INSTRUCTION MANUAL

700202J

RDH OPTIONS

FOR MICROPROCESSOR BASED
EN1000/EN1001 SERIES WELD CONTROLS

MANUAL INCLUDES:

RDH – Remote Data Harness Addition to Weld Control
RDE – Remote Data Entry (8.5 x 8.5) – OBSOLETE
RDEjr. – Remote Data Entry Junior (5.5 x 5.5)
MM2/MM8 – Memory Modules
RDE Cable Assemblies

NOTICE
This Manual supersedes 700132G, 700177A, 700201A, 700202A

ENTRON Controls, LLC.
1402 S. Batesville Road
Greer, South Carolina 29650
(864) 416-0190
FAX: (864) 416-0195
www.entroncontrols.com

RWMA® MEMBER

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ENTRON Controls, LLC.

MICROPROCESSOR BASED WELDING CONTROLS

INSTALLATION AND OPERATION MANUAL FOR:
Model Series RDH Options

! CAUTION !
READ THIS MANUAL COMPLETELY BEFORE ATTEMPTING TO INSTALL OR OPERATE THIS CONTROL

ENTRON Controls, LLC., reserves the right to alter the contents of this manual without previous notice.

ENTRON Controls, LLC.
Greer, South Carolina 29650

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1.0 GENERAL DESCRIPTION

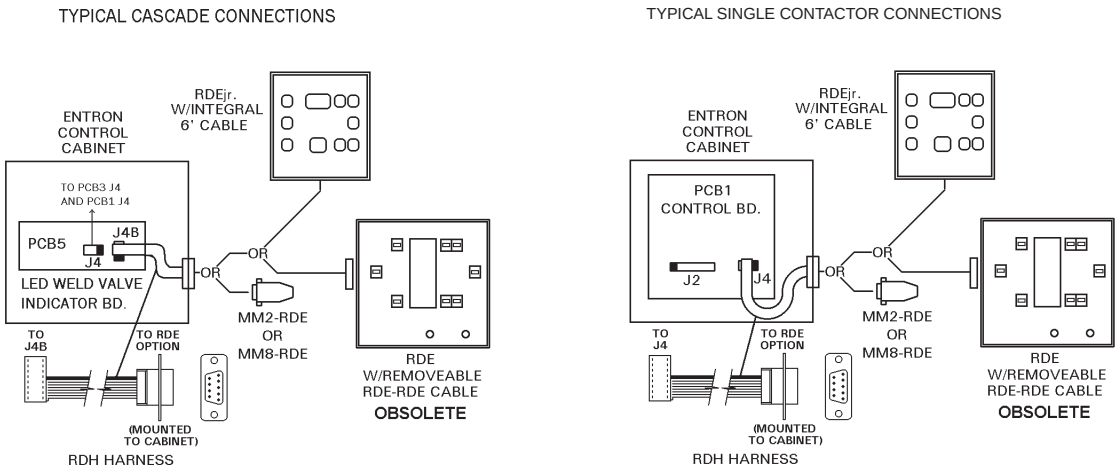

Figure 1-1. *Basic Connections Overview*

1.1 RDH (REMOTE DATA HARNESS)

A RDH (Remote Data Harness) is an open accessory port into the control from the outside that can expand the use of an existing ENTRON Control. Once the RDH option is installed in the weld control, several other options can then be connected to this external connector.

1.2 RDE & RDEjr. (REMOTE DATA ENTRY)

The ENTRON Remote Data Entry (RDE/RDEjr.) option provides a means of programming a weld control from a location separate from the control. A machine operator's position, for example, may require frequent adjustment of a weld schedule. The RDE/RDEjr. may be located near the operator when the weld control cabinet is mounted on an inaccessible side of the welder (see Figure 1-1). See Sections 3.0 and 4.0 for detailed explanation.

1.3 MM2/MM8 MEMORY MODULES

The MM2 Memory Module is designed as a backup device for EN1000/EN1001 Single Function Series Controls. The MM8 Memory Module is designed as a backup device for any EN1000/ EN1001 Cascade Control. See Figure 1-1 and Section 5.0 for detailed explanation.

1.4 CABLE ASSEMBLIES

RDE options come with cable and connectors. Users must construct their own assembly (see Section 6.0). RDEjr. options come with six-foot attached pre-assembled cable assembly (see Section 6.2).

RDE and RDEjr. cable assemblies should be kept as short as possible. Some applications may require more than six feet between the weld control and the RDEjr. When distances greater than six feet are required, ENTRON recommends the use of the RT4 – RS485 interface which allows distances of up to several miles between the data entry device (RT4) and the weld control (see Instruction Manual 700171).

2.0 RDH HARNESS

A RDH (Remote Data Harness) option is an open accessory port into the control from the outside that can expand the use of an existing ENTRON Control. The RDH is nothing more than a harness that extends the communication bus to the outside of the control. This interface is not industrially hardened enough to travel long distances outside the control but works well with typical six-foot lengths. See Section 6.2 if longer lengths are needed.

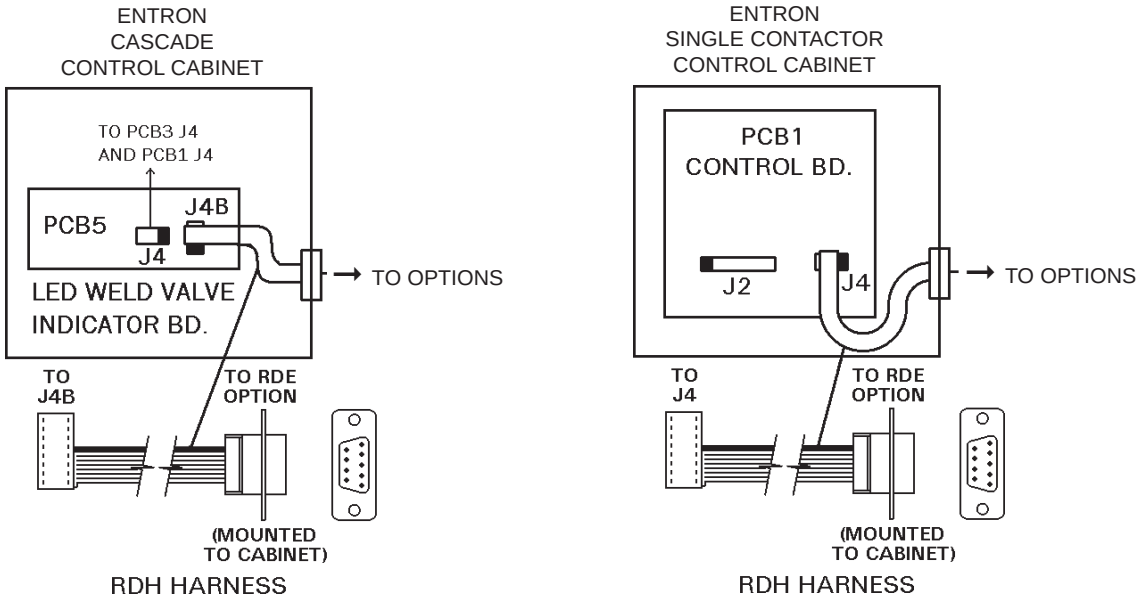

Figure 2-1. *RDH Harness*

2.1 RDH OPTION FIELD RETROFIT KIT

A RDH may be used to add the RDE or RDEjr. option or MM2/MM8 to an existing control in a “B”, “C”, “S”, “E”, “T/D” or “LS/LF” Cabinet. A RDE or RDEjr. can be added to virtually any EN1000 or EN1001 Series Control that has no pre-existing options. Mounting positions for 9 Pin D-Subminiature connector are available on “B”, “C”, “S”, “E”, “T/D” and “LS/LF” Cabinets.

If the customer has a J4-MM2 or J4-MM8 module, it will need to be unplugged so the J4 end of the J4-RDE cable may be attached to the control. In cabinets built before the mid 1990s and on NEMA 12 style cabinets “H”, “G”, and “U”, 9 Pin D-Subminiature connector mounting positions were not provided on all cabinet styles and the customer will need to modify the cabinet to mount the D-Subminiature end of the J4-RDE cable. Greenlee provides a punch (Greenlee Part No. 229; see Figure 2-2) that may be used to punch a mounting for this connector. For customers with controls with options plugged into the J4 connector on PCB1 or controls not in the EN1000, EN1001, EN1003, or EN1004 families, please contact factory for availability of RDE input options for your application.

2.1 RDH OPTION FIELD RETROFIT KIT (cont.)

Table 2-1. *RDH Components*

RDH Field Retrofit Kit - 600718		
Qty.	Description	Part No.
1	Assem, Harness, J4-RDE, 44″	322369-007
1	Label, RDE	460295

In standard controls provided by ENTRON, the J4-RDE Harness in “E” and “S” Cabinets is 44 inches long (P/N 322369-007); the J4-RDE Harness in “C/D/T/LS/LF” Cabinets is 17-1/2 inches long (P/N 322369-006). The 44″ Harness included in this kit is universal for all cabinet types and can be bundled and tied back.

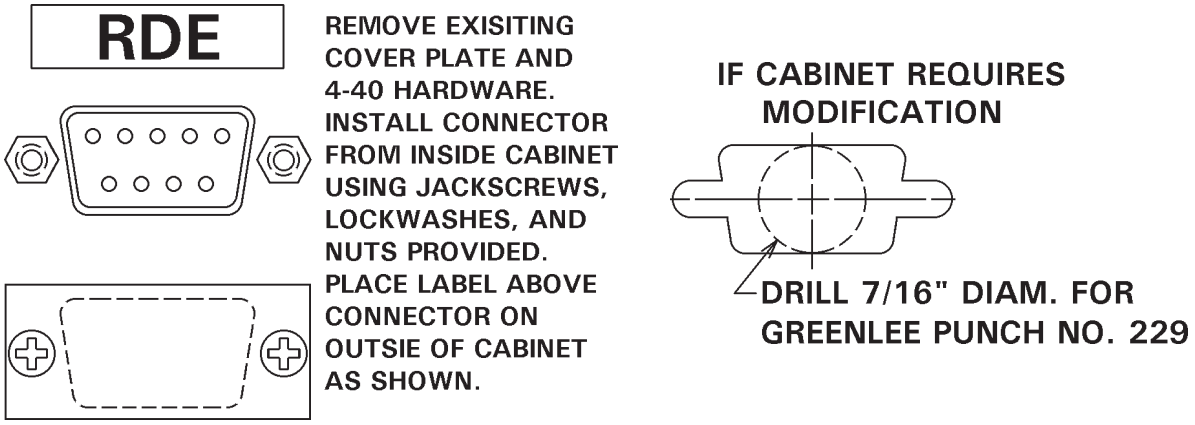

Figure 2-2. *RDE Mounting Details*

NOTICE
DO NOT connect RS232 or other serial devices to the RDE port.

2.2 ORDERING INFORMATION

Weld controls can be ordered with RDH options or they may be field installed. When required at time of order, add the RDH designation to Model Number after the Series type; for example, EN1000/RDH.

2.3 WIRING DIAGRAMS

421274	EN1000-Series/RDH with RDE Option for use with EN1000 & EN1001 Single Contactor Controls and EN1000 & EN1001 Cascade/ Multi-Valve Controls
421180-005	EN1000-Series/RDH, “S” Cabinet
421210-015	EN1000-Series/RDH, “D/T/LS/LF” Cabinet
421210-028	EN1000-FPX(SCR)/RDH/485, 11x11 Flat Plate
421210-034	EN1000-Series/RDH/SP, “D/T/LS/LF” Cabinet, SP=24VDC Power Supply
421212-004	EN1000-Series/RDH, “E” Cabinet
421268-003	EN1001-Series/RDH, “E” Cabinet
421269-002	EN1001-Series/RDH, “D/T/LS/LF” Cabinet
421269-024	EN1001/S49/SP-Series/RDH, “D/T/LS/LF” Cabinet, SP=DC Valve Outputs & 24VDC Power Supply
421269-030	EN1001/S49/SP-3200/RDH, “LS/LF” Cabinet, SP=Customer Supplied Circuit Breaker and Contactor Mounting
421377-008	EN1001(TGA)-1200/GF/RDH, “D/T” Cabinet with “S” Connector & 24VAC Valve Transformer
421387-006	EN1000(TGA)-1200/GF/RDH, “D/T” Cabinet with “S” Connector
421414	EN(2)1000-1200/RDH, “LF” Cabinet
421438-018	EN1001-FP(SCR)/RDH, 9x24 Flat Plate, Cascade/Multi-Valve Control, 230/380/460/575V

3.0 RDE (REMOTE DATA ENTRY) – OBSOLETE - See RDEjr. Section 4.0

The ENTRON Remote Data Entry (RDE) option provides a means of programming a weld control from a location separate from the control. A machine operator's position, for example, may require frequent adjustment of a weld schedule. The RDE may be located near the operator when the weld control cabinet is mounted on an inaccessible side of the welder. The RDE is powered by the control to which it is connected and needs no additional power; it can be moved wherever it is needed.

The standard RDE option includes a remote panel measuring 8-3/4" x 8-3/4" x 3" (Figure 3-1) with a carrying handle (which can be moved to any side). It is constructed of 14 Ga. steel and is equipped with a standard (silk screen printed) ENTRON Dial Plate with push button switches. The unit comes with two cage clamp (non-solder) style 9 pin male D-Subminiature connectors and 25 feet of cable for connecting RDE to the parent weld control.

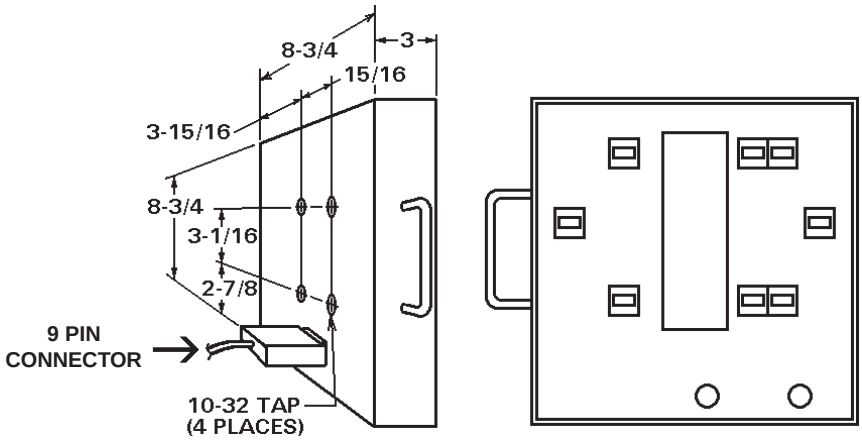

Figure 3-1. *RDE*

Any weld control intended for use with the RDE must contain a RDH (see Section 2.0). This harness is internal to the weld control cabinet and connects the RDE to the control. The location of the plug-in interface connection will differ depending on which model is ordered.

Standard length cable supplied with control is 25 feet and is assembled in the field.

Special consideration must be given when routing the RDE cable to the remote location. Be sure some physical distance exists between high voltage wires and the RDE cable to eliminate the introduction of electrical noise and insure proper data transmission between the control and RDE Display Panel. It is recommended to insulate the mounting of this cabinet from the machine to prevent circulating currents.

NOTICE
No differential voltages can exist between the device the RDE is mounted to and the weld control cabinet.

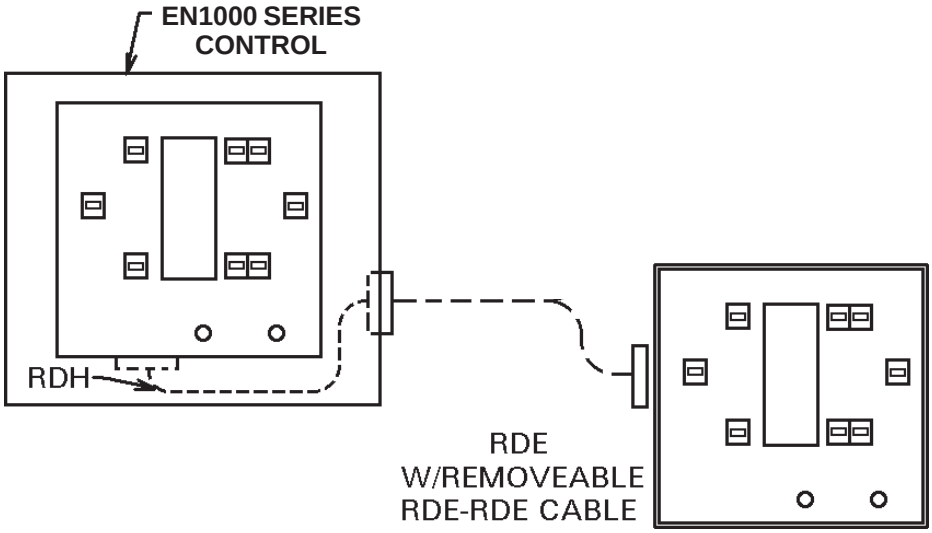

Figure 3-2. *RDE Connections*

3.1 OPERATION

Operation of the RDE is simple as it is a complete reflection of the parent control. The same buttons and displays are provided on the RDE unit. As of October 1, 2003, the software on Cascade Series Controls has been revised so multiple welds and valves can be programmed by use of the data LEDs (see Instruction Manual 700194).

The weld control can be programmed for either location. A PROGRAM LOCKOUT key switch can be used at either location with the RDE. Special consideration must be given when routing the RDE cable to the remote location. Be sure some physical distance exists between high voltage wires and the RDE cable to eliminate the introduction of electrical noise and insure proper data transmission between the control and RDE Display Panel. Connection and disconnection to and from weld control should be done with power off.

3.2 ORDERING INFORMATION

The RDE can be ordered for any EN1000 Single Contactor and Cascade Control with or without Constant Current. Check with factory for availability of RDE and RDH options on special controls and controls with multiple options.

To order the RDE option, ask for:

RDE (RDE is a Model Number in itself and is not part of the weld control Model Number.)

NOTICE
For a control to be able to use the RDE option, it must have the RDH option.

4.0 RDEjr. (REMOTE DATA ENTRY JUNIOR)

The ENTRON Remote Data Entry Junior (RDEjr.) option provides a means of programming a weld control from a location separate from the control. A machine operator's position, for example, may require frequent adjustment of a weld schedule. The RDEjr. may be located near the operator when the weld control cabinet is mounted on an inaccessible side of the welder. The RDEjr. is powered by the control to which it is connected and needs no additional power; it can be moved wherever it is needed.

This unit is enclosed in a 5-3/16 x 5-3/8 plastic case (Figure 4-1). It has a membrane keypad that exactly models the parent weld control's Dial Plate. The RDEjr. has a fixed length, non- removable six-foot long pendant cord. See Section 6.2 for information to build a 9 Pin D-Subminiature cable extension for the RDEjr. A PROGRAM LOCKOUT key switch is not available on RDEjr. units. The PIN LOCKOUT mode can still be used (see EXTENDED FUNCTIONS section in Instruction Manual 700120).

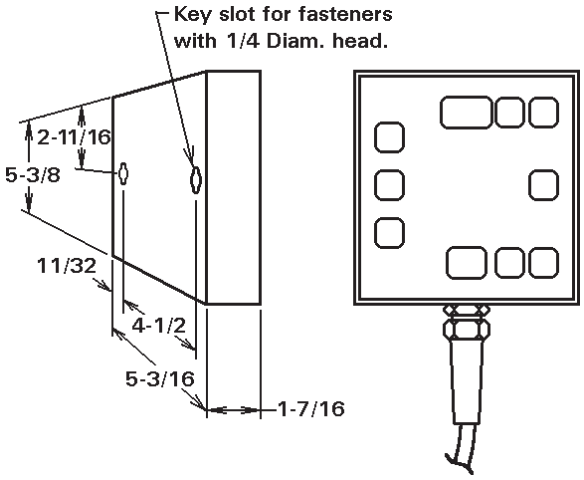

Figure 4-1. *RDEjr.*

Any weld control intended for use with the RDEjr. must contain a RDH (see Section 2.0). This harness is internal to the weld control cabinet and connects the RDEjr. to the control. The location of the plug-in interface connection will differ depending on which model is ordered.

Standard length cable supplied with control is six feet and is permanently installed. Other lengths can be supplied, see Section 6.2.

Special consideration must be given when routing the RDEjr. cable to the remote location. Be sure some physical distance exists between high voltage wires and the RDEjr. cable to eliminate the introduction of electrical noise and insure proper data transmission between the control and RDEjr. Display Panel. It is recommended to insulate the mounting of this cabinet from the machine.

NOTICE
No differential voltages can exist between the device the RDEjr. is mounted to and the weld control cabinet.

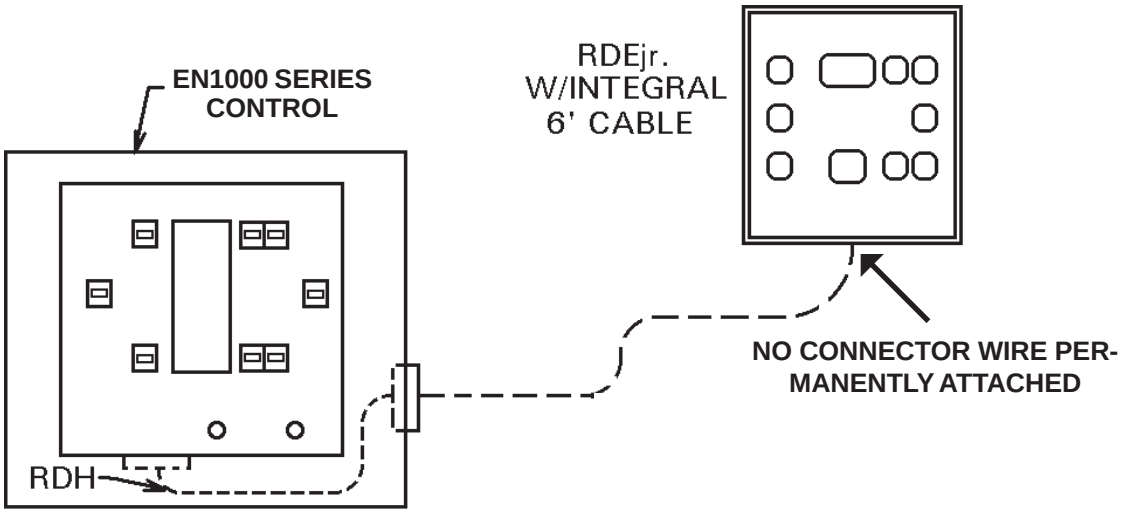

Figure 4-2. *RDEjr. Connections*

4.1 OPERATION

Operation of the RDEjr. is simple as it is a complete reflection of the parent control. As of October 1, 2003, the software on Cascade Series Controls has been revised so multiple welds and valves can be programmed by use of the data LEDs as the RDEjr. has no Valve or Contactor specific displays (see Instruction Manual 700194).

The weld control can be programmed for either location. A PROGRAM LOCKOUT key switch can only be used at the weld control location with the RDEjr. The PIN LOCKOUT mode can be used with the RDEjr. (see EXTENDED FUNCTIONS section in Instruction Manual 700120). Special consideration must be given when routing the RDEjr. cable to the remote location. Be sure some physical distance exists between high voltage wires and the RDEjr. cable to eliminate the introduction of electrical noise and insure proper data transmission between the control and RDEjr. Display Panel. The six-foot cable length of the RDEjr. is the only approved and supplied length of cable for that unit and is permanently attached to the unit. Longer lengths may be constructed using low capacitance cable similar to those used in RS485 networks (ENTRON P/N 900258). See Section 6.2 for RDE-RDE Cable Assembly. Connection and disconnection to and from weld control should be done with power off.

4.2 ORDERING INFORMATION

The RDEjr. can be ordered for any EN1000 Single Contactor and Cascade Controls with or without Constant Current. Check with factory for availability of RDEjr. and RDH options on special controls and controls with multiple options.

To order the RDEjr. option, ask for:

RDEjr. (RDEjr. is a Model Number in itself and is not part of the weld control Model Number.)

NOTICE
For a control to be able to use the RDEjr. option, it must have the RDH option.

5.0 MM2/MM8 MEMORY MODULES

The MM2 Memory Module is designed as a backup device for any EN1000/EN1001 Series Control with PROM firmware version 619016-001**R** or later.

The MM8 Memory Module is designed as a backup device for any EN1000 Cascade Control with Program Board 410321 and PROM firmware version 619011-002**A** or later or EN1001 Cascade Control with Program Board 410363 and PROM firmware version 619044-001**B** or later.

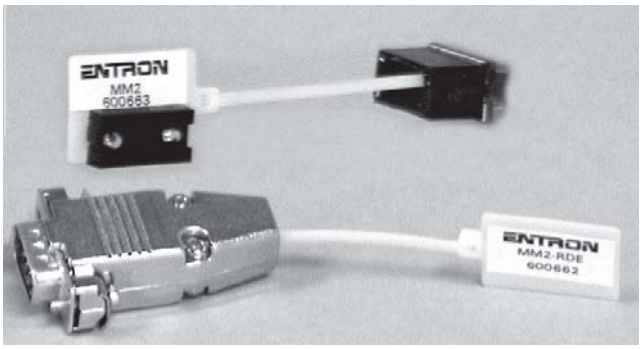

Figure 5-1. *MM2 and MM8*

Other ENTRON Series Controls are able to incorporate the MM2 or MM8 as backup devices. Contact factory for specific control availability.

In either MM2 or MM8, there are two versions of this device:
MM2-RDE/MM8-RDE for controls with RDE option and MM2/MM8 for all other controls. The only difference between these two versions is the connection to the control. The MM2-RDE/MM8-RDE is designed to plug into an external 9 pin D-Subminiature connector. The MM2 is designed to plug directly into the internal J4 connector on the Control Board or, in the case of the MM8, to plug into the J4-B Connector on the WELD/VALVE LED Indicator Board.

5.1 DOCUMENTATION REFERENCES

MM2:	Instruction Manual 700120	EN1000/EN1001 Controls
MM8:	Instruction Manual 700194	EN1000/EN1001 Cascade Controls

5.2 REQUIRED EQUIPMENT AND SOFTWARE

MM2:

1. Any EN1001 Series Control with Control Board 600572-002 Revision V or an older version of the board with PROM firmware version 619016-001**R** or later or EN1000 Series Control with Control Board 600541 Revision WW or later.
2. MM2-RDE – Memory Module with 9 pin D-Subminiature connector, P/N 600662 (RDE option);

   - or -

   MM2 – Memory Module with 16 pin connector, P/N 600663 (J4 option).

MM8:

1. Any EN1000 Cascade Control with Program Board 410321 and PROM firmware version 619011-002**A** or later or EN1001 Cascade Control with Program Board 410363 and PROM firmware version 619044-001**B** or later.
2. MM8-RDE – Memory Module with 9 pin D-Subminiature connector, P/N 600662-001 (RDE option);

   - or -

   MM8 – Memory Module with 16 pin connector, P/N 600663-001 (J4 option).

5.3 COPY ALL DATA FROM CONTROL TO MM2/MM8

Before copying all data from the control to the MM2/MM8, turn ALL power to control off. Connect MM2/MM8 to the control, as shown in Figures 5-2, 5-3, and 5-4. With the control in PROGRAM mode, use EXTENDED FUNCTION parameter **C.A.**, enter **C.A.=10** and press the ENTER push button. In the latest software revision, after releasing ENTER, flashing **S.t.o.r.** and **t.o.E.E.** will be on the DATA display. If ENTER is pressed again, all SCHEDULE data and EXTENDED FUNCTIONS data will be stored in the Memory Module. Otherwise, if any other push button is pressed, copying will be cancelled.

NOTICE
Previous contents of the MM2/MM8 device will be overwritten and unretrievable.

5.4 DOWNLOAD ALL DATA FROM MM2/MM8 TO CONTROL

Before downloading all data from the MM2/MM8 to the control, turn ALL power to control off. Connect MM2/MM8 to the control, as shown in Figures 5-2, 5-3, and 5-4. With the control in PROGRAM mode, use EXTENDED FUNCTION parameter **C.A.**, enter **C.A.=11** and press the ENTER push button. In the latest software revision, after releasing ENTER, **r.E.L.d.** will be on the DATA display. If the ENTER push button is pressed again, all SCHEDULE data and EXTENDED FUNCTIONS data in the control will be overwritten with new downloaded data from MM2/MM8. Otherwise, if any other push button is pressed, downloading will be cancelled.

Record date, Machine Identification information, etc., on the side of the Marker Tag opposite the ENTRON Label.

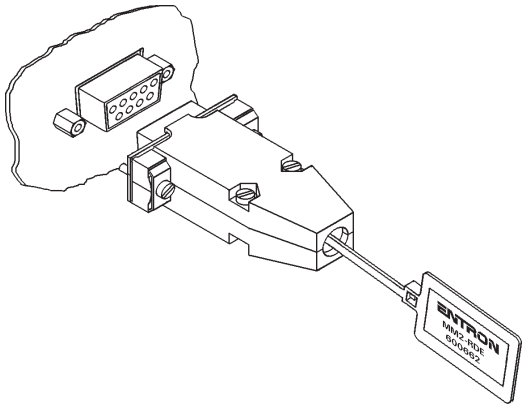

Figure 5-2. *Connection of MM2-RDE or MM8-RDE to the control*

5.4 DOWNLOAD ALL DATA FROM MM2/MM8 TO CONTROL (cont.)

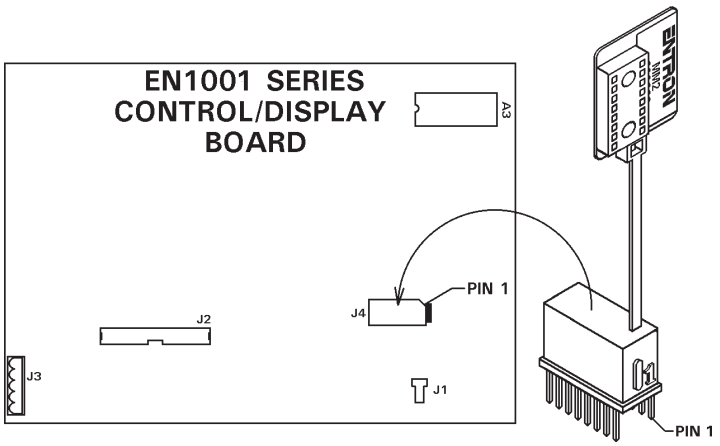

Figure 5-3. *Connection of MM2 to the control*

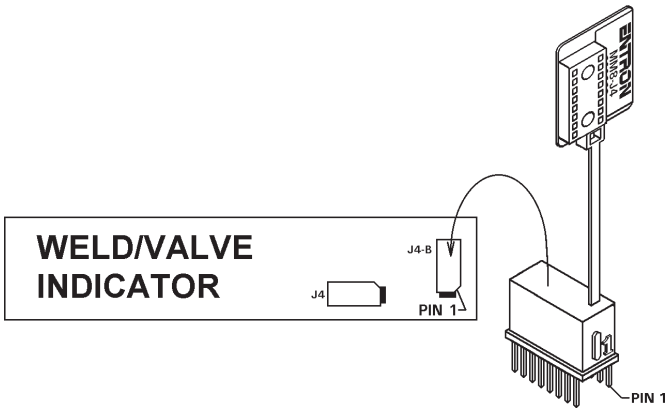

Figure 5-4. *Connection of MM8 to the control*

The 16 pin socket is provided on the Marker Tag to protect the pins of the MM2/MM8 device when it is not plugged into the Control Board.

NOTICE
Pin 1 of the MM2/MM8 **MUST** be plugged in to pin 1 of the J4 socket while power to the control is off, or damage to the control and the MM2/MM8 will result.

5.5 ERROR CODES

ERROR CODE E.r.=33 – No Memory Module

This ERROR will be displayed if the MM2/MM8 is not connected to the control, or if the MM2/MM8 does not exist, or if MM2/MM8 is not plugged in properly.

ERROR CODE E.r.=34 – Download CHECKSUM ERROR

This ERROR will be displayed if a CHECKSUM ERROR exists during download of data from the MM2/MM8 to the control.

ERROR CODE E.r.=35 – Copy CHECKSUM ERROR

This ERROR will be displayed if a CHECKSUM ERROR exists during copy of data from the control to the MM2/MM8.

NOTICE
If errors occur, retry. If errors persist, Memory Module may be defective.

5.6 ORDERING INFORMATION

The MM2 and MM8 can be ordered for any EN1000/EN1001 Single Contactor and Cascade Control with or without Constant Current. Check with factory for availability of MM2/MM8 and RDH options on special controls and controls with multiple options.

To order the MM2 option, ask for:

MM2 (MM2 is a Model Number in itself and is not part of the weld control Model Number.)

To order the MM8 option, ask for:

MM8 (MM8 is a Model Number in itself and is not part of the weld control Model Number.)

NOTICE
For a control to be able to use the MM2/MM8 option, it must have the RDH option.

6.0 RDE AND RDEjr. CABLE ASSEMBLIES

6.1 RDE-RDE CABLE ASSEMBLY

Provided cable assemblies will need to be constructed onsite after routing through conduits, holes, troughs, etc. All cables should be separated as much as possible from other high voltage wires connecting to solenoid valves, welding transformers, and the AC line. Pre-fabricated RDE-RDE cable assemblies are not available. RDE options are provided with cables and connectors as standard.

To create an RDE-RDE Harness, the following parts are required:

2	331136	Connector, 9 pin, Screw Terminal, “D” Style, Plug
25'	900258	Cable, 4 Conductor, 24 Ga. Stranded w/shield
2	460136	Label, RDE

Additional Connectors, Cable and Labels are available at additional cost.

Assembly Instructions:

1. Cut cable to length or route from source to destination. DO NOT route cable with or place cable in same conduit with wires carrying 120 VAC or higher.
2. Strip outer insulation and foil shield at each end 1-1/2" and wire both ends as shown in Figure 6-1.
3. Inspect connections before proceeding to next step. Note that one wrong connection will stop ALL communication.
4. Assemble cover to plug assembly at both ends by snapping cover in place and using the provided screw to secure the assembly.
5. Complete assembly by installing the provided labels on all connectors as shown in Figure 6-2.

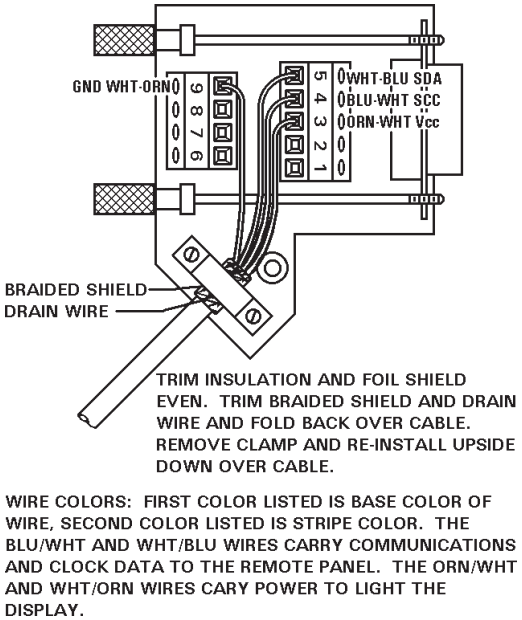

Figure 6-1. *RDE-RDE Harness wiring*

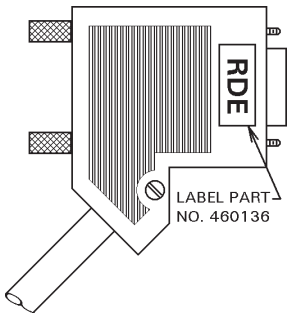

Figure 6-2. *RDE-RDE Harness labeling*

6.2 RDEjr. CABLE ASSEMBLY – FIELD ASSEMBLY OF 9 PIN D-SUBMINIATURE CABLE EXTENSION

The RDEjr. has been designed with a permanently attached six-foot long 9 pin D-Subminiature male pendant. Some applications may require more than six feet between the RDEjr. and the weld control. ENTRON has not tested lengths over six feet. When distances greater than six feet are required, ENTRON recommends the use of the RT4 – RS485 interface which allows distances of up to several miles between the data entry device (RT4) and the weld control (see Instruction Manual 700171).

In cases where the customer wants to extend the six- foot pendant on the RDEjr., ENTRON supplies the components and instructions below. ENTRON does not support the use of cords beyond six feet in length. Please make note of the following information:

1. +5V is sent through this cable and is NOT fused. This same +5V is used by all other components on the Control Board. Adding length may cause excessive voltage drop to the RDEjr.
2. A 2 wire serial interface is used to send data to and from the RDEjr. Extended cable length adds capacitance to these leads and will effect rise times and eventually cause malfunction.
3. The serial interface used is not industrially hardened and will not tolerate radiated noise and current loops introduced by cable extensions and improper routing and wiring.

Assembly Instructions (see Figure 6-3):

1. Run the retaining nut of the Connector Backshell (Part of Item ②) on to the Cable (Item ①). Strip the insulation on the Cable back approximately 2" on one end and unravel the shield braid into two halves, folding each half back against the Cable insulation.
2. Remove unused wires from the flat cable back to the insulation (see Figure 6-4). Locate the undivided portion closest to the end and assemble the Female Connector (Item ③) to the ribbon as shown, approximately 1" from the end of the insulation.
3. Insulate the inside of the Backshell (Item ②) so the ends of the ribbon cable cannot make contact with the metal shell.
4. Install the Jackscrews (Item ⑤) with their associated hardware as the two halves of the Backshell (Item ②) are assembled so the ends lie over the folded back shield braid.
5. On the opposite end, run the retaining nut of the Connector Backshell (Part of Item ②) on to the Cable. Strip the Cable insulation back approximately 2" and unravel the shield braid into two halves, folding each half back against the Cable insulation.
6. Remove unused wires from the flat cable back to the insulation (see Figure 6-4). Locate the undivided portion closest to the end and assemble the Male Connector (Item ④) to the remaining ribbon as shown, approximately 1" from the end of the insulation.
7. Insulate the inside of the Backshell (Item ②) so the ends of the ribbon cable cannot make contact with the metal shell.
8. Install the Thumbscrews (Item ⑥) with their associated hardware as the two halves of the Backshell (Item ②) are assembled so the ends lie over the folded back shield braid.

6.2 RDEjr. CABLE ASSEMBLY (cont.)

Table 6-1. *RDEjr. Cable Assembly Parts List*

PARTS LIST			
QTY.	ITEM	DESCRIPTION	PART NO.
1	1	CABLE, .05 ROUND, SHIELDED, FLAT RIBBON	900297
2	2	CONNECTOR, BACKSHELL FOR 9 PIN D-SUB	331152
1	3	CONNECTOR, 9 PIN, METALLIC, D-SUB, IDC, FEMALE	331127
1	4	CONNECTOR, 9 PIN METALLIC D-SUB, IDC, MALE	331153
1	5	JACKSCREW, D-SUB BACKSHELL	331124
1	6	THUMBSCREW, D-SUB BACKSHELL	331154
as needed	7	LABEL, 1/2 X 1" WIDE OR INSULATION	900296

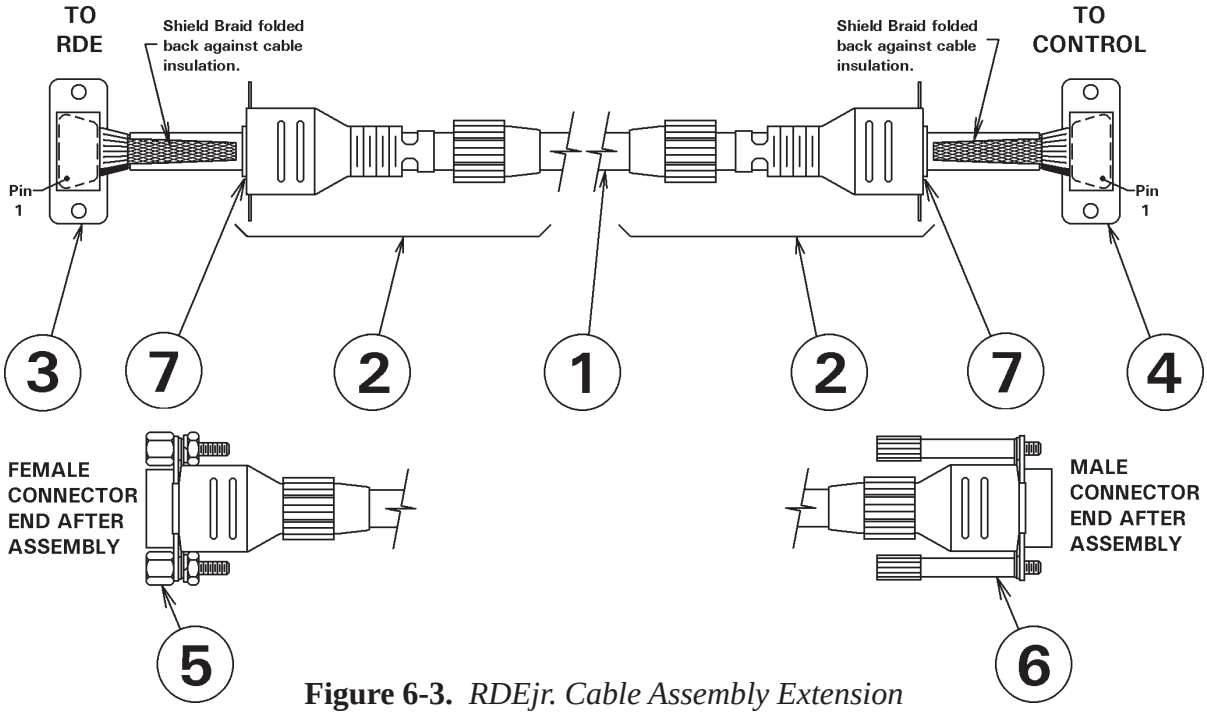

Figure 6-3. *RDEjr. Cable Assembly Extension*

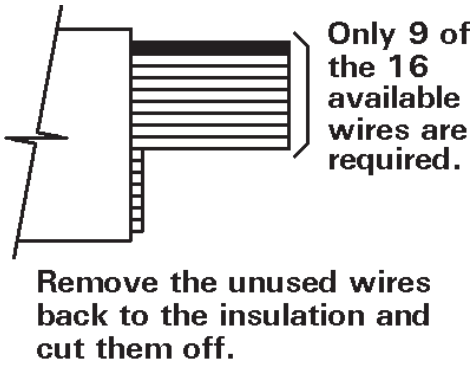

Figure 6-4. *Ribbon Cable detail*

NOTICE

The trimmed ends of Item ① cannot come in contact with Backshell (Item ②). Apply Insulation (Item ⑦) as needed on the inside (wire side) of Backshell to act as insulation.

6.3 ORDERING INFORMATION

Contact factory directly in regards to ordering. Order parts in Table 6-1 as spare parts.

7.0 ENTRON LIMITED WARRANTY AND FACTORY SERVICE

ENTRON Controls, LLC., warrants that all ENTRON control panels, **EXCEPT** Mid-frequency Inverter controls, silicon controlled rectifiers (SCRs), insulated gate bipolar transistors (IGBTs), SCR and IGBT assemblies, circuit breakers, and electro-mechanical contactors, are free of manufacturing defects for a period of **TWO YEARS** from the date of original purchase and, in the event of a manufacturing defect, ENTRON will repair or replace, at its discretion, the defective part without any cost for parts or labor.

All silicon controlled rectifiers, SCR and IGBT assemblies, circuit breakers, and electro-mechanical contactors in ENTRON control panels are covered by **a limited warranty from the original manufacturer**. If these parts fail because of a manufacturing defect, they will not be repaired or replaced by ENTRON, but will be returned by ENTRON to the original manufacturer in accordance with said manufacturer's warranty.

ENTRON Controls, LLC., warrants that all Mid-frequency Inverter controls are free of manufacturing defects for a period of **ONE YEAR** from the date of original purchase and, in the event of a manufacturing defect, ENTRON will repair or replace, at its discretion, the defective part without any cost for parts or labor.

To obtain repairs or replacement parts under this warranty, the defective part must be returned, prepaid, to ENTRON Controls, LLC., 1402 S. Batesville Road, Greer, SC 29650. Please send your repair to the attention of "Service" with a description of the problem you are experiencing, contact person, and phone number.

EXCLUSIONS: This warranty does not cover damage by accident or misuse, unauthorized repair or modification to any control assembly by the customer.

IMPORTANT NOTE: The warranty period is considered from the date of shipment and is tracked by a serial number code.

USE OF OUT OF WARRANTY REPAIR SERVICE:
To obtain service for any printed circuit board assembly or welding control after the warranty period, send assembly or control, prepaid, to ENTRON Controls, LLC., and ENTRON will repair printed circuit board assembly or control and return it to you without further warranty. Additional service charges will be invoiced at time of shipment.

Your ENTRON Controls, LLC., Original Equipment Manufacturers (OEMs), Dealers and Distributors are your first response contact to secure technical assistance on control or welding problems. Should they be unable to assist you, please contact your ENTRON sales representative or the factory directly. Contact the factory at 864-416-0190.