Standard and High Efficiency Light Commercial Rooftop
DS, DH and DV

MECHANICAL GUIDE SPECIFICATIONS FOR DS/DH AND DV SERIES COMMERCIAL PACKAGED UNITS

3 – 25-TON AC, GAS ELECTRIC, AND HEAT PUMP (up to 20 tons).

Related Sections (As Specified by the Construction Specification Institute)

- Section 230680 Schedules for Decentralized HVAC Equipment
  - 230680.13 Decentralized Unitary HVAC Equipment Schedule:
  - 230680.13.A. Rooftop Unit (RTU) schedule:
- Schedule is per the project specification requirements.
  - Section 230716 HVAC equipment insulation
  - 230716.13 Decentralized, Rooftop Units
  - 230716.13.A. Evaporator fan compartment
  - 0230716.13.B. Gas Heat Compartment
- Section 230913 Instrumentation and control devices for HVAC
  - 230913. 23 Sensors and Transmitters
  - 230913. 23.A. Thermostats
- Section 2309 33 Electric and Electronic Control System for HVAC
  - 2309 33.13 Decentralized, Rooftop Units
  - 2309 33.13.A. General
  - 2309 33.13.B. Safeties
- Section 2309 93 Sequence of Operations for HVAC Controls
  - 2309 93.13 Decentralized, Rooftop Units:
  - 2309 93.13.A. INSERT SEQUENCE OF OPERATION
- Section 23 4013 Panel Air Filters
  - 23 4013.13 Decentralized, Rooftop Units:
  - 23 4013.13.A. Standard filter section
- Section 238119 Self-Contained Air Conditioners
  - 238119.13 Small-Capacity Self-Contained Air Conditioners:
  - 238119.13.A. General
  - 238119.13.B. Quality Assurance
  - 238119.13.C. Delivery, Storage, and Handling
  - 238119.13.D. Project Conditions
  - 238119.13.E. Operating Characteristics
  - 238119.13.F. Electrical Requirement
  - 238119.13.G. Unit Cabinet
  - 238119.13.H. Gas Heat
  - 238119.13.I. Coils
  - 238119.13.J. Refrigerant Components
  - 238119.13.K. Filter Section
  - 238119.13.L. Evaporator Fan and Motor
  - 238119.13.M. Condenser Fans and Motors
  - 238119.13.N. Special Features Options and Accessories

General

- All 3 – 12.5 ton units are designed for convertible airflow orientation to serve downflow or horizontal applications. All 15-25 ton models are dedicated downflow airflow orientation.
- All units are charged with R-32 refrigerant and run-tested at the factory to check modes of operation and proper fan rotation.
- Unit meets ASHRAE 90.1 minimum efficiency requirements.
- Unit shall be designed to conform to ASHRAE 15.
- All units are rated in accordance with AHRI Standards 210/240 or 340/360.
- Units are ETL listed and certified under US and Canadian standards of safety requirements per UL 60335-2-40 for 3 to 25 ton units and ANSI Z21.47 (Gas/Electric units only).
- Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
- Unit shall be designed in accordance with ISO 9001, and shall be manufactured in a facility registered by ISO 9001:2015.
- Roof curb shall be designed to conform to NRCA Standards.
- Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory and must be available upon request.
- Unit shall be designed to prevent water intrusion up to max rated external static pressure.
- Unit is shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.

Voltages

- All (DS/DH) units are available in 208/240V 3-phase 60 Hz, 460V 3-phase 60 Hz, and 575V 3-phase 60 Hz. Additionally, 3- 5-ton sizes are available in 208/240 1-phase 60 Hz.
- All (DV) units are available in 208/240V 3-phase 60 Hz and 460V 3-phase.
- Main power supply voltage, phase, and frequency must match those required by the manufacturer.

Warranty

- Units feature a 5-year parts and compressor warranty. Gas heat exchangers in gas/electric units include a 20-year warranty.
- Complete warranty details are available from your local dealer/contractor or at www.daikincomfort.com.

Cabinet

- Unit cabinets are made with galvanized steel as follows, top panel 0.046"~19-gauge, access doors 0.034" ~21-gauge, side rails 0.058" 16 gauge with a powder-paint finish on all the external surfaces. Service panels provide access to refrigeration, heating, blower, controls, and filter sections.
- Interior surfaces in the indoor air section are single wall insulated with a minimum ½ in. thick, 1½ lb./ft 3 density, flexible fiberglass insulation bonded with a phenolic binder, Aluminum foil-faced on the air side with a minimum R-value of 1.8.
- Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 210/240 minimum exterior sweat criteria.
- Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- Cabinet finish panel is tested for 500 hours in a salt spray test in accordance with ASTM B117 standard for salt spray resistance.
- Base rails are a minimum 3½" tall and include holes to allow for overhead rigging and lifting with forklifts.
- Unit includes a condensate drain pan with both vertical and horizontal drain connections.
- Unit must have ¾"-14 NPT drain connection, possible either through the bottom or side of the drain pan on 3 – 12.5 ton units and 1" 14 NPT on 15 – 25 ton units. Connection shall be made per manufacturer's recommendations.
- Condensate Drain Pan shall be a sloped and made of a corrosion resistant material.
- Unit must comply with ASHRAE Standard 62.1.
- Unit shall be field convertible from vertical to horizontal airflow on all 3 – 12.5 ton models. No special kit required.
- Base of unit shall have a thru-the-base gas (3 – 25 tons only) and electrical connections (factory-installed or field-installed), standard.

Access Panels

- All Cabinet panels are designed to be easily removable for servicing Unit, and shall have one factory-installed, tool-less, removable, filter access panel up to 12.5 tons. Option for hinged access panel for controls and blower section shall be available from the factory, hinges shall be of stainless-steel material for corrosion resistance.

Controls

DS and DH Models

- Units are factory-wired with color-coded wires with low-voltage control circuit protected by a resettable circuit breaker on the 24-v transformer side. Transformer shall have 75VA capability.
- Units have single-point power (except for 3 – 6 ton gas /electric models) entry either with the unit or with the electrical heat kits on a central control terminal board to provide connection points conveniently and safely for essential control functions such as: smoke detectors, phase monitor, Economizer, thermostat, DOC control options, and low- and high-pressure switches.
- Unit to be provided with a terminal block for connection and control wiring.
- Units come with a grounding lug as standard.
- Units come standard with 5kA SCCR.

DV Models

- Units have single-point power entry either with the unit or with the electrical heat kits on a central control terminal board to provide connection points conveniently and safely for essential control functions such as: smoke detectors, Economizer, and control PCBs.
- Electrical components are in the indoor and outdoor control boxes.
- Main PCB in the outdoor control box basically controls the components in the outdoor section (e.g., compressor, condenser fan motors, EEVs, etc.).
- Indoor PCB in the indoor control box basically controls the components in the indoor section (e.g., blower motor) and the accessories (e.g., Economizer, electric heater, etc.).
- Unit to be provided with a terminal block for connection and control wiring.
- Units come with a grounding lug as standard.
- Units come standard with 5kA SCCR.

Compressors

DS and DH models

- Compressors are hermetically sealed scroll compressors and are factory mounted on rubber grommets. On units with two refrigeration circuits (7.5 – 25 -ton), one scroll compressor is used on each circuit. 6 ton systems utilize a 2-stage scroll compressor.
- Compressors shall be protected from over-temperature and over-amperage conditions by an internal, motor overload device.
- Compressors shall be internally protected from high discharge pressure through an internal pressure relief valve and externally protected via pressure switch in the discharge line.
- The ASTP (Advance Scroll Temperature Protector) is external and mounted on the discharge line for the 20T and 25T.

DV Models

- Compressors are hermetically sealed scroll compressors and are factory-mounted on rubber grommets.
- Compressor features variable-speed operation via an inverter drive.
- Compressor equips the vapor injection, which is controlled by a solenoid valve and motor-operated expansion valve.
- Compressor shall be protected from over-temperature conditions using the discharge pipe temperature or compressor body temperature detected by thermistors, or the estimated compressor port temperature calculated by the PCB.
- Compressors shall be protected from over-amperage conditions based on the compressor input ampacity detected by the inverter PCB.
- Compressors shall be protected from high discharge pressure by the discharge pressure transducer and high pressure switch in the discharge line.

Drain pan

- Unit includes a sloped condensate drain pan made of a non-corrosive material compliant with ASHRAE Standard 62.1. Shall use a ¾" -14 NPT (1" 14 NPT on 15 – 25 ton) drain connection, possible either through the bottom or end of the drain pan.
- Connection shall be made per manufacturer's recommendations. No base pan penetration, other than those authorized by the manufacturer, is permitted.

Filtration

- Unit includes a factory-installed throwaway filter 2" thick, with dimensions selected based on commercial availability and low face velocity. 15 – 25 ton systems can also accept 4" filters.
- Option to include higher filtration rating MERV8 or MERV13 filters.
- Filters are accessible through a tool-less access panel on 3 – 12.5 ton models for fast and easy removal and maintenance.
- Filters shall be held in place by a pivoting filter tray, facilitating easy removal and installation.

Coils

- Gas/electric and air conditioner models utilize aluminum Micro Channel condenser coils. BELC small/ medium only 3 to 12.5 ton.
- Heat Pump Coils are made of internally finned copper tube mechanically bonded to aluminum plate fins and are pressure tested at the factory to ensure pressure and leak integrity. The evaporator coil and condenser coil are leak-tested to 575 psig and pressure-tested to 450 psig.
- 7.5 – 25 -ton units have two refrigerant circuits. 3 – 6-ton and DVH 7.5-10 ton units have a single refrigerant circuit.
- On all 3 – 25 -ton AC, Gas Electric, and Heat Pump (only up to 6 ton) units, each refrigerant circuit has a TXV metering device for indoor and outdoor coils.
- Evaporator and condenser coils are qualified to UL 60335-2-40 burst test. Units include high- and low-pressure switches, service ports, and factory-installed filter driers. All heat pump units use a refrigerant accumulator.

Heating Section

- Gas/Electric units include a corrosion-resistant, indirect fire, aluminized tubular steel heat exchanger with formed wrinkle bends at the inner diameter of each radius.
- Type 409 stainless steel heat exchangers are available as a factory-installed option.
- The gas heating section uses an induced draft combustion blower and a direct spark ignition system. Units are suitable for use with natural gas or propane with a field-installed kit.
- The unit heating section must include the following: high-temperature limit switches, induced-draft motor speed sensors, flame rollout switches, and flame-proving controls.
- All gas piping connecting to unit gas valve shall enter the unit cabinet at a single location on the side of the unit (horizontal plane).
- Low NOx reduction shall be provided as an option to reduce nitrous oxide emissions to meet California's Air Quality Management District (SCAQMD and SJVAPCD) low-NOx emissions requirement of 14ng/J or less.
- Primary tubes and vestibule plates on low NOx units shall be 409 stainless steel. Other components shall be aluminized steel.

Heat Pump Heating

- Heat pump units. Evaporator coil, condenser coil, compressors and refrigerant circuit are designed for heat pump operation. The refrigerant circuit contains a 4-way reversing valve to provide heat. Hybrid heating option is provided for auxiliary heating.

Fans

- Fans in 3-phase and 1-phase equipment are ECM direct-drive, multi-speed motors.
- All motors are thermally protected with permanently lubricated bearings.
- Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating shall be required. Motor to include inherent automatic-reset thermal overload protection or circuit breaker and permanent lubricated bearings.

- Evaporator blowers for sizes 3 – 12.5 -ton consist of single width, single inlet (SWSI) type, Class II construction supply fan with aluminum fan and blades. Evaporator blowers for sizes 15 – 25 -ton consist of (2) 15" double width, double inlet DWDI type, Class I construction supply fan with aluminum fan and blades.
- Shall have slow ramp up to speed capabilities.
- Outdoor condenser fans are direct-drive, permanently lubricated, and contain overload protection.

Cooling Operation Range of Outdoor Ambient Temperature

- The cooling operating range is between 40°F and 125°F outdoor ambient temperature as standard from the factory.
- DVH Operating Range: The cooling operating range is between 23°F and 125°FDB, and the heating operation range is between -13 °F and 60°FWB outdoor ambient temperature as standard from the factory

Storage and Handling

- Unit to be stored and handled per manufacturer's recommendations.
- Unit to be lifted by crane using spread bars.
- Unit to be stored in the upright position.

Refrigerant Detection System (RDS)

- The mitigation system is a stationary device that detects the presence of R-32 refrigerant above 25% LFL using refrigerant sensors and then initiates mitigation actions.
- The mitigation system's primary function is to reduce the concentration of leaked R-32 refrigerant to prevent serious safety hazards.
- The mitigation actions are accomplished by halting HVAC operation and continuing indoor blower operation to provide airflow.
- Once refrigerant concentration reaches below a safe threshold, the unit will remain in mitigation mode for five minutes to evacuate any remaining R-32 refrigerant within the unit. Upon completion, the unit will resume its normal operation.

DVH PCB Controls

- Compressor, condenser fan(s) and blower fan modulation to match the system capacity with the building load.
- Remote/zone controller shall support prohibit functionality to limit zone settings such as mode change, fan speed, setpoint
- EEV control based on the evaporator's superheat or compressor discharge temperature.
- The protection function adjusts the compressor speed when any abnormality is detected.
- Onboard fault detection, which monitors and alerts users of any issues with the system on the remote controller and Main PCB.
- The unit shall equip the freeze protection, which stops the compressor operation when the indoor coil freezing is detected, as a default. The indoor blower continues running to melt the ice, and once the indoor coil temperature rises, the unit restarts the normal operation automatically.
- Factory-installed BACnet® PCB shall support BACnet® MS/TP communication.
- The unit shall have the filter cleaning alarm based on the dirty filter switch input, accumulated run-time, or both.
- Fully modulating Hot Gas Reheat control by utilizing a zone or return air duct Humidity sensor.
- Indoor PCB has Economizer control that provides:
  - — Adjustable parameters for Economizer operation (e.g., minimum position, free cooling setpoint).
  - — FDD that senses and alerts when the Economizer is not operating properly, per California Title 24.
  - — Demand Control Ventilation using a zone or return duct 2-10Vdc CO_2 sensor input. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
- Title 24 Economizer control must support Fixed/differential drybulb, Fixed/differential Enthalpy, demand control ventilation and Free Cooling
- The indoor PCB must enable power exhaust during Economizer mode.
- The unit shall have the system configuration settings, which can be changed from Main PCB or BRC controller.
- The indoor PCB shall have blower-proving-switch software interlock safety function.
- The unit must support Optimum Start and Optimum Stop when connecting with the BRC1NRV72 or newer.
- The PCBs have the run-time calculation function for each main component.
- The indoor PCB has the external output ports, which are energized when any alarm, filter cleaning alarm, Economizer-related alarm, or A2L refrigerant leakage is detected.

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- The unit shall have fully modulating SZ VAV as a standard option that can be enabled or disabled using field settings on the controller or PCB.
- Demand control ventilation shall be a standard option when CO_2 sensor is connected.
- The unit must support Dry mode operation on the base unit for humidity control.
- The unit must support third party zone sensors such as 10K Type III Temperature input, 0-10VDC Humidity sensor, and 2-10VDC CO_2 sensor.
- The unit shall support multi-zone VAV operation by modulating the fan to static pressure setpoint and the compressor to Discharge Air Temp setpoint.
- The unit shall supply 50F to 60F in cooling mode and 76˚F to 95˚F in heating mode when in multi-zone VAV operation.
- The unit must support simultaneous modulating hot gas reheat operation in multi-zone VAV mode.
- The unit shall support write functionality of Temperature, Humidity and CO_2 values from third party BAS.

Accessories And Options — Not All Accessories and Options are Available for all Units.

Factory-Installed Options

- Non-Powered Convenience Outlet: A 115V, 15A, GFCI outlet can be installed in the unit making it easy for technicians to service other units once an electrician runs power to the outlet. Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle. Transformer not included for this option. Outlet shall include a field-installed "Wet in Use" cover.
- Hot Gas Reheat (HELC GAS / AC SMALL & MEDIUM UNITS ONLY): The hot gas reheat feature allows the removal of excess humidity without overcooling the space in cooling or continuous fan modes. This option uses a fully modulating three-way valve in conjunction with the *iLINQ* DDC Controller. Outdoor operating range is 60 – 95 degrees Fahrenheit. Space humidity can be maintained between 40% and 60% relative humidity.
- DVH models to have modulating HGRH accessory.
- Powered Convenience Outlet: A 115V, 15A, GFCI outlet can be powered with a step-transformer built into the unit. For use when the unit is not running. When a factory-installed powered convenience outlet is installed in the equipment, the unit MCA (Min. Circuit Ampacity) will increase by 7.5A for 208/230V units; increase by 3.75A for 460V units; and by 3A for 575V units. The MOP (Max. Overcurrent Protection) device must be sized accordingly. Outlet shall be powered from main line power to the rooftop unit. Outlet shall include a field-installed "Wet in Use" cover.
- Stainless-Steel Heat Exchanger (ALL GAS UNITS): A tubular heat exchanger made of 409-type stainless steel can be installed in the unit.
- Return Air and/or Supply Air Smoke Detectors: Return air and/or supply air smoke detectors can be installed in the unit. To safely identify the presence of smoke inside the air-conditioning system and shut down the blower to prevent the smoke from dispersing into different zones.
- Disconnect Switch (non-fused): A disconnect switch can be installed in the unit with factory wiring complete from the switch to the unit. Please note that, IF ELECTRIC HEAT IS INSTALLED THE DISCONNECT IS SIZED WITH THE ELECTRIC HEATER, IF NO KIT IS SELECTED THE LARGEST ELECTRIC HEAT IS USED TO SIZE THE DISCONNECT FOR LATER FIELD INSTALLATION FOR ALL UNITS. The appropriate electric heat kit must be ordered along with the disconnect switch (non-fused) to be factory-installed. For models with a powered convenience outlet option and a disconnect switch (non-fused) option, the power to the powered convenience outlet will be shut off when the disconnect switch (non-fused) is in the "off" position. National Electrical Code (NEC) and UL approved non-fused switch shall provide unit power shutoff. Disconnect shall be accessible from outside of the unit and provide local shutdown and lockout capability.
- Hinged Access Panels: Allows access to unit's major components. Combined with latches for easy access to control box and blower motor.
- Through-the-base electrical connection: Allows an easy and fast field installation through the unit base pan.
- Through-the-base gas utility connection: Allows an easy and fast field installation through the unit base pan.
- Single Point Power Connection for Power Exhaust: Factory-installed, single-point power connection for field installed modulating power exhaust support.
- Electromechanical Controllers: Basic controls that include terminal block for unit connectivity to T-Stat, including modulating HGRH control.
- Multi-zone VAV: Duct static-based blower speed adjustment is enabled. A field-supplied static pressure sensor and a high static switch are required. DAT (Discharge Air Temperature) control is selectable. DVH units only.

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iLINQ DDC Controller:

The unit shall come with factory-installed DDC controller that should be capable of the following functionality:

- Fully modulating Hot Gas Reheat control by utilizing a zone or return air duct Humidity sensor.
- Demand Control Ventilation using a zone or return duct CO_2 sensor.
- Title 24 Economizer control must support Fixed/Differential Dry bulb, Fixed/Differential Enthalpy.
- Fully adjustable fan speed setting for each of the 5-unit operating modes.
- Lead Lag compressor control for run-time equalization.
- Built-in web server for local area network remote access on the DDC controller.
- Monitor and control the rooftop unit from the web server without the need for controls front-end system.
- Animated 3D equipment graphic of the rooftop unit on the web server
- Monitor up to 10 rooftop units from one master DDC controller without requiring a controls front-end system.
- Direct integration into an *iLINQ* Touch unit for remote monitoring and control of the rooftop unit.
- Monitor up to 10 rooftop units from one touchscreen Room Terminal unit.
- Onboard fault detection that monitors and alerts the users of any issues with the system on the web server, *iLINQ* Touch display, and the DDC controller.
- DDC controller shall have Ethernet connection capability to be accessible on customer's Wi-Fi network.
- DDC controller shall have two ethernet ports for easier daisy chain connection of multiple RTU's.
- DDC controller shall support BACnet® MS/TP and BACnet® IP communication.
- DDC controller must support Optimized Start and Optimized Stop without the need for front end control system.
- DDC controller must enable power exhaust during Economizer mode.
- DDC controller must have onboard trend data for at least 30 days.
- DDC controller must provide access to trend data remotely on the web server without the need for front end control system.
- DDC controller must have an onboard time clock with 7-day weekly scheduling and 14 holiday event scheduling capability, without the need for front end control system.
- DDC controller shall be capable of backup/restore parameter function without the need for front end control system or controls contractor.
- DDC controller shall have export capability of trend logs as .CSV file.
- DDC controller shall have export capability of at least 200 Alarm records as .CSV file.
- DDC controller shall have easy copy/paste functionality to move configuration file from one controller to another.
- DDC controller shall have Blower proving switch software interlock equipment safety function.
- DDC controller shall support SCR electric heat function.
- DDC controller shall have Dirty filter alarm based on external device input or run-time calculation.
- DDC controller shall have in-built equipment Run-time calculator.
- DDC controller shall have Remote Start/Stop occupancy input.
- DDC controller shall have Load shedding input switch.
- Automatic Daylight saving time adjustment.
- Onboard LCD for local commissioning.
- R-32 (A2L) refrigerant leak detection system description.

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Field-Installed Options

- Manual Fresh Air Damper: Manual damper package shall consist of damper, air inlet screen, and rain hood which can be preset to admit up to 25% outdoor air for year-round ventilation.
- Motorized Fresh Air Damper: A two-position damper with rain hood and screen provides 25% outside air when the indoor fan starts and closes when the indoor fan shuts down. Consists of actuator, damper, air inlet screen, and rain hood. Damper shall close upon indoor (evaporator) fan shutoff and/or loss-of-power. The damper actuator shall plug into the rooftop unit's wiring harness plug. No hard wiring shall be required.
- Horizontal Economizer: Fully modulating between 0 and 100%, contains seals that meet ASHRAE 90.1 requirements. Includes controls, motor, dampers, minimum position settings, a preset linkage, a wiring harness with plug, a mixed-air temperature sensor, enthalpy or dry bulb control, and a barometric relief damper. An optional duct-mounted barometric relief damper is available. An optional return enthalpy sensor is available to provide comparative or differential enthalpy control. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or return shall not be acceptable. The Economizer damper type has been tested using the AMCA 511 guidelines under Section 14 "Volume Control Damper". The dampers used on these Economizers are MicroMetl NS1 series or McDaniel Metals and have been tested and are listed by AMCA as Class 1A dampers. Class 1A dampers have a leakage rate of no more than 3 cfm per square foot at 1" static pressure. Shall be designed to close damper(s) during loss-of-power conditions with spring return built into motor. Economizer controller shall accept a 2-10 Vdc CO_2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
- Economizer controller when used without *iLINQ* DDC controller, shall be Honeywell® JADE® W7220 that provides:
  - 2-line LCD interface screen for setup, configuration, and troubleshooting.
  - Onboard Fault Detection and Diagnostics (FDD) that senses and alerts when the Economizer is not operating properly, per California Title 24.
  - Sensor failure loss of communication identification.
  - Automatic sensor detection.
  - Capabilities for use with multiple-speed indoor fan systems.
  - Utilize digital sensors: Dry bulb and Enthalpy.
  - Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.
- Power Exhaust: Power exhaust shall be used in conjunction with an integrated Economizer. These accessory exhausts return air and may be used in either downflow or horizontal (duct-mounted) applications. Horizontal power exhaust shall be mounted in return duct work. Power exhaust shall be controlled by Economizer controller operation. Exhaust fans shall be energized when dampers open past the 0-100% adjustable setpoint on the Economizer control. (Damper to be field-installed, all wiring and accessory set-up is factory-installed)
- High Altitude Kit (ALL GAS UNITS): Can be used in gas/electric units operating at higher altitudes.
- LP Conversion Kit (ALL GAS UNITS): Allows gas/electric package units to use propane fuel.
- Roof curbs: Full perimeter roof curb. Two different heights 14" and 24", allows proper installation and structure stability. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
- Concentric duct kits: designed to provide a single-point, air distribution system with the added benefit of having directional air control.
- Restraint mounting clips: Allows for installation reinforcement for Hurricane and/or seismic events.
- CO_2 sensor: Sensor designed to alarm the system when the CO_2 levels are outside safe parameters.
- Flue extension: Allows the exhaust gas produced by the gas heater to be redirected.
- Burglar Bar Sleeves: Designed to prevent the access thru the return or supply ducting inside the unit.
- Downflow square to round adaptor 18": Installed into a recessed portion of the roof curb, the concentric duct adaptor changes the orientation of the duct work from square to round for applications utilizing that type of ducting system.
- Side discharge concentric diffuser system: The Concentric diffuser system is an all-in-one supply and return duct free arrangement for RTU systems. This system comes with two separate duct connections, one for a supply and another for a return.
- Remote indoor sensor: Remote sensor to monitor the temperature on zones away from the main thermostat.
- Freeze stat: Temperature sensing device that monitors the heat exchange to prevent the coil from freezing.
- Filtration: 2" MERV8 and MERV13 filters available for high air filtration requirements.

Factory- or Field-Installed Options

- Downflow Economizer: Fully modulating between 0 and 100%, contains seals that meet ASHRAE 90.1 requirements. Includes controls, motor, dampers, minimum position settings, a preset linkage, a wiring harness with plug, a mixed air temperature sensor, enthalpy or dry bulb control, and a barometric relief damper. An optional return enthalpy sensor is available to provide comparative or differential enthalpy control. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or return shall not be acceptable. The Economizer damper type has been tested using the AMCA 511 guidelines under Section 14 "Volume Control Damper". The dampers used on these Economizers are MicroMetl NS1 series or McDaniel Metals and have tested and are listed by AMCA as Class 1A dampers. Class 1A dampers have a leakage rate of no more than 3 cfm per square foot at 1" static pressure. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor. Economizer controller shall accept a 2-10 Vdc CO_2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
- Economizer controller (when used without *iLINQ* DDC controller) shall be the Honeywell® W7220 that provides:
  - 2-line LCD interface screen for setup, configuration, and troubleshooting.
  - Onboard Fault Detection and Diagnostics (FDD) that senses and alerts when the Economizer is not operating properly, per California Title 24.
  - Sensor failure loss of communication identification.
  - Automatic sensor detection.
  - Capabilities for use with multiple-speed indoor fan systems.
  - Utilize digital sensors: Dry bulb and Enthalpy.
  - Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.
- Electric Heat Kits (ALL COOLERS AND HEAT PUMPS): Heater elements are constructed of rust-resistant nickel chromium and are available in 240V-1-phase-60Hz, 240V-3-phase-60Hz, 480V-3-phase-60Hz and 575V-3-phase-60Hz. All heaters have overcurrent protection and high-temperature limit control. A single-point wiring connection is provided through a terminal block. Electric heaters are provided with staged heating as standard and option to upgrade to SCR controls.
- Phase Monitor: Phase monitor (3-phase only), available for 3 – 25-ton DS and DH series models. Phase monitor shall provide protection for motors and compressors against problems caused by phase loss, phase reversal and phase unbalance. Phase monitor is equipped with an LED that provides an ON or FAULT indicator.
- Drain pan overflow switch: Allows the controls to detect and send an alarm when there is an overflow on the drain pan. NOT AVAILABLE FOR SMALL CHASSIS.
- Condenser Hail Guards: Louvered metal guards help protect the condenser coil from hail and debris; available as a field-installed or factory-installed options on 3 – 25-ton units.

STANDARD WARNING/ DISCLAIMERS

WARNING

ONLY PERSONNEL THAT HAVE BEEN TRAINED TO INSTALL, ADJUST, SERVICE, MAINTENANCE OR REPAIR (HEREINAFTER, "SERVICE") THE EQUIPMENT SPECIFIED IN THIS MANUAL SHOULD SERVICE THE EQUIPMENT.

THIS EQUIPMENT IS NOT INTENDED FOR USE BY PERSONS (INCLUDING CHILDREN) WITH REDUCED PHYSICAL, SENSORY OR MENTAL CAPABILITIES, OR LACK OF EXPERIENCE AND KNOWLEDGE, UNLESS THEY HAVE BEEN GIVEN SUPERVISION OR INSTRUCTION CONCERNING USE OF THE APPLIANCE BY A PERSON RESPONSIBLE FOR THEIR SAFETY.

CHILDREN SHOULD BE SUPERVISED TO ENSURE THAT THEY DO NOT PLAY WITH THE EQUIPMENT.

THE MANUFACTURER WILL NOT BE RESPONSIBLE FOR ANY INJURY OR PROPERTY DAMAGE ARISING FROM IMPROPER SUPERVISION, SERVICE OR SERVICE PROCEDURES. IF YOU SERVICE THIS UNIT, YOU ASSUME RESPONSIBILITY FOR ANY INJURY OR PROPERTY DAMAGE WHICH MAY RESULT. IN ADDITION, IN JURISDICTIONS THAT REQUIRE ONE OR MORE LICENSES TO SERVICE THE EQUIPMENT SPECIFIED IN THIS MANUAL, ONLY LICENSED PERSONNEL SHOULD SERVICE THE EQUIPMENT. IMPROPER SUPERVISION, INSTALLATION, ADJUSTMENT, SERVICING, MAINTENANCE OR REPAIR OF THE EQUIPMENT SPECIFIED IN THIS MANUAL, OR ATTEMPTING TO INSTALL, ADJUST, SERVICE OR REPAIR THE EQUIPMENT SPECIFIED IN THIS MANUAL WITHOUT PROPER SUPERVISION OR TRAINING MAY RESULT IN PRODUCT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

WARNING

DO NOT BYPASS SAFETY DEVICES.

This manual is to be used by qualified, professionally trained HVAC technicians only. Daikin does not assume any responsibility for property damage or personal injury due to improper service procedures or services performed by an unqualified person.

IMPORTANT INFORMATION

IMPORTANT NOTICES

RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS

WARNING

TO PREVENT THE RISK OF PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH, DO NOT STORE COMBUSTIBLE MATERIALS OR USE GASOLINE OR OTHER FLAMMABLE LIQUIDS OR VAPORS IN THE VICINITY OF THIS APPLIANCE.

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



WARNING

THIS UNIT SHOULD NOT BE CONNECTED TO, OR USED IN CONJUNCTION WITH, ANY DEVICES THAT ARE NOT DESIGN CERTIFIED FOR USE WITH THIS UNIT OR HAVE NOT BEEN TESTED AND APPROVED BY THE MANUFACTURER. SERIOUS PROPERTY DAMAGE OR PERSONAL INJURY, REDUCED UNIT PERFORMANCE AND/OR HAZARDOUS CONDITIONS MAY RESULT FROM THE USE OF DEVICES THAT HAVE NOT BEEN APPROVED OR CERTIFIED BY THE MANUFACTURER.

WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.) Do not pierce or burn. Be aware that refrigerants may not contain an odor.

WARNING

Only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.

SAFE REFRIGERANT HANDLING

While these items will not cover every conceivable situation, they should serve as a useful guide.

WARNING

Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding 700°C and electric switching devices.

WARNING

The compressor POE oil for R-410A units is extremely susceptible to moisture absorption and could cause compressor failure. Do not leave system open to atmosphere any longer than necessary for installation.

WARNING

Refrigerants are heavier than air. They can "push out" the oxygen in your lungs or in any enclosed space. To avoid possible difficulty in breathing or death:

- Never purge refrigerant into an enclosed room or space. By law, all refrigerant must be reclaimed.
- If an indoor leak is suspected, thoroughly ventilate the area before beginning work.
- Liquid refrigerant can be very cold. To avoid possible frostbite or blindness, avoid contact with refrigerant and wear gloves and goggles. If liquid refrigerant does contact your skin or eyes, seek medical help immediately.
- Always follow EPA regulations. Never burn refrigerant, as poisonous gas will be produced.

WARNING

To avoid possible injury, explosion or death, practice safe handling of refrigerants.

WARNING

To avoid possible explosion:

- Never apply flame or steam to a refrigerant cylinder. If you must heat a cylinder for faster charging, partially immerse it in warm water.
- Never fill a cylinder more than 80% full of liquid refrigerant.
- Never add anything other than R-22 to an R-22 cylinder or R-410A to an R-410A cylinder. The service equipment used must be listed or certified for the type of refrigerant used.
- Store cylinders in a cool, dry place. Never use a cylinder as a platform or a roller.

OUTSIDE THE U.S., **call 1-713-861-2500**.
(Not a technical assistance line for dealers.) Your telephone company will bill you for the call.

IMPORTANT INFORMATION *(CONTINUED)*

WARNING

To avoid possible explosion, use only returnable (not disposable) service cylinders when removing refrigerant from a system.

- **Ensure the cylinder is free of damage which could lead to a leak or explosion.**
- **Ensure the hydrostatic test date does not exceed 5 years.**
- **Ensure the pressure rating meets or exceeds 400 lbs.**

When in doubt, do not use cylinder.

QUALIFICATION OF WORKERS

Personnel must be certified to service, work, and/or repair units with FLAMMABLE REFRIGERANTS. A certificate should document the competence and qualification achieved through training that included the substance of the following:

• Information about the explosion potential of FLAMMABLE REFRIGERANTS to show that flammables may be dangerous when handled without care.

• Information about POTENTIAL IGNITION SOURCES, especially those that are not obvious, such as lighters, light switches, vacuum cleaners, electric heaters.

• Information about the different safety concepts, including ventilated and unventilated areas.

• Information about refrigerant detectors, including function, operation, and service measures.

• Information about the concept of sealed components and sealed enclosures according to IEC 60079-15:2010.

• Information about the correct working procedures, including commissioning, maintenance, repair, decommissioning, and disposal procedures.

Our continuing commitment to quality products may mean a change in specifications without notice.
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