
**User's
Manual**

**Model ZR22A, ZR202A
Heater Assembly**

EX*A*xti

IM 11M12A01-21E

◆ For the safe use of this equipment



CAUTION

The cell (sensor) at the tip of the detector is made of ceramic (zirconia element). Do not drop the detector or subject it to pressure stress.

- Do NOT allow the sensor (probe tip) to make contact with anything when installing the detector.
 - Do not allow liquid to drop directly on the probe (sensor) of the detector when installing it.
 - Check the calibration gas piping before introducing the calibration gas to ensure that there is no leakage of the gas. If there is any leakage of the gas, the moisture drawn from the measured gas may damage the sensor.
 - The detector (especially at the tip) becomes very hot. Be sure to handle it with gloves.
-



DANGER

EXAxtZR is very heavy. Handle it with care. Do not drop it. Handle safely to avoid injury.

Connect the power supply cord only after confirming that the supply voltage matches the rating of this equipment. In addition, confirm that the power is switched off when connecting power supply.

Some process gas is dangerous to humans. When removing this equipment from the process line for maintenance or other reasons, protect yourself from potential poisoning by using a protective mask and ventilating the area well.

(1) About This Manual

- This manual should be passed on to the end user.
- The contents of this manual are subject to change without prior notice.
- The contents of this manual shall not be reproduced or copied, in part or in whole, without permission.
- This manual explains the functions contained in this product, but does not warrant that those will suit the particular purpose of the user.
- Every effort has been made to ensure accuracy in the preparation of this manual. However, should any errors or omissions come to the attention of the user, please contact the nearest Yokogawa Electric representative or sales office.
- This manual does not cover the special specifications. This manual may not be updated, when specifications, construction and parts are changed, if the changes do not affect the functions or performance of the product.
- If the product is used in a manner not specified in this manual, the safety of this product may be impaired.

(2) Safety and Modification Precautions

- Follow the safety precautions in this manual when using the product to ensure protection and safety of personnel, product and system containing the product.

(3) The following safety symbols are used on the product as well as in this manual.



This symbol indicates that the operator must follow the instructions laid out in this manual in order to avoid the risk of electric shock, injury to, personnel or fatalities. The manual describes what special care the operator must exercise to avoid such risks.



This symbol indicates that the operator must refer to the instructions in this manual in order to prevent the instrument (hardware) or software from being damaged, or a system failure from occurring.



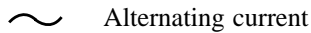
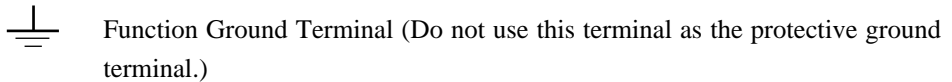
This symbol draws attention to information essential for understanding the operation and functions.



This symbol gives information that complements the present topic.



This symbol identifies a source to which to refer.



◆ After - Sales Warranty

- Yokogawa warrants the product for the period stated in the quotation which was delivered upon purchase. Regarding to warranty service, refer to Section 1. (Introduction). If the customer site is located outside of the service area, a fee will be charged if it is required to send a maintenance engineer to the customer site, even during the warranty period.
- In the following cases, the customer will be charged a repair fee regardless of warranty period.
 - Failure of components which are outside scope of warranty stated in instruction manual.
 - Failure caused by usage of software, hardware or auxiliary equipment, which Yokogawa Electric Corporation did not supply.
 - Failure due to improper or insufficient maintenance by user.
 - Failure due to modification, misuse or operation outside specifications, which Yokogawa did not authorize.
 - Failure due to power supply (voltage, frequency) being outside specifications or abnormal.
 - Failure caused by any usage outside scope of recommended usage.
 - Any damage from fire, earthquake, storms or floods, lightning, disturbances, riots, warfare, radiation and other such natural causes “acts of God”.
- Yokogawa does not warrant suitability for any specific application of the user. Yokogawa will not bear direct/indirect responsibility for damage due to a specific application.
- Yokogawa Electric Corporation will not bear responsibility when the user configures the product into systems or resells the product.
- Maintenance service and supplying repair parts will be covered for five years after production ends. For repair of this product, please contact the nearest sales office described in this instruction manual.

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1. Introduction

The ZR22A and ZR202A Heater Assemblies for ZR22G and ZR202G are described here.

The ZR22G and ZR202G manuals are listed below.

- Model ZR22G, ZR402G Separate type Zirconia Oxygen Analyzer:

IM11M12A01-02E

- Model ZR22G, ZR402G Separate type Zirconia High Temperature Humidity Analyzer:

IM11M12A01-03E

- Model ZR202G Integrated type Zirconia Oxygen Analyzer:

IM11M12A01-04E

- Model ZR202G Integrated type Zirconia High Temperature Humidity Analyzer:

IM11M12A01-05E

The heater assembly is a replaceable part. After unpacking, check the following. If any problems are found, contact our sales office (do not install if problems are found).

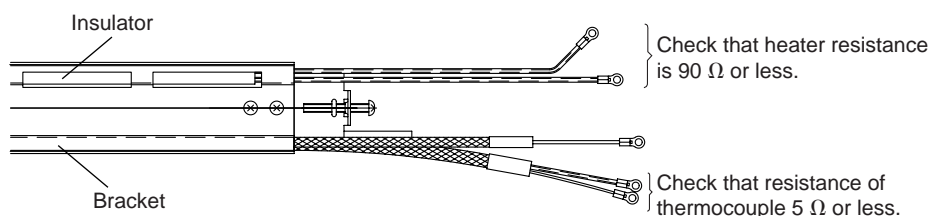
Our warranty does not apply if user replaces the heater.

- Check after unpacking

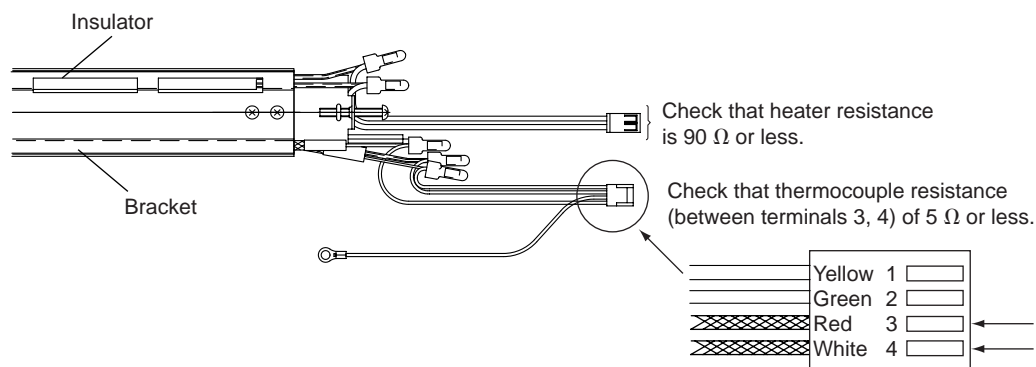
Do a visual inspection to check that bracket is not bent, and insulator element is not chipped or broken.

- Measure resistance of heater and thermocouple (using a tester or the like)

< ZR22A (separate type) heater assembly >



< ZR202A (integrated type) heater assembly >



F1.1E.EPS

2. Specifications

2.1 Model ZR22A Heater Assembly

Table 2.1 ZR22A

Style: S2

Model	Suffix code	Option code	Description
ZR22A			Heater Assembly for ZR22G
Length (*1)	-015		0.15 m
	-040		0.4 m
	-070		0.7 m
	-100		1 m
	-150		1.5 m
	-200		2 m
	-250		2.5 m
	-300		3 m
Jig for change	-A		with Jig (*2)
	-N		None
Reference air (*3)	-A		Reference air Natural convection
	-B		External connection (Instrument air)
	-C		Pressure compensated (for ZR22G S2)
			Pressure compensated (for ZR22G S1)

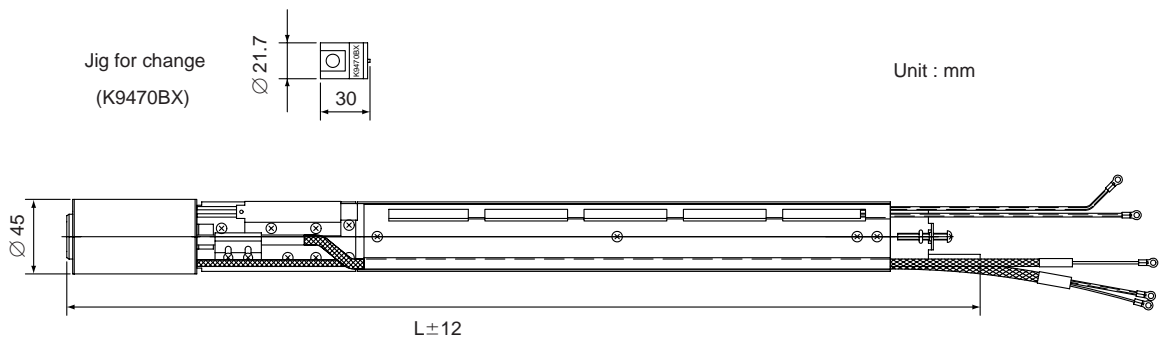
*1 Suffix code of length should be selected as same as ZR22G installed. T2.1E.EPS

*2 Jig part no. is K9470BX to order as a parts after purchase.

*3 Select appropriately among "-A", "-B", "-C" according to the reference air supply method and style.

(Note) The heater is made of ceramic, do not drop or subject it to pressure stress.

● External Dimensions



L length

Model & Code	L	Weight (kg)
ZR22A-015	302	Approx. 0.5
ZR22A-040	552	Approx. 0.8
ZR22A-070	852	Approx. 1.2
ZR22A-100	1152	Approx. 1.6
ZR22A-150	1652	Approx. 2.2
ZR22A-200	2152	Approx. 2.8
ZR22A-250	2652	Approx. 3.4
ZR22A-300	3152	Approx. 4.0

F2.1.1E.EPS

Figure 2.1 External Dimension of ZR22A

2.2 Model ZR202A Heater Assembly

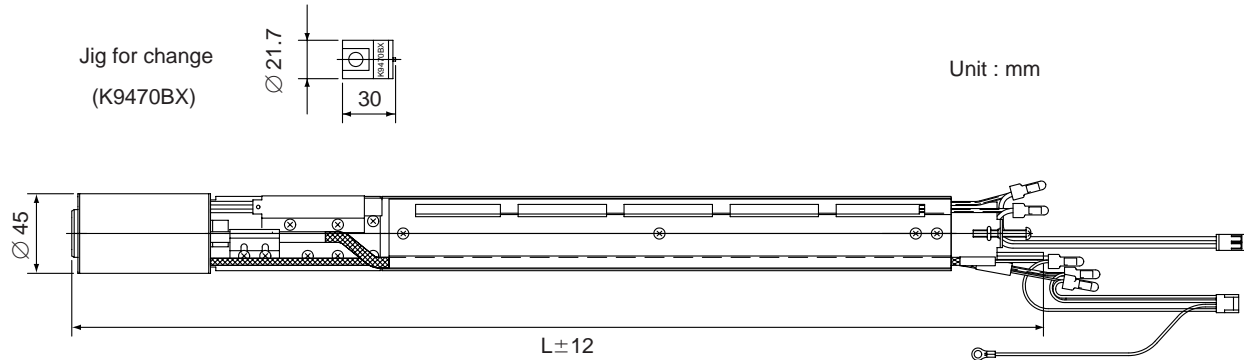
Table 2.2 ZR202A

Model	Suffix code	Option code	Description
ZR202A			Heater Assembly for ZR202G
Length (*1)	-040		0.4 m
	-070		0.7 m
	-100		1 m
	-150		1.5 m
	-200		2 m
	-250		2.5 m
	-300		3 m
Jig for change	-A		with Jig
	-N		None
		-A	Always -A

T2.2E.EPS

(*1) Suffix code of length should be selected as same as ZR202G installed.
* The heater is made of ceramic, do not drop or subject it to pressure stress.

● External Dimensions



L length

Model & Code	L	Weight (kg)
ZR202A-040	552	Approx. 0.8
ZR202A-070	852	Approx. 1.2
ZR202A-100	1152	Approx. 1.6
ZR202A-150	1652	Approx. 2.2
ZR202A-200	2152	Approx. 2.8
ZR202A-250	2652	Approx. 3.4
ZR202A-300	3152	Approx. 4.0

F2.1.1.EPS

Figure 2.2 External Dimensions of ZR202A

3. Instruction for replacement of the Heater Unit

3.1 Instruction for replacement for Model ZR22A Heater Unit

CAUTION

Allow adequate time for the cell and heater assembly to cool before replacing them, or you may get burnt.

When removing the cell, the metal O-ring should be replaced with a new one. Never reuse a metal O-ring. Once-used metal O-ring should be replaced with a new one.

The grease used for rubber O-rings lubricant see (14), (21), (22) etc. makes poisonous gas when heated to more than 250°C.

Wash your hands thoroughly after work! Especially be careful if you smoke.

3.1.1 Removal procedures

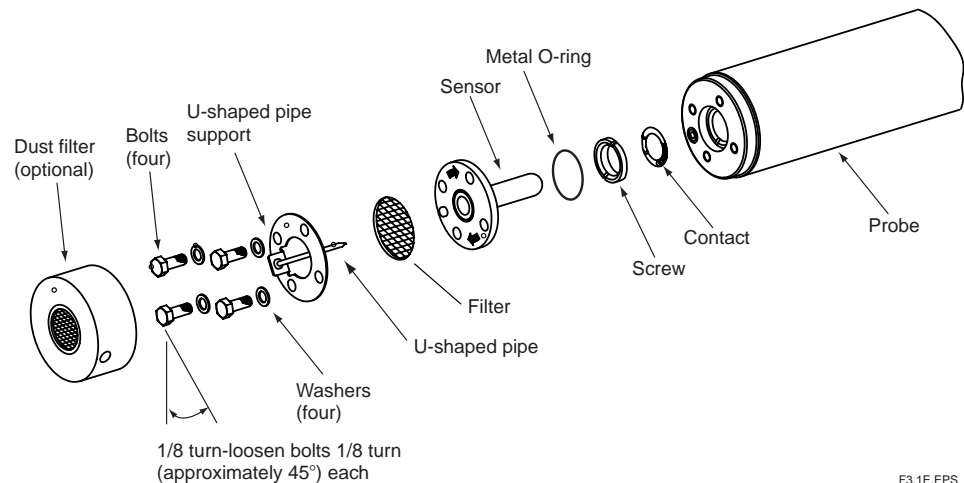


Figure 3.1 Exploded View of Sensor Assembly

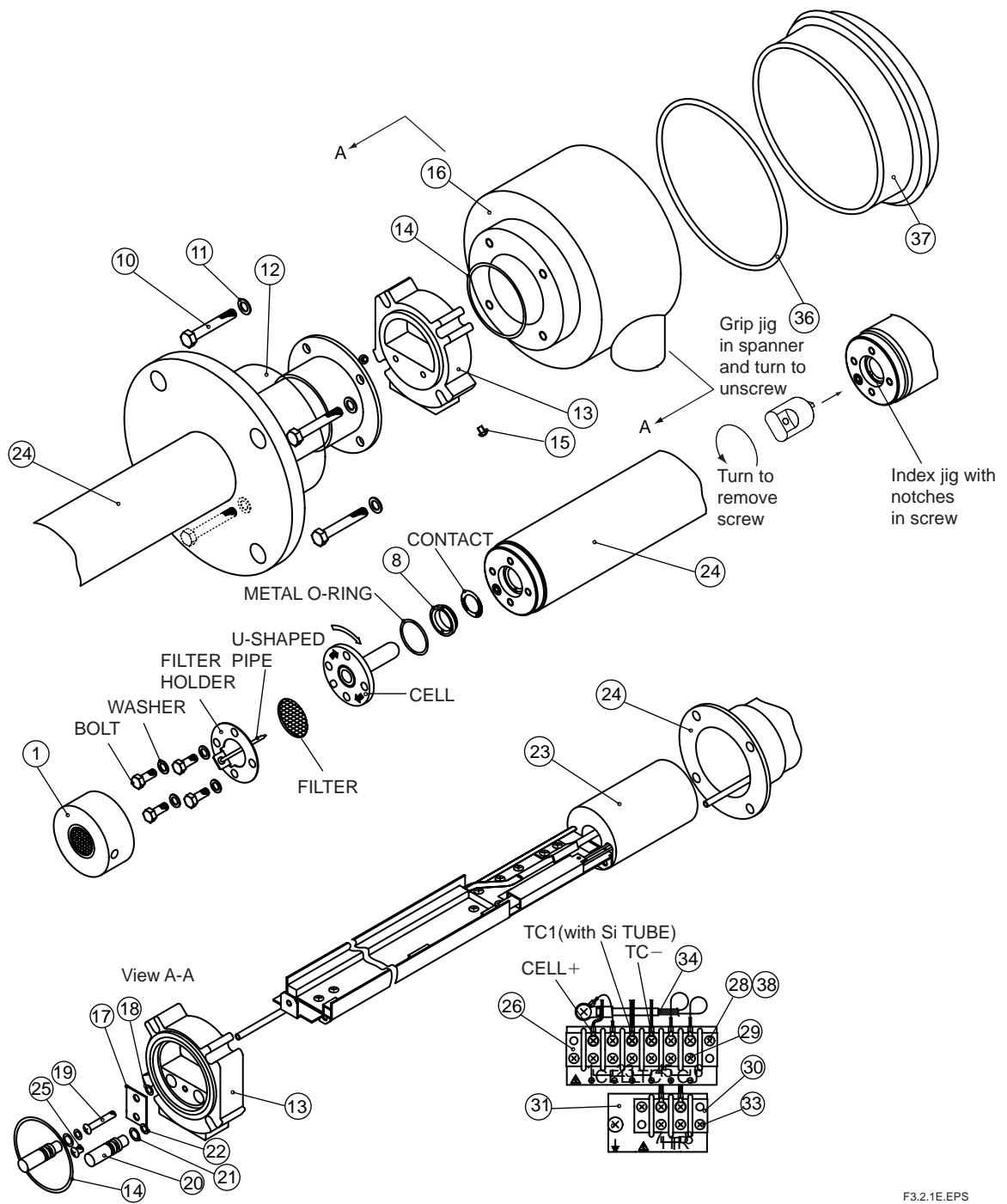
- (1) Remove the four bolts and associated washers from the tip of the detector probe.
- (2) Remove the U-shaped pipe support together with the U-shaped pipe. Remove filter also.
- (3) Pull the sensor assembly toward you while turning it clockwise. Also, remove the metal O-ring between the assembly and the probe. Remove filter also.
(When replacing the assembly, be careful not to scratch or dent the tip of the probe with which the metal O-ring comes in contact (the surface with which the sensor flange also comes in contact). Otherwise, the measurement gas will not be sealed.)
- (4) Use tweezers to pull the contact out of the groove in the tip of the probe.
- (5) Clean the sensor assembly, especially the metal O-ring contact surface to remove any contaminants adhering to that part. If you can use any of the parts from among those removed, also clean them up to remove any contaminants adhering to them.
(Once the metal O-ring has been used, it can not be reused. So, be sure to replace it.)



Note

If the heater strut assembly can not be removed because a screw has fused to its thread, one of our service representatives can fix it.

3.1.2 Replacement of the Heater Unit



F3.2.1E.EPS

Figure 3.2.1 Installation of Model ZR22A HEATER UNIT when reference air suffix code -C or -E specified

3. Instruction for replacement of the Heater Unit

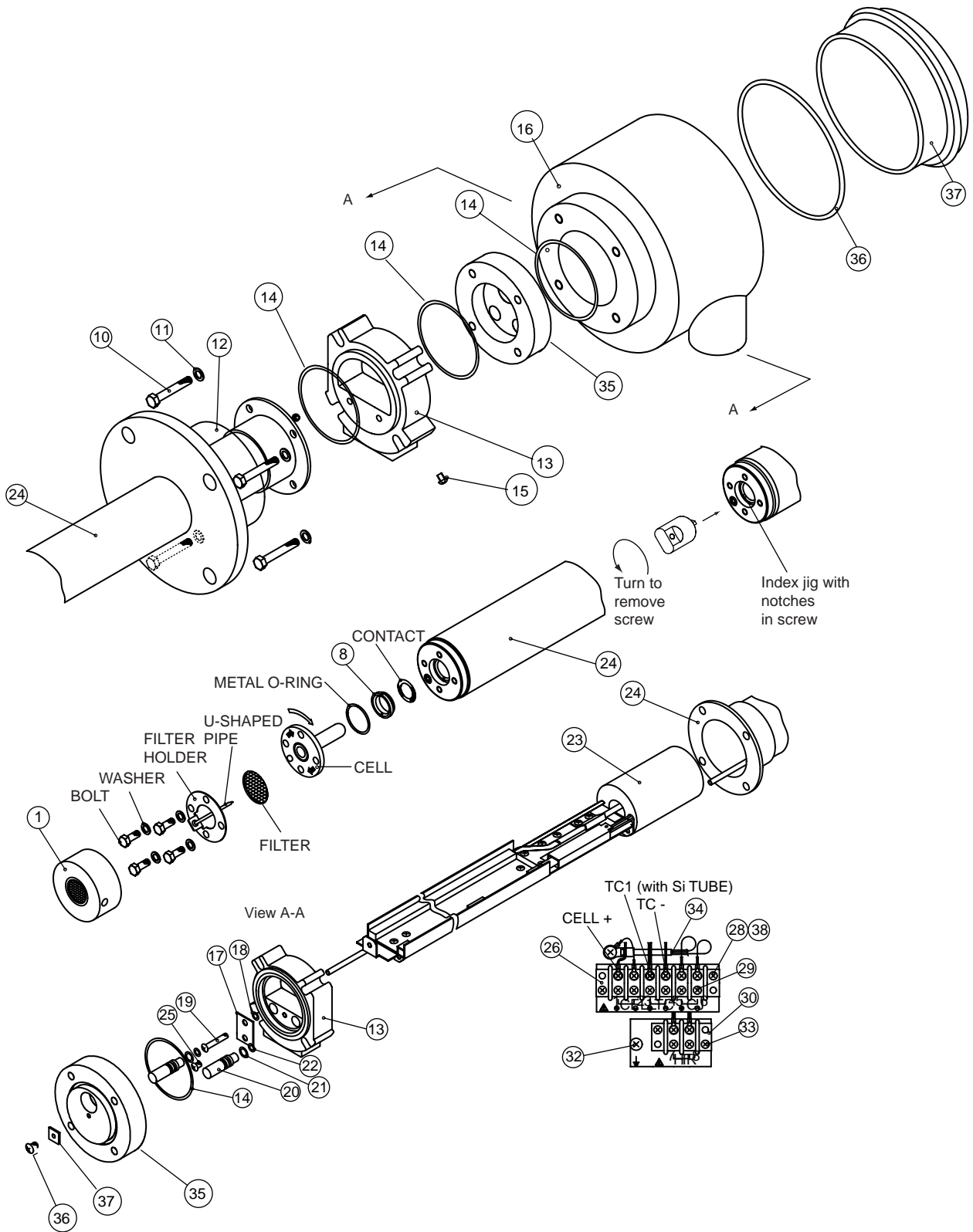


Figure 3.2.2 Installation of Model ZR22A HEATER UNIT when reference air suffix code -D specified

F3.2.2E.EPS

1. Removing of the Cell

Remove the Filter Holder, the U-shaped Pipe, the Filter and the Cell according to Sec. 3.1.1 "Removal procedures for the sensor assembly".

2. Removing of the terminal box

- (1) Open the terminal box and remove the three terminal connections (CELL+, TC+ and TC-).
- (2) To disconnect the HTR terminals, remove the terminal block SCREW (28). The other terminal connections remain connected; disconnect the two HTR connections. (These terminals have no polarity.)
- (3) Remove the two SCREWS (15) that fasten the COVER (12) and slide it to the flange side.
- (4) Remove the four Bolts (10) and the terminal box (16) with care so that the already disconnected wire will not get caught in the terminal box.

3. Replacement of Heater Strut Assembly

- (1) Loosen Screw (19) until heater strut assembly's PLATE (17) can be removed. There's no need to remove O-ring (18) which prevents SCREW (19) from coming out. Pull out connector (13).
- (2) Loosen and remove the SCREW (8) with a special tool (part no. K9470BX or equivalent) and then remove the HEATER STRUT ASSY (23) from the detector (24).
- (3) To reassemble the heater strut assembly, reverse the above procedure:
Insert the HEATER STRUT ASSY (23) into the detector (24), while inserting the calibration pipe in the detector (24) into the heater section in the HEATER STRUT ASSY (23) as well as in the bracket hole. Coat the SCREW (8) with grease (NEVER-SEEZ: G7067ZA) and tighten the SCREW (8) with a special tool (part no. K9470BX or equivalent) with a tightening torque of $12\text{N} \cdot \text{m} \pm 10\%$. (SCREW (8) attached with HEATER STRUT ASSY (23) is shipped with coating.)

4. Assembling of CONNECTOR

- (1) To install the O-rings (22) on the calibration-gas and reference-gas pipes, disassemble the CONNECTOR (13) in the following procedure. Remove the SCREW (25) and then remove the PLATE (17) and two CAPs (20).
If the O-ring (22) remains in the hole, pull them out from the back.
- (2) Pass the heater and thermocouple lead-wire through the CONNECTOR (13). Also, pass the calibration-gas and reference-gas pipes through the holes of the CONNECTOR (13).
- (3) Insert the calibration-gas and reference-gas pipes into O-rings (22) after confirming no damage to O-rings.
If the O-ring (22) fails, replace it with a new one.
- (4) Push the two CAPs (20) into the associated opening of the CONNECTOR (13). Insert the PLATE (17), aligning it with the groove of the CAP (20), and tighten it with the SCREW (25). If you attempt to insert the calibration-gas and reference-gas pipes into the CONNECTOR (13) without disassembling the CONNECTOR (13), the O-ring may be damaged.
- (5) Tighten the SCREW (19) in HEATER STRUT ASSY (23) until CONNECTOR (13) cannot move.

3. Instruction for replacement of the Heater Unit

5. Assembling of Terminal Box and Wiring

Reassemble in reverse order to the above disassembly procedure.

How to identify the wires from the heater strut assembly : Two wires coming from the ceramic insulator are heaters'. Single core wire is CELL+. One of two core wires with semitransparent silicone tube is TC+ and the other is TC-. (If wire markers are attached to each wire, connect wires to the corresponding terminal.

6. Installing of the Cell

Install the Filter Holder, the U-shaped Pipe, the Filter and the Cell according to Section 3.1.3 " Part assembly procedure of the sensor assembly". HEATER STRUT ASSY (23) is shipped with a new CONTACT.

3.1.3 Part assembly procedure of the sensor assembly

- (1) First, install the contact. Being careful not to cause irregularities in the pitch of the coil spirals (i.e., not to bend the coil out of shape), place it in the ringed groove properly so that it forms a solid contact.

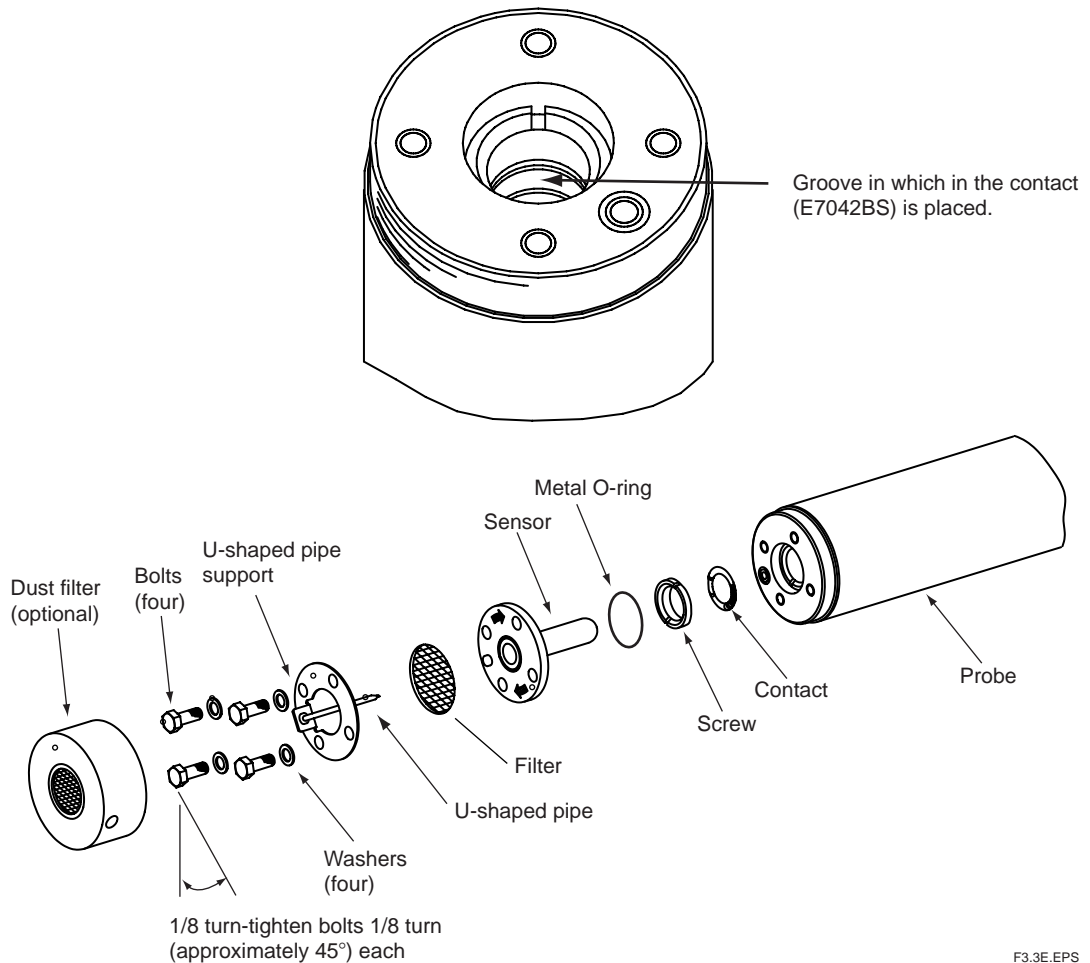


Figure 3.3 Installing the Contact

- (2) Next, make sure that the O-ring groove on the flange surface of the sensor is clean. Install the metal O-ring in that O-ring groove, and then insert the sensor in the probe while turning it clockwise. After inserting it until the metal O-ring comes in contact with the probe's O-ring contact surface, properly align the U-shaped-pipe insertion holes with the bolt openings.
- (3) Attach the U-shaped pipe to its support with filter, then fully insert the U-shaped pipe and its support into the probe.
- (4) Coat the threads of the four bolts with antiseize grease and then screw them in along with the washers. First, tighten the four bolts uniformly by hand, and then use a torque wrench to tighten all areas of the metal O-ring uniformly, that is, to make sure the sensor flange is perfectly parallel to the O-ring's working face in the probe. This is done by tightening first one bolt and then its opposing bolt each 1/8 turn, and then one of the other bolts followed by its opposing bolt, each also 1/8 turn. This continues in rotating fashion until they are all fully tightened with the torque wrench preset to approximately 5.9 N · m. If they are not uniformly tightened, the sensor or heater may be damaged. Replacement of the sensor assembly is now complete. Install the detector and restart operation. Calibrate the instrument before making a measurement.

3.2 Instruction for replacement of Model ZR202A Heater Unit



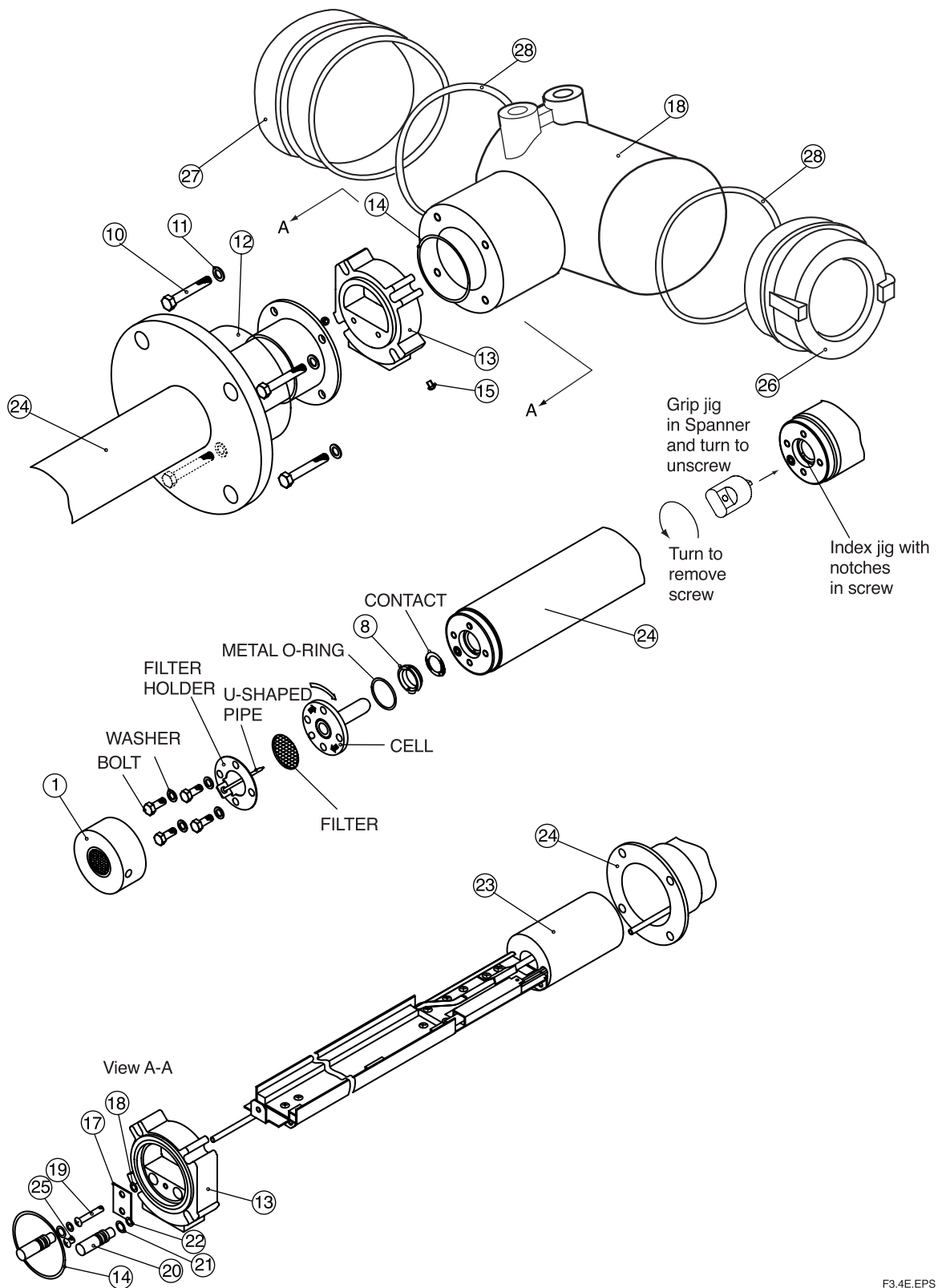
CAUTION

Allow adequate time for the cell and heater assembly to cool before replacing them, or you may get burnt.

When removing the cell, the metal O-ring should be replaced with a new one. Never reuse a metal O-ring. Once-used metal O-ring should be replaced with a new one.

The grease used for rubber O-rings lubricant see (14), (21), (21) etc. makes poisonous gas when heated to more than 250°C.

Wash your hands thoroughly after work! Especially be careful if you smoke.



F3.4E.EPS

Figure 3.4 Installation of Model ZR202A HEATER UNIT

3. Instruction for replacement of the Heater Unit

1. Removing of the Cell

Remove the Filter Holder, the U-shaped Pipe, the Filter and the Cell according to chapter 3.11 "Removal procedures of the sensor assembly".

2. Removing of the converter case

- (1) Remove the two SCREWS (15) that fasten the COVER (12) and slide it to the flange side.
- (2) Remove the four BOLTS (10) and the converter (16). Then remove the three connectors to which lead-wire from the heater, CELL+ signal and thermocouple are connected. If the auto calibration unit is attached, the wires from solenoid valves are connected to the converter with connectors.

3. Replacement of Heater Strut Assembly

- (1) Loosen Screw (19) until heater strut assembly's PLATE (17) can be removed. There's no need to remove O-ring (18) which prevents SCREW (19) from coming out. Pull out connector (13).
- (2) Loosen and remove the SCREW (8) with a special tool (part no. K9470BX or equivalent) and then remove the HEATER STRUT ASSY (23) from the detector (24).
- (3) To reassemble the heater strut assembly, reverse the above procedure:
Insert the HEATER STRUT ASSY (23) into the detector (24), while inserting the calibration pipe in the detector (24) into the heater section in the HEATER STRUT ASSY (23) as well as in the bracket hole. Coat the SCREW (8) with grease (NEVER-SEEZ: G7067ZA) and tighten the SCREW (8) with a special tool (part no. K9470BX or equivalent) with a tightening torque of $12\text{N}\cdot\text{m}\pm 10\%$. (SCREW (8) attached with HEATER STRUT ASSY (23) is shipped with coating.)

4. Assembling of CONNECTOR

- (1) To install the O-rings (22) on the calibration-gas and reference-gas pipes, disassemble the CONNECTOR (13) in the following procedure. Remove the SCREW (25) and then remove the PLATE (17) and two CAPS (20).
If the O-ring (22) remains in the hole, pull them out from the back.
- (2) Pass the heater, CELL+ and thermocouple lead-wire through the CONNECTOR (13). Also, pass the calibration-gas and reference-gas pipes through the holes of the CONNECTOR (13).
- (3) Insert the calibration-gas and reference-gas pipes into O-rings (22) after confirming no damage of O-rings.
If the O-ring (22) fails, replace it with a new one.
- (4) Push the two CAPS (20) into the associated opening of the CONNECTOR (13). Insert the PLATE (17), aligning it with the groove of the CAP (20), and tighten it with the SCREW (25). At this time, fix the terminal of the end of green wire from the four core connectors to CONNECTOR (13) by SCREW (25). If you attempt to insert the calibration-gas and reference-gas pipes into the CONNECTOR (13) without disassembling the CONNECTOR (13), the O-ring may be damaged.
- (5) Tighten the SCREW (19) in HEATER STRUT ASSY (23) until CONNECTOR (13) cannot move.

5. Assembling of Converter and Wiring

Reassemble in reverse order to the above disassembly procedure.

Each connector from the heater strut assembly is identified by its size and the number of cores. Insert them fully by taking care of their size and direction. The connectors from solenoid valves are marked "ZERO" or "Z" and "SPAN" or "S", so correspond each marking with converter's.

6. Installing of the Cell

Install the Filter Holder, the U-shaped Pipe, the Filter and the Cell according to section 3.1.3 "Part assembly of the sensor assembly". HEATER STRUT ASSY (23) is shipped with a new CONTACT.

4. Checking After Replacing Heater Unit

4.1 Checking Wiring

Model ZR22A (Separate type heater) uses screw termination.

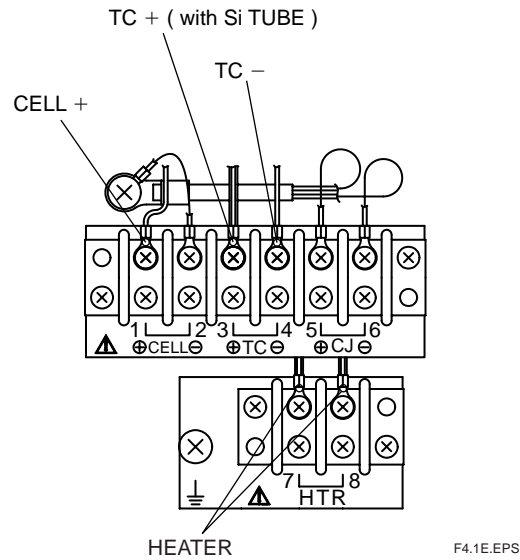


Figure 4.1 Model ZR22A Terminal wiring diagram

Model ZR202A (Integrated type heater) uses a connector.

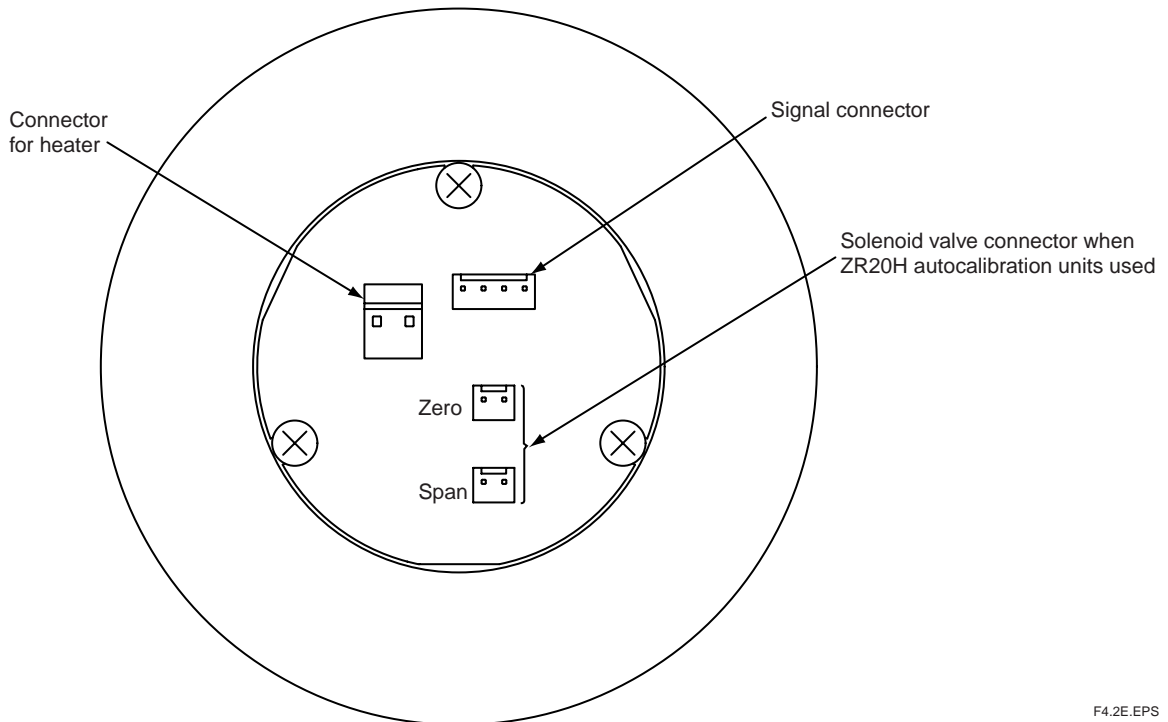


Figure 4.2 Bottom view of Model ZR202A Connector wiring diagram

4.2 Checking Heater Operation

After turning on the power, check that heater heats up normally.

For separate type (ZR22A) see IM11M12A01-02E, 03E section 7.3, and for integrated type (ZR202A) see IM11M12A01-04E, 05E section 7.3 “Supplying Power to Converter Unit”.

After confirming that operation is satisfactory, return detector to operation.

Calibrate before taking measurements.

Revision Record

Manual Title :Model ZR22A, ZR202A Heater Assembly

Manual Number : IM 11M12A01-21E

Edition	Date	Remark (s)
1st	Aug. 2001	Newly published
2nd	July. 2003	Style of ZR22A changed to S2 Sec. 3.1 Instruction for replacement for ZR22A Heater Unit some changed.
