.

Cycle Temperature (°C)

1. Below the Cycle Time (min) field is the Cycle Temperature (°C) field. Use this field to enter the temperature set point you require the system to reach during preheat.

Cycle Air Flow (mL/min)

1. Below the Cycle Temperature (°C) field is the Cycle Air Flow (mL/min) field. Enter the air flow set point required when the cycle is running here.

Current Time

1. The Current Time section located below the Cycle Air Flow (mL/min) field allow the operator to set the current date and time. These settings are used to log test data files. Verify that this information is correct, or adjust as needed using the touchscreen.

2. If you do not need to set a Preheat Delay for your system, press the “Done” button now to return to the View Screen. Press the “Done” button a second time to return to the Main Screen and complete your test setup.

3. If your test requires a Preheat Delay, remain on the Settings Screen and follow the instructions below.

Preheat Delay (Optional)

The RTFO Touch features an optional Preheat Delay function, which allows operators to program the system to start the preheat cycle automatically after a specific timed delay. This feature is setup using the bottom portion of the Settings Screen.

1. To program a preheat delay, enter the hours and minutes you want to wait before the preheat starts and press the yellow button beside the “Minutes” field. For example, if you wanted the preheat to begin at the same time the next day you would enter “24” into the hours field.

2. The yellow button will light up to show that a delay has been set. This button acts as a toggle switch, allowing users to turn off a delay that has been started by pressing the lit button again.

Figure F.6 - Status bar, Preheat Delay state

3. During an active Preheat Delay, the status bar on the Main Screen will read “Preheat Delay” (Figure F.7), and the remaining time before preheat start is shown.

4. Once you have set your Preheat Delay, press “Done” on the SETTINGS screen to return to the VIEW screen. Press DONE on the VIEW screen to return to the MAIN screen.

F.2 Run Test

1. Press “View” on the Main Screen.

2. Once on the View Screen, press “Settings” to access the Settings Screen.

3. Verify that the Preheat Time, Cycle Time, Cycle Temperature, and Cycle Air Flow are all set up to the specification you wish to test to.

4. Press “Done” to return to the View Screen, and then press “Done” again to return to the Main Screen.

7. Press the “Preheat” button. The RTFO will start heating to the cycle temperature for the duration of the preheat time. The status display will change to “Preheat” (Figure E.7).

Figure F.7 - Main Screen - Preheat

8. Once the preheat is complete, the status display will read “Load Samples”. Verify that the temperature and air flow are correct on the Main Screen, then load the sample jars. Rotate the carousel using the “Jog Wheel” button on the Main Screen. It is normal for the unit temperature to drop when the door is open. The RTFO will recover back to the set point within eight minutes once the door is closed.

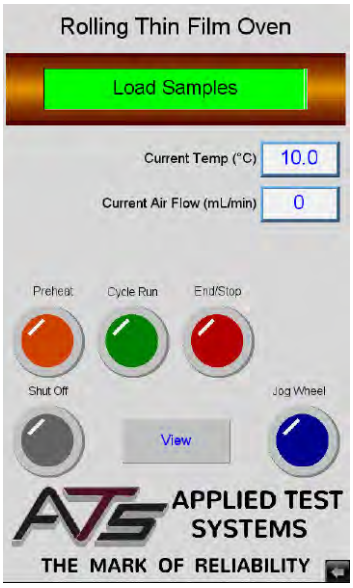


Figure F.8 - Main Screen - Load Samples

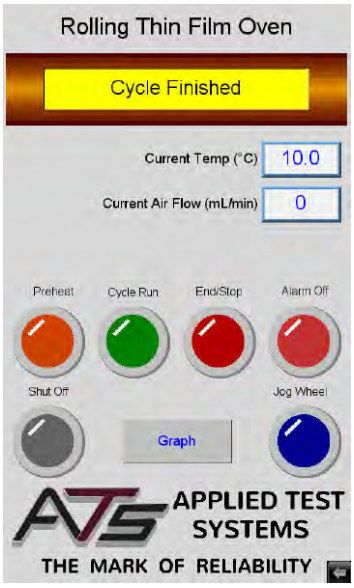


Figure F.9 - Main Screen - Cycle Finished

9. Once the samples are loaded, press the “Cycle Run” button to start the cycle. The status display should change to “Cycle Running”.

WARNING: Unit should always be operated in a well ventilated area. Refer to and adhere to SDS sheets of product being tested.

10. When the aging process is complete, the status display will read “Cycle Finished”. Press the “End/Stop” button. Unload the samples per the specification, rotating the carousel using the “Jog Wheel” button. Pressing the “Alarm Off” button will stop the alarm from sounding - once the button is pressed, the “Alarm Off” button will disappear.

11. You are now ready to load the next test samples. If you are done testing for a long period of time and wish to turn off the oven, press the “Shut Off” button. When doing so, remember that the preheat time may be as long as 16 hours for some specifications so you may wish to leave the furnace on if you are going to be testing again soon.

G. Troubleshooting

G.1 Preface

Listed within this section are the most common troubleshooting errors that operators may encounter when using the RTFO Touch. Users may follow the steps provided to work through these basic errors.

WARNING: Any additional issues or system errors should be brought to the attention of the ATS service department immediately. Please do not attempt to independently fix any other system errors. Any additional errors fixed independent of the ATS service deparment could result in damage to the equipment, or injury on the part of the operator.

WARNING: Place Main Power Switch in 'OFF' position and disconnect power before removing side cover to access electrical panel. ONLY open the side panel when explicitly instructed to. Do not touch or alter anything within the side panel unless instructed to. Failure to adhere to this warning could result in severe electric shock, injury, or death.

G.2 Unit Will Not Turn On

1. Verify the system is plugged in to the correct power source, and that the cord is secured to the power input on the machine.

2. Verify the Main Power switch on the front of the unit is in the "ON" position and the light on the front of the unit is illuminated.

3. Verify that the system's circuit breaker is not tripped. Place Main Power Switch in "OFF" position and disconnect power. Remove the side door panel and refer to Section C.1 for the circuit breaker location. If the breaker is in the "OFF" position (Figure G.1), switch it to the "ON" position (Figure G.2).

Figure G.1 - Circuit breaker in the "OFF" position

Figure G.2 - Circuit breaker in the "ON" position

4. Verify the outlet is rated for the correct amperage (10 Amps).

5. Reconnect power and place Main Power Switch in “ON” position.

6. If the unit still does not power on or the breaker continues to trip once the power is restored after checking each of these areas, please contact the ATS service department at +1-724-283-1212.

G.3 Carousel Will Not Rotate

When the unit is powered on and the RTFO door is closed, the fan should rotate continuously. The carousel will only start rotating once the unit is in the run cycle mode (when a test is running).

CAUTION: Carousel rotation direction is user selectable. Check selected rotation before maintenance to carousel or carousel motor.

1. If the carousel does not rotate during run cycle mode and the door is closed, first open the door. Press the “Jog” button with the door open.

WARNING: Place Main Power Switch in ‘OFF’ position and disconnect power before removing side cover to access electrical panel and fuses.

2. If the carousel still does not rotate you will need to check the carousel fuses (fuse #3 and #4). Remove the side panel and refer to Section C.1, Figure C.4 for location.

3. An indicator light will signal if the fuses have blown. If the light is on, replace the fuses and press the “Jog” button with the RTFO door open to see if the carousel turns. If you replace the fuses and the carousel still does not turn, contact the ATS service department at +1-724-283-1212.

G.4 Fan Motor Will Not Rotate

When the unit is powered on and the RTFO door is closed, the fan should rotate continuously in a counter clockwise direction as viewed from above.

WARNING: Place Main Power Switch in ‘OFF’ position and disconnect power before removing side cover to access electrical panel and fuses.

WARNING: The fan should not rotate when the door is open. If the fan continues to operate when the door is open, contact the ATS service department.

1. If the fan does not rotate you will need to check the fan fuses (fuse #1 and #2). Remove the side panel and refer to Section C.1, Figure C.4 for location.

2. An indicator light will signal if the fuses have blown. If the light is on, replace the fuses, then check for fan operation. If you replace the fuses and the fan still does not turn, contact the ATS service department at +1-724-283-1212.

G.5 Unit Has No Airflow

1. Verify that the supply air connection is secure in the rear of the machine, and that the air flow is set to the specified setting on the Settings Screen.

WARNING: Place Main Power Switch in 'OFF' position and disconnect power before removing side cover to access electrical panel and fuses.

2. If the air flow is set at the appropriate setting but the unit still has no air flow, you will need to remove the side panel and check the air regulator. Refer to Section C.1 for location.

3. Verify that the air regulator is set at 22-25 PSI. If it is not, adjust as needed.

4. If the unit still has no air flow, please contact the ATS service department at +1-724-283-1212.

H. Maintenance

H.1 Cleaning the Unit

Before cleaning the RTFO, unplug the machine and allow it to cool. Always wear personal protective gear, and clean using Acetone. Do not use any other flammable solvents to clean this machine. Allow equipment to sit, with door open, for a minimum of 15 minutes before further use to allow any vapors from the cleaning solvent to dissipate.

WARNING: Do not use flammable solvents other than what is specified.

WARNING: Using solvents or products not specified by the equipment manufacturer may create potential for formation of flammable or volatile gas mixtures. Always refer to product SDS or contact the manufacterer.

H.2 Replacing Damaged Cables

A qualified person should perform the replacement of any cable. Replacement cables shall be of like kind, size, rating, and specification as originally supplied by the manufacturer. Use of cables not meeting original specifications may result in injury to personnel, improper operation, damage to equipment, and void warranty.

H.3 Greasing the Bearings

There are two bearings supporting the shaft of the carousel wheel that should be greased every six months with high temperature grease (Super Lube Synthetic Grease MFG#41150) or equivalent with a 260°C rating.

WARNING: Finger crush hazard.

Rear Bearing

1. Place Main Power Switch in “OFF” position and disconnect power.

Figure H.1 - Five Screws on Rear Cover

Figure H.2 - Screws on Chain Guard

Figure H.3 - Exposed bearing

2. To grease the rear bearing, remove the five screws on the rear cover (Figure H.1), then remove the six screws for the chain guard (Figure H.2). The bearing will now be exposed (Figure H.3). Pump grease in until it overflows slightly.

Front Inside Bearing

1. Place Main Power Switch in “OFF” position and disconnect power.

WARNING: Electrical shock hazard. The heating elements remain electrically live when the Main Power Switch is in the “ON” position. Always remember to place the Main Power Switch in the “OFF” position and disconnect power before performing any maintenance.

2. To grease the front inside bearing (located behind the carousel), first loosen the nut on the air line feed (Figure H.4). Once the nut has been loosened, remove the bottom tray and set aside (Figure H.5).

3. Next use a 1/16 Allen Wrench to loosen the set screw located within the nut in the center of the carousel. See Figure H.6 for location, refer to Figure H.7 to loosen. Once the set screw has been loosened, use a 3/4 wrench to loosen the nut (Figure H.8).

4. Remove the carousel. The bearing is now exposed and can be easily greased (Figure H.9). Pump grease into the bearing until it overflows slightly.

Figure H.4 - Loosen nuts on the air line.

Figure H.5 - Remove the tray.

Figure H.6 - Front inside bearing set screw

Figure H.7 - Loosen set screw.

Figure H.8 - Use a 3/4 wrench to loosen the nut surrounding the set screw.

Figure H.9 - Front inside bearing.

H.4 Chain Maintenance

1. Place Main Power Switch in “OFF” position and disconnect power.

2. Remove the rear cover and the center guard cover as performed in Section H.2. Check the chain for proper tension (Figure H.10) - when squeezed together in the middle, the chain should have at least one inch distance between the two sides. If the distance is less than one inch, loosen the screws and adjust until it reaches the proper distance.

WARNING: Finger crush hazard.

3. Remove the two screws that fasten the top cover and check the set screws on the top sprocket (Figure H.11) as well as the ones on the bottom sprocket. If they seem loose, tighten as needed.

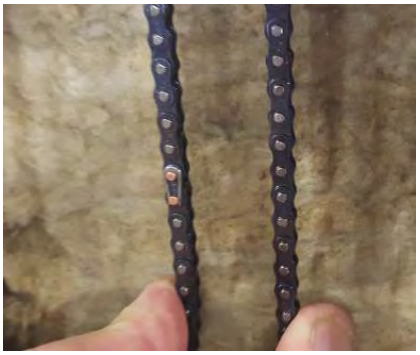


Figure H.10 - Check the chain for proper tension.

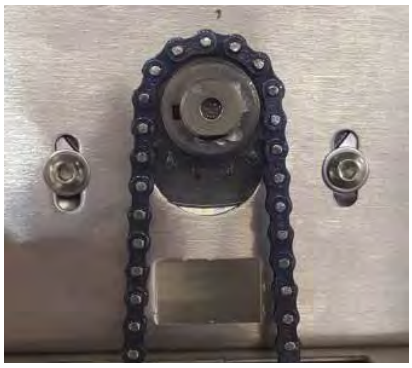


Figure H.11 - Checking the set screws on the top sprocket.

H.5 Tray Cleaning

1. Place Main Power Switch in “OFF” position and disconnect power.

WARNING: Electrical shock hazard. The heating elements remain electrically live when the Main Power Switch is in the “ON” position. Always remember to place the Main Power Switch in the “OFF” position and disconnect power before performing any maintenance.

2. Loosen the nuts on the copper airline feed using two wrenches until the copper airline can be pulled apart (Figure H.12). This will allow the removal of the tray.

3. Remove the bottom tray and clean with Acetone (Figure H.13).

4. The coils underneath the tray are extremely sensitive and do not require regular cleaning (Figure H.14). Should any material drip onto the coils, it will burn off gradually over time. Any additional cleaning may damage the coils.

Figure H.12 - Nuts on airline feed

Figure H.13 - Remove the tray

Figure H.14 - Sensitive coils

H.6 Replacement Parts

PART NUMBER	DESCRIPTION
102664	3-WIRE TEFLON CBL
102676	AC GEAR MOTOR
102677	AC MOTOR
RTFO-JAR	Additional Glass Containers
102569	Blower Wheel
102661	Ceramic Hook
RTFO-SCRAPER	Custom Scraper for us with RTFO Jars
102568	Door Latch with Catch
100573	Enclosure Fan
102674	FUSE - CLASS GBB, 10A, 250V
ELE6111	FUSE - CLASS MDL, 1A, 250V
3-14604	Heating Element Assembly
102666	INDUC PROX
3-15047	One Heater Coil with Ceramic Hooks
102672	PUSH BUTTON
4-13492	Replacement Silicon Specimen Wheel Gasket

102283	Shaft Bearing
102675	Single Stage Relay
101129	SUP EMC/RFI FILTER - RLC CIRCUIT - 250VAC, 30A
102673	TEMP Controller
102824	THERMOSTAT
102678	VFD Drive

Appendix A: Warranty

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. Load cells are covered for manufactured defects only - incidents of over load or other customer misuse are not covered under warranty. 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 –

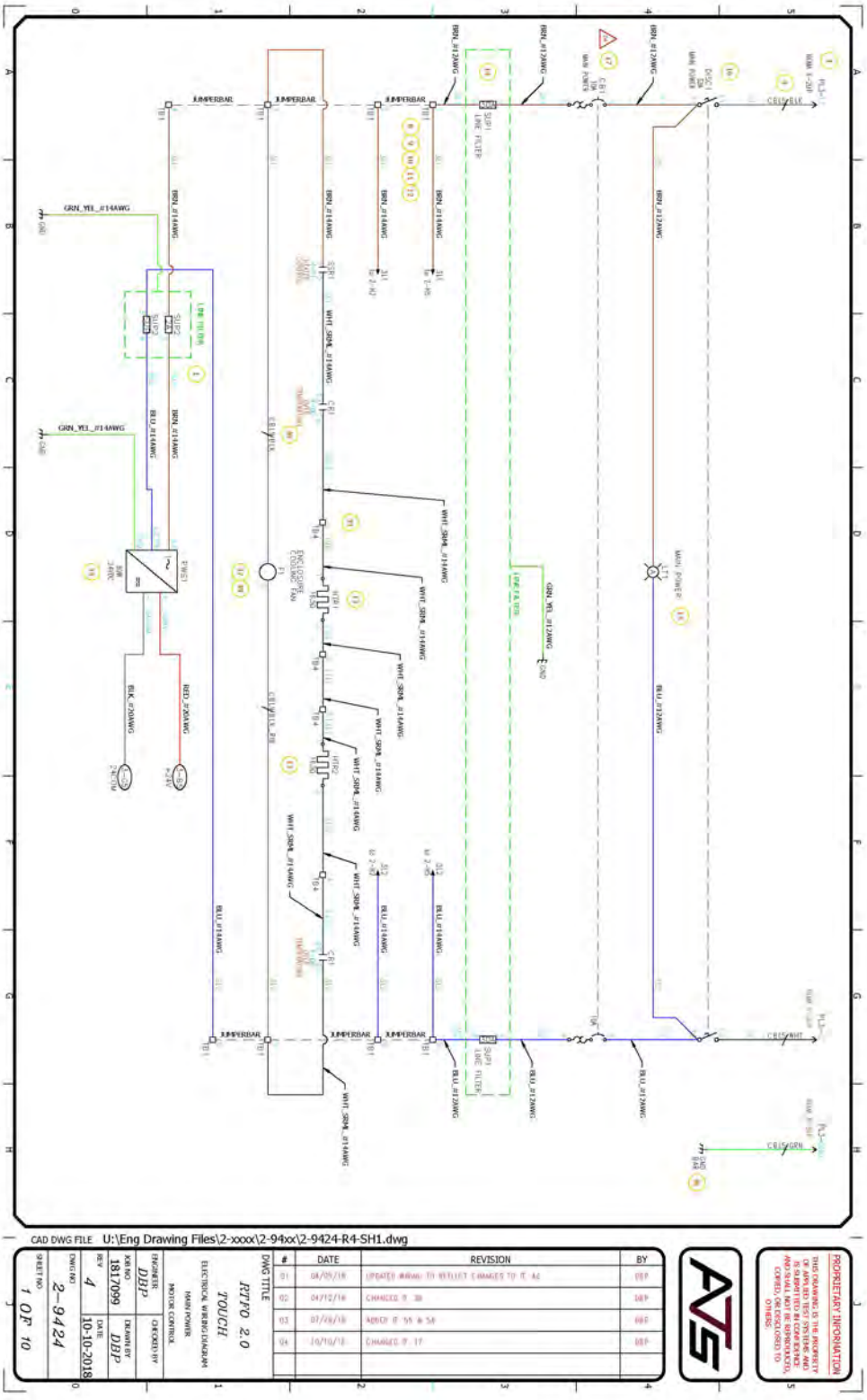
3. Applied Test Systems examination of such equipment discloses to its satisfaction that the defect exists and was not caused by negligence, misuse, improper installation, accident, or unauthorized repair or alteration.

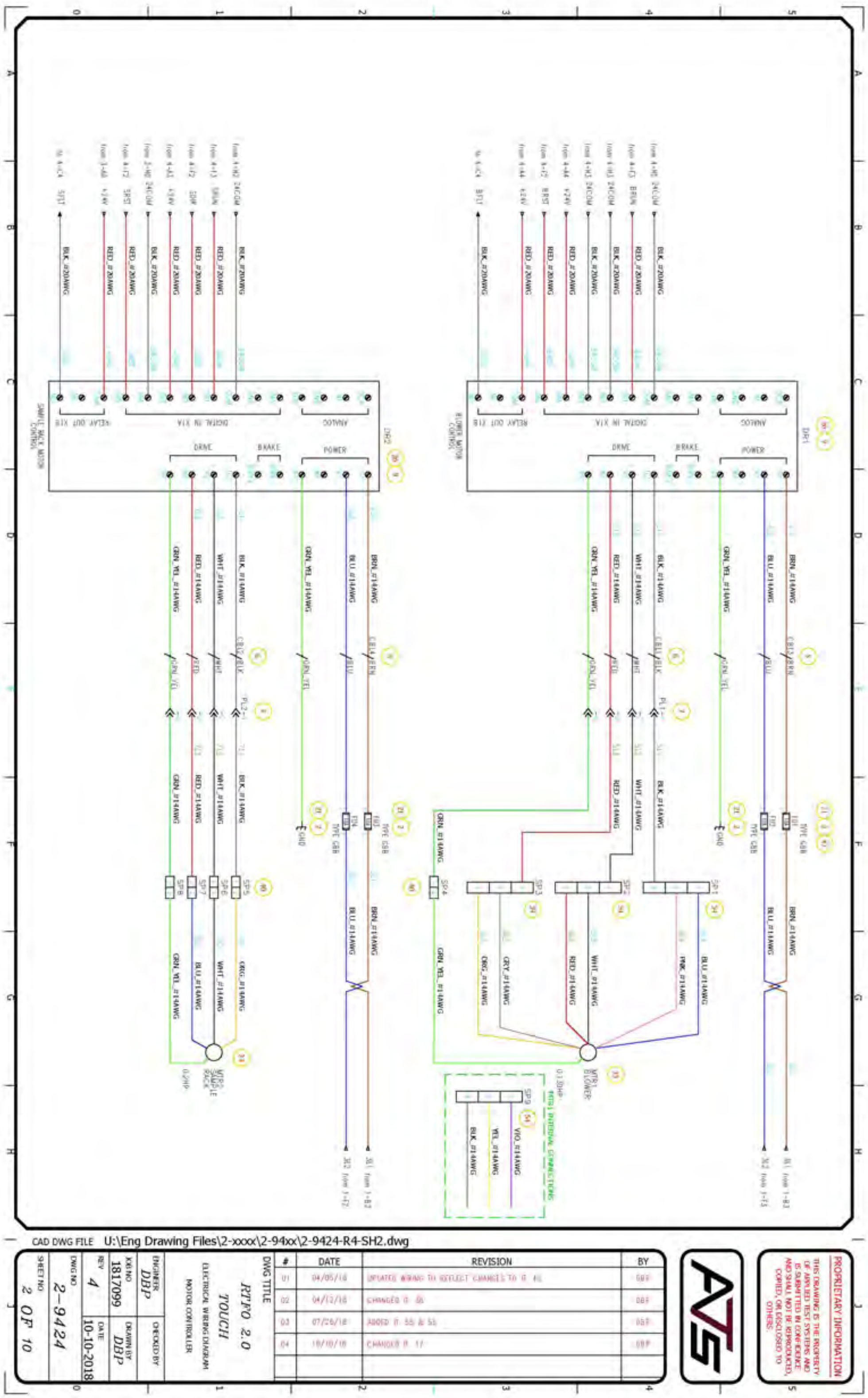
This warranty is in lieu of all other warranties, expressed or implied, including the implied warranty of merchantability or fitness for particular purpose. In no event shall Applied Test Systems be liable for direct, indirect, special, incidental, collateral, or consequential damages.

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.

Appendix B: Wiring Diagram

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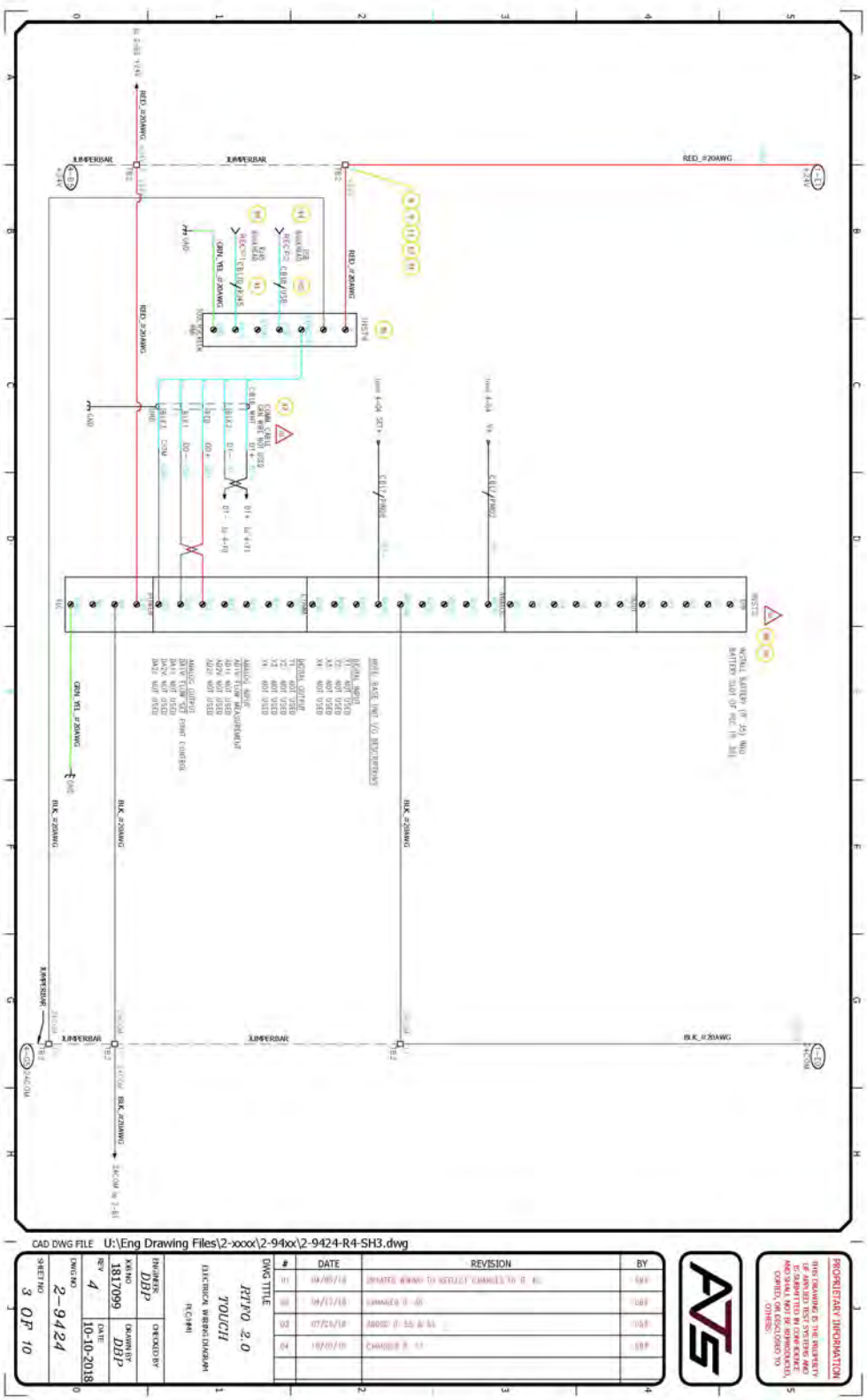
RTFO 2.0
TOUCH
ELECTRICAL WIRING DIAGRAM
MOTOR CONTROLLER
ENGINEER DBP
DRAWN BY DBP
JOB NO 1817099
REV 4
DATE 10-10-2018
DWG NO 2-9424
SHEET NO 2 OF 10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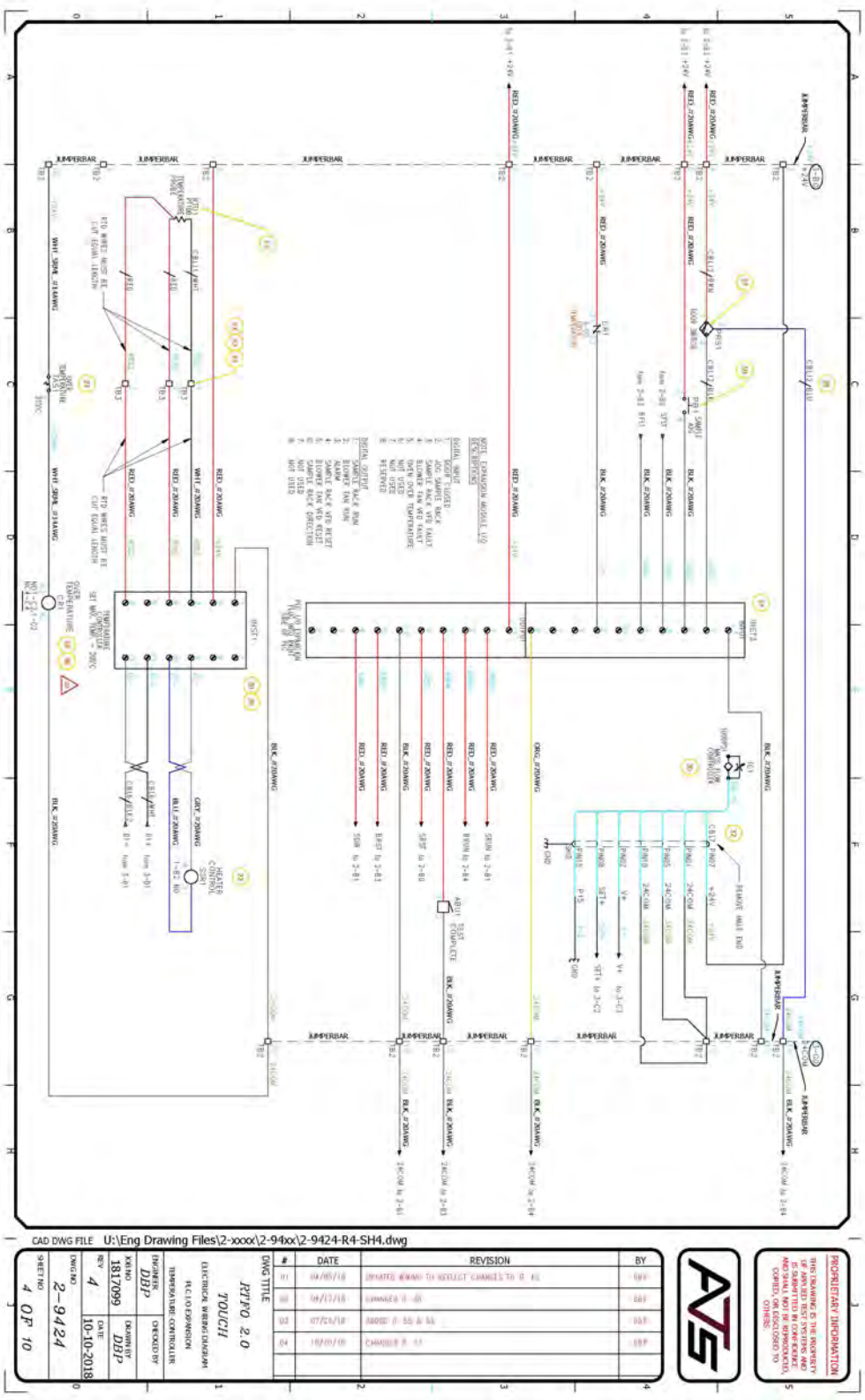
DWG TITLE RTFO 2.0 TOUCH
ELECTRICAL WIRING DIAGRAM
ENGINEER DBP
CHECKED BY
DRAWN BY DBP
DATE 10-10-2018
REV 4
DWG NO 2-9424
SHEET NO 3 OF 10
DATE REVISION BY
PROPRIETARY INFORMATION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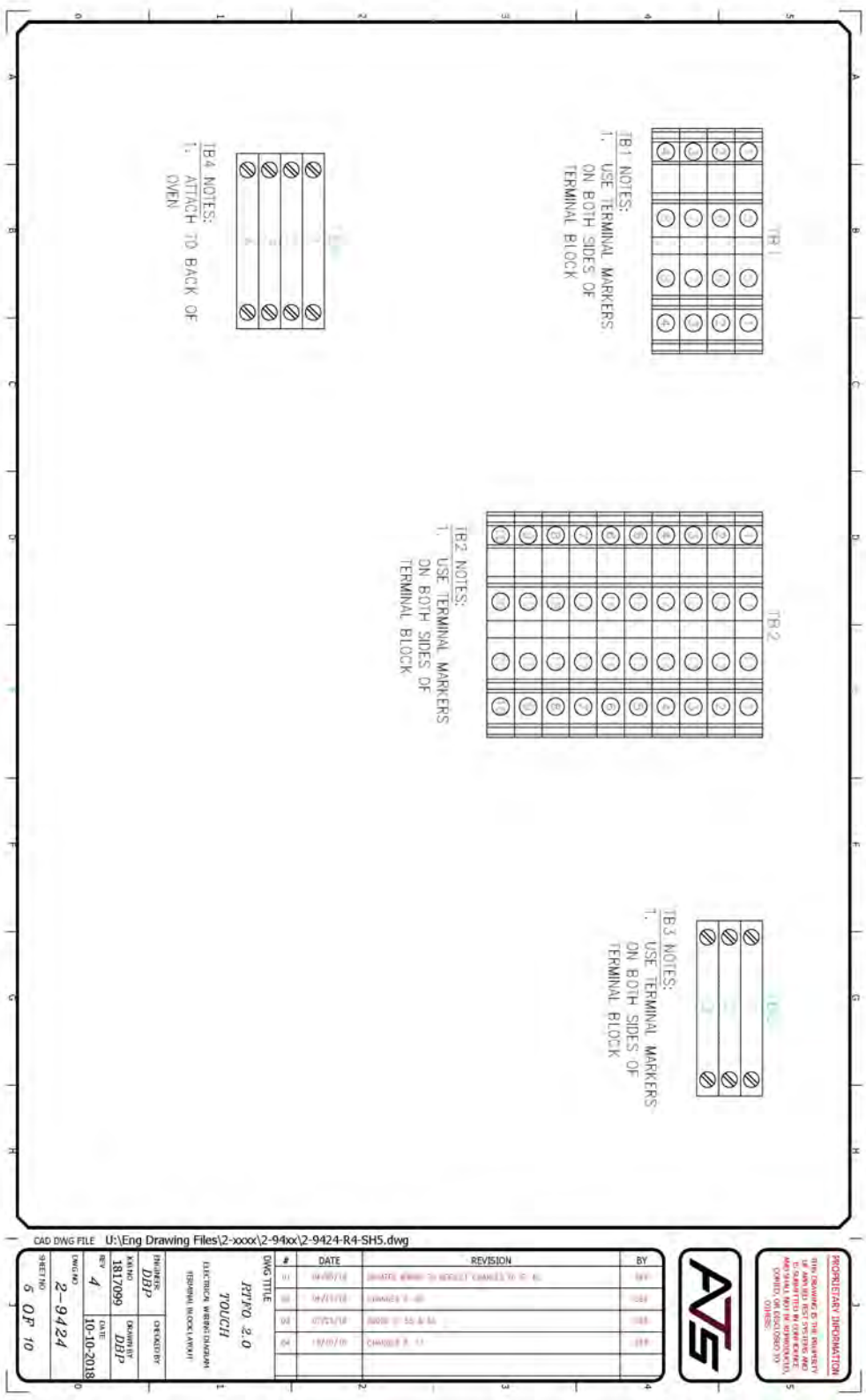
DWG TITLE
RTFO 2.0
TOUCH
ELECTRICAL WIRING DIAGRAM
H.C.I.O EXPANSION
TEMPERATURE CONTROLLER
ENGINEER DBP
CHECKED BY
DRAWN BY DBP
DATE 10-10-2018
DWG NO 2-9424
REV 4
SHEET NO 4 OF 10
XREFS 1817099
DATE REVISION BY
01 04/05/18 UPDATED WIRING TO REFLECT CHANGES TO 0-10
02 04/13/18 CHANGED 0-10
03 07/26/18 ADDED 0-10 & SS
04 10/10/18 CHANGED 0-10
PROPRIETARY INFORMATION
THIS DRAWING IS THE PROPERTY OF ADVED TEST SYSTEMS AND IS SUBMITTED IN CONFIDENCE AND SHALL NOT BE REPRODUCED, COPIED, OR DISCLOSED TO OTHERS.


TB1
TB2
TB3
TB1 NOTES:
1. USE TERMINAL MARKERS ON BOTH SIDES OF TERMINAL BLOCK
TB2 NOTES:
1. USE TERMINAL MARKERS ON BOTH SIDES OF TERMINAL BLOCK
TB3 NOTES:
1. USE TERMINAL MARKERS ON BOTH SIDES OF TERMINAL BLOCK
TB4 NOTES:
1. ATTACH TO BACK OF OVEN
PROPRIETARY INFORMATION
CAD DWG FILE U:\Eng Drawing Files\2-xxxx\2-94xx\2-9424-R4-SH5.dwg
DATE REVISION BY
DWG TITLE RTFO 2.0 TOUCH
ELECTRICAL WIRING DIAGRAM
TERMINAL BLOCK LAYOUT
ENGINEER DBP
CHECKED BY
JOB NO 1817099
DRAWN BY DBP
REV 4
DATE 10-10-2018
DWG NO 2-9424
SHEET NO 5 OF 10

Appendix C: Image Glossary

Appendix D: European Declaration of Conformity

THE MARK OF RELIABILITY

APPLIED TEST SYSTEMS

Applied Test Systems
154 East Brook Lane
Butler, PA 16002
http://www.atspa.com/

REV. 0

Created: 9/13/2018
Published: 9/27/2018

EUROPEAN DECLARATION OF CONFORMITY

We, **Applied Test Systems**, declare under our sole responsibility that the **ATS Rolling Thin Film Oven (RTFO)**, all variants, to which this declaration relates is in conformity with the following standard(s) or other normative document(s):

- Directive **2001/95/EC** of the European Parliament and of the Council of 3 December 2001 on **General Product Safety**

- Directive **2014/30/EU** of 26 February 2014 on the harmonisation of the laws of the Member States relating to **Electromagnetic Compatibility** (recast), (**EMC**) & **EN61326-1:2013**

- Directive **2006/42/EC** of the European Parliament and of the Council of 17 May 2006 on **Machinery**, and amending Directive 95/16/EC

- DIRECTIVE **2014/35/EU** of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of **electrical equipment** designed for use within certain voltage limits **(Low Voltage)** & **EN61010-1:2010 + AC:2011** & **EN-IEC 61010-2-010:2014**

The Technical Construction File is maintained at Applied Test Systems, 154 East Brook Lane, Butler, Pennsylvania

The authorized representative located within the Community is:

Rob Carroll, COO of Applied Test Systems

Date of issue: September 13, 2018

Place of issue: Applied Test Systems, Butler, PA

Rob Carroll
Chief Operating Officer
Applied Test Systems