



SNAPSHOT INSTALLATION MANUAL
INSTRUCTIONS FOR INSTALLING NEW HEATING CARTRIDGE/HEATING SLEEVE
TO A WELKER® HEATED REGULATOR

PARTS
EHAMT011
HR1124
MM79200

DRAWING NUMBERS
AD822B0
ADHRA02
ADHR002

MANUAL NUMBER
IOM-254

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SAFETY

IMPORTANT SAFETY INFORMATION READ ALL INSTRUCTIONS



NOTES emphasize information and/or provide additional information to assist the user.



CAUTION messages appear before procedures that could result in damage to equipment if not observed.



WARNING messages appear before procedures that could result in personal injury if not observed.

This manual is intended to be used as a snapshot set of instructions for removing the old heating cartridge and thermostat and installing the following parts to a Welker® Heated Regulator: Self-Regulating Heating Cartridge, Part EHAMT011, and Heater Sleeve, Part HR1124. For comprehensive instructions regarding your complete system, please refer to the Installation, Operation, and Maintenance (IOM) Manuals for each individual component. A list of relevant component IOM Manuals is provided in the Appendix to this manual.

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation of the Welker® equipment described in this manual. Correct installation, however, is the responsibility of the end user. Welker® reserves the right to make changes to this manual and all products in order to improve performance and reliability.

BEFORE YOU BEGIN

Read these instructions completely and carefully.

IMPORTANT – Save these instructions for local inspectors' use.

IMPORTANT – Observe all governing codes and ordinances.

Note to Installer – Leave these instructions with the end user.

Note to End User – Keep these instructions for future reference.

Installation of the Heating Cartridge and Heater Sleeve is of a mechanical and electrical nature.

Proper installation is the responsibility of the installer. Product failure due to improper installation is not covered under the warranty.

If you received a damaged Heating Cartridge and/or Heater Sleeve, please contact a Welker® representative immediately.

Phone: 281.491.2331
Address: 13839 West Bellfort Street
Sugar Land, TX 77498

SECTION 1: PRODUCT INFORMATION

1.1 Introduction

We appreciate your business and your choice of Welker® products. The installation, operation, and maintenance liability for this equipment becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance (IOM) Manuals* prior to installation and operation of this equipment is required for a full understanding of its application and performance prior to use.*

If you have any questions, please call Welker® at 1.281.491.2331.

**The following procedures have been written for use with standard Welker® parts and equipment. Assemblies that have been modified might have additional requirements and specifications that are not listed in this manual.*

1.2 Snapshot Procedure Description

This manual contains basic information for a specific operation, generally accomplished in the field. The operation referred to is the removal of an old heater cartridge and thermostat and the installation and wiring of a new heating cartridge and heating cartridge sleeve to any of several Welker® Heated Regulator models. The old heater cartridge has four (4) wires, whereas the new heating cartridge has two (2) wires. This is because the new heating cartridge is self-regulating and therefore does not require a thermostat. This is why the old thermostat and heater cartridge will be discarded.

While the old heater cartridge and thermostat were CSA- or IECEx-certified, the new heating element and heating element sleeve are not CSA- or IECEx-certified. However, they do comply with NEC Class I, Div. 1, Groups C & D, T3.

This manual contains two installation sections: One covers Welker® HR, IHRA, and IHRD models that currently are IECEx-certified and one covers Welker® HR, IHRA, and IHRD models that currently are CSA-certified. Please refer to the section that covers your Welker® Heated Regulator model.

This document does not cover any other aspects of the operation of your Welker® Heated Regulator unit. For further instructions regarding your particular unit, please refer to the specific *Installation, Operation, and Maintenance (IOM) Manual*. A list of relevant *IOMs* can be found in the *Appendix* to this manual.

Welker® might custom design the Welker® Heated Regulator unit to suit the particular application and specifications of each customer.

1.3 Electrical Specifications



The specifications listed in this section are specific to the focus of this manual on one operation. Welker® can modify the equipment according to your company's needs. Please note that the specifications may vary depending on the customization of your equipment.

Table 1: New Heating Cartridge Electrical Specifications

Electrical Classification	NEC Class I, Div. 1, Groups C & D, T3
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Table 2: New Heating Cartridge Options

Operating Voltage	Power (±10%)	Surface Temperature (±18 °F / 10 °C)	Maximum Inrush Current	Resistance at 77 °F (25 °C)
AC 110/240 V	26 W	176 °F (80 °C)	3 A	455–945 Ω
	45 W	284 °F (140 °C)	4.5 A	300–620 Ω
	113 W	428 °F (220 °C)	5 A	447–1006 Ω

New Heating Cartridge With Sleeve



Table 3: Old Heating Cartridge Electrical Specifications

Product Certifications	CSA IECEX
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Table 4: Old Heating Cartridge Options

Electrical Connection	Power	Thermostat Temperature Range	Current	Resistance
AC 110/120 V	150 W	68 °F to 210 °F (20 °C to 98 °C)	1.25 A	196 Ω
	200 W	180 °F to 380 °F (82 °C to 193 °C)	1.67 A	75 Ω
AC 220/240 V	100 W	68 °F to 210 °F (20 °C to 98 °C)	0.417 A	576 Ω
	200 W	180 °F to 380 °F (82 °C to 193 °C)	0.833 A	288 Ω

Figure 1: Old Heating Cartridge Wiring Diagram

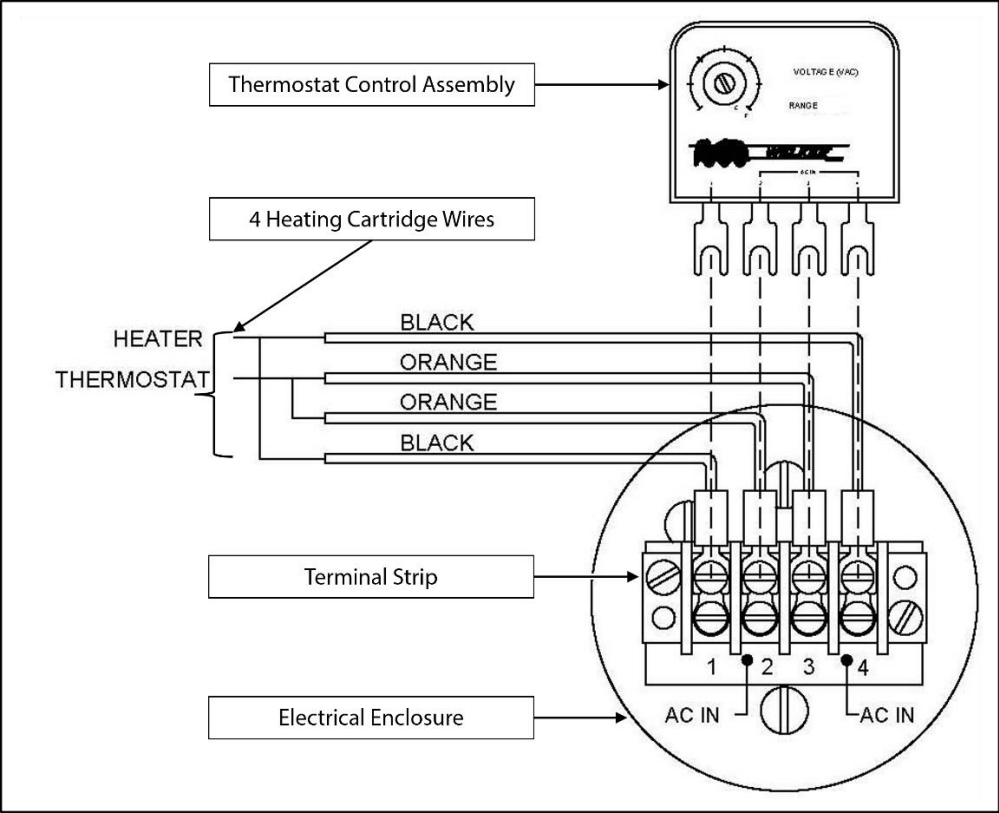
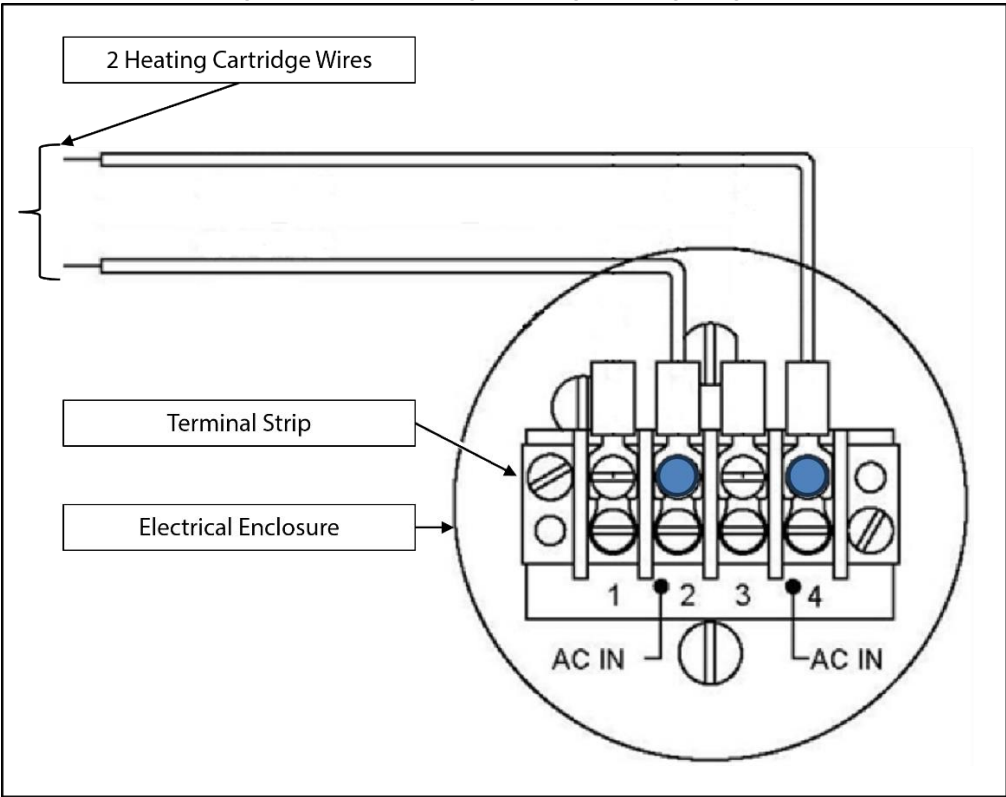


Figure 2: New Heating Cartridge Wiring Diagram



SECTION 2: SNAPSHOT INSTALLATION PROCEDURE

2.1 Before You Begin



After unpacking the new self-regulating heating cartridge and heated sleeve, check them for any damage that might have occurred during shipment. Immediately contact a Welker® representative if you received a damaged heating cartridge and/or heated sleeve.



All electrical connections must meet local and national electric codes, and excessive weight added to the conduit run must be supported.

The following consists of a set of procedures to accomplish removal of the existing heating cartridge and installation of the new heating cartridge and heated sleeve in your Welker® Heated Regulator unit. This document does not cover any other aspects of the operation of the Welker® Heated Regulator unit. Please refer to the appropriate *Installation, Operation, and Maintenance (IOM) Manual* for the specific unit(s). A list of *IOMs* is included in the *Appendix* to this manual.

For the Welker® Heated Regulator threaded-plug unit, Welker® recommends having the following items available:

1. Crescent Wrench
2. Gloves
3. Hex Key Set
4. Phillips Head Screwdriver
5. Tweezers
6. For Models With a Cable Gland, a New Cable Gland Kit Will Be Required (Please refer to *IOM-V481* for details regarding the cable gland)

For the Welker® Heated Regulator unit that features a plug with an O-ring, Welker® recommends having the following items available:

1. Crescent Wrench
2. Gloves
3. Hex Key Set
4. O-Ring Kit
5. Phillips Head Screwdriver
6. Seal Pick
7. Tweezers

The procedure described in this manual regarding the installation and wiring of the heating element and heated sleeve should be performed on a smooth, clean surface.



New seals supplied in spare parts kits should be lightly lubricated before being installed to ease the installation of the seals and reduce the risk of damage when positioning them on parts. Wipe excess lubricant from the seals, as it may adversely affect analytical instrument results.



For sample-exposed seals, Welker recommends non-hydrocarbon-based lubricants, such as Krytox®. For non-sample-exposed seals, Welker recommends either non-hydrocarbon-based lubricants or silicone-based lubricants, such as Dow® 111.



The removal of the existing heating cartridge and thermostat and installation and wiring of the new heating cartridge and heating sleeve should be performed on a smooth, clean surface.

2.2 Snapshot Installation Procedure: Preparation

1. The first step is to turn off all electrical power to the Welker® Heated Regulator unit and isolate it from all applicable energy sources.



Be certain to turn off ALL electrical power before accomplishing the installation of the heating cartridge and sleeve.



DO NOT open the certified electrical enclosure until it can no longer be a potential ignition source.



Ensure that the regulator unit is isolated from all incoming and outgoing connections (including neutral conductors) prior to opening the certified electrical enclosure.



The heater will be HOT after use. Allow approximately thirty (30) minutes for the heater to cool down prior to performing the procedure in this manual.

2. Disconnect the electrical wiring.
3. Depressurize the pipeline.



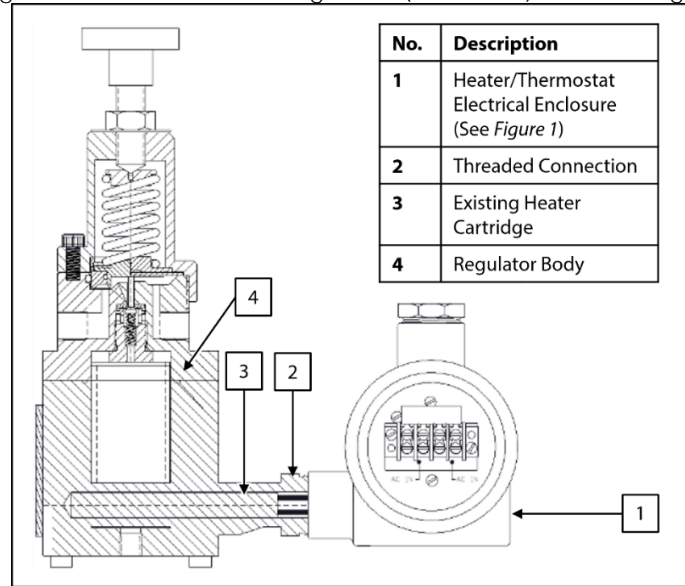
The pipeline MUST BE depressurized prior to installing and removing the Welker® Heated Regulator unit.

4. Disconnect the customer-supplied tubing, fittings, or instrument attached to the unit.
5. Remove the Welker® Heated Regulator unit from the pipeline and relieve all trapped pressure.
6. Place the unit on a clean, smooth surface.

2.3 Snapshot Installation Procedure: For Welker® Heated Regulators **With Existing IECEx Certification**

1. For the Welker® Heated Regulator (HR model) threaded unit, follow this sequence of steps:
 - a. Remove the electrical enclosure lid.
 - b. Loosen all screws on the terminal strip (*Figure 1*).
 - c. Remove the thermostat and discard it.
 - d. Remove the four (4) heater cartridge wires from the terminal strip.
 - e. Unscrew the electrical enclosure from the Welker® Heated Regulator body. This will expose the four (4) heater cartridge wires.
 - f. Gently pull the heater cartridge from the Welker® Heated Regulator body. Discard the heater cartridge.
 - g. Take the new self-regulating heating cartridge and coat the outside of it with a thin layer of Dow® 111.
 - h. Take the new heating cartridge sleeve and coat the outside of it with a thin layer of Dow® 111.

Figure 3: Welker® Heated Regulator (HR Model) – IECEx Diagram



- i. Insert the sleeve into the Welker® Heated Regulator body.
- j. Wipe off excess Dow® 111.
- k. Carefully insert the heating cartridge into the sleeve, gently working back and forth to get all trapped air out of the sleeve.
- l. Carefully fish out the two (2) wires of the heating cartridge and work them into the electrical enclosure but do not connect them yet.
- m. Reattach the electrical enclosure by screwing it in to the Welker® Heated Regulator body.
- n. Attach the wires of the self-regulating heating element (no thermostat required) to the top of the terminal strip in positions 2 and 4. Both wires are the same color. It does not matter which is attached to which position.
- o. Reaffix the electrical enclosure lid.
- p. The Welker® Heated Regulator unit is now ready to be reinstalled to the field location. Follow instructions in the applicable *Installation, Operation, and Maintenance (IOM) Manual* to reattach the power supply on the bottom side of the terminal strip.



All electrical connections must meet local and national electric codes, and excessive weight added to the conduit run must be supported.

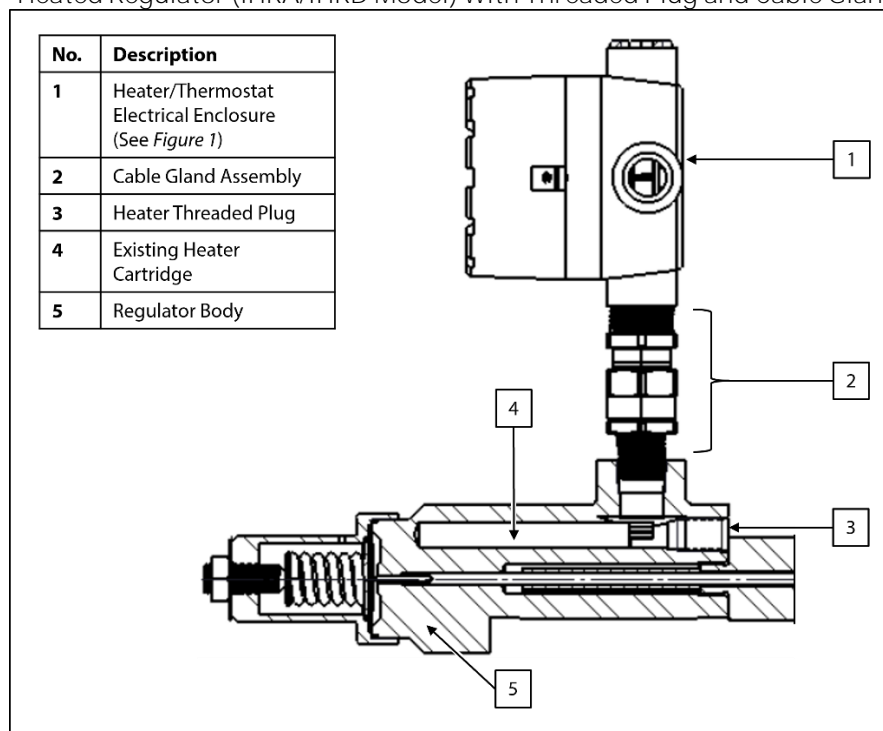
2. For the Welker® Heated Regulator (IHRA/IHRD model) threaded-plug, cable-gland unit, follow this sequence of steps. Please be advised that the new compound that is applied to the new heating cartridge wires can only allow return to service after 4 hours following application. The compound will fully cure in 24 hours. The compound will fully cure in 24 hours.



The new cable gland assembly compound that is applied to the new heating cartridge wires can only allow return to service after 4 hours following application. The compound will fully cure in 24 hours at 60–80 °F (16–27 °C). Lower temperatures will give a longer cure time. For example, at 37 °F (3 °C), full cure takes about 7 days.

- Remove the electrical enclosure lid.
- Loosen all screws on the terminal strip (*Figure 1*).
- Remove the thermostat and discard it.
- Remove the four (4) heater cartridge wires from the terminal strip.
- Using a wrench, unscrew the cable gland from the Welker® Heated Regulator body. This will expose compound within which the four (4) heater cartridge wires are secured.

Figure 4: Welker® Heated Regulator (IHRA/IHRD Model) With Threaded Plug and Cable Gland – IECEx Diagram



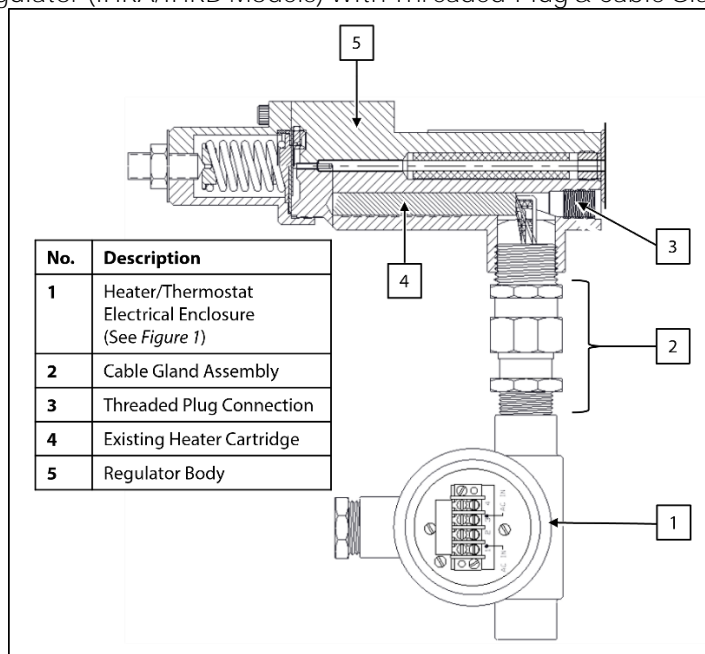
- Unscrew the threaded plug.
- Put on latex or plastic safety gloves in order to protect your hands from possible skin irritation from the compound.
- After separating the gland from the electrical enclosure, pull the exposed four (4) wires from the electrical enclosure. **The compound will surround the wires, with the wires' connection ends exposed. The compound will be a rigid pale yellow epoxy putty sealing material whose shape conforms to the wires and to the inside of the cable gland.**
- Disconnect the cable gland assembly.
- Cut the wires at the point where they connect with the heating cartridge.
- The compound will have adhered to the cable gland assembly, rendering it unusable a second time. Discard the old cable gland assembly with the compound and embedded wires. Be sure to dispose of the compound according to all applicable rules and regulations.
- Gently pull the heater cartridge from the Welker® Heated Regulator body. Discard the heater cartridge.
- Take the new self-regulating heating cartridge and coat the outside of it with a thin layer of Dow® 111. Be careful not to get the lubricant on the two (2) exposed wires.



DO NOT GET lubricant on the cable gland or the two (2) exposed wires. To achieve optimum adhesion, wire and cable gland surfaces must be clean and free of oil, grease, and dirt.

- n. Take the new heating cartridge sleeve and coat the outside of it with a thin layer of Dow® 111.
- o. Insert the sleeve into the Welker® Heated Regulator body.
- p. Wipe off excess Dow® 111.
- q. Carefully insert the heating cartridge into the sleeve, gently working back and forth to get all trapped air out of the sleeve.

Figure 5: Welker® Heated Regulator (IHRA/IHRD Models) With Threaded-Plug & Cable Gland Assembly – IECEx Diagram



- r. Carefully fish out the two (2) wires of the heating cartridge.
- s. **Use a new cable gland assembly that you have sourced from the manufacturer. Refer to the manufacturer's instructions in IOM-V481 for installing the compound in the cable gland that will protect the two (2) new heating cartridge wires. This process will take approximately half an hour.**
- t. Reattach the threaded plug.
- u. Work the exposed ends of the two (2) new heating cartridge wires in to the electrical enclosure. Do not attach them now.
- v. Reattach the electrical enclosure by screwing the cable gland in to the Welker® Heated Regulator body.
- w. Attach the wires of the self-regulating heating element (no thermostat required) to the top of the terminal strip in positions 2 and 4. Both wires are the same color. It does not matter which is attached to which position.
- x. Reaffix the electrical enclosure lid.



The new compound that is applied to the new heating cartridge wires can only allow return to service after 4 hours following application. The compound will fully cure in 24 hours at 60–80 °F (16–27 °C).

- y. Following the 4-hour cable gland compound cure time, the Welker® Heated Regulator unit will be ready to be reinstalled to the field location. Follow instructions in the applicable *Installation, Operation, and Maintenance (IOM) Manual* to reattach the power supply on the bottom side of the terminal strip.

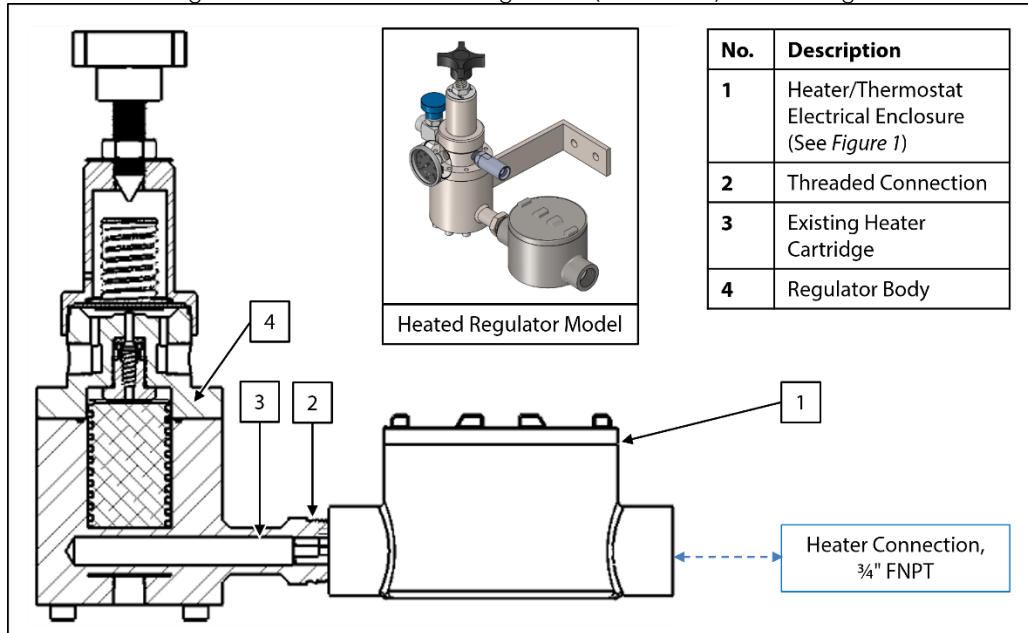


All electrical connections must meet local and national electric codes, and excessive weight added to the conduit run must be supported.

2.4 Snapshot Installation Procedure: For Welker® Heated Regulators With Existing CSA Certification

1. For the Welker® Heated Regulator threaded unit, follow this sequence of steps:
 - a. Remove the electrical enclosure lid.
 - b. Loosen all screws on the terminal strip.
 - c. Remove the thermostat and discard it.
 - d. Remove the four (4) heater cartridge wires from the terminal strip.
 - e. Unscrew the electrical enclosure from the Welker® Heated Regulator body. This will expose the four (4) heater cartridge wires.

Figure 6: Welker® Heated Regulator (HR Model) – CSA Diagram



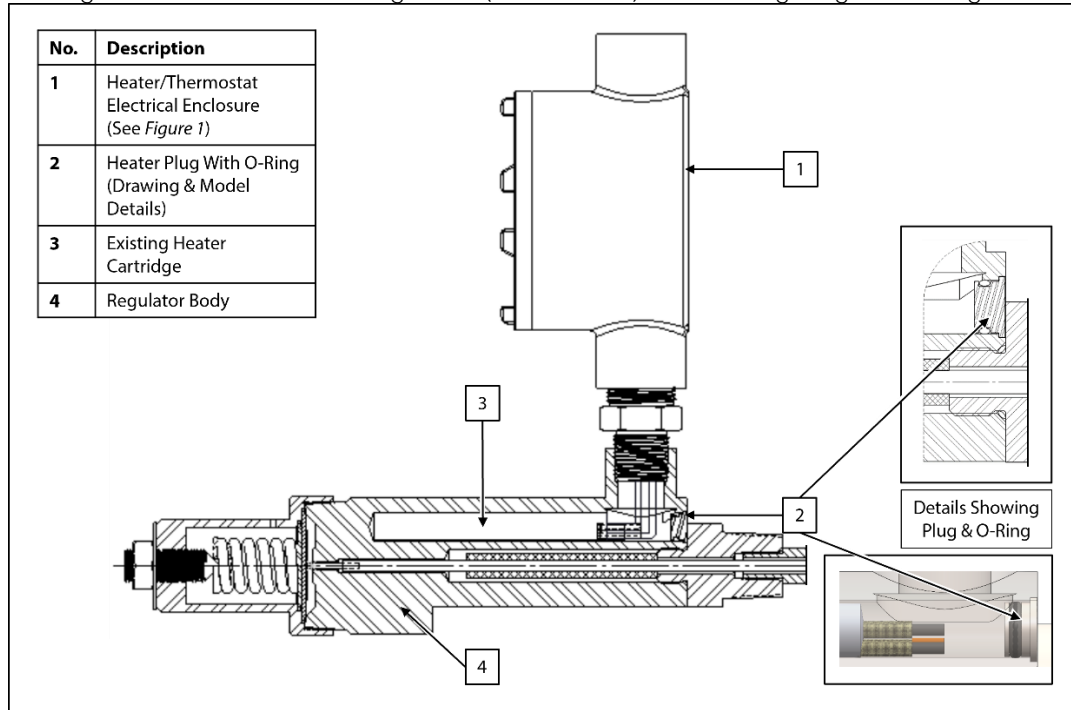
- f. Gently pull the heater cartridge from the Welker® Heated Regulator body. Discard the heater cartridge.
- g. Take the new self-regulating heating cartridge and coat the outside of it with a thin layer of Dow® 111.
- h. Take the new sleeve and coat the outside of it with a thin layer of Dow® 111.
- i. Insert the sleeve into the Welker® Heated Regulator body.
- j. Wipe off excess Dow® 111.
- k. Carefully insert the heating cartridge into the sleeve, gently working back and forth to get all trapped air out of the sleeve.
- l. Carefully fish out the two (2) wires of the heating cartridge and work them into the electrical enclosure but do not connect them yet.
- m. Reattach the electrical enclosure by screwing it in to the Welker® Heated Regulator body.
- n. Attach the wires of the self-regulating heating cartridge (no thermostat required) to the top of the terminal strip in positions 2 and 4. Both wires are the same color. It does not matter which is attached to which position.
- o. Reaffix the electrical enclosure lid.
- p. The Welker® Heated Regulator unit is now ready to be reinstalled to the field location. Follow instructions in the applicable *Installation, Operation, and Maintenance (IOM) Manual* to reattach the power supply on the bottom side of the terminal strip.



All electrical connections must meet local and national electric codes, and excessive weight added to the conduit run must be supported.

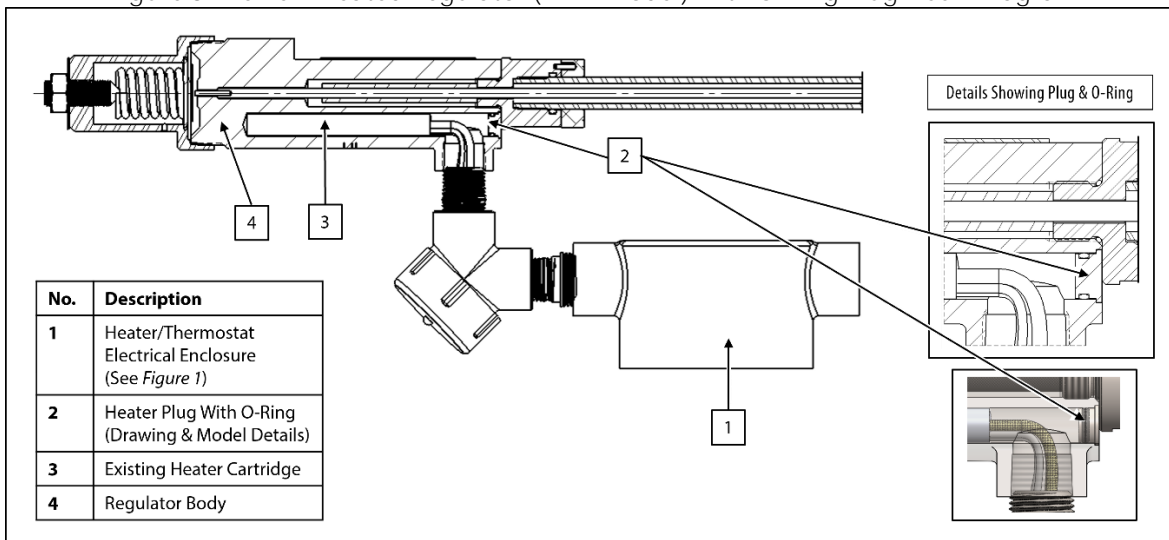
2. For the Welker® Heated Regulator unit with O-ring plug, follow this sequence of steps:
 - a. Remove the electrical enclosure lid.
 - b. Loosen all screws on the terminal strip.
 - c. Remove the thermostat and discard it.
 - d. Remove the heater cartridge wires from the terminal strip.
 - e. Remove the O-ring plug from the bottom of the Welker® Heated Regulator body. Remove the electrical enclosure from the Welker® Heated Regulator body.
 - f. Gently fish out the heater cartridge wires and push them through the bottom of the Welker® Heated Regulator body.

Figure 7: Welker® Heated Regulator (IHRD Model) With O-Ring Plug – CSA Diagram



- g. Remove the heater cartridge from the Welker® Heated Regulator body. Discard the heater cartridge.
- h. Take the new self-regulating heating cartridge and coat the outside of it with a thin layer of Dow® 111.
- i. Take the new heater sleeve and coat the outside of it with a thin layer of Dow® 111.
- j. Carefully insert the sleeve into the Welker® Heated Regulator body.
- k. Wipe off excess Dow® 111.

Figure 8: Welker® Heated Regulator (IHRA Model) With O-Ring Plug – CSA Diagram



- l. Carefully insert the heating cartridge into the sleeve, gently working back and forth to get all trapped air out of the sleeve.
- m. Fish out the wires of the heating cartridge and work them into the electrical enclosure but do not connect them yet.
- n. Insert a fresh, lightly lubricated O-ring to the heater plug location on the heated regulator body.
- o. Insert the heater plug into the O-ring until it is a snug fit.
- p. Attach the wires of the self-regulating heating cartridge (no thermostat required) to the top of the terminal strip in positions 2 and 4. Both wires are the same color. It does not matter which is attached to which position.
- q. Reaffix the electrical enclosure lid.
- r. The unit is now ready to be reinstalled to the field location. Follow instructions in the applicable *Installation, Operation, and Maintenance (IOM) Manual* to reattach the power supply on the bottom side of the terminal strip.



All electrical connections must meet local and national electric codes, and excessive weight added to the conduit run must be supported.

APPENDIX: REFERENCED OR ATTACHED DOCUMENTS

Welker® *Installation, Operation, and Maintenance (IOM) Manuals* suggested for reference or for use with this unit:

- IOM-050: Welker® IHRA-4SS Automatic Insertion Heated Regulator
- IOM-078: Welker® HR-4SS Heated Instrument Regulator
- IOM-118: Welker® IHRA-4SS 220/230 Automatic Insertion Heated Regulator, High Voltage
- IOM-119: Welker® HR-4SS 230 Heated Regulator, High Voltage
- IOM-123: Welker® IHRA-4SS 220/230 Automatic Insertion Heated Regulator, High Voltage, 100" + Insertion Length
- IOM-156: Welker® IHRA Automatic Insertion Heated Regulator
- IOM-157: Welker® IHRD Heated Probe Regulator
- IOM-158: Welker® HR Heated Instrument Regulator
- IOM-204: Welker® IHRD-4 Heated Probe Regulator
- IOM-215: Welker® SHIRA Automatic Insertion Steam Heated Regulator

Other *Installation, Operation, and Maintenance (IOM) Manuals* suggested for reference or for use with this unit:

- DBK Group Industrial Thermal Management: PSA Series Heating Element (Welker® IOM-V525)
- Peppers Cable Glands Limited Single Compression Barrier Gland IOM (Welker® IOM-V481)
- Peppers Cable Glands Limited T-1000 Compound Safety Data Sheet (Welker® IOM-V527)

Welker® drawings and schematics suggested for reference or for use with this unit:

- Assembly Drawing: AD822BO (Welker® CSA-Certified Heated Regulator)
- Assembly Drawing: ADHRA02 (Welker® IECEx-Certified Heated Regulator)
- Assembly Drawing: ADHRO02 (Welker® IECEx-Certified Heated Regulator)

NOTES



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