2.0 System Description

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MECHANICAL VENTILATION

Introduction

This system description is for the mechanical ventilation systems provided throughout the building.

Standards

Where applicable the systems have been designed and installed, in accordance with, but not limited to:

- *Building Regulations Part F*
- *HVCA DW144.*

Design

The mechanical ventilation system is designed to meet the specified flow rates and air changes. The mechanical supply and extract design rates can be seen within the provided technical schedules.

Mechanical Ventilation Heat Recovery

Description

Mechanical supply and extract ventilation with heat recovery to the Main Office, Single Offices, Reception, Gym, Canteen and Meeting Room Spaces.

MVHR Units

Ground Floor:

8-no Mitsubishi LGH-200RVXT-E heat recovery units (HRU-0.0.1 - 0.0.8)
1-no Mitsubishi LGH-65RVX-E heat recovery units (HRU-0.0.9)
1-no Air Vent Technology HRPSL-350EC heat recovery units (HRU-0.0.10)

MVHR units are single phase connected to a local power isolator and are suspended above grid ceilings as detailed on the record drawings.

Controls

Each Mitsubishi MVHR unit is hard-wired to a dedicated Mitsubishi PZ-61DR-E controller which is situated on the unit. The controller is only to be used for commissioning purposes. The Air Vent Technology MVHR unit is hard wired to a dedicated HRCPB-P controller which is situated on the unit. The controller is only to be used for commissioning purposes..

All units are also hardwired back to a centralised AE200-E controller.

Ductwork

Ductwork extends between the MVHR units, fresh air and exhaust louvres and supply and extract ceiling diffusers as detailed on the record drawings.

Ductwork has been installed using galvanised steel spiral duct and fittings.

Connections to MVHR units, louvres and diffusers are made using insulated/ acoustic flexible ducting.

Access doors are provided in ducts in positions indicated on the record drawings.

Volume Control Dampers

Single blade volume control dampers are provided in all branch ducts as detailed on the record drawings.

Fire Dampers

Fusible link curtain type fire dampers are provided in ducts passing through any fire rated walls. The dampers are fixed to the building primary steelwork.

Connecting ducts are fixed with nylon fixings in order to break away without stress to the damper.

An access door is provided in the duct at each fire damper for inspection and testing.

Sound Attenuators

Sound attenuators are provided in ductwork room side of each MVHR unit.

Cross-talk attenuators

Cross-talk attenuators are provided in ducts passing between rooms.

Diffusers and Louvres

As scheduled on the record drawings.

Each diffuser and louvre are complete with a connecting plenum.

Extract Ventilation

Description

Inline extract fans serves the spaces listed.

Extract Fan

1no Vent Axia ACM200 inline fan.
1no Air Vent Technology QST200 inline fan.
1no Air Vent Technology QST150 inline fan.
1no Air Vent Technology QST250 inline fan.

The fans are single phase and located above the on the ground floor. EF0.0.4 is located on the mezz floor within the ground floor plantroom.

Controls

Reception Coffee/Drinks Point

Extract to the reception coffee/drinks point is controlled by an on/off air flow switch from HRU0.0.8.

Toilets and Shower Rooms

Scheduled extract ventilation provided by inline fans controlled via the centralised AE200-E controller.

The extract fan within the ground floor disabled WC and shower room is controlled via an independent system with PIR and separate fire shutdown. NOT via the AE200-E centralised controller.

Ductwork

Ductwork extends between the extract air valves, the fans, and the external exhaust air louvres. EF 0.0.3 ductwork extends between the extract return grille for the reception coffee/drinks area and discharges at the bell mouth of HRU0.0.8.

Ductwork has been installed using galvanised steel spiral duct and fittings. Final connections to the fan are made using flexible duct.

Fire Dampers

Fusible link curtain type fire dampers are provided in ducts passing through any fire rated walls. Connecting ducts are fixed with nylon fixings in order to break away without stress to the damper.

An access door is provided in the duct at each fire damper for inspection and testing.

Extract Air Valves

As scheduled on the record drawings.

Fire Alarm – Forced Shut Down

All MVHR and Extract fan units other than the Ground Floor Disabled WC/Shower Room & Reception coffee/drinks area (EF 0.0.2 & 0.0.3) are hardwired to the centralised AE200-E controller which forces shutdown on fire alarm.

The Ground Floor Disabled WC/Shower EF 0.0.2 is shut down from a separate shut down system.

Reception coffee/drinks area EF 0.0.3 runs from an air pressure on/off switch from HRU 0.0.8 and shuts down from the HRU.

AIR-CONDITIONING

Introduction

This system description is for the air-conditioning systems provided throughout the building for comfort heating and cooling purposes.

Standards

Where applicable the systems have been designed and installed, in accordance with, but not limited to:

- *The F-Gas Regulations*
- *Manufacturer's Instructions*

Design

Minimum winter external temperature for design purposes: -3°C.

Maximum summer external temperature for design purposes: 30°C db.

Internal temperature (winter): 21°C +/-2°C (at steady state conditions).

Internal temperature (summer): 23°C +/-2°C (at steady state conditions).

No Humidity Control.

Heat Gain Allowances can be seen within the issued technical schedules.

VRF (Variable Refrigerant Flow) Air-conditioning

Description

VRF Air-conditioning systems provide comfort heating and cooling to single room offices, reception, gym, canteen and meeting rooms.

Air-conditioning Equipment

Ground Floor:

11-no Mitsubishi PEFY-P125VMA-E3 ducted indoor unit.
2-no Mitsubishi PEFY-P100VMA-E3 ducted indoor unit.
6-no Mitsubishi PEFY-P25VMA-E2 ducted indoor unit.
5-no Mitsubishi PEFY-P20VMA-E2 ducted indoor unit.
1-no Mitsubishi PEFY-P32VMA-E2 ducted indoor unit.
1-no Mitsubishi PEFY-P50VMA-E2 ducted indoor unit.
3-no Mitsubishi PURY-P900YSNW-A outdoor unit.
1-no Mitsubishi PURY-P800YSNW-A outdoor unit.

First Floor:

10-no Mitsubishi PEFY-P125VMA-E3 ducted indoor unit.
7-no Mitsubishi PEFY-P25VMA-E2 ducted indoor unit.
1-no Mitsubishi PEFY-P50VMA-E2 ducted indoor unit.
1-no Mitsubishi PEFY-P40VMA-E2 ducted indoor unit.
1-no Mitsubishi PEFY-P63VMA-E2 ducted indoor unit.

The outdoor units are 3-phase each connected to a local power isolator. The units are located in a central compound mounted directly onto a concrete base and enclosed fencing complete with double gate.

Branch selector boxes are suspended above grid ceilings as detailed on the drawings. The units are single phase each connected to a local power isolator.

Indoor units are suspended in grid ceilings as detailed on the drawings other than the wall mounted units within the comms room. The units are single phase each connected to a local power isolator.

Controls

The controls to single room offices, reception, gym, canteen and meeting rooms are controlled via local Mitsubishi PAR-33MAA-J controllers which can also be overridden by the centralised controller.

The controls to the main office are controlled solely via the centralised AE-200E controller.

Fire Alarm – Forced Shut Down

All AC units are hardwired to the centralised AE200-E controller which forces shutdown on fire alarm.

Refrigerant

The VRF air-conditioning systems are charged with R410A refrigerant.

Refrigeration Pipework

Refrigeration pipework extends between each outdoor unit and the associated branch selector boxes and indoor units.

Pipework has been installed using refrigeration grade copper tube and fittings supported on cable baskets/ trays.

Condensates

The condensates are installed from the indoor units and discharges to ground within the condenser compound as detailed on the record drawings.

First Floor Comms Room – Cooling System

Description

3-no dedicated single split air-conditioning system to provide cooling only.

Air-conditioning Equipment

3-no Mitsubishi PKA-M100KA wall mounted indoor units.
3-no Mitsubishi PUHZ-P100YKA outdoor units.

The systems are rated at 9.4 kW nominal cooling.

The systems are rated at 11.2 kW nominal heating.

The outdoor units are 3-phase and connected to a local power isolator. The units are located on the external as per the record drawings.

The indoor units are wall mounted within the Comms Room as detailed on the drawings. The units are single phase and is powered from the outdoor unit.

Controls

Power and control wiring extends between the outdoor and indoor unit.

The indoor units are controlled by a Mitsubishi PAR-33MAA-J controller hard-wired to the units. The controllers are located in the Comms Room.

Refrigerant

The single split air-conditioning system is charged with R410A refrigerant.

Refrigeration Pipework

Refrigeration pipework extends between the outdoor unit and the indoor unit.

Pipework has been installed using refrigeration grade copper tube and fittings supported on cable baskets/ trays.

Condensates

The condensates are installed from the indoor units and discharges to ground within the condenser compound as detailed on the record drawings.

COMMS ROOM TEMPRATURE CONTROL

Room Over Temperature Alarm Panel

The temperature of the comms room is monitored via a room temperature sensor which is hardwired to a RTA2-2 room over temperature alarm panel. When the set point is reached the panel will set off a flashing warning beacon located within the comms room and send an SMS text to the appointed device.

THERMAL INSULATION

Thermal Insulation of Ductwork

Insulation Thicknesses

Insulation thicknesses for ductwork conveying air for ventilation are in accordance with the building regulations non-domestic compliance guide.

Insulated Ducts

Ductwork is thermally insulated using foil faced fibreglass duct wrap with taped joints where detailed on the record drawings.

Thermal Insulation of Refrigeration Pipework

Insulation Thicknesses

Insulation thicknesses for refrigeration pipework are in accordance with the manufacturer's recommendations.

Insulated Refrigeration Pipework

Refrigeration pipework is fully insulated using black class O insulation.

TESTING AND COMMISSIONING

Mechanical Ventilation

- Commissioning of air systems.

Air-conditioning

- Pressure testing of refrigeration pipework systems.
- Charging of refrigeration systems.
- Testing of condensates.
- Commissioning of air-conditioning systems.

ELECTRICAL

First Logic provided the following electrical works associated with the mechanical services installation:

- Power supplies and isolators to all new plant and equipment.
- Cross-bonding.
- Fire alarm relay interfaces.