

RESISTANCE WELDING PROCESS CONTROL MONITOR

WELD SENTRY

USER MANUAL



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Revision Record

Revision	EO	Date	Basis of Revision
A	None	03/98	Original manual
B	17463	05/98	Incorporate Baxter CVG changes.
C	19146	01/02	Change name to Unitek Peco™. Reformat manual.
D	45804	04/20	Update Company Name (Amada Weld Tech).
E	46311	04/21	See ECO for Details
F	47208	01/24	Change Manual Title

FOREWORD

Thank you for purchasing an AMADA WELD TECH, Weld Sentry Resistance Welding Process Control Monitor.

Upon receipt of your equipment, please thoroughly inspect it for shipping damage prior to its installation. Should there be any damage, please immediately contact the shipping company to file a claim, and notify AMADA WELD TECH INC. at:

1820 South Myrtle Avenue
Monrovia, CA 91016
Telephone: (626) 303-5676
FAX: (626) 358-8048
e-mail: info@amadaweldtech.com

The purpose of this manual is to supply operating and maintenance personnel with the information needed to safely operate and maintain the Weld Sentry Resistance Welding Process Control Monitor.

We have made every effort to ensure that the information in this manual is accurate and adequate. The contents of this manual are subject to change without notice.

Should questions arise, or if you have suggestions for improvement of this manual, please contact us at the above location/numbers.

AMADA WELD TECH is not responsible for any loss due to improper use of this product.

The Weld Sentry Option is available on many different AMADA WELD TECH Power Supplies, both current and obsolete. The obsolete models are included for reference:

Current Power Supply Models:

HF2S/230	1-265-xx
HF2S/380	1-265-0x-01
HF2S/460	1-265-0x-02
HF2S/208	1-265-0x-03

Obsolete Power Supply Models:

250DPS	1-254-xx
500DPS	1-255-xx
500HVS	1-256-xx
875DPS	1-257-xx
PM7S	1-241-xx

SAFETY NOTES

This instruction manual describes how to operate, maintain and service the Weld Sentry Resistance Welding Process Control Monitor, and provides instructions relating to its SAFE use. Procedures described in this manual **MUST** be performed, as detailed, by **QUALIFIED** and **TRAINED** personnel.

For **SAFETY**, and to effectively take advantage of the full capabilities of the tester, please read these instruction manuals before attempting to use the workstation.

Procedures other than those described in this manual or not performed as prescribed in it, may expose personnel to electrical hazards.

After reading this manual, retain it for future reference when any questions arise regarding the proper and **SAFE** operation of the tester.

Please note the following conventions used in this manual:

WARNING: Comments marked this way warn the reader of actions which, if not followed, might result in immediate death or serious injury.

CAUTION: Comments marked this way warn the reader of actions which, if not followed, might result in either damage to the equipment, or injury to the individual if subject to long-term exposure to the indicated hazard.

**Disposal**

Properly handle and dispose of used materials.

For the disposal of electronic waste please contact AMADA WELD TECH.

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LIMITED WARRANTY

GENERAL TERMS AND CONDITIONS FOR THE SALE OF GOODS

1. Applicability.

(a) These terms and conditions of sale (these “**Terms**”) are the only terms which govern the sale of the goods (“**Goods**”) by Amada Weld Tech Inc. (“**Seller**”) to the buyer identified in the Sales Quotation and/or Acknowledgment (as each defined below) to which these Terms are attached or incorporated by reference (“**Buyer**”). Notwithstanding anything herein to the contrary, if a written contract signed by authorized representatives of both parties is in existence covering the sale of the Goods covered hereby, the terms and conditions of said contract shall prevail to the extent they are inconsistent with these Terms.

(b) The accompanying quotation of sale (the “**Sales Quotation**”) provided to Buyer, and/or sales order acknowledgement (“**Acknowledgement**”) and these Terms (collectively, this “**Agreement**”) comprise the entire agreement between the parties, and supersede all prior or contemporaneous understandings, agreements, negotiations, representations and warranties, and communications, both written and oral. For clarification, after the Acknowledgement is received by Buyer, the order for Goods is binding and cannot be cancelled by Buyer for any reason and the full purchase price amount set forth in the Acknowledgement shall be due and payable by Buyer to Seller pursuant to the payment schedule set forth in the Acknowledgement unless otherwise agreed to in writing by Seller. All terms and conditions contained in any prior or contemporaneous oral or written communication which are different from, or in addition to, the terms and conditions in this Agreement are hereby rejected and shall not be binding on Seller, whether or not they would materially alter this Agreement. These Terms prevail over any of Buyer’s terms and conditions of purchase regardless whether or when Buyer has submitted its purchase order or such terms. Fulfillment of Buyer’s order does not constitute acceptance of any of Buyer’s terms and conditions and does not serve to modify or amend these Terms. Notwithstanding anything herein to the contrary, all orders for Goods must be for a minimum purchase price of \$100 or such orders will be rejected by Seller.

2. Delivery.

(a) The Goods will be delivered within a reasonable time after Seller provides Buyer the Acknowledgment, subject to availability of finished Goods. Seller will endeavor to meet delivery schedules requested by Buyer, but in no event shall Seller incur any liability, consequential or otherwise, for any delays or failure to deliver as a result of ceasing to manufacture any product or any Force Majeure Event. Delivery schedules set forth in the Acknowledgment are Seller’s good faith estimate on the basis of current schedules. In no event shall Seller be liable for special or consequential damages resulting from failure to meet requested delivery schedules.

(b) Unless otherwise agreed in writing by the parties in the Acknowledgement, Seller shall deliver the Goods to Seller’s plant in Monrovia, CA, USA (the “**Shipping Point**”) using Seller’s standard methods for packaging and shipping such Goods. Buyer shall take delivery of the Goods within three (3) days of Seller’s written notice that the Goods have been delivered to the Shipping Point. Buyer shall be responsible for all loading costs (including freight and insurance costs) and provide equipment and labor reasonably suited for receipt of the Goods at the Shipping Point. Seller shall not be liable for any delays, loss or damage in transit.

(c) Seller may, in its sole discretion, without liability or penalty, make partial shipments of Goods to Buyer, if applicable. Each shipment will constitute a separate sale, and Buyer shall pay for the units shipped whether such shipment is in whole or partial fulfillment of Buyer’s purchase order.

(d) If for any reason Buyer fails to accept delivery of any of the Goods on the date fixed pursuant to Seller’s notice that the Goods have been delivered at the Shipping Point, or if Seller is unable to deliver the Goods at the Shipping Point on such date because Buyer has not provided appropriate instructions, documents, licenses or authorizations: (i) risk of loss to the Goods shall pass to Buyer; (ii) the Goods shall be deemed to have been delivered; and (iii) Seller, at its option, may store the Goods until Buyer picks them up, whereupon Buyer shall be liable for all related costs and expenses (including, without limitation, storage and insurance).

3. Non-delivery.

(a) The quantity of any installment of Goods as recorded by Seller on dispatch from Seller’s place of business is conclusive evidence of the quantity received by Buyer on delivery unless Buyer can provide conclusive evidence proving the contrary.

(b) Seller shall not be liable for any non-delivery of Goods (even if caused by Seller’s negligence) unless Buyer gives written notice to Seller of the non-delivery within three (3) days of the date when the Goods would in the ordinary course of events have been received.

(c) Any liability of Seller for non-delivery of the Goods shall be limited to (in Seller’s sole discretion) replacing the Goods within a reasonable time or adjusting the invoice respecting such Goods to reflect the actual quantity delivered.

4. Shipping Terms. Unless indicated otherwise in the Acknowledgment, Delivery shall be made EXW (Incoterms 2010), Shipping Point, including without limitation, freight and insurance costs. If no delivery terms are specified on the Acknowledgement, the method of shipping will be in the sole discretion of Seller. Unless directed in writing otherwise by Buyer, full invoice value will be declared for all shipments.

5. Title and Risk of Loss. Title and risk of loss passes to Buyer upon delivery of the Goods at the Shipping Point. As collateral security for the payment of the purchase price of the Goods, Buyer hereby grants to Seller a lien on and security interest in and to all of the right, title and interest of Buyer in, to and under the Goods, wherever located, and whether now existing or hereafter arising or acquired from time to time, and in all accessions thereto and replacements or modifications thereof, as well as all proceeds (including insurance proceeds) of the foregoing. The security interest granted under this provision constitutes a purchase money security interest under the California Commercial Code.

6. Amendment and Modification. These Terms may only be amended or modified in a writing which specifically states that it amends these Terms and is signed by an authorized representative of each party.

7. Inspection and Rejection of Nonconforming Goods.

(a) Buyer shall inspect the Goods within two (2) days of receipt ("**Inspection Period**"). Buyer will be deemed to have accepted the Goods unless it notifies Seller in writing of any Nonconforming Goods during the Inspection Period and furnishes such written evidence or other documentation as required by Seller. "**Nonconforming Goods**" means only the following: (i) product shipped is different than identified in Buyer's Acknowledgement; or (ii) product's label or packaging incorrectly identifies its contents. Notwithstanding the foregoing, for shipped Goods that require field installation, the "re-verification" terms in the Acknowledgement shall apply and for custom installations, the inspection and verification shall take place at Buyer's site immediately after the installation is completed.

(b) Seller will only accept Nonconforming Goods that are returned under Seller's Return Material Authorization procedures then in effect ("**RMA**"). Buyer shall obtain a RMA number from Seller prior to returning any Nonconforming Goods and return the Nonconforming Goods prepaid and insured to Seller at 1820 South Myrtle Avenue, Monrovia, CA 91016 or to such other location as designated in writing by Seller for the examination to take place there. If Seller reasonably verifies Buyer's claim that the Goods are Nonconforming Goods and that the nonconformance did not developed by use from Buyer, Seller shall, in its sole discretion, (i) replace such Nonconforming Goods with conforming Goods, or (ii) credit or refund the Price for such Nonconforming Goods pursuant to the terms set forth herein. Notwithstanding the foregoing, the only remedy for Nonconforming Goods that are custom systems is repair (not refund or replacement). No returns for Nonconforming Goods are allowed after thirty (30) days from the original shipping date.

(c) Buyer acknowledges and agrees that the remedies set forth in Section 7(a) are Buyer's exclusive remedies for the delivery of Nonconforming Goods. Except as provided under Section 7(a) and Section 14, all sales of Goods to Buyer are made on a one-way basis and Buyer has no right to return Goods purchased under this Agreement to Seller.

8. Price.

(a) Buyer shall purchase the Goods from Seller at the prices (the "**Prices**") set forth in Seller's published catalogue literature in force as of the date of the Sales Quotation. However, the Prices shown in such catalogue literature or any other publication are subject to change without notice. Unless specifically stated to the contrary in the Sales Quotation, quoted Prices and discounts are firm for thirty (30) days from the date of the Sales Quotation. Unless otherwise stated, prices are quoted EXW (Incoterms 2010), Shipping Point. Unless otherwise stated in the Acknowledgement, if the Prices should be increased by Seller before delivery of the Goods to a carrier for shipment to Buyer, then these Terms shall be construed as if the increased prices were originally inserted herein, and Buyer shall be billed by Seller on the basis of such increased prices.

(b) All Prices are exclusive of all sales, use and excise taxes, and any other similar taxes, duties and charges of any kind imposed by any governmental authority on any amounts payable by Buyer. Buyer shall be responsible for all such charges, costs and taxes (present or future); provided, that, Buyer shall not be responsible for any taxes imposed on, or with respect to, Seller's income, revenues, gross receipts, personnel or real or personal property or other assets.

9. Payment Terms.

(a) Unless otherwise provided in the Acknowledgement, if Buyer has approved credit with Seller, Buyer shall pay all invoiced amounts due to Seller within thirty (30) days from the date of Seller's invoice. If Seller does not have Buyer's financial information and has not provided pre-approved credit terms for Buyer, the payment must be made in cash with order or C.O.D. in US dollars. If Buyer has approved credit terms, the payment may be made by cash with order, wire transfer of immediately available funds, or check in US dollars. Certain products require a down payment. Any payment terms other than set forth above will be identified in the Acknowledgement. Notwithstanding anything herein to the contrary, all prepaid deposits and down payments are non-refundable. If a deposit is not received when due, Seller reserves the right to postpone manufacturing of Goods until payment is received. Seller will not be responsible for shipment delays due to deposit payment delays.

(b) In Seller's sole discretion, Seller may access Buyer interest on all late payments at the lesser of the rate of 1.5% per month or the highest rate permissible under applicable law, calculated daily and compounded monthly. Buyer shall reimburse Seller for all costs incurred in collecting any late payments, including, without limitation, attorneys' fees. In addition to all other remedies available under these Terms or at law (which Seller does not waive by the exercise of any rights hereunder), Seller shall be entitled to suspend the delivery of any Goods if Buyer fails to pay any amounts when due hereunder and such failure continues for ten (10) days following written notice thereof.

(c) Buyer shall not withhold payment of any amounts due and payable by reason of any set-off of any claim or dispute with Seller, whether relating to Seller's breach, bankruptcy or otherwise.

10. Intellectual Property; Software License.

(a) To the extent that any Goods provided under this Agreement contains software, whether pre-installed, embedded, in read only memory, or found on any other media or other form ("**Software**"), such Software and accompanying documentation are licensed to Buyer, not sold and shall remain the sole and exclusive property of Seller or third party licensors of Seller. Seller grants Buyer a non-exclusive license to use the Software solely as provided in and in connection with the use of the Goods in which such Software is contained and in accordance with any applicable user documentation provided with such Goods and subject to the provisions of this Agreement. Certain of Seller's Goods may include third party software such as computer operating systems. Licenses to such third party software are subject to the terms and conditions of any applicable third party software license agreements. Unless identified in the Acknowledgement, no license is granted by Seller with respect to such third party software products that may be provided with the Goods (if any). Seller makes no warranties regarding any third party software that may accompany the Goods or otherwise and such software is explicitly included in the definition of Third Party Products below.

(b) Buyer shall not copy, modify, or disassemble, or permit others to copy, modify, or disassemble, the Software, nor may Buyer modify, adapt, translate, reverse assemble, decompile, or otherwise attempt to derive source code from the Software. Buyer shall not transfer possession of the Software except as part of, or with, the Goods, and each such transfer shall be subject to the restrictions contained herein. Buyer may not sublicense, rent, loan, assign or otherwise transfer the Software or documentation, and Buyer shall retain on all copies of the Software and documentation all copyright and other proprietary notices or legends appearing therein or thereon. Seller may terminate this license upon written notice for any violation of any of the terms of this license or any material breach of any provision of this Agreement. Buyer shall immediately discontinue use of the Software upon any termination of this license or Agreement. This license shall terminate upon any termination of the Agreement.

(c) All patents, trademarks, copyrights or other intellectual property rights embodied in the Goods, including without limitation the Software, are owned by Seller and its licensors. Seller and its licensors retain all right, title and interest in such intellectual property rights. Except as expressly set forth herein, no license rights or ownership in or to any of the foregoing is granted or transferred hereunder, either directly or by implication. ALL RIGHTS RESERVED.

(d) If Buyer is the United States Government or any agency thereof, each of the components of the Software and user documentation are a "commercial item," and "computer software" as those terms are defined at 48 C.F.R. 2.101, consisting of "commercial computer software" and "commercial computer software documentation," as such terms are used in 48 C.F.R. 12.212. Consistent with 48 C.F.R. 12.212 and 48 C.F.R. 227.7202-1 through 227.7202-4, all United States government Buyers acquire only those rights in the Software and user documentation that are specified in this Agreement.

11. Installation and Other Services. Seller shall provide installation services ("Installation Services") to Buyer if set forth in the Acknowledgment. If Installation Services are provided for in the Acknowledgment, Buyer will prepare the location for the installation consistent with Buyer's written specifications and Buyer will install necessary system cable and assemble any necessary equipment or hardware not provided by Seller, unless agreed otherwise in writing by the parties. For Goods that will be operated on or in connection with Buyer supplied hardware or software, Buyer is responsible for ensuring that its hardware and software conform with Seller minimum hardware and software requirements as made available to Buyer. Seller shall provide other field services, such as maintenance visits and field repairs (the "Other Services" and together with the Installation Services, the "Services") if set forth in the Acknowledgment.

12. Limited Warranty.

(a) Subject to the exceptions and upon the conditions set forth herein, Seller warrants to Buyer that for a period of one (1) year from the date of shipment ("Warranty Period"), that such Goods will be free from material defects in material and workmanship.

(b) Notwithstanding the foregoing and anything herein to the contrary, the warranty set forth in this Section 12 shall be superseded and replaced in its entirety with the warranty set forth on **Exhibit A** hereto if the Goods being purchased are specialty products, which include, without limitation, laser products, fiber markers, custom systems, workstations, Seller-installed products, non-catalogue products and other custom-made items (each a "Specialty Product").

(c) **EXCEPT FOR THE WARRANTY SET FORTH IN SECTION 12(A), SELLER MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO THE GOODS (INCLUDING ANY SOFTWARE) OR SERVICES, INCLUDING ANY (a) WARRANTY OF MERCHANTABILITY; (b) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; (c) WARRANTY OF TITLE; OR (d) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.**

(d) Products manufactured by a third party and third party software ("Third Party Product") may constitute, contain, be contained in, incorporated into, attached to or packaged together with, the Goods. Third Party Products are not covered by the warranty in Section 12(a). For the avoidance of doubt, **SELLER MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO ANY THIRD PARTY PRODUCT, INCLUDING ANY (a) WARRANTY OF MERCHANTABILITY; (b) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; (c) WARRANTY OF TITLE; OR (d) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.** Notwithstanding the foregoing, in the event of the failure of any Third Party Product, Seller will assist (within reason) Buyer (at Buyer's sole expense) in obtaining, from the respective third party, any (if any) adjustment that is available under such third party's warranty.

(e) Seller shall not be liable for a breach of the warranty set forth in Section 12(a) unless: (i) Buyer gives written notice of the defect, reasonably described, to Seller within five (5) days of the time when Buyer discovers or ought to have discovered the defect and such notice is received by Seller during the Warranty Period; (ii) Seller is given a reasonable opportunity after receiving the notice to examine such Goods; (iii) Buyer (if requested to do so by Seller) returns such Goods (prepaid and insured to Seller at 1820 South Myrtle Avenue, Monrovia, CA 91016 or to such other location as designated in writing by Seller) to Seller pursuant to Seller's RMA procedures and Buyer obtains a RMA number from Seller prior to returning such Goods for the examination to take place; and (iii) Seller reasonably verifies Buyer's claim that the Goods are defective and that the defect developed under normal and proper use.

(f) Seller shall not be liable for a breach of the warranty set forth in Section 12(a) if: (i) Buyer makes any further use of such Goods after giving such notice; (ii) the defect arises because Buyer failed to follow Seller's oral or written instructions as to the storage, installation, commissioning, use or maintenance of the Goods; (iii) Buyer alters or repairs such Goods without the prior written consent of Seller; or (iv) repairs or modifications are made by persons other than Seller's own service personnel, or an authorized representative's personnel, unless such repairs are made with the written consent of Seller in accordance with procedures outlined by Seller.

(g) All expendables such as electrodes are warranted only for defect in material and workmanship which are apparent upon receipt by Buyer. The foregoing warranty is negated after the initial use.

(h) Subject to Section 12(e) and Section 12(f) above, with respect to any such Goods during the Warranty Period, Seller shall, in its sole discretion, either: (i) repair or replace such Goods (or the defective part) or (ii) credit or refund the price of such Goods at the pro rata contract rate, provided that, if Seller so requests, Buyer shall, at Buyer's expense, return such Goods to Seller.

(i) **THE REMEDIES SET FORTH IN SECTION 12(H) SHALL BE BUYER'S SOLE AND EXCLUSIVE REMEDY AND SELLER'S ENTIRE LIABILITY FOR ANY BREACH OF THE LIMITED WARRANTY SET FORTH IN SECTION 12(A).** Representations and warranties made by any person, including representatives of Seller, which are inconsistent or in conflict with the terms of this warranty, as set forth above, shall not be binding upon Seller.

13. Limitation of Liability.

(a) **IN NO EVENT SHALL SELLER BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR PUNITIVE DAMAGES, LOST PROFITS OR REVENUES OR DIMINUTION IN VALUE, LOSS OF INFORMATION OR DATA, OR PERSONAL INJURY OR DEATH ARISING IN ANY WAY OUT OF THE MANUFACTURE, SALE, USE, OR INABILITY TO USE ANY GOODS, SOFTWARE OR SERVICE, OR ARISING OUT OF OR RELATING TO ANY BREACH OF THESE TERMS, WHETHER OR NOT THE POSSIBILITY OF SUCH DAMAGES HAS BEEN DISCLOSED IN ADVANCE BY BUYER OR COULD HAVE BEEN REASONABLY FORESEEN BY BUYER, REGARDLESS OF THE LEGAL OR EQUITABLE THEORY (CONTRACT, TORT OR OTHERWISE) UPON WHICH THE CLAIM IS BASED, AND NOTWITHSTANDING THE FAILURE OF ANY AGREED OR OTHER REMEDY OF ITS ESSENTIAL PURPOSE.**

(b) **IN NO EVENT SHALL SELLER'S AGGREGATE LIABILITY ARISING OUT OF OR RELATED TO THIS AGREEMENT, WHETHER ARISING OUT OF OR RELATED TO BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE, EXCEED THE TOTAL OF THE AMOUNTS PAID TO SELLER FOR THE GOODS SOLD HEREUNDER.**

(c) ALL WARRANTIES SET FORTH HEREIN, DIRECT OR IMPLIED, ARE VOIDED IF THE INITIAL INSTALLATION AND START-UP OF THE SUBJECT GOOD IS NOT SUPERVISED BY AN AUTHORIZED REPRESENTATIVE OF SELLER. AFTER INSTALLATION, ANY RE-ALIGNMENT, RE-CLEANING, OR RE-CALIBRATION, PROVIDED THEY ARE NOT RELATED TO A PROVEN DEFECT IN MATERIALS OR WORKMANSHIP, SHALL BE PERFORMED BY AN AUTHORIZED REPRESENTATIVE OF SELLER AT THE CURRENT SERVICE RATES.

(d) WHERE GOODS ARE SUBJECT TO A MOVE TO ANOTHER LOCATION AFTER THE ORIGINAL INSTALLATION HAS BEEN MADE, THE WARRANTY MAY BE MAINTAINED ONLY IF SUPERVISED BY AN AUTHORIZED REPRESENTATIVE OF SELLER. SELLER, FOR A SERVICE CHARGE, WILL ARRANGE FOR AND SUPERVISE THE DISCONNECTION, TRANSPORTATION, REINSTALLATION AND START-UP OF THE EQUIPMENT. CLAIMS FOR DAMAGE IN SHIPMENT ARE THE RESPONSIBILITY OF BUYER AND SHALL BE FILED PROMPTLY WITH THE TRANSPORTATION COMPANY.

14. Return Goods Policy. Seller's products may be returned to Seller for credit within sixty (60) days of shipment subject to the following conditions.

(a) In order to return products for credit, Buyer must obtain a RMA number from Seller. Upon receipt, it must be executed by an authorized person and then returned with the Goods. Goods returned to Seller without a RMA will be returned at Buyer's expense.

(b) Goods are to be returned to Seller at 1820 South Myrtle Avenue, Monrovia, CA 91016 with Freight Prepaid. Seller will not accept collect shipments.

(c) Restocking fees will be assessed in accordance with the following schedules: (i) Goods returned within the first thirty (30) days from shipment date will be restocked less twenty percent (20%) of the amount billed on the original invoice. (ii) Goods returned over thirty (30) days of shipment but less than sixty (60) days will be restocked less thirty percent (30%) of the amount billed on the original invoice. (iii) No returns are allowed after sixty (60) days from the original shipping date.

(d) The restocking fees set forth above are the minimum fees. If a returned Good requires rework to restore it to a saleable condition, further charges will be assessed. Seller's quality assurance department will document the condition of the Goods when received by Seller and report their findings to Buyer.

(e) **Notwithstanding the foregoing provisions of this Section 14, the following Goods cannot be returned, are not eligible for any credit and cannot be restocked: (i) custom or modified products and (ii) any expendable product(s) that have been used.**

15. Compliance with Law and Indemnification. Buyer shall comply with all applicable laws, regulations and ordinances. Buyer shall maintain in effect all the licenses, permissions, authorizations, consents and permits that it needs to carry out its obligations under this Agreement. Buyer shall comply with all export and import laws of all countries involved in the sale of the Goods under this Agreement or any resale of the Goods by Buyer. Goods, Services and technical data delivered by Seller shall be subject to U.S. export controls. Buyer shall, and shall cause its customers to, obtain all licenses, permits and approvals required by any government and shall comply with all applicable laws, rules, policies and procedures of the applicable government and other competent authorities. Buyer will indemnify and hold Seller harmless for any violation or alleged violation by Buyer of such laws, rules, policies or procedures. Buyer shall not transmit, export or re-export, directly or indirectly, separately or as part of any system, the Goods or any technical data (including processes and Services) received from Seller, without first obtaining any license required by the applicable government, including without limitation, the U.S. government. Buyer also certifies that none of the Goods or technical data supplied by Seller under this Agreement will be sold or otherwise transferred to, or made available for use by or for, any entity that is engaged in the design, development, production or use of nuclear, biological or chemical weapons or missile technology. No Buyer information will be deemed "technical data" unless Buyer specifically identifies it to Seller as such. Buyer assumes all responsibility for shipments of Goods requiring any government import clearance. Seller may terminate this Agreement if any governmental authority imposes antidumping or countervailing duties or any other penalties on Goods. For all international shipments, Seller requires that all required Export Control documentations, including Form BIS-711 Statement by Ultimate Consignee and Purchases, are submitted by Buyer along with the purchase order. Seller reserves the right to postpone shipment until all documentations are completed and submitted to Seller. Seller will not be responsible for shipment delays due to non-compliance by Buyer of the foregoing two sentences.

16. Termination. In addition to any remedies that may be provided under these Terms, Seller may terminate this Agreement with immediate effect upon written notice to Buyer, if Buyer: (i) fails to pay any amount when due under this Agreement and such failure continues for ten (10) days after Buyer's receipt of written notice of nonpayment; (ii) has not otherwise performed or complied with any of these Terms, in whole or in part; or (iii) becomes insolvent, files a petition for bankruptcy or commences or has commenced against it proceedings relating to bankruptcy, receivership, reorganization or assignment for the benefit of creditors.

17. Waiver. No waiver by Seller of any of the provisions of this Agreement is effective unless explicitly set forth in writing and signed by Seller. No failure to exercise, or delay in exercising, any rights, remedy, power or privilege arising from this Agreement operates or may be construed as a waiver thereof. No single or partial exercise of any right, remedy, power or privilege hereunder precludes any other or further exercise thereof or the exercise of any other right, remedy, power or privilege.

18. Confidential Information. All non-public, confidential or proprietary information of Seller, including, but not limited to, specifications, samples, patterns, designs, plans, drawings, documents, data, business operations, customer lists, pricing, discounts or rebates, disclosed by Seller to Buyer, whether disclosed orally or disclosed or accessed in written, electronic or other form or media, and whether or not marked, designated or otherwise identified as "confidential," in connection with this Agreement is confidential, solely for the use of performing this Agreement and may not be disclosed or copied unless authorized in advance by Seller in writing. Upon Seller's request, Buyer shall promptly return all documents and other materials received from Seller. Seller shall be entitled to injunctive relief for any violation of this Section 18. This Section 18 does not apply to information that is: (a) in the public domain through no fault of Buyer; (b) known to Buyer at the time of disclosure without restriction as evidenced by its records; or (c) rightfully obtained by Buyer on a non-confidential basis from a third party.

19. Force Majeure. Seller shall not be liable or responsible to Buyer, nor be deemed to have defaulted or breached this Agreement, for any failure or delay in fulfilling or performing any term of this Agreement when and to the extent such failure or delay is caused by or results from acts or circumstances beyond the reasonable control of Seller including, without limitation, acts of God, flood, fire, earthquake, explosion, governmental actions, war, invasion or hostilities (whether war is declared or not), terrorist threats or acts, riot, or other civil unrest, national emergency, revolution, insurrection, epidemic, lock-outs, strikes or other labor disputes (whether or not relating to either party's workforce), or restraints or delays affecting carriers or inability or delay in obtaining supplies of

adequate or suitable materials, materials or telecommunication breakdown or power outage (each a “**Force Majeure Event**”), provided that, if the event in question continues for a continuous period in excess of thirty (30) days, Buyer shall be entitled to give notice in writing to Seller to terminate this Agreement.

20. Assignment. Buyer shall not assign any of its rights or delegate any of its obligations under this Agreement without the prior written consent of Seller. Any purported assignment or delegation in violation of this Section 20 is null and void. No assignment or delegation relieves Buyer of any of its obligations under this Agreement.

21. Relationship of the Parties. The relationship between the parties is that of independent contractors. Nothing contained in this Agreement shall be construed as creating any agency, partnership, joint venture or other form of joint enterprise, employment or fiduciary relationship between the parties, and neither party shall have authority to contract for or bind the other party in any manner whatsoever.

22. No Third-Party Beneficiaries. This Agreement is for the sole benefit of the parties hereto and their respective successors and permitted assigns and nothing herein, express or implied, is intended to or shall confer upon any other person or entity any legal or equitable right, benefit or remedy of any nature whatsoever under or by reason of these Terms.

23. Governing Law. All matters arising out of or relating to this Agreement is governed by and construed in accordance with the internal laws of the State of California without giving effect to any choice or conflict of law provision or rule (whether of the State of California or any other jurisdiction) that would cause the application of the laws of any jurisdiction other than those of the State of California.

24. Dispute Resolution.

(a) If Buyer is an entity formed under the laws of the United States of America, or any of its states, districts or territories (“**U.S. Law**”), then any dispute, legal suit, action or proceeding arising out of or relating to this Agreement shall be adjudicated and decided in the federal courts of the United States of America or the courts of the State of California in each case located in the City of Los Angeles and County of Los Angeles, California and each party irrevocably submits to the exclusive and personal jurisdiction of such courts in any such dispute, suit, action or proceeding.

(b) If Buyer is an entity formed under the laws of any country, state, district or territory other than U.S. Law, then the parties irrevocably agree that any dispute, legal suit, action or proceeding arising out of or relating to this Agreement shall be submitted to the International Court of Arbitration of the International Chamber of Commerce (“**ICC**”) and shall be finally settled under the Rules of Arbitration of the ICC. The place and location of the arbitration shall be in Los Angeles, California, pursuant to the ICC’s Rules of Arbitration and shall be finally settled in accordance with said rules. The arbitration shall be conducted before a panel of three arbitrators. Each party shall select one arbitrator and the two arbitrators so selected shall select the third arbitrator, who shall act as presiding arbitrator. Notwithstanding the foregoing, if the matter under dispute is \$500,000 or less, there shall only be one arbitrator who shall be mutually selected by both parties. If the party-selected arbitrators are unable to agree upon the third arbitrator, if either party fails to select an arbitrator, or in the case that only one arbitrator is required and the parties are unable to agree, then the International Court of Arbitration shall choose the arbitrator. The language to be used in the arbitral proceeding shall be English. The arbitrator(s) shall have no authority to issue an award that is contrary to the express terms of this Agreement or the laws of the State of California or applicable US Federal Law, and the award may be vacated or corrected on appeal to a court of competent jurisdiction for any such error. The arbitrator(s) shall be specifically empowered to allocate between the parties the costs of arbitration, as well as reasonable attorneys’ fees and costs, in such equitable manner as the arbitrator(s) may determine. The arbitrator(s) shall have the authority to determine issues of arbitrability and to award compensatory damages, but they shall not have authority to award punitive or exemplary damages. Judgment upon the award so rendered may be entered in any court having jurisdiction or application may be made to such court for judicial acceptance of any award and an order of enforcement, as the case may be. In no event shall a demand for arbitration be made after the date when institution of a legal or equitable proceeding based upon such claim, dispute or other matter in question would be barred by the applicable statute of limitations. Notwithstanding the foregoing, either party shall have the right, without waiving any right or remedy available to such party under this Agreement or otherwise, to seek and obtain from any court of competent jurisdiction any interim or provisional relief that is necessary or desirable to protect the rights or property of such party, pending the selection of the arbitrator(s) hereunder or pending the arbitrator(s)’ determination of any dispute, controversy or claim hereunder.

25. Notices. All notices, request, consents, claims, demands, waivers and other communications hereunder (each, a “**Notice**”) shall be in writing and addressed to the parties at the addresses set forth on the face of the Acknowledgement or to such other address that may be designated by the receiving party in writing. All Notices shall be delivered by personal delivery, nationally recognized overnight courier (with all fees pre-paid), facsimile (with confirmation of transmission) or certified or registered mail (in each case, return receipt requested, postage prepaid). Except as otherwise provided in this Agreement, a Notice is effective only (a) upon receipt of the receiving party, upon confirmation of delivery by nationally recognized overnight courier or upon forty-eight (48) hours after being sent by certified or registered mail (as applicable), and (b) if the party giving the Notice has complied with the requirements of this Section 25.

26. Severability. If any term or provision of this Agreement is invalid, illegal or unenforceable in any jurisdiction, such invalidity, illegality or unenforceability shall not affect any other term or provision of this Agreement or invalidate or render unenforceable such term or provision in any other jurisdiction.

27. Survival. Provisions of these Terms which by their nature should apply beyond their terms will remain in force after any termination or expiration of this Order including, but not limited to, the following provisions: Compliance with Laws, Confidentiality, Governing Law, Dispute Resolution, Survival, and the restrictions on Software in Sections 10(b), (c) and (d).

CHAPTER 1

DESCRIPTION

Function of a Weld Monitor

Two conditions must be met to produce a good weld. First, the oxide layer covering the metal surfaces must be eliminated. Second, the irregular surface of the metals must be in intimate contact with each other.

All present day welding processes are just different ways of achieving these two goals by using various combinations of heat, pressure and time. In the resistance welding process, the pressure is applied by the electrodes which are mounted on a welding head. These electrodes carry a very high electrical current for a fraction of a second. Heat, generated by the resistance of the workpieces to the flow of electricity, either melts the workpieces at their interface or at least reduces their strength to a level where their surfaces become plastic. When the flow of current stops, the electrode force is maintained, for another fraction of a second, while the weld rapidly cools and solidifies. The size and shape of the weld is generally limited by the size and contour of the faces of the electrodes.

General practice in resistance spot welding is to base quality control on weld properties as well as on the uniformity and consistency of results. The quality of spot welds is usually checked by visual inspection and by destructive testing. Nondestructive testing methods tend to be inconsistent and are not ordinarily used as an inspection criteria except in the semiconductor industry. Quality standards should be based on the requirements of the specific application. For example, it is rarely possible to obtain maximum joint strength and minimum indentation using the same machine settings.

Weld monitors are devices which measure one or more specific electrical and/or mechanical parameters which dynamically change during the welding process. Somewhat in order of popularity, these measurements include weld current, the voltage drop across the electrodes, workpiece expansion / deformation, the electrode force, the size of the electrode face, the acoustic energy emitted while the weld is being formed, and the temperature of the workpieces. Variations in the thickness, tensile strength, hardness, surface finish and cleanliness of the workpieces have a significant effect on weld quality. The shape of the electrode face also affects weld quality. Modern measurement techniques make it possible to accurately measure the energy and pressure used to make a resistance weld. Weld monitoring is effective to the extent that the electrical and mechanical measurements made during the welding process reflect the variations in the physical properties of the workpieces and the welding equipment.

The successful user of a weld monitor usually conducts extensive experiments in order to determine which combination of measurement parameters correlates with the quality of their specific parts. Once correlation is verified in a production environment over a reasonable time, the weld monitor becomes a vital manufacturing tool. *To date no weld monitor has been commercially available which simultaneously monitors all parameters; nor has any monitor successfully predicted the quality of the parts.*

AMADA WELD TECH's - Weld Sentry accurately and consistently measures the voltage (AC/DC) and current used during the weld process. This makes it superior to any other precision instrument of its type. Production line testing has shown that the Weld Sentry makes precise measurements that accurately evaluates the quality of a welding processes and can increase quality and reduce manufacturing costs.

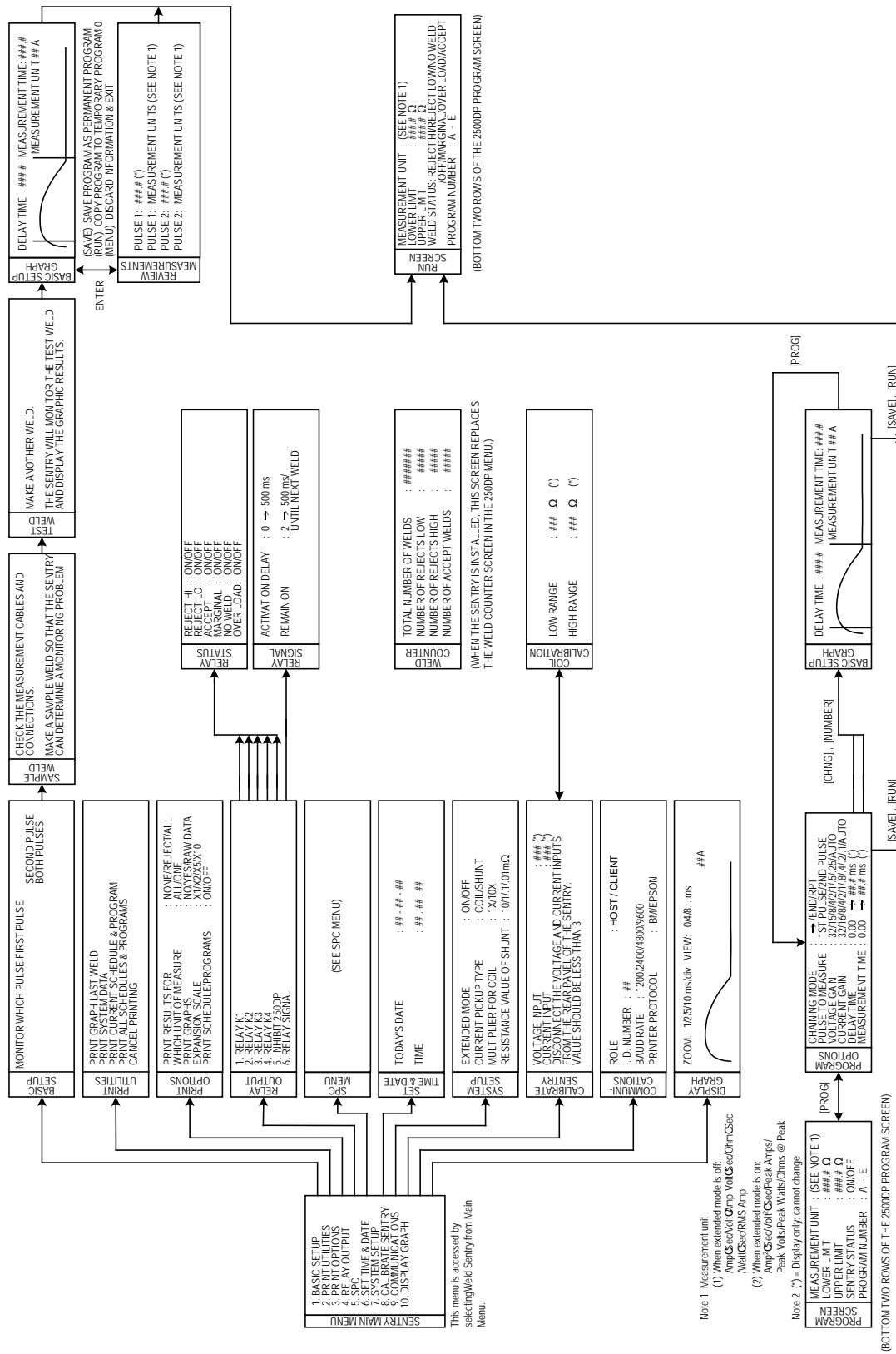


Figure 1-1. Example showing the 250DP/Sentry Main Menu

CHAPTER 2

GETTING STARTED

Rear Panel Components

The Weld Sentry option is an available option for multiple AMADA WELD TECH Power Supplies. The illustration below shows the input and output connections on the rear panel of the obsolete PM7S (Phasemaster 7 with Sentry Option). The I/O Connections will be the same over the different product lines.

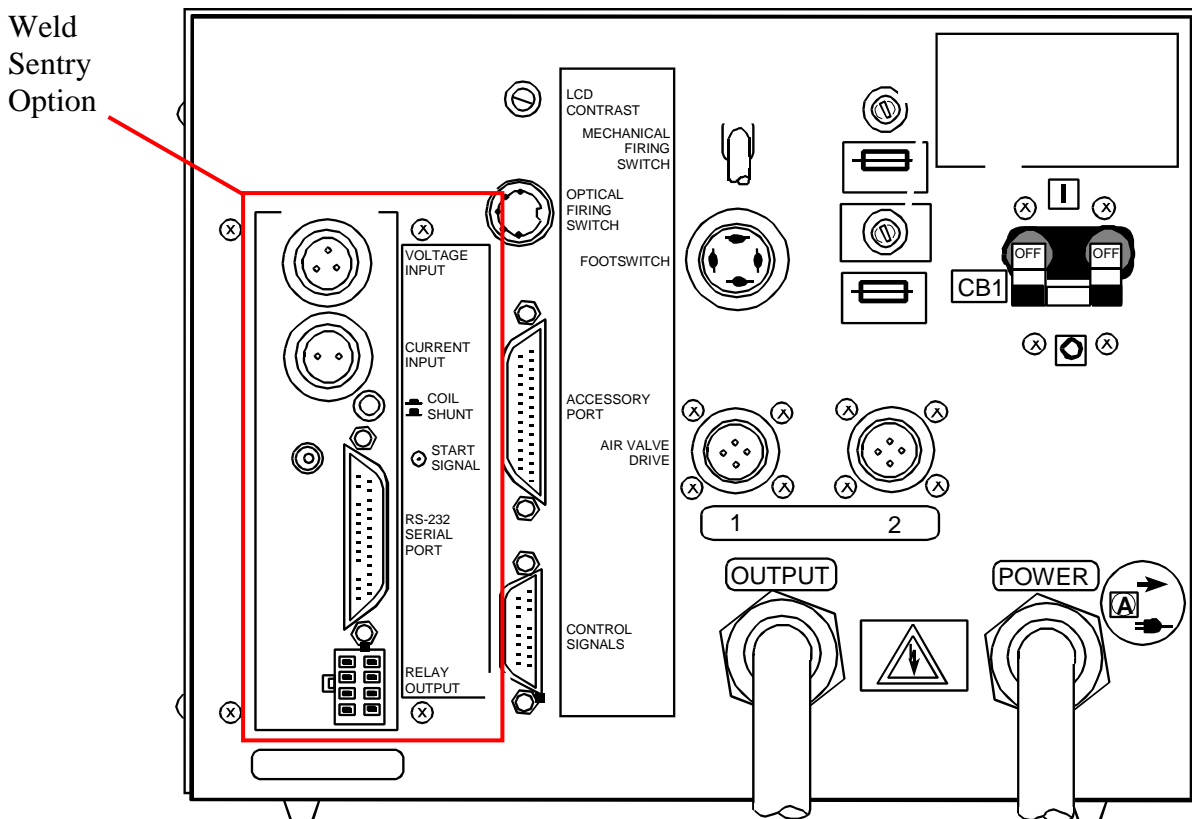


Figure 2-1. Rear Panel of PM7S with Sentry Option Installed

- A **VOLTAGE INPUT:** 3-pin receptacle for the 7 foot (2.1 m) shielded cable assembly which is used to measure Weld Voltage. The voltage measurement range is 0.10 to 40 volts peak. The clip terminals permit easy attachment of this cable to the welding electrodes. Polarity is not important.
- B **CURRENT INPUT:** 2-pin receptacle for the Current Coil or Current Input Cable for a user supplied Shunt. Supplied with a snap-on 1x current Coil, Model WSPUC 150, with 9.8 feet (3 m) of cable and a measurement range of 150 to 40,000 amps peak. The optional 10x Current Coil, Model WSPUC 15, is available, with a measurement range of 15 to 4,000 amps peak. The measurement range for user supplied Shunts is 10 to 40,000 amps.

CHAPTER 2: GETTING STARTED

- C COIL/SHUNT SWITCH: Selects whether a Current Coil or a Shunt is used to measure welding current. The “OUT” position selects Shunt and the “IN” position selects Coil.
- D EXT. TRIGGER: External Triggering is not used when the Sentry is installed in the power supply.
- E RS-232 SERIAL PORT: DB-25 Connector is used to connect the Sentry’s RS-232 Communications Interface. The Sentry can transmit data in ASCII or Binary Format. Transmit lines and communications protocol can be configured by changing the position of 5 shunts, E1-E5, on the Sentry’s control board.
- F OUTPUT: 2 DC solid state relays, 3 to 60 volts, 1 amp. Relays can be programmed to activate under any combination of six conditions: Accept; Marginal; Reject Low; No Weld; and Input Overload. As an option, 2 additional DC or AC solid state relays can be added. AC solid state relays are rated 12 to 280 volts, 1 amp.

Screen Format

In the screen examples below, both the 250DPS and PM7S are obsolete products, however the screen displays are basically the same across all product lines:

- a 250DPS RUN STATE SCREEN,
- b SENTRY MAIN MENU,
- c 250DPS PROGRAM STATE SCREEN,
- d SENTRY PROGRAM SCREEN,
- e SENTRY PROGRAM GRAPH and
- f PM7S RUN STATE.

where “S” indicates the Sentry Status Line which shows: Sentry Program (A-E), Measurement Unit (results of last weld), Upper/Lower Limits; and Sentry Status (ON/OFF).

S

SCHEDULE 1	PULSE 1 10.0%	PULSE 2 35.0%
BASIC WELD POLARITY: (+)WIDTH: SHORT		
AIR HEAD 2-L WELD#: 00001		
AMP-SECONDS	LOWER	UPPER SENTRY
(A) 299.1μ	270.0μ	310.0μ READY
▲▼ Select Schedule		■ RUN ■

(a) RUN STATE

< SENTRY MAIN MENU >	
■ BASIC SETUP	■ SET TIME & DATE
■ PRINT UTILITIES	■ SYSTEM SETUP
■ PRINT OPTIONS	■ CALIBRATE SENTRY
■ RELAY OUTPUT	■ COMMUNICATIONS
■ SPC	■ DISPLAY GRAPH
◀▶▶▶ Select then ENTER	

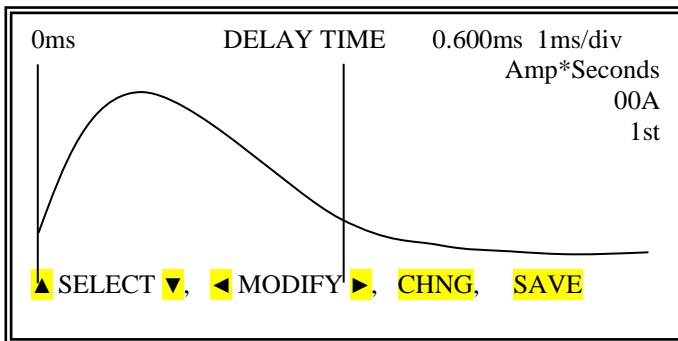
(b) SENTRY MAIN MENU

SCHEDULE: 01			
FUNCTION: BASIC	WELD #	:	00001
POLARITY: [+]	WIDTH	:	SHORT
████████	PULSE 1	████████	PULSE 2
ENERGY	:010%		030.0%
AMP SECONDS	LOWER	UPPER	SENTRY PROG
0	63.00x	77.00x	ON A
PROG	Sentry Programs, ◀▶ A – E □ PROGRAM □		

(c) 250DPS PROGRAM STATE

PROGRAM	:	01A →	01B END
PULSE TO MEASURE	:	FIRST	SECOND
VOLTAGE GAIN	:	4	4
CURRENT GAIN	:	2	2
DELAY TIME	:	00.00 ms	0.000 ms
MEASUREMENT TIME	:	20.00 ms	15.00 ms
◀▶▶▶ SELECT, NUMBERS Change □ PROGRAM □			

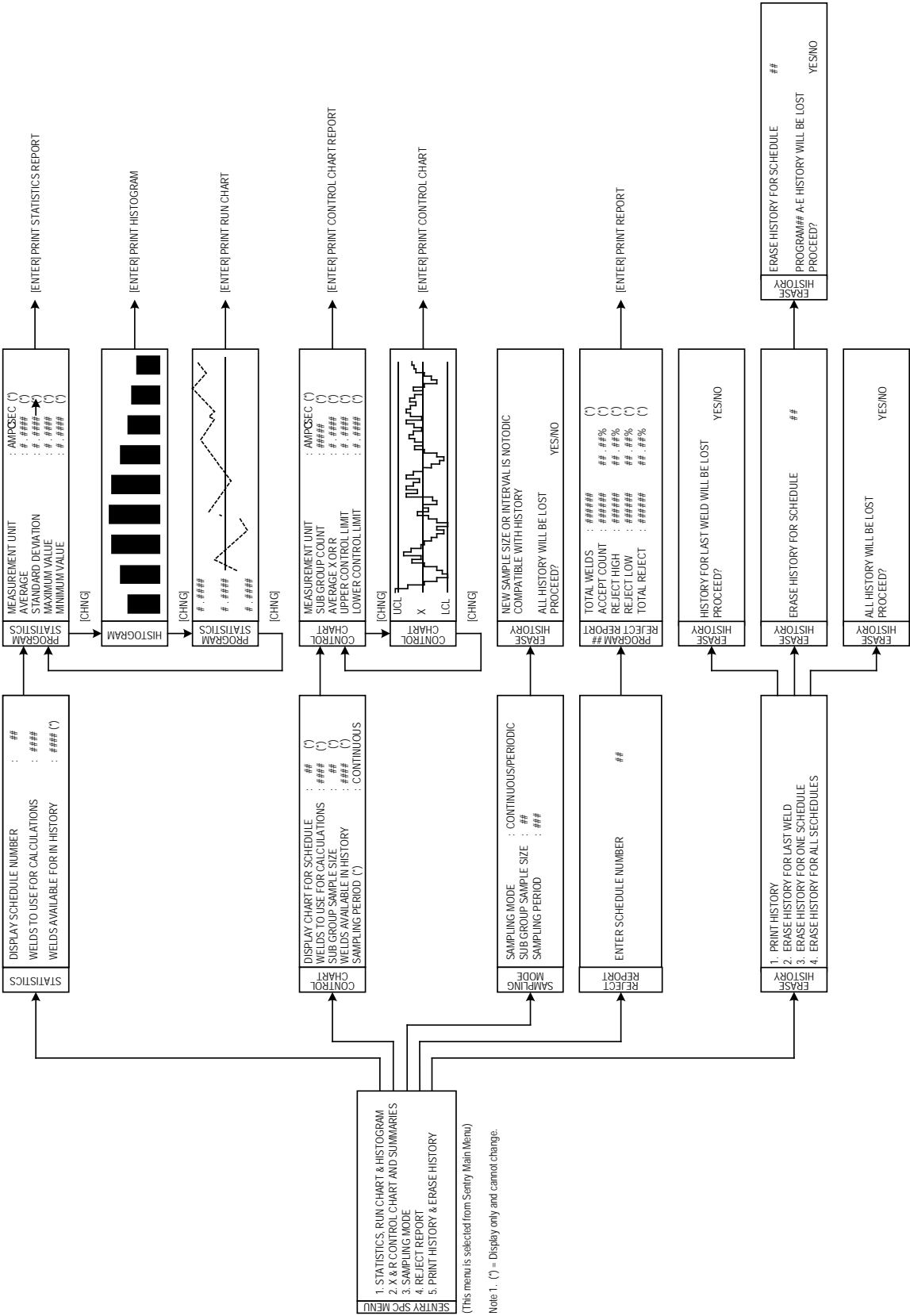
(d) SENTRY PROGRAM SCREEN



(e) SENTRY PROGRAM GRAPH

SCHEDULE:	9 UP / DOWNSLOPE			
SYSTEM:	AIR 2-LEVEL [+] WELD: 0000001			
████████	SQZ	■ UP	■ WELD	■ DOWN
		■ HOLD		
CYCLES:	10	12	10	0
CURRENT:	30	75	20	0
AMP SECONDS	LOWER	UPPER	SENTRY	
(A)	299.1μ	270.0μ	310.0μ	READY
▲▼ Select Schedule			□ RUN □	

(f) PM7S RUN STATE



Flow Chart for Sentry SPC Menu

CHAPTER 3

INSTALLATION

Sentry Option

Current and Voltage Measurement Inputs

Input cables to pick up Weld Current and Weld Voltage must be connected at the rear panel of the Sentry. To measure Weld Current the Sentry uses either a Current Coil or a user supplied Current Shunt. Select the type of Current Input to be used by depressing the Coil/Shunt Switch on the rear panel and by selecting the Shunt Size from the System Setup Menu. Weld Voltage is measured by attaching the clips on the Voltage pickup cable to the welding electrodes.

Current Coil Installation

Snap open the Current Coil and slip the open coil over *one* welding cable or *one* electrode holder as shown in figure 3-1. The position of the Weldmatic current Coil is not critical. However, in some cases changes of several percent in the Sentry measurement reading can be produced by moving the Current Coil around. It is best to center the Current Coil and even better to orient the Current Coil in the same position each time it is removed and re-attached. Snap the coil completely closed.

Plug the Current Coil Connector into the matching receptacle on the Sentry rear panel. Depress the COIL/SHUNT Switch to select COIL.

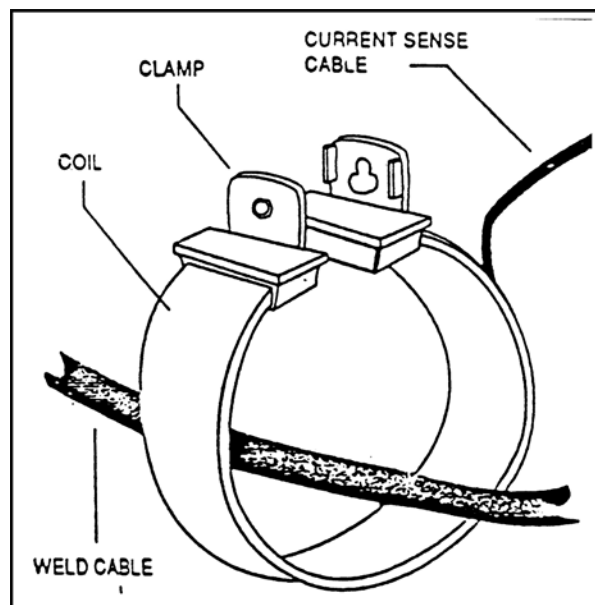


Figure 3-1. Current Coil Placed Over a Single Welding Cable

Current Shunt Installation – User Supplied

Current Shunts are 4 terminal precision resistors capable of handling very large currents. The maximum recommended Current Shunt voltage drop should be limited to 0.5 volts in order to minimize weld energy losses. Use the Current Coil, supplied with the Sentry Option, to determine the proper shunt. Current Shunts can be obtained from meter manufacturers such as Simpson and Tripplet. The following table provides a guide to Current Shunt selection.

Weld Current (Max Amps)	Shunt Resistance (milliohms)
50	10.0
500	1.0
5,000	0.1
50,000	0.01

To install the Current Shunt, disconnect the welding cable coming from one of the terminals on the weld head as shown in figure 3-2. Place the Current Shunt between the open connections and then securely re-attach all connections.

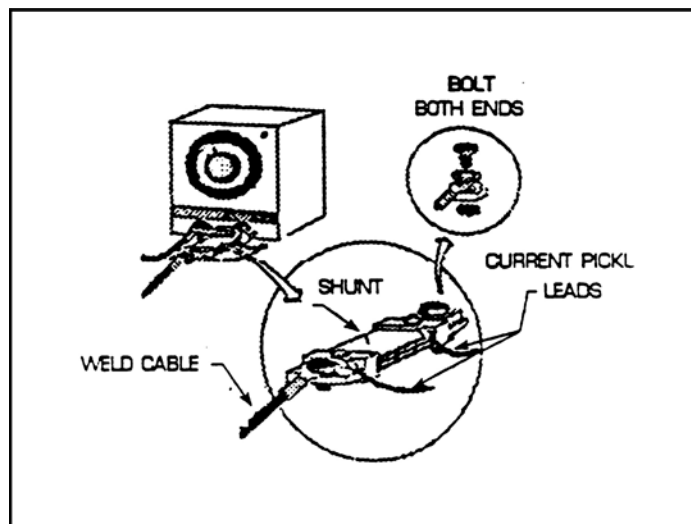


Figure 3-2. Current Shunt Installation

Attach the alligator clips on the Current Input Cable to the voltage terminals on the Current Shunt. Plug the Current Input Cable into the Current Input Connector on the rear panel, polarity is not important. For a more permanent installation, replace the alligator clips with terminals. Place the COIL/SHUNT Switch in the “OUT” position to select SHUNT. Select the appropriate size Shunt from the “CURRENT PICKUP TYPE” menu at “Power Up”.

Weld Voltage Cable Installation

Attach the voltage measuring clips as close as is physically possible to the tip end of each electrode. Figure 3-3 shows the typical probe attachments for measuring weld voltage.

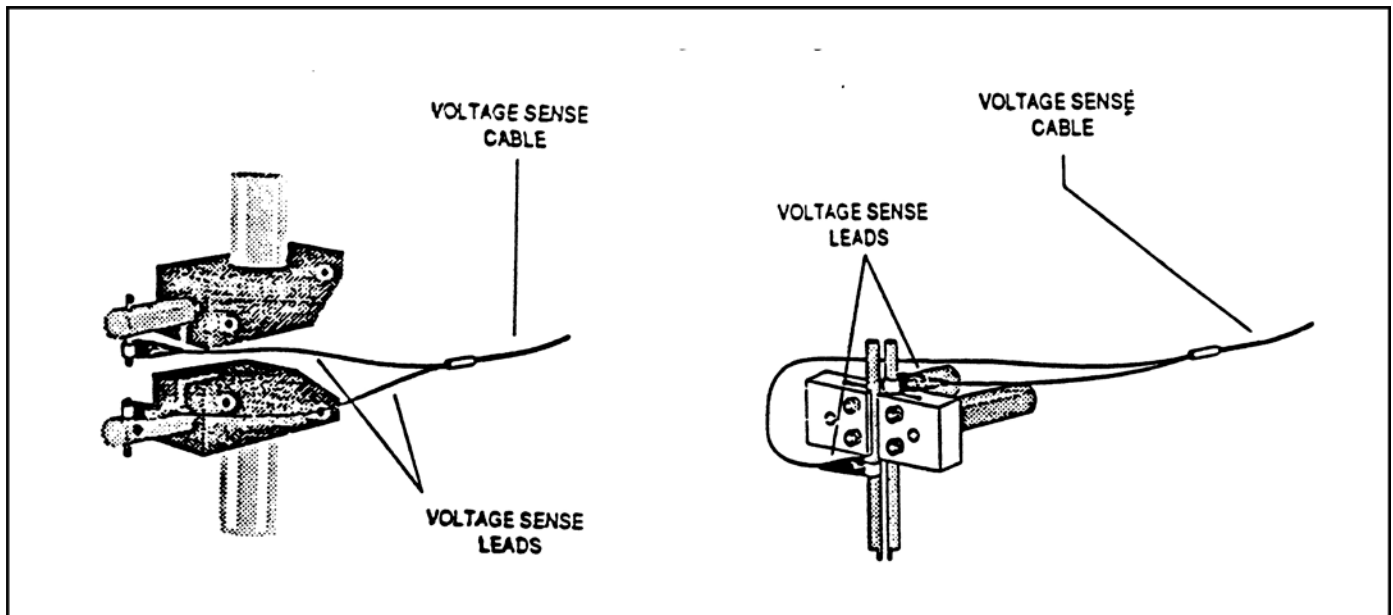


Figure 3-3. Voltage Measurement Clip Attachment

Optional Printer/PC Installation

Connect the RS-232 Serial Port of the Sentry to a user supplied serial data logging device, such as a serial printer or personal computer. The user must provide a serial cable with a male DB-25 connector on one end for connection to the Sentry. The connector on the other end is determined by the serial port of the printer or computer.

Configure Communications Protocol

There are 5 Shunt positions (E1 – E5) on the Sentry’s Control Board which are used to configure communications protocol for the RS-232 Serial Port. Programming for communications is accessed through the Main Menu/Weld Sentry/Communications.

CHAPTER 3: INSTALLATION

The Sentry is shipped configured for connection to a personal computer. See Appendix A for specifications. To change shunt positions on the Sentry Control Board, it will be necessary to remove the outside cover of the power supply. Use the following procedure:

WARNING: Contact with voltages present in the power supply may cause serious injuries.

- a Switch the Front Panel Power Switch to OFF.
- b Disconnect the power supply from its power source.
- c Remove the top two screws on each side of the cover.
- d LOOSEN the bottom two screws on each side and lift the cover “straight up”.
- e Locate the Sentry Board at the right side of power supply.
- f Change Shunt positions as desired.
- g Replace the cover.
- h Replace and tighten screws.
- i Re-connect the power supply to the power source.

CHAPTER 4

OPERATING INSTRUCTIONS

Weld Sentry Operation

Press [HELP] at any time to display the user-friendly help messages. The Help messages are context sensitive and offer specific information for the currently displayed screen or option. Instructions to select a feature will list the Weld Sentry Menu selection, and then the subsequent selections. For example: the instructions to select Weld Sentry/System Setup/Current Pickup Type means to first press [MENU] to display the main Menu and then use ◀ / ▶ to move the cursor to Weld Sentry and press enter. Then use ◀ / ▶ to move the cursor to System Setup, press [ENTER] and then select Current Pickup Type.

Setup Weld Sentry System

- a Connect the Sentry Voltage and Current Pickup Cables. See Chapter 3 - Installation.
- b Turn Power Supply ON. Press [MENU] and select Weld Sentry to display the Sentry Menu.
- c Select SET TIME AND DATE and enter the correct time and date. Once this has been done, the Sentry's battery backup will maintain time and date when the power supply is shut off.
- d Select the desired options from the Sentry Menu: Print Options, Relay Outputs, System Setup and Communication Options. Once these have been selected, they will be saved in memory and will be used for all Sentry Programs. See Appendix A for default Sentry System Configuration.
- e If desired, re-set Weld Counters to zero. Select main Menu/Weld Counters to view the number of; Total Welds, Reject Low, Reject High and Accept Welds.
- f Press [RUN] to return to the Run State.

Setup Weld Sentry Program

- a Select the Weld Schedule which you want to monitor.

Note: In order to monitor using the Weld Sentry, you must have first develop a Weld Schedule.

- b Select Weld Sentry/Basic Setup from the Main Menu. Basic Setup is used to create a Sentry Program(s) specifically for the related Weld Schedule. Press [SAVE] to save the new Sentry Program(s), along with the related Weld Schedule.
- c Select Weld Sentry/SPC from the Main Menu to access statistics, run charts, histograms, control charts and related summary calculations. When the Weld Sentry is turned ON for a Weld Schedule, results for each Program are automatically saved in SPC history.
- d Select Weld Sentry/Print Utilities from the Main Menu to print out System Parameters, Schedule, Programs or Graph of Last Weld.
- e Select Weld Sentry/Display Graph from the Main Menu to display a waveform graph of the last weld. You can also weld when this graph is displayed.

CHAPTER 4: OPERATING INSTRUCTIONS

Modify an Existing Sentry Program

- a Press [PROG] to display the Program Screen which includes the Sentry Program Line:

SCHEDULE: 01			
FUNCTION: BASIC	WELD #	:	00001
POLARITY: [+]	WIDTH	:	SHORT
ENERGY	:010%	PULSE 1	PULSE 2
			030.0%
AMP SECONDS	LOWER	UPPER	SENTRY PROG
0	63.00x	77.00x	ON A
PROG	Sentry Programs, A – E <input type="checkbox"/> PROGRAM <input type="checkbox"/>		

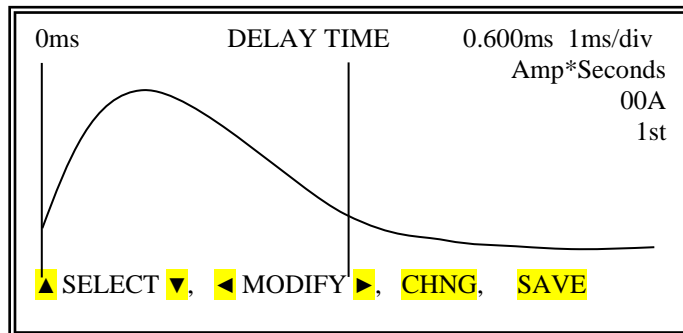
- b Move the cursor and move to the desired field to change; Measurement Unit, Lower or Upper Limits, Sentry ON/OFF, or change Program Line to display A-E.
- c Converting Multipliers – Weld Sentry results are expressed using multiplier abbreviations. Lower and Upper Limits must be entered using corresponding multipliers. The Multipliers are:

Multiplier Abbreviation		Multiplier
μ	.000001	10 ⁻⁶
m	.001	10 ⁻³
x1	1	10 ⁰
K	1,000	10 ³
M	1,000,000	10 ⁶
G	1,000,000,000	10 ⁹

- d Press [PROG] a second time to display the Sentry Program Screen as shown below.

PROGRAM	:	01A →	01B	END
PULSE TO MEASURE	:	FIRST	SECOND	
VOLTAGE GAIN	:	4	4	
CURRENT GAIN	:	2	2	
DELAY TIME	:	00.00 ms	0.000 ms	
MEASUREMENT TIME	:	20.00 ms	15.00 ms	
<hr/>				
SELECT, NUMBERS	Change <input type="checkbox"/> PROGRAM <input type="checkbox"/>			

- e Press [CHNG] when the cursor is on Delay Time or Measurement Time to display the Sentry Program Graph as shown below.



- f Use [◀ / ▶] to modify the Measurement and Delay Times.
- g Press [SAVE] to save the changes and replace the current Program(s).

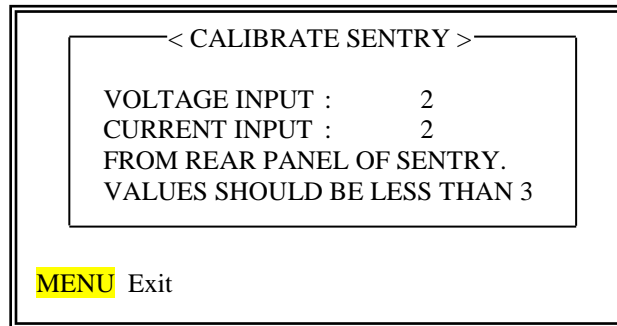
CHAPTER 5 SERVICE

Section I: Calibration

Calibration Check

The Weld Sentry has a built-in Calibration Check which can be used as an easy way to check the accuracy of the Voltage and Current measurement circuits. It is good Quality Assurance practice to establish a regular Calibration Check.

Select Weld Sentry from the Main Menu. Move the cursor to CALIBRATE SENTRY and press [ENTER]. The following screen will be displayed:



1. Disconnect the voltage and current pick up leads from the back panel of the Sentry.
2. Check the values displayed next to Voltage Input and Current Input. If they are less than 3, the unit is calibrated within specified tolerance. To adjust calibration, refer to Current and Voltage Input Adjustments below.
3. *Don't forget to reconnect the pick up leads after the calibration check.*
Check the Current Input whenever switching from a Current Coil to a Current Shunt or back again. The Sentry is shipped from the factory adjusted for the CURRENT COIL. It may be necessary to adjust the Current Input if a CURRENT SHUNT is to be used.

Current and Voltage Input Adjustments

In addition to the built-in calibration check, there are 4 precision voltage references which can be measured on the Sentry PCB. If the built-in calibration check shows either voltage or current inputs over 2, the following adjustments will correct the calibration. Requires use of a DVM and should be performed by a qualified technician.

- 1 Select the correct COIL/SHUNT SWITCH position.
- 2 Disconnect Voltage and Current Input cables from the rear of the Sentry.
- 3 Remove the cover and locate the Weld Sentry board at the right side of the unit.
- 4 Refer to drawing 4-32603-01, Assembly PCB, Weld Monitor Module.
- 5 Using TP0 as the ground reference, check the voltage at each test point. Adjusts the trimpots only if necessary.

R16 – FIRST STAGE VOLTAGE INPUT: 0 mv to + 10 mv measured at TP1

R33 – FINAL STAGE VOLTAGE INPUT: 0 mv \pm 1 mv measured at TP2

R58 – FIRST STAGE CURRENT INPUT: 0 mv to + 10 mv measured at TP3

R75 – FINAL STAGE CURRENT INPUT: 0 mv \pm 1 mv measured at TP4

NOTE: The first stage input *must* be adjusted before the final stage. Otherwise it may not be possible to adjust the final stage within tolerance.

- 6 *Don't forget to reconnect the pick up leads after the calibration adjustments:*

Voltage Measurement Check

If desired, the following procedure can be used to check the accuracy of the voltage measurement result.

Required Equipment

- 1 Stable DC Voltage Source (calibrated)
- 2 Manual Firing Switch ⁽¹⁾
- 3 Precision Shunt (0.01 to 10 milliohm resistance) ⁽²⁾

Setup PM7S or 250DPS

- 1 Press [PROG] and enter appropriate weld schedule.
PM7S Weld Schedule
 ,5 Cycles
 20% Current (low transformer tap)
250DPS Weld Schedule
 Single Pulse
 0.06% Energy
- 2 Use ▼ to move to the Sentry Program line and enter:
 Measurement Unit: Volt*Seconds
 Lower Limit: None
 Upper Limit: None
 Sentry: ON
- 3 Press [PROG] again to display the Sentry Program screen and enter:
 Voltage Gain: 1
 Current Gain: 4
 Delay Time: 0.000ms
 Measurement Time: 10 ms
- 4 Press [SAVE] to save the schedule and program in memory.

Test Procedure

- 1 Connect manual firing switch to power supply. ⁽¹⁾
 - 2 Use weld cables to connect each end of the shunt to each output terminal of the power supply or transformer. ⁽²⁾
 - 3 Attach the voltage pickup leads to the output of the Voltage Source.
 - 4 Attach the current coil around one weld cable.
 - 5 Set the voltage source to output 9 volts DC.
 - 6 Select [WELD] for the Weld/No Weld switch on the PM7S/250DPS.
 - 7 Use the manual firing switch to fire the power supply.
 - 8 The Weld Sentry measurement should equal 90 millivolt*Seconds \pm 2%.
 - 9 If the voltage measurement is not correct, refer to Current and Voltage Input Adjustments, above, and adjust the voltage input.
- ⁽¹⁾ If no manual firing switch is available, you can fire the power supply by shorting the two pins of the firing switch connector.
- ⁽²⁾ If the current coil calibration will not be performed, you can fire the weld head across a length of weld cable or any standard load.

Technical Assistance

If you need further technical assistance, please contact either your authorized service agent or AMADA WELD TECH at the postal or e-mail address or telephone or FAX number shown in the Foreword of this manual.

Telephone Service

Call our Repair Department at the telephone number shown in the Foreword of this manual. Before calling, please obtain the model number and serial number from the identification plate on the rear panel.

Factory Service Repair

AMADA WELD TECH provides a repair service for both warranty and non-warranty repairs. Call the Customer Service Department at the telephone number shown in the Foreword of this manual for a Return Material Authorization number. All equipment to be returned to us for repair must be shipped PREPAID.

Please include information concerning the type of problem you are experiencing. Include with the shipping information the name and telephone number of the person whom we should call with the estimated cost of repairs.

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<http://www.amadaweldtech.com>

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