Daikin HVAC Controls Guide Specification
Version 2.0

VARIABLE REFRIGERANT VOLUME (VRV) HVAC SYSTEM
REMOTE CONTROLLERS

Part 1 - General

1.1. Physical characteristics

A. General:
The local remote control shall be made from plastic materials with a neutral color. Each controller shall have a LCD (Liquid Crystal Display) that shows set point, room temperature, mode of operation (on/off/cool/heat), and fan speed.

1.2. Electrical characteristics

A. General:
Each indoor unit control circuit board shall supply 16 volts DC to the local remote controller. The voltage may rise or fall in relation to the transmission packets that are sent and received.

B. Wiring:
The control wiring shall be terminated in a daisy chain design from outdoor unit, to branch selector, then daisy chaining to each indoor unit in the system and terminating at the farthest indoor unit. The remote control wiring shall run from the indoor unit control board terminal block to the remote controller connected to that indoor unit.

C. Wiring size:
Wiring shall be non-shielded, 2-conductor sheathed vinyl cord or cable, and 18 AWG stranded copper wire.

1.3. VRV Controls Network

A. The VRV Controls Network is comprised of local remote controllers, multi-zone controllers, advanced multi-zone controllers, and open protocol software devices that transmit information via the high-speed communication bus and may also be controlled via a network PC. The VRV Controls Network supports operation monitoring, scheduling, error e-mail distribution, general user software, tenant billing, maintenance support, and integration with Building Management Systems (BMS) using open protocol via BACnet® or Lonworks® interfaces; all of which blend to provide the optimal control strategy for the best HVAC comfort solution.

Part 2 - Products

2.1. Remote Controllers

Daikin VRV local remote controllers are compatible with all VRV indoor units. The remote controller wiring consist of a non-polar two-wire connection to the indoor unit. The local remote controllers may be wall-mounted and can be adjusted to maintain the optimal operation of the connected indoor unit(s). Temperature setpoint can be adjusted in increments of 1°F/°C. In the cases where a system or unit error may occur, the VRV controllers will display a two-digit error code and the unit address. The local remote controllers do not need to be addressed.

A. Navigation Remote Controller

   1. BRC1E73

   2. BRC1E72

B. Simple Remote Controller

   1. BRC2A71

C. Wireless Remote Controller

   1. BRC4C82

   2. BRC7E83

   3. BRC7C812

   4. BRC7E818

D. Remote Temperature Sensor

   a. KRCS01-1B

Part 3 – Specifications

3.1. Navigation Remote Controller

A. BRC1E73: Navigation (NAV) Remote Controller
The NAV Remote Controller can provide control for all VRV indoor units. The remote controller wiring consist of a non-polar two-wire connection to the indoor unit at terminals P1/P2. The NAV Remote Controller is wall mounted and can be adjusted to maintain the optimal operation of the connected indoor unit(s). The NAV Remote Controller does not need to be addressed.

The NAV Remote Controller can be used in conjunction with the BRC2A71 (Simplified Remote Controller) or another NAV Remote Controller to control the same indoor unit group. No more than 2 remote controllers can be placed in the same group.

1. Mounting:
     The NAV Remote Controller shall be mounted into a standard 2" x 4" junction box.

2. Display Features:
     a. The NAV Remote Controller shall be approximately 4.75" x 4.75" in size with a 2.75" x 1.75" LCD display.
     b. Backlit LCD display with contrast adjustment and auto off after 30 seconds.
     c. Display language shall be selectable from English, French or Spanish.
     d. Selectable display – Detailed, Standard and Simple
         1) Detailed display
             i. Shall display Operation Mode, Cool, Heat and Setback setpoints, Fan Speed, Louver position, Room Temperature, Time and Day of the Week
         2) Standard display
             i. Shall display Operation Mode, Cool, Heat and Setback setpoints and Fan Speed
         3) Simple display
             i. Shall display Operation Mode, Cool, Heat and Setback setpoints, Fan Speed and Room Temperature
             ii. The room temperature shall be displayed with a large 11/16" font
     e. All displayed items configurable
         1) Configure "Off" to be displayed when unit is turned off (field setting required)
             i. Prevents mode adjustment

2) Setpoint can be removed from display when unit is turned Off (field setting required)
    i. Prevents setpoint adjustment
3) Fan speed display removable (field setting required)
    i. Prevents fan speed adjustment

f. System Status icons.
g. The controller shall display temperature setpoint in one degree increments with a range of 60-90°F (16-32°C)
h. Detailed and Simple display will reflect room temperature (0-176°F/-18-80°C range in one degree increments).
    1) Display of temperature information shall be configurable for Fahrenheit or Celsius
i. On/Off status shall be displayed with an LED.
j. Error codes will be displayed with a two digit code in the event of system abnormality/error.
    1) A blinking LED will also signal system abnormality/error
k. The following system temperatures can be displayed to assist service personnel in troubleshooting:
    1) Return Air Temperature
    2) Liquid Line Temperature
    3) Gas Line Temperature
    4) Discharge Air Temperature (depending on unit),
    5) Remote Controller Sensor Temperature
    6) Temperature used for Indoor Unit Control

3. Basic Operation:
a. Capable of controlling a group of up to 16 indoor units.
b. Controller shall control the following group operations:
    1) On/Off, Operation Mode (Cool, Heat, Fan, Dry and Auto* (*with VRV Heat Recovery & Heat Pump Systems))
        i. Configure only the essential modes to be selectable – remove unnecessary mode selection(s) from display
    2) Independent Cooling and Heating setpoints in the occupied mode
        i. Dual setpoints (individual Cool and Heat setpoints with minimum setpoint differential 0 – 7°F (0 – 4°C) default 2°F (1°C)) or Single setpoint
    3) Independent Cooling Setup and Heating Setback setpoints in the unoccupied mode
    4) Fan Speed
        ii. Up to 5 speeds (dependent on indoor unit type)
    5) Vane direction and oscillation (dependent on indoor unit type)
        iii. Airflow direction
            1. Up to 5 louver positions and auto swing
        iv. Individual airflow

4

1. Provides individual control of up to four (4) louvers on an indoor unit
   - v. Dual airflow
      1. Provides control of both internal and external louver positions
   - vi. Automatic draft protection
      1. Automatically prevents air flow from blowing directly on occupants
- b. The controller shall be able to limit the user adjustable setpoint ranges individually for cooling and heating in the occupied period
- c. Function button lockout (On/Off, Mode, Fan Speed, Up/Down, Left, Right Arrows)
- d. Optional Controller Face Decal (BRC1E72RM, BRC1E72RF, BRC1E72RMF, BRC1E72RM2, BRC1E72RF2, BRC1E72RMF2) to hide unnecessary (locked out) buttons
- e. Indoor Unit group assignment
- f. Filter indicator
   1) Filter service indicator shall be displayed after 100, 1250 or 2500 (default) hours of run time configurable via field setting
- g. Clock (12/24 hour) and Day display
- h. Automatic adjustment for Daylight Savings Time (DST)
   1) Set changeover period (second Sunday in March / first Sunday in November)

4. Programmability:
   - a. Controller shall support schedule settings with selectable weekly pattern options.
      1) 7-day
      2) Weekday + Weekend
      3) Weekday + Saturday + Sunday
      4) Everyday
      5) The schedule shall support unit On/Off
      6) Independent settings for Cooling and/or Heating setpoints when unit is on (occupied)
      7) Independent Setup (Cooling) and Setback (Heating) setpoints when unit is off (unoccupied)
      8) A maximum of 5 operations can be schedulable per day
      9) Time setting in 1-minute increments
   - b. The Controller shall support Auto-changeover mode for both Heat Pump and Heat Recovery systems, therefore, allowing the optimal room temperature to be maintained by automatically switching the indoor unit's mode between Cool and Heat according to the room temperature and temperature setpoint.

1) Changeover to cooling mode shall occur at cooling setpoint + 1°F (0.5^{o}C) as the primary changeover deadband and takes the guard timer into consideration
     i. Configurable from 1 – 4°F (0.5 – 2°C)
2) Changeover to cooling mode shall occur at the primary changeover deadband to cooling + 1°F (0.5^{o}C) as the secondary changeover deadband.
     i. Configurable from 1 – 4°F (0.5 – 2°C)
3) Changeover to heating mode shall occur at heating setpoint - 1°F (0.5^{o}C) as the primary changeover deadband and takes the guard timer into consideration
     i. Configurable from 1 – 4°F (0.5 – 2°C)
4) Changeover to heating mode shall occur at the primary changeover deadband to heating - 1°F (0.5^{o}C) as the secondary changeover deadband.
     i. Configurable from 1 – 4°F (0.5 – 2°C)
5) 1 hour guard timer
     i. Upon changeover, guard timer will prevent another changeover during this period.
     ii. Guard timer is ignored by a change of setpoint manually from either the Multi-zone Controller, Remote Controller, or by schedule.
     iii. The Guard timer is also ignored if the space temperature reaches the secondary changeover deadband (configurable from 1 - 4°F (0.5 – 2°C)) from the primary changeover deadband, and the guard timer has been activated
     iv. 60 minutes as default, configurable to 15, 30, or 90 minutes

c. The controller shall support the Auto-setback by sensor function (dependent on indoor unit type)
   1) The cooling and heating setpoints shall gradually relax (configurable) internally when the room is determined to be unoccupied
       i. The internal setpoint shall return to the original setpoint when room occupancy is detected
d. The controller shall support the Auto-off by sensor function (dependent on indoor unit type)
   1) The indoor unit shall turn off when it is determined that the room is unoccupied after a specified time has elapsed
       i. The indoor unit shall be turned on manually when occupancy is detected
e. The controller shall support the Filter Auto Clean function to be performed once a day (dependent on indoor unit type)
   1) Eight (8) time periods (00:00-03-00, 03:00-06:00, 06:00-09:00, 09:00-12:00, 12:00-15:00, 15:00-18:00, 18:00-21:00,

6

21:00-00:00) shall be available to select from to enable the automatic filter cleaning function

  i. Default time period (00:00 to 3:00) shall be used if the period for filter auto cleaning is not specified

2) The indoor unit shall be stopped during auto filter cleaning function operation

f. The Controller shall support an Auto Off Timer for temporarily enabling indoor unit operation during the unoccupied period.

  1) When the Off Timer is enabled and when the unit is manually turned on at the remote controller
  2) The controller shall shut off the unit after a set time period
  3) The time period shall be configurable in the controller menu with a range of 30-180 minutes in 10 minute increments

g. The room temperature shall be capable of being sensed at either the NAV Remote Controller, the Indoor Unit return air temperature sensor (default), or Remote Temperature Sensor (KRCS01-1B) configured through the field settings.

B. BRC1E72: Navigation (NAV) Remote Controller

The NAV Remote Controller can provide control for all VRV indoor units. The remote controller wiring consist of a non-polar two-wire connection to the indoor unit at terminals P1/P2. The NAV Remote Controller is wall mounted and can be adjusted to maintain the optimal operation of the connected indoor unit(s). The NAV Remote Controller does not require addressing.

The NAV Remote Controller can be used in conjunction with the BRC2A71 (Simplified Remote Controller) or another NAV Remote Controller to control the same indoor unit group. No more than 2 remote controllers can be placed in the same group.

1. Mounting:
   The NAV Remote Controller shall be mounted into a standard 2" x 4" junction box.

2. Display Features:
   a. The NAV Remote Controller shall be approximately 4.75" x 4.75" in size with a backlit 2.75" x 1.75" LCD display.
   b. Feature Backlit LCD Display with contrast adjustment and auto off after 30 seconds.
   c. Display information shall be selectable from English, French, or Spanish.
   d. Configurable display mode – Detailed, Standard, and Simple
      1) Large 11/16" room temperature displayed in Simple display
   h. The controller shall display Operation Mode, Setpoint, and Fan Speed.

1) Displayed items configurable
2) Configure "Off" to be displayed when unit is turned off (field setting required)
    i. Prevents mode adjustment
3) Setpoint can be removed from display when unit is turned Off (field setting required)
    i. Prevents setpoint adjustment
4) Fan speed display removable (field setting required)
    i. Prevents fan speed adjustment

i. System Status icons.
j. The controller shall display temperature setpoint in one degree increments with a range of 60-90°F (16-32°C)
k. Detailed and Simple display will reflect room temperature (0-176°F/-18-80°C range in one degree increment).
    1) Display of temperature information shall be configurable for Fahrenheit or Celsius
l. On/Off status shall be displayed with an LED.
m. Error codes will be displayed in the event of system abnormality/error with a two digit code.
    1) A blinking LED will also signal system abnormality/error
n. The following system temperatures can be displayed to assist service personnel in troubleshooting:
    1) Return Air Temperature
    2) Liquid Line Temperature
    3) Gas Line Temperature
    4) Discharge Air Temperature (depending on unit),
    5) Remote Controller Sensor Temperature
    6) Temperature used for Indoor Unit Control

3. Basic Operation:
    a. Capable of controlling a group of up to 16 indoor units.
    b. Controller shall control the following group operations:
        1) On/Off, Operation Mode (Cool, Heat, Fan, Dry and Auto* (*with VRV Heat Recovery & Heat Pump Systems))
            i. Configure only the essential modes to be selectable – remove unnecessary mode selection(s) from display
        2) Independent Cooling and Heating setpoints in the occupied mode
            i. Dual setpoints (individual Cool and Heat setpoints with minimum setpoint differential 0 – 8°F (0 – 4°C) default 2°F (1°C)) or Single setpoint
    c. Independent Cooling Setup and Heating Setback setpoints in the unoccupied mode
    d. Fan Speed
    e. Airflow direction (dependent on indoor unit type).

8

    f.   The controller shall be able to limit the user adjustable setpoint ranges individually for cooling and heating in the occupied period

    g.   Function button lockout (On/Off, Mode, Fan Speed, Up/Down, Left, Right Arrows)

    h.   Optional Controller Face Decal (BRC1E72RM, BRC1E72RF, BRC1E72RMF, BRC1E72RM2, BRC1E72RF2, BRC1E72RMF2) to hide unnecessary (locked out) buttons

    i.   Indoor Unit group assignment

    j.   Filter indicator
        1) Filter service indicator displayed after 100 or 2500 (default) hours of run time configurable via field setting

    k.   Clock (12/24 hour) and Day display

    l.   Automatic adjustment for Day Light Savings Time (DST)
        1) Set changeover period (second Sunday in March / first Sunday in November)

4. Programmability:

    a.   Controller shall support schedule settings with selectable weekly pattern options.
        1) 7-day
        2) Weekday + Weekend
        3) Weekday + Saturday + Sunday
        4) Everyday
        5) The schedule shall support unit On/Off
        6) Independently settable Cooling and/or Heating setpoints when unit is on (occupied)
        7) Setup (Cooling) and Setback (Heating) setpoints when unit is off (unoccupied)
        8) A maximum of 5 operations can be schedulable per day
        9) Time setting in 1-minute increments

    b.   The Controller shall support auto-changeover mode for both Heat Pump and Heat Recovery systems allowing the optimal room temperature to be maintained by automatically switching the indoor unit's mode between Cool and Heat according to the room temperature and temperature setpoint.
        1) Changeover to cooling mode shall occur at cooling setpoint + 1^oF (0.5^oC) as the primary changeover deadband and takes the guard timer into consideration
            i.   Configurable from $1 – 4^o$F ($0.5 – 2^o$C)
        2) Changeover to cooling mode shall occur at the primary changeover deadband to cooling + 1^oF (0.5^oC) as the secondary changeover deadband.
            i.   Configurable from $1 – 4^o$F ($0.5 – 2^o$C)
        3) Changeover to heating mode shall occur at heating setpoint - 1^oF (0.5^oC) as the primary changeover deadband and takes the guard timer into consideration

9

  i. Configurable from 1 – 4°F (0.5 – 2°C)

4) Changeover to heating mode shall occur at the primary changeover deadband to heating - 1°F (0.5°C) as the secondary changeover deadband.

  i. Configurable from 1 – 4°F (0.5 – 2°C)

5) 1 hour guard timer

  i. Upon changeover, guard timer will prevent another changeover during this period.

  1. Guard timer is ignored by a change of setpoint manually from either the Multi-zone Controller, Remote Controller, or by schedule.

  2. The Guard timer is also ignored if the space temperature reaches the secondary changeover deadband (configurable from 1 - 4°F (0.5 – 2°C)) from the primary changeover deadband, and the guard timer has been activated

  3. 60 minutes as default, configurable to 15, 30, or 90 minutes

c. The Controller shall support an Auto Off Timer for temporarily enabling indoor unit operation during the unoccupied period.

1) When the Off Timer is enabled and when the unit is manually turned on at the remote controller

2) The controller shall shut off the unit after a set time period

3) The time period shall be configurable in the controller menu with a range of 30-180 minutes in 10 minute increments

d. The room temperature shall be capable of being sensed at either the NAV Remote Controller, the Indoor Unit return air temperature sensor (default), or Remote Temperature Sensor (KRCS01-1B) configured through the field settings.

3.2. Simplified Remote Controller

A. BRC2A71: Simplified Remote Controller

The Simplified Remote Controller can provide control for all VRV indoor units. The remote controller wiring consists of a non-polar two-wire connection to the indoor unit at terminals P1/P2. The Simplified Remote Controller is wall mounted and can be adjusted to maintain the optimal operation of the connected indoor unit(s). The Simplified Remote Controller does not require addressing.

The Simplified Remote Controller can be used in conjunction with the BRC1E71 (Navigation Remote Controller) or another Simplified Remote Controller to control the same indoor unit group. No more than 2 remote controllers can be placed in the same group.

1. Mounting:

The Simplified Remote Controller shall be mounted into a standard 2" x 2" junction box.

2. Display Features:
   a. The Simplified Remote Controller shall be approximately 4.75" x 2.75" in size with a 1" x 1.75" LCD display.
   b. The controller shall display Operation Mode, Setpoint, and Fan Speed.
   c. The controller shall be able to display temperature setpoint in one degree increments with a range of 60-90°F (16-32°C).
   d. On/Off status shall be displayed with an LED.
   e. Error codes will be displayed in the event of system abnormality/error with a two digit code.
      1) A blinking LED will also signal system abnormality/error

3. Basic Operation:
   a. Capable of controlling a group of up to 16 indoor units.
   b. Controller shall control the following group operations:
      1) On/Off, Operation Mode (Cool, Heat, Fan, Dry and Auto* (*with VRV Heat Recovery System))
      2) Independent Cooling and Heating setpoints in the Occupied mode
      3) Independent Cooling Setup and Heating Setback setpoints in the Unoccupied mode,
      4) Set fan speed
      5) The controller shall be able to limit the user adjustable setpoint ranges individually for cooling and heating in the occupied period
      6) Indoor unit group assignment
      7) Function key lockout (Mode / Fan Speed) via Optional Controller Face Plates (BRC2A71RU / BRC2A71R)

3.3. Wireless Remote Controller

A. BRC4C82 / BRC7E83 / C812 / E818: Wireless Remote Controller
The Wireless Remote Controller can provide control for all VRV indoor units. The remote controller wiring consists of a non-polar two-wire connection to the indoor unit at terminals P1/P2. The Wireless Remote Controller is wall mounted and can be adjusted to maintain the optimal operation of the connected indoor unit(s). The Wireless Remote Controller does not require addressing.

The Wireless Remote Controller can be used in conjunction with the BRC2A71 (Simplified Remote Controller) or another Wireless Remote Controller to control the same indoor unit group. No more than 2 remote controllers can be placed in the same group.

1. Mounting:
   a. The Wireless Remote Controller receiver shall be mounted on the wall or on the indoor unit (dependent on indoor unit model type).

2. Display Features:
   a. The Wireless Remote Controller shall be approximately 6.25" x 2.75" in size with a 3.75" x 0.75" LCD display.
   b. The controller shall be able to display Operation Mode, Setpoint and Fan Speed.
   c. The controller shall be able to display temperature setpoint in one degree increments with a range of 60-90°F (16-32°C).
   d. Error codes will be displayed in the event of system abnormality/error with a two digit code.
      1) A blinking LED will also signal system abnormality/error

3. Basic Operation:
   a. Capable of controlling a group of up to 16 indoor units.
   b. Controller shall control the following group operations:
      1) On/Off, Operation Mode (Cool, Heat, Fan, Dry and Auto* (*with VRV Heat Recovery System))
      2) Independent Cooling and Heating Setpoints in the occupied mode
      3) Fan Speed
      4) Air flow direction (dependent on indoor unit type)
      5) Indoor unit group assignment

4. Programmability:
   a. Supports timer controlled start/stop operation (up to 72 hours).

3.4. Remote Temperature Sensor

A. KRCS01-1B: Remote Temperature Sensor
The Remote Temperature Sensor can provide temperature sensing for all VRV indoor units. The remote controller wiring consists of a non-polar two-wire connection to the indoor unit at terminals X13A. The Remote Temperature Sensor is wall mounted and is used to maintain the optimal operation of the connected indoor unit.

The Remote Temperature Sensor can be used in conjunction with the Navigation Remote Controller, Simplified Remote Controller, and the Wireless Remote Controller to sense space temperature outside of the indoor unit. No more than 2 remote controllers can be placed in the same group.

1. Mounting:

    a. Sensor Box shall be 2.38" x 1.97" x 0.75" (H x W x D) in size.

    b. Can be mounted on the wall in the provided sensor box.

    c. Can be mounted in the Simplified Remote Controller (BRC2A71).

    d. Can be mounted a button temperature sensor holder (field supplied).

2. Application:

    a. The location of the temperature sensor should provide a realistic sample of the space temperature in order to provide the optimum comfort level to the occupants.

        1) Things that need to be considered are:

            i. Indoor unit location

           ii. Will outside area be brought into the space and/or indoor unit

          iii. Ceiling heights

          iv. Control Scheme

           v. Design and limitations due to architecture

          vi. Plenum air return

3. Basic Operation:

    a. Replaces indoor unit return air temperature sensor.

        1) Senses room temperature for only one indoor unit