# AHU Technical Data
# Birkbeck College Clore Building
# Recuperator Option
# GEA Ref 108900

**GEA CAIRplus SX 128.160AVVV**
**Plant: Recuperator option**

| | |
|---|---|
| unit data 1 | |
| function | Supply air |
| volume flow | 17856 m³/h |
| Velocity | 2.42 m/s |
| unit data 2 | |
| function | Return air |
| volume flow | 17856 m³/h |
| Velocity | 2.42 m/s |
| Eurovent- | |
| AHU Energy Efficiency Class | D |
| Layout temperature Eurovent | -10.0 °C |
| RLT Energie Effizienz Klasse | |
| SFPv (EN 13779) | 2.55 KW/m3/s |
| | |
| Application: | Standard |
| Installation site: | Outdoor installation |
| Air direction: | Horizontal |
| Arrangement type: | Double deck |

**Unit part 1**

| | |
|---|---|
| - Casing in standard version | |
| - Casing wall thickness | 50mm |
| - Casing characteristics according to prEN 1886 (2007)* | |
| - Mechanical stability | D1 (R) |
| - Casing leakage | L2 (R) |
| - Filter bypass leakage | F9 |
| - Thermal insulation | T3 |
| - Thermal bridging factor | TB3 |
| - Heat transfer ratio of panel construction | K = 0.57 W/m2K |

**Insertion loss value according to DIN EN 1886**

| [Hz] | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|
| [dB] | 17 | 21 | 27 | 30 | 31 | 31 | 40 |

* Based on model box test


**Denco Ltd**
Moreton Business Park
GB - Moreton-on-Lugg, Hereford HR4 8DS

(R) real unit test

**Material quality**

**- Inner skin**

Aluzink sheet steel with anti-fingerprint coating (FeP02G AZ 185)
Corrosion protection class III per DIN 55928 Part 8, suitable for outside installation

**- Outer skin**

Aluzink sheet steel with anti-fingerprint coating (FeP02G AZ 185)
Corrosion protection class III per DIN 55928 Part 8, suitable for outside installation

**- Interior parts**

Galvanized sheet steel or equivalent

**- Frame profiles**

Aluminium AlMgSi 0.5

**Unit part 2**

| | |
|---|---|
| - Casing in standard version | |
| - Casing wall thickness | 50mm |
| - Casing characteristics according to prEN 1886 (2007)* | |
| - Mechanical stability | D1 (R) |
| - Casing leakage | L2 (R) |
| - Filter bypass leakage | F9 |
| - Thermal insulation | T3 |
| - Thermal bridging factor | TB3 |
| - Heat transfer ratio of panel construction | K = 0.57 W/m2K |

**Insertion loss value according to DIN EN 1886**

| [Hz] | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|
| [dB] | 17 | 21 | 27 | 30 | 31 | 31 | 40 |

* Based on model box test

(R) real unit test

**Material quality**

**- Inner skin**

Aluzink sheet steel with anti-fingerprint coating (FeP02G AZ 150)
Corrosion protection class III per DIN 55928 Part 8, suitable for outside installation

**- Outer skin**

Aluzink sheet steel with anti-fingerprint coating (FeP02G AZ 150)
Corrosion protection class III per DIN 55928 Part 8, suitable for outside installation

**- Interior parts**

Galvanized sheet steel or equivalent

**- Frame profiles**

Aluminium AlMgSi 0.5

**Roof element - weather-resistant**

**SUPPLY**

**Flexible connection**
installed on end wall
Connection profile with 4-hole screw connection
as galvanized version

**Damper**
across unit cross-section
internal
installed on end wall
Standard, galvanized, working in opposite directions
press. drop Pa 4

**Number of necessary actuator drives, by others**
- min. torque 15Nm for each drive

**Heater - unit**
**Medium: low-pressure hot water (LPHW) / brine**

| | | |
|---|---|---|
| **heat exchanger** | | |
| **material** | | |
| Frame | | Steel, galvanized |
| Pipe configuration | | copper pipe |
| Fin: aluminium | | |
| finned tube system | | SD401/202 |
| no. of rows/circuits | RR/WW | 1/4 |
| fin distance | mm | 4.00 |
| connections intern./ext. | | external |
| no. inlet | DN | 1 x 32 |
| no. outlet | DN | 1 x 32 |
| water content | l | 7 |
| **Air** | | |
| volume flow | m³/h | 17856 |
| press. drop | Pa | 17 |
| approach velocity | m/s | 2.94 |
| **inlet** | | |
| temperature/rel. humidity | °C/% | -3.0/90.0 |
| humidity absolute | g/kg | 2.6 |
| **outlet** | | |
| temperature/rel. humidity | °C/% | 5.0/49.1 |
| humidity absolute | g/kg | 2.6 |
| **power** | | |
| total | kW | 47.9 |
| **Medium type** | | |
| water/glycol | | Water |
| glycol percentage | % | 0 |
| Mass flow rate | kg/h | 2059.2 |
| volume flow | m³/h | 2.1 |
| intake/discharge | °C/°C | 80.0/ 60.0 |
| flow speed | m/s | 0.600 |
| press. drop | kPa | 4.4 |
| pressure max. permissible | bar | 16.0 |
| temperature max. permissible | °C | 110 |

**Panel filter - unit**

**Filter class: G4 in accordance with EN 779**

| | | |
|---|---|---|
| **Filter** | | |
| class | | G4 |
| Medium | | synthetic fibre |
| Filter frame special cardboard, clad | | |
| efficiency EM | % | 0 |
| filter efficiency AM | % | 90.0 |
| **cells** | | |
| area | m² | 6.50 |
| Number / size | Stk./mm | 4/592x592x48 |
| Number / size | Stk./mm | 2/592x287x48 |
| Number / size | Stk./mm | 0/0x0x0 |
| Number / size | Stk./mm | 0/0x0x0 |
| temperature max. permissible | °C | 80 |
| max. permissible humidity | % | 100 |
| Galvanized construction | | |
| **press. drop** | | |
| start | Pa | 90 |
| recommended end | Pa | 200 |
| max. end | Pa | 200 |
| dimensioning | Pa | 145 |

**Sound attenuator unit**

**Section absorption principle**

| | | | |
|---|---|---|---|
| **splitters** | | | |
| Number | Stk. | 5 | |
| **Air** | | | |
| volume flow | m³/h | 17856 | |
| press. drop | Pa | 51 | |
| octave band attenuator | | | |
| frequency | | **insertion loss** | **flow sound power** |
| 63 Hz | dB | 6 | 52 |
| 125 Hz | dB | 12 | 47 |
| 250 Hz | dB | 25 | 43 |
| 500 Hz | dB | 26 | 39 |
| 1000 Hz | dB | 29 | 35 |
| 2000 Hz | dB | 20 | 32 |
| 4000 Hz | dB | 15 | 29 |
| 8000 Hz | dB | 15 | 26 |

**Energy recovery - unit**

**Ecoplat system with bypass**

| | | | |
|---|---|---|---|
| **energy recovery** | | | |
| **calculation of:** | | **Summer** | **Winter** |
| heat recovery factor | | 0.43 | 0.42 |
| efficiency | % | 42.5 | 41.9 |
| **power** | | | |
| total | kW | 20.1 | 40.0 |
| **heat exchanger** | | | |
| plate | | | |
| execution | | Standard | |
| fin distance | mm | 7.20 | |
| Weight | kg | 99 | |

**calculation Winter**

| **Air** | | **Supply air** | **Return air** |
|---|---|---|---|
| volume flow | m³/h | 17856 | 17856 |
| press. drop | Pa | 242 | 252 |
| flow area | m² | 0.99 | 0.99 |
| **inlet** | | | |
| temperature/rel. humidity | °C/% | 5.0/50 | 21.0/40 |
| humidity absolute | g/kg | 2.7 | 6.2 |
| **outlet** | | | |
| temperature/rel. humidity | °C/% | 11.7/32 | 14.3/61 |
| humidity absolute | g/kg | 2.7 | 6.2 |
| Condensate volume | kg/h | 0.0 | 0.0 |
| **calculation Summer** | | | |
| **inlet** | | | |
| temperature/rel. humidity | °C/% | 30.0/43 | 22.0/50 |
| humidity absolute | g/kg | 11.4 | 8.2 |
| **outlet** | | | |
| temperature/rel. humidity | °C/% | 26.6/52 | 25.4/41 |
| humidity absolute | g/kg | 11.4 | 8.2 |
| Condensate volume | kg/h | | 0.0 |

**007 - 1 Pcs**

**Droplet eliminator, TA1**

for air speed v < 3.6m/s
with SX units can be removed separately
from heat exchanger
press. drop Pa 67

**Number of necessary actuator drives, by others**
- min. torque 15Nm for each drive

**Bag filter - unit**

**Filter class: F7 in accordance with EN 779**

| **Filter** | | |
|---|---|---|
| class | | F7 |
| Medium | | synthetic fibre |
| Filter frame galvanized | | |
| efficiency EM | % | 85 |
| filter efficiency AM | % | 99.0 |
| **bag** | | |
| area | m² | 26.40 |
| Number / size | Stk./mm | 4/592x592x380 |
| Number / size | Stk./mm | 2/287x592x380 |
| Number / size | Stk./mm | 0/0x0x0 |
| Number / size | Stk./mm | 0/0x0x0 |
| Built in frame standard brackets | | |
| Galvanized construction | | |
| **press. drop** | | |
| start | Pa | 133 |
| recommended end | Pa | 200 |
| max. end | Pa | 450 |
| dimensioning | Pa | 167 |

**Direct evaporator**
**Medium: refrigerant**
**heat exchanger**
**material**

| | | |
|---|---|---|
| Frame | | Steel, galvanized |
| Pipe configuration | | copper pipe |
| Fin | | aluminium |
| finned tube system | | SD181/100 |
| number of rows | | 2.0 |
| injections | | 12 |
| fin distance | mm | 1.80 |
| connections intern./ext. | | external |
| water content | l | 11 |
| **Air** | | |
| volume flow | m³/h | 17856 |
| press. drop | Pa | 74 |
| approach velocity | m/s | 3.02 |
| **inlet** | | |
| temperature/rel. humidity | °C/% | 30.0/43.0 |
| humidity absolute | g/kg | 11.4 |
| **outlet** | | |
| temperature/rel. humidity | °C/% | 16.9/86.0 |
| Actual temperature / rel.humidity | °C/% | |
| Setpoint temperature / rel.humidity | °C/% | |
| humidity absolute | g/kg | 10.3 |
| Condensate volume | kg/h | 23.0 |
| **power** | | |
| total | kW | 96.0 |
| sensible | kW | 80.0 |
| **Medium type** | | |
| type of refrigerant | | R410A |
| **Temperature** | | |
| Evaporator intake | °C | 7 |
| Evaporation | °C | 6 |
| flow speed | m/s | 10.270 |
| pressure max. permissible | bar | 40.0 |
| temperature max. permissible | °C | 110 |

**Droplet eliminator, TA4**

shortened for air speed v =< 3.6m/s
with SX units can be removed separately
from heat exchanger
press. drop Pa 53

**Heater - unit**
**Medium: low-pressure hot water (LPHW) / brine**
**heat exchanger**
**material**

| | | |
|---|---|---|
| Frame | | Steel, galvanized |
| Pipe configuration | | copper pipe |
| Fin: aluminium | | |
| finned tube system | | SD251/133 |
| no. of rows/circuits | RR/WW | 1/2 |
| fin distance | mm | 2.50 |

| | | |
|---|---|---|
| connections intern./ext. | | external |
| no. inlet | DN | 1 x 40 |
| no. outlet | DN | 1 x 40 |
| water content | l | 7 |
| **Air** | | |
| volume flow | m³/h | 17856 |
| press. drop | Pa | 26 |
| approach velocity | m/s | 3.02 |
| **inlet** | | |
| temperature/rel. humidity | °C/% | 5.0/90.0 |
| humidity absolute | g/kg | 4.9 |
| **outlet** | | |
| temperature/rel. humidity | °C/% | 21.0/31.5 |
| humidity absolute | g/kg | 4.9 |
| **power** | | |
| total | kW | 95.9 |
| **Medium type** | | |
| water/glycol | | Water |
| glycol percentage | % | 0 |
| Mass flow rate | kg/h | 4119.1 |
| volume flow | m³/h | 4.2 |
| intake/discharge | °C/°C | 80.0/ 60.0 |
| flow speed | m/s | 0.600 |
| press. drop | kPa | 4.0 |
| pressure max. permissible | bar | 16.0 |
| temperature max. permissible | °C | 110 |

**Fan - unit**

**High-performance centrifugal impeller without spiral casing**

| **fan** | **Typ** | **ER71C-4DN.I7.1R-GSAMNI** |
|---|---|---|
| **Air** | | |
| volume flow | m³/h | 17856 |
| pressure reference | bar | 1.013 |
| temperature reference | °C | 20 |
| **pressure** | | |
| sum external | Pa | 282 |
| pressure drop unit | Pa | 747 |
| total | Pa | 1088 |
| **fan** | | |
| dynamic | Pa | 59 |
| static | Pa | 1029 |
| section | Pa | 0 |
| pressure at nozzle | Pa | 1328 |
| actual speed | 1/min | 1399 |
| max. speed | 1/min | 1840 |
| efficiency | % | 78.2 |
| shaft power | kW | 6.90 |
| SFPv | kW/m³/s | 1.45 |
| oper. point P_elec. SA | kW | 7.81 |
| max. P_elec. SA acc.to RAL | kW | 9.99 |
| max. shaft power | kW | 0.00 |
| sound power - not weighted | dB | 99 |
| sound power A-weighted | dB(A) | 95 |
| **Sound power fan** | **suction side** | **pressure side** |

| | | | |
|---|---|---|---|
| 63 Hz | dB/dB(A) | 82/ 56 | 84/ 58 |
| 125 Hz | dB/dB(A) | 86/ 70 | 88/ 72 |
| 250 Hz | dB/dB(A) | 90/ 81 | 92/ 83 |
| 500 Hz | dB/dB(A) | 90/ 86 | 92/ 88 |
| 1000 Hz | dB/dB(A) | 86/ 86 | 88/ 88 |
| 2000 Hz | dB/dB(A) | 81/ 82 | 83/ 84 |
| 4000 Hz | dB/dB(A) | 77/ 78 | 79/ 80 |
| 8000 Hz | dB/dB(A) | 72/ 71 | 74/ 73 |
| **Total** | **dB/dB(A)** | **95/ 91** | **97/ 93** |

**motor** Motor efficiency class IE2

| | | |
|---|---|---|
| rated power | kW | 11.00 |
| rated speed | 1/min | 1480 |
| number of poles | | 4 |
| Voltage/frequency | V/Hz | 3x400/50 |
| absorbed current | A | 20.7 |
| enclosure | | IP55 |
| iso-class | | F |
| Construction | | B3 |
| Model size | | 160M |
| winding protection | | PTC thermistor |

**data freq. inverter**

| | | |
|---|---|---|
| rated power | kW | |
| Voltage/frequency | V/Hz | 3x400/50 |
| operating frequency | Hz | 47 |
| max. operating frequency | Hz | 55 |

| **Sound power Unit** | | **suction side** | **pressure side** | **outside at unit** |
|---|---|---|---|---|
| 63 Hz | dB/dB(A) | 74/ 48 | 84/ 58 | 67/ 41 |
| 125 Hz | dB/dB(A) | 68/ 52 | 88/ 72 | 71/ 55 |
| 250 Hz | dB/dB(A) | 58/ 49 | 92/ 83 | 71/ 62 |
| 500 Hz | dB/dB(A) | 56/ 52 | 92/ 88 | 65/ 61 |
| 1000 Hz | dB/dB(A) | 48/ 48 | 88/ 88 | 58/ 58 |
| 2000 Hz | dB/dB(A) | 49/ 50 | 83/ 84 | 52/ 53 |
| 4000 Hz | dB/dB(A) | 51/ 52 | 79/ 80 | 48/ 49 |
| 8000 Hz | dB/dB(A) | 45/ 44 | 74/ 73 | 34/ 33 |
| **Total** | **dB/dB(A)** | **75/ 59** | **97/ 93** | **75/ 66** |

**Door protection grill, reinforced**

**Flexible connection**
installed on end wall
Connection profile with 4-hole screw connection
as galvanized version

**EXHAUST**

**Flexible connection**
installed on end wall
Connection profile with 4-hole screw connection
as galvanized version

**Damper**
across unit cross-section
internal
installed on end wall

Standard, galvanized, working in opposite directions
press. drop Pa 4

**Panel filter - unit**
**Filter class: G4 in accordance with EN 779**

| | | |
|---|---|---|
| **Filter** | | |
| class | | G4 |
| Medium | | synthetic fibre |
| Filter frame special cardboard, clad | | |
| efficiency EM | % | 0 |
| filter efficiency AM | % | 90.0 |
| **cells** | | |
| area | m² | 6.50 |
| Number / size | Stk./mm | 4/592x592x48 |
| Number / size | Stk./mm | 2/592x287x48 |
| Number / size | Stk./mm | 0/0x0x0 |
| Number / size | Stk./mm | 0/0x0x0 |
| temperature max. permissible | °C | 80 |
| max. permissible humidity | % | 100 |
| Galvanized construction | | |
| **press. drop** | | |
| start | Pa | 90 |
| recommended end | Pa | 200 |
| max. end | Pa | 200 |
| dimensioning | Pa | 145 |

**Fan - unit**
**High-performance centrifugal impeller without spiral casing**

| | | |
|---|---|---|
| **fan** | **Typ** | **ER71C-4DN.H7.1R-GSAMNI** |
| **Air** | | |
| volume flow | m³/h | 17856 |
| pressure reference | bar | 1.013 |
| temperature reference | °C | 20 |
| **pressure** | | |
| sum external | Pa | 270 |
| pressure drop unit | Pa | 474 |
| total | Pa | 803 |
| **fan** | | |
| dynamic | Pa | 59 |
| static | Pa | 744 |
| section | Pa | 0 |
| pressure at nozzle | Pa | 1328 |
| actual speed | 1/min | 1273 |
| max. speed | 1/min | 1840 |
| efficiency | % | 77.8 |
| shaft power | kW | 5.12 |
| SFPv | kW/m³/s | 1.11 |
| oper. point P_elec. SA | kW | 5.86 |
| max. P_elec. SA acc.to RAL | kW | 7.40 |
| max. shaft power | kW | 0.00 |
| sound power - not weighted | dB | 97 |
| sound power A-weighted | dB(A) | 93 |
| **Sound power fan** | **suction side** | **pressure side** |

| | | | |
|---|---|---|---|
| 63 Hz | dB/dB(A) | 80/ 54 | 82/ 56 |
| 125 Hz | dB/dB(A) | 84/ 68 | 86/ 70 |
| 250 Hz | dB/dB(A) | 88/ 79 | 90/ 81 |
| 500 Hz | dB/dB(A) | 87/ 84 | 89/ 86 |
| 1000 Hz | dB/dB(A) | 83/ 83 | 85/ 85 |
| 2000 Hz | dB/dB(A) | 79/ 80 | 81/ 82 |
| 4000 Hz | dB/dB(A) | 74/ 75 | 76/ 77 |
| 8000 Hz | dB/dB(A) | 70/ 69 | 72/ 71 |
| **Total** | **dB/dB(A)** | **92/ 88** | **94/ 90** |

**motor** Motor efficiency class IE2

| | | |
|---|---|---|
| rated power | kW | 7.50 |
| rated speed | 1/min | 1450 |
| number of poles | | 4 |
| Voltage/frequency | V/Hz | 3x400/50 |
| absorbed current | A | 14.3 |
| enclosure | | IP55 |
| iso-class | | F |
| Construction | | B3 |
| Model size | | 132M |
| winding protection | | PTC thermistor |

**data freq. inverter**

| | | |
|---|---|---|
| rated power | kW | |
| Voltage/frequency | V/Hz | 3x400/50 |
| operating frequency | Hz | 44 |
| max. operating frequency | Hz | 50 |

| **Sound power Unit** | | **suction side** | **pressure side** | **outside at unit** |
|---|---|---|---|---|
| 63 Hz | dB/dB(A) | 80/ 54 | 74/ 48 | 65/ 39 |
| 125 Hz | dB/dB(A) | 84/ 68 | 71/ 55 | 69/ 53 |
| 250 Hz | dB/dB(A) | 88/ 79 | 61/ 52 | 69/ 60 |
| 500 Hz | dB/dB(A) | 87/ 84 | 58/ 55 | 62/ 59 |
| 1000 Hz | dB/dB(A) | 83/ 83 | 50/ 50 | 55/ 55 |
| 2000 Hz | dB/dB(A) | 79/ 80 | 54/ 55 | 50/ 51 |
| 4000 Hz | dB/dB(A) | 74/ 75 | 53/ 54 | 45/ 46 |
| 8000 Hz | dB/dB(A) | 70/ 69 | 49/ 48 | 32/ 31 |
| **Total** | **dB/dB(A)** | **92/ 88** | **76/ 62** | **73/ 64** |

**Door protection grill, reinforced**

**Energy recovery - unit**
**Ecoplat system with bypass**

**Sound attenuator unit**
**Section absorption principle**
**splitters**

| | | |
|---|---|---|
| Number | Stk. | 5 |

**Air**

| | | |
|---|---|---|
| volume flow | m³/h | 17856 |
| press. drop | Pa | 51 |

| octave band attenuator frequency | | **insertion loss** | **flow sound power** |
|---|---|---|---|
| 63 Hz | dB | 6 | 52 |
| 125 Hz | dB | 12 | 47 |
| 250 Hz | dB | 25 | 43 |

| | | | |
|---|---|---|---|
| 500 Hz | dB | 26 | 39 |
| 1000 Hz | dB | 29 | 35 |
| 2000 Hz | dB | 20 | 32 |
| 4000 Hz | dB | 15 | 29 |
| 8000 Hz | dB | 15 | 26 |

**Flexible connection**
installed on end wall
Connection profile with 4-hole screw connection
as galvanized version