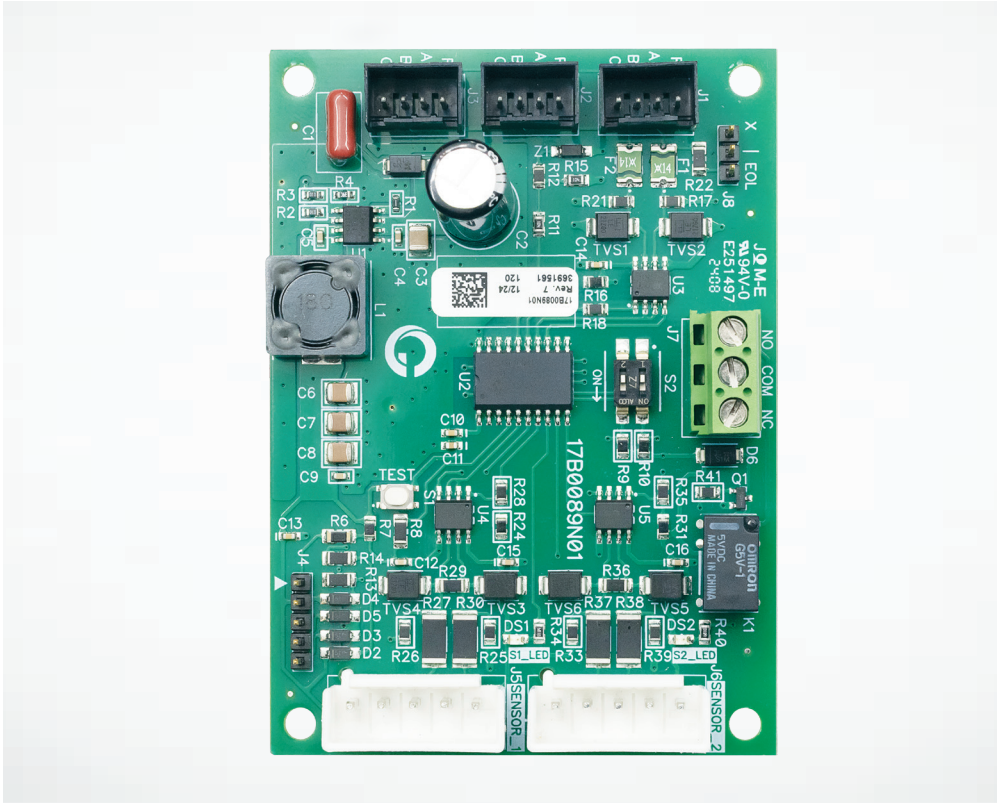
REFRIGERANT DETECTION SYSTEM

APPLICATION, OPERATION & MAINTENANCE MANUAL

Part#: 97B0152N01 | Created: December 18, 2025

For Factory-Installed and Field-Applied RDS



Models:
RDS

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Overview

Models:
RDS

GENERAL INFORMATION

The Refrigerant Detection System (RDS) is an accessory control responsible for monitoring sensors that detect R-454B refrigerant or enabling external ventilation. The RDS includes an output relay with normally open and closed contacts for various uses, such as shutting down third-party heating devices. The RDS uses non-volatile Flash memory for storing configuration and operational information.

If the RDS detects refrigerant concentration above the maximum threshold, the RDS enables the unit blower, disables the compressor(s), and enables the pilot relay on the RDS board. You can use this relay to open external zoning dampers and/or activate external mechanical ventilation. The relay is normally closed (NC) and can control a signal with a maximum of 28VA @ 24VAC.

GENERAL OPERATING PARAMETERS

The following are general operating parameters for the RDS:

- Operating Environment: -40°F to 176°F (-40°C to 80°C) and up to 95% relative humidity, non-condensing.
- Storage Environment: -40°F to 185°F (-40°C to 85°C) and up to 95% relative humidity, non-condensing.

POWER REQUIREMENTS

RDS power draw with one sensor:

- Normally 8VA draw at 24VAC
- Maximum 12VA draw at 24VAC.

RDS power draw with two sensors:

- Normally 16VA draw at 24VAC
- Maximum 24VA draw at 24VAC.

Table 1: Field-installed RDS Kit Part Numbers and Replacement Sensors

Single-Board Configuration

Application	Kit Type	Sensor	Part Number
Small Packaged Units (1/2-6 Ton)	Board and Sensor Kit	Danfoss	17K0002N01
		Cubic	17K0002N03
	Sensor Kit	Danfoss	17K0003N01
		Cubic	17K0003N03
Large Packaged Units (6-25 Ton)	Board and Sensor Kit	Danfoss	17K0004N01
		Cubic	17K0004N03
	Sensor Kit	Danfoss	17K0005N01
		Cubic	17K0005N03
Vertical Stack Chassis	Board and Sensor Kit	Danfoss	17K0006N01
		Cubic	17K0006N03
	Sensor Kit	Danfoss	17K0007N01
		Cubic	17K0007N03
Console Units	Board and Sensor Kit	Danfoss	17K0008N01
		Cubic	17K0008N03
	Sensor Kit	Danfoss	17K0009N01
		Cubic	17K0009N03
Water-to-Water Units	Board and Sensor Kit	Danfoss	17K0017N01
		Cubic	17K0015N03
	Sensor Kit	Danfoss	17K0018N01
		Cubic	17K0016N03

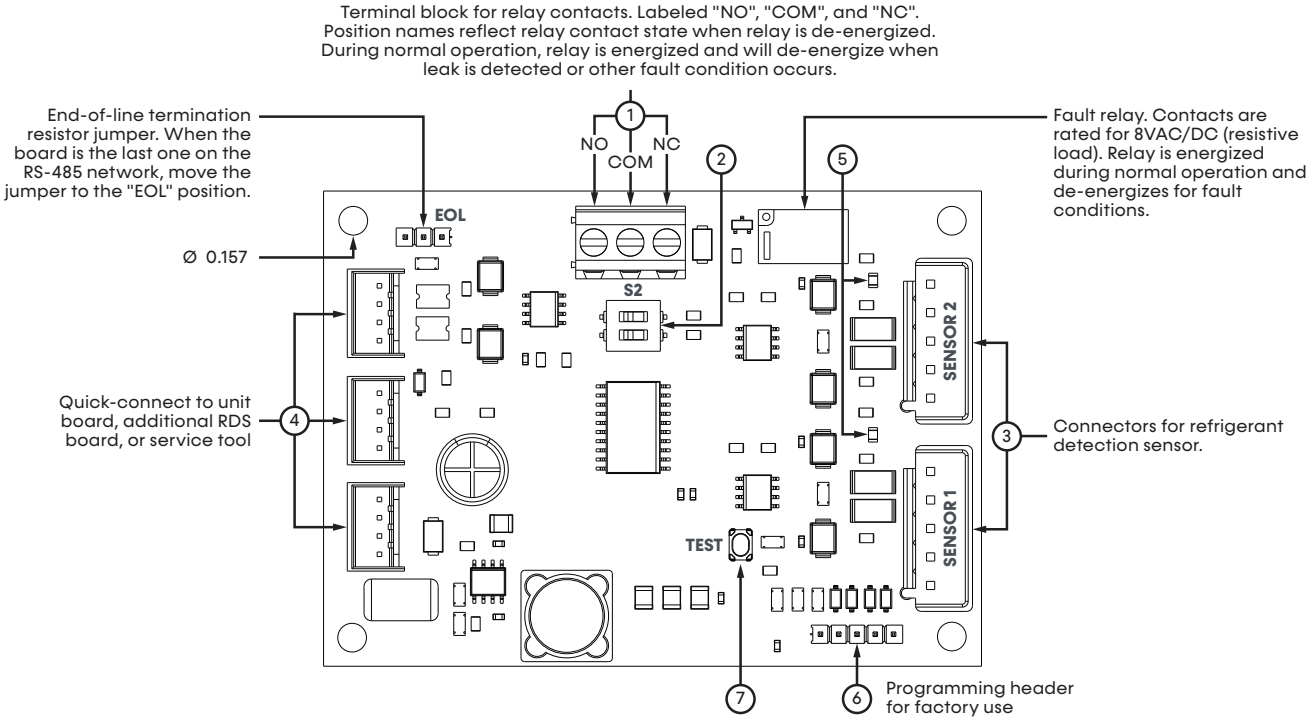
Multi-Board Configuration

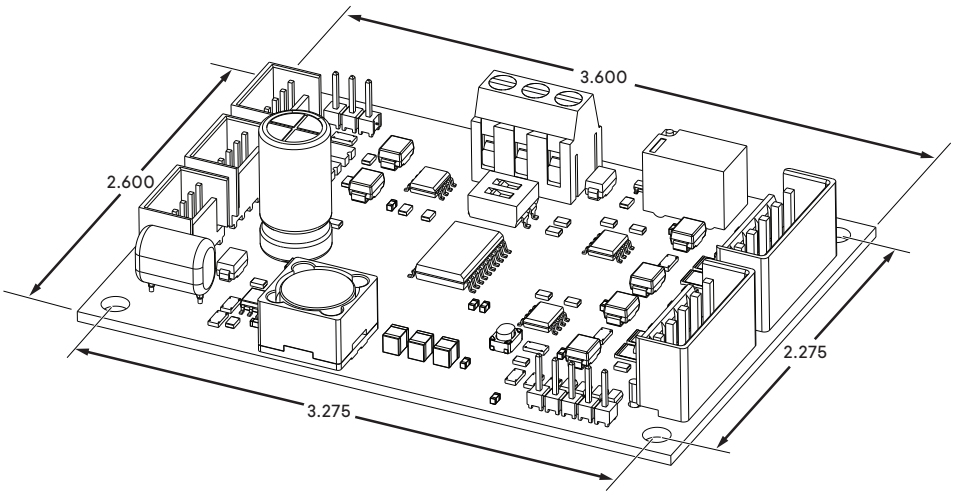
Application	Kit Type	Sensor	Part Number
Rooftop Units	Board and Sensor Kit	Danfoss	17K0010N01
		Cubic	17K0010N03
	Sensor Kit	Danfoss	17K0011N01
		Cubic	17K0012N01
Split System Air Handlers Board 1	Board and Sensor Kit	Danfoss	17K0013N01
		Cubic	17K0011N03
	Sensor Kit	Danfoss	17K0014N01
		Cubic	17K0012N03
Indoor Split System Compressor Board 2	Board and Sensor Kit	Danfoss	17K0015N01
		Cubic	17K0013N03
	Sensor Kit	Danfoss	17K0016N01
		Cubic	17K0014N03

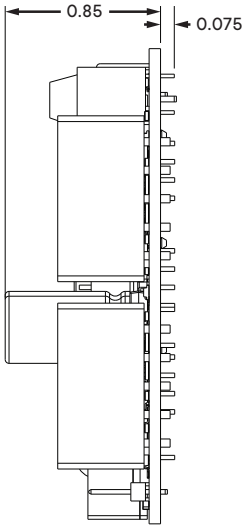
NOTE: You can mix RDS sensor types within the unit, however, the harness is specific to each sensor. Check current stocking levels at time of order.

Models:
RDS

Physical Dimensions and Connections







CONNECTIONS AND CONTACT RATINGS

1. One relay terminal to primary control board is normally closed (NC) and rated per desired signal to maximum of 28VA @ 24VAC.
2. One 2-position DIP Switch bank to set the address of the RDS board on the Modbus network. Refer to **DIP Switch Addressing** table and accompanying drawings for more configuration information.
3. Two bi-directional half-duplex RS-485 serial comm. ports capable of interfacing with RDS sensors using Modbus RTU.
4. One bi-directional half-duplex RS-485 serial comm. port to communicate with the server controller on the system bus.
5. Two LEDs (S1_LED and S2_LED) present for sensor and RDS sensor PCB system diagnostics.
6. One TEST button (momentary switch) for initiating Test mode to validate mitigation mode. You can also initiate mitigation mode using the Wireless Service Tool.

Controller Configuration and Troubleshooting

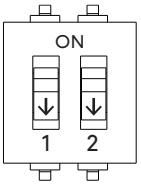
Models:
RDS

DIP SWITCH CONFIGURATIONS

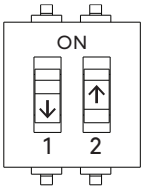
Table 2: DIP Switch Addressing

	Board 1		Board 2	
	Switch 1	Switch 2	Switch 1	Switch 2
Single-Board Configuration	0	0		
Multi-board Configuration	0	0	0	1

Address 0
(Default - Single Board Configuration)



Address 1
(Two Board Configuration)



REFRIGERANT DETECTION SYSTEM FAULT CODES

If a fault event occurs, the following table provides guidance to diagnose the issue:

Table 3: RDS Fault Codes

Fault Code	Fault LED	Fault	Possible Causes
160	Flash Code 2	Loss of RDS Control Communication	• Control wiring issue between the unit's control and the RDS • RDS board failure
161	Flash Code 3	RDS Control Test Fault	The RDS control in Test mode
162	Flash Code 4	Loss of RDS Sensor Communications	• Control wiring issue between the RDS and the sensor • RDS sensor failure - replace RDS sensor
163	Flash Code 5	RDS Sensor Fault	RDS sensor failure - replace RDS sensor
164	Flash Code 6	RDS Sensor Over Threshold	Leak in refrigerant system

NOTE: The above fault codes display only during an active RDS fault. See the unit's DXM2.6 fault history for RDS faults that may have timed out.

Models:
RDS

Controls and Wiring Diagrams

CXM2 Communicating Controls

For detailed controller information, see the CXM2 Application, Operation, and Maintenance (AOM) manual (part # 97B0137N01). To confirm the controller type of your particular unit, refer to digit 9 on the unit model number and the unit nomenclature diagram found in the unit IOM or Product Catalog.

DXM2.6 Advanced Communicating Controls

For detailed controller information, see the DXM2.6 Application, Operation, and Maintenance (AOM) manual (part # 97B0142N01). To confirm the controller type of your particular unit, refer to digit 9 on the unit model number and the unit nomenclature diagram found in the unit IOM or Product Catalog.

Wireless Service Tool

For detailed controller information, see the Wireless Service Tool Application, Operation, and Maintenance (AOM) manual (part # 97B0169N01). The Wireless Service Tool port is located on the corner post of most models.

Wire Diagram Generator

For information on your unit's factory wiring, consult our Wiring Diagram Generator with either the serial number or model number. This will also show you proper connection points on the control board for adding RDS wiring harnesses.

Installation
Small Packaged Units

Models:
RDS

FIELD-INSTALLED RDS SYSTEM

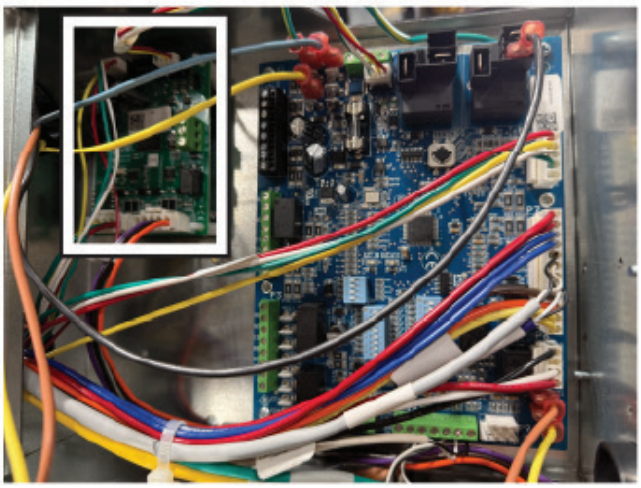
1. If field installing an RDS, first ensure you have the appropriate kit using the **Field-installed RDS Kit Part Numbers and Replacement Sensors** table on Page 3.
2. The kit contains the following:
   - 2 – RDS sensors
   - 1 – RDS board
   - 1 – RDS board to unit control harness: 8-inches length
   - 1 – RDS board to RDS sensor harness: 18-inches length (compressor section)
   - 1 – RDS board to RDS sensor harness: 96-inches length (blower section)
   - 1 – RDS sensor bracket (blower section)
   - Assorted mounting hardware (screws, stand-offs, etc)
3. Before beginning installation, ensure power is disconnected from the unit.
4. Insert plastic board stand-offs into the indicated holes in the control box (4x).
5. Gently snap the RDS board onto the plastic standoffs.
6. Using the J4 connector on the CXM2 or the P4 connector on the DXM2.5/DXM2.6, connect the RDS board to the main unit control board.
7. Mount the compressor section RDS sensor to the side of the unit control box with the provided screw holes. Connect the sensor to the RDS board.
8. Mount the RDS sensor bracket to the indicated spot in the blower section. For horizontal units, refer to page 8 for locations based on blower orientation.
9. Mount the RDS sensor to the bracket. Routing the cable through the wire grommet between the compressor section and blower section, connect the RDS sensor to the RDS board.
10. Verify that all connections are secure and wires are not taut. If the RDS board is only connected to the main unit control, the End-of-Line termination resistor jumper should be installed in the EOL position as indicated on page 4.
11. Ensure that all wire harnesses are properly secured and not touching metal edges or refrigeration copper.
12. If needed, consult the Wiring Diagram Generator for a wiring diagram of the unit as shipped from the factory.
13. After all checks are complete, return power to the unit.
14. The unit control should automatically detect the RDS board and attached sensors, which is indicated by Communication LEDs flashing (the Fault LED should not be flashing). It is recommended to connect the Wireless Service Tool to verify the RDS is present and communicating properly.

⚠ ATTENTION

The sensor cannot be installed in a way that exposes it to water and must be installed using the orientation displayed in the figure below.

Models	006–048	060–072
RDS Requirement	Optional	Required
Number of Sensors	2	2

Figure 1: Board Location



Models:
RDS

Installation
Small Packaged Units

Figure 2: Vertical Control Box Sensor

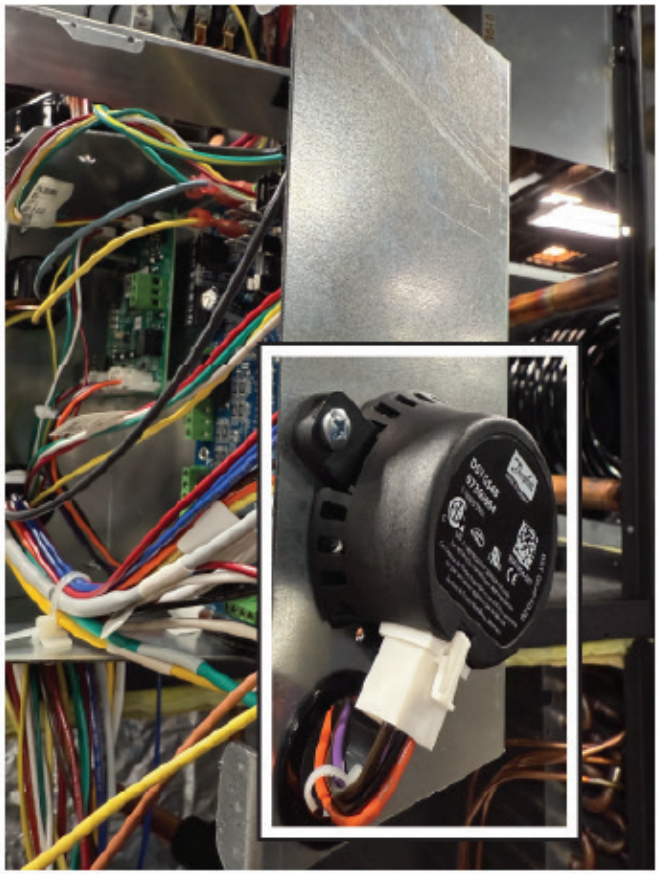


Figure 3: Vertical Blower Compartment Sensor

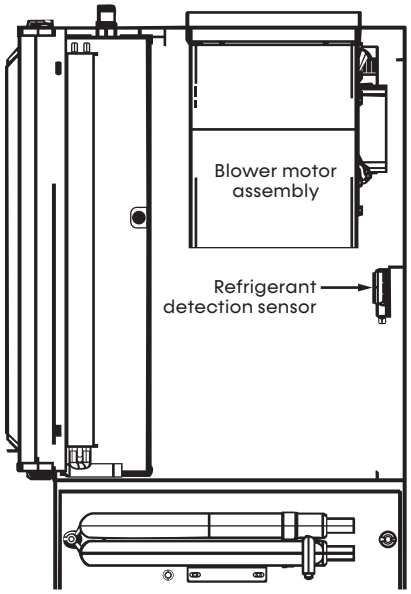
Move the RDS Sensor After Field Conversion (Small Packaged Units Only)

Models:
RDS

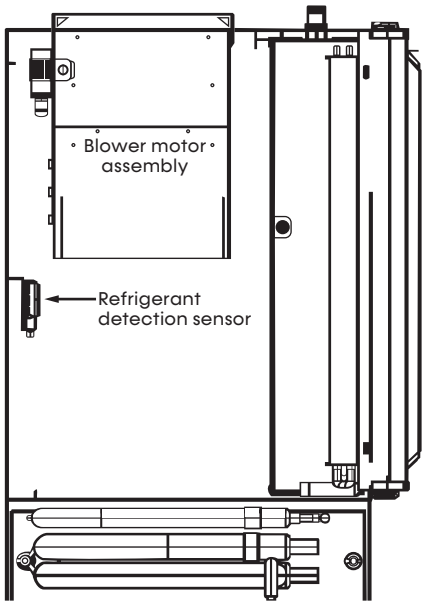
REFRIGERANT DETECTION SYSTEM SENSOR LOCATIONS

After field converting air discharge on units with a factory-installed Refrigerant Detection System (RDS), move the RDS sensor to the location the unit configuration requires. The following examples detail RDS sensor location per return and discharge configuration.

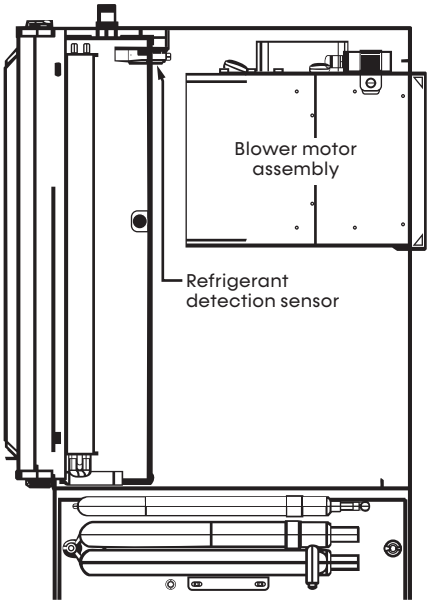
Left Return Back Discharge Sensor on the Right Side of the Unit



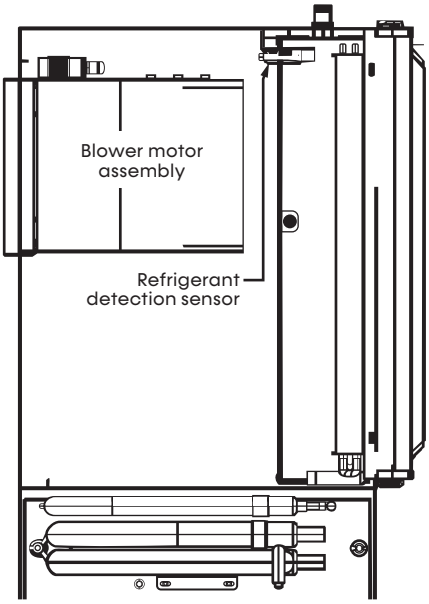
Right Return Back Discharge Sensor on the Left Side of the Unit



Left Return Straight Discharge Sensor on the Back Side of the Unit



Right Return Straight Discharge Sensor on the Back Side of the Unit



Models:
RDS

Installation
Vertical Stack Units

FIELD-INSTALLED RDS SYSTEM

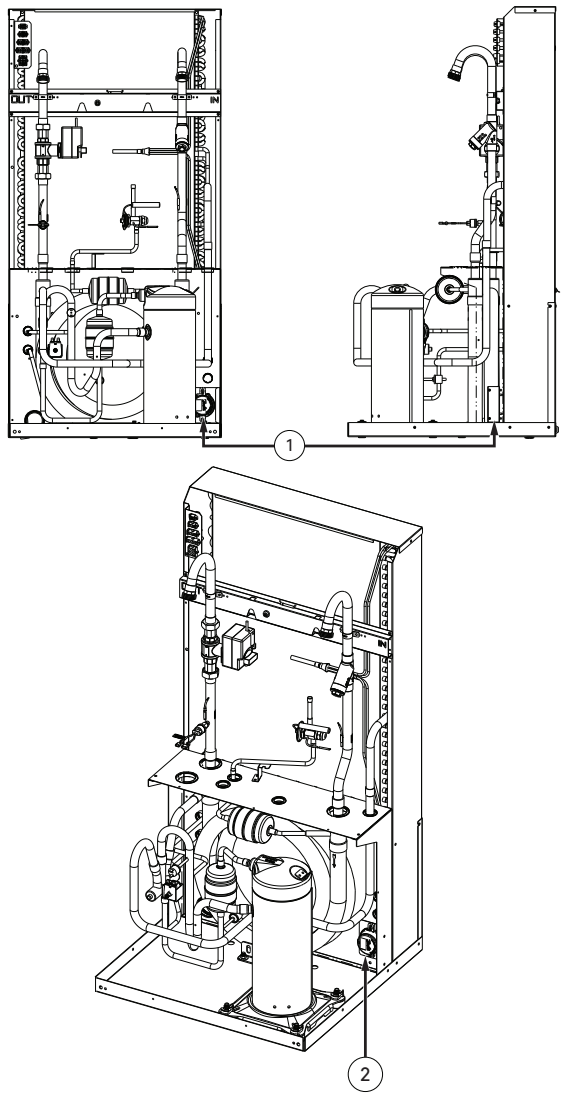
1. If field installing an RDS, first ensure you have the appropriate kit using the **Field-installed RDS Kit Part Numbers and Replacement Sensors** table on Page 3.
2. The kit should contain the following:
   - 1 – RDS sensor
   - 1 – RDS board
   - 1 – RDS board to unit control harness: 8-inches length
   - 1 – RDS board to RDS sensor harness
   - 1 – RDS sensor bracket
   - Assorted mounting hardware (screws, stand-offs, etc)
3. Before beginning installation, ensure power is disconnected from the unit.
4. Insert plastic board stand-offs into the indicated holes in the control box (4x).
5. Gently snap the RDS board onto the plastic standoffs.
6. Using the J4 connector on the CXM2 or the P4 connector on the DXM2.5/DXM2.6, connect the RDS board to the main unit control board.
7. Mount the RDS sensor bracket to the indicated spot behind the control box.
8. Mount the RDS sensor to the bracket. Routing the cable through the wire grommet into the control box, connect the RDS sensor to the RDS board.
9. Verify that all connections are secure and wires are not taut. If the RDS board is only connected to the main unit control, install the End-of-Line termination resistor jumper in the EOL position as indicated on page 4.
10. Ensure that all wire harnesses are properly secured and not touching metal edges or refrigeration copper.
11. If needed, consult the Wiring Diagram Generator for a wiring diagram of the unit as shipped from the factory.
12. After all checks are complete, return power to the unit.
13. The unit control should automatically detect the RDS board and attached sensors, which is indicated by Communication LEDs flashing (the Fault LED should not be flashing). It is recommended to connect the Wireless Service Tool to verify the RDS is present and communicating properly.

⚠ ATTENTION

The sensor cannot be installed in a way that exposes it to water and must be installed using the orientation displayed in the figure below.

Models	006-036
RDS Requirement	Optional
Number of Sensors	1

Figure 4: Sensor Placement



Installation Console Units

Models: RDS

FIELD-INSTALLED RDS SYSTEM

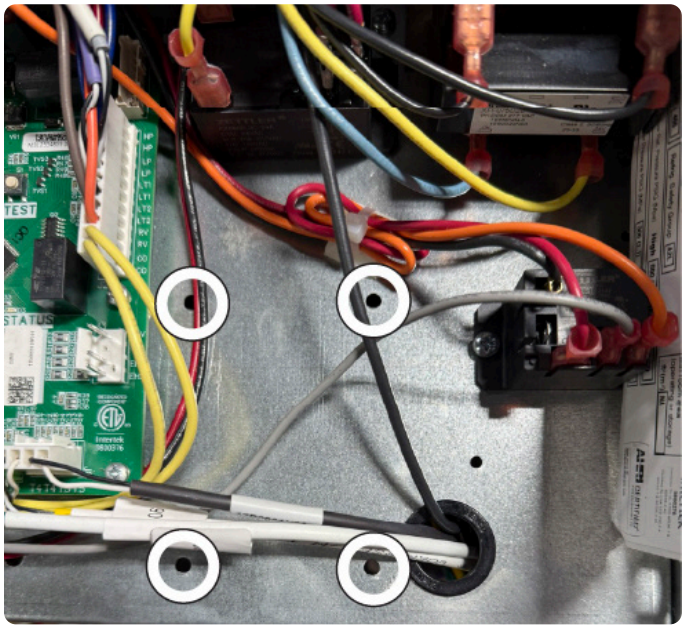
1. If field installing an RDS, first ensure you have the appropriate kit using the **Field-installed RDS Kit Part Numbers and Replacement Sensors** table on Page 3.
2. The kit should contain the following:
   - 2 – RDS sensors
   - 1 – RDS board
   - 1 – RDS board to unit control harness: 8-inches length
   - 1 – RDS board to RDS sensor harness: 18-inches length (compressor section)
   - 1 – RDS board to RDS sensor harness: 96-inches length (air coil section)
   - 2 – RDS sensor bracket
   - Assorted mounting hardware (screws, stand-offs, etc)
3. Before beginning installation, ensure power is disconnected from the unit.
4. Insert plastic board stand-offs into the indicated holes in the control box (4x).
5. Gently snap the RDS board onto the plastic standoffs.
6. Using the J4 connector on the CXM2, connect the RDS board to the main unit control board.
7. Mount the compressor section RDS sensor to the side of the unit control box with the provided screw holes. Connect the sensor to the RDS board.
8. Mount the RDS sensor bracket to the indicated spot in the compressor section, and in the air coil section as indicated.
9. Mount the RDS sensors to each bracket. Routing the cables through the wire grommet between the compressor section and air coil section into the control box, connect the RDS sensors to the RDS board.
10. Verify that all connections are secure and wires are not taut. If the RDS board is only connected to the main unit control, install the End-of-Line termination resistor jumper in the EOL position as indicated on page 4.
11. Ensure that all wire harnesses are properly secured and not touching metal edges or refrigeration copper.
12. If needed, consult the Wiring Diagram Generator for a wiring diagram of the unit as shipped from the factory.
13. After all checks are complete, return power to the unit.
14. The unit control should automatically detect the RDS board and attached sensors, which is indicated by Communication LEDs flashing (the Fault LED should not be flashing). It is recommended to connect the Wireless Service Tool to verify the RDS is present and communicating properly.

⚠ ATTENTION

The sensor cannot be installed in a way that exposes it to water and must be installed using the orientation displayed in the figure below.

Models	006–018
RDS Requirement	Optional
Number of Sensors	2

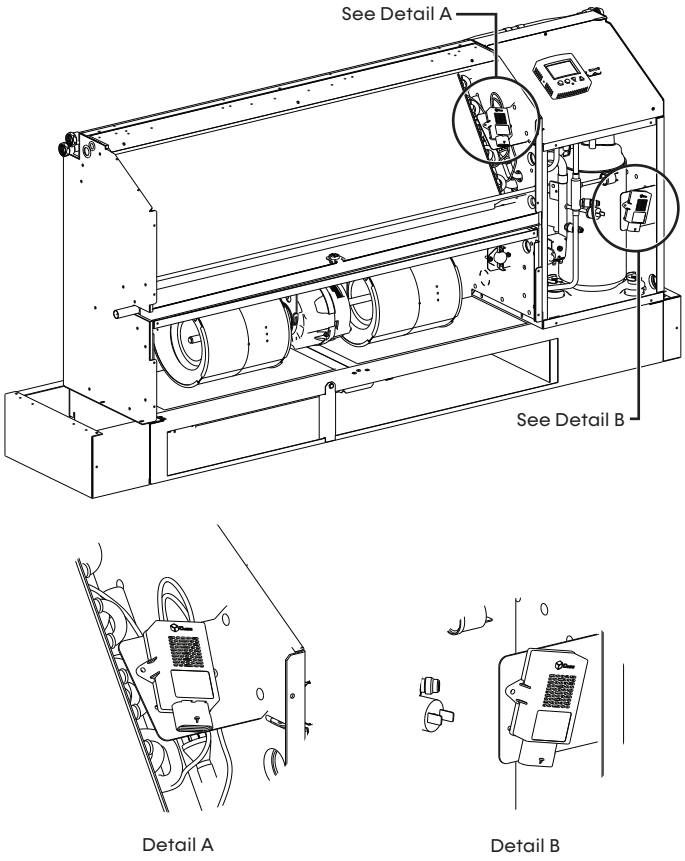
Figure 5: Board Location



Models:
RDS

Installation
Console Units

Figure 6: Sensor Placement



Installation Water-to-Water Units

Models: RDS

FIELD-INSTALLED RDS SYSTEM

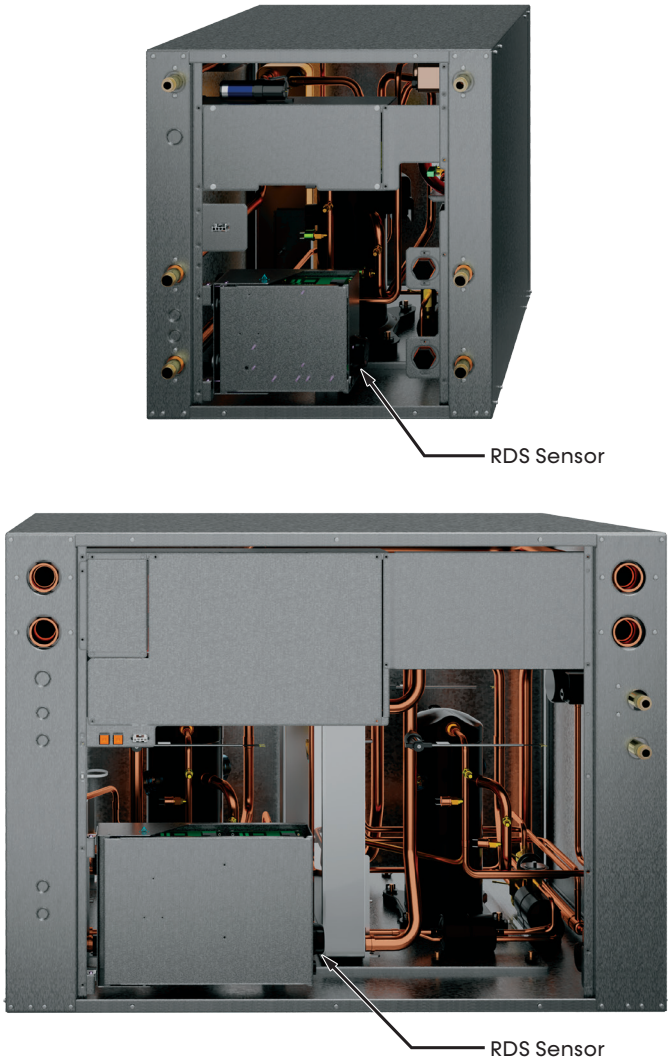
1. If field installing an RDS, first ensure you have the appropriate kit using the **Field-installed RDS Kit Part Numbers and Replacement Sensors** table on Page 3.
2. The kit should contain the following:
   - 1 – RDS sensors
   - 1 – RDS board
   - 1 – RDS board to unit control harness: 8-inches length
   - 1 – RDS board to RDS sensor harness: 18-inches length (compressor section)
   - Assorted mounting hardware (screws, stand-offs, etc)
3. Before beginning installation, ensure power is disconnected from the unit.
4. Insert plastic board stand-offs into the indicated holes in the control box (4x).
5. Gently snap the RDS board onto the plastic standoffs.
6. Using the P4 connector on the DXM2.5/DXM2.6, connect the RDS board to the main unit control board.
7. Mount the RDS sensor to the side of the unit control box with the provided screw holes. Connect the sensor to the RDS board.
8. Verify that all connections are secure and wires are not taut. If the RDS board is only connected to the main unit control, install the End-of-Line termination resistor jumper in the EOL position as indicated on page 4.
9. Ensure that all wire harnesses are properly secured and not touching metal edges or refrigeration copper.
10. If needed, consult the Wiring Diagram Generator for a wiring diagram of the unit as shipped from the factory.
11. After all checks are complete, return power to the unit.
12. The unit control should automatically detect the RDS board and attached sensors, which is indicated by Communication LEDs flashing (the Fault LED should not be flashing). It is recommended to connect the Wireless Service Tool to verify the RDS is present and communicating properly.

⚠ ATTENTION

The sensor cannot be installed in a way that exposes it to water and must be installed using the orientation displayed in the figure below.

Models	036–120
RDS Requirement	Optional
Number of Sensors	1

Figure 7: Sensor Placement



Models:
RDS

Replacement
Large Packaged Units

FIELD-INSTALLED RDS SYSTEM

Large horizontal and vertical units (6 to 25 tons) come standard with factory-installed RDS. There are two sensors included: One in the compressor section, and one in the blower section. The RDS board is mounted on the control box cover.

If a sensor needs to be replaced, see page 3 for a list of sensor-only kits per product line. The manufacturer utilizes two brands of sensors, and each sensor has a specific connector. You can mix sensor types in the field without issue. Each sensor-only kit includes a sensor and correct harness for that sensor type.

1. The sensor-only kit contains the following:
   - 1 – RDS sensor
   - 1 – RDS board to RDS sensor harness
2. Before beginning installation, ensure power is disconnected from the unit.
3. Remove the RDS sensor that is not operating by removing the harness and removing the screws holding it to the mounting bracket.
4. If the replacement sensor is of the same type, mount the sensor to the bracket and plug in the harness.
   a. If the sensor is of a different type, remove the wire harness back to the control box, then replace with the harness included in the kit.
   b. Mount the new sensor to the bracket and plug in the harness.
5. Verify that all connections are secure and wires are not taut.
6. Ensure that all wire harnesses are properly secured and not touching metal edges or refrigeration copper.
7. If needed, consult the Wiring Diagram Generator for a wiring diagram of the unit as shipped from the factory.
8. After all checks are complete, return power to the unit.
9. The unit control should automatically detect the new sensors. It is recommended to connect the Wireless Service Tool to verify the RDS is present and communicating properly.

⚠ ATTENTION

The sensor cannot be installed in a way that exposes it to water and must be installed using the orientation displayed in the figure below.

Models	072–300
RDS Requirement	Required
Number of Sensors	2

Figure 8: Board Location

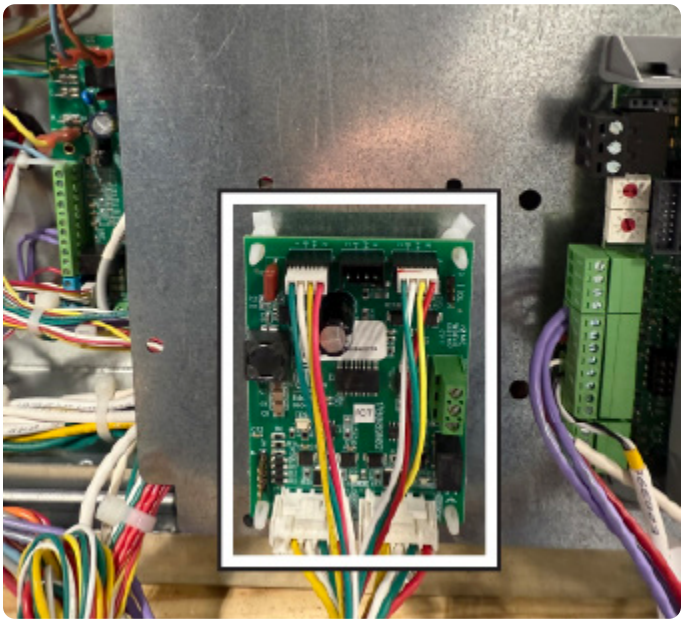


Figure 9: Horizontal Blower Sensor Location

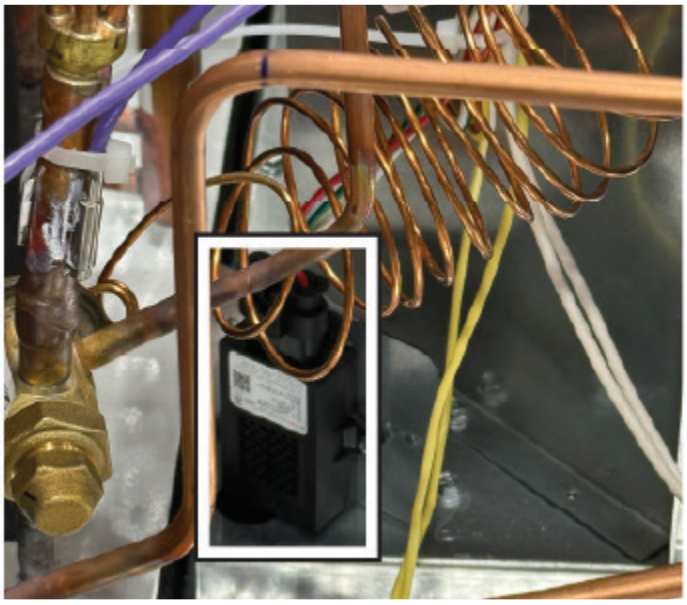


Figure 10: Horizontal Compressor Sensor Location

Figure 11: Vertical Compressor Sensor Location

Figure 12: Vertical Blower Sensor Location

Models:
RDS

Replacement Rooftop Units

FIELD-INSTALLED RDS SYSTEM

Rooftop units come standard with factory-installed RDS. There are three sensors included: One in the compressor section, one in the air coil section, and one in the return air plenum. There are two RDS boards mounted in the control box.

If a sensor need to be replaced, see page 3 for a list of sensor-only kits per product line. The manufacturer utilizes two brands of sensors, and each sensor has a specific connector. You can mix sensor types in the field without issue. Each sensor-only kit includes a sensor and correct harness for that sensor type.

1. The sensor-only kit contains the following:
   - 1 – RDS sensor
   - 1 – RDS board to RDS sensor harness
2. Before beginning installation, ensure power is disconnected from the unit.
3. Remove the RDS sensor that is not operating by removing the harness and removing the screws holding it to the mounting bracket.
4. If the replacement sensor is of the same type, mount the sensor to the bracket and plug in the harness.
   a. If the sensor is of a different type, remove the wire harness back to the control box, then replace with the included harness in the kit.
   b. Mount the new sensor to the bracket and plug in the harness.
5. Verify that all connections are secure and wires are not taut.
6. Ensure that all wire harnesses are properly secured and not touching metal edges or refrigeration copper.
7. If needed, consult the Wiring Diagram Generator for a wiring diagram of the unit as shipped from the factory.
8. After all checks are complete, return power to the unit.
9. The unit control should automatically detect the new sensors. It is recommended to connect the Wireless Service Tool to verify the RDS is present and communicating properly.

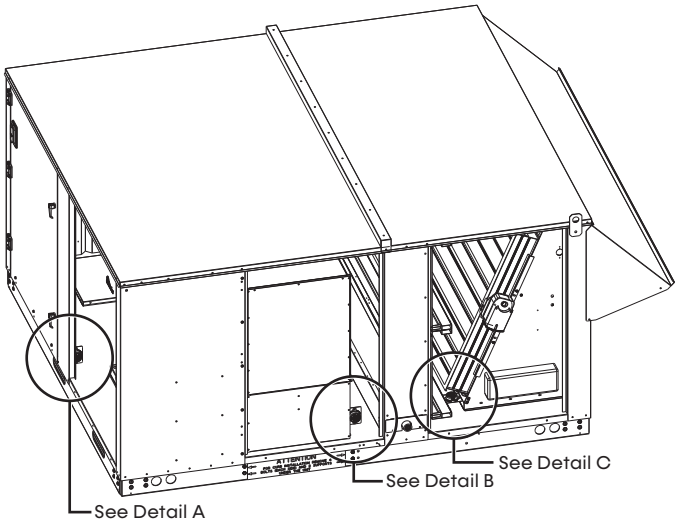
Note: All sensors must be installed to be compliant

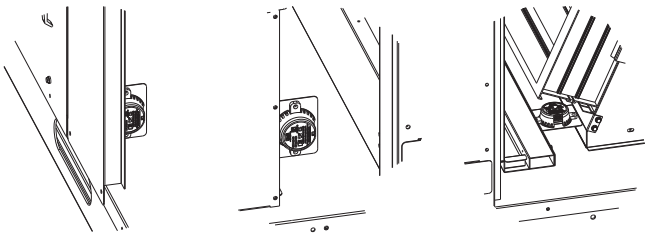
⚠ ATTENTION

The sensor cannot be installed in a way that exposes it to water and must be installed using the orientation displayed in the figure below.

Models	036–240
RDS Requirement	Required
Number of Sensors	3

Figure 13: Sensor Locations





NOTES

The graphic above shows the preferred factory-supplied RDS sensor locations. All models come standard with a RDS and three sensors.

Replacement Split System Units

Models: RDS

SPLIT UNITS - AIR HANDLER

Split unit air handlers come standard with factory-installed RDS. There is one sensor attached to a bracket by the air coil. The RDS board is mounted inside the control box.

If a sensor needs to be replaced, see page 3 for a list of sensor-only kits per product line. The manufacturer utilizes two brands of sensors, and each sensor has a specific connector. You can mix sensor types in the field without issue. Each sensor-only kit includes a sensor and correct harness for that sensor type.

1. The sensor-only kit contains the following:
   - 1 – RDS sensor
   - 1 – RDS board to RDS sensor harness
2. Before beginning installation, ensure power is disconnected from the unit.
3. Remove the RDS sensor that is not operating by removing the harness and removing the screws holding it to the mounting bracket.
4. If the replacement sensor is of the same type, mount the sensor to the bracket and plug in the harness.
   a. If the sensor is of a different type, remove the wire harness back to the control box, and replace with the harness included in the kit.
   b. Mount the new sensor to the bracket and plug in the harness.
5. Verify that all connections are secure and wires are not taut.
6. Ensure that all wire harnesses are properly secured and not touching metal edges or refrigeration copper.
7. If needed, consult the Wiring Diagram Generator for a wiring diagram of the unit as shipped from the factory.
8. After all checks are complete, return power to the unit.
9. The unit control should automatically detect the new sensors. It is recommended to connect the Wireless Service Tool to verify the RDS is present and communicating properly.

NOTE: For units with cased coils, refer to the SK IOM for more details on the installed RDS.

⚠ ATTENTION

The sensor cannot be installed in a way that exposes it to water and must be installed using the orientation displayed in the figure below.

Models	024–060
RDS Requirement	Required
Number of Sensors	1

Figure 14: Board Location

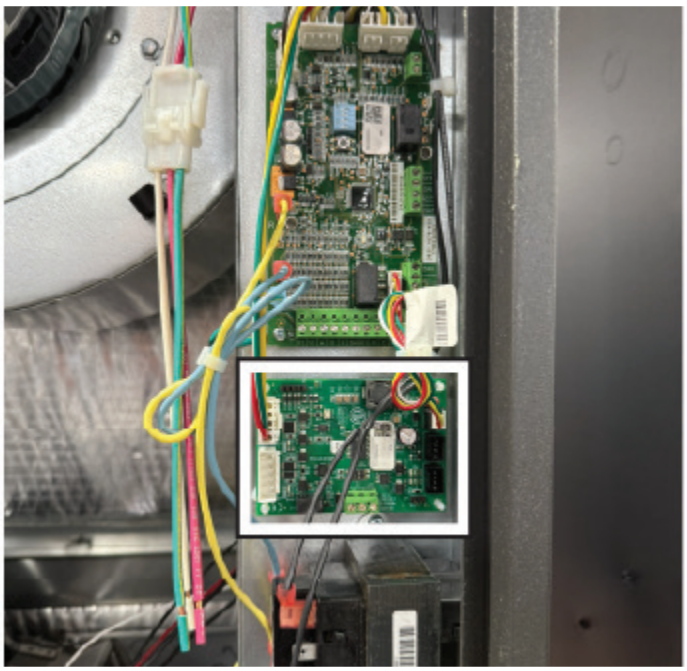


Figure 15: Sensor Location

Models:
RDS

Replacement
Split System Units

SPLIT UNITS - COMPRESSOR SECTION

Split units come standard with factory-installed RDS. There is one sensor attached to the control box. The RDS board is mounted inside the control box.

If a sensor needs to be replaced, see page 3 for a list of sensor-only kits per product line. The manufacturer utilizes two brands of sensors, and each sensor has a specific connector. You can mix sensor types in the field without issue. Each sensor-only kit includes a sensor and correct harness for that sensor type.

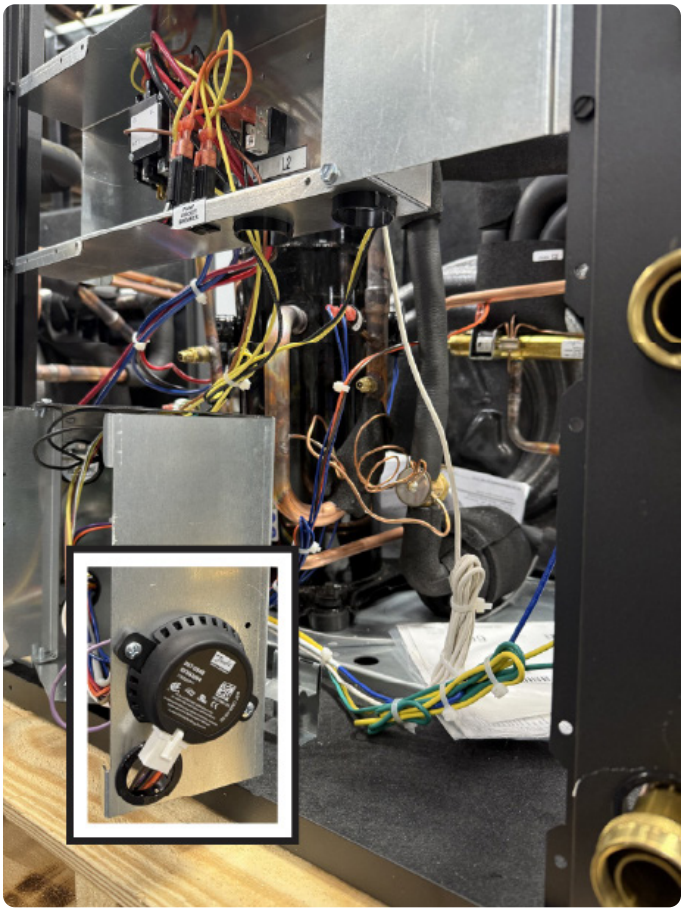
1. The sensor-only kit contains the following:
   - 1 – RDS sensor
   - 1 – RDS board to RDS sensor harness
2. Before beginning installation, ensure power is disconnected from the unit.
3. Remove the RDS sensor that is not operating by removing the harness and removing the screws holding it to the mounting bracket.
4. If the replacement sensor is of the same type, mount the sensor to the bracket and plug in the harness.
   a. If the sensor is of a different type, remove the wire harness back to the control box, and replace with the harness included in the kit.
   b. Mount the new sensor to the bracket and plug in the harness.
5. Verify that all connections are secure and wires are not taut.
6. Ensure that all wire harnesses are properly secured and not touching metal edges or refrigeration copper.
7. If needed, consult the Wiring Diagram Generator for a wiring diagram of the unit as shipped from the factory.
8. After all checks are complete, return power to the unit.
9. The unit control should automatically detect the new sensors. It is recommended to connect the Wireless Service Tool to verify the RDS is present and communicating properly.

⚠ ATTENTION

The sensor cannot be installed in a way that exposes it to water and must be installed using the orientation displayed in the figure below.

Models	024–060
RDS Requirement	Required
Number of Sensors	1

Figure 18: Sensor Location



Notes

Models:
RDS

Models:
RDS

Revision History

Date	Section	Description
12/18/25	All	Created