Honeywell

DD15 Daikin VRV Interface Module Installation Instructions

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Introduction

Daikin North America LLC and Honeywell have jointly developed an organically integrated system which allows Honeywell's INNCOM Integrated Room Automation system to provide direct digital control of the Daikin Variable Refrigerant Volume (VRV) heat recovery system. This is an industry first solution that provides the hotelier an intelligent integrated room automation system capable of connecting all of the guestroom devices to control room temperature, lighting drapes and amenities, in-room 3rd party integration of door locks, as well as connect to the INNcontrol 3 software on a central server over the Deep Mesh Network, with the efficiency of Daikins VRV system.

Features

- A seamless energy management solution, with integrated VRV capability tailored specifically for hospitality
- Provides a more energy efficient solution with lower operating costs than traditional FCU systems
- Maximizes dehumidification capability, and significantly reduces mechanical noise over traditional FCU systems
- In-room 2.4Ghz RF wireless network communications
- Software control of the field settings for the Daikin VRV in door unit (IDU)
- Error reporting from the Daikin system to the INNcontrol 3 application on the central server
- Over-the-air loadable for easy installation, commissioning, and maintenance
- Ideal for new installation and retrofit
- Compact interface module
- Best-in-class offerings from Honeywell and Daikin

Specification

Parameter	Specification
Input Voltage (P4)	16VDC
DC Output (P3)	12V, 30mA (50mA Peak)
Current Consumption	Typical 100mA. See the DD15 Digital Output section for application specific current consumption.
Bind Switch	Recessed switch used for commissioning and binding (S1)
Indicator LED's	Diagnostic LED (green), Transmit activity (Yellow), Receive activity (Red)
Communications	S5bus for wired bus communication, 2.4Ghz wireless RF Transceiver for Deep Mesh RF communication
Dimensions	84.5mm (L) x 47mm (W) x 29mm (H)
Maximum Operating Temperature	(0°C to 40°C)
Maximum Storage Temperature	-40°C – 70°C
Relative Humidity	5 – 90%RH Non-Condensing
Approvals	FCC 47CFR PT 15.247 Issued:2004/10/01 Operation within the bands 902-928MHz, 2400-2483.5MHz and 5725-5850MHz RSS-247 Issue: 2015/05/22 Issue 1 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices FCC 47CFR PT 15 SPT B Issued:2013/01/28 Title 47 CFR Part 15 Subpart B: Unintentional Radiators ICES 003 Issued: 2012/08/01 Spectrum Management and Telecommunications Interference-Causing Equipment Standard EN 300 328:2015 V1.9.1 EMC & Radio Spectrum Matters (ERM); Wideband Transmission Systems Data Transmission Equipment Operating in the 2.4GHz ISM Band & Using Wide Band Modulation Techniques Harmonized EN for Article 3.2- R&TTE Directive

Parameter	Specification
	EN 300 489-1 V1.9.2 Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
	EN 301 489-17 Electromagnetic compatibility and radio spectrum matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment; Part 17: Specific Conditions for broadband data transmission systems –V2.1.1
	N 55022 Issue:2010/12/01 Information Technology Equipment-Radio Disturbance Characteristics – Limits and Methods of Measurement, Includes COR 2011/10/01
	EN 55024 Issue: 2010/11/01 Information Technology Equipment – Immunity Characteristics Limits and Methods of Measurement.

Safety Precautions

The following safety precautions should be observed during the installation start-up to prevent personal injury or equipment damage:

- Observe national and local electrical codes.
- Observe voltage and current limits marked on the DD15
- Observe voltage and current limits and rating when wiring to the Daikin VRV IDU and X18A/X35A terminal boards
- Assumption is that the installer has a working knowledge of the INNCOM system

Replacing Legacy Device

A single DD15 replaces the legacy solution of a RTD-LCINC and a PC-485, which provided the integration between Daikin VRV and the INNCOM by Honeywell system.

Shutting down power to the Daikin VRV unit will be required when disconnecting the RTD-LCINC and the PC-485. Follow the wiring instructions section when installing the DD15.

NOTE:

The form factor of the DD15 allows for a different mounting application.
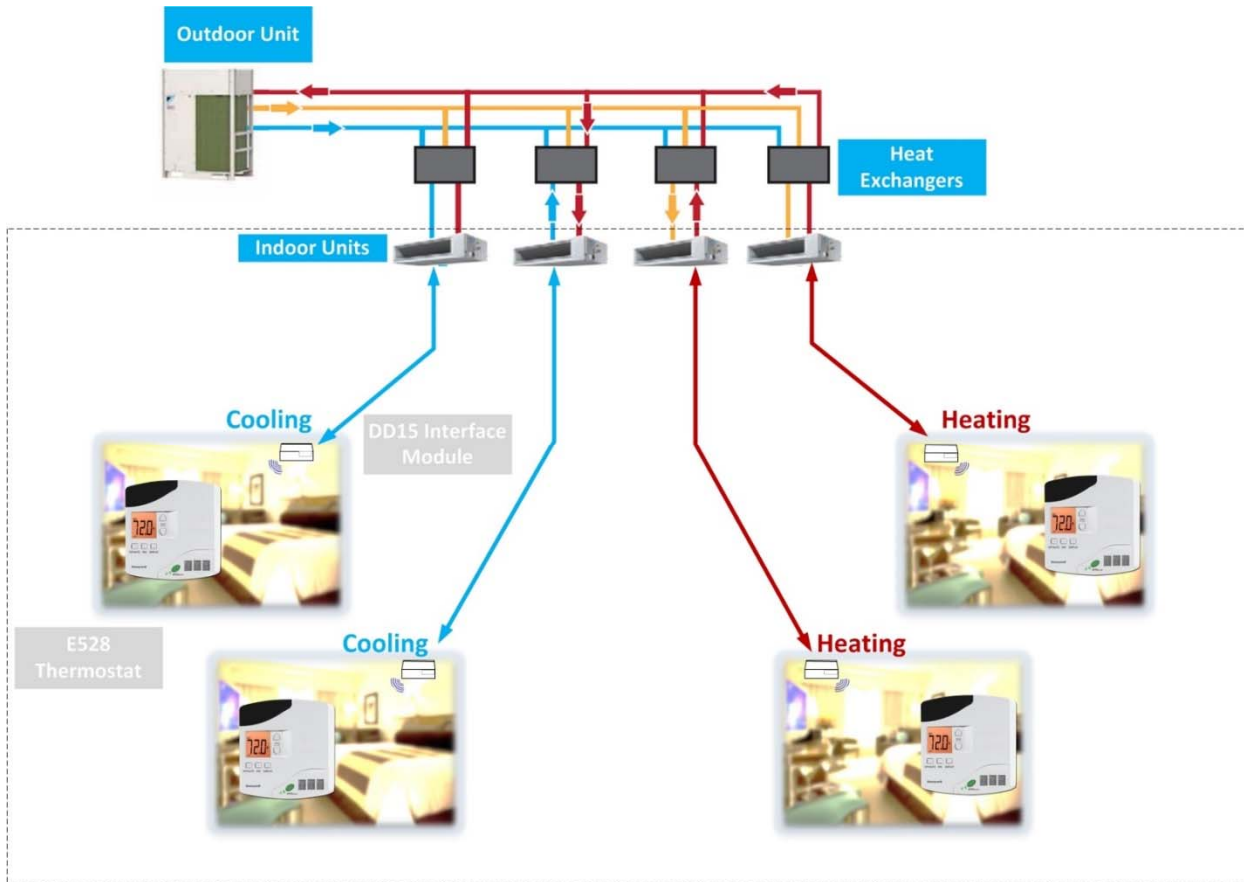
System Overview

Figure 1 Standard VRV Integration Overview

Honeywell's INNCOM e528 or e527 thermostat replaces the standard Daikin VRV room controller for the heat recovery system. Daikin's heat recovery solution provides an alternative to a chiller plant and is becoming more widely accepted in the hospitality market. The e528 or e527 thermostat is the "intelligent" device capable of linking ancillary sensors and serving as an information gateway. For example, coupled with a magnetic door switch (wired or wireless), motion detectors and other devices, the e528 or e527 thermostat becomes the center of a highly effective Energy Management System application, communicating EMS information requirements from the guestroom to the central server. When connected to the INNcontrol server over a wired or wireless backhaul network, a centrally controlled EMS package is created. Through interfaces with other devices and sensors, the solution provides the following functions:

- Guestroom HVAC diagnostics
- Remote room occupancy indication

- Central Electronic Lock
- Humidity Management
- Outside temperature display
- Peak demand load shedding
- Property/Building Management System (PMS/BMS) interface

Deep Mesh Wireless Communication

The DD15 interface module is equipped with a 2.4 GHz wireless RF transceiver for Deep Mesh RF communications. This provides the capability to wirelessly communicate to Honeywell's INNCOM e528 or e527 thermostat. This additionally provides the capability to wirelessly over-the-air load the device for software updates and configuration changes.

NOTE:

The DD15 is not intended to be used as a general purpose RF media gateway or protocol converter.

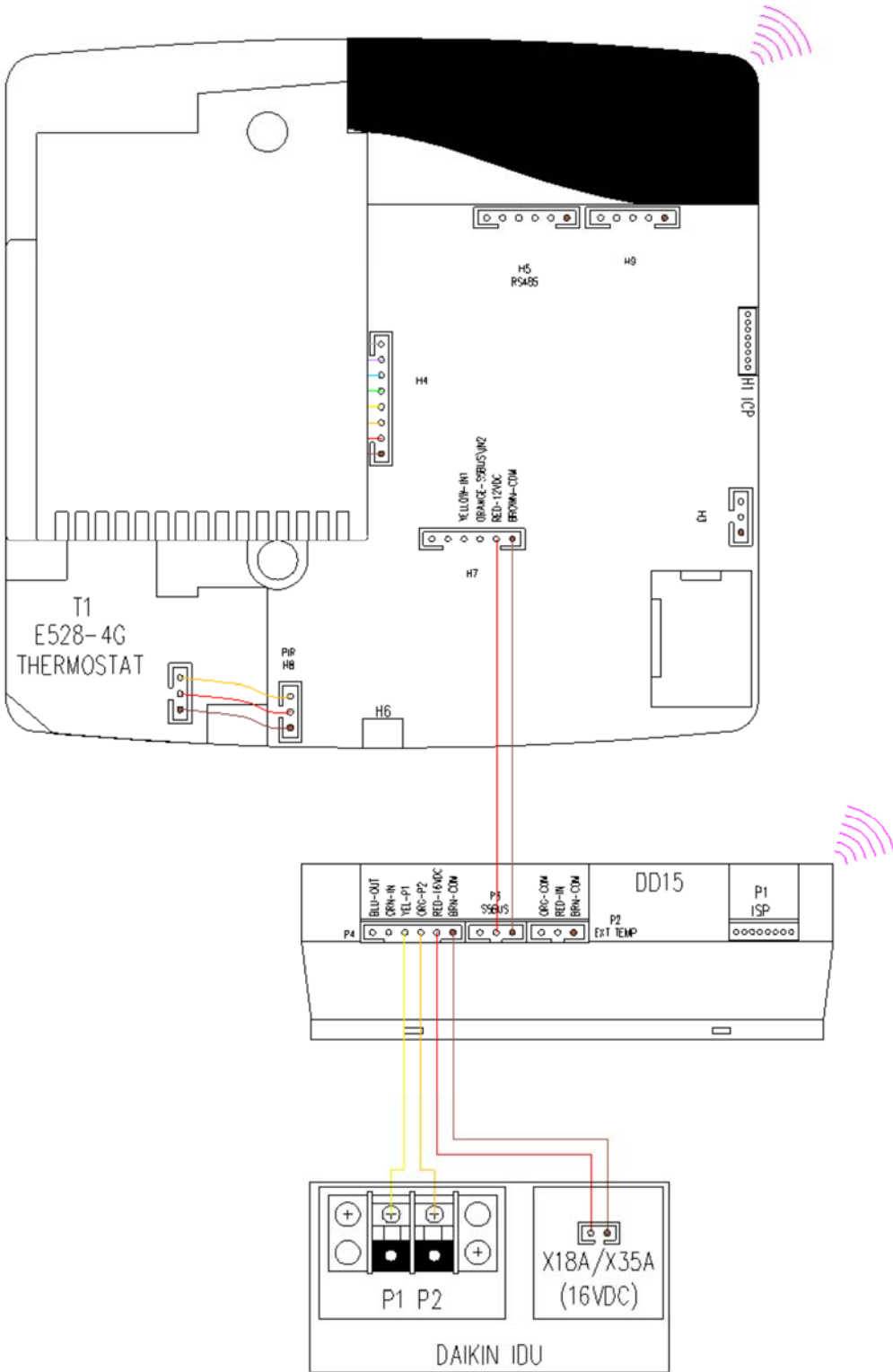| Parameter	Specification
RF Data Rate	250kbps
Antenna Type	SMT
Indoor Range	100ft
Outdoor/ RF line-of-sight range	1000ft+
Transmit Power	10mW (+18dBm)
Receive Sensitivity	-94.6dBm
Frequency Band	2.4Ghz
Encryption	AES-128
Protocol	802.15.4
Frequency Channels	11-26

Table 1 Deep Mesh RF Radio Attributes

Figure 2 Typical Wireless Installation

Mounting

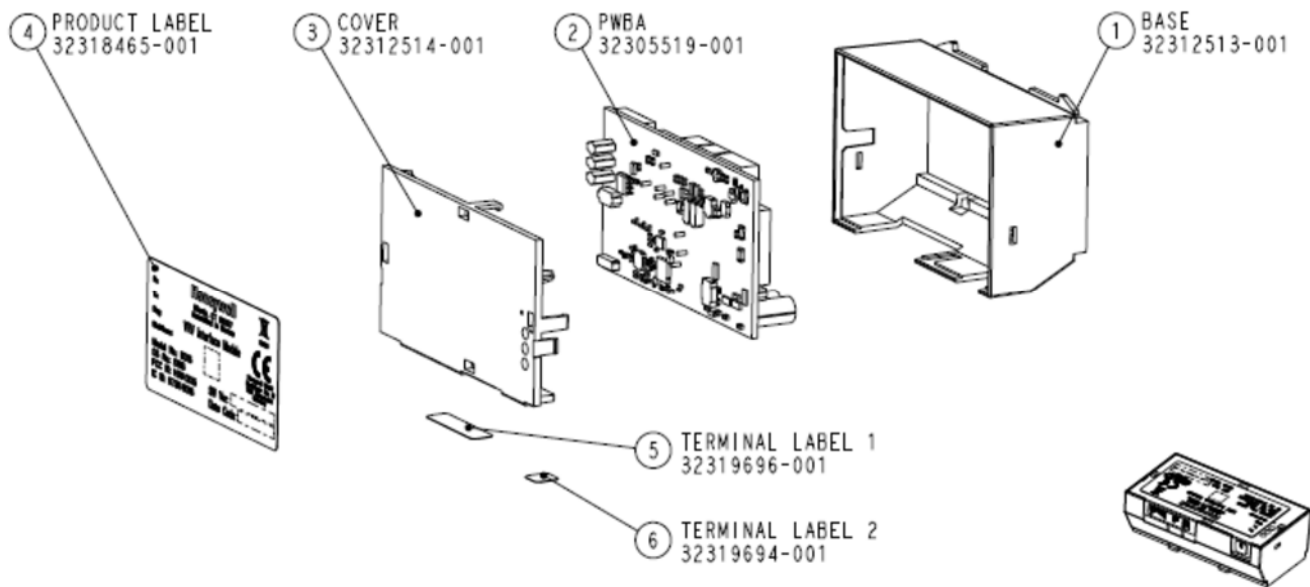Use the following details and precautions to mount the device.

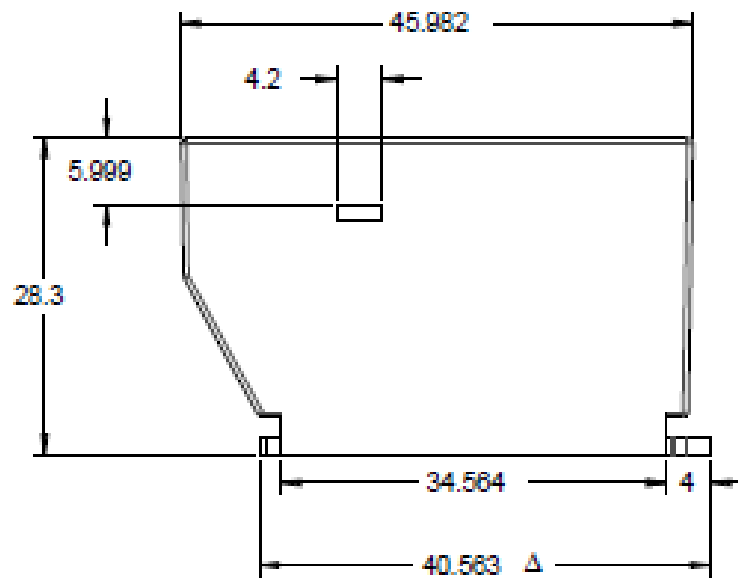**Figure 3 DD15 Exploded Diagram**
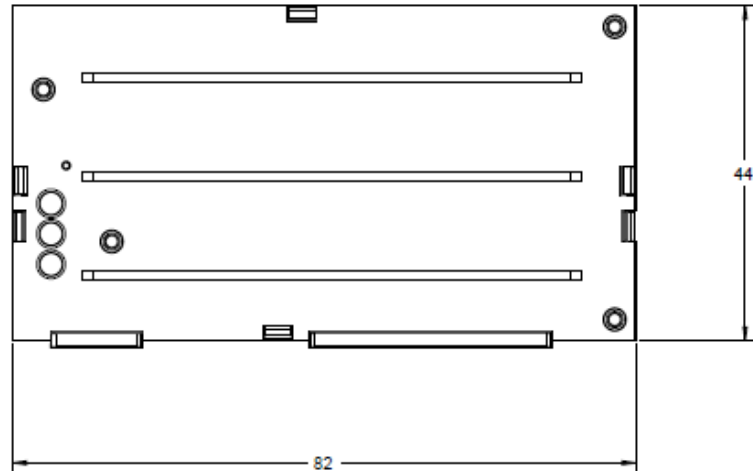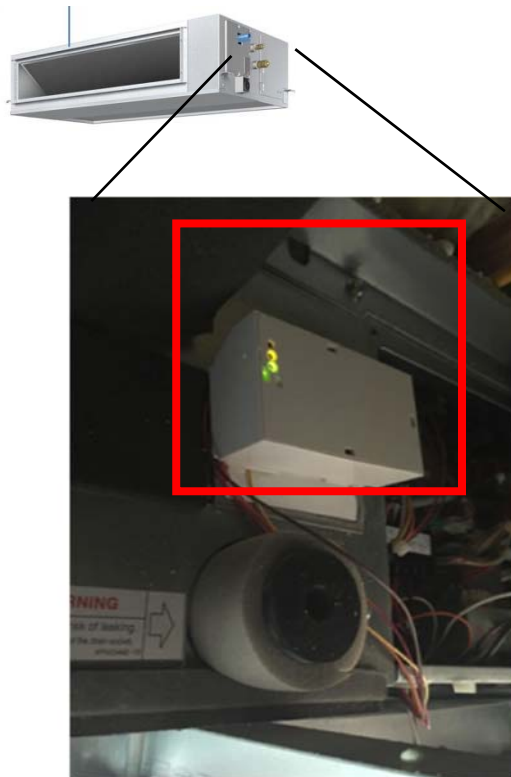
Figure 4 Side view

Figure 5 Top view

Mount the DD15 in any orientation to a suitable flat surface using the provided double sided tape (once adhesive is applied, you will not be able to reposition device). Can be mounted inside or outside of the indoor unit. DD15 must not be mount in a metal enclosure as not to interfere with RF communications.

EXTERNAL MOUNTING   WALL MOUNTED, FXAQ DAIKIN UNIT

Figure 6 Mounting locations

Wiring

Use the following information to properly wire the device. Follow all precautions and read all instructions prior to beginning any work.

> **CAUTION!**
>
> Electrical Shock Hazard! Can cause severe injury, death or property damage. Disconnect power supply and load power sources before beginning wiring or making wiring connections to prevent electrical shock or equipment damage.

Running Long Cable Lengths

The DD15 is typically installed in our around the Daikin IDU using the provided harnesses. When wiring the Daikin P1P2 bus or DIII –net line communication cable should be non-shielded, 18AWG, standard non-polar cabling. For further detailed wired requirements of the Daikin IDU, please contact Daikin directly.

Parameter	Specification
24AWG Bare Solid Copper	
Insulation	FRPE (PVC), 100% FEP (Plenum)
Ripcord	Under Jacket
Jacket	Flame Retardant PVC
Impedance	100 +/- 15 Ohms
Mutual Capacitance, Max. nf/1000ft	17.1
DC Resistance, Max. Ohms/100ft	28.6

Table 2 DD15 Cable and Conductor Attributes

DD15 Headers & Pins

P1 In-Circuit Programming Header – Main Micro

Pin	Signal	Function
1-8	Various	Programming header for programming the main micro. Use 03-0501

Table 3 DD15 In-Circuit Programming Header

P2 External Temperature Sensor

Pin	Signal	Function	Color

1	GND	Ground	Brown
2	NTC	10K NTC (NU)	Red
3	GND	Ground	Orange
	Honeywell recommends to use the following: PN: 04-1094.MOD external thermistor PN: 04-1096.MOD ruggedized external thermistor		

Table 4 DD15 External Temperature Sensor Header

P3 S5bus In / S5bus Out

Pin	Signal	Function	Color
1	GND	Ground	Brown
2	VEE	12VDC	Red
3	S5bus	Communication Bus (NU)	Orange

Table 5 DD15 S5bus and Input Voltage Header

P4 P1/P2 Interface

Pin	Signal	Function	Color
1	GND	Common	Brown
2	VIN	Power(+16VDC)	Red
3	P2	Daikin Communication Bus	Orange
4	P1	Daikin Communication Bus	Yellow
5	IN-1	Dry Contact Input (NU)	Green
6	OUT-1	Open Collector Output (NU)	Blue

Table 6 Daikin IDU Interface Header

Figure 7 Six conductor wire harness

DD15 Harnesses

Part Number	Drawing
32315379 (x1)	
62-1465	

CAUTION!

1. Don't connect DD15 to the VRV indoor unit before verifying the Daikin VRV system is operating error free using the iTouch Manager (iTM).

2. Connect the 6-wire harness to its corresponding port on the DD15.

3. Connect the 3-wire harness to the S5bus port on the DD15 (NOTE: S5Bus not used in wireless application)

4. The orange and yellow wires of the 6-wire harness are to connect to Daikin indoor unit P1P2 terminal (P1 P2 connection is non-polarized)

5. From the 3-wire harness, connect the brown wire to ground, red wire to 12VDC and the orange wire to the S5bus terminals on the thermostat, H7.

6. From the 6-wire harness, plug the brown and red wire connector (image below) to the X18A or X35A socket (16V DC) on the Daikin indoor unit PCB.

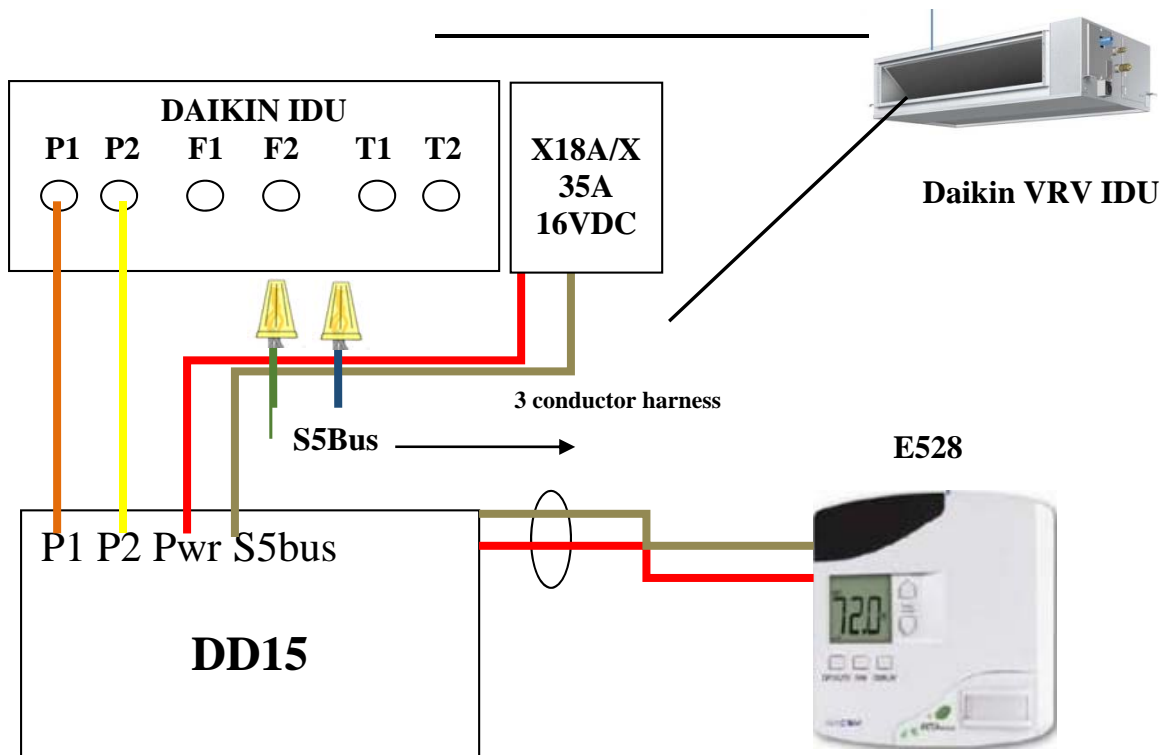**Figure 8 16VDC power connector**

Figure 9 Wiring example

NOTE:
The green and blue wires are capped off and not used in this configuration.

Start-Up

The DD15 device will power up without user interaction, and operate in default mode until communication with the thermostat is established. The diagnostic LED will fast blink on start up. The system will return to the last configured temperature setting, and update upon first interaction. The DD15 will send all necessary field settings to the Daikin IDU, such as fan always, and remote measured room temperature (temperature measured from the INNCOM e528 or e527 thermostat).

Check installation

NOTE:

Continue for wired communication only, for wireless communication complete RF BIND PROCEDURE, first!

1. Power up the Daikin indoor unit first.
2. Red power LED is lit
3. Set the thermostat to the highest setpoint check if the indoor unit engages heating
4. Set a setpoint like 65F lower than the room temperature and check if the indoor unit coordinate providing cooling.
5. The Daikin indoor unit may need 1 to 5 minutes for cool/heat mode changeover.
6. Confirm the room temperature input at iTM is matching with what ream at e528.
7. Change the fan speed at the thermostat and confirm the fan speed change at indoor unit and iTM.

DD15 RF Bind Procedure

NOTE:

S1 is used for teaching the DD15 a specific device address or function map. Use a paper clip to access S1 for teaching the address.

1. The DD15 uses a "reverse binding" procedure to acquire network information from the thermostat, meaning that the device will signal the thermostat that it wants the information. Besides the information set in the thermostat in the steps above, the DD15 requires a map of network components, complete with unique address. This information is typically carried in the I/O Map.
2. Place the thermostat in Service Parameter mode as above. Go to the Io (I/O Map Teach) parameter and press the DISPLAY button (for e528.4G) or OFF/AUTO to view the value. Set the Io value to the desired I/O Map number. Do NOT press the thermostat's DISPLAY or OFF/AUTO button.
3. For the e528.4G, press OFF/AUTO and the LCD will display **bnd**.
4. Using a small point (e.g., the end of a straightened paper clip),

press the recessed Reset/Bind switch (S1) on the DD15 once.
5. The thermostat sends a bind offer to the DD15. If accepted, the thermostat will buzz loudly. The DD15 will reset.
6. Test the DD15 functionality.

DD15 Power Outage and Restoration

All INNCOM devices have an onboard non-volatile memory, which is used to store the operating state of the DD15 in case of a power outage. With restoration of communications or power, the unit will initiate a brief power-up sequence. After power-up is complete, the unit will return to the last know configuration state.

Inputs & Outputs

Wiring Input

In the case of using an external thermistor with the DD15, plug the thermistor into the Ext Temp socket on the DD15.

Wiring Output

In the case the DD15 will control other heat source.

Troubleshoot DD15 LED function

LED	Function
Green	**Slow Blink Pattern** (once per second): Indicates the DD15 is in standard operation mode, is powered, and running. **Medium Speed Blink Pattern:** The DD15 has accepted the teach-mode command, and will reset. **Solid On Pattern:** DD15 is in failure mode. **Sold Off Pattern:** The DD15 is not powered on, or if powered on, the DD15 is in failure mode.
Red	**Fast Blink Pattern:** Indicates P1/P2 received data activity
Yellow	**Fast Blink Pattern:** Indicates P1/P2 transmitted data activity

▪ All Daikin fault codes are communicated to the DD15 via the P1P2 protocol. These codes are then passed to the INNCOM Server PC to be displayed in IC3 for the hotel engineers.

Error code U5

1. System Transmission error, the DD15 is not communicating with the IDU.
2. Confirm the DD15 has power.

Model & Part Numbers

The part numbers provided below should be used to order the appropriate parts.

DD15   DD15   Daikin Direct VRV interface module

Thermostats:
e528   01-9911-A0L7-xxx   Honeywell's INNCOM thermostat
e527   201-527xxx   Honeywell's INNCOM thermostat

Regulatory Compliance

This device has been tested and found to be in compliance with the requirements stated below.

Federal Communications Commission (FCC)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

> **NOTE!**
>
> This equipment has been tested and found to comply with the limits for Class B digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
>
> Re-orient or relocate the receiving antenna
>
> Increase the separation between the equipment and receiver
>
> Connect the equipment to an outlet on a different circuit from the receiver
>
> Consult the dealer or an experienced radio/TV contractor for help.

> **CAUTION!**
>
> Any changes or modifications not expressly approved by Honeywell could void your authority to operate this equipment.

Canadian Dept. of Comm.(DOC)

> **NOTE!**
>
> This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
>
> C'et appareil est conforme la norme d'Industrie Canada exempts de licence RSS. Son fonctionnement est soumis aux deux conditions suivantes: (1) c'et appareil ne peut pas provoquer d'interférences, et (2) c'et appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de la dispositifWaste Electrical & Electronic Equipment

Customers are advised to dispose of this product at the end of its useful life according to applicable local laws, regulations, and procedures.