



OPERATION AND SERVICE MANUAL

HYAMP® II

MODEL 5030DT GROUND BOND TESTER

SERIAL NUMBER

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Model 5030DT

Item 37637

Ver 1.12

© Associated Research, Inc., 2002
13860 West Laurel Drive
Lake Forest, Illinois, 60045-4546
U.S.A.

Printed Aug 15, 2002

5 YEAR WARRANTY POLICY

Associated Research, Inc., certifies that the instrument listed in this manual meets or exceeds published manufacturing specifications. This instrument was calibrated using standards that are traceable to the National Institute of Standards and Technology (NIST).

Your new instrument is warranted to be free from defects in workmanship and material for a period of (1) year from date of shipment. You must return the "Owners Registration Card" provided within (15) days from receipt of your instrument.

AR recommends that your instrument be calibrated on a twelve month cycle. Instruments purchased and used in the U.S. may have their warranty extended in one year increments to a maximum of **(5) years** provided they are returned to AR at least **annually** for calibration and inspection. The annual calibration and inspection must be performed annually each and every year following receipt of instrument. Any instrument not calibrated and inspected annually will not be eligible for extended warranty status. This extended warranty is non-transferable and is offered only to the original purchaser.

A return goods authorization (RGA) must be obtained from AR before returning this instrument for warranty service. Please contact our Customer Support Center at 1-800-858-TEST (8378) to obtain an RGA number. It is important that the instrument is packed in its original container for safe transport. If the original container is not available please contact our customer support center for proper instructions on packaging. Damages sustained as a result of improper packaging will not be honored. Transportation costs for the return of instrument for warranty service must be prepaid by the customer. AR will assume the return freight costs when returning the instrument to the customer during the first year of ownership. All freight charges after the first year are the customers responsibility. The return method will be at the discretion of Associated Research.

Except as provided herein, Associated Research makes no warranties to the purchaser of this instrument and all other warranties, express or implied (including, without limitation, merchantability or fitness for a particular purpose) are hereby excluded, disclaimed and waived.

Any non-authorized modifications, tampering or physical damage will void your warranty. Elimination of any connections in the earth grounding system or by-passing any safety systems will void this warranty. This warranty does not cover batteries or accessories not of Associated Research manufacture. Parts used must be parts that are recommended by AR as an acceptable specified part. Use of non-authorized parts in the repair of this instrument will void the warranty.

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SECTION 1
OPERATORS MANUAL

SAFETY PRECAUTIONS

GENERAL:

This product and its related documentation must be reviewed for familiarization with safety markings and instructions before operation.

This product is a Safety Class I instrument (provided with a protective earth terminal).

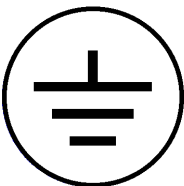
Before applying power verify that the instrument is set to the correct line voltage (115 or 230) and the correct fuse is installed.



INSTRUCTION MANUAL SYMBOL. PLEASE REFER TO THE INSTRUCTION MANUAL FOR SPECIFIC WARNING OR CAUTION INFORMATION TO AVOID PERSONAL INJURY OR DAMAGE TO THE PRODUCT.



INDICATES HAZARDOUS VOLTAGES MAY BE PRESENT.



CHASSIS GROUND SYMBOL.



CALLS ATTENTION TO A PROCEDURE, PRACTICE, OR CONDITION, THAT COULD POSSIBLY CAUSE BODILY INJURY OR DEATH.



CALLS ATTENTION TO A PROCEDURE, PRACTICE, OR CONDITION, THAT COULD POSSIBLY CAUSE DAMAGE TO EQUIPMENT OR PERMANENT LOSS OF DATA.

SERVICE AND MAINTENANCE

User Service

To prevent electric shock do not remove the instrument cover. There are no user serviceable parts inside. Routine maintenance or cleaning of internal parts is not necessary. Any external cleaning should be done with a clean dry or slightly damp cloth. Avoid the use of cleaning agents or chemicals to prevent any foreign liquid from entering the cabinet through ventilation holes or damaging controls and switches, also some chemicals may damage plastic parts or lettering. Schematics, when provided, are for reference only. Any replacement cables and high voltage components should be acquired directly from Associated Research, Inc. Refer servicing to an Associated Research, Inc. authorized service center.

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Service Interval

The instrument and its power cord, test leads, and accessories must be returned at least once a year to an Associated Research authorized service center for calibration and inspection of safety related components. Associated Research will not be held liable for injuries suffered if the instrument is not returned for its annual safety check and maintained properly.

User Modifications

Unauthorized user modifications will void your warranty. Associated Research will not be responsible for any injuries sustained due to unauthorized equipment modifications or use of parts not specified by Associated Research. Instruments returned to Associated Research with unsafe modifications will be returned to their original operating condition at your expense.

TEST STATION

Location

Select an area away from the main stream of activity which employees do not walk through in performing their normal duties. If this is not practical because of production line flow, then the area should be roped off and marked for **TESTING**. No employees other than the test operators should be allowed inside.

If benches are placed back-to-back, be especially careful about the use of the bench opposite the test station. Signs should be posted: "**DANGER - TEST IN PROGRESS - UNAUTHORIZED PERSONNEL KEEP AWAY.**"

Power

Ground Bond Test Equipment must be connected to a good ground. Be certain that the power wiring to the test bench is properly polarized and that the proper low resistance bonding to ground is in place.

Power to the test station should be arranged so that it can be shut off by one prominently marked switch located at the entrance to the test area. In the event of an emergency, anyone can cut off the power before entering the test area to offer assistance.

Work Area

Perform the tests on a nonconducting table or workbench, if possible.

There should not be any metal in the work area between the operator and the location where products being tested will be positioned.

Position the tester so the operator does not have to reach over the product under test to activate or adjust the tester. If the product or component being tested is small, it may be possible to construct guards or an enclosure, made of a non-conducting material such as clear acrylic, such that the item being tested is within the guards or enclosure during the test, and fit them with switches so that the tester will not operate unless the guards are in place or the enclosure closed.

Keep the area clean and uncluttered. All test equipment and test leads not absolutely necessary for the test should be removed from the test bench and put away. It should be clear to both the operator and to any observers which product is being tested, and which ones are waiting to be tested or have already been tested.

Do not perform Ground Bond Tests in a combustible atmosphere or in any area where combustible materials are present.

TEST OPERATOR

Qualifications

The operator should understand the electrical fundamentals of voltage, current, and resistance.

Safety Procedures

Operators should be thoroughly trained to follow these and all other applicable safety rules and procedures before they begin a test. Defeating any safety system should be treated as a serious offense and should result in severe penalties, such as removal from the Ground Bond Testing job. Allowing unauthorized personnel in the area during a test should also be dealt with as a serious offense.

Dress

Operators should not wear jewelry which could accidentally complete a circuit.

Medical Restrictions

This instrument should not be operated by personnel with heart ailments or devices such as pacemakers.

GLOSSARY OF TERMS

(as used in this manual)

Alternating Current, AC: Current which reverses direction on a regular basis, commonly in the U.S.A. 60 times per second, in other countries 50 times per second.

Conductive: Having a volume resistivity of no more than 10^3 ohm-cm or a surface resistivity of no more than 10^5 ohms per square.

Conductor: A solid or liquid material which has the ability to let current pass through it, and which has a volume resistivity of no more than 10^3 ohm-cm.

Current: The movement of electrons through a conductor. Current is measured in amperes, milliamperes, microamperes, nanoamperes, or picoamperes. Symbol = **I**

Dielectric: An insulating material which is positioned between two conductive materials in such a way that a charge or voltage may appear across the two conductive materials.

Direct Current, DC: Current which flows in one direction only. The source of direct current is said to be polarized and has one terminal which is always at a higher potential than the other.

Hipot Tester: Common term for dielectric-withstand test equipment.

Hypot®: Registered trademark of Associated Research, Inc., for its dielectric-withstand test equipment.

Insulation: Gas, liquid or solid material which has a volume resistivity of at least 10^{12} ohm-cm and is used for the purpose of resisting current flow between conductors.

Resistance: That property of a substance which impedes current and results in the dissipation of power in the form of heat. The practical unit of resistance is the *ohm*. Symbol = **R**

Trip Point: The minimum resistance required to cause an indication of unacceptable performance during a ground bond test.

Voltage: Electrical pressure, the force which causes current through an electrical conductor.
Symbol = **V**

INTRODUCTION

The importance of testing... User safety

In an era of soaring liability costs, original manufacturers of electrical and electronic products must make sure every item is as safe as possible. All products must be designed and built to prevent electric shock, even when users abuse the equipment or by-pass built in safety features.

To meet recognized safety standards, one common test is the "dielectric voltage-withstand test". Safety agencies which require compliance safety testing at both the initial product design stage and for routine production line testing include: Underwriters Laboratories, Inc. (UL), the Canadian Standards Association (CSA), the International Electrotechnical Commission (IEC), the British Standards Institution (BSI), the Association of German Electrical Engineers (VDE), the Japanese Standards Association (JSI). These same agencies may also require that an insulation resistance test and high current ground bond test be performed.

The Dielectric Withstand (Hipot) Test....

The principle behind a dielectric voltage - withstand test is simple. If a product will function when exposed to extremely adverse conditions, it can be assumed that the product will function in normal operating circumstances.

The most common applications of the dielectric-withstand test are:

- Design (performance) Testing.... determining design adequacy to meet service conditions.
- Production Line Testing.... detecting defects in material or workmanship during processing.
- Acceptance Testing.... proving minimum insulation requirements of purchased parts.
- Repair Service Testing.... determine reliability and safety of equipment repairs.

The specific technique varies with each product, but basically, during a dielectric voltage - withstand test, an electrical device is exposed to a voltage significantly higher than it normally encounters. The high voltage is continued for a given period of time.

If, during the time the component is tested, stray current flow remains within specified limits, the device is assumed to be safe under normal conditions. The basic product design and use of the insulating material will protect the user against electrical shock.

The equipment used for this test, a dielectric-withstand tester, is often called a "hipot" (for high potential tester). The "rule of thumb" for testing is to subject the product to twice its normal operating voltage, plus 1,000 volts.

However, specific products may be tested at much higher voltages than 2X operating voltages + 1,000 volts. For example, a product designed to operate in the range between 100 to 240 volts, can be tested between 1,000 to 4,000 volts or higher. Most "double insulated" products are tested at voltages much higher than the "rule of thumb".

Testing during development and prototype stages is more stringent than production run tests because the basic design of the product is being evaluated. Design tests usually are performed on only a few samples of the product. Production tests are performed on each and every item as it comes off the production line.

The hipot tester must also maintain an output voltage between 100% and 120% of specification. The output voltage of the hipot must have a sinusoidal waveform with a frequency between 40 to 70 Hz and has a peak waveform value that is not less than 1.3 and not more than 1.5 times the root-mean-square value.

Why Perform a Ground Bond Test

Ground bond testing is done to insure that a low resistance path exists between the safety ground pin of a three-wire line cord and exposed metal of the item under test. If a live wire inside the item under test came loose and contacted the chassis, the fault current would flow through the low resistance safety ground, and protect the user.

The need for high current bonding (i.e. 10A or 30A) as apposed to low current go-no go type testers, results from the nature of line voltage breakers' high current characteristics. Safety Grounding circuits must withstand the line voltage breaker' current rating in order to maintain a safe voltage potentials on the chassis of the faulty device. Verifying the integrity of the grounding circuit at high currents insures that the line breaker will open before the grounding circuit wires fail. This insures that the power will be deenergized at the device while maintaining safe voltage levels on the chassis.

IF YOU SHOULD HAVE ANY QUESTIONS RELATING TO THE OPERATION OF YOUR INSTRUMENT CALL 1-800-858-TEST(8378) IN THE U.S.A.
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Model 5030DT Functional Specifications

GROUND BOND TEST MODE

Unless otherwise stated, accuracies are relative to a laboratory standard measurement.

Descriptions	Specifications
INPUT VOLTAGE	115 / 230V selectable, $\pm 15\%$ variation 47 - 63 Hz
FUSE	115 VAC, 230VAC -- 5A fast acting 250VAC
OUTPUT	Current: AC 3 - 31 Amps, 0.01 Amp / step Regulation: $\pm(2\%$ of Setting + 0.02 A) Voltage: AC 3 - 8 Volts, 0.1 Volt / step
OUTPUT FREQUENCY	50 / 60 Hz selectable
DWELL TIME SETTING	0 and 0.5 - 999.9 seconds, 0.1 second / step "0" for continuous running Accuracy: $\pm(0.1\%$ of Setting + 0.05 seconds)
FAILURE SETTINGS	High limit: 0 - 600m Ω for 3 - 12 Amps, 1m Ω / step 0 - 150m Ω for 3 - 31 Amps, 1m Ω / step Accuracy: $\pm(2\%$ of setting + 2m Ω) Low limit: 0 - 600m Ω for 3 - 12 Amps, 1m Ω / step 0 - 150m Ω for 3 - 31 Amps, 1m Ω / step Accuracy: $\pm(2\%$ of setting + 2m Ω)
MILLIOHM OFFSET	Max. Offset Capability: 100m Ω , 1m Ω / step Accuracy: $\pm(2\%$ of setting + 2m Ω)
METERING	Ammeter (4 digits) Range: 0 - 31 Amps Resolution: 0.01 Amp / step Accuracy: $\pm(3\%$ of Reading + 0.03A) Ohmmeter (3 digits) Range: 0 - 600m Ω Resolution: 1 m Ω / step Accuracy: $\pm(2\%$ of Reading + 2m Ω) Timer (4 digits) Range: 0 - 999.9 seconds Resolution: 0.1 seconds / step Accuracy: $\pm(0.1\%$ of Reading + 0.05 seconds)

REMOTE CONTROL	The following input and output signals are provide through two 9 pin “D” type connectors;
SECURITY	Password lockout capability to avoid unauthorized access to test set-up program.
LINE CORD	Detachable 7 ft. (2.13m) power cable terminated in a three prong grounding plug.
TERMINATIONS	5ft.(1.52m) high current and return leads with clips.
MECHANICAL	Bench or rack mount (2U height) with tilt up front feet Dimensions: (w x h x d) 17 x 3.5 x 16.5in. (432 x 88 x 419mm) Weight: 27.6 lbs (12.5kgs)
ENVIRONMENTAL	Operating Temperature: 32° - 113°F (0° - 45°C) Relative Humidity: 0 to 95%
CALIBRATION	Traceable to National Institute of Standards and Technology (NIST). Calibration controlled by software. Adjustments are made through front panel keypad in a restricted access calibration mode. Calibration information stored in non-volatile memory.
PROGRAM MEMORY	10 sets

KEY FEATURES & BENEFITS OF HYAMP II

1. All parameters for the setups can be adjusted through a simple menu driven program by using quick access front panel keys.
The easy to follow setup screens ensure that the operator correctly sets up all test parameters.
2. Tamper proof front panel controls.
This makes it possible to limit user access to the setup screens so that only authorized personnel with a security password can change test parameters. Passwords are programmable, this ensures that the required test parameters can not be tampered with.
3. Four wire measurement (Kelvin method) and milliohm offset capability.
These features minimize the effect of test lead resistance. The four wire measurement technique eliminates test lead resistance when using the standard test leads. The milliohm offset function allows the use of longer test leads and test fixtures without compromising the test results.
4. Storage of up to 10 different test programs.
A real benefit for manufacturers that test different products. This makes it possible to store all the various test parameters required and quickly recall them for each of the different products that needs to be tested. The first three program memories can also be accessed through the remote control (PLC) port so that a manufacturer can quickly toggle through the various programs without going into the set up menu.
5. Versatile PLC control for either sequential or simultaneous testing.
Interconnection of the HYAMP II and the HypotPLUS II makes these two instruments a true semi-automated test system. The test system can be configured to test Ground Bond first and then advance to the Dielectric test. The system can also be set up to test Ground Bond and Dielectric simultaneously for greater time savings and increased throughput.
6. Line and load regulation.
This system maintains the output voltage to within 1% from no load to full load and over the line voltage range to ensure that test results remain consistent and within safety agency requirements.
7. User selectable output voltage frequencies of 50 or 60 hertz.
HYAMP II was designed for the global market. This feature makes it simple for the user to select the output frequency in the Ground Bond mode so that products can be tested at the same frequency they will be used at.
8. Adjustable output current, output voltage and milliohm trip ranges.
This capability makes the HYAMP II versatile enough to meet all safety agency specifications for ground bond test requirements.

9. Low Limit Trip Range.
This capability makes it possible to ensure that a test item was properly connected since the HYAMP II can be set to monitor minimum and maximum levels of resistance during a ground bond test.
10. Front panel LCD displays test parameters and results.
A front panel LCD allows the operator to monitor the test. The display holds the results after a test item failure so that the operator can easily review the test results. Indications of low fail & high fail are clearly displayed.
11. PLC remote inputs and outputs.
The standard 9 pin interfaces provide outputs for Pass, Fail, and Test in Process. Inputs include Test, Reset and Program Select. This gives the user all the basic remotes required to configure the HYAMP II through simple PLC relay control.
12. Flashing Test indicator.
A flashing LED located directly over the high current terminal clearly indicates when high current is active to provide maximum operator safety.
13. Withstand processing indicator.
A front panel LED indicates when the high voltage from the HypotPLUS II is being applied to the item under test for greater operator safety.
14. Easily configurable into an automated test system.
HYAMP II comes standard with rear output connectors and rack mount handles to make it simple to build into an automated system.
15. Software calibration control.
HYAMP II is calibrated through the front panel keypad. All calibration information is stored in non-volatile memory. This allows HYAMP II to be completely calibrated without removing any covers and exposing the technician to hazardous voltages.

WHAT'S NEW IN HYAMP II

STORAGE OF UP TO 10 DIFFERENT TEST SETUPS

Allows users who test many different products to access various test setups through the keypad or through PLC remote.

MICROPROCESSOR CONTROLLED

The easy to follow menu screens ensure that the user will set all parameters through the keypad correctly.

PLC REMOTES

Two 9 pin interfaces provide the user with all the necessary remotes required to configure HYAMP II through simple PLC control. Outputs include Pass, Fail, Test in Process and Reset out. Inputs include Test, Reset and Withstand Processing. Remote recall of memory programs 1-3.

DWELL TIMER COUNTDOWN

The countdown timer allows the user to clearly see how much time is left on the test.

TAMPER-PROOF CONTROLS

With the user programmable password, access to setup screens can be limited to authorized personnel only.

METER MEMORY

This standard feature holds results of failed tests on the LCD, allowing the user to further review test results.

HIGHER OUTPUT CURRENT

Increased output current of 31 Amps allows the HYAMP II to meet safety agency requirements.

FRONT PANEL LCD WITH ADJUSTABLE DIMMER

HYAMP II utilizes an enhanced LCD to display setups and test results. For easier reading of the screen, the user can set the contrast to 10 different levels using the keypad.

ALARM VOLUME CONTROL

The user can change the volume of the failure alarm to fit a variety of environments.

FREQUENCY SELECTION

This feature allows the user to toggle between 50hz and 60hz so products can be tested at the same frequency they will be used at.

FRONT PANEL CALIBRATION

By going into the restricted access calibration mode the user can calibrate the unit through the keypad with no need to remove any panels or covers which could expose the technician to hazardous voltages.

STANDARD ACCESSORIES

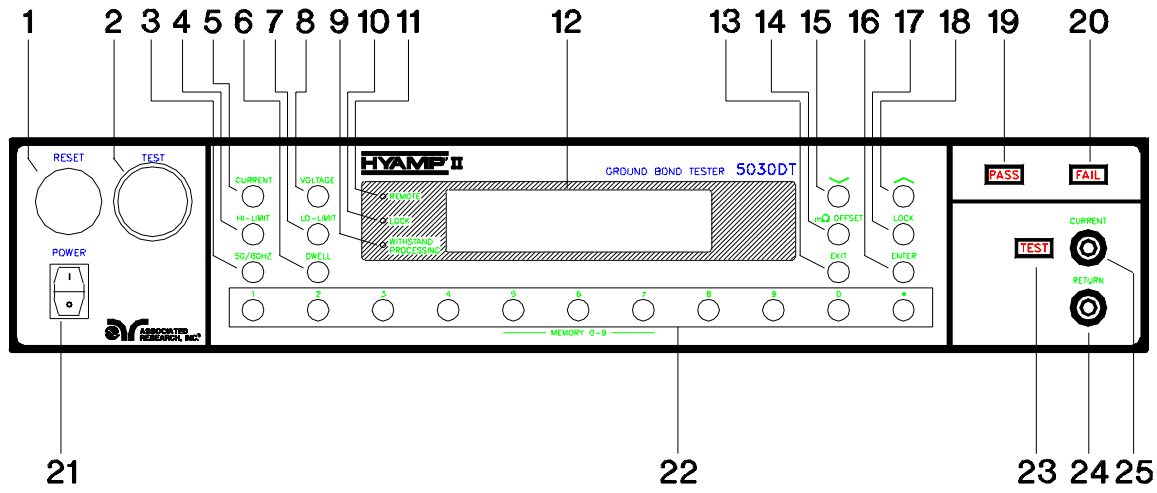
A set of rack mount handles and a receptacle box for testing products terminated with a line cord are standard to allow HYAMP II to fit a variety of testing applications.

MILLIOHM OFFSET CAPABILITY

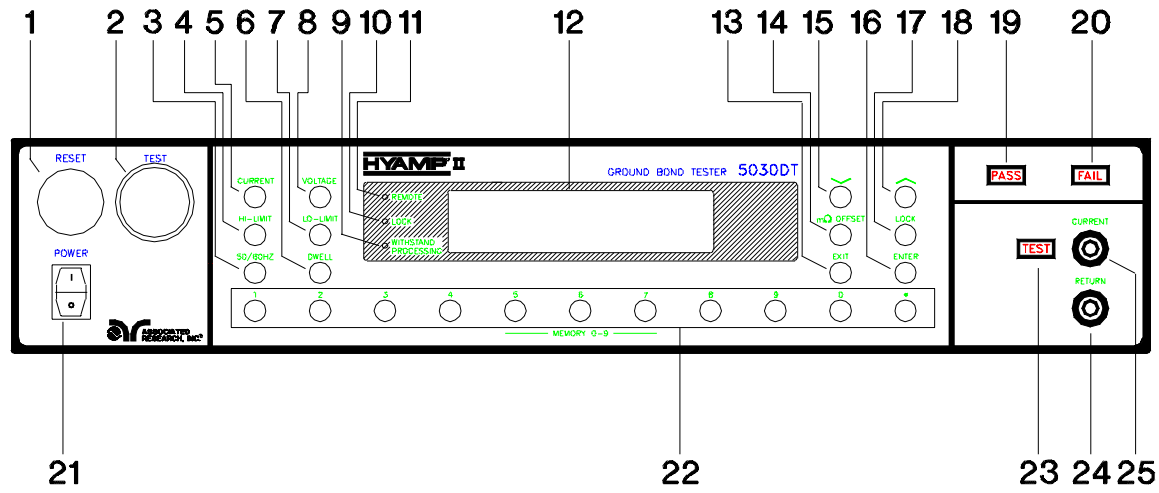
This feature minimizes the effect of lead resistance. The milliohm offset allows for the use of longer test leads and test fixtures without compromising test results.

ADJUSTABLE OUTPUT VOLTAGE

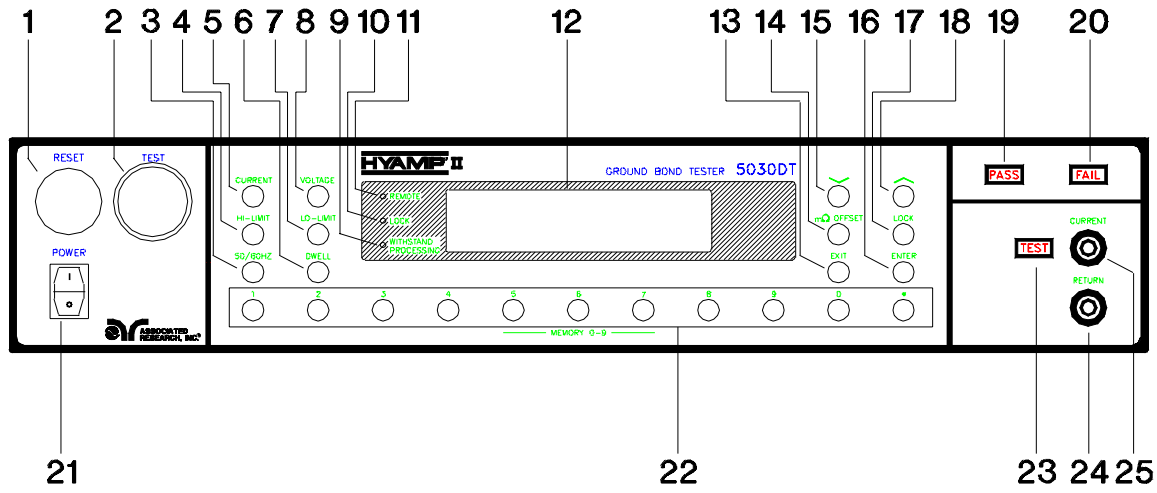
User adjustable voltage from 3-8 Volts AC in 0.1 volt steps allows HYAMP II to meet safety agency requirements.

FRONT PANEL CONTROLS


1. **RESET SWITCH:** This is a momentary contact switch. If out-of-range resistance failure occurs, the red Failure lamp (20) will light. To reset the system for the next test, press and release the red Reset switch (1). This switch may also be used to abort a Test in Progress.
2. **TEST SWITCH:** This is a momentary contact switch. Press the green switch to turn on the high current output when in test mode.
3. **50/60 KEY:** Dedicated key used to enter 50/60 Hz select mode. Active only when AC mode is selected. The enter key (16) toggles from 50 to 60 Hz.
4. **HI-LIMIT KEY:** Dedicated key used to select Upper Resistance limit entry. The numeric keypad (22) is used to enter the value. The Enter key (16) is used to save the new value.
5. **CURRENT KEY:** Dedicated key used to select Output Current entry. The numeric keypad (22) is used to enter the value. The Enter key (16) is used to save the new value.
6. **DWELL KEY:** Dedicated key used to select Test Voltage time duration entry. The numeric keypad (22) is used to enter the value. The Enter key (16) is used to save the new value.
7. **LO-LIMIT KEY:** Dedicated key used to select Lower Resistance limit entry. The numeric keypad (22) is used to enter the value. The Enter key (16) is used to save the new value.
8. **VOLTAGE KEY:** Dedicated key used to select Output Voltage maximum limit entry. The numeric keypad (22) is used to enter the value. The Enter key (16) is used to save the new value.

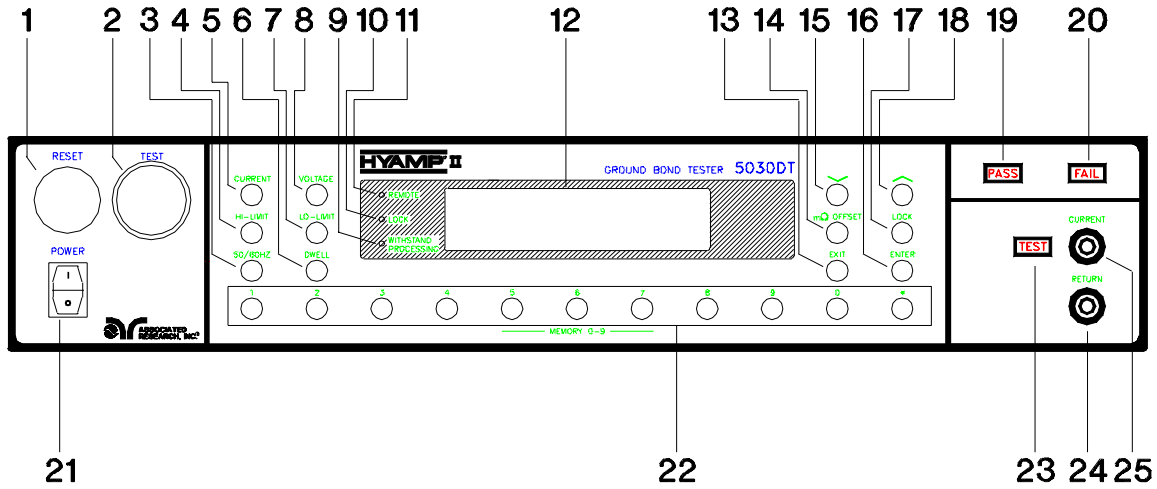
FRONT PANEL CONTROLS


9. **WITHSTAND PROCESSING LED:** The Withstand Processing LED illuminates when Remote I/O signal input contacts 6 and 7 have been activated. Used to indicate HV on when interconnected to a hipot tester.
10. **KEY LOCKOUT LED:** When the Key Lockout light is ON the "password" software lockout has been enabled. This means that the operator will be unable to access the "program" mode of the instrument to change any settings.
11. **REMOTE LED:** This LED illuminates when the unit is in remote control mode.
12. **LCD DISPLAY:** The Liquid Crystal Display is the main readout for the operator and programmer of the test settings and test result.
13. **EXIT KEY:** Use this key when you desire to enter the **Run Mode** to initiate a test or use this key when you enter numeric data during a **Setup** routine and you wish to clear the information.
14. **mΩ OFFSET KEY:** The milliohm offset key is used to offset any unwanted resistance that should not be included in the actual resistance value to be used for criteria comparison.
15. **DOWN ARROW ↓: (FUNCTION KEY)** Use this key to advance forward through the setup menus, remote, volume, and contrast. Also may be used to decrease output current during a test in 10 mA increments.
16. **ENTER KEY:** Use the enter key after entering new data through the keypad to save it. This key also used to toggle ON/OFF functions.

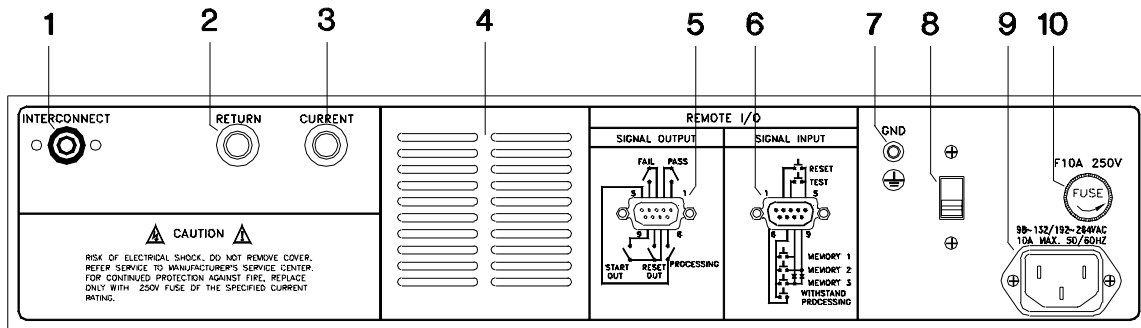
FRONT PANEL CONTROLS


17. **LOCK KEY:** Used to enter the security Lock Menu. This menu may or may not ask for a password depending on how the Lock function was configured in the calibration mode.
18. **UP ARROW ↑: (FUNCTION KEY)** Use this key to advance backwards through the setup menus, remote, volume, and contrast. Also may be used to increase output current during a test in 10 mA increments.
19. **PASS LED INDICATOR:** This green indicator lights at the end of a ground bond test if no failure has occurred during the test.
20. **FAIL LED INDICATOR:** When a failure occurs (Hi or Low) during a ground bond test this red indicator will light.
21. **POWER SWITCH:** Rocker-style switch with international ON (|) and OFF (0) markings.
22. **DATA ENTRY NUMERIC KEYPAD:** For numeric entry or change of testing parameters during the Setup mode. Keypad entry is unavailable if the “Lock” indicator on the front panel is on. Press and hold one of these keys (until the second tone is heard) to store parameters in memory. Also used to recall test parameters stored in memory.
23. **TEST LED INDICATOR:** This green LED flashes to indicate to the operator that voltage is present at the output terminal, and a test is in process.
24. **RETURN OUTPUT JACK:** For the connection of the detachable 5 foot (1.52 m) black kelvin return test lead. This lead is always used when performing a test.

FRONT PANEL CONTROLS



25. CURRENT OUTPUT JACK: For the connection of the detachable 5 foot (1.52 m) red kelvin test lead. This lead is always used when performing a ground bond test.

REAR PANEL CONTROLS


1. **INTERCONNECT JACK:** For the connection of the return lead from the hipot tester used when performing both hipot and Ground Bond tests on the same test item.
2. **RETURN OUTPUT JACK:** For the connection of the detachable 5 foot (1.52 m) black kelvin return test lead. This lead is always used when performing a test.
3. **CURRENT OUTPUT JACK:** For the connection of the detachable 5 foot (1.52 m) red kelvin test lead. This lead is always used when performing a ground bond test.
4. **THERMAL FAN:** Cycles on to cool the instrument automatically.
5. **REMOTE OUTPUT:** 9 pin “D” subminiature female connector for monitoring PASS, FAIL, and PROCESSING output relay signals, as well as remote START and RESET outputs.
6. **REMOTE INPUT:** 9 pin “D” subminiature male connector for remote control of test and reset functions as well as program memory selection 1, 2, or 3 and withstand processing input.
7. **CHASSIS GROUND (EARTH) TERMINAL:** This safety terminal should be connected to a good earth ground before operation.
8. **INPUT POWER SWITCH:** Line voltage selection is set by the position of the switch. In the down position it is set for 115 volt operation, in the up position it is set for 230 volt operation.
9. **INPUT POWER RECEPTACLE:** Standard IEC 320 connector for connection to a standard NEMA style line power (mains) cord.
10. **FUSE RECEPTACLE:** To change the fuse unplug the power (mains) cord and turn the fuse cap counter clockwise to remove the fuse.

INSTALLATION

Introduction

This section contains information for the unpacking, inspection, preparation for use and storage of your Associated Research, Inc., product.

Unpacking and Inspection

Your instrument was shipped in a custom foam insulated container that complies with ASTM D4169-92a Assurance Level II Distribution Cycle 13 Performance Test Sequence.

If the shipping carton is damaged, inspect the contents for visible damage such as dents, scratches or broken meters. If the instrument is damaged, notify the carrier and the Associated Research customer support department immediately. Please save the shipping carton and packing material for the carriers inspection. Our customer support department will assist you in the repair or replacement of your instrument. Please do not return your product without first notifying us and receiving an RGA (return goods authorization) number.

Preparation for Use

Power Requirements and Line Voltage Selection



This instrument requires a power source of either 115 volts AC \pm 15%, 47-63 Hz single phase or 230 volts AC \pm 15%, 47-63 Hz single phase. Please check the rear panel to be sure the proper switch setting is selected for your line voltage requirements before turning your instrument on. In addition, please be sure the correct fuse is selected and installed while the instrument is in the off position.

Do not switch the line voltage selector switch located on the rear panel while the instrument is on or operating. This may cause internal damage and represents a safety risk to the operator.

NOTE

For operation at 115 Volts AC and 230 Volts AC use a 5A 250VAC fast acting fuse.

Power Cable

WARNING BEFORE CONNECTING POWER TO THIS INSTRUMENT, THE PROTECTIVE GROUND (EARTH) TERMINALS OF THIS INSTRUMENT MUST BE CONNECTED TO THE PROTECTIVE CONDUCTOR OF THE LINE (MAINS) POWER CORD. THE MAIN PLUG SHALL ONLY BE INSERTED IN A SOCKET OUTLET (RECEPTACLE) PROVIDED WITH A PROTECTIVE GROUND (EARTH) CONTACT. THIS PROTECTIVE GROUND (EARTH) MUST NOT BE DEFEATED BY THE USE OF AN EXTENSION CORD (POWER CABLE) WITHOUT A PROTECTIVE CONDUCTOR (GROUNDING).

This instrument is shipped with a three-wire power cable. When this cable is connected to an appropriate AC power source, this cable connects the chassis to earth ground. The type of power cable shipped with each instruments depends on the country of destination.

Test Leads

The test leads provided are designed specifically for use with this instrument. The red High Current lead will mate with the red Current jack. The black Return lead will install into the black Return jack.

The test lead ratings are as follows:

Description	Part Number	Rating
High Current lead	05002D-24	31 A, 750V
Return lead	05002D-37	31 A, 750V

Operating Environment

This instrument may be operated in temperatures from 32° - 113° F (0° - 45° C).

Relative humidity of 0 to 95%.

Altitude up to 15,000 feet (4,600 meters).

Ventillation: When choosing a bench location, or in rack mount applications, insure that there is at least 6 inches (15 cm) of space from the rear panel to any wall or obstruction behind the unit.

STORAGE AND SHIPMENT

Environment

This instrument may be stored or shipped in environments with the following limits:

Temperature..... -40° to +75°C

Altitude..... 7,620 meters (25,000 feet)

The instrument should also be protected against temperature extremes which may cause condensation within the instrument.

Packaging

Original Packaging: Please retain all original packaging materials if you do not have an alternate method of repackaging. If you are returning your instrument to us for servicing please repackage the instrument in its original container or use an alternate packaging solution. Please do not reuse the original packing material if there appears to be damage or missing packing material. Contact our customer support department (1-800-858-8378) for an RGA (return goods authorization) number. Please enclose the instrument with all options, accessories and test leads. Indicate the nature of the problem or type of service needed. Also, please mark the container "FRAGILE" to insure proper handling. Upon receipt your instrument will be issued an AR service number. Please refer to this number in all correspondence.

Other Packaging: If you do not have the original packaging materials please follow these guidelines:

- 1). Wrap the instrument in a bubble pack or similar foam. Enclose the same information as above.
- 2). Use a strong double-wall container that is made for shipping instrumentation. 350 lb. test material is adequate.
- 3). Use a layer of shock-absorbing material 70 to 100 mm (3 to 4 inch) thick around all sides of the instrument. Protect the control panel with cardboard.
- 4). Seal the container securely.
- 5). Mark the container "FRAGILE" to insure proper handling.
- 6). Please ship models 5030DT via Federal Express or UPS air.
- 7). Please refer in all correspondence to your AR service number.

Field Installation Of Options

There are no field installable options on the model 5030DT.

QUICK START

This quick start guide assumes the operator has some familiarity with automated ground bond testing and desires to use the "**default**" settings on the instrument. The default settings shown will remain in memory unless you choose to override them with your own test program. The instrument default settings are as follows:

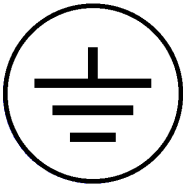
DEFAULTS

- **Input Voltage:** 115 volts AC (rear panel switch selectable)
- **Communications:** local (front panel key selectable)
- **Mode:** set-up
- **Current Output:** 25.00 Amps
- **Voltage Output:** 8.00 volts AC
- **Resistance Trip (High):** 100 m Ω
- **Resistance Trip (Low):** 0 m Ω
- **Dwell Timer:** 1 second
- **AC Output Frequency:** 60Hz
- **Buzzer:** Volume Level 5
- **Contrast:** LCD contrast level 1
- **Remote:** OFF
- **Lock:** OFF

a). Unpack this instrument from its special shipping container. Be sure to save all packaging materials in case you need to return it to the factory for service.

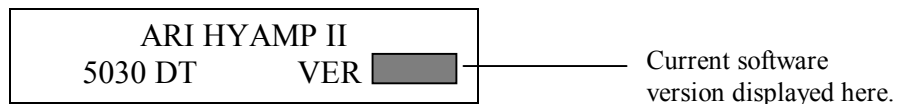
WARNING b). Locate a suitable testing area and be sure you have read all safety instructions for the operation of the instrument and suggestions on the test area set-up in the SAFETY section of this manual. Locate a three prong grounded outlet. Be sure the outlet has been tested for proper wiring before connecting the instrument to it.

CAUTION c). Check to be sure the correct input line voltage has been selected on the rear panel. Either 115 volts AC or 230 volts AC. Connect the power input plug into its socket on the rear panel of the instrument. Connect the male end of the plug to the outlet receptacle.



Please be sure that the safety ground on the power line cord is not defeated and that you are connecting to a grounded power source.

d). Turn on the POWER switch located on the lower left hand side of the front panel. Upon powering the instrument up a POWER ON SELF TEST (POST) will automatically be performed. This test will check for the condition of the ram chips, led indicators, pcb's and other critical components. All of the front panel led's will light temporarily then go out. In addition, you will see the Associated Research name and Model Number briefly appear on the LCD readout and then clear itself.



You should then see the default parameters on the LCD meter as follows:

Set	M1	1.0s
25.00A		100mΩ

These abbreviated parameters stand for the following:

- SET:** This is the parameter settings review screen.
- M1:** The instrument is using the default set ups contained in memory 1.
- 1.0s:** The dwell timer is set to a test duration of 1 second.
- 25.00A:** The test current is set to 25.00 Amps.
- 100mΩ:** The high resistance trip point is set to 100 milliohms.

If you wish to not use any one of these parameters you must overwrite the memory 1 position or change your parameters and save them in a different memory such as memory position 2.

e). If the instrument defaults are acceptable then be sure to connect the appropriate test leads to the device under test (DUT) or test fixture. Be sure to connect this safety ground to a suitable known good ground before energizing this instrument, Then connect the return lead first (black) to the test fixture or item followed by the high current output lead (red).

WARNING f). Please check your connections to be sure they are making good contact and that the test station or area is clear of debris and other personnel. **DO NOT TOUCH THE DEVICE UNDER TEST ONCE THE TEST HAS BEEN STARTED.** To initiate the test press the GREEN test button on the front panel. This is a momentary button and does not need to be held in the pressed position during the test. The instrument will then cycle ON and begin the automated test sequence using the defaults. If a failure occurs you will HEAR an audible alarm go off. To stop the alarm you must depress the RED button marked RESET. This will silence the alarm and reset the instrument to begin another test. This RESET button may also be used as a safety button to quickly ABORT a test and cut off the HIGH CURRENT.

TEST When HIGH CURRENT is present a green TEST indicator located to the left of the CURRENT receptacle will flash until the HIGH CURRENT is OFF. If the device under test PASSED, then a single beep will sound and the GREEN PASS indicator will light. In the case of a FAIL condition, the RED FAIL indicator will light and the audible alarm will sound. The instrument will provide a memory of the test condition results on the LCD display that will remain until the next test is initiated. Depressing the reset button will reset the instrument alarm while keeping the last test results on the display. Depressing the reset button a second time will clear the display.

QUICK GUIDE TO INTERCONNECTING HYAMP II TO HypotPLUS II USING THE SUPPLIED CABLE KIT

1. Enable the HypotPLUS II remote interface. Operation menu REMOTE = "ON".
2. Connect the Double ended banana plug cable from the HypotPLUS II rear RETURN jack to the HYAMP II INTERCONNECT jack.
3. Based on the test method, select one of the two (9 pin dsub) control cables shown in the table below. Connect this cable along with the Common control cable (9 pin dsub 5030DT-21) between the HYAMP and the HypotPLUS II remote I/O with the **BLUE ends on the HYAMP II.**

Note: The cables are identified on the blue tubing.

Cable number	Method	Operation
030DT-22	Sequential	HYAMP first then Hypot
030DT-23	Simultaneous	HYAMP and Hypot at the same time

4. Connect the high current plug (red) from the receptacle adapter box (P/N 36541) to the HYAMP II jack marked CURRENT (red), and the high voltage plug (white) to the HypotPLUS II jack marked HV (white).
5. Connect the RETURN lead with the alligator clip (black) to the HYAMP II jack marked RETURN (black). The alligator clip should be connected to the DUT chassis.
6. Check the test parameters and initiate the tests by pressing the Hyamp test button. The Reset buttons on both instruments are active to disable the tests or for failure reset.
 - For a more detailed description on interconnecting your system, see page 37.

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OPERATION INSTRUCTIONS FOR HYAMP II
Model 5030DT

A. POWER UP:

CAUTION Check to be sure the correct input line voltage has been selected on the rear panel. Either 115 volts AC or 230 volts AC. Connect the power input plug into its socket on the rear panel of the instrument. Connect the male end of the plug to the outlet receptacle.

Please be sure that the safety ground on the power line cord is not defeated and that you are connecting to a grounded power source. Also connect the rear panel chassis ground for additional safety.

Turn on the POWER switch located on the lower left hand side of the front panel. Upon powering the instrument up a POWER ON SELF TEST (POST) will be automatically performed. This test will check for the condition of the ram chips, led indicators, pcb's and other critical components. All of the front panel led's will light temporarily then go out. In addition the display will show the following message.

ARI HYAMP II 5030DT VER : X.X

The instrument will recall the last memory program which was active and the display will show the parameters which were programmed into that memory. The instrument is now ready for operation.

B. SETUP PROCEDURE:

1. To set the output test current

Please press the "CURRENT" key, the display will show:

CURRENT = XX.XXA

Please use the "Numerical" keys to enter the desired test current, then press the "Enter" key to store the current setting. If an incorrect value is entered, press the "Exit" key, then the correct value may be re-entered. The maximum current which may be entered is 31.00 Amps. Any value above these will produce an ERROR message.

2. To set the output test voltage

Please press the “VOLTAGE” key, the display will show:

Voltage = X.XX V

Use the “Numerical” keys to enter the voltage setting, then press the “Enter” key to store the setting. The unit of measure is in volts with 3.00 - 8.00 being the range.

3. To set the high limit resistance trip setting

Please press the “HI-LIMIT” key, the display will show:

HI-LMT = XXX mΩ

Please use the “Numerical” keys to enter the high limit resistance trip setting, then press the “Enter” key to store the setting. The unit of measure is in milliohms with a range from 0-600 mΩ’s.

4. To set the low limit resistance trip setting

Please press the “LO-LIMIT” key, the display will show:

LO-LMT = XXX mΩ

Please use the “Numerical” keys to enter the low limit resistance trip setting, then press the “Enter” key to store the setting. The unit of measure is in milliohms with a range from 0-600 mΩ’s, if set for “0”, the low limit resistance trip setting will be disabled.

5. To set the dwell time

Please press the “DWELL” key the display will show:

Dwell - T = XXX . X s

Use the “Numerical” keys to enter the dwell time setting, then press the “Enter” key to store the dwell time setting. The range is 0 to 999.9 seconds, if the dwell time is set to “0”, the instrument will operate in a continuous ON mode when the test button is

depressed and released. It will stop when the DUT (Device Under Test) goes into failure or the manual reset button is pressed.

6. To set the output frequency

Please press the “50/60HZ” key, the display will show:

Freq = XX HZ

Use the “Enter” key to toggle between either 50 or 60 HZ then press the “Exit” key to store the selection.

7. To lock or unlock the keyboard of the front panel

The HYAMP II is equipped with two lockout modes; one requires a password to activate or deactivate the lockout feature the other does not require a password. Within each mode you can selectively lockout all front panel control functions except TEST and RESET or you may allow the operator to select from the pre-programmed memories.

(A). Setup of Password and Lock Functions:

To setup a PASSWORD or change the MEMORY LOCK functions you must power up the instrument in the calibration mode. To do this you must do the following:

1. Place the power switch in the off position.
2. Press and hold in the “0” key, then turn on the power switch. The display will indicate the following:

Calibration Mode
0:V 1:A 7:Lock

3. Press the “7” key, the display will show:

P . W . # = X X X X

or

P . W . # = 0

4. If the password is not to be changed, please press the “Exit” key. The program will go to the Memory Lock Function setting. Please refer to item “7”, listed below.

5. If a password for the Lock Function is not required, please use the numerical key to enter “0” and press the “Enter” key. The program will go to the Memory Lock Function setting.

6. If a password for Lock Function is required, please use the numerical keys to enter a four digit “Numerical Code” and press the “Enter” key. The program will go to the Memory Lock Function. Once the password is set, the password has to be entered to activate or deactivate the “Lock” function.

7. After setting the password, press the “Exit” key, the display will show:

M R - L o c k = ON

or

M R - L o c k = OFF

Press the “Enter” key to select Memory Lock “ON” or “OFF”.

If the MR-Lock is in the “ON” position, all the memory programs will be locked along with keyboard functions. The operator will be locked out of recalling memory programs while in the lock mode.

If the MR-Lock is in the “OFF” position, the instrument will not lock the memory programs even if the keyboard is locked. The memory programs may be recalled while in the lock mode but the test parameters within each setup cannot be changed.

(B.) Turning the LOCK function ON or OFF with no password activated:
Press the “Lock” key, the display will show:

L o c k = ON

or

L o c k = OFF

Press the “Enter” key to select the “Lock (ON)” or “Unlock (OFF)” mode, then press the “Exit” key to exit and return to the test mode. If the “Lock” mode is selected, the “Lock” indicator on the front panel will light and the keyboard will be locked. If the “Lock” indicator is not lit, the keyboard will be operational.

(C). Turning the LOCK function “ON” or “OFF” with a “Password”:
Press the “Lock” key, the display will show:

P . W . # = _

Please use the “Numerical” keys to enter the four numeral password and then press the “Enter” key to exit and return to the test mode. If the current position of the lock function is “OFF”, the status will be changed to “ON” and the “Lock” indicator on the front panel will be illuminated. In the reverse case, the status will be changed to “OFF” and the “Lock” indicator will be off.

8. To setup the Remote Control, LCD Contrast, and Alarm Volume

(A). Status of Remote Control setting

Press the “UP” or “DOWN” arrow key to toggle the programs until the display shows:

Remote = ON or Remote = OFF

Press the “Enter” key to select the “ON” or “OFF” function of the Remote Control mode, the display will show the status immediately. Press the Exit key to exit to the test mode or toggle to another setting using the arrow keys. If the Remote Control is set to “ON”, the “Test” function will be controlled by the “Remote Control” via the remote connectors located on the rear panel. The “Test” switch on the front panel is locked out, but the “Reset” switch will still be functional. If the Remote Control is set to “OFF”, the operation will be controlled by the “Test” and “Reset” switches on the front panel.

(B). LCD Contrast setting

Press the “UP” or “DOWN” arrow keys to toggle the programs to the display shown:

Contrast = X

Please use the “Numerical” keys to enter the range of Contrast, from “0” to “9”. Then press the “Enter” key to store the Contrast range. A total of 10 ranges are available. The LCD will change the Contrast immediately and the display will show the set value on the screen. The Contrast number “0” is the weakest and “9” is the strongest. Toggle the arrow keys to another setting or press the “Exit” key to exit from the setting mode and enter the testing mode.

(C). Alarm volume setting

Press the “UP” or “DOWN” key to toggle the programs until the display shows:

Buzzer = X

Use the “Numerical” keys to enter the range of alarm volume from “0” to “9”. A total of 10 levels. Then press the “Enter” key to store the selected alarm volume setting. The instrument will emit a tone signal as a sample of the alarm volume selected and the LCD screen will show the set point immediately. Level “0” will turn off the alarm. Level “1” produces the lowest volume and level “9” is the loudest. Press the “EXIT” key to exit to the test mode or toggle to another program using the arrow keys.

9. To store and recall the memory programs

HYAMP II is equipped with a total of 10 memory programs numbered 0 to 9. This makes it possible to store all the various test parameters required, and quickly recall them for each of the different products that need to be tested. Program memories can also be accessed through the remote control (PLC) port so that a manufacturer can quickly toggle through the various programs without going into the setup menu.

(A). Storage of Memory Program

Once you have entered all the test parameters such as Current, Voltage, Hi-Limit Trip Resistance, Dwell Time, etc., as outlined in the above procedures you may store your setup into one of the 10 memories. The display will show:

S e t	M	__	XXX . X s
XX . XX A			XXX mΩ

Select one of the memory positions “0” to “9” to store the data which was just entered. This is done by pressing and holding a “Numerical” key in for approx., 2 seconds. HYAMP II will respond with two beep tones, one short tone when you select the key and one longer tone when the data is stored into that memory position. Please select the correct memory position as you may inadvertently overwrite a previously stored program. The display will show:

S e t	MX		XXX . Xs
XX . XX A			XXX mΩ

(B). Recall of a Memory Program

Please press the “Numerical” key of the Memory Program that you wish to recall. The instrument will respond with a short beep tone and the display will indicate the test parameters stored in that program. To start a test press the “TEST” key.

C. OPERATING PROCEDURES:

1. Please follow the **Setup Procedures** to set the general status of Remote Control, LCD Contrast and the Alarm Volume.

If the instruments defaults are acceptable then be sure to connect the appropriate test leads to the device under test (DUT) or test fixture. Be sure to connect the safety ground (on the rear panel) to a suitable known good ground before energizing this instrument. Then connect the return lead first to the test fixture or the DUT followed by the high current lead.

Check your connections to be sure they are making good contact and that the test station or area is clear of debris or other personnel.

WARNING DO NOT TOUCH THE DEVICE UNDER TEST ONCE THE TEST HAS BEEN STARTED.

2. Please follow the setup procedures to set or recall setups from memory programs. The display will show the number of the “Memory Program”, time of “Dwell”, value of “Test Current” and the value of the “High Limit Resistance Trip” as follows:

S e t M <u> </u> XXX . X s XX . XX A XXX mΩ	or	S e t MX XXX . X s XX . XX A XXX mΩ
--	----	---

If the set data is to be stored in the memory program, please follow the procedure outlined in the setup procedures on **Storage of Memory Program**.

3. To initiate a test press the “Test” switch on the front panel. The instrument will output the set current for the length of time set on the dwell timer. The display will show:

D w e l l MX XXX . X s X X . XX A XXX mΩ
--

NOTE: If the alarm volume is set to “0” (OFF), no audible alarm will be heard during a failure condition.

4. If the resistance exceeds the high limit trip setting but does not exceed the metering range, the red “FAIL” symbol will illuminate and the alarm will be activated. The display will show:

H I - L M T MX XXX . X s XX . XX A XXX mΩ

5. If the resistance exceeds the high limit trip setting and exceeds the metering range, the red “FAIL” symbol will illuminate and the alarm will sound. The display will show:

HI - LMT	MX	XXX . X s
XX . XX A		OFL mΩ

6. If the resistance does not exceed the low limit setting, the red “FAIL” symbol will illuminate and the alarm will sound. The display will show:

LO - LMT	MX	XXX . X s
XX . XX A		XXX mΩ

7. To stop the alarm, please press the “RESET” switch once. The alarm will stop and the display will retain the failure information. If the “Reset” switch is pressed again, the data on the display screen will be cleared and the display will indicate the setting data from the last test. The instrument is now ready for the next test.

8. If the DUT passed all of the tests, the green “PASS” symbol on the front panel will illuminate and the instrument will output a short audible beep tone to indicate the DUT has passed the tests. The instrument is now ready to perform another test.

The display will show:

Pass	MX	XXX . X s
XX . XX A		XXX mΩ

9. If the operator elects to abort a test in process this can be accomplished by pressing the “Reset” switch at anytime. The instrument will stop the test process immediately.

The display will show:

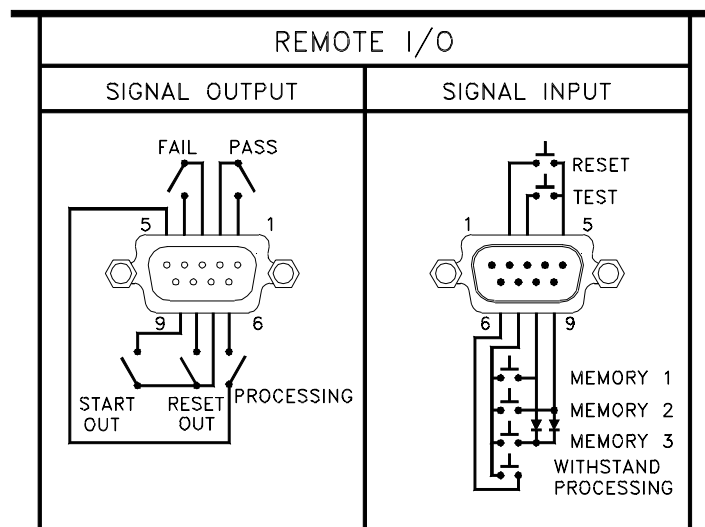
Abort	MX	XXX . X s
XX . XX A		XXX mΩ

Please press the “Test” switch to initiate another test.

D. CONNECTION OF REMOTE I/O:

Two 9 pin “D” type connectors are mounted on the rear panel that provide REMOTE-INPUT-OUTPUT control and information. These connectors mate with standard 9 pin “D” subminiature connector provided by the user. The output mates to a male (plug) connector while the input mates to a female (receptacle) connector. For best performance a shielded cable should be used. To avoid ground loops the shield should not be grounded at both ends of the cable. Suggested AMP part numbers for interconnecting to the Remote I/O are shown below.

205204-4	PLUG SHELL WITH GROUND INDENTS
205203-3	RECEPTACLE SHELL
745254-7	CRIMP SNAP-IN PIN CONTACT (for plug)
745253-7	CRIMP SNAP-IN SOCKET CONTACT (for receptacle)
745171-1	SHIELDED CABLE CLAMP (for either plug or receptacle)
747784-3	JACKSCREW SET (2)

REMOTE INTERFACE REAR PANEL:

1. SIGNAL OUTPUTS ON REMOTE I/O

The rear panel connector provides three output signals to remotely monitor PASS, FAIL, and PROCESSING conditions, and it also provides a RESET OUT pulse signal and a START OUT pulse signal. The monitoring signals are provided by three normally open internal relays that switch on to indicate the current condition of the tester. The RESET OUT signal and the START OUT pulse signal are also provided by a normally open internal relay. The RESET OUT gives a signal whenever the reset function is activated. This can be used to abort a withstand test while the units are interfaced as a test system. The START OUT gives a momentary output pulse at the end of the ground bond test which can be used to start the hipot test. These are normally open free contacts and will

not provide any voltage or current. The ratings of the contacts are 1A / 250 VAC (0.5 ADC). The signal outputs are provided on the 9 pin female type D connector. Below is a listing that indicates what conditions activate each pin. When a terminal becomes active the relay closes thereby allowing the external voltage to operate an external device.

- Pins 1 and 2 provide the PASS signal.
- Pins 3 and 4 provide the FAIL signal.
- Pins 5 and 6 provide the PROCESSING signal.
- Pins 7 and 8 provide the RESET OUT signal.
- Pins 7 and 9 provide the START OUT pulse signal.

The following describes how the relays operate for each test condition.

PROCESSING - The relay contact closes the connection between pin (5) and pin (6) while the instrument is performing a test. The connection is opened at the end of the test.

PASS - The relay contact closes the connection between pin (1) and pin (2) after detecting that the item under test passed all tests. The connection is opened when the next test is initiated or the reset function is activated.

FAIL - The relay contact closes the connection between pin (3) and pin (4) after detecting that the item under test failed any test. The connection is opened when the next test is initiated or the reset function activated.

RESET OUT - The relay contact closes the connection between pin (7) and pin (8) while the reset function is activated. This is only a continuous closure dependent on the length of time the reset button is held in an active state.

START OUT - The relay contact closes the connection between pin (7) and pin (9) momentarily after the completion and pass of the ground bond test. This is only a momentary closure, and therefore, the contact does not stay closed.

2. SIGNAL INPUTS OF REMOTE I/O AND MEMORY PROGRAMS

The HYAMP II remote connector enables remote operation of the TEST and RESET functions or allows the operator to select one of three pre-programmed tests. A signal input is also provided to indicate that a withstand test is processing. When the remote function is (ON) the test switch on the front panel will be disabled to prevent a test from being activated through the test switch (refer to page 31 for details). A normally open momentary switch can then be wired across pins 3 and 5 to allow remote operation of the TEST function. A normally open momentary switch can also be wired across pins 2 and 5 which allows remote operation of the RESET function. For safety, the front panel RESET switch remains active even when a remote reset switch is connected so that high voltage can be shut down from either location.

The HYAMP II also allows access to three MEMORY PROGRAMS through the remote control connector. This gives the user the capability to quickly change parameters and initiate a test remotely. The HYAMP II basically operates in a PLC mode by responding to simple switch or relay contact closures. The built in memory programs of the instrument are used to accomplish this. Three internal memory programs can be accessed. By connecting terminals 7, 8 and 9 in different combinations the user can select the correct memory program.

WARNING ACTIVATING MEMORY PROGRAM FUNCTIONS THROUGH THE REMOTE CONNECTOR, SELECTS THE PROGRAM AND STARTS THE TEST WHICH IS PREPROGRAMMED INTO THAT MEMORY.

CAUTION DO NOT CONNECT VOLTAGE OR CURRENT TO THE SIGNAL INPUTS, THIS COULD RESULT IN DAMAGE TO THE CONTROL CIRCUITRY.

MEMORY 1 - Momentarily connecting terminal 7 to 8 signals the instrument to immediately begin the test program that is stored in memory 1.

MEMORY 2 - Momentarily connecting terminal 7 to 9 signals the instrument to immediately begin the test program that is stored in memory 2.

MEMORY 3 - Momentarily connecting terminal 7 to terminals 8 and 9 signals the instrument to immediately begin the test program that is stored in memory 3.

With the HYAMP II and the HypotPLUS II being used as a test system, the processing signal from the hipot tester will be sent across pin (6) and pin (7) of the HYAMP II remote input. This signal will illuminate the front panel "Withstand Processing" indicator which notifies the operator that high voltage is enabled.

E. HYAMP II AND HypotPLUS II INTERCONNECTION:

The two units have been designed to interface and work as one test system. Testing may be performed in either a sequential method or simultaneously. The traditionally sequential method performs the ground bond test first to verify the ground integrity and then performs the hipot test when a good ground is indicated. The simultaneous method is used for high speed testing and performs the ground bond test and hipot test at the same time. Due to this there are two methods to interconnect your units. You may either use the cables we provide or you can make your own cables. Instructions regarding both cabling options are provided in the next two sections. Also, refer to the end of section E for a complete diagram of a basic test setup.

When preparing your interconnected system, be sure to set the HypotPLUS II's Remote Control menu setting to "ON" as described in the Operation section of the HypotPLUS II manual. After configuring the required test parameters for both instruments and connecting the cables, initiate the test cycle by activating either the remote test signal or

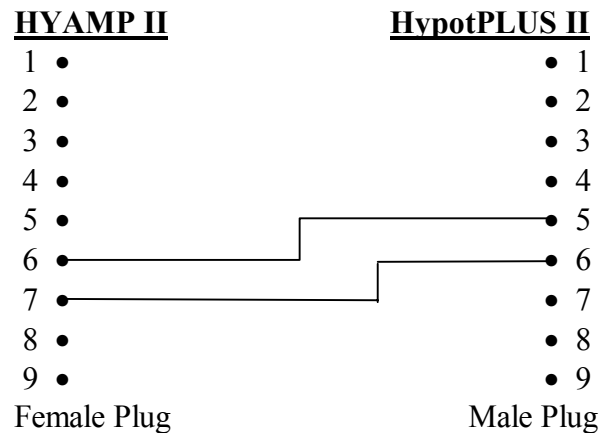
the front panel test button on the HYAMP II. The hipot test will begin automatically relative to the test method selected.

1. INSTRUCTIONS FOR USER-FABRICATED INTERCONNECT CABLES.

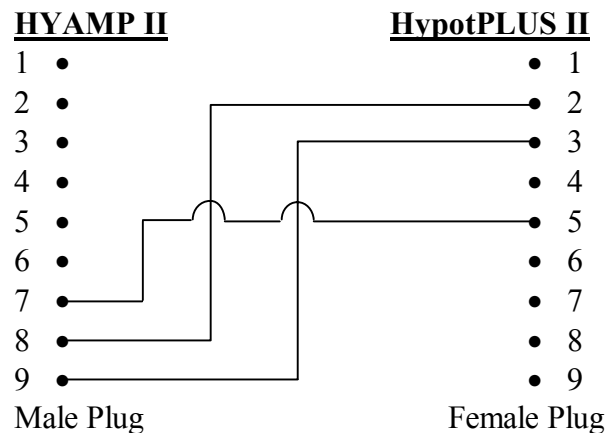
The following diagrams show how to connect the Remote I/O of both units. The associated pin numbers are given for the connectors on both units and the pins to be wired together. Refer to section **D** of this manual for the required parts to make these cables.

A. Sequential Testing

HYAMP II SIGNAL INPUT \ HypotPLUS II SIGNAL OUTPUT CONNECTION

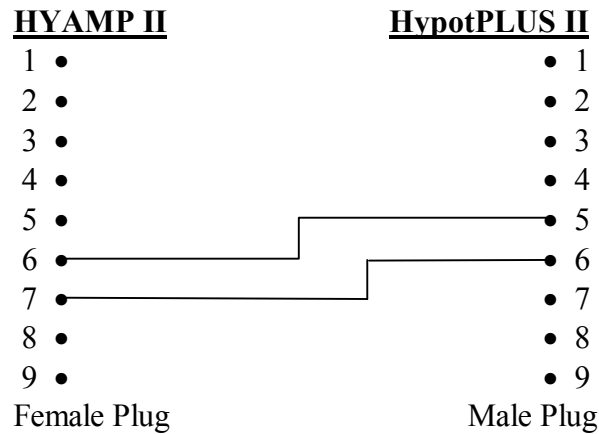


HYAMP II SIGNAL OUTPUT \ HypotPLUS II SIGNAL INPUT CONNECTION

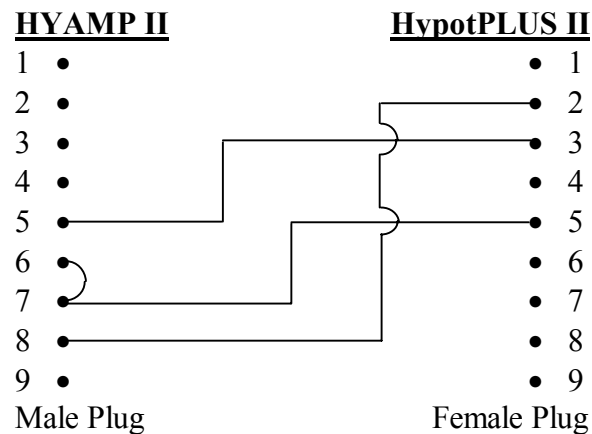


B. Simultaneous Testing

HYAMP II SIGNAL INPUT \ HypotPLUS II SIGNAL OUTPUT CONNECTION



HYAMP II SIGNAL OUTPUT \ HypotPLUS II SIGNAL INPUT CONNECTION



RETURN CABLE CONNECTION

For the return cable connection, it is suggested that two insulated banana plugs be used with 18AWG stranded wire. For proper connection, one end of the return cable should be connected the RETURN jack on the rear panel of the HypotPLUS II and the other end connected to the INTERCONNECT jack on the rear panel of the HYAMP II. The suggested E.F. Johnson part number for the banana plug is as follows:

108-0303-001 Banana Plug Insulated(2)

2. INTERCONNECTING WITH THE HAA-01 ACCESSORY CABLE KIT.

Accessory kit HAA-01 includes the rear interface cables needed for interfacing the HYAMP II with the HypotPLUS II . The following table lists the kits contents in detail.

Part Number	Description	Qty.
HS-8-11	Cable Assembly Return	1
5030DT-21	Cable Assembly R/P Interface COM	1
5030DT-22	Cable Assembly R/P Interface SEQ	1
5030DT-23	Cable Assembly R/P Interface SIM	1
36541	Adapter Box HV, HC Domestic	1

The following sections describe the procedures for interconnecting your units. Please refer to the test method you require for specific cable connection instructions.

A. Common Cable Connections.

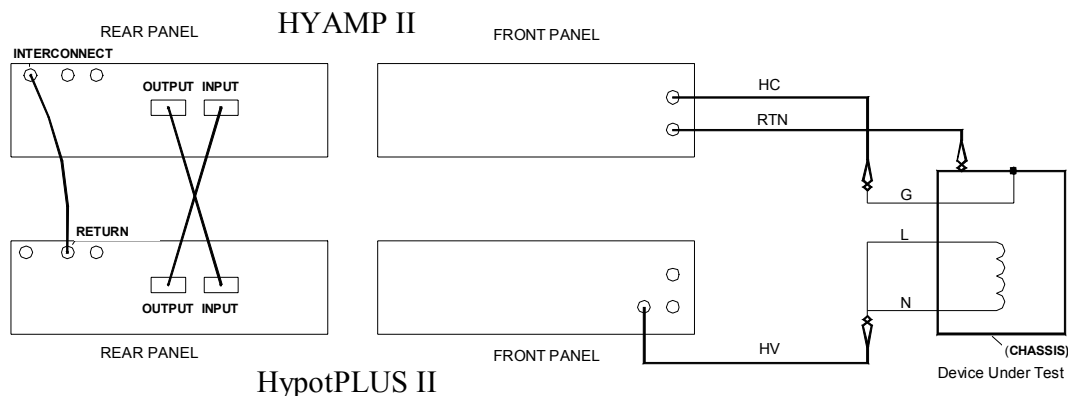
First locate the HS-8-11 return cable, identified by its double banana plug connectors. Connect one end to the RETURN jack on the rear panel of the HypotPLUS II and the other end to the INTERCONNECT jack on the rear panel of the HYAMP II.

Then locate the cable marked “5030DT-21 COMMON”. Connect the female plug (the end with the blue tubing) to the signal input receptacle on the rear panel of the HYAMP II. Then connect the male plug (the end with the black tubing) to the signal output receptacle on the rear panel of the HypotPLUS II.

B. Test Method Specific Connection.

1. For sequential testing methods use the following cable connection. Locate the cable marked “5030DT-22 SEQUENTIAL”. Connect the male plug (the end with the blue tubing) to the signal output receptacle on the rear panel of the HYAMP II. Then connect the female plug (the end with the black tubing) to the signal input receptacle on the rear panel of the HypotPLUS II.

2. For simultaneous testing methods use the following cable connection. Locate the cable marked “5030DT-23 SIMULTANEOUS”. Connect the male plug (the end with the blue tubing) to the signal output receptacle on the rear panel of the HYAMP II. Then connect the female plug (the end with the black tubing) to the signal input receptacle on the rear panel of the HypotPLUS II.



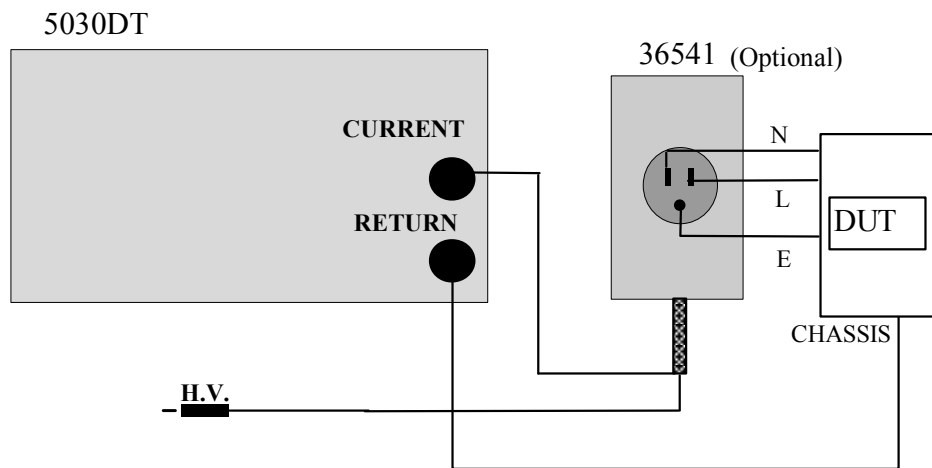
Basic Test Setup

F. ADAPTER BOX CONNECTION

The adapter box is an optional accessory and is not provided as standard equipment with the HYAMP II. If you would like to acquire a 36541 adapter box for use with your HYAMP II please contact Associated Research using the contact information provided in the Safety section of this manual.

The following diagram shows how to connect the optional adapter box to the HYAMP II and the Device Under Test. This adapter box allows the user an easy way to connect an item which is terminated in a three prong line cord. The high current is wired to the ground pin of the receptacle box and from there the test is performed on the ground conductor of the DUT to the chassis or dead metal of the product. The high voltage lead is not used and should be secured out of the way.

If the HYAMP II and the HypotPLUS II are being used as a test system, the high voltage lead should be plugged into the high voltage jack on the front panel of the HypotPLUS II. The return lead from the HypotPLUS II should be connected to the HYAMP II as described in the previous section (Common Cable Connections). This configuration would allow you to do both the ground bond and hipot tests by pushing a single test button on the HYAMP II, once all connections are made and the test parameters are set up.



Test Connections

MODEL 5030DT OPTIONS

Introduction

This section contains a list and descriptions of available factory installed options at the time of this printing.

Option Label

If your instrument has been modified with options, there will be an option label on the rear panel of the unit. The option label contains an option(s) code that may be cross-referenced to the Options List.

For example, your options code would appear as follows:

fitted with option 01.....OPT: 01

5030DT Options

Option List

Code	Description
01	Continuous Output with PASS buzzer

Description

01 Continuous Output with PASS buzzer

The Continuous Output with PASS buzzer option allows the user to perform multiple ground bond tests without the need to repeatedly energize and deenergize the output. All of the standard specifications for output ratings remain the same as the standard instrument. The operation of the failure judgment and indication are the fundamental differences in the operation of the instrument.

To make the best use of the continuous running feature the Dwell timer should be set to 0.0 seconds to enable the continuous running mode. However if the Dwell timer is set to any value other than 0.0 s, when the timer has completed the test results will be captured until the test is restarted.

To start the ground bond test the TEST button on the front panel can be pressed with the test leads connected or disconnected from the DUT. Once the test leads are connected to the DUT and the measured resistance is less than the Hi-Limit setting the instrument will indicate a PASS condition with audible alarm and the PASS light illuminated on the front panel.

When the continuity is broken or the instrument measures a resistance value greater than the Hi-Limit setting, the FAIL indicator will illuminate but the alarm will not sound. The

fail condition will remain until the resistance drops below the Hi-Limit setting, or until the Reset button is pressed to deenergize the output.

This operation emulates the basic audible continuity testers found on many multimeters, and is useful in doing multipoint ground bond tests on the DUT by disconnecting and reconnecting the test leads without disabling the output. This method is perfectly safe to the operator with regards to the voltage potential that is available on the test leads. This open circuit voltage is controlled by the voltage setting parameter. The user can access the voltage setting parameter by pressing the VOLTAGE button on the left hand side of the display on the front panel. The maximum voltage setting available is 8 volts AC and presents absolutely no risk to the operator.

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SECTION 2
SERVICE MANUAL

CALIBRATION PROCEDURES

This instrument has been fully calibrated at the factory in accordance to our published specifications. It has been calibrated with standards traceable to NIST. You will find in this manual a copy of the "Certificate of Calibration". It is recommended that you have this instrument recalibrated and a safety check done at least once per year. AR recommends you use "Calibration Standards" that are NIST traceable, or traceable to agencies recognized by NIST to keep this instrument within published specifications. End user metrology standards or practices may vary. These metrology standards determine the measurement uncertainty ratio of the calibration standards being used. Calibration adjustments can only be made in the Calibration mode, calibration checks can only be made in the Test mode of operation.

Calibration Equipment Required:

The following equipment will be needed to properly calibrate your instrument.

- 1). Digital Multimeter with the minimum ranges;
ac voltage: 10 VAC
ac current: 30 AAC.

CALIBRATION PROCEDURE:

To enter the calibration mode the instrument must be in the OFF position. Press and hold the "0" key, then turn on the Input Power Switch. The display will show:

Calibration Mode 0: V 1: A 7: Lock

Press "0" for volts calibration, "1" for amps and "7" for the password and lock mode settings.

1. Calibration of Voltage

Equipment needed: STANDARD AC VOLTMETER capable of measuring 10VAC.

Please connect a standard ac voltmeter with 10V minimum full scale range to the current and return connectors. Then press the "0" key on the front panel. The instrument will provide approximately 7.5VAC on the output connectors and the display will show:

Voltage = __ V

Please use the numerical keys to enter the reading from the ac voltmeter into the instrument. Then press the “Enter” key to store the voltage setting. If an incorrect value is entered, press the “EXIT” key. Then the correct value may be re-entered.

2. Calibration of Current

Equipment needed: STANDARD AC AMMETER with a range of 30A.

Please connect the standard ac ammeter across the output leads of the instrument. Press the “1” key. The instrument will provide around 30A on the output and the display will show:

Current = __ A

Please use the numerical keys to enter the reading of the standard ac ammeter into the instrument. Then press the “Enter” key to store the current setting. If an incorrect value is entered, press the “EXIT” key. The correct value may be re-entered.

3. Setup of the Password and Lock Function

Please refer to the setup procedures section of this manual.

4. Exit Calibration Mode

After the calibration is complete, turn the input power switch to OFF (0) to exit the Calibration Mode. Turn the power switch to ON (1) to return to standard operating test mode for calibration verification.

Replacement Parts List HYAMP II

Model 5030DT

Rev. E 6/03/2002 ECO 4890

Part Number	Qty	Reference Designator	Description
37515	1	CSW-01	PCB Assy Input Protection Board
37550	1	CKB-01	PCB Assy Keyboard Assembly
37629	1	CG7310	PCB Assy Main Control Board
37636	1	AMP-250	PCB Assy Main Power Amplifier Board
37591	1	REC-16	PCB Assy Rectifier Board
37564	2		Bracket Mounting 19"
38124	1		Cabinet Chassis
38028	1		Cabinet Cover
38101	1		Feet Kit Plastic w/o Rubber Inserts
38102	4		Rubber Insert
37561	1		Cable RS-232 20cm F/F
37562	1		Cable RS-232 20cm M/F
37632	2		Capacitor Electrolytic 47000uF 20V
37633	1		Capacitor Tantalum 10uF 35V
37631	2		Diode Rectify Bridge 50V/50A
37563	2		Handle Rack Mount
37554	1		LCD Display 16 x 2 Characters
33189	1		Line Cord (Mains)
37637	1		Manual Operating & Service 5030DT
37555	1		Power Switch 2P 10A/250V
35999	1		Return Connector Black Banana Jack
37557	1		Switch Reset, Red
37556	1		Switch Test, Green
37879	1	T1	Transformer Input, Toroidal
37878	1	-	Fuse 5A 250V, Very Slow Blow, 20mm
37781	1	-	Fuse Holder, 20mm
5002D-37	1		Cable Assy High Current Return Lead
5002D-24	1		Cable Assy High Current Output Lead
37239	2		High Current Return Jack
37239	2		High Current Output Jack
37236	4		Grommet Red (High Current Output Jack)
37237	4		Grommet Black (High Current Return Jack)
37487	15	Q1-Q14,16	Power Transistors D1148
37567	1	IC30	12 Bit D/A Converter 7237
37697	1	IC34	Microcontroller 8 Bit 89C52
37569	1	IC24	8 Bit D/A Converter DAC0800
38220	1	82147 / IC27	ROM Conversion Board

SCHEMATIC INDEX

Drawing Number	Description	Pages
S05030DT	Wiring Diagram	1
S37622	Main Control Board	4
S37624	Main Power Amplifier Board	1
S37550	Keypad Board	1
S37515	Input Protection Board	1
S37591	Rectifier Board	1
S38220	ROM Conversion Board	1