Williamson Cooling Ltd

Quotation

PLANNING
PLAN No. Addonwlw
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DX 20kW Indirect Free cooling option
Indoor Unit Quantity 5
GEA-DENCO T-Range U28FVGH

Compact DX water cooled air handling unit with internal compressors and free cooling function.

External Dry Cooler.

Ambicool Function

Units fitted with the Ambicool function can provide free cooling for long periods resulting in substantial energy and running cost savings. The system uses a DX water cooled circuit that rejects heat removed from the space to a water cooled condenser and then via a water /glycol mix to an external Dry Cooler. When the water / glycol temperature is colder than the room air, it is diverted through a free cooling coil before reaching the water cooled condenser, picking up some heat directly from the room rather than from the refrigeration system. Under conditions such as this, the compressor run time is reduced, thereby saving energy.

Up-flow unit

- Return air f room the conditioned space enters the unit through a front mounted grille.
- The air passes through the unit, is conditioned, and is discharged to the space from the top.
- Main Filter Grade G4.
- Filters are located on the return air face of the cooling coil.
- Filter replacement is from the front of the unit.
- Filters are controlled by an adjustable differential pressure switch, if a preset differential pressure is exceeded, a maintenance message is activated.

Fan

- The air handling unit is fitted with a double inlet, double width (DIDW) fan with forward curved blades.
- Integral 3 speed motor.
- Fan with low vibration impeller, statically and dynamically balanced.
- The fan and motor arrangement is fitted on anti vibration mounts.
- Internal overheat protection.
- Fan operation is monitored using an airflow sensor. In the event of a fan failure all other unit functions are interlocked to prevent their operation.

Refrigeration circuit

- Refrigeration circuit pipe work is contained within the unit.

- Filter drier, charging valve, sight glass
- Suction line is provided with vapour sealed insulation.
- For continuous capacity control a hot gas bypass valve is installed in the unit.
- Depending on suction pressure the valve is opened up to 75% of the bypass line.
- Discharge gas is directed into the evaporator suction header.
- Refrigerant injection is performed using a thermostatic expansion valve with external
- Pressure equalisation and a separate liquid solenoid valve.

Compressor

- High performance fully hermetic suction gas cooled scroll compressor in compact configuration
- Suction and discharge side shut off valves
- Oil filling
- Motor protection against over current and thermal overload.
- High pressure switch with manual reset
- Low pressure switch with automatic reset
- Fitted on rubber anti-vibration mounts

Free cool water control valve

- Fully modulating 3 way control valve with drive open / drive closed actuator.
- Fitted in the return side of the hydraulic circuit.
- Manual override in the case of an emergency.

Cooling coil

- Internally grooved copper tubes with aluminium fins.
- Coil inclined within the unit.
- Stainless steel condensate tray with trap at the bottom of the unit.

Electric heating

- 3 phase heater bank.
- Stainless steel hairpin heater elements with stainless steel fins.
- Overheat protection thermostat with manual reset.

Steam Humidifier

- The humidifier is designed for connection to a normal mains water supply and is suitable for use across a wide water conductivity range.
- Sterile, odourless and mineral deposit free steam is generated in a high density plastic cylinder.
- High performance electrodes and auto adaptive drain cycle for long service life.
- Continuous proportional steam production based on deviation from set point.
- The humidifier is mounted on a corrosion free plastic frame.
- Inlet and outlet solenoid valves.
- Inlet water filter.
- High pressure water connection.

Water Cooled Condenser

- Stainless steel brazed plate heat exchanger.

- Plate surfaces optimised to avoid build up of deposits.
- Fully connected to refrigeration within unit.
- Requires water connections and fitting of external trainer by others.

Casing

- Welded frame construction with flush fitting doors and panels.
- Internal Aluzink components.
- Compression locks to all doors and panels with a special key.
- Front access only required for installation and maintenance.
- All doors and panels are lined with 25 mm thick, non-eroding, non- combustible insulation with thermal and acoustic properties.
- Panels are polyester pre coated steel to colour RAL7024.

Control Panel

Integral control panel wired in accordance with EN60204 and complete with the following components:

- incoming mains supply terminals, suitable for 400V/3Ph/N/50Hz supply
- Circuit breakers for individual components to provide protection against overload and short circuit all necessary contactors.
- Front mounted door interlocked isolator allowing the unit to be electrically disconnected without opening the unit doors.
- Colour coded and numbered wiring in accordance with the wiring diagram.

Electronic controls

The control system is a modular microprocessor based electronic control and steering system Consisting of a control terminal and a basic module. The control terminal enables to display and enter settings and includes a graphical LC display with buttons.
All operation statuses (e. g. operation, cooling, heating, dehumidification and humidification) are constantly displayed using graphical symbols. Data to be shown in the main display can be selected in the menu. All functions and operation statuses as well as a maximum of 70 alarm messages or alarm switch offs can be retrieved using structured and self-explanatory menus.

Electronic control comprises the following functions:

- Monitoring and operation of the basic module
- Changing operation parameters with password protection divided in independent levels for users, customer service and manufacturer.
- Visual display of alarm messages in plain text.
- Functional buttons and operation messages by using graphical symbols
- Display of operation parameters/actual values
- Operation hours display in plain text
- Status display in plain text
- Room temperature and humidity control
- Switching between compressors depending on operation hours for equal load distribution
- Minimising compressor switch cycles
- Interval between starting sequences of a compressor.

Monitoring of all important components in terms of proper functioning:

- Air flow, filter contamination
- High and low pressure per compressor,
- Thermoswitch for electric heating (if available),
- Humidifier functions like current consumption drain cycle and cylinder condition, as well as monitoring of all sensors. (if available)
- Power failure-safe settings by using of EE-PROM.

Following contacts are available

- Unit isolation through external monitoring sensors, e.g. fire, smoke, carbon dioxide sensors possible.
- Collective fault messaging for communication of alarms
- Maintenance message
- Connection possibility for remote switch by others
- Transmission of a collective fault message
- volt free status contacts

Denco Net function

- Inbuilt controller function allowing sequence control for a number of units
- One unit is always selected as standby.

Water detector

- Water level sensor in condensate tray. 5 m sensor cable for routing below unit. 3 m connection cable.
- Water detection sensors are connected to the unit controller. When water is detected an alarm message appears on the unit display.
- Water detection terminals are provided in the unit for connection by others of water detection tape.

Temperature and humidity sensor installed in unit return air Manual-Off-Auto switch

- Allows individual manual - off - auto operation of unit functions via in unit switches.
- Accessible only to service and maintenance personnel Technical data indoor unit

Selection data		
Gross total capacity	kW	26, 71
Gross sensible capacity	kW	24, 75
Net total capacity	kW	24, 0
Net sensible capacity	kW	22, 1
Dehumidification capacity	kW	1, 96
Sensible heat ratio	SHR	0,927
Heat of Rejection	kW	35, 9

Air quality		
Air inlet dry bulb temperature	°C	22, 0

Air inlet relative air humidity	%	45
Air inlet wet bulb temperature	°C	14, 7
Air outlet dry bulb temperature	°C	13, 2
Air outlet wet bulb temperature	°C	10, 4
General		
Air path		up flow (top discharge)
Humidifier installed		Humidifier Standard
Humidifier capacity	kg/h	3.0
Electric heating installed Electric heating		
Electric heating capacity	kW	12, 0
Filter type	G4	Filter
Sound power level	dB	91
Sound pressure level Free Field	dB (A)	65
Acoustic Pressure Distance	m	2
Electrical Data		
Supply voltage		3~400V, 50Hz voltage
basic unit		
Operation current	A	48
Fans		
Air volume flow		m^3/s 2,070 m^3/s
External pressure	Pa	49
Fan motor exhaust heat	kW	2, 69
Speed setting		AC fan - high speed
WC Condenser		
Coolant		Water/Glycol
Glycol concentration	%	25
Coolant Inlet Temperature	°C	40, 0
Coolant Outlet Temperature	°C	46, 0
Coolant Volume Flow l/s		1,519
Heat exchanger pressure loss		bar 0,506
Unit pressure loss		bar 0, 96
Refrigeration Circuit		
Refrigerant		R407C refrigerant
Compressor type		Scroll
Number of compressors per circuit		2
Refrigeration circuits		1
Power Consumption per Compressor	kW	4, 61

Dimension and weight of indoor unit

Length mm 1252

Width mm 685
Height mm 1940
Weight kg 460
Indoor unit connections
Cool water inlet mm 35
Cool water outlet mm 35
Humidifier mm 15
Condensate drain mm 22
Manufacturer GEA Denco type TU028FVGH

Plinths Quantity 5
Plinth 200 mm high

Used to facilitate services entry to unit. Rigid sheet steel construction with unit matching covers. Services entry points covered by sheet steel plates. Top flange matches unit size and is supplied with 3mm thick gasket.

Dry Cooler
Quantity 5
Air cooled dry cooler DDRA75-6

General
- Suitable for outdoor installation.
- ISO 9001 quality standard.
- Weatherproof frame and panels.
- Mounting feet can be configured on site to allow vertical or horizontal air distribution.

Heat exchanger
- Multiple row heat exchanger with inner grooved tubes and aluminium fins spaced at 2mm intervals.
- The heat exchanger is evacuated and supplied with a nitrogen holding charge.
- Copper distribution and header piping suitable for water/water glycol mixture

Fan
- Direct driven low noise axial fan
- With contact protection grille according to DIN 31001and 24167
- Statically and dynamically balanced
- Suitable for air inlet temperatures -25 up to 50°C
- Protection type IP54 and insulation material class F.
- Internal motor thermal protection contacts.

Mains isolator

- Side mounted mains isolator in interlocked enclosure allowing electrical isolation of the unit.

Technical data outdoor unit

Chilled water		
Coolant		Water/Glycol
Glycol concentration	%	25
Chilled water inlet temperature	°C	46, 0
Chilled water outlet temperature	°C	40, 0
Chilled water volume flow	m^3/h	6,321
Unit pressure loss	kPa	15, 95
Ambient temperature	°C	35, 0
Sound pressure level Free Field	dB (A)	55
Acoustic Pressure Distance	m	10
Heat of Rejection	kW	41, 6
Maximum operating current	A	9, 9
Power Input		W 3 x 670

Dimension and weight per outdoor unit

Length mm 2780
Width mm 1067.0
Height mm 945
Weight kg 270
Connections outdoor unit
Pipe Diameter IN mm 54
Pipe Diameter OUT mm 54
Manufacturer GEA Denco type **DDRA075-06**
Hydronic Module
Quantity 5

Hydronic module is for external use and should be located local to the dry coolers. Each dry cooler consists of a pump, expansion vessel and flow.

Extras added to pipe-work during installation (per circuit)

- Water supply to system
- Filling point for Glycol
- Strainer and local isolation valves
- Air vent
- Flow and return temp gauges, pressure gauge.
- Isolation valves for the dry coolers

- Install 2 x condensers to North side (railway) outside of cage in 2 available spaces.
- Install 3 x condensers to South side using route of existing services.
- Drain tray and hot water condensate pump at extra cost (to be confirmed)
- New Denco units to be connected to existing ductwork.
- Mains supply by others 48 amp x 3 phase + N + E